June, 2018

Logistics

A shipper's perspective

ERICSSON

Ericsson – global logistics Challenge

DB SCHENKER · DHL · PANALPINA on 6 continents · KUEHNE+NAGEL · UPS · TNT · FedEx

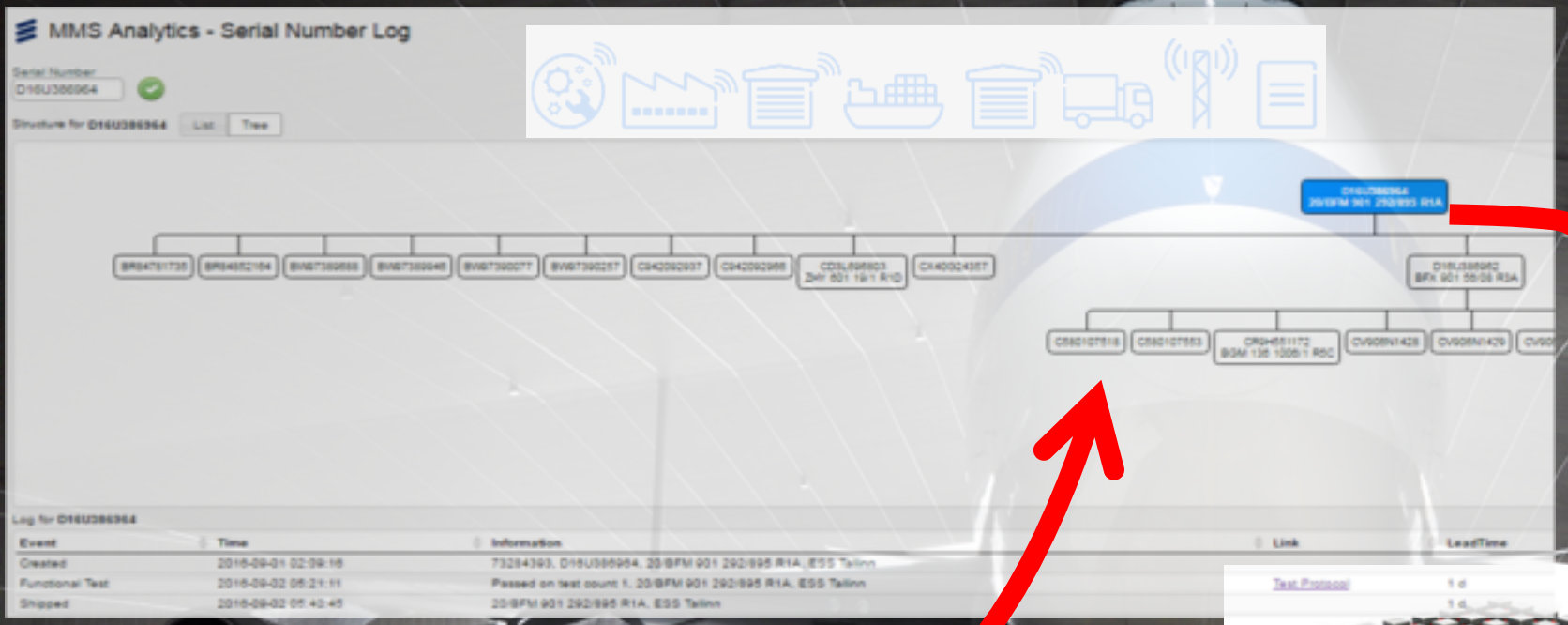
1	550,000	28,000	80%
1 BUSD per annum on outbound freight and logistics	550,000 m^3 of equipment shipped as 100,000 individual pieces	Equivalent to 28,000 TEU, enough to fill 6 Panamax carriers	Migrated from 20% to >80% sea freight in 6 years

Local supply chain network:

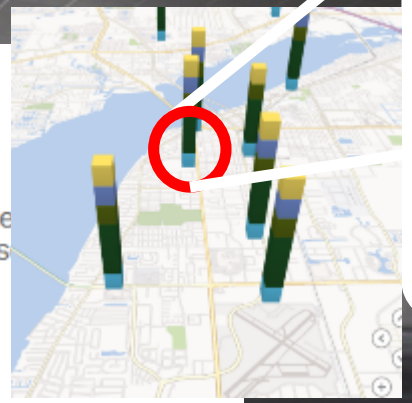
- More than 1400 warehouses
- More than 470 different Service Providers

Internally high visibility

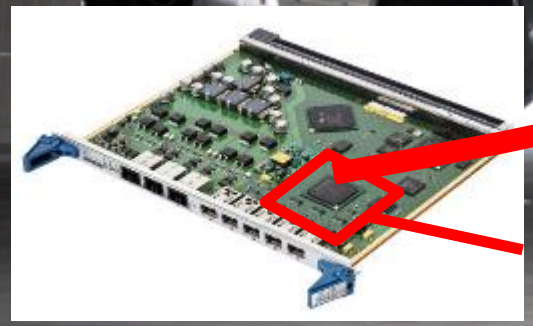
Track & Trace in OWN IT systems in place



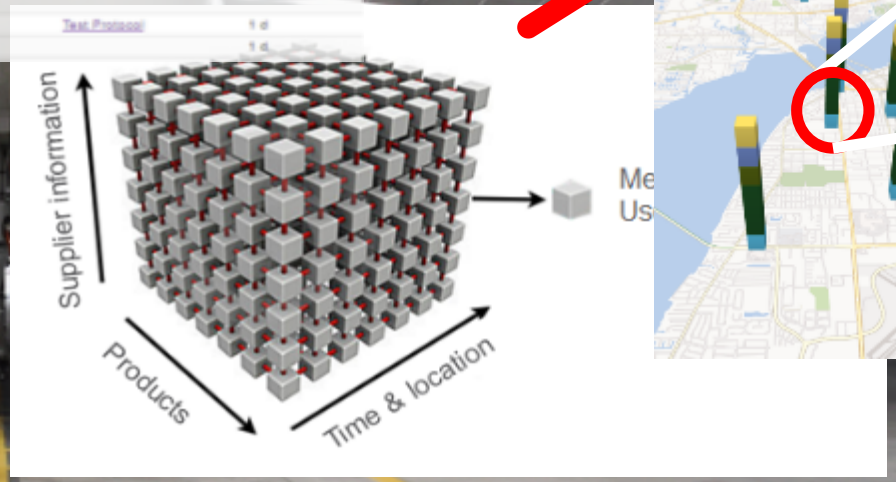
Customer A



Ability to locate units to specific radio site and slot in racks.



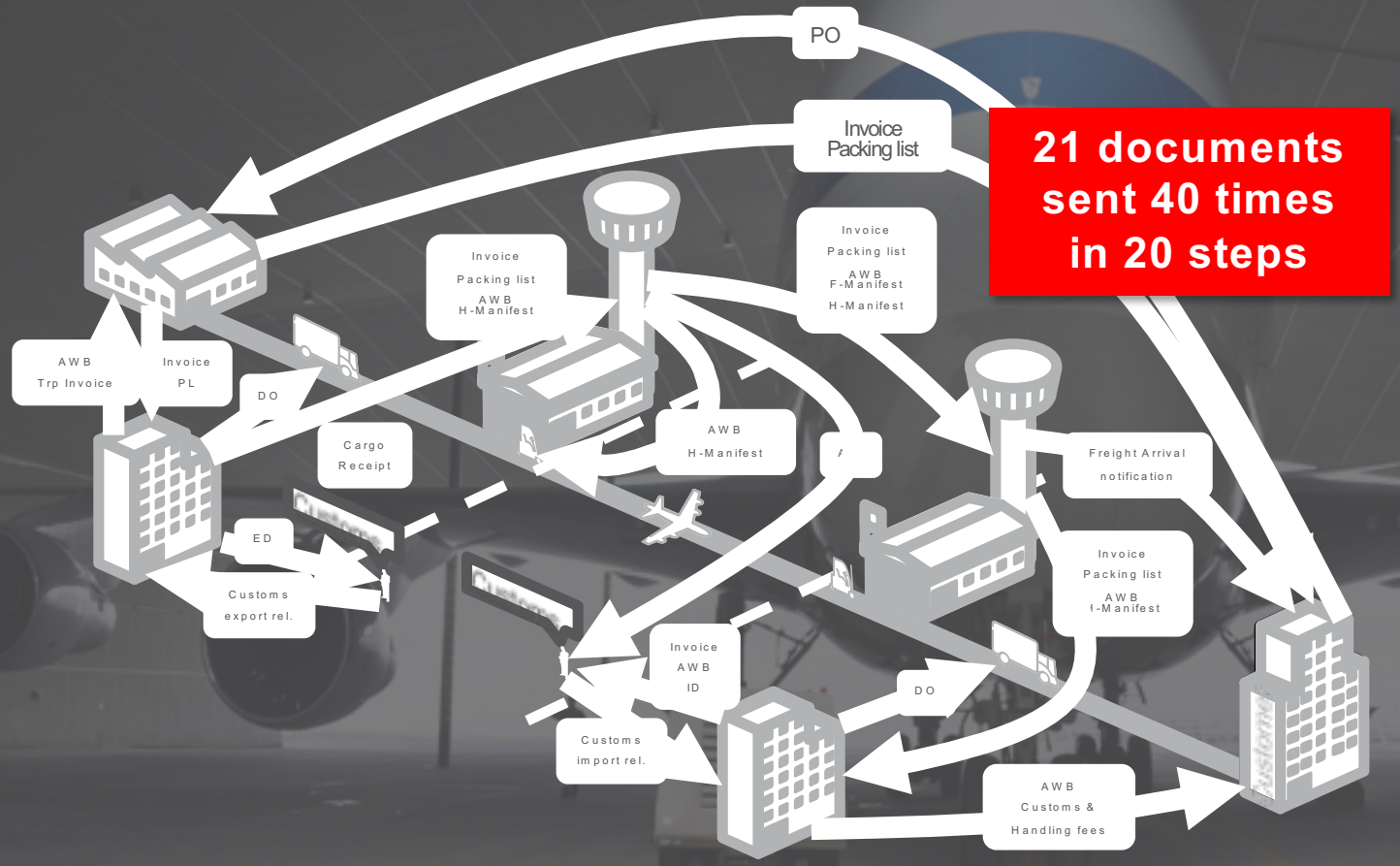
Ability to trace components from a specific supplier batch



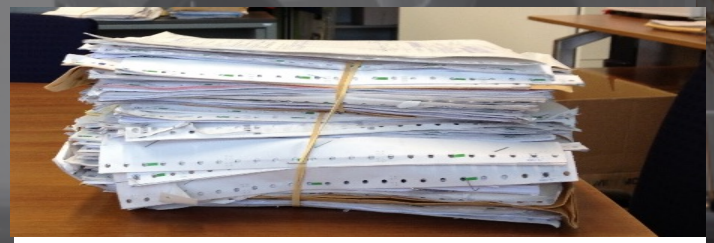
Externally No visibility

Data Sharing Between Companies Not in place

Ericsson Air-freight reality



- *Information traveling on paper at same speed as the cargo*
- *Paper/document flow a major issue*
- *Actors not connected digitally - low visibility*



The volume of paper shipped by Ericsson each year fills a

747 freighter

Shipments from Sweden to Germany (1000 km) by air took as much time as biking (biking 8 hours a day)

multi-party flow with Few connected Receivers demanding more visibility.

What problem to solve?

Limited visibility on what is happening in supply chains
- Multiple stakeholders not connected, paper based data
- Deliveries unpredictable, planning difficult, surprises many, safety stocks high, lead times long, costs high

Poor quality control.
- Goods stolen, damaged, lost etc.
- Regulatory compliance not automated and problematic
- Lack of accountability for Logistics Service Providers

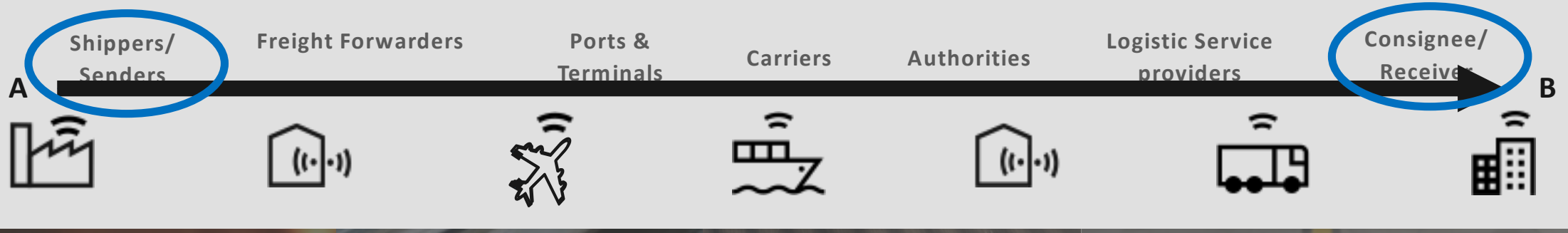
Core components of a solution:

Common shared data pool
- Information sharing between all actors
- Automation of administration and manual work
- Optimization of logistics across end to end chains
- Participation within seconds, all actors

Real-time monitoring
- IoT device, data mgt for logistics
- Integrated with common data share across the chain

Who benefits?

Consignees feels problem, Shippers pays and feels the pressure from the consignees, **all will benefit**



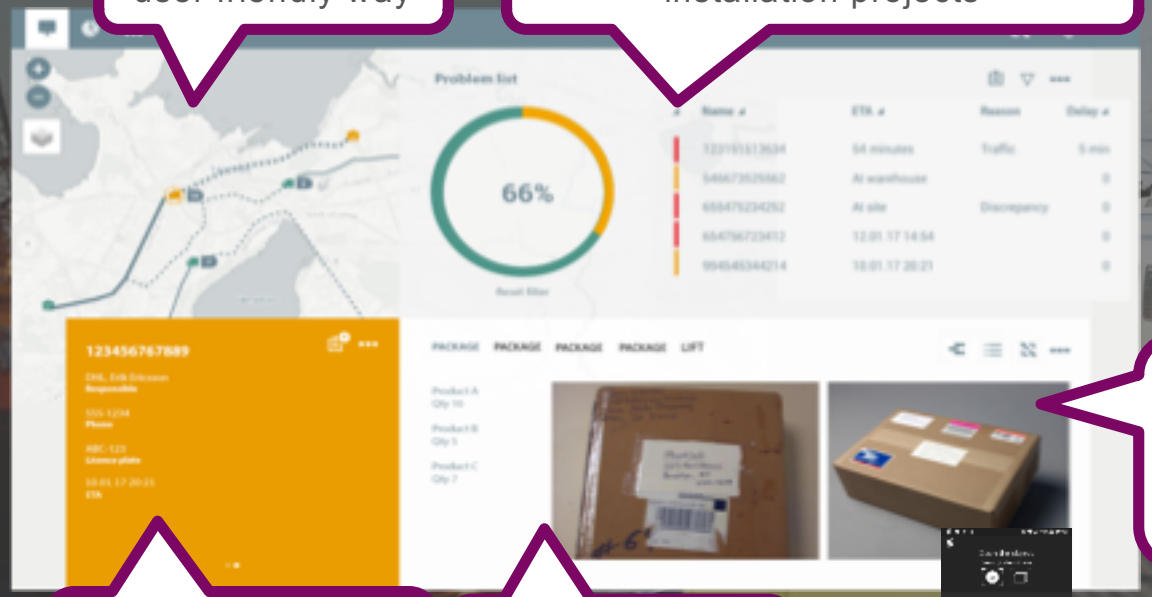
* Figures highlighted in the notes of this slide.

