



## **LOGISTICS OF THE ENERGY REVOLUTION**

INNOVATING  
ENERGY SUPPLY  
CHAINS



**POWERING  
OUR WORLD,  
TOGETHER**

DELIVERING EXCELLENCE  
TO THE ENERGY SECTOR

## **DHL ENERGY REGIONAL CONFERENCE 2022**

# **Innovation in action: Blockchain**

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**Services & Business Practice Manager, CoE Blockchain,**  
**DHL Corporate IT**





Question 1: **What is a blockchain?**

**A:** A distributed ledger on a peer to peer network

**B:** An exchange

**C:** A type of cryptocurrency

**D:** A centralized ledger



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Question 2: **What is immutability?**

**A:** Running without the concept of “human trust”

**B:** Majority of the nodes need to come to a consensus

**C:** Data in a block cannot be tampered with

**D:** Peer to peer digital ledger of transactions



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Question 3: **Which industry can benefit from blockchain**

**A:** Government & Regulatory

**B:** Ecommerce / Retail

**C:** Energy

**D:** All of the above





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# There are many topics where **Blockchain** can be utilized for **supply chain** management **processes**

Agree on ad-hoc quotes for one-off shipments

Agree on rate cards for contracted freight shipments

Invoice & audit processes

Arrange for automatic duty drawbacks

Customs clearances

Eliminate intermediaries for track & trace

Agree on project costs for an industrial project

Eliminate intermediaries for freight bill audit (FBA)

Regulatory compliance

Information Logistics Provision (ILP)

Immutability of data

Reach consensus amongst partners in the supply chain network

Business rules automation using smart contracts

Data orchestration using smart contracts

Trusted network

Tokenization and NFTs

Data integrity and data security

Audit trails

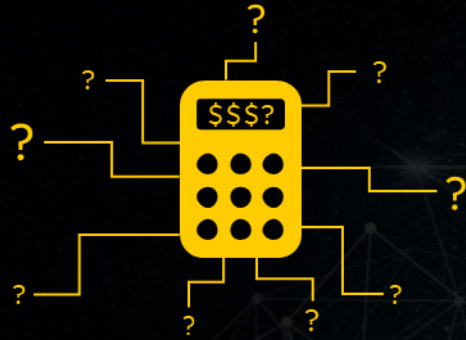
Co-creation of functionalities

Connections to IoT for Proof of Delivery (POD)

## Industry Challenge #1:

### Costs incurred by necessity of auditing freight bills

#### COMPLEXITY



#### ERRORS



#### AUDITING



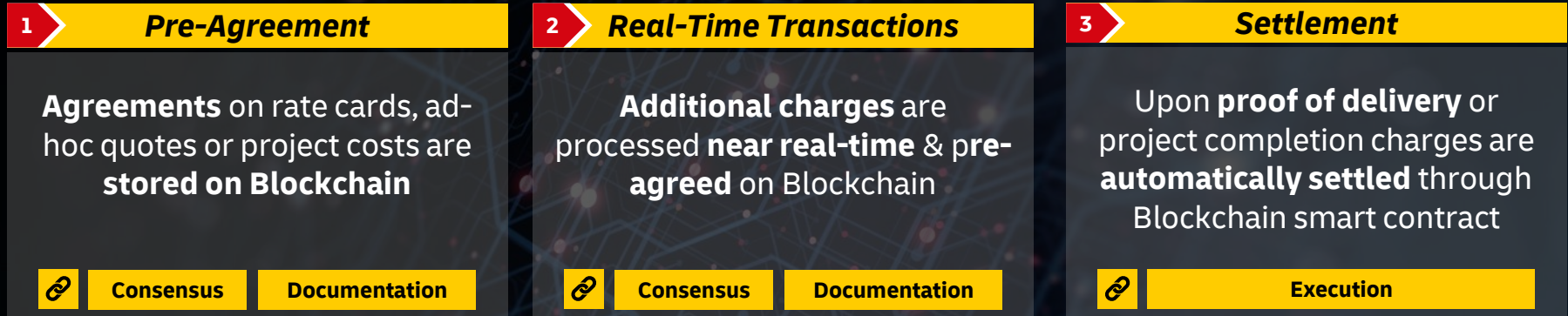
- Many types of **(sur)charges**
- **Additional charges** incurred during shipment life-cycle
- Many parties leading to **in-transparency**

- Unintentional **invoicing errors**
- Potential **overcharging**
- Need for separate **invoice checking** process

- Shippers employ **freight bill auditors**
- But **incur costs** for their services

