STIL
Logistica Digitale Integrata

# The STIL project: a proposal for third generation freight villages based on ICT

Flavio Bonfatti
University of Modena and Reggio Emilia
SATA srl

# The STIL project

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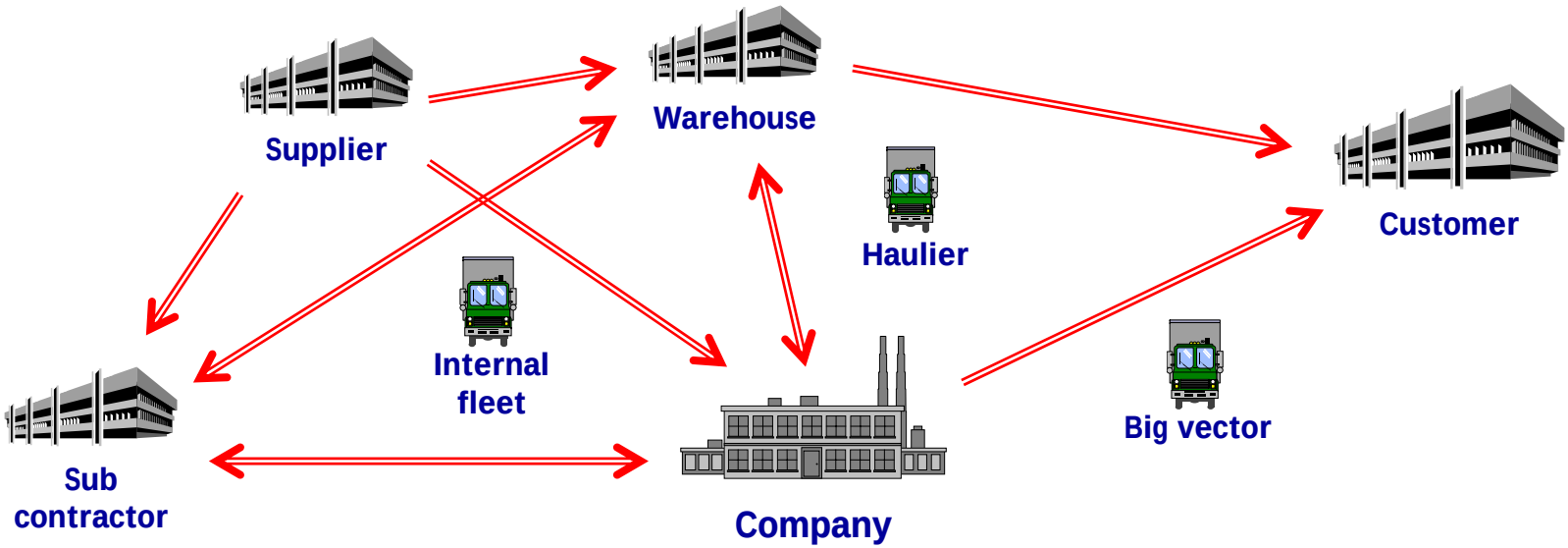
Logistica Digitale Integrata

- **Co-funded by the Emilia-Romagna region**
  - Meaning "Telematic Services for Integrated Logistics"
  - Started on Feb 2005, lasting 24 months
- **Objectives**
  - Develop the concept of Virtual Freight Village (VFV) and apply it at the regional scale
  - Design and prototype an open and secure ICT infrastructure to support interoperable Internet-based services for logistics
  - Experiment ICT infrastructure and supported services on the field
- **Partner**
  - Catholic University of Piacenza – Co-ordinator
  - Other universities: Bologna, Modena and Reggio Emilia, Parma
  - Software houses: Gruppo Pro, Gruppo Sistema, SATA
  - Consultants: ASTER, DEMOCENTER, Harimann, NICOM
  - Integrated hub: Piacenza Intermodale

# Freight villages

- **What are them?**
  - Sort of business ecosystem populated by actors different by nature, size and role
  - Rooted on a certain territory and characterised by collaborations and competitions according to the market rules
  - Evolving and adapting to changing conditions in the analogy, to some extent, with natural ecosystems