Digitization Logistics - Ericsson

In-bound Logistics to Radio Sites

Show issues in user friendly way

Real-time Monitoring, linked to installation projects

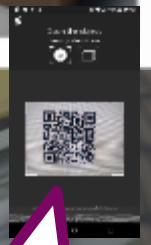


Details documentation and other information

i.e. Information, pictures, report damages…

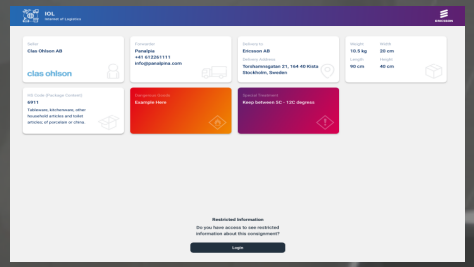
Using connected pallets

Knowing what is on each pallet



Proof of delivery through app – can be used by any partner

- QR code - Unique Identifiers on all objects
- As URI – anyone can participate, get info.



Main **Use Cases**:

› Where are all the deliveries for my Base Station?

› When will they arrive?

› Can I deliver when I need it?

› Can I automate my handling events?

› Manage deviations, events, alarms, information etc.

Requirements on Airfreight

› Seamless digital multi-mode

  › Enables real-time monitoring

  › Supporting floating inventory

  › Paperless and adaptable while in transport

› Re-routing made easy

› Air-freight premium needs to have end-2-end gain

Is smart Logistics Next?

- In order to prove business value and ensure 5G meets real industry requirements, Ericsson factories are fast-tracking the introduction of a new generation of smart manufacturing.
- Developing and implementing the first 5G and Industrial IoT systems in a real manufacturing environment allows this new wave of tech enablers to reach maturity more rapidly.

The digital factory

More information

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ERICSSON

Think Data - Become Digital

June 19th, 2018, IATA Aviation Data Symposium

Boris Hueske, Head of Digital Transformation

Lufthansa Cargo

Digitalisation is...

data | connectivity | customer | speed | platform

Technology will transform the way we do air freight

From paper to data - eFreight is one pre-requisite to unleash digitalisation potential in airfreight

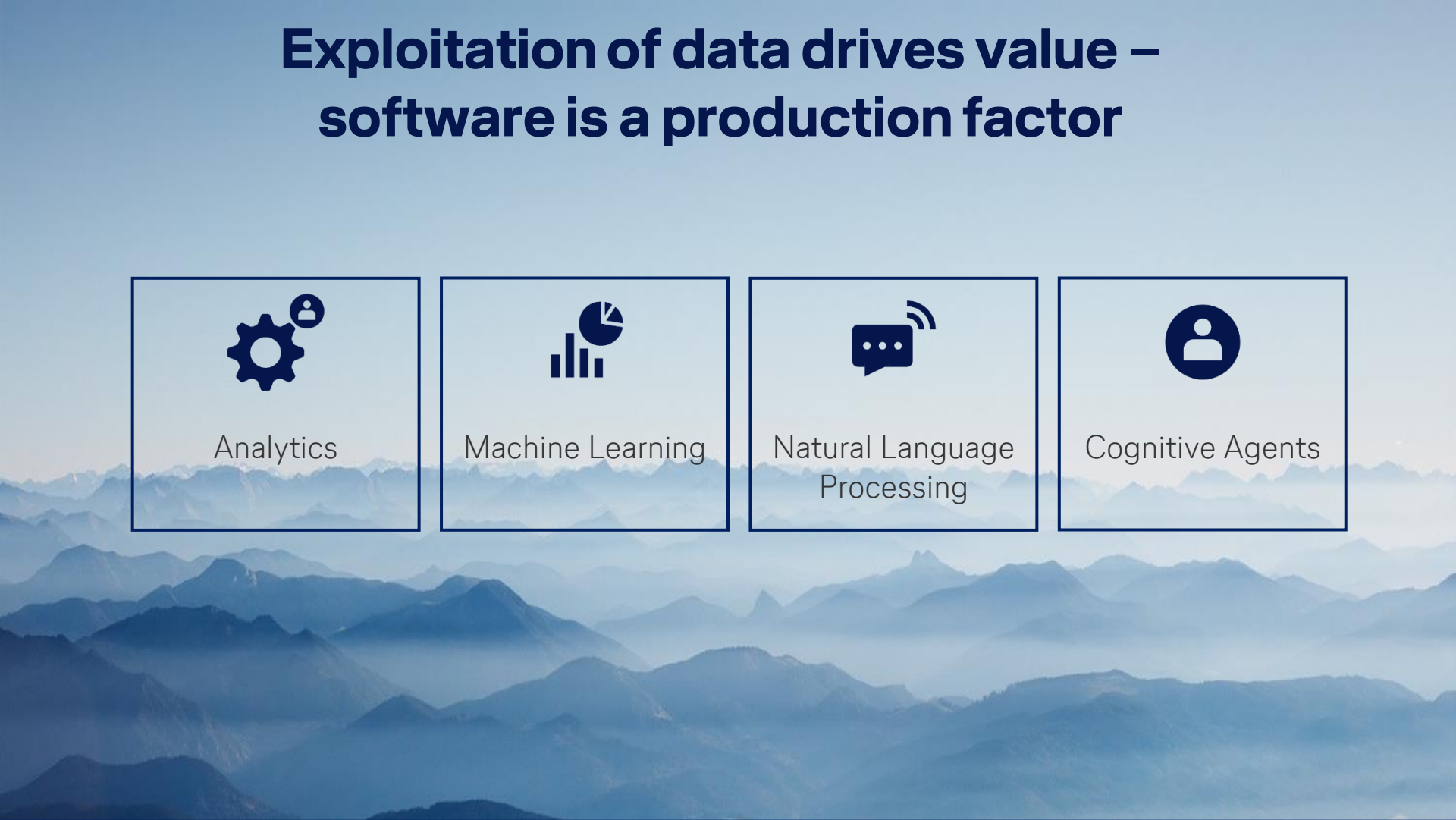
The resource data needs to be managed

central master data management

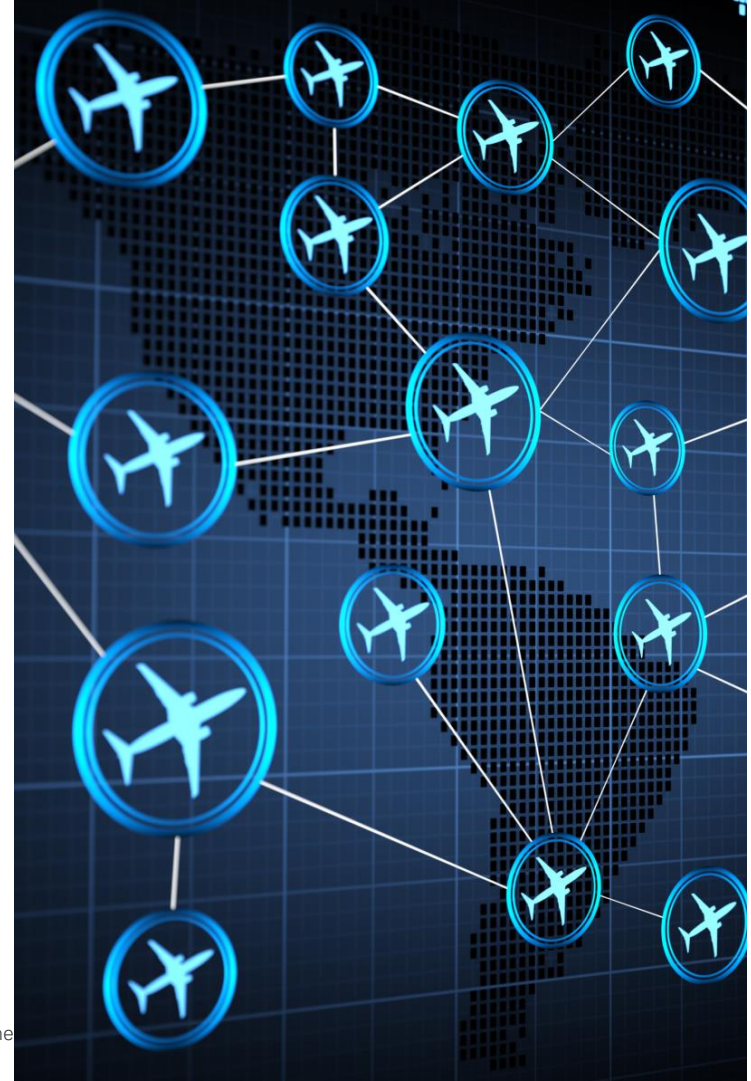
corporate wide data glossary

data governance, lifecycle management

Exploitation of data drives value – software is a production factor



APIs connect



Standards accelerate

Think Data – Become Digital!

1. Drive paperless transport.
   Sell online.

2. Value data.
   Generate value with software.

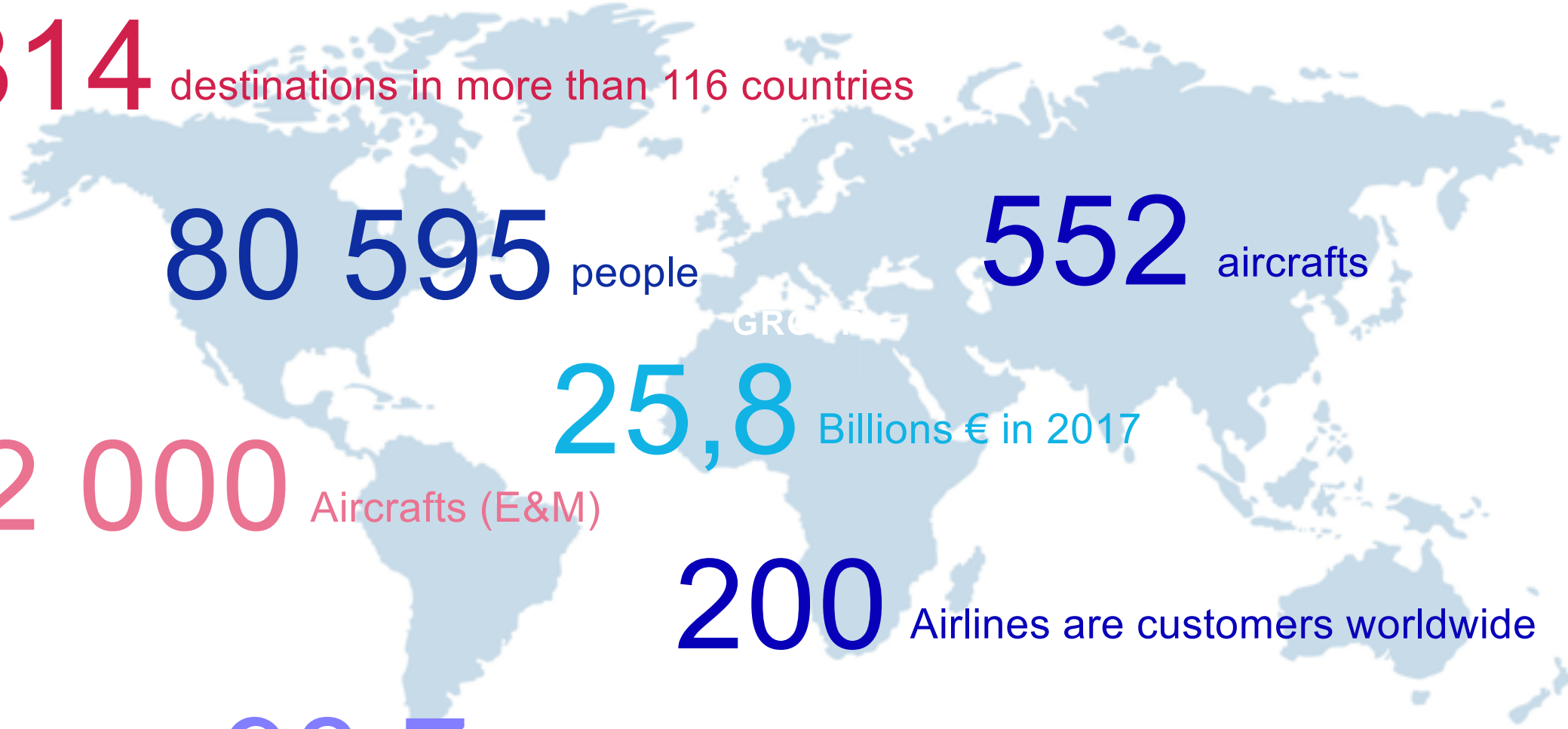
3. Get connected.
   Facilitate data standards.

Artificial Intelligence program

IATA ADS Berlin June 19th 2018

AIR FRANCE KLM
Powered by Cognitive

AIR FRANCE KLM GROUP



314 destinations in more than 116 countries

80 595 people

552 aircrafts

25,8 Billions € in 2017

2 000 Aircrafts (E&M)

200 Airlines are customers worldwide

98,7 millions of passengers in 2017

AI program : an IT initiative
Lead by CIO Office and OR/DS dept

Ambition

Reinforce AFKL value proposition by offering cognitive services to customers and employees

Impact AFKL profitability substantially by optimizing processes and transform organizations

Objectives

Create awareness on AI through use cases

Coordinated different organization around similar initiatives

Reinforce internal capabilities

Introduction to Repair

Remaining capacity after passengers is allocated to cargo

Sometimes, shipments cannot go in their associated flight: Repaired bookings

Multiple causes:

- Late shipment
- Cancelled flight, strike, …
- Wrong overbooking
- Priority bookings or previous repairs

Repairs must then be reallocated to new flights : Time consuming task, no previously existing process

How to reallocate the repairs?

Introduction to Repair

Today :

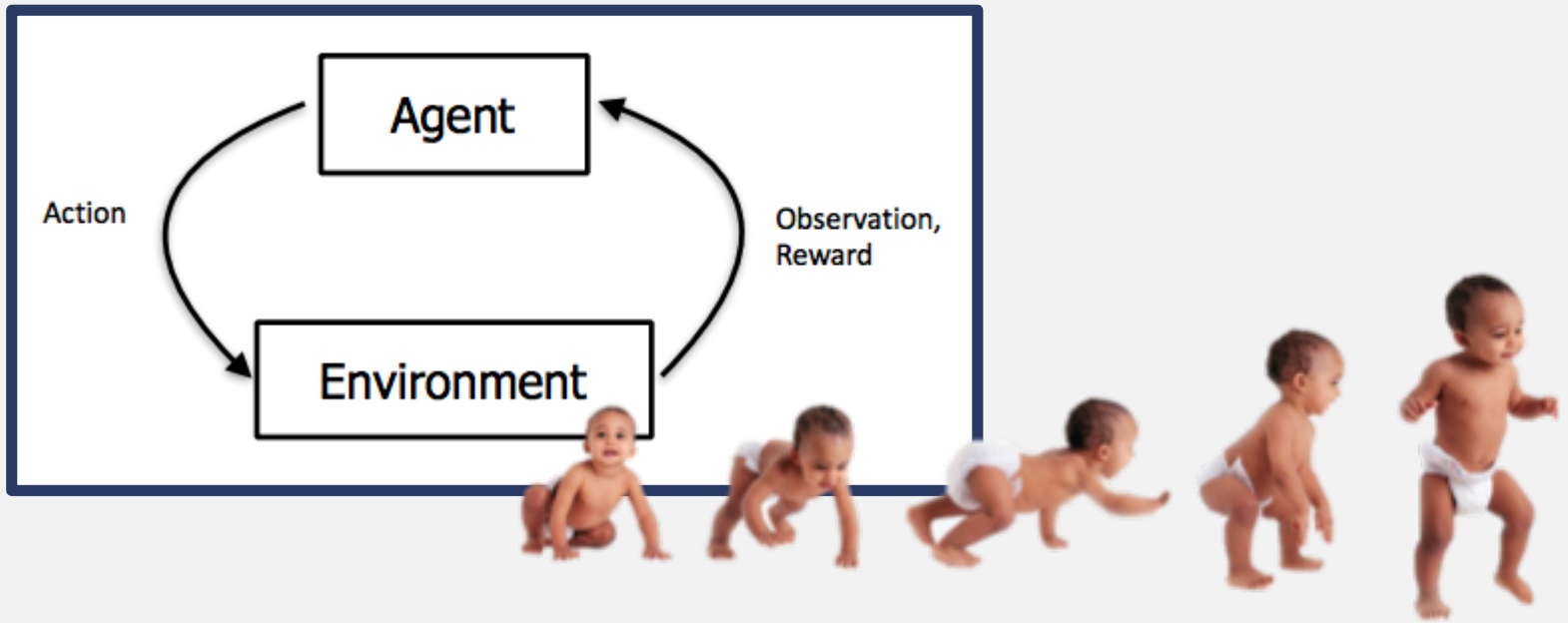
- Analysts are doing it manually
- Time consuming (10-15% of their time)
- Not efficient (multiple application to dig into)
- Solution not optimal

