Blockchain demonstrator

A supply chain simulation for blockchain integration

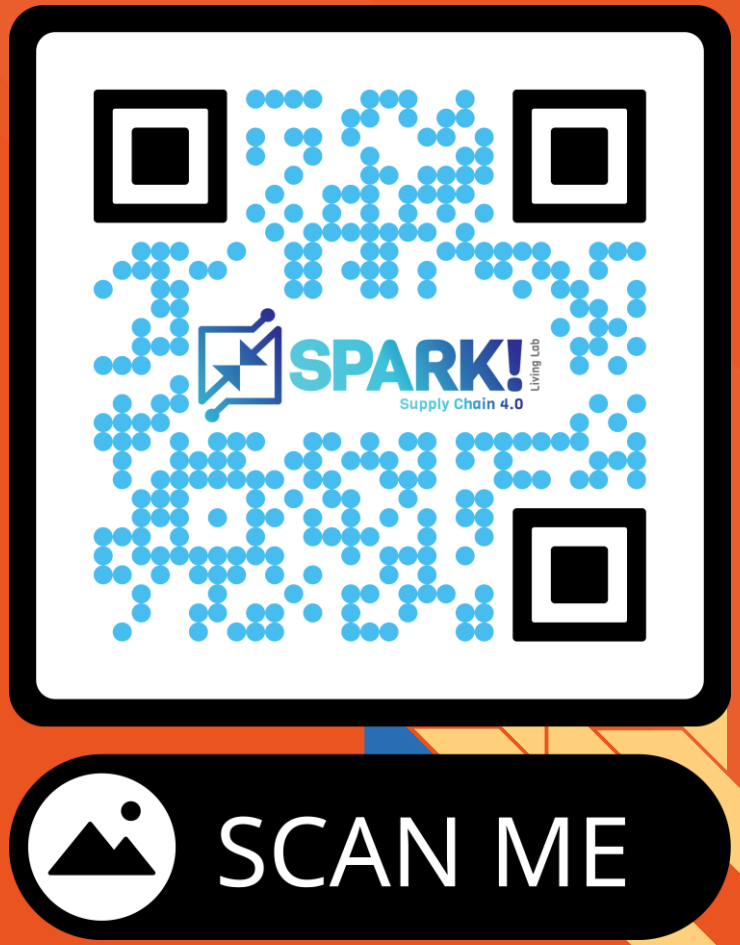
Workshop Blockchain Demonstrator

This material was (partly) realized with financing from the Topsector Logistiek.

Jamboard

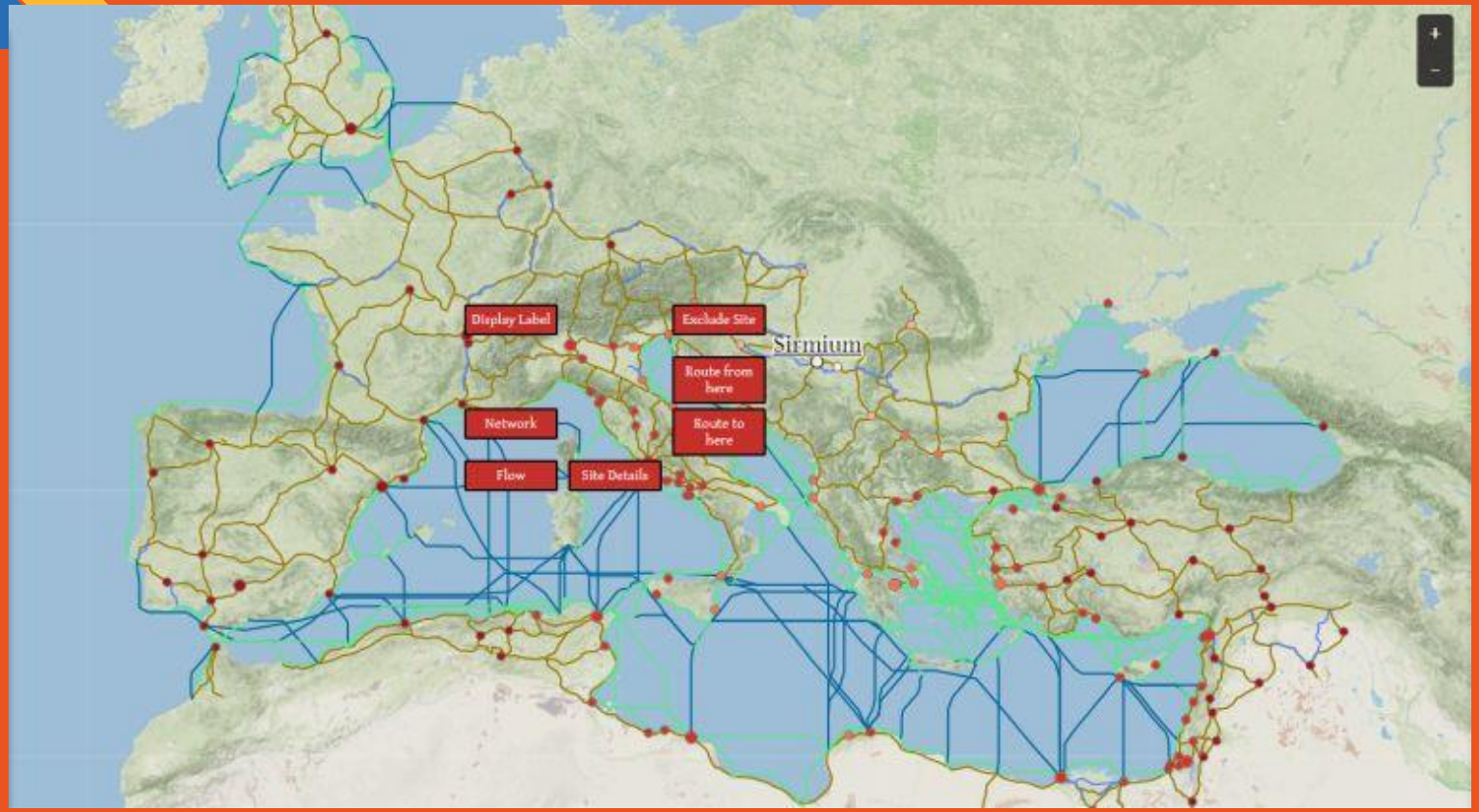
shorturl.at/gpxGH

Why are you here?
Who are you?
What would you like to learn?
What do you know about supply chain already?
What problems do you think are most prolific in supply chain?



The world of supply chain

Famous Examples



It’s all about supply chain!

What is supply chain?

The science of obtaining, producing and distributing materials and products in a proper place and in proper quantities.

- Getting stuff from A to B
- On time
- In sufficient quantities
- And sufficient quality

Seems so simple! We've been doing it for over 4000 years!

We must have gotten it right by now.. Right?


Freight traffic only
18t
Except for access
XF
EURO 6
Ani Trans
www.ani-trans.eu
DAF
AUGIZEAU
CONVOI EXCEPTIONNEL
DAF

What’s going on?

- Can technology save us?

