SAFE SOFTWARE®

FME Server

Administrator's Guide

User Guide

Version: 2022.2

Updated: September 2022

FME Server
Administrator's Guide

FME Server 2022.2

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CONTENTS

FME Server Administrator's Guide

Planning an FME Server Installation

Performing an Installation

Upgrading FME Server

Optimizing FME Server

Securing FME Server

Other Tasks

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Safe Software Inc.
Suite 1200 - 9639 137A St.
Surrey, BC Canada V3T 0M1

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1

FME Server Administrator's Guide

About This Guide

The **FME® Server Administrator's Guide** is intended for system administrators and those who are responsible for installing and configuring FME Server in a Windows or Linux environment.

This document assumes that system and FME Server administrators have knowledge of or access to resources in the following areas:

- The location and structure of the spatial data resources you want to work with in FME Server
- Your web application architecture
- FME Workbench, if you plan on installing FME Desktop and authoring workspaces

> **Note** In the printed document format (PDF) version of this guide, links to topics in the FME Server Reference Manual and FME Server Web User Interface documentation do not function. The corresponding pages of these topics are available in the FME Server Documentation online at https://docs.safe.com/fme/html/FME_Server_Documentation/Home.htm.

Additional FME Server Resources

Safe Software provides the following resources to assist with your learning about FME Server:

- FME Community is the online source for all information on Safe Software products, including documentation, demos and support resources:

  https://community.safe.com/

- Product documentation

  The most up-to-date product documentation is available on the FME Community.

Installed product documentation is available in the FME Server installation directory > Docs.

FME Server product documentation includes:

- FME Server Administrator’s Guide: Information on installation, licensing, upgrading and common configurations.
- FME Server Tutorial: An introductory course on authoring and publishing in FME Server.
- FME Server Reference Manual: Developer resources and detailed technical documentation.
- FME Server Web User Interface: A guide to using the FME Server's web interface.
- FME Server Developer's Guide: Quick-start, tutorial and sample code for working with the FME Server APIs.
- FME Server REST API Specifications: Developer reference for working with the REST API.

- Training

Training courses on FME Desktop and FME Server (offered by Safe Software and our reseller network)

The current public training calendar is available from:

https://www.safe.com/training/live-online/ > Course Schedule

Contact your Safe Software account manager or your FME reseller to arrange a private training course for your organization.

2

Planning an FME Server Installation

Things to Consider - An Overview

When you acquire FME Server, you must decide how to deploy it on your system. There are a number of considerations:

- Choosing a Deployment Architecture: Learn about your options for how to deploy FME Server, either as a stand-alone system, or distributed on your network.
- Planning for Security Updates: Understand how security updates on FME Server-related components may affect how you decide to deploy FME Server.
- Planning for Scalability and Performance: Following installation, you can scale up your FME Server by increasing job throughput and optimizing job performance. These are measures you can take anytime after you install. Although they may not affect your initial planning, it's important to understand your options both up front, and going forward as you work with FME Server.

See Also

- About Component and Job Recovery in FME Server on page 33
- System Requirements on page 34
- Requirements for FME Workspaces on page 37

Choosing a Deployment Architecture

The FME Server installer provides three options for installation:

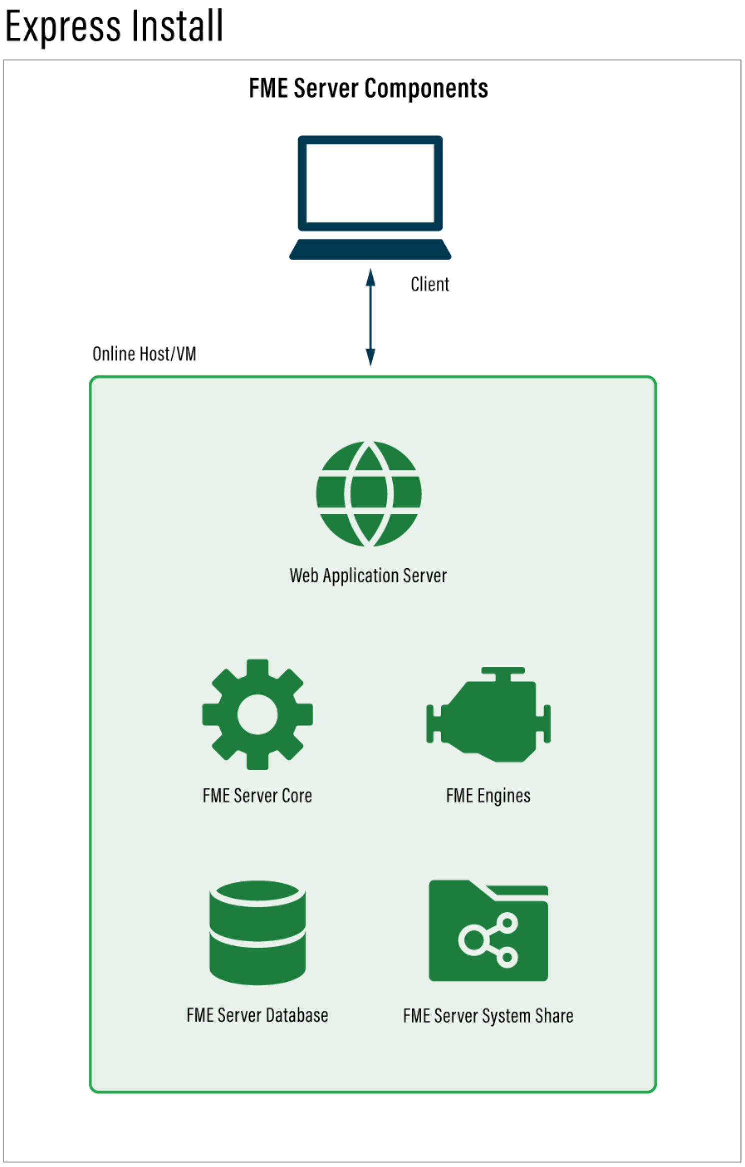
- Express
- Distributed/Fault Tolerant

- Distributed Engine

> **Note** To install a distributed engine, you must already have performed a distributed/fault-tolerant installation.

Express

An Express architecture installs all the required components of FME Server on a single host machine, and is the quickest and easiest way to get started with FME Server.



- Install FME Server: Express Installation for Windows on page 41
- Install FME Server: Express Installation for Linux on page 53

Distributed

A Distributed installation provides options for spreading components across a network to achieve a 2- or 3-tiered architecture. This approach allows greater control of some components that you provide and maintain yourself, such as a database server for the FME Server Database, and a web application server. You can provide redundancy with some elements, but if you require high availability, consider a fault-tolerant architecture (see below) instead. If you are considering fault tolerance in the future, you should start with a distributed installation now for an easier transition.

> **Note** The FME Server distributed and fault-tolerant options share the same installer.

To learn more, see Distributing FME Server Components on page 19.

Fault-Tolerant

A fault-tolerant installation provides options for spreading components across a network, ensuring high availability, and allows choices to maintain some components yourself, such as a database server for the FME Server Database, and a web application server.

Comprised of redundant FME Server Core and web application server components spread across additional host machines, this architecture ensures that if a hardware component fails, FME Server remains online. This installation requires only a single FME Server System Share and FME Server Database server (which, optionally, can serve a custom database with replication.) A third-party load balancer is required, which directs incoming traffic to one of the redundant web application servers.

Note The FME Server distributed and fault-tolerant options share the same installer.

To learn more, see Planning for Fault Tolerance on page 22.

Distributed Engine

The Distributed Engine installation allows you to build onto an existing FME Server installation by Adding FME Engines on a Separate Machine.

Reasons you might want to provide a distributed engine include:

- Utilizing an Esri ArcGIS license on a separate host machine.
- Hosting FME Engines on a different OS than your web application server and FME Server Core.
- Utilizing system resources of other machines.
- Placing FME Engines in close proximity to your data.

For more information, see Planning for Scalability and Performance on page 30.

Disaster Recovery

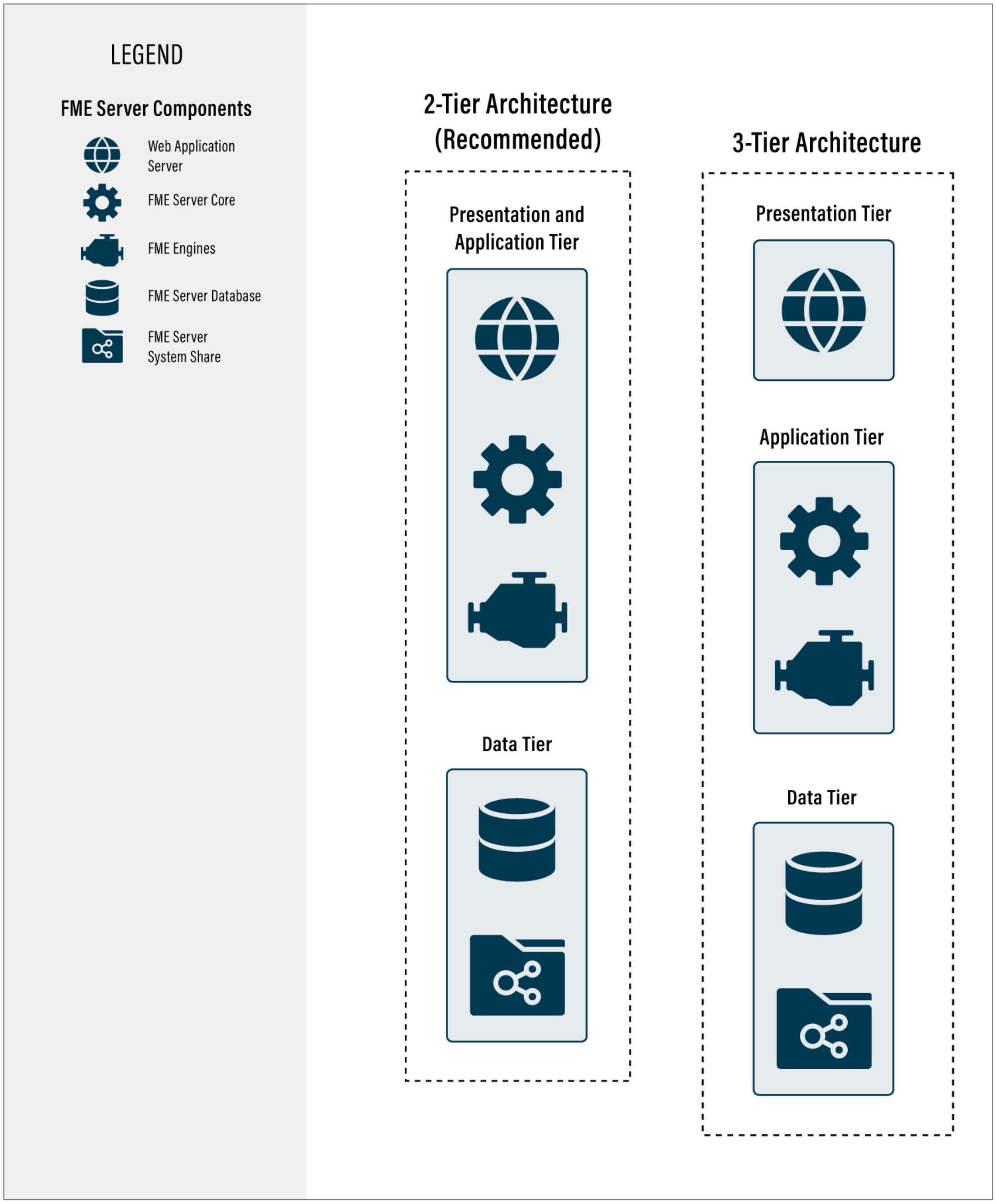
Disaster recovery is primarily concerned with recovering FME Server operations and data in the event of a major failure of a data center. The general concept of disaster recovery is that if one data center fails, the second data center can be brought online after a manual redirect, and start accepting requests. Disaster recovery can be incorporated into any of the other architectures discussed here.

For more information, see Planning for Disaster Recovery on page 26.

Distributing FME Server Components

You can distribute the components of an FME Server installation to achieve an n-tier architecture. Both 2-tier and 3-tier configurations are supported:

Distributed Component Supported Architecture Options



In a 2-tier architecture, an Apache Tomcat web application server runs the FME Server Web Services, and is installed alongside the the FME Server Core and FME Engines. Only the FME

Server Database is installed separately, along with a remote file system for the FME Server System Share.

Installing the web application server on the same host machine as the FME Server Core is the recommended architecture for a distributed installation.

A 3-tier architecture separates the web application server to another host machine, splitting the presentation and application tiers.

In a 2- or 3-tier scenario, you can provide and manage the following components:

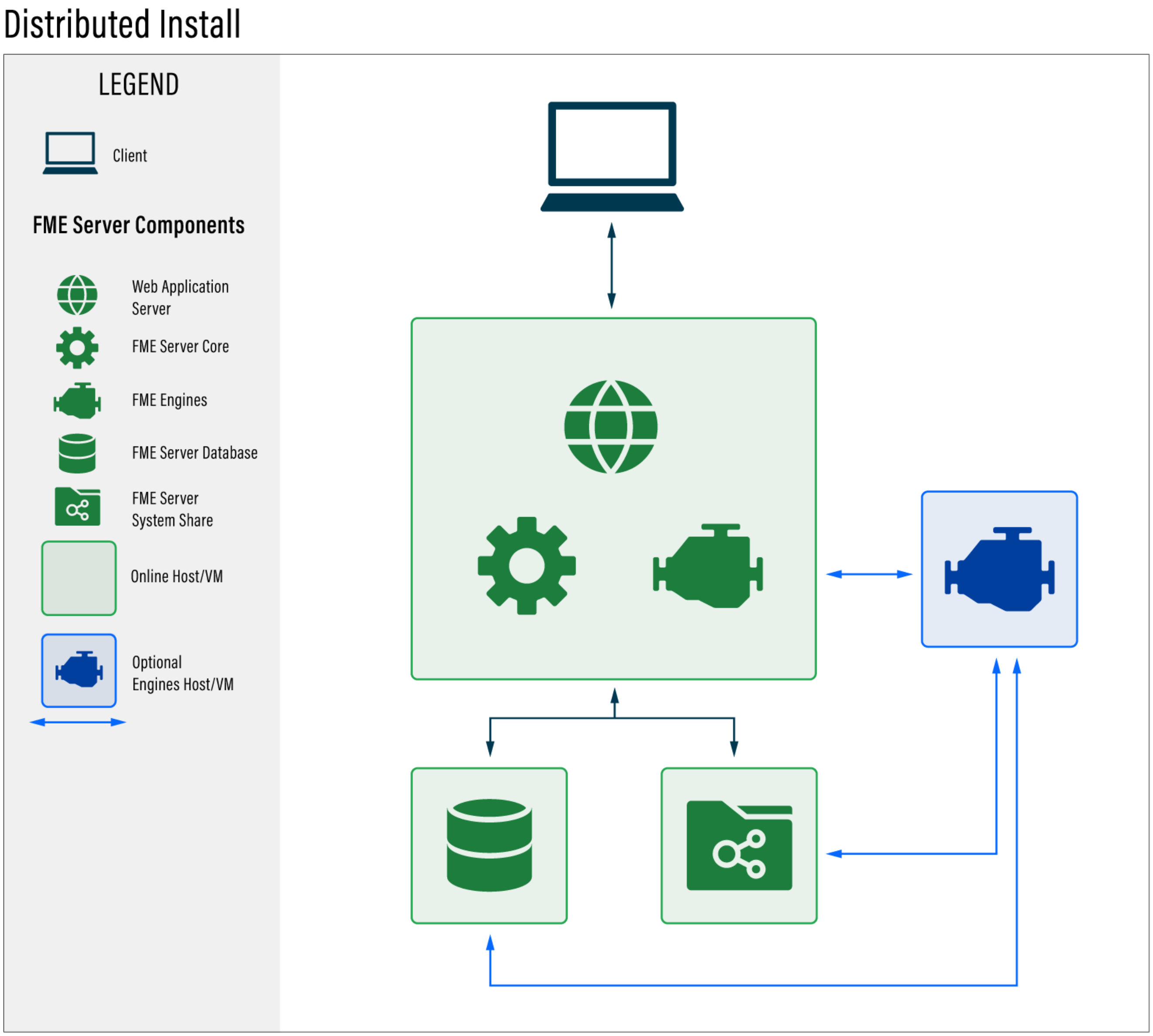
- The web application server provided by the installer is Apache Tomcat. Optionally, you can provide your own web application server, instead of using the one shipped with the installer.
- The FME Server Database can be hosted on a PostgreSQL database server provided by the installer, or you can configure the database on your own server using PostgreSQL, Microsoft SQL Server or Oracle. If using an Oracle database server, you must obtain the Oracle Database JDBC Driver.
- A remote file system to host the FME Server System Share, which includes Repositories and Resources.

Note Although the FME Server Database and System Share will not have data redundancy by default, this can be set up by your organization.

Warning We recommend installing the web application server on a system that is synchronized to the same time zone as the FME Server Core. Differing time zones may result in improper timing of Schedule Initiated triggers.

Recommended 2-tier Architecture

This diagram demonstrates the recommended 2-tier architecture, with the web application server, FME Server Core, and FME Engines running on the same host, and separate servers for the FME Server Database and FME Server System Share. Optionally, you can add FME Engines on a Separate Machine.



Implementing a Distributed Architecture

Perform a distributed installation of FME Server according to the 2-tier or 3-tier procedure:

- Distributing Components (2-Tier)
- Distributing Components (3-Tier)

Or, after an Express installation, perform the following reconfigurations, where necessary:

- Moving the Web Applications Server to Another Machine
- Changing the Database Provider for the FME Server Database
- Moving the FME Server System Share to Another Machine

Planning for Fault Tolerance

The goal of a fault-tolerant environment is to ensure that if a hardware component fails, FME Server remains online.

The fault tolerant architecture is comprised of multiple, redundant web application servers (to run the FME Server Web Services) and FME Server Cores spread across separate host machines. FME Engines can be hosted on the same or additional hosts.

A third-party load balancer is required, which directs incoming traffic to one of the redundant web components.

The web application server provided by the installer is Apache Tomcat. Optionally, you can provide your own web application server instead of using the one shipped with the installer. We recommend installing the web application server on the same system as the Core, but this component can also be distributed.

The FME Server Database can be hosted on a PostgreSQL database server provided by the installer, or you can configure the database on your own server using PostgreSQL, Microsoft SQL Server or Oracle. We recommend providing your own database server configured for redundancy. If using an Oracle database server, you must obtain the Oracle Database JDBC Driver.

Organizations are expected to maintain the FME Server Database and FME Server System Share (a file system for hosting Repositories and Resources) on their own fault-tolerant servers. This ensures the fault-tolerant FME Server has reliable access to workspaces, repositories, resources, and other items.

Warning We recommend installing all FME Servers on systems that are synchronized to the same time zone. If time zones differ across FME Servers, unexpected issues may arise, including:

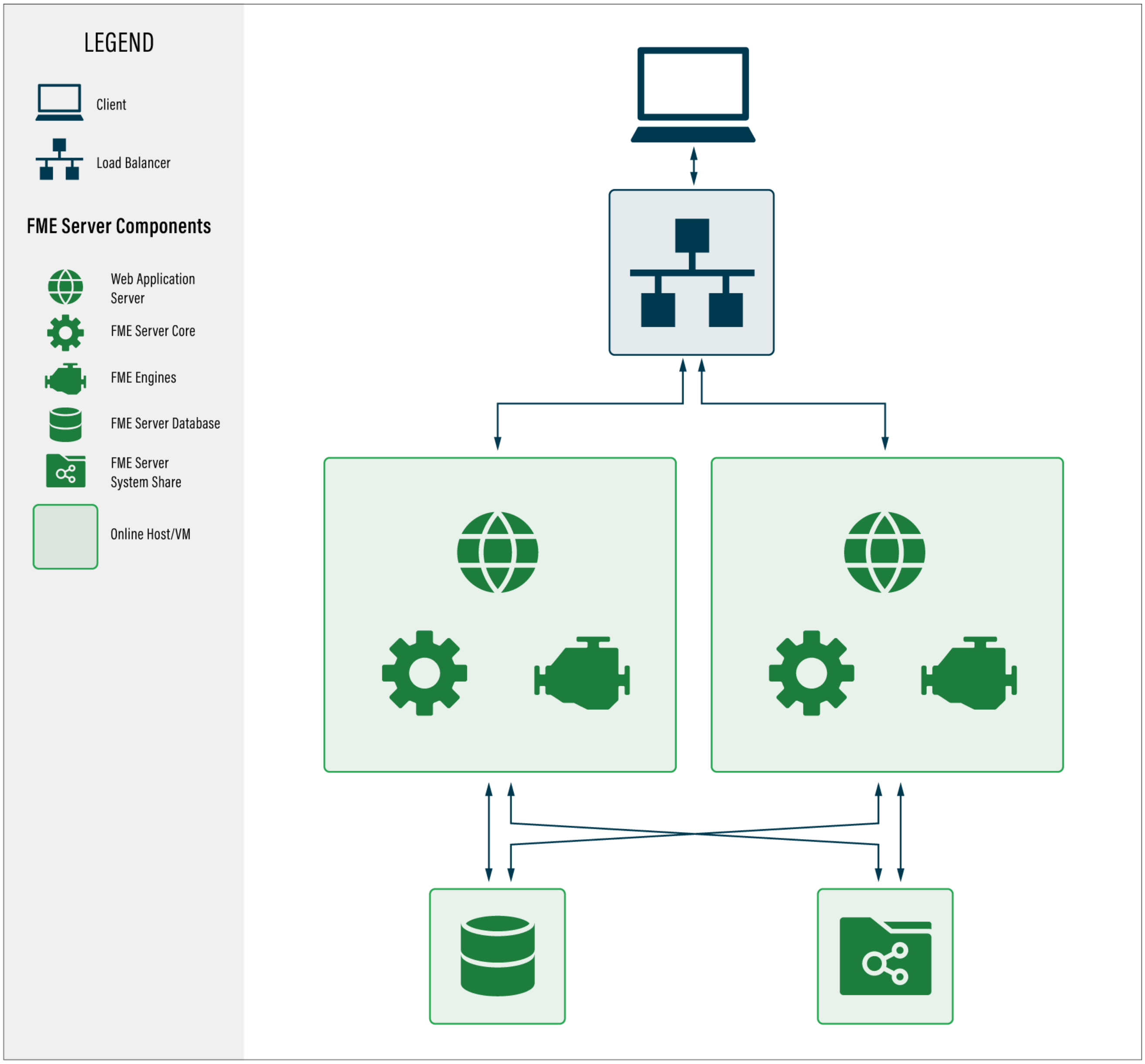
- Improper timing of Schedule Initiated triggers.
- Inconsistent or misleading timestamps in log files (accessed from Resources).

Note In a fault tolerant installation of FME Server, the Automations triggers UDP Message Received and Email Received (SMTP) (and corresponding Notification Service UDP Publisher and SMTP Publisher) are not supported. To receive email messages, consider the Email Received (IMAP) trigger instead.

Example Architectures

Example 1: FME Engines hosted on the same machine as the web application server and FME Server Core

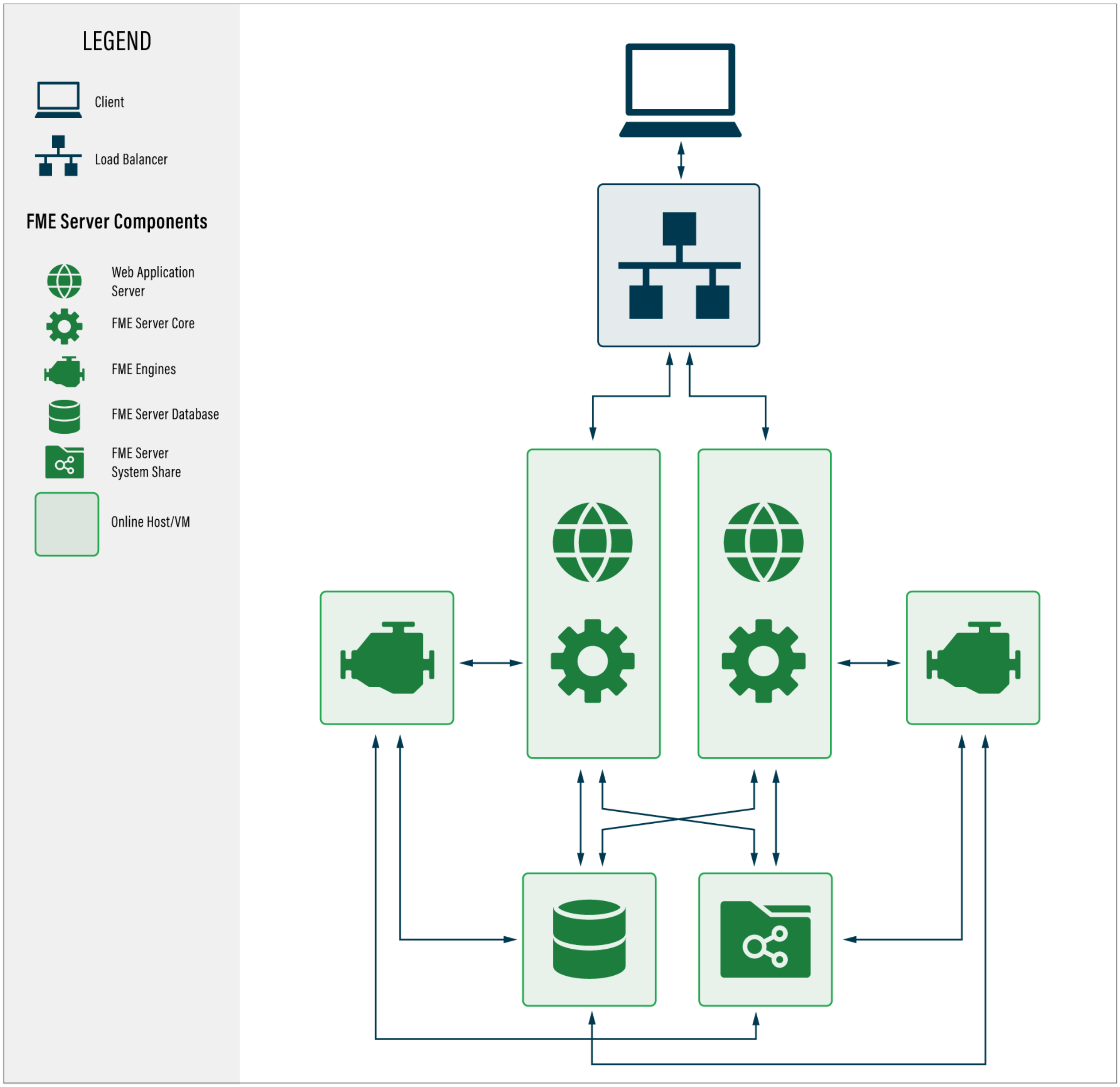
Fault Tolerant Install Example 1



Example 2: FME Engines distributed and hosted on a separate machine from the web application server and FME Server Core

There can be any number of distributed FME Engine hosts associated with the FME Server Core.

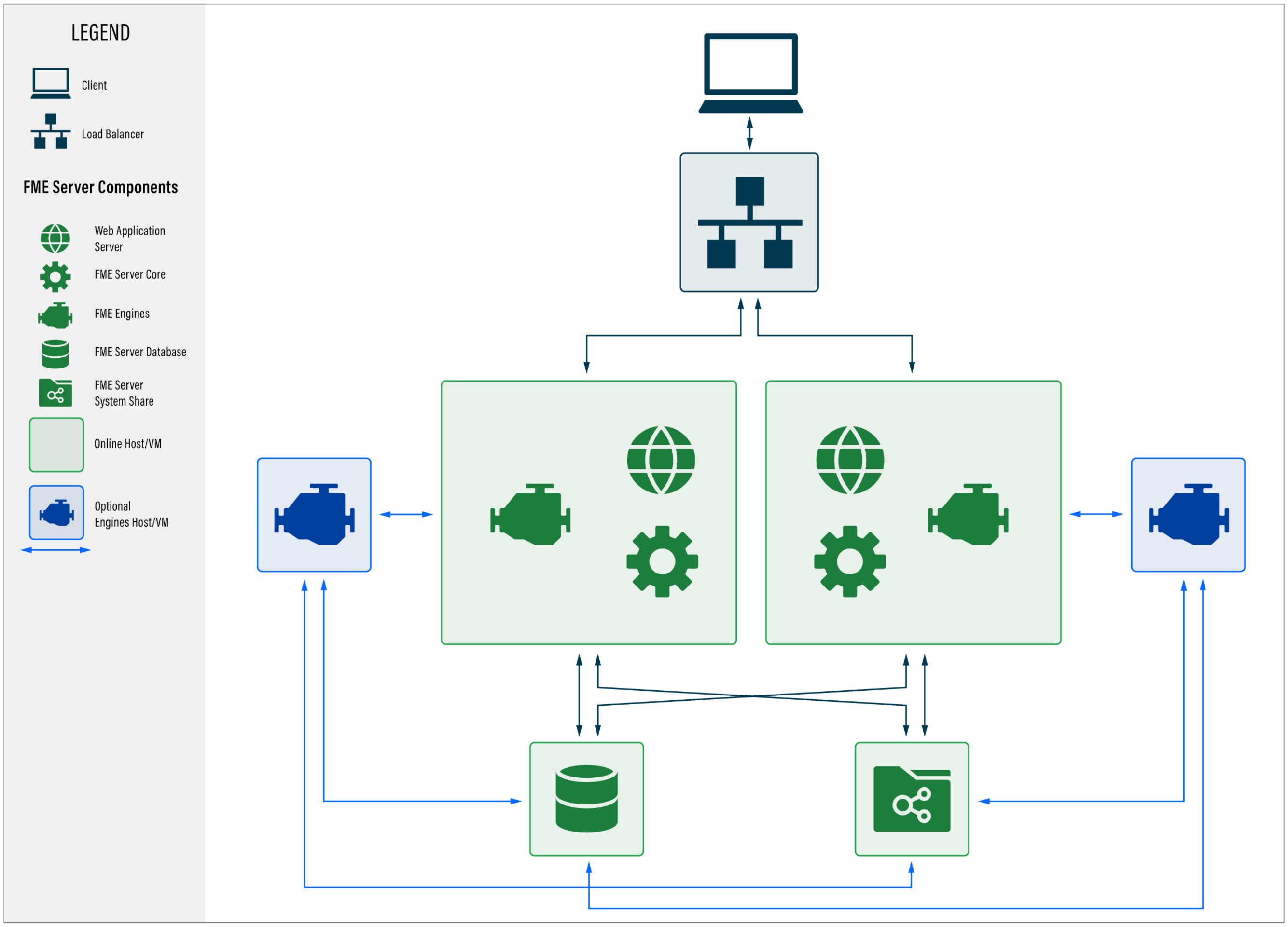
Fault Tolerant Install Example 2



Example 3: A combination of examples 1 and 2

Some FME Engines are hosted on the same machine as the web application server and FME Server Core, and others are distributed.

Fault Tolerant Install Example 3



To Install a Fault Tolerant System

- Proceed to Installing a Scalable, Fault-Tolerant FME Server on page 61.

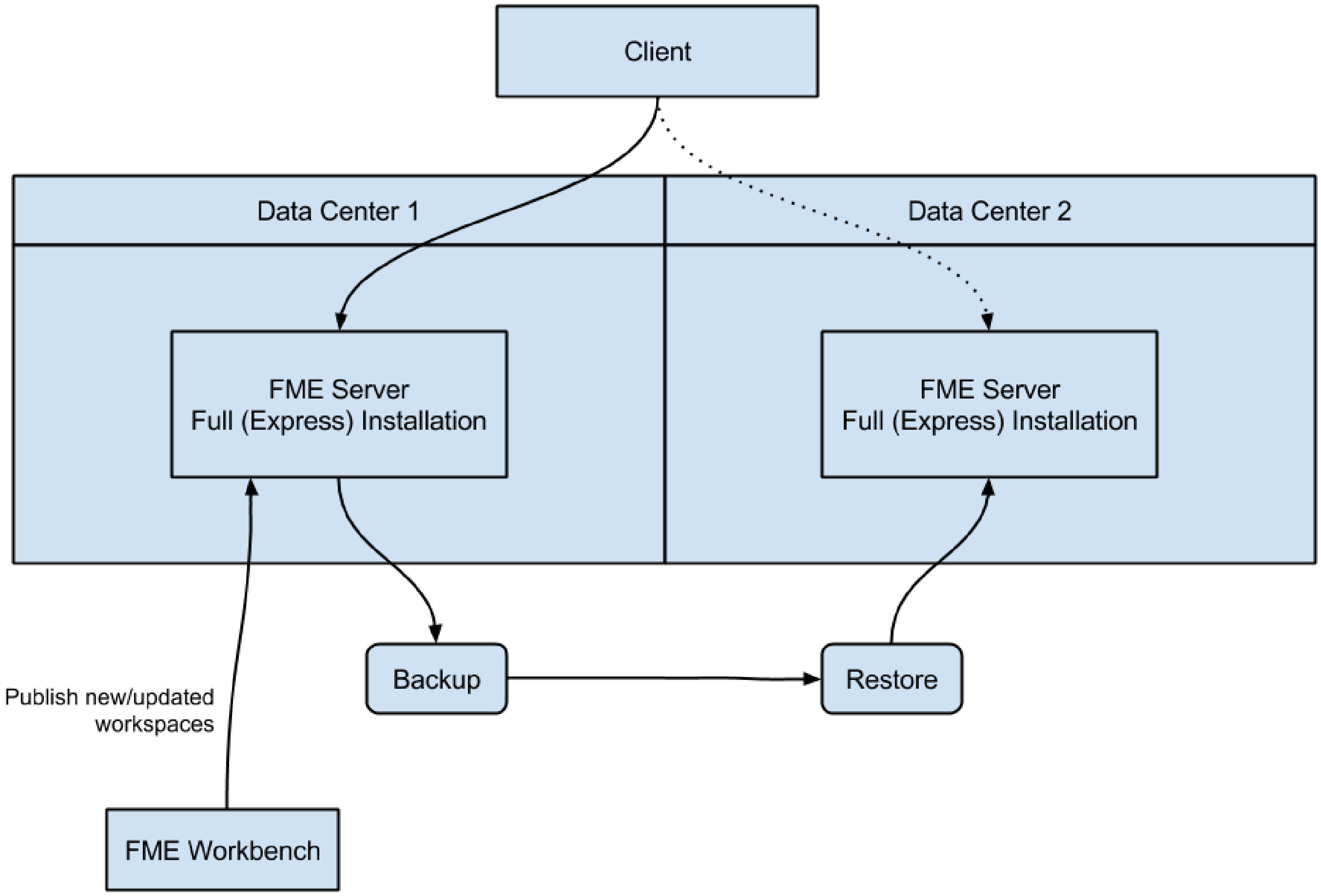
Planning for Disaster Recovery

Disaster recovery is primarily concerned with recovering FME Server operations and data in the event of a major failure of a data center. The general concept of disaster recovery is that if one data center fails, the second data center takes over, and the FME Server Core located there becomes the 'active' Core. The time frame for disaster recovery is typically longer than fault-tolerant recovery. Disaster recovery may range from minutes, hours, or even days, while fault-tolerant recovery is typically in seconds to minutes.

Disaster recovery can be incorporated into a fault-tolerant architecture. Alternatively, if you are primarily concerned with disaster recovery, and less concerned about the fast recovery provided by fault tolerance, you may want to implement a different architecture.

> ⓘ **Warning** We recommend installing all FME Servers on systems that are synchronized to the same time zone. If time zones differ across FME Servers, unexpected issues may arise, including:
>
> - Improper timing of Schedule Initiated triggers.
> - Inconsistent or misleading timestamps in log files (accessed from Resources).

This example of disaster recovery is a combination of an Express installation and a fault-tolerant installation. However, instead of a third-party load balancer between systems, FME Server clients must be manually redirected to the FME Server Core host server of the second data center in the event of a disaster. Each data center houses full ("Express") installations of FME Server, essentially configured to provide similar functionality. To ensure synchronicity of FME Server system data between data centers, Backup & Restore operations are performed regularly. (Otherwise, workspaces and other updates must be published twice - to the FME Server Core hosts on each data center.)


Client
Data Center 1
Data Center 2
FME Server
Full (Express) Installation
FME Server
Full (Express) Installation
Backup
Restore
Publish new/updated workspaces
FME Workbench

Keep in mind that when planning for disaster recovery, all clients of FME Server, including web browsers, the FME Server Console, and the FME Server REST API, must connect to the "active" FME Server Core host.

Planning for Security Updates

All installations of FME Server, regardless of type, include the FME Server Core and FME Engines. These components are always provided directly from the FME Server installation package. Two additional components - a Web Application Server and a server for the FME Server Database - must also be installed. When you choose an Express installation of FME Server, the install package provides its own versions of these components, including an Apache Tomcat web application servlet, and a PostgreSQL database server. If you choose a Distributed installation of FME Server, you may need to provide your own database server and web application server, depending on the scenario.

One factor in deciding between a stand-alone or distributed installation of FME Server is the degree of control you want in applying security updates to the web application and database servers. If you install a full, stand-alone FME Server (Express), keep in mind that any security updates to these components are dependent on updates to FME Server releases in general. Each time FME Server releases an update to its software (including both major and minor releases), any security updates for these components are included in that release.

If you do not want to rely on updates to the FME Server software in general for security updates to the web application and database servers, then we recommend a Distributed/Fault Tolerant installation. You can provide these components on your own, and maintain security for them separately. In the case of the web application server, Apache Tomcat and Oracle WebLogic are supported. The FME Server Database supports PostgreSQL, Oracle, and SQL Server. Alternatively, if your FME Server is entirely internal to your organization, and behind a firewall, then you may be more comfortable with the security updates provided with a full installation.

- To proceed with a full installation of FME Server, including web application and database servers provided with the install package, see Install FME Server: Express Installation for Windows on page 41 or Install FME Server: Express Installation for Linux on page 53.
- To read about installation scenarios that support providing your own web application and database servers, see Distributed on page 17.

Reporting Potential Vulnerabilities

FME Server is comprised of many Java and 3rd-party libraries. It is possible for virus scanners to identify security vulnerabilities at any time during the life of an FME Server installation. When this occurs, you can search the FME Community for more information, or contact Safe Software Support to report the vulnerability. Safe Software takes all security vulnerability concerns seriously. Each concern is handled individually and we will report on the appropriate action once investigated.

Planning for Scalability and Performance

Scale up your FME Server to increase job throughput and optimize job performance.

Increasing Job Throughput

To increase the ability of FME Server to run jobs simultaneously, consider any of these approaches:

Multiple Engines on the Same Machine

You can scale FME Server to support a higher volume of jobs by adding FME Engines on the same machine as the FME Server Core. A single active Core is all you need to scale processing capacity. The FME Server Core contains a Software Load Balancer that distributes jobs to the FME Engines. Each FME Engine can process one job at any one time, so if you have ten engines, you can run ten jobs simultaneously. If you have many simultaneous job requests, with jobs consistently in the queue, consider adding engines to your Core machine.

> **Note** Adding engines to the same machine does not reduce the time a single translation takes to run. This time is dependent on the underlying hardware and the design of the workspace. Complex workspaces, big data manipulation, and large datasets take more time to run.

Having multiple engines on the same machine also helps with Job Recovery.

Adding Engines on Separate Machines

If existing FME Engines are utilizing all system resources to process jobs, you can add FME Engines on a separate machine. This allows you to use the system resources of multiple machines, which allows additional concurrent jobs to be run.

Multiple FME Server Installations

A fault tolerant architecture provides for multiple, stand-alone FME Server installations. In addition to providing fault tolerance, this configuration distributes jobs between FME Servers via a third-party load balancer.

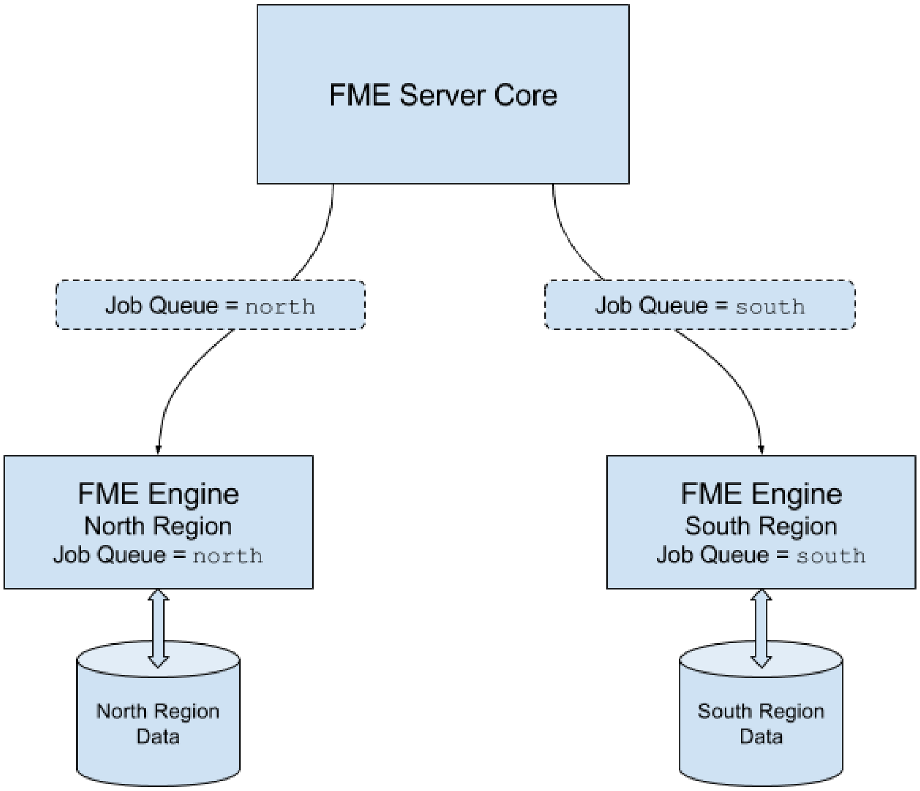
Increasing Job Performance

Adding FME Engines on a Separate Machine provides flexibility for running jobs in close physical proximity to the data they read and write. This approach can be used within a network, or across networks that are geographically distributed.

> **Note** Distributing FME Engines across networks that are geographically distributed requires that the network connecting FME components is high-speed and reliable. Specifically, the FME Engines read data and configuration files from, and write log files to, the FME Server System Share location. The network cannot be occasionally connected; it must always be connected.

To ensure each job is run by the intended engine, you must use this approach in combination with Job Queues.

For example, consider a network with two data sources - one located in a northern region, and another located in a southern region. To run jobs efficiently, it makes sense to locate FME Engines in both regions. Jobs that are run on queue `north` access data in the northern data store. These jobs are routed to FME Engines located in the northern region. Likewise, jobs that are run on queue `south` access data in the southern data store. These jobs are routed to FME Engines located in the southern region.



Controlling the Queue

To exercise a finer level of control over how jobs are processed, consider the following approaches:

Queue Control

Job Queues manages or spreads the work load of engines running workspaces. In a distributed environment, you may wish to run small jobs on certain engines, and larger jobs on other engines.

Or, you may have a mix of OS platforms on which certain FME formats can and cannot be run. For instance, consider an FME Server on a Linux OS. Linux cannot run some formats that may be required by your business. So, it may be necessary to have a Windows OS configured with an additional FME Server Engine.

Queues are also used when Adding FME Engines on a Separate Machine, to route jobs to engines that are located in close physical proximity to the data they read and write.

You can set engines to process certain jobs based on the queue of the transformation request.

Queue Priority

FME Server allows you to set job priority using the *Priority* directive of a queue. Jobs in higher-priority queues may execute before jobs in lower-priority queues.

About Component and Job Recovery in FME Server

FME Server restarts components and jobs automatically when crashes occur—no additional planning is needed.

Component Recovery

FME Server comes out-of-the-box with component recovery. This means that, even on a single system, FME Server monitors and restarts components that fail, including the FME Engines and the FME Server Core. This is achieved through the FME Server Process Monitor. The ability for FME Server to monitor its own components ensures reliable uptime and dependability.

Job Recovery

FME Server also includes the ability to restart a translation (job) when a crash occurs. FME Server continues to resubmit a translation up to a specified number of attempts. As a result, jobs that experience temporary issues, such as a network hiccup, are resubmitted and run again. Job recovery is configurable and can be turned off entirely. For more information, see Job Recovery.

> **Note** Resubmitted jobs may cause data duplication, such as when writing to database formats.

System Requirements

For system requirements for the Windows or Linux operating systems, see https://www.safe.com/fme/tech-specs/.

For information about supported web browsers, see Accessing the Web User Interface.

Linux: Offline Installations

FME on Linux requires many third party packages. These dependencies must be satisfied when FME is installed. The easiest way to satisfy these dependencies is to install FME on a computer that is connected to the internet, allowing packages to be downloaded as needed.

It is possible, however, to manually prepare an offline computer for FME installation.

1. Get dependencies for the FME Engines component of the installation.
   a. Extract all files from the FME Server installer with flags `--noexec` and `--keep`. For example:

      ```
      ./fme-server-2021.2.2-b21806-linux~ubuntu.20.04.run --noexec --keep
      ```

      These flags create a folder `fme-server` in the current directory that contains the contents of the FME Server installer, including the FME Engine .deb or .rpm package.
   b. Get the package dependencies:
      - Ubuntu/Debian: `dpkg -I <package_name>.deb`
      - Red Hat/CentOS: `yum deplist <package_name>.rpm`
2. Get dependencies for the FME Server component of the installation
   - Packages required: `zip`, `unzip`, `perl`, `tar`, `xhost`, `policycoreutils-python-utils`
   - If your deployment architecture includes the PostgreSQL database server provided with the installation (Express and certain distributed architectures), the following additional packages are required:

- Debian/Ubuntu: `postgresql`
- Redhat/CentOS: `postgresql-server`

> **Note** RedHat and CentOS require that NumPy and Matplotlib packages are installed via pip and pip3. This may be done before or after installing FME. For more information, see Using Python with FME Server.

For more information:

- Ubuntu/Debian: Installing packages without an Internet connection
- Red Hat/CentOS: https://access.redhat.com/solutions/29269

> **Warning** If you are accessing local mirrors of public repositories, ensure they match the version of your Linux.

Linux: Online Installations

Internet-restricted Installations through a Proxy

If installing on a machine with limited internet access in which a proxy is configured to handle communication required by the installer, the proxy must be configured to allow connections to the system package repository for that operating system.

Check for Active Subscription (Red Hat Only)

FME cannot be installed on a Red Hat instance unless it has an active subscription. For more information:

- https://access.redhat.com/documentation/en-us/red_hat_subscription_management/1/html/quick_registration_for_rhel/

Make Sure the System is Up-to-Date

On Fedora/Red Hat/CentOS, run:

```
yum update
```

On Ubuntu/Debian, run:

```
apt update && apt upgrade
```

Install zip and unzip Utilities

On Fedora/Red Hat/CentOS, run:

```
yum install zip
yum install unzip
```

On Ubuntu/Debian, run:

```
apt-get install zip
apt-get install unzip
```

Red Hat/CentOS: Configure Access to EPEL Repository

On Red Hat or CentOS, you must first download and install the Extra Package for Enterprise Linux (EPEL) Community Project repository.

For more information:

- https://fedoraproject.org/wiki/EPEL#How_can_I_use_these_extra_packages.3F

See also:

- https://docs.rackspace.com/support/how-to/install-epel-and-additional-repositories-on-centos-and-red-hat/

Requirements for FME Workspaces

To perform data transformations, FME Server runs workspaces. When a workspace runs on FME Server, it is referred to as a job.

In this Section

- FME Workbench
- GridShift Files
- Third-Party Applications for FME

FME Workbench

FME Workbench is used to author and publish the workspaces used by FME Server. FME Workbench is not part of FME Server; rather, it is part of the FME Desktop product. Contact your Safe Software account manager or your local Safe Software reseller, if you would like more information about FME Desktop.

If you don't have access to FME Desktop, you cannot publish workspaces to FME Server, although you can still perform and test the installation.

Connecting to FME Server

Web connection allows FME Workbench to connect to FME Server using the HTTP protocol. It requires the Web Application Server port to be open to communication between the FME Workbench computer and the FME Server computer.

Version of FME Workbench

The version of FME Workbench you use must match the FME Server version you have installed. This requirement ensures that the workspaces you author will run when published to FME Server.

If you are running an FME Server version that is older than your FME Workbench, it is possible to upgrade the FME Engines used by FME Server to match your FME Workbench version. Instructions for upgrading the FME Engine only are available in FME Engine Only Upgrade

GridShift Files

If you plan to run workspaces that transform data between the datums NAD27 and NAD83, you can use datum shift files for Canada or the US. For more information, see Configuring Implicit NAD27 to NAD83 Datum Shifts.

Third-Party Applications for FME

FME Workspaces often rely on third party applications for connecting to data sources. Examples include an Oracle client for connecting to an Oracle database and an ArcGIS installation for connecting to Esri Geodatabases.

If you must install a third-party application for your FME Desktop installation, repeat that installation on all machines hosting FME Engines. Review our FME formats matrix and compare by platforms to check if the formats you plan to use are available.

3

Performing an Installation

Install FME Server: Express Installation for Windows

This chapter provides information for an Express installation of FME Server for Windows. Before getting started, take a few minutes to review Planning an FME Server Installation.

To Perform an Express Installation for Windows

1. Obtain the Installer
2. Run the Installer
3. Starting and Stopping FME Server
4. Log on to the Web User Interface
5. Request and Install a License
6. Test the Installation

See Also

- Uninstalling

Obtain the Installer

To obtain the applicable FME Server installation package, visit the FME Downloads page. This page includes download links to release and beta installation packages for various platforms.

To request a 60-day trial license of FME Server, visit http://www.safe.com/fme/fme-technology/fme-server/trial-download/.

You can also contact sales@safe.com to get access.

What's Next?

- Run the Installer

Run the Installer

Run the installer under an administrator account. This account must have:

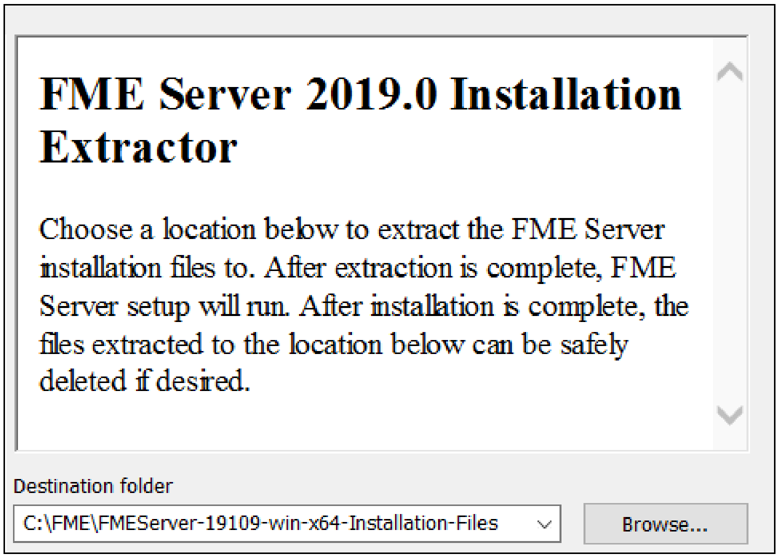
- Write privileges to the specified installation directory.
- "Log on as a service" rights on this machine. For more information, see this Microsoft Docs article.

FME Server Installation Extractor

Start the FME Server installer.

On the Installation Extractor dialog, specify a *Destination folder* in which to extract installation files. Note that this folder *only* specifies where installation files are extracted—it does *not* specify where FME Server program files are installed. That location is specified later in the installer.

> **Tip** Take note of the specified *Destination folder* location. Following installation, you may wish to:
>
> - Review the installation .log file.
> - Remove these files. Doing so saves almost 2 GB disk space.



FME Server 2019.0 Installation Extractor

Choose a location below to extract the FME Server installation files to. After extraction is complete, FME Server setup will run. After installation is complete, the files extracted to the location below can be safely deleted if desired.

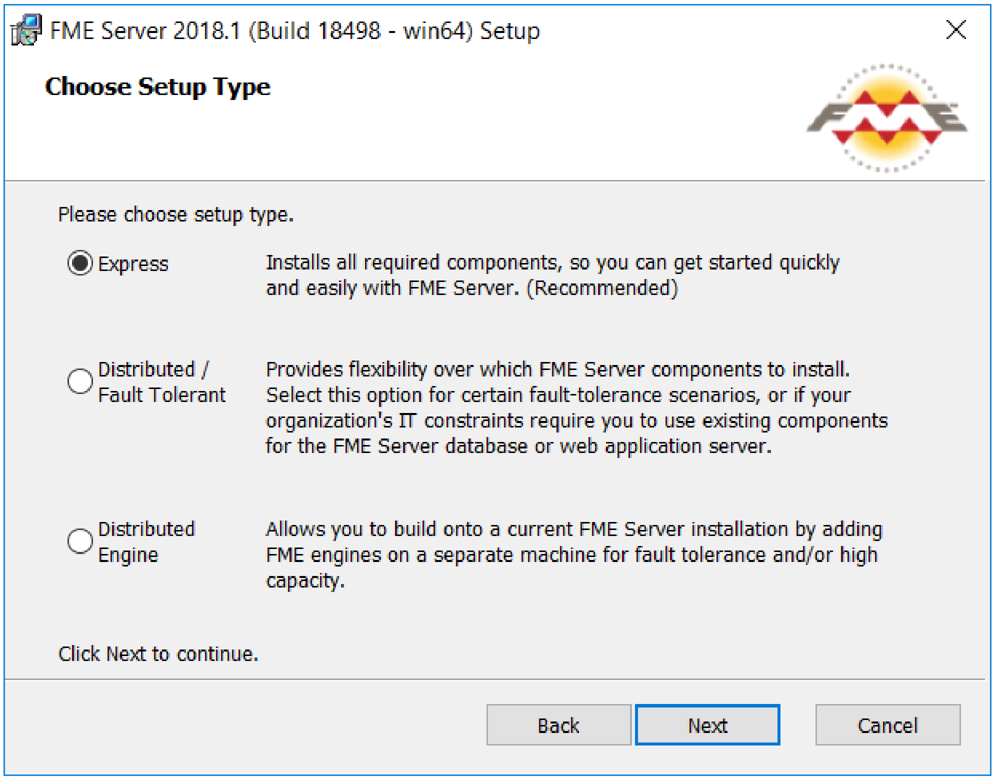
Destination folder: C:\FME\FMEServer-19109-win-x64-Installation-Files

Click **Install**.

When extraction is complete, the installer opens. Proceed through the installer to the Choose Setup Type dialog.

Choose Setup Type

Select the **Express** option.



FME Server 2018.1 (Build 18498 - win64) Setup

Choose Setup Type

Please choose setup type.

● Express — Installs all required components, so you can get started quickly and easily with FME Server. (Recommended)

○ Distributed / Fault Tolerant — Provides flexibility over which FME Server components to install. Select this option for certain fault-tolerance scenarios, or if your organization's IT constraints require you to use existing components for the FME Server database or web application server.

○ Distributed Engine — Allows you to build onto a current FME Server installation by adding FME engines on a separate machine for fault tolerance and/or high capacity.

Click Next to continue.

Destination Folder

- **Install FME Server to**: By default, most files for your FME Server installation are written to C:\Program Files\FME Server\. To change the installation directory, modify the path.
- **Install the FME Server System Share to**: By default, FME Server System Share files, which include Repositories and Resources, are written to %ALLUSERSPROFILE% \Safe Software\FME Server\.

> **Note** Unless modified, C:\ProgramData is the default value of the %ALLUSERSPROFILE% environment variable.

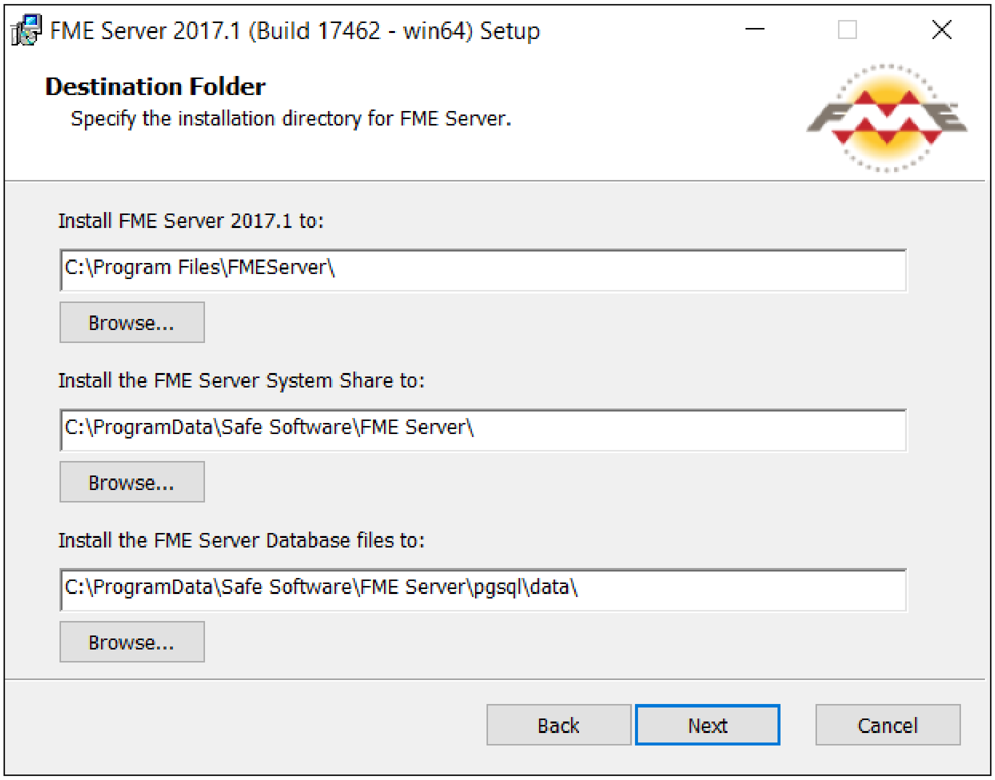
This configuration is recommended, because applications that use FME Server to write data can access C:\ProgramData\Safe Software\FME Server when all FME Server System Services run under the local system account (the most common scenario), while the remaining files are protected in a read-only location. To change the installation directory of FME Server System Share files, modify the path.

> **Note** If you plan to scale-out your FME Server anytime following installation by Adding FME Engines on a Separate Machine, the specified directory must be read/write accessible by the account that runs the additional FME Engines.

- **Install the FME Server Database files to**: By default, FME Server Database files are written to %ALLUSERSPROFILE%\Safe Software\FME Server\pgsql\data.

> **Note** Unless modified, C:\ProgramData is the default value of the %ALLUSERSPROFILE% environment variable.

To change the installation directory of FME Server Database files, modify the path.



FME Server 2017.1 (Build 17462 - win64) Setup

Destination Folder

Specify the installation directory for FME Server.

Install FME Server 2017.1 to:

C:\Program Files\FMEServer\

Install the FME Server System Share to:

C:\ProgramData\Safe Software\FME Server\

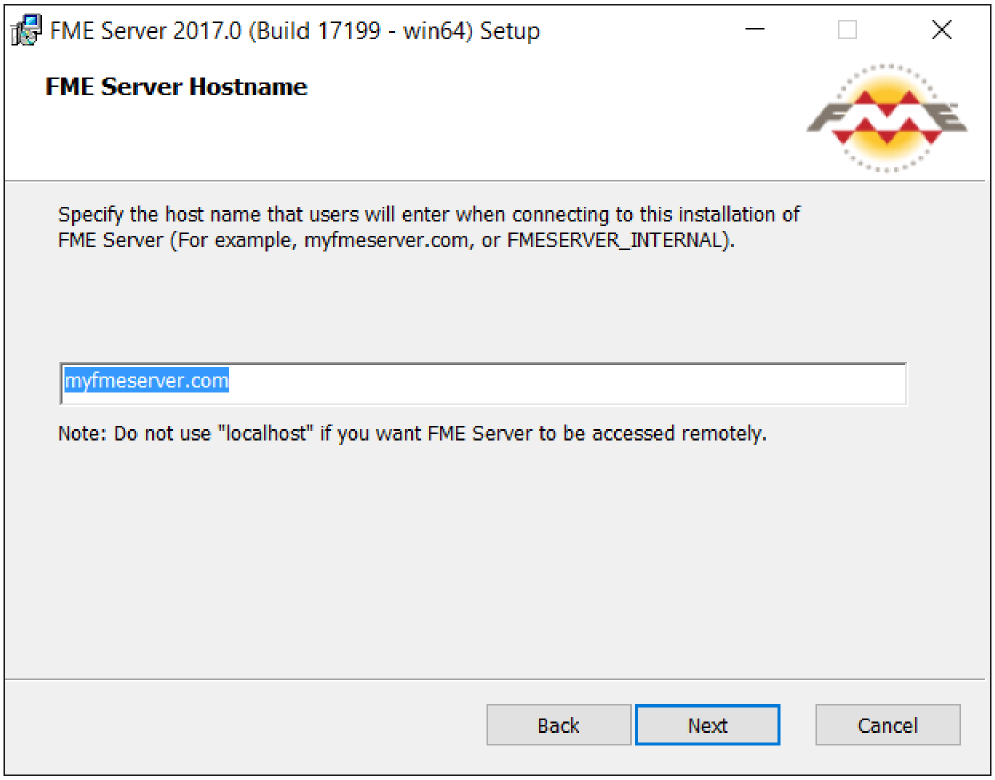
Install the FME Server Database files to:

C:\ProgramData\Safe Software\FME Server\pgsql\data\

FME Server Hostname

If this FME Server installation will be available to users outside an internal network (for example, on an external website), specify the external hostname that users will enter when connecting to FME Server. For example, if you are hosting FME Server on myfmeserver.com/myfmeserver, enter myfmeserver.com.

Otherwise, enter the internal server hostname, IP Address, or DNS.



FME Server Hostname

Specify the host name that users will enter when connecting to this installation of FME Server (For example, myfmeserver.com, or FMESERVER_INTERNAL).

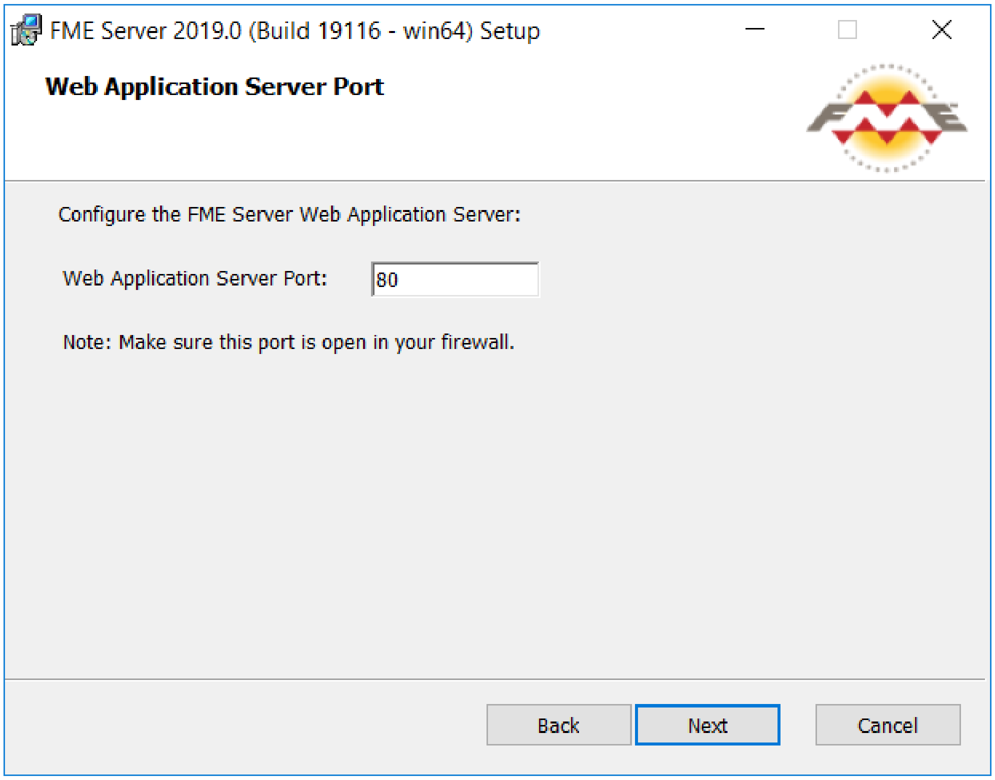
myfmeserver.com

Note: Do not use "localhost" if you want FME Server to be accessed remotely.

Web Application Server Port

Port 80 is the recommended default. If this port is in use, port 8080 is recommended.

Note Common applications that may be using port 80 include Skype and Internet Information Services (IIS). Either turn off these services, or select a different port, such as 8080.


FME Server 2019.0 (Build 19116 - win64) Setup
Web Application Server Port

Configure the FME Server Web Application Server:

Web Application Server Port: 80

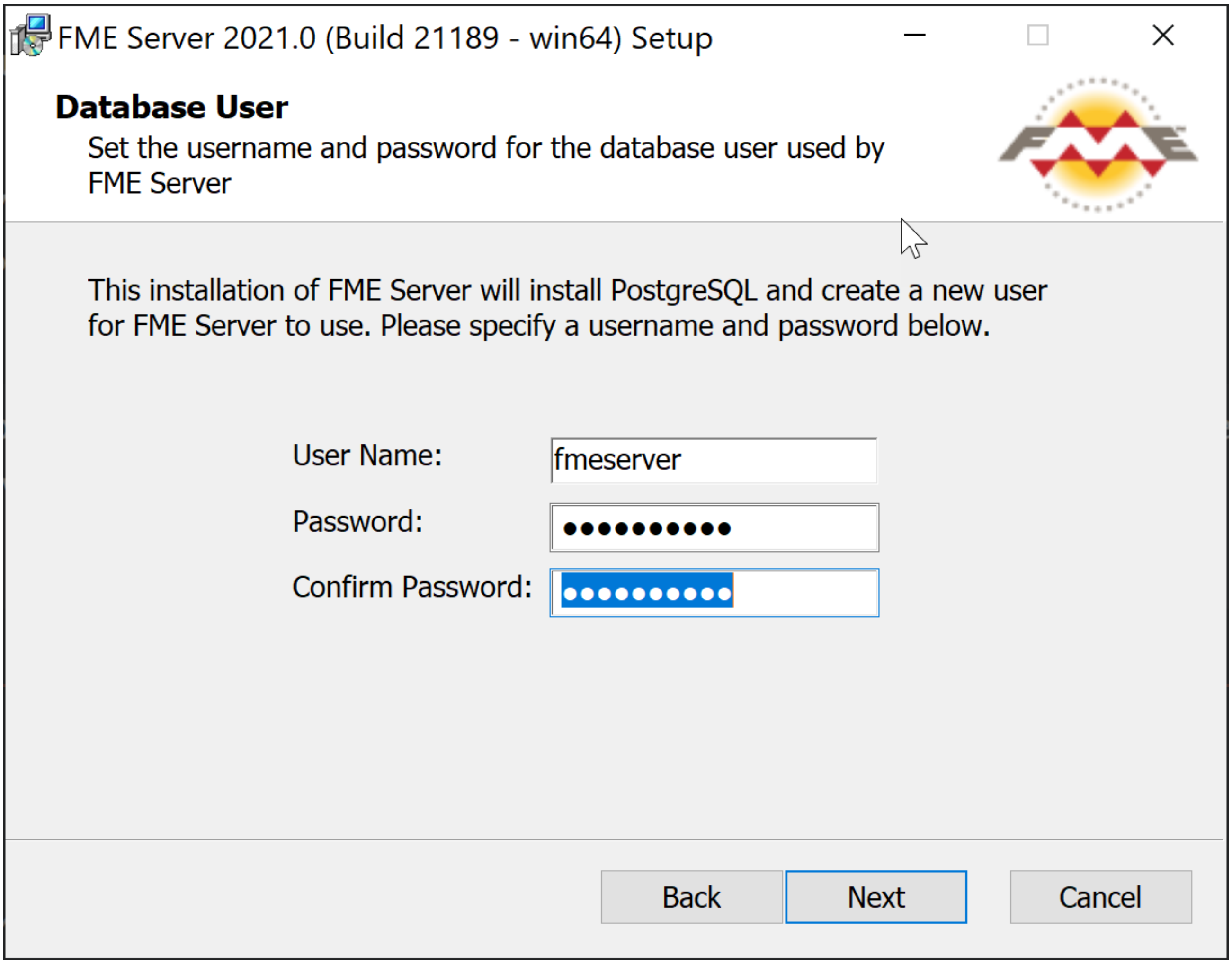
Note: Make sure this port is open in your firewall.

Database User

The installation creates the FME Server Database on a PostgreSQL database server, and a user account under which to use the database. Specify a *User Name* (defaults to **fmeserver**) and *Password* for the database user account.

Warning Do not specify *User Name* **postgres**. This name corresponds to the PostgreSQL master user. If the corresponding passwords do not match, the database will not install.

Note The password for the FME Server Database user account is encrypted in FME Server installation files.



FME Server 2021.0 (Build 21189 - win64) Setup

Database User

Set the username and password for the database user used by FME Server

This installation of FME Server will install PostgreSQL and create a new user for FME Server to use. Please specify a username and password below.

User Name: fmeserver

Password: ●●●●●●●●●●●

Confirm Password: ●●●●●●●●●●●

On the last screen, click **Install**.

Proceed to Starting and Stopping FME Server below.

Starting and Stopping FME Server

After performing the installation, the FME Server service and associated applications start automatically. You might have to start and stop these applications at some point. See Starting and Stopping FME Server Manually for instructions.

Note If UAC (User Account Control) is enabled on your Windows system and the installation was not run from an elevated prompt (that is, Run as administrator), you might need to start the FME Server Windows Services.

What's Next?

- Log on to the Web User Interface

Log on to the Web User Interface

To log in to the Web User Interface for the first time as an administrator following installation, specify *Username* `admin` and *Password* `admin`. You will be prompted to update the `admin` password upon initial use, based on the default Password Policy configuration.

For more information and support:

- FME Server Troubleshooting: Web Interface Login
- Accessing the Web User Interface
- Changing the Login Password
- Default User Accounts and Passwords
- Role-Based and User-Based Access Control

What's Next?

- Request and Install a License

Request and Install a License

License files are installed, by default, to:Windows: `C:\ProgramData\Safe Software\FME Server\licenses`Linux: `/opt/fmeserver/licenses`Dynamic Engine (CPU Usage) licensing is not available for engines on FME Cloud.

Automatic Mode (Recommended)

If your FME Server host machine has an internet connection, you can request and install a license online without any need for downloading and re-uploading a license file.

> **Note**
>
> - Licensing FME Server over the internet requires no inbound connection. For more information, see FME Server Automatic Licensing URLs.
> - If you purchased credits for Dynamic Engines (CPU Usage), automatic mode only is supported. Manual mode licensing (below) is not supported.

1. Open the FME Server Web User Interface as a user assigned to the fmesuperuser role. If none of your FME Engines are licensed, you will see a prompt to activate FME Server. Click on the prompt. Otherwise, select **System Configuration** > **Licensing**.
2. Click **Request New License**.
3. Complete the fields on the Request a New License page. If you have a product *Serial Number*, be sure to provide it. If not, you will receive a 7-day evaluation license, which you can extend to 60 days (see below).

   > **Note** In addition to licenses for standard FME Engines, an evaluation license that is requested in Automatic Mode includes 100 hours of Dynamic Engine (CPU Usage) credits.

4. *Licensing Mode*: Select **Automatic**.
5. Click **OK**.
6. A message indicates that your license is installed, and your available engines appear momentarily on the Engines page.

> **Note** If the Serial Number you provided includes Dynamic Engines (CPU Usage), they are not configured to start by default. You can start and configure your Dynamic Engines on the Engines page.

Manual Mode

If you prefer not to use an internet connection for licensing, or if your FME Server host machine does not have an internet connection, use this process to install a license.

> **Note** If you purchased credits for Dynamic Engines (CPU Usage), manual mode licensing is not supported. Use automatic mode for licensing (above). For more information, contact your Safe Software sales representative.

1. Open the FME Server Web User Interface as a user assigned to the fmesuperuser role. If none of your FME Server engines are licensed, you will see a prompt to activate FME Server. Click on the prompt. Otherwise, select **System Configuration** > **Licensing**.
2. Click **Request New License**.
3. Complete the fields on the Request a New License page. If you have a product *Serial Number*, be sure to provide it. If not, you will receive a 7-day evaluation license, which you can extend to 60 days (see below).
4. *Licensing Mode*: Select **Manual**.
5. Click **OK**. A license request .json file downloads.
6. Email the .json file to codes@safe.com.
7. You will receive an email from Safe Software with a license file, which has a `.fmelic` extension. Download the file.
8. Return to the Licensing page. Under Standard Engines, click **Upload License File** and select the `.fmelic` file to upload. Or, drag and drop the `.fmelic` file onto the page

under Standard Engines. A message indicates that it is installed, and your available engines appear on the Engines page.

Extending an Evaluation License

If you installed a 7-day evaluation license, you should have an email from codes@safe.com that allows you to extend the license to 60 days.

Automatic Mode (Recommended)

If your FME Server host machine has an internet connection, you can extend an evaluation license online without any need for downloading and re-uploading a license file.

1. Open the email and click the link as instructed.
2. A web page opens indicating the request was successful. Additionally, a link is provided to download the license file. Click the link to download the file for safekeeping.
3. Return to **System Configuration** > **Licensing** and click **Refresh License**. The license should now be extended accordingly. The EXPIRES field shows the new expiry date.

Manual Mode

If you prefer not to use an internet connection for licensing, or if your FME Server host machine does not have an internet connection, use this process to extend an evaluation license.

1. Open the email and click the link as instructed.
2. A web page opens indicating the request was successful. Additionally, a link is provided to download the license file. Click the link to download the file.
3. Return to **System Configuration** > **Licensing** and click **Upload License File**. Or, drag and drop the file onto the page. (You may need to move the license to a location where it can be accessed). A message indicates that it is installed. The license should now be extended accordingly. The EXPIRES field shows the new expiry date.

Problems?

- FME Server Troubleshooting: FME Server Engines
- Contact codes@safe.com.

See Also

- FME Server Licensing Walk-Through
- FME Server Automatic Licensing URLs
- FME Engines

What's Next?

- Test the Installation

Test the Installation

To test your FME Server installation, confirm that FME Server can perform its primary function—running a job.

1. On the Run Workspace page, specify:
   - Repository: Samples
   - Workspace: austinApartments.fmw
   - Service: Job Submitter
2. Click Run Workspace.

   If you see a success message, your install was a success.

Uninstalling

Things to Consider

Before uninstalling FME Server, keep in mind the following:

- Before you upgrade to a newer version of FME Server, see Upgrading FME Server on page 310 for instructions on backing up your existing configuration. You must uninstall any previous versions of FME Server before installing an upgrade.
- Uninstalling FME Server removes the contents of your Tomcat directory if you installed the default Web Application Server. This folder is located in the FME Server installation directory under `Utilities\tomcat`. If you made custom modifications to this Tomcat, these modifications should be backed up before uninstall.

To Uninstall:

Ensure that FME Server, FME Server Application Server, or other Web Application servers are shut down before proceeding.

You can uninstall FME Server as you would any other program by selecting Start menu > Control Panel > Programs and Features > FME Server.

Install FME Server: Express Installation for Linux

This chapter provides information for an Express installation FME Server for Linux. Before getting started, take a few minutes to review Planning an FME Server Installation.

To Perform an Express Installation for Linux

1. Ensure System Requirements are met, including updates and dependencies.
2. Obtain the Installer
3. Run the Installer
4. Starting and Stopping FME Server
5. Log on to the Web User Interface
6. Request and Install a License
7. Test the Installation

See Also

- Uninstalling

Obtain the Installer

To obtain the applicable FME Server installation package, visit the FME Downloads page. This page includes download links to release and beta installation packages for various platforms.

To request a 60-day trial license of FME Server, visit http://www.safe.com/fme/fme-technology/fme-server/trial-download/.

You can also contact sales@safe.com to get access.

What's Next?

- Run the Installer

Run the Installer

The installer should be executed as the root user. The recommended method is to call the install file directly. These examples assume you are in the same directory as the installer:

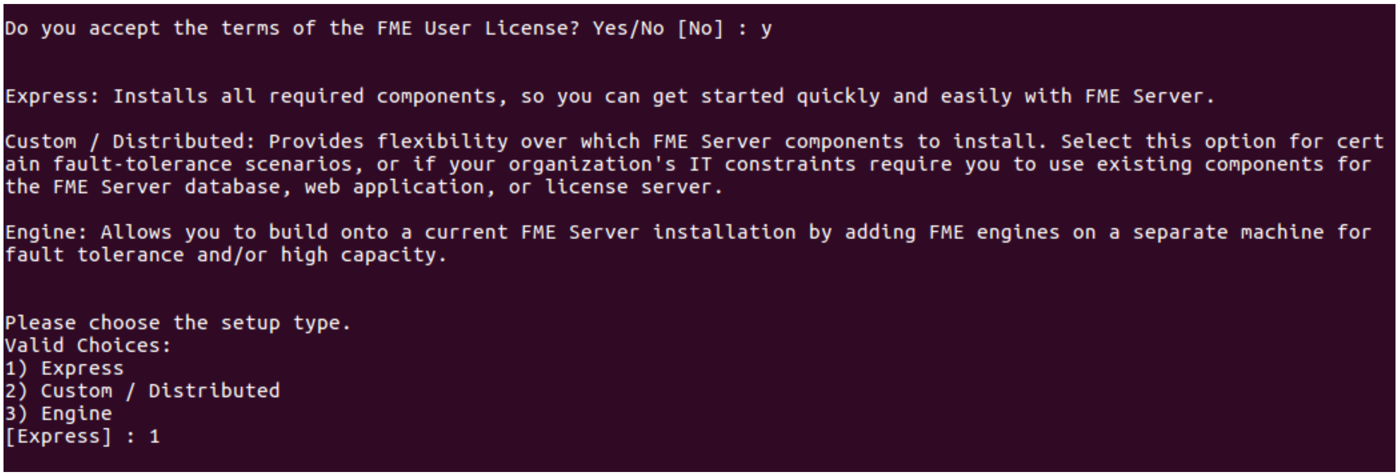
- As root user:

  ```
  chmod +x fme-server-b18205-linux-x64~ubuntu.16.04.run
  ./fme-server-b18205-linux-x64~ubuntu.16.04.run
  ```

- Not root user, but with sudo privileges:

  ```
  sudo chmod +x fme-server-b18205-linux-x64~ubuntu.16.04.run
  sudo ./fme-server-b18205-linux-x64~ubuntu.16.04.run
  ```

Proceed through to the Choose Setup Type prompt. Select the Express option.



```
Do you accept the terms of the FME User License? Yes/No [No] : y

Express: Installs all required components, so you can get started quickly and easily with FME Server.

Custom / Distributed: Provides flexibility over which FME Server components to install. Select this option for cert
ain fault-tolerance scenarios, or if your organization's IT constraints require you to use existing components for
the FME Server database, web application, or license server.

Engine: Allows you to build onto a current FME Server installation by adding FME engines on a separate machine for
fault tolerance and/or high capacity.


Please choose the setup type.
Valid Choices:
1) Express
2) Custom / Distributed
3) Engine
[Express] : 1
```

Proceed through all the prompts. For each prompt, the default answer appears in square brackets, such as `[default]`. If you press Enter without typing an answer, you are accepting the default answer.

Warning When prompted for the database user name and password, do not specify user name **postgres**. This name corresponds to the PostgreSQL master user. If the corresponding passwords do not match, the database will not install.

Note

- The password for the FME Server Database user account is encrypted in FME Server installation files.
- Regardless of the installation directory you specify, FME Engines are installed directly under /opt/fme-engine.
- FME Server installs an NGINX reverse proxy, which allows you to select port 80 or any port number less than 1024, and run the Apache Tomcat Web Application Server as the FME Server user instead of root.

Proceed to Starting and Stopping FME Server on the facing page.

Starting and Stopping FME Server

After performing the installation, start the FME Server System Services. For instructions on starting and stopping the services manually, see Starting and Stopping FME Server Manually on page 409. For instructions on configuring the services to start at boot time, see Configuring FME Server as a System Service (Linux) on page 414.

What's Next?

- Log on to the Web User Interface

Log on to the Web User Interface

To log in to the Web User Interface for the first time as an administrator following installation, specify *Username* `admin` and *Password* `admin`. You will be prompted to update the `admin` password upon initial use, based on the default Password Policy configuration.

For more information and support:

- FME Server Troubleshooting: Web Interface Login
- Accessing the Web User Interface
- Changing the Login Password
- Default User Accounts and Passwords
- Role-Based and User-Based Access Control

What's Next?

- Request and Install a License

Request and Install a License

License files are installed, by default, to:Windows: `C:\ProgramData\Safe Software\FME Server\licenses`Linux: `/opt/fmeserver/licenses`Dynamic Engine (CPU Usage) licensing is not available for engines on FME Cloud.

Automatic Mode (Recommended)

If your FME Server host machine has an internet connection, you can request and install a license online without any need for downloading and re-uploading a license file.

> **Note**
>
> - Licensing FME Server over the internet requires no inbound connection. For more information, see FME Server Automatic Licensing URLs.
> - If you purchased credits for Dynamic Engines (CPU Usage), automatic mode only is supported. Manual mode licensing (below) is not supported.

1. Open the FME Server Web User Interface as a user assigned to the fmesuperuser role. If none of your FME Engines are licensed, you will see a prompt to activate FME Server. Click on the prompt. Otherwise, select **System Configuration** > **Licensing**.
2. Click **Request New License**.
3. Complete the fields on the Request a New License page. If you have a product *Serial Number*, be sure to provide it. If not, you will receive a 7-day evaluation license, which you can extend to 60 days (see below).

   > **Note** In addition to licenses for standard FME Engines, an evaluation license that is requested in Automatic Mode includes 100 hours of Dynamic Engine (CPU Usage) credits.

4. *Licensing Mode*: Select **Automatic**.
5. Click **OK**.
6. A message indicates that your license is installed, and your available engines appear momentarily on the Engines page.

> **Note** If the Serial Number you provided includes Dynamic Engines (CPU Usage), they are not configured to start by default. You can start and configure your Dynamic Engines on the Engines page.

Manual Mode

If you prefer not to use an internet connection for licensing, or if your FME Server host machine does not have an internet connection, use this process to install a license.

