SphereEx

SphereEx-Boot

User Manual

V0.1

2022.04

Contents

1 Product Instructions

1.1 What is SphereEx-Boot?

SphereEx-Boot tool is a command line tool based on Python to facilitate the management of ShardingSphere-Proxy clusters.

The main functions of SphereEx-Boot are to install, uninstall, start, stop, view the running status, and other operations on ShardingSphere-Proxy.

1.2 Keywords

- Manager node: the physical machine installed with SphereEx-Boot tool is called the manager node.
- Worker node: the physical machine that installs ShardingSphere-Proxy and zookeeper is called worker node.

1.3 Advantages

Quick & easy implementation

Quickly get started with ShardingSphere-Proxy.

Use the SphereEx-Boot tool to get started with ShardingSphere-Proxy. With the SphereEx-Boot tool, you can run any ShardingSphere-Proxy cluster component with just one command line.

Simple operation and maintenance

SphereEx-Boot tool can quickly install and deploy ShardingSphere-Proxy cluster, as well as manage ShardingSphere-Proxy cluster to reduce operation and maintenance costs.

Easy to expand

The provided standardized horizontal expansion function, can dynamically expand the cluster anytime and anywhere by increasing the number of data servers.

1.4 Architecture Overview

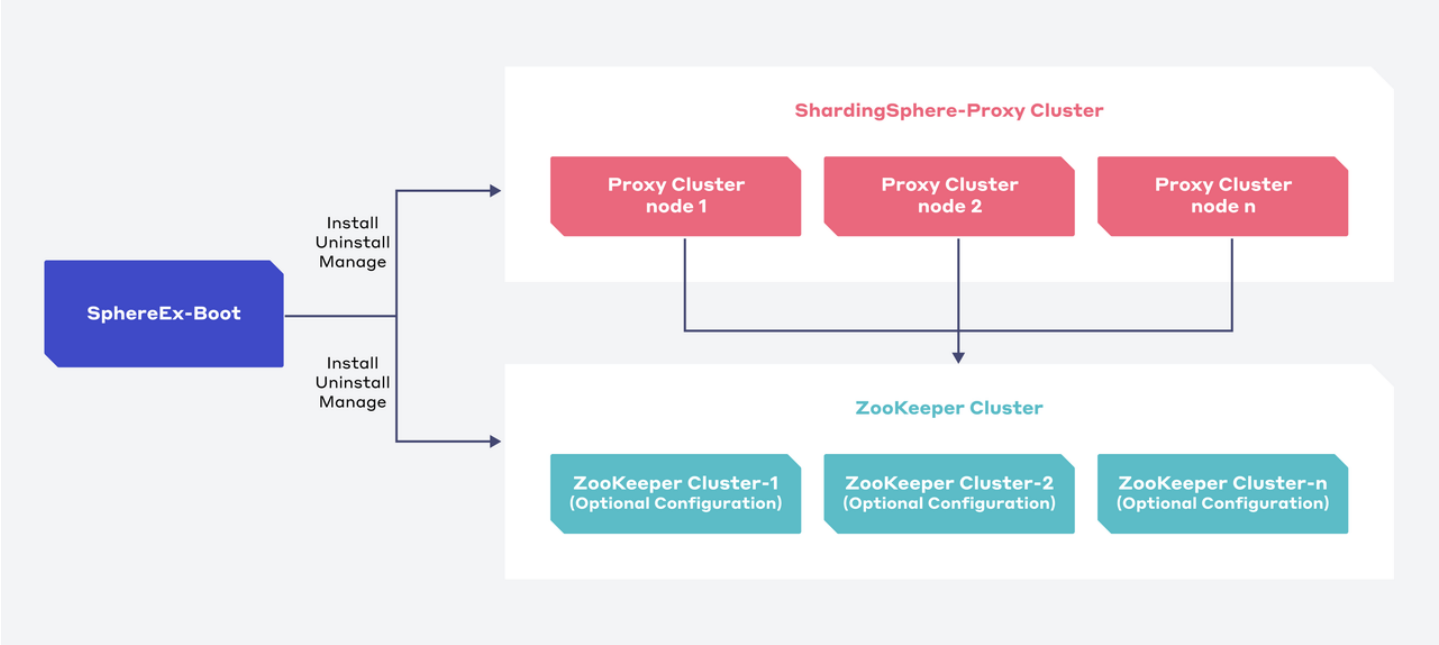

Fig. 1: Logical Structure

1.5 Recommended Configuration

Recommended server configuration:

Name	CPU (cores)	Memory (GB)	Disk Capacity (GB)
SphereEx-Boot tool server	4 Cores (minimum)	8 G+	50 G+
Shardi ngSphere-Proxy	8 Cores (minimum)	16 G+	200 G+
ZooKeeper	8 Cores (minimum)	16 G+	200 G+

Port description:

Server	Server	Port description
SphereEx-Boot	22	Port description
ShardingSphere-Proxy	3307	ShardingSphere-Proxy boot port
ZooKeeper	2181	ZooKeeper boot port

2 Quick Start

2.1 Installation Preparation

2.1.1 Operating System

The manager node where SphereEx-Boot tool is located and the worker node where ShardingSphere-Proxy is located currently support Linux mainstream distribution systems (such as CentOS 7. X, Ubuntu 16 +, etc.).

Note:

You can run the command cat /proc/version to view the current operating system version information.

2.1.2 Manager Node

Ensure that the following software is installed on the manager node:

- sshpass 1.0.0+
- Python 2.7 or Python 3.5+
- pip 20.0.0+
- JDK 1.8+

2.1.3 Worker Node

Ensure that the following software is installed on the worker node:

- sshpass 1.0.0+
- Python 2.7 or Python 3.5+
- JDK 1.8+

2.2 Install SphereEx-Boot

2.2.1 Installing SphereEx-Boot Online

1. Run the following command to install SphereEx-Boot.

```
[root@centos71 ~]# curl -sSL https://download.sphere-ex.com/boot/install.sh | bash

############################################## 100.0%

Processing ./spex-0.1.0.tar.gz

Preparing metadata (setup.py) ... done

... ...

Successfully install spex.....
```

2.2.2 Installing SphereEx-Boot Offline

- Download the SphereEx-Boot at the following link: https://download.sphere-ex.com/boot/spex-0.1.0.tar.gz . After the download is completed, run the following command to install.

```
$ pip install spex-0.1.0.tar.gz
```

- If pip is not installed, you can unzip spex-0.1.0.tar.gz installation package, then enter the decompression directory and run the following command to install.

```
python setup.py install
```

2.3 Confirm SphereEx-Boot Successful Install

Run the spex --help command to confirm whether the installation was successful. The following output confirms a successful install.

```
[root@centos71 ~]# spex --help
Usage: spex [OPTIONS] COMMAND [ARGS]...

 Spex is a command line management tool for managing ShardingSphere-Proxy
 clusters

Options:
 --version Version of spex
 --help   Show this message and exit.

Commands:
 cluster Cluster management, such as install, start, stop and uninstall
 config  Cluster configuration management
```

2.4 Quickly Build a Sample Cluster

This section guides users on how to quickly set up a local sample cluster using SphereEx-Boot.

2.4.1 Server Preparation

- Worker node IP: 127.0.0.1
- Login account: root
- Password: root

Note:

The above should be replaced with your own IP address, login account and password.

2.4.2 Prerequisite

The manager node and the worker node need to login with SSH account and password through sshpass for mutual trust authorization.

Verify whether the manager node can log in to the worker node with an account and password.

```
$ ssh root@127.0.0.1
[root@centos71 .ssh]# ssh root@127.0.0.1
Last login: Tue Dec 21 15:33:32 2021 from 127.0.0.1
```

2.4.3 Operation

1. Create a cluster named demo.

```
$ mkdir demo
$ cd demo
$ spex cluster init --name demo --download all
$ ls -l
total 126672
-rw-r--r-- 1 spex-demo  48M 12 9 14:46 apache-shardingsphere-5.0.0-shardingsphere-proxy-bin.tar.gz
-rw-r--r-- 1 spex-demo  12M 12 9 14:46 apache-zookeeper-3.6.3-bin.tar.gz
-rw-r--r-- 1 spex-demo  741B 12 9 14:47 cluster-config.yaml
drwxr-xr-x 9 spex-demo  288B 12 9 14:54 conf
-rw-r--r-- 1 spex-demo  984K 12 9 14:47 mysql-connector-java-5.1.47.jar
-rw-r--r-- 1 spex-demo  1.1K 12 9 14:47 zoo.cfg
```

2. Add the cluster configuration file to the SphereEx-Boot tool management environment.

```
[root@centos71 demo]# spex config add -f cluster-config.yaml
Successfully add cluster
```

