AEM Forms Administration

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SmartDoc Technologies Courseware: www.aemforms.training

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AEM Forms Administration

Before you Begin 5

Course Overview 5

Local Environments 5

www.aemforms.training 5

Limited Courseware License 5

CRX and Packages 7

CRXDE Lite 7

Package Manager and Packages 8

Package an AEM Forms application 8

Dependencies 8

Package Share and Software Distribution 9

Exercises 10

Demo: Download Packages from Software Distribution 10

Install a Package in Package Manager 12

Exercise: Create a Package for an AEM Forms application 14

Exercise: Examine the Package 17

Batch Load Packages 18

OSGi Configurations & Run Modes 20

OSGi Configurations 20

OSGi Configuration Nodes in CRXDE Lite 20

Configuration Files 21

Run Modes 21

Resolution Rules for Configurations 21

Resolution at Startup 22

Resolution at Runtime 22

Exercises 22

Create configuration nodes in CRXDE Lite 22

Create a Custom Run Mode 25

Create an OSGi Configuration for the Publish run mode 27

Create an OsgiConfig for an SMTP Server 30

LDAP Integration 36

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The Services 36
LDAP 36
AEM Integration 37
Microsoft Active Directory 37
Exercises 38
Install a Sample LDAP Server 38
Integrate AEM 41
Demo 48
Configure the External Login Module 48
Configure the DefaultSyncHandler 49
Configure the LDAP Identity Provider 50
JAAS and JMX 53
Login as a Synchronized User 55

Operations 56
HTTPS 56
Operations 56
Health Reports 57
Maintenance 57
Tar Compaction 57
Exercises 58
Configure HTTPS 58
View Health Reports 61
Enhance Security with replication-receiver 65
Configure Daily Maintenance Tasks 68
Configure Weekly Maintenance Tasks 70
TAR Compaction and Offline Revision Clean-up 81
Run a DataStore Consistency Check 85

Log Files 86
The Default Log Files 86
Custom Logs 86
Exercises 87
View Logging Defaults 87
Create Custom Loggers 89
Create a Custom Logger with a sling:OsgiConfig node 93

Create a Custom Log File for LDAP 96
Set your Log Levels to INFO 99

Deployment Scenarios 101
Online Backup 101
Single Tar Instance 101
Tar Cold Standby 102
Important Properties 102
MongoDB 103
Exercises 103
Create an Online Backup 103
Create a Tar Cold Standby 105
Trouble-Shooting 113

Trouble Shooting 115
Could not Install Package 115

About this Courseware 116

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Before you Begin

This course, and all our SmartDoc courseware, is now being taught by many trainers in many locations. Therefore, we are providing this section and this information to help you get started.

Course Overview

Prerequisites: Introduction to AEM Forms.

Approximate Instructor-Led Classroom Duration: 3 days

This course focuses on the AEM Forms on OSGi product. There is a similar course entitled AEM Forms Administration JEE for students who wish to focus on the AEM Forms on JEE product.

AEM Forms Administration OSGi is a 3-day, instructor-led course where you will learn to install, configure, and maintain an AEM Forms on OSGi server. It can be taught live, in a classroom, or as a virtual course. AEM Forms on OSGi is the world's leading enterprise forms management platform. It facilitates the creation and management of responsive and adaptive HTML5 forms and includes out-of-the-box forms portal components and document services.

You will learn all the Administration tools including the Felix Web Console, CRXDE Lite, and the various administration consoles in AEM's Touch UI and Classic interfaces. You will learn how to install, configure, manage, maintain, and secure an AEM Forms on OSGi server. You will learn how to integrate your server with your enterprise applications like databases, mail servers, and LDAP systems. You will learn how to configure the Adobe Document Services on OSGi. You will learn how to create and manage workflows with the AEM Forms on OSGi workflow tools.

Local Environments

Students should work on their own environments with Administrator access.

The *Introduction-and-Installation* course shows how to install and configure local Author and Publish environments. These environments are important for Administration because students cannot use one of the pre-configured AEM Forms Sandbox environments.

www.aemforms.training

The support site (**www.aemforms.training**) is designed to support our students during and after a training session. Here is what you will find on the support site.

- The **Known Issues** section documents bugs and issues with various versions of AEM Forms.
- The **Sandbox** section lists AEM Forms Servers you can use for the hands-on exercises.
- The **Forum** section enables you to post, review, and answer questions about AEM Forms.

Limited Courseware License

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CRX and Packages

This module covers important fundamentals of CRX and AEM Forms packages. You will learn about the important folders in CRX and work with CRXDE Lite to create a package for an AEM Forms application.

CRXDE Lite

Each CRX folder has an important purpose. It is important for you as a developer or IT Administrator to understand Adobe's intent for each of these CRX folders.

/apps

This is the folder that we use for our development as opposed to /libs which is used by Adobe for AEM's core software. You can copy Adobe's adaptive form components from /libs and paste them in /apps to make them your own. You can also use a process called Sling Resource Merger to inherit from /libs.

/conf

This folder contains your adaptive form templates, cloud configurations, and your *design-time* workflow models.

/content

This folder contains your adaptive forms and your Form Data Models. It also contains page content and the digital assets housed by the AEM Assets module.

/etc

This folder contains the CSS of your theme and any watched folders. It is also possible that legacy client libraries might be in this location.

/libs

This folder contains all AEM's core software. When an Administration runs a service pack or a cumulative fix pack, most, if not all the updates are prefixed by /libs/.

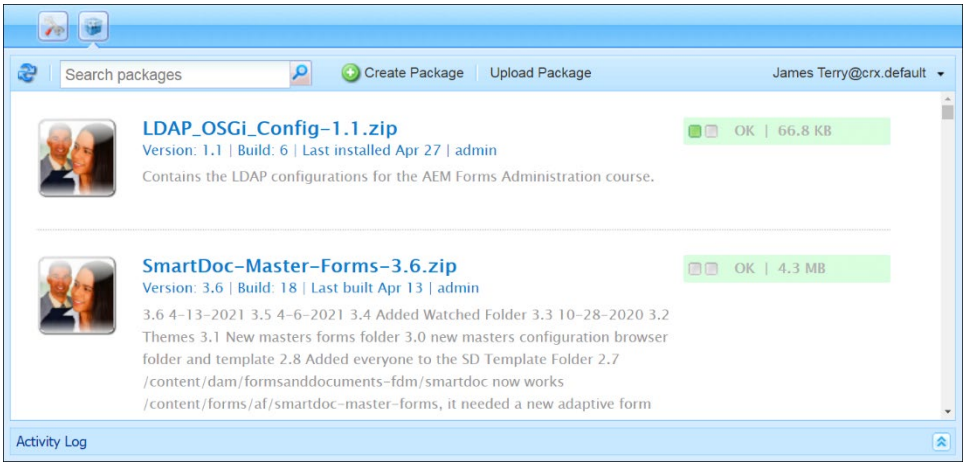
/var

This folder contains your *run-time* workflow models.

Package Manager and Packages

Package Manager is part of CRXDE Lite. You can use Package Manager to create and work with packages. Packages enable you to import and export repository content. Packages typically contain content, applications, and configurations You will use packages to accomplish all the following:

- To install new functionality.
- To transfer content and apps between AEM server instances.
- To backup repository content.
- To export content to the local file system.



Package an AEM Forms application

Each package you create with Package Manager contains filters to target the specific content you want in the package. The challenge of creating a package for an AEM Forms application is to filter in all the locations where Adobe persists the AEM Forms content. Notice how the Forms and Themes content is persisted to two different CRX locations. You need to filter in all the locations.

Item	Filter
Forms	/content/forms/af/<name>
	/content/dam/formsanddocuments/<name>
Theme	/etc/clientlibs/fd/themes/<name>
	/content/dam/formsanddocuments-themes/<name>
Design Time Workflow model	/conf/global/settings/workflow/models/<name>
Run Time workflow model	/var/workflow/models/<name>
Watched Folder	/etc/fd/watchfolder/staging/<name>
	/etc/fd/watchfolder/config/<name>

Dependencies

Add your server's Service Pack as a dependency of your application. Administrators will receive a notification after they upload your application to their server.

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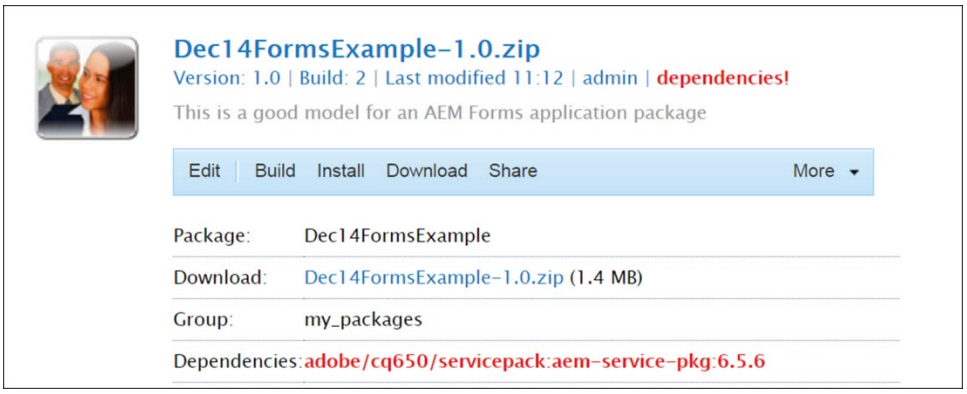
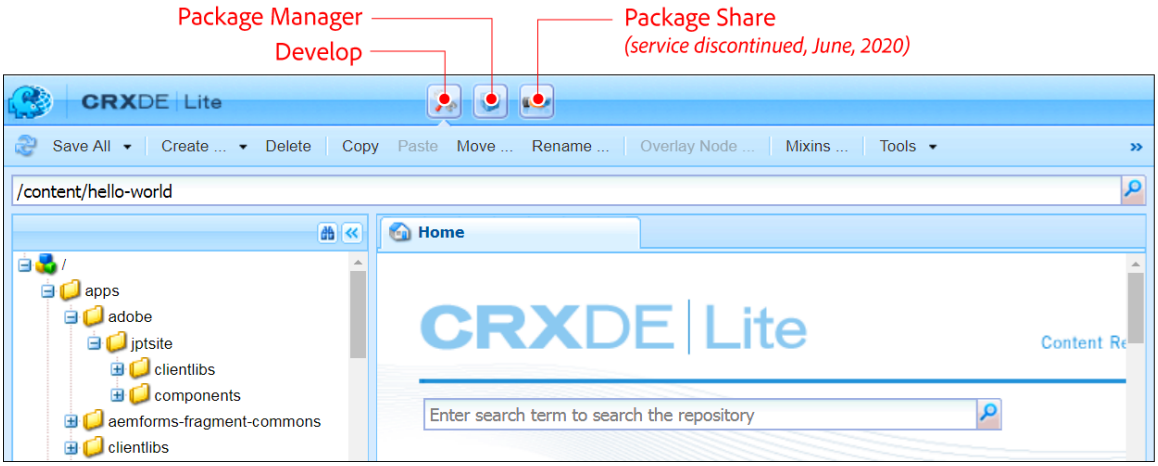


Package Share and Software Distribution

Package Share is a deprecated Adobe service that may still be listed in your version of CRXDE Lite. The service was discontinued in June, 2020.



The Package Share button is removed in AEM 6.5.5. and higher.

Package Share was replaced with Adobe Software Distribution in June, 2020.

https://experience.adobe.com/downloads

Exercises

Demo: Download Packages from Software Distribution

As of June, 2020, you cannot necessarily access Software Distribution with the same Adobe ID you used for Package Share. You need to login with an account that meets Adobe-wide security standards. If you don't have one, Adobe recommends contacting a Support Administrator within your organization.

> ***Note:*** *You may need to login with Firefox, Microsoft Edge, or some other browser where you are not already logged in with an Adobe ID.*

https://experience.adobe.com/downloads

Follow these steps to download a package.

1. Open this URL with a browser.

https://experience.adobe.com/downloads

2. Sign in with an Adobe ID.

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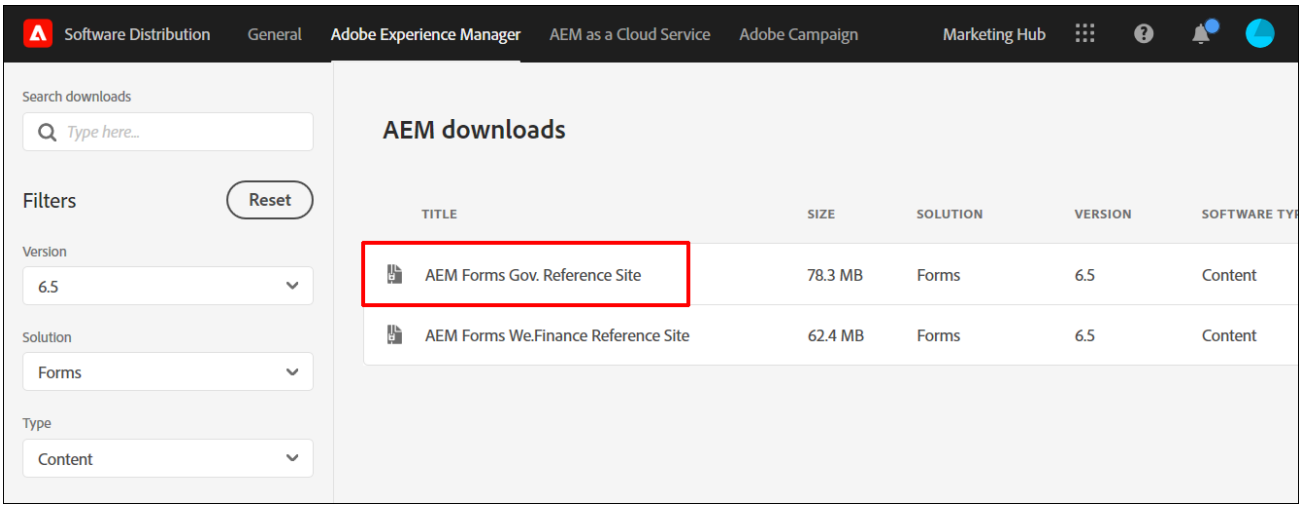
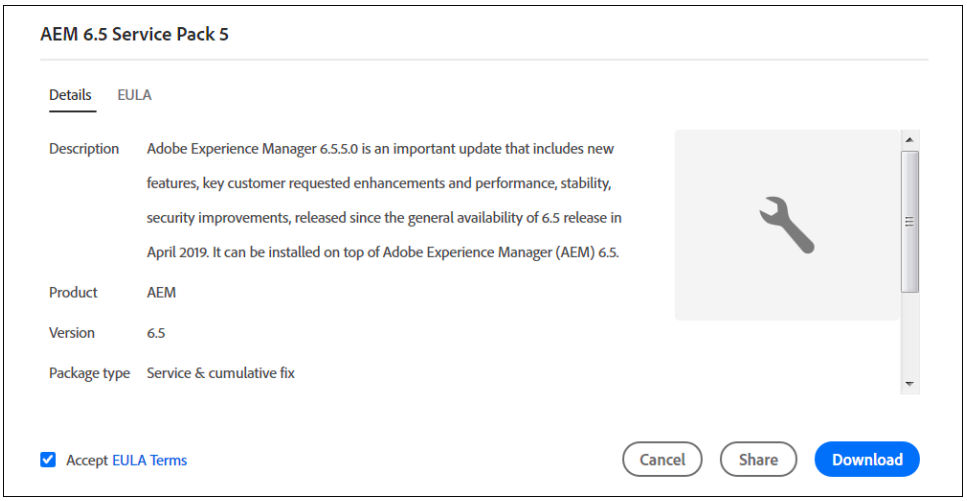
3. Click the **Adobe Experience Manager** tab.
4. Select your version.
5. Select **Forms**.
6. Select **Content**.
7. Select the **AEM Forms Gov. Reference Site**.



8. Click the **Accept EULA Terms**.
9. Click **Download**.
10. Locate and select the current Service pack.



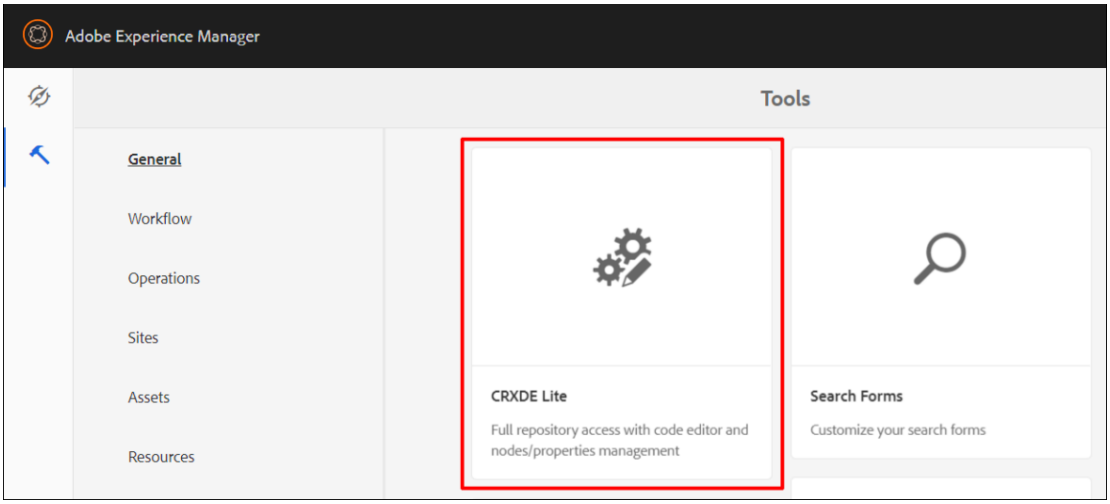
11. Click the **Accept EULA Terms**.
12. Click **Download**.

Install a Package in Package Manager

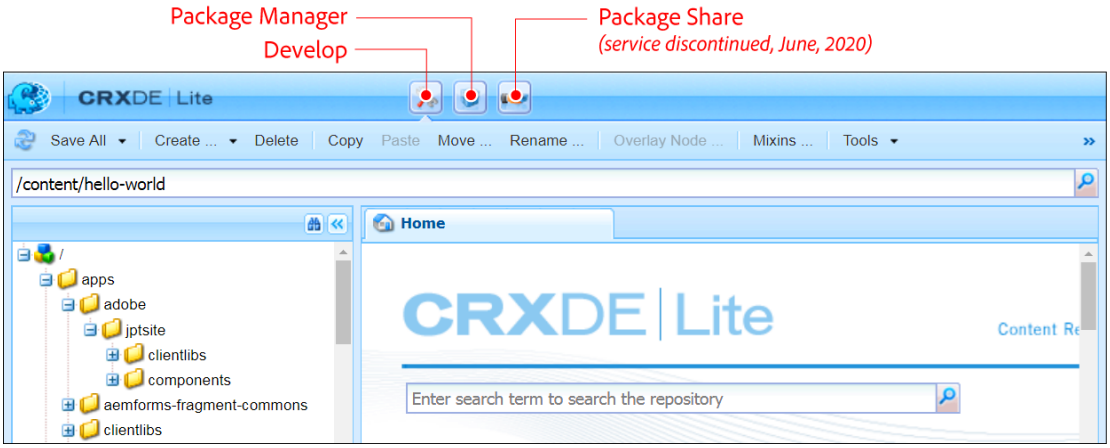
Note: *If you are using a SmartDoc Sandbox Server, this package is already installed.*

In this exercise, you will upload and install the **SmartDoc Master Forms** package. You will need to follow these steps whenever you must upload and install an AEM package.

1. Launch **AEM**.
2. Click **Adobe Experience Manager** in the upper-left corner of the header bar.
3. Select **Tools** *(the hammer icon)*.
4. Select **General – CRXDE Lite**.



5. Click **Package Manager**.



You will now see the **CRX Package Manager**.

6. Click **Upload Package**.
7. In the *Upload Package* window click **Browse…**
8. Select the **SmartDoc-Master-Forms-<version>.zip** package from your Student Files.

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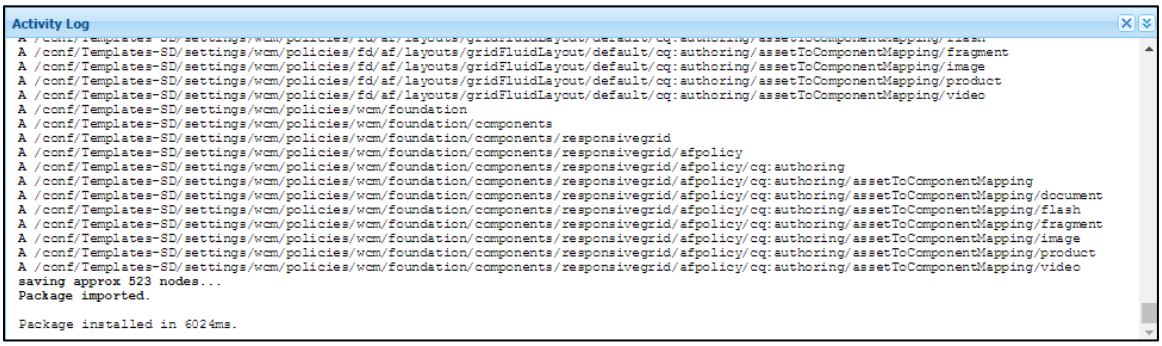
9. Click **Open** and **OK**. Your package will upload.

10. Check to see if your package has dependencies or if it is ready to install.

11. If all is good, click **Install**.

12. In the Install Package dialog window ignore the **Advanced Settings** drop-down and click **Install**.

The **Activity Log** panel will display the content that was added from the package and will also tell you how many "nodes" *(assets, components)* were installed in your repository.



13. Start your Publish Server if it is not already running.

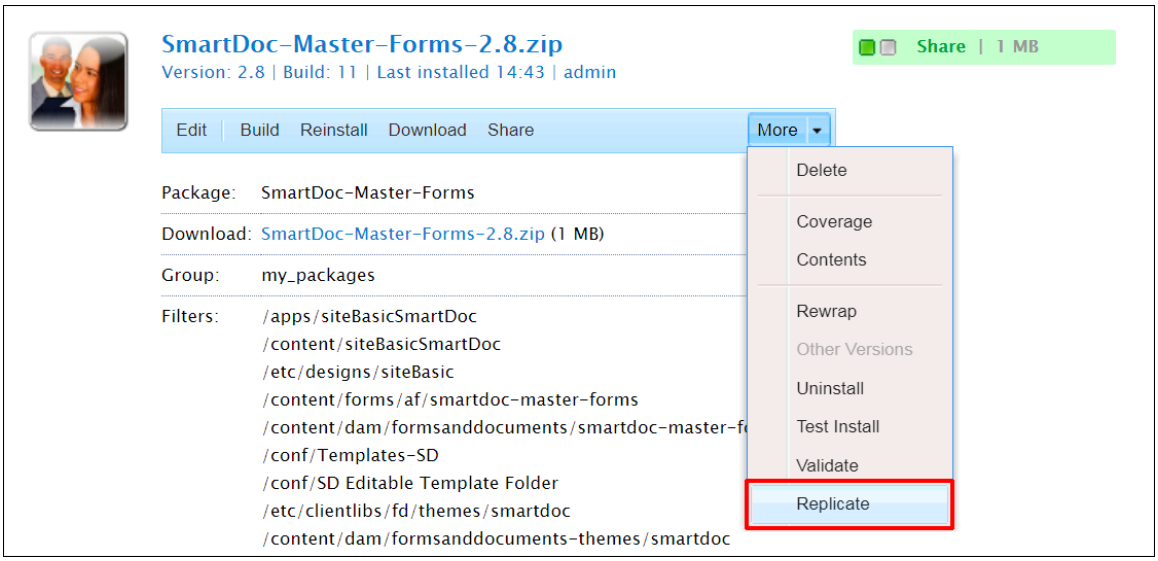
14. Once your Publish Server is up, you can follow these steps to replicate this package.

15. Open a browser tab with **Package Manager** on your Author instance.

http://<servername>:4502/crx/packmgr/index.jsp

16. Locate the **SmartDoc-Master-Forms** package that you previously installed *(see illustration)*.

17. Click **More** and select **Replicate** *(see illustration)*.



18. When your replication completes, the package will be *copied to*, and *installed on*, your Publish Server. You will see this message in the Activity Log.

Replicate Package: /etc/packages/my_packages/SmartDoc-Master-Forms-3.5.zip
Mon Feb 14 2022 10:56:11 GMT-0500 (Eastern Standard Time)
Replicating package
Package is replicated asynchronously in 144ms.

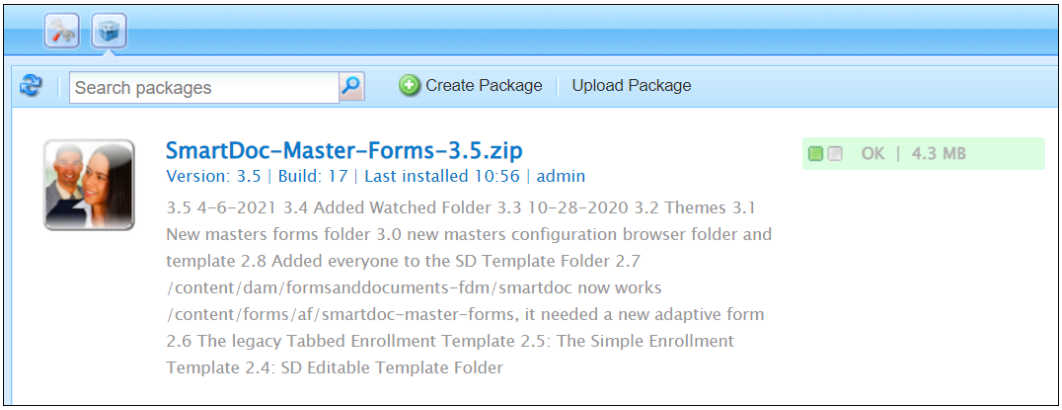
19. Login to your Publish instance with this URL.

http://<servername>:4503/libs/granite/core/content/login.html

20. Enter your *User name* and *Password* and click **Sign In**.

21. Open your Publish Server's Package Manager to view the replicated package. Notice that the package is installed. You may need to refresh your browser.

http://localhost:4503/crx/packmgr/index.jsp

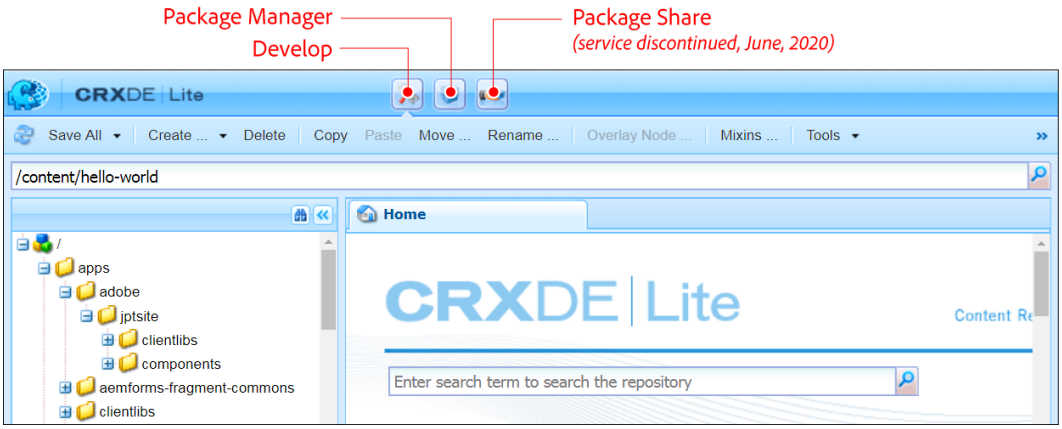


Exercise: Create a Package for an AEM Forms application

When you create a package, you are creating a zip file that contains repository content in the form of a file-system serialization. Adobe refers to this serialization as *vault* serialization and a package also contains *vault* meta information, which includes *import configuration details and filter definitions*.

22. Open **Package Manager** *(see illustration)*.

http://<server name>:<port>/crx/packmgr/index.jsp



23. Select **Create Package**.

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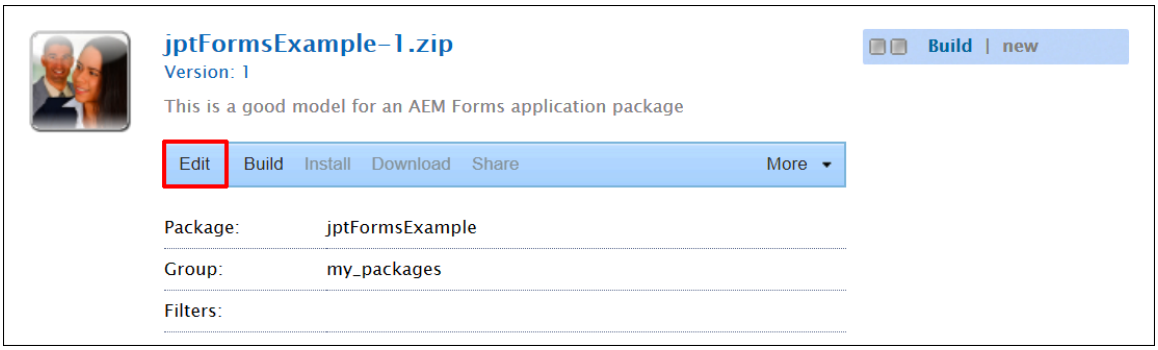
24. Enter **<yourname>FormsExample** as the Package Name.
25. Click **OK**.
26. Click **Edit**.
27. Enter **1.0** for the Version number.
28. Enter **This is a good model for an AEM Forms application package** as the Description.
29. Click **Browse** next to Thumbnail.
30. Locate the **packageThumbnail.png** in your Student files and click **Open**.
31. Click **Save**.

Your package should now look like this.



32. Click **Edit** *(see illustration above)*.
33. Select **Filters**.
34. Click **Add filter**.
35. Click the **Select Path** icon to the right of the **Root path** field.
36. Navigate to **/apps/siteBasicSmartDoc** and select it.
37. Click **OK**.
38. Click **Done**. You should now see 1 filter for **/apps/siteBasicSmartDoc**.
39. Click **Add filter** each time and add these additional filters.

Item	Filter
Sites Application	/apps/siteBasicSmartDoc
	/content/siteBasicSmartDoc
	/etc/designs/siteBasic
Forms	**/content/forms/af/smartdoc-master-forms**
	/content/dam/formsanddocuments/smartdoc-master-forms

Templates	**/conf/Templates-SD**
Theme	**/etc/clientlibs/fd/themes/smartdoc**
	/content/dam/formsanddocuments-themes/smartdoc
Data Integrations	**/content/dam/formsanddocuments-fdm/smartdoc**
Assets	**/content/dam/sitebasic**
Client Library	**/etc/clientlibs/smartdocjs**
Design Time Workflow model	**/conf/global/settings/workflow/models/processFormSubmission0**
Run Time Workflow model	**/var/workflow/models/processFormSubmission0**
Watched Folder	**/etc/fd/watchfolder/staging/testOutputServiceWF**
	/etc/fd/watchfolder/config/testOutputServiceWF

40. Click **Edit** on your **/content/dam/sitebasic** filter.

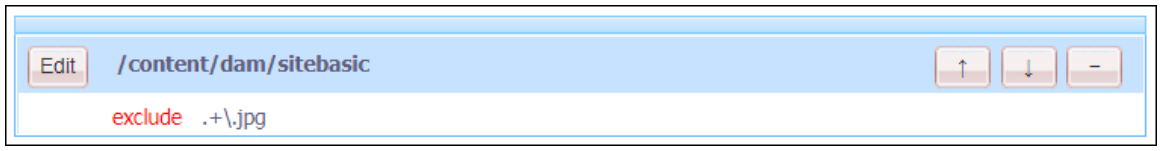
    Note: *This should be an assets folder.*

41. Click **Add rule**.

42. Select **exclude**.

43. Enter **.+\.jpg** to exclude all jpg files.

44. Click **Done**. You will see that your filter now has a rule.

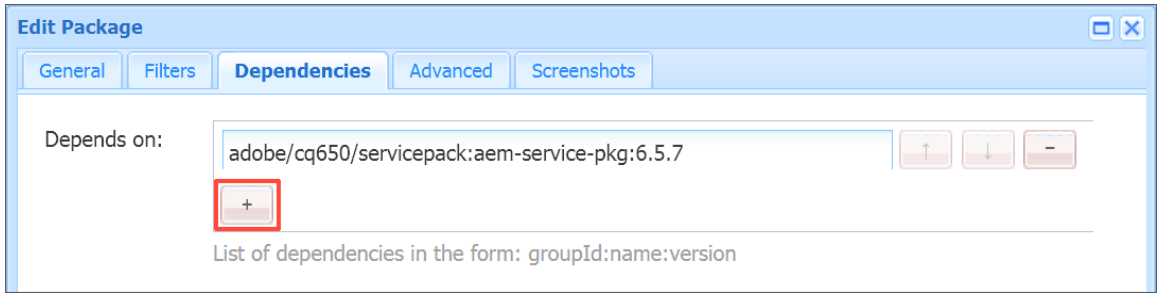


45. Click **Save**.

46. Click **Edit**.

47. Select **Dependencies**.

48. Since this application was only tested on your version of the AEM Forms add-on package, add a dependency by clicking the **+ button**.



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49. Enter the groupId, name, and version of the dependency.

adobe/cq650/servicepack:aem-service-pkg:6.5.11

50. Click **Save**.

51. Click **Build** to build your package.

You will see all the action in the **Activity Log**. This is a truncated version

Build Package: /etc/packages/my_packages/formsExampleJames-1.zip
Tue Oct 16 2018 10:59:48 GMT-0400 (Eastern Daylight Time)

Building package
Embedding thumbnail...
A META-INF
A META-INF/MANIFEST.MF
A META-INF/vault
A META-INF/vault/config.xml
A META-INF/vault/filter.xml
A META-INF/vault/nodetypes.cnd
A META-INF/vault/properties.xml
A /.content.xml
A /conf
A /conf/.content.xml
A /conf/Templates-SD

A META-INF/vault/definition/thumbnail.png

Package built in 704ms.

Exercise: Examine the Package

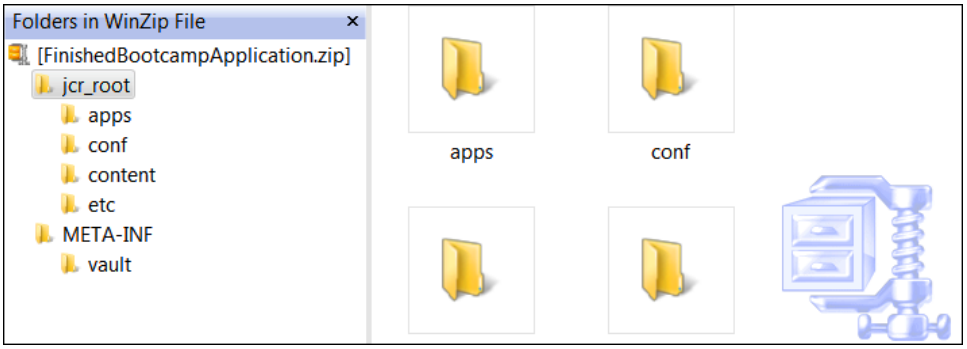
An AEM package contains the following folders:

– **jcr_root:** the actual content from the JCR.

– **META-INF:** Metadata about node definitions and the filter.xml file. This metadata is used by FileVault.

52. **Download** the package you just created.

53. Use WinZip or a similar program to unzip the package.



54. Open the **filter.xml** file located here.

\META-INF\vault\filter.xml

This XML shows the filters you just created.

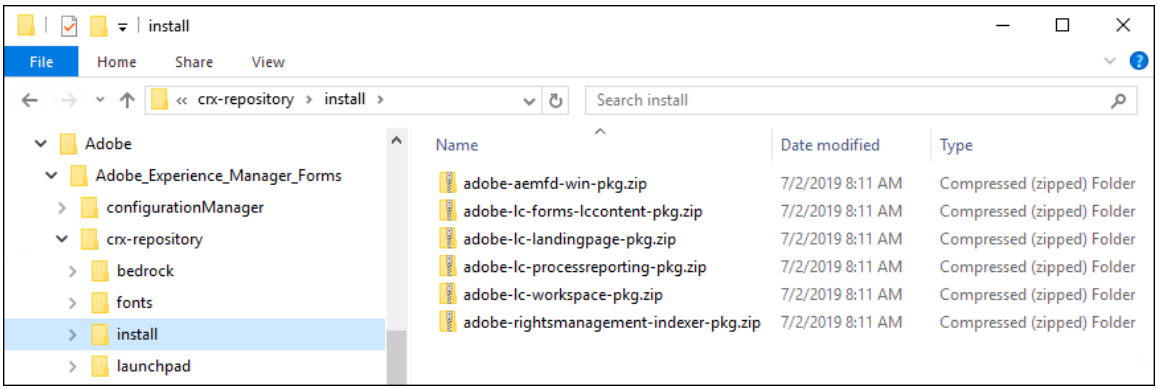
```
<workspaceFilter version="1.0">
    <filter root="/apps/siteBasicSmartDoc"/>
    <filter root="/content/siteBasicSmartDoc"/>
    <filter root="/etc/designs/siteBasic"/>
    <filter root="/content/forms/af/smartdoc-master-forms"/>
    <filter root="/content/dam/formsanddocuments/smartdoc-master-forms"/>
    <filter root="/conf/Templates-SD"/>
    <filter root="/etc/clientlibs/fd/themes/smartdoc"/>
    <filter root="/content/dam/formsanddocuments-themes/smartdoc"/>
    <filter root="/content/dam/sitebasic">
    <exclude pattern=".+\.jpg"/>
    </filter>
    <filter root="/etc/clientlibs/smartdocjs"/>
    <filter root="/conf/global/settings/workflow/models/processFormSubmission"/>
    <filter root="/var/workflow/models/processFormSubmission"/>
</workspaceFilter>
```

Batch Load Packages

> ***Note:*** *You do not have access to do these steps on a SmartDoc Sandbox Servers. You can only create one of these folders when you have physical access to your AEM Forms Server.*

The install directory is created by default on a JEE server. As you can see in the illustration below, Adobe uses this folder to auto-install packages on a JEE server.

<drive>:\Adobe\Adobe_Experience_Manager_Forms\crx-repository\install



You can add also an install directory to your OSGi server to support batch loading of packages. Follow these steps if you have physical access to your own AEM Server.

55. Open your **crx-quickstart** directory.

56. Create this folder if it does not exist.

/crx-quickstart/install

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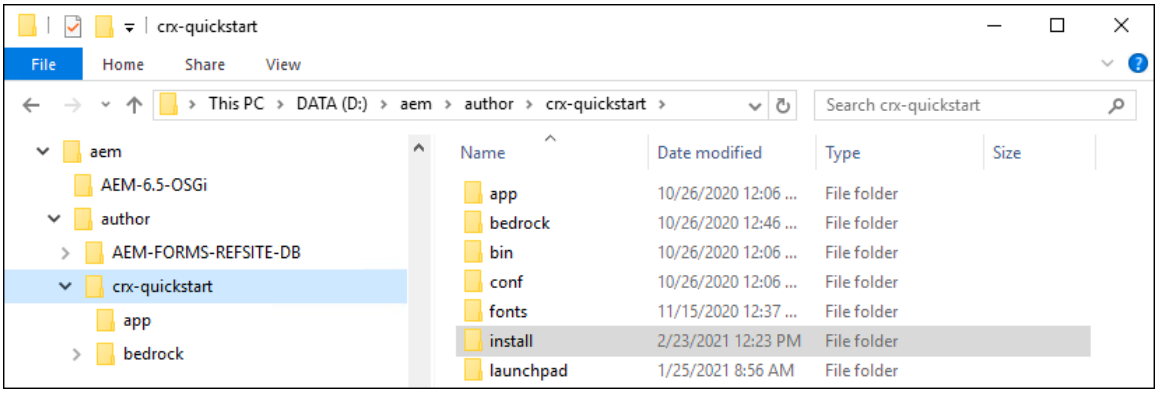
57. Your folder should look like this.



58. You can now move packages to this folder, and they will be automatically uploaded and installed.

    Note: *Packages placed in the install folder will be automatically installed in alphabetical order. If you need to install many packages and the order of installation is not important, this is an effective method. The packages will be installed immediately, and this method does NOT require a server reboot.*

59. Go to your Student Files and locate the jptHelloWorld-<version>.zip file.

60. Copy it and paste it on your install folder.

61. Go back to Package Manager and you will see the package has been installed.

OSGi Configurations & Run Modes

You already learned how to configure OSGi bundles with the Web Console. These configuration settings are not portable to other instances unless you replicate the same steps in the Web Console. You will learn some new techniques in this chapter to create OSGi configurations that are portable.

You also learned about run modes during installation. In this section, we will learn more about how you can use run modes to configure your AEM instances.

OSGi Configurations

In addition to the Web Console, OSGi configurations can also be found in these two areas.

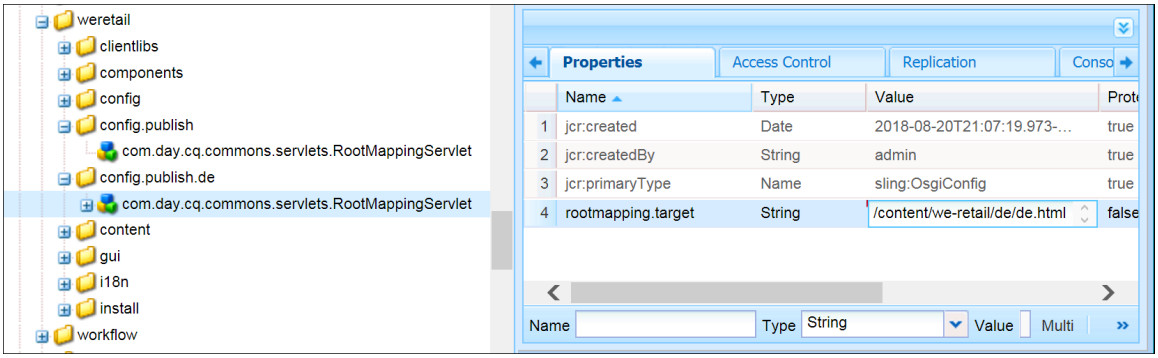
- In configuration nodes in CRX.
- In configuration files (*.config) in the /launchpad directory of your crx-quickstart folder.

OSGi Configuration Nodes in CRXDE Lite

OSGi configuration nodes enable you to create server configurations that are portable and easy to archive. By combining run modes with OSGi configuration nodes, you can create 1 comprehensive package for multiple server configurations. This package will be portable and easy to archive.

Starting with version 6.4, this is the recommended best practice from Adobe. You will create these types of OSGi Configuration nodes in the exercises of this chapter. This is the syntax for these nodes:

/apps/config.author.dev
/apps/config.publish.de



This method enables your configurations to be portable and shared among different instances of AEM. Like the settings you did in Web Console, any changes you make to these configurations are immediately live without requiring a server reboot. Here are your key steps.

- Create a folder in /apps for each run mode like config.author and config.publish.
- Create a node of type sling:OsgiConfig for each configuration you need.
- Name the node with the Persistent Identity (PID) of the service.
- Create the parameters as properties and values of the node.

You can also modify existing configurations by copying them from the /libs folder to the /apps folder. For instance, the configurations in /apps/system/config will override the configurations in /apps/system/config.

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Configuration Files

As mentioned, AEM uses configuration files found in the \crx-quickstart\launchpad\config folder but it is NOT recommended for you to create or edit any configurations found here.

