

RESEARCH PROGRESS UPDATE DIGITAL DATA MARKETPLACES

Trusted, fair and economic data sharing enabling
value creation for the aerospace industry

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INTERNET HISTORY EUROPE

AMSTERDAM SCIENCE PARK



1988:
The Internet landed in Europe
at CWI



1994:
The Amsterdam Internet Exchange
housed at NIKHEF



Now > 60 datacenters emerged around the Amsterdam Internet
Exchange creating 12.500 jobs*
Digital Reality (3.0B\$ >175 DCs) Equinix (4.4 B\$ >200 DCs)



University of Amsterdam
Faculty of Science
located right in the middle

* Source 2019 report datacenters and employment, Dutch Datacenter Association

WHAT IS IT ABOUT?

A DIGITAL DATA MARKET PLACE:

- **Serves a common benefit no single organization can achieve on its own.**
- **Is created and governed by an industry consortium as a means to reduce risk, ensuring competition, fairness and trust.**
- **Supply members advertise their assets, contracts arrange asset access and usage by other members.**
- **To prevent data asset exposure, members can use a consortium governed infrastructure to execute data science scenario's**
- **Allows consortia to implement (digitally) enforceable contracts, whilst supporting dispute resolution by immutable logging.**

EXAMPLES OF DATA SHARING RELEVANT TO OUR INDUSTRY

Improve **passenger experience** at airports



Improve **efficiencies** across multi modal logistic chains



Increase **fleet availability** by improving maintenance scheduling using data to predict maintenance need & optimize planning



Research efforts also consider use-cases in Healthcare, Agriculture, Smart Cities, Public Safety, Cybersecurity, ..

RESEARCH QUESTION

CONTEXT: DATA SCIENCE ALGORITHM DEVELOPMENT



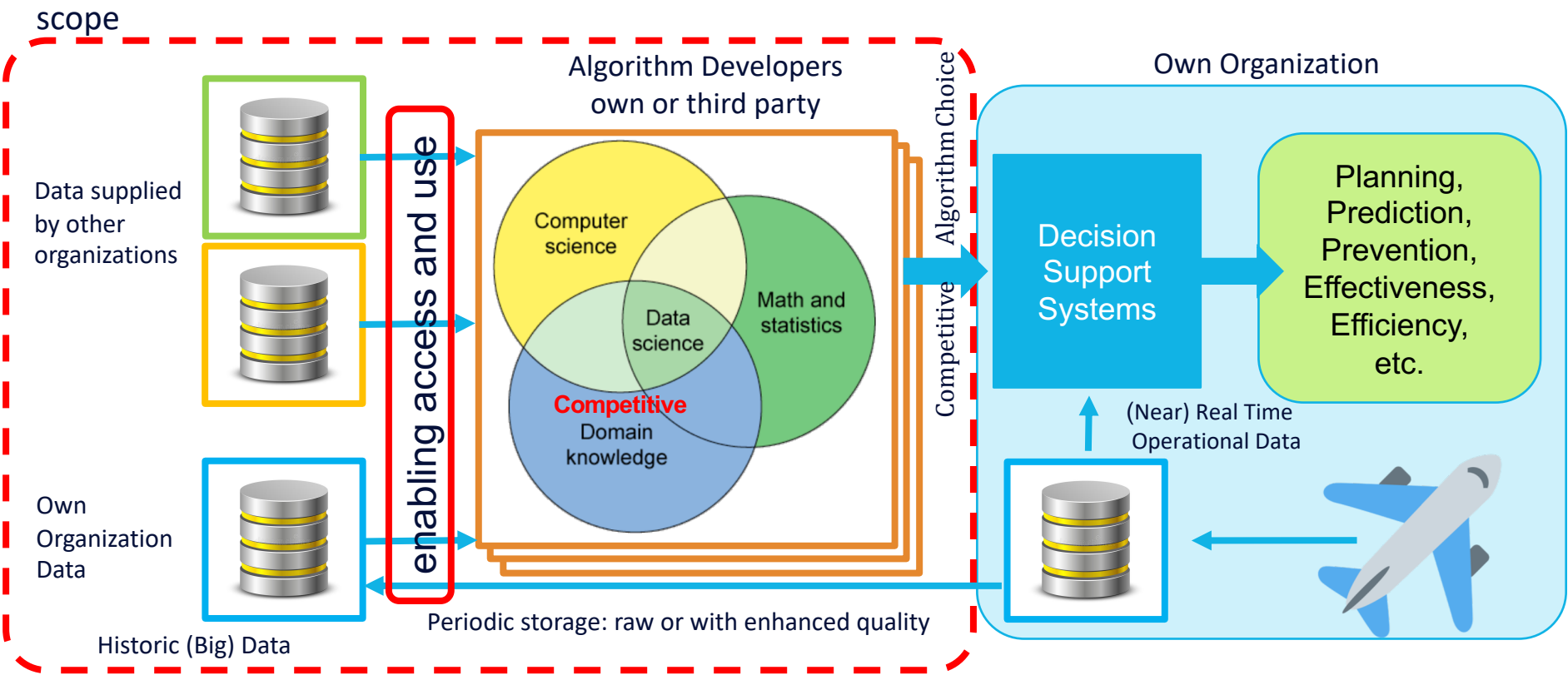
Taking into consideration:

- 1) The value creation potential of data sharing to increase algorithm accuracy
- 2) Disproportionate value generation by data platforms creating monopolies

Research question: How can (big) data assets be shared between data suppliers and algorithms developers in

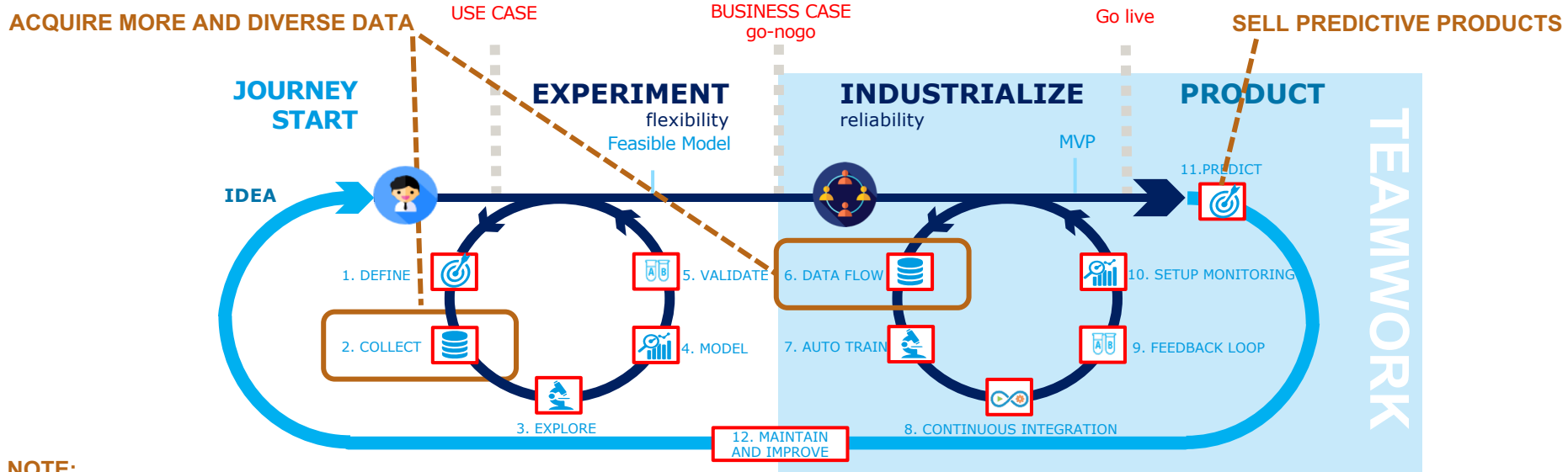
- 1) *A fair and economic way,*
- 2) *whilst providing adequate means to reduce risk?*

