

GN4-3 WP6 Status

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WP6 – current structure and work items

T1: Network Technology Evolution

- Low Latency networking
- Optical Time and Frequency Networking (OTFN)
- White box networking for R&E use cases
 - Internet Exchange Point (IXP), RENATER
 - CPE, FUNET
 - Data centre, GRNET
 - White box performance testing, PSNC
- Router for Academia, Research and Education (RARE) with the GÉANT P4 Lab
- Data Plane Programming (DPP)
 - In-band Network Telemetry
- Quantum Key Distribution (QKD)

T2: Network Services Evolution and Development

- Service Provider Architecture Platform (SPA)
- Orchestration, Automation and Virtualisation (OAV) Focus Groups
 - Architecture and ODA mapping
 - Training
 - Wiki with the Community Portal
 - Campus Network Management as a Service - CNaaS
 - (DTN and Terminology FGs are dormant)

T3: Monitoring and Management

- perfSONAR including perfSONAR Consultancy
- Performance Measurement Platform (PMP)
- Network Management as a Service (NMaaS)
- WiFiMon
- Network Telemetry
 - 100G monitoring/measurement
 - P4-based flow monitoring

WP6 umbrella page:

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

Task 1 – Network Technology Evolution

Low Latency Networking

- Seeking better monitoring capabilities for real-time applications (e.g. LoLa)
- Implemented GÉANT backbone per-segment latency and jitter monitoring
- Available at <https://timemap.geant.org/> (right click links for details)
- Being implemented by the GÉANT Operations team

Optical Time and Frequency Networking OTFN

- Testing in progress, in GÉANT, and around NREN T&F interconnectivity
- Summary [white paper](#) on T&F services in NRENs published
- Published [SWITCH's L-band deployment](#) white paper
- March [OTFN infoshare](#) material online ([recording](#))

White Box for R&E networks

- Use case white papers: [RENATER GIX](#) and [CPE](#), [FUNET CPE](#), [GRNET DC](#)
- And papers on [WB performance testing](#) and [Total Cost of Ownership](#) (TCO)
- Exploring testing RARE at 100G in a lab environment
- Planned work completed

Task 1 – Network Technology Evolution

Data Plane Programming DPP

- Focused on In-band Network Telemetry (INT)
- Deployed testbed running between 3 organisations, fourth in progress (NTUA)
- White paper published [INT testbed experience](#) including lessons learned
- March [INT infoshare \(recording\)](#) and June [TNC'21 DPP/INT BoF \(recording\)](#)

Quantum Key Distribution QKD

- Produced QKD in the NRENs state of the art [white paper](#)
- Four infoshares held (recordings available via the provided links):
 - [Quantum technologies](#), [QKD](#), [QKD simulation](#), [QKD testbed](#)
- Currently evaluating QKD simulators and testbeds options
- Planned PoC with Toshiba between GÉANT PoPs in late 2021 / early 2022

Router for Research and Academia RARE

- Full-featured open source platform now available – see the [RARE wiki](#)
- Runs FreeRtr control plane with P4 / DPDK data plane
- Distributed P4 Lab set up at 4 GÉANT PoPs; many NRENs/unis joining
- Growing use cases: RENATER private peering, PolKA, DMC21, bier/AMT, ...

International RARE/FreeRtr lab

"WP6 T1 International RARE/free..."

Toutes les modifications ont été enregistrées dans Drive.

Ajouter un calque Partager

Aperçu

- NSI 10G RNP-UFES
- NSI 10G RNP-ICAIR
- 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
- Static? ?G BUD-FRA
- Linha 13
- Static? ?G BUD-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 Platform

SPA

- Development and support to the production GCS service
- Provides TMForum ODA-compliant software tools
- Exploring possibilities to extend to other GÉANT services
- Work in progress to containerise components and provide via NMaaS



Orchestration,
Automation,
Virtualisation

OAV

- Aiming to raise the bar for OAV in the NREN community
- New [training modules](#) being released regularly through GÉANT e-Academy
- White paper on [OAV architectures](#), with [promotional video](#) and [pamphlet](#)
- Ongoing work on mapping NREN architectures to the TMForum ODA reference architecture (examples published to date: [SURF](#), [CYNET](#), [CARNET](#), [HEANet](#))
- [Wiki](#) including OAV [community portal](#); extended to cover all WP6 work
- Organised [OAV BoF](#) at TNC21
- Collaborated with GNA-G Automation WG to update reference [terminology](#)
- [Software Tools for CNaaS infoshare](#) held ([recording](#))

Network Automation eAcademy



Meet us on the first Tuesday
of every month
One hour for questions &
answers
Just drop us an email at
oav@lists.geant.org and we
will send you the link.

