Solution

# CSS-based SQL Acceleration

| | |
|---|---|
| **Issue** | 1.0.0 |
| **Date** | 2025-07-30 |

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# Contents



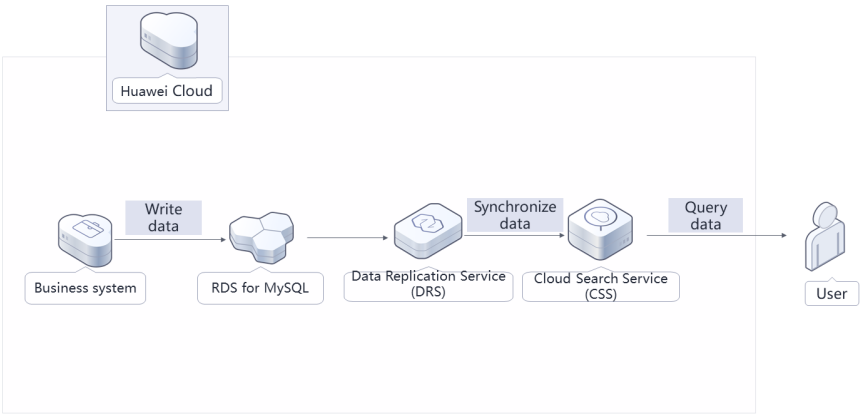
# 1 Solution Overview

## Application Scenarios

Based on Cloud Search Service (CSS), this solution synchronizes MySQL data to CSS in real time. CSS provides stable, low-latency, high-concurrency, and scalable query performance, as well as excellent multi-dimensional query analysis and full-text search capabilities. This solution is applicable to operation departments of e-commerce and logistics to query and analyze offering orders and logistics information from multiple dimensions.

## Solution Architecture

This solution helps you deploy the CSS-based SQL acceleration solution with just a few clicks and quickly complete basic configurations for Relational Database Service (RDS), Data Replication Service (DRS), and CSS.




To use this solution, you need to:

- Create an RDS for MySQL or **GaussDB(for MySQL)** database to store your service data.

- Synchronize RDS data to CSS in real time.
- Create a CSS cluster. CSS is a fully hosted, distributed search service powered by open-source Elasticsearch. It provides high-concurrency and low-latency query and analysis capabilities.

## Advantages

- Ease of use

  This solution is out-of-the-box. You can use DRS to synchronize data in real time without coding or data synchronization tasks.
- High performance

  With the industry-leading vector retrieval engine and composite index capability of CSS, this solution can support full-text retrieval and random multi-dimensional analysis in ad-hoc scenarios.
- Capability expansion

  CSS improves database concurrency, scale-out capability, and complex query (full-text search, fuzzy search, and random multi-dimensional analysis) satisfaction.

## Constraints

- Before deploying this solution, you have registered an account with access to the target region.

# 2 Resource Planning and Costs

This solution deploys the resources listed in the following table. The costs are only estimates and may differ from the final prices. For details, see **Price Calculator**.

**Table 2-1** Resource planning and costs

| Product | Configuration Example | Estimated Fee/Month |
| --- | --- | --- |
| RDS for MySQL | Pay-per-use: $0.27 USD/hour<br>• Region: AP-Singapore<br>• Billing Mode: Pay-per-use<br>• DB Engine: MySQL<br>• DB Engine Version: 5.7<br>• DB Instance Type: Primary/Standby<br>• Storage: Cloud SSD 100 GB<br>• DB Instance Class: General-purpose 2 vCPUs \| 8 GB<br>• Quantity: 1 | $0.27 USD*24*30= $194.4 USD |
| Data Replication Service (DRS) | Pay-per-use: $0.38 USD/hour<br>• Region: AP-Singapore<br>• Billing Mode: Pay-per-use<br>• Task Type: Data Synchronization<br>• Data Flow: Out of the cloud<br>• Source DB Engine: MySQL<br>• Destination DB Engine: CSS/ES<br>• Network Type: VPC<br>• Specifications: Medium | $0.38 USD/ hour<br>(The specific cost is estimated based on the actual data transmission volume.) |

| Product | Configuration Example | Estimated Fee/Month |
| --- | --- | --- |
| Cloud Search Service (CSS) | Pay-per-use: $0.86 USD<br>• Region: AP-Singapore<br>• Billing Mode: Pay-per-use<br>• Type: Elasticsearch<br>• Version: 7.9.3<br>• Quantity: 3<br>• Node Specifications: ess.spec-4u8g 4 vCPUs \| 8 GB<br>• Storage Type: Ultra-high I/O<br>• Storage Capacity: 100 GB | $0.86 USD*24*30= $619.2 USD |
| Total | — | $813.6 USD + Data transfer configuration fee (0.38 USD/GB) |

# 3 Procedures



## 3.1 Preparations

### Creating the rf_admin_trust Agency

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

**Figure 3-1** Console

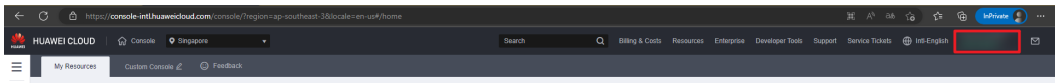
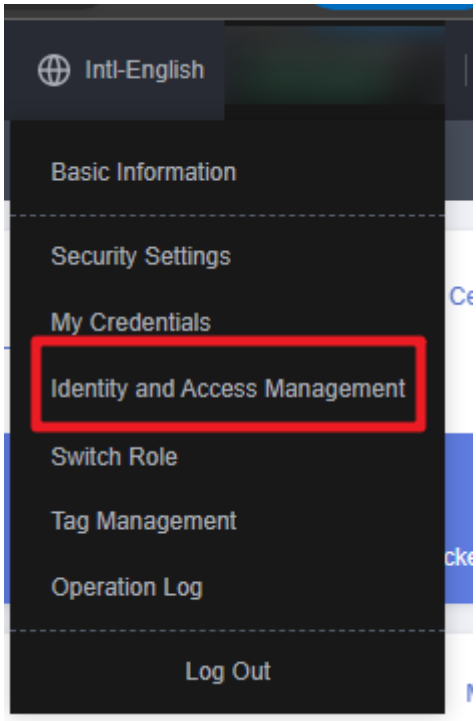


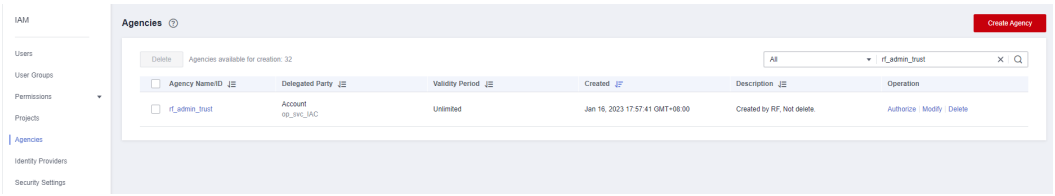

  

