StarGo v2.0.3 使用说明文档

一、StarGo介绍

StarGo 是一个用于管理多个 StarRocks 集群的命令行工具。通过 StarGo 可以实现多集群的部署、查看、升级、降级、启停及扩缩容等操作。

StarGo 原作者 ID 为：wangtianyi2004，项目开源地址：https://github.com/wangtianyi2004/starrocks-controller，目前已停止更新。

StarGo v2.0 是征集社区需求后基于原版的改造版本，主要开发者为"yinmh"、"gay121"、"DMZGXL" 等同学，2.0 版本将不断整合社区需求进行三位小版本的迭代，待主干功能实现完备后，项目将继续沿用 StarGo 的名称，以 **v2.1** 的版本号合入 StarRocks GitHub：https://github.com/StarRocks/stargo（当前未合入）。

目前，2.0 版本的主要 Release Note 信息如下：

```
## 2.0.1-RC:
1、屏蔽"在线"功能，调整为基于本地包的"纯离线"模式，支持部署、升级、降级等操作；
2、支持通过配置文件配置集群 root 密码，方便在修改集群 root 初始密码后正常通过 StarGo 管理集群；
3、工具内置 OpenJDK 8，在 FE、BE 启动脚本中均添加 JDK 配置，不再依赖系统或用户级的 Java 环境；
4、优化部分降级逻辑；
5、部分其他代码细节的调整。

## 2.0.2-RC:
1、支持 Broker 服务的部署、升级、降级、启停操作，同样在 Broker 服务的启动脚本中添加 JDK 配置；
2、支持按照 "storage_root_path = /data1,medium:HDD;/data2,medium:SSD;/data3" 这种规范的格式为 BE 配置多盘存储路径；
3、其他细节的调整。

## 2.0.3（当前版本）：
1、支持集群的扩缩容；
2、增加"迁入集群"功能，即支持将"已部署的集群"配置为可用 stargo 管理的集群；
3、增加"移出集群"功能，即将被 stargo 管理的集群脱离管理（上一条的逆操作）；
4、增加"清理目录"功能，用来对部署失败时的残留文件进行清理；
5、增加"销毁集群"功能，即支持将不需要的集群进行卸载清理（包含程序目录与数据目录，风险操作！）；
6、支持配置 FE 角色；
7、优化参数校验逻辑；
8、优化缩容 Leader 节点时的处理逻辑；
9、其他细节的优化。
##行为变更：
1、为确保参数见名知意，将 stargo 工作目录集群 yaml 中"jdbc_user"调整为"sr_user"，"jdbc_password"调整为"sr_password"。若从stargo v2.0.2版本升级，注意需要在升级后手动调整集群拓扑文件的该部分内容。
```

开发中的版本：

```
## 2.0.4：
1、支持通过 yaml 为 FE 配置 xmx 堆内存；
2、增加 help 命令来对内部命令进行说明（讨论中，可能不添加）；
3、优化 FE 的升/降级顺序问题；
4、优化目录逻辑，取消路径对"二级目录"的要求；
5、优化程序启停逻辑，解决日志打印的无效 ERROR 问题；
6、直接在集群迁入时直接在 yaml 中配置用户名密码；
7、增加"取消 BE 缩容"功能；
8、优化缩容 FE Leader 时的日志提示（调整 master 为 Leader）；
9、欢迎提出。
.....
```

二、文件说明

当前版本的安装包名称为 stargo-v2.0.3.tar.gz，解压进入目录后将看到如下 6 个文件：

```
[root@node01 ~]# tar xvf stargo-v2.0.3.tar.gz
[root@node01 ~]# cd stargo-v2.0.3
[root@node01 stargo-v2.0.3]# ll -h
total 61M
-rw-r--r-- 1 root root 2.6K Jan 14 13:14 deploy-template.yaml
-rwxr-xr-x 1 root root  11K Jan 14 13:14 env_check.sh
-rw-r--r-- 1 root root  52M Jan 14 13:14 jdk8u352-b08.tar.gz
-rw-r--r-- 1 root root  88K Jan 14 13:14 README.md
-rw-r--r-- 1 root root  182 Jan 14 13:14 repo.yaml
-rwxr-xr-x 1 root root 8.2M Jan 14 13:14 stargo
```

接下来，我们将逐个对文件的功能进行说明。

2.1、deploy-template.yaml

`deploy-template.yaml` 是集群配置信息的拓扑文件模板。我们可根据该模板来编辑目标集群的 yaml 配置文件，然后在部署时通过指定集群对应的 yaml 文件来让 StarGo 获取部署所需的 ip、端口、文件路径等信息。下面的示例就是测试环境中较为常用的 "3FE+3BE+3Broker" 混布架构。配置文件中除 IP 和个别目录外，其余均可在其他环境中直接复用：

注意：yaml 文件中的缩进和空格有特殊含义，本文为了方便说明加了错误格式的注释信息，使用时请参考压缩包中的模板严格按照格式进行配置。

```
global:
    user: "root"  ## SSH使用的用户，需调整为当前Linux用户
    ssh_port: 22  ## SSH端口，无需调整，正常都为默认的22端口

##前置说明：该yaml中涉及的所有目录配置，在其末尾不要添加"/"。正
确：/data/starrocks/fe/log，错误：/data/starrocks/fe/log/。在进行"清理"或"销毁"操作
时，目前stargo是以截取的方式保证数据目录和日志目录的上一级空文件夹也能被删除。后续版本考虑兼容
优化。
fe_servers:
  - host: 192.168.110.101  ## FE节点的IP，需调整为当前服务器需用的内网IP
    ssh_port: 22           ## SSH端口，通常默认即可
    http_port: 8030        ## FE http_port，默认为8030端口，若不与其他服务冲突则无需调
整。注意：集群中所有FE的http端口需要一致
```

```
    rpc_port: 9020          ## FE rpc_port，默认为9020，若不与其他服务冲突则无需调整
    query_port: 9030        ## FE query_port，默认为9030，若不与其他服务冲突则无需调整
    edit_log_port: 9010     ## FE edit_log_port，默认为9010，若不与其他服务冲突则无需调整
    deploy_dir: /opt/starrocks/fe         ## FE部署目录，StarGo当前逻辑下，要求目标文件夹前至少还有两层目录（后面会展开说明）！
    meta_dir: /data/starrocks/fe/meta     ## FE元数据目录，StarGo当前逻辑下，要求目标文件夹前至少还有两层目录！
    log_dir: /data/starrocks/fe/log       ## FE主要日志目录（fe.log及fe.warn.log），StarGo当前逻辑下，要求目标文件夹前至少还有两层目录！
    priority_networks: 192.168.110.0/24   ## FE IP绑定，需使用CIDR写法来调整为当前服务器IP，例如192.168.110.0/24即表示192.168.110.1~192.168.110.254的IP区间。在服务器存在多网卡或虚拟网卡时，StarRocks需要通过该参数让FE识别到正确网段的IP。若不清楚CIDR的写法，也可直接在这里配置具体的IP，例如：192.168.110.101
    role: FOLLOWER          ## 配置FE的角色，可选择配置FOLLOWER或OBSERVER，不配置该项时默认为FOLLOWER。StarRocks FE要求FOLLOWER角色的节点存活半数以上才能够选主，所以建议集群中FOLLOWER配置为奇数个。OBSERVER节点不会参与选主，其作用仅为拓展FE读的能力，所以对个数无要求，可以为0个或者任意个。
  - host: 192.168.110.102   ## 同上
    ssh_port: 22
    http_port: 8030
    rpc_port: 9020
    query_port: 9030
    edit_log_port: 9010
    deploy_dir: /opt/starrocks/fe
    meta_dir: /data/starrocks/fe/meta
    log_dir: /data/starrocks/fe/log
    priority_networks: 192.168.110.0/24
    role: FOLLOWER
  - host: 192.168.110.103   ## 同上
    ssh_port: 22
    http_port: 8030
    rpc_port: 9020
    query_port: 9030
    edit_log_port: 9010
    deploy_dir: /opt/starrocks/fe
    meta_dir: /data/starrocks/fe/meta
    log_dir: /data/starrocks/fe/log
    priority_networks: 192.168.110.0/24
    role: FOLLOWER

be_servers:
  - host: 192.168.110.101   ## BE节点的IP，需调整为当前服务器需用的内网IP
    ssh_port: 22            ## SSH端口，通常默认即可
    be_port: 9060                   ## BE be_port，默认为9060端口，若不与其他服务冲突则无需调整
    webserver_port: 8040            ## BE webserver_port，默认为8040端口，若不与其他服务冲突则无需调整
    heartbeat_service_port: 9050    ## BE heartbeat_service_port，默认为9050端口，若不与其他服务冲突则无需调整
    brpc_port: 8060                 ## BE brpc_port，默认为8060端口，若不与其他服务冲突则无需调整
    deploy_dir : /opt/starrocks/be     ## BE程序的分发部署目录，StarGo当前逻辑下，要求目标文件夹前至少还有两层目录！
```

```
    storage_dir:
/data1/starrocks/be/storage,medium:SSD;/data2/starrocks/be/storage    ## BE数据存储目录，StarGo当前逻辑下，要求目标文件夹前至少还有两层目录。StarRocks无法自动识别存储介质类型，默认会将所有磁盘识别为HDD，若我们服务器中同时使用了HDD和SSD两种磁盘，就需要在该处按照规范的格式显式的对SSD盘进行配置。若服务器中只有HDD或只有SSD，我们则无需额外配置介质，直接配置路径即可。在我们使用全SSD时，虽然StarRocks默认显示的存储类型仍是HDD，但由于固态硬盘带来的性能提升是物理层面的，并不会影响使用，所以这种情况我们同样不需额外配置介质，仍直接指定路径即可。
    log_dir: /data/starrocks/be/log       ## BE日志目录（be.INFO与be.WARNING），StarGo当前逻辑下，要求目标文件夹前至少还有两层目录！
    priority_networks: 192.168.110.0/24   ## BE IP绑定，需使用CIDR写法来调整为当前服务器IP，参数说明参考上文FE部分
    config:                               ## [*未开放]StarGo未来支持在部署时解析yaml中的参数直接写入StarRocks的配置文件，该功能目前未全面开放
      enable_new_load_on_memory_limit_exceeded: true  ## [*重要]该参数目前支持配置，也推荐在部署时加入该配置以优化当前StarRocks的导入逻辑
  - host: 192.168.110.102  ## 同上
    ssh_port: 22
    be_port: 9060
    webserver_port: 8040
    heartbeat_service_port: 9050
    brpc_port: 8060
    deploy_dir : /opt/starrocks/be
    storage_dir: /data/starrocks/be/storage  ## 注意按照上文描述的格式要求填写
    log_dir: /data/starrocks/be/log
    priority_networks: 192.168.110.0/24
    config:
      enable_new_load_on_memory_limit_exceeded: true
  - host: 192.168.110.103  ## 同上
    ssh_port: 22
    be_port: 9060
    webserver_port: 8040
    heartbeat_service_port: 9050
    brpc_port: 8060
    deploy_dir : /opt/starrocks/be
    storage_dir: /data/starrocks/be/storage,medium:HDD  ## 注意按照上文描述的格式要求填写
    log_dir: /data/starrocks/be/log
    priority_networks: 192.168.110.0/24
    config:
      enable_new_load_on_memory_limit_exceeded: true

##若不需要部署Broker，可删除下方内容。Broker目前主要用于和Hadoop及对象存储等通信，默认的Broker名称均为：hdfs_broker
broker_servers:
  - host: 192.168.110.101  ## Broker节点的IP，需调整为当前服务器实际的内网IP
    ssh_port: 22           ## SSH端口，通常默认即可
    broker_port: 8000      ## broker_port，默认为8000端口，若不与其他服务冲突则无需调整
    deploy_dir : /opt/starrocks/apache_hdfs_broker    ## Broker程序的分发部署目录，StarGo当前逻辑下，要求目标文件夹前至少还有两层目录！
    log_dir: /data/starrocks/apache_hdfs_broker/log   ## Broker日志目录，StarGo当前逻辑下，要求目标文件夹前至少还有两层目录！
  - host: 192.168.110.102  ## 同上。补充说明：Broker节点通常与BE节点混布，不需要绑定IP，故没有也不需要配置priority_networks参数
    ssh_port: 22
    broker_port: 8000
```

```
    deploy_dir: /opt/starrocks/apache_hdfs_broker
    log_dir: /data/starrocks/apache_hdfs_broker/log
  - host: 192.168.110.103  ## 同上
    ssh_port: 22
    broker_port: 8000
    deploy_dir : /opt/starrocks/apache_hdfs_broker
    log_dir: /data/starrocks/apache_hdfs_broker/log
```

关于目录配置的补充说明：

1、基于安全性和规范性考虑，StarGo 当前要求 yaml 中配置的目录至少前面拥有两级目录，以 /opt/starrocks/be 为例，即要程序目录包含 /opt 与下层的 /opt/starrocks，不能直接配置在根目录或一级目录中。

2、在 yaml 中配置的各个目录"实例名"前的部分我们需要提前创建，例如：/data/starrocks/fe/meta 路径中的 fe 即为"实例名"，其前的 /data/starrocks 我们需要手动创建并**授权**给当前 Linux 用户，而包含"实例名"的后续目录，即示例中的 fe/meta 目录，StarGo 将在部署时自动创建。**同时注意，StarGo 也只允许我们创建到 /data/starrocks 目录，在部署时若检测到这两级目录下也包含了 fe/meta，程序出于数据安全性将不会继续运行。**yaml 中的其他路径也是相同逻辑。

结合以上两点，若直接使用上文 deploy-template.yaml 进行部署，我们需要提前手动创建的文件夹为：

192.168.110.101节点：	192.168.110.102节点：	192.168.110.103节点：
/opt/starrocks	/opt/starrocks	/opt/starrocks
/data/starrocks	/data/starrocks	/data/starrocks
/data1/starrocks		
/data2/starrocks		

备注：生产环境中，推荐将数据目录（meta 或 storage）和日志目录分盘存储，来保证 IO 及存储空间互不影响。

2.2、env_check.sh

env_check.sh 是配合 StarGo 进行部署前环境检测的 shell 脚本，用来检测 StarGo 及 StarRocks 运行的必要环境条件及重要系统参数，执行前请确保该脚本已拥有可执行权限。其他需要说明的有：

1）脚本适用于红帽系系统，Ubuntu 系及 Debian 系暂未适配，可根据检测项自行检查部署环境；

2）不再检测系统中的 Java 环境，StarGo 会使用本地的 OpenJDK 8 为 StarRocks 配置程序级的运行环境；

3）检测通过的项会显示为"绿色"的 success，未通过的项会用"红色字体"给出提示及调整命令。在部署前请务必根据提示调整环境，规范的环境参数配置可以避免后续部署及使用过程中绝大多数不必要的问题；

