First joint ONF <-> ONAP PoC read-out

week of 27 November 2017

***** DRAFT *****

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Series of PoCs & where we left off ...

October 2015: 1st POC

October 2016: 3rd POC

INDUSTRY ADOPTION

April 2016: 2nd POC

June 2017: 4th POC

MAIN GOALS of JOINT ONF <-> ONAP PoC

Main goals of PoC are the following:

- Start integration in a broader architecture (ONAP based) of the Wireless Transport + RAN multi-vendor network.
- Application of microwave model (TR-512/532 based) to DAS & eNB
- Demonstration of a scalable and multi-site architecture across several countries, with multi SDN controller instances in the same network.
- Implementation of the equipment model based on TR-532

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PARTICIPANTS and LOCATIONS

Vendor	Type of test devices	Location of test devices	Connected via (location of ODL SDN controller)
ZTE	2x MW devices	Tianjin, China	DT-Cloud in Prague, Czech Republic
DragonWave-X	6x MW devices 4x Horizon Compact Plus (HC+) 2x Horizon Quantum	Ottawa, Canada	DT-Cloud in Prague, Czech Republic
	2x MW devices	AT&T Lab, NJ, USA	AT&T-cloud in NJ, USA
Intracom Telecom	2x MW devices OmniBAS OSDR ODU	Athens, Greece	DT-Cloud in Prague, Czech Republic
SIAE	2x MW devices AGS20 IDU split-mount	Milan, Italy	DT-Cloud in Prague, Czech Republic
Nokia	2x MW devices, eNB	AT&T Lab, NJ, USA	AT&T-cloud in NJ, USA
ADVA	2x ETH switch	Open SDN & NFV Lab, Berlin, Germany	Sendate-Cloud in Berlin, Germany
	3x ROADM		
CommScope	DAS	WinLab, NJ, USA	OWL-cloud (WinLab) in NJ, USA
AltioStar	RRH (eNB)	WinLab, NJ, USA	OWL-cloud (WinLab) in NJ, USA
Ericsson	4x MW devices	WinLab, NJ, USA	OWL-cloud (WinLab) in NJ, USA
Ceragon	Simulator	VM inside DT-Cloud, Prague, Czech Republic	DT-Cloud in Prague, Czech Republic

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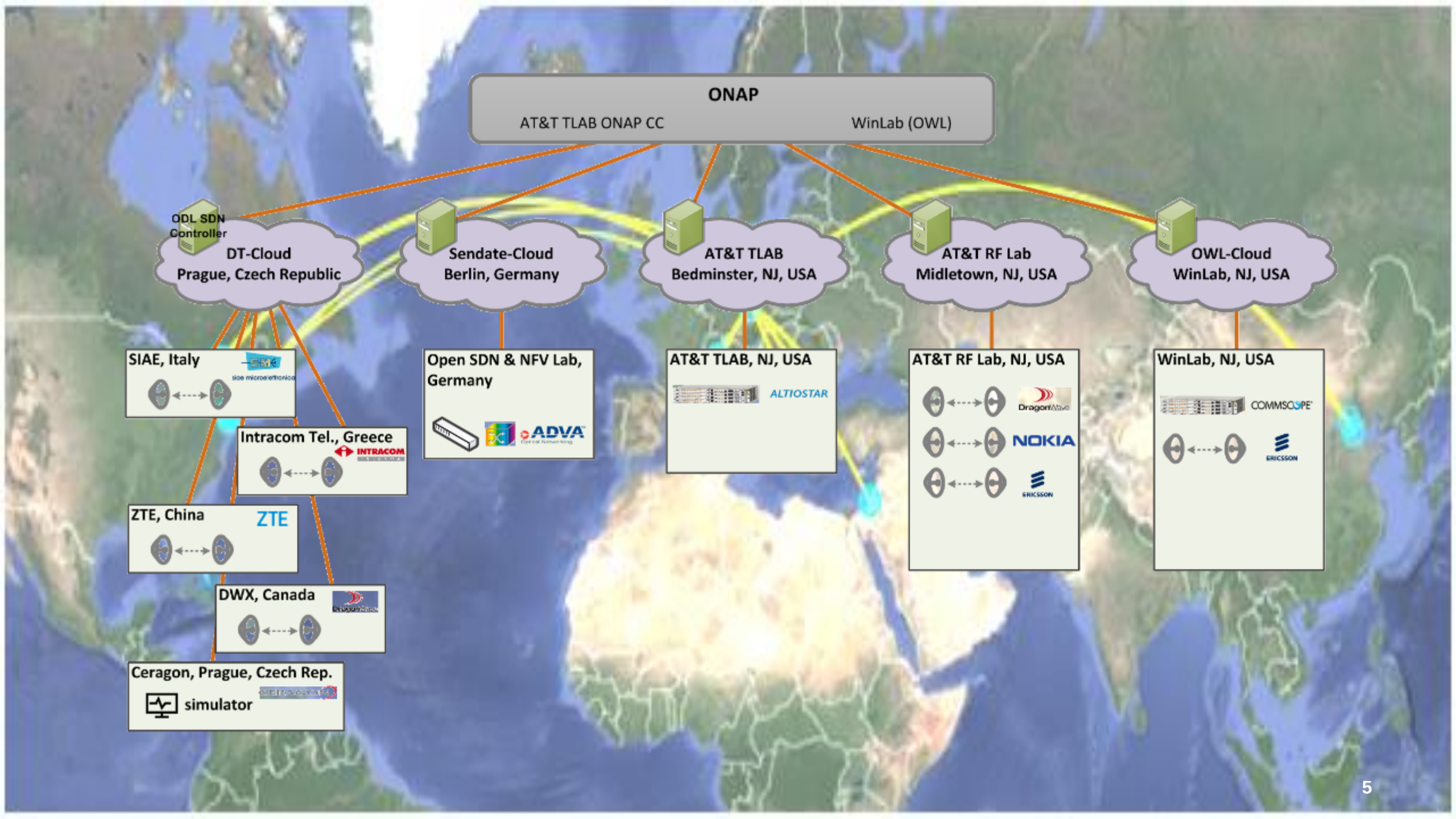
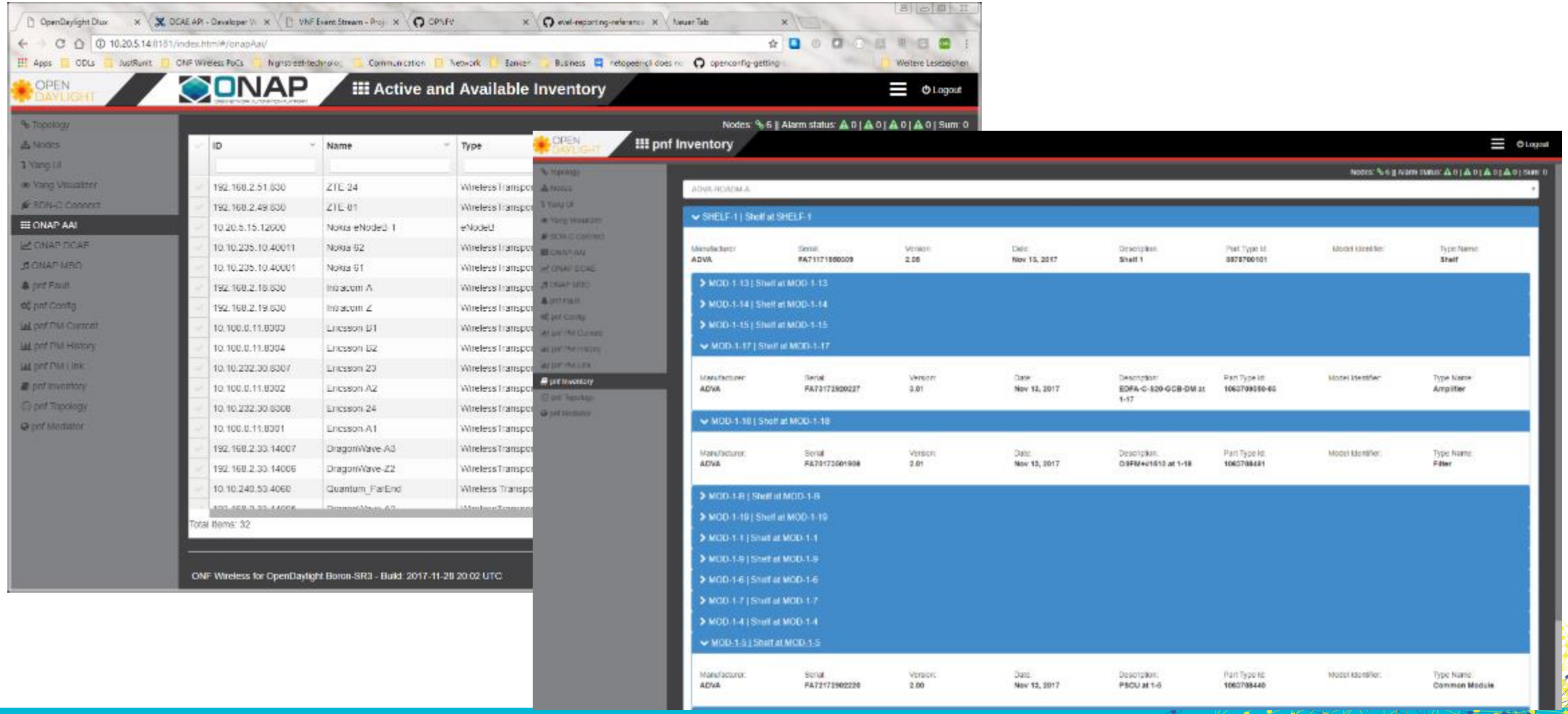

