

Hortonworks Data Platform

Installing HDP Manually

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Hortonworks Data Platform : Installing HDP Manually

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1. Getting Ready to Install

This section describes the information and materials you need to get ready to install the Hortonworks Data Platform (HDP) manually. Use the following instructions before you deploy Hadoop cluster using HDP:

1. [Understand the basics](#)
2. [Meet minimum system requirements](#)
3. [Configure the remote repositories](#)
4. [Decide on deployment type](#)
5. [Collect information](#)
6. [Prepare the environment](#)
7. [Optional - Install MySQL](#)
8. [Create system users and groups](#)
9. [Download companion files](#)
10. [Define environment parameters](#)

1.1. Understand the Basics

The Hortonworks Data Platform consists of three layers.

- **Core Hadoop:** The basic components of Apache Hadoop.
 - **Hadoop Distributed File System (HDFS):** A special purpose file system that is designed to work with the MapReduce engine. It provides high-throughput access to data in a highly distributed environment.
 - **Apache Hadoop YARN:** YARN is a general-purpose, distributed, application management framework that supersedes the classic Apache Hadoop MapReduce framework for processing data in Hadoop clusters. The fundamental idea of YARN is to split up the two major responsibilities of the JobTracker i.e. resource management and job scheduling/monitoring, into separate daemons: a global **ResourceManager** and per-application **ApplicationMaster (AM)**. The ResourceManager and per-node slave, the **NodeManager (NM)**, form the new, and generic, system for managing applications in a distributed manner. The ResourceManager is the ultimate authority that arbitrates resources among all the applications in the system. The per-application ApplicationMaster is, in effect, a framework specific entity and is tasked with negotiating resources from the ResourceManager and working with the NodeManager(s) to execute and monitor the component tasks.
 - **MapReduce:** A framework for performing high volume distributed data processing using the MapReduce programming paradigm.
- **Essential Hadoop** A set of Apache components designed to ease working with Core Hadoop.

- **Apache Pig:** A platform for creating higher level data flow programs that can be compiled into sequences of MapReduce programs, using Pig Latin, the platform's native language.
- **Apache Hive:** A tool for creating higher level SQL-like queries using HiveQL, the tool's native language, that can be compiled into sequences of MapReduce programs.
- **Tez:** A general-purpose, highly customizable framework that creates simplifies data-processing tasks across both small scale (low-latency) and large-scale (high throughput) workloads in Hadoop.
- **Apache HCatalog:** A metadata abstraction layer that insulates users and scripts from how and where data is physically stored.
- **Apache HBase:** A distributed, column-oriented database that provides the ability to access and manipulate data randomly in the context of the large blocks that make up HDFS.
- **Apache ZooKeeper:** A centralized tool for providing services to highly distributed systems. ZooKeeper is necessary for HBase installations.
- **Supporting Components** A set of Apache components designed to ease working with Core Hadoop.
 - **Apache Oozie:** A server based workflow engine optimized for running workflows that execute Hadoop jobs.
 - **Apache Sqoop:** A component that provides a mechanism for moving data between HDFS and external structured datastores. Can be integrated with Oozie workflows.

You must always install Core Hadoop, but you can select the components from the other layers based on your needs. For more information on the structure of the HDP, see [Understanding Hadoop Ecosystem](#).

1.2. Meet Minimum System Requirements

To run the Hortonworks Data Platform, your system must meet minimum requirements.

- [Hardware Recommendations](#)
- [Operating System Requirements](#)
- [Software Requirements](#)
- [Database Requirements](#)
- [JDK Recommendations](#)

1.2.1. Hardware Recommendations

Although there is no single hardware requirement for installing HDP, there are some basic guidelines. You can see sample setups here: [Suggested Hardware for a Typical Hadoop Cluster](#).

1.2.2. Operating Systems Requirements

The following operating systems are supported:

- 64-bit Red Hat Enterprise Linux (RHEL) 5 or 6
- 64-bit CentOS 5 or 6

1.2.3. Software Requirements

On each of your hosts:

- yum [for RHEL or CentOS]
- rpm
- scp
- curl
- wget
- unzip
- tar
- pdsh

1.2.4. Database Requirements

By default, Hive and Oozie use Derby database for its metastore. To use external database for Hive and Oozie metastore, ensure that a MySQL database is deployed and available.

- You can choose to use a current instance of MySQL or install a new instance for its use. For more information, see [Install MySQL \(Optional\)](#).
- Ensure that your database administrator creates the following databases and users.
 - For Hive, ensure that your database administrator creates `hive_dbname`, `hive_dbuser`, and `hive_dbpasswd`.
 - For Oozie, ensure that your database administrator creates `oozie_dbname`, `oozie_dbuser`, and `oozie_dbpasswd`.



Note

For instructions on creating users for MySQL, see [here](#).

1.2.5. JDK Requirements

Your system must have the correct JDK installed on all the nodes of the cluster. HDP requires Oracle JDK 1.6 update 31.

Use the following instructions to manually install JDK 1.6 update 31:

1. Check the version. From a terminal window, type:

```
java -version
```

2. (Optional) Uninstall the Java package if the JDK version is less than v1.6 update 31.

```
rpm -qa | grep java  
yum remove {java-1.*}
```

3. (Optional) Verify that the default Java package is uninstalled.

```
which java
```

4. Download the Oracle 64-bit JDK (jdk-6u31-linux-x64.bin) from the Oracle download site. From your browser window, go to <http://www.oracle.com/technetwork/java/javasebusiness/downloads/java-archive-downloads-javase6-419409.html#jdk-6u31-oth-JPR>.

Accept the license agreement and download `jdk-6u31-linux-x64.bin` to a temporary directory (**\$JDK_download_directory**).

5. Change directory to the location where you downloaded the JDK and run the install.

```
mkdir /usr/jdk1.6.0_31  
cd /usr/jdk1.6.0_31  
chmod u+x $JDK_download_directory/jdk-6u31-linux-x64.bin  
./$JDK_download_directory/jdk-6u31-linux-x64.bin
```

6. Create symbolic links (symlinks) to the JDK.

```
mkdir /usr/java  
ln -s /usr/jdk1.6.0_31/jdk1.6.0_31 /usr/java/default  
ln -s /usr/java/default/bin/java /usr/bin/java
```

7. Set up your environment to define `JAVA_HOME` to put the Java Virtual Machine and the Java compiler on your path.

```
export JAVA_HOME=/usr/java/default  
export PATH=$JAVA_HOME/bin:$PATH
```

8. Verify if Java is installed in your environment. Execute the following from the command line console:

```
java -version
```

You should see the following output:

```
java version "1.6.0_31"  
Java(TM) SE Runtime Environment (build 1.6.0_31-b04)  
Java HotSpot(TM) 64-Bit Server VM (build 20.6-b01, mixed mode)
```

1.2.6. Virtualization and Cloud Platforms

HDP is certified and supported when running on virtual or cloud platforms (for example, VMware vSphere or Amazon Web Services EC2) as long as the respective guest operating

system (OS) is supported by HDP and any issues detected on these platforms are reproducible on the same supported OS installed on bare metal.

See [Operating Systems Requirements](#) for the list of supported operating systems for HDP.

1.3. Configure the Remote Repositories

The standard HDP install fetches the software from a remote yum repository over the Internet. To use this option, you must set up access to the remote repository and have an available Internet connection for each of your hosts.



Note

If your cluster does not have access to the Internet, or you are creating a large cluster and you want to conserve bandwidth, you can instead provide a local copy of the HDP repository that your hosts can access. For more information, see [Deployment Strategies for Data Centers with Firewalls](#), a separate document in this set.

1. Download the yum repo configuration file `hdp.repo`. On your local mirror server, execute the following command:

- For RHEL/CentOS 5:

```
wget -nv http://public-repo-1.hortonworks.com/HDP/centos5/2.x/GA/hdp.repo  
-O /etc/yum.repos.d/hdp.repo
```

- For RHEL/CentOS 6:

```
wget -nv http://public-repo-1.hortonworks.com/HDP/centos6/2.x/GA/hdp.repo  
-O /etc/yum.repos.d/hdp.repo
```

2. Confirm the HDP repository is configured by checking the repo list.

```
yum repolist
```

You should see something like this. Ensure that you have HDP-2.0.4.0 directory:

```
Loaded plugins: fastestmirror, security  
Loading mirror speeds from cached hostfile  
* base: mirrors.cat.pdx.edu  
* extras: linux.mirrors.es.net  
* updates: mirrors.usc.edu  
repo id repo name status  
HDP-2.0.4.0 Hortonworks Data Platform Version - HDP-2.0.4.0 enabled: 53
```

1.4. Decide on Deployment Type

While it is possible to deploy all of HDP on a single host, this is appropriate only for initial evaluation. In general you should use at least three hosts: one master host and two slaves.

1.5. Collect Information

To deploy your HDP installation, you need to collect the following information:

- The fully qualified domain name (FQDN) for each host in your system, and which component(s) you wish to set up on which host. You can use `hostname -f` to check for the FQDN if you do not know it.
- The hostname (for an existing instance), database name, username, and password for the MySQL instance, if you install Hive/HCatalog.



Note

If you are using an existing instance, the `dbuser` you create for HDP's use must be granted ALL PRIVILEGES on that instance.

1.6. Prepare the Environment

To deploy your HDP instance, you need to prepare your deploy environment:

- [Enable NTP on the Cluster](#)
- [Check DNS](#)
- [Disable SELinux](#)

1.6.1. Enable NTP on the Cluster

The clocks of all the nodes in your cluster must be able to synchronize with each other. If your system does not have access to the Internet, set up a master node as an NTP xserver. Use the following instructions to enable NTP for your cluster:

1. Configure NTP clients. Execute the following command on all the nodes in your cluster:

```
yum install ntp
```

2. Enable the service. Execute the following command on all the nodes in your cluster:

```
chkconfig ntpd on
```

3. Start the NTP. Execute the following command on all the nodes in your cluster:

```
/etc/init.d/ntpd start
```

4. For using existing NTP server in your environment. Configure firewall on local NTP server to enable UDP input traffic on port 123. See the following sample rule:

```
-A RH-Firewall-1-INPUT -s 192.168.1.0/24 -m state --state NEW -p udp --dport 123 -j ACCEPT
```

Restart iptables. Execute the following command on all the nodes in your cluster:

```
service iptables restart
```

Configure clients to use the local NTP server. Edit the `/etc/ntp.conf` and add the following line:

```
server $LOCAL_SERVER_IP OR HOSTNAME
```

1.6.2. Check DNS

All hosts in your system must be configured for DNS and Reverse DNS.



