# Multicast Information Model

**draft-zhang-mboned-multicast-info-model-01**

Mboned WG
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Sandy. Zhang
Linda. Wang
Stig. Venaas

# Why introduce Multicast Info Model?

✓ Existed multicast YANG models:


- These models describe different technologies for multicast;
- These models are distributed as separate file and focus on the protocol itself;
- They are device models;
- They cannot describe a high-level multicast information.

➢ Stand at a high level to take advantage of these models to control the multicast network to implement multicast service

# What is Multicast Info Model?

- Provide a human readability of the whole multicast network;
- Frame different components and correlate them;
- Based on the human readable UML Class Diagram, instantiate these classes through XML encoding or YANG model;
- Take full advantage of and depend on existed multicast YANG models;
- Open for future multicast technologies;

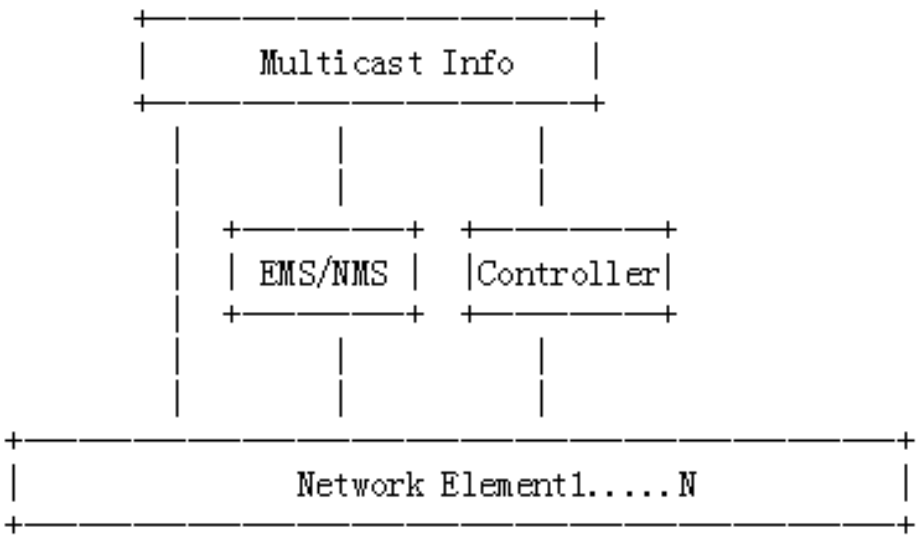
# Multicast Information Model 01 update

- Add the UML diagram in the draft that has been presented in Seoul meeting.
- Add example usage of this model such as debugging according to Stig's suggestion.
- Revise the model YANG program.

- This model has been verified in ODL BIER project. The project will be released in Carbon version.
- This model is feasible and practicable.

# Multicast Information Model 01 update

- Example usage of Multicast Model




- Network operators can input this model to a controller who is responsible to translate the information and invoke the corresponding protocol models into configurations to configure the network elements through NETCONF/RESTCONF/…
- Network operators can input this model to the EMS/NMS to manage the network elements or configure the network elements directly.
- When the network elements detect failure or some other changes, the network operators can collect these kind of notifications through this model to assist locating the exact failure and reacting immediately.


- http://www.opendaylight.org/

- OpenDaylight is a highly available, modular, extensible, scalable and multi-protocol controller infrastructure built for SDN deployments on modern heterogeneous multi-vendor networks. OpenDaylight provides a model-driven service abstraction platform that allows users to write apps that easily work across a wide variety of hardware and south-bound protocols.

- ODL employs a model-driven approach to describe the network, the functions to be performed on it and the resulting state or status achieved.

- By sharing YANG data structures in a common data store and messaging infrastructure, OpenDaylight allows for fine-grained services to be created then combined together to solve more complex problems. In the ODL Model Driven Service Abstraction Layer (MD-SAL), any app or function can be bundled into a service that is then then loaded into the controller. Services can be configured and chained together in any number of ways to match fluctuating needs within the network.

