



Orchestration, Automation and Virtualisation Architectures

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NOG.HR Meeting, 19 October 2023, Zagreb, Croatia

Public (PU)



30 years of Poznań Supercomputing and Networking Center

Center of e-Infrastructure

- National Research and Education Network PIONIER
- Research Metropolitan Area Network - POZMAN
- HPC Center
- Data repositories and Digital Libraries Federation

Center of Research & Development

- New Generation Networks
- HPC, Grids & Clouds
- Grand challenge applications
- New media and visualization technologies
- Knowledge Platforms
- Future Internet - Technology, Applications and Services for IS
- Cyber Security
- Quantum Communication and Computing – use cases and practical scenarios

<https://www.psnk.pl/>

PSNC in numbers



507

employees



16

laboratories



30

years of operation



16+

fields of activity



65

current projects

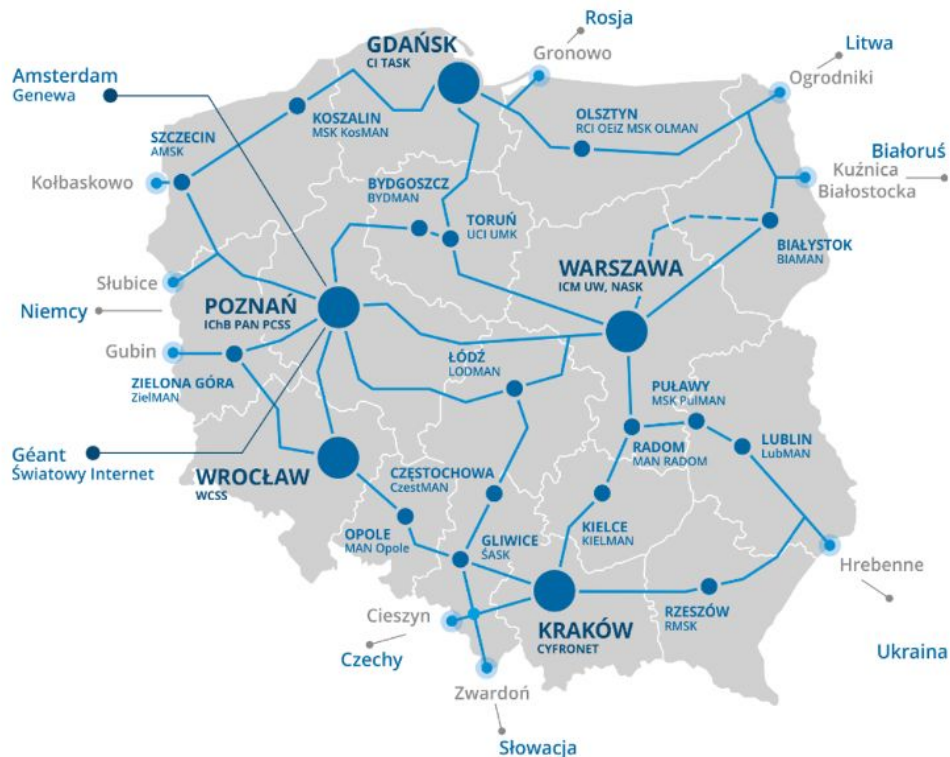


103

projects in H2020,
Horizon Europe,
Digital Europe
Programme



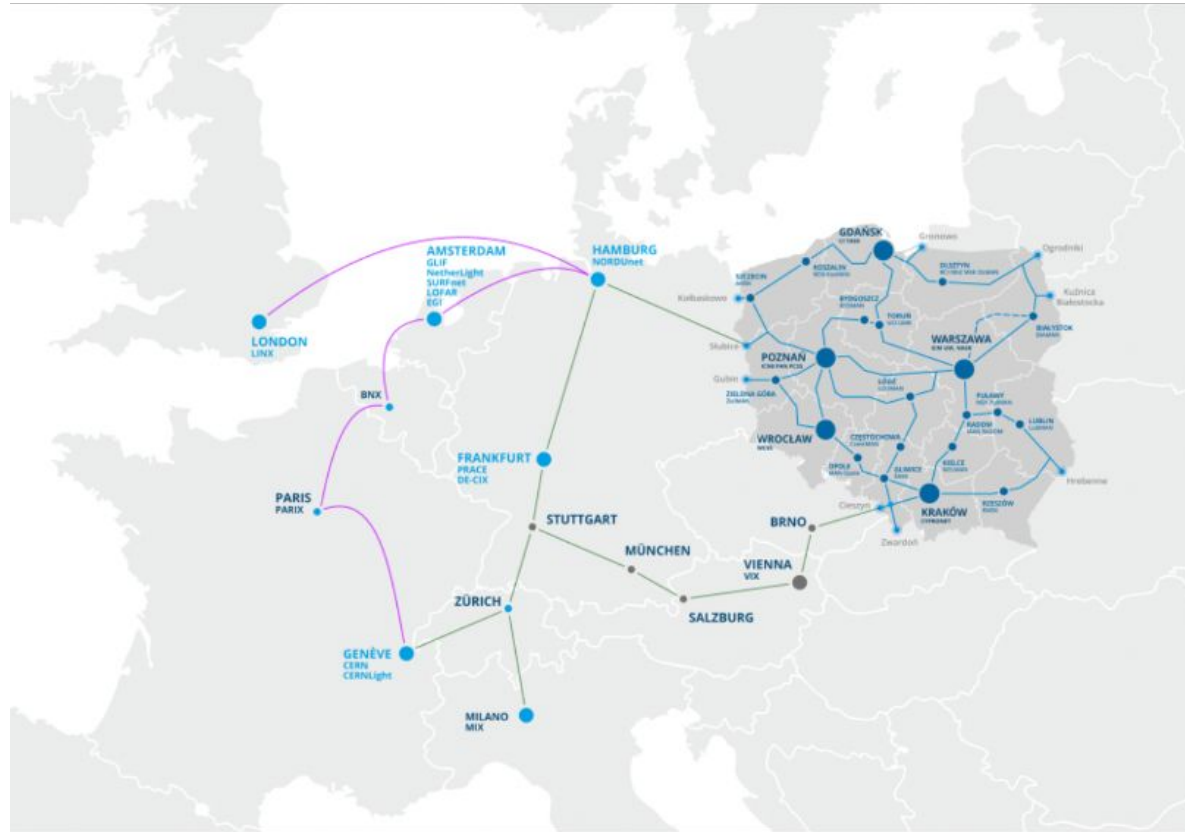
PSNC Network - PIONIER in Poland



Type of connected unit	Number of units
Research institutions	221
Universities	196
Post-secondary schools	21
High schools, secondary schools, primary schools and vocational schools	234
Healthcare	59
Public safety	27
Government administration	27
Provincial administration	59
District, municipality and city administration	73
Other administration	9
Court and public prosecutor's office	26
Cultural institutions	104
Other educational	27

~10 000 km of fiber in total

PIONIER Connectivity in Europe



The GÉANT Project



GÉANT's vision is to ensure equal network access for all scientists across Europe to the research infrastructures and the e-infrastructure resources



The GÉANT Project is a part of the European Union's Horizon Europe research and innovation programme under the seven-year Framework Partnership Agreement (FPA)