Agenda

Intro & presentation of session’s learning outcomes

Feedback on the game preparation, discussion on bullwhip effect

Playing the bullwhip effect only game (1 round)

Feedback on bullwhip effect

Introduction of blockchain & DLT

Playing the blockchain demonstrator (1 round)

Feedback on BCDM

Conclusion & practical takeouts for real life

We are

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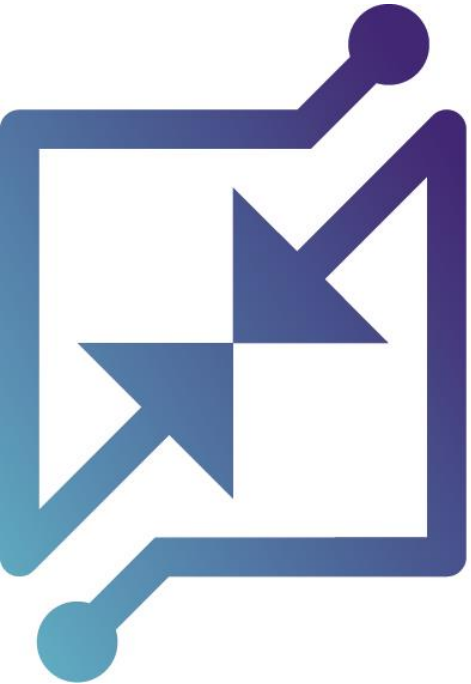


SPARK!

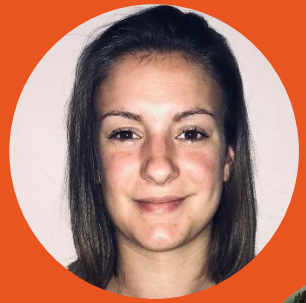
Living Lab

Supply Chain 4.0

This research project (Spark! Living Lab) is part of the research programme Sustainable Living Labs, which is co-financed by the Dutch Research Council (NWO), the Ministry of Infrastructure and Water Management, Taskforce for Applied Research (SIA) and the Top Sector Logistics.

Developed and supported by













Supply Chain Finance Community

Jamboard

shorturl.at/gpxGH

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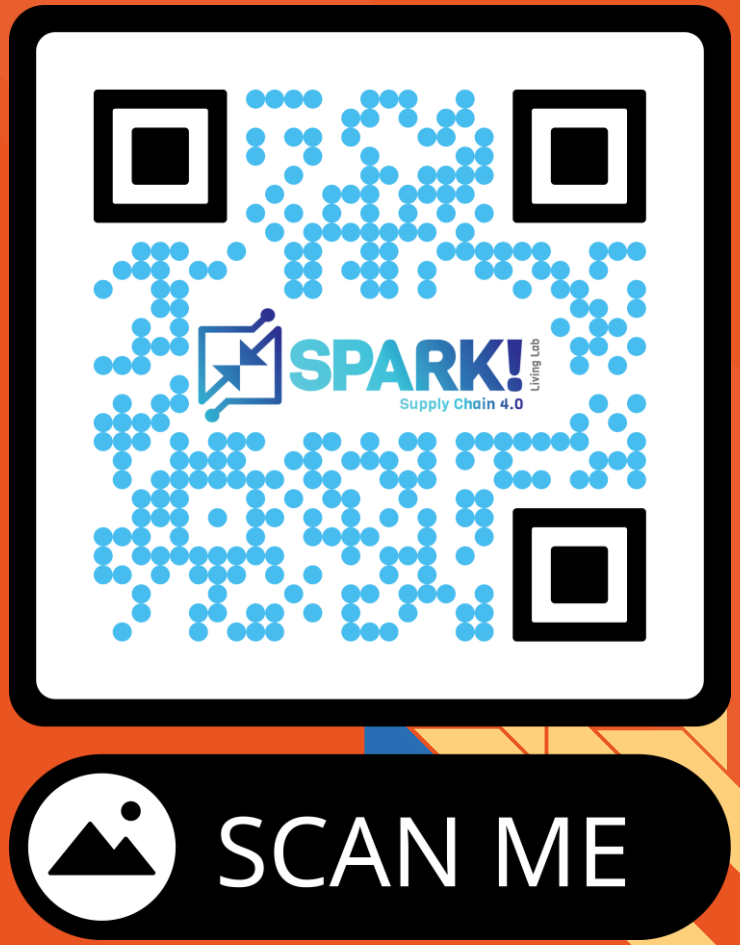
What would you like to learn?
What do you know about supply chain already?
What problems do you think are most prolific in supply chain?



Goal of today

“Feel” logistics

To participate in a simulation so that you can “feel” the effect of being in a supply chain. Gaining an insight as to why the supply chain suffers from its unique problems.

Understand Bullwhip

Understand why supply chains keep running into these problems and what it has to do with **Data.**

Foreshadow automation

Brainstorm possible improvements to the dilemmas of the supply chain

Learning objectives

What is a supply chain? 

What are important flows in a supply chain? How do they move?

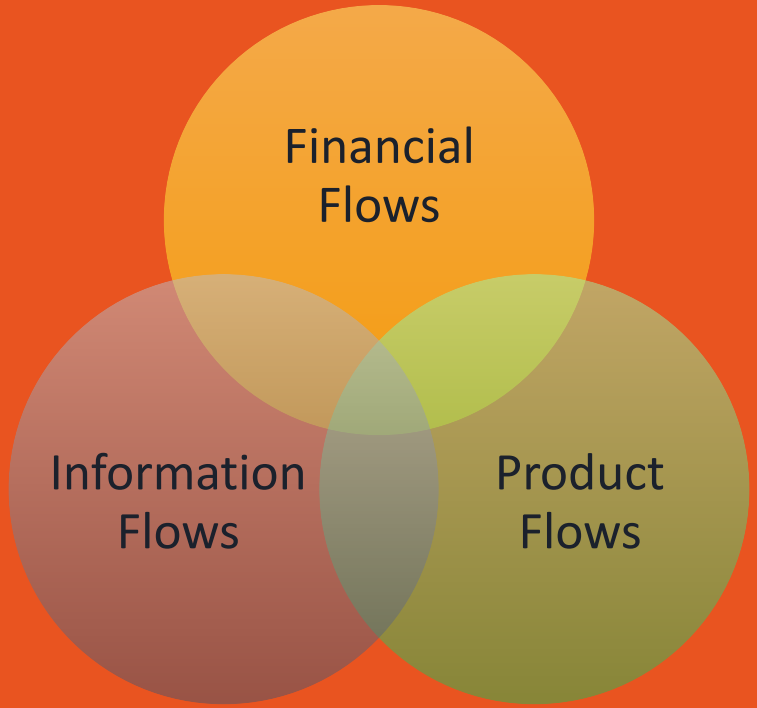
What typical supply chain reaction does the beer game show?

What are data sharing technologies (DST)? Their role? Their potential impact?

What effect DST have on the supply chain reaction shown in the beer game?

What are recommended behaviors in a supply chain?

