OPEN NETWORK AUTOMATION PLATFORM

ONAP “VNF Developer” Experience

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June 20, 2018

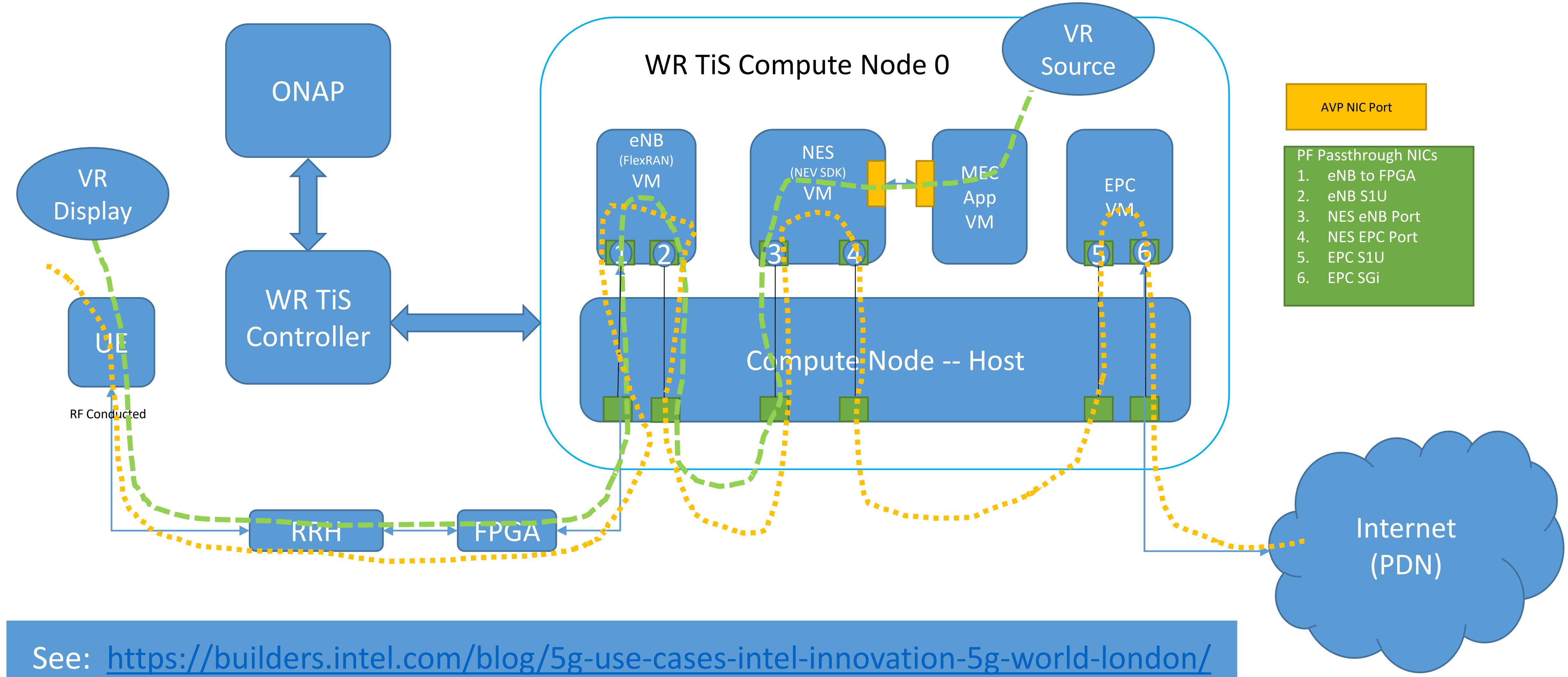
Context

- We have VNFs
  - Reference platforms – e.g. FlexRAN, NEV SDK, etc.
- We have ONAP experience
  - Contributions to Amsterdam and Beijing

- The Goal:
  - Demonstrate the reference FlexRAN VNF orchestrated with ONAP
    - VNF Packaging
    - ONAP Onboarding
    - Service Creation
    - Orchestration

More challenging than expected

End to End Demonstration Setup



PF Passthrough NICs

1. eNB to FPGA
2. eNB S1U
3. NES eNB Port
4. NES EPC Port
5. EPC S1U
6. EPC SGi

See: https://builders.intel.com/blog/5g-use-cases-intel-innovation-5g-world-london/