> **Note** If you purchased credits for Dynamic Engines (CPU Usage), manual mode licensing is not supported. Use automatic mode for licensing (above). For more information, contact your Safe Software sales representative.

1. Open the FME Server Web User Interface as a user assigned to the fmesuperuser role. If none of your FME Server engines are licensed, you will see a prompt to activate FME Server. Click on the prompt. Otherwise, select **System Configuration** > **Licensing**.
2. Click **Request New License**.
3. Complete the fields on the Request a New License page. If you have a product *Serial Number*, be sure to provide it. If not, you will receive a 7-day evaluation license, which you can extend to 60 days (see below).
4. *Licensing Mode*: Select **Manual**.
5. Click **OK**. A license request .json file downloads.
6. Email the .json file to codes@safe.com.
7. You will receive an email from Safe Software with a license file, which has a `.fmelic` extension. Download the file.
8. Return to the Licensing page. Under Standard Engines, click **Upload License File** and select the `.fmelic` file to upload. Or, drag and drop the `.fmelic` file onto the page

under Standard Engines. A message indicates that it is installed, and your available engines appear on the Engines page.

Extending an Evaluation License

If you installed a 7-day evaluation license, you should have an email from codes@safe.com that allows you to extend the license to 60 days.

Automatic Mode (Recommended)

If your FME Server host machine has an internet connection, you can extend an evaluation license online without any need for downloading and re-uploading a license file.

1. Open the email and click the link as instructed.
2. A web page opens indicating the request was successful. Additionally, a link is provided to download the license file. Click the link to download the file for safekeeping.
3. Return to **System Configuration** > **Licensing** and click **Refresh License**. The license should now be extended accordingly. The EXPIRES field shows the new expiry date.

Manual Mode

If you prefer not to use an internet connection for licensing, or if your FME Server host machine does not have an internet connection, use this process to extend an evaluation license.

1. Open the email and click the link as instructed.
2. A web page opens indicating the request was successful. Additionally, a link is provided to download the license file. Click the link to download the file.
3. Return to **System Configuration** > **Licensing** and click **Upload License File**. Or, drag and drop the file onto the page. (You may need to move the license to a location where it can be accessed). A message indicates that it is installed. The license should now be extended accordingly. The EXPIRES field shows the new expiry date.

Problems?

- FME Server Troubleshooting: FME Server Engines
- Contact codes@safe.com.

See Also

- FME Server Licensing Walk-Through
- FME Server Automatic Licensing URLs
- FME Engines

What's Next?

- Test the Installation

Test the Installation

To test your FME Server installation, confirm that FME Server can perform its primary function—running a job.

1. On the Run Workspace page, specify:
   - Repository: Samples
   - Workspace: austinApartments.fmw
   - Service: Job Submitter
2. Click Run Workspace.

   If you see a success message, your install was a success.

Uninstalling

Things to Consider

Before uninstalling FME Server, keep in mind the following:

- Before you upgrade to a newer version of FME Server, see Upgrading FME Server on page 310 for instructions on backing up your existing configuration. You must uninstall any previous versions of FME Server before installing an upgrade.
- Uninstalling FME Server removes the contents of your Tomcat directory if you installed the default Web Application Server. This folder is located in the FME Server installation directory under `Utilities\tomcat`. If you made custom modifications to this Tomcat, these modifications should be backed up before uninstall.
- Uninstalling removes the configuration of the following components, but does not uninstall them. If reinstalling or performing an upgrade, these components are reused and reconfigured:
  - The PostgreSQL FME Server Database, if applicable.
  - The NGINX reverse proxy.

To Uninstall:

Ensure that FME Server, FME Server Application Server, or other Web Application servers are shut down before proceeding.

Run the `uninstall.sh` script in the FME Server installation directory. To ensure that everything gets uninstalled, run this script as root.

Installing a Scalable, Fault-Tolerant FME Server

Before installing FME Server for fault tolerance, make sure you have:

- Read and understood Planning an FME Server Installation, including Planning for Fault Tolerance.
- Provided the prerequisites in Before Installation.
- Linux: Ensured System Requirements are met on all machines you have allocated for your fault-tolerant architecture, including updates and dependencies.

To perform an installation for fault tolerance:

1. Obtain the Installer
2. Install the FME Servers on all machines you have allocated for your fault-tolerant architecture.
3. Configure the FME Server Database on your database server.

   Note Optionally, you can install the PostgreSQL database that is included with the FME Server installer , instead of configuring the FME Server Database on your own database server. Be aware the default database is not configured for redundancy.

4. Set Up the Load Balancer and Configure with FME Server to route traffic between each FME Server instance you installed.
5. Start the FME Server system services. Following a fault-tolerant installation, the FME Server system services do not start automatically. You must manually start them.
6. Log on to the Web User Interface and update the password for the admin user account (recommended).
7. Request and Install a License.
8. Test the Installation.

What's Next?

Optimize: You can scale-up your system by:

- Increasing the number of FME Engines that run on machines that are part of your FME Server deployment.
- Adding FME Engines on additional machines.

  For more information, see Planning for Scalability and Performance.

Before Installation

Before you install FME Server for fault tolerance, ensure the following components are in place on your network:

- Separate machines on which to install the number of FME Servers that you have allocated for your fault tolerant architecture.
- A load balancer to route traffic between each FME Server instance you install.
- Fault-tolerant database server on a separate machine.
- Fault-tolerant file system on a separate machine.

Next Steps

Proceed to Obtain the Installer.

Provide a Database Server

FME Server uses its own database to manage jobs and workspace information. It is not a source or destination data source for FME workspaces.

When configuring a fault tolerant environment for FME Server, you must provide your own database server on which to configure the FME Server database. Supported database servers include:

- Oracle
- PostgreSQL
- SQL Server

Provide a database server that is physically separate from the machines on which the FME Servers are installed. Separating the FME Server Database ensures that it also remains available in a failover scenario.

When providing a database server, keep in mind the following:

- In addition to being physically separate, the database server should, by itself, be configured for fault tolerance.

- When you install the FME Servers, the database server must be running and you must know the connection information.
- If using an Oracle database server, you must obtain the Oracle Database JDBC driver. For more information, see https://www.oracle.com/technetwork/database/application-development/jdbc/downloads/index.html.

> **Note** Oracle Database JDBC driver versions that use ojdbc10.jar are *not* supported.

- Following installation, you must be able to create a new database on the server using SQL scripts.

For information about acquiring a fault tolerant database server, consult your IT department.

Provide a Remote File System for the FME Server System Share

- ***Skill Level***: Intermediate
- ***Estimated Time Required***: 5-15 minutes
- ***Prerequisites***:
  - Domain Service Account has correct permissions on network shares.

FME Server System Share files, which include Repositories and Resources, are installed in specific directories that are shared to enable access from different computers.

Create a directory for the FME Server System Share that is physically separate from the machine on which the FME Server Core and web application server are installed. Separating the file system ensures it remains available in a fault tolerant scenario.

When providing a remote file system, keep in mind the following:

- The accounts that run the FME Server components must have read and write permissions on the remote file system directory. For more information, see Directory and Account Permissions.

- In addition to being physically separate, the file system should, by itself, be configured for fault tolerance.
- When the directory is specified during installation, it must be in the form of a UNC path. Mapped drives are not supported.
- The directory that holds the System Share must be empty, unless System Share folders have already been created there as part of an installation involving multiple FME Server Cores.

For information about acquiring a fault tolerant file system, consult your IT department.

Linux Only

For distributed installations on Linux, it is necessary to create a user, prior to installation, on the machine that will host the installation of the FME Server Core and Engines. This user must be named 'fmeserver' and belong to group 'fmeserver', and be granted permissions on the FME Server System Share. For more information, see Directory and Account Permissions.

Example Instructions

The following example creates user 'fmeserver' in group 'fmeserver', and allows mount /mnt/data to be writable by the newly-created user.

> **Note** The following instructions are provided as a general guideline for adding a user and mounting a directory. Exact instructions may vary depending on the distribution and share type in your Linux configuration.

1. Run the following commands in the Linux command line:

   ```
   groupadd fmeserver
   useradd -m -g fmeserver fmeserver
   ```

2. Mount the FME Server System Share directory so that user 'fmeserver' has read and write permissions. For example, to mount a Windows-based file share:

   ```
   mount -v -t cifs //network/share /mnt/data -o gid=1008,uid=1008
   ```

`gid` and `uid` are the group id and user id of the user and group that were created. These id's can be found using these commands:

```
id -g fmeserver
id -u fmeserver
```

Obtain the Installer

To obtain the applicable FME Server installation package, visit the FME Downloads page. This page includes download links to release and beta installation packages for various platforms.

To request a 60-day trial license of FME Server, visit http://www.safe.com/fme/fme-technology/fme-server/trial-download/.

You can also contact sales@safe.com to get access.

What's Next?

- Install the FME Servers

Install the FME Servers

Perform the following installation on all machines you have allocated for your fault tolerant architecture.

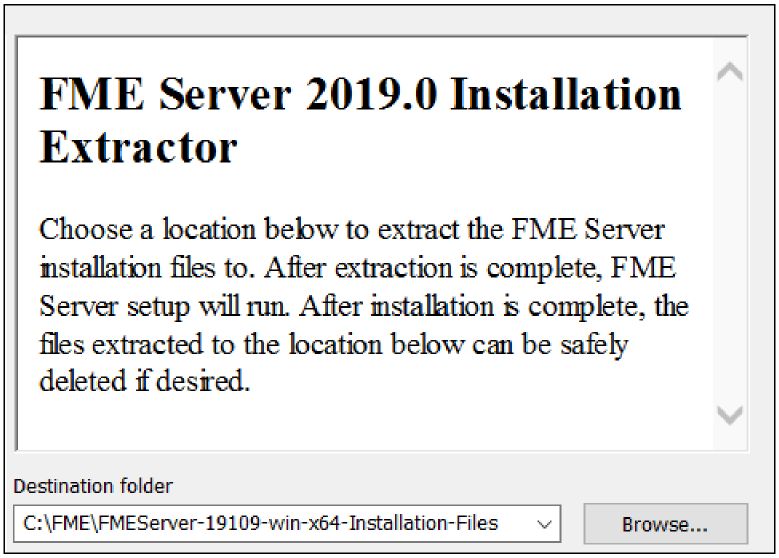
Start the FME Server Installer.

(Windows only) Installation Extractor

On the Installation Extractor dialog, specify a *Destination folder* in which to extract installation files. Note that this folder *only* specifies where installation files are extracted—it does *not* specify where FME Server program files are installed. That location is specified later in the installer.

Tip Take note of the specified *Destination folder* location. Following installation, you may wish to:

- Review the installation .log file.
- Remove these files. Doing so saves almost 2 GB disk space.



FME Server 2019.0 Installation Extractor

Choose a location below to extract the FME Server installation files to. After extraction is complete, FME Server setup will run. After installation is complete, the files extracted to the location below can be safely deleted if desired.

Destination folder

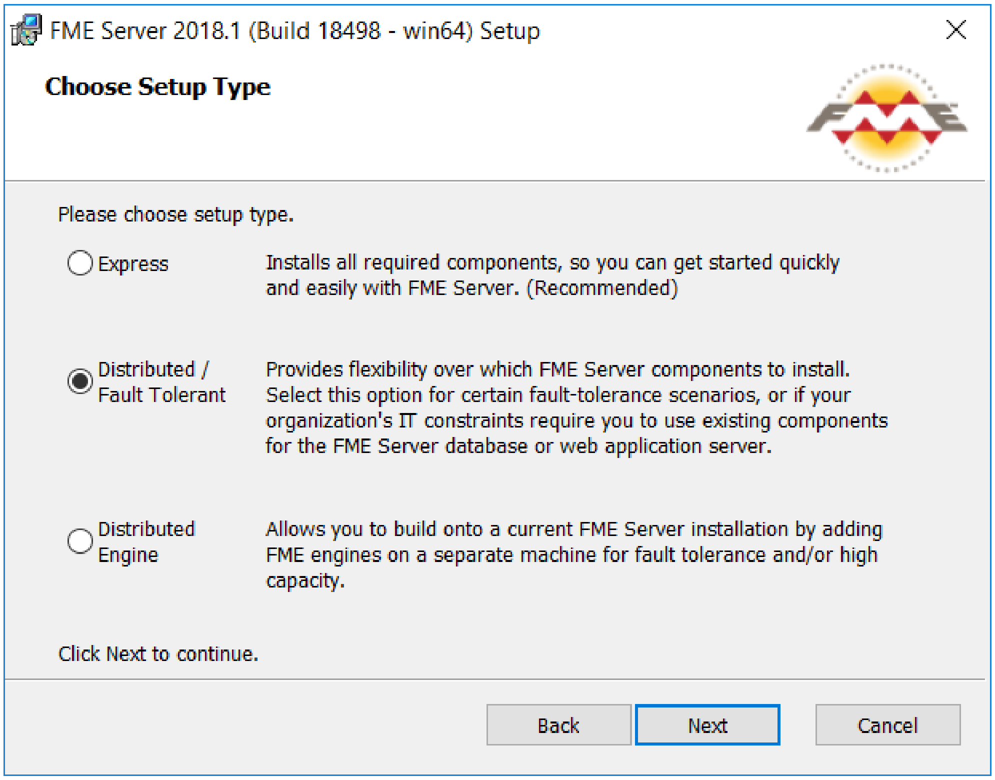
C:\FME\FMEServer-19109-win-x64-Installation-Files

Click **Install**.

When extraction is complete, the installer opens. Proceed through the installer to the Choose Setup Type dialog.

Choose Setup Type

Select the Distributed/Fault Tolerant install option.



FME Server 2018.1 (Build 18498 - win64) Setup

Choose Setup Type

Please choose setup type.

○ Express — Installs all required components, so you can get started quickly and easily with FME Server. (Recommended)

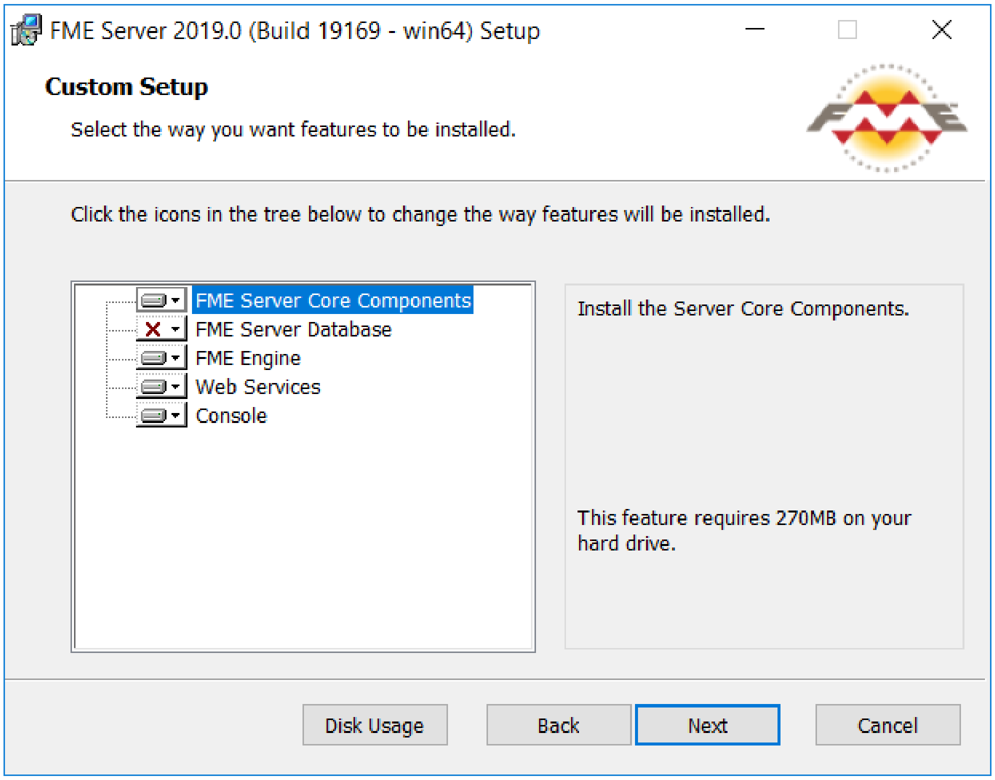
● Distributed / Fault Tolerant — Provides flexibility over which FME Server components to install. Select this option for certain fault-tolerance scenarios, or if your organization's IT constraints require you to use existing components for the FME Server database or web application server.

○ Distributed Engine — Allows you to build onto a current FME Server installation by adding FME engines on a separate machine for fault tolerance and/or high capacity.

Click Next to continue.

Custom Setup

Select FME Server Core Components, FME Engine, and Web Services. (Optionally, select Console. For more information, see FME Server Console.)



FME Server 2019.0 (Build 19169 - win64) Setup

Custom Setup

Select the way you want features to be installed.

Click the icons in the tree below to change the way features will be installed.

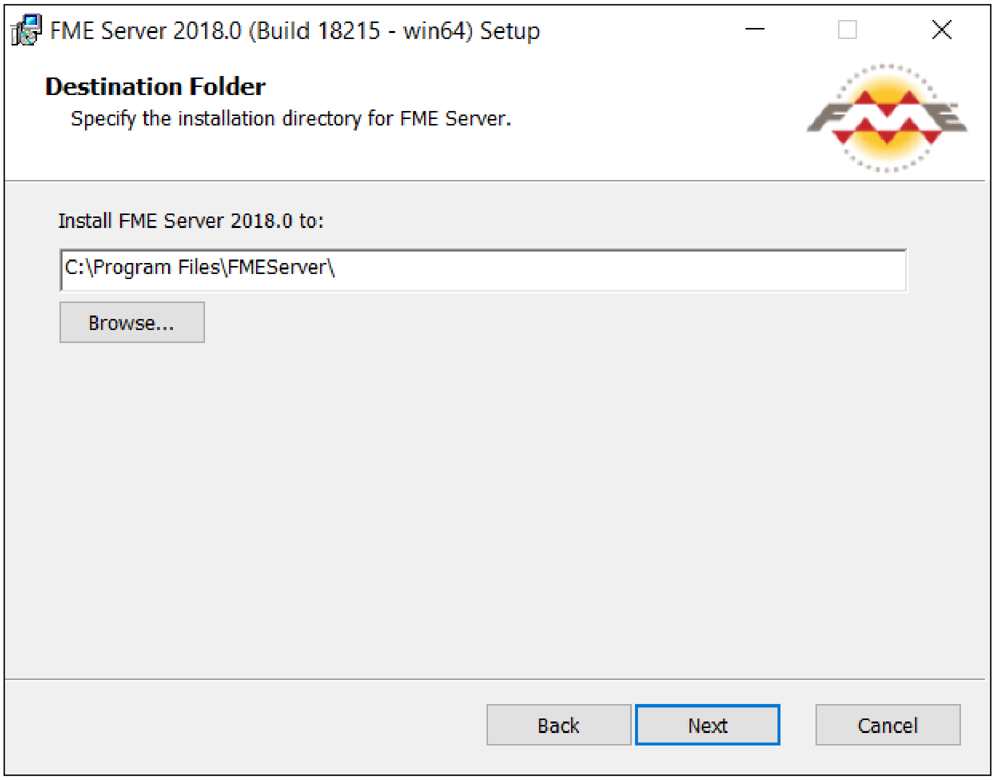
- FME Server Core Components
- ✗ FME Server Database
- FME Engine
- Web Services
- Console

Install the Server Core Components.

This feature requires 270MB on your hard drive.

Destination Folder

Specify the installation directory for FME Server.



FME Server 2018.0 (Build 18215 - win64) Setup

Destination Folder

Specify the installation directory for FME Server.

Install FME Server 2018.0 to:

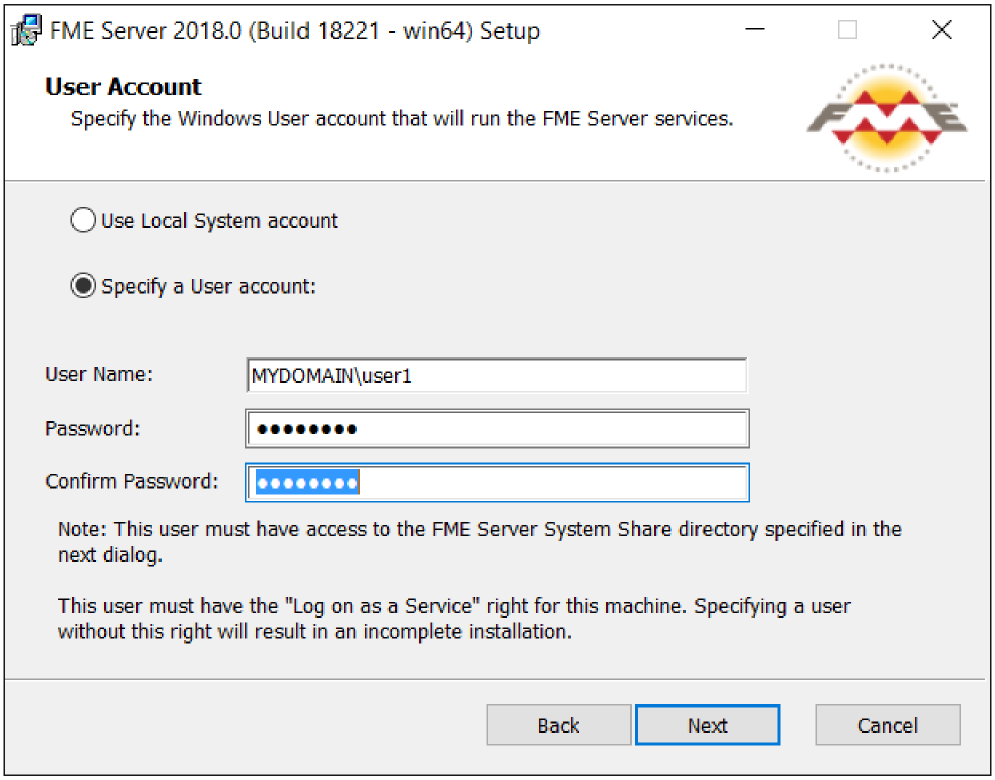
C:\Program Files\FMEServer\

User Account

Specify the Windows user account that will run the FME Server System Services. This account must have:

- Read/Write access to the FME Server System Share that you specify in the next dialog. The System Share is the location where FME Server stores Repositories and Resources files. It must be accessible by all machines that comprise the FME Server deployment. (For more information, see Provide a Remote File System for the FME Server System Share.)
- Read/Write access to the FME Server installation directory that you specified in the previous dialog.
- "Log on as a service" rights on this machine. For more information, see this Microsoft Docs article.

Note The FME Server Database service always runs under the local system account.



FME Server 2018.0 (Build 18221 - win64) Setup

User Account

Specify the Windows User account that will run the FME Server services.

○ Use Local System account

● Specify a User account:

User Name: MYDOMAIN\user1

Password: ••••••••

Confirm Password: ••••••••

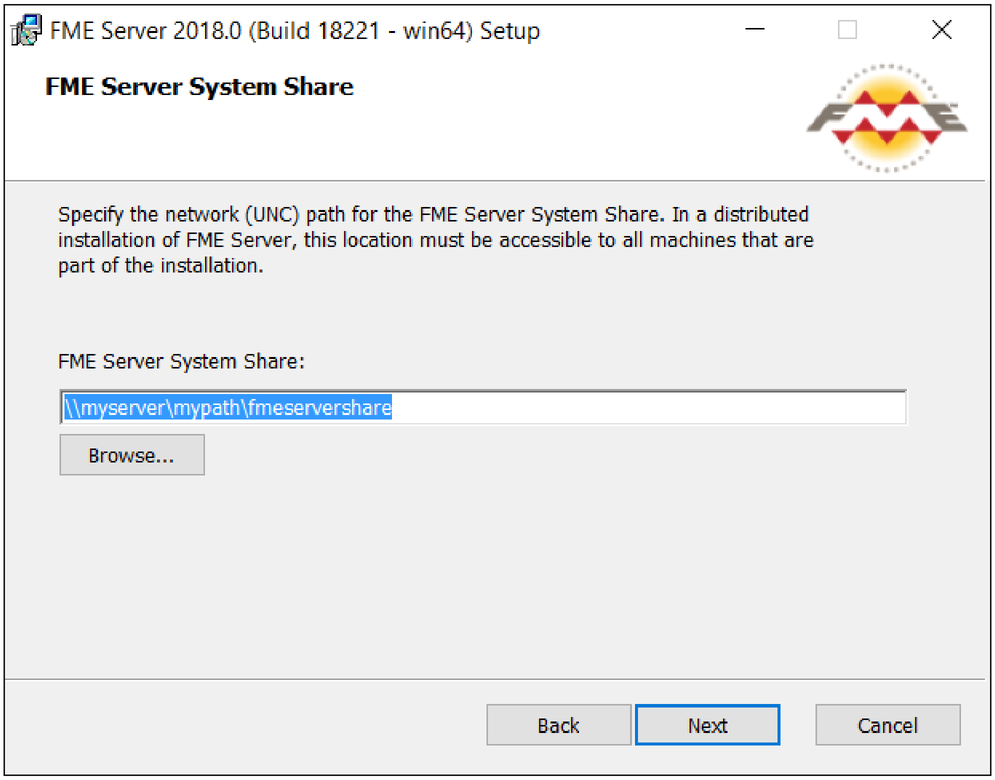
Note: This user must have access to the FME Server System Share directory specified in the next dialog.

This user must have the "Log on as a Service" right for this machine. Specifying a user without this right will result in an incomplete installation.

FME Server System Share

Specify a shared directory visible to all machines that make up the FME Server. This directory stores FME Server System Share files, which include Repositories and Resources. If this is a Linux installation, specify the mounted directory. For more information, see Provide a Remote File System for the FME Server System Share.

Note If you are upgrading to a newer version of FME Server, ensure the specified directory is empty of files from the previous installation. Otherwise, conflicts may occur that can produce unexpected results in performance.



FME Server 2018.0 (Build 18221 - win64) Setup

FME Server System Share

Specify the network (UNC) path for the FME Server System Share. In a distributed installation of FME Server, this location must be accessible to all machines that are part of the installation.

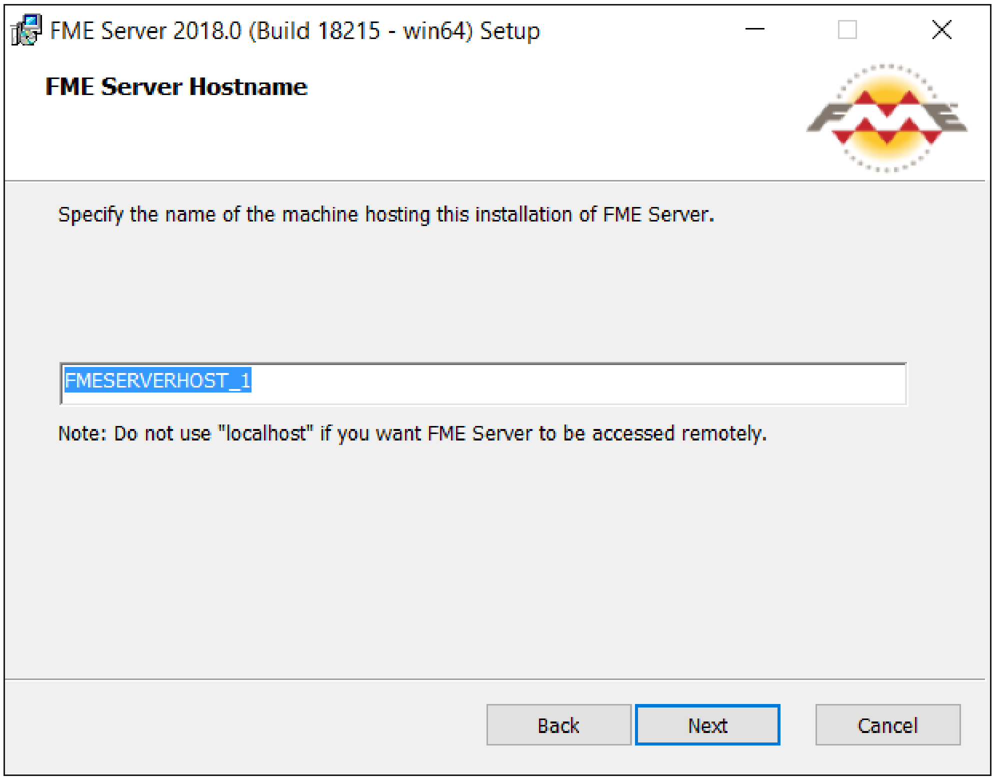
FME Server System Share:

\\myserver\mypath\fmeservershare

FME Server Hostname

Specify the name of the machine hosting this installation of FME Server.

Note Do not specify "localhost".



FME Server 2018.0 (Build 18215 - win64) Setup

FME Server Hostname

Specify the name of the machine hosting this installation of FME Server.

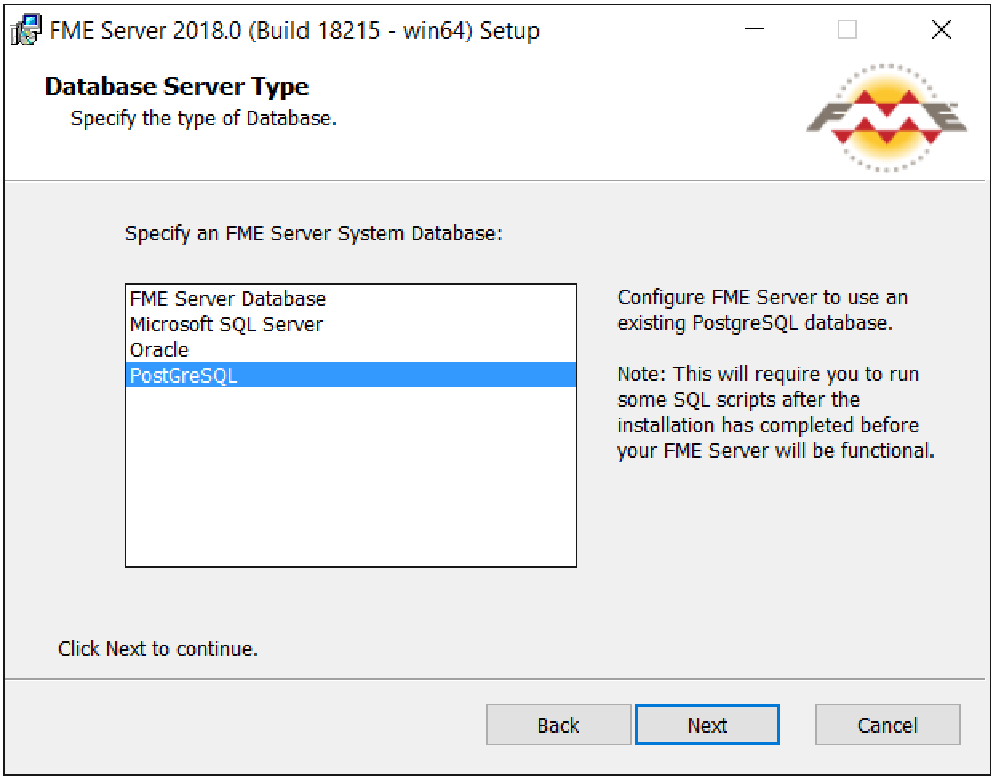
FMESERVERHOST_1

Note: Do not use "localhost" if you want FME Server to be accessed remotely.

Database Server Type

Specify the type of database for the FME Server Database. For more information, see Provide a Database Server.

Note Do not specify the "FME Server Database".



FME Server 2018.0 (Build 18215 - win64) Setup

Database Server Type

Specify the type of Database.

Specify an FME Server System Database:

- FME Server Database
- Microsoft SQL Server
- Oracle
- PostGreSQL

Configure FME Server to use an existing PostgreSQL database.

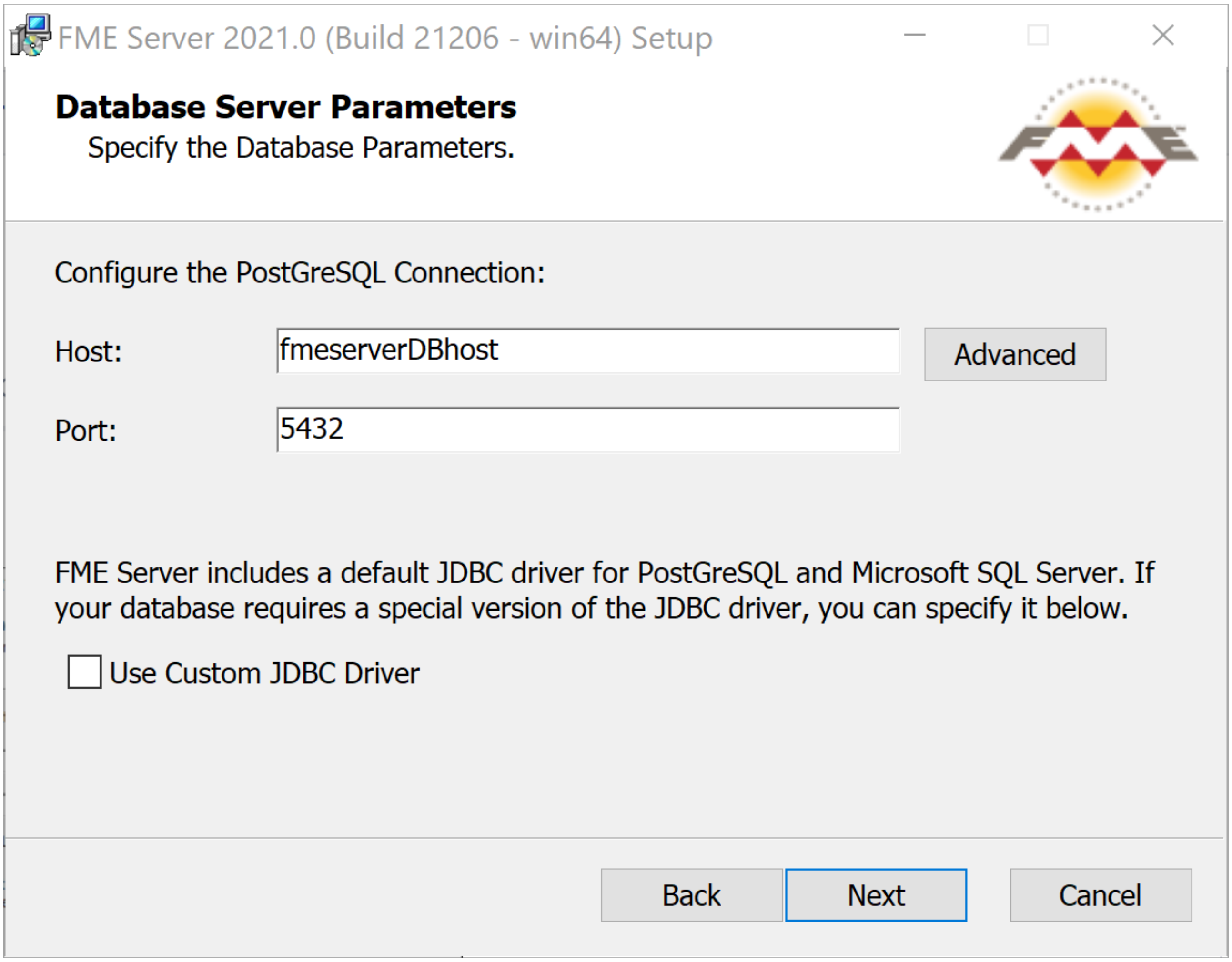
Note: This will require you to run some SQL scripts after the installation has completed before your FME Server will be functional.

Click Next to continue.

Database Server Parameters

Specify the connection parameters for the FME Server Database. Optionally, to customize further the connection parameters in the JDBC connection string, click **Advanced**.

> **Note**
>
> - If **Microsoft SQL Server** was specified in the previous dialog, check *Use SQL Server instance name* to use that value instead of *Port*.
> - If **Oracle** was specified in the previous dialog, you must check *Use Custom JDBC Driver* and specify the *JDBC Driver*.



FME Server 2021.0 (Build 21206 - win64) Setup

Database Server Parameters

Specify the Database Parameters.

Configure the PostGreSQL Connection:

Host: fmeserverDBhost

Port: 5432

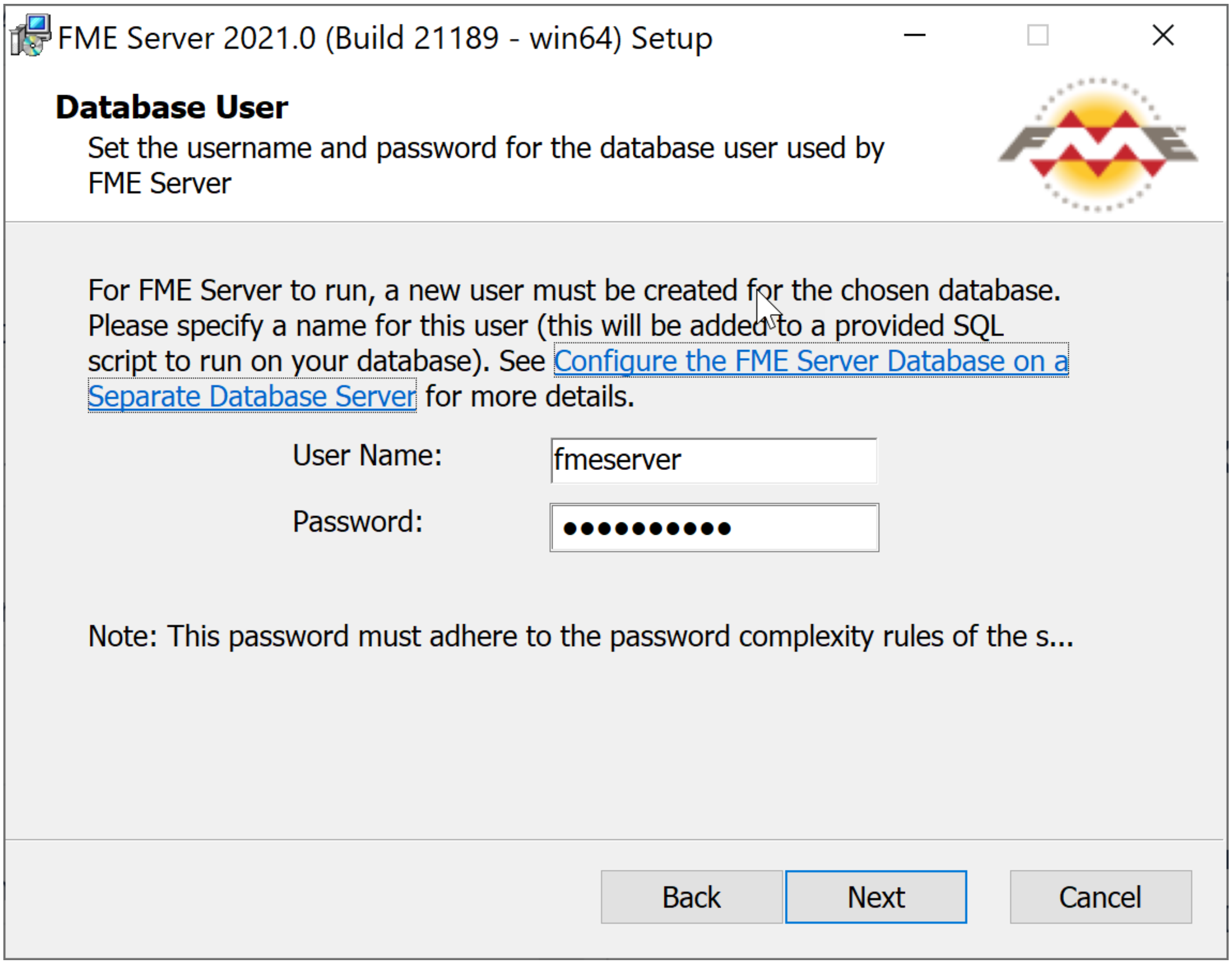
FME Server includes a default JDBC driver for PostGreSQL and Microsoft SQL Server. If your database requires a special version of the JDBC driver, you can specify it below.

□ Use Custom JDBC Driver

Database User

The installation creates a user account under which to use the FME Server database. Specify a *User Name* (defaults to **fmeserver**) and *Password* for the database user account.

> **Note** The password for the FME Server Database user account is encrypted in FME Server installation files. Take note of the *User Name* and *Password* that you specified. You may need to reference it later.



Database User

Set the username and password for the database user used by FME Server

For FME Server to run, a new user must be created for the chosen database. Please specify a name for this user (this will be added to a provided SQL script to run on your database). See Configure the FME Server Database on a Separate Database Server for more details.

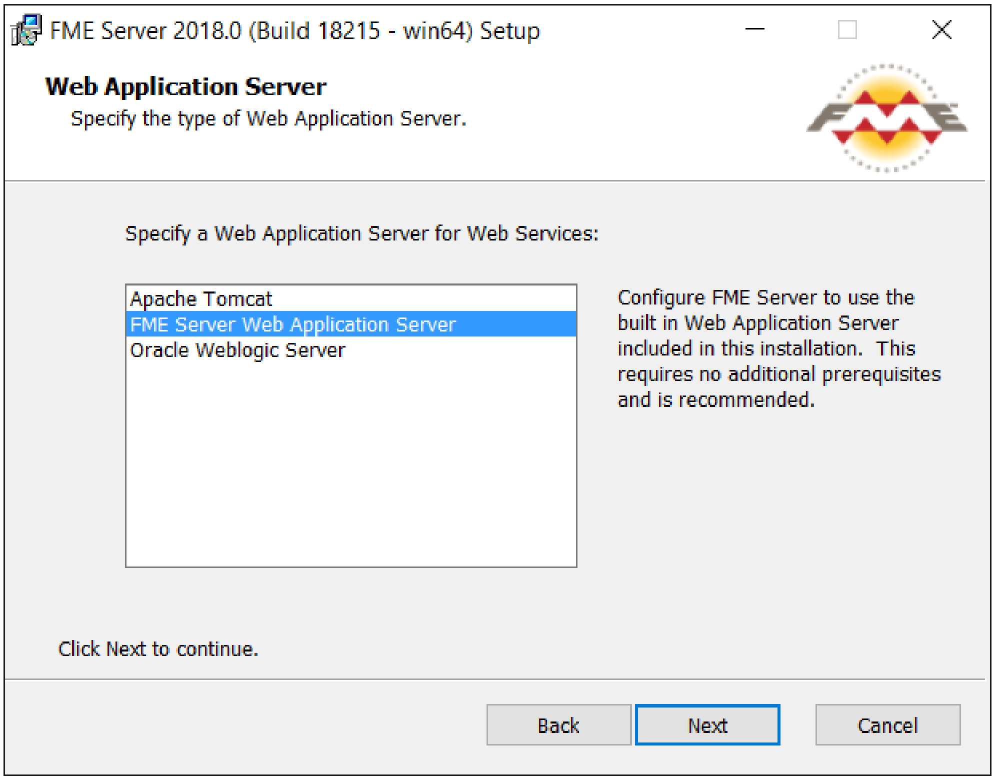
User Name: fmeserver

Password: ●●●●●●●●●●●

Note: This password must adhere to the password complexity rules of the s...

Web Application Server

Specify the **FME Server Web Application Server**.



Web Application Server

Specify the type of Web Application Server.

Specify a Web Application Server for Web Services:

- Apache Tomcat
- FME Server Web Application Server
- Oracle Weblogic Server

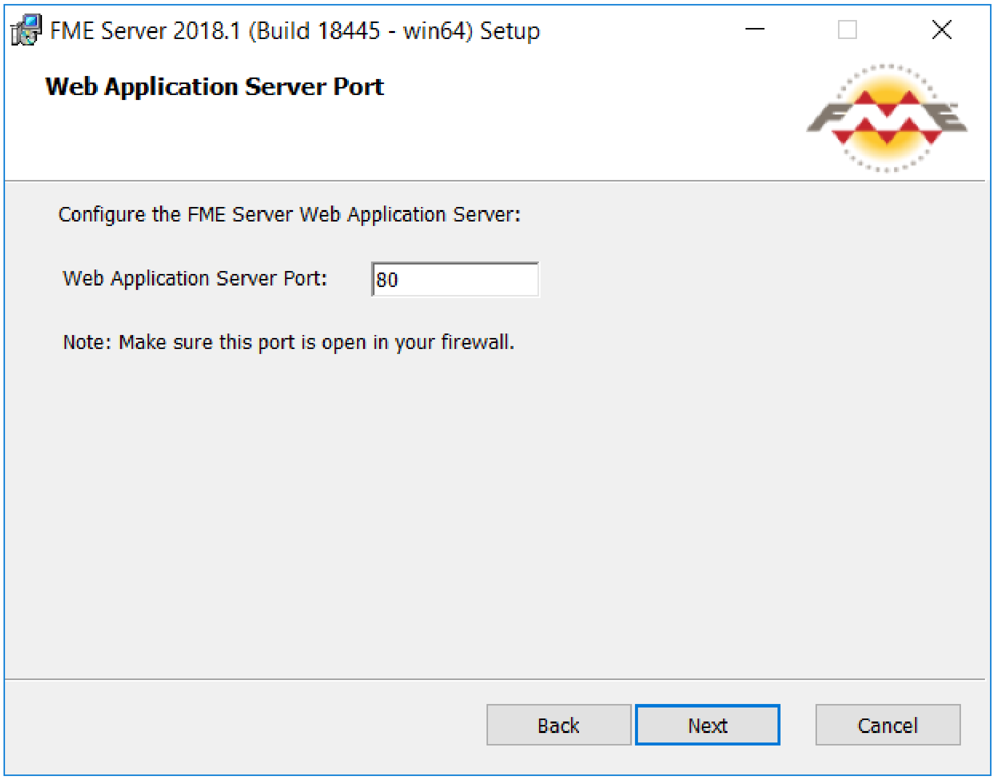
Configure FME Server to use the built in Web Application Server included in this installation. This requires no additional prerequisites and is recommended.

Click Next to continue.

Web Application Server Port

Specify the port to use for communication with the Web Application Server. On Windows, port 80 is the recommended default. If this port is in use, port 8080 is recommended. On Linux, port 8080 is recommended.

> **Note** Common applications that may be using port 80 include Skype and Internet Information Services (IIS). Either turn off these services, or select a different port, such as 8080.



FME Server 2018.1 (Build 18445 - win64) Setup
Web Application Server Port
Back
Next
Cancel

Configure the FME Server Web Application Server:

Web Application Server Port: 80

Note: Make sure this port is open in your firewall.

Follow the remaining dialogs to complete the installation.

What's Next?

- Configure the FME Server Database on a Separate Database Server

Configure the FME Server Database on a Separate Database Server

To configure FME Server to use a separate database server, follow the steps below. You can configure FME Server with a Microsoft SQL Server, PostgreSQL, or Oracle database, running on either Windows or Linux.

1. Database Configuration: Set up FME Server database tables and database users with permissions to access the FME Server database.

> **Note** The specific way to set up database tables and user permissions on various production databases may differ depending on the available database tools and intended target platform.

Database Configuration - Microsoft SQL Server

It is assumed that SQL Server is installed.

One notation used is `<FMEServerDir>`, which is the installation directory of FME Server. In Windows, this is typically `C:\Program Files\FMEServer`.

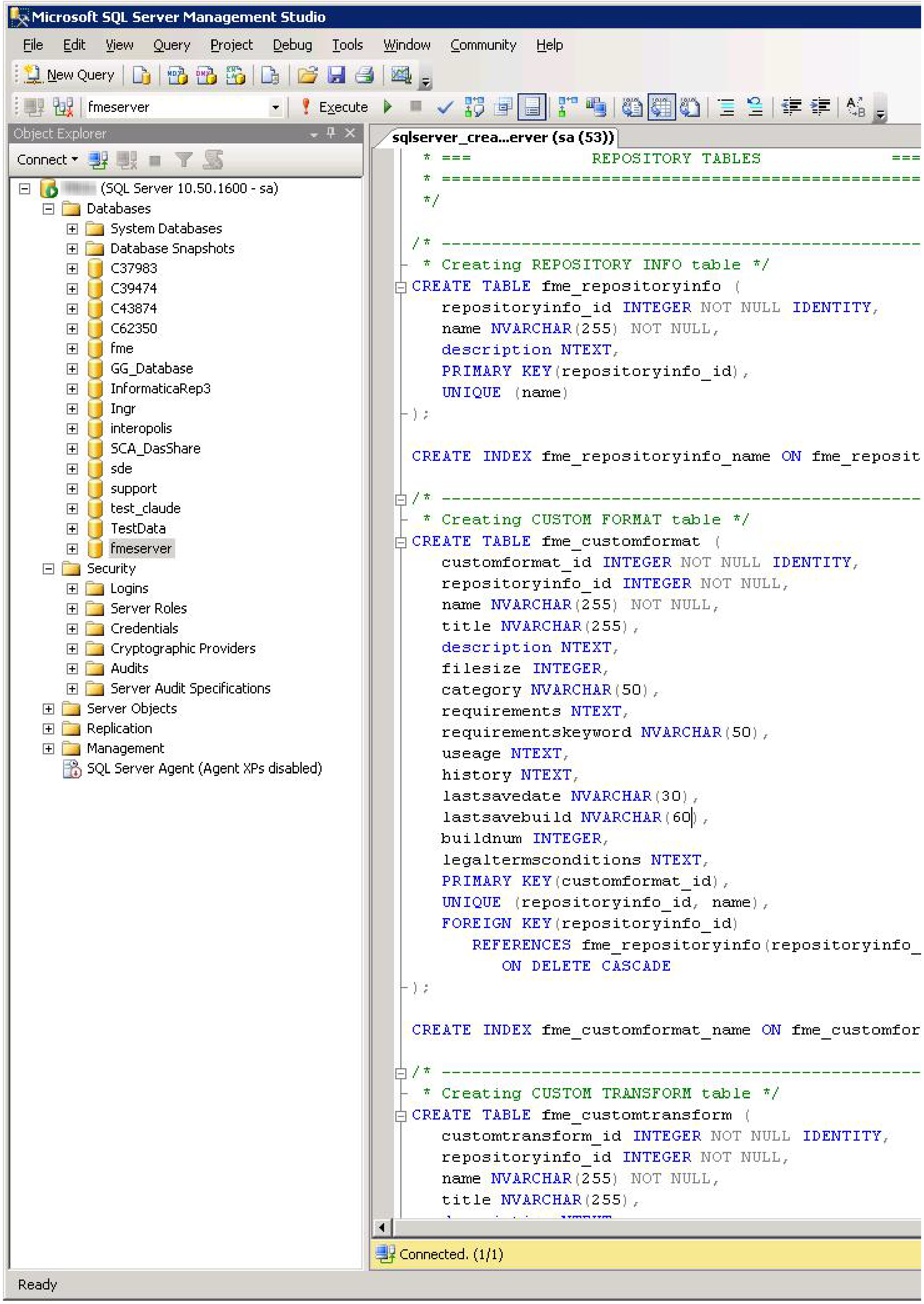
SQL scripts are provided to help with SQL Server database configuration. These SQL scripts are located in the `<FMEServerDir>\Server\database\sqlserver\` directory of the FME Server Core machine.

> **Note** This directory refers to the machine on which the FME Server Core is installed (not the machine on which the database server is installed). To run these scripts, you must transfer this directory to the database machine, or reference it through a UNC path.

If you are upgrading, you should back up any job history you want to keep.

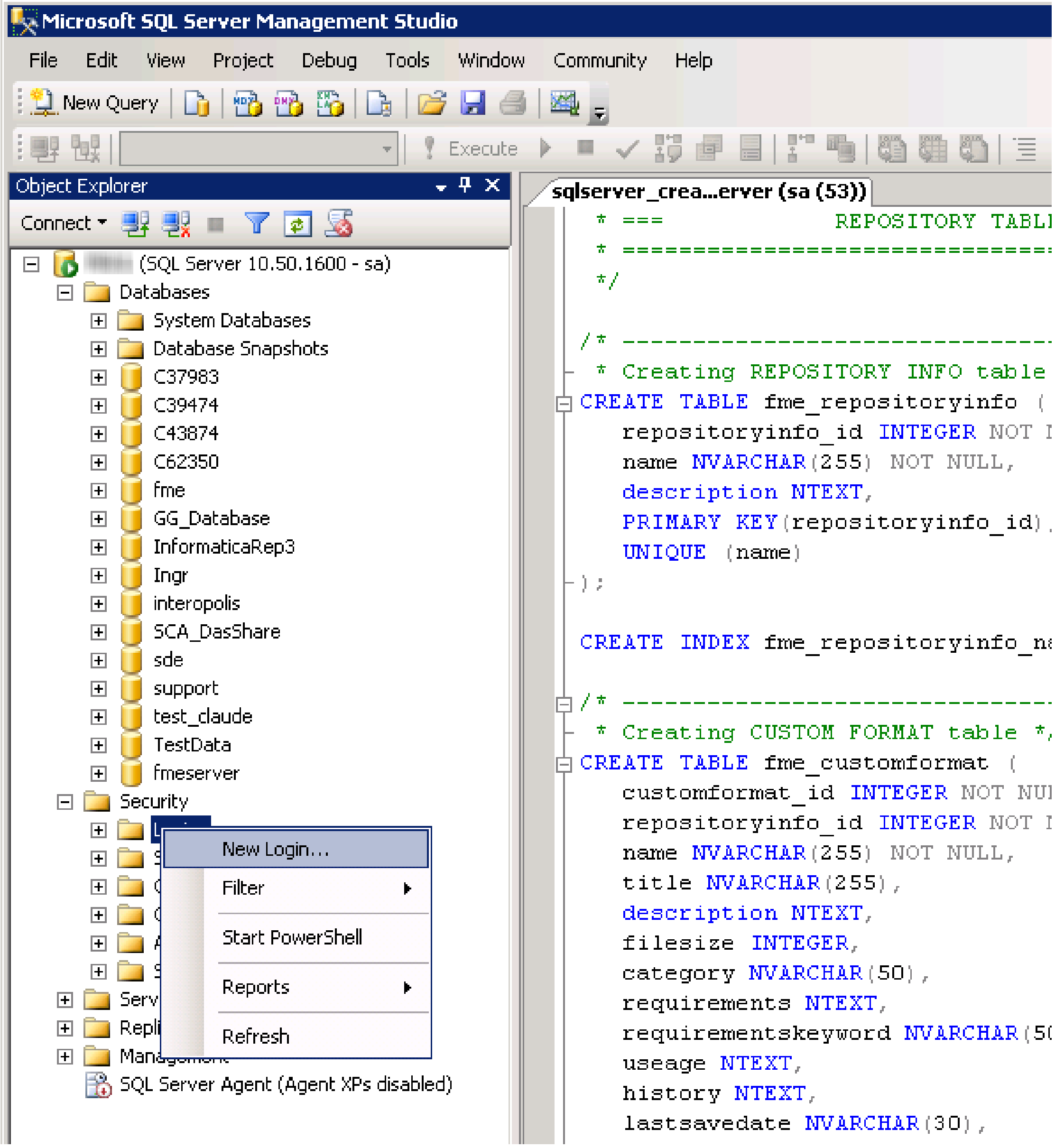
Instructions Using SQL Server Management Studio

1. Open the SQL Server Management Studio and connect to the SQL Server database engine.
2. Open `sqlserver_createDB.sql` and run the script against the `fmeserver` database, as shown below:



```
 * ===              REPOSITORY TABLES              ===
 * ==================================================
 */

/* --------------------------------------------------
 * Creating REPOSITORY INFO table */
CREATE TABLE fme_repositoryinfo (
   repositoryinfo_id INTEGER NOT NULL IDENTITY,
   name NVARCHAR(255) NOT NULL,
   description NTEXT,
   PRIMARY KEY(repositoryinfo_id),
   UNIQUE (name)
);

CREATE INDEX fme_repositoryinfo_name ON fme_reposit

/* --------------------------------------------------
 * Creating CUSTOM FORMAT table */
CREATE TABLE fme_customformat (
   customformat_id INTEGER NOT NULL IDENTITY,
   repositoryinfo_id INTEGER NOT NULL,
   name NVARCHAR(255) NOT NULL,
   title NVARCHAR(255),
   description NTEXT,
   filesize INTEGER,
   category NVARCHAR(50),
   requirements NTEXT,
   requirementskeyword NVARCHAR(50),
   useage NTEXT,
   history NTEXT,
   lastsavedate NVARCHAR(30),
   lastsavebuild NVARCHAR(60),
   buildnum INTEGER,
   legaltermsconditions NTEXT,
   PRIMARY KEY(customformat_id),
   UNIQUE (repositoryinfo_id, name),
   FOREIGN KEY(repositoryinfo_id)
      REFERENCES fme_repositoryinfo(repositoryinfo_
         ON DELETE CASCADE
);

CREATE INDEX fme_customformat_name ON fme_customfor

/* --------------------------------------------------
 * Creating CUSTOM TRANSFORM table */
CREATE TABLE fme_customtransform (
   customtransform_id INTEGER NOT NULL IDENTITY,
   repositoryinfo_id INTEGER NOT NULL,
   name NVARCHAR(255) NOT NULL,
   title NVARCHAR(255),
```

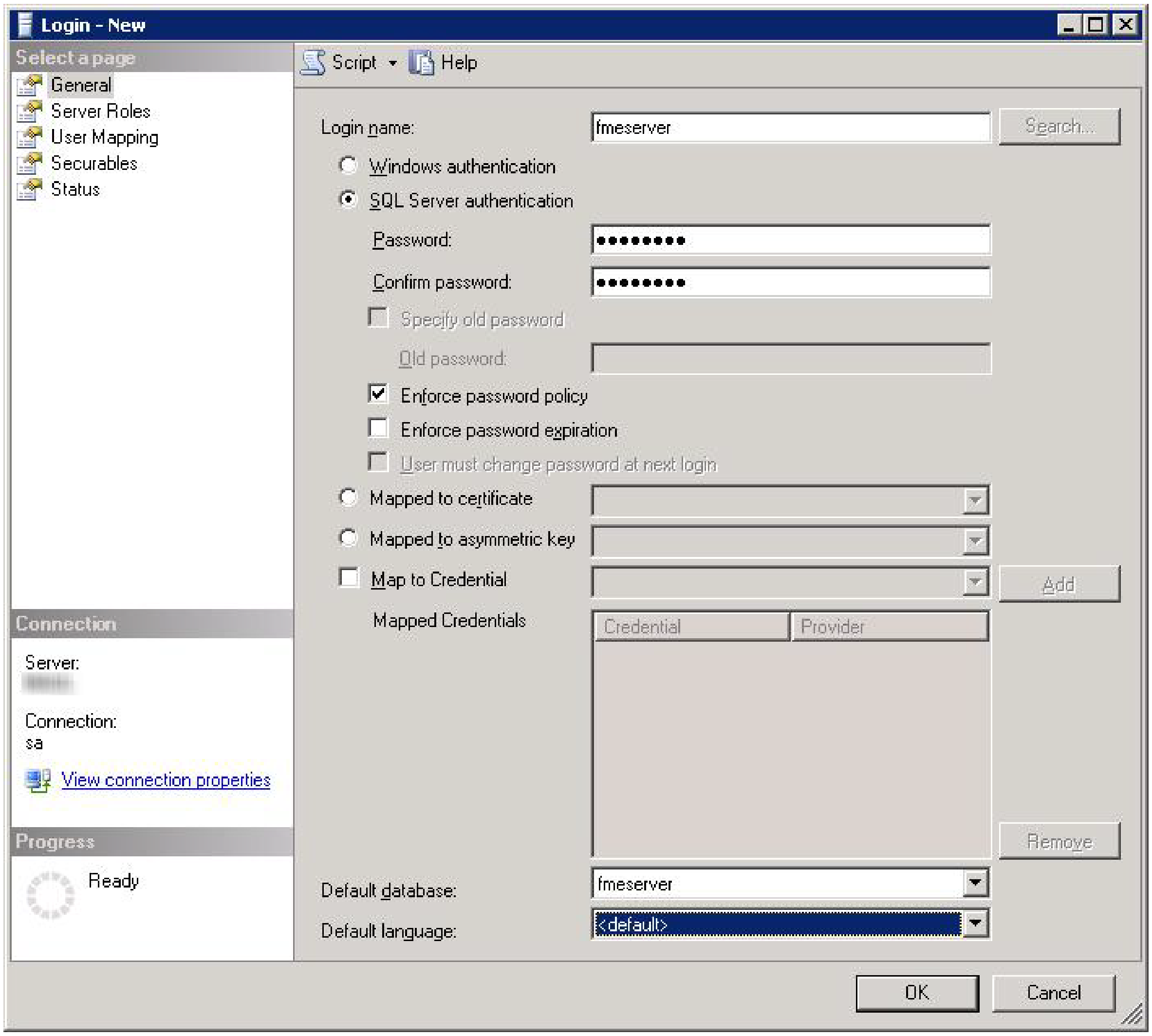
3. On the Object Explorer pane, expand the Security folder, right-click Login, and then select New Login:



```
 * ===            REPOSITORY TABL
 * ================================
 */

/* --------------------------------
 * Creating REPOSITORY INFO table
CREATE TABLE fme_repositoryinfo (
   repositoryinfo_id INTEGER NOT I
   name NVARCHAR(255) NOT NULL,
   description NTEXT,
   PRIMARY KEY(repositoryinfo_id),
   UNIQUE (name)
);

CREATE INDEX fme_repositoryinfo_na

/* --------------------------------
 * Creating CUSTOM FORMAT table *,
CREATE TABLE fme_customformat (
   customformat_id INTEGER NOT NUI
   repositoryinfo_id INTEGER NOT I
   name NVARCHAR(255) NOT NULL,
   title NVARCHAR(255),
   description NTEXT,
   filesize INTEGER,
   category NVARCHAR(50),
   requirements NTEXT,
   requirementskeyword NVARCHAR(5(
   useage NTEXT,
   history NTEXT,
   lastsavedate NVARCHAR(30),
```

4. On the Login – New page, click General to open the page shown in the example below.
   - At the Login name field, enter `fmeserver`.
   - Make sure the option button is active for SQL Server authentication.
   - In the Password field enter the password that was specified for the database during the FME Server installation, and in the Confirm password field enter the same password again.

- Make sure the Enforce password policy is active. If not, click the checkbox to activate it.
- If required, click the checkbox for Enforce password expiration to clear it.
- At the Default database field enter fmeserver.



Login name: fmeserver

○ Windows authentication

● SQL Server authentication

Password: •••••••••

Confirm password: •••••••••

☐ Specify old password

Old password:

☑ Enforce password policy

☐ Enforce password expiration

☐ User must change password at next login

○ Mapped to certificate

○ Mapped to asymmetric key

☐ Map to Credential

Mapped Credentials

Credential	Provider

Default database: fmeserver

Default language: <default>

Server:
[redacted]

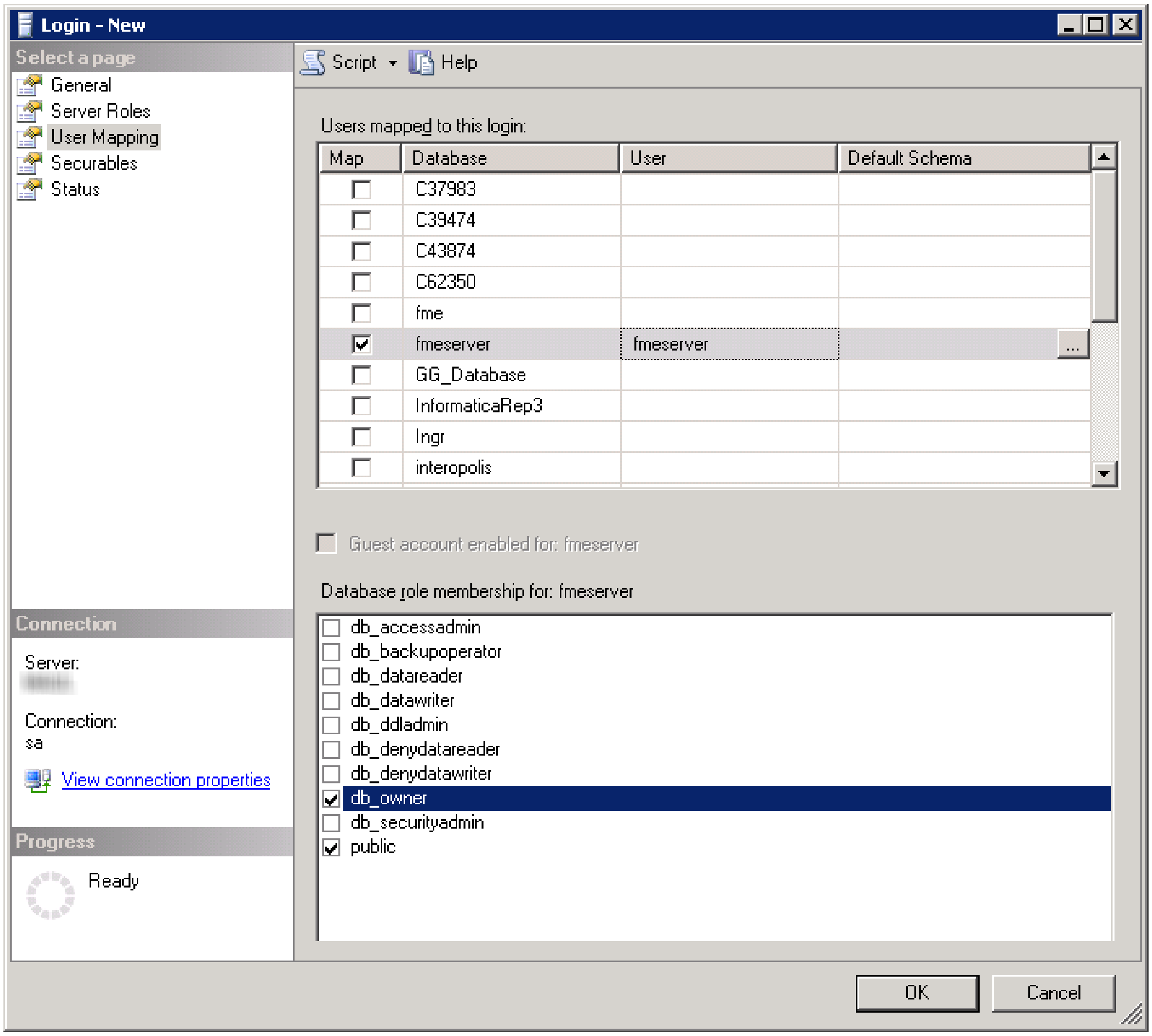
Connection:
sa

View connection properties

Ready

5. On the same Login – New page, click User Mapping to open the page shown in the next figure.
    - At the Users mapped to this login location, in the Map column click the checkbox to activate it and map the login name to the `fmeserver` database.

- At the Database role membership for location, notice that the fmeserver database is specified and check db_owner to assign that role to this database.
- Click OK to close this page.



Users mapped to this login:

Map	Database	User	Default Schema
□	C37983		
□	C39474		
□	C43874		
□	C62350		
□	fme		
☑	fmeserver	fmeserver	...
□	GG_Database		
□	InformaticaRep3		
□	Ingr		
□	interopolis		

□ Guest account enabled for: fmeserver

Database role membership for: fmeserver

□ db_accessadmin
□ db_backupoperator
□ db_datareader
□ db_datawriter
□ db_ddladmin
□ db_denydatareader
□ db_denydatawriter
☑ db_owner
□ db_securityadmin
☑ public

Server:
[redacted]

Connection:
sa

Instructions Without SQL Server Management Studio

1. Connect to the SQL Server database engine and run sqlserver_createDB.sql.
2. Open sqlserver_createUser.sql.
3. Look for the line that begins:

```
CREATE LOGIN fmeserver WITH PASSWORD =
```

Replace `<<DATABASE_PASSWORD>>` with the password specified during the installation.

4. Run the script.

> **Note** If your SQL Server uses an Always On availability group, you must also configure the `MultisubnetFailover` property of the `DB_JDBC_URL` parameter in the fmeDatabaseConfig.txt configuration file. For more information, see the SQL Server examples under Configure the Database Connection.

Database Configuration - Oracle

Before proceeding, you must provide the following:

- Install an Oracle database server.
- Obtain the Oracle Database JDBC driver. For more information, see https://www.oracle.com/technetwork/database/application-development/jdbc/downloads/index.html.

<FMEServerDir> is the installation directory of FME Server. In Windows, this is typically `C:\Program Files\FMEServer`.

If you are upgrading, you should back up any job history you want to keep.

Windows

This section describes how to configure an Oracle database. You can configure the Oracle database from other Oracle database tools depending on your personal preference.

For an Oracle database configuration, various SQL scripts are provided to help.

These SQL scripts are located in the <FMEServerDir>`\Server\database\oracle` directory of the FME Server Core machine.

> **Note** This directory refers to the machine on which the FME Server Core is installed (not the machine on which the database server is installed). To run these scripts, you must transfer this directory to the database machine, or reference it through a UNC path.

- `oracle_createUser.sql` – This script creates the FME Server database user, and grants all required permissions to the FME Server database user. The password appears as `<<DATABASE_PASSWORD>>`. Before running this script, replace `<<DATABASE_PASSWORD>>` with the password that was specified for the database during the FME Server installation.
- `oracle_createDB.sql` – This script creates all FME Server related database packages, tables, indexes, views, and triggers.
- `oracle_dropUser.sql` – This script drops the FME Server database user and the database packages, tables, indexes, views, and triggers associated with the FME Server database user.

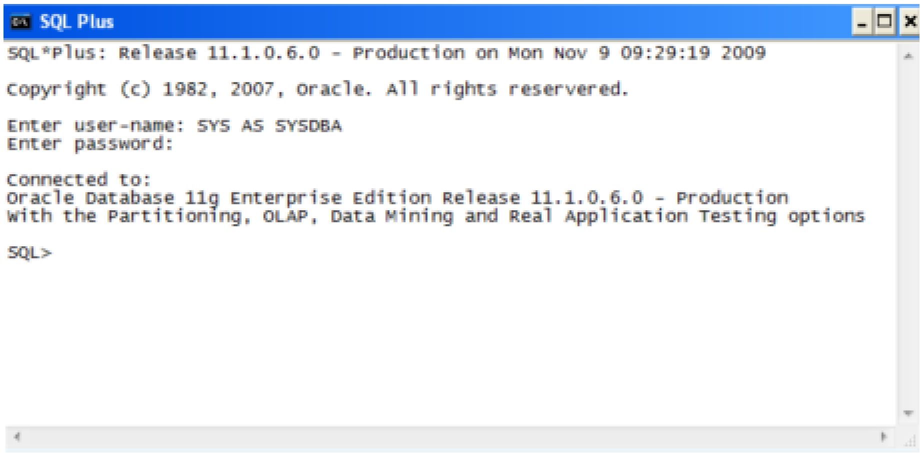
Using the Command Prompt

To use the command prompt to configure the database, follow these instructions:

1. Install Oracle SQL*Plus, if you haven’t already.
2. Open Oracle SQL*Plus and log on as a user with adequate privileges, such as SYSDBA.

   In this example, the following parameters were used and entered:

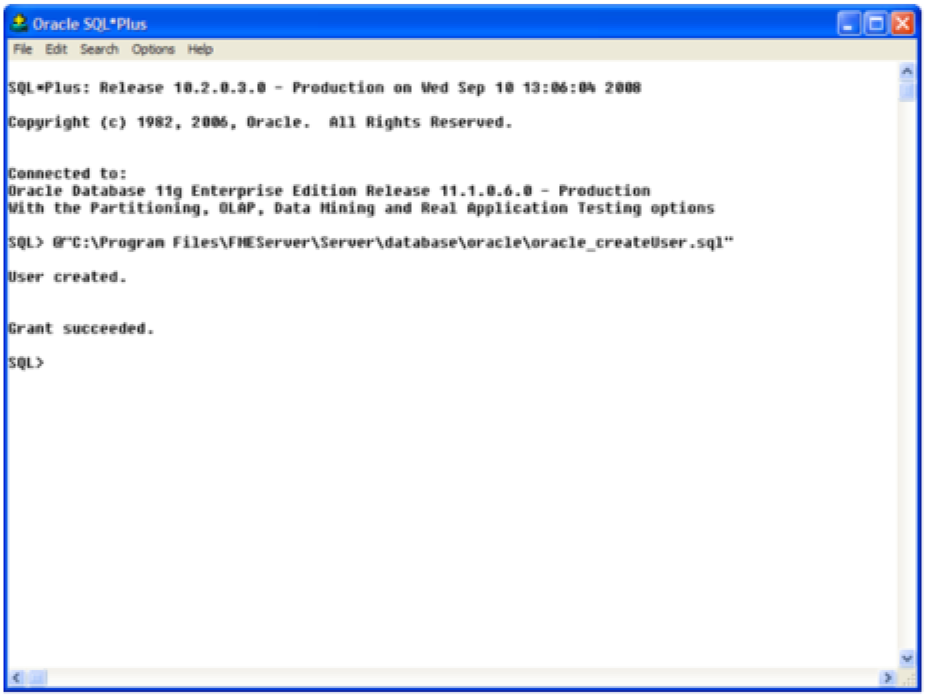
   - User: SYS AS SYSDBA
   - Password: fmeserver
   - String: XX-ORACLE11G:1521/ORCL AS SYSDBA



```
SQL*Plus: Release 11.1.0.6.0 - Production on Mon Nov 9 09:29:19 2009

Copyright (c) 1982, 2007, Oracle. All rights reserved.

Enter user-name: SYS AS SYSDBA
Enter password:

Connected to:
Oracle Database 11g Enterprise Edition Release 11.1.0.6.0 - Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL>
```

3. Create an FME Server database user as follows:
   a. In `oracle_createUser.sql`, replace `<<DATABASE_PASSWORD>>`with the password that was specified for the database during the FME Server installation.
   b. From the SQL prompt, run the `oracle_createUser.sql` script by entering the following command:

      `@”<FMEServerDir>\Server\database\oracle\oracle_createUser.sql”`



```
SQL*Plus: Release 10.2.0.3.0 - Production on Wed Sep 10 13:06:04 2008

Copyright (c) 1982, 2006, Oracle.  All Rights Reserved.


Connected to:
Oracle Database 11g Enterprise Edition Release 11.1.0.6.0 - Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL> @"C:\Program Files\FMEServer\Server\database\oracle\oracle_createUser.sql"

User created.


Grant succeeded.

SQL>
```

The default TABLESPACE is the Oracle DB configured default. If the created user doesn't have read/write permissions on the default TABLESPACE, change the default TABLESPACE or create an appropriate TABLESPACE.

This command creates a TABLESPACE on the Oracle DB server called FMESERVER shown in the following example:

```
CREATE SMALLFILE TABLESPACE FMESERVER DATAFILE
'E:\ORADATA\FMESERVER01.DBF' SIZE 100000K REUSE AUTOEXTEND
ON NEXT 2048K MAXSIZE 1024M LOGGING EXTENT MANAGEMENT LOCAL
SEGMENT SPACE MANAGEMENT AUTO DEFAULT NOCOMPRESS;
```

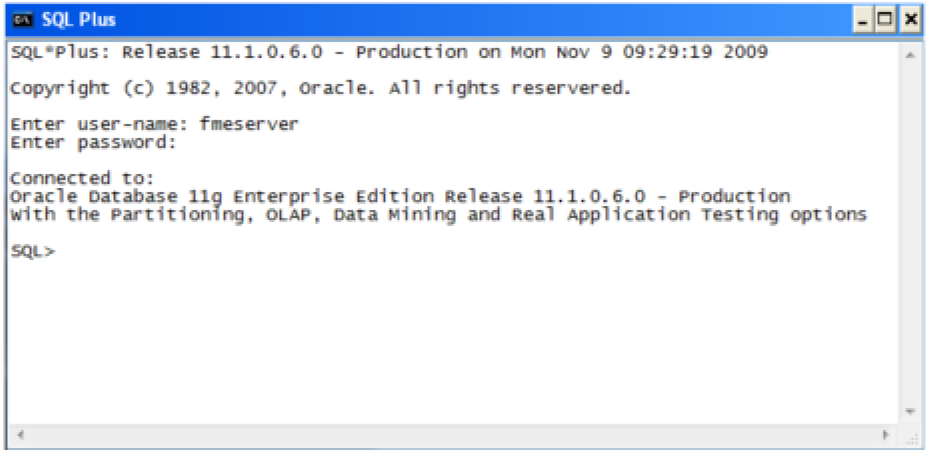
By default this command uses the TABLESPACE "FMESERVER" as shown in the following example:

```
CREATE USER fmeserver IDENTIFIED BY fmeserver DEFAULT
TABLESPACE "FMESERVER" TEMPORARY TABLESPACE "TEMP";
```

4. When an FME Server database user is created, you can connect to it by logging on again to SQL*Plus.

   In this example, the following parameters were used and entered on the user interface:

   - User: fmeserver
   - Password: fmeserver

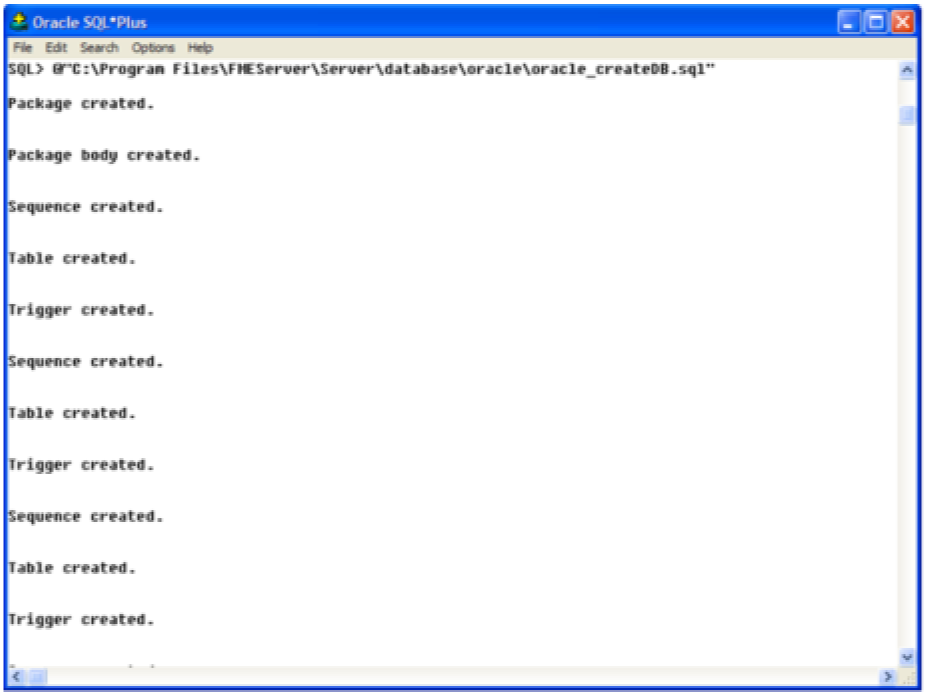


```
SQL*Plus: Release 11.1.0.6.0 - Production on Mon Nov 9 09:29:19 2009

Copyright (c) 1982, 2007, Oracle.  All rights reserved.

Enter user-name: fmeserver
Enter password:

Connected to:
Oracle Database 11g Enterprise Edition Release 11.1.0.6.0 - Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL>
```

> **Note** The preceding example assumes your user name and password are fmeserver.

5. When connected to the FME Server database, run the `oracle_createDB.sql` script by entering the following command:

   `@”<FMEServerDir>\Server\database\oracle\oracle_createDB.sql”`



```
SQL> @"C:\Program Files\FMEServer\Server\database\oracle\oracle_createDB.sql"

Package created.


Package body created.


Sequence created.


Table created.


Trigger created.


Sequence created.


Table created.


Trigger created.


Sequence created.


Table created.


Trigger created.
```

> **Note** If you drop the FME Server database and login user, run the oracle_dropUser.sql script.

Linux

Oracle SQL*Plus is a freeware client for connecting to an Oracle database. You can download it from the Internet using the following address:

https://www.oracle.com/technology/software/tech/sql_plus/index.html

For more information, see the Oracle web site at:

https://www.oracle.com/technology/sample_code/tech/sql_plus/htdocs/demobld.html

The instructions that follow describe how to configure Oracle for use with FME Server. These instructions describe using SQL*Plus for the database setup. Depending on your personal preference, you can also configure the Oracle database using other Oracle tools.

For Oracle configurations, various SQL scripts are provided to help with Oracle database configuration. These SQL scripts are located in the <FMEServerDir>`/Server/database oracle/` directory of the FME Server Core machine.

> **Note** This directory refers to the machine on which the FME Server Core is installed (not the machine on which the database server is installed). To run these scripts, you must transfer this directory to the database machine, or reference it through a UNC path.

- `oracle_createUser.sql` – This script creates the FME Server database user, and grants all required permissions to the FME Server database user. The password appears as `<<DATABASE_PASSWORD>>`. Before running this script, replace `<<DATABASE_PASSWORD>>` with the password that was specified for the database during the FME Server installation.
- `oracle_createDB.sql` – This script creates all FME Server related database packages, tables, indexes, views, and triggers.
- `oracle_dropUser.sql` – This script drops the FME Server database user and the database packages, tables, indexes, views, and triggers associated with the FME Server database user.

Using the Command Prompt

To use the command prompt to configure the database, follow these instructions:

1. Install the Oracle Client Tools, which includes SQL*Plus, if you haven’t already.
2. Run `sqlplus` and log on as a user with adequate privileges, such as SYSDBA.

   For example:

   ```
   sqlplus SYS/<password>@<Host>:<Port>/<service> AS SYSDBA
   ```

3. Create the FME Server database user:
   1. In a text editor, open the `oracle_creatorUser.sql` script and update the password `<<DATABASE_PASSWORD>>` to the one specified during the FME Server installation.
   2. From the SQL prompt, run the oracle_createUser.sql script by entering the following command:

      ```
      @”<FMEServerDir>/Server/database/oracle/oracle_
      createUser.sql”
      ```

      The default TABLESPACE is the Oracle DB configured default. If the created user doesn’t have read/write permissions on the default TABLESPACE, you need to change the default TABLESPACE or create an appropriate TABLESPACE.