500 contributors from 37 partners - European R&E Institutions



50 M users

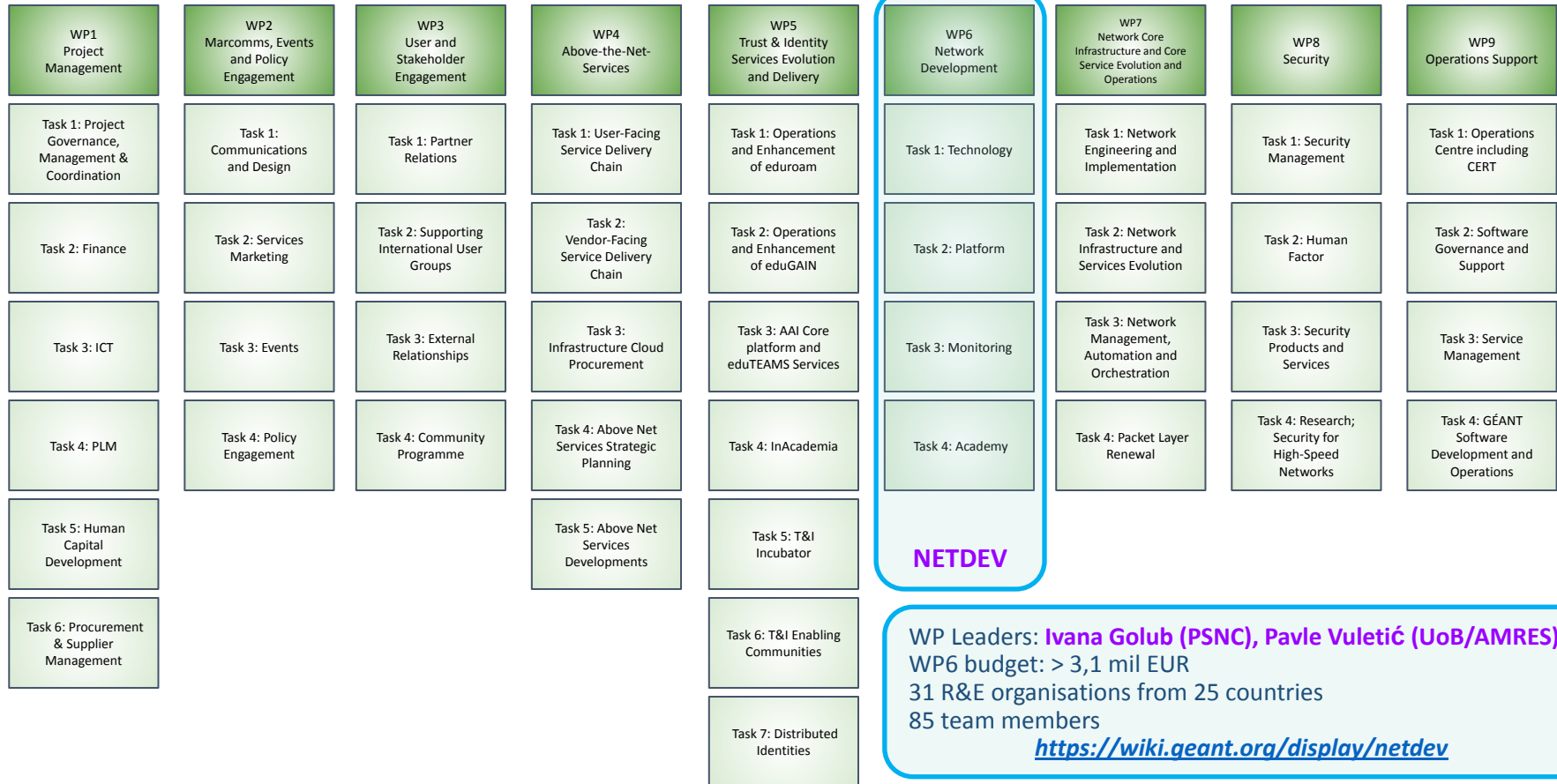


GÉANT 5-1 (GN5-1) Project duration: 1 Jan 2023 – 31 Dec 2024

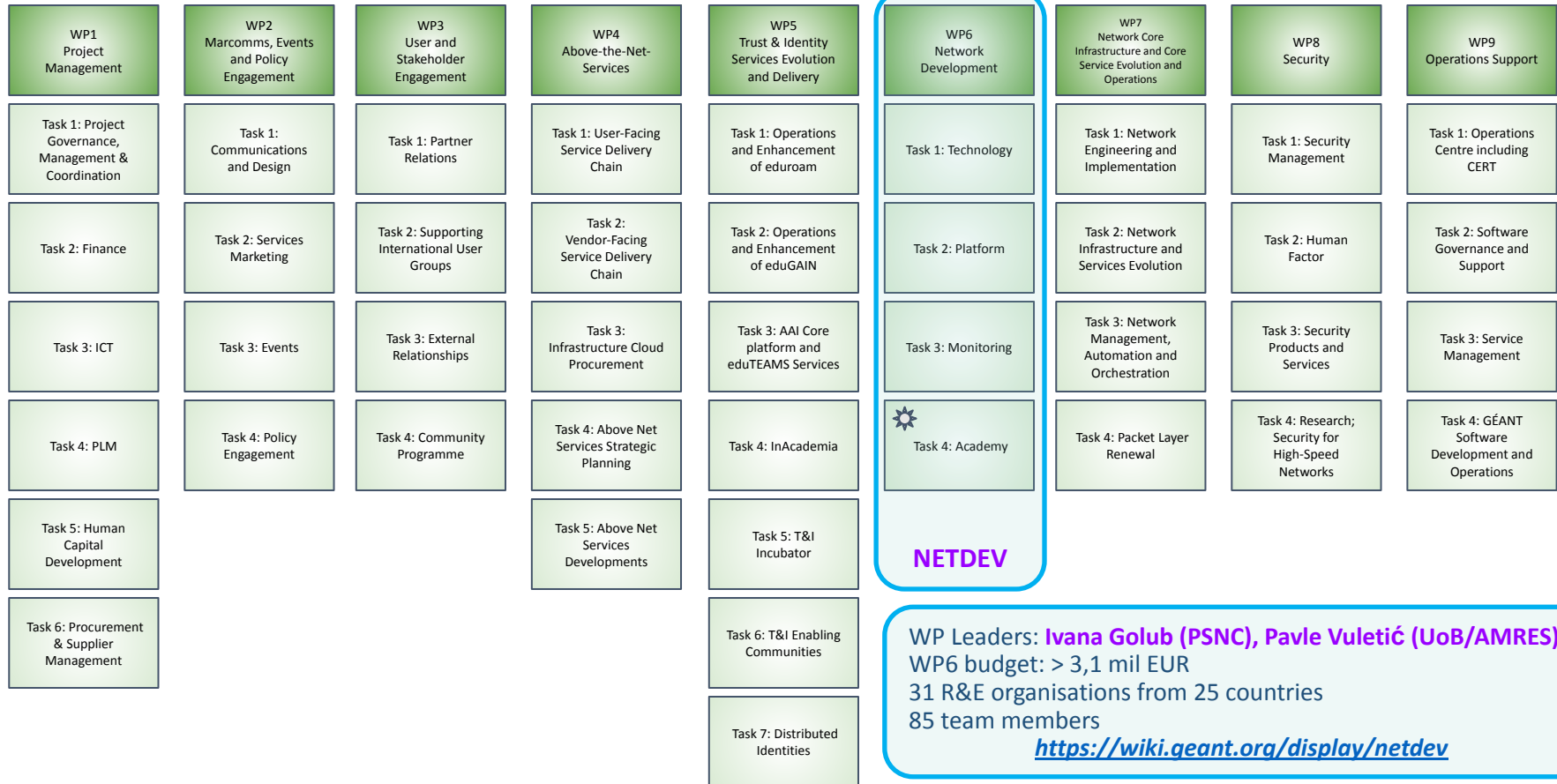
The GÉANT 5-1 Project Structure

WP1 Project Management	WP2 Marcomms, Events and Policy Engagement	WP3 User and Stakeholder Engagement	WP4 Above-the-Net-Services	WP5 Trust & Identity Services Evolution and Delivery	WP6 Network Development	WP7 Network Core Infrastructure and Core Service Evolution and Operations	WP8 Security	WP9 Operations Support
Task 1: Project Governance, Management & Coordination	Task 1: Communications and Design	Task 1: Partner Relations	Task 1: User-Facing Service Delivery Chain	Task 1: Operations and Enhancement of euroam	Task 1: Technology	Task 1: Network Engineering and Implementation	Task 1: Security Management	Task 1: Operations Centre including CERT
Task 2: Finance	Task 2: Services Marketing	Task 2: Supporting International User Groups	Task 2: Vendor-Facing Service Delivery Chain	Task 2: Operations and Enhancement of eduGAIN	Task 2: Platform	Task 2: Network Infrastructure and Services Evolution	Task 2: Human Factor	Task 2: Software Governance and Support
Task 3: ICT	Task 3: Events	Task 3: External Relationships	Task 3: Infrastructure Cloud Procurement	Task 3: AAI Core platform and eduTEAMS Services	Task 3: Monitoring	Task 3: Network Management, Automation and Orchestration	Task 3: Security Products and Services	Task 3: Service Management
Task 4: PLM	Task 4: Policy Engagement	Task 4: Community Programme	Task 4: Above Net Services Strategic Planning	Task 4: InAcademia	Task 4: Academy	Task 4: Packet Layer Renewal	Task 4: Research; Security for High-Speed Networks	Task 4: GÉANT Software Development and Operations
Task 5: Human Capital Development			Task 5: Above Net Services Developments	Task 5: T&I Incubator				
Task 6: Procurement & Supplier Management				Task 6: T&I Enabling Communities				
				Task 7: Distributed Identities				

