Main problem statement

• Organizations that normally compete have to bring data together to achieve a common goal!
• The shared data may be used for that goal but not for any other!
• Data may have to be processed in untrusted data centers.
  – How to enforce that using modern Cyber Infrastructure?
  – How to organize such alliances?
  – How to translate from strategic via tactical to operational level?
  – What are the different fundamental data infrastructure models to consider?
**Approach**

- **Strategic:**
  - Translate legislation into machine readable policy
  - Define data use policy
  - Trust evaluation models & metrics

- **Tactical:**
  - Map app given rules & policy & data and resources
  - Bring computing and data to (un)trusted third party
  - Resilience

- **Operational:**
  - TPM & Encryption schemes to protect & sign
  - Policy evaluation & docker implementations
  - Use VM and SDI/SDN technology to enforce
  - Block chain to record what happened (after the fact!)
Secure Digital Market Place Research

- National Law & Regulations
- Market rules
- Member admission

Secure Digital Marketplace

- Agreement
- Registry

Deployment Models

- Deployment Specification
- Marketplace infrastructure

Future Internet Research Testbeds

- Algorithm supplier(s)
- Data supplier(s)

- Customer(s)
- Dispute Resolution

- Accounting & Auditing
- Parameterization & authorizations

Member Organisation Deployment Models Agreement

Market rules

Member admission
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)
NWO CIMPLO project

City / regional Scale

Cybersecurity Big Data
NWO COMMIT/SARNET project
3.5 FTE

Campus / Enterprise Scale

NLIP iShare project
SAE Use Case envisaged research collaboration

Funding Agency
- NSF
- NWO

International Networking
- Internet
- ESnet
- GÉANT

Regional / National Networking
- CENIC (Connecting California)
- SoX
- LEARN
- SURFNET
- Universiteit van Amsterdam

Local University
- Stanford
- Georgia Tech
- UT Dallas

Aircraft MRO, OEM & Operators
- Boeing
- Delta Airlines
- Bell Helicopter
- Air France KLM

Industry Standards Body
- SAE AeroSpace Group

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

System and Network Engineering
Data Processing models

• Bring data to computing
• Bring computing to data
• Bring computing and data to (un)trusted third party
• A mix of all of the above
• Block chain to record what happened
• Block chain for data integrity
• Bring the owner of Data in control!
• Data owner policy + PEP technology
SC16 Demo

DockerMon

Sending docker containers with search algorithms to databases all over the world.

http://sc.delaat.net/sc16/index.html#5

Problem Description

- Scientific datasets are usually made publicly available, but data cannot always leave the organization premises.
- On-site data processing can be challenging because of incompatibility of systems or lack of manpower.
- Can a container-based system perform remote on-site data processing efficiently?
- What are the networking issues to solve?

Underlay and Overlay

Main features:
- Networked containers
- VXLAN overlay
- Containers that perform data retrieval and computation
- Containers built on-demand
- On-site data processing
- Distributed data source
- Multiple sites with datasets

The Game

Our SC16 demo is a gamification of the remote dataset processing architecture.

How many different animal species can you find? You have a fixed budget and each function and processing will cost you money!

In our game you will:
- Select a correlate function to combine the results of the different sites.
- Pick different search functions, represented as tools, to find animals in the remote datasets.
- Build containers with the search and correlate functions.
- Execute the containers on the sites of your choice.

Will you have the best score?

More information:
- http://byoc.lab.uvalight.net/info
- http://sne.science.uva.nl/sne/gigaport3
- http://delaat.net/sc
Q&A

• More information:
  – http://delaat.net/dl4ld