Sharing Big Data Assets via a Secure Digital Market Place

SAE HM-1 meeting on IVHM / ARP 6904 WG

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Content

Air France - KLM Research Context

Problem: Sharing Big Data Assets across autonomous organizations

Solution Concept: Secure Digital Market Place

Technology: Lightpath and Data Transfer Nodes.

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My role within our ICT Innovation R&D department
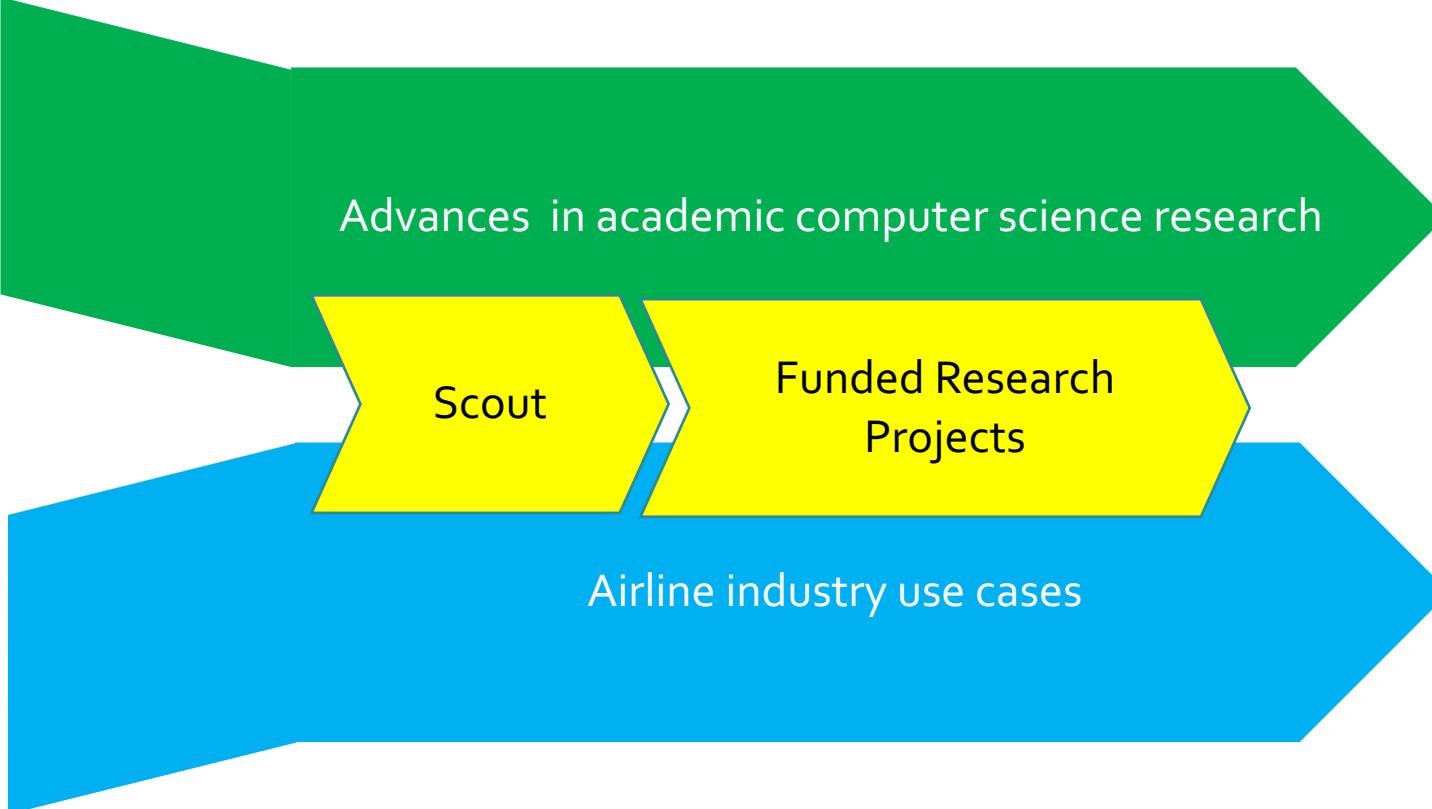
Researching Big Data Sharing at Air France KLM

Global Scale

National Scale

City / regional Scale

Campus / Enterprise Scale

Aircraft MRO
NWO CIMPLO project
4.5 FTE

Cybersecurity
NWO COMMIT/
SARNET project
3.5 FTE

Logistics:
NWO DaL4LoD project
(4.5 FTE)
Blockchain proposal (3.5 FTE)
NLIP iShare project

Passenger Flows

Passenger Experience

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SAE Use Case based envisaged research collaboration

Funding Agency
- NSF — Big Data Hub or Industry initiative funding
- NWO Netherlands Organisation for Scientific Research — Topsector Funding

International Networking
- INTERNET2
- ESnet ENERGY SCIENCES NETWORK
- GÉANT

Regional / National Networking
- CENIC Connecting California
- SoX Southern Crossroads
- LEARN LONESTAR EDUCATION AND RESEARCH NETWORK
- SURFNET

Local University
- Stanford
- Georgia Tech
- UT Dallas
- Universiteit Leiden The Netherlands / Universiteit van Amsterdam

Aircraft MRO & OEM
- BOEING
- DELTA AIR LINES
- Bell Helicopter
- AIR FRANCE KLM

Industry Standards Body
- SAE INTERNATIONAL
- SAE AeroSpace Group
  HM-1 working group
  Use Case on vibration sensor data

Status May 2016

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Sharing Big Data Assets between different organizations needs:

Clearly defined and agreed common **benefit** (defining the group's identity)

Common group rules governing <u>use</u>, <u>access</u> and <u>benefit</u> sharing.

