

How multi-domain authorization research evolved into Data Exchange Systems research

A historic overview of concepts illustrated by results

Symposium 'From Systems and Networks to Complex Cyber Infrastructures'
Dec. 9th 2022, Amsterdam

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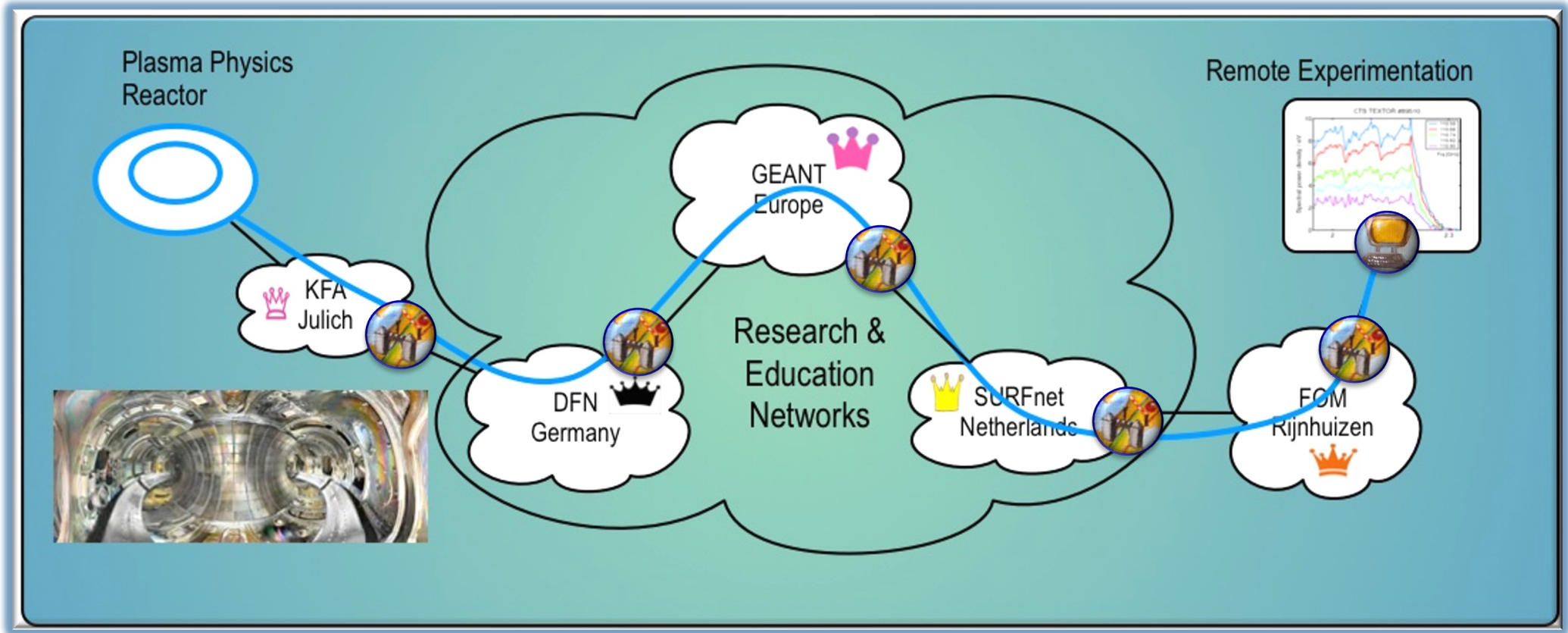


