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EURIDICE

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The Intelligent Cargo Concept in the European Project EURIDICE

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Content

- The EURIDICE vision and message
- What is Intelligent Cargo
- Architectural paradigm shift
- Pilot applications

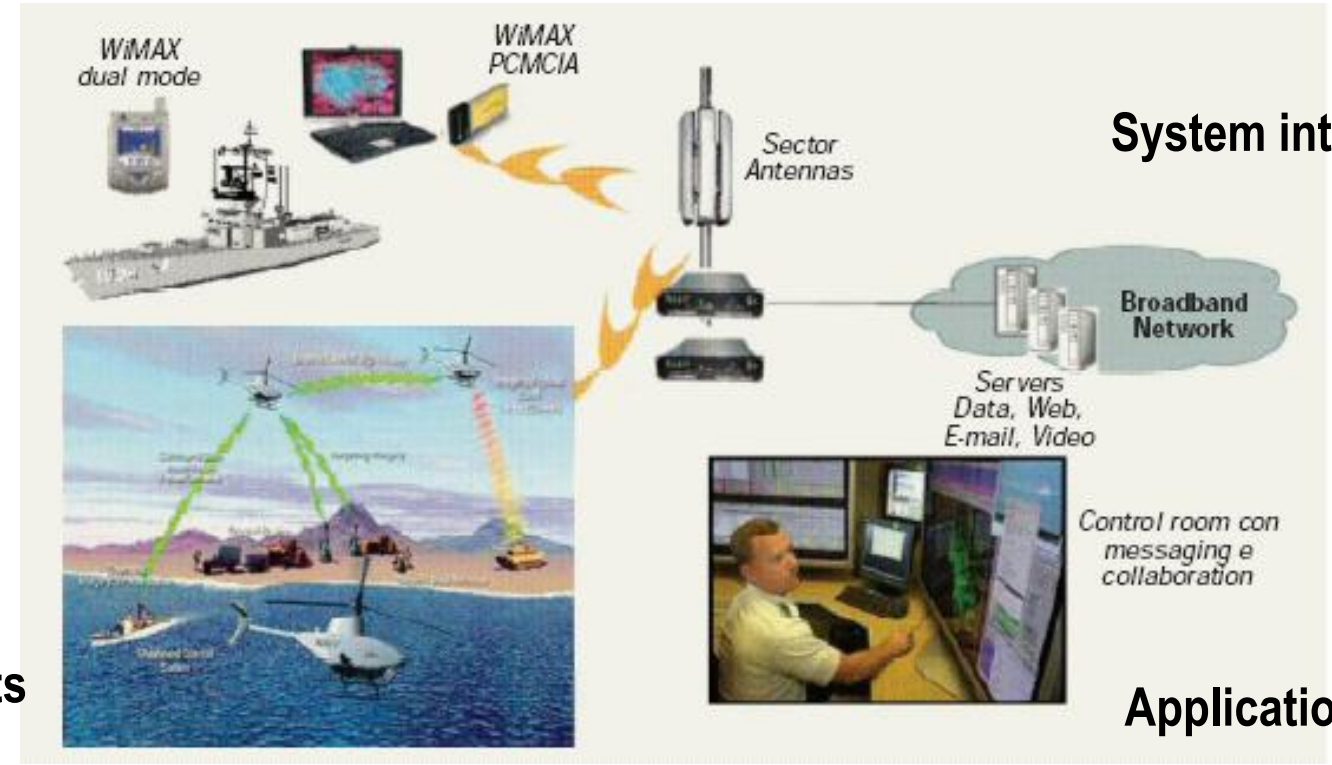
The logistics industry

- Extreme fragmentation
  - Majority of SMEs, average turnover in EU: 430 k€ (src. EC DG TREN)
  - 80% road haulage goes to micro-companies (src. EUROSTAT)
  - Large players subcontracting most low-value activities.
- Labour intensive, low margins
  - 2.6 million workers in road freight transport (src. EC DG ENT)
  - Value-added per employee in EU: 33 k€ (src. EC DG TREN)
- Commodity vs. value-added service
  - Advanced services (4PL, intermodal) so far underdeveloped
  - SCM process and information mostly in the customer hands, i.e., the “cargo owner” (industry, distribution).
- Sustainability challenges
  - Trucks absorbing 35% of total road-fuel production with an expected increase to over 40% by 2030 (source “World Energy Outlook 2006”).
  - Transport-related CO2 emissions at 23% and rising.
- Regulatory pressures
  - The community pays for infrastructures (trucks account for 50% of motorway traffic)
  - Citizens suffer pressures on fuel prices, congestion in cities and road safety problems.

ICT for goods mobility today: Cutting-edge technologies for top demanding customers

Technology vendors

System integrators



IT departments

Application vendors

Target : high value goods, with special requirements (precious, dangerous, perishable, needed just-in-time, …)

What about goods that are neither precious nor special?
What services are needed by the majority of logistic users and operators?

What services are needed by the majority of logistic users and operators?

- A qualified answer: “nothing, thank you!”
- “Governments should stop wasting money in goods traceability projects: no one cares about that”

  President of Assologistica (Italian Association of Logistic companies)
  23/4/08, speech at Politecnico of Milano convention on Logistics in Port
- Why:
  - “Because operators already have all the data they really need.”
  - “Traceability across operators would force us to link our information system into a ‘system of systems’.. costly and hardly achievable.”