Name	Date modified	Type	Size
com	8/20/2018 9:03 PM	File folder	
org	8/20/2018 9:03 PM	File folder	
we	12/13/2018 8:58 A...	File folder	
ACMExtensionsMessages.config	8/21/2018 9:43 AM	XML Configuration File	3 KB
ACMExtensionsMessages_de.config	8/21/2018 9:43 AM	XML Configuration File	3 KB
ACMExtensionsMessages_de_DE.config	8/21/2018 9:43 AM	XML Configuration File	3 KB
ACMExtensionsMessages_en_US.config	8/21/2018 9:43 AM	XML Configuration File	3 KB
ACMExtensionsMessages_fr.config	8/21/2018 9:43 AM	XML Configuration File	3 KB
ACMExtensionsMessages_fr_FR.config	8/21/2018 9:43 AM	XML Configuration File	3 KB
ACMExtensionsMessages_ja.config	8/21/2018 9:43 AM	XML Configuration File	3 KB
ACMExtensionsMessages_ja_JP.config	8/21/2018 9:43 AM	XML Configuration File	3 KB
org_apache_felix_cm_impl_DynamicBindings.config	1/15/2019 11:00 A...	XML Configuration File	6 KB

Run Modes

You have already seen an example of an author run mode and a publish run mode. You can also create other types of run modes and set configuration parameters for each run mode. Here are a few examples.

- **By Environment:** dev, test, prod
- **By Location:** us (United States), ca (Canada), de (Germany)
- **By Company or Organization:** internal, partner, customer

You can combine run modes in a configuration folder like this.

- /apps/weretail/config.publish.de

Configurations from multiple folders will be applied if they match the run mode. For instance, if your instance is started with these run modes: **publish**, **dev**, and **ca**, then configurations from all these folders will be applied.

- /apps/*/config.**ca**
- /apps/*/config.**publish.dev**
- /apps/*/config.**publish.ca.dev**

If there are multiple configurations for the same PID in these folders, the configuration with the highest number of matching run modes is applied. In the above case, it is **config.publish.ca.dev**.

In the instance shown above with these run modes: **publish**, **dev**, and **ca**, the configurations from these folders will be ignored.

- /apps/*/config.publish.emea
- /apps/*/config.publish.emea.dev

Resolution Rules for Configurations

The following are the resolution rules for the different configurations.

Resolution at Startup

When you start up your system, this is resolution order with #1 having the highest priority.

1. Nodes of type sling:OsgiConfig under /apps
2. Nodes of type sling:OsgiConfig under /libs
3. Config files under AEM quickstart folder

Resolution at Runtime

At runtime, any change you make in Web Console will take precedence.

1. Modifications made in the Web Console
2. Modifications made in /apps
3. Modifications made in /libs

Exercises

Create configuration nodes in CRXDE Lite

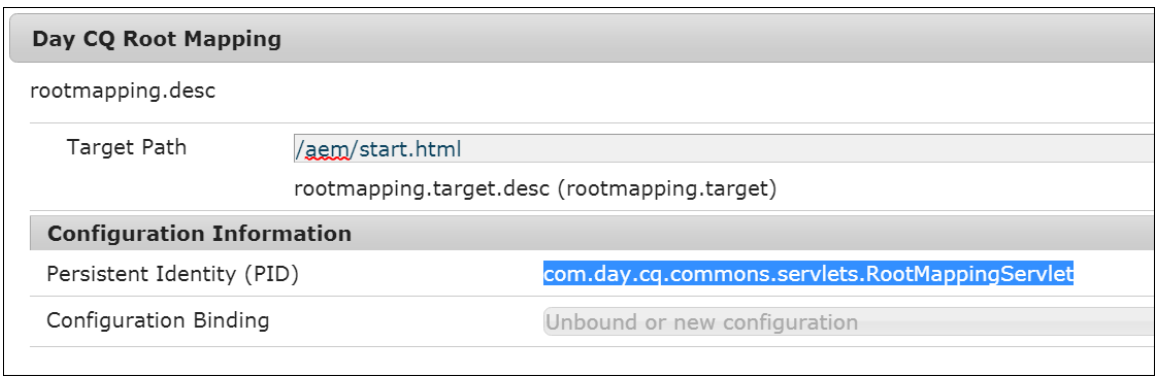
Follow these steps to create a configuration node in CRXDE Lite. This configuration node will cause your Author instances to default to AEM Forms.

> ***Note:*** *The name of your configuration node must match the Persistent Identity (PID) of the configuration in the Web Console.*

1. Open **Web Console** and select **Configuration**.

http://<servername>:4502/system/console/configMgr

2. Search for **Day CQ Root Mapping** to locate the AEM Root Mapping for this instance.
3. Click **Edit the configuration values** *(the pencil icon)* on the *Day CQ Root Mapping*.
4. Highlight the Persistent Identity (PID) **com.day.cq.commons.servlets.RootMappingServlet**



5. Right-click and select **Copy**.

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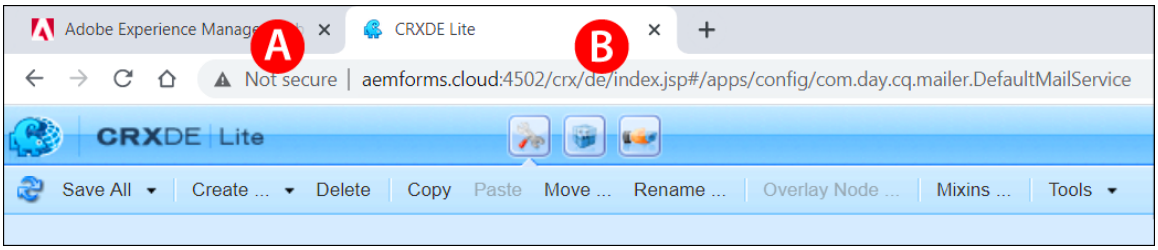
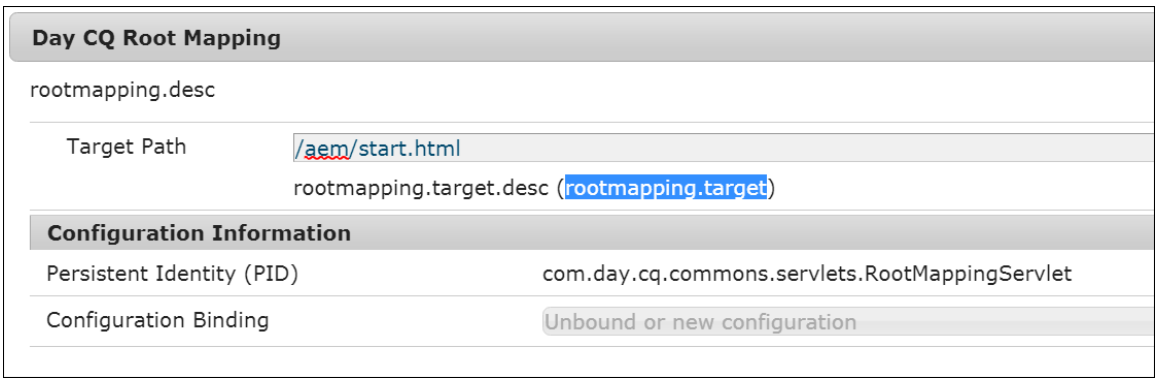
6. Open **CRXDE Lite** in a different tab of the same browser. Keep at least 2 tabs open, 1 for Web Console **(A)** and 1 for CRXDE **(B)** *(see illustration)*. You will move back and forth between the tabs.

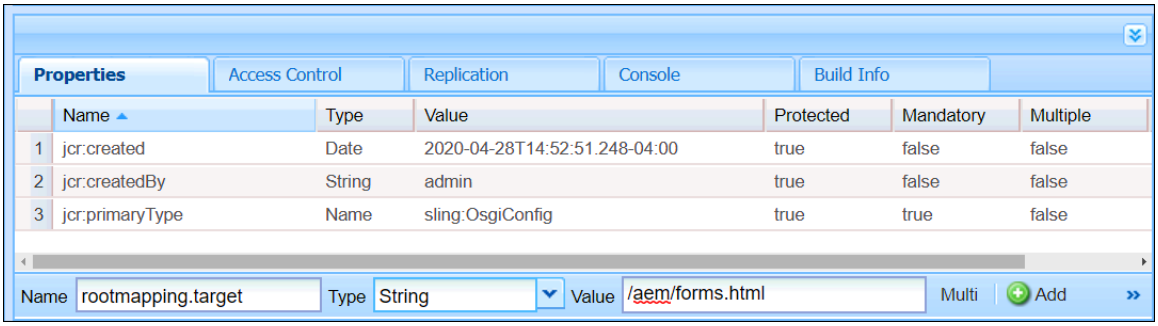
http://<servername>:4502/crx/de



7. Select the tab with **CRXDE Lite**.
8. Right-click on the apps directory and select **Create – Create Folder**.
9. Enter **config.author** for the folder name.
10. Click **OK**.
11. Click **Save All**.
12. Right-click on the **apps/config.author** directory and select **Create – Create Node**.
13. Paste your PID (**com.day.cq.commons.servlets.RootMappingServlet)** for the Name.
14. Select **sling:OsgiConfig** for the Type.
15. Click **OK**.
16. Click **Save All**.
17. Switch to the tab with **Web Console Configuration**.
18. Copy the property name within the parentheses *(see illustration)*.



19. Create a new property on the **com.day.cq.commons.servlets.RootMappingServlet** node with these values.
    Name: **rootmapping.target**
    Type: **String**
    Value: **/aem/forms.html**



20. Click **Add**.

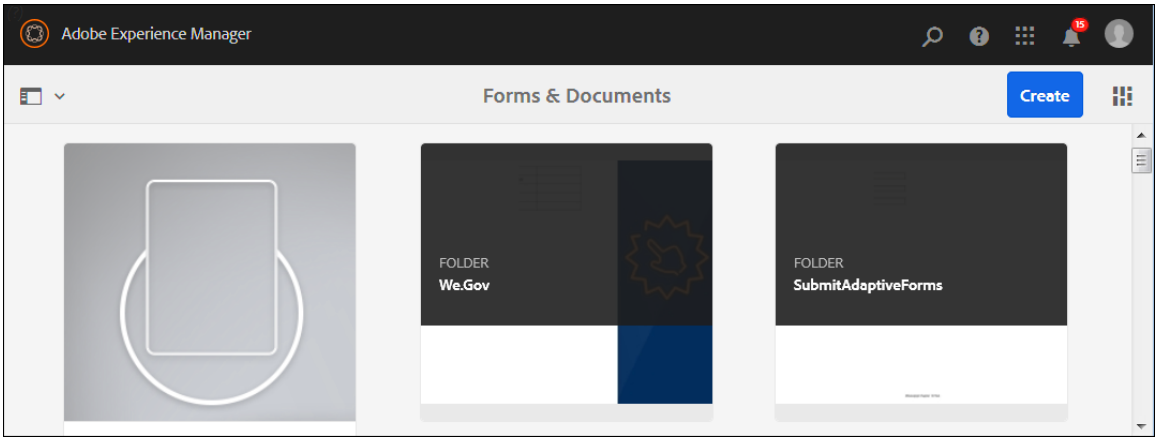
21. Click **Save All**.

22. Open a new browser and navigate to this author instance. Note: This should be a different browser than the one you are currently using.

http://<servername>:4502

23. Enter your **admin** credentials and click **Sign In**.

Your browser will open to the *Forms & Documents* section.



View your Run Mode

Follow these steps in the new browser to view your run mode.

24. Open **Web Console**.

http://<servername>:4502/system/console/configMgr

25. Select **Status – Sling Settings**.

Your run modes appear at the bottom.

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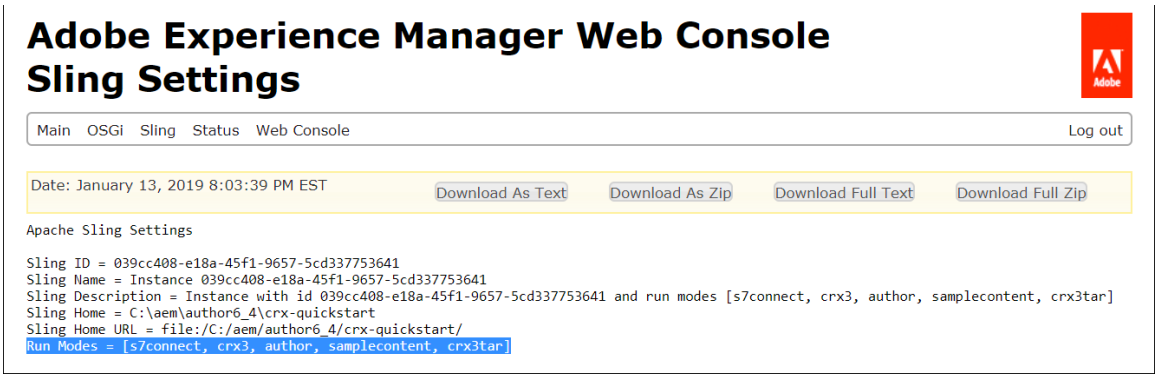


Run Modes = [s7connect, crx3, author, samplecontent, crx3tar]

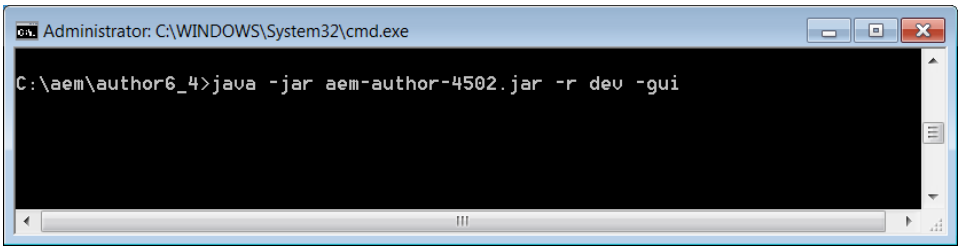
Create a Custom Run Mode

Follow these steps to create a custom run mode.

26. Shut down your Author instance.
27. Run **CMD** as Administrator.
28. Navigate to the directory of your **aem-author-4502.jar** file.
29. Enter this command to start AEM.

java -jar aem-author-4502.jar -r dev -gui

> ***Note:*** *The* ***–r dev*** *parameter means your runmode will be dev. The* ***–gui*** *parameter means your AEM instance will have a graphical user interface.*



30. When your instance comes up, enter your **admin** credentials.
31. Click **Sign In**.
32. Select **Adobe Experience Manager – Tools**.
33. Select **Operations – Web Console**.
34. Select **Status – Sling Settings**.

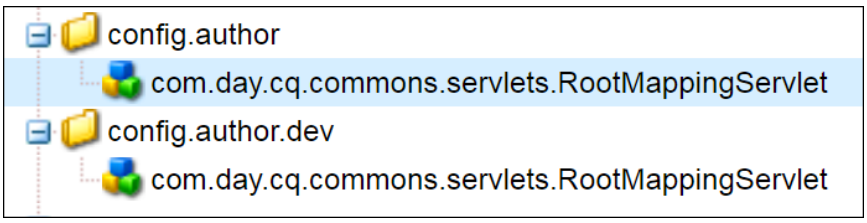
You should now see the **dev** custom run mode.

Run Modes = [dev, s7connect, crx3, author, samplecontent, crx3tar]

Create an OSGi Configuration for your Run Mode

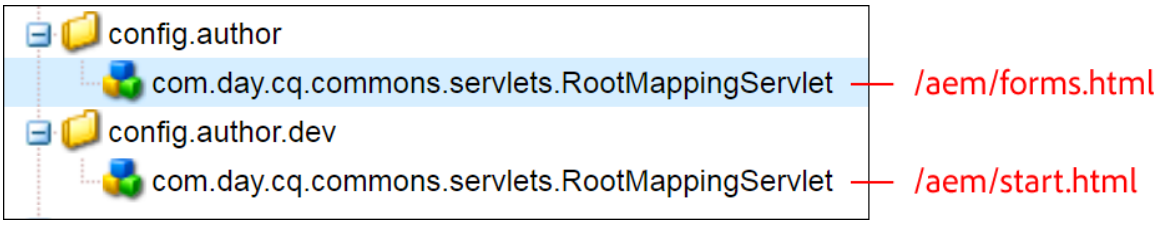
Follow these steps to create an OSGi Configuration for your new run mode.

35. Go to **CRXDE Lite**.
36. Right-click on the apps folder and select **Create – Create Folder**.
37. Enter **config.author.dev** for the folder name.
38. Click **OK**.
39. Click **Save All**.
40. Copy the **com.day.cq.commons.servlets.RootMappingServlet** from your *config.author* folder and paste it in your new *config.author.dev* folder. Note: This will save you some steps.



41. Click **Save All**.
42. Select the configuration node in the **config.author.dev** folder so you can see its properties.
43. Change the **Value** for the rootmapping.target property for this new node from **/aem/forms.html** to **/aem/start.html**.
44. Click **Save All**.

You should now have two configuration nodes that are targeting author environments, but one of them is targeting a dev, author environment. This illustration shows the results you should expect for each of these runmodes.



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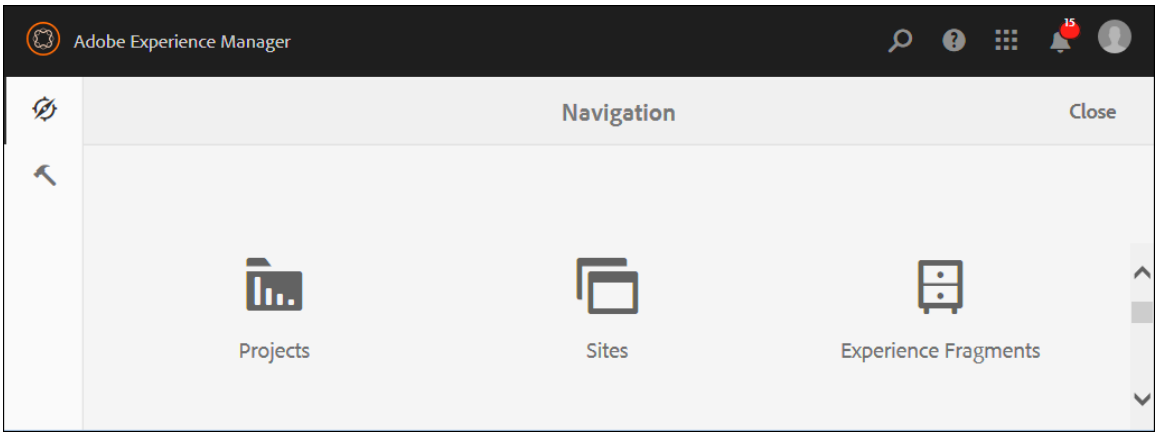
45. Open a new browser and navigate to this author instance.

http://<servername>:4502

46. Enter your credentials and click **Sign In**.

Your browser will open with the default screen. This is the **aem/start.html** screen because this is an **author, dev** runtime instance.



Note: *If this did not work for you, make sure you have the dev run mode. Start your server from a CMD prompt with this command:* ***java -jar aem-author-4502.jar -r dev –gui***

Note: *You may see this message: libs/granite/ui/components/shell/header/user/User has been compiled by a more recent version of the Java Runtime (class file version 53.0), this version of the Java Runtime only recognizes class file versions up to 52.0. This is* ***a java.lang.UnsupportedClassVersionError****. I have seen this issue with AEM Forms 6.5.2 running on Java 1.8.0_181. You can solve it by running Java 11.0.7.*

Create an OSGi Configuration for the Publish run mode

As mentioned earlier, in addition to being a specific instance of AEM, your Publish server is also a specific Publish run mode in AEM. You can create OSGi configurations for a publish run mode and they will take precedence on a Publish server. You can also create a country specific Publish run mode. In this exercise, you will create a country-specific Publish run mode for Germany. This run mode will set the Publish home page to the German page in Adobe's sample We-Retail application. Follow these steps.

47. Go to **CRXDE Lite**.

48. Navigate to **apps – weretail**.

49. Right-click on the **weretail** node and select **Create – Create Folder**.

50. Enter **config.publish.de** for the folder name.

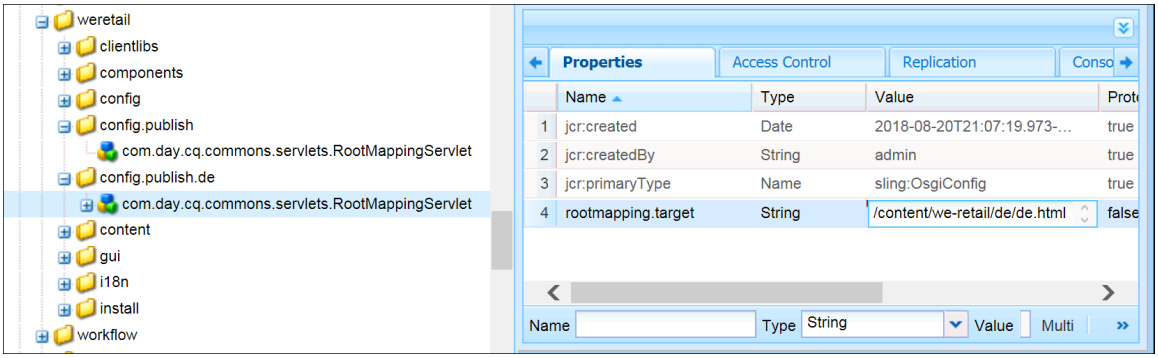
51. Click **OK**.

52. Click **Save All**.

53. Expand the **weretail – config.publish** folder.

54. Right-click on the **com.day.cq.commons.servlets.RootMappingServlet** in the *config.publish* folder and select **Copy**.

55. Right-click the **config.publish.de** folder and select **Paste**.



56. Click **Save All**.

57. Select the configuration node in the **config.publish.de** folder so you can see its properties.

58. Double-click the **Value** field for the **rootmapping.target** property in the Properties tab.

59. Change the **Value** for the rootmapping.target property from to **/content/we-retail/de/de.html**.

60. Click **Save All**.

Replicate a Configuration Package to the Publish Server

You will now create a package for your config.publish.de configuration. You will also use the command line to start up a German (de) Publish server. Once this Publish server is running, you will replicate your package to the Publish server. Follow these steps.

61. Select **Package Manager** on Author.

62. Click **Create Package**.

63. Enter **Publish-Server-Configuration-for-Germany** for the Name.

64. Enter **1.0** for the Version.

65. Click **OK**.

66. Click **Edit**.

67. Enter **A package of an OSGi Configuration** for the Description.

68. Click **Browse** next to Thumbnail.

69. Locate the **germanThumbnail.png** in your Student files and click **Open**.

70. Select the **Filters** tab.

71. Click **Add filter**.

72. Click the **Select Path** icon to the right of the **Root path** field.

73. Create a path to your **config.publish.de** configuration.

/apps/weretail/config.publish.de/com.day.cq.commons.servlets.RootMappingServlet

74. Click **Done**.

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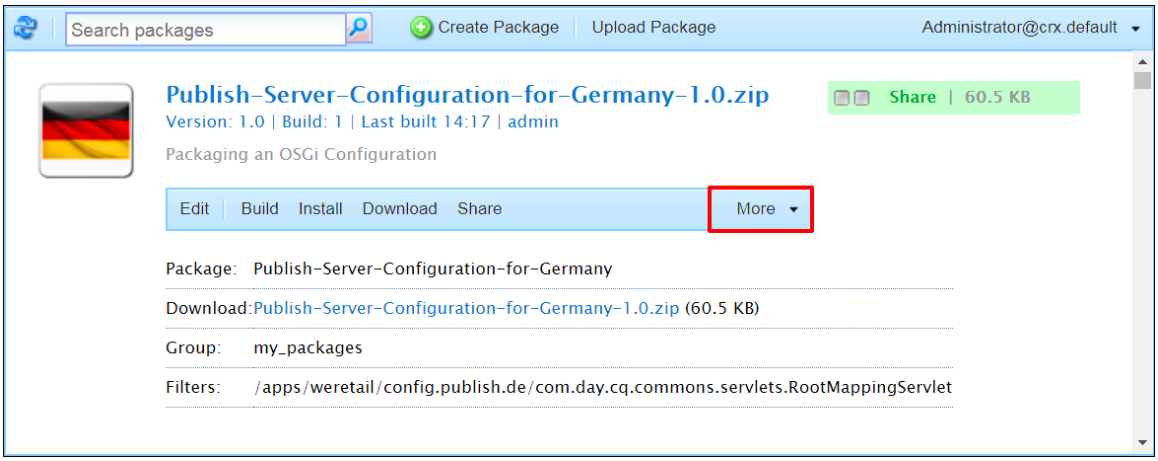
75. Click **Save**.

76. Click **Build** and **Build** again.

Your package will now look like this.

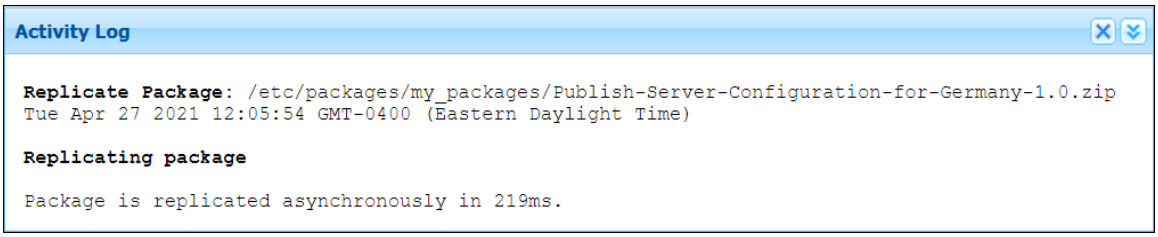


77. If your Publish server is not running, start it up before you replicate.

78. On your Author instance, select **More – Replicate** and click **Replicate**.

    Note: *You must first replicate your package before you start up your server with a German runmode.*

You will see this message in the Activity Log.



79. After your package replicates, shut down your Publish server. You will need to start it with the **config.publish.de** run mode.

80. Navigate to the directory of your **aem-publish-4503.jar** file. It will be something like this.

C:\aem\publish

81. Copy the path.

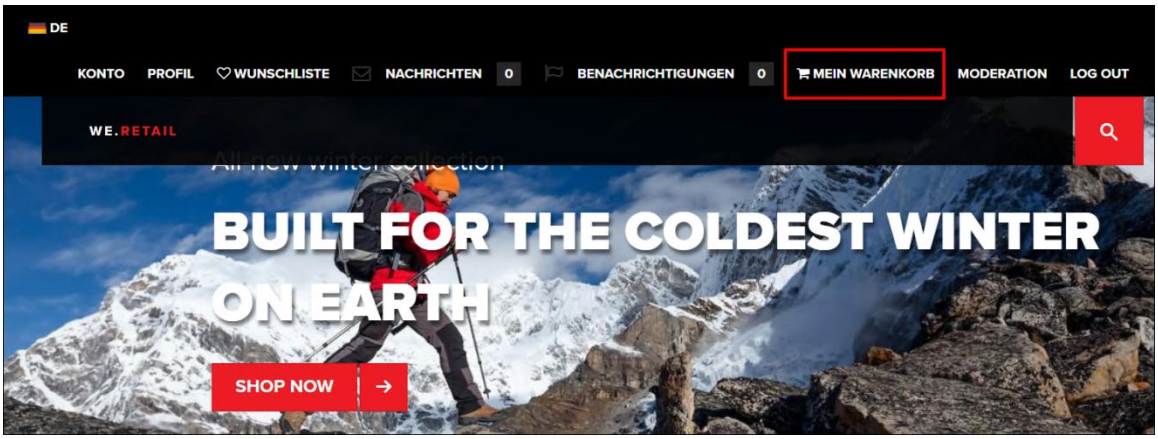
82. Run **CMD** as Administrator.

83. Change directories to your publish directory. You can enter **cd** and then paste your path.

84. Enter this command to start the Publish Server.

java -jar aem-publish-4503.jar -r publish, de –gui

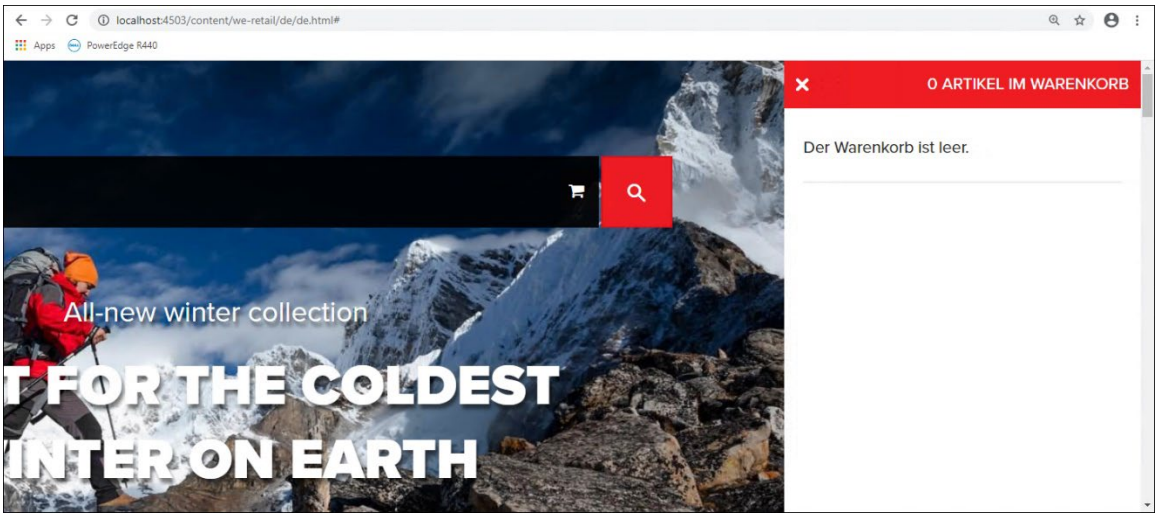
You should see your Publish Server start up with the German page.



http://<servername>:4503/content/we-retail/de/de.html

85. Click the Shopping cart **MEIN WARENKORB** *(see illustration above)*.

86. You should see some translated text.



Create an OsgiConfig for an SMTP Server

You will now create a **sling:OsgiConfig** configuration node for an SMTP Server. The Persistent Identity (PID) can be found using the Web Console. When you finish, it should look something like this.

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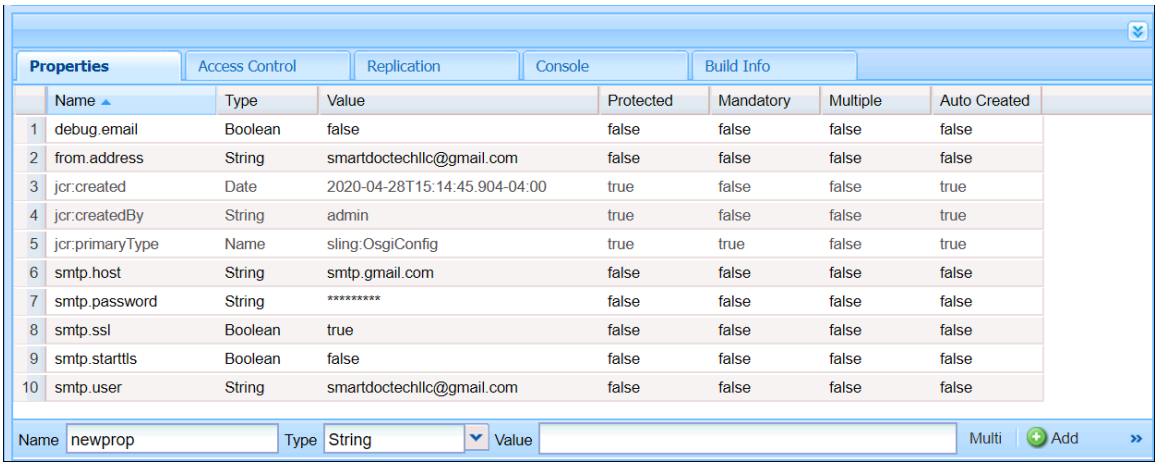
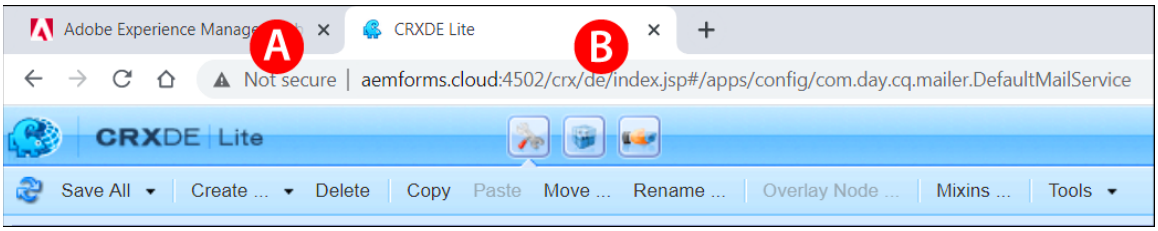


Note: *The name of your configuration node must match the Persistent Identity (PID) of the configuration in the Web Console.*

87. Open **Web Console** and select **Configuration**.

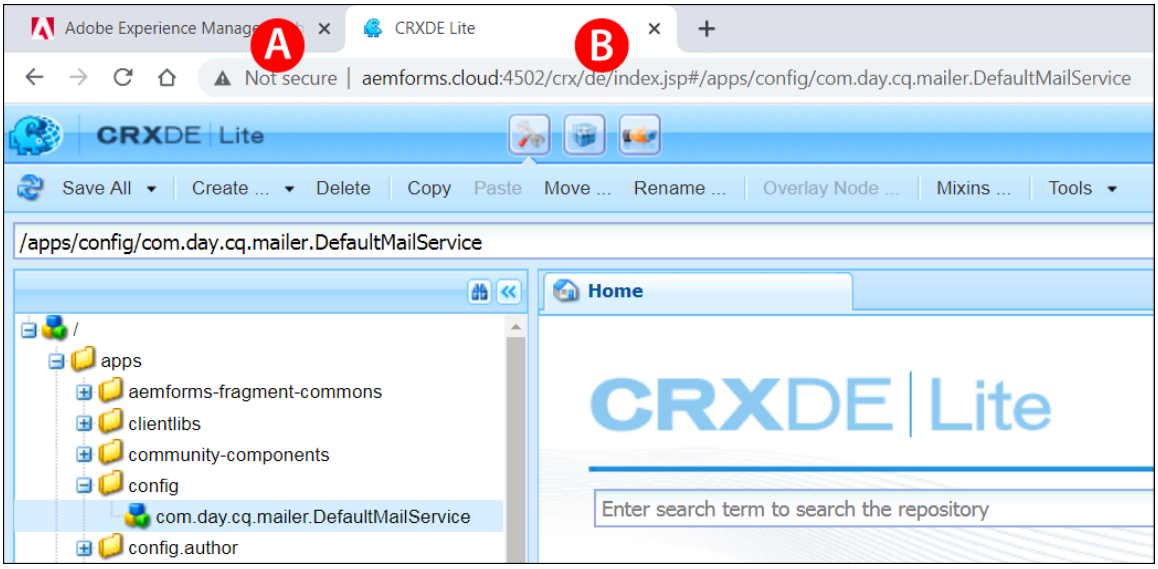
http://<servername>:4502/system/console/configMgr

88. Search for **Day CQ Mail** to locate the service configuration properties.
89. Click **Edit the configuration values** *(the pencil icon)* on the *Day CQ Mail Service*.
90. Select the Persistent Identity (PID) **com.day.cq.mailer.DefaultMailService**.
91. Right-click on the PID and select **Copy**.
92. **Paste** the PID into NotePad or a similar Text Editor.
93. Open **CRXDE Lite** in a different tab of the same browser. Keep at least 2 tabs open, 1 for Web Console **(A)** and 1 for CRXDE Lite **(B)** *(see illustration)*. You will move back and forth between the tabs.



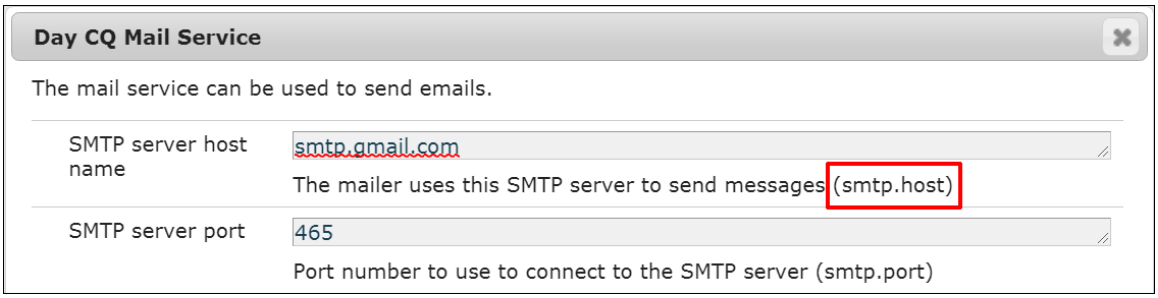
94. If you don't have an **apps/config** folder, right-click on **/apps** and select **Create – Create Folder**.
95. Enter **config** for the Name and click **OK**.
96. Click **Save All**.
97. Right-click on the **apps/config** folder and select **Create – Create Node**.
98. Paste your PID (**com.day.cq.mailer.DefaultMailService)** for the Name.
99. Select **sling:OsgiConfig** for the Type.
100. Click **OK**.

101. Click **Save All**.



102. Switch to the tab with **Web Console Configuration** (A).

103. Copy the first property **smtp.host**. Note: The property name is contained within parentheses *(see illustration)*.



104. Switch to the tab with **CRXDE Lite** (B).

105. Paste **smtp.host** as the Name of a new property of your OSGi configuration node. The Type should be String.

106. Enter **smtp.gmail.com** or another suitable SMTP Server as the Value.

107. Click **Add** and **Save All**.

108. Follow this process to add the remaining properties and values. This table shows the values for Google's SMTP mail service.

Property	Type	Value
smtp.port	**String**	**465**
smtp.user	**String**	**A Gmail address, like smartdoctechllc@gmail.com**
smtp.password	**String**	**********
from.address	**String**	**A Gmail address, like smartdoctechllc@gmail.com**
smtp.ssl	**Boolean**	**true**

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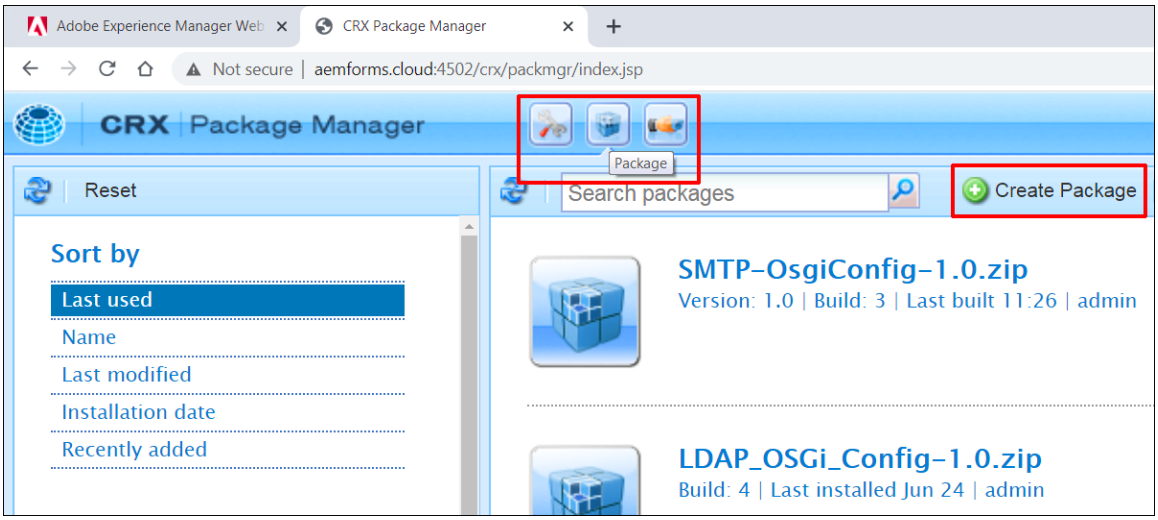
smtp.starttls	**Boolean**	**false**
debug.email	**Boolean**	**false**

109. When you are done, you can create a package and replicate it to your Publish Server.

110. Click **Package** to open **Package Manager**.

111. Click **Create Package**.



112. Enter **SMTP-OsgiConfig** for the *Package Name*.

113. Enter **1.0** for the Version.

114. Click **OK**.

115. Click the package title: **SMTP-OsgiConfig-1.0.zip** to open the details panel.

116. Click **Edit**.

117. Enter **A package with an OSGi configuration node for an SMTP mail configuration** as the Description.

118. Click **Browse** next to Thumbnail.

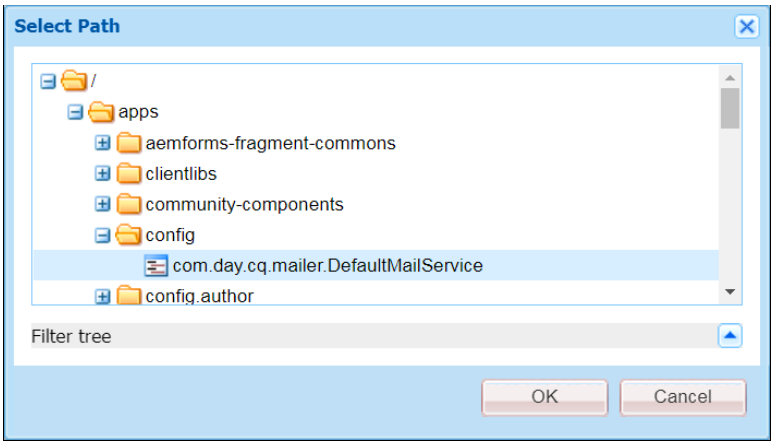
119. Locate the **smtpEmailThumbnail.png** in your Student files and click **Open**.

120. Select the **Filters** tab.

121. Click **Add filter**.

122. Click Browse to the right of the Root path field.

123. Select **/apps/config** and select your configuration node *(see illustration)*.

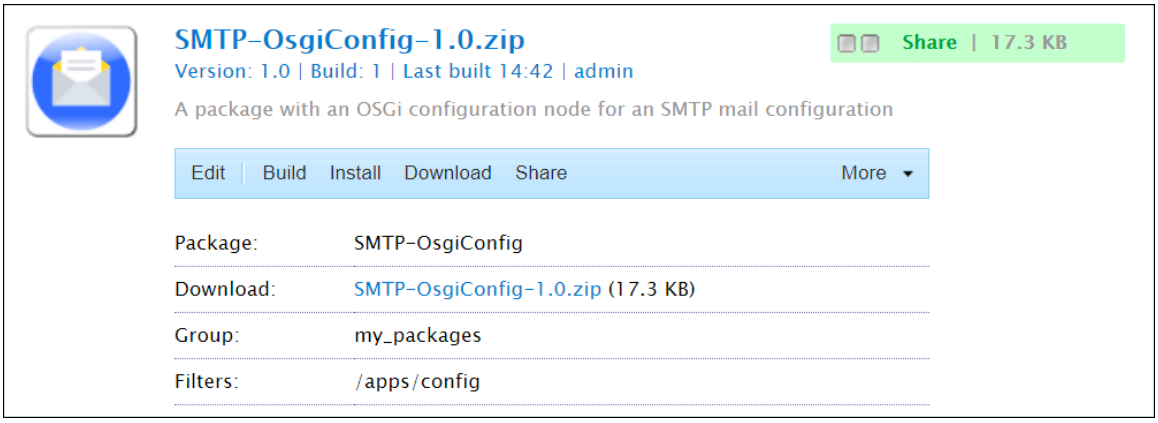


124. Click **OK**.

125. Click **Done** and **Save**.

126. Click **Build** and **Build** again to build your new package.

127. Your packages should now look like this.



128. Click **Replicate** to replicate your package to your Publish Server. Note: Your Publish Server must be running, and your Replication Agent must be properly configured.

