

# AWS 实验记录

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实验概述：

## 实验一：Introduction to Amazon EC2

实验概述：

- 1、创建 EC2 实例
- 2、观察实例的参数
- 3、更新安全组协议，增加 web 服务（http 协议）
- 4、重新定义实例大小：实例的类型和 EBS 卷
- 5、探索 EC2 的限制
- 6、尝试终止保护

关键问题分析与解决：

存在的问题：无

解决的方法：无

## 实验二：Working with EBS

实验概述：

- 1、新建 EBS 卷
- 2、连接卷到一个实例
- 3、登陆到创建的实例
- 4、创建并配置文件系统
- 5、创建一个 EBS 快照
- 6、恢复 EBS 快照

### 关键问题分析与解决：

存在的问题：

- 1、完成 SSH 链接的 xshell 配置
- 2、在登陆实例时，需要使用 ssh 连接并完成相应配置，找不到以前存的密钥文件。

解决的方法：

- 1、参考百度教程，注意两者的端口是否一致

## 实验三：Build your VPC and Launch a Web Server

实验概述：

- 1、创建自己的私有云
- 2、创建附加子网
- 3、创建一个私有云的安全组
- 4、登陆到第一个 web 服务实例

### 关键问题分析与解决：

存在的问题：1、网络学的不好。甚至不知道实验内容是什么，于是问同学。

- 2、不是很明白 vpc 和子网的关系，以及安全组如何工作。

解决的方法：1、理解实验内容后，查询相关定义。安全组：用来实现安全组内和组间弹性

云服务器的访问控制，加强弹性云服务器的安全保护。安全组创建后，用户

可以在安全组中定义各种访问规则，当弹性云服务器加入该安全组后，即受

到这些访问规则的保护。VPC（Virtual Private Cloud）：是公有云上自定义

的逻辑隔离网络空间，是一块可我们自定义的网络空间，与我们在数据中心

运行的传统网络相似，托管在 VPC 内的是我们在私有云上的服务资源，如

云主机、负载均衡、云数据库等。

2、vpc 本身是一个逻辑隔离的网络环境, 可以通过设置安全组和网络 acl 来进行流量控制: 安全组提供 cvm 实例级别的网络流量控制。 没有显式允许进出实例的流量将自动被拒绝。

## 实验四: Build your DB Server and Interact with your DB using an App

实验概述:

- 1、为 RDS 数据库实例创建一个 VPC 安全协议组
- 2、创建一个数据库子网组
- 3、创建一个 RDS 数据库实例
- 4、访问上述创建的数据库

关键问题分析与解决:

存在的问题: 1、不是很明白操作流程

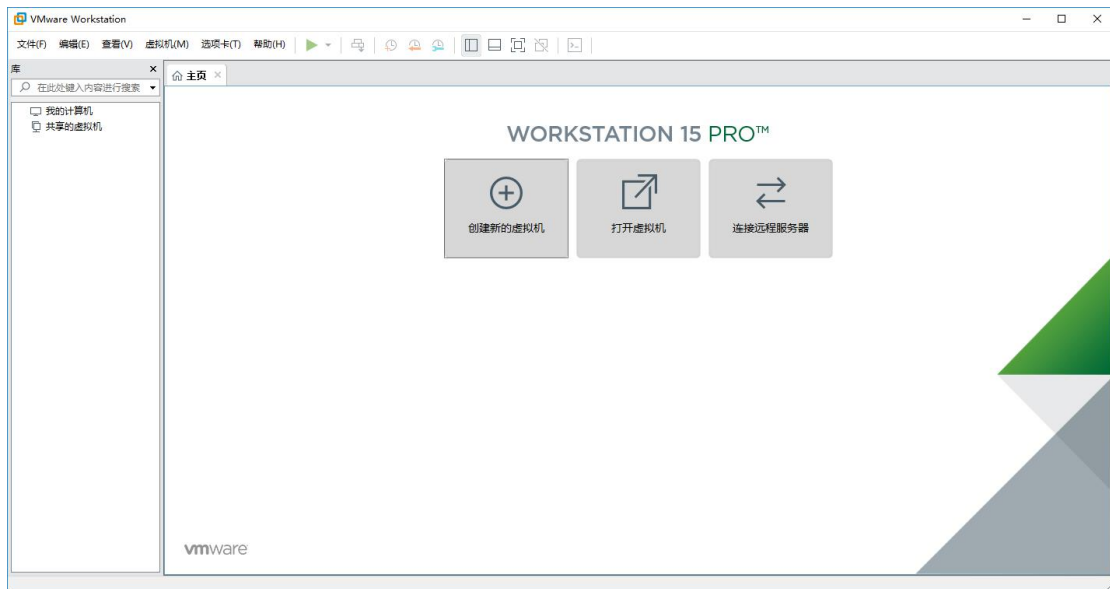
解决的方法: 1、参考了一篇博文, 成功创建

<https://www.cnblogs.com/edward2013/p/5496531.html>

## 实验五: 配置 Hadoop 伪分布式

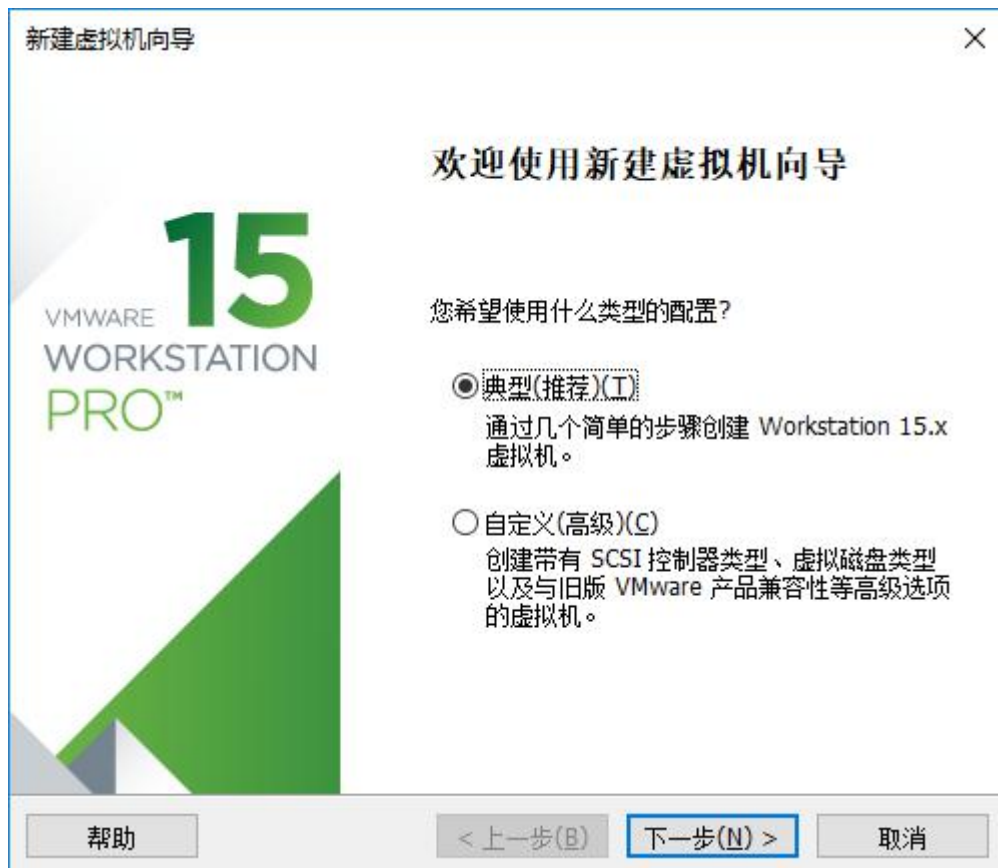
一、安装 Ubuntu 虚拟机。

- 1.安装并启动 VMware Workstation 软件 (以 VMware Workstation 15 为例)