4）对于检测未通过的项，脚本提示给出的语句均为临时调整命令（会在服务器重启后失效），若需要配置永久生效，请参考博客"部署环境准备"章节；

5）部署前需要在集群所有服务器上运行该脚本进行检测。

脚本的实现逻辑不再赘述，下面对各检测项给出的异常提示进行简单的说明：

```
[root@node01 stargo-v2.0.3]# ./env_check.sh

############################## CPU检查 ##############################
StarRocks BE需要CPU支持AVX2指令集才可启动，请更换至符合要求的x86架构服务器
#说明：该项为硬件检测，提示异常时，x86架构下需要更换服务器，ARM架构下需使用单独编译的StarRocks部署包。

############################ Linux版本检查 ############################
若无特殊原因，建议您更换使用CentOS7部署StarRocks，该系统当前测试最为充分
#说明：从稳定性角度考虑，建议生产环境直接使用CentOS 7.6或CentOS 7.9。

############################ glibc版本检查 ############################
StarRocks BE要求glibc版本最低为2.17才可启动，请升级glibc或使用更高内核版本的系统
或：
检测到较高的glibc版本，StarRocks BE或将无法启动，请更换或降级系统为CentOS7
#说明：按照当前的测试，系统glibc版本小于2.17或大于2.28，BE都会有问题，所以再次建议使用CentOS 7进行部署。

############################## swap检查 ##############################
使用swap分区可能影响查询性能，建议禁用，临时禁用命令：echo 0 | sudo tee /proc/sys/vm/swappiness
#说明：重要参数，可有效避免查询抖动问题。

############################ 内核参数检查 ############################
推荐调整overcommit_memory=1，以允许内核分配所有的物理内存来保障程序稳定性，临时调整命令：echo 1 | sudo tee /proc/sys/vm/overcommit_memory
#说明：重要参数，可有效避免环境原因引起的BE异常退出。

########################## 最大打开文件数检查 ##########################
句柄数限制过小可能导致服务异常退出，临时调整命令：ulimit -n 65535
#说明：重要参数，过低BE可能会无法正常运行。在使用StarGO部署时，要求该项需在配置文件中进行配置。

########################## 最大打开进程数检查 ##########################
进程数限制过小可能导致服务异常退出，临时调整命令：ulimit -u 65535
#说明：重要参数，过低BE可能会无法正常运行。在使用StarGO部署时，要求该项需在配置文件中进行配置。

############################ FE端口检查 ############################
FE需用的默认端口被占用，请检查或在部署时调整端口，检查命令：ss -antpl | grep -E '8030|9010|9020|9030'
#说明：FE需用的端口有四个，若当前服务器混布了其他服务（例如yarn.resourcemanager），就可能会冲突，此时就需要调整yaml配置中的端口。

############################ BE端口检查 ############################
BE需用的默认端口被占用，请检查或在部署时调整端口，检查命令：ss -antpl | grep -E '9060|9050|8040|8060'
#说明：BE需用的端口有四个，若当前服务器混布了其他服务（例如yarn.nodemanager），就可能会冲突，此时就需要调整yaml配置中的端口。

########################## Broker端口检查 ##########################
Broker需用的默认端口被占用，请检查或在部署时调整端口，检查命令：ss -antpl | grep '8000'
#说明：Broker需用的仅为8000端口，若和服务器中已有服务冲突，就需要调整yaml配置中的端口。

############################ 防火墙检查 ############################
```

```
系统防火墙为启用状态，为保证集群内部通信，建议关闭防火墙或开放端口，临时关闭命令：systemctl stop firewalld
#说明：多台服务器之间相互通信需要开发上述端口，生产环境通常有其他防护措施，建议直接关闭系统防火墙。

########################## tcp参数检查 ##########################
推荐调整tcp_abort_on_overflow参数值为1，临时调整命令：echo 1 | sudo tee /proc/sys/net/ipv4/tcp_abort_on_overflow
#说明：重要参数，可避免tcp引起的查询或写入报错。

########################## somaxconn检查 ##########################
推荐调整somaxconn参数值为1024，临时调整命令：echo 1024 | sudo tee /proc/sys/net/core/somaxconn
#说明：重要参数，可避免队列过小引起的查询或写入报错。

########################## SELinux检查 ##########################
建议关闭SELinux，临时关闭命令：setenforce 0
#说明：重要参数，SELinux安全机制较复杂，无特殊需求都建议关闭。

########################## hugepage检查 ##########################
推荐禁用透明大页，临时禁用命令：echo never > /sys/kernel/mm/transparent_hugepage/enabled
推荐禁用碎片整理，临时禁用命令：echo never > /sys/kernel/mm/transparent_hugepage/defrag
#说明：重要参数，透明大页参数或对集群性能产生较大影响。

########################## 时钟同步检查 ##########################
未检测到ntpd服务，StarRocks各FE节点间的时钟差大于5秒将无法启动，建议在部署前使用ntp对各节点进行时钟同步
#说明：ntpd服务存在仅是集群时钟同步的"必要条件"，这里的判断结果可能并不准确。建议在部署前对服务器进行规范的校时或同步操作。

########################## 时区检查 ##########################
检测到服务器未使用Asia/Shanghai时区，不恰当的时区设置可能影响集群数据导入导出，临时调整命令：timedatectl set-timezone Asia/Shanghai
#说明：操作系统的时区设置可能会影响StarRocks导入后DATE类型数据值，建议提前调整规避。

########################## 磁盘容量检查 ##########################
检测到存在磁盘剩余容量不足20%的情况，请确认磁盘空间充足后再进行集群部署，检查命令：df -h
#说明：部署、升级、降级操作均需要消耗磁盘空间，此外StarRocks默认的磁盘高水位为85%，风险水位为95%，触发阈值后会禁用部分功能，因此若磁盘剩余空间不足需及时更换或扩容磁盘。

########################## 内存大小检查 ##########################
服务器内存较小，为保证集群性能和稳定性，生产环境的建议内存为32G+
#说明：StarRocks计算过程为全内存模式，不支持落盘，内存过小时无法良好体验其极速性能。

########################## netstat命令检查 ##########################
未找到netstat命令，StarGo当前需使用netstat检测通信，否则无法正常使用。安装命令：yum -y install net-tools
#说明：netstat命令是StarGo工具所在节点需要用到的，并不是StarRocks依赖的命令。考虑运维时也会频繁用到，建议每台服务器都进行安装。
```

特别说明：因`ulimit -u`和`ulimt -n`两个参数较为重要，除需进行临时配置外，在部署过程中 stargo 还会检测配置文件`/etc/security/limits.conf`中是否也添加了对应配置，因此在部署前我们需要修改**各个节点**的配置文件：

```
[root@node01 ~]# vi /etc/security/limits.conf
```

在配置文件末尾添加配置，例如：

```
* soft nofile 65535
* hard nofile 65535
* soft nproc 65535
* hard nproc 65535
```

说明：该处软限硬限的配置也可以更大，例如 102400。

2.3、jdk8u352-b08.tar.gz

在调研和收集社区多轮测试反馈后，StarGo 最终选用 `Eclipse Temurin OpenJDK` 作为内置 JDK。该 JDK 无商用风险，体积小巧且兼容性优秀，已经过多套 StarRocks 生产集群的长期检验。对应版本的 JDK 下载地址为：

https://github.com/adoptium/temurin8-binaries/releases/download/jdk8u352-b08/OpenJDK8U-jdk_x64_linux_hotspot_8u352b08.tar.gz

```
[root@node01 bin]# ./java -version
openjdk version "1.8.0_352"
OpenJDK Runtime Environment (Temurin)(build 1.8.0_352-b08)
OpenJDK 64-Bit Server VM (Temurin)(build 25.352-b08, mixed mode)
```

说明：在使用 StarGo 的过程中，该 jdk 包不可删除、不可移动、亦不可重命名。内置 JDK 的目的是保障集群服务稳定性，遂无"支持自定义配置 JDK"的计划。

`jdk8u352-b08.tar.gz` 即为删除源码包后打的精简包。在使用 StarGo 部署集群时，StarGo 将为每个服务分发一份 JDK（这个逻辑后续版本会考虑优化），并在其启动脚本中使用绝对路径配置 JAVA_HOME，例如 `start_fe.sh` 中：

```
# java
##下行的JAVA_HOME配置即为StarGo自动添加的内容
JAVA_HOME=/opt/starrocks/fe/jdk

if [ "$JAVA_HOME" = "" ]; then
  echo "Error: JAVA_HOME is not set."
  exit 1
fi
JAVA=$JAVA_HOME/bin/java
```

2.4、README.md

README.md 是随包附带的使用说明文档，也即本文档。该文档会随 StarGo 的迭代来补充或删改内容，使用某个版本时以内置的说明文档为准。

2.5、repo.yaml

repo.yaml 是 StarGo 获取本地部署包的配置文件。在我们进行部署、升级、降级和扩容操作时我们需要在其中配置目标版本的二进制包路径及包名，其配置示例如下：

```
#该配置文件配置部署或升级/降级需用的StarRocks二进制包路径及包名：
sr_path: /opt/software/            ## 部署包所在文件夹路径，路径末尾的"/"加或者不加逻辑上都不影响
sr_name: StarRocks-2.3.7.tar.gz    ## 部署包包名
#sr_name: StarRocks-2.4.2.tar.gz
```

StarRocks x86 架构下的部署包可从"StarRocks 国际官网"或"镜舟科技官网"获取：

https://www.starrocks.io/download/community

https://www.mirrorship.cn/zh-CN/download/community（推荐）

在官网下载页中展示有安装包对应的 MD5 信息，推荐在下载完成后核对安装包的 MD5 信息以确认下载的安装包未出现文件损坏：

```
[root@node01 software]# md5sum StarRocks-2.3.7.tar.gz
1e20c74a7713b87553205b9538b29ef8  StarRocks-2.3.7.tar.gz
```

2.6、stargo

StarGo 二进制文件，无需安装，没有依赖，开箱即用。使用前确保程序已拥有可执行权限。

我们可通过 `./stargo version` 命令来查看 stargo 的版本信息，进而配合 Release Note 和 README.md 文档来确认对应版本支持的功能：

```
[root@node01 stargo-v2.0.3]# ./stargo version
StarGo Version:  v2.0.3
```

若需要对 stargo 进行升级，直接替换该文件为新版本的即可。

三、操作说明

3.1、集群部署

3.1.1 部署架构设计

假设我们使用三台 "32 核 64G 万兆网卡 100G 系统盘+2*1T SSD 数据盘"的同规格服务器，其中数据盘挂载路径分别为 /data1 和 /data2，则测试环境部署架构可设计如下。其中，StarGo 只需要在"任意一个"可与 StarRocks 集群通信的节点上放置，在或者不在部署 StarRocks 服务的机器上都可以，例如这里我们放在 node01 上：

Host	IP	部署服务	目录设计	Linux用户
node01	192.168.110.101	StarGo	StarGo程序目录：/opt/stargo-v2.0.3	root

Host	IP	部署服务	目录设计	Linux用户
node01	192.168.110.101	FE/BE/Broker	FE程序目录：/opt/starrocks/fe FE元数据目录：/data1/starrocks/fe/meta FE日志目录：/data1/starrocks/fe/log BE程序目录：/opt/starrocks/be BE数据目录：/data2/starrocks/be/storage BE日志目录：/data2/starrocks/be/log Broker程序目录：/opt/starrocks/apache_hdfs_broker Broker日志目录：/data2/starrocks/apache_hdfs_broker/log	root
node02	192.168.110.102	FE/BE/Broker	同上。	root
node03	192.168.110.103	FE/BE/Broker	同上。	root

备注：假设我们后续希望使用 StarGo 管理多套集群，我们也可以将 StarGo 放在单独的一台服务器中，作为中控节点集中管理所有集群。

3.1.2 运行环境检测脚本

在三台部署 StarRocks 服务的服务器上分别运行环境检测脚本，并按照提示进行系统参数的修改，确保最终检测时看到的都为绿色字体的 `success`：

```
[root@node01 stargo-v2.0.3]# ./env_check.sh

############################## CPU检查 ##############################
success

########################### Linux版本检查 ###########################
success

########################### glibc版本检查 ###########################
success

############################## swap检查 ##############################
success

############################ 内核参数检查 ############################
success

########################## 最大打开文件数检查 ##########################
success

########################## 最大打开进程数检查 ##########################
success

############################ FE端口检查 ############################
success

############################ BE端口检查 ############################
success

########################## Broker端口检查 ##########################
success
```

```
############################ 防火墙检查 ############################
success

########################## tcp参数检查 ##########################
success

######################### somaxconn检查 #########################
success

######################### SELinux检查 ##########################
success

######################### hugepage检查 #########################
success
success

######################### 时钟同步检查 #########################
success

############################ 时区检查 ############################
success

######################### 磁盘容量检查 #########################
success

######################### 内存大小检查 #########################
success

######################### netstat命令检查 ########################
success
```

3.1.3 配置SSH免密

在当前架构下，StarGo 需分别向 node01、node02 和 node03 分发程序文件，故需要分别配置免密，具体操作不再赘述，生成公私钥及分发公钥的主要命令为：

```
[root@node01 ~]# ssh-keygen -t rsa
[root@node01 ~]# ssh-copy-id root@192.168.110.101  ##注意本机不要遗漏
[root@node01 ~]# ssh-copy-id root@192.168.110.102
[root@node01 ~]# ssh-copy-id root@192.168.110.103
```

分发过程中按提示输入密码即可。

备注：这里要特别注意不要遗漏配置 node01 向 node01 节点的 SSH 免密，虽然是同一节点，但如果需要 SSH 通信，仍需要和其他节点一样手动配置免密。

3.1.4 创建文件目录

根据规划，我们在三台服务器中分别创建程序、日志、数据的存储目录，以 node01 为例（其他节点也需要执行）：

```
[root@node01 ~]# mkdir /opt/starrocks
[root@node01 ~]# mkdir -p /data1/starrocks
[root@node01 ~]# mkdir -p /data2/starrocks
```

说明：若使用的非 root 用户，在创建文件夹后，还应注意进行目录的授权。

3.1.5 配置yaml文件

根据 deploy-template.yaml 模板及架构设计，配置当前集群的 yaml 拓扑文件，假设为 sr-c1.yaml：

```
global:
    user: "root"
    ssh_port: 22

fe_servers:
  - host: 192.168.110.101
    ssh_port: 22
    http_port: 8030
    rpc_port: 9020
    query_port: 9030
    edit_log_port: 9010
    deploy_dir: /opt/starrocks/fe
    meta_dir: /data1/starrocks/fe/meta
    log_dir: /data1/starrocks/fe/log
    priority_networks: 192.168.110.0/24
    role: FOLLOWER
  - host: 192.168.110.102
    ssh_port: 22
    http_port: 8030
    rpc_port: 9020
    query_port: 9030
    edit_log_port: 9010
    deploy_dir: /opt/starrocks/fe
    meta_dir: /data1/starrocks/fe/meta
    log_dir: /data1/starrocks/fe/log
    priority_networks: 192.168.110.0/24
    role: FOLLOWER
  - host: 192.168.110.103
    ssh_port: 22
    http_port: 8030
    rpc_port: 9020
    query_port: 9030
    edit_log_port: 9010
    deploy_dir: /opt/starrocks/fe
    meta_dir: /data1/starrocks/fe/meta
    log_dir: /data1/starrocks/fe/log
    priority_networks: 192.168.110.0/24
    role: FOLLOWER

be_servers:
  - host: 192.168.110.101
    ssh_port: 22
    be_port: 9060
    webserver_port: 8040
    heartbeat_service_port: 9050
    brpc_port: 8060
    deploy_dir : /opt/starrocks/be
    storage_dir: /data2/starrocks/be/storage
    log_dir: /data2/starrocks/be/log
    priority_networks: 192.168.110.0/24
```

```
    config:
      enable_new_load_on_memory_limit_exceeded: true
  - host: 192.168.110.102
    ssh_port: 22
    be_port: 9060
    webserver_port: 8040
    heartbeat_service_port: 9050
    brpc_port: 8060
    deploy_dir : /opt/starrocks/be
    storage_dir: /data2/starrocks/be/storage
    log_dir: /data2/starrocks/be/log
    priority_networks: 192.168.110.0/24
    config:
      enable_new_load_on_memory_limit_exceeded: true
  - host: 192.168.110.103
    ssh_port: 22
    be_port: 9060
    webserver_port: 8040
    heartbeat_service_port: 9050
    brpc_port: 8060
    deploy_dir : /opt/starrocks/be
    storage_dir: /data2/starrocks/be/storage
    log_dir: /data2/starrocks/be/log
    priority_networks: 192.168.110.0/24
    config:
      enable_new_load_on_memory_limit_exceeded: true

broker_servers:
  - host: 192.168.110.101
    ssh_port: 22
    broker_port: 8000
    deploy_dir : /opt/starrocks/apache_hdfs_broker
    log_dir: /data2/starrocks/apache_hdfs_broker/log
  - host: 192.168.110.102
    ssh_port: 22
    broker_port: 8000
    deploy_dir: /opt/starrocks/apache_hdfs_broker
    log_dir: /data2/starrocks/apache_hdfs_broker/log
  - host: 192.168.110.103
    ssh_port: 22
    broker_port: 8000
    deploy_dir : /opt/starrocks/apache_hdfs_broker
    log_dir: /data2/starrocks/apache_hdfs_broker/log
```

3.1.6 配置repo.yaml

这里我们将本次演示需要用到的安装包都存放在 node01 的 /opt/software 目录下：

```
[root@node01 software]# ll -h
total 3.5G
-rw-r--r-- 1 root root 1.6G Jan 14 13:14 StarRocks-2.3.7.tar.gz
-rw-r--r-- 1 root root 1.9G Jan 14 13:14 StarRocks-2.4.2.tar.gz
```

安装包下载后都已核对 MD5 确认文件无损坏，先以安装 StarRocks-2.3.7 为例，修改 repo.yaml 为：

```
#该配置文件配置部署或升级/降级需用的StarRocks二进制包路径及包名：
sr_path: /opt/software/
sr_name: StarRocks-2.3.7.tar.gz
```

3.1.7 执行部署命令

StarGo 的集群部署命令语法为：

```
./stargo cluster deploy <cluster_name> <version> <topology_file>
## cluster_name：自定义的集群名称，例如这里我们写为'sr-c1'
## version：部署的StarRocks版本号，规范写法为v+版本号，例如'v2.3.7'，其他格式将会报错
## topology_file：目标集群需使用的yaml文件名称，例如本次我们使用的'sr-c1.yaml'
```

参考语法完善后的部署命令为：

```
[root@node01 ~]# cd /opt/stargo-v2.0.3
[root@node01 stargo-v2.0.3]# ./stargo cluster deploy sr-c1 v2.3.7 sr-c1.yaml
```

备注：该命令需要切换至 StarGo 程序目录执行，下文演示的命令也是在该目录中进行。

执行后程序会先进行服务器的连通性、端口、目录等的检查，在检查通过后，程序将拉取安装包然后分发解压部署（下面是本地虚拟机测试环境的部署日志，因测试环境配置较低，集群部署耗时约 9 分钟。在配置较高的生产环境中，整个部署过程可以保证在 5 分钟左右）：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster deploy sr-c1 v2.3.7 sr-c1.yaml
[20230114-122511  OUTPUT] Deploy cluster [clusterName = sr-c1, clusterVersion =
v2.3.7, metaFile = sr-c1.yaml]

InitConf time cost = 1.109537ms
SetGlobalVar time cost = 161ns
[20230114-122521  OUTPUT] PRE CHECK DEPLOY ENV:
PreCheck FE:
server id             ssh auth  meta dir     deploy dir  http port    rpc port
     query port  edit log port  openfiles count
--------------------  --------  -----------  ----------  -----------  ----------
----  ----------  -------------  ---------------
192.168.110.101:9010  PASS      PASS         PASS        PASS         PASS
     PASS        PASS           PASS
192.168.110.102:9010  PASS      PASS         PASS        PASS         PASS
     PASS        PASS           PASS
192.168.110.103:9010  PASS      PASS         PASS        PASS         PASS
     PASS        PASS           PASS

PreCheck BE:
server id             ssh auth  storage dir  deploy dir  webSer port  heartbeat
port  brpc port   be port        openfiles count
--------------------  --------  -----------  ----------  -----------  ----------
----  ----------  -------------  ---------------
192.168.110.101:9060  PASS      PASS         PASS        PASS         PASS
     PASS        PASS           PASS
192.168.110.102:9060  PASS      PASS         PASS        PASS         PASS
     PASS        PASS           PASS
192.168.110.103:9060  PASS      PASS         PASS        PASS         PASS
     PASS        PASS           PASS
```

```
PreCheck Broker:
server id             ssh auth  deploy dir   broker port  open files count
--------------------  --------  -----------  -----------  ----------------
192.168.110.101:8000  PASS      PASS         PASS         PASS
192.168.110.102:8000  PASS      PASS         PASS         PASS
192.168.110.103:8000  PASS      PASS         PASS         PASS

