On and off Premise Solution Validation on CORD

QCT (Quanta Cloud Technology)

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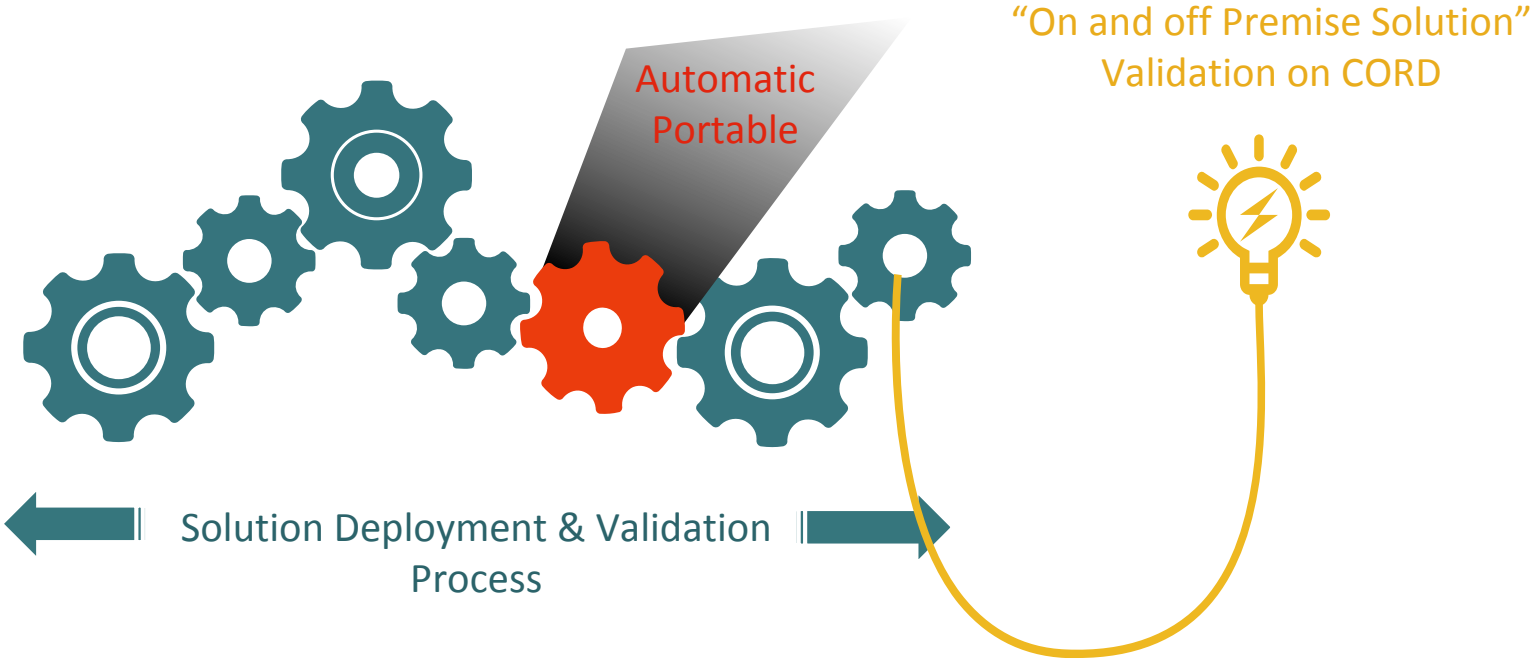
Motivation

- From the hardware perspective
  - Hardware from different vendors may not compatible with each other
  - Heterogeneous hardware will also increase the development effort

- From the software perspective
  - Deployment of CORD took a lot of time
  - New commit may affect the existing hardware

Our Goal Begins From



QCT's value add-on in CORD Platform

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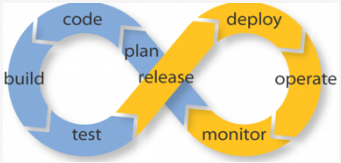
QCT
Service Assurance