      This command creates a TABLESPACE on the Oracle DB server called FMESERVER shown in the following example:

      ```
      CREATE SMALLFILE TABLESPACE FMESERVER DATAFILE
      '/ORADATA/FMESERVER01.DBF' SIZE 100000K REUSE AUTOEXTEND ON
      NEXT 2048K MAXSIZE 1024M LOGGING EXTENT MANAGEMENT LOCAL
      SEGMENT SPACE MANAGEMENT AUTO DEFAULT NOCOMPRESS;
      ```

      By default this command uses the TABLESPACE “FMESERVER” shown in this example:

      ```
      CREATE USER fmeserver IDENTIFIED BY fmeserver DEFAULT
      TABLESPACE "FMESERVER" TEMPORARY TABLESPACE "TEMP";
      ```

4. When an FME Server database user has been created, you can connect to it by logging on again to SQL*Plus or by entering the following command:

   ```
   CONNECT <UserName>/<Password>@<Host>:<Port>/<service>;
   ```

5. When connected to the FME Server database, run the oracle_createDB.sql script by entering the following command:

   ```
   @”<FMEServerDir>/Server/database/oracle/oracle_createDB.sql”
   ```

Database Configuration - PostgreSQL

PostgreSQL is an open source database that can be downloaded from the Internet. For more information, see the PostgreSQL web site at:

https://www.postgresql.com

It’s assumed that PostgreSQL is already installed .

One notation used is <FMEServerDir>, which is the installation directory of FME Server. In Windows, this is typically `C:\Program Files\FMEServer`.

It’s also assumed that you have JRE 5 or higher and PostgreSQL database installed before you proceed further. If you want to use the JDBC driver, there are several steps to perform.

If you are upgrading, you should back up any job history you want to keep.

Windows

This section describes how to configure a PostgreSQL database. You can configure this database from other PostgreSQL database tools, depending on your personal preference.

For a PostgreSQL database configuration, various SQL scripts are provided to assist you. These SQL scripts are located in the following directory:

```
<FMEServerDir>\Server\database\postgresql
```

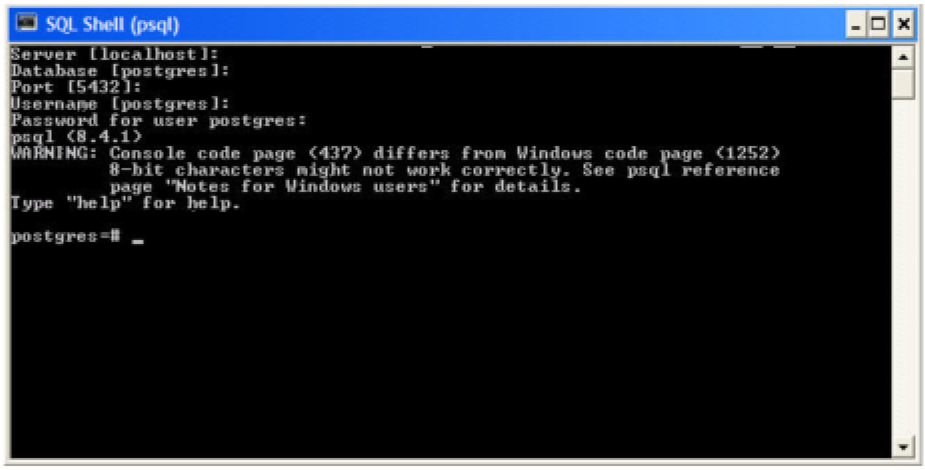
Note This directory refers to the machine on which the FME Server Core is installed (not the machine on which the database server is installed). To run these scripts, you must transfer this directory to the database machine, or reference it through a UNC path.

- `postgresql_createUser.sql` – This script creates the FME Server database user and password that you specified during installation, and grants all required permissions to this user. The password appears as `<<DATABASE_PASSWORD>>`. Before running this script, replace `<<DATABASE_PASSWORD>>` with the password that was specified for the database during the FME Server installation.
- `postgresql_createDB.sql` – This script creates the FME Server database.
- `postgresql_createSchema.sql` – This script creates all FME Server related tables, indexes, views, and triggers.
- `postgresql_dropUser.sql` – This script drops the FME Server database user.
- `postgresql_dropDB.sql` – This script drops the FME Server database.

Using the Command Prompt

To use the command prompt to configure the database, follow these instructions:

1. Install PostgreSQL SQL shell (`psql`) if you haven't done so already.
2. Open `psql` and log on as a user with the appropriate privileges:



```
Server [localhost]:
Database [postgres]:
Port [5432]:
Username [postgres]:
Password for user postgres:
psql (8.4.1)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

postgres=# _
```

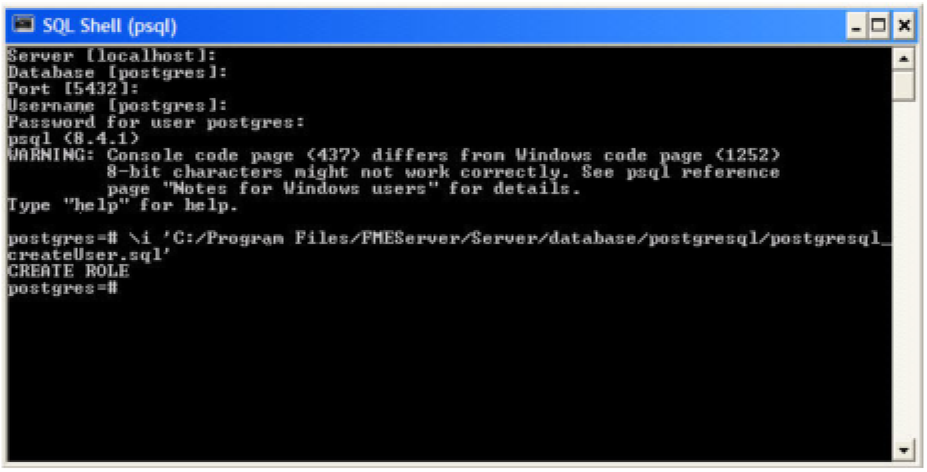
3. Create an FME Server database user as follows:

   a. Open `postgresql_createUser.sql` in a text editor, and replace `<<DATABASE_PASSWORD>>` with the password specified during the FME Server installation.

   b. From the SQL prompt, run the `postgresql_createUser.sql` script by entering the following command:

   ```
   \i '<FMEServerDIR>/Server/database/postgresql/postgresql_createUser.sql'
   ```

   By default, the provided SQL script creates the FME Server database user and password that you specified during installation:



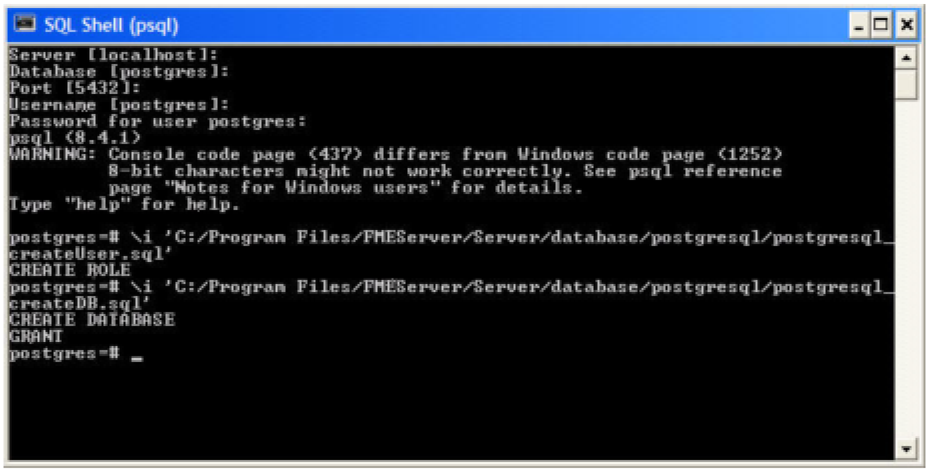
```
Server [localhost]:
Database [postgres]:
Port [5432]:
Username [postgres]:
Password for user postgres:
psql (8.4.1)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

postgres=# \i 'C:/Program Files/FMEServer/Server/database/postgresql/postgresql_
createUser.sql'
CREATE ROLE
postgres=#
```

4. Create an FME Server database.

From the SQL prompt, run the `postgresql_createDB.sql` script by entering the following command:

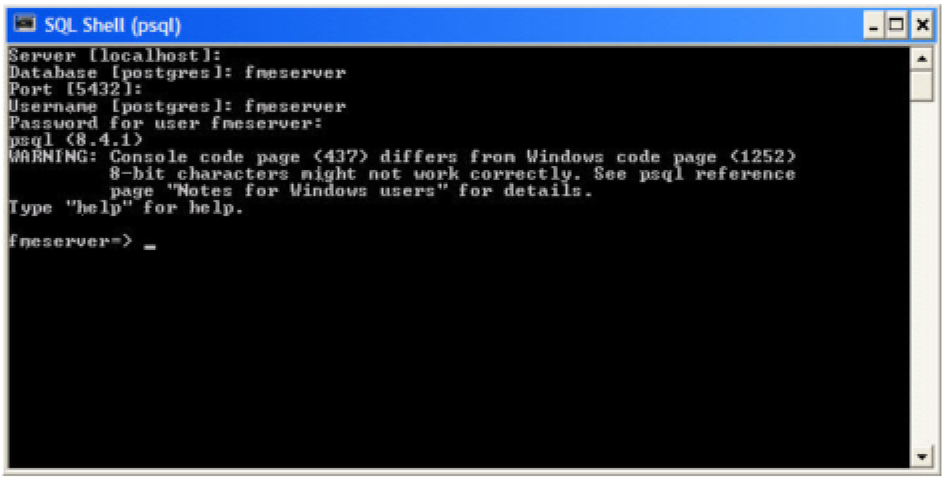
```
\i '<FMEServerDIR>/Server/database/postgresql/postgresql_createDB.sql'
```

By default, the provided SQL script creates an FME Server database named fmeserver and grants all privileges on the database to the user.



```
Server [localhost]:
Database [postgres]:
Port [5432]:
Username [postgres]:
Password for user postgres:
psql (8.4.1)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

postgres=# \i 'C:/Program Files/FMEServer/Server/database/postgresql/postgresql_
createUser.sql'
CREATE ROLE
postgres=# \i 'C:/Program Files/FMEServer/Server/database/postgresql/postgresql_
createDB.sql'
CREATE DATABASE
GRANT
postgres=# _
```

5. Quit `psql` and log on as the FME Server database user.



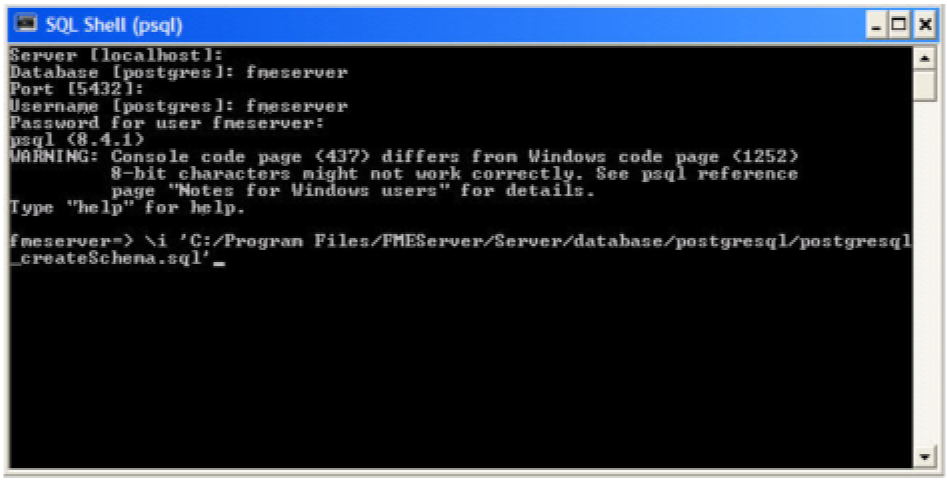
```
Server [localhost]:
Database [postgres]: fmeserver
Port [5432]:
Username [postgres]: fmeserver
Password for user fmeserver:
psql (8.4.1)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

fmeserver=> _
```

6. Create the FME Server database schema as follows:

From the SQL prompt, run the `postgresql_createSchema.sql` script by entering the following command:

```
\i '<FMEServerDir>/Server/database/postgresql/postgresql_createSchema.sql'
```

By default, the provided SQL script creates all FME Server related tables, indexes, views, and triggers.



```
Server [localhost]:
Database [postgres]: fmeserver
Port [5432]:
Username [postgres]: fmeserver
Password for user fmeserver:
psql (8.4.1)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

fmeserver=> \i 'C:/Program Files/FMEServer/Server/database/postgresql/postgresql
_createSchema.sql'_
```

Linux

This section describes configuring PostgreSQL from both the command prompt and a user interface, such as the PostgreSQL Query Browser and the PostgreSQL Administrator.

For PostgreSQL configurations, various SQL scripts are provided to help with PostgreSQL database configuration. These SQL scripts are located in the <FMEServerDir>`/Server/database/postgresql/` directory of the FME Server Core machine.

> **Note** This directory refers to the machine on which the FME Server Core is installed (not the machine on which the database server is installed). To run these scripts, you must transfer this directory to the database machine, or reference it through a UNC path.

- `postgresql_createUser.sql` – This script creates the FME Server database user and password that you specified during installation, and grants all required

permissions to the FME Server database user. The password appears as `<<DATABASE_PASSWORD>>`. Before running this script, replace `<<DATABASE_PASSWORD>>` with the password that was specified for the database during the FME Server installation.

> **Note** The password is encrypted and appears in the script as `<<DATABASE_PASSWORD>>`.

- `postgresql_createDB.sql` – This script drops the FME Server database and creates a new one with the required FME Server tables. By default this database is named fmeserver. Be careful when running this script because it drops the existing FME Server database.
- `postgresql_createSchema.sql` – This script creates all FME Server related tables, indexes, views, and triggers.

> **Note** This script must be run as user fmeserver.

- `postgresql_dropDB.sql` – This script drops the existing FME Server database, which is named fmeserver by default.
- `postgresql_dropUser.sql` – This script drops the FME Server database user.

Using the Command Prompt

To use the command prompt to configure the database, follow these instructions:

1. Install PostgreSQL Server if you haven't already.
2. Open a command prompt and change to the following directory, which contains the PostgreSQL SQL scripts:

   `<FMEServerDir>/Server/database/postgresql/`

3. Open `postgresql_createUser.sql` in a text editor, and replace `<<DATABASE_PASSWORD>>` with the password specified during the FME Server installation.

4. Run the postgresql program with the postgresql_createUser.sql script:

   ```
   psql -d postgres -h <hostname> -p <port> -f postgresql_createUser.sql
   ```

5. Run the postgresql program with the postgresql_createDB.sql script:

   ```
   psql -d postgres -h <hostname> -p <port> -f postgresql_createDB.sql
   ```

6. Run the postgresql program with the postgresql_createSchema.sql script, as the user you specified during installation:

   ```
   psql -U <username> -d fmeserver -h <hostname> -p <port> -f postgresql_createSchema.sql
   ```

> **Note** If you drop the FME Server database and login user, run the postgresql program with the appropriate postgresql_dropDB.sql or postgresql_dropUser.sql scripts.

After Database Creation

1. On the machine on which the FME Server database server is installed, open pg_hba.conf. For default installation directories of this file:
   - PostgreSQL 10: `<`*`PostgreSQLDir`*`>\data\pg10\pg_hba.conf`
   - PostgreSQL 11: `C:\Program Files\PostgreSQL\11\data\pg_hba.conf`

2. Change the following lines:

   ```
   host    all     all    127.0.0.1/32     md5
   host    all     all      ::1/128        md5
   ```

   to:

   ```
   host    all     all 0.0.0.0/0        md5
   ```

```
    host    all      all     ::/0                md5
    ```
    3. Restart the FME Server Database service.

2. **Enable connections**: FME Server connects to the database when it starts. Therefore, ensure that your database server is running and configured to accept incoming connections before FME Server is started. The database must allow connections over TCP/IP with all machines on which the FME Server Core and FME Engines are installed.
3. Ensure that all installations of FME Server are running. For more information, see Working with the FME Server System Services.

What's Next?

- Set Up the Load Balancer and Configure with FME Server

Set Up the Load Balancer and Configure with FME Server

Use these instructions to:

1. Set up your load balancer to prepare for routing traffic between each FME Server instance you installed under Installing a Scalable, Fault-Tolerant FME Server.
2. Configure FME Server to recognize the load balancer URL.

Set Up the Load Balancer

Load Balancing the FME Server Web Services

Required

- Route traffic on port 80 (Windows) or port 8080 (Linux) to each FME Server instance in your deployment.

Recommended

- Set up a health check for FME Server. A health check endpoint determines if either the FME Server Web Services or FME Server Core node is down, and if so, requests are not routed to that server. Without a health check configured, the load balancer may try to route client requests to an unhealthy (down) server. The consequences of routing requests to an unhealthy server vary depending on the load balancer, and may result in error responses or long delays in response due to request timeouts and retrying on a healthy server.

Optional

- Configure timeouts for client- and server-side inactivity. When configuring timeouts, consider that longer timeouts on the server are appropriate for time-consuming operations, particularly running workspaces that take a long time to complete.

Load Balancing the WebSocket Server

An FME Server WebSocket Server runs on each FME Server instance, but only one WebSocket Server should be used at a time. The WebSocket Server is used mainly for Notification Service Topic Monitoring.

Required

- Route traffic on port 7078 to one WebSocket Server, and switch to others if the one in use fails. If the load balancer does not support automatic failover to backup servers, then manual intervention is required to route to a healthy WebSocket Server.

Recommended

- Set longer client- and server-side timeouts to allow for longer WebSocket connections.

Configure FME Server with the Load Balancer URL

To configure FME Server to recognize the load balancer URL, perform the following tasks in the FME Server Web User Interface:

Update Service URLs

- On the Services page, click **Change All Hosts**. In the Change All Hosts dialog, enter the public load balancer URL, and click **OK**.

Update Topic Monitoring URL

1. On the Networking page, expand Topic Monitoring.
2. Under Fault Tolerant Configuration, update the *Internal WebSocket URL* field with the public load balancer URL. Automations Destinations (and Notification Service Subscribers) use this URL to communicate with the FME Server WebSocket Server. The load balancer URL redirects requests to the active WebSocket Server.
3. If necessary, update Advanced Routing settings:
   - *External WebSocket Host*: The load balancer name. For example:

     ```
     fme-server-loadbalancer
     ```

     This setting does not likely need to be changed, and should only be set if you use separate hosts to route HTTP and Websocket traffic to FME Server.
   - *External WebSocket Port*: If the WebSocket Server is accessed through a port other than 7078, specify the port number here. Otherwise, leave blank.
4. Click **Save**.

Update Reset Password URL (Optional)

If you plan to enable the Reset Password feature, update the *Public URL* field on the Reset Password page with the public load balancer URL, and click **Save**.

What's Next?

Proceed to Log on to the Web User Interface.

Log on to the Web User Interface

To log in to the Web User Interface for the first time as an administrator following installation, specify *Username* `admin` and *Password* `admin`. You will be prompted to update the `admin` password upon initial use, based on the default Password Policy configuration.

For more information and support:

- FME Server Troubleshooting: Web Interface Login
- Accessing the Web User Interface
- Changing the Login Password
- Default User Accounts and Passwords
- Role-Based and User-Based Access Control

What's Next?

- Request and Install a License

Request and Install a License

License files are installed, by default, to:Windows: `C:\ProgramData\Safe Software\FME Server\licenses`Linux: `/opt/fmeserver/licenses`Dynamic Engine (CPU Usage) licensing is not available for engines on FME Cloud.

Automatic Mode (Recommended)

If your FME Server host machine has an internet connection, you can request and install a license online without any need for downloading and re-uploading a license file.

> **Note**
>
> » Licensing FME Server over the internet requires no inbound connection. For more information, see FME Server Automatic Licensing URLs.
>
> » If you purchased credits for Dynamic Engines (CPU Usage), automatic mode only is supported. Manual mode licensing (below) is not supported.

1. Open the FME Server Web User Interface as a user assigned to the fmesuperuser role. If none of your FME Engines are licensed, you will see a prompt to activate FME Server. Click on the prompt. Otherwise, select **System Configuration** >

Licensing.

2. Click **Request New License**.
3. Complete the fields on the Request a New License page. If you have a product *Serial Number*, be sure to provide it. If not, you will receive a 7-day evaluation license, which you can extend to 60 days (see below).

> **Note** In addition to licenses for standard FME Engines, an evaluation license that is requested in Automatic Mode includes 100 hours of Dynamic Engine (CPU Usage) credits.

4. *Licensing Mode*: Select **Automatic**.
5. Click **OK**.
6. A message indicates that your license is installed, and your available engines appear momentarily on the Engines page.

> **Note** If the Serial Number you provided includes Dynamic Engines (CPU Usage), they are not configured to start by default. You can start and configure your Dynamic Engines on the Engines page.

Manual Mode

If you prefer not to use an internet connection for licensing, or if your FME Server host machine does not have an internet connection, use this process to install a license.

> **Note** If you purchased credits for Dynamic Engines (CPU Usage), manual mode licensing is not supported. Use automatic mode for licensing (above). For more information, contact your Safe Software sales representative.

1. Open the FME Server Web User Interface as a user assigned to the fmesuperuser role. If none of your FME Server engines are licensed, you will see a prompt to activate

FME Server. Click on the prompt. Otherwise, select **System Configuration** > **Licensing**.

2. Click **Request New License**.
3. Complete the fields on the Request a New License page. If you have a product *Serial Number*, be sure to provide it. If not, you will receive a 7-day evaluation license, which you can extend to 60 days (see below).
4. *Licensing Mode*: Select **Manual**.
5. Click **OK**. A license request .json file downloads.
6. Email the .json file to codes@safe.com.
7. You will receive an email from Safe Software with a license file, which has a `.fmelic` extension. Download the file.
8. Return to the Licensing page. Under Standard Engines, click **Upload License File** and select the `.fmelic` file to upload. Or, drag and drop the `.fmelic` file onto the page under Standard Engines. A message indicates that it is installed, and your available engines appear on the Engines page.

Extending an Evaluation License

If you installed a 7-day evaluation license, you should have an email from codes@safe.com that allows you to extend the license to 60 days.

Automatic Mode (Recommended)

If your FME Server host machine has an internet connection, you can extend an evaluation license online without any need for downloading and re-uploading a license file.

1. Open the email and click the link as instructed.
2. A web page opens indicating the request was successful. Additionally, a link is provided to download the license file. Click the link to download the file for safekeeping.
3. Return to **System Configuration** > **Licensing** and click **Refresh License**. The license should now be extended accordingly. The EXPIRES field shows the new expiry date.

Manual Mode

If you prefer not to use an internet connection for licensing, or if your FME Server host machine does not have an internet connection, use this process to extend an evaluation license.

1. Open the email and click the link as instructed.
2. A web page opens indicating the request was successful. Additionally, a link is provided to download the license file. Click the link to download the file.
3. Return to **System Configuration** > **Licensing** and click **Upload License File**. Or, drag and drop the file onto the page. (You may need to move the license to a location where it can be accessed). A message indicates that it is installed. The license should now be extended accordingly. The EXPIRES field shows the new expiry date.

Problems?

- FME Server Troubleshooting: FME Server Engines
- Contact codes@safe.com.

See Also

- FME Server Licensing Walk-Through
- FME Server Automatic Licensing URLs
- FME Engines

What's Next?

- Test the Installation

Test the Installation

To test your FME Server installation, confirm that FME Server can perform its primary function—running a job.

1. On the Run Workspace page, specify:
    - Repository: Samples
    - Workspace: austinApartments.fmw
    - Service: Job Submitter
2. Click Run Workspace.

    If you see a success message, your install was a success.

Distributing Components (2-Tier)

Before installing a 2-tier distributed architecture, make sure you have:

- Reviewed Planning an FME Server Installation.
- Provided the prerequisites in Before Installation.
- Linux: Ensured System Requirements are met, including updates and dependencies.

To perform a 2-tier installation of FME Server:

1. Obtain the Installer
2. Install the FME Server Database

    > **Note** Complete this step *only* if you wish to install a PostgreSQL database that is included with the FME Server installer, and do *not* wish to configure the FME Server Database on your own database server. For more information, see Provide a Database Server.

3. Install the FME Server Core, FME Engines, and Web Application Server.
4. Configure the FME Server Database

> **Note** Complete this step *only* if you are configuring the FME Server Database on your own database server, and did *not* install the PostgreSQL database that is included with the FME Server installer. For more information, see Provide a Database Server.

5. Start the FME Server system services. Following a distributed installation, the FME Server system services do not start automatically. You must manually start them on each machine that is hosting FME Server components.
6. Log on to the Web User Interface
7. Request and Install a License
8. (Recommended) Update the Windows service accounts that run the FME System Services.
9. (Upgrade Only) Restore your FME Server Configuration from a Previous Installation.
10. Test the Installation.

What's Next?

Optimize: You can scale-up your FME Server by:

- Increasing the number of FME Engines that run when you start FME Server.
- Adding FME Engines on separate machines that are closer to your data.

For more information, see Planning for Scalability and Performance.

Before Installation

Before you install the FME Server components for a 2-tier system, ensure the following non-FME Server components are in place on your network:

- Database server on a separate machine.
- File system on a separate machine.

Next Steps

Proceed to Obtain the Installer.

Provide a Database Server

FME Server uses its own database to manage jobs and workspace information. It is not a source or destination data source for FME workspaces.

To ensure the FME Server Database remains available in a failover scenario, provide a machine on which to install the database that is physically separate from the machines on which the FME Servers are installed. In addition to being physically separate, the database server should, by itself, be configured for fault tolerance.

You can choose to install a PostgreSQL database that is included with the FME Server installer, or you can configure the FME Server Database on your own database server. If you use your own database server, keep in mind the following:

- PostgreSQL, Oracle, and SQL Server are supported. The following versions are recommended:
  - PostgreSQL: 11.x or later.
  - Oracle: 12c or later.
  - SQL Server: 2016 or later.
- When you install the FME Servers, the database server must be running and you must know the connection information.
- If using an Oracle database server, you must obtain the Oracle Database JDBC driver. For more information, see https://www.oracle.com/technetwork/database/application-development/jdbc/downloads/index.html.

  > **Note** Oracle Database JDBC driver versions that use ojdbc10.jar are *not* supported.

- Following installation, you must be able to create a new database on the server using SQL scripts.

For information about acquiring a fault-tolerant database server, consult your IT department.

Updating the FME Server Database Password

If you choose to install a PostgreSQL database that is included with the FME Server installer, and want to update the password for the database user account, follow these instructions:

1. Start pgAdmin4.exe from <*FMEServerDir*>\Utilities\pgsql\pgAdmin 4\bin\.
2. If this is your first time starting pgAdmin4, it will prompt you to set a master password. Choose something you will remember.
3. If pgAdmin auto-connects to the FME Server Database, an entry appears in the Object browser, under Servers, similar to the following:

   ```
   fmeserver (<hostname>:7082)
   ```

   If pgAdmin III does not auto-connect to the FME Server Database, add a new Server for it. To add a New Server:

   a. Right-click on **Servers** and Select **Create** > **Server...**.
   b. In the **General** tab of the Create - Server dialog, specify the *Name* for the server connection. This can be anything, such as `fmeserver`.
   c. In the **Connection** tab of the Create - Server dialog, specify the server properties, using the `Database Connection` details in the fmeDatabaseConfig configuration

file, for DB_TYPE=postgresql, as follows:

Property	Value from fmeDatabaseConfig.txt
Host name/address	DB_JDBC_URL=jdbc:postgresql://<***hostname***>:<*port*>/<database_name>
Port	DB_JDBC_URL=jdbc:postgresql://<*hostname*>:<***port***>/<*database_name*>
Maintenance database	DB_JDBC_URL=jdbc:postgresql://<*hostname*>:<*port*>/<***database_name***>
Username	DB_USERNAME=<***username***>
Password	DB_PASSWORD=<***password***>

d. Click **Save**.

4. In the Object browser, select the FME Server Database server, and locate and expand **Login/Group Roles**.
5. Right-click the fmeserver database user account and select **Properties**. Under **Definition**, change the *Password* and click **Save**.
6. In the fmeDatabaseConfig configuration file, update the value of the DB_PASSWORD parameter that corresponds to DB_TYPE=postgresql with the new password specified above.

   When finished, save the file.
7. (Recommended) Encrypt the FME Server Database password.

8. Restart FME Server.

1. Open a command prompt and change to the following directory:

   <*FMEServerDir*>/Utilities/pgsql/bin

2. Run the following command to connect to the FME Server Database:

   ```
   ./psql -d <databaseName> -p <port> -U <username>
   ```

   To confirm the settings, check the `Database Connection` details in the fmeDatabaseConfig configuration file, for `DB_TYPE=postgresql`, as follows:

Property	Value from fmeDatabaseConfig.txt
-d	DB_JDBC_URL=jdbc:postgresql://<*hostname*>:<*port*>/<***database_name***>
-h	DB_JDBC_URL=jdbc:postgresql://<***hostname***>:<*port*>/<*database_name*>
-p	DB_JDBC_URL=jdbc:postgresql://<*hostname*>:<***port***>/<*database_name*>
-U	DB_USERNAME=<***username***>
Password (when prompted)	DB_PASSWORD=<***password***>

3. Once connected, enter the following command to change the password for your user:

   ```
   \password
   ```

4. Use `\q` to quit psql.

5. In the the fmeDatabaseConfig configuration file, update the value of the `DB_PASSWORD` parameter that corresponds to `DB_TYPE=postgresql` with the new password specified above, and save the file.
6. (Recommended) Encrypt the FME Server Database password.
7. Restart FME Server.

Provide a Remote File System for the FME Server System Share

- ***Skill Level***: Intermediate
- ***Estimated Time Required***: 5-15 minutes
- ***Prerequisites***:
  - Domain Service Account has correct permissions on network shares.

FME Server System Share files, which include Repositories and Resources, are installed in specific directories that are shared to enable access from different computers.

Create a directory for the FME Server System Share that is physically separate from the machine on which the FME Server Core and web application server are installed. Separating the file system ensures it remains available in a fault tolerant scenario.

When providing a remote file system, keep in mind the following:

- The accounts that run the FME Server components must have read and write permissions on the remote file system directory. For more information, see Directory and Account Permissions.
- In addition to being physically separate, the file system should, by itself, be configured for fault tolerance.
- When the directory is specified during installation, it must be in the form of a UNC path. Mapped drives are not supported.
- The directory that holds the System Share must be empty, unless System Share folders have already been created there as part of an installation involving multiple FME Server Cores.

For information about acquiring a fault tolerant file system, consult your IT department.

Linux Only

For distributed installations on Linux, it is necessary to create a user, prior to installation, on the machine that will host the installation of the FME Server Core and Engines. This user must be named 'fmeserver' and belong to group 'fmeserver', and be granted permissions on the FME Server System Share. For more information, see Directory and Account Permissions.

Example Instructions

The following example creates user 'fmeserver' in group 'fmeserver', and allows mount /mnt/data to be writable by the newly-created user.

> **Note** The following instructions are provided as a general guideline for adding a user and mounting a directory. Exact instructions may vary depending on the distribution and share type in your Linux configuration.

1. Run the following commands in the Linux command line:

   ```
   groupadd fmeserver
   useradd -m -g fmeserver fmeserver
   ```

2. Mount the FME Server System Share directory so that user 'fmeserver' has read and write permissions. For example, to mount a Windows-based file share:

   ```
   mount -v -t cifs //network/share /mnt/data -o gid=1008,uid=1008
   ```

   `gid` and `uid` are the group id and user id of the user and group that were created. These id's can be found using these commands:

   ```
   id -g fmeserver
   id -u fmeserver
   ```

Obtain the Installer

To obtain the applicable FME Server installation package, visit the FME Downloads page. This page includes download links to release and beta installation packages for various platforms.

To request a 60-day trial license of FME Server, visit http://www.safe.com/fme/fme-technology/fme-server/trial-download/.

You can also contact sales@safe.com to get access.

What's Next?

If you are opting to install a PostgreSQL database that is included with the FME Server installer, and do *not* wish to configure the FME Server Database on your own database server, proceed to Install the FME Server Database. Otherwise, proceed to Install the FME Server Core, FME Engines, and Web Application Server.

Install the FME Server Database

Install a PostgreSQL FME Server Database on a separate machine on your network.

> **Note** Complete this step *only* if you wish to install a PostgreSQL database that is included with the FME Server installer, and do *not* wish to configure the FME Server Database on your own database server. For more information, see Provide a Database Server.

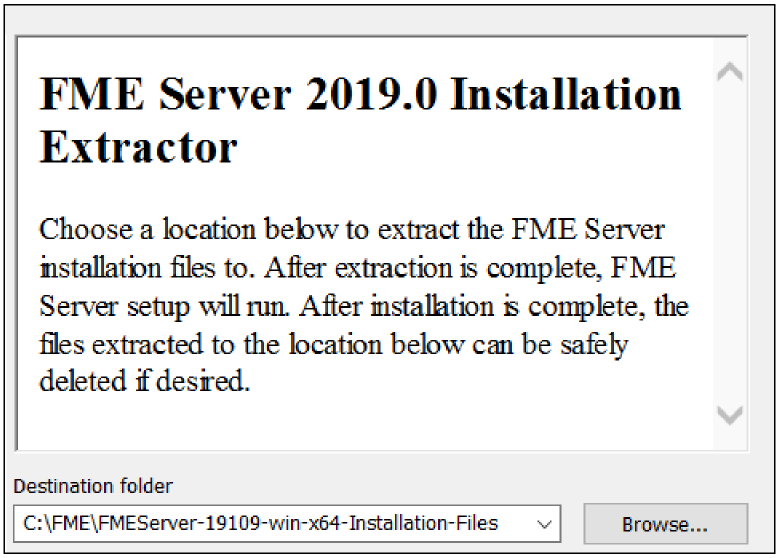
Start the FME Server installer.

(Windows only) Installation Extractor

On the Installation Extractor dialog, specify a *Destination folder* in which to extract installation files. Note that this folder *only* specifies where installation files are extracted—it does *not* specify where FME Server program files are installed. That location is specified later in the installer.

Tip Take note of the specified *Destination folder* location. Following installation, you may wish to:

- Review the installation .log file.
- Remove these files. Doing so saves almost 2 GB disk space.



FME Server 2019.0 Installation Extractor

Choose a location below to extract the FME Server installation files to. After extraction is complete, FME Server setup will run. After installation is complete, the files extracted to the location below can be safely deleted if desired.

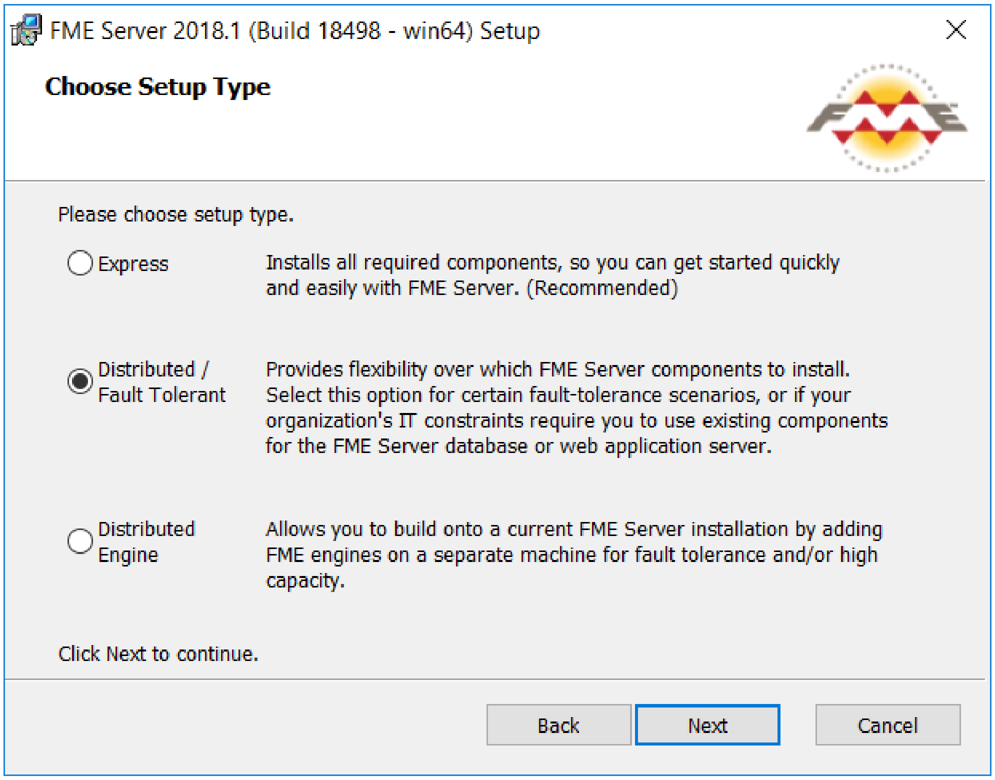
Destination folder: C:\FME\FMEServer-19109-win-x64-Installation-Files

Click **Install**.

When extraction is complete, the installer opens. Proceed through the installer to the Choose Setup Type dialog.

Choose Setup Type

Select the Distributed/Fault Tolerant install option.



FME Server 2018.1 (Build 18498 - win64) Setup

Choose Setup Type

Please choose setup type.

○ Express — Installs all required components, so you can get started quickly and easily with FME Server. (Recommended)

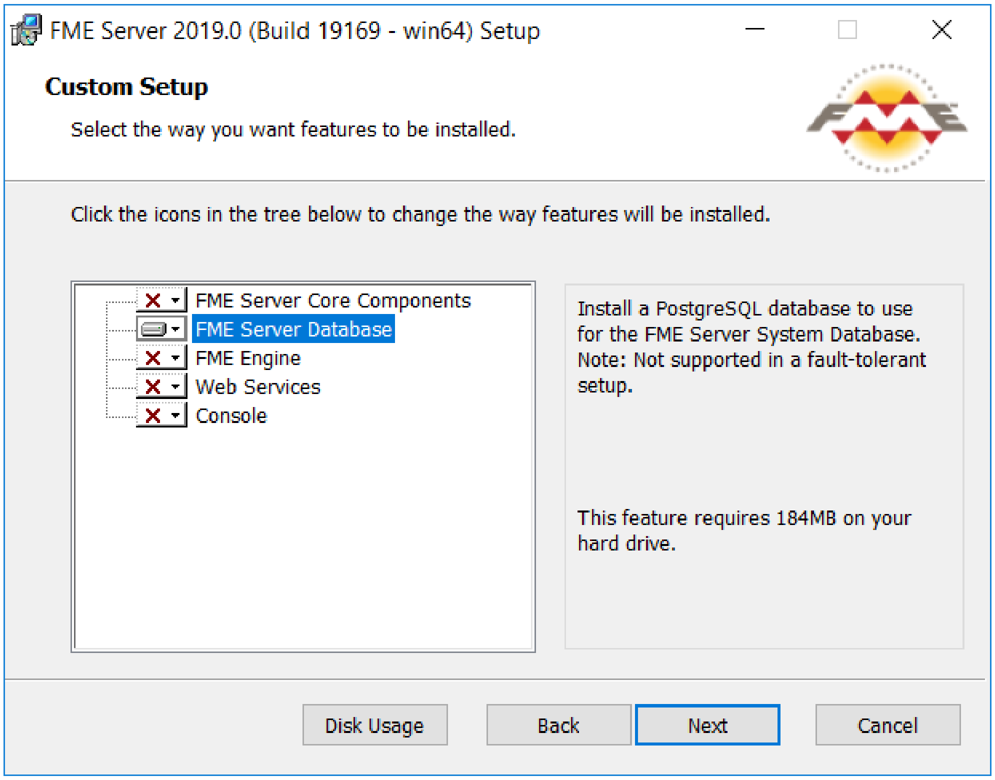
● Distributed / Fault Tolerant — Provides flexibility over which FME Server components to install. Select this option for certain fault-tolerance scenarios, or if your organization's IT constraints require you to use existing components for the FME Server database or web application server.

○ Distributed Engine — Allows you to build onto a current FME Server installation by adding FME engines on a separate machine for fault tolerance and/or high capacity.

Click Next to continue.

Custom Setup

Specify FME Server Database. Unselect all other components.



FME Server 2019.0 (Build 19169 - win64) Setup

Custom Setup

Select the way you want features to be installed.

Click the icons in the tree below to change the way features will be installed.

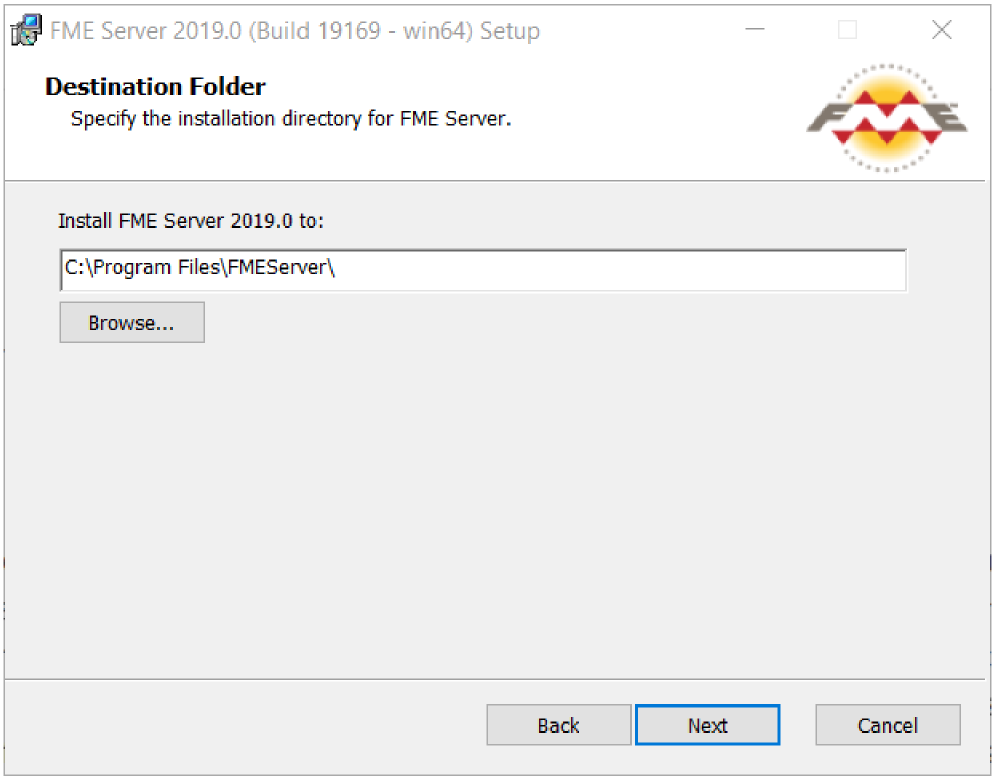
- ✗ FME Server Core Components
- FME Server Database
- ✗ FME Engine
- ✗ Web Services
- ✗ Console

Install a PostgreSQL database to use for the FME Server System Database. Note: Not supported in a fault-tolerant setup.

This feature requires 184MB on your hard drive.

Destination Folder

Specify the installation directory for the FME Server Database.



Destination Folder

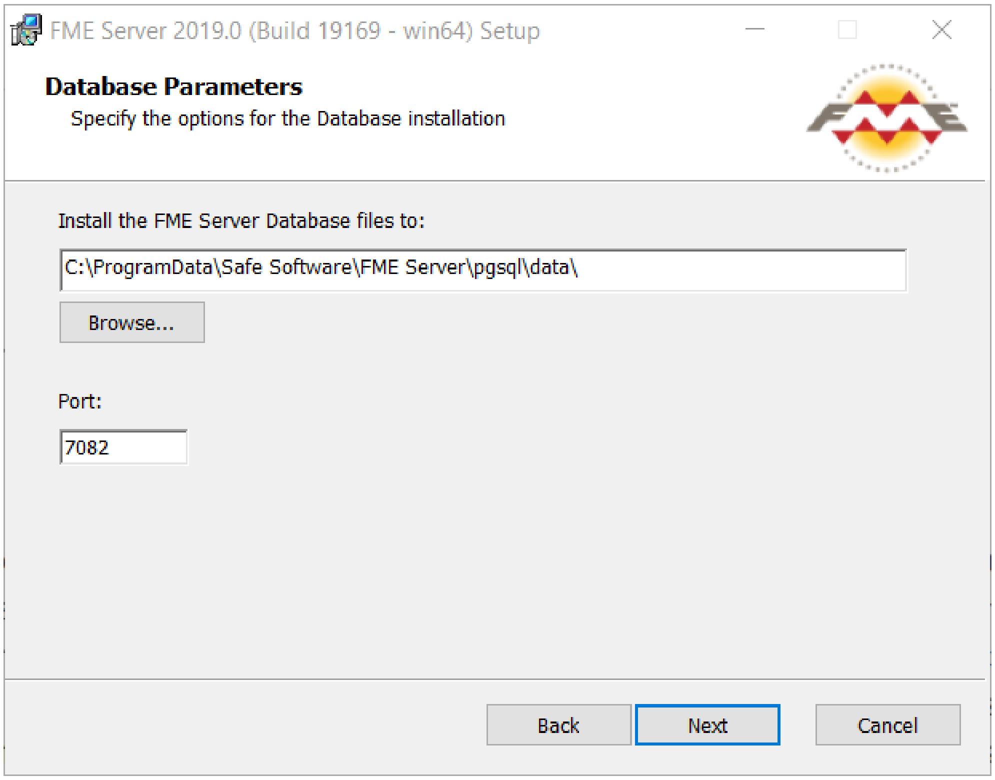
Specify the installation directory for FME Server.

Install FME Server 2019.0 to:

C:\Program Files\FMEServer\

Database Parameters

- *Install the FME Server Database files to*: Specify a directory to install the database files.
- *Port*: Specify the port that the database will listen on. Port **7082** is the default.



FME Server 2019.0 (Build 19169 - win64) Setup

Database Parameters

Specify the options for the Database installation

Install the FME Server Database files to:

C:\ProgramData\Safe Software\FME Server\pgsql\data\

Port:

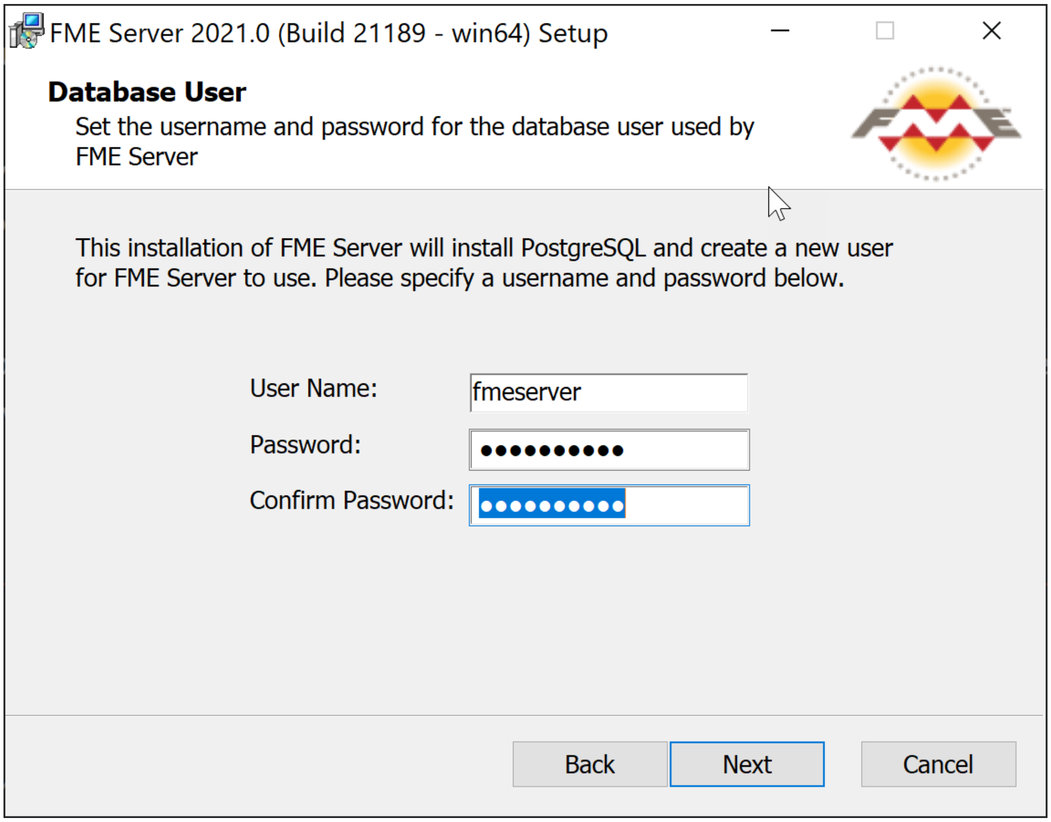
7082

Database User

Specify a *User Name* (defaults to **fmeserver**) and *Password* for the database user account.

Warning Do not specify *User Name* **postgres**. This name corresponds to the PostgreSQL master user. If the corresponding passwords do not match, the database will not install.

Note The password for the FME Server Database user account is encrypted in FME Server installation files. Take note of the *User Name* and *Password* that you specified. You may need to reference it later.



FME Server 2021.0 (Build 21189 - win64) Setup

Database User

Set the username and password for the database user used by FME Server

This installation of FME Server will install PostgreSQL and create a new user for FME Server to use. Please specify a username and password below.

User Name: fmeserver

Password: ●●●●●●●●●●

Confirm Password: ●●●●●●●●●●

Follow the remaining dialogs to complete the installation.

What's Next?

- Install the FME Server Core, FME Engines, and Web Application Server

Install the FME Server Core, FME Engines, and Web Application Server

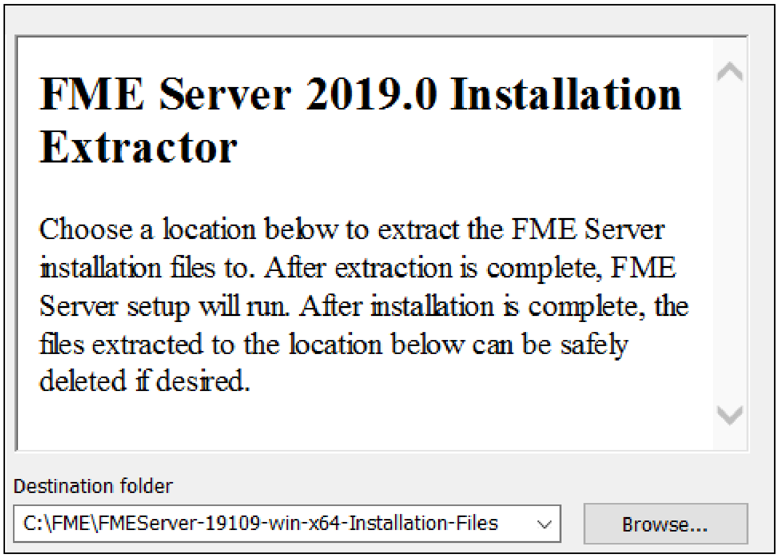
Start the FME Server Installer.

(Windows only) Installation Extractor

On the Installation Extractor dialog, specify a *Destination folder* in which to extract installation files. Note that this folder *only* specifies where installation files are extracted—it does *not* specify where FME Server program files are installed. That location is specified later in the installer.

Tip Take note of the specified *Destination folder* location. Following installation, you may wish to:

- Review the installation .log file.
- Remove these files. Doing so saves almost 2 GB disk space.



FME Server 2019.0 Installation Extractor

Choose a location below to extract the FME Server installation files to. After extraction is complete, FME Server setup will run. After installation is complete, the files extracted to the location below can be safely deleted if desired.

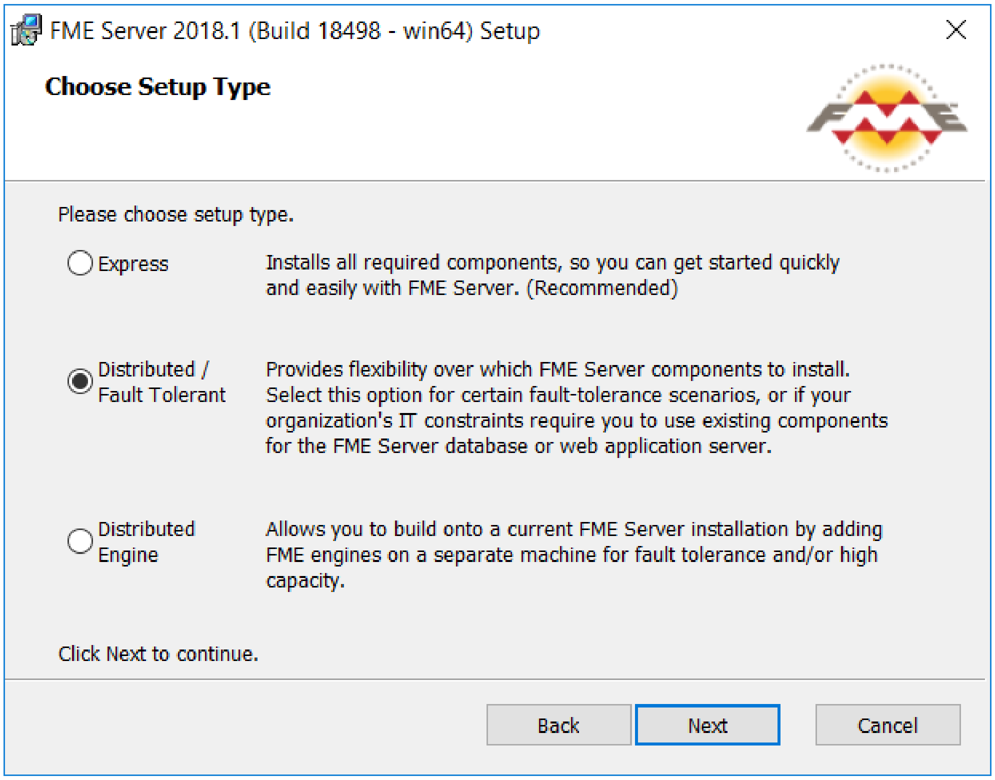
Destination folder: C:\FME\FMEServer-19109-win-x64-Installation-Files

Click **Install**.

When extraction is complete, the installer opens. Proceed through the installer to the Choose Setup Type dialog.

Choose Setup Type

Select the Distributed/Fault Tolerant install option.


FME Server 2018.1 (Build 18498 - win64) Setup

Choose Setup Type

Please choose setup type.

○ Express — Installs all required components, so you can get started quickly and easily with FME Server. (Recommended)

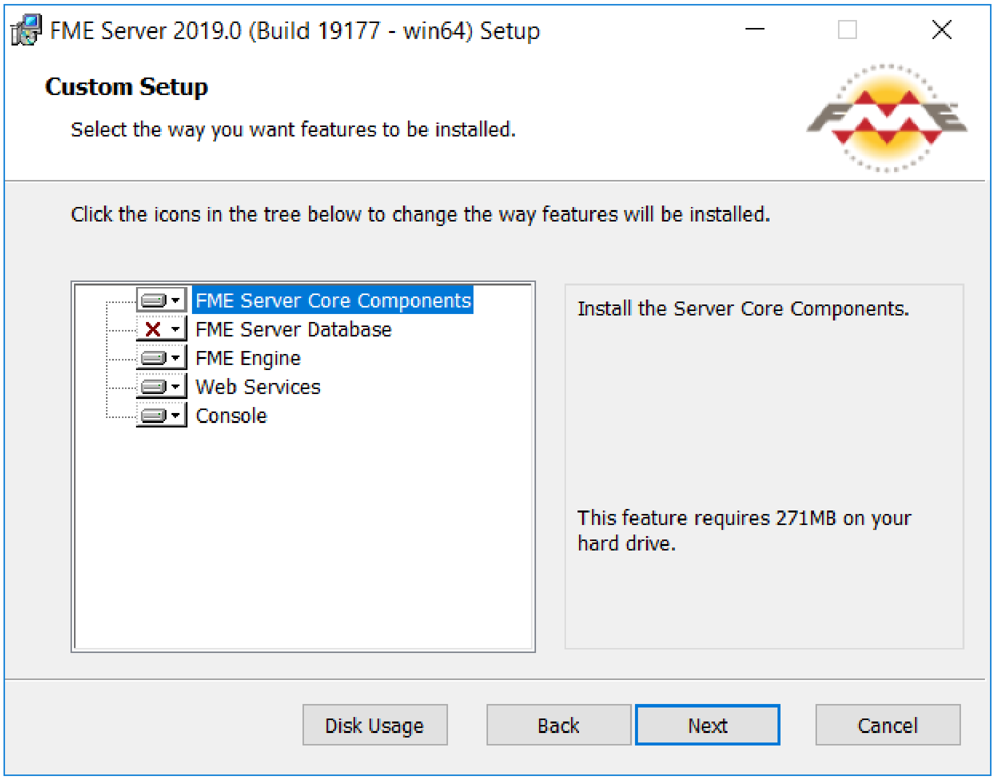
● Distributed / Fault Tolerant — Provides flexibility over which FME Server components to install. Select this option for certain fault-tolerance scenarios, or if your organization's IT constraints require you to use existing components for the FME Server database or web application server.

○ Distributed Engine — Allows you to build onto a current FME Server installation by adding FME engines on a separate machine for fault tolerance and/or high capacity.

Click Next to continue.

Custom Setup

Select **FME Server Core Components**, **FME Engine**, and **Web Services**. Do *not* select **FME Server Database**. (Optionally, select **Console**. For more information, see FME Server Console.)



FME Server 2019.0 (Build 19177 - win64) Setup

Custom Setup

Select the way you want features to be installed.

Click the icons in the tree below to change the way features will be installed.

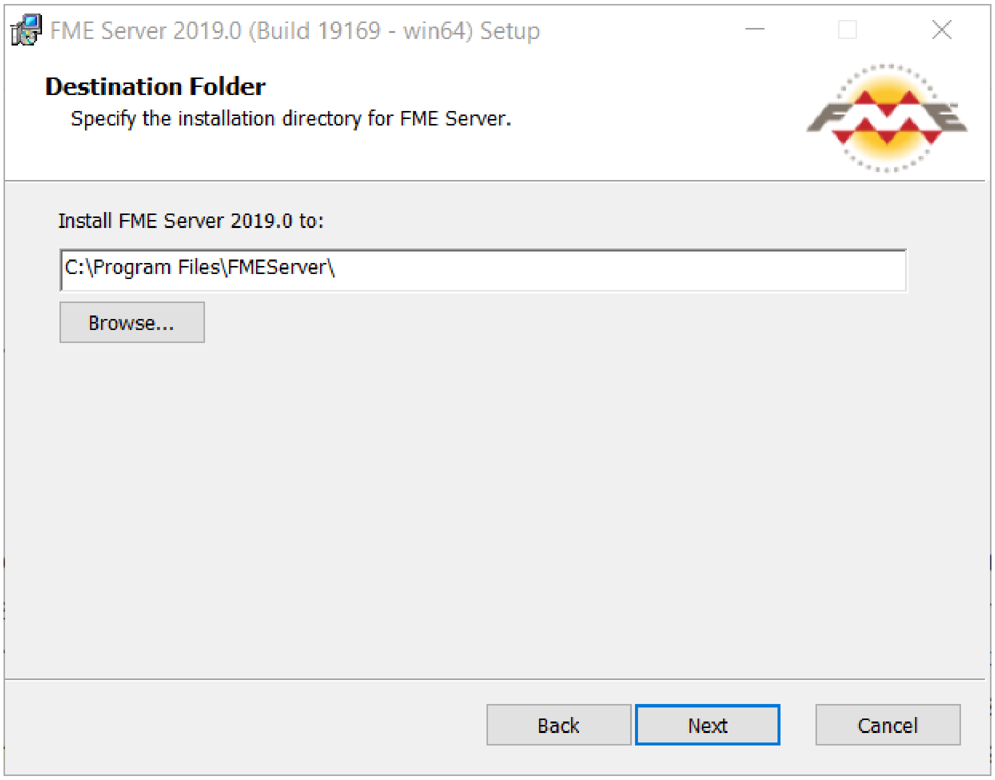
- FME Server Core Components
- ☒ FME Server Database
- FME Engine
- Web Services
- Console

Install the Server Core Components.

This feature requires 271MB on your hard drive.

Destination Folder

Specify the installation directory for FME Server.



FME Server 2019.0 (Build 19169 - win64) Setup

Destination Folder

Specify the installation directory for FME Server.

Install FME Server 2019.0 to:

C:\Program Files\FMEServer\

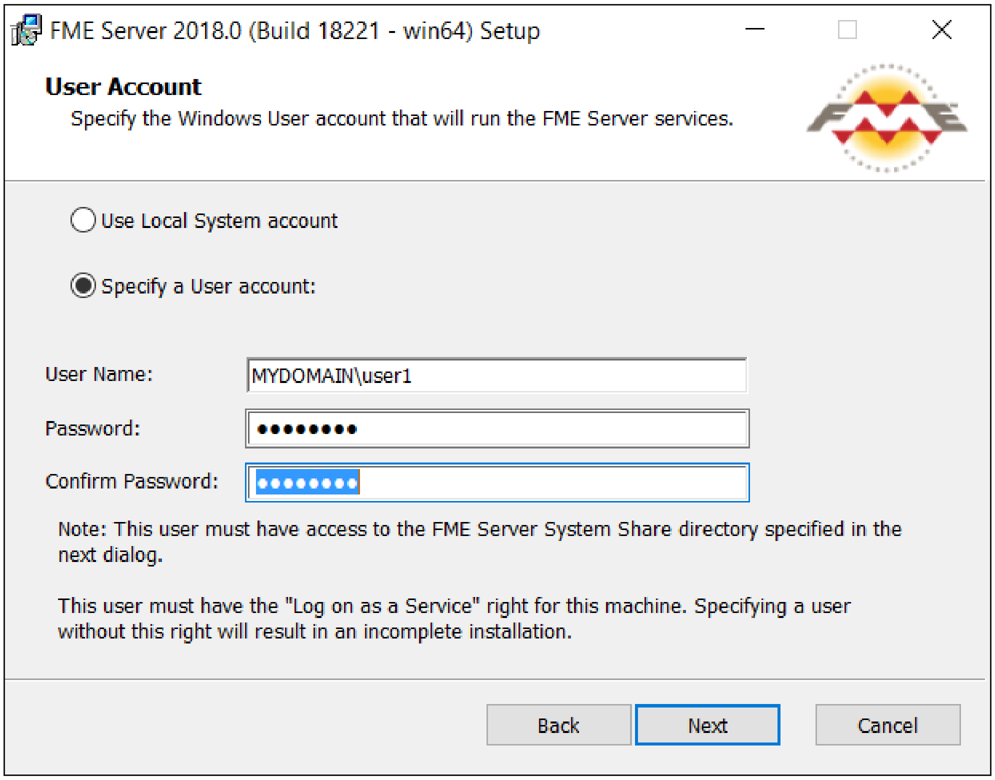
User Account

Specify the Windows user account that will run the FME Server System Services. This account must have:

- Read/Write access to the FME Server System Share that you specify in the next dialog. The System Share is the location where FME Server stores Repositories and Resources files. (For more information, see Provide a Remote File System for the FME Server System Share.)
- Read/Write access to the FME Server installation directory that you specified in the previous dialog.
- "Log on as a service" rights on this machine. For more information, see this Microsoft Docs article.

> **Note** If unsure, you can update account settings for the FME Server system services after installation in the Services manager (Windows) or Linux equivalent.

> **Note** The FME Server Database service always runs under the local system account.



User Account

Specify the Windows User account that will run the FME Server services.

○ Use Local System account

● Specify a User account:

User Name: MYDOMAIN\user1

Password: ••••••••

Confirm Password: ••••••••

Note: This user must have access to the FME Server System Share directory specified in the next dialog.

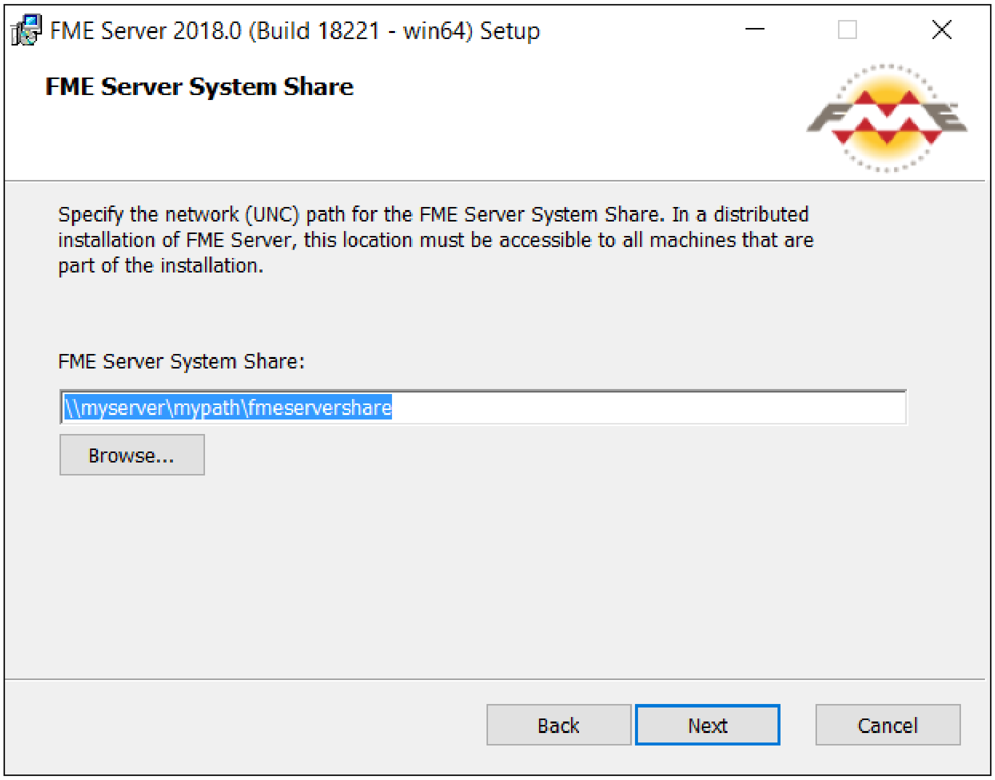
This user must have the "Log on as a Service" right for this machine. Specifying a user without this right will result in an incomplete installation.

FME Server System Share

Specify a directory on another machine to store FME Server System Share files, which include Repositories and Resources. If this is a Linux installation, specify the mounted directory. For more information, see Provide a Remote File System for the FME Server System Share.

Tip As a best practice, specify the full UNC path to the FME Server System Share, even if it is on the same (local) machine where you are running the installer.

Note If you are upgrading to a newer version of FME Server, make sure the specified directory is empty of files from the previous installation. Otherwise, conflicts may occur that can produce unexpected results in performance.


FME Server 2018.0 (Build 18221 - win64) Setup

FME Server System Share

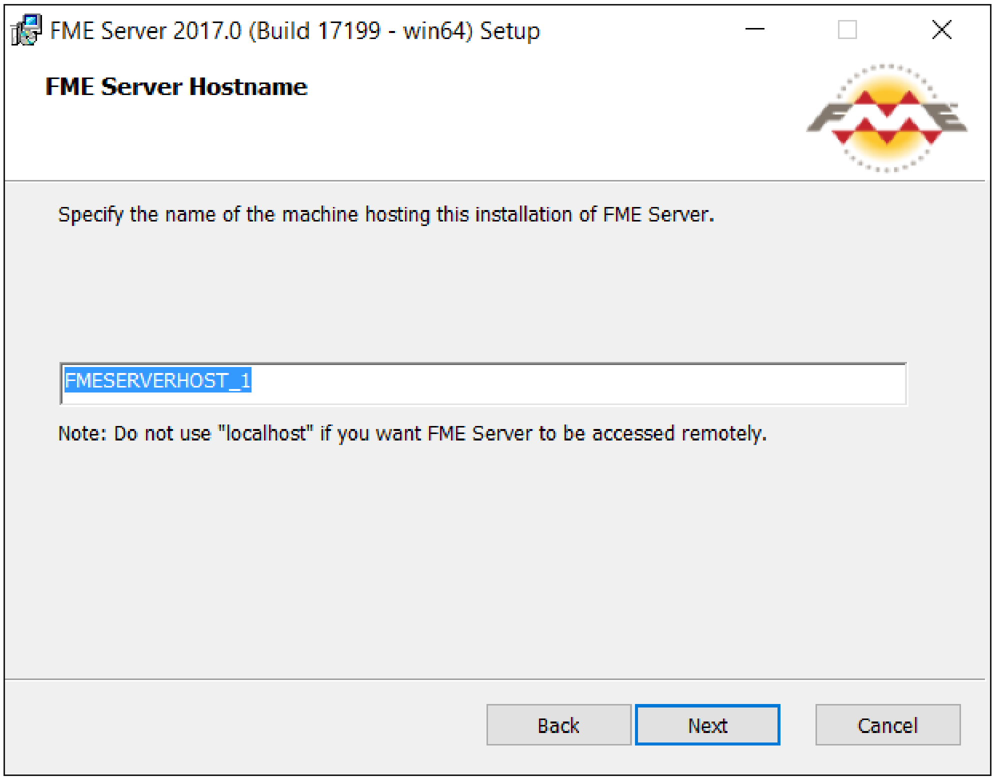
Specify the network (UNC) path for the FME Server System Share. In a distributed installation of FME Server, this location must be accessible to all machines that are part of the installation.

FME Server System Share:

\\myserver\mypath\fmeservershare

FME Server Hostname

Specify the host that will run the FME Server Core.


FME Server 2017.0 (Build 17199 - win64) Setup

FME Server Hostname

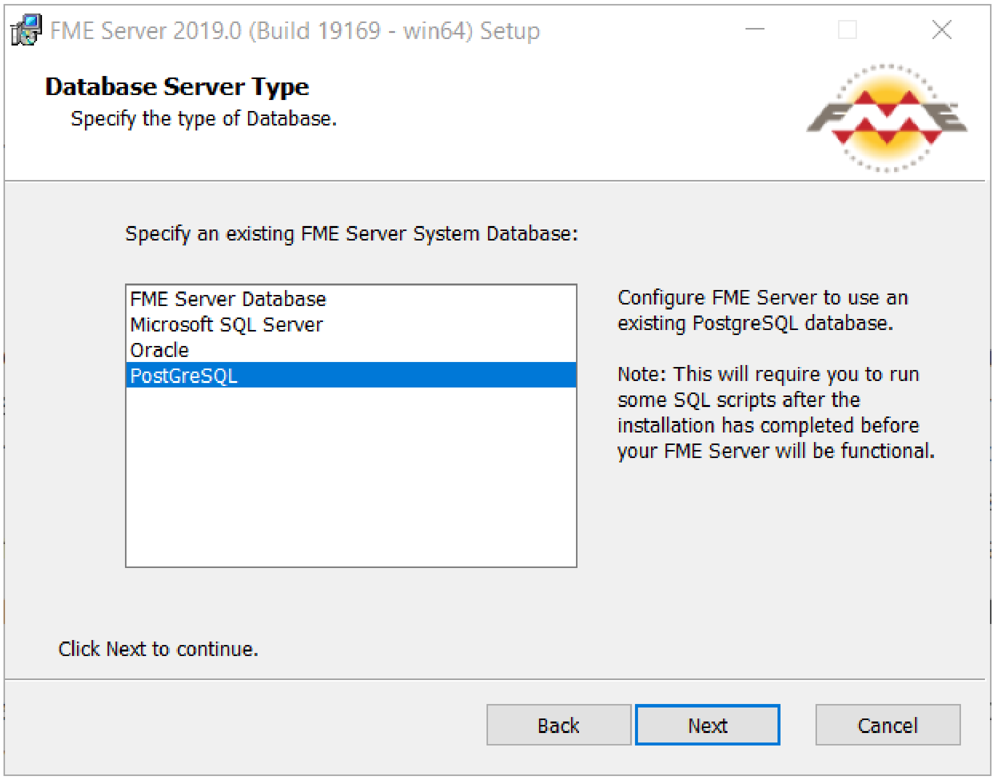
Specify the name of the machine hosting this installation of FME Server.

FMESERVERHOST_1

Note: Do not use "localhost" if you want FME Server to be accessed remotely.

Database Server Type

Specify the type of database for the FME Server Database. If you installed the PostgreSQL database included with the FME Server installer, select **FME Server Database**. If you are configuring the FME Server Database on your own database server, select the database server type: **Microsoft SQL Server**, **Oracle**, or **PostgreSQL**. For more information, see Provide a Database Server.



Database Server Type

Specify the type of Database.

Specify an existing FME Server System Database:

- FME Server Database
- Microsoft SQL Server
- Oracle
- PostGreSQL

Configure FME Server to use an existing PostgreSQL database.

Note: This will require you to run some SQL scripts after the installation has completed before your FME Server will be functional.

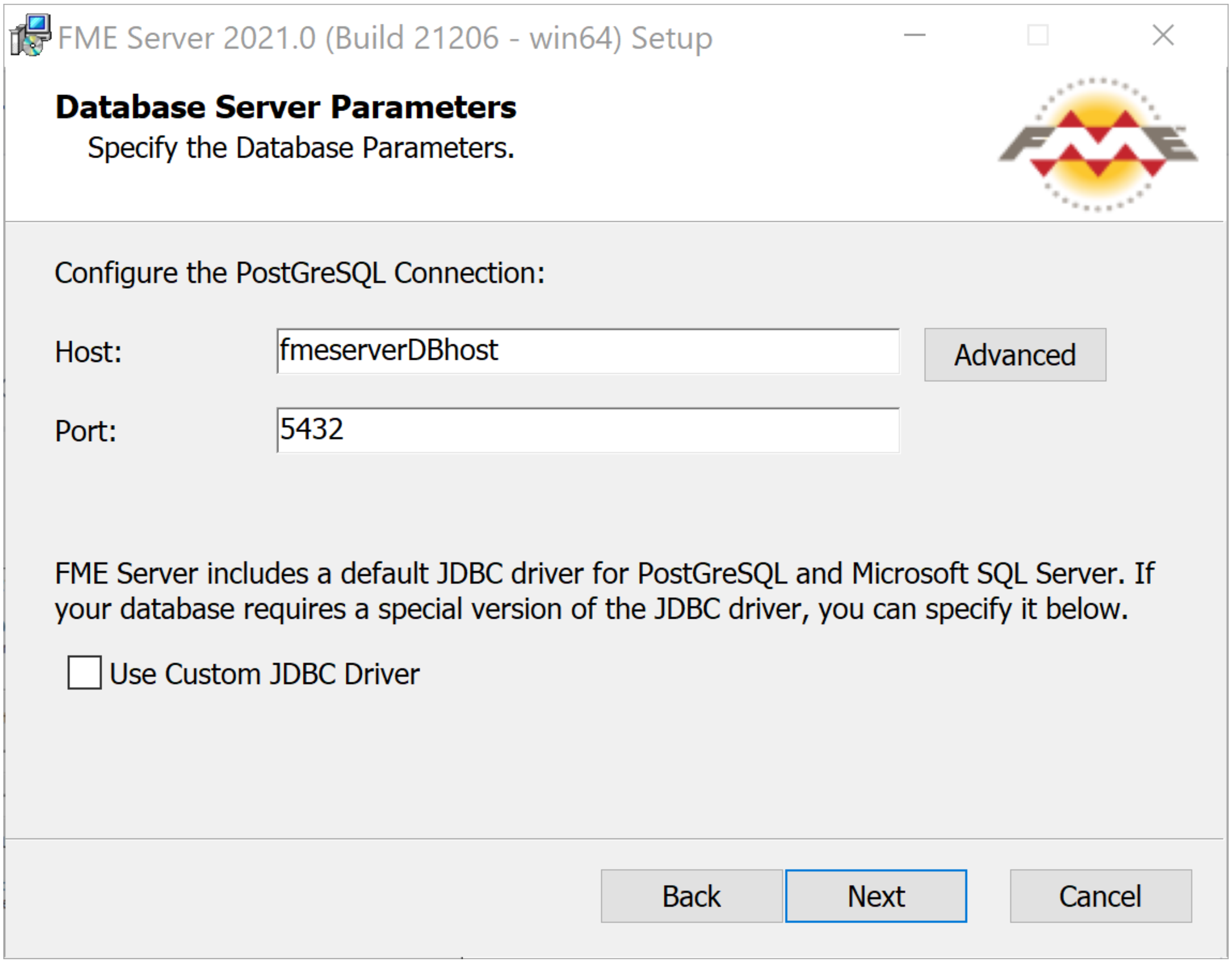
Click Next to continue.

Database Server Parameters

Specify the connection parameters for the FME Server Database. Optionally, to customize further the connection parameters in the JDBC connection string, click **Advanced**.

Note

- If **Microsoft SQL Server** was specified in the previous dialog, check *Use SQL Server instance name* to use that value instead of *Port*.
- If **Oracle** was specified in the previous dialog, you must check *Use Custom JDBC Driver* and specify the *JDBC Driver*.


FME Server 2021.0 (Build 21206 - win64) Setup

Database Server Parameters

Specify the Database Parameters.

Configure the PostGreSQL Connection:

Host: fmeserverDBhost

Port: 5432

FME Server includes a default JDBC driver for PostGreSQL and Microsoft SQL Server. If your database requires a special version of the JDBC driver, you can specify it below.

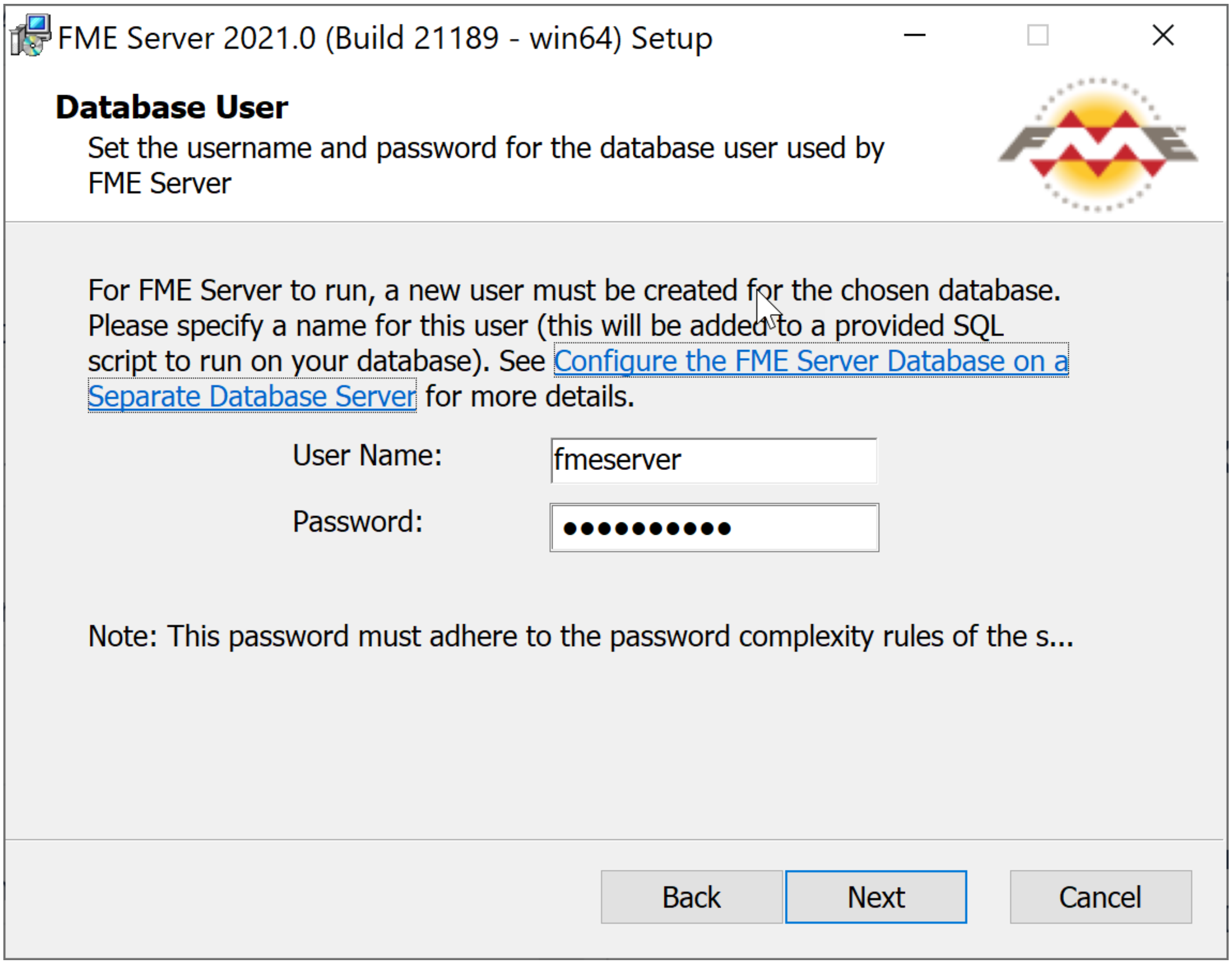
□ Use Custom JDBC Driver

Database User

The installation creates a user account under which to use the FME Server database. Specify a *User Name* (defaults to **fmeserver**) and *Password* for the database user account.

> **Note** The password for the FME Server Database user account is encrypted in FME Server installation files. Take note of the *User Name* and *Password* that you specified. You may need to reference it later.

If you installed the PostgreSQL database included with the FME Server installer, specify the same *User Name* and *Password* that you specified for Database User previously, under Install the FME Server Database.



Database User

Set the username and password for the database user used by FME Server

For FME Server to run, a new user must be created for the chosen database. Please specify a name for this user (this will be added to a provided SQL script to run on your database). See Configure the FME Server Database on a Separate Database Server for more details.

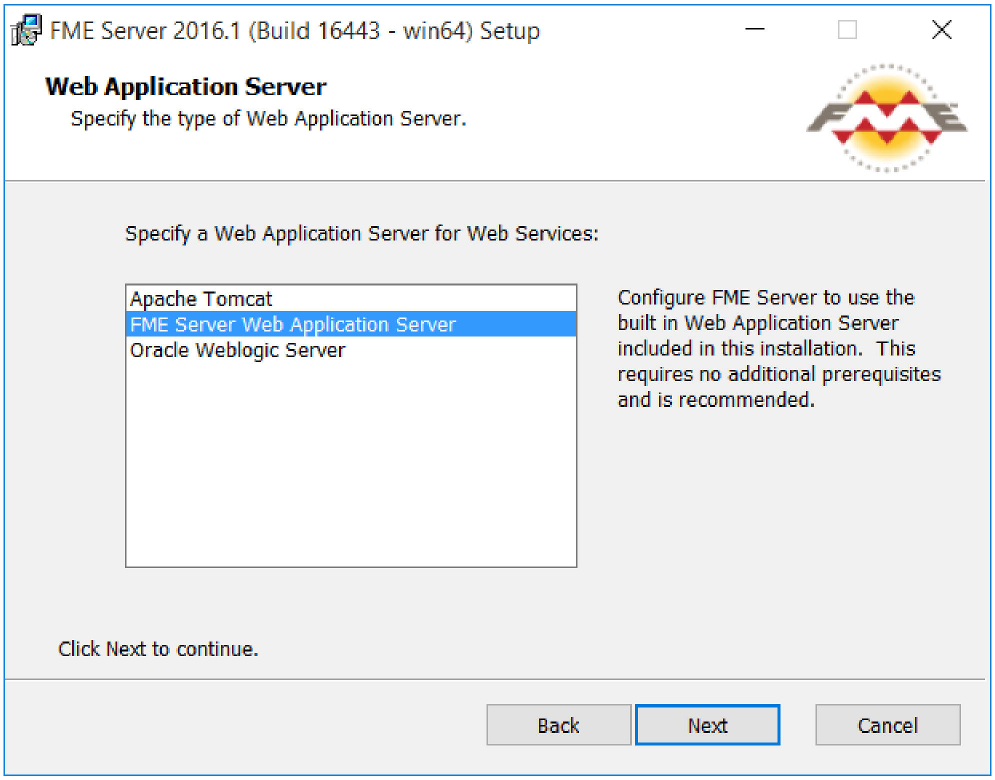
User Name: fmeserver

Password: ●●●●●●●●●●●

Note: This password must adhere to the password complexity rules of the s...

Web Application Server

Specify the **FME Server Web Application Server**.



Web Application Server

Specify the type of Web Application Server.

Specify a Web Application Server for Web Services:

- Apache Tomcat
- FME Server Web Application Server
- Oracle Weblogic Server

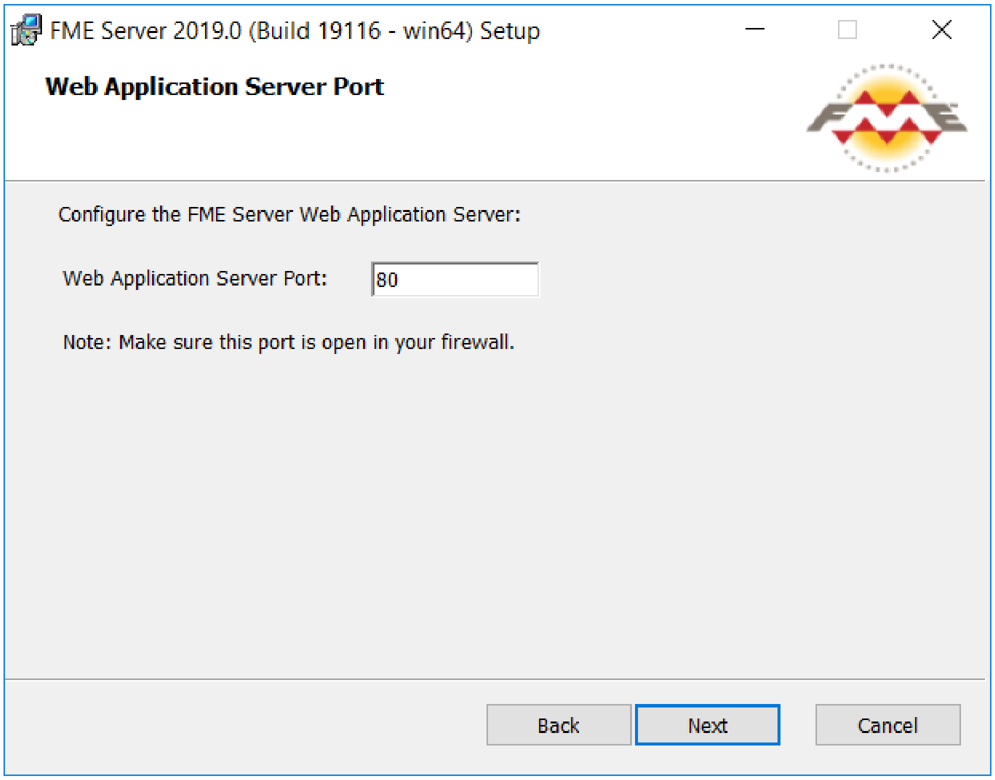
Configure FME Server to use the built in Web Application Server included in this installation. This requires no additional prerequisites and is recommended.

Click Next to continue.

Web Application Server Port

Specify the port to use for communication with the web application server. On Windows, port 80 is the recommended default. If this port is in use, port 8080 is recommended. On Linux, port 8080 is recommended.

> **Note** Common applications that may be using port 80 include Skype and Internet Information Services (IIS). Either turn off these services, or select a different port, such as 8080.



Web Application Server Port

Configure the FME Server Web Application Server:

Web Application Server Port: 80

Note: Make sure this port is open in your firewall.

Follow the remaining dialogs to complete the installation.

What's Next?

If you are configuring the FME Server Database on your own database server, and did *not* install the PostgreSQL database that is included with the FME Server installer, proceed to Configure the FME Server Database on a Separate Database Server. Otherwise, proceed to Log on to the Web User Interface.

Configure the FME Server Database on a Separate Database Server

> **Note** Complete this step *only* if you are configuring the FME Server Database on your own database server, and did *not* install the PostgreSQL database that is included with the FME Server installer. For more information, see Provide a Database Server.

To configure FME Server to use a separate database server, follow the steps below. You can configure FME Server with a Microsoft SQL Server, PostgreSQL, or Oracle database, running on either Windows or Linux.

1. Database Configuration: Set up FME Server database tables and database users with permissions to access the FME Server database.

> **Note** The specific way to set up database tables and user permissions on various production databases may differ depending on the available database tools and intended target platform.

Database Configuration - Microsoft SQL Server

It is assumed that SQL Server is installed.

One notation used is `<FMEServerDir>`, which is the installation directory of FME Server. In Windows, this is typically `C:\Program Files\FMEServer`.

SQL scripts are provided to help with SQL Server database configuration. These SQL scripts are located in the `<FMEServerDir>\Server\database\sqlserver\` directory of the FME Server Core machine.

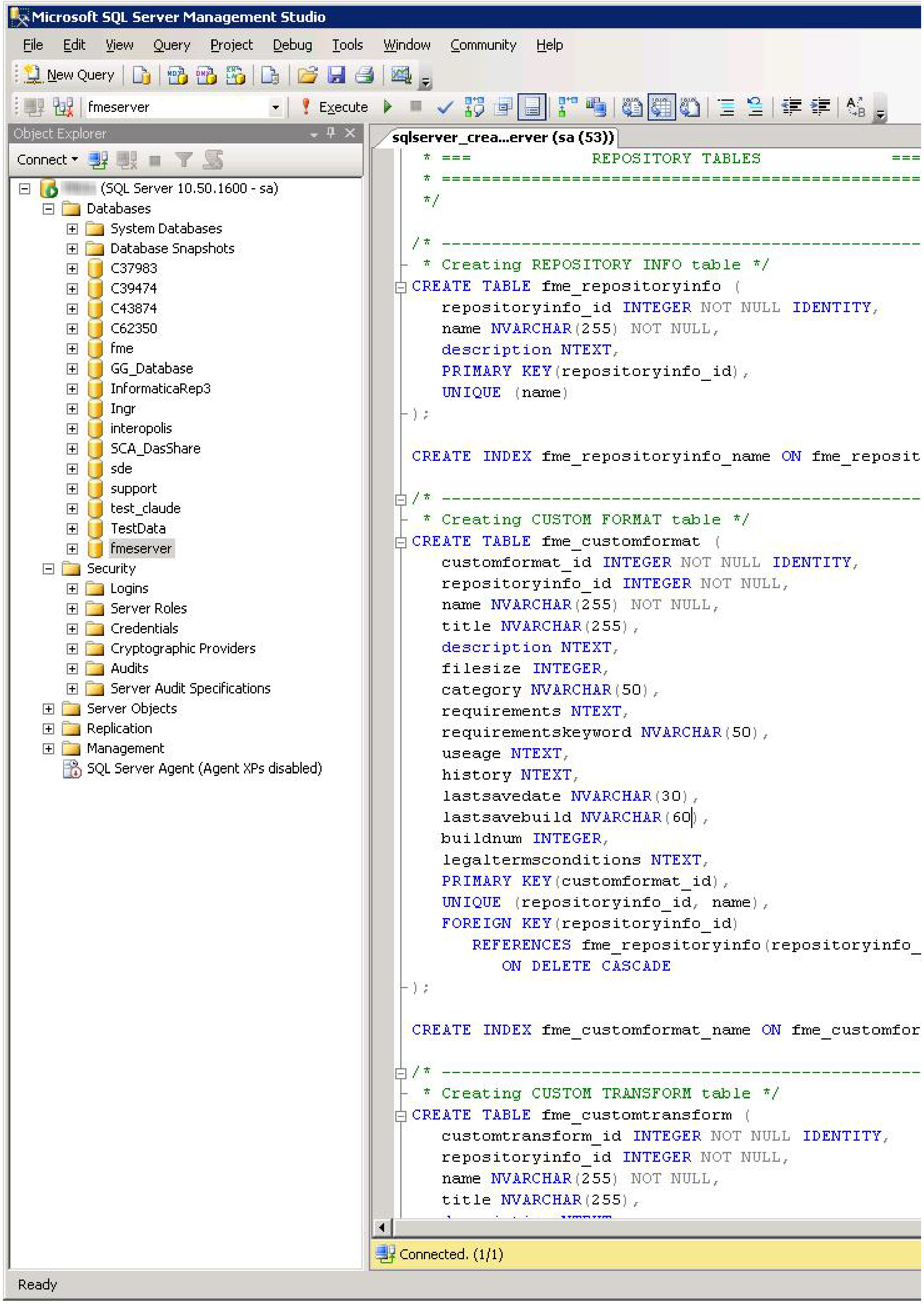
> **Note** This directory refers to the machine on which the FME Server Core is installed (not the machine on which the database server is installed). To run these scripts, you must transfer this directory to the database machine, or reference it through a UNC path.

If you are upgrading, you should back up any job history you want to keep.

Instructions Using SQL Server Management Studio

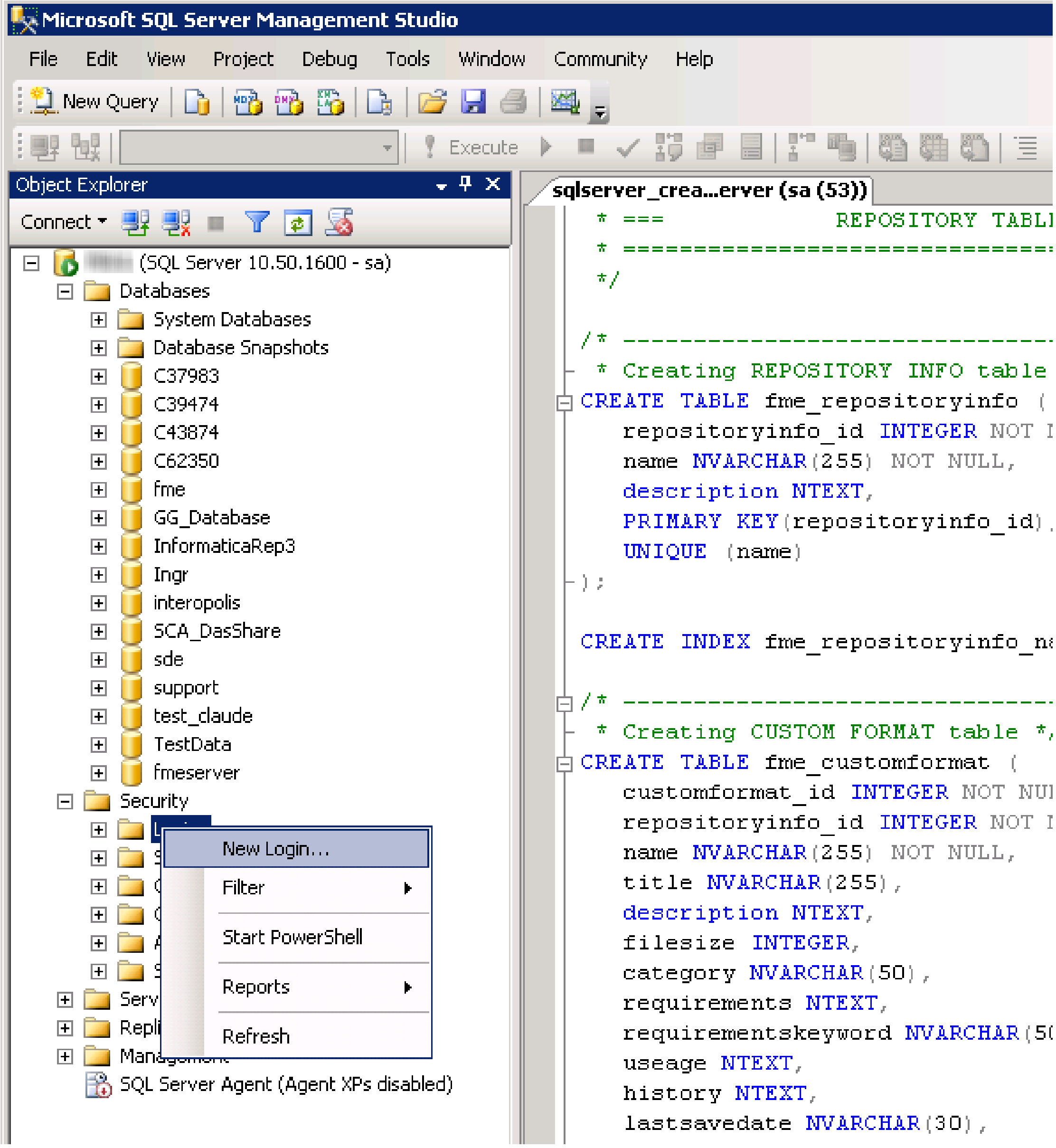
1. Open the SQL Server Management Studio and connect to the SQL Server database engine.

2. Open `sqlserver_createDB.sql` and run the script against the `fmeserver` database, as shown below:



```
 * ===              REPOSITORY TABLES              ===
 * ================================================
 */

/* ------------------------------------------------
 * Creating REPOSITORY INFO table */
CREATE TABLE fme_repositoryinfo (
   repositoryinfo_id INTEGER NOT NULL IDENTITY,
   name NVARCHAR(255) NOT NULL,
   description NTEXT,
   PRIMARY KEY(repositoryinfo_id),
   UNIQUE (name)
);

CREATE INDEX fme_repositoryinfo_name ON fme_reposit

/* ------------------------------------------------
 * Creating CUSTOM FORMAT table */
CREATE TABLE fme_customformat (
   customformat_id INTEGER NOT NULL IDENTITY,
   repositoryinfo_id INTEGER NOT NULL,
   name NVARCHAR(255) NOT NULL,
   title NVARCHAR(255),
   description NTEXT,
   filesize INTEGER,
   category NVARCHAR(50),
   requirements NTEXT,
   requirementskeyword NVARCHAR(50),
   useage NTEXT,
   history NTEXT,
   lastsavedate NVARCHAR(30),
   lastsavebuild NVARCHAR(60),
   buildnum INTEGER,
   legaltermsconditions NTEXT,
   PRIMARY KEY(customformat_id),
   UNIQUE (repositoryinfo_id, name),
   FOREIGN KEY(repositoryinfo_id)
      REFERENCES fme_repositoryinfo(repositoryinfo_
         ON DELETE CASCADE
);

CREATE INDEX fme_customformat_name ON fme_customfor

/* ------------------------------------------------
 * Creating CUSTOM TRANSFORM table */
CREATE TABLE fme_customtransform (
   customtransform_id INTEGER NOT NULL IDENTITY,
   repositoryinfo_id INTEGER NOT NULL,
   name NVARCHAR(255) NOT NULL,
   title NVARCHAR(255),
```

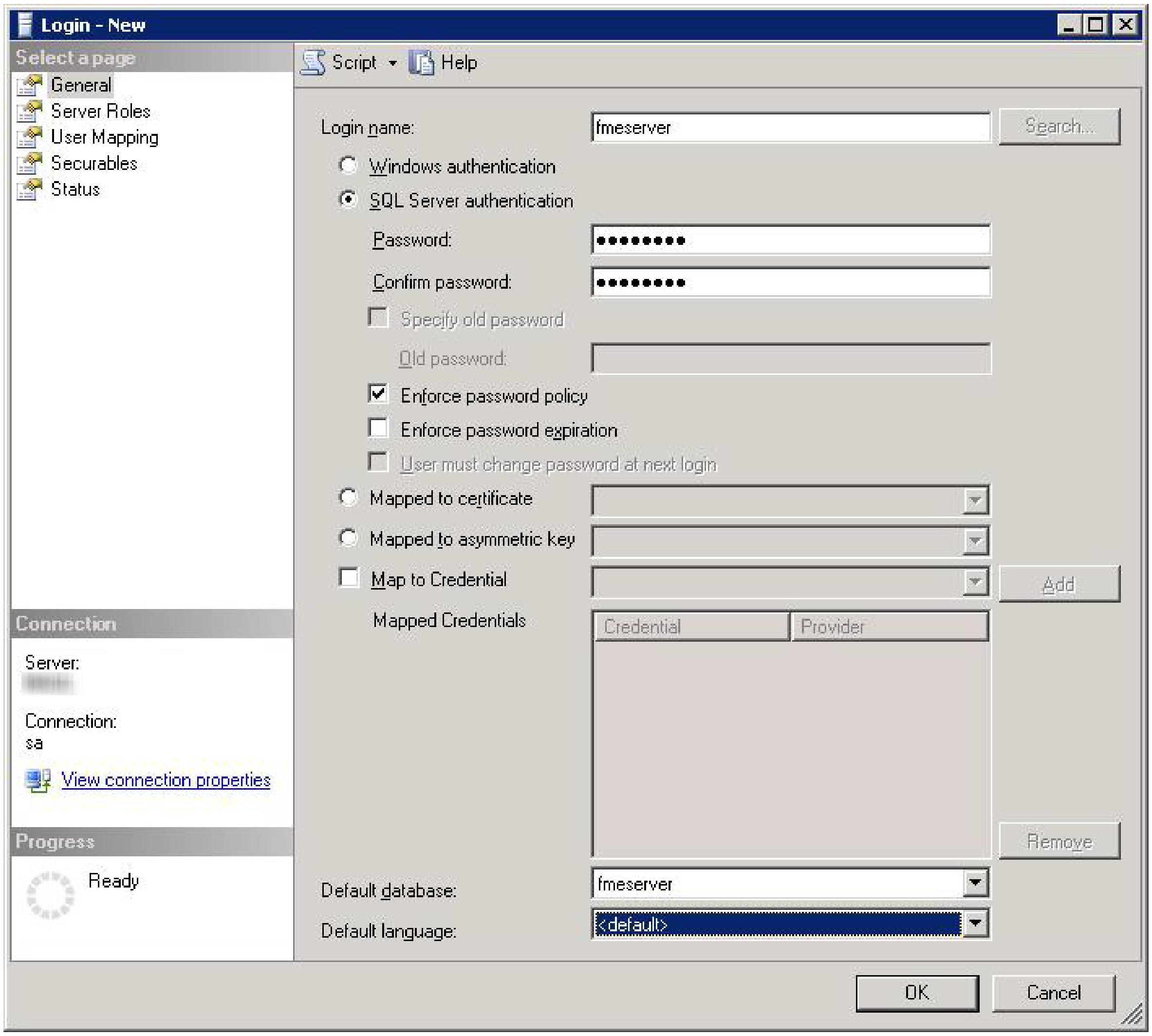
3. On the Object Explorer pane, expand the Security folder, right-click Login, and then select New Login:



```
 * ===              REPOSITORY TABLI
 * =================================
 */

/* ---------------------------------
 * Creating REPOSITORY INFO table
CREATE TABLE fme_repositoryinfo (
   repositoryinfo_id INTEGER NOT I
   name NVARCHAR(255) NOT NULL,
   description NTEXT,
   PRIMARY KEY(repositoryinfo_id),
   UNIQUE (name)
);

CREATE INDEX fme_repositoryinfo_na

/* ---------------------------------
 * Creating CUSTOM FORMAT table *,
CREATE TABLE fme_customformat (
   customformat_id INTEGER NOT NUI
   repositoryinfo_id INTEGER NOT I
   name NVARCHAR(255) NOT NULL,
   title NVARCHAR(255),
   description NTEXT,
   filesize INTEGER,
   category NVARCHAR(50),
   requirements NTEXT,
   requirementskeyword NVARCHAR(5(
   useage NTEXT,
   history NTEXT,
   lastsavedate NVARCHAR(30),
```

4. On the Login – New page, click General to open the page shown in the example below.
   - At the Login name field, enter `fmeserver`.
   - Make sure the option button is active for SQL Server authentication.

- In the Password field enter the password that was specified for the database during the FME Server installation, and in the Confirm password field enter the same password again.
- Make sure the Enforce password policy is active. If not, click the checkbox to activate it.
- If required, click the checkbox for Enforce password expiration to clear it.
- At the Default database field enter fmeserver.



Login name: fmeserver

○ Windows authentication

● SQL Server authentication

Password: ●●●●●●●●●

Confirm password: ●●●●●●●●●

□ Specify old password

Old password:

☑ Enforce password policy

□ Enforce password expiration

□ User must change password at next login

○ Mapped to certificate

○ Mapped to asymmetric key

□ Map to Credential

Default database: fmeserver

Default language: <default>

Connection

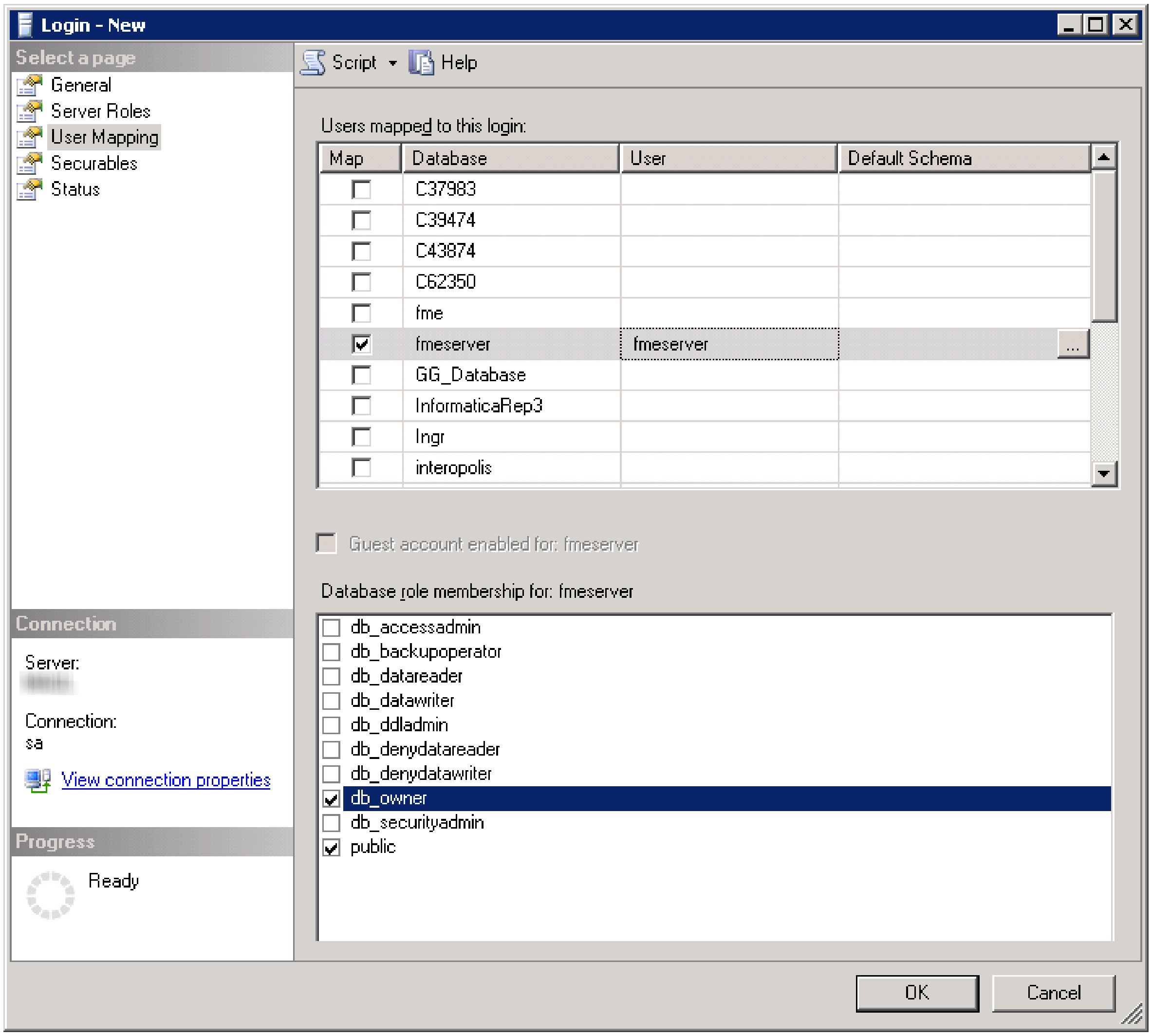
Server:
[redacted]

Connection:
sa

Ready

5. On the same Login – New page, click User Mapping to open the page shown in the next figure.

- At the Users mapped to this login location, in the Map column click the checkbox to activate it and map the login name to the `fmeserver` database.
- At the Database role membership for location, notice that the fmeserver database is specified and check `db_owner` to assign that role to this database.
- Click OK to close this page.



Users mapped to this login:

Map	Database	User	Default Schema
☐	C37983		
☐	C39474		
☐	C43874		
☐	C62350		
☐	fme		
☑	fmeserver	fmeserver	
☐	GG_Database		
☐	InformaticaRep3		
☐	Ingr		
☐	interopolis		

☐ Guest account enabled for: fmeserver

Database role membership for: fmeserver

☐ db_accessadmin
☐ db_backupoperator
☐ db_datareader
☐ db_datawriter
☐ db_ddladmin
☐ db_denydatareader
☐ db_denydatawriter
☑ db_owner
☐ db_securityadmin
☑ public

Server:
[redacted]

Connection:
sa

Ready

Instructions Without SQL Server Management Studio

1. Connect to the SQL Server database engine and run `sqlserver_createDB.sql`.
2. Open `sqlserver_createUser.sql`.

3. Look for the line that begins:

   ```
   CREATE LOGIN fmeserver WITH PASSWORD =
   ```

   Replace `<<DATABASE_PASSWORD>>` with the password specified during the installation.

4. Run the script.

> **Note** If your SQL Server uses an Always On availability group, you must also configure the `MultisubnetFailover` property of the `DB_JDBC_URL` parameter in the fmeDatabaseConfig.txt configuration file. For more information, see the SQL Server examples under Configure the Database Connection.

Database Configuration - Oracle

Before proceeding, you must provide the following:

- Install an Oracle database server.
- Obtain the Oracle Database JDBC driver. For more information, see https://www.oracle.com/technetwork/database/application-development/jdbc/downloads/index.html.

<FMEServerDir> is the installation directory of FME Server. In Windows, this is typically `C:\Program Files\FMEServer`.

If you are upgrading, you should back up any job history you want to keep.

Windows

This section describes how to configure an Oracle database. You can configure the Oracle database from other Oracle database tools depending on your personal preference.

For an Oracle database configuration, various SQL scripts are provided to help.

These SQL scripts are located in the <FMEServerDir>`\Server\database\oracle` directory of the FME Server Core machine.

> **Note** This directory refers to the machine on which the FME Server Core is installed (not the machine on which the database server is installed). To run these scripts, you must transfer this directory to the database machine, or reference it through a UNC path.

- `oracle_createUser.sql` – This script creates the FME Server database user, and grants all required permissions to the FME Server database user. The password appears as `<<DATABASE_PASSWORD>>`. Before running this script, replace `<<DATABASE_PASSWORD>>` with the password that was specified for the database during the FME Server installation.
- `oracle_createDB.sql` – This script creates all FME Server related database packages, tables, indexes, views, and triggers.
- `oracle_dropUser.sql` – This script drops the FME Server database user and the database packages, tables, indexes, views, and triggers associated with the FME Server database user.

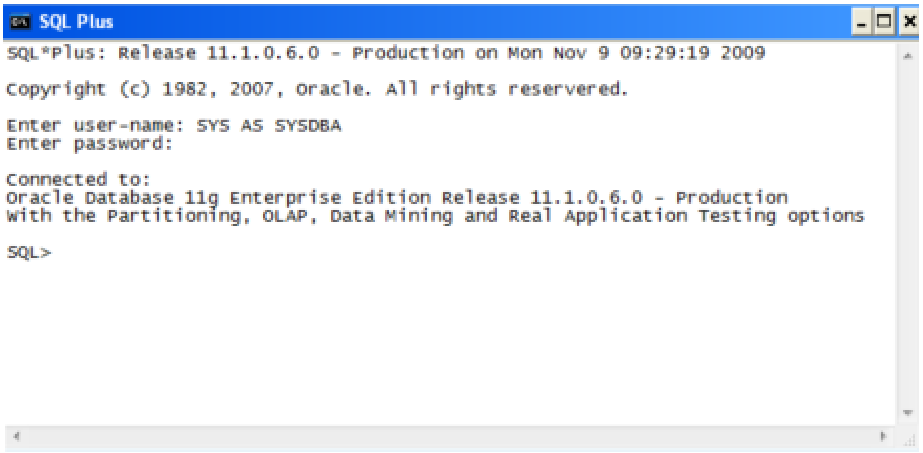
Using the Command Prompt

To use the command prompt to configure the database, follow these instructions:

1. Install Oracle SQL*Plus, if you haven't already.
2. Open Oracle SQL*Plus and log on as a user with adequate privileges, such as SYSDBA.

   In this example, the following parameters were used and entered:

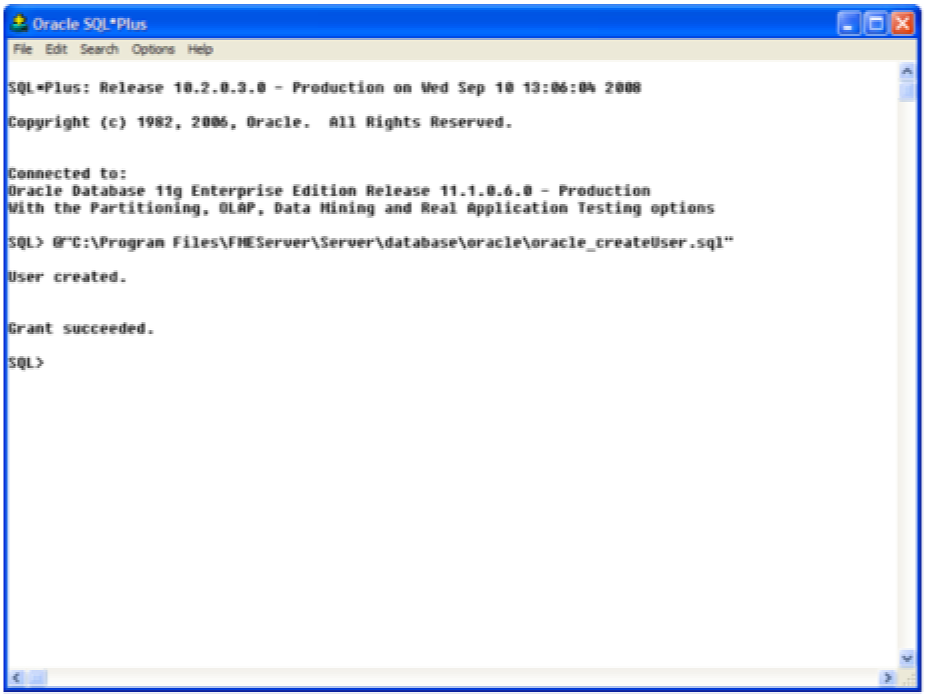
   - User: SYS AS SYSDBA
   - Password: fmeserver
   - String: XX-ORACLE11G:1521/ORCL AS SYSDBA



```
SQL*Plus: Release 11.1.0.6.0 - Production on Mon Nov 9 09:29:19 2009

Copyright (c) 1982, 2007, Oracle. All rights reserved.

Enter user-name: SYS AS SYSDBA
Enter password:

Connected to:
Oracle Database 11g Enterprise Edition Release 11.1.0.6.0 - Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL>
```

3. Create an FME Server database user as follows:
   a. In `oracle_createUser.sql`, replace `<<DATABASE_PASSWORD>>`with the password that was specified for the database during the FME Server installation.
   b. From the SQL prompt, run the `oracle_createUser.sql` script by entering the following command:

      `@"<FMEServerDir>\Server\database\oracle\oracle_createUser.sql"`



```
SQL*Plus: Release 10.2.0.3.0 - Production on Wed Sep 10 13:06:04 2008

Copyright (c) 1982, 2006, Oracle.  All Rights Reserved.


Connected to:
Oracle Database 11g Enterprise Edition Release 11.1.0.6.0 - Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL> @"C:\Program Files\FMEServer\Server\database\oracle\oracle_createUser.sql"

User created.


Grant succeeded.

SQL>
```

The default TABLESPACE is the Oracle DB configured default. If the created user doesn’t have read/write permissions on the default TABLESPACE, change the default TABLESPACE or create an appropriate TABLESPACE.

This command creates a TABLESPACE on the Oracle DB server called FMESERVER shown in the following example:

```
CREATE SMALLFILE TABLESPACE FMESERVER DATAFILE
'E:\ORADATA\FMESERVER01.DBF' SIZE 100000K REUSE AUTOEXTEND
ON NEXT 2048K MAXSIZE 1024M LOGGING EXTENT MANAGEMENT LOCAL
SEGMENT SPACE MANAGEMENT AUTO DEFAULT NOCOMPRESS;
```

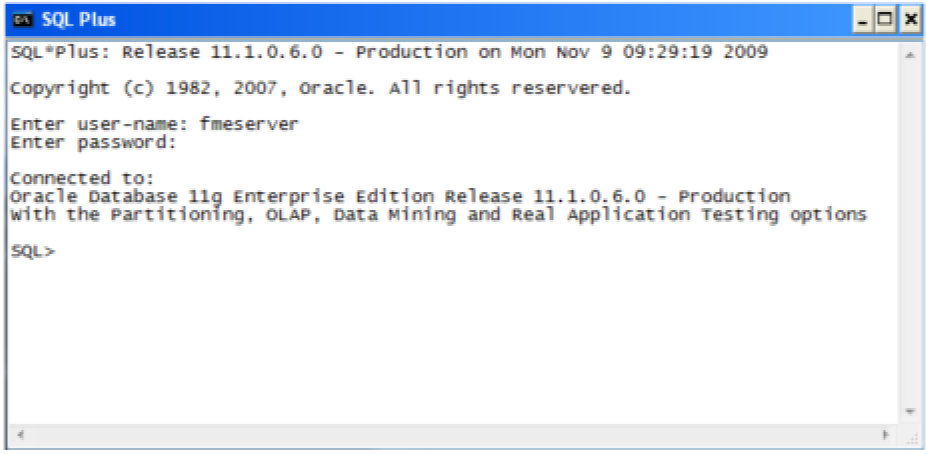
By default this command uses the TABLESPACE “FMESERVER” as shown in the following example:

```
CREATE USER fmeserver IDENTIFIED BY fmeserver DEFAULT
TABLESPACE "FMESERVER" TEMPORARY TABLESPACE "TEMP";
```

4. When an FME Server database user is created, you can connect to it by logging on again to SQL*Plus.

   In this example, the following parameters were used and entered on the user interface:

   - User: fmeserver
   - Password: fmeserver

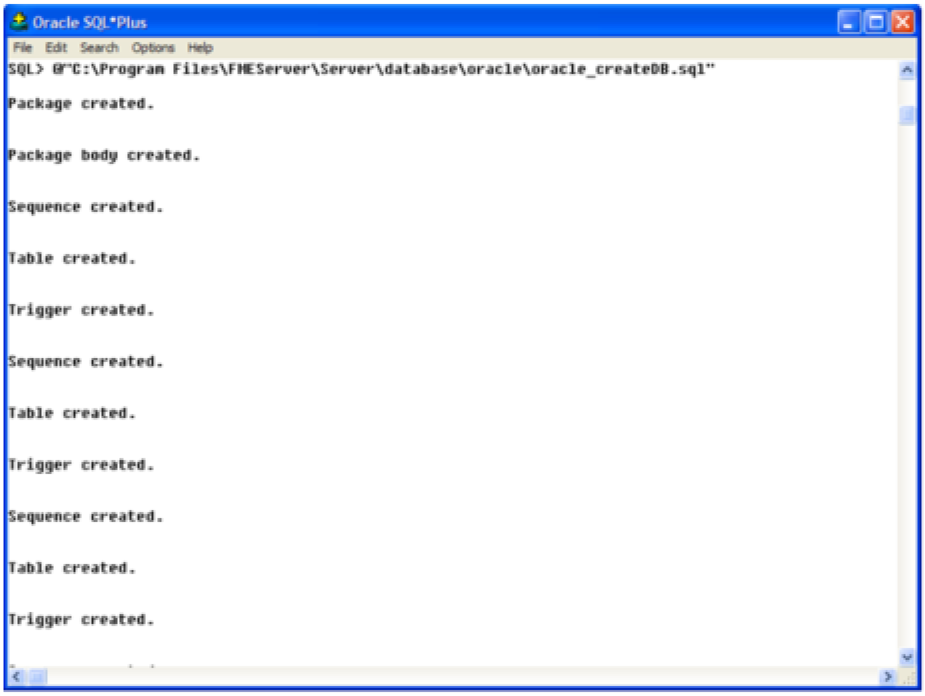


```
SQL*Plus: Release 11.1.0.6.0 - Production on Mon Nov 9 09:29:19 2009

Copyright (c) 1982, 2007, Oracle.  All rights reserved.

Enter user-name: fmeserver
Enter password:

Connected to:
Oracle Database 11g Enterprise Edition Release 11.1.0.6.0 - Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL>
```

Note The preceding example assumes your user name and password are fmeserver.

5. When connected to the FME Server database, run the `oracle_createDB.sql` script by entering the following command:

   `@”<FMEServerDir>\Server\database\oracle\oracle_createDB.sql”`



```
SQL> @"C:\Program Files\FMEServer\Server\database\oracle\oracle_createDB.sql"

Package created.

Package body created.

Sequence created.

Table created.

Trigger created.

Sequence created.

Table created.

Trigger created.

Sequence created.

Table created.

Trigger created.
```

Note If you drop the FME Server database and login user, run the oracle_dropUser.sql script.

Linux

Oracle SQL*Plus is a freeware client for connecting to an Oracle database. You can download it from the Internet using the following address:

https://www.oracle.com/technology/software/tech/sql_plus/index.html

For more information, see the Oracle web site at:

https://www.oracle.com/technology/sample_code/tech/sql_plus/htdocs/demobld.html

The instructions that follow describe how to configure Oracle for use with FME Server. These instructions describe using SQL*Plus for the database setup. Depending on your personal preference, you can also configure the Oracle database using other Oracle tools.

For Oracle configurations, various SQL scripts are provided to help with Oracle database configuration. These SQL scripts are located in the <FMEServerDir>`/Server/database oracle/` directory of the FME Server Core machine.

> **Note** This directory refers to the machine on which the FME Server Core is installed (not the machine on which the database server is installed). To run these scripts, you must transfer this directory to the database machine, or reference it through a UNC path.

- `oracle_createUser.sql` – This script creates the FME Server database user, and grants all required permissions to the FME Server database user. The password appears as `<<DATABASE_PASSWORD>>`. Before running this script, replace `<<DATABASE_PASSWORD>>` with the password that was specified for the database during the FME Server installation.
- `oracle_createDB.sql` – This script creates all FME Server related database packages, tables, indexes, views, and triggers.
- `oracle_dropUser.sql` – This script drops the FME Server database user and the database packages, tables, indexes, views, and triggers associated with the FME Server database user.

Using the Command Prompt

To use the command prompt to configure the database, follow these instructions:

1. Install the Oracle Client Tools, which includes SQL*Plus, if you haven't already.
2. Run `sqlplus` and log on as a user with adequate privileges, such as SYSDBA.

   For example:

   ```
   sqlplus SYS/<password>@<Host>:<Port>/<service> AS SYSDBA
   ```

3. Create the FME Server database user:
   a. In a text editor, open the `oracle_creatorUser.sql` script and update the password `<<DATABASE_PASSWORD>>` to the one specified during the FME Server installation.
   b. From the SQL prompt, run the oracle_createUser.sql script by entering the following command:

      ```
      @"<FMEServerDir>/Server/database/oracle/oracle_
      createUser.sql"
      ```

      The default TABLESPACE is the Oracle DB configured default. If the created user doesn't have read/write permissions on the default TABLESPACE, you need to change the default TABLESPACE or create an appropriate TABLESPACE.

      This command creates a TABLESPACE on the Oracle DB server called FMESERVER shown in the following example:

      ```
      CREATE SMALLFILE TABLESPACE FMESERVER DATAFILE
      '/ORADATA/FMESERVER01.DBF' SIZE 100000K REUSE AUTOEXTEND ON
      NEXT 2048K MAXSIZE 1024M LOGGING EXTENT MANAGEMENT LOCAL
      SEGMENT SPACE MANAGEMENT AUTO DEFAULT NOCOMPRESS;
      ```

      By default this command uses the TABLESPACE "FMESERVER" shown in this example:

      ```
      CREATE USER fmeserver IDENTIFIED BY fmeserver DEFAULT
      TABLESPACE "FMESERVER" TEMPORARY TABLESPACE "TEMP";
      ```

4. When an FME Server database user has been created, you can connect to it by logging on again to SQL*Plus or by entering the following command:

   ```
   CONNECT <UserName>/<Password>@<Host>:<Port>/<service>;
   ```

5. When connected to the FME Server database, run the oracle_createDB.sql script by entering the following command:

   ```
   @”<FMEServerDir>/Server/database/oracle/oracle_createDB.sql”
   ```

Database Configuration - PostgreSQL

PostgreSQL is an open source database that can be downloaded from the Internet. For more information, see the PostgreSQL web site at:

https://www.postgresql.com

It’s assumed that PostgreSQL is already installed .

One notation used is <FMEServerDir>, which is the installation directory of FME Server. In Windows, this is typically `C:\Program Files\FMEServer`.

It’s also assumed that you have JRE 5 or higher and PostgreSQL database installed before you proceed further. If you want to use the JDBC driver, there are several steps to perform.

If you are upgrading, you should back up any job history you want to keep.

Windows

This section describes how to configure a PostgreSQL database. You can configure this database from other PostgreSQL database tools, depending on your personal preference.

For a PostgreSQL database configuration, various SQL scripts are provided to assist you. These SQL scripts are located in the following directory:

```
<FMEServerDir>\Server\database\postgresql
```

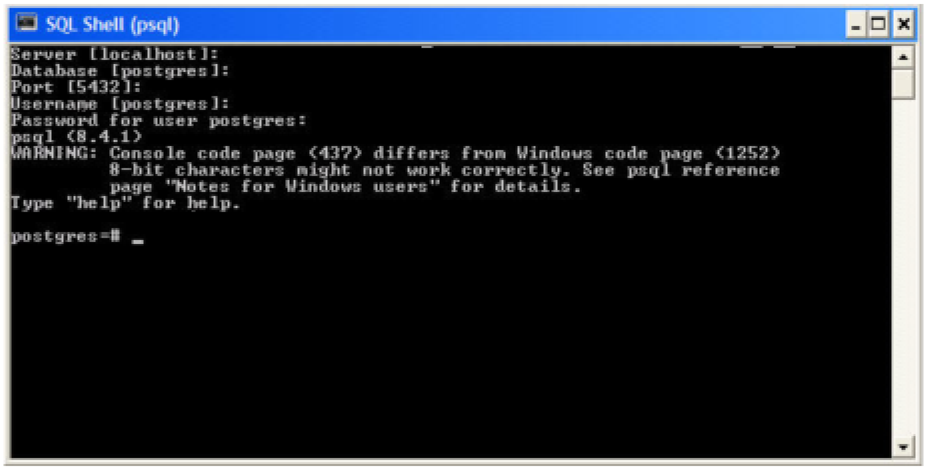
Note This directory refers to the machine on which the FME Server Core is installed (not the machine on which the database server is installed). To run these scripts, you must transfer this directory to the database machine, or reference it through a UNC path.

- `postgresql_createUser.sql` – This script creates the FME Server database user and password that you specified during installation, and grants all required permissions to this user. The password appears as `<<DATABASE_PASSWORD>>`. Before running this script, replace `<<DATABASE_PASSWORD>>` with the password that was specified for the database during the FME Server installation.
- `postgresql_createDB.sql` – This script creates the FME Server database.
- `postgresql_createSchema.sql` – This script creates all FME Server related tables, indexes, views, and triggers.
- `postgresql_dropUser.sql` – This script drops the FME Server database user.
- `postgresql_dropDB.sql` – This script drops the FME Server database.

Using the Command Prompt

To use the command prompt to configure the database, follow these instructions:

1. Install PostgreSQL SQL shell (`psql`) if you haven’t done so already.
2. Open `psql` and log on as a user with the appropriate privileges:

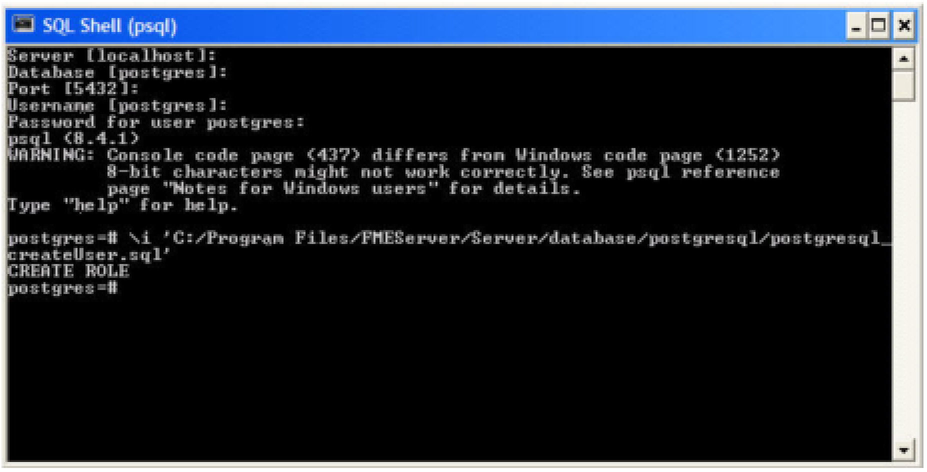


```
Server [localhost]:
Database [postgres]:
Port [5432]:
Username [postgres]:
Password for user postgres:
psql (8.4.1)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

postgres=# _
```

3. Create an FME Server database user as follows:
    a. Open `postgresql_createUser.sql` in a text editor, and replace `<<DATABASE_PASSWORD>>` with the password specified during the FME Server installation.
    b. From the SQL prompt, run the `postgresql_createUser.sql` script by entering the following command:

       `\i '<FMEServerDIR>/Server/database/postgresql/postgresql_createUser.sql'`

       By default, the provided SQL script creates the FME Server database user and password that you specified during installation:



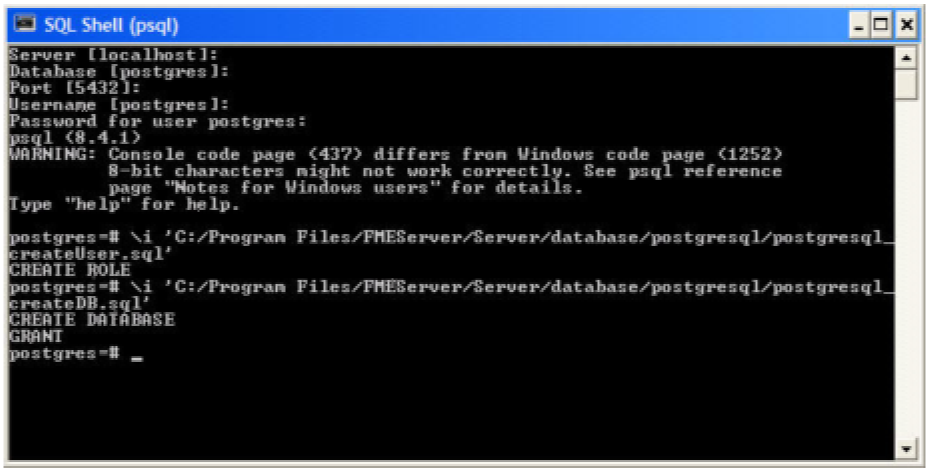
```
Server [localhost]:
Database [postgres]:
Port [5432]:
Username [postgres]:
Password for user postgres:
psql (8.4.1)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

postgres=# \i 'C:/Program Files/FMEServer/Server/database/postgresql/postgresql_
createUser.sql'
CREATE ROLE
postgres=#
```

4. Create an FME Server database.

From the SQL prompt, run the `postgresql_createDB.sql` script by entering the following command:

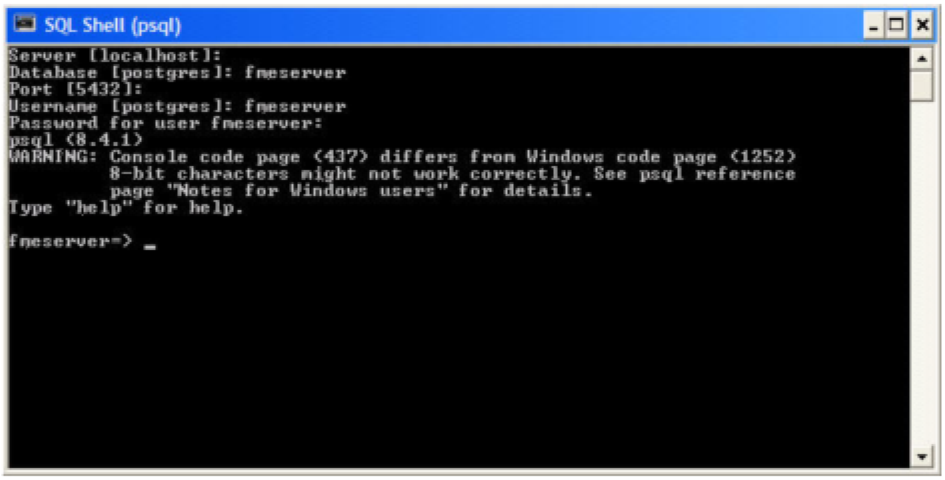
```
\i '<FMEServerDIR>/Server/database/postgresql/postgresql_createDB.sql'
```

By default, the provided SQL script creates an FME Server database named fmeserver and grants all privileges on the database to the user.



```
Server [localhost]:
Database [postgres]:
Port [5432]:
Username [postgres]:
Password for user postgres:
psql (8.4.1)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

postgres=# \i 'C:/Program Files/FMEServer/Server/database/postgresql/postgresql_
createUser.sql'
CREATE ROLE
postgres=# \i 'C:/Program Files/FMEServer/Server/database/postgresql/postgresql_
createDB.sql'
CREATE DATABASE
GRANT
postgres=# _
```

5. Quit `psql` and log on as the FME Server database user.



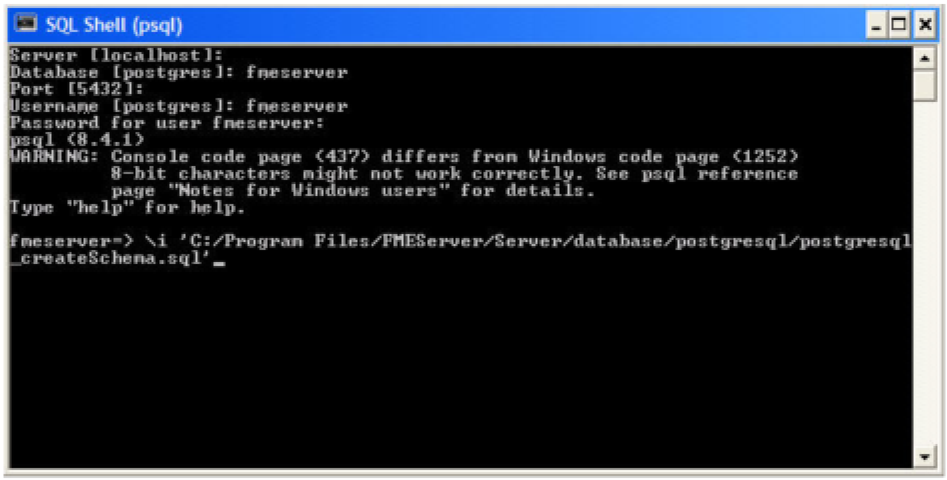
```
Server [localhost]:
Database [postgres]: fmeserver
Port [5432]:
Username [postgres]: fmeserver
Password for user fmeserver:
psql (8.4.1)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

fmeserver=> _
```

6. Create the FME Server database schema as follows:

From the SQL prompt, run the `postgresql_createSchema.sql` script by entering the following command:

```
\i '<FMEServerDir>/Server/database/postgresql/postgresql_createSchema.sql'
```

By default, the provided SQL script creates all FME Server related tables, indexes, views, and triggers.



```
Server [localhost]:
Database [postgres]: fmeserver
Port [5432]:
Username [postgres]: fmeserver
Password for user fmeserver:
psql (8.4.1)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

fmeserver=> \i 'C:/Program Files/FMEServer/Server/database/postgresql/postgresql
_createSchema.sql'
```

Linux

This section describes configuring PostgreSQL from both the command prompt and a user interface, such as the PostgreSQL Query Browser and the PostgreSQL Administrator.

For PostgreSQL configurations, various SQL scripts are provided to help with PostgreSQL database configuration. These SQL scripts are located in the <FMEServerDir>`/Server/database/postgresql/` directory of the FME Server Core machine.

> **Note** This directory refers to the machine on which the FME Server Core is installed (not the machine on which the database server is installed). To run these scripts, you must transfer this directory to the database machine, or reference it through a UNC path.

- `postgresql_createUser.sql` – This script creates the FME Server database user and password that you specified during installation, and grants all required

permissions to the FME Server database user. The password appears as <<DATABASE_PASSWORD>>. Before running this script, replace <<DATABASE_PASSWORD>> with the password that was specified for the database during the FME Server installation.

> **Note** The password is encrypted and appears in the script as <<DATABASE_PASSWORD>>.

- postgresql_createDB.sql – This script drops the FME Server database and creates a new one with the required FME Server tables. By default this database is named fmeserver. Be careful when running this script because it drops the existing FME Server database.
- postgresql_createSchema.sql – This script creates all FME Server related tables, indexes, views, and triggers.

> **Note** This script must be run as user fmeserver.

- postgresql_dropDB.sql – This script drops the existing FME Server database, which is named fmeserver by default.
- postgresql_dropUser.sql – This script drops the FME Server database user.

Using the Command Prompt

To use the command prompt to configure the database, follow these instructions:

1. Install PostgreSQL Server if you haven’t already.
2. Open a command prompt and change to the following directory, which contains the PostgreSQL SQL scripts:

   `<FMEServerDir>/Server/database/postgresql/`

3. Open `postgresql_createUser.sql` in a text editor, and replace `<<DATABASE_PASSWORD>>` with the password specified during the FME Server installation.
4. Run the postgresql program with the postgresql_createUser.sql script:

   ```
   psql -d postgres -h <hostname> -p <port> -f postgresql_createUser.sql
   ```
5. Run the postgresql program with the postgresql_createDB.sql script:

   ```
   psql -d postgres -h <hostname> -p <port> -f postgresql_createDB.sql
   ```
6. Run the postgresql program with the postgresql_createSchema.sql script, as the user you specified during installation:

   ```
   psql -U <username> -d fmeserver -h <hostname> -p <port> -f postgresql_createSchema.sql
   ```

> **Note** If you drop the FME Server database and login user, run the postgresql program with the appropriate postgresql_dropDB.sql or postgresql_dropUser.sql scripts.

After Database Creation

1. On the machine on which the FME Server database server is installed, open pg_hba.conf. For default installation directories of this file:
   - PostgreSQL 10: `<`*`PostgreSQLDir`*`>\data\pg10\pg_hba.conf`
   - PostgreSQL 11: `C:\Program Files\PostgreSQL\11\data\pg_hba.conf`
2. Change the following lines:

   ```
   host    all      all     127.0.0.1/32      md5
   host    all      all       ::1/128         md5
   ```

   to:

   ```
   host    all      all 0.0.0.0/0         md5
   ```

