



**EXIN
OpenStack Software**

FOUNDATION

Certified by


Newton

Sample Exam

Edition 201706

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Content

Introduction	4
Sample Exam	5
Answer Key	12
Evaluation	26

Introduction

This is the sample exam EXIN Foundation Certificate in OpenStack Software (FOSS.EN). The Rules and Regulations for EXIN's examinations apply to this exam.

This exam consists of 40 multiple-choice questions. Each multiple-choice question has a number of possible answers, of which only one is the correct answer.

The maximum number of points that can be obtained for this exam is 40. Each correct answer is worth one point. If you obtain 26 points or more you will pass.

The time allowed for this exam is 60 minutes.

Good luck!

Sample Exam

1 / 40

What is the role of the OpenStack Foundation?

- A. The OpenStack Foundation wants to commercialize the OpenStack licensing model.
- B. The OpenStack Foundation wants to help achieve the OpenStack mission providing shared resources.
- C. The OpenStack Foundation wants to make sure IaaS is developed under local legislations.
- D. The OpenStack Foundation wants to promote private modular cloud and hybrid Cloud computing.

2 / 40

What is the main purpose of a Cloud Operating System?

- A. It is a software application for retrieving, presenting and traversing information resources on the World Wide Web.
- B. It is an information space where documents and other web resources are identified by URLs, interlinked by hypertext links, and can be accessed via the Internet.
- C. It manages the operation, execution and processes of virtual machines, servers and infrastructure, as well as the back-end hardware and software resources.
- D. It processes requests via HTTP, the basic network protocol used to distribute information on the World Wide Web.

3 / 40

In what Cloud service types is OpenStack mostly deployed?

- A. Hybrid Cloud
- B. IaaS
- C. PaaS
- D. SaaS

4 / 40

What Nova component receives http requests, converts commands and communicates with other components?

- A. Nova-api
- B. Nova-compute
- C. Nova-consoleauth
- D. Nova-novncproxy

5 / 40

What framework used by Nova allows changes to the Applications Program Interfaces (API) while preserving backward compatibility?

- A. API Microversions
- B. API Networks
- C. Container
- D. Flavor

6 / 40

Nova cells create a hierarchy of Nova installs.

What is the name of the top-level cell?

- A. API Cell
- B. Cell Selection
- C. Child Cell
- D. Grandchild Cell

7 / 40

What library uses Nova to provide a messaging API which supports RPC?

- A. APMQ
- B. Oslo.messaging
- C. RabbitMQ
- D. RPCClient

8 / 40

What command should be used in order to create an instance?

- A. glance image-list
- B. nova boot
- C. service nova start
- D. service nova status

9 / 40

What is a function of the Nova service?

- A. It provides and manages compute instances.
- B. It provides data reporting to a variety of consumers.
- C. It provides secure storage, provisioning and management of secrets.
- D. It supports creating boot storage volumes

10 / 40

What functionality of Glance enables virtual machines to be backed up quickly?

- A. The distribution of bootable disk images
- B. The metadata definitions catalogue
- C. The storage and cataloguing of snapshots
- D. The storage of bootable disk images

11 / 40

What are the **most** common types of Glance-supported images?

- A. Aki and ari
- B. Iso
- C. Raw and qcow2
- D. Vdi and vhd

12 / 40

Which component of Cinder selects the optimal block storage provider node on which to create a volume?

- A. cinder-api
- B. cinder-backup
- C. cinder-scheduler
- D. cinder-volume

13 / 40

Which is one of the principal Databases supported by cinderDB for housing Cinder block volume state and metadata?

- A. Microsoft SQL Server
- B. MongoDB
- C. MySQL
- D. Oracle

14 / 40

Cinder creates snapshots as point-in-time copies of the data contained in a volume.

What return state is provided in an API call for a snapshot ready to be used?

- A. AVAILABLE
- B. CREATED
- C. CREATING
- D. READY

15 / 40

What does Cinder use the volume type for?

- A. Configuring the block storage to use the message broker
- B. Creating the database tables for the block storage service
- C. Determining which type of backend to use
- D. Registering the block storage with the identity service

16 / 40

What is a use case for Object storage?

- A. Inexpensive, scalable and self-healing retention of massive amounts of unstructured data
- B. Primary storage for a database or file system
- C. Situations where the data frequently changes
- D. Workloads requiring long-term persistence of data

17 / 40

What element of the Swift architecture is responsible for managing the mapping of user created folders within the Object store service?

