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e-Freight 2011

“AN E-FREIGHT PLATFORM FOR THE EUROPEAN FREIGHT TRANSPORT COMMUNITY”

The e-Freight Platform Architecture

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Agenda



- **Scope and objectives**
- **Architectural Approach**
- **Stakeholder requirements**
- **e-Freight Platform Features**
- **Business Architecture**
- **Data Architecture**
- **Conclusions**

The e-Freight Platform Objectives



Provide a comprehensive software infrastructure to facilitate the development and deployment of e-Freight Solutions in compliance with the e-Freight Framework

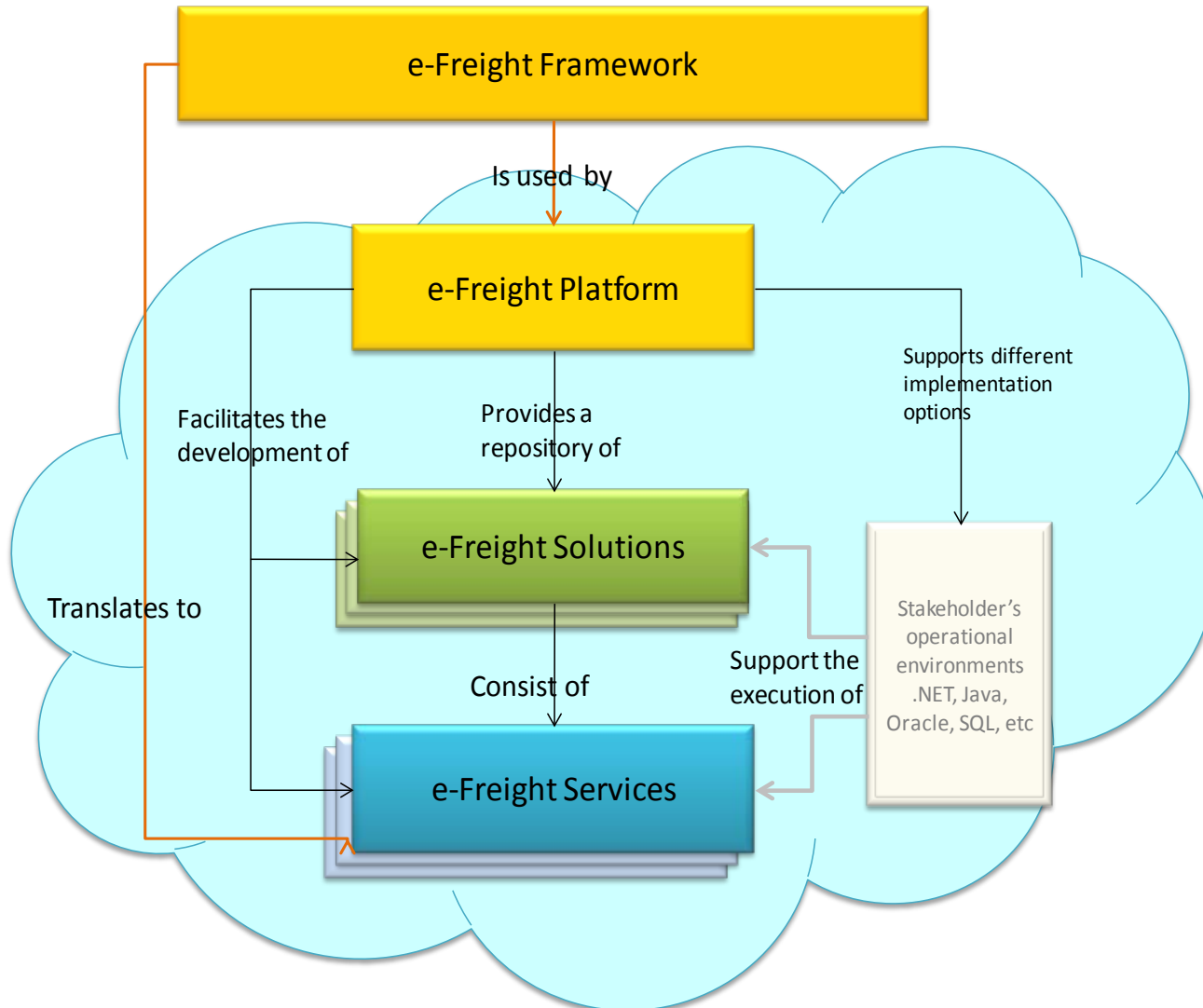
Promote reuse interoperability and data security and quality

Stakeholder focus strategy



The strategy is to enable different transport stakeholders including SMEs to establish e-Freight compliant solutions running in their own operating environments.