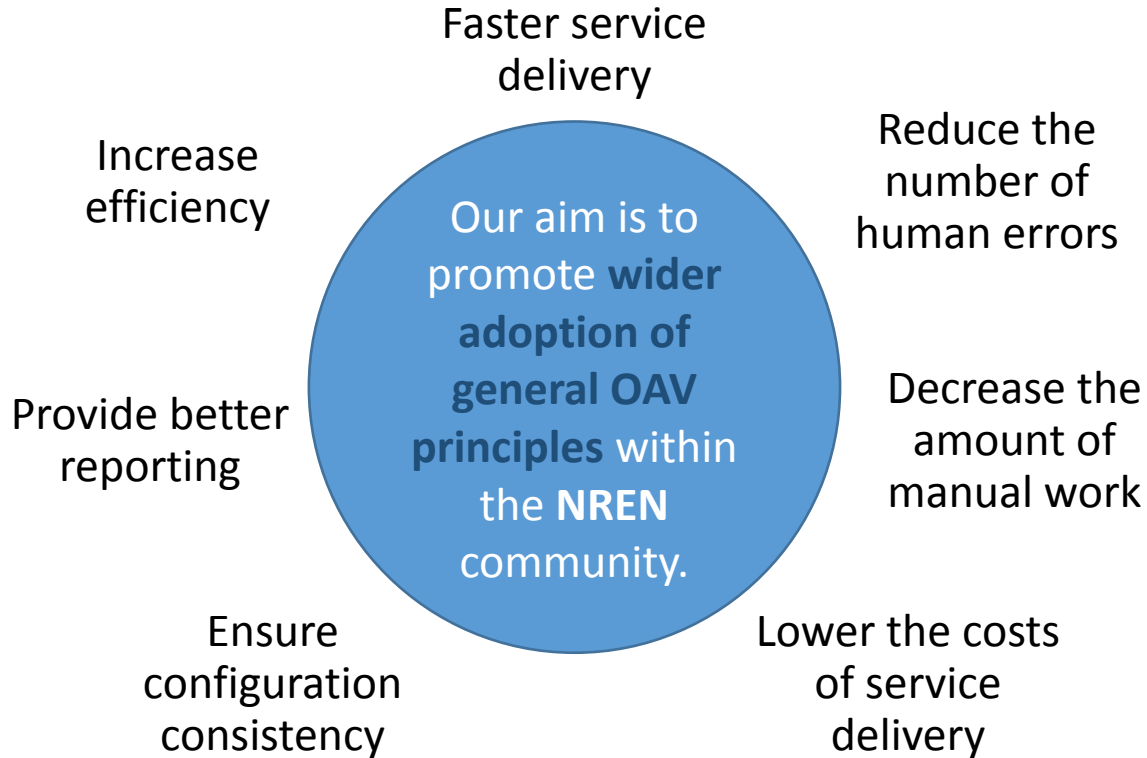
The GÉANT 5-1 Project Structure



The GÉANT 5-1 Project Structure



OAV: Orchestration, Automation and Virtualisation



Collaborative approach to OAV in the GÉANT Community



Strong need for collaboration and exchange of knowledge and expertise



Knowledge as a gap



We speak different languages



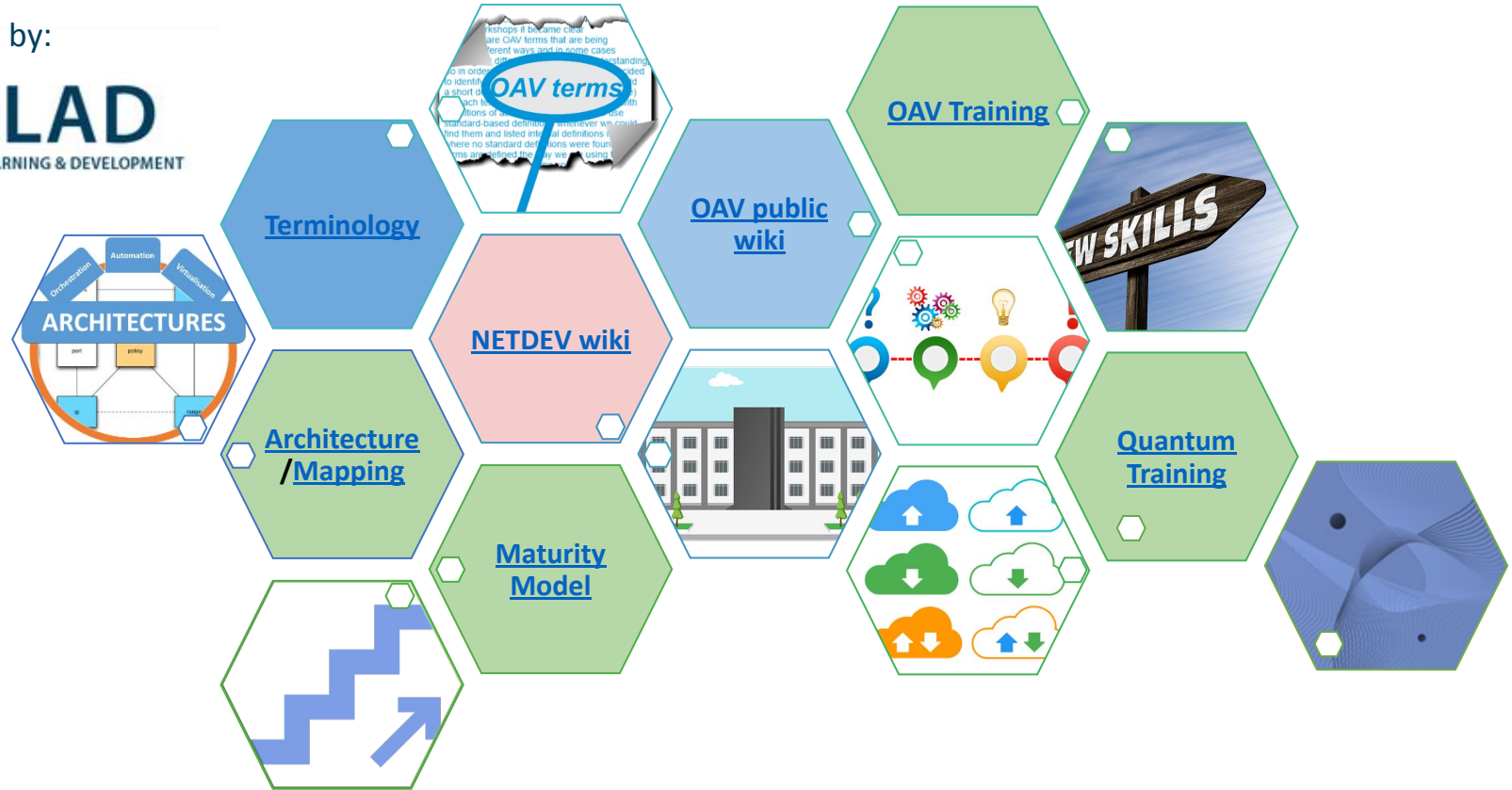
A generally accepted architecture blueprint needed



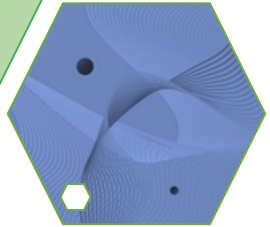
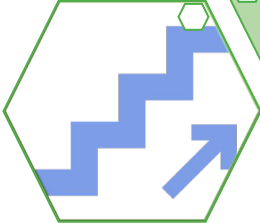
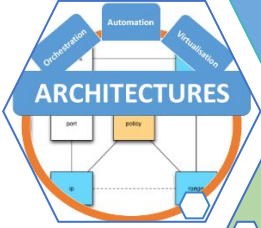
NRENs are willing to share experiences and learn from others

Network eAcademy

Powered by:



...whether it be the case
are OAV terms that are being
erent ways and in some cases
...to in order of...
to identify...
a short de...
...each...
...ions of...
...standard-based defini...
find them and listed initial definitions...
here no standard definitions were found...
...we using...



