

The new MEGA Approach for Agent & Process Modeling

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- ❑ Trends

- ❑ Flows & behaviors

- ❑ Process participants : the WHO in processes

- ❑ Process, Systems & Interactions

- ❑ Services

- ❑ State of current standards

Trends

- External influences
 - Emergence of new modeling standards that affect enterprise architecture
 - BPMN, UML2, SOA
 - Users tend to become more domain users than pure modelers
 - They have less expertise in modeling ...
 - .. while more advanced modeling technics are required to fulfill their needs
 - The world we try to model has becomes more complex and multi-dimensional
 - Business integrations, Multiple Technologies, Regulations, System of systems...
- Internal influences
 - Enterprise modeling now has a long history and needs to be updated to meet current challenges
 - Globalization requires that best practices can be share among several countries to recreate a proper EA/SoS based engineering community



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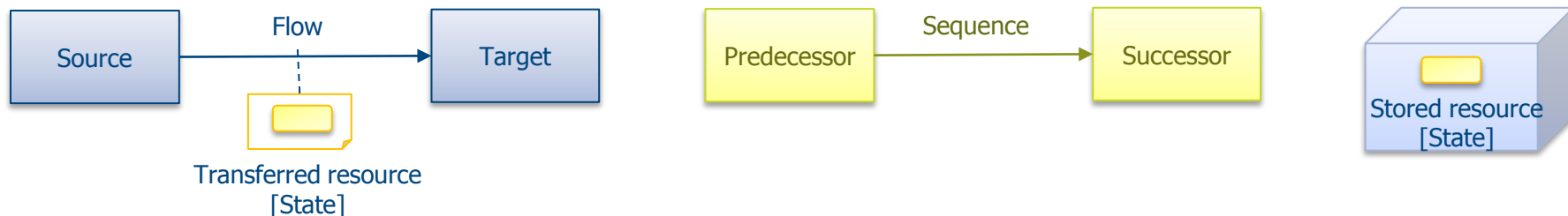
- ❑ Process, Systems & Interactions

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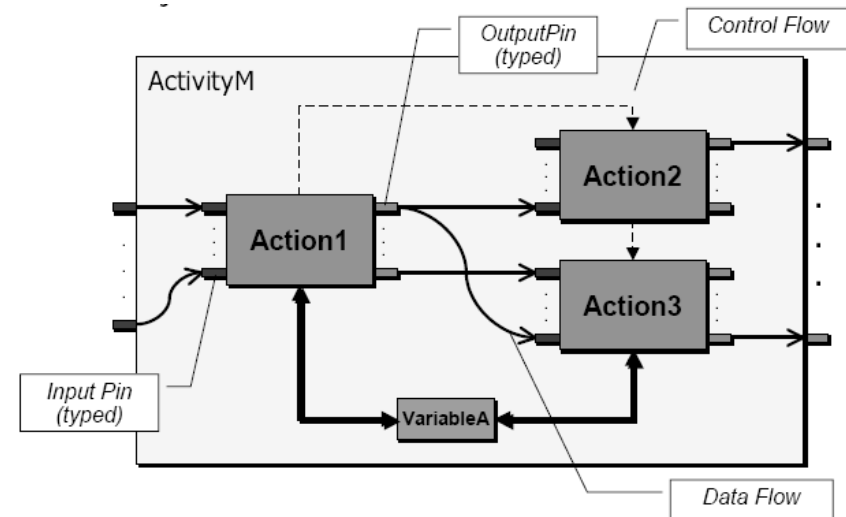
Flows, sequences, storages – the problem

- Basic elements
 - Basic communication is based on **flows** that manifest the transfer of **resources** in a particular **state** from a source to a target.
 - Communications occur over time and follow temporal ordering manifested by **sequences** between predecessors and successors.
 - Resources can be hosted in stores that ensure time synchronization between entities exchanging resources.
- Issues
 - How to combine flows, sequences and stores?



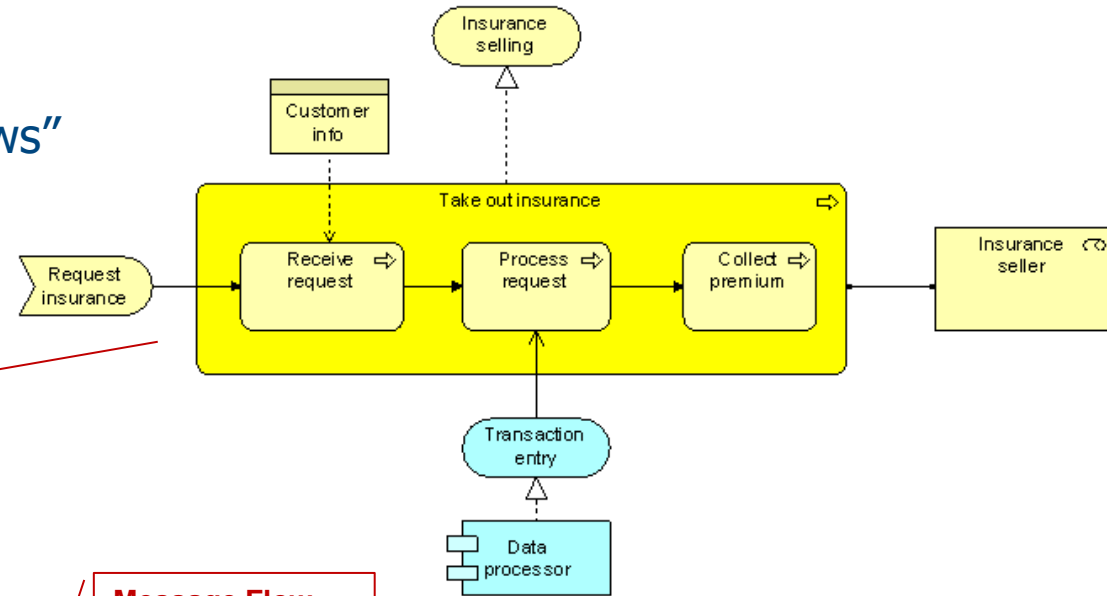
Flows, sequences, storages – current standards

- Traditional MEGA
 - Messages are the central elements
 - Messages represent at the same time flows and sequences (except when marked as “information only”).
- UML
 - Control Flow : sequence
 - Object Flow: flow
 - Pins: stores at the edge of activities



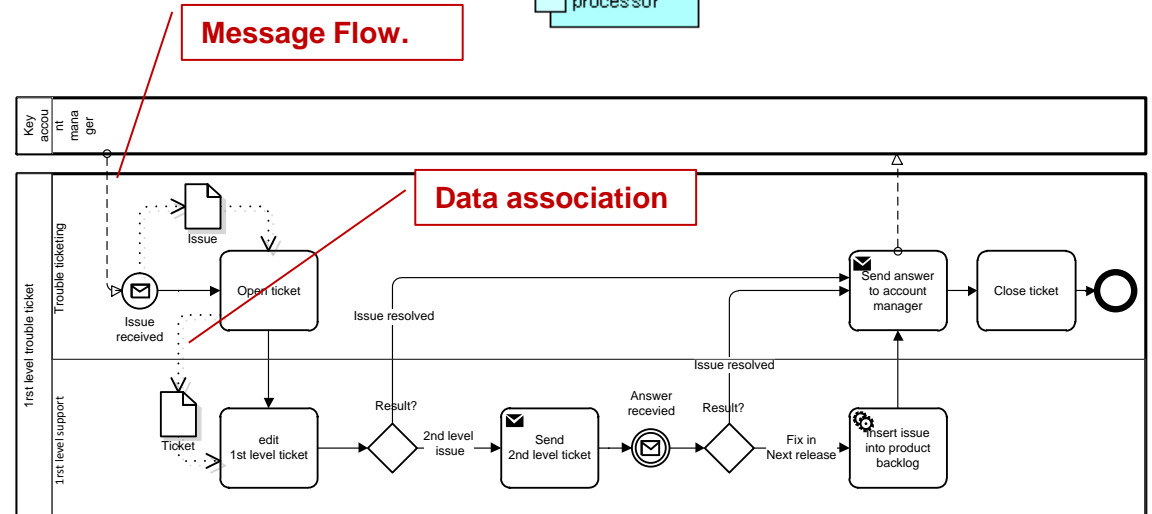
Flows, sequences, storages – current standards

- Archimate and EPC :
 - Events play the role of “message flows”
 - no real notions of source/target of information