## DPDHL's Blockchain Solution to Industry Challenge #1:

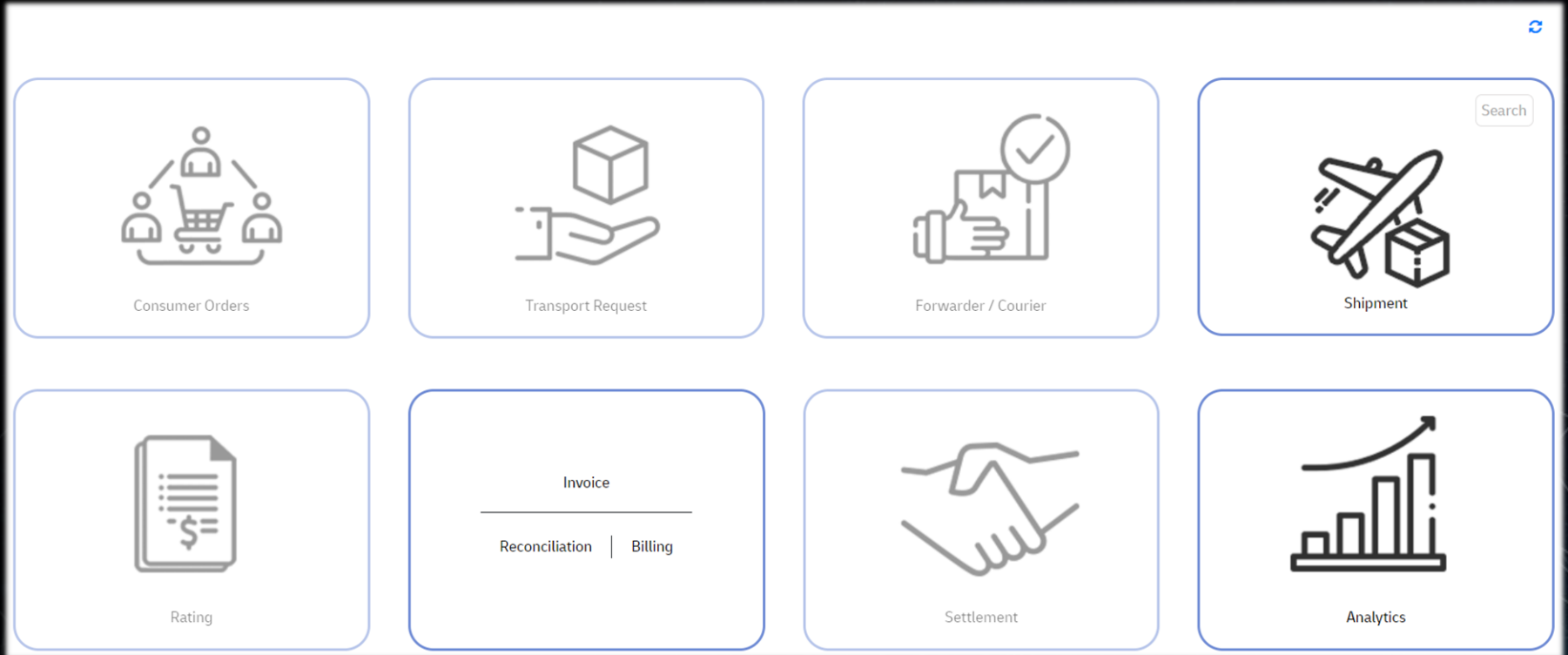
### Automated invoicing and settlement based on immutable digital documentation



**Immutable records** of all rates, charges and transactions  
Automated and **correct invoicing** and settlement of all charges

## DPDHL's Blockchain Solution to Industry Challenge #1:

Front-end user screens are connected to the Blockchain layer for data visualization – **DASHBOARD**





# DPDHL's Blockchain Solution to Industry Challenge #1:

XXX



## INVOICES & CHARGES

All

All	Self-Billed	Posted	Reconciled	Released	Exceptions	Consolidated		
Lock	Origin	Destination	Shipment Date	Shipment Id	Invoice No.	Shipper Acc No.	Typ	
	FRA , DE	HAM , DE		464500148	4700203899M8	855317024	LSP	
	FRA , DE	HAM , DE		464500149	4700203899M9	855317024	GEN	
	HAM , DE	FRA , DE		464500150	4700203899M10	855317024	ADA	
	FRA , DE	HAM , DE		464500151	4700203899M11	855317024	SEL	
	HAM , DE	FRA , DE		464500152	4700203899M12	855317024	ADA	
	HAM , DE	FRA , DE		464500153	4700203899M13	855317024	ADA	

# DPDHL's Blockchain Solution to Industry Challenge #1:

XXXX



Show  
Released

**Bill to Party**

Account No. 969009360  
Name IBM DEUTSCHLAND GMBH  
Address Line 1 ACCOUNTS PAYABLE, IBM ALLEE 1  
Postal Code 63303  
City FRANKFURT  
Country Code DE