3. Install the demo cluster.

```
$ spex cluster install --name demo
Operation ShardingSphere-Proxy
check proxy install dir exist!
Completed.....
Operation ShardingSphere-Proxy
create install directory
127.0.0.1 : 3307 => success
install proxy
127.0.0.1 : 3307 => success
copying shell file
127.0.0.1 : 3307 => success
copying config file
```

```
127.0.0.1 : 3307 => success
copying agent config file
skipped host:127.0.0.1 item : None
copying depend file
127.0.0.1 : 3307 => success
Completed.....
```

4. Start the demo cluster.

```
$ spex cluster start --name demo
Operation ShardingSphere-Proxy
start proxy
127.0.0.1 : 3307 => success
The port is 3307
The classpath is /root/shardingsphere-proxy/apache-shardingsphere-5.0.0-shardingsphere-proxy-bin/conf:.:/root/sharding-proxy/apache-shardingsphere-5.0.0-shardingsphere-proxy-bin/lib/*:/root/sharding-proxy/apache-shardingsphere-5.0.0-shardingsphere-proxy-bin/ext-lib/*
Please check the STDOUT file: /root/sharding-proxy/apache-shardingsphere-5.0.0-shardingsphere-proxy-bin/logs/stdout.log
Completed.....
```

5. View the demo cluster running status.

```
$ spex cluster status --name demo
Operation ShardingSphere-Proxy
proxy status
127.0.0.1 : 3307 => success
PID:6355 PORT:3307 %CPU:20.6 %MEM:10.1 START:00:33 TIME:0:03
Results summary
+-------------+------+------+------+------+-------+------+
|    HOST     | PORT | PID  | %CPU | %MEM | START | TIME |
+-------------+------+------+------+------+-------+------+
| 127.0.0.1   | 3307 | 6355 | 20.6 | 10.1 | 00:33 | 0:03 |
+-------------+------+------+------+------+-------+------+
Completed.....
Operation ZooKeeper
zookeeper status
127.0.0.1 : 2181 => success
/usr/bin/java
Client port found: 2181. Client address: localhost. Client SSL: false.
Mode: standalone
ZooKeeper JMX enabled by default
Using config: /root/zookeeper/apache-zookeeper-3.6.3-bin/bin/../conf/zoo.cfg
Results summary
+-------------+------+-----------------+
|    HOST     | PORT |      STATUS     |
+-------------+------+-----------------+
| 127.0.0.1   | 2181 | Mode: standalone |
+-------------+------+-----------------+
Completed.....
```

6. Uninstall the demo cluster.

To uninstall the installed demo cluster, run the command $ spex cluster uninstall --name demo to uninstall the corresponding cluster.

```
$ spex cluster uninstall --name demo
Are you sure to uninstall demo cluster ? [y/N]: y
Operation ShardingSphere-Proxy
stop proxy
127.0.0.1 : 3307 => success
ShardingSphere-Proxy does not started!
remove install directory
127.0.0.1 : 3307 => success
Completed.....
Operation ZooKeeper
stop zookeeper
```

```
127.0.0.1 : 2181 => success
/usr/bin/java
Stopping zookeeper ... no zookeeper to stop (could not find file /root/zookeeper/data/zookeeper_server.pid)
ZooKeeper JMX enabled by default
Using config: /root/zookeeper/apache-zookeeper-3.6.3-bin/bin/../conf/zoo.cfg
remove zookeeper data directory
127.0.0.1 : 2181 => success
remove zookeeper install directory
127.0.0.1 : 2181 => success
Completed.....
```

2.5 Uninstall SphereEx-Boot

To delete or uninstall an existing SphereEx-Boot, refer to the following steps.

1. Run the command pip uninstall spex to uninstall SphereEx-Boot.

```
[root@community ~]# pip uninstall spex
Found existing installation: spex 0.1.0
Uninstalling spex-0.1.0:
  Would remove:
    /usr/local/bin/spex
    /usr/local/lib/python3.6/site-packages/spex-0.1.0-py3.6.egg-info
    /usr/local/lib/python3.6/site-packages/src/*
Proceed (Y/n)? y
  Successfully uninstalled spex-0.1.0
```

3 User Guide

3.1 Overview

SphereEx-Boot tool is a command line tool based on Python. Its main function is to install and deploy ShardingSphere-Proxy. You can install, uninstall, start, stop, view running status and other operations on ShardingSphere-Proxy. The physical machine that installs the SphereEx-Boot tool is called manager node, and the physical machine that installs the ShardingSphere-Proxy is called worker node. The SphereEx-Boot tool currently supports mainstream Linux systems.

