



IBM Cloud Professional Certification Program

Study Guide Series

Exam C9530-519 IBM API Connect V5.0.5 Solution Implementation

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Purpose of Exam Objectives

When an exam is being developed, the Subject Matter Experts work together to define the role the certified individual will fill. They define all of the tasks and knowledge that an individual would need to have in order to successfully implement the product. This creates the foundation for the objectives and measurement criteria, which are the basis for the certification exam.

The Middleware Certification item writers use these objectives to develop the questions that they write and which will appear on the exam.

It is recommended that you review these objectives. Do you know how to complete the task in the objective? Do you know why that task needs to be done? Do you know what will happen if you do it incorrectly? If you are not familiar with a task, then go through the objective and perform that task in your own environment. Read more information on the task. If there is an objective on a task there is about a 95% chance that you WILL see a question about it on the actual exam.

After you have reviewed the objectives and completed your own research, then take the assessment exam. While the assessment exam will not tell you which question you answered incorrectly, it will tell you how you did by section. This will give you a good indication as to whether you are ready to take the actual exam or if you need to further review the materials.

Note: This is the high-level list of objectives. As you review these objectives, click for a more detailed level of how to perform the task.

High-level Exam Objectives

Section 1 - Architectural Overview of IBM API Connect	
1.1	Articulate the architectural requirements to support a given IBM API Connect topology.
1.2	Compare the different IBM API Connect deployment options.

1.3	Differentiate between the two types of organizations in IBM API Connect.
1.4	Demonstrate the various stages in the lifecycle of an API including Create, Run, Manage, and Secure. The API lifecycle provides the foundation of an API strategy.
1.5	Distinguish between the various roles involved in the lifecycle of an API within IBM API Connect.
1.6	Implement the OpenAPI specification in IBM API Connect.
1.7	Identify typical use cases for IBM API Connect across industry.
Section 2 - Cloud Manager Role	
2.1	Install and administer collectives and gateways.
2.2	Install and configure the API Connect Cloud.
2.3	Install, configure, and customize the Developer Portal.
2.4	Manage the API Connect Cloud using the REST interface.
2.5	Use the API Connect Command Line Interface.
2.6	Backup and restore IBM API Connect configuration data.
2.7	Backup and restore APIs and Products.
2.8	Analyze logs to identify problems within the API Connect Cloud.
2.9	Secure the API Connect Cloud.
2.10	Integrate with an external user registry.
2.11	Configure the API Gateway extensions.
2.12	Manage IBM API Connect catalogs.
2.13	Manage the API Connect Cloud.
Section 3 - API Developer Role	
3.1	Design a LoopBack application using API Connect.
3.2	Use the Unit Testing tools to test APIs.
3.3	Implement user-defined policies.
3.4	Utilize built-in policies.
3.5	Manage error handling.
3.6	Utilize API properties.
3.7	Create an API assembly.
3.8	Create and configure a SOAP API.
3.9	Create and configure a REST API.
3.10	Apply a security definition to an API.
3.11	Use the API Connect Developer Toolkit Command Line Interface.
Section 4 - Product Manager Role	
4.1	Distinguish between the various lifecycle stages of APIs and Products.
4.2	Gain business insight from analytics information.

4.3	Show the relationship between Products and Plans and APIs.
4.4	Design Products and Plans.
4.5	Administer Consumer Access.
Section 5 - App Developer Role	
5.1	Use the Developer Portal.

Detailed Exam Objectives

Section 1 - Architectural Overview of IBM API Connect

1.1. Articulate the architectural requirements to support a given IBM API Connect topology.

- 1.1.1. Select the various components (management servers, gateway servers, portal servers, collective servers) of an API Cloud.
- 1.1.2. Determine the minimum infrastructure requirements (network, firewall, user registry, etc.) for IBM API Connect.
- 1.1.3. Choose how to define different environments/catalogs within your API Cloud based on functional unit (development, UAT, QA, production) or end users (partners, internal, external).
- 1.1.4. Design an architecture to support a scalable, HADR deployment of IBM API Connect.