RESEARCHING DATA SHARING SOLUTIONS: A DIGITAL DATA MARKETPLACE GOVERNED BY A MEMBERSHIP CONSORTIUM



JOURNEY OF THE DATA SCIENTIST / ENGINEER

ROLE OF THE DIGITAL DATA MARKETPLACE



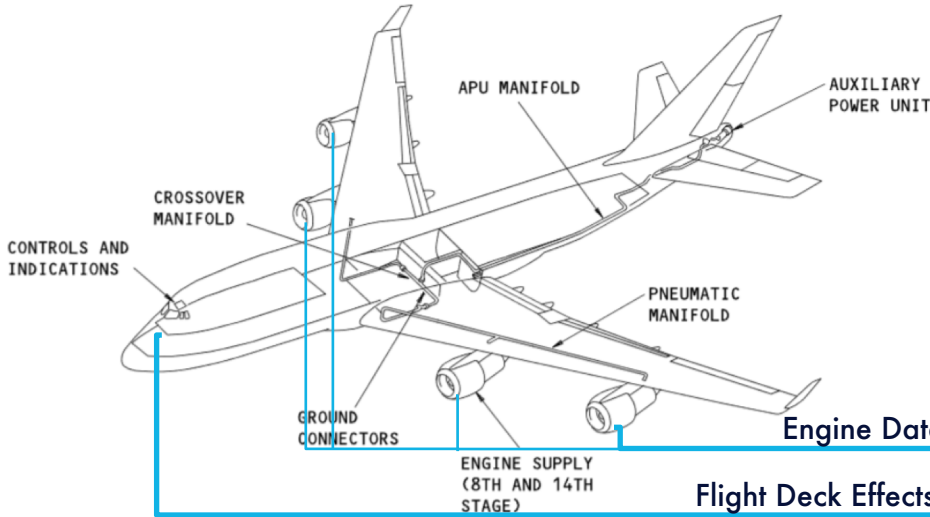
NOTE:
KNOWLEDGE SHARING IN OTHER PHASES (4,7,9,10) MAY ALSO BE A GOALS OF COLLABORATION IN A MARKETPLACE COMMUNITY.



USE-CASE – THE 747 BLEED AIR SYSTEM

WHERE DATA IS SPLIT ACROSS THREE PLACES.

Imagine if data scientist can use historic data from 747 aircraft operated by multiple airlines.

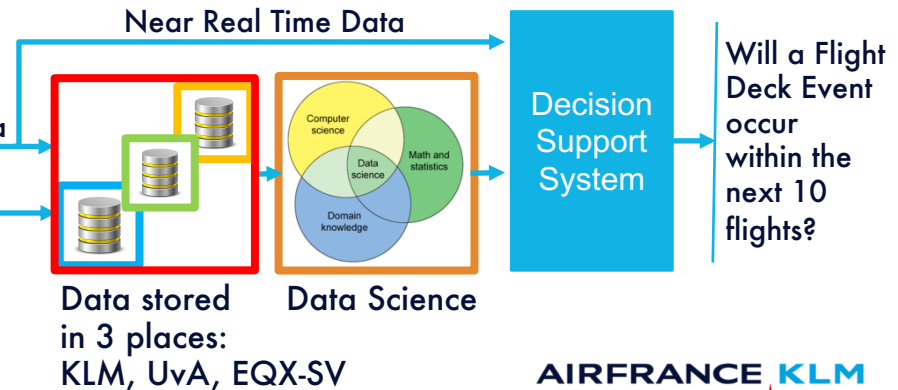


The more Flight Deck Effect occurrences are available, the more likely that a prognostic relation can be learnt.

The Bleed Air System regulates pressure and temperature of air from a turbine engine needed by other aircraft systems taking care of:

- cabin pressure
- de-icing
- water pressure
- and more..

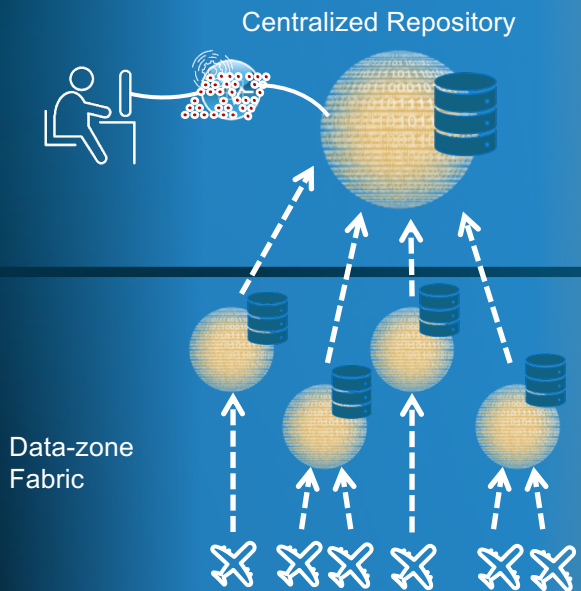
Flight Deck Effects indicate system functionality decreases and may trigger maintenance actions