**Shipper**

Account No. 855317024  
Name IBM DEUTSCHLAND GMBH  
Address Line 1 SCHOPENSTEHL 15  
Postal Code 20095  
City HAMBURG  
Country Code DE

**Consignee**

Account No. 966317024  
Name IBM DEUTSCHLAND GMBH  
Address Line 1 ACCOUNTS PAYABLE, IBM ALLEE 1  
Postal Code 63303  
City FRANKFURT  
Country Code DE

**Proforma Details**

**Order Details**

Order No. 4700203899M8  
Job No.  
Branch Code  
Branch Name

Department Code  
Department Name  
Total Packages 2  
Total Weight 3.000 (KGM)

Total Volume 1.200 M3  
Total Chargeable 3.000 KGM  
Total Amount 12.26 EUR  
Goods Description

**Origin**

Location Code FRA  
Location Name  
Country Code DE

**Destination**

Location Code HAM  
Location Name  
Country Code DE

**Charge Lines**

APPROVE

## Industry Challenge #2:

### Costs incurred by relying on 5PL intermediaries for shipment visibility

#### MULTI-CARRIER SOURCING



Best rates  
Reduced dependencies  
Hedge against capacity limits

#### FRAGMENTED VISIBILITY



Complexity of shipment  
visibility  
No holistic overview across  
carriers

#### INTERMEDIARIES (5PLs)



Intermediary offerings (5PLs)  
have sprung up charging for  
centralized shipment visibility

## DPDHL's Blockchain Solution to Industry Challenge #2:

An Information Logistics Provision (ILP) solution to minimize need for 5PLs

1

### *Data Capture*

DPDHL and non-DPDHL shipments info is **securely stored** on the Blockchain

Decentralization = **no single owner** of the data

2

### *Data Consolidation*

The Blockchain **consolidates all data** and maintains the highest level of **security**

3

### *Data Access*

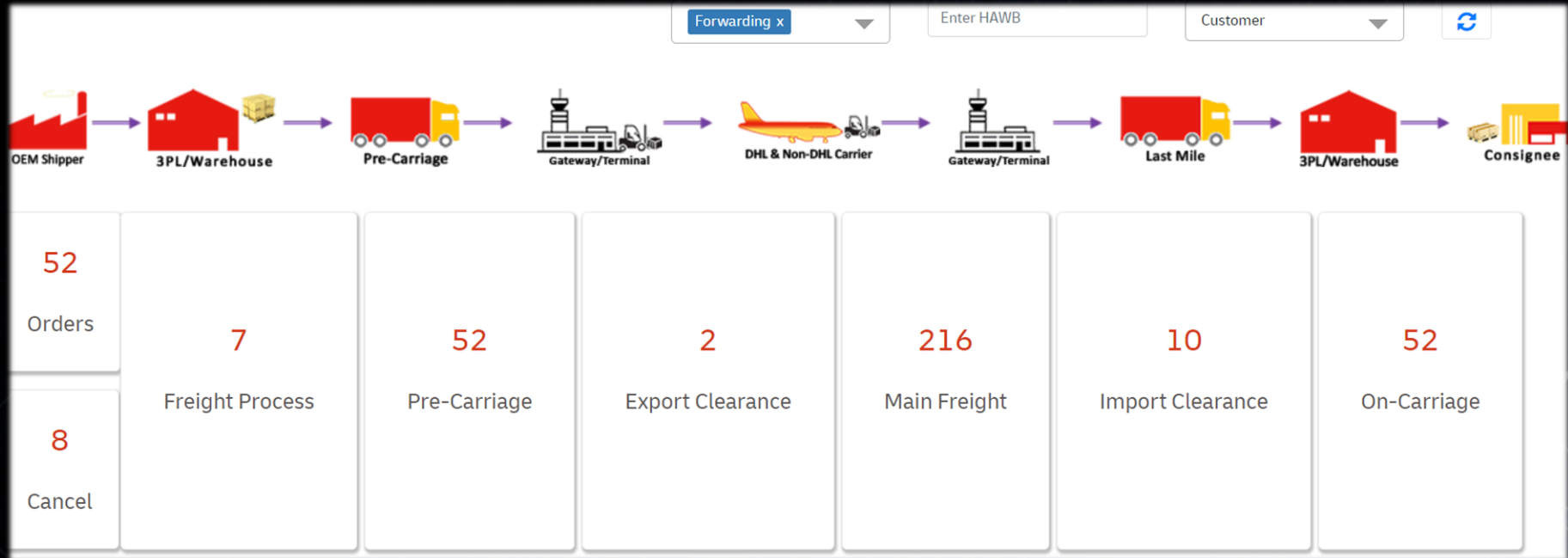
The data is **disclosed on a “need to know” basis** through role based access control (RBAC)

