Eclipse GlassFish Server Quick Start Guide, Release 5.1

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Eclipse GlassFish Server

Quick Start Guide

Release 5.1

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This book demonstrates key features of the GlassFish Server product and enables you to quickly learn the basics. Step-by-step procedures introduce you to product features and GlassFish Server Open Source Edition 5.1 Quick Start Guide Eclipse GlassFish Server 5.1 Quick Start Guide you to use them immediately.

Eclipse GlassFish Server Quick Start Guide, Release 5.1

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Preface

This documentation is part of the Java Enterprise Edition contribution to the Eclipse Foundation and is not intended for use in relation to Java Enterprise Edition or Orace GlassFish. The documentation is in the process of being revised to reflect the new Jakarta EE branding. Additional changes will be made as requirements and procedures evolve for Jakarta EE. Where applicable, references to Java EE or Java Enterprise Edition should be considered references to Jakarta EE.

Please see the Title page for additional license information.

This book demonstrates key features of the GlassFish Server product and enables you to quickly learn the basics. Step-by-step procedures introduce you to product features and enable you to use them immediately.

This preface contains information about and conventions for the entire GlassFish Server Open Source Edition (GlassFish Server) documentation set.

GlassFish Server 5.0 is developed through the GlassFish project open-source community at `https://javaee.github.io/glassfish/`. The GlassFish project provides a structured process for developing the GlassFish Server platform that makes the new features of the Java EE platform available faster, while maintaining the most important feature of Java EE: compatibility. It enables Java developers to access the GlassFish Server source code and to contribute to the development of the GlassFish Server. The GlassFish project is designed to encourage communication between Oracle engineers and the community.

The following topics are addressed here:

- GlassFish Server Documentation Set
- Typographic Conventions
- Symbol Conventions

GlassFish Server Documentation Set

The GlassFish Server documentation set describes deployment planning and system installation. For an introduction to GlassFish Server, refer to the books in the order in which they are listed in the following table.

Book Title	Description
Release Notes	Provides late-breaking information about the software and the documentation and includes a comprehensive, table-based summary of the supported hardware, operating system, Java Development Kit (JDK), and database drivers.
Quick Start Guide	Explains how to get started with the GlassFish Server product.
Installation Guide	Explains how to install the software and its components.
Upgrade Guide	Explains how to upgrade to the latest version of GlassFish Server. This guide also describes differences between adjacent product releases and configuration options that can result in incompatibility with the product specifications.
Deployment Planning Guide	Explains how to build a production deployment of GlassFish Server that meets the requirements of your system and enterprise.
Administration Guide	Explains how to configure, monitor, and manage GlassFish Server subsystems and components from the command line by using the `asadmin` utility. Instructions for performing these tasks from the Administration Console are provided in the Administration Console online help.
Security Guide	Provides instructions for configuring and administering GlassFish Server security.
Application Deployment Guide	Explains how to assemble and deploy applications to the GlassFish Server and provides information about deployment descriptors.
Application Development Guide	Explains how to create and implement Java Platform, Enterprise Edition (Java EE platform) applications that are intended to run on the GlassFish Server. These applications follow the open Java standards model for Java EE components and application programmer interfaces (APIs). This guide provides information about developer tools, security, and debugging.
Embedded Server Guide	Explains how to run applications in embedded GlassFish Server and to develop applications in which GlassFish Server is embedded.
High Availability Administration Guide	Explains how to configure GlassFish Server to provide higher availability and scalability through failover and load balancing.
Performance Tuning Guide	Explains how to optimize the performance of GlassFish Server.
Troubleshooting Guide	Describes common problems that you might encounter when using GlassFish Server and explains how to solve them.
Error Message Reference	Describes error messages that you might encounter when using GlassFish Server.
Reference Manual	Provides reference information in man page format for GlassFish Server administration commands, utility commands, and related concepts.
Message Queue Release Notes	Describes new features, compatibility issues, and existing bugs for Open Message Queue.

Book Title	Description
Message Queue Technical Overview	Provides an introduction to the technology, concepts, architecture, capabilities, and features of the Message Queue messaging service.
Message Queue Administration Guide	Explains how to set up and manage a Message Queue messaging system.
Message Queue Developer's Guide for JMX Clients	Describes the application programming interface in Message Queue for programmatically configuring and monitoring Message Queue resources in conformance with the Java Management Extensions (JMX).
Message Queue Developer's Guide for Java Clients	Provides information about concepts and procedures for developing Java messaging applications (Java clients) that work with GlassFish Server.
Message Queue Developer's Guide for C Clients	Provides programming and reference information for developers working with Message Queue who want to use the C language binding to the Message Queue messaging service to send, receive, and process Message Queue messages.

