solution

Source Code Compilation with Jenkins

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1 Solution Overview

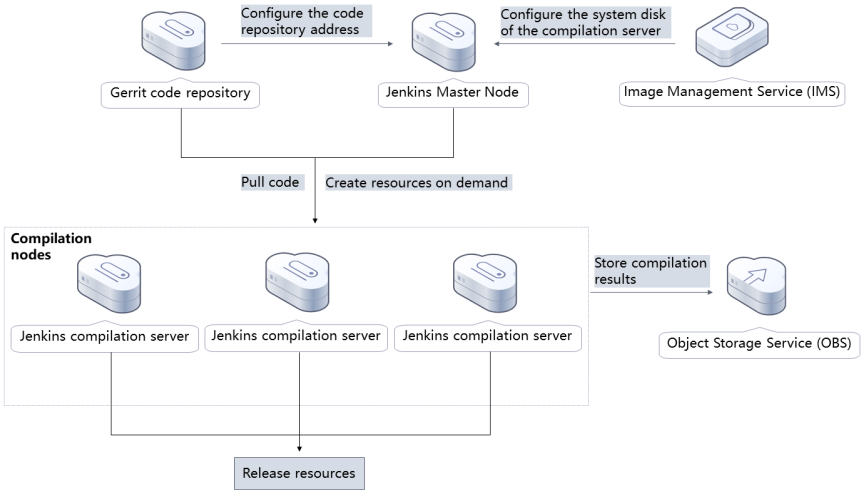
Scenarios

This solution helps you quickly deploy source code compilation environments on **Elastic Cloud Server (ECS)**. With the elastic scaling of ECS and the persistency of Jenkins, this solution helps you quickly and inexpensively deploy complex compilation environments, greatly improving the efficiency of software deployment. Jenkins is an open-source continuous integration tool written in Java. It aims to provide an open and easy-to-use software platform for continuous integration of software projects.

Solution Architecture

This solution is a great way to deploy software more efficiently. The solution architecture is illustrated below.

Figure 1-1 Architecture



This solution will:

- Create two ECSs, one for the Gerrit code repository and one for the Jenkins master node.
- Configure compilation nodes and configure Huawei Cloud plug-ins on the Jenkins master node to dynamically create and release ECS compilation nodes.
- Create an Object Storage Service (OBS) bucket to store compilation results.

You can use Image Management Service (IMS) to prepare the OS environment required for the compilation in advance.

Advantages

- Elastic scaling

  Benefiting from elastic scaling and on-demand purchase of ECS, compilation nodes can be dynamically created or released.
- Low cost

  ECS is used for scheduled, automatic compilation and OBS is used to store compiled code. You do not need to purchase physical servers.
- Easy deployment

  Resources can be quickly provisioned and source code compilation environment based on Jenkins can be deployed.

Constraints

- Before deploying this solution, you need to sign up for Huawei Cloud. Ensure that your account is not in arrears or frozen.
- After this solution is deployed, the compilation environment with Jenkins is set up automatically, but it takes about 20 minutes to complete. Once this process is complete, you can access Jenkins and Gerrit URLs.

2 Resource Planning and Costs

This solution will deploy the resources listed in the following table. The costs are only estimates and may differ from the final prices. For details, see the **price calculator**.

Table 2-1 Resource and cost planning

Huawei Cloud Service	Example Configuration	Estimated Monthly Cost
Elastic Cloud Server (ECS)	• Region: AP-Singapore • Billing Mode: Pay-per-use • CPU Architecture: x86 • Specifications: General computing-plus | c6.xlarge.2 | 4 vCPUs | 8 GiB • Image: CentOS 7.6 64bit • System Disk: High I/O | 40 GiB • Data Disk: High I/O | 100 GiB • Quantity: 2	0.24 x 24 x 30 x 2 = $345.60 USD
Elastic IP (EIP)	• Region: AP-Singapore • Billing Mode: Pay-per-use • Product Type: Dedicated • Routing Type: Dynamic BGP • Billed By: Bandwidth • Bandwidth: 10 Mbit/s • Quantity: 2	0.25 x 24 x 30 x 2 = $352.80 USD

Huawei Cloud Service	Example Configuration	Estimated Monthly Cost
Object Storage Service (OBS)	• Region: AP-Singapore • Billing Mode: Pay-per-use • Product Type: Object storage • Storage Class: Standard • Data Redundancy Policy: Single-AZ storage • Pay per Use Pricing, Standard (USD): 0.0250/GB per month Traffic: Upload traffic to OBS: Free	It is estimated that 1 GB data will be added every month, which will cost $0.02 USD. For details, see the monthly bill.
Total	-	$698.42 USD

3 Procedure

3.1 Preparations
3.2 Quick Deployment
3.3 Getting Started
3.4 Quick Uninstallation

3.1 Preparations

Creating the rf_admin_trust Agency

Step 1 Log in to the Huawei Cloud official website, open the **console**, move your mouse over the account name, and choose **Identity and Access Management**.

Figure 3-1 Console page

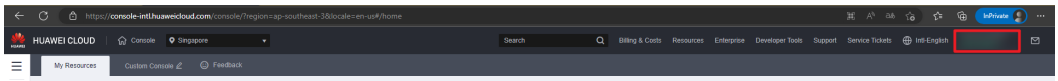
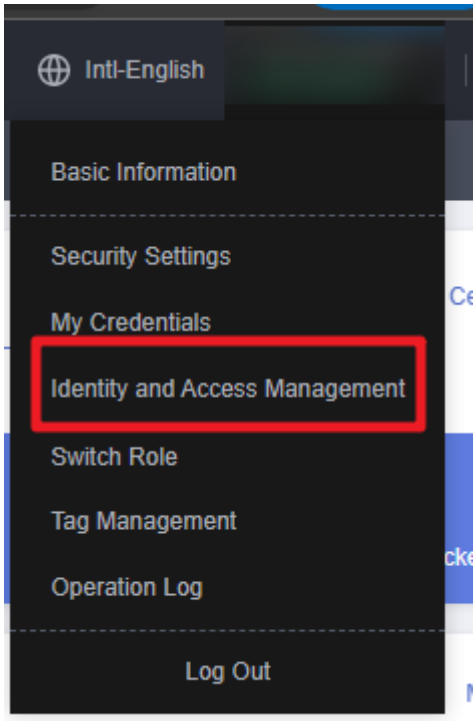
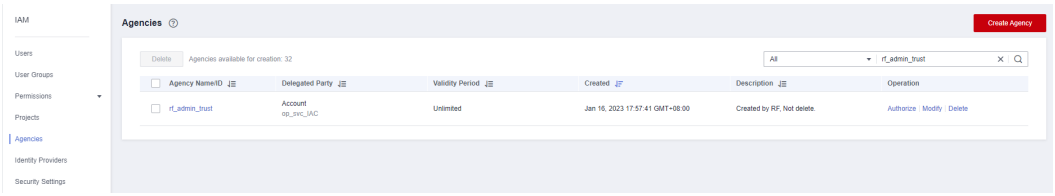


Figure 3-2 Identity and Access Management



Step 2 Choose **Agencies** in the left navigation pane and search for the **rf_admin_trust** agency.

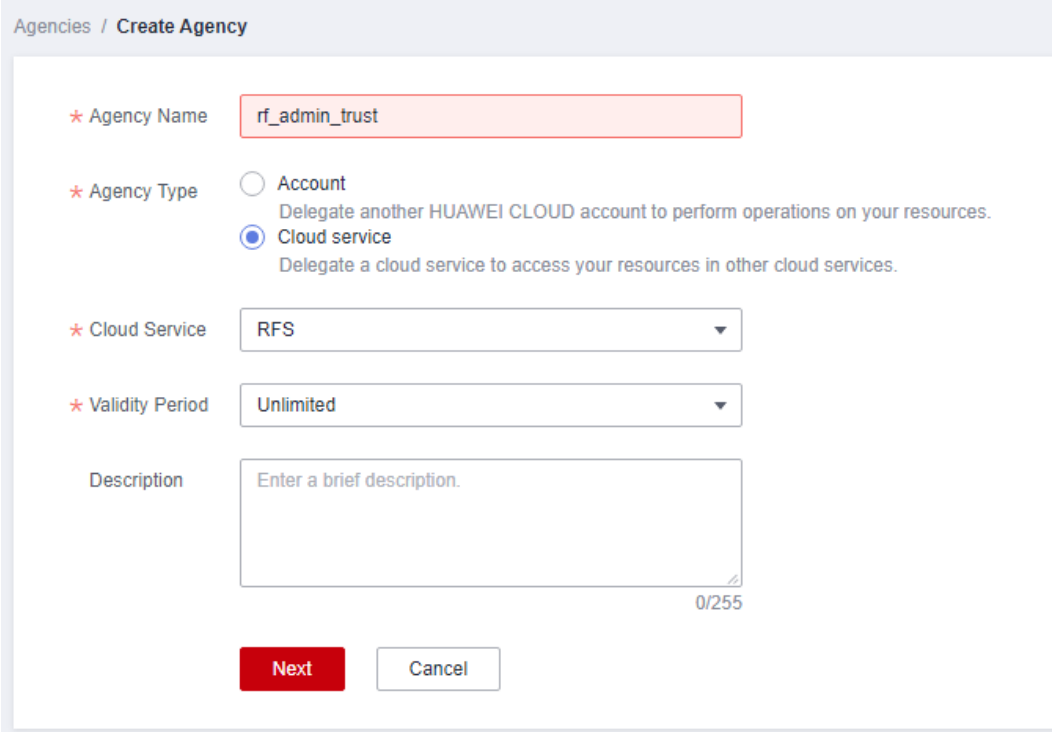
Figure 3-3 Agency list



- If the agency is found, skip the following steps.
- If the agency is not found, perform the following steps to create it.