**Figure 3-2** Identity and Access Management




**Step 2** Choose **Agencies** and then search for the **rf_admin_trust** agency in the right pane.

**Figure 3-3** Agencies

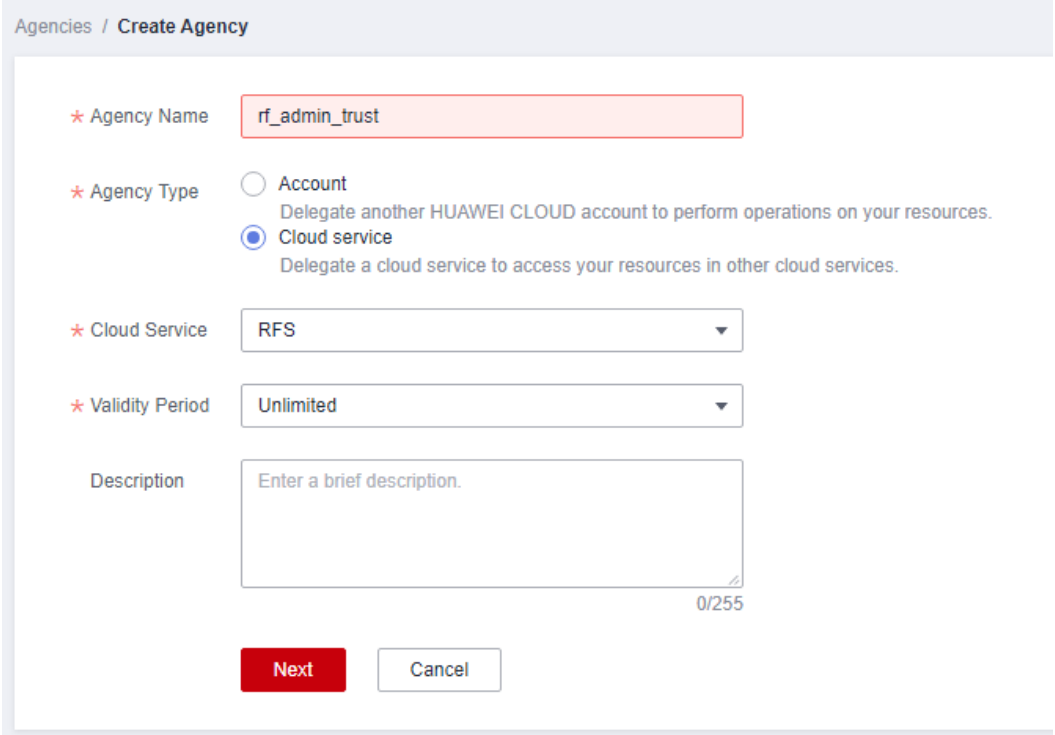



- If the agency is found, skip the following steps.
- If the agency is not found, perform the following steps.

**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**, enter **RFS** for **Cloud Service**, and click **Next**.

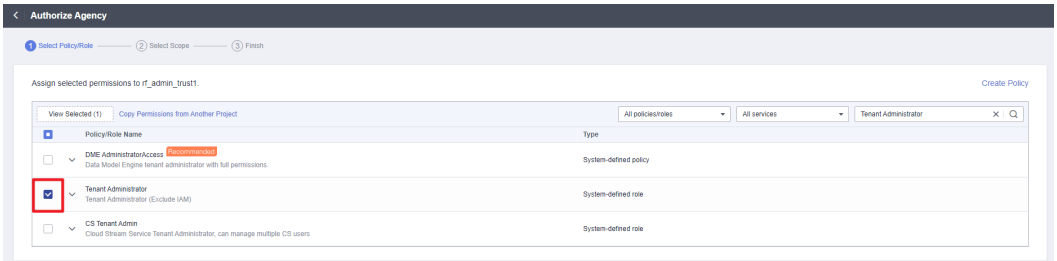
  

**Figure 3-4** Create Agency



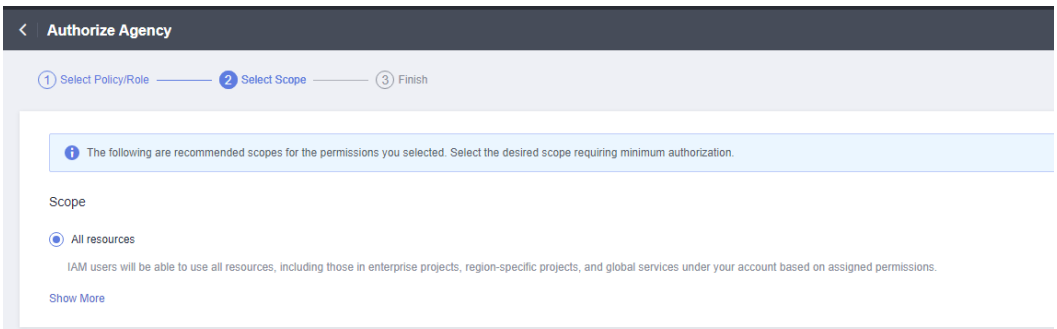

**Step 4** Search for **Tenant Administrator**, select it in the search results, and click **Next**.

**Figure 3-5** Select Policy/Role




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

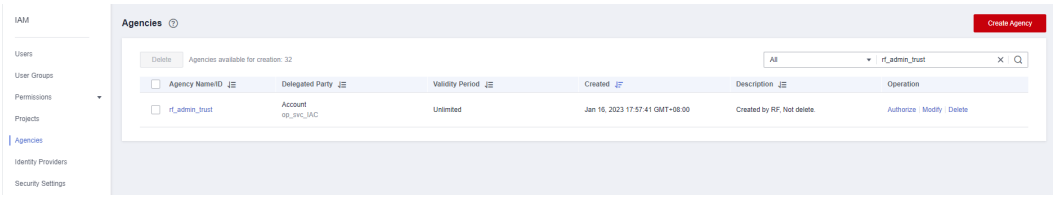
**Figure 3-6** Select Scope




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

**Figure 3-7** Agencies




**----End**

# 3.2 Quick Deployment

This section describes how to automatically deploy the CSS-based SQL acceleration solution.

**Table 3-1** Parameter description

| Parameter | Type | Mandatory | Description | Default Value |
| --- | --- | --- | --- | --- |
| vpc_name | string | Yes | VPC name. This template uses a newly created VPC and the VPC name must be unique. The name contains 1 to 64 characters, including letters, digits, underscores (_), hyphens (-), and periods (.). | search_acceleration_based_css_new_vpc_demo |
| security_group_name | string | Yes | Security group name. This template uses a newly created security group. For details about how to modify a security group rule, see **(Optional) Modifying Security Group Rules**. The name contains 1 to 64 characters, including letters, digits, underscores (_), hyphens (-), and periods (.). | search_acceleration_based_css_new_vpc_demo |