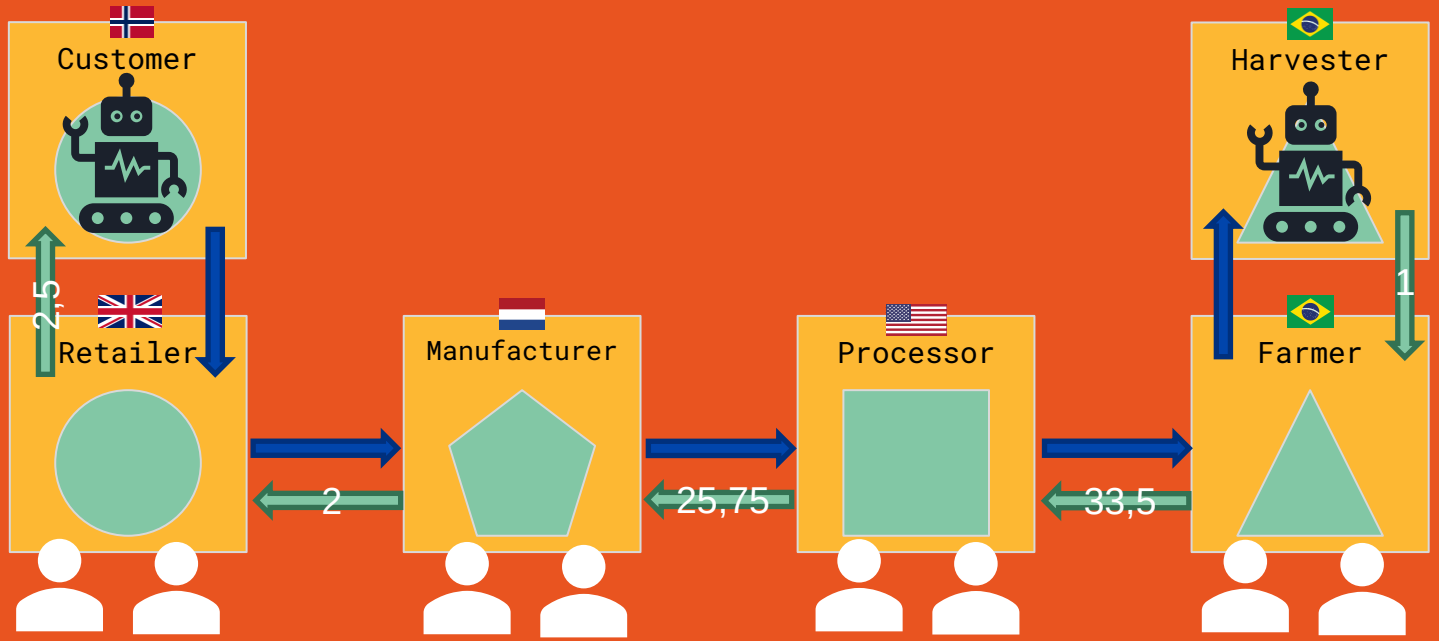
Supply chain is about



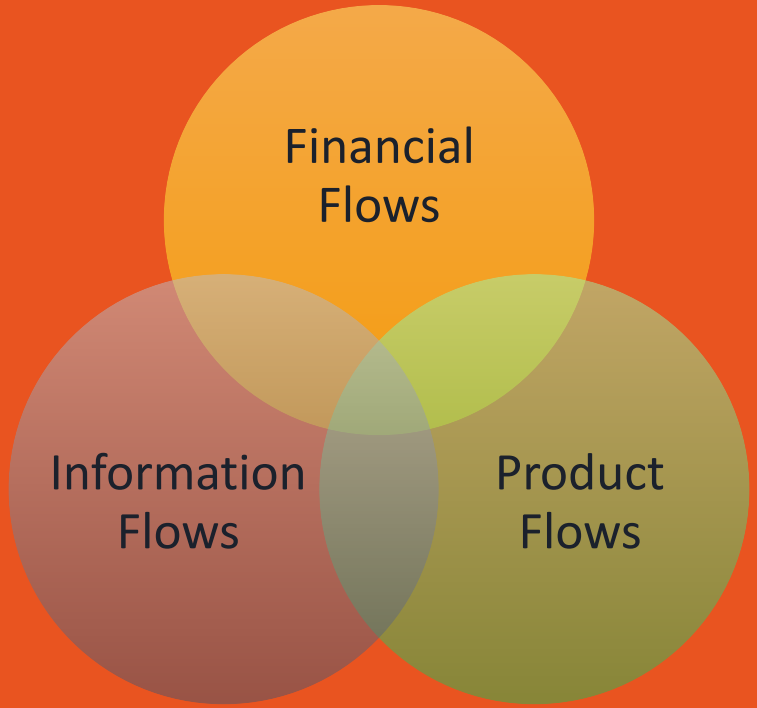
Blockchain demonstrator

Picture Thorsen

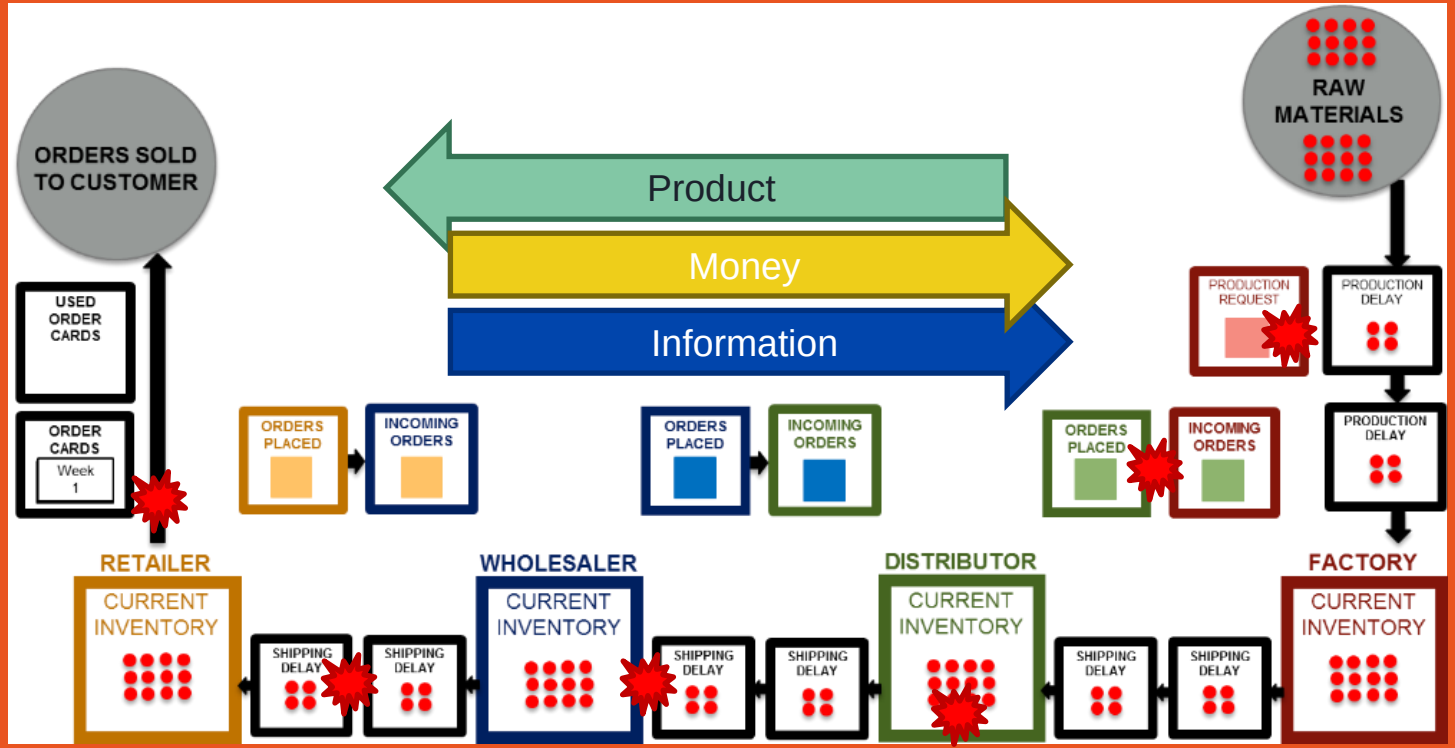
The blockchain demonstrator

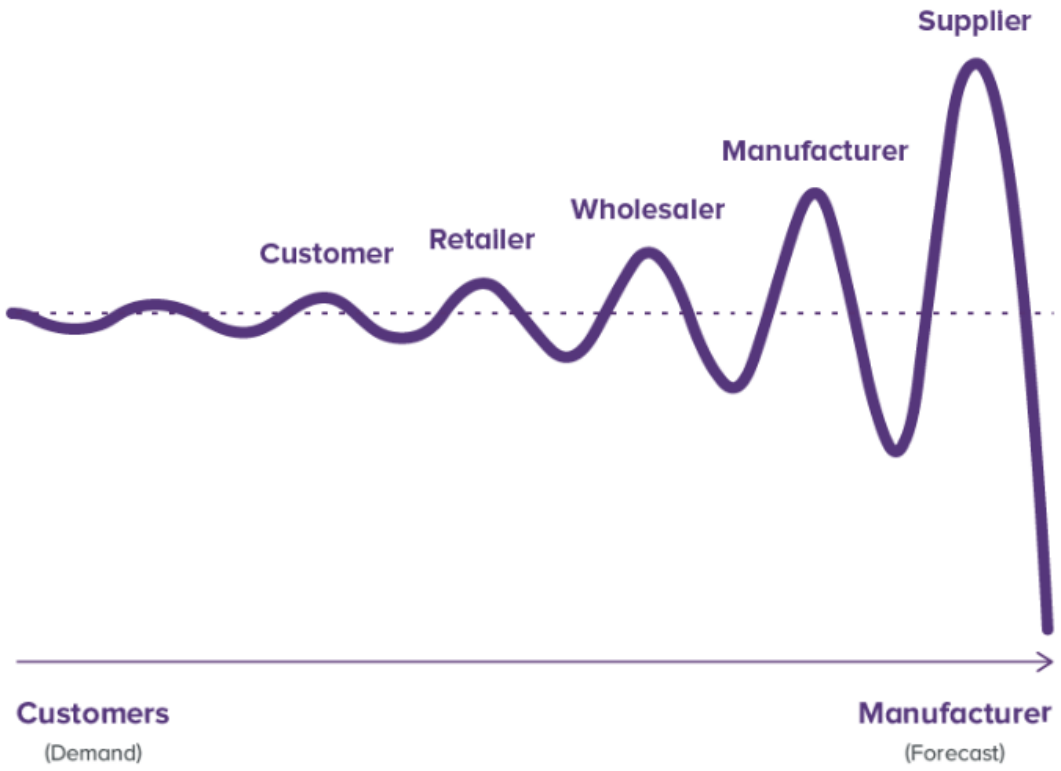


Supply chain is about



The beer game




Supplier
Manufacturer
Wholesaler
Retailer
Customer
Customers
(Demand)
Manufacturer
(Forecast)