REFERENCES

- http://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.install.doc/overview_apimgmt_topology.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.install.doc/load_balancing_in_api_management_environments.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.install.doc/capim_portal_HA.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.overview.doc/api_management_overview.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.install.doc/overview_installing_apimgmt.html

1.2. Compare the different IBM API Connect deployment options.

- 1.2.1. Choose deployment on your platform of choice (on -premise, Bluemix public, Bluemix dedicated, Bluemix local, hybrid).
- 1.2.2. Outline the seamless flexibility in deployment options (runs anywhere, single and multi-tenant, single vendor, same code base) of IBM API Connect.

REFERENCES

- <ftp://www.redbooks.ibm.com/redbooks/REDP5349> Section 3.4

1.3. Differentiate between the two types of organizations in IBM API Connect.

- 1.3.1. Articulate the role of provider organizations and the relationship with its members.
- 1.3.2. Articulate the role of developer organizations and how, together with communities, they can be used to restrict visibility of APIs.
- 1.3.3. Administer (create, update, delete) provider organizations.

- 1.3.4. Administer (create, edit, delete, manage subscriptions, manage applications, sending notifications) developer organizations.

REFERENCES

- http://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.c.overview.doc/overview_apimgmt_about.html
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- https://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.c.apionprem.doc/apionprem_manage_consumerorgs.html

1.4. Demonstrate the various stages in the lifecycle of an API, including Create, Run, Manage, and Secure. The API lifecycle provides the foundation of an API strategy.

- 1.4.1. Illustrate how organizations can quickly create high-quality secure and scalable APIs for enterprise systems.
- 1.4.2. Illustrate how developers can leverage integrated tooling to build, run, debug, and deploy APIs and microservices written for polyglot runtimes like Node.js or Java.
- 1.4.3. Illustrate how to create and manage self-service portals that empower internal and external developers to quickly discover and consume APIs and at the same time get insights into securely accessed enterprise data.
- 1.4.4. Illustrate how to set and enforce API policies to secure back-end information assets and comply with governance and regulatory mandate.
- 1.4.5. Demonstrate how changes in one stage of the API lifecycle is automatically reflected in other components of the IBM API Connect solution.

REFERENCES

- https://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.c.overview.doc/api_management_overview.html
- https://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.c.toolkit.doc/tutorial_cli_overview.html
- https://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.c.apionprem.doc/tutorial_apionprem_expose_SOAP.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.c.apionprem.doc/task_apionprem_new_idp.html (Invite collaborators)
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.c.toolkit.doc/tapim_sec_api_config.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.c.apionprem.doc/capim_product_lifecycle.html

1.5. Distinguish between the various roles involved in the lifecycle of an API within IBM API Connect.

- 1.5.1. Outline the different roles (Cloud Owner, Cloud Administrator, Organization Manager, Topology Administrator) involved and their permissions as it applies to the Cloud Manager UI.
- 1.5.2. Outline the different roles (Owner, Administrator, API Developer, Publisher) involved and their respective permissions as it applies to the API Manager UI.
- 1.5.3. Outline the different roles (Developer Organization Owner, Application Developer, Viewer) involved and their respective permissions as it applies to the Developer Portal UI.

REFERENCES

- http://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.overview.doc/overview_apimgmt_users.html
- <http://www.redbooks.ibm.com/redpapers/pdfs/redp5349.pdf>
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.overview.doc/overview_apimgmt_users.html

1.6. Implement the OpenAPI specification in IBM API Connect.

- 1.6.1. Inspect the content (basePath, parameters, tags, securityDefinitions, etc.) of an OpenAPI definition file.
- 1.6.2. Administer (adding, updating, exporting) a REST API using an OpenAPI definition file.
- 1.6.3. Perform the validation of the YAML or JSON definition of an API or Product in IBM API Connect.
- 1.6.4. Examine the IBM extensions to the OpenAPI specification.

