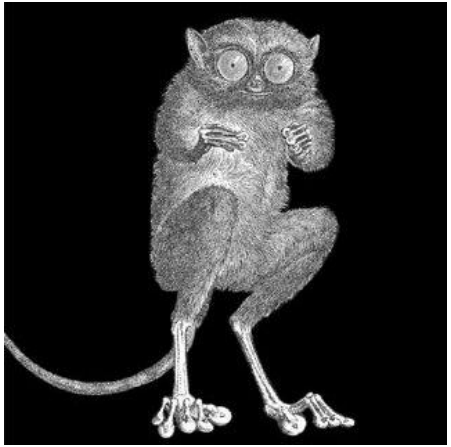
OpenDaylight Today

Lori Jakab – December 2018

$ whoami⏎



[+] UPC alumni

[+] Cisco software engineer

[+] Open source enthusiast

WIRESHARK

LISPmob

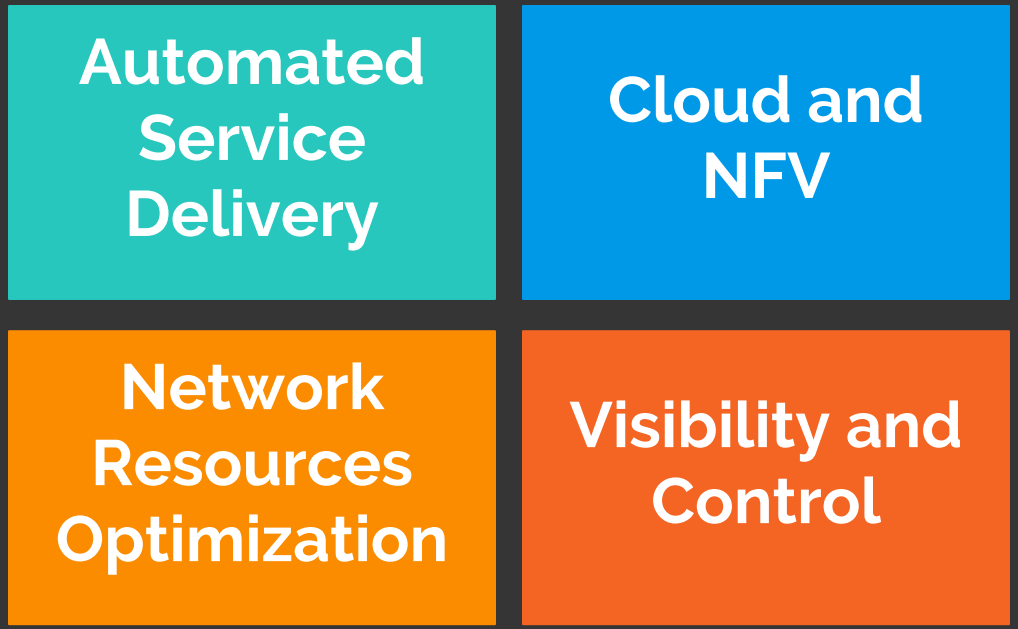
OvS
Open vSwitch

OPEN
DAYLIGHT

LFNETWORKING

OpenDaylight is a modular open platform for customizing and automating networks of any size and scale.

