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AIRBUS
DEFENCE AND SPACE

Interactive Enterprise Semantic Cartography for more resilient organizations

INE – Enterprise Engineering : architectures, methods and models

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Organisational Resilience

- 1) the ability of an organization to **absorb and adapt in a changing environment** to enable it to deliver its objectives and to **survive and prosper**
- 2) **states** that the more resilient organizations **can anticipate and respond to threats and opportunities**, arising from sudden or gradual changes in their internal and external context.

Contributes to

- an improve ability to anticipate and address risks and vulnerabilities
- an increased coordination and integration of management disciplines to improve coherence and performance
- a greater understanding of interested parties and dependencies that support strategic goals and objectives.

The reverse is true : no resilience without **means and practices for increased coordination and integration** of management disciplines to improve performance and coherence with a **great understanding of the stakeholders contributing to strategic goals and objectives of the enterprises**

Standards related to enterprise frameworks, transformation processes and visual modeling languages

ISO 22316:2017

Definitions

Enablers

Frameworks: Unified Architecture Framework, ISO 42010 (Architecture Description Language), ArchiMate Layers/Viewpoints/Aspects ...

Transformation Methodologies: TOGAF

Visual Modelling Language: ArchiMate ...

+ so many proprietary Enterprise Architecture Management solutions

⇒ No digital continuity between the different Enterprise Repositories

⇒ Silos (organizational, technical, languages ...)

ArchiMate could be implemented by mean of:

- Drawing tools
- Visual Modeling Solutions with static diagrams
- Knowledge repositories ...

How to ensure long term continuous digital continuity, consistency and continuous operational interoperability between contents of repositories which are heterogeneous in terms of languages, semantic, structure, underlying paradigms, syntaxes, etc.?

How to avoid heavy production of many static diagrams ?

Addressed by
Standards for
Enterprise ...

Frameworks

Transformation
Methodologies

Visual Modelling

Limits in terms of
continuous operational
interoperability

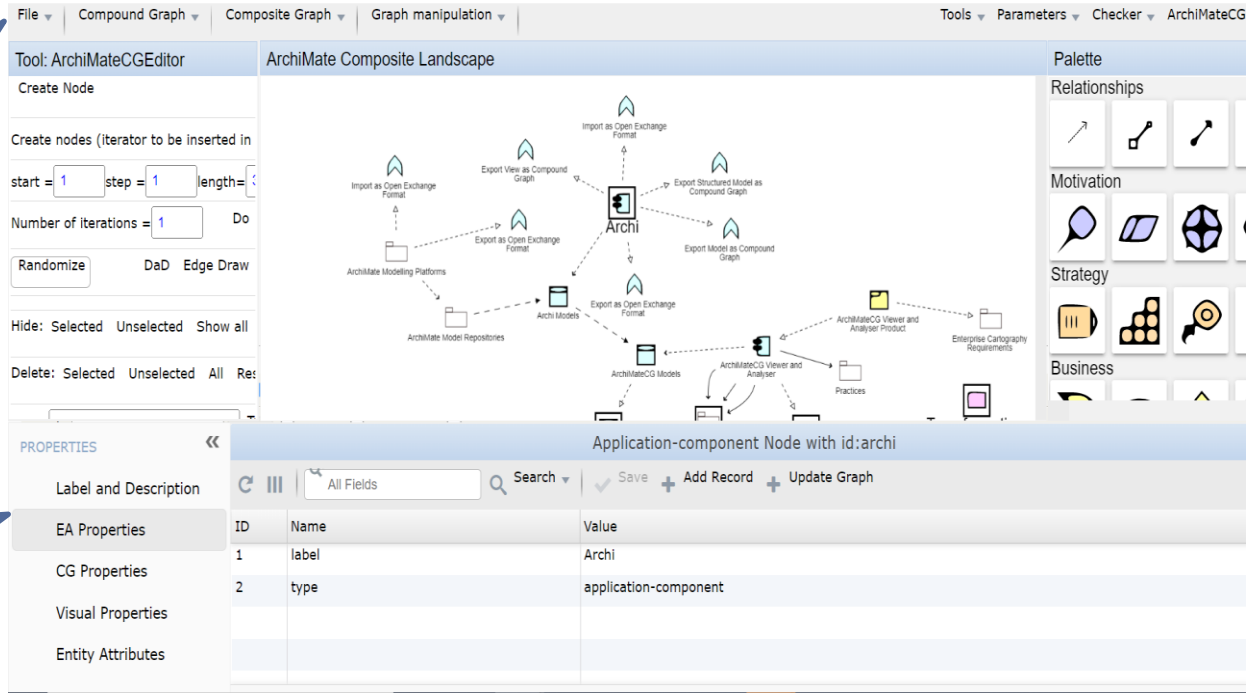
Import/Export ArchiMate formalized on top of various languages

Labelled Compound Property Graphs

Application Database and Protocol Schema



Manufacturing Data PLM
Virtual Manufacturing
Digital Continuity
MBSE
Digital Twins ...



