Orchestration, Automation and Virtualisation Maturity Model

OAV MM Focus Group

Infoshare

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oav@lists.geant.org

www.geant.org

OAV Drivers

Orchestration

ensure consistent behaviour across technical domains

end-to-end fulfilment and assurance

Automation

moving from human- to machine-centric paradigm

domain expert engineers focus on strategic activities

Virtualisation

bridge technologies

dynamic optimisation and tailored solutions

network as software

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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

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Why OAV MM?

Provide a common OAV progress indicator for the community

Help organisations on their OAV journey

Building the OAV MM

Adopted a MM development methodology based on design science

Defined OAV as the MM application area

Analysed over 15 existing MMs related to some aspect of OAV

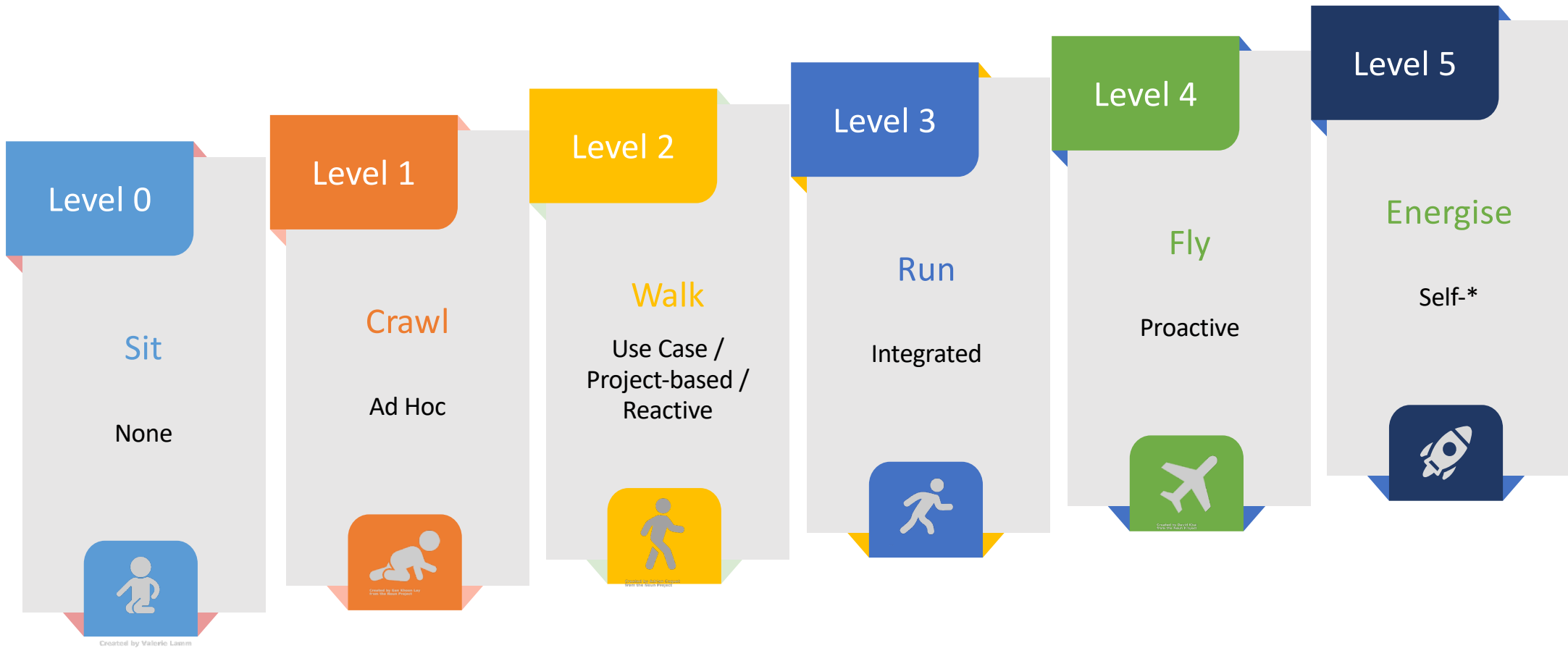Incorporated several relevant MMs

Developed the OAV MM iteratively
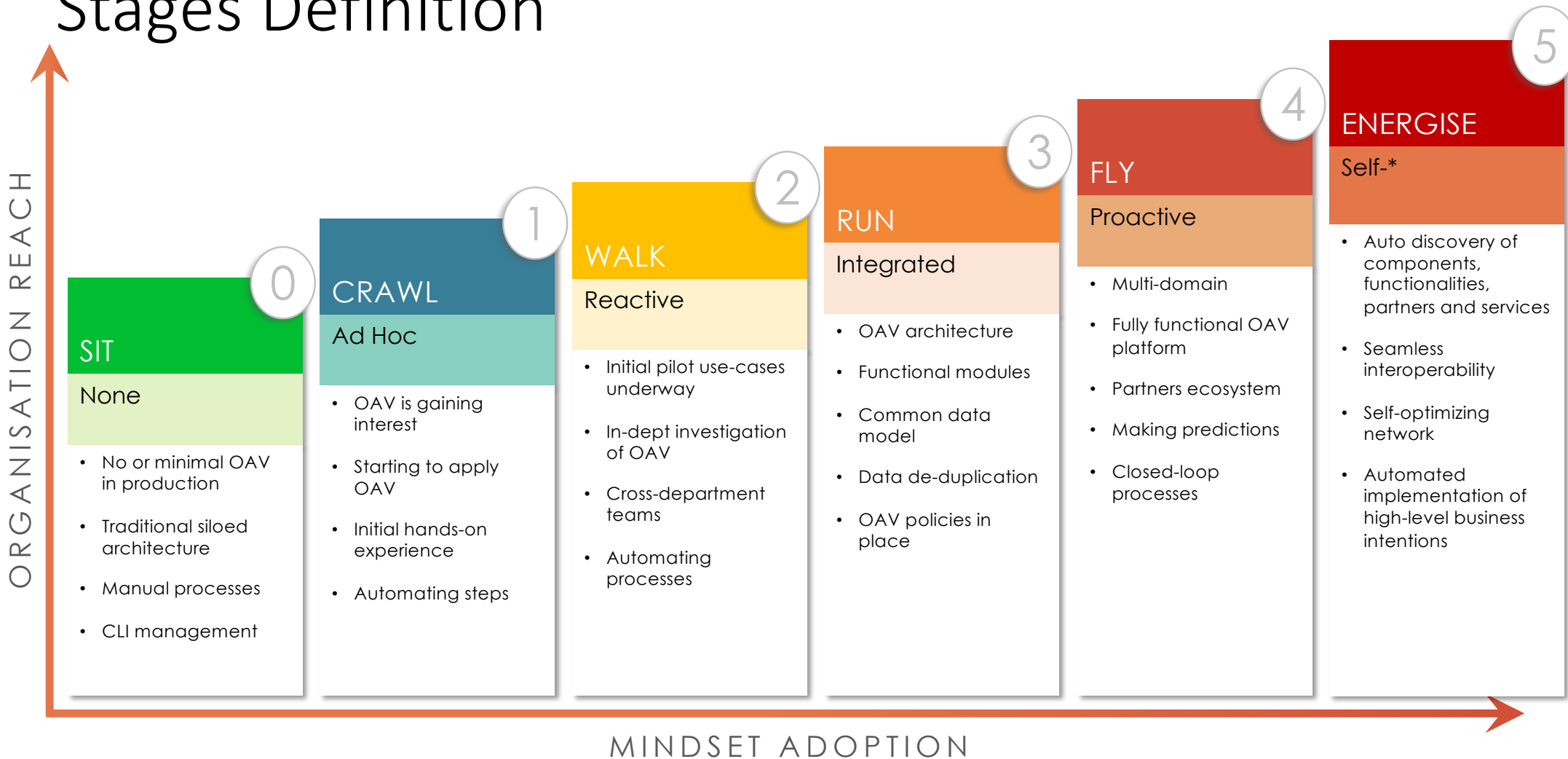
Evaluated usefulness, quality and effectiveness