Use cases



Source: opendaylight.org

Modularity

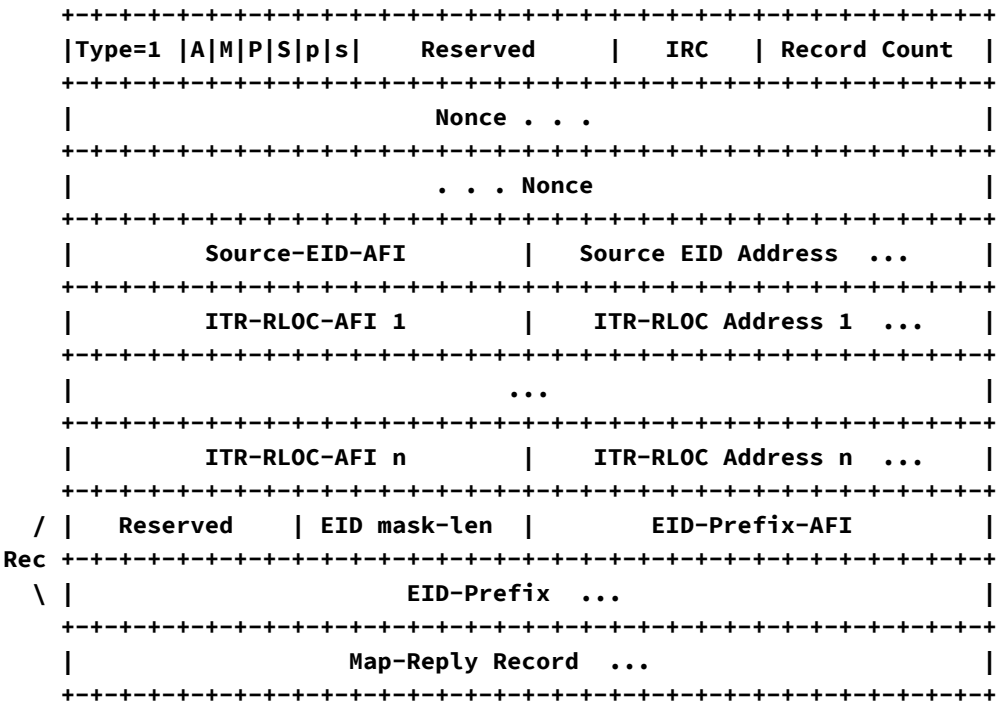
- SDN controllers initially OpenFlow centric
  - Application APIs were limited, and implementation was OF
- ODL: decouple application API from SB protocol
- (Model Driven) Service Abstraction Layer

YANG (RFC 6020, 7950)

Data modeling language, used in ODL for:

- Describing the structure of data that is exchanged
- Defining RPCs, which can be called without worrying about what component will execute it
- Publish notifications to registered listeners

Example: LISP control packet



Example: YANG data definition

```
module odl-lisp-proto {
    ...

    grouping MapRequest {
        leaf authoritative {
            type boolean;
        }
        leaf mapDataPresent {
            type boolean;
        }
        leaf probe {
            type boolean;
        }
        leaf smr {
            type boolean;
        }
        leaf pitr {
            type boolean;
        }
        leaf smrInvoked {
            type boolean;
        }

    ...
```

```
    ...

        leaf nonce {
            type int64;
        }
        container SourceEid {
            uses eid-container;
        }
        list itrRloc {
            key "itr-rloc-id";
            leaf itr-rloc-id {
                type string;
            }
            uses rloc-container;
        }
        uses eid-list;
        container MapReply {
            uses mapping-record-container;
        }
        uses map-request-metadata;
    }
}
```

Example: YANG RPC definition

```
module odl-mappingservice {

    import odl-lisp-proto { prefix lisp-proto; revision-date 2015-11-05; }

    rpc add-key {
        input {
            uses lisp-proto:eid-container;
            uses lisp-proto:mapping-authkey-container;
        }
    }

    rpc get-key {
        input {
            uses lisp-proto:eid-container;
        }
        output {
            uses lisp-proto:mapping-authkey-container;
        }
    }
}
```

Example: RPC call

HTTP POST /restconf/operations/odl-mappingservice:add-key

```
{
    "input": {
        "eid": {
            "address-type": "ietf-lisp-address-types:ipv6-prefix-afi",
            "ipv6-prefix": "2001:db8::1/128"
        },
        "mapping-authkey": {
            "key-string": "password",
            "key-type": 1
        }
    }
}
```

