Pulsar升级回退演练

准备工作

检查命令：

```
bin/pulsar zookeeper-shell
......
ls /ledgers/cookies
[10.1.32.151:3181, 10.1.32.152:3181, 10.1.32.153:3181]

get /ledgers/cookies/10.1.32.151:3181
4
bookieHost: "10.1.32.151:3181"
journalDir: "/data/pulsar/bookkeeper/journal"
ledgerDirs: "1\t/data/pulsar/bookkeeper/ledgers"
instanceId: "8dc37d76-5739-40d1-9ad8-ab4fe61f4b67"

get /ledgers/cookies/10.1.32.152:3181
4
bookieHost: "10.1.32.152:3181"
journalDir: "/data/pulsar/bookkeeper/journal"
ledgerDirs: "1\t/data/pulsar/bookkeeper/ledgers"
instanceId: "8dc37d76-5739-40d1-9ad8-ab4fe61f4b67"

get /ledgers/cookies/10.1.32.153:3181
4
bookieHost: "10.1.32.153:3181"
journalDir: "/data/pulsar/bookkeeper/journal"
ledgerDirs: "1\t/data/pulsar/bookkeeper/ledgers"
instanceId: "8dc37d76-5739-40d1-9ad8-ab4fe61f4b67"
```

zookeeper中查询到bookie的 instanceId保持一致说明集群三个bookie正常

更新前制造一些数据：

```
  bin/pulsar-admin brokers list zhoufr_pulsar_test
  bin/pulsar-admin tenants create zhoufr
  bin/pulsar-admin namespaces create zhoufr/pulsar
  bin/pulsar-admin topics create-partitioned-topic zhoufr/pulsar/test-topic -p 3
  bin/pulsar-admin namespaces set-persistence zhoufr/pulsar -a 2 -e 3 -w 2 -r 0
  bin/pulsar-admin namespaces get-persistence zhoufr/pulsar
  bin/pulsar-client produce persistent://zhoufr/pulsar/test-topic -m "hellworld"
-n 1000
```

一、升级zookeeper

将新包解压至目标目录，检查配置，关闭老的进程，启动新的进程：

```
[root@zhoufr-pulsar-node01 scripts]# ./stop_zookeeper.sh
doing stop zookeeper ...
stopping zookeeper
Shutdown is in progress... Please wait...
Shutdown completed.

...
[root@zhoufr-pulsar-node01 scripts]# ./start_zookeeper.sh
doing start zookeeper ...
starting zookeeper, logging to /opt/Apps/pulsar280/logs/pulsar-zookeeper-zhoufr-
pulsar-node01.log
Note: Set immediateFlush to true in conf/log4j2.yaml will guarantee the logging
event is flushing to disk immediately. The default behavior is switched off due
to performance considerations.
```

> 注：另外两台进行相同的动作，但是不能同时操作，防止脑裂

二、升级bookeeper

首先，停止老的进程

```
[root@zhoufr-pulsar-node01 pulsar]# /opt/Apps/pulsar/scripts/stop_bookie.sh
doing stop bookie ...
stopping bookie
Shutdown is in progress... Please wait...
Shutdown completed.
```

然后以只读的形式启动新版：

```
bin/pulsar bookie --readOnly
```

如果成功启动

这样的话，就可以将readOnly换成正则启动：

```
[root@zhoufr-pulsar-node01 pulsar280]# scripts/start_bookie.sh
doing start bookie ...
starting bookie, logging to /opt/Apps/pulsar280/logs/pulsar-bookie-zhoufr-pulsar-
node01.log
Note: Set immediateFlush to true in conf/log4j2.yaml will guarantee the logging
event is flushing to disk immediately. The default behavior is switched off due
to performance considerations.
```

另外两台做相同的操作，不要同时操作，防止集群脑裂

```
[root@zhoufr-pulsar-node02 pulsar280]# /opt/Apps/pulsar/scripts/stop_bookie.sh
doing stop bookie ...
stopping bookie
Shutdown is in progress... Please wait...
Shutdown completed.
[root@zhoufr-pulsar-node02 pulsar280]# pwd
/opt/Apps/pulsar280
[root@zhoufr-pulsar-node02 pulsar280]# bin/pulsar bookie --readOnly
```