Missing or misdirected value proposition

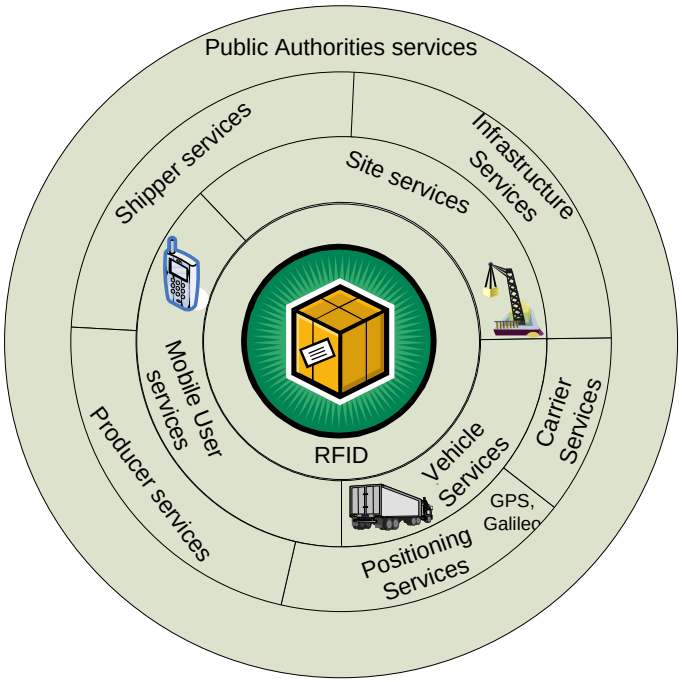
Overshooting:
offer focused on top-demanding customers

Faulty architectural approach

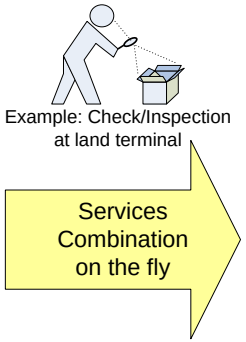
Adoption barriers:
unjustified cost and complexity for average users

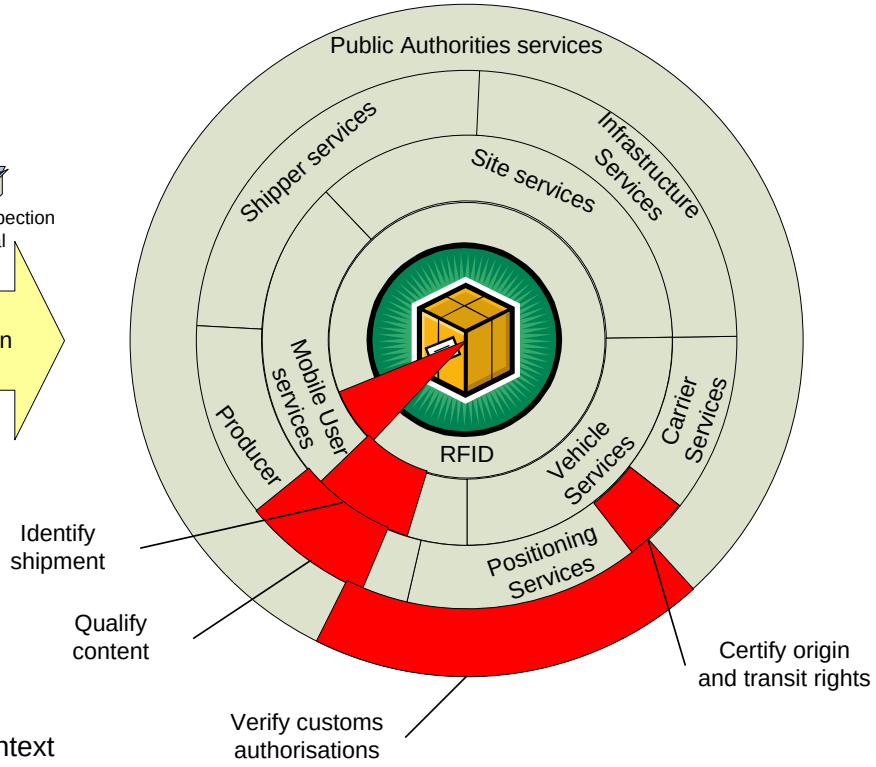
EURIDICE Intelligent Cargo vision

"In five years time, most of the goods flowing through European freight corridors will be 'intelligent', i.e.: self-aware, context-aware and connected through a global telecommunication network to support a wide range of information services for logistic operators, industrial users and public authorities."



Cargo-centric Information Services Infrastructure





User and context specific interaction

From vision to adoption: Finding our own “elevator speech”

- “Pleased to meet you …”
  - 📽“In five years time, most of the goods flowing through European freight corridors will be ‘intelligent’, i.e.: self-aware, context-aware and connected through a global telecommunication network to support a wide range of information services for logistic operators, industrial users and public authorities.”
  - 👽“(we are building) a cargo centric information chain that offers automated end-to-end information about the logistic supply chain based on existing technologies and standards combined with intermediating trusted third parties.”