POSTMAN

MD-SAL based applications

- At the heart of every app are the YANG models
- YANG models are compiled into Java classes
  - Used as consistent Data Transfer Objects (DTOs)
  - Used for automatic RESTCONF and NETCONF bindings
  - Define the tree structure of the clustered data store
- Benefits:
  - Reduced learning curve for creating APIs and applications
  - Easier API maintenance
  - Immutability -- helps avoiding thread contention

OpenDaylight RestConf API Documentation

Controller Resources | Mounted Resources

Below are the list of APIs supported by the Controller.

aaa(2016-12-14)	Show/Hide | List Operations | Expand Operations | Raw
aaa-app-config(2017-06-19)	Show/Hide | List Operations | Expand Operations | Raw
aaa-cert(2015-11-26)	Show/Hide | List Operations | Expand Operations | Raw
aaa-cert-mdsal(2016-03-21)	Show/Hide | List Operations | Expand Operations | Raw
aaa-cert-rpc(2015-12-15)	Show/Hide | List Operations | Expand Operations | Raw
aaa-encrypt-service-config(2016-09-15)	Show/Hide | List Operations | Expand Operations | Raw
aaa-password-service-config(2017-06-19)	Show/Hide | List Operations | Expand Operations | Raw
cluster-admin(2015-10-13)	Show/Hide | List Operations | Expand Operations | Raw
distributed-datastore-provider(2014-06-12)	Show/Hide | List Operations | Expand Operations | Raw

odl-lisp-sb(2015-09-04)

Show/Hide | List Operations | Expand Operations | Raw

POST	/restconf/operations/odl-lisp-sb:send-map-reply
POST	/restconf/operations/odl-lisp-sb:send-map-request
POST	/restconf/operations/odl-lisp-sb:reset-stats
POST	/restconf/operations/odl-lisp-sb:send-map-notify
POST	/restconf/operations/odl-lisp-sb:get-stats
POST	/restconf/operations/odl-lisp-sb:send-map-register

odl-mappingservice(2015-09-06)

Show/Hide | List Operations | Expand Operations | Raw

POST	/restconf/config
GET	/restconf/config/odl-mappingservice:mapping-database
PUT	/restconf/config/odl-mappingservice:mapping-database
DELETE	/restconf/config/odl-mappingservice:mapping-database
POST	/restconf/config/odl-mappingservice:mapping-database
GET	/restconf/config/odl-mappingservice:mapping-database/virtual-network-identifier/{vni}
PUT	/restconf/config/odl-mappingservice:mapping-database/virtual-network-identifier/{vni}
DELETE	/restconf/config/odl-mappingservice:mapping-database/virtual-network-identifier/{vni}
POST	/restconf/config/odl-mappingservice:mapping-database/virtual-network-identifier/{vni}

PUT /restconf/config/odl-mappingservice:mapping-database/virtual-network-identifier/{vni}/mapping/{eid-uri}/{origin}/mapping-record/eid

Response Class

Model | Model Schema

odl-mappingservice/mapping-database/virtual-network-identifier/mapping/mapping-record(config)eid-TOP

