

# Deployment

See the [Quick Start](#) guide to getting Fedora up and running as quickly as possible.

Although deploying Fedora is as easy as downloading the WAR file and copying to your servlet container's `webapps` directory, this document details the process.

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## Downloads

See the latest [release](#) for Fedora WAR files to download.

## System Requirements

- Java 11

```
java -version
openjdk version "11.0.5" 2019-10-15
OpenJDK Runtime Environment (build 11.0.5+10-post-Ubuntu-0ubuntu1.1)
OpenJDK 64-Bit Server VM (build 11.0.5+10-post-Ubuntu-0ubuntu1.1, mixed mode, sharing)
```

- Servlet 3.0 container such as:
  - [Tomcat 9](#)
  - [Jetty 9.x](#)
- A case-sensitive filesystem. Fedora 6 stores resources on disk in an [OCFL repository](#), and OCFL [requires a case-sensitive filesystem](#). By default, Windows and Mac systems use case-insensitive filesystems. If you intend to run Fedora on such a system, you have to make sure to meet 1 of the following requirements:
  - Locate Fedora home on a case-sensitive volume. This is an exercise for the reader.
  - Do not use Archival Groups. Case related resource name collisions can only happen when dealing with resources contained within the same Archival Group.
  - Do not name two different resources the same but with different casing.

## Deploying with Tomcat 9

1. Download and install [Tomcat](#)
2. Set the Java properties for Tomcat (see: [Application Configuration](#) and [Catalina Java Properties](#) sections below)
3. Either [configure the container auth](#) or [disable auth entirely](#)
4. Copy the Fedora WAR file into Tomcat's "webapps" directory, `$CATALINA_HOME/webapps/fcrepo.war`
5. Start the server, `$CATALINA_HOME/bin/startup.sh`
6. Navigate to <http://localhost:8080/fcrepo/rest> in your browser

Tomcat and Encoded slashes

 If you attempt to create a resource with an encoded slash in the path (ie. `http://localhost:8080/fcrepo/rest/path%2Fto%2Fresource`) Tomcat will throw a 400 error. You can disable this by adding `-Dorg.apache.tomcat.util.buf.UDECODER.ALLOW_ENCODED_SLASH=true` to your `CATALINA_OPTS`.

## Deploying with Jetty 9

1. Download and install [Jetty](#)
2. Set the Java properties for Jetty (see: [Application Configuration](#) and [Catalina Java Properties](#) sections below)
3. Either [configure the container auth](#) or [disable auth entirely](#)

4. Copy the Fedora WAR file into Jetty's "webapps" directory, `$JETTY_BASE/webapps/fcrepo.war`
5. Start the server, `java -jar $JETTY_HOME/start.jar`
6. Navigate to <http://localhost:8080/fcrepo/rest> in your browser

The Fedora web-application supports several deploy-time, system-level configuration options. These configuration elements can be set using a properties file or through system properties.

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See: [Best Practices - Fedora Configuration](#)

## Deployments

Four means of deploying Fedora have been verified

- Tomcat 9 servlet container
- Jetty 9 servlet container
- Maven `jetty:run` plugin - *for testing*
- One-Click Run - *for testing*

Each of these deployment approaches has its own way of setting System Properties.

### Tomcat 9

On Debian Linux systems, the typical way of setting System Properties is to update the following file:

```
/etc/default/tomcat9
```

Within that file, new properties can be added per the example below:

```
JAVA_OPTS="${JAVA_OPTS} -Dfcrepo.home=/mnt/fedora-data"
```

Additional information regarding the configuration of System Properties in Tomcat 9 can be found [here](#).

### Windows notes

Alternatively on Windows systems you can set the following file:

```
CATALINA_BASE/bin/setenv.bat (windows)
```

Within that file, new properties can be added per the example below:

```
set CATALINA_OPTS=%CATALINA_OPTS% -Dfcrepo.home=/mnt/fedora-data
```

### Reverse Proxy

If you have a reverse proxy for serving HTTPS that uses Tomcat's HTTP port, you will also need to set up a [RemoteIPValve](#) in your `server.xml` in order for Tomcat to rewrite links with HTTPS.

To do this you will first need to make sure the X-Forwarded-Proto header is set in your server config (example with Apache):

```
<VirtualHost *:443>
  RequestHeader set X-Forwarded-Proto "https"
  ServerName dummy-host.example.com

  SSLEngine on
  SSLCertificateFile /etc/ssl/certs/localhost.crt
  SSLCertificateKeyFile /etc/ssl/private/localhost.key

  ProxyPreserveHost On
  ProxyRequests Off
  ProxyPass / http://localhost:8080/
  ProxyPassReverse / http://localhost:8080/

  DocumentRoot "/opt/fedora/apache-tomcat-8.5.66/webapps/fcrepo-webapp"
</VirtualHost>
```

Then you will need to add a Valve to the localhost Engine in Tomcat's server.xml:

```
<Valve className="org.apache.catalina.valves.RemoteIpValve"
  protocolHeader="X-Forwarded-Proto" />
```

## Jetty 9

On Debian Linux systems, one way of setting System Properties is to update the following file:

```
/etc/default/jetty
```

Within that file, new properties can be added per the example below (note the use of JAVA\_OPTIONS instead of JAVA\_OPTS):

```
JAVA_OPTIONS="${JAVA_OPTIONS} -Dfcrepo.home=/mnt/fedora-data"
```

Additional information regarding the configuration of System Properties in Jetty 9 can be found [here](#).

## Windows notes

Alternatively on Windows systems you can set the following file:

```
{JETTY_DIST}/start.ini
```

Within that file, new properties can be added per the example below:

```
--exec
-Dfcrepo.home=/mnt/fedora-data
Maven jetty:run
```

System Properties can be set when using the Maven jetty:run plugin by passing them per the example below:

```
mvn -Dfcrepo.home=/mnt/fedora-data jetty:run
```

[Click here for a complete list of configurable properties.](#)

## Catalina Java Properties

For a complete inventory of configurable properties please refer to the [Properties](#) page.

## JVM Tuning Properties

We have a separate page with suggested [VM options](#) for general Java tuning.