Prepared a questionnaire to support the self-assessment process
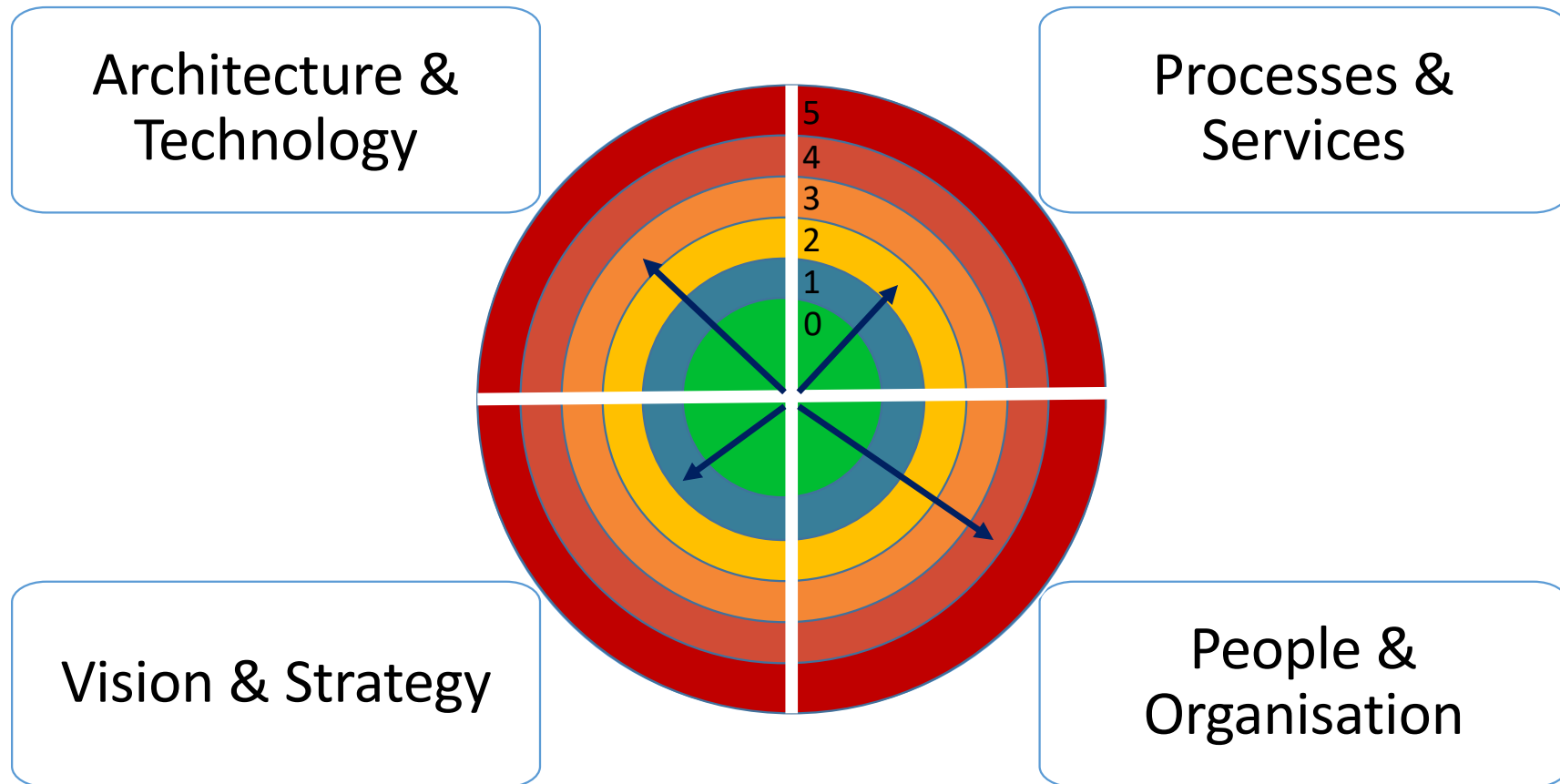
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OAV Maturity Model - Stages

Level 0 — Sit — None

Level 1 — Crawl — Ad Hoc

Level 2 — Walk — Use Case / Project-based / Reactive

Level 3 — Run — Integrated

Level 4 — Fly — Proactive

Level 5 — Energise — Self-*

Stages Definition

ORGANISATION REACH

MINDSET ADOPTION

0

SIT

None

- No or minimal OAV in production
- Traditional siloed architecture
- Manual processes
- CLI management

1

CRAWL

Ad Hoc

- OAV is gaining interest
- Starting to apply OAV
- Initial hands-on experience
- Automating steps

2

WALK

Reactive

- Initial pilot use-cases underway
- In-dept investigation of OAV
- Cross-department teams
- Automating processes

3

RUN

Integrated

- OAV architecture
- Functional modules
- Common data model
- Data de-duplication
- OAV policies in place

4

FLY

Proactive

- Multi-domain
- Fully functional OAV platform
- Partners ecosystem
- Making predictions
- Closed-loop processes

