

UCS Hyperflex Trunk-servicelevering en -verificatie

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Inleiding

In dit document wordt ZooKeeper beschreven, wat in wezen een gecentraliseerde service is voor gedistribueerde systemen naar een hiërarchische waardeopslag. Het wordt gebruikt om een gedistribueerde configuratie service, synchronisatieservice en naamgeving voor grote gedistribueerde systemen te bieden. De architectuur van ZooKeeper ondersteunt hoge beschikbaarheid door redundante services. Clients kunnen dus een andere ZooKeeper-leider vragen als de eerste geen antwoord geeft. ZooKeeper-knooppunten slaan hun gegevens op in een hiërarchische naamruimte, zoals een bestandssysteem of een boomgegevensstructuur. Clients kunnen lezen en schrijven naar de knooppunten en hebben zo een gedeelde configuratiedienst. ZooKeeper kan worden gezien als een atomisch uitgezonden systeem waardoor updates volledig geordend zijn.

ZooKeeper biedt deze belangrijkste functies:

- Betrouwbaar systeem - Het systeem is zeer betrouwbaar omdat het blijft werken, zelfs wanneer een knooppunt niet werkt.
- Eenvoudige architectuur - De architectuur van ZooKeeper is vrij eenvoudig; het gebruikt een gedeelde hiërarchische naamruimte, die helpt bij de procescoördinatie.
- Snel verwerken - ZooKeeper is vooral snel voor lezen-dominante werklasten.
- Schaalbaar - De prestaties van ZooKeeper kunnen worden verbeterd door het toevoegen van knooppunten.

In HX is er deze specifieke implementatie:

- De service die **exposant** heet, beheert zooetueper startup/shutdown.
- Processen binnen de HX-cluster zijn klanten aan Zookeeper en communiceren via tcp poort **2181** ex storfs, stmgr, enzovoort.
- Systemen met meer dan vijf knooppunten zullen een aantal knooppunten in de stand-alone hebben. Systemen met vijf knooppunten of minder zouden nooit een knooppunt in een stand-alone moeten hebben.
- Het minimumaantal knooppunten vereist voor Quorum = $N/2 + 1$.

Bijvoorbeeld, voor een drieknoopcluster - $N/2=1.5$ Rond naar $1 + 1 = 2$ (slechts één noedelstoring kan worden getolereerd)

Bijvoorbeeld voor een vijf knooppunt-cluster - $N/2=2.5$ Rond naar $2 + 1 = 3$ (er kunnen slechts twee

knooppunten worden getolereerd)

Aangezien u slechts vijf knooppunten voor een ZK-cluster doet, tolereer u slechts een maximum van twee knooppunten voor om het even welk aantal knopen in de cluster. Dit geldt voor geconvergeerde knooppunten.

Servicestatus controleren

```
root@SpringpathControllerMSH7NHXRFL:/var/log/zookeeper# service exhibitor status
exhibitor start/running, process 4905
```

```
root@help:/var/log/springpath# ps -aux | grep -i exhibitor
root 12519 0.0 0.2 4690592 198892 ? Ssl May19 7:19 exhibitor -cp exhibitor.jar:/etc/exhibitor/ -
Xmx256M -XX:+HeapDumpOnOutOfMemoryError -
XX:HeapDumpPath=/var/log/exhibitor_heap_dump_2019_05_19_22:19:48.hprof -
Dlog4j.configuration=file:///etc/exhibitor/log4j.properties -
Dspringpath.zkdownscript=/usr/share/springpath/storfs-misc/zkMonitor.sh -
Djava.security.egd=file:/dev/./urandom -jar exhibitor.jar --hostname 10.197.252.100 -c file --
fsconfigdir /etc/exhibitor --port 8180 --listenaddress 10.197.252.100
root@help:/var/log/springpath# pidof exhibitor
12519
```

Zoeker-service

Zoveel heeft een syntax van vier letters die je in staat stelt om de status van een zoekopdracht, lijstverbindingen, aantal knooppunten enzovoort weer te geven.

