OPEN
Compute Project
OpenBMC
9/25/2017

OpenBMC

OPEN Compute Project

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BMC Development

	Outsourced	Home Grown	Open
Control of features	X	✔	✔
Fast bug fixes	X	✔	✔
Control of security updates	X	✔	✔
Cheaper to develop	✔	X	✔
Open Source Community Code Reviews	X	X	✔
Simple infrastructure support	✔	X	✔
Unique look	X	✔	✔

What is the OpenBMC Project

Free open source software management Linux

distribution designed for the embedded environment

...

Reduce the cost of development

Views of Success

- Core enables industry
- Feature advances come faster
- Hardware manufacturers support OpenBMC
- Software supports OpenBMC
- Diverse architectures are managed similarly in the datacenter

Strong Community

- Code Contributions
  - IBM, Google, Rackspace, Yadro, Inventec, Mellanox, and more
- 145 emails address' from 51 different domain names
- Average 65 users on IRC (freenode #openbmc)
- 8 sponsor users for UI
- Hardware donations for build and code reviews

- https://lists.ozlabs.org/pipermail/openbmc/

Active code base

Contribution Distribution

Welcome Yadro, Nuvoton, Inventec

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Contributions

- Machine configuration
- Business logic
- Core contributions

What is the OpenBMC Project

Contributions to upstream communities

- U-Boot and Kernel
- Supported: ASPEED AST2400 and AST2500
  Nuvoton Poleg BMC

Staying up to date

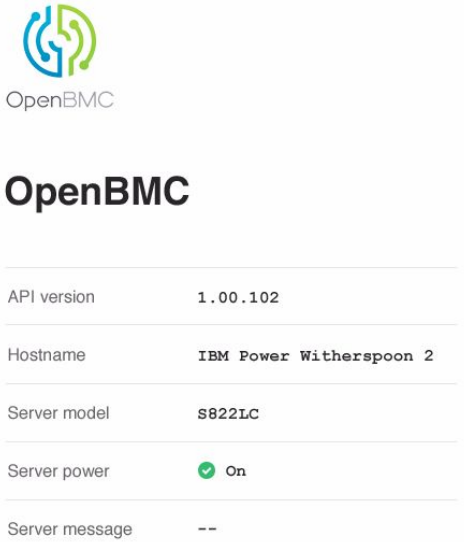
- U-Boot 2016
- Linux 4.4 → 4.7 → 4.10 … 4.13
- Yocto 1.7 → 1.8 → 2.1

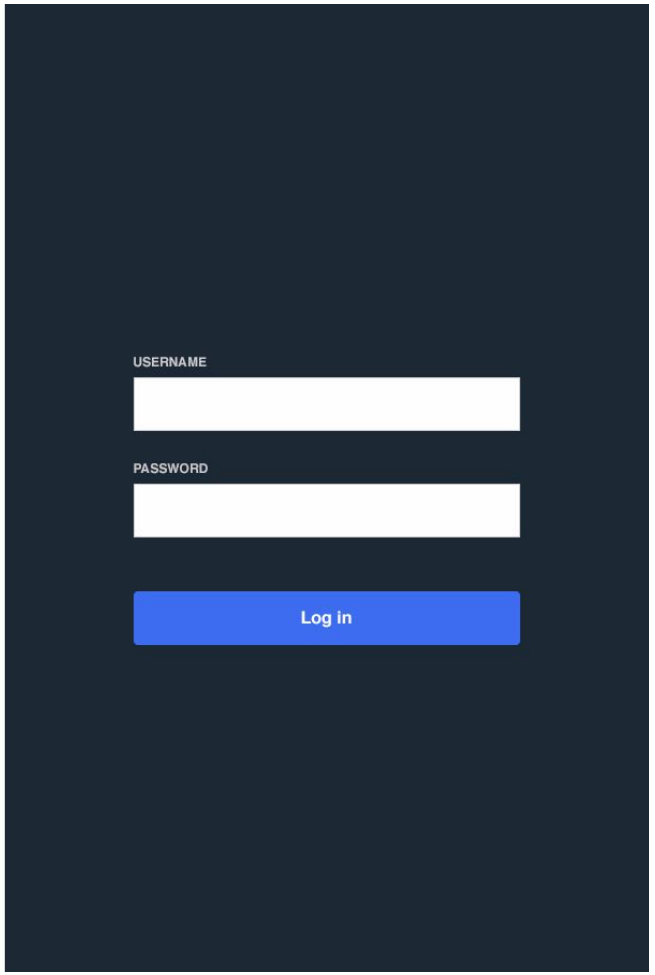
Tag 2.0 is almost here

- /org will be removed

- Webui preview
- Enhanced Code Update support
- Security
  - Password changing via REST
  - Closed BIOS writes to flash
- Error logs
  - Mark resolved, Associations
- Network
  - Vlan, ipmi support
- Boot
  - Added one time boot

