Hewlett Packard Enterprise

HPE Cray EX Series System Administration with HPE Performance Cluster Manager

Lab Guide

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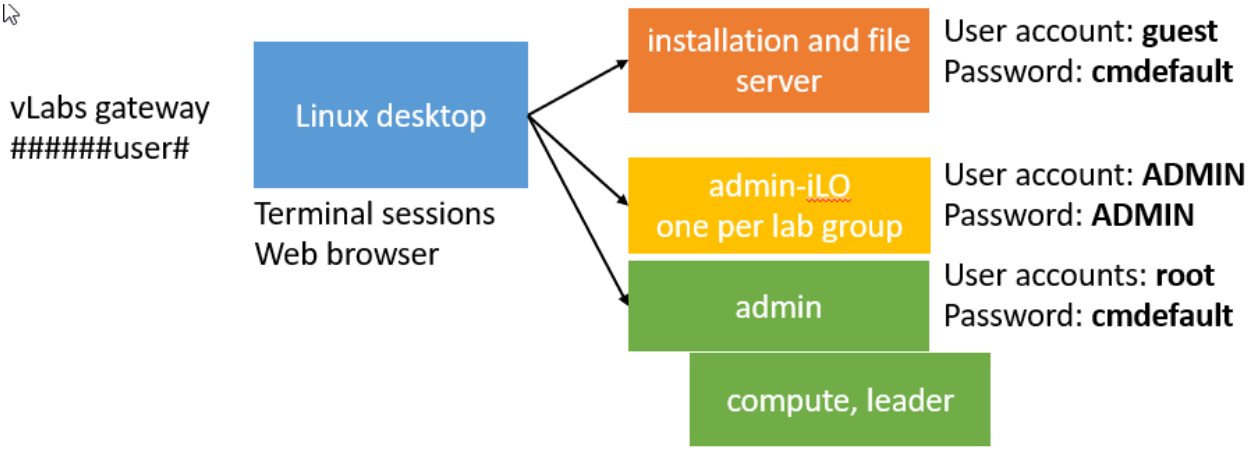
Lab module system overview