129. Open **Web Console Configuration** on your Publish Server.

http://localhost:4503/system/console/configMgr

130. Search for **Day CQ Mail Service**.

131. Click **Edit the Configuration Values** *(the pencil icon)* on the *Day CQ Mail Service*.

132. You will see the configuration values you created and packaged on Author are now on Publish.

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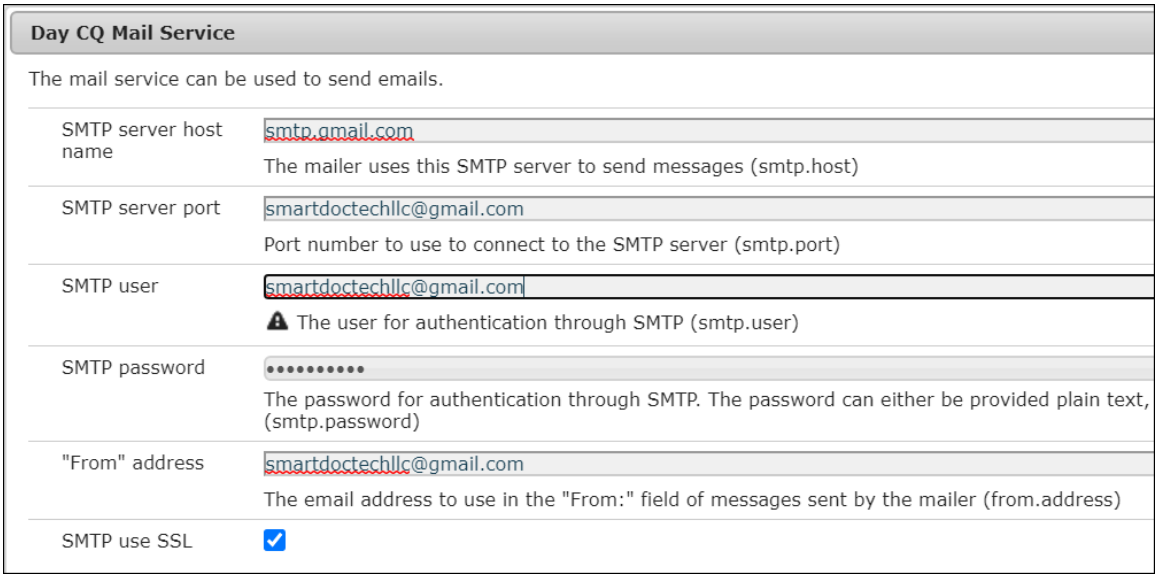


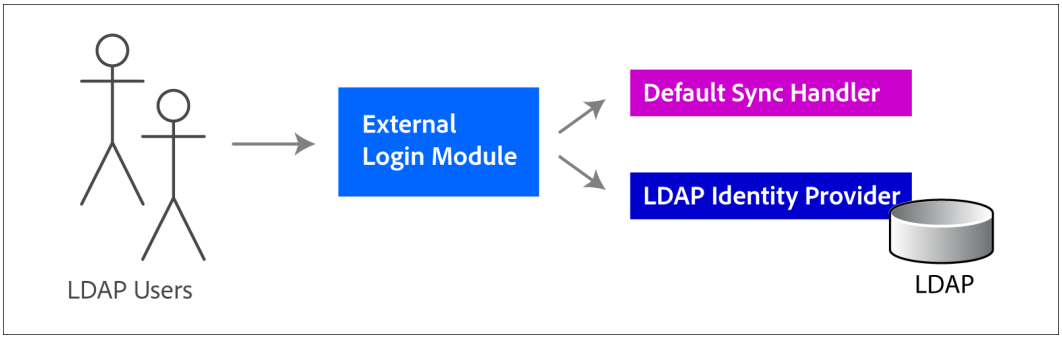
133. Close **Web Console Configuration**.

LDAP Integration

In this section, you will integrate AEM with LDAP users and groups. The benefit of this approach is you will capitalize on your existing LDAP system for the creation and authentication of users and groups. AEM will still be used to authorize users and groups for specific roles and permissions.

The Services

You need to create configurations for all these services in the Web Console Configuration.



- The **External Login Module**
  This service will define the *Default Sync Handler* and the *LDAP Identity Provider* for the login. For instance, in the demo, the *External Login Module* will define **activeDirectory** as the *Sync Handler* and **ldapActiveDirectory** as the *LDAP Identity Provider*.
- The **Default Sync Handler**
  This service defines how the users and groups will be handled.
- The **LDAP Identity Provider**
  This service defines how users are retrieved from the LDAP.

We will use the Web Console Configuration in the demo so the values that you enter will be immediately applied to your server's configuration. We will use OSGi configuration nodes for the exercise.

LDAP

We will install a sample LDAP with existing users and groups.

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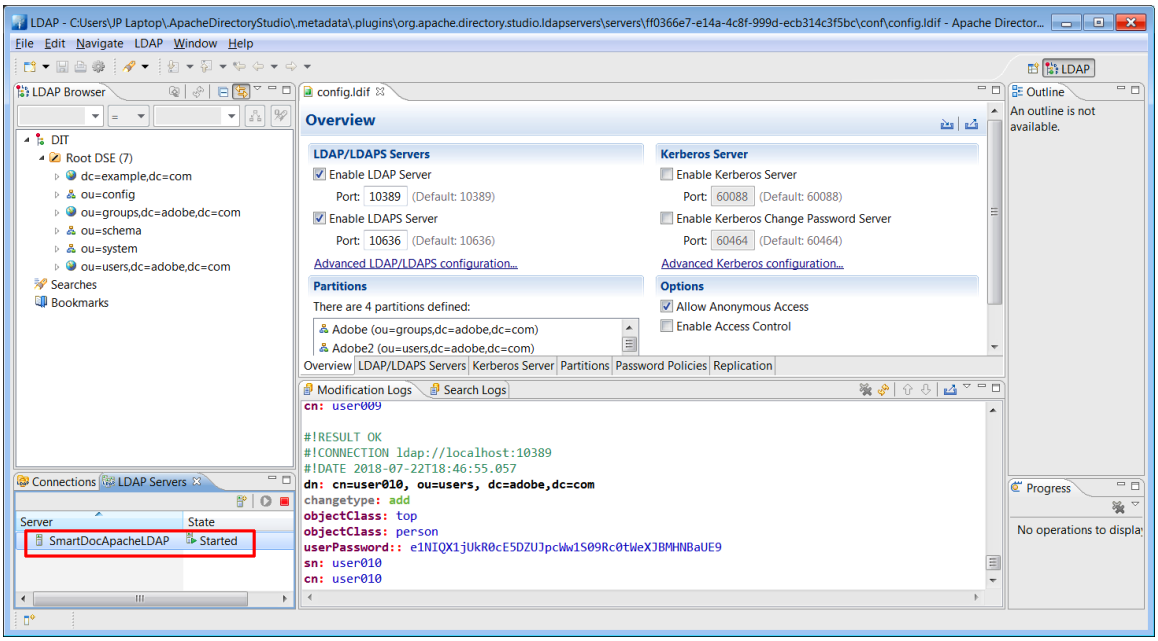
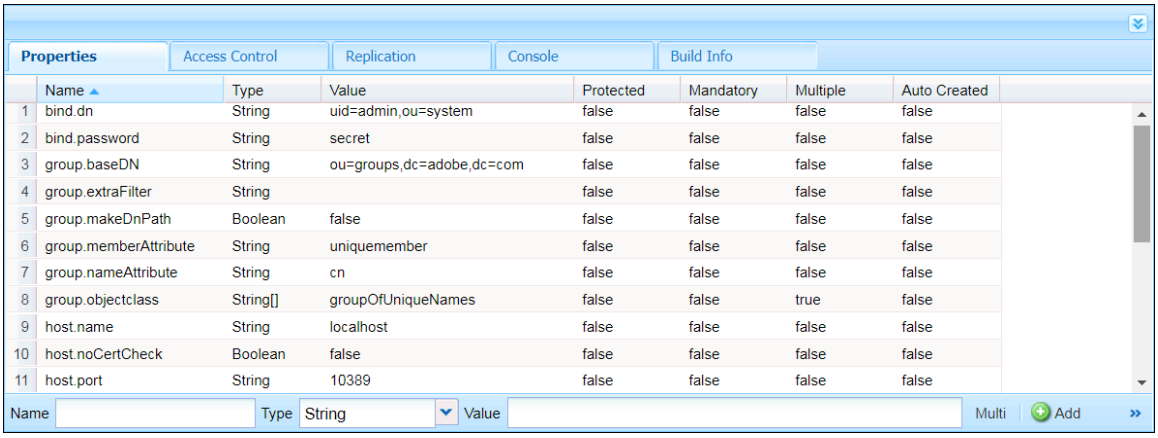


AEM Integration

We will install a Package with OSGi configuration nodes.



Microsoft Active Directory

Active Directory is somewhat of an umbrella title referring to directory-based identity services in Windows Server operating systems. A Windows Server that runs the Active Directory Domain Service is a domain controller for a Windows network. The server will authenticate and authorize all users and computers in the network. It does much more, but for our purposes, we can think of it as a great source for user and group organization and information.

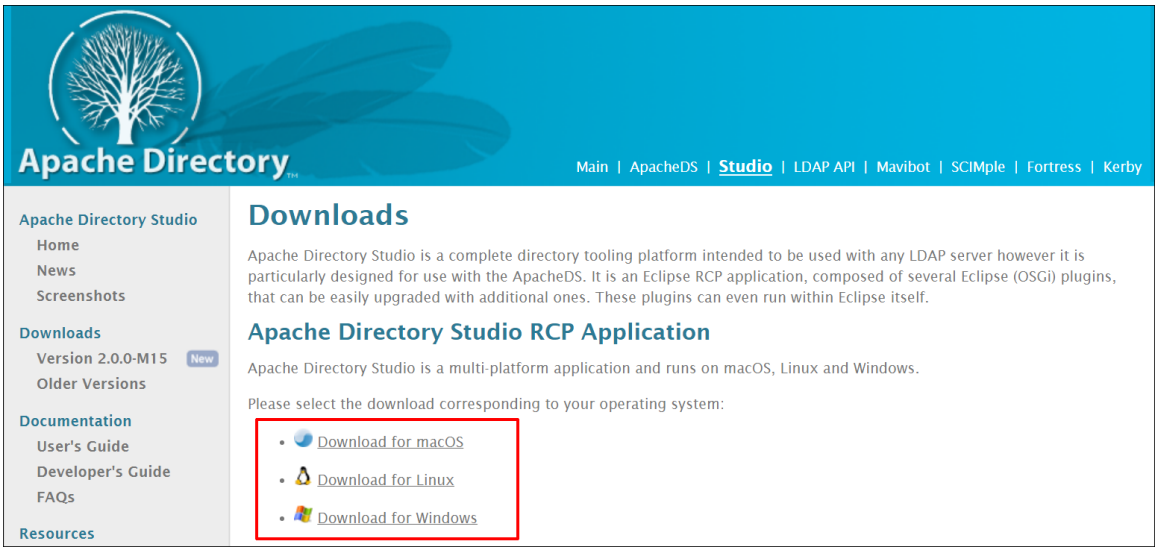
Exercises

Install a Sample LDAP Server

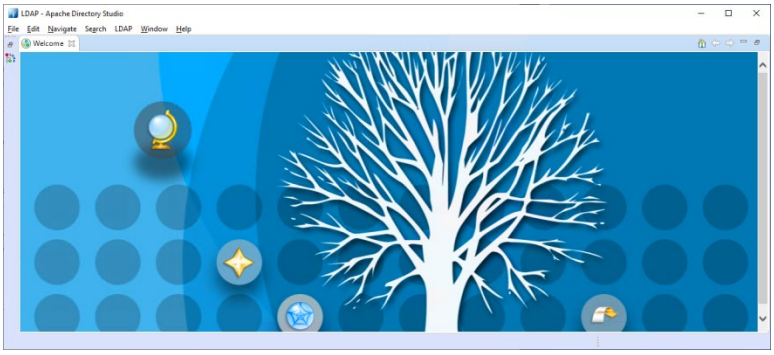
Follow these steps to install the Apache LDAP Server and the sample users and groups for the exercises.

1. Download the **ApacheDirectoryStudio** for your environment.

https://directory.apache.org/studio/downloads.html



2. Double-click the installer to launch.
3. Click **Next** and click **I agree.**
4. Enter your Destination Folder path and click **Next**.
5. Enter your Java Home Directory and click **Install**.
6. Click **Next** and **Finish**.
7. Open **Apache Directory Studio**.



8. Close the **Welcome** message.
9. Select the **LDAP Servers** tab *(see illustration)*.
10. Click the **New Server** icon.

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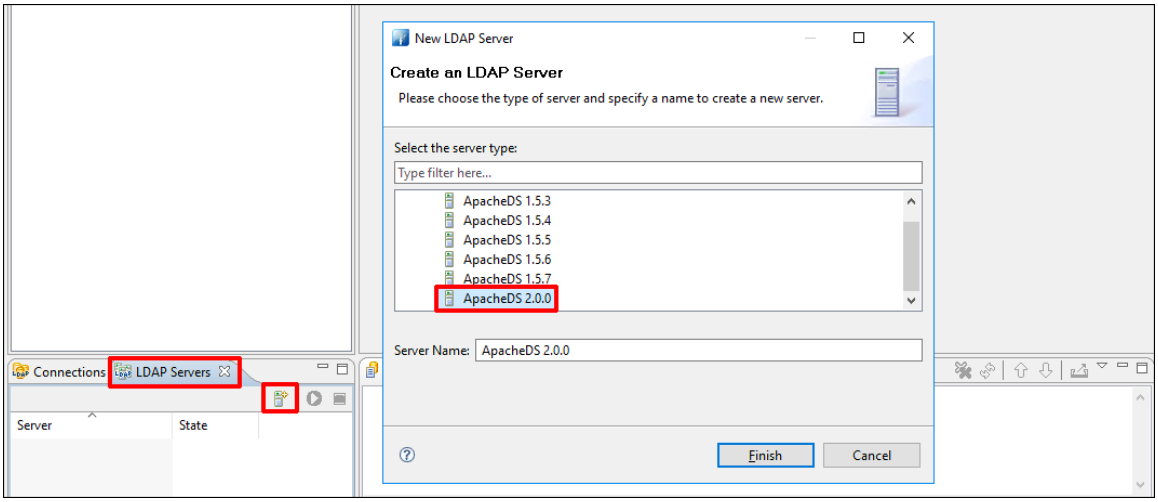
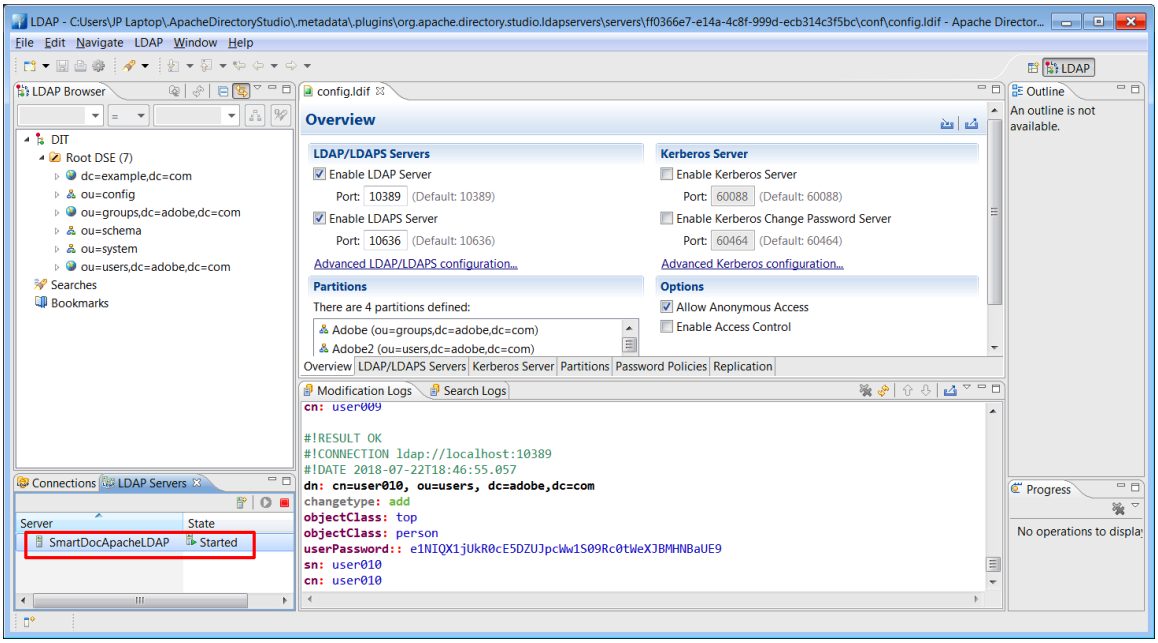
11. Select **ApacheDS 2.0.0**.



12. Enter **SmartDocApacheLDAP** as the Server Name.

13. Click **Finish**.

14. Double-click the **SmartDocApacheLDAP** server.



15. You will see the **config.ldif** overview tab opened with the default configuration as shown in the screenshot above.

    Note: *If your SmartDocApacheLDAP server is not able to start, it may be because port 10389 is already in use. Open a CMD window and issue a netstat –a command to see if port 10389 is already in use. If your AEM server is running, it may already be connected to this port.*

16. Click the Advanced Partitions configuration link.

17. Click Add to enter a partition for groups.

18. Enter Adobe for the ID.

– Enter **ou=groups,dc=adobe,dc=com** for the Suffix.

19. Click **Add** again to enter a partition for users.

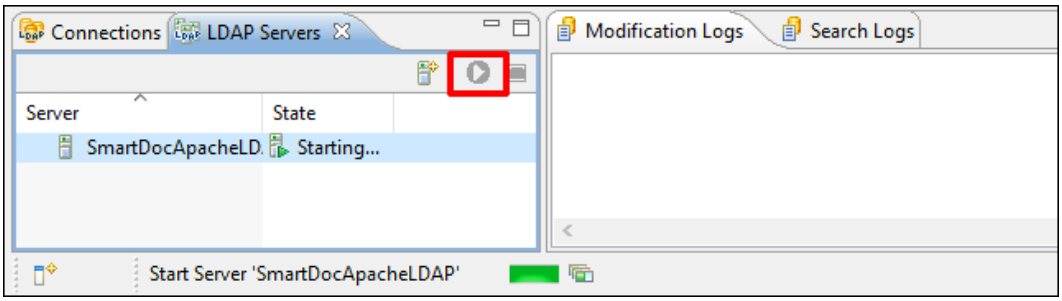
20. Enter **Adobe2** for the ID.

21. Enter **ou=users,dc=adobe,dc=com** for the Suffix.

22. Select **File – Save All** to save the partitions created for groups and users.

23. **Stop** the server if it is not already stopped.

24. **Start** it by selecting it and clicking the green arrow.



25. Switch to the **Connections** tab.

26. Right-click and select **New Connection**.

27. Enter these details:

– Connection name: **SMARTDOCAPACHELDAP**

– Hostname: **localhost**

– Port: **10389**

– Encryption Method: **No encryption**

– Provider: **Apache Directory LDAP Client API**
Note: This property may not appear on newer versions of the software.

28. Click **Next**.

29. Fill in the authentication information:

– Bind DN or user: **uid=admin,ou=system**

– Bind password: **secret**

30. Click **Finish**.

31. Right-click the **SMARTDOCAPACHELDAP** connection in the bottom right and choose **Import** > **LDIF Import**.

32. Click **Browse** and browse to the **users-groups-adobe.ldif** file in your Student Files.

33. Click **Open**.

34. Select **Overwrite existing logfile**.

35. Click **Finish**.

36. Expand the **ou=groups,dc=adobe,dc=com** node.

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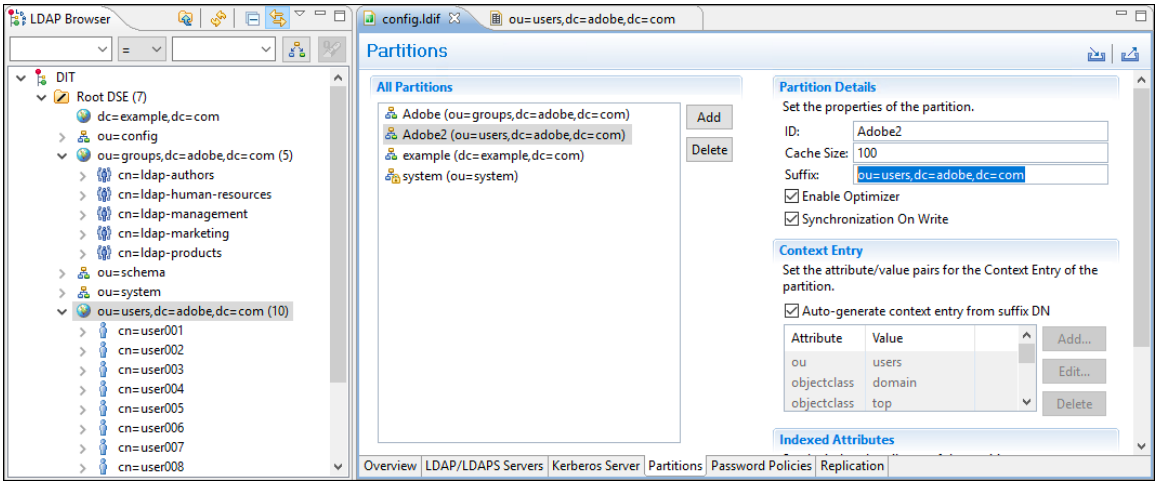
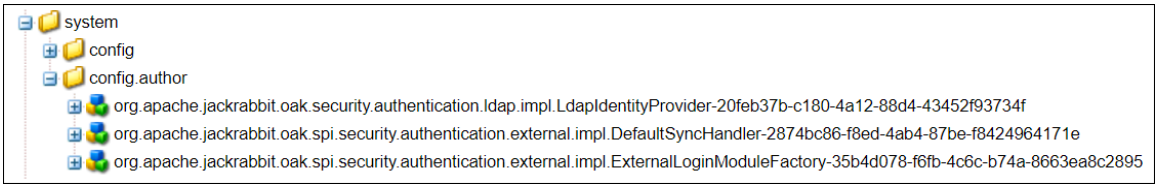
37. Expand the **ou=users,dc=adobe,dc=com** node.

You can now see the users and groups from the ldif file in the LDAP server.

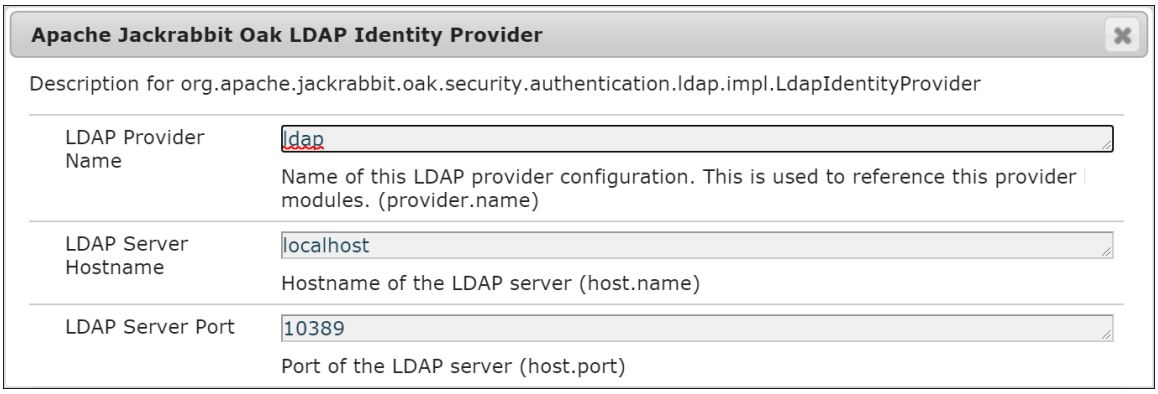


Integrate AEM

1. Go to your Author instances of AEM.
2. Go to **Package Manager** in CRX.
3. Click **Upload Package**.
4. Click Browse and locate the **LDAP_OSGi_Config-1.1.zip** package in your Student Files.
5. Select the file and click **Open**.
6. Click **OK**.
7. Click **Install** and **Install** again.
8. Select **Develop** in CRXDE Lite.
9. Select **apps/system/config.author**. You will see 3 configuration nodes. These nodes are for the *LDAP Identity Provider*, the *Default Sync Handler*, and the *External Login Module* respectively.



10. Go to the **Web Console**.
11. Go to **Configuration Manager**.
12. Search for **LDAP**. This will show you the configuration for the LDAP IDP. This came from the nodes you saw in CRXDE Lite.
13. View the properties for the **LDAP Identity Provider**. You will see the values from the OSGi configuration nodes.

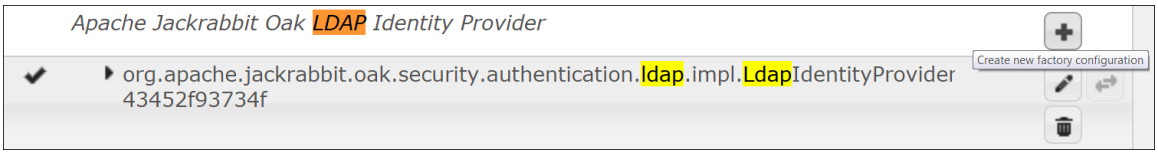


14. Search for **DefaultSyncHandler**. You may see a few of these. View the properties.

15. Search for **External Login Module**. You may see a few of these. View the properties.

Factory Methods

A plus icon in Configuration stands for Create new factory configuration. This is an indication that you can create more than 1 of these configurations.



The top line is the Factory. Clicking **Create new factory configuration** *(the plus icon)*.will create another entry below. You can view the properties for each instance.

Testing User Logins 1

Make sure your LDAP is started. Follow these steps.

16. Open **Apache Directory Studio**.

17. Go to the **LDAP Servers** tab.

18. Click the Green start button.

19. Go to the **Connections** tab.

20. Right-click the Connection and select **Open Connection**. You should see these users and groups *(see illustration)*.

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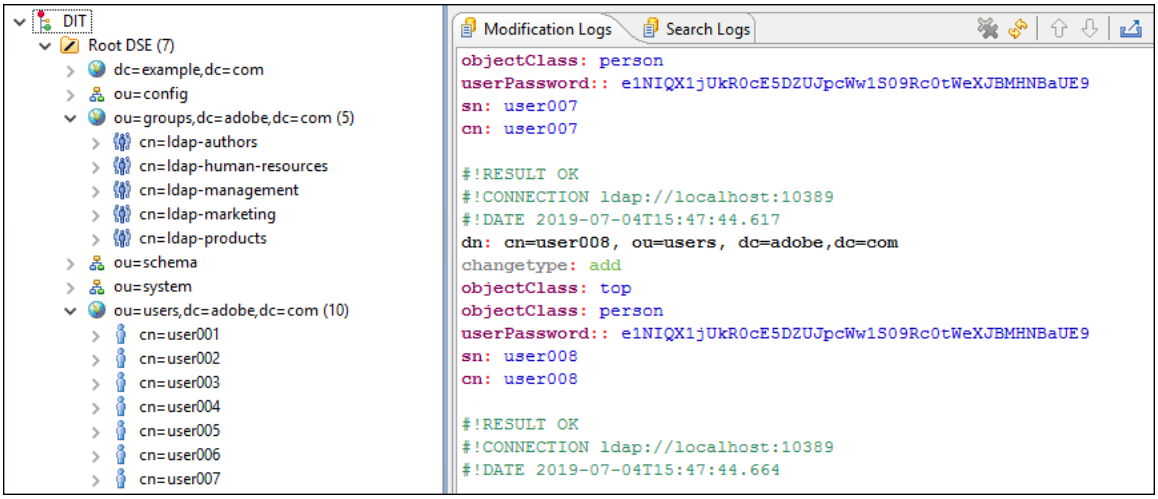


21. Login to AEM with a new browser that is NOT already logged in as Admin.

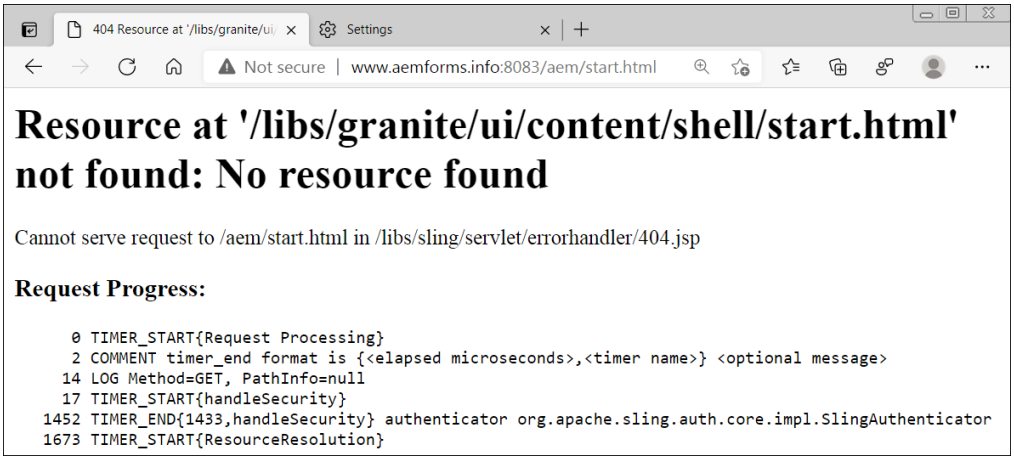
http://<server>:<port>/aem/start.html

22. Enter **user007** for the User name.

23. Enter **1234** for the password.

24. Click **Sign In**.

You should see this error because the LDAP users and groups do not have any privileges yet.



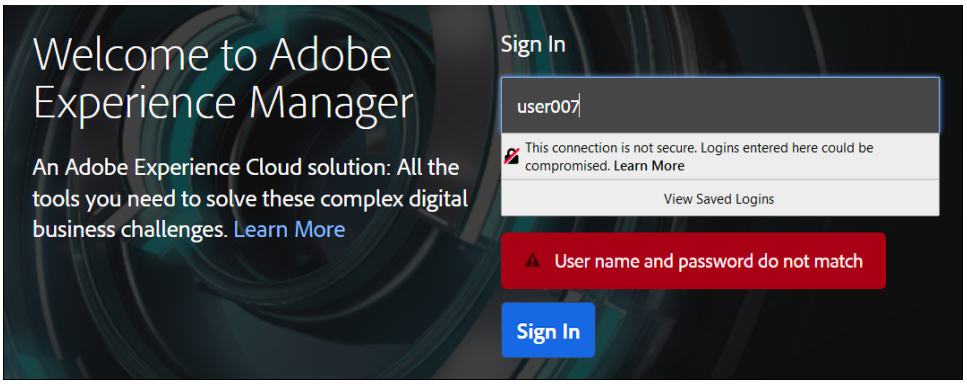
Your user007 was authenticated through LDAP but user007 is not authorized to view anything on AEM.

Trouble-Shooting

If you don't get the white error page and get the *"User name and password do not match"* message, try the following troubleshooting steps.

– Go to Apache Directory Studio and relaunch the server and re-open the connection

– Go to CRXDE Lite and uninstall, delete, and reinstall the Adobe package: *LDAP_OSGi_ Config-1.0.zip.*



Provide Authorization

We received the error message because the user does not have access to any resources in the repository because we have not yet defined permissions for the user or group that came over from the LDAP system. However, the user and group information for user007 were imported into AEM.

All the users are part of the authors group. So, if you assign permissions to the ldap-authors group, all users will be able to read content in AEM. This is the architecture of the LDAP.

ldap-authors
- **ldap-marketing**
  - **user002**
  - **user008**
- **ldap-human-resources**
  - **user001**
  - **user006**
  - **user009**
- **ldap-products**
  - **user004**
  - **user007**
  - **user010**
- **ldap-managment**
  - **user003**
  - **user005**

We will add *ldap-authors* to the *Contributors* group. The *Contributors* group is a built-in AEM group that has the *jcr:read* permission at the root level of the repository. This is the ACL for the *Contributors* group.

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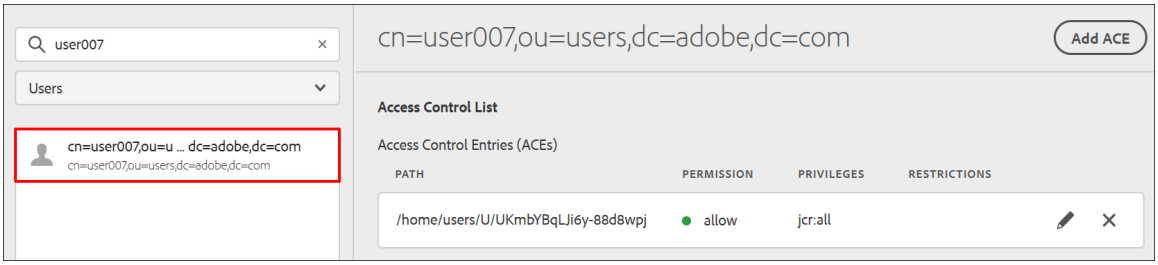
Path	Permission	Privileges	Restrictions
/	allow	jcr:read	empty
/	deny	jcr:read	rep:glob="libs/*/config/*"
/	deny	jcr:read	rep:glob="libs/*/install/*"
/	deny	jcr:read	rep:glob="apps/*/config/*"
/	deny	jcr:read	rep:glob="apps/*/install/*"
/conf	allow	jcr:read	rep:glob=""
/etc	allow	jcr:read	rep:glob=""
/etc	allow	jcr:read	rep:glob="/jcr:primaryType"
/etc/blueprints	allow	jcr:read	empty
/etc/docs	allow	jcr:read	empty
/etc/importers	allow	jcr:read	rep:glob=""/etc
/importers	allow	jcr:read	rep:glob="/jcr:primaryType"
/etc/linkchecker	allow	jcr:read	empty
/etc/livefyre	allow	jcr:read	rep:glob=""
/etc/livefyre	allow	jcr:read	rep:glob="/jcr:primaryType"
/etc/mobile	allow	jcr:read	empty
/etc/scaffolding	allow	jcr:read	empty
/home/groups/c/contributor	allow	jcr:read	empty
/libs/wcm/scaffolding/content/scaffolding	allow	jcr:read	empty

TouchUI

Follow these steps in the TouchUI.

25. Go back to your browser that is logged in to AEM as admin.
26. Select **Adobe Experience Manager – Tools – Security**.
27. Click **Permissions**.
28. Select **Users** in the drop-down.
29. Enter **user007** in the search field.
30. Double-click the record for user007.

You will see that *user007* was authenticated through LDAP but is not authorized to view anything on AEM. user007 only has access to his or her user file in the **/home/users** directory.



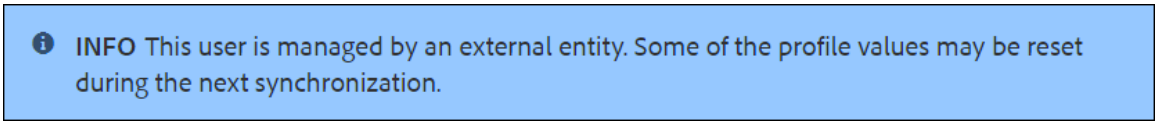
31. Select **Adobe Experience Manager – Tools – Security**.

32. Click **Users**.

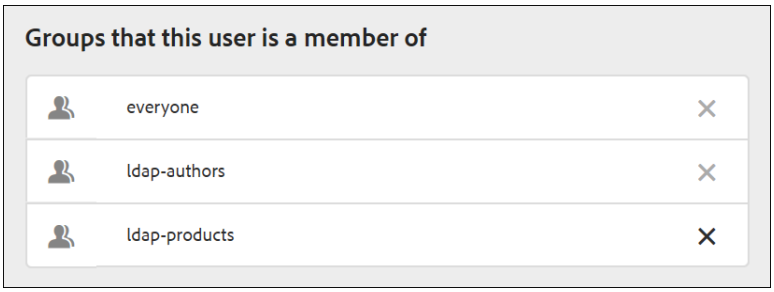
33. Click **Search** and enter **user007**.

34. Click **user007**.

35. Notice this message about the user being managed by LDAP.



36. Select the **Groups** tab. Notice that **user007** is a member of 3 groups.



37. Click **Cancel** and **Close** *(the X in the upper-right)*.

38. Select **Adobe Experience Manager – Tools – Security**.

39. Click **Groups**.

40. Click **Search** and enter **ldap-authors**.

41. Click the **ldap-authors** group.

42. Select the **Members** tab.

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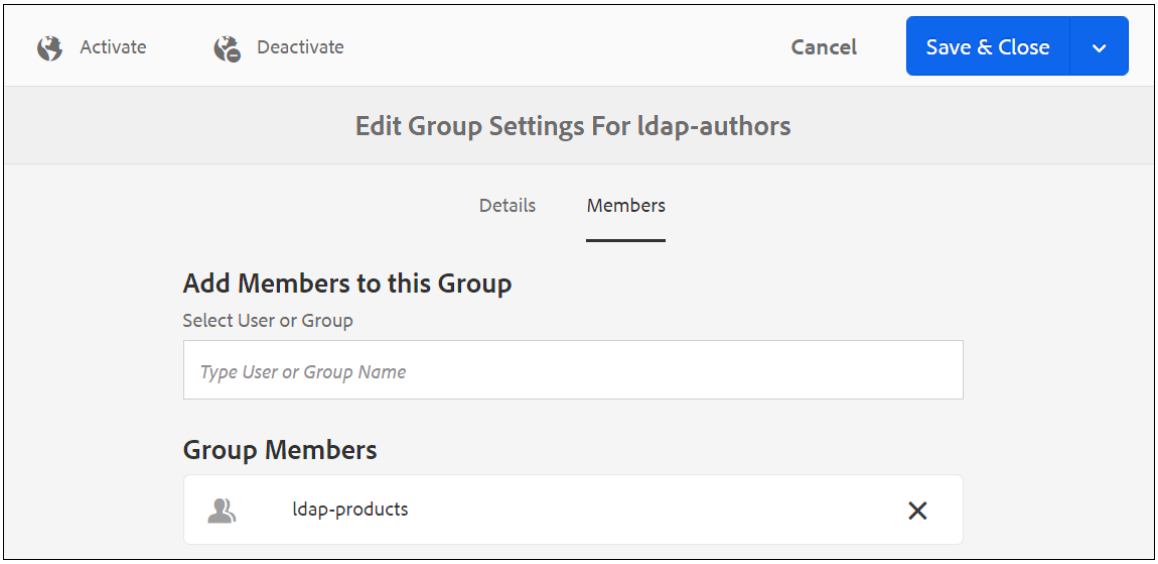
43. Notice that *ldap-products* is a member of *ldap-authors*.

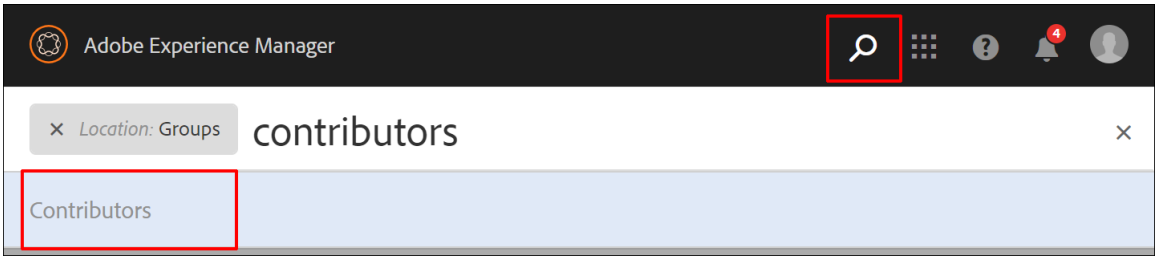


Since *user007* is a member of *ldap-products* and *ldap-products* is a member of *ldap-authors*, we can simply add *ldap-authors* to the *Contributors* group.

44. Click **Cancel** and **Close** *(the X in the upper-right)*.

45. Click **Search** and enter **Contributors**.

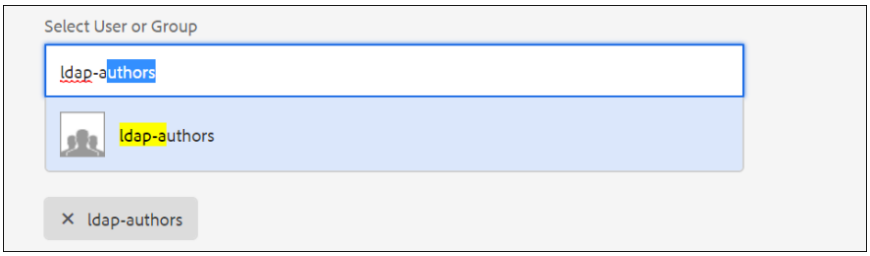
46. Click the **Contributors** group.



47. Select the **Members** tab.

48. Enter **ldap-authors** in the *Select User or Group* field and click Enter.

49. Select **ldap-authors**.



50. Click **Save & Close**.

Because access rights are automatically inherited to child nodes, all members of the *ldap-authors* group are now part of the *Contributors* group and have *jcr:read* access to all nodes in the CRX repository.

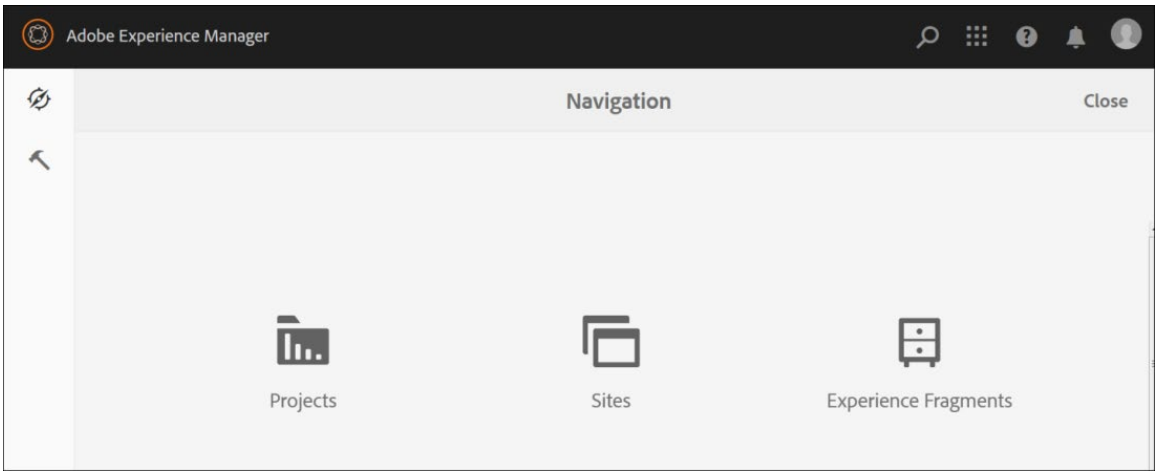
Testing User Logins 2

51. Login to AEM with a new browser that is NOT already logged in as Admin. Note: If you still have your browser session with the error that resulted from the user007 login, you can simply click Refresh.

52. Enter **user007**.

53. Enter password: **1234**.

You should now see AEM.



54. Click **User** in the upper-right and select **Sign-Out**.

55. Enter **user002**.

56. Enter password: **1234**.

Demo

The instructor will execute these steps to configure the Default Sync Handler and the External Login Module in the SmartDoc network. Note: A modified version of these steps will work in your environment if you use Microsoft Active Directory.

Follow these steps to configure the Default Sync Handler and the External Login Module.

1. Open **Web Console Configuration**.

http://<server>:<port>/system/console/configMgr

Configure the External Login Module

2. Search for **External Login Module**.

3. You will see a plus icon to the right of the *Apache Jackrabbit Oak External Login Module*. This plus icon indicates that it is a factory configuration, and you can create more than one.