ONAP
AT&T TLAB ONAP CC
WinLab (OWL)
ODL SDN Controller
DT-Cloud
Prague, Czech Republic
Sendate-Cloud
Berlin, Germany
AT&T TLAB
Bedminster, NJ, USA
AT&T RF Lab
Midletown, NJ, USA
OWL-Cloud
WinLab, NJ, USA
SIAE, Italy
Intracom Tel., Greece
ZTE, China
DWX, Canada
Ceragon, Prague, Czech Rep.
simulator
Open SDN & NFV Lab, Germany
AT&T TLAB, NJ, USA
ALTIOSTAR
AT&T RF Lab, NJ, USA
NOKIA
WinLab, NJ, USA
COMMSCOPE

PoC 4.1 USE CASES / APPLICATIONS



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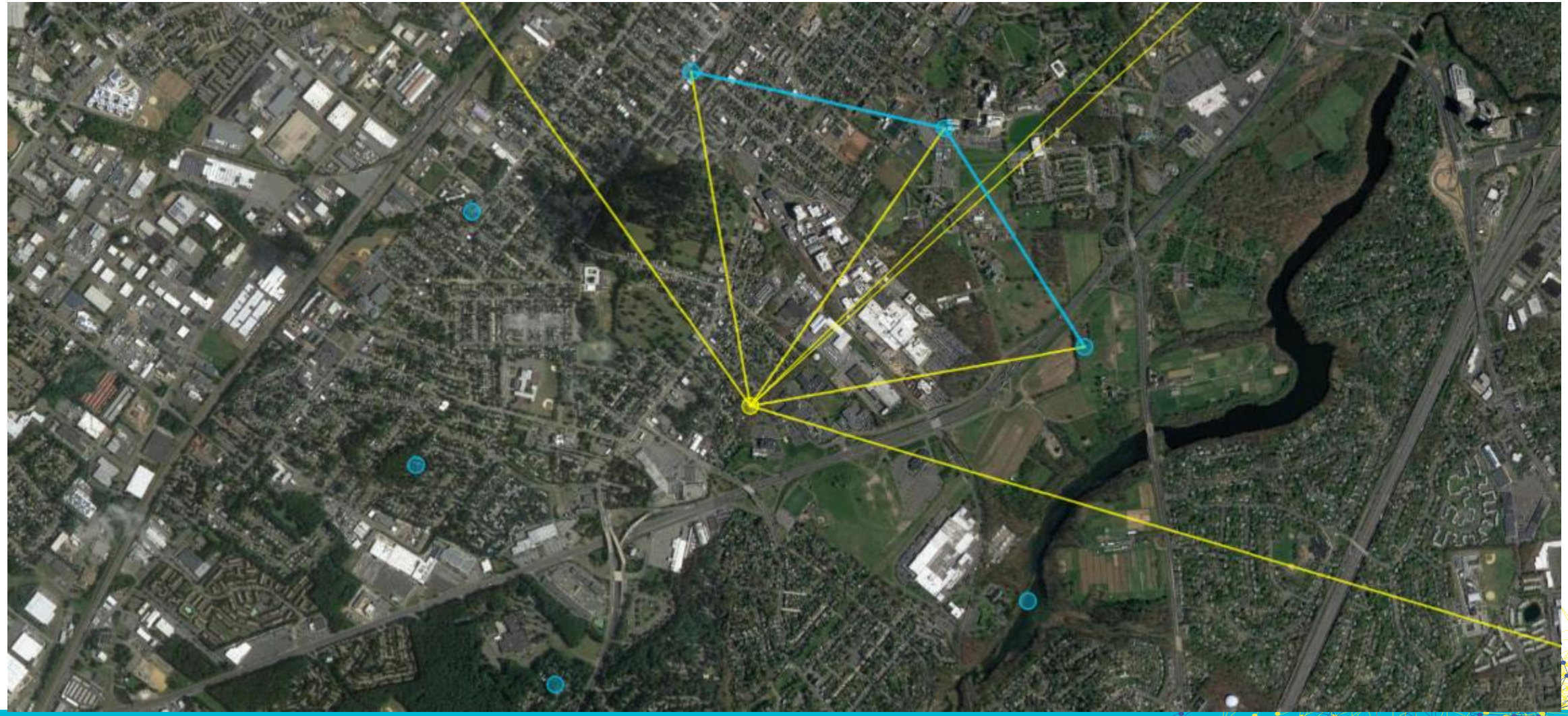
Demo Winlab (OWL)



