High Scalability Solution using ODL

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Luis Gomez, Atul Gosain & Tejas Nevrekar,
Lumina Networks

Agenda

- Current ODL Scale
- Netconf Use Case Study
- OpenFlow Use Case Study
- Next Steps in ODL

Current ODL Scale Options

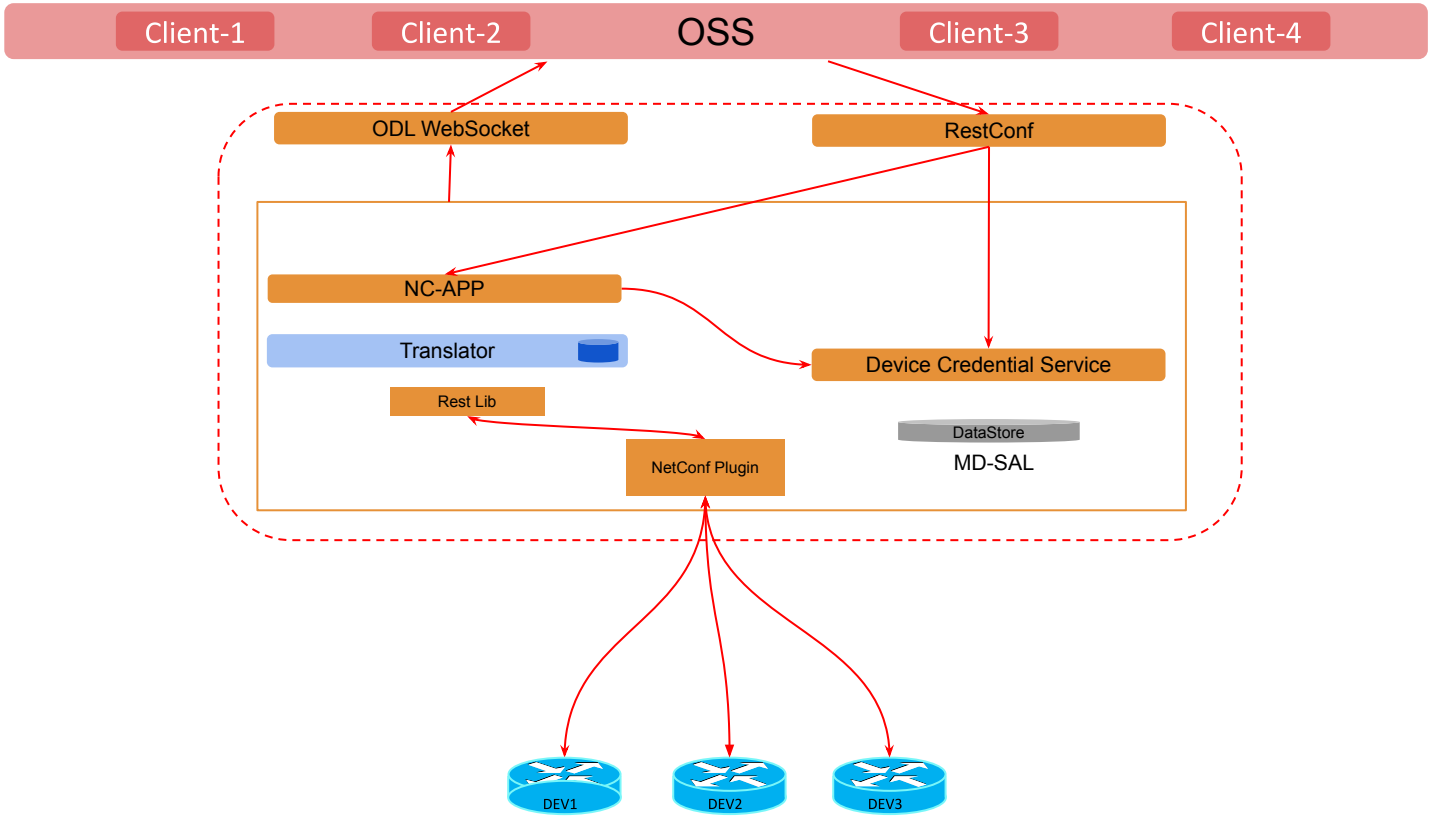
- Vertical Scaling
  - Increase the amount of resources (CPU, heap-size) available to Controller
  - Difficult to scale beyond a certain limit
  - Downsides associated with large instance - GC pause, disk I/O saturation

- Clustering / Singleton Service
  - More than one Controller instances working in tandem
  - More of a High-Availability solution than a scaling solution
  - Performance impacted due to associated overheads ex. state replication

