

# Emerging Technologies in Ocean Freights



Presenter: **Harshvardhan** | Advisor for the thesis: **Dr Chris Caplice**

# Presentation Flow

- Introduction
- Analysis
- Conclusion



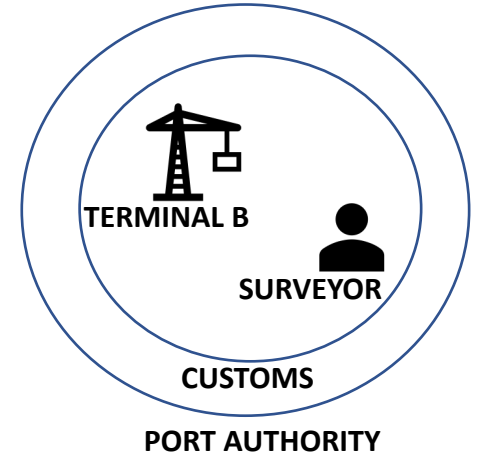
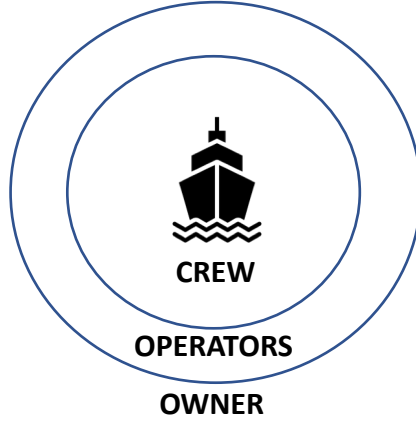
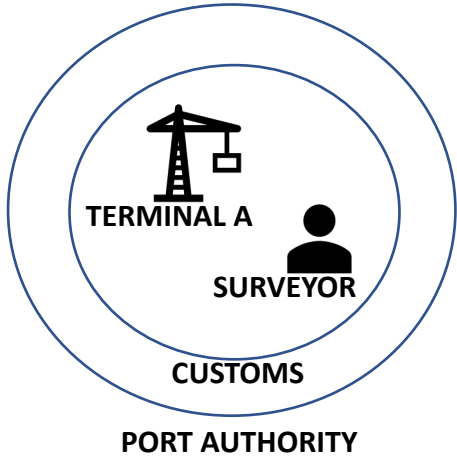
INSURERS