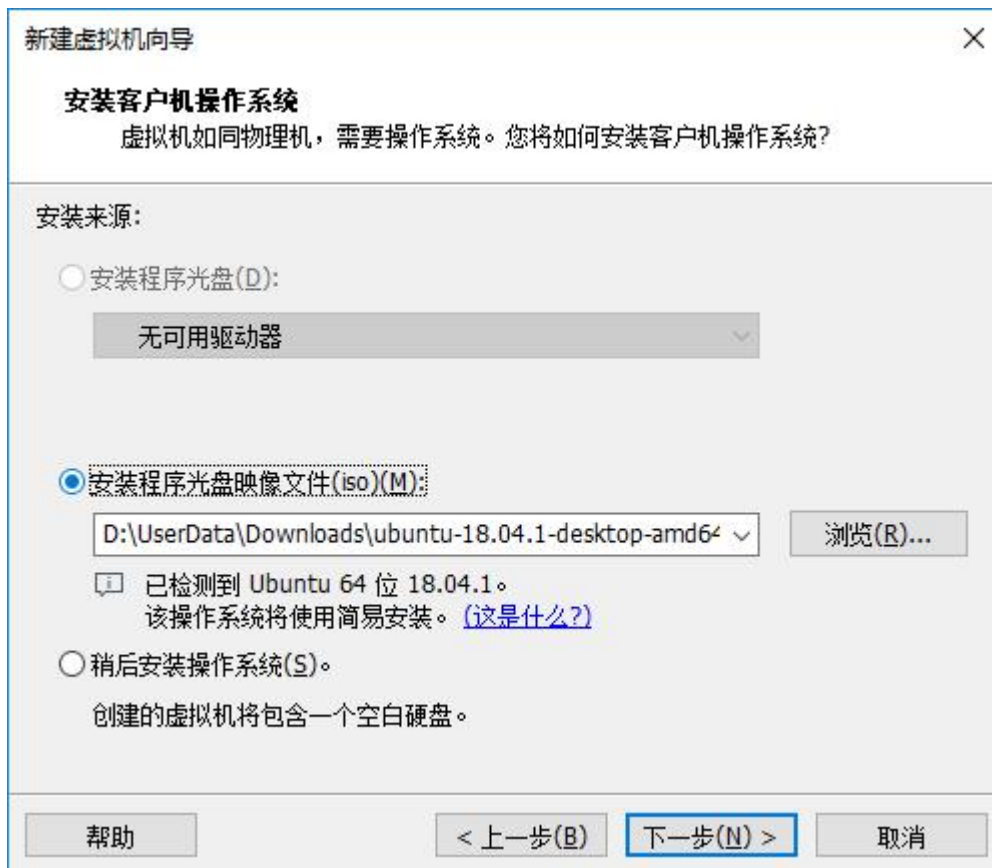


图片 1 安装并启动虚拟机软件

2. 点击“创建新的虚拟机”，进入“新建虚拟机向导”。



3.选择“典型”，点击下一步。选择安装来源为“安装程序光盘镜像文件（ISO）”，并指定 ISO 文件的地址。



4. 在接下来的向导中输入“计算机名称”，“用户名”“密码”等个性化信息。



5. 输入虚拟机的名称及位置，建议设置在空余空间较大的硬盘分区。

新建虚拟机向导

命名虚拟机

您希望该虚拟机使用什么名称？

虚拟机名称(V):

Ubuntu 64 位 (2)

位置(L):

D:\UserData\Documents\Virtual Machines\Ubuntu 64 位 (2)

浏览(B)...

在“编辑”>“首选项”中可更改默认位置。

< 上一步(B)

下一步(N) >

取消

6. 设置分配给虚拟机的硬盘空间及是否拆分虚拟硬盘文件，建议维持默认。

新建虚拟机向导

指定磁盘容量

磁盘大小为多少？

虚拟机的硬盘作为一个或多个文件存储在主机的物理磁盘中。这些文件最初很小，随着您向虚拟机中添加应用程序、文件和数据而逐渐变大。

最大磁盘大小 (GB)(S):

40.0

针对 Ubuntu 64 位 的建议大小: 20 GB

☐ 将虚拟磁盘存储为单个文件(O)

☒ 将虚拟磁盘拆分成多个文件(M)

拆分磁盘后，可以更轻松地在计算机之间移动虚拟机，但可能会降低大容量磁盘的性能。

帮助

< 上一步(B)

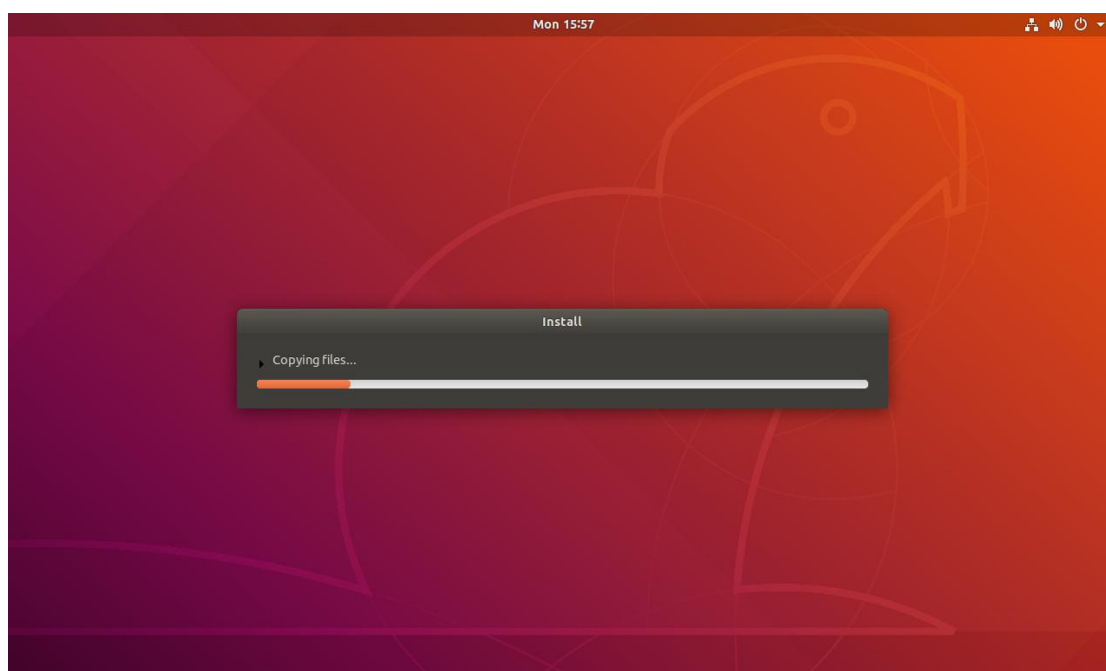
下一步(N) >

取消

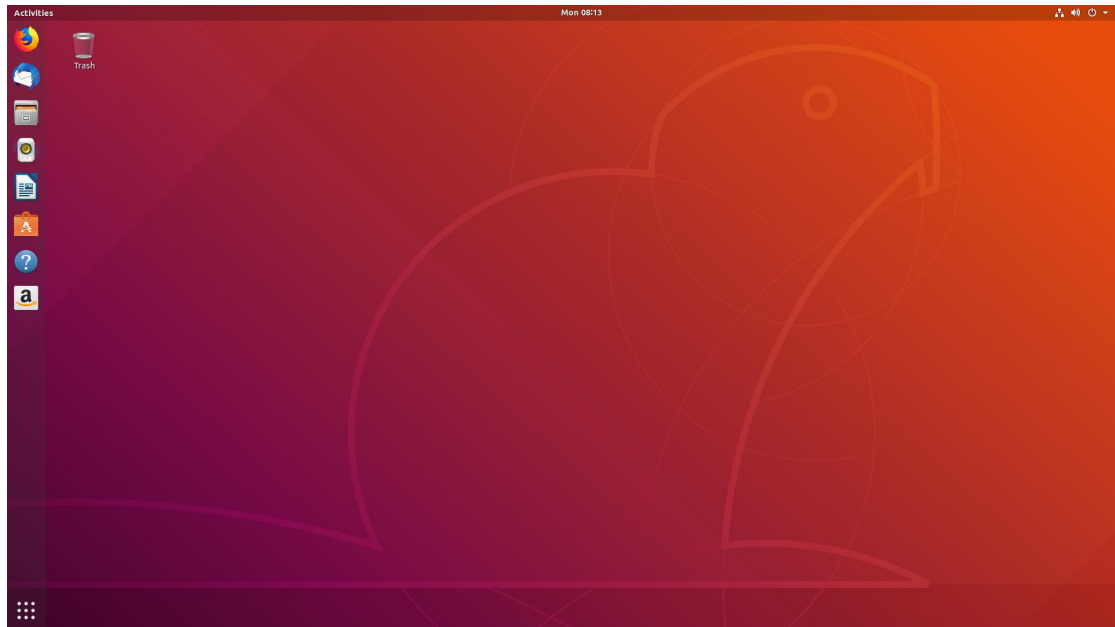
7.再次确认设置，确认无误后选择“完成”。虚拟机会创建并自动启动。



8.等待 VMware 完成简易安装并配置环境。



配置完成后即可进入 Ubuntu 桌面环境。



## 二、Hadoop 的安装与配置

### 1.创建 Hadoop 用户

进入终端，执行命令：

```
sudo useradd -m hadoop -s /bin/bash
```

并设置密码（以 Hadoop 为例）

```
sudo passwd Hadoop
```

设置管理员权限

```
sudo adduser hadoop sudo
```

并注销切换到 Hadoop 用户。



## 2.配置 Java 环境

(Ubuntu 默认源中不再提供 Oracle JDK, 需要第三方源)