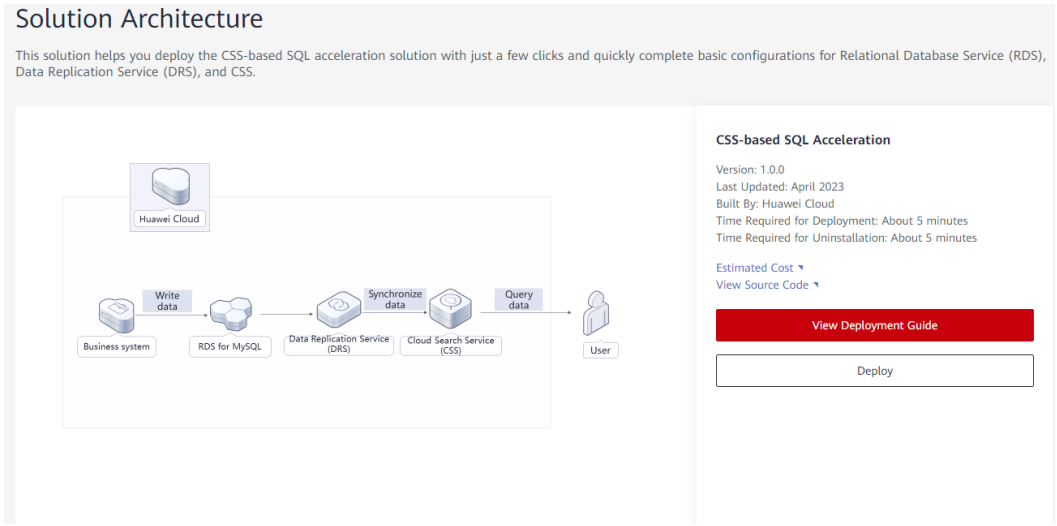
| | | | | |
|---|---|---|---|---|
| css_name | string | Yes | CSS cluster name. The value contains 4 to 32 characters, including digits, letters, hyphens (-), and underscores (_), and must start with a letter. | search_css_new_vpc_demo |
| css_flavor | string | Yes | CSS cluster specifications. For details about how to configure specifications, see **CSS Node Specifications**. | ess.spec-4u8g |
| css_password | string | Yes | CSS password. Value range: 8 to 32 characters, including at least three types of the following characters: uppercase letters, lowercase letters, digits, and special characters. The following special characters are allowed: ~ ! @ # $ % ^ * - _ = + ? , ( ) & | Left blank |
| rds_name | string | Yes | RDS database name. The value contains 4 to 64 characters and must start with a letter. It is case sensitive and can contain letters, digits, hyphens (-), and underscores (_). Other special characters are not allowed. | search_acceleration_based_css_new_vpc_demo |
| rds_flavor | string | Yes | RDS specifications. For details about how to configure specifications, see **RDS for MySQL Instance Classes**. | rds.mysql.n1.large.4.ha |

| | | | | |
|---|---|---|---|---|
| rds_password | string | Yes | RDS password. Value range: 8 to 32 characters, including at least three types of the following characters: uppercase letters, lowercase letters, digits, and special characters. The following special characters are allowed: ~ ! @ # $ % ^ * - _ = + ? , ( ) & | Left blank |

**Step 1** Log in to Huawei Cloud Solution Best Practices and choose **CSS-based SQL Acceleration**. Click **Deploy Now** to switch to the **Create Stack** page.

