



# White Paper

## Fabasoft on Linux - Installation of Fabasoft Folio Services

Fabasoft Folio 2024 Update Rollup 1

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## 1 Introduction

This document describes preparing the installation of Fabasoft Folio Service as well as the installation itself and the configuration of Fabasoft Folio Service in a Linux environment.

Chapter 2 “Fabasoft Reference Architecture” describes the Fabasoft reference architecture, including amongst others Fabasoft Folio Backend Services, Fabasoft Folio Web Services, Fabasoft Folio Conversion Services, and Fabasoft Folio AT Services.

Chapter 3 “Software and Hardware Requirements” deals with assumed system environment and supported platforms as well as software the descriptions in this document are based on.

Chapter 4 “Prerequisites” describes how to lay the foundations for installing the software of which the installation is described in this document.

Chapter 5 “Installation of Fabasoft Folio Backend Services” describes the installation of Fabasoft Folio Backend Services

Chapter 6 “Configuration of Fabasoft Folio Backend Services” describes the configuration of Fabasoft Folio Backend Services and the steps necessary to create a Fabasoft Folio Domain.

Chapter 7 “Updating of a Fabasoft Folio Domain” describes updating an existing Fabasoft Folio Domain.

Chapter 8 “Installation of Fabasoft Folio Web Services” describes the installation of a Fabasoft Folio Web Service.

Chapter 9 “Configuration of Fabasoft Folio Web Services” describes the configuration of a Fabasoft Folio Web Service.

Chapter 10 “Installation of Fabasoft Folio Conversion Services” describes how to install and configure a Fabasoft Folio Conversion Service.

Chapter 12 “Installation of Fabasoft Folio AT Services” describes the installation and configuration of a Fabasoft Folio AT Service.

## 2 Fabasoft Reference Architecture

The Fabasoft product family is implemented as distributed web application. The functionality of Fabasoft software products can be used via commercially available standard web browsers.

The incoming user queries are forwarded to the Fabasoft Folio Web Service by the Apache HTTP Server. The Fabasoft Folio Web Service represents the business logic and creates the view for the Fabasoft Folio Web Client.

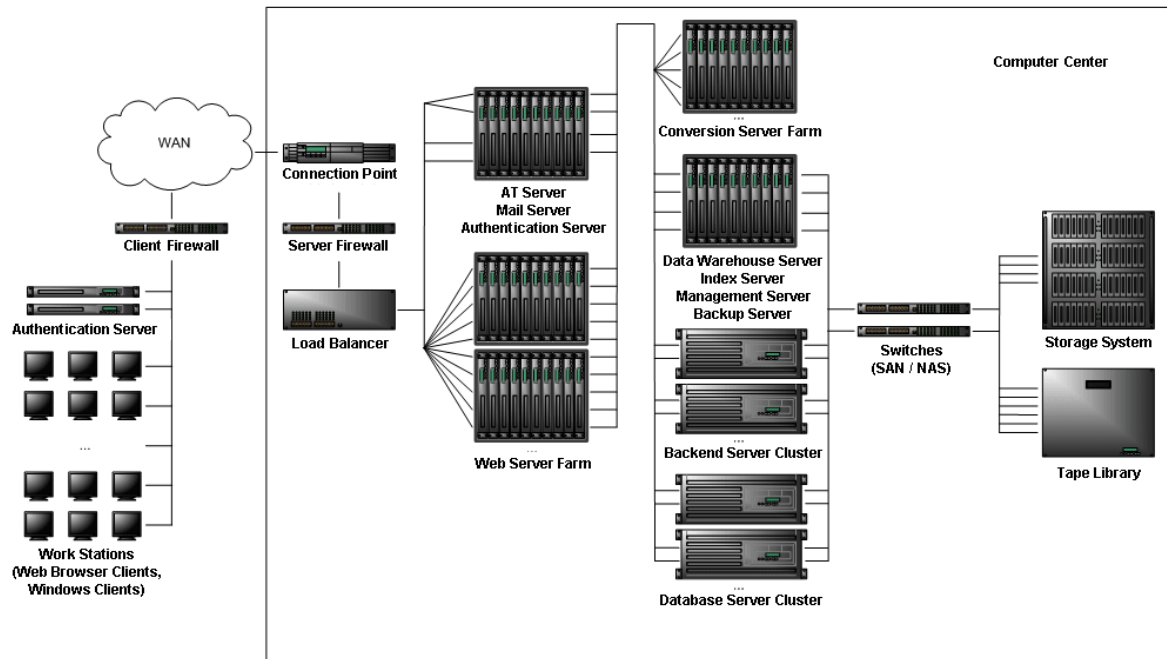
By means of the Fabasoft Folio Kernel, in the Fabasoft Folio Web Service the object model is available, object placement and access protection are defined and checked, properties are buffered, method calls are allocated and transactions are performed.

Fabasoft Folio Web Services process user queries by accessing the data managed by the Fabasoft Folio Backend Services.

Fabasoft Folio Backend Services (Fabasoft Folio COO Services and Fabasoft Folio MMC Services) are used for accessing and storing data in Fabasoft Folio Stores. Fabasoft Folio Stores are logical data stores, storing business objects in a relational database system and in the file system.

Fabasoft Folio Conversion Services allow converting contents. Conversion queries are forwarded by the Fabasoft Folio Web Services to the Fabasoft Folio Conversion Services.

A Fabasoft Folio Domain consists of Fabasoft Folio Web Services, Fabasoft Folio Conversion Services and Fabasoft Folio Backend Services logically belonging together. Optionally Fabasoft Folio AT Services can also be included into the Fabasoft Folio Domain.



### 3 Software and Hardware Requirements

**System environments:** All information contained in this document implicitly assumes a Linux environment.

**Supported platforms:** For detailed information on supported operating systems and software see the software product information on the Fabasoft distribution media.

#### 3.1 Requirements for Installing Fabasoft Folio Backend Services and a Fabasoft Folio Domain

Descriptions in this document are based on the following software:

##### Third-party products

- Red Hat Enterprise Linux 9.3 (x64)
- Oracle Instant Client 19c (19.20.0.0.0) for Linux x86-64  
Available at <http://otn.oracle.com/tech/oci/instantclient/instantclient.html>
- PostgreSQL 15.5
- OpenJDK 17 (JRE, headless, included in the supported operating system)

##### Additional information and files

- The file `tnsnames.ora` from the database server (verify the fully qualified domain name is written in).
- Username and password to connect to the database.
- Username and password of the administrative user of the database.

- Backend Service Kerberos authentication: A Kerberos Principal in the format `ADDERPC/<fqdn>@<REALM>` as described in the document “Fabasoft on Red Hat Linux – Preparation Guide”.

## 3.2 Requirements for Installing Fabasoft Folio Web Services

Descriptions in this document are based on the following software:

### Third-party products

- Red Hat Enterprise Linux 9.3 (x64)
- OpenJDK 17 (JRE, headless, included in the supported operating system)

### Additional information and files

- The URL of the Fabasoft Folio Web Management on the Fabasoft Folio Backend Server.
- The fully qualified domain name of the Fabasoft Folio Backend Server.
- Backend Service Kerberos authentication: A Kerberos Principal in the format `ADDERPC/<fqdn>@<REALM>` as described in the document “Fabasoft on Red Hat Linux – Preparation Guide”.
- Web Service Kerberos authentication: A Kerberos Principal in the format `HTTP/<fqdn>@<REALM>` as described in the document “Fabasoft on Red Hat Linux – Preparation Guide”.

## 3.3 Requirements for Installing Fabasoft Folio Conversion Services

Descriptions in this document are based on the following software:

### Third-party products

- Red Hat Enterprise Linux 9.3 (x64)
- OpenJDK 17 (JRE, headless, included in the supported operating system)
- LibreOffice 6.4.7 (x64)  
Available at: <http://www.libreoffice.org>  
**Note:** Conversion of Microsoft Office document via LibreOffice is not supported.
- Ghostscript 10.02 (x64)
- FFmpeg 4.4 (x64)
- QCAD 3.25 (x64)
- ExifTool 12.70 (x64)
- X Virtual Framebuffer  
Package `xorg-x11-xvfb` (on Red Hat Linux) as contained on the Linux distribution media or update channel provided by the Linux distribution vendor.

## 3.4 Requirements for Installing Fabasoft Folio AT Services

Descriptions in this document are based on the following software:

### Third-party products

- Red Hat Enterprise Linux 9.3 (x64)
- OpenJDK 17 (JRE, headless, included in the supported operating system)



## Additional information and files

- Backend Kerberos authentication: A Kerberos Principal in the format `ADERPc/<fqdn>@<REALM>` as described in the document “Fabasoft on Red Hat Linux – Preparation Guide”.

## 4 Prerequisites

For all Fabasoft Folio Services prepare the servers according to the following documents depending on the operating system:

- Fabasoft on Linux - Preparation Guide for AlmaLinux (especially the listed libraries)
- Fabasoft on Linux - Preparation Guide for Red Hat Enterprise Linux (especially the listed libraries)

### 4.1 Prerequisites for Fabasoft Folio Backend Services

- Make sure that all third-party software products listed in chapter 3.1 “Requirements for Installing Fabasoft Folio Backend Services” have been installed.
- All Fabasoft Folio software packages from the distribution media have to be available on a file system local on the machine (hard disk, CD, DVD etc.) or on a network share.
- A valid Fabasoft Folio license key is also required.

#### Database

This document describes the usage of Oracle databases. Therefore, a preconfigured working database server (as described in the document “Oracle Database Preparation Guide”) is required.

### 4.2 Prerequisites for Fabasoft Folio Web Services

- Make sure that all third-party software products listed in chapter 3.2 “Requirements for Installing Fabasoft Folio Web Services” have been installed.
- Working Fabasoft Folio Backend Services, as described in chapter 5 “Installation of Fabasoft Folio Backend Services and a Fabasoft Folio Domain” have to be available.

### 4.3 Prerequisites for Fabasoft Folio Conversion Services

- Make sure that all third-party software products listed in chapter 3.3 “Requirements for Installing Fabasoft Folio Conversion Services” have been installed.
- Working Fabasoft Folio Web Services, as described in chapter 8 “Installation of Fabasoft Folio Web Services”, have to be available.

**Note:** According to chapter 2 “Fabasoft Reference Architecture”, the Fabasoft Folio Web Services used for installing the Fabasoft Folio Conversion Services should not be used as Fabasoft Folio Web Services.

### 4.4 Prerequisites for Fabasoft Folio AT Services

Make sure that all third-party software products listed in chapter 3.4 “Requirements for Installing Fabasoft Folio AT Services” have been installed.



## 5 Installation of Fabasoft Folio Backend Services and a Fabasoft Folio Domain

Commands mentioned in this document are usually executed as user `root` in a shell. If a command is executed as a different user, it is mentioned additionally.

