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Virtual Technology Summit

Hands-On Learning With Oracle and Community Experts

Where Technology and Community Meet

Oracle NoSQL Database 3.0

Installation, Cluster Topology Deployment, HA and more

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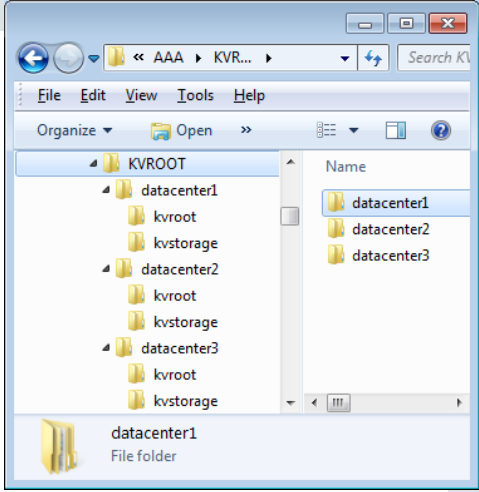
Download Oracle NoSQL Database

- Go here and download ONDB and unzip into a directory (will be your KVHOME)
  - http://download.oracle.com/otn-pub/otn_software/nosql-database/kv-ce-3.0.9.zip

Steps to Deploy ONDB

- Create a config file with host, port, capacity, memory etc.
- Start Storage Node Agent
- On this storage node agent
  - Name your KV store
  - Deploy a data center
  - Add storage node to the data center
  - Deploy admin service for web GUI
  - Create a storage node pool
- Add other Storage node agents to the data center
- Create and deploy topology

NoSQL HOL - Getting to Work



- Setup for work
  - Create an installation directory somewhere called “kvhome”
  - Unzip the Lab content into that kvhome directory
  - Create a data directory called “KVROOT”, subdir “datacenter1-3” subdirs “kvroot”, “kvstorage”
    - » See Picture for details
  - Setup your environment for the scripts
    - Look at setenv.bat
      - set KVHOME=%USERPROFILE%\nosql\kvhome
      - set KVROOT=%USERPROFILE%\nosql\KVROOT
      - set CLASSPATH=%KVHOME%\lib
      - set PATH=C:\Program Files (x86)\Java\jre7\bin;%PATH%

NoSQL HOL - Getting to Work

- Make sure your environment is finding the install
  - User> java -jar %KVHOME%\lib\kvstore.jar

```
Usage: java -jar KVHOME/lib/kvstore.jar
  <kvlite | makebootconfig | securityconfig |
   start | stop | restart | runadmin | load | ping | version |
   generateconfig | help> [-verbose] [args]
```

NoSQL HOL - Getting to Work

- Step 1 - Create a Storage Node configuration file
  - This is done 1 per physical machine or 1 per VM
  - Examine the script makeboot.bat
    - Notice: capacity, CPUs, memory, etc
    - Notice: we play with ports because VM's on 1 machine
      - If separate machines, then all ports can be the same
  - Run it **user>makeboot.bat**
  - Go checkout the config.xml file

NoSQL HOL - Getting to Work

- Step 2 – Start the Storage Node agents
  - This is done 1 per physical machine or 1 per VM
  - Examine the script start.bat (Notice: a simple command points to KVROOT)
  - Use processExplorer or Task Manager: (Notice no processes from kvstore)
  - Run it **user>start.bat**
  - Use processExplorer or Task Manager : (Notice processes from kvstore)
    - Processes listen for boot strapping commands to setup / extend clusters

NoSQL HOL - Getting to Work

- Step 3 – Start an administration CLI session
  - This is done on one of the storage nodes in the cluster
  - Examine the script startadmin.bat
    - Notice: uses the agent port, puts you into a bootstrap mode
  - Run it **user>startadmin.bat**
    - Notice: you are now at an administrative command prompt