Learning objectives

What is a supply chain?

What are important flows in a supply chain? How do they move?

What typical supply chain reaction does the beer game show?

What are data sharing technologies (DST)? Their role? Their potential impact?

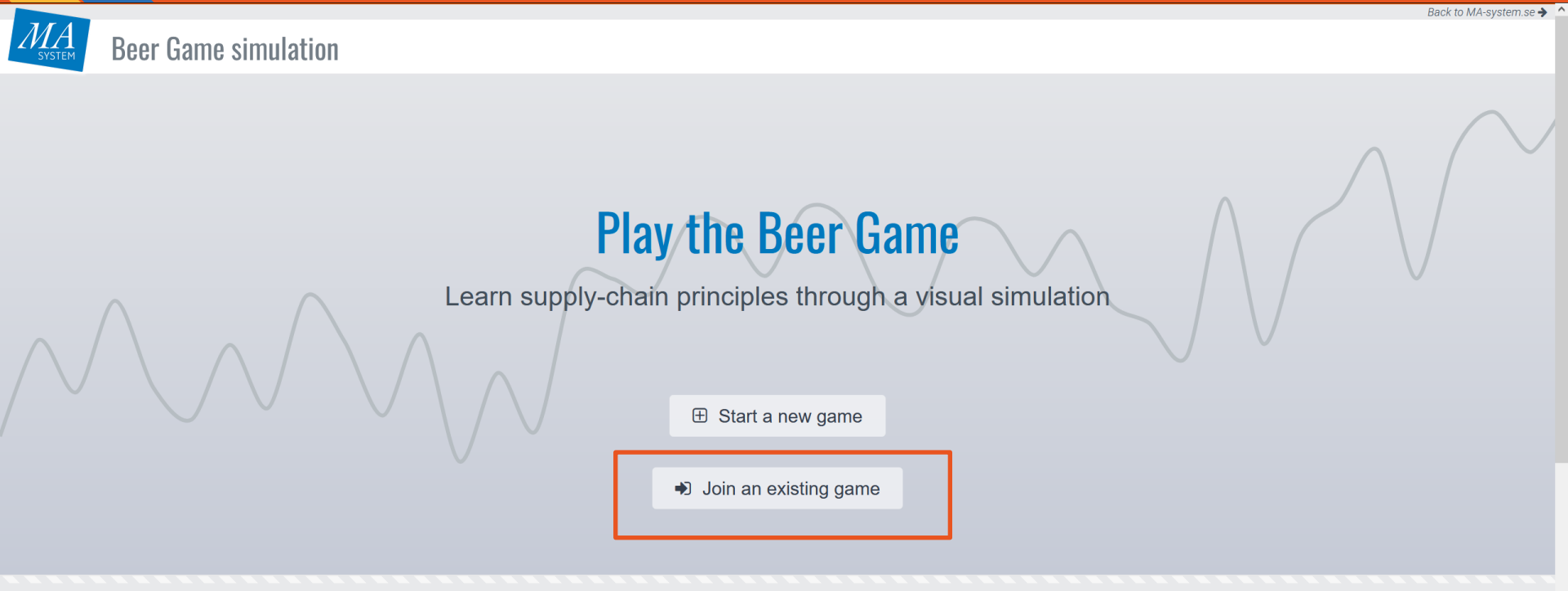
What effect DST have on the supply chain reaction shown in the beer game?

What are recommended behaviors in a supply chain?