Training Strategies

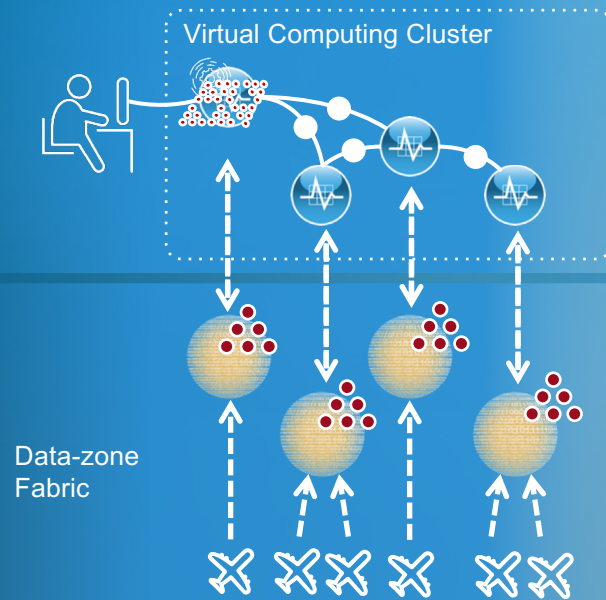
Centralized

Raw data transferred from dispersed data zones to a central repository for analysis



Federated

Raw data stays in place. Model trained through orchestration of local (at each data-zone) and global computations



DIGITAL DATA MARKETPLACE GOVERNANCE

A FOUR STEP APPROACH

ExchangeWell

DEMO



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

INTRODUCTION

- Organized by SAE ITC, **ExchangeWell** brings data owners and algorithm developers together in a digital data marketplace that provides the required trust for mutual engagement.
- It enables members to share their data assets in a **fair and economic way** whilst providing an adequate means to **reduce risk**.
- Sharing data enables **digital transformation of the industry** and **business value creation**.

Objective: Help answer key question:

- Will ExchangeWell as proposed provide value to our industry?



COMMON BENEFIT

GROUP RULES



ORGANIZE TRUST

IMPLEMENT
INFRASTRUCTURE





EXCHANGEWELL™

A Program of SAE ITC

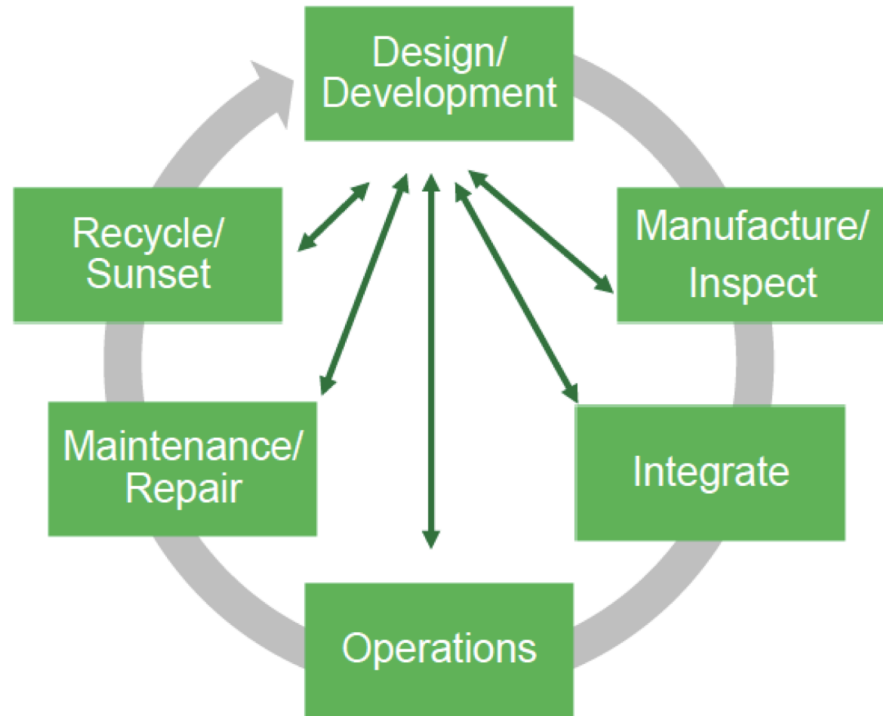
A consortium program to provide the means for industry leaders to access industry experts, develop practical experience from pilots, collaborate on pre-competitive research and establish a strategic path forward to effectively implement data management strategies which positively impact and benefit industry.