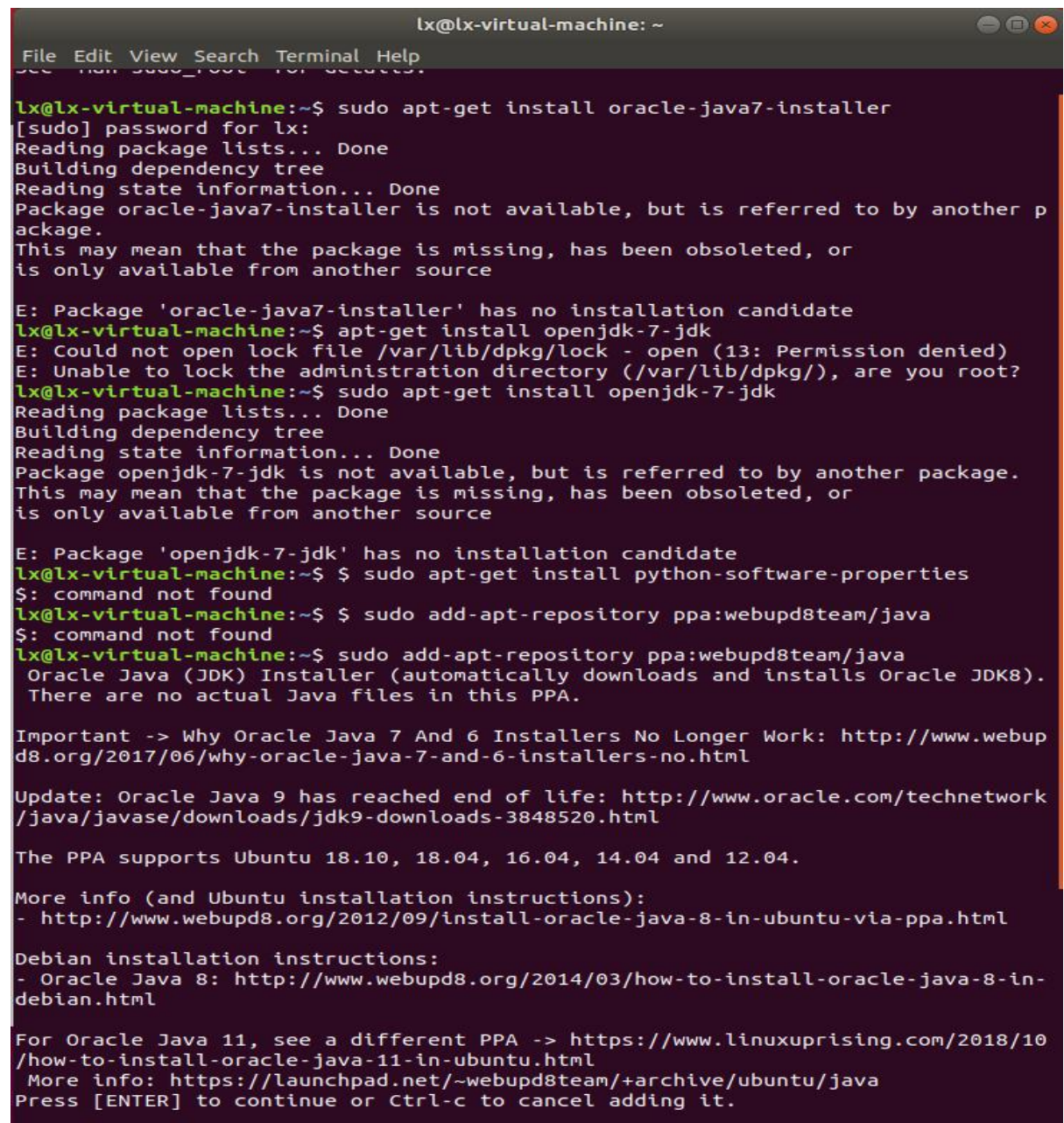
### 2.1 换源

在终端中输入以下命令。

```
sudo apt-get install python-software-properties
```

```
sudo add-apt-repository ppa:webupd8team/java
```

```
sudo apt-get update
```



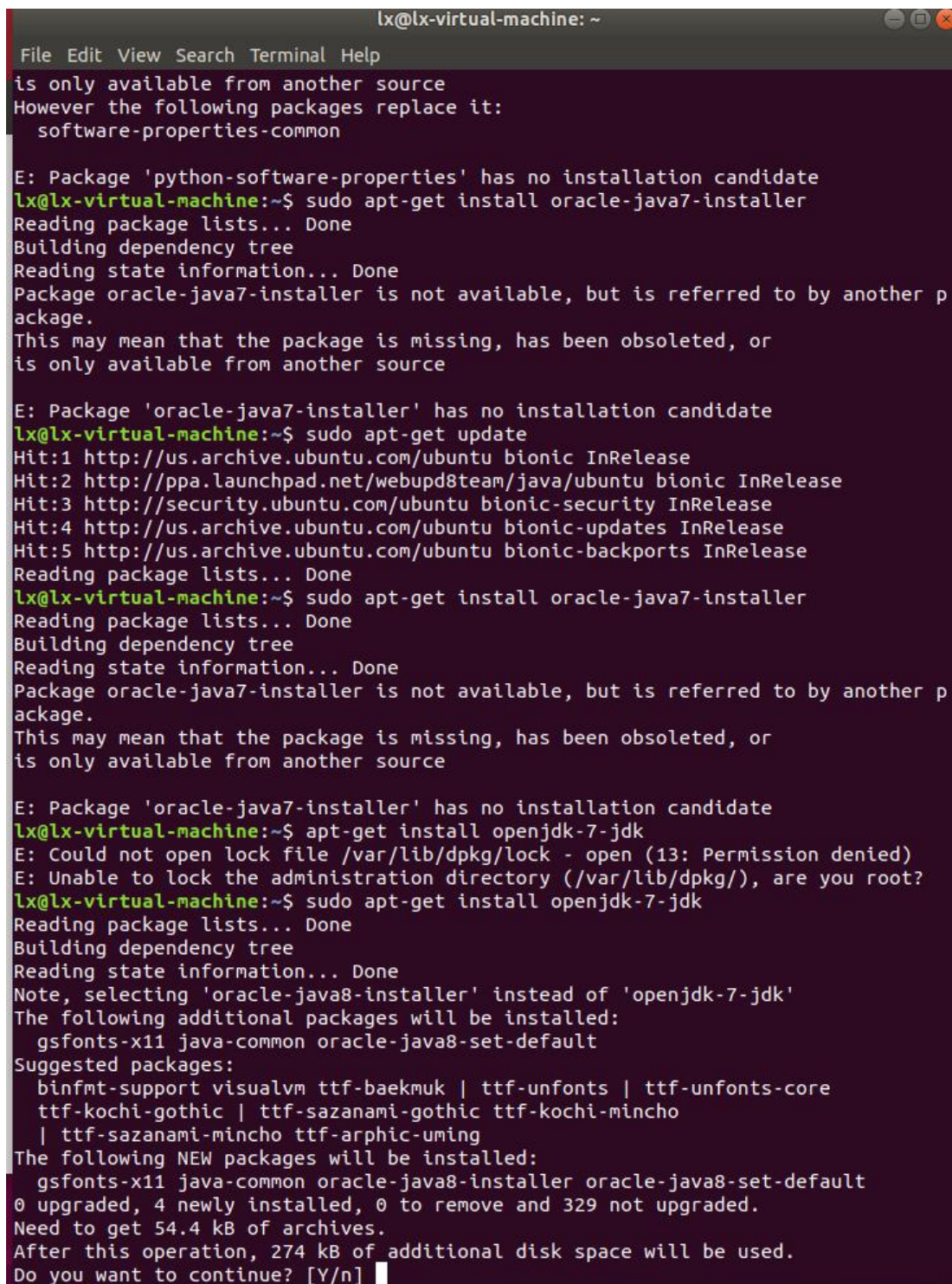
```
lx@lx-virtual-machine: ~  
File Edit View Search Terminal Help  
lx@lx-virtual-machine:~$ sudo apt-get install oracle-java7-installer  
[sudo] password for lx:  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Package oracle-java7-installer is not available, but is referred to by another package.  
This may mean that the package is missing, has been obsoleted, or  
is only available from another source  
  
E: Package 'oracle-java7-installer' has no installation candidate  
lx@lx-virtual-machine:~$ apt-get install openjdk-7-jdk  
E: Could not open lock file /var/lib/dpkg/lock - open (13: Permission denied)  
E: Unable to lock the administration directory (/var/lib/dpkg/), are you root?  
lx@lx-virtual-machine:~$ sudo apt-get install openjdk-7-jdk  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Package openjdk-7-jdk is not available, but is referred to by another package.  
This may mean that the package is missing, has been obsoleted, or  
is only available from another source  
  
E: Package 'openjdk-7-jdk' has no installation candidate  
lx@lx-virtual-machine:~$ $ sudo apt-get install python-software-properties  
$: command not found  
lx@lx-virtual-machine:~$ $ sudo add-apt-repository ppa:webupd8team/java  
$: command not found  
lx@lx-virtual-machine:~$ sudo add-apt-repository ppa:webupd8team/java  
Oracle Java (JDK) Installer (automatically downloads and installs Oracle JDK8).  
There are no actual Java files in this PPA.  
  
Important -> Why Oracle Java 7 And 6 Installers No Longer Work: http://www.webupd8.org/2017/06/why-oracle-java-7-and-6-installers-no.html  
  
Update: Oracle Java 9 has reached end of life: http://www.oracle.com/technetwork/java/javase/downloads/jdk9-downloads-3848520.html  
  
The PPA supports Ubuntu 18.10, 18.04, 16.04, 14.04 and 12.04.  
  
More info (and Ubuntu installation instructions):  
- http://www.webupd8.org/2012/09/install-oracle-java-8-in-ubuntu-via-ppa.html  
  
Debian installation instructions:  
- Oracle Java 8: http://www.webupd8.org/2014/03/how-to-install-oracle-java-8-in-debian.html  
  
For Oracle Java 11, see a different PPA -> https://www.linuxuprising.com/2018/10/how-to-install-oracle-java-11-in-ubuntu.html  
More info: https://launchpad.net/~webupd8team/+archive/ubuntu/java  
Press [ENTER] to continue or Ctrl-c to cancel adding it.
```