### 5.1 Installation and Configuration of Oracle Instant Client

To install Oracle Instant Client, perform the following steps:

1. Change to the directory that contains the downloaded ZIP package of Oracle Instant Client.
2. Extract the compressed package:  
`# unzip instantclient-<version>.zip`
3. Create a library directory for the Oracle Instant Client libraries.  
`# mkdir -p /usr/lib64/oracle/<version>/client/lib`
4. Copy the files of the Oracle Instant Client to the folder.  
`# cp instantclient_<version>/* /usr/lib64/oracle/<version>/client/lib/`
5. Add the path to the Oracle libraries (default `/usr/lib64/oracle/<version>/client/lib`) to the global dynamic linker configuration file `/etc/ld.so.conf`. Therefore execute the following commands:  
`# cd /usr/lib64/oracle/<version>/client/lib`  
`# pwd >> /etc/ld.so.conf`
6. Refresh the linker cache.  
`# ldconfig`
7. Create the directories `/usr/lib/oracle/<version>/network` and `/usr/lib64/oracle/<version>/network/admin`.  
`# mkdir -p /usr/lib64/oracle/<version>/network/admin`
8. Copy the `tnsnames.ora` file from the database server (default `ORACLE_HOME/network/admin`) to the previously created directory (`/usr/lib64/oracle/<version>/network/admin`).
9. Verify that the user `fscsrv` has the permission to read `tnsnames.ora`.  
`# cd /usr/lib64/oracle/<version>/network/admin`  
`# ls -l`  
The directory listing must have at least the following entry:  
`-rw-r--r-- 1 root root 364 Aug 30 01:00 tnsnames.ora`
10. View the `tnsnames.ora` file using `cat`.  
`# cat tnsnames.ora`

```
[root@rhel5test admin]# cat tnsnames.ora
# tnsnames.ora Network Configuration File: /home/oracle/oracle/product/10.2.0/db_2/network/admin/tnsnames.ora
# Generated by Oracle configuration tools.

ORCL =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = oracleserver)(PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = orcl)
    )
  )

LISTENER_ORCL =
  (ADDRESS = (PROTOCOL = TCP)(HOST = oracleserver)(PORT = 1521))

EXTPROC_CONNECTION_DATA =
  (DESCRIPTION =
    (ADDRESS_LIST =
      (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC0))
    )
    (CONNECT_DATA =
      (SID = PLSExtProc)
      (PRESENTATION = RO)
    )
  )

[root@fscbackend admin]#
The net service name (in this case "orcl") is required later for installing the Fabasoft Folio
Domain.
```

Oracle Instant Client is now installed and configured.

**Note:** If Oracle is used as database system for Fabasoft Folio Backend Services then either the environment variable TNS\_ADMIN or ORACLE\_HOME have to be set before running the Fabasoft setup.

```
# export TNS_ADMIN=/usr/lib64/oracle/<version>/network/admin
# export ORACLE_HOME=/usr/lib64/oracle/<version>
```

## 5.2 Configuration of PostgreSQL

In order to use the phonetic search (sounds like, does not sound like) in Fabasoft Folio, the postgresql-contrib RPM (or an equivalent if compiled from source) must be installed. Additionally, `fuzzystmatch.sql`, part of postgresql-contrib, must be executed when the database is created manually.

For performance reasons it is required to set the parameter `cursor_tuple_fraction` to the value 1.0.

The PostgreSQL Client Authentication method can be configured via the file `pg_hba.conf`. Fabasoft Folio supports the authentication modes `trust`, `password`, and `md5`.

To use SSL/TLS encryption for the connection, the `SSLMODE` parameter (supported values are "disable" and "require") can be added to the client connect string. For example, the connect string "PORT=5432;SSLMODE=require" uses port 5432 for the connection and requires the server to use an encrypted connection.

## 5.3 Verification of the RPM Signatures

The Fabasoft Folio RPM packages are signed using a GPG key (<https://www.gnupg.org>). This signature can be verified to ensure that the packages have not been compromised.

The Fabasoft RPM signing key can be obtained from the following URL:  
<https://download.fabasoft.com/keys>

Use the `rpm` utility to import the key:

```
rpm --import gpgkey.asc
```

The currently imported GPG keys can be queried as following:

```
rpm -qa gpg-pubkey
gpg-pubkey-aefcdcf2-63500ac3
```

To obtain some more information:

```
rpm -qi gpg-pubkey-aefcdcf2-63500ac3
Name       : gpg-pubkey
Version    : aefcdcf2
Release    : 63500ac3
Architecture: (none)
Install Date: Mon Nov 13 11:16:01 2023
Group      : Public Keys
Size       : 0
License    : pubkey
Signature  : (none)
Source RPM : (none)
Build Date : Wed Oct 19 16:33:39 2022
Build Host : localhost
Packager   : Fabasoft R&D GmbH security@fabasoft.com
Summary    : Fabasoft R&D GmbH <security@fabasoft.com> public key
...
```

If you want to remove a key the following command can be used:

```
rpm -e gpg-pubkey-aefcdcf2-63500ac3
```

The RPM signatures can be verified using the following commands:

```
find Setup -name '*.rpm' | xargs rpm -K
find Setup -name '*.rpm' | xargs rpm -Kv
```

### Example

If the corresponding public key is not installed, the output looks like this:

```
find Setup -name '*.rpm' | xargs rpm -K
Setup/ComponentsBase/Services/LINUX_RHEL_X64/fsc-base-${VERSION}-
${BUILD}.x86_64.rpm: digests SIGNATURES NOT OK
find Setup -name '*.rpm' | xargs rpm -Kv
Setup/ComponentsBase/Services/LINUX_RHEL_X64/fsc-base-${VERSION}-
${BUILD}.x86_64.rpm:
  Header V4 RSA/SHA256 Signature, key ID aefcdcf2: NOKEY
  Header SHA256 digest: OK
  Header SHA1 digest: OK
  Payload SHA256 digest: OK
  MD5 digest: OK
```

If the corresponding public key is installed, the output looks like this:

```
find Setup -name '*.rpm' | xargs rpm -K
Setup/ComponentsBase/Services/LINUX_RHEL_X64/fsc-base-${VERSION}-
${BUILD}.x86_64.rpm: digests signatures OK
find Setup -name '*.rpm' | xargs rpm -Kv
Setup/ComponentsBase/Services/LINUX_RHEL_X64/fsc-base-${VERSION}-
${BUILD}.x86_64.rpm:
  Header V4 RSA/SHA256 Signature, key ID aefcdcf2: OK
  Header SHA256 digest: OK
  Header SHA1 digest: OK
  Payload SHA256 digest: OK
  MD5 digest: OK:
```

## 5.4 Installation of Fabasoft Folio Backend Services and a Fabasoft Folio Domain

To install Fabasoft Folio Backend Services via the automated setup, perform the following steps:

1. Insert the Fabasoft product DVD in the DVD drive of your server. Verify that the Fabasoft product DVD is not mounted with the `noexec` option. Otherwise you will not be able to run the `setup.sh` script.
2. Open a root-console and navigate to the mount point of the DVD drive.  
# `cd /media/dvd`
3. Execute the setup shell script.  
# `./setup.sh`
4. The setup wizard will be opened in a browser window. Read the license agreement carefully. Afterwards select *I accept* and click "Next".

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☐ I decline ☒ I accept

5. The configuration of the installed Fabasoft Folio system is based on a template. The template defines how many Fabasoft Folio COO Services and Fabasoft Folio MMC Services are installed. Additionally default values for the Fabasoft Folio Service are provided. The settings may be changed later on in the setup process if necessary.

- *Typical*  
Select this option to install one Fabasoft Folio COO Service (with four Fabasoft Folio COO Stores) and one Fabasoft Folio MMC Service (with one Fabasoft Folio MMC Store).
- *Minimum*  
Select this option to install one Fabasoft Folio COO Service (with one Fabasoft Folio COO Store) and one Fabasoft Folio MMC Service (with one Fabasoft Folio MMC Store).
- *Custom*  
Select this option to install by default one Fabasoft Folio COO Service (with four Fabasoft Folio COO Stores) and one Fabasoft Folio MMC Service (with two Fabasoft Folio MMC Stores). Select *Custom* and click “Next”.

**Select Configuration to Install**

Configuration	
<input type="radio"/> Typical	A typical installation is recommended for a Fabasoft Folio Domain with up to 100 named users. All parameters are set to default values.
<input type="radio"/> Minimum	A minimum installation is recommended for a Fabasoft Folio Domain that serves as a demo installation or a training installation. All parameters are set to default values.
<input checked="" type="radio"/> Custom	A custom installation is recommended in all other situations. Knowledge in the underlying concepts and architecture is required. Parameters may be set manually.

6. The option *Define a new architecture template* can be selected to create a new template based on default values. *Load a predefined architecture template* can be used to select a saved template file of a previous installation. This step is omitted if a typical or minimum installation is made. Select *Define a new architecture template* and click “Next”.

**Select Custom Installation**

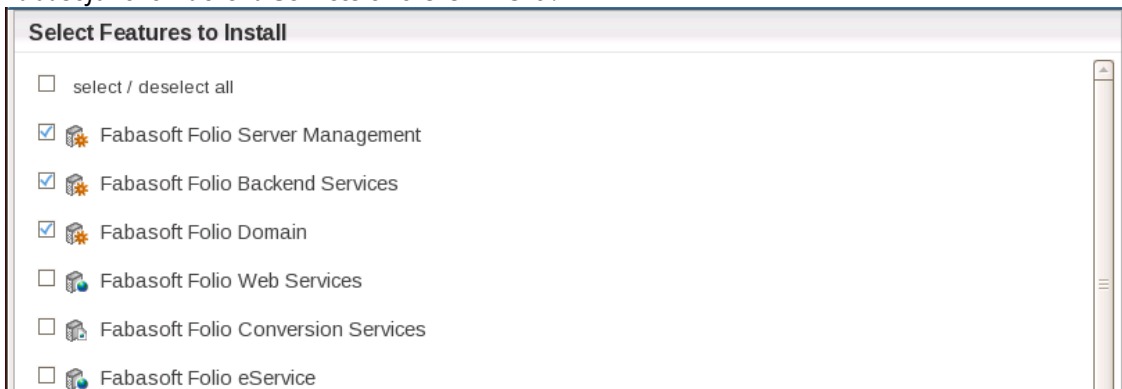
Custom Installation

☒ Define a new architecture template  
☐ Load a predefined architecture template

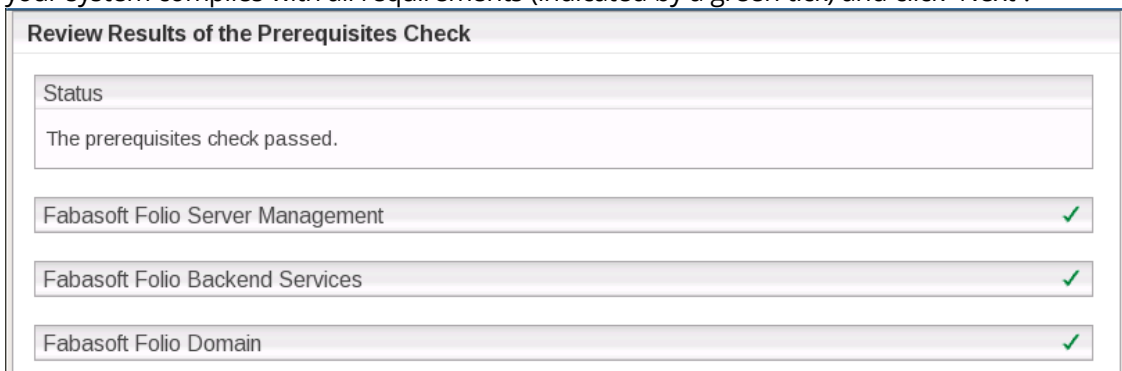
7. In the next dialog two options are available. Select *Choose a license file for the installation of a new Fabasoft Folio Domain*, specify a license file and click "Next".



- *Install a new Fabasoft Folio Domain*  
Select this option to install Fabasoft Folio Backend Services. In the *License file* field, type the path to the license file or click "Browse" to browse the file system.
  - *Use an existing Fabasoft Folio backend installation*  
Select this option to use an existing Fabasoft Folio backend installation.
8. Clear all check boxes except of *Fabasoft Folio Server Management*, *Fabasoft Folio Domain* and *Fabasoft Folio Backend Services* and click "Next".



9. A check on all prerequisites is performed. Its result is presented in an overview. Ensure that your system complies with all requirements (indicated by a green tick) and click "Next".