The overall e-Freight Concept



Architecture Approach



- **The specification of the e-Freight Platform Architecture is guided methodologically by the Open Group Architecture Framework (TOGAF).**
- **TOGAF is a holistic approach to design, which is typically modeled at four levels:**
 - Business
 - Application
 - Data
 - Technology.

TOGAF Building Blocks in Architecture Design



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e-Freight Platform Architecture Vision



- 1. *Alignment of EU Policy, Business and IT.* The architecture should facilitate:**
 - Maintaining cohesion between EU Policy, Business (represented by the e-Freight Framework) and IT through e-Freight Solutions
 - Controlling complexity and change management costs
 - Supporting adaptability of the European freight transport system to economic , social and environments drivers
- 2. *Efficient development and change management with respect to business objectives of specific transport networks***
- 3. *Support large scale adoption of e-Freight solutions in the EU freight logistics and transport community***

Alignment of EU Policy, Business and IT



Short Title	Detailed Requirements
Align EU policies, business services and their processes	Provide facilities to manage alignment of EU policy rules and regulations with business services and process in the e-Freight Framework models. Help achieve and maintain industry and regulatory compliance with robust data protection, policy enforcement and auditing capabilities to demonstrate compliance
Core Application Services	Provide core freight transport application services as main business processes for: <ol style="list-style-type: none"> Common Long Term Planning Operations Management Regulatory Information Management
Core Data Services	Provide core freight transport data services to support the core application and extended services
Support Domain Knowledge Modeling and Analysis	Provide a domain modeling features to support the description, definition and analysis of core domain knowledge artifacts which will assist: <ol style="list-style-type: none"> Making domain knowledge an organisational asset Forming customer solutions in a standard way Streamlining processes to reduce time, effort and environmental impact Efficient change management and quality assurance
Reduce Environmental Impact	Support increased visibility of carbon footprint for each shipment. Facilitate long term and operational planning for optimised environmental impact
Greater Freight Visibility	At any point in time the planned activity for any movement is known and can be queried by transport service providers, customers, regulatory bodies and port authorities.
Efficient Services	Provide facilities to schedule logistics operations in real-time, dynamically optimising transport schedules in response to operational events and issues.
Align Business Services and IT Services through a Service-Oriented Architecture	Support the adoption of an SOA design and governance practice through platform features to: <ol style="list-style-type: none"> Describe, discover and adopt business services from a business service catalogue Describe, discover and adapt IT services to enable rapid reuse of existing technical solutions Assist governance of services through management tools in moderating changes and upholding service quality
Monitoring and Auditing	Support transaction and application monitoring. Provide reports for auditing the system performance and usage. <ol style="list-style-type: none"> Provide transaction monitoring and alerting for distributed e-Freight Solutions and their services trace for measurable load Provide SLA-based service monitoring and reporting

Efficient Development and Change Management



Short Title	Detailed Requirements
Change Governance	Assist governance of domain knowledge through management tools in moderating changes and upholding quality.
Model-Driven Development	Provide a development environment to support the description, definition and analysis of core domain knowledge artifacts which will assist: <ul style="list-style-type: none"> a) Developing composite applications by different groups of stakeholders combining core application services and data services with existing systems b) Provide quality assurance through model-driven validation and verification mechanisms. c) Provide a development approach with a standard application framework, notations and vocabularies guided by the tools
Agile Software Development	Focus on providing development support with the following aspects of software development in mind: <ul style="list-style-type: none"> a) Improve customer satisfaction through iterative and incremental delivery of working solutions b) Provide tools for efficient and ease in changing application requirements (even at the late stages of development) c) Deliver solutions frequently - weeks rather than months d) Working software is the principal measure of progress
Service-Oriented Development	Assist Service-Oriented Development by: <ul style="list-style-type: none"> a) Providing common standard vocabularies (data models and semantics) for messaging between services in e-Freight solutions b) Providing standard integration services to support the interoperability with cargo, vehicle, traffic and infrastructure monitoring devices. c) Providing standard data services to support the application interoperability between e-Freight Solutions d) Providing common collaboration tools enabling the SOA design principles and utilising the above assets