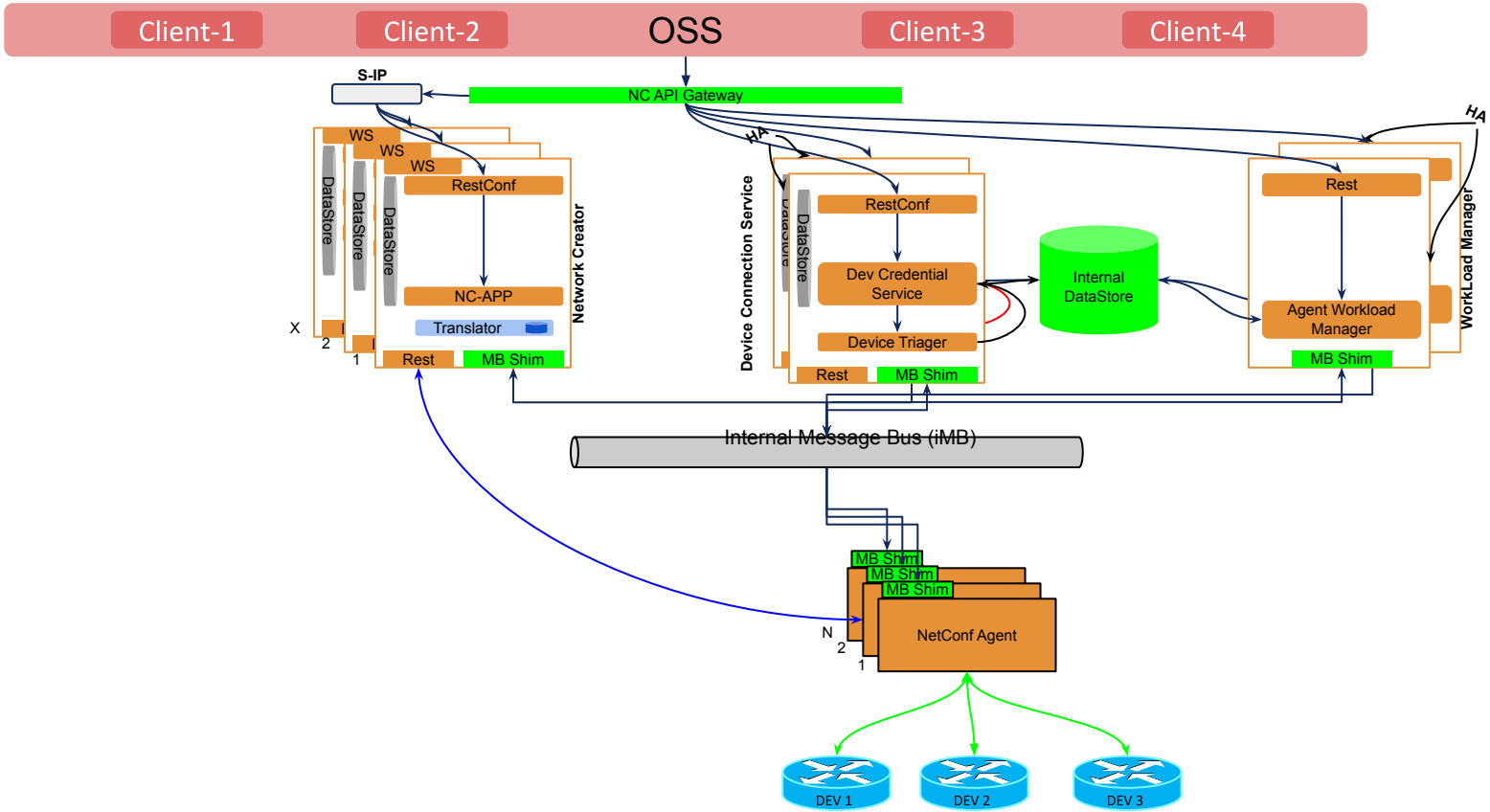
NETCONF Application Case Study

- We consider a scenario of a non-clustered Netconf application
- The NETCONF application has the following components:
  - A Network Creation (NC) application exposing an standard device yang model (e.g. openconfig) via RESTCONF.
  - A Translator service to perform model schema translation: standard <-> vendor specific model.
  - A Device Credential Service to store device connection information.
  - A REST library to send RESTCONF request to device.
  - ODL NETCONF plugin.

