PATH Variables

I'm not sure how one first gets exposed to path variables, only that it can be confusing at first glance. This document tries to remedy that without going into the history of **everything**.

The linux file system

What you need to know:

There are various directories that follow this pattern [not limited to]:

- bin: binaries (actual commands you execute: e.g. git and ssh)
- lib: libraries
- include: source code
- share: other, usually documentation
- man: manual pages

The directories can exist inside of any directory path. There are the usual ones you may have seen already:

- /bin
- /usr/bin
- /usr/local/bin
- /lib
- /usr/lib
- /usr/local/lib

Path Search

Ever wonder what happens when you type in a command (ssh) into the terminal and somehow your shell knows to launch that program.

Assuming the command is not a shell command, the shell will check the appropriate variable which includes search locations to launch the program you wish to execute.

In our example, ssh is located in /usr/bin on my machine.

We can find out where it by using the command which which (hehe!) will traverse our search paths to find the executable we are looking for.

user@linux1:~\$ which ssh
/usr/bin/ssh

Intro the the PATH variable

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Generally your search path for binaries will look something like the below.

/usr/local/sbin:/usr/local/bin:/usr/sbin:/sbin:/bin

We can see what is in our path variable by using the command echo to check the contents of the variable that contains our search paths. This variable is called PATH.

user@linux1:~\$ echo \$PATH
/usr/local/sbin:/usr/local/bin:/usr/sbin:/sbin:/bin

When a search occurs it will take the left most path, search that directory, then proceed to the next path to its right IF and ONLY IF it does not find what it is looking for in the directory it is currently searching.

Fore example: Lets take a look at the executable pip.

/usr/local/bin is first in the search path so we'll see the version of pip installed by CS Techstaff.

user@linux1:~\$ which pip
/usr/local/bin/pip

There also exists and pip executable in /usr/bin/pip but as discussed above the shell will use the binary first in the search path.

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