CLASSIFICATION  
SOCIETIES



FLAG STATE



SUPPLIER



AGENT



BROKERS



AGENT



RECEIVER



BANK



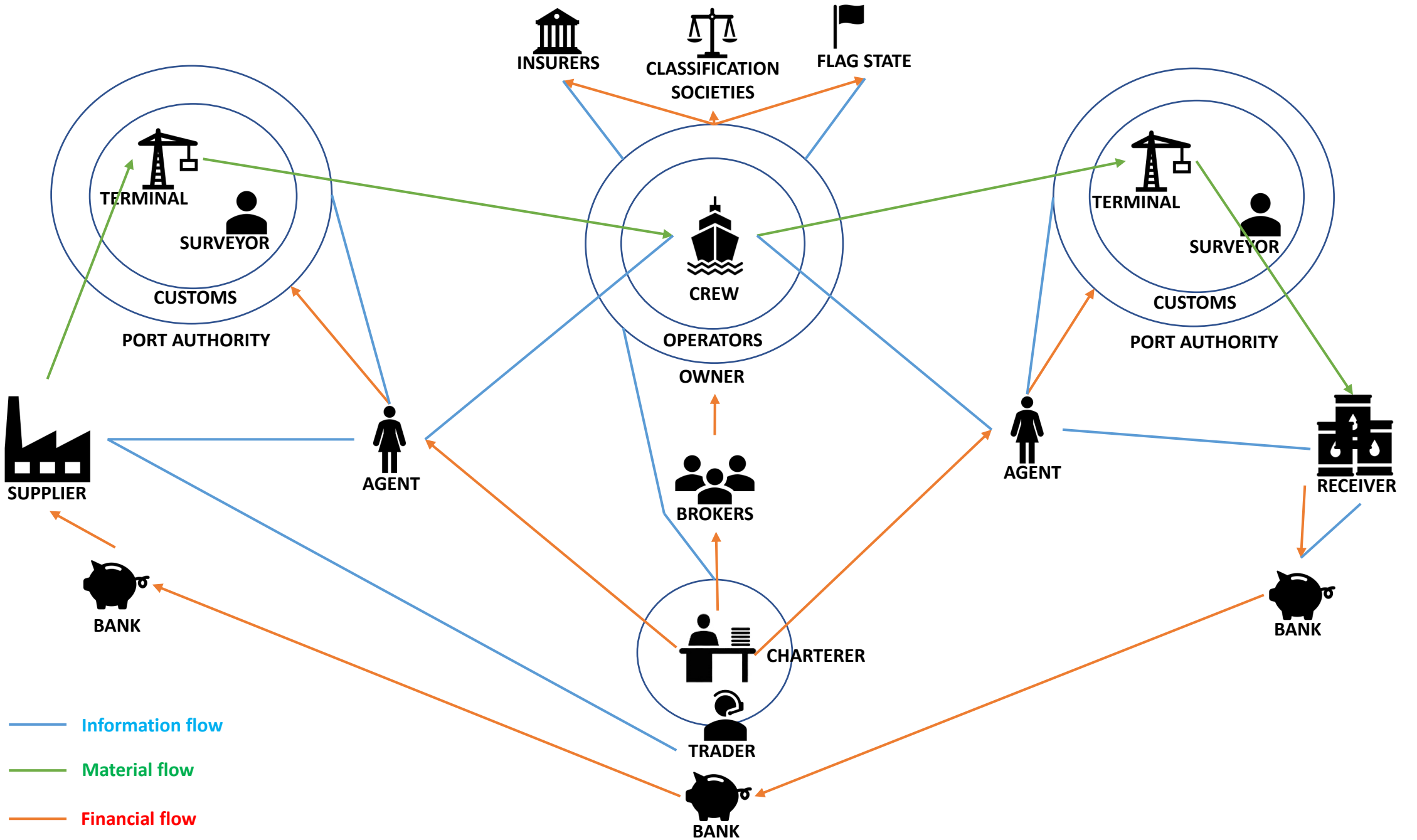
TRADER

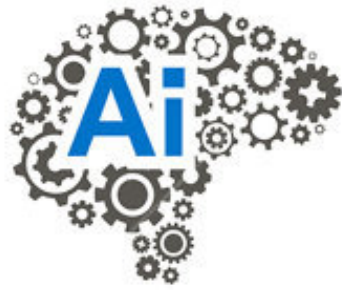


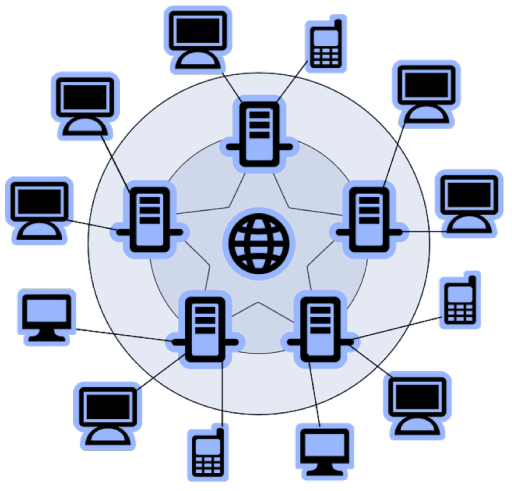
BANK



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**Immutability**

**Distributed Consensus**

**Trustless**



**TRUST**



**Record Keeping**



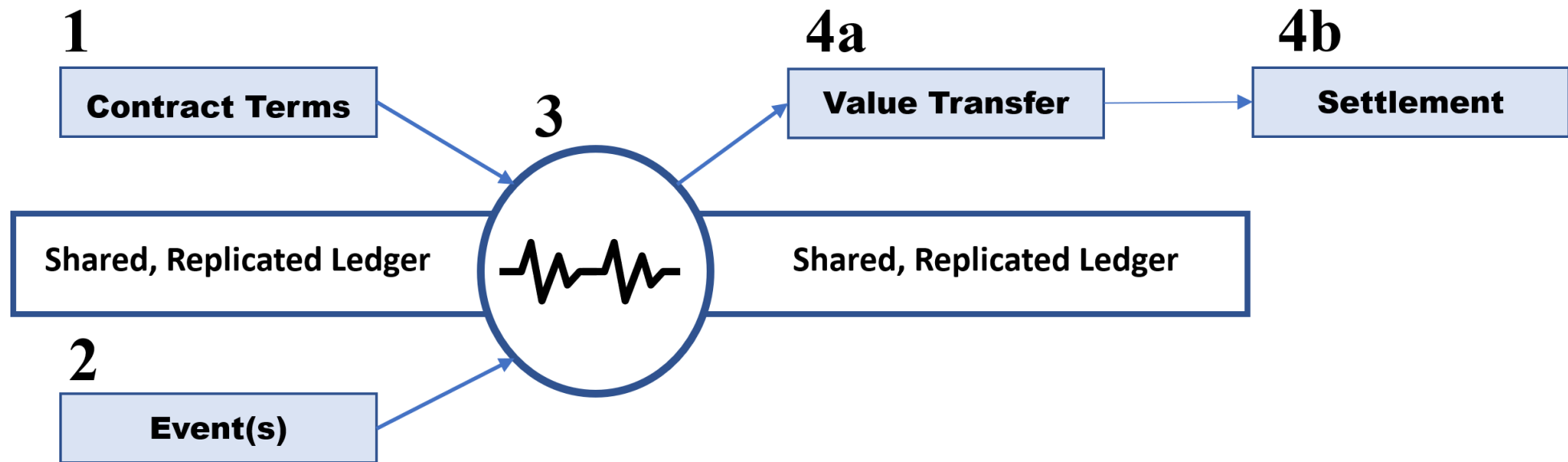
**Value Transfer**

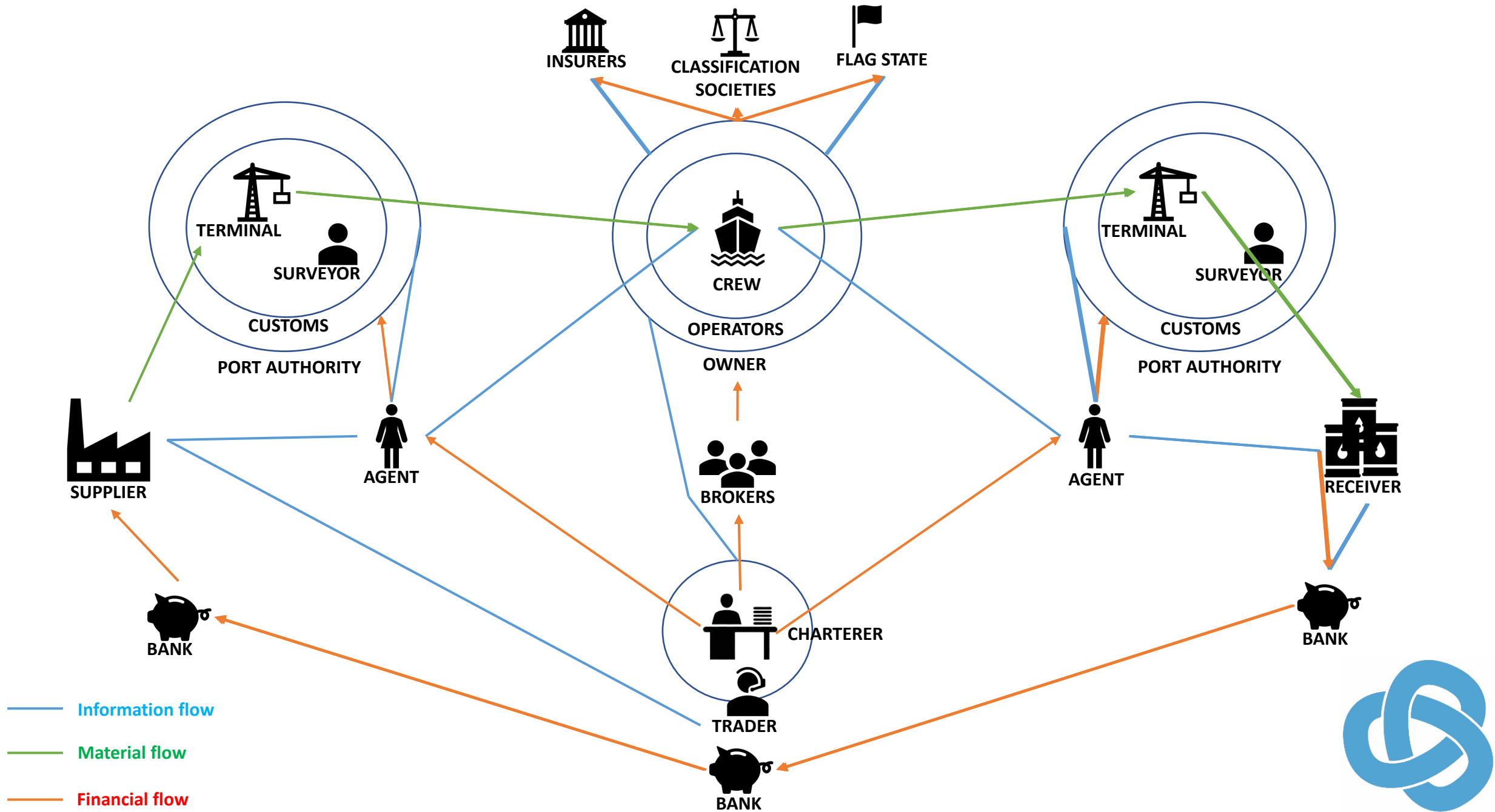
# Public Vs Permissioned Blockchains

	Public Blockchain	Permissioned Blockchain
Access	Open read/write	Permissioned read and/or write
Speed	Slower	Faster
Security	Proof of Work Proof of Stake Other consensus mechanisms	Pre-approved participants
Identity	Anonymous Pseudonymous	Known identities



# Smart Contracts







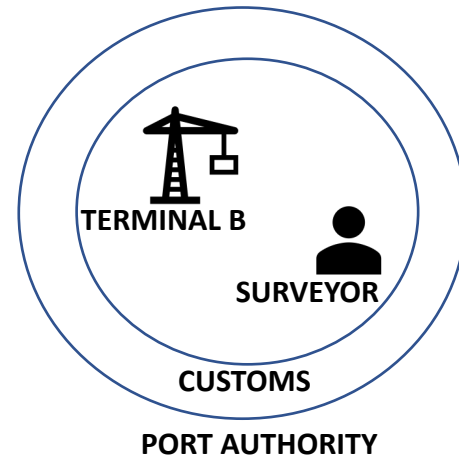
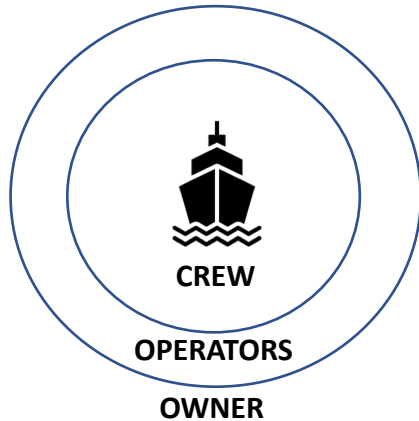
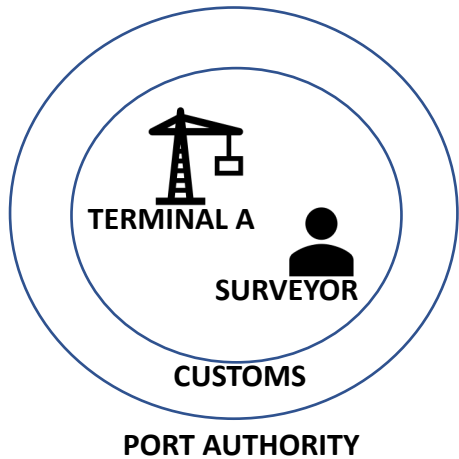
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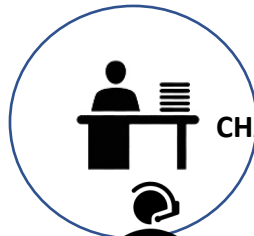
RECEIVER



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TRADER



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**TRUST**

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**DOCUMENTATION**

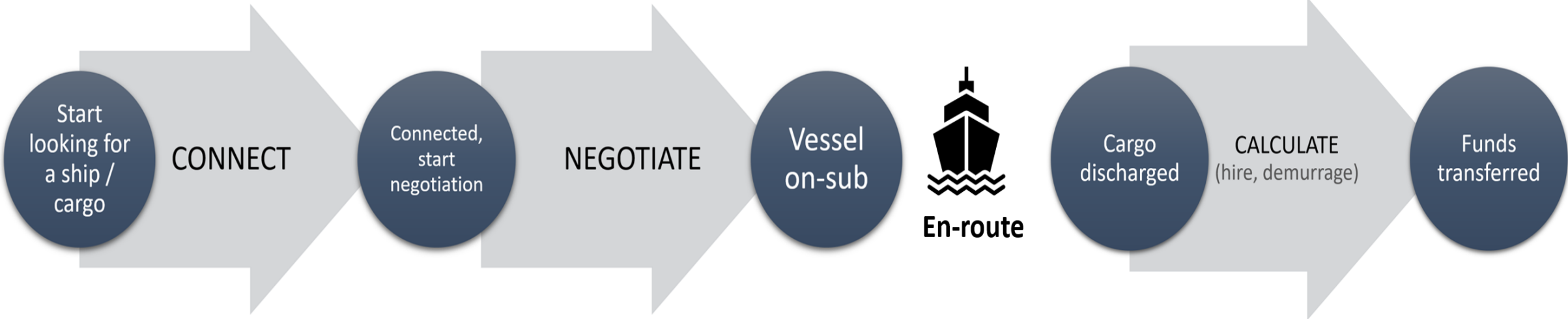
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**VALUE TRANSFER**