Integration of a vast and growing **decentral network** of logistics actors  
**Reduction of shipment visibility complexity** through superior information and transparency



## DPDHL's Blockchain Solution to Industry Challenge #2:

Front-end user screens are connected to the Blockchain layer for data visualization – **DASHBOARD**



# DPDHL's Blockchain Solution to Industry Challenge #1:

XXX



Home In-Transit Logout

Account ☐ Select

Original Layout

Account Code	Transport Mode	Hawb/Tracking No/Order ...	Customer Reference	Shipper	Customer/Consignee	Origin	Destination	Est Delivery	Number
AUKAE001	AIR	U400272	52200227395			SYD	AKL	2022-01-23 21:10:00 UTC+1	1
220065607	EXP	7731055894	Not Assigned			MZM	CHC	2022-01-25 23:59:00 UTC+0	1
220065607	EXP	1767016941	Not Assigned			MZM	MEL	2022-01-31 23:59:00 UTC+0	1
SGCAF003	AIR	U390094	52200200641			SIN	MEL	2022-01-18 18:40:00 UTC+10	2
220065607	EXP	2983154646	Not Assigned			MZM	MEL	2022-01-31 23:59:00 UTC+0	1
954987611	EXP	3637577215							
610783364	EXP	7130721496							
SGCAF003	AIR	U390484							
220065607	EXP	2862186235							
610783364	EXP	7130718136							
954805789	EXP	9930322591							
610783364	EXP	1957385496							
610783364	EXP	2662336854							
962310427	EXP	4578405716							
630211003	EXP	2978334273							
954987611	EXP	1816254226							
PICAF005	SEA	LUXA03569							

Multiple MOTs across carriers

Real time events listing

MOT = Mode of Transport

HAWB#: **U147596**  
MAWB#: **105-01360892**

Map

Map Satellite

# Q&A

# Lessons learned when applying Blockchain technologies



A Blockchain deployment is a journey that requires a step by step approach...

Generic



Complex topic resulting in challenges in communication



Documentation on governance model(s) and tech setup required



Collaboration amongst partners in the network is key

Specific



Stakeholder management needed to keep everyone on board



Before the start, check if Blockchain is the right way forward



Service agreements need to be formalized into legal contracts/SLAs

... with opportunities for continuous improvements

## General adaptation of a Blockchain solution

Facilitates a network of multiple partners



The challenges of **Business Change** needs focus to manage it properly

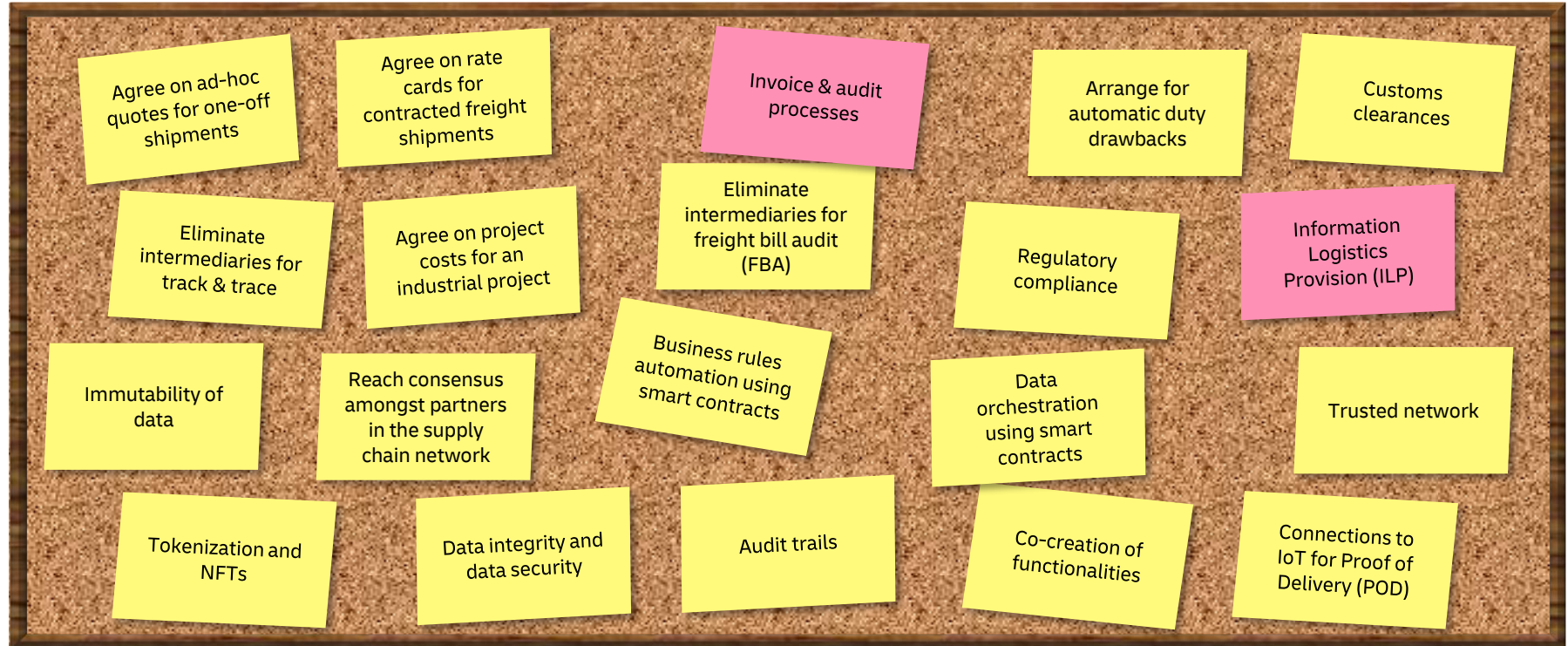
**Concerted Blockchain initiatives** with multiple partners are inherent to a blockchain based deployment