10. In the next dialog two options are available:
- *Use kerberized Fabasoft Folio Service*  
Select this option to use Kerberos for authentication between the services.

- *Use non kerberized Fabasoft Folio Service*

Selecting this option, Kerberos is not used for authentication between the services.

Select whether Kerberos should be used for authentication and click “Next”.

11. Specify the settings for the created Fabasoft Folio Domain.

- Under *Edition*, in the *Edition/Solution* dropdown list select a pre-configuration for the Fabasoft Folio Domain.
- Under *Domain Details* a *Name* for the Fabasoft Folio Domain can be specified and an *ID* can be selected.

**Note:** The available domain IDs depend on the license file used.

- In the *Load demo data* field specify whether demo data is loaded or not.
- In the Add-ons section specify an additional Fabasoft Product if needed.

Specify your Fabasoft Folio Domain settings and click “Next”.

12. Select the database system that should be used. Depending on the database system enter the database administration credentials and click “Next”.

- *Oracle Database*

In the *SQL\*Net Alias* dropdown list select the identifier of the oracle database. The identifier will be read from the `tnsnames.ora` file. Type the name and the password of the oracle user



"sys".

The screenshot shows the 'Configure Database' window. Under the 'Select Database System' section, 'Oracle Database' is selected. The 'Oracle Database Connection Settings' section contains the following fields: 'SQL\*Net Alias' with a dropdown menu showing 'orcl', 'Username' with the text 'sys', and 'Password' with masked characters '\*\*\*\*\*'.

- *PostgreSQL*

In the *Create Database* box, select whether a new database should be created or an existing should be used. In the *PostgreSQL Connection Settings* box, type the PostgreSQL administrator credentials, the server name and the port (default: 5432).

The screenshot shows the 'Configure Database' window. Under the 'Select Database System' section, 'PostgreSQL' is selected. The 'Select Database' section has two radio buttons: 'Create a new database' (selected) and 'Use an existing database'. The 'PostgreSQL Connection Settings' section contains the following fields: 'Admin username' with the text 'postgres', 'Admin password' with masked characters '\*\*\*\*\*', 'Server' with the text 'postgresserver', and 'Port' with the text '5432'.

13. In the *Review Configuration*, the Fabasoft Folio Service can be configured.

If you want to create additional Fabasoft Folio MMC Services and COO Services, click "Edit" next to *Fabasoft Folio Backend Services*. Otherwise click "Next" to start the installation. In this case the

next steps can be omitted.

Review Configuration

Common Product Settings

Fabasoft Folio Domain

Edit

14. In the *Fabasoft Folio COO Services* box and the *Fabasoft Folio MMC Services* box, the following options are available:

- A Fabasoft Folio Backend Service can be edited by clicking the name of the service.
- A Fabasoft Folio Backend Service can be deleted by clicking "Remove" (✖).
- A Fabasoft Folio Backend Service can be created by clicking the plus icon (+).

Click the name of a Fabasoft Folio Backend Service, to edit the settings.

Fabasoft Folio Backend Services

Fabasoft Folio COO Services

Name	Port	Database
<a href="#">COOSVC1</a>	18070	COOSVC1 at localhost

Fabasoft Folio MMC Services

Name	Port	Path
<a href="#">MMCSVC1</a>	18071	/var/opt/fabasoft/lib/mmc/1.506/MMCSVC1

The following options are available:

- Under *Fabasoft Folio COO Service*, *Service name* and *Port* of a Fabasoft Folio COO Service can be edited.

Using Oracle Database, the following options are available:

- *Username*: In the field type the name of the database user.
- *Password*: In this field type the password of the database user.
- *Index tablespace*: In this field type the name of your previously created tablespace, as described in the document "Oracle Database Preparation Guide". If you leave this field blank the Default tablespace is used.

Oracle 10g Settings

Username

COOSVC1

Password

\*\*\*\*\*

Index tablespace

coosvc

Using PostgreSQL, the following options are available:

- *Server*: In this field type the name of the server running the PostgreSQL database.
- *Port*: In the field type the port the PostgreSQL database listens on.
- *Admin username*: In this field type the username of the database administrator.
- *Admin password*: In this field type the password of the database administrator.
- *Database*: In this field type the name of the database.
- *Username*: In this field type a username which is used from the Fabasoft Folio COO Service to connect to the database.
- *Password*: In this field type a password for the user.

PostgreSQL Settings	
Server	postgresserver
Port	5432
Admin username	postgres
Admin password	....
Database	COOSVC1
Username	COOSVC1
Password	....

- Under *Fabasoft Folio COO Stores*, the currently available Fabasoft Folio COO Stores are displayed.

A Fabasoft Folio Store can be deleted by clicking "Remove" (✖).

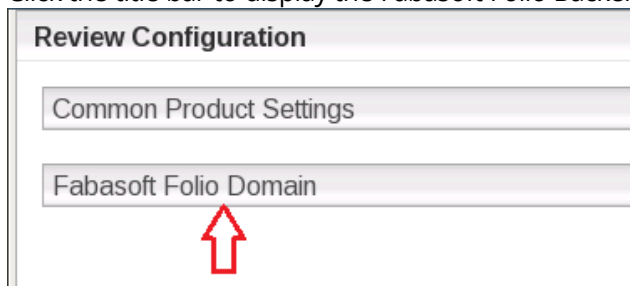
To add a Fabasoft Folio COO Store click the plus icon (⊕) top right. Specify the name and select the corresponding Fabasoft Folio MMC Store. To create a Fabasoft Folio Gateway, select *Gateway*.

Edit the Fabasoft Folio Backend Service and click "Apply".

Fabasoft Folio COO Service and COO Stores	
<b>Fabasoft Folio COO Service</b>	
Service name	COOSVC1
Service port	18070
<b>PostgreSQL Settings</b>	
Server	localhost
Port	5432
Admin username	postgres
Admin password	
Create new database	<input checked="" type="checkbox"/>
Username	COOSVC1
Password	

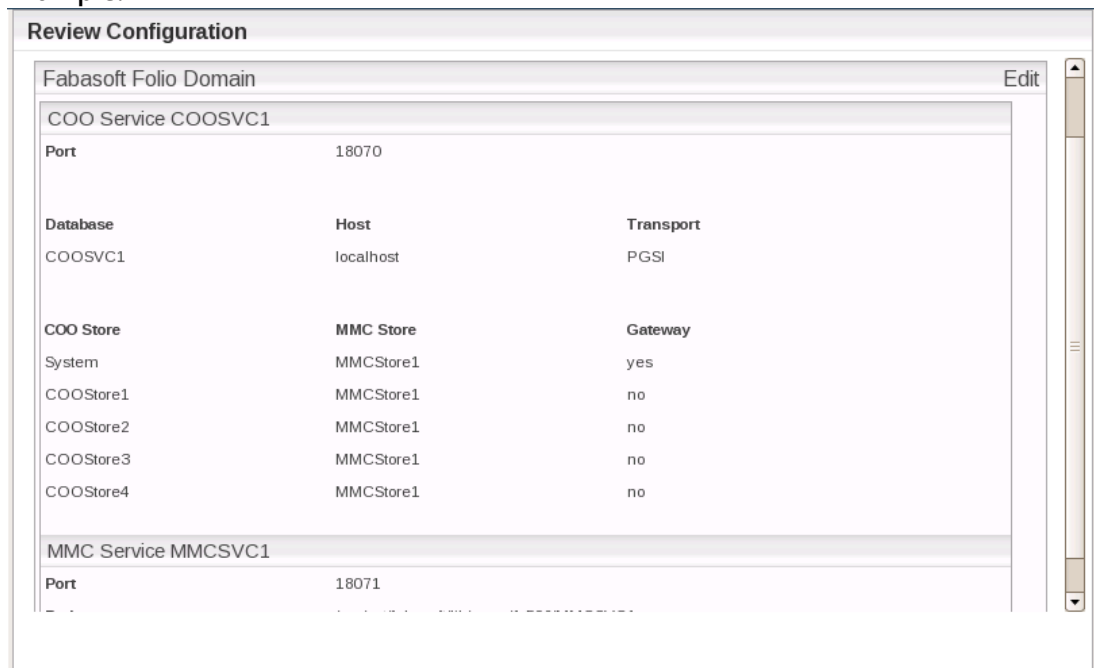
15. To close the dialog for configuring the Fabasoft Folio Backend Services, click "Apply".

16. Click the title bar to display the Fabasoft Folio Backend Services configuration details.



17. Verify the configuration settings and click "Next".

**Example:**



18. If *Custom* has been selected in step 5, click "Save template" to save the configuration to a file.

19. Click "Install" to start the installation.

The Fabasoft Folio Backend Services are installed.

## 6 Configuration of Fabasoft Folio Backend Services

### 6.1 Disable Kerberos

If a *non-kerberized setup* should be used (e.g. working without a Microsoft Windows domain using LDAP), Kerberos should be disabled, as the according settings of the Fabasoft Folio Server Management Service will be inherited to all services created for new domains.

To disable Kerberos, perform the following steps:

1. Logon as user `fscsrv`.  
# `su - fscsrv`
2. Stop all running Fabasoft Folio Service.  
> `/opt/fabasoft/bin/fscmgmt stop all`
3. Open the file `/var/opt/fabasoft/instances/COOManagement/env/CommandLine` in an editor.
4. In the file change the option `-j` to `-k` and save the file.

5. Open the file `/var/opt/fabasoft/instances/WebManagement/env/CommandLine` in an editor. If the file does not exist so far, create it.
6. In the file type the option `-x` and save it.
7. Start all Fabasoft Folio Service.  

```
> /opt/fabasoft/bin/fscmgmt start all
```

Now Kerberos is disabled.

## 6.2 Additional Configuration

### 6.2.1 Administrative Users

Only users that are local to the system (via Pluggable Authentication Module (PAM), see according documentation shipped with Red Hat Enterprise Linux) and that are members of the group `fsc` are permitted to access the Fabasoft Folio Server Management Service.

Microsoft Windows domain users that should be permitted to administer the Fabasoft Folio Service must be added as local users with membership to the group `fsc`. Their login name must match exactly on the Linux side (case sensitive). The domain name has to be omitted.

To add an administrative Microsoft Windows domain user, perform the following steps:

1. Create a local user on the Linux computer having exactly the same login name as in the Microsoft Windows domain and add it to the group `fsc`.  

```
# useradd -g fsc -G fsc <username>
```

Repeat this command for every Microsoft Windows domain user that should be permitted to administer Fabasoft Folio Service.
2. To check that the user has been added to the group `fsc`, execute the following command:  

```
# cat /etc/group
```

At the very bottom of the file locate the line beginning with `fsc`. The username of the Microsoft Windows domain user should have been added to this line. Multiple users are separated by a

```

comma.
fscbackend:~ # cat /etc/group
root:x:0:
bin:x:1:daemon
daemon:x:2:
sys:x:3:
tty:x:5:
disk:x:6:
lp:x:7:
www:x:8:
kmem:x:9:
wheel:x:10:
mail:x:12:
news:x:13:
uucp:x:14:
shadow:x:15:
dialout:x:16:
audio:x:17:
floppy:x:19:
cdrom:x:20:
console:x:21:
utmp:x:22:
at:!:25:
public:x:32:
video:x:33:
games:x:40:
xok:x:41:
trusted:x:42:
modem:x:43:
ftp:x:49:
postfix:!:51:
maildrop:!:59:
man:x:62:
sshd:!:65:
ldap:!:70:
ntadmin:!:71:
nobody:x:65533:
nogroup:x:65534:nobody
users:x:100:fscsrv
oinstall:!:1000:oracle
dba:!:1001:
fsc:!:1002:olivia.myers
fscbackend:~ # █

```

A local user has now been created and added to the group `fsc`.