REFERENCES

- http://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.apionprem.doc/task_apionprem_using_swagger_definitions.html
- <http://swagger.io/specification/>
- https://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/task_apionprem_creating_apis.html
- https://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/capim_cli_swagger_def_file.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/task_apim_cli_validation.html
- https://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/rapim_cli_swagger_extensions.html

1.7. Identify typical use cases for IBM API Connect across industry.

- 1.7.1. Outline the driving forces (external innovation, social interaction, partner onboarding, mobile expansion, microservices, monetization, Internet of Things, etc.) for a rapid adoption of APIs.

- 1.7.2. Identify good candidates for APIs.
- 1.7.3. Compile API use cases in Banking.
- 1.7.4. Compile API use cases in Government.
- 1.7.5. Compile API use cases in Retail.
- 1.7.6. Compile API use cases in Telecommunications.
- 1.7.7. Compile API use cases in Automotive.
- 1.7.8. REFERENCES
- 1.7.9. <https://developer.ibm.com/apiconnect/2015/11/01/api-use-cases-for-everyindustry/>
 - <https://developer.ibm.com/apiconnect/2014/08/19/identifying-good-candidatesapis/>
 - <https://developer.ibm.com/apiconnect/2014/08/12/api-economy-drivers/>
 - <https://developer.ibm.com/apiconnect/2016/09/07/identifying-api-use-cases-inbanking/>
 - <https://developer.ibm.com/apiconnect/2016/11/14/identifying-api-use-cases-ingovernment-white-paper-available/>
 - <https://developer.ibm.com/apiconnect/2016/09/22/identifying-api-use-cases-inretail-white-paper-available/>
 - <https://developer.ibm.com/apiconnect/2016/09/12/identifying-api-use-casestelecommunications/>
 - <https://developer.ibm.com/apiconnect/2016/11/02/identifying-api-use-cases-inhttps://developer.ibm.com/apiconnect/2016/11/02/identifying-api-use-cases-in-automotive-white-paper-available/automotive-white-paper-available/>
 - <https://developer.ibm.com/apiconnect/2014/08/19/identifying-good-candidatesapis/>
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 - <https://developer.ibm.com/apiconnect/2014/12/18/telecom-apis-now-talking/>
 - <https://developer.ibm.com/apiconnect/2014/10/31/whats-driving-apis-automotive/>

Section 2 - Cloud Manager Role

2.1. Install and administer collectives and gateways.

- 2.1.1. Illustrate minimum requirements.
- 2.1.2. Download API Connect Controller package.
- 2.1.3. Install the collective Controller.
- 2.1.4. Setup password.
- 2.1.5. Start the controller.
- 2.1.6. Add the API Connect Collective to the Cloud Manager.
- 2.1.7. Install Collective member host.
- 2.1.8. Prepare virtual DataPower appliance to use as an API connect Gateway server.

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- http://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.install.doc/tapic_install_collective.html
- http://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.install.doc/overview_installing_gatewayvm_apimgmt.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.install.doc/overview_apimgmt_planning.html
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- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.install.doc/tapic_install_collective.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.install.doc/overview_installing_gatewayvm_apimgmt.html

2.2. Install and configure the IBM API Connect Cloud.

- 2.2.1. Deploy the Management OVA template.
- 2.2.2. Configure DHCP or Static addressing.
- 2.2.3. Change CPU and RAM setting to minimum requirement.
- 2.2.4. Change Default password if needed.
- 2.2.5. Apply SMTP server.
- 2.2.6. Create an external LDAP server if needed.

REFERENCES

- http://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.install.doc/overview_installing_mgmtvm_apimgmt.html
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- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.install.doc/overview_configuringDCHP.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.cmc.doc/email_connect.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.cmc.doc/task_cmc_userregistries.html

2.3. Install, configure, and customize the Developer Portal.

- 2.3.1. Install the Developer Portal OVA.
- 2.3.2. Configure the Developer Portal in the Cloud Manager Console.
- 2.3.3. Apply Public key.
- 2.3.4. Apply SMTP server.
- 2.3.5. Install TLS Certificate.
- 2.3.6. Customize the Developer Portal.
- 2.3.7. Assign people to a role.
- 2.3.8. Assign permission to a role.
- 2.3.9. Secure the Developer Portal.

