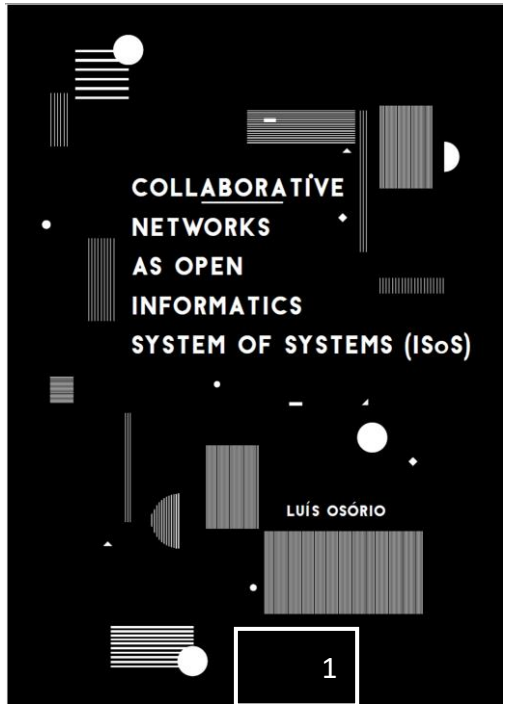
Collaborative Networks as Open Informatics System of Systems (ISoS)

Luís Osório



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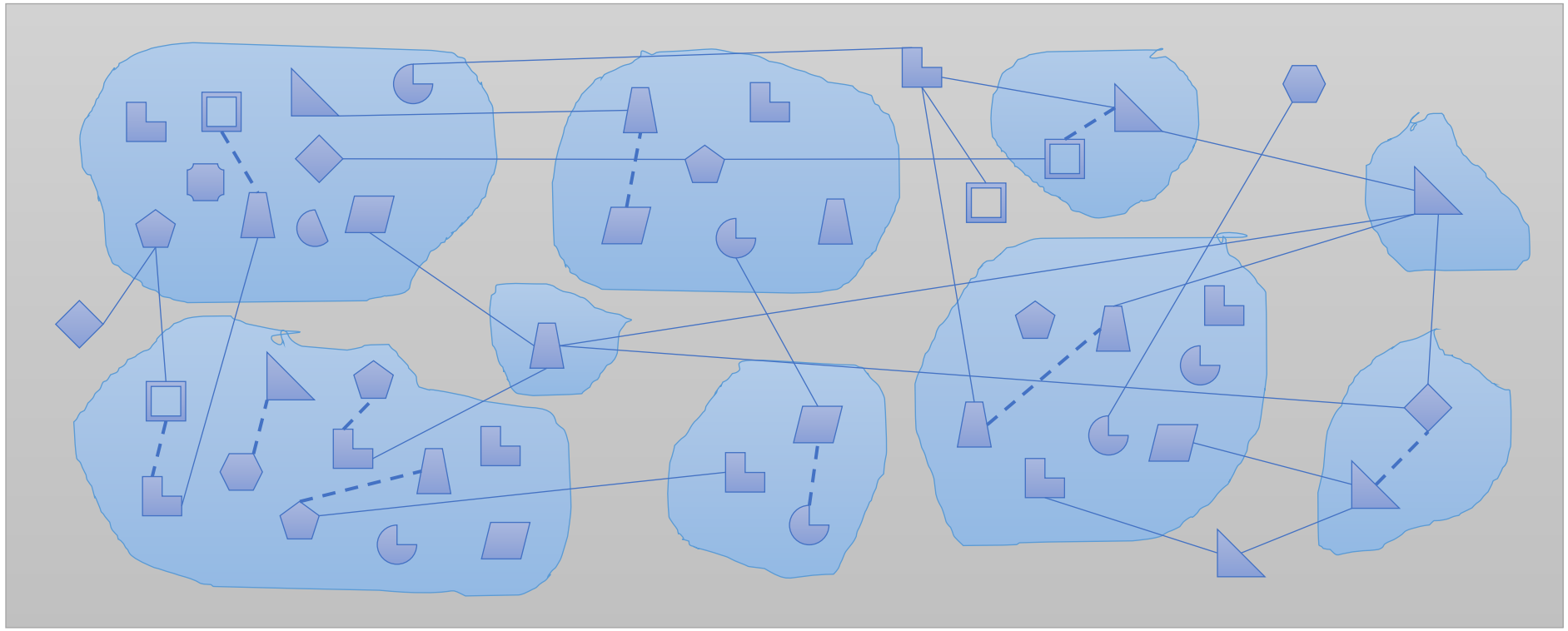
The Research Problem