5

ENERGISE

Self-*

- Auto discovery of components, functionalities, partners and services
- Seamless interoperability
- Self-optimizing network
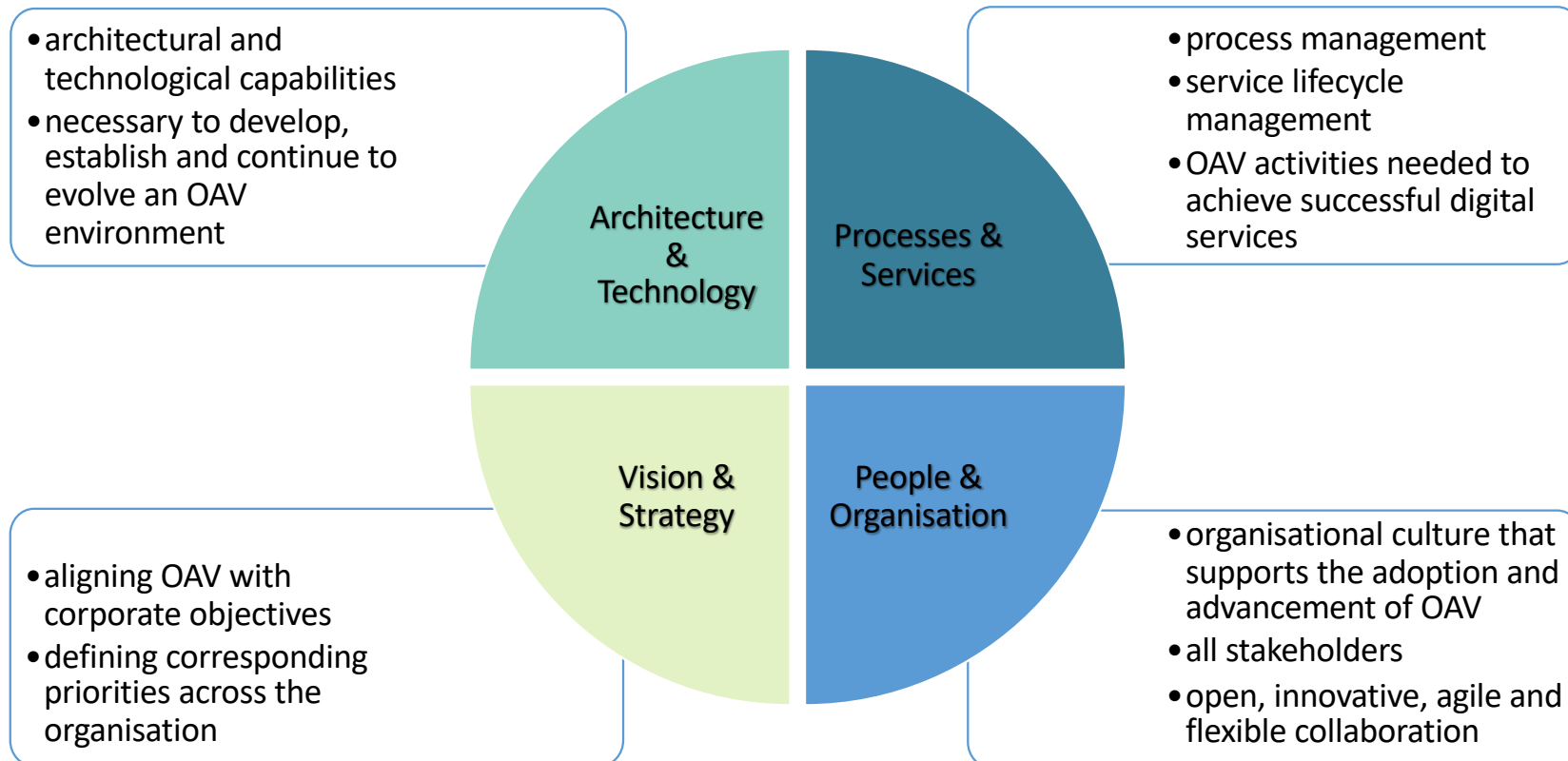- Automated implementation of high-level business intentions

OAV MATURITY MODEL

OAV Maturity Model - Dimensions

Architecture & Technology

Processes & Services

5
4
3
2
1
0

Vision & Strategy

People & Organisation

Dimensions definition

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

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

Architecture & Technology

Processes & Services

Vision & Strategy

People & Organisation

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

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

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OAV Maturity Assessment

	Architecture & Technology	Processes & Services	Vision & Strategy	People & Organisation
Level 5 Self-*				
Level 4 Proactive				
Level 3 Integrated				
Level 2 Reactive				
Level 1 Ad Hoc				
Level 0 None				

Granular OAV Maturity Assessment

	Architecture & Technology			Processes & Services			Vision & Strategy		People & Organisation	
	Components	Virrtualisation	Data modeling	Service design	Monitoring and reporting	Security management	Policies development	Standardisation	Culture	Training
Level 5 — Self-*										
Level 4 — Proactive					■					
Level 3 — Integrated			■	■	■	■	■			
Level 2 — Reactive	■		■	■	■	■	■	■	■	■
Level 1 — Ad Hoc	■		■	■	■	■	■	■	■	■
Level 0 — None	■	■	■	■	■	■	■	■	■	■

Architecture & Technology

deep dive

Architecture & Technology Subdimensions

Components integration	APIs	Compatibility
Virtualisation	Security	Data modelling
Analytics	AI	Data