Support the Adoption of e-Freight Solutions



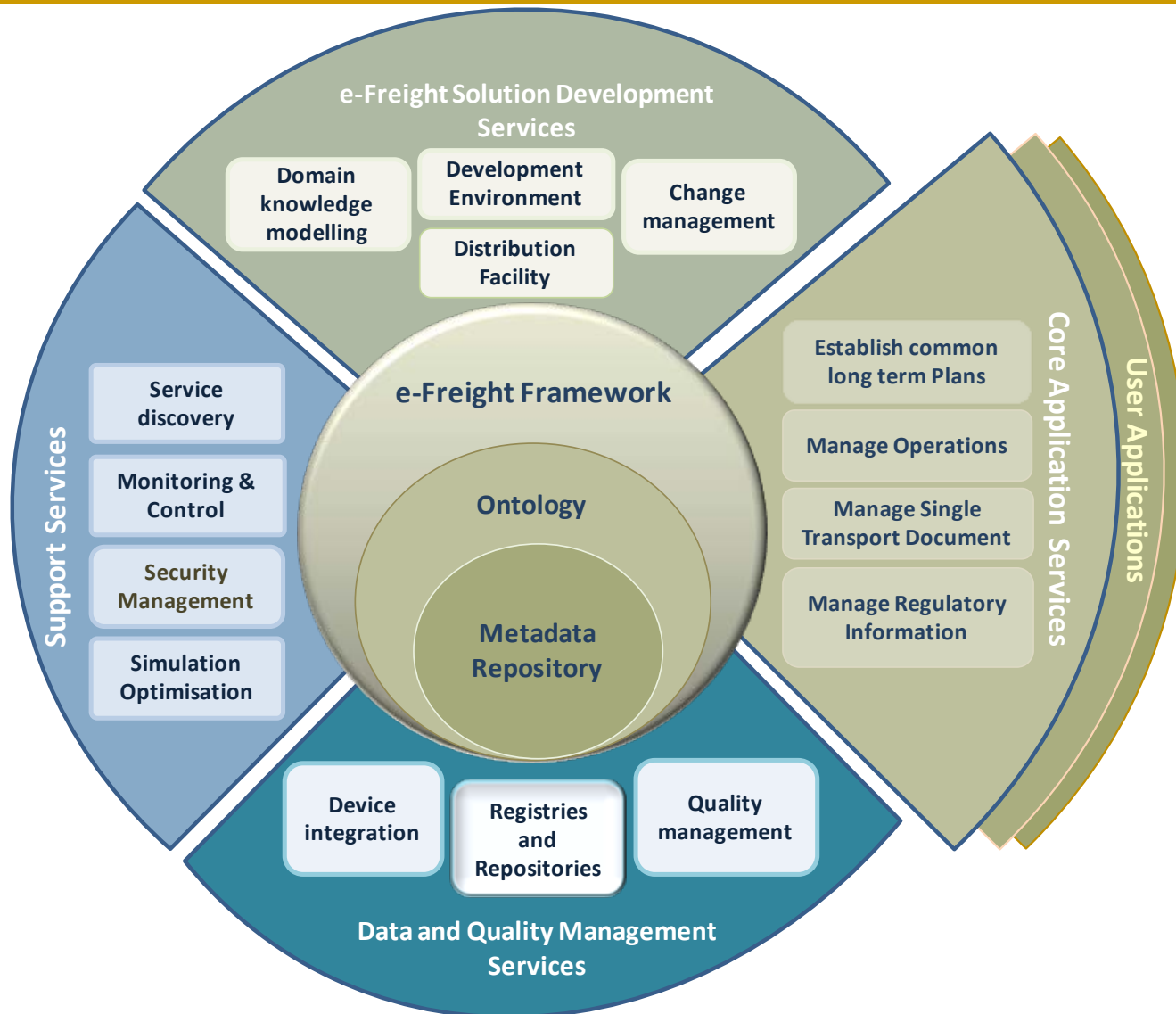
Short Title	Detailed Requirements
Distribution Repository	<p>Provide efficient distribution, integration and development services and knowledge for e-Freight Solution adopters</p> <ul style="list-style-type: none"> a) Provide a centralized facility for distributing e-Freight solutions across the industry partners (e.g. an AppStore type repository from where e-Freight solutions or/and individual services may be downloaded by those who want to implement solutions in the e-Freight domain). b) Provide publishing support and advertisement of available application services and common data schemas.
Support Solution Discovery	<ul style="list-style-type: none"> a) Enable efficient search of e-Freight Solutions from federated registries (Solution Discovery) b) Enable transport providers in all modes to provide information about their service offerings and register services c) Support focused searches on transport user needs to identify and use combined transport services most suited for their purposes d) Support different transport communities to create their own platform registries.
Assured Messaging Infrastructure	<p>It is assumed that most stakeholder will use their own Messaging Infrastructure and Message Routing and Distribution. Requirements relating to improving security need to be further investigated.</p>
Hosting Support	<p>Provide support for managing hosting of e-Freight solutions</p> <ul style="list-style-type: none"> a) e-Freight Solution properties (such as data sources) should be configurable and scripted installation should enable automated deployment and execution b) Deployment models should reflect a separation between application and administration tasks, that is, developers should define and maintain the configuration of an application and deployment teams the environmental properties. c) Multiple deployments of e-Freight platforms shall be supported on single environments (i.e. servers) and should be maintained independently. d) Provide tools to support tracking outages and inefficiencies by helping manage and automate service upgrades e) Provide a standards-based Security Framework to help lower costs and complexities of securing e-Freight Solutions