Training

- Learning units on the GLAD e-Academy (18 in total): <https://e-academy.geant.org/>
- Explore the training metro map

Architecture Mapping

- Mapping NREN digital architecture with the reference TMForum's Open Digital Architecture - ODA
- Comparing NREN's digital architectures with architectures from other sources
- Enhancing automation and orchestration

Consultancy and Expertise

- Weekly meetings with OAV team experts – **Talk with the experts!**
- An opportunity to customise existing solutions
- Choose your own training path!

Task 3 – Monitoring and Management

perfSONAR

- Well established [toolkit](#) for active network performance monitoring
- Continued development & support in the Global team, now with RNP
- Latest version [v4.4.1](#); v5.0 underway
- [2nd European perfSONAR User Workshop](#) material online ([day1](#), [day2](#))

perfSONAR Consultancy

- Providing perfSONAR advice and guidance to the GÉANT community
- Helping projects or NRENs deploying for specific communities, e.g., recently working with RENATER and Jisc, and low latency team in WP6

Performance Measurement Platform PMP

- Runs [perfSONAR mesh](#) from participating NRENs to GÉANT backbone
- Providing maintenance and support; node replacements
- New [intercontinental mesh](#) – includes SA, ESnet, TEIN3, BELLA, SINET

Task 3 – Monitoring and Management

Network Management as a Service NMaaS

- Provides a [portfolio of applications](#) run via a secure, virtual platform
- Dockerised images Implemented through a Kubernetes cluster
- User base is growing, both within GN4-3 and R&E networks worldwide

WiFiMon

- A [new production GÉANT service](#) since July 2020
- Provides crowdsourced and/or RPi-based WiFi performance monitoring
- A promotional [WiFiMon video](#) has been published and an [infoshare](#) held
- Supports eduroam monitoring

Network Telemetry

- Published [zero footprint monitoring white paper](#), inc. streaming telemetry
- Held [Telemetry and Big Data Workshop](#) and [NEMMO](#) workshop
- Defining tests for 100G network monitoring and performance measurement (software transfer tools, RARE, and perfSONAR)
- P4-based flow monitoring

Find out more about the WP6 work

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

White
Papers

OAV
Community
Portal

Code
repositories

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.

Deliverables and Milestones

OAV Training

Digital Architecture Mapping



WP6 Production Services	
WiFiMon	
NMaaS	
perfSONAR	
Performance Measurement Platform (PMP)	
WP6 Production Software	
SPA Service Provider Architecture	Service Provider Architecture (SPA)