Organization's Informatics Technology Landscape (IT)



Heterogeneous technology artifacts (software/hardware elements)

Fuzzy Responsibility Borders — Inter-border interactions - - - - Intra-border interactions

Technology Dependency - Vendor Lock-in

Organization's IT (Information and Technology landscape)

- Follows specific architectures
- Based on incomplete Standards
- Without competing products
  - Making substitution difficult

The "total" integration trend shows

- Risks of concentration
- Weakens market competition

Models and Technology Diversity

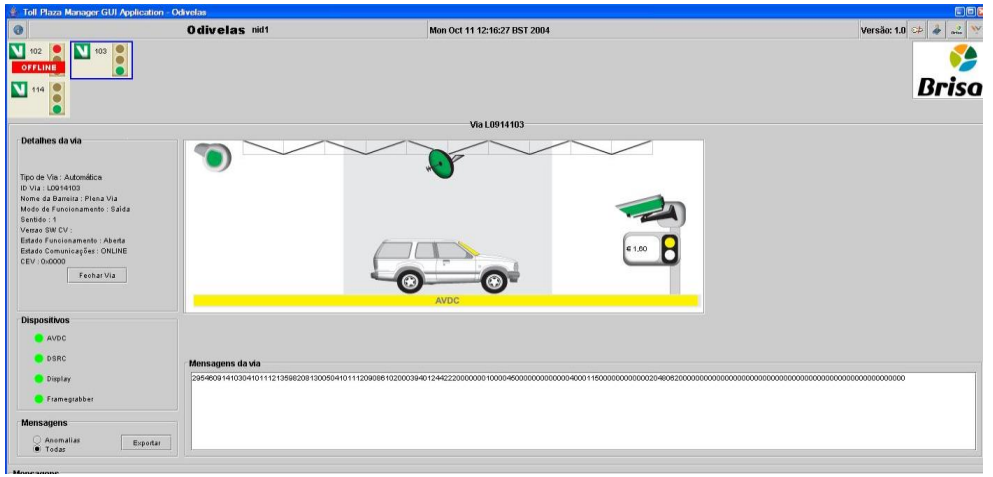
- Programming languages, development, integration and building/deployment systems