Note

If you are unable to configure DNS and Reverse DNS, you must edit the hosts file on every host in your cluster to contain each of your hosts.

Use the following instructions to check DNS for all the host machines in your cluster:

1. Forward lookup checking.

For example, for domain `localdomain` that contains host with name `host01` and IP address `192.168.0.10`, execute the following command:

```
nslookup host01
```

You should see a message similar to the following:

```
Name: host01.localdomain
Address: 192.168.0.10
```

2. Reverse lookup checking.

For example, for domain `localdomain` that contains host with name `host01` and IP address `192.168.0.10`, execute the following command:

```
nslookup 192.168.0.10
```

You should see a message similar to the following:

```
10.0.168.192.in-addr.arpa name = host01.localdomain.
```

If you do not receive valid responses (as shown above), you should set up DNS zone in your cluster or configure host files on each host of the cluster using one of the following options:

- **Option I:** Configure hosts file on each node of the cluster.

For all nodes of cluster, add to the `/etc/hosts` file key-value pairs like the following:

```
192.168.0.11 host01
```

- **Option II:** Configuring DNS using BIND nameserver.

The following instructions, use the example values given below:

```
Example values:
domain name: "localdomain"
nameserver: "host01"/192.168.0.11
hosts: "host02"/192.168.0.12, "host02"/192.168.0.12
```

1. Install BIND packages:

```
yum install bind
yum install bind-libs
yum install bind-utils
```

2. Initiate service

```
chkconfig named on
```

3. Configure files. Add the following lines for the example values given above (ensure that you modify these for your environment) :

- Edit the `/etc/resolv.conf` (for all nodes in cluster) and add the following lines:

```
domain localdomain
search localdomain
nameserver 192.168.0.11
```

- Edit the `/etc/named.conf` (for all nodes in cluster) and add the following lines:

```
listen-on port 53 { any; }; //by default it is opened only for localhost
...
zone "localdomain" {
    type master;
    notify no;
    allow-query { any; };
    file "named-forw.zone";
};
zone "0.168.192.in-addr.arpa" {
    type master;
    notify no;
    allow-query { any; };
    file "named-rev.zone";
};
```

- Edit the `named-forw.zone` as shown in the following sample forward zone configuration file:

```
$TTL 3D
@ SOA  host01.localdomain.root.localdomain
      (201306030;3600;3600;3600;3600)
NS host01          ; Nameserver Address
localhost IN A 127.0.0.1
host01  IN A 192.168.0.11
host02  IN A 192.168.0.12
host03  IN A 192.168.0.13
```

- Edit the `named-rev.zone` as shown in the following sample reverse zone configuration file:

```
$TTL 3D
@ SOA host01.localdomain.root.localdomain. (201306031;28800;2H;4W;1D);
NS host01.localdomain.; Nameserver Address
11 IN PTR host01.localdomain.
12 IN PTR host02.localdomain.
13 IN PTR host03.localdomain.
```

4. Restart bind service.

```
/etc/init.d/named restart
```

5. Add rules to firewall.

```
iptables -A INPUT -p udp -m state --state NEW --dport 53 -j ACCEPT
iptables -A INPUT -p tcp -m state --state NEW --dport 53 -j ACCEPT
service iptables save
service iptables restart
```

Alternatively, you can also allow traffic over DNS port (53) using `system-config-firewall` utility.

1.6.3. Disable SELinux

Security-Enhanced (SE) Linux feature should be disabled during installation process.

1. Check state of SELinux. On all the host machines, execute the following command:

```
getenforce
```

If the result is `permissive` or `disabled`, no further actions are required, else proceed to step 2.

2. Disable SELinux either temporarily for each session or permanently.

- **Option I:** Disable SELinux temporarily by executing the following command:

```
setenforce 0
```

- **Option II:** Disable SELinux permanently in the `/etc/sysconfig/selinux` file by changing the value of `SELINUX` field to `permissive` or `disabled`. Restart your system.

1.7. [Optional] Install MySQL

If you are installing Hive and HCatalog services, you need a MySQL database instance to store metadata information. You can either use an existing MySQL instance or install a new instance of MySQL manually. To install a new instance:

1. Connect to the host machine you plan to use for Hive and HCatalog.
2. Install MySQL server. From a terminal window, type:

For RHEL/CentOS:

```
yum install mysql-server
```

3. Start the instance.

```
/etc/init.d/mysqld start
```

4. Set the `root` user password.

```
mysqladmin -u root password '{password}'
```

5. Remove unnecessary information from log and STDOUT.

```
mysqladmin -u root 2>&1 >/dev/null
```

6. As `root`, use `mysql` (or other client tool) to create the “`dbuser`” and grant it adequate privileges. This user provides access to the Hive metastore.

```
CREATE USER '$dbusername'@'%' IDENTIFIED BY '$dbuserpassword';
GRANT ALL PRIVILEGES ON *.* TO '$dbusername'@'%';
flush privileges;
```

7. See if you can connect to the database as that user. You are prompted to enter the `$dbuserpassword` password above.

```
mysql -u $dbusername -p
```

8. Install the MySQL connector JAR file:

```
yum install mysql-connector-java*
```

1.8. Create System Users and Groups

In general Hadoop services should be owned by specific users and not by root or application users. The table below shows the typical users for Hadoop services. If you choose to install the HDP components using the RPMs, these users will automatically be set up.

If you do not install with the RPMs, or want different users, then identify the users that you want for your Hadoop services and the common Hadoop group and create these accounts on your system.

Table 1.1. Typical System Users and Groups

Hadoop Service	User	Group
HDFS	hdfs	hadoop
YARN	yarn	hadoop
MapReduce	mapred	hadoop
Tez	tez	hadoop
Hive	hive	hadoop
Pig	pig	hadoop
HCatalog/WebHCatalog	hcat	hadoop
HBase	hbase	hadoop
ZooKeeper	zookeeper	hadoop
Oozie	oozie	hadoop

1.9. Download Companion Files

We have provided a set of companion files, including script files (`scripts.zip`) and configuration files (`configuration_files.zip`), that you should download and use throughout this process. Download and extract the files:

```
wget http://public-repo-1.hortonworks.com/HDP/tools/2.0.4.0/
hdp_manual_install_rpm_helper_files-2.0.4.21.tar.gz
```

1.10. Define Environment Parameters

You need to set up specific users and directories for your HDP installation using the following instructions:

1. Define users and groups:

The following table describes system user account and groups. Use this table to define what you are going to use in setting up your environment. These users and groups should reflect the accounts you created in [Create System Users and Groups](#).



Note

The `scripts.zip` file you downloaded in [Download Companion Files](#) includes a script, `usersAndGroups.sh`, for setting user and group environment parameters.

We strongly suggest you edit and source (alternatively, you can also copy the contents to your `~/.bash_profile`) to set up these environment variables in your environment.

Table 1.2. Define Users and Groups for Systems

Parameter	Definition
HDFS_USER	User owning the HDFS services. For example, <code>hdfs</code> .
YARN_USER	User owning the YARN services. For example, <code>yarn</code> .
ZOOKEEPER_USER	User owning the ZooKeeper services. For example, <code>zookeeper</code> .
HIVE_USER	User owning the Hive services. For example, <code>hive</code> .
WEBHCAT_USER	User owning the WebHCat services. For example, <code>hcat</code> .
HBASE_USER	User owning the HBase services. For example, <code>hbase</code> .
PIG_USER	User owning the Pig services. For example, <code>pig</code> .
HADOOP_GROUP	A common group shared by services. For example, <code>hadoop</code> .

2. Define directories:

The following table describes the directories for install, configuration, data, process IDs and logs based on the Hadoop Services you plan to install. Use this table to define what you are going to use in setting up your environment.



Note

The `scripts.zip` file you downloaded in [Download Companion Files](#) includes a script, `directories.sh`, for setting directory environment parameters.

We strongly suggest you edit and source (alternatively, you can also copy the contents to your `~/.bash_profile`) to set up these environment variables in your environment.

Table 1.3. Define Directories for Core Hadoop

Hadoop Service	Parameter	Definition
HDFS	DFS_NAME_DIR	Space separated list of directories where NameNode should store the file system image. For example,

Hadoop Service	Parameter	Definition
		/grid/hadoop/hdfs/nn /grid1/hadoop/hdfs/nn
HDFS	DFS_DATA_DIR	Space separated list of directories where DataNodes should store the blocks. For example, /grid/hadoop/hdfs/dn /grid1/hadoop/hdfs/dn /grid2/hadoop/hdfs/dn
HDFS	FS_CHECKPOINT_DIR	Space separated list of directories where SecondaryNameNode should store the checkpoint image. For example, /grid/hadoop/hdfs/snn /grid1/hadoop/hdfs/snn /grid2/hadoop/hdfs/snn
HDFS	HDFS_LOG_DIR	Directory for storing the HDFS logs. This directory name is a combination of a directory and the <i>\$HDFS_USER</i> . For example, /var/log/hadoop/hdfs where <i>hdfs</i> is the <i>\$HDFS_USER</i> .
HDFS	HDFS_PID_DIR	Directory for storing the HDFS process ID. This directory name is a combination of a directory and the <i>\$HDFS_USER</i> . For example, /var/run/hadoop/hdfs where <i>hdfs</i> is the <i>\$HDFS_USER</i>
HDFS	HADOOP_CONF_DIR	Directory for storing the Hadoop configuration files. For example, /etc/hadoop/conf
YARN	YARN_LOCAL_DIR	Space separated list of directories where YARN should store temporary data. For example, /grid/hadoop/yarn /grid1/hadoop/yarn /grid2/hadoop/yarn.
YARN	YARN_LOG_DIR	Directory for storing the YARN logs. For example,