Connection pathway to lab clusters

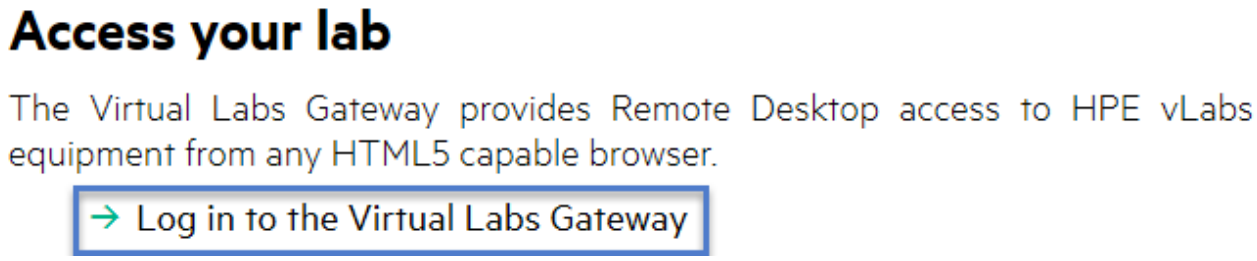


Connect to the lab environment

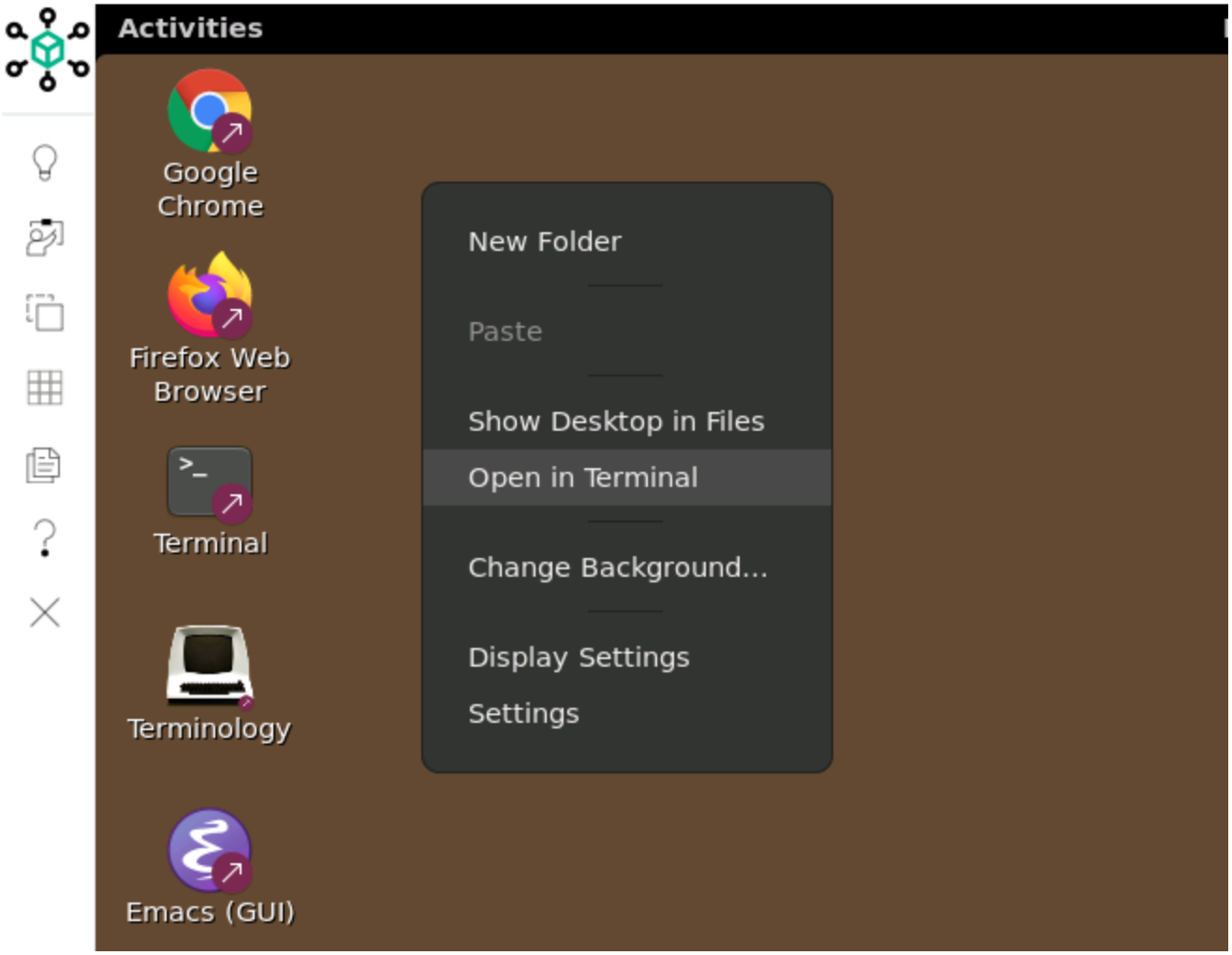
1. In a web browser, enter the HPE Virtual Labs home page URL:

   http://vlabs.hpe.com/

2. Click Log in to the Virtual Labs Gateway.



3. Type the Virtual Labs Gateway username and password provided by the instructor.
4. Click Sign In.
5. On an empty area of the lab desktop, right click select Open in Terminal.



6. In the terminal session, log in to the admin node (replace # with the number that corresponds with your assigned admin node):

   `ssh root@192.168.235.98`

   Password: **`cmdefault`**

   Ignore You have Mail, ABRT (automatic bug reporting tool), and XAUTH errors that may appear in the terminal session.

Cluster components

Cluster components include computers that perform specified tasks in support of cluster operations, computers that end user applications run on, Ethernet management network switches, high-speed data network switches, and other infrastructure components. Cluster commands target these components. Cluster components are also called *nodes* or *devices*.

Run all commands in this lab module 1 in a terminal session connected to the admin node.