=

**CONTRACT**



Start looking for a ship / cargo

CONNECT

Connected, start negotiation

NEGOTIATE

Vessel on-sub



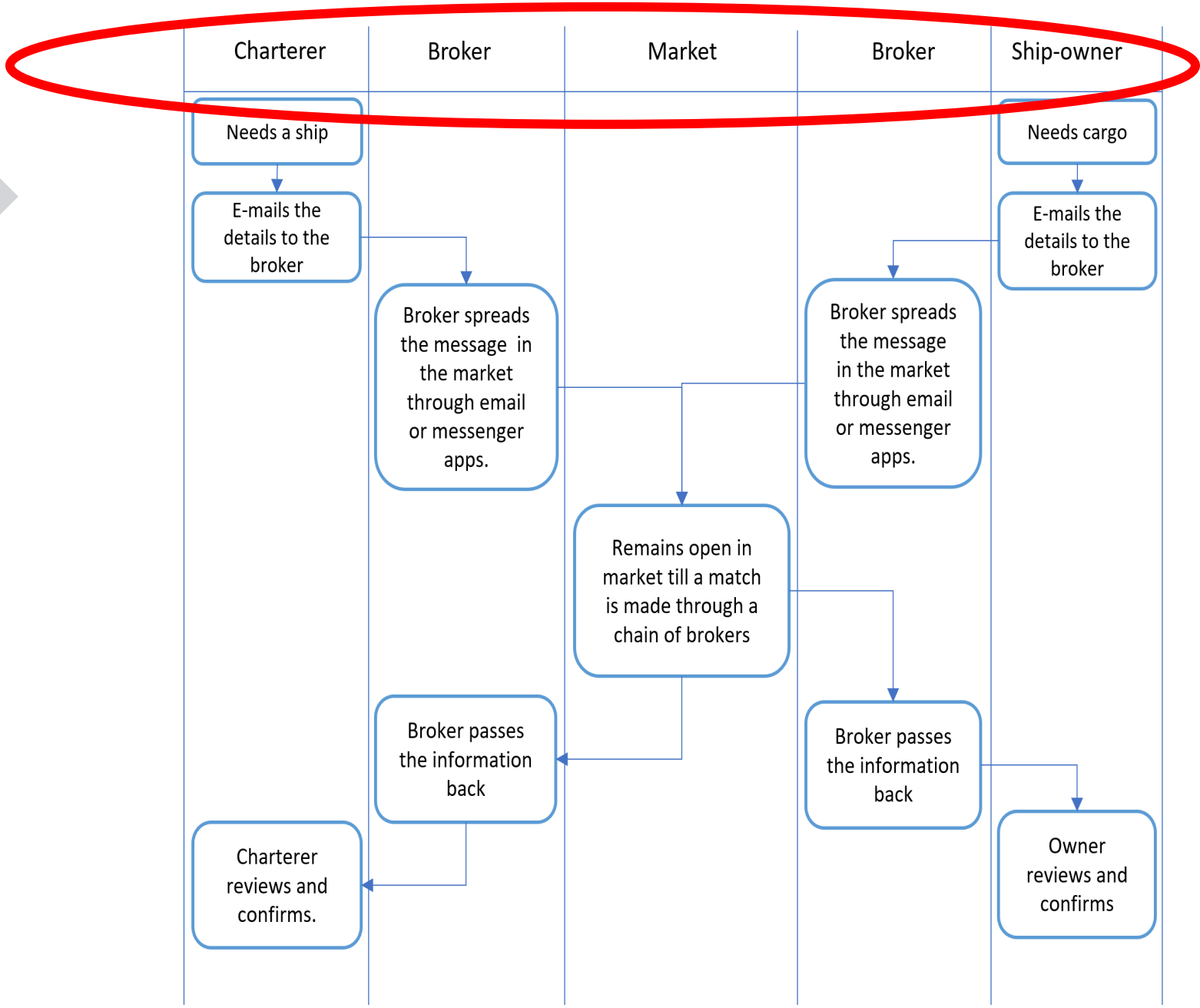
En-route

Cargo discharged

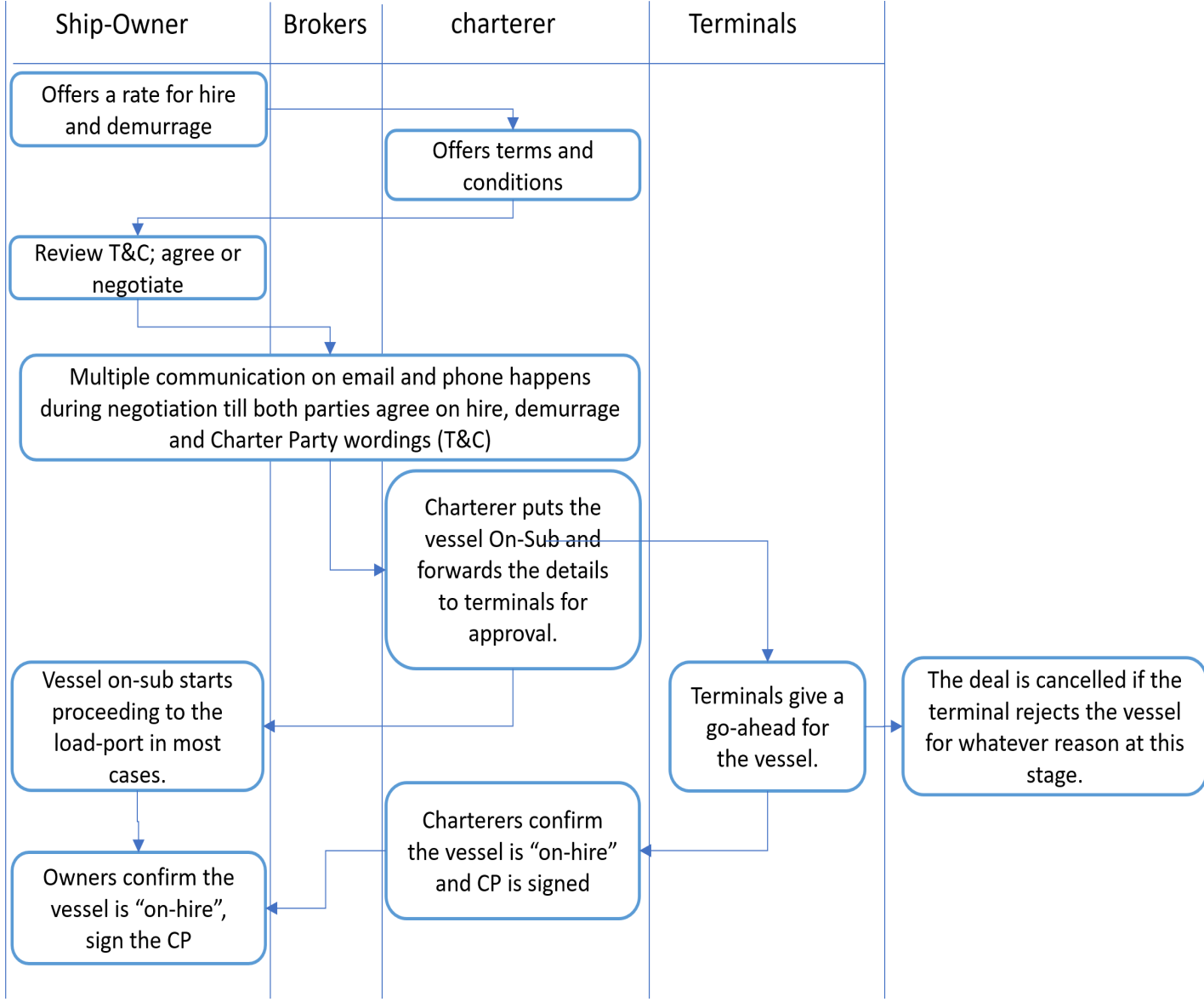
CALCULATE (hire, demurrage)

