Big Data: real time ICT for logistics

Data Logistics 4 Logistics Data (dl4ld)

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Partners:

AIR FRANCE KLM

Gemeente Amsterdam

Thales

Transfides

Evofenedex

Oracle

Simacan
Use case: Transport Process improvement in synchromodal container transport Singapore - Rotterdam - Limburg

1. Sea transport
2. Rotterdam terminal
3. Barge
4. BCTN terminal
5. Road transport

![travel times graph]

Map of the transport routes:
- Sea terminal Rotterdam
- Barge terminal BCTN
- Road transport

Logos of participating companies:
- portbase
- HERMESS
- InterTransIS
- Gibson
- Vopak
- CEVA
- BCTN
- Overbeek

[Logos for additional companies]
Problem statement

• Logistics users and service providers want to use data for performance improvement, reliable and shorter transport time, less energy and CO₂!
• They are not able to share sensitive data in a secure and efficient way for legal or economic reasons.
• Models and methods for trust and enforcement are missing!

Focus:
• Design and implementation of experimental capabilities required for creating value-rich logistic information services.
• Blueprint & roadmap for stakeholders to agree on how data is stored, shared, transformed in a controllable, enforceable, accountable, auditable and goal oriented way.
Approach

WP2. Forward Looking Research

WP3. Technical Capabilities and integration

WP4. Community building

Use cases
Other initiatives
Compartment 2 projects

Reference implementation
Blueprint + Roadmap

Innovative capabilities

Needs
Requirements

Research questions
Gaps
Big Data Sharing use cases placed in airline context

- **Global Scale**
  - Aircraft Component Health Monitoring (Big) Data
    - NWO CIMPLO project
    - 4.5 FTE

- **National Scale**
  - Cargo Logistics Data
    - (C1) DaL4LoD
    - (C2) Secure scalable policy-enforced distributed data Processing (using blockchain)

- **City / regional Scale**

- **Campus / Enterprise Scale**
  - Cybersecurity Big Data
    - NWO COMMIT/SARNET project
    - 3.5 FTE

The iSHARE project is powered by NLIP.
SAE Use Case envisaged research collaboration

Funding Agency

- NSF
- Topsector Funding

International Networking

- Internet
- ESnet
- GÉANT

Regional / National Networking

- CENIC
- SoX
- LEARN
- SURFNET

Local University

- Stanford
- Georgia Tech
- UT Dallas
- Universiteit van Amsterdam

Aircraft MRO, OEM & Operators

- Boeing
- Delta Air Lines
- Bell Helicopter
- Air France

Industry Standards Body

- SAE AeroSpace Group
  HM-1 working group
  Use Case on aircraft sensor Big Data

System and Network Engineering

Air FRANCE KLM
Validation Fieldlab and Dissemination

Output:
- Experimental facilities from day one!
- Proof of concepts demonstrating secure data sharing
- Blueprint, roadmap and standards where applicable
Example model: Policy Enforced Data Processing

- Bringing data and processing software from competing organizations together for common goal
- Docker with encryption, policy engine, certs/keys, blockchain and secure networking
- Data Docker (virtual encrypted hard drive)
- Compute Docker (protected application, signed algorithms)
- Visualization Docker (to visualize output)
Ambition to put capabilities into fieldlab

Re-enforcing ICT preconditions:
Each envisaged site has similar elements
Research goal:
Explore value of academic network research capabilities that enable innovative ways & models to share big data assets.
Detailed Approach

### Strategic
- Digital business agreement negotiation & trust organized by member organization
- Architecture driven deployment of trusted system functions needed by business
- Creating Inter-organizational solutions

### Tactical
- Digital realization & implementation of trust
- Creating archetypes of deployment models
- Semantic composition of services
- Incorporating forward looking infrastructure architectures

### Operational
- Inter-organization service quality & consistency in practice
- Multidomain aspects (identity, AAA)
- Infrastructure programmability
- Programmable component deployment

### Why & What
- National Law & Regulations
- Market rules
- Marketplace Member Organisation
- Algorithm supplier(s)
- Data supplier(s)
- Customer(s)
- Agreement
- Registry
- Deployment Models
- Deployment Specification
- Parameterization & authorizations
- Accounting & Auditing

### National & International Academic Fieldlabs
- Topsector Fieldlabs (Logistics, Smart Industry, Health, AgriFood, ...)

### WP3 Blueprint
- WP3 Sector Requirements
- WP4 Knowledge Exchange

### 6 M cycles
Take Aways

• We have a good basis in logistics communities; Airport, Seaport, Greenport, Hinterland
• We have use cases with real-life challenges around big data in logistics.
• We have experimental facilities from day one to try out and experience the aptness and value of capabilities that are developed.
• We have commitment from SURF to federate with SURFLab and the Supercomputer center.
• We have committed (inter)national partners.
• We will cooperate with NLIP, Connekt, Dinalog and the C2D Big Data Hubs for Use Cases and dissemination to logistics and other topsectors!
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Q & A

Partners:

Project Lead:
- TNO
- Z
- evofenedex
- ORACLE
- simacan

Scientific Lead:
- Ciena
- AIR FRANCE KLM
- Gemeente Amsterdam
- THALES TRANSFIDES