Opportunities :

- Let analysts focus on added value tasks
- Time saving
- Good quality of solution
- Better quality of service

Reinforcement Learning

Reinforcement Learning allows machines and software agents to automatically determine the ideal behavior within a specific context, in order to maximize its performance



Cargo Smart Repair

Historical data

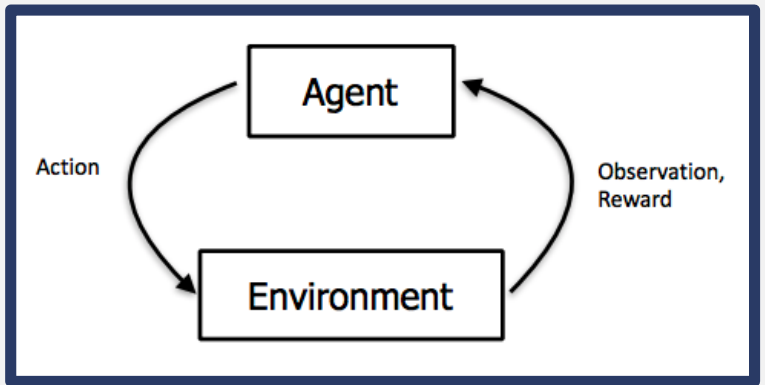
First idea was to look at historical data to apply Machine Learning algorithms; but it was not usable regarding the disparity in the process

- We needed to explore a new domain : simulations

Automatize cargo repair process

Simulations

- Create fictive flights
- Create fictive bookings/events
- Environment representation :
  - **State:** Booking configurations and available capacities of flights
  - **Actions:** Remove booking of the category volume and put it in a backlog
  - **Rewards:** Penalty corresponding to the removed booking category

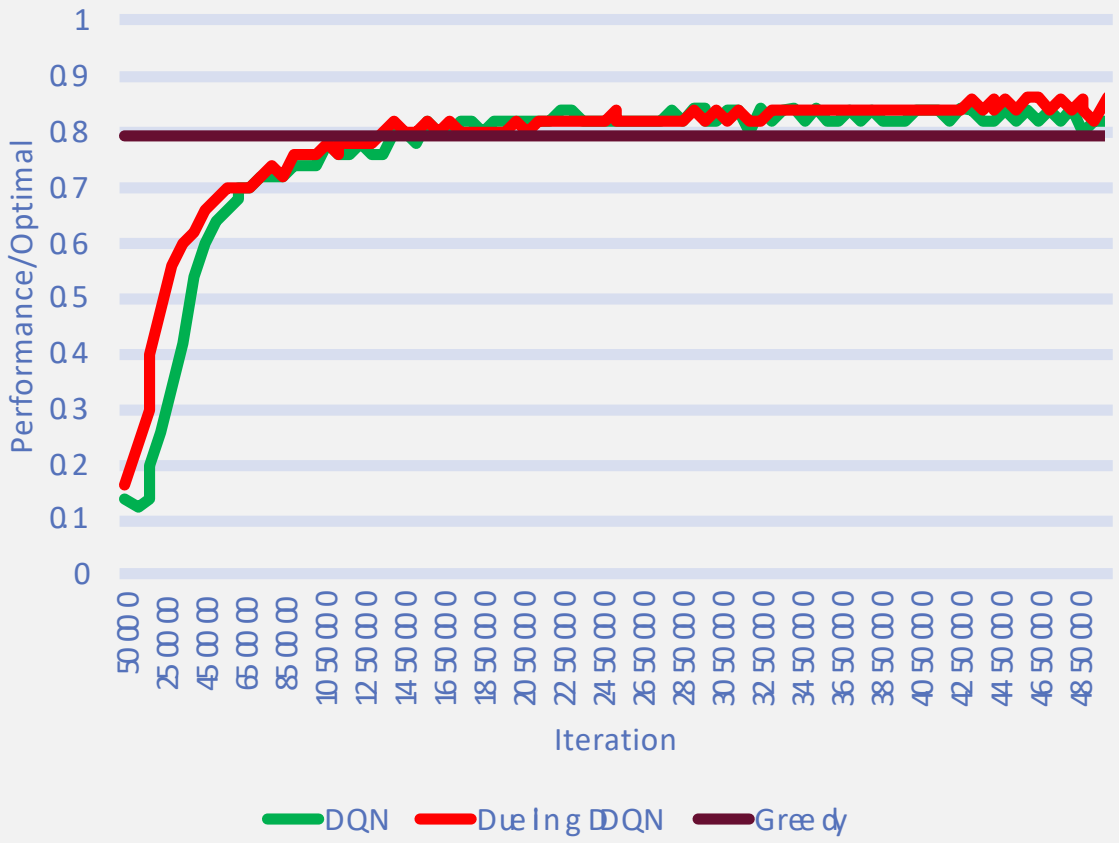


AIRFRANCE KLM

Timeline & Results

Timeline

- First discussions in oct 2017 to define the use case
- Historical data exploration in nov-dec 2017
- Modelisation and simulations 3 months jan to march 2018
- Proposal in april 2018



Nexts steps

- More training, tuning of the model, modelisation
- Run a pilot this summer on selected flights
- Implement the solution to give an advise to analyst before the end of the year : real time data + integration

AIRFRANCE KLM


AIRFRANCE KLM

Connecting the air freight industry to increase its value proposition

Henk Mulder
Head, Digital Cargo

IATA Aviation Data Symposium & AI Lab

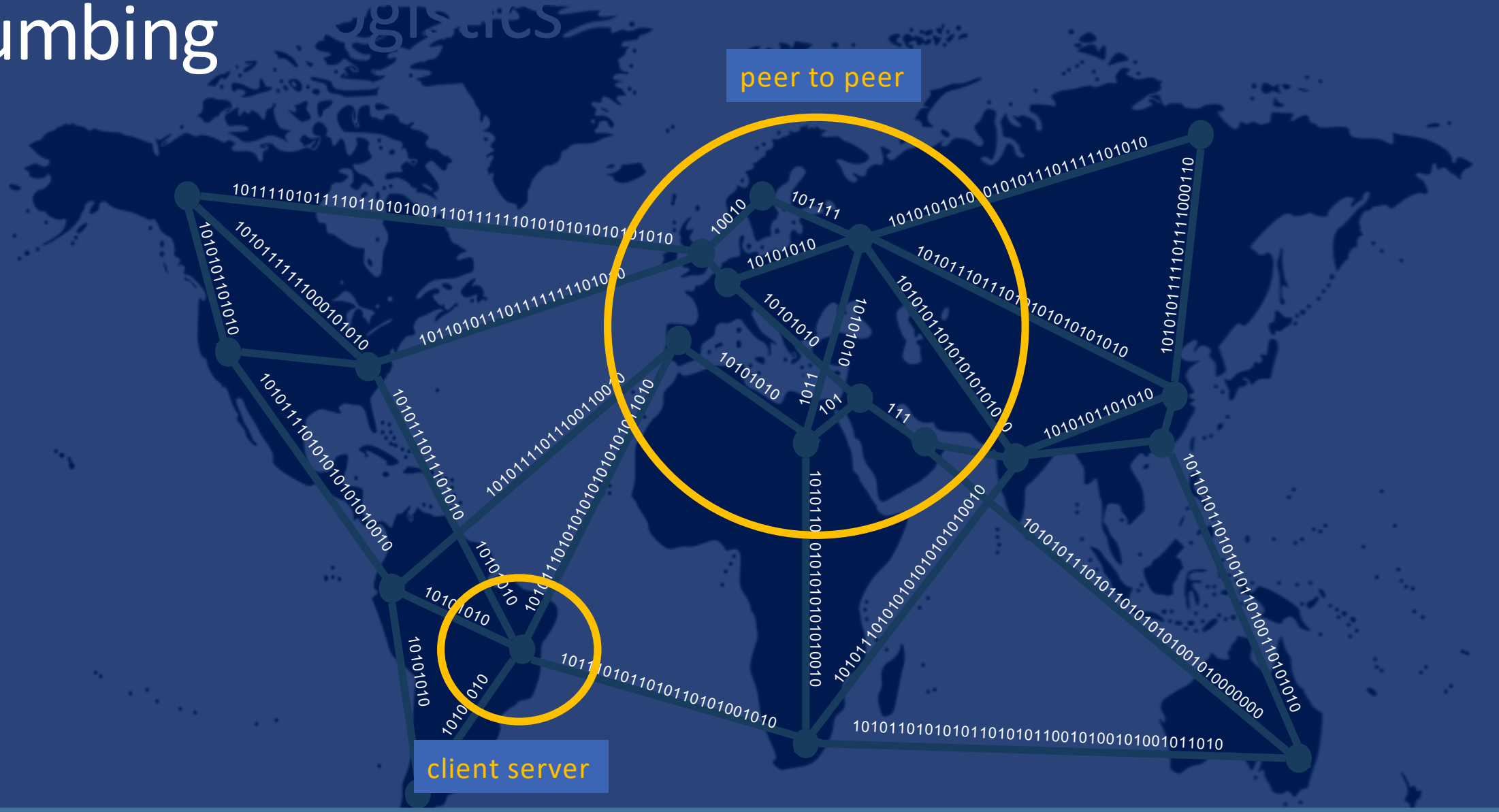
Berlin, 19-21 June

Internet of Logistics

International Air Transport Association

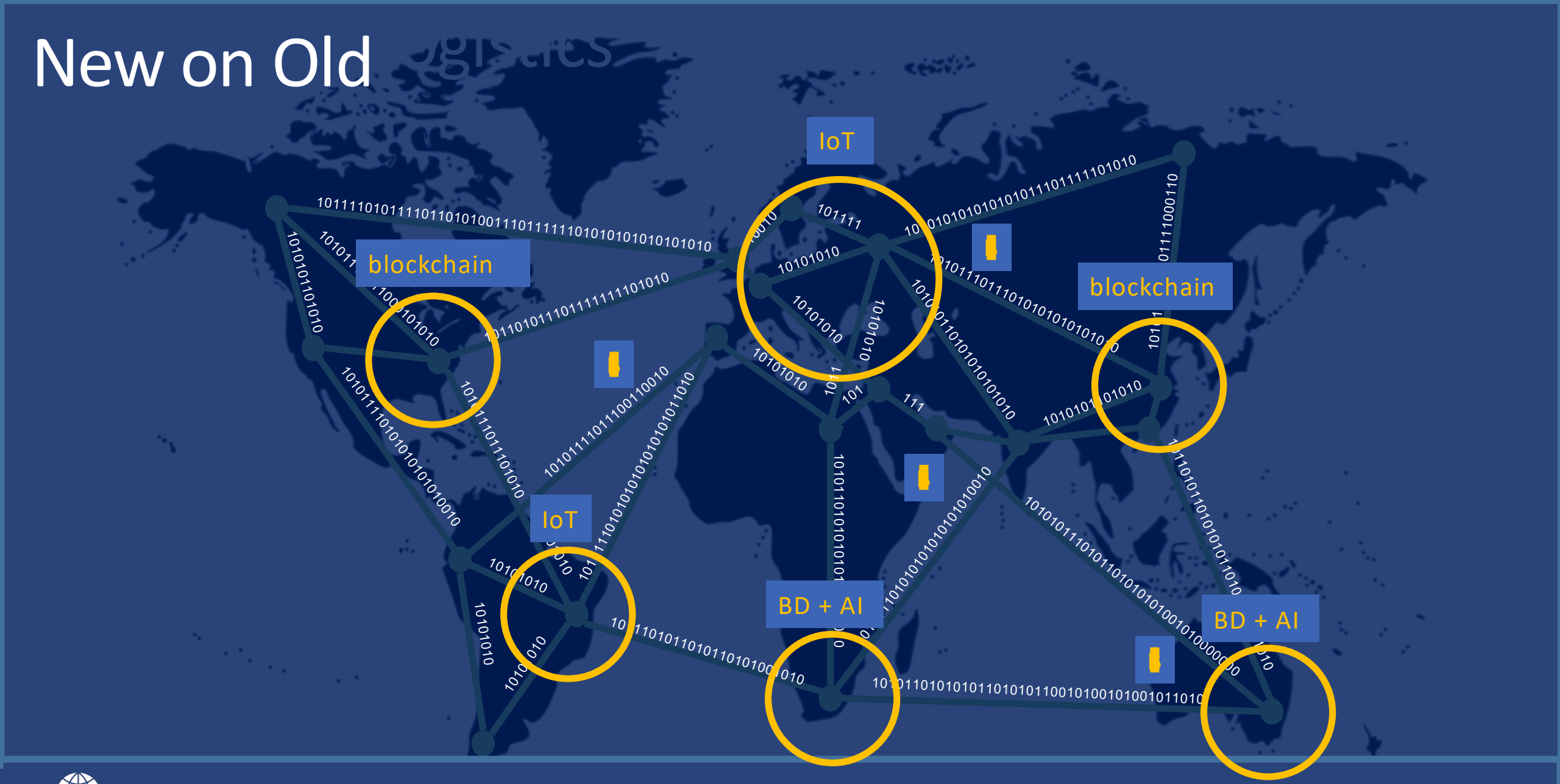
Henk Mulder, mulderh@iata.org

Plumbing



Henk Mulder, mulderh@iata.org

New on Old



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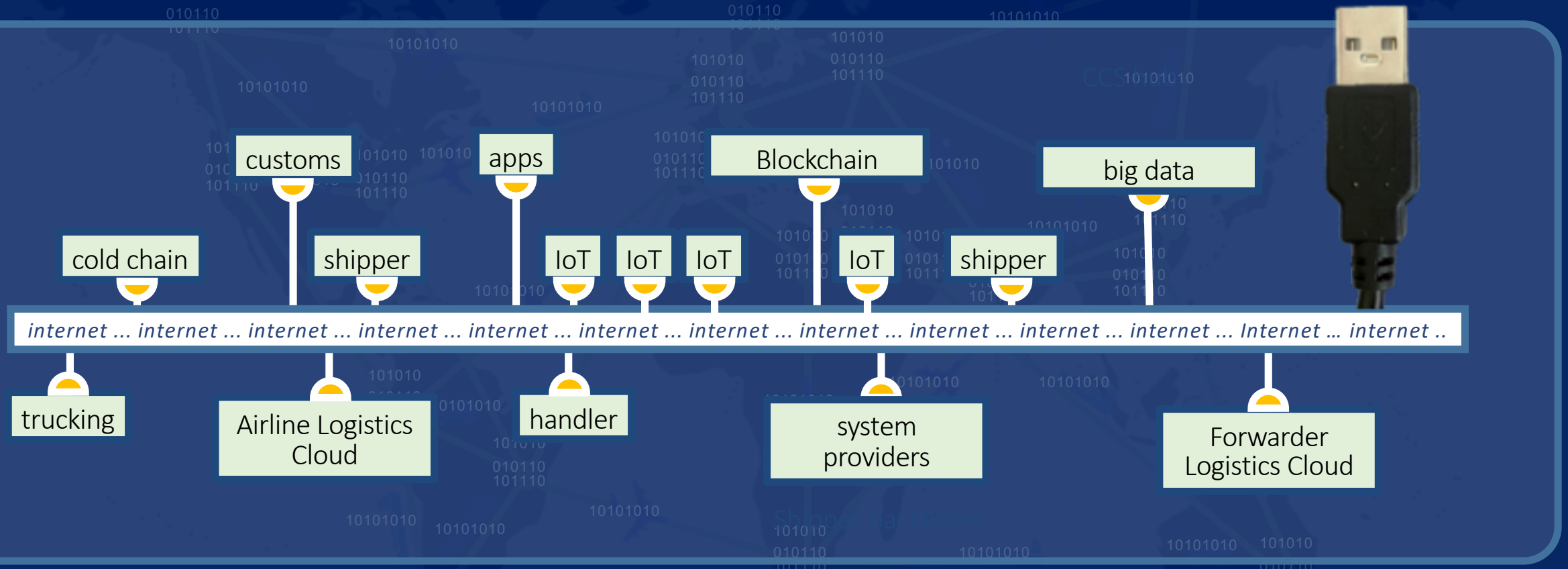
Immersive data ocean

