Demo Participants

- Service Provider sponsor – also providing resources:
  - telenor
    - Led by Pål Gronlund
    - OSM TSC

- Vendors involved – providing resources:
  - Intel
  - netrounds
  - RIFT.io

- Open Source initiative involved:
  - MANO

- System Integrators involved – providing resources:
  - ARCTOS LABS
Motivation and Drivers for this Demo Proposal

Ensuring exceptional customer quality is #1 goal for operators

But, networks are virtualizing and becoming more complex with more frequent changes

End-to-end service validation and assurance with automated and orchestrated software-based (and open source) tools will therefore become paramount to delivering exceptional customer experience in the new, agile world
Motivation and Drivers for this Demo Proposal

**Further Details**

1. **Design time:** End-to-end validation required when building new service chains
   - Prior to adding NSDs to the catalog

2. **Run time:** The chain must be activation tested as part of the fulfilment process
   - To ensure that the deployment is correct in the real-world environment

3. **Frequent changes** will occur to service chains during the life-time
   - VNFs being upgraded
   - Configurations being updated
   - Relocation of whole chain (or individual VNFs) to new environments

4. **No time** to manually test and validate that changes will not break anything
   - Testing has to be programmable and automatable

5. **Assurance capabilities must be designed** into the lifecycle management of every service chain
Demo Scenario Summary

- Focus on DevOps of services including Service Chains
  - During **design time**: Verify that new service chains (NSDs) is OK before adding to catalog
  - During **run time**: Verify that deliveries/updates of service chain VNF components are OK
    - Any non-working update will be detected and result in a rollback

- Build on Open Source MANO
  - Use Open Source MANO as NFVO
  - Use OpenStack as VIM

- Open Source MANO NFVO
  - Onboards all VNFs used in the demo, including Netrounds Virtual Test Agents (vTAs)
  - Deploys a service chain (Network Service), including a number of vTAs

- EPA in OpenStack
  - vTAs use **EPA** (CPU pinning, PCI passthrough, SR-IOV or Virtio) for reliable results
  - One scenario can include toggling EPA on/off for selected VNFs in chain to show how this affects test results
What Service Chains (NSDs) Normally Look Like

Network Service (NS)

CP1

vFW

vPE

vCache

CP2
Proposal: Stitch Virtual Test Agents (VTAs) to the NS

Next page shows corresponding Network Connectivity Topology.
Looking at the VNF Network Connectivity Topology
Proposal 1: Test Across VNFs and Hypervisors During NSD Design

**Relevant traffic types:** Ethernet, IPv4, IPv6, Stateful TCP, Unicast UDP, Multicast UDP, HTTP

**Relevant tests:** Firewall security rules (blocking of specific ports, blocking of restricted web sites), Network throughput, latency, jitter, QoS priority and scheduling, header transparency
Reality: There Is a Lot of Plumbing Outside of the Chain

**4G/5G Transport & Network Slices**

**End-to-end** is what matters for the Customer
Proposal 2: Test and Assurance of the Complete End-to-end Path

4G/5G Transport & Network Slices

Intra Data Center

Global Enterprise Network

Under control of NFV MANO (day 0 init + VNF lifecycle management)

Under control of end-to-end Service Orchestration (run-time config)
What to Demo

1. Show onboarded VNFs in OSM
2. Design a NSD (Service Chain)
   • Can we extend NSD with test attributes?
3. Deploy NS using OSM
   • Show VTA cloud init and call home
4. Validate design of NS (see slide 9)
   • Prio 1 is manually triggered though API calls (similar to current demos)
   • Prio 2 is to trigger from OSM provided that we create such an integration
5. Evaluate results
   • Prio 1 is to manually evaluate results in Control Center
   • Prio 2 is notifying OSM though active feedback
6. Deploy NS in “live/real” environment
   • Different from design environment
   • Includes end-to-end (see slide 11)
   • Show it works OK, transition to Assurance
7. Switch over to quality monitoring
   • Same here, prio 1 manually, prio 2 through OSM
8. Upload an updated VNF image
   • Assume that one of the components in the service chain should be updated
9. Restart the cycle
   • The update will cause the chain to break. This will be shown in the Netrounds results
10. Roll back to restore the chain
    • Tests confirm the chain is back at normal state again

**Demo tests**: Firewall rules (port blocking, traffic dropping), blocking of restricted web sites, network throughput, latency, jitter, QoS priority and scheduling, header transparency
What to Demo - Visuals

Steps 1-3
OSM/Rift.io Dashboard Examples
What to Demo - Visuals

**Step 5**
Netrounds Control Center Dashboard Examples
Current Lab Configuration

• HW Includes:
  • Dell PowerEdge R730xd
  • Dual Intel(R) Xeon(R) CPU E5-2620 v3 @ 2.40GHz
  • Dual 82599ES 10-Gigabit SFI/SFP+ Network Connection
  • Dual I350 Gigabit Network Connection
• Open Source MANO NFVO
• Netrounds Virtual Test Agents (vTAs)
• Other Service Chain VNFs/vendors: To be decided
Demo Next Steps

• Inclusion of learnings from Verizon & Intel Network Builders Innovation Challenge

• Additional Open Source MANO interest areas such as nested network services
Thank you!

Any questions? Please contact kaela.loffler@netrounds.com