Typographic Conventions

The following table describes the typographic changes that are used in this book.

Typeface	Meaning	Example
`AaBbCc123`	The names of commands, files, and directories, and onscreen computer output	Edit your `.login` file. Use `ls a` to list all files. `machine_name% you have mail.`

`AaBbCc123`	What you type, contrasted with onscreen computer output	`machine_name% su`
		
		`Password:`

AaBbCc123	A placeholder to be replaced with a real name or value	The command to remove a file is `rm` filename.
AaBbCc123	Book titles, new terms, and terms to be emphasized (note that some emphasized items appear bold online)	Read Chapter 6 in the User's Guide. A cache is a copy that is stored locally. Do not save the file.

Symbol Conventions

The following table explains symbols that might be used in this book.

Symbol	Description	Example	Meaning
`[ ]`	Contains optional arguments and command options.	`ls [-l]`	The `-l` option is not required.
`{ | }`	Contains a set of choices for a required command option.	`-d {y|n}`	The `-d` option requires that you use either the `y` argument or the `n` argument.
`${ }`	Indicates a variable reference.	`${com.sun.javaRoot}`	References the value of the `com.sun.javaRoot` variable.
-	Joins simultaneous multiple keystrokes.	Control-A	Press the Control key while you press the A key.
+	Joins consecutive multiple keystrokes.	Ctrl+A+N	Press the Control key, release it, and then press the subsequent keys.
>	Indicates menu item selection in a graphical user interface.	File > New > Templates	From the File menu, choose New. From the New submenu, choose Templates.

1 Quick Start for Basic Features

Eclipse GlassFish Server provides a server for the development and deployment of Java Platform, Enterprise Edition (Java EE platform) applications and web technologies based on Java technology. GlassFish Server 5.1 provides the following:

- A lightweight and extensible core based on OSGi Alliance standards
- A web container
- An easy-to-use Administration Console for configuration and management
- Update Tool connectivity for updates and add-on components
- Support for high availability clustering and load balancing

The following topics are addressed here:

- About This Quick Start Guide
- Default Paths and File Names
- Default Administration Values
- Starting and Stopping the Default Domain
- Starting and Stopping the Database Server
- Starting the Administration Console
- Deploying and Undeploying Applications
- High Availability Clustering and Load Balancing
- For More Information

About This Quick Start Guide

Eclipse GlassFish Server 5.1 Quick Start Guide demonstrates key features of the GlassFish Server product and enables you to quickly learn the basics. Step-by-step procedures introduce you to product features and enable you to use them immediately.

This guide assumes that you have already obtained and installed the GlassFish Server 5.1 software. For more information about installing GlassFish Server 5.1, see the GlassFish Server Open Source Edition Installation Guide.

Instructions and examples in this guide that apply to all supported operating systems use the forward slash character (/) as path separators in all file names and commands. Ensure that you use the correct character for the system on which GlassFish Server is installed. For example:

- UNIX, Linux, or Mac OS X systems: as-install `/bin/asadmin `

- Windows systems: as-install`\bin\asadmin`

This guide provides basic information only. For comprehensive information about GlassFish Server and other entities mentioned in this guide, see For More Information.

To review additional details about this release before you begin using the software, see the GlassFish Server Open Source Edition Release Notes. The Release Notes provide important information about the GlassFish Server 5.1 release, including details about new features, information about known issues and possible workarounds, and tips for installing and working with GlassFish Server 5.1 software.

Default Paths and File Names

The following table describes the default paths and file names that are used in this book.

Table 1-1 Default Paths and File Names

Placeholder	Description	Default Value
as-install	Represents the base installation directory for GlassFish Server.	Installations on the Oracle Solaris operating system, Linux operating system, and Mac OS operating system: user's-home-directory`/glassfish6/glassfish` Installations on the Windows operating system: SystemDrive`:\glassfish6\glassfish`
as-install-parent	Represents the parent of the base installation directory for GlassFish Server.	Installations on the Oracle Solaris operating system, Linux operating system, and Mac operating system: user's-home-directory`/glassfish6` Installations on the Windows operating system: SystemDrive`:\glassfish6`
domain-root-dir	Represents the directory in which a domain is created by default.	as-install`/domains/`
domain-dir	Represents the directory in which a domain's configuration is stored.	domain-root-dir`/`domain-name

Placeholder	Description	Default Value
instance-dir	Represents the directory for a server instance.	domain-dir`/`instance-name

Default Administration Values

The following table lists default administration values for GlassFish Server. See Default Paths and File Names for more information about the as-install and domain-dir placeholders.