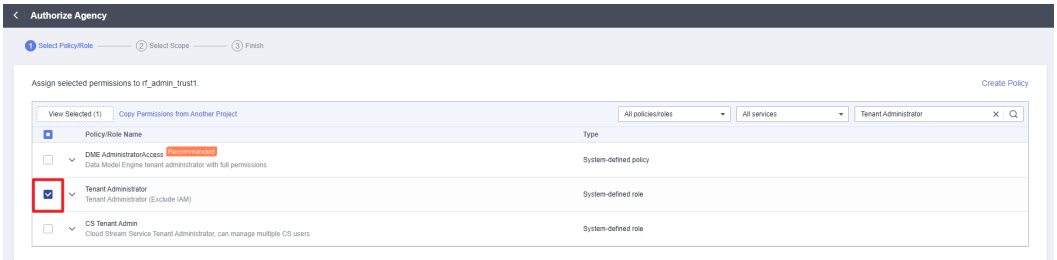
Step 3 Click **Create Agency** in the upper right corner of the page. On the displayed page, enter **rf_admin_trust** for **Agency Name**, select **Cloud service** for **Agency Type**, select **RFS** for **Cloud Service**, and click **Next**.

Figure 3-4 Create Agency



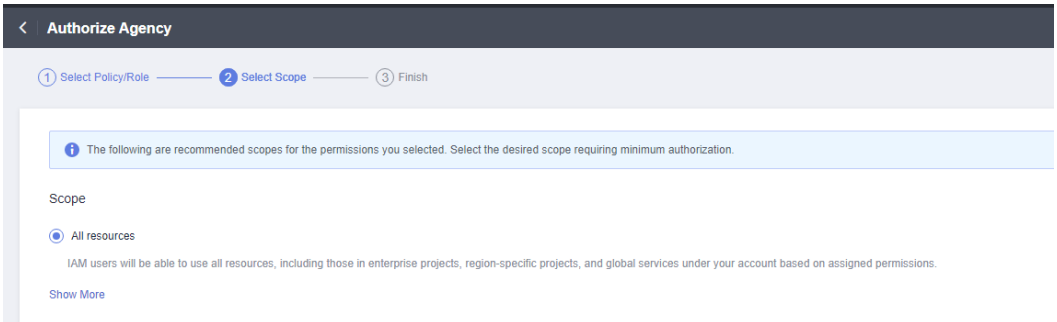
Step 4 Search for **Tenant Administrator**, select it in the search results, and click **Next**.

Figure 3-5 Selecting a policy



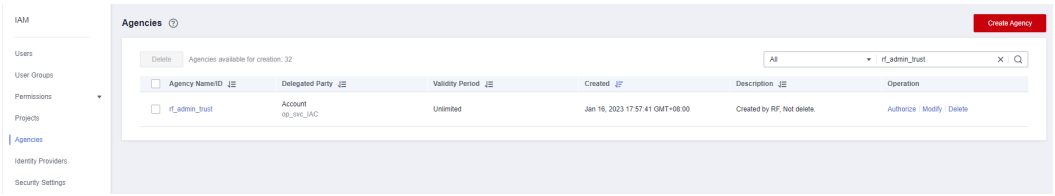
Step 5 Select **All resources** and click **OK**.

Figure 3-6 Select Scope



Step 6 Check that the **rf_admin_trust** agency is created and displayed in the agency list.

Figure 3-7 Agency list



----End

3.2 Quick Deployment

This section describes how to deploy the Source Code Compilation with Jenkins solution.

Table 3-1 Parameter description

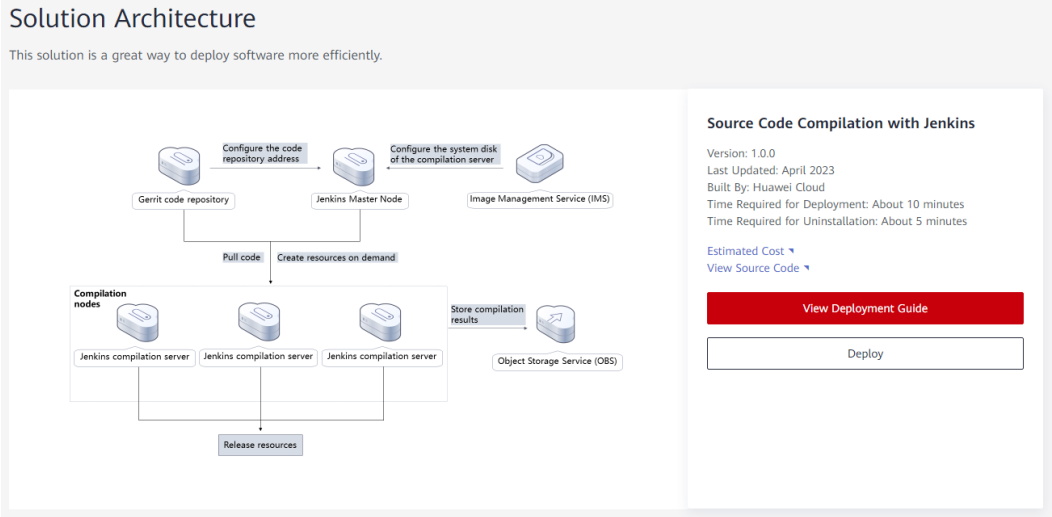
Parameter	Type	Mandatory	Description	Default Value
vpc_name	String	Yes	The prefix of a Virtual Private Cloud (VPC) name. The VPC naming format is {vpc_name}_vpc. This template uses a newly created VPC and the VPC name must be unique. The prefix can contain 1 to 57 characters and can include letters, digits, underscores (_), hyphens (-), and periods (.).	build_system_based_on_jenkins_demo
secgroup_name	String	Yes	The prefix of a security group name. The security group naming format is {secgroup_name}_secgroup. This template uses a newly created security group. For details about how to configure security group rules, see the **(Optional) Modifying Security Group Rules**. The prefix can contain 1 to 55 characters and can include letters, digits, underscores (_), hyphens (-), and periods (.).	build_system_based_on_jenkins_demo

Parameter	Type	Mandatory	Description	Default Value
ecs_name	String	Yes	The prefix of the Jenkins and Gerrit server names. The naming format is {ecs_name}-jenkins or {ecs_name}-gerrit. The server name must be unique. The prefix can contain 1 to 56 characters and can include letters, digits, underscores (_), hyphens (-), and periods (.)	build_system_based_on_jenkins_demo
jenkins_flavor	String	Yes	The flavor of the Jenkins server. The default flavor is c6.xlarge.2 (4U8G). For more flavors, see the deployment guide.	c6.xlarge.2
gerrit_flavor	String	Yes	The flavor of the Gerrit server. The default flavor is c6.xlarge.2 (4U8G). For more flavors, see the deployment guide.	c6.xlarge.2
ecs_password	String	Yes	The initial password of the Jenkins and Gerrit servers. After an ECS is created, log in to the ECS console and change the password by referring to the instructions provided in deployment guide. It can include 8 to 26 characters and must include at least three of the following character types: uppercase letters, lowercase letters, digits, and special characters (!@$%^-_=+[{}]:,./?). The password cannot contain any username or the username spelled backwards. The administrator is **root**.	Left blank
jenkins_disk_size	Number	Yes	The size of the data disk attached to the Jenkins server. The unit is GB. Value range: 10 to 32768. The default value is **500**.	500