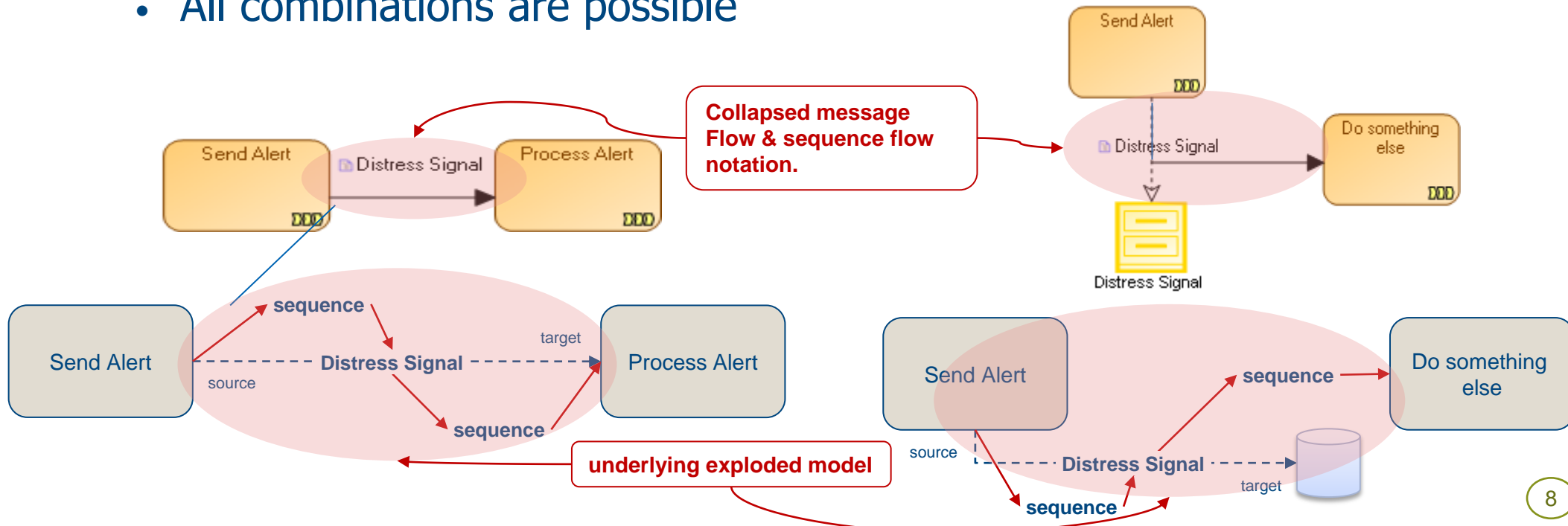
The model below illustrates the use of business processes and its relation with other concepts. The Take out insurance process is composed of three sub-processes. For clarity, the sub-processes are drawn in the overall process (structuring). Each sub-process triggers the next sub-process. The event Request for Insurance triggers the first sub-process. A particular role, in this case an insurance seller, is assigned to perform the required work. The process itself realizes an Insurance selling service. The Receive request sub-process uses the business object Customer info. Also, during the take out process, the Process request sub-process makes use of an application service Transaction entry.

- BPMN
 - Hybrid approach with:
 - Message flows at process boundaries
 - Data associations
 - (See next slides)

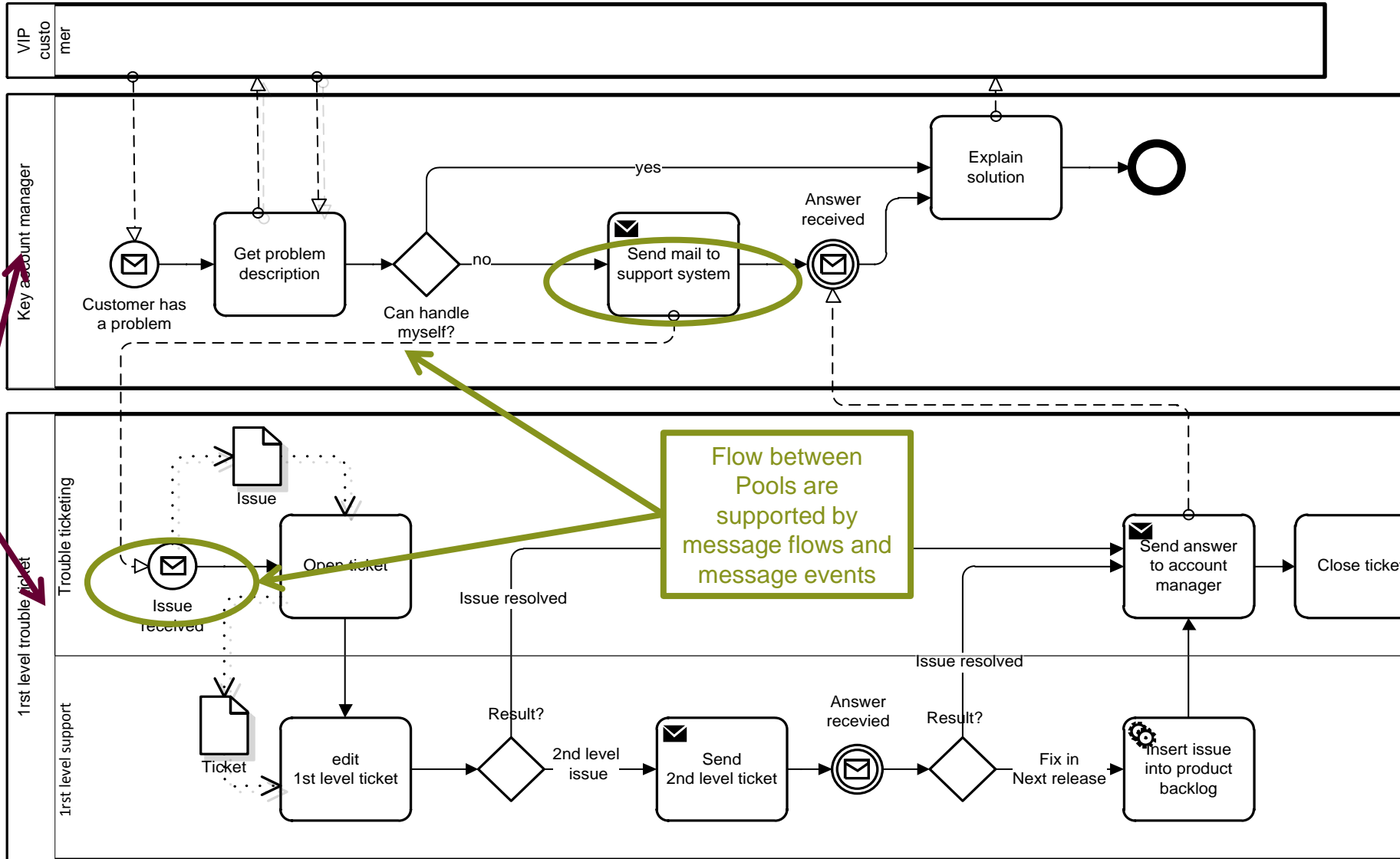


Flows, sequences, storages – Towards a unified view

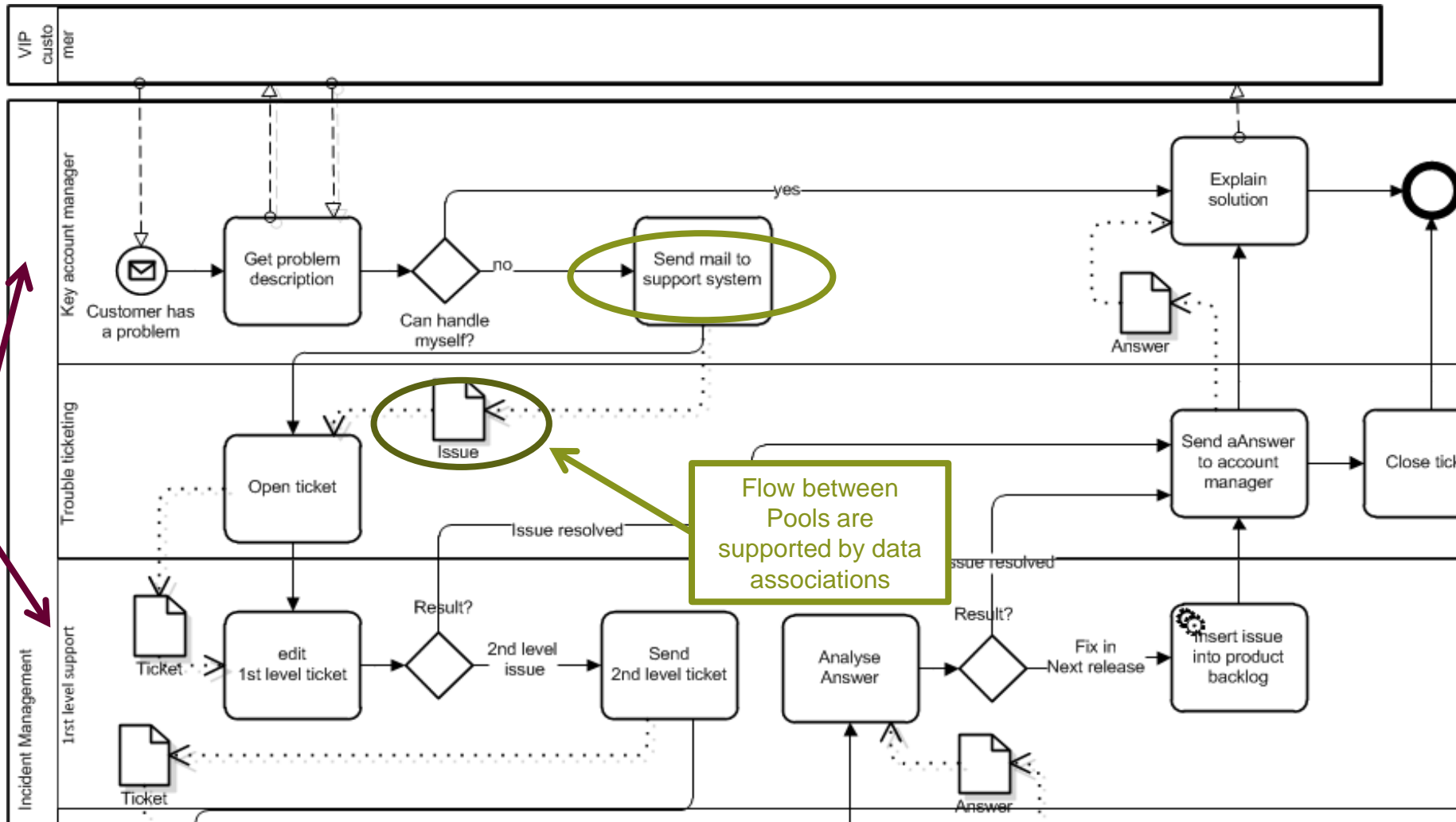
- Message Flows **are part of** process sequences
 - A Message flow is an active connector
 - It is “started” (next message flow)
 - It ends (what’s next when reaching the target)
 - The proposed notation can collapse or un-collapse message flows & sequence flows
 - All combinations are possible