按照提示输入回车确认安装 PPA 源。

## 2.2 安装 JDK 环境。

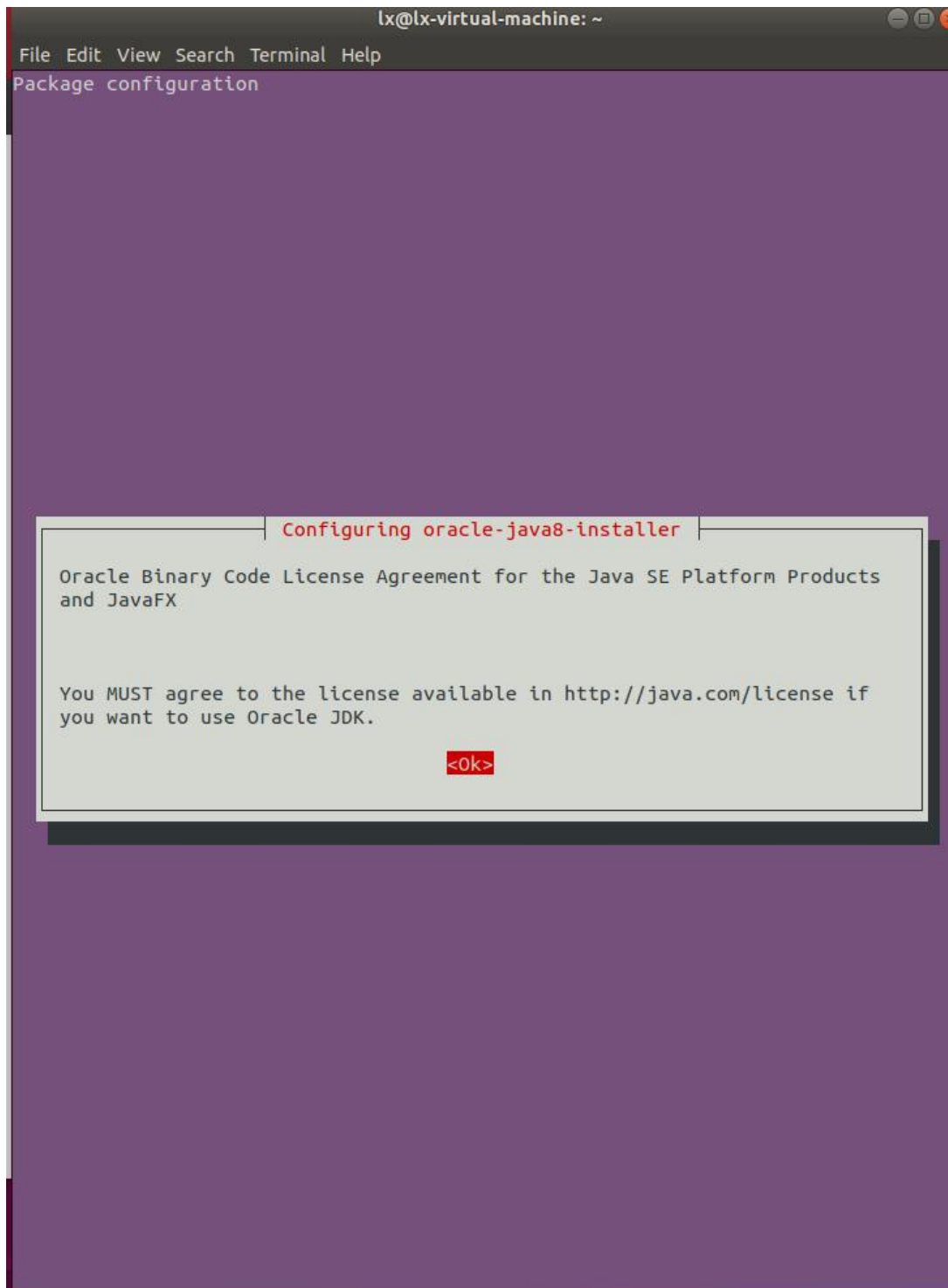
在终端内输入

```
sudo apt-get install oracle-java7-installer
```

A terminal window titled 'lx@lx-virtual-machine: ~' showing the installation of 'oracle-java7-installer'. The user runs 'sudo apt-get install oracle-java7-installer' and receives an error: 'Package oracle-java7-installer is not available, but is referred to by another package. This may mean that the package is missing, has been obsoleted, or is only available from another source'. The user then runs 'sudo apt-get update' and 'sudo apt-get install oracle-java7-installer' again, but the same error persists. Finally, the user runs 'apt-get install openjdk-7-jdk' and receives a permission denied error. The terminal then suggests installing 'oracle-java8-installer' instead, showing a list of additional packages to be installed and the disk space requirements.