注意日志显示成功启动后方可进行broker的操作

三、升级broker

broker属于内存类型，可以直接关闭和开启

```
[root@zhoufr-pulsar-node01 pulsar280]# /opt/Apps/pulsar/scripts/stop_broker.sh
doing stop broker ...
stopping broker
Shutdown is in progress... Please wait...
Shutdown completed.
[root@zhoufr-pulsar-node01 pulsar280]#
/opt/Apps/pulsar280/scripts/start_broker.sh
doing start broker ...
starting broker, logging to /opt/Apps/pulsar280/logs/pulsar-broker-zhoufr-pulsar-
node01.log
Note: Set immediateFlush to true in conf/log4j2.yaml will guarantee the logging
event is flushing to disk immediately. The default behavior is switched off due
to performance considerations.
```

四、检测

```
[root@zhoufr-pulsar-node01 pulsar280]# bin/pulsar-admin broker-stats  load-
report
{
  "webServiceUrl" : "http://10.1.32.151:8080",
  "pulsarServiceUrl" : "pulsar://10.1.32.151:6650",
  "persistentTopicsEnabled" : true,
  "nonPersistentTopicsEnabled" : true,
  "cpu" : {
    "usage" : 28.87490539166667,
```

```json
      "limit" : 400.0
    },
    "memory" : {
      "usage" : 501.1755065917969,
      "limit" : 2048.0
    },
    "directMemory" : {
      "usage" : 128.0,
      "limit" : 4096.0
    },
    "bandwidthIn" : {
      "usage" : 40.49401041666667,
      "limit" : 1.024E7
    },
    "bandwidthOut" : {
      "usage" : 51.95390625,
      "limit" : 1.024E7
    },
    "msgThroughputIn" : 0.0,
    "msgThroughputOut" : 0.0,
    "msgRateIn" : 0.0,
    "msgRateOut" : 0.0,
    "lastUpdate" : 1662631601242,
    "lastStats" : {
      "zhoufr/pulsar/0x80000000_0xc0000000" : {
        "msgRateIn" : 0.0,
        "msgThroughputIn" : 0.0,
        "msgRateOut" : 0.0,
        "msgThroughputOut" : 0.0,
        "consumerCount" : 0,
        "producerCount" : 0,
        "topics" : 1,
        "cacheSize" : 0
      }
    },
    "numTopics" : 1,
    "numBundles" : 1,
    "numConsumers" : 0,
    "numProducers" : 0,
    "bundles" : [ "zhoufr/pulsar/0x80000000_0xc0000000" ],
    "lastBundleGains" : [ ],
    "lastBundleLosses" : [ ],
    "brokerVersionString" : "2.8.0",
    "protocols" : { },
    "advertisedListeners" : { },
    "loadReportType" : "LocalBrokerData",
    "maxResourceUsage" : 0.24471460282802582,
    "bundleStats" : {
      "zhoufr/pulsar/0x80000000_0xc0000000" : {
        "msgRateIn" : 0.0,
        "msgThroughputIn" : 0.0,
        "msgRateOut" : 0.0,
        "msgThroughputOut" : 0.0,
        "consumerCount" : 0,
        "producerCount" : 0,
```

```
        "topics" : 1,
        "cacheSize" : 0
      }
    }
  }
```

五、回退操作

回退操作之前看了一下pulsar的原理图，发现broker和bookkeeper元数据保存在 zk当中，然后本身bookkeeper也存储ledger数据，保证数据的一致性很重要，单纯关闭进程，然后拷回数据目录（假设有备份），再启动，这样一台一台的操作存在风险，当其他节点有写入新数据，那数据一致性就会存在问题（我们的ledger的配置是：`-a 2 -e 3 -w 2`）。想来想去，还是按照升级的方式逆向操作会安全一些。

- Ensemble Size (E) 决定了Pulsar写入Ledger可用的Bookies池的大小
- Write Quorum Size (Qw) Pulsar将要写入的实际的Bookies数量
- Ack Quorum Size (Qa) 是确认写入Bookies的数量

