Orchestration, Automation and Virtualisation Maturity Model

OAV MM Focus Group

Infoshare
21.10.2022

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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
## Maturity Model Goals

<table>
<thead>
<tr>
<th>Measure</th>
<th>Measure the current OAV capabilities in a meaningful way</th>
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</thead>
<tbody>
<tr>
<td>Identify</td>
<td>Enable clear identification of strengths and improvement points, be aware of threats and opportunities</td>
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<tr>
<td>Prioritise</td>
<td>Help prioritise what to do in order to advance and improve</td>
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<tr>
<td>Journey</td>
<td>Identify gaps between the current and future state and how to get there</td>
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</tbody>
</table>
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
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-*
SIT
None
- No or minimal OAV in production
- Traditional siloed architecture
- Manual processes
- CLI management

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

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

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

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

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 - Dimensions

- Architecture & Technology
- Processes & Services
- Vision & Strategy
- People & Organisation
Dimensions definition

- Architectural and technological capabilities
- Necessary to develop, establish and continue to evolve an OAV environment

- Organisational culture that supports the adoption and advancement of OAV
- All stakeholders
- Open, innovative, agile and flexible collaboration

- Aligning OAV with corporate objectives
- Defining corresponding priorities across the organisation

- Process management
- Service lifecycle management
- OAV activities needed to achieve successful digital services

- Organisational culture that supports the adoption and advancement of OAV
- All stakeholders
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- Architecture & Technology
- Processes & Services
- Vision & Strategy
- People & Organisation
<table>
<thead>
<tr>
<th>Level</th>
<th>Architecture &amp; Technology</th>
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<th>Vision &amp; Strategy</th>
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## Granular OAV Maturity Assessment

<table>
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<tr>
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Architecture & Technology
depth dive
Architecture & Technology Subdimensions

- Components integration
- APIs
- Compatibility
- Virtualisation
- Security
- Data modelling
- Analytics
- AI
- Data
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

<table>
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| • 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
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

- 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, ...
Architecture & Technology Subdimensions

Data

- 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
A&T self-assessment

Go to www.menti.com and use the code 2114 1952

Instructions

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Or use QR code
Processes & Services Subdimensions

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

- 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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Vision & Strategy deep dive
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

- 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
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

deeplive
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

Stakeholders involvement

- 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
Conducting a Maturity Assessment

Three-phase approach

Assess  Analyse  Address
OAV Assessment

- [https://www.surveymonkey.com/r/SPYDQVB](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
**Tips & Tricks**

<table>
<thead>
<tr>
<th>Choose</th>
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<tbody>
<tr>
<td>Choose the best answer by collaborating with relevant parties</td>
</tr>
<tr>
<td>• Avoid personal views and opinions</td>
</tr>
<tr>
<td>• Try to define strict measurable criteria relevant for your organisation</td>
</tr>
</tbody>
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<table>
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<tr>
<th>Consolidate</th>
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<tbody>
<tr>
<td>Consolidate the results and define your to-be stages</td>
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</table>

<table>
<thead>
<tr>
<th>Achieve</th>
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<tbody>
<tr>
<td>Keep in mind that future state objective does not need to be to achieve the highest level in all areas</td>
</tr>
<tr>
<td>• Depends on goals, expenses, applicability...</td>
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</tbody>
</table>
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
Thank you

If you have any questions please email:
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