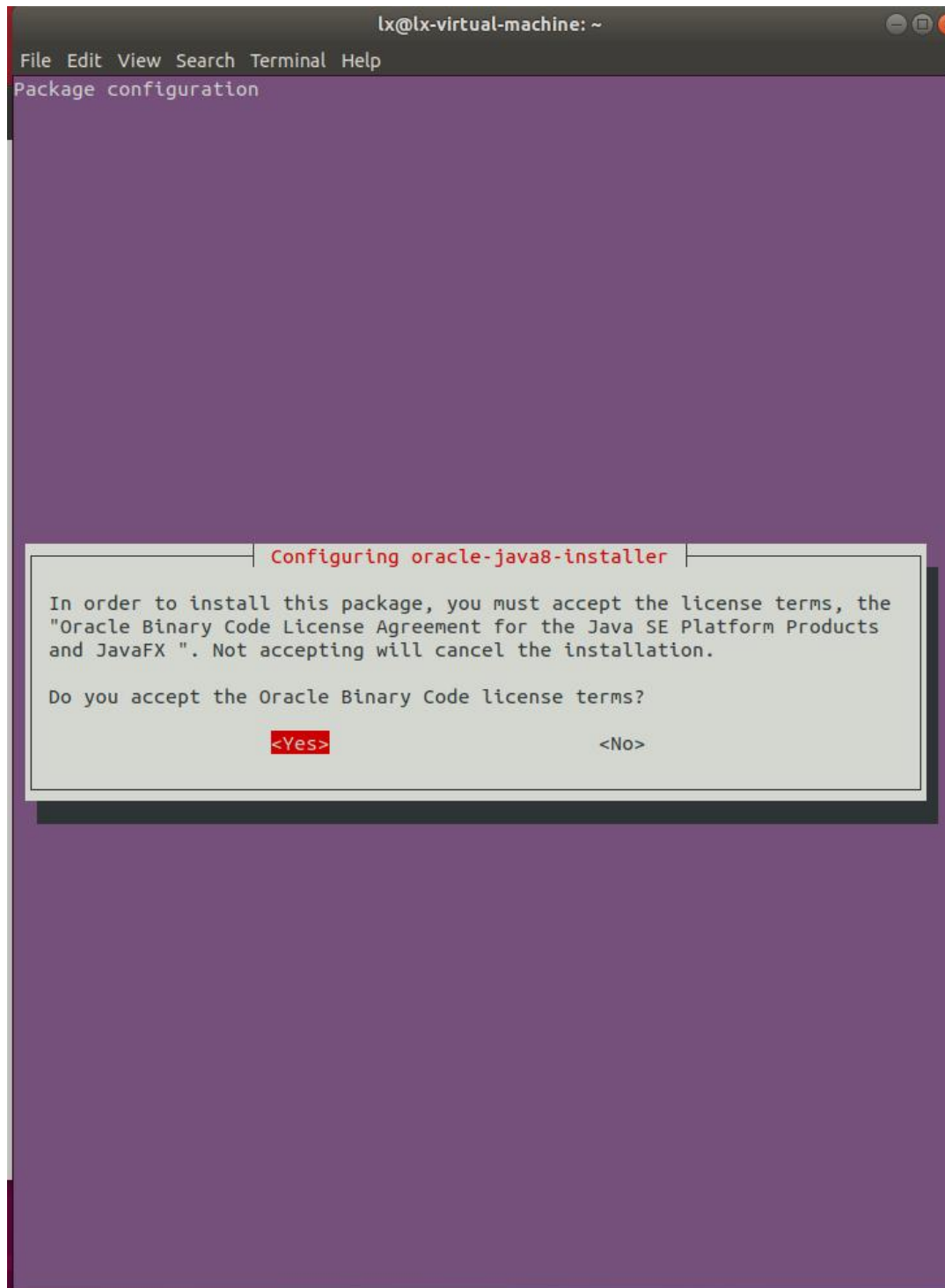
```
lx@lx-virtual-machine: ~  
File Edit View Search Terminal Help  
is only available from another source  
However the following packages replace it:  
  software-properties-common  
  
E: Package 'python-software-properties' has no installation candidate  
lx@lx-virtual-machine:~$ sudo apt-get install oracle-java7-installer  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Package oracle-java7-installer is not available, but is referred to by another p  
ackage.  
This may mean that the package is missing, has been obsoleted, or  
is only available from another source  
  
E: Package 'oracle-java7-installer' has no installation candidate  
lx@lx-virtual-machine:~$ sudo apt-get update  
Hit:1 http://us.archive.ubuntu.com/ubuntu bionic InRelease  
Hit:2 http://ppa.launchpad.net/webupd8team/java/ubuntu bionic InRelease  
Hit:3 http://security.ubuntu.com/ubuntu bionic-security InRelease  
Hit:4 http://us.archive.ubuntu.com/ubuntu bionic-updates InRelease  
Hit:5 http://us.archive.ubuntu.com/ubuntu bionic-backports InRelease  
Reading package lists... Done  
lx@lx-virtual-machine:~$ sudo apt-get install oracle-java7-installer  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Package oracle-java7-installer is not available, but is referred to by another p  
ackage.  
This may mean that the package is missing, has been obsoleted, or  
is only available from another source  
  
E: Package 'oracle-java7-installer' has no installation candidate  
lx@lx-virtual-machine:~$ apt-get install openjdk-7-jdk  
E: Could not open lock file /var/lib/dpkg/lock - open (13: Permission denied)  
E: Unable to lock the administration directory (/var/lib/dpkg/), are you root?  
lx@lx-virtual-machine:~$ sudo apt-get install openjdk-7-jdk  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Note, selecting 'oracle-java8-installer' instead of 'openjdk-7-jdk'  
The following additional packages will be installed:  
  gsfonts-x11 java-common oracle-java8-set-default  
Suggested packages:  
  binfmt-support visualvm ttf-baekmuk | ttf-unfonts | ttf-unfonts-core  
  ttf-kochi-gothic | ttf-sazanami-gothic ttf-kochi-mincho  
  | ttf-sazanami-mincho ttf-arphic-uming  
The following NEW packages will be installed:  
  gsfonts-x11 java-common oracle-java8-installer oracle-java8-set-default  
0 upgraded, 4 newly installed, 0 to remove and 329 not upgraded.  
Need to get 54.4 kB of archives.  
After this operation, 274 kB of additional disk space will be used.  
Do you want to continue? [Y/n]
```

输入 Y 确认安装，进入安装界面。





同意协议，即可进入下载与环境配置



类似的，我们需要安装 SSH 服务端，以远程登录。终端输入：

```
sudo apt-get install openssh-server
```

## 2.3 配置 Java 环境变量

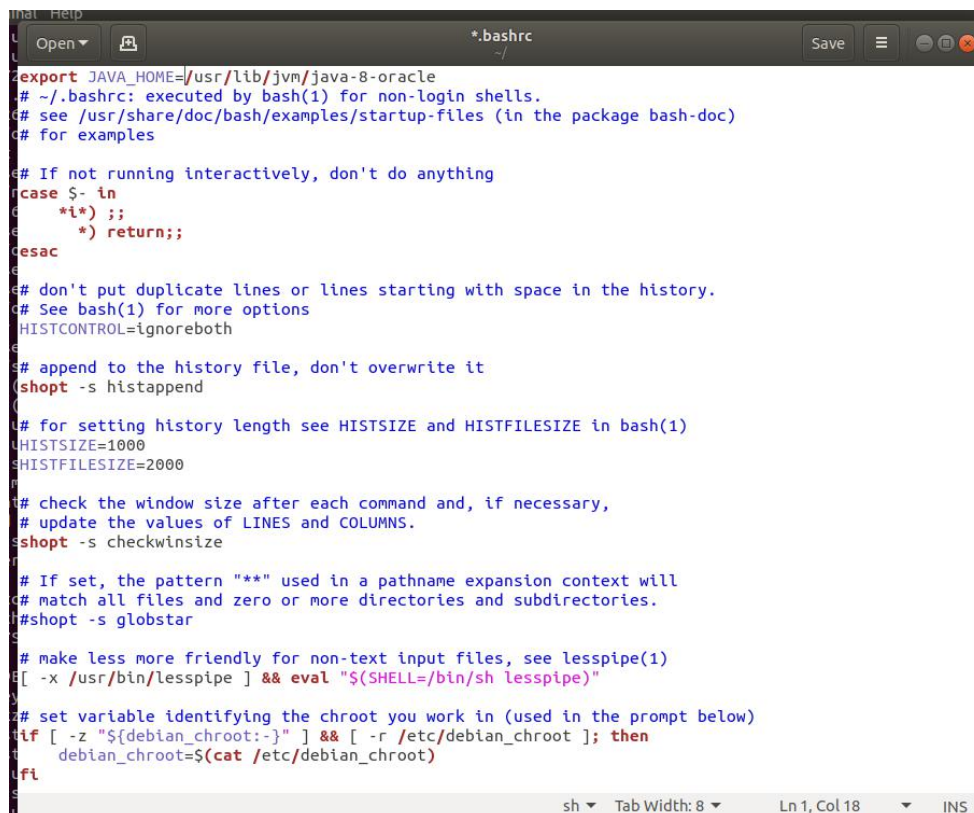
在终端中输入

```
gedit ~/.bashrc
```

在弹出的编辑器中编辑配置文件

在文件最前面添加如下单独一行，输入

```
export JAVA_HOME=/usr/lib/jvm/java-8-oracle
```



```
#!/bin/bash
export JAVA_HOME=/usr/lib/jvm/java-8-oracle
# ~/.bashrc: executed by bash(1) for non-login shells.
# see /usr/share/doc/bash/examples/startup-files (in the package bash-doc)
# for examples

# If not running interactively, don't do anything
case $- in
    *) ;;
    *) return;;
esac

# don't put duplicate lines or lines starting with space in the history.
# See bash(1) for more options
HISTCONTROL=ignoreboth

# append to the history file, don't overwrite it
shopt -s histappend

# for setting history length see HISTSIZE and HISTFILESIZE in bash(1)
HISTSIZE=1000
HISTFILESIZE=2000

# check the window size after each command and, if necessary,
# update the values of LINES and COLUMNS.
shopt -s checkwinsize

# If set, the pattern "*" used in a pathname expansion context will
# match all files and zero or more directories and subdirectories.
shopt -s globstar

# make less more friendly for non-text input files, see lesspipe(1)
[ -x /usr/bin/lesspipe ] && eval "$(SHELL=/bin/sh lesspipe)"

# set variable identifying the chroot you work in (used in the prompt below)
if [ -z "${debian_chroot:-}" ] && [ -r /etc/debian_chroot ]; then
    debian_chroot=$(cat /etc/debian_chroot)
fi
```

同样的，需要让这个环境变量生效，执行如下的命令：

```
source ~/.bashrc
```

执行上面的命令之后，看我们设置的环境变量是否是生效的，可以执行 `echo $JAVA_HOME` 或者 `java -version`，查看是否是自己安装的 Java 路径以及相应的版本。

### 3.安装 Hadoop

#### 3.1 获取 Hadoop

使用 wget 命令获取源码包。输入：

```
wget
```

```
http://mirror.bit.edu.cn/apache/hadoop/common/hadoop-3.1.1/hadoop-3.1.1.tar.gz
```

解压

```
tar zxvf hadoop-3.1.1.tar.gz
```

```
sudo mv hadoop-3.1.1 /usr/local/Hadoop
```