Network Automation eAcademy

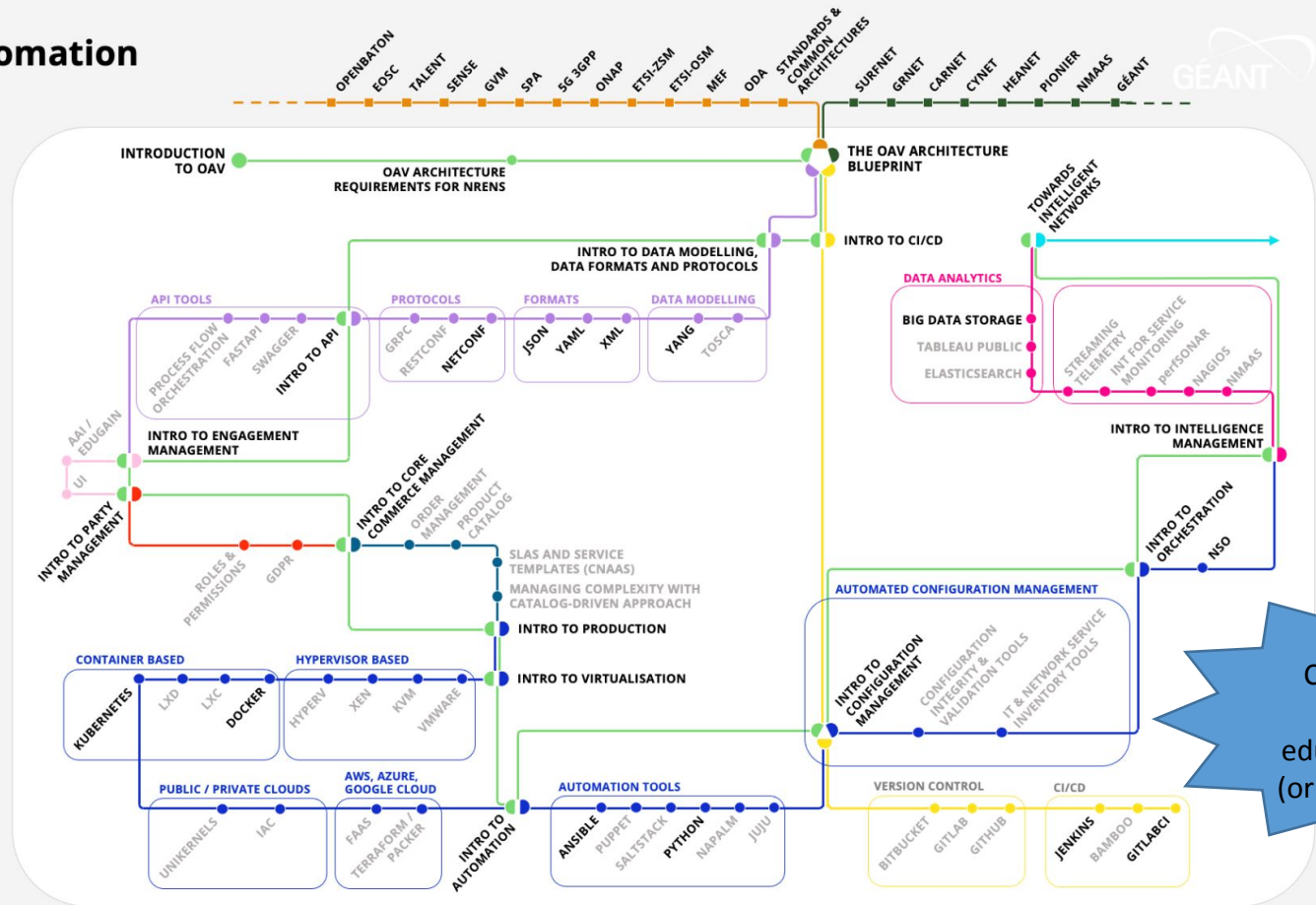
Legend

- Unit / ■ Document
- Released / ● Not released
- Exchange point
- You can jump back and forth between this station and all exchange points at any time

Tracks

- GENERAL INTRODUCTION
- AGILE, DevOps, CI/CD
- DECOUPLING & INTEGRATION
- PRODUCTION
- ENGAGEMENT MANAGEMENT
- PARTY MANAGEMENT
- CORE COMMERCE MANAGEMENT
- INTELLIGENCE MANAGEMENT
- OAV REALISATION
- USE CASES AND EXAMPLES
- ARCHITECTURE

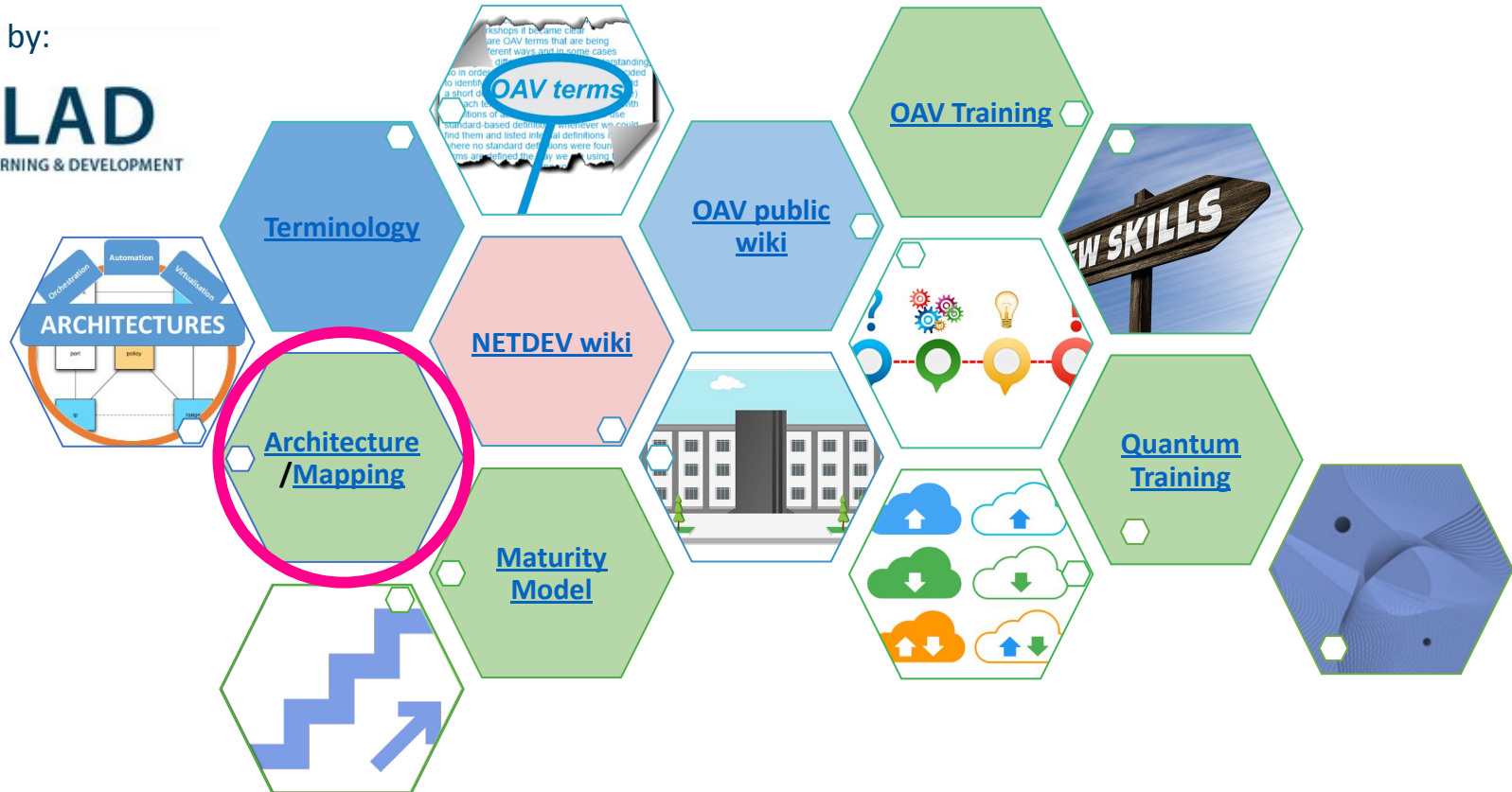
Functional Blocks in the TM Forum OPEN DIGITAL ARCHITECTURE (ODA)



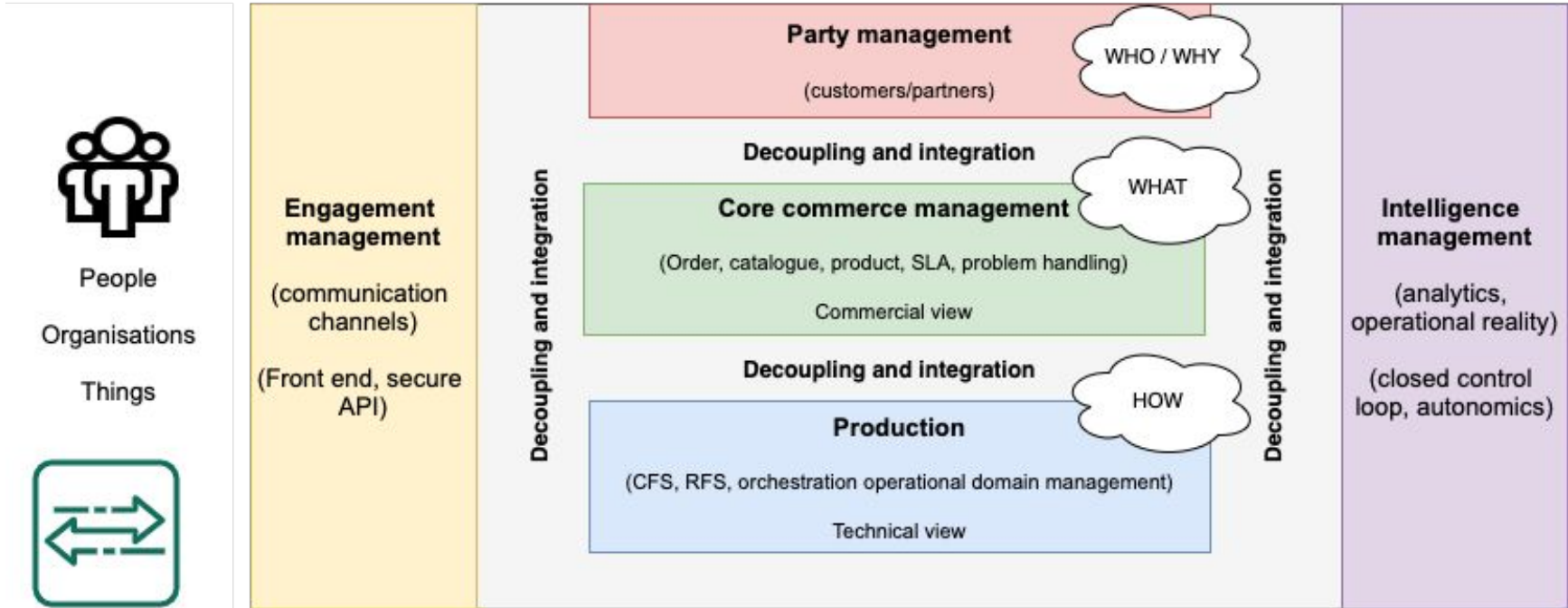
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eduGAIN access
(or social media)