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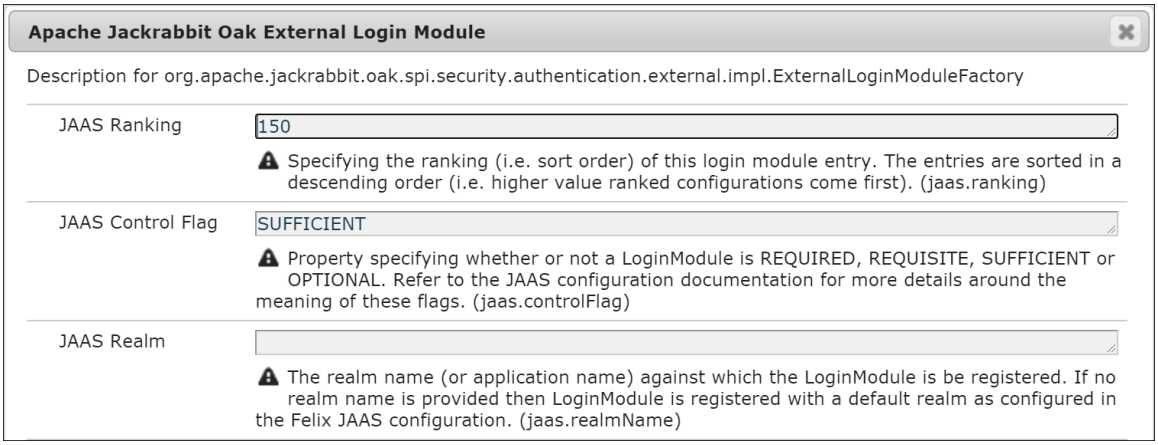
4. Click **Create new factory configuration** *(the plus icon)*.

5. You will see a panel for an *Apache Jackrabbit Oak External Login Module* configuration.



6. Enter **149** for the JAAS Ranking.

7. Enter **ldapActiveDirectory** for the *Identity Provider Name*.

8. Enter **activeDirectory** for the *Sync Handler Name*.

9. Click **Save**.

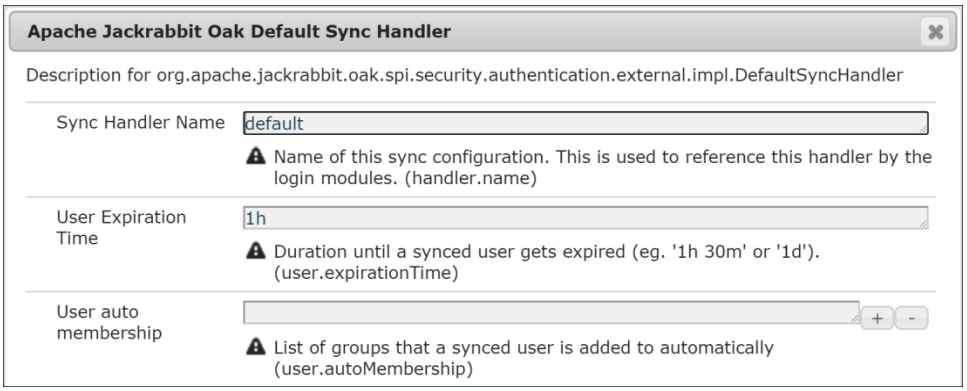
Configure the DefaultSyncHandler

10. Search for **DefaultSyncHandler**.

11. You will see a plus icon to the right of the *Apache Jackrabbit Oak Default Sync Handler*. This plus icon indicates that it is a factory configuration, and you can create more than one.

12. Click **Create new factory configuration** *(the plus icon)*.

13. You will see a panel for an *Apache Jackrabbit Oak Default Sync Handler* configuration.



14. Enter **activeDirectory** for the *Sync Handler Name*.

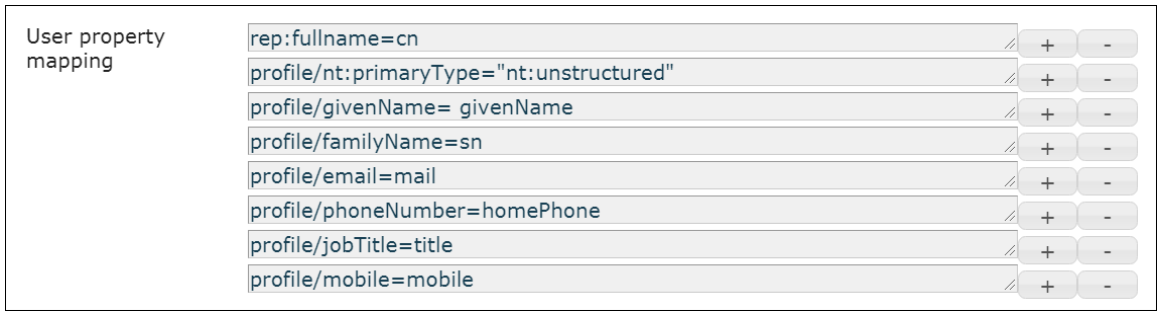
15. Enter **contributor** for the *User auto membership*.

Note: *By entering contributor you will ensure that your synchronized user has some authorization rights to AEM. If they are not authorized at all, they can successfully authenticate but will see a message that says, "Resource at 'libs/cq/core/content/projects.html not found".*

16. Click the plus icon in *User property mapping* to enter a new field.
17. Enter **profile/nt:primaryType="nt:unstructured"** in the new field.
18. Click the plus icon in *User property mapping* again to enter another new field.
19. Enter **profile/givenName= givenName** in the new field.
20. Click the plus icon in *User property mapping* again five times to enter five more values.
21. Enter these mappings in the new fields.

profile/familyName=sn
profile/email=mail
profile/phoneNumber=homePhone
profile/jobTitle=title
profile/mobile=mobile

Your *User property mapping* values should now look like this.



22. Optional Step *(see note below).* Enter **/smartdoc** for the *User Path Prefix*.
23. Enter **1** for *User membership nesting depth*.
24. Optional Step *(see note below).* Enter **/smartdoc** for the *Group Path Prefix*.
25. Click **Save**.

Note: *The User Path Prefix and Group Path Prefix are optional. I use this on my servers to keep all synchronized users in a rep:AuthorizableFolder called sdcloud. This helps me organize and backup my systems.*

Configure the LDAP Identity Provider

26. Search for **LDAP**.
27. You will see a plus icon to the right of the *Apache Jackrabbit Oak LDAP Identity Provider*. This plus icon indicates that it is a factory configuration, and you can create more than one.
28. Click **Create new factory configuration** *(the plus icon)*.
29. You will see a panel for an *Apache Jackrabbit Oak LDAP Identity Provider* configuration.

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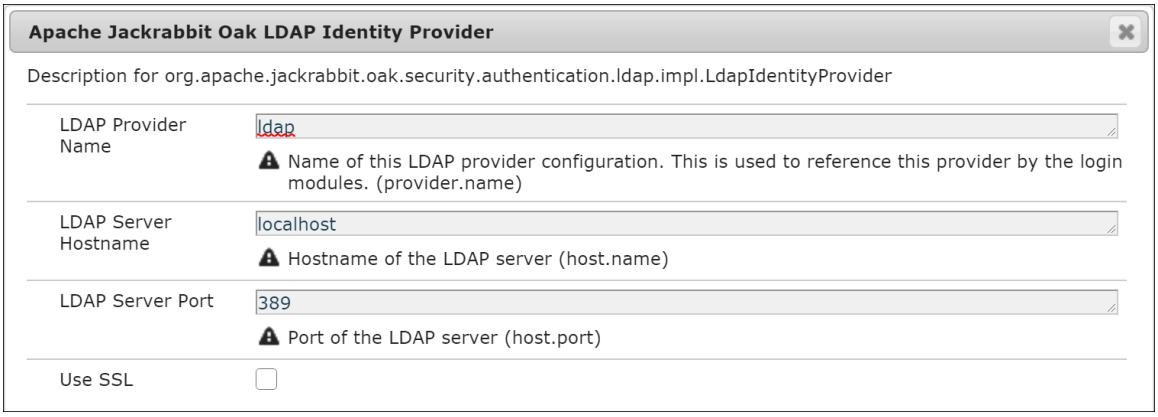
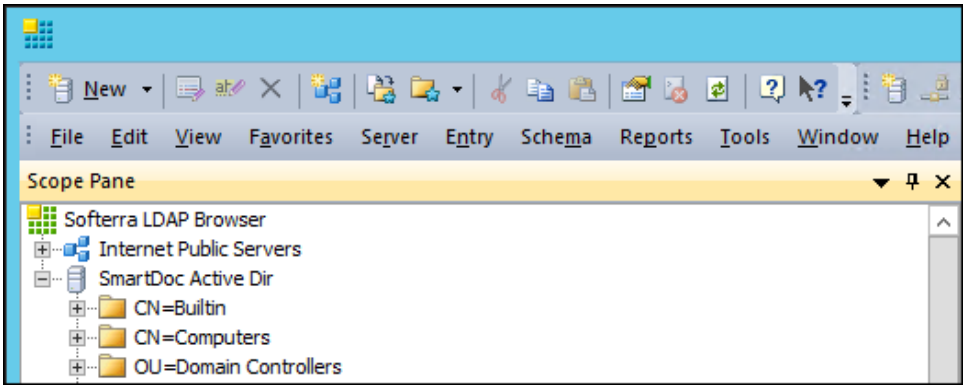


Gather your LDAP values

If you are using a SmartDoc Sandbox Server, you can use the values detailed here. However, if you are syncing AEM with your own Active Directory, you need to use a tool like the Softerra LDAP Browser to retrieve your values.

30. Open the **Softerra LDAP Browser**.

31. Expand your LDAP *(see illustration)*.



32. Select a group name. You will see the values for the group.

Name	Value	Type
objectClass	top	Attribute
objectClass	group	Attribute
cn	Honolulu	Attribute
member	CN=Jeanie Hioki,CN=Users,DC=smartdoctech,DC=com	Attribute
distinguishedName	CN=Honolulu,CN=Users,DC=smartdoctech,DC=com	Attribute
instanceType	[Writable]	Attribute
whenCreated	7/1/2019 7:00:07 PM	Attribute
whenChanged	3/6/2020 2:11:48 PM	Attribute
uSNCreated	15647808	Attribute
uSNChanged	29137146	Attribute
name	Honolulu	Attribute
sAMAccountName	Honolulu	Attribute
sAMAccountType	< samGroupObject >	Attribute
groupType	[GlobalScope, Security]	Attribute
objectCategory	CN=Group,CN=Schema,CN=Configuration,DC=smartdoctech,DC=com	Attribute
dSCorePropagationData	1/1/1601	Attribute
objectGUID	{FF56B79B-13DA-4A0F-BFFA-BF82640ACE21}	Binary Attribute
objectSid	S-1-5-21-3374335622-3702993713-632219675-2225	Binary Attribute

33. Select a user name. You will see the values for the user.

Name	Value	Type
objectClass	top	Attribute
objectClass	person	Attribute
objectClass	organizationalPerson	Attribute
objectClass	user	Attribute
cn	Jeanie Hioki	Attribute
sn	Hioki	Attribute
description	gold	Attribute
physicalDeliveryOfficeName	Honolulu2019	Attribute
givenName	Jeanie	Attribute
distinguishedName	CN=Jeanie Hioki,CN=Users,DC=smartdoctech,DC=com	Attribute
instanceType	[Writable]	Attribute
whenCreated	3/6/2020 2:10:03 PM	Attribute
whenChanged	3/6/2020 2:11:22 PM	Attribute
displayName	Jeanie Hioki	Attribute
uSNCreated	29137032	Attribute
memberOf	CN=Honolulu,CN=Users,DC=smartdoctech,DC=com	Attribute
uSNChanged	29137118	Attribute
department	Form Development	Attribute
company	Honolulu	Attribute
name	Jeanie Hioki	Attribute

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userAccountControl	[NormalAccount, NoPasswordExpiration]	Attribute
badPwdCount	1	Attribute
codePage	0	Attribute
countryCode	0	Attribute
badPasswordTime	5/9/2020 12:51:40 PM	Attribute
lastLogoff	unspecified	Attribute
lastLogon	unspecified	Attribute
pwdLastSet	3/6/2020 2:10:03 PM	Attribute
primaryGroupID	513	Attribute
accountExpires	never	Attribute
logonCount	0	Attribute
sAMAccountName	jeanie	Attribute
sAMAccountType	< samUserAccount >	Attribute
userPrincipalName	jeanie@smartdoctech.com	Attribute
objectCategory	CN=Person,CN=Schema,CN=Configuration,DC=smartdoctech,DC=com	Attribute
dSCorePropagationData	1/1/1601	Attribute
mail	jeanie@smartdoctech.com	Attribute
objectGUID	{A562E34B-7FC0-4734-A9CE-FD602217F4AD}	Binary Attribute
objectSid	S-1-5-21-3374335622-3702993713-632219675-2317	Binary Attribute

Configure your Service

34. Enter these values if you are using a SmartDoc Sandbox Server.

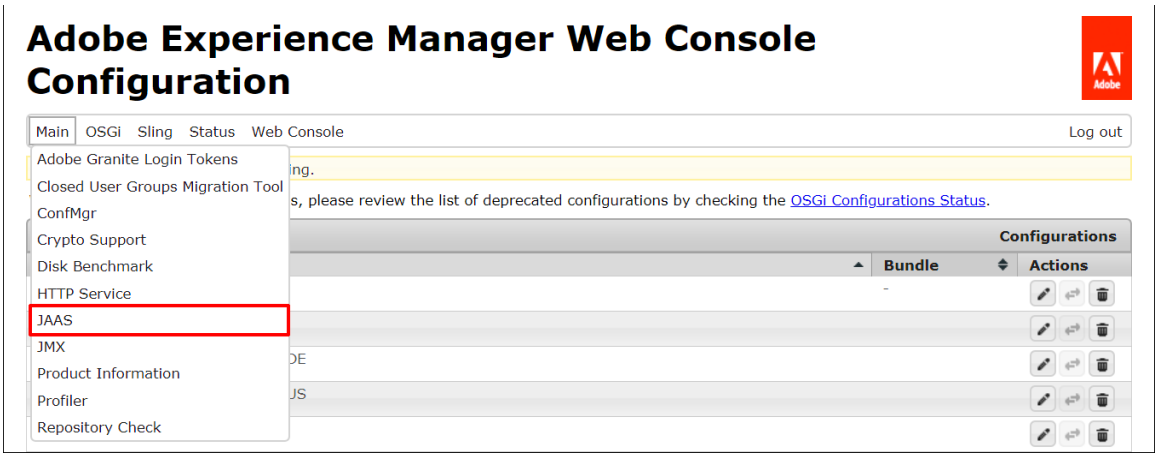
Name	Property	Value
LDAP Provider Name	(provider.name)	**ldapActiveDirectory**
LDAP Server Hostname	(host.name)	**localhost or the IP address of the LDAP Server. 192.168.16.133**
LDAP Server Port	(host.port)	**389**
Bind DN	(bind.dn)	**CN=Administrator,CN=Users,DC=smartdoctech,DC=com**
Bind Password	(bind.password)	**********
User base DN	(user.baseDN)	**DC=smartdoctech,DC=com**
User object classes	(user.objectclass)	**user**
User id attribute	(user.idAttribute)	**sAMAccountName**
Group base DN	(group.baseDN)	**DC=smartdoctech,DC=com**
Group object classes	(group.objectclass)	**group**
Group name attribute	(group.nameAttribute)	**cn**
Group member attribute	(group.memberAttribute)	**member**

35. Click **Save**.

JAAS and JMX

Open Web Console and follow these steps to synchronize your users.

36. Select **Main – JAAS**. This will open the *Java Authentication and Authorization Service* console.



37. Confirm that your external login module appears as a Registered LoginModule. You should see something like this.

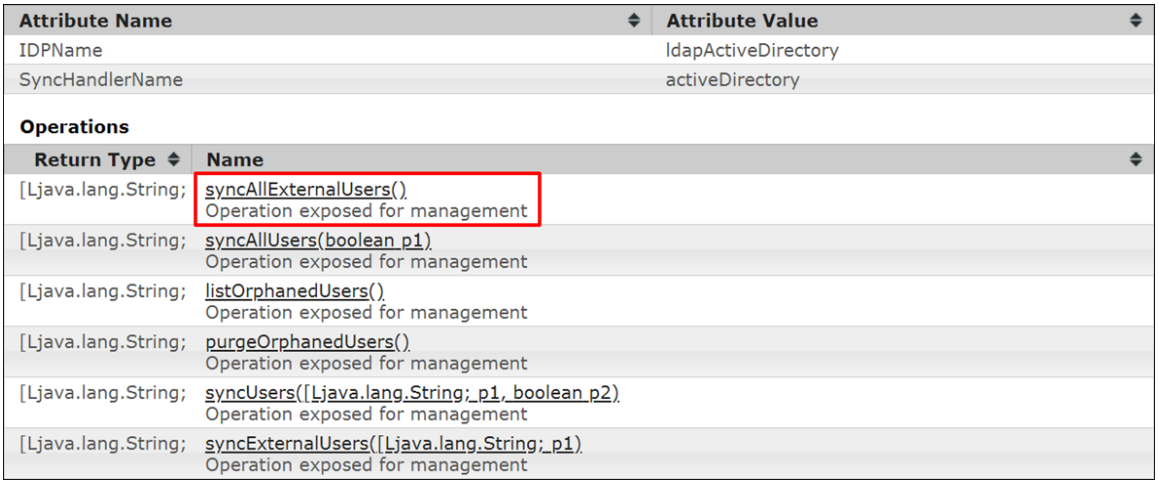
149 org.apache.jackrabbit.oak.spi.security.authentication.external.impl.ExternalLoginModuleFactory(23135)

38. Select **Main – JMX**.

39. Search for **External Identity**.

40. Locate your External Login Module and click it.

41. Click **syncAllExternalUsers()**.



42. Click **Invoke**.

43. You should see a listing of synchronized users.

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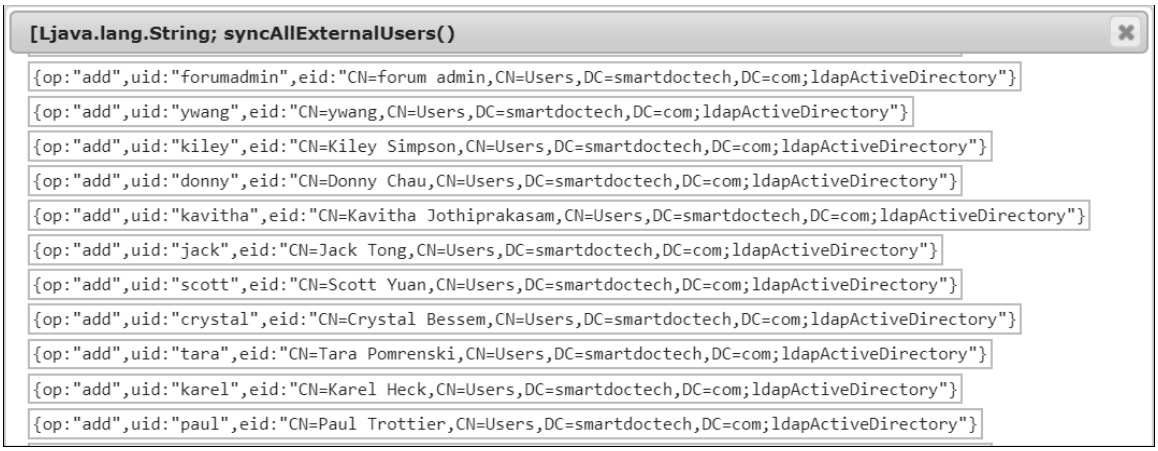


Login as a Synchronized User

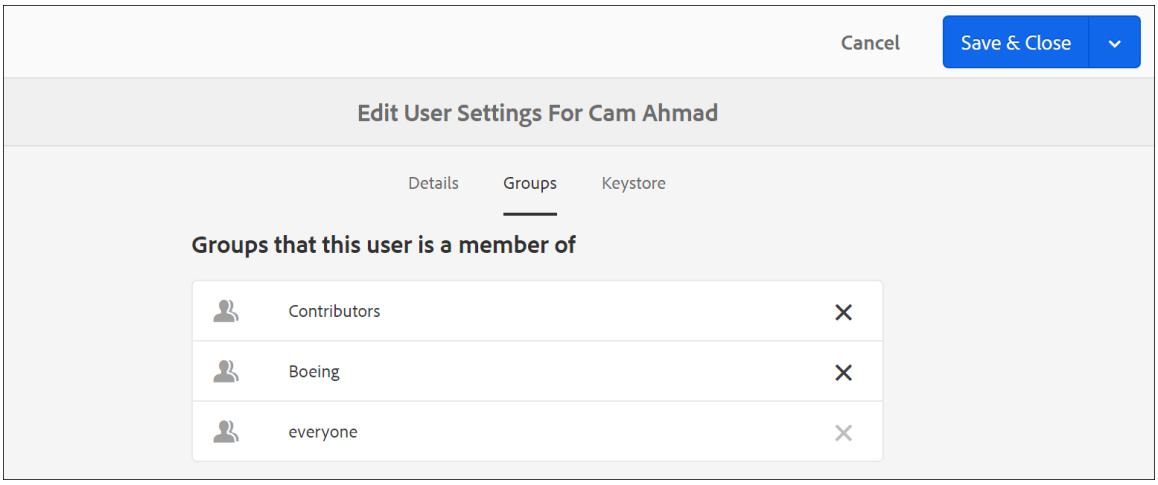
44. Open AEM with a new browser.

http://<server>:<port>/aem/start.html

> ***Note:*** *Your authentication is stored at the browser level. So, if you are currently logged in as an Administrator, you cannot use this same browser for testing the authentication of a new user.*

45. Login as one of the Active Directory users.
46. Click **User** in the upper-right and select Profile.
47. Select the **Groups** tab.

You should see the user's groups.



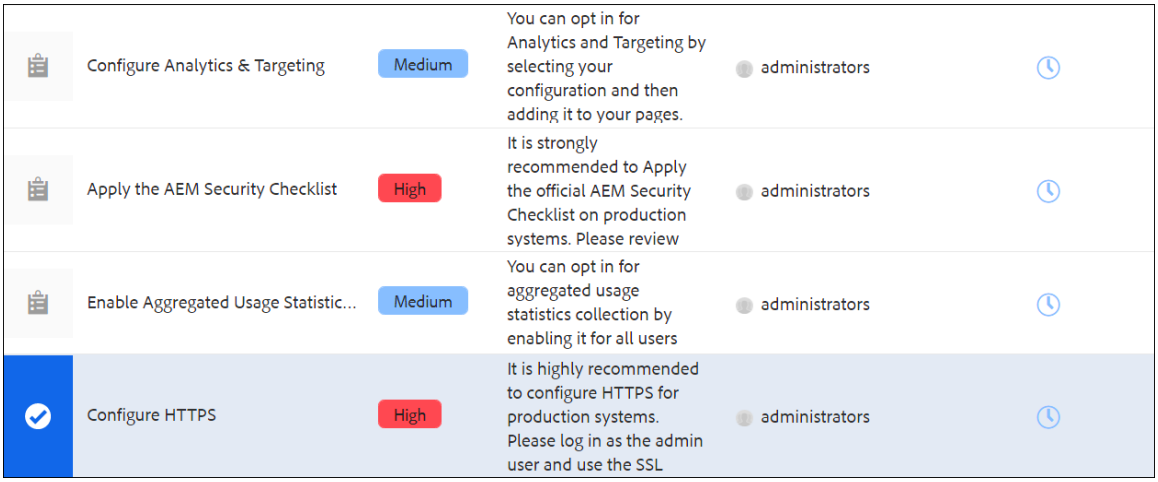
Operations

We will do the following in this module.

- Use AEM Health Reports to analyze and improve security.
- Use AEM Maintenance to perform daily and weekly tasks.
- Execute Tar Compaction on the segmentstore.

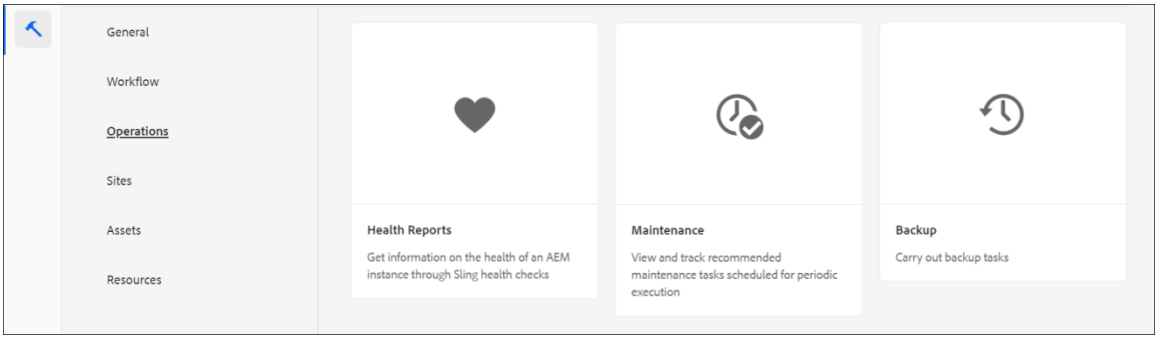
HTTPS

The first place to start is your Administrator Inbox. Adobe provides important messages about a new AEM instance in your Administrator's Inbox. The first High priority message advises you to review and apply the online *AEM Security Checklist*. The second High priority message advises you to configure HTTPS. We will do this in the exercises.



Operations

You can access AEM's *Operations* dashboard by selecting *Tools – Operations*. The *Operations* dashboard enables you to monitor AEM system health with built-in visual tools. We will work with Health Reports and Maintenance in this module, and we will use the Backup operations in a later module.



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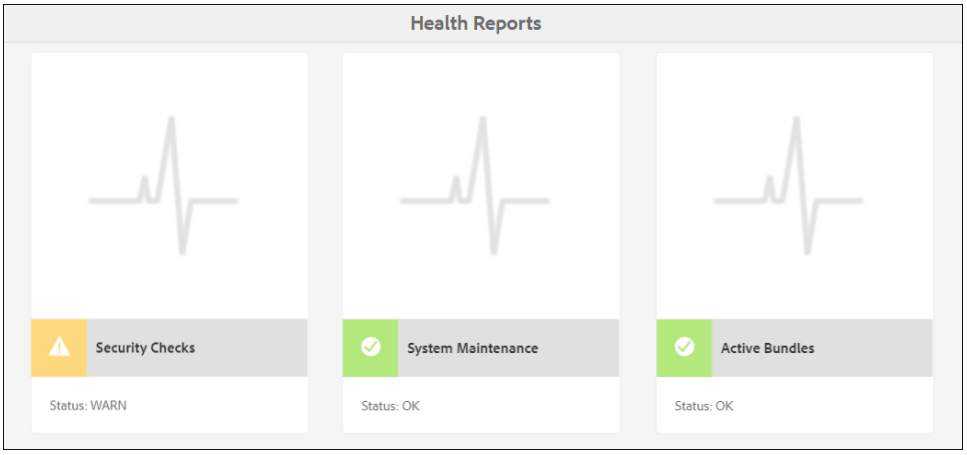
Health Reports

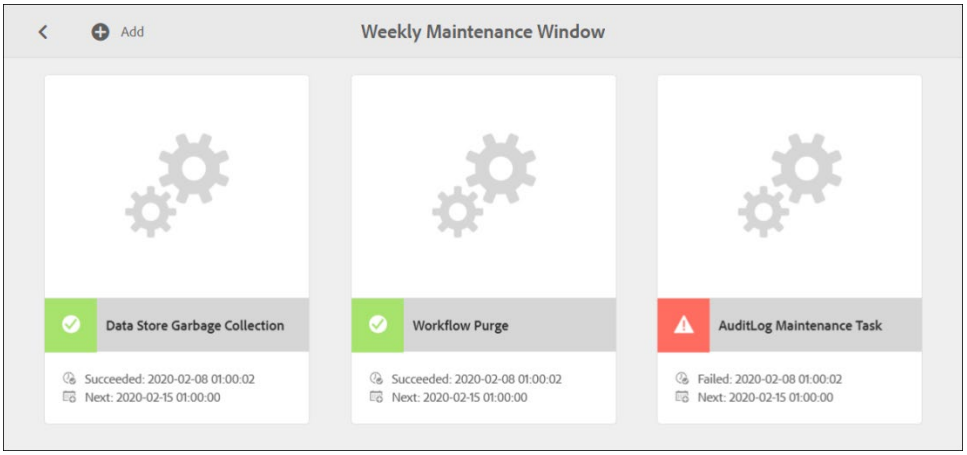
You can view the health of your AEM system with **Health Reports** *(see illustration)*.



We will execute several security checks and improvements in the exercises. For instance, we will update the replication agents to use the replication-receiver account instead of the Admin account. We will not execute all the security suggestions. For instance, we will not disable CRXDE Support.

Maintenance

You can view and track scheduled maintenance tasks with **Maintenance**. We will review the timing and details of *Daily* and *Weekly* Maintenance tasks. The weekly tasks will take the most work because without proper configuration, some of these weekly tasks will fail. We will properly configure the *Workflow Purge* task and the *AuditLog Maintenance* task.



Tar Compaction

When you update or delete data in the JCR, the existing data remains. It is never directly overwritten in a TAR file. Over time, your TAR files will become numerous and large. You can optimize your TAR files in the segmentstore with TAR Compaction. This example shows a segment store before (1) and after (2) a compaction. After a compaction is complete, you can move the *.bak files to an archive.

1

Name	Date modified	Type	Size
data00016a.tar.bak	7/30/2019 9:27 PM	BAK File	109,667 KB
data00018a.tar.bak	8/5/2019 4:41 PM	BAK File	111,863 KB
data00034a.tar.bak	8/21/2019 4:33 PM	BAK File	262,285 KB
data00055a.tar.bak	9/19/2019 4:28 PM	BAK File	3,184 KB
data00061a.tar.bak	9/24/2019 4:59 PM	BAK File	222,072 KB
data00087a.tar.bak	12/15/2019 4:59 PM	BAK File	3,321 KB
data00096a.tar	12/22/2019 3:00 AM	TAR File	262,897 KB
data00097a.tar.bak	12/25/2019 9:14 PM	BAK File	62,593 KB
data00111a.tar	1/22/2020 3:00 AM	TAR File	11,901 KB
data00112a.tar	1/23/2020 2:20 PM	TAR File	64,934 KB
data00113a.tar	1/25/2020 1:00 AM	TAR File	51,870 KB
data00114a.tar	1/26/2020 3:00 AM	TAR File	34,764 KB
data00115b.tar	1/26/2020 3:00 AM	TAR File	25 KB
data00116a.tar	2/1/2020 1:00 AM	TAR File	203,410 KB
data00117a.tar	2/2/2020 3:00 AM	TAR File	33,079 KB
data00119a.tar	2/8/2020 1:00 AM	TAR File	187,885 KB
data00120a.tar	2/9/2020 3:00 AM	TAR File	32,875 KB
data00122a.tar	2/12/2020 8:44 PM	TAR File	121,262 KB
data00123a.tar	2/12/2020 8:51 PM	TAR File	870 KB
gc.log	1/22/2020 3:00 AM	Text Document	1 KB
journal.log	2/12/2020 8:51 PM	Text Document	19,249 KB
manifest	2/12/2020 8:45 PM	File	1 KB
repo.lock	7/15/2019 11:57 AM	LOCK File	0 KB

2

Name	Date modified	Type	Size
data00016a.tar.bak	7/30/2019 9:27 PM	BAK File	109,667 KB
data00018a.tar.bak	8/5/2019 4:41 PM	BAK File	111,863 KB
data00034a.tar.bak	8/21/2019 4:33 PM	BAK File	262,285 KB
data00055a.tar.bak	9/19/2019 4:28 PM	BAK File	3,184 KB
data00061a.tar.bak	9/24/2019 4:59 PM	BAK File	222,072 KB
data00087a.tar.bak	12/15/2019 4:59 PM	BAK File	3,321 KB
data00097a.tar.bak	12/25/2019 9:14 PM	BAK File	62,593 KB
data00124a.tar	2/12/2020 8:58 PM	TAR File	263,549 KB
data00125a.tar	2/12/2020 8:59 PM	TAR File	7,567 KB
gc.log	2/12/2020 8:59 PM	Text Document	1 KB
journal.log	2/12/2020 8:59 PM	Text Document	1 KB
manifest	2/12/2020 8:58 PM	File	1 KB
repo.lock	7/15/2019 11:57 AM	LOCK File	0 KB

3

Name	Date modified	Type	Size
data00124a.tar	2/12/2020 8:58 PM	TAR File	263,549 KB
data00125a.tar	2/12/2020 8:59 PM	TAR File	7,567 KB
gc.log	2/12/2020 8:59 PM	Text Document	1 KB
journal.log	2/12/2020 8:59 PM	Text Document	1 KB
manifest	2/12/2020 8:58 PM	File	1 KB
repo.lock	7/15/2019 11:57 AM	LOCK File	0 KB

Exercises

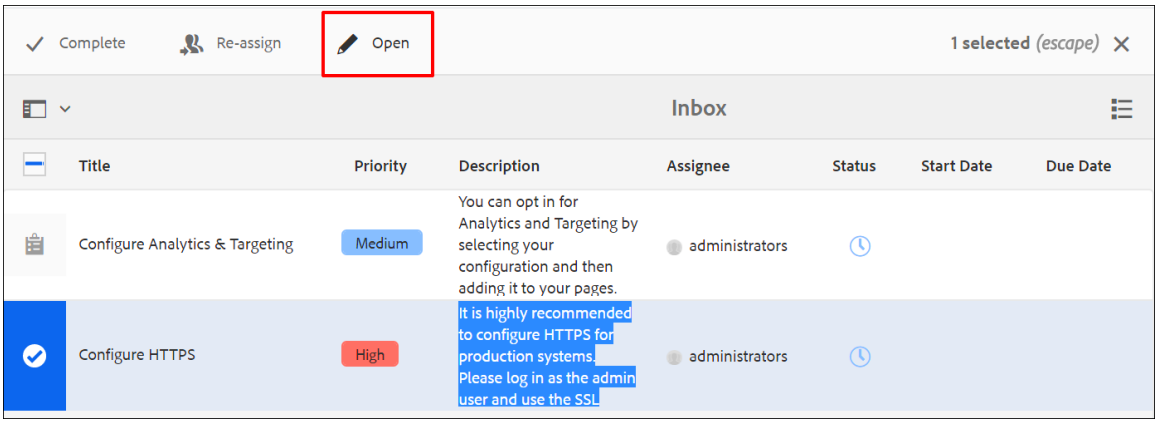
The first place to start is your Administrator Inbox. Adobe provides important messages about a new AEM instance in your Administrator's Inbox.

Configure HTTPS

It is a best practice to configure HTTPS for production systems.

> ***Note:*** *The certificate and private key in the Student folders are configured for localhost.*

1. Open AEM.
2. Select **Inbox – View All**.
3. Select **Configure HTTPS** and click Open. This will open the SSL Wizard. You can also access the SSL Wizard by selecting *Tools – Security – SSL Configuration*.



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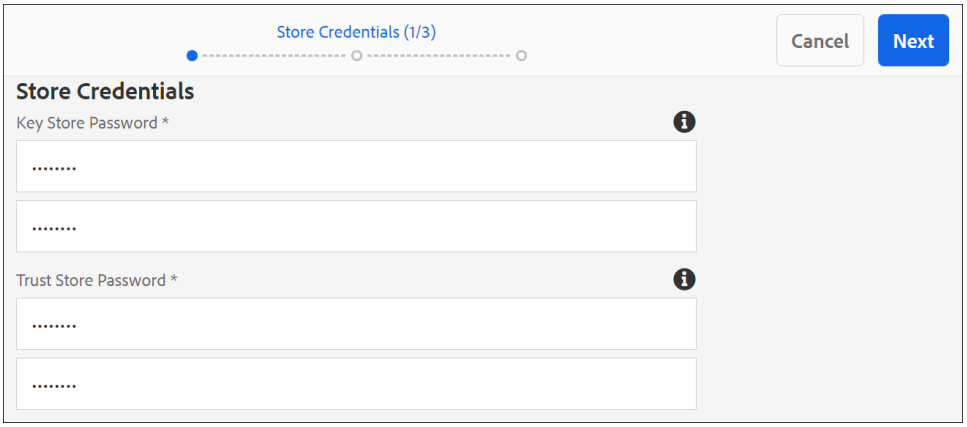
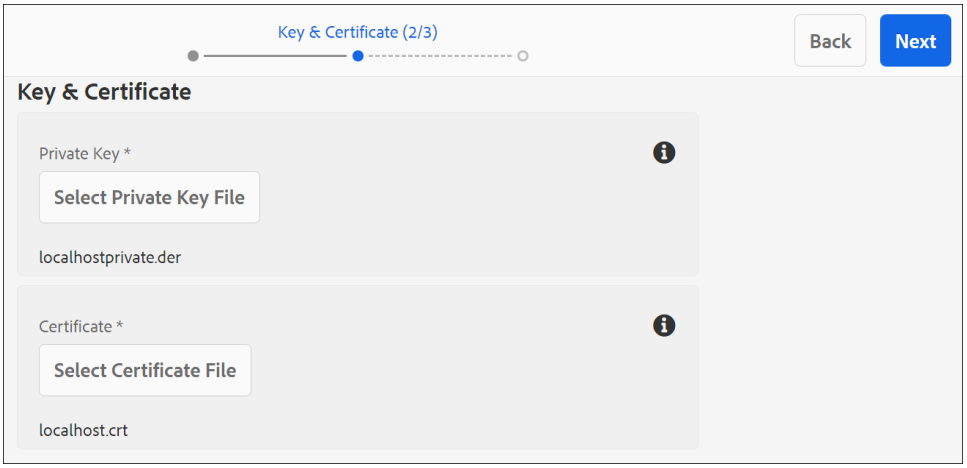
4. Enter **password** for all of the following.



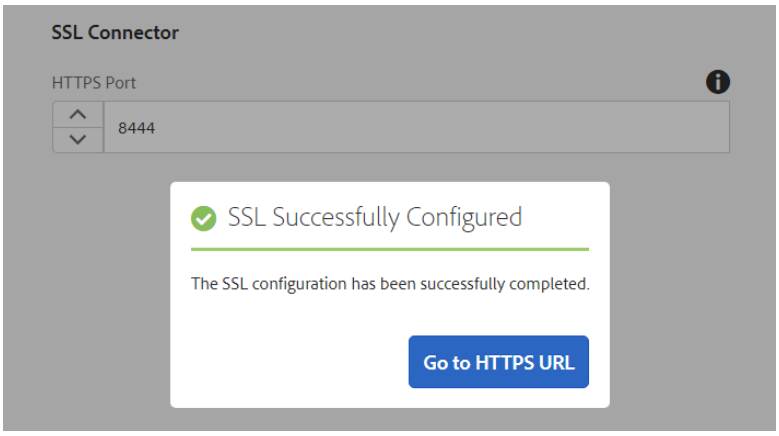
5. Click **Next**.
6. Click **Select the Private Key File**.
7. Select the Private Key **localhostprivate.der** in your Student Files.
8. Click **Open**.
9. Click **Select Certificate File**.
10. Select the certificate **localhost.crt** in your Student Files.
11. Click **Open**. *Note: These certificates are for the domain name localhost. You should create or purchase a certificate for your specific domain name.*



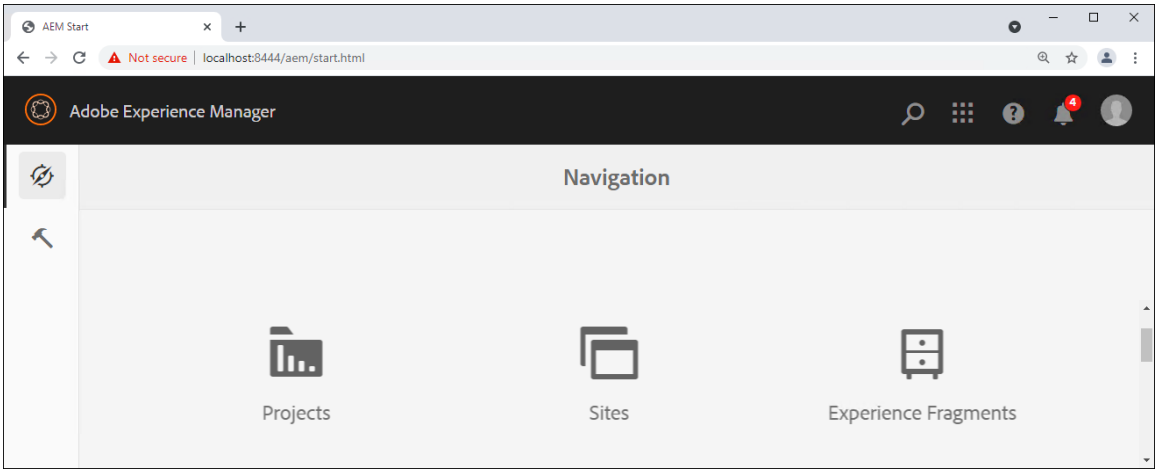
12. Click **Next**.

    Note: *The certificate and private key in the Student folders are configured for localhost.*

13. Enter **localhost** as your server name or your server's domain name.
14. Enter **8444** because it's possible that the JEE version will already be using port 8443.
15. Click **Done**.



16. Click **Go to HTTPS URL**.
17. Click **ADVANCED**.
18. Click **Proceed to localhost (unsafe)**.



You can also see the updated properties in Web Console Configuration. Follow these steps.

19. Login to **Web Console Configuration**.

http://localhost:4502/system/console/configMgr

20. Search for **Granite SSL**.
21. Click **Edit the configuration values** *(the pencil icon)* on the *Adobe Granite SSL Connector Factory*.
22. You will see these properties and values.

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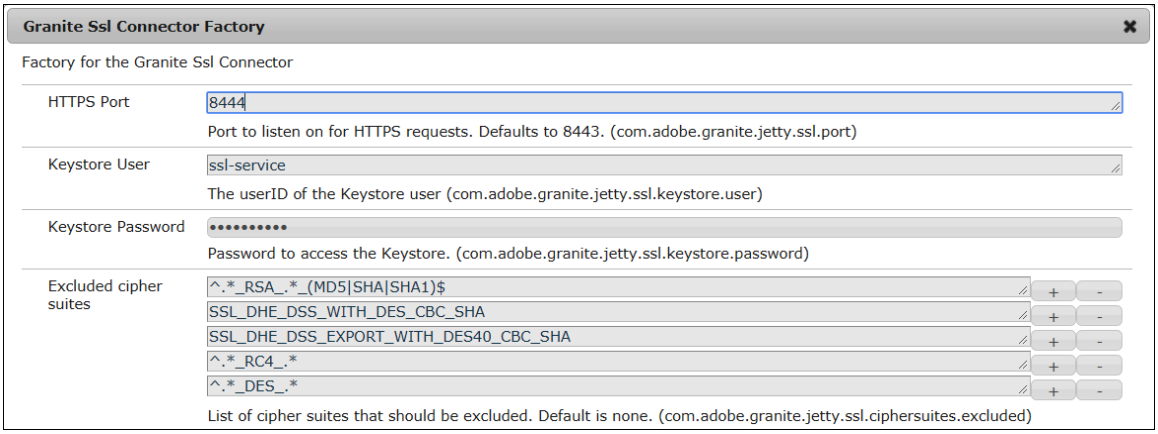
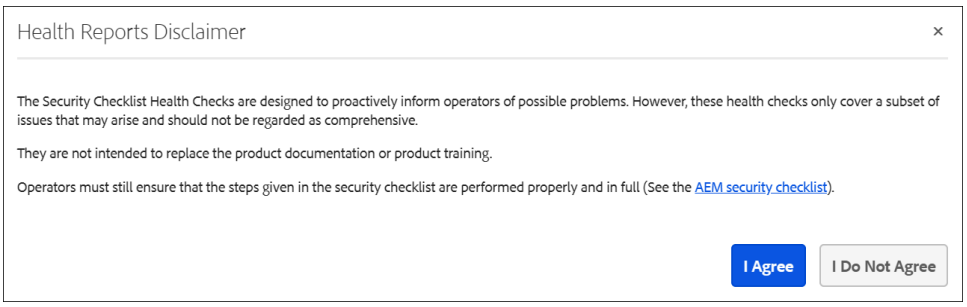


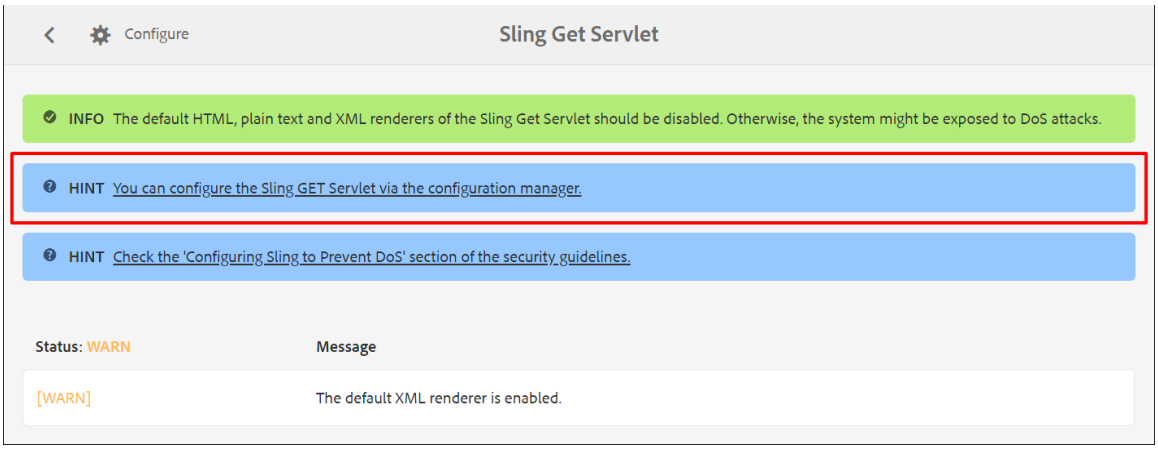
View Health Reports

1. Navigate to **Tools – Operations – Health Reports – Security Checks**.
2. You may see the **Health Reports Disclaimer**.
3. If so, click **I Agree** or otherwise close the Disclaimer by collapsing the panel.