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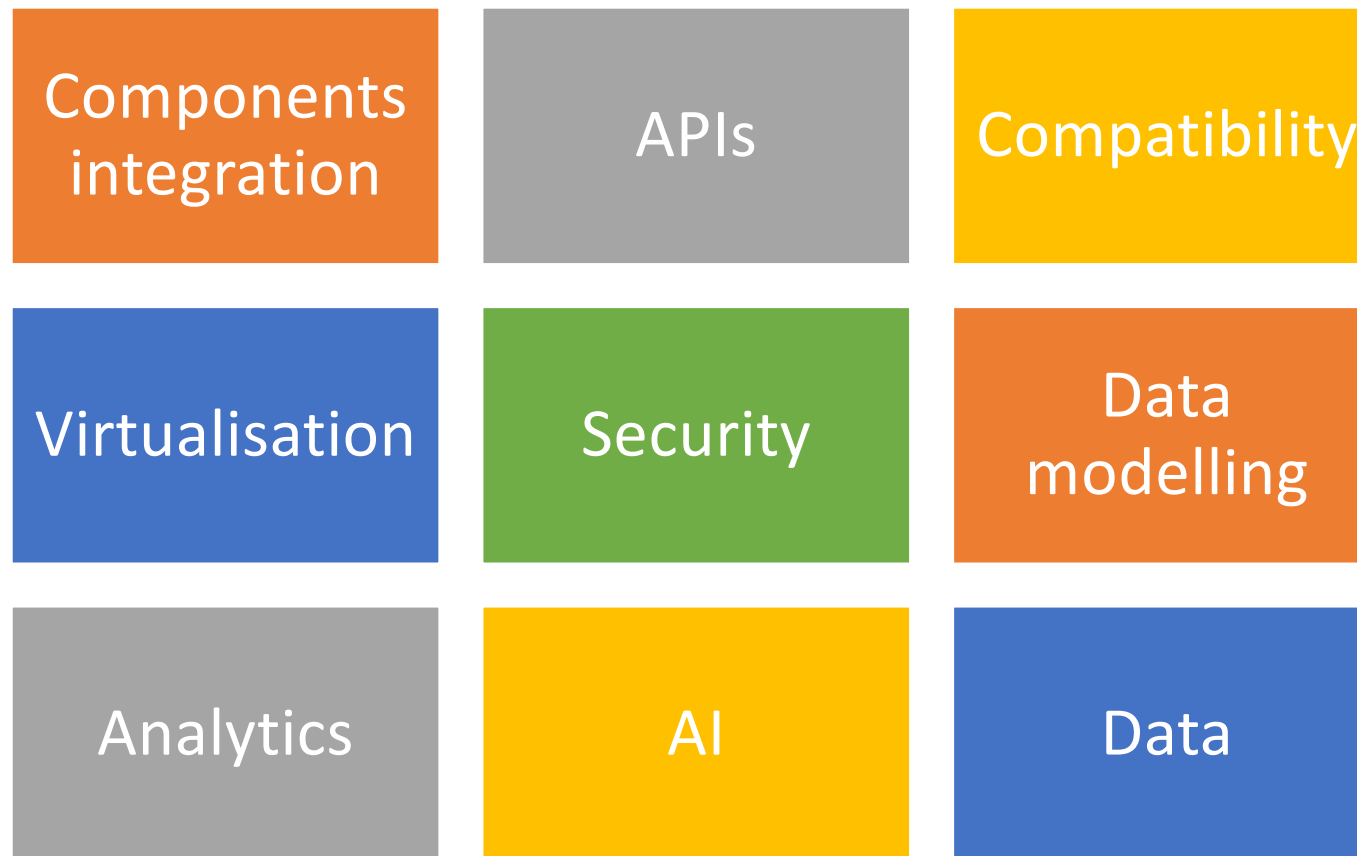
Architecture & Technology Subdimensions

Components integration

- Vendor-neutral approach
  - Use a single component to manage different resources
- Transcend the silo mentality
  - Well-defined functionalities
  - Clear separation of duty
- Single source of truth
  - Know what is where w/o data duplication
- Modular, flexible architecture
  - Orchestrate components to achieve higher goals

Architecture & Technology Subdimensions

Virtualisation

- Unified view of the network
  - physical and virtual resources
- Network software-isation
  - SDN, NFV, VMs, containers, etc.
- Horizontal and vertical scalability
  - On-demand capacity
- E2E orchestration and visibility
  - Single and Multi-domain
- Stages based on Intel Service Provider Network Maturity

Architecture & Technology Subdimensions

Analytics

- Data visualisation and dashboards
  - Descriptive analytics
- Understand the current network state
  - Diagnostic analytics
- Analyse historical data to gain meaningful insights
- Learn from data
  - Predictive analytics
- Make data-driven decisions
  - Prescriptive analytics

Architecture & Technology Subdimensions

APIs

- Machine-to-machine interaction
  - Real-time reactions
- Essential for orchestration and automation
  - No human involvement
- North-Southbound APIs
  - Get intent, push configuration
- East-Westbound APIs
  - Talk to partner architectures

Architecture & Technology Subdimensions

Security

- Expanded security surface
    - A lot of new components to protect
- Harden and secure the OAV activities
    - Adapted security policies
- Advanced security architecture
    - Focus is no longer only on the network
- Threat intelligence
    - Prevent breach, data leak, etc.

