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Enterprise Operating System

Alexey Sergeev

Promoter: José Tribolet

What is an Enterprise?

An Enterprise is a semantic web of active servers (agents), either silicon based or carbon based, running "internally" their own apps and interacting "externally" through the web, in real-time.

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Problem statement

Enterprises do not have or not aware of the internal mechanisms responsible for enterprise operation and adaptation, which leads to ineffective or lack of adaptation at all, which in turn may lead to enterprise end of existence.

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Goal of the research

To create a methodology which will make enterprise self-aware and ensure that all mechanisms necessary for enterprise operation and adaptation are in place.

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Towards solution

Enterprise Operating System (EOS) is the essential component of enterprise system that supports system's basic functions, controls the way a system works, manages system resources and their allocation among actors to make it possible for them to function and work together, adapt to changes and recover after critical situations.

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Towards solution

Universal Enterprise Operating System (UEOS) – reference specification of EOS which includes all the mechanisms required for ideal and most efficient enterprise operation, viability and adaptability.

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Problem statement (reformulated)

EOS does not include all required mechanisms of UEOS, which leads to ineffective or lack of adaptation at all, which in turn may lead to enterprise end of existence.

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Goal of the research (reformulated)

To create a methodology which will help to ensure EOS includes all required mechanisms from UEOS.

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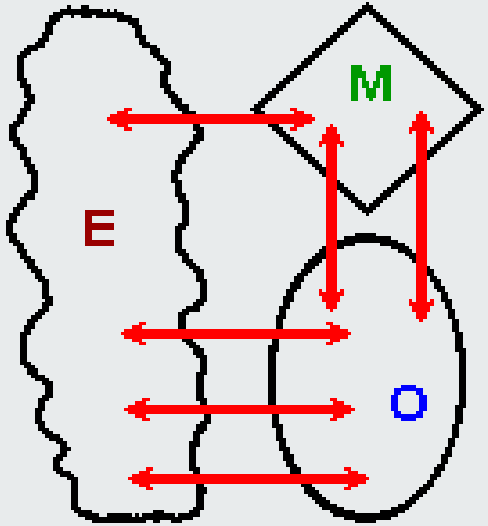
Relevant theories

- Viable System Model (VSM)
- Distributed Systems (DS)
- Complex Adaptive Systems (CAS)

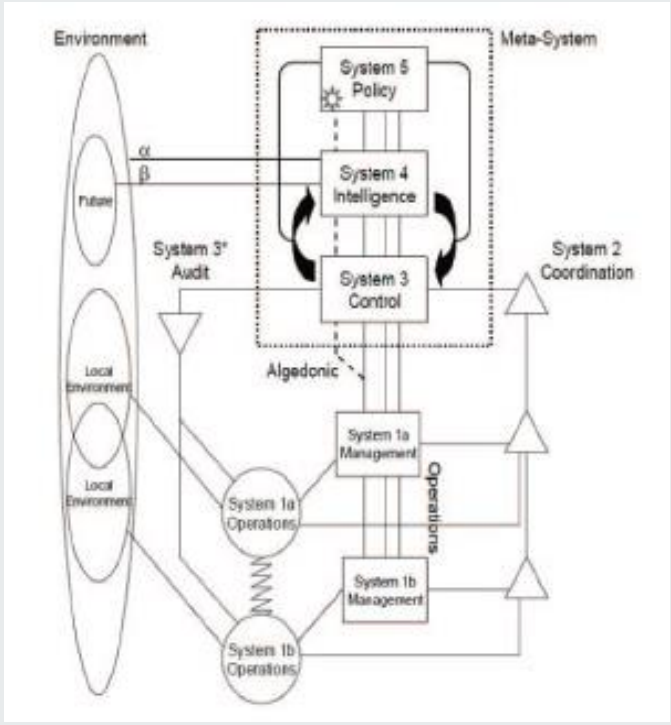
Enterprise as a viable system

- *Viable system is any system organized in such a way as to meet the demands of surviving in the changing environment. [S. Beer]*
- Enterprise by its nature is a viable system.
- EOS should conform to VSM