# A continuum of situations

- **Strong orientation to logistics …**
  - Prevalence of logistic operators to cover jointly the entire demand from next-door and far companies and supply chains
  - Then providing a spectrum of logistic services
  - (including transport, multi-modality, warehousing, pre- and post-production)
- **… vs. focus on the supply chain**
  - Prevalence of production and distribution companies, sometimes belonging to the same supply chain
  - Sharing a variety of logistic services (the same as above)
  - Mutually provided to each other or coming from logistic operators located in the same area or outside

# Why third generation?

- **Individual organisation**
  - The freight village is simply the sum of individual companies located in the same area
  - Sharing resources (e.g. parking, security) and purchasing jointly (e.g. tires, gasoline)
- **Hierarchical organisation**
  - The village hosts companies belonging to steady logistic chains
  - With long-term relations between leading and subcontracting companies
- **Networked organisation**
  - The village companies establish dynamic relations with each other in accordance with business opportunities
  - Having available advanced communication and collaboration ICT support functions

# Identified needs /1

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- **Logistic operator viewpoint**
  - Access and position control of incoming trucks 5.0
  - State and current location of circulating goods 5.0
  - Interoperability with and between logistic operators 5.0
  - Security of communications (especially wireless) 4.5
  - Management and planning of internal resources 4.0
  - Electronic remote control of buildings and warehouses 3.5
  - Interoperability with users of logistic services 3.0
  - Fleet management and maintenance 2.5
  - Simulation and strategic evaluation of policies 2.5
  - Infomobility and GIS support functions 2.0
  - Support to custom operations and documentation 2.0

# Identified needs /2

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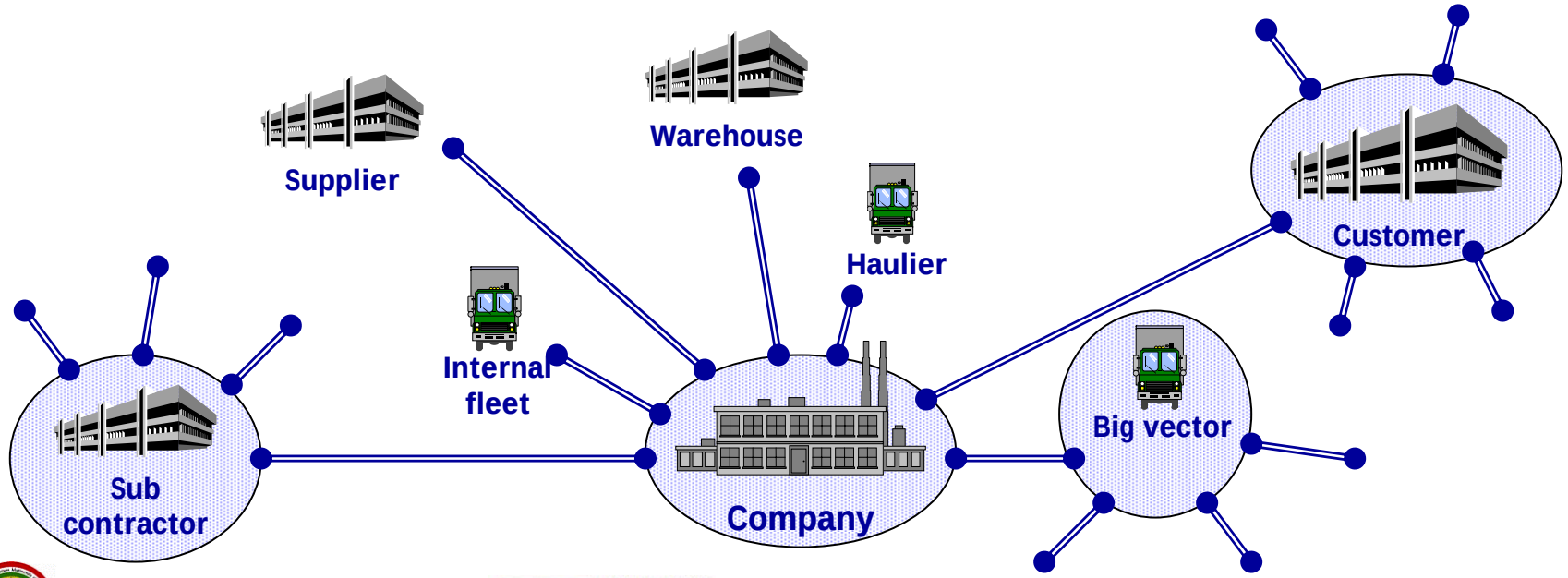
- **Supply chain viewpoint**
  - Transport progress monitoring and final delivery 5.0
  - Knowledge and update of transport costs 5.0
  - Simulation and strategic evaluation of policies 5.0
  - Interoperability with providers of logistic services 4.5
  - Interoperability with suppliers and subcontractors 4.0
  - Access schedule and conditions of incoming trucks 4.0
  - Tracking & tracing functionality 4.0
  - Demand aggregation to reach economy of scale 3.0
  - Brokering to search for the most convenient operator 3.0
  - Internal fleet management and maintenance 2.5
  - RFID-based warehouse management 2.0