3.2 Environment Preparation

Manager node software configuration

Software
sshpass 1.0+
Python 2.7 / Python 3.5+
pip 20.0.0+
JDK 1.8+

Worker node software configuration

Software
sshpass 1.0+
Python 2.7 / Python 3.5+
JDK 1.8+

3.3 Install SphereEx Boot

3.3.1 Installing SphereEx-Boot Offline

1. Download the SphereEx-Boot at the following link: https://download.sphere-ex.com/boot/spex-0.1.0.tar.gz. After the download is completed, run the following command to install.

```
[root@centos71 ~]# pip install spex-0.1.0.tar.gz
Preparing metadata (setup.py) ... done
Requirement already satisfied: ansible<=2.10.7,>=2.8.0 in /usr/local/lib/python3.6/site-packages (from spex==0.1.0) (2.10.7)
……
Installing collected packages: spex
  Attempting uninstall: spex
```

```
  Found existing installation: spex 0.1.0
  Uninstalling spex-0.1.0:
    Successfully uninstalled spex-0.1.0
  Running setup.py install for spex ... done
Successfully installed spex-0.1.0
```

2. After the installation is completed, run the command spex --version to view the version.

```
[root@centos71 ~]# pip --version
pip 21.3.1 from /usr/local/lib/python3.6/site-packages/pip (python 3.6)
```

3.3.2 Installing SphereEx-Boot Online

1. Run the command curl -sSL https://download.sphere-ex.com/boot/install.sh | bash to install SphereEx-Boot.

```
[root@centos71 ~]# curl -sSL https://download.sphere-ex.com/boot/install.sh | bash
############################################## 100.0%
Processing ./spex-0.1.0.tar.gz
 Preparing metadata (setup.py) ... done
... ...
Successfully install spex.....
```

3.3.3 View SphereEx-Boot Help

1. You can use the –help parameter to confirm SphereEx-Boot's command and subcommand help information.

- Example: view SphereEx-Boot's help information.

```
[root@centos71 demo]# spex --help
Usage: spex [OPTIONS] COMMAND [ARGS]...

 Spex is a command line management tool for managing ShardingSphere-Proxy
 clusters

Options:
 --version Version of spex
 --help   Show this message and exit.

Commands:
 cluster Cluster management, such as install, start, stop and uninstall
 config  Cluster configuration management
```

- Example: view SphereEx-Boot's cluster help information.

```
[root@centos71 demo]# spex cluster --help
Usage: spex cluster [OPTIONS] COMMAND [ARGS]...

Cluster management, such as install, start, stop and uninstall

Options:
 --help Show this message and exit.

Commands:
 download Download ShardingSphere-Proxy, Zookeeper, Database driver...
 init Quickly initialization a cluster configuration --proxy-host
 can...

install Install cluster of ShardingSphere-Proxy or zookeeper
 list List already added clusters
 scale Scale cluster of ShardingSphere-Proxy It can be scale out...
 start Start cluster of ShardingSphere-Proxy or zookeeper
```

```
status Status cluster of ShardingSphere-Proxy or ZooKeeper
stop Stop cluster of ShardingSphere-Proxy or zookeeper
uninstall Uninstall cluster of ShardingSphere-Proxy or zookeeper
```

- Example: view SphereEx-Boot config help information.

```
[root@centos71 demo]# spex config --help
Usage: spex config [OPTIONS] COMMAND [ARGS]...

Cluster configuration management

Options:
 --help Show this message and exit.

Commands:
 add Add cluster environment.
 check Check the cluster configuration file you can use --file or...
 delete Delete cluster configuration
 info Show cluster configuration content
 template Show cluster configuration template.
```

3.4 Using SphereEx-Boot

3.4.1 Cluster Topology Profile Operation

3.4.1.1 Cluster Topology Profile Description

When deploying a cluster through SphereEx-Boot, you need to provide a cluster topology configuration file in yaml format. The configuration data is as follows:

- cluster_name: the name of the cluster
- install_user: the user name when logging into the worker node
- install_password: the user password when logging into the worker node
- proxy: ShardingSphere-Proxy configuration
  - version: ShardingSphere-Proxy' s version identification
  - file: installation package file path of ShardingSphere-Proxy' s manager node
  - conf_dir: service profile directory of ShardingSphere-Proxy' s manager node
  - depend_files: driver jar package file path of ShardingSphere-Proxy' s manager node
  - install_dir: deployment directory of ShardingSphere-Proxy' s worker node
  - port: startup port ShardingSphere-Proxy' s worker node
  - overwrite: If the worker node installation directory already exists, it will reinstall it.
  - servers: the information list of worker node
    - host: the IP address of worker node
    - port: the startup port of ShardingSphere-Proxy' s worker node (not necessary, if not configured, the configuration in proxy shall prevail).
    - install_dir: installation directory of ShardingSphere-Proxy' s worker node (not necessary, if not configured, the configuration in proxy shall prevail).
    - agent_conf_file: agent configuration file path of ShardingSphere-Proxy' s manager node. (not necessary, if not configured, the configuration in proxy shall prevail)

        - overwrite: If the worker node installation directory already exists, it will reinstall it. (The parameter overwrite is not necessary, if not configured, the configuration in proxy shall prevail).
- zookeeper: ZooKeeper's configuration (if ZooKeeper is not required, it can not be configured)
    - version: ZooKeeper's version identification
    - file: the installation file path of ZooKeeper's manager node
    - conf_file: the configuration file path of manager node ZooKeeper zoo.cfg
    - install_dir: the installation directory of Zookeeper's worker node
    - data_dir: dataDir configuration value in configuration file zoo.cfg of ZooKeeper's worker node
    - port: the startup port of ZooKeeper's worker node
    - overwrite: If the worker node installation directory already exists, it will reinstall it.
    - servers: list of ZooKeeper
        - host: IP address of worker node
        - myid: myid value of ZooKeeper cluster
        - port: the startup port ZooKeeper's of worker node (not necessary, if not configured, the configuration in ZooKeeper shall prevail)
        - install_dir: the installation directory of ZooKeeper's worker node (not necessary, if not configured, the configuration in ZooKeeper shall prevail)
        - conf_file: the zoo.cfg configuration file path Zookeeper's manager node (not necessary, if not configured, the configuration in ZooKeeper shall prevail)
        - data_dir: the configuration value of dataDir in configuration file zoo.cfg on ZooKeeper's worker node ZooKeeper (not necessary, if not configured, the configuration in ZooKeeper shall prevail)
        - overwrite: If the worker node installation directory already exists, it will reinstall it. (The parameter overwrite is not necessary, if not configured, the configuration in ZooKeeper shall prevail)

Cluster topology configuration example:

```
cluster_name: demo
install_user: root
install_password: 'root'

proxy:
  version: '5.0.0'
  install_dir: /opt/shardingsphere-proxy
  conf_dir: /root/demo/conf
  file: /root/demo/apache-shardingsphere-5.0.0-shardingsphere-proxy-bin.tar.gz
  depend_files:
   - /root/demo/mysql-connector-java-5.1.47.jar
  port: 3307
  overwrite: true
  servers:
   - host: 10.0.1.1

zookeeper:
  version: '3.6.3'
  install_dir: /opt/zookeeper
  data_dir: /tmp/zookeeper
  conf_file: /root/demo/zoo.cfg
  file: /root/demo/apache-zookeeper-3.6.3-bin.tar.gz
  port: 2181
  overwrite: true
  servers:
   - host: 10.0.1.1
     myid: 1
```

3.4.1.2 Cluster Topology File Initialization

1. Export cluster topology configuration file.

- Run the following command to generate a cluster topology template named cluster-template.yaml in current directory. Configure your actual configuration data according to the cluster topology description.

```
$ spex config template --type full --output ./
```

- Run the command spex cluster init to initialize cluster configuration file and content.

3.4.1.3 Check the Cluster Topology File

1. Run the command spex config check -f <cluster-file> to check the configuration of the specified cluster topology file. Example: Check the cluster topology file named cluster-config.yaml.

```
[root@centos71 demo]# spex config check -f cluster-config.yaml
Proxy are no errors
Zookeeper are no errors
```

3.4.1.4 Add Cluster Topology Information

1. Run the command spex config add to add the cluster topology configuration file to SphereEx-Boot to manage. After adding, SphereEx-Boot can manage the cluster through the cluster name.

```
[root@centos71 demo]# spex config add -f cluster-config.yaml
Successfully add cluster
```