#### 3.2 初始化 Hadoop，设置 JAVA\_HOME

##### 1.编辑 hadoop-env.sh

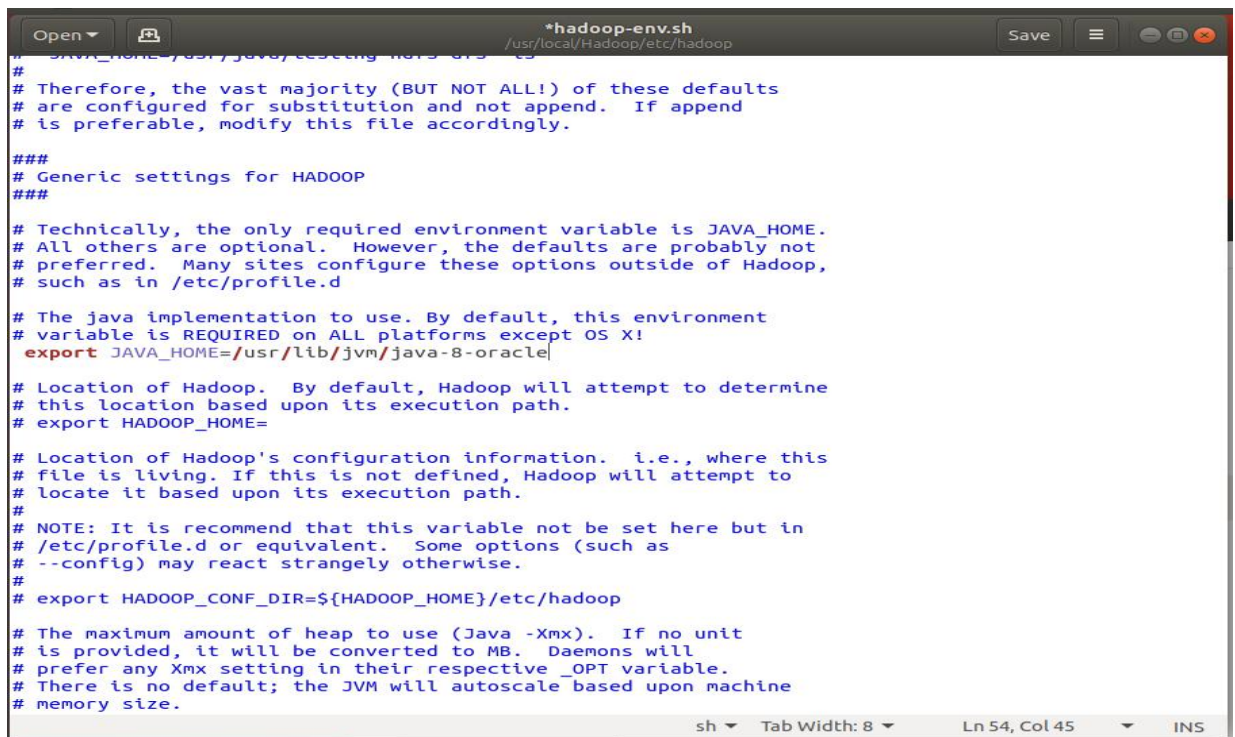
使用文本编辑器打开 /usr/local/Hadoop/etc/hadoop/hadoop-env.sh

将

```
#export JAVA_HOME=${JAVA_HOME}
```

修改为（去除#号）

```
Export JAVA_HOME=/usr/lib/jvm/java-8-oracle
```



```
*hadoop-env.sh
/usr/local/Hadoop/etc/hadoop

#
# Therefore, the vast majority (BUT NOT ALL!) of these defaults
# are configured for substitution and not append. If append
# is preferable, modify this file accordingly.
###
# Generic settings for HADOOP
###

# Technically, the only required environment variable is JAVA_HOME.
# All others are optional. However, the defaults are probably not
# preferred. Many sites configure these options outside of Hadoop,
# such as in /etc/profile.d

# The java implementation to use. By default, this environment
# variable is REQUIRED on ALL platforms except OS X!
export JAVA_HOME=/usr/lib/jvm/java-8-oracle

# Location of Hadoop. By default, Hadoop will attempt to determine
# this location based upon its execution path.
# export HADOOP_HOME=

# Location of Hadoop's configuration information. i.e., where this
# file is living. If this is not defined, Hadoop will attempt to
# locate it based upon its execution path.
#
# NOTE: It is recommend that this variable not be set here but in
# /etc/profile.d or equivalent. Some options (such as
# --config) may react strangely otherwise.
#
# export HADOOP_CONF_DIR=${HADOOP_HOME}/etc/hadoop

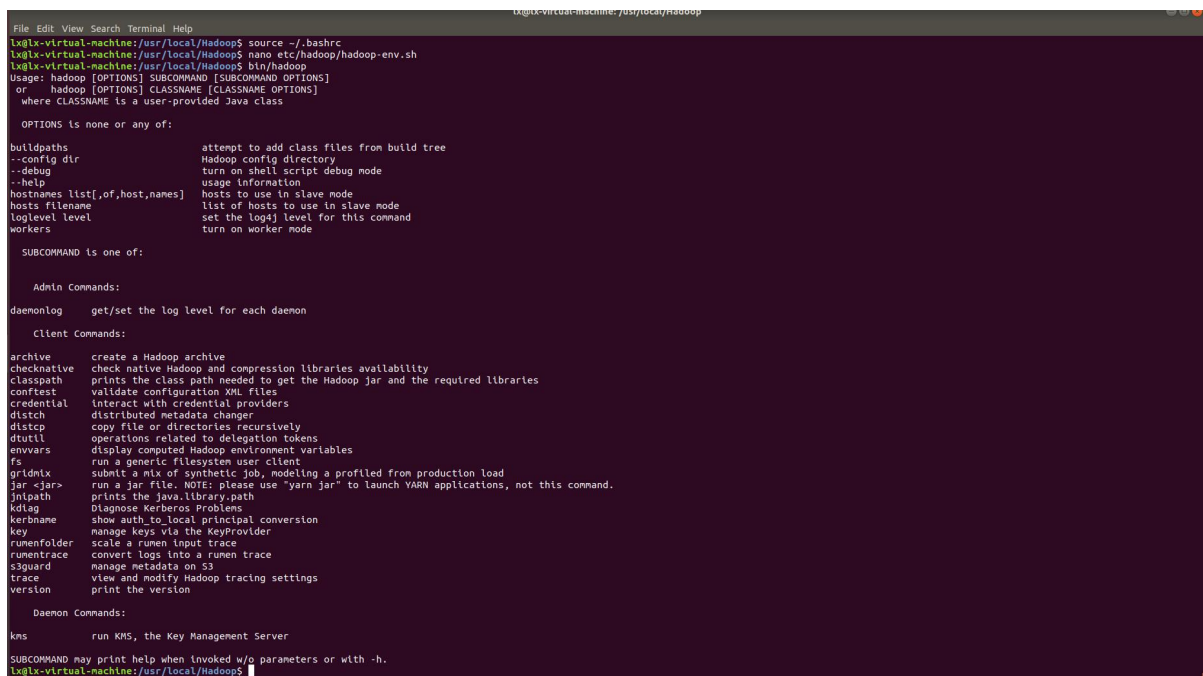
# The maximum amount of heap to use (Java -Xmx). If no unit
# is provided, it will be converted to MB. Daemons will
# prefer any Xmx setting in their respective _OPT variable.
# There is no default; the JVM will autoscale based upon machine
# memory size.

sh Tab Width: 8 Ln 54, Col 45 INS
```

此时在终端中输入

```
bin/hadoop
```

输出 Hadoop 的帮助文件，则表明配置成功。



```
File Edit View Search Terminal Help
lx@lx-virtual-machine: /usr/local/Hadoop$ source ~/.bashrc
lx@lx-virtual-machine: /usr/local/Hadoop$ nano etc/hadoop/hadoop-env.sh
lx@lx-virtual-machine: /usr/local/Hadoop$ bin/hadoop
Usage: hadoop [OPTIONS] SUBCOMMAND [SUBCOMMAND OPTIONS]
or hadoop [OPTIONS] CLASSNAME [CLASSNAME OPTIONS]
where CLASSNAME is a user-provided Java class

OPTIONS is none or any of:

buildpaths      attempt to add class files from build tree
--config dlr     Hadoop config directory
--debug          turn on shell script debug mode
--help           usage information
hostnames list[ of, host, names] hosts to use in slave mode
hosts filename  list of hosts to use in slave mode
logfile level   set the log4j level for this command
workers         turn on worker mode

SUBCOMMAND is one of:

  Admin Commands:

daemonlog       get/set the log level for each daemon

  Client Commands:

archive         create a Hadoop archive
checknative     check native Hadoop and compression libraries availability
classpath       prints the class path needed to get the Hadoop jar and the required libraries
confest         validate configuration XML files
credential      interact with credential providers
distcp          distributed metadata changer
distcp          copy file or directories recursively
dtutil          operations related to delegation tokens
envvars         display computed Hadoop environment variables
fs              run a generic filesystem user client
gridmix         submit a mix of synthetic job, modeling a profiled from production load
jar <jar>       run a jar file. NOTE: please use "yarn jar" to launch YARN applications, not this command.
jlnpath         prints the java.library.path
kdiag           Diagnose Kerberos Problems
kerbname        show auth to local principal conversion
key             manage keys via the KeyProvider
runemfolder     scale a runem input trace
runemtrace      convert logs into a runem trace
s3guard         manage metadata on S3
trace           view and modify Hadoop tracing settings
version         print the version

  Daemon Commands:

kms             run KMS, the Key Management Server

SUBCOMMAND may print help when invoked w/o parameters or with -h.
lx@lx-virtual-machine: /usr/local/Hadoop$
```