    …

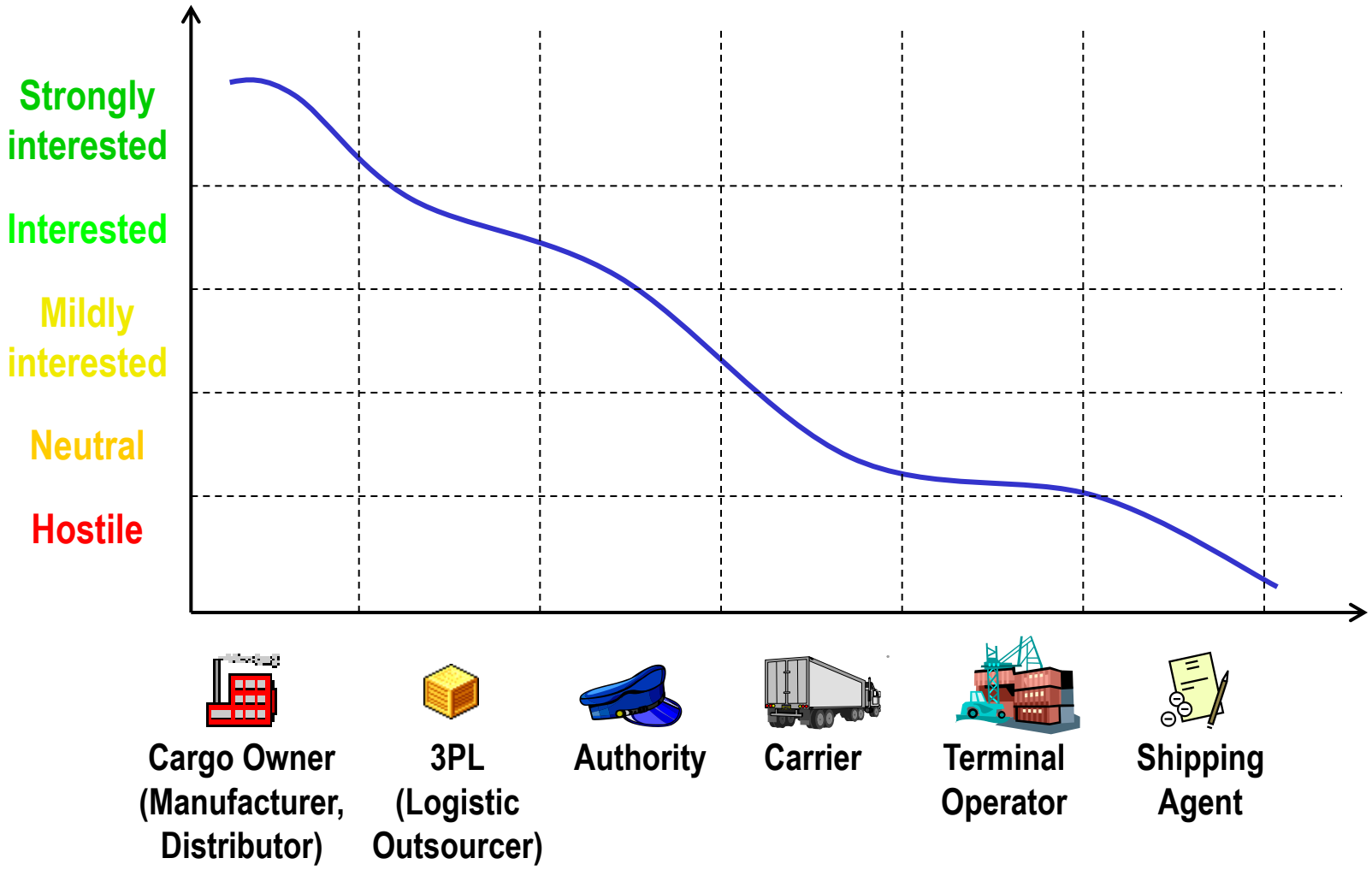
    ☺“We provide this ❶ product for these ❷ customers to achieve these ❸ benefits.”

1. The product

- We provide:
  - Information infrastructure / platform? (too vague)
  - Hardware / software tools / systems? (too limited)
  - (yet another) process / data integration platform? (not true)

"We provide cargo information services .."

The customers: Who cares about the cargo being intelligent? → Who is target of our value proposition?



Value proposition pitfalls

- Some apparently good targets are hostile or neutral at best
  - Shipping agencies, terminal operators, carriers.
  - Misdirected value propositions can be found behind some past failures.
- Aiming at individual targets is not enough
  - The intelligent cargo concept, like other similar approaches, builds on cooperation between different actors.
  - Among the necessary actors some will find no value in the interchange, at least at the beginning (e.g., small carriers).
  - Other motivations/levers can be attempted to convince them, but a good business architecture should work by itself (frictionless).
- Importance of finding the right architectural approach
  - Maximize the value for those who care.
  - Minimize the burden for those who don't care.

2. The customers

- Our customers:
  - Logistic companies
  - Cargo owners / shippers
  - Authorities / infrastructures ? (not customers, more providers / users)