3.4.1.5 View the Added Cluster Topology

1. Run the command spex cluster list to view the added cluster topology. Currently, there are two cluster topologies, demo and demo1.

```
[root@centos71 demo]# spex cluster list
+--------------+
| Cluster Name |
+--------------+
|   demo   |
|  demo1   |
+--------------+
```

3.4.1.6 Delete Cluster Topology

1. Run spex config delete <cluster-name> to remove the specified cluster topology from SphereEx-Boot which will not affect ShardingSphere-Proxy and ZooKeeper on the worker node. Example: remove a cluster named demo.

```
[root@centos71 demo]# spex config delete demo
Operation ShardingSphere-Proxy
check proxy install dir exist!
10.0.1.1 : 3307 /demo/shardingsphere-proxy is existence!
Completed......
Operation ZooKeeper
check ZooKeeper install dir exist!
10.0.1.1 : 2181 /demo/zookeeper/ is existence!
Completed......
Are you sure to delete configuration of demo? [y/N]: y
Completed.......
```

3.4.1.7 View Cluster Topology Content

1. Run the command spex config info --name <cluster-name> to view the specified cluster topology content. Example: view the contents of the cluster topology named demo.

```
[root@centos71 demo]# spex config info --name demo
proxy
+--------------+-------------+------+--------------------------+
| install_user |   host  | port |    install_dir     |
+--------------+-------------+------+--------------------------+
|   root   | 10.0.1.1 | 3307 | /demo/shardingsphere-proxy |
+--------------+-------------+------+--------------------------+
zookeeper
+--------------+-------------+------+------+-----------------+---------------------+
| install_user |   host  | port | myid |  install_dir  |    data_dir    |
+--------------+-------------+------+------+-----------------+---------------------+
|   root   | 10.0.1.1 | 2181 | 1  | /demo/zookeeper/ | /demo/zookeeper/data |
+--------------+-------------+------+------+-----------------+---------------------+
```

2. Run the command spex config info --name <cluster-name>--detail to view the detailed configuration of the specified cluster topology.

```
[root@centos71 demo]# spex config info --name demo --detail
cluster_name: demo
install_user: root
install_password: root
proxy:
 version: '1.0'
 file: /root/demo/apache-shardingsphere-5.0.0-shardingsphere-proxy-bin.tar.gz
 conf_dir: /root/demo/conf
 agent_conf_file:
 depend_files:
 - /root/demo/mysql-connector-java-5.1.47.jar
 install_dir: /demo/shardingsphere-proxy
 port: 3307
 overwrite: false
 servers:
 - host: 10.0.1.1
zookeeper:
 version: '1.0'
 file: /root/demo/apache-zookeeper-3.6.3-bin.tar.gz
 conf_file: /root/demo/zoo.cfg
 install_dir: /demo/zookeeper/
 data_dir: /demo/zookeeper/data
 port: 2181
 overwrite: false
 servers:
 - host: 10.0.1.1
  myid: 1
```

3.4.2 Install Cluster

Requirements

The manager node and the worker node need to log in with SSH account and password through sshpass for mutual trust authorization.

Environment Preparation

Run the command spex cluster download to download all installation packages, including: - ZooKeeper - ShardingSphere-Proxy - MySQL Driver

Operation

1. Cluster topology file initialization. Please refer to "Cluster Topology File Initialization" for details.

2. Check the cluster topology file. Please refer to "Check the Cluster Topology File" for details.
3. Add a cluster topology file. Please refer to "Add Cluster Topology Information" for details.
4. Run the command spex cluster install --name <cluster-name> to install the cluster. Example: install the added cluster named demo.

```
[root@centos71 demo]# spex cluster install --name demo
Operation ShardingSphere-Proxy
check proxy install dir exist!
Completed......
Operation ShardingSphere-Proxy
create install directory
10.0.1.1 : 3307 => success
install proxy
10.0.1.1 : 3307 => success
copying shell file
10.0.1.1 : 3307 => success
copying config file
10.0.1.1 : 3307 => success
copying agent config file
skipped host : 10.0.1.1 item : None
copying depend file
10.0.1.1 : 3307 => success
Completed......
Operation ZooKeeper
check ZooKeeper install dir exist!
Completed......
Operation ZooKeeper
create ZooKeeper install directory
10.0.1.1 : 2181 => success
create ZooKeeper data directory
10.0.1.1 : 2181 => success
install ZooKeeper
10.0.1.1 : 2181 => success
copy ZooKeeper config file
10.0.1.1 : 2181 => success
create myid
10.0.1.1 : 2181 => success
Completed......
```

Note: After updating the cluster configuration file, you must run the command spex config add to update the new cluster topology configuration file information to SphereEx-Boot, and then continue the installation.