Parameter	Type	Mandatory	Description	Default Value
gerrit_disk_size	Number	Yes	The size of the data disk attached to the Gerrit server. The unit is GB. Value range: 10 to 32768. The default value is **500**.	500
jenkins_eip_size	Number	Yes	The bandwidth size of the Elastic IP (EIP) bound to the Jenkins server. The EIP is billed by bandwidth. The unit is Mbit/s. Value range: 1 to 2000. The default size is 10 Mbit/s.	10
gerrit_eip_size	Number	Yes	The bandwidth size of the Elastic IP (EIP) bound to the Gerrit server. The EIP is billed by bandwidth. The unit is Mbit/s. Value range: 1 to 2000. The default size is 10 Mbit/s.	10
bucket_name	String	Yes	The name of the OBS bucket for storing compiled code. The name must be globally unique in OBS. It must include 3 to 63 characters and can include only lowercase letters, digits, hyphens (-), and periods (.). It cannot be an IP address.	build-system-based-on-jenkins-demo

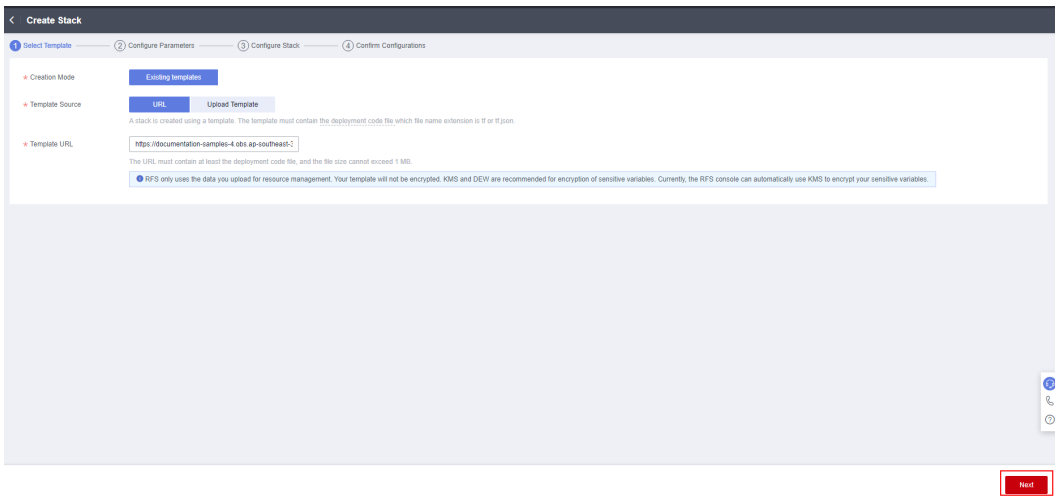
Step 1 Log in to Huawei Cloud Solution Best Practices and choose **Source Code Compilation with Jenkins**. Click **Deploy** to switch to the **Create Stack** page.

Figure 3-8 Selecting a solution



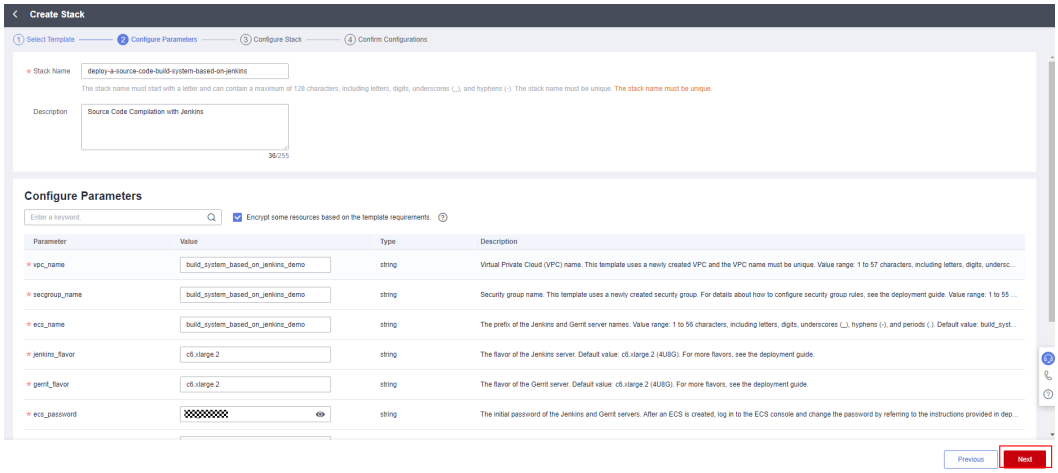
Step 2 On the **Select Template** page, click **Next**.

Figure 3-9 Select Template



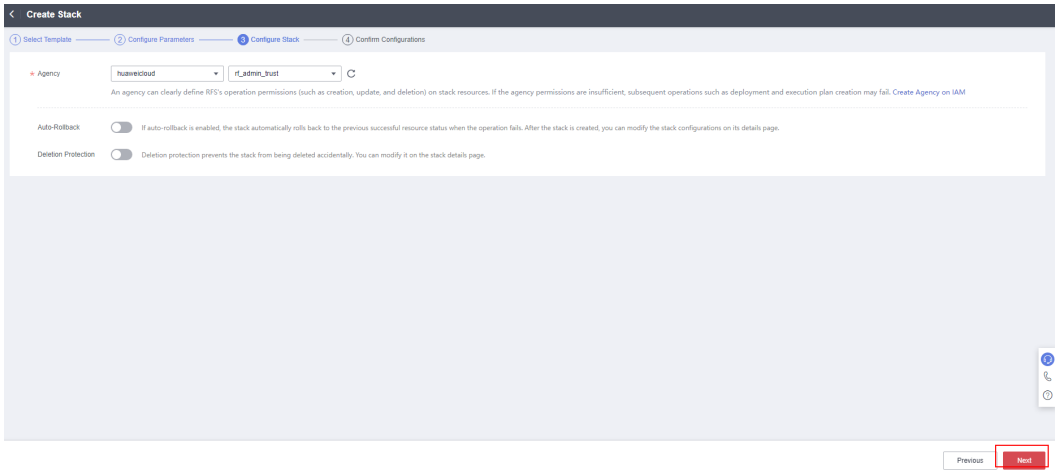
Step 3 On the **Configure Parameters** page, enter a stack name, configure parameters based on **Table 3-1**, and click **Next**.

Figure 3-10 Configure Parameters



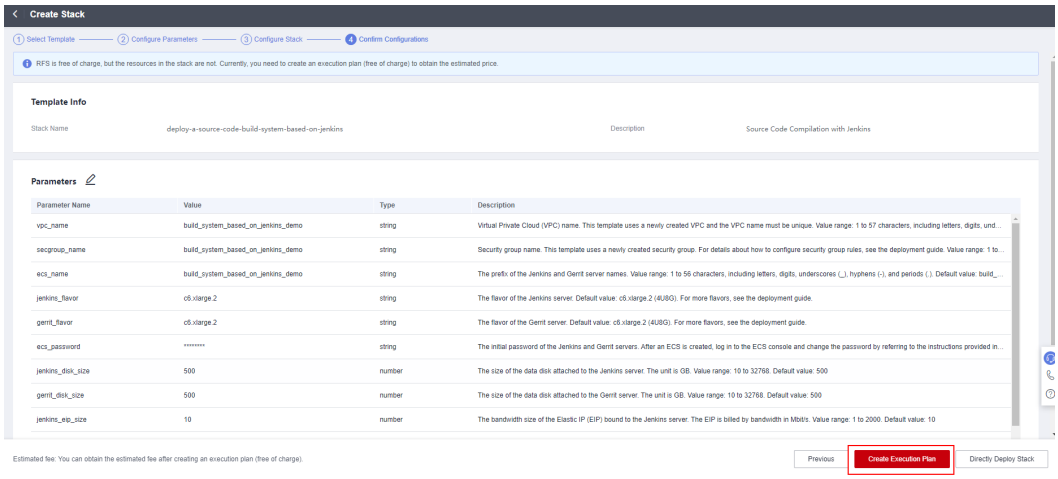
Step 4 On the **Configure Stack** page, select the **rf_admin_trust** agency and click **Next**.