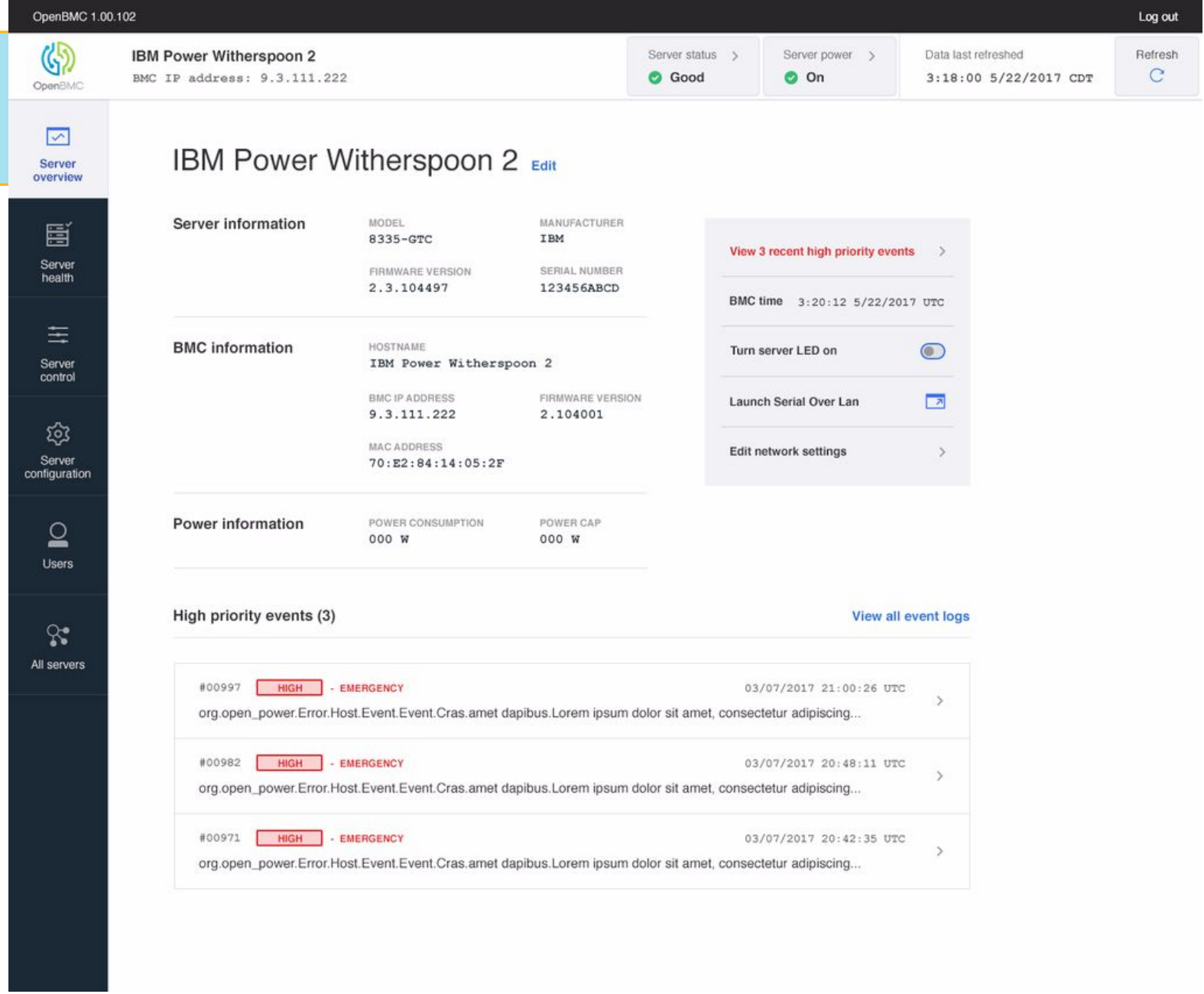
User Interface - Login





User Interface – Systems Overview

- Client Rendered
- HTML5
- No java

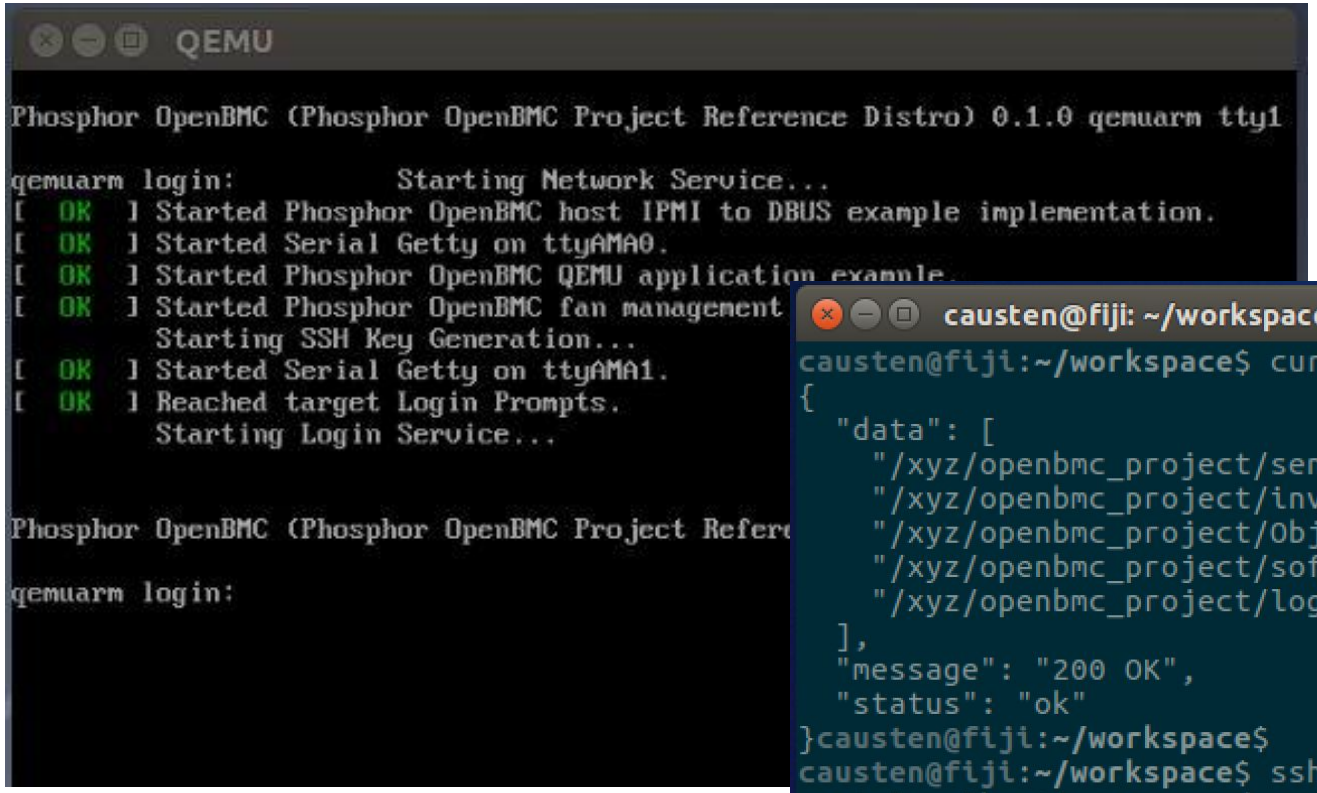