Alternatively to these commands, the tool `system-config-users` on Red Hat Enterprise Linux provides a graphical user interface for adding or modifying user accounts. For more information consult the Red Hat Enterprise Linux manuals on user management.

## 6.3 Kerberos

After the installation of the RPM packages the Fabasoft Folio Service user (`fscsrv`) is available. The ownership and permissions of the file `/etc/fabasoft/krb5.keytab`, that has been created during preparation of Linux (see document “Fabasoft on Red Hat Linux – Preparation Guide”), need to be adjusted. Therefore perform the following steps:

1. Set the ownership of the file `/etc/fabasoft/krb5.keytab` to `fscsrv` by executing the following command:  

```
# chown fscsrv:fsc /etc/fabasoft/krb5.keytab
```
2. Set the permission for the file `/etc/fabasoft/krb5.keytab` as only the user `fscsrv` can read and write it by executing the following command:  

```
# chmod 0600 /etc/fabasoft/krb5.keytab
```

The ownership and permissions for the file `/etc/fabasoft/krb5.keytab` have been changed.

## 6.4 Database Properties

The file `/etc/fabasoft/base.conf` contains settings for the database. Ensure that these settings match the Oracle Instant Client installation and the database server environment.

**Note:** Reasonable defaults are provided as a reference only. Except for the Oracle SID, these default settings will be sufficient in most cases. Please consult the documentation provided by Oracle for further information on the required database settings.

In chapter 5.1 “Installation and Configuration of Oracle Instant Client” the `/usr/lib64/oracle/<version>/network/admin` directory has been created. The environment variables in the file `/etc/fabasoft/base.conf` have to match this directory.

To check and, if necessary, adjust the configuration, perform the following steps:

1. Open the file `/etc/fabasoft/base.conf` in an editor (e.g. vim). Therefore execute the following command:  

```
# vim /etc/fabasoft/base.conf
```
2. Check the following environment variables and adjust if necessary:  

```
ORACLE_HOME=/usr/lib64/oracle/<version>  
TNS_ADMIN=${ORACLE_HOME}/network/admin
```

  
`ORACLE_HOME=/usr/lib64/oracle/<version>` has to match the version number of the Oracle Instant Client.  
**Note:** The value of the environment variable `ORACLE_HOME` in `/etc/fabasoft/base.conf` will be overwritten during the setup by the value defined before running the setup.
3. After doing the modifications save the file and close the editor.

The environment variables have been checked.

### Character set

Make sure that the `NLS_LANG` parameter used by the Oracle Instant Client is set to “AMERICAN\_AMERICA.AL32UTF8”. More information about the `NLS_LANG` parameter can be found here: <http://www.oracle.com/technetwork/products/globalization/nls-lang-099431.html>

To specify a `NLS_LANG` value different from the default value, adapt it in the file `/etc/fabasoft/base.conf`. The value must be “AMERICAN\_AMERICA.AL32UTF8”.

This setting corresponds to the database settings as described in the white paper “Fabasoft on Microsoft Windows and Linux - Oracle Database Preparation Guide”.

## 6.5 Default Database Indexes

Each Fabasoft Folio COO Service creates default database indexes which are documented in the `indexes.txt` file located in `/opt/fabasoft/share/db`.

The index usage for columns of type `VARCHAR` or `NVARCHAR` depends on the property “Queries Are Case-Insensitive” (`COOSYSTEM@1.1:domaincisqry`) which is configurable in the current domain object. When changing the value of this property, the indexes should be changed accordingly.



## 7 Updating of a Fabasoft Folio Domain

### 7.1 Migration

When updating Fabasoft Folio from a version below 2012 Summer Release to a version equal or higher 2012 Summer Release following migration steps have to be considered.

From version 2012 Summer Release numerical values larger than  $2^{32}-1$  (or  $2^{31}-1$  for negative numbers) are supported. In previous versions numbers are stored as 32 bit values. Since 1 bit is used for the sign (+ or -), for the number range only 31 bits remain. In Fabasoft Folio it can be defined for number properties, whether they use a sign or not. If no sign is used, the negative value range is used for storing large numbers.

In the course of the conversion from 32 bit to 64 bit, those large values that are stored as negative numbers must be migrated. The identification of affected properties is done via the tool `upgr122`. As part of an update by the Fabasoft Folio Setup this tool will run automatically.

**Attention:** In the following chapter two scenarios are described that need further manual steps.

#### 7.1.1 Manual Steps

##### Scenario 1: Affected values exist only in versions or in the archive

The automated identification only considers integer properties that contain values of the affected number range in the current version. For integer properties that potentially contain values of the affected number range only in versions or in the archive, a migration CSV file has to be created manually.

The CSV file must have the following format:

```
version;upgradetype;objidold;objidnew;tabidold;tabidnew
1223;9;<object address 1>;<object address 1>;1;1
1223;9;<object address 2>;<object address 2>;1;1
and so on
```

The object address of the integer property can be set as 64 bit ID or as COO address.

##### Example:

```
1223;9;285774255974402;285774255974402;1;1
```

or

```
1223;9;COO.1.1001.1.223234;COO.1.1001.1.223234;1;1
```

The CSV file has to be stored in the migration folder (`<server directory>/CooSrv/files/migration` or `/var/opt/fabasoft/instances/files/migration`) on all backend servers before running the setup, such that the migration is carried out as part of the COO service start-up.

##### Scenario 2: Fabasoft Folio Backend Services are distributed on several clusters

If Fabasoft Folio Backend Services are distributed across multiple clusters, a manual execution of the tool `Setup\ComponentsBase\Services\<Plattform>\upgr\upgr122` is necessary on each cluster. After each run, the output file (phase=1: `attridfile`; phase=2: `csvfile`) has to be used as input file for the following execution:

1. Determining a list of potentially affected properties (execute on each cluster):  
`upgr122 phase=1 attridfile=attrids.txt`

2. Determine which properties are actually values in the numerical range of  $2^{31} - 2^{32}-1$  (execute on each cluster):

```
upgr122 phase=2 attridfile=attrids.txt csvfile=UINT322INT64.csv
```

The result file (UINT322INT64.csv) has to be stored in the migration folder (/var/opt/fabasoft/instances/files/migration) on all backend servers before running the setup, such that the migration is carried out as part of the COO service start-up.

## 7.2 Update

This chapter describes a complete update of a Fabasoft Folio Domain and its services.

**Note:** It is necessary to stick to the given order.

To update a Fabasoft Folio Domain, perform the following steps:

1. Check whether the installed Oracle Instant Client is still supported by Fabasoft software products or if a later version is required.  
**Note:** If a later version is required go to <http://otn.oracle.com/tech/oci/instantclient/instantclient.html> and download the necessary ZIP package. Copy the ZIP package to a directory on the Linux computer, extract it and copy the files to the directory that contains the old Oracle Instant Client files.
2. Insert the Fabasoft product DVD in the DVD drive of your server.
3. Open a root-console and navigate to the mount point of the DVD drive.  

```
# cd /media/dvd
```
4. Execute the setup shell script.  

```
# ./setup.sh
```
5. The setup wizard will be opened in a browser window. Read the license agreement carefully. Afterwards select *I accept* and click "Next".

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☐ I decline ☒ I accept

6. Select *Update existing Fabasoft services and products* and click "Next".

**Choose an Installation Mode**

Installation Mode

☐ Install additional Fabasoft services and products for existing domain

Host: RA5WIN08R2SQL2.sq.fabasoft.com

Port: 18070

☒ Update services and products

**Add License**

License file:  Browse...

7. Select the Fabasoft Folio Service you want to update.

**Select Features to Install**

☒ select / deselect all

☒ Fabasoft Folio Server Management

☒ Fabasoft Folio Backend Services

☒ Fabasoft Folio Domain

8. A check on all prerequisites is performed. Its result is presented in an overview. Ensure that your system complies with all requirements (indicated by a green tick) and click "Update".

**Review Results of the Prerequisites Check**

Status

The prerequisites check passed.

Fabasoft Folio Server Management	✓
Fabasoft Folio Backend Services	✓
Fabasoft Folio Domain	✓

The Fabasoft Folio Domain is updated.

## 8 Installation of Fabasoft Folio Web Services

To install Fabasoft Folio Web Services via the automated setup, perform the following steps:

1. Insert the Fabasoft product DVD in the DVD drive of your server. Verify that the Fabasoft product DVD is not mounted with the `noexec` option. Otherwise you will not be able to run the `setup.sh` script.
2. Open a root-console and navigate to the mount point of the DVD drive.  
`# cd /media/dvd`
3. Execute the setup shell script.  
`# ./setup.sh`

4. The setup wizard will be opened in a browser window. Read the license agreement carefully. Afterwards select *I accept* and click "Next".

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☐ I decline ☒ I accept

5. If Fabasoft software products have already been installed on the computer, you will see a page like the one below, where you can decide to
- *Install additional Fabasoft products* or to
  - *Update existing Fabasoft services and products.*
  - *Update existing Fabasoft services only.*

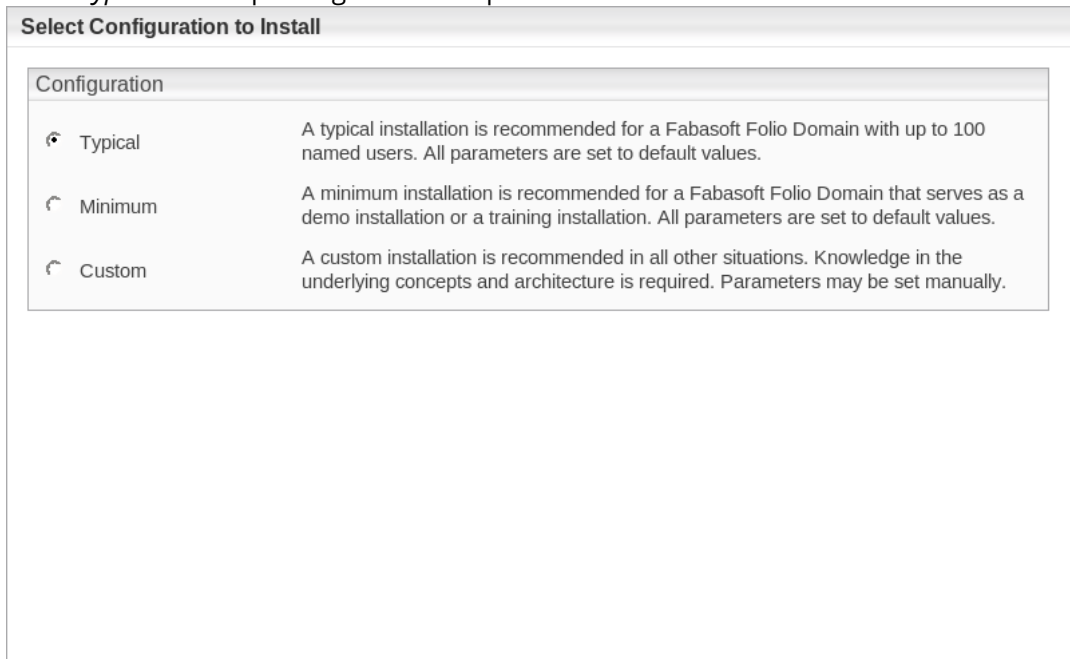
**Choose an Installation Mode**

**Installation Mode**  
☒ Install additional Fabasoft services and products for existing domain  
Host   
Port   
☐ Update existing Fabasoft services and products  
☐ Update existing Fabasoft services only