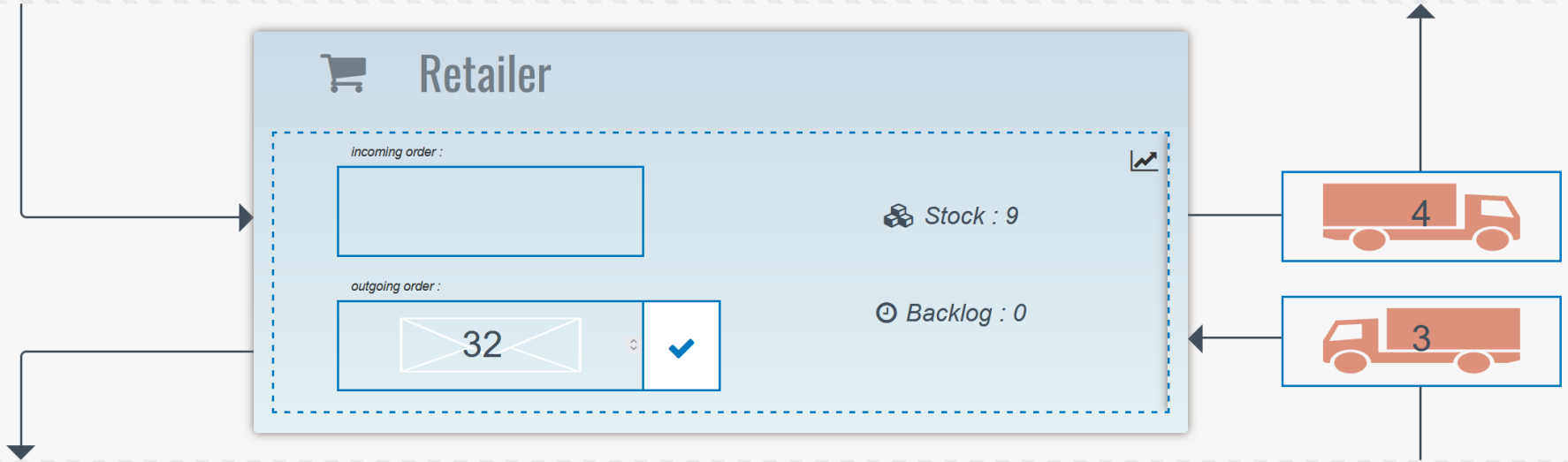
Let’s play

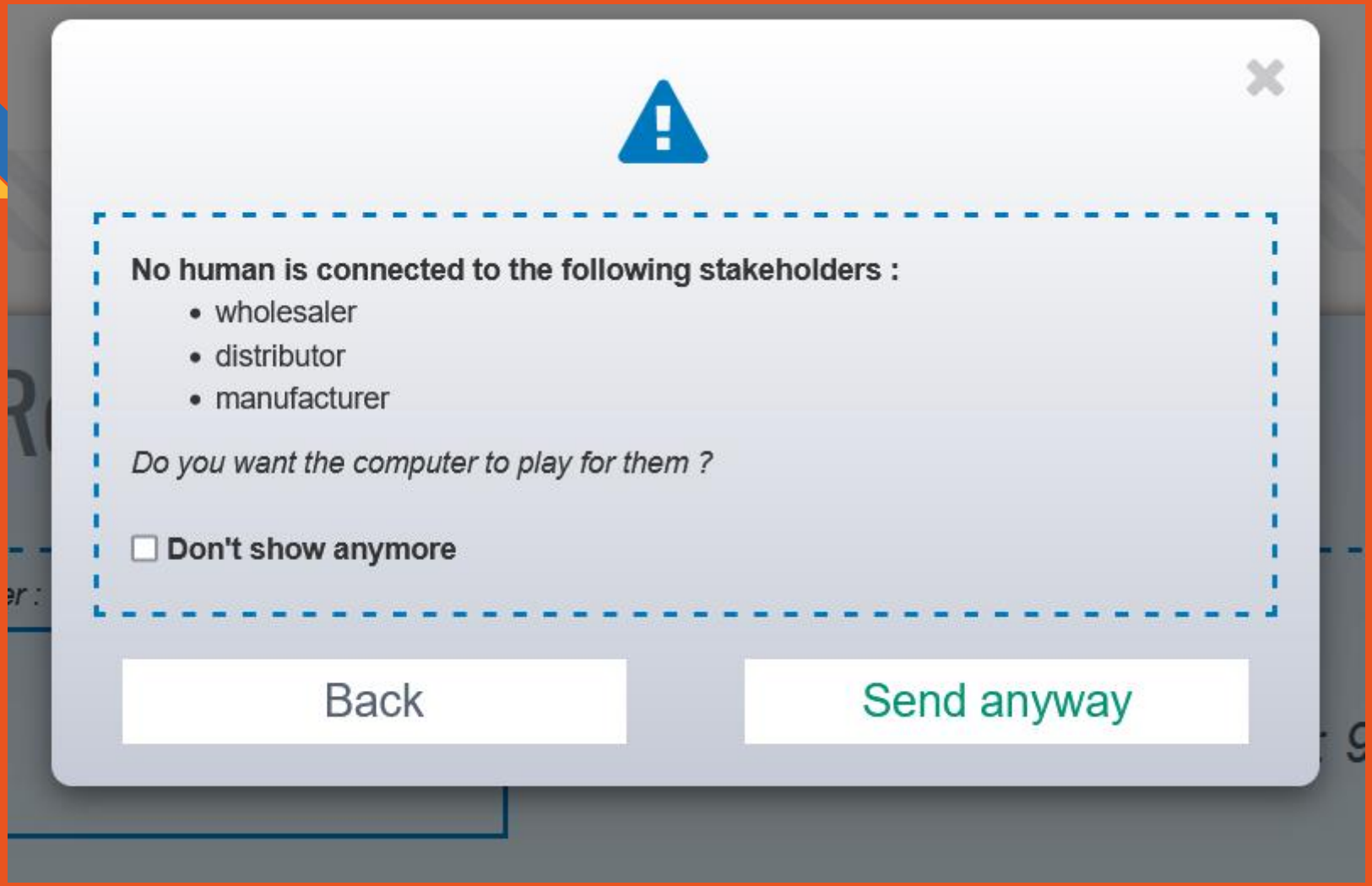
Go to:
https://demonstrator.sparklivinglab.nl/

Reflections?

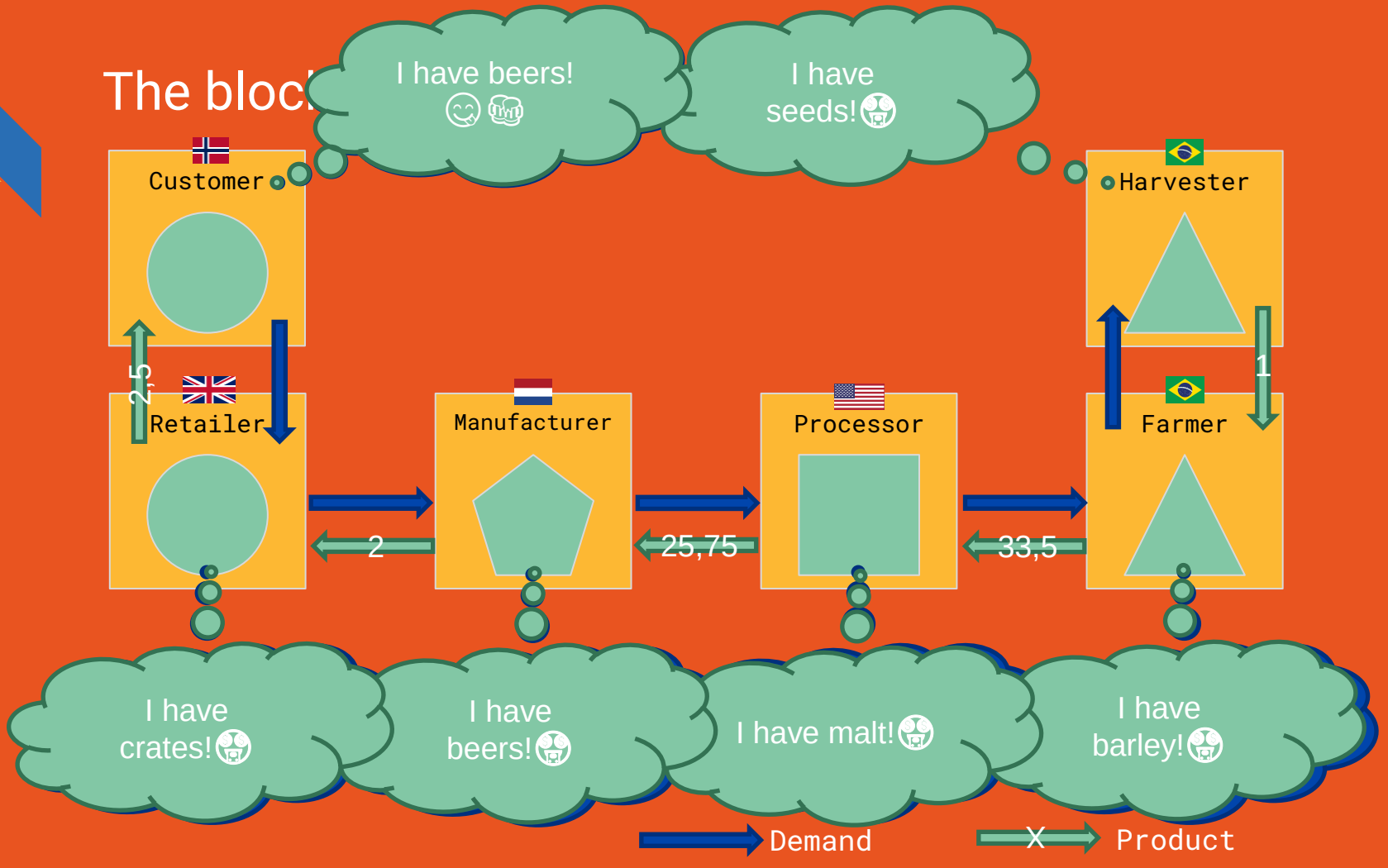

Back to MA-system.se
MA SYSTEM
Beer Game simulation
Play the Beer Game
Learn supply-chain principles through a visual simulation
Start a new game
Join an existing game

cobalagi > Retailer




No human is connected to the following stakeholders :
wholesaler
distributor
manufacturer
Do you want the computer to play for them ?
Don't show anymore
Back
Send anyway