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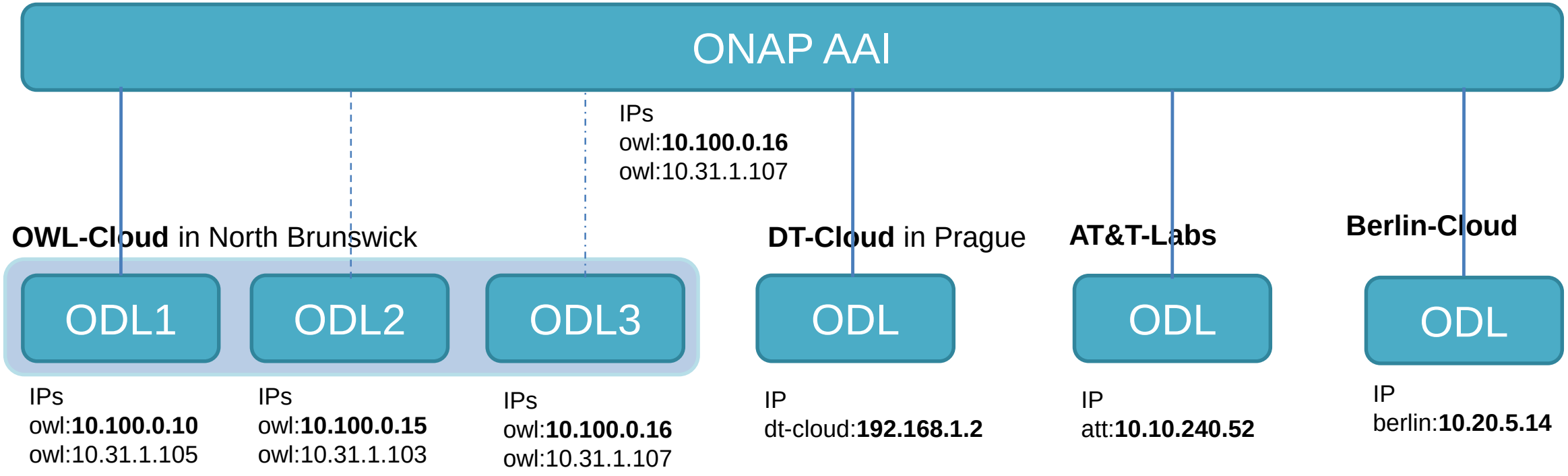
ONAP VNFs (in this PoC)

"OWL" Cloud (ONAP Wireless Lab at Rutgers University Winlab)



An ODL-Boron-SR3 cluster

3x single ODL-Boron-SR3

Open Issues:
- NetConf notifications and
- WebSockets to Browser

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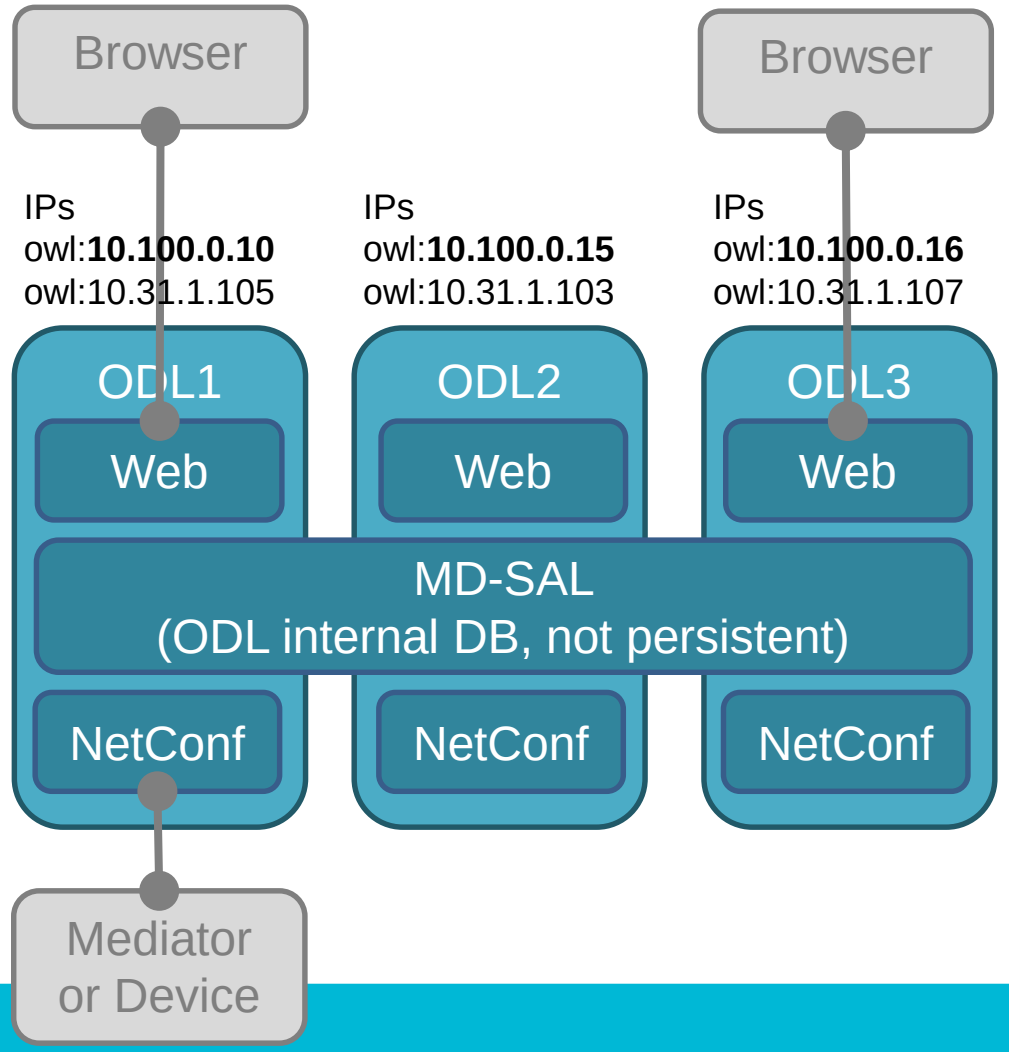
ONAP ODL Cluster