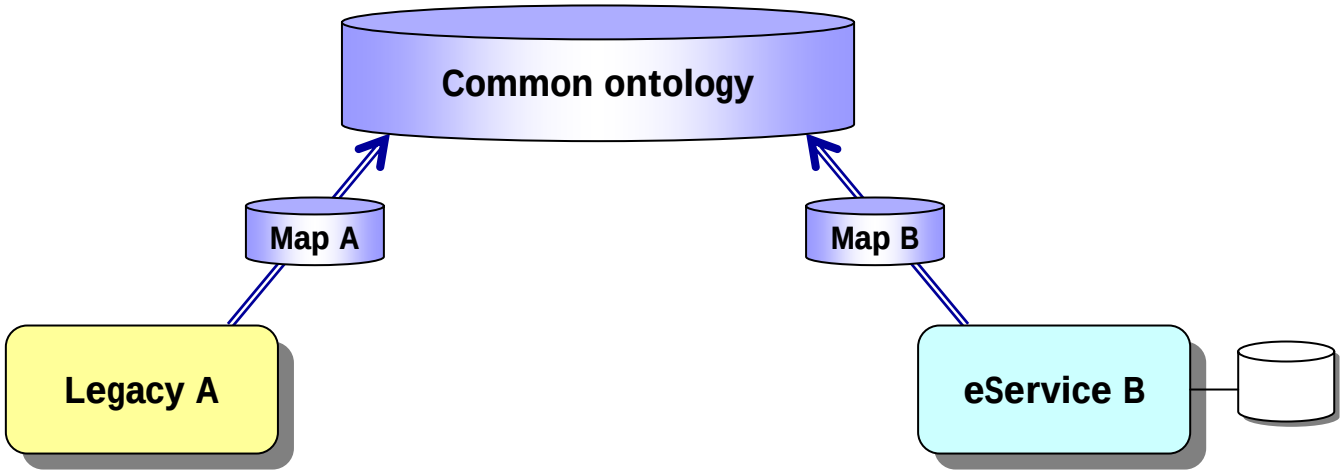
# Interoperability problems

- **Internal vs. external interoperability**
  - Data exchange between company legacy system and applications
  - Data exchange with legacy systems and applications at partners
- **Syntactic vs. semantic interoperability**
  - Bilateral agreements on formats of exchanged data
  - Bilateral agreements on meanings of exchanged data



