GN4-3 WP6 Update

Network Technologies and Services Development

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STF Meeting, 6 July 2021, Online

www.geant.org

A quick update

- Reminder of WP6 structure

- News from the subtasks

- RARE
  - Connectivity to the GÉANT P4 Lab is expanding

- Orchestration, automation and virtualisation (OAV)
  - Training and architecture mapping

WP6 – current structure and work items

T1: Network Technology Evolution

- Low Latency networking (LoLa)
- Optical Time and Frequency Networking (OTFN)
- White box networking for R&E use cases
  - CPE Normandy, RENATER
  - Internet Exchange Point (IXP), RENATER
  - CPE, FUNET
  - Data centre, GRNET
  - White box performance testing, PSNC
- Router for Academia, Research and Education (RARE)
- Data Plane Programming (DPP)
- Quantum Key Distribution (QKD)
- M6.10: Evaluation of network technology experiments and their potential for use by the GÉANT community

T2: Network Services Evolution and Development

- Service Provider Architecture (SPA)
- Orchestration, Automation and Virtualisation (OAV)
  - Architecture
  - Training
  - Wiki with the Community Portal
  - Campus Network Management as a Service (CNaaS)

T3: Monitoring and Management

- perfSONAR
- perfSONAR Consultancy
- Performance Measurement Platform (PMP)
- Network Management as a Service (NMaaS)
- WiFiMon
- Network Telemetry (inc.100G monitoring/measurement)

WP6 umbrella page:
https://wiki.geant.org/display/NETDEV

Task 1 – Network Technology Evolution

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Low Latency Networking **LoLa**	• GÉANT Ops now adopting TimeMap on the backbone • Available at https://timemap.geant.org/ (right click links for details)
Optical Time and Frequency Networking **OTFN**	• March OTFN infoshare material online (recording) • Krzysztof Turza (PSNC) is now the sub-task leader (thank you Nicolas!)
White Box **for R&E networks**	• White papers: RENATER GIX implementation and WB performance testing • FUNET CPE and GRNET DC to follow, exploring testing to RARE at 100G
Data Plane Programming **DPP (INT)**	• White paper published INT testbed experience and lessons learned • March INT infoshare (recording) and June TNC'21 DPP/INT BoF (recording)
Quantum Key Distribution **QKD**	• March QKD infoshare material online (recording) • Planned PoC with Toshiba between GÉANT PoPs in late 2021 / early 2022

Router for Academia, Research and Education (RARE)

- Combines open source, feature-rich (FreeRouter) control plane with P4/DPDK data plane