UNIVERSITEIT VAN AMSTERDAM

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GROUP

1998: THE MULTI-KINGDOM PROBLEM

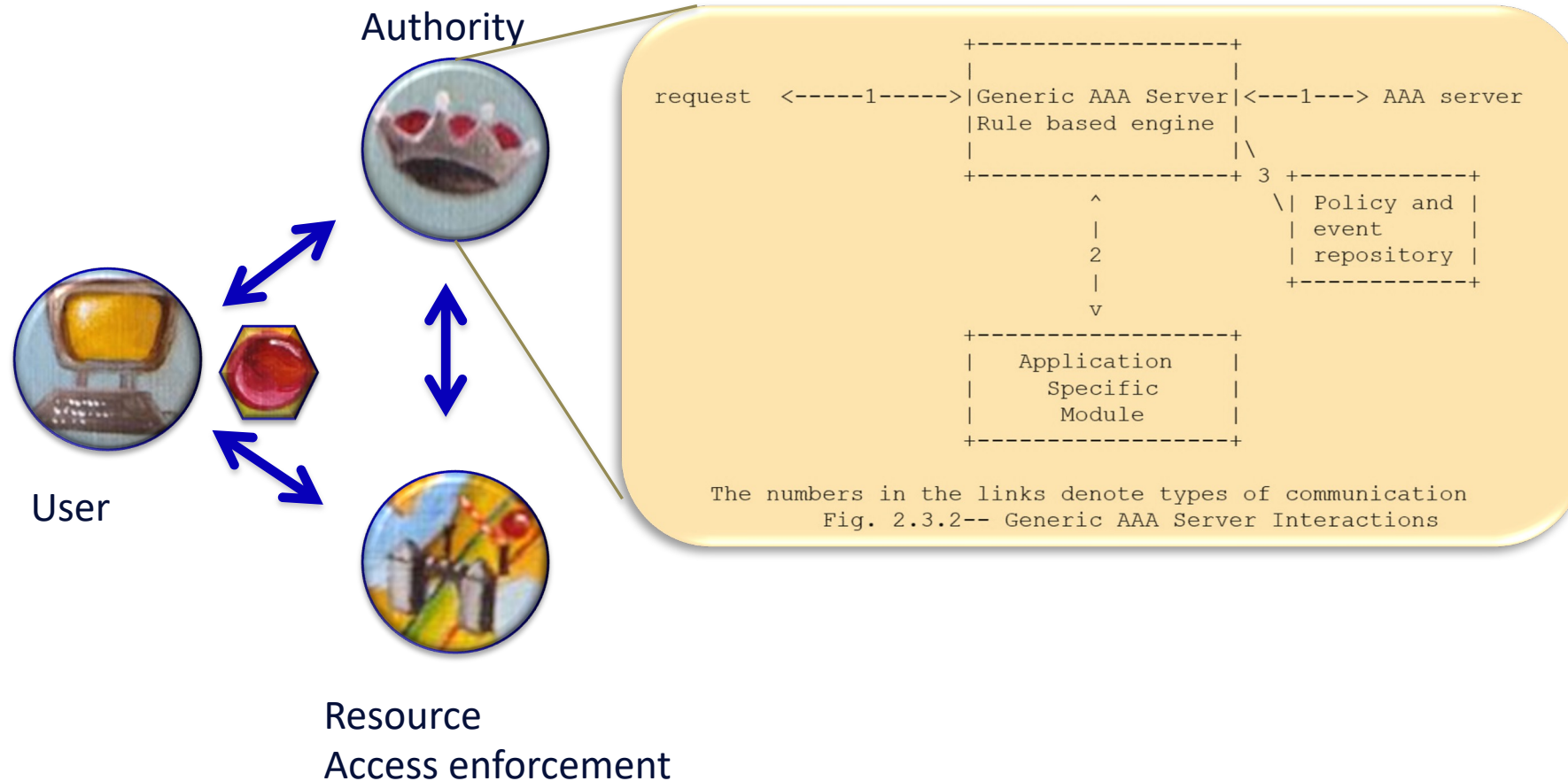
AUTHORIZING USAGE OF DEDICATED CAPACITY NETWORK SEGMENTS



Access to high speed, dedicated capacity network segments

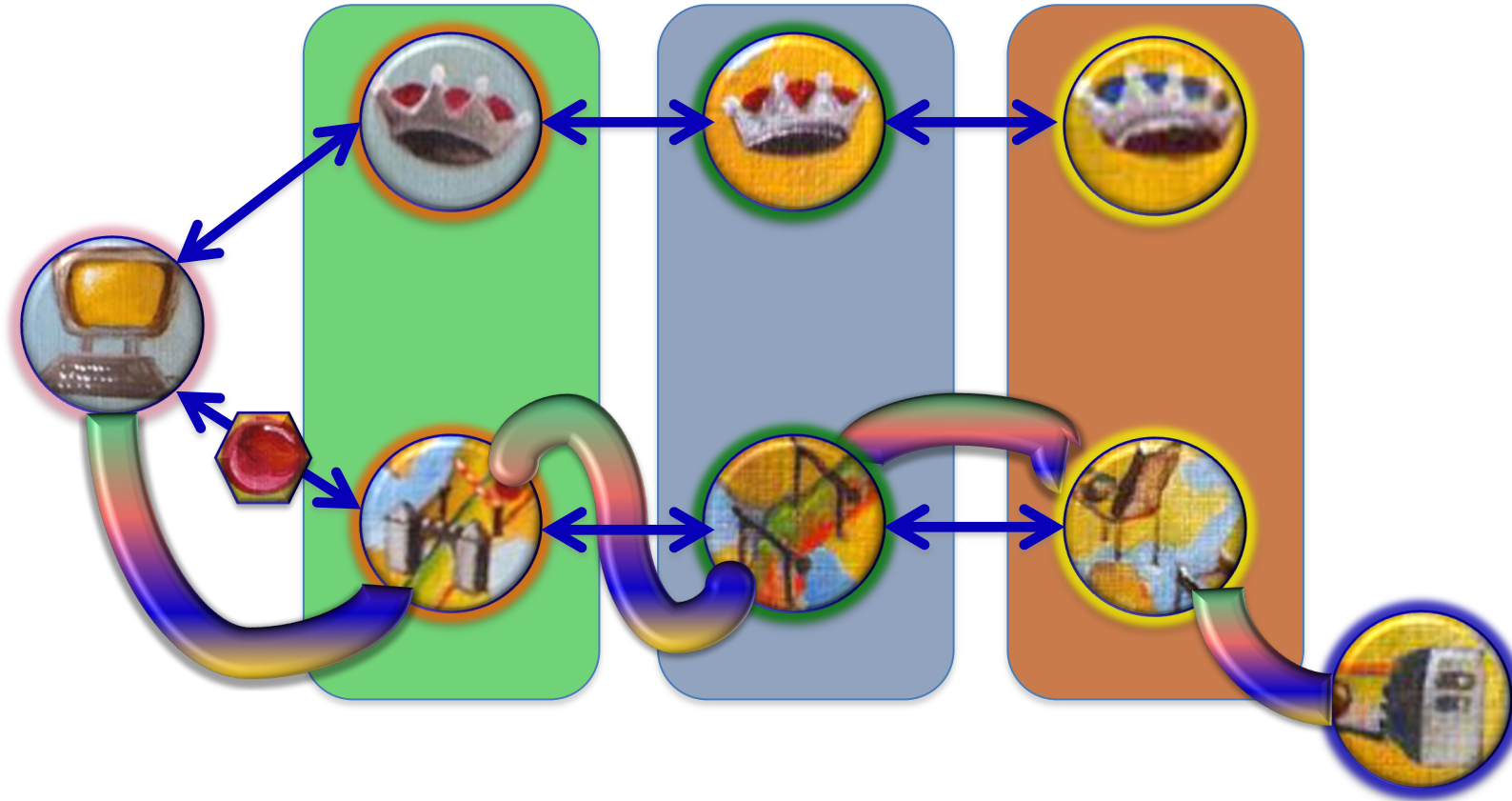
1999: IRTF AAA ARCHITECTURE RESEARCH GROUP

RFC2903 GENERIC AAA ARCHITECTURE & RFC2904 AUTHORIZATION FRAMEWORK



2000: IRTF AAA ARCHITECTURE RESEARCH GROUP

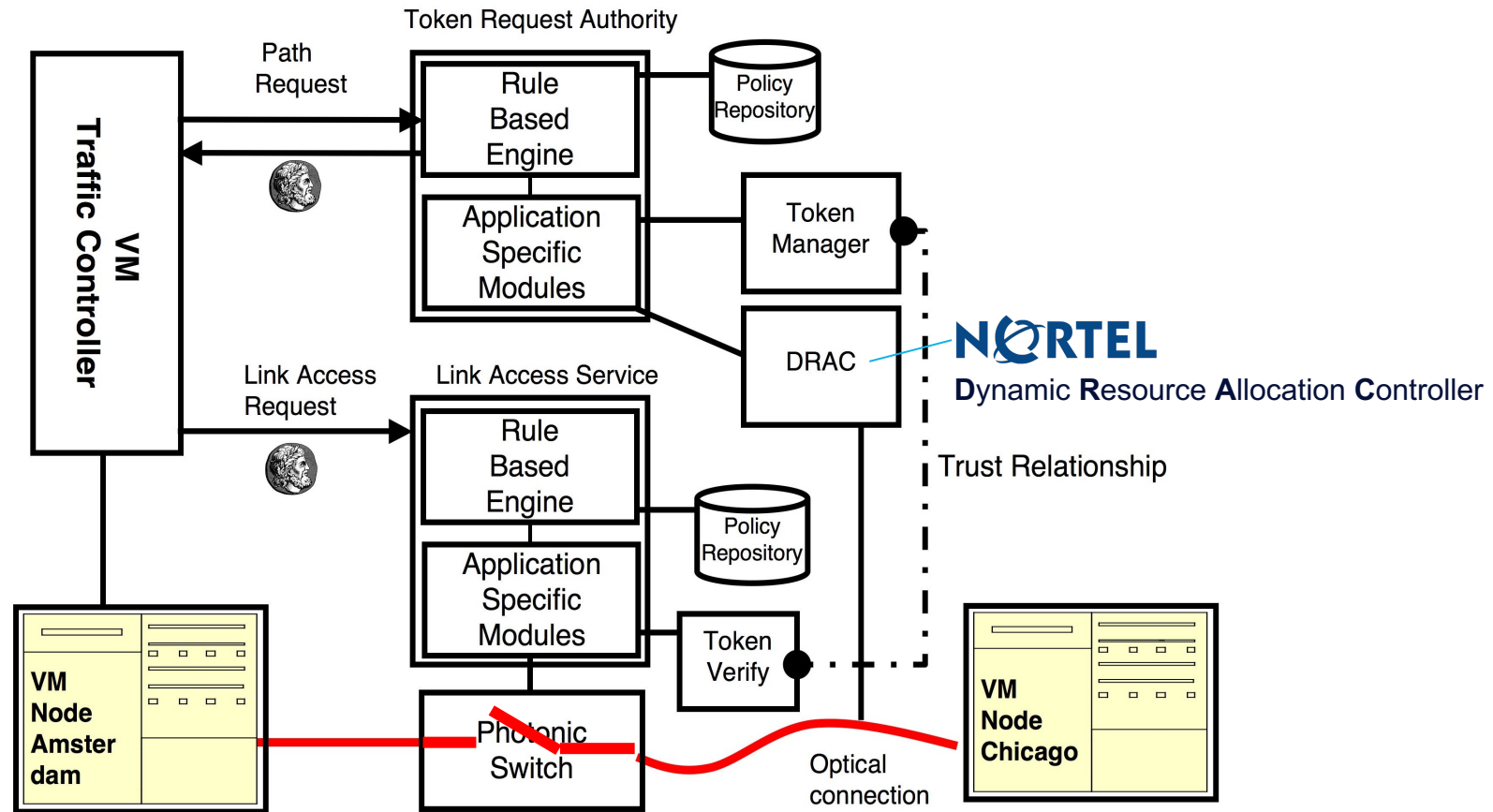
EXAMPLE OF A MULTIDOMAIN AUTHORIZATION SEQUENCE