Two flash architectures

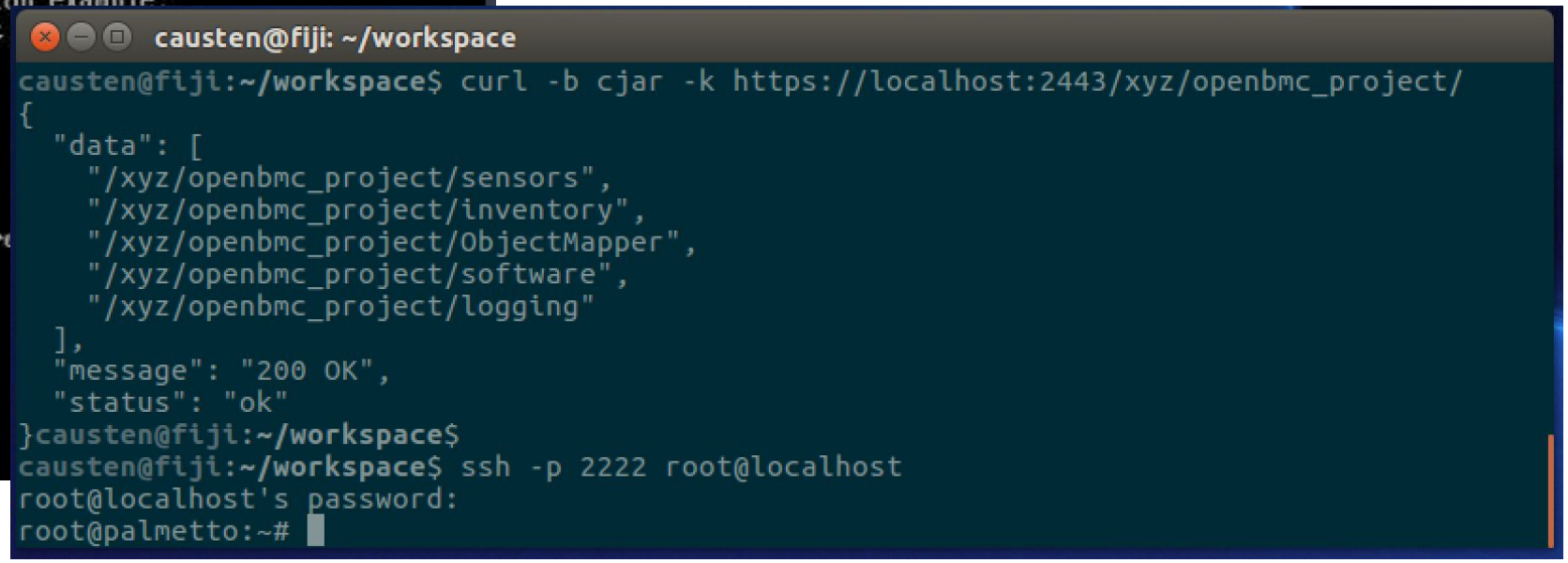
- UBI file system
  - Brick Protection
  - Faster Flashing
  - Multiple BMC image
- Flash File System
  - Current default

Quick Test Drive?