The bloc

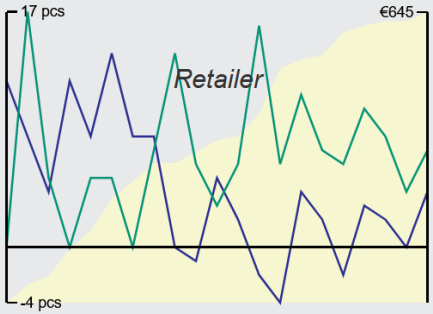

I have beers!
I have seeds!
Customer
Harvester
2,5
1
Retailer
Manufacturer
Processor
Farmer
2
25,75
33,5
I have crates!
I have beers!
I have malt!
I have barley!
Demand
X
Product

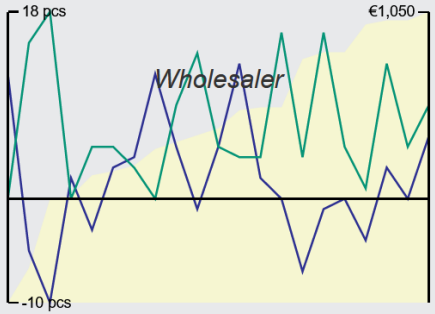
The bullwhip effect

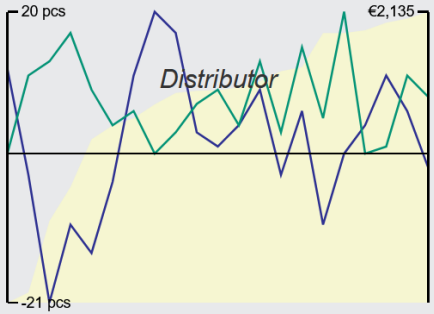
Supply-chains may reach a situation where :

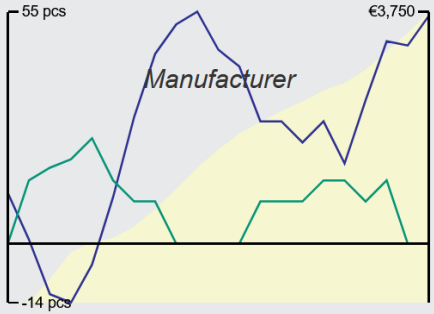
- Stakeholders alternate between phases of over-stock and out-of-stock.
- These variations increase as we move up the chain from consumer to raw-material suppliers.

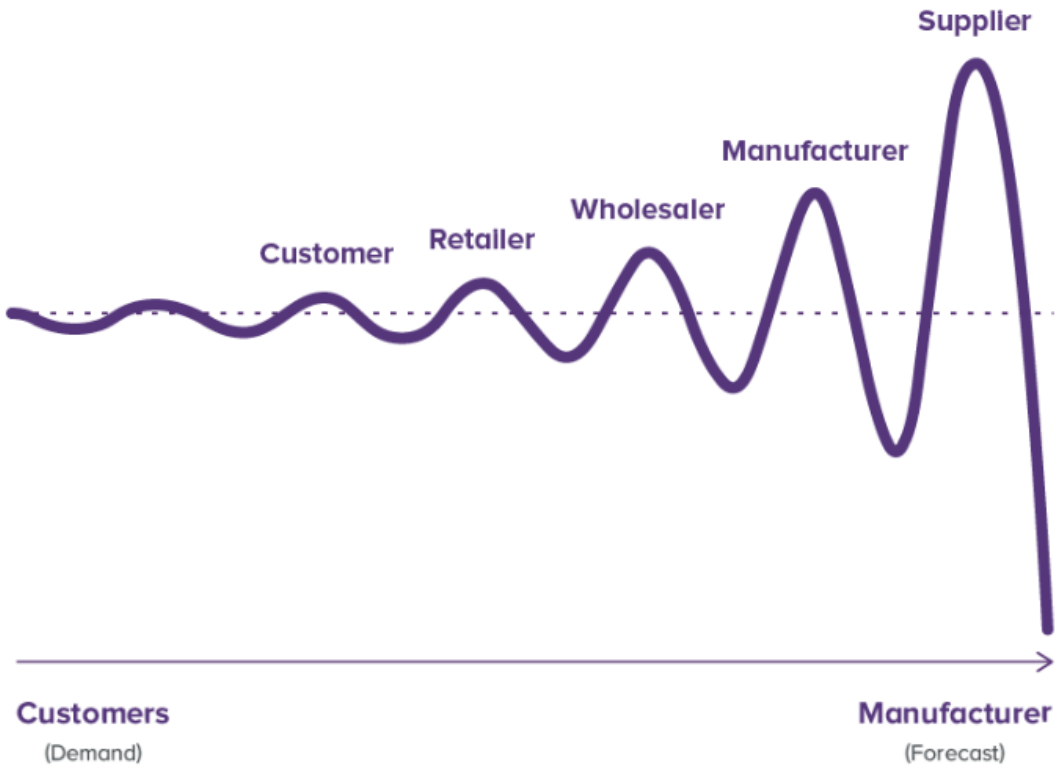
Can you identify this phenomenon in the graphs below ?










Supplier
Manufacturer
Wholesaler
Retailer
Customer
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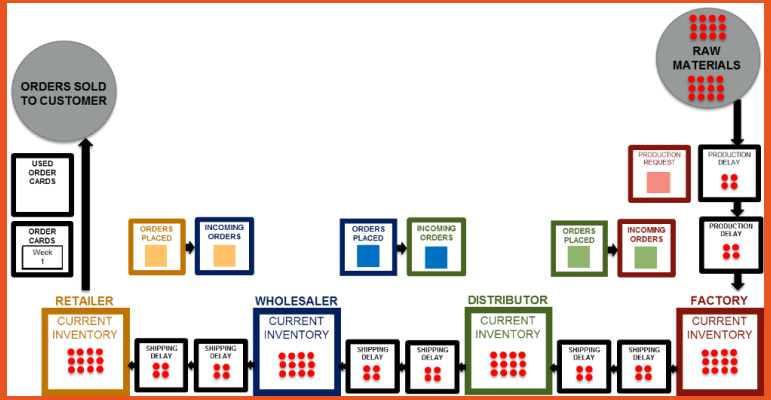
(Forecast)