International Air Transport Association

Henk Mulder, mulderh@iata.org

ONE Record :: ubiquitous data access



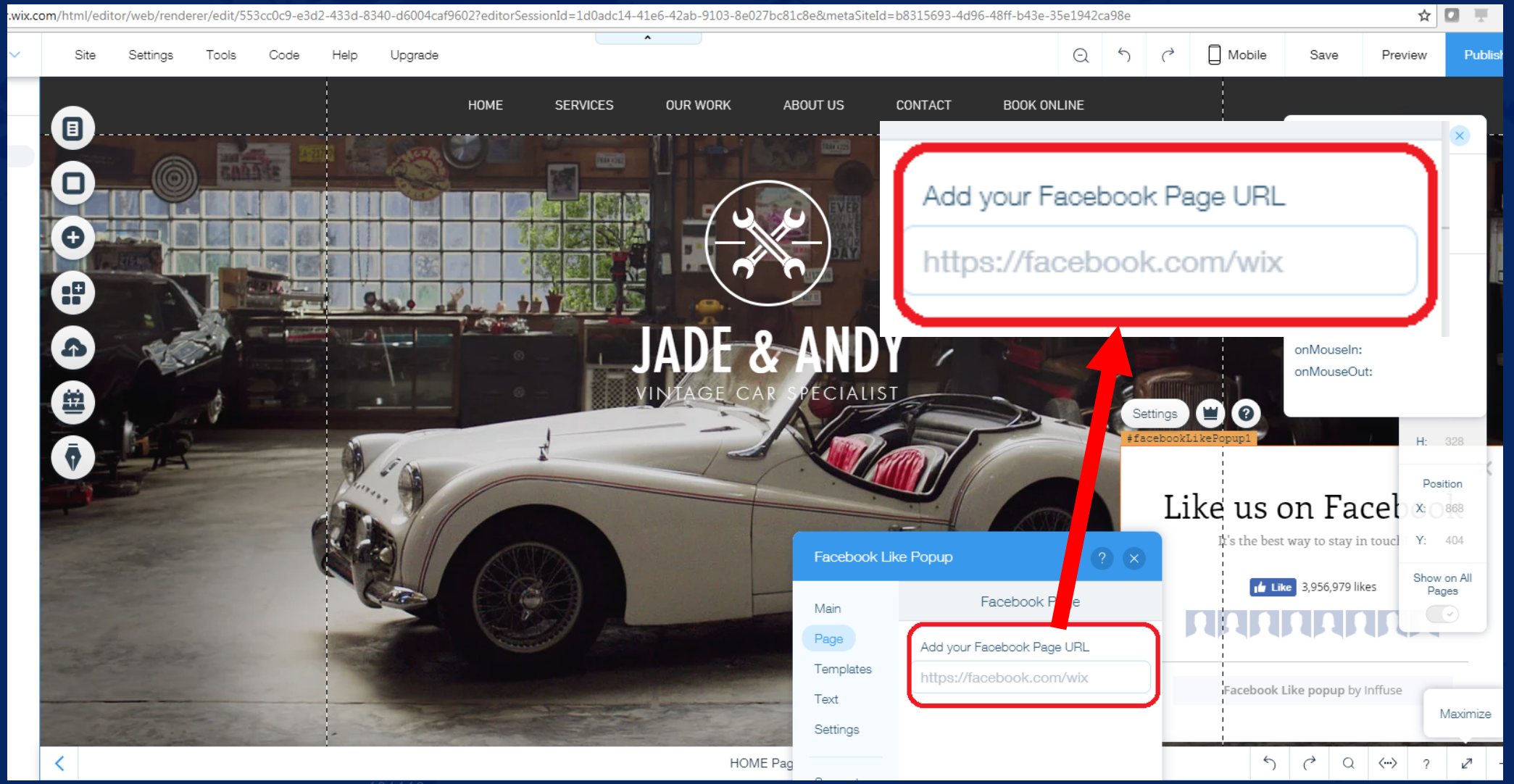
Henk Mulder, mulderh@iata.org

ONE Record :: simplicity of the web

https://onerecord.anyserver.com/airline/123-1234567/awb

Henk Mulder, mulderh@iata.org

ONE Record :: power of the web



Henk Mulder, mulderh@iata.org

ONE Record :: data sharing standard

Data standard: what we exchange

In a global transport and logistics environment there can be no single common data standards; there are many. Using ontologies (digital dictionaries) we can automatically interpret and translate data between parties

API standard: how we exchange

Web based data exchange is as old as the web (1991). Today the typical web API's are RESTful and sophisticated token based security like OAuth is easily implemented

Trust Network: who can exchange

Access to the Internet of Logistics will be managed through distributed trust networks that will be managed by accredited governance entities

Henk Mulder, mulderh@iata.org

ONE Record: :: making it happen

Develop

IATA's **ONE Record Task Force** is developing the ontologies (schema and vocabulary) and API standard as well as the governance and specification of trust networks

First draft → end 2018

Test

In cooperation with the Digital Cargo Forum (DCF) , we are testing the data sharing concept with ontologies and API's in a real supply chain setting

Test exchanges → live already

Implement

Building on the test environment, new parties are being added to the network and the functional scope is being expanded

development, testing and implementation are done in parallel → speed is essential

Henk Mulder, mulderh@iata.org

Connecting the air freight industry to increase its value proposition

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Digital Disruption of the Supply Chain

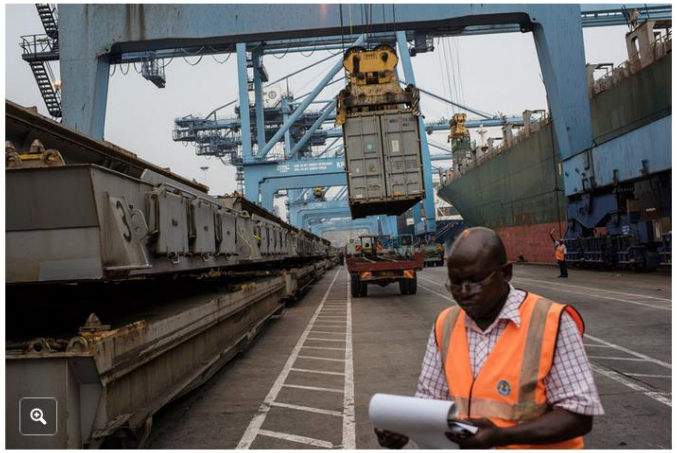
A digital transformation journey with Blockchain and IoT

Mario Louca – Executive Director
Industry & Global Blockchain Leader
IBM Global Travel & Transportation Industry

Latest news – Distrupting the supply chain

The New York Times

Blockchain: A Better Way to Track Pork Chops, Bonds, Bad Peanut Butter?



Cargo containers are loaded on a Maersk ship at the Port of Mombasa in Kenya.

PIL, PSA, IBM Conclude Blockchain Trial from Chongqing to Singapore

Shipping company Pacific International Lines (PIL), port group PSA International (PSA) and technology company IBM Singapore (IBM) have completed a blockchain-based supply chain platform trial.

As informed, the companies worked on a proof of concept (POC) exercise, built on IBM Blockchain Platform, applying and then testing the platform to track and trace cargo movement from Chongqing to Singapore via the Southern Transport Corridor.

SupplyChain TOPICS COMPANIES TOP 10 MAG

BLOCKCHAIN MIDDLE EAST

Dnata hails successful blockchain pilot with aviation partners

By JAMES HENDERSON • Nov 24, 2017, 4:35AM

coindesk Blockchain 101 Technology Markets Business Data & Research Consensus

Dnata Taps IBM for Air Cargo Blockchain Pilot

361 190 1

Sujha Sundararajan

Nov 24, 2017 at 11:15 UTC

NEWS

Dnata, provider of air and travel services in the Middle East, has announced the completion of a proof-of-concept examining blockchain's potential in the Dubai air cargo industry.

So, what are we disrupting?

Trade logistics is overly complex and fragmented

Operating Layer

- Plan & Book shipments
- Pick up from shipper
- Receive freight at forwarder branch facility
- Transfer to forwarder hub
- Prepare export shipments
- Transfer shipments to carrier domain
- Receive shipments in carrier domain
- Accept shipments as ready for carriage
- Prepare freight for transport
- Shipment for flight, load and depart
- Distribute information
- Arrive flight, unload & dispatch shipment to w/h
- Check-in shipment
- Arrive shipment
- Handover freight to forwarder
- Arrive shipment at forwarder hub
- Transfer shipment to forwarder branch facility
- Load truck and produce run sheet
- Deliver, obtain POD & conclude cycle

End to end trade is facilitated by different data standards through the process of moving freight

Operating Layer

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Messaging Layer

IATA CARGO-XML

IATA One Record

UN/EDIFACT

FNA

EDI ELECTRONIC DATA INTERCHANGE

Documentation process being carried out in air cargo is manual and overly complex

Operating Layer

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Document Layer

Messaging Layer

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Documentation process being carried out in air cargo is manual and overly complex

Transfer to forwarder hub

Receive freight at forwarder branch facility

Arrive shipment at forwarder hub

Transfer shipment to forwarder branch facility

Load truck and produce run sheet

Deliver, obtain POD & conclude cycle

Although data standards and protocols exist, they are fragmented along the supply chain

- ✓ No single participant has full visibility into the shipment life cycle

Although some documents are digitized, from 30 to 200 documents are still been processed per shipment manually

- ✓ More error-prone
- ✓ Duplication of messages

Leading to more Invoice Disputes and High Transaction and Settlement Fees

- ✓ Dispute resolution for shipment delays and damaged or lost goods caused cargo losses of $55B in 2015

Resulting with an average end-to-end shipping of 6 days for air and much longer for container shipping

IATA CARGO-XML

TRADE AND CARGO FACILITATION ASSOCIATION

EDI ELECTRONIC DATA INTERCHANGE

Our vision

To eliminate physical paper from the supply chain by digitizing end to end trade lanes, enabling the synchronous flows of physical good with associated documents and messages in real time.

Creating a single secure event driven and document exchange cloud-based platform supporting the global supply chain

Our toolbox of assets

Shipment Tracking & Monitoring
At Piece Level

Multi Modal Platform
Multi Data Standard Unification

Digitalizing Documents & Workflows

Dispute Resolution

Global Trade Digitization
Container Shipping

Customs Clearance

Watson Trade Compliance

GHA SLA Management

Customs Declarations

IBM is working with a number of airlines, shippers, airports and logistics providers to leverage Blockchain & Watson AI

Tracking and monitoring shipments at piece level in real time – *Major Asian Airline*

- Track shipments of perishables from a supplier to the Consignee
- Utilizes QR code and temperature monitoring devices to log real time status through the shipment.
- Participants included Shipper, Freight Forwarder and the Consignee.

Document digitalization across the supply chain

dnata flydubai cargo

- Digitizing documents for faster movement of shipments along trade lanes.
- Earlier pre-clearance of documents and goods and automating the works flows for improving border inspection clearance procedures.

Improve Ground Handling SLAs and Claim Management – *Major European Airline*

- Digitizing key ground handling events including the capture of FSU messages in real time (as events)
- This allows for the analyse of the FSU message to track and monitor service levels.
- Smart contracts are now used to automate the dispute management workflow.

Accelerating trade and removing barriers to trade in container shipping

MAERSK

- Digitizing all events and documents for real time tracking, monitoring and automating workflows along trade lanes
- Sharing a single trusted view with all parties of events & associated documents

Utilizing Blockchain to track and monitor shipments at piece level in real time

The Business challenge

- Transportation of perishable goods need to me maintained within a specific temperature range for quality control purposes
- Tracking shipments along trade lanes is not sufficient, monitoring in real time is also essential

The Solution

- Use the Blockchain to track a shipment of perishables from a supplier to the Consignee (a restaurant chain)
- Utilize QR code and temperature monitoring devices to log QR code data and temperature data to the Blockchain in real time through the shipment life cycle
- Participants included, Shipper, Freight Forwarder, Consignee

The Participating Parties

- Shipper & Consignee
- The airline
- Freight Forwarder

ColdChain

Utilizing Blockchain to improve document sharing across the supply chain

The Business Problem

- **Over 30 documents are still been processed per shipment manually**
  - ✓ More error-prone
  - ✓ Impacting Customs Clearance with an average end-to-end shipping is 6 days
- **Many of the data elements involved in the booking process and the shipment documentation are repeated**

The Solution

- **Build a blockchain solution for managing shipment documents and capturing critical events throughout the life cycle of a shipment**
- **Eliminate original paper forms and communicate with authorities digitally**
- **Automating the work flows for improving Lead time of procedures such as border inspection clearance**

The Participants

- **Shipper & Consignee**
- **The airline**
- **Freight Forwarder**
- **3 x Customs Authorities**

Accelerating trade and removing barriers to trade in container shipping using IoT and Blockchain

The paperwork and processes vital to global trade are also one of its biggest burdens. Maersk has digitilized this costly paper trail by partnership with IBM

Significantly reducing the cost of transportation while increasing clearance times

Business problem

- Paper based processes add cost and complexity to trades in the end to end ecosystem of the Maersk business and customers. Large volumes of administration and documentation create billions of dollars in costs.

Solution

– IBM's blockchain and Internet of Things technology is used to create a Global Trade Digitisation (GTD) solution providing transparency and to enable all relevant and approved parties in the supply chain access to the information they need and the ability to act on it.