Organizing trust amongst group members as **means to reduce risk**

Infrastructure supporting **implementation of trust** whilst ensuring **autonomy**

Trust as a means to reduce risk

Risk:

Compliancy
Liability
Disclosure
Ownership
Intellectual Property
Additional oversight
etc., etc...

Means:

Trust and power are both means capable of reducing risk

How to organize trust and power? -> **The Secure Digital Market Place concept**

Secure Digital Market Place to create trust allowing data sharing according to member organized market rules and subsequent contracts between autonomous members.

- Digital Market Place (DMP) is a member organization as **independent legal entity.**

- Goal of the DMP is to **organize trust between members** wanting to gain a particular common benefit no single member can gain on its own.

- Members of the DMP can be supplier or a consumer or both.

- All members have **equal rights** within a DMP

- DMP is **governed by a board of members** in which all members participate

- DMP establishes regulation consisting of **market rules and admission requirements**

- DMP appoints a **market master** in charge of market operations

- DMP establishes regulation for **conflict** settlement

- DMP appoints an **adjudication committee**

- Members can obtain rights (licenses) from the DMP within the framework of the DMP regulation to act in a particular defined market role.

- What elements of the DMP can be digitized?

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Secure Digital Market Place architectural sketch
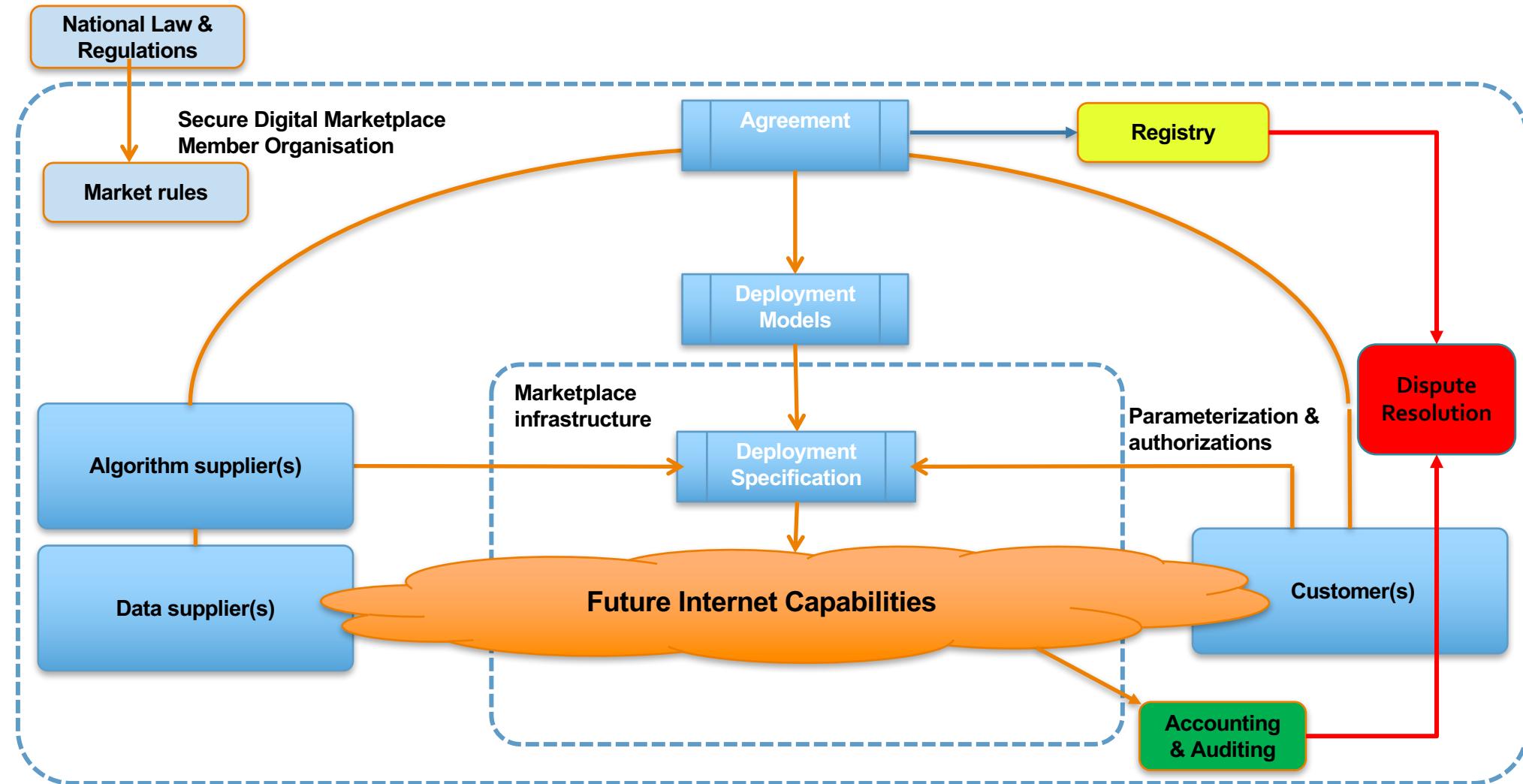
Traditional Data Sharing deployment model.
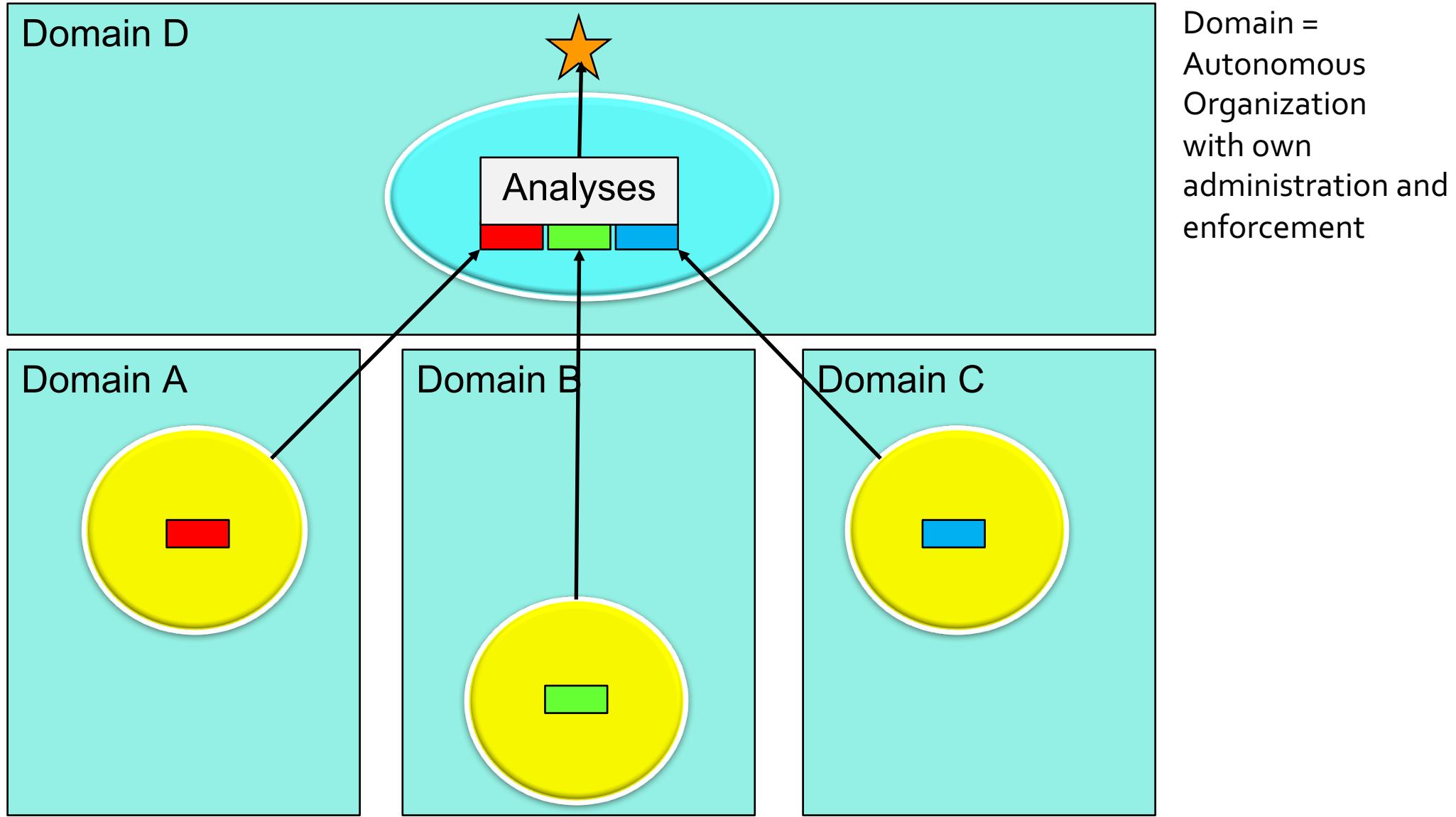
Model: bring processing to the data.
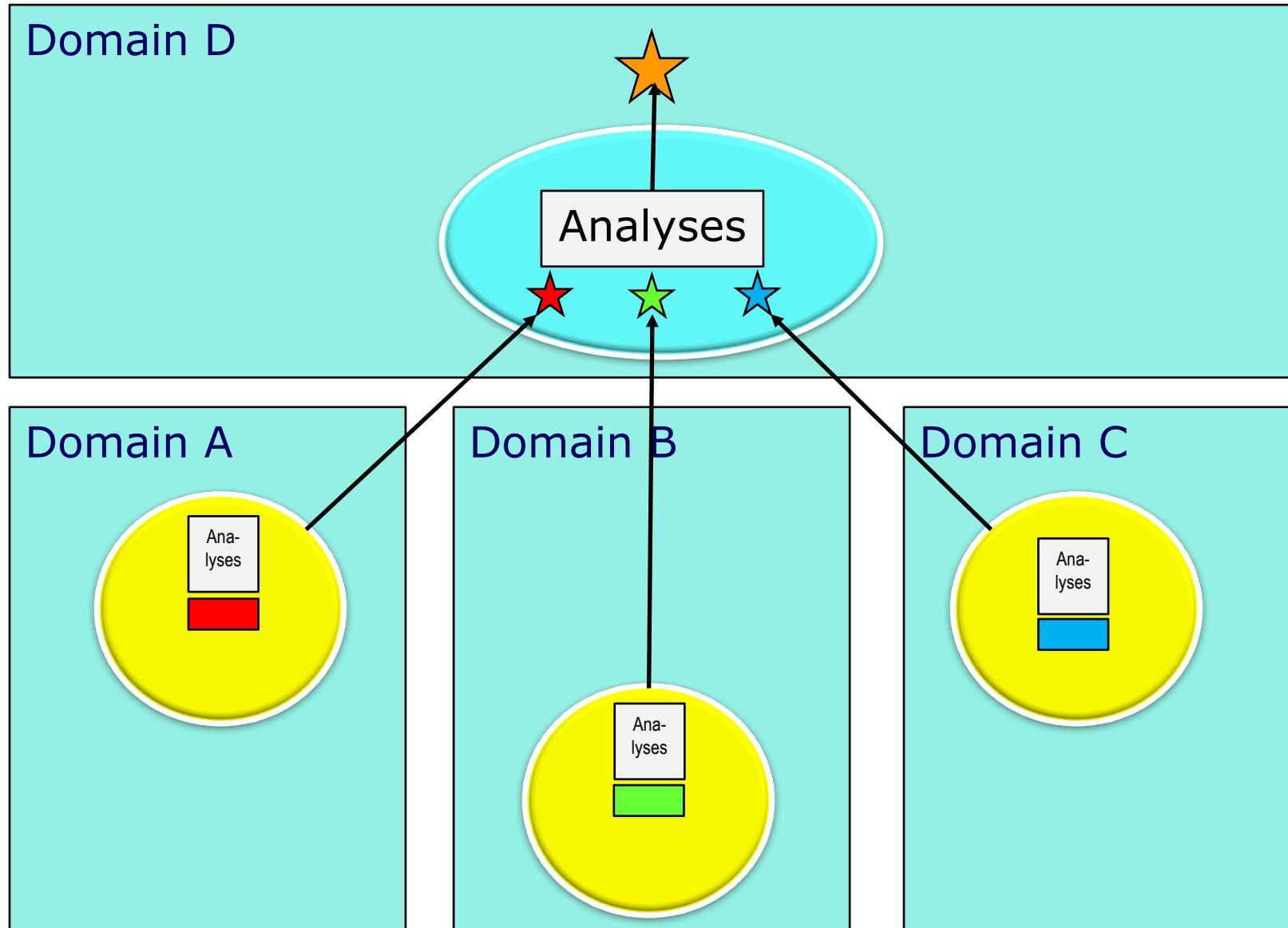
Model: "Bring Your Own Container" reading its data via HP links.
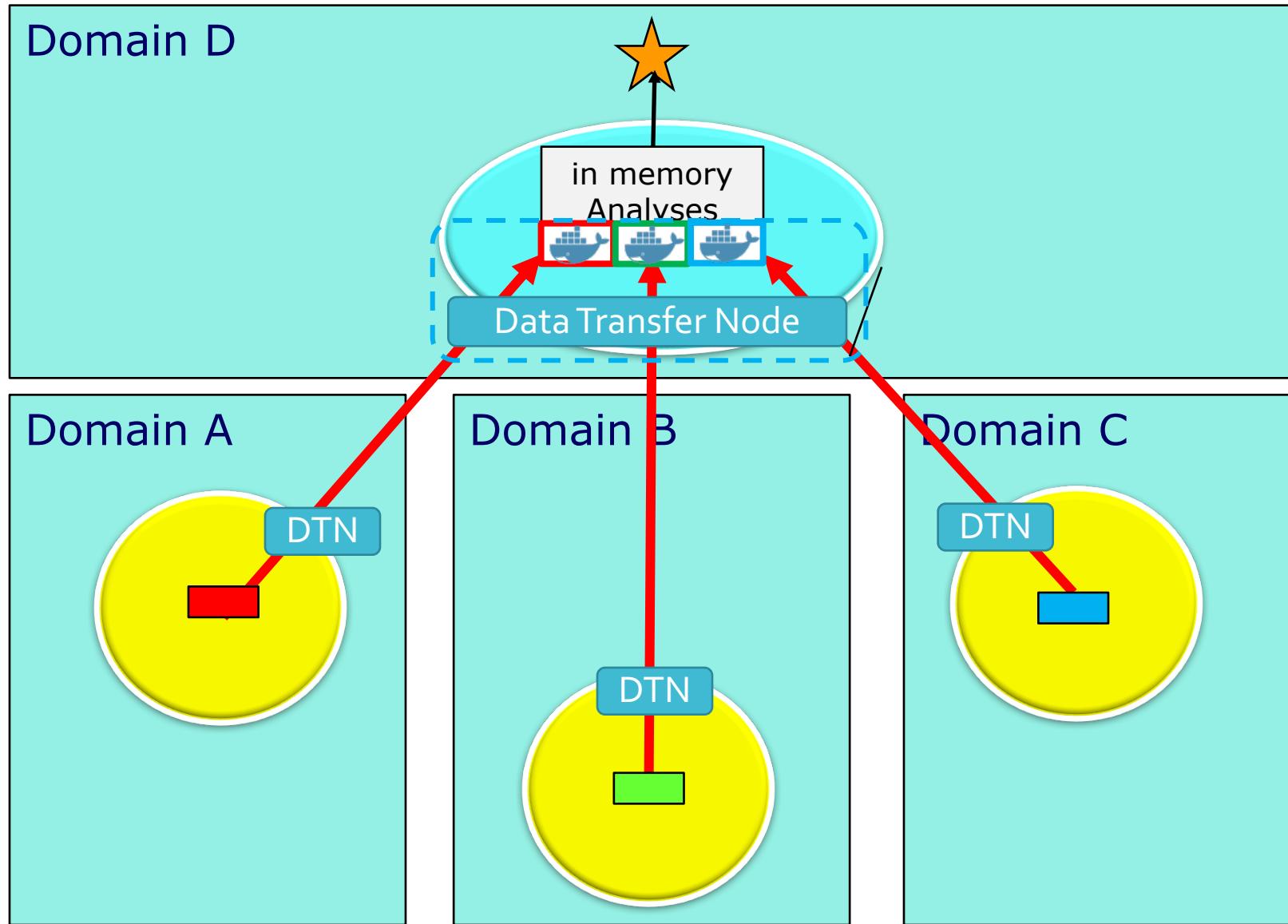
**Data Transfer Node** enables utilization of available high network bandwidth across distance