SAE ITC
An SAE International Affiliate

*Collaborative Innovation.
Trusted Implementation.*

Stakeholders

- Regulatory
- Airline/ Operator
- Airframer/ Integrator
- OEM
- Sub Assembly Manufacturer
- Distributor
- Component/ Part Manufacturer
- Standards Organization
- Industry Review Body
- Auditor/ Mandated Body
- SAE ITC
- Registrar
- Maintenance
- Training Provider
- IT System and Software Tools Provider
- Data Aggregators and Analyzers
- Insurers
- Legal
- Access Authorizing Agent
- Research/ Academics



We're here!
ExchangeWell



We're here!
ARINC IA



SAE ORGANIZATION

Affiliate



- AESQ SG
- ARINC IA
- ASPQP
- DATC
- IBIS
- Probitas Authentication
- WMC/PIN

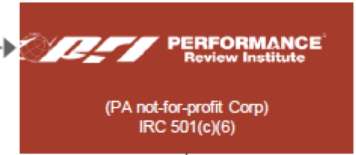
ExchangeWell



For-profit Subsidiaries



Affiliate



For-profit Subsidiaries



Alliance Partners



- Denotes Ownership & Governance Stewardship
- - - Denotes Governance Stewardship
- - - - Denotes No Ownership or Governance Stewardship

U.S. OFFICES

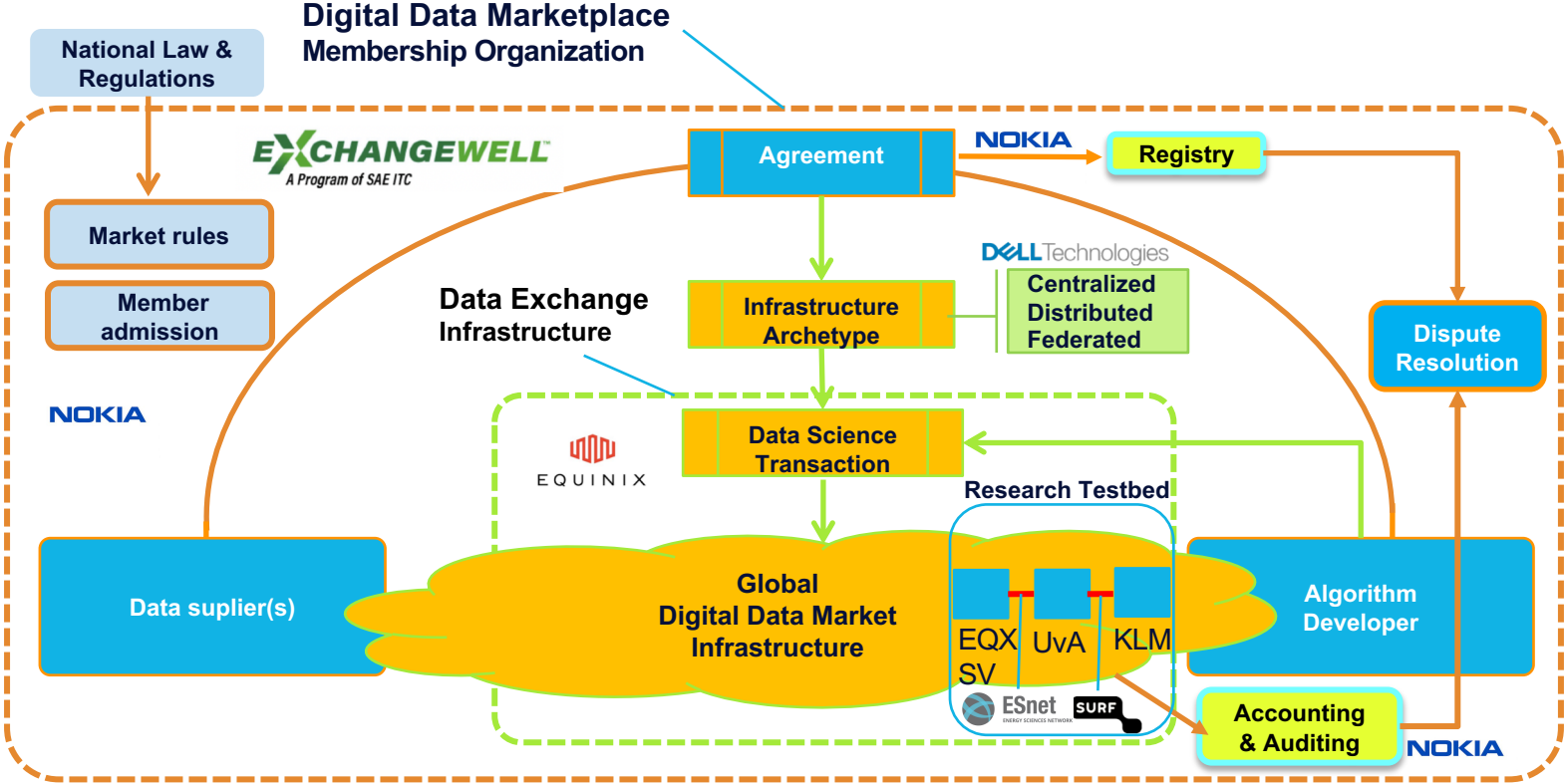
- Warrendale, PA (Corporate Headquarters for SAE, PRI and ITC)
- Troy, MI (Automotive Headquarters for SAE, DATC)
- Livonia, MI (ETI, Inc. offices)
- Washington, DC (Washington offices for SAE)
- New York/New Jersey (TBMG offices)
- Bowie, MD (ARINC IA offices)

