Towards an IT infrastructure for compliance management by data interoperability
the changing role of authorities

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Content

• The issue of container security

• Requirements to an IT infrastructure

• Technical options

• Proposal for an IT infrastructure

• Conclusions
**Container security - the data pipeline**

- **authority**
  - post export assurance by customs
  - invoice, order, entry in records
  - consignor or exporter
  - Freight forwarder or 3PL
  - Freight forwarder or 3PL
  - carrier's receipt
  - vessel booking
  - packing list
  - Letter of Credit
  - insurance fees
  - contracts of carriage
  - shipping note
  - House Way Bill
  - freight account
  - country A
  - GPS and satellite positioning
  - port 1
- **Seamless integrated data pipeline**
- **authority**
  - post clearance assurance by customs
  - entry in records
  - consignee or importer
  - Freight forwarder or 3PL
  - Freight forwarder or 3PL
  - carrier's receipt
  - vessel booking
  - packing list
  - Letter of Credit
  - insurance fees
  - contracts of carriage
  - shipping note
  - House Way Bill
  - freight account
  - country B
  - GPS and satellite positioning
  - port 2
Container targeting

• Data requirements
  • Goods: product-packaging-containers-transport means
  • People and entities: buyer, seller, forwarder, etc.
  • Historic data: past behavior of people and entities and past goods flows between origin and destination

• Risk analysis results
  • Green - no inspection
  • Orange - additional data required
  • Red - physical inspection
IT infrastructure requirements

- Complete and consistent data
- Dynamic business relations
- Minimization of the administrative burden
- Data ownership and liability
- Non functional requirements
  - Scalability and performance
  - Migration strategy
Complete and consistent data set - lack of interoperability.

- Duplication of data
- Inconsistent data
- Missing data, both on goods and people & entities
Dynamic business relations

- From framework contracts (hierarchies) to transactions (market)
- Modal shift (synhromodality) with real-time data
- Supply chain agility
- Dynamic service composition
Minimization of the administrative burden

- (Re-)Export, exit, incoming, transit, import
- Piggy back on trader data
Data ownership and liability

• Commercial sensitive - buyer/seller, shipper/forwarder, etc.
• Liable for a service on an object, not its content
Technical solutions

• Data push by messaging - increase of administrative burden

• Data pull by service orientation

• Data pull based on (linked) open data
Service orientation

Known traders, AEO, ...

Domain 1
- Directory service
- Register

Aggregated directory service

Containers

Service providers

Domain 2

Domain 3

Domain 4

Optimization by
- Global Aggregated Directory Service
- Events generated by an ADS (requires movement information)
Linked Open Data, with event driven architecture

- Known traders, AEO, ...
- Directory service
- Register
- Service provider
- Domain 1
- Domain 2
- Domain 3
- Domain 4

• Security protocols based on mutual recognition
• Events equal current ENS

Mutual recognition
## Proposed IT architecture - phases

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Experiments - Living Labs - Living Lab 1

Asia-Europe

BAP
  - Yantian/HK – Felixstowe (also EPT)
  - Felixstowe - World

DHL
  - Singapore – Rotterdam
  - Hong Kong/Dubai - Rotterdam

K+N
  - Singapore - Rotterdam

Seacon
  - Penang – Venlo
  - Venlo – Singapore
  - Venlo – Shanghai
A PCS, BCS or trader system can store all relevant information.
A GS1 EPCIS implementation only stores objects and events, but is able to federate queries via a directory service.
A GS1 EPCIS implementation needs to be extended for Cassandra.

Specified by a networked ontology represented by EDIfact structures.
Backbone infrastructure - another view

A type of ADS
Trader interoperability at global scale to improve data quality (= data exactly reflects physical situation)

Deal with

• Different standards (XML, EDI, ...)

• Different implementation guides of the same standard

• Large number of SMEs - end-user solutions are required
Interoperability

Logistic services (transport, transship, store, stuff/strip) with their behavior

Reference to concepts, associations and rules, easy extendable (networked ontologies)

Incompatible implementations: UML class diagrams are copied and can be amended for different purposes

Large variety of Implementation Guides

Current IT systems are (electronic) business document based.

New IT systems based on business concepts and ontologies with consistent implementation variants
Smart risk analysis

- First prototype available
- Data result yet to be expressed as ontology based on a core ontology
- Integration with dashboard and/or risk analysis engine
Various dashboards have been developed...

Cassandra / Supply Chain Visibility Dashboard

Search Supply Chain Event Data

Cassandra

Improving Security through Visibility

View Purchase Order

Key Data
- Place of Loading: EGALY - Alexandria
- Place of Discharge: ESBGN - Barcelona
- Date: 02/10/2013
- Model of Transport: Sea
- Status: Delivered

Purchase Order Details
- Place of origin: EGALY - Alexandria
- Place of Delivery: ESBGN - Barcelona
- Seller’s Ref N°: 745298320
- Shipper’s Ref N°: 745298320
- LSP Reference N°: 745298320
- Service Contract: 745298320
- Invoice No.: 745298320
- Incoterms: FOB

Totals
- Vol: 0
- Net Wt: 0
- Gross Wt: 0
- Packages: 0
- Pieces: 0

Parties
Thank you for your attention.

Questions?

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