Bare Metal In The Cloud: Isn’t it Ironic?

by Dmitry Tantsur and Ilya Etingof, Red Hat

In this talk

• What’s bare metal provisioning
• Ironic introduction and work flows
• The future of ironic

Why bare metal allocation

• Raw computing power
• Hard-to-virtualize hardware e.g. GPU, FPGA
• Perfect isolation e.g. tenant security
• Cloud software deployment

Why ironic

• Fully API driven, CLI and GUI available
• Mature and battle-tested
• Good vendor support
  • HPE, Dell EMC, Fujitsu, Cisco, Lenovo, Huawei
  • 3rdparty CI mandatory
• Support for UEFI

Two faces of ironic

• Stand-alone bare metal provisioning service
  • RESTful API
  • Ironic Conductor
  • Deployment Agent
• OpenStack bare metal provisioning service
• OpenStack Nova driver

Hardware management harness

• Baseboard Management Controller (BMC)
• Hardware management protocols (IPMI, Redfish etc)

What BMC can do

• System power management
• Boot device configuration
• System BIOS management
• Hardware RAID configuration
• Virtual media boot
• ... and many others

Machine deployment workflow

• Hardware introspection
• Node cleaning (BIOS, RAID etc)
• Network configuration
• Boot configuration
• Image deployment
• Custom OS configuration

Deployment: Inspection

Out-of-band:

• Hardware capabilities
• Inventory information
• ...

In-band:

• All the above
• Benchmarks
• Allocated ports at the switch
• ...

Deployment: Cleaning

Out-of-band:

• Apply BIOS settings
• Reassemble hardware RAID
• Update firmware
In-band:

- Wipe out local drives
- Reassemble RAID
- ...

**Deployment: Networking**

Two kinds of networks:

- Service (cleaning, provisioning, rescue)
- Tenant (for end users)

Three network management models:

- Using existing network infrastructure
- Using OpenStack Networking with shared network
- Using OpenStack Networking with switch management

**Deployment: Boot configuration**

- Boot from network (PXE, iPXE, Virtual Media)
- Boot IPA for deploy

**Deployment: Deploy user image**

Many ways to write user image

- Over iSCSI
- Over HTTP
- Potential: BitTorrent

**Deployment: sequence diagram**

![Sequence Diagram](image)

**Upcoming features**

- Deploy Templates
- Federation Capabilities
- Graphical Console Support
Future use-cases

- Hyper-converged, containers
- Edge cloud