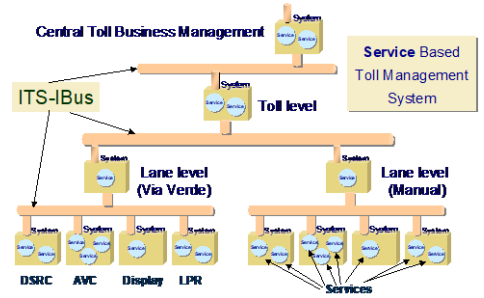
Lacking a Strategy

- For the **whole**
- For the Integration of
  - **Complex System of Systems**

ETC/Brisa Case

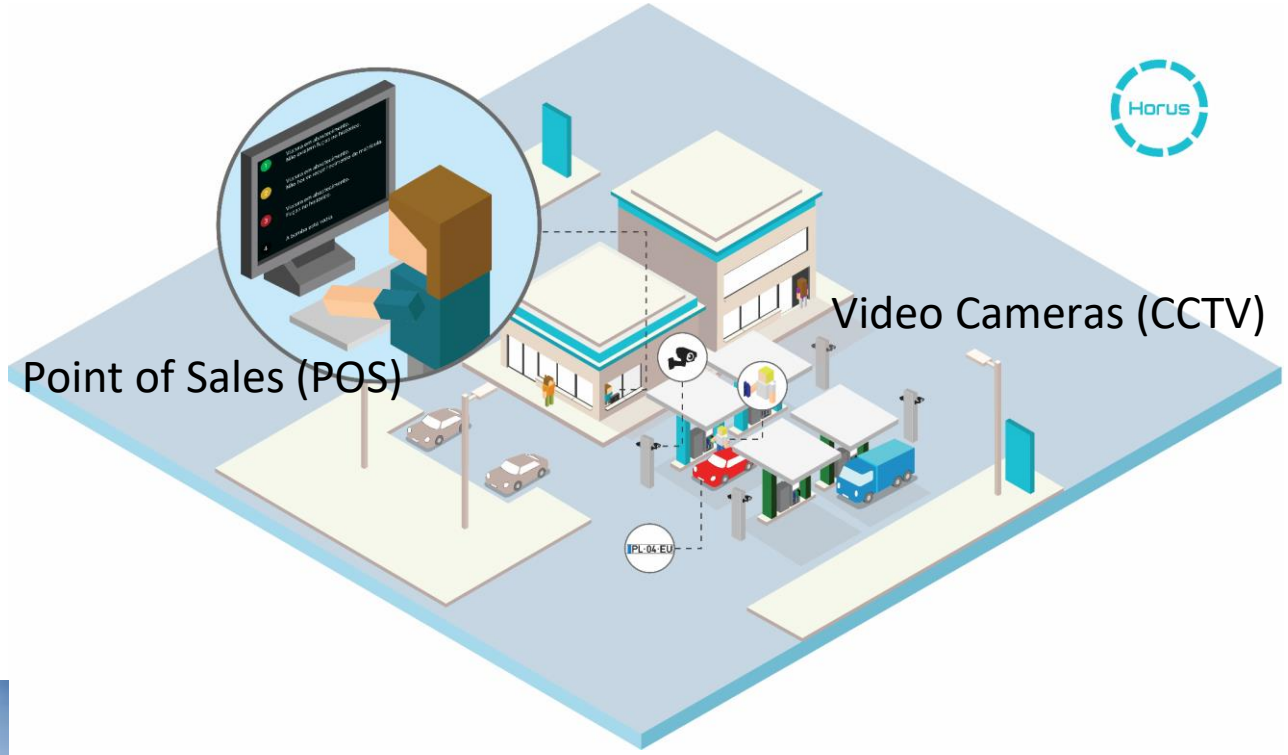
- A single supplier for the ETC system
- New payment services beyond tolling
  - parking lots, fueling stations, mobility
- Evolve for a multi-supplier technology landscape





The HORUS Case

BP Portugal

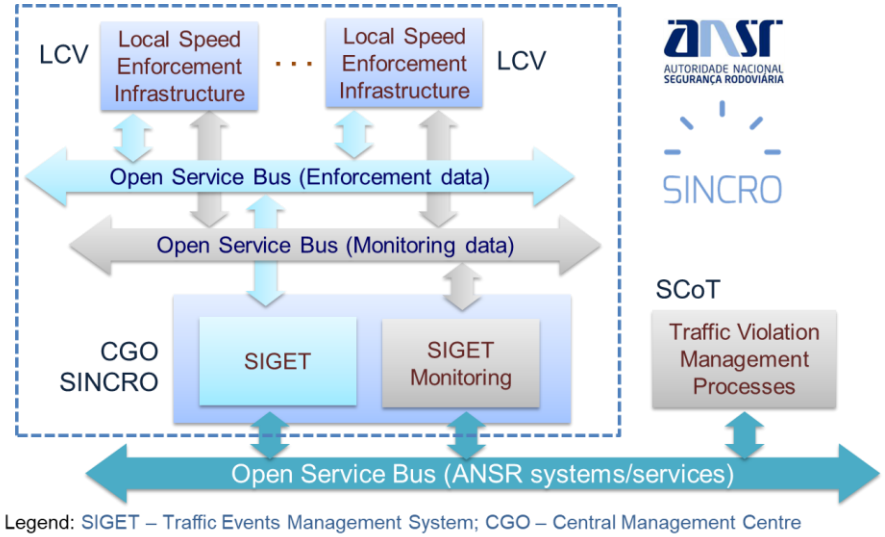


Galp

- Fueling pos-payment control (HORUS Isyetm)
  - Multi-supplier technology landscape
- Collaboration among fueling distribution networks