Back to BPMN Style Issue (1)



Back to BPMN Style Issue (2)



Entities are assigned to lanes

Flow between Pools are supported by data associations

Summary

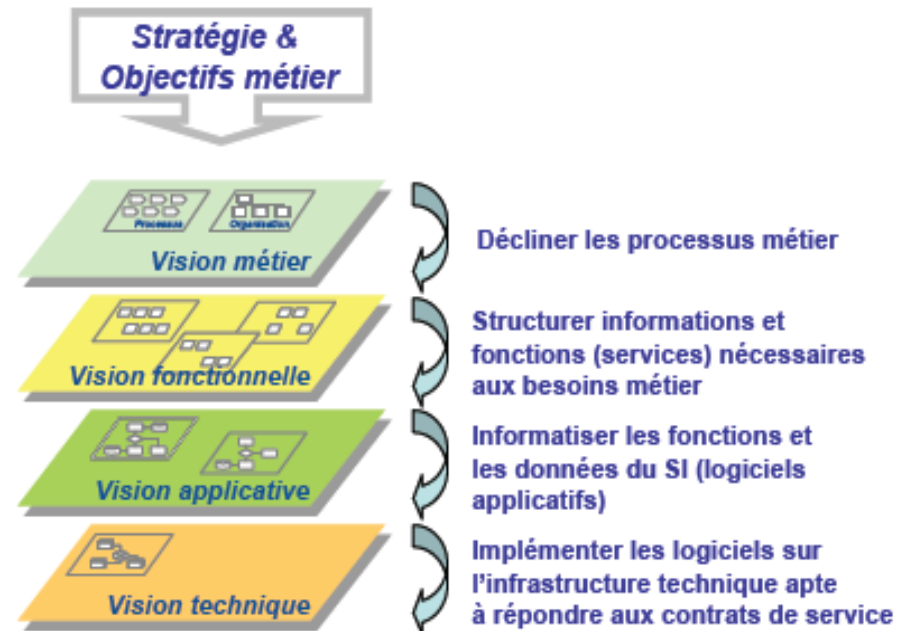
- A consistent systemic approach must rely on a proper definition of message flows
 - Message flows are active connectors
 - They are started, they last and they end
 - Message are thereby part of temporal ordering relationships
 - This architecture from the basis of flow within processes and flows within interactions
- An additional store model is required to enable time synchronization between agents that participates to interactions
- BPMN2 and UML2 are currently in the middle of the road regarding the support of this architecture (fUML is the one having the more advanced execution semantic)



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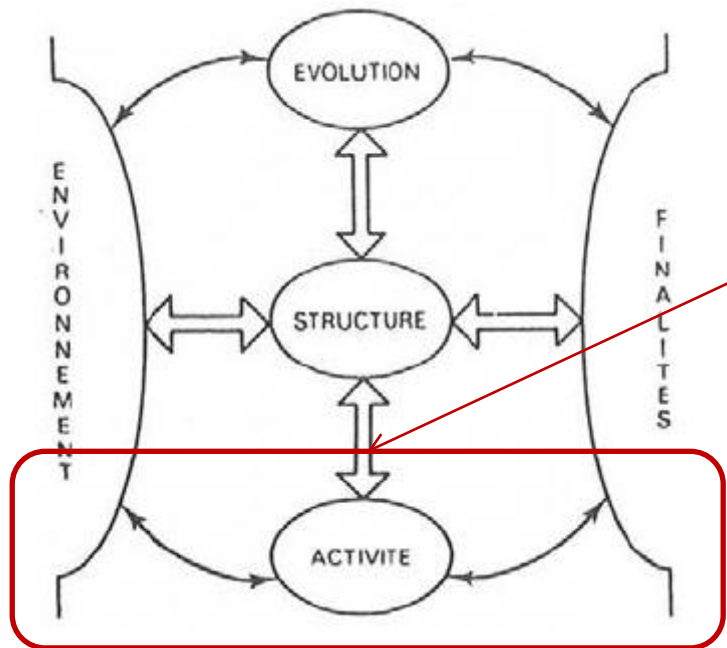
Club-Urba – Lost in process translation

- Major characteristics
 - Separation between
 - Business view carried out by business processes
 - Functional view carried out by a hierarchy of functions
 - Integration of organization structure in the business view
- Observations
 - The business view is limited to processes as if there were no concept of business domain agents, expressed independently of org-structures
 - There is no « systemic approach » providing a bridge between processes, functions and delivered services.
 - Organization structures shall be in the solution layer at the same level as the application view
 - The so-called functional view is ambiguous and does not follow traditional layering: conceptual view / organic view

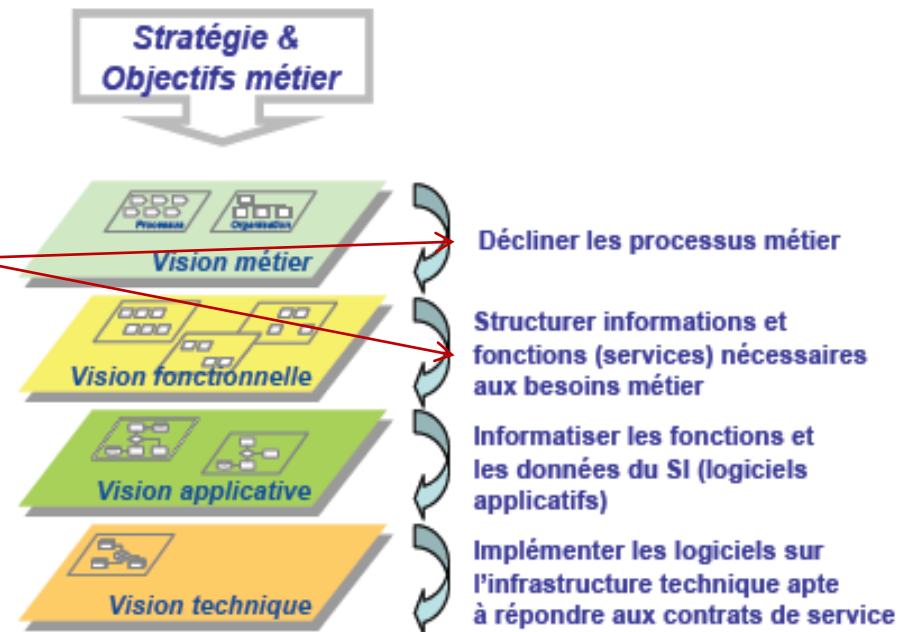


Systemic = systems (agent), functions, purposes (end) and evolution

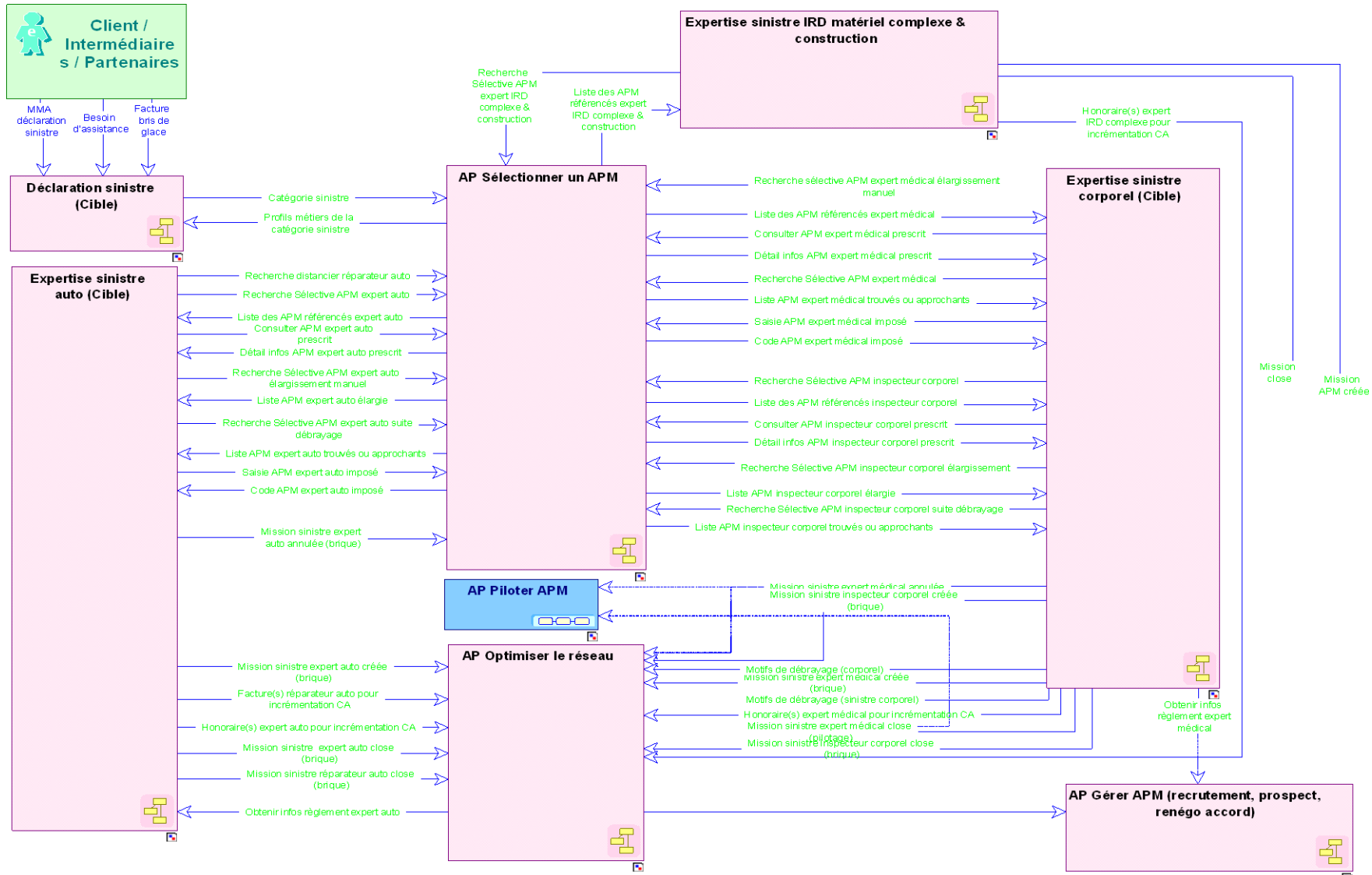
- Something (anything that can be identified)
- — that (who) in a context (environment)
- — for a purpose (end, project)
- — does something (activity = behavior)
- — through other "who" (structure = stable shape)
- — and that transforms itself overtime (evolution)
 - JL. Le Moigne