Controleer de diertuinstatus op het lokale knooppunt - (ok ==> Gaat het?.. imok=>Ik ben OK).

```
root@SpringpathControllerMSH7NHXRFL:/var/log/zookeeper# echo ruok|nc localhost 2181
imok
```

Controleer of de diertuin een leider of volger is.

```
root@SpringpathControllerMSH7NHXRFL:/var/log/zookeeper# echo srvr | nc localhost 2181
Zookeeper version: 3.4.6--1, built on 06/16/2015 22:50 GMT
Latency min/avg/max: 0/0/101
Received: 213128515
Sent: 213164119
Connections: 6
Outstanding: 0
Zxid: 0xa000301d0
Mode: leader
Node count: 17090
```

```
root@SpringpathControllerMSH7NHXRFL:/var/log/zookeeper# echo stat | nc localhost 2181
Zookeeper version: 3.4.6--1, built on 06/16/2015 22:50 GMT
Clients:
 /192.168.5.161:56128[1](queued=0,recved=169146196,sent=169162634)
 /192.168.5.161:38614[1](queued=0,recved=186015,sent=186017)
 /192.168.5.164:44412[1](queued=0,recved=184398,sent=184399)
 /192.168.5.164:44447[1](queued=0,recved=561168,sent=563034)
 /127.0.0.1:60060[0](queued=0,recved=1,sent=0)
 /192.168.5.161:58754[1](queued=0,recved=39233,sent=39261)
```

```
Latency min/avg/max: 0/0/101
```

```
Received: 213109927
Sent: 213145531
Connections: 6
Outstanding: 0
Zxid: 0xa000301d0
Mode: leader
Node count: 17090
```

```
root@SpringpathControllerMSH7NHXRFL:/var/log/zookeeper# echo mntr | nc localhost 2181
zk_version      3.4.6--1, built on 06/16/2015 22:50 GMT
zk_avg_latency  0
zk_max_latency  101
zk_min_latency  0
zk_packets_received  213148668
zk_packets_sent    213184272
zk_num_alive_connections  6
zk_outstanding_requests  0
zk_server_state  leader
zk_znode_count    17090
zk_watch_count   4305
zk_ephemorals_count  20
zk_approximate_data_size  1831768
zk_open_file_descriptor_count  43
zk_max_file_descriptor_count  4096
zk_followers     3
zk_synced_followers  3
zk_pending_syncs  0
```

Controleer de configuratie van de Zookeeper:

```
root@SpringpathControllerMSH7NHXRFL:/var/log/zookeeper# echo conf | nc localhost 2181
clientPort=2181
dataDir=/var/zookeeper/version-2
dataLogDir=/var/zookeeper/version-2
tickTime=3000
maxClientCnxns=60
minSessionTimeout=6000
maxSessionTimeout=60000
serverId=3
initLimit=10
syncLimit=3
electionAlg=3
electionPort=3888
quorumPort=2888
peerType=0
```

Logbestanden in een rechthoekig menu opslaan

Als er problemen zijn met de gebruikersgroepen, helpen deze logbestanden met het vinden van sporen:

- `/var/log/zoökeeper/zoökeeper*` - Hiermee worden gearchiveerde stammen onderhouden, behulpzame zoekwoorden WARN, FOUT, Vaarwel, leider enzovoort.
- `/var/log/springpath/zk-*`
- `/var/log/springpath/exhibitor.log`

```
root@SpringpathControllerMSH7NHXRFL:/var/log/zookeeper# grep -i leader
/var/log/zookeeper/zookeeper.log*
/var/log/zookeeper/zookeeper.log.7:2016-10-14 22:59:26,088 [myid:3] - INFO
[QuorumPeer[myid=3]/0:0:0:0:0:0:0:0:2181:Leader@60] - TCP NoDelay set to: true
/var/log/zookeeper/zookeeper.log.7:2016-10-14 22:59:26,099 [myid:3] - INFO
```

```
[QuorumPeer[myid=3]/0:0:0:0:0:0:0:0:2181:Leader@358] - LEADING - LEADER ELECTION TOOK - 354
/var/log/zookeeper/zookeeper.log.7:2016-10-14 22:59:26,120 [myid:3] - INFO [LearnerHandler-
/192.168.5.164:36487:LearnerHandler@522] - Received NEWLEADER-ACK message from 0
/var/log/zookeeper/zookeeper.log.7:2016-10-14 22:59:26,120 [myid:3] - INFO [LearnerHandler-
/192.168.5.163:43451:LearnerHandler@522] - Received NEWLEADER-ACK message from 1
/var/log/zookeeper/zookeeper.log.7:2016-10-14 22:59:26,120 [myid:3] - INFO
[QuorumPeer[myid=3]/0:0:0:0:0:0:0:0:2181:Leader@943] - Have quorum of supporters, sids: [ 0,1,3
]; starting up and setting last processed zxid: 0x100000000
/var/log/zookeeper/zookeeper.log.7:2016-10-14 22:59:26,272 [myid:3] - INFO
[WorkerReceiver[myid=3]:FastLeaderElection@597] - Notification: 1 (message format version), 3
(n.leader), 0x0 (n.zxid), 0x1 (n.round), LOOKING (n.state), 2 (n.sid), 0x0 (n.peerEpoch) LEADING
(my state)
/var/log/zookeeper/zookeeper.log.7:2016-10-14 22:59:26,291 [myid:3] - INFO [LearnerHandler-
/192.168.5.162:48778:LearnerHandler@486] - Sending snapshot last zxid of peer is 0x0 zxid of
leader is 0x100000000sent zxid of db as 0x100000000
/var/log/zookeeper/zookeeper.log.7:2016-10-14 22:59:26,298 [myid:3] - INFO [LearnerHandler-
/192.168.5.162:48778:LearnerHandler@522] - Received NEWLEADER-ACK message from 2
```

```
root@SpringpathControllerMSH7NHXRFL:/var/log/zookeeper# grep -i warn
/var/log/zookeeper/zookeeper.log*
```

```
/var/log/zookeeper/zookeeper.log.7:2016-10-14 22:46:30,354 [myid:] - WARN
[main:QuorumPeerMain@113] - Either no config or no quorum defined in config, running in
standalone mode
/var/log/zookeeper/zookeeper.log.7:2016-10-14 22:52:55,238 [myid:] - WARN
[main:QuorumPeerMain@113] - Either no config or no quorum defined in config, running in
standalone mode
```

```
root@SpringpathControllerMSH7NHXRFL:/var/log/zookeeper# grep -i goodbye
/var/log/zookeeper/zookeeper.log*
```

```
/var/log/zookeeper/zookeeper.log.1:2017-01-23 03:55:50,429 [myid:3] - WARN [LearnerHandler-
/192.168.5.163:44118:LearnerHandler@646] - ***** GOODBYE /192.168.5.163:44118 *****
/var/log/zookeeper/zookeeper.log.1:2017-01-24 23:30:14,956 [myid:3] - WARN [LearnerHandler-
/192.168.5.164:44720:LearnerHandler@646] - ***** GOODBYE /192.168.5.164:44720 *****
/var/log/zookeeper/zookeeper.log.3:2016-12-01 23:45:22,510 [myid:3] - WARN [LearnerHandler-
/192.168.5.164:44051:LearnerHandler@646] - ***** GOODBYE /192.168.5.164:44051 *****
/var/log/zookeeper/zookeeper.log.3:2016-12-08 00:36:37,752 [myid:3] - WARN [LearnerHandler-
/192.168.5.162:46577:LearnerHandler@646] - ***** GOODBYE /192.168.5.162:46577 *****
/var/log/zookeeper/zookeeper.log.4:2016-11-22 23:45:30,957 [myid:3] - WARN [LearnerHandler-
/192.168.5.163:49016:LearnerHandler@646] - ***** GOODBYE /192.168.5.163:49016 *****
/var/log/zookeeper/zookeeper.log.4:2016-11-23 00:03:59,397 [myid:3] - WARN [LearnerHandler-
/192.168.5.164:45952:LearnerHandler@646] - ***** GOODBYE /192.168.5.164:45952 *****
/var/log/zookeeper/zookeeper.log.4:2016-12-01 22:51:00,538 [myid:3] - WARN [LearnerHandler-
/192.168.5.163:45284:LearnerHandler@646] - ***** GOODBYE /192.168.5.163:45284 *****
/var/log/zookeeper/zookeeper.log.5:2016-11-10 23:39:47,477 [myid:3] - WARN [LearnerHandler-
/192.168.5.163:43576:LearnerHandler@646] - ***** GOODBYE /192.168.5.163:43576 *****
/var/log/zookeeper/zookeeper.log.5:2016-11-11 00:49:39,782 [myid:3] - WARN [LearnerHandler-
/192.168.5.164:35219:LearnerHandler@646] - ***** GOODBYE /192.168.5.164:35219 *****
```