100 Gb/s provides +/- 20x transfer rate then a local SSD (5 Gb/s)

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# A model implementing trading aspects in a hub.

SURFsara
Is the national supercomputing center in The Netherlands

Netherlight is the national optical network exchange providing access to a global research e-Infrastructure

In mem analyses

e-Market

$

blockchain

DTN

Domain A

DTN

Domain B

DTN

DTN

Domain C

DTN

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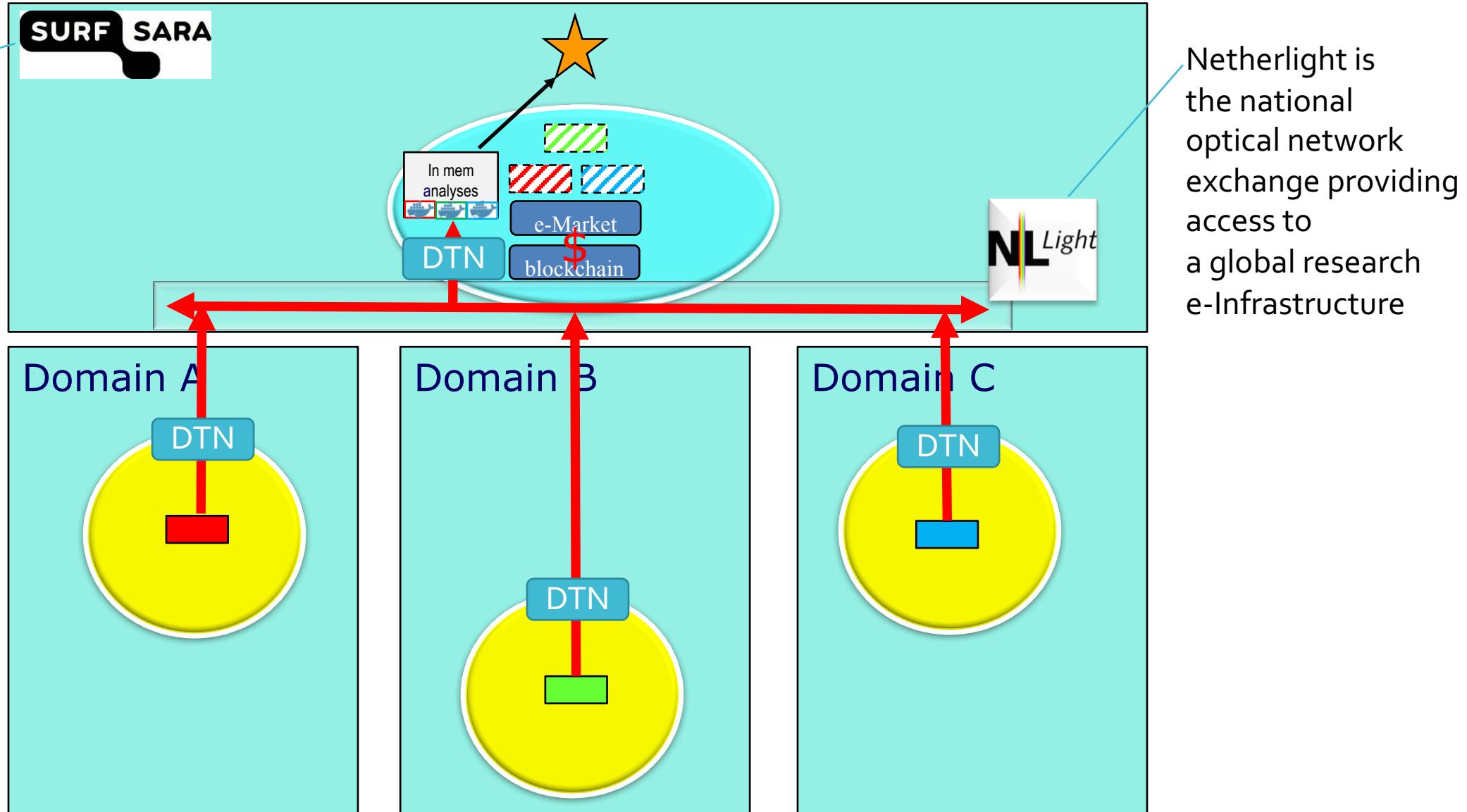
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Experiments