Hands-on Lab: File Content, Compression, & Networking Commands

Estimated time needed: **40** minutes

Objectives

In this lab, you will be introduced to the use of basic Unix commands related to the following categories:

- File content viewing commands
- Text processing commands
- File/Folder compression & archiving commands
- Networking commands

About Skills Network Cloud IDE

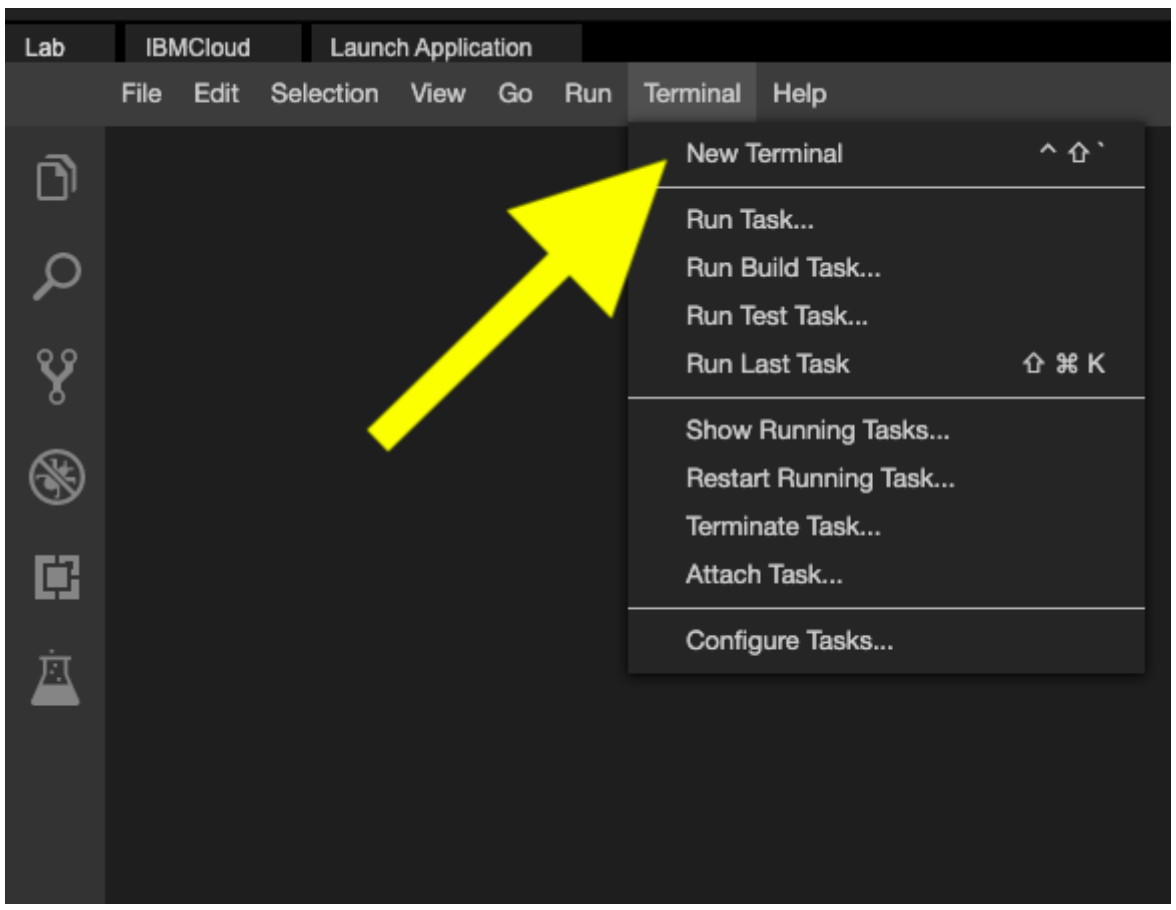
Skills Network Cloud IDE (based on Theia and Docker) provides an environment for hands on labs for course and project related labs. Theia is an open source IDE (Integrated Development Environment), that can be run on desktop or on the cloud. To complete this lab, you will be using the Cloud IDE based on Theia.