**Add License**  
License file

But in this chapter we discuss an installation against existing backend services on a different machine with no Fabasoft Folio Services installed. (distributed installation)

6. Select *Typical* as setup configuration template and click “Next”.

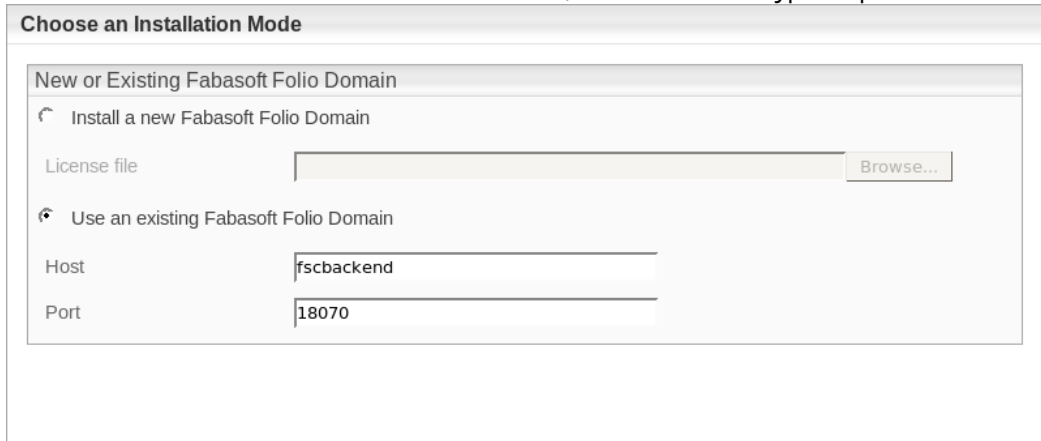


The dialog box titled "Select Configuration to Install" contains a table with three rows. The first row is selected, with a radio button next to "Typical". The second row has a radio button next to "Minimum". The third row has a radio button next to "Custom". Each row has a description of the configuration type.

Configuration	
<input checked="" type="radio"/> Typical	A typical installation is recommended for a Fabasoft Folio Domain with up to 100 named users. All parameters are set to default values.
<input type="radio"/> Minimum	A minimum installation is recommended for a Fabasoft Folio Domain that serves as a demo installation or a training installation. All parameters are set to default values.
<input type="radio"/> Custom	A custom installation is recommended in all other situations. Knowledge in the underlying concepts and architecture is required. Parameters may be set manually.

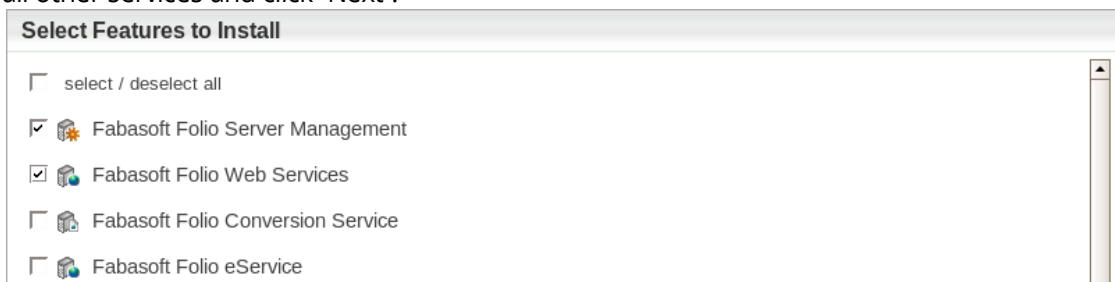
7. In the next dialog two options are available:

- *Choose a license file for the installation of a new Fabasoft Folio Domain*  
Select this option to install Fabasoft Folio Backend Services. In the *License file* field, type the path to the license file or click “Browse” to browse the file system.
- *Use an existing Fabasoft Folio backend installation*  
Select this option to use an existing Fabasoft Folio backend installation. Select *Use an existing Fabasoft Folio backend installation*. In the *Hostname* field type the hostname of the Fabasoft Folio Backend Server, in the *Port* field type its port and click “Next”.







The dialog box titled "Choose an Installation Mode" contains a section titled "New or Existing Fabasoft Folio Domain". It has two radio buttons. The first is "Install a new Fabasoft Folio Domain" with a "License file" text box and a "Browse..." button. The second is "Use an existing Fabasoft Folio Domain" which is selected. It has "Host" and "Port" text boxes. The "Host" box contains "fscbackend" and the "Port" box contains "18070".

8. Select *Fabasoft Folio Server Management and Fabasoft Folio Web Services*, clear the checkboxes of all other services and click “Next”.



The dialog box titled "Select Features to Install" has a "select / deselect all" button at the top. Below it are five items, each with a checkbox and an icon. The first two items, "Fabasoft Folio Server Management" and "Fabasoft Folio Web Services", have their checkboxes checked. The other three items, "Fabasoft Folio Conversion Service" and "Fabasoft Folio eService", have their checkboxes unchecked.

Select Features to Install	
<input type="checkbox"/> select / deselect all	
<input checked="" type="checkbox"/>  Fabasoft Folio Server Management	
<input checked="" type="checkbox"/>  Fabasoft Folio Web Services	
<input type="checkbox"/>  Fabasoft Folio Conversion Service	
<input type="checkbox"/>  Fabasoft Folio eService	

9. A check on all prerequisites is performed. Its result is presented in an overview. Ensure that your system complies with all requirements (indicated by a green tick) and click "Next".

**Review Results of the Prerequisites Check**

Status
The prerequisites check passed.
Fabasoftware Folio Server Management
Fabasoftware Folio Web Services

**Note:** You can expand the check overview by clicking the check icon (e.g. green tick).

10. Select whether Kerberos should be used for authentication and click "Next".

**Select Authentication Mode**

☒ Use kerberized Fabasoftware Folio services  
☐ Use non kerberized Fabasoftware Folio services

**Kerberos principal**

Principal:



11. In the *Review Configuration* box, the Fabasoftware Folio Service can be configured. If you want to change the settings, click "Edit" next to *Fabasoftware Folio Web Services*. Otherwise click "Next" to start the installation. In this case the next steps can be omitted.

**Review Configuration**

Fabasoftware Folio Web Services	Edit
---------------------------------	------

12. The following options are available to configure the Fabasoftware Folio Web Services. Click the name of a Fabasoftware Folio Web Service, to edit the settings.
- A Fabasoftware Folio Web Service can be edited by clicking the name of the service.
  - A Fabasoftware Folio Web Service can be deleted by clicking "Remove" (✗).
  - A Fabasoftware Folio Web Service can be created by clicking the plus icon (+).

**Fabasoftware Folio Web Services**

Service Definition			
Service name	<a href="#">Web Service 1</a>	17080	 

The following options are available:

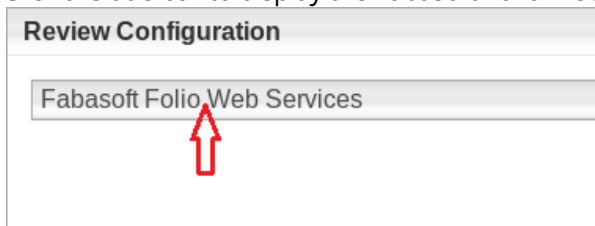
- *Web Service Port*  
In this field type the port the Fabasoftware Folio Web Service listens on.

- *Load Balancer Host (optional)*  
In this field type the hostname of the load balancer.
- *Authentication*  
Select the authentication mode which is used for users to log on to the Fabasoft Folio Web Service.  
If *Basic* is selected, a username and password to logon to the Fabasoft Folio Web Service have to be specified. Selecting *LDAP* the URL to the LDAP directory server has to be specified.

**Fabasoft Folio Web Service**

Web service port	17080
Load balancer host	
Authentication	<input type="radio"/> Kerberos <input checked="" type="radio"/> Basic <input type="radio"/> LDAP
Username	fscweb
Password	*****

13. To close the dialog for configuring the Fabasoft Folio Web Services, click "Apply".
14. Click the title bar to display the Fabasoft Folio Web Services configuration details.



15. Verify the configuration settings and click "Next".

**Example:**

**Review Configuration**

Fabasoft Folio Web Services		Edit
Web Service 1		
Port	17080	
Load balancer host		
Authentication	basic	

16. Click "Install" to start the installation.  
The Fabasoft Folio Web Services are installed.

## 9 Configuration of Fabasoft Folio Web Services

### 9.1 Kerberos

After the installation of the RPM packages the Fabasoft Folio Service user (`fscsrv`) is available. The ownership and permissions of the file `/etc/fabasoft/krb5.keytab`, that has been created during



preparation of Linux (see document “Fabasoft on Red Hat Linux – Preparation Guide”), need to be adjusted. Therefore perform the following steps:

1. Set the ownership of the file `/etc/fabasoft/krb5.keytab` to `fscsrv` by executing the following command:  

```
# chown fscsrv:fsc /etc/fabasoft/krb5.keytab
```
2. Set the permission for the file `/etc/fabasoft/krb5.keytab` as only the user `fscsrv` can read and write it by executing the following command:  

```
# chmod 0600 /etc/fabasoft/krb5.keytab
```

The ownership and permissions for the file `/etc/fabasoft/krb5.keytab` have been changed.

### Starting with Fabasoft Folio

Kerberos authentication requires a specific login name to be present in a user object.

For a user “test” in a domain “testdomain.at” the corresponding login name is `test@testdomain.at`, which is the so called user principal name (UPN) associated with the domain user.

In previous releases the required login name was “testdomain\test” (first component of full-qualified domain name followed by username). For upgraded web services the login name does not have to be changed to the new format. For new web services the new format has to be used.

If the old format should be used in this case, an environment variable must be configured on a per web service basis.

Execute the following command:

```
echo -n "YES" >
/var/opt/fabasoft/instances/WebService_<id>/env/FSCVEXT_KRB5SAMUSERLOGNAME
```

After a restart of the web service, the old format is in use.

## 9.2 Grant Login to the Fabasoft Folio Domain

The user `fscsrv`, local to the Fabasoft Folio Web Server, must be granted permission to log on to the Fabasoft Folio Domain. Therefore an additional login name is appended to the System Administrator user object. When using Kerberos, perform the following steps on the Fabasoft Folio Backend Server:

1. Logon as user `fscsrv`.  

```
# su - fscsrv
```
2. Get a Kerberos ticket for the administrative user.  

```
> kinit <administrative user>
```
3. Add the login name of the administrative user to Fabasoft Folio by executing the following command:  

```
> HOST=<fully qualified domain name of the Fabasoft Folio Backend Server> \
> PORT=<port of the primary Fabasoft Folio COO Service> \
> /opt/fabasoft/sbin/cooload -userlogname ':<fully qualified domain name of the
Fabasoft Folio Web Server>:\fscsrv'
```

The administrative user has been added to Fabasoft Folio so it is possible to log on to the Fabasoft Folio Domain with this user.

**Note:** To grant the `fscsrv` user permission to the Fabasoft Folio Domain without using Kerberos, skip the line `kinit<administrative user>`.

## 9.3 Basic Authentication With htpasswd

The login name of the user running the Fabasoft Folio Web Service has to be added to the `htpasswd` file.

To add a user login name to the `htpasswd` file, use the following command:

- Red Hat Linux  

```
# htpasswd -b /etc/fabasoft/web/htpasswd <username> <password>
```

Configure all the apache configuration files for the desired product components in the path `/etc/httpd/conf.d/` by enabling the basic authentication method. Here is an example:

```
# Basic Authentication
AuthType Basic
AuthName "<product name>"
AuthUserFile /etc/fabasoft/web/htpasswd
Require valid-user
```

## 9.4 Configuring SSL Communication

Make sure that the Fabasoft Folio Web Server is converted to SSL communication (suggestive in combination with basic authentication). The configuration file is located in `/etc/httpd/conf.d/ssl.conf`.