**Training, education and communication** needs to be part of project



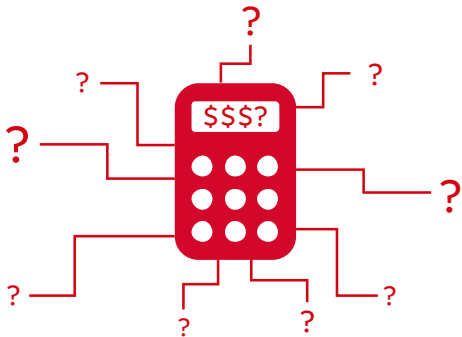
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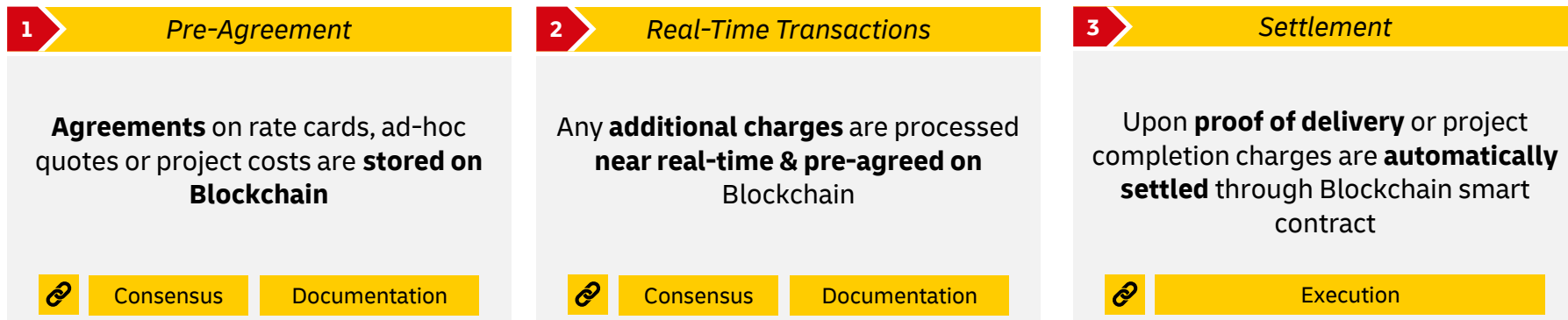
#### AUDITING



- Shippers employ **freight bill auditors**
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## DPDHL's Blockchain Solution to Industry Challenge #1: Automated invoicing and settlement based on immutable digital documentation



**Immutable records** of all rates, charges and transactions  
Automated and **correct invoicing** and settlement of all charges

## Front-end user screens are connected to the Blockchain layer for data visualization (**Challenge #1**):



Consumer Orders



Transport Request



Forwarder / Courier



Shipment



Rating

Invoice

Reconciliation | Billing



Settlement



Analytics





# Front-end user screens are connected to the Blockchain layer for data visualization (Challenge #1):

## INVOICES & CHARGES

All

All	Self-Billed	Posted	Reconciled	Released	Exceptions	Consolidated	
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# Front-end user screens are connected to the Blockchain layer for data visualization (Challenge #1)

Show  
Released

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 Address Line 1 ACCOUNTS PAYABLE, IBM ALLEE 1  
 Postal Code 63303  
 City FRANKFURT  
 Country Code DE

## Proforma Details

### Order Details

Order No.	4700203899M8	Department Code		Total Volume	1.200 M3
Job No.		Department Name		Total Chargeable	3.000 KGM
Branch Code		Total Packages	2	Total Amount	12.26 EUR
Branch Name		Total Weight	3.000 (KGM)	Goods Description	