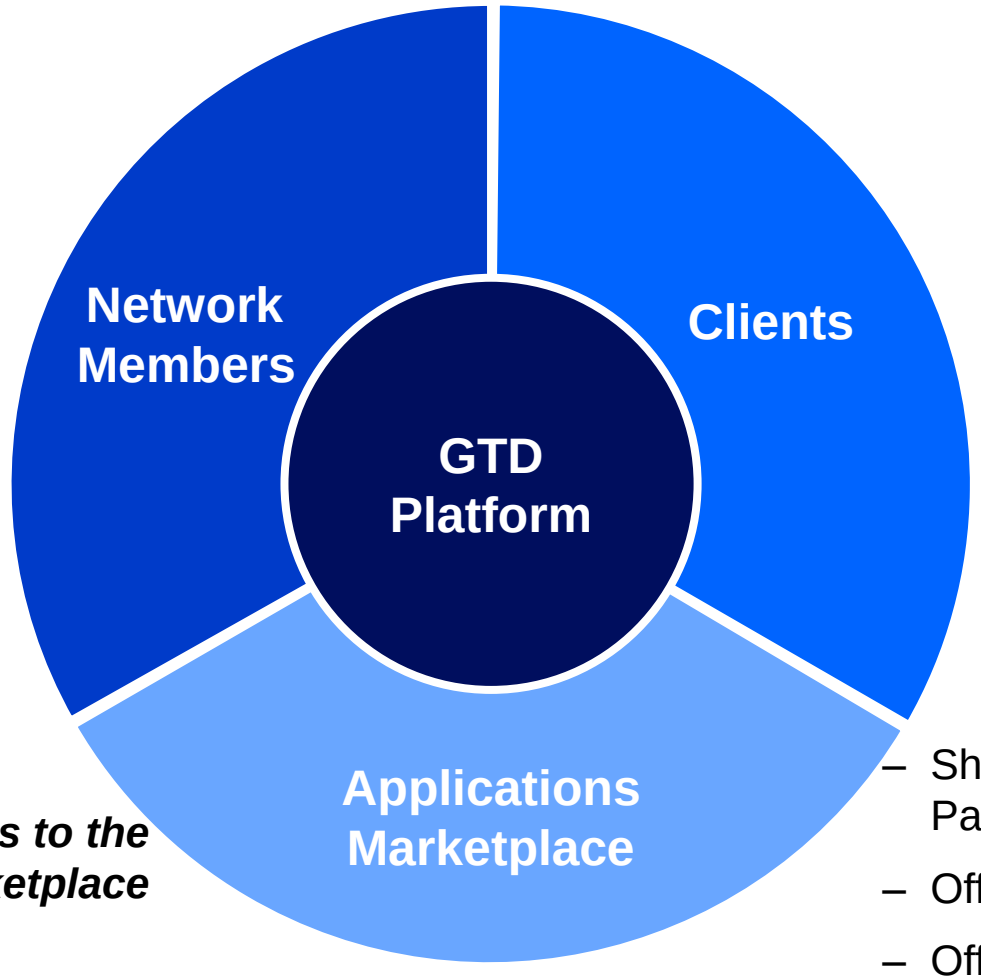
https://www.youtube.com/watch?v=dcddYatMCGQ

MAERSK

The ecosystem will include the network members, clients, and offering providers

Provide and gain access to end-to-end supply chain information

- Ocean carriers
- Ports and terminals
- Government authorities
- Inland transportation
- 3rd party data providers



Primary consumers and beneficiaries of the platform

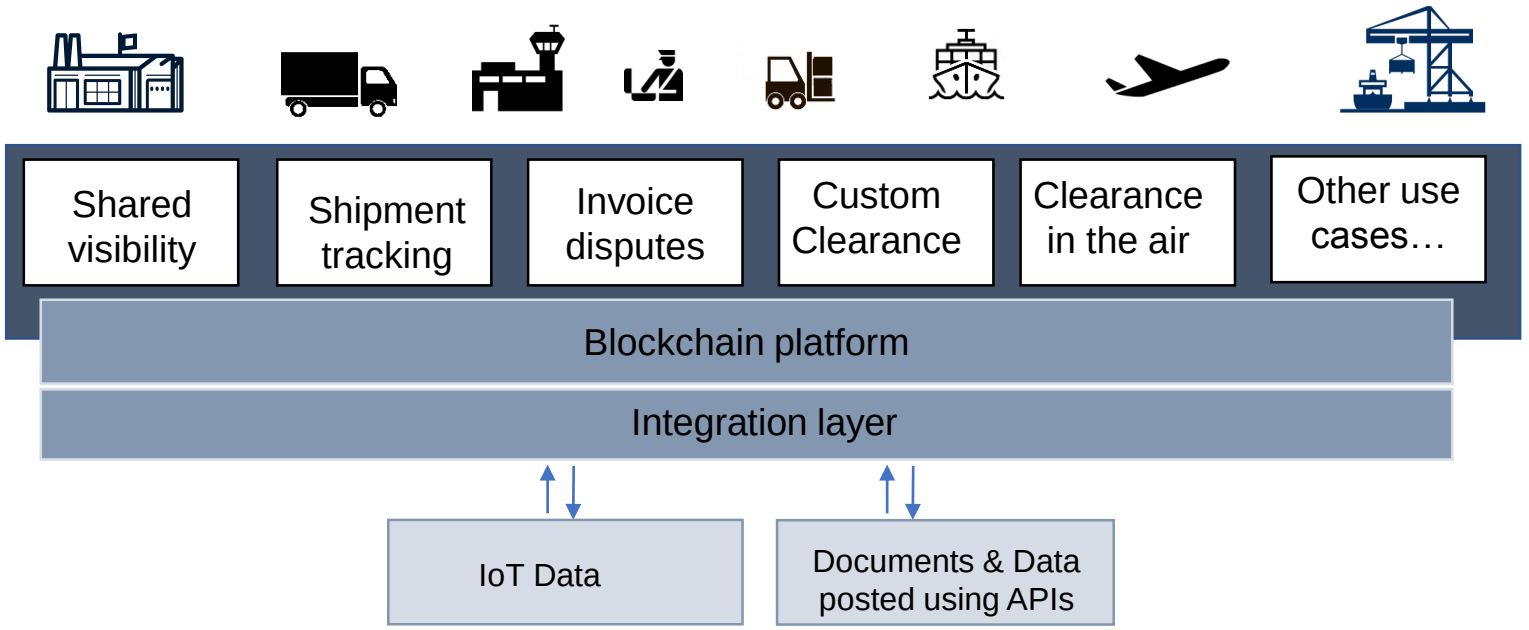
- Shippers (BCOs, retailers, manufacturers, etc.)
- Freight forwarders, customs brokers, 3PL
- Network Members
- Financial institutions

Offer value added services to the ecosystem through a platform marketplace

- Shipping Information Pipeline and Paperless Trade
- Offerings from third party ISVs
- Offerings from Network Members and Clients

IBM | MAERSK

Final use case - Unifying the data standards



IATA
One Record
Cargo-XML
Cargo-IMP

UN/EDIFACT

EDI
ELECTRONIC DATA INTERCHANGE

One connection provides access to all trading partners **regardless of data protocols, formats or standards**.

A platform to solve the pain points in the supply chain

Thank you!

BLOCKCHAIN

Nicolas Kozakiewicz

BLOCKCHAIN

is the **NEW MULTI-MARKET**

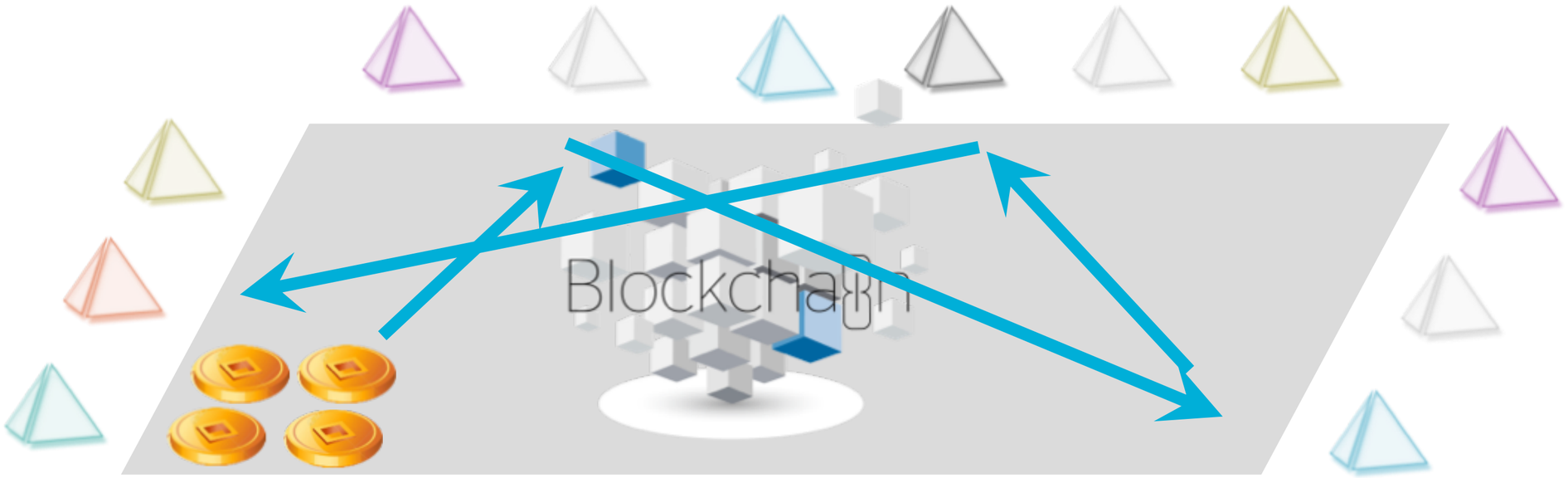
TRUST-ACEABLE

PROTOCOL

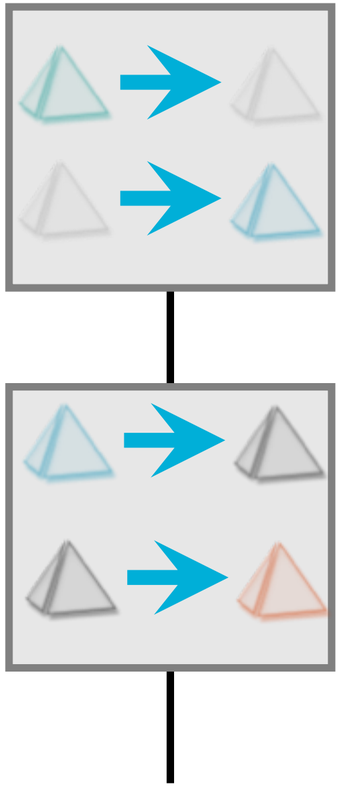
FOR **END 2 END**

DIGITAL SERVICES

EXAMPLE: **BITCOIN**

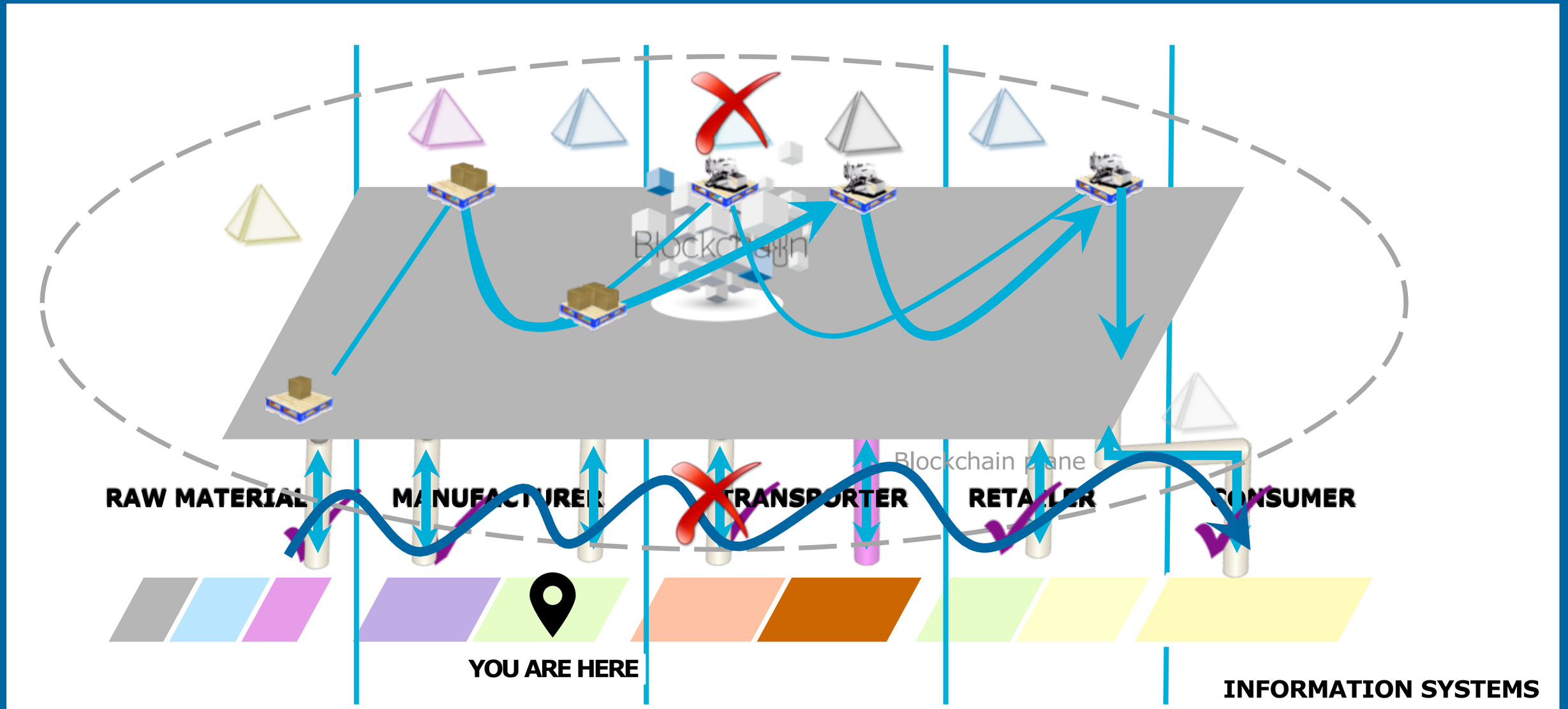


Blockchain plane



Authentication of all « » 
Trace of all 
Immutability of information

TRACEABILITY **IN MANUFACTURING**



ORIGIN : RETURN OF EXPERIENCE

Market needs

Our value proposition

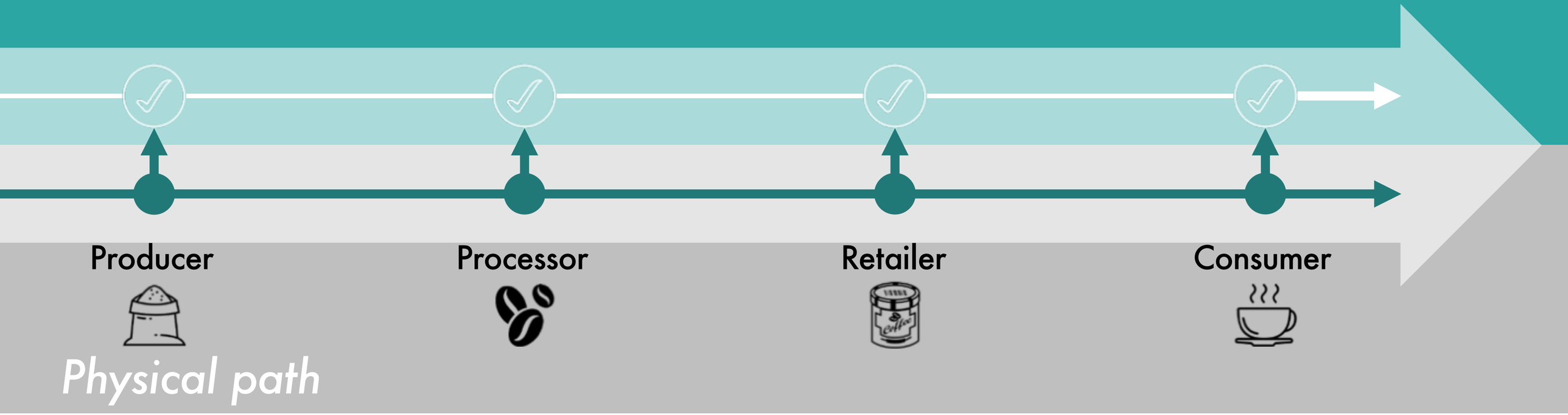
Scan me to know my story

The first food traceability label that provides consumers with proofs of product history