Note: Kings must **trust** each other: i.e. a king must know another king does the right thing

2005: EXAMPLE INTEGRATION

VALIDATING GENERIC AAA CONCEPTS WITH NORTEL (CIENA) TECHNOLOGY



Virtual Machine live migration via a provisioned optical network connection demonstrated at SuperComputing & iGrid 2005

Franco Travostino, Paul Daspit, Leon Gommans, Chetan Jog, Cees de Laat, Joe Mambretti, Inder Monga, Bas van Oudenaarde, Satish Raghunath, Phil Yonghui Wang,

Seamless live migration of virtual machines over the MAN/WAN, Future Generation Computer Systems, Volume 22, Issue 8, 2006

2012: HOW TO ORGANIZE TRUST?

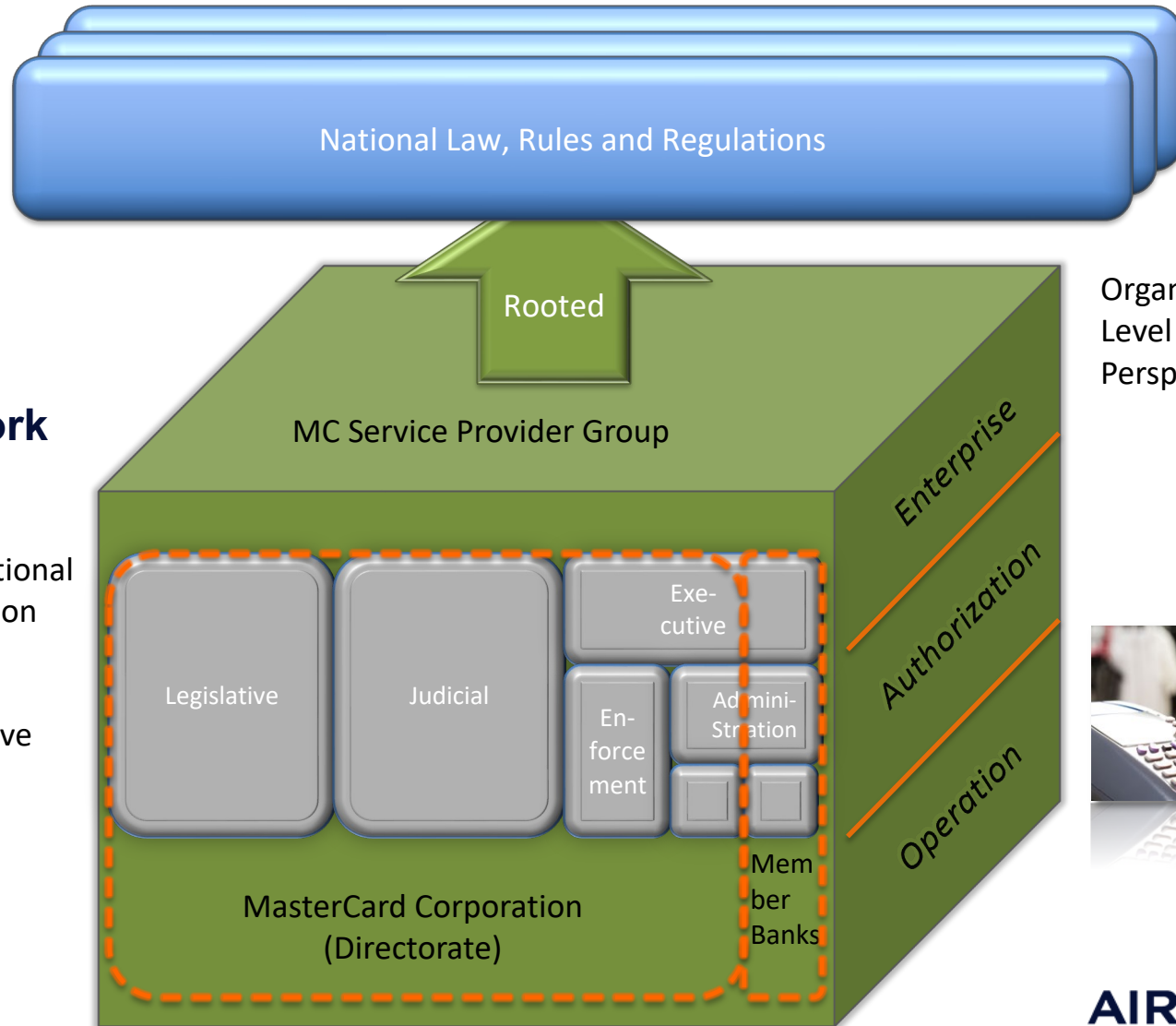
SERVICE PROVIDER GROUP CONCEPT PRESENTED AT INTERNET2 SPRING MEETING, ARLINGTON

Why is a credit card trusted worldwide?

The Service Provider Group Framework

Leon Gommans, John Vollbrecht, Betty Gommans
Cees de Laat, FGCS, June 2014

Chapter 5 of my PhD thesis 2014.



