aws re/start

Create a Troubleshooting Knowledge Base

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Overview

Troubleshooting Knowledge Base

Throughout this course, you will document the processes and techniques that you learn to successfully troubleshoot technical issues. The Troubleshooting Knowledge Base that you create should include the problems that you encounter while you work on the hands-on labs and activities. It should also include the issues that you encounter while you explore Amazon Web Services (AWS) services on your own.

Your objective is to build your own Troubleshooting Knowledge Base. You can take this knowledge base with you at the end of the course and use it as a valuable resource in your career.

At the end of this project, you will be able to do the following:

- Describe common technical challenges that users face when they attempt to deploy, upgrade, and maintain AWS Cloud deployments.
- Explain how to overcome specific technical challenges by confirming and adjusting deployment configurations as necessary.
- Present troubleshooting techniques to stakeholders.

You should have access to an Excel spreadsheet through Canvas. Figure 1 shows a screen capture of this spreadsheet. This template will help you organize and document issues, and record the resolution steps that you performed. Each entry that you create in the Troubleshooting Knowledge Base should include the following details:

- Issue number
- Categories
- Issue description
- Symptoms
- Root cause analysis (RCA)
- Resolution procedures
- Helpful tools or resources
- Comments

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Issue #	Categories	Issue Description	Symptoms	Root Cause Analysis	Resolution Procedures	Helpful Tools or Resources	Comments
Example One	Networking	Application on Amazon EC2 instance - connectivity issue	Could not connect to an existing web site. Was able to successfully connect yesterday. Tried different browsers and got the following errors: - Firefox: The connection has timed out. The server at ec2-34-221-214-86.us-west-2.compute.amazonaws.com is taking too long to respond. - Chrome: This site can't be reached ec2-34-221-214-86.us-west-2.compute.amazonaws.com took too long to respond. ERR_CONNECTION_TIMED_OUT - Microsoft Edge: Hmmm...can't reach this page Details There was a temporary DNS error. Try refreshing the page. Error Code: INET_E_RESOURCE_NOT_FOUND	The instance was no longer running. Perhaps someone stopped it and then it was restarted, because the URL to connect to it changed, as well.	Use the Amazon EC2 dashboard to verify that the Amazon EC2 instance is running. If not, start it and try to connect again.	Amazon EC2 dashboard: To view instance status, select **Instances,** and look at **Instance State** in the details pane. To start an instance: 1) Select the instance. 2) Select **Instance state**> **Start instance** 3) Wait until Instance State shows *Running*.	Other details to check: - Is the URL correct? - Are any AWS services down in the target Region? Check the AWS Service Health Dashboard at https://status.aws.amazon.com/
Example two	Networking	SSH to EC2 instance issue	Could not SSH to a running EC2 Instance. ssh -I key.pem ec2-user@publicip Received error "Network error: Connection timed out".	There were two issues. First, the permissions were not correctly set on the key pair. Also, the security group did not allow traffic on port 22.	1. Verify the SSH key being use is one that the EC2 instance supports. 2. verify the SSH key has the correct permissions set (chmod 400). 3. verify the security group associated with the EC2 instance has TCP port 22 open for inbound traffic.	https://aws.amazon.com/premiumsupport/knowledge-center/ec2-linux-ssh-troubleshooting/ and https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/TroubleshootingInstancesConnecting.html	Other details to check: - Is ec2-user the correct user to try to connect as? - Does the laptop have internet access? (e.g., web pages load in a browser) - Did someone mess with the SSH settings on the instance I am trying to connect to?
Example three	Foundational IT	Out of disk space on an EC2 instance	Application on an instance stopped running.	The instance ran out of disk space.	Check available disk space. From a terminal: $ df -h	sudo find / -size +1G -ls or find / -name +200M -ls or find . -mmin -5	The **Find** command helps locate which files are taking up so much space or which ones were modified recently (e.g. in the last 5 minutes).
Example four	Foundational IT	Linux service stopped running	Web page hosted on an instance was not loading (page not found error).	The web server wasn't running.	Check the web server process status $ sudo service httpd status and if it is not running start it $ sudo service httpd start	/var/log/apache or /var/log/httpd	Look at the web server log file if the web server won't start.

Figure 1. Troubleshooting Knowledge Base template with sample entries

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Groups

Your instructor will organize the class into groups, or teams. This arrangement provides opportunities for you to discuss, compare, and evaluate different approaches to resolving common cloud deployment challenges. By working with a group, you are likely to develop more comprehensive solutions and solve technical issues with the various perspectives.

At the end of the course, each group will be asked to present their findings in one of the knowledge base categories. The exception is the Foundational IT category.

> **NOTE:** Teams will not know which category they will present until the last week of class. Therefore, be sure to add entries to all categories as you work through the AWS re/Start program.

You will submit your completed version of the Troubleshooting Knowledge Base to your instructor at the end of the course.

Knowledge base categories

Your knowledge base should include many entries by the end of this course. To organize your knowledge base entries, tag each entry with the appropriate category and service or technology. Table 1 shows each knowledge base category with applicable AWS products and services.