Enkele voorbeeldblokken - Verkiezingen voor landeigenaars

```
2017-01-22 23:47:29,427 [myid:3] - INFO [Thread-2:QuorumCnxManager$Listener@504] - My election
bind port: /192.168.5.161:3888
2017-01-22 23:47:29,435 [myid:3] - INFO
[QuorumPeer[myid=3]/0:0:0:0:0:0:0:0:2181:QuorumPeer@714] - LOOKING
2017-01-22 23:47:29,438 [myid:3] - INFO
[QuorumPeer[myid=3]/0:0:0:0:0:0:0:0:2181:FastLeaderElection@815] - New election. My id = 3,
proposed zxid=0x9000a6b4d
2017-01-22 23:47:29,443 [myid:3] - INFO [WorkerReceiver[myid=3]:FastLeaderElection@597] -
Notification: 1 (message format version), 2 (n.leader), 0x800055ea0 (n.zxid), 0x1 (n.round),
FOLLOWING (n.state), 0 (n.sid), 0x9 (n.peerEpoch) LOOKING (my state)
2017-01-22 23:47:29,444 [myid:3] - INFO [WorkerReceiver[myid=3]:FastLeaderElection@597] -
```

Notification: 1 (message format version), 2 (n.leader), 0x800055ea0 (n.zxid), 0x1 (n.round), FOLLOWING (n.state), 1 (n.sid), 0x9 (n.peerEpoch) LOOKING (my state)
2017-01-22 23:47:29,444 [myid:3] - INFO [WorkerReceiver[myid=3]:FastLeaderElection@597] - Notification: 1 (message format version), 3 (n.leader), 0x9000a6b4d (n.zxid), 0x1 (n.round), LOOKING (n.state), 3 (n.sid), 0x9 (n.peerEpoch) LOOKING (my state)
2017-01-22 23:47:29,444 [myid:3] - INFO [WorkerReceiver[myid=3]:FastLeaderElection@597] - Notification: 1 (message format version), 2 (n.leader), 0x800055ea0 (n.zxid), 0x1 (n.round), FOLLOWING (n.state), 1 (n.sid), 0x9 (n.peerEpoch) LOOKING (my state)
2017-01-22 23:47:29,445 [myid:3] - INFO [WorkerReceiver[myid=3]:FastLeaderElection@597] - Notification: 1 (message format version), 2 (n.leader), 0x800055ea0 (n.zxid), 0x1 (n.round), LEADING (n.state), 2 (n.sid), 0x9 (n.peerEpoch) LOOKING (my state)
2017-01-22 23:47:29,445 [myid:3] - INFO [WorkerReceiver[myid=3]:FastLeaderElection@597] - Notification: 1 (message format version), 2 (n.leader), 0x800055ea0 (n.zxid), 0x1 (n.round), FOLLOWING (n.state), 0 (n.sid), 0x9 (n.peerEpoch) LOOKING (my state)
2017-01-22 23:47:29,446 [myid:3] - INFO [QuorumPeer[myid=3]/0:0:0:0:0:0:0:0:2181:QuorumPeer@784] - FOLLOWING
2017-01-22 23:47:29,449 [myid:3] - INFO [QuorumPeer[myid=3]/0:0:0:0:0:0:0:0:2181:Learner@86] - TCP NoDelay set to: true