Architecture & Technology Subdimensions

AI

- Advanced systems and actions using

  - ML, deep learning, NLP, …

- Detecting anomalies

  - Find historical and real-time abnormalities

- Classifying events

  - Identify hidden patterns

- Making predictions

  - Smart decision making

Architecture & Technology Subdimensions

Compatibility

- Ensure components can talk to each other
  - Essential for orchestration, migration, etc.
- Use of common standard approaches
  - Expands the pool of available tools
- Smart procurement
  - Seamless integration with existing solutions
- Interoperability between partners
  - Facilities multi-domain implementations

Architecture & Technology Subdimensions

Data modelling

- Common description requirements
  - for services and resources
- Abstract object modelling
  - Resource facing view
  - Customer facing view
- Use of layered, hierarchical models
  - Easily create new services using existing pieces
- Support for extensibility
  - and naming standards, vocabularies, …

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Architecture & Technology Subdimensions

- Big Data
  - Increased number of data sources
- Structured vs unstructured data
  - Metadata descriptions
- Data quality
  - Accuracy, completeness, consistency, …
- data storage infrastructures
  - Database, data warehouse, data lake

Data

A&T self-assessment

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Mentimeter

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Processes & Services

deep dive

Processes & Services Subdimensions

Process automation	Service design	Service lifecycle management
Monitoring and reporting	Troubleshooting	Security management

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Processes & Services Subdimensions

Process automation

- Moving from human- to machine-centric paradigm
  - Expert engineers focus on strategic activities
  - Minimizing human errors
  - Auto-triggering
- Well-defined workflows
  - Optimized use of resources and increased efficiency
  - Clear picture of relationships and dependencies
  - Flexible approach: full and partial automation
- CI/CD
- Shortened time to market

Processes & Services Subdimensions

Monitoring and reporting

- Complete state view with self-triggered monitoring of processes, services and resources

  - User-friendly visualisation

- Detection of security events

- Accurate and valuable information in the monitoring reports

- Required for SLA implementation

- Predictions of possible future alarms

  - AI support

- Better network and services planning

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Processes & Services Subdimensions

Service design

- Engagement of all stakeholders

- Extensibility with well-defined components and interfaces

  - Readiness for new requirements

- Reusability

- Technology agnostic

- Orchestration as a key component to easily build new services

Processes & Services Subdimensions

Troubleshooting

- Efficient and fast analysis and investigations in complex services

- Correlation and root cause analysis

- Decision support (problem solving and mitigation actions)

Processes & Services Subdimensions

Service lifecycle management

- Well-defined service lifecycle phases

  - Consistent control over the service

  - Optimised resource utilisation

  - Better decision taking

- Improved engagement stakeholder groups

  - E.g. active participation of the users

Processes & Services Subdimensions

Security management

- Fast reaction to threats and security incidents

- Proactive incident practices

- Security audits

- Chaos engineering (breaking things purposefully; prefers experiments in production)

- AI support

  - AIOps - AI solutions applied in IT operations to provide continuous fixes and improvements via automation