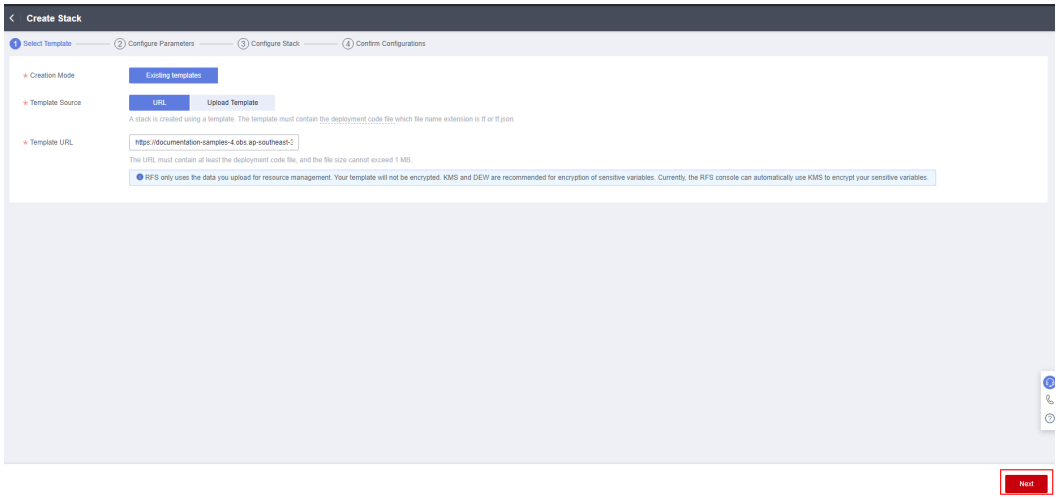
**Figure 3-8** Deploying the solution




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

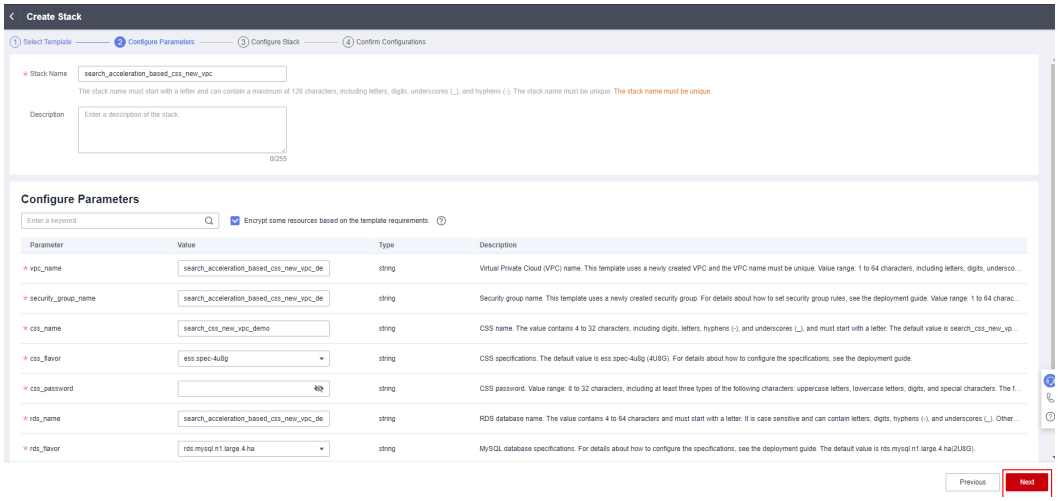
  

**Figure 3-9** Selecting a template




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

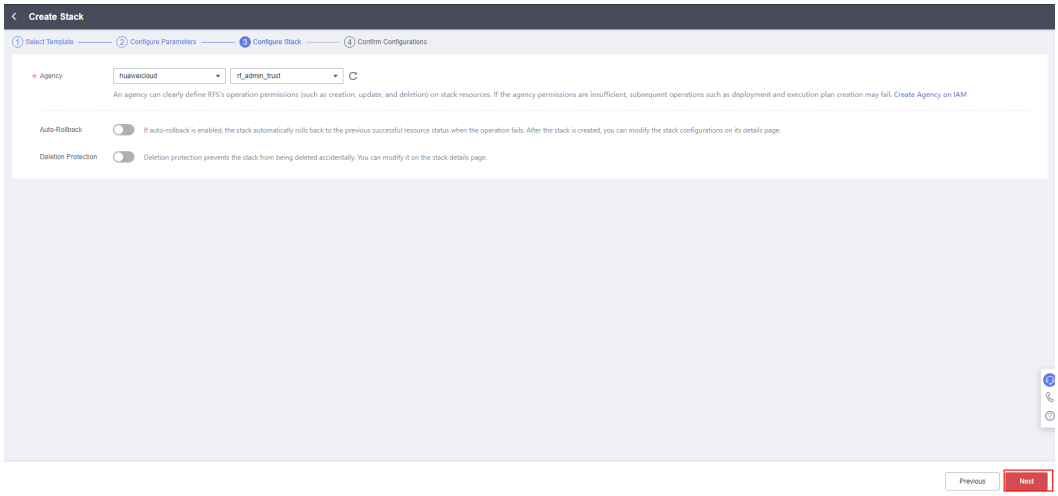
**Figure 3-10** Configure parameters




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

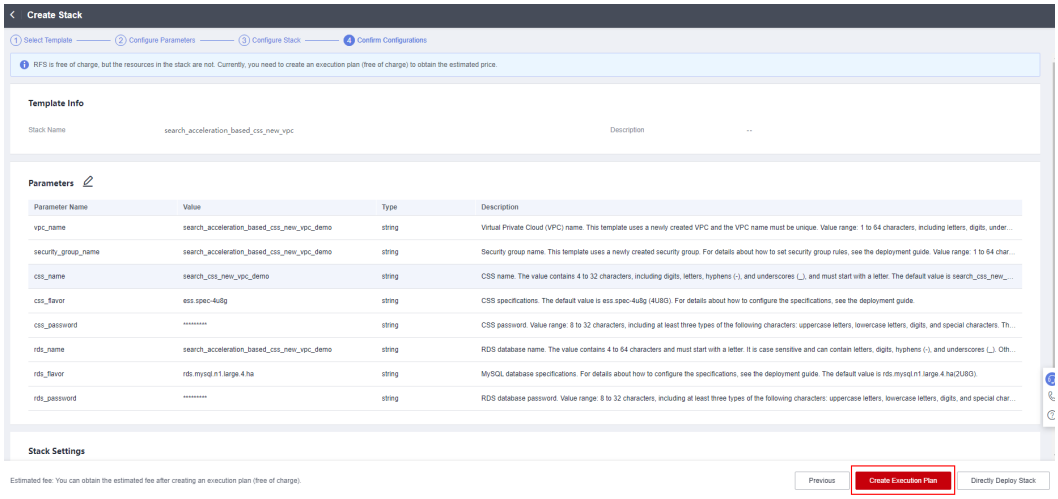
  

**Figure 3-11** Configure Stack




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

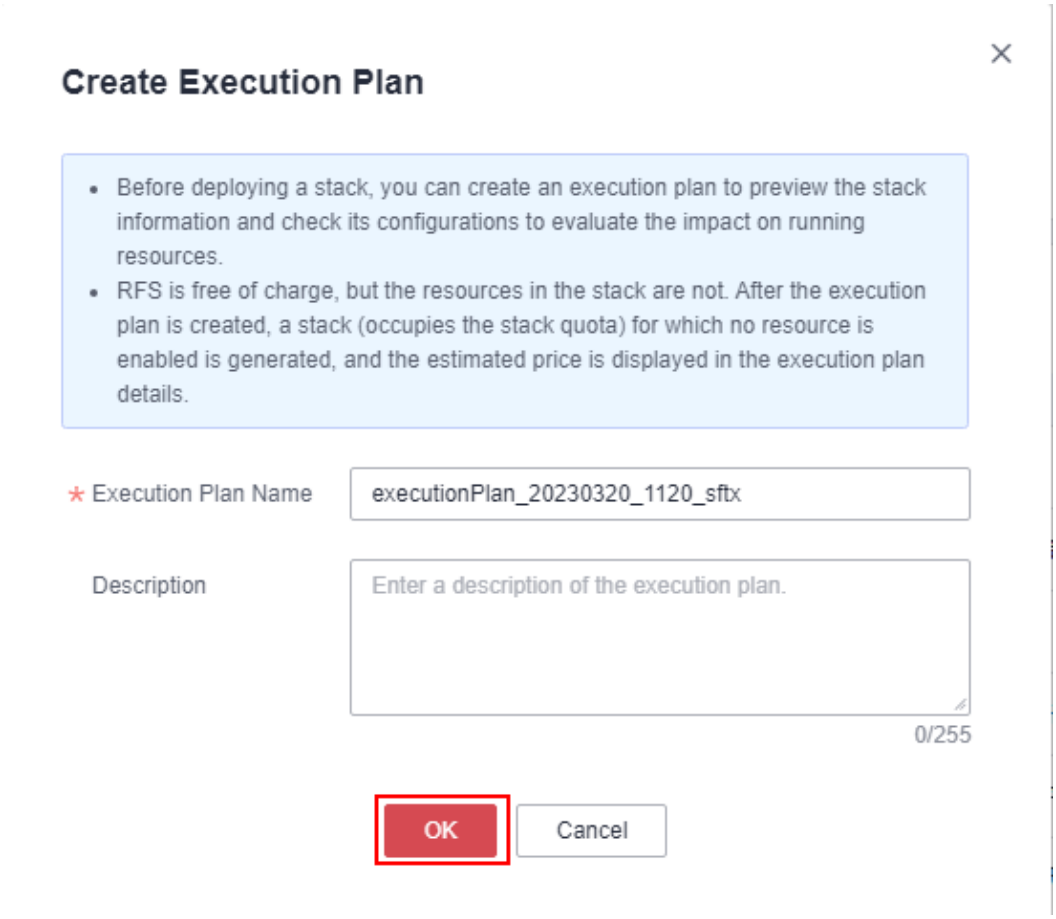
**Figure 3-12** Confirming the configurations