- A. Account server
- B. Container server
- C. Object server
- D. Proxy server

18 / 40

What is a Ring?

- A. A mapping of account, container and object names to the physical location on disk of those entities
- B. A part of the cluster that is usually located remotely from the data center
- C. A set of physical storage devices that are isolated from storage devices in other zones

19 / 40

What kind of data structure is used by Swift Rings?

- A. Array
- B. Gzipped
- C. List
- D. Tree

20 / 40

What is one of the two restrictions on container names?

- A. The maximum allowable size upon upload is 5 gigabytes (GB).
- B. They cannot contain a forward slash (/).
- C. They cannot contain a percent sign (%).
- D. They must be more than 256 bytes in length.

21 / 40

Objects in Swift are stored as binary files on the file system with metadata. What is a requirement for the underlying file system to support this?

- A. A database that stores the container's metadata
- B. Availability zones within a single geographic region
- C. Support for Fault isolation
- D. Support extended attributes (xattrs) on files

22 / 40

Which component of Manila is responsible for the creation of file system shares?

- A. File Shares Service
- B. Filter Scheduler
- C. Reference Provider

23 / 40

From which OpenStack project was Manila abstracted?

- A. Cinder
- B. Glance
- C. Keystone
- D. Swift

24 / 40

Through which component is identity management served?

- A. Keystone, for this module provides a user directory mapped to services they can access.
- B. Neutron, for this module takes care of managing networks and IP addresses.
- C. Trove, for this module is the home of the provisioning of database engines.

25 / 40

What is the relationship between users and projects?

- A. A project can be an operator for all users.
- B. A user aggregates the number of resources in each service.
- C. Projects can be added to any role in a user.
- D. Users are bound to a project by assigning them a role on that project.

26 / 40

What data format is used by Keystone for exchanging authentication and authorization data between parties, in particular, between an identity provider and a service provider?

- A. HTML
- B. SAML
- C. WML
- D. XML

27 / 40

Where needs the Freezer API to be installed on OpenStack?

- A. in the backup queue
- B. on the client side
- C. on the compute node
- D. on the controller server

28 / 40

What feature enables the management subsets of projects with a "parent" project operating as Domain?

- A. Cloud Admin
- B. Domain
- C. Group
- D. Hierarchical multitenancy

29 / 40

Which types of private information can Barbican handle?

- A. Asymmetric keys only
- B. Symmetric keys only
- C. Symmetric keys and asymmetric keys
- D. Symmetric keys, asymmetric keys and raw secrets

30 / 40

What is a potential client of the Barbican REST interface?

- A. Castellan
- B. Oslo
- C. Pecan
- D. SQLAlchemy

31 / 40

Neutron provides several networking functionalities.

Which of these is a fundamental shift in how data center networks are defined, provisioned, and consumed?

- A. API extensions for OpenStack networking
- B. IP Address Management (IPAM)
- C. Software defined Networking (SDN)
- D. Tunneling

32 / 40

Which encapsulation protocol for running overlay network is supported in OpenStack Neutron?

- A. VEP (Virtual End Point)
- B. VLAN (Virtual Local Area Network)
- C. VNID (Virtual Network ID)
- D. VxLAN (Virtual Extensible LAN)

33 / 40

Which Fuel component manages disk volumes configuration data, network configuration data, and any other environment-specific data that is necessary for successful deployment?

- A. Astute
- B. Cobbler
- C. Nailgun
- D. Puppet

34 / 40

What are individual datapoints (collection) associated with a particular meter called in Ceilometer?

- A. Alarms
- B. Meters
- C. Samples
- D. Statistics

35 / 40

What OpenStack project is designed to capture metering data in a time series database?

- A. Ceilometer
- B. Gnocchi
- C. Neutron
- D. Zaqr

36 / 40

Which command creates a new Heat stack?

- A. `$ heat stack-create --template-file --parameters`
- B. `$ heat stack-show`
- C. `$ heat stack-update --template-file --parameters`
- D. `$ heat template-validate --template-file`

37 / 40

Which of the following Heat Orchestration service components provides an AWS Query API that is compatible with the AWS CloudFormation?

- A. heat-api
- B. heat-api-cfn
- C. heat-api-cloudwatch
- D. heat engine

38 / 40

What API provides Zaqr?

- A. Amazon EC2 API
- B. OpenStack Compute API
- C. RESTful API
- D. special Admin API for privileged users to perform administrative actions

39 / 40

On what are the Zaqr Multi-tenant queues based?