Table 1-2 Default Administration Values

Item	Default Value or Location
Domain name	`domain1`
Master password	`changeit`
`asadmin`(1M) command-line utility	as-install`/bin`
Configuration files	domain-dir`/config`
Log files	domain-dir`/logs`
Administration server port	`4848`
HTTP port	`8080`
HTTPS port	`8181`
Pure JMX clients port	`8686`
Message Queue port	`7676`
IIOP port	`3700`
IIOP/SSL port	`3820`
IIOP/SSL port with mutual authentication	`3920`

Starting and Stopping the Default Domain

When you install GlassFish Server, a default domain named `domain1` is created. The following procedures describe how to start and stop `domain1` when it is the only domain. For information about starting and stopping a domain when there are multiple domains, see "Administering Domains" in GlassFish Server Open Source Edition Administration Guide.

To Start the Default Domain

Before You Begin

GlassFish Server software must be installed before you start the domain.

Run the `asadmin start-domain` command without an operand:

```
as-install/bin/asadmin start-domain
```

The command starts the default domain, `domain1`.

To Stop the Default Domain

Run the `asadmin stop-domain` command without an operand:

```
as-install/bin/asadmin stop-domain
```

The command stops the default domain, `domain1`.

To determine whether a domain is running, use the `asadmin list-domains` command:

```
as-install/bin/asadmin list-domains
```

Starting and Stopping the Database Server

A database server is not started by default when you start the GlassFish Server domain. If your applications require a database back end, you must start and stop the database server manually.

The following procedures describe how to start and stop the Apache Derby server that is bundled with GlassFish Server. For information about starting and stopping other database servers, see the documentation for your specific product.

For the list of database products supported in this release, see the GlassFish Server Open Source Edition Release Notes.

For more information about database connectivity, see "https://javaee.github.io/glassfish/documentation[Administering Database Connectivity]" in Eclipse GlassFish Server Administration Guide.

To Start the Apache Derby Server

Before You Begin

At least one GlassFish Server domain must be started before you start the database server.

Run the `asadmin start-database` command.

The general form for the command is as follows:

```
as-install/bin/asadmin start-database --dbhome directory-path
```

For example, to start the Apache Derby server from its default location:

```
as-install/bin/asadmin start-database --dbhome as-install-parent/javadb
```

To Stop the Apache Derby Server

Run the `asadmin stop-database` command:

```
as-install/bin/asadmin stop-database
```

Starting the Administration Console

The GlassFish Server Administration Console provides a browser interface for configuring, administering, and monitoring GlassFish Server.

To Start the Administration Console

Before You Begin

At least one GlassFish Server domain must be started.

1. Type the URL in your browser.
   The default URL for the Administration Console on the local host is as follows:

```
http://localhost:4848
```

1. If prompted, log in to the Administration Console.
   You will be prompted to log in if you chose to require an administration password at the time GlassFish Server was installed.

See Also

For more information, see the Administration Console online help.

Deploying and Undeploying Applications

The process of configuring and enabling applications to run within the GlassFish Server framework is referred to as deployment.

This section explains how to deploy, list, and undeploy applications. The procedures in this section use the `hello.war` sample application. The following topics are addressed here:

- To Obtain the Sample Application
- Deploying and Undeploying the Sample Application From the Command Line
- Deploying and Undeploying Applications by Using the Administration Console
- Deploying and Undeploying the Sample Application Automatically

To Obtain the Sample Application

1. Download a copy of the `hello.war` sample application from `https://javaee.github.io/glassfish/downloads/quickstart/hello.war`.
2. Save the `hello.war` file in the directory of your choice.
   This directory is referred to as sample-dir.

Deploying and Undeploying the Sample Application From the Command Line

GlassFish Server provides `asadmin` subcommands for performing the following deployment-related tasks:

- To Deploy the Sample Application From the Command Line
- To List Deployed Applications From the Command Line

- To Undeploy the Sample Application From the Command Line

To Deploy the Sample Application From the Command Line

Before You Begin

The sample application must be available before you start this task. To download the sample, see To Obtain the Sample Application. At least one GlassFish Server domain must be started before you deploy the sample application.

1. Run the `asadmin deploy` command.
   The general form for the command is as follows:

```
as-install/bin/asadmin deploy war-name
```

To deploy the `hello.war` sample, the command is as follows:

```
as-install/bin/asadmin deploy sample-dir/hello.war
```

1. Access the `hello` application by typing the following URL in your browser:

```
http://localhost:8080/hello
```

The application's start page is displayed, and you are prompted to type your name.

```
Hi, my name is Duke. What's yours?
```

1. Type your name and click Submit.
   The application displays a customized response, giving you a personal `Hello`.

See Also

For more information about the `deploy` subcommand, see `deploy(1)`.