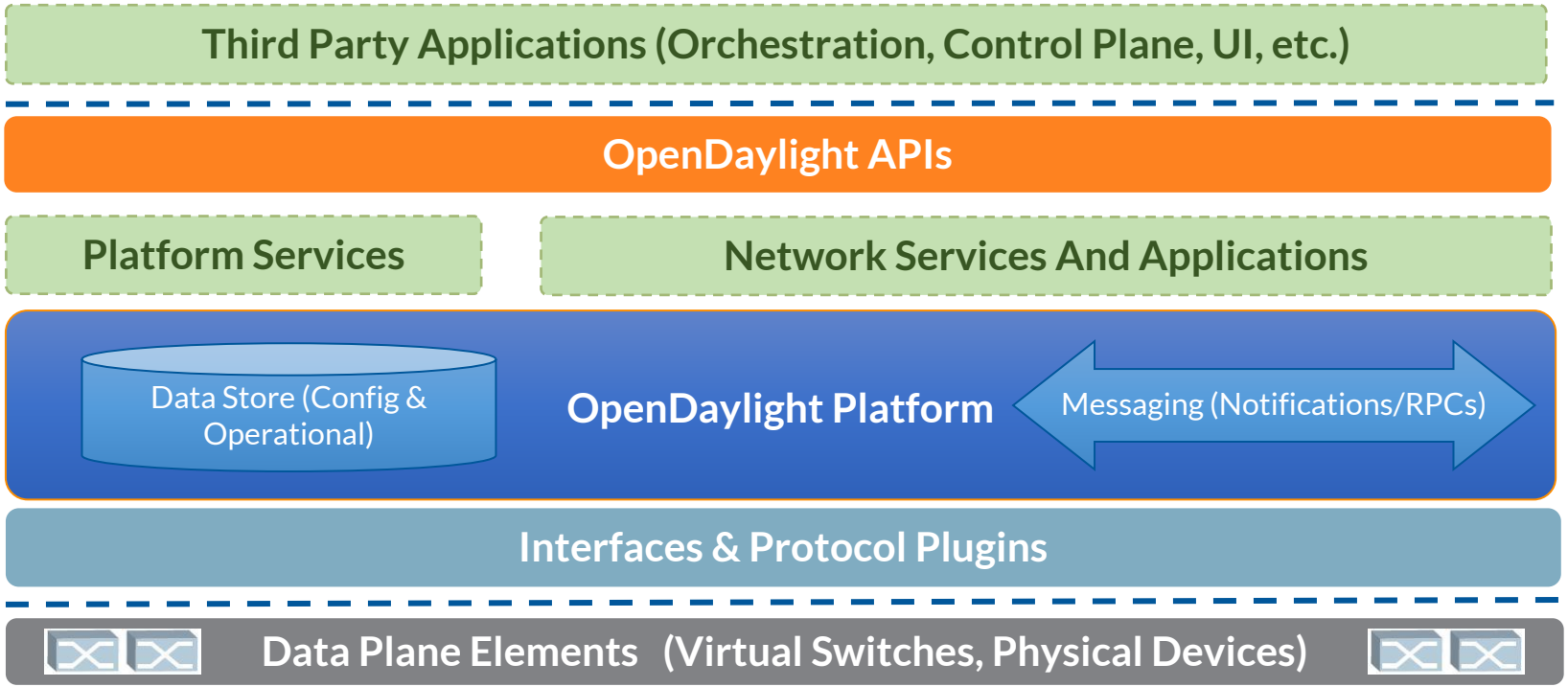
Response Content Type application/json ▾