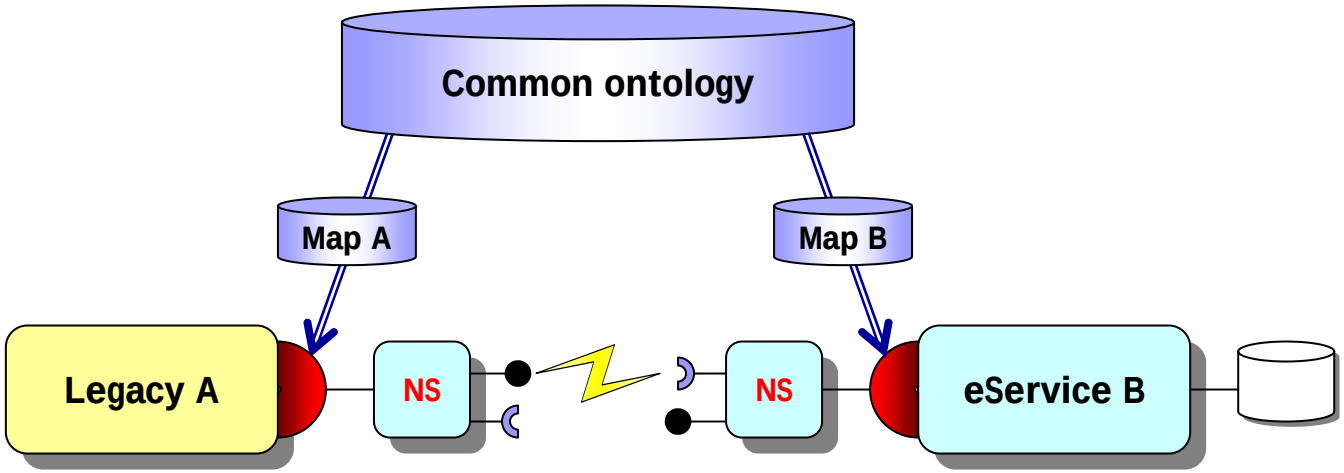
# Need for a common ontology …

- **A common set of concepts and terms**
  - Representing the domain shared knowledge
  - (that is, knowledge of the exchanged data and business documents)
  - Extracted from the information systems of the village actors
  - And mapped onto each of these local/sectoral schemas