QEMU == No Hardware Required



AST2400 and AST2500 supported



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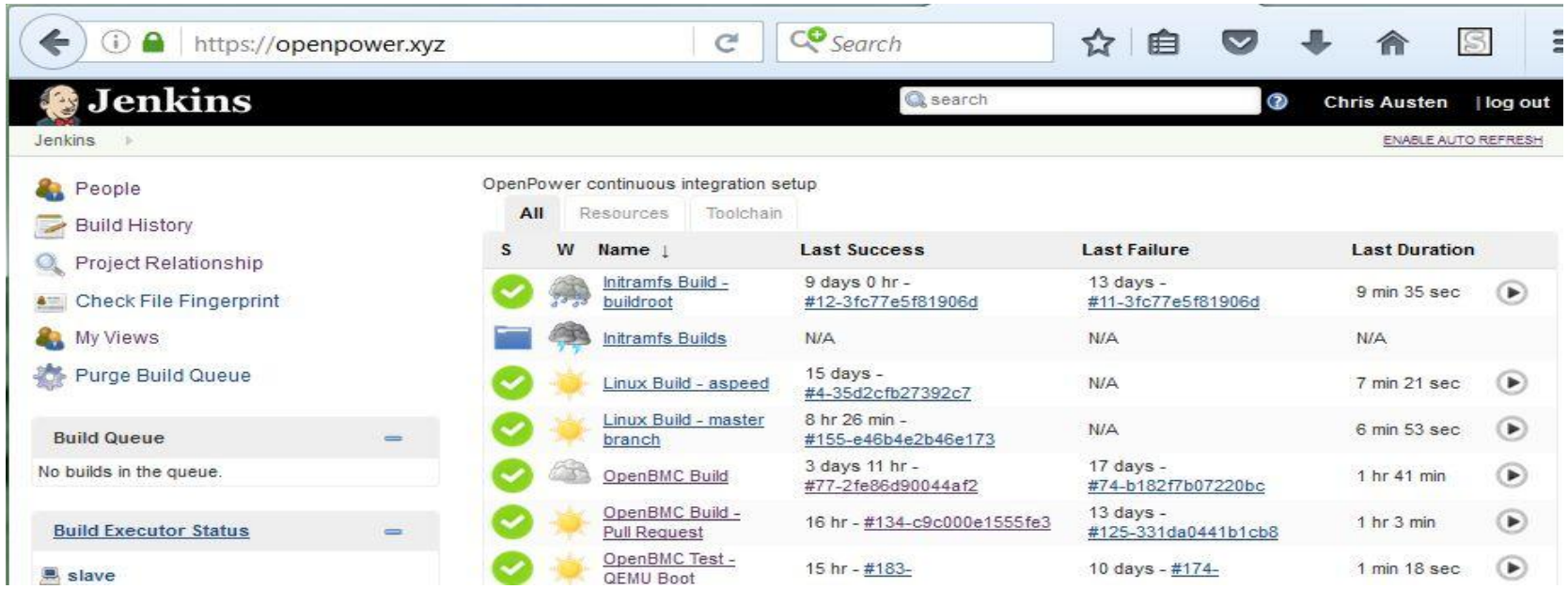
Automated Build Verification