为了更好的验证回退，我们将2.8.0再做一次升级至2.8.2，然后我再进行性能测试，在性能测试过程中进行回退，来模拟在业务没有中断的情况，了解其影响程度。

生产:

```
bin/pulsar-perf produce -t 100 persistent://zhoufr/pulsar/test-topic
```

```
15:42:46.567 [main] INFO  org.apache.pulsar.testclient.PerformanceProducer - Throughput produced:    39813 msg ---    100.1 msg/s ---     0.8 Mbi
t/s --- failure      0.0 msg/s --- Latency: mean:    3.987 ms - med:    3.788 - 95pct:    5.028 - 99pct:    9.865 - 99.9pct: 14.675 - 99.99: 14.
828 - Max: 14.828
15:42:56.591 [main] INFO  org.apache.pulsar.testclient.PerformanceProducer - Throughput produced:    40815 msg ---    100.0 msg/s ---     0.8 Mbi
t/s --- failure      0.0 msg/s --- Latency: mean:    3.999 ms - med:    3.813 - 95pct:    5.504 - 99pct:    9.288 - 99.9pct: 10.598 - 99.99: 15.
060 - Max: 15.060
15:43:06.614 [main] INFO  org.apache.pulsar.testclient.PerformanceProducer - Throughput produced:    41817 msg ---    100.0 msg/s ---     0.8 Mbi
t/s --- failure      0.0 msg/s --- Latency: mean:    3.893 ms - med:    3.808 - 95pct:    4.629 - 99pct:    7.409 - 99.9pct:  9.658 - 99.99:  9.
711 - Max:  9.711
15:43:16.639 [main] INFO  org.apache.pulsar.testclient.PerformanceProducer - Throughput produced:    42820 msg ---    100.1 msg/s ---     0.8 Mbi
t/s --- failure      0.0 msg/s --- Latency: mean:    3.957 ms - med:    3.822 - 95pct:    4.887 - 99pct:    8.842 - 99.9pct: 11.538 - 99.99: 13.
764 - Max: 13.764
15:43:26.663 [main] INFO  org.apache.pulsar.testclient.PerformanceProducer - Throughput produced:    43822 msg ---    100.0 msg/s ---     0.8 Mbi
t/s --- failure      0.0 msg/s --- Latency: mean:    3.942 ms - med:    3.789 - 95pct:    4.970 - 99pct:    8.439 - 99.9pct: 12.238 - 99.99: 15.
268 - Max: 15.268
15:43:36.687 [main] INFO  org.apache.pulsar.testclient.PerformanceProducer - Throughput produced:    44824 msg ---    100.1 msg/s ---     0.8 Mbi
t/s --- failure      0.0 msg/s --- Latency: mean:    4.025 ms - med:    3.797 - 95pct:    5.330 - 99pct:   11.083 - 99.9pct: 12.570 - 99.99: 13.
157 - Max: 13.157
15:43:46.712 [main] INFO  org.apache.pulsar.testclient.PerformanceProducer - Throughput produced:    45827 msg ---    100.1 msg/s ---     0.8 Mbi
t/s --- failure      0.0 msg/s --- Latency: mean:    4.020 ms - med:    3.855 - 95pct:    4.959 - 99pct:    9.099 - 99.9pct: 18.161 - 99.99: 18.
406 - Max: 18.406
15:43:56.736 [main] INFO  org.apache.pulsar.testclient.PerformanceProducer - Throughput produced:    46829 msg ---    100.0 msg/s ---     0.8 Mbi
t/s --- failure      0.0 msg/s --- Latency: mean:    3.946 ms - med:    3.828 - 95pct:    4.763 - 99pct:    8.145 - 99.9pct: 11.480 - 99.99: 12.
227 - Max: 12.227
15:44:06.761 [main] INFO  org.apache.pulsar.testclient.PerformanceProducer - Throughput produced:    47832 msg ---    100.1 msg/s ---     0.8 Mbi
t/s --- failure      0.0 msg/s --- Latency: mean:    3.935 ms - med:    3.874 - 95pct:    4.645 - 99pct:    6.807 - 99.9pct: 10.856 - 99.99: 15.
143 - Max: 15.143
15:44:16.786 [main] INFO  org.apache.pulsar.testclient.PerformanceProducer - Throughput produced:    48835 msg ---    100.1 msg/s ---     0.8 Mbi
t/s --- failure      0.0 msg/s --- Latency: mean:    4.101 ms - med:    3.863 - 95pct:    5.317 - 99pct:   11.002 - 99.9pct: 19.336 - 99.99: 22.
547 - Max: 22.547
15:44:26.811 [main] INFO  org.apache.pulsar.testclient.PerformanceProducer - Throughput produced:    49836 msg ---     99.8 msg/s ---     0.8 Mbi
t/s --- failure      0.0 msg/s --- Latency: mean:    4.134 ms - med:    3.839 - 95pct:    6.109 - 99pct:   10.819 - 99.9pct: 12.471 - 99.99: 16.
477 - Max: 16.477
15:44:36.834 [main] INFO  org.apache.pulsar.testclient.PerformanceProducer - Throughput produced:    50839 msg ---    100.1 msg/s ---     0.8 Mbi
t/s --- failure      0.0 msg/s --- Latency: mean:    4.051 ms - med:    3.841 - 95pct:    5.298 - 99pct:   10.371 - 99.9pct: 13.853 - 99.99: 16.
632 - Max: 16.632
```