Core Application Services



Short Title	Detailed Requirements
Common Long Term Planning	Features required from this core application include: <ol style="list-style-type: none"> a) Provide facilities to schedule logistics operations in real-time, dynamically optimising transport schedules in response to operational events and issues b) Facilitate generation of more accurate inputs for optimization algorithms c) Facilitate generation of deviation matrices d) Provide services for better utilisation of resources leads to fewer wasted movements and so lower carbon footprint
Operations Management	Features required from this core application include: <ol style="list-style-type: none"> a) Track capacity on specific road segments and generally corridors b) Support visualization of combined modalities c) Visibility at any point in time of planned activities for any movement, which can be queried by transport service providers, customers and regulatory authorities
Regulatory Information Management	Features required from this core application include: <ol style="list-style-type: none"> a) Provide interoperability for reporting with existing regulatory systems at both National and European levels b) Provide a Common Reporting Facility for common regulatory submissions c) Provide Shared Information Services for reporting to users on regulatory information d) Provide support for a Single Transport Document e) Support information exchange between administrations for security management

e-Freight Platform Features

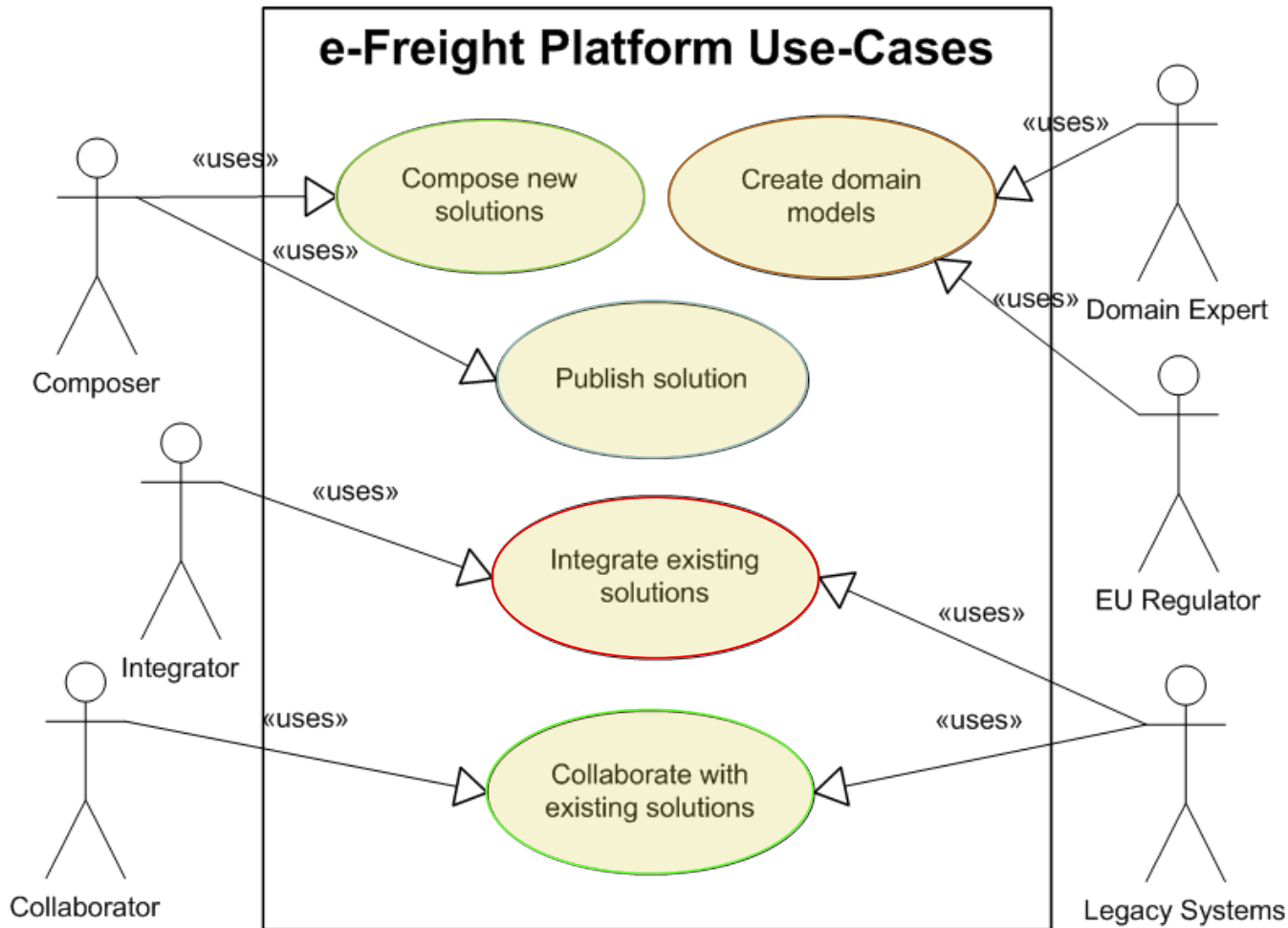


Technical opportunities



- **the platform architecture can support increased usability, adoption and resilience to changes through the following technical opportunities:**
 - Technology Independence through Virtual Runtime Environments (e.g. .NET or JAVA)
 - Technology Independence through a Layered Services Pattern (e.g. adopting an SOA Pattern)
 - Flexible Resource Management (e.g. utilizing a Cloud-Computing Pattern)
 - Reusable Services and Governance (e.g. Services in e-Freight conform to e-Freight standards)
 - Quality Assurance Mechanisms (i.e. to ensure service quality is upheld in service development)