For more information about deploying applications from the command line, see the GlassFish Server Open Source Edition Application Deployment Guide.

To List Deployed Applications From the Command Line

Run the `asadmin list-applications` command:

```
as-install/bin/asadmin list-applications
```

To Undeploy the Sample Application From the Command Line

Run the `asadmin undeploy` command.

The general form for the command is as follows:

```
as-install/bin/asadmin undeploy war-name
```

For war-name, use the literal `hello`, not the full `hello.war` name.

For the `hello.war` example, the command is as follows:

```
as-install/bin/asadmin undeploy hello
```

See Also

For more information about the `undeploy` subcommand, see `undeploy`(1).

Deploying and Undeploying Applications by Using the Administration Console ^^

The graphical Administration Console of GlassFish Server enables you to perform the following deployment-related tasks:

* To Deploy the Sample Application by Using the Administration Console
* To View Deployed Applications in the Administration Console
* To Undeploy the Sample Application by Using the Administration Console

To Deploy the Sample Application by Using the Administration Console

Before You Begin

The sample application must be available before you start this task. To download the sample, see To

Obtain the Sample Application. At least one GlassFish Server domain must be started before you deploy the sample application.

1. Launch the Administration Console by typing the following URL in your browser:

```
http://localhost:4848
```

1. Click the Applications node in the tree on the left.
   The Applications page is displayed.
2. Click the Deploy button.
   The Deploy Applications or Modules page is displayed.
3. Select Packaged File to be Uploaded to the Server, and click Browse.
4. Navigate to the location in which you saved the `hello.war` sample, select the file, and click Open.
   You are returned to the Deploy Applications or Modules page.
5. Specify a description in the Description field, for example:
   `hello`
6. Accept the other default settings, and click OK.
   You are returned to the Applications page.
7. Select the check box next to the `hello` application and click the Launch link to run the application.
   The default URL for the application is as follows:

```
http://localhost:8080/hello/
```

See Also

For more information, see the Administration Console online help.

To View Deployed Applications in the Administration Console

1. Launch the Administration Console by typing the following URL in your browser:

```
http://localhost:4848
```

1. Click the Applications node in the tree on the left.
   Expand the node to list deployed applications. Deployed applications are also listed in the table on the Applications page.

To Undeploy the Sample Application by Using the Administration Console

1. Launch the Administration Console by typing the following URL in your browser:

```
http://localhost:4848
```

1. Click the Applications node in the tree on the left.
   The Applications page is displayed.
2. Select the check box next to the `hello` sample application.
3. Remove or disable the application.
   - To remove the application, click the Undeploy button.
   - To disable the application, click the Disable button.

See Also

For more information, see the Administration Console online help.

Deploying and Undeploying the Sample Application Automatically

GlassFish Server enables you to performing the following deployment-related tasks automatically:

- To Deploy the Sample Application Automatically
- To Undeploy the Sample Application Automatically

To Deploy the Sample Application Automatically

You can deploy applications automatically by placing them in the domain-dir`/autodeploy` directory, where domain-dir is the directory of the domain for which you want to configure automatic deployment. For this example, use the default domain, `domain1`, in the default domain-root-dir, which is as-install`/domains`:

```
as-install/domains/domain1/autodeploy
```

Before You Begin

The sample application must be available before you start this task. To download the sample, see To Obtain the Sample Application.

Copy the application WAR file to the domain-dir`/autodeploy` directory.

- On UNIX, Linux, and Mac OS X systems, type this command:

```
cp sample-dir/hello.war as-install/domains/domain-dir/autodeploy
```

- On Windows systems, type this command:

```
copy sample-dir\hello.war as-install\domains\domain-dir\autodeploy
```

GlassFish Server automatically discovers and deploys the application. The default URL for the application is as follows:

```
http://localhost:8080/hello/
```

To Undeploy the Sample Application Automatically

1. Change to the domain's `autodeploy` directory.

```
cd as-install\domains\domain-dir\autodeploy
```

1. Delete the sample application's WAR file to undeploy and remove the application.
    - On UNIX, Linux, and Mac OS X systems, type this command:

```
rm hello.war
```

- On Windows systems, type this command:

```
del hello.war
```

High Availability Clustering and Load Balancing

GlassFish Server enables multiple GlassFish Server instances to be clustered to provide high availability through failure protection, scalability, and load balancing. The subsections that follow provide an overview of high availability clustering and load balancing for GlassFish Server.