消费:

```
bin/pulsar-perf consume -t 100 persistent://zhoufr/pulsar/test-topic
```

```
15:42:52.395 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    36158 msg --- 100.927  msg/s -- 0.788 Mbit/s
--- Latency: mean: 0.000 ms - med: 0 - 95pct: 0 - 99pct: 0 - 99.9pct: 0 - 99.99pct: 0 - Max: 0
15:43:02.412 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    37066 msg --- 90.266   msg/s -- 0.705 Mbit/s -
-- Latency: mean: 352.159 ms - med: 350 - 95pct: 669 - 99pct: 697 - 99.9pct: 703 - 99.99pct: 704 - Max: 704
15:43:12.428 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    38067 msg --- 99.927   msg/s -- 0.781 Mbit/s -
-- Latency: mean: 729.018 ms - med: 729 - 95pct: 737 - 99pct: 738 - 99.9pct: 739 - 99.99pct: 741 - Max: 741
15:43:22.444 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    39070 msg --- 100.144  msg/s -- 0.782 Mbit/s
--- Latency: mean: 711.044 ms - med: 711 - 95pct: 719 - 99pct: 721 - 99.9pct: 724 - 99.99pct: 725 - Max: 725
15:43:32.458 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    40073 msg --- 100.146  msg/s -- 0.782 Mbit/s
--- Latency: mean: 692.666 ms - med: 693 - 95pct: 701 - 99pct: 702 - 99.9pct: 703 - 99.99pct: 712 - Max: 712
15:43:42.475 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    41079 msg --- 100.445  msg/s -- 0.785 Mbit/s
--- Latency: mean: 672.726 ms - med: 674 - 95pct: 682 - 99pct: 684 - 99.9pct: 687 - 99.99pct: 689 - Max: 689
15:43:52.489 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    42094 msg --- 101.343  msg/s -- 0.792 Mbit/s
--- Latency: mean: 576.286 ms - med: 577 - 95pct: 639 - 99pct: 645 - 99.9pct: 647 - 99.99pct: 648 - Max: 648
15:44:02.507 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    43049 msg --- 95.352   msg/s -- 0.745 Mbit/s -
-- Latency: mean: 592.052 ms - med: 499 - 95pct: 924 - 99pct: 967 - 99.9pct: 976 - 99.99pct: 977 - Max: 977
15:44:12.523 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    44054 msg --- 100.321  msg/s -- 0.784 Mbit/s
--- Latency: mean: 968.571 ms - med: 969 - 95pct: 997 - 99pct: 999 - 99.9pct: 1000 - 99.99pct: 1000 - Max: 1000
15:44:22.539 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    45062 msg --- 100.642  msg/s -- 0.786 Mbit/s
--- Latency: mean: 904.625 ms - med: 905 - 95pct: 934 - 99pct: 936 - 99.9pct: 942 - 99.99pct: 943 - Max: 943
15:44:32.554 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    46070 msg --- 100.646  msg/s -- 0.786 Mbit/s
--- Latency: mean: 840.622 ms - med: 843 - 95pct: 869 - 99pct: 872 - 99.9pct: 873 - 99.99pct: 873 - Max: 873
15:44:42.570 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    47079 msg --- 100.743  msg/s -- 0.787 Mbit/s
--- Latency: mean: 775.525 ms - med: 776 - 95pct: 805 - 99pct: 808 - 99.9pct: 816 - 99.99pct: 817 - Max: 817
15:44:52.585 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    48093 msg --- 101.240  msg/s -- 0.791 Mbit/s
--- Latency: mean: 673.889 ms - med: 674 - 95pct: 729 - 99pct: 734 - 99.9pct: 738 - 99.99pct: 741 - Max: 741
15:45:02.602 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    49116 msg --- 102.140  msg/s -- 0.798 Mbit/s
--- Latency: mean: 543.650 ms - med: 551 - 95pct: 607 - 99pct: 611 - 99.9pct: 613 - 99.99pct: 613 - Max: 613
15:45:12.619 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    50226 msg --- 110.811  msg/s -- 0.866 Mbit/s
--- Latency: mean: 206.531 ms - med: 206 - 95pct: 393 - 99pct: 403 - 99.9pct: 409 - 99.99pct: 409 - Max: 409
15:45:22.678 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    51338 msg --- 111.017  msg/s -- 0.867 Mbit/s
--- Latency: mean: 0.000 ms - med: 0 - 95pct: 0 - 99pct: 0 - 99.9pct: 0 - 99.99pct: 0 - Max: 0
15:45:32.738 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    52455 msg --- 111.051  msg/s -- 0.868 Mbit/s
--- Latency: mean: 0.000 ms - med: 0 - 95pct: 0 - 99pct: 0 - 99.9pct: 0 - 99.99pct: 0 - Max: 0
15:45:42.797 [main] INFO  org.apache.pulsar.testclient.PerformanceConsumer - Throughput received:    53492 msg --- 103.071  msg/s -- 0.805 Mbit/s
--- Latency: mean: 0.000 ms - med: 0 - 95pct: 0 - 99pct: 0 - 99.9pct: 0 - 99.99pct: 0 - Max: 0
```