NETCONF application on single node



NETCONF application scaled out



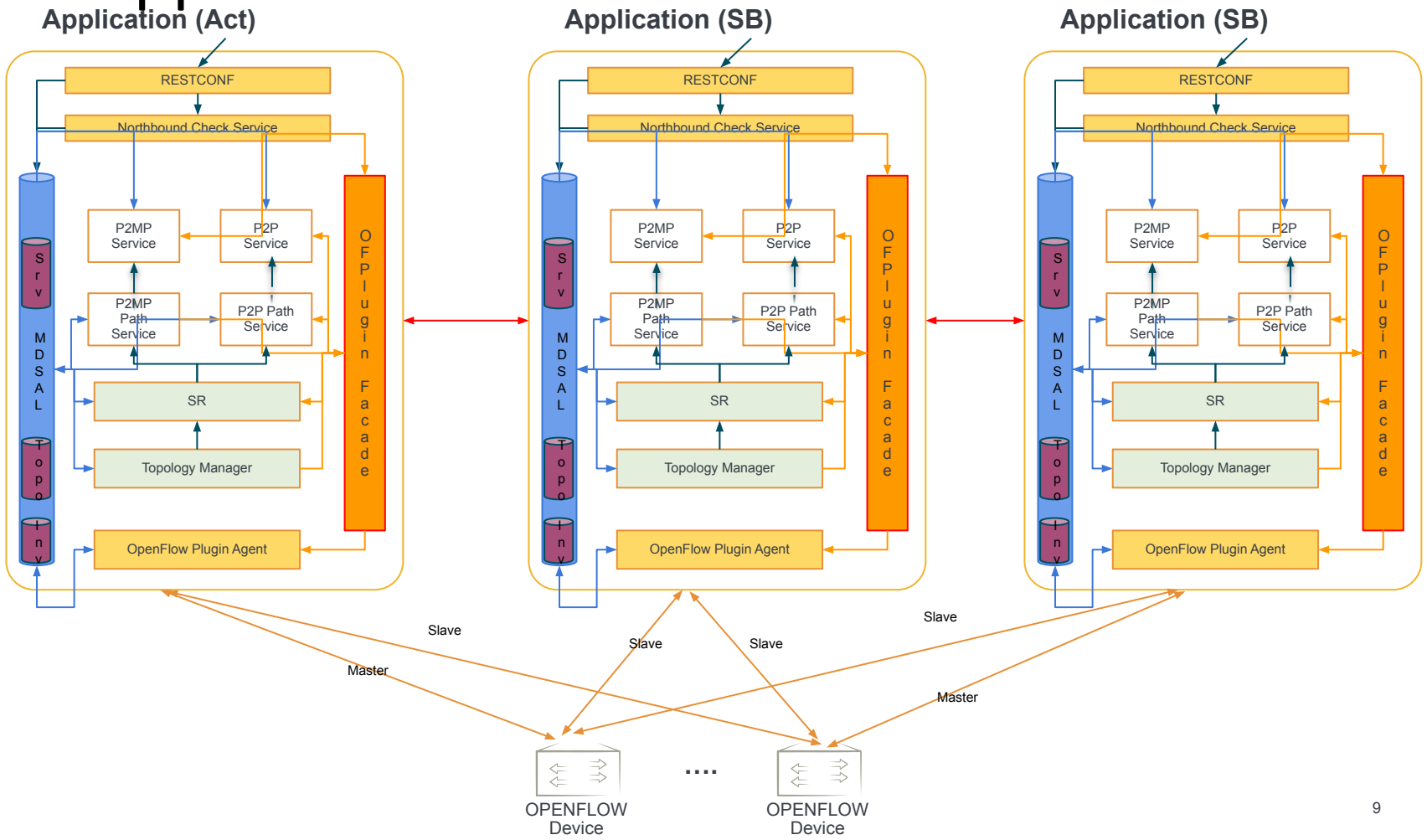
Steps to Scale out

- Split the monolithic into micro-services
- Horizontally Scale the Device agent
- Use Message Bus for inter-module communication
- Introduce Agent Workload Manager (AWM) and the Device Triager Service to automatic distribute NETCONF connections
- Horizontally Scale Service Apps and Introduce API Gateway