### Charge Lines

Charge Code	Description	Charge Currency	Charge amount
DE-BAT	contract	EUR	113.52
DE-KER	Kerosene Surcharge in Percent(%)	EUR	2.76
DE-OVERSIZE	Oversize/Excess weight parcels	EUR	546
DE-POD	POD	EUR	15.6

APPROVE

## Industry Challenge #2:

### Costs incurred by relying on 5PL intermediaries for shipment visibility

#### MULTI-CARRIER SOURCING



- Shippers apply a **multi-carrier sourcing strategy**, e.g. to get the best rates, reduce dependencies and hedge against capacity limits
- But each **carrier** presents their data in a **specific manner**

#### FRAGMENTED VISIBILITY



- This fragmentation drives the **complexity of shipment visibility**
- There is **no holistic overview** across carriers

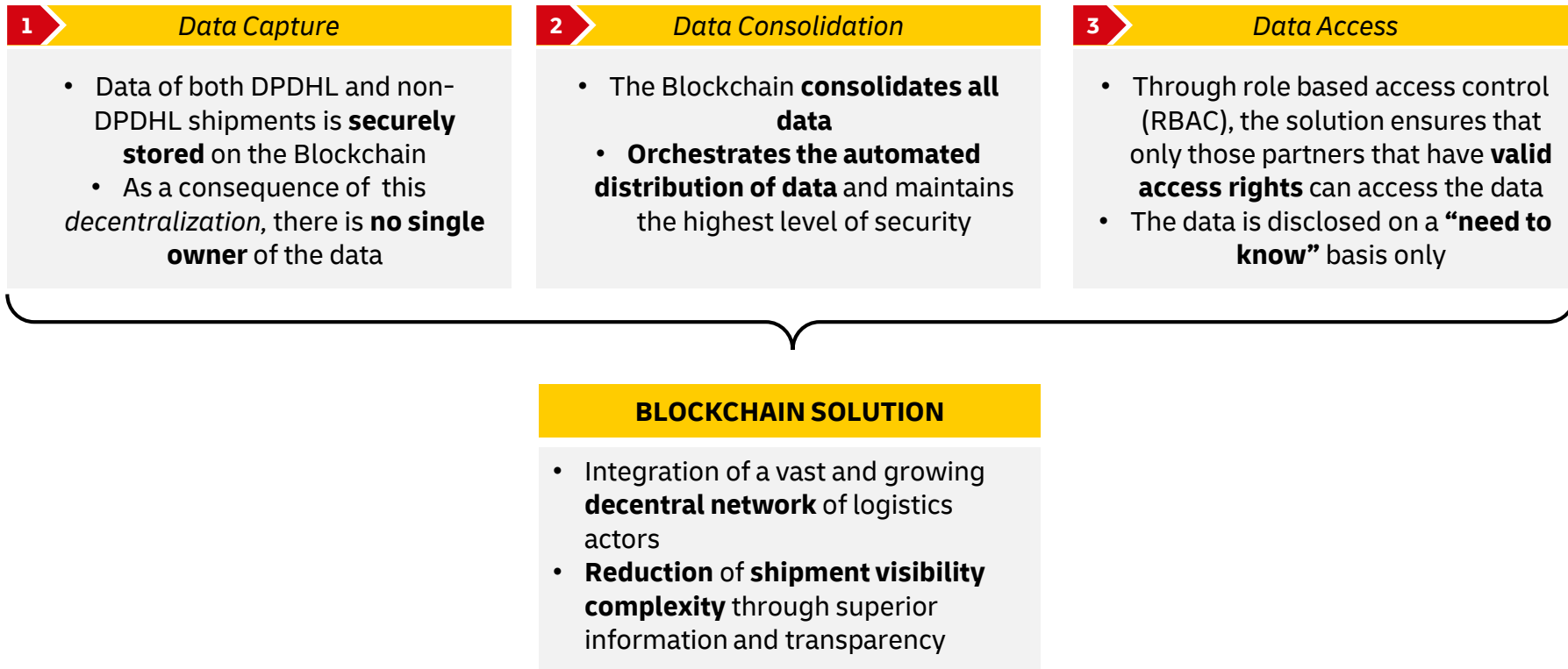
#### INTERMEDIARIES (5PLs)



- As a consequence, **intermediary offerings (5PLs)** have sprung up
- But they **charge for shipment visibility** as a value added (centralized) service