Hadoop Service	Parameter	Definition
		<p><code>/var/log/hadoop/yarn.</code></p> <p>This directory name is a combination of a directory and the <code>\$YARN_USER</code>. In the example <code>yarn</code> is the <code>\$YARN_USER</code>.</p>
YARN	YARN_PID_DIR	<p>Directory for storing the YARN process ID.</p> <p>For example,</p> <p><code>/var/run/hadoop/yarn.</code></p> <p>This directory name is a combination of a directory and the <code>\$YARN_USER</code>. In the example, <code>yarn</code> is the <code>\$YARN_USER</code>.</p>
MapReduce	MAPREDUCE_LOG_DIR	<p>Directory for storing the JobHistory Server logs.</p> <p>For example,</p> <p><code>/var/log/hadoop/mapred.</code></p> <p>This directory name is a combination of a directory and the <code>\$MAPRED_USER</code>. In the example <code>mapred</code> is the <code>\$MAPRED_USER</code></p>

Table 1.4. Define Directories for Ecosystem Components

Hadoop Service	Parameter	Definition
Pig	PIG_CONF_DIR	Directory to store the Pig configuration files. For example, <code>/etc/pig/conf.</code>
Pig	PIG_LOG_DIR	Directory to store the Pig logs. For example, <code>/var/log/pig.</code>
Pig	PIG_PID_DIR	Directory to store the Pig process ID. For example, <code>/var/run/pig.</code>
Oozie	OOZIE_CONF_DIR	Directory to store the Oozie configuration files. For example, <code>/etc/oozie/conf.</code>
Oozie	OOZIE_DATA	Directory to store the Oozie data. For example, <code>/var/db/oozie.</code>
Oozie	OOZIE_LOG_DIR	Directory to store the Oozie logs. For example, <code>/var/log/oozie.</code>
Oozie	OOZIE_PID_DIR	Directory to store the Oozie process ID. For example, <code>/var/run/oozie.</code>
Oozie	OOZIE_TMP_DIR	Directory to store the Oozie temporary files. For example, <code>/var/tmp/oozie.</code>
Hive	HIVE_CONF_DIR	Directory to store the Hive configuration files. For example, <code>/etc/hive/conf.</code>
Hive	HIVE_LOG_DIR	Directory to store the Hive logs. For example, <code>/var/log/hive.</code>
Hive	HIVE_PID_DIR	Directory to store the Hive process ID. For example, <code>/var/run/hive.</code>

Hadoop Service	Parameter	Definition
WebHCat	WEBHCAT_CONF_DIR	Directory to store the WebHCat configuration files. For example, /etc/hcatalog/conf/webhcat.
WebHCat	WEBHCAT_LOG_DIR	Directory to store the WebHCat logs. For example, var/log/webhcat.
WebHCat	WEBHCAT_PID_DIR	Directory to store the WebHCat process ID. For example, /var/run/webhcat.
HBase	HBASE_CONF_DIR	Directory to store the HBase configuration files. For example, /etc/hbase/conf.
HBase	HBASE_LOG_DIR	Directory to store the HBase logs. For example, /var/log/hbase.
HBase	HBASE_PID_DIR	Directory to store the HBase process ID. For example, /var/run/hbase.
ZooKeeper	ZOOKEEPER_DATA_DIR	Directory where ZooKeeper will store data. For example, /grid/hadoop/zookeeper/data
ZooKeeper	ZOOKEEPER_CONF_DIR	Directory to store the ZooKeeper configuration files. For example, /etc/zookeeper/conf.
ZooKeeper	ZOOKEEPER_LOG_DIR	Directory to store the ZooKeeper logs. For example, /var/log/zookeeper.
ZooKeeper	ZOOKEEPER_PID_DIR	Directory to store the ZooKeeper process ID. For example, /var/run/zookeeper.
Sqoop	SQOOP_CONF_DIR	Directory to store the Sqoop configuration files. For example, /usr/lib/sqoop/conf.

2. Installing HDFS and YARN

This section describes how to install the Hadoop Core components, HDFS, YARN, and MapReduce.

Complete the following instructions to install Hadoop Core components:

1. [Set Default File and Directory Permissions](#)
2. [Install the Hadoop RPMs](#)
3. [Install Compression Libraries](#)
4. [Create Directories](#)

2.1. Set Default File and Directory Permissions

Set the default file and directory permissions to 0022 (022). This is typically the default for most Linux distributions.

Use the `umask` command to confirm and set as necessary.

Ensure that the `umask` is set for all terminal sessions that you use during installation.

2.2. Install the Hadoop RPMs

Execute the following command on all cluster nodes.

From a terminal window, type:

```
yum install hadoop hadoop-hdfs hadoop-libhdfs hadoop-yarn hadoop-mapreduce  
hadoop-client openssl
```

2.3. Install Compression Libraries

Make the following compression libraries available on all the cluster nodes.

2.3.1. Install Snappy

Complete the following instructions on all the nodes in your cluster:

1. Install Snappy.

```
yum install snappy snappy-devel
```

2. Make the Snappy libraries available to Hadoop:

```
ln -sf /usr/lib64/libsnappy.so /usr/lib/hadoop/lib/native/.
```

2.3.2. Install LZO

Execute the following command on all the nodes in your cluster. From a terminal window, type:

```
yum install lzo lzo-devel hadoop-lzo hadoop-lzo-native
```

2.4. Create Directories

Create directories and configure ownership + permissions on the appropriate hosts as described below.

If any of these directories already exist, we recommend deleting and recreating them.

Use the following instructions to create appropriate directories:

1. We strongly suggest that you edit and source the files included in `scripts.zip` file (downloaded in [Download Companion Files](#)).

Alternatively, you can also copy the contents to your `~/ .bash_profile` to set up these environment variables in your environment.

2. [Create the NameNode directories](#)
3. [Create the Secondary NameNode directories](#)
4. [Create the DataNode and YARN NodeManager local directories](#)
5. [Create the log and PID directories](#)

2.4.1. Create the NameNode Directories

On the node that hosts the NameNode service, execute the following commands:

```
mkdir -p $DFS_NAME_DIR;  
chown -R $HDFS_USER:$HADOOP_GROUP $DFS_NAME_DIR;  
chmod -R 755 $DFS_NAME_DIR;
```

where:

- `$DFS_NAME_DIR` is the space separated list of directories where NameNode stores the file system image. For example, `/grid/hadoop/hdfs/nn /grid1/hadoop/hdfs/nn`.
- `$HDFS_USER` is the user owning the HDFS services. For example, `hdfs`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

2.4.2. Create the SecondaryNameNode Directories

On all the nodes that can potentially run the SecondaryNameNode service, execute the following commands:

```
mkdir -p $FS_CHECKPOINT_DIR;
```

```
chown -R $HDFS_USER:$HADOOP_GROUP $FS_CHECKPOINT_DIR;  
chmod -R 755 $FS_CHECKPOINT_DIR;
```

where:

- `$FS_CHECKPOINT_DIR` is the space separated list of directories where SecondaryNameNode should store the checkpoint image. For example, `/grid/hadoop/hdfs/snn /grid1/hadoop/hdfs/snn /grid2/hadoop/hdfs/snn`.
- `$HDFS_USER` is the user owning the HDFS services. For example, `hdfs`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

2.4.3. Create DataNode and YARN NodeManager Local Directories

On all DataNodes, execute the following commands:

```
mkdir -p $DFS_DATA_DIR;  
chown -R $HDFS_USER:$HADOOP_GROUP $DFS_DATA_DIR;  
chmod -R 750 $DFS_DATA_DIR;
```

where:

- `$DFS_DATA_DIR` is the space separated list of directories where DataNodes should store the blocks. For example, `/grid/hadoop/hdfs/dn /grid1/hadoop/hdfs/dn /grid2/hadoop/hdfs/dn`.
- `$HDFS_USER` is the user owning the HDFS services. For example, `hdfs`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

On the ResourceManager and all Datanodes, execute the following commands:

```
mkdir -p $YARN_LOCAL_DIR;  
chown -R $YARN_USER:$HADOOP_GROUP $YARN_LOCAL_DIR;  
chmod -R 755 $YARN_LOCAL_DIR;
```

where:

- `$YARN_LOCAL_DIR` is the space separated list of directories where YARN should store temporary data. For example, `/grid/hadoop/yarn/local /grid1/hadoop/yarn/local /grid2/hadoop/yarn/local`.
- `$YARN_USER` is the user owning the YARN services. For example, `yarn`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

On the ResourceManager and all Datanodes, execute the following commands:

```
mkdir -p $YARN_LOCAL_LOG_DIR;  
chown -R $YARN_USER:$HADOOP_GROUP $YARN_LOCAL_LOG_DIR;  
chmod -R 755 $YARN_LOCAL_LOG_DIR;
```

where:

- `$YARN_LOCAL_LOG_DIR` is the space separated list of directories where YARN should store temporary data. For example, `/grid/hadoop/yarn/logs /grid1/hadoop/yarn/logs /grid2/hadoop/yarn/local`.
- `$YARN_USER` is the user owning the YARN services. For example, `yarn`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

2.4.4. Create the Log and PID Directories

On all nodes, execute the following commands:

```
mkdir -p $HDFS_LOG_DIR;  
chown -R $HDFS_USER:$HADOOP_GROUP $HDFS_LOG_DIR;  
chmod -R 755 $HDFS_LOG_DIR;
```

where:

- `$HDFS_LOG_DIR` is the directory for storing the HDFS logs.

This directory name is a combination of a directory and the `$HDFS_USER`.

For example, `/var/log/hadoop/hdfs` where `hdfs` is the `$HDFS_USER`.
- `$HDFS_USER` is the user owning the HDFS services. For example, `hdfs`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

```
mkdir -p $YARN_LOG_DIR;  
chown -R $YARN_USER:$HADOOP_GROUP $YARN_LOG_DIR;  
chmod -R 755 $YARN_LOG_DIR;
```

where:

- `$YARN_LOG_DIR` is the directory for storing the YARN logs.

This directory name is a combination of a directory and the `$YARN_USER`.

For example, `/var/log/hadoop/yarn` where `yarn` is the `$YARN_USER`.
- `$YARN_USER` is the user owning the YARN services. For example, `yarn`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

```
mkdir -p $HDFS_PID_DIR;  
chown -R $HDFS_USER:$HADOOP_GROUP $HDFS_PID_DIR;  
chmod -R 755 $HDFS_PID_DIR
```

where:

- `$HDFS_PID_DIR` is the directory for storing the HDFS process ID.

This directory name is a combination of a directory and the `$HDFS_USER`.

For example, `/var/run/hadoop/hdfs` where `hdfs` is the `$HDFS_USER`.
- `$HDFS_USER` is the user owning the HDFS services. For example, `hdfs`.

- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

```
mkdir -p $YARN_PID_DIR;  
chown -R $YARN_USER:$HADOOP_GROUP $YARN_PID_DIR;  
chmod -R 755 $YARN_PID_DIR;
```

where:

- `$YARN_PID_DIR` is the directory for storing the YARN process ID.

This directory name is a combination of a directory and the `$YARN_USER`.

For example, `/var/run/hadoop/yarn` where `yarn` is the `$YARN_USER`.

- `$YARN_USER` is the user owning the YARN services. For example, `yarn`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

```
mkdir -p $MAPRED_LOG_DIR;  
chown -R $MAPRED_USER:$HADOOP_GROUP $MAPRED_LOG_DIR;  
chmod -R 755 $MAPRED_LOG_DIR;
```

where:

- `$MAPRED_LOG_DIR` is the directory for storing the JobHistory Server logs.

This directory name is a combination of a directory and the `$MAPREDs_USER`.

For example, `/var/log/hadoop/mapred` where `mapred` is the `$MAPRED_USER`.

- `$MAPRED_USER` is the user owning the MAPRED services. For example, `mapred`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

```
mkdir -p $MAPRED_PID_DIR;  
chown -R $MAPRED_USER:$HADOOP_GROUP $MAPRED_PID_DIR;  
chmod -R 755 $MAPRED_PID_DIR;
```

where:

- `$MAPRED_PID_DIR` is the directory for storing the JobHistory Server pid.

This directory name is a combination of a directory and the `$MAPREDs_USER`.

For example, `/var/run/hadoop/mapred` where `mapred` is the `$MAPRED_USER`.

- `$MAPRED_USER` is the user owning the MAPRED services. For example, `mapred`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

3. Setting Up the Hadoop Configuration

This section describes how to set up and edit the deployment configuration files for HDFS and MapReduce.

Use the following instructions to set up Hadoop configuration files:

1. We strongly suggest that you edit and source the files included in `scripts.zip` file (downloaded in [Download Companion Files](#)).

Alternatively, you can also copy the contents to your `~/.bash_profile` to set up these environment variables in your environment.

2. From the downloaded `scripts.zip` file, extract the files from the `configuration_files/core_hadoop` directory to a temporary directory.
3. Modify the configuration files.

In the temporary directory, locate the following files and modify the properties based on your environment.

Search for `TODO` in the files for the properties to replace. See [Define Environment Parameters](#) for more information.

- a. Edit the `core-site.xml` and modify the following properties:

```
<property>
  <name>fs.default.name</name>
  <value>hdfs://$namenode.full.hostname:8020</value>
  <description>Enter your NameNode hostname</description>
</property>
```

```
<property>
  <name>fs.checkpoint.dir</name>
  <value>/grid/hadoop/hdfs/snn,/grid1/hadoop/hdfs/snn,/grid2/hadoop/hdfs/
snn</value>
  <description>A comma separated list of paths. Use the list of
  directories from $FS_CHECKPOINT_DIR.
  For example, /grid/hadoop/hdfs/snn,sbr/grid1/hadoop/hdfs/
snn,sbr/grid2/hadoop/hdfs/snn </description>
</property>
```

- b. Edit the `hdfs-site.xml` and modify the following properties:

```
<property>
  <name>dfs.name.dir</name>
  <value>/grid/hadoop/hdfs/nn,/grid1/hadoop/hdfs/nn</value>
  <description>Comma separated list of paths. Use the list of directories
  from $DFS_NAME_DIR.
  For example, /grid/hadoop/hdfs/nn,/grid1/hadoop/hdfs/nn.
</description>
</property>
```

```
<property>
  <name>dfs.data.dir</name>
  <value>/grid/hadoop/hdfs/dn,/grid1/hadoop/hdfs/dn</value>
  <description>Comma separated list of paths. Use the list of directories
  from $DFS_DATA_DIR.
  For example, /grid/hadoop/hdfs/dn,/grid1/hadoop/hdfs/dn.
</description>
</property>
```

```
<property>
  <name>dfs.http.address</name>
  <value>$namenode.full.hostname:50070</value>
  <description>Enter your NameNode hostname for http access.</description>
</property>
```

```
<property>
  <name>dfs.secondary.http.address</name>
  <value>$secondary.namenode.full.hostname:50090</value>
  <description>Enter your Secondary NameNode hostname.</description>
</property>
```

```
<property>
  <name>dfs.https.address</name>
  <value>$namenode.full.hostname:50470</value>
  <description>Enter your NameNode hostname for https access.</
description>
</property>
```



Note

The value of NameNode new generation size should be 1/8 of maximum heap size (`-Xmx`). Please check, as the default setting may not be accurate.

To change the default value, edit the `/etc/hadoop/conf/hadoop-env.sh` file and change the value of the `-XX:MaxnewSize` parameter to 1/8th the value of the maximum heap size (`-Xmx`) parameter.

- c. Edit the `yarn-site.xml` and modify the following properties:

```
<property>
  <name>yarn.resourcemanager.resourcetracker.address</name>
  <value>$resourcemanager.full.hostname:8025</value>
  <description>Enter your ResourceManager hostname.</description>
</property>
```

```
<property>
  <name>yarn.resourcemanager.scheduler.address</name>
  <value>$resourcemanager.full.hostname:8030</value>
  <description>Enter your ResourceManager hostname.</description>
</property>
```

```
<property>
  <name>yarn.resourcemanager.address</name>
  <value>$resourcemanager.full.hostname:8050</value>
  <description>Enter your ResourceManager hostname.</description>
</property>
```

```
<property>
  <name>yarn.resourcemanager.admin.address</name>
  <value>${resourcemanager.full.hostname}:8041</value>
  <description>Enter your ResourceManager hostname.</description>
</property>
```

```
<property>
  <name>yarn.nodemanager.local-dirs</name>
  <value>/grid/hadoop/hdfs/yarn/local,/grid1/hadoop/hdfs/yarn/local</value>
  <description>Comma separated list of paths. Use the list of directories from $YARN_LOCAL_DIR.
  For example, /grid/hadoop/hdfs/yarn/local,/grid1/hadoop/hdfs/yarn/local.</description>
</property>
```

```
<property>
  <name>yarn.nodemanager.log-dirs</name>
  <value>/grid/hadoop/hdfs/yarn/logs</value>
  <description>Use the list of directories from $YARN_LOCAL_LOG_DIR.
  For example, /grid/hadoop/yarn/logs /grid1/hadoop/yarn/logs /grid2/hadoop/yarn/logs</description>
</property>
```

```
<property>
  <name>yarn.log.server.url</name>
  <value>http://$jobhistoryserver.full.hostname:19888/jobhistory/logs/</value>
  <description>URL for job history server</description>
</property>
```

d. Edit the `mapred-site.xml` and modify the following properties:

```
<property>
  <name>mapreduce.jobhistory.address</name>
  <value>${jobhistoryserver.full.hostname}:10020</value>
  <description>Enter your JobHistoryServer hostname.</description>
</property>
```

```
<property>
  <name>mapreduce.jobhistory.webapp.address</name>
  <value>${jobhistoryserver.full.hostname}:19888</value>
  <description>Enter your JobHistoryServer hostname.</description>
</property>
```

4. Copy the configuration files.

a. On all hosts in your cluster, create the Hadoop configuration directory:

```
rm -r $HADOOP_CONF_DIR
mkdir -p $HADOOP_CONF_DIR
```

where `$HADOOP_CONF_DIR` is the directory for storing the Hadoop configuration files.

For example, `/etc/hadoop/conf`.

b. Copy all the configuration files to `$HADOOP_CONF_DIR`.

c. Set appropriate permissions:

```
chmod a+x $HADOOP_CONF_DIR/  
chown -R $HDFS_USER:$HADOOP_GROUP $HADOOP_CONF_DIR/./.  
chmod -R 755 $HADOOP_CONF_DIR/./.
```

where:

- `$HDFS_USER` is the user owning the HDFS services. For example, `hdfs`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

4. Validating the Core Hadoop Installation

Use the following instructions to start core Hadoop and doing simple smoke tests:

1. [Format and Start HDFS](#)
2. [Smoke Test HDFS](#)
3. [Start YARN](#)
4. [Start MapReduce JobHistory Server](#)
5. [Smoke Test MapReduce](#)

4.1. Format and Start HDFS

1. Execute these commands on the NameNode host machine:

```
su $HDFS_USER
/usr/lib/hadoop/bin/hadoop namenode -format
/usr/lib/hadoop/sbin/hadoop-daemon.sh --config $HADOOP_CONF_DIR start
namenode
```

2. Execute these commands on the SecondaryNameNode:

```
su $HDFS_USER
/usr/lib/hadoop/sbin/hadoop-daemon.sh --config $HADOOP_CONF_DIR start
secondarynamenode
```

3. Execute these commands on all DataNodes:

```
su $HDFS_USER
/usr/lib/hadoop/sbin/hadoop-daemon.sh --config $HADOOP_CONF_DIR start
datanode
```

where:

- `$HDFS_USER` is the user owning the HDFS services. For example, `hdfs`.
- `$HADOOP_CONF_DIR` is the directory for storing the Hadoop configuration files. For example, `/etc/hadoop/conf`.

4.2. Smoke Test HDFS

1. See if you can reach the NameNode server with your browser:

```
http://$namenode.full.hostname:50070
```

2. Create hdfs user directory in HDFS:

```
su $HDFS_USER
```

```
hadoop fs -mkdir /user/hdfs
```

3. Try copying a file into HDFS and listing that file:

```
su $HDFS_USER
hadoop fs -copyFromLocal /etc/passwd passwd
hadoop fs -ls
```

4. Test browsing HDFS:

```
http://$datanode.full.hostname:50075/browseDirectory.jsp?namenodeInfoPort=50070&dir=/&nnaddr=$datanode.full.hostname:8020
```

4.3. Start YARN

1. Execute these commands from the ResourceManager server:

```
<login as $YARN_USER and source the directories.sh companion script>
source directories.sh
/usr/lib/hadoop-yarn/sbin/yarn-daemon.sh --config $HADOOP_CONF_DIR start
resourcemanager
```

2. Execute these commands from all NodeManager nodes:

```
<login as $YARN_USER and source the directories.sh companion script>
source directories.sh
/usr/lib/hadoop-yarn/sbin/yarn-daemon.sh --config $HADOOP_CONF_DIR start
nodemanager
```

where:

- `$YARN_USER` is the user owning the YARN services. For example, `yarn`.
- `$HADOOP_CONF_DIR` is the directory for storing the Hadoop configuration files. For example, `/etc/hadoop/conf`.