Clusters of GlassFish Server Instances

A cluster is a collection of GlassFish Server instances that work together as one logical entity. A cluster provides a runtime environment for one or more Java Platform, Enterprise Edition (Java EE) applications. A cluster provides high availability through failure protection, scalability, and load balancing.

A GlassFish Server instance is a single Virtual Machine for the Java platform (Java Virtual Machine or JVM machine) on a single node in which GlassFish Server is running. A node defines the host where the GlassFish Server instance resides. The JVM machine must be compatible with the Java Platform, Enterprise Edition (Java EE).

GlassFish Server instances form the basis of an application deployment. An instance is a building block in the clustering, load balancing, and session persistence features of GlassFish Server. Each instance belongs to a single domain and has its own directory structure, configuration, and deployed applications. Every instance contains a reference to a node that defines the host where the instance resides.

For more information, see the following documentation:

- "Administering GlassFish Server Nodes" in GlassFish Server Open Source Edition High Availability Administration Guide
- "Administering GlassFish Server Clusters" in Eclipse GlassFish Server High Availability Administration Guide
- "Administering GlassFish Server Instances" in Eclipse GlassFish Server High Availability Administration Guide

Session Persistence and Failover

Storing session state data enables the session state to be recovered after the failover of an instance in a cluster. Recovering the session state enables the session to continue without loss of information. GlassFish Server supports in-memory session replication on other servers in the cluster for maintaining HTTP session and stateful session bean data.

For more information, see "Configuring High Availability Session Persistence and Failover" in GlassFish Server Open Source Edition High Availability Administration Guide.

Load Balancing for Clustered Configurations

GlassFish Server supports web server and hardware-based load balancing for clustered configurations. A load balancer is deployed with a cluster, and provides the following features:

- Allows an application or service to be scaled horizontally across multiple physical (or logical) hosts yet still present the user with a single URL
- Insulates the user from host failures or server crashes when used with session persistence
- Enhances security by hiding the internal network from the user

Eclipse GlassFish Server is compatible with the Apache HTTP server `mod_jk` module for load balancing.

GlassFish Server load balancing configurations can vary widely depending on the needs of your enterprise. For complete information about configuring load balancing in GlassFish Server, see the following documentation:

- "Configuring HTTP Load Balancing" in GlassFish Server Open Source Edition High Availability Administration Guide
- "RMI-IIOP Load Balancing and Failover" in GlassFish Server Open Source Edition High Availability Administration Guide

For More Information

Additional resources are available to help you learn more about GlassFish Server 5.1 and related technologies.

The following resources are described here:

- Product Documentation
- GlassFish Communities
- Tutorials
- Java EE 8 Samples

Product Documentation

Comprehensive product documentation is available and includes the following.

- GlassFish Server Open Source Edition Release Notes: Latest details about new features, known issues, and tips for installing and working with GlassFish Server software.
- Oracle GlassFish Server Documentation Library (`http://docs.oracle.com/cd/E26576_01/index.html`): Collection of guides that document Oracle GlassFish Server features and functions.
- GlassFish Server Open Source Edition Product Documentation page (`https://javaee.github.io/glassfish/documentation`): Collection of guides that document Eclipse GlassFish Server features and functions.

GlassFish Communities

The following resources will help you connect with other users, learn more about GlassFish Server, and get help if needed.

- GlassFish Forum (https://javaee.groups.io/g/javaee):
  Public online discussion forum that provides community support and tips for working with GlassFish Server.
- GlassFish Documentation Project (https://javaee.github.io/glassfish/documentation):
  Documentation community site that provides details about GlassFish Server documentation and how you can participate.

Tutorials

The following tutorials provide working examples and detailed instructions for creating enterprise applications for the Java EE 8 platform.

- Your First Cup: An Introduction to the Java EE Platform (https://javaee.github.io/firstcup/). For beginning Java EE programmers, this short tutorial explains the entire process for developing a simple enterprise application. The sample application is a web application that consists of a component that is based on the Enterprise JavaBeans specification, a JAX-RS web service, and a JavaServer Faces component for the web front end.
- The Java EE 8 Tutorial (https://javaee.github.io/tutorial/). This comprehensive tutorial explains how to use Java EE 8 platform technologies and APIs to develop Java EE applications.

Java EE 8 Samples

The sample applications demonstrate Java EE technologies. The samples are available as part of the Java EE SDK distributions. The SDK distributions are available from the Java EE SDK downloads page (http://www.oracle.com/technetwork/java/javaee/downloads/index.html).