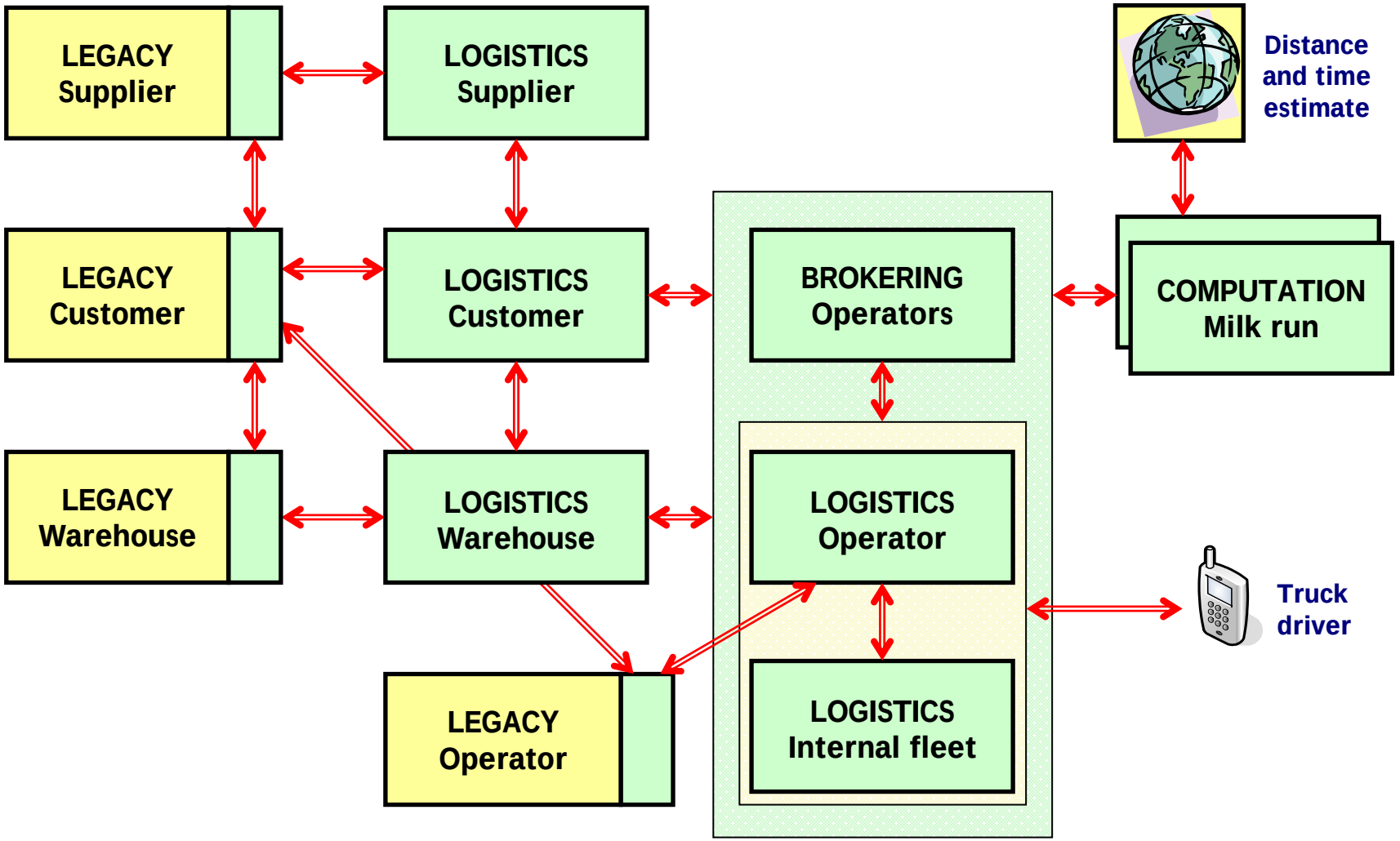


# A collaboration environment …

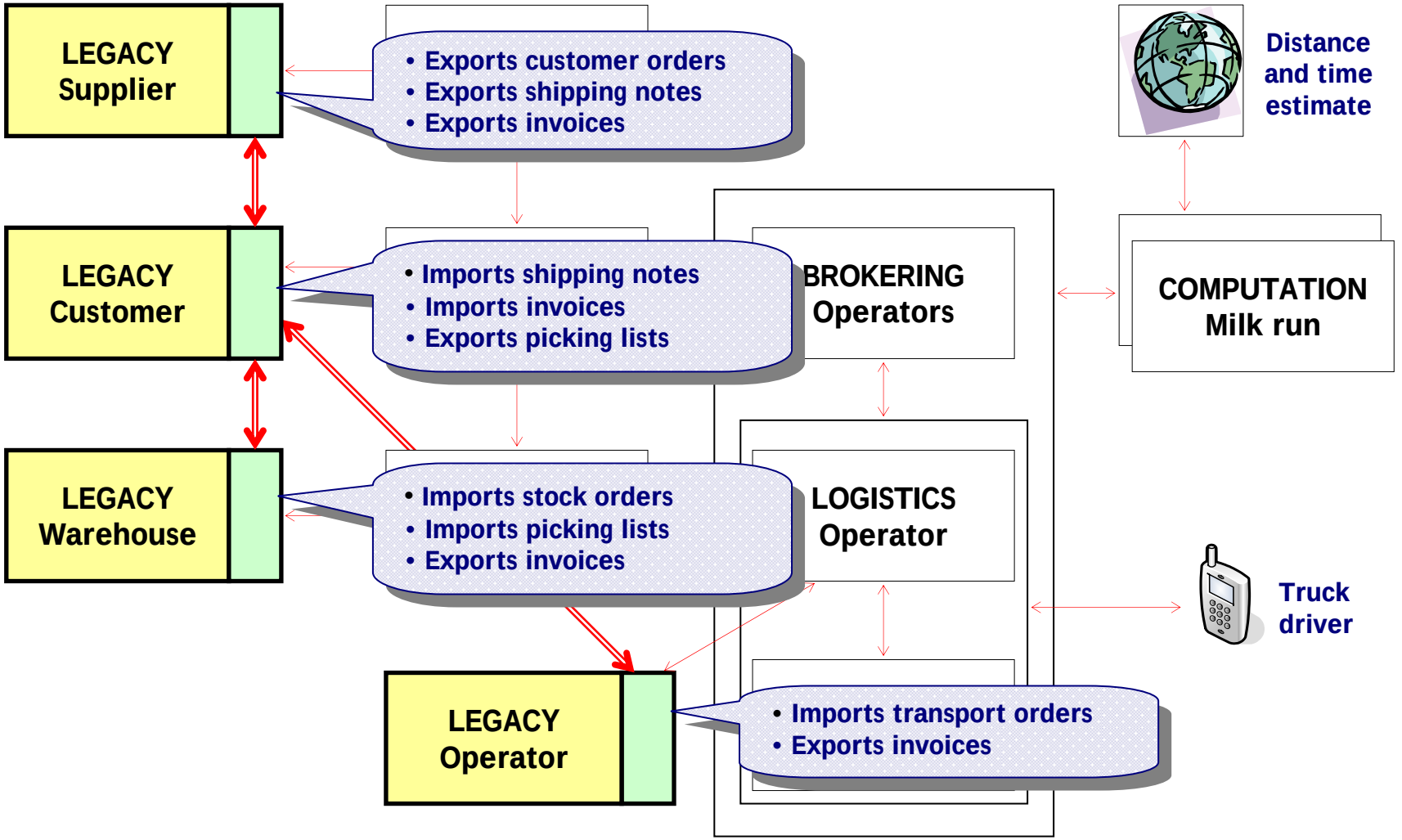
- **Legacy A sends a request …**
  - Written with its own format, semantics (and language)
  - Then automatically translated into the common ontology
  - Then communicated by the Networking Service
  - Then automatically translated from the common ontology
  - And finally read by eService B in its format, semantics (and language)