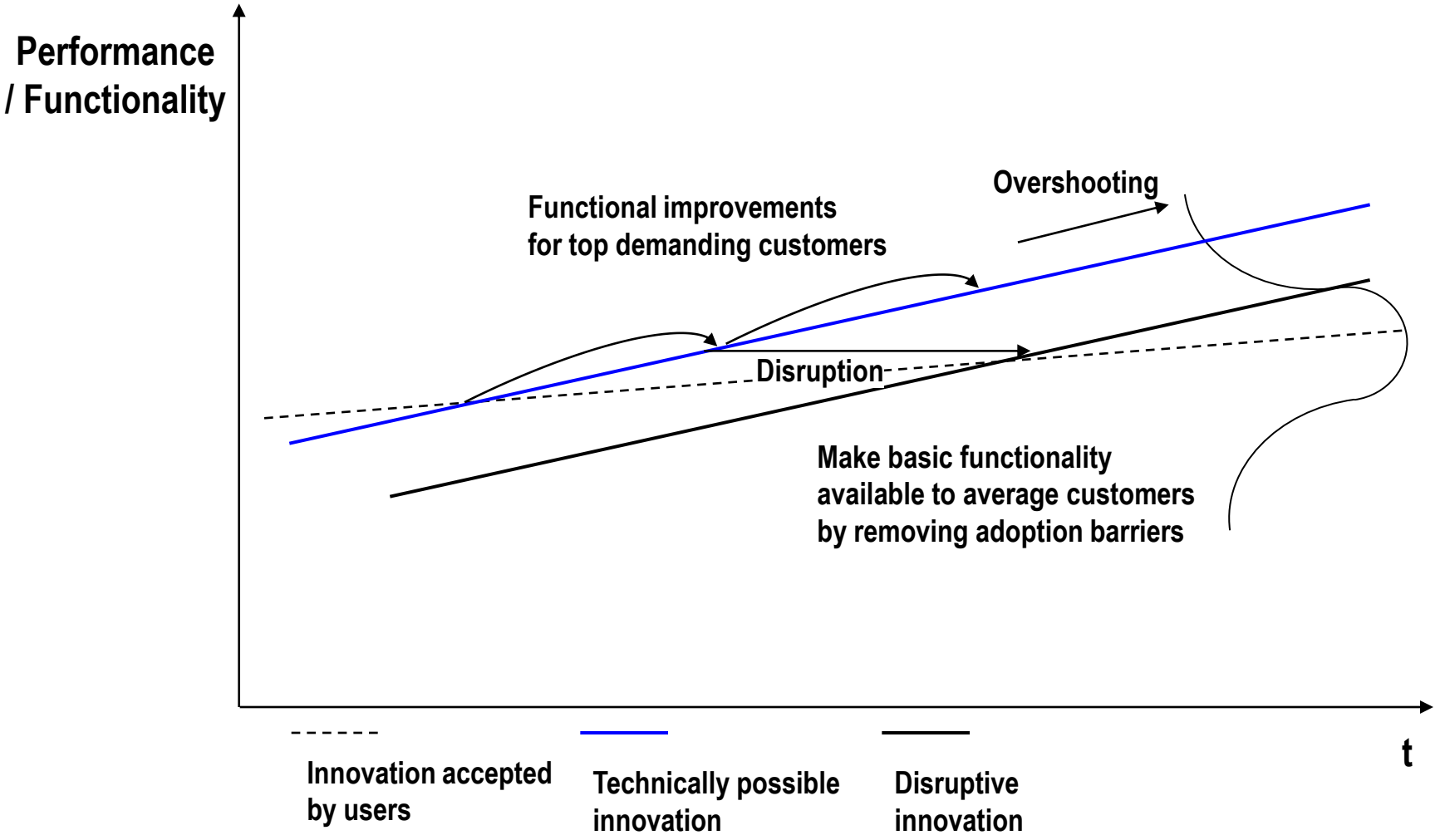
"We provide cargo information services for logistic and industrial companies .."

3. The benefits

- What is our value proposition?
  - Cargo-centric
  - Open (not proprietary), based on existing technologies and standards combined with intermediating trusted third parties
  - End-to-end information train
  - Option to use the EURIDICE architecture gradually, depending on the needs and available resources
  - …
- Need to translate this into user value

→ Blue Ocean “Value Innovation” approach

Disruptive innovation strategy: Aim at the largest pool of users → remove barriers