Outline of the FlexRAN Orchestration Solution

- Create: ONAP Service
  - Heat template
  - Single VM
    - Networks preconfigured
    - Other parameters part of the Heat template
  - Cloud-init for handling configuration and startup of the application
- Out of scope
  - PNF or VNF ?
  - HPA (still under development in Beijing release)
  - Events (e.g. VES)
  - LCM

Key Milestones along the Way

- Infrastructure Setup
- VNF Packaging
- Onboard the VNF package
- Service creation
- Service orchestration

Infrastructure Setup - VIM

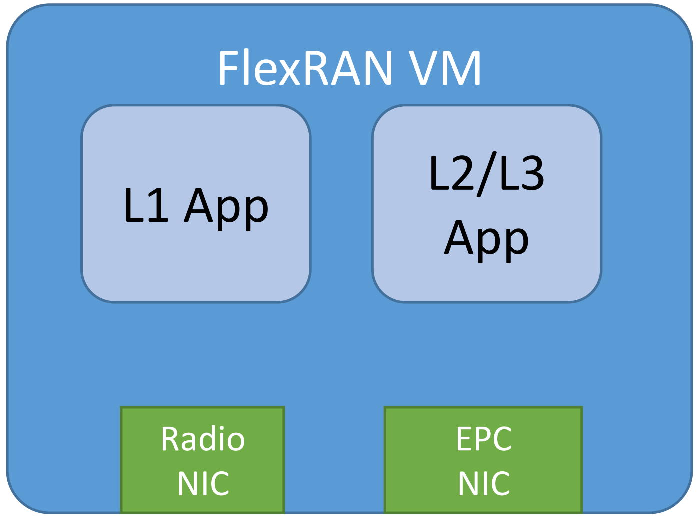
- VNF already being demonstrated WindRiver TiC
- Trickiest part - setting up our own instances in the lab
- Some planning is required
  - Networks for the use case
  - Networks for management
  - Access to Internet, VNFs
  - Dealing with proxies
  - Multiple users?
  - Cloud-init

Moderately challenging

Skills: Infrastructure planning, setup, VIM, ONAP

VNF Packaging

- Heat template
  - Follow ONAP conventions
- ONAP Management
  - Used cloud-init support instead of LCM
- Parameters
  - E.g. # antennas, Application configuration



Not hard - but, it was fairly simple

Skills: VNF Packaging Requirements, Modeling, Heat (cloud-init), (or TOSCA)

Infrastructure – ONAP Installation

- Started with OOM installation of Amsterdam
- Tricky to install
  - Pulling scripts from JIRA
  - Sequencing - Pods not always working after “up”
    - E.g. SDC always came up unhealthy – needed to be restarted → VNC Portal
- Extra – for the demo, we moved our ONAP installation around
  - Proxy settings
  - Internet access