回退broker

下面，我们开始回退broker:

```
[root@zhoufr-pulsar-node01 pulsar282]#
/opt/Apps/pulsar282/scripts/stop_broker.sh
[root@zhoufr-pulsar-node01 pulsar282]#
/opt/Apps/pulsar280/scripts/start_broker.sh
doing start broker ...
starting broker, logging to /opt/Apps/pulsar280/logs/pulsar-broker-zhoufr-pulsar-
node02.log
Note: Set immediateFlush to true in conf/log4j2.yaml will guarantee the logging
event is flushing to disk immediately. The default behavior is switched off due
to performance considerations.
```

生产和消费经过短暂的失败后恢复正常

test-6-6] Creating producer on cnx [id: 0x52359fee, L:/10.1.32.151:40916 - R:10.1.32.153/10.1.32.153:6650]
15:48:55.387 [pulsar-client-io-2-1] INFO org.apache.pulsar.client.impl.ProducerImpl - [persistent://zhoufr/pulsar/test-topic-16] [zhoufr_pulsar_
test-6-6] Created producer on cnx [id: 0x52359fee, L:/10.1.32.151:40916 - R:10.1.32.153/10.1.32.153:6650]
15:48:55.388 [pulsar-client-io-2-1] INFO org.apache.pulsar.client.impl.ProducerImpl - [persistent://zhoufr/pulsar/test-topic-16] [zhoufr_pulsar_
test-6-6] Re-Sending 98 messages to server
15:48:55.689 [pulsar-timer-6-1] INFO org.apache.pulsar.client.impl.ConnectionHandler - [persistent://zhoufr/pulsar/test-topic-43] [zhoufr_pulsar
_test-6-8] Reconnecting after connection was closed
15:48:55.692 [pulsar-client-io-2-1] INFO org.apache.pulsar.client.impl.ProducerImpl - [persistent://zhoufr/pulsar/test-topic-43] [zhoufr_pulsar_
test-6-8] Creating producer on cnx [id: 0x61227961, L:/10.1.32.151:40912 - R:10.1.32.153/10.1.32.153:6650]
15:48:55.697 [pulsar-client-io-2-1] INFO org.apache.pulsar.client.impl.ProducerImpl - [persistent://zhoufr/pulsar/test-topic-43] [zhoufr_pulsar_
test-6-8] Created producer on cnx [id: 0x61227961, L:/10.1.32.151:40912 - R:10.1.32.153/10.1.32.153:6650]
15:48:55.698 [pulsar-client-io-2-1] INFO org.apache.pulsar.client.impl.ProducerImpl - [persistent://zhoufr/pulsar/test-topic-43] [zhoufr_pulsar_
test-6-8] Re-Sending 99 messages to server
15:48:56.061 [pulsar-timer-6-1] INFO org.apache.pulsar.client.impl.ConnectionHandler - [persistent://zhoufr/pulsar/test-topic-98] [zhoufr_pulsar
_test-6-10] Reconnecting after connection was closed