- Dedicated Test Development Team
- Every commit… tested

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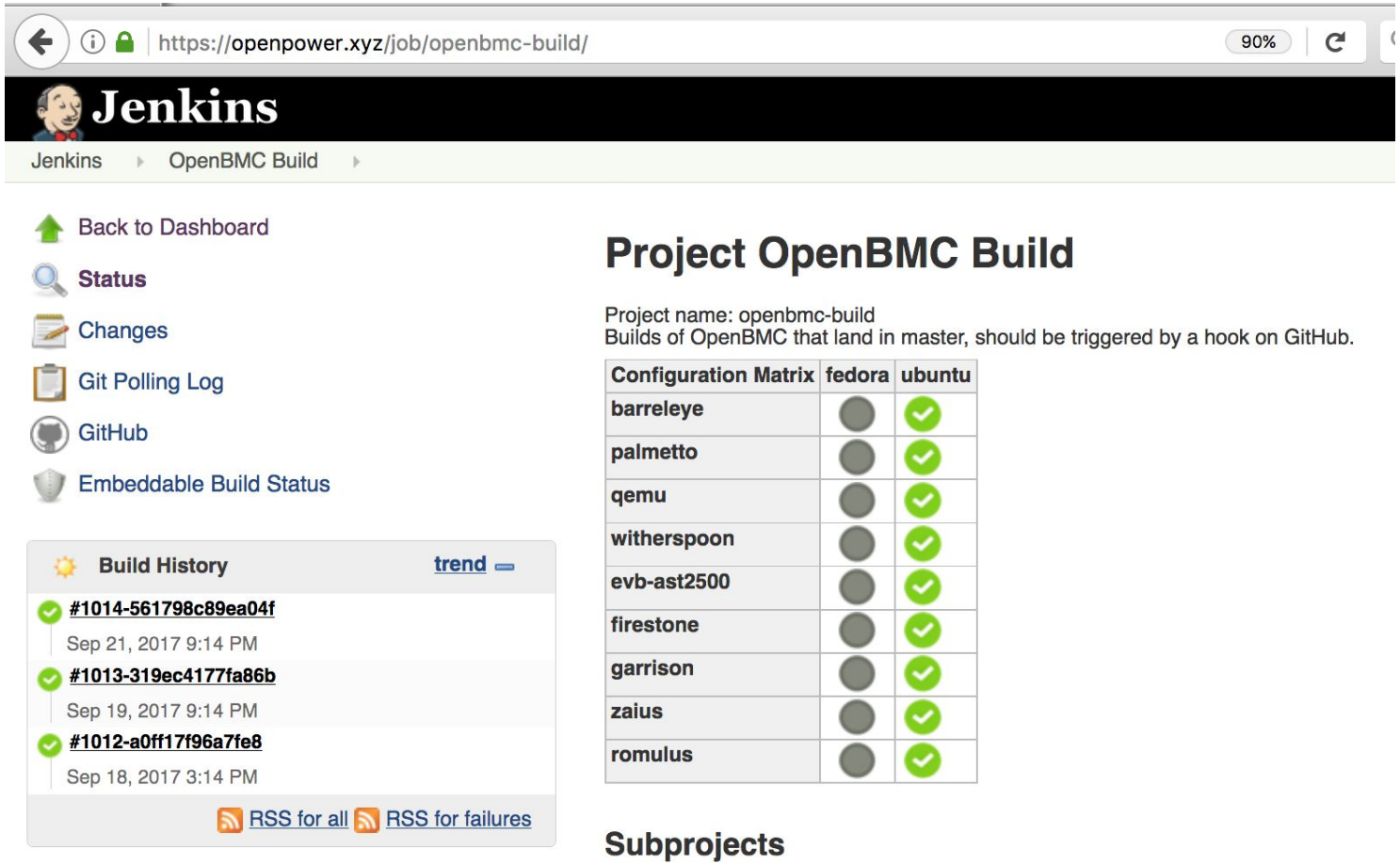
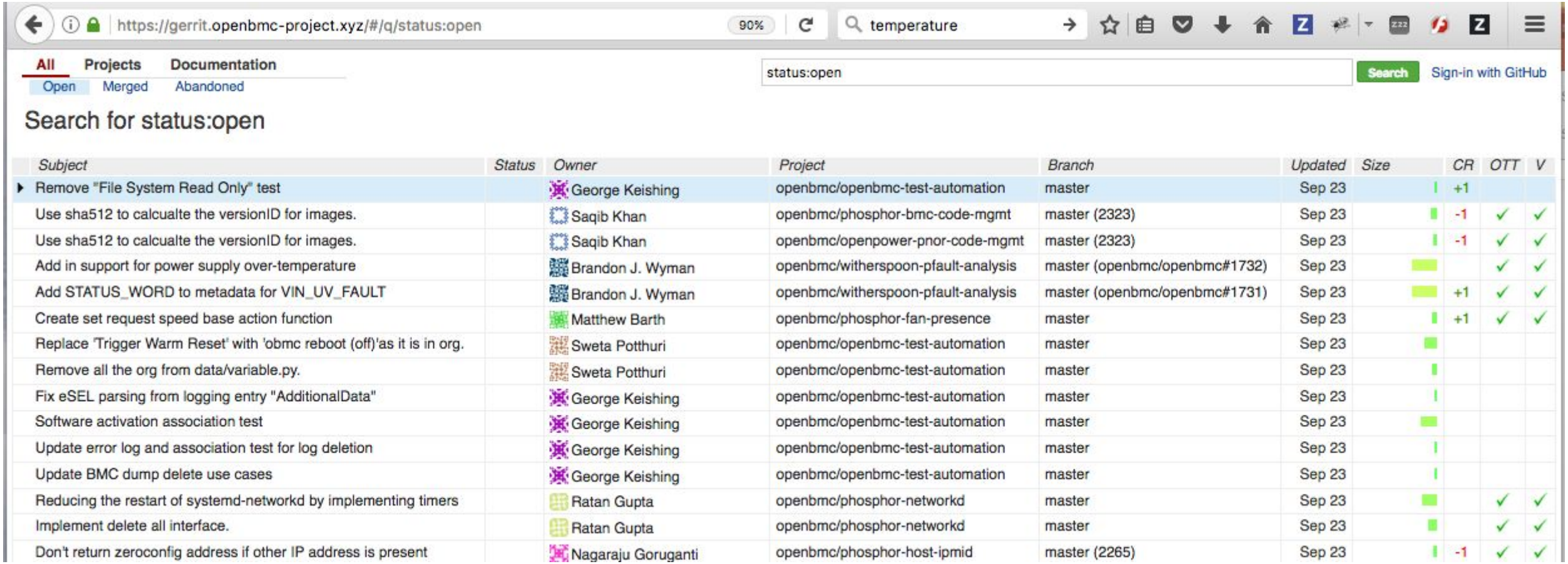
Prebuilt images