Figure 3-11 Configure Stack



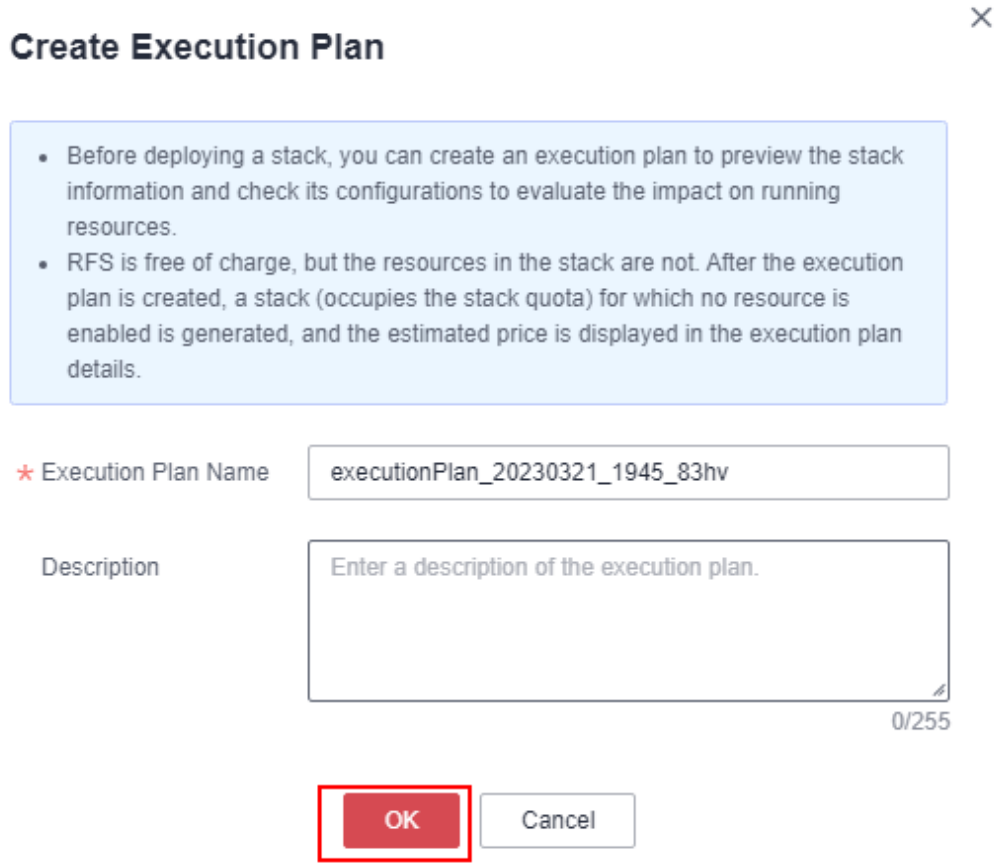
Step 5 On the **Confirm Configurations** page, confirm the configurations and click **Create Execution Plan**.

Figure 3-12 Confirm Configurations



Step 6 In the displayed **Create Execution Plan** dialog box, enter an execution plan name and click **OK**.

Figure 3-13 Create Execution Plan



Step 7 Wait until the status of the execution plan changes to **Available**, and then click **Deploy** in the **Operation** column. In the displayed dialog box, click **Execute**.

Figure 3-14 Execution plan created

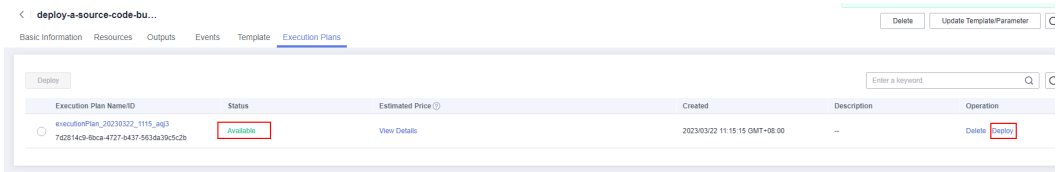
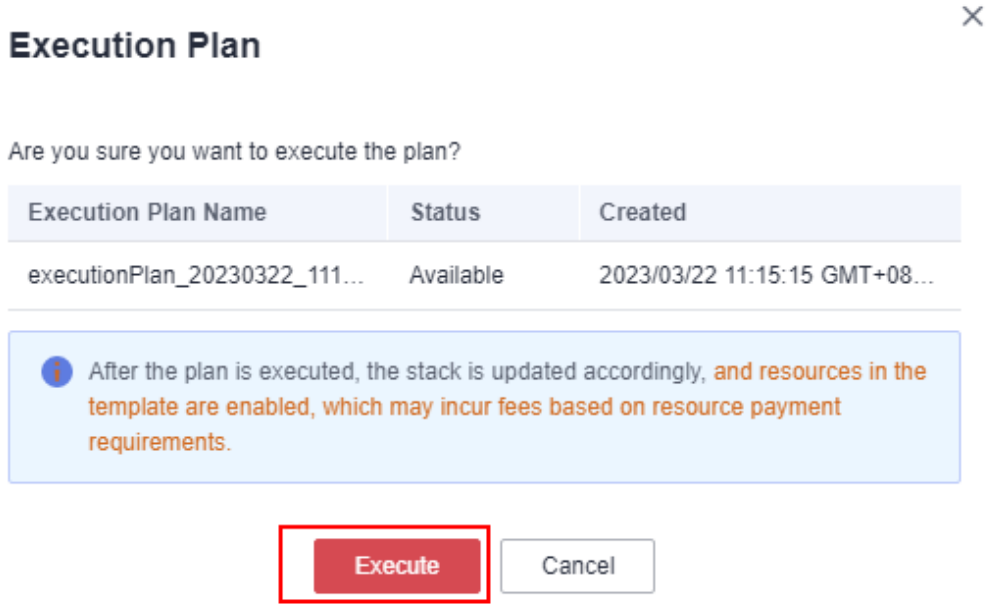


Figure 3-15 Confirming the execution plan



Step 8 Wait until the deployment is successful and click the **Events** tab to view details.

Figure 3-16 Resources created

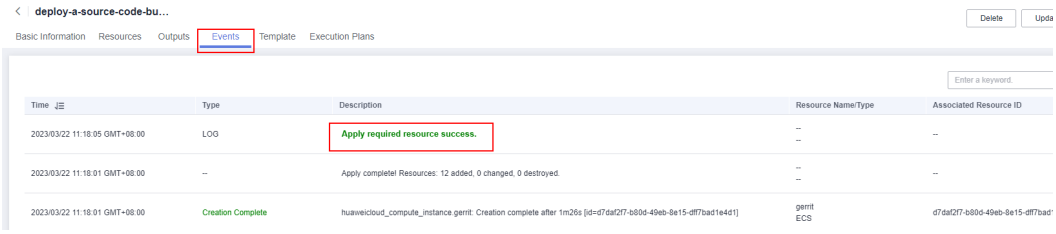
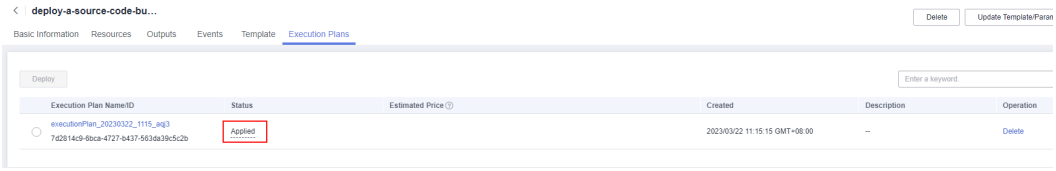


Figure 3-17 Deployment completed



----End

3.3 Getting Started

(Optional) Modifying Security Group Rules

NOTICE

- This solution uses port 50000 to communicate with the Jenkins master node. By default, the VPC subnet created in this solution allows access from port 50000. Configure an IP address whitelist by referring to **Modifying a Security Group Rule**.

A security group is a collection of access control rules for cloud resources, such as cloud servers, containers, and databases, to control inbound and outbound traffic. Cloud resources associated with the same security group have the same security requirements and are mutually trusted within a VPC.

You can modify the security group policy, for example, by adding, modifying, or deleting a TCP port, as follows:

- Adding a security group rule: **Add an inbound rule** and enable a TCP port if needed.
- Modifying a security group rule: Inappropriate security group settings can be a serious security risk. You can **modify security group rules** to ensure the network security of your ECSs.
- Deleting a security group rule: If the source or destination IP address of an inbound or outbound security group rule changes, or a port does not need to be enabled, you can **delete the security group rule**.

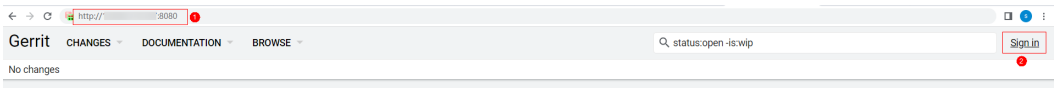
Accessing Gerrit and Creating a Code Repository

Step 1 On the **Outputs** tab of the stack, copy the Gerrit access address.