Preparations -> Game 2



IBM | MAERSK

TRADELENS

The IBM Tradelens use case

About cargo freight management

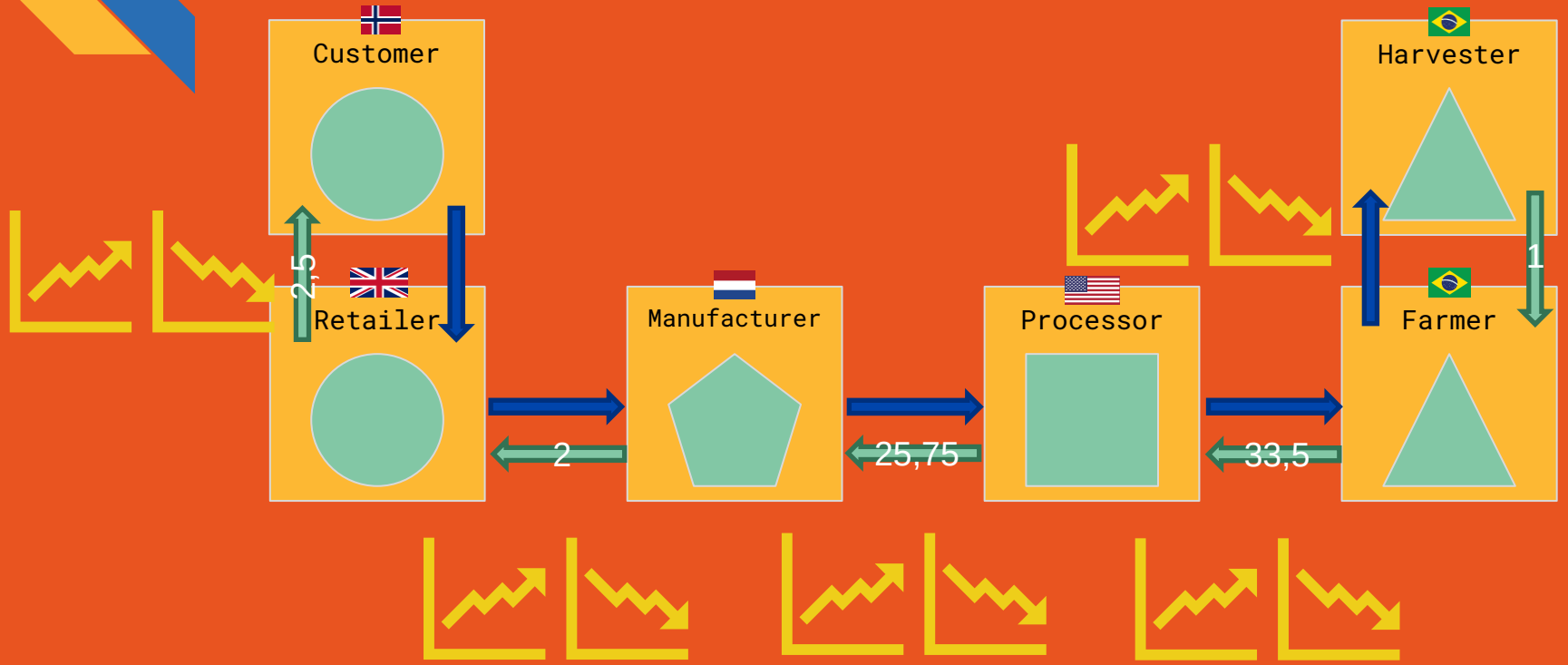
Automated exchange of information

Making paper-based processes more efficient

A real application of blockchain on a supply chain

With some real results

The blockchain demonstrator



One duo, two key roles

Person A

- Is on the web app
- Input order
- Tracks inventory changes
- Tracks customer order changes
- Proposes new order

Person B

- In on the Gsheet
- Input for each round
    + Order to supplier
    + Inventory
    + Balance

Looks for trend, pattern with graphs

Advises on order

Home Page - Blockchain Demo

128.199.35.228

SPARK!

Login

THE BLOCKCHAIN DEMONSTATOR

BEERGAME

Insert game id...

Join game

Game id: xxxxxx

Type here to search

NLD 08:44 15/09/21

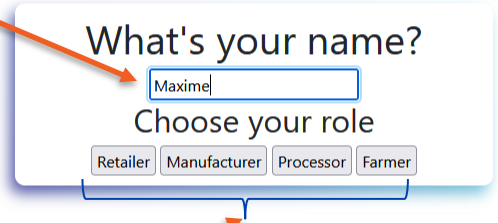
Choose name and role - Block

128.199.35.228/BeerGame/ChooseRoleAndName

SPARK!