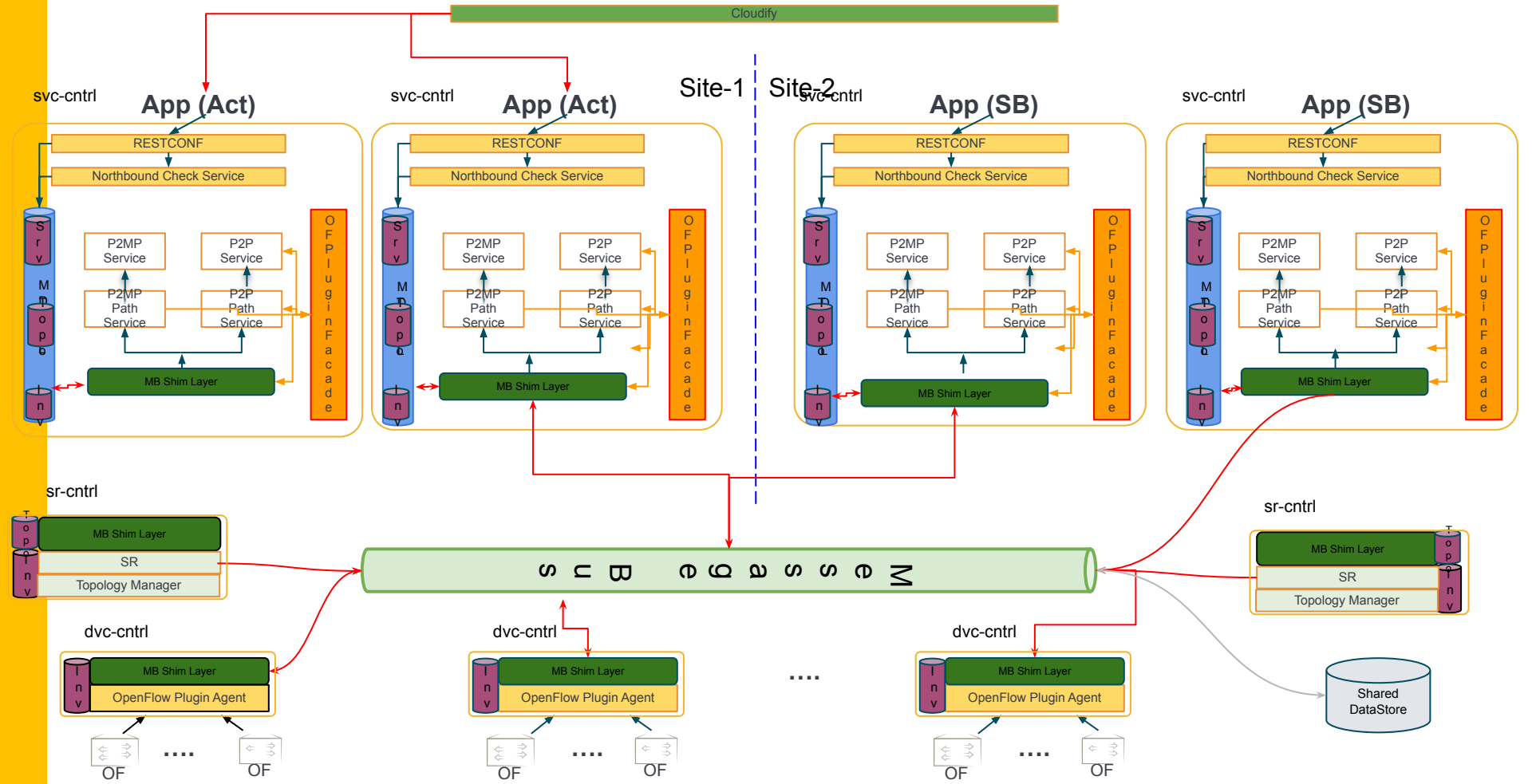
OpenFlow Application Case Study

- We consider a scenario of a cluster-aware OF application
- It is currently deployed as a 3-node clustered application and a singleton to make a single application instance as the master
- The application has the following components:
  - Point to Point transport service
  - Point to Multipoint transport service
  - Point to Point path service
  - Point to Multipoint path service
  - SR service to provide MPLS-SR OF programming
  - Topology Manager maintaining a desired and actual topology
  - The ODL OpenFlow plugin

OF application on 3-node cluster



Case 1: OF application scaled out



Steps to Scale out

- Move to active/standby set up
- Use Message Bus for inter-module communication
- Separate OF controller from the service controller
- Horizontal scale OF plugin agents
- Further divide the service controller into a SR+topology and the rest of the services

Next Steps in ODL

- Create nimble distributions of ODL e.g. NETCONF, OF that can run in its own container
- Upstream the Agent Workload Manager and Device Triager that are required for such scale out
- Use JSON-RPC as the Message Bus SHIM

Thanks