### 3.3 配置伪分布式 Hadoop

#### 3.3.1 配置 SSH 免密码登录

```
ssh localhost (此时需要输入当前用户密码)
```

```
exit
```

```
cd ~/.ssh/
```

```
ssh-keygen -t rsa (此时敲三次回车, 三个选项维持默认)
```

```
cat id_rsa.pub >> authorized_keys
```

```
chmod 600 ./authorized_keys
```

#### 3.3.2 修改配置文件

打开/usr/local/Hadoop/etc/Hadoop/core-site.xml, 并修改为如下代码所示。

```
<configuration>
```

```
  <property>
```

```
    <name>hadoop.tmp.dir</name>
```

```
    <value>file:/usr/local/hadoop/tmp</value>
```

```
    <description>Abase for other temporary directories.</description>
```

```
  </property>
```

```
  <property>
```

```
    <name>fs.defaultFS</name>
```

```
    <value>hdfs://localhost:9000</value>
```

```
  </property>
```

```
</configuration>
```



```
Open ▾  core-site.xml  Save  [Icons]
/usr/local/Hadoop/etc/hadoop

<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="configuration.xsl"?>
<!--
Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

    http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License. See accompanying LICENSE file.
-->

<!-- Put site-specific property overrides in this file. -->

<configuration>
  <property>
    <name>hadoop.tmp.dir</name>
    <value>file:/usr/local/hadoop/tmp</value>
    <description>Abase for other temporary directories.</description>
  </property>
  <property>
    <name>fs.defaultFS</name>
    <value>hdfs://localhost:9000</value>
  </property>
</configuration>
```

接下来修改配置文件 hdfs-site.xml, 修改为如下:

```
<configuration>

  <property>

    <name>dfs.replication</name>

    <value>1</value>

  </property>

  <property>

    <name>dfs.namenode.name.dir</name>

    <value>file:/usr/local/hadoop/tmp/dfs/name</value>

  </property>

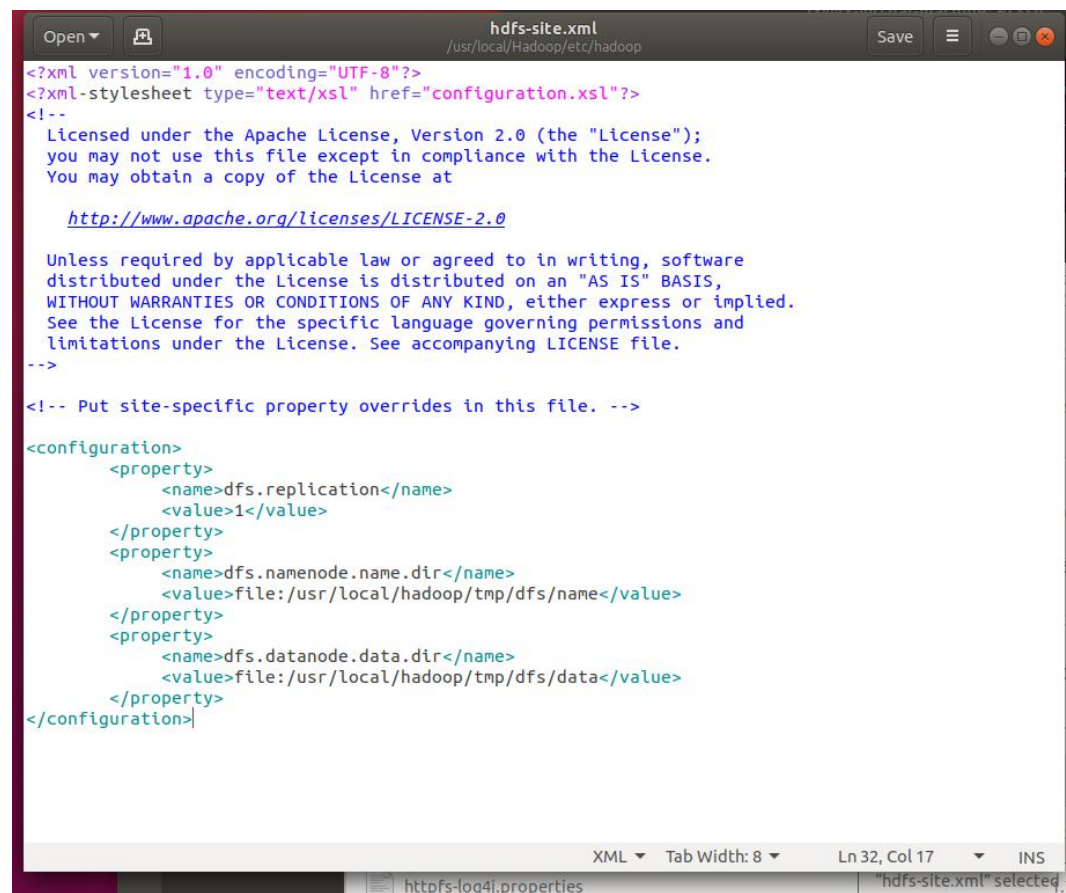
  <property>

    <name>dfs.datanode.data.dir</name>

    <value>file:/usr/local/hadoop/tmp/dfs/data</value>
```

```
</property>
```

```
</configuration>
```



```
hdfs-site.xml
/usr/local/Hadoop/etc/hadoop

<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="configuration.xsl"?>
<!--
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distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License. See accompanying LICENSE file.
-->
<!-- Put site-specific property overrides in this file. -->
<configuration>
  <property>
    <name>dfs.replication</name>
    <value>1</value>
  </property>
  <property>
    <name>dfs.namenode.name.dir</name>
    <value>file:/usr/local/hadoop/tmp/dfs/name</value>
  </property>
  <property>
    <name>dfs.datanode.data.dir</name>
    <value>file:/usr/local/hadoop/tmp/dfs/data</value>
  </property>
</configuration>
```

及修改 mapred-site.xml 文件。

```
<configuration>
```

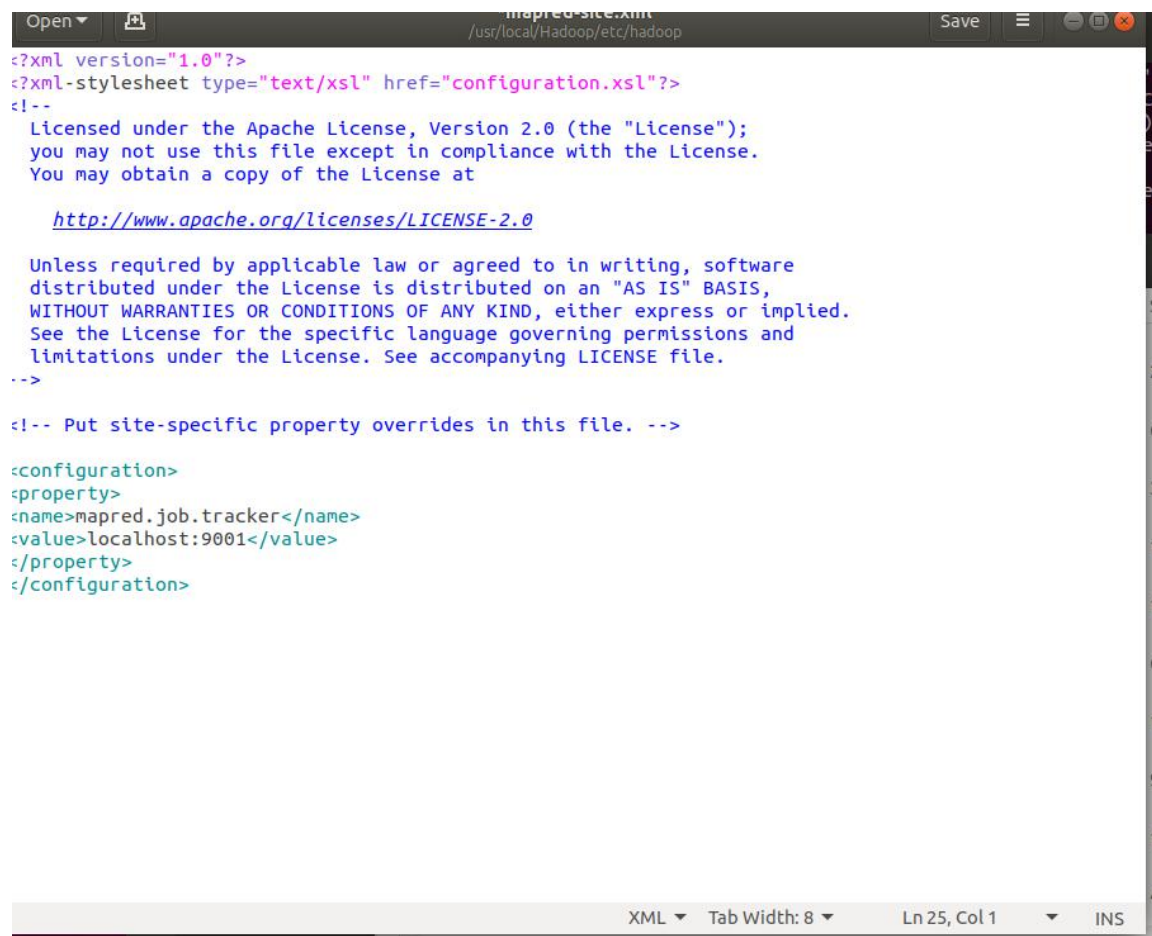
```
<property>
```

```
<name>mapred.job.tracker</name>
```

```
<value>localhost:9001</value>
```

```
</property>
```

```
</configuration>
```



```
Open ▾  mapred-site.xml  Save  ▮  [Icons]
/usr/local/Hadoop/etc/hadoop

<?xml version="1.0"?>
<?xml-stylesheet type="text/xsl" href="configuration.xsl"?>
<!--
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limitations under the License. See accompanying LICENSE file.
-->

<!-- Put site-specific property overrides in this file. -->

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

XML ▾ Tab Width: 8 ▾ Ln 25, Col 1 ▾ INS

### 3.3.4 格式化 Nomenode

在终端输入以下命令：