[20230114-122521  OUTPUT] PreCheck successfully. RESPECT
PreCheckSR time cost = 10.164619225s
[20230114-122521  OUTPUT] Create the deploy folder ...
CreateDir time cost = 3.21588262s
[20230114-122524    INFO] execCMD: cp /opt/software/StarRocks-2.3.7.tar.gz
/root/.stargo/download/StarRocks-2.3.7.tar.gz
[20230114-122525    INFO] execCMD: cp jdk8u352-b08.tar.gz
/root/.stargo/download/jdk8u352-b08.tar.gz
[20230114-122525  OUTPUT] Copy StarRocks package to compress dir ...
[20230114-122525  OUTPUT] Decompress StarRocks package & jdk ...
[20230114-122542    INFO] The tar file /root/.stargo/download/StarRocks-
2.3.7.tar.gz has been decompressed under /root/.stargo/download/
[20230114-122543    INFO] The tar file /root/.stargo/download/jdk8u352-b08.tar.gz
has been decompressed under /root/.stargo/download/
PrepareSRPkg time cost = 19.186783675s
[20230114-122543  OUTPUT] Distribute FE Dir ...
[20230114-122552    INFO] Upload dir FeSourceDir =
[/root/.stargo/download/StarRocks-2.3.7/fe] to feTargetDir = [/opt/starrocks/fe]
on FeHost = [192.168.110.101]
[20230114-122555    INFO] Upload dir JDKSourceDir =
[/root/.stargo/download/jdk8u352-b08] to JDKTargetDir = [/opt/starrocks/fe/jdk]
on FeHost = [192.168.110.101]
[20230114-122555    INFO] Modify JAVA_HOME: host = [192.168.110.101], filePath =
[/opt/starrocks/fe/bin/start_fe.sh]
[20230114-122617    INFO] Upload dir FeSourceDir =
[/root/.stargo/download/StarRocks-2.3.7/fe] to feTargetDir = [/opt/starrocks/fe]
on FeHost = [192.168.110.102]
[20230114-122627    INFO] Upload dir JDKSourceDir =
[/root/.stargo/download/jdk8u352-b08] to JDKTargetDir = [/opt/starrocks/fe/jdk]
on FeHost = [192.168.110.102]
[20230114-122627    INFO] Modify JAVA_HOME: host = [192.168.110.102], filePath =
[/opt/starrocks/fe/bin/start_fe.sh]
[20230114-122649    INFO] Upload dir FeSourceDir =
[/root/.stargo/download/StarRocks-2.3.7/fe] to feTargetDir = [/opt/starrocks/fe]
on FeHost = [192.168.110.103]
[20230114-122659    INFO] Upload dir JDKSourceDir =
[/root/.stargo/download/jdk8u352-b08] to JDKTargetDir = [/opt/starrocks/fe/jdk]
on FeHost = [192.168.110.103]
[20230114-122659    INFO] Modify JAVA_HOME: host = [192.168.110.103], filePath =
[/opt/starrocks/fe/bin/start_fe.sh]
[20230114-122659  OUTPUT] Distribute BE Dir ...
[20230114-122723    INFO] Upload dir BeSourceDir =
[/root/.stargo/download/StarRocks-2.3.7/be] to BeTargetDir = [/opt/starrocks/be]
on BeHost = [192.168.110.101]
[20230114-122726    INFO] Upload dir JDKSourceDir =
[/root/.stargo/download/jdk8u352-b08] to JDKTargetDir = [/opt/starrocks/be/jdk]
on BeHost = [192.168.110.101]
```

```
[20230114-122726    INFO] Modify JAVA_HOME: host = [192.168.110.101], filePath =
[/opt/starrocks/be/bin/start_be.sh]
[20230114-122822    INFO] Upload dir BeSourceDir =
[/root/.stargo/download/StarRocks-2.3.7/be] to BeTargetDir = [/opt/starrocks/be]
on BeHost = [192.168.110.102]
[20230114-122832    INFO] Upload dir JDKSourceDir =
[/root/.stargo/download/jdk8u352-b08] to JDKTargetDir = [/opt/starrocks/be/jdk]
on BeHost = [192.168.110.102]
[20230114-122832    INFO] Modify JAVA_HOME: host = [192.168.110.102], filePath =
[/opt/starrocks/be/bin/start_be.sh]
[20230114-122929    INFO] Upload dir BeSourceDir =
[/root/.stargo/download/StarRocks-2.3.7/be] to BeTargetDir = [/opt/starrocks/be]
on BeHost = [192.168.110.103]
[20230114-122938    INFO] Upload dir JDKSourceDir =
[/root/.stargo/download/jdk8u352-b08] to JDKTargetDir = [/opt/starrocks/be/jdk]
on BeHost = [192.168.110.103]
[20230114-122938    INFO] Modify JAVA_HOME: host = [192.168.110.103], filePath =
[/opt/starrocks/be/bin/start_be.sh]
[20230114-122938  OUTPUT] Distribute Broker Dir ...
[20230114-122943    INFO] Upload dir BrokerSourceDir =
[/root/.stargo/download/StarRocks-2.3.7/apache_hdfs_broker] to brokerTargetDir =
[/opt/starrocks/apache_hdfs_broker] on BrokerHost = [192.168.110.101]
[20230114-122946    INFO] Upload dir JDKSourceDir =
[/root/.stargo/download/jdk8u352-b08] to JDKTargetDir =
[/opt/starrocks/apache_hdfs_broker/jdk] on BrokerHost = [192.168.110.101]
[20230114-122946    INFO] Modify JAVA_HOME: host = [192.168.110.101], filePath =
[/opt/starrocks/apache_hdfs_broker/bin/start_broker.sh]
[20230114-123007    INFO] Upload dir BrokerSourceDir =
[/root/.stargo/download/StarRocks-2.3.7/apache_hdfs_broker] to brokerTargetDir =
[/opt/starrocks/apache_hdfs_broker] on BrokerHost = [192.168.110.102]
[20230114-123017    INFO] Upload dir JDKSourceDir =
[/root/.stargo/download/jdk8u352-b08] to JDKTargetDir =
[/opt/starrocks/apache_hdfs_broker/jdk] on BrokerHost = [192.168.110.102]
[20230114-123017    INFO] Modify JAVA_HOME: host = [192.168.110.102], filePath =
[/opt/starrocks/apache_hdfs_broker/bin/start_broker.sh]
[20230114-123037    INFO] Upload dir BrokerSourceDir =
[/root/.stargo/download/StarRocks-2.3.7/apache_hdfs_broker] to brokerTargetDir =
[/opt/starrocks/apache_hdfs_broker] on BrokerHost = [192.168.110.103]
[20230114-123047    INFO] Upload dir JDKSourceDir =
[/root/.stargo/download/jdk8u352-b08] to JDKTargetDir =
[/opt/starrocks/apache_hdfs_broker/jdk] on BrokerHost = [192.168.110.103]
[20230114-123048    INFO] Modify JAVA_HOME: host = [192.168.110.103], filePath =
[/opt/starrocks/apache_hdfs_broker/bin/start_broker.sh]
DistributeSrDir time cost = 5m4.108024164s
WriteBackMeta time cost = 378.812µs
[20230114-123048  OUTPUT] Modify configuration for FE nodes & BE nodes & Broker
nodes ...
ModifyClusterConfig time cost = 1.447409664s
############################################ START FE CLUSTER
############################################
############################################ START FE CLUSTER
############################################
[20230114-123049    INFO] Starting Leader FE node [host = 192.168.110.101,
editLogPort = 9010]
```

```
[20230114-123110    INFO] The FE node start succefully [host = 192.168.110.101,
queryPort = 9030]
[20230114-123110    INFO] Starting FOLLOWER FE node [host = 192.168.110.102,
editLogPort = 9010]
[20230114-123132    INFO] The FE node start succefully [host = 192.168.110.102,
queryPort = 9030]
[20230114-123132    INFO] Starting FOLLOWER FE node [host = 192.168.110.103,
editLogPort = 9010]
[20230114-123153    INFO] The FE node start succefully [host = 192.168.110.103,
queryPort = 9030]
[20230114-123153    INFO] List all FE status:
                                        feHost = 192.168.110.101     feQueryPort
= 9030     feStatus = true
                                        feHost = 192.168.110.102     feQueryPort
= 9030     feStatus = true
                                        feHost = 192.168.110.103     feQueryPort
= 9030     feStatus = true

InitFeCluster time cost = 1m4.056038286s
############################################## START BE CLUSTER
##############################################
############################################## START BE CLUSTER
##############################################
[20230114-123153    INFO] Starting BE node [BeHost = 192.168.110.101
HeartbeatServicePort = 9050]
[20230114-123215    INFO] The BE node start succefully [host = 192.168.110.101,
heartbeatServicePort = 9050]
[20230114-123215    INFO] Starting BE node [BeHost = 192.168.110.102
HeartbeatServicePort = 9050]
[20230114-123236    INFO] The BE node start succefully [host = 192.168.110.102,
heartbeatServicePort = 9050]
[20230114-123236    INFO] Starting BE node [BeHost = 192.168.110.103
HeartbeatServicePort = 9050]
[20230114-123257    INFO] The BE node start succefully [host = 192.168.110.103,
heartbeatServicePort = 9050]
[20230114-123257  OUTPUT] List all BE status:
                                        beHost = 192.168.110.101
beHeartbeatServicePort = 9050  beStatus = true
                                        beHost = 192.168.110.102
beHeartbeatServicePort = 9050  beStatus = true
                                        beHost = 192.168.110.103
beHeartbeatServicePort = 9050  beStatus = true

InitBeCluster time cost = 1m3.84722974s
[20230114-123257    INFO] Starting Broker node [BrokerHost = 192.168.110.101
BrokerPort = 8000]
[20230114-123317    INFO] The broker node start succefully [host =
192.168.110.101, brokerPort = 8000]
[20230114-123317    INFO] Starting Broker node [BrokerHost = 192.168.110.102
BrokerPort = 8000]
[20230114-123338    INFO] The broker node start succefully [host =
192.168.110.102, brokerPort = 8000]
[20230114-123338    INFO] Starting Broker node [BrokerHost = 192.168.110.103
BrokerPort = 8000]
```

```
[20230114-123358    INFO] The broker node start succefully [host =
192.168.110.103, brokerPort = 8000]
[20230114-123358  OUTPUT] List all Broker status:
                                        BrokerHost = 192.168.110.101
brokerPort = 8000  brokerStatus = true
                                        BrokerHost = 192.168.110.102
brokerPort = 8000  brokerStatus = true
                                        BrokerHost = 192.168.110.103
brokerPort = 8000  brokerStatus = true

InitBrokerCluster time cost = 1m1.331587499s
```

注意：

1、在执行部署命令后若集群检查不通过程序将直接退出，我们需要根据提示排查未通过的原因。

2、若在部署过程中出现异常，我们可先检查集群的meta文件是否生成，再选择执行"清理"或"卸载"命令来清理部署的残留文件，具体的命令及说明见 3.8 和 3.9 章节。

3.2、集群状态查看与服务启停

3.2.1 查看集群管理列表

在部署完成后，我们可查看当前 StarGo 管理的集群列表，语法为：

```
./stargo cluster list
```

当前仅用 StarGo 管理了一套集群，所以执行后展示列表如下：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster list
[20230110-205519  OUTPUT] List all clusters
ClusterName      Version     User        CreateDate                MetaPath
                 PrivateKey
-------------    --------    --------    --------------------       ------------
----------------   ------------------
sr-c1            v2.3.7      root        2023-01-14 12:30:48
/root/.stargo/cluster/sr-c1    /root/.ssh/id_rsa
```

3.2.2 查看指定集群信息

上面 list 命令查出的 ClusterName 即为我们执行部署命令时指定的名称，根据集群名称我们还可以查看对应集群的详细信息，其语法为：

```
./stargo cluster display <cluster_name>
```

修改命令后执行，查看 sr-c1 集群的状态：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster display sr-c1
[20230114-123927  OUTPUT] Display cluster [clusterName = sr-c1]
clusterName = sr-c1
clusterVerison = v2.3.7
ID                    ROLE    HOST              PORT         STAT    DEPLOYDIR
           DATADIR
--------------------   ------  ---------------    ---------    -----   ---------
---------   ---------------------------------
```

```
192.168.110.101:9010   FE      192.168.110.101    9010/9030    UP/L
/opt/starrocks/fe    /data1/starrocks/fe/meta
192.168.110.102:9010   FE      192.168.110.102    9010/9030    UP
/opt/starrocks/fe    /data1/starrocks/fe/meta
192.168.110.103:9010   FE      192.168.110.103    9010/9030    UP
/opt/starrocks/fe    /data1/starrocks/fe/meta
192.168.110.101:9060   BE      192.168.110.101    9060/9050    UP
/opt/starrocks/be    /data2/starrocks/be/storage
192.168.110.102:9060   BE      192.168.110.102    9060/9050    UP
/opt/starrocks/be    /data2/starrocks/be/storage
192.168.110.103:9060   BE      192.168.110.103    9060/9050    UP
/opt/starrocks/be    /data2/starrocks/be/storage
192.168.110.101:8000   Broker  192.168.110.101    8000         UP
            /opt/starrocks/apache_hdfs_broker
192.168.110.102:8000   Broker  192.168.110.102    8000         UP
            /opt/starrocks/apache_hdfs_broker
192.168.110.103:8000   Broker  192.168.110.103    8000         UP
            /opt/starrocks/apache_hdfs_broker
```

说明：STAT 列中的 UP 表示当前节点状态正常，UP/ L 表示当前节点为 FE Leader节点。

出于使用习惯，当前还设计了一种简略信息的状态查看方式，语法为：

```
./stargo cluster status <cluster_name>
```

执行查看语句：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster status sr-c1
[20230114-123955  OUTPUT] List cluster status. [ClusterName = sr-c1 ]
[20230114-123955  OUTPUT] List all FE status:
           feHost = 192.168.110.101  feQueryPort = 9030  feStatus = true
feVersion = 2.3.7-43fbd55  feRole = FOLLOWER
           feHost = 192.168.110.102  feQueryPort = 9030  feStatus = true
feVersion = 2.3.7-43fbd55  feRole = FOLLOWER
           feHost = 192.168.110.103  feQueryPort = 9030  feStatus = true
feVersion = 2.3.7-43fbd55  feRole = FOLLOWER

[20230114-123955  OUTPUT] List all BE status:
           beHost = 192.168.110.101  beHeartbeatServicePort = 9050   beStatus =
true  beVersion = 2.3.7-43fbd55
           beHost = 192.168.110.102  beHeartbeatServicePort = 9050   beStatus =
true  beVersion = 2.3.7-43fbd55
           beHost = 192.168.110.103  beHeartbeatServicePort = 9050   beStatus =
true  beVersion = 2.3.7-43fbd55

[20230114-123956  OUTPUT] List all Broker status:
           BrokerHost = 192.168.110.101   brokerPort = 8000   brokerStatus =
true
           BrokerHost = 192.168.110.102   brokerPort = 8000   brokerStatus =
true
           BrokerHost = 192.168.110.103   brokerPort = 8000   brokerStatus =
true
```

3.2.3 停止指定集群

停止指定集群的语法为：

```
./stargo cluster stop <cluster_name>
```

例如停止 sr-c1 集群：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster stop sr-c1
[20230114-124033  OUTPUT] Stop cluster [clusterName = sr-c1]
[20230114-124033  OUTPUT] Stop cluster sr-c1
[20230114-124033    INFO] Waiting for stoping FE node [FeHost = 192.168.110.101]
[20230114-124036   ERROR] Error in ping db [dbPath =
root:@tcp(192.168.110.101:9030)/], error = dial tcp 192.168.110.101:9030:
connect: connection refused
[20230114-124036    INFO] Waiting for stoping FE node [FeHost = 192.168.110.102]
[20230114-124039    INFO] Waiting for stoping FE node [FeHost = 192.168.110.103]
[20230114-124041  OUTPUT] Stop cluster sr-c1
[20230114-124041    INFO] Waiting for stoping BE node [BeHost = 192.168.110.101]
[20230114-124043   ERROR] Error in ping db [dbPath = root:@tcp(:0)/], error =
dial tcp :0: connect: connection refused
[20230114-124043    INFO] Waiting for stoping BE node [BeHost = 192.168.110.102]
[20230114-124044    INFO] Waiting for stoping BE node [BeHost = 192.168.110.103]
[20230114-124046  OUTPUT] Stop cluster sr-c1
[20230114-124046    INFO] Waiting for stoping Broker node [BrokerHost =
192.168.110.101]
[20230114-124047   ERROR] Error in ping db [dbPath = root:@tcp(:0)/], error =
dial tcp :0: connect: connection refused
[20230114-124047    INFO] Waiting for stoping Broker node [BrokerHost =
192.168.110.102]
[20230114-124047    INFO] Waiting for stoping Broker node [BrokerHost =
192.168.110.103]
```

备注：执行停止命令时，日志打印的 ERROR 信息是由于服务停止后检测不到通信引起的，不影响命令执行效果，当前版本可先忽略，后续版本将优化该问题。

3.2.4 启动指定集群

启动指定集群的语法为：

```
./stargo cluster start <cluster_name>
```

例如再次启动刚才停止的 sr-c1 集群：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster start sr-c1
[20230114-124141  OUTPUT] Start cluster [clusterName = sr-c1]
[20230114-124141    INFO] Starting FE node [FeHost = 192.168.110.101,
EditLogPort = 9010]
[20230114-124212    INFO] Starting FE node [FeHost = 192.168.110.102,
EditLogPort = 9010]
[20230114-124223    INFO] Starting FE node [FeHost = 192.168.110.103,
EditLogPort = 9010]
[20230114-124235    INFO] Starting BE node [BeHost = 192.168.110.101,
HeartbeatServicePort = 9050]
[20230114-124246    INFO] Starting BE node [BeHost = 192.168.110.102,
HeartbeatServicePort = 9050]
[20230114-124257    INFO] Starting BE node [BeHost = 192.168.110.103,
HeartbeatServicePort = 9050]
[20230114-124309    INFO] Starting Broker node [BrokerHost = 192.168.110.101,
brokerPort = 8000]
[20230114-124319    INFO] Starting Broker node [BrokerHost = 192.168.110.102,
brokerPort = 8000]
[20230114-124329    INFO] Starting Broker node [BrokerHost = 192.168.110.103,
brokerPort = 8000]
```