```
host    all      all     ::/0              md5
```

3. Restart the FME Server Database service.

2. **Enable connections**: FME Server connects to the database when it starts. Therefore, ensure that your database server is running and configured to accept incoming connections before FME Server is started. The database must allow connections over TCP/IP with all machines on which the FME Server Core and FME Engines are installed.
3. Ensure that all installations of FME Server are running. For more information, see Working with the FME Server System Services.

What's Next?

- Log on to the Web User Interface

Log on to the Web User Interface

To log in to the Web User Interface for the first time as an administrator following installation, specify *Username* `admin` and *Password* `admin`. You will be prompted to update the `admin` password upon initial use, based on the default Password Policy configuration.

For more information and support:

- FME Server Troubleshooting: Web Interface Login
- Accessing the Web User Interface
- Changing the Login Password
- Default User Accounts and Passwords
- Role-Based and User-Based Access Control

What's Next?

- Request and Install a License

Request and Install a License

License files are installed, by default, to:Windows: `C:\ProgramData\Safe Software\FME Server\licenses`Linux: `/opt/fmeserver/licenses`Dynamic Engine (CPU Usage) licensing is not available for engines on FME Cloud.

Automatic Mode (Recommended)

If your FME Server host machine has an internet connection, you can request and install a license online without any need for downloading and re-uploading a license file.

> **Note**
>
> - Licensing FME Server over the internet requires no inbound connection. For more information, see FME Server Automatic Licensing URLs.
> - If you purchased credits for Dynamic Engines (CPU Usage), automatic mode only is supported. Manual mode licensing (below) is not supported.

1. Open the FME Server Web User Interface as a user assigned to the fmesuperuser role. If none of your FME Engines are licensed, you will see a prompt to activate FME Server. Click on the prompt. Otherwise, select **System Configuration** > **Licensing**.
2. Click **Request New License**.
3. Complete the fields on the Request a New License page. If you have a product *Serial Number*, be sure to provide it. If not, you will receive a 7-day evaluation license, which you can extend to 60 days (see below).

   > **Note** In addition to licenses for standard FME Engines, an evaluation license that is requested in Automatic Mode includes 100 hours of Dynamic Engine (CPU Usage) credits.

4. *Licensing Mode*: Select **Automatic**.

5. Click **OK**.
6. A message indicates that your license is installed, and your available engines appear momentarily on the Engines page.

> **Note** If the Serial Number you provided includes Dynamic Engines (CPU Usage), they are not configured to start by default. You can start and configure your Dynamic Engines on the Engines page.

Manual Mode

If you prefer not to use an internet connection for licensing, or if your FME Server host machine does not have an internet connection, use this process to install a license.

> **Note** If you purchased credits for Dynamic Engines (CPU Usage), manual mode licensing is not supported. Use automatic mode for licensing (above). For more information, contact your Safe Software sales representative.

1. Open the FME Server Web User Interface as a user assigned to the fmesuperuser role. If none of your FME Server engines are licensed, you will see a prompt to activate FME Server. Click on the prompt. Otherwise, select **System Configuration** > **Licensing**.
2. Click **Request New License**.
3. Complete the fields on the Request a New License page. If you have a product *Serial Number*, be sure to provide it. If not, you will receive a 7-day evaluation license, which you can extend to 60 days (see below).
4. *Licensing Mode*: Select **Manual**.
5. Click **OK**. A license request .json file downloads.
6. Email the .json file to codes@safe.com.
7. You will receive an email from Safe Software with a license file, which has a `.fmelic` extension. Download the file.

8. Return to the Licensing page. Under Standard Engines, click **Upload License File** and select the `.fmelic` file to upload. Or, drag and drop the `.fmelic` file onto the page under Standard Engines. A message indicates that it is installed, and your available engines appear on the Engines page.

Extending an Evaluation License

If you installed a 7-day evaluation license, you should have an email from codes@safe.com that allows you to extend the license to 60 days.

Automatic Mode (Recommended)

If your FME Server host machine has an internet connection, you can extend an evaluation license online without any need for downloading and re-uploading a license file.

1. Open the email and click the link as instructed.
2. A web page opens indicating the request was successful. Additionally, a link is provided to download the license file. Click the link to download the file for safekeeping.
3. Return to **System Configuration** > **Licensing** and click **Refresh License**. The license should now be extended accordingly. The EXPIRES field shows the new expiry date.

Manual Mode

If you prefer not to use an internet connection for licensing, or if your FME Server host machine does not have an internet connection, use this process to extend an evaluation license.

1. Open the email and click the link as instructed.
2. A web page opens indicating the request was successful. Additionally, a link is provided to download the license file. Click the link to download the file.
3. Return to **System Configuration** > **Licensing** and click **Upload License File**. Or, drag and drop the file onto the page. (You may need to move the license to a location where it can be accessed). A message indicates that it is installed. The license should now be extended accordingly. The EXPIRES field shows the new expiry date.

Problems?

- FME Server Troubleshooting: FME Server Engines
- Contact codes@safe.com.

See Also

- FME Server Licensing Walk-Through
- FME Server Automatic Licensing URLs
- FME Engines

What's Next?

- (Recommended) Update the Windows service accounts that run the FME System Services.
- (Upgrade Only) Restore your FME Server Configuration from a Previous Installation.
- Test the Installation.

Test the Installation

To test your FME Server installation, confirm that FME Server can perform its primary function—running a job.

1. On the Run Workspace page, specify:
   - Repository: Samples
   - Workspace: austinApartments.fmw
   - Service: Job Submitter
2. Click Run Workspace.

   If you see a success message, your install was a success.

Distributing Components (3-Tier)

Before installing a 3-tier distributed architecture, make sure you have:

- Read and understood Planning an FME Server Installation.
- Provided the prerequisites in Before Installation.
- Linux: Ensured System Requirements are met, including updates and dependencies.

To perform a 3-tier installation of FME Server:

1. Obtain the Installer
2. Install the FME Server Database

   > **Note** Complete this step *only* if you wish to install a PostgreSQL database that is included with the FME Server installer, and do *not* wish to configure the FME Server Database on your own database server. For more information, see Provide a Database Server.

3. Install the FME Server Core and FME Engines
4. Install the FME Server Web Services
5. Configure the FME Server Database

   > **Note** Complete this step *only* if you are configuring the FME Server Database on your own database server, and did *not* install the PostgreSQL database that is included with the FME Server installer. For more information, see Provide a Database Server.

6. Start the FME Server system services. Following a distributed installation, the FME Server system services do not start automatically. You must manually start them on each machine that is hosting FME Server components.
7. Log on to the Web User Interface
8. Update the WebSocket Host
9. Request and Install a License

10. (If necessary) Update the Windows service accounts that run the FME System Services.
11. (Upgrade only) Restore your FME Server Configuration from a Previous Installation.
12. Test the Installation.

What's Next?

Optimize: You can scale-up your FME Server by:

- Increasing the number of FME Engines that run when you start FME Server.
- Adding FME Engines on separate machines that are closer to your data.

For more information, see Planning for Scalability and Performance.

Before Installation

Before you install the FME Server components for a 3-tier architecture, ensure the following non-FME Server components are in place on your network:

- Database server on a separate machine.
- Web application server on a separate machine; or, if using the Web Application Server provided with FME Server, a machine on which to install it.
- File system on a separate machine.
- (Recommended) One or more Windows service accounts with read and write permissions on the network shares of the FME Server Core/Engines and the Web Application Server. In most distributed installations, this account is necessary for these components to communicate with each other across a network. For more information, see Running the FME Server System Services Under Different Accounts (Windows).

Next Steps

Proceed to Obtain the Installer.

Provide a Database Server

FME Server uses its own database to manage jobs and workspace information. It is not a source or destination data source for FME workspaces.

To ensure the FME Server Database remains available in a failover scenario, provide a machine on which to install the database that is physically separate from the machines on which the FME Servers are installed. In addition to being physically separate, the database server should, by itself, be configured for fault tolerance.

You can choose to install a PostgreSQL database that is included with the FME Server installer, or you can configure the FME Server Database on your own database server. If you use your own database server, keep in mind the following:

- PostgreSQL, Oracle, and SQL Server are supported. The following versions are recommended:
  - PostgreSQL: 11.x or later.
  - Oracle: 12c or later.
  - SQL Server: 2016 or later.
- When you install the FME Servers, the database server must be running and you must know the connection information.
- If using an Oracle database server, you must obtain the Oracle Database JDBC driver. For more information, see https://www.oracle.com/technetwork/database/application-development/jdbc/downloads/index.html.

  > **Note** Oracle Database JDBC driver versions that use ojdbc10.jar are *not* supported.

- Following installation, you must be able to create a new database on the server using SQL scripts.

For information about acquiring a fault-tolerant database server, consult your IT department.

Updating the FME Server Database Password

If you choose to install a PostgreSQL database that is included with the FME Server installer, and want to update the password for the database user account, follow these instructions:

1. Start pgAdmin4.exe from <*FMEServerDir*>\Utilities\pgsql\pgAdmin 4\bin\.
2. If this is your first time starting pgAdmin4, it will prompt you to set a master password. Choose something you will remember.
3. If pgAdmin auto-connects to the FME Server Database, an entry appears in the Object browser, under Servers, similar to the following:

   ```
   fmeserver (<hostname>:7082)
   ```

   If pgAdmin III does not auto-connect to the FME Server Database, add a new Server for it. To add a New Server:

   a. Right-click on **Servers** and Select **Create** > **Server...**.
   b. In the **General** tab of the Create - Server dialog, specify the *Name* for the server connection. This can be anything, such as `fmeserver`.
   c. In the **Connection** tab of the Create - Server dialog, specify the server properties, using the `Database Connection` details in the fmeDatabaseConfig configuration

file, for `DB_TYPE=postgresql`, as follows:

Property	Value from fmeDatabaseConfig.txt
Host name/address	DB_JDBC_URL=jdbc:postgresql://<***hostname***>:<*port*>/<database_name>
Port	DB_JDBC_URL=jdbc:postgresql://<*hostname*>:<***port***>/<*database_name*>
Maintenance database	DB_JDBC_URL=jdbc:postgresql://<*hostname*>:<*port*>/<***database_name***>
Username	DB_USERNAME=<***username***>
Password	DB_PASSWORD=<***password***>

d. Click **Save**.

4. In the Object browser, select the FME Server Database server, and locate and expand **Login/Group Roles**.
5. Right-click the fmeserver database user account and select **Properties**. Under **Definition**, change the *Password* and click **Save**.
6. In the fmeDatabaseConfig configuration file, update the value of the `DB_PASSWORD` parameter that corresponds to `DB_TYPE=postgresql` with the new password specified above.

   When finished, save the file.
7. (Recommended) Encrypt the FME Server Database password.

8. Restart FME Server.

1. Open a command prompt and change to the following directory:

   <*FMEServerDir*>/Utilities/pgsql/bin

2. Run the following command to connect to the FME Server Database:

   ```
   ./psql -d <databaseName> -p <port> -U <username>
   ```

   To confirm the settings, check the `Database Connection` details in the fmeDatabaseConfig configuration file, for `DB_TYPE=postgresql`, as follows:

Property	Value from fmeDatabaseConfig.txt
-d	DB_JDBC_URL=jdbc:postgresql://<*hostname*>:<*port*>/<***database_name***>
-h	DB_JDBC_URL=jdbc:postgresql://<***hostname***>:<*port*>/<*database_name*>
-p	DB_JDBC_URL=jdbc:postgresql://<*hostname*>:<***port***>/<*database_name*>
-U	DB_USERNAME=<***username***>
Password (when prompted)	DB_PASSWORD=<***password***>

3. Once connected, enter the following command to change the password for your user:

   ```
   \password
   ```

4. Use `\q` to quit psql.

5. In the the fmeDatabaseConfig configuration file, update the value of the `DB_PASSWORD` parameter that corresponds to `DB_TYPE=postgresql` with the new password specified above, and save the file.
6. (Recommended) Encrypt the FME Server Database password.
7. Restart FME Server.

Provide a Remote File System for the FME Server System Share

- ***Skill Level***: Intermediate
- ***Estimated Time Required***: 5-15 minutes
- ***Prerequisites***:
  - Domain Service Account has correct permissions on network shares.

FME Server System Share files, which include Repositories and Resources, are installed in specific directories that are shared to enable access from different computers.

Create a directory for the FME Server System Share that is physically separate from the machine on which the FME Server Core and web application server are installed. Separating the file system ensures it remains available in a fault tolerant scenario.

When providing a remote file system, keep in mind the following:

- The accounts that run the FME Server components must have read and write permissions on the remote file system directory. For more information, see Directory and Account Permissions.
- In addition to being physically separate, the file system should, by itself, be configured for fault tolerance.
- When the directory is specified during installation, it must be in the form of a UNC path. Mapped drives are not supported.
- The directory that holds the System Share must be empty, unless System Share folders have already been created there as part of an installation involving multiple FME Server Cores.

For information about acquiring a fault tolerant file system, consult your IT department.

Linux Only

For distributed installations on Linux, it is necessary to create a user, prior to installation, on the machine that will host the installation of the FME Server Core and Engines. This user must be named 'fmeserver' and belong to group 'fmeserver', and be granted permissions on the FME Server System Share. For more information, see Directory and Account Permissions.

Example Instructions

The following example creates user 'fmeserver' in group 'fmeserver', and allows mount /mnt/data to be writable by the newly-created user.

> **Note** The following instructions are provided as a general guideline for adding a user and mounting a directory. Exact instructions may vary depending on the distribution and share type in your Linux configuration.

1. Run the following commands in the Linux command line:

   ```
   groupadd fmeserver
   useradd -m -g fmeserver fmeserver
   ```

2. Mount the FME Server System Share directory so that user 'fmeserver' has read and write permissions. For example, to mount a Windows-based file share:

   ```
   mount -v -t cifs //network/share /mnt/data -o gid=1008,uid=1008
   ```

   `gid` and `uid` are the group id and user id of the user and group that were created. These id's can be found using these commands:

   ```
   id -g fmeserver
   id -u fmeserver
   ```

Provide a Web Application Server

A web application server may be installed on the local system or on a separate machine.

FME Server supports Apache Tomcat version 9.0.x. On Windows, we recommend running the web application server on the same version of the Java Runtime Environment as

FME Server runs. To determine this version, use a text editor to open file `release` in <*FMEServerDir*>\FMEServer\Utilities\jre.

The following are *not* supported:

- Apache Tomcat version 10.x.
- Java Runtime Environment 9 or later.

> **Note** On Linux, you must add the following environment variable to etc/environment:
>
> ```
> JAVA_HOME="/usr/lib/jvm/java-8-openjdk-amd64"
> ```

You must know the port number on which your web application server receives incoming requests and the path to the directory where your web application server stores web application `.war` files. (This directory is normally called `webapps`.)

Additionally, you must allow the necessary system accounts permission to run the web application server. For more information, see Directory and Account Permissions.

Obtain the Installer

To obtain the applicable FME Server installation package, visit the FME Downloads page. This page includes download links to release and beta installation packages for various platforms.

To request a 60-day trial license of FME Server, visit http://www.safe.com/fme/fme-technology/fme-server/trial-download/.

You can also contact sales@safe.com to get access.

What's Next?

If you are opting to install a PostgreSQL database that is included with the FME Server installer, and do *not* wish to configure the FME Server Database on your own database server, proceed to Install the FME Server Database. Otherwise, proceed to Install the FME Server Core and FME Engines.

Install the FME Server Database

Install a PostgreSQL FME Server Database on a separate machine on your network.

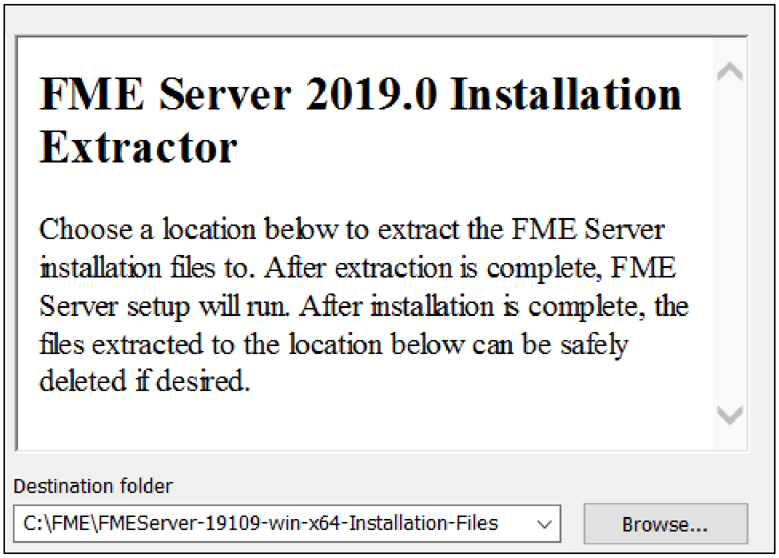
> **Note** Complete this step *only* if you wish to install a PostgreSQL database that is included with the FME Server installer, and do *not* wish to configure the FME Server Database on your own database server. For more information, see Provide a Database Server.

Start the FME Server installer.

(Windows only) Installation Extractor

On the Installation Extractor dialog, specify a *Destination folder* in which to extract installation files. Note that this folder *only* specifies where installation files are extracted—it does *not* specify where FME Server program files are installed. That location is specified later in the installer.

> **Tip** Take note of the specified *Destination folder* location. Following installation, you may wish to:
>
> - Review the installation .log file.
> - Remove these files. Doing so saves almost 2 GB disk space.



FME Server 2019.0 Installation Extractor

Choose a location below to extract the FME Server installation files to. After extraction is complete, FME Server setup will run. After installation is complete, the files extracted to the location below can be safely deleted if desired.

Destination folder

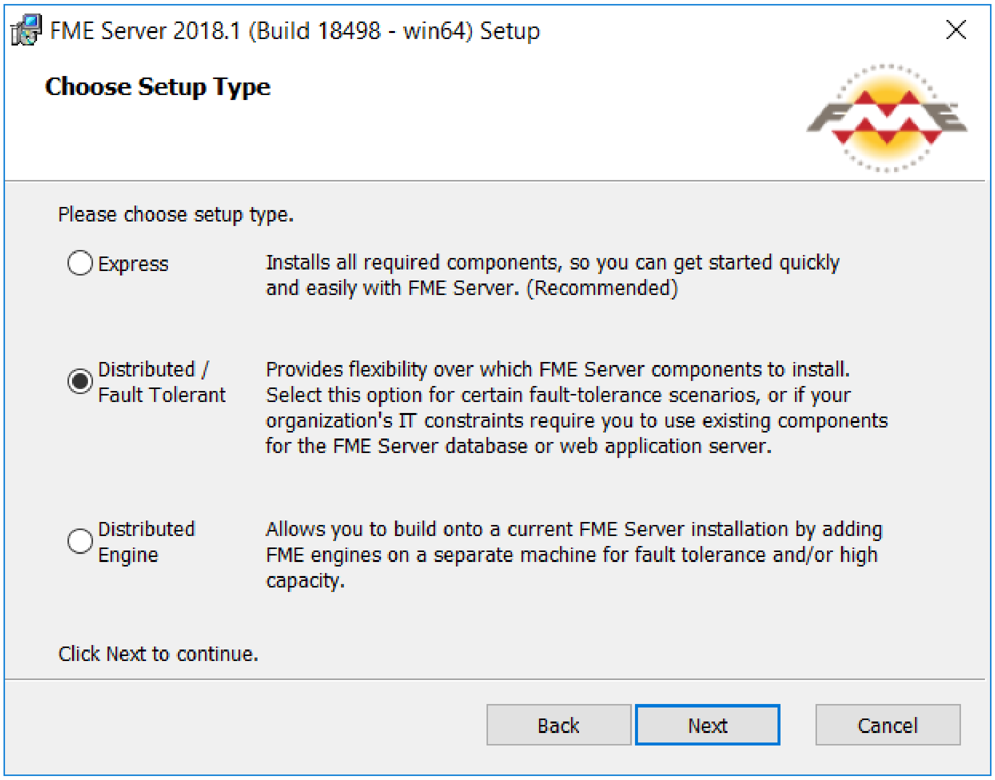
C:\FME\FMEServer-19109-win-x64-Installation-Files

Click **Install**.

When extraction is complete, the installer opens. Proceed through the installer to the Choose Setup Type dialog.

Choose Setup Type

Select the Distributed/Fault Tolerant install option.



FME Server 2018.1 (Build 18498 - win64) Setup

Choose Setup Type

Please choose setup type.

○ Express — Installs all required components, so you can get started quickly and easily with FME Server. (Recommended)

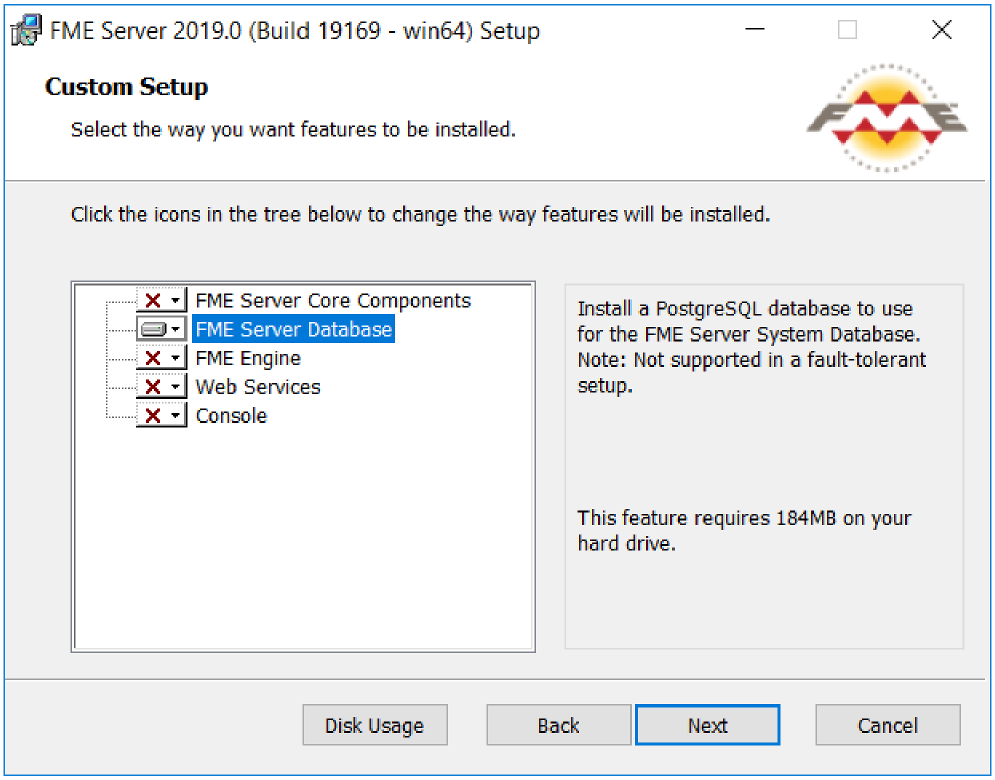
● Distributed / Fault Tolerant — Provides flexibility over which FME Server components to install. Select this option for certain fault-tolerance scenarios, or if your organization's IT constraints require you to use existing components for the FME Server database or web application server.

○ Distributed Engine — Allows you to build onto a current FME Server installation by adding FME engines on a separate machine for fault tolerance and/or high capacity.

Click Next to continue.

Custom Setup

Specify FME Server Database. Unselect all other components.



FME Server 2019.0 (Build 19169 - win64) Setup

Custom Setup

Select the way you want features to be installed.

Click the icons in the tree below to change the way features will be installed.

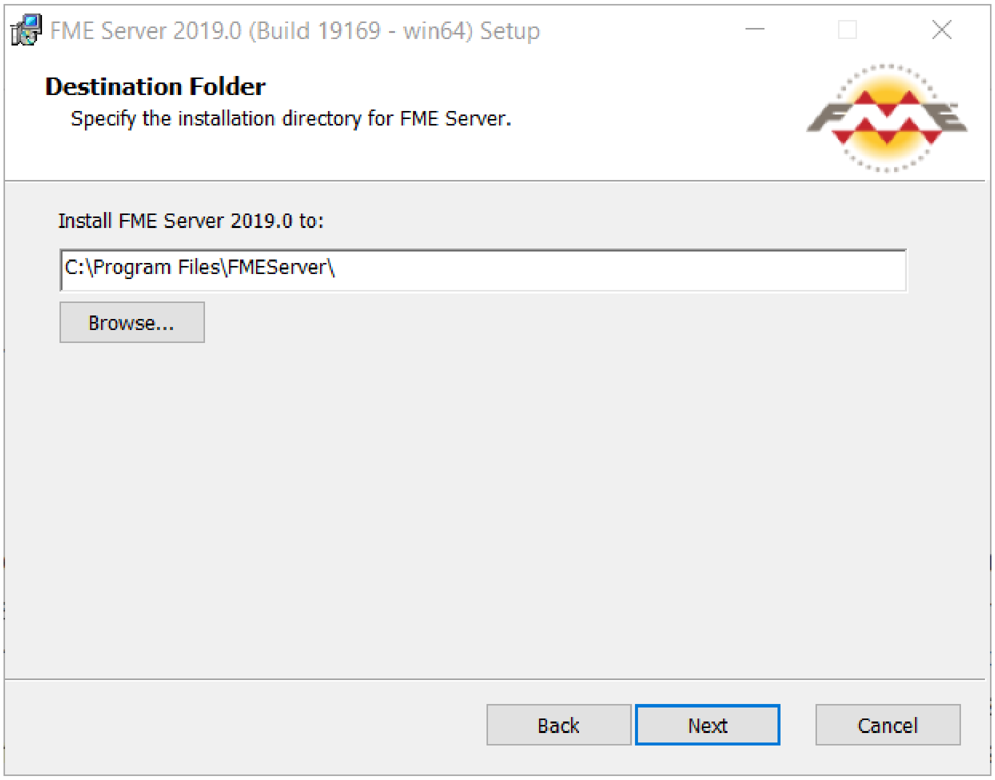
- ☒ FME Server Core Components
- FME Server Database
- ☒ FME Engine
- ☒ Web Services
- ☒ Console

Install a PostgreSQL database to use for the FME Server System Database. Note: Not supported in a fault-tolerant setup.

This feature requires 184MB on your hard drive.

Destination Folder

Specify the installation directory for the FME Server Database.



FME Server 2019.0 (Build 19169 - win64) Setup

Destination Folder

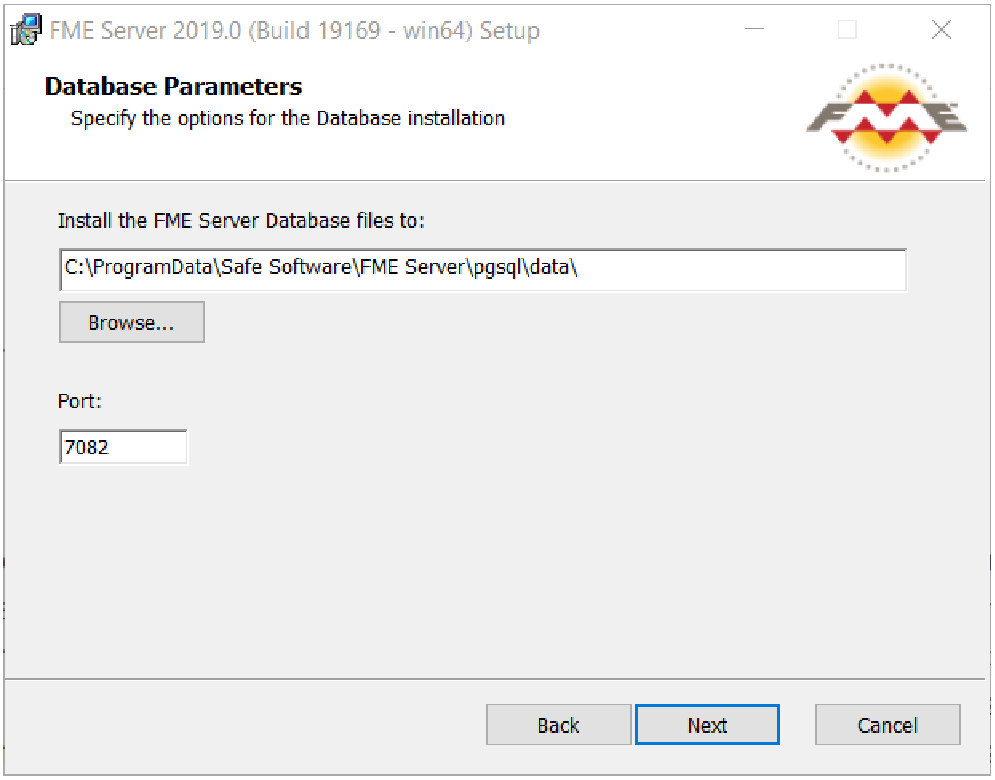
Specify the installation directory for FME Server.

Install FME Server 2019.0 to:

C:\Program Files\FMEServer\

Database Parameters

- *Install the FME Server Database files to*: Specify a directory to install the database files.
- *Port*: Specify the port that the database will listen on. Port **7082** is the default.



FME Server 2019.0 (Build 19169 - win64) Setup

Database Parameters

Specify the options for the Database installation

Install the FME Server Database files to:

C:\ProgramData\Safe Software\FME Server\pgsql\data\

Port:

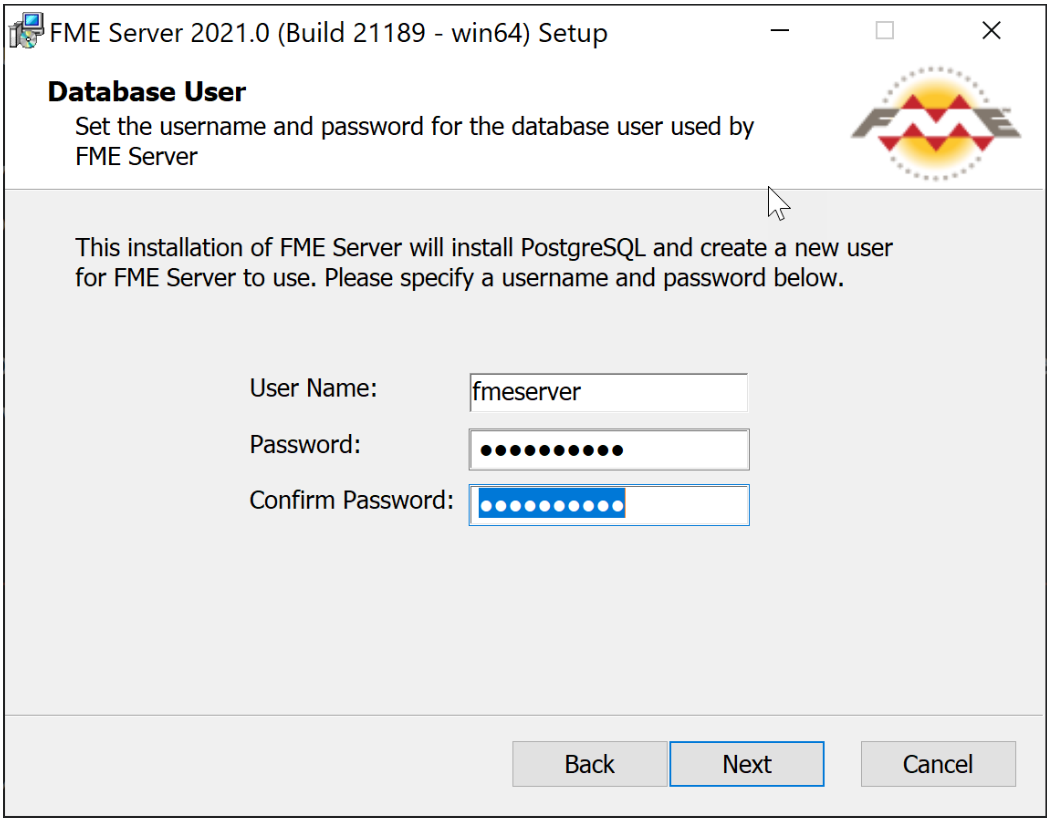
7082

Database User

Specify a *User Name* (defaults to **fmeserver**) and *Password* for the database user account.

> **Warning** Do not specify *User Name* **postgres**. This name corresponds to the PostgreSQL master user. If the corresponding passwords do not match, the database will not install.

> **Note** The password for the FME Server Database user account is encrypted in FME Server installation files. Take note of the *User Name* and *Password* that you specified. You may need to reference it later.


FME Server 2021.0 (Build 21189 - win64) Setup

Database User

Set the username and password for the database user used by FME Server

This installation of FME Server will install PostgreSQL and create a new user for FME Server to use. Please specify a username and password below.

User Name: fmeserver

Password: ●●●●●●●●●●

Confirm Password: ●●●●●●●●●●

Follow the remaining dialogs to complete the installation.

What's Next?

- Install the FME Server Core and FME Engines

Install the FME Server Core and FME Engines

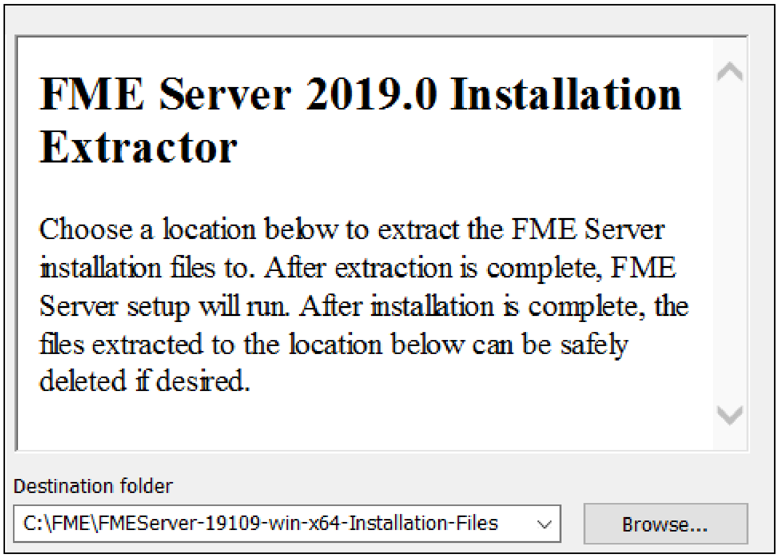
Start the FME Server Installer.

(Windows only) Installation Extractor

On the Installation Extractor dialog, specify a *Destination folder* in which to extract installation files. Note that this folder *only* specifies where installation files are extracted—it does *not* specify where FME Server program files are installed. That location is specified later in the installer.

Tip Take note of the specified *Destination folder* location. Following installation, you may wish to:

- Review the installation .log file.
- Remove these files. Doing so saves almost 2 GB disk space.



FME Server 2019.0 Installation Extractor

Choose a location below to extract the FME Server installation files to. After extraction is complete, FME Server setup will run. After installation is complete, the files extracted to the location below can be safely deleted if desired.

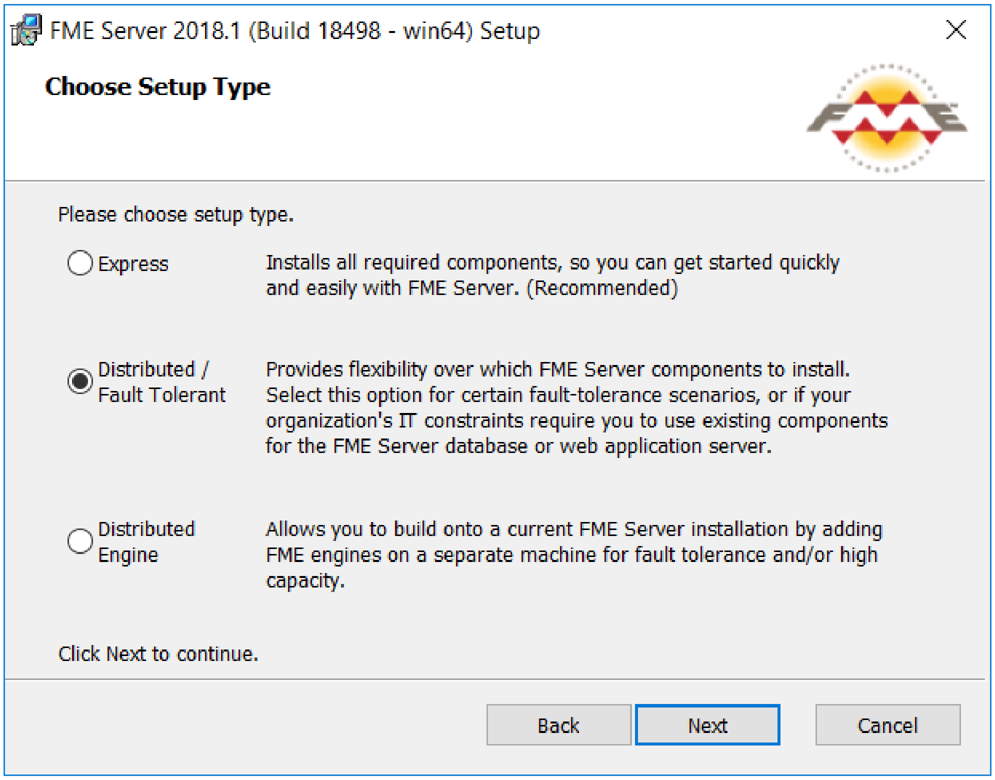
Destination folder: C:\FME\FMEServer-19109-win-x64-Installation-Files

Click **Install**.

When extraction is complete, the installer opens. Proceed through the installer to the Choose Setup Type dialog.

Choose Setup Type

Select the Distributed/Fault Tolerant install option.



FME Server 2018.1 (Build 18498 - win64) Setup

Choose Setup Type

Please choose setup type.

○ Express — Installs all required components, so you can get started quickly and easily with FME Server. (Recommended)

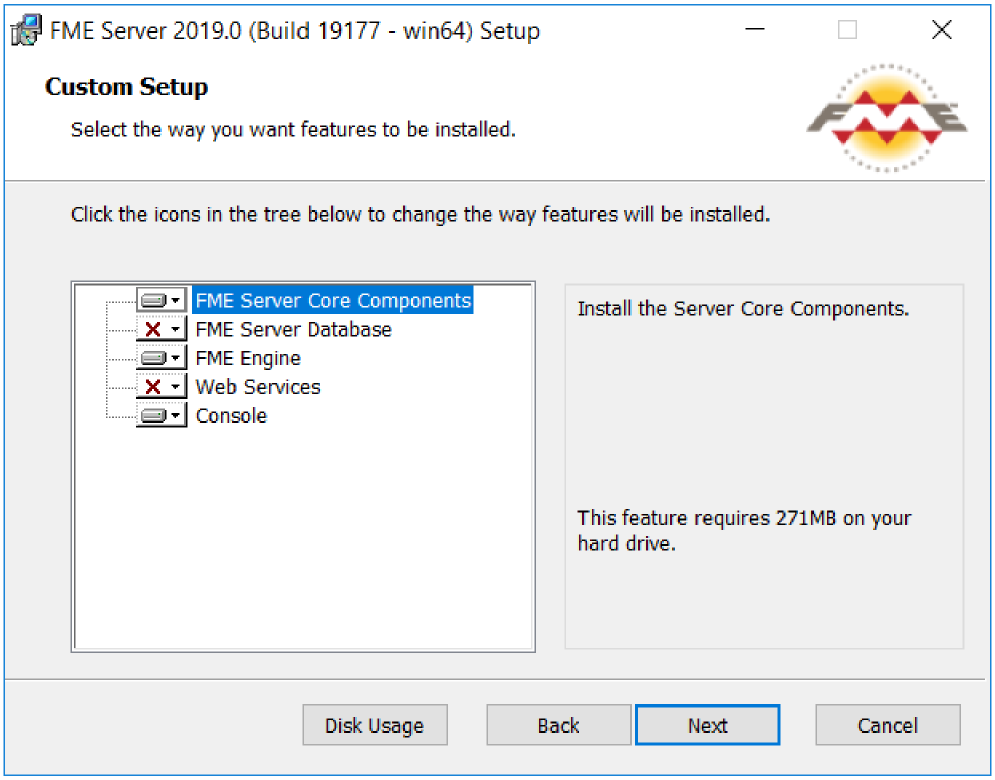
● Distributed / Fault Tolerant — Provides flexibility over which FME Server components to install. Select this option for certain fault-tolerance scenarios, or if your organization's IT constraints require you to use existing components for the FME Server database or web application server.

○ Distributed Engine — Allows you to build onto a current FME Server installation by adding FME engines on a separate machine for fault tolerance and/or high capacity.

Click Next to continue.

Custom Setup

Select **FME Server Core Components** and **FME Engine**. Do *not* select **FME Server Database** or **Web Services**. (Optionally, select **Console**. For more information, see FME Server Console.)


FME Server 2019.0 (Build 19177 - win64) Setup

Custom Setup

Select the way you want features to be installed.

Click the icons in the tree below to change the way features will be installed.

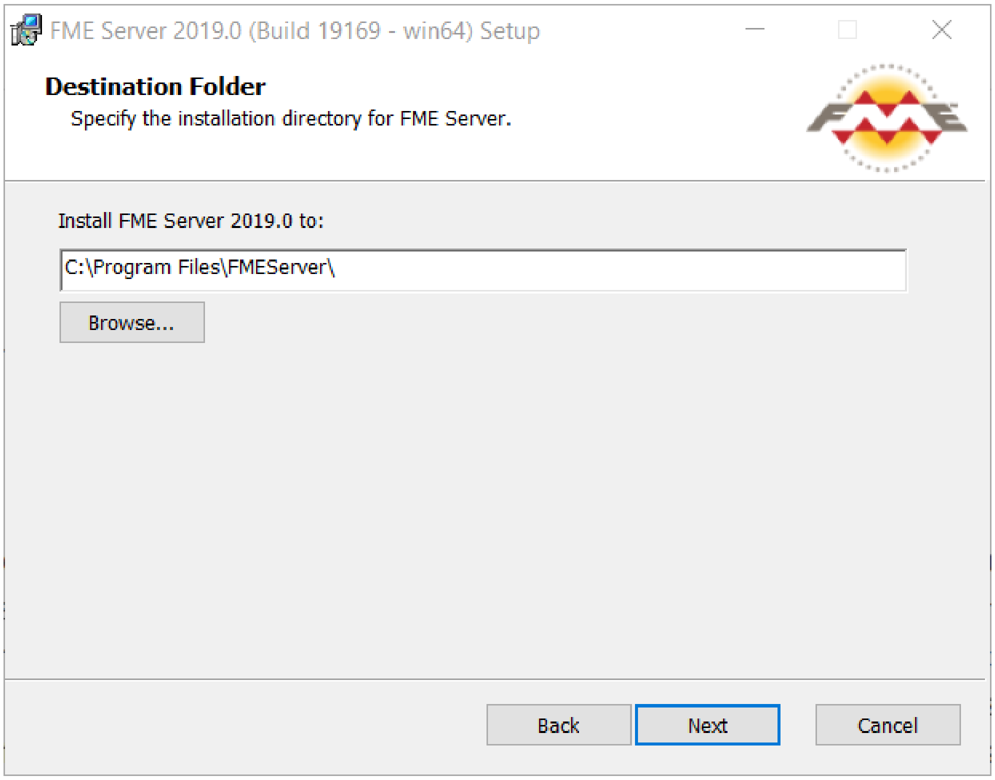
- FME Server Core Components
- ☒ FME Server Database
- FME Engine
- ☒ Web Services
- Console

Install the Server Core Components.

This feature requires 271MB on your hard drive.

Destination Folder

Specify the installation directory for FME Server.


FME Server 2019.0 (Build 19169 - win64) Setup

Destination Folder

Specify the installation directory for FME Server.

Install FME Server 2019.0 to:

C:\Program Files\FMEServer\

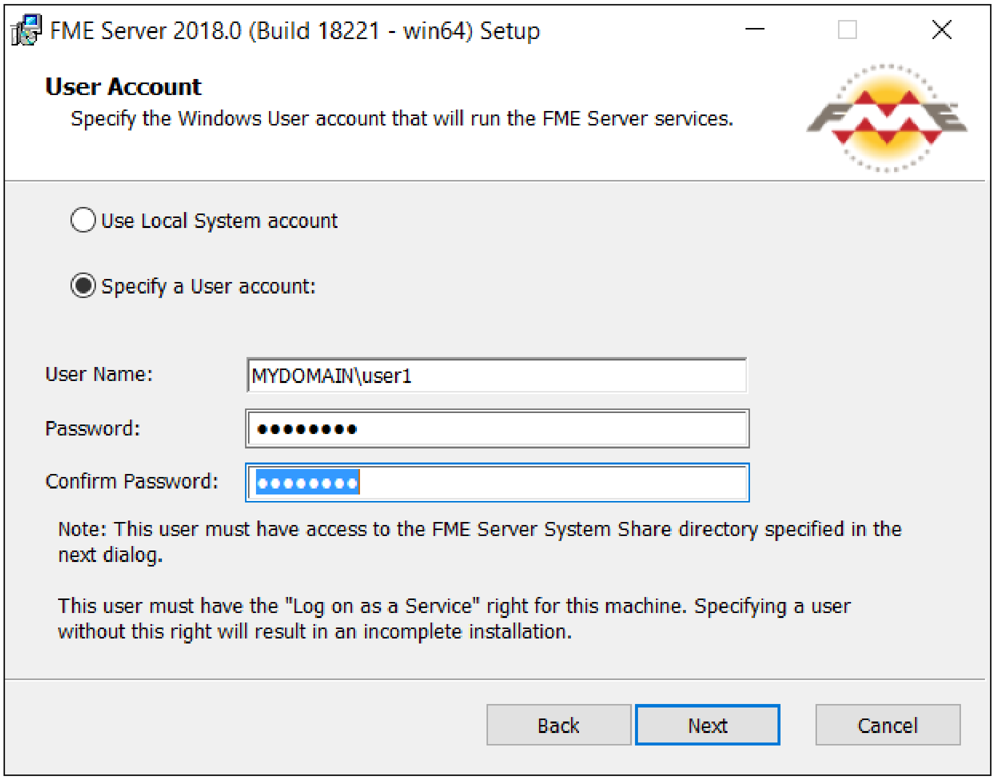
User Account

Specify the Windows user account that will run the FME Server System Services. This account must have:

- Read/Write access to the FME Server System Share that you specify in the next dialog. The System Share is the location where FME Server stores Repositories and Resources files. (For more information, see Provide a Remote File System for the FME Server System Share.)
- Read/Write access to the FME Server installation directory that you specified in the previous dialog.
- "Log on as a service" rights on this machine. For more information, see this Microsoft Docs article.

> **Note** If unsure, you can update account settings for the FME Server system services after installation in the Services manager (Windows) or Linux equivalent.

> **Note** The FME Server Database service always runs under the local system account.



FME Server 2018.0 (Build 18221 - win64) Setup

User Account

Specify the Windows User account that will run the FME Server services.

○ Use Local System account

● Specify a User account:

User Name: MYDOMAIN\user1

Password: ••••••••

Confirm Password: ••••••••

Note: This user must have access to the FME Server System Share directory specified in the next dialog.

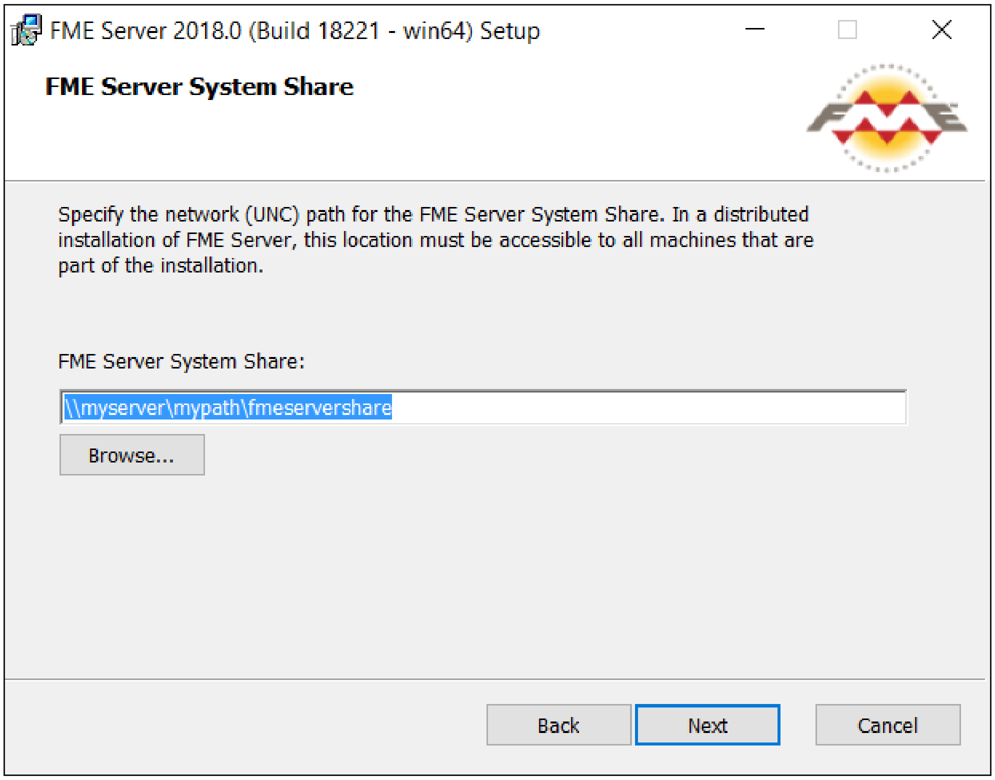
This user must have the "Log on as a Service" right for this machine. Specifying a user without this right will result in an incomplete installation.

FME Server System Share

Specify a directory on another machine to store FME Server System Share files, which include Repositories and Resources. If this is a Linux installation, specify the mounted directory. For more information, see Provide a Remote File System for the FME Server System Share.

Tip As a best practice, specify the full UNC path to the FME Server System Share, even if it is on the same (local) machine where you are running the installer.

Note If you are upgrading to a newer version of FME Server, make sure the specified directory is empty of files from the previous installation. Otherwise, conflicts may occur that can produce unexpected results in performance.



FME Server 2018.0 (Build 18221 - win64) Setup

FME Server System Share

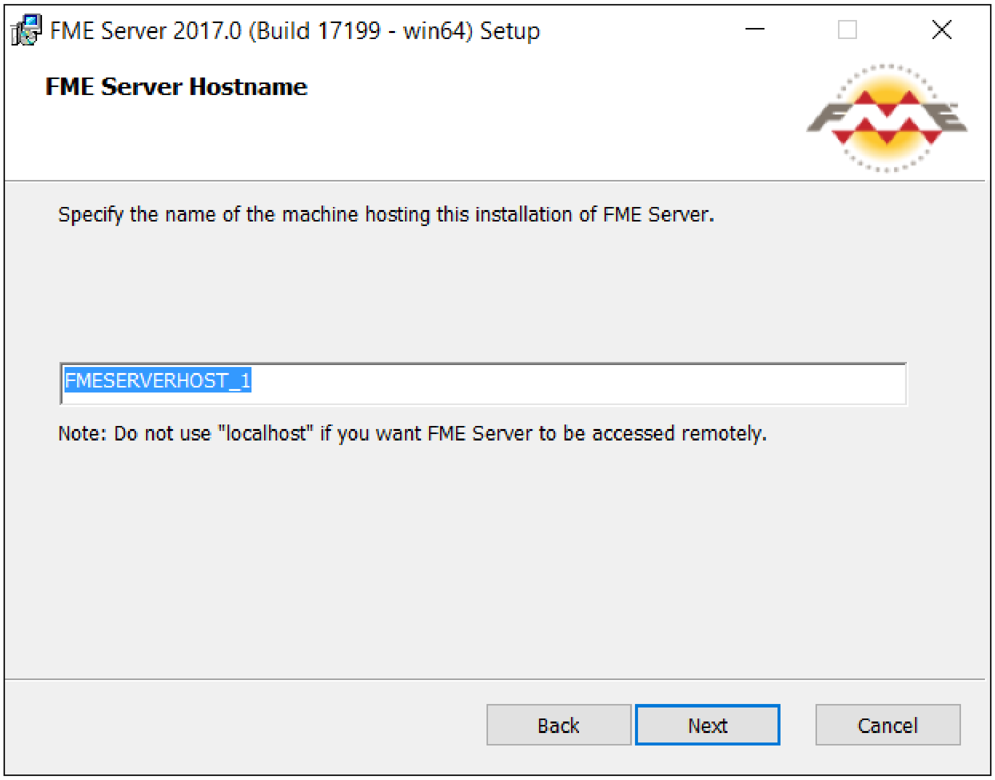
Specify the network (UNC) path for the FME Server System Share. In a distributed installation of FME Server, this location must be accessible to all machines that are part of the installation.

FME Server System Share:

\\myserver\mypath\fmeservershare

FME Server Hostname

Specify the host that will run the FME Server Core.



FME Server 2017.0 (Build 17199 - win64) Setup

FME Server Hostname

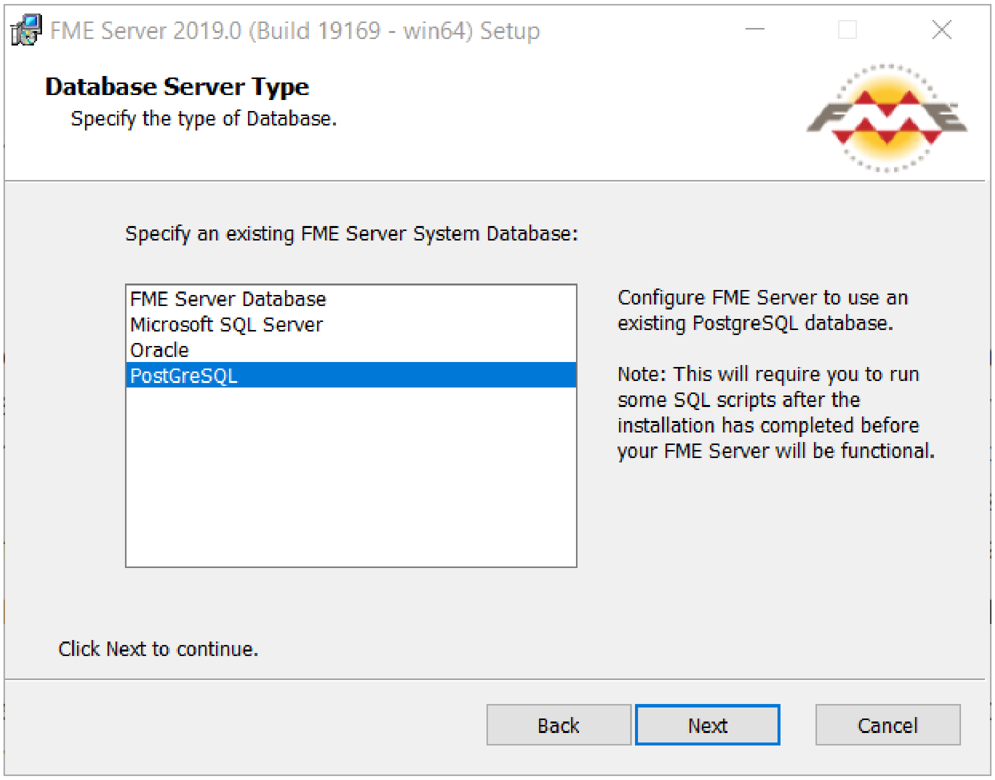
Specify the name of the machine hosting this installation of FME Server.

FMESERVERHOST_1

Note: Do not use "localhost" if you want FME Server to be accessed remotely.

Database Server Type

Specify the type of database for the FME Server Database. If you installed the PostgreSQL database included with the FME Server installer, select **FME Server Database**. If you are configuring the FME Server Database on your own database server, select the database server type: **Microsoft SQL Server**, **Oracle**, or **PostgreSQL**. For more information, see Provide a Database Server.



Database Server Type

Specify the type of Database.

Specify an existing FME Server System Database:

- FME Server Database
- Microsoft SQL Server
- Oracle
- PostGreSQL

Configure FME Server to use an existing PostgreSQL database.

Note: This will require you to run some SQL scripts after the installation has completed before your FME Server will be functional.

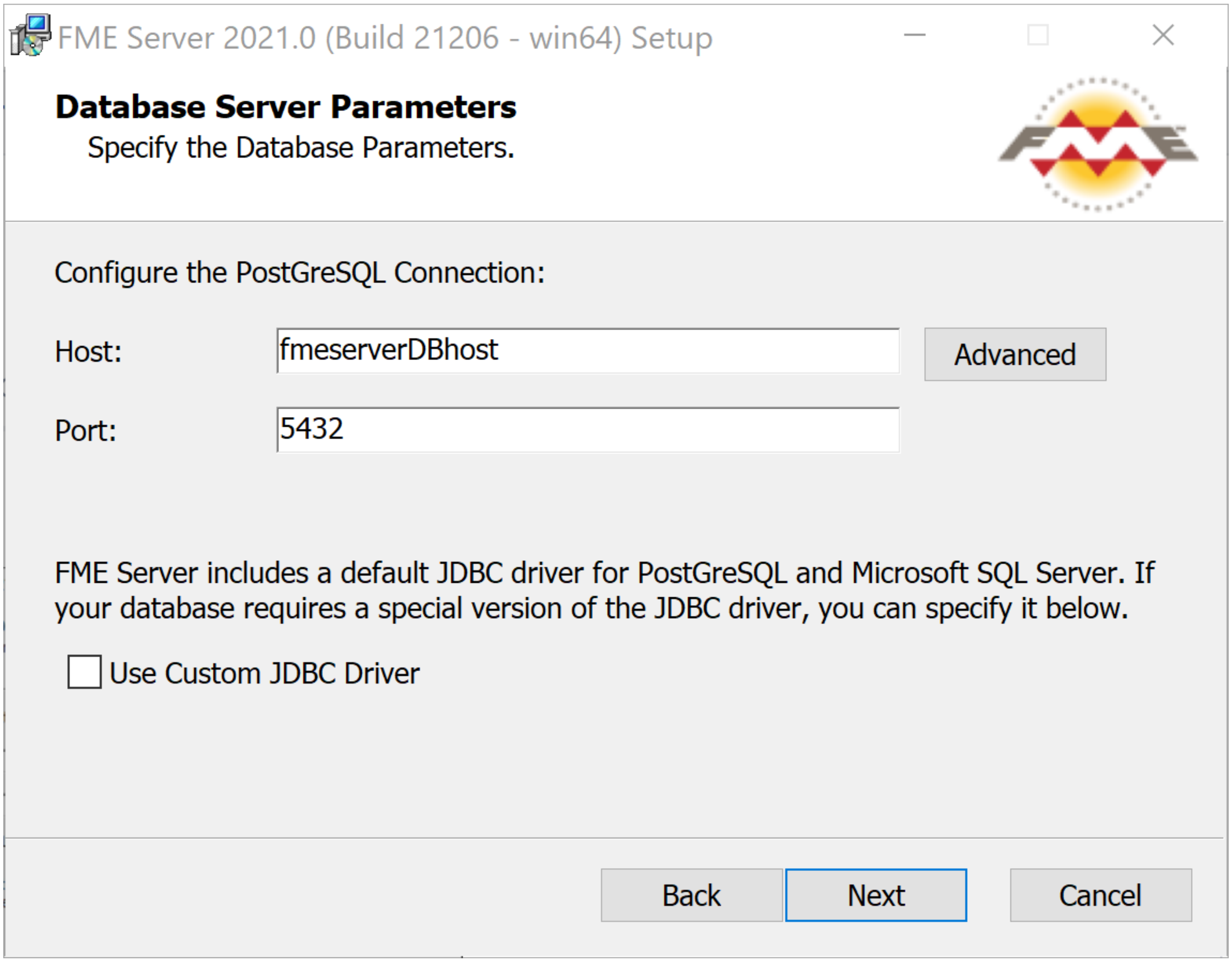
Click Next to continue.

Database Server Parameters

Specify the connection parameters for the FME Server Database. Optionally, to customize further the connection parameters in the JDBC connection string, click **Advanced**.

Note

- If **Microsoft SQL Server** was specified in the previous dialog, check *Use SQL Server instance name* to use that value instead of *Port*.
- If **Oracle** was specified in the previous dialog, you must check *Use Custom JDBC Driver* and specify the *JDBC Driver*.



FME Server 2021.0 (Build 21206 - win64) Setup

Database Server Parameters

Specify the Database Parameters.

Configure the PostGreSQL Connection:

Host: fmeserverDBhost

Port: 5432

FME Server includes a default JDBC driver for PostGreSQL and Microsoft SQL Server. If your database requires a special version of the JDBC driver, you can specify it below.

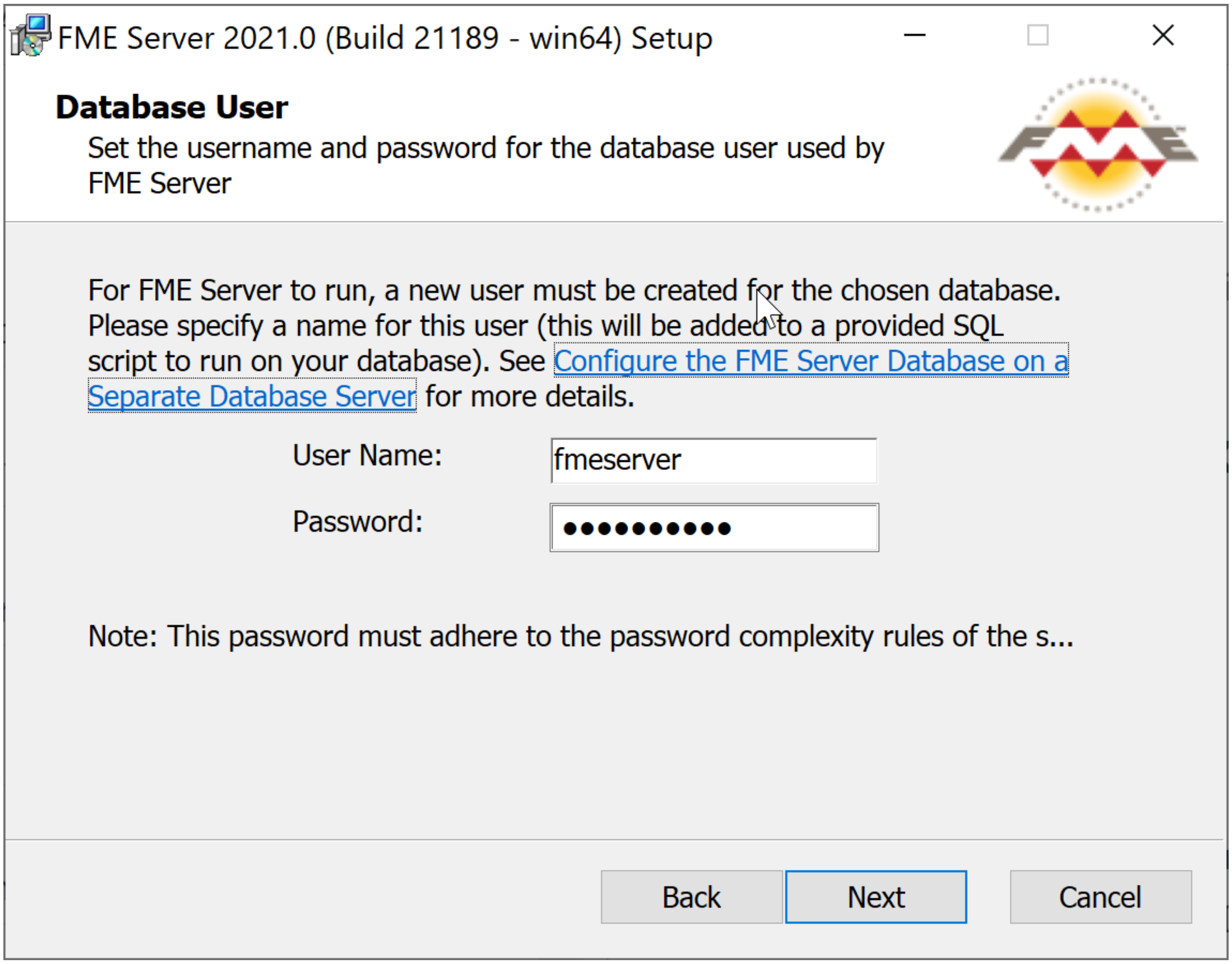
□ Use Custom JDBC Driver

Database User

The installation creates a user account under which to use the FME Server database. Specify a *User Name* (defaults to **fmeserver**) and *Password* for the database user account.

> **Note** The password for the FME Server Database user account is encrypted in FME Server installation files. Take note of the *User Name* and *Password* that you specified. You may need to reference it later.

If you installed the PostgreSQL database included with the FME Server installer, specify the same *User Name* and *Password* that you specified for Database User previously, under Install the FME Server Database.



Database User

Set the username and password for the database user used by FME Server

For FME Server to run, a new user must be created for the chosen database. Please specify a name for this user (this will be added to a provided SQL script to run on your database). See Configure the FME Server Database on a Separate Database Server for more details.

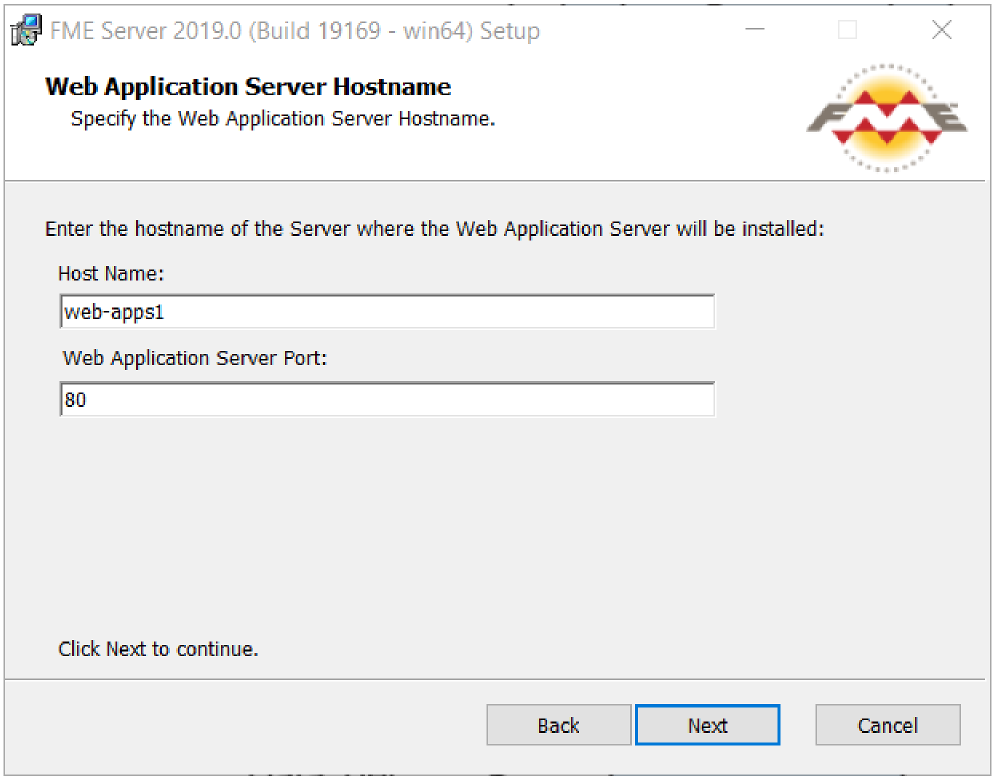
User Name: fmeserver

Password: ●●●●●●●●●●●

Note: This password must adhere to the password complexity rules of the s...

Web Application Server Hostname

Specify the connection parameters for the web application server. For more information, see Provide a Web Application Server.



FME Server 2019.0 (Build 19169 - win64) Setup

Web Application Server Hostname

Specify the Web Application Server Hostname.

Enter the hostname of the Server where the Web Application Server will be installed:

Host Name: web-apps1

Web Application Server Port: 80

Click Next to continue.

Follow the remaining dialogs to complete the installation.

What's Next?

- Proceed to Install the FME Server Web Services

Install the FME Server Web Services

Perform all tasks, where applicable:

Install the FME Server Web Services

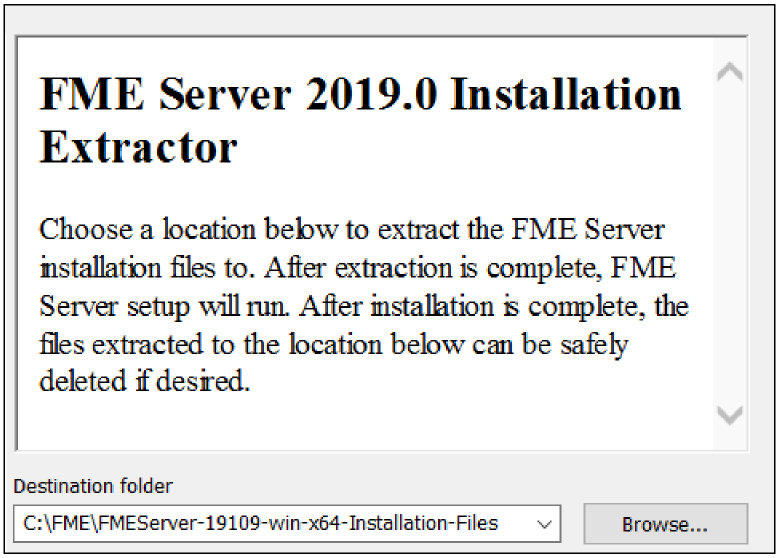
Windows

1. Start the FME Server Installer on the <webHost>.

2. On the Installation Extractor dialog, specify a *Destination folder* in which to extract installation files. Note that this folder *only* specifies where installation files are extracted—it does *not* specify where FME Server program files are installed. That location is specified later in the installer.

Tip Take note of the specified *Destination folder* location. Following installation, you may wish to:

- Review the installation .log file.
- Remove these files. Doing so saves almost 2 GB disk space.



FME Server 2019.0 Installation Extractor

Choose a location below to extract the FME Server installation files to. After extraction is complete, FME Server setup will run. After installation is complete, the files extracted to the location below can be safely deleted if desired.

Destination folder: C:\FME\FMEServer-19109-win-x64-Installation-Files

Click **Install**.

When extraction is complete, the installer opens. Proceed through the installer to the Choose Setup Type dialog.

3. Select the Distributed/Fault Tolerant setup type.
4. On the Custom Setup dialog, select only the Web Services component for installation.
5. On the Destination Folder dialog, specify the installation directory.
6. On the User Account dialog, specify the Windows user account that will run the FME Server System Services. This account must have:
   - Read/Write access to the FME Server System Share that you specify in the next dialog. The System Share is the location where FME Server stores Repositories and Resources files. (For more information, see Provide a Remote File System for the FME Server System Share.)

- Read/Write access to the FME Server installation directory that you specified in the previous dialog.
- "Log on as a service" rights on this machine. For more information, see this Microsoft Docs article.

> **Note** If unsure, you can update account settings for the FME Server system services after installation in the Services manager (Windows) or Linux equivalent.

7. On the Existing FME Server System Share dialog, specify the UNC path to the remote file system for the FME Server System Share.

   > **Tip** As a best practice, specify the full UNC path to the FME Server System Share, even if it is on the same (local) machine where you are running the installer.

8. On the FME Server Hostname dialog, enter the host name of the computer on which FME Server is installed.
9. On the Web Application Server dialog, specify the web application server. If already provided, it is recommended that you shut down the service during installation.
10. On the Web Application Server Port dialog, specify the port to use for communication with the web application server. Port 80 is the recommended default. If this port is in use, port 8080 is recommended.

    > **Note** Common applications that may be using port 80 include Skype and Internet Information Services (IIS). Either turn off these services, or select a different port, such as 8080.

Linux

1. Start the FME Server Installer.
2. Select the Distributed (Custom) install option.
3. At the feature selection dialog, select only the Web Services component.

   The installer prompts you for the name of the FME Server Host.
4. Enter the host name of the computer on which the FME Server Core is installed.
5. The installer prompts you for the path to the remote file system for the FME Server System Share. Enter the path to the mounted directory that was specified in Provide a Remote File System for the FME Server System Share.
6. The installer prompts you to specify the web application server. If already provided, it is recommended that you shut down the service during installation. Port 8080 is recommended.
7. Manually start FME Server and configure it to start automatically. See Working with the FME Server System Services.
8. In order for the Data Download and Data Streaming web services to reference the correct web host location when outputting results that are returned from an FME Engine, you must manually change this location in your FME Engine configuration files:
   a. Locate your FME Engine configuration files, under <*FMEServerDir*>\Server\fmeEngineConfig*.txt
   b. For each file, under the SUB_SECTION for FILE_DOWNLOAD_SERVICE and STREAM_DOWNLOAD_SERVICE, modify the SUCCESS_RESPONSE directive as follows:

   From:

   ```
   SUCCESS_RESPONSE 0:Translation Successful|OutputLocation=!FME_AUTO_DIR_NAME!
   ```

   To:

```
SUCCESS_RESPONSE 0:Translation
Successful|OutputLocation=<webHost>/DefaultResults/!FME_AUTO_DIR_
NAME_SIMPLE!
```

Following the installation on `<webHost>`, the FME Server Web Application Server automatically starts. If you used your own web application server, you can restart that service.

Configure Firewall Settings

The FME Server Web Services and other clients communicate with the FME Server Core over TCP/IP. Requests are sent to the FME Server Core over port 7071. Result messages are returned to clients over a randomly assigned port created by the FME Server Core. Therefore, be sure to configure any firewall settings on the `<webHost>` with a rule to allow for full communication with the `<coreHost>` machines.

(Oracle WebLogic only) Disable WebLogic Authentication

If you are using an Oracle WebLogic server, you must disable WebLogic authentication. This step is necessary to prevent WebLogic from intercepting login requests, which interferes with FME Server authentication.

1. Locate and open the following configuration file in your WebLogic installation:

   ```
   <WebLogic_install_dir>/user_projects/domains/<your_
   domain>/config/config.xml
   ```
2. Add (or change) the following lines before the security configuration closing tag `</security-configuration>`:

   ```
   <enforce-valid-basic-auth-credentials>
     false
   </enforce-valid-basic-auth-credentials>
   ```
3. Save and close the file.

What's Next?

If you are configuring the FME Server Database on your own database server, and did *not* install the PostgreSQL database that is included with the FME Server installer, proceed to Configure the FME Server Database on a Separate Database Server. Otherwise, proceed to Log on to the Web User Interface.

Configure the FME Server Database on a Separate Database Server

> **Note** Complete this step *only* if you are configuring the FME Server Database on your own database server, and did *not* install the PostgreSQL database that is included with the FME Server installer. For more information, see Provide a Database Server.

To configure FME Server to use a separate database server, follow the steps below. You can configure FME Server with a Microsoft SQL Server, PostgreSQL, or Oracle database, running on either Windows or Linux.

1. Database Configuration: Set up FME Server database tables and database users with permissions to access the FME Server database.

   > **Note** The specific way to set up database tables and user permissions on various production databases may differ depending on the available database tools and intended target platform.

   ## Database Configuration - Microsoft SQL Server

   It is assumed that SQL Server is installed.

   One notation used is `<FMEServerDir>`, which is the installation directory of FME Server. In Windows, this is typically `C:\Program Files\FMEServer`.

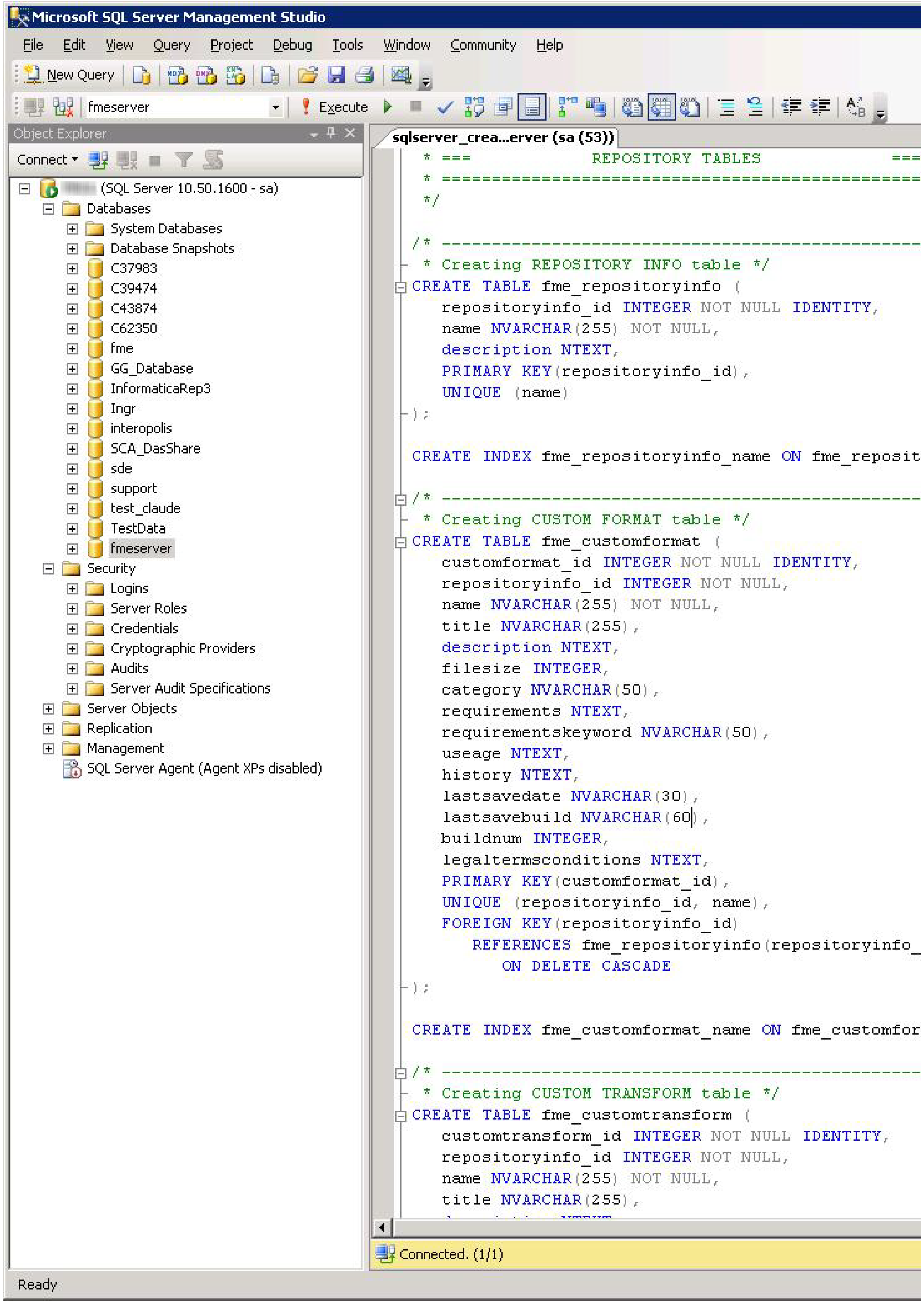
SQL scripts are provided to help with SQL Server database configuration. These SQL scripts are located in the `<FMEServerDir>\Server\database\sqlserver\` directory of the FME Server Core machine.

> **Note** This directory refers to the machine on which the FME Server Core is installed (not the machine on which the database server is installed). To run these scripts, you must transfer this directory to the database machine, or reference it through a UNC path.

If you are upgrading, you should back up any job history you want to keep.

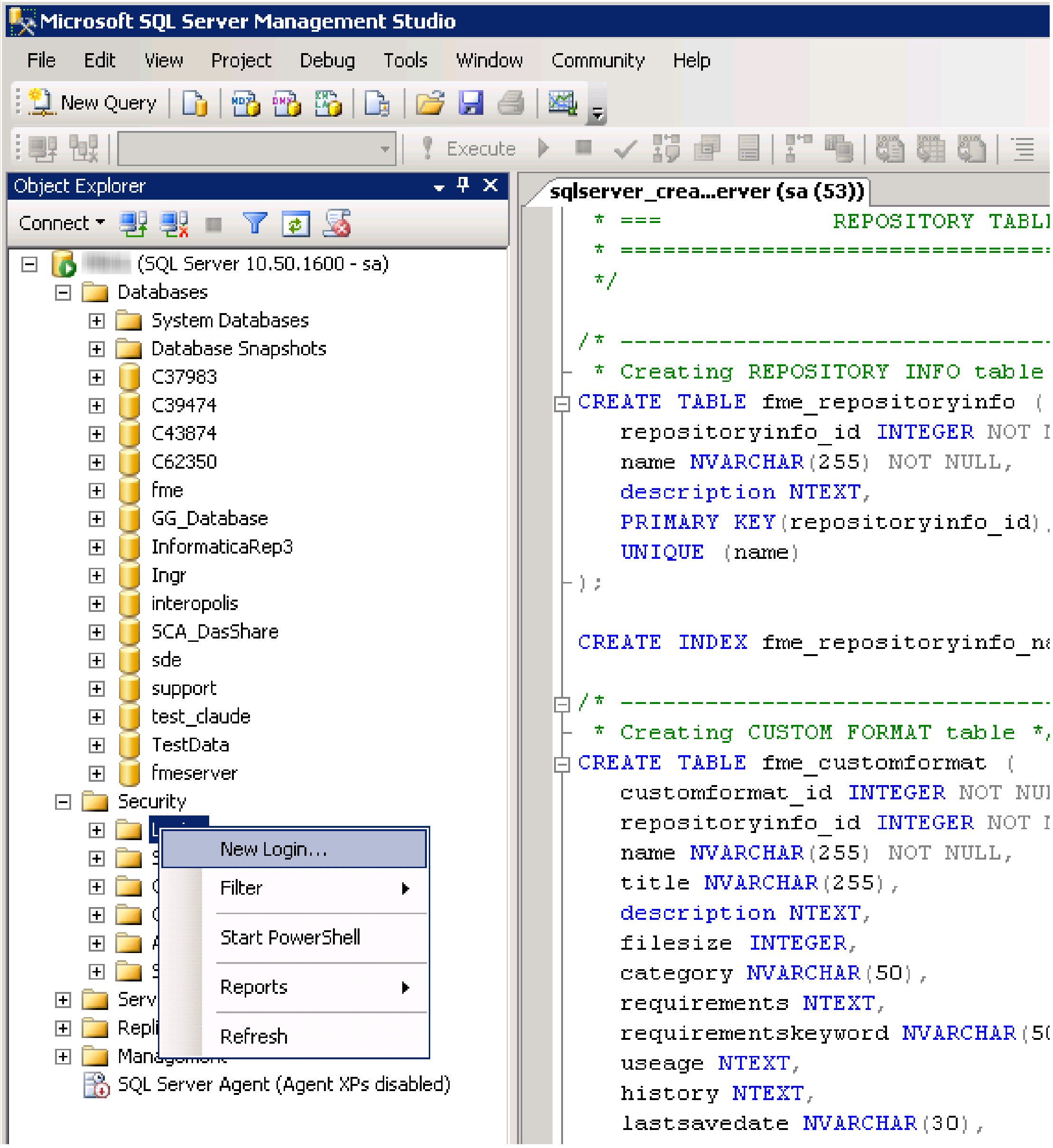
Instructions Using SQL Server Management Studio

1. Open the SQL Server Management Studio and connect to the SQL Server database engine.
2. Open `sqlserver_createDB.sql` and run the script against the `fmeserver` database, as shown below:



```
 * ===            REPOSITORY TABLES          ===
 * ============================================
 */

/* --------------------------------------------
 * Creating REPOSITORY INFO table */
CREATE TABLE fme_repositoryinfo (
   repositoryinfo_id INTEGER NOT NULL IDENTITY,
   name NVARCHAR(255) NOT NULL,
   description NTEXT,
   PRIMARY KEY(repositoryinfo_id),
   UNIQUE (name)
);

CREATE INDEX fme_repositoryinfo_name ON fme_reposit

/* --------------------------------------------
 * Creating CUSTOM FORMAT table */
CREATE TABLE fme_customformat (
   customformat_id INTEGER NOT NULL IDENTITY,
   repositoryinfo_id INTEGER NOT NULL,
   name NVARCHAR(255) NOT NULL,
   title NVARCHAR(255),
   description NTEXT,
   filesize INTEGER,
   category NVARCHAR(50),
   requirements NTEXT,
   requirementskeyword NVARCHAR(50),
   useage NTEXT,
   history NTEXT,
   lastsavedate NVARCHAR(30),
   lastsavebuild NVARCHAR(60),
   buildnum INTEGER,
   legaltermsconditions NTEXT,
   PRIMARY KEY(customformat_id),
   UNIQUE (repositoryinfo_id, name),
   FOREIGN KEY(repositoryinfo_id)
      REFERENCES fme_repositoryinfo(repositoryinfo_
         ON DELETE CASCADE
);

CREATE INDEX fme_customformat_name ON fme_customfor

/* --------------------------------------------
 * Creating CUSTOM TRANSFORM table */
CREATE TABLE fme_customtransform (
   customtransform_id INTEGER NOT NULL IDENTITY,
   repositoryinfo_id INTEGER NOT NULL,
   name NVARCHAR(255) NOT NULL,
   title NVARCHAR(255),
```

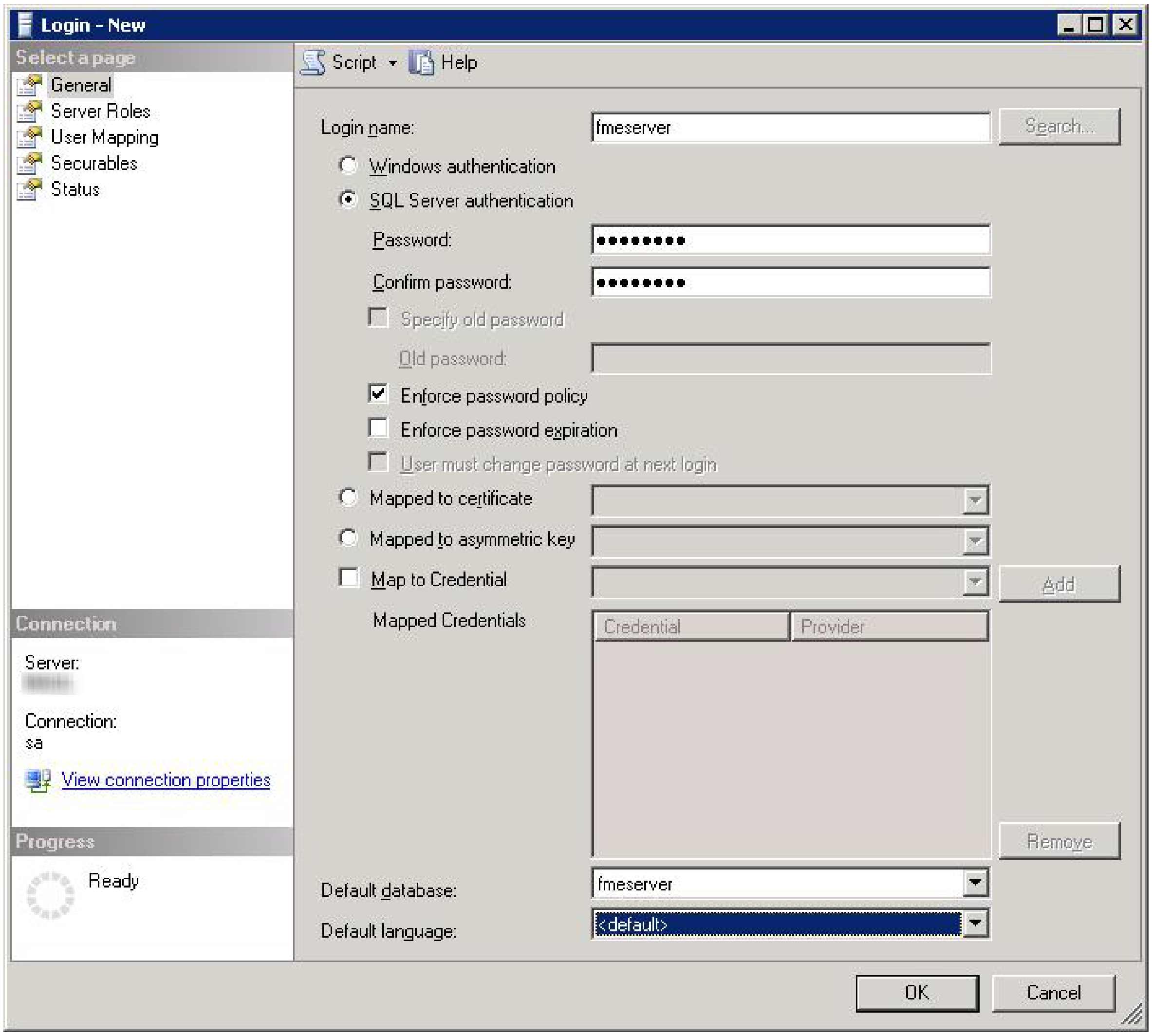
3. On the Object Explorer pane, expand the Security folder, right-click Login, and then select New Login:



```
 * ===            REPOSITORY TABLI
 * ================================
 */


/* --------------------------------
 * Creating REPOSITORY INFO table
CREATE TABLE fme_repositoryinfo (
   repositoryinfo_id INTEGER NOT I
   name NVARCHAR(255) NOT NULL,
   description NTEXT,
   PRIMARY KEY(repositoryinfo_id),
   UNIQUE (name)
);

CREATE INDEX fme_repositoryinfo_na

/* --------------------------------
 * Creating CUSTOM FORMAT table *,
CREATE TABLE fme_customformat (
   customformat_id INTEGER NOT NUI
   repositoryinfo_id INTEGER NOT I
   name NVARCHAR(255) NOT NULL,
   title NVARCHAR(255),
   description NTEXT,
   filesize INTEGER,
   category NVARCHAR(50),
   requirements NTEXT,
   requirementskeyword NVARCHAR(5(
   useage NTEXT,
   history NTEXT,
   lastsavedate NVARCHAR(30),
```

4. On the Login – New page, click General to open the page shown in the example below.
   - At the Login name field, enter `fmeserver`.
   - Make sure the option button is active for SQL Server authentication.
   - In the Password field enter the password that was specified for the database during the FME Server installation, and in the Confirm password field enter the same password again.

- Make sure the Enforce password policy is active. If not, click the checkbox to activate it.
- If required, click the checkbox for Enforce password expiration to clear it.
- At the Default database field enter fmeserver.



Login - New

Login name: fmeserver

○ Windows authentication

● SQL Server authentication

Password: ••••••••

Confirm password: ••••••••

□ Specify old password

Old password:

☑ Enforce password policy

□ Enforce password expiration

□ User must change password at next login

○ Mapped to certificate

○ Mapped to asymmetric key

□ Map to Credential

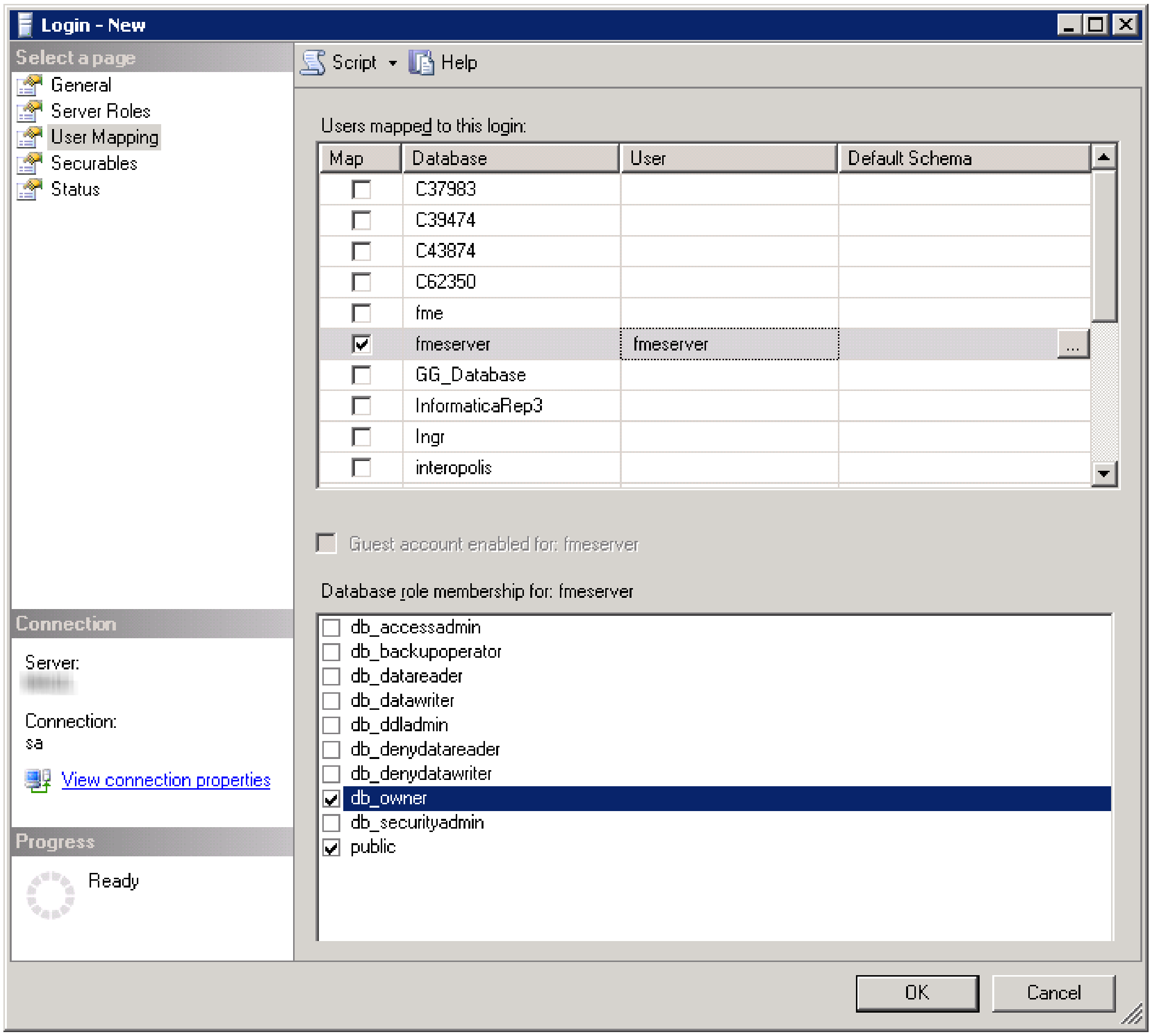
Mapped Credentials

Default database: fmeserver

Default language: <default>

5. On the same Login – New page, click User Mapping to open the page shown in the next figure.
   - At the Users mapped to this login location, in the Map column click the checkbox to activate it and map the login name to the `fmeserver` database.

- At the Database role membership for location, notice that the fmeserver database is specified and check db_owner to assign that role to this database.
- Click OK to close this page.



Login - New

Select a page
- General
- Server Roles
- User Mapping
- Securables
- Status

Connection

Server:
[redacted]

Connection:
sa

View connection properties

Progress

Ready

Script ▾ Help

Users mapped to this login:

Map	Database	User	Default Schema
□	C37983		
□	C39474		
□	C43874		
□	C62350		
□	fme		
☑	fmeserver	fmeserver	...
□	GG_Database		
□	InformaticaRep3		
□	Ingr		
□	interopolis		

□ Guest account enabled for: fmeserver

Database role membership for: fmeserver

□ db_accessadmin
□ db_backupoperator
□ db_datareader
□ db_datawriter
□ db_ddladmin
□ db_denydatareader
□ db_denydatawriter
☑ db_owner
□ db_securityadmin
☑ public

OK Cancel

Instructions Without SQL Server Management Studio

1. Connect to the SQL Server database engine and run sqlserver_createDB.sql.
2. Open sqlserver_createUser.sql.
3. Look for the line that begins:

```
CREATE LOGIN fmeserver WITH PASSWORD =
```

Replace `<<DATABASE_PASSWORD>>` with the password specified during the installation.

4. Run the script.

> **Note** If your SQL Server uses an Always On availability group, you must also configure the `MultisubnetFailover` property of the `DB_JDBC_URL` parameter in the fmeDatabaseConfig.txt configuration file. For more information, see the SQL Server examples under Configure the Database Connection.

Database Configuration - Oracle

Before proceeding, you must provide the following:

- Install an Oracle database server.
- Obtain the Oracle Database JDBC driver. For more information, see https://www.oracle.com/technetwork/database/application-development/jdbc/downloads/index.html.

<FMEServerDir> is the installation directory of FME Server. In Windows, this is typically `C:\Program Files\FMEServer`.

If you are upgrading, you should back up any job history you want to keep.

Windows

This section describes how to configure an Oracle database. You can configure the Oracle database from other Oracle database tools depending on your personal preference.

For an Oracle database configuration, various SQL scripts are provided to help.

These SQL scripts are located in the <FMEServerDir>`\Server\database\oracle` directory of the FME Server Core machine.

Note This directory refers to the machine on which the FME Server Core is installed (not the machine on which the database server is installed). To run these scripts, you must transfer this directory to the database machine, or reference it through a UNC path.

- `oracle_createUser.sql` – This script creates the FME Server database user, and grants all required permissions to the FME Server database user. The password appears as `<<DATABASE_PASSWORD>>`. Before running this script, replace `<<DATABASE_PASSWORD>>` with the password that was specified for the database during the FME Server installation.
- `oracle_createDB.sql` – This script creates all FME Server related database packages, tables, indexes, views, and triggers.
- `oracle_dropUser.sql` – This script drops the FME Server database user and the database packages, tables, indexes, views, and triggers associated with the FME Server database user.

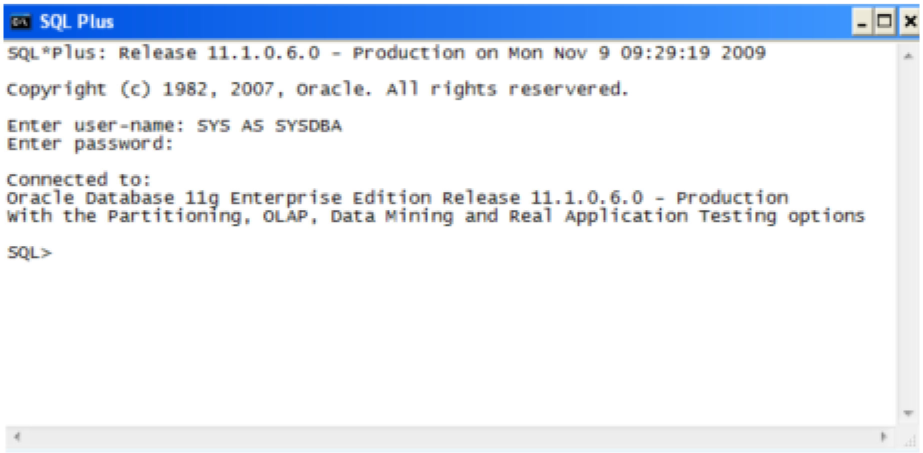
Using the Command Prompt

To use the command prompt to configure the database, follow these instructions:

1. Install Oracle SQL*Plus, if you haven't already.
2. Open Oracle SQL*Plus and log on as a user with adequate privileges, such as SYSDBA.

   In this example, the following parameters were used and entered:

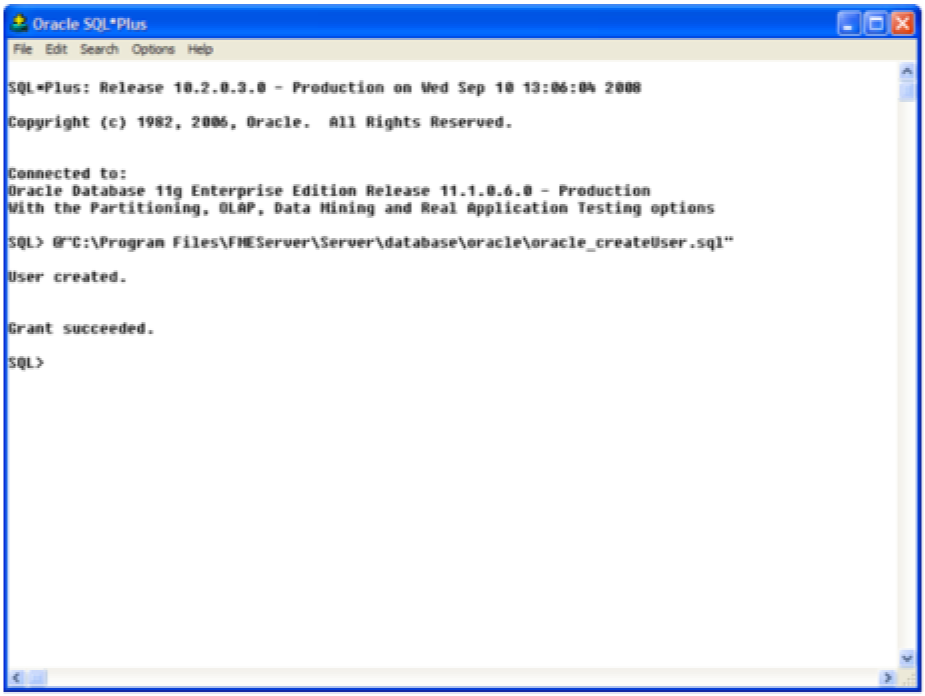
   - User: SYS AS SYSDBA
   - Password: fmeserver
   - String: XX-ORACLE11G:1521/ORCL AS SYSDBA



```
SQL*Plus: Release 11.1.0.6.0 - Production on Mon Nov 9 09:29:19 2009

Copyright (c) 1982, 2007, Oracle. All rights reserved.

Enter user-name: SYS AS SYSDBA
Enter password:

Connected to:
Oracle Database 11g Enterprise Edition Release 11.1.0.6.0 - Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL>
```

3. Create an FME Server database user as follows:
   a. In `oracle_createUser.sql`, replace `<<DATABASE_PASSWORD>>`with the password that was specified for the database during the FME Server installation.
   b. From the SQL prompt, run the `oracle_createUser.sql` script by entering the following command:

      `@”<FMEServerDir>\Server\database\oracle\oracle_createUser.sql”`



```
SQL*Plus: Release 10.2.0.3.0 - Production on Wed Sep 10 13:06:04 2008

Copyright (c) 1982, 2006, Oracle.  All Rights Reserved.


Connected to:
Oracle Database 11g Enterprise Edition Release 11.1.0.6.0 - Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL> @"C:\Program Files\FMEServer\Server\database\oracle\oracle_createUser.sql"

User created.


Grant succeeded.

SQL>
```

The default TABLESPACE is the Oracle DB configured default. If the created user doesn't have read/write permissions on the default TABLESPACE, change the default TABLESPACE or create an appropriate TABLESPACE.

This command creates a TABLESPACE on the Oracle DB server called FMESERVER shown in the following example:

```
CREATE SMALLFILE TABLESPACE FMESERVER DATAFILE
'E:\ORADATA\FMESERVER01.DBF' SIZE 100000K REUSE AUTOEXTEND
ON NEXT 2048K MAXSIZE 1024M LOGGING EXTENT MANAGEMENT LOCAL
SEGMENT SPACE MANAGEMENT AUTO DEFAULT NOCOMPRESS;
```

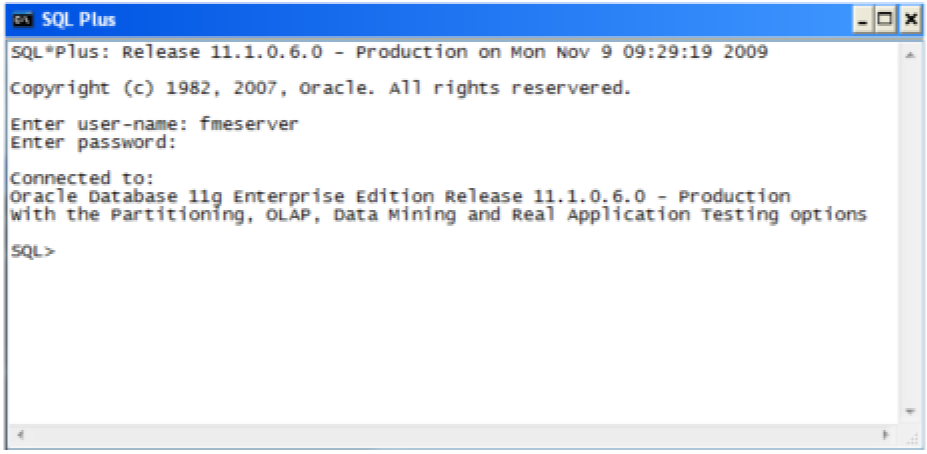
By default this command uses the TABLESPACE "FMESERVER" as shown in the following example:

```
CREATE USER fmeserver IDENTIFIED BY fmeserver DEFAULT
TABLESPACE "FMESERVER" TEMPORARY TABLESPACE "TEMP";
```

4. When an FME Server database user is created, you can connect to it by logging on again to SQL*Plus.

   In this example, the following parameters were used and entered on the user interface:

   - User: fmeserver
   - Password: fmeserver

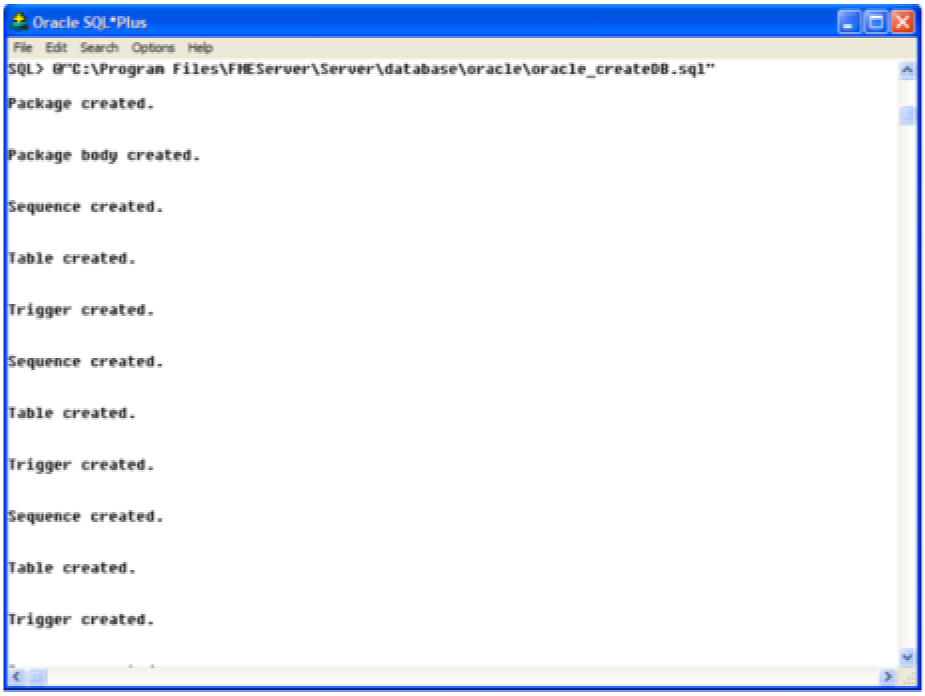


```
SQL*Plus: Release 11.1.0.6.0 - Production on Mon Nov 9 09:29:19 2009

Copyright (c) 1982, 2007, Oracle.  All rights reserved.

Enter user-name: fmeserver
Enter password:

Connected to:
Oracle Database 11g Enterprise Edition Release 11.1.0.6.0 - Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL>
```

> **Note** The preceding example assumes your user name and password are fmeserver.

5. When connected to the FME Server database, run the `oracle_createDB.sql` script by entering the following command:

   `@"<FMEServerDir>\Server\database\oracle\oracle_createDB.sql"`



```
SQL> @"C:\Program Files\FMEServer\Server\database\oracle\oracle_createDB.sql"

Package created.


Package body created.


Sequence created.


Table created.


Trigger created.


Sequence created.


Table created.


Trigger created.


Sequence created.


Table created.