1. Independent of the chosen ip-address in the browser address bar, the data is synchronized.
   > same view
2. The cluster decides, which of the ODL NetConf clients establishes the NetConf session to the mediator.
   > only one NetConf session to the mediator
3. It is possible to run different app (bundle, microservices) versions on the different ODL nodes.
   > This offers an online migration.

Open issues (to be analyzed)

- It seems that the subscription for NetConf notification is not working
- The current websocket implementation for notification to the Web-Gui (and other RestConf clients) is not prepared for an ODL cluster.

>> no notifications (Alarms)

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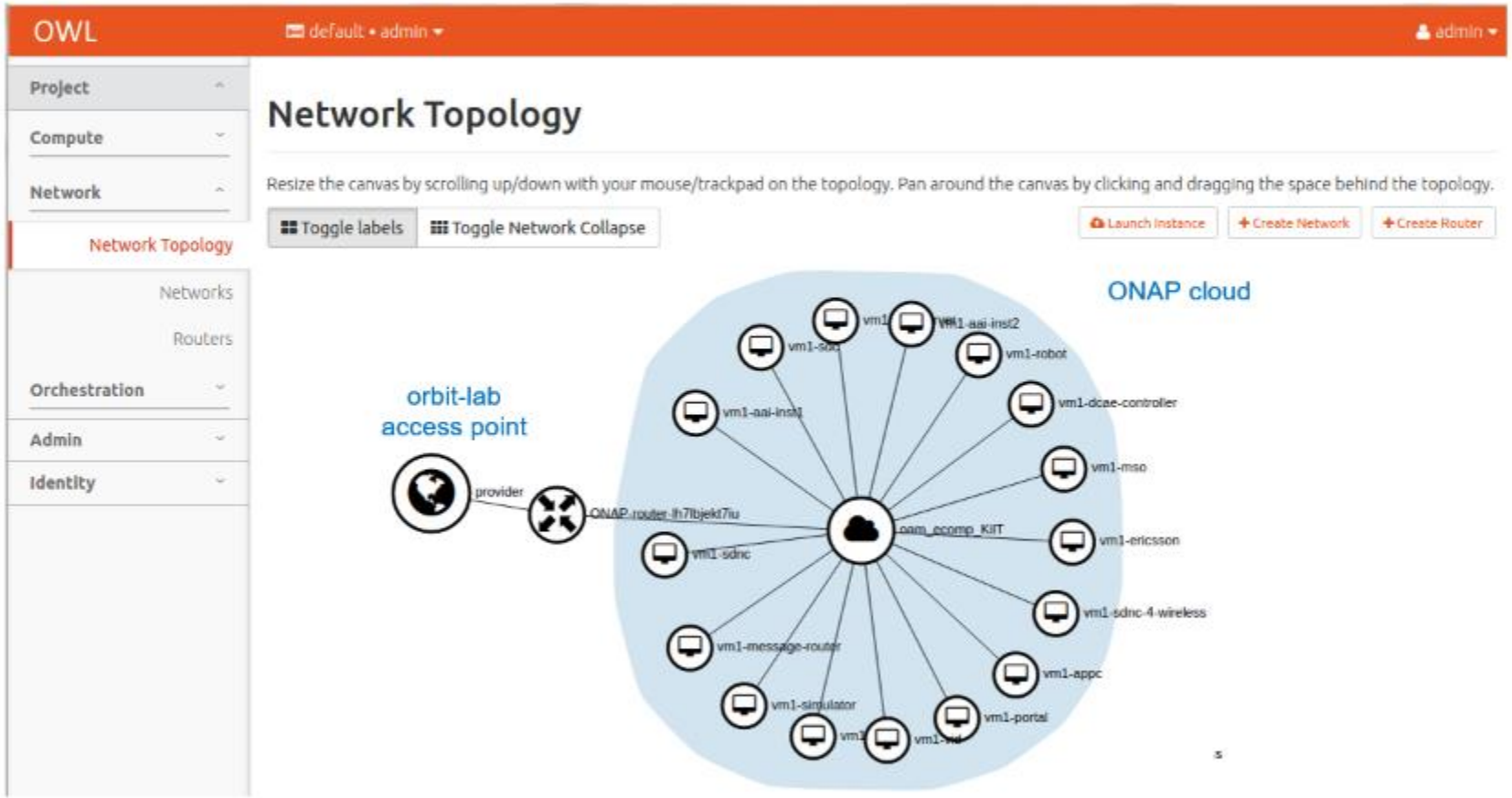
ONAP WIRELESS LAB “OWL”