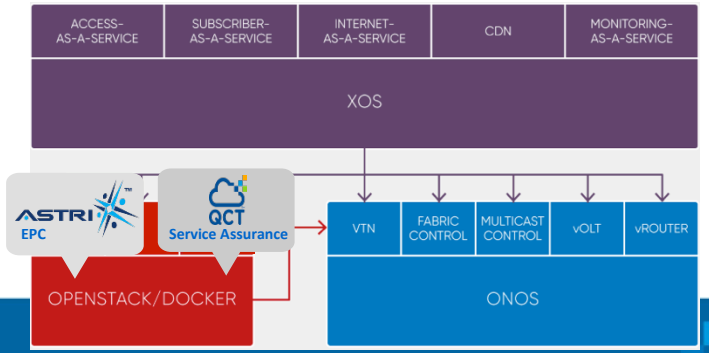
ASTRI™
EPC



1. QCT Service Assurance VNF On-boarding;
2. Monitoring as as Service (MaaS)

1. EPC VNF On-boarding.

1. On & Off Premise CICD service;
2. CORD 6.0 auto-deployment;
3. System Validation.

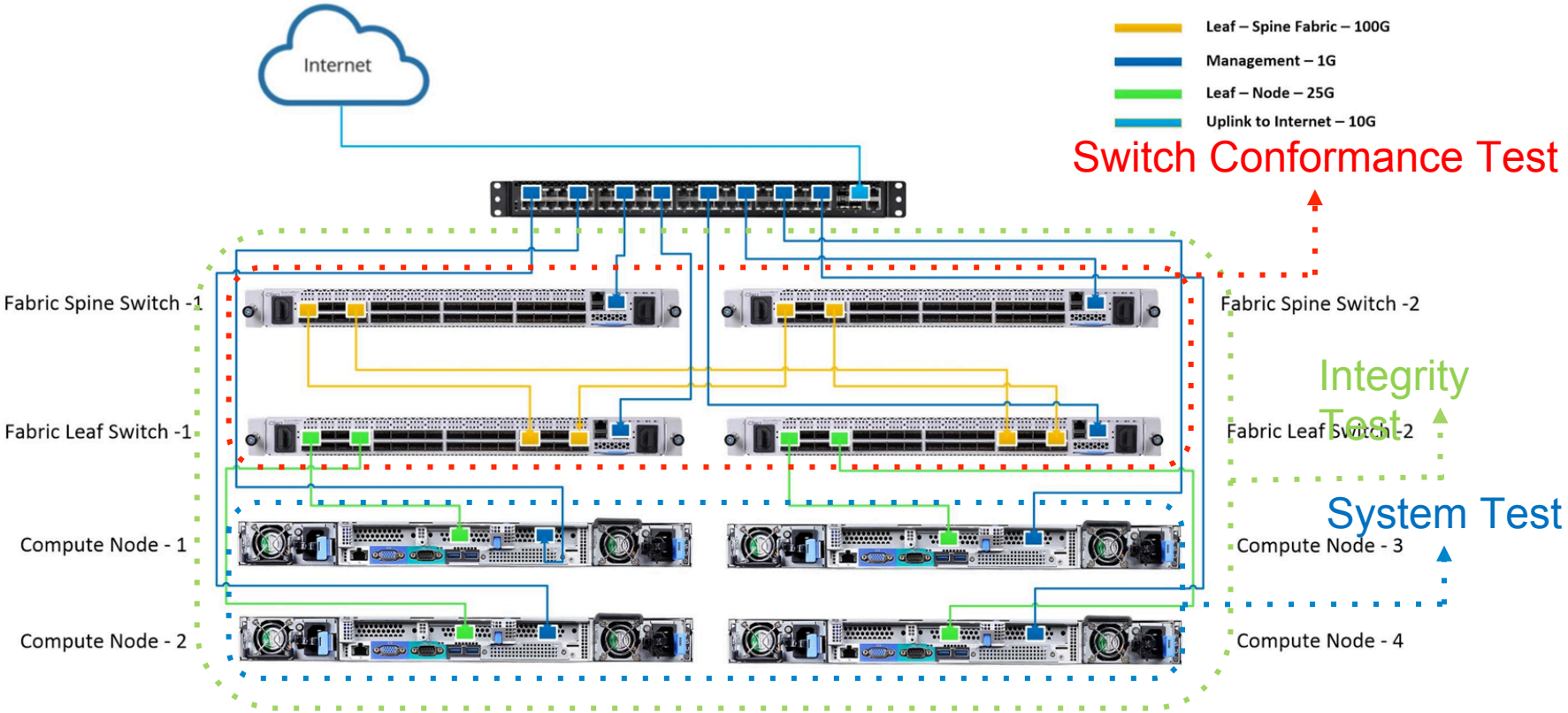


Why It Matters?

- “On and off Premise Solution Validation”

- Keep deployment up to date
  - Make sure the hardware is always compliant with latest code
- Manual works are not possible for daily deployment
  - Take a lot of time when we do the deployment each time
- Customer-side validation
  - Conformance test on customer-side
  - Portability is required
- Easily accelerate the partnership collaboration

QCT CORD Ready Pod Reference Architecture



QCT IX1 100G Switch Integration for CORD Fabric

- Base on M-CORD 6.0 to integrate our switch
  - Fabric service is not deployed by default
  - There is only one ONOS deployed for controlling OVS
    - VTN service

- In order to integrate QCT IX1 100G switch into M-CORD 6.0
  - Switch Certification Testing Process
  - Change TOSCA files in helm services
    - Include Fabric service
    - Change apps deployed on ONOS service (VTN)

- Allow Fabric service to be deployed with CORD

Switch Certification Testing Process

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Fabric Oftest

Conformance test with QCT IX1 100G switch

ONOS /Segment Routing Integration Tests

Connect 4 IX1 100G switches as leaf-spine architecture

QCT CORD POD Auto-Deployment

Integrate IX1 into QCT CORD Pod

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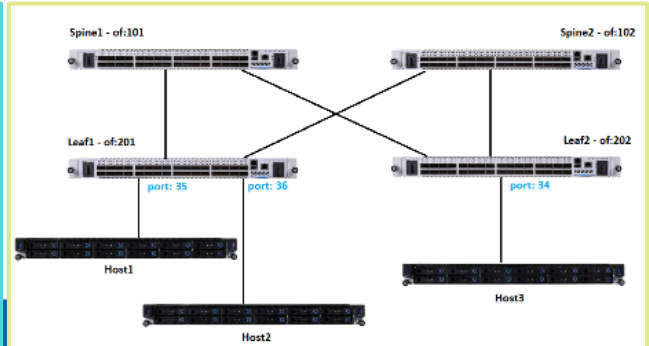
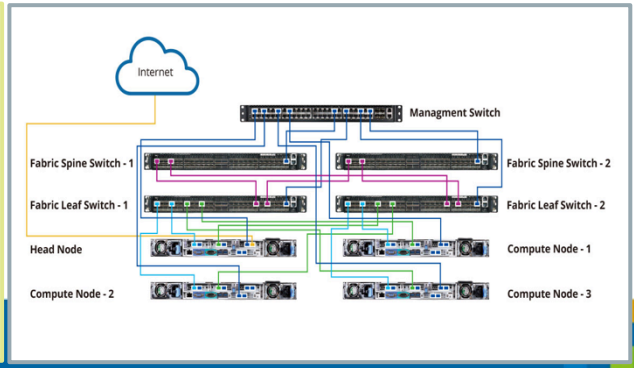