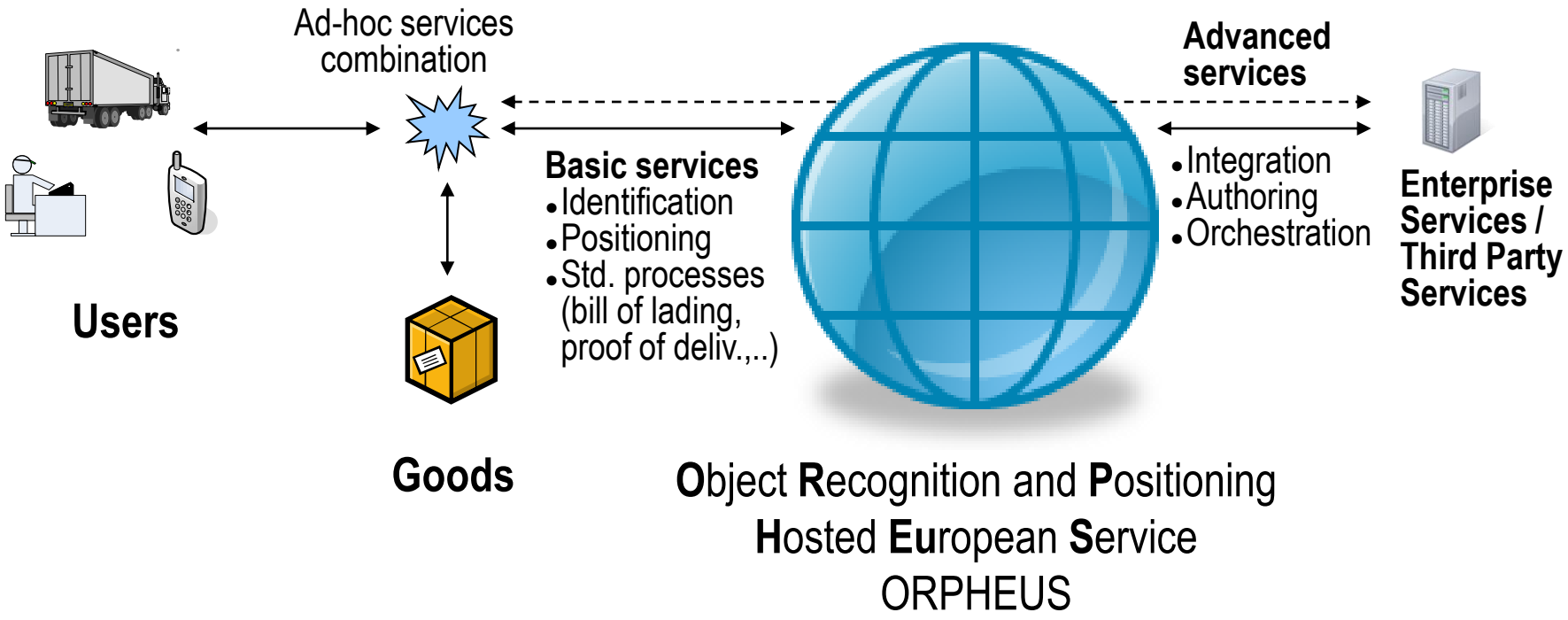
The EURIDICE message

"We provide cargo information services for logistic and industrial companies that can be activated at low cost and work with any logistic partner along any transport route. "

Our mission:

"Providing cargo information services for all"

ICT for goods mobility tomorrow



Intelligent cargo = self-identifying, easy to interact and communicate with

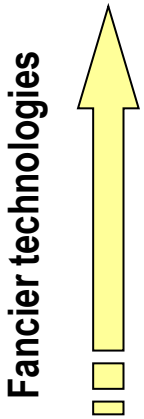
What does “Intelligent Cargo” mean?

- The technological innovation dimension is not sufficient to define Intelligent Cargo.

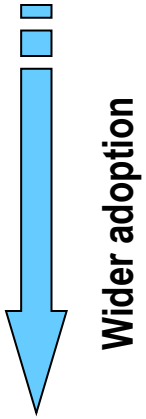
Smart tags, sensor networks, distributed intelligent agents, …

- Defining Intelligent Cargo requires a second dimension of architectural innovation, to highlight changes from the users perspective.
- EURIDICE list of

intelligent cargo capabilities:



- Cargo capable of autonomous decisions (intelligent agent),
- Cargo capable to start processes (independent behavior),
- Cargo capable to monitor and register its status,
- Cargo capable to grant access to services (authorization, ETA estimation, data read/write, ..),
- Cargo capable to detect its context (location, user, infrastructure, ..),
- Cargo capable to identify itself.



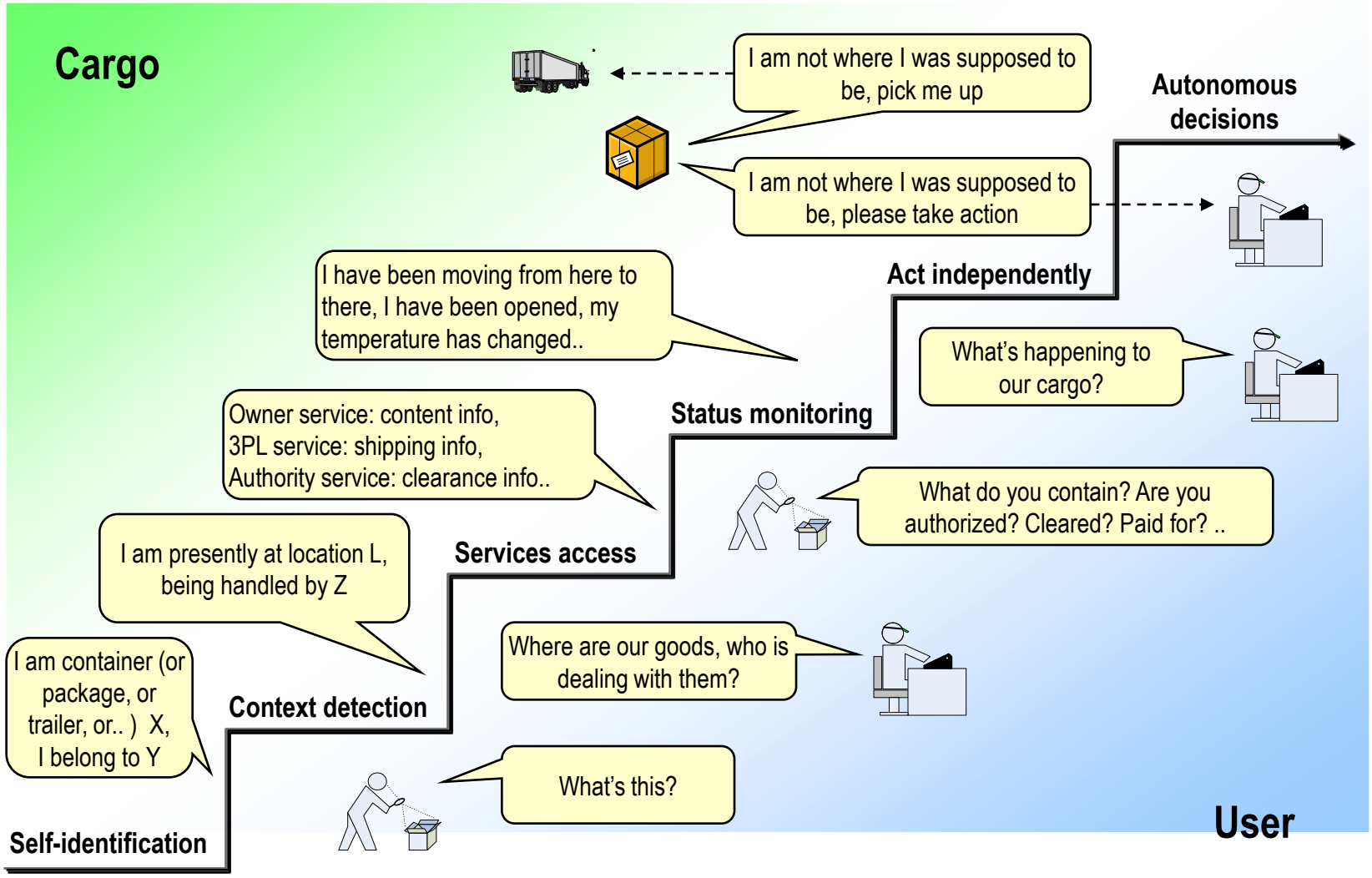
Intelligent vs. “dumb” cargo, basic capabilities