1. In a terminal session connected to the admin node, list the components of the cluster:

cm node show

2. List cm node usage help:

   cm node -h
   Example output:

```
# cm node -h
usage: cm node [-h]

{add,bios,console,delete,discover,dnf,firmware,provision,refresh,run,
set,show,unset,update,yum,zypper}
                ...
positional arguments:

{add,bios,console,delete,discover,dnf,firmware,provision,refresh,run,
set,show,unset,update,yum,zypper}
    add                 Add nodes using a cluster definition file.
    bios                Reset or change bios settings
    console             Connect to the console of a node
    delete              Delete one or more nodes
    discover            Operations to discover new nodes via DHCP
    dnf                 Perform dnf operations on a node
    firmware            Show or update firmware versions
    provision           Provision an image to one or more nodes
    refresh             Refresh elements of one or more nodes
    run                 Run a command on remote nodes
    set                 Set node properties
    show                Show node properties
    unset               Un-set node properties
    update              Update existing elements of one or more nodes
    yum                 Perform yum operations on a node
    zypper              Perform zypper operations on a node

optional arguments:
  -h, --help            show this help message and exit
```

3. List cm node usage help:

   cm node show -h
   Example output:

```
[root@admin1 ~]# cm node show -h
usage: cm node show [-h]
                    [--image-push-transport | --domain-search-path | --redundant-mgmt-network
| --disk-bootloader | --switch-mgmt-network | --mgmt-switch | --tpm-boot | --custom-
partitions | --dhcp-bootfile | --node-notes | --geolocation | --pdu-protocol | --ice-node-
template | --discover-rack-provision | --su-leader | --su-leader-role]
```

```
                    [--alias-names] [--alias-groups] [-D ALIAS-GROUP]
                    [--kernel-extra-params | --kernel-distro-params | --kernel-leader-params]
                    [--udpcast-min-receivers | --udpcast-min-wait | --udpcast-max-wait | --
udpcast-max-bitrate | --udpcast-mcast-rdv-addr | --udpcast-rexmit-hello-interval | --udpcast-
ttl | --udpcast-retries-until-drop | --udpcast-portbase]
                    [--ips [NET_NAME]]
                    [--predictable-net-names | --mgmt-bonding]
                    [--conserver-logging | --conserver-ondemand | --console-device]
                    [-g] [-A] [-B] [-C] [-I] [-L] [-M] [-N [DEV_NAME]] [-P]
                    [-T [NAME,...]] [-O] [--display-no-header]
                    [--min-column-width WIDTH] [--column-width WIDTH] [-j]
                    [--online] [--offline] [--unmanaged] [--non-exist]
                    [-n NODE1,NODE2... | -f FILE | -t {custom,image,network,system,role}
NAMES]
                    [--confirm]

Show node properties.  Without options, displays node names.

optional arguments:
  -h, --help            show this help message and exit

general options:

  --image-push-transport
                        Show the transport method used to push initial images to
                        ICE leader nodes. Subsequent images are pushed to leaders using
rsync.
                        This is a global value. Do not specify -g/--global or nodes.
  --domain-search-path  Display the current domain search path. Applies only to admin
                        and leader nodes. Use -g/--global to show the global default.
  --redundant-mgmt-network
                        Show network redundancy state.
  --disk-bootloader     Show current bootloader setting.
  --switch-mgmt-network
                        Show current switch management network setting.
  --mgmt-switch         Show the management switch that node(s) are connect to.
  --tpm-boot            Show whether TPM Trusted Boot is enabled.
                        Use -g/--global to show the global default.
  --custom-partitions   Show the custom partition setup. Show the name of the
                        custom partitions configuration file or 'disabled'.
                        'disabled' means to use the default slot-based system.
  --dhcp-bootfile       Show dhcp boot file.
  --node-notes          Show node notes.
  --geolocation         Show geolocation.
  --pdu-protocol        Show PDU monitoring protocol.
  --ice-node-template   Show the ICE Node Template associated with ICE leader-nodes.
  --discover-rack-provision
                        Show if discover-rack's provision functionality is enabled
                        on ICE leader-nodes.
                        Use -g/--global to show the global default
  --su-leader           Show node's SU leader (IP)
  --su-leader-role      Show if the node is setup as an SU leader.

alias options:
  The --alias-groups and --alias-names options may be specified separately or together.

  --alias-names         Show existing node name aliases for the requested node(s)
  --alias-groups        Show existing node name alias groups for the requested node(s)
  -D ALIAS-GROUP, --convert-to-aliases ALIAS-GROUP
```

```
                        Display aliases from ALIAS-GROUP in place of node names in command
output.

kernel options:
  The following options may exist for an image or a node. Node values take precedence, if
defined.

  --kernel-extra-params
                        Show additional kernel parameters.
  --kernel-distro-params
                        Show distro kernel parameters.
  --kernel-leader-params
                        Show kernel parameters for a leader(s).

udpcast options:
  The -g/--global option can be used to view the global value of any udpcast option.

  --udpcast-min-receivers
                        Show the minimum receivers for udpcast/flamethrower.