- A. Keystone project IDs
- B. Network name
- C. Segmentation IDs
- D. UUID

40 / 40

What type of project service is provided by Designate?

- A. Multi-project
- B. Single-project
- C. Subnets of Tenant Networks
- D. Tenant network

Answer Key

1 / 40

What is the role of the OpenStack Foundation?

- A. The OpenStack Foundation wants to commercialize the OpenStack licensing model.
- B. The OpenStack Foundation wants to help achieve the OpenStack mission providing shared resources.
- C. The OpenStack Foundation wants to make sure IaaS is developed under local legislations.
- D. The OpenStack Foundation wants to promote private modular cloud and hybrid Cloud computing.

- A. Incorrect. OpenStack has nothing to do with commercialization of the model
- B. Correct. This is the only correct answer. See slide deck M02_OpenStackIntro.pptx, Slide 11.
- C. Incorrect. There is no link between local legislations and the development of IaaS as part of the role of the OpenStack Foundation.
- D. Incorrect. Cloud computing is the model used for OpenStack. It is not the role of the foundation itself.

2 / 40

What is the main purpose of a Cloud Operating System?

- A. It is a software application for retrieving, presenting and traversing information resources on the World Wide Web.
- B. It is an information space where documents and other web resources are identified by URLs, interlinked by hypertext links, and can be accessed via the Internet.
- C. It manages the operation, execution and processes of virtual machines, servers and infrastructure, as well as the back-end hardware and software resources.
- D. It processes requests via HTTP, the basic network protocol used to distribute information on the World Wide Web.

- A. Incorrect. That is the definition of a Web browser.
- B. Incorrect. That is the definition of the World Wide Web.
- C. Correct. A cloud operating system manages the operation, execution and processes of a large pools of compute, Storage, and Networking resources (Server, Virtual Server, Storage, Networks), as well as the back-end hardware and software resources. See M02_OpenStackIntro.pptx, slide 7.
- D. Incorrect. That is the definition of a Web server.

3 / 40

In what Cloud service types is OpenStack mostly deployed?

- A. Hybrid Cloud
- B. IaaS
- C. PaaS
- D. SaaS

A. Incorrect. Hybrid Cloud is a cloud Type and not a Cloud service type. See M02_OpenStackIntro.pptx, slide 5.

B. Correct. OpenStack is a free and open-source software platform for cloud computing, mostly deployed as an infrastructure-as-a-service (IaaS). See M02_OpenStackIntro.pptx, slide 5.

C. Incorrect. PaaS allows the consumer, generally a developer, to deploy applications through a programming language or tools supported by the cloud platform provider.

D. Incorrect. SaaS allows the consumer to use the software in a cloud environment (for example, web-based email).

4 / 40

What Nova component receives http requests, converts commands and communicates with other components?

- A. Nova-api
- B. Nova-compute
- C. Nova-consoleauth
- D. Nova-novncproxy

A. Correct. Nova-api receives http requests, converts commands and communicates with other components via the queue or http (in the case of object store). It accepts and responds to end user compute API calls. See M07_Nova_Compute_Service.pptx Slide 11.

B. Incorrect. Nova-compute manages the communications with the Hypervisor and Virtual Machines.

C. Incorrect. Nova-consoleauth authorizes console access based on user/project/role.

D. Incorrect. Nova-novncproxy provides a proxy for accessing instances through vnc connections.

5 / 40

What framework used by Nova allows changes to the Applications Program Interfaces (API) while preserving backward compatibility?

- A. API Microversions
- B. API Networks
- C. Container
- D. Flavor

A. Correct. Nova uses a framework called 'API Microversions' for allowing changes to the API while preserving backward compatibility. See 07_Nova_Compute_Service.pptx, slide 7.

B. Incorrect. API Networks exposes all OpenStack APIs, including the OpenStack Networking API, to tenants.

C. Incorrect. Containers are isolated, portable environments where you can run applications along with all the libraries and dependencies they need.

D. Incorrect. A Flavor is an available hardware configuration for a server. Each flavor has a unique combination of disk space, memory capacity, and priority for CPU time.

6 / 40

Nova cells create a hierarchy of Nova installs.

What is the name of the top-level cell?

- A. API Cell
- B. Cell Selection
- C. Child Cell
- D. Grandchild Cell

A. Correct. The top-level cell ("API cell") has a host that runs the nova-api service, but no nova-compute services. See M07_Nova_Compute_Service.pptx, slide 21.