4. Many of the cards in the Security Checklist dashboard show a WARN status in yellow (see illustration).
5. Click the **Sling Get Servlet** card to see a diagnosis and hints for solutions.

6. Notice the diagnosis is a warning that The default XML renderer is enabled *(see illustration)*.
7. Notice the green **INFO** panel says the default XML renderer of the Sling Get Servlet should be disabled.
8. Notice the blue **HINT** is a link that will open the Configuration Manager *(Web Console Configuration)* where you can change this configuration.
9. **Click** the link.



The **Apache Sling GET Servlet** configuration is opened in *Web Console Configuration*.

10. Deselect **Enable XML**.

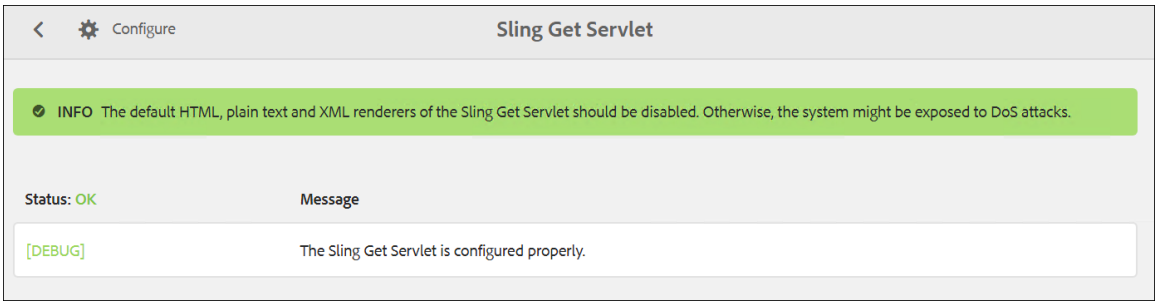
    Note: *The default HTML, plain text and XML renderers of the Sling Get Servlet should be disabled. Otherwise, the system might be exposed to DoS attacks.*

11. Click **Save**.

12. Navigate back to **Tools – Operations – Health Reports – Security Checks**.

13. Click on the **Sling Get Servlet** card.

The Sling Get Servlet card is now green.



DavEx Heath Check and CRXDE Lite

14. Navigate to **Tools – Operations – Health Reports – Security Checks**.

15. Click **CRXDE Support**.

16. Notice that the recommendation is to disable the CRX Development Bundles on production systems.

17. **DO NOT MAKE ANY CHANGES**.

These are the CRX bundles and for various reasons and considerations, you may or may not want to disable these bundles on production systems. You should seriously weigh the pros and cons before making this decision.

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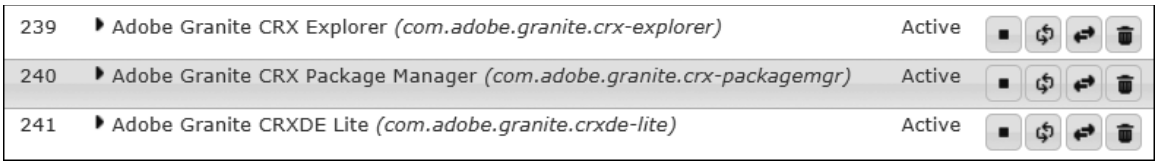
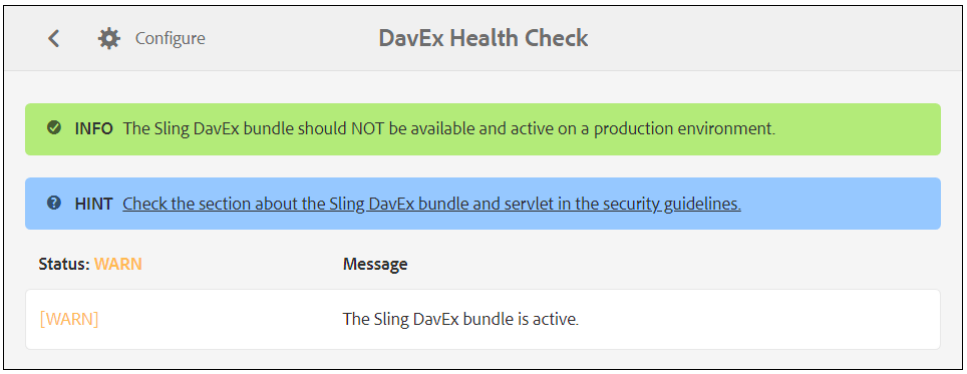


18. Navigate to **Tools – Operations – Health Reports – Security Checks**.

19. Click **DavEx Health Check**.

20. Notice that the recommendation is to disable the Sling DavEx bundle on production system.

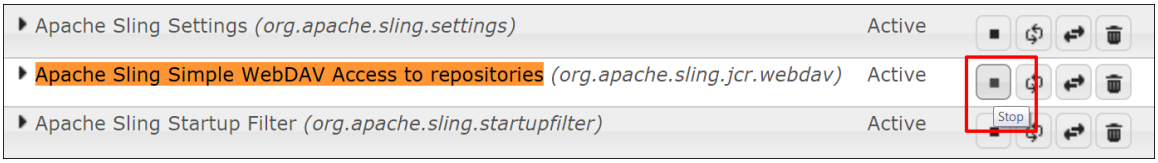


21. Open **Web Console Bundles**.

http://localhost:4502/system/console/bundles

22. Search for the **Apache Sling Simple WebDAV Access to repositories** bundle.

23. Click **Stop** to change the status from Active to Resolved.



24. Search for the **Apache Sling JCR DavEx** bundle.

25. Click **Stop** to change the status from Active to Resolved.

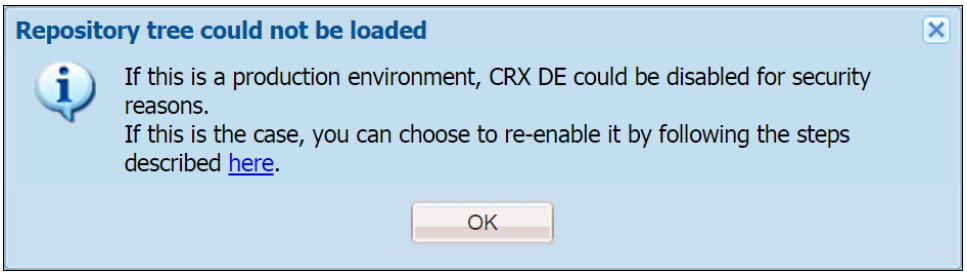
26. Navigate to **Tools – Operations – Health Reports – Security Checks**.

27. Click **DavEx Health Check**.

28. Notice that the DavEx Health Check Status is now OK.

23. Open CRX by clicking **Tools – General – CRXDE Lite**.

24. Notice that the Repository tree could not be loaded. This is because the WebDav bundles are no longer active.



29. Open Web Console Bundles

http://localhost:4502/system/console/bundles

30. Search for the **Apache Sling JCR DavEx** bundle.

31. Click **Start** to change the status from *Resolved* to *Active*.

32. Search for the **Apache Sling Simple WebDAV Access to repositories** bundle.

33. Click **Start** to change the status from Resolved to Active.

25. Open CRX by clicking **Tools – General – CRXDE Lite**.

26. Notice that the Repository tree is now loaded successfully.

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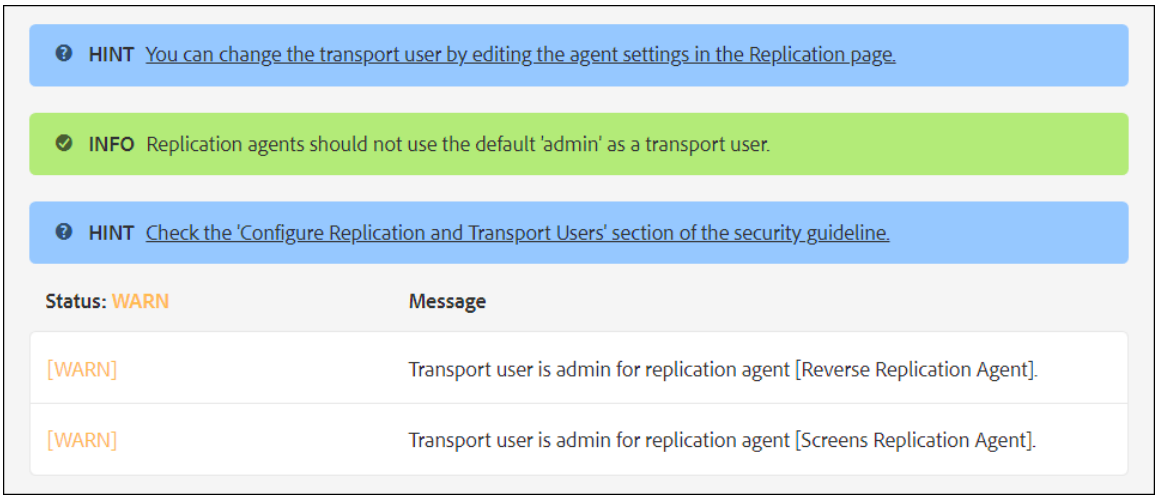
Enhance Security with replication-receiver

By default, the standard account that is used by the replication agents is the admin account. It is considered a best practice for AEM Security to replace this default admin account with a specific user.

1. Navigate to **Tools – Operations – Health Reports – Security Checks** on your Author instance.
2. Select **Replication and Transport Users**.
3. Notice the diagnosis is a warning that the transport user is the admin account *(see illustration)*.
4. Notice the green **INFO** panel says replication agents should not use the default 'admin' as a transport user.
5. Notice the blue **HINT** on top is a link that will open the Replication page where you can change this configuration.
6. **Click** the link.



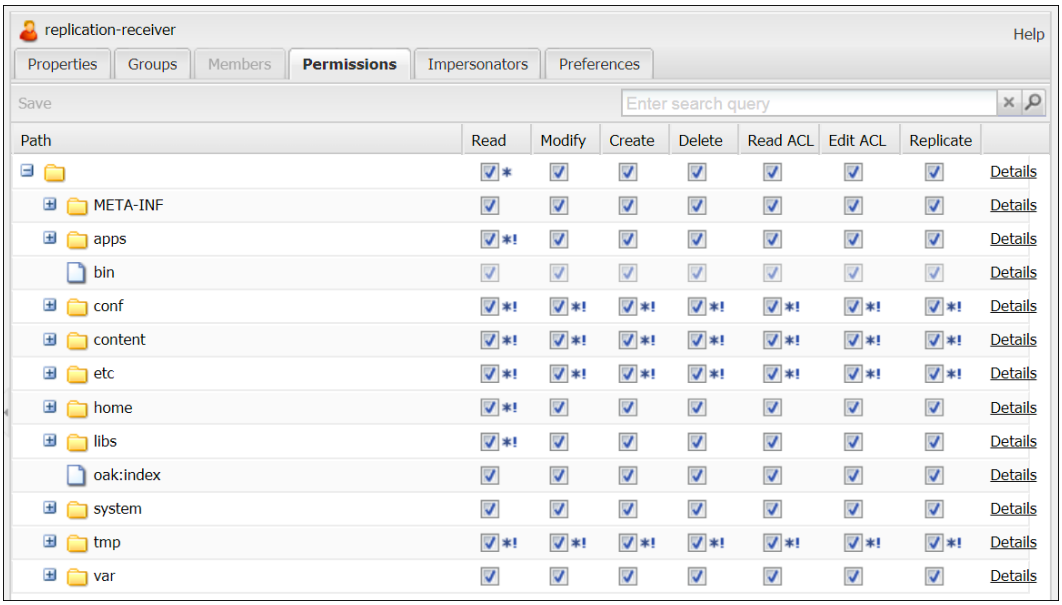
7. Keep this browser tab open and open an additional browser tab with your Publish server. You need to be logged into your Publish server as an administrator.

http://localhost:4503/crx/packmgr/index.jsp

8. Change the application path to launch useradmin.

http://localhost:4503/useradmin

9. Enter **replication** in the search field on the left.
10. Double-click the **replication-receiver** user.
11. Select the **Permissions** tab on the right. You will see this user's permissions.



12. Select the **Groups** tab. You will see this user is part of the administrators group.

13. Select your URL and copy it to a new browser tab.

14. Change the application path to AEM.

http://localhost:4503/aem/start.html

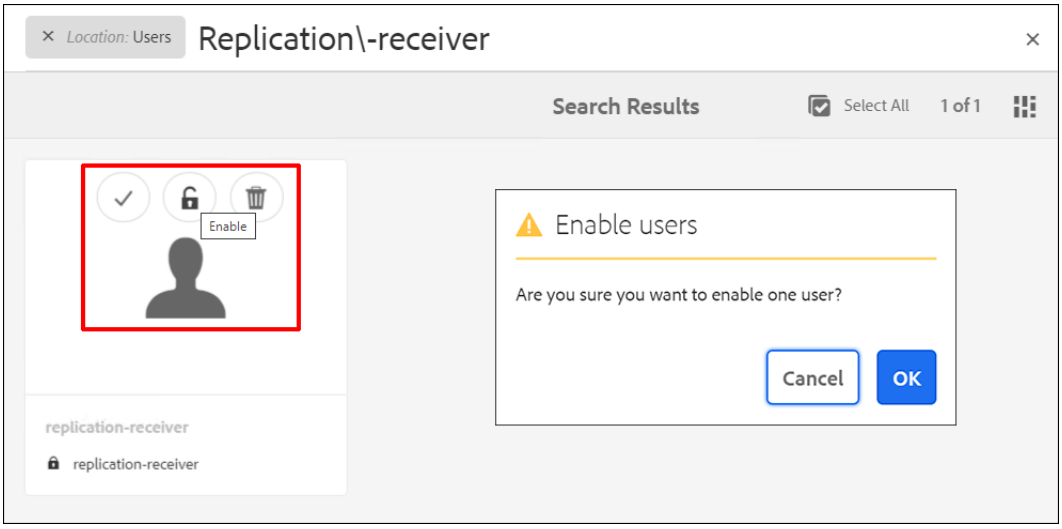
15. Select **Tools – Security – Users**.

16. Click **Search** and enter **Replication**.

17. Select **Replication-receiver**.

18. Hover over the lock icon and click **Enable** (locked).

19. Click **OK**.



20. Select the **replication-receiver** and click **Properties** in the Action bar.

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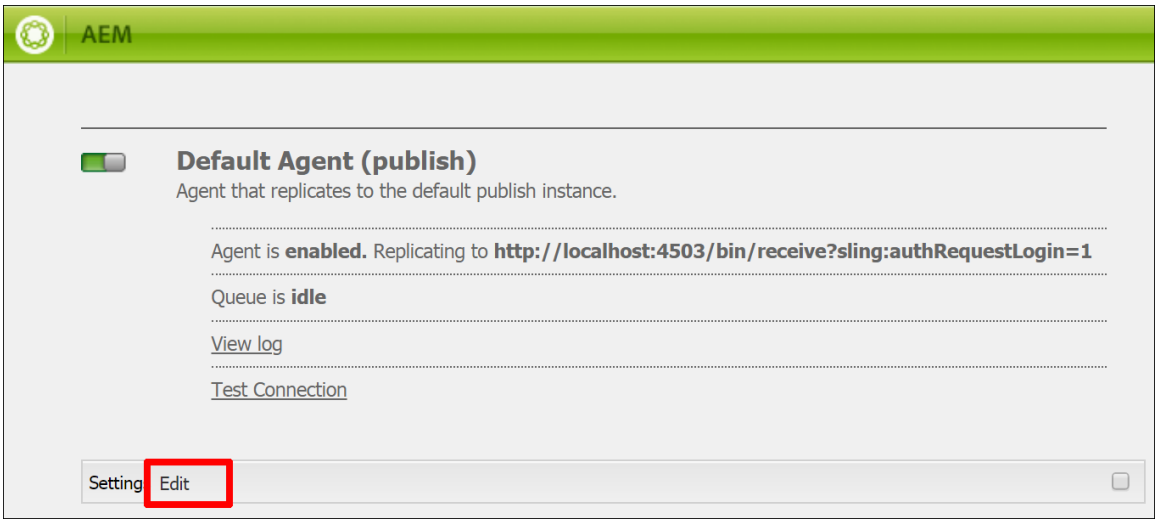
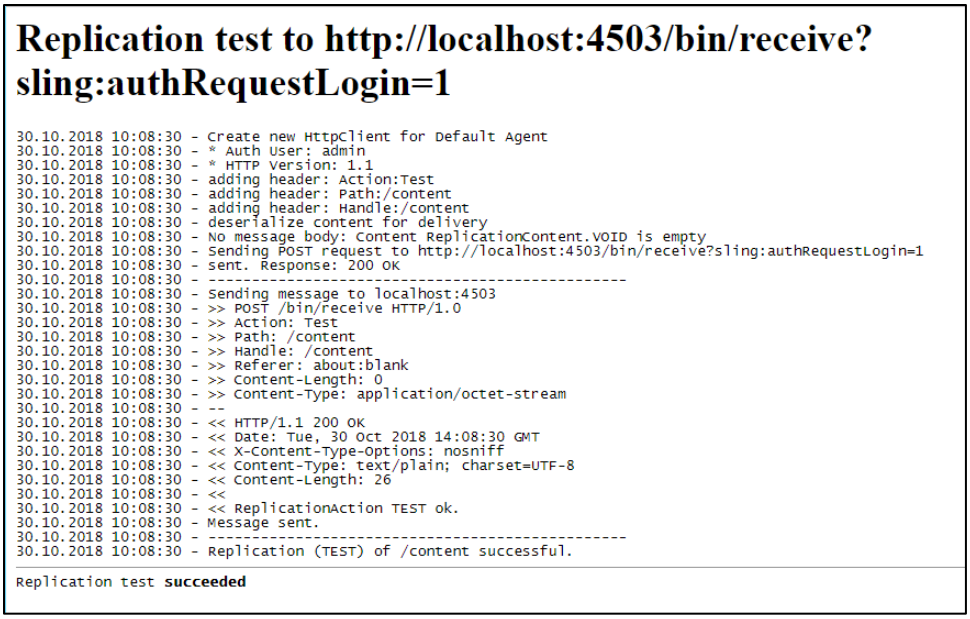
21. Click **Change Password**.
22. Enter **password** as the *New password* and then *Retype Password*.
23. Enter your Admin password.
24. Click **Save** and then click **Save & Close**.
25. Go back to your browser tab with your **AEM Author** instance.
26. Select **Tools – Deployment – Replication** to view the *Replication* page.
27. Click **Agents on author**.
28. Select **Default Agent (publish)**.
29. Click **Edit**.



30. Select the **Transport** tab.
31. Enter **replication-receiver** for the User.
32. Enter **password** for the password.
33. Click **OK**.
34. Click **Test Connection**.

You should see a success message.

Replication test succeeded



Replication test to http://localhost:4503/bin/receive?sling:authRequestLogin=1

```
30.10.2018 10:08:30 - Create new HttpClient for Default Agent
30.10.2018 10:08:30 - * Auth User: admin
30.10.2018 10:08:30 - * HTTP Version: 1.1
30.10.2018 10:08:30 - adding header: Action:Test
30.10.2018 10:08:30 - adding header: Path:/content
30.10.2018 10:08:30 - adding header: Handle:/content
30.10.2018 10:08:30 - deserialize content for delivery
30.10.2018 10:08:30 - No message body: Content ReplicationContent.VOID is empty
30.10.2018 10:08:30 - Sending POST request to http://localhost:4503/bin/receive?sling:authRequestLogin=1
30.10.2018 10:08:30 - sent. Response: 200 OK
30.10.2018 10:08:30 - ------------------------------------------------
30.10.2018 10:08:30 - Sending message to localhost:4503
30.10.2018 10:08:30 - >> POST /bin/receive HTTP/1.0
30.10.2018 10:08:30 - >> Action: Test
30.10.2018 10:08:30 - >> Path: /content
30.10.2018 10:08:30 - >> Handle: /content
30.10.2018 10:08:30 - >> Referer: about:blank
30.10.2018 10:08:30 - >> Content-Length: 0
30.10.2018 10:08:30 - >> Content-Type: application/octet-stream
30.10.2018 10:08:30 - --
30.10.2018 10:08:30 - << HTTP/1.1 200 OK
30.10.2018 10:08:30 - << Date: Tue, 30 Oct 2018 14:08:30 GMT
30.10.2018 10:08:30 - << X-Content-Type-Options: nosniff
30.10.2018 10:08:30 - << Content-Type: text/plain; charset=UTF-8
30.10.2018 10:08:30 - << Content-Length: 26
30.10.2018 10:08:30 - <<
30.10.2018 10:08:30 - << ReplicationAction TEST ok.
30.10.2018 10:08:30 - Message sent.
30.10.2018 10:08:30 - ------------------------------------------------
30.10.2018 10:08:30 - Replication (TEST) of /content successful.
```

Replication test **succeeded**

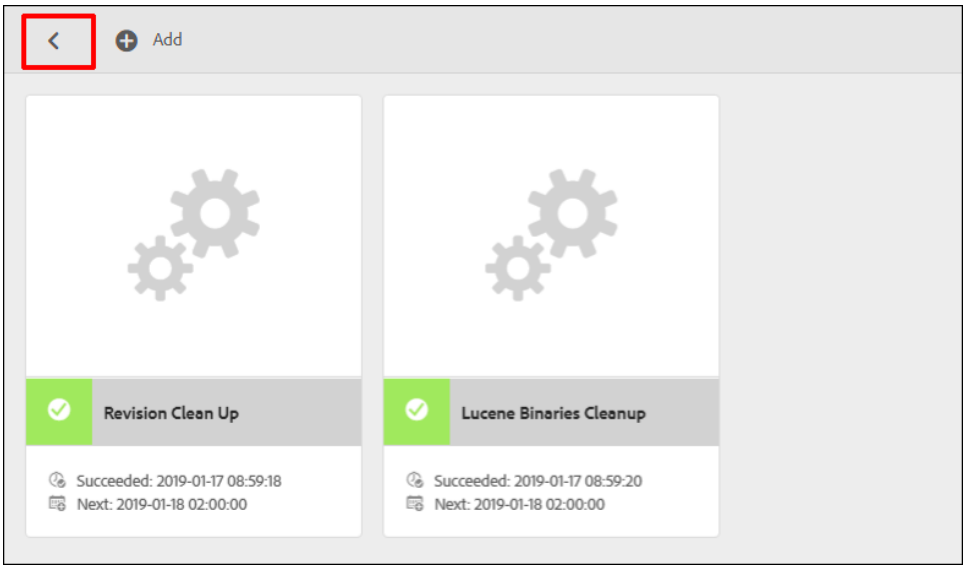
Configure Daily Maintenance Tasks

Follow these steps to configure the Daily Maintenance tasks.

1. Select **Adobe Experience Manager – Tools – Operations – Maintenance**.
2. Click the **Daily Maintenance Window** card.
3. You can see that the **Revision Clean Up** and **Lucene Binaries Cleanup** are already running at night.

Succeeded: <Date> <Time>

Next: <Date> <Time>



4. Go back to the Maintenance page by clicking the back arrow in the upper-left.
5. Hover over the **Daily Maintenance Window** card so you can see the **Configure** icon *(the icon with two gears)*.

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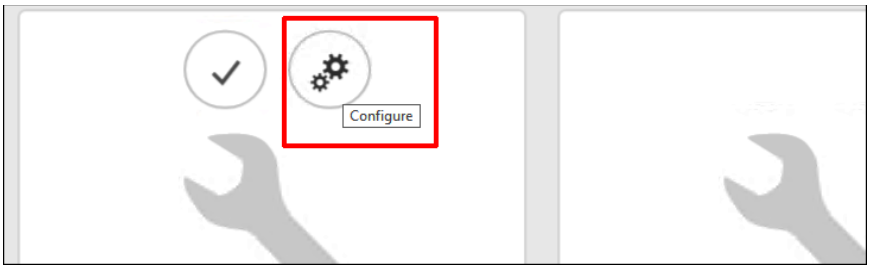
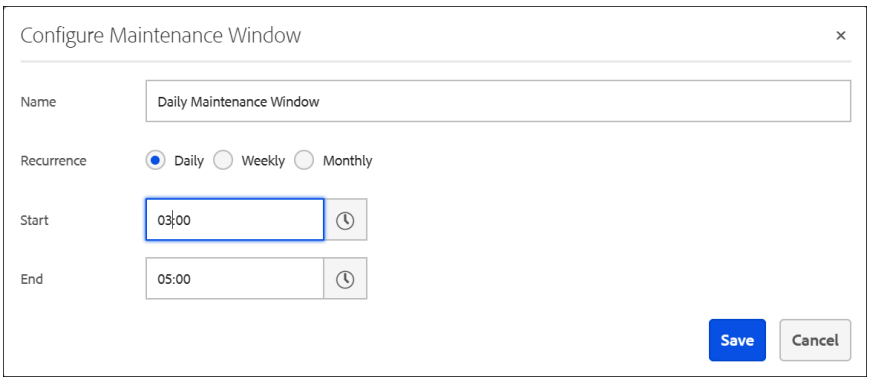
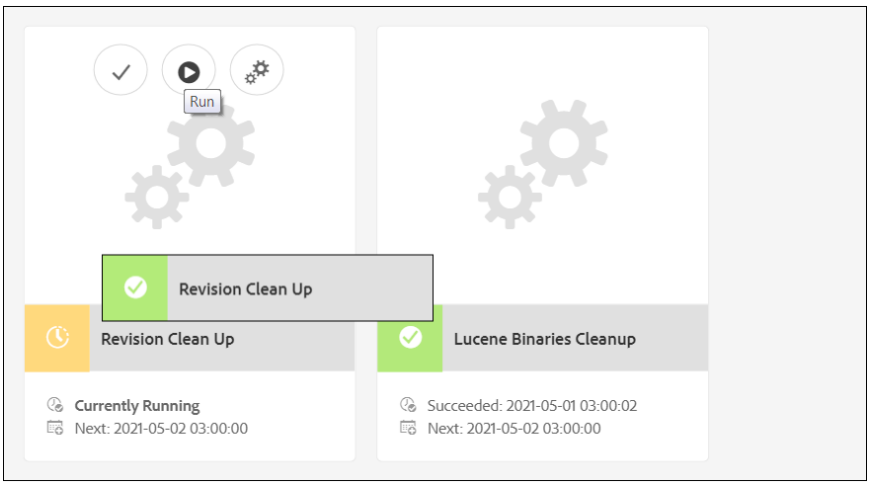


6. Click the **Configure** icon.
7. Review the schedule.
8. Modify the start time to **3:00**.



9. Click **Save**.
10. Click the **Daily Maintenance Window** card so you go back to the **Revision Clean Up** card.
11. Hover over the **Revision Clean Up** card to show the icons *(see illustration)*.
12. Click **Run**. The Revision Clean Up will change to a Currently Running status *(yellow)*.



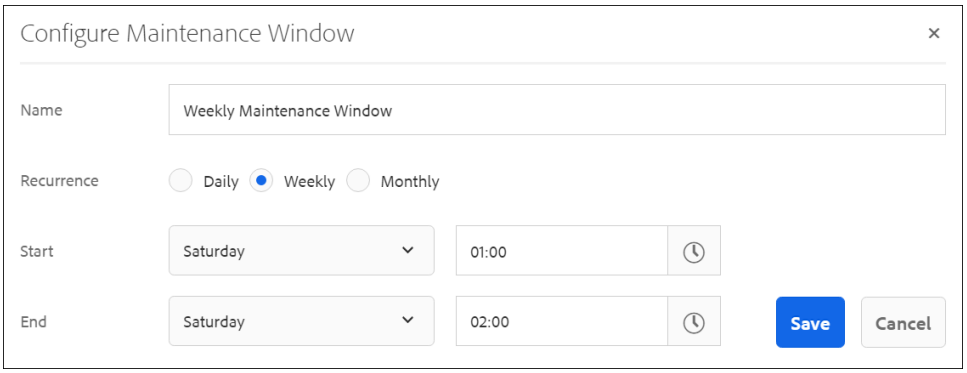
13. Let it run. After it completes, the status will change to Succeeded *(green)* and it will show you the next scheduled run time.

Configure Weekly Maintenance Tasks

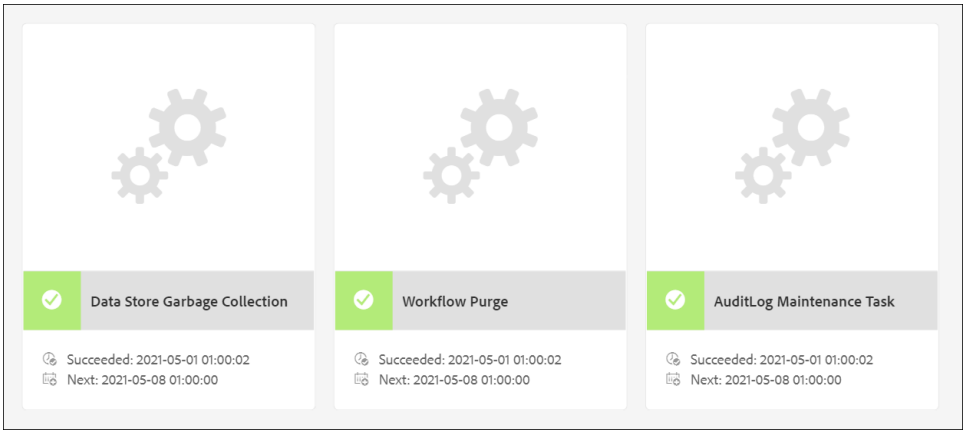
14. Click back to return to the Maintenance page. You can also follow this path to see the Maintenance page.

Adobe Experience Manager – Tools – Operations – Maintenance

15. Click the **Weekly Maintenance Window**.
16. Hover over the **Weekly Maintenance Window** card so you can see the **Configure** icon *(the icon with two gears)*.
17. Click the **Configure** icon. You will see the *Weekly Maintenance Window*. This is the time when your weekly tasks will run. You should avoid doing a system backup during this window.



18. Click **Cancel** to close the window.
19. Click the **Weekly Maintenance Window** card to view the tasks.
20. Your goal is to make sure all these weekly tasks succeed. The Data Store Garbage Collection does not need any configuration, but the other two do.



Configure the Workflow Purge task

21. Navigate to **Adobe Experience Manager – Tools – Operations – Health Reports**.
22. Click **System Maintenance**.
23. Click the **Maintenance Task WorkflowPurgeTask**.

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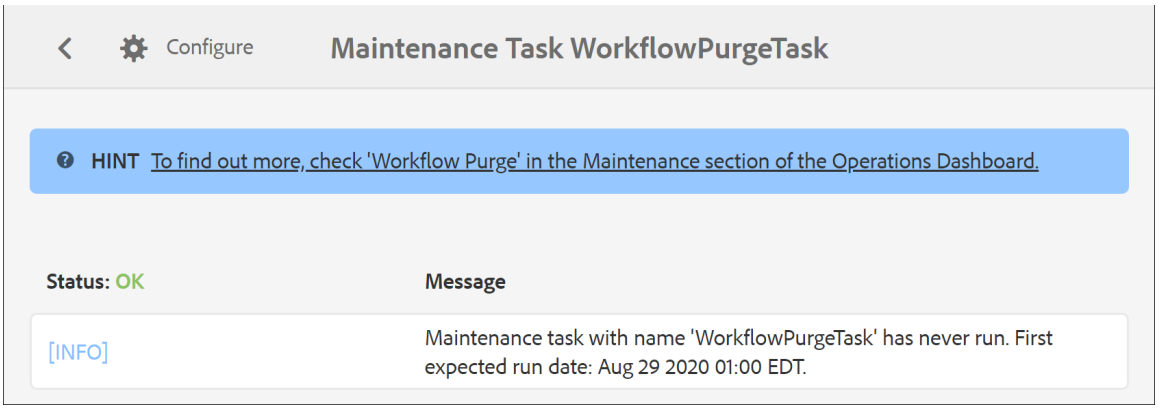
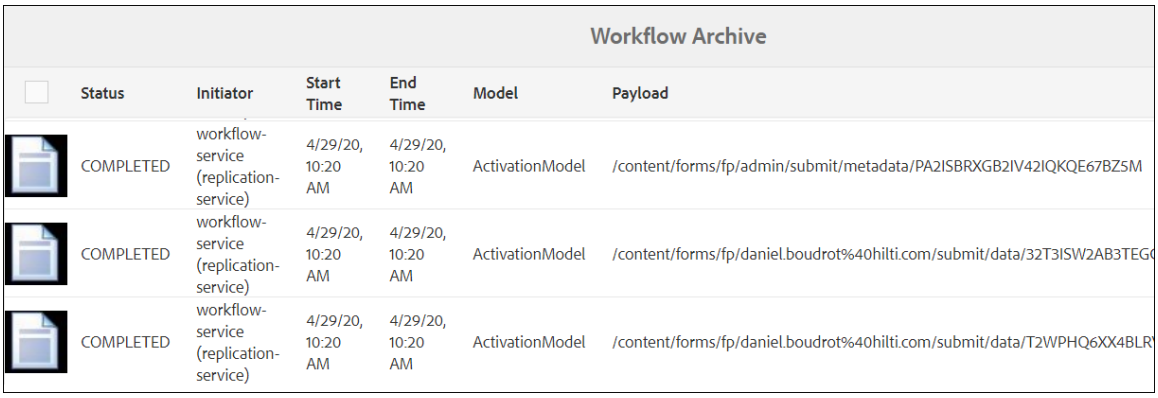


Note: *Minimizing the number of workflow instances increases the performance of the workflow engine. It is a best practice to purge completed workflow instances from the repository. You may also want to put a time limit on running workflow instances. You can purge workflow instances of all models or of a specific model.*

In this exercise, you will create a weekly workflow purge that will purge all completed workflows in the repository. Follow these steps.

24. Navigate to **Adobe Experience Manager – Tools – Workflow – Archive**.

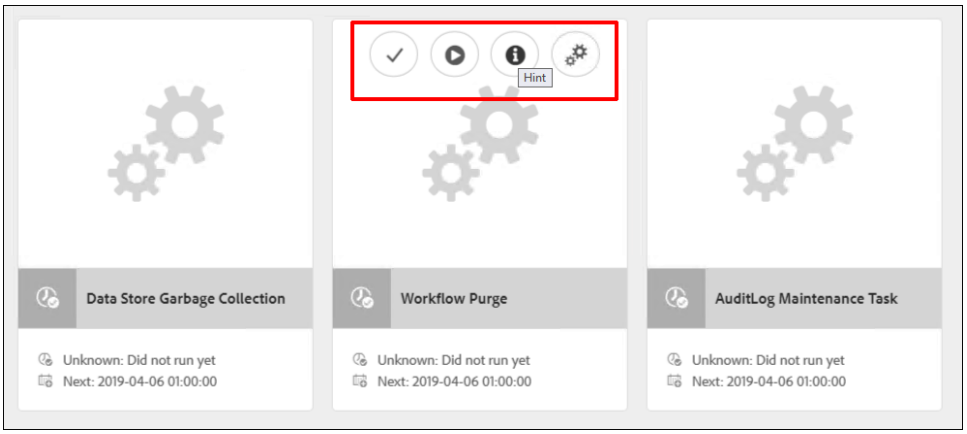
25. You will see all the archived workflows. If this is a new AEM server, the Archive may be empty which indicates that no workflow instances have run. This illustration shows a Workflow Archive with archived instances.



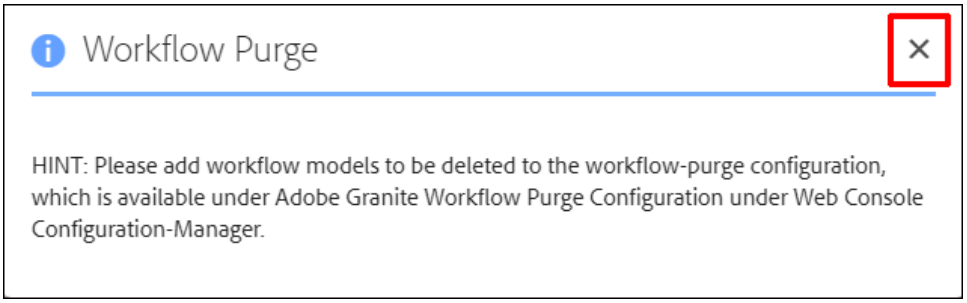
26. Navigate to **Adobe Experience Manager – Tools – Operations – Maintenance.**

27. Click the **Weekly Maintenance Window** card.

28. Hover over the Workflow Purge task and click **Hint** *(the icon with an i)*.



The hint tells you to add workflow models to the workflow-purge configuration.



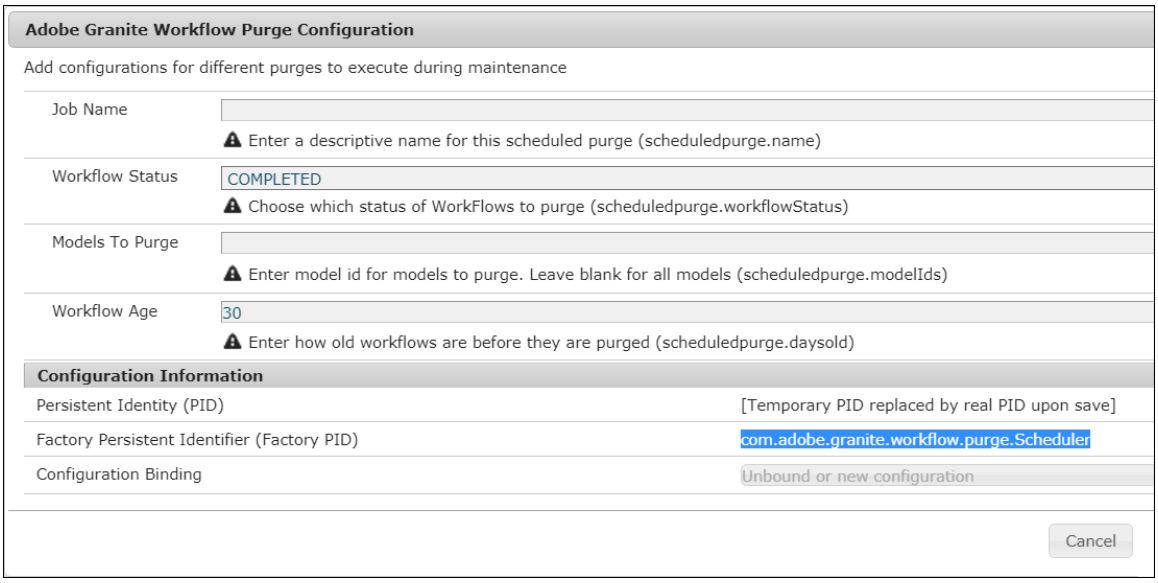
29. Click **X** in the upper-right corner to close the Info window.

30. Navigate to **Adobe Experience Manager – Tools – Operations – Web Console.**

31. Search for **Purge Configuration** to locate the **Adobe Granite Workflow Purge Configuration**.

32. Click **+ (Create new factory configuration)**.

The OSGi configuration shown here does not have any values for Job Name so there are currently no jobs scheduled to be purged.



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33. Select the **Factory Persistent Identifier (Factory PID)**, right-click and select **Copy**.

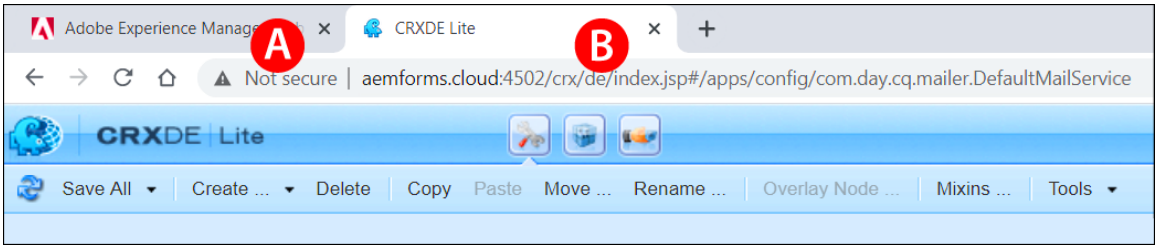
com.adobe.granite.workflow.purge.Scheduler

34. **Paste** the Factory PID into NotePad or a similar Text Editor.

35. Add **-WEEKLY** to the end. It should now look like this.

com.adobe.granite.workflow.purge.Scheduler-WEEKLY

36. Open **CRXDE Lite** in a different tab of the same browser. Keep at least 2 tabs open, 1 for Web Console **(A)** and 1 for CRXDE Lite **(B)** *(see illustration below)*. You will move back and forth between the tabs.



37. If you don't have an **apps/config** folder, right-click on **/apps** and select **Create – Create Folder**.

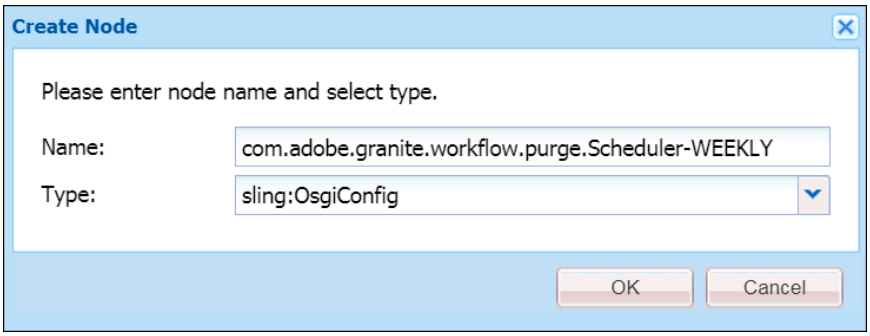
38. Enter **config** for the Name and click **OK**.

39. Click **Save All**.

40. Right-click on the **apps/config** folder and select **Create – Create Node**.

41. Paste your modified Factory PID (**com.adobe.granite.workflow.purge.Scheduler-WEEKLY)** for the Name.

42. Select **sling:OsgiConfig** for the Type.

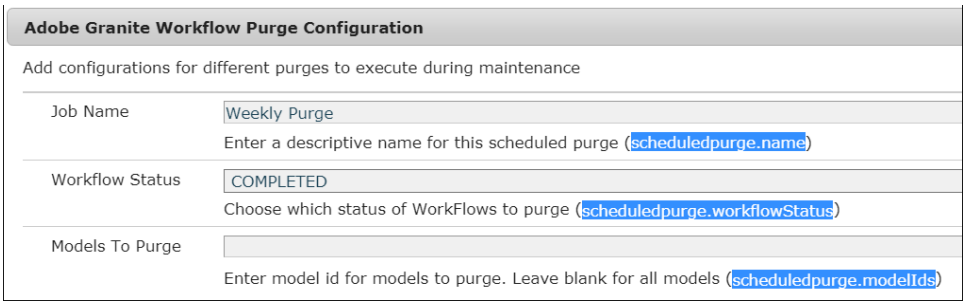


43. Click **OK**.

44. Click **Save All**.

45. Switch to the tab with **Web Console Configuration**.

46. Copy the first property **scheduledpurge.name**. Note: The property name is always within the parentheses. The property names in this illustration are highlighted in blue.