Organisational Level Perspective

Organisational Distribution of Power Perspective



2015: THE POWER OF (BIG) DATA

AN EVENT IN RECORDED ENGINE DATA INDICATING COMPRESSOR DAMAGE



3 PH: XXX 956608 EGT Sector Shift Cruise

3 PH: XXX 956608 Quick EGT Increase Cruise

5 PH: XXX 956608 Engine Wear Cruise

3 PH: XXX 956608 EGT HDM Decrease Takeoff

3 PH: XXX 956608 EGT Sector Shift Takeoff

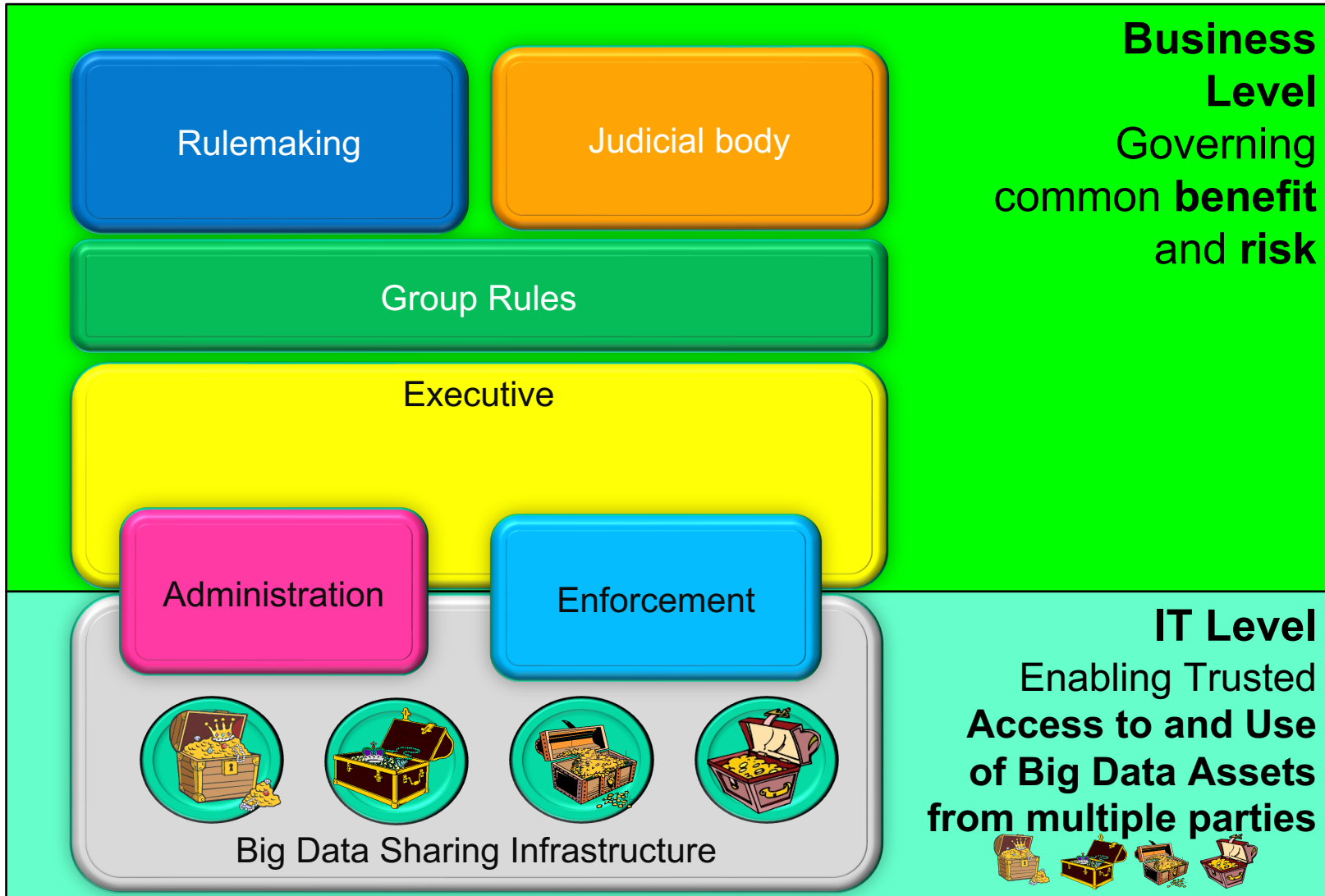
3 PH: XXX 956608 EGT Divergence Shift Cruise

Prognos[®]

AIRFRANCE **KLM**
INDUSTRIES Engineering & Maintenance

2016: ORGANIZING TRUST FOR BIG DATA SHARING

APPLYING THE SERVICE PROVIDER GROUP CONCEPT IN BIG DATA CONTEXT



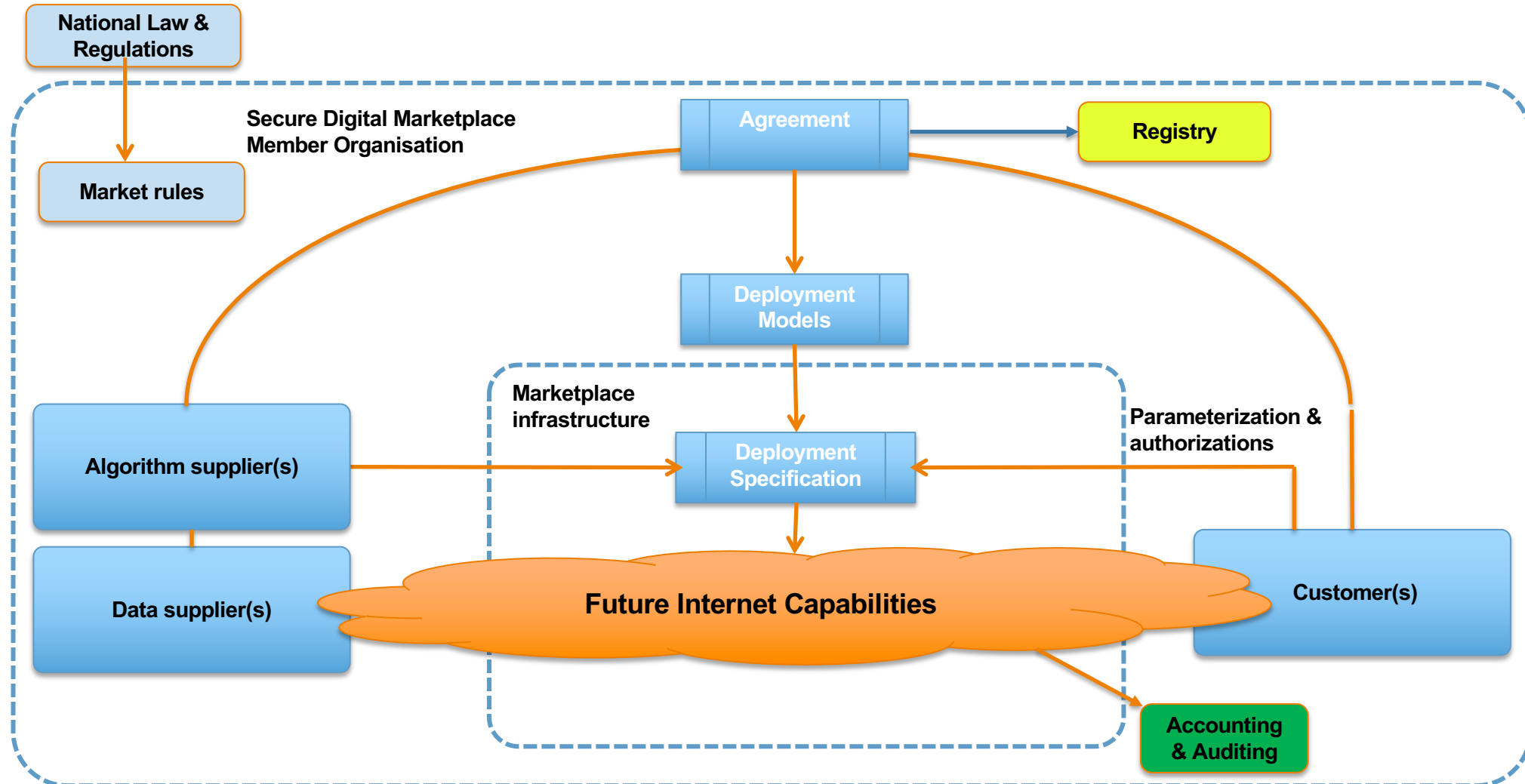
Presented at
SURF booth at
Supercomputing 2016

Input to NWO (funding
agency) ICT with
Industry
Workshop 2016



2016: THE DIGITAL DATA MARKETPLACE CONCEPT

DEVELOPED AT NWO "ICT WITH INDUSTRY" WORKSHOP NOV 2016



First presented to aerospace industry during the SAE HM-1 conference Mar 29th 2017 Fort Worth, TX





CONSORTIUM DRIVEN DIGITAL DATA MARKETPLACE

SAE ITC RECOGNIZES IN 2017 ITS POTENTIAL ROLE TO HELP CREATE CONSORTIA

SAE ITC ExchangeWell Consortium Development Program

Marketplace
Infrastructure



COMMON BENEFIT

Define and agree common benefit no single organization can achieve on its own.