2017-01-22 23:47:29,449 [myid:3] - INFO [WorkerReceiver[myid=3]:FastLeaderElection@597] - Notification: 1 (message format version), 2 (n.leader), 0x800055ea0 (n.zxid), 0x1 (n.round), LEADING (n.state), 2 (n.sid), 0x9 (n.peerEpoch) FOLLOWING (my state)
2017-01-22 23:47:29,660 [myid:3] - INFO [QuorumPeer[myid=3]/0:0:0:0:0:0:0:0:2181:Environment@100] - Server environment:zookeeper.version=3.4.6--1, built on 06/16/2015 22:50 GMT
2017-01-22 23:47:29,661 [myid:3] - INFO [QuorumPeer[myid=3]/0:0:0:0:0:0:0:0:2181:Environment@100] - Server environment:host.name=SpringpathControllerMSH7NHXRFL
2017-01-22 23:47:29,661 [myid:3] - INFO [QuorumPeer[myid=3]/0:0:0:0:0:0:0:0:2181:Environment@100] - Server environment:java.version=1.7.0_79
2017-01-22 23:47:29,661 [myid:3] - INFO [QuorumPeer[myid=3]/0:0:0:0:0:0:0:0:2181:Environment@100] - Server environment:java.vendor=Oracle Corporation
2017-01-22 23:47:29,661 [myid:3] - INFO [QuorumPeer[myid=3]/0:0:0:0:0:0:0:0:2181:Environment@100] - Server environment:java.home=/usr/lib/jvm/java-7-openjdk-amd64/jre
2017-01-22 23:47:29,661 [myid:3] - INFO [QuorumPeer[myid=3]/0:0:0:0:0:0:0:0:2181:Environment@100] - Server environment:java.class.path=/usr/share/zookeeper/bin/./build/classes:/usr/share/zookeeper/bin/./build/lib/*.jar:/usr/share/zookeeper/bin/./lib/slf4j-log4j12-1.6.1.jar:/usr/share/zookeeper/bin/./lib/slf4j-api-1.6.1.jar:/usr/share/zookeeper/bin/./lib/netty-3.7.0.Final.jar:/usr/share/zookeeper/bin/./lib/log4j-1.2.16.jar:/usr/share/zookeeper/bin/./lib/jline-0.9.94.jar:/usr/share/zookeeper/bin/./zookeeper-3.4.6.jar:/usr/share/zookeeper/bin/./src/java/lib/*.jar:/usr/share/zookeeper/bin/./conf:
2017-01-22 23:47:29,661 [myid:3] - INFO [QuorumPeer[myid=3]/0:0:0:0:0:0:0:0:2181:Environment@100] - Server environment:java.library.path=/usr/java/packages/lib/amd64:/usr/lib/x86_64-linux-gnu/jni:/lib/x86_64-linux-gnu:/usr/lib/x86_64-linux-gnu:/usr/lib/jni:/lib:/usr/lib
2017-01-22 23:47:29,661 [myid:3] - INFO [QuorumPeer[myid=3]/0:0:0:0:0:0:0:0:2181:Environment@100] - Server environment:java.io.tmpdir=/tmp
2017-01-22 23:47:29,661 [myid:3] - INFO [QuorumPeer[myid=3]/0:0:0:0:0:0:0:0:2181:Environment@100] - Server environment:java.compiler=