Funds transferred

Start looking for a ship / cargo

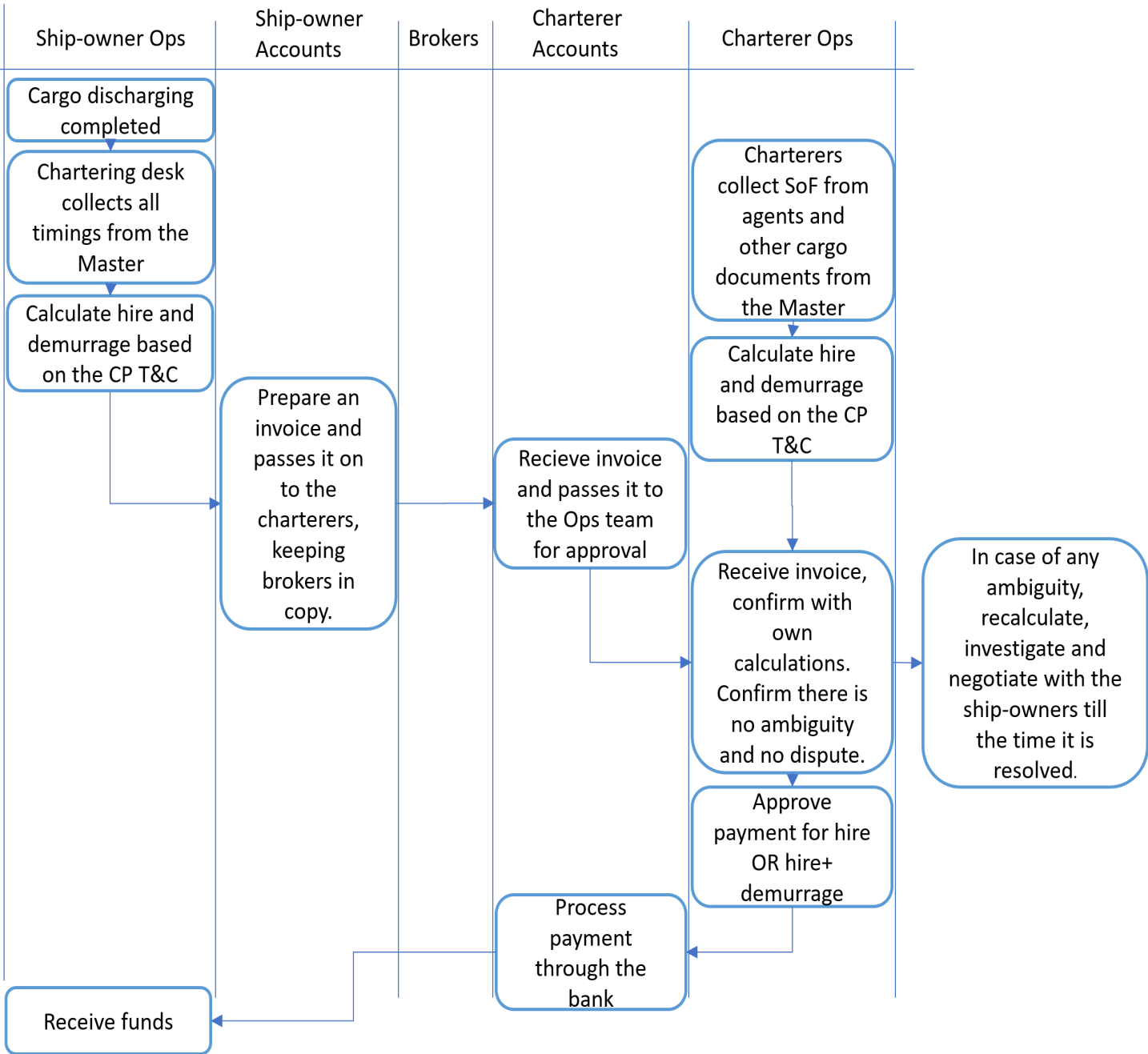


Connected,  
start  
negotiation

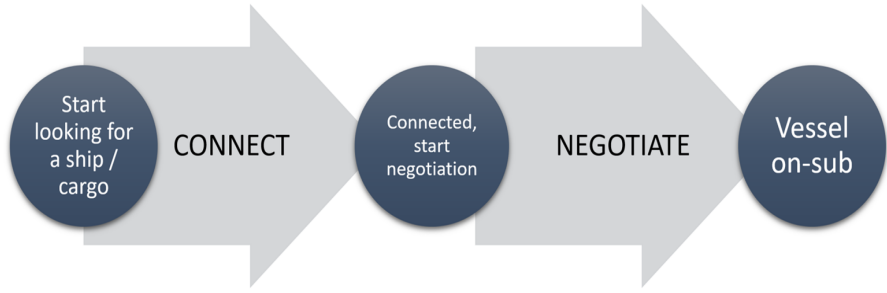


Cargo discharged

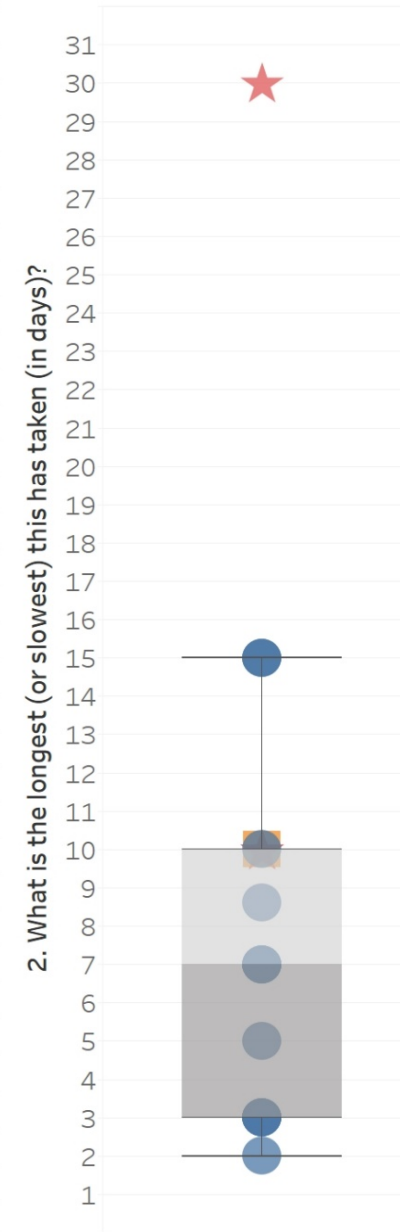
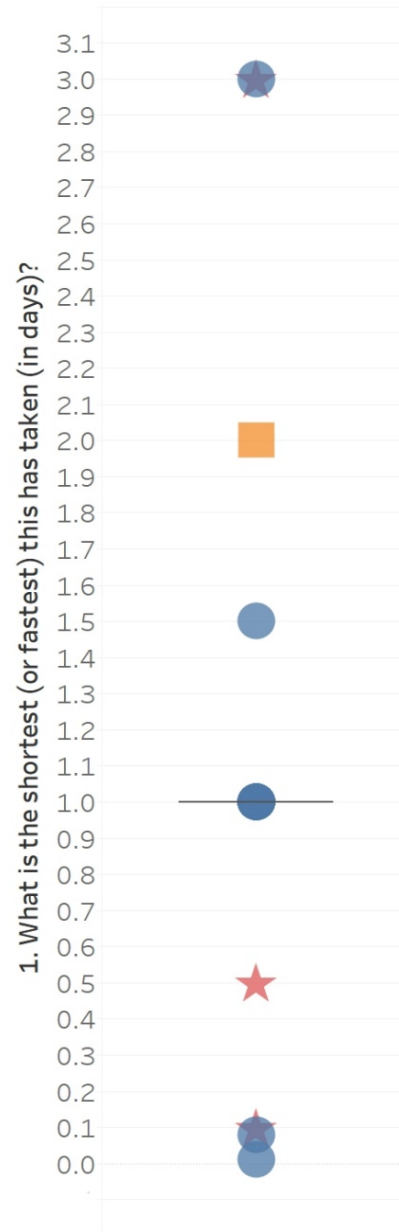
CALCULATE (hire, demurrage)



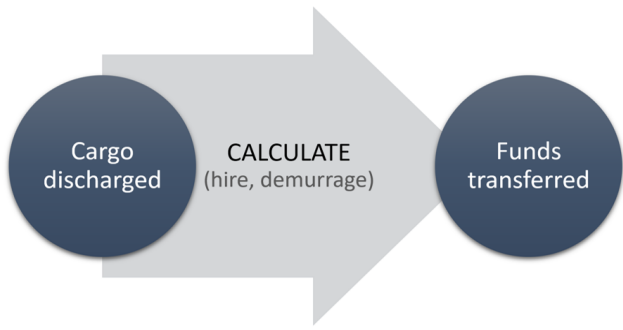




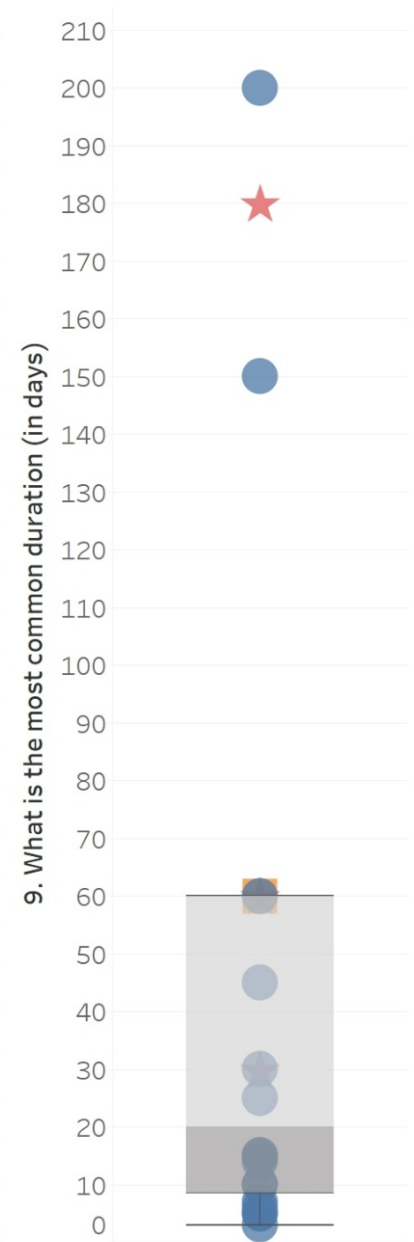
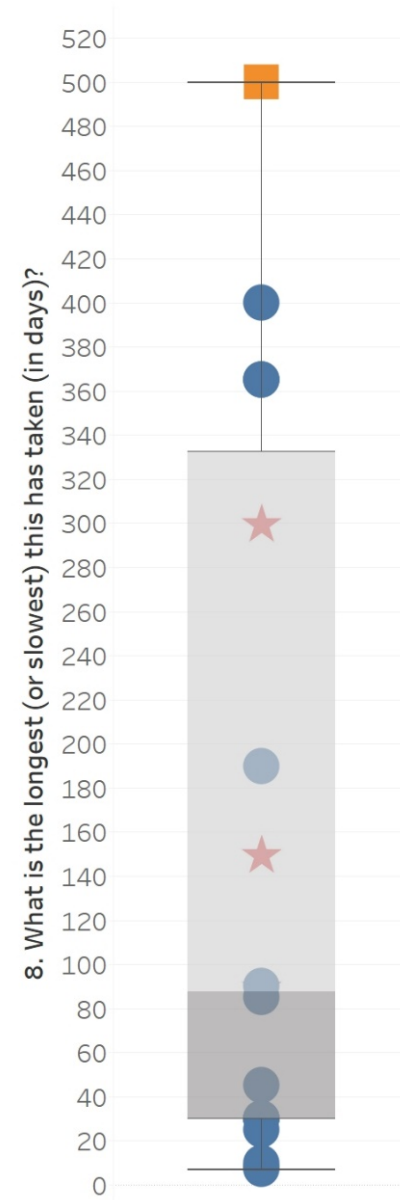
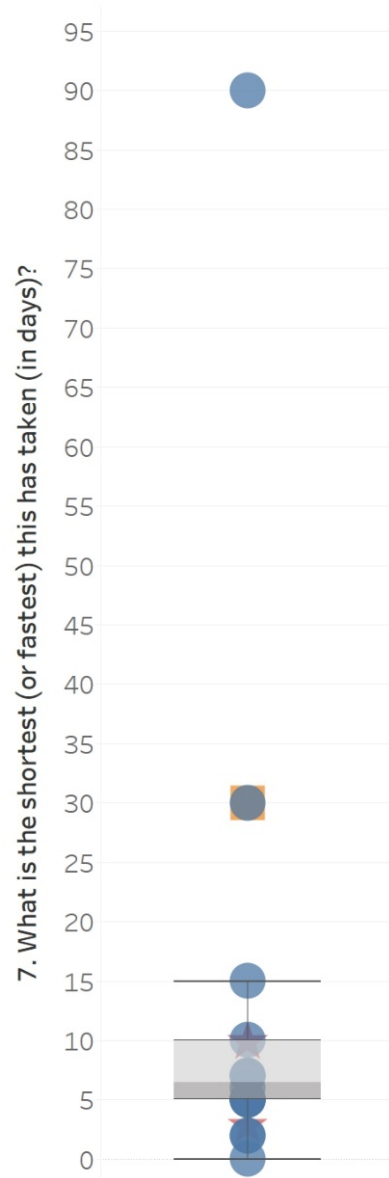
	Minimum	25 <sup>th</sup> Quartile	Median	Average	75 <sup>th</sup> Quartile	Maximum
1. Shortest	0	1	1	1	1	3
2. Longest	2	3	7	8	10	30
3. Most common	1	1	2	3	5	30