GROUP RULES

Define consortium rules considering data use, access and benefit sharing



ORGANIZE TRUST

Organize power and trust as a **means to reduce risk** for participating members

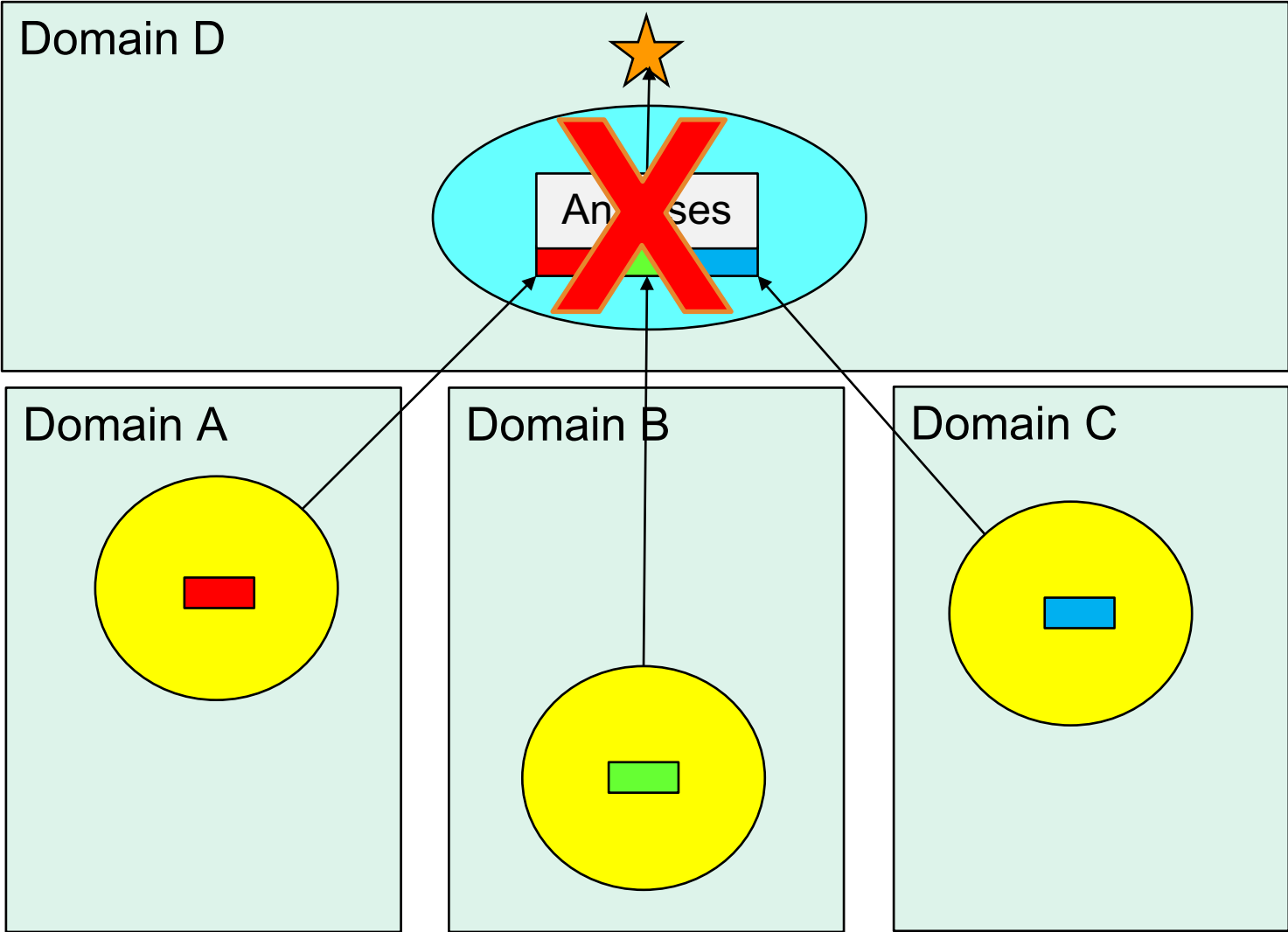


IMPLEMENT INFRASTRUCTURE

Research operationalization of **Digital Data Marketplace** concepts

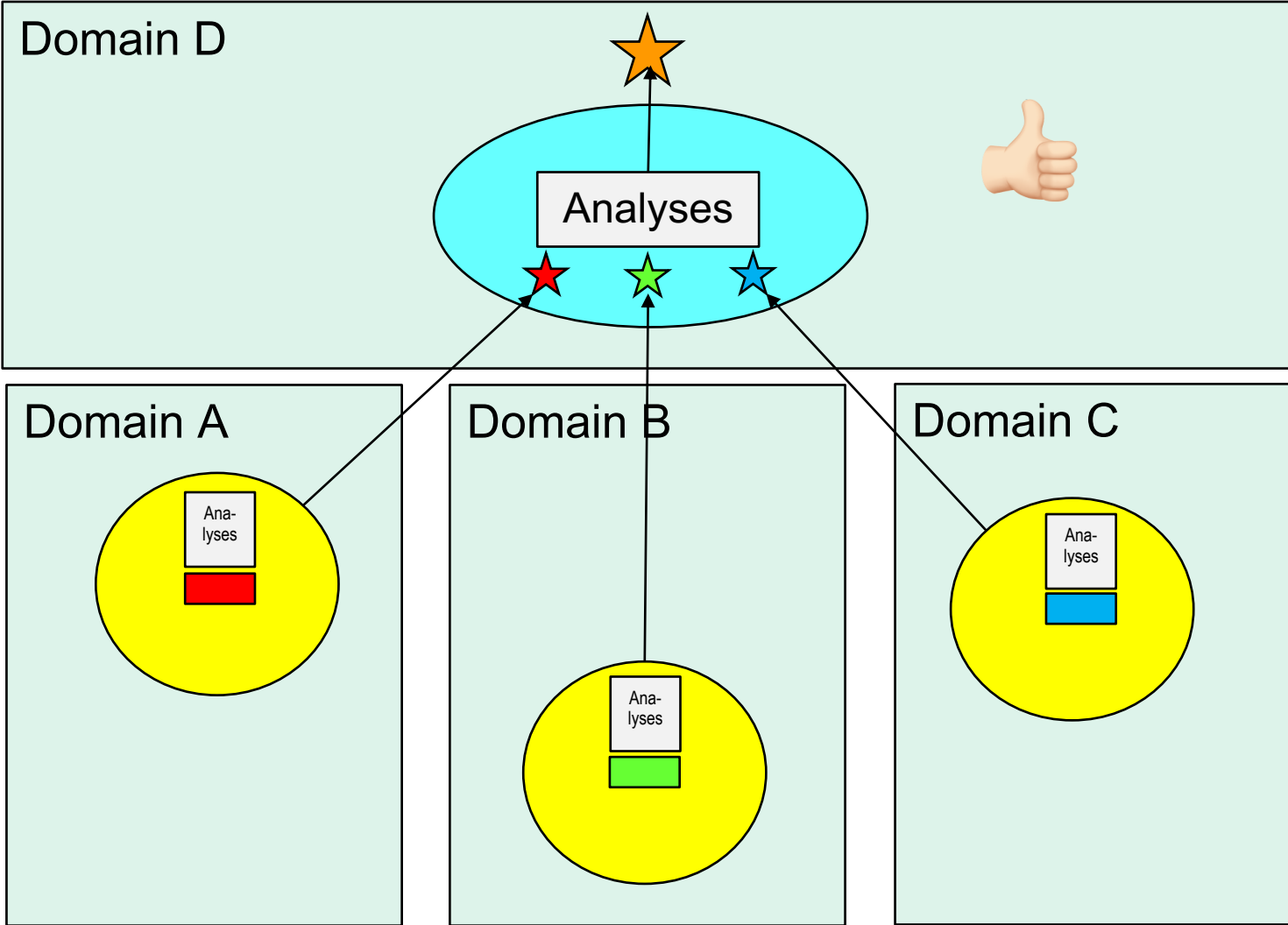
RECOGNIZING BIG DATA SHARING ARCHETYPES

PRESENTED AT SMALL BIG DATA CONFERENCE, AMSTERDAM ARENA SEPT 2016



BIG DATA SHARING ARCHETYPES

BRING THE ANALYSES TO THE DATA AND CONSOLIDATE AT HUB IS MORE ACCEPTABLE