Code Reviews



Subject	Status	Owner	Project	Branch	Updated	Size	CR	OTT	V
Remove "File System Read Only" test		George Keishing	openbmc/openbmc-test-automation	master	Sep 23		+1		
Use sha512 to calcualte the versionID for images.		Saqib Khan	openbmc/phosphor-bmc-code-mgmt	master (2323)	Sep 23		-1	✓	✓
Use sha512 to calcualte the versionID for images.		Saqib Khan	openbmc/openpower-pnor-code-mgmt	master (2323)	Sep 23		-1	✓	✓
Add in support for power supply over-temperature		Brandon J. Wyman	openbmc/witherspoon-pfault-analysis	master (openbmc/openbmc#1732)	Sep 23			✓	✓
Add STATUS_WORD to metadata for VIN_UV_FAULT		Brandon J. Wyman	openbmc/witherspoon-pfault-analysis	master (openbmc/openbmc#1731)	Sep 23		+1	✓	✓
Create set request speed base action function		Matthew Barth	openbmc/phosphor-fan-presence	master	Sep 23		+1	✓	✓
Replace 'Trigger Warm Reset' with 'obmc reboot (off)'as it is in org.		Sweta Potthuri	openbmc/openbmc-test-automation	master	Sep 23				
Remove all the org from data/variable.py.		Sweta Potthuri	openbmc/openbmc-test-automation	master	Sep 23				
Fix eSEL parsing from logging entry "AdditionalData"		George Keishing	openbmc/openbmc-test-automation	master	Sep 23				
Software activation association test		George Keishing	openbmc/openbmc-test-automation	master	Sep 23				
Update error log and association test for log deletion		George Keishing	openbmc/openbmc-test-automation	master	Sep 23				
Update BMC dump delete use cases		George Keishing	openbmc/openbmc-test-automation	master	Sep 23				
Reducing the restart of systemd-networkd by implementing timers		Ratan Gupta	openbmc/phosphor-networkd	master	Sep 23			✓	✓
Implement delete all interface.		Ratan Gupta	openbmc/phosphor-networkd	master	Sep 23			✓	✓
Don't return zeroconfig address if other IP address is present		Nagaraju Goruganti	openbmc/phosphor-host-ipmid	master (2265)	Sep 23		-1	✓	✓

Core Infrastructure of the OpenBMC Project

Control the Functions in your OpenBMC…

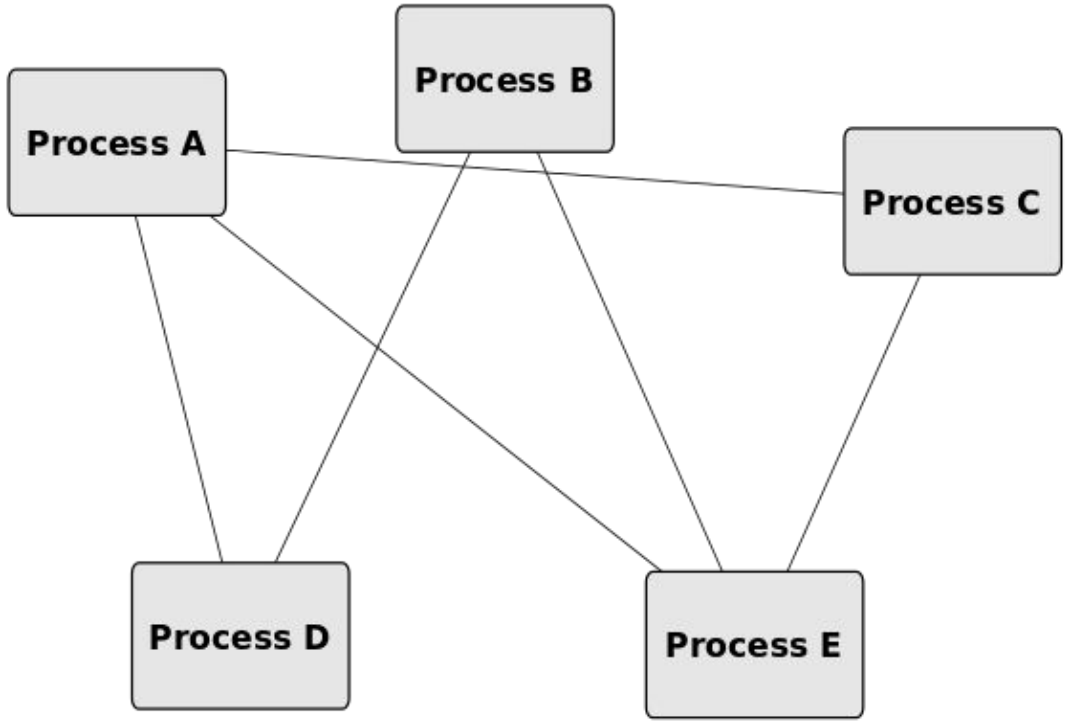
- Built on Yocto-Linux

Simple infrastructure for you

- Process management Systemd
- IPC via D-Bus
- Interfaces via REST and IPMI
- Automatic REST API from D-Bus introspection

Without D-Bus

- Code all IPC yourself
- Startup / Recover logic
- Multi-company collaboration?