Viable System Model

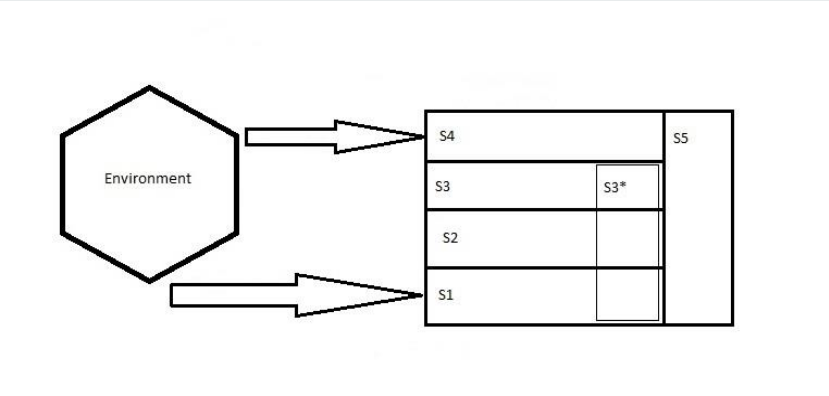


adopted from “The VSM Guide” by J. Walker

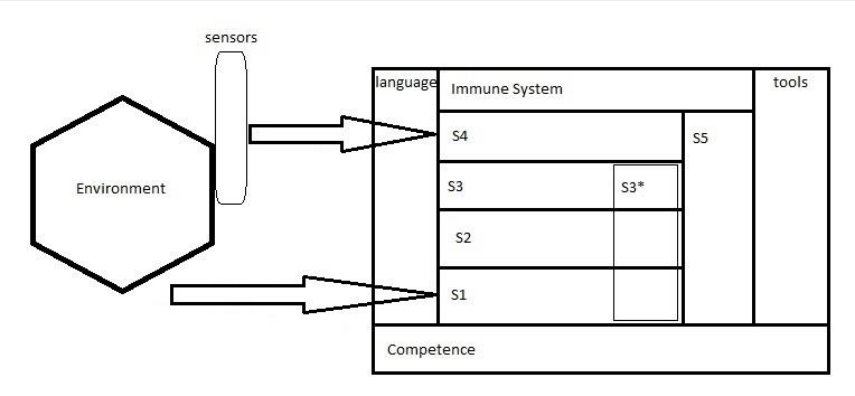


adopted from “The Use of Viable System Model to Develop Guidelines for Generating Enterprise Architecture Principles” by M.E. Zadeh et al.

Extended VSM



VSM basic model - adaptation



Extended VSM proposal

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Enterprise as a DS

- System element roles and interconnect network channels are crucial
- The mechanisms for functions and resources distribution between the elements
- Parallelism and task-sharing controller
- Data and functions duplication
- Fault tolerance

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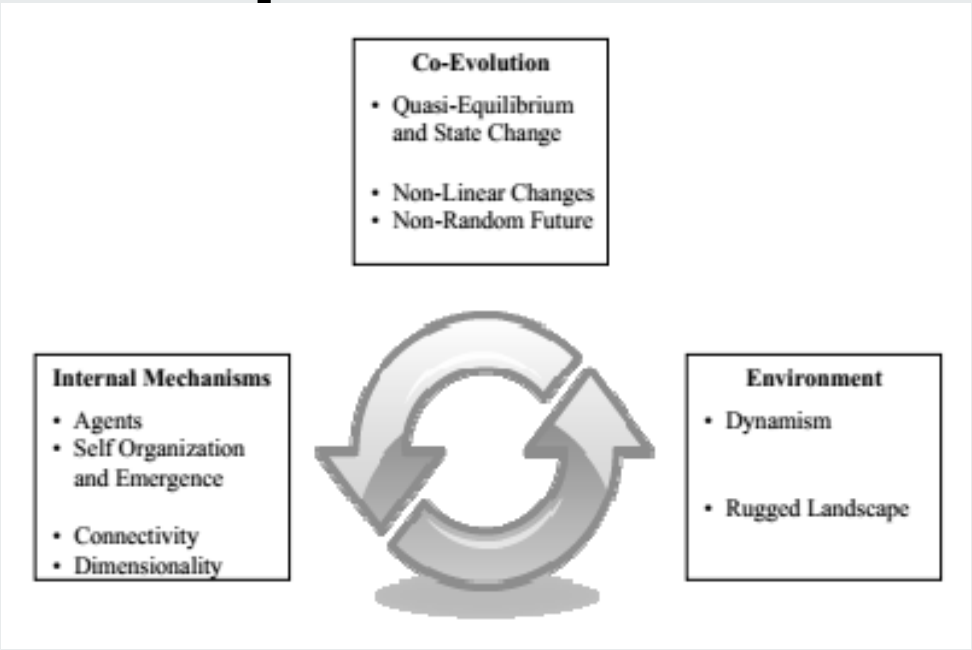
Enhance DS with VSM concepts