LEADER ELECTION TOOK

```
root@SpringpathControllerMSH7NHXRFL:/var/log/springpath# cat zk-debug-storfs.log
```

```
2017-01-22 23:47:18,702:5866(0x7fd1f7ef5700):ZOO_INFO@check_events@1760: initiated connection to
server [192.168.5.163:2181]
2017-01-22 23:47:18,704:5866(0x7fd1f7ef5700):ZOO_INFO@check_events@1807: session establishment
complete on server [192.168.5.163:2181], sessionId=0x159165ff6310005, negotiated timeout=17001
2017-01-22 23:47:18,704:5866(0x7fd1f76f4700):ZOO_INFO@process_completions@2170: Calling a
watcher for node s], type = s
2017-01-23 01:50:16,809:5866(0x7fd1f7ef5700):ZOO_ERROR@handle_socket_error_msg@1778: Socket
[192.168.5.163:2181] zk retcode=-4, errno=112(Host is down): failed while receiving a server
response
2017-01-23 01:50:16,818:5866(0x7fd1f76f4700):ZOO_INFO@process_completions@2170: Calling a
watcher for node s], type = s
2017-01-23 01:50:16,818:5866(0x7fd1f7ef5700):ZOO_INFO@check_events@1760: initiated connection to
server [192.168.5.164:2181]
2017-01-23 01:50:16,818:5866(0x7fd1f7ef5700):ZOO_ERROR@handle_socket_error_msg@1778: Socket
[192.168.5.164:2181] zk retcode=-4, errno=112(Host is down): failed while receiving a server
response
2017-01-23 01:50:17,819:5866(0x7fd1f7ef5700):ZOO_ERROR@handle_socket_error_msg@1740: Socket
[192.168.5.162:2181] zk retcode=-4, errno=115(Operation now in progress): poll refused to accept
read/write from the client
```

```
root@help:/var/log/springpath# cat zkEvents.log
```

```
INFO:ZkEvents:Send changes to listeners
INFO:EventDB:Received message{"timestamp": 1559200009008, "description": "Cluster policy
compliance is satisfied", "id": "ClusterPolicyComplianceSatisfiedEvent"}
DEBUG:kazoo.client:Received EVENT: Watch(type=3, state=3,
path=u'/zkEvents/lastModificationTime')
DEBUG:kazoo.client:Sending request(xid=42): GetData(path='/zkEvents/lastModificationTime',
watcher=
```

Cluster is healthy

```
root@SpringpathControllerPZTMTRSH7K:/var/log/springpath# tail exhibitor.log
```

```
05-20 05:28:52.223 INFO org.mortbay.log - Started SocketConnector@10.197.252.99:8180
05-20 05:29:20.106 INFO com.netflix.exhibitor.core.activity.ActivityLog - State: down
05-20 05:29:20.106 INFO com.netflix.exhibitor.core.activity.ActivityLog - Attempting to stop
instance
05-20 05:29:20.106 INFO com.netflix.exhibitor.core.activity.ActivityLog - Attempting to
start/restart ZooKeeper
05-20 05:29:20.328 INFO com.netflix.exhibitor.core.activity.ActivityLog - jps didn't find
instance - assuming ZK is not running
05-20 05:29:20.347 INFO com.netflix.exhibitor.core.activity.ActivityLog - Process started via:
/usr/share/zookeeper/bin/zkServer.sh
05-20 05:29:20.353 ERROR com.netflix.exhibitor.core.activity.ActivityLog - ZooKeeper Server:
ZooKeeper JMX enabled by default
05-20 05:29:20.353 ERROR com.netflix.exhibitor.core.activity.ActivityLog - ZooKeeper Server:
Using config: /usr/share/zookeeper/bin/./conf/zoo.cfg
05-20 05:29:21.366 INFO com.netflix.exhibitor.core.activity.ActivityLog - ZooKeeper Server:
Starting zookeeper ... STARTED
05-20 05:29:50.128 INFO com.netflix.exhibitor.core.activity.ActivityLog - State: serving
```

Houder logbestanden van Support-bundel (verhalen)

In een ondersteunende bundel, zijn dit belangrijke te onderzoeken bestanden:

zookeeper.log	/var/log/zookeeper
zk-storfs.log	/var/log/springpath
echo_stat_ nc_localhost_2181.out	under cmds_output