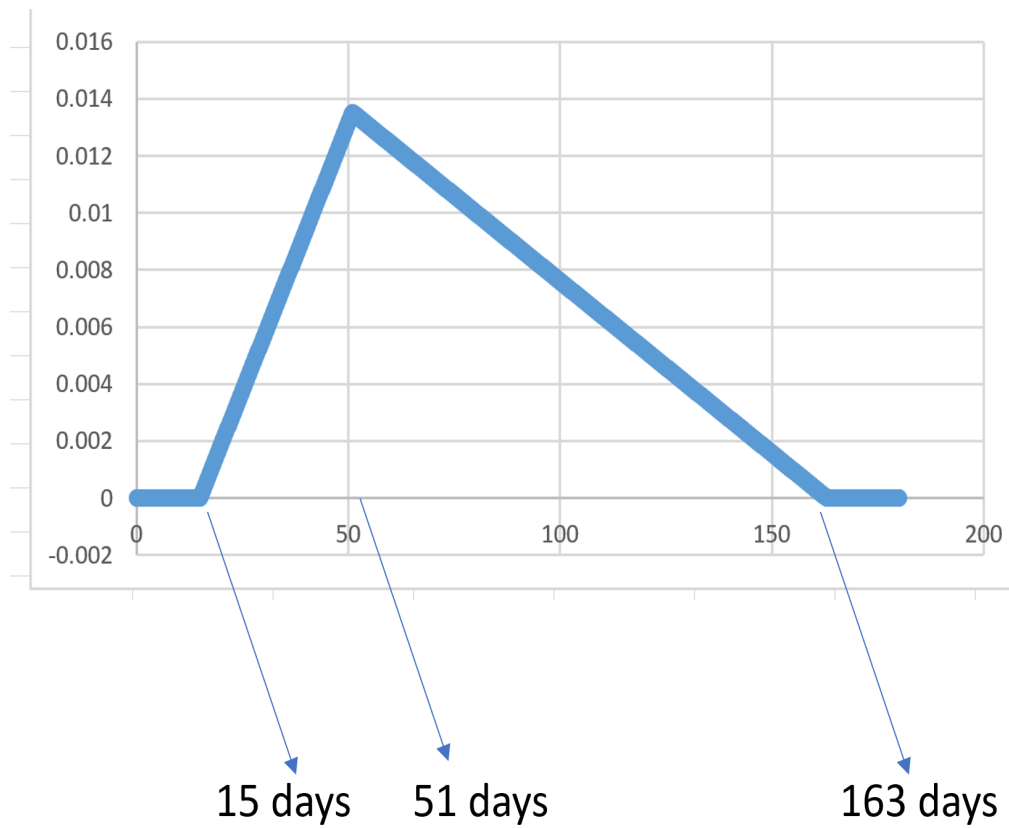
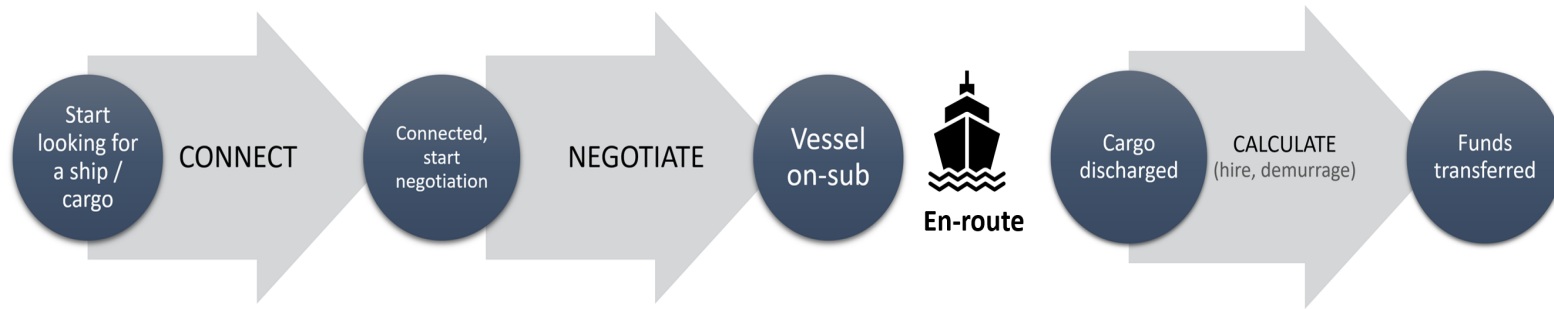
- Role
- Broker
  - Charterer/trader
  - ★ Ship-owner/operator/manager

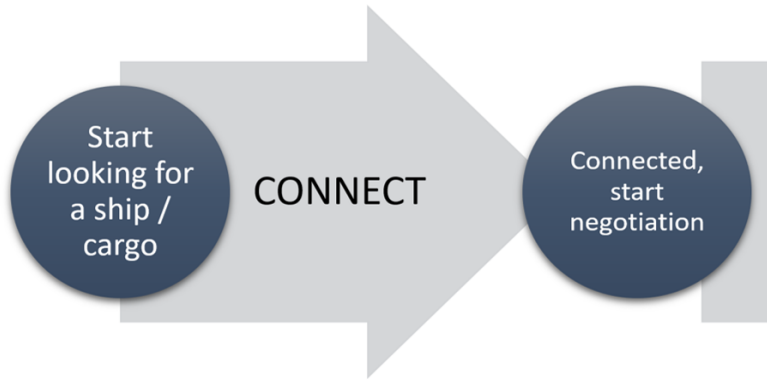


	Minimum	25 <sup>th</sup> Quartile	Median	Average	75 <sup>th</sup> Quartile	Maximum
1. Shortest	0	5	6	6	10	90
2. Longest	7	30	88	75	332	30
3. Most common	0	10	20	23	60	200

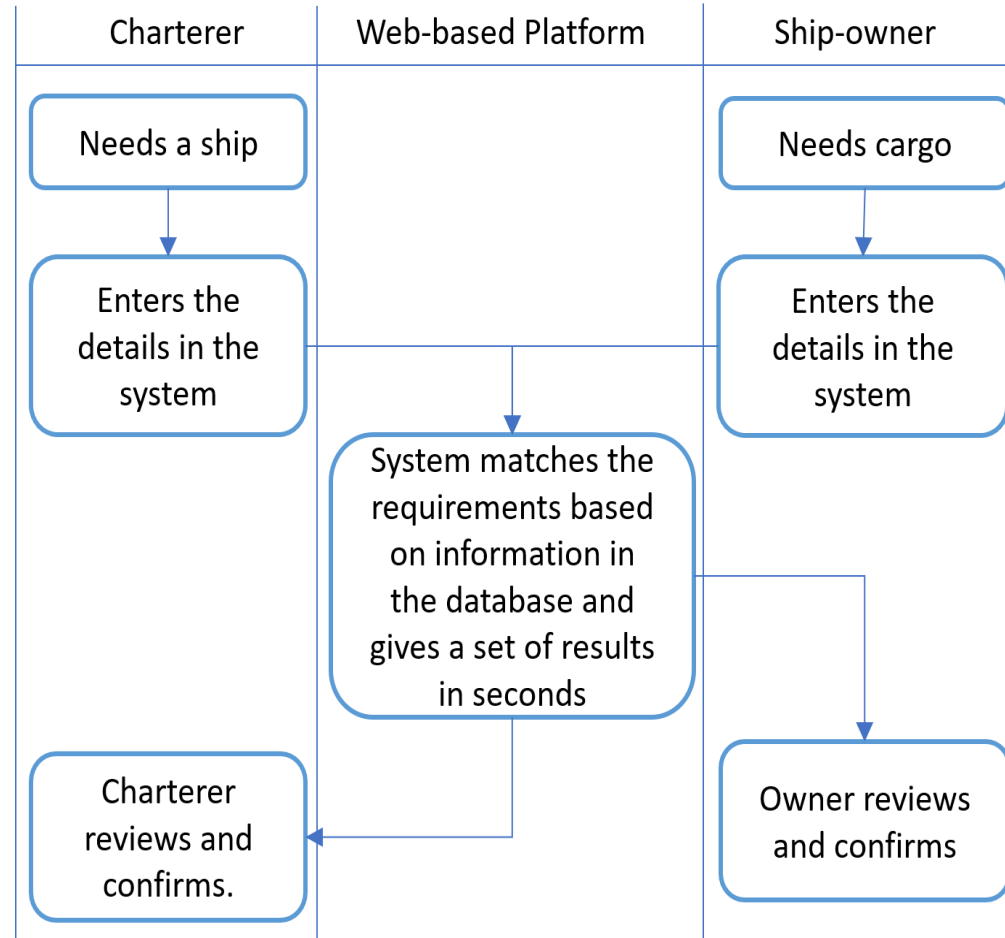


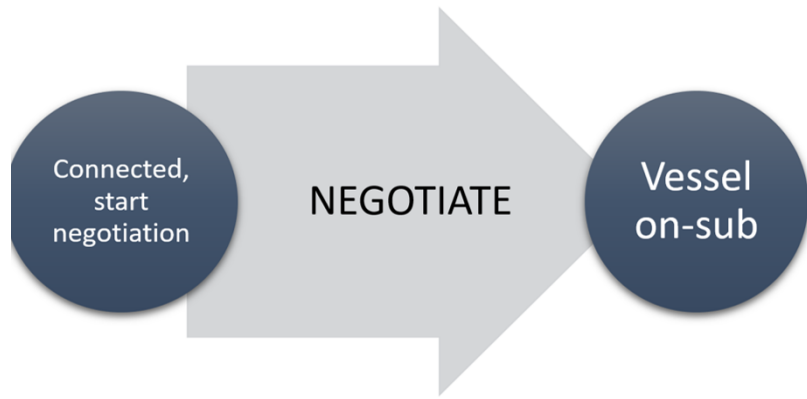
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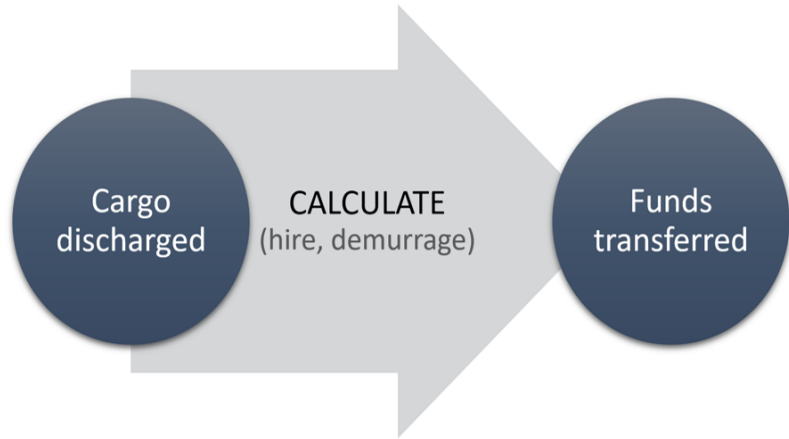


