AEM-6.0 Certification Exam

Certification Exam Contents

https://training.adobe.com/certification/exams/aem_6_0_developer/_jcr_content/sampleExam

These 51 questions are divided into Four Different Parts and each part has different weight age of questions.

- Installing and Configuring an AEM Developer Environment.
- Building and deploying AEM projects.
- Building AEM components.
- Building OSGI Services.
- Troubleshooting AEM Projects.

Installation

https://docs.adobe.com/docs/en/aem/6-0/deploy/custom-standalone-install.html

- The default port for AEM is 4502. If that port is not available or already in use, Quickstart automatically configures itself to use the first available port number as follows: 4502, 8080, 8081, 8082, 8083, 8084, 8085, 8888, 9362, <random>.
- When you rename the file, it must start with cq; as in cq5-publish-p4503.jar. The "cq5" prefix at the beginning of the filename is ignored.
- Port must have 4 or 5 digits and must come after a dash. If there are any other digits in the filename, then the port number must be prefixed with -p.

RUN MODES

Installation (or fixed) run modes are used at installation time and then fixed for the entire lifetime of the instance, they cannot be changed.

- https://helpx.adobe.com/experience-manager/kb/RunModeSetUp.html
- http://www.aemcq5tutorials.com/tutorials/set-up-run-modes-in-aem/

- http://aemtips.blogspot.com/2013/05/how-to-set-up-run-modes-in-aem.html
- https://docs.adobe.com/docs/en/aem/6-0/deploy/configuring/configure-runmodes.html

Notes:

- Run mode already for **production** environment: **nosamplecontent**
- Run mode "**author**" & "**publish**" **CANNOT** be **changed** after install

Start in debug mode

https://helpx.adobe.com/experience-manager/kb/CQ5HowToSetupRemoteDebuggingWithEclipse.html

OSGi Configuration

There are 2 ways to configure the OSGi Adobe CQ Web console, content-nodes (sling:OsgiConfig) in the repository

Web Console

- Any configurations made with the Web Console are **applied immediately and applicable to the current instance**, irrespective of the current run mode, or any subsequent changes to the run mode.
- While modifying an OSGi bundle configuration from the Felix Web Console. The configuration **changes are applied immediately as it takes precedence at run-time**.

OSGi Configuration in the Repository

- The **Persistent Identity** (PID) of the service: it is name of file.

- These configurations are made by creating **sling:OsgiConfig** nodes in the repository for the system to reference. These nodes mirror the OSGi configurations, and form a user interface to them. To update the configuration data you update the node properties.

- You are creating a new OSGi configuration in the repository. The configuration **changes are applied as soon as the node is updated by restarting the service**.

- If you modify the configuration data in the repository the changes are immediately applied to the relevant OSGi configuration as if the changes had been made using the Web console.

  > When making a Factory Configuration append **-<identifier>** to the name.
  >
  > As in: org.apache.sling.commons.log.LogManager.factory.config**-<identifier>**
  >
  > Where <identifier> is replaced by free text that you (must) enter to identify the instance (you cannot omit this information); for example:
  >
  > org.apache.sling.commons.log.LogManager.factory.config**-MINE**

- RESOLUTION ORDER AT STARTUP

  > **The following order of precedence is used:**
  > 1/ Repository nodes under **/apps/*/config**....either with type **sling:OsgiConfig** or property files (CHECK)
  >
  > 2/ Repository nodes with type **sling:OsgiConfig** under **/libs/*/config**.... (ootb defns)
  >
  > 3/ Any **.config** files from **<cq-installation-dir>/crx-quickstart/launchpad/config**/.... on the local file system.

- RESOLUTION ORDER AT RUNTIME

  Configuration changes made while the system is running trigger a reload with the modified configuration.