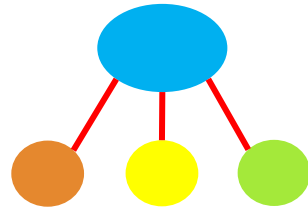


2017 HOW TO IMPLEMENT A GLOBAL DDM?

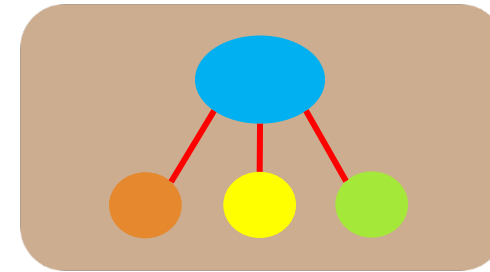
CREATING COLLABORATION WITH EQUINIX CTO OFFICE IN SILICON VALLEY

GLOBAL RESEARCH INFRASTRUCTURES

Data Sharing Infrastructure Model
 Research using Future Internet capabilities



GLOBAL DATACENTER INFRASTRUCTURES

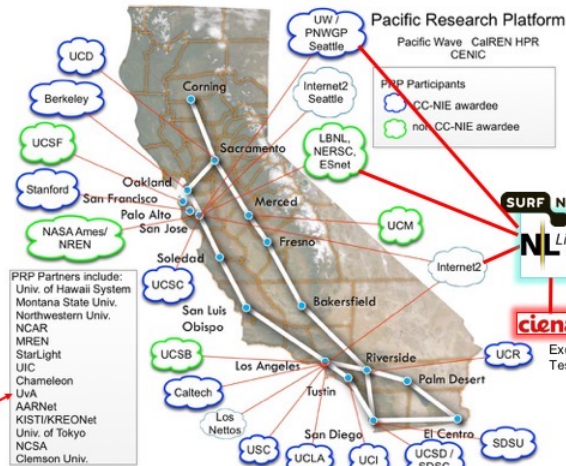


How to create a Global Digital Marketplace Ecosystem



prp.ucsd.edu

As foundation of 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

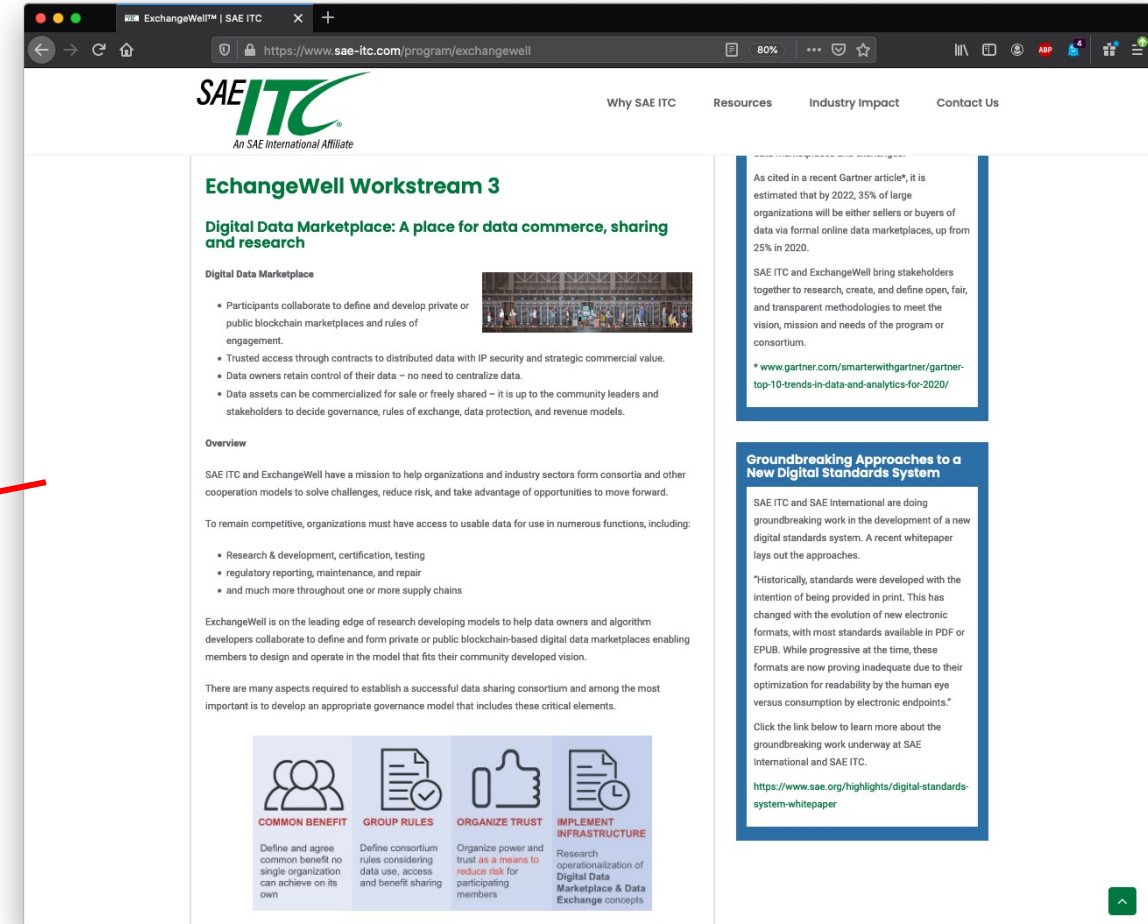
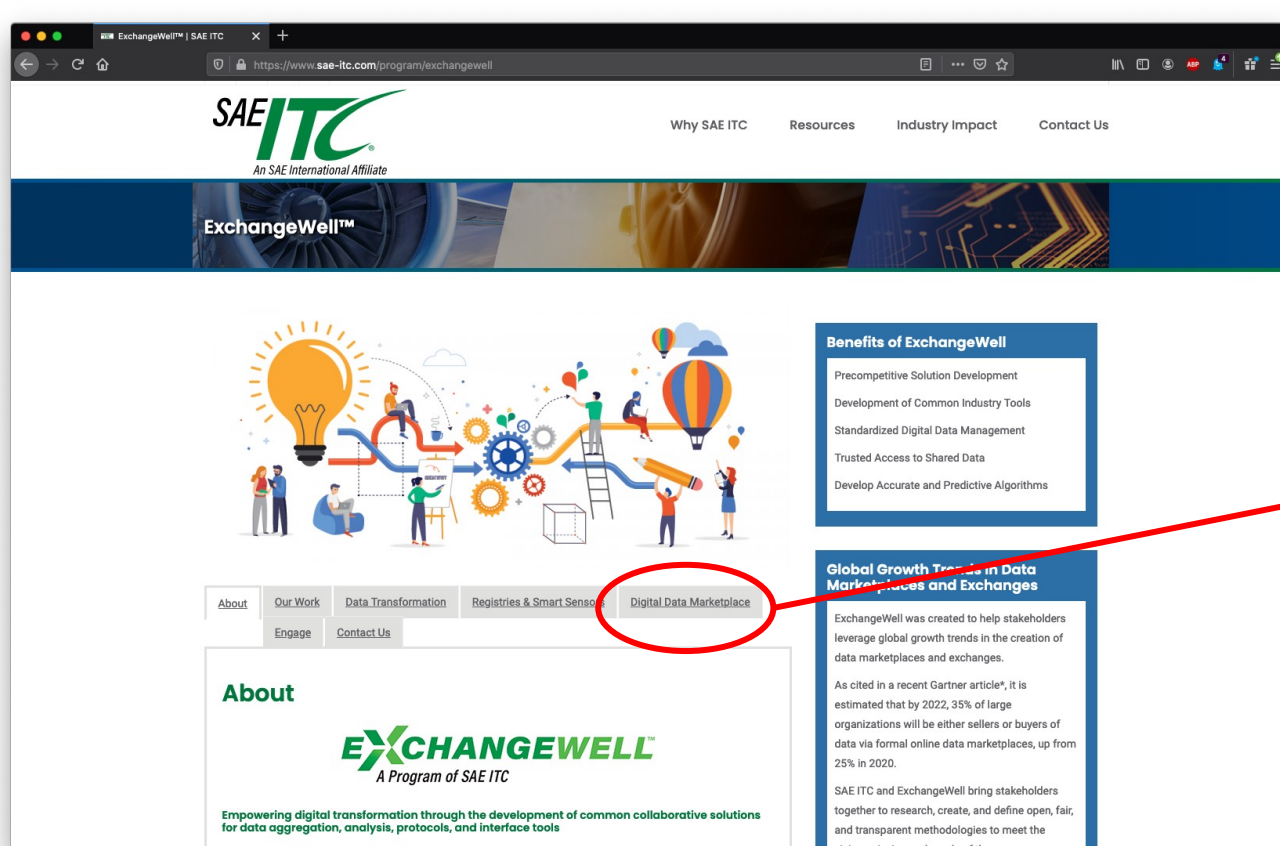