### A web-based solution

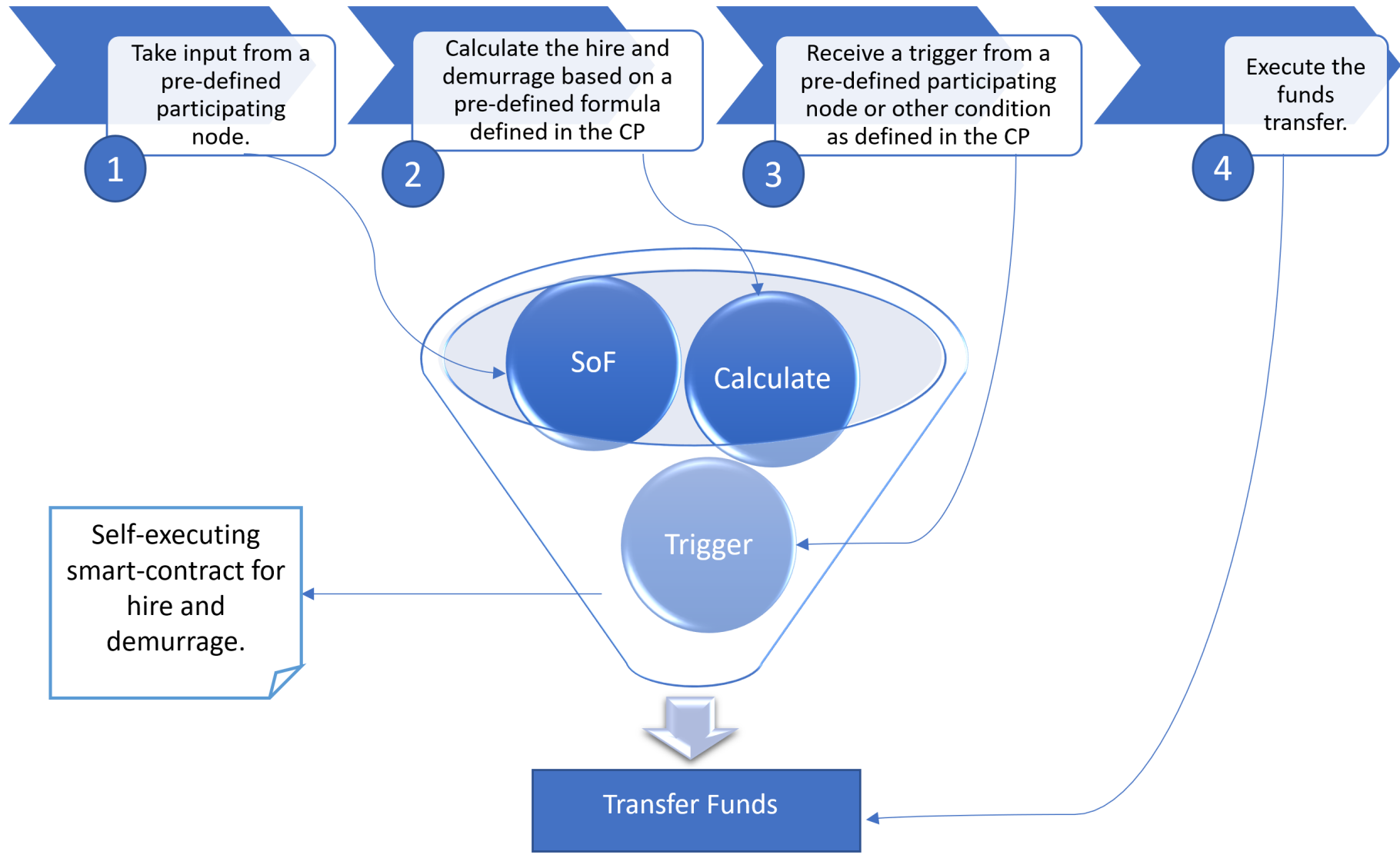


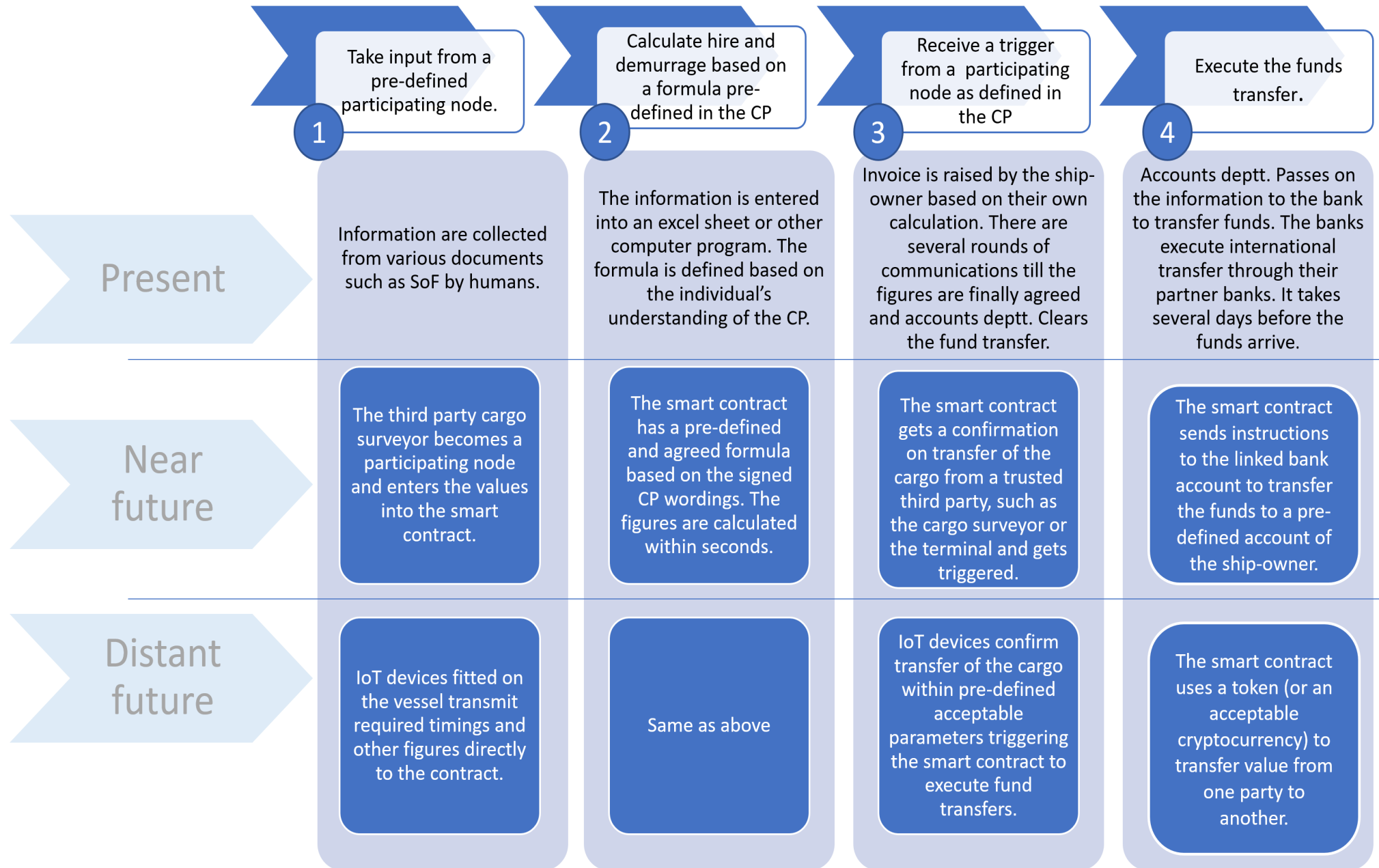


- **Natural Language Processing algorithms have limited abilities at the moment**
- **Blockchain applications do not help with this step**




## **Blockchain-based self-executing smart contracts**







# Document Management

 **Refineria Isla Curaçao B.V.** **Bill of Lading**  
(Conocimiento de Embarque)

Shipped in apparent good order and condition by REFINERIA ISLA CURAÇAO B.V.  
(Embarcado en aparente buen estado y condición por)

on board the vessel: VICTORY flag MARSHALL ISLANDS  
(a bordo del buque) (de bandera)

whereof IMDAD LIYAKAT PATANKAR is Master, loaded at EMMASTAD, PORT, CURAÇAO  
(del cual) (en su calidad de capitán, cargado en)

and to be delivered at the port of PUERTO LA CRUZ, VENEZUELA  
(y para ser entregado en el puerto de)

or, so near thereto as the vessel can safely get, always afloat unto, consigned to PDVSA PETROLEO, S.A.  
(o tan cerca del mismo donde el buque pueda arribar con seguridad a la consignación de)

of contents NAFTA CATALITICA ISLA  
(de contenido)

EXACT QUANTITY LOADED (Cantidades Exactas Cargadas)	GROSS AT 60°F (Bruto a 60°F)	NET AT 60°F (Neto a 60°F)
BARRELS OF 42 U.S. GALLONS (Barriles de 42 galones U.S.)		122,687
LONG TONS (Toneladas Largas)		14,650.000
METRIC TONS (Toneladas Metricas)		14,884.580
U.S. GALLONS (Galones U.S.)		5,152,854.00
KILOGRAMS (Kilogramos)		14,884.578
CUBIC METERS (Metros Cubicos)		19,492.635
LITERS at 15°C o 60°F (Litros a 15 °C o 60 °F)		19,492,635

To the order on payment of freight at the rate of .  
(A la orden previo pago del flete a la tasa de)

This shipment is carried under and pursuant to the terms of charter party  
(Este embarque se lleva a cabo de acuerdo y bajo los terminos del convenio de fletamento de)

Date between . and .  
(Fecha) (entre) (y)

As charterer, and all the terms whatsoever of the said charter except the rate and payment of freight specified  
(Como fletador, y todos los terminos, cualquiera que sean, del citado fletamento excepto la tasa y el pago de flete especificado)

there in apply to and govern the rights of the parties concerned in this shipment.  
(en el mismo se aplicaran y regiran los derechos de las partes en este embarque.)