Production
services

Development

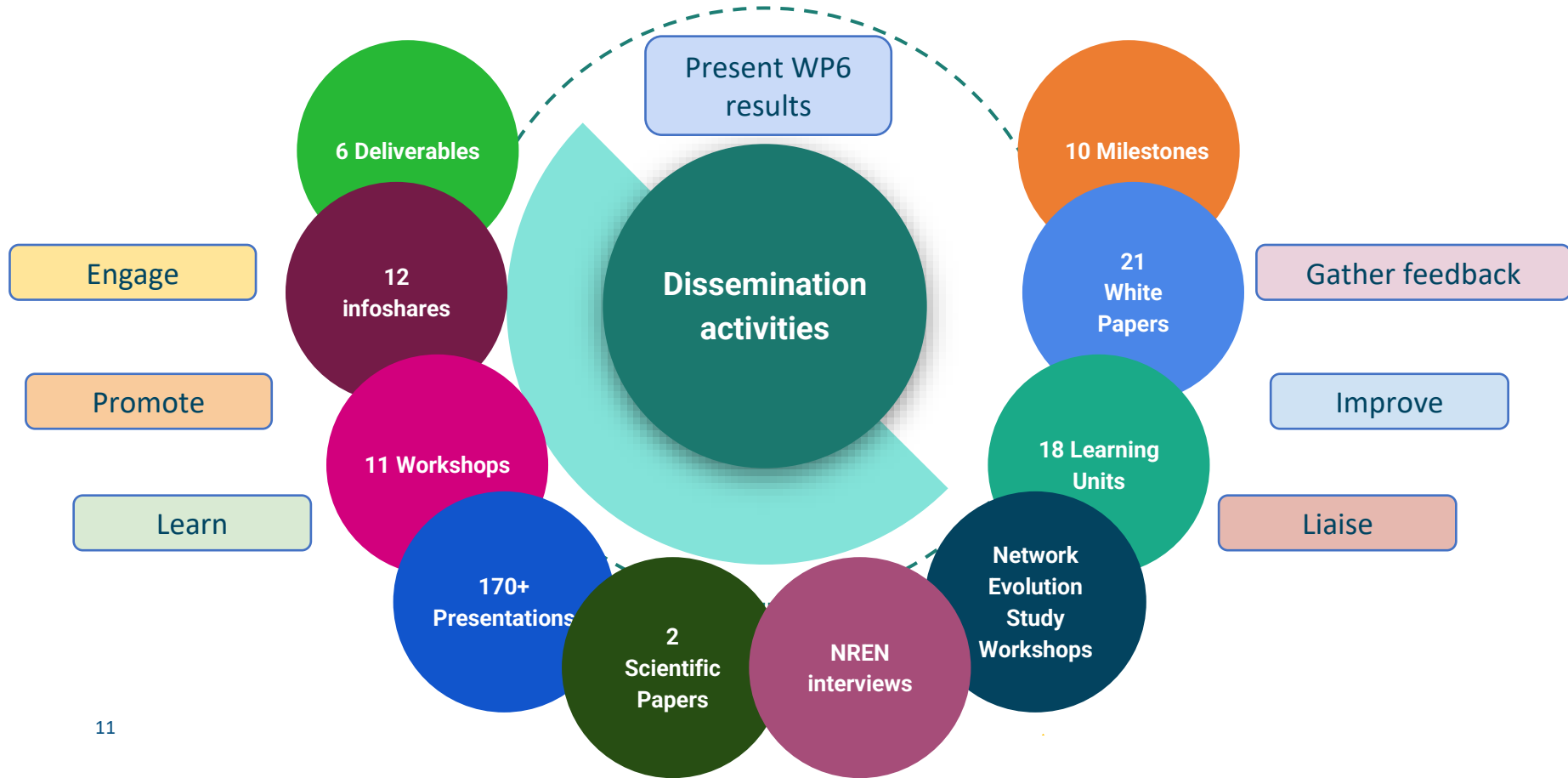
Presentations

Recordings

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 Box	White Boxing

WP6 Dissemination Activities



New since the last STF

White box testing

- [White Paper: White Box - GRNET Data Centre Use Case](#)
- [White Paper: Ultrastable Frequency Transfer in L-Band](#)
- [White Paper: Funet CPE – White Box Edge Router](#)

Architecture mapping

- [White Paper: HEAnet OAV Architecture Analysis](#)

New releases of production services: [perfSONAR](#), [NMaaS](#), [WiFiMon](#), [SPA](#)

ARGUS

New releases and updates: [RARE/FreeRtr](#), [INT/DPP](#), [TimeMap](#)

Infoshares: [QKD simulators](#), [QKD Physical implementation and testbed](#)

More about WP6 topics

Today's STF:

- WP6 White Box – Xavier Jeannin (RENATER)
- SPA platform - OAV-based service management approach - Roman Lapacz (PSNC)
- ARGUS - An alarm aggregation console - Morten Brekkevold, Vidar Faltinsen (Uninett)

Future events (please register!):

- SIG-NOC – 15 December 2021: <https://events.geant.org/event/1058/>
- GÉANT Infoshares: White Box in NREN context: <https://events.geant.org/event/1064/>

<https://wiki.geant.org/display/netdev>

Thank you

Any questions?

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