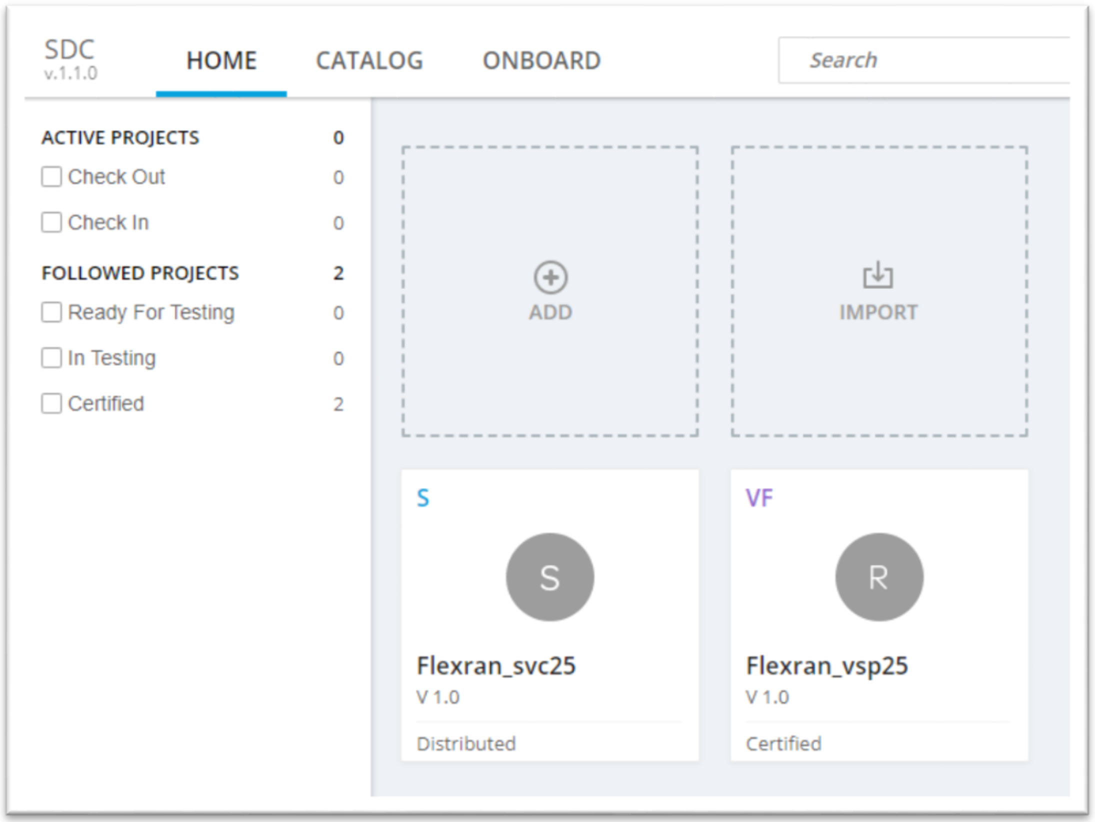
Challenging

Skills: REST, Kubernetes, Rancher, Helm, docker, ONAP internals

Suggestions: common logging, use of K8s, Postman collections

VNF Package Onboarding

- Pretty much followed posted demos from Amsterdam
- DataModel ?
  - VLM
  - VSP
  - VF
- Some of the steps felt extraneous



ACTIVE PROJECTS	0
Check Out	0
Check In	0
FOLLOWED PROJECTS	2
Ready For Testing	0
In Testing	0
Certified	2