3.4.3 Uninstall Cluster

1. Run the command spex cluster uninstall --name <cluster-name> to unistall a cluster, which will delete the deployment directory in the worker node. Example: uninstall a cluster named demo.

```
[root@centos71 demo]# spex cluster uninstall --name demo
Are you sure to uninstall demo cluster ? [y/N]: y
Operation ShardingSphere-Proxy
stop proxy
10.0.1.1 : 3307 => success
Stopping the ShardingSphere-Proxy
STOPED PID:14014 PORT:3307
remove install directory
10.0.1.1 : 3307 => success
Completed......
Operation ZooKeeper
stop ZooKeeper
10.0.1.1 : 2181 => success
/usr/bin/java
Stopping zookeeper ... STOPPED
```

```
ZooKeeper JMX enabled by default
Using config: /demo/zookeeper/apache-zookeeper-3.6.3-bin/bin/../conf/zoo.cfg
remove ZooKeeper data directory
10.0.1.1 : 2181 => success
remove ZooKeeper install directory
10.0.1.1 : 2181 => success
Completed.....
```

3.4.4 Start Cluster

1. Run the command spex cluster start --name <cluster-name> to start the cluster. Example: start the cluster named demo.

```
[root@centos71 demo]# spex cluster start --name demo
Operation ZooKeeper
start ZooKeeper
10.0.1.1 : 2181 => success
/usr/bin/java
Starting zookeeper ... STARTED
ZooKeeper JMX enabled by default
Using config: /demo/zookeeper/apache-zookeeper-3.6.3-bin/bin/../conf/zoo.cfg
Completed.....
Operation ShardingSphere-Proxy
start proxy
10.0.1.1 : 3307 => success
The port is 3307
The classpath is /demo/shardingsphere-proxy/apache-shardingsphere-5.0.0-shardingsphere-proxy-bin/conf:.:/demo1/shardingsphere-proxy/apache-shardingsphere-5.0.0-shardingsphere-proxy-bin/lib/*:/demo1/shardingsphere-proxy/apache-shardingsphere-5.0.0-shardingsphere-proxy-bin/ext-lib/*
Please check the STDOUT file: /demo/shardingsphere-proxy/apache-shardingsphere-5.0.0-shardingsphere-proxy-bin/logs/stdout.log
Completed.....
```

3.4.5 Stop Cluster

1. Run the command spex cluster stop --name <cluster-name> to stop a cluster. Example: stop the cluster named demo.

```
[root@centos71 demo]# spex cluster stop --name demo
Operation ShardingSphere-Proxy
stop proxy
10.0.1.1 : 3307 => success
Stopping the ShardingSphere-Proxy
STOPED PID:9157 PORT:3307
Completed.....
Operation ZooKeeper
stop ZooKeeper
10.0.1.1 : 2181 => success
/usr/bin/java
Stopping zookeeper ... STOPPED
ZooKeeper JMX enabled by default
Using config: /demo/zookeeper/apache-zookeeper-3.6.3-bin/bin/../conf/zoo.cfg
Completed.....
```

3.4.6 Scale in Cluster

1. Run the command spex cluster stop --name <cluster-name> --host <host-ip> to stop the specified node. Example: in demo cluster, scale in the ShardingSphere-Proxy whose IP address is 10.0.1.2.

```
$ spex cluster stop --name demo --type proxy --host 10.0.1.2
[root@centos71 ~]# spex cluster stop --name demo --type proxy --host 10.0.1.2
Operation ShardingSphere-Proxy
stop proxy
10.0.1.2 : 3388 => success
Stopping the ShardingSphere-Proxy
STOPED PID:29550 PORT:3388
Completed.....
```

3.4.7 Scale out Cluster

1. Run the command spex cluster scale --name <cluster-name> --host <host-ip> to scale out a cluster. Example: in demo cluster, scale out the ShardingSphere-Proxy whose IP address is 10.0.1.2.

```
$ spex cluster scale --name demo --host 10.0.1.2
```