15:48:56.064 [pulsar-client-io-2-1] INFO org.apache.pulsar.client.impl.ProducerImpl - [persistent://zhoufr/pulsar/test-topic-98] [zhoufr_pulsar_
test-6-10] Creating producer on cnx [id: 0xdbf250c3, L:/10.1.32.151:40936 - R:10.1.32.153/10.1.32.153:6650]
15:48:56.069 [pulsar-client-io-2-1] INFO org.apache.pulsar.client.impl.ProducerImpl - [persistent://zhoufr/pulsar/test-topic-98] [zhoufr_pulsar_
test-6-10] Created producer on cnx [id: 0xdbf250c3, L:/10.1.32.151:40936 - R:10.1.32.153/10.1.32.153:6650]
15:48:56.069 [pulsar-client-io-2-1] INFO org.apache.pulsar.client.impl.ProducerImpl - [persistent://zhoufr/pulsar/test-topic-98] [zhoufr_pulsar_
test-6-10] Re-Sending 99 messages to server
15:48:57.635 [main] INFO org.apache.pulsar.testclient.PerformanceProducer - Throughput produced: 76913 msg --- 236.0 msg/s --- 1.8 Mbi
t/s --- failure 0.0 msg/s --- Latency: mean: 30060.334 ms - med: 18410.111 - 95pct: 89406.975 - 99pct: 96081.919 - 99.9pct: 98274.815 - 99.9
9pct: 98865.663 - Max: 98865.663
15:49:07.664 [main] INFO org.apache.pulsar.testclient.PerformanceProducer - Throughput produced: 77922 msg --- 100.0 msg/s --- 0.8 Mbi
t/s --- failure 0.0 msg/s --- Latency: mean: 4.453 ms - med: 3.933 - 95pct: 8.578 - 99pct: 10.573 - 99.9pct: 13.423 - 99.99pct: 14.
434 - Max: 14.434
15:49:17.688 [main] INFO org.apache.pulsar.testclient.PerformanceProducer - Throughput produced: 78925 msg --- 100.1 msg/s --- 0.8 Mbi
t/s --- failure 0.0 msg/s --- Latency: mean: 3.958 ms - med: 3.868 - 95pct: 4.792 - 99pct: 6.803 - 99.9pct: 11.858 - 99.99pct: 14.
804 - Max: 14.804
15:49:27.712 [main] INFO org.apache.pulsar.testclient.PerformanceProducer - Throughput produced: 79927 msg --- 100.0 msg/s --- 0.8 Mbi
t/s --- failure 0.0 msg/s --- Latency: mean: 4.063 ms - med: 3.889 - 95pct: 5.065 - 99pct: 9.179 - 99.9pct: 15.158 - 99.99pct: 15.
668 - Max: 15.668
15:49:37.736 [main] INFO org.apache.pulsar.testclient.PerformanceProducer - Throughput produced: 80930 msg --- 100.1 msg/s --- 0.8 Mbi
t/s --- failure 0.0 msg/s --- Latency: mean: 4.062 ms - med: 3.870 - 95pct: 5.243 - 99pct: 9.045 - 99.9pct: 13.994 - 99.99pct: 14.
409 - Max: 14.409