at global scale using existing e-Infrastructure
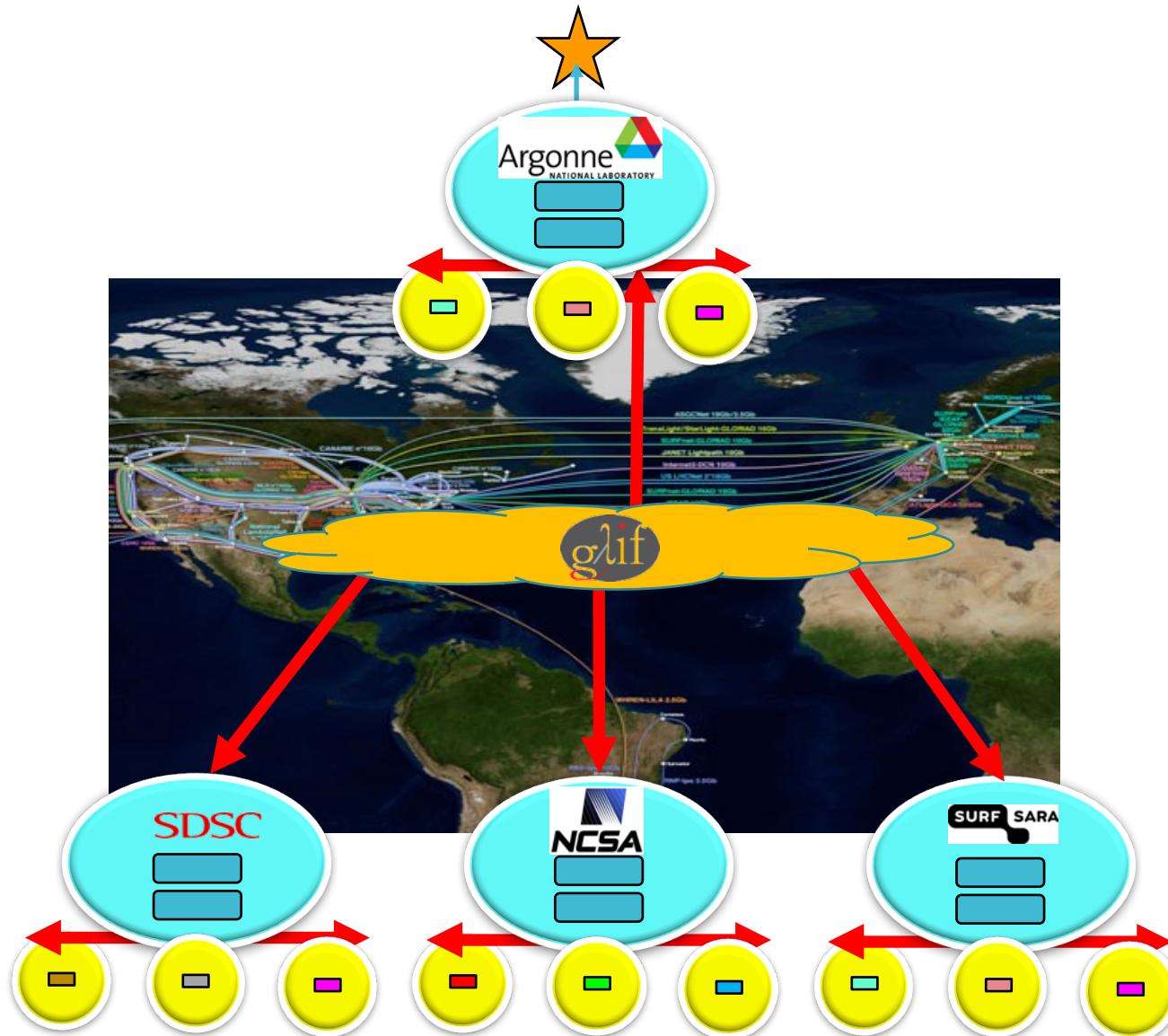
2003: GLIF project initiated a Global Lightpath e-Infrastructure
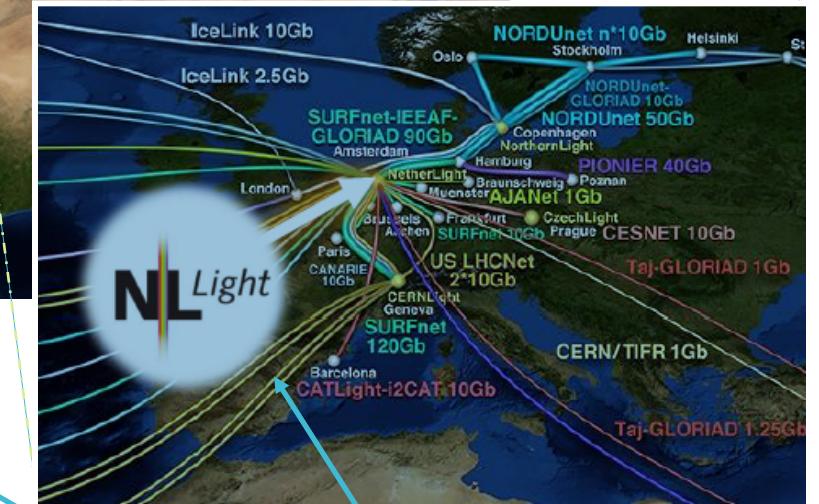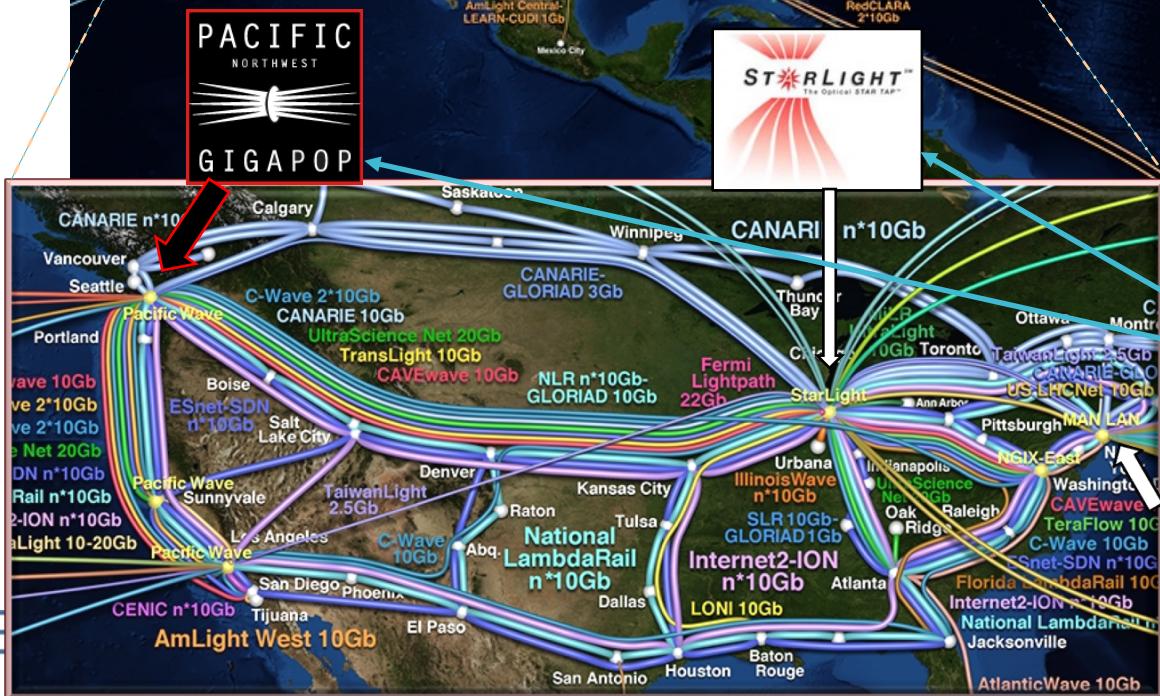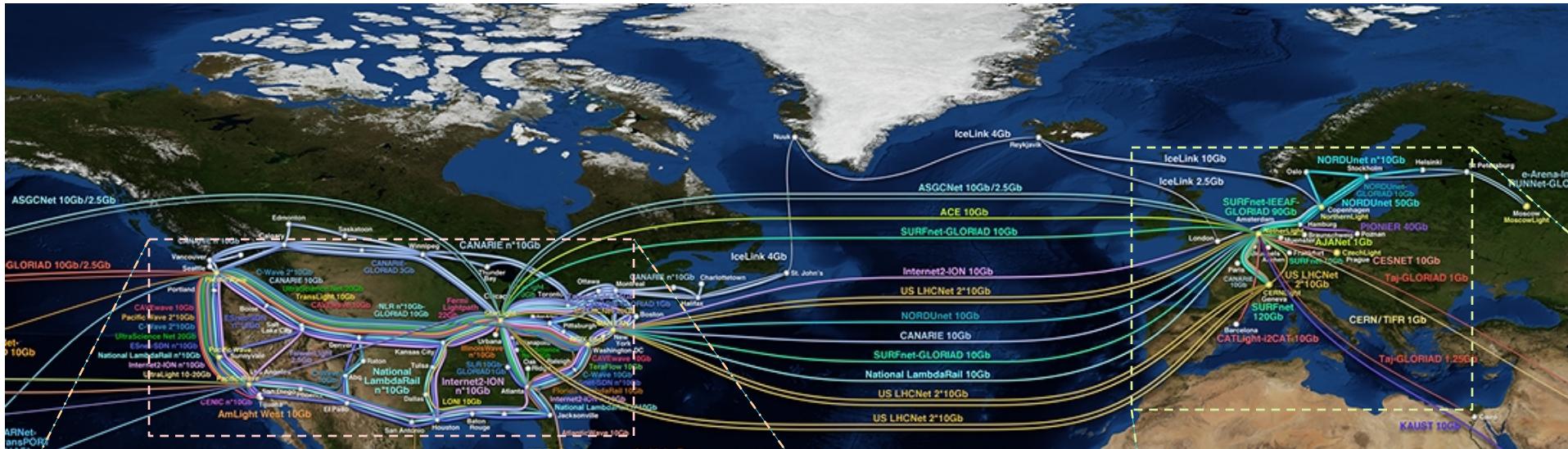
Optical Network Exchanges