REFERENCES

- http://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.devportal.doc/capim_devportal_admin.html
- http://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.install.doc/tapim_portal_installing_VA.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.install.doc/tapim_portal_ova_install.htmlhttps://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.devportal.doc/capim_devportal_admin.html
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- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/con_ldap_requirements.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.devportal.doc/tapim_portal_add_identity.html

2.4. Manage the IBM API Connect Cloud using the REST interface.

- 2.4.1. Demonstrate how the users and developers organization will be managed.
- 2.4.2. Demonstrate use of APIs to browse public products to the Developer Portal.
- 2.4.3. Demonstrate use of REST APIs to browse public APIs.
- 2.4.4. Show how to manage application and subscriptions using APIs.
- 2.4.5. Obtain details about the Developer Portal configuration using APIs.

REFERENCES

- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.apirest.doc/rest_apis.html

2.5. Use the IBM API Connect Command Line Interface.

- 2.5.1. Log into the Command Line Interface with different methods.
- 2.5.2. Troubleshoot with the Command Line Interface.
- 2.5.3. Get status of the servers.
- 2.5.4. Perform upgrades.
- 2.5.5. Automate commands.

REFERENCES

- http://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.overview.doc/ref_cli_about_cli.html

2.6. Backup and restore IBM API Connect configuration data.

- 2.6.1. Log in to SSH CLI for management server.
- 2.6.2. Store a file on FTP or SFTP server using backup command.
- 2.6.3. Make a note of the user ID or password of your Management servers at the time of the backups.
- 2.6.4. Restore configuration file stored on FTP or SFTP server.
- 2.6.5. For Gateway servers only, if the user ID or password is changed, these credentials must be updated in the API Connect cloud console.

REFERENCES

- http://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.overview.doc/overview_backupcli_apimgmt.html
- http://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.overview.doc/overview_restorecli_apimgmt.html
- <https://developer.ibm.com/apiconnect/2016/06/22/automating-apic-managementhttps://developer.ibm.com/apiconnect/2016/06/22/automating-apic-management-cli-operations/cli-operations/>

2.7. Backup and restore APIs and Products.

- 2.7.1. Back up a Product version to Source Control.
- 2.7.2. Restore a previous backed up Product version.
- 2.7.3. Compare the methods for backing up an API for Source Control.
- 2.7.4. Show the process restoring a previously backed up API.

REFERENCES

- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.apionprem.doc/task_apionprem_export_product.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.apionprem.doc/task_apionprem_upload_product.html

2.8. Analyze logs to identify problems within the IBM API Connect Cloud.

- 2.8.1. Download logs from the CMC.
- 2.8.2. Choose the location of logs on the Cloud Manager server.
- 2.8.3. Initiate commands that provide real-time log information as they occur.
- 2.8.4. Compare options to copy logs from servers to alternative targets.
- 2.8.5. Compile PostMortem logs for analysis.
- 2.8.6. Examine vital resources usage with logs.
- 2.8.7. Inspect logs that relate to the Developer Portal UI error messages.
- 2.8.8. Inspect logs that relate to the API gateway.
- 2.8.9. Inspect logs relating to a microservice application.

REFERENCES

- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.install.doc/overview_apic_troubleshooting_upgrade.html
- http://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.devportal.doc/rapim_portal_troubleshoot.html

2.9. Secure the IBM API Connect Cloud.

- 2.9.1. Create and modify a TLS Profile to secure the cloud.
- 2.9.2. Generate appropriate SSL certificates for API Connect.
- 2.9.3. Plan firewall port communication.
- 2.9.4. Differentiate between Local Registry, LDAP and URL Authentication.
- 2.9.5. Integrate secure transport from Cloud Manager to Gateway, Developer Portal, and API Manager.