Figure 3-18 Gerrit access address

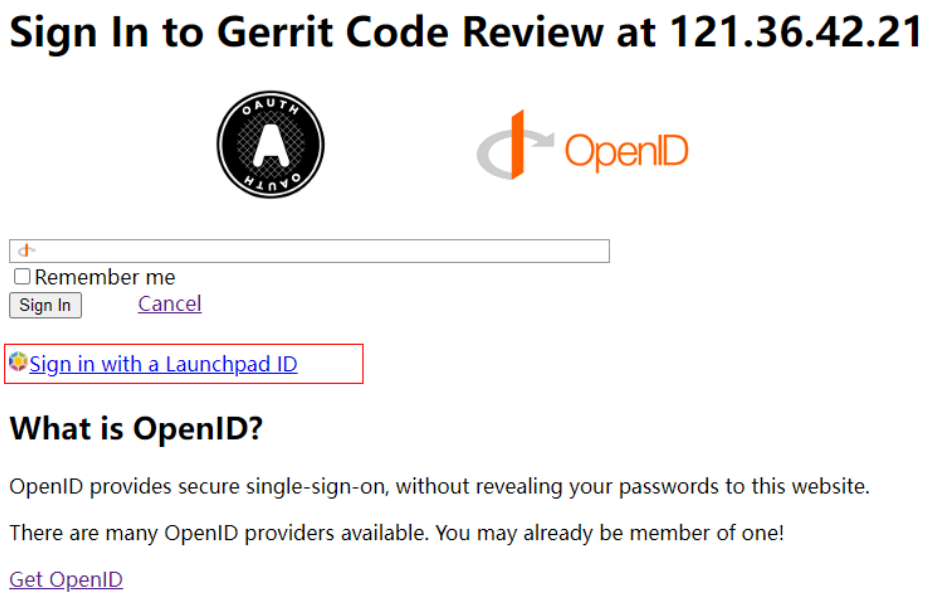
Step 2 Paste the Gerrit access address to the address bar of a browser and click **Sign in**.

Figure 3-19 Accessing Gerrit



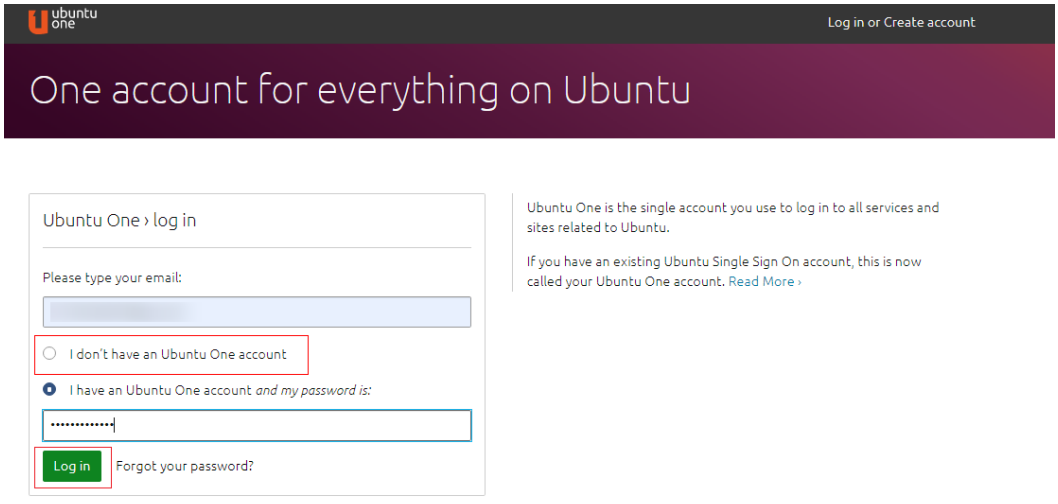
Step 3 Click **Sign in with a Launchpad ID**.

Figure 3-20 Signing in to Gerrit (1)



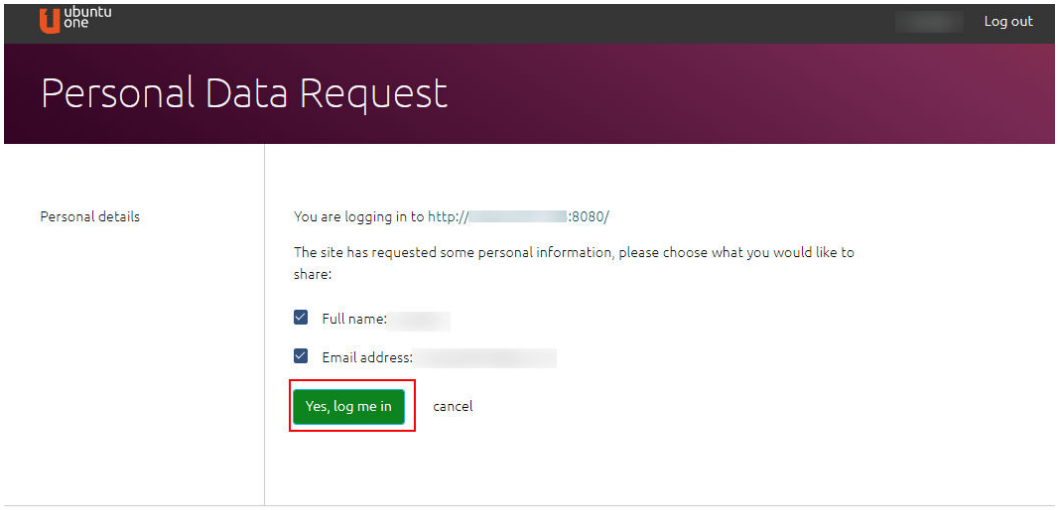
Step 4 On the Ubuntu One page, enter an email address and password to log in. (If you do not have an account, click **Log in or Create account** in the upper right corner to create an account.)

Figure 3-21 Signing in to Gerrit (2)



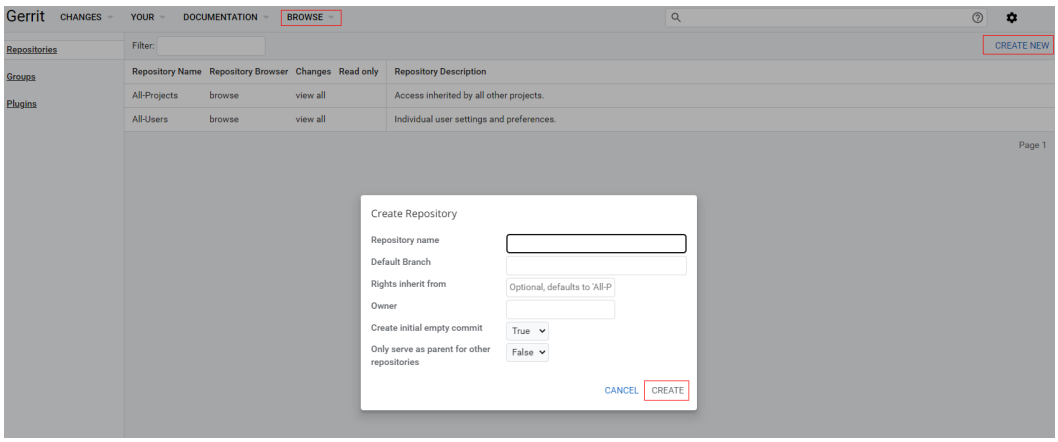
Step 5 On the displayed page, click **Yes, log me in**.

Figure 3-22 Signing in to Gerrit (3)



Step 6 Choose **BROWSE** > **Repositories** > **CREATE NEW**, specify **Repository name** and **Default Branch**, and click **CREATE**.