P&S self-assessment

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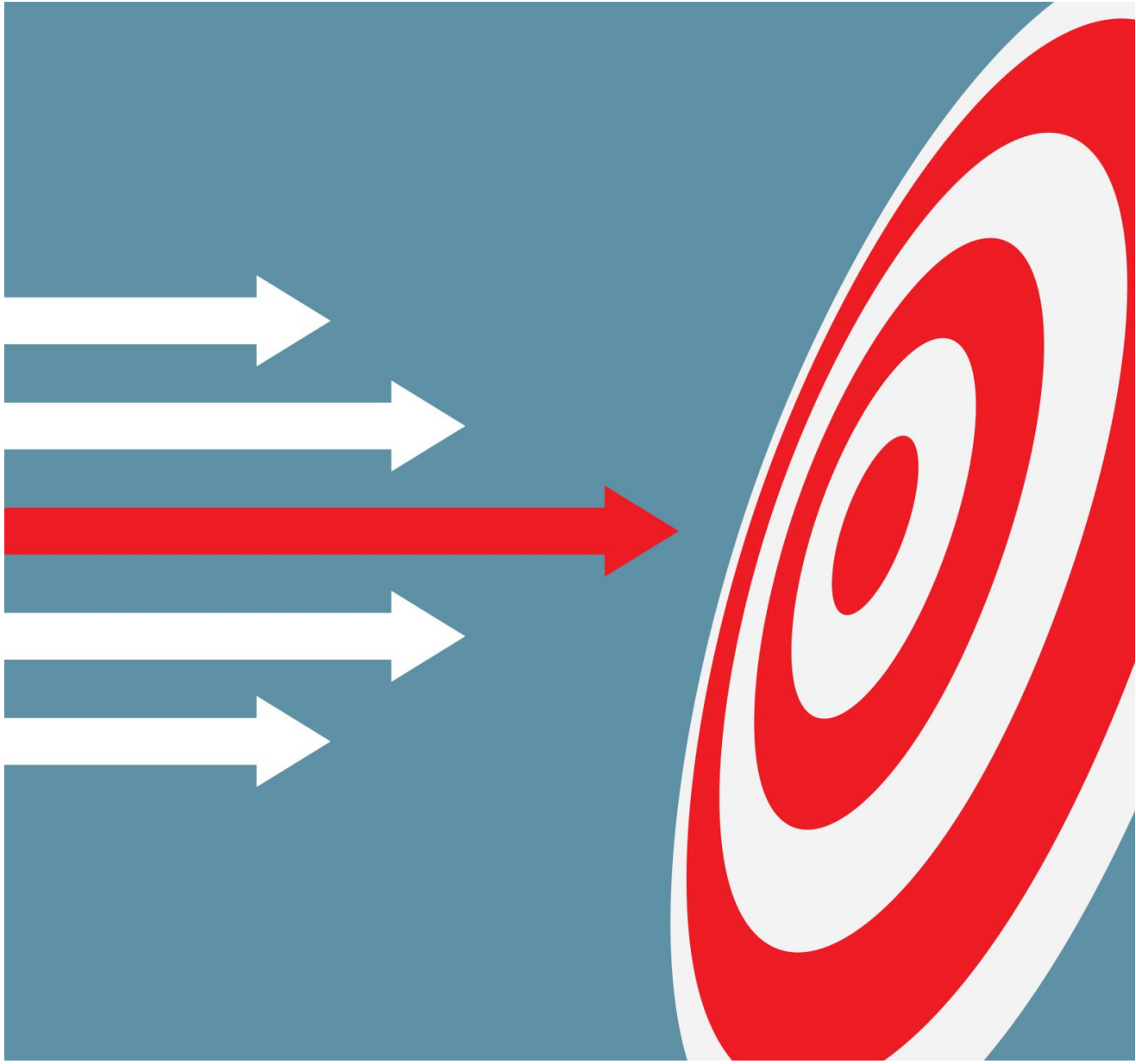
deep dive
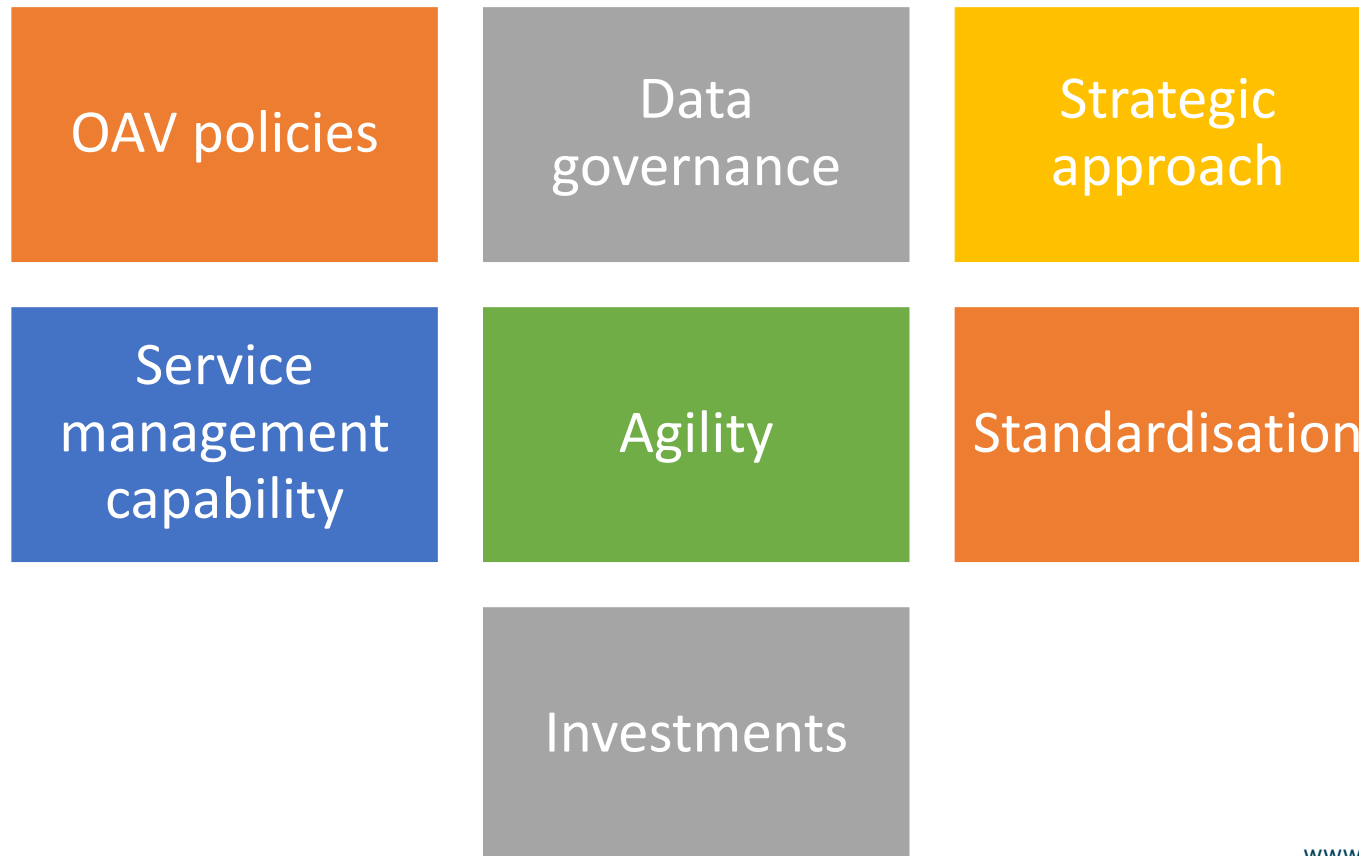
Vision & Strategy