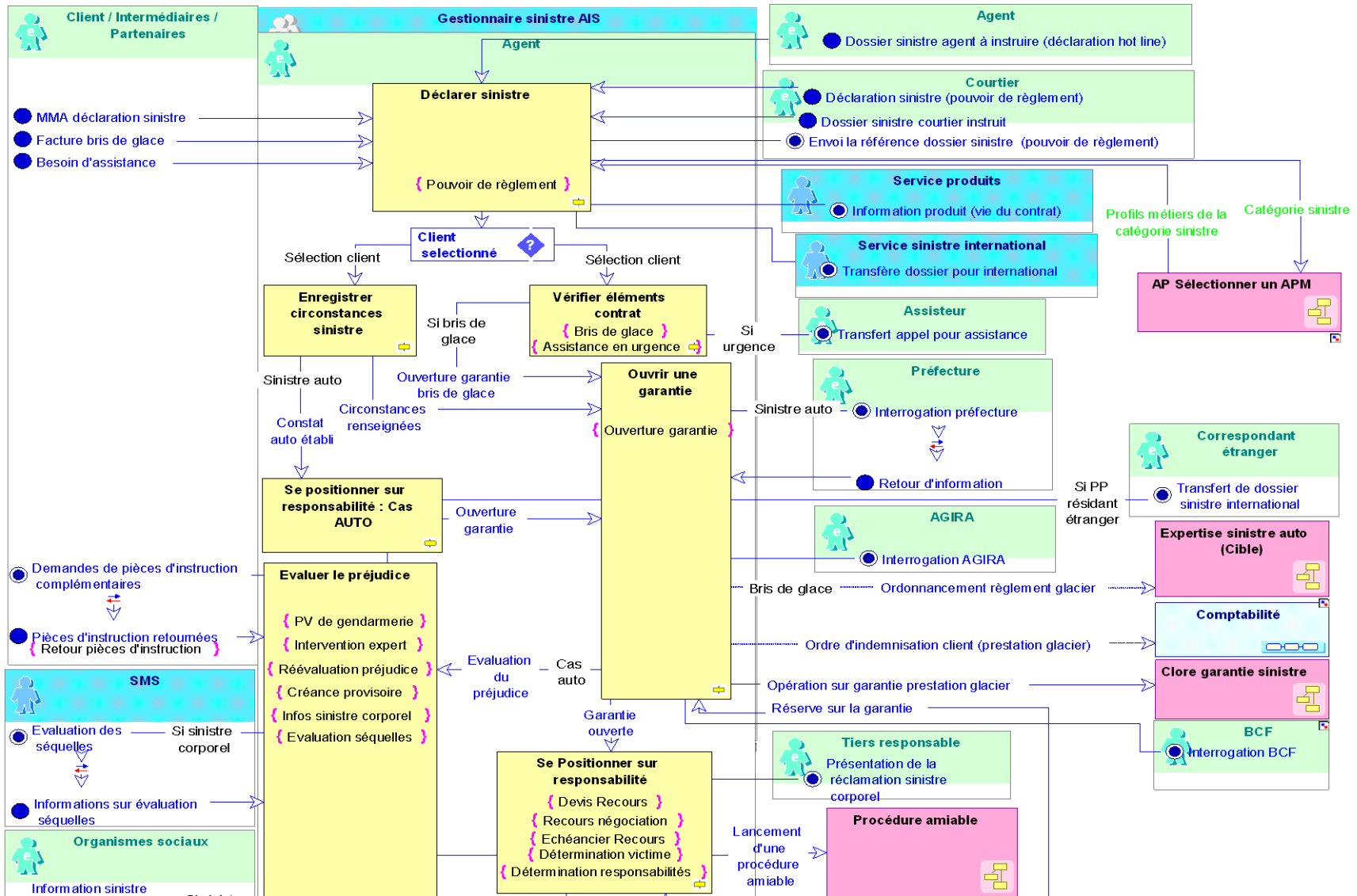
The process approach has lost the connection with structure and interactions



Result of confusion between WHO and HOW



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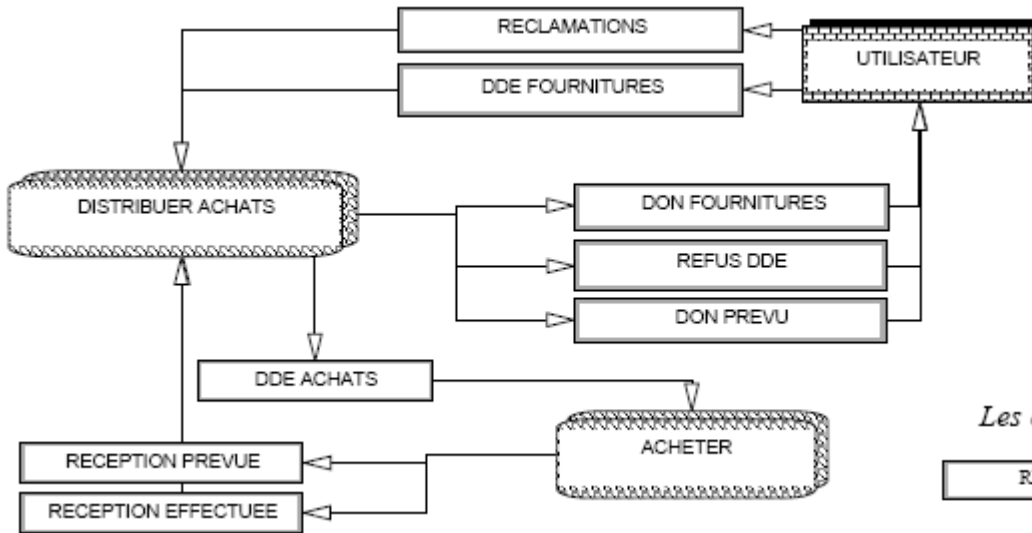


What has happened?

- A walkthrough Merise examples will show how the initial systemic principles of Merise/Gamma have been lost
- It also shows what needs to be put back in place in the new context of enterprise architecture when collaboration and service orientation have become a major challenge.

Merise example : Communication and processing

COMMUNICATION MODEL : MCC

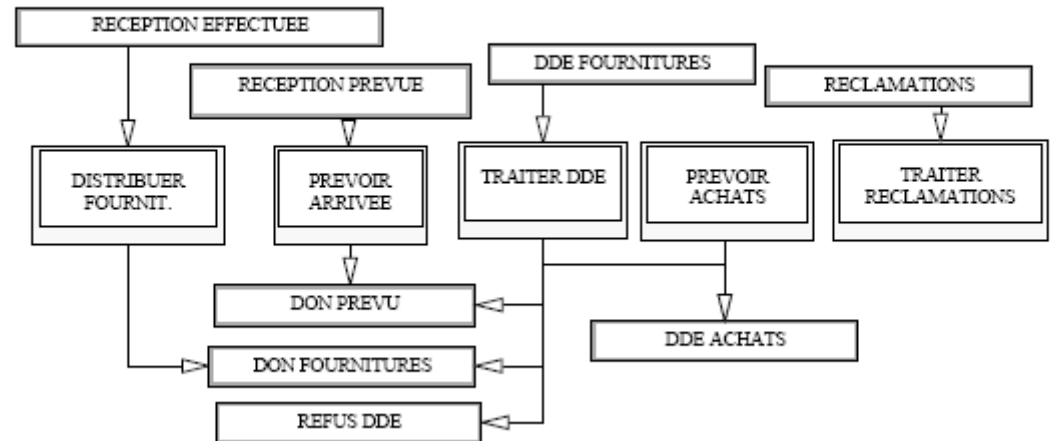


J.L. Le Moigne

L'exercice d'un processus implique l'hypothèse de l'existence d'un processeur au moins. Il n'est pas d'activité sans acteur, de production sans producteur.

- Similarities between communication models and processing models have led to confusion between these two viewpoints.