Figure 3-23 Creating a code repository

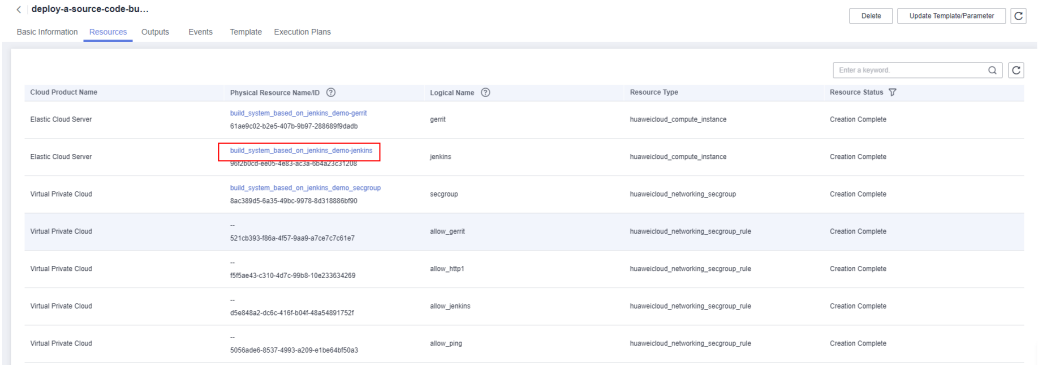


----End

Accessing Jenkins and Configuring Plugins

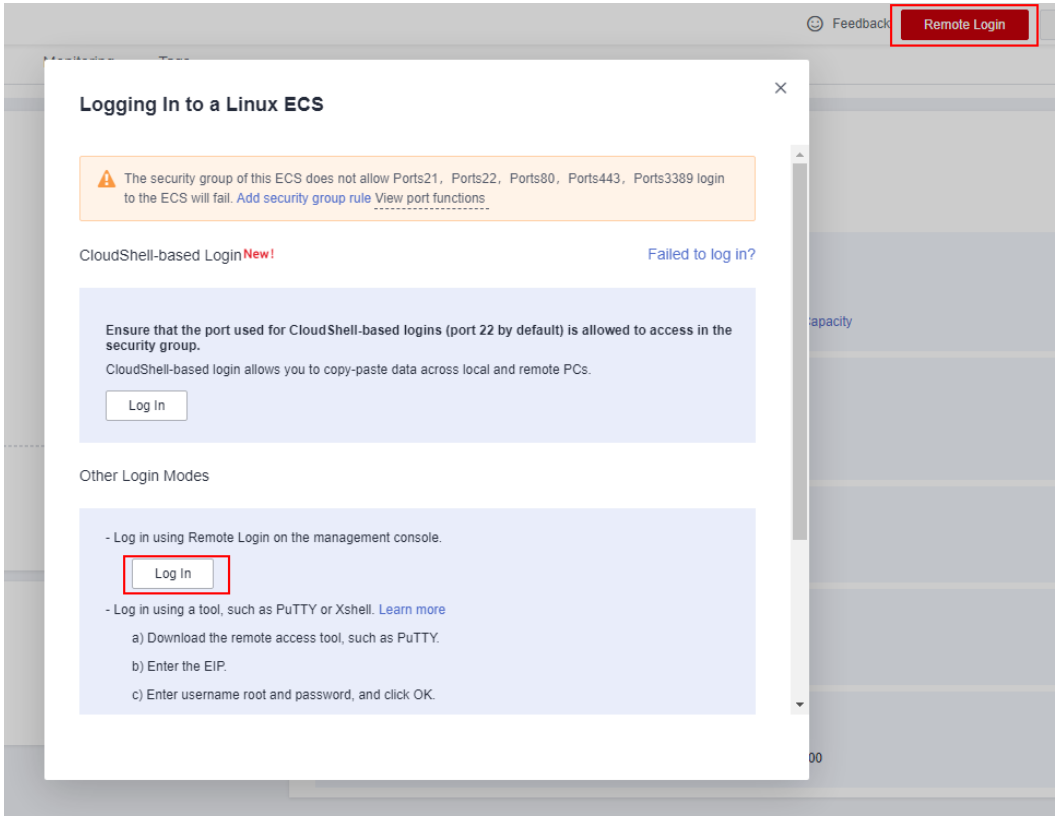
Step 1 On the **Resources** tab of the stack, click the created Jenkins server.

Figure 3-24 Accessing the Jenkins server



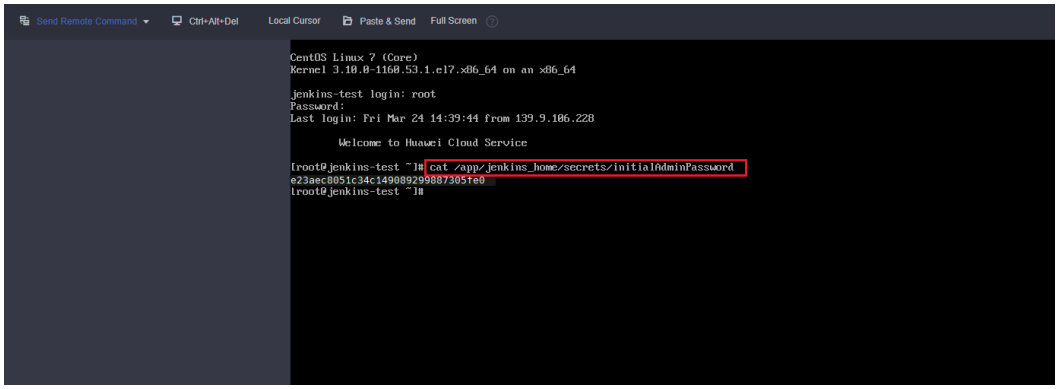
Step 2 Click **Remote Login**. In **Other Login Modes** area, click **Log In**. For more login modes, see **ECS Help Center**.

Figure 3-25 Logging in to the Jenkins server



Step 3 Run **cat /app/jenkins_home/secrets/initialAdminPassword** to obtain the login password of user **admin** and copy the password.

Figure 3-26 Obtaining the password of user admin for logging in to the Jenkins server

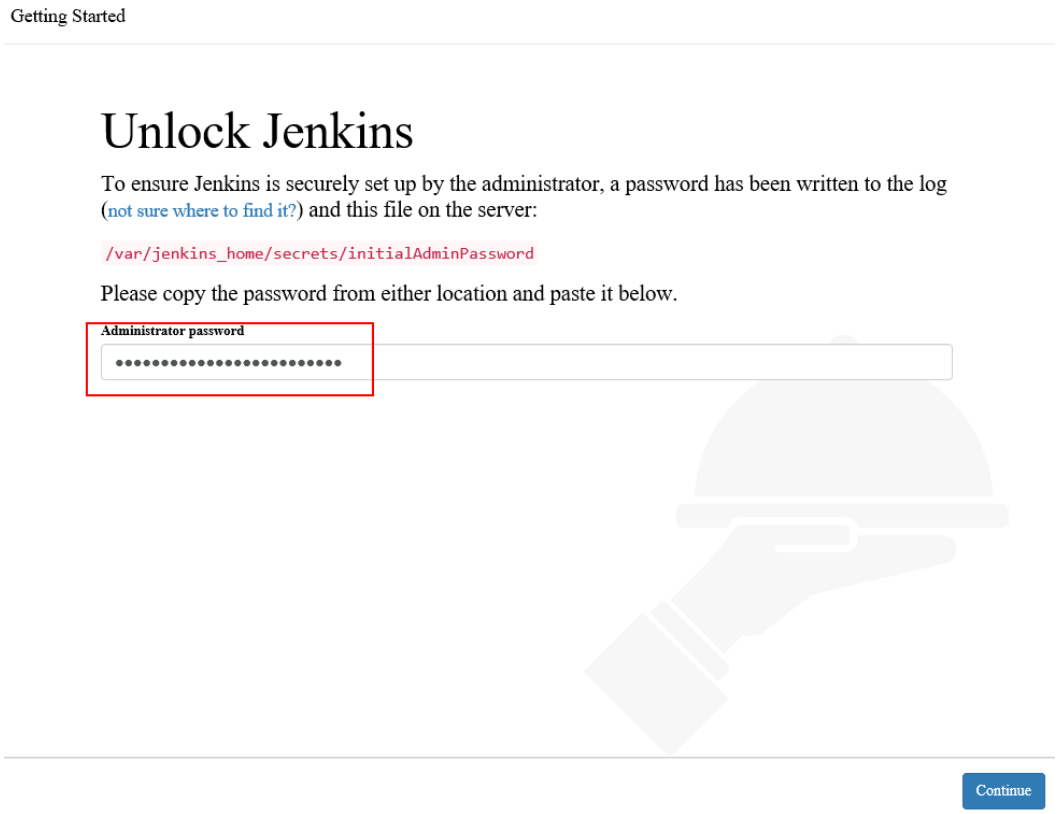


Step 4 On the **Outputs** tab of the stack, copy the Jenkins access address.

Figure 3-27 Jenkins access address

Step 5 Paste the Jenkins access address into the address bar of a browser, enter the password obtained in **Step 3**, and click **Continue**.

Figure 3-28 Logging in to Jenkins



Step 6 Install plugins by selecting, for example, **Install suggested plugins**.