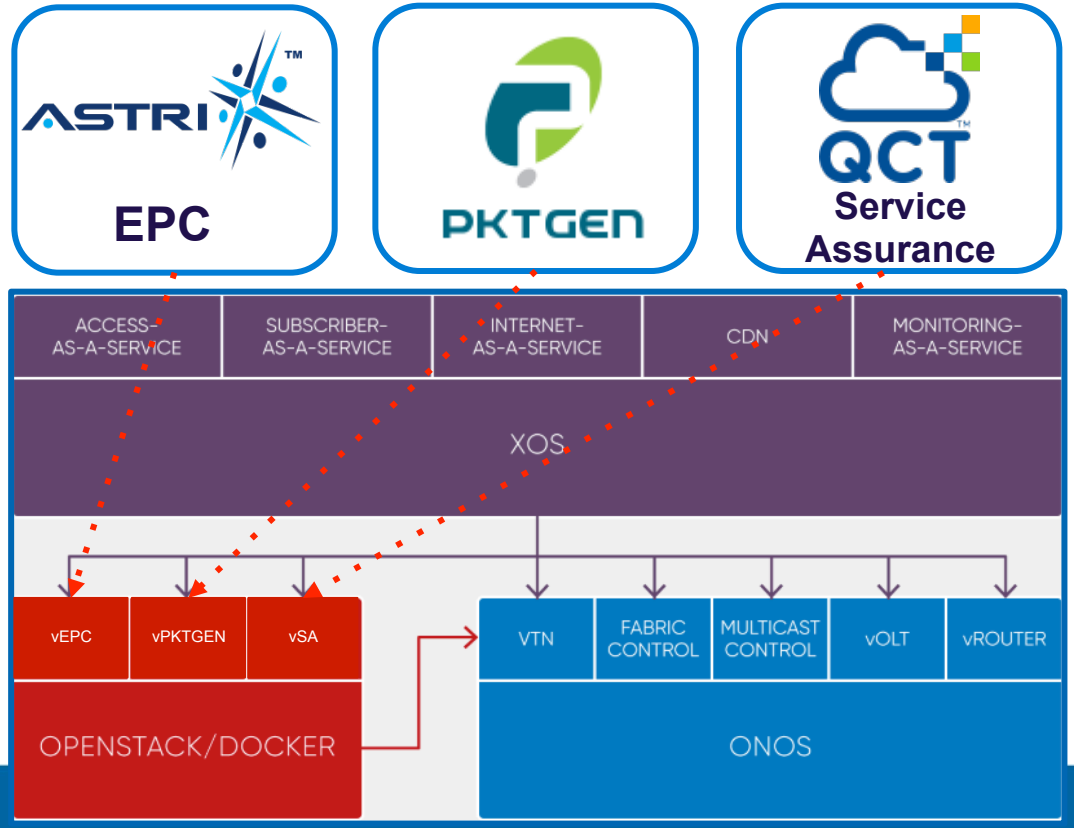


CORD-Tester Test Cases for System Test

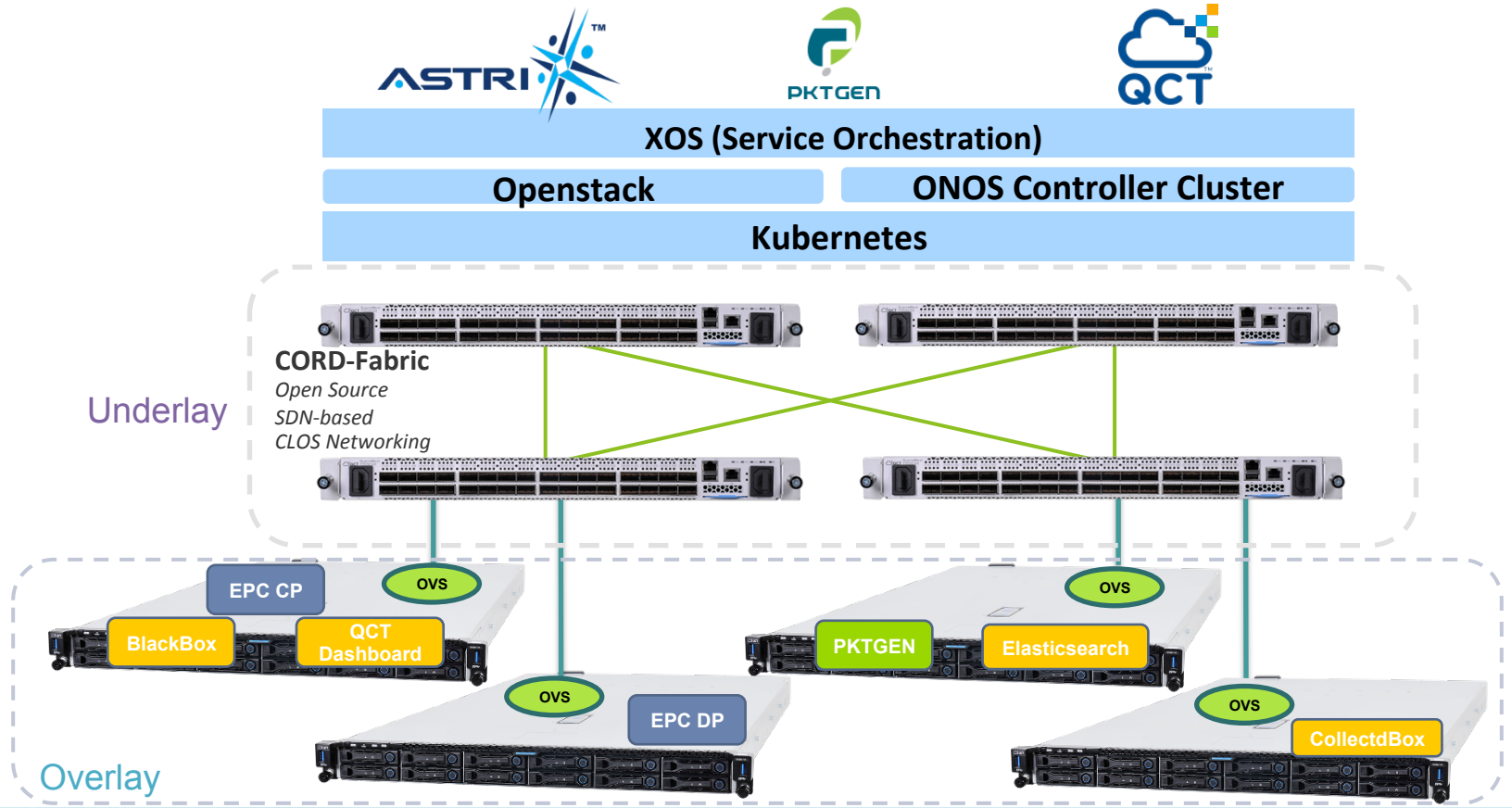
- Extensible end-to-end system test suite targeting CORD POD
- Currently our system test cases include:
  - **Post Installation Tests**
  - **XOS Based Tests**

On-board VNFs (EPC, PKTGEN, SA)

