



OpenDaylight Update

November 2013

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Agenda

- Intro to Opendaylight
- Hydrogen Release
- Major Feature: Model Driven Service Abstraction Layer (SAL)
- Asks from Netconf and Yang

What is OpenDaylight

- An OpenSource Project to build an ecosystem of OpenSource SDN software
 - Multi-project
 - Multi-vendor



OpenDaylight Project Goals

- **Code:** To create a robust, extensible, open source code base that covers the major common components required to build an SDN solution
- **Acceptance:** To get broad industry acceptance amongst vendors and users
- **Community:** To have a thriving and growing technical community contributing to the code base, using the code in commercial products, and adding value above, below and around.

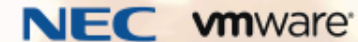


Broad Industry Support for OpenDaylight

Platinum Members



Gold Members



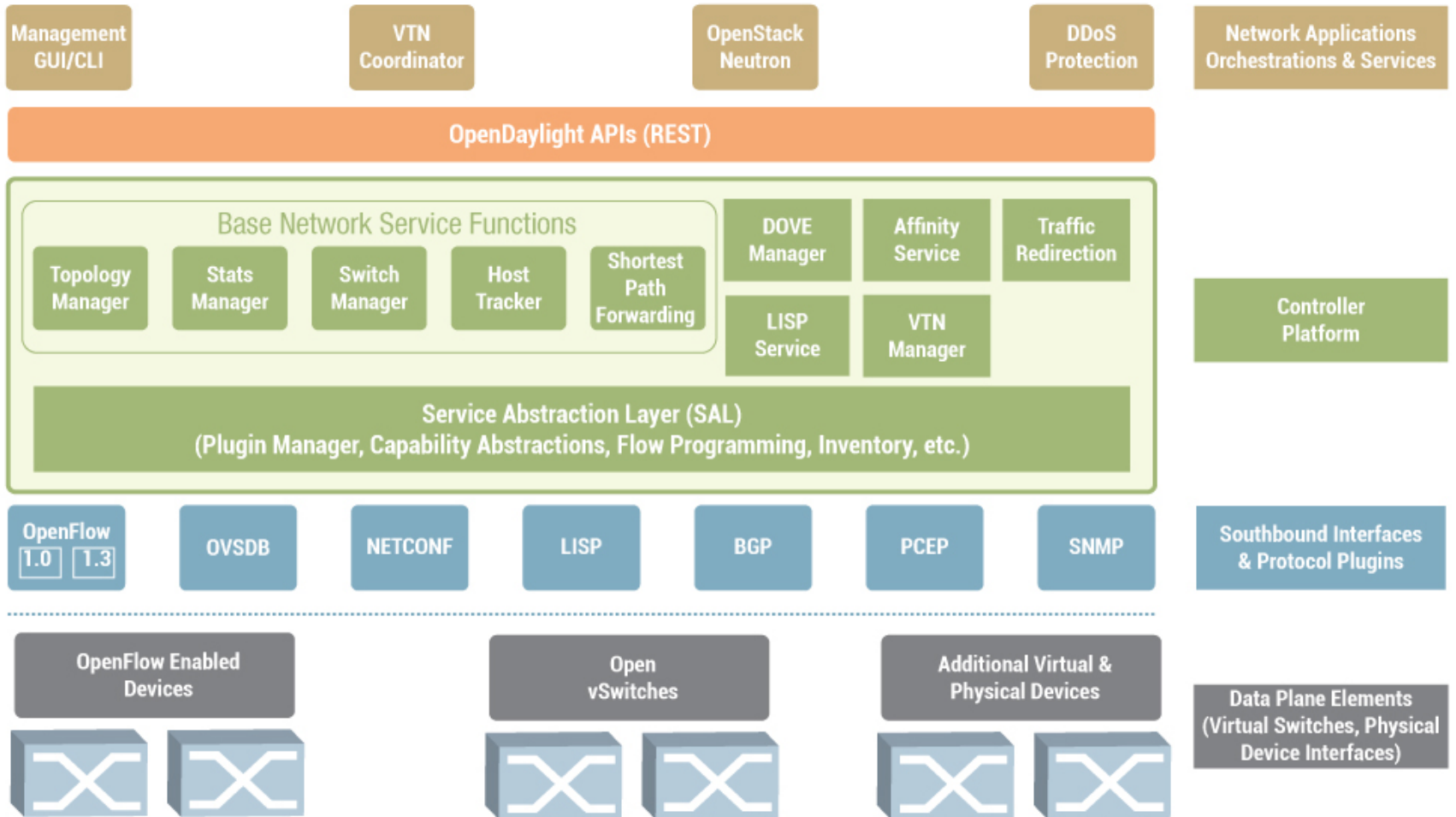
Silver Members





First Code Release "Hydrogen"