47. Switch to the tab with **CRXDE Lite**.

48. Paste **scheduledpurge.name** as the Name of a new property of your OSGi configuration node. The Type should be **String**.

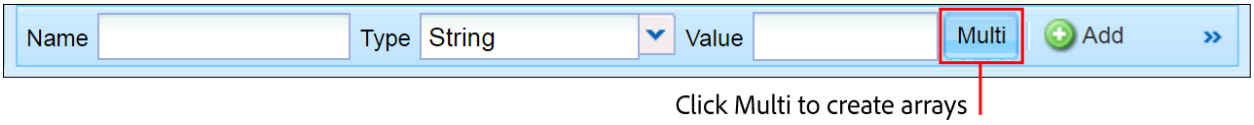
49. Enter **Weekly Purge** for the value.

50. Click **Add** and **Save All**.

51. Follow this process to add the remaining properties and values. This table shows the properties and values you need to add.

Name	Type	Value
scheduledpurge.name	*String*	*Weekly Purge*
scheduledpurge.workflowStatus	**String**	**COMPLETED**
scheduledpurge.modelIds	**String[]**	
scheduledpurge.daysold	**Long**	**1** *Note: You can also set it to 0 if you want to completely clean the archive.*

Note: *Make sure to click the Multi button to create the String Array.*



Note: *Ids as in scheduledpurge.modelIds are the models to purge. If you leave this empty, the instances of all workflow models will be purged. Note: Ids begins with an I like Indiana does.*

Your properties and values should now look like this.

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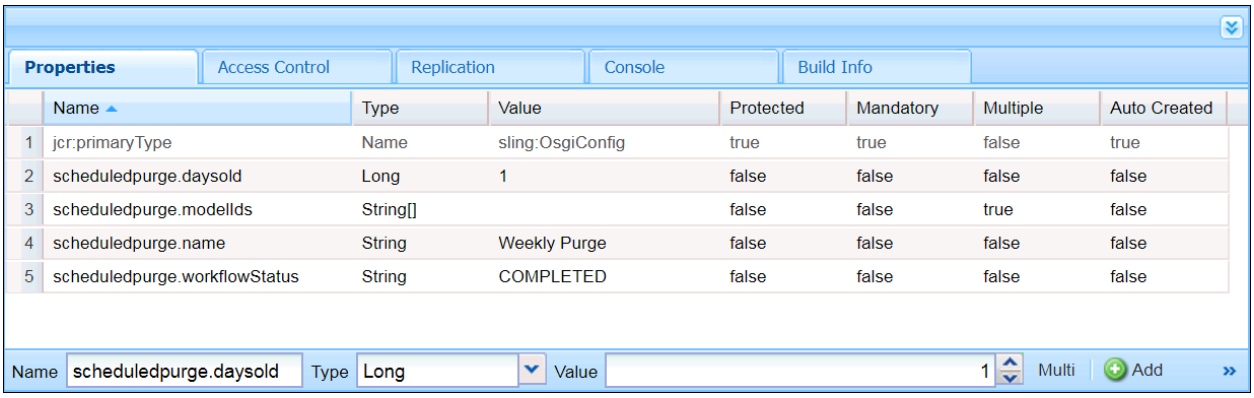
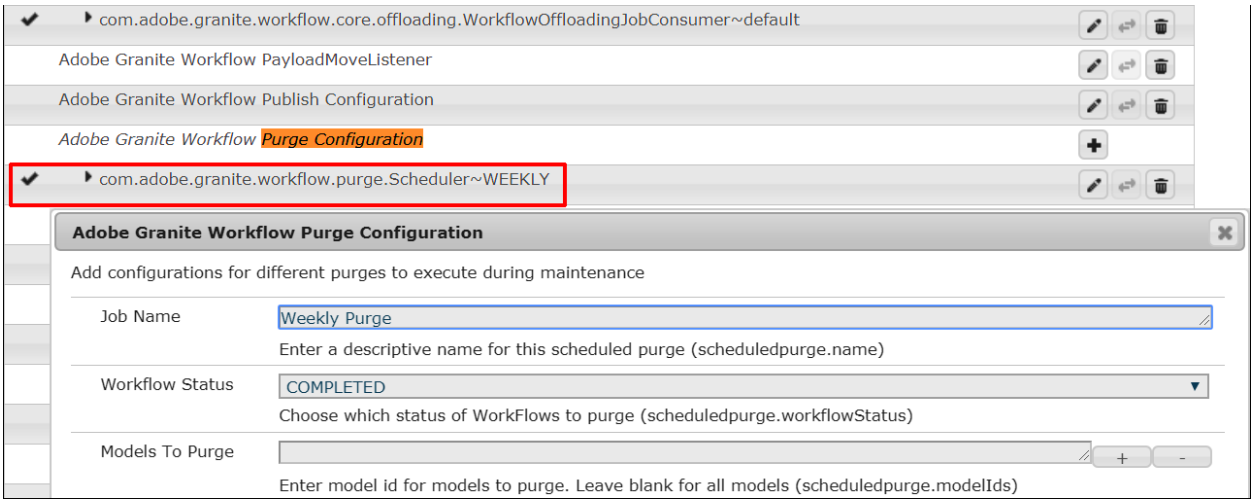


This table describes the properties we just set.

Purge Configuration Parameters

Property Name (Web Console)	OSGi Property Name	Description
Job Name	scheduledpurge.name	A descriptive name for the scheduled purge.
Workflow Status	scheduledpurge.workflowStatus	The status of the workflow instances to purge. The following values are valid: COMPLETED: Completed workflow instances are purged. RUNNING: Running workflow instances are purged. COMPLETED: Completed workflow instances are purged.
Models To Purge	scheduledpurge.modelIds	The ID of the workflow models to purge. The ID is the path to the model node, for example /etc/workflow/models/dam/update_asset/jcr:content/model. Specify no value to purge instances of all workflow models. To specify multiple models, click the + button in the Web Console.
Workflow Age	scheduledpurge.daysold	The age of the workflow instances to purge, in days.

52. Click **Save All** when you are done.
53. Switch to the tab with **Web Console Configuration** and **Refresh** the page.
54. Search for **Purge Configuration**.
55. Click **Edit the configuration values** *(the pencil icon)* and you will see the new configuration you created in the OSGi Configuration node.



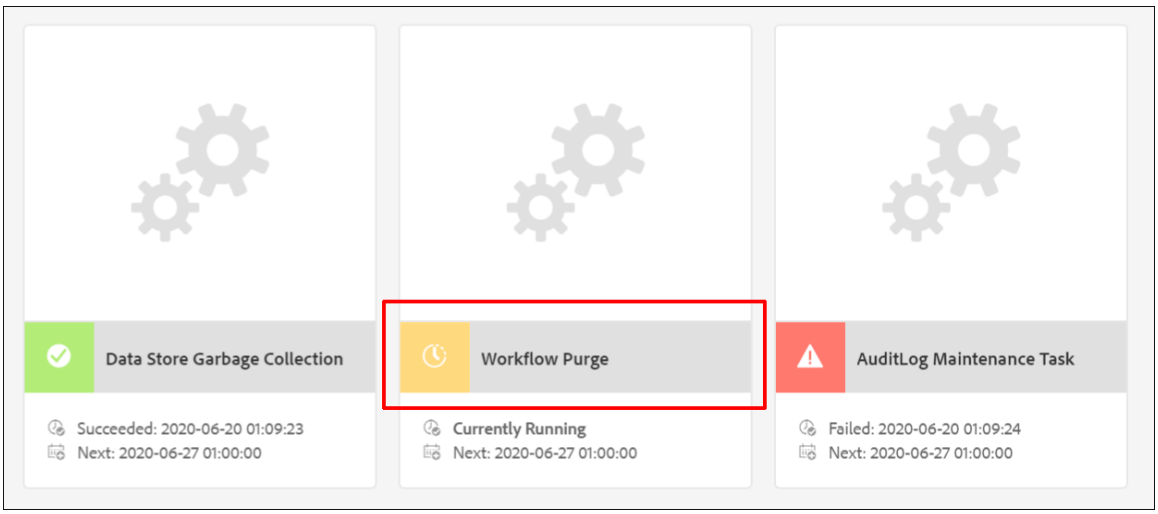
56. Notice that the Job Name and Workflow Age properties now have values.

Run the Workflow Purge task

57. Return to the **Weekly Maintenance Window**.

Adobe Experience Manager – Tools – Operations – Maintenance – Weekly Maintenance Window.

58. Hover over the **Workflow Purge** task and select **Run**. The status will change to **Currently Running**. This will be yellow until it completes when it will change to green *(see illustration)*.



59. If you have a lot of workflows to purge, this could take a while. When it is completed, you will see the status of the card change to *Succeeded* and the color will be green.

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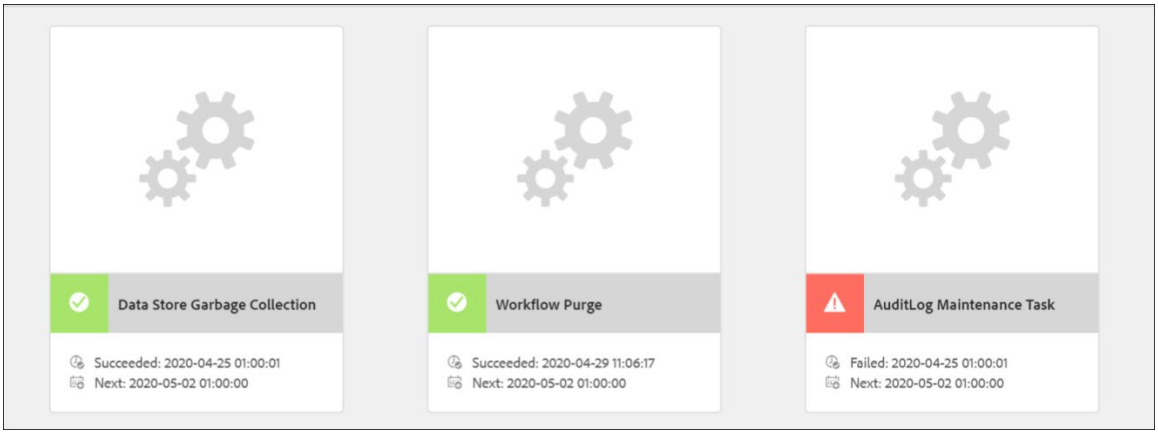
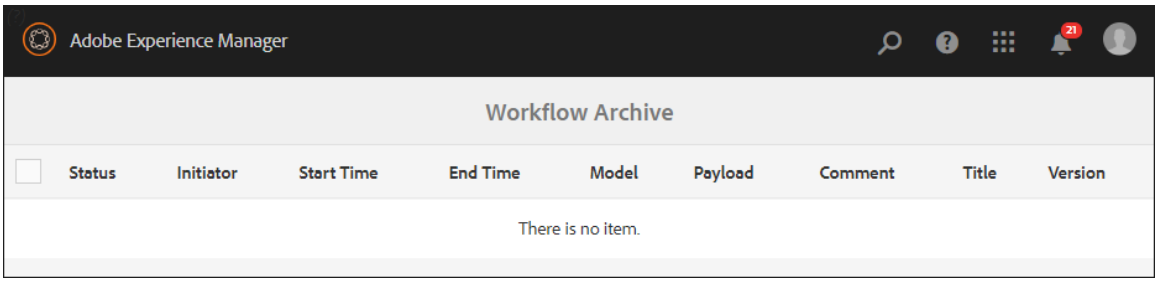


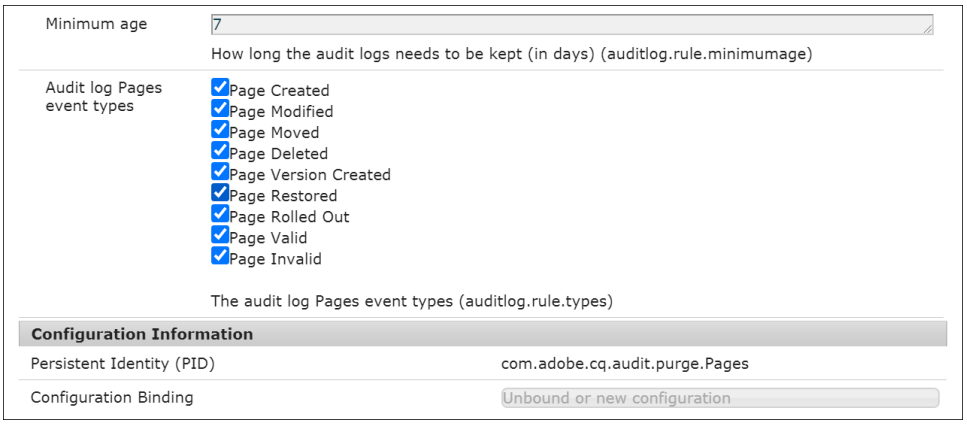
60. Navigate back to the Workflow Archive page: **Adobe Experience Manager – Tools – Workflow – Archive**.

You will no longer see any completed workflows older than 1 day.



Configure the AuditLog Maintenance Task

61. Navigate to **Tools – Operations – Health Reports**.
62. Click **System Maintenance**.
63. Click the **Maintenance Task AuditLog Maintenance Task**. Note: This may be called **Maintenance Task com.day.cq.audit.impl.AuditLogMaintenanceTask**.
64. Click **Configure**. You will see the **Pages Audit Log Purge Rule** configuration.
65. Enter **trimAuditLog** or some other meaningful name as the *Rule Name*.
66. Enter **/content** for the *Content path*.
67. Enter **7** for the Minimum age so the audit log will be kept for 7 days.
68. Select all the options for *Audit log Pages event types*.



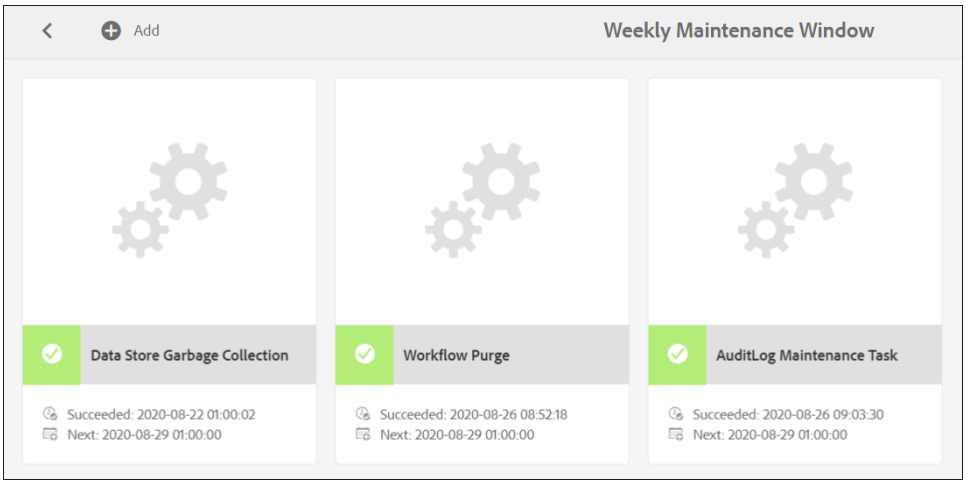
69. Click **Save**.

Run the AuditLog Maintenance Task

70. Return to the **Weekly Maintenance Window**.

Adobe Experience Manager – Tools – Operations – Maintenance – Weekly Maintenance window.

71. Hover over the **AuditLog Maintenance** task and select **Run**. The status will change to **Currently Running** and then to **Succeeded**.



Create a Package for the Weekly Maintenance Tasks.

Follow these steps to create an OSGi configuration node and a package. You will be able to migrate your weekly task configurations to a new server.

72. Navigate to your **apps/config** folder. You should already have an OSGi configuration node called com.adobe.granite.workflow.purge.Scheduler-WEEKLY).

73. Open **Web Console Configuration** in a different tab of the same browser. Keep at least 2 tabs open, 1 for Web Console **(A)** and 1 for CRXDE Lite **(B)** *(see illustration below)*. You will move back and forth between the tabs.

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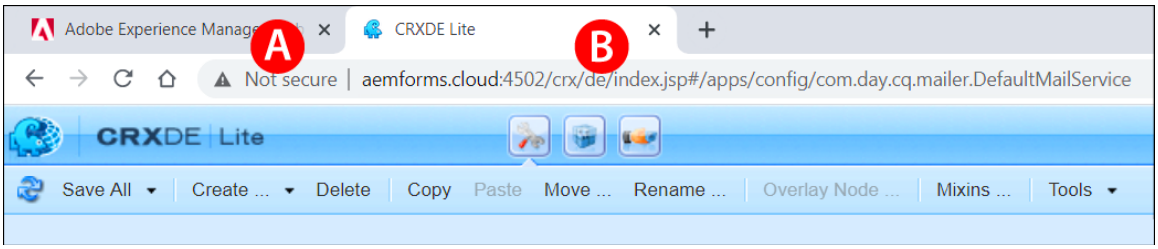


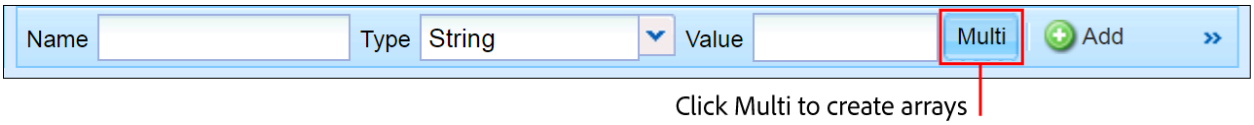
74. Switch to the tab with **Web Console Configuration**.
75. Search for the **Pages audit Log Purge Rule** configuration.
76. Click **Edit the configuration** *(the pencil icon)* on the *Pages audit Log Purge Rule*.
77. Copy the **PID**.

com.adobe.granite.workflow.purge.Scheduler~WEEKLY

78. Switch to the tab with **CRXDE Lite**.
79. Right-click on **apps/config** and select **Create – Create Node**.
80. **Paste** the PID in the Name field.
81. Select **sling:OsgiConfig** for the Type.
82. Click **OK** and **Save All**.
83. Switch to the tab with **Web Console Configuration**.
84. Copy the first property **auditlog.rule.name**.
85. Switch to the tab with **CRXDE Lite**.
86. Paste **auditlog.rule.name** as the Name of a new property of your OSGi configuration node. The Type should be String.
87. Enter **trimAuditLog** for the value.
88. Click **Add** and **Save All**.
89. Follow this process to add the remaining properties and values. This table shows the properties and values you need to add.

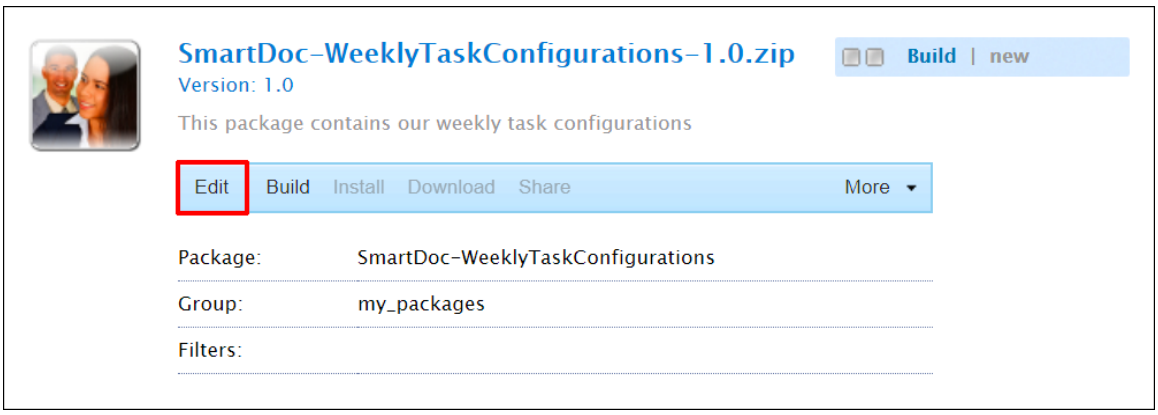
Name	Type	Value
auditlog.rule.name	*String*	*trimAuditLog*
auditlog.rule.contentpath	**String**	**/content**
auditlog.rule.minimumage	**String**	**7**
auditlog.rule.types	**String[]**	**"PageCreated","PageModified","PageMoved","PageDeleted","VersionCreated","PageRestored","PageRolled\Out","PageValid","PageInvalid"**

Note: *Make sure to click the Multi button to create the String Array. You need the double quotes around the values in the String Array.*



90. Select **Package Manager**.
91. Select **Create Package**.
92. Enter **<yourname>-WeeklyTaskConfigurations** as the Package Name.
93. Click **OK**.
94. Click **Edit**.
95. Enter **1.0** for the Version number.
96. Enter **This package contains our weekly task configurations** as the Description.
97. Click **Browse** next to Thumbnail.
98. Locate the **task-icon.png** in your Student files and click **Open**.
99. Click **Save**.

Your package should now look like this.



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100. Click **Edit** *(see illustration above)*.

101. Select **Filters**.

102. Click **Add filter**.

103. Click the **Select Path** icon to the right of the **Root path** field.

104. Navigate to **/apps/config/com.adobe.cq.audit.purge.Pages** and select it.

105. Click **OK** and **Done**.

106. Click **Add filter**.

107. Click the **Select Path** icon to the right of the **Root path** field.

108. Navigate to **/apps/config/ com.adobe.granite.workflow.purge.Scheduler-WEEKLY** and select it.

109. Click **OK** and **Done**.

110. Click **Save**.

111. Click **Build** and **Build** again to build your package.

112. Click **More – Replicate** to migrate these configurations to your Publish Server.

    Note: *You can also download this package and install these configurations on other servers.*

TAR Compaction and Offline Revision Clean-up

When you update data in the JCR, the existing data is never directly overwritten in a TAR file. So, your repository will get larger. To manage the repository's growth, AEM uses a garbage collection mechanism that reclaims disk space by removing obsolete data from the repository. This is referred to as **Revision Cleanup** and as **Compaction**.

Note: *Make sure to back up your repository files located here:* ***\crx-quickstart\repository\segmentstore***

You can streamline your repository with TAR compaction. This example shows a segment store before (1) and after (2) a compaction. After compaction is complete, you can move the *.bak files to an archive.

1

Name	Date modified	Type	Size
data00016a.tar.bak	7/30/2019 9:27 PM	BAK File	109,667 KB
data00018a.tar.bak	8/5/2019 4:41 PM	BAK File	111,863 KB
data00034a.tar.bak	8/21/2019 4:33 PM	BAK File	262,285 KB
data00055a.tar.bak	9/19/2019 4:28 PM	BAK File	3,184 KB
data00061a.tar.bak	9/24/2019 4:59 PM	BAK File	222,072 KB
data00087a.tar.bak	12/15/2019 4:59 PM	BAK File	3,321 KB
data00096a.tar	12/22/2019 3:00 AM	TAR File	262,897 KB
data00097a.tar.bak	12/25/2019 9:14 PM	BAK File	62,593 KB
data00111a.tar	1/22/2020 3:00 AM	TAR File	11,901 KB
data00112a.tar	1/23/2020 2:20 PM	TAR File	64,934 KB
data00113a.tar	1/25/2020 1:00 AM	TAR File	51,870 KB
data00114a.tar	1/26/2020 3:00 AM	TAR File	34,764 KB
data00115b.tar	1/26/2020 3:00 AM	TAR File	25 KB
data00116a.tar	2/1/2020 1:00 AM	TAR File	203,410 KB
data00117a.tar	2/2/2020 3:00 AM	TAR File	33,079 KB
data00119a.tar	2/8/2020 1:00 AM	TAR File	187,885 KB
data00120a.tar	2/9/2020 3:00 AM	TAR File	32,875 KB
data00122a.tar	2/12/2020 8:44 PM	TAR File	121,262 KB
data00123a.tar	2/12/2020 8:51 PM	TAR File	870 KB
gc.log	1/22/2020 3:00 AM	Text Document	1 KB
journal.log	2/12/2020 8:51 PM	Text Document	19,249 KB
manifest	2/12/2020 8:45 PM	File	1 KB
repo.lock	7/15/2019 11:57 AM	LOCK File	0 KB

2

Name	Date modified	Type	Size
data00016a.tar.bak	7/30/2019 9:27 PM	BAK File	109,667 KB
data00018a.tar.bak	8/5/2019 4:41 PM	BAK File	111,863 KB
data00034a.tar.bak	8/21/2019 4:33 PM	BAK File	262,285 KB
data00055a.tar.bak	9/19/2019 4:28 PM	BAK File	3,184 KB
data00061a.tar.bak	9/24/2019 4:59 PM	BAK File	222,072 KB
data00087a.tar.bak	12/15/2019 4:59 PM	BAK File	3,321 KB
data00097a.tar.bak	12/25/2019 9:14 PM	BAK File	62,593 KB
data00124a.tar	2/12/2020 8:58 PM	TAR File	263,549 KB
data00125a.tar	2/12/2020 8:59 PM	TAR File	7,567 KB
gc.log	2/12/2020 8:59 PM	Text Document	1 KB
journal.log	2/12/2020 8:59 PM	Text Document	1 KB
manifest	2/12/2020 8:58 PM	File	1 KB
repo.lock	7/15/2019 11:57 AM	LOCK File	0 KB

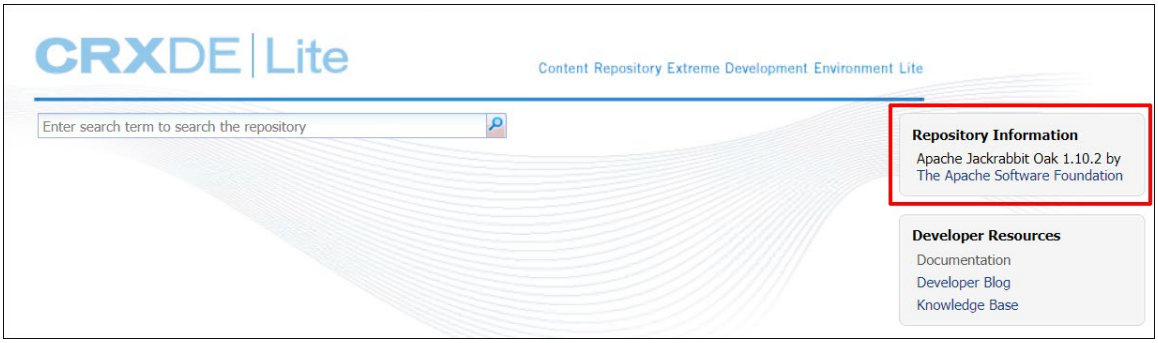
3

Name	Date modified	Type	Size
data00124a.tar	2/12/2020 8:58 PM	TAR File	263,549 KB
data00125a.tar	2/12/2020 8:59 PM	TAR File	7,567 KB
gc.log	2/12/2020 8:59 PM	Text Document	1 KB
journal.log	2/12/2020 8:59 PM	Text Document	1 KB
manifest	2/12/2020 8:58 PM	File	1 KB
repo.lock	7/15/2019 11:57 AM	LOCK File	0 KB

Follow these steps to determine your version of Oak and download the Oak Run tool.

1. Open **CRXDE Lite** to determine your version of Apache Jackrabbit Oak.

This illustration shows **Apache Jackrabbit Oak 1.10.2**.



2. Download the oak-run jar for your version by following these steps.
3. Search Google for **download oak-run jar**.

   Note: *This is a best practice even if you don't use it now. If CRXDE Lite access ever fails, and you need to run oak-run to correct your segment store, you will already have oak-run available on your server.*

4. You will see various options. The Central Repository is a good one to choose.

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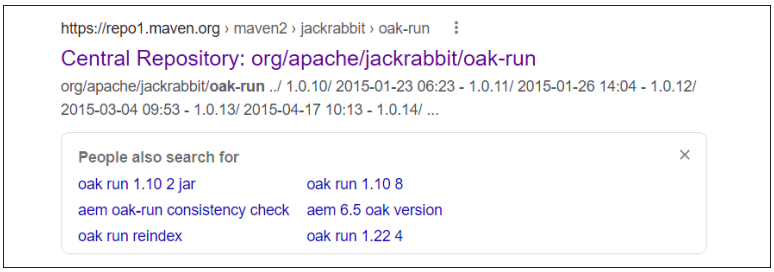

5. Locate and download the correct JAR file for your version of Apache Jackrabbit Oak. For instance, this is the version for AEM Forms 6.5.7.

oak-run-1.22.9.jar

Before you can use the Oak Run tool, you must shut down your AEM Server. Follow these steps.

6. **Shut down** your AEM Server.
7. Open **Windows File Explorer**.
8. Make a backup of your repository folder.

\crx-quickstart\repository\segmentstore

9. Open your **AEM Folder**.
10. Create a new folder named **oakrun**.

c:\aem\oakrun

11. Move the **oak-run-<version>.jar** file into your **oakrun** folder.
12. Copy the file path of your oakrun folder. It will likely be something like this.

c:\aem\oakrun

13. Review your current segmentstore by opening this folder.

\aem\author\crx-quickstart\repository\segmentstore

14. Run **CMD** as Administrator.
15. Change directory to the location of the **oak-run-<version>.jar** file.

c:\aem\oakrun

16. Before we can clean up the revisions in the oak repository, we need to find all the checkpoints to the segments. Run this in the command prompt. Update this with your version of oak-run.

java -jar oak-run-<version>.jar checkpoints ../author/crx-quickstart/repository/segmentstore

```
D:\aem\oakrun>java -jar oak-run-1.22.9.jar checkpoints ../author/crx-quickstart/repository/segmentstore
Apache Jackrabbit Oak 1.22.9
Checkpoints ../author/crx-quickstart/repository/segmentstore
- bb1def4d-edf3-4a64-953b-8c51e9ec0fa9 created 2022-03-14 16:37:35.54 expires 2024-12-08 15:37:35.54
- 8fd26fd7-ac9e-404e-8397-2d771235dc06 created 2022-03-14 16:37:35.54 expires 2024-12-08 15:37:35.54
Found 2 checkpoints
```

17. Once we've found all the checkpoints, we need to delete any unreferenced checkpoint.

java -jar oak-run-<version>.jar checkpoints ../author/crx-quickstart/repository/segmentstore rm-unreferenced

```
D:\aem\oakrun>java -jar oak-run-1.22.9.jar checkpoints ../author/crx-quickstart/repository/segmentstore rm-unreferenced
Apache Jackrabbit Oak 1.22.9
Checkpoints ../author/crx-quickstart/repository/segmentstore
Referenced checkpoint from /:async@async is bb1def4d-edf3-4a64-953b-8c51e9ec0fa9
Referenced checkpoint from /:async@fulltext-async is 8fd26fd7-ac9e-404e-8397-2d771235dc06
Removed 0 checkpoints in 41ms.
```

18. Run this command to compact the segment store.

java -jar -Dsun.arch.data.model=32 oak-run-<version>.jar compact ../author/crx-quickstart/repository/segmentstore

```
Administrator: Command Prompt
        Tue Jul 16 02:00:06 EDT 2019, data00004a.tar
        Tue Jul 16 15:31:51 EDT 2019, data00009a.tar
        Mon Jul 15 14:25:05 EDT 2019, data00001a.tar
        Wed Jul 17 11:54:34 EDT 2019, manifest
        Tue Jul 16 02:00:06 EDT 2019, gc.log
        Mon Jul 15 20:32:13 EDT 2019, data00002a.tar
        Tue Jul 16 15:53:29 EDT 2019, data00010a.tar
        Mon Jul 15 11:57:43 EDT 2019, repo.lock
        Tue Jul 16 02:00:00 EDT 2019, data00003a.tar
        Mon Jul 15 14:03:49 EDT 2019, data00000a.tar
        Tue Jul 16 14:37:20 EDT 2019, data00005a.tar
        Tue Jul 16 15:14:18 EDT 2019, data00008a.tar
    size 303.4 MB (303428313 bytes)
    -> compacting
    -> cleaning up
    -> writing new journal.log: 4146bc96-4d52-4325-ae02-f303bdd5e43c:886 root 1563379001508

    after
        Wed Jul 17 11:56:41 EDT 2019, gc.log
        Mon Jul 15 11:57:43 EDT 2019, repo.lock
        Wed Jul 17 11:56:41 EDT 2019, data00012a.tar
        Wed Jul 17 11:56:41 EDT 2019, journal.log
        Wed Jul 17 11:56:36 EDT 2019, manifest
    size 113.1 MB (113067284 bytes)
    removed files [data00000a.tar, data00006a.tar, data00008a.tar, data00001a.tar, data00009a.tar, data00005a.tar, data0
0004a.tar, data00010a.tar, data00002a.tar, data00003a.tar, data00007a.tar, data00011a.tar]
    added files [data00012a.tar]
Compaction succeeded in 6.793 s (6s).

D:\aem\oakrun>
```

You should see a message like this one.

Compacting ..\author64\crx-quickstart\repository\segmentstore with enforced regu
lar access mode
before
Tue Apr 02 16:41:19 EDT 2019, data00004a.tar
Mon Apr 01 13:48:22 EDT 2019, data00000a.tar
Mon Apr 01 13:58:16 EDT 2019, data00001a.tar
Tue Apr 02 10:59:28 EDT 2019, data00003a.tar
Tue Apr 02 11:00:00 EDT 2019, manifest
Mon Apr 01 13:18:28 EDT 2019, repo.lock
Tue Apr 02 16:41:19 EDT 2019, journal.log
Tue Apr 02 02:00:09 EDT 2019, data00002a.tar
Tue Apr 02 02:00:10 EDT 2019, gc.log
size 307.5 MB (307471648 bytes)
-> compacting
-> cleaning up
-> writing new journal.log: 6a4d0fa7-b60f-4e0b-a190-28a14d43349d:1166 root 1
554239153662

removed files [data00000a.tar, data00001a.tar, data00004a.tar, data00002a.tar, data00003a.tar]
added files [data00005a.tar]
Compaction succeeded in 9.699 s (9s).

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19. Review your compacted segmentstore by opening this folder.

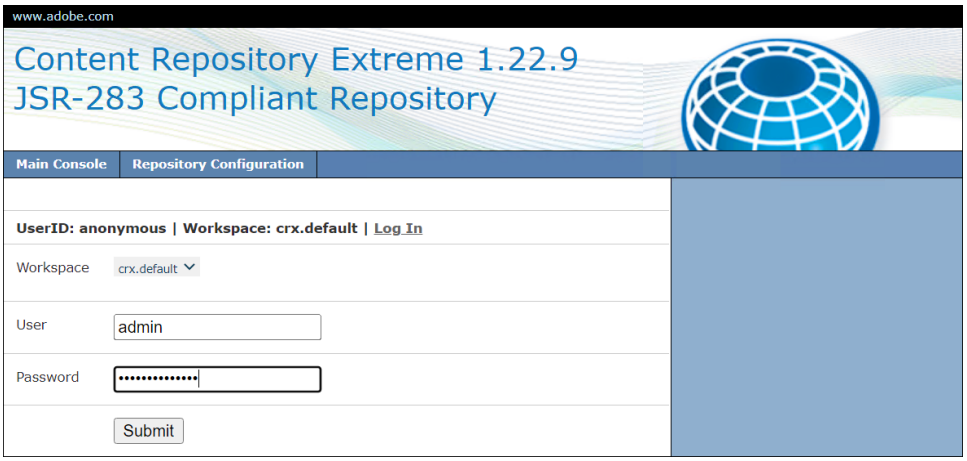
\aem\author\crx-quickstart\repository\segmentstore

20. Remove or archive any *.bak files.

Run a DataStore Consistency Check

21. Login as an Administrator to the CRX Explorer.

http://<servername>:4502/crx/explorer/index.jsp

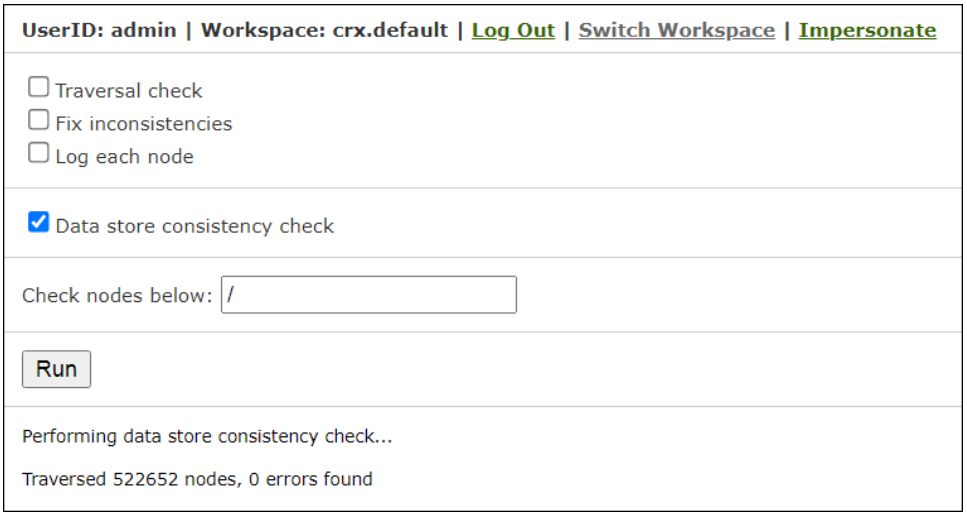


22. Select **Repository Configuration**.

23. Select **Check Repository**.

24. Select **Data store consistency check** and click **Run**.

25. Be patient and keep this browser session open until you receive a message. This tool does not write to a log file by default, but it will display messages in the page.



Log Files

AEM log files provide detailed information about the current system state. The system log files are available by default. You can also create custom log files to track messages produced by your applications. The benefit of custom log files is that they contain specific messages about your target and limit the non-relevant information contained in the default log entries.

The logging system in AEM is based on *Simple Logging Facade for Java (SLF4J)*. The system includes

- A logging logger
- A logging writer

The logging logger collects data from different components in AEM, filters them by requested severity level, and redirects the output to a configured logging writer. The logging writer persists the data to a location. There is no need to configure a logging writer unless you need to change the default log file size or change the maximum number of log files before rotation begins.

The Default Log Files

Here are the default log files. They are also known as the *Apache Sling Commons Logs*.

- **request.log:** HTTP requests and responses
- **access.log:** Sign-in and sign-out activity
- **error.log:** Errors and unfiltered log messages
- **stdout.log:** startup activity
- **stderr.log:** startup activity errors
- **audit.log:** user-generated repository changes (i.e., create a template)
- **history.log:** Author activity with timestamps and user information
- **upgrade.log:** upgrade operations

This line in a JSP file will log a message to the stout.log file.

System.out.println("Some string");

The stdout.log file is located here.

C:\aem\author\crx-quickstart\logs\stdout.log

Custom Logs

You can also create custom logs for a specific OSGi service. For instance, you can create a custom log to monitor the LDAP synchronization you created in an earlier exercise.

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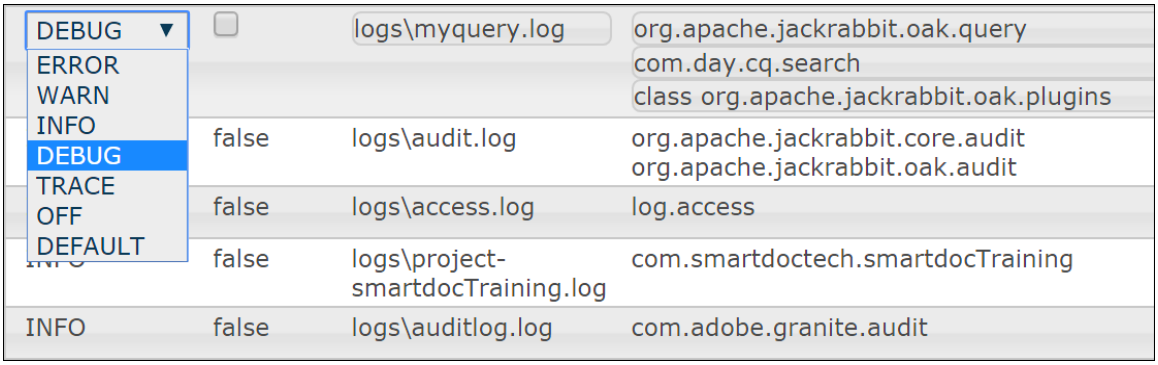


We will set some of our loggers to a DEBUG level. Although this is OK for training, you will want to change the setting to ERROR when you finish your exercise. Consider the Log Level Hierarchy.

- TRACE *(includes DEBUG, INFO, WARN, and ERROR)*
- DEBUG *(includes INFO, WARN, and ERROR)*
- INFO *(includes WARN and ERROR)*
- WARN *(includes ERROR)*
- ERROR

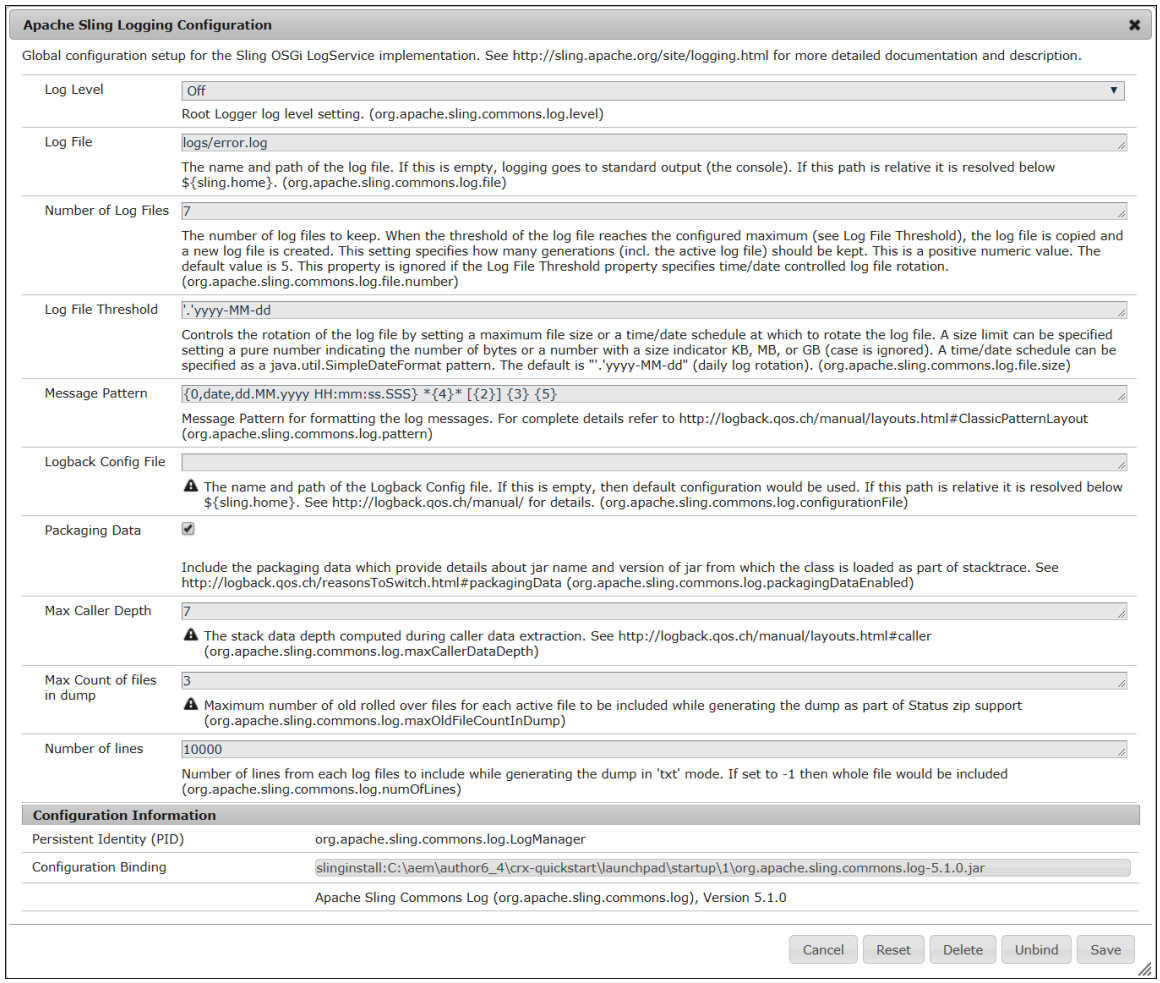
Exercises

View Logging Defaults

In this exercise, you will view the *Apache Sling Logging Configuration* and view important details about the AEM Default logs which are also known as the *Apache Sling Commons Logs*.