4.4. Start MapReduce JobHistory Server

1. Execute these commands from the JobHistory server to set up directories on HDFS :

```
su $HDFS_USER
hadoop fs -mkdir -p /mapred/history/done_intermediate
hadoop fs -chmod -R 1777 /mapred/history/done_intermediate
hadoop fs -mkdir -p /mapred/history/done
hadoop fs -chmod -R 1777 /mapred/history/done
hadoop fs -chown -R $MAPRED_USER:$HDFS_USER /mapred
```

2. Execute these commands from the JobHistory server:

```
su - $MAPRED_USER
export HADOOP_LIBEXEC_DIR=/usr/lib/hadoop/libexec/
export HADOOP_MAPRED_HOME=/usr/lib/hadoop-mapreduce
export HADOOP_MAPRED_PID_DIR=/var/run/hadoop/mapred
export HADOOP_MAPRED_LOG_DIR=/var/log/hadoop/mapred
```

```
<login as $MAPRED_USER and source the directories.sh companion script>
```

```
source directories.sh
/usr/lib/hadoop-mapreduce/sbin/mr-jobhistory-daemon.sh start historyserver
--config $HADOOP_CONF_DIR
```

where:

- `$HDFS_USER` is the user owning the HDFS services. For example, `hdfs`.
- `$MAPRED_USER` is the user owning the MapRed services. For example, `mapred`.
- `$HADOOP_CONF_DIR` is the directory for storing the Hadoop configuration files. For example, `/etc/hadoop/conf`.

4.5. Smoke Test MapReduce

1. Try browsing to the ResourceManager:

```
http://$resourcemanager.full.hostname:8088/
```

2. Smoke test using Terasort and sort 10GB of data.

```
su $HDFS_USER
/usr/lib/hadoop/bin/hadoop jar /usr/lib/hadoop-mapreduce/hadoop-mapreduce-
examples-2*.jar teragen 100 /test/10gsort/input
/usr/lib/hadoop/bin/hadoop jar /usr/lib/hadoop-mapreduce/hadoop-mapreduce-
examples-2*.jar terasort /test/10gsort/input /test/10gsort/output
```

5. Installing Apache Pig

This section describes installing and testing Apache Pig, a platform for creating higher level data flow programs that can be compiled into sequences of MapReduce programs, using Pig Latin, the platform's native language.

Complete the following instructions to install Pig:

1. [Install the Pig RPMs](#)
2. [Validate the Installation](#)

5.1. Install the Pig RPMs

On all the hosts where Pig programs will be executed, install the RPMs. From a terminal window, type:

```
yum install pig
```

The RPM will install Pig libraries to `/usr/lib/pig`. Pig configuration files are placed in `/usr/lib/pig/conf`.

5.2. Validate the Installation

Use the following steps to validate your installation:

1. On the host machine where Pig is installed execute the following commands:

```
login as $HDFS_USER  
/usr/lib/hadoop/bin/hadoop dfs -copyFromLocal /etc/passwd passwd
```

2. Create the pig script file `/tmp/id.pig` with the following contents:

```
A = load 'passwd' using PigStorage(':');  
B = foreach A generate \ $0 as id; store B into '/tmp/id.out';
```

3. Execute the Pig script:

```
export JAVA_HOME=/usr/java/default  
pig -l /tmp/pig.log /tmp/id.pig
```

6. Installing Apache Hive and Apache HCatalog

This section describes installing and testing Apache Hive, a tool for creating higher level SQL queries using HiveQL, the tool's native language, that can be compiled into sequences of MapReduce programs.

It also describes installing and testing Apache HCatalog, a metadata abstraction layer that insulates users and scripts from how and where data is physically stored.

Complete the following instructions to install Hive and HCatalog:

1. [Install the Hive and HCatalog RPMs](#)
2. [Set Directories and Permissions](#)
3. [Set Up the Hive/HCatalog Configuration Files](#)
4. [Create Directories on HDFS](#)
5. [Validate the Installation](#)

6.1. Install the Hive and HCatalog RPMs

1. On all client/gateway nodes (on which Hive programs will be executed), Hive Metastore Server, and HiveServer2 machine, install the Hive RPMs.

```
yum install hive hcatalog
```

2. Optional - Download and add the database connector JAR.

By default, Hive uses embedded Derby database for its metastore. However, you can optionally choose to enable remote database (MySQL) for Hive metastore.

- a. Execute the following command on the Hive metastore machine.

```
yum install mysql-connector-java*
```

- b. After the yum install, the mysql jar is placed in '/usr/share/java/'. Copy the downloaded JAR file to the /usr/lib/hive/lib/ directory on your Hive host machine.
- c. Ensure that the JAR file has appropriate permissions.

6.2. Set Directories and Permissions

Create directories and configure ownership + permissions on the appropriate hosts as described below.

If any of these directories already exist, we recommend deleting and recreating them. Use the following instructions to set up Pig configuration files :

1. We strongly suggest that you edit and source the files included in `scripts.zip` file (downloaded in [Download Companion Files](#)).

Alternatively, you can also copy the contents to your `~/.bash_profile` to set up these environment variables in your environment.

2. Execute these commands on the Hive server machine:

```
mkdir -p $HIVE_LOG_DIR;  
  
chown -R $HIVE_USER:$HADOOP_GROUP $HIVE_LOG_DIR;  
chmod -R 755 $HIVE_LOG_DIR;
```

where:

- `$HIVE_LOG_DIR` is the directory for storing the Hive Server logs.
This directory name is a combination of a directory and the `$HIVE_USER`.
- `$HIVE_USER` is the user owning the Hive services. For example, `hive`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

6.3. Set Up the Hive/HCatalog Configuration Files

Use the following instructions to set up the Hive/HCatalog configuration files:

1. Extract the Hive/HCatalog configuration files.

From the downloaded `scripts.zip` file, extract the files in `configuration_files/hive` directory to a temporary directory.

2. Modify the configuration files.

In the temporary directory, locate the following file and modify the properties based on your environment. Search for `TODO` in the files for the properties to replace.

- a. Edit `hive-site.xml` and modify the following properties:

```
<property>  
  <name>javax.jdo.option.ConnectionURL</name>  
  <value>jdbc:mysql://$mysql.full.hostname:3306/$database.name?  
createDatabaseIfNotExist=true</value>  
  <description>Enter your JDBC connection string. </description>  
</property>
```

```
<property>  
  <name>javax.jdo.option.ConnectionUserName</name>  
  <value>$dbusername</value>  
  <description>Enter your MySQL credentials. </description>  
</property>
```

```
<property>  
  <name>javax.jdo.option.ConnectionPassword</name>  
  <value>$dbuserpassword</value>  
  <description>Enter your MySQL credentials. </description>  
</property>
```

Enter your MySQL credentials from [Install MySQL \(Optional\)](#).

```
<property>
  <name>hive.metastore.uris</name>
  <value>thrift://$metastore.server.full.hostname:9083</value>
  <description>URI for client to contact metastore server. To enable
  HiveServer2, leave the property value empty. </description>
</property>
```

3. Copy the configuration files.

a. On all Hive hosts create the Hive configuration directory.

```
rm -r $HIVE_CONF_DIR ;
mkdir -p $HIVE_CONF_DIR ;
```

b. Copy all the configuration files to `$HIVE_CONF_DIR` directory.

c. Set appropriate permissions:

```
chown -R $HIVE_USER:$HADOOP_GROUP $HIVE_CONF_DIR/.. / ;
chmod -R 755 $HIVE_CONF_DIR/.. / ;
```

where:

- `$HIVE_CONF_DIR` is the directory to store the Hive configuration files. For example, `/etc/hive/conf`.
- `$HIVE_USER` is the user owning the Hive services. For example, `hive`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

6.4. Create Directories on HDFS

1. Create Hive user home directory on HDFS.

```
Login as $HDFS_USER
hadoop fs -mkdir -p /user/$HIVE_USER
hadoop fs -chown $HIVE_USER:$HDFS_USER /user/$HIVE_USER
```

2. Create warehouse directory on HDFS.

```
Login as $HDFS_USER
hadoop fs -mkdir -p /apps/hive/warehouse
hadoop fs -chown -R $HIVE_USER:$HDFS_USER /apps/hive
hadoop fs -chmod -R 775 /apps/hive
```

where:

- `$HDFS_USER` is the user owning the HDFS services. For example, `hdfs`.
- `$HIVE_USER` is the user owning the Hive services. For example, `hive`.

3. Create hive scratch directory on HDFS.

```
Login as $HDFS_USER
hadoop fs -mkdir -p /tmp/scratch
hadoop fs -chown -R $HIVE_USER:$HDFS_USER /tmp/scratch
```

```
hadoop fs -chmod -R 777 /tmp/scratch
```

where:

- `$HDFS_USER` is the user owning the HDFS services. For example, `hdfs`.
- `$HIVE_USER` is the user owning the Hive services. For example, `hive`.

6.5. Validate the Installation

Use the following steps to validate your installation:

1. Start Hive Metastore service.

```
Login as $HIVE_USER  
nohup hive --service metastore>$HIVE_LOG_DIR/hive.out 2>$HIVE_LOG_DIR/hive.  
log &
```

2. Smoke Test Hive.

- a. Open Hive command line shell.

```
hive
```

- b. Run sample commands.

```
show databases;  
create table test(col1 int, col2 string);  
show tables;
```

3. Start HiveServer2.

```
/usr/lib/hive/bin/hiveserver2 >$HIVE_LOG_DIR/hiveserver2.out  
2> $HIVE_LOG_DIR/hiveserver2.log &
```

4. Smoke Test HiveServer2.

- a. Open Beeline command line shell to interact with HiveServer2.

```
/usr/lib/hive/bin/beeline
```

- b. Establish connection to server.

```
!connect jdbc:hive2://$hive.server.full.hostname:10000 $HIVE_USER  
password org.apache.hive.jdbc.HiveDriver
```

- c. Run sample commands.

```
show databases;  
create table test2(a int, b string);  
show tables;
```

where:

- `$HDFS_USER` is the user owning the HDFS services. For example, `hdfs`.
- `$HIVE_LOG_DIR` is the directory for storing the Hive Server logs. This directory name is a combination of a directory and the `$HIVE_USER`.