Screen shot: OWL OpenStack Network Topology 2017-09-06

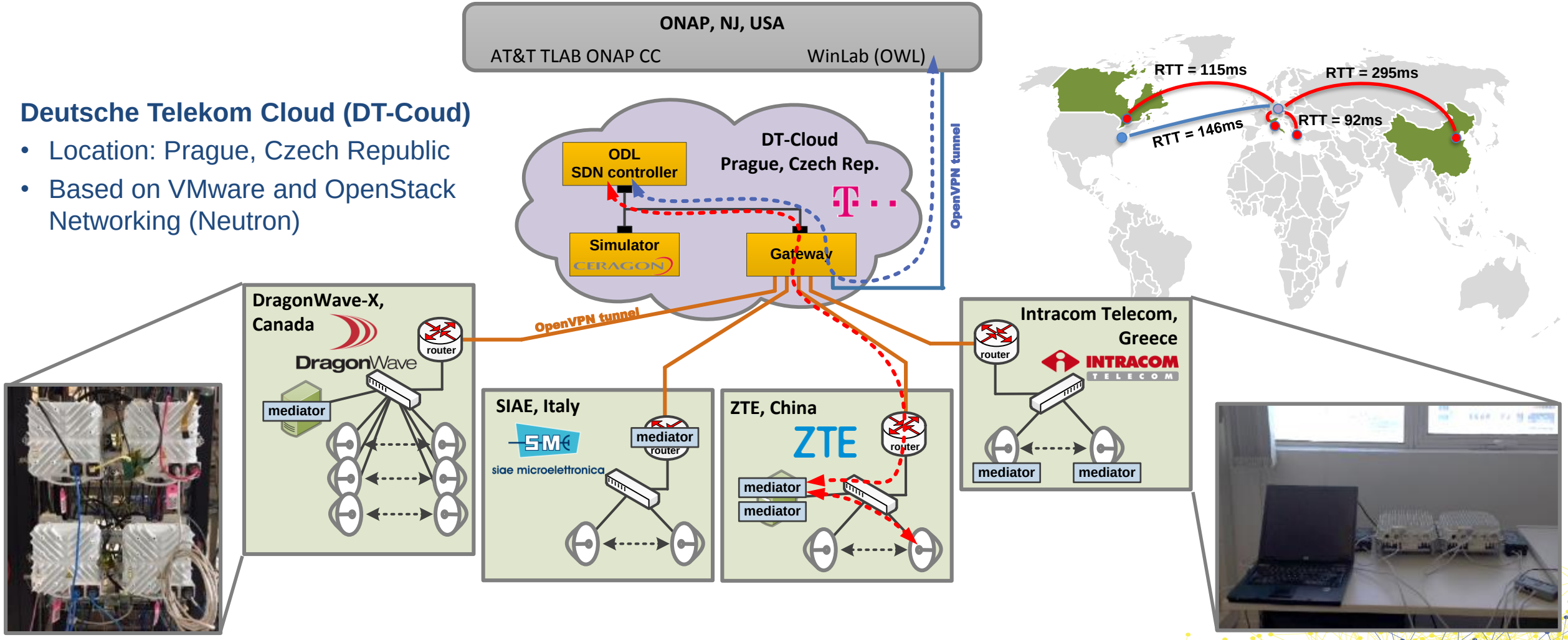
3 step security:

1. Registered SSH access from the internet to orbit-lab
2. Limited access for selected members from orbit-lab to ONAP cloud, controlled by ONAP.
3. Each VM and its application uses SSH and Basic-auth.

Remote cloud-based architecture using Deutsche Telekom Cloud

Deutsche Telekom Cloud (DT-Coud)

- Location: Prague, Czech Republic
- Based on VMware and OpenStack Networking (Neutron)



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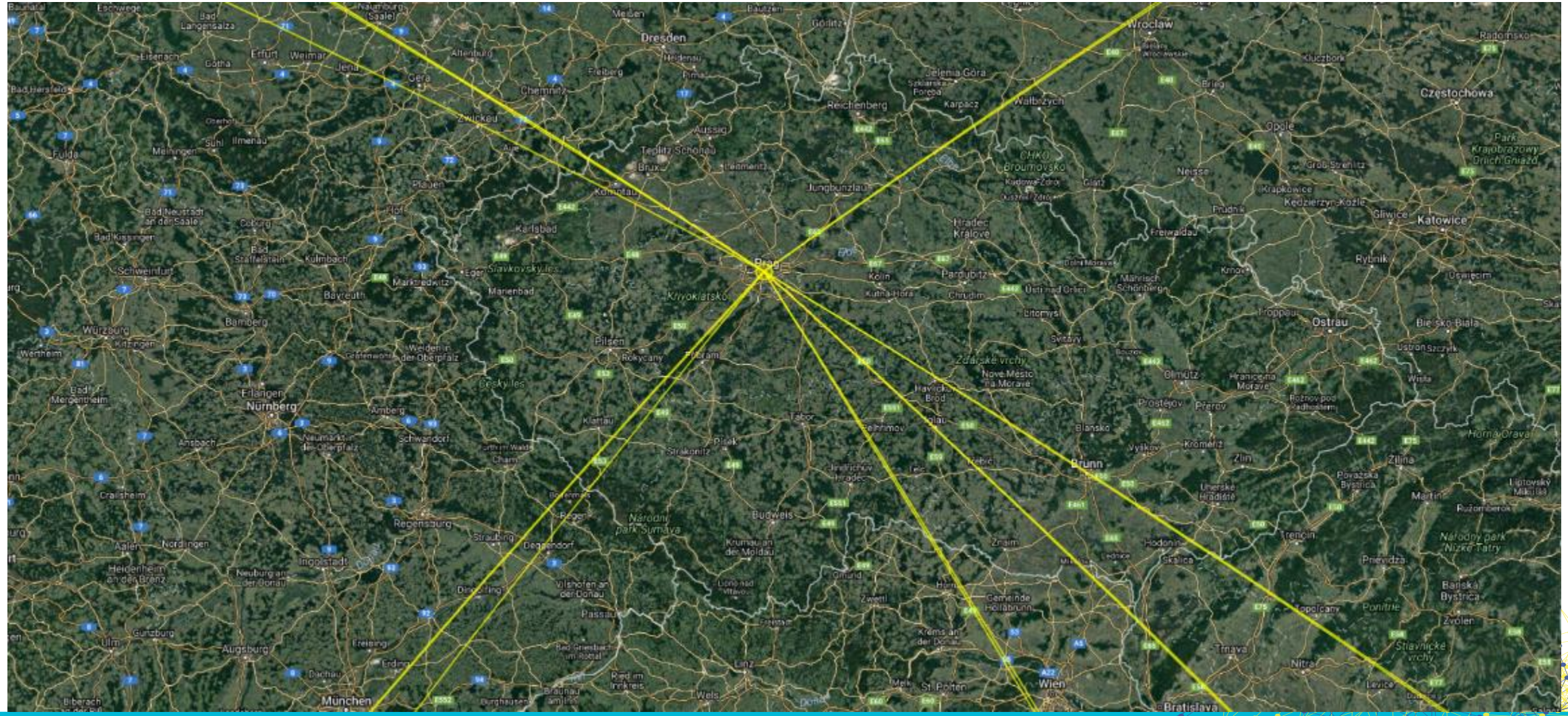
Demo DT-Cloud