3.2.5 启停集群某类服务

StarRocks 中的服务类型目前可以分为 FE、BE 和 Broker（CN 当前暂不考虑），StarGo 可根据进程类型批量的启停一类进程，语法为：

```
./stargo cluster start|stop <cluster_name> --role FE|BE|Broker
## 说明：每条命令中，--role后只能指定FE、BE或Broker三类进程中的一个，不支持同时指定。
```

例如我们停止 sr-c1 集群中的 Broker 进程后再启动：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster stop sr-c1 --role Broker
[20230114-124604  OUTPUT] Stop cluster [clusterName = sr-c1]
[20230114-124604    INFO] Stopping Broker cluster ...
[20230114-124604  OUTPUT] Stop cluster sr-c1
[20230114-124604    INFO] Waiting for stoping Broker node [BrokerHost =
192.168.110.101]
[20230114-124604   ERROR] Error in ping db [dbPath = root:root@tcp(:0)/], error
= dial tcp :0: connect: connection refused
[20230114-124604    INFO] Waiting for stoping Broker node [BrokerHost =
192.168.110.102]
[20230114-124605   ERROR] Error in ping db [dbPath = root:root@tcp(:0)/], error
= dial tcp :0: connect: connection refused
[20230114-124605    INFO] Waiting for stoping Broker node [BrokerHost =
192.168.110.103]
[20230114-124605   ERROR] Error in ping db [dbPath = root:root@tcp(:0)/], error
= dial tcp :0: connect: connection refused

[root@node01 stargo-v2.0.3]# ./stargo cluster start sr-c1 --role Broker
[20230114-124619  OUTPUT] Start cluster [clusterName = sr-c1]
[20230114-124619    INFO] Starting Broker cluster ...
[20230114-124619    INFO] Starting Broker node [BrokerHost = 192.168.110.101,
brokerPort = 8000]
```

```
[20230114-124629    INFO] Starting Broker node [BrokerHost = 192.168.110.102,
brokerPort = 8000]
[20230114-124640    INFO] Starting Broker node [BrokerHost = 192.168.110.103,
brokerPort = 8000]
```

备注：执行停止命令时，日志打印的 ERROR 信息是由于服务停止后检测不到通信引起的，不影响命令执行效果，当前版本可先忽略，后续版本将优化该问题。

3.2.6 启停指定实例服务

StarGo 也支持启停指定实例（这里的实例指具体的某个 FE、BE 或 Broker），其语法为：

```
./stargo cluster start|stop <cluster_name> --node <node_id>
## node_id：即上文通过display命令查到的ID列
```

以启停 ID 为 192.168.110.103:9060 的 BE 实例为例：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster stop sr-c1 --node
192.168.110.103:9060
[20230114-124711  OUTPUT] Stop cluster [clusterName = sr-c1]
[20230114-124711    INFO] Stopping BE node. [BeHost = 192.168.110.103]
[20230114-124711    INFO] Waiting for stoping BE node [BeHost = 192.168.110.103]

[root@node01 stargo-v2.0.3]# ./stargo cluster start sr-c1 --node
192.168.110.103:9060
[20230114-124727  OUTPUT] Start cluster [clusterName = sr-c1]
[20230114-124727    INFO] Start BE node. [BeHost = 192.168.110.103,
HeartbeatServicePort = 9050]
```

3.3、配置集群root用户密码

StarRocks在部署完成后，默认用户为 root，密码为空（**这里的 root 是指 "StarRocks 数据库"的用户，而不是 Linux 系统的用户**）。StarGo 通过 类似 Java JDBC 的方式与集群通信，默认也是使用 StarRocks 的用户 root 和"空密码"来访问集群。在我们修改 StarRocks 集群的密码后我们也需要将修改后的密码手动配置在 StarGo 工作目录中集群对应的 yaml 拓扑文件中，否则 StarGo 将无法进行集群的管理。

例如我们修改 StarRocks 集群 root 用户的密码为 root，我们用 mysql-client 或可视化工具将 StarRocks 视为 MySQL 访问，IP 使用任意 FE 的 IP，端口为 9030，访问集群：

```
[root@node03 ~]# mysql -h192.168.110.102 -P9030 -uroot
```

修改密码后退出：

```
mysql> set password = password('root');
mysql> exit
```

在部署时我们使用的 sr-c1.yaml 拓扑文件仅用于集群部署，在部署完成后该文件可删除，StarGo 会在"工作目录"为每个集群生成对应的拓扑文件 meta.yaml 用于集群管理，集群密码信息就是需要到该文件中配置。我们切换目录到当前 Linux 用户的家目录，以当前的 root 用户为例：

```
[root@node01 stargo-v2.0.3]# cd  ##该命令表示切换到家目录，root用户家目录为'/root'，其他用户为'/home/用户名'
[root@node01 ~]# ll -a           ##展示当前目录文件列表，并显示隐藏文件
total 1650892
dr-xr-x---.  8 root root     4096 Jan 14 20:10 .
dr-xr-xr-x. 19 root root      250 Jan 14 14:03 ..
drwxr-xr-x.  2 root root        6 Nov 20  2021 .m2
drwx------   2 root root       80 Jan 14 14:08 .ssh
drwxr-xr-x   5 root root       48 Jan 14 15:01 .stargo
……
```

可以看到有一个 .stargo 目录，该目录就是 StarGo 的**"本地工作目录"**，进入目录并查看：

```
[root@node01 ~]# cd .stargo/
[root@node01 .stargo]# ll
total 4
drwxr-xr-x 3 root root   19 Jan 14 19:31 cluster  ##该目录保存stargo管理的所有集群的yaml拓扑文件。其下层文件夹的名称即为各个集群的集群名称，其中保存集群对应的yaml文件。不可手动清理！！！
drwxr-xr-x 4 root root  106 Jan 14 15:02 download ##该目录保存从配置目录中获取的StarRocks安装包、JDK包及二者解压后的文件，需手动清理。当前这里实现不够友好，后续版本考虑优化。
drwxr-xr-x 2 root root 4096 Jan 14 15:08 tmp      ##该目录保存临时的配置文件，可手动清理。
```

切换至目标目录，为 meta.yaml 配置用户名和密码信息：

```
[root@node01 .stargo]# cd cluster/sr-c1/
[root@node01 sr-c1]# vim meta.yaml

clusterinfo:
  user: root
  version: v2.3.7
  create_date: "2023-01-14 12:30:48"
  meta_path: /root/.stargo/cluster/sr-c1
  private_key: /root/.ssh/id_rsa
  sr_user: "root"       ##添加用户名root，该项只能配置为root，其他用户权限不足
  sr_password: "root"   ##添加密码，例如上文修改为的root
global:
  user: root
  ssh_port: 22
server_configs:
……
```

保存退出后，就可继续使用 StarGo 进行集群的管理。

3.4、集群升级与降级

集群升降级操作的语法为：

```
./stargo cluster upgrade|downgrade <cluster_name> <target_version>
## cluster_name：需要升降级的集群名，例如上文使用的'sr-c1'
## target_version：升降级的目标版本，规范写法同样为"v+版本号"，例如本次升级演示使用
的'v2.4.2'
```

备注：

1、StarRocks 非常不推荐进行跨大版本的升降级（例如 2.1-2.3 或 2.2-2.4，亦或者反向），当前 StarGo 对升降级的版本未进行限制，后续版本会考虑优化。

2、目前在进行升级或降级操作时，没有进行集群副本是否健康的校验。当集群建表都为默认的三副本时，我们只需要在升降级前执行 `show proc '/statistic';` 命令，确认 `UnhealthyTabletNum` 为 0 后，即可进行升降级操作。

3.4.1 集群升级

当需要对集群进行升级操作时，我们需要配置 repo.yaml，例如当前我们将 StarRocks 从 2.3.7 升级至 2.4.2，修改 repo.yaml：

```
#该配置文件配置部署或升级/降级需用的StarRocks二进制包路径及包名：
sr_path: /opt/software/
#sr_name: StarRocks-2.3.7.tar.gz
sr_name: StarRocks-2.4.2.tar.gz
```

备注：

1、在升级前我们仍需要先下载 StarRocks 对应版本的二进制包，当前 2.4.2 版本的部署包已下载存放至 /opt/software 目录中。

2、升级或降级操作不会依赖部署时配置的 sr-c1.yaml 文件，我们仅需要配置 repo.yaml 以获取目标版本的安装包。

执行升级命令：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster upgrade sr-c1 v2.4.2
```

执行升级命令后，StarGo 会拉取 repo.yaml 中配置的本地安装包到工作目录解压，然后逐个将原版本程序的 bin 和 lib 目录添加时间戳重命名，例如：bin.bak-20230114125225，再将新版本程序的 bin 文件夹和 lib 文件夹分发到目标目录，最后将进程切换到新版本程序。升级操作的整体顺序为 BE-->FE-->Broker，在日志中我们可以看到程序执行的详细步骤：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster upgrade sr-c1 v2.4.2
[20230114-124957  OUTPUT] Upgrade cluster. [ClusterName = sr-c1, TargetVersion =
v2.4.2]
InitConf time cost = 1.010823ms
SetGlobalVar time cost = 253ns
[20230114-124957  OUTPUT] Upgrade StarRocks Cluster sr-c1, from version v2.3.7 to
version v2.4.2
[20230114-124957    INFO] execCMD: cp /opt/software/StarRocks-2.4.2.tar.gz
/root/.stargo/download/StarRocks-2.4.2.tar.gz
[20230114-125001    INFO] execCMD: cp jdk8u352-b08.tar.gz
/root/.stargo/download/jdk8u352-b08.tar.gz
[20230114-125001  OUTPUT] Copy StarRocks package to compress dir ...
[20230114-125001  OUTPUT] Decompress StarRocks package & jdk ...
```

```
[20230114-125027    INFO] The tar file /root/.stargo/download/StarRocks-
2.4.2.tar.gz has been decompressed under /root/.stargo/download/
[20230114-125028    INFO] The tar file /root/.stargo/download/jdk8u352-b08.tar.gz
has been decompressed under /root/.stargo/download/
PrepareSRPkg time cost = 30.966407399s
[20230114-125028  OUTPUT] Starting upgrade BE node. [beId = 0]
[20230114-125029    INFO] upgrade BE node - backup BE lib. [host =
192.168.110.101, sourceDir = /opt/starrocks/be/lib, targetDir =
/opt/starrocks/be/lib.bak-20230114125028]
[20230114-125056    INFO] upgrade BE node - upload new BE lib. [host =
192.168.110.101, sourceDir = /root/.stargo/download/StarRocks-2.4.2/be/lib,
targetDir = /opt/starrocks/be/lib]
[20230114-125056    INFO] Waiting for stoping BE node [BeHost = 192.168.110.101]
[20230114-125057    INFO] upgrade BE node - stop BE node. [host =
192.168.110.101, beDeployDir = /opt/starrocks/be]
[20230114-125058    INFO] upgrade BE node - backup BE bin. [host =
192.168.110.101, sourceDir = /opt/starrocks/be/bin, targetDir =
/opt/starrocks/be/bin.bak-20230114125057]
[20230114-125058    INFO] upgrade BE node - upload new BE bin. [host =
192.168.110.101, sourceDir = /root/.stargo/download/StarRocks-2.4.2/be/bin,
targetDir = /opt/starrocks/be/bin]
[20230114-125058    INFO] modify start_be.sh
[20230114-125059    INFO] upgrade BE node - start BE node. [host =
192.168.110.101, beDeployDir = /opt/starrocks/be]
[20230114-125110    INFO] upgrade BE node - start BE node. [host =
192.168.110.101, beDeployDir = /opt/starrocks/be]
[20230114-125110  OUTPUT] The BE node upgrade successfully.
[20230114-125110  OUTPUT] Starting upgrade BE node. [beId = 1]
[20230114-125110    INFO] upgrade BE node - backup BE lib. [host =
192.168.110.102, sourceDir = /opt/starrocks/be/lib, targetDir =
/opt/starrocks/be/lib.bak-20230114125110]
[20230114-125223    INFO] upgrade BE node - upload new BE lib. [host =
192.168.110.102, sourceDir = /root/.stargo/download/StarRocks-2.4.2/be/lib,
targetDir = /opt/starrocks/be/lib]
[20230114-125223    INFO] Waiting for stoping BE node [BeHost = 192.168.110.102]
[20230114-125225    INFO] upgrade BE node - stop BE node. [host =
192.168.110.102, beDeployDir = /opt/starrocks/be]
[20230114-125225    INFO] upgrade BE node - backup BE bin. [host =
192.168.110.102, sourceDir = /opt/starrocks/be/bin, targetDir =
/opt/starrocks/be/bin.bak-20230114125225]
[20230114-125225    INFO] upgrade BE node - upload new BE bin. [host =
192.168.110.102, sourceDir = /root/.stargo/download/StarRocks-2.4.2/be/bin,
targetDir = /opt/starrocks/be/bin]
[20230114-125226    INFO] modify start_be.sh
[20230114-125227    INFO] upgrade BE node - start BE node. [host =
192.168.110.102, beDeployDir = /opt/starrocks/be]
[20230114-125238    INFO] upgrade BE node - start BE node. [host =
192.168.110.102, beDeployDir = /opt/starrocks/be]
[20230114-125238  OUTPUT] The BE node upgrade successfully.
[20230114-125238  OUTPUT] Starting upgrade BE node. [beId = 2]
[20230114-125238    INFO] upgrade BE node - backup BE lib. [host =
192.168.110.103, sourceDir = /opt/starrocks/be/lib, targetDir =
/opt/starrocks/be/lib.bak-20230114125238]
```

```
[20230114-125349    INFO] upgrade BE node - upload new BE lib. [host =
192.168.110.103, sourceDir = /root/.stargo/download/StarRocks-2.4.2/be/lib,
targetDir = /opt/starrocks/be/lib]
[20230114-125349    INFO] Waiting for stoping BE node [BeHost = 192.168.110.103]
[20230114-125350    INFO] upgrade BE node - stop BE node. [host =
192.168.110.103, beDeployDir = /opt/starrocks/be]
[20230114-125351    INFO] upgrade BE node - backup BE bin. [host =
192.168.110.103, sourceDir = /opt/starrocks/be/bin, targetDir =
/opt/starrocks/be/bin.bak-20230114125350]
[20230114-125351    INFO] upgrade BE node - upload new BE bin. [host =
192.168.110.103, sourceDir = /root/.stargo/download/StarRocks-2.4.2/be/bin,
targetDir = /opt/starrocks/be/bin]
[20230114-125351    INFO] modify start_be.sh
[20230114-125352    INFO] upgrade BE node - start BE node. [host =
192.168.110.103, beDeployDir = /opt/starrocks/be]
[20230114-125403    INFO] upgrade BE node - start BE node. [host =
192.168.110.103, beDeployDir = /opt/starrocks/be]
[20230114-125403  OUTPUT] The BE node upgrade successfully.
UpgradeBeCluster time cost = 3m34.716470812s
[20230114-125403  OUTPUT] Starting upgrade FE node. [feId = 0]
[20230114-125403    INFO] upgrade FE node - backup FE lib. [host =
192.168.110.101, sourceDir = /opt/starrocks/fe/lib, targetDir =
/opt/starrocks/fe/lib.bak-20230114125403]
[20230114-125415    INFO] upgrade FE node - upload new FE lib. [host =
192.168.110.101, sourceDir = /root/.stargo/download/StarRocks-2.4.2/fe/lib,
targetDir = /opt/starrocks/fe/lib]
[20230114-125415    INFO] Waiting for stoping FE node [FeHost = 192.168.110.101]
[20230114-125417    INFO] upgrade FE node - stop FE node. [host =
192.168.110.101, feDeployDir = /opt/starrocks/fe]
[20230114-125417    INFO] upgrade FE node - backup FE bin. [host =
192.168.110.101, sourceDir = /opt/starrocks/fe/bin, targetDir =
/opt/starrocks/fe/bin.bak-20230114125417]
[20230114-125417    INFO] upgrade FE node - upload new FE bin. [host =
192.168.110.101, sourceDir = /root/.stargo/download/StarRocks-2.4.2/fe/bin,
targetDir = /opt/starrocks/fe/bin]
[20230114-125418    INFO] modify start_fe.sh
[20230114-125418    INFO] upgrade FE node - start FE node. [host =
192.168.110.101, feDeployDir = /opt/starrocks/fe]
[20230114-125418   ERROR] Error in ping db [dbPath =
root:root@tcp(192.168.110.101:9030)/], error = dial tcp 192.168.110.101:9030:
connect: connection refused
[20230114-125429    INFO] upgrade FE node - start FE node. [host =
192.168.110.101, feDeployDir = /opt/starrocks/fe]
[20230114-125429  OUTPUT] The FE node upgrade successfully.
[20230114-125429  OUTPUT] Starting upgrade FE node. [feId = 1]
[20230114-125429    INFO] upgrade FE node - backup FE lib. [host =
192.168.110.102, sourceDir = /opt/starrocks/fe/lib, targetDir =
/opt/starrocks/fe/lib.bak-20230114125429]
[20230114-125506    INFO] upgrade FE node - upload new FE lib. [host =
192.168.110.102, sourceDir = /root/.stargo/download/StarRocks-2.4.2/fe/lib,
targetDir = /opt/starrocks/fe/lib]
[20230114-125506    INFO] Waiting for stoping FE node [FeHost = 192.168.110.102]
[20230114-125509    INFO] upgrade FE node - stop FE node. [host =
192.168.110.102, feDeployDir = /opt/starrocks/fe]
```

```
[20230114-125509    INFO] upgrade FE node - backup FE bin. [host =
192.168.110.102, sourceDir = /opt/starrocks/fe/bin, targetDir =
/opt/starrocks/fe/bin.bak-20230114125509]
[20230114-125509    INFO] upgrade FE node - upload new FE bin. [host =
192.168.110.102, sourceDir = /root/.stargo/download/StarRocks-2.4.2/fe/bin,
targetDir = /opt/starrocks/fe/bin]
[20230114-125509    INFO] modify start_fe.sh
[20230114-125510    INFO] upgrade FE node - start FE node. [host =
192.168.110.102, feDeployDir = /opt/starrocks/fe]
[20230114-125521    INFO] upgrade FE node - start FE node. [host =
192.168.110.102, feDeployDir = /opt/starrocks/fe]
[20230114-125522  OUTPUT] The FE node upgrade successfully.
[20230114-125522  OUTPUT] Starting upgrade FE node. [feId = 2]
[20230114-125522    INFO] upgrade FE node - backup FE lib. [host =
192.168.110.103, sourceDir = /opt/starrocks/fe/lib, targetDir =
/opt/starrocks/fe/lib.bak-20230114125522]
[20230114-125559    INFO] upgrade FE node - upload new FE lib. [host =
192.168.110.103, sourceDir = /root/.stargo/download/StarRocks-2.4.2/fe/lib,
targetDir = /opt/starrocks/fe/lib]
[20230114-125559    INFO] Waiting for stoping FE node [FeHost = 192.168.110.103]
[20230114-125602    INFO] upgrade FE node - stop FE node. [host =
192.168.110.103, feDeployDir = /opt/starrocks/fe]
[20230114-125602    INFO] upgrade FE node - backup FE bin. [host =
192.168.110.103, sourceDir = /opt/starrocks/fe/bin, targetDir =
/opt/starrocks/fe/bin.bak-20230114125602]
[20230114-125602    INFO] upgrade FE node - upload new FE bin. [host =
192.168.110.103, sourceDir = /root/.stargo/download/StarRocks-2.4.2/fe/bin,
targetDir = /opt/starrocks/fe/bin]
[20230114-125602    INFO] modify start_fe.sh
[20230114-125603    INFO] upgrade FE node - start FE node. [host =
192.168.110.103, feDeployDir = /opt/starrocks/fe]
[20230114-125614    INFO] upgrade FE node - start FE node. [host =
192.168.110.103, feDeployDir = /opt/starrocks/fe]
[20230114-125614  OUTPUT] The FE node upgrade successfully.
UpgradeFeCluster time cost = 2m10.938102144s
[20230114-125614  OUTPUT] Starting upgrade Broker node. [brokerId = 0]
[20230114-125614    INFO] upgrade Broker node - backup Broker lib. [host =
192.168.110.101, sourceDir = /opt/starrocks/apache_hdfs_broker/lib, targetDir =
/opt/starrocks/apache_hdfs_broker/lib.bak-20230114125614]
[20230114-125622    INFO] upgrade Broker node - upload new Broker lib. [host =
192.168.110.101, sourceDir = /root/.stargo/download/StarRocks-
2.4.2/apache_hdfs_broker/lib, targetDir = /opt/starrocks/apache_hdfs_broker/lib]
[20230114-125622    INFO] Waiting for stoping Broker node [BrokerHost =
192.168.110.101]
[20230114-125622    INFO] upgrade Broker node - stop Broker node. [host =
192.168.110.101, brokerDeployDir = /opt/starrocks/apache_hdfs_broker]
[20230114-125623    INFO] upgrade Broker node - backup Broker bin. [host =
192.168.110.101, sourceDir = /opt/starrocks/apache_hdfs_broker/bin, targetDir =
/opt/starrocks/apache_hdfs_broker/bin.bak-20230114125622]
[20230114-125623    INFO] upgrade Broker node - upload new Broker bin. [host =
192.168.110.101, sourceDir = /root/.stargo/download/StarRocks-
2.4.2/apache_hdfs_broker/bin, targetDir = /opt/starrocks/apache_hdfs_broker/bin]
[20230114-125623    INFO] modify start_broker.sh
[20230114-125623    INFO] upgrade Broker node - start Broker node. [host =
192.168.110.101, brokerDeployDir = /opt/starrocks/apache_hdfs_broker]
```

```
[20230114-125623  OUTPUT] The Broker node upgrade successfully.
[20230114-125623  OUTPUT] Starting upgrade Broker node. [brokerId = 1]
[20230114-125624    INFO] upgrade Broker node - backup Broker lib. [host =
192.168.110.102, sourceDir = /opt/starrocks/apache_hdfs_broker/lib, targetDir =
/opt/starrocks/apache_hdfs_broker/lib.bak-20230114125623]
[20230114-125646    INFO] upgrade Broker node - upload new Broker lib. [host =
192.168.110.102, sourceDir = /root/.stargo/download/StarRocks-
2.4.2/apache_hdfs_broker/lib, targetDir = /opt/starrocks/apache_hdfs_broker/lib]
[20230114-125646    INFO] Waiting for stoping Broker node [BrokerHost =
192.168.110.102]
[20230114-125646    INFO] upgrade Broker node - stop Broker node. [host =
192.168.110.102, brokerDeployDir = /opt/starrocks/apache_hdfs_broker]
[20230114-125646    INFO] upgrade Broker node - backup Broker bin. [host =
192.168.110.102, sourceDir = /opt/starrocks/apache_hdfs_broker/bin, targetDir =
/opt/starrocks/apache_hdfs_broker/bin.bak-20230114125646]
[20230114-125647    INFO] upgrade Broker node - upload new Broker bin. [host =
192.168.110.102, sourceDir = /root/.stargo/download/StarRocks-
2.4.2/apache_hdfs_broker/bin, targetDir = /opt/starrocks/apache_hdfs_broker/bin]
[20230114-125647    INFO] modify start_broker.sh
[20230114-125647    INFO] upgrade Broker node - start Broker node. [host =
192.168.110.102, brokerDeployDir = /opt/starrocks/apache_hdfs_broker]
[20230114-125647  OUTPUT] The Broker node upgrade successfully.
[20230114-125647  OUTPUT] Starting upgrade Broker node. [brokerId = 2]
[20230114-125647    INFO] upgrade Broker node - backup Broker lib. [host =
192.168.110.103, sourceDir = /opt/starrocks/apache_hdfs_broker/lib, targetDir =
/opt/starrocks/apache_hdfs_broker/lib.bak-20230114125647]
[20230114-125709    INFO] upgrade Broker node - upload new Broker lib. [host =
192.168.110.103, sourceDir = /root/.stargo/download/StarRocks-
2.4.2/apache_hdfs_broker/lib, targetDir = /opt/starrocks/apache_hdfs_broker/lib]
[20230114-125709    INFO] Waiting for stoping Broker node [BrokerHost =
192.168.110.103]
[20230114-125709    INFO] upgrade Broker node - stop Broker node. [host =
192.168.110.103, brokerDeployDir = /opt/starrocks/apache_hdfs_broker]
[20230114-125710    INFO] upgrade Broker node - backup Broker bin. [host =
192.168.110.103, sourceDir = /opt/starrocks/apache_hdfs_broker/bin, targetDir =
/opt/starrocks/apache_hdfs_broker/bin.bak-20230114125709]
[20230114-125710    INFO] upgrade Broker node - upload new Broker bin. [host =
192.168.110.103, sourceDir = /root/.stargo/download/StarRocks-
2.4.2/apache_hdfs_broker/bin, targetDir = /opt/starrocks/apache_hdfs_broker/bin]
[20230114-125710    INFO] modify start_broker.sh
[20230114-125710    INFO] upgrade Broker node - start Broker node. [host =
192.168.110.103, brokerDeployDir = /opt/starrocks/apache_hdfs_broker]
[20230114-125710  OUTPUT] The Broker node upgrade successfully.
UpgradeBrokerCluster time cost = 56.429611937s
WriteBackMeta time cost = 399.034µs
```