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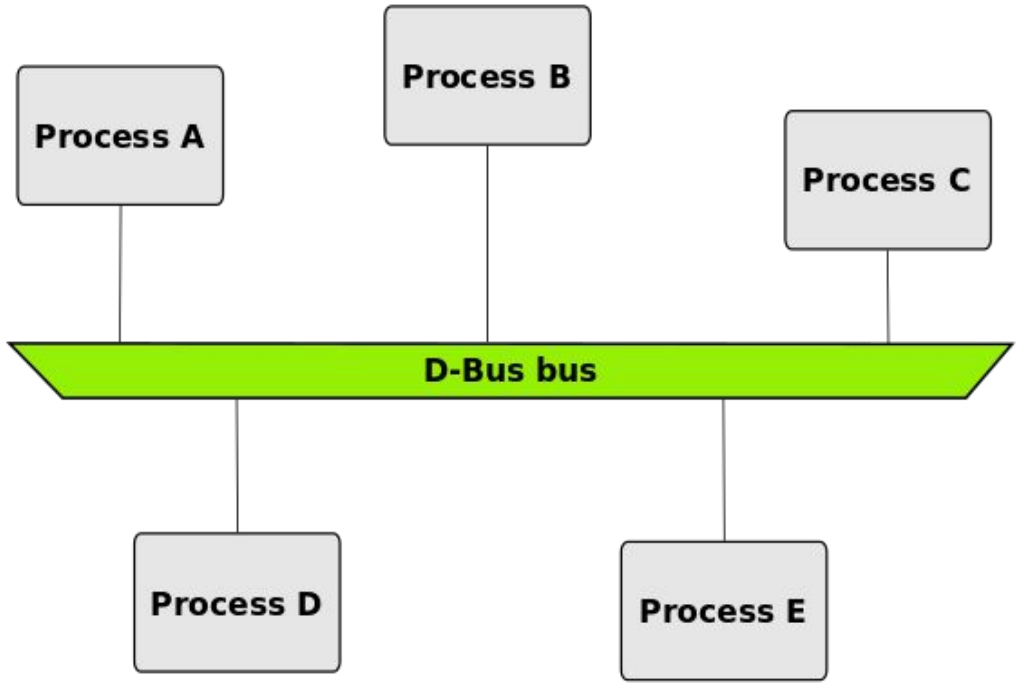
With D-Bus

- Rapid community collaboration
- Rapid Prototyping
  - Bindings for C/C++, Python, etc
- Compete IPC integration with systemd



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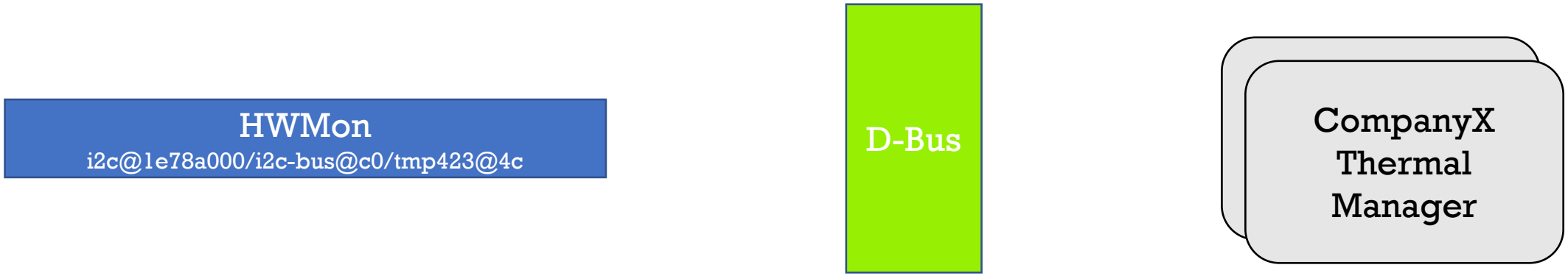
With D-Bus example



OpenBMC Dbus Interface Examples

Attach an interface, get the benefits in Dbus and REST

xyz.openbmc_project.Sensor.Threshold.Warning

- Broadcast notification when value trips
- “Min”, “Max”

xyz.openbmc_project.Inventory.Item

- VPD Properties
- “Present”

Making ODM development easier

In 2 Ways…

XML Integration

- Manifest for your hardware
- Define wiring
- Define environmental limits
- IPMI entity IDs

XML Integration

```
<targetInstance>
    <id>MAX31785.hwmon2</id>
    <type>unit-hwmon-feature</type>
    ...
    <attribute>
        <id>HWMON_FEATURE</id>
        <default>
                <field><id>HWMON_NAME</id><value>fan1</value></field>
                <field><id>DESCRIPTIVE_NAME</id><value>fan0</value></field>
                <field><id>WARN_LOW</id><value>1000</value></field>
                <field><id>WARN_HIGH</id><value>80000</value></field>
                <field><id>CRIT_LOW</id><value></value></field>
                <field><id>CRIT_HIGH</id><value></value></field>
        </default>
    </attribute>
```

Making ODM development easier

In 2 Ways…

XML Integration

- Manifest for your hardware
- Define wiring
- Define environmental limits
- IPMI entity IDs

YAML definitions for REST

- Human readable properties
- Documentation driven code

YAML, Code and Schema Documented

```yaml
description: >
    Implement to provide event/error entry attributes.
    This interface should be instantiated for the phosphor::logging namespace.
    This interface is a collection of objects, therefore it is required to
    implement org.freedesktop.DBus.ObjectManager on the logging namespace root.
    Optionally, implement org.openbmc.Object.Delete to allow the deletion of
    individual entries.
properties:
    - name: Id
      type: uint32
      description: >
          The error event entry id number.
    - name: Timestamp
      type: uint64
      description: >
          Commit timestamp of the error event entry in milliseconds since 1970.
```