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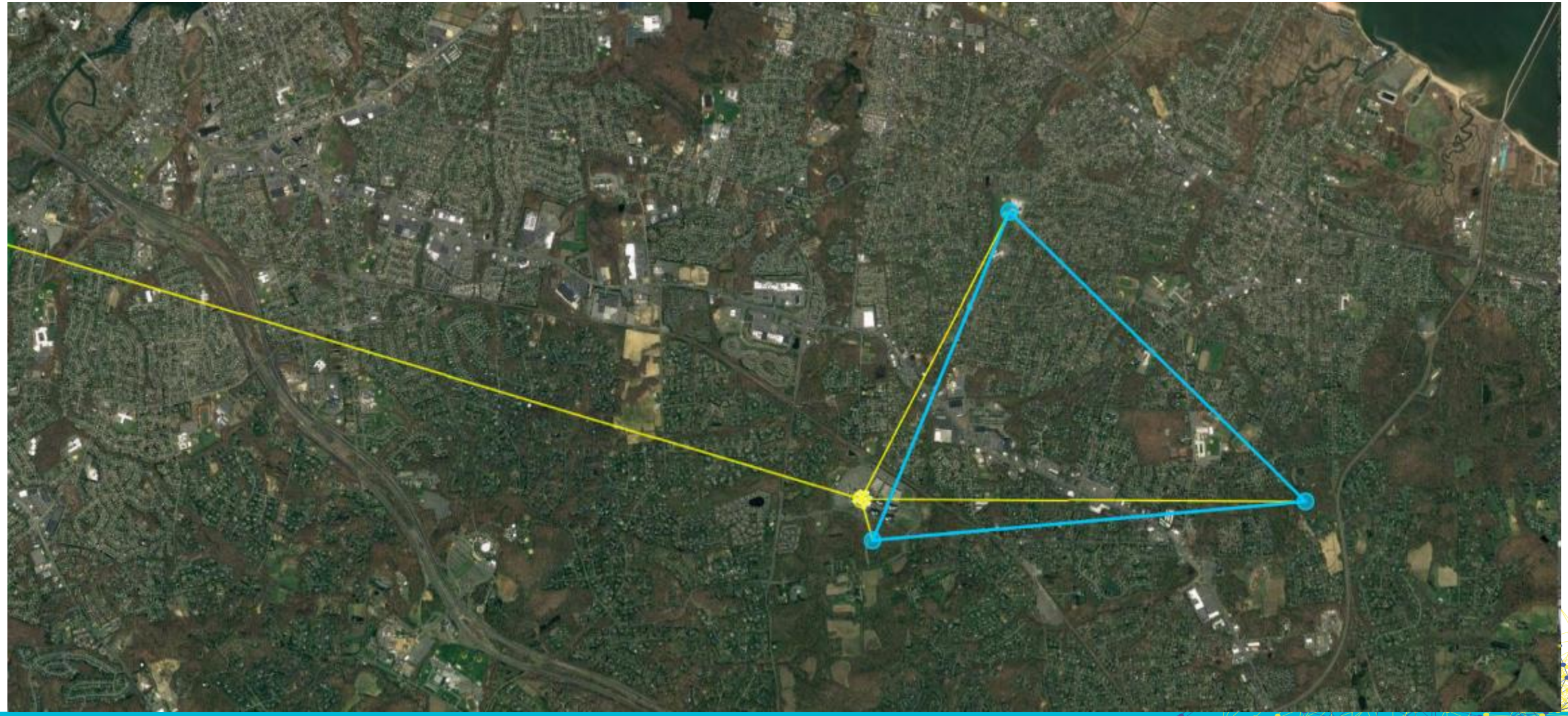
Demo AT&T Labs – RF Lab



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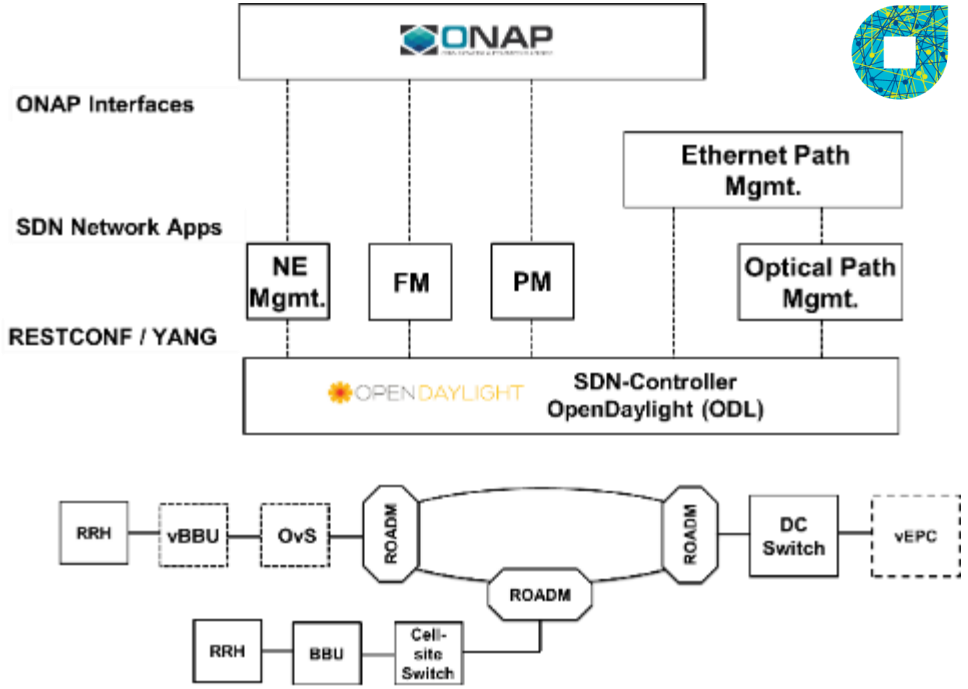
Open SDN & NFV Lab Berlin

- Research AND commercialization platform
- primarily for small and medium enterprises
- to smoothly evolve research results
- to commercial products and services
- within a truly open SDN & NFV ecosystem.



