IBM Cloud Professional Certification Program

Study Guide Series

Exam C1000-105: IBM Cloud Associate SRE v1

Table of Contents

Purpose of Exam Objectives

When an exam is developed, Subject Matter Experts work together to define the role the certified individual will fill. They define the tasks and knowledge that an individual would need to successfully perform this job role at the level specified. This creates the foundation for the objectives and measurement criteria, which form the basis of the certification exam.

Cloud certification question writers use these objectives to develop exam questions.

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, go through the objective, perform that task in your own environment and read more information on the task. If there is an objective on a task, there is a high likelihood that you WILL see a question about it on the actual exam. The IBM Center for Cloud Training provides instructional learning path designed to prepare you to take the certification exam.

https://www.ibm.com/training/cloud/jobroles

After reviewing the objectives in this guide and completing your own research, take the assessment exam. While the assessment exam does not indicate which specific questions were answered incorrectly, it does indicate overall performance by section. This is a good indicator of preparedness or if further preparation is warranted.

High-level Exam Objectives

Section 1 – Applying Site Reliability Engineering Principles	
1.1.	Identify root causes and contributing factors and apply software engineering principles toward mitigation
1.2.	Explain service level objective, service level indicator, error budget
1.3.	Identify appropriate IBM Cloud tools and technology for operations management
1.4.	Explain of release strategies and concepts
1.5.	Explain modern software engineering concepts
Section 2 – Operations	
2.1.	Implement and manage backup and recovery
2.2.	Monitor resource utilization
2.3.	Perform operational readiness review
2.4.	Identify key metrics for service health
Section 3 – Monitoring and Incident Detection	
3.1.	Apply build to manage concepts
3.2.	Create and maintain metrics, traces, and alerts
3.3.	Recognize and differentiate performance and availability metrics
3.4.	Describe operations information provided by Watson AIOps
Section 4 – Incident Management	
4.1.	Explain blameless postmortems
4.2.	Describe how to manage incidents
Section 5 – Security and Compliance	
5.1.	Explain security policies
5.2.	Monitor security threats
5.3.	Evaluate security compliance
Section 6 – Troubleshooting	
6.1.	Describe how to troubleshoot problems caused by the runtime and backend services
6.2.	Describe how to troubleshoot problems caused by the compute infrastructure
6.3.	Troubleshoot the problems caused by the network
6.4.	Describe how to troubleshoot problems caused by storage
6.5.	Collect, analyze, and manage logs for troubleshooting on IBM Cloud
Section 7 – Availability, Reliability, and Resiliency	
7.1.	Differentiate between availability, reliability, resiliency, and architecture as related to business needs
7.2.	Design for component resiliency
7.3.	Implement resiliency for the workload
7.4.	Describe storage replication
7.5.	Describe failure domains

Section 8 – Deployment Automation	
8.1.	Describe zero downtime deployment
8.2.	Explain infrastructure as code with Terraform and Schematics
Section 9 – Problem Management	
9.1.	Explain post-incident review concepts
9.2.	Develop and update run books
9.3.	Implement rank-ordered postmortem actions and toil

Note: This is the high-level list of objectives; see below for more details on how each task is defined.

Exam Objective Details

1. Applying Site Reliability Engineering Principles

1.1. Identify root causes and contributing factors and apply software engineering principles toward mitigation

SUBTASKS

1.1.1. Explain the basic tenets of Root Cause Analysis – The 5 HOWs technique
1.1.2. Describe the triggers of a postmortem
1.1.3. Describe the 4 golden signals key to SRE
1.1.4. Identify the key steps in the mitigation process for SRE

1.2. Explain service level objective, service level indicator, error budget

SUBTASKS

1.2.1. Describe service level objectives
1.2.2. Describe service level indicators
1.2.3. Describe error budget

1.3. Identify appropriate IBM Cloud tools and technology for operations management

SUBTASKS

1.3.1. Describe the tenets of service management
1.3.2. Describe the key elements to an incident management architecture on IBM Cloud
1.3.3. Describe the key elements to a problem management architecture on IBM Cloud

1.4. Explain of release strategies and concepts

SUBTASKS

1.4.1. Describe the concept of continuous integration
1.4.2. Describe the concept of continuous delivery
1.4.3. Describe the concept of continuous deployment