  --udpcast-min-wait    Show the minimum wait for udpcast/flamethrower.
  --udpcast-max-wait    Show the maximum wait for udpcast/flamethrower.
  --udpcast-max-bitrate
                        Show the maximum bit rate for udpcast/flamethrower.
  --udpcast-mcast-rdv-addr
                        Show udpcast rdv address used for senders and receivers
                        to find each other.
  --udpcast-rexmit-hello-interval
                        Show how often (if ever) udp-sender will re-transmit hello packets.
  --udpcast-ttl         Show udpcast global/per-node TTL value used for udp-sender.
                        Default is 1.
  --udpcast-retries-until-drop
                        Show number of retries until client is dropped.
  --udpcast-portbase    Show udpcast portbase for udp-sender to push images
                        to udp-receivers for the node(s).

ip options:
  --ips [NET_NAME]      Show all IPs associated with the specified node(s).
                        Specify NET_NAME to narrow output to a single network.

network options:
  --predictable-net-names
                        Show current predictable network names setting.
                        Use -g/--global to show the global default.
  --mgmt-bonding        Show the type of bonding configured in the database for node(s).
                        Supported types are "802.3ad" and "active-backup".

console options:
  --conserver-logging   Show console logging setting.
  --conserver-ondemand  Show current conserver ondemand value.
  --console-device      Show the console device.

global options:
  -g, --global          Some options have per-node and global settings. Use this option
                        to show the global value rather than the individual node value(s).
                        See individual options for applicability.

database options:
  -A, --all-fields      Show all fields for each node.
                        note: this produces LOTS of output. Consider using -j/--json as well.
  -B, --management-bmc-interface
```

```
                        Show node management BMC interface information.
  -C, --controller      Show node controller information.
  -I, --image           Show node image information.
  -L, --location        Show node location information.
  -M, --management-interface
                        Show node management interface information.
  -N [DEV_NAME], --nics [DEV_NAME]
                        Show node NIC information. Use DEV_NAME to display info for a
specific NIC.
  -P, --platform        Show node platform information.
  -T [NAME,...], --attributes [NAME,...]
                        Show node attributes. By default, all attributes are displayed.
                        If NAME,... is specified, displays only that list of attributes in
                        the order specified.
  -O, --other-fields    include node information that does not appear in other groups.

database option formatting:
  --display-no-header   do not display the column header. All fields will be separated by
tabs.
  --min-column-width WIDTH
                        sets the minimum column width. Defaults to 20
  --column-width WIDTH  sets column display width to a fixed value.
  -j, --json            display output in JSON format.

filtering output by managed and administrative states:
  By default, only nodes that are managed and online are displayed. Use one or more of the
options
  below to modify this behavior.

  --online              Display nodes marked as online. This is the default.
                        To view both online and offline nodes specify both --online
                        and --offline.
  --offline             Display nodes marked as offline. This status is generally
                        used for maintenance purposes and is typically temporary.
  --unmanaged           Display nodes marked as unmanaged. Unmanaged nodes
                        exist in the HPCM DB but are not managed as regular nodes.
                        The admin node provides an IP address and hostname but no
                        other HPCM operations are typically permitted. Unmanaged
                        nodes are created by HPCM and cannot otherwise be created
                        or changed by the administrator.
  --non-exist           Display nodes marked as not existing. These are node
                        entries in the HPCM DB that may be incomplete or simply not
                        meant to be seen or used by customers. This option is meant
                        only for HPCM developers.

node options:
  Specify one of these options to select specific nodes to show. By default,
  nodes in the compute, ice_compute and leader system groups are shown.

  -n NODE1,NODE2..., --nodes NODE1,NODE2...
                        Comma-separated list of names. Valid expression styles include:
                        'node?,node[1,3],node[10-14],node[001-022],node[2-6,20-
26,36],node52*'
                        Commands that support operations on the admin node can use 'admin'
  -f FILE, --file FILE  Get names from a file
  -t {custom,image,network,system,role} NAMES, --type {custom,image,network,system,role}
NAMES
                        Get names from an HPCM group or by role. Specify the
                        type followed by a comma-separated string of NAMES. Each
                        name is an HPCM group of that type or, when the type is
```

```
                        'role', a supported HPCM node role. Common 'system' group
                        names are 'compute', 'ice_compute', and 'leader'.
                        The currently supported role is 'su-leader'. Use
                        "-t system ALL" for all cluster nodes, including 'admin'.
  --confirm             Display wildcard-expanded node names then prompt to continue.
```