An history carried by the product itself

Blockchain

recreates the digital copy of the physical path taken by a product



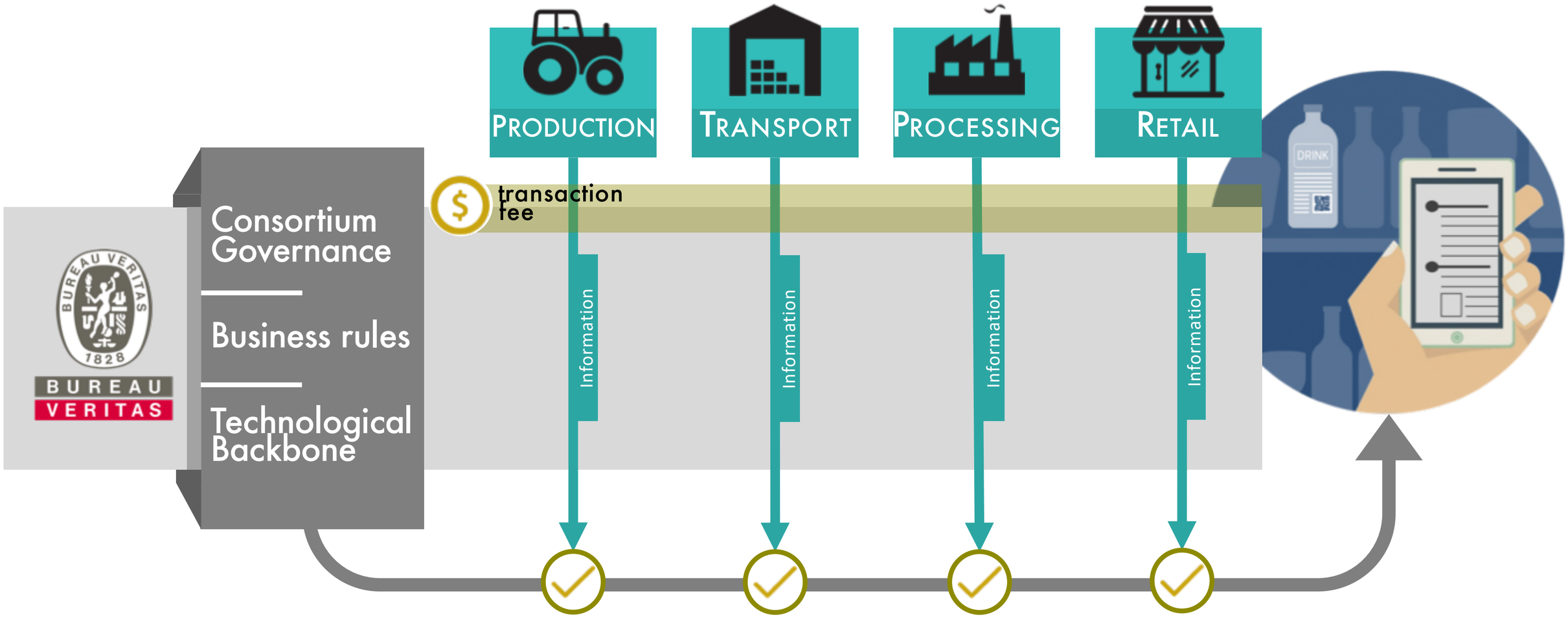
What the solution does bring

For consumer

What the solution does bring

For blockchain participants

Pay-per-use model



powered by worldline

Blockchain solution:
Let’s go into the detail

BUREAU VERITAS

powered by worldline

Technological choice: Worldline

DESIGN

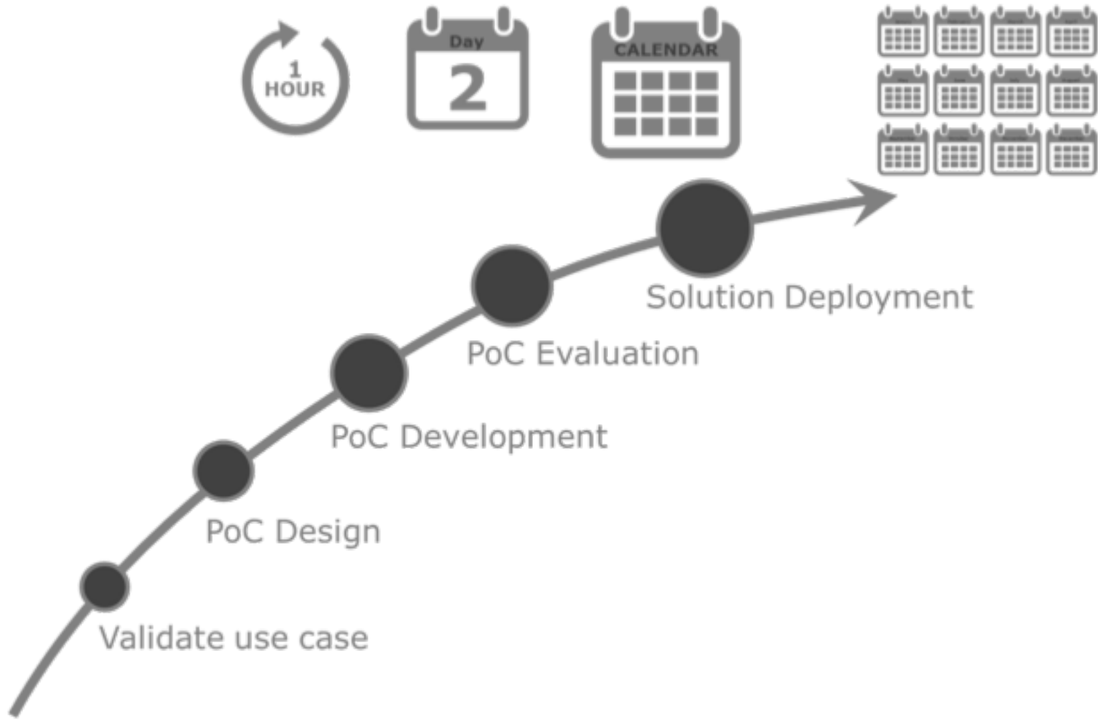
> Use case specification close to the customer
> Blockchain sourcing choice
> Governance formalization

DEVELOPMENT

> Blockchain set-up (& customization if needed)
> Legacy IT development : GUI, gateway, .. & blockchain API
> Test & iterative validation

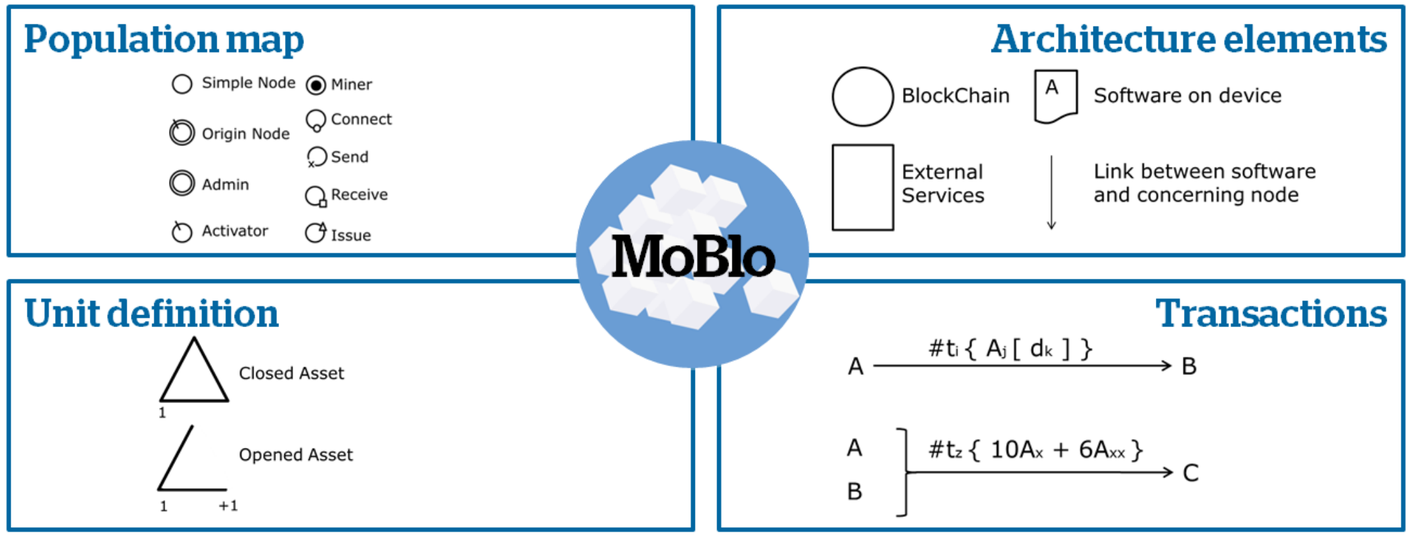
OPERATING

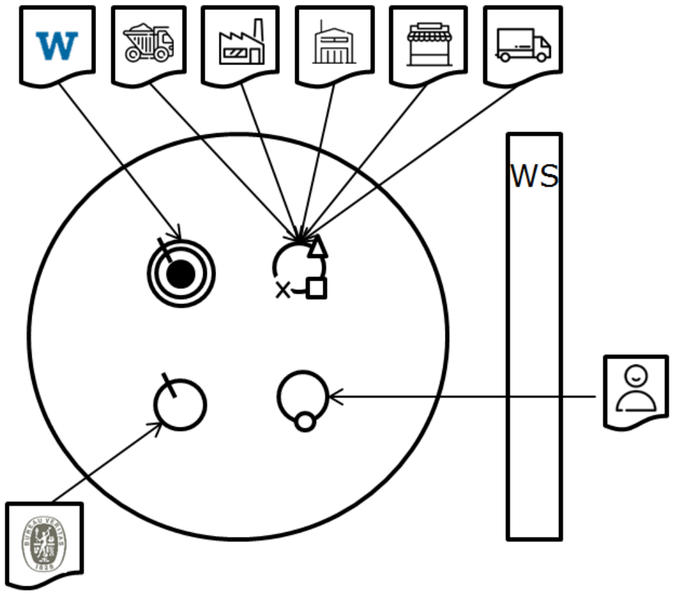
> Cloud infrastructure hosting & document storage
> Processing
> Maintenance & evolution
> Governance



Technological choice: MoBlo

Go through the 4 categories, ask an expert if required





Technological choice: Multichain blockchain

Robustness

Private blockchain - bitcoin fork

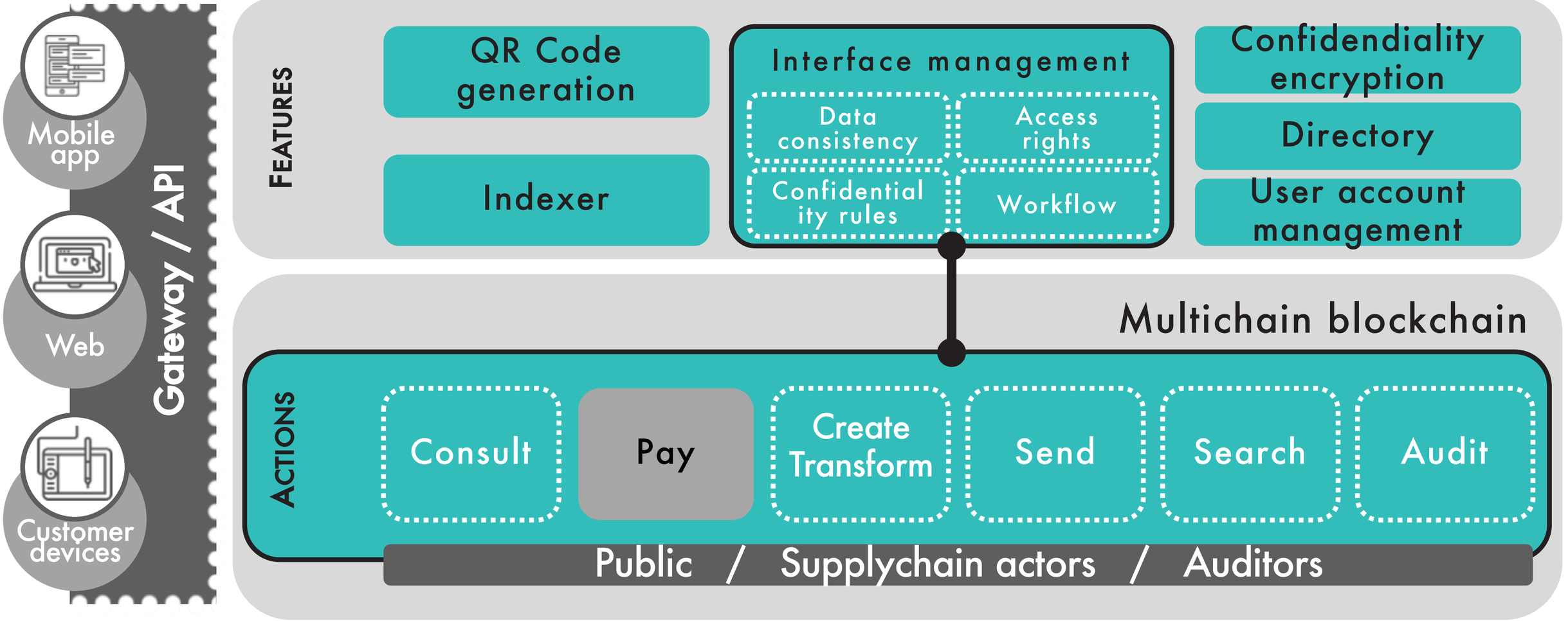
Trust

Fine-grained management of access rights and enrolment - Pseudoanonymization

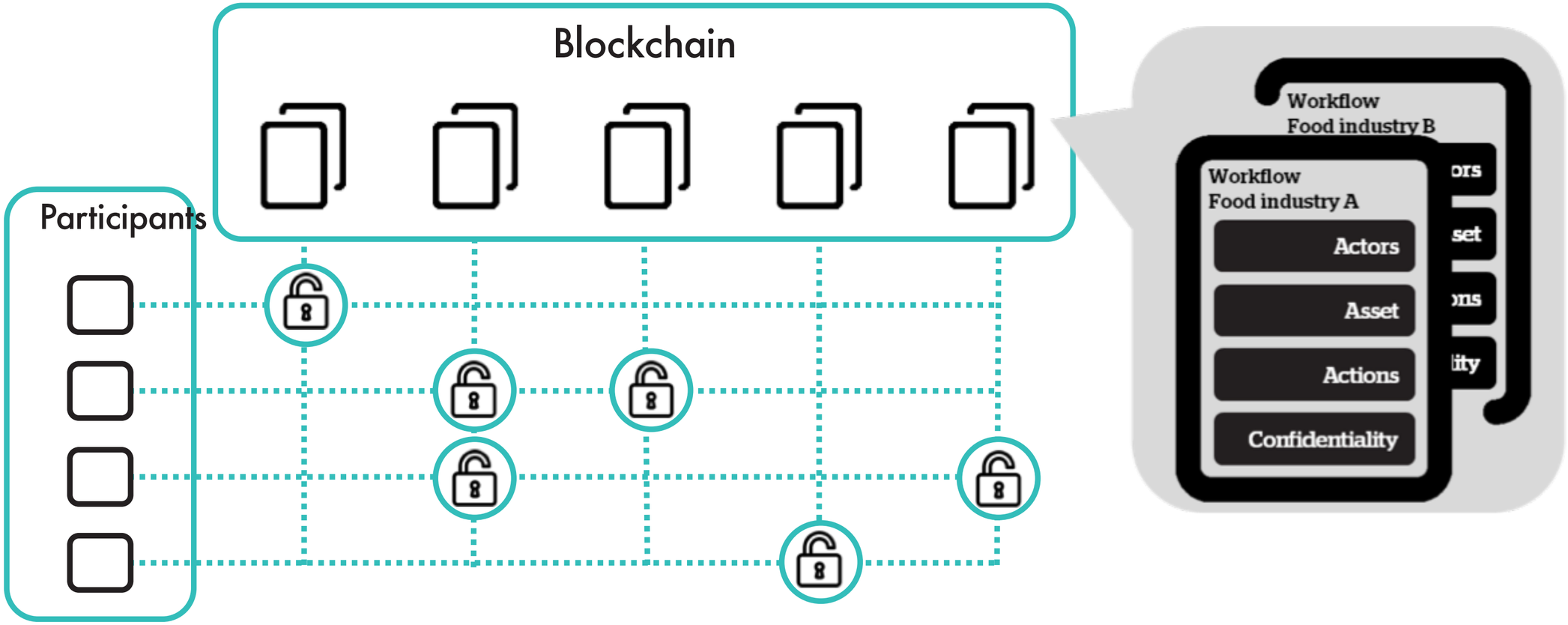
Integrity

Proof Of Work – mining done by various actors

Solution architecture



Multi-sector solution: Only one blockchain for any usage



Fine-grained management of data confidentiality

Open

Data accessible to **every participant** and consumer.