Capability	Dumb Cargo (state of the art)	Intelligent Cargo
Self-identification	• Local identification based on proprietary systems of each actor. • Shared IDs through ad-hoc connection between back-office systems. • Pre-fixed level of detail throughout the supply chain.	• Global identification provided by public domain services. • Cargo is able to self-identify through a common infrastructure, accessible to field users, vehicles and back-office. • Dynamically selected level of detail (package, pallet, container, ..).
Context detection	• No self-standing context detection capability. • Context is extrapolated by back-office systems accessing other information sources (e.g., local ID repository).	• Context determination provided by public domain services. • Common infrastructure, providing context data (identification details, location, time) to authorized users.
Access to services	• No direct access to services from the cargo itself. • Services managed by proprietary systems of each actor or by generic (not cargo related) platforms.	• Common infrastructure, providing access to services to authorized users or systems interacting with the cargo.

Intelligent vs. “dumb” cargo, specialized capabilities

Capability	Dumb Cargo (state of the art)	Intelligent Cargo
Status monitoring and registering	• Sensing and data storing at a specific cargo level (e.g. container). • To go beyond raw data, ad hoc back-office elaboration is needed.	• Status data are available in real time through the service infrastructure. • Status data are contextualized and integrated with the other cargo information services.
Independent behavior	• No such capability.	• Cargo is able to invoke services and start processes autonomously in response to predefined events.
Autonomous decisions (Intelligent agent)	• No such capability.	• Cargo has decisions making capabilities and is able to choose services to invoke according to circumstances.

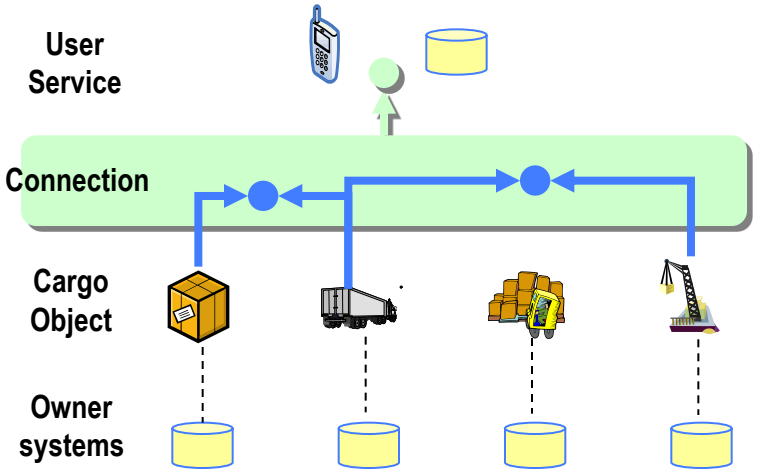
Intelligent Cargo in practice



Expected paradigm shift

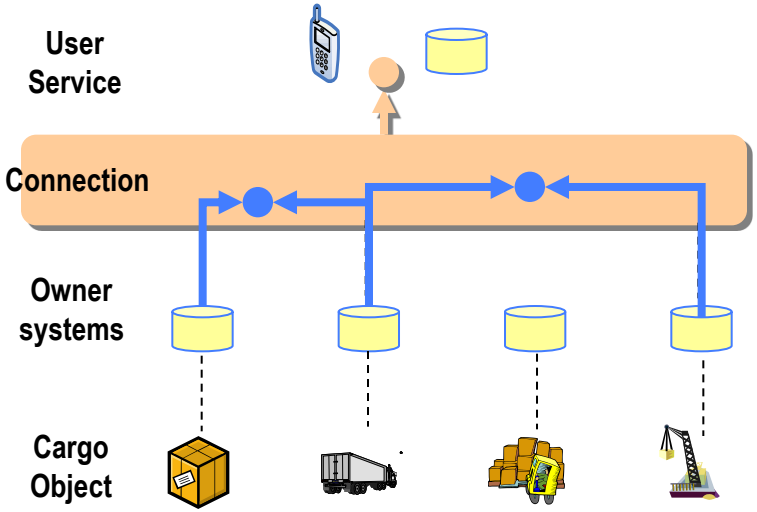
	Current paradigm	Intelligent Cargo
Data origin	User or back-office generated.	Item/sensor generated.
Interaction paradigm	Organization-to-organization	Thing-to-thing.
Data processing	Centralized at organization level.	Distributed, may start at object level.
Communication support	Predefined communication channels.	Self-configuring combination of local and global communication resources.
Data interchange semantics	Mutually agreed with each partner or between trade community members.	Globally established, for any-to-any ad hoc exchanges.
Decisions support	Top-down decision making, based on periodic data revision.	Event-triggered, decentralized and (partially) automated exception resolution.