Les opérations conceptuelles sont :



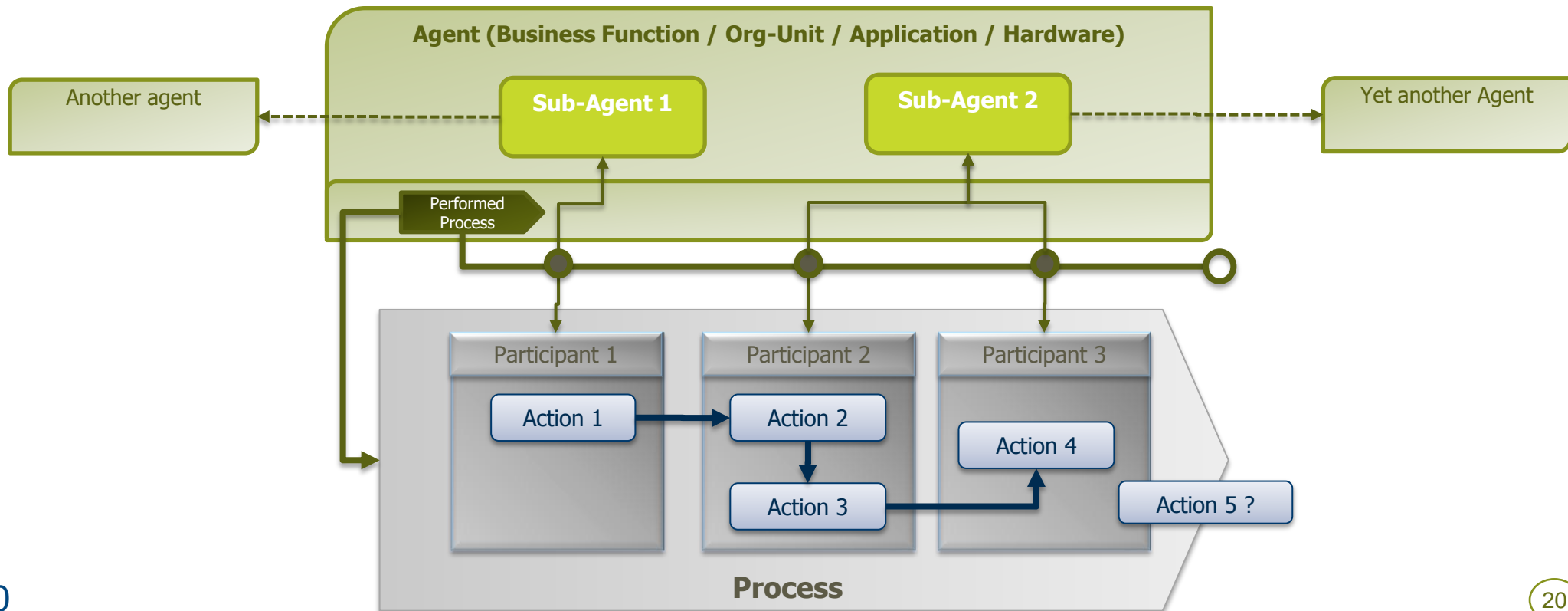
PROCESSING MODEL : MCT



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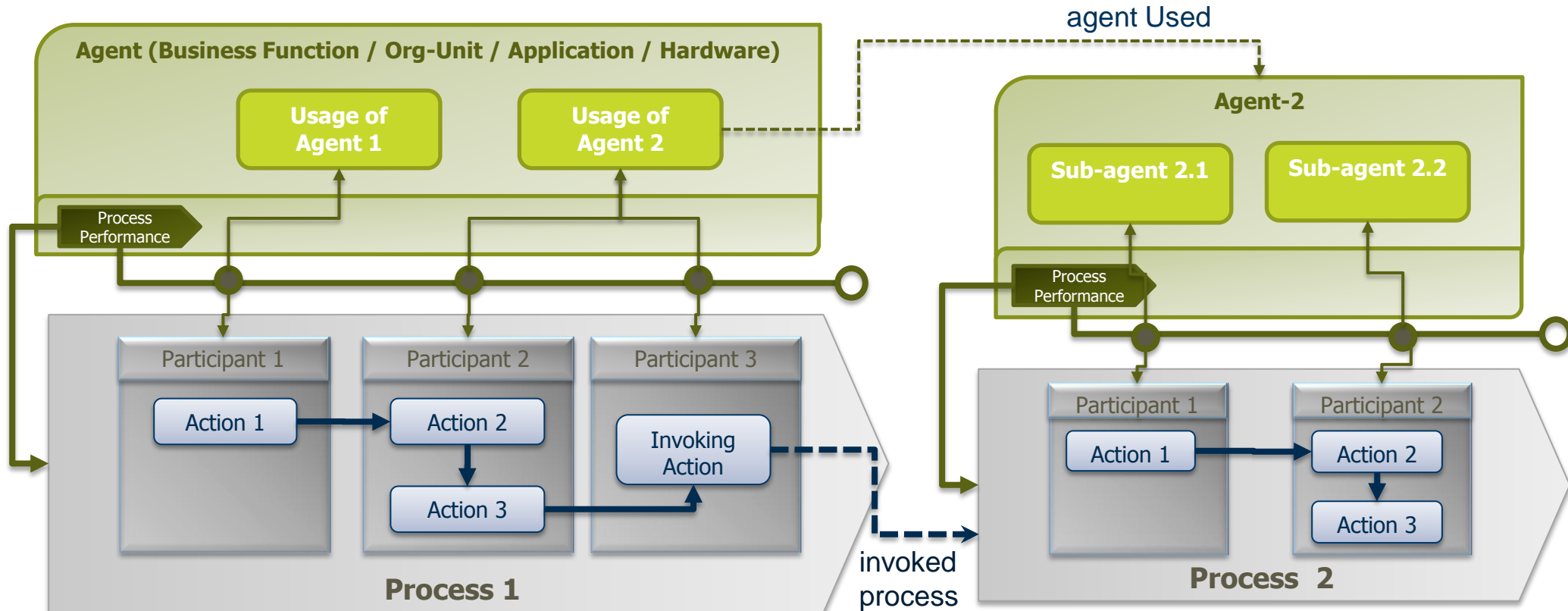
Impact of process approaches

- Processes are performed in the context of agents that either perform activities or delegate them to sub-agent through service contracts
- Process participants (swim-lanes / slice of responsibilities within processes) are mapped to sub-agents of the hosting agent where their process is performed



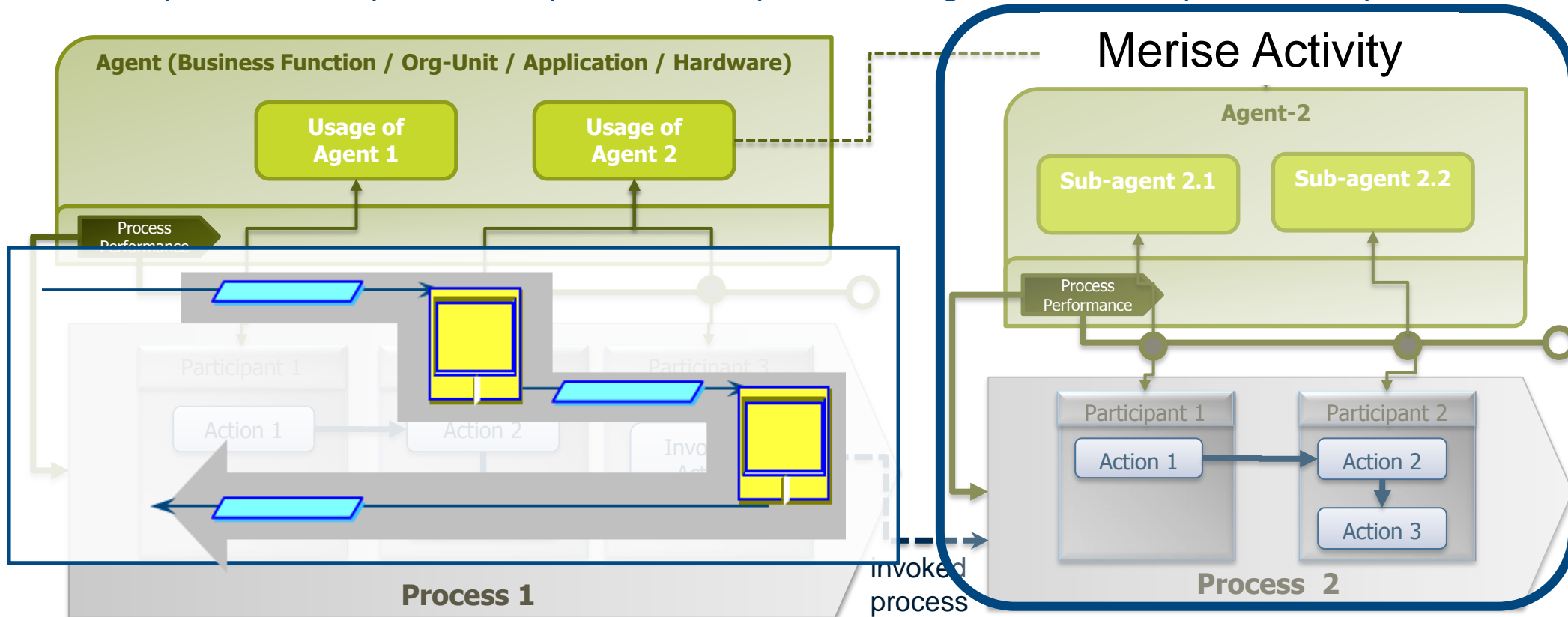
Tying together processes decomposition and agent decomposition

- Upper layer processes are the “emerging behavior” that agents have to provide in their involvement context
 - agent 2 must be able to provide what it is required to do in the context of “agent Architecture”
- Processes in sub-agents should conform to what inputs and outputs of upper layer calling actions
- This provides a “requirement/implementation” pattern throughout the decomposition analysis



