Crucible

Version v0.0.4rc1, 2025-03-20

`crucible` is a command line tool for managing bare-metal, installing a live image to disk, and configuring a booted operating system.

The tool is currently written in Python, and exists only as a proof-of-concept.

Proof of Concept

The proof of concept tool is very limited in terms of what OS configuration it offers to the user.

NIC Configuration

Woes of Device Naming

Fawkes uses biosdevname to provide some sense of predictable interface names. biosdevname works great for simple servers with a single NIC, such as an onboard NIC, biosdevname provides the simple `em1` name. For servers with multiple NICs, such as PCIe NICs, these names can still vary wildly because they revolve around the BUS ID. For example, depending on where the PCIe card is inserted and how that motherboard's chipset processes the PCIe busses, the same card inserted in four different servers may have any of the following names (to list a few):

- `p801p1`
- `p785p1`
- `p2p1`
- `p10p1`

This causes problems for triage and development, where a guessing game of sorts has to be played to figure out which NIC is which.

Fawkes NIC Names

Fawkes controls its host's interface names based on the PCI-SIG (Peripheral Component Interconnect Special Interest Group) of a device.

By obtaining the PCI Vendor and Device ID, we can provide customization for classifying NICs for various purposes, each purpose has a defined NIC naming prefix:

- `mgmt`: internal/management network connection
- `sun`: internal/storage network connection
- `hsn`: high-speed connection
- `lan`: external/site-connection

The information belongs to the first 4 bytes of the PCI header, and admin can obtain it using `lspci` or `ethtool`. The snippet below will dump a formatted list of all detected Ethernet devices.

```
alias lid='for file in $(ls -1d /sys/bus/pci/drivers/*/0000\:*/net/*); do printf "%
-6s %s\n" "$(basename $file)" $(grep PCI_ID "$(dirname $(dirname $file))/uevent" | cut
-f 2 -d '='); done'
```

The value on the left hand side of the value is the Device ID, and the right hand side is the Vendor ID.

```
host:~ # lid
em1    8086:37D2
```

```
em2    8086:37D2
p801p1 15B3:1013
p801p2 15B3:1013
```

Customizing

At this time, the proof-of-concept version of Crucible does allow customization of which devices are named which NICs.

To do so, edit the `/usr/lib/crucible/lib/python3.10/site-packages/crucible/network/ifname.yml` where Crucible is installed by populating the various categories with the requested information.

Device and Vendor ID Quick Reference

Below is a table of commonly used devices for Fawkes system, this table will continue to expand as Fawkes becomes more prevalent on a larger variety of hardware.

Vendor	Model	Device ID	Vendor ID
Intel Corporation	Ethernet Connection X722	37d2	8086
Intel Corporation	82576	1526	8086
Mellanox Technologies	ConnectX-4	1013	**15b3**
Mellanox Technologies	ConnectX-5	**1017**	15b3
Giga-Byte	Intel Corporation I350	1521	8086
QLogic Corporation	FastLinQ QL41000	8070	**1077**