Thing-to-thing vs. organization-to-organization



Thing-to-thing

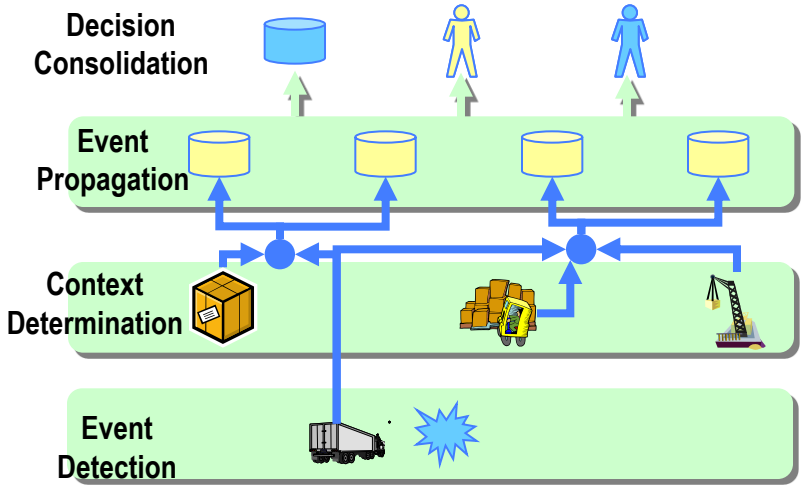
- Connect via cargo objects interaction.
- Decentralized data processing.
- Owner systems may not be involved (only to access owner services).



Organization-to-organization

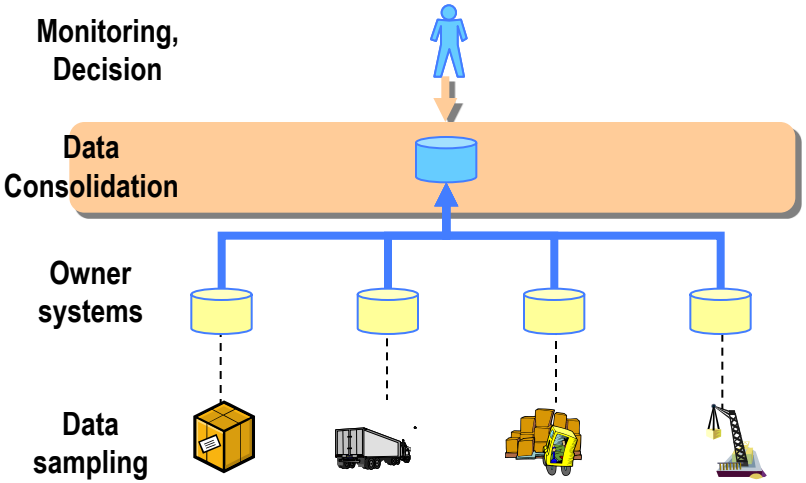
- Connect via pre-existing links between organizations.
- Cargo objects may not be involved (disconnected physical / information flows).