NoSQL HOL - Getting to Work

- Step 4 – Create / deploy the bootstrap zone and admin U.I. service
  - This is defining a logical Zone, assigning Storage Nodes, setting replication
  - Examine the script cstore1_win.src (file extension is meaningless)
    - Notice: this is a series of commands for the admin CLI
    - Notice: we are running them as a script, but you can do each line in CLI
  - Run it **kv>load –file cstore1_win.src**
    - Notice: you just defined a cluster (store) named “ondb”
  - Open a browser and type in the url: localhost:5899 ….see the topology

NoSQL HOL - Getting to Work

- Step 5 – Create / deploy 2 more Zones, with Storage Nodes
  - This is finishing the declaration of resources and defining a Topology
    - The topology is not actually deployed until the very last step
    - Be prepared, go to your browser as soon as you run script
  - Examine the script cstore2_win.src
    - Notice - adding resources to a pool, then telling Topology use the pool
  - Run it **kv>load -file cstore2_win.src** …hurry to your browser
    - Now you have a full Topology created and a cluster Deployed

NoSQL HOL - Getting to Work

- Step 6 – Lets talk about the Topology created, SN, RG and HA topic
  - While examining the Admin Browser, hover over RG links and notice SN shift
    - What you will see is that each replica in RG lands in separate SN
  - Examine the SN's, replicas and masters
  - Run it **kv>ping**
    - Now you can see where the master is …. For the moment

NoSQL HOL - Getting to Work

- Step 7 – Lets kill some hardware and see what happens
  - Open for editing the stop.bat file, and copy “datacenter3” line
    - In another terminal window, execute the line to stop a SN
      - like pulling power on machine
      - **user>start java -jar %KVHOME%\lib\kvstore.jar stop -root %KVROOT%\datacenter3\kvroot**
      - Go checkout your browser and see it is telling you there are problems
  - Back to the admin shell, run it again **kv>ping**
    - You can see master has changed, one data center down
      - Still have read / write access even after having killed a master

NoSQL HOL - Getting to Work

- Step 8 – Bring the cluster back fully online
  - Open for editing the start.bat file, and copy the “datacenter3” line
    - In another terminal window and execute the line to start the SN
      - like turn power on machine
      - **user>start /b java -jar %KVHOME%\lib\kvstore.jar start -root %KVROOT%\datacenter3\kvroot**
      - Go checkout your browser and see it is telling things are getting better
  - Back to the admin shell, run it again **kv>ping**
    - Now you can see the master has changed again, no admin, but automatic HA optimization

NoSQL HOL – Using the NoSQL Cluster

- We are going to define some Tables, import data, do some Queries
  - Using data CLI to avoid JDK, IDE, OS issues in compiling apps
  - Creating tables is straight forward, nothing to do on this slide, just review it:

```
# Create table
table create -name shardUsers
# Add the fields to the table
add-field -name firstName -type STRING
add-field -name lastName -type STRING
add-field -name email -type STRING
```

```
# Define primary keys, then shard key as subset
primary-key -field lastName -field firstName
# Add a shard key.
shard-key -field lastName
exit
# Add the table plan to the database
plan add-table -wait -name shardUsers
```

NoSQL HOL – Using the NoSQL Cluster

- Step 1 - Lets put some Table schema into our cluster
  - will be using the data CLI to avoid having to deal with JDK 1.7, IDE's, etc
  - Start the DataCLI and define some Table definitions
    - Note – Schema is not strictly necessary, except if you want indexing
    - Run CLI **user>datacli.sh**
  - Import Table definitions
    - Run load command **kv>load -file createTable.src**
    - Run load command **kv>load -file createChildTable.src**
    - Run load command **kv>load -file createComplexFields.src**

NoSQL HOL – Using the NoSQL Cluster

- Step 2 - Lets take a look at our Table schema created
  - Assume the DataCLI is still running, if not start it
  - Show the Table definitions
    - Run command **kv>show tables**
      - This will give you the list of all tables names
    - Run command **kv>show table –name <a name from the list>**
      - **kv>show table –name shardUsers**
      - **kv>show table –name shardUsers –child shardUsers.address**
    - Notice: Shard Key, Primary Key, Fields <typed>, Indexes, etc