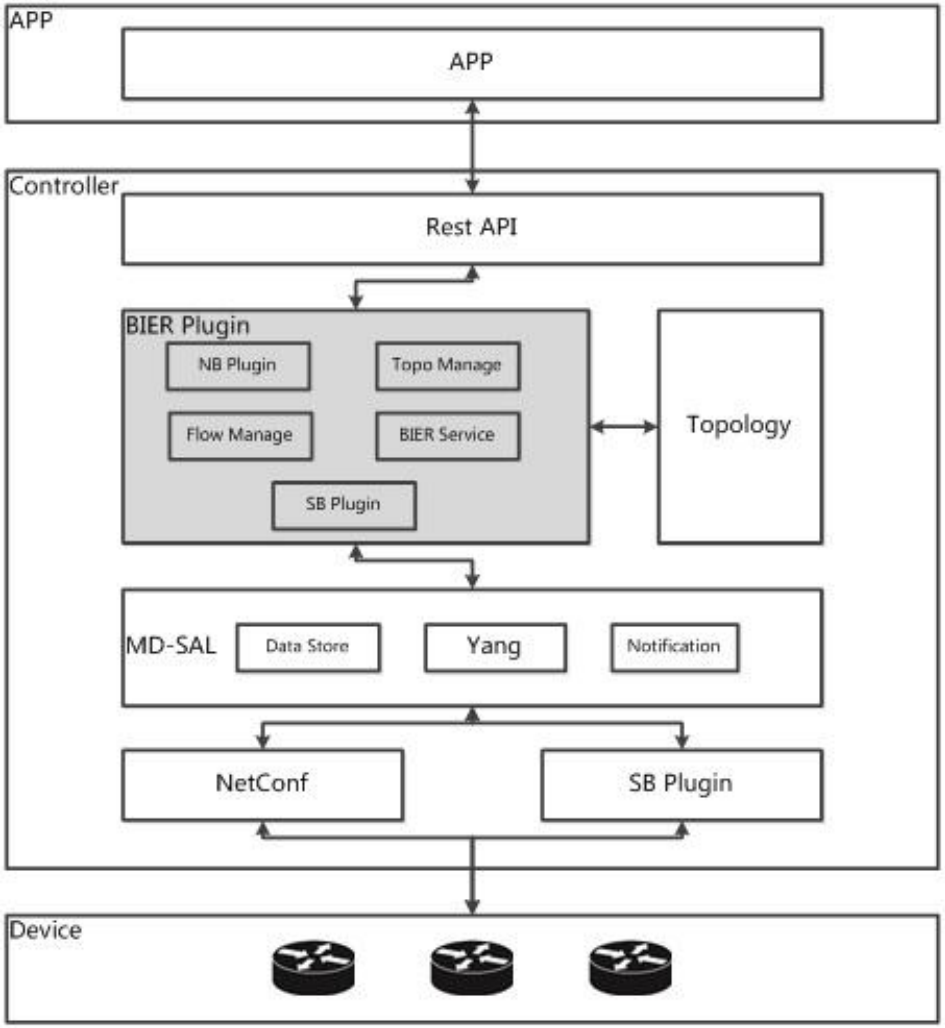
# BIER project in ODL

https://wiki.opendaylight.org/view/BIER:Main

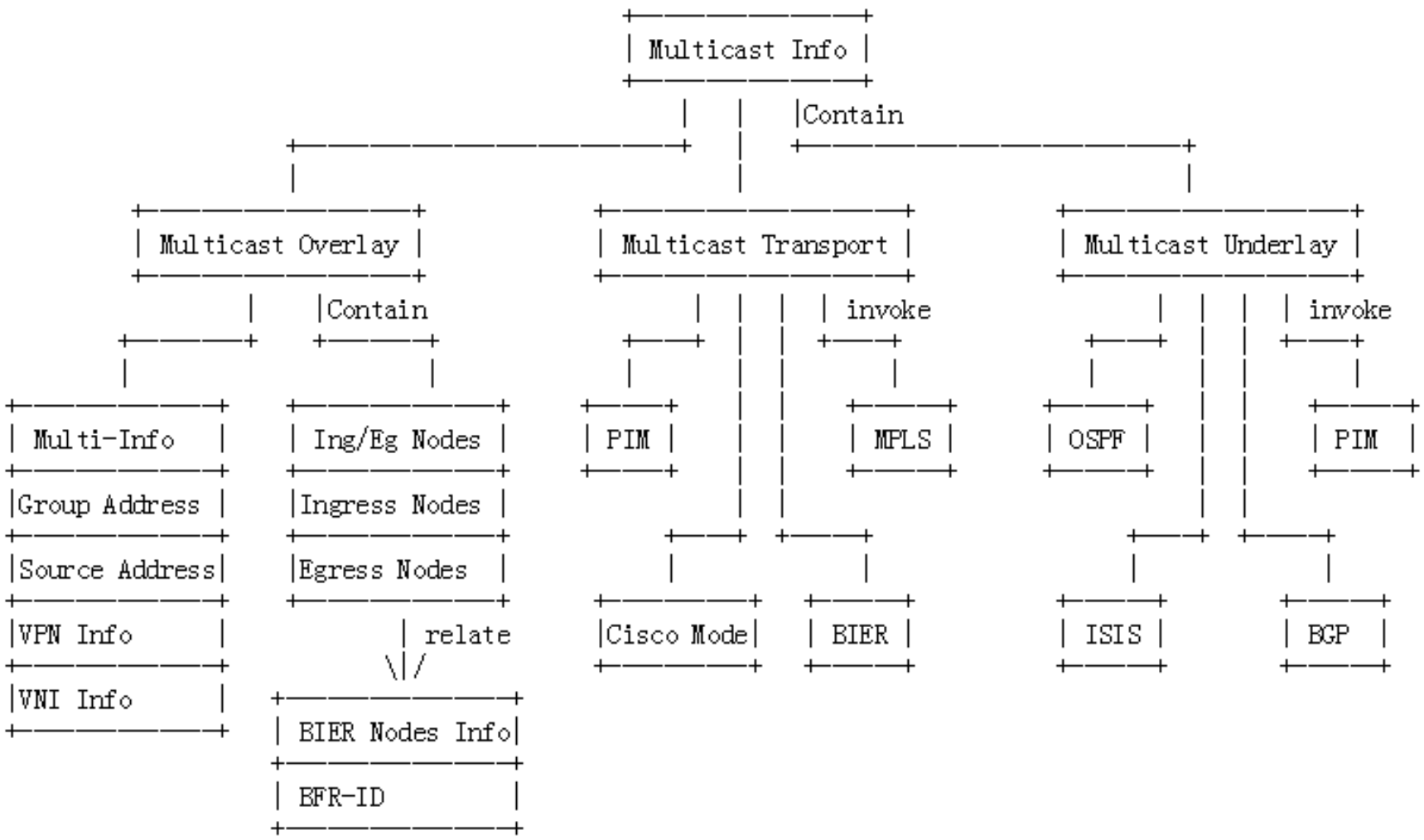
The BIER project is driven by two YANG models:

**Multicast Information Model**
draft-zhang-mboned-multicast-info-model-01

**YANG Data Model for BIER Protocol**
draft-ietf-bier-bier-yang-01



# Multicast UML Class Diagram



# Multicast Data Model Overview

module: ietf-multicast-information

+--rw multicast-information

+--rw multicast-info

……

+--rw multicast-overlay

……

+--rw multicast-transport

……

+--rw multicast-underlay

……

Divide the multicast data model into three layers as well.

# Multicast Data Model - Information

+--rw multicast-info* [vpn-id source-address source-wildcard group-address group-wildcard vni-type vni-value]

- +--rw vpn-id uint32
- +--rw source-address inet:ip-address
- +--rw source-wildcard uint8
- +--rw group-address inet:ip-address
- +--rw group-wildcard uint8
- +--rw vni-type virtual-type
- +--rw vni-value uint32

**Multicast info:**

- ✓ Basic multicast flow information;
- ✓ Key of the multicast service.

# Multicast Data Model - Overlay

```
+--rw multicast-overlay
 |  +--rw nodes-information
 |  |  +--rw ingress-node?   inet:ip-address
 |  |  +--rw egress-nodes* [number]
 |  |     +--rw number        uint32
 |  |     +--rw egress-node?   inet:ip-address
 |  +--rw bier-information
 |  |  +--rw sub-domain?     sub-domain-id
 |  |  +--rw ingress-node?   bfr-id
 |  |  +--rw egress-nodes* [number]
 |  |     +--rw number        uint32
 |  |     +--rw egress-node?   bfr-id
 |  +--rw overlay-technology
 |     +--rw (overlay-tech-type)?
 |        +--:(mld)
 |        +--:(mvpn)
```

**Overlay layer includes:**

- ✓ Ingress/egress nodes information;
- ✓ Overlay technology.

# Multicast Data Model - Transport

```
+--rw multicast-transport
  +--rw bier
  |  +--rw sub-domain?       sub-domain-id
  |  +--rw (encap-type)?
  |  |  +--:(mpls)
  |  |  +--:(non-mpls)
  |  |  +--:(ipv6)
  |  +--rw bitstringlength?   uint16
  |  +--rw set-identifier?    si
  |  +--rw ecmp?              boolean
  |  +--rw frr?               boolean
  +--rw cisco-mode
  |  +--rw p-group?           inet:ip-address
  |  +--rw graceful-restart?  boolean
  |  +--rw bfd?               boolean
  +--rw mpls
  |  +--rw (mpls-tunnel-type)?
  |     +--:(mldp)
  |     |  +--rw mldp-tunnel-id?      uint32
  |     |  +--rw mldp-frr?            boolean
  |     |  +--rw mldp-backup-tunnel?  boolean
  |     +--:(p2mp-te)
  |        +--rw te-tunnel-id?       uint32
  |        +--rw te-frr?             boolean
  |        +--rw te-backup-tunnel?   boolean
  +--rw pim
     +--rw graceful-restart?  boolean
     +--rw bfd?               boolean
```

**Transport layer includes:**

- ✓ Transport technology type
- ✓ Corresponding individual YANG models

# Multicast Data Model - Underlay

```
+--rw multicast-underlay
  +--rw underlay-requirement?   boolean
  +--rw bgp
  +--rw ospf
  |  +--rw topology-id?   uint16
  +--rw isis
  |  +--rw topology-id?   uint16
  +--rw babel
  +--rw pim
```

**Underlay layer includes:**

- ✓ Underlay technology type
- ✓ Corresponding individual YANG models

# Next Steps

- Any comments ☺
- WG adoption?