15:52:56.129 [pulsar-client-io-1-1] INFO org.apache.pulsar.client.impl.ConsumerImpl - [persistent://zhoufr/pulsar/test-topic-71][sub] Subscribin
g to topic on cnx [id: 0x7c119ea8, L:/10.1.32.152:46028 - R:10.1.32.151/10.1.32.151:6650], consumerId 50
15:52:56.131 [pulsar-client-io-1-1] INFO org.apache.pulsar.client.impl.ConsumerImpl - [persistent://zhoufr/pulsar/test-topic-71][sub] Subscribed
to topic on 10.1.32.151/10.1.32.151:6650 -- consumer: 50
15:52:56.366 [pulsar-timer-5-1] INFO org.apache.pulsar.client.impl.ConnectionHandler - [persistent://zhoufr/pulsar/test-topic-86] [sub] Reconnec
ting after connection was closed
15:52:56.367 [pulsar-client-io-1-1] INFO org.apache.pulsar.client.impl.ConnectionPool - [[id: 0xea7f0422, L:/127.0.0.1:57818 - R:localhost/127.0
.0.1:6650]] Connected to server
15:52:56.375 [pulsar-client-io-1-1] INFO org.apache.pulsar.client.impl.ConsumerImpl - [persistent://zhoufr/pulsar/test-topic-86][sub] Subscribin
g to topic on cnx [id: 0x7c2e3940, L:/10.1.32.152:45972 - R:10.1.32.151/10.1.32.151:6650], consumerId 98
15:52:56.378 [pulsar-client-io-1-1] INFO org.apache.pulsar.client.impl.ConsumerImpl - [persistent://zhoufr/pulsar/test-topic-86][sub] Subscribed
to topic on 10.1.32.151/10.1.32.151:6650 -- consumer: 98
15:52:56.568 [pulsar-timer-5-1] INFO org.apache.pulsar.client.impl.ConnectionHandler - [persistent://zhoufr/pulsar/test-topic-61] [sub] Reconnec
ting after connection was closed
15:52:56.569 [pulsar-client-io-1-1] INFO org.apache.pulsar.client.impl.ConnectionPool - [[id: 0x211fe8c3, L:/127.0.0.1:57820 - R:localhost/127.0
.0.1:6650]] Connected to server
15:52:56.576 [pulsar-client-io-1-1] INFO org.apache.pulsar.client.impl.ConnectionPool - [[id: 0x71a5c2ec, L:/10.1.32.152:46034 - R:10.1.32.151/1
0.1.32.151:6650]] Connected to server
15:52:56.577 [pulsar-client-io-1-1] INFO org.apache.pulsar.client.impl.ConsumerImpl - [persistent://zhoufr/pulsar/test-topic-61][sub] Subscribin
g to topic on cnx [id: 0x71a5c2ec, L:/10.1.32.152:46034 - R:10.1.32.151/10.1.32.151:6650], consumerId 99
15:52:56.579 [pulsar-client-io-1-1] INFO org.apache.pulsar.client.impl.ConsumerImpl - [persistent://zhoufr/pulsar/test-topic-61][sub] Subscribed
to topic on 10.1.32.151/10.1.32.151:6650 -- consumer: 99
15:53:03.980 [main] INFO org.apache.pulsar.testclient.PerformanceConsumer - Throughput received: 97340 msg --- 162.766 msg/s -- 1.272 Mbit/s
--- Latency: mean: 11996.171 ms - med: 12008 - 95pct: 22752 - 99pct: 23749 - 99.9pct: 24406 - 99.99pct: 24682 - Max: 24682
15:53:14.036 [main] INFO org.apache.pulsar.testclient.PerformanceConsumer - Throughput received: 98336 msg --- 99.437 msg/s -- 0.777 Mbit/s -
-- Latency: mean: 0.000 ms - med: 0 - 95pct: 0 - 99pct: 0 - 99.9pct: 0 - 99.99pct: 0 - Max: 0
15:53:24.093 [main] INFO org.apache.pulsar.testclient.PerformanceConsumer - Throughput received: 99337 msg --- 99.542 msg/s -- 0.778 Mbit/s -
-- Latency: mean: 0.000 ms - med: 0 - 95pct: 0 - 99pct: 0 - 99.9pct: 0 - 99.99pct: 0 - Max: 0
15:53:34.152 [main] INFO org.apache.pulsar.testclient.PerformanceConsumer - Throughput received: 100372 msg --- 102.909 msg/s -- 0.804 Mbit/s
--- Latency: mean: 0.000 ms - med: 0 - 95pct: 0 - 99pct: 0 - 99.9pct: 0 - 99.99pct: 0 - Max: 0
15:53:44.208 [main] INFO org.apache.pulsar.testclient.PerformanceConsumer - Throughput received: 101425 msg --- 104.694 msg/s -- 0.818 Mbit/s
--- Latency: mean: 0.000 ms - med: 0 - 95pct: 0 - 99pct: 0 - 99.9pct: 0 - 99.99pct: 0 - Max: 0
15:53:54.265 [main] INFO org.apache.pulsar.testclient.PerformanceConsumer - Throughput received: 102421 msg --- 99.039 msg/s -- 0.774 Mbit/s -
-- Latency: mean: 0.000 ms - med: 0 - 95pct: 0 - 99pct: 0 - 99.9pct: 0 - 99.99pct: 0 - Max: 0
15:54:04.321 [main] INFO org.apache.pulsar.testclient.PerformanceConsumer - Throughput received: 103418 msg --- 99.139 msg/s -- 0.775 Mbit/s -
-- Latency: mean: 0.000 ms - med: 0 - 95pct: 0 - 99pct: 0 - 99.9pct: 0 - 99.99pct: 0 - Max: 0