November 2017

December 2017

2018

Many more

supported by

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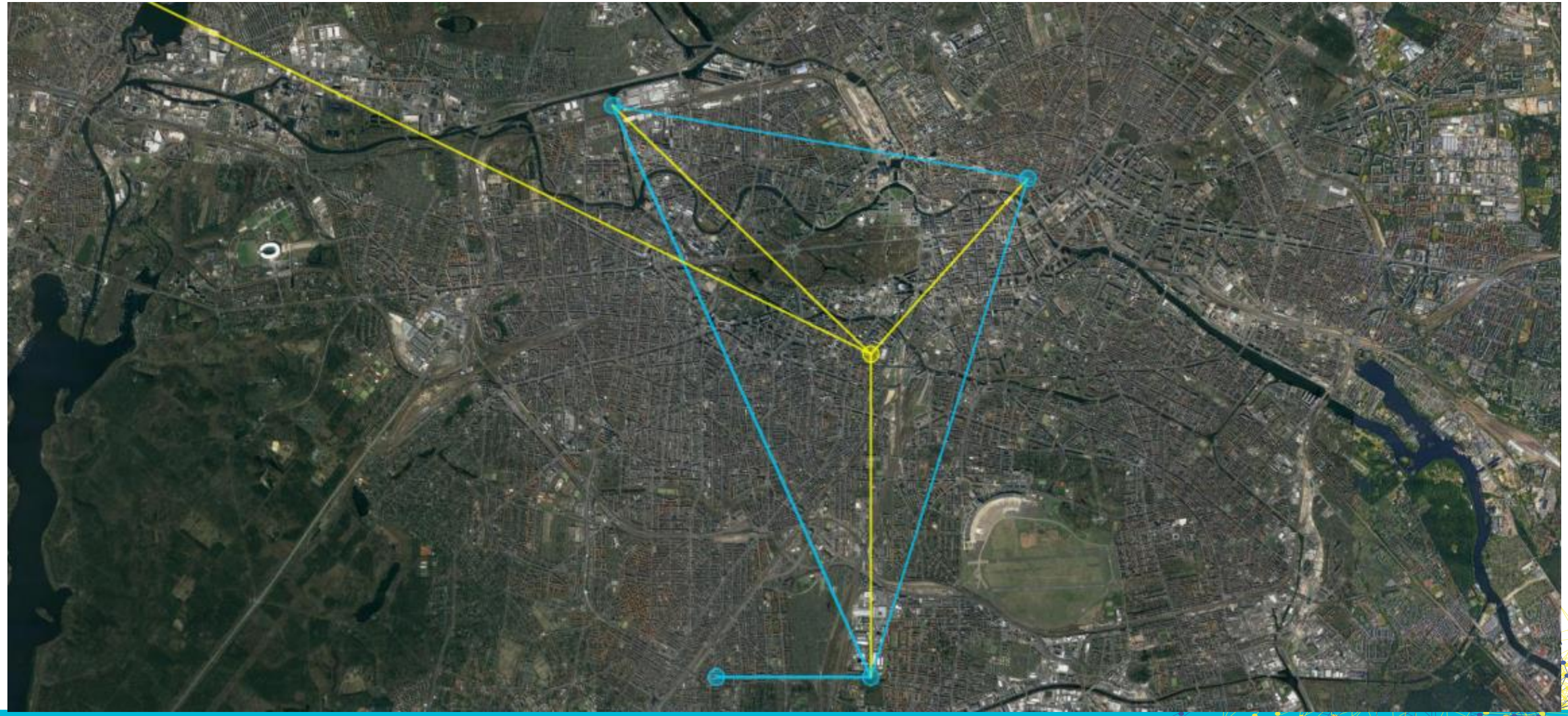
Demo Berlin



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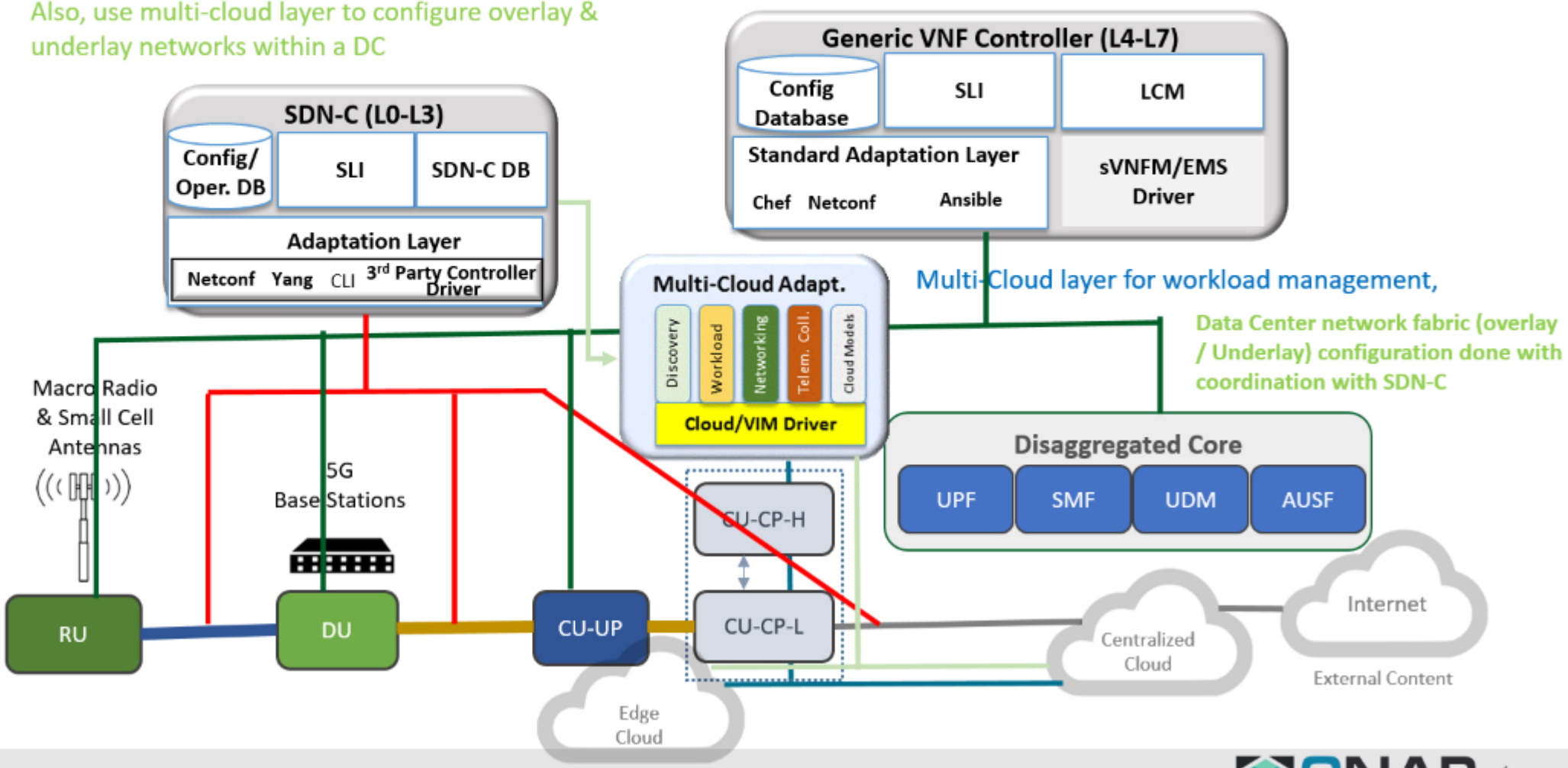
Controller Scope to support anticipated 5G use cases

SDN-C (and possibly 3rd party controller) will be used for transport configuration – Front Haul, Mid Haul, Back Haul, etc.