Network eAcademy

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TMForum Open Digital Architecture as a Reference Architecture



Digital Architecture Analysis

Mapping NREN & use cases architectures to a common blueprint, the TM Forum Open Digital Architecture (functional architecture).



NREN Architectures

- [CARNET](#)
- [CYNET](#)
- [GÉANT](#)
- [GRNET](#)
- [HEAnet](#)
- [PIONIER](#)
- [SURF](#)

NETDEV Architectures

- [Argus](#)
- [NMaaS](#)
- [SPA](#)

Other Use Cases

- [5G](#)
- [EOSC](#)
- [ETSI GANA](#)
- [ETSI OSM](#)
- [ETSI ZSM](#)
- [GVM](#)
- [MEF LSO](#)
- [Open Baton](#)
- [ONAP](#)
- [SENSE](#)
- [TALENT](#)

NMaaS - Network Management as a Service

A portfolio of network management applications run as dedicated, cloud-based per-user instance

28 applications available, easy to add new tools

Use cases:

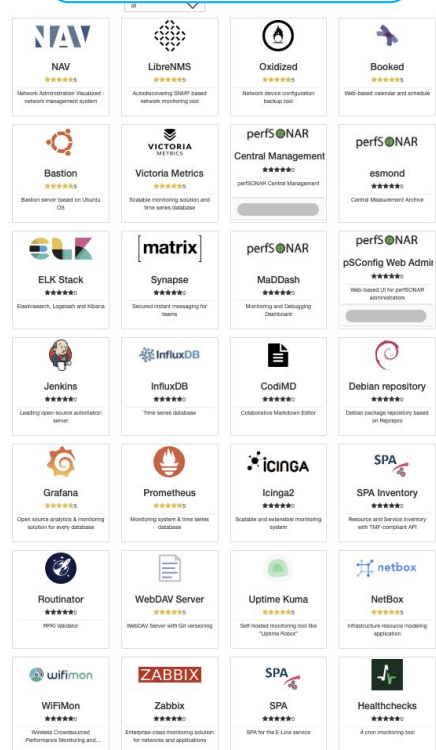
- Network/Equipment Management for Small/Medium size networks/institutions
- Project-owned equipment
- NMaaS Virtual Lab - **NEW!**

How to use NMaaS?

- Managed service
 - Production NMaaS instance: <https://nmaas.eu>
 - Sandbox instance: <https://nmaas.geant.org>
- Self-hosted
 - On your own NMaaS instance: <https://docs.nmaas.eu/install-guide>
 - On a local machine: <https://docs.nmaas.eu/local-vm>

NMaaS

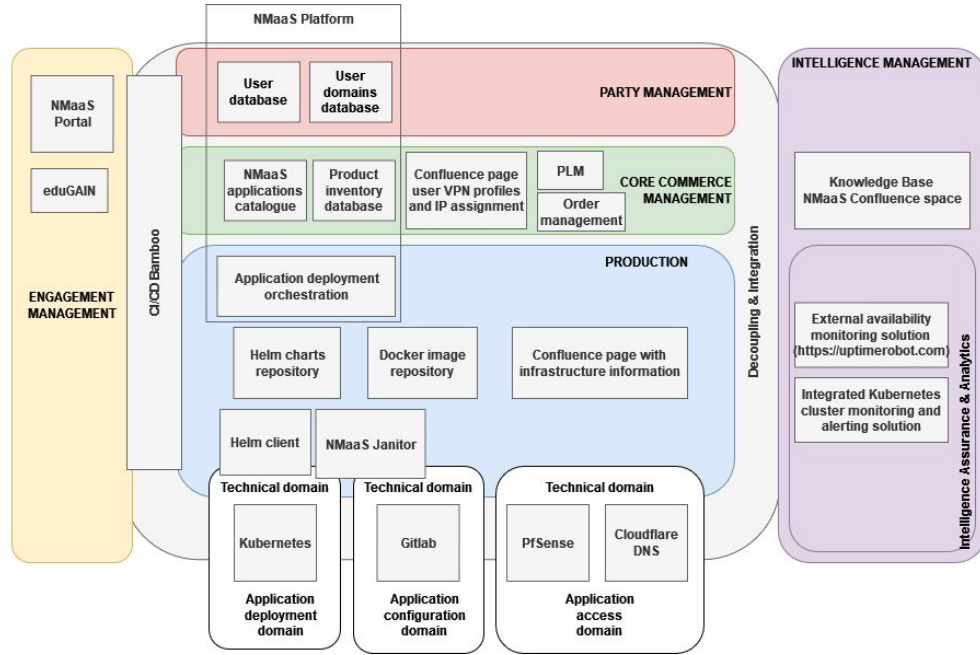
nmaas.eu
nmaas@lists.geant.org



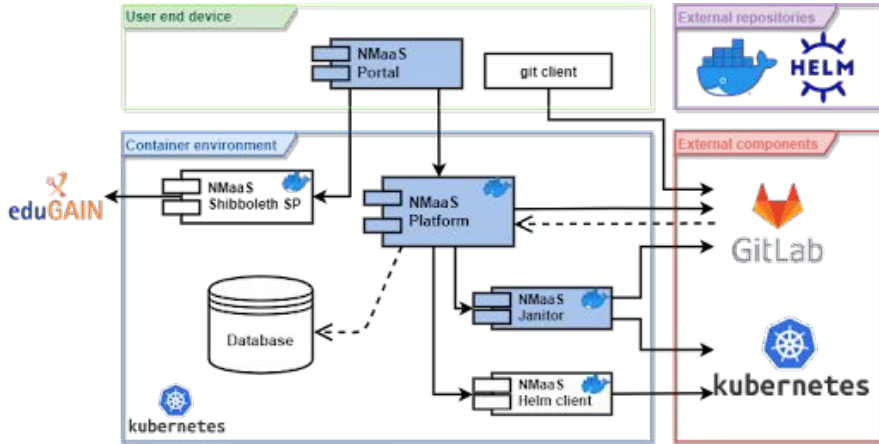
NMaaS Architecture



Users
Network operators

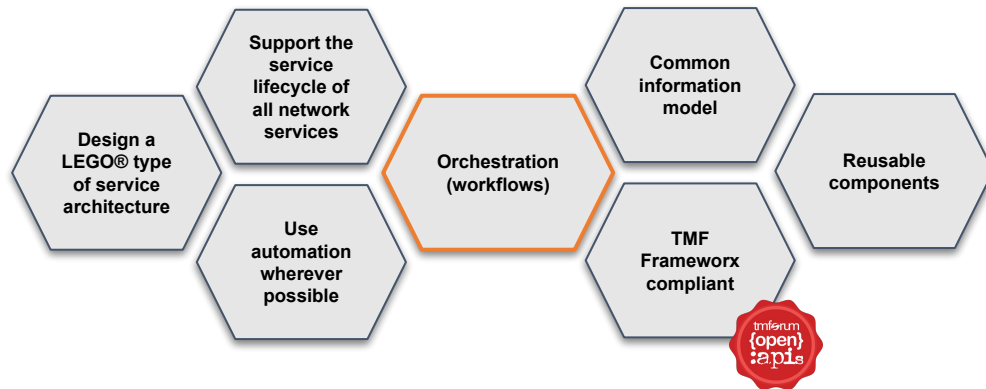


[NMaaS-OAV-Architecture-Analysis](#)

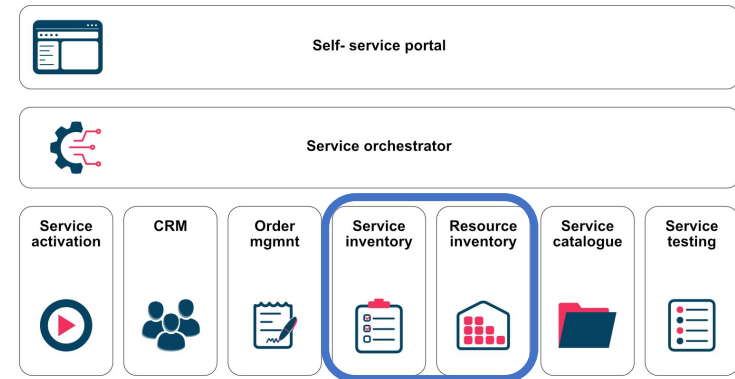
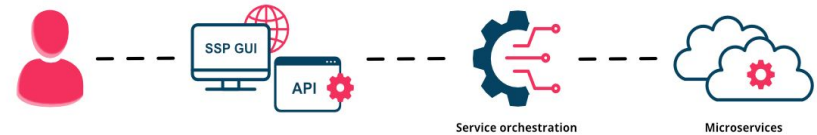


SPA Service Provider Architecture

SPA is a modular distributed platform to orchestrate and automate network services in the GÉANT and NREN network infrastructures.