1. Open **AEM**.
2. Select **Tools – Operations – Web Console**.
3. Click the **OSGi** menu and select **Configuration**.
4. Search for **Apache Sling Logging Configuration**.
5. Click **Edit the configuration values** *(the pencil icon)* on the *Apache Sling Logging Configuration*.

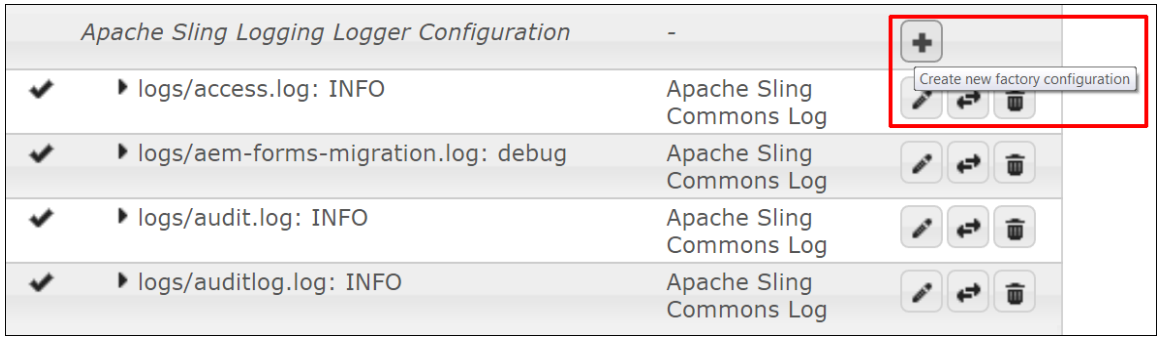
You will see the default settings for an Author instance including the name and location of the error.log and thresholds for log files.



6. Click **Cancel**.

7. Notice the **Apache Sling Logging Logger Configuration** is a factory configuration. This is indicated by the plus icon *(see illustration)*.

8. Notice the logs that are already created. They are the Apache Sling Commons Logs.



9. Scroll to the top and select **Status – Log Files**.

You can download the log files from AEM servers if you don't have access to the local drive.

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If you do have access to the server's drive, you can find the log files in this folder.

\crx-quickstart\logs

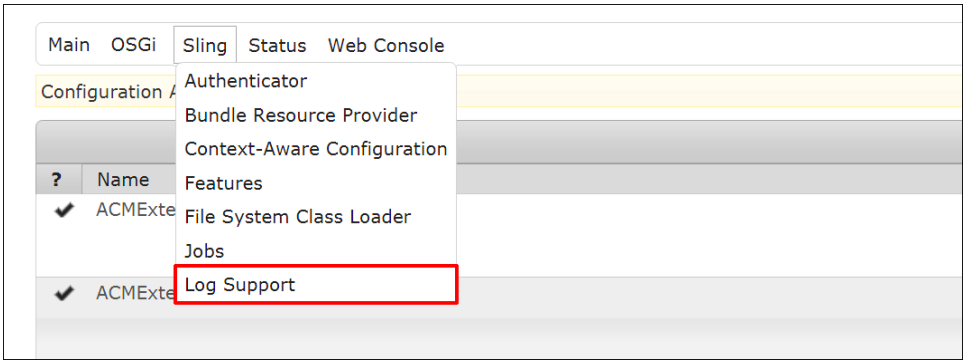
Create Custom Loggers

This exercise demonstrates how to create custom loggers.

Create a custom myquery.log

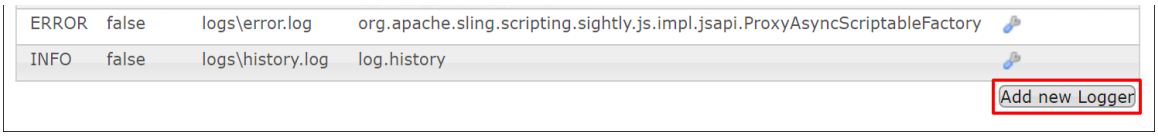
Follow these steps.

10. Select **Sling – Log Support**.

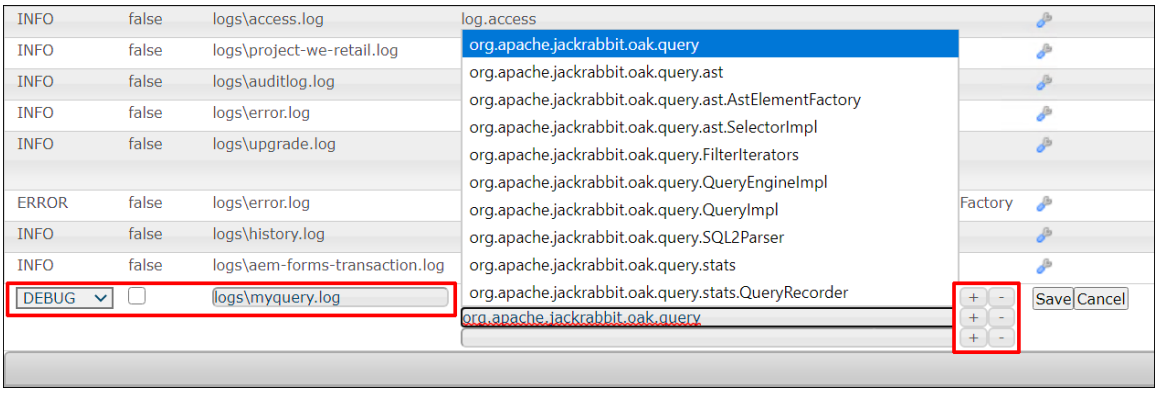


Note: *The list of all default logs in an AEM author instance are displayed here along with their log levels.*

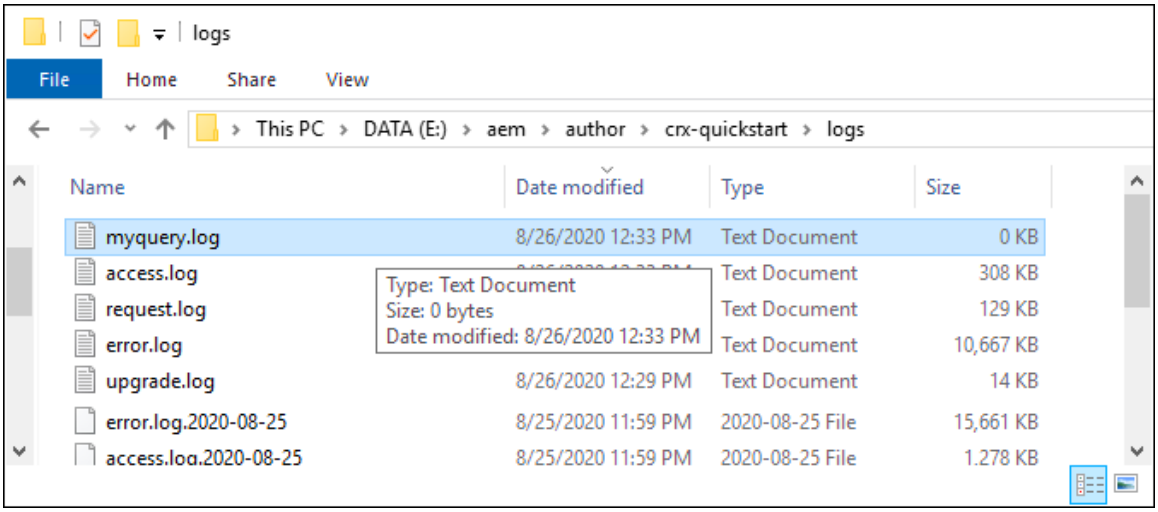
11. Click **Add New Logger** *(the button on the bottom-right of the table).*



12. Select **DEBUG** for the Log Level.
13. Enter **logs\myquery.log** for the Log File.
14. Click the plus button to the right of the logger field *(see illustration below)* twice so you can enter 3 loggers.
15. Enter **class org.apache.jackrabbit.oak.plugins** as your first logger.
16. Enter **org.apache.jackrabbit.oak.query** as your second logger.
17. Enter **com.day.cq.search** as your third logger.



18. Click **Save**.
19. Navigate to: **\crx-quickstart\logs** in your file system. You should see the **myquery.log** file.



Note: *You can use this log to examine indexing and querying activity.*

20. Right-click on **myquery.log** and open it in Notepad or Notepad++.
21. You should see messages like these.

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12.02.2020 12:06:18.704 *DEBUG* [0:0:0:0:0:0:0:1 [1581527178700] GET /mnt/overlay/granite/ui/content/shell/header/actions/pulse.data.json HTTP/1.1] org.apache.jackrabbit.oak.query.QueryEngineImpl Parsing JCR-SQL2 statement: SELECT * FROM [granite:InboxItem] AS s where s.assignee IS NOT NULL AND (s.status='ACTIVE') ORDER BY s.startTime DESC

12.02.2020 12:06:18.705 *DEBUG* [0:0:0:0:0:0:0:1 [1581527178700] GET /mnt/overlay/granite/ui/content/shell/header/actions/pulse.data.json HTTP/1.1] org.apache.jackrabbit.oak.query.QueryImpl cost using filter Filter(query=SELECT * FROM [granite:InboxItem] AS s where s.assignee IS NOT NULL AND (s.status='ACTIVE') ORDER BY s.startTime DESC, path=*, property=[assignee=[is not null], status=[ACTIVE]])

12.02.2020 12:06:18.705 *DEBUG* [0:0:0:0:0:0:0:1 [1581527178700] GET /mnt/overlay/granite/ui/content/shell/header/actions/pulse.data.json HTTP/1.1] org.apache.jackrabbit.oak.query.QueryImpl cost for reference is Infinity

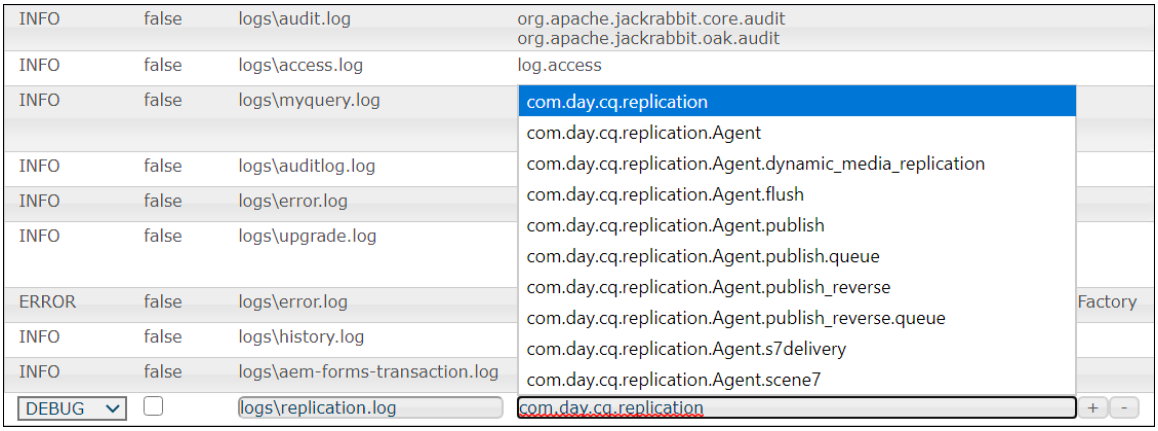
12.02.2020 12:06:18.705 *DEBUG* [0:0:0:0:0:0:0:1 [1581527178700] GET /mnt/overlay/granite/ui/content/shell/header/actions/pulse.data.json HTTP/1.1] org.apache.jackrabbit.oak.query.QueryImpl cost for property is Infinity

22. Navigate back to **Web Console Configuration** and select **Sling – Log Support**.
23. Click the wrench icon to edit the log you just created.
24. Set the log level to **ERROR**.
25. Click **Save**.

    Note: *If the logger is not set back to ERROR or to INFO, its size will grow very large and can impact your system storage capacity. It's a best practice to only use DEBUG level to examine a single query, then immediately set the logging level back to INFO, WARN, or ERROR.*

Create a Replication Log

26. Click **Add new Logger**.
27. Select **DEBUG** for the Log Level.
28. Enter **logs\replication.log** for the Log File.
29. Enter **com.day.cq.replication** for the Logger.



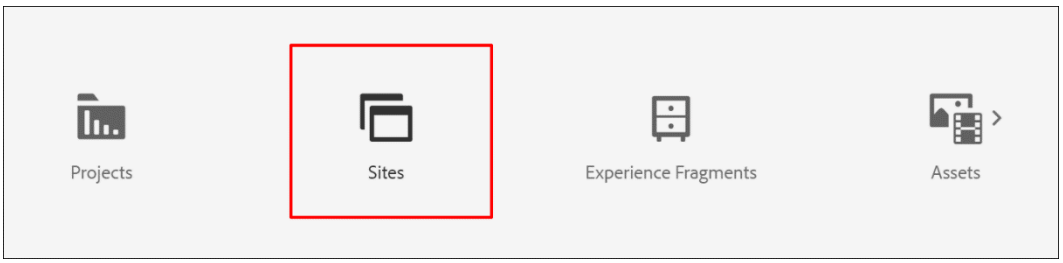
30. Click **Save**.

31. Start your Publish instance if it is not already started.

32. After your Publish Server is running, open your Author on a different tab.

33. Open **Sites** on your Author instance.

Adobe Experience Manager – Navigation – Sites



34. Select **We.Retail – United States – English**.

35. Click **Create** and select **Page**.

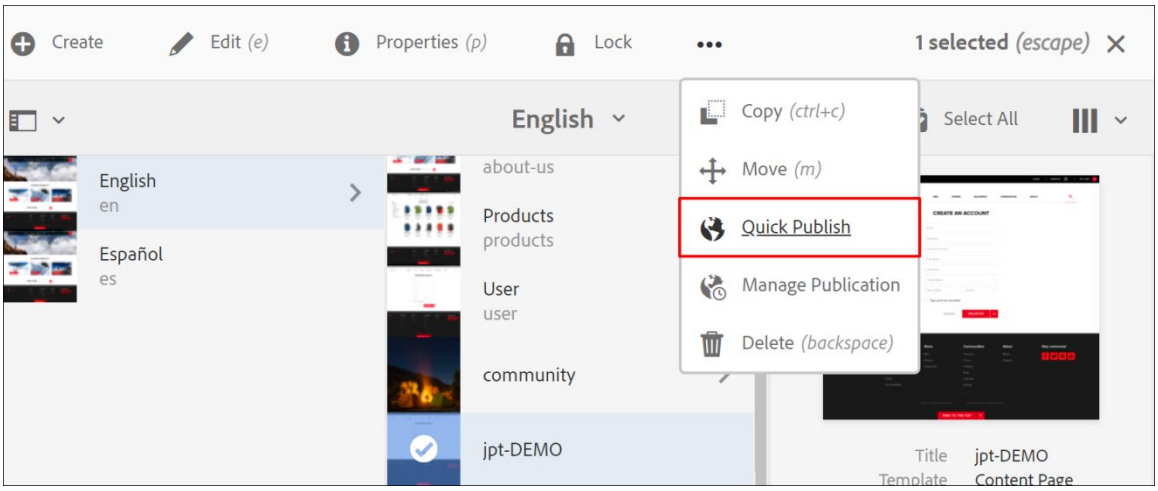
36. Select **Content Page** and click **Next**.

37. Enter **<yourname>-Demo** for the Title and the Name.

38. Click **Create**.

39. Click **Done**.

40. Select the **<yourname>-Demo** page and click **Quick Publish** *(see illustration)*.



41. Click **Publish**.

42. Go to your **replication.log** and search for **<yourname>-Demo**.

43. You should see many messages including DEBUG and INFO messages. Here is 1 example.

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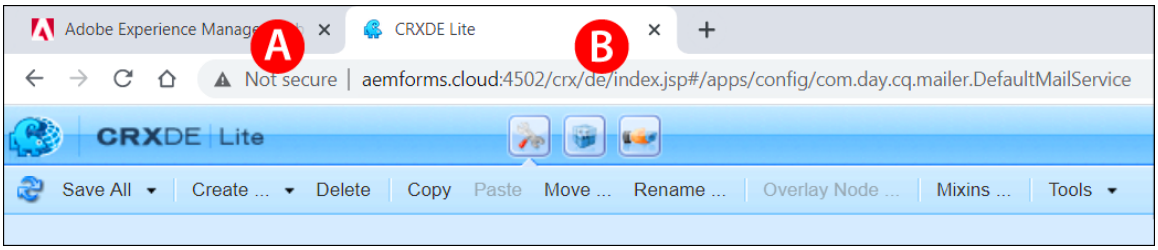
24.06.2020 15:11:16.631 *DEBUG* [100.1.251.123 [1593025876433] POST /bin/replicate HTTP/1.1] com.day.cq.replication.Agent.publish.queue Creating replication job (action: ReplicationAction{type=ACTIVATE, path[0]='/content/we-retail/us/en/jpt-Demo', time=1593025876435, userId='admin', revision='null'}) with content ReplicationContentFacade{path='/var/replication/data/2b638c9d-6c4a-4f46-9533-7e8e6c6d763a/7c/7c9c9c83-5774-4f06-a8c0-bd1dad33ec21', contentType='application/cq5-replication-durbo', contentLength=1830}

Create a Custom Logger with a sling:OsgiConfig node

Follow these steps to create a custom logger as a sling:OsgiConfig node.

44. Open **Web Console Configuration** in one tab **(A)** and **CRXDE Lite** in a different tab **(B)** *(see illustration below)*. You will move back and forth between the tabs.



45. Select the tab with **CRXDE Lite**.

http://<servername>:<port>/crx/de

46. Right-click on **/apps/weretail** and select **Create – Folder**.

47. Enter **config.author** for the Name.

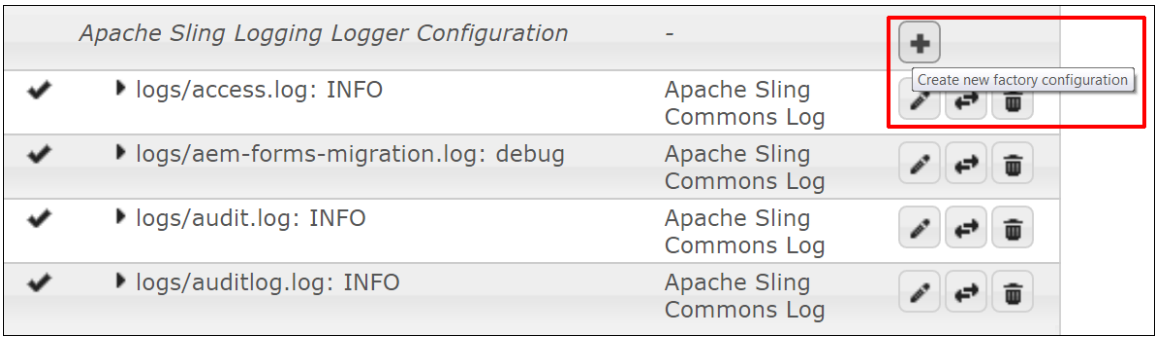
48. Click **OK**.

49. Click **Save All**.

50. Switch to the tab with **Web Console Configuration**.

51. Select **OSGi – Configuration** if Web Console Configuration is not your current page.

52. Search for **Logging Logger** to locate the *Apache Sling Logging Logger Configuration* panel. Notice it is a factory configuration which means you can create more than 1 logger.



53. Click **Create new factory configuration** *(the plus icon)*.

54. Select the Factory Persistent Identifier *(Factory PID)* **org.apache.sling.commons.log.LogManager.factory.config** and click **Copy**.

55. **Paste** the Factory PID into NotePad or a similar Text Editor.

56. Add **-TRAINING** to the end of your Factory PID. Your PID should now look like this.

org.apache.sling.commons.log.LogManager.factory.config-TRAINING

> ***Note:*** *When you configure a logging factory (multiple configurations for an OSGi Component), you need to add a unique identifier to the end of the Factory PID to differentiate it from the others.*

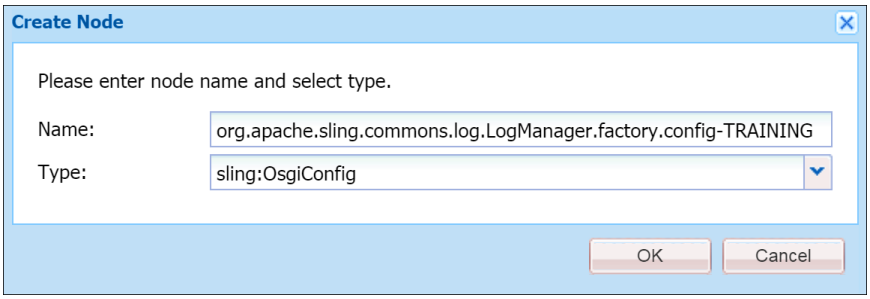
57. Switch to the tab with **CRXDE Lite**.

58. Right-click on the **/apps/weretail/config.author** folder and select **Create – Create Node**.

59. Paste your PID (**org.apache.sling.commons.log.LogManager.factory.config-TRAINING)** for the Name.

60. Select **sling:OsgiConfig** for the Type.

61. Click **OK**.



62. Click **Save All**.

63. Switch to the tab with **Web Console Configuration**.

64. Copy the first property **org.apache.sling.commons.log.level**.

65. Switch to the tab with **CRXDE Lite**.

66. Paste **org.apache.sling.commons.log.level** as the Name of a new property of your OSGi configuration node.

67. Select **String** for the Type.

68. Enter **info** as the Value.

69. Click **Add** and **Save All**.

70. Follow this process to add the remaining properties and values.

Property	Type	Value
org.apache.sling.commons.log.level	*String*	*info*
org.apache.sling.commons.log.file	**String**	**logs/training.log**
org.apache.sling.commons.log.pattern	**String**	**{0,date,dd.MM.yyyy HH:mm:ss.SSS} *{4}* [{2}] {3} {5}**
org.apache.sling.commons.log.names	**String[]**	**org.apache.felix, com.day**
org.apache.sling.commons.log.additiv	**Boolean**	**false**

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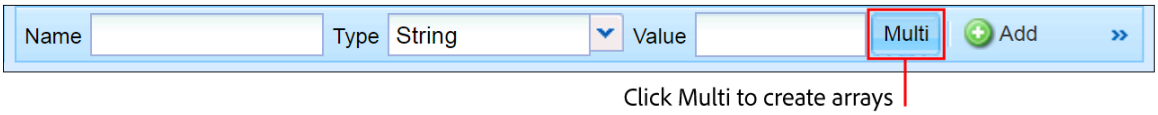
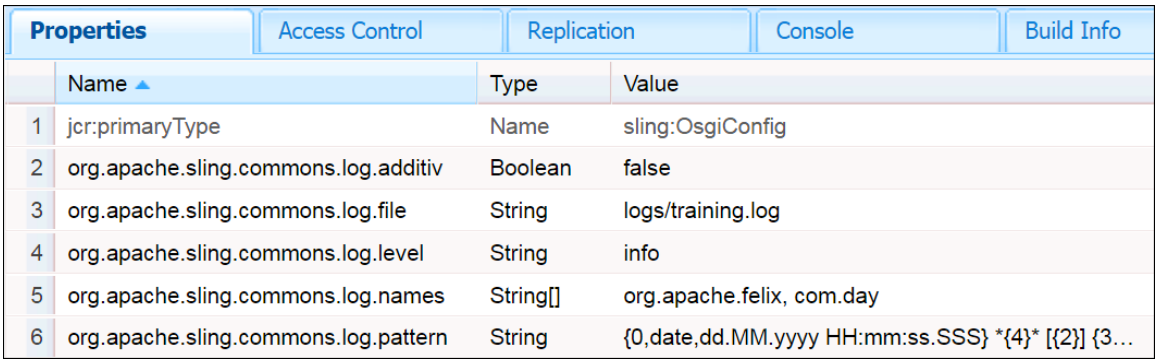
Note: *Make sure to click the Multi button to create the String Array.*



71. Click **Save All**.

Your properties should look like this.



Properties | Access Control | Replication | Console | Build Info

	Name	Type	Value
1	jcr:primaryType	Name	sling:OsgiConfig
2	org.apache.sling.commons.log.additiv	Boolean	false
3	org.apache.sling.commons.log.file	String	logs/training.log
4	org.apache.sling.commons.log.level	String	info
5	org.apache.sling.commons.log.names	String[]	org.apache.felix, com.day
6	org.apache.sling.commons.log.pattern	String	{0,date,dd.MM.yyyy HH:mm:ss.SSS} *{4}* [{2}] {3…

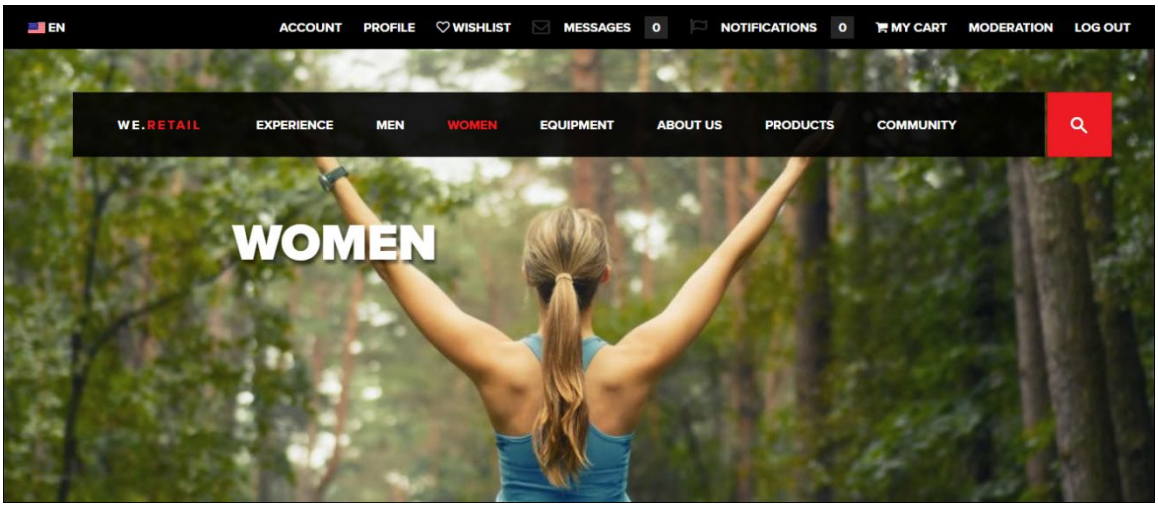
72. Navigate to: **/crx-quickstart/logs** in your file system. You should see the training log.

73. Right-click on **training.log** and open it in Notepad. It is likely empty or may have very little data.

74. Go back to **AEM** and open **Sites**.

75. Select **We.Retail – United States – English – Women** and click **Edit**.

76. You will see a page.



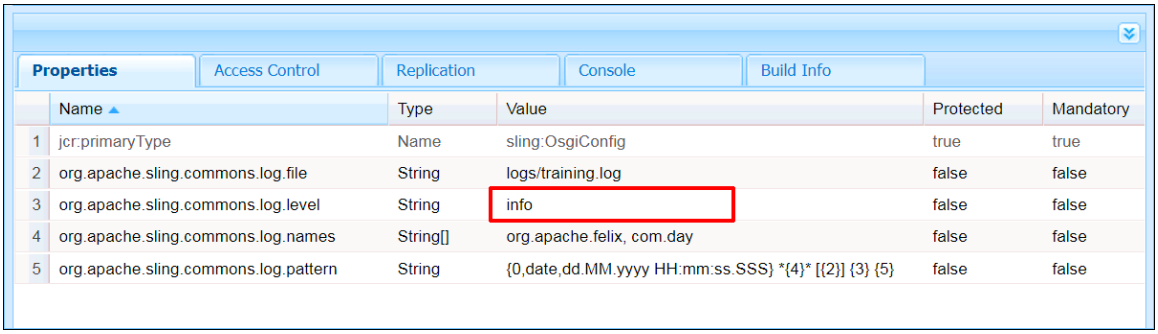
77. Go back to your **training.log** and you should see messages like these.

12.02.2020 12:37:59.446 *INFO* [sling-cq-polling-importer-5-myDataSource] com.day.cq.polling.importer.impl.PollingImporterImpl importData: Importing data from livefyreRightsImporter:myDataSource to /etc/importers/polling/livefyre-poller/jcr:content as polling-importer-service by com.adobe.social.integrations.livefyre.livefyreAssetImporter.impl.LivefyreRightsRequestPoller@756afd1a

12.02.2020 12:38:25.928 *INFO* [100.1.251.123 [1581529105833] GET /libs/wcm/core/content/components.1581528927825.json HTTP/1.1] com.day.cq.wcm.core.impl.components.ComponentServlet provided components.

> ***Note:*** *The dates in the log file correspond to the DD.MM.YYYY pattern that you set in the* ***org.apache.sling.commons.log.pattern*** *pattern.*

78. Go back to your OSGi Configuration node in CRX.



Properties | Access Control | Replication | Console | Build Info

	Name	Type	Value	Protected	Mandatory
1	jcr:primaryType	Name	sling:OsgiConfig	true	true
2	org.apache.sling.commons.log.file	String	logs/training.log	false	false
3	org.apache.sling.commons.log.level	String	info	false	false
4	org.apache.sling.commons.log.names	String[]	org.apache.felix, com.day	false	false
5	org.apache.sling.commons.log.pattern	String	{0,date,dd.MM.yyyy HH:mm:ss.SSS} *{4}* [{2}] {3} {5}	false	false

79. Change **info** to **error**. You can also decide to delete this logger whenever you want.

80. Click **Save All**.

Create a Custom Log File for LDAP

Follow these steps to create a custom log file to record LDAP error messages.

Get the PID of the Package

1. Open **Web Console Configuration**.

http://<servername>:<port>/system/console/configMgr

2. Search for **ldap**.

3. Click **Edit the configuration values** *(the pencil icon)* on any of the *Apache Jackrabbit Oak LDAP Identity Providers*.

4. Scroll to the bottom of the *LDAP Identity Provider*.

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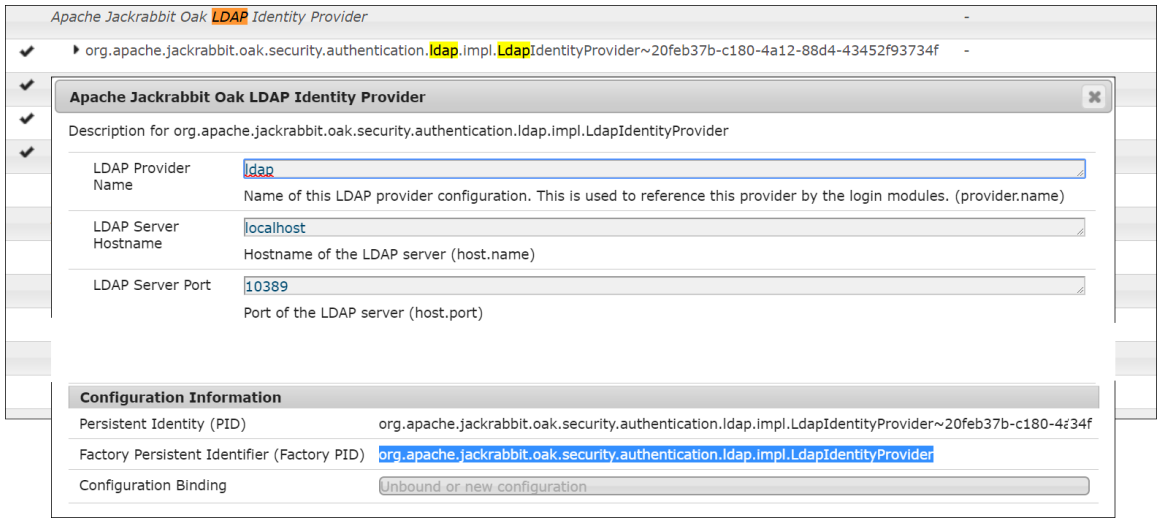


5. Copy the **Factory PID** and paste it in NotePad.

org.apache.jackrabbit.oak.security.authentication.ldap.impl.LdapIdentityProvider

6. Select **Cancel** to close the *LDAP Identity Provider*.

7. Follow the same approach and copy the Factory PIDs for the *External Login Module* and the *Default Sync Handler*. They will be similar to these strings.

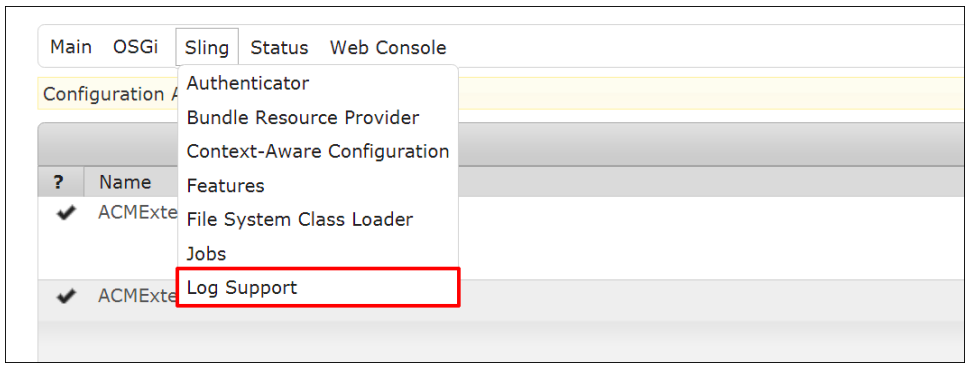
org.apache.jackrabbit.oak.spi.security.authentication.external.impl.ExternalLoginModuleFactory
org.apache.jackrabbit.oak.spi.security.authentication.external.impl.DefaultSyncHandler

8. Select **Cancel** to close any open panel.

9. Scroll to the top of the Web Console.

Create the Loggers

10. Select **Sling – Log Support**.



11. Click **Add new Logger**.

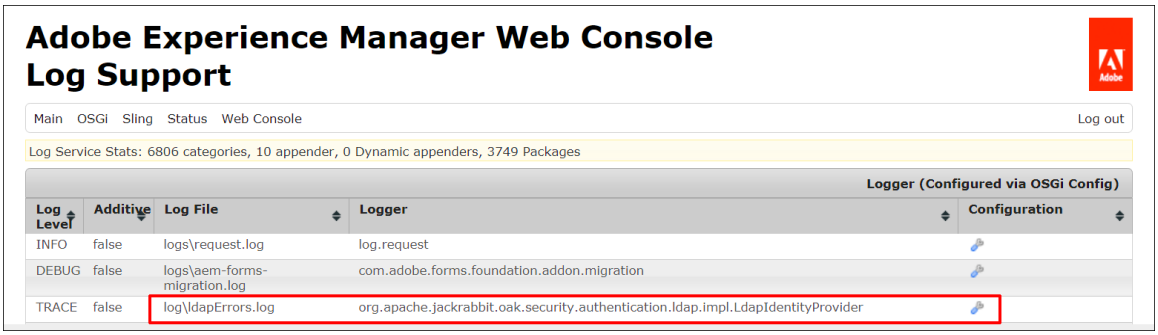
12. Enter **TRACE** for the Log Level.

13. Enter **log\ldapErrors.log** for the log file name.

14. Enter the Factory PID of the *LDAP Identity Provider* as your first Logger.

org.apache.jackrabbit.oak.security.authentication.ldap.impl.LdapIdentityProvider

15. Click **Save**. You now have your first logger.



16. Click **Add new Logger**.

17. Enter **TRACE** for the Log Level.

18. Enter **log\externalLoginModule.log** for the log file name.

19. Enter the Factory PID of the *External Login Module* as your second Logger.

org.apache.jackrabbit.oak.spi.security.authentication.external.impl.ExternalLoginModuleFactory

20. Click **Save**. You now have your second logger.

21. Click **Add new Logger**.

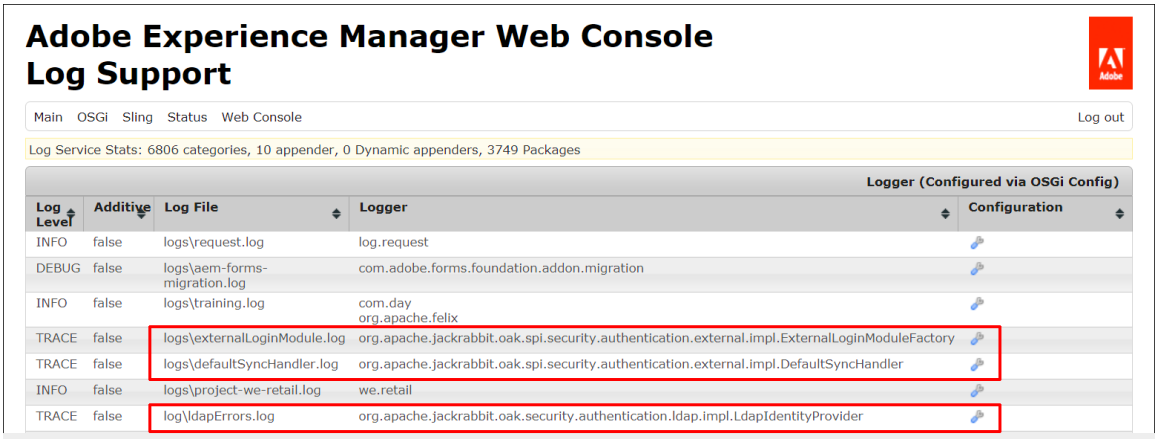
22. Enter **TRACE** for the Log Level.

23. Enter **log\defaultSyncHandler.log** for the log file name.

24. Enter the Factory PID of the *Default Sync Handler* as your third Logger.

org.apache.jackrabbit.oak.spi.security.authentication.external.impl.DefaultSyncHandler

25. Click **Save**. You now have a logger for each LDAP service. It is highly likely that your ldapErrors.log will record the most information.



26. Open AEM with a different browser.

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27. Login with an LDAP user that you haven't used previously (i.e., user001, password=1234).

28. Open your **ldapErrors.log in NotePad.**

12.02.2020 14:10:00.816 *ERROR* [HealthCheck Default Login Accounts] org.apache.jackrabbit.oak.security.authentication.ldap.impl.LdapIdentityProvider Error while connecting to the ldap server.

org.apache.directory.ldap.client.api.exception.InvalidConnectionException: Cannot connect to the server: Connection refused: no further information

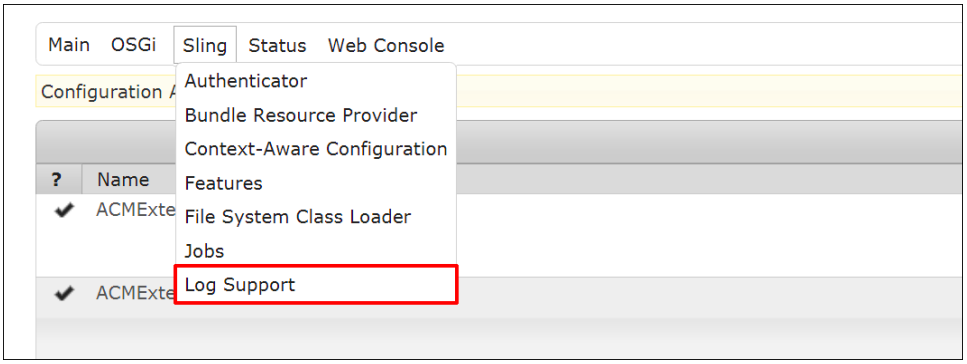
12.02.2020 14:13:48.265 *ERROR* [qtp2134887098-2815] org.apache.jackrabbit.oak.security.authentication.ldap.impl.LdapIdentityProvider Error while connecting to the ldap server.

org.apache.directory.ldap.client.api.exception.InvalidConnectionException: Cannot connect to the server: Connection refused: no further information

Set your Log Levels to INFO

If any loggers to a DEBUG level. Although this is OK for training, you will want to change the setting to INFO when you finish your exercise.

29. Open **Web Console** and select **Sling – Log Support**.



30. If any of your loggers are set to a DEBUG level, change them to an ERROR level.

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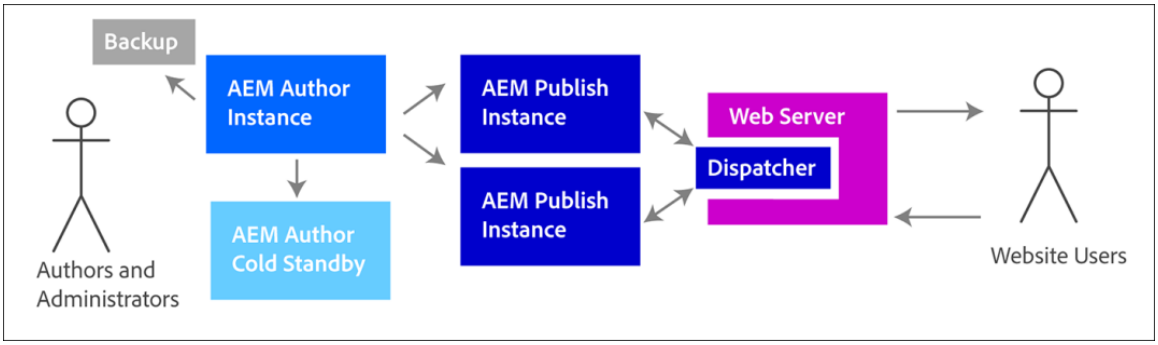
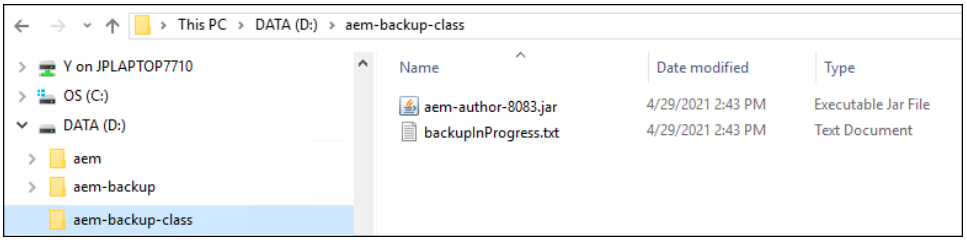
Deployment Scenarios

You should build redundancy into your implementation for fail-over support. We will take two positive steps towards that in the exercises. We will create an online backup of AEM and the complete repository. An online backup is a one-time backup of your live system. We will also configure a Tar Cold Standby of the Author instance. This Tar Cold Standby will be an automatic backup of your live system where changes to the primary repository are automatically replicated to the cold standby repository. The configuration of multiple Publish instances and Dispatcher is covered in the Publish AEM Forms course.



Online Backup

AEM includes an online backup tool. You can create a backup of your entire system without shutting the server down. The backup includes the repository and AEM and you can later restore from these files if your repository ever becomes corrupted. This method works for TAR repositories, which is AEM's default persistence technology. This is a one-time, non-recurring backup. Initially, you will see a file called backupInProgress.txt *(see illustration)*. When the backup is complete, the file will go away.



Note: *Do not run an online AEM backup while you are running other services like a workflow purge or a datastore garbage collection.*

Single Tar Instance

So far, we have been using a single Tar instance runs on a single server.