The SINCRO/ANSR Case

- National road speed enforcement network
- Multi-supplier technology landscape



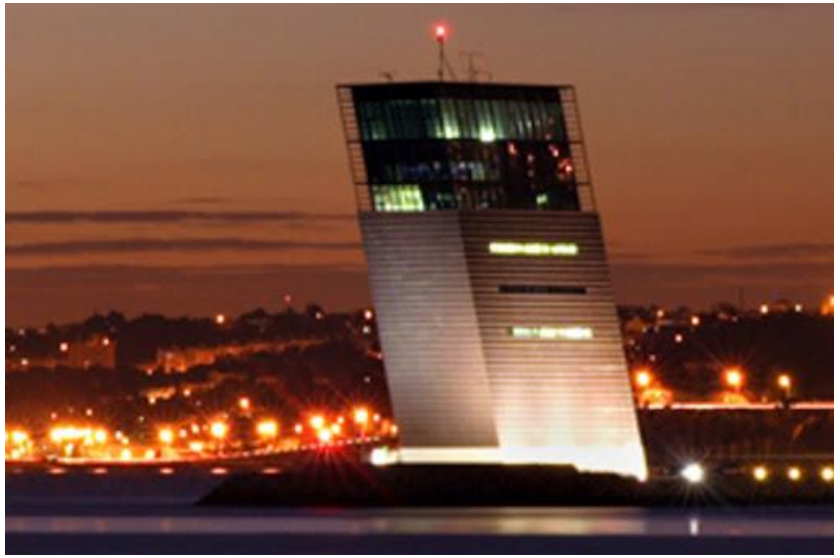
Collaborations with

- Infraestruturas de Portugal - Infrastructures
- Brisa - Road concessionaires
- Municipalities, Police Authorities

The MIELE/APL, APDL Case

- Logistics Single Window (LSW)
  - Door-to-door freight tracking
- Multi-supplier technology landscape

Port of Leixões



Port of Lisbon

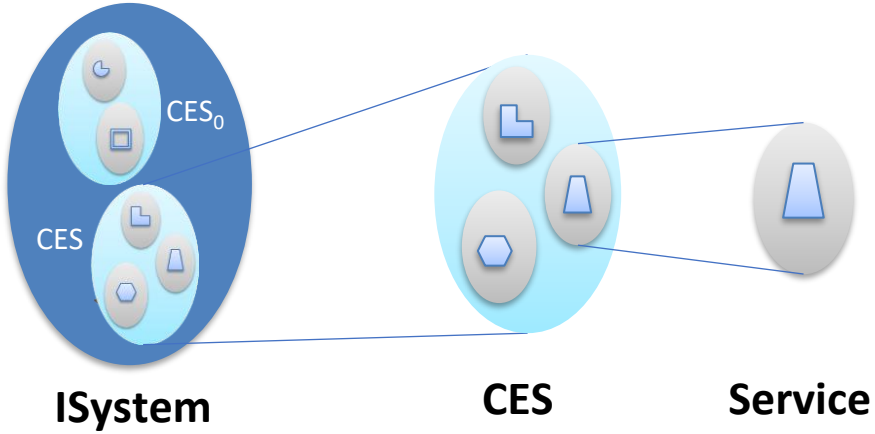
Collaborative Services platform

- Freight transport (maritime, railways, road) services
- Logistics services
- Customs and other Authorities

Informatics System of Systems (**ISoS**)

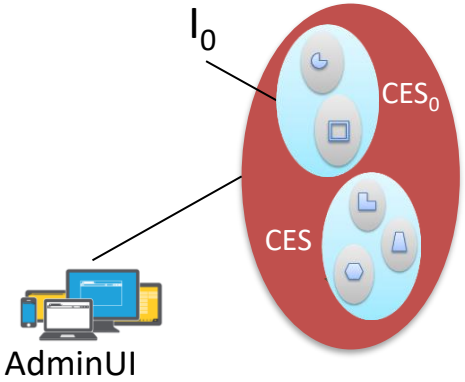
Every technology artifact is structured as

- **Isystem**, **Cooperation Enabled Services** (**CES**) or **Service** concepts