**Example:** Extract of the web server configuration for SSL

```
<VirtualHost _default_:443>
    Listen 0.0.0.0:443
    SSLEngine on
    SSLProtocol all
    SSLCipherSuite HIGH:MEDIUM
    SSLCertificateFile /opt/fabalabs/etc/<Certificate.cer>
    SSLCertificateKeyFile /opt/fabalabs/etc/<CertificateKey.key>
</VirtualHost>
```

This way SSL is activated for the server. Additionally it can be configured for which pages SSL shall be used. For that purpose define the directories that should be used in a virtual host.

## 9.5 Configuring SSL Communication for Outgoing Requests

Outgoing HTTPS requests require CA certificates of the destination servers to be configured. The default list of trusted certificates is stored in `/etc/pki/tls/certs/ca-bundle.crt`.

`openssl` must be used to add additional CA certificates to the file.

Execute the following command:

```
openssl x509 -in <path-to-new-ca-file> -text >> /etc/pki/tls/certs/ca-bundle.crt
```

## 9.6 Configuring Electronic Signature Authentication

Depending on your Web Service configuration, users might be required to authenticate themselves as part of a use case involving an electronic signature.

If the Web Service is configured to authenticate users via Kerberos, authentication in the context of an electronic signature is also based on Kerberos, no further configuration is required.

If Kerberos is not configured, authentication is based on LDAP via Pluggable Authentication Modules for Linux (PAM). To enable PAM authentication, PAM must be configured according to your LDAP infrastructure (`pam_ldap.conf`). The PAM configuration for each service can be found in

/etc/pam.d. The directory contains a single file per *service*, which is typically a familiar name corresponding to an application. For each service, the file /etc/pam.d/<service> contains its configuration. In case of the Fabasoft Folio Web Service, the service name is "fscweb". Consequently, the file /etc/pam.d/fscweb must be created or modified to complete the authentication configuration for LDAP.

## 10 Installation of Fabasoft Folio Conversion Services

As a Fabasoft Folio Conversion Service is based on a Fabasoft Folio Web Service, refer to chapter 8 "Installation of Fabasoft Folio Web Services" for instructions on how to install a Fabasoft Folio Conversion Service.

## 11 Configuration of Fabasoft Folio Conversion Services

### 11.1 Creation of a Fabasoft Folio Conversion Service User

A Fabasoft Folio Conversion Service needs a dedicated user in whose context it will be running. The user must have a corresponding user object in the Fabasoft Folio Domain. The login name has to be added to the `htpasswd` file.

To create a Fabasoft Folio Conversion Service user, perform the following steps:

1. Add a user login name to the `htpasswd` file. Use the following command:
  - o Red Hat Linux  
# `htpasswd -b /etc/fabasoft/web/htpasswd <username> <password>`
2. Get a Kerberos ticket for the directory service domain user already added to the System Administrator user object in Fabasoft Folio.  
# `kinit <username>`
3. Open a Fabasoft Folio Web Client and connect to the Fabasoft Folio Web Service.  
`http://<webserver>.<sub.company.com>:<portnumber>/<vdir>`
4. In the *Domain Administration*, navigate to the *User Objects* and click the "Users" tab.
5. Open the user object created for the Fabasoft Folio Web Service (on the Fabasoft Folio Conversion Server) in editing mode.
6. In the *Login Name* field, the two login names created during the preparation of the Fabasoft Folio Web Service are displayed.
7. Add a third login name for the user running the Fabasoft Folio Conversion Service.
8. Click "Next" to save the changes and quit the property editor.

A Fabasoft Folio Conversion Service user has been added to the Fabasoft Folio Domain.

**Note:** This user object has already been added to the list of *Privileged Users* in the current domain during installation of the Fabasoft Folio Web Service as the basis for the Fabasoft Folio Conversion Service (see document "Fabasoft on Red Hat Linux – Preparation Guide").

### 11.2 Configuration of Fabasoft Folio Conversion Services

In the Fabasoft Folio Domain, add the Fabasoft Folio Conversion Service to the *Default Web Services* and specify a watched folder.

### 11.2.1 Conversion Server URL

To specify the connection information for the Fabasoft Folio Conversion Service, perform the following steps:

1. Open a Fabasoft Folio Web Client. In the *Domain Administration*, open the settings for the Domain. Navigate to the page "Components Configuration". Open the "Local Web Service Configuration" that can be found in the field "Web Service".
2. Within the "HTTP Connectors" page, edit the connection entry for the Default Web Services.  
**Note:** If the object is opened in read-only mode, click "Edit".
3. Enter the connection information for the Fabasoft Folio Conversion Service in the field *HTTP Connection Table* and click "Next". The following properties are available:
  - *URL*  
Specify the fully qualified domain name of the Fabasoft Folio Conversion Server.
  - *User*  
Specify the login name of the Fabasoft Folio Conversion Service user created as described in chapter 11.1 "Creation of a Fabasoft Folio Conversion Service User".
  - *Password*  
Specify the password of the Fabasoft Folio Conversion Service user.

### 11.2.2 Watched Folder

To specify a watched folder, perform the following steps:

1. Right-click `FSCCONV@1.1001:ExternalConversionConfiguraion` and click "Properties".  
**Note:** If the object is opened in read-only mode, click "Edit".
2. On the "Conversion Configuration" tab in the *Watched Folder* field specify the *File system path* and the *Time limit in seconds*.
  - *File system path*  
Use this field to specify the path to the watched folder (e.g. `/tmp/watchedfolder`).
  - *Time limit in seconds*  
In this field a limit that defines the period of time a conversion may last before an error is returned can be specified.
3. Click "Next" to save the changes.

### 11.2.3 Conversion Timeout

The maximal conversion duration using LibreOffice can be configured via the property *Conversion Timeout (in Seconds)* (`FSCTLH@1.1001:conversiontimeout`) in the *Tools Host Configuration* (`FSCTLH@1.1001:StdOleAutomationHost`). If the timeout is expired the conversion will be cancelled.

## 11.3 Configuration of the Fabasoft Folio Watcher Service

During installation of the software packages specified in the prerequisites of this document, a watcher service is installed on the computer. Once configured and activated, this service will monitor all LibreOffice instances utilized for document conversion and restart them automatically upon failure.

The configuration is defined in `/etc/fabasoftware/watcher.conf`. The number of LibreOffice instances is set with the variable `OOINSTANCES`.

To configure the Fabasoftware Folio Watcher Service, perform the following steps:

1. Open the file `/etc/fabasoftware/watcher.conf` in an editor:  

```
# vi /etc/fabasoftware/watcher.conf
```
2. Locate the variable `OOINSTANCES` and adjust the number of instances.
3. Save the file and exit the editor.
4. Start the service using the following command:
  - o Red Hat Linux:  

```
# service watcherd start
```

The Fabasoftware Folio Watcher Service has been configured.

## 11.4 Install and Configure Ghostscript

### Install Ghostscript

To install Ghostscript, perform the following steps:

1. On the Fabasoftware Folio Conversion Server log on as the user running the Fabasoftware Folio Conversion Service.
2. Download the supported Ghostscript version. A repository of all available Ghostscript products can be found under the following link: <https://github.com/ArtifexSoftware/ghostpdl-downloads/releases>
3. Unpack the downloaded file:  

```
tar -xvzf ghostscript-<version>.tar.gz
```

An installation folder is created, which is needed to build Ghostscript on your server.
4. Change into the directory of the installation folder and execute the following commands to install Ghostscript:  

```
./configure  
make  
make install
```
5. Download the Ghostscript fonts package, which can be found under the following link: <http://downloads.sourceforge.net/gs-fonts/ghostscript-fonts-std-8.11.tar.gz>
6. Unpack the downloaded file:  

```
tar -xvzf ghostscript-fonts-std-8.11.tar.gz
```
7. Copy or move the created directory `fonts` to `/usr/local/share/ghostscript/fonts`

### Configure PDF/A Conversion with Ghostscript

The following steps are only necessary if you want to convert documents to PDF/A file format.

1. Copy the `iccprofiles` directory from the directory of the installation folder (unpacked `ghostscript-<version>.tar.gz`) to the standard Ghostscript installation path (`/usr/local/share/ghostscript/<version>`).
2. Edit the `PDF_A_def.ps` configuration file (`/usr/local/share/ghostscript/<version>/lib/PDF_A_def.ps`).
3. In the `/ICCPProfile` line replace `srgb.icc` with the path of the copied `srgb.icc` file:  
`/ICCPProfile /usr/local/share/ghostscript/<version>/iccprofiles/srgb.icc`

## 11.5 Install and Configure FFmpeg

The following steps are necessary if you want to convert video contents.

1. Build or download a static build of FFmpeg: <http://ffmpeg.org/>
2. Move the static FFmpeg tool to a location which is referenced by the PATH environment variable (e.g. /usr/local/bin).

## 11.6 Install and Configure ExifTool

The following steps are necessary, if image properties should be available.

1. Add the "Extra Packages for Enterprise Linux" (EPEL) repository to yum.
2. Install ExifTool with `yum install perl-Image-ExifTool`.

## 11.7 Additional Configuration Options

Additional conversion options can be specified in the registry path

HKEY\_LOCAL\_MACHINE\Software\Fabasoft\FSCONV@1.1001:

- `PreferOpenOfficePDFA`: A value greater than 0 specifies that a PDF/A document will be created when converting via LibreOffice application, even though when the target format is "PDF". By default, this option is not enabled.

## 12 Installation of Fabasoft Folio AT Services

### 12.1 Creation of a Fabasoft Folio AT Service User

A user object dedicated to the Fabasoft Folio AT Service is required in the Fabasoft Folio Domain. To create this user object, perform the following steps:

1. In the *Domain Administration*, navigate to the *User Objects* and click the "Users" tab.
2. Create a user object. Add the following login names:  
`:<fully qualified domain name of the Fabasoft Folio AT Server>:\fscsrv`  
`fscsrv`
3. On the "Environments" tab, add a new user environment in the *Environments* field, or specify a default user environment and select "Yes" in the *Automatically Create Local Environment* field.
4. Click the "Advanced" tab. In the *Automated Tasks* field, specify the automated tasks that should be executed.
5. Click "Next" to create the user object and quit the property editor.
6. In the *Domain Administration*, navigate to *Domain Objects*.
7. Open the *Current Domain* in editing mode.
8. On the "System Configuration" tab, the user object has to be entered as privileged user, so that an automatic change of the user context is possible for that user.
9. Click "Next" to save the changes.

### 12.2 Installation of Fabasoft Folio AT Services

To install Fabasoft Folio AT Services via the automated setup, perform the following steps:

1. Insert the Fabasoft product DVD in the DVD drive of your server. Verify that the Fabasoft product DVD is not mounted with the `noexec` option. Otherwise you will not be able to run the `setup.sh` script.
2. Open a root-console and navigate to the mount point of the DVD drive.  
`# cd /media/dvd`
3. Execute the setup shell script.  
`# ./setup.sh`
4. The setup wizard will be opened in a browser window. Read the license agreement carefully. Afterwards select *I accept* and click "Next".