注意：每次升级后，原程序的 bin 目录和 lib 目录都会在程序部署目录中备份，在确认不需要后，我们可以手动进行清理，避免不必要的磁盘空间占用。

3.4.2 集群降级

对集群进行将级操作时，我们仍是仅需要修改 repo.yaml，例如当前我们再将 StarRocks 从 2.4.2 降级至 2.3.7，修改 repo.yaml：

```
#该配置文件配置部署或升级/降级需用的StarRocks二进制包路径及包名：
sr_path: /opt/software/
sr_name: StarRocks-2.3.7.tar.gz
#sr_name: StarRocks-2.4.1.tar.gz
```

备注：

1、在降级前我们仍需要先获取 StarRocks 对应版本的二进制包，当前 2.3.7 版本的部署包已存在于 /opt/software 目录中。

2、我们需将 StarGo 的"降级操作"与常规认为的"回滚操作"区分开。在使用 StarGo 进行降级时，即便我们是需要降级到集群升级前的版本，StarGo 也不会使用之前备份的 bin 和 lib 目录，而是会再次将当前版本的 bin 和 lib 备份，然后使用指定的低版本安装包重新分发程序至安装目录，最后再按照降级逻辑的处理顺序逐个实例的切换版本。

这里我们执行降级命令：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster downgrade sr-c1 v2.3.7
```

降级的完整逻辑见示例日志：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster downgrade sr-c1 v2.3.7
[20230114-125828  OUTPUT] Downgrade cluster. [ClusterName = sr-c1, TargetVersion
= v2.3.7]
InitConf time cost = 649.425µs
SetGlobalVar time cost = 187ns
[20230114-125828  OUTPUT] Downgrade StarRocks Cluster sr-c1, from version v2.4.2
to version v2.3.7
[20230114-125828    INFO] execCMD: cp /opt/software/StarRocks-2.3.7.tar.gz
/root/.stargo/download/StarRocks-2.3.7.tar.gz
[20230114-125830    INFO] execCMD: cp jdk8u352-b08.tar.gz
/root/.stargo/download/jdk8u352-b08.tar.gz
[20230114-125830  OUTPUT] Copy StarRocks package to compress dir ...
[20230114-125830  OUTPUT] Decompress StarRocks package & jdk ...
[20230114-125846    INFO] The tar file /root/.stargo/download/StarRocks-
2.3.7.tar.gz has been decompressed under /root/.stargo/download/
[20230114-125848    INFO] The tar file /root/.stargo/download/jdk8u352-b08.tar.gz
has been decompressed under /root/.stargo/download/
PrepareSRPkg time cost = 19.40643617s
[20230114-125848  OUTPUT] Starting downgrade FE node. [feId = 0]
[20230114-125848    INFO] downgrade FE node - backup FE lib. [host =
192.168.110.101, sourceDir = /opt/starrocks/fe/lib, targetDir =
/opt/starrocks/fe/lib.bak-20230114125848]
[20230114-125857    INFO] downgrade FE node - download new FE lib. [host =
192.168.110.101, sourceDir = /root/.stargo/download/StarRocks-2.3.7/fe/lib,
targetDir = /opt/starrocks/fe/lib]
[20230114-125857    INFO] Waiting for stoping FE node [FeHost = 192.168.110.101]
[20230114-125859    INFO] downgrade FE node - stop FE node. [host =
192.168.110.101, feDeployDir = /opt/starrocks/fe]
[20230114-125859    INFO] downgrade FE node - backup FE bin. [host =
192.168.110.101, sourceDir = /opt/starrocks/fe/bin, targetDir =
/opt/starrocks/fe/bin.bak-20230114125859]
```

```
[20230114-125859    INFO] downgrade FE node - upload new FE bin. [host =
192.168.110.101, sourceDir = /root/.stargo/download/StarRocks-2.3.7/fe/bin,
targetDir = /opt/starrocks/fe/bin]
[20230114-125859    INFO] modify start_fe.sh
[20230114-125900    INFO] downgrade FE node - start FE node. [host =
192.168.110.101, feDeployDir = /opt/starrocks/fe]
[20230114-125910  OUTPUT] The FE node downgrade successfully.
[20230114-125910  OUTPUT] Starting downgrade FE node. [feId = 1]
[20230114-125911    INFO] downgrade FE node - backup FE lib. [host =
192.168.110.102, sourceDir = /opt/starrocks/fe/lib, targetDir =
/opt/starrocks/fe/lib.bak-20230114125910]
[20230114-125934    INFO] downgrade FE node - download new FE lib. [host =
192.168.110.102, sourceDir = /root/.stargo/download/StarRocks-2.3.7/fe/lib,
targetDir = /opt/starrocks/fe/lib]
[20230114-125934    INFO] Waiting for stoping FE node [FeHost = 192.168.110.102]
[20230114-125937    INFO] downgrade FE node - stop FE node. [host =
192.168.110.102, feDeployDir = /opt/starrocks/fe]
[20230114-125937    INFO] downgrade FE node - backup FE bin. [host =
192.168.110.102, sourceDir = /opt/starrocks/fe/bin, targetDir =
/opt/starrocks/fe/bin.bak-20230114125937]
[20230114-125937    INFO] downgrade FE node - upload new FE bin. [host =
192.168.110.102, sourceDir = /root/.stargo/download/StarRocks-2.3.7/fe/bin,
targetDir = /opt/starrocks/fe/bin]
[20230114-125937    INFO] modify start_fe.sh
[20230114-125938    INFO] downgrade FE node - start FE node. [host =
192.168.110.102, feDeployDir = /opt/starrocks/fe]
[20230114-125938  OUTPUT] The FE node downgrade successfully.
[20230114-125938  OUTPUT] Starting downgrade FE node. [feId = 2]
[20230114-125938    INFO] downgrade FE node - backup FE lib. [host =
192.168.110.103, sourceDir = /opt/starrocks/fe/lib, targetDir =
/opt/starrocks/fe/lib.bak-20230114125938]
[20230114-130002    INFO] downgrade FE node - download new FE lib. [host =
192.168.110.103, sourceDir = /root/.stargo/download/StarRocks-2.3.7/fe/lib,
targetDir = /opt/starrocks/fe/lib]
[20230114-130002    INFO] Waiting for stoping FE node [FeHost = 192.168.110.103]
[20230114-130004    INFO] downgrade FE node - stop FE node. [host =
192.168.110.103, feDeployDir = /opt/starrocks/fe]
[20230114-130004    INFO] downgrade FE node - backup FE bin. [host =
192.168.110.103, sourceDir = /opt/starrocks/fe/bin, targetDir =
/opt/starrocks/fe/bin.bak-20230114130004]
[20230114-130005    INFO] downgrade FE node - upload new FE bin. [host =
192.168.110.103, sourceDir = /root/.stargo/download/StarRocks-2.3.7/fe/bin,
targetDir = /opt/starrocks/fe/bin]
[20230114-130005    INFO] modify start_fe.sh
[20230114-130005    INFO] downgrade FE node - start FE node. [host =
192.168.110.103, feDeployDir = /opt/starrocks/fe]
[20230114-130005  OUTPUT] The FE node downgrade successfully.
DowngradeFeCluster time cost = 1m17.639112525s
[20230114-130005  OUTPUT] Starting downgrade BE node. [beId = 0]
[20230114-130005    INFO] downgrade BE node - backup BE lib. [host =
192.168.110.101, sourceDir = /opt/starrocks/be/lib, targetDir =
/opt/starrocks/be/lib.bak-20230114130005]
[20230114-130032    INFO] downgrade BE node - upload new BE lib. [host =
192.168.110.101, sourceDir = /root/.stargo/download//StarRocks-2.3.7/be/lib,
targetDir = /opt/starrocks/be/lib]
```

```
[20230114-130032    INFO] Waiting for stoping BE node [BeHost = 192.168.110.101]
[20230114-130033    INFO] downgrade BE node - stop BE node. [host =
192.168.110.101, beDeployDir = /opt/starrocks/be]
[20230114-130034    INFO] downgrade BE node - backup BE bin. [host =
192.168.110.101, sourceDir = /opt/starrocks/be/bin, targetDir =
/opt/starrocks/be/bin.bak-20230114130033]
[20230114-130034    INFO] downgrade BE node - upload new BE bin. [host =
192.168.110.101, sourceDir = /root/.stargo/download/StarRocks-2.3.7/be/bin,
targetDir = /opt/starrocks/be/bin]
[20230114-130034    INFO] modify start_be.sh
[20230114-130035    INFO] downgrade BE node - start BE node. [host =
192.168.110.101, beDeployDir = /opt/starrocks/be]
[20230114-130045  OUTPUT] The BE node downgrade successfully.
[20230114-130045  OUTPUT] Starting downgrade BE node. [beId = 1]
[20230114-130045    INFO] downgrade BE node - backup BE lib. [host =
192.168.110.102, sourceDir = /opt/starrocks/be/lib, targetDir =
/opt/starrocks/be/lib.bak-20230114130045]
[20230114-130149    INFO] downgrade BE node - upload new BE lib. [host =
192.168.110.102, sourceDir = /root/.stargo/download//StarRocks-2.3.7/be/lib,
targetDir = /opt/starrocks/be/lib]
[20230114-130149    INFO] Waiting for stoping BE node [BeHost = 192.168.110.102]
[20230114-130150    INFO] downgrade BE node - stop BE node. [host =
192.168.110.102, beDeployDir = /opt/starrocks/be]
[20230114-130151    INFO] downgrade BE node - backup BE bin. [host =
192.168.110.102, sourceDir = /opt/starrocks/be/bin, targetDir =
/opt/starrocks/be/bin.bak-20230114130150]
[20230114-130151    INFO] downgrade BE node - upload new BE bin. [host =
192.168.110.102, sourceDir = /root/.stargo/download/StarRocks-2.3.7/be/bin,
targetDir = /opt/starrocks/be/bin]
[20230114-130151    INFO] modify start_be.sh
[20230114-130152    INFO] downgrade BE node - start BE node. [host =
192.168.110.102, beDeployDir = /opt/starrocks/be]
[20230114-130152  OUTPUT] The BE node downgrade successfully.
[20230114-130152  OUTPUT] Starting downgrade BE node. [beId = 2]
[20230114-130152    INFO] downgrade BE node - backup BE lib. [host =
192.168.110.103, sourceDir = /opt/starrocks/be/lib, targetDir =
/opt/starrocks/be/lib.bak-20230114130152]
[20230114-130255    INFO] downgrade BE node - upload new BE lib. [host =
192.168.110.103, sourceDir = /root/.stargo/download//StarRocks-2.3.7/be/lib,
targetDir = /opt/starrocks/be/lib]
[20230114-130255    INFO] Waiting for stoping BE node [BeHost = 192.168.110.103]
[20230114-130257    INFO] downgrade BE node - stop BE node. [host =
192.168.110.103, beDeployDir = /opt/starrocks/be]
[20230114-130257    INFO] downgrade BE node - backup BE bin. [host =
192.168.110.103, sourceDir = /opt/starrocks/be/bin, targetDir =
/opt/starrocks/be/bin.bak-20230114130257]
[20230114-130258    INFO] downgrade BE node - upload new BE bin. [host =
192.168.110.103, sourceDir = /root/.stargo/download/StarRocks-2.3.7/be/bin,
targetDir = /opt/starrocks/be/bin]
[20230114-130258    INFO] modify start_be.sh
[20230114-130259    INFO] downgrade BE node - start BE node. [host =
192.168.110.103, beDeployDir = /opt/starrocks/be]
[20230114-130259  OUTPUT] The BE node downgrade successfully.
DowngradeBeCluster time cost = 2m53.342750671s
[20230114-130259  OUTPUT] Starting downgrade Broker node. [brokerId = 0]
```

```
[20230114-130259    INFO] downgrade Broker node - backup Broker lib. [host =
192.168.110.101, sourceDir = /opt/starrocks/apache_hdfs_broker/lib, targetDir =
/opt/starrocks/apache_hdfs_broker/lib.bak-20230114130259]
[20230114-130305    INFO] downgrade Broker node - upload new Broker lib. [host =
192.168.110.101, sourceDir = /root/.stargo/download//StarRocks-
2.3.7/apache_hdfs_broker/lib, targetDir = /opt/starrocks/apache_hdfs_broker/lib]
[20230114-130305    INFO] Waiting for stoping Broker node [BrokerHost =
192.168.110.101]
[20230114-130306    INFO] downgrade Broker node - stop Broker node. [host =
192.168.110.101, brokerDeployDir = /opt/starrocks/apache_hdfs_broker]
[20230114-130306    INFO] downgrade Broker node - backup Broker bin. [host =
192.168.110.101, sourceDir = /opt/starrocks/apache_hdfs_broker/bin, targetDir =
/opt/starrocks/apache_hdfs_broker/bin.bak-20230114130306]
[20230114-130306    INFO] downgrade Broker node - upload new Broker bin. [host =
192.168.110.101, sourceDir = /root/.stargo/download/StarRocks-
2.3.7/apache_hdfs_broker/bin, targetDir = /opt/starrocks/apache_hdfs_broker/bin]
[20230114-130306    INFO] modify start_broker.sh
[20230114-130306    INFO] downgrade Broker node - start Broker node. [host =
192.168.110.101, brokerDeployDir = /opt/starrocks/apache_hdfs_broker]
[20230114-130316  OUTPUT] The Broker node downgrade successfully.
[20230114-130316  OUTPUT] Starting downgrade Broker node. [brokerId = 1]
[20230114-130317    INFO] downgrade Broker node - backup Broker lib. [host =
192.168.110.102, sourceDir = /opt/starrocks/apache_hdfs_broker/lib, targetDir =
/opt/starrocks/apache_hdfs_broker/lib.bak-20230114130316]
[20230114-130339    INFO] downgrade Broker node - upload new Broker lib. [host =
192.168.110.102, sourceDir = /root/.stargo/download//StarRocks-
2.3.7/apache_hdfs_broker/lib, targetDir = /opt/starrocks/apache_hdfs_broker/lib]
[20230114-130339    INFO] Waiting for stoping Broker node [BrokerHost =
192.168.110.102]
[20230114-130339    INFO] downgrade Broker node - stop Broker node. [host =
192.168.110.102, brokerDeployDir = /opt/starrocks/apache_hdfs_broker]
[20230114-130339    INFO] downgrade Broker node - backup Broker bin. [host =
192.168.110.102, sourceDir = /opt/starrocks/apache_hdfs_broker/bin, targetDir =
/opt/starrocks/apache_hdfs_broker/bin.bak-20230114130339]
[20230114-130340    INFO] downgrade Broker node - upload new Broker bin. [host =
192.168.110.102, sourceDir = /root/.stargo/download/StarRocks-
2.3.7/apache_hdfs_broker/bin, targetDir = /opt/starrocks/apache_hdfs_broker/bin]
[20230114-130340    INFO] modify start_broker.sh
[20230114-130340    INFO] downgrade Broker node - start Broker node. [host =
192.168.110.102, brokerDeployDir = /opt/starrocks/apache_hdfs_broker]
[20230114-130340  OUTPUT] The Broker node downgrade successfully.
[20230114-130340  OUTPUT] Starting downgrade Broker node. [brokerId = 2]
[20230114-130340    INFO] downgrade Broker node - backup Broker lib. [host =
192.168.110.103, sourceDir = /opt/starrocks/apache_hdfs_broker/lib, targetDir =
/opt/starrocks/apache_hdfs_broker/lib.bak-20230114130340]
[20230114-130402    INFO] downgrade Broker node - upload new Broker lib. [host =
192.168.110.103, sourceDir = /root/.stargo/download//StarRocks-
2.3.7/apache_hdfs_broker/lib, targetDir = /opt/starrocks/apache_hdfs_broker/lib]
[20230114-130402    INFO] Waiting for stoping Broker node [BrokerHost =
192.168.110.103]
[20230114-130402    INFO] downgrade Broker node - stop Broker node. [host =
192.168.110.103, brokerDeployDir = /opt/starrocks/apache_hdfs_broker]
[20230114-130403    INFO] downgrade Broker node - backup Broker bin. [host =
192.168.110.103, sourceDir = /opt/starrocks/apache_hdfs_broker/bin, targetDir =
/opt/starrocks/apache_hdfs_broker/bin.bak-20230114130402]
```

```
[20230114-130403    INFO] downgrade Broker node - upload new Broker bin. [host =
192.168.110.103, sourceDir = /root/.stargo/download/StarRocks-
2.3.7/apache_hdfs_broker/bin, targetDir = /opt/starrocks/apache_hdfs_broker/bin]
[20230114-130403    INFO] modify start_broker.sh
[20230114-130403    INFO] downgrade Broker node - start Broker node. [host =
192.168.110.103, brokerDeployDir = /opt/starrocks/apache_hdfs_broker]
[20230114-130403  OUTPUT] The Broker node downgrade successfully.
DowngradeBrokerCluster time cost = 1m4.75327326s
WriteBackMeta time cost = 422.558µs
```

