Bash

About Bash

In addition to the Cisco NX-OS CLI, Cisco Nexus 3500 platform switches support access to the Bourne-Again SHell (Bash). Bash interprets commands that you enter or commands that are read from a shell script. Using Bash enables access to the underlying Linux system on the device and to manage the system.

Accessing Bash

In Cisco NX-OS, Bash is accessible from user accounts that are associated with the Cisco NX-OS dev-ops role or the Cisco NX-OS network-admin role.

The following example shows the authority of the dev-ops role and the network-admin role:

```
switch# show role name dev-ops

Role: dev-ops
  Description: Predefined system role for devops access. This role
  cannot be modified.
  Vlan policy: permit (default)
  Interface policy: permit (default)
  Vrf policy: permit (default)
  ----------------------------------------------------------------------
  Rule    Perm    Type        Scope               Entity
  ----------------------------------------------------------------------
  4       permit  command                         conf t ; username *
  3       permit  command                         bcm module *
  2       permit  command                         run bash *
  1       permit  command                         python *

switch# show role name network-admin

Role: network-admin
  Description: Predefined network admin role has access to all commands
  on the switch
  ----------------------------------------------------------------------
```

```
  Rule    Perm    Type        Scope               Entity
  ----------------------------------------------------------------------
  1       permit  read-write
switch#
```

Bash is enabled by running the **feature bash-shell** command.

The **run bash** command loads Bash and begins at the home directory for the user.

The following examples show how to enable the Bash shell feature and how to run Bash.

```
switch# configure terminal
switch(config)# feature bash-shell
```

```
switch# run bash
Linux# whoami
admin
Linux# pwd
/bootflash/home/admin
Linux#
```

Note You can also execute Bash commands with the **run bash** <*command*> command.

The following is an example of the **run bash** <*command*> command.

```
run bash whoami
```

Escalate Privileges to Root

The privileges of an admin user can escalate their privileges for root access.

The following are guidelines for escalating privileges:

- Only an admin user can escalate privileges to root.
- Bash must be enabled before escalating privileges.
- Escalation to root is password protected.
- SSH to the switch using `root` username through a non-management interface will default to Linux Bash shell-type access for the root user. Type **vsh** to return to NX-OS shell access.

The following example shows how to escalate privileges to root and how to verify the escalation:

```
switch# run bash
Linux# sudo su root

We trust you have received the usual lecture from the local System
Administrator. It usually boils down to these three things:

    #1) Respect the privacy of others.
    #2) Think before you type.
    #3) With great power comes great responsibility.

Password:

Linux# whoami
```

```
root
Linux# exit
exit
```

Examples of Bash Commands

This section contains examples of Bash commands and output.

Displaying System Statistics

The following example shows how to display system statistics:

```
switch# run bash
Linux# cat /proc/meminfo
MemTotal:      3795100 kB
MemFree:       1472680 kB
Buffers:           136 kB
Cached:        1100116 kB
ShmFS:         1100116 kB
Allowed:        948775 Pages
Free:           368170 Pages
Available:      371677 Pages
SwapCached:          0 kB
Active:        1198872 kB
Inactive:       789764 kB
SwapTotal:           0 kB
SwapFree:            0 kB
Dirty:               0 kB
Writeback:           0 kB
AnonPages:      888272 kB
Mapped:         144044 kB
Slab:           148836 kB
SReclaimable:    13892 kB
SUnreclaim:     134944 kB
PageTables:      28724 kB
NFS_Unstable:        0 kB
Bounce:              0 kB
WritebackTmp:        0 kB
CommitLimit:   1897548 kB
Committed_AS: 19984932 kB
VmallocTotal: 34359738367 kB
VmallocUsed:    215620 kB
VmallocChunk: 34359522555 kB
HugePages_Total:     0
HugePages_Free:      0
HugePages_Rsvd:      0
HugePages_Surp:      0
Hugepagesize:     2048 kB
DirectMap4k:     40960 kB
DirectMap2M:   4190208 kB
Linux#
```

Running Bash from CLI

The following example shows how to run a bash command from the CLI with the **run bash** <*command*> command:

```
switch# run bash ps -el
F S   UID   PID  PPID  C PRI  NI ADDR SZ WCHAN  TTY          TIME CMD
4 S     0     1     0  0  80   0 -   497 select ?        00:00:08 init
5 S     0     2     0  0  75  -5 -     0 kthrea ?        00:00:00 kthreadd
1 S     0     3     2  0 -40   - -     0 migrat ?        00:00:00 migration/0
1 S     0     4     2  0  75  -5 -     0 ksofti ?        00:00:01 ksoftirqd/0
5 S     0     5     2  0  58   - -     0 watchd ?        00:00:00 watchdog/0
1 S     0     6     2  0 -40   - -     0 migrat ?        00:00:00 migration/1
1 S     0     7     2  0  75  -5 -     0 ksofti ?        00:00:00 ksoftirqd/1
5 S     0     8     2  0  58   - -     0 watchd ?        00:00:00 watchdog/1
1 S     0     9     2  0 -40   - -     0 migrat ?        00:00:00 migration/2
1 S     0    10     2  0  75  -5 -     0 ksofti ?        00:00:00 ksoftirqd/2
5 S     0    11     2  0  58   - -     0 watchd ?        00:00:00 watchdog/2
1 S     0    12     2  0 -40   - -     0 migrat ?        00:00:00 migration/3
1 S     0    13     2  0  75  -5 -     0 ksofti ?        00:00:00 ksoftirqd/3
5 S     0    14     2  0  58   - -     0 watchd ?        00:00:00 watchdog/3

...

4 S     0  8864     1  0  80   0 -  2249 wait   ttyS0    00:00:00 login
4 S  2002 28073  8864  0  80   0 - 69158 select ttyS0    00:00:00 vsh
4 R     0 28264  3782  0  80   0 - 54790 select ?        00:00:00 in.dcos-telnet
4 S     0 28265 28264  0  80   0 -  2247 wait   pts/0    00:00:00 login
4 S  2002 28266 28265  0  80   0 - 69175 wait   pts/0    00:00:00 vsh
1 S  2002 28413 28266  0  80   0 - 69175 wait   pts/0    00:00:00 vsh
0 R  2002 28414 28413  0  80   0 -   887 -      pts/0    00:00:00 ps
switch#
```

Running Python from Bash

The following example shows how to load Python and configure a switch using Python objects:

```
switch# run bash
Linux# python
Python 2.7.5 (default, May 16 2014, 10:58:01)
[GCC 4.3.2] on linux2
Type "help", "copyright", "credits" or "license" for more information.
Loaded cisco NxOS lib!
>>>
>>> from cisco import *
>>> from cisco.vrf import *
>>> from cisco.interface import *
>>> vrfobj=VRF('myvrf')
>>> vrfobj.get_name()
'myvrf'
>>> vrfobj.add_interface('Ethernet1/3')
True
>>> intf=Interface('Ethernet1/3')
>>> print intf.config()

!Command: show running-config interface Ethernet1/3
!Time: Thu Aug 21 23:32:25 2014

version 6.0(2)U4(1)

interface Ethernet1/3
  no switchport
  vrf member myvrf


>>>
```