Figure 3-29 Customize Jenkins

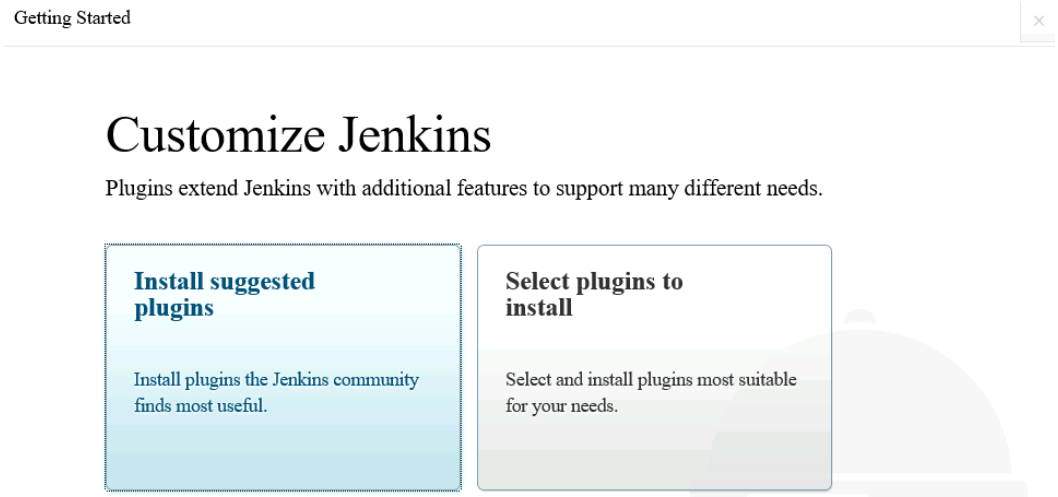
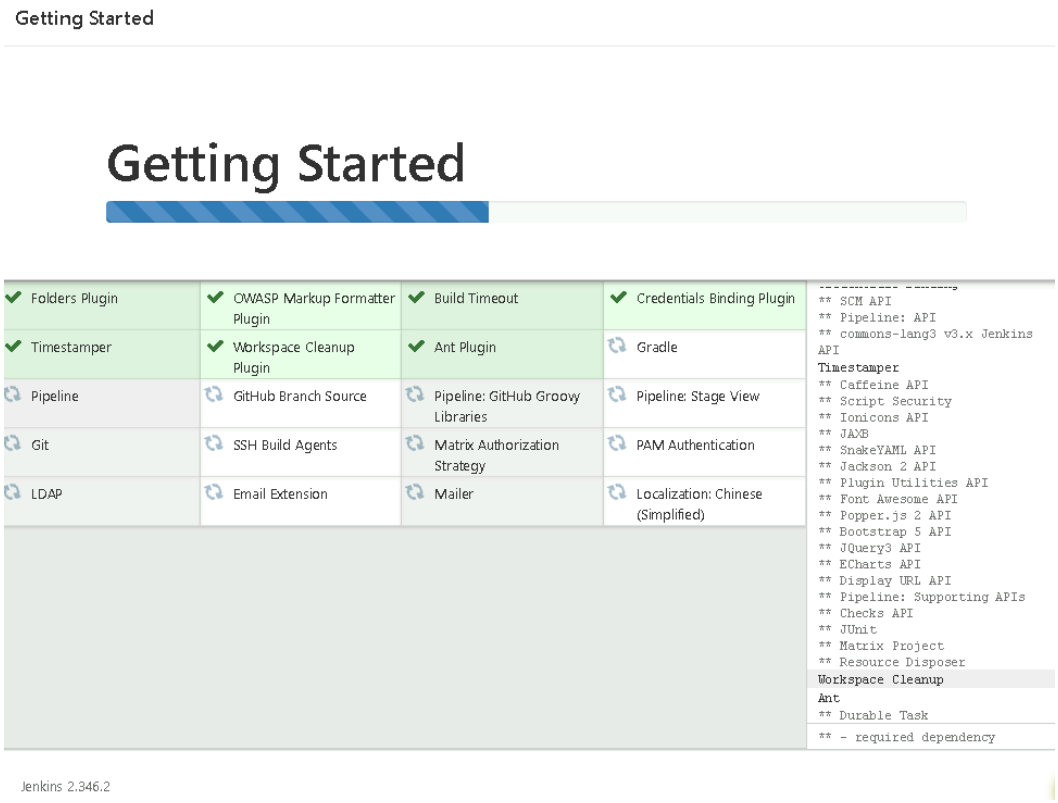
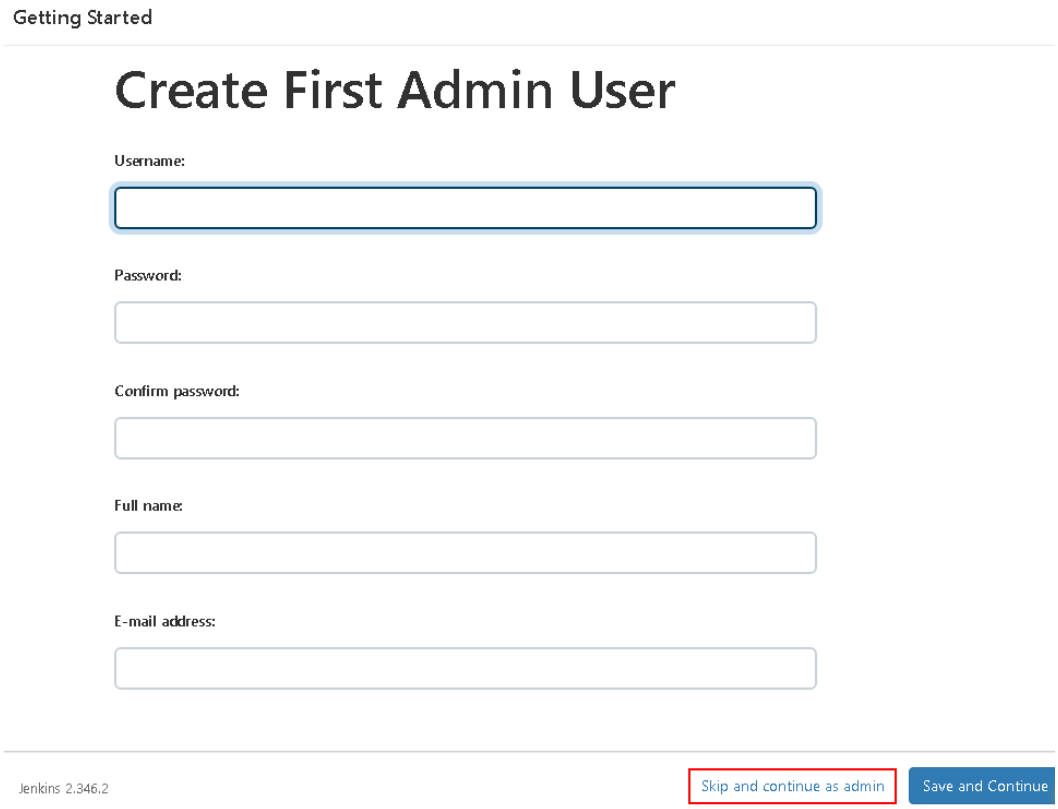


Figure 3-30 Installing plugins



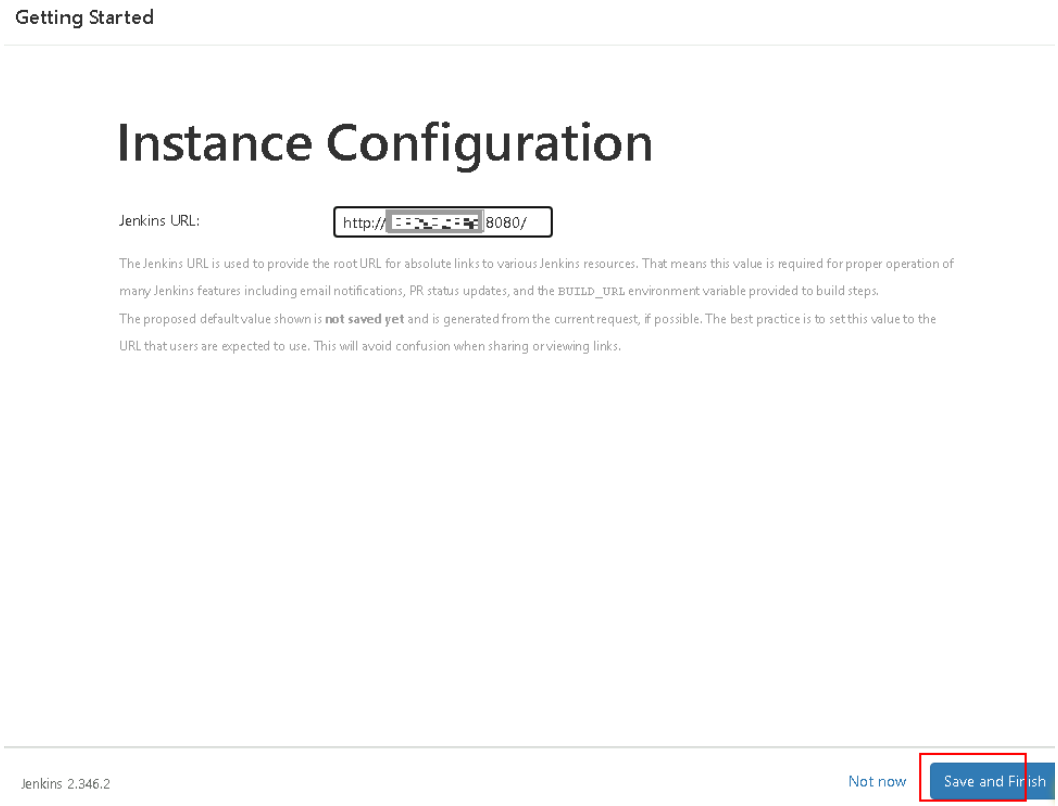
Step 7 Wait until the plugins are installed. Then create an admin user or click **Skip and continue as admin**. In this example, we click **Skip and continue as admin**.