说明：频繁的升降级将会在部署目录产生较多的程序备份，也会在 .stargo/download 目录产生多个版本的安装包及解压文件，当前的逻辑下，我们只能手动清理，后续版本考虑优化。部分目录展示如下：

```
##程序目录目录
[root@node01 be]# pwd
/opt/starrocks/be
[root@node01 be]# ll
total 0
drwxr-xr-x 2 root root 157 Jan 14 21:21 bin
drwxr-xr-x 2 root root 143 Jan 14 21:05 bin.bak-20230114210546
drwxr-xr-x 2 root root 143 Jan 14 21:21 bin.bak-20230114212106
drwxr-xr-x 2 root root  81 Jan 14 20:43 conf
drwxr-xr-x 8 root root 175 Jan 14 20:43 jdk
drwxr-xr-x 8 root root 222 Jan 14 21:21 lib
drwxr-xr-x 8 root root 222 Jan 14 20:48 lib.bak-20230114210515
drwxr-xr-x 8 root root 222 Jan 14 21:05 lib.bak-20230114212037
drwxr-xr-x 2 root root  20 Jan 14 20:48 log
drwxr-xr-x 3 root root 244 Jan 14 20:43 www


##StarGo工作目录
[root@node01 download]# pwd
/root/.stargo/download
[root@node01 download]# ll -h
total 3.5G
drwxr-xr-x 8 root root  175 Jan 14 15:02 jdk8u352-b08
-rw-r--r-- 1 root root  52M Jan 14 21:18 jdk8u352-b08.tar.gz
drwxr-xr-x 6 root root  100 Jan 14 15:02 StarRocks-2.3.7
-rw-r--r-- 1 root root 1.6G Jan 14 21:18 StarRocks-2.3.7.tar.gz
drwxr-xr-x 6 root root  100 Jan 14 20:18 StarRocks-2.4.2
-rw-r--r-- 1 root root 1.9G Jan 14 21:04 StarRocks-2.4.2.tar.gz
```

3.5、集群扩容与缩容

3.5.1 集群扩容

stargo 中的"集群扩容"是指集群的"横向扩容"，即为原有的集群增加 FE、BE 或 Broker 节点。集群单机增配的"纵向"扩容，StarGo 不会考虑。

集群扩容的语法为：

```
./stargo cluster scale-out <cluster_name> <topology_file>
## cluster_name：需扩容集群的集群名，例如这里的'sr-c1'
## topology_file：包含扩容节点对应信息的yaml拓扑文件，文件名称随意，stargo通过该文件获取扩容节点的ip、端口及目录信息
```

这里我们使用 104 和 105 两台服务器演示为集群扩容一个 FE 节点、两个 BE 节点及一个 Broker 节点，首先编写扩容文件 sr-out.yaml：

```yaml
fe_servers:
  - host: 192.168.110.104
    ssh_port: 22
    http_port: 8030
    rpc_port: 9020
    query_port: 9030
    edit_log_port: 9010
    deploy_dir: /opt/starrocks/fe
    meta_dir: /data1/starrocks/fe/meta
    log_dir: /data1/starrocks/fe/log
    priority_networks: 192.168.110.0/24
    role: OBSERVER
be_servers:
  - host: 192.168.110.104
    ssh_port: 22
    be_port: 9060
    webserver_port: 8040
    heartbeat_service_port: 9050
    brpc_port: 8060
    deploy_dir : /opt/starrocks/be
    storage_dir: /data2/starrocks/be/storage
    log_dir: /data2/starrocks/be/log
    priority_networks: 192.168.110.0/24
    config:
      enable_new_load_on_memory_limit_exceeded: true
  - host: 192.168.110.105
    ssh_port: 22
    be_port: 9060
    webserver_port: 8040
    heartbeat_service_port: 9050
    brpc_port: 8060
    deploy_dir : /opt/starrocks/be
    storage_dir: /data2/starrocks/be/storage
    log_dir: /data2/starrocks/be/log
    priority_networks: 192.168.110.0/24
    config:
      enable_new_load_on_memory_limit_exceeded: true
broker_servers:
  - host: 192.168.110.104
    ssh_port: 22
    broker_port: 8000
    deploy_dir : /opt/starrocks/apache_hdfs_broker
    log_dir: /data2/starrocks/apache_hdfs_broker/log
```

说明：扩容的拓扑文件中不需要编写 ssh 的相关信息，扩容时会沿用原集群的信息。

在执行扩容命令前，我们仍需在目标服务器上手动创建对应的目录，并配置 stargo 所在节点对目标节点的免密：

创建目录：

```
[root@node04 ~]# mkdir /opt/starrocks
[root@node04 ~]# mkdir -p /data1/starrocks
[root@node04 ~]# mkdir -p /data2/starrocks
[root@node05 ~]# mkdir /opt/starrocks
[root@node05 ~]# mkdir -p /data1/starrocks
[root@node05 ~]# mkdir -p /data2/starrocks
```

配置免密：

```
[root@node01 ~]# ssh-copy-id root@192.168.110.104
[root@node01 ~]# ssh-copy-id root@192.168.110.105
```

根据我们配置的拓扑文件，执行扩容命令：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster scale-out sr-c1 sr-out.yaml
```

扩容的执行细节见日志：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster scale-out sr-c1 sr-out.yaml
[20230114-130544  OUTPUT] Scale out cluster. [ClusterName = sr-c1]
[20230114-130549  OUTPUT] PRE CHECK DEPLOY ENV:
PreCheck FE:
server id             ssh auth  meta dir     deploy dir  http port    rpc port
     query port  edit log port  openfiles count
--------------------  --------  -----------  ----------  -----------  ----------
----  ----------  -------------  ---------------
192.168.110.104:9010  PASS      PASS         PASS        PASS         PASS
     PASS        PASS           PASS

PreCheck BE:
server id             ssh auth  storage dir  deploy dir  webSer port  heartbeat
port  brpc port   be port        openfiles count
--------------------  --------  -----------  ----------  -----------  ----------
----  ----------  -------------  ---------------
192.168.110.104:9060  PASS      PASS         PASS        PASS         PASS
     PASS        PASS           PASS
192.168.110.105:9060  PASS      PASS         PASS        PASS         PASS
     PASS        PASS           PASS

PreCheck Broker:
server id             ssh auth  deploy dir   broker port  open files count
--------------------  --------  -----------  -----------  ----------------
192.168.110.104:8000  PASS      PASS         PASS         PASS

[20230114-130549  OUTPUT] PreCheck successfully. RESPECT
[20230114-130549  OUTPUT] Create the deploy folder ...
[20230114-130550    INFO] execCMD: cp /opt/software/StarRocks-2.3.7.tar.gz
/root/.stargo/download/StarRocks-2.3.7.tar.gz
```

```
[20230114-130551    INFO] execCMD: cp jdk8u352-b08.tar.gz
/root/.stargo/download/jdk8u352-b08.tar.gz
[20230114-130551  OUTPUT] Copy StarRocks package to compress dir ...
[20230114-130551  OUTPUT] Decompress StarRocks package & jdk ...
[20230114-130608    INFO] The tar file /root/.stargo/download/StarRocks-
2.3.7.tar.gz has been decompressed under /root/.stargo/download/
[20230114-130609    INFO] The tar file /root/.stargo/download/jdk8u352-b08.tar.gz
has been decompressed under /root/.stargo/download/
[20230114-130609  OUTPUT] Distribute FE Dir ...
[20230114-130633    INFO] Upload dir FeSourceDir =
[/root/.stargo/download/StarRocks-2.3.7/fe] to feTargetDir = [/opt/starrocks/fe]
on FeHost = [192.168.110.104]
[20230114-130643    INFO] Upload dir JDKSourceDir =
[/root/.stargo/download/jdk8u352-b08] to JDKTargetDir = [/opt/starrocks/fe/jdk]
on FeHost = [192.168.110.104]
[20230114-130643    INFO] Modify JAVA_HOME: host = [192.168.110.104], filePath =
[/opt/starrocks/fe/bin/start_fe.sh]
[20230114-130643  OUTPUT] Distribute BE Dir ...
[20230114-130749    INFO] Upload dir BeSourceDir =
[/root/.stargo/download/StarRocks-2.3.7/be] to BeTargetDir = [/opt/starrocks/be]
on BeHost = [192.168.110.104]
[20230114-130759    INFO] Upload dir JDKSourceDir =
[/root/.stargo/download/jdk8u352-b08] to JDKTargetDir = [/opt/starrocks/be/jdk]
on BeHost = [192.168.110.104]
[20230114-130759    INFO] Modify JAVA_HOME: host = [192.168.110.104], filePath =
[/opt/starrocks/be/bin/start_be.sh]
[20230114-130903    INFO] Upload dir BeSourceDir =
[/root/.stargo/download/StarRocks-2.3.7/be] to BeTargetDir = [/opt/starrocks/be]
on BeHost = [192.168.110.105]
[20230114-130912    INFO] Upload dir JDKSourceDir =
[/root/.stargo/download/jdk8u352-b08] to JDKTargetDir = [/opt/starrocks/be/jdk]
on BeHost = [192.168.110.105]
[20230114-130912    INFO] Modify JAVA_HOME: host = [192.168.110.105], filePath =
[/opt/starrocks/be/bin/start_be.sh]
[20230114-130912  OUTPUT] Distribute Broker Dir ...
[20230114-130933    INFO] Upload dir BrokerSourceDir =
[/root/.stargo/download/StarRocks-2.3.7/apache_hdfs_broker] to brokerTargetDir =
[/opt/starrocks/apache_hdfs_broker] on BrokerHost = [192.168.110.104]
[20230114-130943    INFO] Upload dir JDKSourceDir =
[/root/.stargo/download/jdk8u352-b08] to JDKTargetDir =
[/opt/starrocks/apache_hdfs_broker/jdk] on BrokerHost = [192.168.110.104]
[20230114-130943    INFO] Modify JAVA_HOME: host = [192.168.110.104], filePath =
[/opt/starrocks/apache_hdfs_broker/bin/start_broker.sh]
[20230114-130943  OUTPUT] Modify configuration for FE nodes & BE nodes & Broker
nodes ...
############################################ SCALE OUT FE CLUSTER
############################################
############################################ SCALE OUT FE CLUSTER
############################################
[20230114-130945    INFO] Starting OBSERVER FE node [host = 192.168.110.104,
editLogPort = 9010]
[20230114-131005    INFO] The FE node start succefully [host = 192.168.110.104,
queryPort = 9030]
[20230114-131005    INFO] List all FE status:
```

```
                                        feHost = 192.168.110.104     feQueryPort
= 9030     feStatus = true

############################################ SCALE OUT BE CLUSTER
############################################
############################################ SCALE OUT BE CLUSTER
############################################
[20230114-131006    INFO] Starting BE node [BeHost = 192.168.110.104
HeartbeatServicePort = 9050]
[20230114-131027    INFO] The BE node start succefully [host = 192.168.110.104,
heartbeatServicePort = 9050]
[20230114-131027    INFO] Starting BE node [BeHost = 192.168.110.105
HeartbeatServicePort = 9050]
[20230114-131048    INFO] The BE node start succefully [host = 192.168.110.105,
heartbeatServicePort = 9050]
[20230114-131048  OUTPUT] List all BE status:
                                        beHost = 192.168.110.104
beHeartbeatServicePort = 9050  beStatus = true
                                        beHost = 192.168.110.105
beHeartbeatServicePort = 9050  beStatus = true

########################################### SCALE OUT BROKER CLUSTER
###########################################
########################################### SCALE OUT BROKER CLUSTER
###########################################
[20230114-131048    INFO] Starting Broker node [BrokerHost = 192.168.110.104
BrokerPort = 8000]
[20230114-131109    INFO] The broker node start succefully [host =
192.168.110.104, brokerPort = 8000]
[20230114-131109  OUTPUT] List all Broker status:
                                        BrokerHost = 192.168.110.104
brokerPort = 8000  brokerStatus = true
```