In witness whereof the master has signed ( 3 ) Bills of Lading of this tenor and date, one of which being accomplished the others will be void.  
(En testimonio de lo anterior el capitán ha firmado) conocimientos de embarque del mismo tenor e igual fecha, uno de los cuales al ser prescrito dejara sin validez a los demas.)

Clauses 1 to 10 inclusive on the reverse of this Bill of Lading are incorporated herein and form part of Bill of Lading.  
(Las clausulas del 1 al 10 inclusive al dorso de este conocimiento de embarque son parte integral de este conocimiento de embarque.)

This sale is under the condition that the exporter of record is REFINERIA ISLA CURAÇAO, B.V.  
(Este venta es bajo la condición de que el exportador de registro es)


Credit Letter N° NIL Shipment N° 28928 Certificate N° NIL  
(N° Carta de Crédito) (N° Embarque) (N° Certificado)

Seac N° NIL B/L N° 10595-28928-1-1 Order N° NIL  
(Código Alfanumérico del Transportista Marítimo) (N° B/L) (Orden N°)

Import License N° NIL Indent N° NIL Partida Arancelaria NIL  
(N° Licencia de Importación)

Remarks (Observaciones)  
NIL

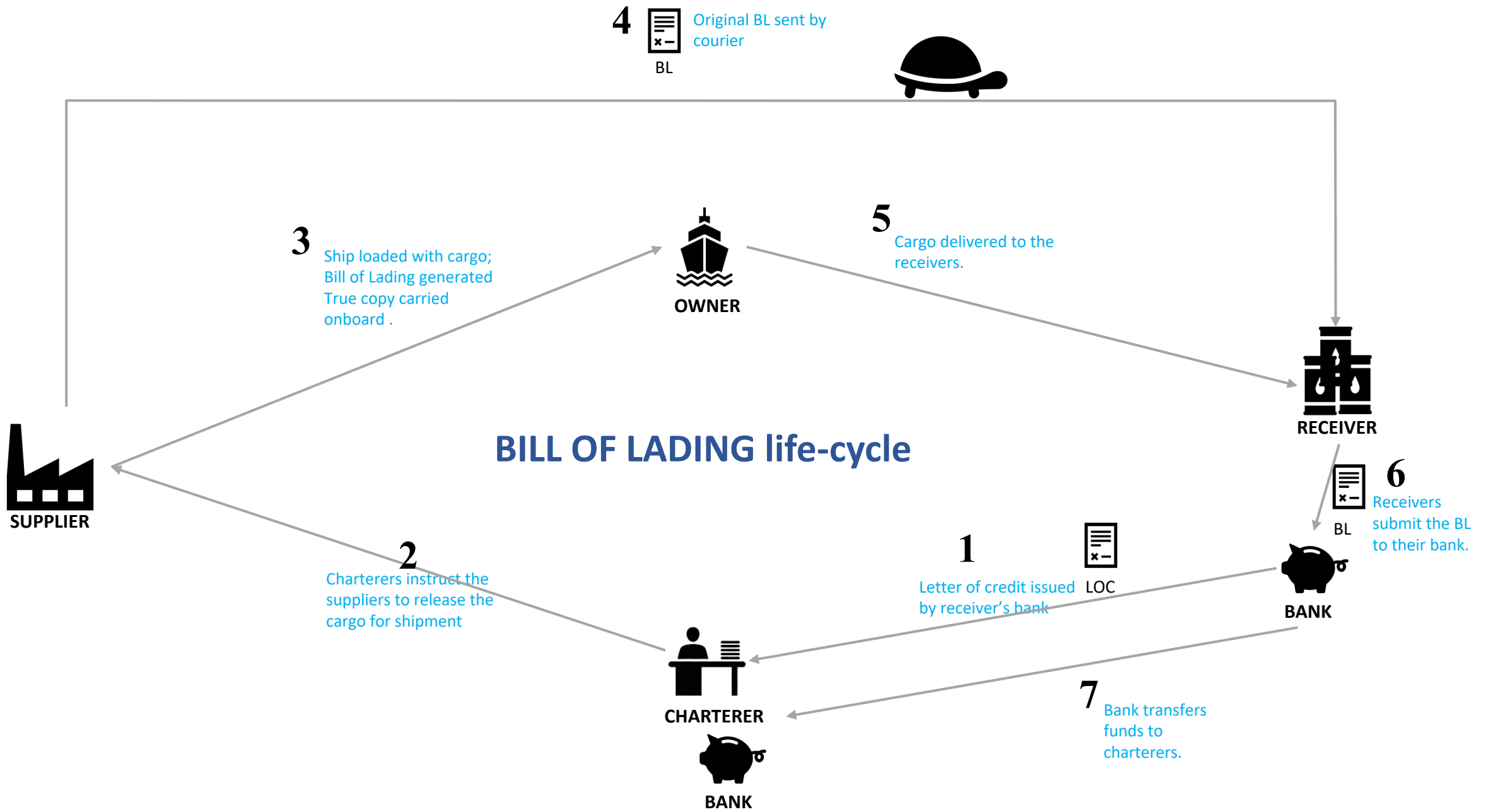
**COPY NON-NEGOTIABLE**

By Master (For el Capitán)  
Signature (Firma)   
Name (Nombre) IMDAD LIYAKAT PATANKAR

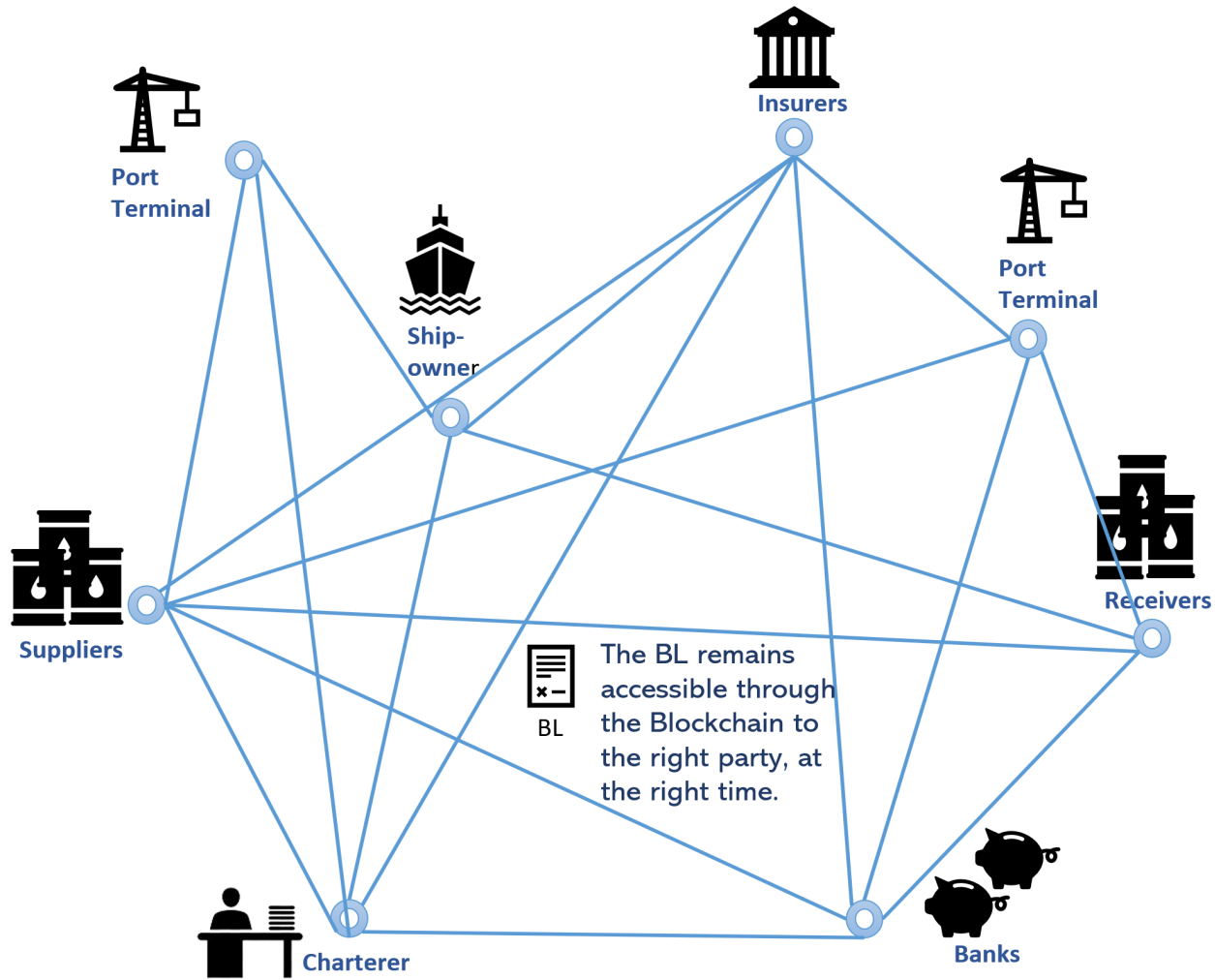
Dated at (Fecha en) EMMASTAD, PORT, CURAÇAO ON (en) October 1st, 2017