Important notice about this lab environment

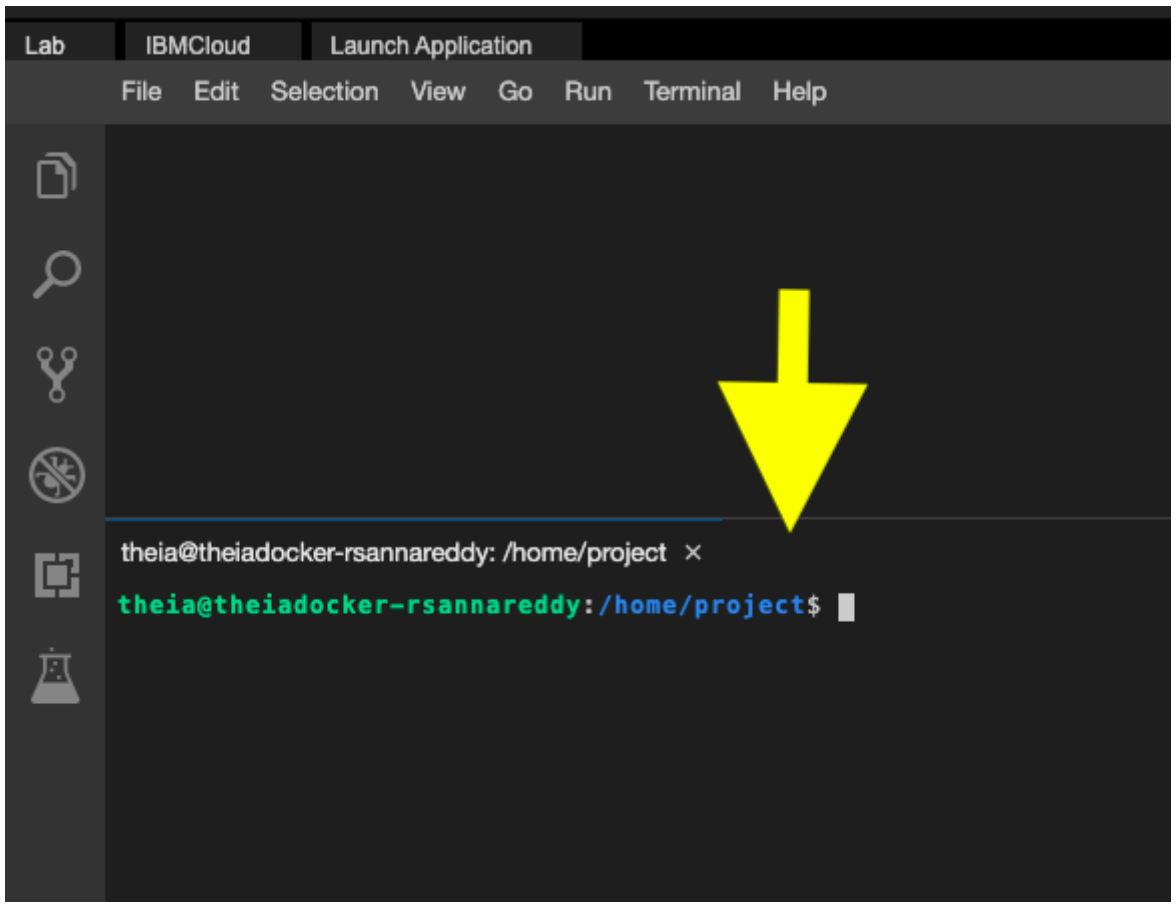
Please be aware that sessions for this lab environment are not persisted. Thus, every time you connect to this lab, a new environment is created for you and any data or files you may have saved in a previous session will be lost. To avoid losing your data, plan to complete these labs in a single session.

Setup

Open a new terminal, by clicking on the menu bar and selecting **Terminal**->**New Terminal**, as in the image below.



This will open a new terminal at the bottom of the screen as seen below.



You can run the commands provided in the following excercises in your newly opened terminal. You can copy the code to your clipboard if you like by clicking on the little copy button on the bottom right of each codeblock, and then paste it on the command line.

Exercise 1 - Viewing file content

In this exercise, you will work with commands for viewing file content.

Important: In order to complete this section, you must run the following in your current directory:

```
wget https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBM-DB0250EN-SkillsNetwork/labs/Bash%20Scripting/usdoi.txt
```

1.1. Display all file contents

`cat`

The `cat` command displays contents of files.

The following command prints the content of the file `usdoi.txt` which you downloaded earlier.

```
cat usdoi.txt
```

1.2. Display file contents page-wise

`more`

The `more` command displays the file contents page by page.

Press `spacebar` to display the next page.

```
more usdoi.txt
```

1.3. Display first few lines of a file

`head`

Print the first 10 lines of the file `usdoi.txt`.

```
head usdoi.txt
```

You can specify the number of lines to be printed.

Print the first 3 lines of the file `usdoi.txt`.

```
head -3 usdoi.txt
```

1.4. Display last lines of a file

`tail`

Print the last 10 lines of the file `usdoi.txt`.

```
tail usdoi.txt
```

You can specify the number of lines to be printed.

