Hadoop with KV-store using Cygwin

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ABSTRACT

Handling Big Data means to handle huge databases. So to handle bigdata, there is Hadoop technology to maintain and manage bigdata with KVstore that is one type of NoSQL database on the Cygwin which provides Linux based platform on windows.

Keyword: - KVLite, Hadoop cluster, Cygwin on Windows, Oracle NoSQL

1. Introduction to KV store

KV store is one of the types of NoSQL datastores. KV store uses the concept of associative array as the basic data model where each key is correspond with only single value in collection. Collection is storage of data, like database. This relation is known as a key value pair. Key will be unique identity in the collection. It provides advantages like scalability, increase performance, flexibility in data retrieval. As it provides

performance of data retrieving, so it stores much data in main memory to avoid expensive I/O operations [3].

2. Introduction to Oracle NoSQL Database

Oracle NoSQL database aim is to provide high reliability, flexibility and availability of data and manages across a configurable set of nodes. It provides large throughput and performance of multi-terabyte distributed key-value pair storage [1]. It also offers the services to store and retrieve data of key value pair form the database. Oracle NoSQL database provides perfect CRUD (Create, Read, Update, Delete) operations with high performance, consistency and durability [1].

Oracle NoSQL database is traditionally three tier based architecture:web server, application server and backend database. To make use of Oracle NoSQL Database, code must be written (using Java or C) that runs on the application server [1].

An application makes use of Oracle NoSQL Database by performing network requests against Oracle NoSQL Database's key-value store, which is referred to as the KVStore. The requests are made using the Oracle NoSQL Database Driver, which is linked into your application as a Java library (.jar file), and then accessed using a series of Java APIs.

3. Introduction to KVLite

KVLite is simple version of the Oracle NoSQL Database. It provides a single-node store that is not replicated. It runs in a single process without requiring any administrative interface. Able to configure, start, and stop KVLite using a command line interface. KVLite is installed when KVstore is installed [4]

Configuring KVLite in Oracle JDeveloper

KVLite is started by using the kvlite utility which is available in the KVHOME/lib/kvstore.jar. If use this utility without any command line options then KVLite will run with the default values:

- The store name is kystore.
- The hostname is the local machine.

- The registry port is 5000.
- The directory where Oracle NoSQL Database data is placed (known as KVROOT) is./kvroot.
- The administration process is turned on using port 5001.

For example:

>java –jar ./lib/kvstore.jar kvlite

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Fig-2 start up Oracle NoSQL Database server

Opened existing kvlite store with config: -root ./kvroot -store <kvstore name> -host <localhost> -port 5000

-admin 5001

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	Fig-3 Running N	NoSQL database as java application				
ky KVStore is created						

The key-value are retrieved from the store and output. Subsequently the KV store is closed:

```
final ValueVersion valueVersion = store.get(Key.createKey(keyString));
System.ut.println(keyString + "" + new String(valueVersion.getValue().getValue())+ "\n");
Store.close();
```

store.put(Key.createKey(keyString), Value.createValue(valueString.getBytes()));

4. Cygwin

Cygwin is the best tool for the users that face the problem in switching operating system (windows to Unix and Unix to windows). Cygwin provides the UNIX environment on the windows operating system. It provides Cygwin command shell prompt in windows system without the need to understand or learn the new commands. Cygwin is a POSIX (Portable Operating System Interface for UNIX) [5]. Cygwin is able to work with any of 32 bit or 64 bit system. Cygwin packages are selected at the installation as per the requirement.



Fig-4 Cygwin Terminal

5. Hadoop

Hadoop is an open source framework it is java based programming which maintain the storage and process of huge amount of data in a distributed computing environment.

6. Hadoop Cluster

Hadoop cluster defined as a type of computational cluster used for storage of huge amount of unstructured data in distributed environment. Hadoop cluster runs on a low cost.



Fig-5 Hadoop components

Steps to run Hadoop cluster

Step: 1 Install Hadoop and configure it with Cygwin

Step: 2 creating single node cluster with Namenode, Secondarynamenode, Datanode, Jobtracker and Tasktracker

Below screenshot shows creation of Hadoop cluster:

>\$ bin/start-all.sh(to start all nodes on cluster) Run the following nodes one by one to run the cluster >\$cd hadoop-1.2.1 >\$bin/hadoop **namenode**

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admin@Namrata ~ \$ cd hadoop-1.2.1	1
admin@Namrata ~/hadoop-1.2.1 \$ bin/hadoop namenode 17/02/26 17:01:12 INFO namenode.NameNode: STARTUP_MSG:	
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Fig-6 Namenode

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.1:9100. Already tried 0 time(s); retry policy is RetryUpToMaximumCountWithFixed
Sleep(maxRetries=10, sleepTime=1 SECONDS)
17/02/26 17:02:43 INFO ipc.Client: Retrying connect to server: localhost/127.0.0
.1:9100. Already tried 1 time(s); retry policy is RetryUpToMaximumCountWithFixed
Sleep(maxRetries=10, sleepTime=1 SECONDS) Fig-7 Secondary Namenode

>bin/hadoop datanode

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Fig-8 Datanode

>bin/hadoop jobtracker

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Fig-9 Jobtracker

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Fig-11 Cluster summary

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sample 'user smith 3200' will fitter by 'smith' only in the user field and '3200' in all fields	Punning John	Sched Queue N delaut	uling Ir	e Schedulin	g Inform	ation							

Fig-12 Hadoop cluster summary

7. Conclusion and future work

This paper concludes with the basics of KVStore, NoSQL databases, accessing KVLite with the Oracle Jdeveloper for key-value data storage then installation process of Cygwin and creating Hadoop cluster of Hadoop components/nodes with Cygwin. Future work states to implement the performance parameters that achieve polyglot persistence

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