1.5. Explain modern software engineering concepts

SUBTASKS

1.5.1. Describe why software engineering concepts are key to SRE
1.5.2. Describe Intent-base Capacity Planning
1.5.3. Describe why dependency identification is a key element for SRE
1.5.4. Describe the importance of performance metrics for SRE

2. Operations

2.1. Implement and manage backup and recovery

SUBTASKS

2.1.1. Identify data to backup
2.1.2. Managing data integrity
2.1.3. Plan for recovery and data restoration
2.1.4. Failure types that lead to data loss
2.1.5. Guarding against the 24 combinations of data integrity failure modes
2.1.6. Manage backup and recovery services on IBM Cloud

2.2. Monitor resource utilization

SUBTASKS

2.2.1. Operational resource utilization monitoring
2.2.2. Describe characteristics of a monitoring strategy
2.2.3. Monitoring from various data sources
2.2.4. Collect metrics from IBM Cloud monitoring tools

2.3. Perform operational readiness review

SUBTASKS

2.3.1. Describe the process of an operational readiness review
2.3.2. Explain the purpose of a RACI (responsible, accountable, consulted, and informed) matrix
2.3.3. Operationalize your application readiness using technical and nontechnical guidelines

2.4. Identify key metrics for service health

SUBTASKS

2.4.1. Describe the four golden signals, USE Method, RED Method
2.4.2. IBM Cloud Pak for Multicloud Management using the four golden signals

3. Monitoring and Incident Detection

3.1. Apply build to manage concepts

SUBTASKS

3.1.1. Describe aspects of build to manage
3.1.2. Describes how the health check API can be used to support the build to manage concept
3.1.3. Describes Critical Success Factor of Build to Manage

3.2. Create and maintain metrics, traces, and alerts

SUBTASKS

3.2.1. Create Metrics and Alerts
3.2.2. Maintain alerts status
3.2.3. Describe tracing
3.2.4. Define service metrics

3.3. Recognize and differentiate performance and availability metrics

SUBTASKS

3.3.1. Describe Kubernetes liveness and readiness probe
3.3.2. Define metrics for Service Level Indicator
3.3.3. Create Alerts from performance metrics
3.3.4. Create and use percentile distribution histogram

3.4. Describe operations information provided by Watson AIOps

SUBTASKS

3.4.1. Describe how AI can help with IT
3.4.2. Describe how Watson AIOps can help with IT operation
3.4.3. Describe how AI can help with incident management

4. Incident Management

4.1. Explain blameless postmortems

SUBTASKS

4.1.1. Explain the concept of “Blameless Postmortem”
4.1.2. Understand postmortems as part of the Service Management Reference Architecture

4.2. Describe how to manage incidents

SUBTASKS

4.2.1. Explain runbook automation use cases
4.2.2. Working with IBM support

5. Security and Compliance

5.1. Explain security policies

SUBTASKS

5.1.1. Describe user-related security policies
5.1.1.1. User and password requirements, including length, complexity, and expiration
5.1.1.2. Additional security controls based on role or access location
5.1.2. Explain system level policies
5.1.2.1. Versions, packages installed
5.1.2.2. Ports and applications running
5.1.3. Discuss how security policies can be applied, and automated
5.1.4. Explain methods of reducing overhead at scale

5.2. Monitor security threats

SUBTASKS

5.2.1. Explain capabilities of IBM Cloud for monitoring
5.2.2. Select appropriate monitoring tool depending on deployment choice
5.2.3. Explain how IBM Cloud Activity tracker records and monitors events

5.3. Evaluate security compliance

SUBTASKS

5.3.1. Determine standards that are required to be met by the application or environment
5.3.2. Explain methods available for analyzing - if the application meets those standards
5.3.3. Select appropriate methods of automating the compliance check and remediation

6. Troubleshooting

6.1. Describe how to troubleshoot problems caused by the runtime and backend services

SUBTASKS

6.1.1. Troubleshooting of IBM Cloud for Container Platforms
6.1.2. Troubleshooting of IBM Cloud for Functions

6.2. Describe how to troubleshoot problems caused by the compute infrastructure

SUBTASKS

6.2.1. Troubleshooting IBM Cloud for Virtual Server Instance
6.2.2. Troubleshooting IBM Cloud for VMware
6.2.3. Troubleshooting IBM Cloud for Power System Virtual Server

6.3. Troubleshoot the problems caused by the network

SUBTASKS

6.3.1. Explain impacts of being network bound
6.3.2. Explain options to remediate networking constraints
6.3.3. Explain impacts of IBM Cloud Native Network Services
6.3.4. Troubleshooting IBM Cloud Internet Services
6.3.5. Troubleshooting IBM Cloud VMware Network Solution