Defined REST Schema

- /
- /list
- /enumerate
- /attr/<property>
- /action/<method>
- /schema

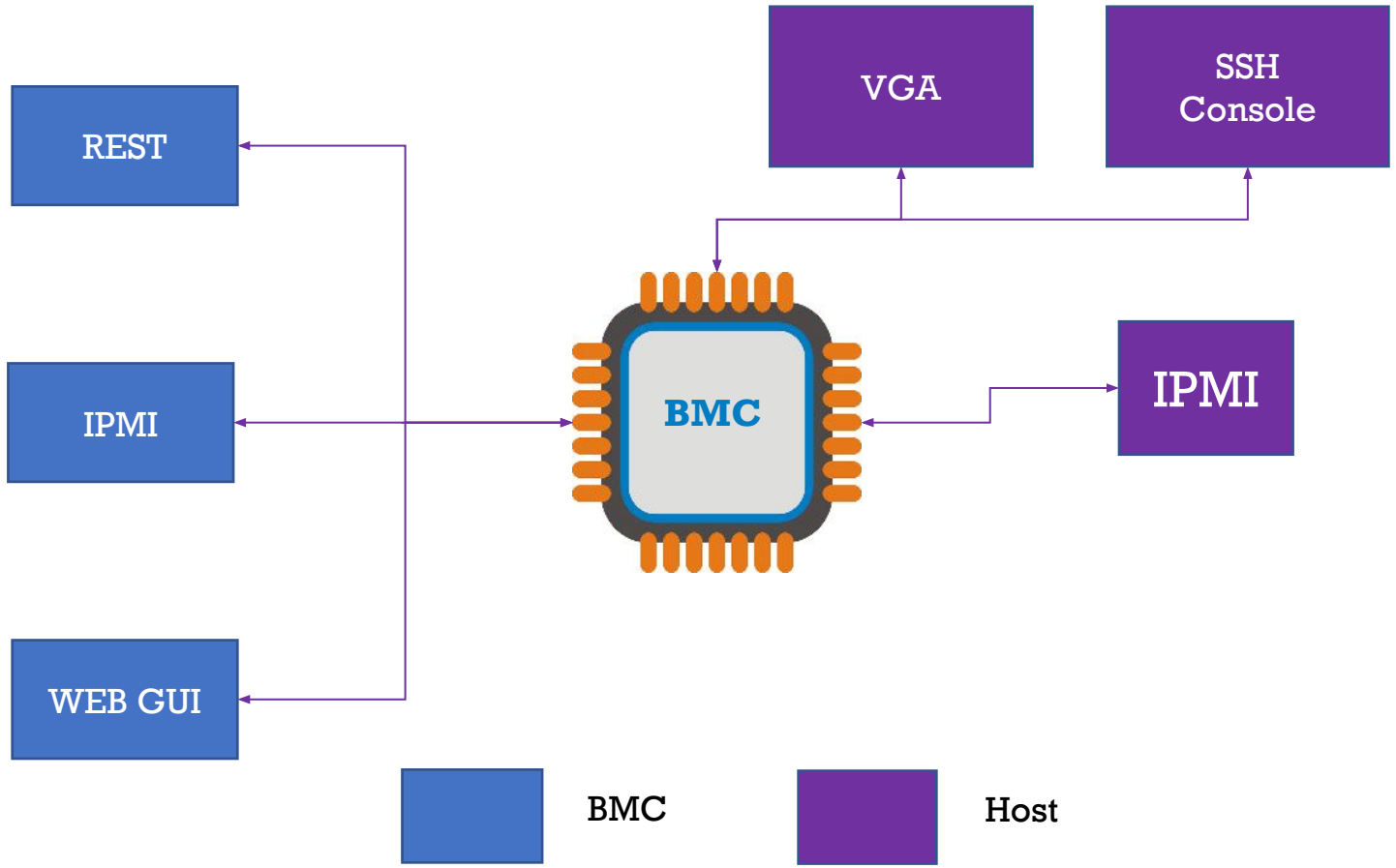
Lets see an example

```
curl -b cjar -k https://bmc/xyz/openbmc_project/inventory/

{
  "data": [
    "/xyz/openbmc_project/inventory/system"
  ],
  "message": "200 OK",
  "status": "ok"
}
```

Lets see an example

```
curl -b cjar -k
https://bmc/xyz/openbmc_project/Inventory/system/chassis/motherboard/cpu0

{
      "BuildDate": "",
       "Manufacturer": "IBM",
       "Model": "",
       "PartNumber": "01HL322",
       "Present": 0,
       "PrettyName": "PROCESSOR MODULE",
       "SerialNumber": "YA3933741577",
       "Version": "EC:10”
}
```

Covered Interfaces -- 2017



Features Provided

- Zeroconf discoverable
- Power Control
- Remote Console
- Power and Cooling Management
- Event Logs
- IPMI
- Sensors
- LED Management
- Host Watchdog
- VPD Inventory
- Simulation

Features in development

- Telemetry
- GPU inventory
- Full IPMI 2.0 Compliance with DCMI IPMI
- Verified Boot

Learn through code

openbmc-tutorials

A series of simple lessons on working with the OpenBMC Project. The lessons are laid out assuming you only have access to github. Some are dependant on previous lessons, when this occurs I have placed links.

Lessons

1. Build the Simulator
2. Hello World with the SDK
3. Watch the bus
4. Hop on the bus
5. Get in the flash
6. Test with Robot

https://github.com/causten/openbmc-tutorials/blob/master/lessonsim101.md

Features of the future...

- OpenCompute Redfish Compliance
- Remote KVM
- Remote USB
- Additional Board Support
- OpenStack Ironic Integration
- QEMU enhancements

Our World

Code:

- https://github.com/openbmc

Continuous Testing

- https://openpower.xyz

Code Reviews

- http://gerrit.openbmc-project.xyz

Contact

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  IRC: #openbmc on freenode.net
- Riot: #openbmc:matrix.org