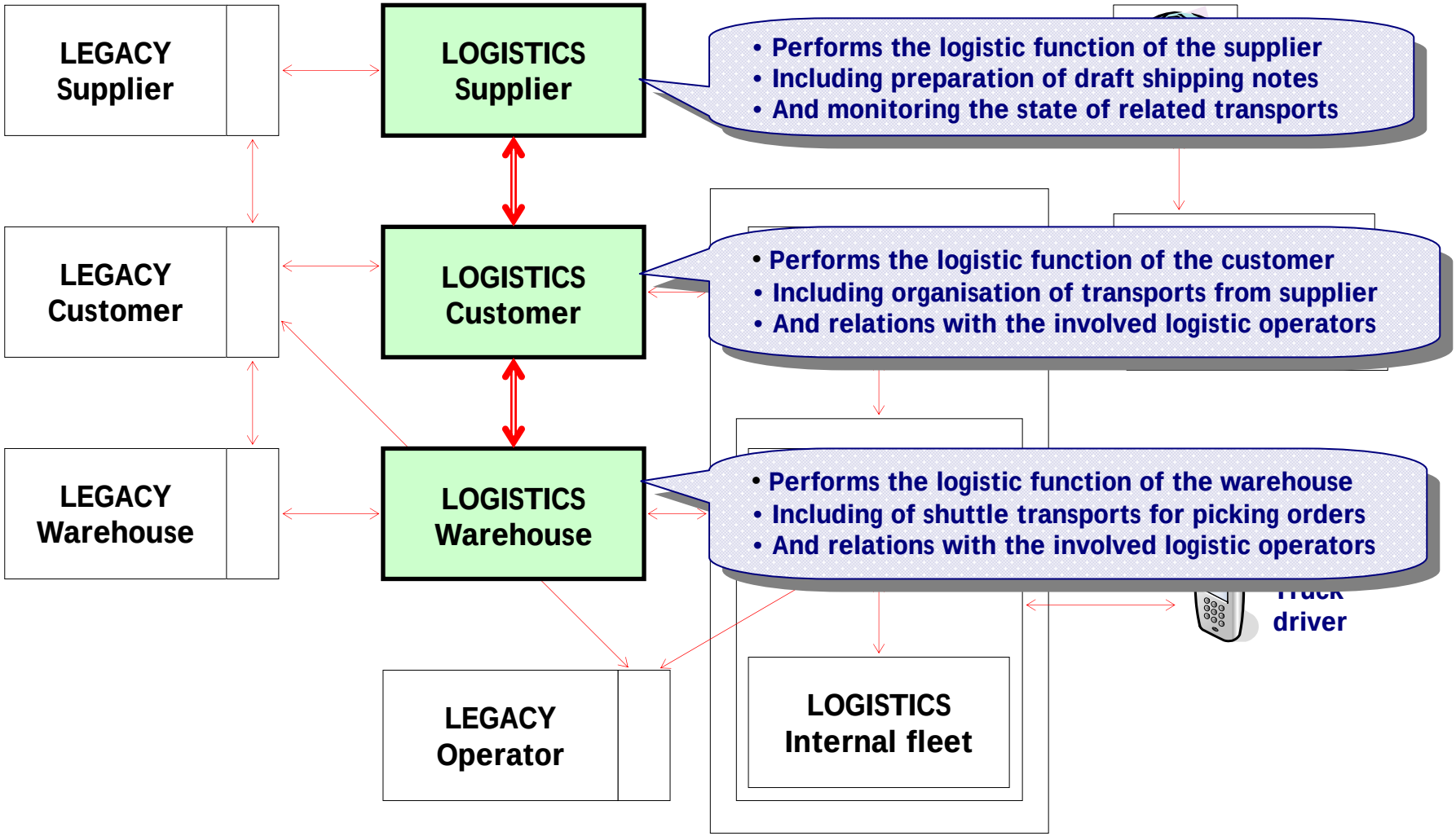
# And a number of new eServices



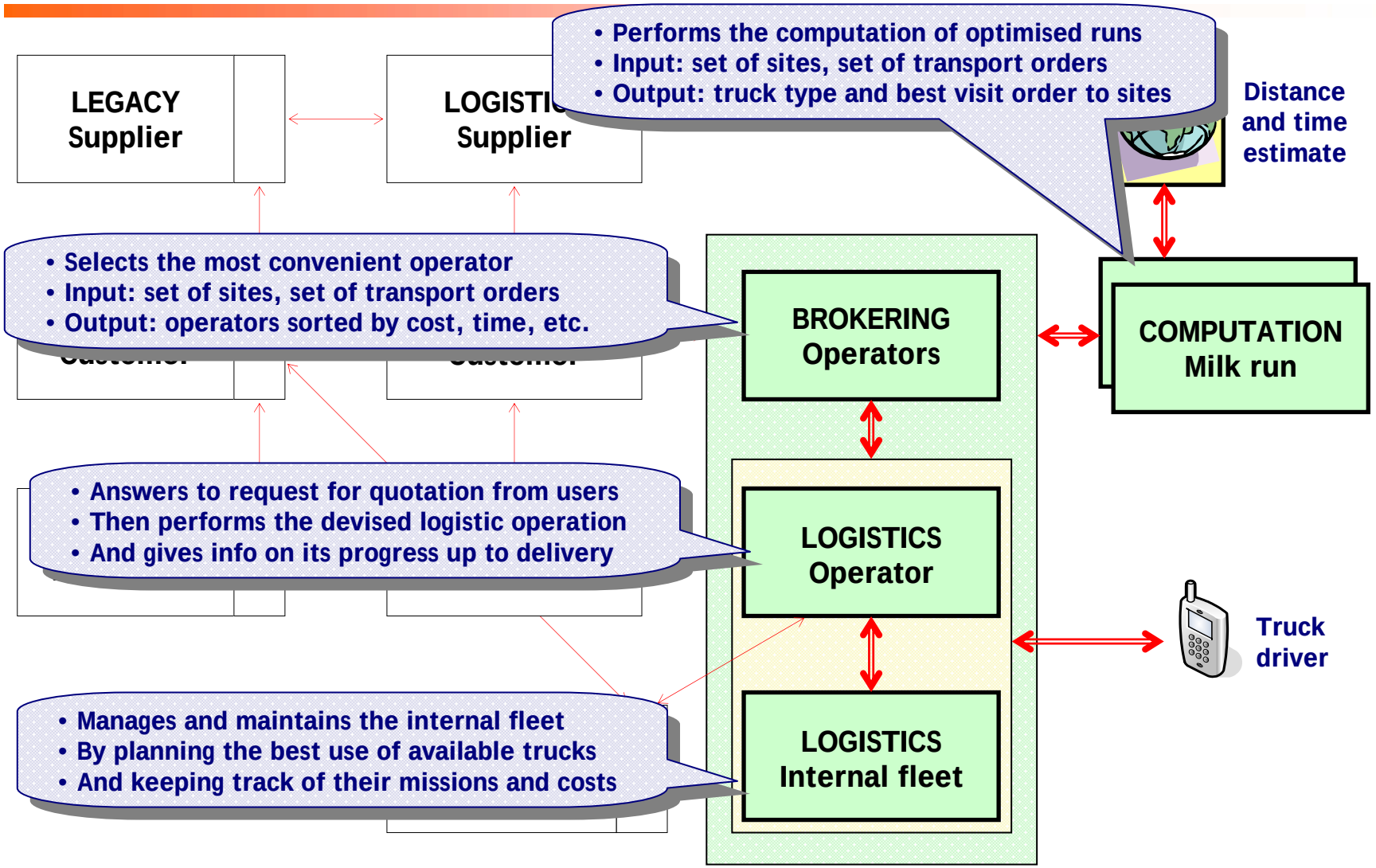
# New eServices /1



# New eServices /2



# New eServices /3



# In conclusion

- **Incremental construction of the domain ontology**
  - The ontology is made available for free to everybody
  - So as to attract new actors to develop compliant applications
  - And then make the offer achieve a critical mass
- **Development of applications and services**
  - New services to meet increasing user requirements
  - By decomposition and adaptation of existing applications
  - By composition and orchestration of elementary functions
- **On-field validation**
  - Presently planning some pilots to use the first services
  - Open to involve new cases in the experimental phase
  - (this is an invitation …)