Trigger created.
```

> **Note** If you drop the FME Server database and login user, run the oracle_dropUser.sql script.

Linux

Oracle SQL*Plus is a freeware client for connecting to an Oracle database. You can download it from the Internet using the following address:

https://www.oracle.com/technology/software/tech/sql_plus/index.html

For more information, see the Oracle web site at:

https://www.oracle.com/technology/sample_code/tech/sql_plus/htdocs/demobld.html

The instructions that follow describe how to configure Oracle for use with FME Server. These instructions describe using SQL*Plus for the database setup. Depending on your personal preference, you can also configure the Oracle database using other Oracle tools.

For Oracle configurations, various SQL scripts are provided to help with Oracle database configuration. These SQL scripts are located in the <FMEServerDir>`/Server/database oracle/` directory of the FME Server Core machine.

> **Note** This directory refers to the machine on which the FME Server Core is installed (not the machine on which the database server is installed). To run these scripts, you must transfer this directory to the database machine, or reference it through a UNC path.

- `oracle_createUser.sql` – This script creates the FME Server database user, and grants all required permissions to the FME Server database user. The password appears as `<<DATABASE_PASSWORD>>`. Before running this script, replace `<<DATABASE_PASSWORD>>` with the password that was specified for the database during the FME Server installation.
- `oracle_createDB.sql` – This script creates all FME Server related database packages, tables, indexes, views, and triggers.
- `oracle_dropUser.sql` – This script drops the FME Server database user and the database packages, tables, indexes, views, and triggers associated with the FME Server database user.

Using the Command Prompt

To use the command prompt to configure the database, follow these instructions:

1. Install the Oracle Client Tools, which includes SQL*Plus, if you haven't already.
2. Run `sqlplus` and log on as a user with adequate privileges, such as SYSDBA.

   For example:

   ```
   sqlplus SYS/<password>@<Host>:<Port>/<service> AS SYSDBA
   ```

3. Create the FME Server database user:
   a. In a text editor, open the `oracle_creatorUser.sql` script and update the password `<<DATABASE_PASSWORD>>` to the one specified during the FME Server installation.

   b. From the SQL prompt, run the oracle_createUser.sql script by entering the following command:

      ```
      @"<FMEServerDir>/Server/database/oracle/oracle_
      createUser.sql"
      ```

      The default TABLESPACE is the Oracle DB configured default. If the created user doesn't have read/write permissions on the default TABLESPACE, you need to change the default TABLESPACE or create an appropriate TABLESPACE.

      This command creates a TABLESPACE on the Oracle DB server called FMESERVER shown in the following example:

      ```
      CREATE SMALLFILE TABLESPACE FMESERVER DATAFILE
      '/ORADATA/FMESERVER01.DBF' SIZE 100000K REUSE AUTOEXTEND ON
      NEXT 2048K MAXSIZE 1024M LOGGING EXTENT MANAGEMENT LOCAL
      SEGMENT SPACE MANAGEMENT AUTO DEFAULT NOCOMPRESS;
      ```

      By default this command uses the TABLESPACE "FMESERVER" shown in this example:

      ```
      CREATE USER fmeserver IDENTIFIED BY fmeserver DEFAULT
      TABLESPACE "FMESERVER" TEMPORARY TABLESPACE "TEMP";
      ```

4. When an FME Server database user has been created, you can connect to it by logging on again to SQL*Plus or by entering the following command:

   ```
   CONNECT <UserName>/<Password>@<Host>:<Port>/<service>;
   ```

5. When connected to the FME Server database, run the oracle_createDB.sql script by entering the following command:

   ```
   @"<FMEServerDir>/Server/database/oracle/oracle_createDB.sql"
   ```

Database Configuration - PostgreSQL

PostgreSQL is an open source database that can be downloaded from the Internet. For more information, see the PostgreSQL web site at:

https://www.postgresql.com

It's assumed that PostgreSQL is already installed .

One notation used is <FMEServerDir>, which is the installation directory of FME Server. In Windows, this is typically `C:\Program Files\FMEServer`.

It's also assumed that you have JRE 5 or higher and PostgreSQL database installed before you proceed further. If you want to use the JDBC driver, there are several steps to perform.

If you are upgrading, you should back up any job history you want to keep.

Windows

This section describes how to configure a PostgreSQL database. You can configure this database from other PostgreSQL database tools, depending on your personal preference.

For a PostgreSQL database configuration, various SQL scripts are provided to assist you. These SQL scripts are located in the following directory:

```
<FMEServerDir>\Server\database\postgresql
```

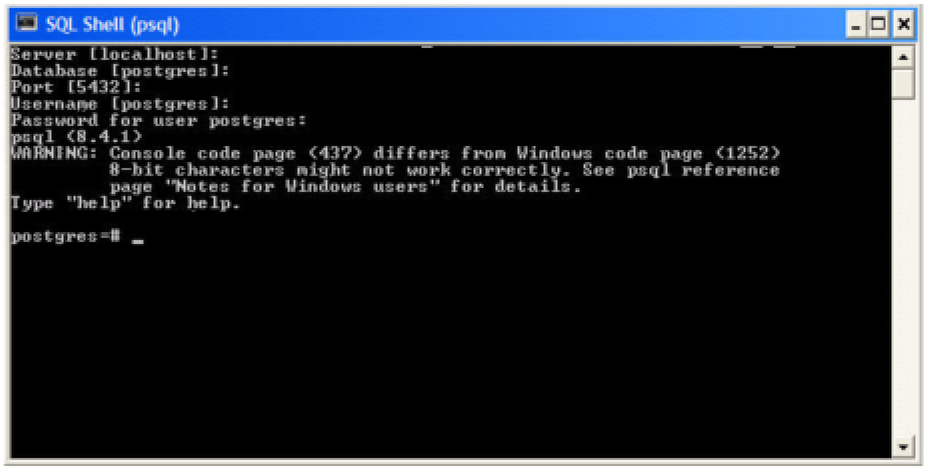
Note This directory refers to the machine on which the FME Server Core is installed (not the machine on which the database server is installed). To run these scripts, you must transfer this directory to the database machine, or reference it through a UNC path.

- `postgresql_createUser.sql` – This script creates the FME Server database user and password that you specified during installation, and grants all required permissions to this user. The password appears as `<<DATABASE_PASSWORD>>`. Before running this script, replace `<<DATABASE_PASSWORD>>` with the password that was specified for the database during the FME Server installation.
- `postgresql_createDB.sql` – This script creates the FME Server database.
- `postgresql_createSchema.sql` – This script creates all FME Server related tables, indexes, views, and triggers.
- `postgresql_dropUser.sql` – This script drops the FME Server database user.
- `postgresql_dropDB.sql` – This script drops the FME Server database.

Using the Command Prompt

To use the command prompt to configure the database, follow these instructions:

1. Install PostgreSQL SQL shell (`psql`) if you haven’t done so already.
2. Open `psql` and log on as a user with the appropriate privileges:

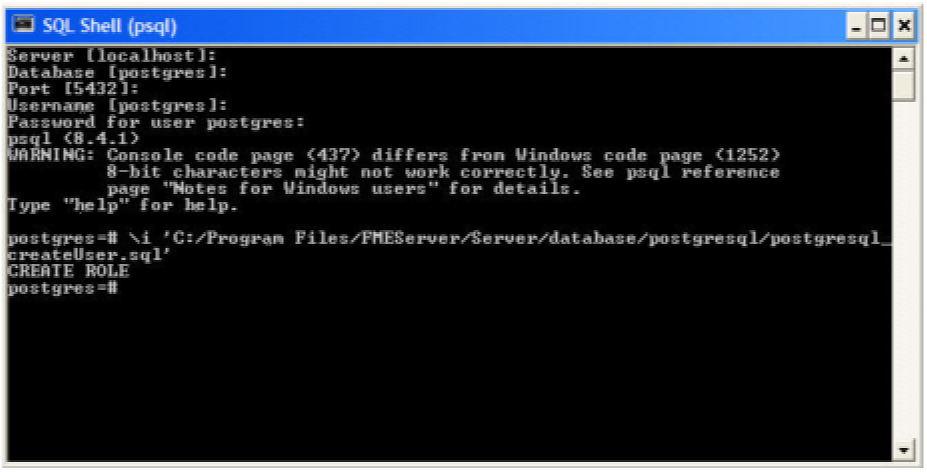


```
Server [localhost]:
Database [postgres]:
Port [5432]:
Username [postgres]:
Password for user postgres:
psql (8.4.1)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

postgres=# _
```

3. Create an FME Server database user as follows:
   a. Open `postgresql_createUser.sql` in a text editor, and replace `<<DATABASE_PASSWORD>>` with the password specified during the FME Server installation.
   b. From the SQL prompt, run the `postgresql_createUser.sql` script by entering the following command:

      ```
      \i '<FMEServerDIR>/Server/database/postgresql/postgresql_
      createUser.sql'
      ```

      By default, the provided SQL script creates the FME Server database user and password that you specified during installation:



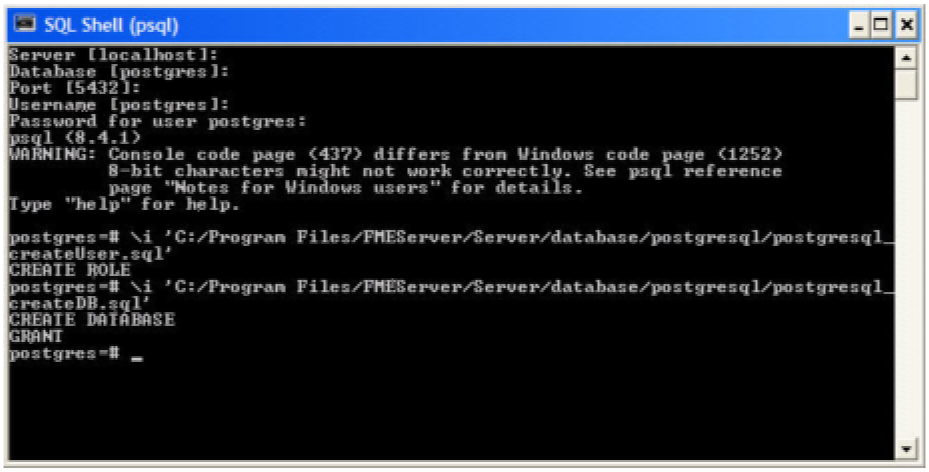
```
Server [localhost]:
Database [postgres]:
Port [5432]:
Username [postgres]:
Password for user postgres:
psql (8.4.1)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

postgres=# \i 'C:/Program Files/FMEServer/Server/database/postgresql/postgresql_
createUser.sql'
CREATE ROLE
postgres=#
```

4. Create an FME Server database.

From the SQL prompt, run the `postgresql_createDB.sql` script by entering the following command:

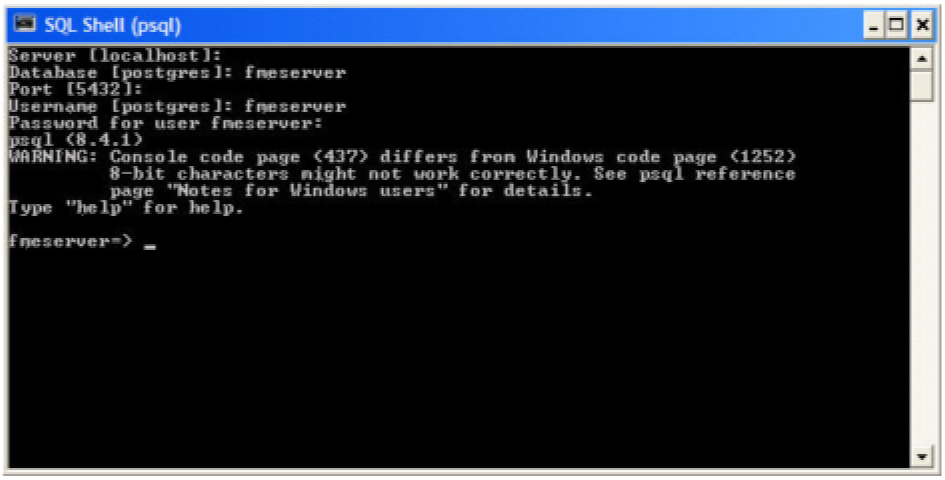
```
\i '<FMEServerDIR>/Server/database/postgresql/postgresql_
createDB.sql'
```

By default, the provided SQL script creates an FME Server database named fmeserver and grants all privileges on the database to the user.



```
Server [localhost]:
Database [postgres]:
Port [5432]:
Username [postgres]:
Password for user postgres:
psql (8.4.1)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

postgres=# \i 'C:/Program Files/FMEServer/Server/database/postgresql/postgresql_
createUser.sql'
CREATE ROLE
postgres=# \i 'C:/Program Files/FMEServer/Server/database/postgresql/postgresql_
createDB.sql'
CREATE DATABASE
GRANT
postgres=# _
```

5. Quit `psql` and log on as the FME Server database user.



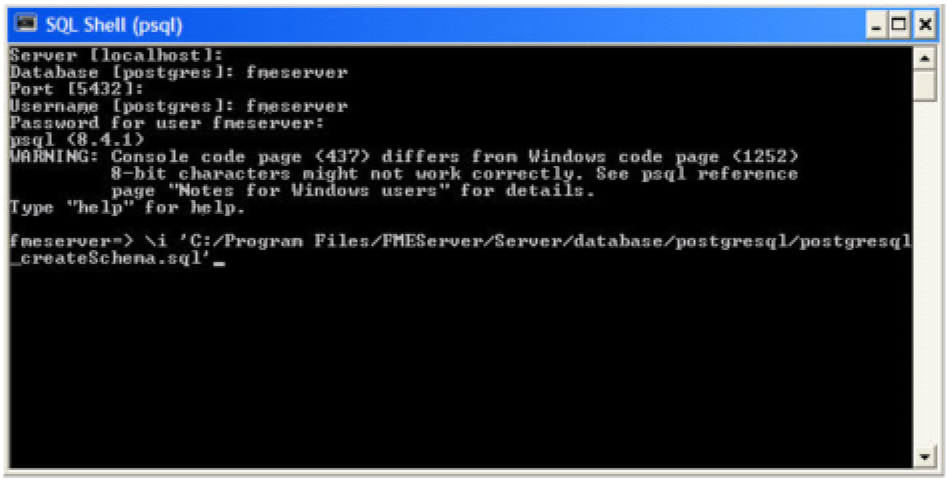
```
Server [localhost]:
Database [postgres]: fmeserver
Port [5432]:
Username [postgres]: fmeserver
Password for user fmeserver:
psql (8.4.1)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

fmeserver=> _
```

6. Create the FME Server database schema as follows:

From the SQL prompt, run the `postgresql_createSchema.sql` script by entering the following command:

```
\i '<FMEServerDir>/Server/database/postgresql/postgresql_
createSchema.sql'
```

By default, the provided SQL script creates all FME Server related tables, indexes, views, and triggers.



```
Server [localhost]:
Database [postgres]: fmeserver
Port [5432]:
Username [postgres]: fmeserver
Password for user fmeserver:
psql (8.4.1)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

fmeserver=> \i 'C:/Program Files/FMEServer/Server/database/postgresql/postgresql
_createSchema.sql'_
```

Linux

This section describes configuring PostgreSQL from both the command prompt and a user interface, such as the PostgreSQL Query Browser and the PostgreSQL Administrator.

For PostgreSQL configurations, various SQL scripts are provided to help with PostgreSQL database configuration. These SQL scripts are located in the <FMEServerDir>`/Server/database/postgresql/` directory of the FME Server Core machine.

> **Note** This directory refers to the machine on which the FME Server Core is installed (not the machine on which the database server is installed). To run these scripts, you must transfer this directory to the database machine, or reference it through a UNC path.

- `postgresql_createUser.sql` – This script creates the FME Server database user and password that you specified during installation, and grants all required

permissions to the FME Server database user. The password appears as <<DATABASE_PASSWORD>>. Before running this script, replace <<DATABASE_PASSWORD>> with the password that was specified for the database during the FME Server installation.

> **Note** The password is encrypted and appears in the script as <<DATABASE_PASSWORD>>.

- postgresql_createDB.sql – This script drops the FME Server database and creates a new one with the required FME Server tables. By default this database is named fmeserver. Be careful when running this script because it drops the existing FME Server database.
- postgresql_createSchema.sql – This script creates all FME Server related tables, indexes, views, and triggers.

> **Note** This script must be run as user fmeserver.

- postgresql_dropDB.sql – This script drops the existing FME Server database, which is named fmeserver by default.
- postgresql_dropUser.sql – This script drops the FME Server database user.

Using the Command Prompt

To use the command prompt to configure the database, follow these instructions:

1. Install PostgreSQL Server if you haven't already.
2. Open a command prompt and change to the following directory, which contains the PostgreSQL SQL scripts:

   <FMEServerDir>/Server/database/postgresql/

3. Open `postgresql_createUser.sql` in a text editor, and replace `<<DATABASE_PASSWORD>>` with the password specified during the FME Server installation.

4. Run the postgresql program with the postgresql_createUser.sql script:

   ```
   psql -d postgres -h <hostname> -p <port> -f postgresql_createUser.sql
   ```

5. Run the postgresql program with the postgresql_createDB.sql script:

   ```
   psql -d postgres -h <hostname> -p <port> -f postgresql_createDB.sql
   ```

6. Run the postgresql program with the postgresql_createSchema.sql script, as the user you specified during installation:

   ```
   psql -U <username> -d fmeserver -h <hostname> -p <port> -f postgresql_createSchema.sql
   ```

> **Note** If you drop the FME Server database and login user, run the postgresql program with the appropriate postgresql_dropDB.sql or postgresql_dropUser.sql scripts.

After Database Creation

1. On the machine on which the FME Server database server is installed, open pg_hba.conf. For default installation directories of this file:
   - PostgreSQL 10: `<`*`PostgreSQLDir`*`>\data\pg10\pg_hba.conf`
   - PostgreSQL 11: `C:\Program Files\PostgreSQL\11\data\pg_hba.conf`

2. Change the following lines:

   ```
   host   all     all    127.0.0.1/32     md5
   host   all     all     ::1/128         md5
   ```

   to:

   ```
   host   all     all 0.0.0.0/0        md5
   ```

```
    host    all     all     ::/0              md5
    ```
    3. Restart the FME Server Database service.

2. **Enable connections**: FME Server connects to the database when it starts. Therefore, ensure that your database server is running and configured to accept incoming connections before FME Server is started. The database must allow connections over TCP/IP with all machines on which the FME Server Core and FME Engines are installed.
3. Ensure that all installations of FME Server are running. For more information, see Working with the FME Server System Services.

What's Next?

- Log on to the Web User Interface

Log on to the Web User Interface

To log in to the Web User Interface for the first time as an administrator following installation, specify *Username* `admin` and *Password* `admin`. You will be prompted to update the `admin` password upon initial use, based on the default Password Policy configuration.

For more information and support:

- FME Server Troubleshooting: Web Interface Login
- Accessing the Web User Interface
- Changing the Login Password
- Default User Accounts and Passwords
- Role-Based and User-Based Access Control

What's Next?

- Update the WebSocket Host

Update the WebSocket Host

Perform this step to allow communication with the FME Server WebSocket Server.

1. Log in to the FME Server Web User Interface (see Logging In to the Web Interface).
2. Select **System Configuration > Networking > Topic Monitoring**.
3. Under Advanced Routing, set *External WebSocket Host* to the host name of the machine on which the FME Server Core is installed.
4. Click **Save**.

What's Next?

- Request and Install a License

Request and Install a License

License files are installed, by default, to:Windows: `C:\ProgramData\Safe Software\FME Server\licenses`Linux: `/opt/fmeserver/licenses`Dynamic Engine (CPU Usage) licensing is not available for engines on FME Cloud.

Automatic Mode (Recommended)

If your FME Server host machine has an internet connection, you can request and install a license online without any need for downloading and re-uploading a license file.

> **Note**
>
> » Licensing FME Server over the internet requires no inbound connection. For more information, see FME Server Automatic Licensing URLs.
>
> » If you purchased credits for Dynamic Engines (CPU Usage), automatic mode only is supported. Manual mode licensing (below) is not supported.

1. Open the FME Server Web User Interface as a user assigned to the fmesuperuser role. If none of your FME Engines are licensed, you will see a prompt to activate FME Server. Click on the prompt. Otherwise, select **System Configuration** > **Licensing**.

2. Click **Request New License**.
3. Complete the fields on the Request a New License page. If you have a product *Serial Number*, be sure to provide it. If not, you will receive a 7-day evaluation license, which you can extend to 60 days (see below).

> **Note** In addition to licenses for standard FME Engines, an evaluation license that is requested in Automatic Mode includes 100 hours of Dynamic Engine (CPU Usage) credits.

4. *Licensing Mode*: Select **Automatic**.
5. Click **OK**.
6. A message indicates that your license is installed, and your available engines appear momentarily on the Engines page.

> **Note** If the Serial Number you provided includes Dynamic Engines (CPU Usage), they are not configured to start by default. You can start and configure your Dynamic Engines on the Engines page.

Manual Mode

If you prefer not to use an internet connection for licensing, or if your FME Server host machine does not have an internet connection, use this process to install a license.

> **Note** If you purchased credits for Dynamic Engines (CPU Usage), manual mode licensing is not supported. Use automatic mode for licensing (above). For more information, contact your Safe Software sales representative.

1. Open the FME Server Web User Interface as a user assigned to the fmesuperuser role. If none of your FME Server engines are licensed, you will see a prompt to activate FME Server. Click on the prompt. Otherwise, select **System Configuration** >

Licensing.

2. Click **Request New License**.
3. Complete the fields on the Request a New License page. If you have a product *Serial Number*, be sure to provide it. If not, you will receive a 7-day evaluation license, which you can extend to 60 days (see below).
4. *Licensing Mode*: Select **Manual**.
5. Click **OK**. A license request .json file downloads.
6. Email the .json file to codes@safe.com.
7. You will receive an email from Safe Software with a license file, which has a `.fmelic` extension. Download the file.
8. Return to the Licensing page. Under Standard Engines, click **Upload License File** and select the `.fmelic` file to upload. Or, drag and drop the `.fmelic` file onto the page under Standard Engines. A message indicates that it is installed, and your available engines appear on the Engines page.

Extending an Evaluation License

If you installed a 7-day evaluation license, you should have an email from codes@safe.com that allows you to extend the license to 60 days.

Automatic Mode (Recommended)

If your FME Server host machine has an internet connection, you can extend an evaluation license online without any need for downloading and re-uploading a license file.

1. Open the email and click the link as instructed.
2. A web page opens indicating the request was successful. Additionally, a link is provided to download the license file. Click the link to download the file for safekeeping.
3. Return to **System Configuration** > **Licensing** and click **Refresh License**. The license should now be extended accordingly. The EXPIRES field shows the new expiry date.

Manual Mode

If you prefer not to use an internet connection for licensing, or if your FME Server host machine does not have an internet connection, use this process to extend an evaluation license.

1. Open the email and click the link as instructed.
2. A web page opens indicating the request was successful. Additionally, a link is provided to download the license file. Click the link to download the file.
3. Return to **System Configuration** > **Licensing** and click **Upload License File**. Or, drag and drop the file onto the page. (You may need to move the license to a location where it can be accessed). A message indicates that it is installed. The license should now be extended accordingly. The EXPIRES field shows the new expiry date.

Problems?

- FME Server Troubleshooting: FME Server Engines
- Contact codes@safe.com.

See Also

- FME Server Licensing Walk-Through
- FME Server Automatic Licensing URLs
- FME Engines

What's Next?

- (Recommended) Update the Windows service accounts that run the FME System Services.
- (Upgrade Only) Restore your FME Server Configuration from a Previous Installation.
- Test the Installation.

Test the Installation

To test your FME Server installation, confirm that FME Server can perform its primary function—running a job.

1. On the Run Workspace page, specify:
   - Repository: Samples
   - Workspace: austinApartments.fmw
   - Service: Job Submitter
2. Click Run Workspace.

   If you see a success message, your install was a success.

Adding FME Engines on a Separate Machine

> **Warning** This topic applies only to traditional FME Server installations. If your FME Server runs in a containerized environment, such as Docker Compose or a Kubernetes cluster, this architecture is not supported.

- ***Skill Level***: Intermediate
- ***Estimated Time Required***: 30-45 minutes
- ***Prerequisites***:
  - Existing Distributed FME Server installation.
  - Access to system, network, and FME Server administrators.

You can add processing capacity to your FME Server by installing additional FME Engines on a separate computer from the FME Server Core.

When adding FME Engines, keep in mind the following:

- Adding FME Engines that do not match the primary release version of the FME Server Core is not supported. The primary release version refers to the first decimal value following the release year. For example, if the release version of the FME Server Core is 2020.0, FME Engines from release versions 2020.0.1 or 2020.0.2 are supported. However, FME Engines from release versions 2020.1 or 2021 are not supported.

- We recommend installing all FME Engines on systems that are synchronized to the same time zone as other FME Engines and the FME Server Core. If time zones differ, unexpected issues may arise, including:
  - Difficulty accessing the FME Server Web User Interface.
  - Improper timing of Schedule Initiated triggers.
  - Inconsistent or misleading timestamps in log files (accessed from Resources).

  For more information, see About Times and Time Zones.

In the instructions below, the computer that hosts the FME Server Core is the `<coreHost>`.

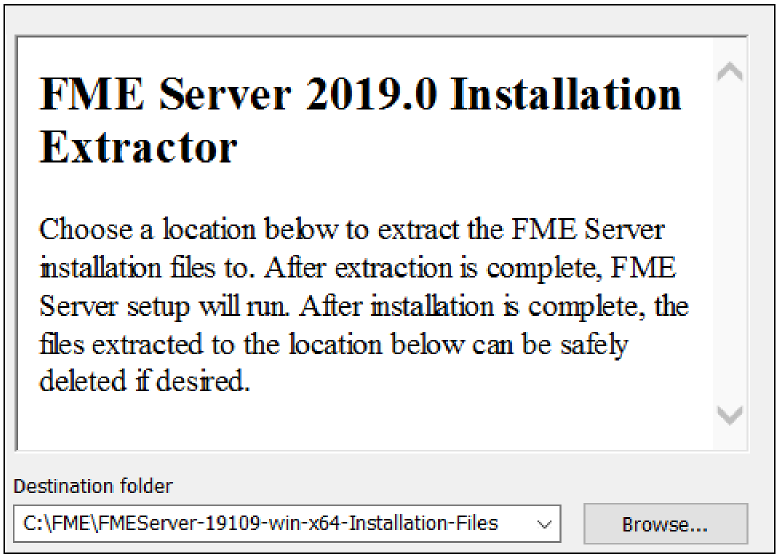
> **Note** In a fault-tolerance environment, we recommend assigning unique names to FME Engines. However, if multiple FME Engine hosts have the same FME Engine name, the queue server configuration applies to all FME Engines with the same name in the same way regardless of which host it resides on. For more information, see Job Queues.

Windows

1. Obtain the Installer. Be sure to obtain the FME Server Installer (not the Engine Installer).
2. Start the installer on another computer (`<engineHost>`).
3. On the Installation Extractor dialog, specify a *Destination folder* in which to extract installation files. Note that this folder *only* specifies where installation files are extracted—it does *not* specify where FME Server program files are installed. That location is specified later in the installer.

Tip Take note of the specified *Destination folder* location. Following installation, you may wish to:

- Review the installation .log file.
- Remove these files. Doing so saves almost 2 GB disk space.



FME Server 2019.0 Installation Extractor

Choose a location below to extract the FME Server installation files to. After extraction is complete, FME Server setup will run. After installation is complete, the files extracted to the location below can be safely deleted if desired.

Destination folder

C:\FME\FMEServer-19109-win-x64-Installation-Files

Click **Install**.

When extraction is complete, the installer opens. Proceed through the installer to the Choose Setup Type dialog.

4. On the Choose Setup Type dialog, select the Distributed Engine setup type.
5. On the Destination Folder dialog, specify the directory to install the FME Engines.
6. On the User Account page, specify the Windows user account that will run the <engineHost>. This account must have:
   - Read/Write access to the FME Server System Share that you specify in the next dialog. The System Share is the location where FME Server stores Repositories and Resources files.
   - Read/Write access to the FME Server installation directory that you specified in the previous dialog.

- "Log on as a service" rights on the `<engineHost>`. For more information, see this Microsoft Docs article.

7. On the Existing FME Server System Share dialog, provide the UNC path to the FME Server System Share directory.

   If the <*coreHost*> machine is an Express installation of FME Server, the System Share is written, by default, to %ALLUSERSPROFILE% \Safe Software\FME Server\, unless specified otherwise.

   > **Note** Unless modified, C:\ProgramData is the default value of the %ALLUSERSPROFILE% environment variable.

   In all cases, enter the UNC path to the System Share, including the final `Safe Software\FME Server` directories, which are created by default. For example, `\\MyServer\Safe Software\FME Server`.

8. On the FME Server Hostname dialog, enter the hostname of the <coreHost> computer.
9. On the Database Server Type dialog, specify the database type that you specified when installing the FME Server Core. If you specified a database other than the "FME Server Database," enter the connection parameters in the next dialog.
10. On the Database User dialog, specify the user name and password for the FME Server Database that you specified when installing FME Server.
11. Complete the remaining dialogs of the FME Server Installer.
12. If this `<engineHost>` is connecting to a `<coreHost>` that also hosts the built-in FME Server database and the initial FME engines, as with an Express Installation, allow the necessary connection to this machine:

    a. On the `<coreHost>`, open file pg_hba.conf, located in %ALLUSERSPROFILE%\Safe Software\FME Server\pgsql\data.

Note Unless modified, C:\ProgramData is the default value of the %ALLUSERSPROFILE% environment variable.

b. Change the following lines:

```
host   all     all    127.0.0.1/32     md5
host   all     all     ::1/128         md5
```

to:

```
host   all     all 0.0.0.0/0        md5
host   all     all    ::/0             md5
```

c. Restart the FME Server Database and FME Server Engines services.

13. If the *<coreHost>* machine was an Express Installation of FME Server, complete the following steps on the *<coreHost>* to configure the FME Server Web Services:

    a. Open the corresponding propertiesFile.properties file for the Data Download, Data Streaming, Job Submitter, and Notification services, located at <*FMEServerDir*>\Utilities\tomcat\webapps\<*service_name*>\WEB-INF\conf\propertiesFile.properties.

       For example, the properties file for the Data Download Service is at <*FMEServerDir*>\Utilities\tomcat\webapps\fmedatadownload\WEB-INF\conf\propertiesFile.properties

    b. For each properties file, locate the parameter REQUEST_DATA_DIR and change the value from a local file system path (for example, `C:/ProgramData/Safe Software/FME Server//resources/system/temp/requestdata`) to a UNC path that references the <coreHost> (for example, `//MyHost/FME Server/resources/system/temp/requestdata`).

Note Use forward slashes only.

c. After saving the changes in the properties file for each service, restart the FME Server Application Server service.

14. On the *<coreHost>* machine, open configuration file fmeServerConfig.txt, located in <FMEServerDir>\Server\, and update the FME_SERVER_HOST_NAME parameter to a value that fully resolves to the IP address of the <coreHost> machine.
15. Restart the FME Server Core service.

Linux

1. If not already accomplished, mount the directory that holds the FME Server System Share. (The System Share holds FME Server Repositories and Resources):

   ```
   sudo mount -t nfs <coreHost>:/<FMEServerSystemShare> /<mntPath>
   ```
2. Obtain the Installer. Be sure to obtain the FME Server Installer (not the Engine Installer).
3. Start the FME Server Installer:

   ```
   sudo ./<installationFile>
   ```
4. From the setup type list, choose `Engine`.
5. The installer prompts you for a location to install the FME Server Engine components. This can be on the local machine.
6. The installer prompts you for the name of the *<coreHost>*. In a fault-tolerant installation, the primary *<coreHost>* should always be specified. Do not specify the failover host.
7. The installer prompts you for the FME Server System Share location. Enter the mounted directory created in step 1.
8. Enter the database type you specified when installing the FME Server Core. If you specified a database other than the "FME Server Database", enter the connection parameters.

9. Enter the user name and password for the FME Server Database that you specified when installing FME Server.
10. Complete the remaining dialogs of the FME Server Installer.
11. Manually start FME Server, and configure it to start automatically.
12. If this *<engineHost>* is connecting to a *<coreHost>* that also hosts the built-in FME Server database and the initial FME engines, as with an Express Installation, allow the necessary connection to this machine:
    a. On the *<coreHost>*, open file pg_hba.conf, located in <*FMEServerDir*>\Utilities\pgsql\data\.
    b. Change the following lines:

    ```
    host   all     all    127.0.0.1/32     md5
    host   all     all     ::1/128         md5
    ```

    to:

    ```
    host   all     all 0.0.0.0/0        md5
    host   all     all    ::/0             md5
    ```

    c. Restart the FME Server Database and FME Server Engines services.
13. Ensure that the user account that runs *<engineHost>* has the necessary permissions to access the FME Server System Share and the FME Server install directory. For more information, see Directory and Account Permissions.
14. On the *<coreHost>* machine, open configuration file fmeServerConfig.txt, located in <*FMEServerDir*>\Server\, and update the FME_SERVER_HOST_NAME parameter to a value that fully resolves to the IP address of the *<coreHost>* machine.
15. Restart the FME Server Core service.

Verify the Installation

The installation on *<engineHost>* starts two FME Engines by default. The FME Engines start and register with the FME Server Core running on *<coreHost>*. All licensed engines are listed on the Engines page of the Web User Interface.

Note You may have to disable any firewalls that are running on this computer.

You can also use the Engines & Licensing page to perform the following tasks:

- To license FME Engines, see Licensing.
- If you want this computer to start more or less FME Engines, see Configuring the Number of FME Engines to Start.

For more information, see Verify the Installation.

Performing a Silent Installation (Windows)

To perform a silent installation of FME Server, extract and run an installer from a Windows command line, and override any default installation properties to customize the installation.

To obtain the installer, see Obtain the Installer.

Extracting Installation Files

Installation files, which consist of a .msi file and .cab files, must be extracted before proceeding with installation. You can extract installation files in either of the following ways:

- Manual extraction. Following extraction, invoke the .msi file to perform a silent install.
- Invoke the installation .exe directly, and use the following parameters to control extraction and installation:

Flag	Description
- d< *path*>	Set the destination folder for unpacked files.
-s, -s1, -s2	Silent mode. Switch -s is a brief form of -s1. Both -s and -s1 hide the main dialog and extraction progress. -s2 hides the start dialog, but extraction progress is displayed.
- sp< *par*>	Installer Flags to pass to the extracted .msi installer when it is run.

Installer Flags

The following .msi-specific flags can be passed to the installer:

Flag	Description
/q[n|b]	Signifies a quiet installation. `/qn` means quiet with no user interface, and `/qb` means a quiet installation with a basic progress bar.
/norestart	Do not restart the computer after installation.
/l*v <*logfile*>	Enable logging to the `<logfile>` specified.

Specifying FME Server Components to Install

To select which components of FME Server to install, as in a Distributed installation, use the `ADDLOCAL` property, and specify components in a comma-delimited list. If this property is not specified, all components are installed, as in an Express installation.

Note Following a distributed or fault tolerant installation, the FME Server system services do not start automatically. You must manually start them.

Feature	Value
FME Server Core	FMEServerCore
Web Services	Services
FME Server Console	ServerConsole
FME Engine	FMEEngine
FME Server Database (on PostgreSQL)	FMEServerDatabase

Example

To install the FME Server Core and FME Engine services:

```
ADDLOCAL=FMEServerCore,FMEEngine
```

Installation Properties

The following table lists the installation properties that you can set in advance, and their default values if left unset. These properties correspond to properties that can be adjusted in the user dialogs of a standard installation.

Property	Default Value	Description
EXTRACTONLY		Extracts the .msi installation file, but does not run the installer. A C++ runtime package and MSSQL driver only are installed.
FMESERVERHOSTNAME	The machine name on which the installer is running	Host name of the machine that runs the FME Server Core.

Property	Default Value	Description
INSTALLDIR	`C:\Program Files\FMEServer` or `C:\apps\FMEServer`	The FME Server install directory. If you change this value the path must end in "\". For example, INSTALLDIR=C:\apps\FMEServer\ **Note** You may require quotes to escape spaces in paths. From the Windows Command Prompt, use eight quotes. For example, `""""""""C:\ProgramData\Safe Software\FME Server""""""""`. From Windows PowerShell, use sixteen quotes. For example, `""""""""""""""""C:\Program Files\FMEServer""""""""""""""""`.

Property	Default Value	Description
FMESERVERUSER	local system account	The Windows user account that will run the FME Server System Services. This account must have: - Read/Write access to the FME Server System Share, where FME Server stores Repositories and Resources files. (For more information, see Provide a Remote File System for the FME Server System Share.) - Read/Write access to the FME Server installation directory. - "Log on as a service" rights on this machine. For more information, see this Microsoft Docs article.
FMESERVERUSERPASSWORD		If FMESERVERUSER is specified, the user account password.

Property	Default Value	Description
FMESERVERSHAREDDATA	`C:\ProgramData\Safe Software\FME Server`	The path to the FME Server System Share directory, where FME Server stores Repositories and Resources files. Path names are case-sensitive. **Note** You may require quotes to escape spaces in paths. From the Windows Command Prompt, use eight quotes. For example, `""""""""C:\ProgramData\Safe Software\FME Server""""""""`. From Windows PowerShell, use sixteen quotes. For example, `""""""""""""""""C:\Program Files\FMEServer""""""""""""""""`.

Property	Default Value	Description
NODENAME	The machine name on which the installer is running	If you are installing only the FME Engine component, use this property to advertise a fully-qualified domain name (FQDN) for the machine hosting the FME Engine to FMESERVERHOSTNAME. Specify a FQDN that resolves to the IP address of the machine via DNS.
OVERRIDE_NETWORK_CHECK		If `Yes`, the installer does not ensure the path specified for FMESERVERSHAREDDATA exists and is writable by the user account specified for FMESERVERUSER.
DATABASETYPE	Default	The database server type that will be used for the FME Server Database. Possible values are `Default`, `MSSQL`, `Oracle`, `PostGreSQL`. `Default` assumes the PostgreSQL database server that is included with the FME Server installer and located on the same machine.

Property	Default Value	Description
DATABASEHOST	[FMESERVERHOSTNAME]	The host that the database is on. Specify only if DATABASETYPE is not `Default`.
DATABASEPORT	MSSQL: 1433 PostGreSQL: 5432 Oracle: 1521	The port to connect to the database. Specify only if DATABASETYPE is not `Default`.
INSTANCENAME		If DATABASETYPE is `MSSQL`, the SQL Server instance name to use for connecting to the database, instead of DATABASEPORT.
DATABASECONNECTIONSTRING	A connection string is generated based on the values of DATABASETYPE, DATABASEHOST, DATABASEPORT, and (if specified) INSTANCENAME.	The JDBC connection string for connecting to the database.
ORACLESID		The SID for the Oracle database. Must be specified only if DATABASETYPE is `Oracle`.

Property	Default Value	Description
JDBCDRIVER		If your database requires a JDBC driver that Safe does not provide, specify the full path to it here, and it will be copied to the appropriate place in the install directory.
DATABASEUSER	fmeserver	The FME Server Database user account name. This property applies regardless of the value specified by `DATABASETYPE`. **Warning** If `DATABASETYPE` is `Default`, do not specify `postgres`. This name corresponds to the PostgreSQL master user. If the corresponding passwords do not match, the database will not install.

Property	Default Value	Description
DATABASEPASSWORD		The password for the FME Server Database user name. **Note** The password for the FME Server Database user account is encrypted in FME Server installation files.
PGDATA	`C:\ProgramData\Safe Software\FME Server`	If `DATABASETYPE=Default`, the directory to contain the data for the FME Server PostgreSQL database.
SERVLETTYPE	Default	The type of Application Server (servlet engine) you will use with FME Server. Possible values are `Default`, `Apache` (Tomcat), and `Oracle` (WebLogic). `Default` installs the Apache Tomcat servlet provided with the FME Server installer.
WEBSERVERHOSTNAME	[FMESERVERHOSTNAME]	The host on which the servlet engine is installed.

Property	Default Value	Description
SERVLETPORT	80 (if open)	The port that the servlet engine host uses or that the built-in Apache server uses. If not specified, the installer checks ports 80, 8080-8085 and uses the first one that is not in use.
WEBAPPSDIR	[INSTALLDIR]\Utilities\tomcat\webapps	If an Apache Tomcat servlet is already installed on the machine, the path to the webapps directory for the servlet engine, for installing WAR files. This is a necessary property for distributed web applications.
SHAREDTOMCATLIB	[INSTALLDIR]\Utilities\tomcat\lib	If an Apache Tomcat servlet is already installed on the machine, the path to the lib directory for the servlet engine, for installing JAR files. This is a necessary property for distributed web applications.
NOLOGPREFIX	No	If `Yes`, FME Server log file names are not prefixed with the server host name.

Property	Default Value	Description
FIRSTLOGINCHANGEPASSWORD	true	If true, the user will be prompted to update the admin password upon initial login to the FME Server Web User Interface following installation. If false, updating the admin password will not be required upon initial login.

Post-Install Tasks

Distributed/Fault Tolerant Installations

If you performed a distributed or fault tolerant installation (specifying the ADDLOCAL property), the FME Server system services do not start automatically. You must manually start them.

MSSQL Formats

If you plan to run workspaces that reference Microsoft SQL Server and Azure SQL Database (MSSQL_*) readers and writers, you must manually install the SQL Server Native Client and Microsoft System CLR Types for SQL Server on all machines that host FME Engines. To install, navigate to the [INSTALLDIR] and run the following:

```
msiexec /i sqlncli.msi /qb
msiexec /i SQLSysClrTypes.msi /qb
```

Examples

The following examples assume you are running a command line from a directory that contains an installer named `fme-server-win-x64.exe` to extract and install, or `fme-server.msi` to install following manual extraction.

Invoking the .exe Installer to Extract and Install

Examples

Extract installer to C:\FME\installer and install with all default options (similar to Express install)

```
fme-server-win-x64.exe -d"C:\FME\installer" -s -sp"/qb /norestart"
```

In Windows PowerShell:

```
start-process -FilePath <downloadpath>\fme-server-win-x64.exe -
Argumentlist '-dC:\FME\installer','-s','-sp"/qb /norestart"'
```

Extract installer to C:\FME\installer and install core only with an FME Server System Share directory on a share on another machine named "\\machine1\share"

```
fme-server-win-x64.exe -d"C:\FME\installer" -s -
sp"ADDLOCAL=FMEServerCore FMESERVERUSER=MYCOMPANY\user1
FMESERVERUSERPASSWORD=password FMESERVERSHAREDDATA=\\machine1\share /qb
/norestart"
```

In Windows PowerShell:

```
start-process -FilePath <downloadpath>\fme-server-win-x64.exe -
Argumentlist '-dC:\FME\installer','-s','-sp"ADDLOCAL=FMEServerCore
FMESERVERUSER=MYCOMPANY\user1 FMESERVERUSERPASSWORD=password
FMESERVERSHAREDDATA=\\machine1\share /qb /norestart"'
```

Invoking the .msi File to Install, Following Manual Extraction

Examples

Install with all default options (similar to Express install), with logging enabled

```
msiexec /i fme-server.msi /qb /norestart /l*v installFMEServerLog.txt
```

Install core only with an FME Server System Share directory on a share on another machine named "\\machine1\share"

```
msiexec /i fme-server.msi ADDLOCAL=FMEServerCore
FMESERVERUSER=MYCOMPANY\user1 FMESERVERUSERPASSWORD=password
FMESERVERSHAREDDATA="\\machine1\share" /qb /norestart /l*v
installFMEServerLog.txt
```

Express install, but with an MSSQL database located on another server

```
msiexec /i fme-server.msi DATABASETYPE=MSSQL
DATABASEHOST=DatabaseMachine DATABASEPORT=1433 /qb /norestart /l*v
installFMEServerLog.txt
```

FME Engine-only install, with all other FME Server components on another server named "\\machine1\FMEServerSystemShare"

```
msiexec /i fme-server.msi /l*v "install.log" /qb /norestart
INSTALLDIR="C:\Program Files\FMEServer\" FMESERVERUSER=MYCOMPANY\user1
FMESERVERUSERPASSWORD=password FMESERVERHOSTNAME="machine1"
ADDLOCAL=FMEEngine
FMESERVERSHAREDDATA="\\machine1\FMEServerSystemShare\"
DATABASETYPE="PostGreSQL" DATABASEHOST="FMEServerCore"
DATABASEPORT="7082" SERVLETPORT="80"
```

Performing a Silent Installation (Linux)

Silent installation of FME Server on Linux is controlled by an install.cfg file that is passed to the installer. This file contains a list of properties that control different options in the installer. The command for silent installation is:

```
./fme-server-linux-x64.run -- --file install.cfg
```

Properties are listed in the install.cfg file in the form:

```
<property>=<value>
```

To obtain the installer, see Obtain the Installer.

Specifying FME Server Components to Install

To select which components of FME Server to install, use the following set of properties. These properties can be set to either `"Yes"` or `"No"` (case-sensitive). The default values are `"Yes"`.

Feature	Property
FME Server Core	FEATURE_FMEServerCore_INSTALL
Web Services	FEATURE_Services_INSTALL
FME Server Console	FEATURE_ServerConsole_INSTALL
FME Engine	FEATURE_FMEEngine_INSTALL
FME Server Database (on PostgreSQL)	FEATURE_FMEServerDatabase_INSTALL

Installation Properties

The following table lists the installation properties that you can specify in the install.cfg file, and their default values if left unset. These properties correspond to properties that can be adjusted in the user dialogs of a standard installation.

Property	Default Value	Description
FMESERVERHOSTNAME	The machine name on which the installer is running	Host name of the machine that runs the FME Server Core.
INSTALLDIR	`/opt/fmeserver`	The FME Server install directory.
FMESERVERSHAREDDATA	[INSTALLDIR]	The path to the FME Server System Share directory, where FME Server stores Repositories and Resources files. Path names are case-sensitive.

Property	Default Value	Description
NODENAME	The machine name on which the installer is running	If you are installing only the FME Engine component, use this property to advertise a fully-qualified domain name (FQDN) for the machine hosting the FME Engine to FMESERVERHOSTNAME. Specify a FQDN that resolves to the IP address of the machine via DNS.

Property	Default Value	Description
DATABASETYPE	Default	The database server type that will be used for the FME Server Database. Possible values are `Default`, `MSSQL`, `Oracle`, `PostGreSQL`. `Default` assumes the PostgreSQL database that is included with the FME Server installer and located on the same machine.
DATABASEHOST	[FMESERVERHOSTNAME]	The host that the database is on. This should only be specified if DATABASETYPE is not Default.

Property	Default Value	Description
DATABASEPORT	MSSQL: 1433 PostGreSQL: 5432 Oracle: 1521	The port to connect to the database. This should only be specified if DATABASETYPE is not Default.
INSTANCENAME		If DATABASETYPE is `MSSQL`, the SQL Server instance name to use for connecting to the database, instead of DATABASEPORT.
DATABASECONNECTIONSTRING	A connection string is generated based on the values of DATABASETYPE, DATABASEHOST, DATABASEPORT, and (if specified) INSTANCENAME.	The JDBC connection string for connecting to the FME Server Database.
ORACLESID		The SID for the Oracle database. Must be specified only if DATABASETYPE is Oracle.

Property	Default Value	Description
JDBCDRIVER		If your database requires a JDBC driver that Safe does not provide, specify the full path to it here, and it will be copied to the appropriate place in the install directory.

Property	Default Value	Description
DATABASEUSER	fmeserver	The FME Server Database user account name. This property applies regardless of the value specified by `DATABASETYPE`.

Property	Default Value	Description
		Warning If `DATABASETYPE` is `Default`, do not specify `postgres`. This name corresponds to the PostgreSQL master user. If the corresponding passwords do not match, the database will not install.

Property	Default Value	Description
DATABASEPASSWORD		The password for the FME Server Database user name. **Note** The password for the FME Server Database user account is encrypted in FME Server installation files.
PGDATADIR	`/opt/fmeserver//Utilities/pgsql/data`	If `DATABASETYPE=Default`, the directory to contain the data for the FME Server PostgreSQL database.

Property	Default Value	Description
SERVLETTYPE	Default	The type of Application Server (servlet engine) you will use with FME Server. Possible values are `Default`, `Apache` (Tomcat), and `Oracle` (WebLogic). `Default` installs the Apache Tomcat servlet provided with the FME Server installer.
WEBSERVERHOSTNAME	[FMESERVERHOSTNAME]	The host on which the servlet engine is installed.
EXTERNALPORT	80	The port that the servlet engine host uses or, if SERVLETTYPE is `Default`, the listening port of the NGINX reverse proxy.

Property	Default Value	Description
SERVLETPORT	8080	If SERVLETTYPE is `Default`, the listening port of the Apache Tomcat servlet engine host. Must be different from EXTERNALPORT.
WEBAPPSDIR	[INSTALLDIR]\Utilities\tomcat\webapps	If an Apache Tomcat servlet is already installed on the machine, the path to the webapps directory for the servlet engine, for installing WAR files. This is a necessary property for distributed web applications.

Property	Default Value	Description
SHAREDTOMCATLIB	[INSTALLDIR]\Utilities\tomcat\lib	If an Apache Tomcat servlet is already installed on the machine, the path to the lib directory for the servlet engine, for installing JAR files. This is a necessary property for distributed web applications.

Property	Default Value	Description
CONFIGSELINUX	Yes	If SERVLETTYPE is "Default" and installation is on a Red Hat or CentOS distribution, the SELinux module must be configured to work with the NGINX reverse proxy.

Property	Default Value	Description
		Note The NGINX reverse proxy allows easy SSL configurati on with the Apache Tomcat web application server, and the ability to choose ports under 1024 without root permission. To configure SELinux, specify `Yes`. Else, `No`.

Property	Default Value	Description
NOLOGPREFIX	No	If Yes, FME Server log file names are not prefixed with the server host name.
FIRSTLOGINCHANGEPASSWORD	true	If `true`, the user will be prompted to update the `admin` password upon initial login to the FME Server Web User Interface following installation. If `false`, updating the `admin` password will not be required upon initial login.

Post-Install: MSSQL Formats Only

If you plan to run workspaces that reference Microsoft SQL Server and Azure SQL Database (MSSQL_*) readers and writers, you must manually install the SQL Server Native Client and Microsoft System CLR Types for SQL Server on all machines that host FME Engines. To install, navigate to the [INSTALLDIR] and run the following:

```
msiexec /i sqlncli.msi /qb
msiexec /i SQLSysClrTypes.msi /qb
```

Examples

Install with all default options (similar to Express install), to /home/user/fmeserver

```
INSTALLDIR="/home/user/fmeserver"
```

Install the FME Server Core only with an FME Server System Share directory on a share on another machine named "\\machine1\share"

```
FMESERVERSHAREDDATA="/mnt/machine1/share"
FEATURE_FMEServerCore_INSTALL="Yes"
FEATURE_FMEEngine_INSTALL="No"
FEATURE_FMEServerSMTPRelay_INSTALL="No"
FEATURE_ServerConsole_INSTALL="No"
FEATURE_Services_INSTALL="No"
```

Express install, but with an MSSQL database located on another server

```
DATABASETYPE=MSSQL
DATABASEHOST=DatabaseMachine
DATABASEPORT=1433
```

Install the Web Services feature only with a Weblogic Servlet Engine:

```
FMESERVERSHAREDDATA="\\CoreMachine\share"
SERVLETTYPE=Oracle
SERVLETPORT=8080
WEBAPPSDIR="/home/user/Weblogic/webapps"
FEATURE_FMEServerCore_INSTALL="No"
FEATURE_FMEEngine_INSTALL="No"
FEATURE_FMEServerSMTPRelay_INSTALL="No"
FEATURE_ServerConsole_INSTALL="No"
FEATURE_Services_INSTALL="Yes"
```

FME Engine-only install, with all other FME Server components on another server named "machine1"

```
FMESERVERHOSTNAME="machine1"
INSTALLDIR="/home/user/FMEServer"
FMESERVERSHAREDDATA="\\machine1\FMEServerSystemShare"
DATABASETYPE="PostGreSQL"
DATABASEHOST="FMEServerCore"
DATABASEPORT="7082" SERVLETPORT="80"
FEATURE_FMEServerCore_INSTALL="No"
FEATURE_FMEEngine_INSTALL="Yes"
FEATURE_FMEServerSMTPRelay_INSTALL="No"
FEATURE_ServerConsole_INSTALL="No"
FEATURE_Services_INSTALL="No"
```

Deploying FME Server with Docker Compose

As a multi-container application, FME Server supports deployment with Docker Compose. We recommend deploying FME Server this way only if you have worked with Docker before and understand its architecture.

Limitations and Considerations

When deciding if you want to deploy FME Server with Docker Compose, keep in mind the following:

- Container deployments of FME Server are built on Linux. Review our FME formats matrix and compare by platforms to see if the formats you plan to use are available on Linux. In particular:
  - Certain Esri formats cannot be used in a Docker deployment due to operating system compatibility. For integrating Esri formats with FME Server, we recommend installing FME Server on Windows machines and not using containers. Esri integrations with ArcPy/ArcGIS Pro require Windows libraries. ArcGIS Server for

    Linux is not a usable alternative.

    - Database formats (such as SQL Server) require the JDBC version of the format, which may require workspace modification if publishing from FME Desktop on Windows.
    - To use third-party libraries, JDBC drivers, and similar requires creating your own FME Server engine container image.

- FME Server deployed with Docker Compose is not supported on the following Linux distributions due to an incompatibility with the Linux kernel version used by these distributions:
    - CentOS 7
    - Red Hat Enterprise 7

  Oracle Linux 7 is supported only if the default Unbreakable Enterprise Kernel is used.
- Adding FME Engines on a Separate Machine that is not containerized is not tested, supported, or recommended by Safe Software. It is not possible to use this architecture to add FME Engines on a Windows VM to a Docker deployment of FME Server for format compatibility.

About the Docker Compose File for FME Server

Services

The Compose file defines containers for each of the services that comprise FME Server. These service names can be specified to start, stop, scale, or run other commands on a specific container. They are also used as the host names for the containers to communicate with each other.

Service	Description
fmeservercore	FME Server Core
fmeserverwebsocket	WebSocket Server
fmeserverweb	FME Server Web Services
fmeserverdb	FME Server Database
fmeserverengine	FME Engines
fmeserverqueue	Job Queues **Note** The preferred method for assigning FME Engines to queues is through the ENGINEPROPERTIES FME Engine Container environment variable.
nginx	Reverse proxy for FME Server; receives all web traffic and forwards it to the right container. Also responsible for handling the https connection.

See Also

- Working with FME Server Container Environment Variables

Ports

The FME Server deployment maps three ports to the host machine:

- nginx maps port 80 and 443 for the FME Server Web User Interface. (See To Disable https (below) for more details.)

- fmeservercore maps port 25 for SMTP relay.

Once FME Server is deployed, any requests to these ports on the host machine are routed to the proper container. This means you can access the FME Server Web User Interface on port 443 of your host machine even though the fmeserverweb service is actually running inside a container.

Volumes

The Compose file defines two main volumes:

- Database - Where the fmeserverdb service stores its database files.
- FME Server System Share - Actually comprised of several volumes that restrict access to certain folders from containers that do not require it.

Deploying and Administering FME Server on Docker Compose

Download the Docker Compose File for FME Server

Docker Compose files are available at https://www.safe.com/support/downloads/ for each available tag (version) of the FME Server container deployment.

Working with the docker-compose Command

Use the `docker-compose` command to create, start, and stop FME Server. This command looks in the current directory for a file named docker-compose.yaml, and uses that for the definition of what to deploy. Alternatively, you can pass in a path to a compose file using the `-f` parameter. Example commands below assume that a docker-compose.yaml exists in the current working directory.

To Launch a New FME Server Stack

Use the `up` parameter to bring up a new set of containers as defined in docker-compose.yaml. Pass in the `-d` parameter to run in the background.

```
docker-compose up -d
```

Docker Compose creates the networks, volumes and containers defined in the Compose file. When complete, you can connect to the FME Server Web User Interface on https://localhost/. The administrator user name and password defaults to `admin` and `admin`, respectively. You can change this on the Users page.

To Launch a New FME Server Stack with a Dynamic Engine (CPU Usage) License

```
docker-compose -f docker-compose.yaml -f docker-compose-dynamic-engine.yaml up -d
```

To Stop a Running FME Server

```
docker-compose stop
```

To Start FME Server

```
docker-compose start
```

To Restart FME Server

```
docker-compose restart
```

To Specify Services in the Compose File

You can specify the Services defined in the Compose file to start and stop. For example, to stop just the FME Server Web Services container:

```
docker-compose stop fmeserverweb
```

To Scale FME Engines

You can scale the number of running engines by launching additional FME Engines containers. (For more information, see Configuring the Number of FME Engines to Start.)

Use the `scale` command to specify the number of FME Engines you want after the command executes. The following command scales the number of engines to 4:

```
docker-compose up --scale fmeserverengine=4
```

To Remove an FME Server Deployment

The `down` command destroys all containers, volumes and networks that were created in the stack. The `-v` parameter removes the volumes as well.

```
docker-compose down -v
```

Without the `-v` parameter, the Database and FME Server System Share volumes are not destroyed, and if the same stack were launched again using `up`, no data would be lost.

To Upgrade an FME Server Deployment

> **Note** See also Upgrading to a Patch Build in Docker.

1. Make a local backup of FME Server on the Backup & Restore page of the Web User Interface. Make sure this file is saved somewhere outside of the FME Server Resources folders, as those will be removed.
2. Remove the containers, volumes and networks.

   ```
   docker-compose down -v
   ```
3. Download the latest version of the containers.

   ```
   docker-compose pull
   ```
4. Deploy the new version of the containers.

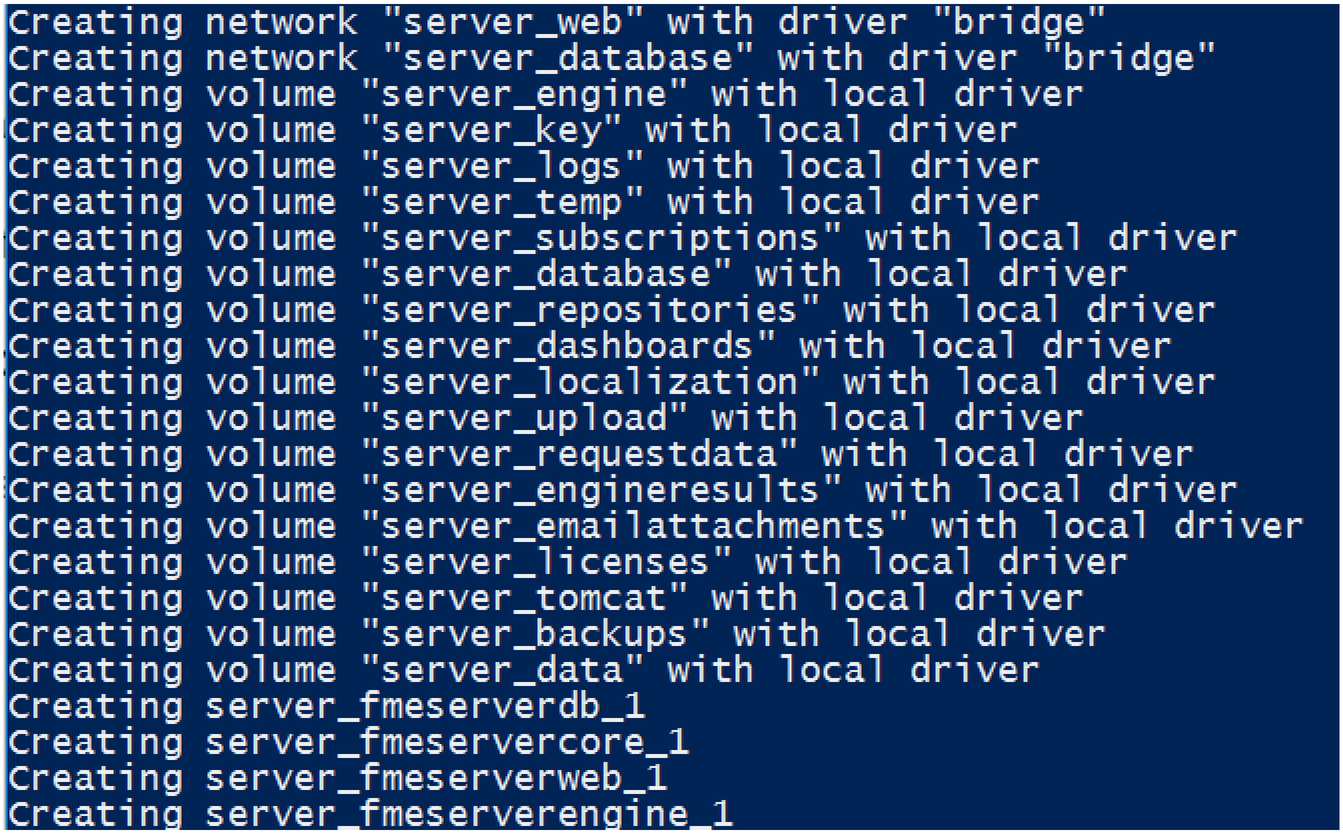
   ```
   docker-compose up -d
   ```
5. Restore your backup on the Backup & Restore page of the Web User Interface by uploading the backup file you saved in step 1.

To Run Multiple FME Servers on One Machine

While not recommended for production machines, running multiple FME Server stacks on a single machine may be useful if you are prototyping or testing workflows on multiple versions of FME Server.

When running multiple FME Servers on the same machine, keep in mind the following:

- When launching a stack, `docker-compose` prepends a project name, separated by an underscore, to all the containers, volumes and networks. The project name defaults to the name of the working directory when the stack is created. In the image below, the stack was launched in a directory named server, so server_ is prepended to all the resources created:



```
Creating network "server_web" with driver "bridge"
Creating network "server_database" with driver "bridge"
Creating volume "server_engine" with local driver
Creating volume "server_key" with local driver
Creating volume "server_logs" with local driver
Creating volume "server_temp" with local driver
Creating volume "server_subscriptions" with local driver
Creating volume "server_database" with local driver
Creating volume "server_repositories" with local driver
Creating volume "server_dashboards" with local driver
Creating volume "server_localization" with local driver
Creating volume "server_upload" with local driver
Creating volume "server_requestdata" with local driver
Creating volume "server_engineresults" with local driver
Creating volume "server_emailattachments" with local driver
Creating volume "server_licenses" with local driver
Creating volume "server_tomcat" with local driver
Creating volume "server_backups" with local driver
Creating volume "server_data" with local driver
Creating server_fmeserverdb_1
Creating server_fmeservercore_1
Creating server_fmeserverweb_1
Creating server_fmeserverengine_1
```

If the docker-compose.yml files for each deployment are not in directories with different names, you can pass in a project name when launching the stack with the `-p` flag:

```
docker-compose -p projectname up -d
```

- Since a few Ports are mapped to the host machine, the same port cannot be used twice. You must either make sure only one is started at a time, or change the port mappings. For example, to use port 8080 instead of 443, delete the redirect port 80:8080 from the fmeserverweb container with this command:

  ```
  EXTERNALPORT=8080 docker-compose up -d
  ```

  This sets the external port on all relevant containers to 8080 and brings up FME Server.

To Disable https

To run FME Server without https:

1. Remove the exposed port 80 from the nginx container in the Docker Compose file (line 80:8080).

2. Start the FME Server with `WEBPROTOCOL=http` and `EXTERNALPORT=80` variables. For example:

   ```
   WEBPROTOCOL=http EXTERNALPORT=80 docker-compose up -d
   ```

To Use a Custom TLS/SSL Certificate

> ⓘ **Warning** Ensure a copy of the certificate is stored in a different location before mounting it in the nginx container. The code in the container may have untested "edge" cases that overwrite the certificate.

To use a valid SSL certificate, make the following files available in a directory on the FME Server host:

- nginx.crt: The certificate, including full certificate chain, if necessary.
- nginx.key: Private key used to generate the certificate.

Once provided, pass in the location to the certificate and key by setting the `SSLCERTLOCATION=/path/to/certificates` variable.

See Also

- Working with FME Server Container Environment Variables
- Upgrading to a Patch Build in Docker

Working with FME Server Container Environment Variables

To perform additional configuration of an FME Server deployment with Docker Compose, define an environment variable section under the relevant container service. Each service has a different set of environment variables that can be defined.

FME Server Web Services Container

Environment Variable	Default Value	Description
EXTERNALHOSTNAME	localhost	The host name that users will use to connect to this FME Server. This is commonly the hostname or IP address of the physical machine on which the Docker deployment is running, or the external endpoint of the load balancer. This variable is used for Topic Monitoring. If you do not need to use Topic Monitoring, leave as `localhost`.
EXTERNALPORT	80 (Windows) 8080 (Linux)	The port used to connect to the FME Server Web User Interface. This should be the port exposed on the host or load balancer that users will use to connect.
FMESERVERHOSTNAME	fmeservercore	The service name or host name of the FME Server Core container.
WEBSERVERHOSTNAME	fmeserverweb	The service name or host name of the FME Server Web Services container.

Environment Variable	Default Value	Description
WEBPROTOCOL	https	The protocol FME Server uses. Can be either `http` or `https`.
WEBSOCKETHOSTNAME	fmeserverwebsocket	The service name or host name of the WebSocket server container.
LOGPREFIX	The host name of the container	The prefix to use on the log files created by this container.
PGSQLHOSTNAME	fmeserverdb	The service name or host name of the FME Server PostgreSQL database. If you want to use a different database type, see Changing the Database Connection, above.
PGSQLPORT	5432	The port for the FME Server PostgreSQL database. If you want to use a different database type, see Changing the Database Connection, above.
POSTGRESQLSSL	false	Set to `true` to force the PostgreSQL connection to use SSL. This adds the option `sslrequire=true` to the JDBC connection strings.

Environment Variable	Default Value	Description
PGSQLUSERNAME	fmeserver	The user to create as part of the FME Server schema that FME Server will use to connect to the database.

FME Engine Container

Environment Variable	Default Value	Description
ENGINEPROPERTIES		A comma-delimited list of properties to set on this engine. Engine properties are useful when assigning FME Engines to queues.
EXTERNALHOSTNAME	localhost	The host name that users will use to connect to this FME Server. This is commonly the hostname or IP address of the physical machine on which the Docker deployment is running. This is used for the data download results URL that is returned after running a job in the Data Download Service. If you don’t use the Data Download service, leave as `localhost`.
EXTERNALPORT	443	Port used to connect to FME Server.
FMESERVERHOSTNAME	fmeservercore	The service name or host name of the FME Server Core container.

Environment Variable	Default Value	Description
PGSQLHOSTNAME	fmeserverdb	The service name or host name of the FME Server PostgreSQL database. If you want to use a different database type, see Changing the Database Connection, above.
PGSQLPORT	5432	The port for the FME Server PostgreSQL database. If you want to use a different database type, see Changing the Database Connection, above.
POSTGRESQLSSL	false	Set to `true` to force the PostgreSQL connection to use SSL. This adds the option `sslrequire=true` to the JDBC connection strings.
PGSQLUSERNAME	fmeserver	The user to create as part of the FME Server schema that FME Server will use to connect to the database.
WEBPROTOCOL	https	The protocol FME Server uses. Can be either `http` or `https`.
LOGPREFIX	The host name of the container	The prefix to use on the log files created by this container.
FME_INSTANCE_NAME	The host name of the container	The name of the engine that appears on the Engines page.

Environment Variable	Default Value	Description
NODENAME	The host name of the container	The host name of the engine that the Core container uses to communicate with this engine.

FME Server Core Container

Environment Variable	Default Value	Description
FMESERVERHOSTNAME	fmeservercore	The service name or host name of the FME Server Core container.
PGSQLHOSTNAME	fmeserverdb	The service name or host name of the FME Server PostgreSQL database. To use a different database type, see Changing the Database Connection, above.
PGSQLPORT	5432	The port for the FME Server PostgreSQL database. To use a different database type, see Changing the Database Connection, above.

Environment Variable	Default Value	Description
POSTGRESQLSSL	false	Set to `true` to force the PostgreSQL connection to use SSL. This adds the option `sslrequire=true` to the JDBC connection strings.
PGSQLUSERNAME	fmeserver	The user to create as part of the FME Server schema that FME Server will use to connect to the database.
WEBSERVERHOSTNAME	fmeserverweb	The service name or host name of the FME Server Web Services container.
REDISHOSTS	fmeserverqueue	The service name or host name of the Redis queue.
REDISPORT	6379	The port for the Redis queue.

Environment Variable	Default Value	Description
PORTPOOL		This setting is required only if FME Engines that are not running in Docker are connecting to this FME Server Core. If engines are connecting from outside the docker network, perform the following: 1. Open additional ports in the Compose file for the engines to connect. 2. Set this PORTPOOL variable to a port range, such as `PORTPOOL=9000-9200`. 3. Map the specified ports to the physical host in the Compose file under the `ports` section. For example: `9000-9200:9000-9200`.

Environment Variable	Default Value	Description
FIRSTLOGINCHANGEPASSWORD	true	If `true`, the user will be prompted to update the `admin` password upon initial login to the FME Server Web User Interface following installation. If `false`, updating the `admin` password will not be required upon initial login.
MAX_TRANSACTION_RESULT_SUCCESSES		Specifies the number of successful translations until an engine process should be restarted.
MAX_TRANSACTION_RESULT_FAILURES		Specifies the number of failed translations until an engine process should be restarted.

Environment Variable	Default Value	Description
PRIMARY_PROCESS	core	Defines the purpose of this container. Valid values are `core`, `websocket`, or `initpgsql`. Setting to `websocket` starts only the websocket process. Setting to `initpgsql` runs the database initialization scripts against the configured database. For more information, see Initializing the PostgreSQL Database, above.

NGINX Container

Environment Variable	Default Value	Description
WEBPROTOCOL	https	The protocol FME Server uses. Can be either `http` or `https`.
EXTERNALHOSTNAME	localhost	The host name that users will use to connect to this FME Server. This is commonly the hostname or IP address of the physical machine on which the Docker deployment is running. This variable is used for Topic Monitoring. If you do not need to use Topic Monitoring, leave as `localhost`.

Environment Variable	Default Value	Description
EXTERNALPORT	443	The port used to connect to FME Server.
NGINX_WORKER_PROCESSES	1	Number of NGINX workers to start.

Changing the Database Connection

> **Note** To configure FME Server to connect to a Microsoft SQL Server or an Oracle database, contact Safe Support.

Initializing the PostgreSQL Database

When a new stack is launched, a mode of the core container populates an empty PostgreSQL database with the FME Server database schema before starting FME Server. If you want to use an existing PostgreSQL database for your FME Server, you must configure an initialization container using the following environment variables.

For example, the following command populates the schema in an existing PostgreSQL database running on host my-psgql-hostname, and then exits.

```
docker run -e PGSQLHOSTNAME=my-pgsql-hostname -e PGSQLPORT=5432 -e
PGSQLADMINUSER=postgres -e PGSQLADMINPASSWORD=postgres -e PRIMARY_
PROCESS=initpgsql safesoftware/fmeserver-core:2018-latest
```

Environment Variable	Default Value	Description
PGSQLHOSTNAME	fmeserverdb	The host name of the PostgreSQL database that is to be initialized.
PGSQLPORT	5432	The port to connect to the PostgreSQL database.
PGSQLADMINUSER	postgres	A user that exists on the PostgreSQL database that has permissions to create a database.
PGSQLADMINPASSWORD		The password for the PGSQLADMINUSER.
PGSQLADMINDATABASE	Same value as PGSQLADMINUSER	Set this to the database to which to connect initially as the PGSQLADMINUSER to initialize the database schema on the fmeserverdbinit service.
PGSQLUSERNAME	fmeserver	The user to create as part of the FME Server schema that FME Server will use to connect to the database.
PRIMARY_PROCESS		Set to `initpgsql`.

Environment Variable	Default Value	Description
AZUREPOSTGRESQL	false	Set to `true` on the fmeserverdbinit service in the Docker Compose file when using an Azure database for PostgreSQL to ensure the connection string is formatted correctly.

Running the Containers as a Different User

By default, the FME Server containers run as a user named fmeserver in group fmeserver, with UID and GID 1363. You may want the UID and GID of the user in the container to match a user defined on the host machine. For example, you may want to use a host bind mount for the FME Server System Share volume instead of using Docker volumes. If mounting a host directory into the container, it is optimal if the permissions in that folder match a real user on the host.

To match the user and group running a container with a user defined on the host machine, pass in variables `FMESERVER_UID` and `FMESERVER_GID`, set to the UID and GID of the user and group ID you want to use, respectively. Additionally, you must run the containers as the root user so that the container init can set the right permissions on the files. This is done in a Docker `run` command with the `--user=0` flag, and in Compose with the attribute `user: 0` to run as root.

Running Containers in the Local Time Zone

By default, FME Server containers run in Coordinated Universal Time (UTC). To adjust to the local time zone of the container hosts, mount time zone files to the fmeserverweb, fmeservercore, fmeserverqueue, and fmeserverengine containers, as follows:

```
volumes:
  - "/etc/timezone:/etc/timezone:ro"
  - "/etc/localtime:/etc/localtime:ro"
```

Alternatively, set the TZ environment variable for each container, as follows:

```
TZ=<timezone>
```

where *<timezone>* is a valid country code. For a list of country codes, see https://en.wikipedia.org/wiki/List_of_tz_database_time_zones.

Upgrading to a Patch Build in Docker

When an FME Server build is released, two tags are created for each component's image. For example, if the release version is 2021.2, these tags are named `2021.2` and `2021.2-20211029`, where `20211029` is the date the image was released.

The available tags for each FME Server component can be found on Dockerhub.

Patch Builds

Images of each build are patched periodically with security updates. When this occurs, each image is released again with the current date as a suffix to the build number (for example, `2021.2-20211030`). As well, the original tag (for example, `2021.2` is updated to refer to the most recently released version of the build. With this in mind, if it is preferable to lock down to a specific image and avoid updating to a patched version, use the timestamped tags. Otherwise, to always use the latest version of a build, use the non-timestamped tag (for example, `2021.2`).

To upgrade to the latest patch build in a Docker Compose deployment

1. Pull the latest images. Run:

   ```
   >> docker-compose pull
   ```

2. Update the FME Server deployment with the new images. Run:

   ```
   >> docker-compose -f docker-compose.yml up -d
   ```

3. Remove the old images. (They should be listed with repository `<none>` and tag `<none>`.)

To upgrade to a specific patch build

1. Search for the build on Dockerhub or Quay.io, which will display each of the patch builds for that build number.
2. In your docker compose file, update each image tag (after the ':' in the image name) to the desired build/timestamp.
3. Update the FME Server deployment with the new images. Run:

   ```
   >> docker-compose -f docker-compose.yml up -d
   ```

See Also

- To Upgrade an FME Server Deployment

Deploying FME Server with Kubernetes

Prerequisites and Considerations

To deploy FME Server with Kubernetes, you must fulfill the following prerequisites:

Install Kubernetes

Install and configure a Kubernetes cluster. To install a local (single-node) cluster, we recommend installing Docker Desktop, and following the Getting Started guide. Once installed, select Enable Kubernetes to start a single-node cluster.

> **Tip** Ensure sufficient CPU and memory resources are assigned to your Docker Engine, preferably higher than the default allocations. We recommend at least 4 CPUs and 8 GB memory.

Install Helm

The Helm tool is required for pulling the fmeserver Kubernetes chart.

1. Install Helm.
2. (Helm v2 only) Initialize it into the cluster. Run:

   ```
   helm init
   ```
3. Add the fmeserver chart to the cluster:

   ```
   helm repo add safesoftware https://safesoftware.github.io/helm-charts/
   ```

Install NGINX

FME Server deployments do not ship with an NGINX ingress controller container. Instead, we leverage the official nginx-ingress controller. The instructions to deploy this are here. We recommend using Helm as the simplest method:

- Helm v2: `helm install stable/nginx-ingress --name my-nginx`
- Helm v3: `helm install my-nginx stable/nginx-ingress`

Other Considerations

When deploying FME Server to a Kubernetes cluster, keep in mind the following:

- It is not possible to use the FME Server Web User Interface to deploy FME Engines or change the number of FME Engines. For more information, see Defining FME Engines, Queue Control, and Streams to a Kubernetes Deployment.
- Any memory or CPU limits you define on containers are ignored by all FME Server processes. Memory and CPU limits defined on FME Engine containers are honored.
- Pods for the FME Engines and FME Server Core/Web Services can be scaled; no other Pods can be scaled.

Performing the Kubernetes Deployment

Use the Helm tool to deploy FME Server with Kubernetes. This tool allows you to set various deployment parameters, depending on need.

Add the Safe Software Helm Repository

```
helm repo add safesoftware https://safesoftware.github.io/helm-charts/
```

At a minimum, you must provide the FME Server release and build number.

Example: Install FME Server 2021.2

```
helm install fmeserver safesoftware/fmeserver-2021.2 --set
fmeserver.image.tag=2021.2
```

After running the `install` command, you can connect to the FME Server Web User Interface on https://<*hostname*>. For more information, see:

- Accessing the Web User Interface
- Logging In to the Web Interface

Example: Install with User-Supplied Values

Create a values.yaml file that passes user-supplied parameter values to the Helm chart.

To get the default Helm chart values file, run:

```
helm show values <chart>
```

For example:

```
helm show values safesoftware/fmeserver-2021.2
```

To write the values to a file:

```
helm show values safesoftware/fmeserver-2021.2 >> values.yaml
```

For more information on value files, see the Helm Docs.

A current list of supported parameters for FME Server can be found on GitHub.

Parameters to Note

The following are parameters you may want to change in the values.yaml file:

Parameter	Example or Possible Value	Description
fmeserver.image.tag	2021.2	Set to the FME Server major release version you want to deploy, such as `2021.0` or `2021.2`. You must also update the FME Server version when installing the chart; for example, `safesoftware/fmeserver-2021.2`
fmeserver.engines[].name	“standard-group”	The name of the engine group. This can be changed, particularly if creating multiple engine groups.
fmeserver.engines[].engines	2	Controls the number of engine pods to start.
fmeserver.engines[].type	STANDARD | DYNAMIC	Controls the type of engine to start.
deployment.hostname		Set to the IP address of the ingress controller noted previously.

Parameter	Example or Possible Value	Description
deployment.numCores	2	Starts two FME Server Core pods for fault tolerance and load balancing.
deployment.useHostnameIngress	true | false	If DNS is set up for the ingress controller, specify the DNS name for deployment.hostname and leave this parameter to true. If not, specify false.

Install FME Server

Ensure the values.yaml file is saved, then reference it with the `helm install` command:

```
helm install <name> <chart> -f values.yaml
```

For example:

```
helm install fmeserver safesoftware/fmeserver-2021.2 -f values.yaml
```

If you make changes to the values.yaml file after FME Server is installed (such as to scale FME Server engines), use the `helm upgrade` command:

```
helm upgrade <name> <chart> -f values.yaml
```

For example:

```
helm upgrade fmeserver safesoftware/fmeserver-2021.2 -f values.yaml
```

Scale FME Engines

To set the number of FME Engines, use the values.yaml file and set the fmeserver.engines[] parameters listed in Parameters to Note (above). Alternatively, see Defining FME Engines, Queue Control, and Streams to a Kubernetes Deployment.

> **Note** Changing the number of FME Engines in the FME Server Web User Interface is not supported in Kubernetes deployments.

Delete an FME Server Deployment

```
helm uninstall fmeserver -n <namespace_name>
```

Defining FME Engines, Queue Control, and Streams to a Kubernetes Deployment

You can define multiple FME Engines for a Kubernetes deployment. Managing FME Engines in the FME Server Web User Interface is not supported in Kubernetes deployments. Instead, engine definition is managed through Kubernetes and a values.yaml file.

Each engine deployment defines the `name` of the deployment, the license `type` (`STANDARD` or `DYNAMIC`), and the number of replicas (`engines`) for that deployment. As well, the deployment `name` serves as an engine property. When configuring Queue Control and Streams, you can use this property when assigning engines to queues (in engine assignment rules) and streams. Additional properties can be assigned to engines with the `engineProperties` specifier.

Each engine deployment can also specify Kubernetes scheduling parameters `nodeSelector`, `tolerations` and `affinity`.

Example FME Engine Deployments

The following examples specify FME Engine deployments in a `values.yaml` file when deploying the FME Server Helm chart.

This example shows a default Helm deployment of one FME Engine deployment with two replicas. In the example, property `standard-group` may be specified in an engine assignment for a queue or stream of *Type*: **Property**.

```
fmeserver:
  engines:
    - name: "standard-group"
      type: "STANDARD"
      engines: 2
      affinity: {}
      nodeSelector: {}
      tolerations: []
```

The following example defines three engine deployments—one standard engine with two replicas, one standard engine with three replicas, and one dynamic engine with three replicas. When configuring engine assignment to queues or streams, use the `name` properties `standard-group`, `standard-group-2`, and `dynamic-group` to assign engines to queues or a stream. Two additional `engineproperties`, `property1` and `property2`, are defined on `standard-group` and `standard-group-2` respectively, and can also be used in engine assignment.

```
fmeserver:
  engines:
    - name: "standard-group"
      type: "STANDARD"
      engines: 2
      engineProperties: "property1"
    - name: "standard-group-2"
      type: "STANDARD"
      engines: 3
      engineProperties: "property2"
    - name: "dynamic-group"
      type: "DYNAMIC
      engines: 3
```

Deploying with Kubernetes and a Trusted Certificate

To deploy FME Server with a trusted certificate to a Kubernetes cluster, you can run cert-manager in your cluster, which issues the necessary certificates.

Alternatively, you can deploy with a certificate and private key that are already generated.

Deploying with cert-manager

Use the `deployment.certManager.issuerName` and `deployment.certManager.issuerType` parameters in the FME Server Helm chart to add annotations to the ingress. The annotations instruct cert-manager to issue a certificate for that ingress.

Deploying with an existing certificate

1. Upload the certificate to the cluster:

   ```
   kubectl create secret tls fmeserver-tls-cert --key
   localhost.self.fmeserver.key --cert localhost.self.fmeserver.crt
   ```
2. Install FME server, setting the TLS certificate:

   Example (Helm v3):

   ```
   helm install fmeserver safesoftware/fmeserver-2021.2 --set
   fmeserver.image.tag=2021.2,
   deployment.tlsSecretName=fmeserver-tls-cert,
   deployment.hostname=localhost
   ```

When finished, connect to the FME Server Web User Interface on http://localhost. For more information, see:

- Accessing the Web User Interface
- Logging In to the Web Interface.