- 2.9.6. Initiate certificate exchange between Cloud Manager and Developer Portal.
- 2.9.7. Create and assign roles to users, including product-defined and custom roles.
- 2.9.8. Configure Space Permissions.
- 2.9.9. Modify registration options in Developer Portal.
- 2.9.10. Integrate a web application firewall in front of the Developer Portal.
- 2.9.11. Integrate Disk Encryption on the Management appliances.

REFERENCES

- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.install.doc/overview_apimgmt_portreqs.html
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2.10. Integrate with an external user registry.

- 2.10.1. Create User Registry using an LDAP registry.
- 2.10.2. Initiate authentications using an external provider with OpenID Connect for the Developer Portal.
- 2.10.3. Combine internal LDAP registry for use in Developer Portal.
- 2.10.4. Create and utilize a delegated Portal Registry.

REFERENCES

- http://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/tapim_sec_api_config_scheme_create_basic.html
- http://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.devportal.doc/tapic_portal_configure_ldap.html
- http://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.devportal.doc/capic_portal_pdur.html

2.11. Configure the API Gateway extensions.

- 2.11.1. Determine where the extension will execute.
- 2.11.2. Build a DataPower Rule to provide necessary behavior.
- 2.11.3. Create extensions.xml for packaging extension.
- 2.11.4. Build DataPower export including all .xml, .xsl, and local files.
- 2.11.5. Deploy the DataPower export to the DataPower Gateways.

REFERENCES

- http://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.mc.doc/config_dp_ext.html

2.12. Manage IBM API Connect catalogs.

- 2.12.1. Create a catalog.
- 2.12.2. Design a Portal URL.
- 2.12.3. Select a Gateway to run API.
- 2.12.4. Choosing API endpoints.
- 2.12.5. Employ Automatic Subscription.
- 2.12.6. Apply permissions to a Catalog.
- 2.12.7. Promote APIs and Products from one catalog to another.
- 2.12.8. Implement Custom User Policies.
- 2.12.9. Control Portal user registration.
- 2.12.10. Implement Developer Organization.
- 2.12.11. Apply Approval processing.
- 2.12.12. Apply roles by catalog.
- 2.12.13. Illustrate use of Spaces.

REFERENCES

- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.apionprem.doc/create_env.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/capim_mng_custpolicies.html
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- https://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.apionprem.doc/create_env.html

2.13. Manage the IBM API Connect Cloud.

- 2.13.1. Administer actions of the Management, Gateway and Collective Services.
- 2.13.2. Implement failover and high availability in the Management Services.
- 2.13.3. Implement additional Gateway Servers.
- 2.13.4. Choose Load Balancing options.
- 2.13.5. Choose DNS schemes for Portal and API calls.
- 2.13.6. Administer Provider Organizations.
- 2.13.7. Compose messages to Provider Organizations.
- 2.13.8. Create users.
- 2.13.9. Examine Management and Gateway Analytics in the CMC.
- 2.13.10. Create User Registries in CMC.

- 2.13.11. Create TLS Profiles in CMC.
- 2.13.12. Configure email server in CMC.
- 2.13.13. Compare user capabilities based on Role and Permissions.

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- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.cm.c.doc/api_create.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.cm.c.doc/create_node_gateway.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.cm.c.doc/config_endpoints.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.cm.c.doc/tenant_manage.html

Section 3 - API Developer Role

3.1. Design a LoopBack application using API Connect.

- 3.1.1. Create a Loopback project and select the kind of application to be created.
- 3.1.2. Construct a Loopback model and datasource in the API Designer or from the CLI.
- 3.1.3. For the model, select and install, if needed, the connector to use.
- 3.1.4. Select an in-memory data source or a back-end data source.
- 3.1.5. Test the Loopback project.
- 3.1.6. Publish of the Loopback project from the API Designer or from the CLI.

REFERENCES

- https://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/tutorial_cli_project_working.html
- https://www.ibm.com/support/knowledgecenter/en/SSFS6T/com.ibm.apic.toolkit.doc/tutorial_cli_project_test.html
- <http://loopback.io/doc/en/lb2/>

3.2. Use the Unit Testing tools to test APIs.

- 3.2.1. Perform unit tests on the Loopback project using the command line.
- 3.2.2. Perform unit tests on the Loopback project using the API Designer Explorer or Assembly.
- 3.2.3. Use the API Designer Test Tool to unit test APIs.
- 3.2.4. Start the test server and micro gateway.
- 3.2.5. Specify or generate parameters in the assembly and test.