Table 1. Troubleshooting Knowledge Base entry categories

Category	AWS Products and Services	Example Troubleshooting Topics
Storage and Data Management	• Amazon Simple Storage Service (Amazon S3) • Amazon Elastic File System (Amazon EFS) • Amazon Simple Storage Service Glacier (Amazon S3 Glacier) • Amazon Elastic Block Store (Amazon EBS), instance store volumes • Snapshots • Amazon Relational Database Service (Amazon RDS) • Amazon DynamoDB • Amazon Redshift	• Troubleshooting a person's access to S3 objects • Troubleshooting AWS Command Line Interface (AWS CLI) access to Amazon S3 • Uploading files to or downloading files from Amazon S3 by using the AWS CLI • Importing data to Amazon S3 or exporting data from Amazon S3 • Mounting Amazon EFS on an Amazon Elastic Compute Cloud (Amazon EC2) instance volume • Configuring data lifecycle migration from Amazon EC2 to Amazon S3 Glacier • Increasing the size of an EBS volume on an EC2 instance • Attaching an additional EBS volume to an EC2 instance and mounting it • Creating snapshots • Restoring snapshots • Accessing an RDS database • Importing data to Amazon RDS or exporting data from Amazon RDS • Adding a column to a database table • Querying a database table and limiting the result set

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Security and Compliance	• AWS Identity and Access Management (IAM) • Security groups • Key pairs • Security credentials • AWS Trusted Advisor • TLS/SSL (HTTPS) • Encryption • Authentication • Authorization access control lists (ACLs)	• Troubleshooting an IAM user's ability to sign in to the AWS Management Console • Updating the rights granted to an IAM user or group • Activating or deactivating an IAM user's programmatic access • Activating or deactivating an IAM user's AWS Management Console access • Turning on multi-factor authentication (MFA) • Setting password complexity requirements
Networking	• Amazon Virtual Private Cloud (Amazon VPC) • Subnets • Amazon Route 53 • Amazon API Gateway • Security groups	• Creating multiple subnets in a single VPC • Configuring a private subnet or a public subnet • Troubleshooting access to a webpage that is running on an EC2 instance • Limiting access to specific TCP ports and specific IP address ranges • Configuring failover routing • Mapping a domain name to an IP address
Automation and Optimization	• AWS CloudFormation • AWS Systems Manager • Amazon EC2 Auto Scaling • AWS Step Functions • AWS Trusted Advisor	• Creating a a VPC with subnets by using AWS CloudFormation • Accessing an EC2 instance shell through the AWS Management Console (web UI) • Configuring Auto Scaling based on changes in CPU use

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Compute	• Amazon EC2 • Amazon Elastic Container Service (Amazon ECS) • Docker • Amazon Elastic Kubernetes • AWS Lambda	• Launching an EC2 instance using the AWS CLI • Launching a container that runs a web server • Invoke a Lambda function • Creating and using Amazon EC2 templates • Creating an Amazon Machine Image (AMI) • Copying an AMI to another RegionGranting access to other AWS services to applications that are running on an EC2 instance
Monitoring and Reporting	• Amazon CloudWatch • Amazon Simple Notification Service (Amazon SNS) • Amazon Simple Queue Service (Amazon SQS) • AWS CloudTrail	• Auditing user actions on your AWS account • Configuring email alerts • Invoke a CloudWatch alert when storage capacity on an EC2 instance gets low • Creating an SNS topic
Foundational IT	• Linux OS configuration • Reading log files • VI editor • Bash scripting • Python • Structured query language (SQL) and database management topics	• Discovering remaining disk space on an EC2 instance • Discovering CPU use on an EC2 instance • Discovering memory on an EC2 instance

Getting started

To begin your Troubleshooting Knowledge Base, create a copy of the spreadsheet template and rename it by adding your name to the end of the file name. For example, rename it to the following:
*SysOps Troubleshooting Knowledge Base**-Jane Doe**.xlsx*

Project details

As you encounter and troubleshoot issues, document your findings in your Troubleshooting Knowledge Base spreadsheet. Use the following guidelines to create your spreadsheet:

- Create a new row in the spreadsheet to document a new issue.
- Enter the relevant information in the appropriate columns.
- Refer to Table 2 for column descriptions.
- Provide enough detail so that you or someone in a systems operations (SysOps) role can easily understand the issue and resolution steps.
- Remember that issues can be in the context of performing a lab or exercise or exploring AWS on your own. Your instructor might provide time at the end of each module for you to work on your project.
- Identify and document any tools, online documentation, or other resources that you used to resolve an issue.
- Do not create duplicate entries for different occurrences of the same issue:
    - Use the spreadsheet's Find function to check whether an issue has already been documented.
    - Make enhancements to existing entries as needed.

Troubleshooting Knowledge Base template description

The template file is JAWS_KNOWLEDGEBASESPREADSHEET_EN.xlsx; it contains a tab named Knowledge Base Entries. Table 2 describes each column in the template.