www.glif.is

UvA/KLM and NSF Pacific Research Platform Testbed

PRP
PACIFIC RESEARCH
PLATFORM

prp.ucsd.edu

Soon to be the
**National
Research
Platform**
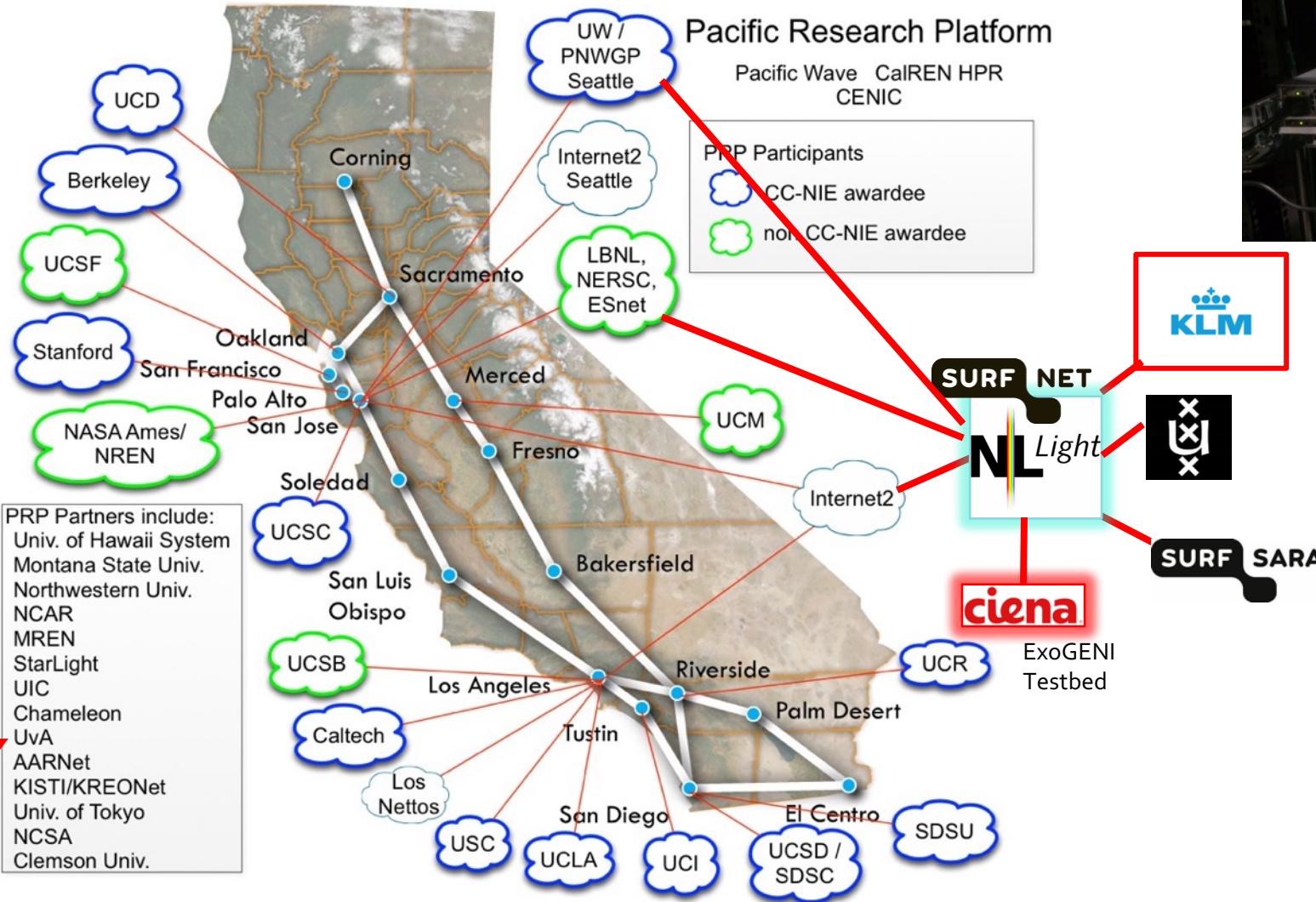
Data Transfer Node at KLM fieldlab with 100 gb/s link to enable SDMP research thanks to UvA, SURFnet and Ciena

ExoGENI Testbed

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