The Meta-ISystem, ISystem0

- Has a coordination/management role



The **Generic Modeling Entity (GME)**

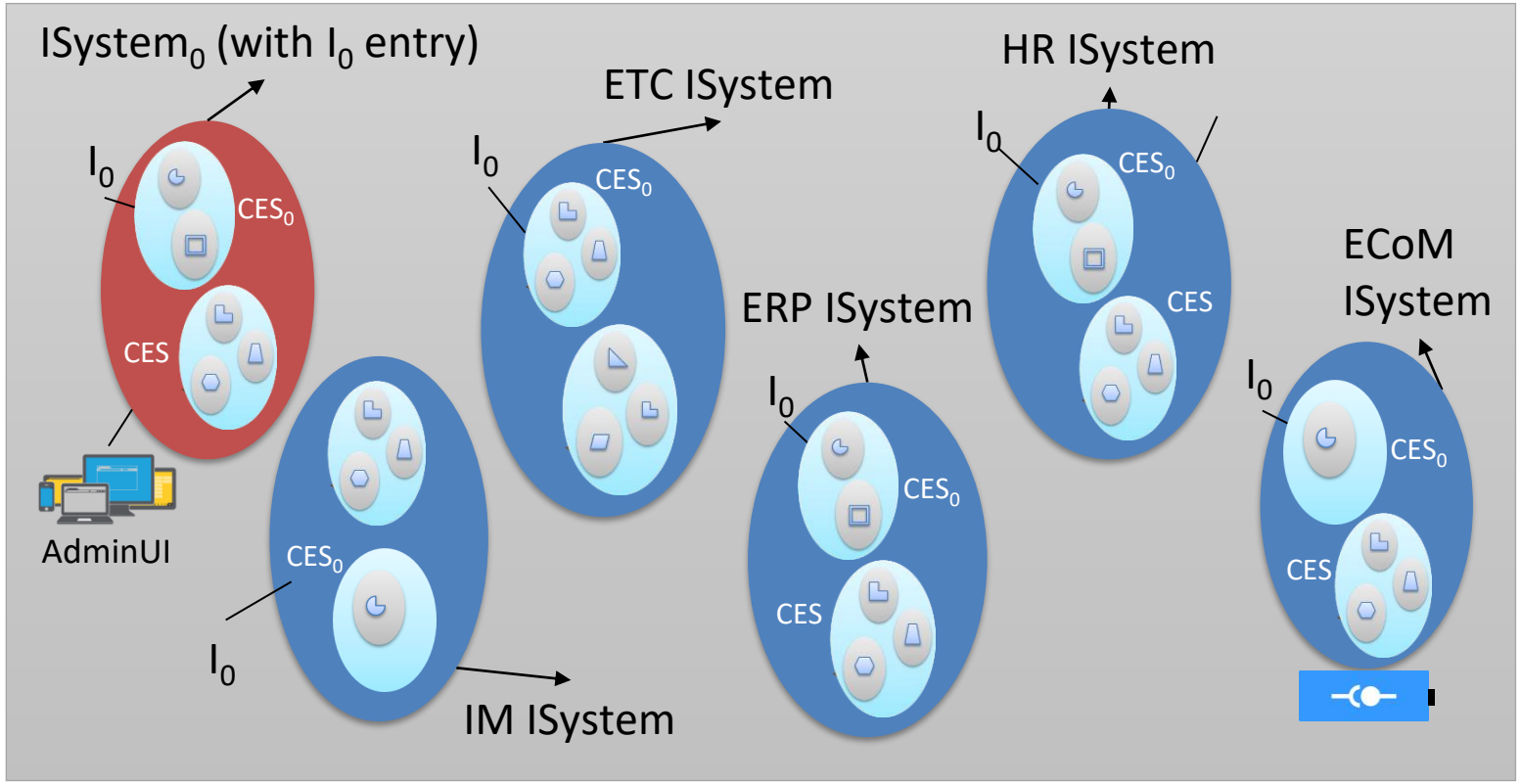
- Adaptive technology binding mechanism
- **OACI** - Open Adaptive Coupling Infrastructure

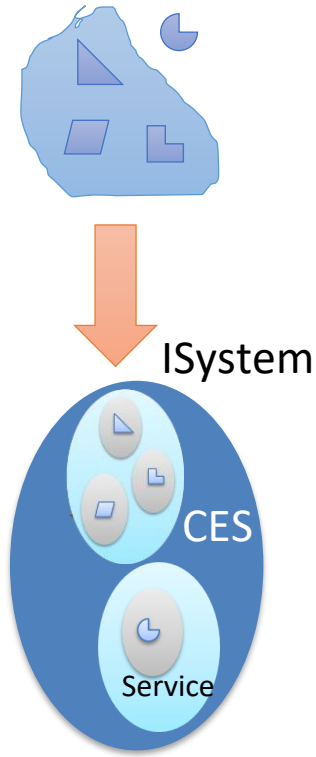
Any **peer Service** of some Isystem/CES

- Can obtain a **technology binding** from the target **ISystem/CES/Service**

The ISoS Technology Landscape

Organization's Informatics Technology Landscape (IT)