7. Installing and Configuring Apache Tez

Tez is the next generation Hadoop Query Processing framework written on top of YARN.

Tez is a new and improved implementation of the MapReduce application that supports container reuse. This allows jobs to run faster on clusters that have limited resources per job. On smaller clusters, it reduces the time for a job to finish by efficiently using a container to run more than one task.

Use the following instructions to install and configure Tez:

1. [Install the Tez RPMs](#)
2. [Enable Tez](#)

7.1. Install the Tez RPMs

1. Execute the following command on all client and gateway nodes in your cluster. From a terminal window, type:

```
yum install tez
```

This will install the Tez RPM.

2. Execute these commands on the Tez client nodes and gateway nodes to create the config directories:

```
mkdir -p $TEZ_CONF_DIR;
```

```
chown -R tez:$HADOOP_GROUP $TEZ_CONF_DIR;  
chmod -R 755 $TEZ_CONF_DIR;
```

where:

- `$TEZ_CONF_DIR` is the directory for storing Tez configuration.
This directory name is a combination of a directory and the `tez`.
- `tez` is the user owning the Tez services. For example, `tez`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

3. From any one of the client nodes, upload the tez jars to HDFS using the following commands:

```
su $HDFS_USER  
hadoop fs -mkdir -p /apps/tez/  
hadoop fs -chmod -R 755 /apps/tez/  
hadoop fs -chown $HIVE_USER:$HADOOP_GROUP /apps/tez/
```

```
su $HIVE_USER  
hadoop fs -mkdir -p /apps/tez/tez-0.1.0.2.0.4.0/lib/  
hadoop fs -chmod -R 755 /apps/tez/
```

```
hadoop fs -put /usr/lib/tez/*.jar /apps/tez/tez-0.1.0.2.0.4.0/  
hadoop fs -put /usr/lib/tez/lib/*.jar /apps/tez/tez-0.1.0.2.0.4.0/lib/  
hadoop fs -chmod 444 /apps/tez/tez-0.1.0.2.0.4.0/*.jar  
hadoop fs -chmod 444 /apps/tez/tez-0.1.0.2.0.4.0/lib/*.jar
```

where,

- `$HDFS_USER` is the user owning HDFS Service. For example, `hdfs`.
- `$HIVE_USER` is the user owning Hive Service. For example, `hive`.
- `HADOOP_GROUP` is the common group shared by services. For example, `hadoop`

7.2. Enable Tez

Use the following instructions to enable Tez:

On all the client and gateway nodes, create a `tez-site.xml` with the following contents and copy it to `$TEZ_CONF_DIR`.

```
<?xml version="1.0"?>  
<?xml-stylesheet type="text/xsl" href="configuration.xsl"?>  
  
<!-- Put site-specific property overrides in this file. -->  
  
<configuration xmlns:xi="http://www.w3.org/2001/XInclude">  
  
<!-- Tez properties -->  
  
  <property>  
    <name>tez.lib.uris</name>  
    <value>${fs.default.name}/apps/tez/tez-0.1.0.2.0.4.0,${fs.default.name}/  
apps/tez/tez-0.1.0.2.0.4.0/lib</value>  
  </property>  
  
</configuration>
```

where

- `$TEZ_CONF_DIR` is the directory that contains all the Tez configuration files and by default is set to `/etc/tez/conf`.
- `$fs.default.name` points to the default URI (protocol specifier, hostname, and port) for all filesystem requests in Hadoop. This is typically HDFS `host:port` combination. For example, `hdfs://$NAMENODE_HOST:$NAMENODE_PORT`.

7.3. Enable Tez for Hive Queries

Use the following instructions to submit Hive queries to Tez:

1. Copy the `hive-exec-0.11.0.jar` to HDFS at the following location: `/apps/hive/install/hive-exec-0.11.0.jar`.

```
su - $HIVE_USER  
hadoop fs -mkdir /apps/hive/install
```

```
hadoop fs -copyFromLocal /usr/lib/hive/lib/hive-exec-* /apps/hive/install/  
hive-exec-0.11.0.jar
```

2. Execute the following command from the Hive client machines, to run Hive in MRR/Tez mode:

```
export HIVE_AUX_JARS_PATH="/usr/lib/hcatalog/share/hcatalog/hcatalog-core.  
jar:$TEZ_CONF_DIR:$TEZ_INSTALL_DIR/*:$TEZ_INSTALL_DIR/lib/*"
```

where

- `$TEZ_CONF_DIR` is the directory for storing the Tez configuration files. For example, `/etc/tez/conf`.
 - `$TEZ_INSTALL_DIR` is the directory where Tez is installed. For example, `/usr/lib/tez/`.
3. Enable Hive to use Tez DAG APIs. On the Hive client machine, add the following to your Hive script or execute the following in the hive shell:

```
set hive.use.tez.natively=true;
```

4. Allow Hive to combine multiple mapreduce (MR) jobs into a single MRR job where possible:

```
set hive.enable.mrr=true;
```

7.4. Disable Tez for Hive Queries

Use the following instructions to disable Tez for Hive queries:

1. Exit from the open Hive shell.

Set the environment variable `$HIVE_AUX_JARS_PATH` to not reference Tez:

```
su - $HIVE_USER  
export HIVE_AUX_JARS_PATH="/usr/lib/hcatalog/share/hcatalog/hcatalog-core.  
jar"
```

You can now use MapReduce v2 with Hive.

8. Installing WebHCat

This section describes installing and testing WebHCat, which provides a REST interface to Apache HCatalog services like job submission and eventing.

Use the following instructions to install WebHCat:

1. [Install the WebHCat RPMs](#)
2. [Set Directories and Permissions](#)
3. [Modify WebHCat Configuration Files](#)
4. [Set Up HDFS User and Prepare WebHCat Directories On HDFS](#)
5. [Validate the Installation](#)

8.1. Install the WebHCat RPMs

On the WebHCat server machine, install the necessary RPMs.

```
yum install hcatalog webhcat-tar-hive webhcat-tar-pig
```

8.2. Set Directories and Permissions

Create directories and configure ownership + permissions on the appropriate hosts as described below.

If any of these directories already exist, we recommend deleting and recreating them. Use the following instructions to set up Pig configuration files :

1. We strongly suggest that you edit and source the files included in `scripts.zip` file (downloaded in [Download Companion Files](#)).

Alternatively, you can also copy the contents to your `~/ .bash_profile`) to set up these environment variables in your environment.

2. Execute these commands on your WebHCat server machine to create log and pid directories.

```
mkdir -p $WEBHCAT_LOG_DIR
chown -R $WEBHCAT_USER:$HADOOP_GROUP $WEBHCAT_LOG_DIR
chmod -R 755 $WEBHCAT_LOG_DIR
```

```
mkdir -p $WEBHCAT_PID_DIR
chown -R $WEBHCAT_USER:$HADOOP_GROUP $WEBHCAT_PID_DIR
chmod -R 755 $WEBHCAT_PID_DIR
```

where:

- `$WEBHCAT_LOG_DIR` is the directory to store the WebHCat logs. For example, `var/log/webhcat`.

- `$WEBHCAT_PID_DIR` is the directory to store the WebHCat process ID. For example, `/var/run/webhcat`.
- `$WEBHCAT_USER` is the user owning the WebHCat services. For example, `hcat`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

8.3. Modify WebHCat Configuration Files

Use the following instructions to modify the WebHCat config files:

1. Extract the WebHCat configuration files

From the downloaded `scripts.zip` file, extract the files in `configuration_files/webhcat` directory to a temporary location.

2. Modify the configuration files

In the temporary directory, locate the following files and modify the properties based on your environment.

Search for `TODO` in the files for the properties to replace. See [Define Environment Parameters](#) for more information.

a. Edit the `webhcat-env.xml` and modify the following properties:

```
<property>
  <name>templeton.hive.properties</name>
  <value>hive.metastore.local=false, hive.metastore.uris=thrift:
  /$metastore.server.full.hostname:9083, hive.metastore.sasl.enabled=no,
  hive.metastore.execute.setugi=true</value>
  <description>Properties to set when running Hive.</description>
</property>
```

```
<property>
  <name>templeton.zookeeper.hosts</name>
  <value>$zookeeper1.full.hostname:2181,$zookeeper1.full.hostname:2181,..
</value>
  <description>ZooKeeper servers, as comma separated HOST:PORT pairs.</
description>
</property>
```

3. Set up the WebHCat configuration files.

a. Delete any existing WebHCat configuration files:

```
rm -rf $WEBHCAT_CONF_DIR/*
```

b. Copy all the config files to `$WEBHCAT_CONF_DIR` and set appropriate permissions:

```
chown -R $WEBHCAT_USER:$HADOOP_GROUP $WEBHCAT_CONF_DIR
chmod -R 755 $WEBHCAT_CONF_DIR
```

where:

- `$WEBHCAT_CONF_DIR` is the directory to store the WebHCat configuration files. For example, `/etc/hcatalog/conf/webhcat`.
- `$WEBHCAT_USER` is the user owning the WebHCat services. For example, `hcat`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

8.4. Set Up HDFS User and Prepare WebHCat Directories On HDFS

1. Set up the WebHCat user.

```
Login as $HDFS_USER
hadoop fs -mkdir /user/$WEBHCAT_USER
hadoop fs -chown -R $WEBHCAT_USER:$HDFS_USER /user/$WEBHCAT_USER
hadoop fs -mkdir /apps/webhcat
```

2. Prepare WebHCat directories on HDFS.

```
hadoop dfs -copyFromLocal /usr/share/HDP-webhcat/pig.tar.gz /apps/webhcat/
hadoop dfs -copyFromLocal /usr/share/HDP-webhcat/hive.tar.gz /apps/webhcat/
hadoop dfs -copyFromLocal /usr/lib/hadoop-mapreduce/hadoop-streaming*.jar /
apps/webhcat/
```

3. Set appropriate permissions for the HDFS user and the webhcat directory.

```
hadoop fs -chown -R $WEBHCAT_USER:users /apps/webhcat
hadoop fs -chmod -R 755 /apps/webhcat
```

where:

- `$HDFS_USER` is the user owning the HDFS services. For example, `hdfs`.
- `$WEBHCAT_USER` is the user owning the WebHCat services. For example, `hcat`.