Advantages

- Simple
- Easy maintenance
- Good performance

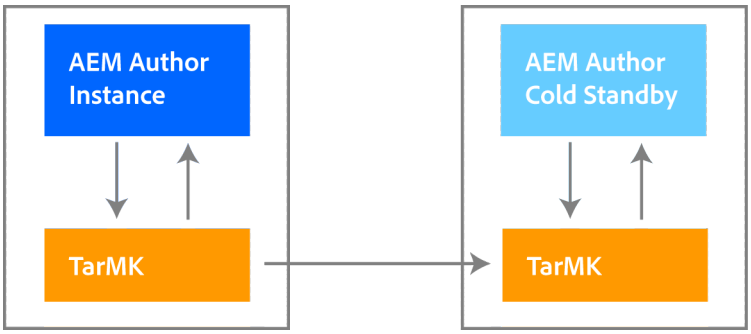
Disadvantages

- Only scalable to the limits of server capacity
- No failover capacity

Tar Cold Standby

A Tar Cold Standby instance is designed for high availability Author instances. If you need a high availability Publish instance with Tar, Adobe recommends using a Publish farm. A Tar Cold Standby is a live ***standby*** copy of the master ***primary*** repository. You will be able to quickly switch to this standby when the primary is unavailable.

In this scenario, one Tar instance acts as the primary instance. The repository from the primary is replicated to a standby failover system. You can also use the cold standby mechanism as a backup because the complete repository is constantly replicated to the failover server. The failover server is running in the cold standby mode, which means only the HttpReceiver of the instance is running.



Advantages

- Simplicity
- Maintainability
- Good performance
- Failover

Disadvantages

- Only scalable to the limits of server capacity
- One server idle most of the time
- Failover is not automatic *(It must be detected externally before the failover system can start serving requests).*

This article details the steps for creating a Cold Standby.

https://helpx.adobe.com/uk/experience-manager/6-5/sites/deploying/using/tarmk-cold-standby.html

You can only access the Web Console on a standby instance because the standby instance does not receive any request from these interfaces. It is only running in sync mode. You can access the Web Console to make sure your bundles are running, and your services are properly configured.

Important Properties

These are the important properties for the Tar Cold Standby.

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Property	Primary	Standby
Mode	primary	standby
Port	8023	8023
Primary Host	127.0.0.1	127.0.0.1
Touch UI is available	Yes	No

MongoDB

MongoDB is a document database with the following features.

- scalability and flexibility
- querying and indexing

The core components in the MongoDB package are:

- mongod - the core database process
- mongos - the controller and query router for sharded clusters
- mongo - the interactive MongoDB Shell

For most cases, a TarMK system with an active or a cold standby deployment is recommended for availability.

MongoDB should be considered in situations where the scaling requirements for your Author instances are more than what can be achieved with a single piece of hardware. If any of the following is true for your Author environment, you should consider installing your AEM Author instance on MongoDB.

- More than 1000 unique users per day
- More than 100 concurrent users
- High volumes of page edits

Publish instances should all be TarMK based.

For more information see this helpx web page.

https://helpx.adobe.com/in/experience-manager/6-5/sites/deploying/using/technical-requirements.html

For more information on the supported versions of Mongo for AEM 6.5, refer to this page.

https://helpx.adobe.com/in/experience-manager/6-5/sites/deploying/using/technical-requirements.html

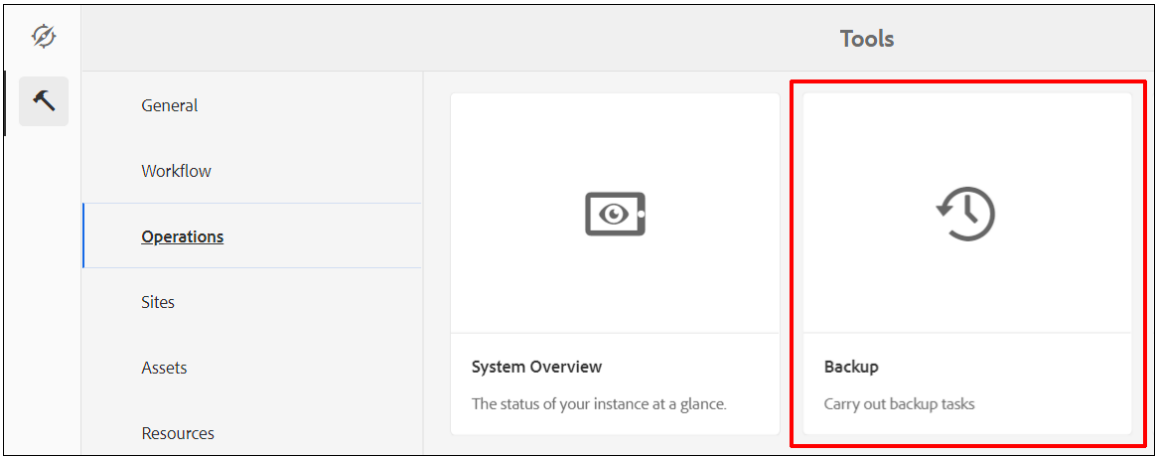
Exercises

Create an Online Backup

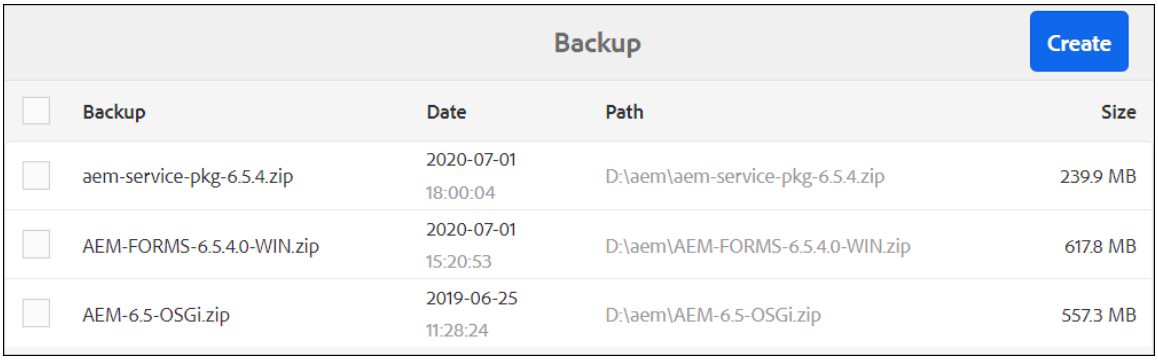
Follow these steps to create an Online Backup of your system. This backup will be performed while the system is up and running.

1. Log in to AEM with Administration privileges.

2. Select **Tools – Operations – Backup**.



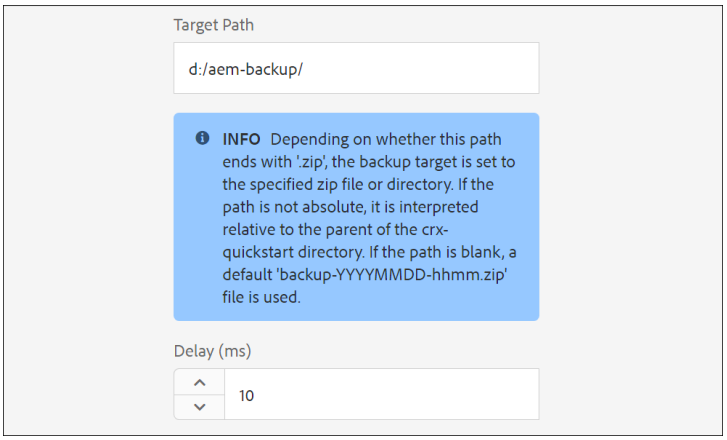
3. You may see files listed here. These are not necessarily backup files. As shown here, these 3 files that display on this panel are simply zip files that are in the parent directory of your AEM folder.



4. Click **Create**.

5. Enter **d:/aem-backup/** for the Target Path and **10** (ms) for the Delay.

   Note: This assumes that you want your backups stored in the d: drive. If you want them located on a different drive, simply update the Target Path.



6. Click **Save**.

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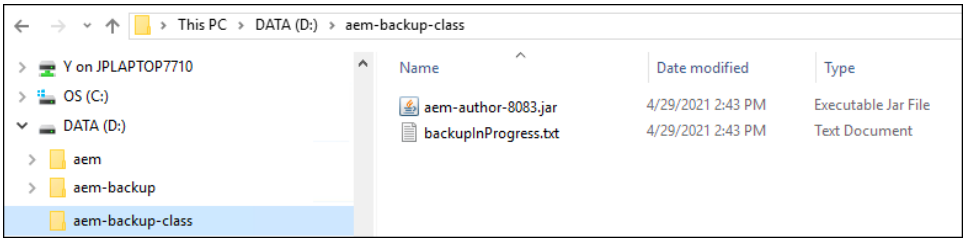
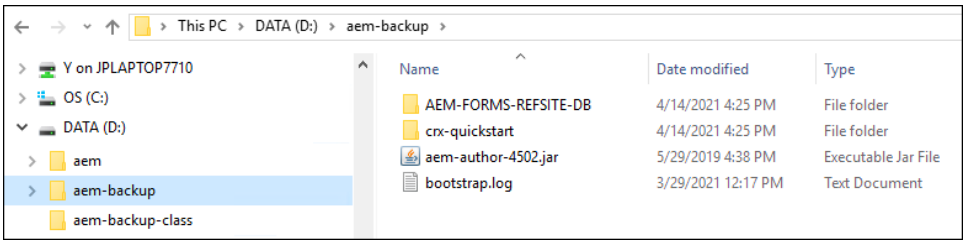
7. Open the server drive of your backup target.

8. You will see a temporary file called **backupInProgress.txt** in your target folder.



When the backup is complete, the backupInProgress.txt file will be gone.



Create a Tar Cold Standby

Create the Primary Instance

Follow these steps to create the primary instance.

1. Shut down your Author and Publish servers. We will create 2 new Author instances in this exercise.

2. Create two new folders in your aem directory. Name one folder **author-primary** and the other **author-standby**.

3. Put the AEM JAR file and the license.properties file into the author-primary folder.

4. Rename the JAR file as **aem-author-primary.jar**.

5. Open **CMD** and navigate to this folder.

C:\aem\author-primary

6. Start the primary instance with this command.

java -XX:+UseParallelGC -jar aem-author-primary.jar -p 4504 -r author

```
E:\aem\author-primary>java -XX:+UseParallelGC -jar aem-author-primary.jar -p 4504 -r author
Loading quickstart properties: default
Loading quickstart properties: instance
Low-memory action set to fork
Using 64bit VM settings, min.heap=1024MB, min permgen=256MB, default fork arguments=[-Xmx1024m, -XX:MaxPermSize=256m]
The JVM reports a heap size of 7170 MB, meets our expectation of 1024 MB +/- 20
Setting properties from filename 'E:/aem/author-primary/aem-author-primary.jar'
Setting 'sling.run.modes' to 'author' from command line.
The admin password for this instance hasn't been defined yet.
Please enter the desired admin password: _
```

7. Enter **admin** as the password.

8. Re-enter **admin** as the password.

Note: *This will take a little while because the crx-quickstart directory must be created. This will likely take 5 to 10 minutes so be patient and let is run.*

9. When the server is up, you will see the login screen.

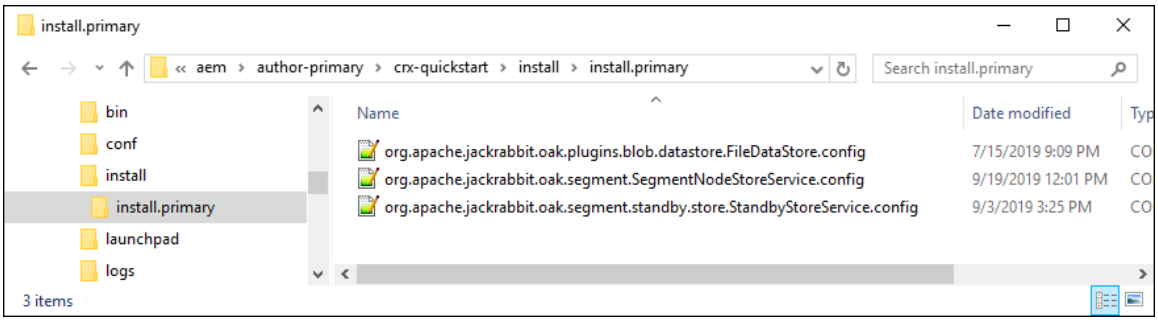
10. Enter **admin** for the User name and **admin** for the Password and click **Sign In**.
11. Go to the **CMD** window.
12. Enter **Ctrl-C** in CMD window to shut the server down.

    Note: *If Ctrl-C does not work, then close the command window.*

13. Create this folder structure in your primary folder:

author-primary/crx-quickstart/install/

14. Open your Student Files folder.
15. Right-click on the **install.primary** folder and select **Copy**.
16. Open your **author-primary/crx-quickstart/install/** folder and select **Paste**.



Here are the important properties in each file.

<u>org.apache.jackrabbit.oak.plugins.blob.datastore.FileDataStore.config</u>

Make sure you have a valid path.

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org.apache.sling.installer.configuration.persist=B"false"
path="./crx-quickstart/repository/datastore"
minRecordLength=I"16384"

org.apache.jackrabbit.oak.segment.SegmentNodeStoreService.config

Make sure customBlobStore is set to "false". Set it to "true" if you are using an external data store.

org.apache.sling.installer.configuration.persist=B"false"
customBlobStore=B"true|false"
standby=B"false"

org.apache.jackrabbit.oak.segment.standby.store.StandbyStoreService.config

Make sure your mode is set to primary. The default port is 8023. This will be the port the StandbyStoreService uses. This is different from and should not be confused with the ports that are used by your AEM instances.

org.apache.sling.installer.configuration.persist=B"false"
mode="primary"
port=I"8023"

17. Start the primary instance by specifying the primary runmode.

java -XX:+UseParallelGC -jar aem-author-primary.jar -p 4504 -r primary,crx3,crx3tar

18. When the instance is up, login with Administrator credentials (**admin** | **admin**).

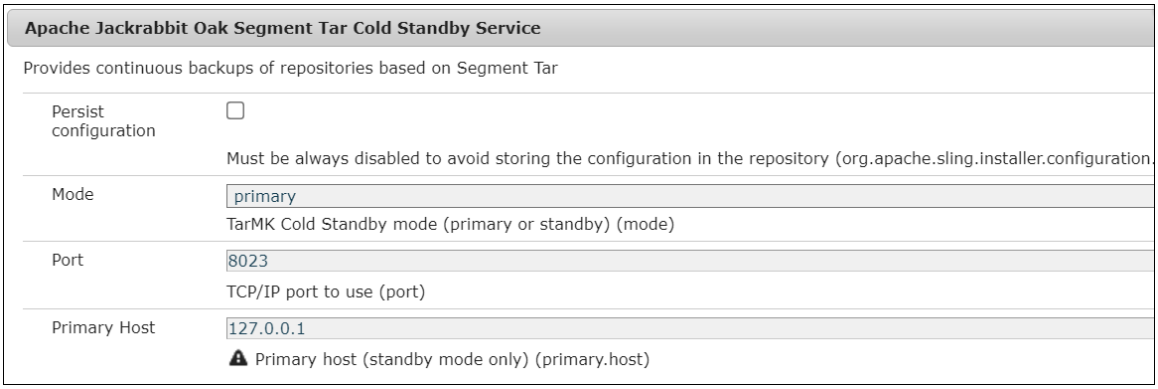
19. Open the **AEM Web Console Configuration**.

http://<servername>:4504/system/console/configMgr

20. Search for **standby**.

21. Select **Edit the configuration values** *(the pencil icon)* on the *Apache Jackrabbit Oak Segment Tar Cold Standby Service* to view the properties.

22. Notice the **Mode** is set to primary.

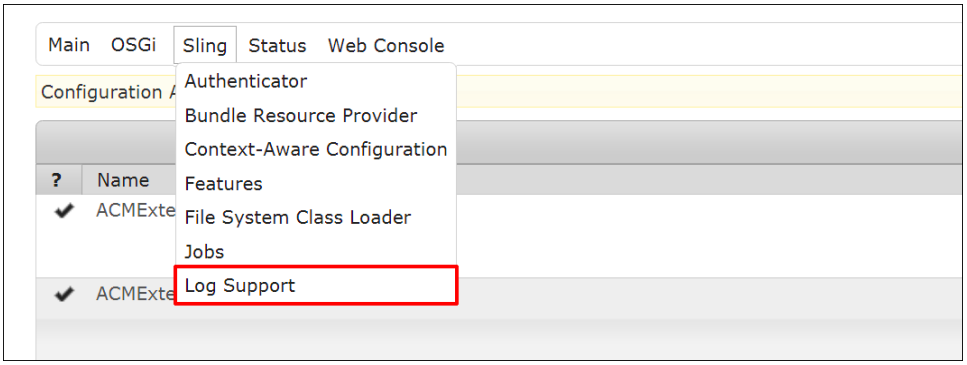


23. Copy the PID and paste it in NotePad.

org.apache.jackrabbit.oak.segment.standby.store.StandbyStoreService

24. Click **Cancel** to close the panel.

25. Scroll up to the top and select **Sling – Log Support**.



26. Click **Add new Logger**.
27. Enter **DEBUG** for the Log Level.
28. Enter **logs\primarySegment.log** for the Log File name.
29. Enter **org.apache.jackrabbit.oak.segment** for the Logger.
30. Click **Save**.
31. Click **Add new Logger**.
32. Enter **DEBUG** for the Log Level.
33. Enter **logs\primaryStandbyStoreService.log** for the Log File name.
34. Enter **org.apache.jackrabbit.oak.segment.standby.store.StandbyStoreService** for the Logger. This is the PID you pasted into NotePad.
35. Click **Save**.

Your Log Support should now look like this.

INFO	false	logs\request.log	log.request
DEBUG	false	logs\primaryStandbyStoreService.log	org.apache.jackrabbit.oak.segment.standby.store.StandbyStoreService
INFO	false	logs\audit.log	org.apache.jackrabbit.core.audit org.apache.jackrabbit.oak.audit
INFO	false	logs\access.log	log.access
INFO	false	logs\project-we-retail.log	we.retail
DEBUG	false	logs\primarySegment.log	org.apache.jackrabbit.oak.segment

Create the Standby Instance

Follow these steps to create the standby instance.

36. Put the AEM JAR file and the license.properties file into the **author-standby** folder.
37. Rename the JAR file as **aem-author-standby.jar**.
38. Open **CMD** and navigate to this folder.

C:\aem\author-standby

39. Start the standby instance with this command.

java -XX:+UseParallelGC -jar aem-author-standby.jar -p 4506 -r author

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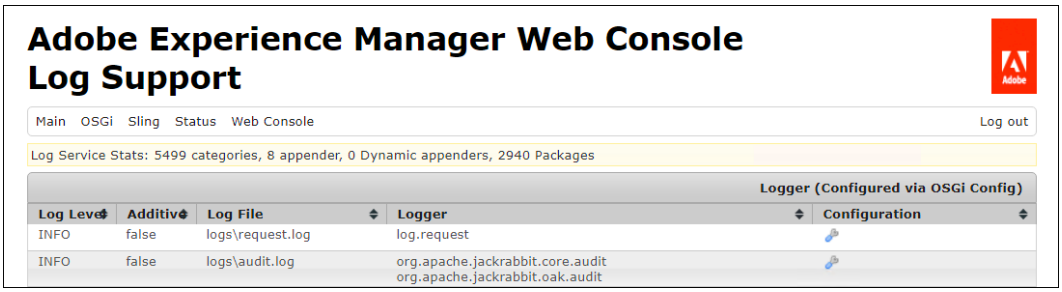
40. Enter **admin** as the password.

41. Re-enter **admin** as the password.

    Note: *This will take a little while because the crx-quickstart directory must be created. This will likely take 5 to 10 minutes so be patient and let is run.*

42. When the standby system comes up, open **Web Console Configuration**.

http://<servername>:4506/system/console/configMgr



43. Select **Sling – Log Support**.

44. Click **Add new Logger**.

45. Enter **DEBUG** for the Log Level.

46. Enter **logs\standbySegment.log** for the Log File name.

47. Enter **org.apache.jackrabbit.oak.segment** for the Logger.

48. Click **Save**.

49. Click **Add new Logger**.

50. Enter **DEBUG** for the Log Level.

51. Enter **logs\standbyStandbyStoreService.log** for the Log File name.

52. Enter **org.apache.jackrabbit.oak.segment.standby.store.StandbyStoreService** for the Logger.

53. Click **Save**.

Your Log Support should now look like this.

INFO	false	logs\request.log	log.request
DEBUG	false	logs\standbyStandbyStoreService.log	org.apache.jackrabbit.oak.segment.standby.store.StandbyStoreService
INFO	false	logs\audit.log	org.apache.jackrabbit.core.audit org.apache.jackrabbit.oak.audit
INFO	false	logs\access.log	log.access
INFO	false	logs\project-we-retail.log	we.retail
DEBUG	false	logs\standbySegment.log	org.apache.jackrabbit.oak.segment

54. Go back to the **CMD** window you used for the standby startup and enter **Ctrl-C** to shut down the standby server.

55. Create this folder structure in your standby folder:

author-standby/crx-quickstart/install

56. Copy the **install.standby** folder in your Student Files.

57. Paste it into your **author-standby/crx-quickstart/install/** folder.

author-standby/crx-quickstart/install/install.standby

Here are the important properties in each file.

org.apache.jackrabbit.oak.plugins.blob.datastore.FileDataStore.config

Make sure you have a valid path.

org.apache.sling.installer.configuration.persist=B"false"
path="./crx-quickstart/repository/datastore"
minRecordLength=I"16384"

org.apache.jackrabbit.oak.segment.SegmentNodeStoreService.config

Make sure customBlobStore is set to "false". Set it to "true" if you are using an external data store.

org.apache.sling.installer.configuration.persist=B"false"
name="Oak-Tar"
service.ranking=I"100"
standby=B"true"
customBlobStore=B"false"

org.apache.jackrabbit.oak.segment.standby.store.StandbyStoreService.config

Make sure your mode is set to standby. The default port is 8023. This will be the port the StandbyStoreService uses. This is different from and should not be confused with the ports that are used by your AEM instances. Both the primary and standby will be set to this port.

org.apache.sling.installer.configuration.persist=B"false"
mode="standby"
primary.host="127.0.0.1"
port=I"8023"
secure=B"false"
interval=I"5"
standby.autoclean=B"true"

58. Open **CMD** and navigate to this folder.

C:\aem\author-standby

59. Start the standby instance with this command.

java -XX:+UseParallelGC -jar aem-author-standby.jar -p 4506 -r standby,crx3,crx3tar

When the instance starts up, you will see this expected error. Remember, the standby instance does not have all the AEM TouchUI tools.

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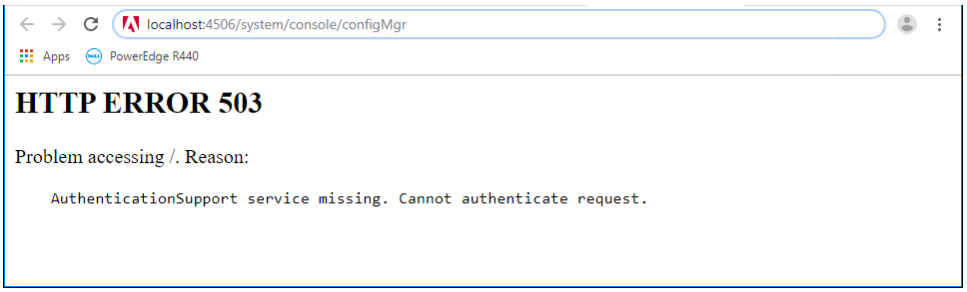


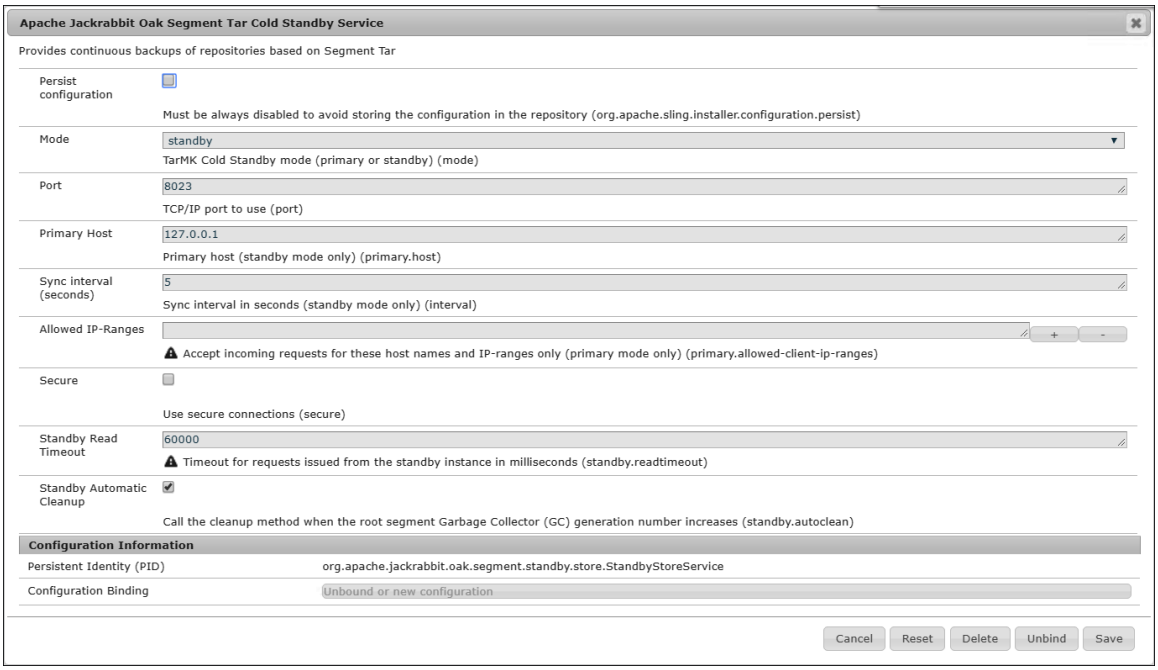
60. Open the **AEM Web Console Configuration** of your standby system with this URL.

http://<servername>:4506/system/console/configMgr

61. Enter **admin** for the username and password.

62. Search for **standby**.

63. Open the **Apache Jackrabbit Oak Segment Tar Cold Standby Service** to view the properties.



64. Click **Cancel**.

Note: *You can check the role of an instance at any time by selecting Status – Sling Settings.*

Test your Configuration

JMX Console Confirmation

You can confirm your system status in the JMX console and by reviewing the logs.

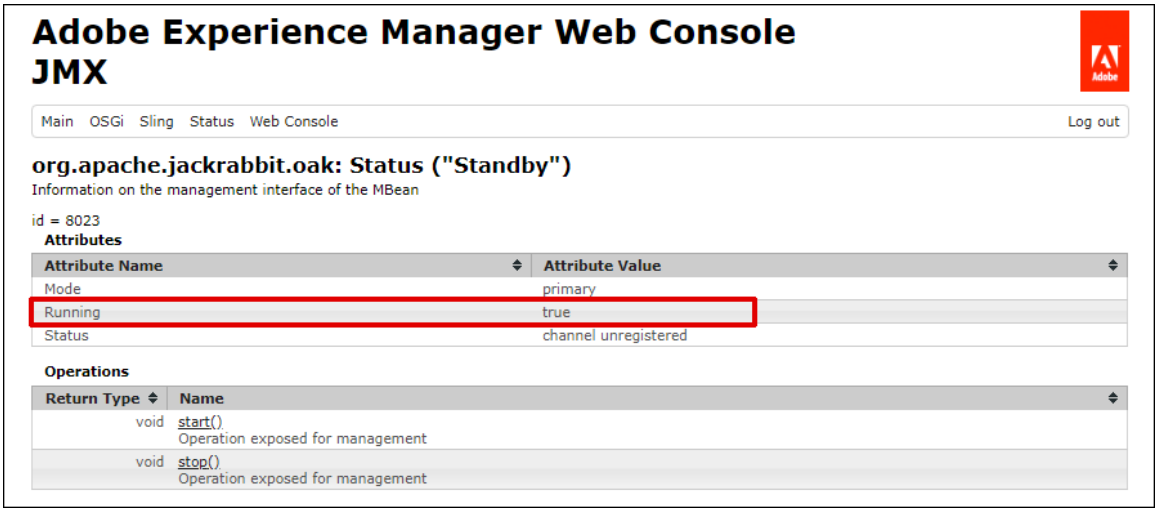
1. Open **Web Console** on the primary instance.

2. Select **Main – JMX** in Web Console on your Primary instance.

3. Search for **Standby**.

4. Click on the Standby item. If you have more than 1 Standby item, click the one with this value **{id=8023}**.

5. You should see the Running attribute set to true.

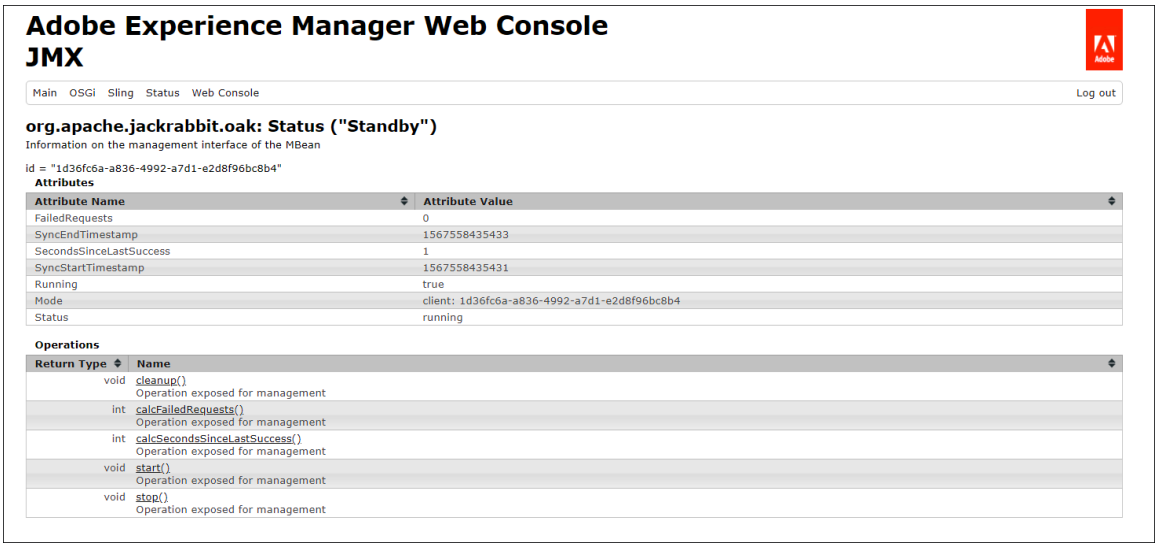


6. Open **Web Console** on the standby instance.

7. Select **Main – JMX** in Web Console on your Standby instance.

8. Search for **Standby**.

9. Click on the **Standby** item. You should see the Status set to running.



Review the logs

You can also confirm your standby system is working by consulting these logs.

The primaryStandbyStoreService.log

You should see this message.

08.09.2019 15:11:15.055 *INFO* [FelixStartLevel] org.apache.jackrabbit.oak.segment.standby.store.StandbyStoreService Started primary on port 8023 with allowed IP ranges []

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The standbyStandbyStoreService.log

You should see this message.

08.09.2019 15:13:43.465 *INFO* [FelixStartLevel] org.apache.jackrabbit.oak.segment.standby.store.StandbyStoreService Started standby on port 8023 with 5s sync frequency

The standbySegment.log

Search for **.StandbyClientSyncExecution**. You should see messages like this.

09.09.2019 02:01:21.557 *DEBUG* [standby-run-7764] org.apache.jackrabbit.oak.segment.standby.client.StandbyClientSyncExecution Inspecting segment 8e143eee-e328-49d0-a742-d2d81ef076d5

The primarySegment.log

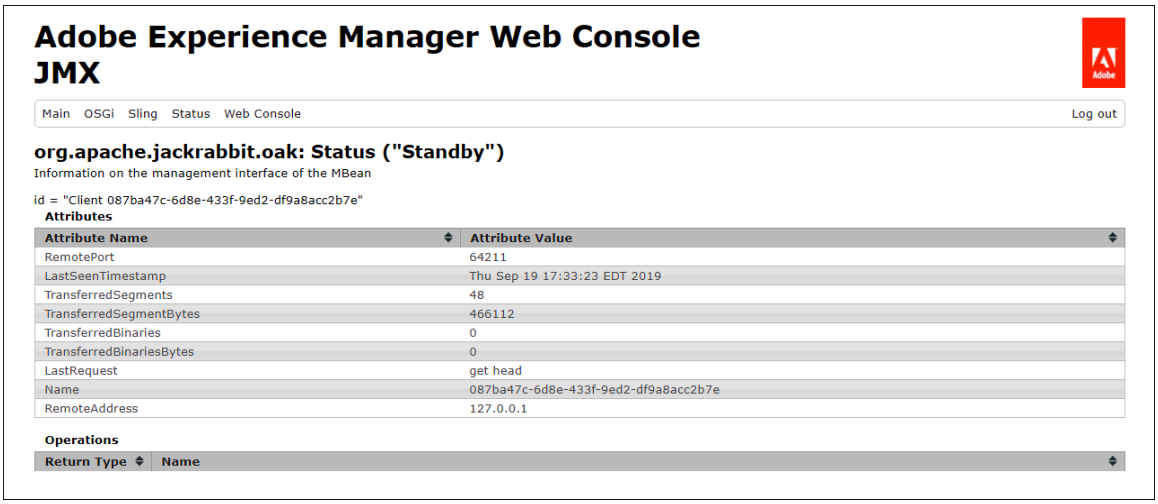
Search for **.CommunicationObserver**. You should see messages like this.

09.09.2019 00:00:04.125 *DEBUG* [primary-9] org.apache.jackrabbit.oak.segment.standby.store.CommunicationObserver Message 'get segment' received from client f5371650-cafc-4326-a9f2-cae519ca64b0

Monitor your Systems

Follow these steps to monitor your primary system.

10. Open Web Console on the primary instance.
11. Select **Main – JMX** in Web Console on your Primary instance.
12. Search for **Standby**.
13. Click on the Standby item. You can monitor your primary instance on this page.



Trouble-Shooting

Touch UI does not display

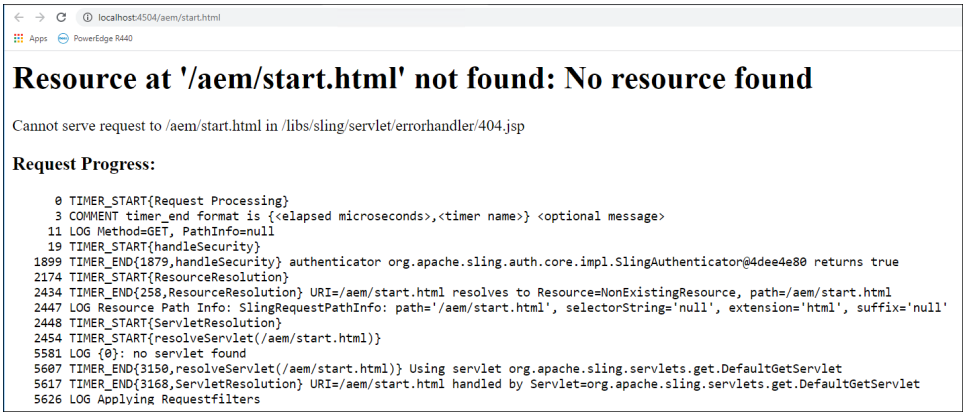
You may not be able to see the Touch UI on the primary. If this is the case, follow these steps.

14. Shut down your primary instance.

15. Remove the **install.primary** folder from your **author-primary/crx-quickstart/install** folder.

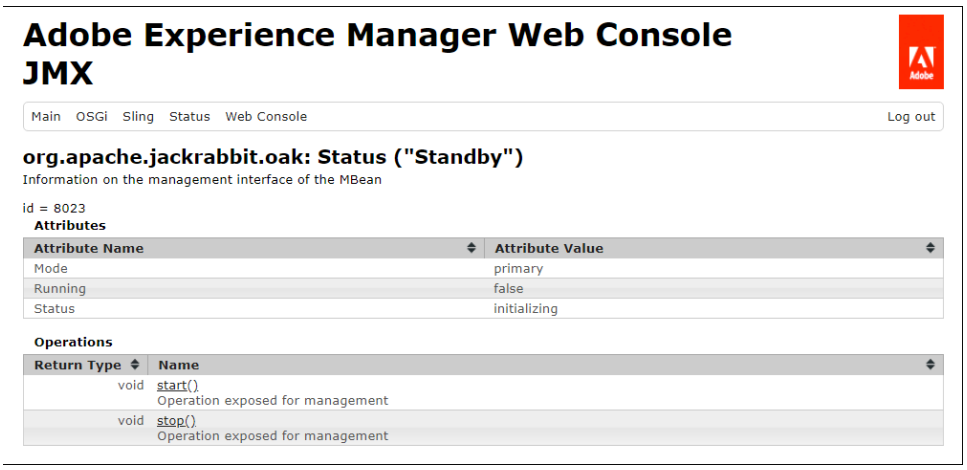
16. Restart the primary instance with this command.

java -XX:+UseParallelGC -jar aem-author-primary.jar -p 4504 -r author



Trouble-Shoot Errors

If the Status on the primary instance is initializing and the Running property is set to false, there may be other instances running on the required port.



Review your log files. You might have a **java.net.BindException**.

Caused by: java.net.BindException: Address already in use: bind
at java.base/sun.nio.ch.Net.bind0(Native Method)
at java.base/sun.nio.ch.Net.bind(Net.java:461)
at java.base/sun.nio.ch.Net.bind(Net.java:453)

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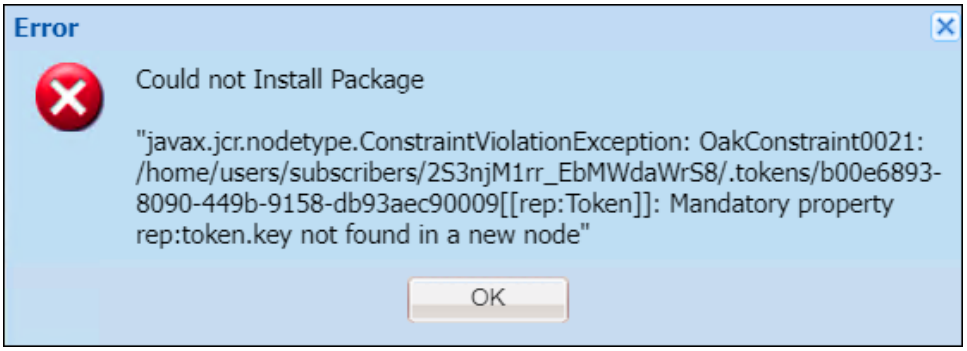
Trouble Shooting

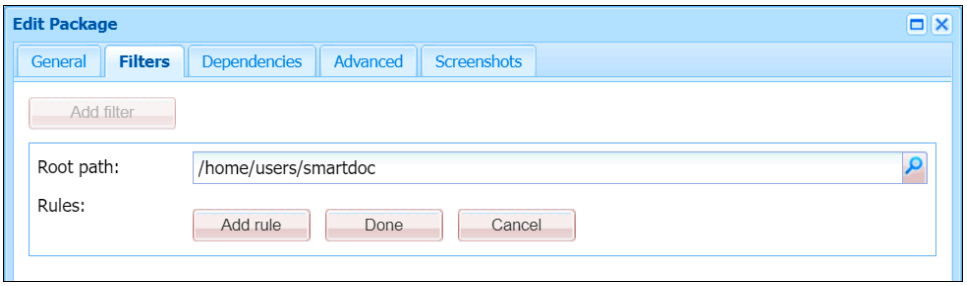
This section details some known issues and trouble-shooting steps.

Could not Install Package

This issue occurs when installing a package of AEM users on a new server. You can solve it by editing your package on your source server. Follow these steps below.



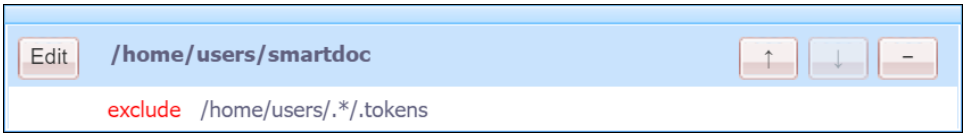
1. Open your package on the source server.
2. Click **Edit** and select the **Filters** tab.
3. Click Edit on your filter. Your screen should now look like this.



4. Click **Add Rule**.
5. Select **Exclude** and enter this line to exclude tokens.

/home/users/.*/.tokens

6. Click **Done**. Your new rule should now look like this.



7. Click **Save** and rebuilt your package.

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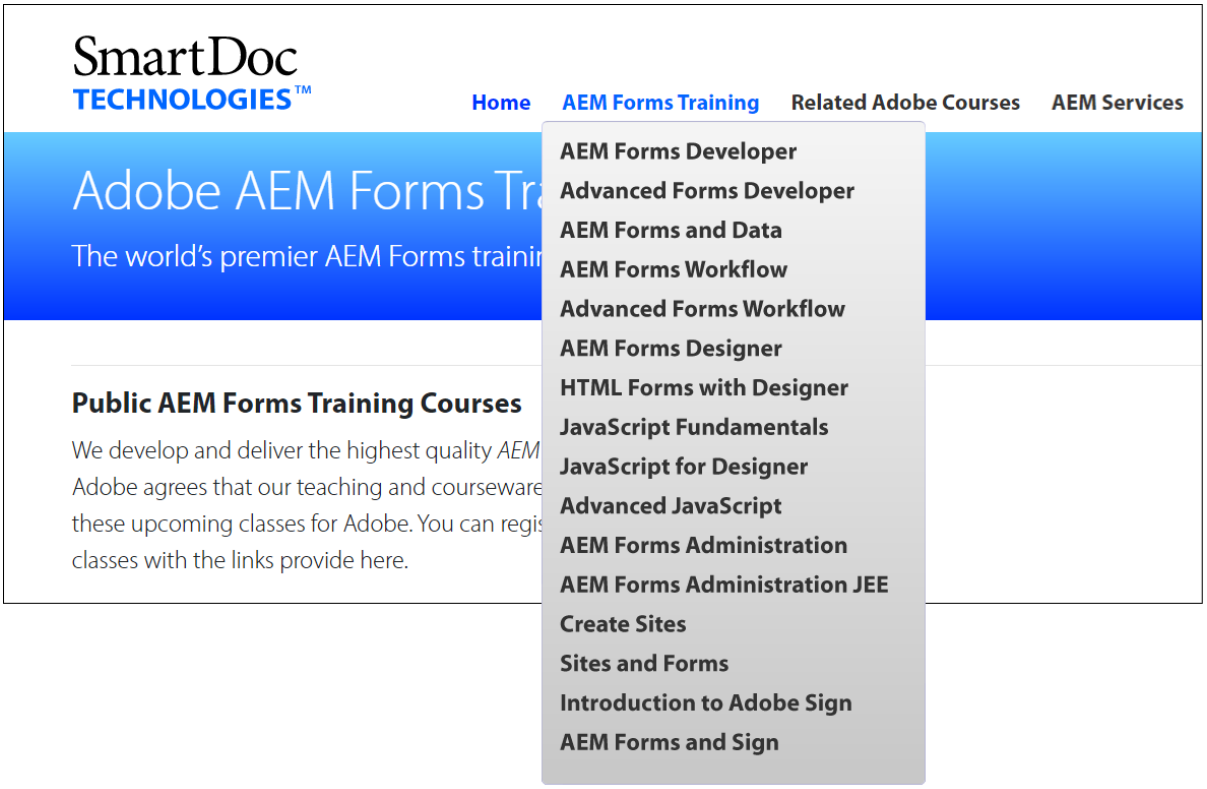

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