B. Incorrect. Introducing a second level of scheduling (the cell selection), in addition to the regular nova-scheduler selection of hosts, provides greater flexibility to control where virtual machines are run.

C. Incorrect. Each child cell runs all of the other typical nova-* services found in a regular installation, except for the nova-api service.

D. Incorrect. The Grandchild Cell is the bottom-level cell.

7 / 40

What library uses Nova to provide a messaging API which supports RPC?

- A. APMQ
- B. Oslo.messaging
- C. RabbitMQ
- D. RPCClient

A. Incorrect. The Advanced Message Queuing Protocol (AMQP) is an open standard application layer protocol for message-oriented middleware.

B. Correct. RPC messaging is done via the oslo.messaging library, an abstraction on top of message queues. See M07_Nova_Compute_Service.pptx, slide 11.

C. Incorrect. *RabbitMQ* is an open source message broker software that implements the Advanced Message Queuing Protocol (AMQP).

D. Incorrect. The RPCClient class is responsible for sending method invocations to remote servers via a messaging transport.

8 / 40

What command should be used in order to create an instance?

- A. glance image-list
- B. nova boot
- C. service nova start
- D. service nova status

A. Incorrect. This command is used to list available images to boot.

B. Correct. The nova boot command is used to create the instance. The whole command sentence is the following: nova boot <ServerName> -- image "<image id>" --flavor <flavor value>. The two primary parameters in the command can be determined through the use of the glance image-list and nova flavor-list. See M07_Nova_Compute_Service.pptx Slide 15.

C. Incorrect. This command is used to bring up the service.

D. Incorrect. This command is used to check if the service is started.

9 / 40

What is a function of the Nova service?

- A. It provides and manages compute instances.
- B. It provides data reporting to a variety of consumers.
- C. It provides secure storage, provisioning and management of secrets.
- D. It supports creating boot storage volumes

- A. Correct. This is a function of Nova. Please see M07_Nova_Compute_Service.pptx Slide 4.
- B. Incorrect. This is a function of Ceilometer.
- C. Incorrect. This is a function of Barbican.
- D. Incorrect. This is a function of Cinder.

10 / 40

What functionality of Glance enables virtual machines to be backed up quickly?

- A. The distribution of bootable disk images
- B. The metadata definitions catalogue
- C. The storage and cataloguing of snapshots
- D. The storage of bootable disk images

- A. Incorrect. This functionality is not specific for backing up virtual machines.
- B. Incorrect. This functionality is not specific for backing up virtual machines.
- C. Correct. See M05_Glance_Image_Service.pptx, Slide 4.
- D. Incorrect. This functionality is not specific for backing up virtual machines.

11 / 40

What are the **most** common types of Glance-supported images?

- A. Aki and ari
- B. Iso
- C. Raw and qcow2
- D. Vdi and vhd

- A. Incorrect. Aki is the Amazon kernel image and ari is the Amazon ramdisk image.
- B. Incorrect. Iso is an archive format for the data contents of an optical disk, for example, CDROM.
- C. Correct. Raw and qcow2 are the most common types of Glance-supported images. See M05_Glance_Image_Service.pptx, slide 9.
- D. Incorrect. Vdi is a VirtualBox image and vhd includes Hyper-V, VMware, Xen and VirtualBox images.

12 / 40

Which component of Cinder selects the optimal block storage provider node on which to create a volume?

- A. cinder-api
- B. cinder-backup
- C. cinder-scheduler
- D. cinder-volume

- A. Incorrect. This component accepts API requests and routes them to cinder-volume for action.
- B. Incorrect. This component routes information between the block storage service process and the database that stores the volume states.
- C. Correct. See M08_Cinder_Block_Storage.pptx, slide 13.
- D. Incorrect. This component responds to R/W requests to the object storage database.

13 / 40

Which is one of the principal Databases supported by cinderDB for housing Cinder block volume state and metadata?

- A. Microsoft SQL Server
- B. MongoDB
- C. MySQL
- D. Oracle

- A. Incorrect. SQL Server is not supported by cinderDB. Only DB2, MySQL, MariaDB and Postgres are supported.
- B. Incorrect. SQL Server is not supported by cinderDB. Only DB2, MySQL, MariaDB and Postgres are supported.
- C. Correct. MySQL is supported by cinderDB. See M08_Cinder_Block_Storage.pptx, slide 12.
- D. Incorrect. SQL Server is not supported by cinderDB. Only DB2, MySQL, MariaDB and Postgres are supported.

14 / 40

Cinder creates snapshots as point-in-time copies of the data contained in a volume.