- Used with Edgecore Wedge 32x100 on GÉANT P4 Lab

- Now connected to StarLight on an Inventec P4 switch

- APAC (Asia, Pacific, Australia) link is coming soon

- Looking at 100G connection across the Atlantic

- Setting up RARE at SURF/UvA for DMC2021 competition

- See https://wiki.geant.org/display/RARE/Home

- For RARE/ P4 Lab enquiries, email rare@lists.geant.org

International RARE/FreerTr lab
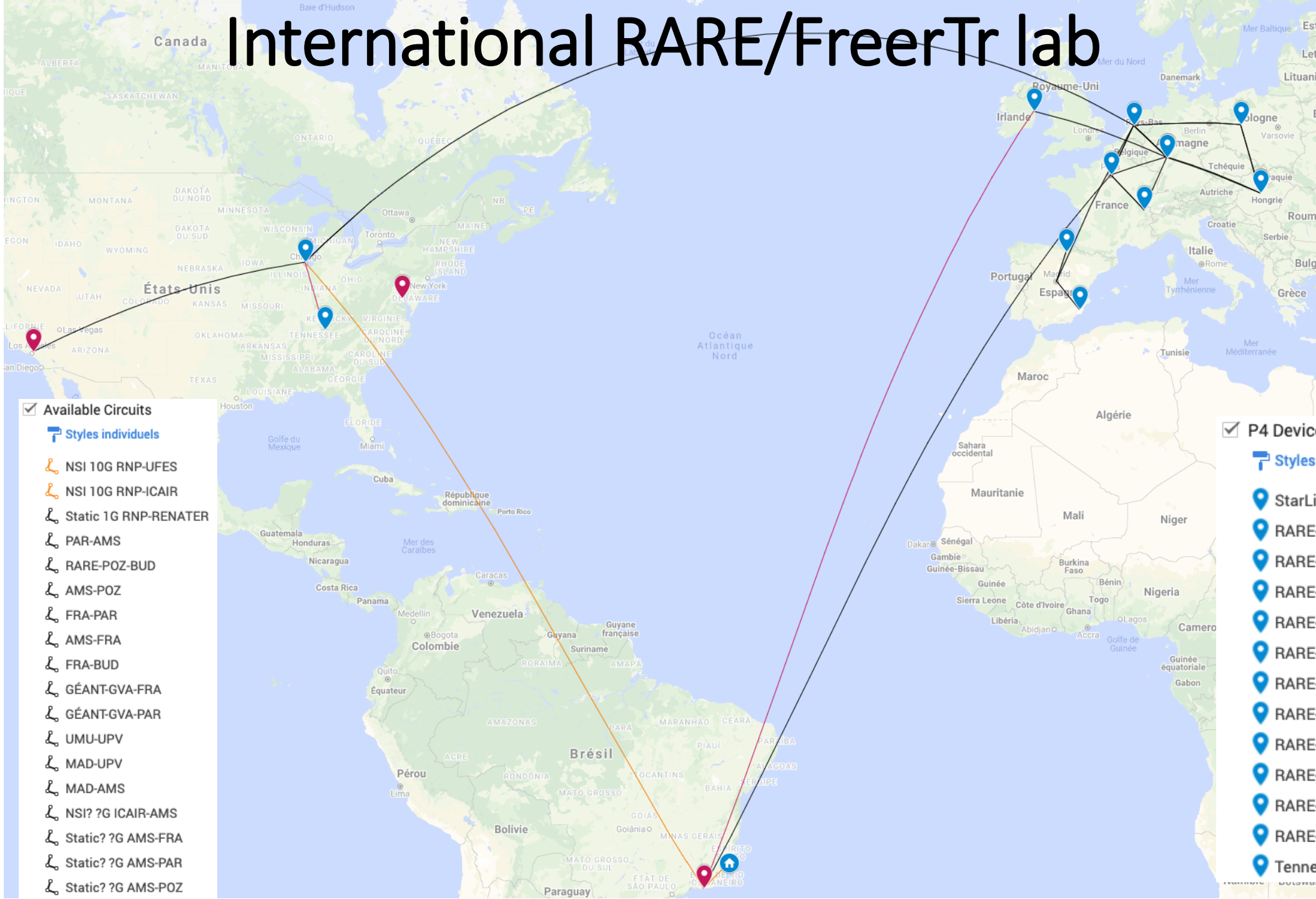
Available Circuits

Styles individuels

- NSI 10G RNP-UFES
- NSI 10G RNP-ICAIR
- Static 1G RNP-RENATER
- PAR-AMS
- RARE-POZ-BUD
- AMS-POZ
- FRA-PAR
- AMS-FRA
- FRA-BUD
- GÉANT-GVA-FRA
- GÉANT-GVA-PAR
- UMU-UPV
- MAD-UPV
- MAD-AMS
- NSI? ?G ICAIR-AMS
- Static? ?G AMS-FRA
- Static? ?G AMS-PAR
- Static? ?G AMS-POZ

P4 Devices

Styles individuels

- StarLight - Invetec D5264
- RARE-PAR - Edgecore Wedge...
- RARE-TCD - APS Networks B...
- RARE-AMS - Edgecore Wedg...
- RARE-POZ
- RARE-FRA
- RARE-BUD
- RARE-FRA
- RARE-GVA
- RARE-BUD
- RARE-UMU
- RARE-UPV
- Tennessee Tech - APS BF25...

Task 2 – Network Services Evolution and Development

Service Provider Architecture
SPA

- Development and support to the production GCS service
- Provides TMForum ODA-compliant software tools
- Published M6.8 on Self-Service Portal development next steps (collaborative work with WP7)

SPA *Service Provider Architecture*

Orchestration, Automation, Virtualisation
OAV

- New white paper published on OAV architectures
- New short video produced (with thanks to Karl Meyer)
- New training modules being released regularly via the GÉANT e-Academy moodle
- Ongoing work on mapping NREN architectures to the TMForum ODA reference architecture (see D6.6 for the rationale for its selection)
- Material from TNC'21 OAV BoF available online (recording)
- Software Tools for CNaaS infoshare material also available (recording)

Map your digital architecture!