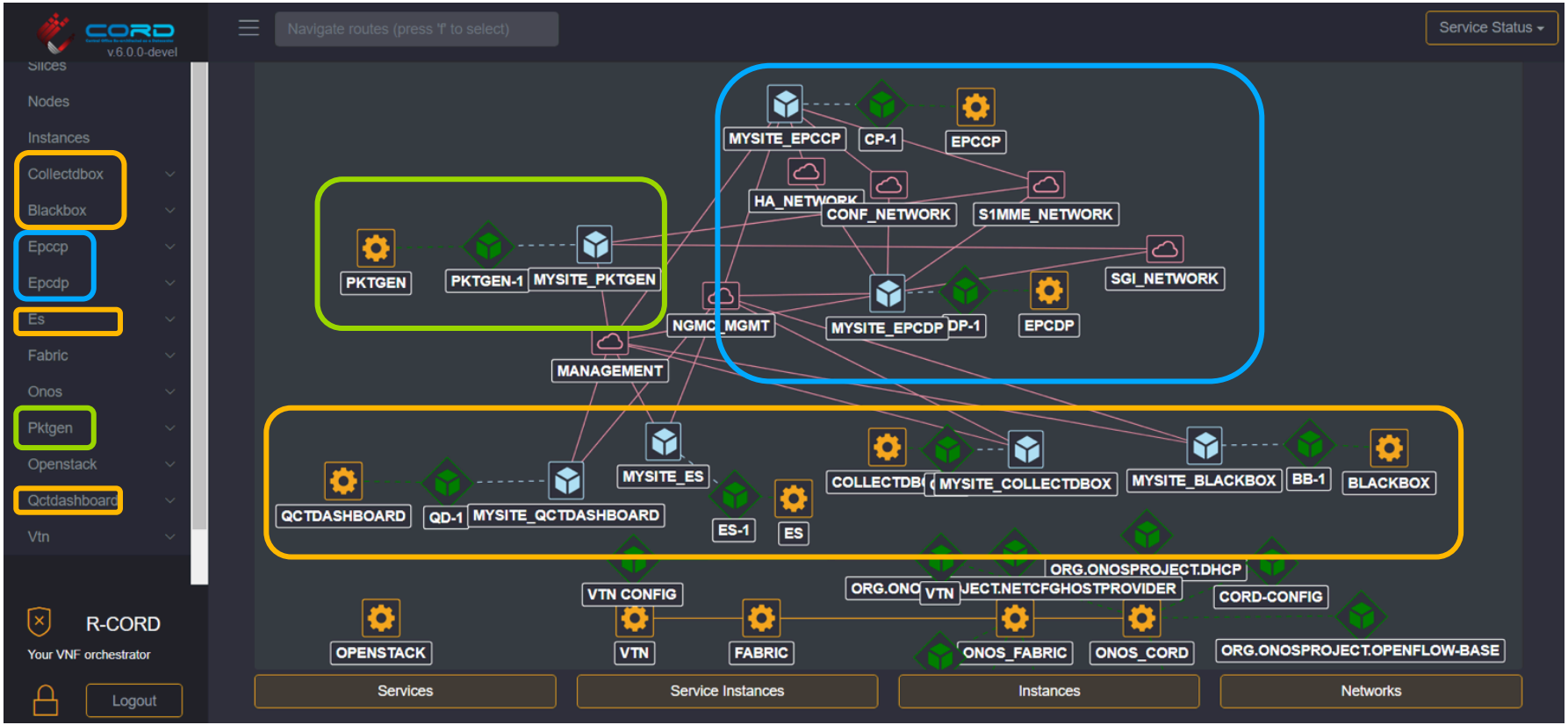
- to Validate the Integrity of QCT CORD Ready Pod



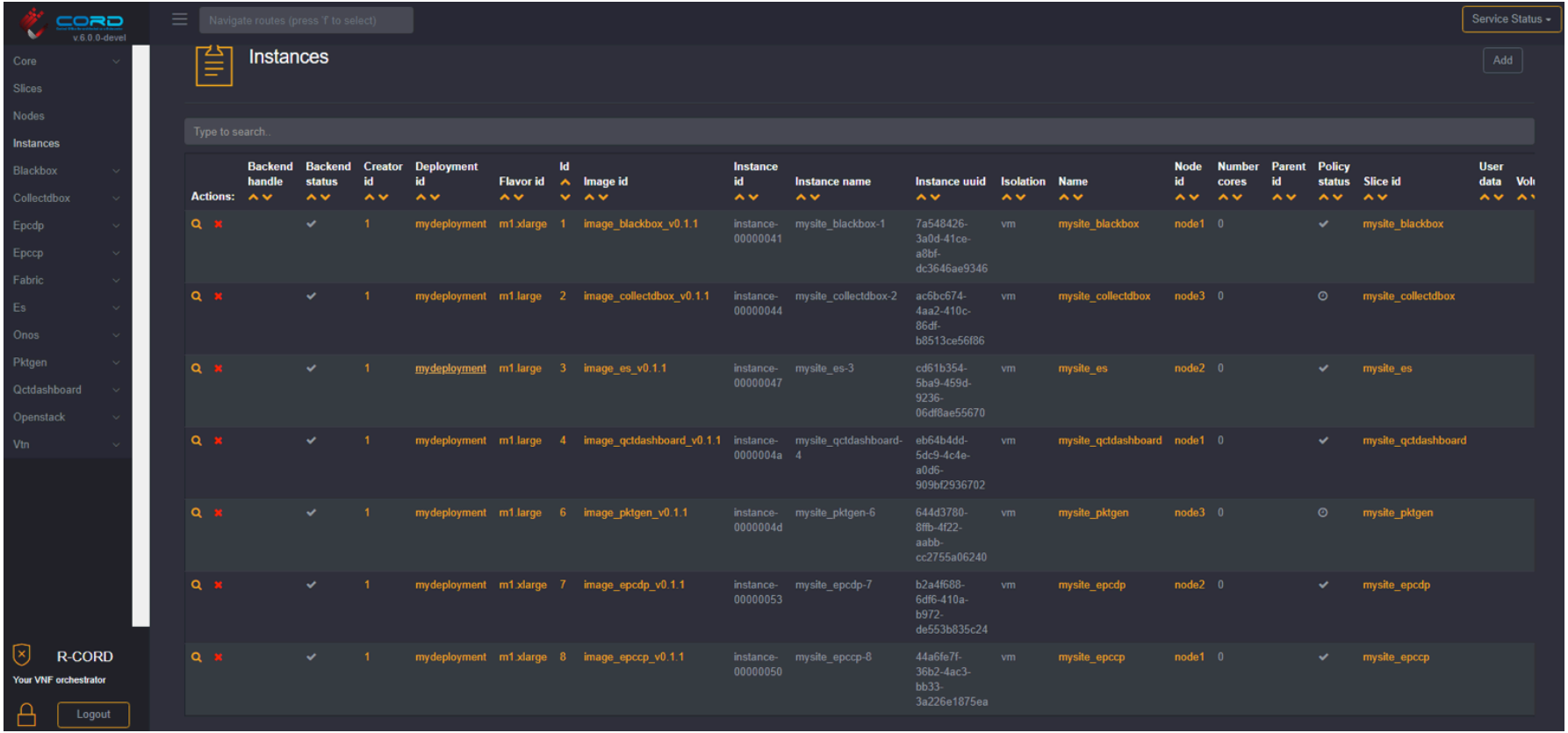
System Architecture of QCT CORD Ready Pod