2. Run the command spex cluster install -n demo --type proxy --host 10.0.1.2 to add a new node.

```
[root@community /]# spex cluster install -n demo --type proxy --host 10.0.1.2
ShardingSphere-Proxy
check proxy install dir exist!
Completed.....
ShardingSphere-Proxy
create install directory
10.0.1.2:3388 =>success
install proxy
10.0.1.2:3388 =>success
copying shell file
10.0.1.2:3388 =>success
copying config file
10.0.1.2:3388 =>success
copying agent config file
skipped host: 10.0.1.2 item:None
copying depend file
10.0.1.2:3388 =>success
Completed.....
```

3. Run the command spex cluster start --name demo --type proxy --host 10.0.1.2 to start a new node.

```
[root@community /]# spex cluster start --name demo --type proxy --host 10.0.1.2
ShardingSphere-Proxy
start proxy
10.0.1.2:3388 =>success
Starting the ShardingSphere-Proxy ...
The port is 3388
The classpath is /root/demo/apache-shardingsphere-5.0.0-shardingsphere-proxy-bin/conf:.:/root/demo/apache-shardingsphere-5.0.0-shardingsphere-proxy-bin/lib/*:/root/demo/apache-shardingsphere-5.0.0-shardingsphere-proxy-bin/ext-lib/*
Please check the STDOUT file: /root/demo/apache-shardingsphere-5.0.0-shardingsphere-proxy-bin/logs/stdout.log
Completed.....
```

3.4.8 View Cluster Status

1. Run the command spex cluster status --name <cluster-name> to view the cluster running status. Example: view the running status of a cluster named demo.

```
[root@centos71 demo]# spex cluster status --name demo
Operation ShardingSphere-Proxy
proxy status
10.0.1.1 : 3307 => success
PID:14014 PORT:3307 %CPU:16.9 %MEM:0.2 START:12:05 TIME:0:01
Results summary
+-------------+------+-------+------+------+-------+------+
|   HOST   | PORT | PID | %CPU | %MEM | START | TIME |
+-------------+------+-------+------+------+-------+------+
| 10.0.1.1 | 3307 | 14014 | 16.9 | 0.2 | 12:05 | 0:01 |
+-------------+------+-------+------+------+-------+------+
Completed.....
Operation ZooKeeper
ZooKeeper status
10.0.1.1 : 2181 => success
/usr/bin/java
Client port found: 2181. Client address: localhost. Client SSL: false.
Mode: standalone
ZooKeeper JMX enabled by default
Using config: /demo/zookeeper/apache-zookeeper-3.6.3-bin/bin/../conf/zoo.cfg
Results summary
+-------------+------+-----------------+
|   HOST   | PORT |   STATUS   |
+-------------+------+-----------------+
| 10.0.1.1 | 2181 | Mode: standalone |
+-------------+------+-----------------+
Completed.....
```

4 FAQ

1. **How to configure Python environment variables?**

When installing Python, you need to configure Python’s bin directory into the PATH environment variable. This allows you to install the SphereEx-Boot tool using the pip in the installed Python.

For example: export PATH=/usr/local/python3/bin:$PATH is appended to end of ~/.bashrc file. Executing source ~/.bashrc validates the environment variable.

2. **How to view dependent software versions?**

- Run the command sshpass -V to view the sshpass version.

[root@centos71 ~]# sshpass -V

sshpass 1.06

- Run the command python -V to view the Python version.

[root@centos71 ~]# python -V

Python 3.6.8

- Run the command pip --version to view the pip version.

[root@centos71 ~]# pip --version

pip 21.3.1 from /usr/local/lib/python3.6/site-packages/pip (python 3.6)

- If the pip version is outdated, you can use the command pip install --upgrade pip to upgrade pip. If the upgrade is unsuccessful, please reinstall pip.

3. **How to install pip package?**

- Python3 environment install pip

wget https://bootstrap.pypa.io/get-pip.py

python get-pip.py or python3 get-pip.py

- Python2 environment install pip

wget https://bootstrap.pypa.io/pip/2.7/get-pip.py

python get-pip.py

4. **How to configure SSH mutual trust?**

Set secret key for passwordless login (if you have set secret key passwordless login, you can skip the following steps)

a.Generate secret key (If id_rsa.pub saved in ~/.ssh/ directory, you can skip this step.)

```
$ ssh-keygen -t rsa
```

b.Set intercommunications using the command ssh-copy-id -i ~/.ssh/id_rsa.pub <user>@<host-ip>.

```
$ ssh-copy-id -i ~/.ssh/id_rsa.pub root@127.0.0.1
```