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

**Figure 3-13** Creating an execution plan




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

**Figure 3-14** Execution plan

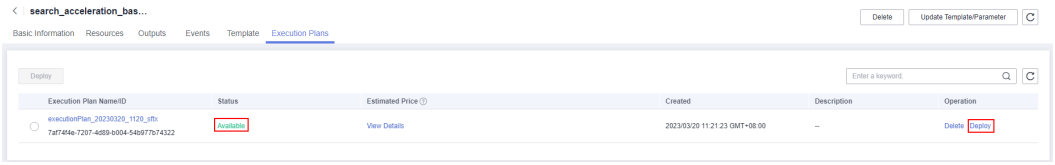
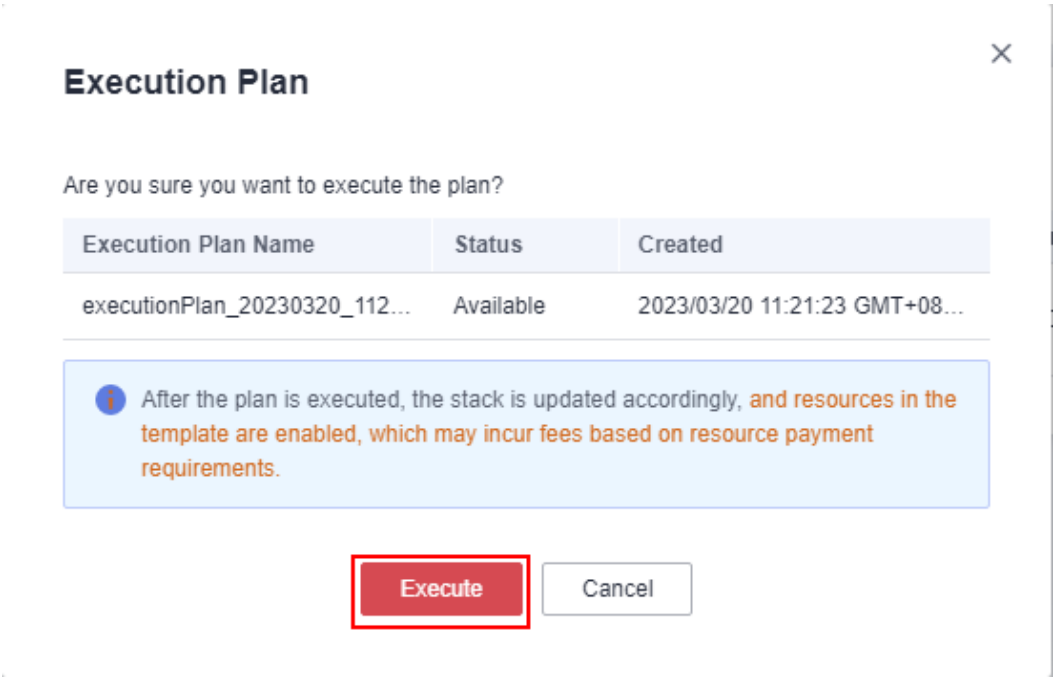


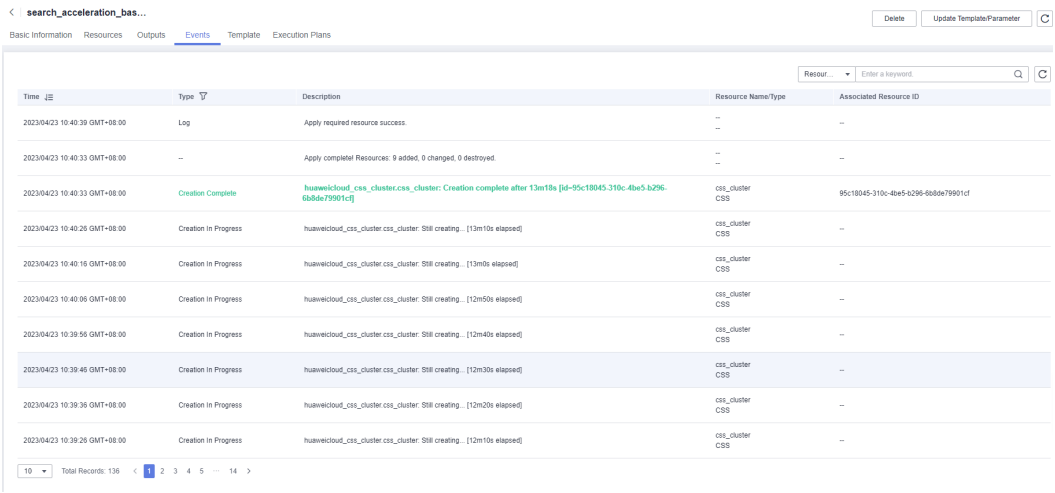

  

**Figure 3-15** Confirming the execution plan




**Step 8** Click the **Events** tab and check whether the message "Apply required resource success" is displayed. If so, the solution is successfully deployed.

**Figure 3-16** Solution deployed




**----End**

# 3.3 Getting Started

## (Optional) Modifying Security Group Rules

**NOTICE**

- This solution uses port 3306 to access the database. By default, the VPC subnet created in this solution allows access from port 3306. 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:

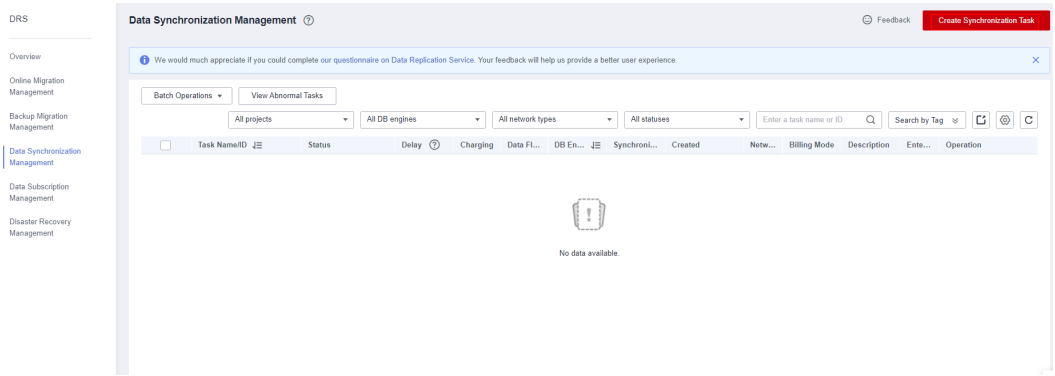
- Adding a security group rule: **Add an inbound rule** and enable a TCP port if needed.
- Modifying a security group rule: Inappropriate security group settings can be a serious security risk. You can **modify security group rules** to ensure the network security of your ECSs.
- Deleting a security 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**.

## Synchronizing Data

After the deployment is complete, the MySQL database and CSS cluster are automatically created. This section describes how to configure DRS to synchronize data.

**Step 1** Log in to the **DRS console**, choose **Data Synchronization Management** from the navigation pane, and click **Create Synchronization Task**.

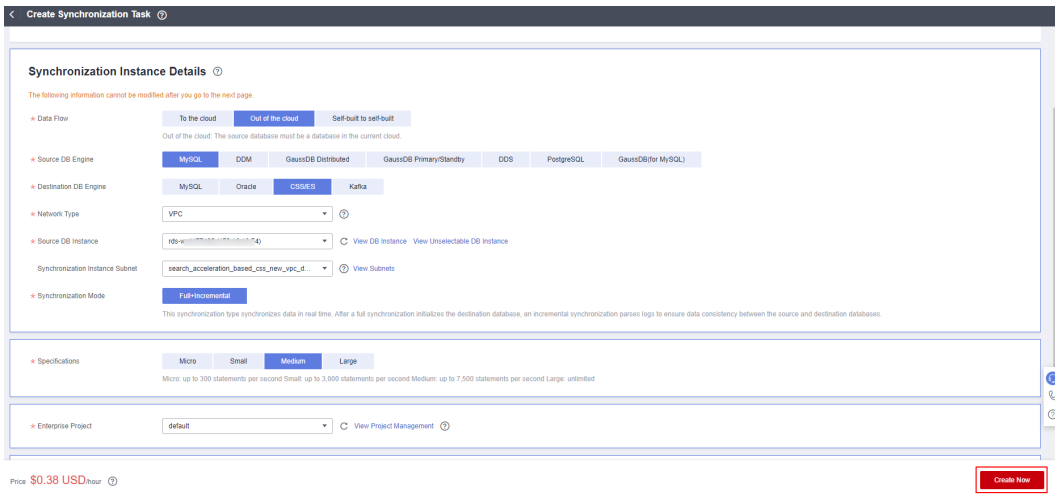
**Figure 3-17** DRS console



**Step 2** Configure the synchronization instance. Select **Out of the cloud** for **Data Flow**, **MySQL** for **Source DB Engine**, **CSS/ES** for **Destination DB Engine**, **VPC** for **Network Type**, select the corresponding MySQL instance name, and select the subnet where the instance to be synchronized resides. Click **Create Now**.