Parameters

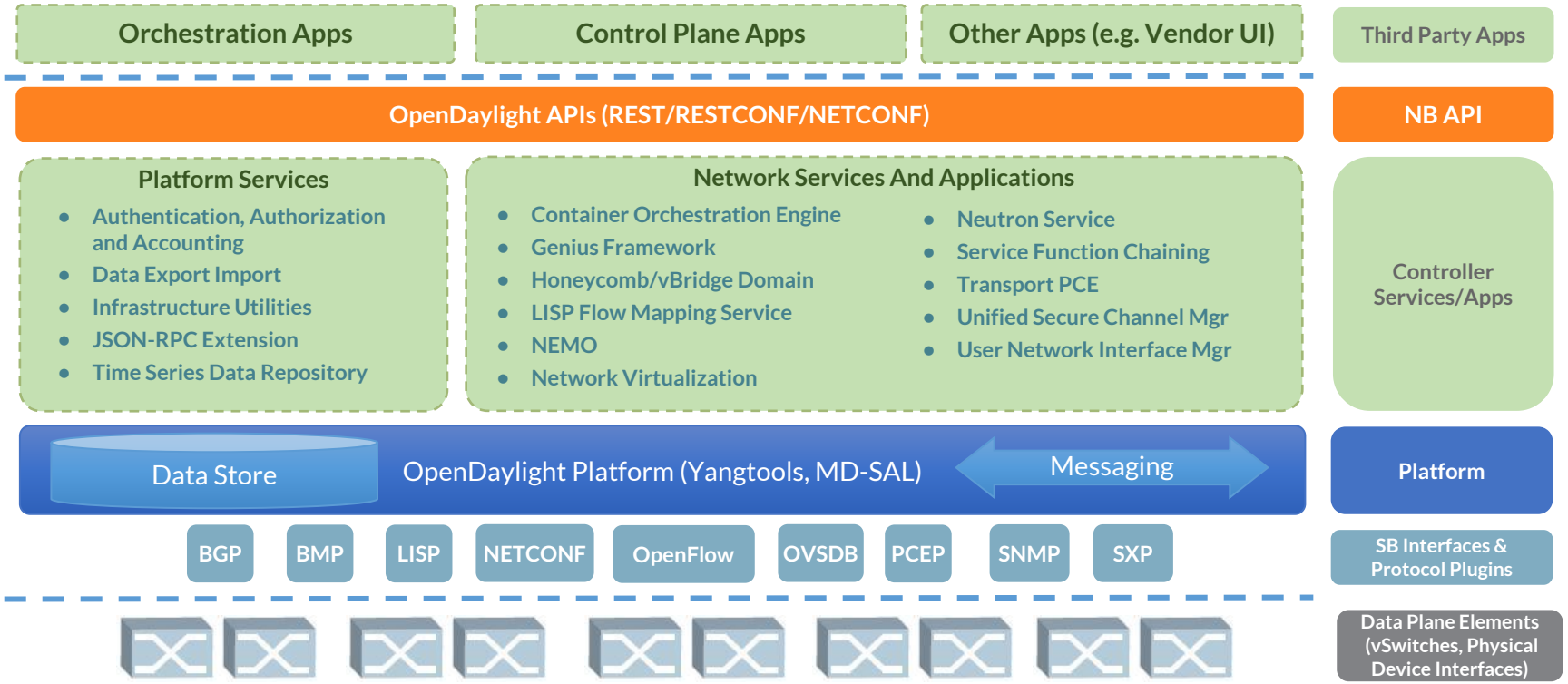
Parameter	Value	Description	Parameter Type	Data Type
vni		The 24-bit Virtual Network Identifier	path	string
eid-uri			path	string
origin		Mapping origin	path	string
(config)eid			body	odl-mappingservice/mapping-database/virtual-network-identifier/mapping/mapping-record(config)eid-TOP