What return state is provided in an API call for a snapshot ready to be used?

- A. AVAILABLE
- B. CREATED
- C. CREATING
- D. READY

- A. Correct. AVAILABLE – The snapshot is ready to be used. See M08_Cinder_Block_Storage.pptx, slide 21.
- B. Incorrect. CREATED – This return state does not exist.
- C. Incorrect. CREATING – The snapshot is being created.
- D. Incorrect. READY – This return state does not exist.

15 / 40

What does Cinder use the volume type for?

- A.** Configuring the block storage to use the message broker
- B.** Creating the database tables for the block storage service
- C.** Determining which type of backend to use
- D.** Registering the block storage with the identity service

- A.** Incorrect. This is a step in the installation process of Cinder.
- B.** Incorrect. This is a step in the installation process of Cinder.
- C.** Correct. See M08_Cinder_Block_Storage.pptx Slide 9.
- D.** Incorrect. This is a step in the installation process of Cinder.

16 / 40

What is a use case for Object storage?

- A.** Inexpensive, scalable and self-healing retention of massive amounts of unstructured data
- B.** Primary storage for a database or file system
- C.** Situations where the data frequently changes
- D.** Workloads requiring long-term persistence of data

- A.** Correct. This is a use case for object storage. See M09_Swift_Object_Storage_Service.pptx, slide 4.
- B.** Incorrect. This is a use case for block storage.
- C.** Incorrect. This is a use case for block storage.
- D.** Incorrect. This is a use case for block storage.

17 / 40

What element of the Swift architecture is responsible for managing the mapping of user created folders within the Object store service?

- A.** Account server
- B.** Container server
- C.** Object server
- D.** Proxy server

- A.** Incorrect. Account servers manage accounts defined with the object storage service.
- B.** Correct. Container servers manage a mapping of containers (i.e. folders) within the object store service. See M09_Swift_Object_Storage_Service.pptx Slide 6.
- C.** Incorrect. Object servers manage actual objects (i.e. files) on the storage nodes.
- D.** Incorrect. Proxy server accepts incoming requests via the OpenStack Object API or just raw HTTP.

18 / 40

What is a Ring?

- A. A mapping of account, container and object names to the physical location on disk of those entities
- B. A part of the cluster that is usually located remotely from the data center
- C. A set of physical storage devices that are isolated from storage devices in other zones

A. Correct. This is a ring. See M09_Swift_Object_Storage_Service.pptx, slide 10.

B. Incorrect. This is a region.

C. Incorrect. This is a zone.

19 / 40

What kind of data structure is used by Swift Rings?

- A. Array
- B. Gzipped
- C. List
- D. Tree

A. Incorrect. An array is a data structure consisting of a collection of elements (values or variables), each identified by at least one array index or key.

B. Correct. Rings use a gzipped data structure. See M09_Swift_Object_Storage_Service.pptx, slide 10.

C. Incorrect. A list is an abstract data type that represents an ordered sequence of values, where the same value may occur more than once.

D. Incorrect. A tree is a widely used abstract data type (ADT) –or data structure implementing this ADT– that simulates a hierarchical tree structure, with a root value and subtrees of children with a parent node, represented as a set of linked nodes.

20 / 40

What is one of the two restrictions on container names?

- A. The maximum allowable size upon upload is 5 gigabytes (GB).
- B. They cannot contain a forward slash (/).
- C. They cannot contain a percent sign (%).
- D. They must be more than 256 bytes in length.

A. Incorrect. Object servers manage actual objects (i.e. files) on the storage nodes.

B. Correct. The only restrictions on container names are that they cannot contain a forward slash (/) and must be less than 256 bytes in length. See M09_Swift_Object_Storage_Service.pptx, slide 6.

C. Incorrect. They cannot contain a forward slash (/), a percent sign (%) is allowed.

D. Incorrect. They must be more than 256 bytes in length.

21 / 40

Objects in Swift are stored as binary files on the file system with metadata. What is a requirement for the underlying file system to support this?

- A. A database that stores the container's metadata
- B. Availability zones within a single geographic region
- C. Support for Fault isolation
- D. Support extended attributes (xattrs) on files

A. Incorrect. Swift Containers have a database that stores both the container's metadata and a record for each object it contains.

B. Incorrect. Availability zones within a single geographic region enables that data can be written to hand-off nodes if primary nodes in that zone are not available.

C. Incorrect. Fault isolation is the practice of designing systems such that when "something bad" happens, the negative consequences are limited in scope.