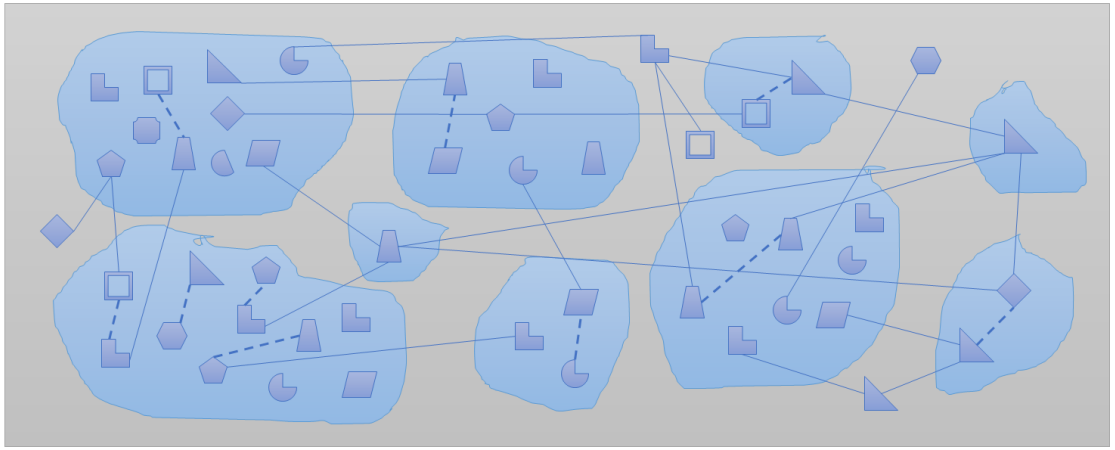




Isystem CES Service

Adoption Strategy

Organization's Informatics Technology Landscape (IT)

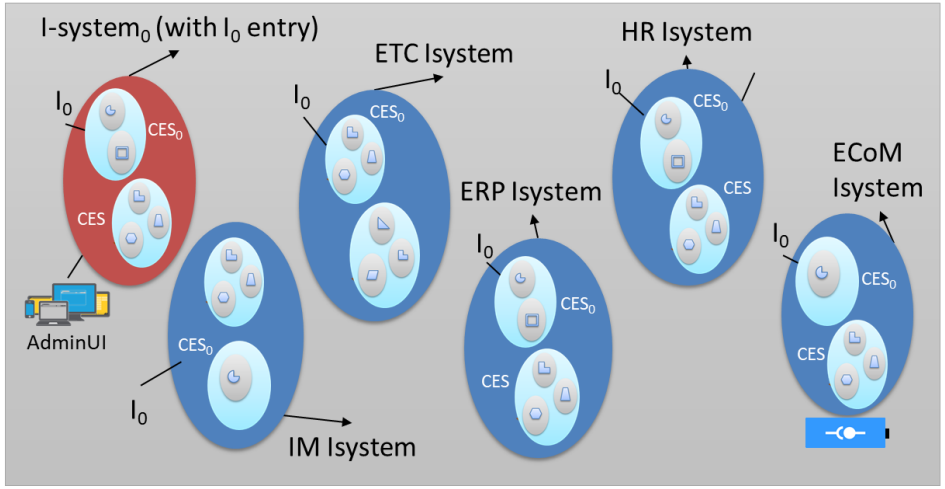


- Reference Implementation of **ISystem$_0$** (demonstrator)
- Pilot Isystem example
- Assessment for added value