Print the last 2 lines of the file `usdoi.txt`.

```
tail -2 usdoi.txt
```

1.5. Count lines, words or characters

`wc`

If you want to find the number of lines, words and characters in a file, for example `usdoi.txt`, enter the command:

```
wc usdoi.txt
```

The output contains the number of lines followed by number of words followed by number of characters in the file.

To print only the number of lines in `usdoi.txt`, use the `-l` option:

```
wc -l usdoi.txt
```

To print only the number of words in `usdoi.txt`, use the `-w` option:

```
wc -w usdoi.txt
```

To print only the number of characters in `usdoi.txt`, use te `-c` option:

```
wc -c usdoi.txt
```

Exercise 2: Customizing view of file content

2.1. View sorted file lines

`sort`

To view the sorted lines of `usdoi.txt`:

```
sort usdoi.txt
```

To view the reverse-sorted lines of `usdoi.txt`:

```
sort -r usdoi.txt
```

2.2. View with repeated, consecutive lines merged into one

`uniq`

First download the following file:

```
wget https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBM-LX0117EN-SkillsNetwork/labs/module%201/zoo.txt
```

View the raw contents of `zoo.txt`:

```
cat zoo.txt
```

View the contents of `zoo.txt` with equal, consecutive lines merged into one:

```
uniq zoo.txt
```

2.3. Extract lines matching specified criteria

grep

The `grep` command allows you to specify a pattern and search for lines from the input text that contain a match to the pattern.

The following command prints all lines in the file `usdoi.txt` which contain the word `people`.

```
grep people usdoi.txt
```

Some of the frequently used options for `grep` are:

Option	Description
`-n`	Along with the matching lines, also print the line numbers
`-c`	Get the count of matching lines
`-i`	Ignore the case of the text while matching
`-v`	Print all lines which do not contain the pattern
`-w`	Match only if the pattern matches whole words

Prints all lines from the `/etc/passwd` file, which do not contain the pattern `login`.

```
grep -v login /etc/passwd
```

2.4. View lines of file with filter applied to each line

cut

The `cut` command allows you to view the lines of a file after a filter is applied to each line. For example, you can use `cut` with the `-c` option to view the first two characters of each line:

```
cut -c -2 zoo.txt
```

or each line starting from the second character:

```
cut -c 2- zoo.txt
```

2.5. View multiple files side by side

paste

Download the following file:

```
wget https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBM-LX0117EN-
SkillsNetwork/labs/module%201/zoo_ages.txt
```

The `paste` command allows you to view multiple files at once - with lines being aligned as columns. You can see what that looks like by entering:

```
paste zoo.txt zoo_ages.txt
```

You can also customize the delimiter. Instead of the default`tab`, you could specify a comma as follows:

```
paste -d "," zoo.txt zoo_ages.txt
```

Exercise 3: File and folder archiving and compression

3.1. Create and manage file archives

tar

The `tar` command allows you to pack multiple files and directories into a single archive file.

The following command creates an archive of the entire `/bin` directory into a file named `bin.tar`.

The options used are as follows:

Option	Description
-c	Create new archive file
-v	Verbosely list files processed
-f	Archive file name

```
tar -cvf bin.tar /bin
```

To see the list of files in the archive, use the `-t` option:

```
tar -tvf bin.tar
```

To untar the archive or extract files from the archive, use the `-x` option:

```
tar -xvf bin.tar
```

Use the `ls` command to verify that the folder `bin` is extracted.

```
ls -l
```

3.2. Package and compress archive files

`zip`

The `zip` command allows you to compress files.

The following command creates a zip file named `config.zip` consisting of all the files with extension `.conf` in the `/etc` directory.

```
zip config.zip /etc/*.conf
```

The **`-r`** option can be used to zip an entire directory.

The following command creates an archive of the `/bin` directory.

```
zip -r bin.zip /bin
```

3.3. Extract, list, or test compressed files in a ZIP archive

`unzip`

The following command lists the files of the archive called `config.zip`

```
unzip -l config.zip
```

The following command extracts all the files in the archive `bin.zip`.

```
unzip -o bin.zip
```

We added the `-o` option to force overwrite, in case you run the command more than once.

You should see a folder named `bin` created in your directory.