**Legal Terms - Please Read Carefully**

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☐ I decline ☒ I accept

5. If Fabasoft software products have already been installed on the computer, you can decide to
  - o *Install new Fabasoft products* or to
  - o *Update existing Fabasoft services and products.*
  - o *Update existing Fabasoft services only.*

**Choose an Installation Mode**

**Installation Mode**

- ☒ Install additional Fabasoft services and products for existing domain
  - Host
  - Port
- ☐ Update existing Fabasoft services and products
- ☐ Update existing Fabasoft services only

**Add License**

- License file

But in this chapter we discuss an installation against existing backend services on a different machine with no Fabasoft Folio Services installed. (distributed installation)



6. Select *Typical* as setup configuration template and click “Next”.

The dialog box is titled "Select Configuration to Install". It contains a section labeled "Configuration" with three radio button options:

Configuration	Description
<input checked="" type="radio"/> Typical	A typical installation is recommended for a Fabasoft Folio Domain with up to 100 named users. All parameters are set to default values.
<input type="radio"/> Minimum	A minimum installation is recommended for a Fabasoft Folio Domain that serves as a demo installation or a training installation. All parameters are set to default values.
<input type="radio"/> Custom	A custom installation is recommended in all other situations. Knowledge in the underlying concepts and architecture is required. Parameters may be set manually.

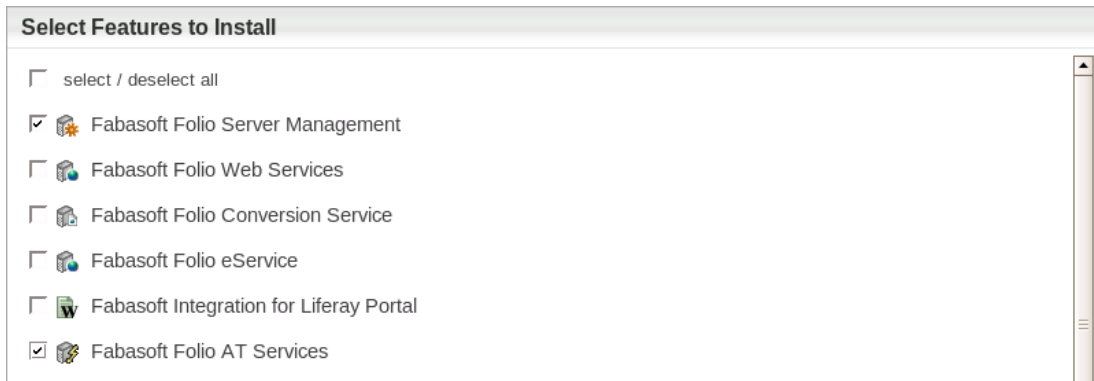
7. In the next dialog two options are available:

- *Choose a license file for the installation of a new Fabasoft Folio Domain*  
Select this option to install Fabasoft Folio Backend Services. In the *License file* field, type the path to the license file or click “Browse” to browse the file system.
- *Use an existing Fabasoft Folio backend installation*  
Select this option to use an existing Fabasoft Folio backend installation.  
Select *Use an existing Fabasoft Folio backend installation*. In the *Hostname* field type the hostname of the Fabasoft Folio Backend Server, in the *Port* field type its port and click “Next”.

The dialog box is titled "Choose an Installation Mode". It contains a section labeled "New or Existing Fabasoft Folio Domain" with two radio button options:







<input type="radio"/> Install a new Fabasoft Folio Domain	
License file	<input type="text"/> <input type="button" value="Browse..."/>
<input checked="" type="radio"/> Use an existing Fabasoft Folio Domain	
Host	<input type="text" value="fscbackend"/>
Port	<input type="text" value="18070"/>

8. Select *Fabasoftware Folio Server Management* and *Fabasoftware Folio AT Services*, clear the checkboxes of all other services and click “Next”.

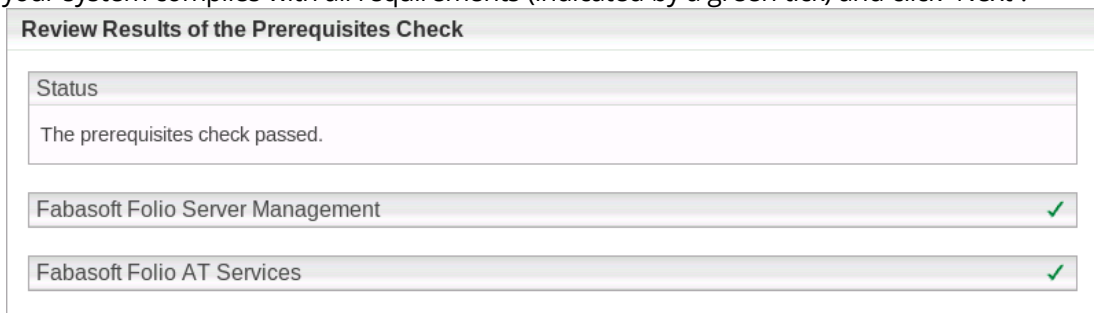


**Select Features to Install**

☐ select / deselect all

- ☒  Fabasoftware Folio Server Management
- ☐  Fabasoftware Folio Web Services
- ☐  Fabasoftware Folio Conversion Service
- ☐  Fabasoftware Folio eService
- ☐  Fabasoftware Integration for Liferay Portal
- ☒  Fabasoftware Folio AT Services

9. A check on all prerequisites is performed. Its result is presented in an overview. Ensure that your system complies with all requirements (indicated by a green tick) and click “Next”.



**Review Results of the Prerequisites Check**

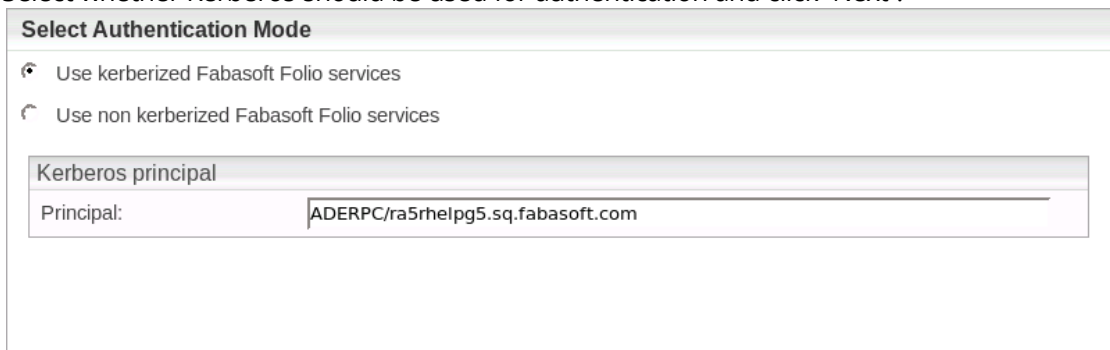
Status

The prerequisites check passed.

Fabasoftware Folio Server Management	✓
Fabasoftware Folio AT Services	✓

**Note:** You can expand the check overview by clicking the check icon (e.g. green tick).

10. Select whether Kerberos should be used for authentication and click “Next”.



**Select Authentication Mode**

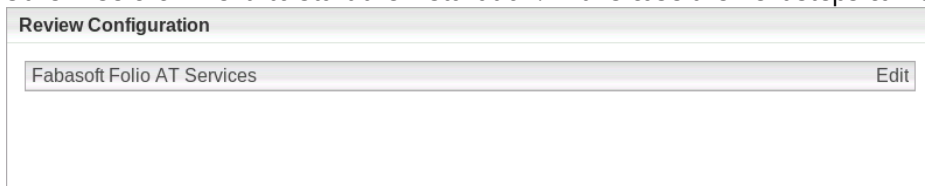
☒ Use kerberized Fabasoftware Folio services

☐ Use non kerberized Fabasoftware Folio services

Kerberos principal

Principal:

11. In the *Review Configuration* box, the Fabasoftware Folio Service can be configured. If you want to change the settings, click “Edit” next to *Fabasoftware Folio Automated Task Services*. Otherwise click “Next” to start the installation. In this case the next steps can be omitted.

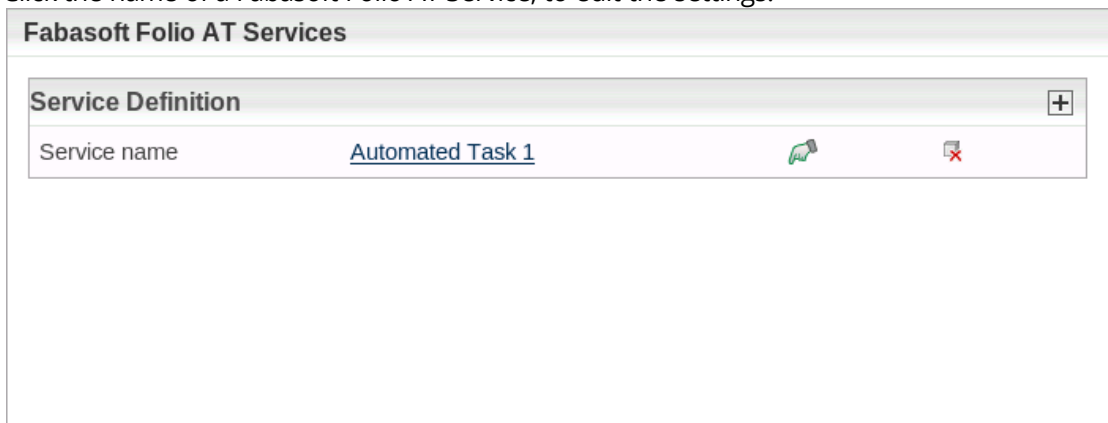


**Review Configuration**

Fabasoftware Folio AT Services	Edit
--------------------------------	------

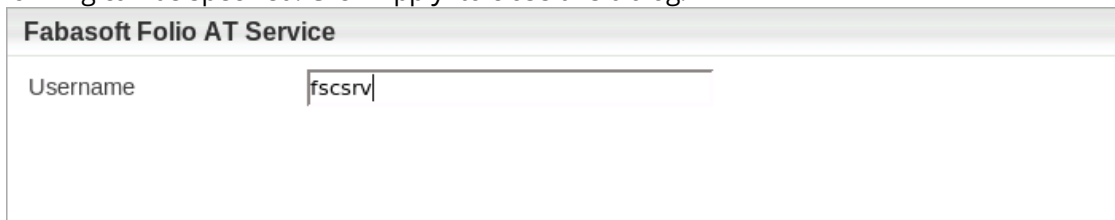
12. The following options are available to configure the Fabasoftware Folio AT Services:
- A Fabasoftware Folio AT Service can be edited by clicking the name of the service.
  - A Fabasoftware Folio AT Service can be deleted by clicking “Remove” (✗).
  - A Fabasoftware Folio AT Service can be created by clicking the plus icon (+).

13. Click the name of a Fabasoft Folio AT Service, to edit the settings.



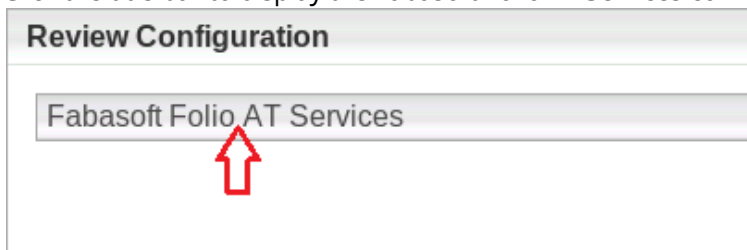
Service Definition	
Service name	Automated Task 1

In the *Username* field the name of the user in whose context the Fabasoft Folio AT Service is running can be specified. Click "Apply" to close this dialog.