D. Correct. Objects are stored as binary files on the file system with metadata stored in the file's extended attributes (xattrs). This requires that the underlying file system choice for object servers support xattrs on files. Some file systems, like ext3, have xattrs turned off by default. See M09_Swift_Object_Storage_Service.pptx, slide 9.

22 / 40

Which component of Manila is responsible for the creation of file system shares?

- A. File Shares Service
- B. Filter Scheduler
- C. Reference Provider

A. Correct. See <https://wiki.openstack.org/wiki/Manila/design>.

B. Incorrect. The filter scheduler is used for filtering backends based on predefined parameters.

C. Incorrect. The reference provider is a driver for shared file systems.

23 / 40

From which OpenStack project was Manila abstracted?

- A. Cinder
- B. Glance
- C. Keystone
- D. Swift

A. Correct. Manila is originally based on Cinder. See M12_otherOpenStkProjects.pptx, slide 19.

B. Incorrect. Manila is not based on Glance, it is originally based on Cinder.

C. Incorrect. Manila is not based on Keystone, it is originally based on Cinder.

D. Incorrect. Manila is not based on Swift, it is originally based on Cinder.

24 / 40

Through which component is identity management served?

- A.** Keystone, for this module provides a user directory mapped to services they can access.
- B.** Neutron, for this module takes care of managing networks and IP addresses.
- C.** Trove, for this module is the home of the provisioning of database engines.

- A.** Correct. See M04_Keystone_Identity Service.pptx, Slide 4.
- B.** Incorrect. Identity management is served through Keystone.
- C.** Incorrect. Identity management is served through Keystone.

25 / 40

What is the relationship between users and projects?

- A.** A project can be an operator for all users.
- B.** A user aggregates the number of resources in each service.
- C.** Projects can be added to any role in a user.
- D.** Users are bound to a project by assigning them a role on that project.

- A.** Incorrect. A user can be an operator for all projects.
- B.** Incorrect. A project aggregates the number of resources in each service.
- C.** Incorrect. Users can be added to any role either globally or in a project.
- D.** Correct. See M04_Keystone_Identity Service.pptx, Slide 8.

26 / 40

What data format is used by Keystone for exchanging authentication and authorization data between parties, in particular, between an identity provider and a service provider?

- A.** HTML
- B.** SAML
- C.** WML
- D.** XML

- A.** Incorrect. HyperText Markup Language (HTML), is the standard markup language used to create web pages.
- B.** Correct. Security Assertion Markup Language (SAML) is an XML-based, open-standard data format for exchanging authentication and authorization data between parties, in particular, between an identity provider and a service provider. See M04_Keystone_Identity Service.pptx, slide 14.
- C.** Incorrect. Wireless Markup Language (WML), based on XML, is a markup language intended for devices that implement the Wireless Application Protocol (WAP) specification, such as mobile phones.
- D.** Incorrect. Extensible Markup Language (XML) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.

27 / 40

Where needs the Freezer API to be installed on OpenStack?

- A. in the backup queue
- B. on the client side
- C. on the compute node
- D. on the controller server

A. Incorrect. Freezer agent is the CLI client that is used to commit jobs to the backup queue. The backup queue is managed by the backup scheduler.

B. Incorrect. Freezer scheduler and Freezer agent are installed on the client side.

C. Incorrect. Login and key may only be used for initial authentication to Keystone.

D. Correct. Freezer API is installed on the OpenStack® controller server, the server where your Horizon and Keystone are installed. (Literature: 2017-01-16_m12_other_opentack_projects (edited).pptx, slide 11).

28 / 40

What feature enables the management subsets of projects with a “parent” project operating as Domain?

- A. Cloud Admin
- B. Domain
- C. Group
- D. Hierarchical multitenancy

A. Incorrect. A “Cloud Admin” is conceptually a super administrator capable of administering all domains.

B. Incorrect. Domains serve as containers for collections of projects that could be administered as a group. When discussing authorization, domains can simply be thought of as groups of projects.

C. Incorrect. A group is a collection of users, roles assigned to the group are automatically associated with all users of that group.

D. Correct. In the Hierarchical multitenancy projects can be nested under other projects by setting the parent_id attribute to an existing project when creating a new project. See M04_Keystone_Identity Service.pptx, slide 11.

29 / 40

Which types of private information can Barbican handle?