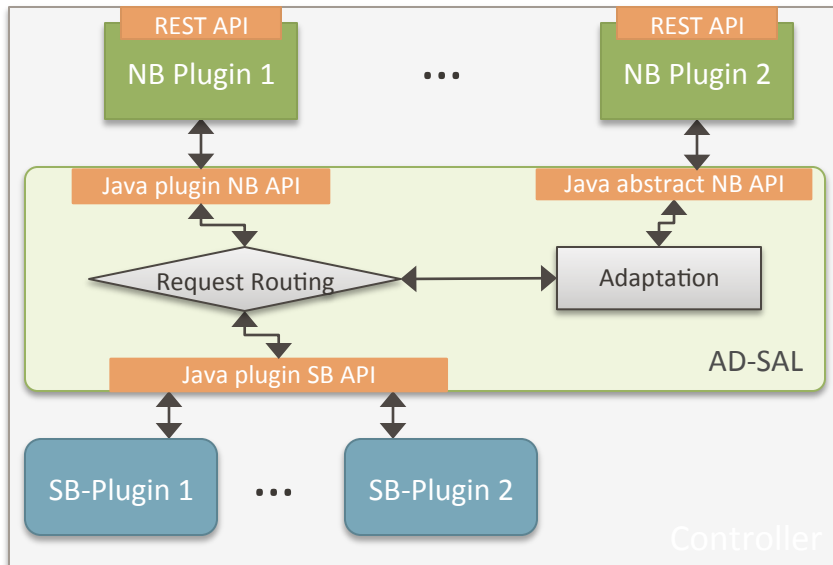
- VTN:** Virtual Tenant Network
- DOVE:** Distributed Overlay Virtual Ethernet
- DDoS:** Distributed Denial Of Service
- LISP:** Locator/Identifier Separation Protocol
- OVSDb:** Open vSwitch DataBase protocol
- BGP:** Border Gateway Protocol
- PCEP:** Path Computation Element Communication Protocol
- SNMP:** Simple Network Management Protocol



Projects in the “Hydrogen” Release

Project	Description	Originator (others)
Controller	Modular, extensible, scalable, and multi-protocol SDN controller based on OSGi	Cisco (IBM, RedHat, NEC, etc.)
Virtual Tenant Network	Multi-tenant network virtualization application using OpenFlow	NEC
YANG Tools	Java-based NETCONF and YANG tooling for OpenDaylight projects	Cisco
OpenFlow Protocol Library	OF 1.3 protocol library implementation	Pantheon (IBM, Cisco, Ericsson)
OpenFlow Plugin	Integration of OpenFlow protocol library in controller SAL	Ericsson, IBM, Cisco
Affinity Metadata Service	APIs to express workload relationships and service levels	Plexxi
Defense4All	DDoS detection and mitigation framework	Radware
BGP-LS/PCEP	Support for traffic engr with BGP-LS (BGP protocol library and topology model) and PCEP (path programming model)	Cisco
OVSDB	OVSDB configuration and management protocol support (e.g., for Open vSwitch and other OVSDB servers)	Univ. of Kentucky
LISP Flow Mapping	LISP (locator/identifier separation protocol) plugin, LISP mapping service (can be used to implement virtual networks)	ConteXtream
SNMP4SDN	SNMP protocol support; APIs to manage commodity Ethernet switches	Industrial Technology Research Inst.
Open DOVE	Multi-tenant network virtualization based on overlays, including ctrl plane and OVS-based data plane	IBM

Moving to Model-Driven SAL



SAL: Service Abstraction Layer

- AD-SAL: "API-Driven" SAL
- MD-SAL: "Model-Driven" SAL



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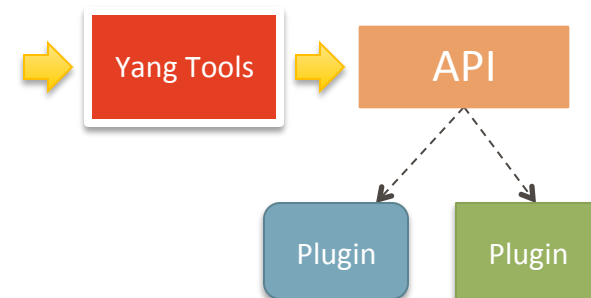
Module sal-flow {
  namespace "urn.opendaylight:flow:service";
  prefix flow;
  import yang-ext {prefix ext;}
  import opendaylight-inventory {prefix inv;}
  ...