此时我们再次检测pulsar的版本：

      "msgRateIn" : 28.001527786651106,
      "msgThroughputIn" : 30456.661696125135,
      "msgRateOut" : 28.001530734476514,
      "msgThroughputOut" : 30456.664903138695,
      "consumerCount" : 28,
      "producerCount" : 28,
      "topics" : 28,
      "cacheSize" : 0
    }
  },
  "numTopics" : 57,
  "numBundles" : 2,
  "numConsumers" : 56,
  "numProducers" : 56,
  "bundles" : ["zhoufr/pulsar/0x40000000_0x80000000", "zhoufr/pulsar/0x00000000_0x40000000"],
  "lastBundleGains" : [ ],
  "lastBundleLosses" : [ ],
  "brokerVersionString" : "2.8.0",
  "protocols" : { },
  "advertisedListeners" : { },
  "loadReportType" : "LocalBrokerData",
  "maxResourceUsage" : 0.4088636636734009,
  "bundleStats" : {
    "zhoufr/pulsar/0x40000000_0x80000000" : {
      "msgRateIn" : 28.0007434101508,
      "msgThroughputIn" : 30463.80879932468,
      "msgRateOut" : 28.0007480538617,
      "msgThroughputOut" : 30463.813851567465,
      "consumerCount" : 28,
      "producerCount" : 28,
      "topics" : 29,
      "cacheSize" : 0
    },
    "zhoufr/pulsar/0x00000000_0x40000000" : {
      "msgRateIn" : 28.001527786651106,
      "msgThroughputIn" : 30456.661696125135,
      "msgRateOut" : 28.001530734476514,

另外两台进行相同的操作,注意不要在同一时间操作

回退bookie

回退bookkeeper需要关注日志，并且也是滚动回退，防止集群脑裂， 同样会发现生产和消费的窗口会重启：

```
[root@zhoufr-pulsar-node01 pulsar282]# /opt/Apps/pulsar282/scripts/stop_bookie.sh
[root@zhoufr-pulsar-node01 pulsar282]#
/opt/Apps/pulsar280/scripts/start_bookie.sh
doing start bookie ...
starting bookie, logging to /opt/Apps/pulsar280/logs/pulsar-bookie-zhoufr-pulsar-
node01.log
Note: Set immediateFlush to true in conf/log4j2.yaml will guarantee the logging
event is flushing to disk immediately. The default behavior is switched off due
to performance considerations.
```

当一个节点发生重置bookkeeper进程时，日志和测试工具都有相应的错误输出，如下截图所示

三台重启之后，测试工具仍然可生产消费，说明进程切换正常

切换zookeeper

采用相同的方式关闭zookeeper，并重新启动老的zookeeper,注意：不要同一时间内关闭和启动, 重置zookeeper对性能测试工具无影响

```
[root@zhoufr-pulsar-node01 pulsar282]#
/opt/Apps/pulsar282/scripts/stop_zookeeper.sh
doing stop zookeeper ...
stopping zookeeper
Shutdown is in progress... Please wait...
Shutdown completed.
[root@zhoufr-pulsar-node01 pulsar282]#
/opt/Apps/pulsar280/scripts/start_zookeeper.sh
doing start zookeeper ...
starting zookeeper, logging to /opt/Apps/pulsar280/logs/pulsar-zookeeper-zhoufr-
pulsar-node01.log
Note: Set immediateFlush to true in conf/log4j2.yaml will guarantee the logging
event is flushing to disk immediately. The default behavior is switched off due
to performance considerations.
```

完成后检查服务器进程如下：