**Figure 3-18** Synchronization Instance Details




**Step 3** After the synchronization instance is created, configure the source and destination databases, enter the MySQL database username (**root**) and password (set during solution deployment), and click **Test Connection**. Enter the connection IP address of the CSS cluster automatically deployed in the solution (as shown in **Figure 3-20**), username (**admin**), and password (set during solution deployment), and click **Test Connection**. Click **Next**.

**CAUTION**

If the connection fails, check the security group and whitelist as prompted.

**Figure 3-19** Configuring the source and destination databases

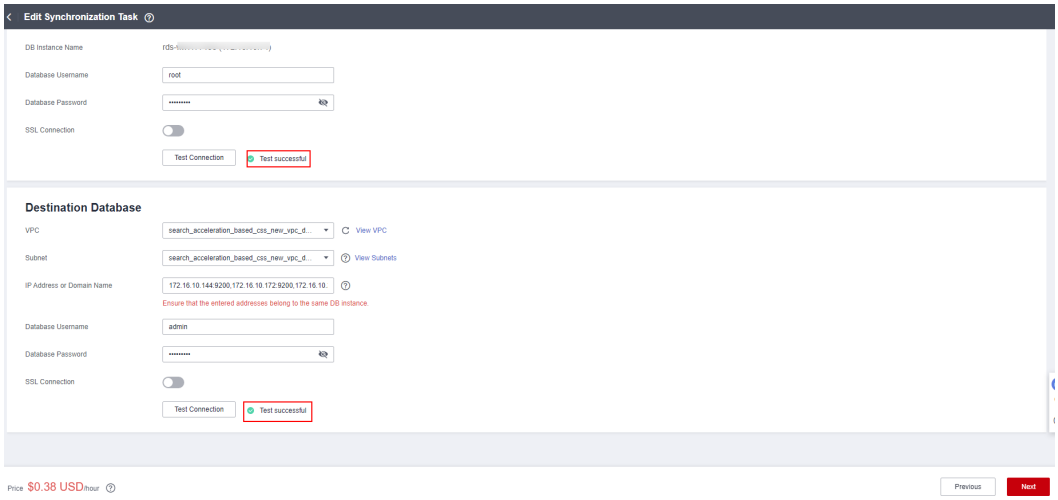
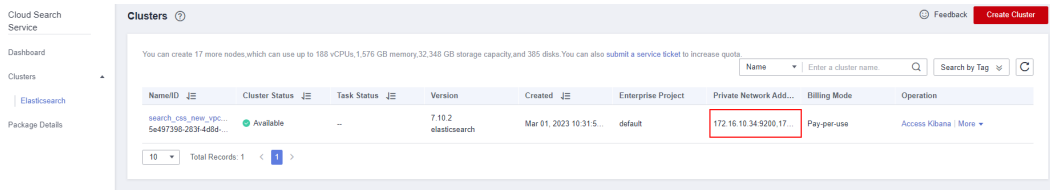


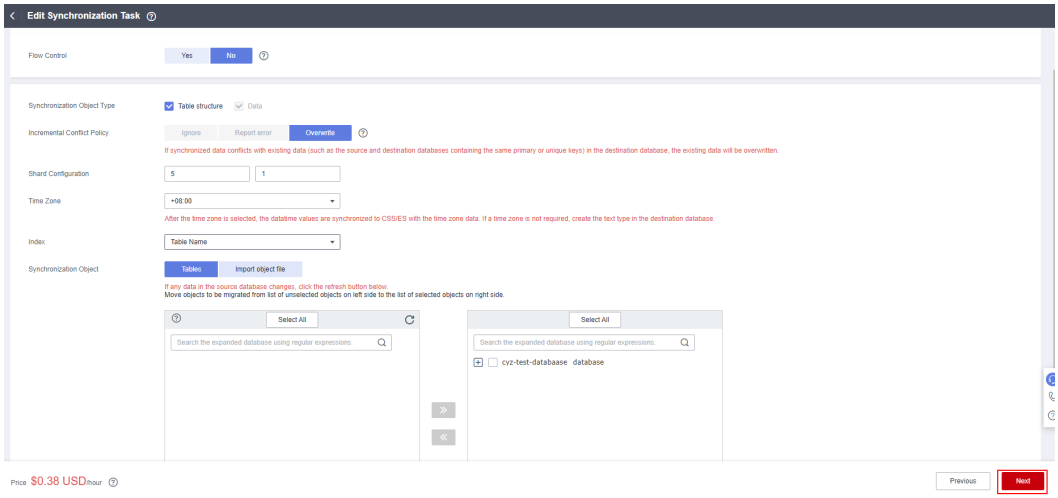

  

**Figure 3-20** Obtaining the connection IP address of the destination database




**Step 4** Select synchronization objects, click the right arrow, and click **Next**.

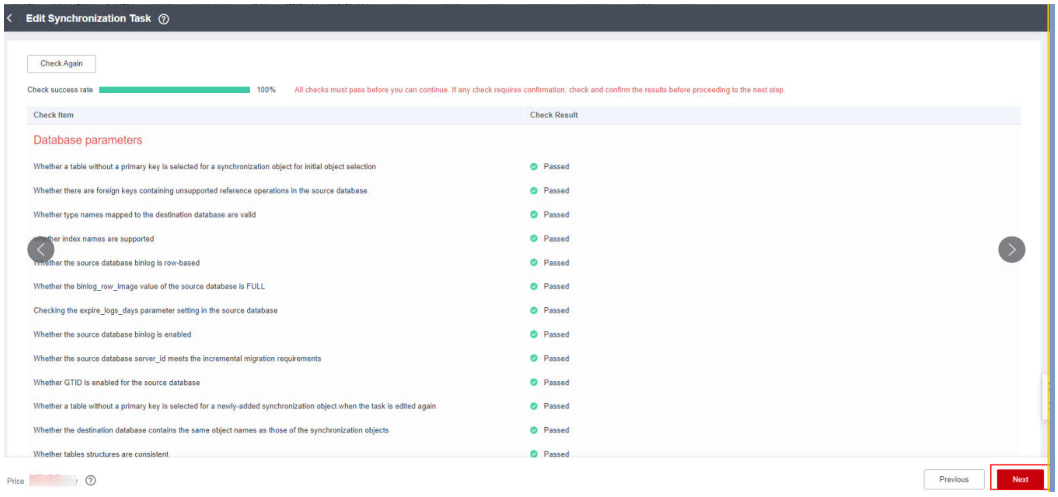
**Figure 3-21** Edit Synchronization Task




**Step 5** Select a data processing method as required. This solution instance does not require data processing. Click **Next**.