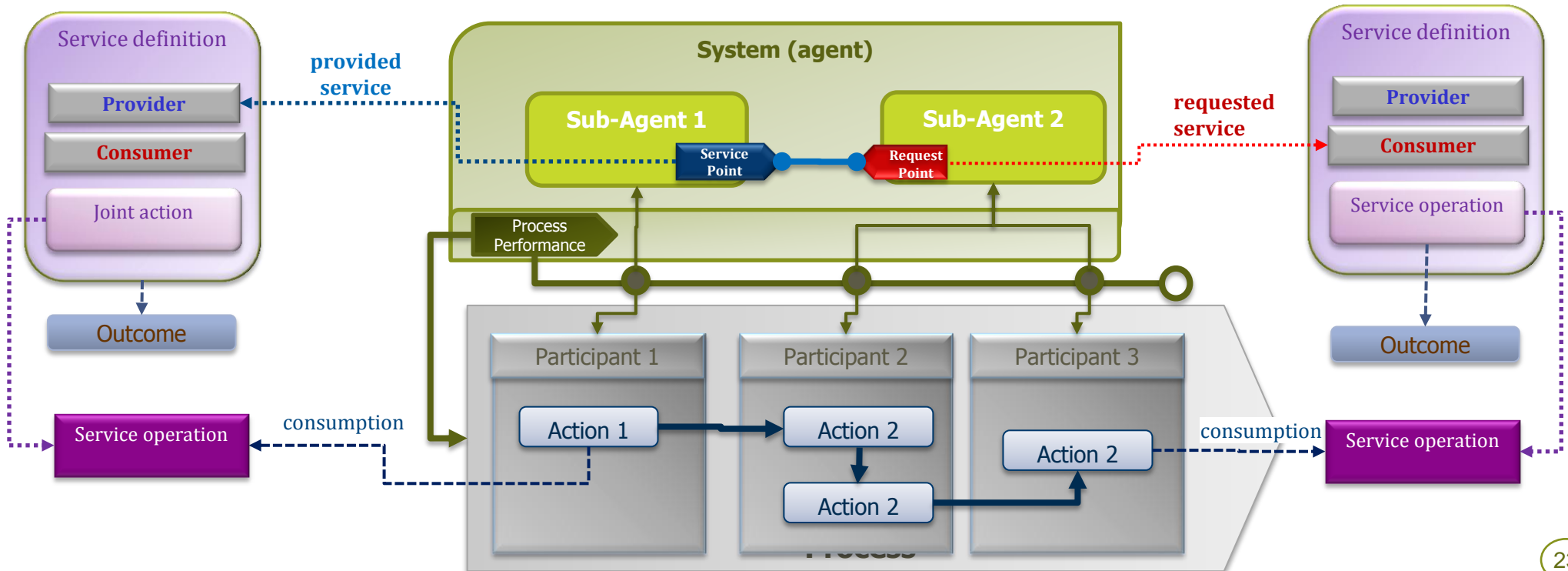
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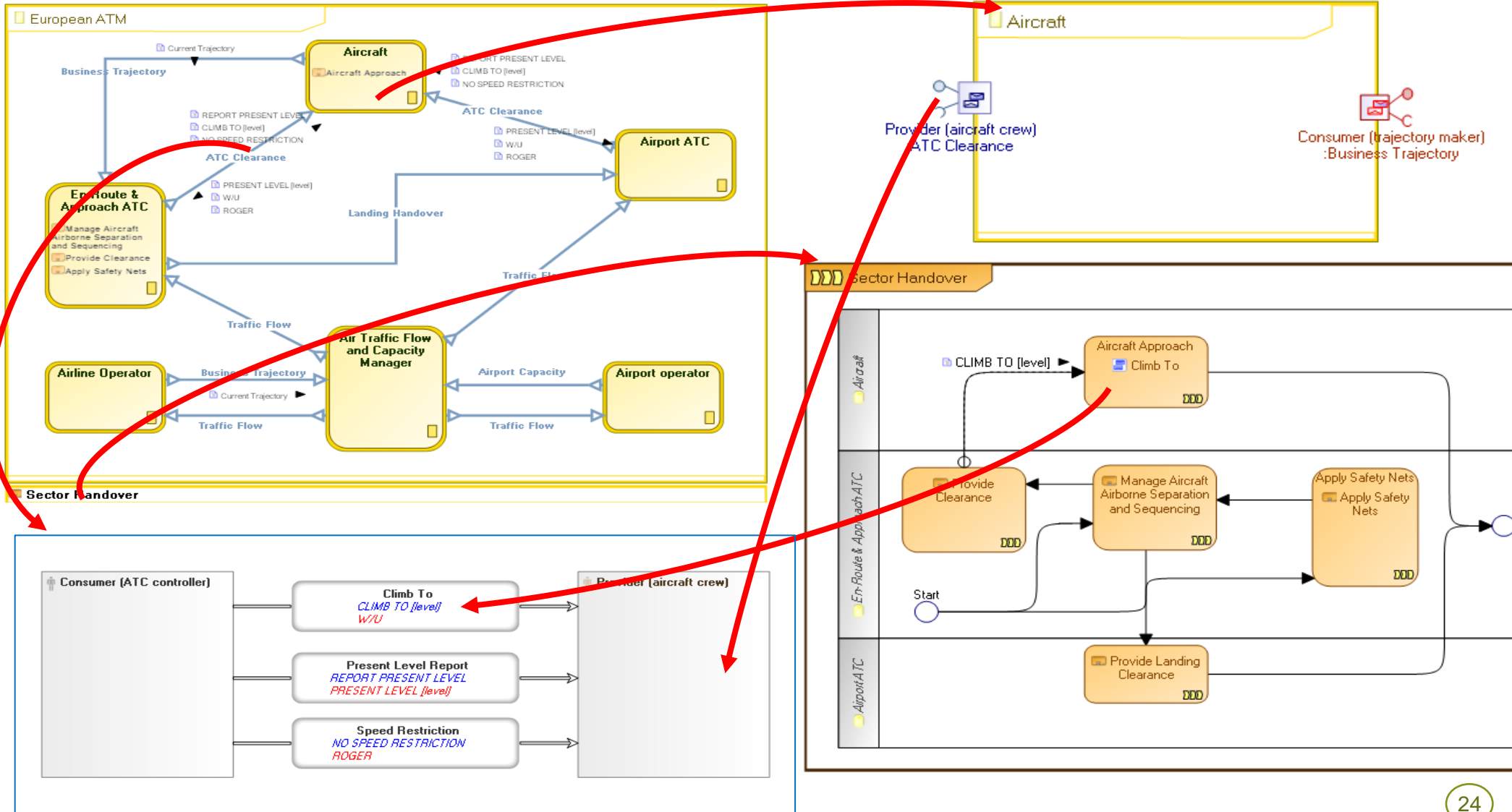


Agents, Process & Services : Interactions between agents

- A Service Definition (or exchange protocol) specifies:
 - Consumer and provider roles
 - Joint actions through which outcomes are exchanged
- Agents indicate « service points » through which they commit themselves to produce deliverables according to service definitions.
- Process steps (service tasks) consume deliverables provided by service operations.