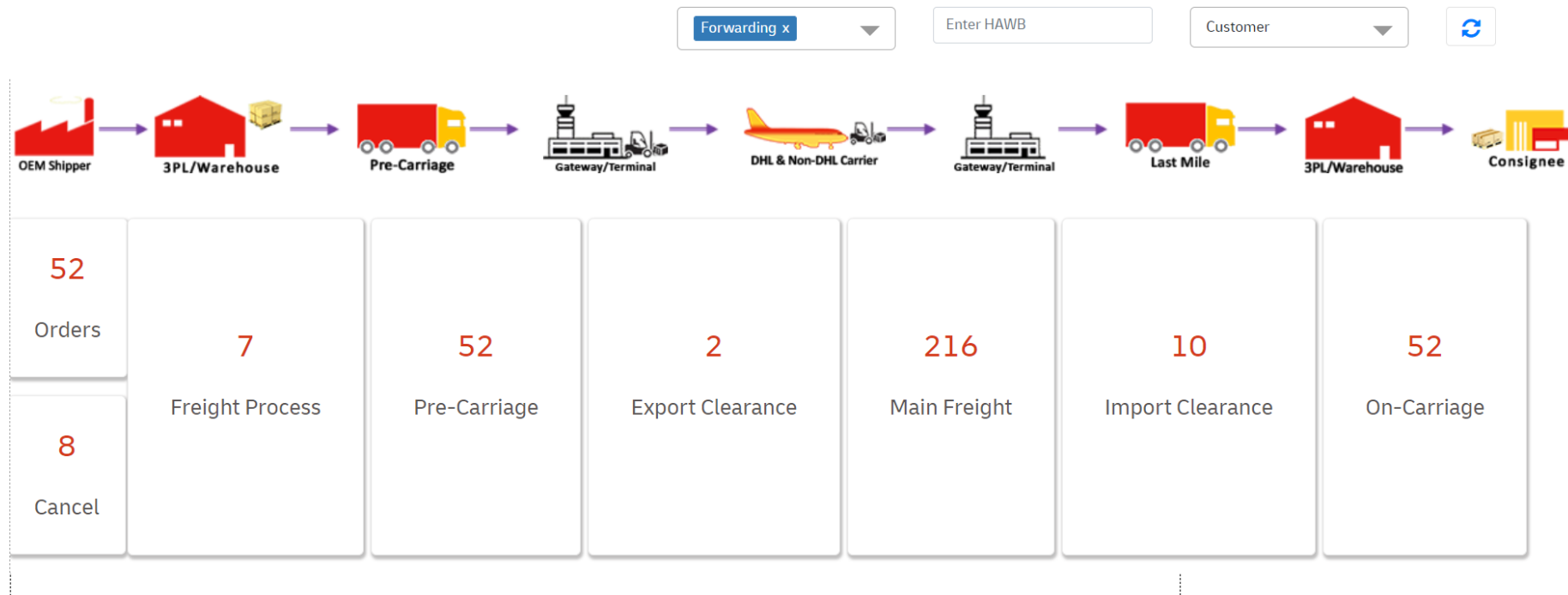


## DPDHL's Blockchain Solution to Industry Challenge #2: An Information Logistics Provision (ILP) solution to minimize 5PL needs