  Then the following order of precedence applies:

  > 1/ Modifying a configuration in the Web console will take immediate effect as it takes precedence at run-time.
  >
  > 2/ Modifying a configuration in */apps* will take immediate effect.
  >
  > 3/ Modifying a configuration in */libs* will take immediate effect, unless it is masked by a configuration in */apps*.

https://docs.adobe.com/docs/en/aem/6-0/deploy/configuring/configuring-osgi.html

Security Check list

This lists all items should be considered in the Security Check List

- Must change default password
- Remove example content & default users
- Disable CRXDE
- Disable WebDAV
- Use the Latest Version of Dispatcher
- Restrict Access via the Dispatcher
- Protect against Cross-Site Scripting (XSS)
- Preventing Denial of Service (DoS) Attacks
- Default Access to User Profile(s) is everyone
- Issues with Cross-Site Request Forgery (CSRF)
- Disable the CQ WCM Debug Filter on production systems
- Clickjacking
- Access to Cloud Service Information
- OSGI Settings

How to Build AEM Projects using Apache Maven

https://docs.adobe.com/docs/en/cq/5-6-1/developing/developmenttools/how-to-build-aem-projects-using-apache-maven.html

- The **maven-scr-plugin** to generate SCR descriptors from Annotations (see the Apache Felix Project's Apache Felix Maven SCR Plugin page for details of this plugin)
- The **maven-bundle-plugin** to define the symbolic name of the OSGi bundle created in the project (see the Apache Felix Project's Apache Felix Bundle Plugin for Maven page for other options of this plugin)
- The **maven-sling-plugin** plugin to allow direct installation of the bundle into AEM using the sling:install goal. See the Apache Sling Project's Maven Sling Plugin page for more details on this plugin.

- The **maven-javadoc-plugin** is configured to exclude any classes with "impl" in their package name from the generated Documentation. This is because the maven-bundle-plugin will by default exclude any packages that are called impl from the Export-Packages header in the Manifest (see Apache Maven Javadoc Plugin)

> Note that the packaging for the module is set to "bundle". This is provided by the Apache Felix Bundle Plugin for Maven.

Notes:

- What is the purpose of maven parent pom.xml file?
- Maven version range? http://maven.apache.org/enforcer/enforcer-rules/versionRanges.html
- Maven deploy to author instance through a dispatcher?

Log Files

https://docs.adobe.com/docs/en/aem/6-0/deploy/configuring/monitoring-and-maintaining.html#Finding%20the%20Log%20Files

- Log file name to view page request time: **request.log**
- Default log level of AEM: **Information (INFO)**
- Custom log file: https://docs.adobe.com/docs/en/aem/6-0/deploy/configuring/monitoring-and-maintaining.html#Create%20a%20Custom%20Log%20File
- Log file config: org.apache.sling.commons.log.LogManager.factory.config-***<identifier>*** -> Characters are accepted for ***<identifier>***?

Server Log URLs

- http://<server>/system/console/status-slinglogs

- http://<server>/bin/crxde/logs

Page Templates

https://docs.adobe.com/docs/en/aem/6-0/develop/the-basics/templates.html#Template%20Availability

Notes:

- ***cq:allowedTemplates*** set in **jcr:content** node of a page: allow template on specific page
- ***allowedPaths***: Path of a page that is allowed to be based on this template.
- ***allowedParents***: Path of a template that is allowed to be a parent of this template.
- ***allowedChildren***: Path of a template that is allowed to be a child of this template.

Components

Overlay and Extending

- Overlay is to override default component functionality. The overlay is accomplished by modifying a copy of the default component in the **/apps** directory, rather than modifying the original component in the **/libs** directory. The component is constructed with an identical relative path, except '**libs**' is replaced with 'apps'.
- Extending is to extend the component functionality through the use of **Resource Hierarchy** and **super types**.

Referrences

- https://docs.adobe.com/docs/en/aem/6-0/develop/platform/overlays.html
- https://docs.adobe.com/docs/en/aem/6-0/develop/social-communities/scf/client-customize.html

DISABLE UPLOAD CAPABILITY OF THE IMAGE COMPONENT

Add a new property or update the **allowUpload** properties and assign **false**. Client here to see more details.