8.5. Validate the Installation

1. Start the WebHCat server.

```
<login as $WEBHCAT_USER>
/usr/lib/hcatalog/sbin/webhcat_server.sh start
```

2. From the browser, type:

```
http://$WebHCat.server.full.hostname:50111/templeton/v1/status
```

You should see the following output:

```
{"status": "ok", "version": "v1"}
```

9. Installing HBase and Zookeeper

This section describes installing and testing Apache HBase, a distributed, column-oriented database that provides the ability to access and manipulate data randomly in the context of the large blocks that make up HDFS. It also describes installing and testing Apache ZooKeeper, a centralized tool for providing services to highly distributed systems.

9.1. Install the HBase and ZooKeeper RPMs

In a terminal window, type:

```
yum install zookeeper hbase
```

9.2. Set Directories and Permissions

Create directories and configure ownership + permissions on the appropriate hosts as described below.

If any of these directories already exist, we recommend deleting and recreating them. Use the following instructions to create appropriate directories:

1. We strongly suggest that you edit and source the files included in `scripts.zip` file (downloaded in [Download Companion Files](#)).

Alternatively, you can also copy the contents to your `~/.bash_profile` to set up these environment variables in your environment.

2. Execute the following commands on all nodes:

```
mkdir -p $HBASE_LOG_DIR;  
chown -R $HBASE_USER:$HADOOP_GROUP $HBASE_LOG_DIR;  
chmod -R 755 $HBASE_LOG_DIR;
```

```
mkdir -p $HBASE_PID_DIR;  
chown -R $HBASE_USER:$HADOOP_GROUP $HBASE_PID_DIR;  
chmod -R 755 $HBASE_PID_DIR;
```

```
mkdir -p $ZOOKEEPER_LOG_DIR;  
chown -R $ZOOKEEPER_USER:$HADOOP_GROUP $ZOOKEEPER_LOG_DIR;  
chmod -R 755 $ZOOKEEPER_LOG_DIR;
```

```
mkdir -p $ZOOKEEPER_PID_DIR;  
chown -R $ZOOKEEPER_USER:$HADOOP_GROUP $ZOOKEEPER_PID_DIR;  
chmod -R 755 $ZOOKEEPER_PID_DIR;
```

```
mkdir -p $ZOOKEEPER_DATA_DIR;  
chmod -R 755 $ZOOKEEPER_DATA_DIR;  
chown -R $ZOOKEEPER_USER:$HADOOP_GROUP $ZOOKEEPER_DATA_DIR
```

where:

- `$HBASE_LOG_DIR` is the directory to store the HBase logs. For example, `/var/log/hbase`.

- `$HBASE_PID_DIR` is the directory to store the HBase process ID. For example, `/var/run/hbase`.
 - `$HBASE_USER` is the user owning the HBase services. For example, `hbase`.
 - `$ZOOKEEPER_USER` is the user owning the ZooKeeper services. For example, `zookeeper`.
 - `$ZOOKEEPER_LOG_DIR` is the directory to store the ZooKeeper logs. For example, `/var/log/zookeeper`.
 - `$ZOOKEEPER_PID_DIR` is the directory to store the ZooKeeper process ID. For example, `/var/run/zookeeper`.
 - `$ZOOKEEPER_DATA_DIR` is the directory where ZooKeeper will store data. For example, `/grid/hadoop/zookeeper/data`.
 - `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.
3. Initialize the zookeeper data directories with the 'myid' file. Create one file per Zookeeper server, and put the number of that server in each file.

```
vi $ZOOKEEPER_DATA_DIR/myid
```

In the myid file on the first server, enter the corresponding number:

```
1
```

In the myid file on the second server, enter the corresponding number:

```
2
```

In the myid file on the second server, enter the corresponding number:

```
3
```

9.3. Set Up the Configuration Files

There are several configuration files that need to be set up for HBase and ZooKeeper.

- Extract the HBase and ZooKeeper configuration files.

From the downloaded `scripts.zip` file, extract the files in `configuration_files/hbase` and `configuration_files/zookeeper` directory to separate temporary directories.

- Modify the configuration files.

In the respective temporary directories, locate the following files and modify the properties based on your environment. Search for `TODO` in the files for the properties to replace.

1. Edit `zoo.cfg` and modify the following properties:

```
dataDir=$zk.data.directory.path
```

```
server.1=$zk.server1.full.hostname:2888:3888
```

```
server.2=$zk.server2.full.hostname:2888:3888
```

```
server.3=$zk.server3.full.hostname:2888:3888
```

2. Edit the `hbase-site.xml` and modify the following properties:

```
<property>
  <name>hbase.rootdir</name>
  <value>hdfs://$hbase.namenode.full.hostname:8020/apps/hbase/data</value>

  <description>Enter the HBase NameNode server hostname</description>
</property>
```

```
<property>
  <name>hbase.master.info.bindAddress</name>
  <value>$hbase.master.full.hostname</value>
  <description>Enter the HBase Master server hostname</description>
</property>
```

```
<property>
  <name>hbase.zookeeper.quorum</name>
  <value>$zk.server1.full.hostname,$zk.server2.full.hostname,$zk.server3.
full.hostname</value>
  <description>Comma separated list of Zookeeper servers (match to what is
specified in zoo.cfg but without portnumbers)</description>
</property>
```

3. Edit the `regionservers` file and list all the `RegionServers` hostnames (separated by newline character) in your environment. For example, see the sample `regionservers` file with hostnames `RegionServer1` through `RegionServer9`.

```
RegionServer1
RegionServer2
RegionServer3
RegionServer4
RegionServer5
RegionServer6
RegionServer7
RegionServer8
RegionServer9
```

- Copy the configuration files

1. On all hosts create the config directory:

```
rm -r $HBASE_CONF_DIR ;
mkdir -p $HBASE_CONF_DIR ;
```

```
rm -r $ZOOKEEPER_CONF_DIR ;
mkdir -p $ZOOKEEPER_CONF_DIR ;
```

2. Copy all the HBase configuration files to `$HBASE_CONF_DIR` and the ZooKeeper configuration files to `$ZOOKEEPER_CONF_DIR` directory.

3. Set appropriate permissions:

```
chmod a+x $HBASE_CONF_DIR/;  
chown -R $HBASE_USER:$HADOOP_GROUP $HBASE_CONF_DIR/./ ;  
chmod -R 755 $HBASE_CONF_DIR/./
```

```
chmod a+x $ZOOKEEPER_CONF_DIR/;  
chown -R $ZOOKEEPER_USER:$HADOOP_GROUP $ZOOKEEPER_CONF_DIR/./ ;  
chmod -R 755 $ZOOKEEPER_CONF_DIR/./
```

where:

- `$HBASE_CONF_DIR` is the directory to store the HBase configuration files. For example, `/etc/hbase/conf`.
- `$HBASE_USER` is the user owning the HBase services. For example, `hbase`.
- `$ZOOKEEPER_CONF_DIR` is the directory to store the ZooKeeper configuration files. For example, `/etc/zookeeper/conf`.
- `$ZOOKEEPER_USER` is the user owning the ZooKeeper services. For example, `zookeeper`.

9.4. Validate the Installation

Use these steps to validate your installation.

1. Start HBase and ZooKeeper.

- a. Execute this command from the each ZooKeeper node:

```
<login as $ZOOKEEPER_USER>  
/usr/lib/zookeeper/bin/zkServer.sh start $ZOOKEEPER_CONF_DIR/zoo.cfg
```

- b. Execute this command from the HBase Master node:

```
<login as $HDFS_USER>  
/usr/lib/hadoop/bin/hadoop fs -mkdir /apps/hbase  
/usr/lib/hadoop/bin/hadoop fs -chown -R hbase /apps/hbase  
<login as $HBASE_USER>  
/usr/lib/hbase/bin/hbase-daemon.sh --config $HBASE_CONF_DIR start master
```

- c. Execute this command from each HBase Region Server node:

```
<login as $HBASE_USER>  
/usr/lib/hbase/bin/hbase-daemon.sh --config $HBASE_CONF_DIR start  
regionserver
```

where:

- `$HBASE_CONF_DIR` is the directory to store the HBase configuration files. For example, `/etc/hbase/conf`.
- `$HBASE_USER` is the user owning the HBase services. For example, `hbase`.

- `$ZOOKEEPER_CONF_DIR` is the directory to store the ZooKeeper configuration files. For example, `/etc/zookeeper/conf`.
- `$ZOOKEEPER_USER` is the user owning the ZooKeeper services. For example, `zookeeper`.

2. Smoke Test HBase and ZooKeeper.

From a terminal window, enter:

```
su - $HBASE_USER  
hbase shell
```

In the Hbase shell, enter the following commands:

```
echo status
```

10. Installing Apache Oozie

This section describes installing and testing Apache Oozie, a server based workflow engine optimized for running workflows that execute Hadoop jobs.

Complete the following instructions to install Oozie:

1. [Install the Oozie RPMs](#)
2. [Set Directories and Permissions](#)
3. [Set Up the Oozie Configuration Files](#)
4. [Validate the Installation](#)

10.1. Install the Oozie RPMs

1. On Oozie server, install the necessary RPMs.

```
yum install oozie extjs-2.2-1
```

```
yum install oozie oozie-client
```

2. Add the ExtJS library to the Oozie application.

```
/usr/lib/oozie/bin/oozie-setup.sh -hadoop 2.x /usr/lib/hadoop -extjs /usr/share/HDP-oozie/ext-2.2.zip
```

3. Add LZO JAR files.

```
/usr/lib/oozie/bin/oozie-setup.sh -hadoop 2.x /usr/lib/hadoop -extjs /usr/share/HDP-oozie/ext-2.2.zip -jars /usr/lib/hadoop/lib/hadoop-lzo-0.5.0.jar
```

10.2. Set Directories and Permissions

Create directories and configure ownership + permissions on the appropriate hosts as described below.

If any of these directories already exist, we recommend deleting and recreating them. Use the following instructions to set up Oozie configuration files:

1. We strongly suggest that you edit and source the files included in `scripts.zip` file (downloaded in [Download Companion Files](#)).

Alternatively, you can also copy the contents to your `~/ .bash_profile`) to set up these environment variables in your environment.