REFERENCES

- https://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/tutorial_cli_project_working.html
- http://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/task_toolkit_testing.html
- <https://developer.ibm.com/apiconnect/getting-started/run-your-api/>

3.3. Implement user-defined policies.

- 3.3.1. Implement proprietary logic for dynamic routing of requests.
- 3.3.2. Make accessible an extra capability that is not provided in IBM API Connect.
- 3.3.3. Construct a user defined policy by creating, describing, packaging and importing the policy in API Connect.

REFERENCES

- https://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.policy.doc/capim_using_custpolicies.html
- https://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/capim_mng_custpolicies.html
- https://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.policy.doc/capim_custpolicies_overview.html

3.4. Utilize built-in policies.

- 3.4.1. Select built-in policies from the assembly editor to add to an API and configure the properties for that policy to run in the DataPowerGateway or the Micro Gateway.
- 3.4.2. Apply built-in policies to an API by adding an assembly extension to your OpenAPI definition file.

REFERENCES

- https://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/rapim_ref_ootb_policies.html
- https://www.ibm.com/support/knowledgecenter/en/SSFS6T/com.ibm.apic.toolkit.doc/rapim_cli_swagger_extensions.html
- https://www.ibm.com/support/knowledgecenter/en/SSFS6T/com.ibm.apic.toolkit.doc/rapim_ref_ootb_policies.html

3.5. Manage error handling.

- 3.5.1. Use the catch section of the assembly to describe the hierarchical handling of errors thrown during the assembly execution.
- 3.5.2. Distinguish between GatewayScript support for synchronous and asynchronous error handling.
- 3.5.3. Use Synchronous error handling with the try, catch, and finally statements.
- 3.5.4. Accept an error object for Asynchronous Error Handling.
- 3.5.5. Handle errors with XSLT.
- 3.5.6. Use the Throw policy in the assembly to indicate logic errors.

REFERENCES

- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/task_toolkit_catch.html
- <https://developer.ibm.com/apiconnect/2016/04/06/throwing-and-catching-errorshttps://developer.ibm.com/apiconnect/2016/04/06/throwing-and-catching-errors-in-ibm-api-connect/in-ibm-api-connect/>
- https://www.ibm.com/support/knowledgecenter/SS9H2Y_7.5.0/com.ibm.dp.doc/errorhandling_js.html

3.6. Utilize API properties.

- 3.6.1. Distinguish between API properties and Context variables when defining an API, creating a custom policy, or configuring a policy or logic construct.
- 3.6.2. Define the API using API properties in the API Designer by adding name, description, encode and default values.
- 3.6.3. Use properties to change behavior in assemblies.
- 3.6.4. Use properties to express catalog variables.

REFERENCES

- https://www.ibm.com/support/knowledgecenter/SSFS6T/com.ibm.apic.toolkit.doc/task_set_config_properties.html
- https://www.ibm.com/support/knowledgecenter/en/SSFS6T/com.ibm.apic.toolkit.doc/capim_context_references.html

3.7. Create an API assembly.

- 3.7.1. Create a REST or SOAP API definition.
- 3.7.2. Create a policy assembly in the Policy assembly section of the design view of an API.
- 3.7.3. Specify which type of gateway you want to use your API with by selecting Micro Gateway policies or DataPower Gateway policies.
- 3.7.4. Create a graphical representation of the assembly flow on the canvas by dragging components from the palette
- 3.7.5. Use the Show catches toggle to show and hide error catches in the palette
- 3.7.6. Filter the canvas to show only the parts that will apply to a specific operation
- 3.7.7. Add, remove, and configure component properties in the property sheet associated with the selected component in the canvas
- 3.7.8. Use the Source view to modify the assembly section.