AS-IS

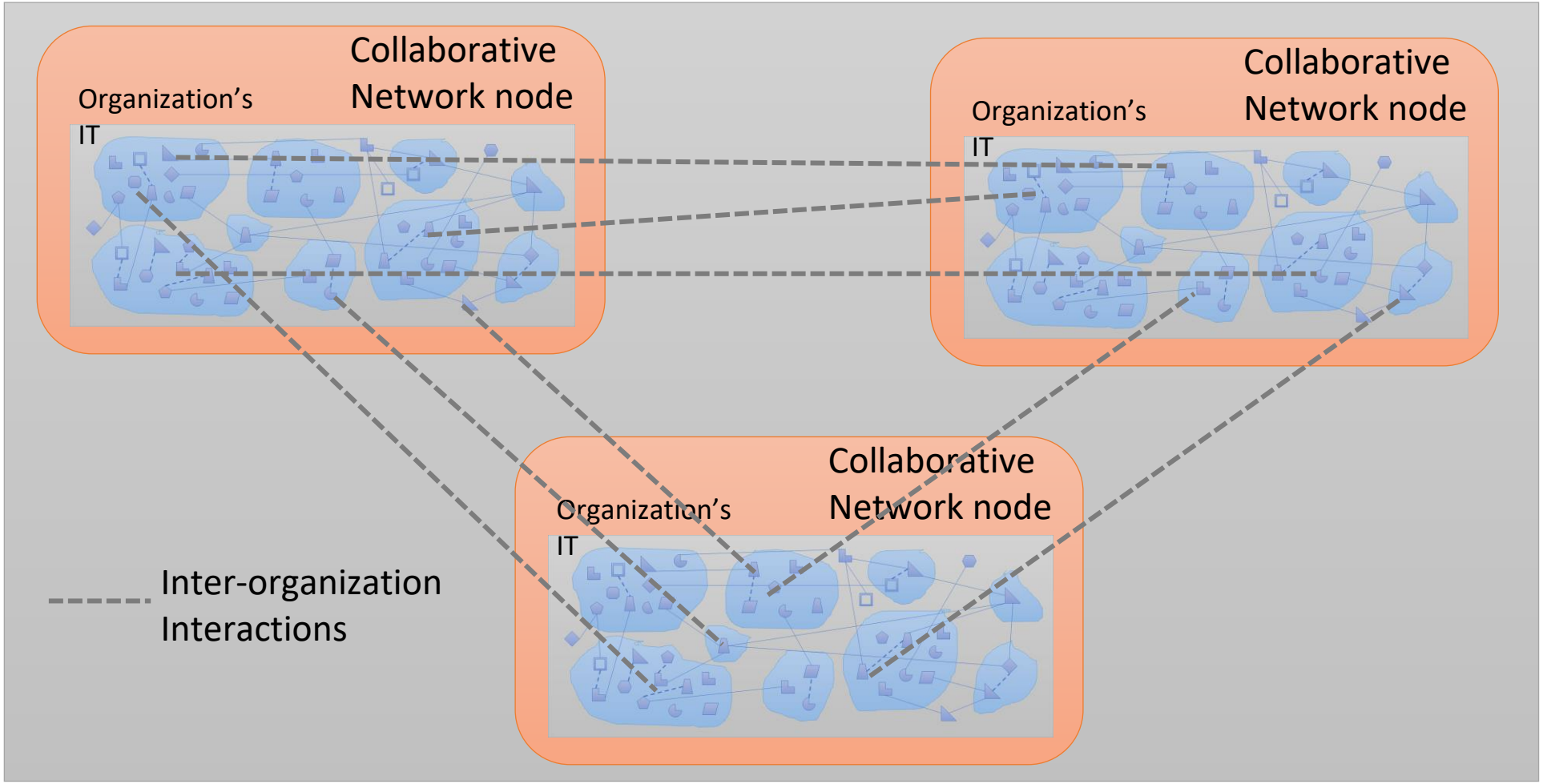
TO-BE

Organization's Informatics Technology Landscape (IT)



