A Walk through Ciena’s experience with Trellis

CORD Build 2017
Background

Started with investment with ODL

Shifted investment to ONOS 2015

Focused on CORD 2016

- Automation of physical POD build out
- Compute node network configuration
Dynamic network sizing

One of the most interesting technologies or CORD

Resourcing not reflective of importance

Does CORD need a fabric abstraction?
Infancy

Manual configuration

No dynamic updates

Frequent fix was complete restart
Container based service to generate configuration

- Queried ONOS for information on hosts, ports, devices
- Generated a configuration that could be pushed to ONOS

Did not address inability of SR to process dynamic updates

Required hosts to ping ONOS before generation

Solution is Complex

- It is not just the SR configuration
- Default gateway when there is both data and control networks
- https://github.com/opencord/cord/blob/master/docs/appendix_basic_config.md
Configuration generator not really used

- Prerequisites were an issue
- Not kept up to date with Trellis changes
- Often used to hand generate initial configuration followed by hand editing

Troubleshooting difficult

- Restarting sometimes fixes things
- Walking flow tables in ONOS
- Can’t be sure if it is OFDPA, ONOS, phase of the moon
- Configuration works on Monday not on Wednesday
- @charles a big help!
Better Integration with XOS
- XOS use of configuration generator

Host subnet configuration (Where is DHCP Relay?)
- Container to allocate fabric address to compute hosts in CORD, deeply flawed

More Configuration Changes
- Keeping configuration generator up to date

Stability still a Hit and Miss
Mostly ignored SR
- Got it working
- Fixed it when it broke

Rinse and Repeat
- Kill and reset ofdpa on leaf1, leaf2, spine1, spine2
- app deactivate org.onosproject.segmentrouting
- wipeout please
- POST network-cfg.json (thanks curl)
- app activate org.onosproject.segmentrouting
- Start OFDPA and connect (leaf1, leaf2, spine1, spine2) to ONOS
- Repeat on failure
Goal is to Demonstrate Fully HA POD

- Customer (behind OLT) to Internet
- Fabric (+ Connection to Internet)
- Physical hosts
- Network switches and OLT/ONU
- Container orchestration (k8s)
- NFVs
  - vSG
  - Spanneti
  - ONOS

Would like to use fabric for control and data traffic
Trellis under a Container Management System (k8s)
- Experimenting with reactive network programming as part of container brigade
- Network configuration generated and hand edited
- 2 x Leaf Switches, 2 x Spine Switches
- 3 Compute nodes behind each switch
- 1 OLT/ONU

Single ONOS Instance (1.10.9)
- ONOS as a Service (VIP)
- Single ONOS instance behind service (currently)
- ONOS can run on any compute node
In Support of Fabric

● ONOS auto starts as service with single instance

● `ofconnect` service on switches to auto connect to ONOS

● Configuration Push Container
  ○ Periodically poll ONOS for network configuration
  ○ Reconcile and Update
  ○ Static network means no dynamic updates

● Compute node network configuration fixed
  ○ IP addressing
  ○ Static cross-fabric routes
Still Experiencing Stability Issues
● Fabric stopped working 2 weeks ago, unexplained
● Tried restart procedure (several times) no joy

Need to dump troubleshooting data
● Flows, devices, hosts, etc.
● @charles is not a scalable solution

Frustration
● When it works, life is good
● When it doesn’t work, can be hard / unexplainable how to fix it
● It “should” just work
Looking Toward the Future

DHCP
- Currently compute node IP addresses are statically assigned
- Move to DHCP using DHCP relay based on leaf subnet
- Existing in current Trellis, needs to be tested

XOS (orchestration really)
- Allocate a subnet to a leaf when it comes on line
- Update DHCP server, SR config, accordingly
- Should a new switch / compute node be governed (orchestrated) as a XOS service?
Trellis represents and import network capability

Maturing over time, but not ready for production
- Combination of hardware, software, configuration, and controller issues

Need more effective troubleshooting tools
- Packet traces through ONOS flows

Configuration should be mostly automated
- Some debate on this (intentional v. discovered)
- Security issues
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