AM3 and AM4 Datacenters
 Amsterdam
 Science Park
 SV10 Datacenter
 Silicon Valley



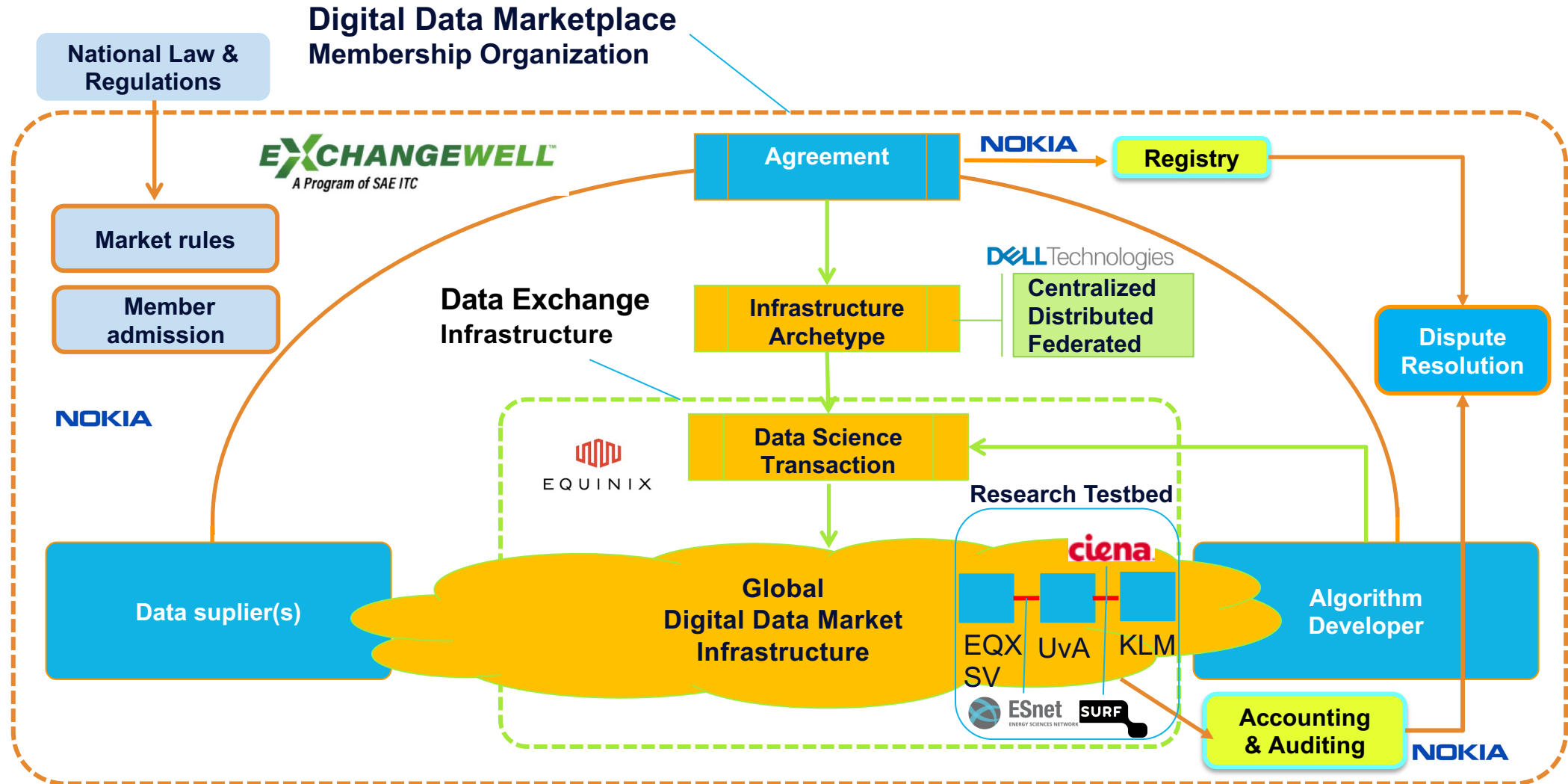
2018 SAE ITC ADOPTED CONCEPT IN EXCHANGEWELL PROGRAM

<https://www.sae-itc.com/program/exchangewell>



DIGITAL DATA MARKETPLACE FOR AI DEVELOPMENT

APR 2019 FIRST DEMONSTRATION DURING SAE-ITC CONFERENCE IN PRAGUE



2021: DIGITAL DATA MARKETPLACE SOLUTION NOKIA/ EQUINIX

MATURING TECHNOLOGY INTO A COMMERCIAL PRODUCT

NOKIA

Download

Nokia Data Marketplace Solution at Equinix

Whitepaper showcasing how Nokia Data Marketplace is complemented by Equinix infrastructure.

2.2 Data Marketplace Overview

The high-level architecture of a data marketplace is depicted in Figure 1. It shows the data marketplace as an entity owned and operated by a membership organization through which data providers and consumers can interact and transact based on community rules and individual agreements.