Table 2. Template Column Descriptions

Column Name	Description
Issue Number	Each time you create a new issue, assign a unique number to it. This number is like a primary key for your database. Increase the number by one for each new entry.
Categories	Categorize each entry into one of the seven categories in Table 1. Each entry should be categorized.
Issue Description	Provide a high-level description of the entry.
Symptom	Clearly describe each symptom or issue that you encounter. Provide as much detail as needed to identify the symptoms of the problem. This level of detail includes the following: • Error codes • Error messages • Sequence of events that led to the error (problem context)
Root Cause Analysis	Describe what resulted in being the cause of the problem. How did you arrive at your conclusion?

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Column Name	Description
Resolution Procedures	Given what you know now, what would be the most efficient way to solve the problem if you encounter it again? List the steps to follow to resolve the problem. Use action verbs to provide additional context. If you checked other relevant configurations that could have been the cause of the problem, you should also list them. Include them even if they ended up not being the issue that you faced. The idea is to have a referenceable list of the most likely causes to confirm and check. You do not need to write full sentences. Instead, create an outline.

Helpful Tools or Resources	If you discovered any helpful tools or resources in the process of resolving an issue, add links to those resources in this column.
	
	Include the following information:
	
	• How to access the resource if applicable, such as the following:
	  ○ URL of an online documentation resource
	  ○ Location path of a log file
	  ○ Name of someone you talked to who is an expert on the subject
	• Specific steps that you followed when you used the tool. For example, you could mention a command that you issued from a terminal that revealed helpful information.

Comments	Provide any additional comments that can further clarify your solution or approach to resolving the issue. In addition, you can describe alternative solutions or additional steps to try.

Final project presentations

Toward the end of the AWS re/Start program, your instructor will assign each group to present on one of the knowledge base categories except for the Foundational IT category. These presentations give the class an opportunity to hear one presentation on each category.

Your instructor will provide the groups time to prepare for the presentations.

Each group should select at least two members of the team to present. Presentations should last 8–10 minutes per team.

> Note: Presentations might include slides, live demonstrations, or recorded demonstrations. You can also project the knowledge base document for the class to see during your presentation.

A rubric will be used to assess your presentations (see Appendix A). The rubric focuses on competency levels in each category. The levels are associated with the listed criteria. The assessment provides an opportunity for self-reflection, and you can use this assessment in future solution designs and conversations with customers. Before you prepare your presentation, you should review the rubric to learn what distinguishes a high-quality presentation from a satisfactory presentation.

Be prepared to answer questions from your instructor and from other students at the end of your presentation. The class might engage in a discussion of the topic that is presented. The presentation is a good time to share ideas.

When the Troubleshooting Knowledge Base is complete, each team member should submit a copy of your knowledge base spreadsheet. This copy must have multiple entries in all seven categories.

If you have any questions regarding this course project, ask your instructor for clarification. Enjoy the project, and good luck!

Appendix A

Course project evaluation rubric

This rubric is provided to convey a level of competency in each category. The level is associated with the listed criteria. Use the rubric for project planning and self-reflection, You can use the rubric for project planning, self-reflection, and future solution designs and conversations with customers.

Criteria	Unsatisfactory	Needs Improvement	Good	Excellent
Identification of Symptoms and Root Cause	The symptoms were not well explained, and the root cause could not be identified.	The symptoms were vaguely explained, or the root cause was not clearly described.	The symptoms were explained fairly well, and the root cause was identified but with limited detail.	The symptoms were explained in precise detail, and the root cause was identified very clearly.
Identification of Appropriate Troubleshooting Steps	No troubleshooting steps were identified.	Troubleshooting steps were identified but not applied.	Troubleshooting steps were identified and applied for remedy.	Multiple troubleshooting steps were identified and applied to resolve the issue, and the steps were documented in detail.
Rationale for Troubleshooting Approach	The rationale for approach could not be explained.	The rationale for approach could be explained in basic overview.	The rationale for approach could be explained in detail.	The rationale for approach could be explained in detail with cause-and-effect relationships noted.
Tools and Documentation Tie-in	The tools, resources, or documentation used to resolve the issue were not mentioned.	The tools, resources, or documentation used to resolve the issue were hardly mentioned.	The tools, resources, or documentation used to resolve the issue were mentioned and appear useful.	The tools, resources, or documentation used to resolve the issue are mentioned and support the troubleshooting approach. The documentation is detailed

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Criteria	Unsatisfactory	Needs Improvement	Good	Excellent
				for future use for others with clarity.
Explanation of Issue or Error to Customer or Team	The presentation did not identify the problem or respective solution.	The presentation included an explanation of the solution but did not include the problem or other details.	The presentation clearly explained the problem, solution, and related services.	The presentation clearly explained the problem, solution, related services, and security considerations.
Documentation	The steps were not documented.	The steps were documented but with errors in process or grammar.	The steps were documented clearly without errors in process.	The steps were clear, concise, and detailed enough that they could be repeated.