## BILL OF LADING

## Non-negotiable Document of Entitlement



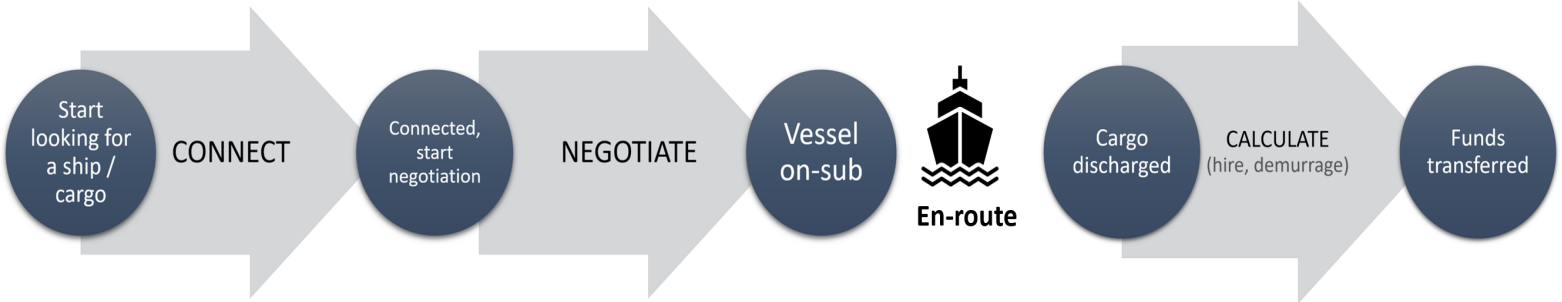
# Document Management



# Document Management

- **Charter Party Agreement**
- **Bill of Lading**
- **Certificate of Quality, Quantity and Origin**
- **Statement of Facts (Timesheet)**
- **Various Cargo documents**

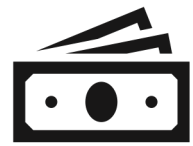
# End-to-end process re-engineering



**TRUST**



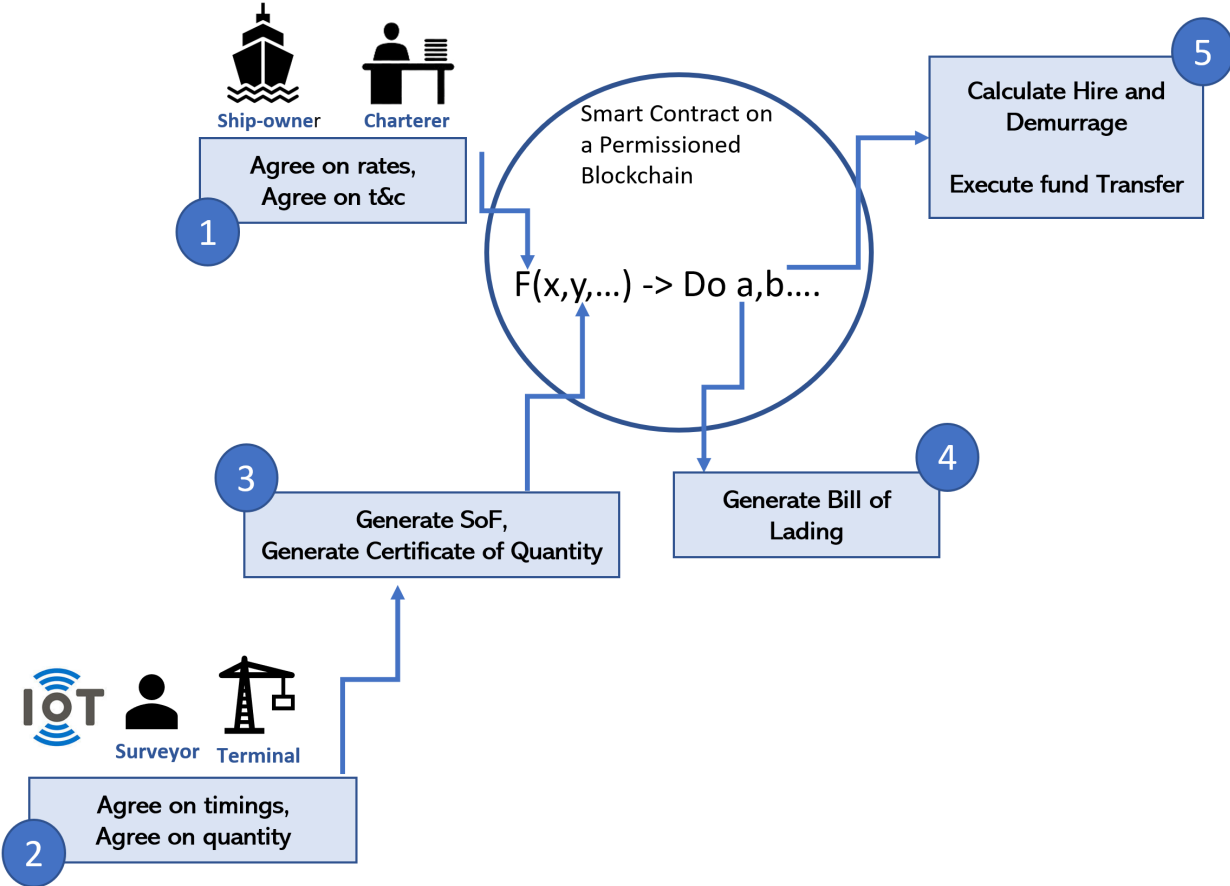
**Record Keeping**



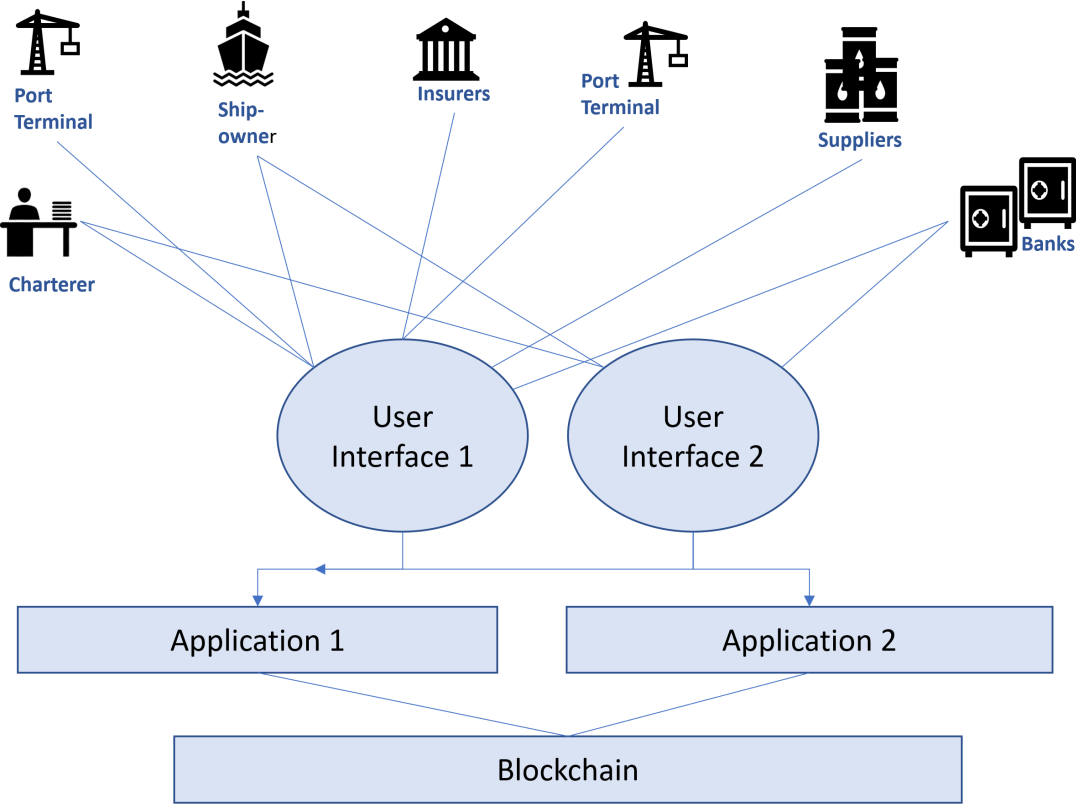
**Value Transfer**

- **Consortium-based approach**
- **End-to-end solution**

# All processes merging together



# The Blockchain of Shipping



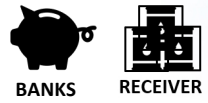
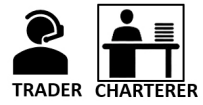
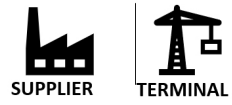


# Legal Aspects of Smart Contracts

	Traditional	Smart
Specification	Natural Language + “legalese”	Code
Assent	Signatures	Digital Signatures
Dispute resolution	Judges, Arbitrators	Decentralized platform, Arbitrators
Nullification	By judges	???
Payment	As specified	Built-in
Escrow	Trusted third party	Built-in

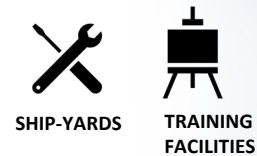
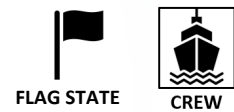
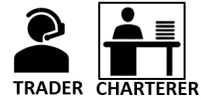
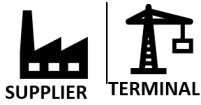
# Future Research

- **More scalable Blockchains making transactions faster and cheaper**
- **Natural Language Processing (NLP) algorithms**



**Document Management**

**Contract Management**



**Document Management**

**Contract Management**

**Certification Management**

**Value/Fund Transfers**

**Identity Management**

**Cargo Trading Platform**

**Marketplace for cargo and ships**

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- 
-

# Conclusion

- **Consortium-based approach**
- **End-to-end solution**

Thank You

**Q & A**