Mapping your architecture with the reference TMForum Open Digital Architecture (ODA) increases chances for:

- Faster development of heterogeneous solutions
- Understanding different solutions
- Interoperability
- Federation of services and solutions
- Multi-domain collaboration

Join the NRENs:

- ODA-mapped already: SURF, CYNET, CARNET
- ODA mappings in progress:
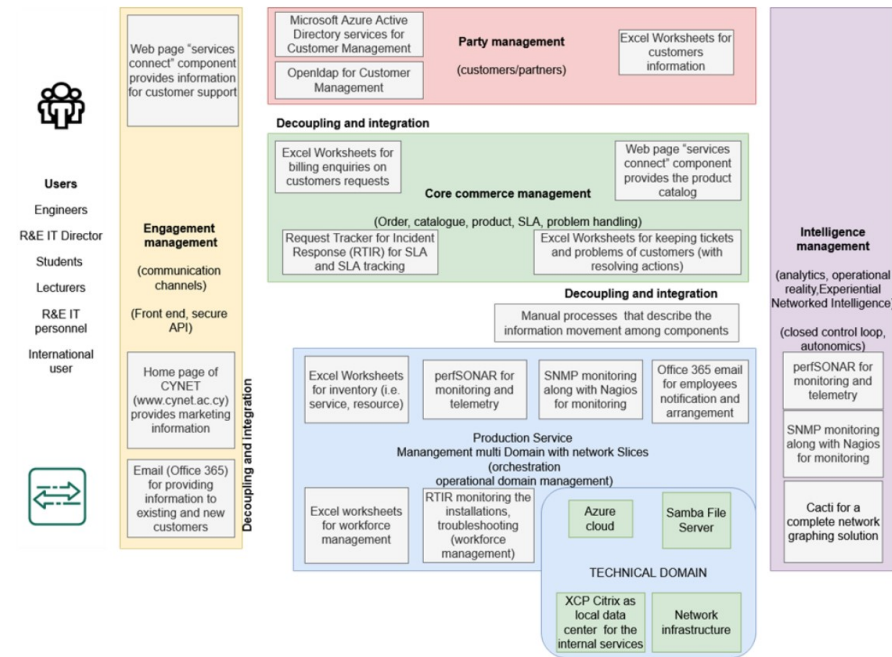 - GRNET, FUNET, SUNET, GÉANT
- Looking for more NRENs to get involved

Figure 4.1: CYNET OAV architecture mapped to TMForum's ODA

Attend OAV training via e-Academy

https://e-academy.geant.org/moodle/

- Or directly: https://e-academy.geant.org/moodle/course/index.php?categoryid=20

- Log-in via eduGAIN

- Many courses available already

- More to come!

Help us with your feedback!

The training map
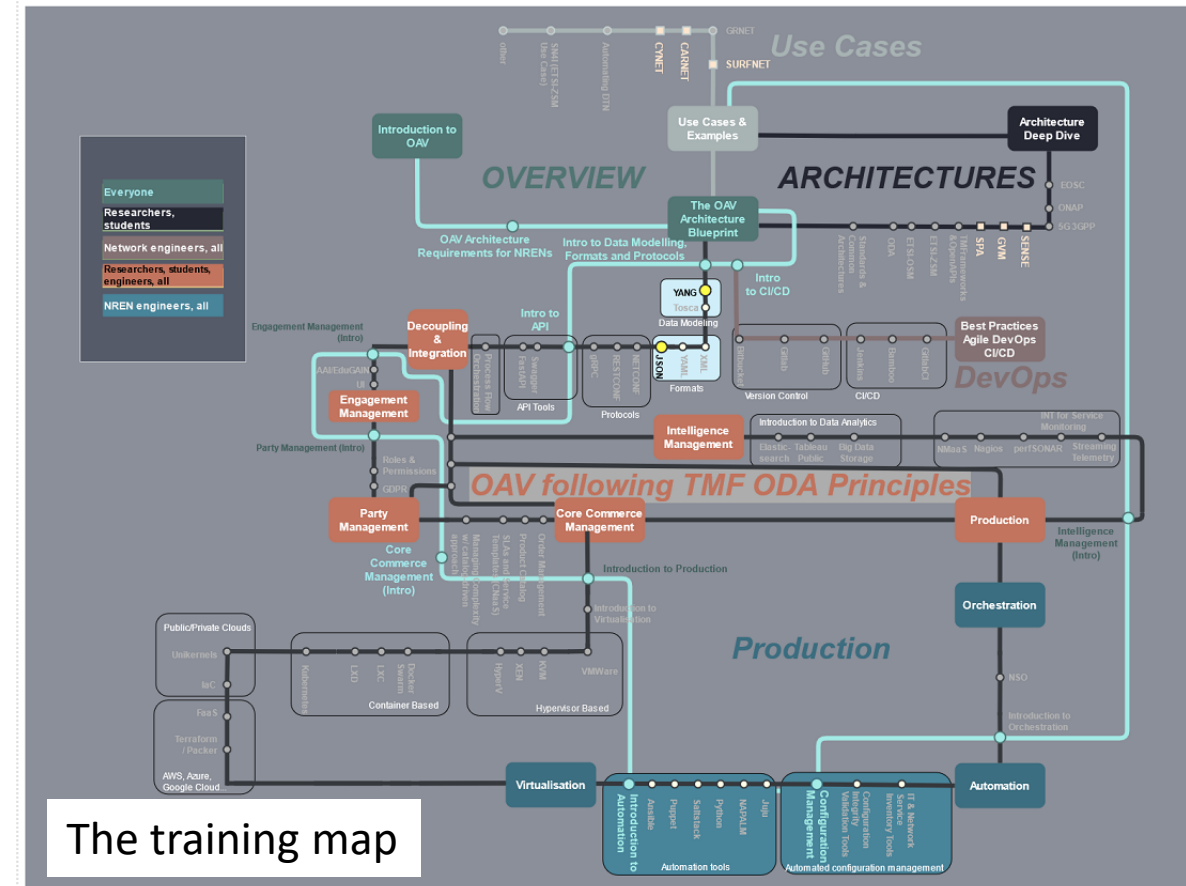
Task 3 – Monitoring and Management