4. Display all fields for one node in JSON format:

   cm node show -Aj -n x3019c0s15b0n0

5. Include node management BMC interface information in JSON format:

   cm node show -Bj -n x3019c0s15b0n0

6. Display node operating system image information in JSON format:

   cm node show -Ij -n x3019c0s15b0n0

7. Display node operating system image information and truncate command output with the cut command:

   cm node show -I | cut -b 1-80

   The cut -b option enables you to specify how many characters (bytes) of output print.

8. Show node management interface information for a single node:

   cm node show -Mj -n x3019c0s15b0n0

9. Show node platform information in json format for a single node:

   cm node show -Pj -n x3019c0s15b0n0

10. List the components of the cluster with the cnodes command, which includes managed Ethernet switches and controllers:

    cnodes

11. List the managed Ethernet switches (the Ethernet management switches route cluster operations traffic):

    cnodes --mgmt-switch

12. Another command that lists compute and leader nodes is:

    cmu_show_nodes

    This command will be used with the cmu_diff command to locate attribute differences among a group of nodes.

    `su-aliases` represents the pool of IP aliases assigned to SU leader nodes.

    The cmu_show_nodes command does not show the management Ethernet switch in its output.

13. The cmu_show_attributes command lists nodes' attributes:

    cmu_show_attributes -n x3019c0s15b0n0,x3019c0s31b0n0

    The output is sorted by node name, starting with the node name on the left, followed by an attribute and its value.

14. To compare node attributes, add the cmu_diff command, which summarizes the attributes and shows differences among nodes—first with 3 nodes of same model:

```
cmu_show_attributes -n x3019c0s19b0n0,x3019c0s29b0n0,x3019c0s30b0n0 | cmu_diff
```

The top of the output summarizes which nodes responded and groups similar nodes. Lines where attributes hold different values are marked in the left column with a lowercase letter m.

```
cmu_show_attributes -n x3019c0s15b0n0,x3019c0s21b0n0,x3019c0s20b0n0 | cmu_diff
```

15. Show a managed node's SU leader:

    ```
    cm node show -n x3019c0s15b0n0 --su-leader
    ```

16. Confirm an SU leader role:

    ```
    cm node show -n leader3 --su-leader-role
    ```

17. Compare the SU leader role with a node that is not an SU leader.

    ```
    cm node show -n x3019c0s15b0n0 --su-leader-role
    ```

18. Obtain the iLO IP address for your labgroup node.

    ```
    grep <node> /etc/hosts
    ```

    The entry with <node>-bmc is the entry for your iLO device.

19. Coordinate with your labgroup members—one person prepare the compute nodes to PXE boot (the command wraps to a second line; do not enter the \ character).

```
ilorest bootorder --continuousboot=pxe -u root -p initial0 \
--url=<iLO IP> --commit
```

20. Close the terminal session.

    This completes lab exercise system overview.