- A. Asymmetric keys only
- B. Symmetric keys only
- C. Symmetric keys and asymmetric keys
- D. Symmetric keys, asymmetric keys and raw secrets

A. Incorrect. Barbican also handles symmetric keys and raw secrets

B. Incorrect. Barbican also handles asymmetric keys and raw secrets

C. Incorrect. Barbican also handles raw secrets

D. Correct. See Lit. A 14-18 and Barbican getting started guide:

<https://github.com/cloudkeep/barbican/wiki/Barbican-Getting-Started-Guide>.

30 / 40

What is a potential client of the Barbican REST interface?

- A. Castellan
- B. Oslo
- C. Pecan
- D. SQLAlchemy

A. Correct. Several potential clients of the Barbican REST interface are noted, including Castellan which presents a generic key management interface for other OpenStack projects with Barbican as an available plugin. See

<http://docs.openstack.org/developer/barbican/contribute/architecture.html>.

B. Incorrect. The Oslo messaging library provides two independent APIs, `oslo.messaging.rpc` for implementing client-server remote procedure calls and `oslo.messaging.notify` for emitting and handling event notifications.

C. Incorrect. Pecan (a lean Python web framework inspired by CherryPy, TurboGears, and Pylons) is utilized to map resources to REST routes.

D. Incorrect. SQLAlchemy is used as the object relational model (ORM) layer to the database, including MySQL and PostgreSQL.

31 / 40

Neutron provides several networking functionalities.

Which of these is a fundamental shift in how data center networks are defined, provisioned, and consumed?

- A. API extensions for OpenStack networking
- B. IP Address Management (IPAM)
- C. Software defined Networking (SDN)
- D. Tunneling

A. Incorrect. API extensions allow a plugin to extend the Neutron API in order to expose more information.

B. Incorrect. IP address management (IPAM) is a means of planning, tracking, and managing the Internet Protocol address space used in a network.

C. Correct. Software Defined Networking (SDN) is a fundamental shift in how data center networks are defined, provisioned, and consumed. See `M06_Neutron_Networking_Service.pptx`, Slide 15.

D. Incorrect. Tunneling, also known as "port forwarding," is the transmission of data intended for use only within a private, usually corporate network through a public network in such a way that the routing nodes in the public network are unaware that the transmission is part of a private network.

32 / 40

Which encapsulation protocol for running overlay network is supported in OpenStack Neutron?

- A. VEP (Virtual End Point)
- B. VLAN (Virtual Local Area Network)
- C. VNID (Virtual Network ID)
- D. VxLAN (Virtual Extensible LAN)

A. Incorrect. In a typical setup, the network overlay tunnel is terminated at the Virtual End Point (VEP).

B. Incorrect. VLANs are used to define a domain where only packets belonging to a specific VLAN can communicate with other networked devices belonging to that same VLAN ID.

C. Incorrect. All network overlay standards solve the scale issue by providing a much larger Virtual Network ID (VNID) space in the encapsulating packet.

D. Correct. Virtual overlay networks supported by OpenStack Neutron are GRE (Generic Routing Encapsulation) and VxLAN (Virtual Extensible LAN). See M06_Neutron_Networking_Service.

33 / 40

Which Fuel component manages disk volumes configuration data, network configuration data, and any other environment-specific data that is necessary for successful deployment?

- A. Astute
- B. Cobbler
- C. Nailgun
- D. Puppet

A. Incorrect. Astute is another important Fuel component, which represents Nailgun's workers, and its function is to run certain actions according to the instructions provided from Nailgun .

B. Incorrect. Cobbler is used as a provisioning service at the moment.

C. Correct. Nailgun is the heart of the Fuel project. Nailgun manages disk volumes configuration data, network configuration data, and any other environment-specific data that is necessary for successful deployment.

D. Incorrect. Puppet is the only deployment service at the moment .

34 / 40

What are individual datapoints (collection) associated with a particular meter called in Ceilometer?

- A. Alarms
- B. Meters
- C. Samples
- D. Statistics

A. Incorrect. Alarms are notifications of when a sample crosses a threshold.

B. Incorrect. Meters measure a particular aspect of resource usage or of ongoing performance.

C. Correct. Samples are individual datapoints (collection) associated with a particular meter. See M11_Ceilometer_Metering_Service.pptx, slide 8.

D. Incorrect. Statistics are a set of samples, aggregated over a time duration that employ 5 different aggregation functions.

35 / 40

What OpenStack project is designed to capture metering data in a time series database?

- A. Ceilometer
- B. Gnocchi
- C. Neutron
- D. Zaqar

A. Incorrect. Ceilometer reliably collects data on the utilization of the physical and virtual resources comprising deployed clouds.