INTERNATIONAL OFFICES

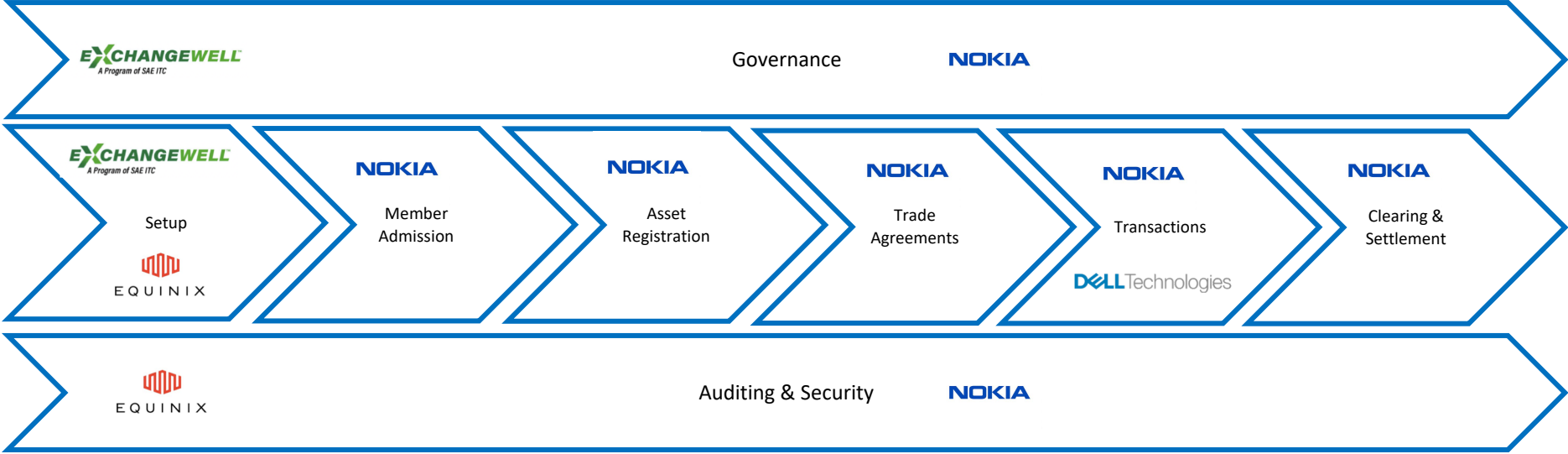
- London, UNITED KINGDOM (SAE, PRI offices)
- Derby, UNITED KINGDOM (PRI)
- Beijing, CHINA (PRI)
- Shanghai, CHINA (SAE WOFE office)
- Aichi (Nagoya), JAPAN (PRI)
- SINGAPORE (PRI)

DIGITAL DATA MARKETPLACE ARCHITECTURE

RESEARCHING IMPLEMENTATION OF ESSENTIAL ELEMENTS



DEMO



QUESTIONS