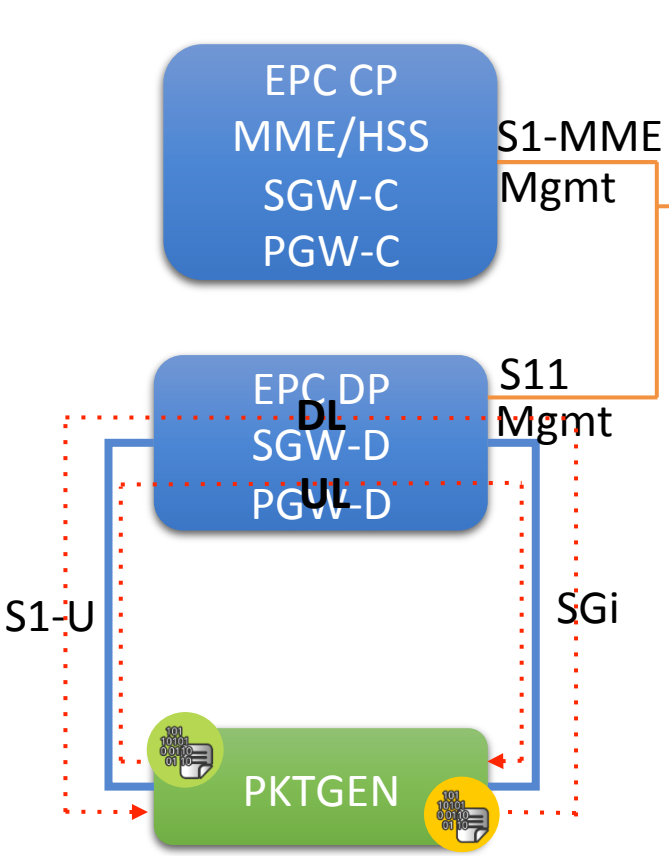
High-Level Architecture on XOS GUI



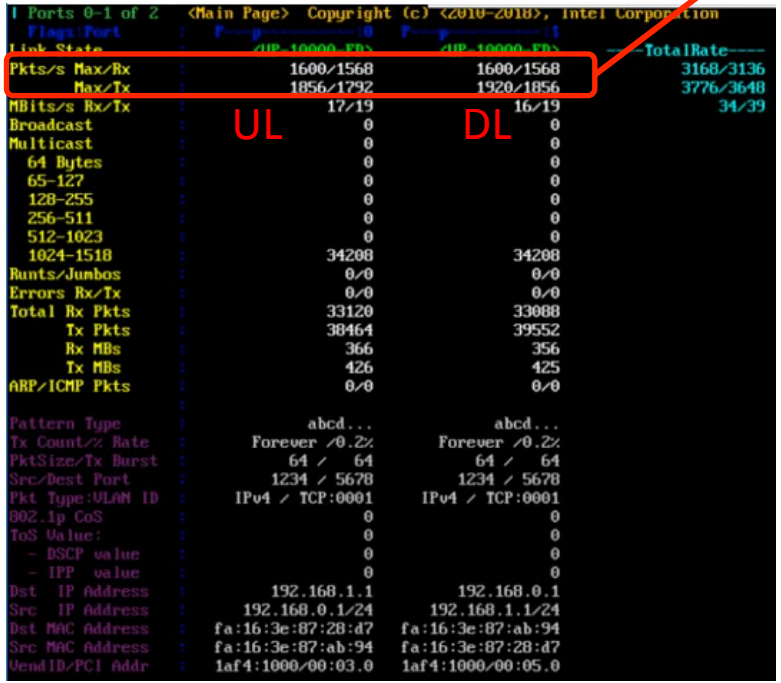
Instances Created in QCT CORD Ready Pod



Network Topology Between VNFs



Success



QCT Service Assurance in CORD

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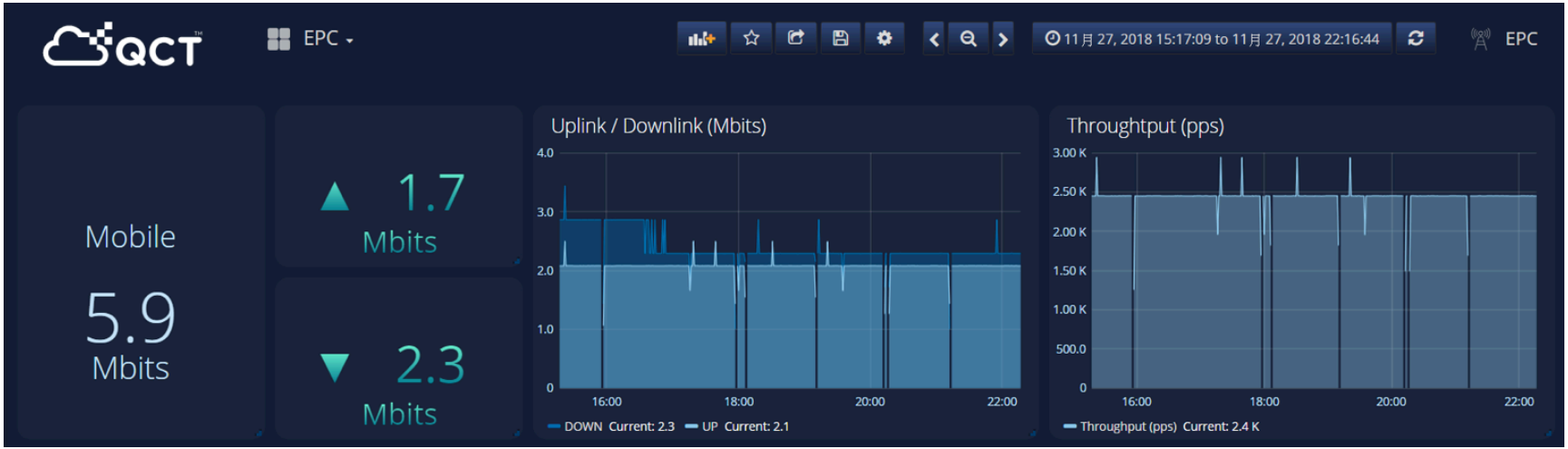