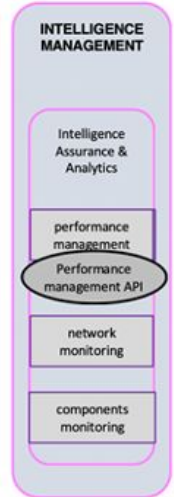
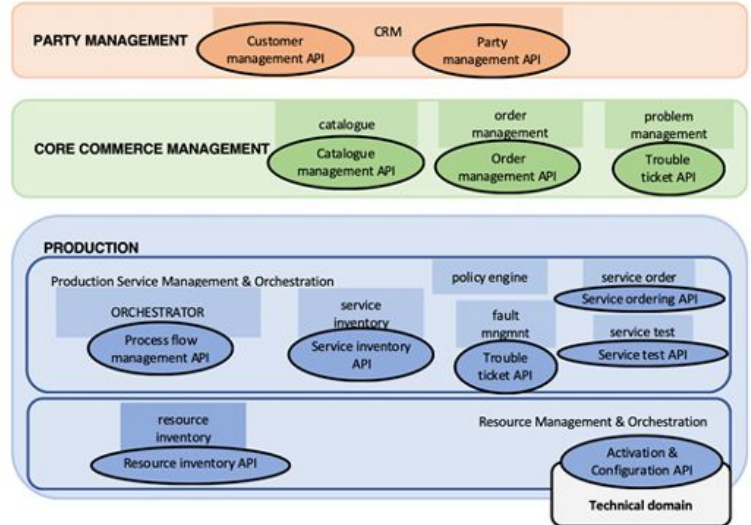
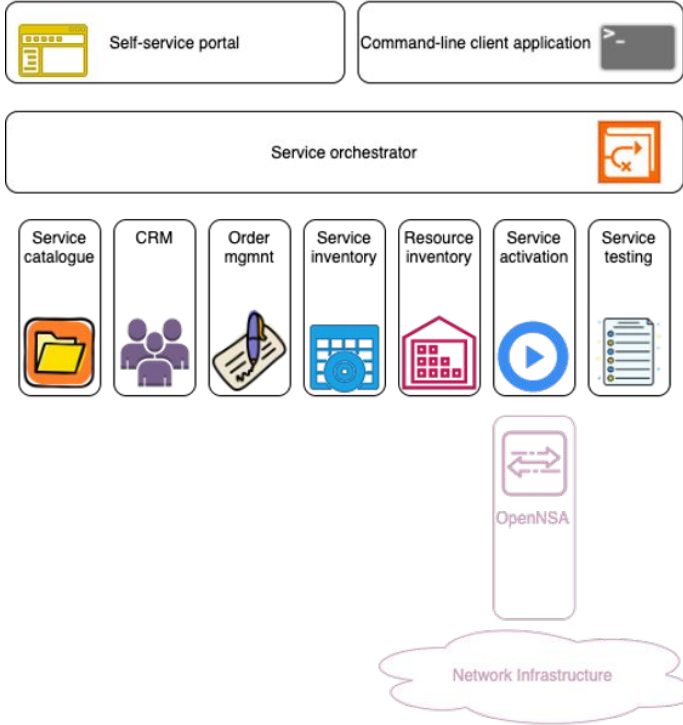


- Process and service orchestration and automation in action
- Used for the GÉANT Connection Service (GCS)
- Test service instance available in NMaaS



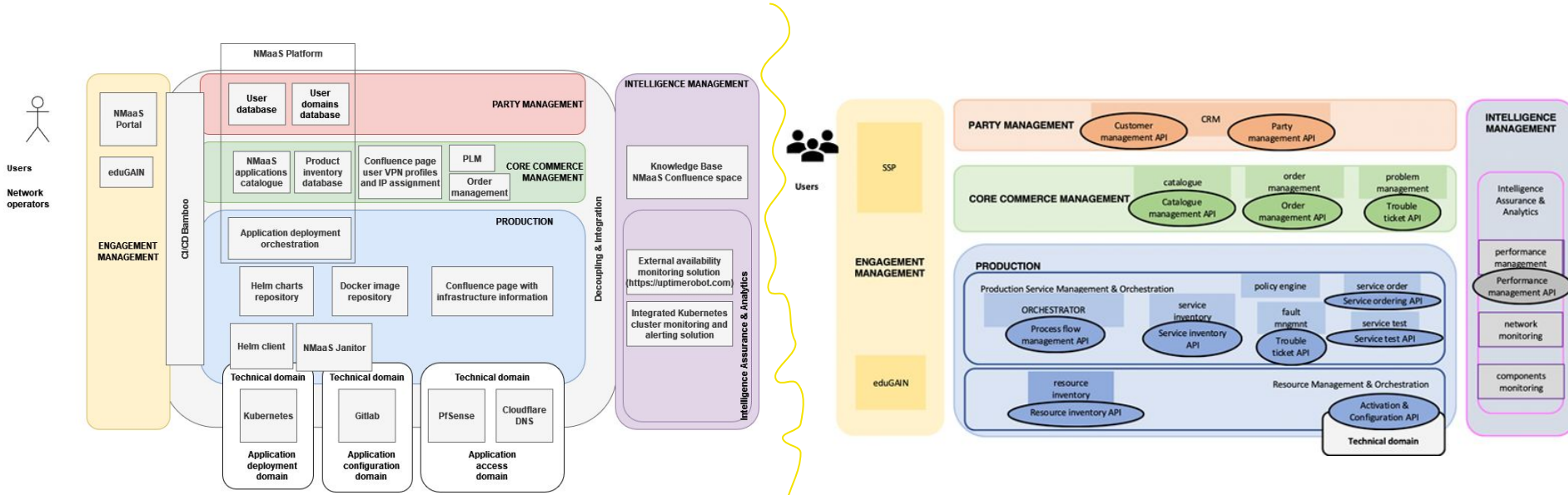
spa@lists.geant.org
<https://wiki.geant.org/display/NETDEV/SPA>