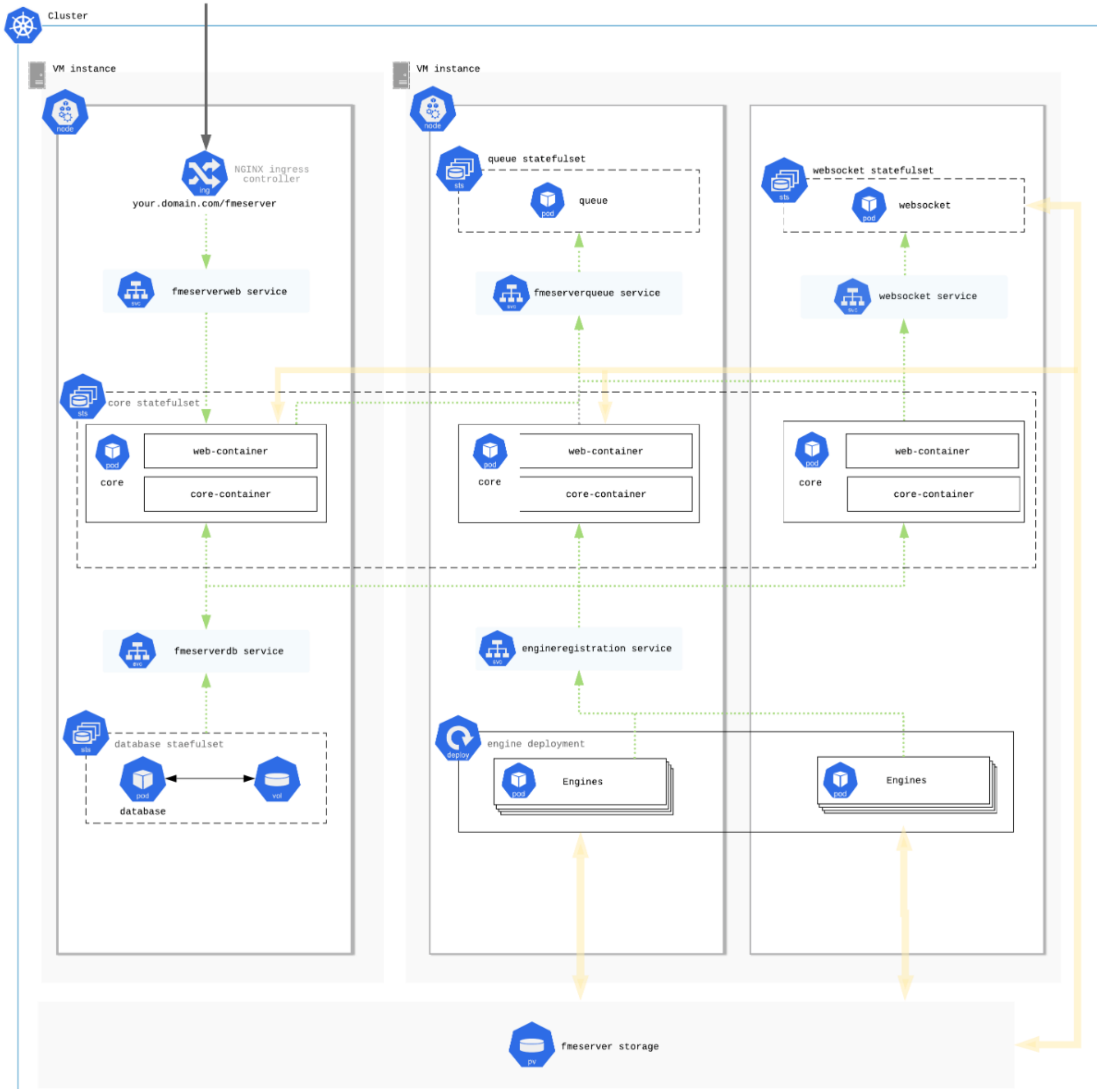
Deploying with Kubernetes across Multiple Hosts

You can duplicate the FME Server Core across multiple hosts in a Kubernetes deployment. This duplication provides higher availability; if one host fails, the FME Server Core on the other host can continue functioning.

To deploy FME Server across multiple hosts, a network file system (NFS) or other distributed system is required. In a Kubernetes deployment, the storage volume must support a *ReadWriteMany* access mode. If no existing distributed file system is available, we recommend using an existing NFS server and configuring Kubernetes to use that server to provision volumes. Alternatively, use an offering from a Cloud provider, such as Azure Files.

Note The Helm chart requires multiple hosts (nodes) to work with more than one FME Server Core. Only one Core is launched per node.

Architecture of a High-Availability FME Server Kubernetes Deployment



To Deploy Across Multiple Hosts

Deploying with an NFS Client Provisioner

> **Warning** Safe Software has not yet tested an NFS Client Provisioner deployment for production workflows.

You can deploy an NFS Client provisioner to use an existing NFS Server to provision volumes for Kubernetes to use. The provisioner must be installed before FME Server and should not be removed before FME Server is removed from the cluster.

1. Follow the instructions here to deploy the NFS client provisioner using the settings of your existing NFS Server.
2. Install FME Server.

   Example:

   > **Note** The following script assumes the storage class name of the NFS Client Provisioner is unchanged from its default, "managed-nfs-storage."

   - Helm v2: `helm install --namespace <fmeserver-namespace> -n <fmeserver-deployment-name> safesoftware/fmeserver-2021.2 --set fmeserver.image.tag=<fmeVersion>,deployment.numCores=2,storage.fmeserver.class=managed-nfs-storage,storage.fmeserver.accessMode=ReadWriteMany`
   - Helm v3: `helm install <fmeserver-deployment-name> safesoftware/fmeserver-2021.2 --namespace <fmeserver-namespace> --set fmeserver.image.tag=<fmeVersion>,deployment.numCores=2,storage.fmeserver.class=managed-nfs-storage,storage.fmeserver.accessMode=ReadWriteMany`

Parameters

> **Note** To add other parameters, if required, see the relevant topic under Deploying FME Server with Kubernetes.

- *fmeserver-namespace*: Kubernetes namespace in which to install FME Server.
- *fmeserver-deployment-name*: Helm deployment name, arbitrary.
- *fmeVersion*: FME Server major release version (examples: `2021.0` or `2021.2`).

Deploying with an External Database

The FME Server Database is a critical part of any FME Server deployment. In a default Kubernetes deployment, it is a single point of failure. If it fails, FME Server stops functioning. For a highly available deployment of FME Server, we recommend that you use a highly available PostgreSQL database. For example, if you are deploying on AWS, you may want to use Amazon Relational Database Service (RDS), which is a highly available and scalable managed database.

To use an external database outside of the Kubernetes cluster, perform the following:

1. Provision the database and take note of the host, master username, and master password.
2. Ensure the cluster has access on port 5432.
3. Create a secret in your cluster in the namespace where you will deploy that contains the admin password for the database. The password must be base64-encoded.
   a. Create a secrets.yaml file similar to the following:

   > **Note** You must manually encode the password in base64.

   ```
   apiVersion: v1
   kind: Secret
   metadata:
   ```

```
  name: fmeserversecret
type: Opaque
data:
  password: Zm15473ja3M
```

   b. Run: `kubectl create -f secrets.yaml`
   c. Note the secret name and the name of the key that holds the value of the password.

4. Run the Helm chart, setting the following values:
   - `deployment.deployPostgresql` (required): Set to `false` to use an external database.
   - `fmeserver.database.host` (required): The host name of the external database
   - `fmeserver.database.adminUser` (optional): The default is `postgres`. If the master user of the external database is not called this, you must set it.
   - `fmeserver.database.adminPasswordSecret` (required): The name of the secret you created.
   - `fmeserver.database.adminPasswordSecretKey` (required): The name of the key in the secret that holds the value of the base64-encoded password.
   - `fmeserver.database.port` (optional): The default port is 5432. If the external database runs on another port, you must set this.

When FME Server is deployed, one of the containers will connect to the external database and run all of the SQL setup scripts.

Deploying with Kubernetes to a Cloud Provider

Deploying to Azure Kubernetes Service Using Azure Files

1. Launch the Cluster

> **Note** For Microsoft Azure documentation on deploying and connecting to an AKS cluster, click here.

   a. Navigate to the Microsoft Azure portal in a web browser.

   b. Navigate to the Kubernetes services section.

   c. Click **Add**.

   d. On the **Basics** tab, specify the parameters:

   - *Subscription*: Specify your subscription and resource group that Kubernetes will run in.
   - *Cluster Details*: Specify a name for the cluster and the region to launch it. The Kubernetes version can remain as the default.
   - *Nodes*:For each FME Server Core you wish to run, you need approximately 8GB of memory. For a single-Core deployment, we recommend 2 vCPUS, 8GB RAM, and 2 nodes. For a two-Core deployment, we recommend 4 vCPUs, 16GB RAM, and 3 nodes.

   > **Note** More than one Core container requires a minimum of two nodes due to a constraint in the Helm chart that prevents Core containers residing on the same node. To ensure fault tolerance, we recommend three nodes because if a node is lost, two Cores can still run on the remaining two nodes.

   - For a test deployment, leave all other parameters at their default settings.

   e. Click **Review + Create**.
   f. After validation checks complete, review the settings, and click **Create**.

2. Install Helm and an NGINX Ingress Controller

   a. Using Azure Cloud Shell, connect to the Kubernetes cluster.
   b. Check that Helm is installed. Run:

      ```
      helm version.
      ```

      If not installed, install Helm.

   c. Give Helm deploy permissions.

      Run:

      ```
      kubectl create clusterrolebinding add-on-cluster-admin --
      clusterrole=cluster-admin --serviceaccount=kube-system:default
      ```

   d. Install the NGINX ingress controller:

      ```
      kubectl apply -f
      https://raw.githubusercontent.com/kubernetes/ingress-
      nginx/controller-
      v0.44.0/deploy/static/provider/cloud/deploy.yaml
      ```

3. Setup Shared Storage using Azure Files

   To deploy FME Server across multiple nodes, create a storage class that defines a shared storage volume backed by Azure Files.

   a. Using Azure Cloud Shell, run:

      ```
      az aks show --resource-group <resource_group> --name <cluster_
      name> --query nodeResourceGroup -o tsv
      ```

      Replacing `<resource_group>` and `<cluster_name>` with what you defined when you deployed your cluster. This command provides the AKS node resource group for your cluster.

   b. Create a general-purpose storage account. Using the Azure CLI, run:

```
az storage account create --resource-group <node_resource_group> --name <storageaccountname> --sku Premium_LRS --kind FileStorage
```

Replacing `<node_resource_group>` with the result of the command in the previous step, and `<storageaccountname>` with a unique name for the storage account.

c. Create a storage class in Kubernetes using the new Azure Files storage account. Use vi or nano to create the following file in Azure Cloud Shell:

```
kind: StorageClass
apiVersion: storage.k8s.io/v1
metadata:
  name: azurefiles-fmeserver
provisioner: kubernetes.io/azure-file
parameters:
  skuName: Premium_LRS
  storageAccount: <storageaccountname>
mountOptions:
  - uid=1363
  - gid=1363
```

Replacing `<storageaccountname>` with the name you specified previously when creating the account.

d. Run:

```
kubectl apply -f <path_to_file>
```

Where `<path_to_file>` is the YAML file created above.

To see `azurefiles-fmeserver` in the list, run:

```
kubectl get sc
```

e. If RBAC is enabled, grant permissions to Azure Files:

```
kubectl create clusterrolebinding add-on-cluster-vol-binder --
clusterrole=cluster-admin --serviceaccount=kube-
system:persistent-volume-binder
```

4. Deploy FME Server

   Perform the following in the Azure Cloud Shell:

   a. Add the Safe Software Helm repository:

      ```
      helm repo add safesoftware
      https://safesoftware.github.io/helm-charts/
      ```

   b. Get the IP address of the ingress controller:

      ```
      kubectl get services --namespace ingress-nginx
      ```

      Note the "External IP" of the nginx-ingress-controller. This is the ingress into the cluster. In a production environment, set up a DNS that points to this IP address and use that as the hostname when deploying FME Server. In this procedure, we access FME Server directly using the IP.

   c. Create a namespace in which to deploy. Run:

      ```
      kubectl create namespace <namespace_name>
      ```

      For example:

      ```
      kubectl create namespace fmeserver
      ```

   d. Create a values.yaml file that will pass user-supplied parameter values into the Helm chart.

      To get the default Helm chart values file, run:

      ```
      helm show values <chart>
      ```

      For example:

      ```
      helm show values safesoftware/fmeserver-2021.2
      ```

      To write the values to a file:

      ```
      helm show values safesoftware/fmeserver-2021.2 >> values.yaml
      ```

For more information on value files, see the Helm Docs.

A current list of supported parameters for FME Server can be found on GitHub.

e. (Optional) Update parameters in values.yaml.

The following are parameters you may want to change in the values.yaml file:

Parameter	Example or Possible Value	Description
fmeserver.image.tag	2021.2	Set to the FME Server major release version you want to deploy, such as `2021.0` or `2021.2`. You must also update the FME Server version when installing the chart; for example, `safesoftware/fmeserver-2021.2`
fmeserver.engines[].name	“standard-group”	The name of the engine group. This can be changed, particularly if creating multiple engine groups.
fmeserver.engines[].engines	2	Controls the number of engine pods to start.

Parameter	Example or Possible Value	Description
fmeserver.engines[].type	STANDARD | DYNAMIC	Controls the type of engine to start.
deployment.hostname		Set to the IP address of the ingress controller noted previously.
deployment.numCores	2	Starts two FME Server Core pods for fault tolerance and load balancing.
deployment.useHostnameIngress	true | false	If DNS is set up for the ingress controller, specify the DNS name for deployment.hostname and leave this parameter to true. If not, specify false.
storage.fmeserver.class	azurefiles-fmeserver	Uses the Azure Files storage account set up previously.

f. Install FME Server.

```
helm install <name> <chart> -f values.yaml
```

For example:

```
helm install fmeserver safesoftware/fmeserver-2021.2 -f
values.yaml
```

If you make changes to the values.yaml file after FME Server is installed (such as to scale FME Server engines), use the `helm upgrade` command:

```
helm upgrade <name> <chart> -f values.yaml
```

For example:

```
helm upgrade fmeserver safesoftware/fmeserver-2021.2 -f
values.yaml
```

g. To access FME Server after it deploys, invoke the external IP in your browser.

Deploying to Google Cloud Using Google Kubernetes Engine and Cloud Filestore

The following steps explain how to deploy an FME Server Kubernetes deployment consisting of multiple FME Server Core nodes to Google Cloud using Google Kubernetes Engine (GKE) and Cloud Filestore for storage.

> **Note** For a single-node deployment, use the quickstart script that corresponds to the FME Server version you want to deploy.

1. Launch the Cluster

   a. Navigate to the Google Kubernetes Engine section of the Google Cloud Platform console.

   b. Select **Create Cluster** to deploy a new Kubernetes Cluster.

   c. From *Cluster templates*, select **Standard cluster**, and set the following parameters:

      - *Name*: Name of the cluster.
      - *Location type*: For test purposes, select **Zonal**.
      - *Zone*: Select the zone closest to you.
      - *Master version*: Keep the default value.

- *Node pool*: For each FME Server Core you want to run, you need approximately 8GB of memory. For a single-Core deployment, we recommend 2 vCPUS, 8GB RAM, and 2 nodes. For a two-Core deployment, we recommend 4 vCPUs, 16GB RAM, and 3 nodes.

> **Note** More than one Core container requires a minimum of two nodes due to a constraint in the Helm chart that prevents Core containers residing on the same node. To ensure fault tolerance, we recommend three nodes because if a node is lost, two Cores can still run on the remaining two nodes.

d. Click **Create**.

2. Connect to the Cluster

Run the following commands in Cloud Shell (recommended). Alternatively, configure your local machine to run `kubectl` and `helm` commands to deploy resources to the cluster.

a. Click **Connect** beside the Kubernetes cluster you just launched.

b. Copy the "Command-line access" command and run in Google Cloud Shell or execute it on your terminal.

c. To check if you are connected to the cluster, run:

```
kubectl get nodes
```

You should see all nodes in the cluster.

d. Install the NGINX ingress controller:

```
kubectl apply -f
https://raw.githubusercontent.com/kubernetes/ingress-
nginx/controller-
<version>/deploy/static/provider/cloud/deploy.yaml
```

Replace *<version>* with the most recent version in the corresponding script in the NGINX Ingress Controller Installation Guide. As well, replace other syntax elements with any changes in the updated script.

3. Set Up Shared Storage for the FME Server System Share

   Using Cloud Filestore, storage for the FME Server System Share is accessible across all nodes. This procedure creates a Cloud Filestore instance to host an NFS server for the Kubernetes cluster to use.

   a. Go to "Filestore" in the Google Cloud Platform console.

   b. Click **Create Instance**, and set the following:

      - *Instance ID*: Identifier for the instance.
      - *Instance tier*: **Standard**
      - *Location*: The same region and zone to which you deployed the Kubernetes cluster.
      - *Fileshare name*: Specify a name.
      - *Fileshare capacity*: **1TB** (default)

   c. Click **Create**.

   d. To deploy a storage class in the cluster to use the new Filestore instance of the NFS server, Kubernetes provides the nfs-subdir-external-provisioner Helm chart. First, go to the details of your Filestore instance and note the IP address and file share name.

   e. Run:

```
helm repo add nfs-subdir-external-provisioner https://kubernetes-sigs.github.io/nfs-subdir-external-provisioner/
helm install nfs-subdir-external-provisioner nfs-subdir-external-provisioner/nfs-subdir-external-provisioner \
--set nfs.server=<ip_address> \
--set nfs.path=<fileshare_name>
```

Replace `<ip_address>` and `<fileshare_name>` with the values of your Fileshare. For example:

```
helm install nfs-subdir-external-provisioner nfs-subdir-
external-provisioner/nfs-subdir-external-provisioner \
--set nfs.server=10.135.210.250 \
--set nfs.path=/fmeserver-storage
```

This command creates a storage class in the Kubernetes cluster called "fmeserver-storage" that uses this Filestore NFS server for volumes in Kubernetes.

> **Note** For more information, see the NFS Subdirectory External Provisioner Helm Chart documentation.

4. Deploy FME Server

   a. Add the Safe Software Helm repository:

   ```
   helm repo add safesoftware
   https://safesoftware.github.io/helm-charts/
   ```

   b. Get the IP address of the Ingress Controller:

   ```
   kubectl -n ingress-nginx get svc
   ```

   Note the "EXTERNAL-IP" of the "ingress-nginx-controller". This is the ingress to the cluster. In a production environment, set up a DNS that points to this IP address and use that as the hostname when deploying FME Server. In this procedure, we access FME Server directly using the IP.

   c. Create a namespace in which to deploy. Run:

   ```
   kubectl create namespace <namespace_name>
   ```

   For example:

   ```
   kubectl create namespace fmeserver
   ```

d. Create a values.yaml file that will pass user-supplied parameter values into the Helm chart.

   To get the default Helm chart values file, run:

   ```
   helm show values <chart>
   ```

   For example:

   ```
   helm show values safesoftware/fmeserver-2021.2
   ```

   To write the values to a file:

   ```
   helm show values safesoftware/fmeserver-2021.2 >> values.yaml
   ```

   For more information on value files, see the Helm Docs.

   A current list of supported parameters for FME Server can be found on GitHub.

e. (Optional) Update parameters in values.yaml.

   The following are parameters you may want to change in the values.yaml file:

Parameter	Example or Possible Value	Description
fmeserver.image.tag	2021.2	Set to the FME Server major release version you want to deploy, such as `2021.0` or `2021.2`. You must also update the FME Server version when installing the chart; for example, `safesoftware/fmeserver-2021.2`

Parameter	Example or Possible Value	Description
fmeserver.engines[].name	“standard-group”	The name of the engine group. This can be changed, particularly if creating multiple engine groups.
fmeserver.engines[].engines	2	Controls the number of engine pods to start.
fmeserver.engines[].type	STANDARD | DYNAMIC	Controls the type of engine to start.
deployment.hostname		Set to the IP address of the ingress controller noted previously.
deployment.numCores	2	Starts two FME Server Core pods for fault tolerance and load balancing.

Parameter	Example or Possible Value	Description
deployment.useHostnameIngress	true | false	If DNS is set up for the ingress controller, specify the DNS name for deployment.hostname and leave this parameter to true. If not, specify false.
storage.fmeserver.class	nfs-client	Uses the Cloud Filestore NFS Server set up previously.

f. Install FME Server.

```
helm install <name> <chart> -f values.yaml
```

For example:

```
helm install fmeserver safesoftware/fmeserver-2021.2 -f
values.yaml
```

If you make changes to the values.yaml file after FME Server is installed (such as to scale FME Server engines), use the `helm upgrade` command:

```
helm upgrade <name> <chart> -f values.yaml
```

For example:

```
helm upgrade fmeserver safesoftware/fmeserver-2021.2 -f
values.yaml
```

g. To access FME Server after it deploys, use your browser to invoke the external IP in your browser.

Deploying to Amazon Elastic Kubernetes Service Using Elastic File System

1. Launch the Cluster and Connect

   To launch and connect to a cluster in Amazon Elastic Kubernetes Service (EKS), follow the instructions in the Getting Started with Amazon EKS documentation. You must configure some prerequisite resources such as an Amazon Virtual Private Cloud (VPC) and Identity and Access Management (IAM) role for the cluster.

   To deploy an FME Server to the cluster for test purposes, we recommend the following settings:

   - *NodeAutoScalingGroupMinSize*: 3
   - *NodeAutoScalingGroupDesiredSize*: 3
   - *NodeAutoScalingGroupMaxSize*: 4
   - *NodeInstanceType*: t3.large

   You can skip the step to "Launch a Guest Book Application."

2. Install Helm and an NGINX Ingress Controller

   a. Check if Helm is already installed. Run:

      ```
      helm version
      ```

      If not installed, install Helm.

   b. Give Helm deploy permissions.

      Run:

      ```
      kubectl create clusterrolebinding add-on-cluster-admin --
      clusterrole=cluster-admin --serviceaccount=kube-system:default
      ```

   c. Install the NGINX ingress controller for AWS:

      ```
      kubectl apply -f
      https://raw.githubusercontent.com/kubernetes/ingress-
      nginx/controller-
      <version>/deploy/static/provider/aws/deploy.yaml
      ```

Replace `<version>` with the most recent version in the corresponding script in the NGINX Ingress Controller Installation Guide. As well, replace other syntax elements with any changes in the updated script.

3. Configure Shared Storage Using Amazon Elastic File System

   To deploy FME Server across multiple nodes, configure storage for the FME Server System Share using Amazon Elastic File System (EFS).

   > **Note** The default Amazon EFS performance options may not be adequate for how your FME Server is used. If you experience performance issues, see the Amazon EFS Performance documentation.

   a. From the AWS Management Console, navigate to EFS.
      i. Click **Create file system**.
      ii. Select the new VPC created for the Kubernetes cluster.
      iii. Click **Customize**.
      iv. Add any tags as desired. Everything can be left as default. Click **Next**.

   b. The subnets should change to the EKS subnets. Add the EKS Node security group to the list of security groups so that our nodes have permissions to mount them.
      i. Click **Next** and then **Create**.
      ii. Create Access Point. We recommend the following settings:
         - Root directory path: /data/fmeserverdata
         - POSIX user
           - User ID: 1363
           - Group ID: 1363

    - Root directory creation permissions
        - Owner user ID: 1363
        - Owner group ID: 1363
        - Permissions: 0755

c. Install the [Amazon EFS CSI Driver]() for your region.

d. Create the efs storage class:

```
kind: StorageClass
apiVersion: storage.k8s.io/v1
metadata:
  name: efs-sc
provisioner: efs.csi.aws.com
```

e. Create the persistent volume using the following yaml file as an example. You will need to replace the `volumeHandle` with your File system ID and Access point ID from the EFS.

```
apiVersion: v1
kind: PersistentVolume
metadata:
  name: fmeserver-data
spec:
  capacity:
    storage: 10Gi
  volumeMode: Filesystem
  accessModes:
    - ReadWriteMany
  persistentVolumeReclaimPolicy: Retain
  storageClassName: efs-sc
  csi:
    driver: efs.csi.aws.com
    volumeHandle: fs-<file-system-id>::fsap-<access-point-id>
```

4. Deploy FME Server

    a. Add the Safe Software Helm repository:

    ```
    helm repo add safesoftware
    https://safesoftware.github.io/helm-charts/
    ```

    b. Get the IP address of the Ingress Controller:

    ```
    kubectl describe service ingress-nginx-controller --namespace
    ingress-nginx
    ```

    Note the "LoadBalancer Ingress:" of the nginx-ingress-controller. This is the ingress into the cluster.

    c. Create a namespace in which to deploy. Run:

    ```
    kubectl create namespace <namespace_name>
    ```

    For example:

    ```
    kubectl create namespace fmeserver
    ```

    d. Create a values.yaml file that will pass user-supplied parameter values into the Helm chart.

    To get the default Helm chart values file, run:

    ```
    helm show values <chart>
    ```

    For example:

    ```
    helm show values safesoftware/fmeserver-2021.2
    ```

    To write the values to a file:

    ```
    helm show values safesoftware/fmeserver-2021.2 >> values.yaml
    ```

    For more information on value files, see the Helm Docs.

    A current list of supported parameters for FME Server can be found on GitHub.

    e. (Optional) Update parameters in values.yaml.

    The following are parameters you may want to change in the values.yaml file:

Parameter	Example or Possible Value	Description
fmeserver.image.tag	2021.2	Set to the FME Server major release version you want to deploy, such as `2021.0` or `2021.2`. You must also update the FME Server version when installing the chart; for example, `safesoftware/fmeserver-2021.2`
fmeserver.engines[].name	“standard-group”	The name of the engine group. This can be changed, particularly if creating multiple engine groups.
fmeserver.engines[].engines	2	Controls the number of engine pods to start.
fmeserver.engines[].type	STANDARD | DYNAMIC	Controls the type of engine to start.
deployment.hostname		Set to the IP address of the ingress controller noted previously.

Parameter	Example or Possible Value	Description
deployment.numCores	2	Starts two FME Server Core pods for fault tolerance and load balancing.
deployment.useHostnameIngress	true | false	If DNS is set up for the ingress controller, specify the DNS name for deployment.hostname and leave this parameter to true. If not, specify false.
storage.fmeserver.class	efs-sc	Uses the EFS storage class set up previously. To verify the name, run `kubectl get sc`

f. Install FME Server.

```
helm install <name> <chart> -f values.yaml
```

For example:

```
helm install fmeserver safesoftware/fmeserver-2021.2 -f values.yaml
```

If you make changes to the values.yaml file after FME Server is installed (such as to scale FME Server engines), use the `helm upgrade` command:

```
helm upgrade <name> <chart> -f values.yaml
```

For example:

```
helm upgrade fmeserver safesoftware/fmeserver-2021.2 -f
values.yaml
```

g. To access FME Server after it deploys, invoke the external IP in your browser.

Deploying to Alibaba Cloud Using Network Attached Storage

> **Note** Official Alibaba documentation on deploying and connecting to a Kubernetes cluster is available here.

1. Launch the Cluster
   a. Navigate to the Alibaba Cloud console.
   b. Click **Container Service**.
   c. Click **Create Kubernetes Cluster**.
   d. Click the **Managed Kubernetes** tab at top.
   e. Specify the following parameters:
      - *Cluster name*, *Region*, *Zone*, and *VPC*.
      - Choose an *Instance type* and *Node count*. For example, **ecs.mn4.large** *Instance type*, quantity of **3**. Uncheck **Attach Data Disk**.
      - Specify an *ssh key pair* for logging in.
      - For all other parameters, keep the default settings.
   f. Click **Create**. The cluster may take 5-10 minutes to create.
2. Connect to the Cluster
   a. Go to **Container Service** in the Alibaba Cloud console.
   b. Click on the cluster you just created.
   c. At the bottom of the page is a kubectl config file. Copy and paste this into a .yaml file on your machine.

   d. Set the environment variable KUBECONFIG to point to this file in your terminal.
   e. To check you are connected, run:

      ```
      kubectl get nodes
      ```

3. Install Helm

   a. Check that Helm is installed. Run:

      ```
      helm version
      ```

      If not installed, install Helm.

   b. Give Helm deploy permissions.

      Run:

      ```
      kubectl create clusterrolebinding add-on-cluster-admin --
      clusterrole=cluster-admin --serviceaccount=kube-system:default
      ```

4. Configure Network Attached Storage (NAS)

   a. In the Alibaba Cloud console, navigate to the NAS console
   b. Click **Create File System**.
   c. Specify the parameters:
      - *Region* and *Zone*: Specify the same as your Kubernetes cluster.
      - Under *Storage Type*, select **SSD performance-type**
      - *Storage Type*: **NFS**
   d. Click **OK**.
   e. Click **Add Mount Point**.
   f. Specify the parameters:
      - *Mount Point Type*: **VPC**
      - Select the same VPC as the one in which the Kubernetes cluster is running.
      - Select the default VPC permission group.
   g. Click **OK**.

h. To add an NAS storage class to the Kubernetes cluster, go to the Alibaba documentation on using NAS storage in a Kubernetes cluster.

   i. Under "Dynamic storage volumes", copy and paste the "Install the plug-in" config file into a file on your local machine.

   ii. In that file, modify the value of `NFS_SERVER` in the controller container, and the "server" in the volume to be the mount point URL created for the NAS.

   iii. Remove the `nodeSelector` section completely.

   iv. Apply to the cluster with `kubectl apply -f <path_to_yaml>`, where `<path_to_yaml>` is the config file created in the previous step.

i. You should now have a storage class in your cluster with the name "alicloud-nas" that can use the FME Server System Share.

5. Deploy FME Server

   a. Add the Safe Software Helm repository:

   ```
   helm repo add safesoftware
   https://safesoftware.github.io/helm-charts/
   ```

   b. Construct a hostname for the FME Server deployment. Alibaba’s Kubernetes Ingress Controller resolves a DNS name in the form:

   ```
   *.<cluster-id>.<region-id>.alicontainer.com
   ```

   For example, you can use DNS hostname:

   ```
   fmeserver.<cluster-id>.<region-id>.alicontainer.com
   ```

   <*cluster-id*> and region can be found on the Container Service page of the Alibaba Cloud console. See the Alibaba documentation for a mapping of regions to `<region-id>`.

   c. Create a values.yaml file that will pass user-supplied parameter values into the Helm chart.

   To get the default Helm chart values file, run:

   ```
   helm show values <chart>
   ```

For example:

```
helm show values safesoftware/fmeserver-2021.2
```

To write the values to a file:

```
helm show values safesoftware/fmeserver-2021.2 >> values.yaml
```

For more information on value files, see the Helm Docs.

A current list of supported parameters for FME Server can be found on GitHub.

d. (Optional) Update parameters in values.yaml.

The following are parameters you may want to change in the values.yaml file:

Parameter	Example or Possible Value	Description
fmeserver.image.tag	2021.2	Set to the FME Server major release version you want to deploy, such as `2021.0` or `2021.2`. You must also update the FME Server version when installing the chart; for example, `safesoftware/fmeserver-2021.2`

Parameter	Example or Possible Value	Description
fmeserver.engines[].name	“standard-group”	The name of the engine group. This can be changed, particularly if creating multiple engine groups.
fmeserver.engines[].engines	2	Controls the number of engine pods to start.
fmeserver.engines[].type	STANDARD | DYNAMIC	Controls the type of engine to start.
deployment.hostname		Set to the IP address of the ingress controller noted previously.
deployment.numCores	2	Starts two FME Server Core pods for fault tolerance and load balancing.

Parameter	Example or Possible Value	Description
deployment.useHostnameIngress	true | false	If DNS is set up for the ingress controller, specify the DNS name for deployment.hostname and leave this parameter to true. If not, specify false.
storage.fmeserver.class	alicloud-nas	Uses the Alibaba NAS set up previously.

e. Install FME Server.

```
helm install <name> <chart> -f values.yaml
```

For example:

```
helm install fmeserver safesoftware/fmeserver-2021.2 -f values.yaml
```

If you make changes to the values.yaml file after FME Server is installed (such as to scale FME Server engines), use the `helm upgrade` command:

```
helm upgrade <name> <chart> -f values.yaml
```

For example:

```
helm upgrade fmeserver safesoftware/fmeserver-2021.2 -f values.yaml
```

f. To access FME Server after it deploys, invoke the external IP in your browser.

Upgrading a Kubernetes Deployment of FME Server

With little downtime, you can upgrade a Kubernetes deployment of FME Server to a later version using the following procedure:

- Launch a new FME Server of the desired build version in a new namespace.
- Backup the current FME Server and restore it to the new FME Server.
- Update the ingress hostname from the old FME Server to the new FME Server.
- Remove the old FME Server.

> **Warning** You may have Schedules, Automations workflows, or Notifications that would conflict with themselves during the time that both the new and old FME Servers are running. Disable these tools before proceeding with a backup.

> **Note** See also Upgrading to a Patch Build in Kubernetes.

Performing the Upgrade

1. Create a new namespace for the new version of FME Server:

   ```
   kubectl create namespace <namespace-new-version>
   ```

   For example:

   ```
   kubectl create namespace fmeserver-2021-2-2
   ```

2. If your FME Server uses an external PostgreSQL database for the FME Server Database, copy the admin password secret, using the namespace of the current version of FME Server, to the new version. (If your FME Server uses the PostgreSQL container that is deployed with the Helm chart, skip this step.)

   ```
   kubectl get secret postgresql-admin-password --namespace
   <namespace-old-version> --export -o yaml | kubectl apply --
   namespace=<namespace-new-version> -f -
   ```

   For example:

   ```
   kubectl get secret postgresql-admin-password --namespace
   fmeserver-2021-2-1 --export -o yaml | kubectl apply --
   namespace=fmeserver-2021-2-2 -f -
   ```

3. Make a copy the values .yaml file for the current FME Server and update the following values:
   - `deployment.hostname`: Set to a temporary hostname. (You will reset it later in this procedure.)
   - `fmeserver.image.tag`: Set to the container image tag you want to deploy for the upgraded FME Server.
   - If your FME Server uses an external PostgreSQL database for the FME Server Database, set the following values to be different from the ones in use for the current FME Server:
     - `fmeserver.database.name`
     - `fmeserver.database.username`

4. Update your Helm repository:

```
helm repo update
```

5. Deploy FME Server in the new namespace using Helm and the updated values .yaml file.

```
helm install --namespace <namespace-new-version> -n <helm-deployment-name> safesoftware/fmeserver-<FME-Server-version> -f <new-values-filename>
```

   For example:

```
helm install --namespace fmeserver-2021-2-2 -n fmeserver-2021-2-2 safesoftware/fmeserver-2021.2 -f values-2021.2.2.yaml
```

6. From the FME Server Web User Interface, perform the following:
   1. License FME Server.
   2. Backup the old FME Server.
   3. Restore the backup to the new FME Server.

7. Change the DNS of the old FME Server to a different, temporary URL. Doing so will allow you to update the DNS of the new FME Server to your production URL.

a. In the old values .yaml file, change the value of `deployment.hostname`.

b. Upgrade the Helm chart of the previous deployment.

```
helm upgrade --namespace <namespace-old-version> <helm-deployment-name> safesoftware/fmeserver-<FME-Server-version> -f <old-values-filename>
```

For example:

```
helm upgrade --namespace fmeserver-2021-2-1 fmeserver-2021-2-1 safesoftware/fmeserver-2021.2 -f values-2021.2.1.yaml
```

8. Update the DNS of the new FME Server to your production URL.

    a. In the new values .yaml file, change the value of `deployment.hostname`.

    b. Upgrade the Helm chart of the new deployment.

    ```
    helm upgrade --namespace <namespace-new-version> <helm-deployment-name> safesoftware/fmeserver-<FME-Server-version> -f <new-values-filename>
    ```

    For example:

    ```
    helm upgrade --namespace fmeserver-2021-2-2 fmeserver-2021-2-2 safesoftware/fmeserver-2021.2 -f values-2021.2.2.yaml
    ```

9. Verify that the upgraded FME Server works as expected. If you find issues, you can switch back the`deployment.hostname` values in the old and new values .yaml files so that your production URL points back to the old FME Server.

10. Remove the old version of FME Server.

    - Helm v2: `helm del --purge <helm-deployment-name>`
    - Helm v3: `helm uninstall <helm-deployment-name> -n <namespace_name>`

    For example:

    - Helm v2: `helm del --purge fmeserver-2021-2-1`
    - Helm v3: `helm uninstall fmeserver-2021-2-1 -n fmeserver-2021-2-1`

11. If your FME Server uses an external PostgreSQL database for the FME Server Database, drop the database for the old FME Server.

Upgrading to a Patch Build in Kubernetes

When an FME Server build is released, two tags are created for each component's image. For example, if the release version is 2021.2, these tags are named `2021.2` and `2021.2-20211029`, where `20211029` is the date the image was released.

The available tags for each FME Server component can be found on Dockerhub.

Patch Builds

Images of each build are patched periodically with security updates. When this occurs, each image is released again with the current date as a suffix to the build number (for example, `2021.2-20211030`). As well, the original tag (for example, `2021.2` is updated to refer to the most recently released version of the build. With this in mind, if it is preferable to lock down to a specific image and avoid updating to a patched version, use the timestamped tags. Otherwise, to always use the latest version of a build, use the non-timestamped tag (for example, `2021.2`).

To upgrade to a patched image in a Kubernetes deployment

1. Add the FME Server Helm repository and the values file that were initially used to deploy FME Server. Run:

   ```
   >> helm repo add safesoftware https://safesoftware.github.io/helm-charts
   ```

2. Update `fmeserver.image.tag` in the values file to the desired tag. Run:

   ```
   >> helm upgrade --namespace <namespace> safesoftware/fmeserver-<version> -f values.yml
   ```

See Also

- Upgrading a Kubernetes Deployment of FME Server

4

Upgrading FME Server

Full FME Server Upgrade

There are multiple approaches to upgrading your FME Server installation, each with advantages and disadvantages. Read below to decide which is right for you.

Upgrading to a Second Machine, Using a Different Host Name

Advantages

- Less risk because the FME Server configuration remains available from the old installation.
- The existing FME Server installation remains accessible.
- No DNS entry modification is required by your IT department.

Disadvantages

- Requires provision of additional machine.
- Users and applications must be updated to access FME Server through a different host name.

For procedure, click here.

Upgrading to a Second Machine, Using the Same Host Name

Advantages

- Less risk because the FME Server configuration remains available from the old installation.
- The existing FME Server installation remains accessible from the same host name without interruption.

Disadvantages

- Requires provision of additional machine.
- Requires DNS entry modification by your IT department.

For procedure, click here.

Upgrading In-Place, on the Same Machine

Advantages

- Does not require provision of additional machine.
- Does not require DNS entry modification by your IT department.

Disadvantages

- More risk because the FME Server configuration cannot be retrieved if the backup file is corrupted.
- The FME Server installation is inaccessible for a period of time.

For procedure, click here.

See Also

- FME Engine Only Upgrade

Upgrading to a Second Machine, Using a Different Host Name

> **Note** If the FME Server you are upgrading from was configured for HTTPS, you must reconfigure HTTPS after the upgrade is complete.

1. Provide a new machine for the upgrade.
2. Backup the FME Server configuration from the old machine.

> **Warning** If Encryption is enabled on the FME Server that is backed up, it must also be enabled on the FME Server that is restored, and use the same custom encryption key.

3. Install FME Server on the new machine. On the FME Server Hostname dialog, specify the new hostname.

   > **Note** If your FME Server installation includes an FME Server Database that is configured on your own database server, you must perform the step to *Configure the FME Server Database on a Separate Database Server* as part of installation. You cannot reuse the FME Server Database from a previous installation because the table schemas may differ from the upgraded version.

4. Restore the backed-up FME Server configuration to the new machine.
5. Test that your configuration has been migrated successfully.

   > **Note** Hardcoded paths to the previous host name in workspaces, transformers and HTTP push subscriptions must be manually updated.

6. Uninstall FME Server from the old machine (or recycle the machine).

Upgrading to a Second Machine, Using the Same Host Name

> **Note** If the FME Server you are upgrading from was configured for HTTPS, you must reconfigure HTTPS after the upgrade is complete.

1. Provide a new machine for the upgrade.
2. Note the host name you are using to access your currently-installed FME Server.

3. On the new machine, configure the hosts file so that this host name resolves to the new machine.

   Windows:

   1. In a text editor, open C:\Windows\System32\Drivers\etc\hosts
   2. Add a line like this: `<localhost_ip> <hostname>`

      For example: `127.0.0.1 fmeserver.com`

   Linux:

   1. In a text editor, open /etc/hosts
   2. Add a line like this: `<localhost_ip> <hostname> <hostname>`

      For example: `127.0.0.1 fmeserver.com fmeserver.com`

4. Backup the FME Server configuration from the old machine.

   > ⓘ **Warning** If Encryption is enabled on the FME Server that is backed up, it must also be enabled on the FME Server that is restored, and use the same custom encryption key.

5. Install FME Server on the new machine. On the FME Server Hostname dialog, specify the same host name as the previous installation.

   > **Note** If your FME Server installation includes an FME Server Database that is configured on your own database server, you must perform the step to *Configure the FME Server Database on a Separate Database Server* as part of installation. You cannot reuse the FME Server Database from a previous installation because the table schemas may differ from the upgraded version.

6. Restore the backed-up FME Server configuration to the new machine.

7. Test that your configuration has been migrated successfully by running a workspace from the Web User Interface in a browser on the new machine. Alternatively, if you want to test from a remote machine, you must temporarily configure the machine to route requests for the FME Server host to the new FME Server machine. Use the same procedure as step 3 above.
8. Instruct your IT department to switch the DNS setting for the host name so that it routes to the new machine instead of the old machine.
9. Uninstall FME Server from the old machine (or recycle the machine).

Upgrading In Place, On the Same Machine

> **Note** If the FME Server you are upgrading from was configured for HTTPS, you must reconfigure HTTPS after the upgrade is complete.

1. Back Up Configuration.

   > **Warning** If Encryption is enabled on the FME Server that is backed up, it must also be enabled on the FME Server that is restored, and use the same custom encryption key.

2. Verify the integrity of the backup by restoring the configuration to the existing FME Server. A successful restore indicates the backup is valid.
3. Uninstall FME Server.
4. Install the newer version.

> **Note** If your FME Server installation includes an FME Server Database that is configured on your own database server, you must perform the step to *Configure the FME Server Database on a Separate Database Server* as part of installation. You cannot reuse the FME Server Database from a previous installation because the table schemas may differ from the upgraded version.

5. Restore Configuration.

Back Up Configuration

> **Warning** If Encryption is enabled on the FME Server that is backed up, it must also be enabled on the FME Server that is restored, and use the same custom encryption key.

To back up an FME Server, perform the following:

1. Back up the FME Server configuration files.
2. Back up repository file versions, if applicable.
3. Back up the FME Server configuration .

> **Note** Before proceeding, be sure to note your product's serial number. It may be required when you restore the configuration to the upgraded FME Server. You can find the serial number on the Licensing page.

Back Up the FME Server Configuration Files

Before proceeding with the primary task of backing up your FME Server configuration, we recommend manually backing up the FME Server Configuration Files to a location outside of your FME Server installation directory, in case you need to refer to them later. These files contain configurations for the FME Server Database and miscellaneous settings for the Transformation and Repository Managers. These configurations are not included in the primary backup procedure. To restore any changes that were made in these files, you must be able to refer to them when the upgrade is complete, so that you can make the corresponding changes in the replacement file.

> **Warning** Configuration files from a backed-up FME Server are for reference only. Do not copy them to the corresponding directory of a restored FME Server.

Back up Repository Versions

If Version Control is enabled on the current FME Server, and it is *not* configured with a remote Git repository, previous versions of repository files are *not* available following an upgrade.

You can view all versions from the Repositories page (History), and download them as desired.

Back up the FME Server Configuration

The FME Server Web User Interface makes it easy to back up your FME Server. For information about what is included in a backup, see Which FME Server Configuration Components are Migrated?.

> **Note** Backing up job history is not supported.

To perform the backup, use the Web User Interface tool.

> **Note** To restore your configuration after you upgrade FME Server, see Restore Configuration.

Uninstall

To uninstall FME Server, complete the following steps:

1. Stop the FME Server System Services
2. Drop the FME Server Database (if required)

3. Uninstall FME Server

Stop the FME Server System Services

> **Note** Before proceeding, be sure to note your product's serial number. It may be required when you restore the configuration to the upgraded FME Server. You can find the serial number on the Licensing page.

For the uninstall process to complete properly, you must first stop the FME Server System Services, as well as any third-party web application and database services. For more information, see Starting and Stopping FME Server Manually.

If you have FME Server components installed on multiple machines, you must stop the services on all applicable machines. For example, if you have installed multiple FME Servers for fault tolerance, you must stop all services on their respective machines. Likewise, if you have FME Engines installed on multiple machines, you must stop the FME Server Engines service on all applicable machines.

To stop the web application server and database services depends on which ones you installed. If you installed FME Server using the Express option, you can use the instructions at Starting and Stopping FME Server Manually to stop these services as well. If you installed FME Server using a Distributed Installation, then you are using your own database server, and you may have opted to use your own web application server. To stop these services, refer to your product-specific documentation.

Drop the FME Server Database

If your installation of FME Server is a Fault-Tolerant installation, or a Distributed Installation in which the FME Server Database is configured on your own database server, you must drop the FME Server Database. Use one of the following sets of SQL scripts, depending on the server you are using to run the database:

> **Note** It is only necessary to drop the FME Server database. It is not necessary to uninstall the database server.

Microsoft SQL Server

Script location: `<FMEServerDir>\Server\database\sqlserver`

Scripts:

`sqlserver_dropUser.sql`
`sqlserver_dropDB.sql`

Oracle

Script location: `<FMEServerDir>\Server\database\oracle`

Scripts:

`oracle_dropUser.sql`

PostgreSQL

Script location: `<FMEServerDir>\Server\database\postgresql`

Scripts:

`postgresql_dropDB.sql`
`postgresql_dropUser.sql`

Uninstall FME Server

- On Windows, uninstall FME Server through the Control Panel.
- On Linux, run the uninstall.sh script in the FME Server installation directory. To ensure that everything gets uninstalled, run this script as root.

If you have FME Server components installed on multiple machines, you must uninstall the components on all applicable machines. For example, if you have installed multiple FME Servers for fault tolerance, you must uninstall FME Server from all machines. Likewise, if you have FME Engines installed on multiple machines, you must uninstall the FME Server Engines from all applicable machines.

If you installed FME Server by distributing components and opted to use your own web application server, it is not necessary to uninstall it. Instead, delete all folders and .war files from the web application installation directory that begin with "fme" (that is, are named like `fme*`).

Finally, if you installed FME Server using any Distributed/Fault Tolerant Installation, you must remove the FME Server System Share, assuming you have already performed a backup of FME Server, or upgraded FME Server to a second machine.

> **Note** On Linux, uninstalling removes the configuration of the following components, but does not uninstall them. They are reconfigured when FME Server is reinstalled. If you want to use the more current version of these components, remove them completely from the system before re-installing:
>
> - The PostgreSQL FME Server Database, if applicable.
> - The NGINX reverse proxy.

Install

Depending on the type of installation you want to perform and your operating system, perform the installation and licensing procedures provided in one of the following sections:

- Express Installation for Windows
- Express Installation for Linux
- Fault-Tolerant Installation
- Distributed Installation (2-tier)
- Distributed Installation (3-tier)

Restore Configuration

To restore an FME Server that you backed up previously, use the Restore tool in the FME Server Web User Interface.

FME Engine Only Upgrade

FME Engines are the component of FME Server that perform the actual data translations and transformations. At times, you might want to upgrade only your FME Engines and not any other FME Server components. For example, you might want to provide support for recently added formats or other newer functionality included in a new release, which requires only an upgrade of the FME Engines.

The procedures described in this section use the standard FME installer provided on the Safe Software web site, and can be performed with an official or beta release of the FME Engine installer.

Safe supports installing newer FME Engines, as long as the engines share the same major version/year as the current installation of FME Server. For example, on FME Server 2016.0, the FME Engines may be upgraded to 2016.1.3, but may *not* be upgraded to 2017.0.

Obtaining the Installer

Install the upgraded FME Engine in its own path rather than overwriting the existing FME Engine. This way, you can reverse the upgrade if required.

To upgrade only the FME Engine component when installing an FME Server environment, use a stand-alone FME Engine installer, not the FME Server installer, and follow these steps.

To obtain the appropriate FME Engine Installer, visit the FME Downloads page.

Install on Windows

To install FME Engine in a Windows environment

1. Run the FME installer on any computers that are running FME Engines that you want to upgrade.

   Be sure to leave the existing FME Engine in place as a backup:

   `<FMEServerDir>\Server\fme`

   and create a new directory for the upgraded FME:

   `<FMEServerDir>\Server\FMEEngineUpgrade`

2. You must license your new FME Engines

   For licensing instructions, see Licensing.

3. Open Windows Explorer.

4. Make a copy of the file `<FMEServerDir>\Server\FMEEngineUpgrade\fme.exe`, place that copy in the same `<FMEServerDir>\Server\FMEEngineUpgrade` directory, and rename it `FMEEngine.exe`.

5. Edit the `<FMEServerDir>\Server\processMonitorConfigEngines.txt` file.

   Look for lines that start FME Engines, such as the following:

   ```
   TEMPLATE_START_ENGINE="C:/apps/FMEServer/Server/fme/FMEEngine.exe"
   ```

   and change the path to the new FME, for example:

   ```
   TEMPLATE_START_ENGINE="C:/apps/FMEServer/Server/FMEEngineUpgrade/FMEEngine.exe"
   ```

6. Restart FME Server.

7. To confirm that you are using the upgraded FME Engine from the new path and that you are using the FME build that you require, check the process monitor engine log (fmeprocessmonitorengine.log) on any computer running an FME Engine.

   In the log, you should see your new FME Engine path and build number reflected in the FME Start-up sections.

Install on Linux

1. Stop FME Server.
2. Move the currently-installed engines to a different directory. For example:

   ```
   mv /opt/fme-engine-2016 /opt/fme-engine-2016-old
   ```

3. Perform the installation according to your Linux environment:

   ### Debian (Ubuntu)

   ### Using a GUI:

   Double-click on the .deb install package, and follow the package manager to install FME Engines.

Using the command line:

Run the following commands under the root account:

```
apt install gdebi-core
gdebi <installer_filename>.deb
```

For example:

```
apt install gdebi-core
gdebi fme-engine-2016_2016.0-16136_amd64.deb
```

Fedora (RedHat, CentOS)

Using a GUI:

Double-click on the .rpm install package, and follow the package manager to install FME Engines.

Using the Command Line:

Run the following command under the root account:

```
yum install <installer_filename>.rpm
```

For example:

```
yum install fme-engine-2016_2016.0-16136_amd64.rpm
```

4. Start FME Server.
5. Use the Engines page to confirm that you are using the upgraded FME Engines. Under "Engines" verify that the "Build" number matches the build number of the filename for the Engines you have installed.

To Undo an Engine Upgrade

1. Run the following command under the root account to uninstall the newer FME Engine package:

Debian (Ubuntu)

```
apt remove <fme_engine_version>
```

For example:

```
apt remove fme-engine-2016
```

Fedora (RedHat, CentOS)

```
yum remove <fme_engine_version>
```

For example:

```
yum remove fme-desktop-2016
```

2. Move the older FME Engines back to the current directory. For example:

```
mv /opt/fme-engine-2016-old /opt/fme-engine-2016
```

Upgrading a Kubernetes Deployment of FME Server

With little downtime, you can upgrade a Kubernetes deployment of FME Server to a later version using the following procedure:

- Launch a new FME Server of the desired build version in a new namespace.
- Backup the current FME Server and restore it to the new FME Server.
- Update the ingress hostname from the old FME Server to the new FME Server.
- Remove the old FME Server.

Warning You may have Schedules, Automations workflows, or Notifications that would conflict with themselves during the time that both the new and old FME Servers are running. Disable these tools before proceeding with a backup.

Note See also Upgrading to a Patch Build in Kubernetes.

Performing the Upgrade

1. Create a new namespace for the new version of FME Server:

   ```
   kubectl create namespace <namespace-new-version>
   ```

   For example:

   ```
   kubectl create namespace fmeserver-2021-2-2
   ```

2. If your FME Server uses an external PostgreSQL database for the FME Server Database, copy the admin password secret, using the namespace of the current version of FME Server, to the new version. (If your FME Server uses the PostgreSQL container that is deployed with the Helm chart, skip this step.)

   ```
   kubectl get secret postgresql-admin-password --namespace
   <namespace-old-version> --export -o yaml | kubectl apply --
   namespace=<namespace-new-version> -f -
   ```

   For example:

   ```
   kubectl get secret postgresql-admin-password --namespace
   fmeserver-2021-2-1 --export -o yaml | kubectl apply --
   namespace=fmeserver-2021-2-2 -f -
   ```

3. Make a copy the values .yaml file for the current FME Server and update the following values:
   - `deployment.hostname`: Set to a temporary hostname. (You will reset it later in this procedure.)
   - `fmeserver.image.tag`: Set to the container image tag you want to deploy for the upgraded FME Server.
   - If your FME Server uses an external PostgreSQL database for the FME Server Database, set the following values to be different from the ones in use for the current FME Server:
     - `fmeserver.database.name`
     - `fmeserver.database.username`

4. Update your Helm repository:

```
helm repo update
```

5. Deploy FME Server in the new namespace using Helm and the updated values .yaml file.

   ```
   helm install --namespace <namespace-new-version> -n <helm-deployment-name> safesoftware/fmeserver-<FME-Server-version> -f <new-values-filename>
   ```

   For example:

   ```
   helm install --namespace fmeserver-2021-2-2 -n fmeserver-2021-2-2 safesoftware/fmeserver-2021.2 -f values-2021.2.2.yaml
   ```

6. From the FME Server Web User Interface, perform the following:
   1. License FME Server.
   2. Backup the old FME Server.
   3. Restore the backup to the new FME Server.
7. Change the DNS of the old FME Server to a different, temporary URL. Doing so will allow you to update the DNS of the new FME Server to your production URL.
   1. In the old values .yaml file, change the value of `deployment.hostname`.
   2. Upgrade the Helm chart of the previous deployment.

      ```
      helm upgrade --namespace <namespace-old-version> <helm-deployment-name> safesoftware/fmeserver-<FME-Server-version> -f <old-values-filename>
      ```

      For example:

      ```
      helm upgrade --namespace fmeserver-2021-2-1 fmeserver-2021-2-1 safesoftware/fmeserver-2021.2 -f values-2021.2.1.yaml
      ```

8. Update the DNS of the new FME Server to your production URL.
   1. In the new values .yaml file, change the value of `deployment.hostname`.
   2. Upgrade the Helm chart of the new deployment.

```
helm upgrade --namespace <namespace-new-version> <helm-
deployment-name> safesoftware/fmeserver-<FME-Server-version> -
f <new-values-filename>
```

For example:

```
helm upgrade --namespace fmeserver-2021-2-2 fmeserver-2021-2-2
safesoftware/fmeserver-2021.2 -f values-2021.2.2.yaml
```

9. Verify that the upgraded FME Server works as expected. If you find issues, you can switch back the`deployment.hostname` values in the old and new values .yaml files so that your production URL points back to the old FME Server.
10. Remove the old version of FME Server.
    - Helm v2: `helm del --purge <helm-deployment-name>`
    - Helm v3: `helm uninstall <helm-deployment-name> -n <namespace_name>`

    For example:

    - Helm v2: `helm del --purge fmeserver-2021-2-1`
    - Helm v3: `helm uninstall fmeserver-2021-2-1 -n fmeserver-2021-2-1`
11. If your FME Server uses an external PostgreSQL database for the FME Server Database, drop the database for the old FME Server.

5

Optimizing FME Server

Configuring the Number of FME Engines to Start

FME Engines connect to an FME Server Core and process requests from the Core. Adding FME Engines to start with the Core provides these benefits:

- Increases the Core's ability to perform concurrent processing of requests.
- Helps with Job Recovery.

The number of licensed FME Engines you can add is limited only by the host's CPU and memory resources, which constrain the maximum concurrent request throughput.

By default, FME Server is configured to start two FME Engines, if two licenses are available. If only one license is available, only one FME Engine starts.

To add or remove FME Engines to Start

Open the Engines page of the Web User Interface, and follow the steps under Configuring the Number of FME Engines to Start.

Adding FME Engines on a Separate Machine

> **Warning** This topic applies only to traditional FME Server installations. If your FME Server runs in a containerized environment, such as Docker Compose or a Kubernetes cluster, this architecture is not supported.

- ***Skill Level***: Intermediate
- ***Estimated Time Required***: 30-45 minutes
- ***Prerequisites***:
  - Existing Distributed FME Server installation.
  - Access to system, network, and FME Server administrators.

You can add processing capacity to your FME Server by installing additional FME Engines on a separate computer from the FME Server Core.

When adding FME Engines, keep in mind the following:

- Adding FME Engines that do not match the primary release version of the FME Server Core is not supported. The primary release version refers to the first decimal value following the release year. For example, if the release version of the FME Server Core is 2020.0, FME Engines from release versions 2020.0.1 or 2020.0.2 are supported. However, FME Engines from release versions 2020.1 or 2021 are not supported.
- We recommend installing all FME Engines on systems that are synchronized to the same time zone as other FME Engines and the FME Server Core. If time zones differ, unexpected issues may arise, including:
  - Difficulty accessing the FME Server Web User Interface.
  - Improper timing of Schedule Initiated triggers.
  - Inconsistent or misleading timestamps in log files (accessed from Resources).

  For more information, see About Times and Time Zones.

In the instructions below, the computer that hosts the FME Server Core is the *<coreHost>*.

> **Note** In a fault-tolerance environment, we recommend assigning unique names to FME Engines. However, if multiple FME Engine hosts have the same FME Engine name, the queue server configuration applies to all FME Engines with the same name in the same way regardless of which host it resides on. For more information, see Job Queues.

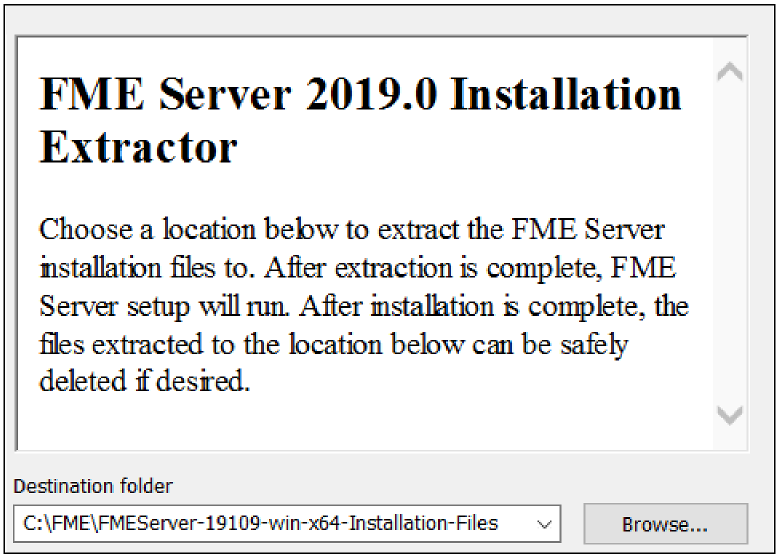
Windows

1. Obtain the Installer. Be sure to obtain the FME Server Installer (not the Engine Installer).
2. Start the installer on another computer (*<engineHost>*).

3. On the Installation Extractor dialog, specify a *Destination folder* in which to extract installation files. Note that this folder *only* specifies where installation files are extracted—it does *not* specify where FME Server program files are installed. That location is specified later in the installer.

   Tip Take note of the specified *Destination folder* location. Following installation, you may wish to:

   - Review the installation .log file.
   - Remove these files. Doing so saves almost 2 GB disk space.

   FME Server 2019.0 Installation Extractor

   Choose a location below to extract the FME Server installation files to. After extraction is complete, FME Server setup will run. After installation is complete, the files extracted to the location below can be safely deleted if desired.

   Destination folder: C:\FME\FMEServer-19109-win-x64-Installation-Files

   Click **Install**.

   When extraction is complete, the installer opens. Proceed through the installer to the Choose Setup Type dialog.

4. On the Choose Setup Type dialog, select the Distributed Engine setup type.
5. On the Destination Folder dialog, specify the directory to install the FME Engines.
6. On the User Account page, specify the Windows user account that will run the <engineHost>. This account must have:

- Read/Write access to the FME Server System Share that you specify in the next dialog. The System Share is the location where FME Server stores Repositories and Resources files.
- Read/Write access to the FME Server installation directory that you specified in the previous dialog.
- "Log on as a service" rights on the `<engineHost>`. For more information, see this Microsoft Docs article.

7. On the Existing FME Server System Share dialog, provide the UNC path to the FME Server System Share directory.

   If the <*coreHost*> machine is an Express installation of FME Server, the System Share is written, by default, to %ALLUSERSPROFILE% \Safe Software\FME Server\, unless specified otherwise.

   > **Note** Unless modified, C:\ProgramData is the default value of the %ALLUSERSPROFILE% environment variable.

   In all cases, enter the UNC path to the System Share, including the final `Safe Software\FME Server` directories, which are created by default. For example, `\\MyServer\Safe Software\FME Server`.

8. On the FME Server Hostname dialog, enter the hostname of the <coreHost> computer.
9. On the Database Server Type dialog, specify the database type that you specified when installing the FME Server Core. If you specified a database other than the "FME Server Database," enter the connection parameters in the next dialog.
10. On the Database User dialog, specify the user name and password for the FME Server Database that you specified when installing FME Server.
11. Complete the remaining dialogs of the FME Server Installer.

12. If this `<engineHost>` is connecting to a `<coreHost>` that also hosts the built-in FME Server database and the initial FME engines, as with an Express Installation, allow the necessary connection to this machine:

    a. On the `<coreHost>`, open file pg_hba.conf, located in %ALLUSERSPROFILE%\Safe Software\FME Server\pgsql\data.

    > **Note** Unless modified, C:\ProgramData is the default value of the %ALLUSERSPROFILE% environment variable.

    b. Change the following lines:

    ```
    host   all     all     127.0.0.1/32     md5
    host   all     all       ::1/128        md5
    ```

    to:

    ```
    host   all     all 0.0.0.0/0        md5
    host   all     all    ::/0             md5
    ```

    c. Restart the FME Server Database and FME Server Engines services.

13. If the `<coreHost>` machine was an Express Installation of FME Server, complete the following steps on the `<coreHost>` to configure the FME Server Web Services:

    a. Open the corresponding propertiesFile.properties file for the Data Download, Data Streaming, Job Submitter, and Notification services, located at <*FMEServerDir*>\Utilities\tomcat\webapps\<*service_name*>\WEB-INF\conf\propertiesFile.properties.

       For example, the properties file for the Data Download Service is at <*FMEServerDir*>\Utilities\tomcat\webapps\fmedatadownload\WEB-INF\conf\propertiesFile.properties

    b. For each properties file, locate the parameter REQUEST_DATA_DIR and change the value from a local file system path (for example, `C:/ProgramData/Safe Software/FME Server//resources/system/temp/requestdata`) to a UNC path that references the <coreHost> (for example, `//MyHost/FME Server/resources/system/temp/requestdata`).

> **Note** Use forward slashes only.

c. After saving the changes in the properties file for each service, restart the FME Server Application Server service.

14. On the *<coreHost>* machine, open configuration file fmeServerConfig.txt, located in <FMEServerDir>\Server\, and update the FME_SERVER_HOST_NAME parameter to a value that fully resolves to the IP address of the <coreHost> machine.
15. Restart the FME Server Core service.

Linux

1. If not already accomplished, mount the directory that holds the FME Server System Share. (The System Share holds FME Server Repositories and Resources):

   ```
   sudo mount -t nfs <coreHost>:/<FMEServerSystemShare> /<mntPath>
   ```
2. Obtain the Installer. Be sure to obtain the FME Server Installer (not the Engine Installer).
3. Start the FME Server Installer:

   ```
   sudo ./<installationFile>
   ```
4. From the setup type list, choose `Engine`.
5. The installer prompts you for a location to install the FME Server Engine components. This can be on the local machine.
6. The installer prompts you for the name of the *<coreHost>*. In a fault-tolerant installation, the primary *<coreHost>* should always be specified. Do not specify the failover host.

7. The installer prompts you for the FME Server System Share location. Enter the mounted directory created in step 1.
8. Enter the database type you specified when installing the FME Server Core. If you specified a database other than the "FME Server Database", enter the connection parameters.
9. Enter the user name and password for the FME Server Database that you specified when installing FME Server.
10. Complete the remaining dialogs of the FME Server Installer.
11. Manually start FME Server, and configure it to start automatically.
12. If this `<engineHost>` is connecting to a `<coreHost>` that also hosts the built-in FME Server database and the initial FME engines, as with an Express Installation, allow the necessary connection to this machine:

    a. On the `<coreHost>`, open file pg_hba.conf, located in <*FMEServerDir*>\Utilities\pgsql\data\.

    b. Change the following lines:

    ```
    host   all     all    127.0.0.1/32     md5
    host   all     all     ::1/128         md5
    ```

    to:

    ```
    host   all     all 0.0.0.0/0        md5
    host   all     all    ::/0             md5
    ```

    c. Restart the FME Server Database and FME Server Engines services.

13. Ensure that the user account that runs `<engineHost>` has the necessary permissions to access the FME Server System Share and the FME Server install directory. For more information, see Directory and Account Permissions.
14. On the `<coreHost>` machine, open configuration file fmeServerConfig.txt, located in <*FMEServerDir*>\Server\, and update the FME_SERVER_HOST_NAME parameter to a value that fully resolves to the IP address of the `<coreHost>` machine.

15. Restart the FME Server Core service.

Verify the Installation

The installation on `<engineHost>` starts two FME Engines by default. The FME Engines start and register with the FME Server Core running on `<coreHost>`. All licensed engines are listed on the Engines page of the Web User Interface.

> **Note** You may have to disable any firewalls that are running on this computer.

You can also use the Engines & Licensing page to perform the following tasks:

- To license FME Engines, see Licensing.
- If you want this computer to start more or less FME Engines, see Configuring the Number of FME Engines to Start.

For more information, see Verify the Installation.

Changing the Database Provider for the FME Server Database

To change the database provider for the FME Server Database, perform an "in-place" backup and restore procedure:

1. Backup Your FME Server Configuration
2. Configure the New Database Server
3. Configure the Database Connection
4. Restart FME Server
5. Restore Your FME Server Configuration
6. Remove Dependency, Disable, and Stop the Previous Database Service

FME Server supports PostgreSQL, SQL Server, or Oracle databases.

Backup Your FME Server Configuration

Perform a backup of your FME Server configuration.

Configure the New Database Server

Run the necessary database configuration scripts and post-configuration scripts. Follow the steps in Configure the FME Server Database on a Separate Database Server.

Configure the Database Connection

> **Note** If using an Oracle database server, you must obtain the Oracle Database JDBC driver. Driver versions recommended: 12.1 (ojdbc7.jar), 12.2 (ojdbc8.jar), 18.3 (ojdbc8.jar), 19.3 (ojdbc8.jar). Driver versions *not* recommended: 19.6, 19.7, all ojdbc10.jar versions. For more information, see https://www.oracle.com/technetwork/database/application-development/jdbc/downloads/index.html.

1. Encrypt the database password you generated in the previous step. In an initial installation of FME Server, this password is encrypted in installation files by default. However, it is no longer encrypted when the database server is updated. Follow the procedure in Encrypting the FME Server Database Password.
2. Locate the fmeDatabaseConfig.txt configuration file.
3. Under the heading ‘FME SERVER SETTINGS START’, locate the section titled 'Database Connection' and update the parameters for the database you want to use for your repository.

   ### Parameters

   DB_TYPE - Identifies the database server: postgresql, sqlserver, oracle.

   DB_DRIVER - The JDBC driver name used for connecting to the database.

   DB_JDBC_URL - The JDBC URL used for connecting to the database.

DB_USERNAME - The database user name.

DB_PASSWORD - The database user password.

DB_CONNECT_EXPIRY - The database connection expiry time, in seconds.

DB_SQLSTMTS_PATH - The path to the SQL statement resource bundle.

Examples

Example - PostgreSQL

```
DB_TYPE=postgresql
DB_DRIVER=org.postgresql.Driver
DB_JDBC_URL=jdbc:postgresql://localhost:5432/fmeserver
DB_USERNAME=fmeserver
DB_PASSWORD=fmeserver
DB_CONNECT_EXPIRY=60
DB_SQLSTMTS_PATH=C:/Apps/FMEServer/Server/database
```

Examples - SQL Server

To use a local installation of SQL Server Express

```
DB_TYPE=sqlserver
DB_DRIVER=com.microsoft.sqlserver.jdbc.SQLServerDriver
DB_JDBC_URL=jdbc:sqlserver://localhost/SQLEXPRESS
DB_USERNAME=fmeserver
DB_PASSWORD=$FMEserver
DB_CONNECT_EXPIRY=60
DB_SQLSTMTS_PATH=C:/Apps/FMEServer/Server/database
```

To use a named instance of a SQL Server

Specify the `instanceName` property with the `DB_JDBC_URL` parameter:

```
DB_TYPE=sqlserver
DB_DRIVER=com.microsoft.sqlserver.jdbc.SQLServerDriver
```

```
DB_JDBC_
URL=jdbc:sqlserver://<
ServerName>;databaseName=<database>;instanceName=<InstanceName>
DB_USERNAME=fmeserver
DB_PASSWORD=$FMEserver
DB_CONNECT_EXPIRY=60
DB_SQLSTMTS_PATH=C:/Apps/FMEServer/Server/database
```

To use a domain service account instead of a named database user or ***fmeserver*** (the default database username)

Complete the following steps:

1. Specify the `integratedSecurity` property with the `DB_JDBC_URL` parameter. FME Server uses the *Log on as* credentials of the FME Server Core and FME Server Application Server services to connect to the SQL Server database. Do not set the `DB_USERNAME` or `DB_PASSWORD` parameter values.

   ```
   DB_TYPE=sqlserver
   DB_DRIVER=com.microsoft.sqlserver.jdbc.SQLServerDriver
   DB_JDBC_
   URL=jdbc:sqlserver://<
   ServerName>;databaseName=<database>;integratedSecurity=true
   DB_USERNAME=
   DB_PASSWORD=
   DB_CONNECT_EXPIRY=60
   DB_SQLSTMTS_PATH=C:/Apps/FMEServer/Server/database
   ```

2. Go to directory <*FMEServerDir*>\Server\fme\ and complete the following:
   a. Locate the file with a name that begins mssql-jdbc-auth*.dll
   b. Copy the file to the <*FMEServerDir*>\Server\lib\fmeutil\ directory.
   c. In the <*FMEServerDir*>\Server\lib\fmeutil\ directory, rename the file to sqljdbc_auth.dll

To specify the database connection port

Specify the port after `<ServerName>` in the `DB_JDBC_URL` parameter. For example:

```
DB_JDBC_URL=jdbc:sqlserver://<ServerName>;port=1755;
```

To specify an Always On availability group

If using an Always On availability group, include the `MultisubnetFailover` property with the `DB_JDBC_URL` parameter:

```
DB_JDBC_
URL=jdbc:sqlserver://<
ServerName>;databaseName=<database>;MultisubnetFailover=true
```

Examples - Oracle

To specify an on-premise database with a System ID (SID)

Use the following syntax for the `DB_JDBC_URL` parameter:

```
DB_JDBC_URL=jdbc:oracle:thin:@<host>:<port>:<sid>
```

For example:

```
DB_TYPE=oracle
DB_DRIVER=oracle.jdbc.driver.OracleDriver
DB_JDBC_URL=jdbc:oracle:thin:@localhost:1521:orcl
DB_USERNAME=fmeserver
DB_PASSWORD=fmeserver
DB_CONNECT_EXPIRY=60
DB_SQLSTMTS_PATH=C:/Apps/FMEServer/Server/database
```

To specify an on-premise database with a service name

Use the following syntax for the `DB_JDBC_URL` parameter:

```
DB_JDBC_URL=jdbc:oracle:thin:@<host>:<port>/<servicename>
```

For example:

```
DB_JDBC_URL=jdbc:oracle:thin:@hostname.mydomain.com:1521/mydatabase1
```

To specify an Oracle Cloud database

Use the following syntax for the `DB_JDBC_URL` parameter:

```
DB_JDBC_URL=jdbc:oracle:thin:@<ip>:<port>/<servicename>
```

For example:

```
DB_JDBC_URL=jdbc:oracle:thin:@129.44.44.2:1521/orcl_
iad2fd.mycorpz1.mycorp.myvcn.com
```

Restart FME Server

Restart all of the FME Server System Services.

Restore Your FME Server Configuration

Perform a restore of your FME Server configuration:

Remove Dependency, Disable, and Stop the Previous Database Service

If the database service from which you migrated is the PostgreSQL database that was included in a default installation of FME Server (such as an express install), you must remove the dependency of the FME Server Core on that database, and then disable and stop it. For more information, see Removing the FME Server Core Dependency on the FME Server Database.

Removing the FME Server Core Dependency on the FME Server Database

You may need to disable and stop the service of the PostgreSQL database that is included in a default installation of FME Server (known as the "FME Server Database"). A common reason for performing this action is after Changing the Database Provider for the FME Server Database. However, shutting down the old FME Server Database also attempts to shut down the FME Server Core, unless this service dependency is removed.

1. Remove the Dependency of the FME Server Core on the FME Server Database
   a. Open a Command Prompt as administrator (Start Menu > Command Prompt > right click and select "Run as administrator").
   b. Type the following command into the Command Window and press Enter.

      ```
      sc config "FME Server Core" depend= /
      ```
2. Disable and Stop the FME Server Database
   a. Open the Windows Services (Control Panel > Administrative Tools > Services)
   b. Open the FME Server Database service.
   c. In the Properties dialog, change *Startup Type* to **Disabled**.
   d. Under *Service status*, click **Stop**.
   e. Click **Apply**.

Moving the Web Applications Server to Another Machine

To improve performance and free up resources, you may wish to move the web applications server, which runs the FME Server Web Services, to another machine.

> ⓘ **Warning** We recommend installing the web application server on a system that is synchronized to the same time zone as the FME Server Core. Differing time zones may result in improper timing of Schedule Initiated triggers.

This move requires the following steps:

1. Install a web applications server on the new host machine (optional)
2. Install the FME Server Web Services on the new host
3. Update Services URLs
4. Configure CORS filters (optional)

Install a web applications server on the new host machine (optional)

To run the FME Server Web Services, you can use the Apache Tomcat web application server that is automatically provided when you install the services. In this case, skip this step and proceed to the next step.

Alternatively, you can install and use your own web application server for running the FME Server Web Services. Supported web applications servers include Apache Tomcat and Oracle WebLogic.

You must know the port number on which your web application server receives incoming requests and the path to the directory where your web application server stores web application `.war` files. (This directory is sometimes called `webapps`.)

Install the FME Server Web Services on the new host

On the new web applications server host, follow the instructions under Install the FME Server Web Services, for either Windows or Linux.

Update Services URLs

On the machine hosting the FME Server Core:

1. Open the fmeServerConfig.txt configuration file.

   Locate the FME_SERVER_WEB_URL directive and update the URL value to the new web applications server host. For example:

   ```
   FME_SERVER_WEB_URL=http://MY_WEBAPP_HOST:80
   ```
2. Open the FME Server Web User Interface.
   a. Login and navigate to Services.
   b. Click on each service to open the Editing Service page.
   c. In the URL Pattern field, update the URL value to the new web applications server host, and click OK when done.

      For example, to update the Data Download Service:

      ```
      http://MY_WEBAPP_HOST/fmedatadownload
      ```

Configure CORS filters (optional)

If you are a web application developer, you may want to configure Cross-Origin Resource Sharing (CORS) filters, so that your application can bypass manual authentication when accessing the FME Server Web Services on another domain.

See Also

- Changing the Web Application Server Host Name and Port

Using a Reverse Proxy with FME Server

A reverse proxy forwards requests from the internet or intranet to a server that fulfills the requests. Often a reverse proxy configured with SSL provides a secure entry point into a network through a DMZ.

The instructions for configuring your reverse proxy depend on the brand of web server or other product you select to fill this role.

Use these instructions to:

1. Set up your reverse proxy to route traffic to FME Server.
2. Configure FME Server to recognize the reverse proxy URL.

Set Up the Reverse Proxy

Routing Traffic to the FME Server Web Services

Recommended

- Route two-way traffic between the FME Server Core, FME Server Web Services, and the reverse proxy.

Optional

- Configure timeouts for client- and server-side inactivity. When configuring timeouts, consider that longer timeouts on the server are appropriate for time-consuming operations, particularly running workspaces that take a long time to complete.

Routing Traffic to the WebSocket Server

An FME Server WebSocket Server runs on each FME Server instance, but only one WebSocket Server should be used at a time. The WebSocket Server is used mainly for Notification Service Topic Monitoring.

Required

- Route traffic on port 7078 to one WebSocket Server, and switch to others if the one in use fails. If the reverse proxy does not support automatic failover to backup servers, then manual intervention is required to route to a healthy WebSocket Server.

Recommended

- Set longer client- and server-side timeouts to allow for longer WebSocket connections.

Configure FME Server with the Reverse Proxy URL

To configure FME Server to recognize the reverse proxy URL, perform the following tasks in the FME Server Web User Interface:

Update Service URLs

- On the Services page, click **Change All Hosts**. In the Change All Hosts dialog, enter the public reverse proxy URL, and click **OK**.

Update Topic Monitoring URL

1. On the Network & Email page, expand Topic Monitoring.
2. Under Fault Tolerant Configuration, update the *Internal WebSocket URL* field with the public reverse proxy URL. Automations external actions (and Notification Service Subscribers) use this URL to communicate with the FME Server WebSocket Server. The reverse proxy URL redirects requests to the active WebSocket Server.
3. If necessary, update Advanced Routing settings:

- *External WebSocket Host*: The reverse proxy name. For example:

  ```
  fme-server-reverseproxy
  ```

  This setting does not likely need to be changed, and should only be set if you use separate hosts to route HTTP and Websocket traffic to FME Server.

- *External WebSocket Port*: If the WebSocket Server is accessed through a port other than 7078, specify the port number here. Otherwise, leave blank.

4. Click **Save**.

Update Reset Password URL (Optional)

If you plan to enable the Reset Password feature, update the *Public URL* field on the Reset Password page with the public reverse proxy URL, and click **Save**.

6

Securing FME Server

Security Basics

To get started with FME Server security, there are three main tasks to perform:

- Configuring Role-Based and User-Based Access Control
- Configuring Authentication for the FME Server Web Services
- Configuring for HTTPS

Role-Based and User-Based Access Control

FME Server security is based on two primary concepts:

- ***Users***: The individual accounts that access FME Server. When FME Server is installed for the first time, default user accounts are created. Note that the default *Status* of these accounts, except the **admin** account, is **Disabled**.
- ***Roles***: Comprised of one or more users.

FME Server security controls access to resources either through *role-based* or *user-based* access.

Optionally, you can incorporate your organization's directory server (for example, Windows Active Directory) groups and users into your FME Server security configuration.

Role-Based Access

Roles make it easy to assign the same set of permissions to multiple users based on job function. Permissions to perform certain operations are assigned to specific roles. In turn, these permissions apply to the users who belong to that role.

For example, a request by user `user1` could be to run a workspace in the Samples repository for the Data Download Service. FME Server security grants access if any of the roles to which `user1` is assigned has permission to run workspaces in the Samples repository, and also has access to the Data Download Service.

FME Server provides a set of default roles:

Click to view default roles

Role	Description	User
fmeadmin	Provides full access to FME Server, including the Web User Interface.	admin
fmeauthor	Provides workspace authors access to FME Server to publish, author, and test new workspaces.	author
fmeguest	Provides unauthenticated access to run jobs via Web Service URLs.	guest
fmesuperuser	Authorized to access all resources of FME Server, including existing and newly-created resources.	admin
fmeuser	Provides users access to the Web User Interface and Web Services.	user

On the Roles page of the Web User Interface, an administrator can:

- Create and remove roles.
- Configure users in roles.
- Configure permissions of roles.

On the Active Directory page of the Web User Interface, an administrator can integrate the organization's Windows Active Directory, LDAP, or other directory server groups and users into its FME Server security configuration.

User-Based Access

Another way for FME Server to determine if a user can access a resource is whether the user owns it, or has been given permissions on it.

User Ownership

Anything a user creates in FME Server, such as a repository, is owned by that user. When you own something, you have full permissions on it. This permission supersedes the permissions you have on other items in FME Server based on the role to which you belong.

Additionally, as an owner, you can:

- Share permissions on the items you own with other users or roles.
- Assign ownership of something to another user. To change ownership of an item, edit it from the Items page.

User Permission

Users can be granted permissions on resources, and these permissions may supersede the permissions available to them through their role. (In fact, it is not even necessary for a user to belong to a role.)

On the Users page of the Web User Interface, an administrator can:

- Create and remove users.
- Configure users in roles.
- Configure permissions of users.

On the Active Directory page of the Web User Interface, an administrator can integrate the organization's Windows Active Directory, LDAP, or other directory server users and groups into its FME Server security configuration.

Shared Access

Through sharing, users can grant different levels of access to items in FME Server to other users or roles. A user can share an item if their account is enabled for sharing, and either of the following is true:

- The user owns the item.
- The user has Manage permission in User Management (usually granted to an administrator).

About the Trusted User Account

A special account, referred to as the trusted account, can be used to provide unauthenticated access to any component. By default, this trusted account is named **guest** and is assigned to the **fmeguest** role. By default, the **fmeguest** role is configured to allow unauthenticated access to the FME Server Web Services. This means it is possible to invoke a service URL without providing any credentials.

> **Note**
>
> » The *Status* of the **guest** user account is **Disabled** by default.
>
> » If you want all of the FME Server Web Services to prompt for authentication, remove the **guest** account after you configure your own set of users and access control for your FME Server.

To change the user name and password of the trusted account for a service:

1. Configure the `DEFAULT_USER_ID` and `DEFAULT_PASSWORD` parameters in the propertiesFile.properties file for each service. If your FME Server installation uses the built-in Apache Tomcat servlet, these files are located under:

   `<FMEServerDir>\Utilities\tomcat\webapps\<service>\WEB-INF\conf\propertiesFile.properties`

2. Applying the same settings as above, update the name and password of the account on the Users page.

See Also

- Configuring Authentication for the FME Server Web Services
- Authentication and Authorization

Default User Accounts and Passwords

The FME Server installer creates the following user accounts by default:

> **Note** The default *Status* of these accounts, except the **admin** account, is **Disabled**.

Username/Password	Description	Default Status	Role
admin/admin	Access to all FME Server resources. **Note** You are prompted to update the `admin` password upon initial use, based on the default Password Policy configuration.	Enabled	fmeadmin, fmesuperuser
author/author	An account intended for FME Workbench authors.	Disabled	fmeauthor
guest/guest	An account that provides unauthenticated access to the FME Server Web Services.	Disabled	fmeguest
user/user	An account intended for the FME Server Web User Interface.	Disabled	fmeuser

See Also

- Changing the Login Password
- Role-Based and User-Based Access Control

Configuring Authentication for the FME Server Web Services

All workspaces that are run from FME Server use at least one of the FME Server Web Services, and these services must authenticate with the user account that requests them. The user account must have Run permission on the repository in which the workspace resides, and Access permission to the service.

Depending on your security requirements, you may want to configure authentication for the FME Server Web Services using the following options.