B. Correct. Gnocchi is an OpenStack project developed to capture metering data in a time series database. (Literature: 2017-01-16_m11_ceilometer_metering_service (edited).pptx, slide 11)

C. Incorrect. Neutron is a system for managing networks and IP addresses.

D. Incorrect. Zaqar is a multi-tenant cloud messaging service for Web developers.

36 / 40

Which command creates a new Heat stack?

- A. `$ heat stack-create --template-file --parameters`
- B. `$ heat stack-show`
- C. `$ heat stack-update --template-file --parameters`
- D. `$ heat template-validate --template-file`

A. Correct. To create a new stack from the CLI, you can use the stack-create command. (Literature: 2017-01-16_m10_heat_orchestration_service (edited).pptx, slide 17)

B. Incorrect. Displays the stack status and details through the CLI.

C. Incorrect. It updates an existing stack from a modified template file.

<http://docs.openstack.org/user-guide/content/heat-stack-create.html>.

D. Incorrect. You can use the template-validate command to validate a template file without creating a stack from it. <http://docs.openstack.org/user-guide/content/heat-stack-create.html>

37 / 40

Which of the following Heat Orchestration service components provides an AWS Query API that is compatible with the AWS CloudFormation?

- A. heat-api
- B. heat-api-cfn
- C. heat-api-cloudwatch
- D. heat engine

A. Incorrect. Heat-api is a service that exposes an external REST-based API to the heat-engine service.

B. Correct. Heat-api-cfn provides an AWS Query API that is compatible with the AWS CloudFormation and that processes API requests by sending them to the heat-engine over RPC. See M10_Heat_Orchestration_Service.pptx, slide 6.

C. Incorrect. Heat-api-cloudwatch is a CloudWatch-like API service to the heat project.

D. Incorrect. Heat engine does all the orchestration work and is the layer in which the resource integration is implemented.

38 / 40

What API provides Zaqar?

- A. Amazon EC2 API
- B. OpenStack Compute API
- C. RESTful API
- D. special Admin API for privileged users to perform administrative actions

A. Incorrect. That is nova-api (It supports the OpenStack Compute API, Amazon EC2 API, and a special Admin API for privileged users to perform administrative actions).

B. Incorrect. That is nova-api (It supports the OpenStack Compute API, Amazon EC2 API, and a special Admin API for privileged users to perform administrative actions).

C. Correct. The service features a fully RESTful API that developers can use to send messages between various components of their Software-as-a-Service (SaaS) and mobile applications see M12_otherOpenStkProjects.pptx, Slide 31.

D. Incorrect. That is nova-api (It supports the OpenStack Compute API, Amazon EC2 API, and a special Admin API for privileged users to perform administrative actions).

39 / 40

On what are the Zaqar Multi-tenant queues based?

- A. Keystone project IDs
- B. Network name
- C. Segmentation IDs
- D. UUID

A. Correct. Zaqar Multi-tenant queues are based on Keystone project IDs. See M12_otherOpenStkProjects.pptx, slide 31.

B. Incorrect. The OpenStack Networking service provides a scalable system for managing the network connectivity within an OpenStack cloud deployment, the *Network Name* is specified to identify the network.

C. Incorrect. The Open vSwitch provider bridge br-provider replaces the internal tag with the actual VLAN tag (*segmentation ID*) of the provider network.

D. Incorrect. The network UUID is used to attach instances.

40 / 40

What type of project service is provided by Designate?

- A. Multi-project
- B. Single-project
- C. Subnets of Tenant Networks
- D. Tenant network

A. Correct. Designate provides Multi-project DNSaaS services for OpenStack. See M12_otherOpenStkProjects.pptx, slide 9.

B. Incorrect. Designate provides Multi-project DNSaaS services for OpenStack, not Single-project.

C. Incorrect. Like the external network, a tenant network also requires a subnet attached to it.

D. Incorrect. The tenant network provides internal network access for instances.

Evaluation

The table below shows the correct answers to the questions in this sample exam.

Question	Answer	Question	Answer
1	B	21	D
2	C	22	A
3	B	23	A
4	A	24	A
5	A	25	D
6	A	26	B
7	B	27	D
8	B	28	D
9	A	29	D
10	C	30	A
11	C	31	C
12	C	32	D
13	C	33	C
14	A	34	C
15	C	35	B
16	A	36	A
17	B	37	B
18	A	38	C
19	B	39	A
20	B	40	A

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