Let’s Move to the Automation Details

Automation Tool Stack

- CI Server - Drone

  - Jenkins on OpenShift (CORD 5.0)

- Configuration Tool - Ansible

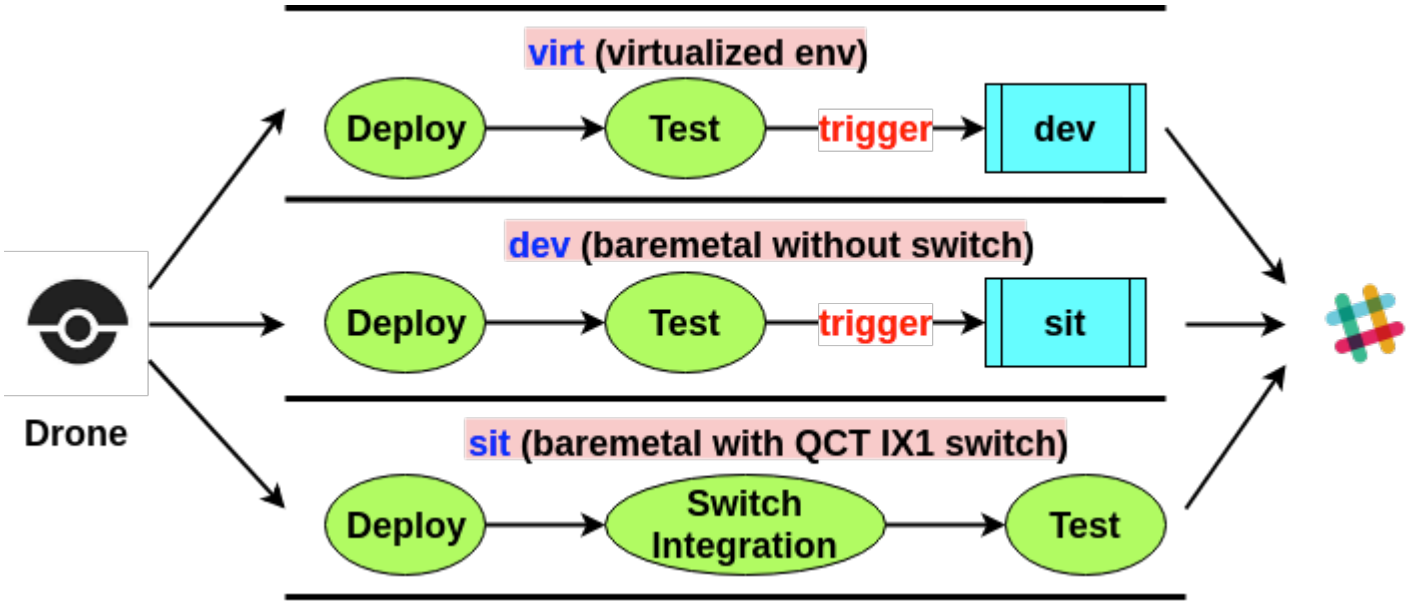
Why Drone?

- Small amount of resource needed (written by golang)
- Docker is the only dependency
- Deployment(Drone) as code (with docker-compose)
- DinD (You could define different image for every job)
- **Portable** (with Drone CLI)

Why Ansible?

- Agentless
- Capable to configure multiple machines simultaneously
- Much more human-readable than shell script
- Modularized Design

Deployment Flow Overview



CORD Deployment Processes

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- Provision OS
- Install Kubernetes (kubeadm, **not Gate-Based k8s**)
- Install OpenStack (openstack-helm & openstack-helm-infra)
- Install CORD (opencord/helm-charts)
- Physical Switch Integration & Connectivity Test
- Run CORD Tester
- VNF onboarding

Troubleshooting Experiences Sharing

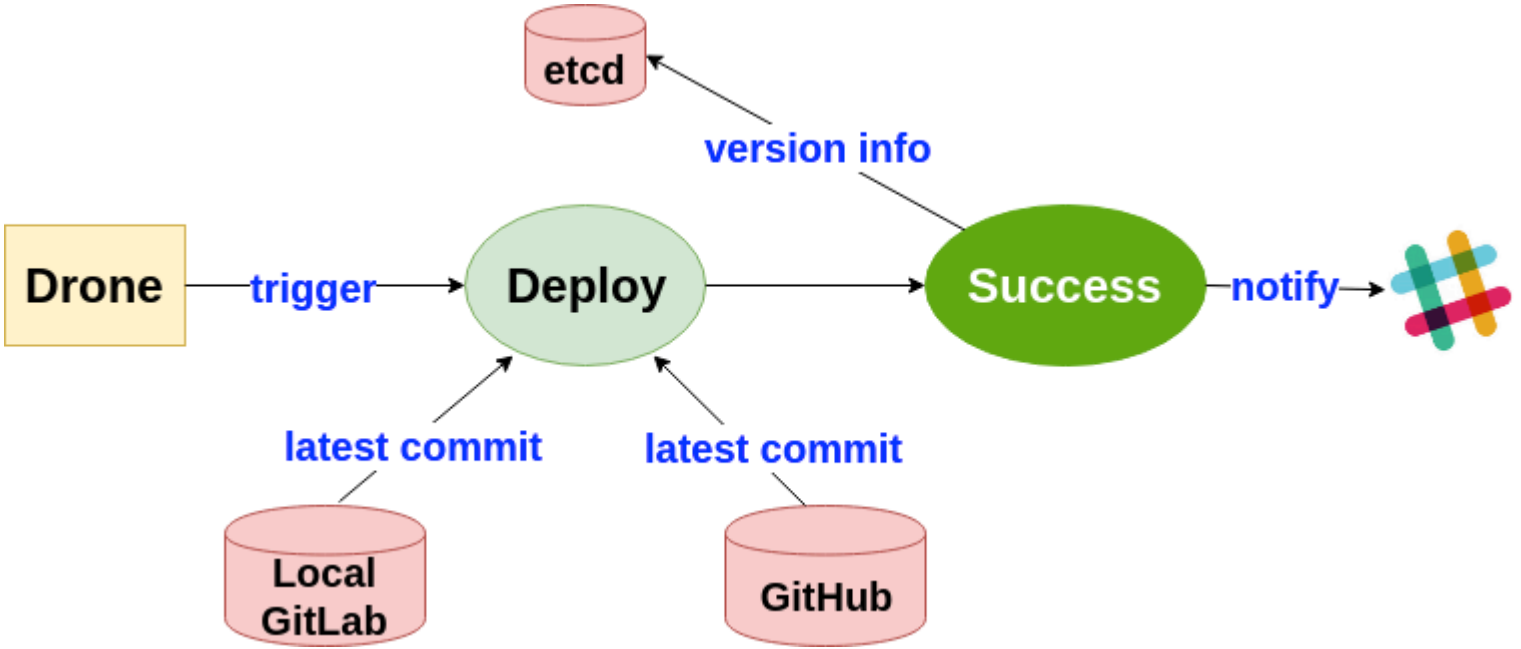
- openstack-helm installation stucks occasionally
  - Local Registry Mirror by Harbor
- ExternalName doesn’t work
  - ExternalName type Service only works with kube-dns, not CoreDNS
- Some services are not scheduled & working properly
  - Untaint NoSchedule attributes of master nodes
  - Duplicate label sets of gate-based k8s
- Cannot mount volumes from Ceph RBD
  - Ceph RBD client is needed in every node
  - ceph.conf in ceph-mgr pod in needed in every node
- Cord-tester crashes kube-dns
  - Move cord-tester to outside, not in any node.