Parameter content type: application/json ▾

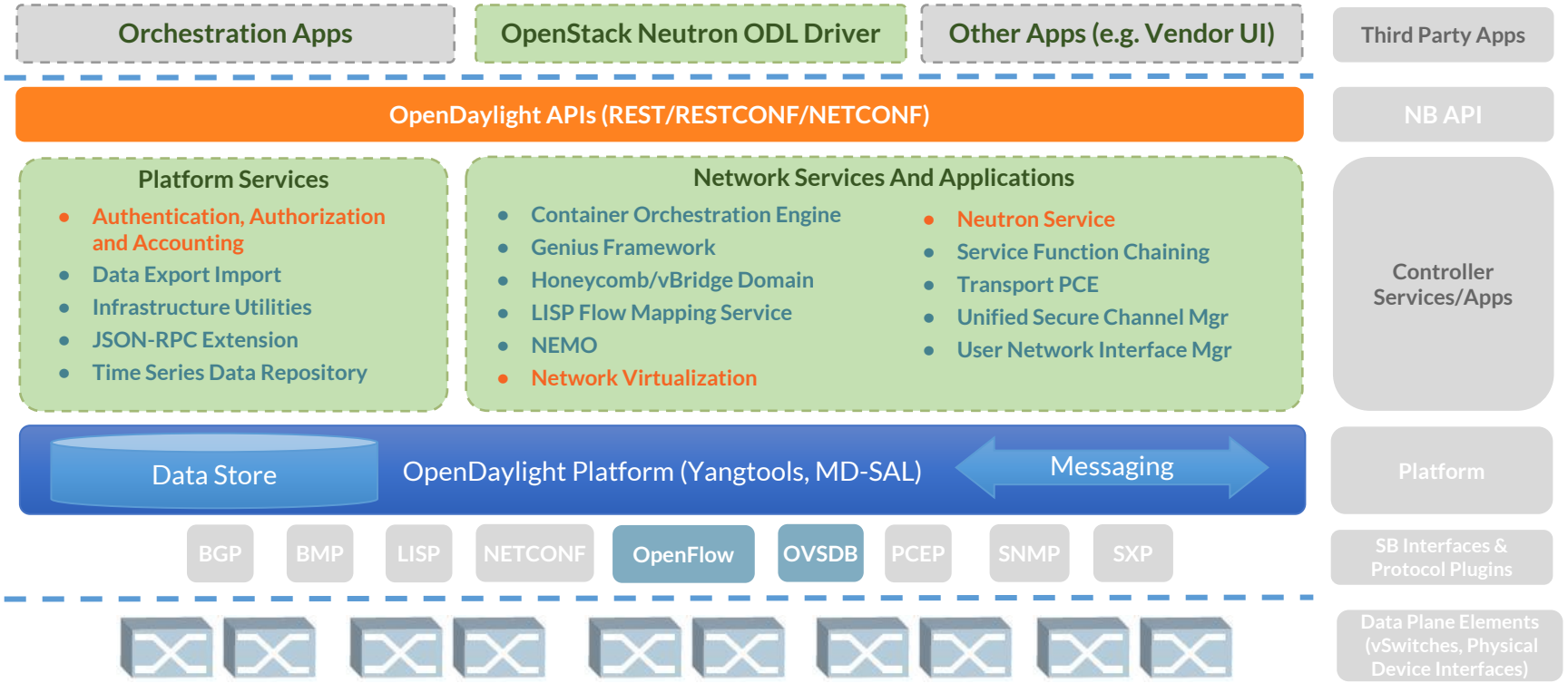
Try it out!



The OpenDaylight high level architecture



OpenDaylight Fluorine release



OpenStack OpenDaylight integration

Automated Service Delivery

In combination with ONAP/OPNFV, major global operators use OpenDaylight to control network connectivity at different layers (L1/L2/L3) in multi-domain environments (data center, access, core) and quickly and reliably turn up connectivity for clients using heterogeneous hardware, by leveraging ODL’s model based design.

Cloud and NFV

OpenDaylight is being used to enable the use of VNFs in the cloud to enable CORD (Central Office Re-architected as a Datacenter) and bring datacenter economics and cloud agility to the Telco Central Office.

Network Resources Optimization

One of the largest OpenDaylight powered network is owned by Tencent in China, who owns the QQ and WeChat messaging apps, totaling more than 500M active monthly users. They use ODL for traffic engineering, creating an SD-WAN solution that minimizes the use of expensive links.