Fabasoft Folio AT Service	
Username	fscsrv

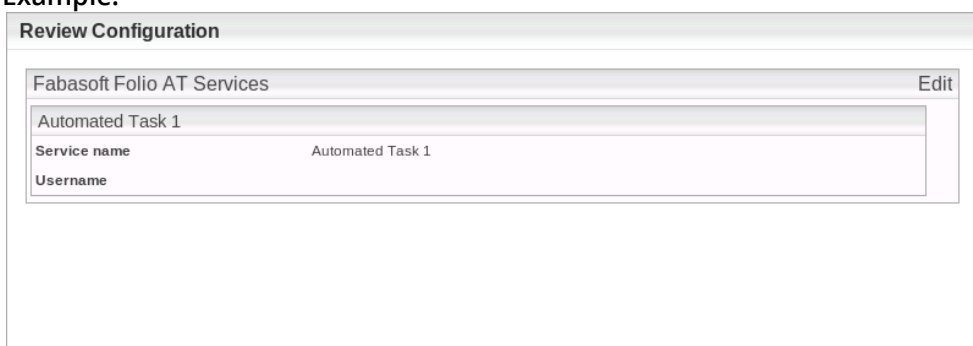
14. To close the dialog for configuring the Fabasoft Folio AT Services, click "Apply".  
15. Click the title bar to display the Fabasoft Folio AT Services configuration details.



Review Configuration	
Fabasoft Folio AT Services	

16. Verify the configuration settings and click "Next".

**Example:**



Review Configuration	
Fabasoft Folio AT Services	
Automated Task 1	
Service name	Automated Task 1
Username	

17. Click "Install" to start the installation.

The Fabasoft Folio AT Services are installed.

## 12.3 Kerberos

After the installation of the RPM packages the Fabasoft Folio Service user (*fscsrv*) is available. The ownership and permissions of the file */etc/fabasoft/krb5.keytab*, that has been created during

preparation of Linux (see document “Fabasoft on Red Hat Linux – Preparation Guide”), need to be adjusted. Therefore perform the following steps:

1. Set the ownership of the file `/etc/fabasoft/krb5.keytab` to `fscsrv` by executing the following command:  

```
# chown fscsrv:fsc /etc/fabasoft/krb5.keytab
```
2. Set the permission for the file `/etc/fabasoft/krb5.keytab` as only the user `fscsrv` can read and write it by executing the following command:  

```
# chmod 0600 /etc/fabasoft/krb5.keytab
```

The ownership and permissions for the file `/etc/fabasoft/krb5.keytab` have been changed.

## 12.4 Creation of Fabasoft Folio AT Services

To create a Fabasoft Folio AT Service, perform the following steps:

1. Logon as user `fscsrv`.  

```
# su - fscsrv
```
2. Create a Fabasoft Folio AT Service instance by executing the following command:  

```
> /opt/fabasoft/bin/fscatm -a -h <hostname> -princ <krbprincipal>
```

`<hostname>` is the hostname of the Fabasoft Folio Backend Server running the primary Fabasoft Folio COO Service.

`<krbprincipal>` defines the imported principal in the format `<user>@<REALM>`. The import is described in the document “Fabasoft on Red Hat Linux – Preparation Guide”.

**Note:** `<REALM>` must be specified in capital letters.

A default port of 18070 is assumed for the Fabasoft Folio Backend Service. To specify another port, use the `-p` option.

**Note:** Non-kerberized installations additionally use the `-k` option but omit the `-princ` option.

Run `fscatm` (without any options) to see an overview of all options available.
3. Start all Fabasoft Folio Service:  

```
> /opt/fabasoft/bin/fscmgmt start all
```

A Fabasoft Folio AT Service is available.

## 12.5 Processing Automated Tasks

The chapter “Processing Automated Tasks” of the „Installation and Configuration of Fabasoft Folio Service on Windows“ white paper provides detailed information about processing automated tasks.

## 13 Uninstallation of Fabasoft Folio Services

Uninstallation of all installed Fabasoft Folio Services can be executed using  
`/opt/fabasoft/sbin/uninstall`.

**Note:** Temporary files (e.g. caches) created by the Fabasoft Folio Kernel are not removed until all Fabasoft Folio Services have been uninstalled using `/opt/fabasoft/sbin/uninstall`.

## 14 Administration Tasks

### 14.1 Management of Fabasoft Folio Service

To back up or clean up Fabasoft Folio Service the command line tool `fscadmin` can be used. The tool can be found in `/opt/fabasoft/bin`.

To be able to use this tool, you have to switch to user `fscsrv`:

```
# su - fscsrv
```

**Example:**

- To list all Fabasoft Folio Service use the following command:  
`./fscadmin --action list --host localhost`
- To back up the content areas of service four execute the following command:  
`./fscadmin --action backup --service 4 --host localhost`
- To clean up all content areas of the Fabasoft Folio Domain until yesterday use the following command:  
`./fscadmin --action cleanup --service all --time 1 --host localhost`
- To clean up all content areas of the Fabasoft Folio Domain until yesterday with an execution time limit of 60 minutes use the following command:  
`./fscadmin --action cleanup --service all --time 1 --host localhost --limit 60`
- To check the content consistency of the Fabasoft Folio Domain use the following command:  
`./fscadmin --action checkconsistency --service all --host localhost`
- To synchronize the contents of a CAS area by taking the creation date into account use the following command:  
`./fscadmin --action cleanup --service all --synbydate 2010-06-06 --host localhost`
- To synchronize the daily backup directory of a CAS area use the following command:  
`./fscadmin --action cleanup --service all --synctobackup 2010-06-06 --host localhost`
- To restore the daily backup directory of a CAS area use the following command:  
`./fscadmin --action cleanup --service all --syncfrombackup 2010-06-06 --host localhost`
- To clean up the daily backup directory of a CAS area use the following command:  
`./fscadmin --action cleanup --service all --cleanupbackup 2010-06-06 --host localhost`

To clean up a CAS backup directory with the need of a minimum number of passed days since the deletion of a file in the CAS Area the command line tool `cleanbackup` can be used.

To be able to use this tool, you have to install `fsc-cas-utils.rpm`.

**Example:**

- To remove files from the backup directory which have been deleted for at least 60 days in the CAS Area:  
`cleanbackup -root /path/to/backupdirectory -days 60`

### 14.2 Management of the Fabasoft Folio Server Cache

To save or load the cached Fabasoft Folio objects of the Fabasoft Folio COO Service also the command line tool `fscadmin` can be used.

### Example:

- To save the COO addresses of all currently cached objects into a file use the following command:  
`./fscadmin --action savecache --file <filename> --service <COO service number>`
- To load objects, of an already saved cache state, into the Fabasoft Folio server cache use the following command:  
`./fscadmin --action loadcache --file <filename> --service <COO service number>`
- To load all objects, and all referenced objects, of a database query result into the Fabasoft Folio server cache use the following command:  
`./fscadmin --action loadbyquery --query "SELECT objname FROM UserEnvironment"`  
This query initializes the Fabasoft Folio server cache with all *User Environments* and all referenced objects (e.g. commonly used objects COOSYSTEM@1.1:usrenvlocalobjects).

## 14.3 Execution of Fabasoft app.ducx Expressions

To execute Fabasoft app.ducx Expressions the command line tool `fsceval` can be used. This tool can be found in the `/opt/fabasoft/bin` directory also.

Usage: `fsceval { argument }`

<code>-verbose</code>	... verbose
<code>-nologo</code>	... suppress banner logo
<code>-ducxunit</code>	... enable ducx unit test
<code>-formatoutput</code>	... print formatted output
<code>-dumptokens</code>	... enable dumptokens
<code>-eval &lt;expr&gt;</code>	... evaluate <expr>
<code>-file &lt;path&gt;</code>	... evaluate contents of file <path>
<code>-stdin</code>	... evaluate contents of stdin
<code>-assert</code>	... enable assert mode
<code>-flags &lt;f&gt;</code>	... use thread flags <f>
<code>-evalflags &lt;f&gt;</code>	... use evaluation flags <f>
<code>-env &lt;path&gt;</code>	... load environment variables in <path>
<code>-threads &lt;t&gt;</code>	... number of threads <f>
<code>-login &lt;logname&gt;</code>	... login for user <logname>, privileged account required
<code>-userfile &lt;path&gt;</code>	... login based on user list in <path>
<code>-tracetoconsole</code>	... trace output to console
<code>-tracetofile &lt;path&gt;</code>	... trace output to file <path>
<code>-trace</code>	... use debugger interfaces for trace

### Example:

Execution of a simple expression (as one command line):

```
su - fscsrv -c "fsceval -eval \"coort.Trace('hello world')\""
```

## 14.4 Checking Log Files

In case of problems log files may provide useful information. The Fabasoft Folio log files can be found here:

- `/var/opt/fabasoft/log/*`

- /tmp/fscsetup.log
- /var/log/messages

## 14.5 Additional Administration Tasks

- To clear the generated object images of an object the action `FSCCONV@1.1001:ClearObjectImages` can be used. Doing so the preview images of the object will be regenerated by the next access to the images:

**Example:** `<object>.FSCCONV@1.1001:ClearObjectImages();`

- To clear the generated object images of a set of objects defined by a Fabasoft Folio Query the action `FSCCONV@1.1001:ClearObjectImages` can be used:

**Example:** `coouser.FSCCONV@1.1001:ClearObjectImages("SELECT objname FROM COOSYSTEM@1.1:ContentObject WHERE .FSCCONV@1.1001:objimgnextretry IS NOT NULL", "/tmp/log.txt");`

- To upgrade all saved object versions and resave the object versions with the current state the action `COOSYSTEM@1.1:UpgradeVersions` can be used. Object versions stored in delta tables (prior to Fabasoft Folio version 7) will be resaved as blob-based version. The first parameter specifies the Fabasoft Folio version up to which object versions should be upgraded. A value of 1407 means that all versions created with Fabasoft Folio versions smaller 14.0.7 will be migrated. The action can be called on a domain object meaning that all object versions in all Fabasoft Folio COO Services will be upgraded. Alternatively a call on a dedicated COO Service is also possible, which makes parallelization possible. In case of a domain object, a Fabasoft Folio query can be specified to restrict the upgrade process to the query result.

**Examples:**

- `#TV.TV_LOGFILE = "c:\\upgradeversions.log";  
coodomain.UpgradeVersions(1407);`
- `#TV.TV_LOGFILE = "c:\\upgradeversions.log";  
<coosrv>.UpgradeVersions(1407);`
- `#TV.TV_LOGFILE = "c:\\upgradeversions.log";  
coodomain.UpgradeVersions(1407, "SELECT objname FROM NOTE@1.1:NoteObject");`

- After updating Fabasoft Folio with a version lower than 2020 to version 2020 or higher, the ACLs must be migrated.

To update every old ACL reference to their corresponding new ACL the action

`COOSYSTEM@1.1:UpgradeACLs` can be used. This action optionally takes one parameter to specify the amount of threads (default: 1), two parameters to manually specify the old ACL and the new ACL, and a parameter to specify the upgrade step to execute (default: all;

`UPGRADEACLs_SERVER` migrates `COOSYSTEM@1.1:objaclobj` using the COO Service,

`UPGRADEACLs_KERNEL` migrates all other ACL attributes using Kernel-based object updates).

One thread acts on one COO Service at a time. Threads are only used for updating the references in `COOSYSTEM@1.1:objaclobj`. All other attributes are updated after successfully updating all references in `COOSYSTEM@1.1:objaclobj`. If some objects cannot be updated due to a lock, the update on these objects is retried once.

**Examples:**

- `#TV.TV_LOGFILE = "./upgradeaccls.log";  
coodomain.UpgradeACLs(4);`
- `#TV.TV_LOGFILE = "./upgradeaccls.log";  
coodomain.UpgradeACLs(, oldacl, replacementacl);`
- `#TV.TV_LOGFILE = "./upgradeaccls.log";  
coodomain.UpgradeACLs(, [oldacl1, oldacl2], [replacementacl1, replacementacl2], UPGRADEACLs_SERVER);`