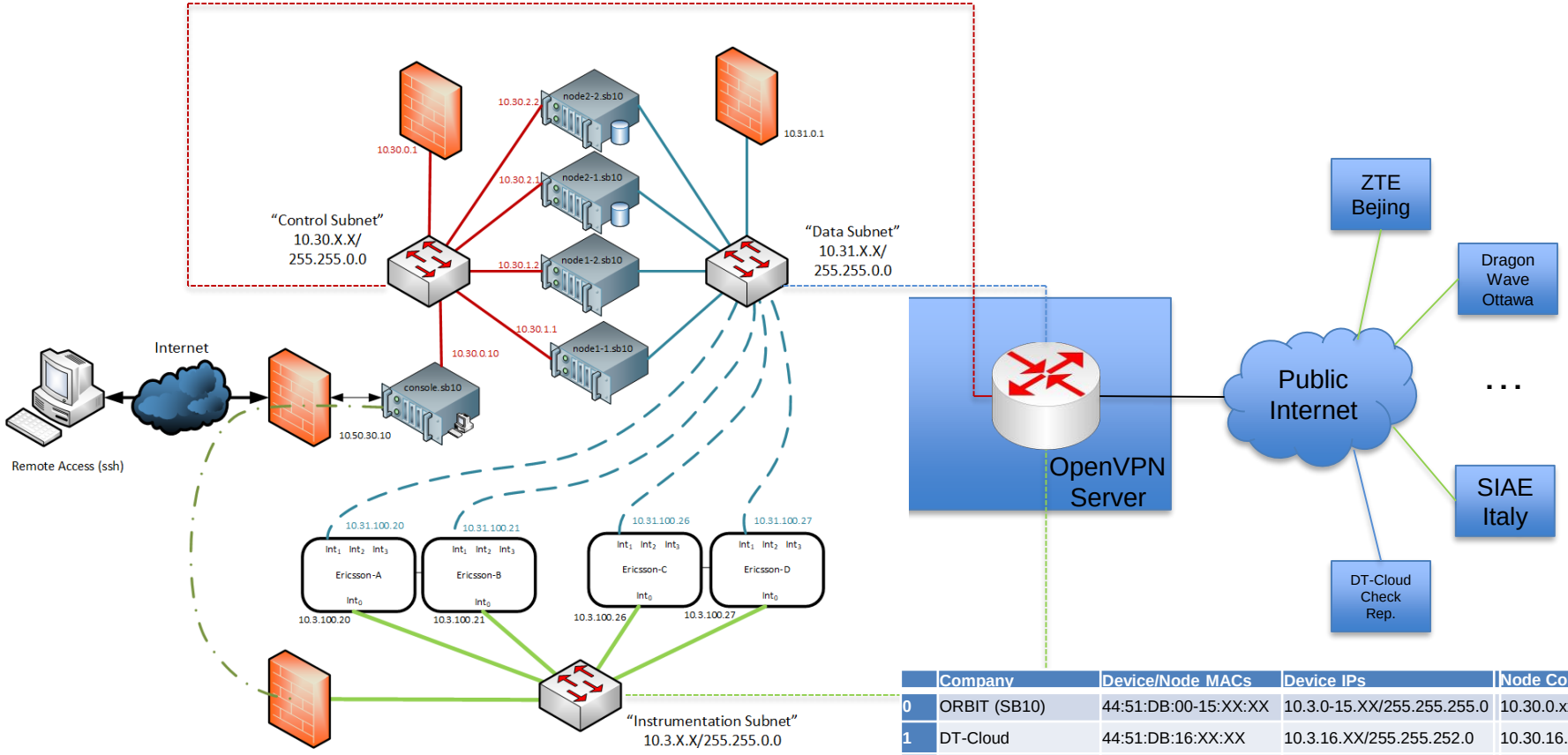
Also, use multi-cloud layer to configure overlay & underlay networks within a DC

App-C (now Generic VNF Controller) is responsible for various network application configuration (PNF / VNF) – DUs, CUs, Disaggregated core, etc.

UE Management out of scope for now



PLAN for 2018: Unified and Simplified Access



- Per location Device, Node and VM IP subnets (with 1024 addresses per location)
- Standardized L3 (OpenVPN) and L2 (l2tp) connectivity to "central"
- Full site-to-site connectivity with (custom) ACLs

	Company	Device/Node MACs	Device IPs	Node Control IPs	Node Data IPs	VM IPs
0	ORBIT (SB10)	44:51:DB:00-15:XX:XX	10.3.0-15.XX/255.255.255.0	10.30.0.xx/255.255.252.0	10.31.0.xx/255.255.252.0	10.100.0.xx/255.255.252.0 (??)
1	DT-Cloud	44:51:DB:16:XX:XX	10.3.16.XX/255.255.252.0	10.30.16.xx/255.255.252.0	10.31.16.XX/255.255.252.0	
2	BerlinLab	44:51:DB:20:XX:XX	10.3.20.XX/255.255.252.0	10.30.20.xx/255.255.252.0	10.31.20.XX/255.255.252.0	
3	AT&TLabs	44:51:DB:24:XX:XX	10.3.24.XX/255.255.252.0	10.30.24.xx/255.255.252.0	10.31.24.XX/255.255.252.0	
4	highstreet-lab	44:51:DB:28:XX:XX	10.3.28.XX/255.255.252.0	10.30.28.xx/255.255.252.0	10.31.28.XX/255.255.252.0	
5	Ericson	44:51:DB:32:XX:XX	10.3.32.XX/255.255.252.0	10.30.32.xx/255.255.252.0	10.31.32.XX/255.255.252.0	
6	Nokia	44:51:DB:36:XX:XX	10.3.36.XX/255.255.252.0	10.30.36.xx/255.255.252.0	10.31.36.XX/255.255.252.0	

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Next steps

- Lessons learned (details within white paper)
  - ODL Geo-Cluster
  - ONAP Cluster
- Evolution of ONF – ONAP – 5G community lab
- Evolution of model (TR-532) + Ethernet PHY
- Ongoing collaboration among open source project teams
- PoC 5.0 items of interest, approximate date, etc.

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