- Need to apply System 4 and System 5 concepts to the DS model.
- Building the Systems 4 and 5 of the viable DS requires to include an agent capable for decision-making into the DS structure. Accordingly, DS requires a human being to be integrated to the system.

Enterprise as a CAS



Underlying principles of complex adaptive systems

(adopted from "Theory Of Complex Adaptive Inquiring Organizations: Application To Continuous Assurance Of Corporate Financial Information" by J.A. Kuhn)

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Related work: *EOS*

- Guerreiro S., van Kervel S., Babkin E. Towards Devising an Architectural Framework for Enterprise Operating Systems. In Proceedings of the 8th International Joint Conference on Software Technologies, pages 578-585.
- van Kervel S. Ontology driven Enterprise Information Systems Engineering. SIKS Dissertation series nr. 2012-50. ISBN: 978-90-9027133-0

- Páscoa C., Tribolet J. Organizational Operating Systems, an Approach, CENTERIS 2015 - Conference on ENTERprise Information Systems Oct 7-9 2015, Oct. 2015 , pp. 521–528 , Elsevier

Related work: *GOD-theory*

- Aveiro D., Rito Silva A., Tribolet J. Control Organization: A DEMO Based Specification and Extension. / A. Albani, J.L.G. Dietz, and J. Verelst (Eds.): EEWC 2011, LNBIP 79, pp. 16–30, 2011. © Springer-Verlag Berlin Heidelberg 2011
- Aveiro D. Towards a GOD-theory for organizational engineering: continuously modeling the (re)Generation, Operationalization and Discontinuation of the enterprise. PhD thesis, Instituto Superior Tecnico, 2009.

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Research questions

- Is VSM good enough to represent every enterprise?
- What are the relations between enterprise and distributed systems?
- What are the exact EOS definition and boundaries?
- Which processes and mechanisms within the enterprise are really essential and crucial to be parts of EOS?
- How to model and represent the EOS, so it can be used on practice?

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Research questions

- What is the full specification of Universal EOS?
- What is the methodology to extract EOS of given enterprise?
- How to compare EOS of given enterprise to UEOS to find gaps or inefficiencies?
- How to change EOS of given enterprise to make it compliant with UEOS?

Methodology (draft)

Step 1. Create EOS specification.

1. Analysis of the ontological model of the enterprise.
2. Interviewing enterprise representatives.
3. Running series of case-study discussions with enterprise representatives.

Step 2. Model EOS using defined modelling method. At this stage, enterprise will be made aware of its current EOS.

Step 3. Compare EOS model to reference UEOS model. At this step, it will be possible to identify the gaps in EOS.

Step 4. Propose changes to EOS in order for it to comply with UEOS.

Step 5. The last step would be to help enterprise to implement changes required for EOS to comply with UEOS.

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Questions to community

- What are the exact EOS definition and boundaries?
- Which processes and mechanisms within the enterprise are really essential and crucial to be parts of EOS?
- How to model and represent the EOS, so it can be used on practice?