Service Provider Architecture



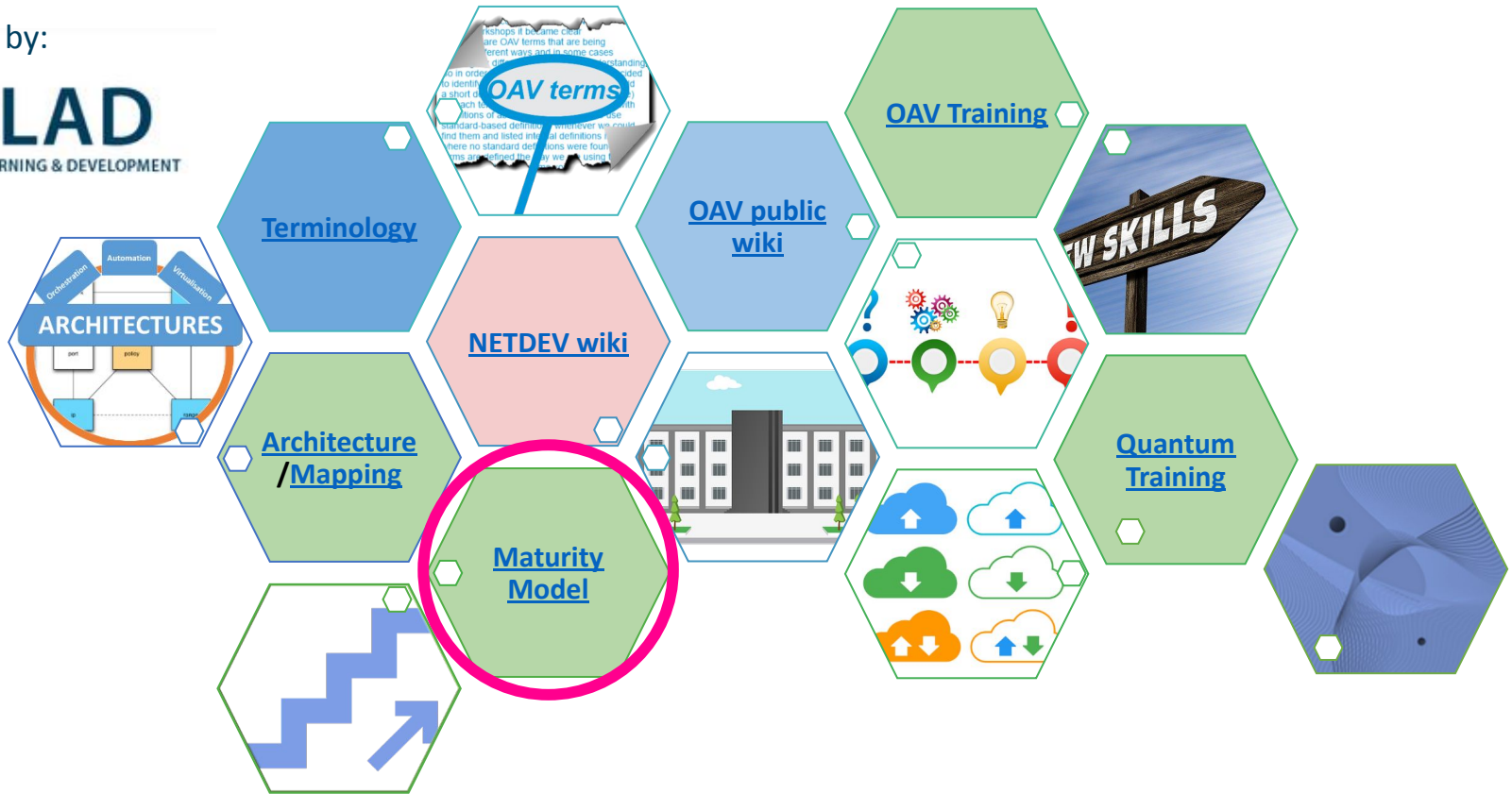
Technical domain

NMaaS and SPA Architectures



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Why OAV MM?



Provide a common OAV progress indicator

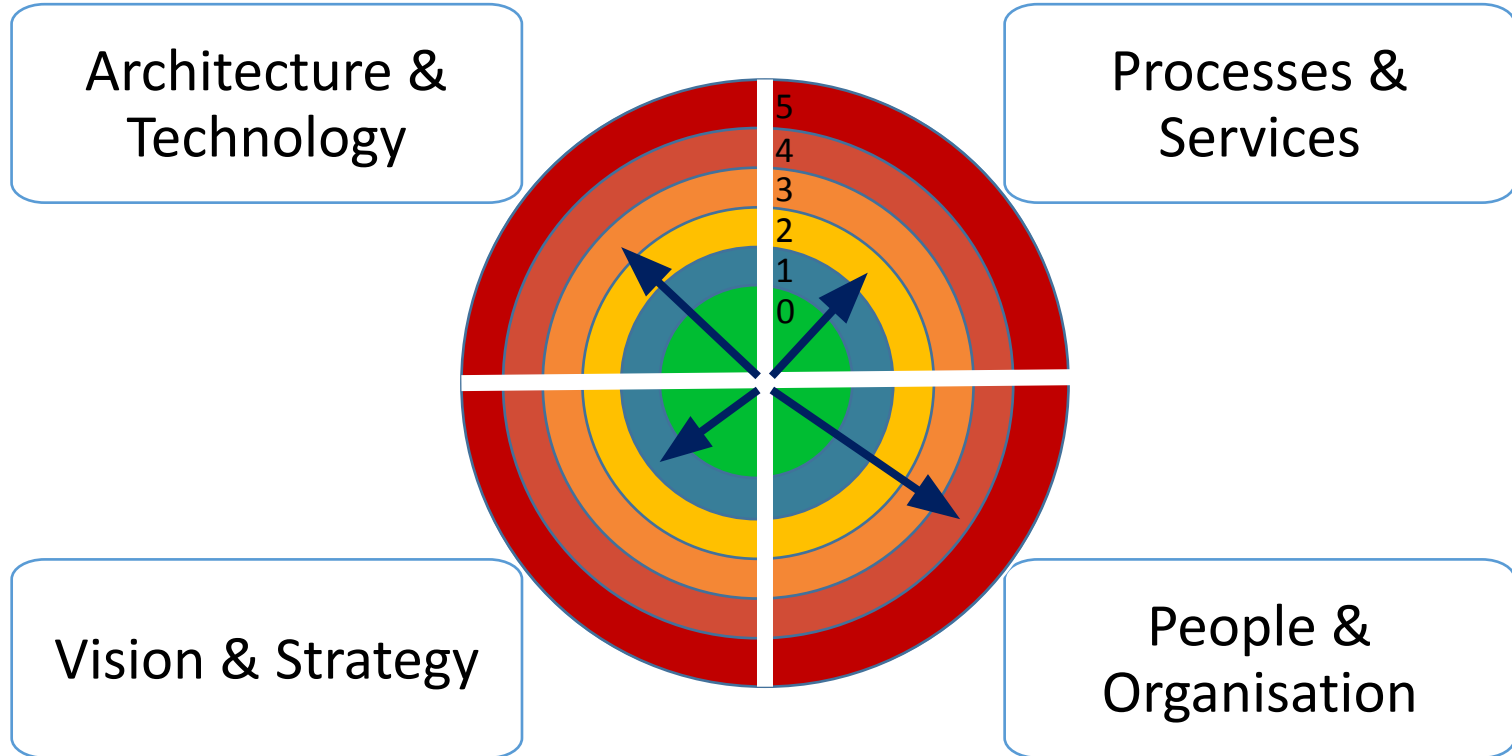


Help organisations on their OAV journey

Maturity Model Goals

Measure	Measure the current OAV capabilities in a meaningful way
Identify	Enable clear identification of strengths and improvement points, be aware of threats and opportunities
Prioritise	Help prioritise what to do in order to advance and improve
Journey	Identify gaps between the current and future state and how to get there

OAV Maturity Model - Dimensions



Dimensions definition

- architectural and technological capabilities
- necessary to develop, establish and continue to evolve an OAV environment

Architecture
& Technology

- process management
- service lifecycle management
- OAV activities needed to achieve successful digital services

Processes &
Services

- aligning OAV with corporate objectives
- defining corresponding priorities across the organisation

Vision &
Strategy

- organisational culture that supports the adoption and advancement of OAV
- all stakeholders
- open, innovative, agile and flexible collaboration