6.4. Describe how to troubleshoot problems caused by storage

SUBTASKS

6.4.1. Describe the options and capabilities of storage on IBM Cloud
6.4.2. Troubleshooting the Block Storage common issue
6.4.3. Describe the capabilities and options of File Storage
6.4.4. Describe the capabilities and options of Cloud Object Storage

6.5. Collect, analyze, and manage logs for troubleshooting on IBM Cloud

SUBTASKS

6.5.1. Troubleshooting of logging capabilities on IBM Cloud
6.5.2. Troubleshooting of monitoring and alerting capabilities on IBM Cloud

7. Availability, Reliability, and Resiliency

7.1. Differentiate between availability, reliability, resiliency, and architecture as related to business needs

SUBTASKS

7.1.1. Demonstrate understanding of availability
7.1.2. Demonstrate understanding of reliability
7.1.3. Demonstrate understanding of resiliency
7.1.4. Summarize resilience reference architecture

7.2. Design for component resiliency

SUBTASKS

7.2.1. Explain service availability
7.2.2. Explain multizone virtual private cloud (VPC)
7.2.3. Explain multizone cluster
7.2.4. Explain global load balancer

7.3. Implement resiliency for the workload

SUBTASKS

7.3.1. Explain fault tolerance
7.3.2. Explain health checking
7.3.3. Explain service mesh
7.3.4. Explain API gateway
7.3.5. Summarize highly available cloud solutions
7.3.6. Explain virtual private cloud (VPC) autoscaling
7.3.7. Explain cluster autoscaling

7.4. Describe storage replication

SUBTASKS

7.4.1. Explain replication in Cloudant
7.4.2. Explain replication in DB2 for Cloud
7.4.3. Explain Cloud Object Storage data availability

7.5. Describe failure domains

SUBTASKS

7.5.1. Explain platform HA/DR
7.5.2. Explain multizone region

8. Deployment Automation

8.1. Describe zero downtime deployment

SUBTASKS

8.1.1. Explain and differentiate between different zero-downtime deployment models
8.1.2. Describe zero-downtime deployments
8.1.3. Describe non-disruptive deployments with IKS and OpenShift

8.2. Explain infrastructure as code with Terraform and Schematics

SUBTASKS

8.2.1. Explain Infrastructure-as-Code (IaC) and distinguish key capabilities of IaC tooling
8.2.2. Demonstrate knowledge of the Hashicorp Configuration Language
8.2.3. Explain infrastructure-as-code with Terraform and IBM Schematics
8.2.4. Explain how to refresh state and roll back changes

9. Problem Management

9.1. Explain post-incident review concepts

SUBTASKS

9.1.1. Identify scenarios which require postmortem review
9.1.2. Gather and prepare data required to conduct a postmortem review
9.1.3. Schedule a postmortem review meeting with key stakeholders and participants
9.1.4. Describe the processes used to reach a root cause
9.1.5. Document agreed actions and outcomes from the postmortem review

9.2. Develop and update run books

SUBTASKS

9.2.1. Utilize and manage run books
9.2.2. Describe the tools and capabilities that could be used for incident resolution
9.2.3. Modify existing runbooks and knowledge
9.2.4. Configure changes to automated runbooks
9.2.5. Document repeatable operational tasks

9.3. Implement rank-ordered postmortem actions and toil

SUBTASKS

9.3.1. Define toil in the context of SRE
9.3.2. Identify frequent manual toil activities using feedback loops for improvement
9.3.3. Explain how to work with the product owner to prioritize action items in the backlog
9.3.4. Select prioritized backlog item to progress
9.3.5. Use software and systems engineering skills to reduce toil

Next Steps

1. Review the available sample test for this exam to understand the types of questions the exam includes.
2. Visit https://www.ibm.com/training/cloud/jobroles to learn more about this role in a learning plan designed to prepare you for this exam.
3. Visit http://www.pearsonvue.com/ibm to take the assessment test for this exam ($30 per exam). Keep in mind the assessment exam can be taken as many times as you would like; however, you will still receive the same questions only in a different order.
    a. If you comfortably passed the assessment exam, return to http://www.pearsonvue.com/ibm to schedule your proctored exam session.
    b. If you failed the assessment exam, review how you did by section; focusing attention on the sections where you need improvement.