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- https://www.ibm.com/support/knowledgecenter/en/SSFS6T/com.ibm.apic.toolkit.doc/tutorial_apionprem_assemblyresource.html
- http://www.ibm.com/support/knowledgecenter/SSFS6T/com.ibm.apic.toolkit.doc/task_apionprem_composing_apis.html
- http://www.ibm.com/support/knowledgecenter/en/SSFS6T/com.ibm.apic.toolkit.doc/task_apionprem_swagger_ibm_extensions.html

3.8. Create and configure a SOAP API.

- 3.8.1. Create a SOAP API from a SOAP service.
- 3.8.2. Create a SOAP API from WSDL.
- 3.8.3. Add a SOAP API from a pre-defined registry.
- 3.8.4. Test SOAP API.
- 3.8.5. Create API Definitions.

REFERENCES

- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.apionprem.doc/tutorial_apionprem_creating_SOAP_API.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/create_api_wsdl.html

3.9. Create and configure a REST API.

- 3.9.1. Create a REST API definition from scratch.
- 3.9.2. Create a REST API definition from a template.
- 3.9.3. Create a REST API that invokes an existing SOAP service.
- 3.9.4. Import an existing OpenAPI definition.
- 3.9.5. Customize a REST API definition.
- 3.9.6. Update a REST API from an OpenAPI definition.

REFERENCES

- http://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/tutorial_apionprem_apiproxy.html
- http://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/task_apim_cli_templates.html
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- http://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/task_apionprem_creating_apis.html
- http://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.apionprem.doc/tapim_api_swagger_update.html

3.10. Apply a security definition to an API.

- 3.10.1. Differentiate between various Security Definition types.
- 3.10.2. Elaborate on the restrictions when using Security Definitions.
- 3.10.3. Apply Security Definitions to APIs.

REFERENCES

- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/tapim_sec_api_config_scheme_create.html
- https://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/tapim_sec_api_config_scheme_apply_res.html

3.11. Use the IBM API Connect Developer Toolkit Command Line Interface.

- 3.11.1. Create and validate artifacts.
 - 3.11.1.1. Manage configuration variables.
 - 3.11.1.2. Create development artifacts.
 - 3.11.1.3. Run the API Designer.
 - 3.11.1.4. Validate development artifacts.
- 3.11.2. Create and test loopback applications.
 - 3.11.2.1. Display service logs.

- 3.11.2.2. Create and manage Loopback applications.
- 3.11.2.3. Create Micro Gateway applications.
- 3.11.2.4. Manage service properties.
- 3.11.2.5. Manage services.
- 3.11.3. Publish to the API Connect Cloud.
 - 3.11.3.1. Manage APIs in a catalog.
 - 3.11.3.2. Manage provider applications.
 - 3.11.3.3. Manage catalogs in an organization.
 - 3.11.3.4. Manage consumer applications.
 - 3.11.3.5. Manage APIs and products in draft.
 - 3.11.3.6. Log in to API Connect Cloud.
 - 3.11.3.7. Log out of API Connect Cloud.
 - 3.11.3.8. Manage members.
 - 3.11.3.9. Manage organizations.
 - 3.11.3.10. Manage policies in a catalog.
 - 3.11.3.11. Manage products in a catalog.
 - 3.11.3.12. Publish products and APIs in a catalog.
 - 3.11.3.13. Manage spaces in a catalog.
 - 3.11.3.14. Manage subscriptions.

Section 4 - Product Manager Role

4.1. Distinguish between the various lifecycle stages of APIs and Products.

- 4.1.1. Create Product and Plans including APIs.
- 4.1.2. Stage Products in target Space/Catalog.
- 4.1.3. Publish Products to Developer Portal.
- 4.1.4. Document Product for Application Developers in the Developer Portal.
- 4.1.5. Manage Application Developer access to Products.
- 4.1.6. Manage ongoing lifecycle of Product through updates, versions, retirement, and deletion.