Exercise 4 - Networking commands

4.1. Show the system's host name

`hostname`

To view the current host name, run the command below .

```
hostname
```

You can use the `-i` option to view the IP adrress of the host:

```
hostname -i
```

4.2. Test if a host is reachable

`ping`

Check if www.google.com is reachable. The command keeps sending data packets to the www.google.com server and prints the response it gets back. (Press `Ctrl+C` to stop pinging)

```
ping www.google.com
```

If you want to ping only for a limited number of times, use `-c` option.

```
ping -c 5 www.google.com
```

4.3. Display network interface configuration

`ifconfig`

The `ifconfig` command is used to configure or display network interface parameters for a network.

To display the configuration of all network interfaces of the system, enter:

```
ifconfig
```

To display the configuration of an ethernet adapter `eth0`, enter:

```
ifconfig eth0
```

`eth0` is usually the primary network interface that connects your server to the network.

You can see your server's IP address in line number 2 after the word `inet`.

4.4. Transfer data from or to a server

`curl`

You can use `curl` to access the file at the following URL and display the file's contents on your screen:

```
curl https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBM-DB0250EN-
SkillsNetwork/labs/Bash%20Scripting/usdoi.txt
```

or to access the file at the given URL and save it in your current working directory:

```
curl -O https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBM-DB0250EN-
SkillsNetwork/labs/Bash%20Scripting/usdoi.txt
```

4.5. Downloading file(s) from a URL

`wget`

The `wget` command is similar to `curl` - however it's primary use is for file downloading. One unique feature of `wget` is that it can recursively download files at a URL.

To see how `wget` works, first remove `usdoi.txt` from your current directory:

```
rm usdoi.txt
```

and re-download it using `wget` as follows:

```
wget https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBM-DB0250EN-
SkillsNetwork/labs/Bash%20Scripting/usdoi.txt
```

Practice exercises

Before you begin, ensure you're in your home directory:

```
cd ~
pwd
```

1. Problem:

> *Display your username*

▼ Click here for Hint

> Use the `whoami` command

▼ Click here for Solution

```
whoami
```

2. Problem:

> *View the kernel version*

▼ Click here for Hint

> Use the `uname` command with the right options

▼ Click here for solution

```
uname -r
```

3. Problem:

> *Display the number of lines in the `/etc/passwd file`.*

▼ Click here for Hint

> use the `wc` command with right option.

▼ Click here for Solution

```
wc -l /etc/passwd
```

4. Problem:

> *Display the lines that contain the string 'not installed' in `/var/log/bootstrap.log`.*

▼ Click here for Hint

> use the `grep` command.

▼ Click here for Solution

```
grep "not installed" /var/log/bootstrap.log
```

5. Problem:

> *`https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBM-DB0250EN-SkillsNetwork/labs/Bash%20Scripting/top-sites.txt` contains most popular websites. Find out all the websites that have the word `org` in them.*

▼ Click here for Hint

> use the `wget` command to download the file.

use the `grep` command to search

▼ Click here for Solution

```
wget https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBM-DB0250EN-SkillsNetwork/labs/Bash%20Scripting/top-sites.txt
grep org top-sites.txt
```

▼ Alternative Solution

```
curl -o top-sites.txt https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBM-DB0250EN-SkillsNetwork/labs/Bash%20Scripting/top-sites.txt
grep org top-sites.txt
```

6. Problem:

> *Print the first 7 lines of `top-sites.txt`*

▼ Click here for Hint

> use the `head` command with the correct arguments

▼ Click here for Solution

```
head -n 7 top-sites.txt
```

7. Problem:

> *Print the last 7 lines of `top-sites.txt`*

▼ Click here for Hint

> use the `tail` command with the correct arguments

▼ Click here for Solution

```
tail -n 7 top-sites.txt
```

8. Problem:

> *Zip the file `top-sites.txt` into a file called `top-sites.zip`*

▼ Click here for Hint

> *Use the `zip` command*

▼ Click here for Solution

```
zip top-sites.zip top-sites.txt
```

9. Problem:

> *Print the first three characters of each line from `top-sites.txt`*

▼ Click here for Hint

> use the `cut` command with the correct arguments

▼ Click here for Solution

```
cut -c -3 top-sites.txt
```

10. Problem:

> *Print details of the `eth0` internet adapter*

▼ Click here for Hint

> use the `ifconfig` command with the correct argument

▼ Click here for Solution

```
ifconfig eth0
```

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Change Log

Date (YYYY-MM-DD)	Version	Changed By	Change Description
2021-05-30	0.1	Ramesh Sannareddy	Created initial version of the lab
2021-11-29	0.2	Sam Prokopchuk	Update lab contents and split
2021-12-02	0.3	Jeff Grossman	Review and Update lab