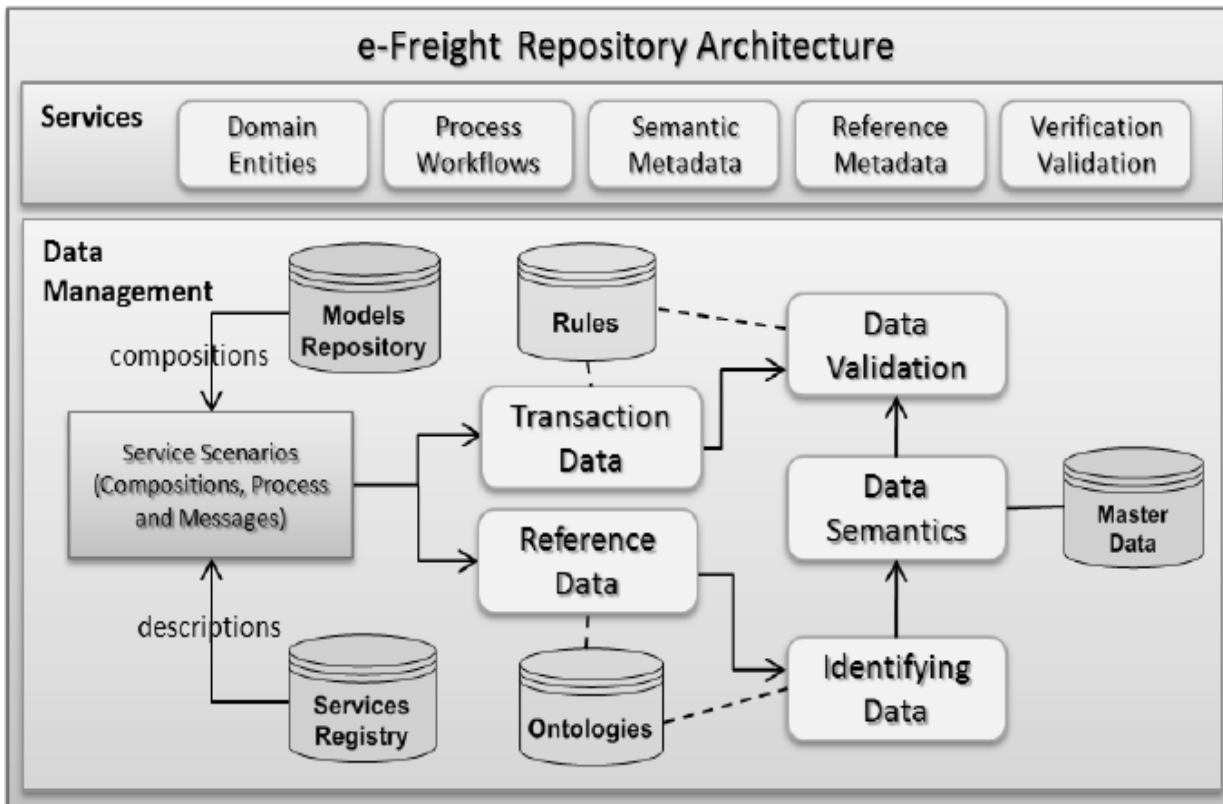
Business Architecture – Use Cases



Data Architecture



e-Freight will employ a Meta Data Repository (MRD) in order to provide both a conceptual and operational organizational facility of all required information for the implementation, integration and execution of e-Freight community applications



Data Quality



- **As in other domains e-Freight stakeholders will rely on quality information for effective operations and decision-making.**
- **However, fundamental questions still remain as to how quality should be defined and the specific criteria that should be used to manage data quality.**
- **Our approach is based upon formal methods to link data semantics with business rules for determining the level of data quality at different semiotic levels (i.e syntactic, semantic and Usefulness / Data Fitness)**

Conclusions



- **The e-Freight platform is intended to support the implementation of e-Freight EU policy by facilitating the development of e-Freight Solutions compatible with a standardised e-Freight framework addressing the following three processes:**
 - Regulatory Information Management
 - Long Term Planning of Logistic Solutions
 - Transport and logistics Operations Management
- **Focus on Single Window, Single Transport Document, Security management by authorities and Deployment of Intelligent Transport Systems**

Conclusions



- **Key e-Freight Platform features include:**
 - Aligning policy , business and IT by combining domain engineering and service engineering approaches
 - Promoting the use of appstores for e-Freight Solutions with specific focus on easy access for SMEs
 - Providing tools to facilitate integration of e-Freight Solutions with existing applications
 - Making available common services for enhanced data quality and security.

The actual outputs so far...



e-Freight Platform Live

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Thank you