  typedef flow-table-ref {
    type instance-identifier;
  }

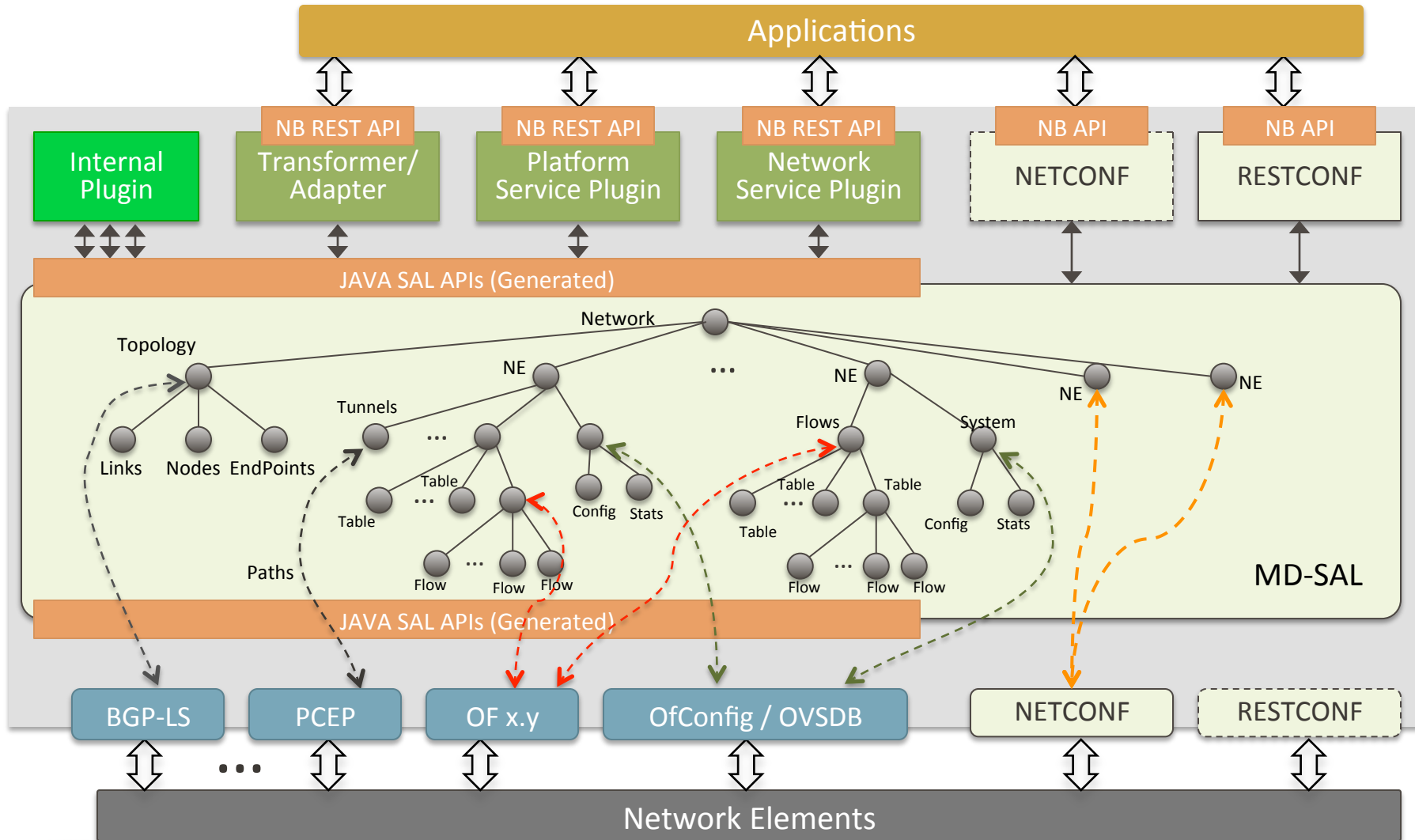
  grouping node-flow {
    leaf node {
      ext:context-reference "inv:node-context";
      type inv:node-ref;
    }
    leaf flow-table {
      type flow-table-ref;
    }
    uses types:flow;
  }

  rpc add-flow {
    input {
      uses node-flow;
    }
  }
  rpc update-flow { ... }
  ...
}
    