ATM Example

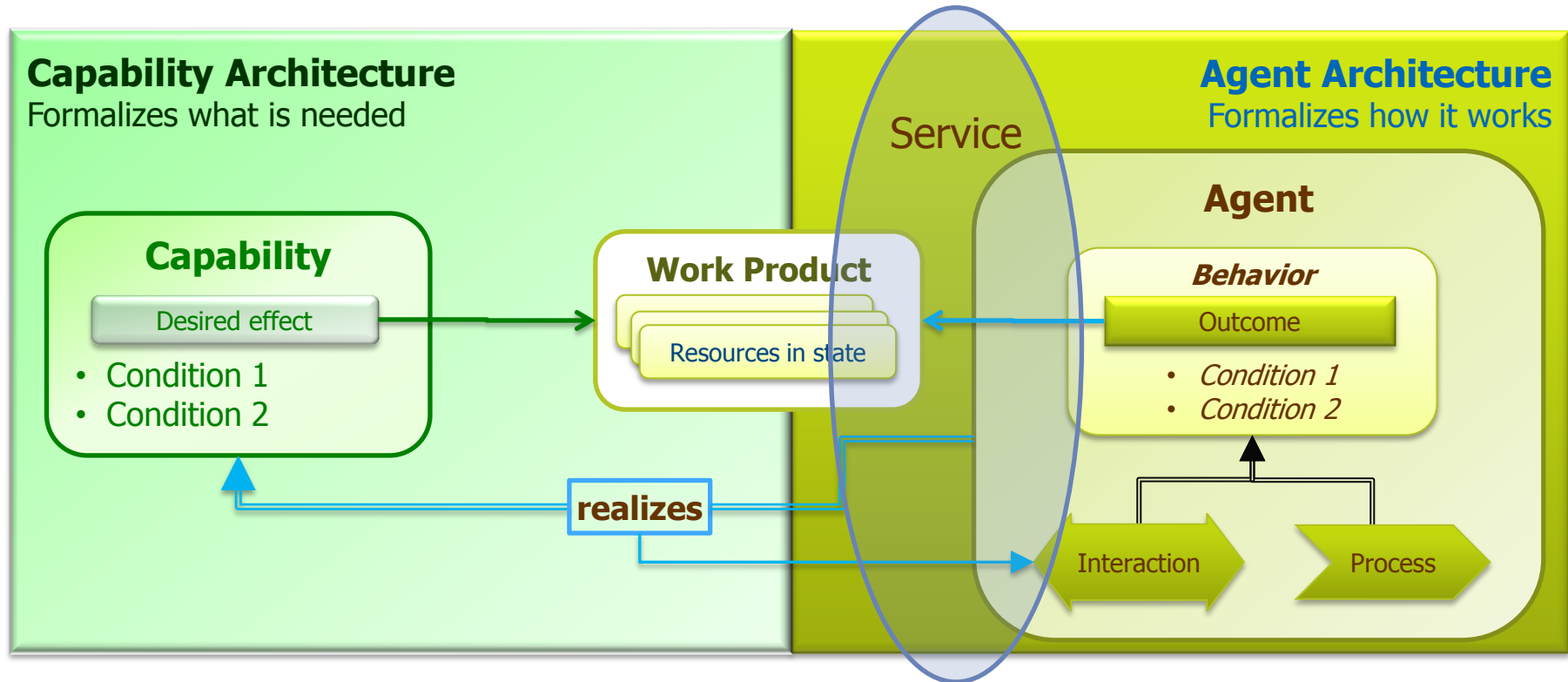




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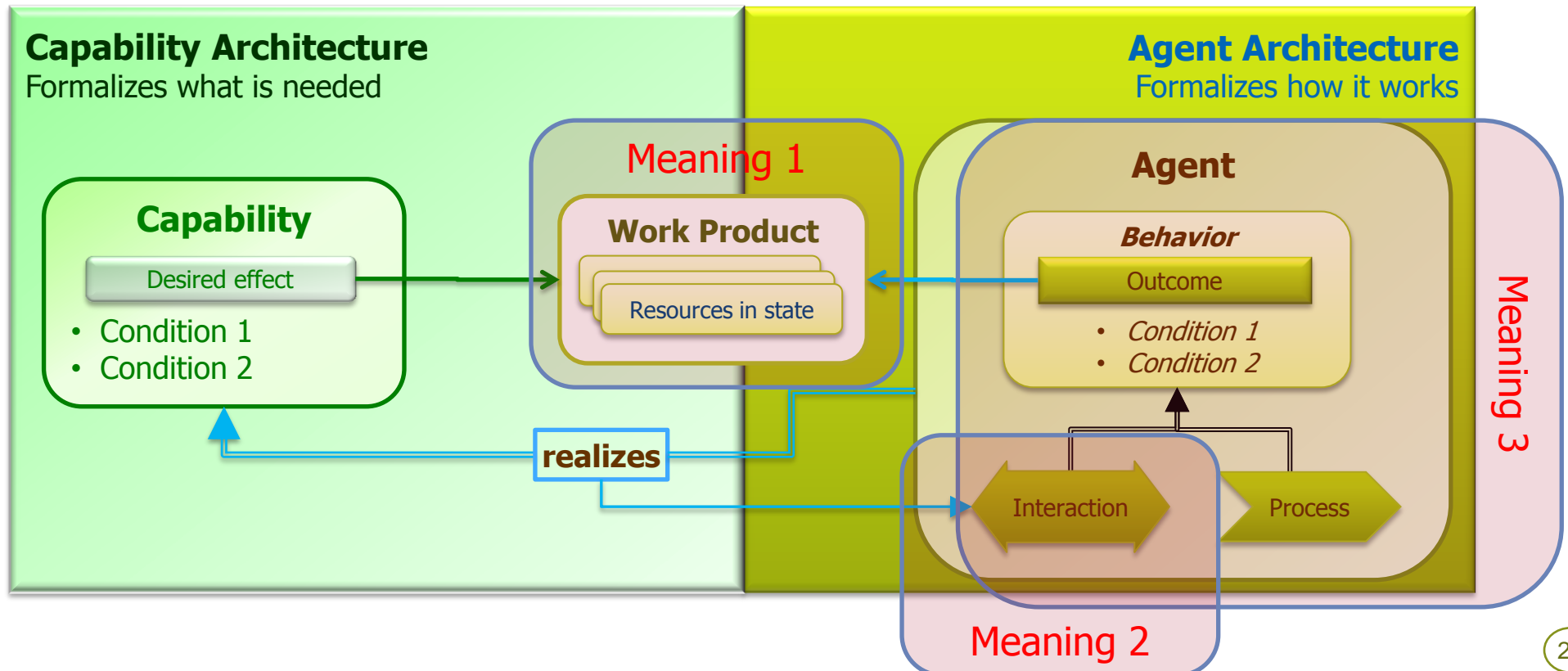
Service – proposed definition

- A service is a set of invocable activities made available by one or multiple agents (providers) in order to deliver an outcome for the benefits of other agents (consumers), under certain conditions.



Multiple meaning of the "service" term

- Meaning 1 : service as product
 - confusion between service activities and their results
- Meaning 2 : service as interfaces
 - Confusion between services and service interface definition
- Meaning 3: service as agents
 - Confusion between service activities and their enabling agent