```
Cd /usr/local/Hadoop
```

```
./bin/hdfs.namenode -formatmat
```

若出现以下界面，则说明格式化成功。

```
lx@lx-virtual-machine: /usr/local/Hadoop
File Edit View Search Terminal Help
app: java-1.0.5.jar:/usr/local/Hadoop/share/hadoop/hdfs/hadoop-hdfs-native-client-3.1.1.jar:/usr/local/Hadoop/share/hadoop/hdfs/hadoop-hdfs-native-client-3.1.1-tests.jar:/usr/local/Hadoop/share/hadoop/hdfs/hadoop-hdfs-nfs-3.1.1.jar:/usr/local/Hadoop/share/hadoop/hdfs/hadoop-hdfs-3.1.1.jar:/usr/local/Hadoop/share/hadoop/hdfs/hadoop-hdfs-cclient-3.1.1.jar:/usr/local/Hadoop/share/hadoop/hdfs/hadoop-hdfs-rbf-3.1.1.jar:/usr/local/Hadoop/share/hadoop/hdfs/hadoop-hdfs-rbf-3.1.1-tests.jar:/usr/local/Hadoop/share/hadoop/hdfs/hadoop-hdfs-httpfs-3.1.1.jar:/usr/local/Hadoop/share/hadoop/hdfs/hadoop-hdfs-cclient-3.1.1-tests.jar:/usr/local/Hadoop/share/hadoop/mapreduce/lib/hamcrest-core-1.3.jar:/usr/local/Hadoop/share/hadoop/mapreduce/lib/junit-4.11.jar:/usr/local/Hadoop/share/hadoop/mapreduce/hadoop-mapreduce-client-jobclient-3.1.1-tests.jar:/usr/local/Hadoop/share/hadoop/mapreduce/hadoop-mapreduce-client-app-3.1.1.jar:/usr/local/Hadoop/share/hadoop/mapreduce/hadoop-mapreduce-client-nativetask-3.1.1.jar:/usr/local/Hadoop/share/hadoop/mapreduce/hadoop-mapreduce-client-uploader-3.1.1.jar:/usr/local/Hadoop/share/hadoop/mapreduce/hadoop-mapreduce-client-hs-3.1.1.jar:/usr/local/Hadoop/share/hadoop/mapreduce/hadoop-mapreduce-client-shuffle-3.1.1.jar:/usr/local/Hadoop/share/hadoop/mapreduce/hadoop-mapreduce-client-jobclient-3.1.1.jar:/usr/local/Hadoop/share/hadoop/mapreduce/hadoop-mapreduce-client-common-3.1.1.jar:/usr/local/Hadoop/share/hadoop/mapreduce/hadoop-mapreduce-examples-3.1.1.jar:/usr/local/Hadoop/share/hadoop/mapreduce/hadoop-mapreduce-client-core-3.1.1.jar:/usr/local/Hadoop/share/hadoop/mapreduce/hadoop-mapreduce-client-hs-plugins-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/ehcache-3.3.1.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/jersey-guice-1.19.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/jackson-module-jaxb-annotations-2.7.8.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/snakeyaml-1.16.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/javax.inject-1.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/sopalliance-1.0.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/json-to-2.5.1.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/java-util-1.9.0.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/dnsjava-2.1.7.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/metrics-core-3.2.4.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/jersey-client-1.19.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/guice-4.0.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/geronimo-jcache-1.0.spec-1.0-alpha-1.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/HikariCP-java7-2.4.12.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/fst-2.59.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/guice-servlet-4.0.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/jackson-jaxrs-json-provider-2.7.8.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/swagger-annotations-1.5.4.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/objenesis-1.0.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/mssql-jdbc-6.2.1.jre7.jar:/usr/local/Hadoop/share/hadoop/yarn/lib/jackson-jaxrs-base-2.7.8.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-client-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-registry-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-server-timeline-pluginstorage-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-applications-distributedshell-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-server-nodemanager-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-applications-unmanaged-am-launcher-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-server-common-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-common-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-services-api-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-api-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-server-applicationhistoryservice-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-server-tests-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-server-shadedclicemanager-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-server-router-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-services-core-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-server-resourcenanager-3.1.1.jar:/usr/local/Hadoop/share/hadoop/yarn/hadoop-yarn-server-web-proxy-3.1.1.jar
STARTUP_MSG: build = https://github.com/apache/hadoop -r 2b9a8c1d3a2caf1e733d57f346af3ff6d5ba529c; compiled by 'leftnoteasy' on 2018-08-02T04:26Z
STARTUP_MSG: java = 1.8.0_191
*****
2018-12-31 18:52:07.409 INFO namenode.NameNode: registered UNIX signal handlers for [TERM, HUP, INT]
2018-12-31 18:52:07.453 INFO namenode.NameNode: createNameNode [-formatmat]
Usage: hdfs namenode [-backup] [-check] [-format [-clusterid cid] [-force] [-nonInteractive]] [-upgrade [-clusterid cid] [-renameReserved<k-v pairs>]] [-upgradeOnly [-clusterid cid] [-renameReserved<k-v pairs>]] [-rollback] [-rollingUpgrade <rollback|started>] [-unporttcheckpoint] [-]
```

再输入：

```
./sbin/start-dfs.sh
```

开启进程。

```
lx@lx-virtual-machine: /usr/local/Hadoop
File Edit View Search Terminal Help
Connection to localhost closed.
lx@lx-virtual-machine: /usr/local/Hadoop$ cd ~/.ssh/
lx@lx-virtual-machine: ~/.ssh$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/lx/.ssh/id_rsa):
/home/lx/.ssh/id_rsa already exists.
Overwrite (y/n)? y
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/lx/.ssh/id_rsa.
Your public key has been saved in /home/lx/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:gMX7+KTtelFDp+naPqbMb+Pxcpy/Q5jhbQf6zytHJeA lx@lx-virtual-machine
The key's randomart image is:
+---[RSA 2048]-----+
|  ..          |
|  o.  .       |
|  . . . .     |
|  o.o E . .   |
|  . BS* . o   |
|  * O + o     |
|  ..O * o     |
|  o .OoB +..  |
|  =0*0o.o*+.  |
+---[SHA256]-----+
lx@lx-virtual-machine: ~/.ssh$ cd /usr/local/Hadoop
lx@lx-virtual-machine: /usr/local/Hadoop$ ./sbin/start-dfs.sh
Starting namenodes on [localhost]
localhost: lx@localhost: Permission denied (publickey,password).
Starting datanodes
localhost: lx@localhost: Permission denied (publickey,password).
Starting secondary namenodes [lx-virtual-machine]
lx-virtual-machine: lx@lx-virtual-machine: Permission denied (publickey,password).
lx@lx-virtual-machine: /usr/local/Hadoop$ cd ~/.ssh/
lx@lx-virtual-machine: ~/.ssh$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/lx/.ssh/id_rsa):
/home/lx/.ssh/id_rsa already exists.
Overwrite (y/n)?
lx@lx-virtual-machine: ~/.ssh$ cat id_rsa.pub >> authorized_keys
lx@lx-virtual-machine: ~/.ssh$ chmod 600 ./authorized_keys
lx@lx-virtual-machine: ~/.ssh$ cd /usr/local/Hadoop
lx@lx-virtual-machine: /usr/local/Hadoop$ ./sbin/start-dfs.sh
Starting namenodes on [localhost]
Starting datanodes
```