**Step 6** Perform a pre-check, wait until the pre-check is complete, and click **Next**.

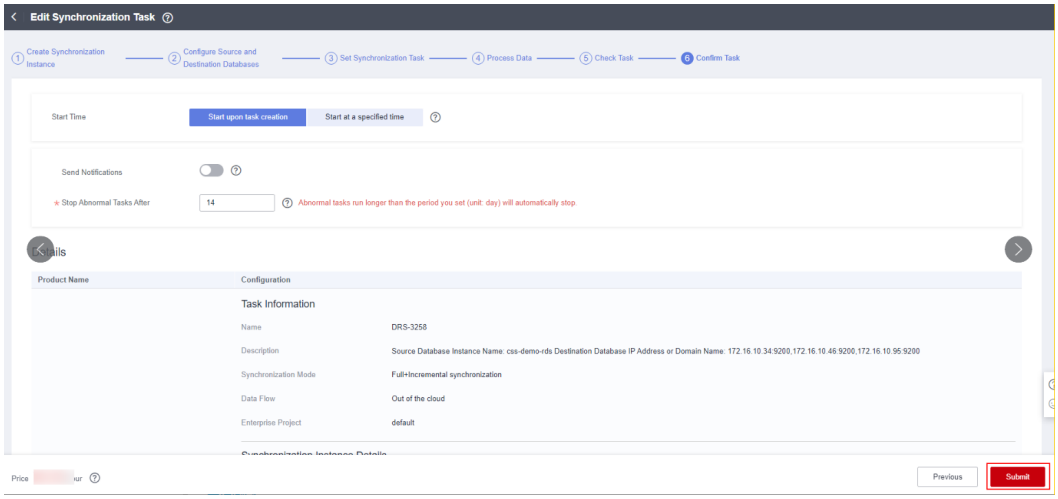
**Figure 3-22** Performing a pre-check




**Step 7** Click **Submit**. Wait until the full synchronization is completed and the incremental synchronization is started.

**Figure 3-23** Confirming the task



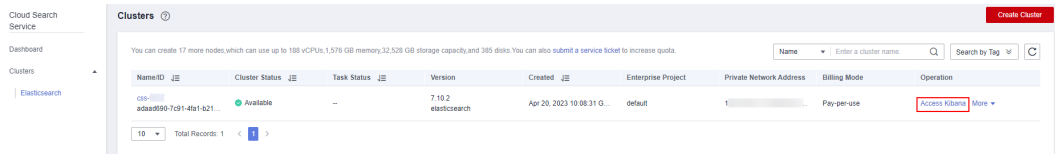

**----End**

## Query Test

This section describes how to use CSS to query data.

**Step 1** Log in to **CSS console**. On the cluster management page, click **Kibana** in the **Operation** of the cluster created in this solution. The Kibana page is displayed.

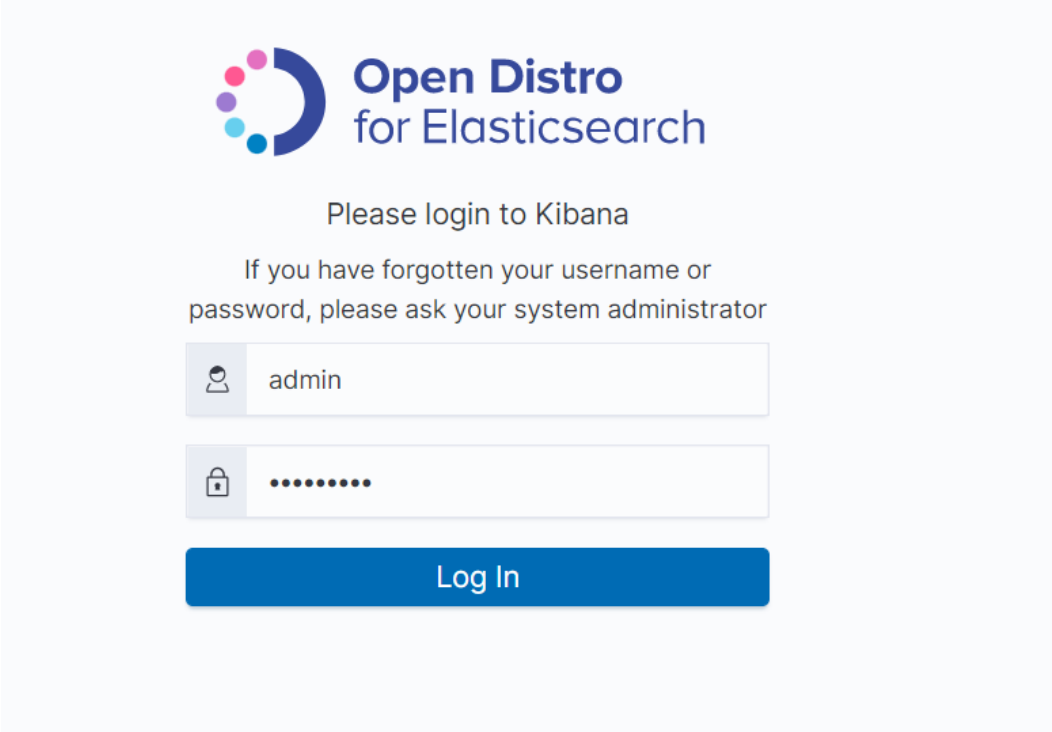
**Figure 3-24** CSS cluster management page