Event-triggered, decentralized decisions support



Intelligent cargo

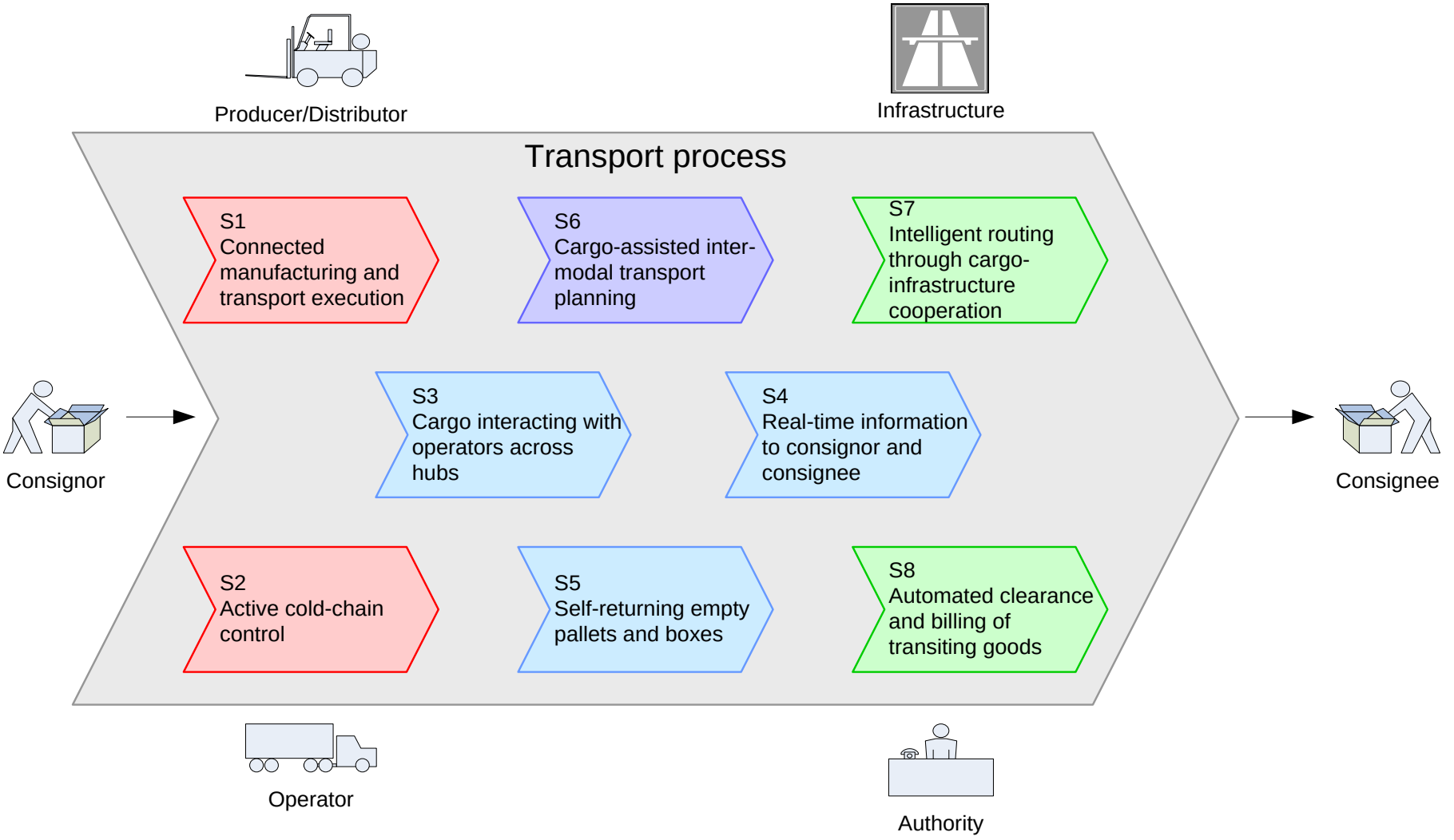
- Automated event detection and context determination.
- Bottom-up exception resolution (escalation, consolidation of decisions).



Traditional approach

- Data consolidation from back-office systems.
- Top-down centralized monitoring, revision and communication.

Pilot Scenarios

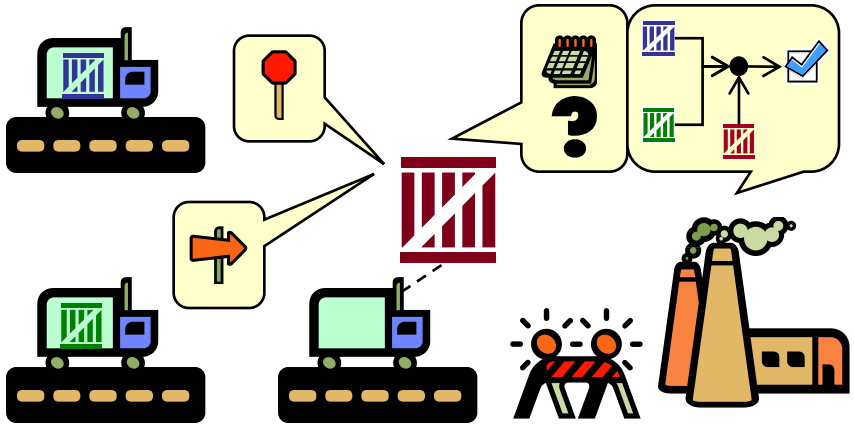


Example: Scenario S1
Connected manufacturing and transport execution

Objective:

To increase synchronization between transportation and manufacturing processes, through:

- Inbound shipments self-updating their progress status, detecting deviations on the planned delivery and triggering changes to the production plan.
- Synchronized delivery of items that are part of a unique assembled final product, each item being aware of its dependencies and being able to alert the other components in case of deviations.



Test user:

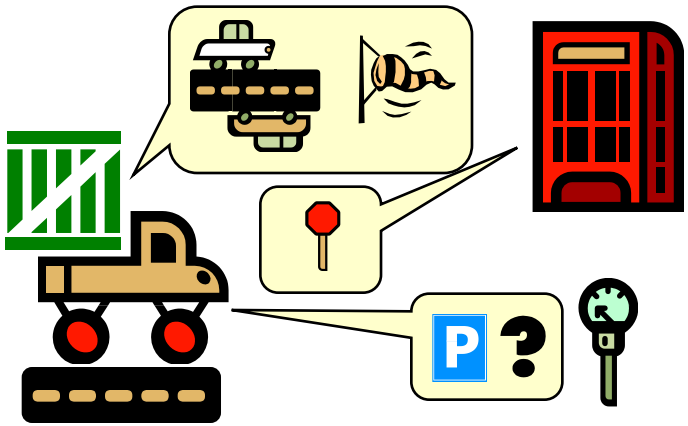
Safilo

Example: Scenario S7 Intelligent routing through cargo-infrastructure cooperation

Objective:

To avoid congestion and accidents and optimize utilization of road and parking infrastructures, through:

- automated re-routing performed by the cargo itself based on its planned and actual status, traffic and weather conditions, availability of parking areas;
- cooperation between cargo and infrastructure operator to acquire authorization and reserve parking space;
- self-diagnosis of anomalous events on the cargo (e.g., non-authorized movements in parking area) and automated triggering of the infrastructure security systems.



Test users:

SDAG,

Slovenian Motorways,

Autovie Venete

Thank you for your attention

http://www.euridice-project.eu

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