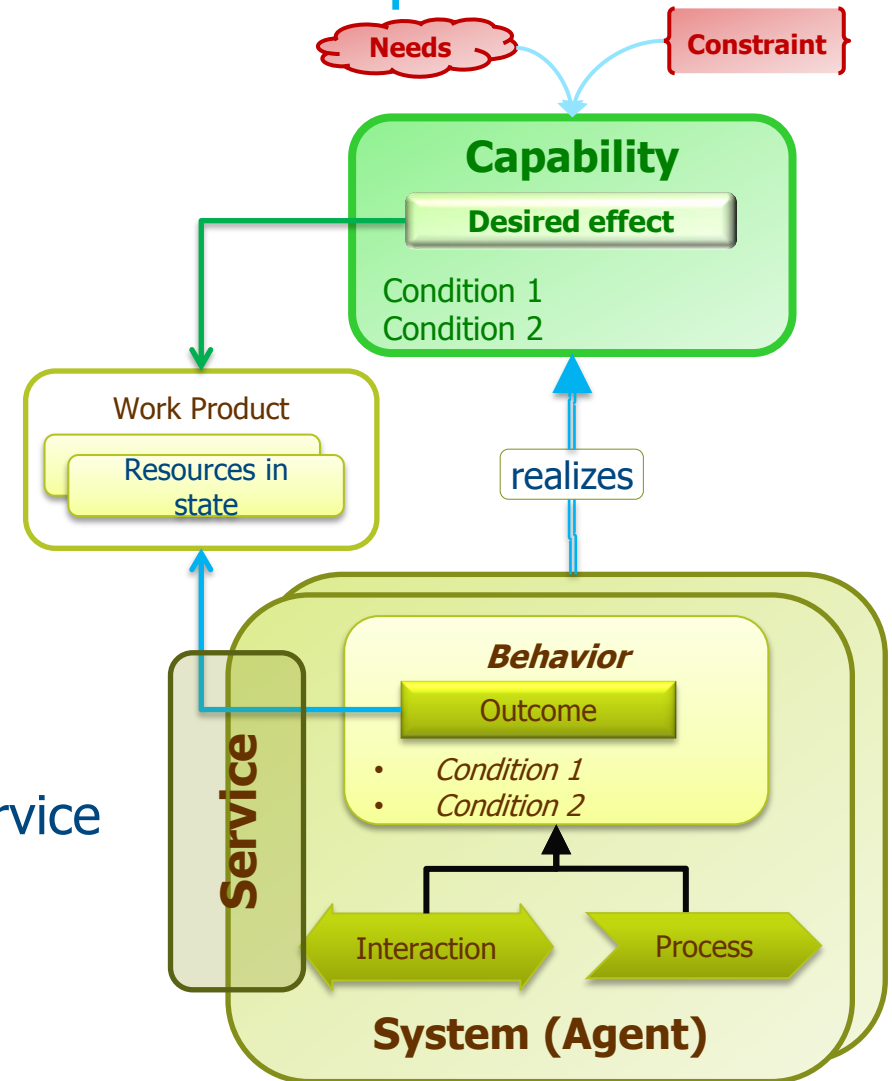


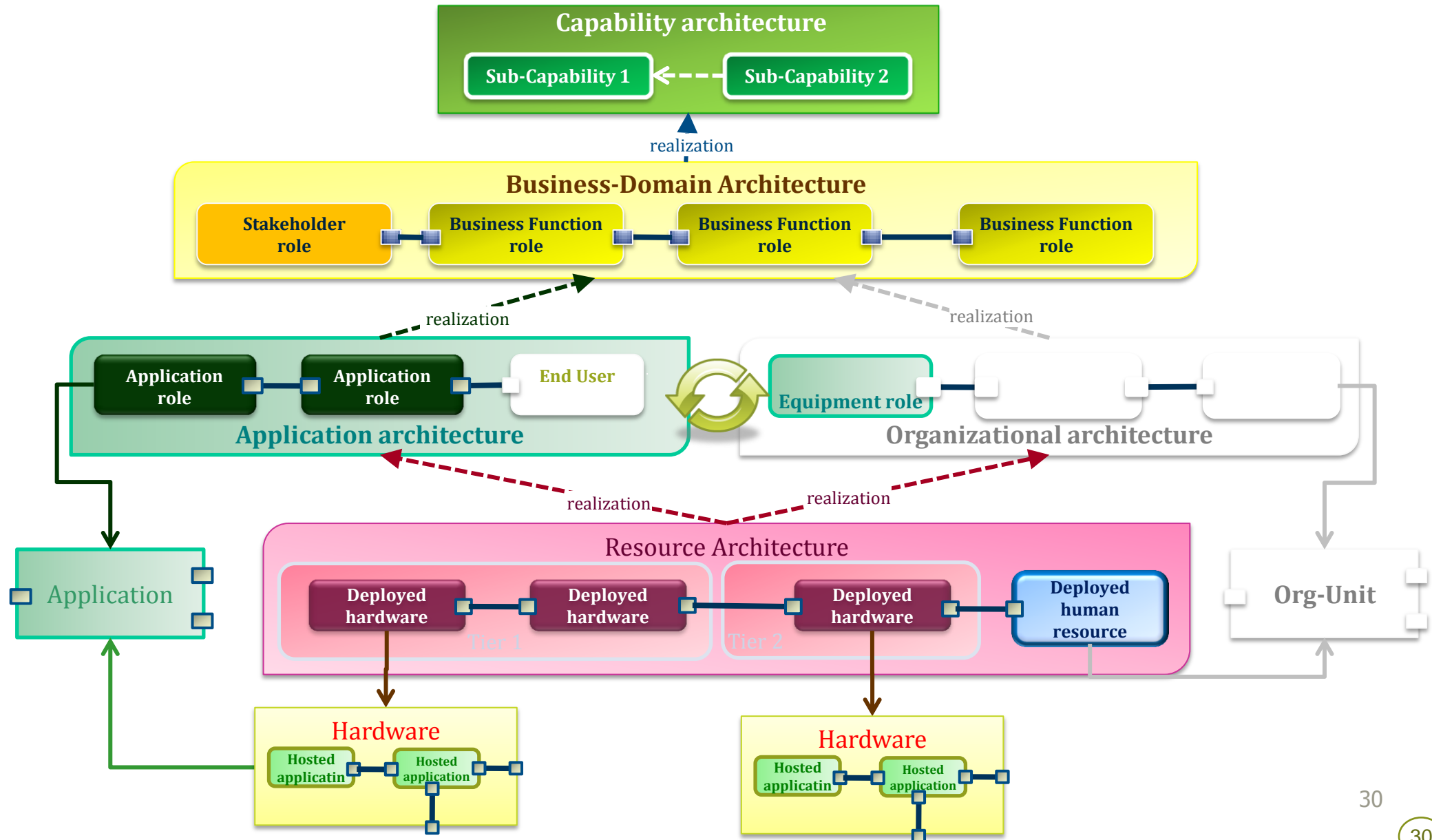
Standard references

- DoDAF 2.02
- UDPM-2
 - <http://megaportal/project/software/DoDAF/Shared%20Documents/UPDM/UPDM%202.0/UPDM-2%20-%20Beta1%20-%202011-05-07.pdf>
- SOAML
 - <http://megaportal/project/software/DoDAF/Shared%20Documents/SOAML/SOAML%20-%20Beta%20%20-%20no%20change%20bar%20-%202009-12-09.pdf>
- SysML 1.3
- OASIS RM
 - Reference model for SOA (2006)
 - <http://megaportal/project/software/DoDAF/Shared%20Documents/OASIS/soa-ra-cd-02%20-%202009-09-14.pdf>
 - Reference Architecture Foundation for SOA (2009)
 - <http://megaportal/project/software/DoDAF/Shared%20Documents/OASIS/soa-ra-cd-02%20-%202009-09-14.pdf>
- MODEM (MODAF 1.2.04 re-engineered in the IDEAS framework)
- ISO 9000/2000
- ISO 20000 + AFNOR
 - http://megaportal/project/software/DoDAF/Shared%20Documents/ISO%2020000/AFNOR%20-%20ITIL%20et%20ISO%2020000_MEGA%20International.pdf

System & capability architectures: business requirement traceability

- Outcome : work products
 - input and output types
- System behavior
 - Interactions, interfaces, services
 - Processes
- Agent/System structure
 - Systems are composed of other systems
 - Systems deliver their services through service points
 - Systems interact with each other
 - Systems handle processes
 - Systems participate to processes

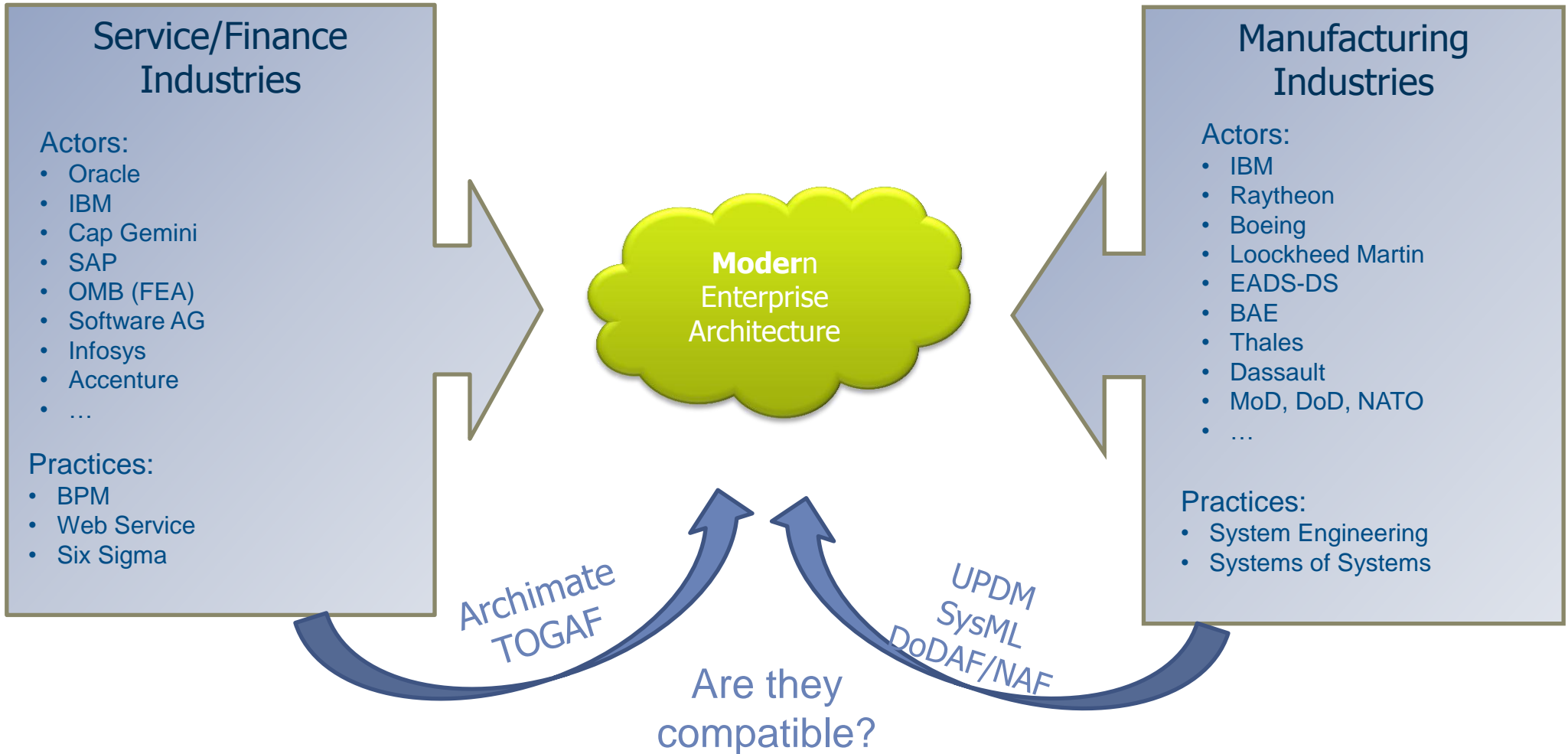




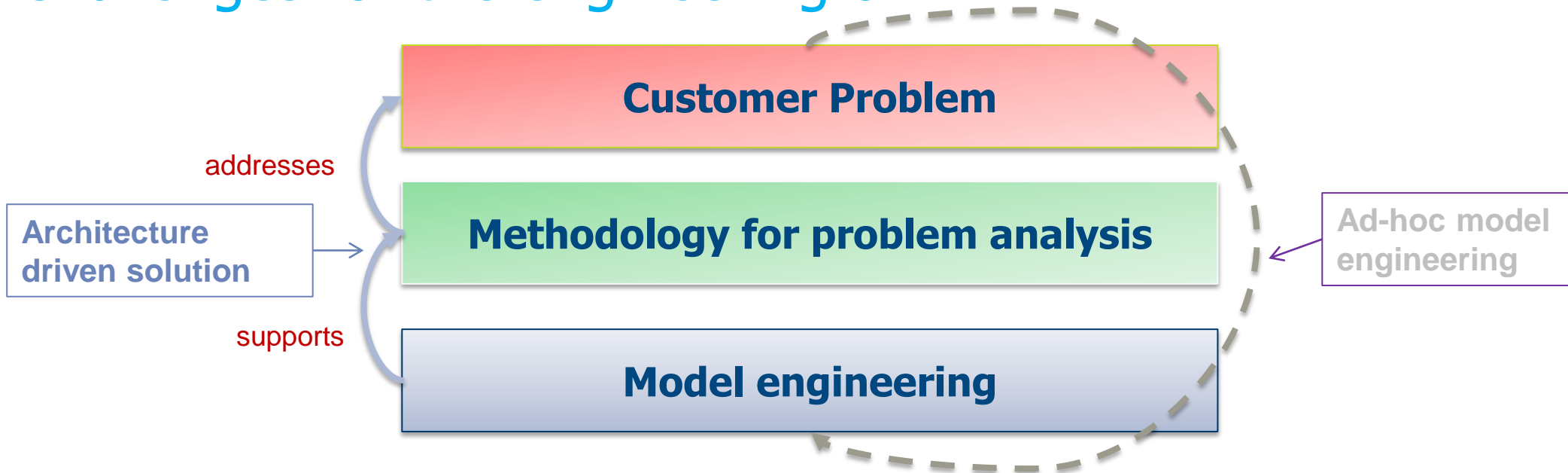


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Two complementary trends



Challenges for the engineering of EA



- In many current practices there is a shortcut from customer problem to ad-hoc model engineering solutions :
 - the customer drives the architecture tooling and practices
- New model engineering is powerful but more complex; the value comes only with the approach to solve customer problem:
 - The solution shall be architecture driven that require a well founded semantic EA.

Questions & answers