3.5.2 集群缩容

stargo 中的集群缩容仍是指横向缩容，即将集群中的某个节点在集群中删除。对于 FE 和 Broker 实例，stargo 会直接执行 Drop 命令，该命令为同步操作，执行后对应节点即完成缩容。而对于 BE 实例，基于数据安全考虑，stargo 会执行 DECOMMISSION 命令，该命令为异步操作，需等待目标 BE 将自己的数据迁移至集群其他节点后才会脱离集群完成缩容，所以实际的缩容时间会随该节点数据量的增大而增加。

说明：

1、FE Leader节点不允许缩容，可以先停止待集群重新选主后再执行缩容。

2、BE 是否被执行缩容可通过 `show backends;` 命令返回值中的 `SystemDecommissioned` 是否为 `true` 来判断。在 BE 开始缩容后，其上的 tablet 会自动迁移至集群其他节点，故 BE 的缩容进度可通过返回值中的 `TabletNum` 剩余数来粗估。

3、因 DECOMMISSION 为异步操作，stargo 仅会在执行缩容命令后给出提示，并不会一直等待缩容完成。

4、当前版本不支持"取消缩容"的功能，后续版本将考虑支持。

集群缩容的语法为：

```
./stargo cluster scale-in <cluster_name> --node <nodeId>
## cluster_name：需缩容的集群名称
## nodeId：缩容节点的节点ID，即为通过display命令查到的ID字段值
```

我们先查看集群的节点 ID：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster display sr-c1
[20230114-131208  OUTPUT] Display cluster [clusterName = sr-c1]
clusterName = sr-c1
clusterVerison = v2.3.7
ID                      ROLE    HOST                PORT          STAT    DEPLOYDIR
           DATADIR
--------------------    ------  ---------------     ---------     -----   ---------
---------   ----------------------------------
192.168.110.101:9010    FE      192.168.110.101     9010/9030     UP
/opt/starrocks/fe    /data1/starrocks/fe/meta
192.168.110.102:9010    FE      192.168.110.102     9010/9030     UP/L
/opt/starrocks/fe    /data1/starrocks/fe/meta
192.168.110.103:9010    FE      192.168.110.103     9010/9030     UP
/opt/starrocks/fe    /data1/starrocks/fe/meta
192.168.110.104:9010    FE      192.168.110.104     9010/9030     UP
/opt/starrocks/fe    /data1/starrocks/fe/meta
192.168.110.101:9060    BE      192.168.110.101     9060/9050     UP
/opt/starrocks/be    /data2/starrocks/be/storage
192.168.110.102:9060    BE      192.168.110.102     9060/9050     UP
/opt/starrocks/be    /data2/starrocks/be/storage
192.168.110.103:9060    BE      192.168.110.103     9060/9050     UP
/opt/starrocks/be    /data2/starrocks/be/storage
192.168.110.104:9060    BE      192.168.110.104     9060/9050     UP
/opt/starrocks/be    /data2/starrocks/be/storage
192.168.110.105:9060    BE      192.168.110.105     9060/9050     UP
/opt/starrocks/be    /data2/starrocks/be/storage
192.168.110.101:8000    Broker  192.168.110.101     8000          UP
            /opt/starrocks/apache_hdfs_broker
192.168.110.102:8000    Broker  192.168.110.102     8000          UP
            /opt/starrocks/apache_hdfs_broker
192.168.110.103:8000    Broker  192.168.110.103     8000          UP
            /opt/starrocks/apache_hdfs_broker
192.168.110.104:8000    Broker  192.168.110.104     8000          UP
            /opt/starrocks/apache_hdfs_broker
```

根据节点 ID，我们进行 101 FE 的缩容：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster scale-in sr-c1 --node
192.168.110.101:9010
[20230114-131245  OUTPUT] Scale in cluster [clusterName = sr-c1, nodeId =
192.168.110.101:9010]
[20230114-131246  OUTPUT] Scale in FE node successfully. [clusterName = sr-c1,
nodeId = 192.168.110.101:9010]

#不允许缩容FE Leader节点，例如我们缩容当前的102节点，stargo会给出提示后结束任务：
[root@node01 stargo-v2.0.3]# ./stargo cluster scale-in sr-c1 --node
192.168.110.102:9010
[20230114-131253  OUTPUT] Scale in cluster [clusterName = sr-c1, nodeId =
192.168.110.102:9010]
[20230114-131253   ERROR] Error in scale in FE node. [clusterName = sr-c1,
nodeId = 192.168.110.102:9010, error = Error 1064: can not drop current master
node.]
```

再演示对 101 节点的 BE 进行缩容操作，日志提示如下：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster scale-in sr-c1 --node
192.168.110.101:9060
[20230114-131353  OUTPUT] Scale in cluster [clusterName = sr-c1, nodeId =
192.168.110.101:9060]
[20230114-131353  OUTPUT] Scale in BE node successfully. [clusterName = sr-c1,
nodeId = 192.168.110.101:9060]
[20230114-131353  OUTPUT] 注意：BE的缩容为异步操作，当前提示仅代表缩容命令执行完成。缩容命
令执行后，后台会先将目标节点的tablet迁移至集群其他BE节点，在迁移完成后将该BE将自动脱离集群。
Tablet迁移进度可通过"show backends;"语句查看TabletNum进行判断。若目标节点的tablet仅剩数
十个且TabletNum长时间不减少，则可考虑执行"show proc '/statistic';"语句，在确认集群无不健
康tablet副本后将目标BE手动Drop掉。
```

最后演示对 103 节点的 Broker 进行缩容，示例如下：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster scale-in sr-c1 --node
192.168.110.103:8000
[20230114-132209  OUTPUT] Scale in cluster [clusterName = sr-c1, nodeId =
192.168.110.103:8000]
[20230114-132209  OUTPUT] Scale in Broker node successfully. [clusterName = sr-
c1, nodeId = 192.168.110.103:8000]
```

3.6、移出集群

stargo 支持将当前管理的集群"移出"，该移出操作仅表示目标集群后续不再由 stargo 管理，并不会对目标集群有其他任何影响。

移出集群操作本质上是删除该集群在 stargo 工作目录中的 meta 文件，其语法如下：

```
./stargo cluster remove <cluster_name>
## cluster_name：需移出管理的集群名
```

例如我们移出对 sr-c1 集群的管理，执行命令：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster remove sr-c1
[20230114-132302  OUTPUT] Remove cluster. [ClusterName = sr-c1]
[20230114-132302  OUTPUT] Meta Dir removed. [Dir = /root/.stargo/cluster/sr-c1]
[20230114-132302    INFO] Removce cluster sr-c1 successfully.
```

3.7、迁入集群

迁入集群的逻辑和移出相反，是将服务器中一套已经手动部署完成的集群迁入到 stargo 的管理中，从逻辑上仍是根据我们编写的 yaml 拓扑文件信息在 stargo 工作目录中生成集群的meta文件。

迁入集群的语法为：

```
./stargo cluster import <cluster_name> <version> <topology_file>
## cluster_name：为迁入管理的集群名命名，例如'sr-new'
## version：迁入集群的版本号，格式要求为'v+版本号'，例如'v2.3.7'
## topology_file：包含需迁入集群信息的yaml拓扑文件，例如下面示例中的'supervise-in.yaml'
```

前面我们将sr-c1集群移出了管理，这里我们根据经过扩缩容后的集群信息完成示例拓扑文件 supervise-in.yaml 的编写，将集群再次添加进入 stargo 的管理。

前置说明：

1、目前 stargo 暂不支持在迁入的 yaml 中直接配置集群的用户名和密码，我们需要在迁入完成后手动修改 stargo 工作目录中为该集群生成的 yaml 文件，示例见前文 3.3 章节。这个功能将在后续版本中增加。

2、当前版本仍存在 2.1 章节中介绍的**"二级目录"**限制。**当前在迁入时并未进行校验，若原集群的目录不符合要求，迁入后虽然可通过 stargo 启停，但无法进行升降级或扩缩容操作。**"二级目录"的限制将在下个版本取消。

编写拓扑文件 supervise-in.yaml：

```yaml
global:
    user: "root"
    ssh_port: 22

fe_servers:
  - host: 192.168.110.102
    ssh_port: 22
    http_port: 8030
    rpc_port: 9020
    query_port: 9030
    edit_log_port: 9010
    deploy_dir: /opt/starrocks/fe
    meta_dir: /data1/starrocks/fe/meta
    log_dir: /data1/starrocks/fe/log
    priority_networks: 192.168.110.0/24
    role: FOLLOWER
  - host: 192.168.110.103
    ssh_port: 22
    http_port: 8030
    rpc_port: 9020
    query_port: 9030
    edit_log_port: 9010
    deploy_dir: /opt/starrocks/fe
```

```
    meta_dir: /data1/starrocks/fe/meta
    log_dir: /data1/starrocks/fe/log
    priority_networks: 192.168.110.0/24
    role: FOLLOWER
  - host: 192.168.110.104
    ssh_port: 22
    http_port: 8030
    rpc_port: 9020
    query_port: 9030
    edit_log_port: 9010
    deploy_dir: /opt/starrocks/fe
    meta_dir: /data1/starrocks/fe/meta
    log_dir: /data1/starrocks/fe/log
    priority_networks: 192.168.110.0/24
    role: OBSERVER

be_servers:
  - host: 192.168.110.102
    ssh_port: 22
    be_port: 9060
    webserver_port: 8040
    heartbeat_service_port: 9050
    brpc_port: 8060
    deploy_dir : /opt/starrocks/be
    storage_dir: /data2/starrocks/be/storage
    log_dir: /data2/starrocks/be/log
    priority_networks: 192.168.110.0/24
    config:
      enable_new_load_on_memory_limit_exceeded: true
  - host: 192.168.110.103
    ssh_port: 22
    be_port: 9060
    webserver_port: 8040
    heartbeat_service_port: 9050
    brpc_port: 8060
    deploy_dir : /opt/starrocks/be
    storage_dir: /data2/starrocks/be/storage
    log_dir: /data2/starrocks/be/log
    priority_networks: 192.168.110.0/24
    config:
      enable_new_load_on_memory_limit_exceeded: true
  - host: 192.168.110.104
    ssh_port: 22
    be_port: 9060
    webserver_port: 8040
    heartbeat_service_port: 9050
    brpc_port: 8060
    deploy_dir : /opt/starrocks/be
    storage_dir: /data2/starrocks/be/storage
    log_dir: /data2/starrocks/be/log
    priority_networks: 192.168.110.0/24
    config:
      enable_new_load_on_memory_limit_exceeded: true
  - host: 192.168.110.105
    ssh_port: 22
```

```
    be_port: 9060
    webserver_port: 8040
    heartbeat_service_port: 9050
    brpc_port: 8060
    deploy_dir : /opt/starrocks/be
    storage_dir: /data2/starrocks/be/storage
    log_dir: /data2/starrocks/be/log
    priority_networks: 192.168.110.0/24
    config:
      enable_new_load_on_memory_limit_exceeded: true

broker_servers:
  - host: 192.168.110.101
    ssh_port: 22
    broker_port: 8000
    deploy_dir : /opt/starrocks/apache_hdfs_broker
    log_dir: /data2/starrocks/apache_hdfs_broker/log
  - host: 192.168.110.102
    ssh_port: 22
    broker_port: 8000
    deploy_dir: /opt/starrocks/apache_hdfs_broker
    log_dir: /data2/starrocks/apache_hdfs_broker/log
  - host: 192.168.110.104
    ssh_port: 22
    broker_port: 8000
    deploy_dir : /opt/starrocks/apache_hdfs_broker
    log_dir: /data2/starrocks/apache_hdfs_broker/log
```

迁入操作仅会进行少量的信息校验（当前为通信及句柄数），不会对 yaml 中的目录、端口等进行校验，也不会对识别其中的自定义配置参数。迁入操作不会影响集群，我们可以对正在运行的集群执行迁入操作，唯一需要留意的就是将前面的拓扑文件配置正确，避免迁入后无法管理。执行迁入命令：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster import sr-new v2.3.7 supervise-in.yaml
[20230114-132535  OUTPUT] Import cluster [clusterName = sr-new, clusterVersion = v2.3.7, metaFile = supervise-in.yaml]

InitConf time cost = 1.765369ms
SetGlobalVar time cost = 227ns
[20230114-132538  OUTPUT] PRE CHECK DEPLOY ENV:
PreCheck FE:
server id                  ssh auth         open files count
--------------------       ---------------  ---------------
192.168.110.102:9010       PASS             PASS
192.168.110.103:9010       PASS             PASS
192.168.110.104:9010       PASS             PASS

PreCheck BE:
server id                  ssh auth         open files count
--------------------       ---------------  ---------------
192.168.110.102:9060       PASS             PASS
192.168.110.103:9060       PASS             PASS
192.168.110.104:9060       PASS             PASS
192.168.110.105:9060       PASS             PASS
```

```
PreCheck Broker:
server id                  ssh auth         open files count
---------------------      ---------------  ---------------
192.168.110.101:8000       PASS             PASS
192.168.110.102:8000       PASS             PASS
192.168.110.104:8000       PASS             PASS


[20230114-132538  OUTPUT] PreCheck successfully. RESPECT
PreCheckSRForSupervise time cost = 2.351028612s
[20230114-132538    INFO] The folder [/root/.stargo/cluster] exists, skip
create.
CreateiSrCtlDirIfNotExist time cost = 46.822μs
WriteBackMeta time cost = 506.077μs
[20230114-132538    INFO] Import cluster sr-new successfully.
```

手动配置工作目录下 sr-new 集群的用户及密码：

```
[root@node01 stargo-v2.0.3]# cd /root/.stargo/cluster/sr-new/
[root@node01 sr-new]# vim meta.yaml
```

添加集群用户名及密码信息：

```
clusterinfo:
  user: root
  version: v2.3.7
  create_date: "2023-01-14 13:25:38"
  meta_path: /root/.stargo/cluster/sr-new
  private_key: /root/.ssh/id_rsa
  sr_user: "root"      ##添加用户名root，其他用户权限不足
  sr_password: "root"  ##添加root用户的对应密码，例如我们设置的root
global:
  user: root
  ssh_port: 22
server_configs:
```

通过 stargo 查看 sr-new 集群的状态信息，能正常查看即表示迁入成功：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster display sr-new
[20230114-132814  OUTPUT] Display cluster [clusterName = sr-new]
clusterName = sr-new
clusterVerison = v2.3.7
ID                     ROLE    HOST               PORT         STAT    DEPLOYDIR
           DATADIR
--------------------   ------  ---------------    ---------    -----   ---------
---------   ----------------------------------
192.168.110.102:9010   FE      192.168.110.102    9010/9030    UP/L
/opt/starrocks/fe    /data1/starrocks/fe/meta
192.168.110.103:9010   FE      192.168.110.103    9010/9030    UP
/opt/starrocks/fe    /data1/starrocks/fe/meta
192.168.110.104:9010   FE      192.168.110.104    9010/9030    UP
/opt/starrocks/fe    /data1/starrocks/fe/meta
192.168.110.102:9060   BE      192.168.110.102    9060/9050    UP
/opt/starrocks/be    /data2/starrocks/be/storage
```

```
192.168.110.103:9060   BE      192.168.110.103    9060/9050    UP
/opt/starrocks/be    /data2/starrocks/be/storage
192.168.110.104:9060   BE      192.168.110.104    9060/9050    UP
/opt/starrocks/be    /data2/starrocks/be/storage
192.168.110.105:9060   BE      192.168.110.105    9060/9050    UP
/opt/starrocks/be    /data2/starrocks/be/storage
192.168.110.101:8000   Broker  192.168.110.101    8000         UP
            /opt/starrocks/apache_hdfs_broker
192.168.110.102:8000   Broker  192.168.110.102    8000         UP
            /opt/starrocks/apache_hdfs_broker
192.168.110.104:8000   Broker  192.168.110.104    8000         UP
            /opt/starrocks/apache_hdfs_broker
```

3.8、清理集群

若使用 stargo 部署过程中因为某些问题导致部署操作中断，之前版本我们需要手动清理残留文件夹后才能再次尝试部署，较为麻烦。新版本增加了清理集群的功能，该操作的语法为：