Semantic Visual Interactive Compound Graph ArchiMate + extensions

Preservation of Identifiers

An experimental platform as Proof of Concept, Proof of value and Research Demonstrator

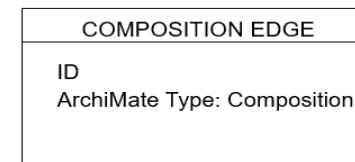
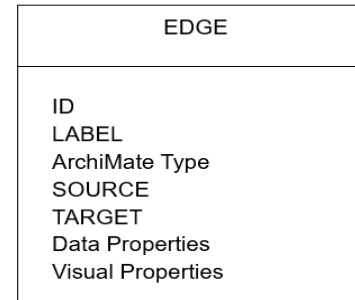
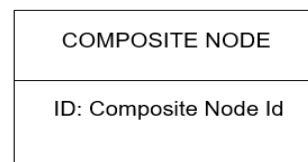
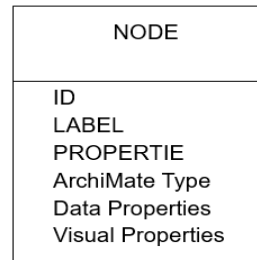
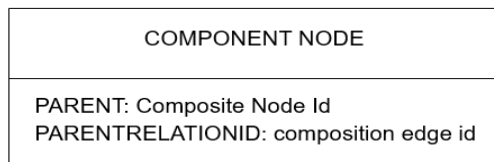
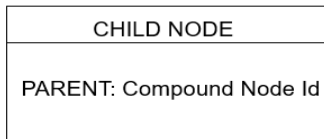
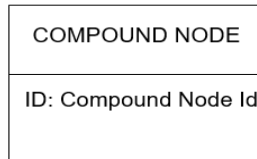
Main Concepts

Polyglot Hypermodel

Set of Multiple representations of the same model relying on different languages for different purposes

Semantic Cartography

Interactive Compound Graphs merging visual representation (semiotic) and formal representation (Graph/Network with typed nodes and edges)



References

- [1] Franz M, Lopes CT, Huck G, Dong Y, Sumer O, Bader GD, « Cytoscape.js: a graph theory library for visualization and analysis », Bioinformatics (2016) 32 (2): 309-311 first published online September 28, 2015 doi:10.1093/bioinformatics/btv557 (PDF)
- [2] ISO 22316:2017, Security and resilience — Organizational resilience — Principles and attributes, <https://www.iso.org/standard/50053.html>
- [3] Mayer, R., Antunes, G., Caetano, A. et al. Using ontologies to capture the semantics of a (business) process for digital preservation. Int J Digit Libr 15, 129–152 (2015). <https://doi.org/10.1007/s00799-015-0141-7>
- [4] OMG, Unified Architecture Framework (UAF) Version: 1.2, July 2022
- [5] The Open Group, ArchiMate® 3.2 Specification, October 2022, ISBN: 1-957866-02-4
- [6] The Open Group, « The TOGAF® Standard, 10th Edition – Architecture Development Method », 25th of April 2022, ISBN-13: 978-9401808682
- [7] W3C, Resource Description Framework - RDF 1.1 Primer, W3C, 24 June 2014
- [8] W3C, Ontology Web Language -OWL 2 Web Ontology Language -Structural Specification and Functional-Style Syntax (Second Edition), W3C Recommendation 11 December 2012

In order to know more about the thematic richness of the topic:

- The wall of LinkedIn articles at <http://www.eads-iw.net/web/nfigay/linkedin-articles>
- The wall of research articles at <http://www.eads-iw.net/web/nfigay/publications>
- #archimatecg #plm_interoperability #emerging_graph_technology_landscape, #advanced_visualization_teccnics on LinkedIn

About the presenter

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(Support System) Complex Connected Production System (Support System) (System of Interest)

Ex... Produ... Maintaining Models of the Products and associated Processes all through their life cycle
al threads for Digital twins – Machine Applicable, Readable and Transferable standards

Enterprises involved – Complex Digital Business Ecosystems
Heterogeneous Business Processes - Services - Capabilities
Disconnected Information Systems with silos
Various heterogeneous and incompatible Information & Communication Technologies

Shorted Life duration

Mastering the complexity of Digital Collaboration

- End to End Cross Organizational Processes
- Continuous Operational Interoperability
- Enterprise Modeling, Ontology, Standardized Application Protocols, Model Driven Approaches

Dr Nicolas Figay, HDR (He/Him)

Let's prepare and build the continuous operational Interoperability supporting end to end digital collaboration

Talks about #ontology, #archimatecg, #plm_interop, #advanced_visualization_technics, and #emerging_landscape_of_graph_related_technologies

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