REFERENCES

- https://www.ibm.com/developerworks/websphere/library/techarticles/1606_marco_li-trs/1606_marcoli.html

4.2. Gain business insight from analytics information.

- 4.2.1. Monitor usage of Products/API on Management Server.
- 4.2.2. Monitor usage of Products/API on Developer Portal.
- 4.2.3. Create custom dashboards to monitor specific aspects of API usage.
- 4.2.4. Export analytics data for external consumption.

4.3. Show the relationship between Products and Plans and APIs.

- 4.3.1. Create a group of APIs as a Product with a Plan, which is the Service Level Agreement, which can be provided to Application Developers.
- 4.3.2. Track the business adoption of Products, Plans, and APIs.

4.4. Design Products and Plans.

- 4.4.1. Identify core company assets to digitize into APIs Systems of Record (core backend systems capabilities).
- 4.4.2. Identify how Systems of Interaction (use case-specific APIs) can enhance core and digital business strategy.
- 4.4.3. Assemble available APIs into a Product with a Plan.

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- https://www.linkedin.com/pulse/becoming-digital-business-api-managementhttps://www.linkedin.com/pulse/becoming-digital-business-api-management-enough-alan-glickenhause?cm_mc_uid=98656825518014642869547&cm_mc_sid_50200000enough-alan-glickenhause?cm_mc_uid=98656825518014642869547&cm_mc_sid_50200000=
- <http://www.redbooks.ibm.com/redpapers/pdfs/redp5349.pdf>

4.5. Administer Consumer Access.

- 4.5.1. Illustrate how someone with at least an API provider role can see who has subscribed to a plan.
- 4.5.2. Show the level of visibility of the subscriptions.
- 4.5.3. Demonstrate an application suspension.

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- http://www.ibm.com/support/knowledgecenter/en/SSMNED_5.0.0/com.ibm.apic.apirest.doc/rest_op_portal_orgs_orgID_products_productID_subscriptionsGET.html?view=kc
- http://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.toolkit.doc/capim_products.html
- http://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.apionprem.doc/task_accessrequests_product.html
- http://www.ibm.com/support/knowledgecenter/SSMNED_5.0.0/com.ibm.apic.apirest.doc/rest_op_portal_orgs_orgID_apps_appID_subscriptions_subID_DELETE.html

Section 5 - App Developer Role

5.1. Use the Developer Portal.

- 5.1.1. Access the Developer Portal by invitation or self-service.
- 5.1.2. Discover APIs in Developer Portal.
- 5.1.3. Register Applications in Developer Portal.
- 5.1.4. Use Analytics in Developer Portal to monitor Apps.
- 5.1.5. Understand Developer Organizations in Developer Portal.

- 5.1.6. Maintain User Accounts, Passwords, and Applications in Portal.
- 5.1.7. Register application, may be self-service or require approval.
- 5.1.8. Browse APIs and select a plan to use API for an application.
- 5.1.9. Use Analytics for Application usage results.
- 5.1.10. Browse Products to select APIs for test.
- 5.1.11. Provide information needed to invoke in selected operation in selected code snippet language.
- 5.1.12. Participate in Developer Community organization, share files, report API bugs through the Developer Portal.

REFERENCES

- <http://www.redbooks.ibm.com/redpapers/pdfs/redp5350.pdf>
- https://www.ibm.com/support/knowledgecenter/SSFS6T/com.ibm.apic.devportal.doc/con_cmsportal_storefront.html
- https://www.ibm.com/developerworks/websphere/library/techarticles/1606_marcolli-trs/1606_marcoli.html

Next Steps

1. Take the [IBM API Connect V5.0.5 Solution Implementation](#) assessment test. Use the promotion code **2018StudyAssess20** for \$20 off each assessment.
2. If you pass the assessment exam, visit pearsonvue.com/ibm to schedule your testing sessions. Use the promotion code **2018StudyCert20** to receive 20% off the exam.
3. If you failed the assessment exam, review how you did by section. Focus attention on the sections where you need improvement. Keep in mind that you can take the assessment exam as many times as you would like (\$10 per exam), however, you will still receive the same questions only in a different order.