Collaborative Networks

Collaborative Networks Challenge

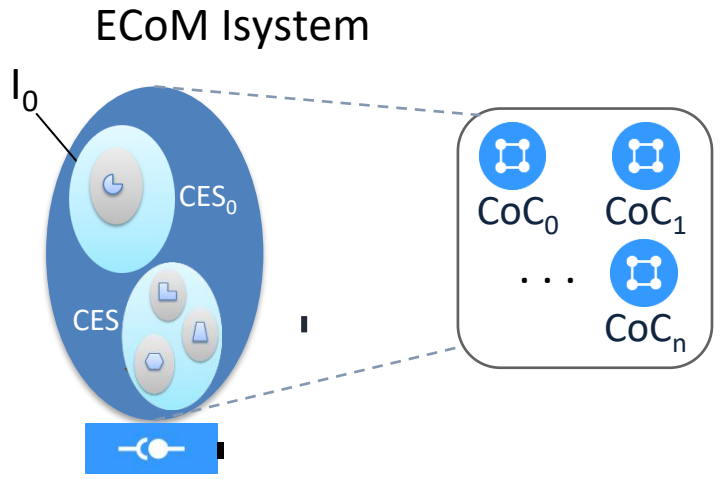


The ECoNet Collaboration Platform

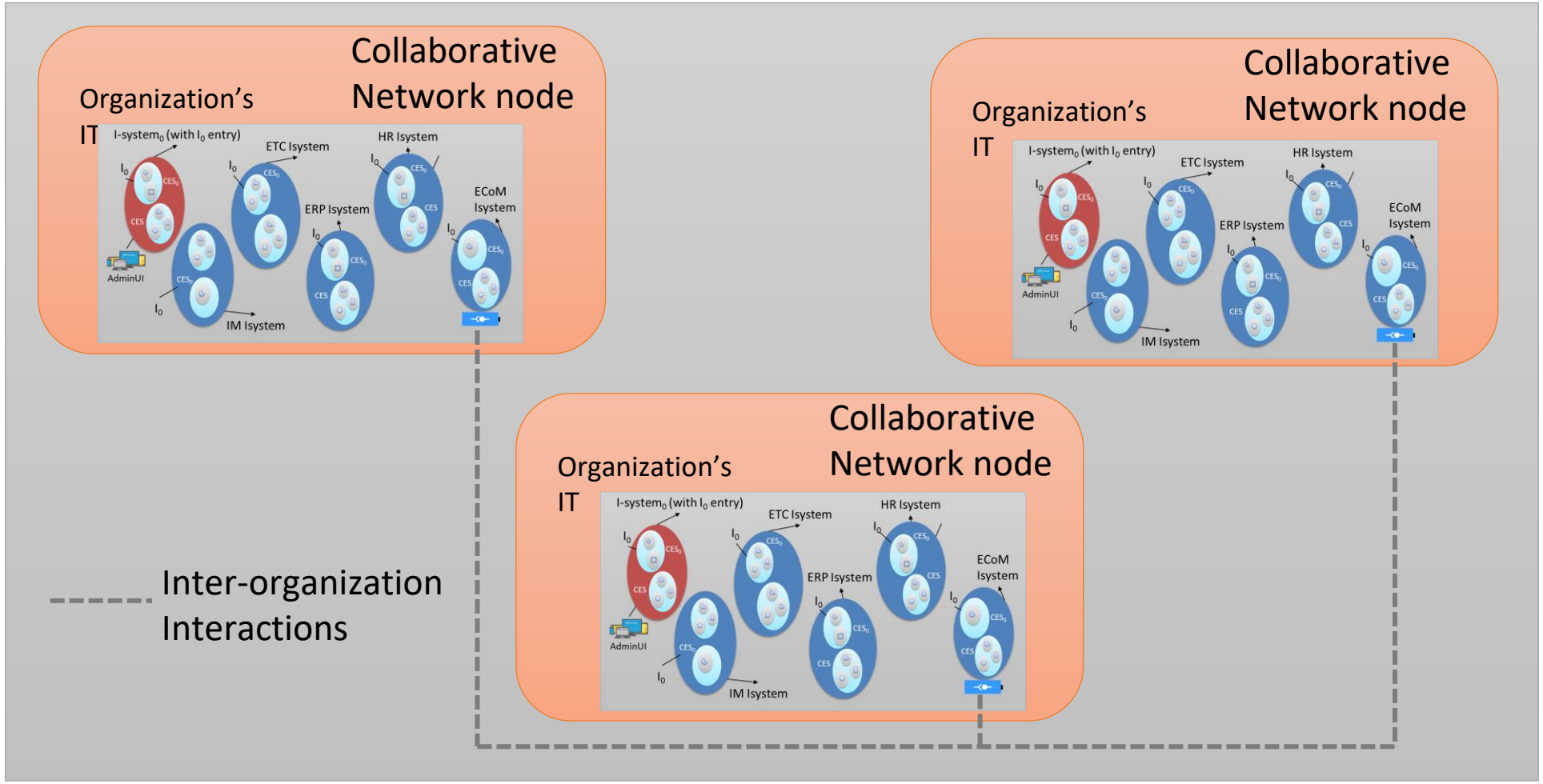
The **ECoNet** Collaborative Networks Infrastructure
- Unifies data and coordination interchanges

Virtual Collaboration Contexts (**VCC**)
- Managing **multi-tenant groups**
- Secure private **collaboration spaces**

The Collaboration Context (**CoC**) concept
- Abstracts the diversity of specialized adapters



Collaborative Networks



Conclusions

- Our research demonstrated the value of ISoS Modularity Framework
  - Cost reduction of technology artifacts
    - **Multiple suppliers** offering compatible products
- Sustainable Integrated Systems Landscape
  - For the Organization
    - With the proposed **ISoS** Technology Framework
  - For the Networks of Organizations (CN)
    - Through the **ECoNet**/ECoM Open Collaborative Platform
- Reference Models and Implementations for Isystems and CES
  - Establishing **Open Standards** able to make **substitutability** possible