Two More Features

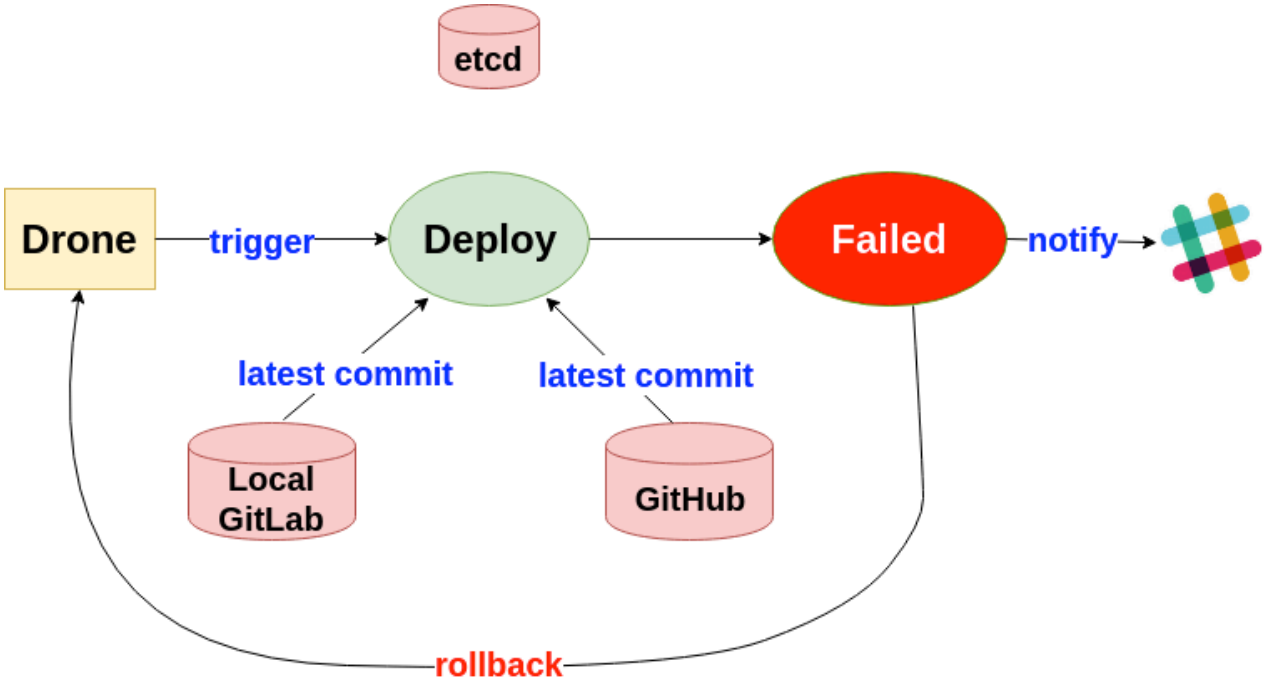
- Rollback

- API tests summary consolidation

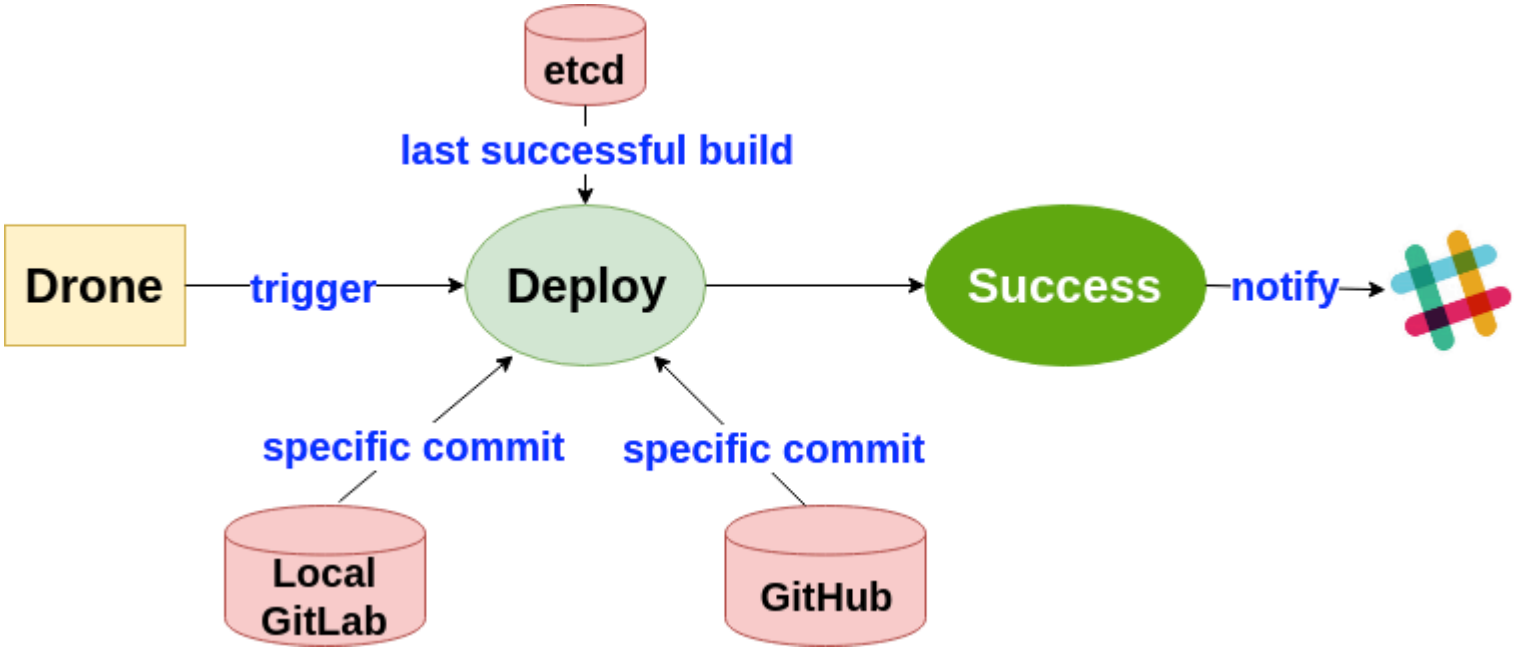
Deployment Flow Diagram (Success)



Deployment Flow Diagram (Failed)



Deployment Flow Diagram (Rollback)



Test Summary Consolidation

QCT CORD Test Summary

Environment: sit
Build No: 072
Status: Passed
Elapsed time: 0:00:37

Test Name (click to open test report)	Total	Pass	Fail	Pass Rate
cord-api:Ch_SanityInstance	6	6	0	100.0%
cord-api:Ch_SliceTest	3	3	0	100.0%
cord-api:Ch_ServiceTest	8	8	0	100.0%
cord-api:Ch_SiteTest	8	8	0	100.0%
cord-api:Ch_SanityFlavors	6	6	0	100.0%
cord-api:Ch_NodeTest	6	6	0	100.0%
cord-api:Ch_UsersTest	9	9	0	100.0%
cord-api:Ch_DeploymentTest	6	6	0	100.0%
cord-api:FabricConfig	10	10	0	100.0%
Total	**62**	**62**	**0**	**100.0%**

Current Status of Daily Deployment

- Kubernetes: **1.12.2**
- openstack-helm: **branch master**
- openstack-helm-infra: **branch master**
- opencord/helm-charts: **branch cord-6.0**

Future Plans

- Keep CORD POD deployment up to date. (**master branch**)
- Replace regular daily build with **gitwatch** trigger
- Add more and more tests
- Onboard more and more VNF & validation

Summary

- QCT provide a one-stop-shop service for CORD environment
- Switch certification testing process can be more mature by working with CORD Certification Brigade
- Easily accelerate the partnership collaboration to evaluate their services on CORD
- Integrate physical RAN for more complete end-to-end use case