Restricted

Data accessible **only to the participant that wrote** it.

Controlled

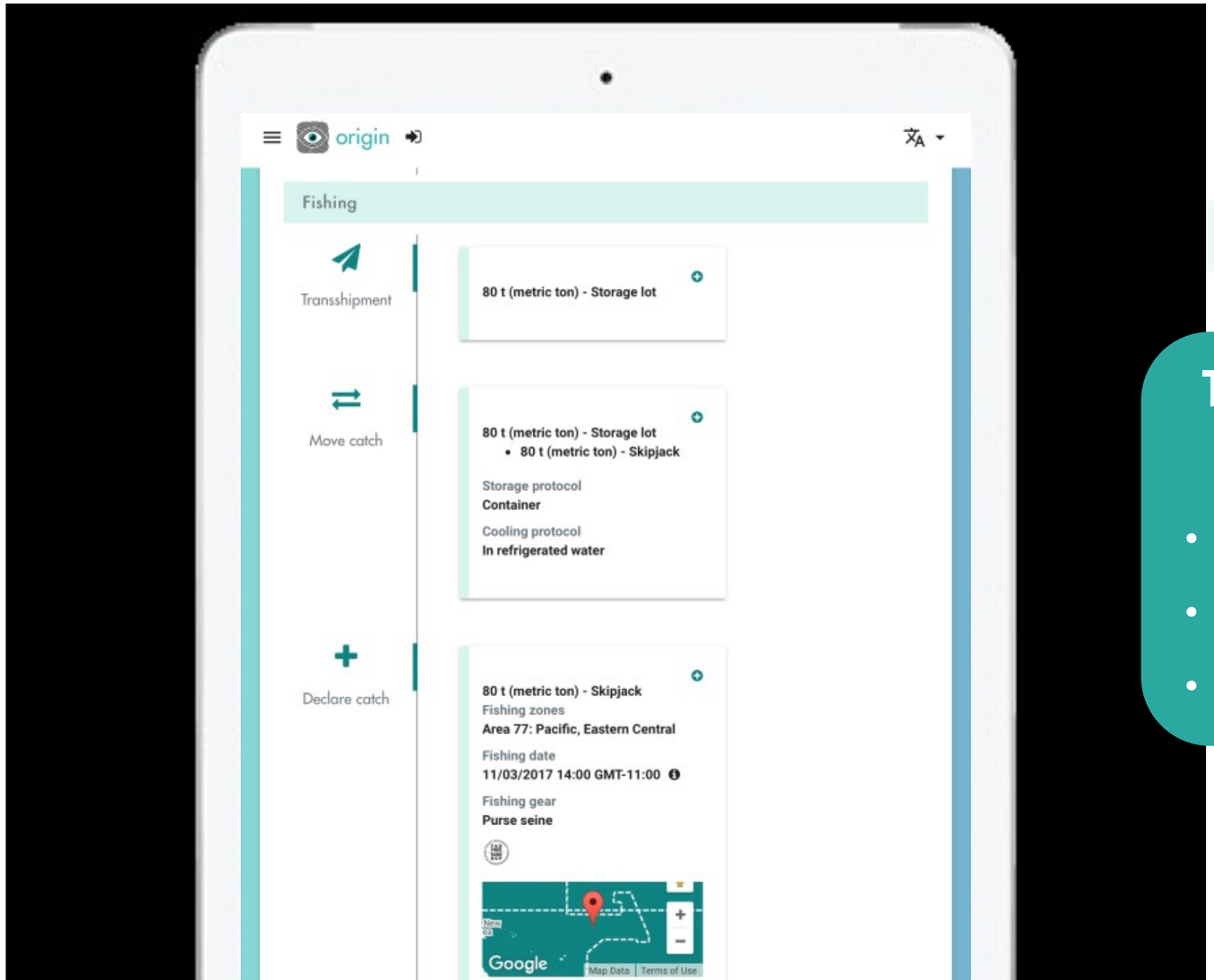
Data accessible to an **group of participants.**

Homomorphic

Possible **controls on encrypted values.**

Illustration (1/2)

B2B INTERFACE FOR THE TUNA SUPPLY CHAIN

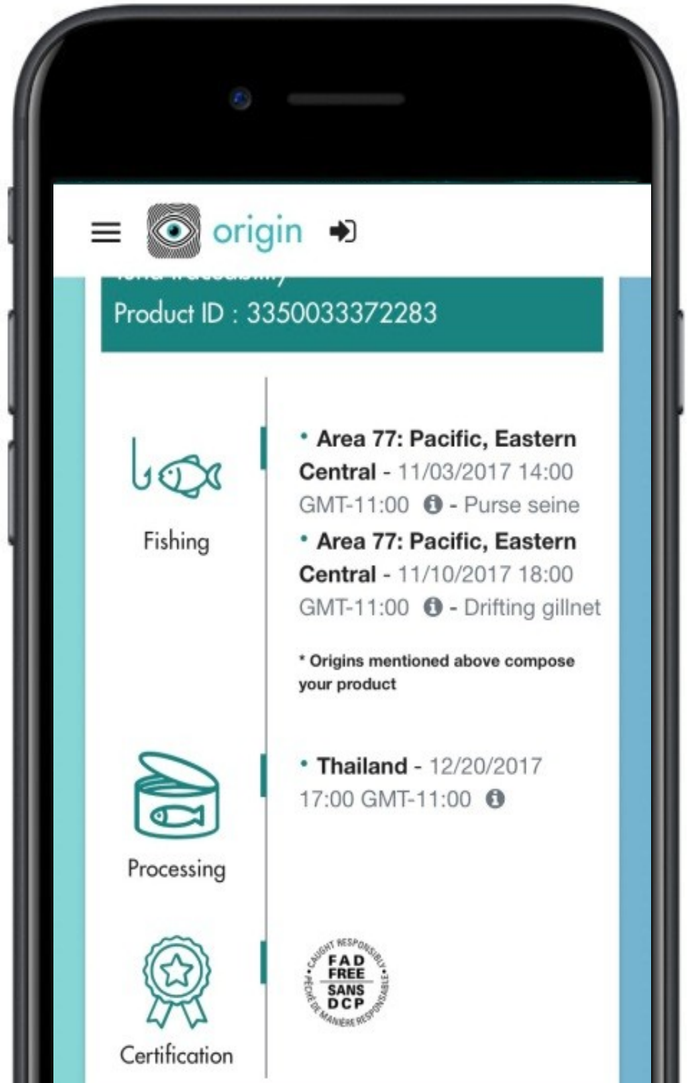


Transshipment user has access to several data from fisher

- Fishing area
- Fishing date
- Quantity and species

Illustration (2/2)

CONSUMER INTERFACE FOR THE TUNA SUPPLY CAIN



End consumers can scan a product and get access to its full history

- Provenance (one or more fishing)
- Fishing area
- Transformation location

Real Time, All the Time

Marcus Stoneham

THE INTERNET OF THINGS

Sources: IDC, MC/EDC: The Digital Universe of Opportunities, Goldman Sachs, IMS Research

50 Billion
Devices

212 Billion
Sensors

THINGS

NETWORK SERVERS

CLOUD

In the past 10 years…

Cost of Sensors

2X ⬇

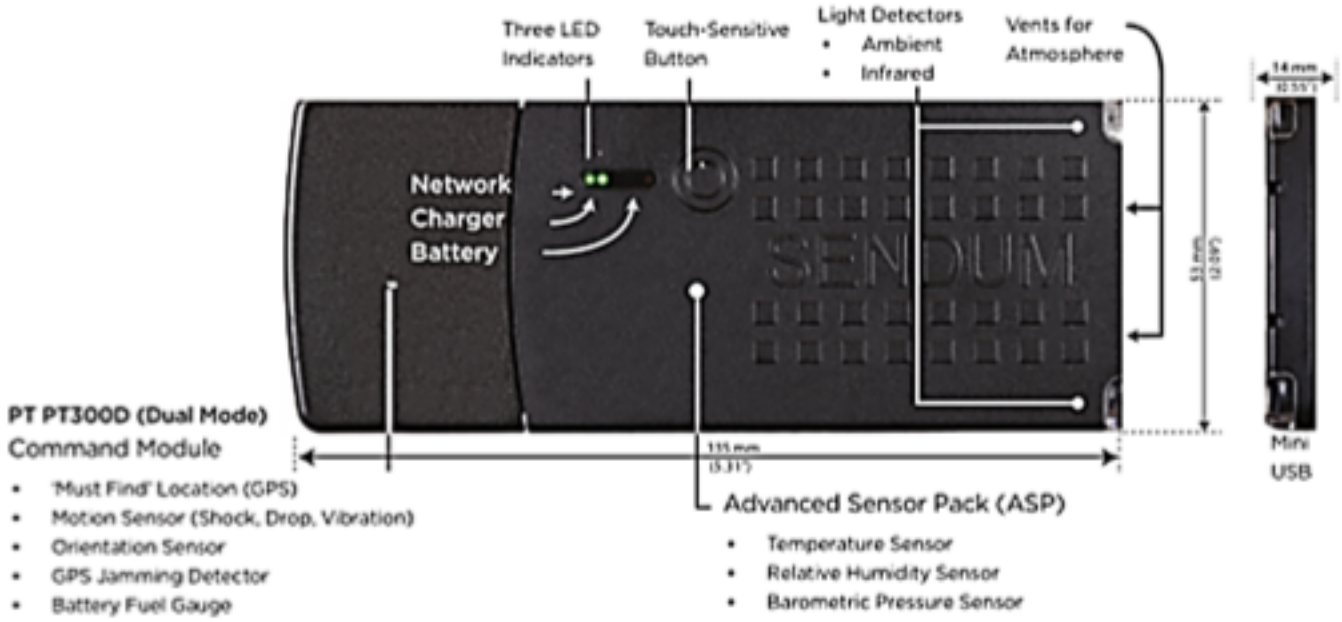
Cost of Bandwidth

40X ⬇

Cost of Processing

60X ⬇

Device Agnostic Approach



Leading Innovation

[Youtube – Honeywell Cargo Signal]

Honeywell

Sensor-Based Logistics Platform

Market-leading Sensors

Cargo

Smartphone

Fleet

Real-Time Data

Location
Temperature
Humidity
Shock
Tilt
Light

CARGOSIGNAL™

Layers

Traffic
Weather

Intelligence

Risk Zones
Disruptions

Business Rules and **Experienced Judgment**

Innovative Service Offerings

Visibility

Quality

Security

Visibility

Harness the power of IoT achieving new levels of speed and accuracy

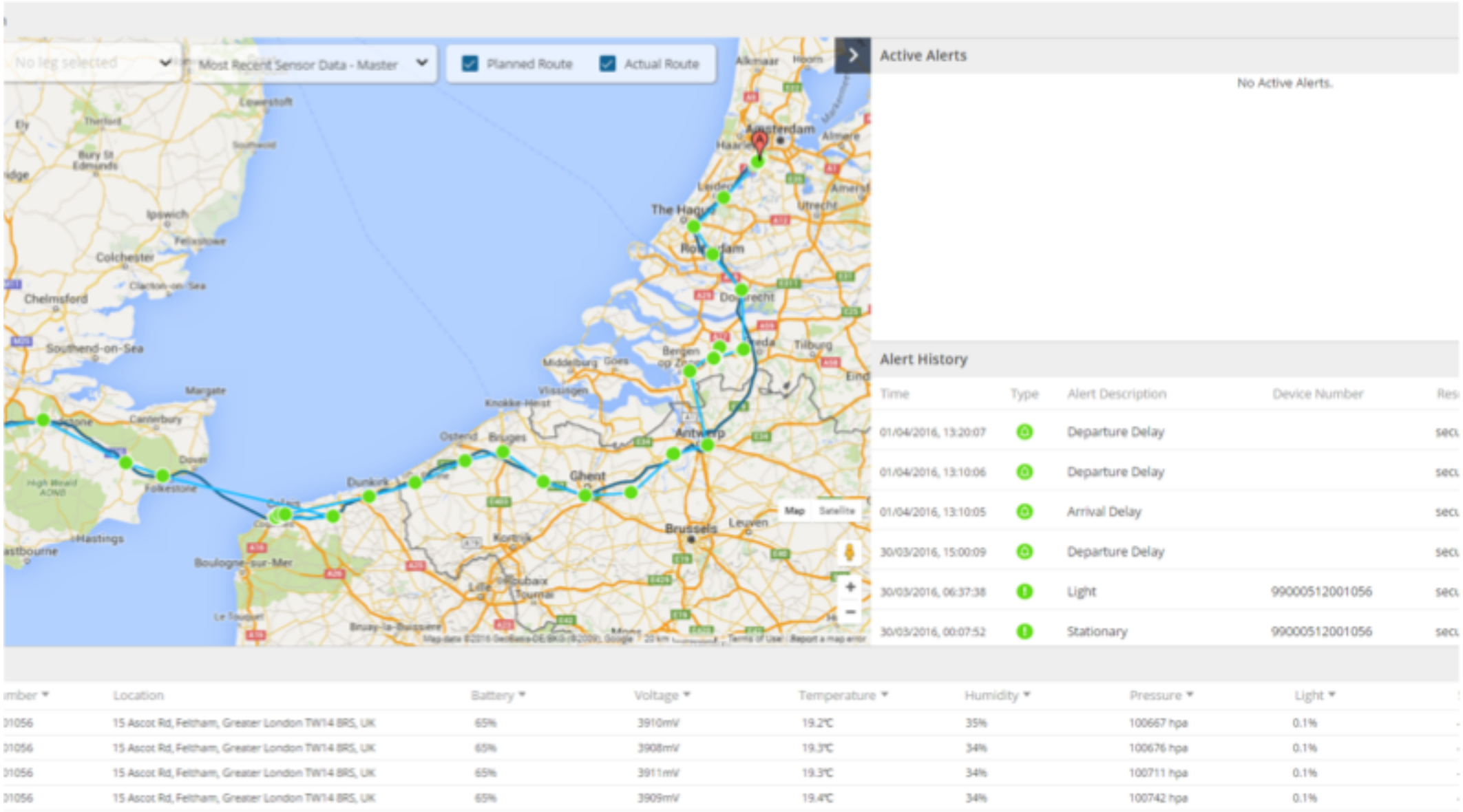
Quality

Analyze and act upon sensor data with location to improve processes

Security

Protect your brand and gain global control of your cargo

Sensor Readings and Location Combined



Case Study 1

Active Temperature Monitoring

1. $150,000 USD of Controlled Substances (Narcotics)
2. Shipping from Barcelona, Spain to Chicago, Illinois
3. Temperature Controlled 15-25°c

Active Temperature Monitoring

Shipment Status Notification	
Shipment	**4470082394**
Status	Arrived to Chicago O'hare Airport
Location	
Temperature	28.5°C (Range +15/+25 Degrees Celsius)
Map	n/a
Additional Notes	We are reaching out to[airline A]in order to determine the status of the container.

We spoke with [airline A] and they said they are in the process of breaking down the plane. They know the temperature requirements and assured us it will be stored in a cool area within the range provided.

We will keep a close eye on the temperature to ensure the requirements are met.

