

# Single Node Setup

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## 1. Purpose

This document describes how to set up and configure a single-node Hadoop installation so that you can quickly perform simple operations using Hadoop MapReduce and the Hadoop Distributed File System (HDFS).

## 2. Prerequisites

### 2.1. Supported Platforms

- GNU/Linux is supported as a development and production platform. Hadoop has been demonstrated on GNU/Linux clusters with 2000 nodes.
- Win32 is supported as a *development platform*. Distributed operation has not been well tested on Win32, so it is not supported as a *production platform*.

### 2.2. Required Software

Required software for Linux and Windows include:

1. JavaTM 1.6.x, preferably from Sun, must be installed.
2. **ssh** must be installed and **sshd** must be running to use the Hadoop scripts that manage remote Hadoop daemons.

Additional requirements for Windows include:

1. [Cygwin](#) - Required for shell support in addition to the required software above.

### 2.3. Installing Software

If your cluster doesn't have the requisite software you will need to install it.

For example on Ubuntu Linux:

```
$ sudo apt-get install ssh  
$ sudo apt-get install rsync
```

On Windows, if you did not install the required software when you installed cygwin, start the cygwin installer and select the packages:

- openssh - the *Net* category

## 3. Download

To get a Hadoop distribution, download a recent [stable release](#) from one of the Apache

Download Mirrors.

## 4. Prepare to Start the Hadoop Cluster

Unpack the downloaded Hadoop distribution. In the distribution, edit the file `conf/hadoop-env.sh` to define at least `JAVA_HOME` to be the root of your Java installation.

Try the following command:

```
$ bin/hadoop
```

This will display the usage documentation for the **hadoop** script.

Now you are ready to start your Hadoop cluster in one of the three supported modes:

- Local (Standalone) Mode
- Pseudo-Distributed Mode
- Fully-Distributed Mode

## 5. Standalone Operation

By default, Hadoop is configured to run in a non-distributed mode, as a single Java process. This is useful for debugging.

The following example copies the unpacked `conf` directory to use as input and then finds and displays every match of the given regular expression. Output is written to the given output directory.

```
$ mkdir input
$ cp conf/*.xml input
$ bin/hadoop jar hadoop-examples-*.jar grep input output
'dfs[a-z.]+ '
$ cat output/*
```

## 6. Pseudo-Distributed Operation

Hadoop can also be run on a single-node in a pseudo-distributed mode where each Hadoop daemon runs in a separate Java process.

### 6.1. Configuration

Use the following:

`conf/core-site.xml`:

```
<configuration>
  <property>
    <name>fs.default.name</name>
    <value>hdfs://localhost:9000</value>
  </property>
</configuration>
```

conf/hdfs-site.xml:

```
<configuration>
  <property>
    <name>dfs.replication</name>
    <value>1</value>
  </property>
</configuration>
```

conf/mapred-site.xml:

```
<configuration>
  <property>
    <name>mapred.job.tracker</name>
    <value>localhost:9001</value>
  </property>
</configuration>
```

## 6.2. Setup passphraseless ssh

Now check that you can ssh to the localhost without a passphrase:

```
$ ssh localhost
```

If you cannot ssh to localhost without a passphrase, execute the following commands:

```
$ ssh-keygen -t dsa -P '' -f ~/.ssh/id_dsa
$ cat ~/.ssh/id_dsa.pub >> ~/.ssh/authorized_keys
```

## 6.3. Execution

Format a new distributed-file-system:

```
$ bin/hadoop namenode -format
```

Start the hadoop daemons:

```
$ bin/start-all.sh
```

The hadoop daemon log output is written to the `${HADOOP_LOG_DIR}` directory (defaults to `${HADOOP_HOME}/logs`).

Browse the web interface for the NameNode and the JobTracker; by default they are available at:

- NameNode - <http://localhost:50070/>

- JobTracker - <http://localhost:50030/>

Copy the input files into the distributed filesystem:

```
$ bin/hadoop fs -put conf input
```

Run some of the examples provided:

```
$ bin/hadoop jar hadoop-examples-*.jar grep input output  
'dfs[a-z.]+'
```

Examine the output files:

Copy the output files from the distributed filesystem to the local filesystem and examine them:

```
$ bin/hadoop fs -get output output  
$ cat output/*
```

or

View the output files on the distributed filesystem:

```
$ bin/hadoop fs -cat output/*
```

When you're done, stop the daemons with:

```
$ bin/stop-all.sh
```

## 7. Fully-Distributed Operation

For information on setting up fully-distributed, non-trivial clusters see [Cluster Setup](#).

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