Dialog

- Node name of **Touch UI** dialog: **cq:dialog**
- Node type of **Touch UI** dialog field: jcr:primaryType="**nt:unstructured**"
- Node name of **Classic UI** dialog: **dialog**
- Node type of **Classic UI** dialog field: jcr:primaryType="**cq:Widget**"
- Name of dialog property: **./<name>**

How is it possible to reuse existing dialog elements such as tabs in other dialogs?

For this use-case, a specific widget with the label **cqinclude** exists which allows for inclusion of existing dialog elements in other dialog definitions

```
{
  "jcr:primaryType": "cq:Widget",
  "xtype": "cqinclude",
  "path": "/libs/replication/components/agent/tab_extended.infinity.json"
}
```

Global.jsp

Objects are provided by default global.jsp

- slingRequest - The wrapped Request Object (SlingHttpServletRequest).
- slingResponse - The wrapped Response Object (SlingHttpServletResponse).
- resource - The Sling Resource Object (slingRequest.getResource();).
- resourceResolver - The Sling Resource Resolver Object (slingRequest.getResoucreResolver();).
- **currentNode** - The resolved JCR node for the request.
- log - The Default logger ().
- sling - The Sling script helper.
- properties - The properties of the addressed resource (resource.adaptTo(ValueMap.class);).

- pageProperties - The properties of the page of the addressed resource.
- pageManager - The page manager for accessing AEM content pages (resourceResolver.adaptTo(PageManager.class);).
- component - The component object of the current AEM component..
- designer - The designer object for retrieving design information (resourceResolver.adaptTo(Designer.class);).
- **currentDesign** - The design of the addressed resource.
- **currentStyle** - The style of the addressed resource.

Notes:

- **currentNode**, **currentDesign**, **currentStyle**
- **not** have "**currentResource**" -> only have "**resource**"

Clientlibs

https://docs.adobe.com/docs/en/aem/6-0/develop/the-basics/clientlibs.html

Notes:

- embed
- dependencies
- http://stackoverflow.com/questions/13052261/what-is-the-difference-between-embed-and-dependencies-for-type-clientlibrary
- debug clientlibs: "**?debugClientLibs=true**". The library that is generated contains **@import** statements instead of the embedded code.

VLT tool

https://docs.adobe.com/docs/en/crx/2-3/how_to/how_to_use_the_vlttool.html

RESOLVED

Removes conflicted state on working copy files or directories.

> This command does not semantically resolve conflicts or remove conflict markers; it merely removes the conflict-related artifact files and allows PATH to be committed again.

Using filters

- ***Merge:*** Content in the package that is not already in the repository is added. Content that is in both the package and the repository is unchanged. No content is removed from the repository.

- ***Replace:*** Content in the package that is not in the repository is added to the repository. Content in the repository is replaced with matching content in the package. Content is removed from the repository when it does not exist in the package.

- ***Update:*** Content in the package that is not in the repository is added to the repository. Content in the repository is replaced with matching content in the package. Existing content gets removed from the repository.

Click here to see details.

Sling servlet

https://sling.apache.org/documentation/the-sling-engine/servlets.html

Notes:

- sling.servlet.**paths**
- sling.servlet.**resourceTypes**, **selectors**, **extensions**, **methods** (default is **GET**)

Dispatcher

The Dispatcher always requests the document directly from the AEM instance in the following cases:

- If the HTTP method is **not GET**. Other common methods are POST for form data and HEAD for the HTTP header.

- If the request URI contains **a question mark "?"**. This usually indicates a dynamic page, such as a search result, which does not need to be cached.
- The file **extension is missing**. The web server needs the extension to determine the document type (the MIME-type).
- The **authentication header** is set (this can be configured)

IGNORING URL PARAMETERS

The **ignoreUrlParams** section defines which URL parameters are ignored when determining whether a page is cached or delivered from cache:

- When a request URL contains parameters that are all ignored, the page is cached.
- When a request URL contains one or more parameters that are not ignored, the page is not cached.