Authenticating with Tokens

A token can provide the credentials required for authentication. We recommend using tokens in conjunction with user accounts that have only the required permissions for their service requests to succeed, and no additional permissions.

Removing the Authentication Requirement

In some cases, you may want to remove the authentication requirement for a given repository and service. You can use this approach with the data download, data streaming, job submitter, KML network link, and data upload services. You can provide unauthenticated access either through the **guest** user account, or Directory Server accounts.

Using the guest User Account

You can provide unauthenticated access to a web service simply by providing the **guest** user account with access to the repository of the workspace you want to run. This scenario is possible because the **guest** user account acts as a trusted account in FME Server, and by default, already has full access to the web services. Whenever a user's account credentials fail to authenticate with a web service, FME Server attempts to authenticate with the **guest** user. Therefore, if the **guest** user is given Run permission on the repository of the workspace being run, authentication succeeds. Configure **guest** user permissions on the Users page.

> **Note** By default, the *Status* of the **guest** user account is **Disabled**.

Using Directory Server Accounts

If you have imported Active Directory accounts into FME Server as users, you can provide those accounts with access to repositories and services. Configure directory server user permissions on the Users page. Alternatively, if your directory server accounts belong to roles, you can configure role access on the Roles page.

See Also

- Authentication and Authorization

Configuring for HTTPS

> **Note** The task described here should be undertaken by advanced users only. Before proceeding, consider your options for alternative solutions until you are certain you wish to proceed. For additional resources, consult the FME Community or FME Support.

- ***Skill Level***: Advanced
- ***Estimated Time Required***: 45-60 minutes
- ***Prerequisites***:
  - Test jobs and services to ensure FME Server is fully functional. For more information, see Verify the Installation
  - Familiarity with the Certificate Authority (CA) instructions from your certificate provider, particularly for generating the Certificate Signing Request (CSR).

- (Recommended) Familiarity with your web application server's SSL configuration and certificates. (Apache Tomcat is the servlet for an Express or Fault-Tolerant installation of FME Server, and as an option with certain Distributed installations.)
- (Recommended) Access to the person who generates your certificates.

> **Note** If using Microsoft IIS Application Request Routing (ARR), refer to this FME Community article.

Configuring for HTTPS

HTTPS ensures that communication between the client and server is encrypted, so that if it is intercepted, a third party cannot easily view or use the information. You can use HTTPS with FME Server to ensure that sensitive login information is not exposed.

The following are two supported methods for securing FME Server with HTTPS. For alternative methods, such as using a self-signed certificate, see Configuring FME Server for HTTPS in the FME Community.

> **Note** The following instructions provide steps for setting up SSL for Apache Tomcat, which is the application server included with an Express or Fault-Tolerant installation of FME Server, and as an option with certain Distributed installations. Instructions to set up SSL on different web application servers vary.
>
> For more information about configuring Apache Tomcat for HTTPS, or if you are using a different version of Apache Tomcat, see the documention for your version on https://tomcat.apache.org/.

Windows

Using a CA-issued Certificate

This method requires you to generate a certificate signing request from FME Server, which your IT team can use to create a CA certificate with the .cer or .crt extensions. If the certificate uses the .pfx extension, follow Using a PFX or P12 Certificate (below) instead.

1. Create a Keystore Generation Script

Open a text editor and copy the example script below, replacing the argument values with your own.

> **Note** The `storepass` and `keypass` arguments must be the same and at least 6 characters.

```
keytool -genkey -noprompt -keyalg RSA -keystore tomcat.keystore -alias <alias> -dname "<dname>" -storepass <storepass> -keypass <keypass> -ext san="<san>" -deststoretype pkcs12
```

Keytool Arguments

Argument	Description
genkey	The keytool program command to generate a new keystore.
noprompt	Using this argument in the command removes any interaction with the user.
keyalg	The algorithm to generate a private/public key pair.
keystore	The keystore file name.
deststoretype	Keystore type, `pkcs12` or `jks`.
dname	The CN name, Organization Unit, Organization, Location (city), State, and two-letter country code. The distinguished name is a set of values used to create the certificate and should be entered as you would like them to be presented to FME Server users and visitors.

Argument	Description
storepass, keypass	The password of the key and keystore. The value must be a minimum of six characters and must be the same for both arguments.
ext san	The subject alternative name is a structured way to indicate all of the domain names and IP addresses that are secured by the certificate.
alias	The name of the key inside the keystore being created.

Example:

```
keytool -genkey -noprompt -keyalg RSA -keystore tomcat.keystore -
alias tomcat -dname "CN=fmeserver.example.org, OU=support,
O=SafeSoftware, L=Surrey, S=BC, C=CA" -storepass password1 -
keypass password1 -ext
san="dns:fmeserver.example.org,dns:fmeserver" -deststoretype
pkcs12
```

2. Run the Keystore Generation Script
   a. Open a command prompt as administrator and navigate to the FME Server installation Java bin directory:

      ```
      cd <FMEServerDir>\Utilities\jre\bin\
      ```

      Where *<FMEServerDir>* is the location of the FME Server installation folder.
   b. Execute the command created in step 1.
3. Generate a Certificate Signing Request (CSR)

   In the command prompt, remain in <*FMEServerDir*>\Utilities\jre\bin\ and run:

   ```
   keytool -certreq -keyalg RSA -alias <alias> -file <filename> -
   keystore tomcat.keystore -ext san="<san>"
   ```

Specify the certificate signing request path to the *<filename>*, and update *<alias>* and *<san>* to match that set in step 1.

Example:

```
keytool -certreq -keyalg RSA -alias tomcat -file certreq.csr -
keystore tomcat.keystore -ext
san="dns:fmeserver.example.org,dns:fmeserver"
```

4. Obtain a Certificate

   Submit the CSR (for example, certreq.csr) generated in step 3 to your CA to obtain a certificate, according to your CA's instructions.

5. Import the Certificate into the Keystore

   If you have multiple certificates, install them in the following order, and be sure to update the alias and certificate path for each.

   a. Import the root certificate (if you have one):

   ```
   keytool -import -alias root -keystore tomcat.keystore -
   trustcacerts -file <path/certificate_filename>
   ```

   b. Import the intermediate certificate (If you have one):

   ```
   keytool -import -alias intermediate -keystore tomcat.keystore
   -trustcacerts -file <path/certificate_filename>
   ```

   c. Import the certificate:

   ```
   keytool -import -alias <alias> -keystore tomcat.keystore -
   trustcacerts -file <path/certificate_filename>
   ```

   > **Note** Use the same *<alias>* specified in step 1.

6. Import the Keystore into FME Server's trusted certs

In a command prompt, from <*FMEServerDir*>\Utilities\jre\bin\, use the following command to import the keystore into FME Server's trusted certs, specifying the `srcstorepass` argument with the password from step 1.

```
keytool -importkeystore -noprompt -srckeystore tomcat.keystore -
destkeystore "<FMEServerDir>\Utilities\jre\lib\security\cacerts" -
deststorepass changeit -srcstorepass <password>
```

Note Ignore the warning that the destination type must default to jks.

7. Back up the Tomcat XML Configuration Files

   Navigate to <FMEServerDir>\Utilities\tomcat\conf and make backups of server.xml, web.xml, and context.xml. We recommend this step so that you can easily revert the configuration at any point if necessary.

8. Configure server.xml

   a. Run a text editor as an administrator and open server.xml, located in <*FMEServerDir*>\Utilities\tomcat\conf.

   b. Locate the `SSLEngine` setting in the `<Listener>` element, including `className="org.apache.catalina.core.AprLifecycleListener"` and change the `"on"` value to `"off"`.

   c. Locate the `<Connector>` element that contains `protocol="org.apache.coyote.http11.Http11NioProtocol"` and replace the entire element with:

   ```
   <Connector protocol="org.apache.coyote.http11.Http11NioProtocol"
   port="443"
   minSpareThreads="5"
   enableLookups="true"
   disableUploadTimeout="true"
   acceptCount="100"
   maxThreads="200"
   maxHttpHeaderSize="16384"
   ```

```
scheme="https"
secure="true"
SSLEnabled="true"
keystoreFile="<file>"
keystorePass="<password>"
clientAuth="false" sslEnabledProtocols="TLSv1.1,TLSv1.2"
sslImplementationName="org.apache.tomcat.util.net.jsse.JSSEImplementation"
ciphers="TLS_AES_256_GCM_SHA384,TLS_CHACHA20_POLY1305_SHA256,TLS_AES_128_GCM_
SHA256,DHE-RSA-AES256-GCM-SHA384,DHE-RSA-AES128-GCM-SHA256,ECDHE-RSA-AES256-GCM-
SHA384,ECDHE-RSA-AES128-GCM-SHA256,DHE-RSA-AES256-SHA256,DHE-RSA-AES128-
SHA256,ECDHE-RSA-AES256-SHA384,ECDHE-RSA-AES128-SHA256,ECDHE-RSA-AES256-
SHA,ECDHE-RSA-AES128-SHA,DHE-RSA-AES256-SHA,DHE-RSA-AES128-SHA"
URIEncoding="UTF8" />

<Connector port="80" protocol="HTTP/1.1" redirectPort="443"/>
```

Make sure to update the `keystoreFile` and `keystorePass` parameters to the keystore location and password set in step 1. For an example, see this server.xml reference. If the password contains invalid XML characters `< > “ ' &`, they must be escaped.

> **Note:**
>
> » To disable TLS 1.1, remove `TLSv1.1,` from the `sslEnabledProtocols` setting.
>
> » The list of `ciphers` is not exhaustive. If your certificate was generated with a different algorithm, the applicable cipher must be added. Any algorithms not in use can be safely removed from this list. For a full list of ciphers supported by Tomcat, see the Apache Tomcat 9.0.69 API Documentation.

d. (Optional) To change the port for HTTPS communication, change `443` to the desired port, for both the `port` and `redirectPort` directives.

e. Save and close the server.xml file.

9. Configure web.xml

a. Open web.xml, located in <*FMEServerDir*>\Utilities\tomcat\conf.

b. Add the following code block to the end of the file, just before the closing `</web-app>` element:

```
<security-constraint>
<web-resource-collection>
<web-resource-name>HTTPSOnly</web-resource-name>
<url-pattern>/*</url-pattern>
</web-resource-collection>
<user-data-constraint>
<transport-guarantee>CONFIDENTIAL</transport-guarantee>
</user-data-constraint>
</security-constraint>
```

c. Save and close the web.xml file.

10. Configure context.xml

a. Open context.xml, located in <*FMEServerDir*>\Utilities\tomcat\conf.

b. Add the following to the end of the file, just before the closing `</context>` element:

```
<Valve
className="org.apache.catalina.authenticator.SSLAuthenticator"
disableProxyCaching="false" />
```

c. Save and close the context.xml file.

11. Update the FME Server Web URL to Use HTTPS

a. Run a text editor as an administrator and open fmeServerConfig.txt.

b. Update the `FME_SERVER_WEB_URL` directive by changing `http` to `https` and change the port to the same one specified in step 8.

c. Save and close the file.

12. Verify the HTTPS Configuration

a. Restart FME Server.

b. Open a web browser and navigate to https://localhost/. If you configured Tomcat to use a port other than the standard port 443, also specify the port (https://localhost:<*port*>).

c. You should see the FME Server login page in a secured format.

13. Modify Service URLs to Use HTTPS

To submit jobs on FME Server via HTTPS, you must enable SSL for the FME Server Web Services.

a. In the FME Server Web User Interface, open the Services page.

b. Click **Change All Hosts** and, in the *URL Pattern* field, change **HTTP** to **HTTPS**. (FME Server may have already set this change.) If required, modify the port number—typically SSL is configured on either port 8443 or 443. When finished, click **OK**.

c. Run a sample workspace with the data download and job submitter services to confirm your FME Server is working with HTTPS.

Your FME Server is now configured to work via HTTPS. However, if you are using the WebSocket Server or Integrated Windows Authentication, some additional steps are required.

14. (Optional) Enable SSL on the WebSocket Server

The FME Server WebSocket Server supports insecure (ws://) or secure connections (wss://). This configuration is only required if you want to use the WebSocket Server or Topic Monitoring (legacy).

a. Run a text editor as an administrator and open the fmeWebSocketConfig.txt file in your FME Server installation directory (<*FMEServerDir*>\Server).

b. Set `WEBSOCKET_ENABLE_SSL=true`.

c. Uncomment the `WEBSOCKET_KEYSTORE_FILE_PATH` directive and set it to reference the keystore file set in server.xml in step 8. For example:

```
WEBSOCKET_KEYSTORE_FILE_
PATH=<FMEServerDir>/Utilities/tomcat/tomcat.keystore
```

> **Note** Use forward slashes, which may be different from the path in server.xml.

d. Uncomment the `WEBSOCKET_KEYSTORE_FILE_PASSWORD` directive and set it to reference the keystore file password set in server.xml in step 8. For example:

```
WEBSOCKET_KEYSTORE_FILE_PASSWORD=password1
```

> **Note** Do not enclose the password in quotes.

e. Specify the same settings for the WEBSOCKET_ENABLE_SSL, WEBSOCKET_KEYSTORE_FILE_PATH, and WEBSOCKET_KEYSTORE_FILE_PASSWORD directives in the following files:

- <*FMEServerDir*>\Server\config\subscribers\websocket.properties
- <*FMEServerDir*>\Server\config\publishers\websocket.properties

f. In the following files, update the protocol in the `value` property of the `PROPERTY` directive from `"ws:"` to `"wss:"`

- <
  FMESharedResourceDir
  >\localization\publishers\websocket\publisherProperties.xml
- <
  FMESharedResourceDir
  >\localization\subscribers\websocket\subscriberProperties.xml

> **Note** *<FMESharedResourceDir>* refers to the location of the FME Server System Share, specified during installation.

g. Run the following .bat files, located in <*FMEServerDir*>\Clients\utilities:
   - addPublishers.bat
   - addSubscribers.bat

h. Restart FME Server.

i. To test that the configuration is complete, run jobs and view Topic Monitoring.

15. (Optional) Update the SSO Authentication URL to use HTTPS

> **Note** This step is applicable only if you want to use Integrated Windows Authentication (single sign-on) to access the FME Server Web Interface.

a. Run a text editor as an administrator and open the fmeserver propertiesFile.properties, located in <*FMEServerDir*>\Utilities\tomcat\webapps\fmeserver\WEB-INF\conf\.

b. Locate the `SINGLE_SIGN_ON_AUTH_URL` parameter, and update the host name and port portion of the URL to match the host name through which the FME Server Web User Interface is accessed.

   For example:

```
SINGLE_SIGN_ON_AUTH_
URL=https://<MyFMEServerHost>:443/fmetoken/sso/generate
```

Using a PFX or P12 Certificate

Use these instructions to configure your FME Server for HTTPS using a .pfx or .p12 certificate obtained from a Certificate Authority (CA). If you do not have a certificate, follow the instructions for Using a CA-issued Certificate (above) instead.

1. Make a backup of the Tomcat XML configuration files

   Go to <*FMEServerDir*>\Utilities\tomcat\conf and make backups of server.xml, web.xml, and context.xml.

2. Configure server.xml

   a. Run a text editor as an administrator and open server.xml, located in <*FMEServerDir*>\Utilities\tomcat\conf.

   b. Locate the `SSLEngine` setting in the `<Listener>` element, including `className="org.apache.catalina.core.AprLifecycleListener"` and change the `"on"` value to `"off"`.

   c. Locate the `<Connector>` element that contains `protocol="org.apache.coyote.http11.Http11NioProtocol"` and replace the entire element with:

```
<Connector protocol="org.apache.coyote.http11.Http11NioProtocol"
port="443"
minSpareThreads="5"
enableLookups="true"
disableUploadTimeout="true"
acceptCount="100"
maxThreads="200"
maxHttpHeaderSize="16384"
scheme="https"
secure="true"
SSLEnabled="true"
keystoreFile="<file>"
keystorePass="<password>"
keystoreType="PKCS12"
clientAuth="false" sslEnabledProtocols="TLSv1.1,TLSv1.2"
sslImplementationName="org.apache.tomcat.util.net.jsse.JSSEImplementation"
ciphers="TLS_AES_256_GCM_SHA384,TLS_CHACHA20_POLY1305_SHA256,TLS_AES_128_GCM_
SHA256,DHE-RSA-AES256-GCM-SHA384,DHE-RSA-AES128-GCM-SHA256,ECDHE-RSA-AES256-GCM-
SHA384,ECDHE-RSA-AES128-GCM-SHA256,DHE-RSA-AES256-SHA256,DHE-RSA-AES128-
SHA256,ECDHE-RSA-AES256-SHA384,ECDHE-RSA-AES128-SHA256,ECDHE-RSA-AES256-
SHA,ECDHE-RSA-AES128-SHA,DHE-RSA-AES256-SHA,DHE-RSA-AES128-SHA"
URIEncoding="UTF8" />

<Connector port="80" protocol="HTTP/1.1" redirectPort="443"/>
```

The `keystoreFile` should point to your .pfx certificate. We recommend storing this certificate in FME Server's Tomcat directory: <*FMEServerDir*>\Utilities\tomcat\. Make sure the `keystorePass` is set to the password for your PFX certificate. If the password contains invalid XML characters `< > “ ' &`, they must be escaped.

> **Note:**
>
> » To disable TLS 1.1, remove `TLSv1.1,` from the `sslEnabledProtocols` setting.
>
> » The list of `ciphers` is not exhaustive. If your certificate was generated with a different algorithm, the applicable cipher must be added. Any algorithms not in use can be safely removed from this list. For a full list of ciphers supported by Tomcat, see the Apache Tomcat 9.0.69 API Documentation.

d. (Optional) To change the port for HTTPS communication, change `443` to the desired port, for both the `port` and `redirectPort` directives.

e. Save and close the server.xml file.

3. Configure web.xml

   a. Open web.xml, located in <*FMEServerDir*>\Utilities\tomcat\conf.

   b. Add the following code block to the end of the file, just before the closing `</web-app>` element:

```
<security-constraint>
<web-resource-collection>
<web-resource-name>HTTPSOnly</web-resource-name>
<url-pattern>/*</url-pattern>
</web-resource-collection>
<user-data-constraint>
<transport-guarantee>CONFIDENTIAL</transport-guarantee>
</user-data-constraint>
```

```
</security-constraint>
```

c. Save and close the web.xml file.

4. Configure context.xml

   a. Open context.xml, located in <*FMEServerDir*>\Utilities\tomcat\conf.

   b. Add the following to the end of the file, just before the closing `</context>` element:

   ```
   <Valve
   className="org.apache.catalina.authenticator.SSLAuthenticator"
   disableProxyCaching="false" />
   ```

   c. Save and close the context.xml file.

5. Update the FME Server Web URL to Use HTTPS

   a. Run a text editor as an administrator and open fmeServerConfig.txt.

   b. Update the `FME_SERVER_WEB_URL` directive by changing `http` to `https` and change the port to the same one specified in step 2.

   c. Save and close the file.

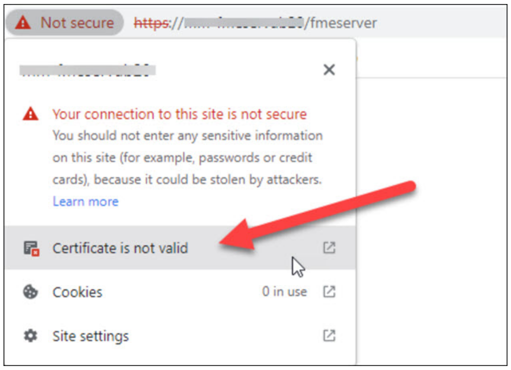
6. (Optional) Export the certificate from the browser in base 64 format and import it into the cacerts trust store

> **Note** This step is required only if your certificate was not obtained from a Trusted Certificate Authority. Instructions may differ slightly in a browser other than Chrome.

   a. Restart the FME Server Application Server service

   b. Open a browser and navigate to https://localhost/. If you configured Tomcat to use a port other than the standard port 443, also specify the port (https://localhost:<*port*>).

   c. View the certificate from the browser.



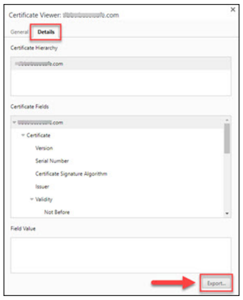
Not secure ~~https~~://[redacted]/fmeserver

[redacted]

Your connection to this site is not secure

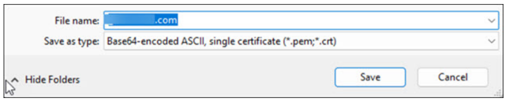
You should not enter any sensitive information on this site (for example, passwords or credit cards), because it could be stolen by attackers.

d. Select the **Details** tab and click **Export**.



Certificate Viewer: [redacted].com

e. Save as **Base-64-encoded ASCII, single certificate (CRT)** to local disk (for example, <*certpath*>\mycert.crt)



File name: [redacted].com

Save as type: Base64-encoded ASCII, single certificate (*.pem;*.crt)

f. Import the keystore into FME Server's trusted certs

In a command prompt, as an administrator, change directory to <*FMEServerDir*>\Utilities\jre\bin\. Use the following command to import the keystore into FME Server’s trusted certs:

```
keytool -import -trustcacerts -keystore
"<FMEServerDir>\Utilities\jre\lib\security\cacerts" -storepass
changeit -noprompt -file <certpath>\mycert.crt
```

7. Verify the HTTPS Configuration

a. Restart FME Server.

b. Open a web browser and navigate to https://localhost/. If you configured Tomcat to use a port other than the standard port 443, also specify the port (https://localhost:<*port*>).

c. You should see the FME Server login page in a secured format.

8. Modify Service URLs to Use HTTPS

   To submit jobs on FME Server via HTTPS, you must enable SSL for the FME Server Web Services.

   a. In the FME Server Web User Interface, open the Services page.

   b. Click **Change All Hosts** and, in the *URL Pattern* field, change **HTTP** to **HTTPS**. (FME Server may have already set this change.) If required, modify the port number—typically SSL is configured on either port 8443 or 443. When finished, click **OK**.

   c. Run a sample workspace with the data download and job submitter services to confirm your FME Server is working with HTTPS.

   Your FME Server is now configured to work via HTTPS. However, if you are using the WebSocket Server or Integrated Windows Authentication, some additional steps are required.

9. (Optional) Enable SSL on the WebSocket Server

   The FME Server WebSocket Server supports insecure (ws://) or secure connections (wss://). This configuration is only required if you want to use the WebSocket Server or Topic Monitoring (legacy).

   a. Run a text editor as an administrator and open the fmeWebSocketConfig.txt file in your FME Server installation directory (<*FMEServerDir*>\Server).

   b. Set `WEBSOCKET_ENABLE_SSL=true`.

   c. Uncomment the `WEBSOCKET_KEYSTORE_FILE_PATH` directive and set it to reference the keystore file set in server.xml in step 2. For example:

```
WEBSOCKET_KEYSTORE_FILE_
PATH=<FMEServerDir>/Utilities/tomcat/mycert.pfx
```

> **Note** Use forward slashes, which may be different from the path in server.xml.

d. Uncomment the `WEBSOCKET_KEYSTORE_FILE_PASSWORD` directive and set it to reference the keystore file password set in server.xml in step 2. For example:

```
WEBSOCKET_KEYSTORE_FILE_PASSWORD=password1
```

> **Note** Do not enclose the password in quotes.

e. Specify the same settings for the WEBSOCKET_ENABLE_SSL, WEBSOCKET_KEYSTORE_FILE_PATH, and WEBSOCKET_KEYSTORE_FILE_PASSWORD directives in the following files:

- <*FMEServerDir*>\Server\config\subscribers\websocket.properties
- <*FMEServerDir*>\Server\config\publishers\websocket.properties

f. In the following files, update the protocol in the `value` property of the `PROPERTY` directive from `"ws:"` to `"wss:"`

- <*FMESharedResourceDir*>\localization\publishers\websocket\publisherProperties.xml
- <*FMESharedResourceDir*>\localization\subscribers\websocket\subscriberProperties.xml

> **Note** *<FMESharedResourceDir>* refers to the location of the FME Server System Share, specified during installation.

g. Run the following .bat files, located in *<FMEServerDir>*\Clients\utilities:
   - addPublishers.bat
   - addSubscribers.bat

h. Restart FME Server.

i. To test that the configuration is complete, run jobs and view Topic Monitoring.

10. (Optional) Update the SSO Authentication URL to use HTTPS

> **Note** This step is applicable only if you want to use Integrated Windows Authentication (single sign-on) to access the FME Server Web Interface.

a. Run a text editor as an administrator and open the fmeserver propertiesFile.properties, located in *<FMEServerDir>*\Utilities\tomcat\webapps\fmeserver\WEB-INF\conf\.

b. Locate the `SINGLE_SIGN_ON_AUTH_URL` parameter, and update the host name and port portion of the URL to match the host name through which the FME Server Web User Interface is accessed.

   For example:

```
SINGLE_SIGN_ON_AUTH_
URL=https://<MyFMEServerHost>:443/fmetoken/sso/generate
```

Linux

FME Server on Linux includes an NGINX reverse proxy that allows easy SSL configuration and the ability to choose ports under 1024 without root permission. HTTPS is configured on the NGINX reverse proxy rather than the Apache Tomcat web application server.

1. Create a directory for the certificate:

   ```
   sudo mkdir /etc/nginx/ssl
   ```

2. Place a certificate and key in the new directory.

   - If you are using a certificate issued by a certificate authority (CA), you will need the certificate or certificate bundle (.crt) and certificate key (.key).

   - If you are using a .pfx or .p12 certificate, you must convert it into .crt and .key format. For more information, see Configuring FME Server for HTTPS in the FME Community.

   - Alternatively, you can generate a self-signed SSL certificate and keystore with the following command:

     ```
     sudo openssl req -x509 -nodes -days 365 -newkey rsa:2048 -
     keyout /etc/nginx/ssl/<KeyName>.key -out
     /etc/nginx/ssl/<CertName>.crt
     ```

     Replace `<KeyName>` and `<CertName>` with the key and certificate filenames, respectively, For example, `nginx.key` and `nginx.crt`.

3. Enable Diffie-Hellman key exchange:

   ```
   sudo openssl dhparam -out /etc/nginx/ssl/dhparam.pem 2048
   sudo chmod 400 /etc/nginx/ssl/dhparam.pem
   ```

4. Open file /etc/nginx/conf.d/fmeserver.conf.

5. Uncomment the `server` block that contains instructions to listen on port 80 and redirect to port 443. This block should appear similar to the following:

   ```
   # Redirect from 80 to 443 when SSL is enabled
   server {
     listen 80;
     server_name <<hostname>>;

     location / {
       return 301 https://$host$request_uri;
   ```

```
    }
  }
```

6. In the main `server` block, comment the line with instructions to listen on port 80, and uncomment the lines that instruct to listen on port 443 with SSL and include the SSL configuration. When complete, these lines should appear as follows:

   ```
     #listen 80;
   listen 443 ssl;
   include /etc/nginx/fmeserver/ssl.conf;
   ```

7. In the `websocket server` block, comment and uncomment the applicable lines to ensure that listening occurs on port 7078 with SSL. When complete, these lines should appear as follows:

   ```
   #listen 7078;
   listen 7078 ssl;
   include /etc/nginx/fmeserver/ssl.conf;
   ```

8. Save and close the file.

9. Open file /etc/nginx/fmeserver/ssl.conf and make sure the SSL certificate and key are pointed to the correct name and directory of your certificate, as defined in steps 1 and 2.

10. Reload the NGINX configuration:

    ```
    service nginx reload
    ```

11. Open file server.xml as administrator. This file is located in <*FMEServerDir*>\Utilities\tomcat\conf.

12. Update the `proxyPort` directive to `443`:

    ```
    proxyPort="443"
    ```

13. Update the `scheme` directive to `https`:

    ```
    scheme="https"
    ```

14. Save and close the file.

15. Open the following configuration file: /opt/fmeserver/Utilities/tomcat/webapps/fmeserver/WEB-INF/conf/propertiesFile.properties
16. Update the `WEB_SOCKET_SERVER_PORT` directive to `443`:

    ```
    WEB_SOCKET_SERVER_PORT=443
    ```
17. Save and close the file.
18. Update the FME Server Web URL to use HTTPS:
    1. Run a text editor as an administrator and open fmeServerConfig.txt.
    2. At the end of the file, under `FME SERVER SETTINGS START` > `Port and Host Assignments`, update the `FME_SERVER_WEB_URL` directive from `http` to `https`, and change the port to the same one specified in step 2.
    3. Save and close the file.
19. Restart FME Server.

See Also

- FME Server Troubleshooting: HTTPS and SSL
- FME Support

Configuring Integrated Windows Authentication

- ***Skill Level***: Advanced
- ***Estimated Time Required***: 30-45 minutes
- ***Prerequisites***:
    - All required authentication credentials are available.
    - Access to system, network, and FME Server administrators.

> **Note** The task described here should be undertaken by advanced users only. Before proceeding, consider your options for alternative solutions until you are certain you wish to proceed. For additional resources, consult the FME Community or FME Support.

With Integrated Windows Authentication (IWA), also known as "single sign-on," you can enable the users you import from your Windows Active Directory connections to integrate their Windows login credentials with FME Server. When single sign-on is enabled:

- There is no need to log in to the FME Server Web User Interface. Instead, select **Use Windows Credentials** on the Sign In page.
- Similarly, there is no need to log in to FME Server when using FME Workbench to publish a workspace or download an item. Instead, check *Use Alternate Login Method* and specify **Windows Credentials** in the Publish or Download wizard.

  > **Note** When publishing a workspace to the Notification Service, you must still provide your FME Server credentials in the HTTP Authentication fields of the Edit Service Properties dialog of the wizard.

> **Note** Single sign-on is currently supported on Internet Explorer, Firefox and Chrome.

To enable single sign-on:

1. Update the Windows domain configuration to allow FME Server to authenticate using single sign-on.
2. Update the web browser configuration to use single sign-on.
3. If you have not already done so, enable single sign-on as part of SASL authentication of a Windows Active Directory connection.

4. (External-facing URL for Apache Tomcat only) Update the Tomcat Properties File with the external-facing URL.

Updating the Windows Domain Configuration

To configure FME Server to use single sign-on authentication, the Windows domain must recognize FME Server as a domain service. Three steps are required:

A. Represent FME Server as a domain service by assigning it a service principal name (SPN).
B. Register the SPN (or SPNs) to the service account.
C. Ensure that the service account requires Kerberos pre-authentication.

A) Assign a Service Principal Name

An SPN has the form: `<service>/<host>`, where:

`<service>` is the service type. In the context of FME Server, this is `http`.

`<host>` is the name of the machine hosting FME Server's web application server. To provide flexibility, we suggest assigning both the unqualified and fully-qualified versions of the host name.

> **Note** If FME Server is configured for access through a DNS alias (CNAME), SPNs must also be registered using this alias.

To obtain the unqualified and fully-qualified versions of the host name:

1. From the FME Server host machine, click the Start menu, right-click 'Computer' or 'My Computer' and select 'Properties'.
2. For the unqualified host name, refer to 'Computer name'.
3. For the fully-qualified host name, refer to 'Full computer name'.

For example, if the unqualified host name is 'MyETLServer' and the fully-qualified host name is 'MyETLServer.domain.net', the SPNs are:

- http/MyETLServer
- http/MyETLServer.domain.net

B) Register an SPN to a Service Account

1. From the Domain Controller, open a command prompt (cmd.exe) via the Start menu.
2. Type `setspn -S <spn> <account>` to register the SPN to the service account.
3. Ensure that the command succeeded with the message 'Updated object'. If the message 'Unable to locate account ...' appears, the account name is incorrectly specified.
4. Repeat until all SPNs are added.

For example, using the SPNs in the previous example, and supposing the service account is 'fmeserveradmin', the following commands would be entered:

```
setspn -S http/MyETLServer fmeserveradmin
setspn -S http/MyETLServer.domain.net fmeserveradmin
```

C) Ensure the Service Account Requires Kerberos Pre-authentication:

1. From the Domain Controller, open 'Active Directory Users and Computers' via the Start menu.
2. In the console tree, navigate to the service account.
3. Right-click the service account, and select Properties.
4. Select the Account tab.
5. Under Account Options, scroll to the bottom and ensure that 'Do not require Kerberos preauthentication' is unchecked.
6. Click Ok.

Updating the Web Browser Configuration

Depending on the browser used to access the FME Server Web User Interface, additional configuration steps may be required for Integrated Windows Authentication (single sign-on).

Internet Explorer

Single sign-on is supported in Internet Explorer versions 2 and later.

In most common Windows domain configurations, no additional configuration is necessary. However, if a user is unable to use single sign-on with FME Server, check the following:

1. Open 'Internet Options' from the Start menu. (In Windows XP, you can access 'Internet Options' from the Tools menu in Internet Explorer.)
2. On the 'Security' tab, select 'Local intranet'.
3. If FME Server is not a part of the local intranet, add it to the list of local intranet sites. To do so, click Sites -> Advanced, then add the site address (for example, `http://fmeserver.domain.net`).
4. On the 'Security' tab, select 'Local intranet' and click 'Custom level...'.
5. Ensure that under User Authentication -> Login, 'Automatic logon only in Intranet zone' is selected.
6. On the 'Advanced' tab, ensure that Security -> Enable Integrated Windows Authentication is checked.
7. Restart the browser.

Chrome

Single sign-on is supported in Chrome versions 8 and later.

In most common Windows domain configurations, no additional configuration is necessary. However, if a user is unable to use single sign-on with FME Server, perform the same steps outlined under Internet Explorer.

Firefox

Single sign-on is supported on all versions of Firefox.

To enable single sign-on in Firefox:

1. In the address bar, type `about:config`. Accept the warning if one appears.
2. In the search bar, type `network.negotiate`.
3. Select the preference 'network.negotiate-auth.trusted-uris', and double-click it to modify its value.
4. Enter FME Server's site address (for example, `http://fmeserver.domain.net`), and click **OK**. Do not specify a port or path. Multiple site addresses can be listed, separated by a comma (,).
5. If using a private browsing tab, search for `network.auth.private-browsing-sso`.
6. Double-click on `network.auth.private-browsing-sso` to change the *Value* to **true**.
7. Restart the browser.

Apple Safari and Opera

Single sign-on is currently not supported on these browsers.

Update the Tomcat Properties File

Complete this step if both of the following are true:

- Your FME Server uses an Apache Tomcat servlet to run the FME Server Web Services. Apache Tomcat is provided with an Express installation of FME Server, and some distributed installations. Or, your distributed installation may be using your own Apache Tomcat servlet.
- Your FME Server Web User Interface is accessible through an external-facing URL, or you have otherwise changed the URL through which the Web User Interface is accessed, such as by Configuring for HTTPS.

To update the Tomcat properties file

1. Open the Apache Tomcat properties file:

   <*FMEServerDir*>\Utilities\tomcat\webapps\fmeserver\WEB-INF\conf\propertiesFile.properties

2. Locate the `SINGLE_SIGN_ON_AUTH_URL` parameter, and update the host name and port portion of the URL to match the host name through which the FME Server Web User Interface is accessed. For example:

   ```
   SINGLE_SIGN_ON_AUTH_
   URL=http://MyFMEServerHost:80/fmetoken/sso/generate
   ```

3. Save and close the file.

4. Restart the FME Server services.

Troubleshooting Authentication Services Configurations

To begin troubleshooting Active Directory issues, look in the fmeServer_* log files for messages related to an authentication service, such as (`Directory Server`), or (`Single Sign-On`).

Failure to Connect to Directory Server (SSL)

Symptom

When connecting to Active Directory with *Encryption Method* = SSL, the following message appears in the Directory Servers page:

`An error occurred while communicating with directory server (81)` or `(91)`

Alternatively, the following message appears in the log file:

```
(Directory Server) Exception: "An error occurred while attempting to
send the LDAP message to "...": javax.net.ssl.SSLHandshakeException:
sun.security.validator.ValidatorException: PKIX path building failed:
```

```
sun.security.provider.certpath.SunCertPathBuilderException: unable to
find valid certification path to requested target caused by
sun.security.validator.ValidatorException: PKIX path building failed:
sun.security.provider.certpath.SunCertPathBuilderException: unable to
find valid certification path to requested target caused by
sun.security.provider.certpath.SunCertPathBuilderException: unable to
find valid certification path to requested target"
(Directory Server) Successfully connected using directory configuration
"<xxx>" and encountered 1 errors.
```

Cause

SSL certificate verification was enabled, but failed because the Certificate Authority (CA) was not trusted.

Resolution

If available, import the Certificate Authority (CA) certificate.

Unable to Use SASL Authentication

Log file message:

```
(Directory Server) Not using SASL for authentication, because
configuration is incomplete.
```

Cause

Authentication Method = **SASL** is specified for a Active Directory connection, but the Realm was not explicitly specified in the form of a fully-qualified domain name (FQDN).

Resolution

Use the *Realm* setting on the Edit Server Connection page to specify an FQDN.

Unsupported SASL Mechanism

Log file message:

```
(Directory Server) SASL mechanism "..." is not supported by Directory
Server.
```

Cause

Authentication Method = **SASL** is specified for a Active Directory connection, but the specified SASL mechanism was not supported by the directory server.

Resolution

The *SASL* field of a directory server connection must be set to an SASL mechanism that is supported by the directory server.

To see the SASL mechanisms supported by a directory server:

From AD Explorer:

1. Connect to the Active Directory.
2. Right-click the Active Directory root, and select 'Properties...'.
3. Select the 'RootDSE Attributes' tab.
4. The supported SASL mechanisms for this Active Directory server are listed under the 'supportedSASLMechanisms' attribute.

MSDN:

1. Determine the version of Microsoft Windows® Server.
2. The supported SASL mechanisms are listed under in this MSDN article: https://docs.microsoft.com/en-us/openspecs/windows_protocols/ms-adts/a98c1f56-8246-4212-8c4e-d92da1a9563b.

Single Sign-On Authentication Failure (Incorrect Mechanism)

Log file message:

```
(Single Sign-On) Client attempted NTLM authentication; single sign-on
authentication supports only Kerberos V5 authentication. Refer to single
sign-on documentation for resolution.
```

```
(Single Sign-On) Failed authentication because of an invalid client
token. Refer to single sign-on documentation for resolution.
```

Cause 1

The service principal name (SPN) is missing.

Resolution 1

See Updating the Windows Domain Configuration for information on how to create and register a service principal name (SPN).

Cause 2

The client is not using a supported web browser, or is using an incorrectly configured web browser.

Resolution 2

See Updating the Web Browser Configuration for information on supported browsers and on how to update web browser configurations.

Single Sign-On Authentication Failure (Negotiation Error)

Log file messages (Symptom 1):

```
(Single Sign-On) Negotiation reported an error: "Failure unspecified at
GSS-API level (Mechanism level: Checksum failed)".
(Single Sign-On) Failed authentication because of an negotiation error.
Refer to single sign-on documentation for resolution.
```

Log files messages (Symptom 2):

```
(Single Sign-On) Negotiation reported a defective token from client:
"...".
(Single Sign-On) Failed authentication because of an negotiation error.
Refer to single sign-on documentation for resolution.
```

Log files messages (Symptom 3):

```
(Single Sign-On) Negotiation reported an error: "...".
```

```
(Single Sign-On) Failed authentication because of an negotiation error.
Refer to single sign-on documentation for resolution.
```

Cause 1

The service principal name (SPN) wasn't registered to the service account used by FME Server.

Resolution 1

Ensure that the service account used for SPN registration matches the one specified in the *SSO Username* field of the Active Directory connection. For more information, see Updating the Windows Domain Configuration.

Cause 2

Single sign-on authentication was attempted and failed, and the user does not exist in the configured Windows domain.

Resolution 2

Ensure that the user account used to log into the client machine is a part of the Windows domain that FME Server is configured to use.

For example, if FME Server is configured to use Active Directory for 'Domain1', clients logged in using a 'Domain2' user account will not be able to authenticate with FME Server.

Single Sign-On Authentication Failure (Service Account)

Log file message:

```
(Single Sign-On) Failed authentication using pre-authenticated
credentials (for a service account).
(Single Sign-On) Failed to create server credentials. Ensure that pre-
authenticated credentials (for a service account) are correctly
specified in single sign-on configuration.
```

Cause 1

The service account used by FME Server was not correctly specified. The account name or password may be incorrect, or both.

Resolution 1

Ensure that the service account details are correctly specified in the *SSO Username* and *SSO Password* fields of an Active Directory connection.

Cause 2

Authentication Method **SASL** is not specified, or the *SASL Mechanism* is not **GSSAPI**.

Resolution 2

SASL must be specified as the *Authentication Method* and **GSSAPI** must be specified as the *SASL Mechanism* in the Active Directory connection.

See Also

- SASL Authentication

Single Sign-On Authentication Failure (Cross-Domain User)

Log file messages:

```
(Single Sign-On) Negotiation complete; authentication granted for user
"...".
(Single Sign-On) Failed authentication because user "..." could not be
found in Active Directory.
```

Cause 1

Single sign-on authentication was attempted and succeeded, but the user does not exist in the configured Windows domain.

Resolution 1

Ensure that the user account used to log into the client machine is a part of the Windows domain that FME Server is configured to use.

For example, if FME Server is configured to use Active Directory for 'Domain1', clients logged in using a 'Domain2' user account will not be able to authenticate with FME Server.

Cause 2

Single sign-on authentication was attempted and succeeded, but FME Server did not have the right privileges to find the user. This may be caused by the service account setting 'Do not require Kerberos preauthentication'.

Resolution 2

Kerberos pre-authentication must be enabled for the service account. See Updating the Windows Domain Configuration for information on how to configure the service account.

Single Sign-On Authentication Failure (Same Machine Access)

Log file messages:

```
(Single Sign-On) Negotiation reported a defective token from client:
"Defective token detected (Mechanism level: GSSHeader did not find the
right tag)".
(Single Sign-On) Failed authentication because of an negotiation error.
Refer to single sign-on documentation for resolution.
```

Cause

Single sign-on authentication was attempted on the same machine as FME Server.

Resolution

Use a different machine to access FME Server.

SASL Authentication Failure 1

Symptom

A Active Directory connection species **SASL** as *Authentication Method*and **GSSAPI** as *SASL Mechanism*, and the following error appears in the log file:

```
(Directory Server) Exception: "LDAPException(resultCode=82 (local
error), errorMessage='An error occurred while attempting to initialize
the JAAS login context for GSSAPI authentication:
javax.security.auth.login.LoginException: Pre-authentication information
was invalid (24) caused by KrbException: Pre-authentication information
was invalid (24) caused by KrbException: Identifier doesn't match
expected value (906)')"
```

Or

```
(Directory Server) Exception: "LDAPException(resultCode=82 (local
error), errorMessage='An error occurred while attempting to initialize
the JAAS login context for GSSAPI authentication:
javax.security.auth.login.LoginException: Client not found in Kerberos
database (6) caused by KrbException: Client not found in Kerberos
database (6) caused by KrbException: Identifier doesn't match expected
value (906)')"
```

Cause

The user's login password was incorrectly specified.

Resolution

Specify the correct password.

SASL Authentication Failure 2

Symptom

When using SASL authentication (Kerberos V5), the following error appears in the log file:

```
(Directory Server) Authenticating user "..." using SASL mechanism
"GSSAPI" with KDC address "..." and realm "..."...
(Directory Server) Successfully established a new connection to "...".
```

Above message may appear multiple times.

```
(Directory Server) Failed to authenticate user.
```

Cause

FME Server did not have the right privileges to find the user. This may be caused by the service account setting 'Do not require Kerberos preauthentication'.

Resolution

Kerberos pre-authentication must be enabled for the service account. See Updating the Windows Domain Configuration for information on how to configure the service account.

SASL Authentication Failure 3

Symptom

When using SASL authentication (Kerberos V5), the following error appears in the log file:

```
(Directory Server) Exception: "LDAPException(resultCode=82 (local
error), errorMessage='An error occurred while attempting to initialize
the JAAS login context for GSSAPI authentication:
javax.security.auth.login.LoginException: Clock skew too great (37)
caused by KrbException: Clock skew too great (37) caused by
KrbException: Identifier doesn't match expected value (906)')"
```

Cause

The authentication failure is caused by a significant discrepancy in the system time between the FME Server host machine and the directory server.

Resolution

Update the system time on one or both systems.

SASL Authentication Failure 4

Symptom

A Active Directory connection species **SASL** as *Authentication Method*and **GSSAPI** as *SASL Mechanism*, and the following error appears in the log file:

```
ERROR main 408010 : (Directory Server) Exception: "LDAPException
(resultCode=82 (local error), errorMessage='An error occurred while
attempting to initialize the JAAS login context for GSSAPI
authentication: javax.security.auth.login.LoginException: Message stream
modified (41) caused by KrbException: Message stream modified (41)')"
ERROR main 408003 : (Directory Server) Failed to connect to an available
server, or no servers were available.
FATAL main 405405 : Security Manager init FAILED
```

Cause

The *Realm* setting does not specify the Authentication Realm as a fully-qualified domain name (FQDN).

Resolution

Use the *Realm* setting on the Edit Server Connection page to specify an FQDN.

Importing a CA Certificate for SSL Connections

To authenticate SSL connections using a CA certificate, import the certificate and instruct FME Server to add it to the list of trusted certificates.

1. Make a backup of the current list of trusted Certificate Authorities:

   <*FMEServerDir*>/Utilities/jre/lib/security/cacerts

2. Obtain your RootCA certificate as a .cer file:

   `http://<domain-controller>/certsrv/certcarc.asp` > 'install this CA certificate'

Or, contact your domain administrator

3. Add the certificate to the list of trusted ones:

   - Linux:

     Open the command terminal and issue the following commands:

     ```
     cd <FMEServerDir>/Utilities/jre
     ./bin/keytool -import -trustcacerts -alias <rootca-alias> -file
     <cer-file> -keystore ./lib/security/cacerts
     ```

   - Windows:

     Launch cmd.exe and issue the following commands:

     ```
     cd <FMEServerDir>\Utilities\jre
     bin\keytool -import -trustcacerts -alias <rootca-alias> -file
     <cer-file> -keystore
     lib\security\cacerts
     ```

     When prompted for keystore password, default is `changeit`.

     When prompted to trust certificate, answer `yes`.

   Where:

   - *`<rootca-alias>`* is the custom alias for the certificate.
   - *`<cer-file>`* is the path to the .cer file downloaded in step 2.

4. Restart FME Server.

Running the FME Server System Services Under Different Accounts (Windows)

By default, the FME Server Core, FME Server Engines, and FME Server Application Server Windows services run under the local system account, which does not have network permissions. You may need to run these services under different accounts that can read and write data to the FME Server System Share and FME Server installation directory, particularly in a distributed installation where these services are installed on separate machines. For more information about required permissions for the FME Server System Services, see Directory and Account Permissions.

> **Note** When making this change, we recommend updating all three services to use the same Service Account or user account.

To Run the FME Server System Services Under Different Accounts

1. **(FME Server Engines service only)** If your FME Engines are installed separately from the FME Server Core (Adding FME Engines on a Separate Machine), you may need to update the user account that runs the FME Engines to provide read/write access to the FME Server System Share and FME Server installation directory. Ensure that account has the necessary permissions on the FME Server Core and FME Server Database machines. For more information, see Running the FME Server Engines Under a Different Account.
2. Open the Windows Services:

   Select Start > Control Panel > Administrative Tools > Services.

   Or

   Run `services.msc`.
3. In the Services list, right-click FME Server Application Server, FME Server Core, or FME Server Engines, and select Properties.

   > **Note** The FME Server Core service is dependent on the FME Server Database service, which must remain under the Local System account.
4. In the Properties dialog, click the Log On tab.
5. Select This account, and specify a user account and password that provides permissions to the FME Server System Share and FME Server installation directory. If

you are updating the FME Server Engines account, make sure the account corresponds to the user you specified in Step 1.

6. If Cross-Origin Resource Sharing settings have been updated, and you are updating the FME Server Engines account, grant Write permissions on file cors.properties to the user you specified in Step 1. This file is located in the \localization\clients folder of the FME Server System Share. For more information, see Directory and Account Permissions. (You must have direct access to this file; it is not available from the Resources page of the Web User Interface.)
7. Click OK.
8. Restart the FME Server System Services you updated.

Encrypting the FME Server Database Password

The password for the FME Server Database is stored in the fmeDatabaseConfig.txt configuration file.

By default, the password is encrypted. The password may be unencrypted if it was manually updated after installation. To encrypt the FME Server Database password, follow these steps:

1. From all machines on which the FME Server Core is installed, open a command prompt and start a PowerShell session. For example, on Windows, the command is:

   ```
   powershell.exe
   ```
2. Change the directory to <*FMEServerDir*>\Clients\utilities\
3. Run encryptConfigSetting.ps1 (Windows) or encryptConfigSetting.sh (Linux), and supply the following parameters:
   - `DB_PASSWORD`
   - The `DB_PASSWORD` value. Find this in fmeDatabaseConfig.txt, and ensure it corresponds to your database server type. If your FME Server is an Express installation, your database server (`DB_TYPE`) is `postgresql`. If your FME Server is a

Custom installation, your database server (`DB_TYPE`) is either `postgresql`, `sqlserver`, or `oracle`.

For example:

```
.\encryptConfigSetting.ps1 DB_PASSWORD fmeserver
```

4. Copy the encrypted password that is generated from the command prompt output and paste it over the unencrypted `DB_PASSWORD` value in fmeDatabaseConfig.txt.
5. Save fmeDatabaseConfig.txt, and restart FME Server.

> **Warning** Any change to System Encryption, including generating a new custom encryption key, or reverting to default encryption, also affects the FME Server Database password. To ensure this password is based on the current key, you must perform these steps again following any changes performed in System Encryption.

7

Other Tasks

Licensing and Administration Tasks

Licensing

Select **System Configuration** > **Licensing**.

License files are installed, by default, to:Windows: `C:\ProgramData\Safe Software\FME Server\licenses`Linux: `/opt/fmeserver/licenses`Dynamic Engine (CPU Usage) licensing is not available for engines on FME Cloud.

Automatic Mode (Recommended)

If your FME Server host machine has an internet connection, you can request and install a license online without any need for downloading and re-uploading a license file.

> **Note**
>
> - Licensing FME Server over the internet requires no inbound connection. For more information, see FME Server Automatic Licensing URLs.
> - If you purchased credits for Dynamic Engines (CPU Usage), automatic mode only is supported. Manual mode licensing (below) is not supported.

1. Open the FME Server Web User Interface as a user assigned to the fmesuperuser role. If none of your FME Engines are licensed, you will see a prompt to activate FME Server. Click on the prompt. Otherwise, select **System Configuration** > **Licensing**.
2. Click **Request New License**.
3. Complete the fields on the Request a New License page. If you have a product *Serial Number*, be sure to provide it. If not, you will receive a 7-day evaluation license, which you can extend to 60 days (see below).

> **Note** In addition to licenses for standard FME Engines, an evaluation license that is requested in Automatic Mode includes 100 hours of Dynamic Engine (CPU Usage) credits.

4. *Licensing Mode*: Select **Automatic**.
5. Click **OK**.
6. A message indicates that your license is installed, and your available engines appear momentarily on the Engines page.

> **Note** If the Serial Number you provided includes Dynamic Engines (CPU Usage), they are not configured to start by default. You can start and configure your Dynamic Engines on the Engines page.

Manual Mode

If you prefer not to use an internet connection for licensing, or if your FME Server host machine does not have an internet connection, use this process to install a license.

> **Note** If you purchased credits for Dynamic Engines (CPU Usage), manual mode licensing is not supported. Use automatic mode for licensing (above). For more information, contact your Safe Software sales representative.

1. Open the FME Server Web User Interface as a user assigned to the fmesuperuser role. If none of your FME Server engines are licensed, you will see a prompt to activate FME Server. Click on the prompt. Otherwise, select **System Configuration** > **Licensing**.
2. Click **Request New License**.

3. Complete the fields on the Request a New License page. If you have a product *Serial Number*, be sure to provide it. If not, you will receive a 7-day evaluation license, which you can extend to 60 days (see below).
4. *Licensing Mode*: Select **Manual**.
5. Click **OK**. A license request .json file downloads.
6. Email the .json file to codes@safe.com.
7. You will receive an email from Safe Software with a license file, which has a `.fmelic` extension. Download the file.
8. Return to the Licensing page. Under Standard Engines, click **Upload License File** and select the `.fmelic` file to upload. Or, drag and drop the `.fmelic` file onto the page under Standard Engines. A message indicates that it is installed, and your available engines appear on the Engines page.

Extending an Evaluation License

If you installed a 7-day evaluation license, you should have an email from codes@safe.com that allows you to extend the license to 60 days.

Automatic Mode (Recommended)

If your FME Server host machine has an internet connection, you can extend an evaluation license online without any need for downloading and re-uploading a license file.

1. Open the email and click the link as instructed.
2. A web page opens indicating the request was successful. Additionally, a link is provided to download the license file. Click the link to download the file for safekeeping.
3. Return to **System Configuration** > **Licensing** and click **Refresh License**. The license should now be extended accordingly. The EXPIRES field shows the new expiry date.

Manual Mode

If you prefer not to use an internet connection for licensing, or if your FME Server host machine does not have an internet connection, use this process to extend an evaluation license.

1. Open the email and click the link as instructed.
2. A web page opens indicating the request was successful. Additionally, a link is provided to download the license file. Click the link to download the file.
3. Return to **System Configuration** > **Licensing** and click **Upload License File**. Or, drag and drop the file onto the page. (You may need to move the license to a location where it can be accessed). A message indicates that it is installed. The license should now be extended accordingly. The EXPIRES field shows the new expiry date.

Problems?

- FME Server Troubleshooting: FME Server Engines
- Contact codes@safe.com.

See Also

- FME Server Licensing Walk-Through
- FME Server Automatic Licensing URLs
- FME Engines

Configuring the FME Engine

Configuring Implicit NAD27 to NAD83 Datum Shifts

If you plan to run workspaces that transform data between the datums NAD27 and NAD83 without explicitly choosing a transformation in a CsmapReprojector transformer, you must decide whether to use datum shift files for Canada or the US.

To apply the setting to all FME processes run on the machine

Run one of the following scripts:

Windows

- Canada: <*FMEServerDir*>Server/fme/utilities/setNAD2783datumCanada.bat
- US: <*FMEServerDir*>Server/fme/utilities/setNAD2783datumUSA.bat

Linux

- Canada: <*FMEServerDir*>Server/fme/utilities/setNAD2783datumCanada.sh
- US: <*FMEServerDir*>Server/fme/utilities/setNAD2783datumUSA.sh

To apply the setting only to FME processes run by the current user

> **Note** A current user can also be a Service Account.

Run one of the following from a command prompt:

> **Note** You must run the following commands as an Administrator.

- Canada: <FMEServerDir>`Server/fme/fme APPLY_SETTINGS "CoordSys/NAD2783 Datum Shift" "canada only"`
- US: <FMEServerDir>`/Server/fme/fme APPLY_SETTINGS "CoordSys/NAD2783 Datum Shift" "usa only"`

To apply different settings for specific FME Engines

In your FME Server architecture, you may want a set of FME Engines on one machine to run jobs that use the Canada datum shift files, and another set of FME Engines on another machine to run jobs that use the US datum shift files.

First, identify and configure separate operating system user accounts to run the distributed FME Engines. For more information, see Running the FME Server Engines Under a Different Account.

Next, for each user account configured to run a set of FME Engines, run the applicable command (above).

Finally, use Job Queues to ensure your workspaces are run by the intended engine.

Configuring PROJ Network Settings

To run workspaces from FME Server that use transformers to perform PROJ library reprojections (such as PROJReprojector and PROJAttributeReprojector), you may need to configure applicable PROJ networking settings.

To configure PROJ networking settings, run the following commands as an Administrator from a command prompt:

To enable PROJ networking

PROJ networking is enabled by default. To disable:

```
<FMEServerDir>Server/fme APPLY_SETTINGS Reproject/PROJ/Networking/Enabled "false”
```

To re-enable:

```
<FMEServerDir>Server/fme APPLY_SETTINGS Reproject/PROJ/Networking/Enabled "true”
```

To set a CDN endpoint

By default, the PROJ content delivery network (CDN) accesses grid files from https://cdn.proj.org. To change this endpoint:

```
<FMEServerDir>Server/fme APPLY_SETTINGS "Reproject/PROJ/Networking/CDN Endpoint" "<Endpoint>”
```

To set the maximum grid cache size

By default, the maximum size of the cache to allocate on the local system for grid files is unlimited, which corresponds to a value of -1. To limit the disk cache size, specify a value, in megabytes, with this command:

```
<FMEServerDir>Server/fme APPLY_SETTINGS "Reproject/PROJ/Networking/Grid
Cache Maximum Size" "<GridCacheMaxSize>”
```

Configuring Grid Transformation Definitions

To reproject between coordinate systems that have different datums in workspaces run from FME Server, use a grid transformation override file that references custom grid files.

You must make the desired changes in FME Workbench, then manually copy the applicable grid override file to FME Server.

1. In FME Workbench, click Tools > FME Options > Coordinate Systems, and edit the applicable grid transformation.
2. Upload the grid shift file to <*FMEServerDir*>\Server\fme\Reproject\GridData on all machines with FME Engines, assuming the installation directory is the same. If not, specify a shared file location outside of <*FMEServerDir*>.
3. Locate the applicable grid override file from the FME Desktop machine:

   Windows:

   ```
   <user>\My Documents\FME\CoordinateSystemGridOverrides\<grid_
   override_file>.txt
   ```

   Linux:

   ```
   > ~/.fme/CoordinateSystemGridOverrides
   ```
4. Make a copy of the grid override file.
5. Open the copy in a text editor. You will see a relative path to the `.\GridData\<GRID_SHIFT_FILE>` file. Change the relative path to a fully-qualified path to the `<FMEServerDir>\Server\fme\Reproject\GridData\<GRID_SHIFT_FILE>.gsb` file.

> **Note** If any part of the path contains spaces, enclose the entire path in quotation marks (""). If paths containing spaces are not enclosed in quotation marks, the FME Server Engines service may fail to restart.

6. Save and close the file.
7. On the Resources page, upload the grid override text file to the CoordinateSystemGridOverrides folder, under Engine.
8. Restart FME Server.

Using Python with FME Server

If you run workspaces from FME Server that reference Python, the FME Engines must know which Python interpreter to use. Workspaces built with FME Desktop 2016 or later tell FME which version of Python is required to run Python code through the Python Compatibility workspace parameter.

The Python interpreter that the FME Engines actually use is the one that most closely matches the Python Compatibility workspace parameter, which, by default, is FME’s latest supported version of Python 3. To change the default Python interpreter used by the FME Engines, see Changing the Python Interpreter (Windows only) (below).

Using Additional Python Modules

If you need to reference a Python module from FME Server that is not part of the Python standard library, follow these steps to: 1) Obtain the module (if you have not already); and 2) Upload the module.

Obtaining the Python Module

If you do not already have the Python module you want to reference, install the package with the following command:

```
> fme.exe python -m pip install <package_name>
```

For example, to install a package named PyExecJS:

```
> fme.exe python -m pip install PyExecJS
```

This command installs the Python module to the FME shared Python user directory:

C:\Users\<*user*>\Documents\FME\Plugins\Python\python<*XY*>

Where <*user*> is the Windows user name and <*XY*> is the Python version of the FME Python interpreter.

Uploading the Python Module

1. In the C:\Users\<*user*>\Documents\FME\Plugins\Python directory, locate the files or folders of the Python module you installed, such as .pyc or.py files, as well as any sub-directories that may contain init.pyc or main.pyc files of your package.
2. Use the Upload tool on the Resources page of the Web User Interface, and upload these file(s) and/or folder(s) to the folder under Engine\Plugins\python that corresponds to the Python release compatible with the module (for example, python36).

Changing the Python Interpreter (Windows only)

> **Note** Beginning with FME Server version 2019.0 on Linux, changing the Python interpreter is not supported.

Sometimes you will want to use a Python interpreter other than the ones shipped with FME Server. In that case, you can change the interpreter through the following procedure:

> **Note** The Python interpreter specified by this procedure does not guarantee the FME Engines will use the interpreter for all workspaces. Instead, the FME Engines use the specified interpreter for all workspaces that have a *Python Compatibility* value that is compatible with the specified interpreter. If the *Python Compatibility* of a workspace is not compatible with the specified interpreter, the FME engines use one of their own Python interpreters that is compatible.

Open a command prompt, specifying **Run as administrator**, and run the following commands:

FME Server 2018.0 and earlier

```
<FMEServerDir>Server/fme/fme.exe APPLY_SETTINGS SYSTEM "Python/Use Custom Python" true
<FMEServerDir>Server/fme/fme.exe APPLY_SETTINGS SYSTEM "Python/Python Interpreter" c:/<path_to_dll>.dll
```

> **Note** For information on how to locate Python dll's (`<path_to_dll>`), see Choosing a different Python Interpreter in the FME Community.

FME Server 2018.1 and later

```
<FMEServerDir>Server/fme/fme.exe APPLY_SETTINGS SYSTEM "Python/Use Custom Python 64" true
<FMEServerDir>Server/fme/fme.exe APPLY_SETTINGS SYSTEM "Python/Python Interpreter 64" c:/<path_to_dll>.dll
<FMEServerDir>Server/fme/fme.exe APPLY_SETTINGS SYSTEM "Python/Custom Python Home 64" c:/<path_to_python_home>
```

> **Note** `<path_to_python_home>` is the installation location of Python.

Using R with FME Server

To execute R scripts from FME Server, such as through the RCaller transformer in an FME Desktop workspace, you must perform the following on all machines that run FME Engines:

1. Install R
2. Install the sqldf package for R

Alternatively, you can direct the FME Engines to an R interpreter that is installed in a non-standard location.

Install R

Download R installers from https://www.r-project.org/.

Windows

Run the installer as administrator. Right-click on the installer in the Start menu and select **Run as administrator**.

Linux

To install R on Linux, we recommend using a package manager.

Install the sqldf package for R

Choose one of the following options:

- Standard install (perform on all machines that run FME Engines)
- Upload to Resources

Standard Install

1. Open the R command prompt as administrator, and run the following command:

   ```
   install.packages('sqldf')
   ```
2. A window launches prompting you to select a download mirror. After selecting a mirror, the sqldf package is installed to the system-wide R library.
3. To verify that sqldf is installed correctly, run the following command:

   ```
   .libPaths()
   ```

   The returned path should include a folder `sqldf`.

Upload to Resources

Use the Upload tool on the Resources page of the FME Server Web User Interface, and upload the package libraries under Engine\Plugins\R.

Using an R Interpreter Installed in a Non-Standard Location

You can direct the FME Engines to use an R interpreter that is installed in a non-default location. To set the path to the interpreter you want to use, run the following command from a command prompt, on all machines running FME Engines:

Windows

> **Note** To avoid errors, the Windows Command Prompt must likely be run as administrator, even if you are currently running your machine with administrator privileges. From the Start Menu, right-click on Command Prompt and select Run as administrator.

- `<FMEServerDir>Server/fme/fme.exe APPLY_SETTINGS SYSTEM "Settings/Rscript Interpreter" <path_to_executable>`

Linux

- `<FMEServerDir>Server/fme/fme APPLY_SETTINGS SYSTEM "Settings/Rscript Interpreter" /<path_to_executable>`

Working with the FME Server System Services

About the FME Server System Services

FME Server is comprised of a series of components, and each component is installed as a standard Windows service.

FME Server Application Server

On install, if you use the default FME Server Web Application Server, the service automatically starts at system boot time. If you are using your own web application server, it is important to note that the FME Server Web Services are deployed and run by your web application server, not by FME Server itself. Ensure that your web application server is started for users to access any FME Server web services including the Web User Interfaces.

FME Server Core

The FME Server Core is the main FME Server service and should always be running. By default, this service is started at system boot time.

FME Server Database

On install, if you use the default FME Server Database, it creates a service called FME Server Database, which automatically starts at system boot time. If you used your own database, such as Oracle, ensure that the service starts prior to the FME Server Core service starting.

FME Server Engines

This service starts and runs the FME Engines.

Starting and Stopping FME Server Manually

Windows

Although the FME Server System Services start automatically, you can start and stop the services manually in the following ways:

- From the Services window (the procedure for accessing the services may vary by Windows version):

  Control Panel > Administrative Tools > Services

  Or

  Start > Run > services.msc

  In the Services window, select one or more of the services, and start or stop as required.

> **Note** On Windows 8, you must be running as Administrator to start or stop the FME Server System Services.

Linux

Linux scripts for starting and stopping FME Server are located in:

`<FMEServerDir>/Server/`

Although you can configure FME Server to start automatically, you can start it manually by running `startServer.sh` as the root user.

This script starts all the FME Server System Services in the necessary order. Alternatively, to start each service individually, run the following scripts, located in the same directory:

- `startCore.sh`: FME Server Core service
- `startEngines.sh`: FME Engines
- `startDatabaseServer.sh`: FME Server Database
- `startApplicationServer.sh`: FME Server Web Application Server
- `startWebSocketServer.sh`: FME Server WebSocket Server
- `startCleanup.sh`: FME Server Cleanup service
- `startRootServices.sh` - Starts all the services that run as the root user. This script calls `startWebSocketServer.sh`, `startCleanup.sh`, and `startApplicationServer.sh`.

To stop FME Server, run `stopServer.sh` as the root user.

Alternatively, stop the services individually with these scripts:

- `stopCore.sh`
- `stopEngines.sh`
- `stopDatabaseServer.sh`
- `stopApplicationServer.sh`
- `stopWebSocketServer.sh`
- `stopCleanup.sh`
- `stopRootServices.sh`

Determining FME Server Processes

To determine the FME Server processes that are running:

- Windows: Launch the Windows Task Manager. Ensure that the Task Manager is set to show processes from all users.
- Linux: Examine the output of:

  ```
  ps -A | grep -i fme
  ```

The following FME Server processes might be listed:

Windows	Linux	Description
FMECleanup.exe	FMECleanup	FME Server System Cleanup service
FMEConfiguration.exe	FMEConfiguration	FME Server Backup & Restore
FMEConnection.exe	FMEConnection	FME Server Database Connections and Web Connections access
FMEEngine.exe	fme	One for each running FME Engine
FMEMountPoint.exe	FMEMountPoint	FME Server Resources
FMENotifier.exe	FMENotifier	FME Server Subscriber Manager - requires the FME Server Core to be running
FMEProcessMonitorCore.exe	FMEProcessMonitorCore	FME Server Process Monitor for Core processes
FMEProcessMonitorEngines.exe	FMEProcessMonitorEngines	FME Server Process Monitor for Engine processes

Windows	Linux	Description
FMEPublisher.exe	FMEPublisher	FME Server Publisher (includes Automations Sources)
FMERelayer.exe	FMERelayer	FME Server Publisher Manager
FMEScheduler.exe	FMEScheduler	FME Server Schedules service - requires the FME Server Core to be running
FMEServer.exe	FMEServer	FME Server Core
FMEServer_ ApplicationServer.exe	java	The Apache Tomcat Web Application Server (servlet) that is installed with an Express installation of FME Server, or as an option with a Distributed installation of FME Server.

Windows	Linux	Description
FMESMTPRelay.exe	FMESMTPRelay	FME Server SMTP email receiver. For more information, see Configuring FME Server to Receive Email.
FMESubscriber.exe	FMESubscriber	FME Server Subscriber (includes Automations Destinations) - requires the FME Server Core to be running
FMEWebSocket.exe	FMEWebSocket	FME Server WebSocket Server. For more information, see WebSocket Publisher and WebSocket Subscriber.
postgres.exe	postgres	The PostgreSQL server for the FME Server Database that is installed with an Express installation of FME Server.
redis-server.exe	redis-server	FME Server Queue, for managing Job Queues.

Configuring FME Server as a System Service (Linux)

You can configure FME Server as a system service that starts when you start your system. You should do this only if you have set up system services before and understand the different run levels on your system.

> **Warning** Configuring scripts to run at start-up on Linux is an advanced task. The steps for doing so vary, depending on your configuration. Use the steps listed in this section as a guide only.

FME Server is composed of a series of components, and each component has its own scripts. Both systemd and SysV scripts are provided.

Configuring with systemd Scripts

Getting Started

The following FME Server systemd startup scripts are provided upon installation:

- *<FMEServerDir>*/Server/startup/systemd/fmeserver-appserver.service
- *<FMEServerDir>*/Server/startup/systemd/fmeserver-cleanup.service
- *<FMEServerDir>*/Server/startup/systemd/fmeserver-core.service
- *<FMEServerDir>*/Server/startup/systemd/fmeserver-database.service
- *<FMEServerDir>*/Server/startup/systemd/fmeserver-engines.service
- *<FMEServerDir>*/Server/startup/systemd/fmeserver-websocket.service

1. Copy these scripts and place them in the following directory, depending on your privilege level:
   - root privilege: /etc/systemd/system/
   - user-level privilege (no system administration rights): /usr/lib/systemd/system/
2. If the Web Application Server component of FME Server is configured for communication on a port under 1024, this service runs as the root user. Open fmeserver-appserver.service and remove the following lines:

```
User=fmeserver
Group=fmeserver
```

3. Create a new folder `tomcat` in /var/run with `fmeserver:fmeserver` ownership.
4. Change ownership of tomcat logs in /opt/fmeserver/Utilities/tomcat/logs/ to `fmeserver:fmeserver`.

To enable startup scripts to run at system boot time

Run the following command for each script:

```
systemctl enable *.service
```

For example:

```
systemctl enable fmeserver-core.service
```

To disable startup scripts from running at system boot time

Run the following command for each script:

```
systemctl disable *.service
```

For example:

```
systemctl disable fmeserver-core.service
```

To start services manually

Run the following command for each script:

```
systemctl start *.service
```

For example:

```
systemctl start fmeserver-core.service
```

To stop services manually

Run the following command for each script:

```
systemctl stop *.service
```

For example:

```
systemctl stop fmeserver-core.service
```

Configuring with SysV Scripts

Make a copy of the FME Server startup scripts:

- *<FMEServerDir>*/Server/startup/SysV/FMEServerAppServer
- *<FMEServerDir>*/Server/startup/SysV/FMEServerCleanup
- *<FMEServerDir>*/Server/startup/SysV/FMEServerCore
- *<FMEServerDir>*/Server/startup/SysV/FMEServerDatabase
- *<FMEServerDir>*/Server/startup/SysV/FMEServerEngines
- *<FMEServerDir>*/Server/startup/SysV/FMEServerWebSocket

Place the scripts here:

- /etc/init.d/FMEServerAppServer
- /etc/init.d/FMEServerCleanup
- /etc/init.d/FMEServerCore
- /etc/init.d/FMEServerDatabase
- /etc/init.d/FMEServerEngines
- /etc/init.d/FMEServerWebSocket

From the /etc/init.d/ directory, update permissions on these files with the following `chmod` command:

```
sudo chmod +x FME*
```

Register the FME Server services with the following command:

```
sudo update-rc.d FMEServer* defaults
```

Purging Logs and History

As FME Server processes jobs, the history of these jobs is stored as records in the repository database and as log files in the file system. Eventually, the volume of these records and logs can build up and cause issues, such as slow web interface response time and low disk space.

To purge log files and job history, use the tools on the System Cleanup page of the Web User Interface.

Changing the Web Application Server Host Name and Port

Often you install FME Server and then need to update the web application server host name or port.

The following instructions assume the Apache Tomcat server that is bundled by default with an FME Server installation is the one currently in use.

Update Service URLs (For Updating Host Name or Port)

1. Log in to the FME Server Web User Interface.
2. Navigate to Services.
3. Click on each service to open the Editing Service page.
4. In the *URL Pattern* field, make the appropriate changes and click **OK** when done.

Update FME Server Web URL (For Updating Host Name or Port)

On the machine hosting the FME Server core:

1. Open the fmeServerConfig.txt configuration file.
2. Locate the FME_SERVER_WEB_URL directive and update the URL value to the new web applications server host and/or port. For example:

   ```
   FME_SERVER_WEB_URL=http://MY_WEBAPP_HOST:80
   ```

Note If Topic Monitoring no longer functions after updating the host name, perform the following additional configuration:

1. Open the propertiesFile.properties file for the FME Server service.
2. Add the line `WEB_SOCKET_SERVER_NAME=<hostname>`, where `<hostname>` is the new host name. Optionally, add the line `WEB_SOCKET_SERVER_PORT=<port>`, where `<port>` is the new port.
3. Restart FME Server.

Update the Web Application Server XML File (For Updating Port)

To update the web application server xml file (server.xml), first determine if your FME Server is configured for HTTPS traffic. Then, follow the applicable instructions:

FME Server not configured for HTTPS

1. Open the server.xml file, located in <*FMEServerDir*>\Utilities\tomcat\conf\.
2. Locate the first instance of a line that begins: `<Connector port=`
3. Change the specified port as desired. For example, change `Connector port="80"` to `Connector port="8080"`.
4. Save the server.xml file.
5. Restart the Tomcat application server.

FME Server configured for HTTPS

1. Open the server.xml file, located in <*FMEServerDir*>\Utilities\tomcat\conf\.
2. Locate the first instance of a line that begins: `<Connector protocol=`
3. Change the specified port as desired. For example, change `port="443"` to `port="4443"`.
4. Locate the line that begins: `<Connector port=`

5. Change the `redirectPort` parameter to the same port specified in the previous step. For example, change `redirectPort="443"` to `redirectPort="4443"`.
6. Save the server.xml file.
7. Restart the Tomcat application server.

See Also

- Moving the Web Applications Server to Another Machine

Configuring International Character Encoding

By default, FME Server tries to detect how your web service handles international character encodings. Beginning with FME Server 2013, you can manually configure the FME Server Web Services and Web User Interface for international character encoding. To do this, you must configure each service and web application separately.

To configure international character encoding for a particular FME Server Web Service or for the Web User Interface:

1. Open the web application's deployment descriptor web.xml file. This file is installed at `<`*`webAppDir`*`>/WEB-INF/web.xml`.
2. Find the `<filter>` element with `<filter-name>i18nFilter` and `<filter-class>COM.safe.web.servlet.CharsetEncodingFilter`.
3. Add/modify the <init-param> directives to configure international character encodings for this web application according to the table below:

Parameter Name	Type	Description
charset	string	Sets the character set to use. UTF-8 is recommended.
detect-encodings	boolean	“true” to automatically detect encodings. “false” to disable.
auto-encoded	list	A list of comma-separated keywords that specify what should be encoded by the specified character set (see charset). Available keywords: • querystring – Encode query strings in the URI. • path – Encode the path component of the URI. • body – Encode the request body for each request.

For further instructions, see the J2EE Servlet Specification v2.5.

Moving the FME Server System Share to Another Machine

The FME Server System Share is the location for storing Repositories and Resources. You may want to specify a new location for the System Share, and move all of its existing contents, to another networked machine.

To move the System Share, perform an upgrade operation (even if you are 'upgrading' to the same version of FME Server). At the Install procedure (after Backup and Uninstall), select a Distributed/Fault Tolerant installation. During the install, on the FME Server System Share dialog, specify the path to the new location. After reinstalling, perform a Restore.

Providing Support for OGC Services

Beginning with FME Server 2016, Safe Software recommends providing Open Geospatial Consortium (OGC) services by configuring FME Desktop workspace templates that implement the OGC standard, and registering them to the FME Server Data Streaming Service to provide output. This method provides fuller control over OGC features than OGC services that were native to FME Server in previous releases.

To get started, workspace templates are available for both the OGC Web Feature Service (WFS) and OGC Web Mapping Service (WMS). You can then configure them to provide basic services with your data. For instructions and downloads, see the following:

- OGC WFS: How to Create a WFS Service Using FME Server
- OGC WMS: How to Create a WMS Service Using FME Server

Backup, Restore, and Migration Tasks

Migrating an FME Server Configuration

To migrate the configuration of an FME Server instance to another instance, perform a backup and restore operation using the tools on the Backup & Restore page of the FME Server Web User Interface.

Performing Scheduled Backups of an FME Server Configuration

FME Server provides a workspace that you can configure to perform regular (scheduled) backups of your Server configuration to an FME Server configuration (.fsconfig) file.

> **Note** For information about the contents of a backup, see Backup & Restore.

To Configure a Scheduled Backup

1. Log in to the FME Server Web User Interface.
2. Select **Schedules**.
3. Click the Backup_Configuration entry.
4. On the Editing Schedule page, check the *Enabled* box.
5. Edit other parameters as necessary. See Adding a Scheduled Task for more information.

   The following published parameters are specific to the Backup_Configuration schedule:

   - *Append Date*: If **Yes**, the date and time of the backup is appended to the filename.
   - *Server Username*: The user performing the backup. The user must belong to the the fmesuperuser role.
   - *Server Password*: Password of the user.
   - *Backup Destination*: The file to store the backup. You can specify a Resources location, or another location that is accessible by the engine running the workspace. It can refer to a UNC path.
6. Click **OK**.

Notifications Tasks

Configuring FME Server to Receive Email

FME Server can receive email via Simple Mail Transfer Protocol (SMTP) or Internet Message Access Protocol (IMAP). Using Automations, you can publish emails to Notification Service topics using either the Email - SMTP or the Email - IMAP trigger.

SMTP or IMAP?

When deciding between SMTP or IMAP, keep in mind the following:

- IMAP is a pull-based mechanism. The Email (IMAP) Trigger polls an existing IMAP server (such as imap.gmail.com) for messages. As long as IMAP access is enabled on the email account, no additional configuration is needed. However, because polling is conducted at intervals, FME Server may not receive email messages as immediately as those sent over SMTP.
- SMTP is a push-based mechanism. FME Server acts as is its own lightweight SMTP server, and receives emails directly, rather than polling for them. As a result, emails may be sent to FME Server topics (and their subscribed workspaces) more immediately than emails delivered over IMAP.
- SMTP functions only on an instance of FME Server with a proper DNS record (that is, the server is accessible over the internet). If your instance of FME Server runs locally or on an intranet, you must use IMAP.
- SMTP is not supported in a fault tolerant installation of FME Server.

Changing the Default SMTP Port (Optional)

By default, SMTP operates over port 25 on Windows and port 7125 on Linux. If you want to change the default port (non-FME Cloud installations only), follow these steps:

> **Note** Be sure to configure your network firewall settings to allow transmission of emails to FME Server on the applicable port.

1. Determine the port on the FME Server Core host that will be used to receive emails.

   > **Note** Be sure to configure your network firewall settings to allow transmission of emails to FME Server on this port.

2. Open the SMTP publisher configuration file:

   <*FMEServerDir*>\Server\config\publishers\email.properties

3. Locate parameter `SMTP_PORT`, and update the setting to the desired port. By default, this parameter is set to port 25 on Windows installations, and 7125 on Linux.

> **Note** To specify a port under 1024 on Linux, configure either of the following:
>
> - Elevated privilege on the FME Server System Services (run as root). For more information, see Starting and Stopping FME Server Manually.
> - Port forwarding: Configure the FME Server Core to route and forward from a source port to a destination port. For example, route traffic on port 25 to port 7125.

4. Restart the FME Server Core service.

Configuring FME Server to Send Email Notifications

FME Server can send emails when a variety of system events occurs, such as the success or failure of jobs that are run from FME Server, or when a repository is created.

For more information, see Monitoring FME Server with Notifications.

Workflow and Resources Tasks

Sending Jobs to Specific Engines with Job Queues

Job queues are a mechanism for sending specific jobs to specific FME Engines. Job queues are configured in the FME Server Web User Interface. For more information, see Job Queues.

Job Recovery

After FME Server submits a translation request to an FME Engine, it monitors the connection to that engine until a response is returned.

If the connection to the engine is lost, or the engine crashes, FME Server resubmits a job to the next available FME Engine in the queue.

To prevent FME Server from indefinitely resubmitting a job, the default setting is to resubmit a job up to three times. This setting is configurable.

Configuring Job Recovery

The `MAX_FAILED_TRANSACTION_REQUEST_RETRIES` parameter in the fmeServerConfig.txt configuration file determines the number of times any transaction is resubmitted before FME Server stops resending the request. A value of < 0 means that no maximum limit is imposed, and requests are resubmitted indefinitely. A value of 0 means that automatic resubmission is disabled. If this parameter is absent, a default value of 3 is used.

> **Warning** A failed job request may cause an FME Engine to shut down improperly. When no maximum limit is imposed, the translation is resent indefinitely, which may cause repeated FME Engine failures.

Sharing FME Engine Resources

Workspaces that are run from FME Server can use custom formats, custom transformers, and custom coordinate systems in the same way that FME Workbench does. There are three ways to upload these shared custom resources to FME Server:

- Use the Resources page of the FME Server Web User Interface: This method makes custom formats, custom transformers, and custom coordinate systems available to all workspaces on FME Server.
- Publish to FME Server: Makes a custom format or custom transformer available to all workspaces in the same repository to which it is published.
- Publish to FME Server with a Workspace: This method allows you to add resources when publishing a workspace. You can upload the resources to a repository or to a resources folder. If you upload to a resources folder, the resources are available to all other workspaces on FME Server. If you choose a repository, the resources are available

to all other workspaces in the same repository to which the current workspace is published.

To publish custom resources to FME Server

1. Open the custom format or custom transformer in FME Workbench:

   File > Open > Select custom format/transformer

2. Publish the resource to FME Server as you would publish a workspace.

   The resource then becomes available to workspaces within the repository to which you published it.

To publish custom resources to FME Server when publishing a workspace

1. Open the workspace you want to publish in FME Workbench.
2. Start the Publish to FME Server wizard:

   File > Publish to FME Server

3. On the Publish Workspace dialog, click Select Files.
4. On the Upload Files dialog, click Add Files.
5. Select the resource file you want to include.
6. On the Upload Files dialog, click Change Location.
7. On the Change Upload Location dialog, specify an Upload Directory:
   - Upload to Repository: All resources published with the workspace are accessible to any user with permission on the same repository. Other workspaces in the repository can access these resources, provided their respective source dataset parameters are manually set to point to the resources.
   - Upload to a shared resource folder: All resources published with the workspace will be available to all other workspaces run from FME Server, from any repository. Resources must be uploaded to the applicable subdirectory under **Engine** in order

for workspaces to use them. For example, a custom format must be uploaded to the **Engine > Formats** folder.

> **Note** If custom coordinate system files are uploaded to any of the applicable ***Engine*** subfolders, the FME Server Engines service must be restarted before they can be used in a workspace. These include the ***CoordinateSystemExceptions***, ***CoordinateSystemGridOverrides***, ***CoordinateSystems***, and ***CsmapTransformationExceptions*** subfolders.

8. Complete the Publish to FME Server wizard as usual.