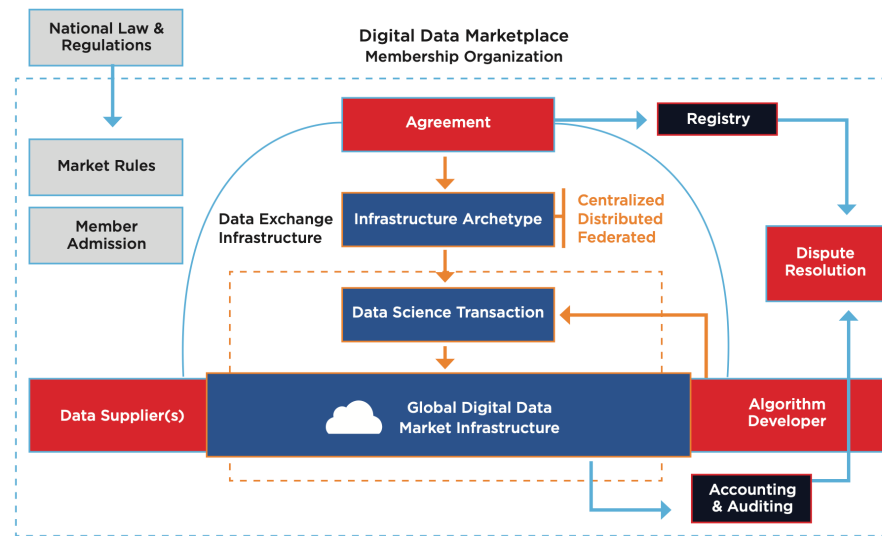
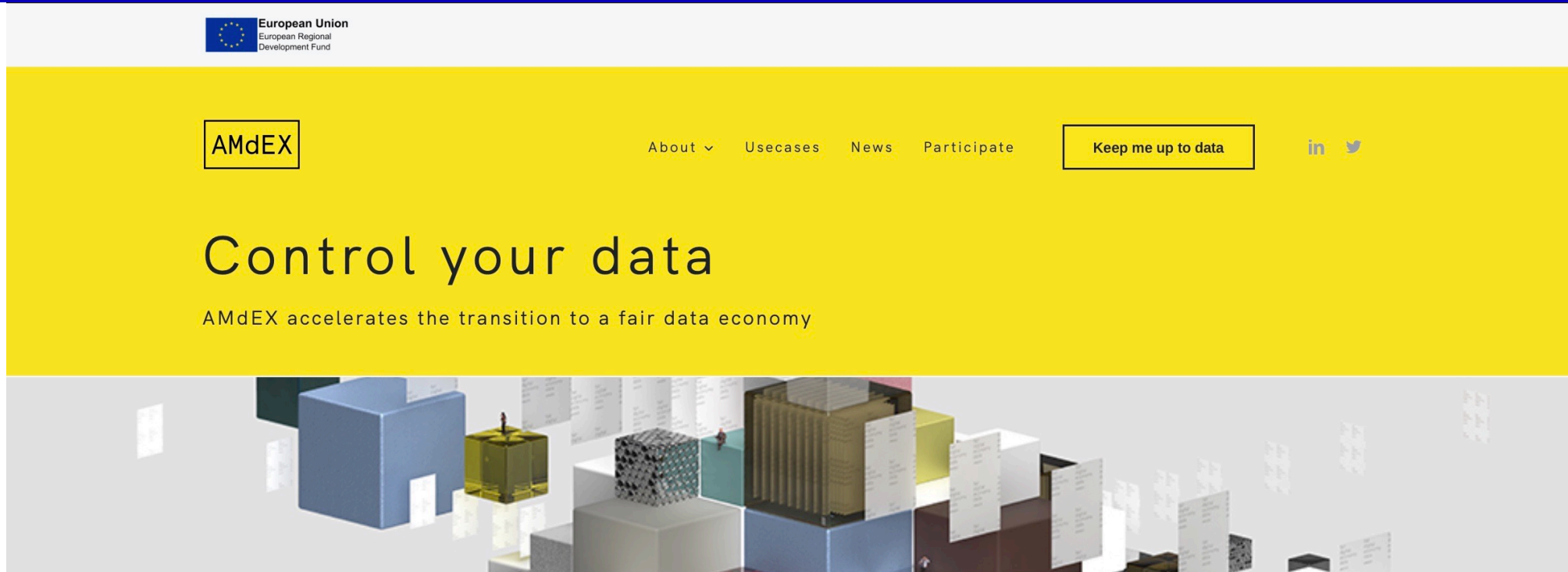


Fig. 1. Data marketplace architecture

A data marketplace must have a process for creating membership rules, and its process for admission must require a prospective member to agree to comply with all membership rules. A member might be a data supplier, algorithm developer or data services provider. After being admitted, members can decide which other members they want to interact with based on an established understanding or agreement. Member groups can compete with other member groups.

FEB 2021: START OF THE AMDEX FIELDLAB PROJECT

COLLABORATION AMS-IX, UVA, AMSTERDAM ECONOMIC BOARD, SURF AND DEXES



We give users control over their data by co-designing and co-developing a secure, trusted and neutral infrastructure for data sharing.

[Why AMdEX is a good idea](#)

[Want to participate in AMdEX?](#)

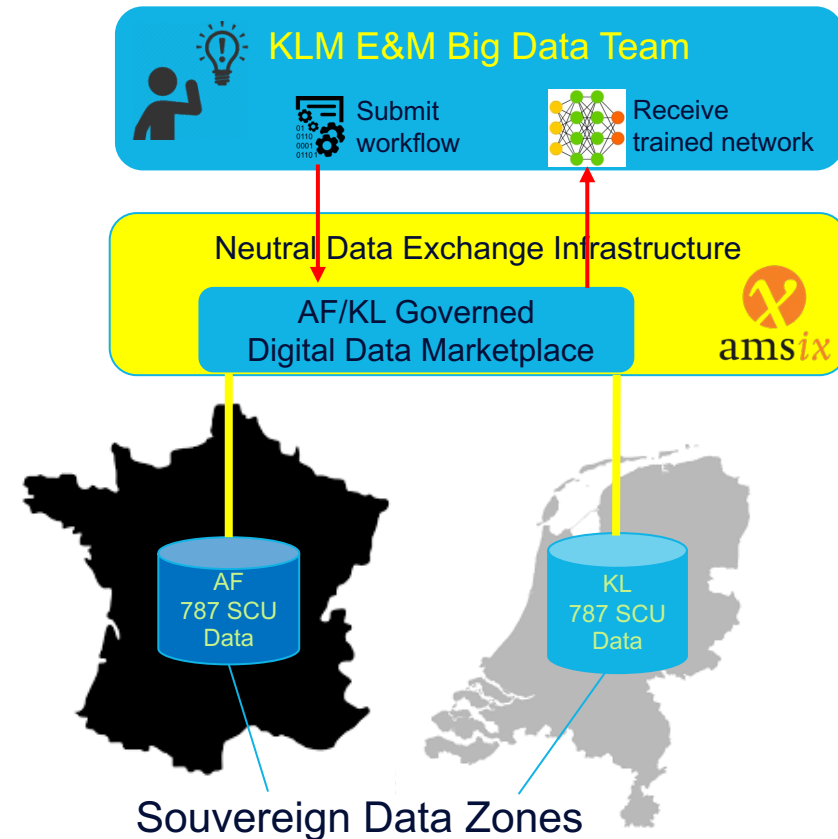
[Keep me up to data](#)

NEXT: DEMO FOR AMS-IX “MORE-IP” EVENT MAY 31ST 2023

SHOWING A KLM PREDICTIVE MAINTENANCE USE CASE **AND VALUE**



AMdEX KLM Use-case team at AMS-IX office



<https://amdex.eu/usecases/>

NEXT: INDEPENDENT DATA CONSORTIUM FOR AVIATION

ORGANIZING TRUST VIA A NEUTRAL INDUSTRY CONSORTIUM

MISSION AND VISION



Board of Directors from:

1. Airbus
2. Air France KLM Group
3. Collins Aerospace
4. Lufthansa
5. Parker Aerospace
6. Safran
7. SkyThread

The IDCA Mission Statement:

IDCA will bring together aviation industry stakeholders to identify and leverage value chains, develop data standards, and **establish consensus-driven governance of data exchange mechanisms**. These processes will allow the industry to achieve gains in sustainability, safety, compliance, value creation, cost reduction and innovation at a scale that no single organization could achieve on its own.

IDCA's vision:

Enable aviation stakeholders to **collaborate seamlessly in value chains based on the exchange of data** in a trustworthy, fair, and efficient manner to benefit themselves and the industry.

THANK YOU