Active Temperature Monitoring

Shipment Status Notification	
Shipment	**4470082394**
Status	Stationary
Location	ORD
Temperature	14.6C (Range +15/+25 Degrees Celsius)
Map	

Spoke with [airline A], and they said it is in an area that is being cooled to 2-8C, I let them know that is unacceptable and the MAWB clearly states 15-25.

They are going to move to different area as soon as possible. We are actively monitoring the temp, and will give them a call if we do not see corrective action being taken.

Active Temperature Monitoring

Shipment Status Notification	
Shipment	**4470082394**
Status	Stationary
Location	ORD
Temperature	20.8 C (Range +15/+25 Degrees Celsius)
Map	

The shipment has been secured in [airline A] temperature controlled area. We have confirmed the readings are back within range.

This is on USDA hold

Battery is at 73%, so we should be good for at least 5 additional days.

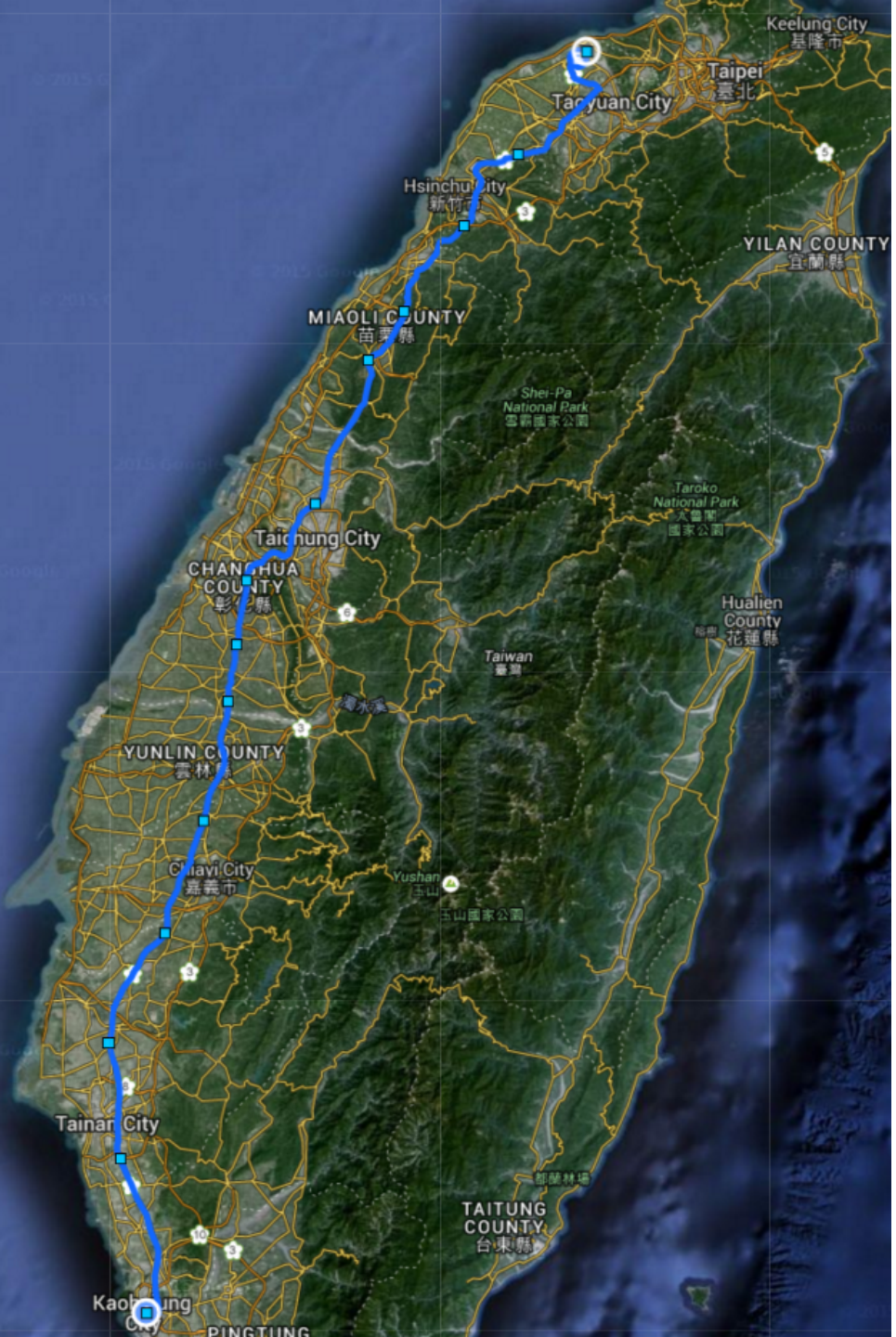
Case Study 2

Valuable Semi-Conductor Prototype

1. High value, time sensitive – next day delivery
2. Critical element to the success of electronics manufacturer's project
3. Shipping from Taipei, Taiwan to US
4. On-site engineers ready to receive shipment

AVOIDING FLIGHT DELAY

Our Command Center confirmed that the shipment arrived successfully at the Taipei airport and was waiting to be loaded onto the aircraft.



AVOIDING FLIGHT DELAY

After confirming flight take-off, our team noted that the sensor on the cargo was still actively reporting its current location on the tarmac at TPE airport

The branch contacted the airline which confirmed not once, but twice, that the cargo was aboard the scheduled flight

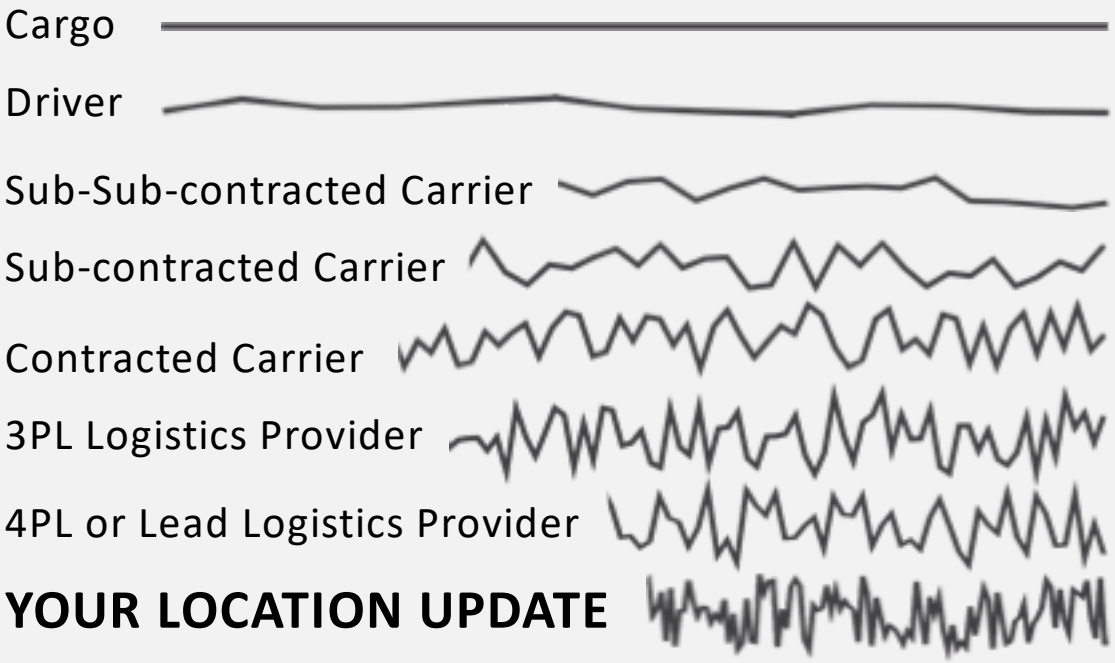
AVOIDING FLIGHT DELAY

The Command Center and branch teams persisted, and in the third conversation, presented with a precise screenshot of the sensor's current reporting location, the airline confirmed that it had failed to load the shipment onto the flight

AVOIDING FLIGHT DELAY

Fortunately, the airline was able to re-load it onto the very next direct flight and arrival was delayed by only a few short hours

The “Noise” In Today’s Supply Chain



ASSUMING:

System integration between all parties
Sub-contracted carriers understand requirements
Driver provides accurate updates
Cargo placed on correct conveyance
Cargo stays with driver

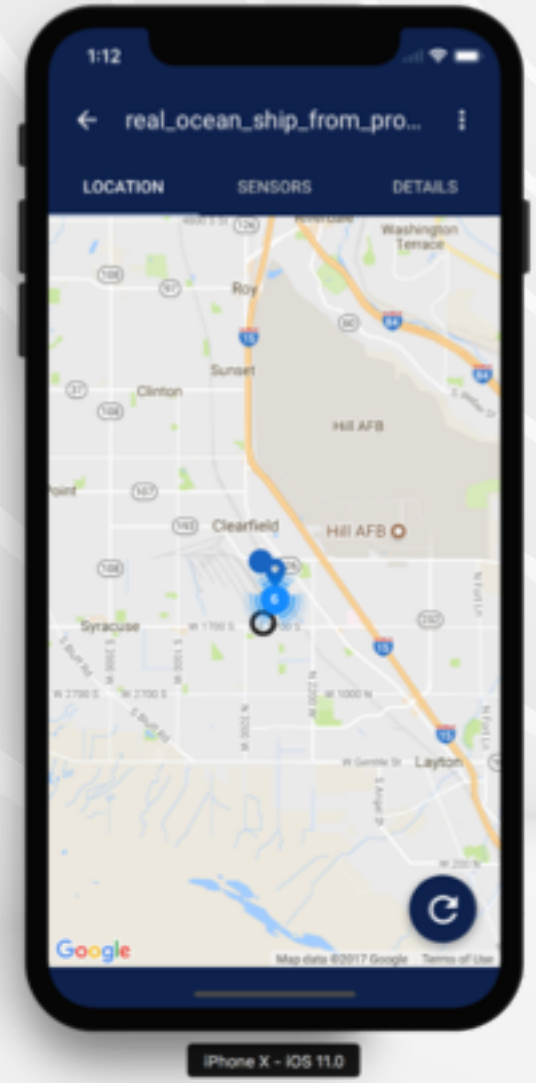
Cargo

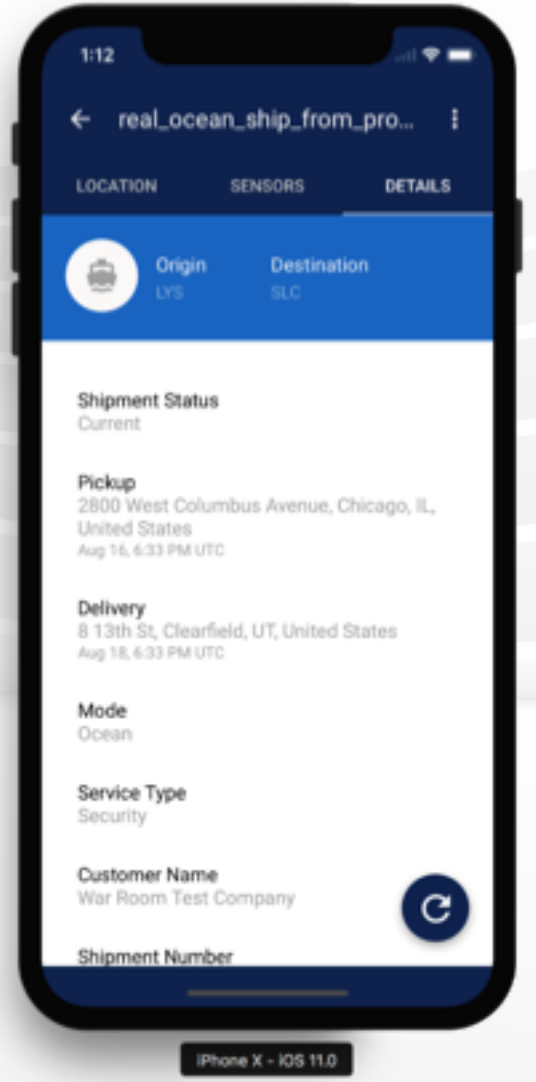
Sensors

YOUR LOCATION UPDATE

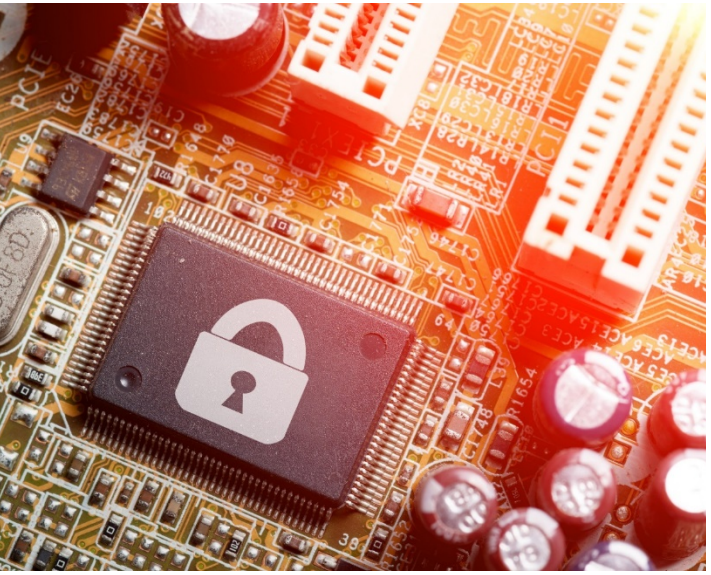
NOISY SIGNAL — NOISE — CLEAR SIGNAL

Enabling Real Time Decisions



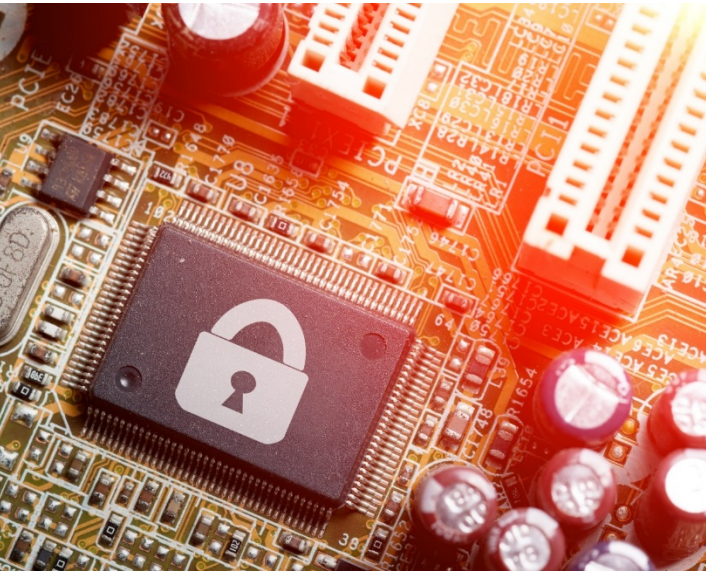


Challenges & Considerations



- Airline Compliance
  - ✓ Airline approval process
  - ✓ DG rules on lithium batteries
- Customs Compliance
  - ✓ Different countries = different rules…..
- Meticulous T&I set up required
  - ✓ Loading / managing / returning the tracking device
  - ✓ Routing plans
  - ✓ Business rules: permitted temperature excursions, shock limits etc

Challenges & Considerations



- Integration with all supply chain partners
  - ✓ Need to know who will touch the freight
  - ✓ Subcontractor selection and management
  - ✓ 24/7 contact information eg, driver details
- Reaction speed
  - ✓ Ability to predict issues before they happen
  - ✓ Immediate responses required from stakeholders
  - ✓ No time to investigate who to contact!

CARGOSIGNAL™

Innovative sensor-based logistics across a customer's supply chain

Digital services powered through the Company's proprietary, cloud based operating system

Enhanced shipment visibility, integrity and security

All services offered whether Expeditors is the carrier or not

Lease hardware with software or on per shipment basis

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