The following example causes Dispatcher to ignores the "q" parameter, so that request URLs that include the q parameter are cached:

```
/ignoreUrlParams
{
    /0001 { /glob "*" /type "deny" }
    /0002 { /glob "q" /type "allow" }
}
```

Using the example ignoreUrlParams value, the following HTTP request causes the page to be cached because the q parameter is ignored:

GET /mypage.html?q=5

Using the example ignoreUrlParams value, the following HTTP request causes the page to not be cached because the p parameter is not ignored:

GET /mypage.html?q=5&p=4

CACHING WHEN AUTHENTICATION IS USED

By default, requests that include this authentication information **are not cached** because authentication is not performed when a cached document is returned to the client. This configuration prevents Dispatcher from serving cached documents to users who do not have the necessary rights.

However, if your requirements permit the caching of authenticated documents, set /allowAuthorized to one:

/allowAuthorized "1"

References

- https://docs.adobe.com/docs/en/dispatcher.html
- https://docs.adobe.com/docs/en/dispatcher/disp-config.html

Day CQ Link Checker Transformer

Link Checker is configured to take no action if a link is broken. In this case, how do I disable the external link checker from validating links? In doing CPU profiling and analyzing thread dumps, link checking is affecting performance, and we'd like to turn it off.

https://helpx.adobe.com/experience-manager/kb/DisableLinkChecker.html

Sightly

unwrap

data-sly-unwrap: Removes the host element from the generated markup while retaining its content. This allows the exclusion of elements that are required as part of HTL presentation logic but are not desired in the actual output.

```
<p data-sly-use.nav="navigation.js" data-sly-unwrap>Hello World</p>
```

will produce

Hello World

Attribute

```
<div class="${''}" data-sly-attribute.id="${''}"></div>
```

produces,

```
<div></div>
```

but,

```
<div class="" data-sly-attribute.id=""></div>
```

produces,

```
<div class=""></div>
```

To prevent the stripping of empty attributes, set their value to an array containing an empty string. For example,

```
<div class="${['']}" data-sly-attribute.id="${['']}"></div>
```

produces,

```
<div class="" id=""></div>
```

Loading Client Libraries

In HTL, client libraries are loaded through a helper template provided by AEM, which can be accessed through *data-sly-use*. Three templates are available in this file, which can be called through *data-sly-call*:

- *css* - Loads only the CSS files of the referenced client libraries.
- *js* - Loads only the JavaScript files of the referenced client libraries.
- *all* - Loads all the files of the referenced client libraries (both CSS and JavaScript).

```
<sly data-sly-use.clientlib="/libs/granite/sightly/templates/clientlib.html"
     data-sly-call="${clientlib.all @ categories=['myCategory1', 'myCategory2']}"/>
```

```
<!doctype html>
<html data-sly-use.clientlib="/libs/granite/sightly/templates/clientlib.html">
    <head>
        <!-- HTML meta-data -->
        <sly data-sly-call="${clientlib.css @ categories='myCategory'}"/>
    </head>
    <body>
        <!-- page content -->
        <sly data-sly-call="${clientlib.js @ categories='myCategory'}"/>
    </body>
</html>
```

References

- https://docs.adobe.com/docs/en/htl/docs/getting-started.html
- https://docs.adobe.com/docs/en/htl/docs/block-statements.html?wcmmode=disabled

Some Questions

1. Question: Which xtype should you use if you want to reuse a part of a dialog in another dialog?

A/ cqinclude
B/ referencesdialog
C/ cqwidgetreference
D/ không nh?

Answer: A

2. Question: How are the resources called that are passed through a workflow?

A/ WorkItem
B/ Transaction
C/ Lifecycle
D/ Payload

Answer: D

3. Question: A client library is used in the component under **/apps** but visitor or user cannot access **/apps** because of security (access denied). The solution is to create a client library folder under the **/etc** folder. How is to satisfy this case?

Answer: Use the categories property to identify the client library folder to embed

4. Question: We want to change the session timeout from 12 hours to 14 days. Which service or component should be used?

A/ **Apache Jackrabbit Oak Token Configuration** (http://svn.apache.org/repos/asf/jackrabbit/oak/trunk/oak-core/src/main/java/org/apache/jackrabbit/oak/security/authentication/token/TokenConfigurationImpl.java)

B/ Adobe CRX Token Authentication Handler: Cleanup Task

Answer: A, Apache Jackrabbit Oak Token Configuration

5. Question: What is the log level after we initialized the AEM instance?

Answer: **INFO**

6. Question: We have 2 templates Catalog and Product. Now, we want to create a new page using Product template under a page using Catalog template. Which statement is correct?