```

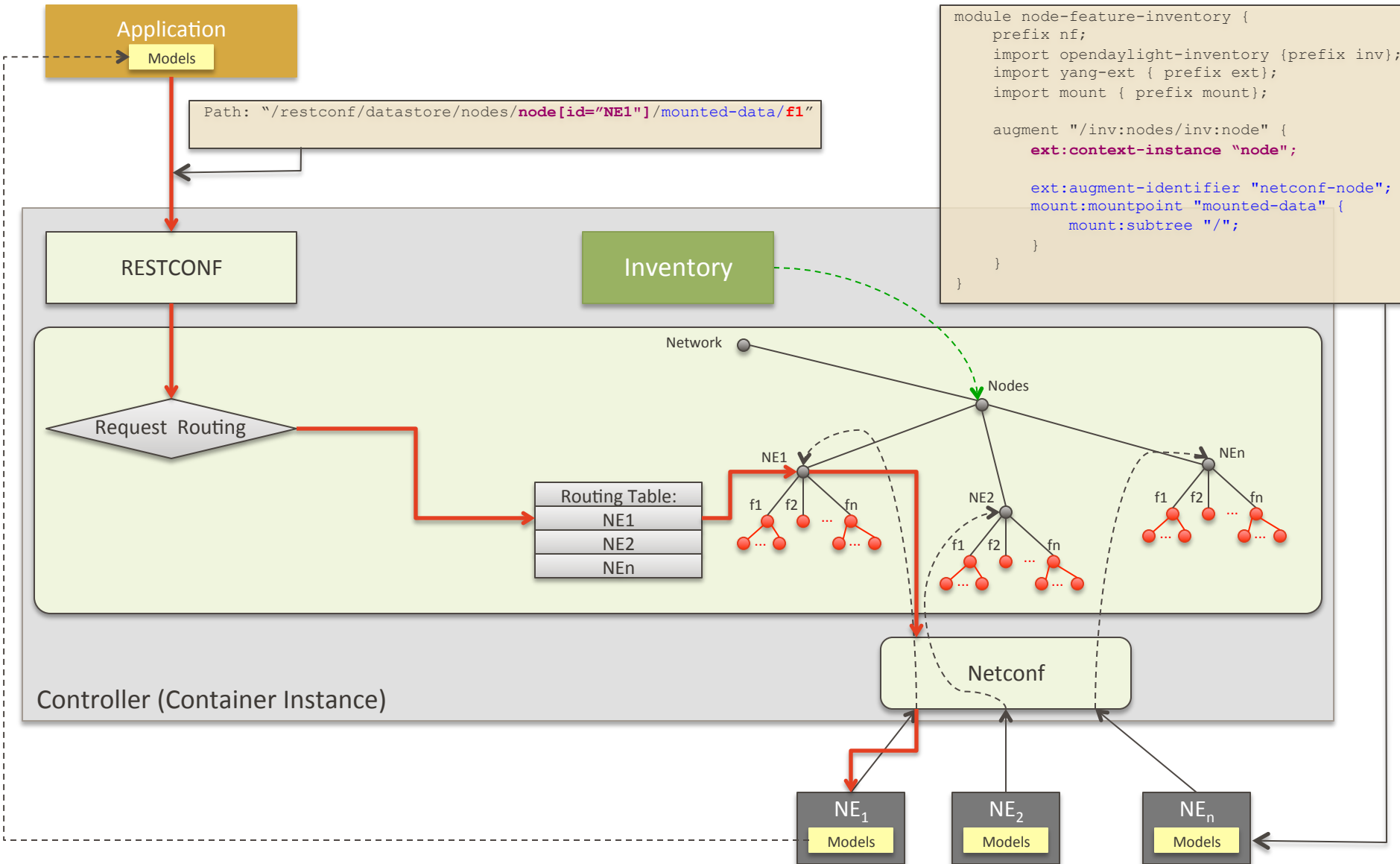
Model



Moving to Model-Driven SAL



Request Routing (App->NE)



Yang Models used in ODL

- Yang Extensions
- Common Base Types:
 - IETF (ietf-types, inet-types), Common base flow types, I2 types, IEEE754 floating point types
- Services:
 - Topology, Inventory, Flow Programming Services, Affinity Service
- Protocols:
 - OpenFlow, BGP/BGP-LS, PCEP

https://wiki.opendaylight.org/view/YANG_Tools:Available_Models

Standardization Asks

- Controller's NB API:
 - Address Space: the whole network as opposed to an NE
 - Policies (access, address space remaps, views, request routing)
- Application requirements:
 - I2RS (defining requirements)
- NETCONF:
 - RESTConf
 - Efficient binary encoding (e.g. draft-varga-netconf-exi-capability)
 - JSON encoding
 - Query language

Standardization Asks (Yang)


- Yang ODL extensions (e.g. request routing, Java API generation)
- Yang programming language bindings (Java, Python, ...)
- Standard Service Models:
 - Example: VPNs, DDoS, QoS, Topology, ...
- Standard Device Models:
 - Example: IP, ACL, RIB,
- WADL/RSDL for RESTCONF clients
- Yang as IDL



Thank you



Resources

- More information and to join:
 - wiki.opendaylight.org
- Keep informed and join the conversation
 - IRC: #opendaylight on Freenone
 - Open mailing lists: lists.opendaylight.org
 - [@openDaylightSDN](https://twitter.com/openDaylightSDN) 
 - #OpenDaylight

