Redfish

The new standard for a Software Defined Infrastructure

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Introducing myself

- Software engineering and Unices since 1988:
  - Mostly Configuration Management Systems (CMS), Build systems, quality tools, on multiple commercial Unix systems
  - Discovered Free, Libre, Open Source Software & Linux (FLOSS) & made first contributions in 1993
  - Full time on OSL since 1995, first as HPE reseller then @ HPE

- Currently:
  - WW FLOSS Technology Strategist in HPE, Grenoble, France
  - HPE FLOSS Advocate and Converged Infrastructure Ambassador
  - WW Linux Community Lead for the HPE Open Source Profession
  - AFUL and APRIL member. FLOSSITA board chair. Conferences at WW level at LinuxCon, Linux.conf.au, Fosdem, ...
  - MondoRescue, Project-Builder.org, python-redfish, UUWL and PUSK Project Lead
  - LinuxCOE, mrepo, tellico, rinse, fossology, collectl, Ironic contributor
  - FOSSBazaar/SPDX and FLOSS Governance enthusiast
  - Mageia (and Fedora) packager

- And also:
  - Amateur singer (Alto / Tenor), recorder player since 1976 and Choir director since 1987, CD collector (7000+), Concerts, Photography
Some definitions
What is REST?

REST - REpresentational State Transfer

- Modern and easy to adopt Software Architectural Style for Web services
- Scalable, Stateless, Performant, Reliable
- Standardized HTTP operations (verbs)
  - GET, POST, PUT, and DELETE
  - Practical implementations also add PATCH, HEAD

See: https://en.wikipedia.org/wiki/Representational_state_transfer
What is API?

API – Application Programming Interface

- API is an interface between different software components invoked over communication networks using standards based technologies.

- Used to power orchestration, apps/tools integration.

- Exist at Firmware or OS level, software libraries, DBs, Web based system,

- Examples include POSIX, X-Window, OpenStack (RESTful)

See: https://en.wikipedia.org/wiki/Application_programming_interface
What is JSON?

JSON - Java Script Object Notation

- Open Standard data-serialization format based on key/value pairs
- Language independent (originated from Javascript)
- Easy for machines to parse and generate with large language support (C, perl, python, java, …)
- Easy for humans to read and edit
- Used to import/export data structures
- Similar standards: YAML, XML

See: https://en.wikipedia.org/wiki/JSON

```
{
    "firstName": "John",
    "lastName": "Smith",
    "isAlive": true,
    "age": 27,
    "address": {
        "streetAddress": "21 2nd Street",
        "city": "New York",
        "state": "NY",
        "postalCode": "10021-3100"
    },
    "phoneNumbers": [ 
        {
            "type": "home",
            "number": "212 555-1234"
        },
        {
            "type": "office",
            "number": "646 555-4567"
        },
        {
            "type": "mobile",
            "number": "123 456-7890"
        }
    ],
    "children": [],
    "spouse": null
}
```
What is OData?

- Open protocol to enable creation and consumption of REST APIs
- Provides Service and Metadata Document, Dynamic Resources
- Uses Resource Operation, which are standardized HTTP operations (verbs)
  - GET, POST, PUT, PATCH and DELETE


See also: http://docs.servicestack.net/why-not-odata
Redfish

- Open industry standard specification and schema
  - Scalable Platform Management **RESTful API** specification proposal (v1.7.0) – DSP0266
  - **JSON**, **YAML** (OpenAPI) and **XML** (Odata CSDL) based Schemas – DSP8010 (v2019.3)
  - **Mockup** to be integrated in an existing web server to simulate a Redfish system – DSP2043
- First really interoperable management interface cross-vendors (vs SMASH), initiated by Dell, Emerson, HPE and Intel
- Built upon giant shoulders (http(s) RESTful API using JSON and OData)
- Easier, better HW support, more **secure**, more **complete** (vs IPMI) (chassis, multi-node platforms)
- Supports private extensions (like SNMP) in an Oem schema
- A way to get and set HW configuration items on physical platforms using a **RESTful API** (automation)

Redfish Timeline

• DMTF published Redfish 1.0 the 4th of August 2015
  - JSON/Odata based schemas to describe resources
  - Mockup to allow developers to test wrt Redfish
  - Documentation, white papers, FAQ
  - Available online at https://www.dmtf.org/standards/redfish
  - Last version is now 2019.2 (2019-09-23)

• Available in:
  - DELL iDRAC BMC with Minimum iDRAC 7/8 FW 2.40.40.40, iDRAC9 FW 3.00.00.0
  - HPE iLO BMC with minimum iLO4 FW 2.30, iLO5
  - HPE Moonshot BMC with minimum FW 1.41
  - Supermicro X10 BMC with minimum FW 3.0 and X11 with minimum FW 1.0
    Insyde Software Supervyse[4] BMC
### Redfish Feature set

#### Collect “IPMI class” server data
- Status of **server health**
- **Temperature** sensors and fans
- Server **identification**
- Inventory **CPUs, memory, disks** and **MAC address**
- Basic **OS** information

#### Perform common actions
- **Power cycle** and **reboot** server
- Change **boot order**
- Set **power thresholds**
- **Alert** notifications via **Events**
- Access **Event log** and **SSH Serial console**

#### Manage server infrastructure
- View / configure BMC **network settings**
- Manage local BMC **user accounts**
- **Chassis** inventory
- **Swordfish** SNIA ‘s extensions
- **OCP & Gen-Z** support
Redfish toolset

- DMTF provides many tools:
  - https://redfish.dmtf.org/ Redfish developer Hub (mockup, docs, tools)
  - https://github.com/DMTF Bindings (C, python, ...), CLI tools, Simulators, Validators

- Community driven projects:
  - https://git.openstack.org/cgit/openstack/python-redfish python-redfish library
  - https://git.openstack.org/cgit/openstack/sushy python library used by Ironic
  - OpenStack Ironic bare metal deployment project has a Redfish driver
    https://docs.openstack.org/ironic/latest/admin/drivers/redfish.html
THANK YOU

Linus Torvalds, Richard Stallman, Eric Raymond, Nat Makarevitch, René Cognenc, Eric Dumas, Rémy Card, Bdale Garbee, Bryan Gartner, Craig Lamparter, Lee Mayes, Gallig Renaud, Andree Leidenfrost, Phil Robb, Bob Gobeille, Martin Michlmayr among others, for their work and devotion to the Open Source Software cause... and my family for their patience :-)

"Changes are never easy to make. There is comfort and safety in tradition, but change must come, no matter how painful or expensive it may be."

Bill Hewlett