**Step 2** Enter the username (**admin**) and password (set during solution deployment) to log in to Kibana.

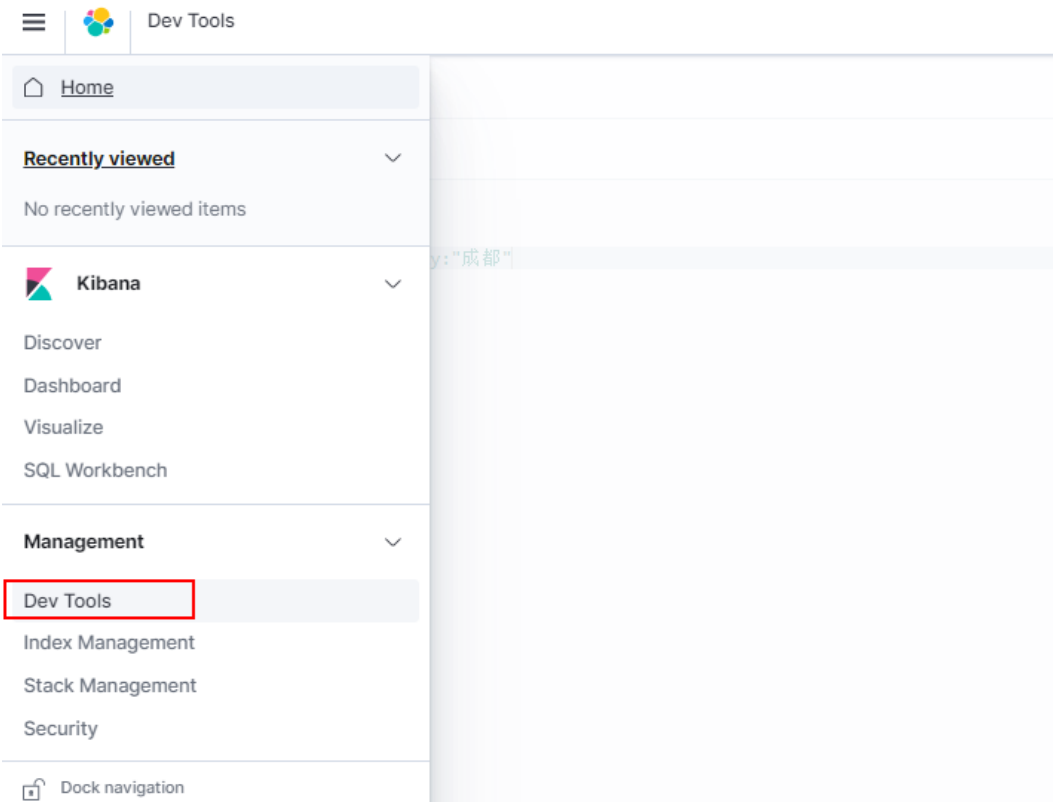
  

**Figure 3-25** Logging in to Kibana




**Step 3** Click in the upper left corner and choose **Dev Tools**.

**Figure 3-26** Dev Tools

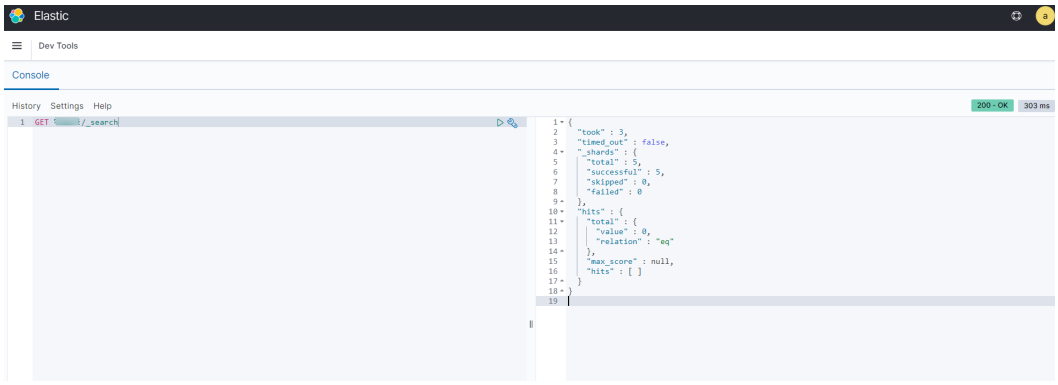


**Step 4** On the debugging page of Dev Tools, run a query statement for debugging.

For example: **GET t_user_store_info/_search?q=city:"Singapore"** #Query all Singapore merchants in the merchant table.

**Figure 3-27** Query result



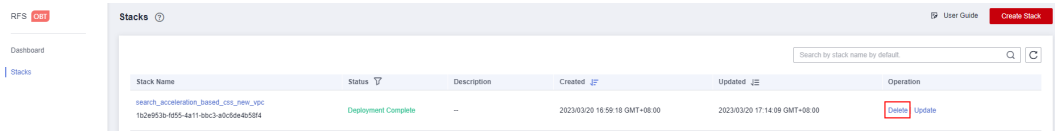

If the query result contains Singapore merchants, the query is successful.

**----End**

# 3.4 Quick Uninstallation

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

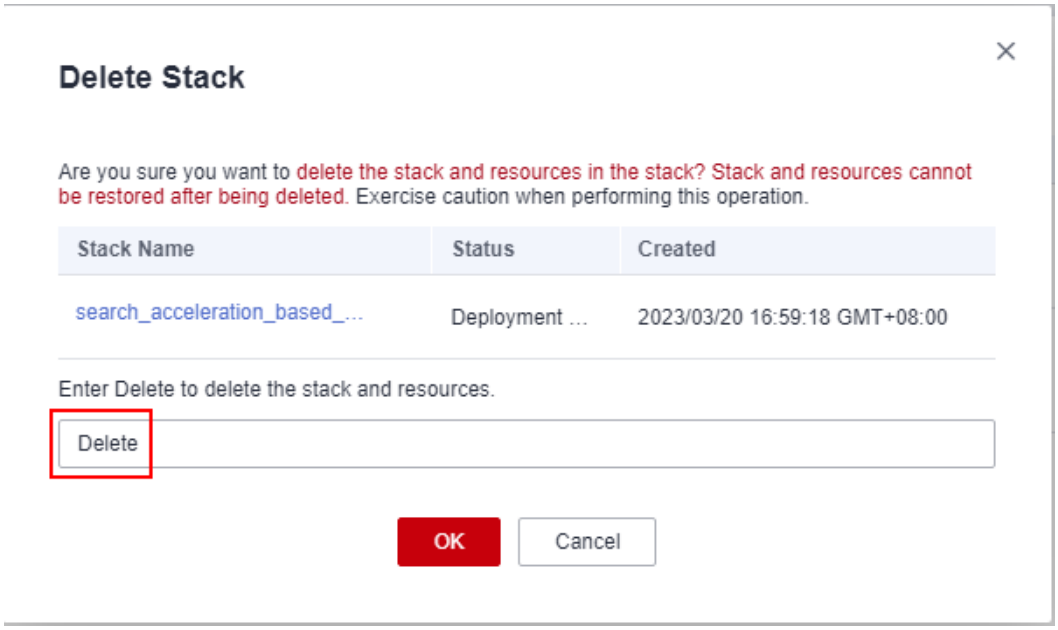
**Figure 3-28** Uninstalling the solution




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

**Figure 3-29** Confirming the uninstallation




**----End**

# 4 Appendix

## Terms

- RDS for MySQL: Quickly deploy and scale RDS for MySQL on the cloud - a fully managed database service powered by the world's most popular enterprise-grade open-source relational database system.
- Data Replication Service (DRS) is dedicated to helping you migrate your databases to the cloud with zero downtime. DRS supports migration between homogenous, heterogeneous, distributed, and sharded databases. With DRS, you can integrate and transmit data from and to databases, database warehouses, or various big data services in seconds, giving you a solid foundation for digital transformation.
- Cloud Search Service (CSS) facilitates data-driven O&M and business operations with a distributed search engine that is based on Elasticsearch, but fully hosted on Huawei Cloud. Compatible with Elasticsearch APIs, CSS vector search can help you quickly build AI-based applications involving image search, recommendation, and semantic search.

# 5 Change History

**Table 5-1** Description

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