NoSQL HOL – Using the NoSQL Cluster

- Step 3 - Lets import some data into our cluster
  - Assume the DataCLI is still running, if not start it
  - Data in a standard JSON file format can be imported / exported from database
  - Run commands:
    - **kv-> put table -name complexUsers -file complexUsers.txt**
      - This will take the JSON data in .txt file and load into cluster
    - **kv-> put table -name shardUsers -file shardUsers.txt**
    - **kv-> put table -name shardUsers.address -file addresses.txt**

NoSQL HOL – Using the NoSQL Cluster

- Step 4 - Lets look at the data in our cluster
  - Assume the DataCLI is still running, if not start it
  - Run commands:
    - **kv-> get table -name complexUsers**
    - **kv-> get table -name shardUsers**
    - **kv-> get table -name shardUsers.address**
    - **kv-> get table -name shardUsers -child shardUsers.address**
      - Notice here that it's a hierarchy, and data is pushed to the child

NoSQL HOL – Using the NoSQL Cluster

- Step 5 - Lets Query the data in our cluster
  - Assume the DataCLI is still running, if not start it
  - Use get on a KEY FIELD to query based on KeySpace, no need for index
    - Note – these are ordered by their definition
  - Run commands:
    - **kv-> get table -name complexUsers -field userID -value 2**

NoSQL HOL – Using the NoSQL Cluster

- Step 6 - Lets Query the data in our cluster
  - Assume the DataCLI is still running, if not start it
  - Use get on an Index to query based on non-key fields
    - Note – these results are ordered store wide
    - Note – see index names from previous step kv->show table –name <tname>
  - Run commands:
    - **kv-> get table -name complexUsers -index arrayIndex -field likes -value movies**
    - **kv-> get table -name shardUsers.address -index addressIndex -field addressName -value work**

NoSQL HOL – Using the NoSQL Cluster

- Step 7 - Lets Query the data in our cluster (Assume the DataCLI running)
  - Use “get” to query based on compound key fields
    - Run **kv->show tables –name shardUsers** :: see PK definition ordering
  - Run commands:
    - **kv-> get table -name shardUsers -field lastName -value Robertson** :: Succeeds
    - **kv-> get table -name shardUsers -field firstName -value Beatrix** :: Fails
    - **kv-> get table -name shardUsers -field lastName -value Robertson -field firstName -value Beatrix** :: Succeeds … note ordering does not matter

NoSQL HOL – Using the NoSQL Cluster

- Step 8 - Lets Query the data in our cluster (Assume the DataCLI running)
  - Use get to query based on a range specification
    - Run **kv->get table –name shardUsers** :: see the data ranges
  - Run commands:
    - **kv-> get table -name shardUsers -field lastName -start Q -end T**
    - **kv-> get table -name shardUsers -field lastName -start I -end K**
      - Try the same query from its child table, notice returns all hierarchy data
    - **kv-> get table -name shardUsers.address -field lastName -start I -end K**

NoSQL HOL - Conclusions

- Getting a cluster setup is super simple
  - Install the software and create config files on each storage node machine
  - Start some agents on those machines
  - Use Admin to create Topology definition of Zones and add your storage nodes
  - Deploy the Topology
  - Use an Admin to create some Table schema, load some data, query

NoSQL HOL - Conclusions

- Easy access and simple query operations cluster wide
  - Use key space definition (primary key of the Table)
  - Use indexes for secondary, value based queries of non-primary keys
  - Access to array fields and ordered compound keys and range filtering

Oracle NoSQL Database

Product editions and licensing

- **Community -or- Enterprise**
  - Apache licensed client drivers
    - Facilitates OEM product integration
  - Community Edition has all of the basic functionality and APIs. Gets you started
    - Subscription option (2k/server)
  - Enterprise Edition for multi-data center, Oracle integration-centric customers and/or non-GPL compliant customers
    - Standard Oracle core based (10k/cpu)

Oracle NoSQL Database

Summary

- **Enterprise ready**- for administrators and developers
- **Integrated** - into Oracle software stack of tools and solutions
- **Engineered** - fast deployment and comprehensive support

- Best NoSQL choice for any company using Oracle products

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