Answer: Add allowChildren property in the Catalog template. Its value is Product template

7. Question: We already had a page. Which property should be used to allow creating a new page (template A) under that page?

Answer: cq:allowedTemplates set in jcr:content node of a page: allow template on specific page

8. Question: We want to debug client lib in the AEM. Which statement is correct?

Answer: Use ?debugClientLibs=true. The library that is generated contains @import

9. Question: We have a definition of dependency as below. Which statement is correct?

```
<dependency>
 <groupId>org.apache.felix</groupId>
 <artifactId>org.apache.felix.scr</artifactId>
 <version>[1.2,2)</version>
</dependency>
```

Answer: including 1.2, and excluding 2

10. Question: When making a Factory Configuration append -<identifier> to the name. Which statement is correct?

Answer: <identifier> is mandatory and replaced by free text

11. Question: We define the AEM run mode and set its value sling.run.modes=**author,foo,dev**. We add a config node under \apps\<project_name>\runmodes. How can we set configuration for all instances of foo?

Answer: config.foo

12. Question: We create a bundle and install it into the repository but it is error because of missing external libraries. How is to obtain / resolve?

Answer: Import external libraries into bundle using maven-bundle-plugin

13. Question: AEM defines some properties / variables in the global. Which property / variable is incorrect?

A/ currentNode

B/ currentDesign

C/ currentStyle

D/ currentResource

Answer: D, we only have resource

14. Question: We have an URL **abc.html?q=aem exam**. After user accessed the URL, we saw some logs as abc.html?q=aem exam is not cached. How can we obtain / resolve this problem?

Answer: Add ignoreUrlParams section defines which URL parameters are ignored

15. Question: We want to create a session in the background service. Which statement is correct?

Answer: Session session = repository.loginService(String, String);

16. Question: We have invalid link in the page. How is to obtain / resolve it?

Answer: disable checker in Day CQ Link Checker Transformer

17. Question: We have a servlet which defines **sling.servlet.paths, sling.servlet.resourceTypes, selectors, extensions** in the configuration. Which statements are correct?

A/ If method is not set, default method is POST

B/ Neither sling.servlet.paths and sling.servlet.resourceTypes are set

C/ If sling.servlet.paths is set, the others will be ignored

D/ Extensions is .....

Answer: C and D

18. Question: Which statement regarding an AEM instance started with author run-mode is correct?
A/ Author run-mode CANNOT be used to preview a website,

B/ The side-kick does NOT appear in the author mode,

C/ The run-mode can be changed to publish after installation,

D/ The run-mode CANNOT be changed to publish after installation.

Answer: D

19. Question: Company wants to send Email Notification.... Which statement is correct?

Answer: Day Mail Service because it contains mail server information

20. Question: there is a database question which relates to Apache Sling Connection Pooled DataSource, Day Commons JDBC Connections Pool.

Answer: you please re-check document to choose a correct one. I would refer to Day Commons JDBC Connections Pool.

21. Question: Why we use .gitignore?

Answer:

- Ignore files (setting files) are automatically generated by IDE e.g. eclipse
- ..... 🙂

22. Question: Customer has some sites and they configure the SSO authentication. After user log on the system, he is brought to the error 403 permission page. How is to resolve it?

Answer: Add hostname into the Apache Sling Referrer Filter.

23. Question: How to control the source in the repository like Subversion?

A/ Apache Maven

B/ FileVault (VLT)

C/

D/

Answer: B

24. Question: Which statement is used to get the property value of the design dialog?

A/ properties.get(<property_name>; "");

B/ currentStyle.get(<property_name>; "") (or currentStyle.get(<property_name>))

C/ currentStyle.getDialog....

D/ currentStyle.getDesignDialog....

Answer: B

25. Question: Configure the factory for a specific service / component. Which property is correct?

Answer: configurationFactory=true