2. Execute the following commands on your Oozie server:

```
mkdir -p $OOZIE_DATA;  
chown -R $OOZIE_USER:$HADOOP_GROUP $OOZIE_DATA;  
chmod -R 755 $OOZIE_DATA;
```

```
mkdir -p $OOZIE_LOG_DIR;
```

```
chown -R $OOZIE_USER:$HADOOP_GROUP $OOZIE_LOG_DIR;  
chmod -R 755 $OOZIE_LOG_DIR;
```

```
mkdir -p $OOZIE_PID_DIR;  
chown -R $OOZIE_USER:$HADOOP_GROUP $OOZIE_PID_DIR;  
chmod -R 755 $OOZIE_PID_DIR;
```

```
mkdir -p $OOZIE_TMP_DIR;  
chown -R $OOZIE_USER:$HADOOP_GROUP $OOZIE_TMP_DIR;  
chmod -R 755 $OOZIE_TMP_DIR;
```

where:

- `$OOZIE_DATA` is the directory to store the Oozie data. For example, `/var/db/oozie`.
- `$OOZIE_LOG_DIR` is the directory to store the Oozie logs. For example, `/var/log/oozie`.
- `$OOZIE_PID_DIR` is the directory to store the Oozie process ID. For example, `/var/run/oozie`.
- `$OOZIE_TMP_DIR` is the directory to store the Oozie temporary files. For example, `/var/tmp/oozie`.
- `$OOZIE_USER` is the user owning the Oozie services. For example, `oozie`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

10.3. Set Up the Oozie Configuration Files

Complete the following instructions to set up Oozie configuration files:

1. Extract the Oozie configuration files.

From the downloaded `scripts.zip` file, extract the files from the `configuration_files/oozie` directory to a temporary directory.

2. Modify the configuration files.

In the temporary directory, locate the following file and modify the properties based on your environment. Search for `TODO` in the files for the properties to replace.

- a. Edit the `oozie-site.xml` and modify the following properties:

```
<property>  
  <name>oozie.base.url</name>  
  <value>http://$oozie.full.hostname:11000/oozie</value>  
  <description>Enter your Oozie server hostname.</description>  
</property>
```

```
<property>  
  <name>oozie.service.StoreService.jdbc.url</name>  
  <value>jdbc:derby:$OOZIE_DATA_DIR/$soozie.db.schema.name-db;create=  
true</value>  
</property>
```

```
<property>
  <name>oozie.service.JPAService.jdbc.driver</name>
  <value>org.apache.derby.jdbc.EmbeddedDriver</value>
</property>
```

```
<property>
  <name>oozie.service.JPAService.jdbc.username</name>
  <value>${OOZIE_DBUSER}</value>
</property>
```

```
<property>
  <name>oozie.service.JPAService.jdbc.password</name>
  <value>${OOZIE_DBPASSWD}</value>
</property>
```

- b. Setup Oozie database schema using the `ooziedb.sh` command line. Execute the following command on the Oozie host machine: tool.

```
${OOZIE_HOME_DIR}/bin/ooziedb.sh create -sqlfile oozie.sql -run Validate DB Connection
```

By default, `OOZIE_HOME_DIR` is set to `/usr/lib/oozie`.

- c. Edit the `oozie-env.sh` and modify the following properties:

```
<property>
  <name>OOZIE_LOG_DIR</name>
  <value>/var/log/oozie</value>
  <description>Use value from OOZIE_LOG_DIR </description>
</property>
```

```
<property>
  <name>OOZIE_PID_DIR</name>
  <value>/var/run/oozie</value>
  <description>Use value from OOZIE_PID_DIR </description>
</property>
```

```
<property>
  <name>OOZIE_DATA_DIR</name>
  <value>/var/db/oozie</value>
  <description>Use value from OOZIE_DATA_DIR </description>
</property>
```

3. Copy the Configuration Files

On your Oozie server create the config directory, copy the config files and set the permissions:

```
rm -r $OOZIE_CONF_DIR ;
mkdir -p $OOZIE_CONF_DIR ;
```

4. Copy all the config files to `OOZIE_CONF_DIR` directory.

5. Set appropriate permissions.

```
chown -R $OOZIE_USER:$SHADOOP_GROUP $OOZIE_CONF_DIR/./ ;
chmod -R 755 $OOZIE_CONF_DIR/./ ;
```

where:

- `$OOZIE_CONF_DIR` is the directory to store Oozie configuration files. For example, `/etc/oozie/conf`.
- `$OOZIE_DATA` is the directory to store the Oozie data. For example, `/var/db/oozie`.
- `$OOZIE_LOG_DIR` is the directory to store the Oozie logs. For example, `/var/log/oozie`.
- `$OOZIE_PID_DIR` is the directory to store the Oozie process ID. For example, `/var/run/oozie`.
- `$OOZIE_TMP_DIR` is the directory to store the Oozie temporary files. For example, `/var/tmp/oozie`.
- `$OOZIE_USER` is the user owning the Oozie services. For example, `oozie`.
- `$HADOOP_GROUP` is a common group shared by services. For example, `hadoop`.

10.4. Validate the Installation

Use these steps to validate your installation.

1. Start the Oozie server:

```
<login as $OOZIE_USER>  
/usr/lib/oozie/bin/oozie-start.sh
```

2. Confirm that you can browse to the Oozie server:

```
http://{oozie.full.hostname}:11000/oozie
```

3. Access the Oozie Server with the Oozie client.

```
oozie admin -oozie http://$oozie.full.hostname:11000/oozie -status
```

You should see the following output:

```
System mode: NORMAL
```

11. Installing Apache Sqoop

This section describes installing and testing Apache Sqoop, a component that provides a mechanism for moving data between HDFS and external structured datastores. Use the following instructions to deploy Apache Sqoop:

1. [Install the Sqoop RPMs](#)
2. [Set Up the Sqoop Configuration](#)
3. [Install the Sqoop RPMs](#)

11.1. Install the Sqoop RPMs

On all nodes where you plan to use the Sqoop client, install the following RPMs:

```
yum install sqoop
```

11.2. Set Up the Sqoop Configuration

This section describes how to set up and edit the deployment configuration files for Sqoop.

Use the following instructions to set up Sqoop configuration files:

1. We strongly suggest that you edit and source the files included in `scripts.zip` file (downloaded in [Download Companion Files](#)).

Alternatively, you can also copy the contents to your `~/.bash_profile`) to set up these environment variables in your environment.

2. From the downloaded `scripts.zip` file, extract the files from the `configuration_files/sqoop` directory to a temporary directory.
3. Modify the configuration files.

In the temporary directory, locate the following files and modify the properties based on your environment.

Search for `TODO` in the files for the properties to replace. See [Define Environment Parameters](#) for more information.

- a. From the file you downloaded in [Download Companion Files](#) extract the files in `configuration_files/sqoop` to a temporary directory.
- b. Copy all the config files to the

```
<copy the config files to $SQOOP_CONF_DIR >
```

where `$SQOOP_CONF_DIR` is the directory to store the Sqoop configuration files. For example, `/usr/lib/sqoop/conf`.

11.3. Validate the Installation

Execute the following command. You should see the Sqoop version information displayed.

```
sqoop version | grep 'Sqoop [0-9].*'
```

12. Manual Install Appendix: Tarballs

Individual links to the Apache structured tarball files for the projects included with Hortonworks Data Platform are listed below:

- **RHEL 5 and CentOS 5:**

Table 12.1. RHEL/CentOS 5

Project	Download
Hadoop	hadoop-2.1.0.2.0.4.0-38.tar.gz
Pig	pig-0.11.2.0.4.0-38.tar.gz
Hive and HCatalog	hive-0.11.0.2.0.4.0-38.tar.gz hcatalog-0.11.0.2.0.4.0-38.tar.gz
Tez	tez-0.1.0.2.0.4.0-38.tar.gz
HBase and ZooKeeper	hbase-0.94.6.2.0.4.0-38-security.tar.gz zookeeper-3.4.5.2.0.4.0-38.tar.gz
Oozie	oozie-3.3.2.2.0.4.0-38-distro.tar.gz
Sqoop	sqoop-1.4.3.2.0.4.0-38.bin__hadoop-2.1.0.2.0.4.0-38.tar.gz

- **RHEL 6 and CentOS 6:**

Table 12.2. RHEL/CentOS 6

Project	Download
Hadoop	hadoop-2.1.0.2.0.4.0-38.tar.gz
Pig	pig-0.11.2.0.4.0-38.tar.gz
Hive and HCatalog	hive-0.11.0.2.0.4.0-38.tar.gz hcatalog-0.11.0.2.0.4.0-38.tar.gz
Tez	tez-0.1.0.2.0.4.0-38.tar.gz
HBase and ZooKeeper	hbase-0.94.6.2.0.4.0-38-security.tar.gz zookeeper-3.4.5.2.0.4.0-38.tar.gz
Oozie	oozie-3.3.2.2.0.4.0-38-distro.tar.gz
Sqoop	sqoop-1.4.3.2.0.4.0-38.bin__hadoop-2.1.0.2.0.4.0-38.tar.gz

13. Uninstalling HDP

Use the following instructions to uninstall HDP:

1. [Stop](#) all the installed HDP services.
2. If HBase and ZooKeeper are installed, execute the following commands on all the cluster nodes:

```
rm -f /usr/share/hbase/lib/zookeeper-$version.jar
rm -rf $ZOOKEEPER_PID_DIR/*.pid
rm -rf $HBASE_PID_DIR/*.pid
```

3. If HCatalog is installed, execute the following command on all the cluster nodes:

```
yum remove hcatalog\*
```

4. If Hive is installed, execute the following command on all the cluster nodes:

```
yum remove hive\*
```

5. If Tez is installed, execute the following command on all the cluster nodes:

```
yum remove tez
```

6. If HBase is installed, execute the following command on all the cluster nodes:

```
yum remove hbase\*
```

7. If ZooKeeper is installed, execute the following command on all the cluster nodes:

```
yum remove zookeeper\*
```

8. If Pig is installed, execute the following command on all the cluster nodes:

```
yum remove pig\*
```

9. If compression libraries are installed, execute the following command on all the cluster nodes:

```
yum remove snappy\*
yum remove hadoop-lzo\*
```

10. Uninstall Hadoop. Execute the following command on all the cluster nodes:

```
yum remove hadoop\*
```

11. Uninstall ExtJS libraries and MySQL connector. Execute the following command on all the cluster nodes:

```
yum remove extjs-2.2-1 mysql-connector-java-5.0.8-1\*
```

12. Delete Hadoop directories. If your Hadoop Home directory is "/usr/lib/hadoop" for example, delete that directory and its subdirectories.

```
rm -rf /usr/lib/hadoop
```