```
./stargo cluster clean <topology_file> -y
## topology_file：需执行清理的集群对应的yaml拓扑文件，例如下面示例中的'sr-c1.yaml'
## 因清理操作涉及数据数据目录的删除，存在误删风险，因此命令中加入'-y'避免误操作！
```

说明：

1、clean 命令中不依赖集群名称，这是因为我们并不确定部署操作是在哪一步中断，此时有可能并未执行到在 stargo 工作目录中生成 meta 文件的那一步，也即该集群在 stargo 中可能并不存在自己的集群名。因此，clean 命令设计为从部署时使用的 yaml 文件中获取目录信息并执行清理。

2、clean 操作不会清理 stargo 工作目录中集群的元数据目录（因为可能就没有），适用于集群 meta 文件未创建的情况。在部署中断后，我们可以用 list 命令查看 stargo 已管理集群列表，观察列表中是否已经可查到中断部署的集群名称，若可查到即表示已生成了meta文件，就适合使用 3.9 章节的 destroy 销毁命令，连同 meta 一并清理。

为方便演示，这里我们在部署过程中手动执行 `ctrl+c` 中断 stargo 进程，模拟异常：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster deploy sr-c1 v2.3.7 sr-c1.yaml
[20230114-133832  OUTPUT] Deploy cluster [clusterName = sr-c1, clusterVersion =
v2.3.7, metaFile = sr-c1.yaml]

InitConf time cost = 553.702µs
SetGlobalVar time cost = 165ns
[20230114-133847  OUTPUT] PRE CHECK DEPLOY ENV:
PreCheck FE:
server id              ssh auth  meta dir     deploy dir  http port    rpc port
     query port  edit log port  openfiles count
--------------------  --------  -----------  ----------  -----------  ----------
----  ----------  -------------  ---------------
192.168.110.101:9010  PASS      PASS         PASS        PASS         PASS
     PASS        PASS           PASS
192.168.110.102:9010  PASS      PASS         PASS        PASS         PASS
     PASS        PASS           PASS
192.168.110.103:9010  PASS      PASS         PASS        PASS         PASS
     PASS        PASS           PASS

PreCheck BE:
```

```
server id             ssh auth  storage dir  deploy dir  webSer port  heartbeat
port  brpc port   be port        openfiles count
--------------------  --------  -----------  ----------  -----------  ----------
----  ----------  -------------  ---------------
192.168.110.101:9060  PASS      PASS         PASS        PASS         PASS
     PASS        PASS           PASS
192.168.110.102:9060  PASS      PASS         PASS        PASS         PASS
     PASS        PASS           PASS
192.168.110.103:9060  PASS      PASS         PASS        PASS         PASS
     PASS        PASS           PASS

PreCheck Broker:
server id             ssh auth  deploy dir   broker port  open files count
--------------------  --------  -----------  -----------  ----------------
192.168.110.101:8000  PASS      PASS         PASS         PASS
192.168.110.102:8000  PASS      PASS         PASS         PASS
192.168.110.103:8000  PASS      PASS         PASS         PASS


[20230114-133847  OUTPUT] PreCheck successfully. RESPECT
PreCheckSR time cost = 15.215368269s
[20230114-133847  OUTPUT] Create the deploy folder ...
CreateDir time cost = 3.33866936s
[20230114-133850    INFO] execCMD: cp /opt/software/StarRocks-2.3.7.tar.gz
/root/.stargo/download/StarRocks-2.3.7.tar.gz
[20230114-133852    INFO] execCMD: cp jdk8u352-b08.tar.gz
/root/.stargo/download/jdk8u352-b08.tar.gz
[20230114-133852  OUTPUT] Copy StarRocks package to compress dir ...
[20230114-133852  OUTPUT] Decompress StarRocks package & jdk ...
[20230114-133910    INFO] The tar file /root/.stargo/download/StarRocks-
2.3.7.tar.gz has been decompressed under /root/.stargo/download/
[20230114-133911    INFO] The tar file /root/.stargo/download/jdk8u352-b08.tar.gz
has been decompressed under /root/.stargo/download/
PrepareSRPkg time cost = 21.096308962s
[20230114-133911  OUTPUT] Distribute FE Dir ...
[20230114-133919    INFO] Upload dir FeSourceDir =
[/root/.stargo/download/StarRocks-2.3.7/fe] to feTargetDir = [/opt/starrocks/fe]
on FeHost = [192.168.110.101]
[20230114-133923    INFO] Upload dir JDKSourceDir =
[/root/.stargo/download/jdk8u352-b08] to JDKTargetDir = [/opt/starrocks/fe/jdk]
on FeHost = [192.168.110.101]
[20230114-133923    INFO] Modify JAVA_HOME: host = [192.168.110.101], filePath =
[/opt/starrocks/fe/bin/start_fe.sh]
##此时手动执行ctrl+c中断操作：
^C
[root@node01 stargo-v2.0.3]#
```

判断该集群是否在 stargo 工作目录中生成了 sr-c1 的 meta 信息：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster list
[20230114-134021  OUTPUT] List all clusters
ClusterName      Version     User        CreateDate                MetaPath
                 PrivateKey

-------------    --------    --------    -------------------       ------------
----------------   ------------------

sr-priv          v2.2.11     root        2022-12-01 09:45:22
/root/.stargo/cluster/sr-c1    /root/.ssh/id_rsa
```

stargo 可管理多套集群，在 list 列表中未看到sr-c1，即表示在部署中断时 meta 并未生成，适合使用 clean 命令。

根据部署时使用的 yaml 信息执行清理，先演示不加 `-y` 参数的命令提示：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster clean sr-c1.yaml
[20230114-134011 WARNING] The operation of clearing the directory is mainly used
to clean up the residual files after the cluster deployment fails. This operation
is risky. Please confirm that the process of the target cluster is not started,
and the deployment directory and the data directory can be cleared. If it is
confirmed that the cleanup can be performed, please add the -y parameter after
the current command.
[20230114-134011 WARNING] 清理目录操作主要用于集群部署失败后的残余文件清理，该操作存在风
险，请确认目标集群的进程未启动，且部署目录及数据数据目录可清空。若确认可执行清理，请在当前命令
后添加-y参数。
```

使用正确的 clean 命令清理：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster clean sr-c1.yaml -y
[20230114-134049  OUTPUT] clean directory.
InitConf time cost = 964.582µs
checkServicePort time cost = 964.582µs
[20230114-134053  OUTPUT] Clean the deploy folder ...
[20230114-134053  OUTPUT] Clean FE deploy dir for node : root@192.168.110.101:22
/opt/starrocks/fe
[20230114-134053  OUTPUT] Clean FE log dir: for node : root@192.168.110.101:22
/data1/starrocks/fe/log
[20230114-134054  OUTPUT] Clean FE meta dir for node : root@192.168.110.101:22
/data1/starrocks/fe/meta
[20230114-134054  OUTPUT] Clean FE deploy dir for node : root@192.168.110.102:22
/opt/starrocks/fe
[20230114-134054  OUTPUT] Clean FE log dir: for node : root@192.168.110.102:22
/data1/starrocks/fe/log
[20230114-134054  OUTPUT] Clean FE meta dir for node : root@192.168.110.102:22
/data1/starrocks/fe/meta
[20230114-134054  OUTPUT] Clean FE deploy dir for node : root@192.168.110.103:22
/opt/starrocks/fe
[20230114-134054  OUTPUT] Clean FE log dir: for node : root@192.168.110.103:22
/data1/starrocks/fe/log
[20230114-134055  OUTPUT] Clean FE meta dir for node : root@192.168.110.103:22
/data1/starrocks/fe/meta
[20230114-134055  OUTPUT] Clean BE deploy dir for node : root@192.168.110.101:22
/opt/starrocks/be
```

```
[20230114-134055  OUTPUT] Clean BE log dir for node : root@192.168.110.101:22
/data2/starrocks/be/log
[20230114-134055  OUTPUT] Clean BE storage dir for node :
root@192.168.110.101:22 /data2/starrocks/be/storage
[20230114-134055  OUTPUT] Clean BE deploy dir for node : root@192.168.110.102:22
/opt/starrocks/be
[20230114-134055  OUTPUT] Clean BE log dir for node : root@192.168.110.102:22
/data2/starrocks/be/log
[20230114-134055  OUTPUT] Clean BE storage dir for node :
root@192.168.110.102:22 /data2/starrocks/be/storage
[20230114-134055  OUTPUT] Clean BE deploy dir for node : root@192.168.110.103:22
/opt/starrocks/be
[20230114-134056  OUTPUT] Clean BE log dir for node : root@192.168.110.103:22
/data2/starrocks/be/log
[20230114-134056  OUTPUT] Clean BE storage dir for node :
root@192.168.110.103:22 /data2/starrocks/be/storage
[20230114-134056  OUTPUT] Clean Broker deploy dir for node :
root@192.168.110.101:22 /opt/starrocks/apache_hdfs_broker
[20230114-134056  OUTPUT] Clean Broker log dir for node :
root@192.168.110.101:22 /data2/starrocks/apache_hdfs_broker/log
[20230114-134056  OUTPUT] Clean Broker deploy dir for node :
root@192.168.110.102:22 /opt/starrocks/apache_hdfs_broker
[20230114-134056  OUTPUT] Clean Broker log dir for node :
root@192.168.110.102:22 /data2/starrocks/apache_hdfs_broker/log
[20230114-134056  OUTPUT] Clean Broker deploy dir for node :
root@192.168.110.103:22 /opt/starrocks/apache_hdfs_broker
[20230114-134056  OUTPUT] Clean Broker log dir for node :
root@192.168.110.103:22 /data2/starrocks/apache_hdfs_broker/log
CleanDir time cost = 3.146796652s
```

为规避风险，执行清理时会进行校验，若清理对象的端口存在监听，清理进程会报错并退出。所以若前面部署过程中进程已启动，我们仍需要手动 kill 进程：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster clean sr-c1.yaml -y
[20230114-133014  OUTPUT] clean directory.
InitConf time cost = 1.092055ms
[20230114-133014  OUTPUT] Detect the FE Http Port is used [Host =
192.168.110.101, Port = 8030] unable to execute clean
```

说明：这里为了文件安全牺牲一定的便利性，后续版本将权衡设计其他方式，尽量在确保安全的前提下简化操作。

3.9、销毁集群

销毁集群是风险最高的一个操作，会将目标集群的"部署目录"和"数据目录"以及"stargo 中的 meta 元数据"一并清空，即恢复到初始状态。

销毁操作被设计用在以下两种情况：

1、用于对"部署过程中出现异常中断，但已在 stargo 中生成 meta 文件的集群"的残余文件清理，是 3.8 章节 clean 命令的场景补充。

2、用于对确认废弃的集群进行卸载清理。

销毁集群的语法为：

```
./stargo cluster destroy <cluster_name> -y
## cluster_name：执行销毁的目标集群名称，例如下方示例中的'sr-new'
## 销毁操作涉及数据文件的删除，风险很大，因此添加"-y"参数防止误操作
```

说明：为规避风险，执行卸载命令的集群，其进程需全部停止且不能存在连接（stargo 通过 netstat -an 命令执行检测，使用 mysql-client 等工具连接或存在 close_wait 的进程都视为存在连接）。因此我们需要先 stop 目标集群，并退出所有连接，然后再执行卸载。

执行对 sr-new 集群的卸载，先使用不加 `-y` 的命令：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster destroy sr-new
[20230114-133110 WARNING] The operation of destroying a cluster is a high-risk
operation. This operation will clear the program directory and data directory of
the target cluster. Please make sure that the target cluster is stopped and no
longer needed. If it is confirmed that the cluster needs to be destroyed, please
add the -y parameter after the current command.
[20230114-133110 WARNING] 销毁集群操作为高风险操作，该操作将清空目标集群的程序目录及数据目录，请务必确认目标集群已停止且无需再用到。若确认需要销毁集群，请在当前命令后添加-y参数。
```

使用完整的命令执行卸载，提示集群在运行中：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster destroy sr-new -y
[20230114-133120  OUTPUT] Destroy cluster. [ClusterName = sr-new]
[20230114-133120   ERROR] The current cluster is starting. Stop the cluster and
then destroy it.
```

停止目标集群：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster stop sr-new
[20230114-133133  OUTPUT] Stop cluster [clusterName = sr-new]
[20230114-133133  OUTPUT] Stop cluster sr-new
[20230114-133133    INFO] Waiting for stoping FE node [FeHost = 192.168.110.102]
[20230114-133136    INFO] Waiting for stoping FE node [FeHost = 192.168.110.103]
[20230114-133138    INFO] Waiting for stoping FE node [FeHost = 192.168.110.104]
[20230114-133141  OUTPUT] Stop cluster sr-new
[20230114-133141    INFO] Waiting for stoping BE node [BeHost = 192.168.110.102]
[20230114-133143   ERROR] Error in ping db [dbPath = root:root@tcp(:0)/], error
= dial tcp :0: connect: connection refused
[20230114-133143    INFO] Waiting for stoping BE node [BeHost = 192.168.110.103]
[20230114-133144    INFO] Waiting for stoping BE node [BeHost = 192.168.110.104]
[20230114-133146    INFO] Waiting for stoping BE node [BeHost = 192.168.110.105]
[20230114-133148  OUTPUT] Stop cluster sr-new
[20230114-133148    INFO] Waiting for stoping Broker node [BrokerHost =
192.168.110.101]
[20230114-133148    INFO] Waiting for stoping Broker node [BrokerHost =
192.168.110.102]
[20230114-133149   ERROR] Error in ping db [dbPath = root:root@tcp(:0)/], error
= dial tcp :0: connect: connection refused
[20230114-133149    INFO] Waiting for stoping Broker node [BrokerHost =
192.168.110.104]
```

部分情况下需要再稍作等待，待服务对端口的监听全部停止，且确认外部已无连接后才允许销毁。再次执行销毁命令：

```
[root@node01 stargo-v2.0.3]# ./stargo cluster destroy sr-new -y
[20230114-133210  OUTPUT] Destroy cluster. [ClusterName = sr-new]
[20230114-133210    INFO] Current cluster is stop.
[20230114-133210    INFO] Waiting for remove FE deploy dir. [FeHost =
192.168.110.102, DeployDir = rm -rf /opt/starrocks/fe]
[20230114-133211    INFO] Waiting for remove FE meta dir. [FeHost =
192.168.110.102, MetaDir = rm -rf /data1/starrocks/fe]
[20230114-133211    INFO] Waiting for remove FE log dir. [FeHost =
192.168.110.102, LogDir = rm -rf /data1/starrocks/fe]
[20230114-133211  OUTPUT] Fe node removed. [FeHost = 192.168.110.102]
[20230114-133211    INFO] Waiting for remove FE deploy dir. [FeHost =
192.168.110.103, DeployDir = rm -rf /opt/starrocks/fe]
[20230114-133211    INFO] Waiting for remove FE meta dir. [FeHost =
192.168.110.103, MetaDir = rm -rf /data1/starrocks/fe]
[20230114-133211    INFO] Waiting for remove FE log dir. [FeHost =
192.168.110.103, LogDir = rm -rf /data1/starrocks/fe]
[20230114-133211  OUTPUT] Fe node removed. [FeHost = 192.168.110.103]
[20230114-133211    INFO] Waiting for remove FE deploy dir. [FeHost =
192.168.110.104, DeployDir = rm -rf /opt/starrocks/fe]
[20230114-133212    INFO] Waiting for remove FE meta dir. [FeHost =
192.168.110.104, MetaDir = rm -rf /data1/starrocks/fe]
[20230114-133212    INFO] Waiting for remove FE log dir. [FeHost =
192.168.110.104, LogDir = rm -rf /data1/starrocks/fe]
[20230114-133212  OUTPUT] Fe node removed. [FeHost = 192.168.110.104]
[20230114-133212    INFO] Waiting for remove BE deploy dir. [BeHost =
192.168.110.102, DeployDir = rm -rf /opt/starrocks/be]
[20230114-133212    INFO] Waiting for remove Be log dir. [BeHost =
192.168.110.102, LogDir = rm -rf /data2/starrocks/be]
[20230114-133212    INFO] Waiting for remove BE storage dir. [BeHost =
192.168.110.102, StorageDir = rm -rf /data2/starrocks/be]
[20230114-133213  OUTPUT] Be node removed. [BeHost = 192.168.110.102]
[20230114-133213    INFO] Waiting for remove BE deploy dir. [BeHost =
192.168.110.103, DeployDir = rm -rf /opt/starrocks/be]
[20230114-133213    INFO] Waiting for remove Be log dir. [BeHost =
192.168.110.103, LogDir = rm -rf /data2/starrocks/be]
[20230114-133213    INFO] Waiting for remove BE storage dir. [BeHost =
192.168.110.103, StorageDir = rm -rf /data2/starrocks/be]
[20230114-133213  OUTPUT] Be node removed. [BeHost = 192.168.110.103]
[20230114-133213    INFO] Waiting for remove BE deploy dir. [BeHost =
192.168.110.104, DeployDir = rm -rf /opt/starrocks/be]
[20230114-133214    INFO] Waiting for remove Be log dir. [BeHost =
192.168.110.104, LogDir = rm -rf /data2/starrocks/be]
[20230114-133214    INFO] Waiting for remove BE storage dir. [BeHost =
192.168.110.104, StorageDir = rm -rf /data2/starrocks/be]
[20230114-133214  OUTPUT] Be node removed. [BeHost = 192.168.110.104]
[20230114-133214    INFO] Waiting for remove BE deploy dir. [BeHost =
192.168.110.105, DeployDir = rm -rf /opt/starrocks/be]
[20230114-133214    INFO] Waiting for remove Be log dir. [BeHost =
192.168.110.105, LogDir = rm -rf /data2/starrocks/be]
[20230114-133214    INFO] Waiting for remove BE storage dir. [BeHost =
192.168.110.105, StorageDir = rm -rf /data2/starrocks/be]
[20230114-133214  OUTPUT] Be node removed. [BeHost = 192.168.110.105]
[20230114-133214    INFO] Waiting for remove Broker deploy dir. [BrokerHost =
192.168.110.101, DeployDir = rm -rf /opt/starrocks/apache_hdfs_broker]
```

```
[20230114-133215    INFO] Waiting for remove Broker log dir. [BrokerHost =
192.168.110.101, LogDir = rm -rf /data2/starrocks/apache_hdfs_broker]
[20230114-133215    INFO] Waiting for remove Broker deploy dir. [BrokerHost =
192.168.110.102, DeployDir = rm -rf /opt/starrocks/apache_hdfs_broker]
[20230114-133215    INFO] Waiting for remove Broker log dir. [BrokerHost =
192.168.110.102, LogDir = rm -rf /data2/starrocks/apache_hdfs_broker]
[20230114-133215    INFO] Waiting for remove Broker deploy dir. [BrokerHost =
192.168.110.104, DeployDir = rm -rf /opt/starrocks/apache_hdfs_broker]
[20230114-133215    INFO] Waiting for remove Broker log dir. [BrokerHost =
192.168.110.104, LogDir = rm -rf /data2/starrocks/apache_hdfs_broker]
[20230114-133215  OUTPUT] Meta Dir removed. [Dir = /root/.stargo/cluster/sr-new]
```

销毁完成。

四、写在后面

StarGo 仅是方便我们进行集群管理的工具，只会机械的按照程序设定的逻辑向集群分发命令，若在使用过程中出现异常，除了根据控制台打印的日志排查，我们仍需要在 StarRocks 集群中根据日志进行问题定位。

欢迎您为 StarGo 提出宝贵的改进建议，我们将一同为社区打造一款优秀的集群管理工具！