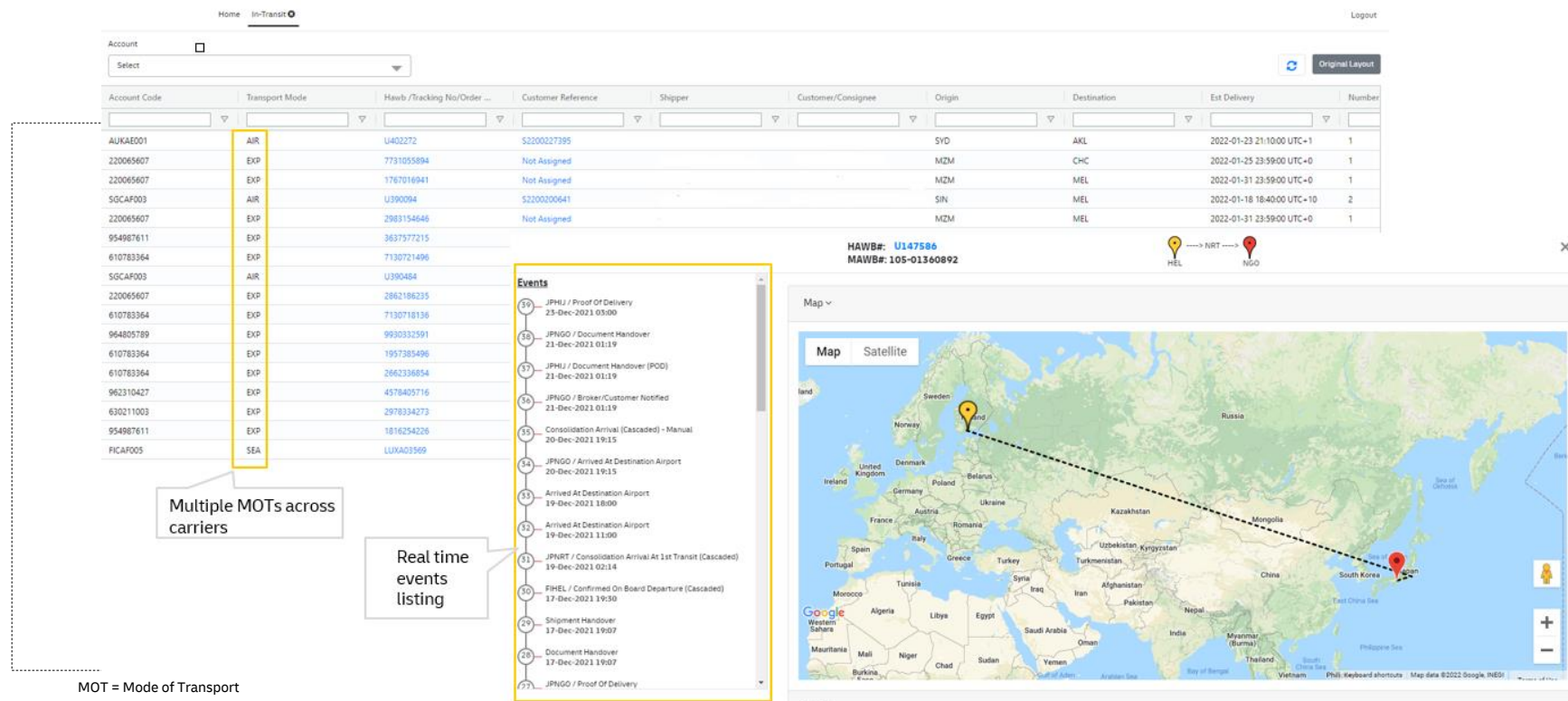


## Front-end user screens are connected to the Blockchain layer for data visualization (Challenge #2)





# Front-end user screens are connected to the Blockchain layer for data visualization (Challenge #2)



The screenshot displays a logistics tracking application interface. At the top, there are navigation links for 'Home' and 'In-Transit', along with a 'Logout' button. Below the navigation bar is a search and filter section with a dropdown menu for 'Account' and a 'Select' button. The main content area is divided into two parts: a table of shipments and a detailed view of a specific shipment.

The shipment table has the following columns: Account Code, Transport Mode, Haws/Tracking No/Order, Customer Reference, Shipper, Customer/Consignee, Origin, Destination, Est Delivery, and Number. The table lists several shipments, with the 'Transport Mode' column highlighted in yellow. The modes include AIR, EXP, and SEA.

Below the table, there is a section titled 'Events' which lists real-time events for the selected shipment. The events are numbered and include details such as the event type, date, and time. The events are:
 

- 39 JPHU / Proof Of Delivery 23-Dec-2023 03:00
- 38 JPHGO / Document Handover 21-Dec-2023 01:19
- 37 JPHU / Document Handover (POD) 21-Dec-2023 01:19
- 36 JPHGO / Broker/Customer Notified 21-Dec-2023 01:19
- 35 Consolidation Arrival (Cascaded) - Manual 20-Dec-2023 19:15
- 34 JPHGO / Arrived At Destination Airport 20-Dec-2023 19:15
- 33 Arrived At Destination Airport 19-Dec-2023 18:00
- 32 Arrived At Destination Airport 19-Dec-2023 11:00
- 31 JPHRT / Consolidation Arrival At 1st Transit (Cascaded) 19-Dec-2023 02:14
- 30 FIHEL / Confirmed On Board Departure (Cascaded) 17-Dec-2023 19:30
- 29 Shipment Handover 17-Dec-2023 19:07
- 28 Document Handover 17-Dec-2023 19:07
- 27 JPHGO / Proof Of Delivery

To the right of the events list, there is a map section titled 'Map' with a dropdown menu for 'Map' and 'Satellite'. The map shows the shipping route from Sweden to South Korea, with a dashed line indicating the path. The map includes labels for various countries and regions, such as Sweden, Norway, Denmark, Poland, Germany, France, Spain, Portugal, Morocco, Algeria, Libya, Egypt, Saudi Arabia, Oman, Yemen, Iran, Afghanistan, Pakistan, India, Myanmar (Burma), Thailand, Vietnam, Philippines, and South Korea. The map also shows the 'Sea of Japan' and the 'East China Sea'.

Annotations on the screenshot include:
 

- A yellow box around the 'Transport Mode' column in the table, with a callout stating 'Multiple MOTs across carriers'.
- A yellow box around the 'Events' list, with a callout stating 'Real time events listing'.
- A callout at the bottom left stating 'MOT = Mode of Transport'.



# Q&A

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# Thank you



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