perfSONAR
- New major release v4.4 due soon
- Material from 2nd European perfSONAR User Workshop online (day 1, day 2)

Performance Measurement Platform PMP
- Runs perfSONAR mesh from participating NRENs to GÉANT backbone
- New intercontinental mesh – includes SA, ESnet, TEIN3, BELLA, SINET

WiFiMon
- A new GÉANT service since July 2020, v1.3 just released
- Provides crowdsourced and/or RPi-based WiFi performance monitoring

Network Telemetry
- Material from Workshop on Network Management and Monitoring online
- Defining tests for 100G network monitoring and performance measurement (potentially: software transfer tools, RARE, and perfSONAR)

Find out more about the WP6 work

https://wiki.geant.org/display/NETDEV

Production services

Development

Presentations

Recordings

White Papers

OAV Community Portal

Code repositories

OAV Training

Deliverables and Milestones

Digital Architecture Mapping

NETDEV Home
Created by Linda Ness, last modified by Susanne Naegele-Jackson on May 28, 2021

GN4-3-WP6: Network Technologies and Services Development

This work package is mainly oriented towards prototyping and piloting new network services. It undertakes evaluation of new and promising network technology in the areas of network infrastructures and network services innovation. In addition, it is responsible for Network Management and Monitoring services and their evolution (provision of operational services).

Objectives

- Enhancements to the existing and/or creation of new services/products/tools through the assessment, validation and implementation of relevant network technologies and services.
- Building and maintaining consensus in the GÉANT community on a future direction for architectures for orchestrating and automating deployment of network services, and on the necessary monitoring and management platforms to support both the services and their underlying network infrastructure(s).
- Promoting wider adoption of general service orchestration and automation principles within the NREN community through consensus building discussions, workshops and dissemination activities.
- Enhancing GÉANT and NREN knowledge transfer through a variety of dissemination activities related to network technologies and services, and network monitoring and management and to build communities of interest around those services and technologies.

GÉANT WP6

WP6 Production Services
- WiFiMon — WiFiMon
- NMaaS — NMaaS
- perfSONAR — perfSONAR
- Performance Measurement Platform (PMP)

WP6 Production Software
- SPA Service Provider Architecture — Service Provider Architecture (SPA)

Digital Architecture & Automation
- OAV Architectures
- Orchestration, Automation and Virtualisation (OAV)
- OAV Training Portal

Applied Automation
- Campus Network Management-as-a-Service
- OAV Community Portal

Research & Development
- Optical Time and Frequency Networks (OTFN)
- Quantum Key Distribution (QKD)
- RARE - Router for Academia Research and Education
- In-Band Network Telemetry (INT)
- DTN - Data Transfer Nodes
- White Boxing

Thank you

Any questions?

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