Vision & Strategy Subdimensions

OAV policies	Data governance	Strategic approach
Service management capability	Agility	Standardisation
	Investments	

Vision & Strategy Subdimensions

OAV policies

- OAV development and implementation policies

  - How to create, use and maintain OAV modules

- Specific guidelines and procedures

  - Ex. common development tools and workflows

- Understand OAV implications in production activities

  - Policies implementation automation

Vision & Strategy Subdimensions

Service management capability

- Consistent approach to service management
    - Requirement for advancing with OAV
- Adhering to a service management framework
    - Service management practices
- Metrics-based optimisation
    - Develop efficient automated processes
- Continuous improvement is essential in OAV
    - Automated change management

Vision & Strategy Subdimensions

Data governance

- Consistent information available on-demand
  - Ensure high-quality data
- Data ownership
  - Data stewards
- Data/Information is a valuable asset
  - Share information in the ecosystem
- Stages based on the Gartner data governance maturity model

Vision & Strategy Subdimensions

Agility

- Quickly adapt to changing requirements
  - Using agile practices
- Deliver value faster
  - Iterative OAV project management
  - Iterative OAV software development
- Tackle OAV problems in sprints
  - Short period to complete a defined set of work
- Stages based on the Agile Maturity Assessment

Vision & Strategy Subdimensions

Investments

- Incorporating OAV in
  - Capital planning
  - Investment priorities
- Control of OAV financial implications
  - Budgeting for OAV growth in all aspects (i.e. skills development)
- OAV in the driving seat
  - Metrics for planning and adjusting

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Vision & Strategy Subdimensions

Strategic approach

- OAV as the business driver

    - Driving innovation

- Development of an OAV vision

    - How to create value with OAV

- Understand the OAV potential

    - Implications on the organisational strategy

- Is there alignment between OAV and the business?

Vision & Strategy Subdimensions

Standardisation

- Measure standards adoption

- Common standardised OAV approaches are

  - More easily adopted

  - More easily managed

  - More easily extended

  - More easily validated

- Adopting standards in the ecosystem boosts

  - Interoperability

  - Open collaboration

V&S self-assessment

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People & Organisation

deep dive

People & Organisation Subdimensions

Teams development

Stakeholders involvement

Learning and skills

Culture

User experience

People & Organisation Subdimensions

Teams development

- People as the driving force of OAV implementation

- Production quality OAV solutions require

  - Skilled teams

  - With multidisciplinary approach

  - Open collaboration

- Joint ventures and partnering

People & Organisation Subdimensions

<div style="border:1px solid #888; background:#a6a6a6; display:inline-block; padding:1em;">

Stakeholders involvement

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- The interest in OAV grows organically
  - From a group of enthusiasts to the whole ecosystem
- OAV efforts affect all stakeholders
  - Internal, and
  - External
- Flexible smart OAV solutions can put the user in the service design seat

People & Organisation Subdimensions

Learning and skills

- Building OAV skilled professionals

- Available opportunities for learning and building OAV skills

  - Upskilling and expertise development

- OAV training program

- OAV talent acquisition & management

- Joint training efforts

People & Organisation Subdimensions

Culture

- Is OAV the "standard" way of doing things?

- Evolution of trust in OAV

- Embracing OAV practices and approaches

- Does everybody believe in OAV's potential?

- Is there motivation and enthusiasm for OAV solutions?

People & Organisation Subdimensions

User experience

- The relationship between OAV and the customer

- OAV helps transcend customer experience

- Move from the traditional communication channel to

  - Proactive behaviour

  - 360-degree customer view

  - Omni-channel experience

  - Self-service

P&O self-assessment

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How to use the OAV MM?

Wiki & Survey

OAV MM Wiki

Detailed information about the Maturity Model can be found on the Wiki pages:

https://wiki.geant.org/display/NETDEV/OAV+Maturity+Model

It can help you check your OAV progress through stages and dimensions

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OAV Assessment

- https://www.surveymonkey.com/r/SPYDQVB

- 31 question in survey

- Data will be used for analytical purposes only
  - we will not publish data for individual institutions

- Report will be sent to person defined in survey

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Tips & Tricks

Choose	**Choose the best answer by collaborating with relevant parties** • Avoid personal views and opinions • Try to define strict measurable criteria relevant for your organisation
Consolidate	Consolidate the results and define your to-be stages
Achieve	Keep in mind that future state objective does not need to be to achieve the highest level in all areas • Depends on goals, expenses, applicability...

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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

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Discussion

Q&A

Thank you

If you have any questions please email :

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