Redfish

The new standard for a Software Defined Infrastructure
Introducing myself

• Software engineering and Unices since 1988:
  • Mostly Configuration Management Systems (CMS), Build systems, quality tools, on multiple commercial Unix systems
  • Discovered Open Source & Linux (OSL) & made first contributions in 1993
  • Full time on OSL since 1995

• Currently:
  • OSL Technology Strategist, Grenoble, France
  • FLOSSITA board chair
  • POSS conference, OpenStack.fr, AFUL previous board member.
  • 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 OSL Governance enthusiast
  • Mandriva, Mageia packager

• And also:
  • Amateur singer (Alto / Tenor), recorder player since 1976 and Choir director since 1987, CD collector (6000+), 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 independant (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

```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
What is Redfish?

- Open industry standard specification and schema
- First really interoperable management interface cross-vendors (vs SMASH)
- Built upon giant shoulders (http(s) RESTful API using JSON and OData)
- Better HW support (vs IPMI) (chassis, multi-node platforms)
- Supports private extensions (like SNMP) in an Oem schema

See: https://en.wikipedia.org/wiki/Redfish (doesn’t exist yet, but being proposed!)
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 2018.3 (2019-01-11)
- 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
Redfish Feature set

**Collect “IPMI class” server data**
- Status of **server health**
- **Temperature** sensors and fans
- Server **identification**
- Inventory **CPUs, memory** and **MAC address**
- **400** items (100 setable)

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

**Manage server infrastructure**
- View / configure BMC network settings
- Manage local BMC **user accounts**
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
  - 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
Data Model
Redfish Demo

https://redfish.dmtf.org/redfish/v1
python-redfish description

- A python library to manage Redfish compliant systems
  - Open Source project under the Apache License v2.0
  - Initiated the 25th March 2015 during the 7th HPE TES in Grenoble.
  - Now an OpenStack project
  - Available at:
    - https://github.com/openstack/python-redfish
    - Discussions on python-redfish@mondorescue.org
    - Bugs at https://launchpad.net/python-redfish
  - Python dependencies: python-requests, python-tortilla, python-futures, python-json, python-urllib, python-simplejson, ...
- Easy integration of Redfish support into python based applications
- Potential consumers: a Redfish client tool based on that library (preliminary work done as part of the project), scripts for Lab setup, Alexandria (CMDB as a Service), Future usages with cobbler, anaconda, ...
**python-redfish Status & Roadmap**

- **Status:**
  - Project at v0.4.1 – Usable for PoC
  - Core library ready:
    - Bios info,
    - Power management
    - Demos scripts available
  - Client tool
  - Docker file for testing with DMTF mockup container
  - Tests performed with:
    - DMTF mockup (0.95 & 1.0)
    - ILO4 and iLO5 based ProLiant servers (0.95 & 1.0)
    - Moonshot chassis Managers (0.95)
    - iLO4 based Moonshot cartridges m510 (1.0)
  - Python dependencies already available in Mageia and Fedora, CentOS 7 on our ftp server. Debian TBD (contribs welcome !)
  - Packages built with project-builder.org (rpm, deb to come)

- **Roadmap:**
  - Fix reported enhancement requests
  - Work on Alexandria needed interfaces (inventory)
Python-Redfish Demo

https://ilorestfulapiexplorer.ext.hpe.com/
THANK YOU

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