- Automation helps ….
  - Greatly saving time for deployment
  - Developers can focus on things are truly important
  - Accelerate test & validation
- Portable automation does matter to our clients

Any Question?

CENTRAL OFFICE TRANSFORMATION WITH QCT NGCO SOLUTION

What | QCT "NGCO Launch" Event

Where | QCT US Solution Center
1010 Rincon Cir. San Jose, CA 95131

When | January 24th, 2019, 9:30 - 16:00

BRIEF AGENDA FOR THE DAY

- Doors will open at 8:30 am for registration
- Keynote presentations through the day
- Telco Industry EXPO
- Networking with industry experts

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Talk to QCT representatives to find out more

We are pleased to invite you to join our **QCT "NGCO Launch" Event** , on **Thursday, January 24, 2019** at QCT Solution Center in San Jose, California. This event is to officially introduce Intel NGCO architecture based on QCT infrastructure, also to showcase our latest solutions collaboratively developed with strategic VNF partners, and explore more advanced technologies around the 5G era at this event, previewing what will be presented at MWC 2019 in Barcelona, Spain.

We look forward to seeing you!

Partner speakers include:

intel redhat ASTRI netElastic systems Radisys

and more...

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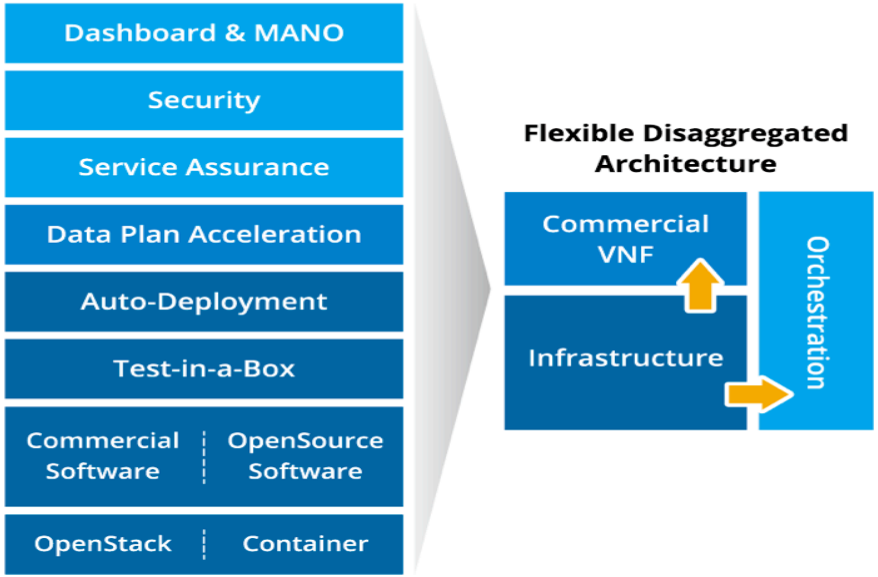
QCT NGCO Architecture



Registration Site QR Code

REGISTRATION CODE: **GUE19**

THANK YOU

www.QCT.io