S
Flexran_svc25
V 1.0
Distributed

VF
Flexran_vsp25
V 1.0
Certified

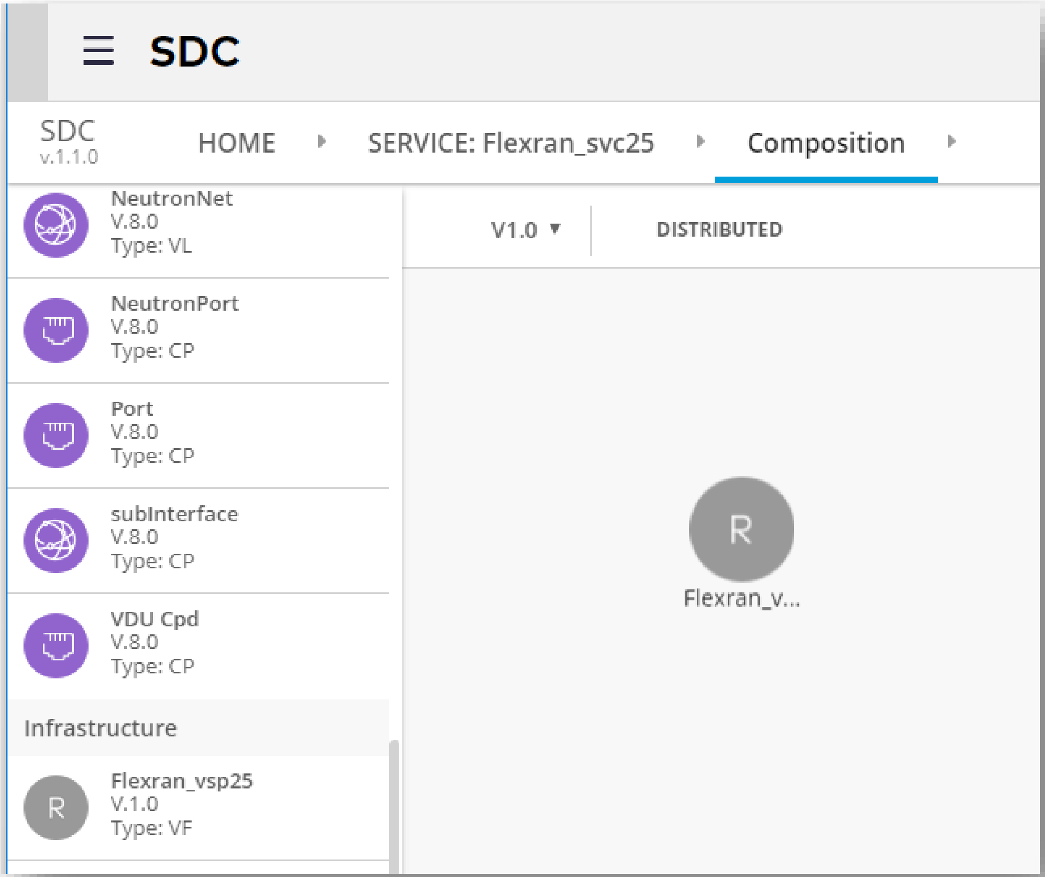
Easy

Skills: VNF models

Suggestions: Documentation, streamline flow, UI

Service Creation

- Again – followed the demos
- Pretty easy – not a complex service
- Confusions:
  - Effect of choices along the way?
    - E.g. generic network function, L1-L3, etc.
- Sticking Point – Service Distribution
  - It said it worked – but it didn't (or wasn't complete)
  - Debug was challenging – fixed by re-installing



Service Creation – Easy; Distribution - Challenging

Skills: Kubernetes, docker, ONAP internals

Suggestions: Unknown errors? Documentation

Service Orchestration – Initial Preloads

- Cloud Region
- Service Type
- Customer
- Confusions:
  - Service Type
  - In some cases, demo scripts set up some of these things

Moderately Easy

Skills: REST, json, ONAP Data Model

Suggestions: Documentation, Postman collections

Service Orchestration

- How to do it? Postman MSO, VID, … ?
- Found the VID to be the easiest way to go (first success)
  - Service Instance creation – with VID ☺
  - VNF instance creation – with VID ☺
  - SDNC preload with ODL apidocs ☹
    - We scripted eventually, but why?
  - VF Module creation – with VID ☺
- Lot’s of cutting/pasting
  - Scripting reduced it a bit
  - How to know this bit of one thing goes to that bit of another thing?
- Bugs – had to restart an mso docker container occasionally, etc.

Challenging

Skills: REST, Kubernetes, docker, ONAP internals

Suggestions: common logging, use of K8s, Postman collections

ONAP features and capabilities not fully exercised …

VNF LCM

- Seemed like a good way to support:
  - Specific application selection/configuration
  - Start/stop of applications
  - Etc.
- Recommended to start with cloud-init

- Started looking into this on the side / in parallel
  - Starting with an OpenStack action
  - Haven’t got it working yet

Events

- VNF did not generate ONAP-ready events
- Amsterdam OOM – no DCAE support anyway
- What we did do:
  - Used the VES evel library to create some events:
    - Detect L1 or L2 application crash
    - Heartbeat

HPA

- FlexRAN requires HPA
  - CPU pinning
  - Hugepages
  - PCI pass-through
  - Etc.

- Too soon to test with Amsterdam
  - Addressed with Flavors

Beijing Release

- Needed for some of the features – but postponed trying until the release
- Attempts to install have commenced

Misc

- SDNC, APPC Directed Graphs
  - We saw these being used with the vCPE use case
  - This use case didn't need – where to start if it did?
- Service Workflows
  - Can you make your own?
  - How to know which one is being used / how to pick?

BKMs

- Get help from someone who’s done it before
  - Community, partner, online resources
- Expect to spend some time
  - Developing the various skills
  - Learning ONAP internals

Enhancements

- Clear, detailed documented examples would be great
  - There’s high level architecture
  - Detailed API docs exist – how to use not always clear
  - All the steps laid out, not embedded in automated scripts
- Documentation
  - Readthedocs – quickly goes out of bounds (?)
    - Ecomp references
    - Wiki pages

Thank You

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