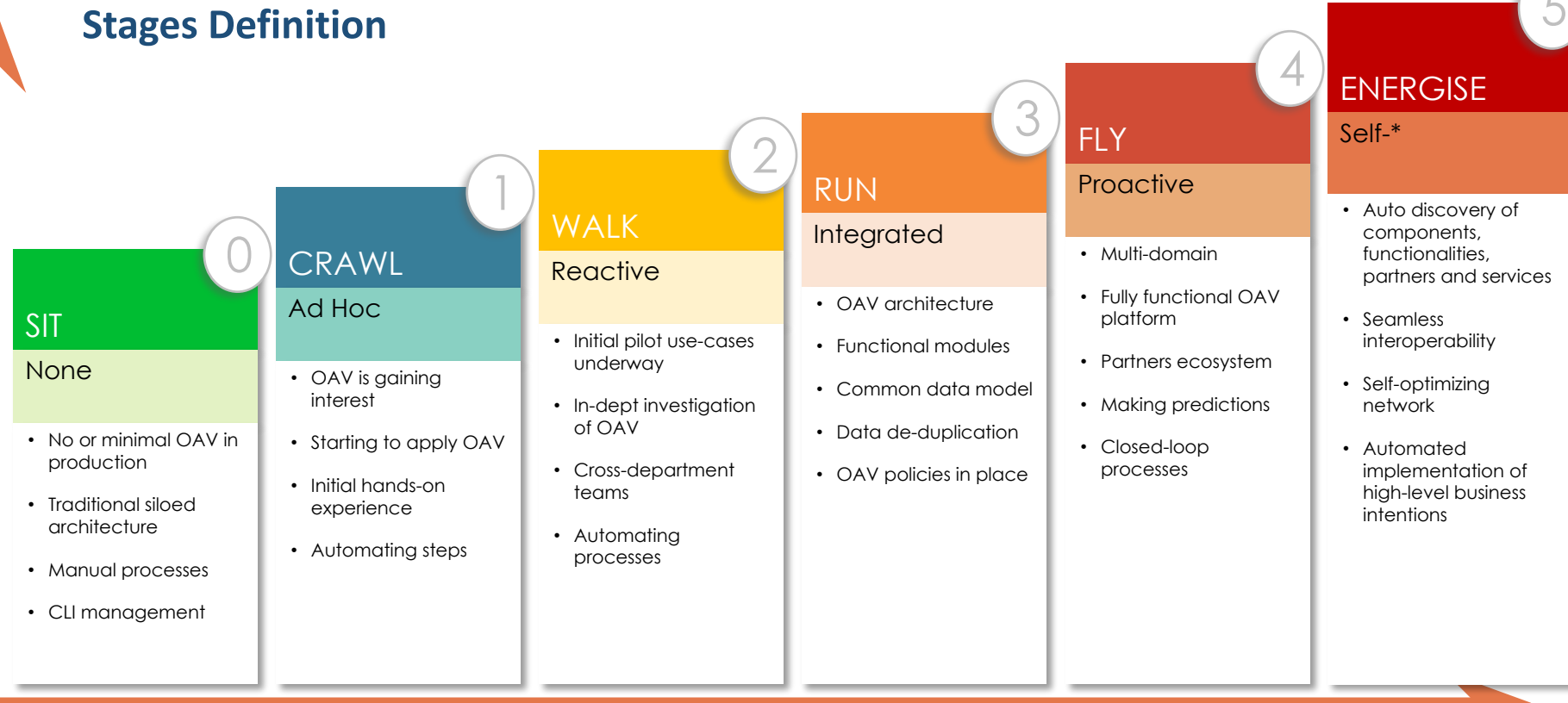
People &
Organisation

OAV Maturity Model - Stages



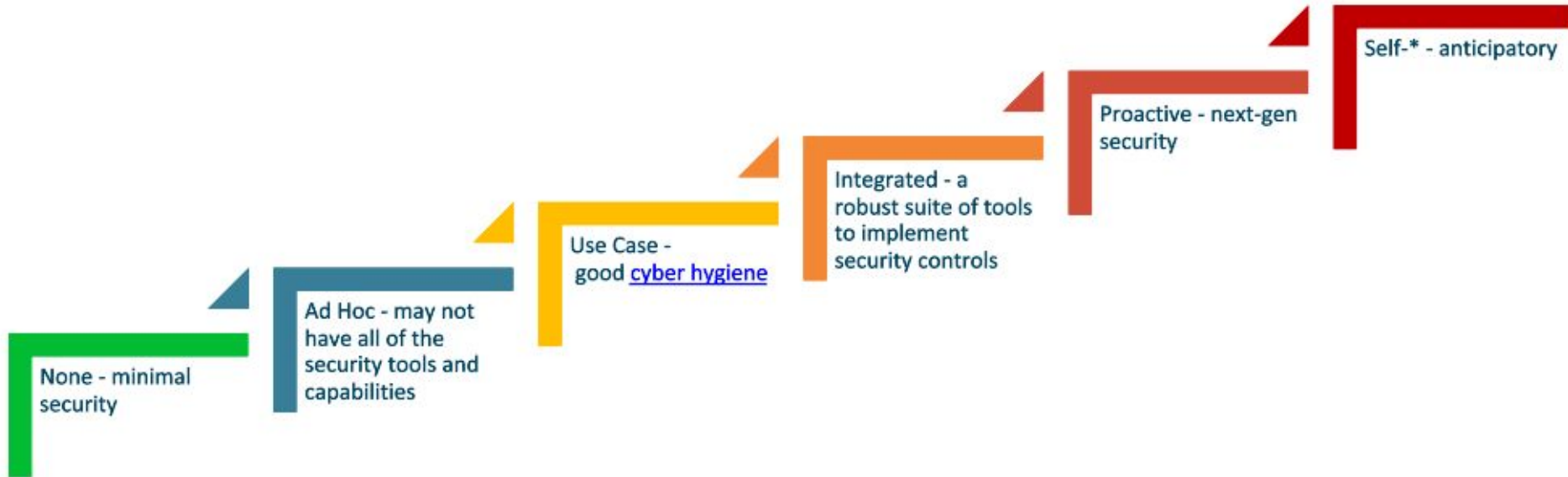
Stages Definition

ORGANISATION REACH



MINDSET ADOPTION

Example for Security



Conducting a Maturity Assessment



Three-phase approach

More information: <https://wiki.geant.org/display/NETDEV/OAV+Maturity+Model>

Important to remember!



Assessing your maturity isn't a one-time exercise



You need to measure your progress toward your desired to-be state

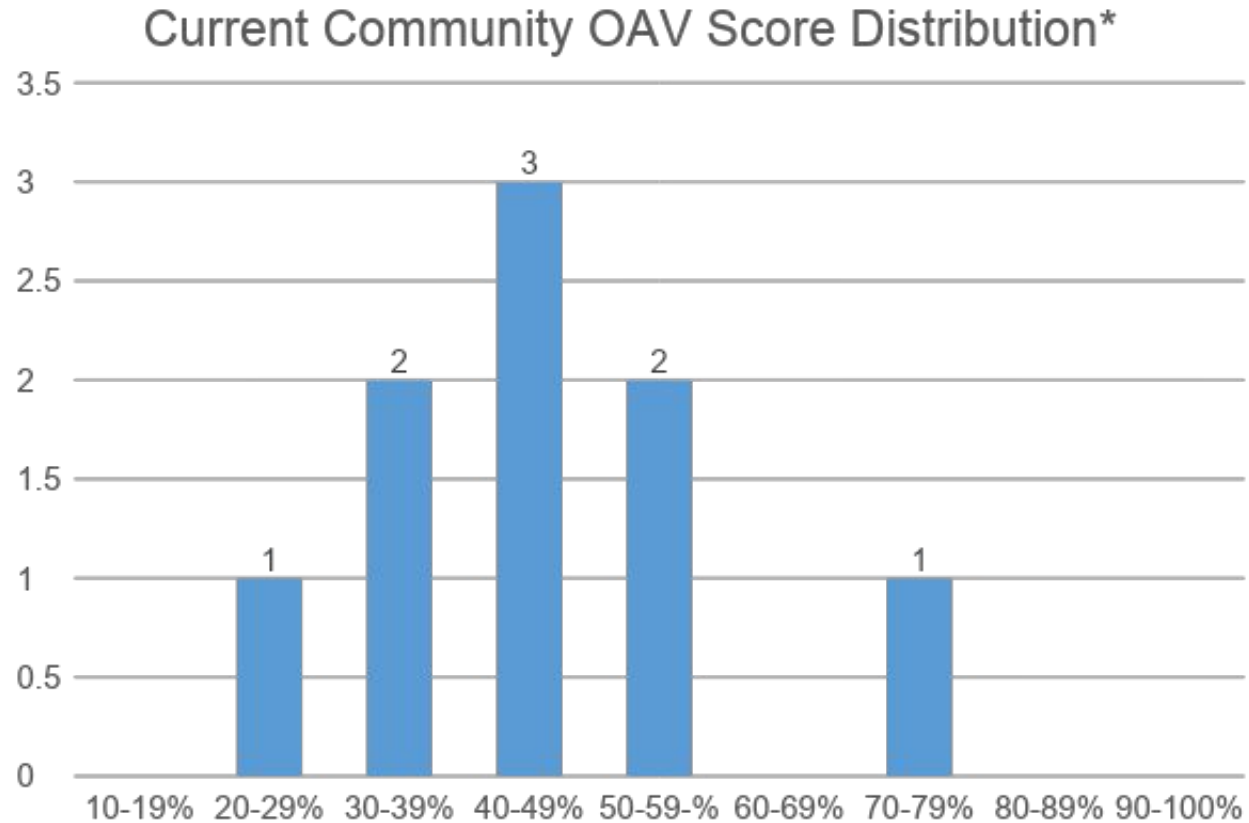


Re-assessing your maturity levels helps review if changes are leading to the right direction

OAV Assessment

- <https://www.surveymonkey.com/r/SPYDQVB>
- 31 questions
- Data is used for analytical purposes only
 - we do not publish data for individual institutions
- Report is sent to the person defined in survey

Some Results



* 9 NRENs analysed so far

Summary

OAV Architecture Analysis and Mapping for

- Consistent and systematic approach
- Understanding different digital architectures
- Systems' advancements, federation, integration
- *Want to map your Digital Architecture?* network-eacademy@lists.geant.org

OAV Maturity Model

- Self-assessment tools
- Provides a consistent and systematic roadmap
- Assess - Analyse - Address. **Repeat!**

To fill in the OAV MM Survey: <https://www.surveymonkey.com/r/SPYDQVB>

Any questions / comments: network-eacademy@lists.geant.org



Thank You!

<https://wiki.geant.org/display/NETDEV/NeA>
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Co-funded by
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