Visibility and control

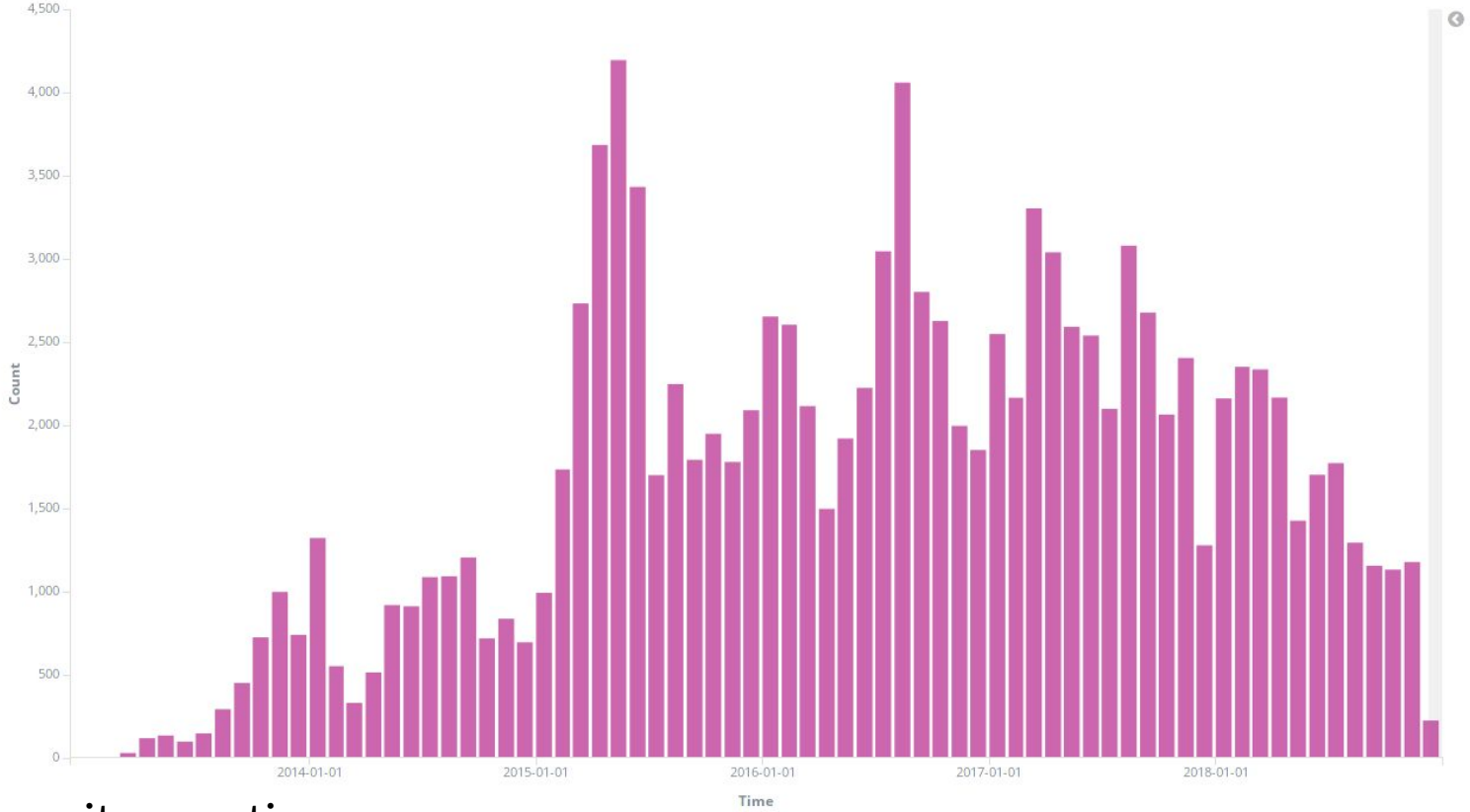
Telefónica I+D is experimenting with using ODL as a top level controller for more specialized controllers, creating a central point of visibility and control for the network.

“Code is the coin of the realm”


Releases
Naming comes from the periodic table of elements.
Six month cycle to align with other (mostly LFN) projects.

Over the last 6 years...

Source: opendaylight.biterg.io



Git commits over time

Tools used

Programming language: (mostly) Java

Runtime container: OSGi / Karaf

Build system: Maven

SCM / Code review: Git / Gerrit

CI / CD: Jenkins

Testing: Robot Framework (Python)

Governance

- Technical Steering Committee (TSC, weekly meetings)
  - Elected insuring representation of conflicting groups
  - Elects a chair person
- Project Technical Leads
  - Elected from among project committers
- Committers
  - Voted internally by projects, approved by TSC
- Board
  - Member companies + TSC representative

Resources

https://www.youtube.com/user/opendaylightproject

https://docs.opendaylight.org/

https://wiki.opendaylight.org/view/Main_Page