

**Hewlett Packard
Enterprise**

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 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>

```
{
  "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?

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 : https://en.wikipedia.org/wiki/Open_Data_Protocol

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

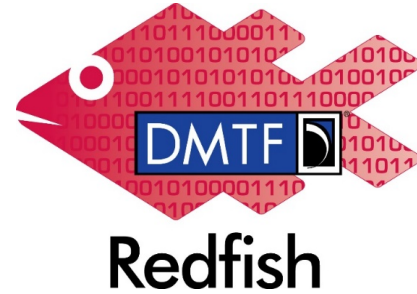
```
{
  "@odata.context": "http://services.odata.org/V4/OData/OData.svc/$metadata#Products",
  "value": [
    {
      "ID": 0,
      "Name": "Meat",
      "Description": "Red Meat",
      "ReleaseDate": "1992-01-01T00:00:00Z",
      "DiscontinuedDate": null,
      "Rating": 14,
      "Price": 2.5
    },
    {
      "ID": 1,
      "Name": "Milk",
      "Description": "Low fat milk",
      "ReleaseDate": "1995-10-01T00:00:00Z",
      "DiscontinuedDate": null,
      "Rating": 3,
      "Price": 3.5
    },
    ...
  ]
}
```





Redfish: What ? Why ? How ?

Redfish

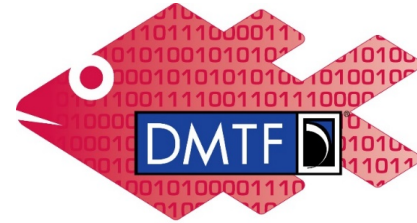


- Open industry standard specification and schema
 - Scalable Platform Management **RESTful API** specification proposal (v1.7.0) – DSP0266
 - **JSON, YAML** (OpenAPI) and **XML** (Odata CSDL) based Schemas – DSP8010 (v2019.3)
 - **Mockup** to be integrated in an existing web server to simulate a Redfish 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)

See : <https://en.wikipedia.org/wiki/Redfish> (waiting for your improvements !) - <http://www.dmtf.org/standards/redfish>

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



Redfish

Founding members



Hewlett Packard
Enterprise



Additional sponsors



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

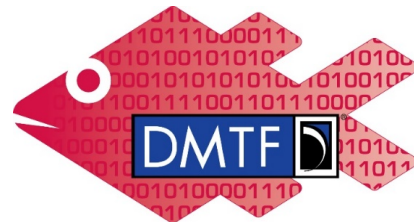
Perform common actions

- **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



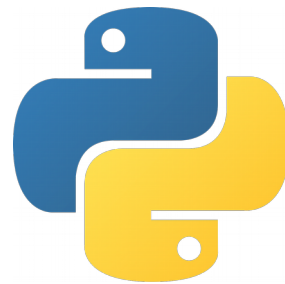
Redfish

– DMTF provides many tools :

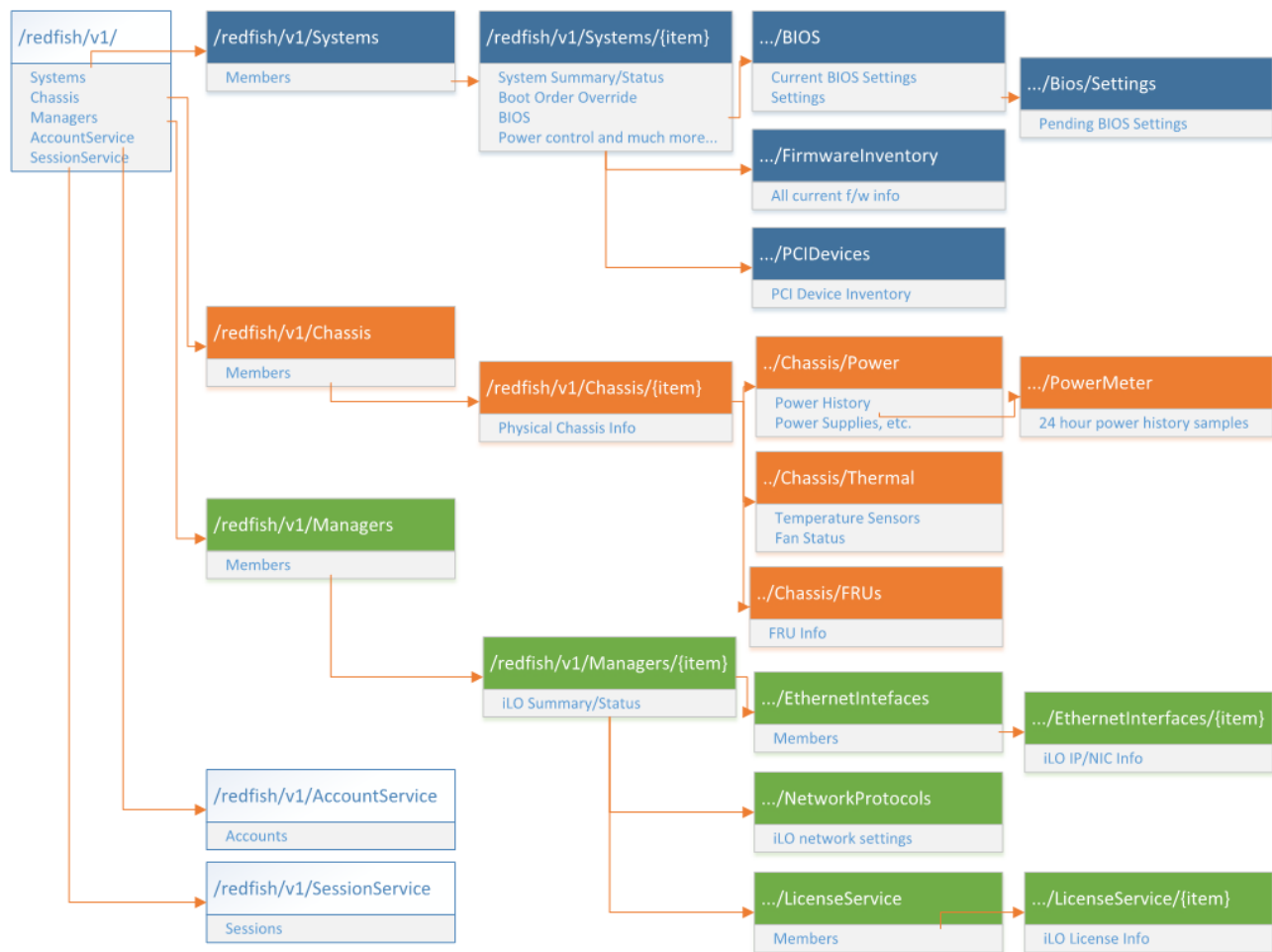
- <https://redfish.dmtf.org/> Redfish **developer Hub** (mockup, docs, tools)
- <https://github.com/DMTF> Bindings (C, python, ...), CLI tools, Simulators, Validators

– 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>



Data Model



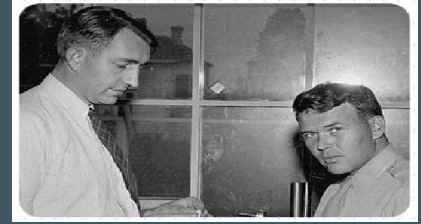
Redfish Demo

<https://redfish.dmtf.org/redfish/v1>

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<http://downloads.linux.hpe.com/>



THANK YOU

Linus Torvalds, Richard Stallman, Eric Raymond, Nat Makarevitch, René Cougnenc, 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