Figure 3-31 Continue as an admin



Step 8 On the **Instance Configuration** page, configure the Jenkins URL and click **Save and Finish**.

Figure 3-32 Configuring the Jenkins URL



Step 9 Wait until the Jenkins setup is complete and click **Start using Jenkins**.

Figure 3-33 Jenkins setup completed

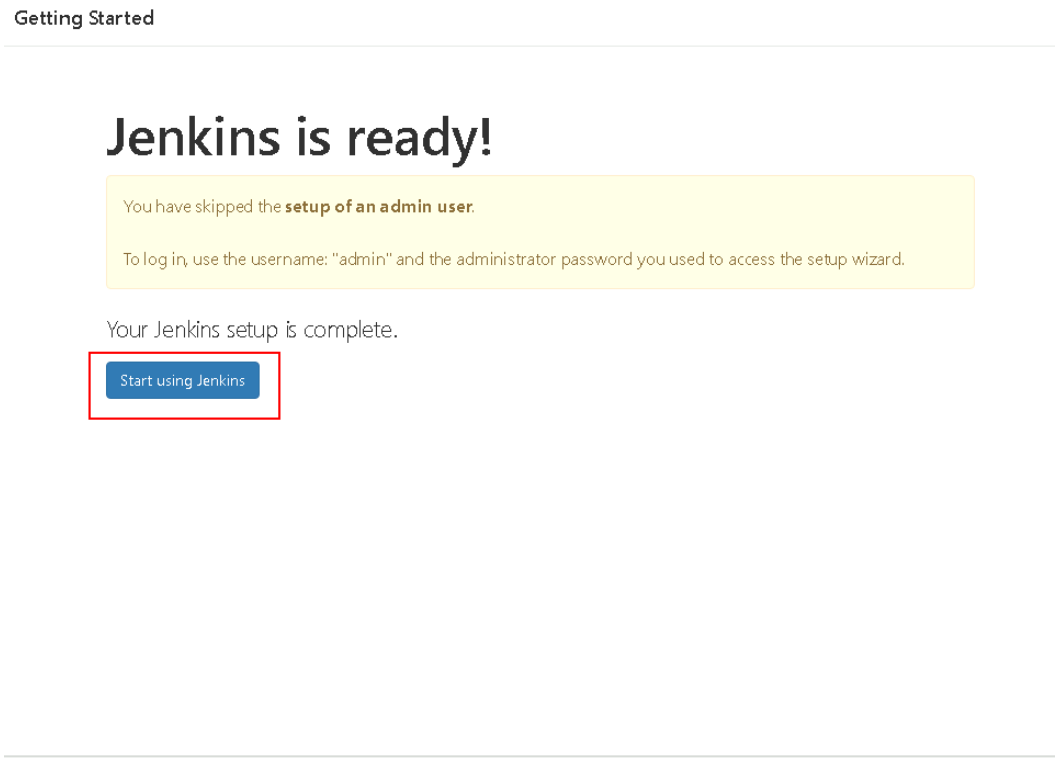
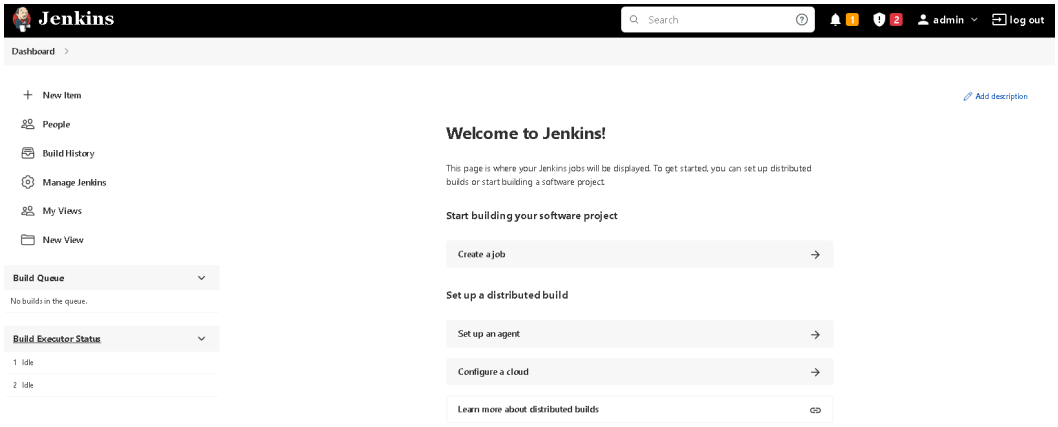


Figure 3-34 Accessing Jenkins



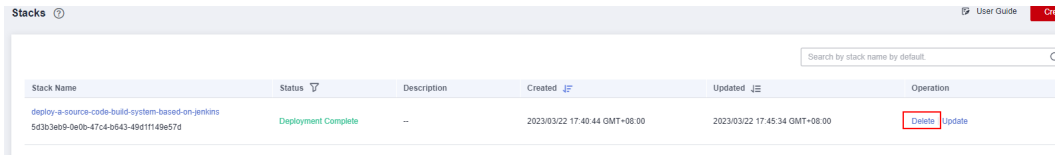
Step 10 **Configure the HuaweiCloud ECS plugin** to automatically create Huawei Cloud ECSs as the slave nodes of the Jenkins cluster.

----End

3.4 Quick Uninstallation

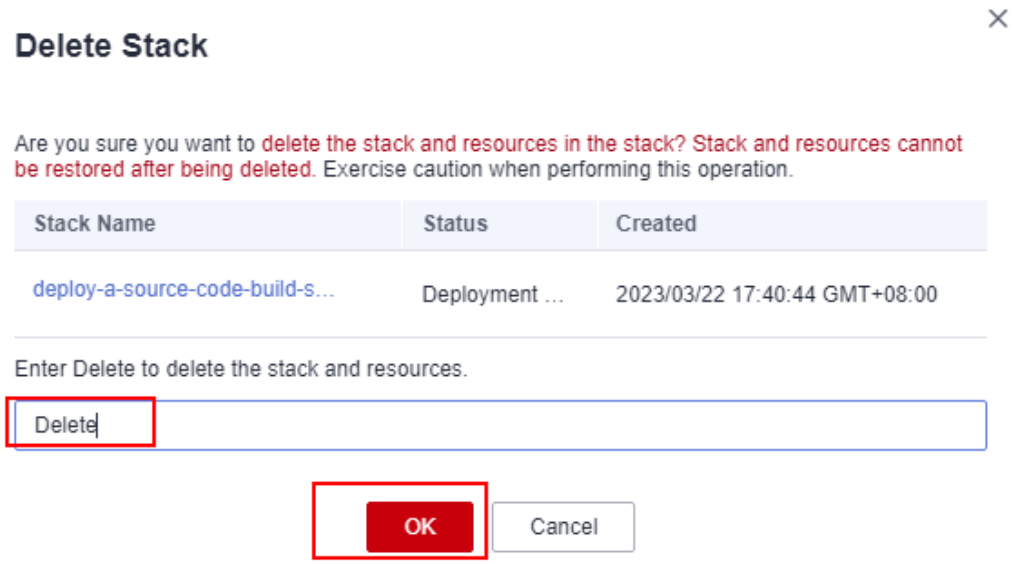
Step 1 Click **Delete** in the row where the solution stack is.

Figure 3-35 Deleting the stack



Step 2 Enter **Delete** and click **OK**.

Figure 3-36 Confirming the deletion



----End

4 Appendix

Terms

- **Elastic Cloud Server (ECS)**: ECS provides secure, scalable, on-demand compute resources, enabling you to flexibly deploy applications and workloads.
- **Elastic IP (EIP)**: EIP provides static public IP addresses and scalable bandwidths that enable your cloud resources to communicate with the Internet. You can easily bind an EIP to an ECS, BMS, virtual IP address, NAT gateway, or load balancer, enabling immediate Internet access.
- **Object Storage Service(OBS)**: Object Storage Service (OBS) provides stable, secure, efficient, and easy-to-use cloud storage that lets you store virtually any volume of unstructured data in any format and access it from anywhere using REST APIs.

5 Change History

Released On	Description
2023-04-30	This issue is the first official release.