Login

Name here

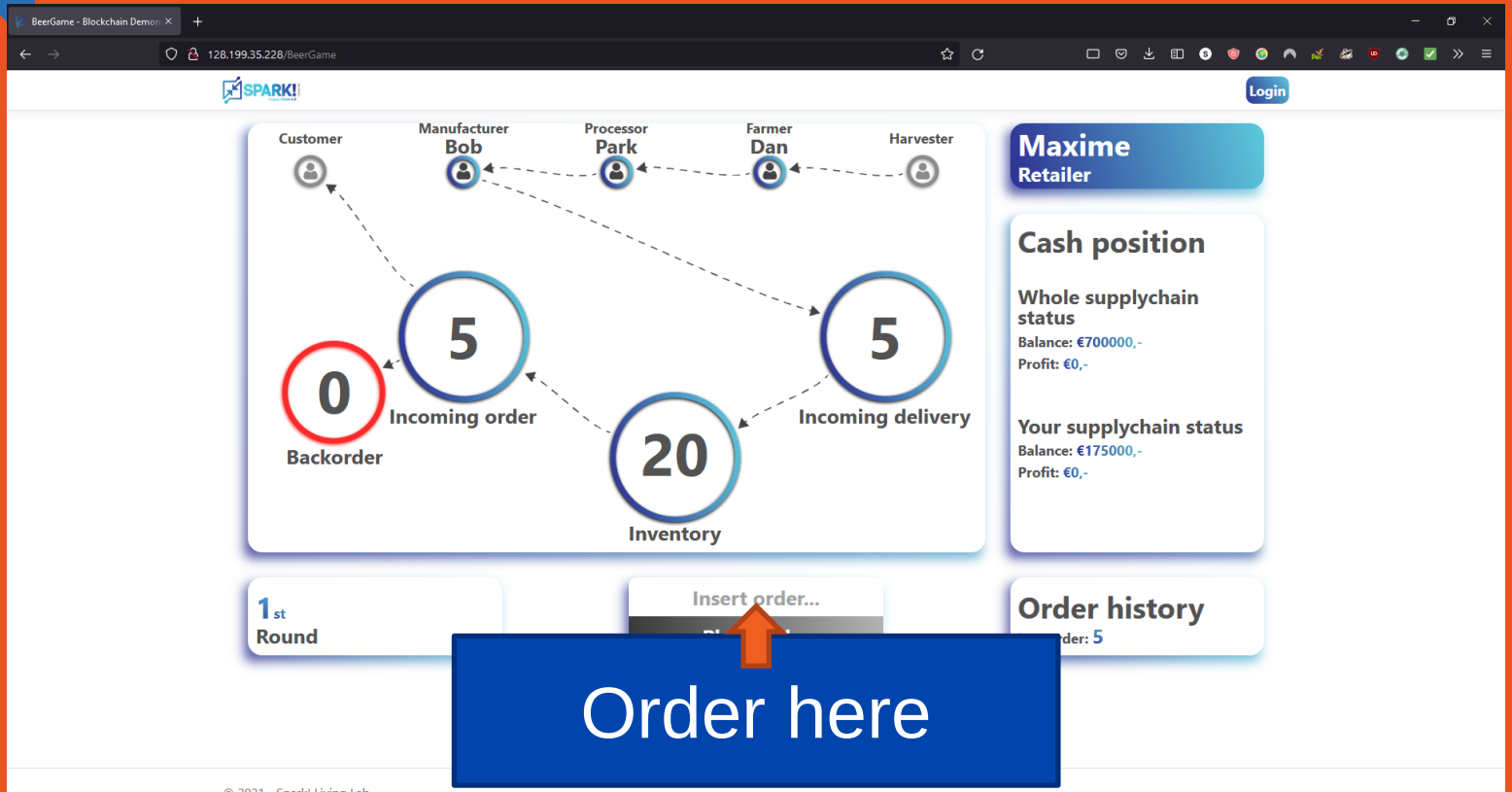


Choose role

Type here to search

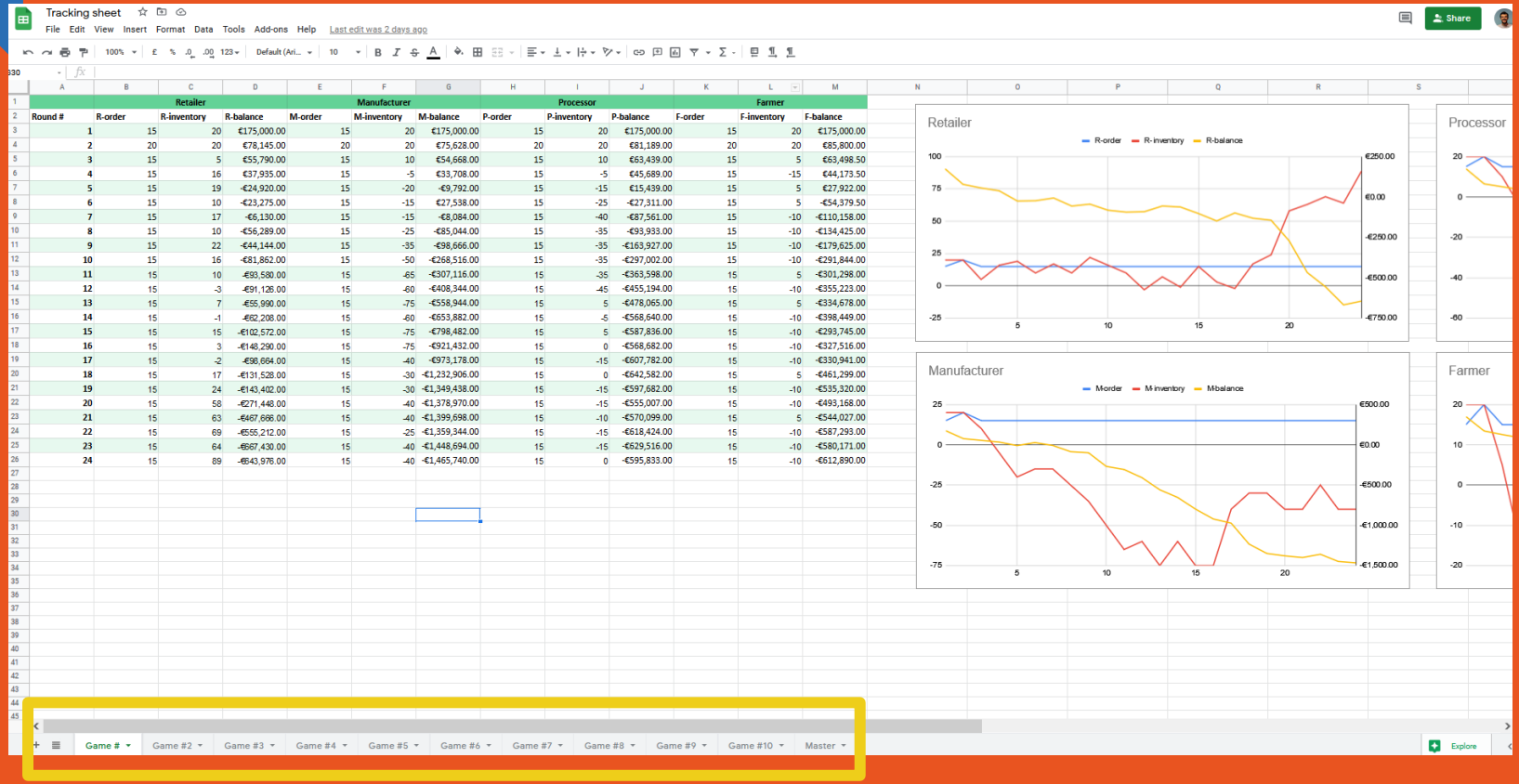
NLD 08:48 15/09/21

The gameplay

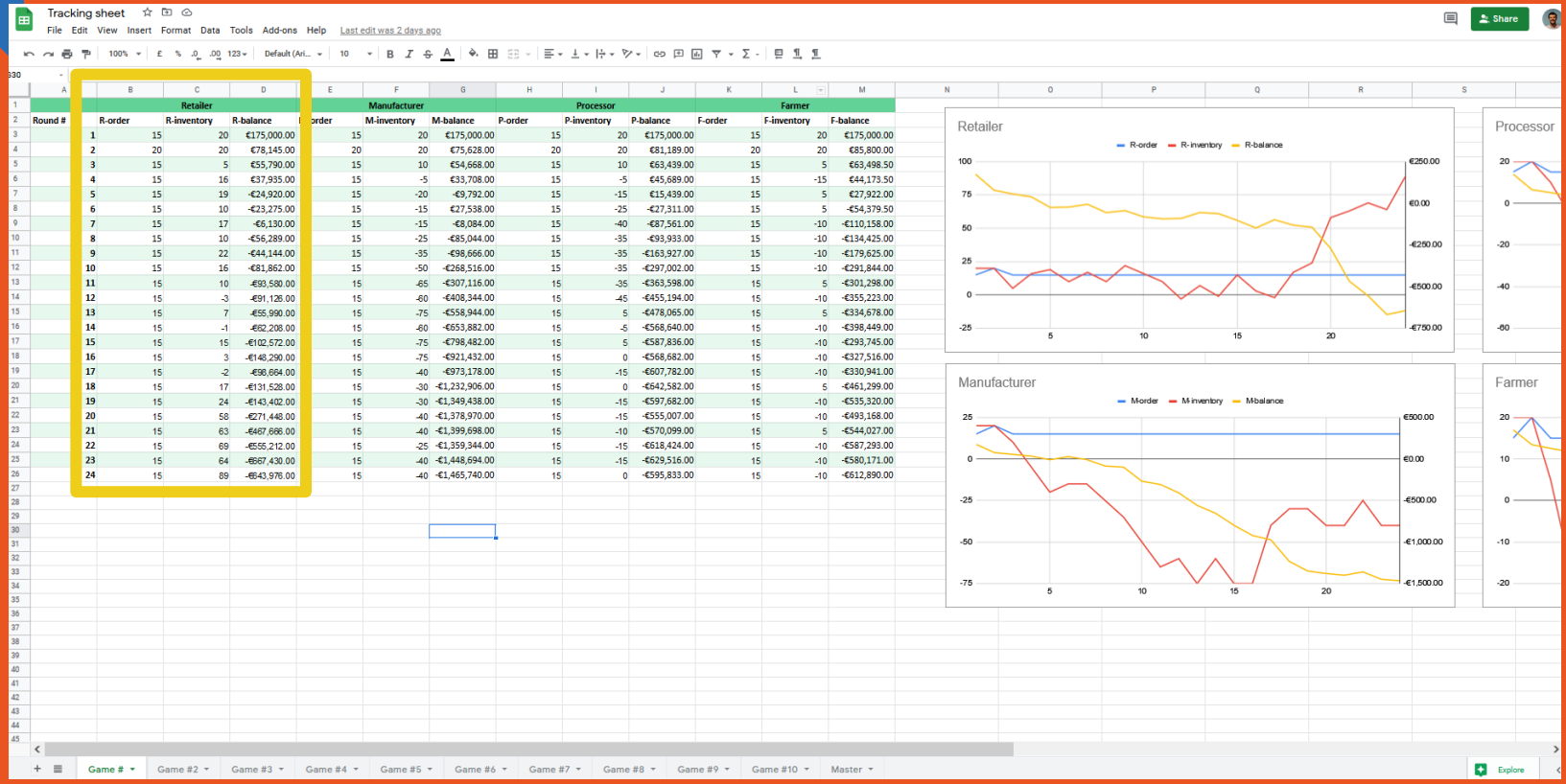


Go to:
https://docs.google.com/spreadsheets/d/1HyylIYx0P0dIwp7G4UnQrkhLuj17TmaNNjCkAbr0Zf0/edit?usp=sharing

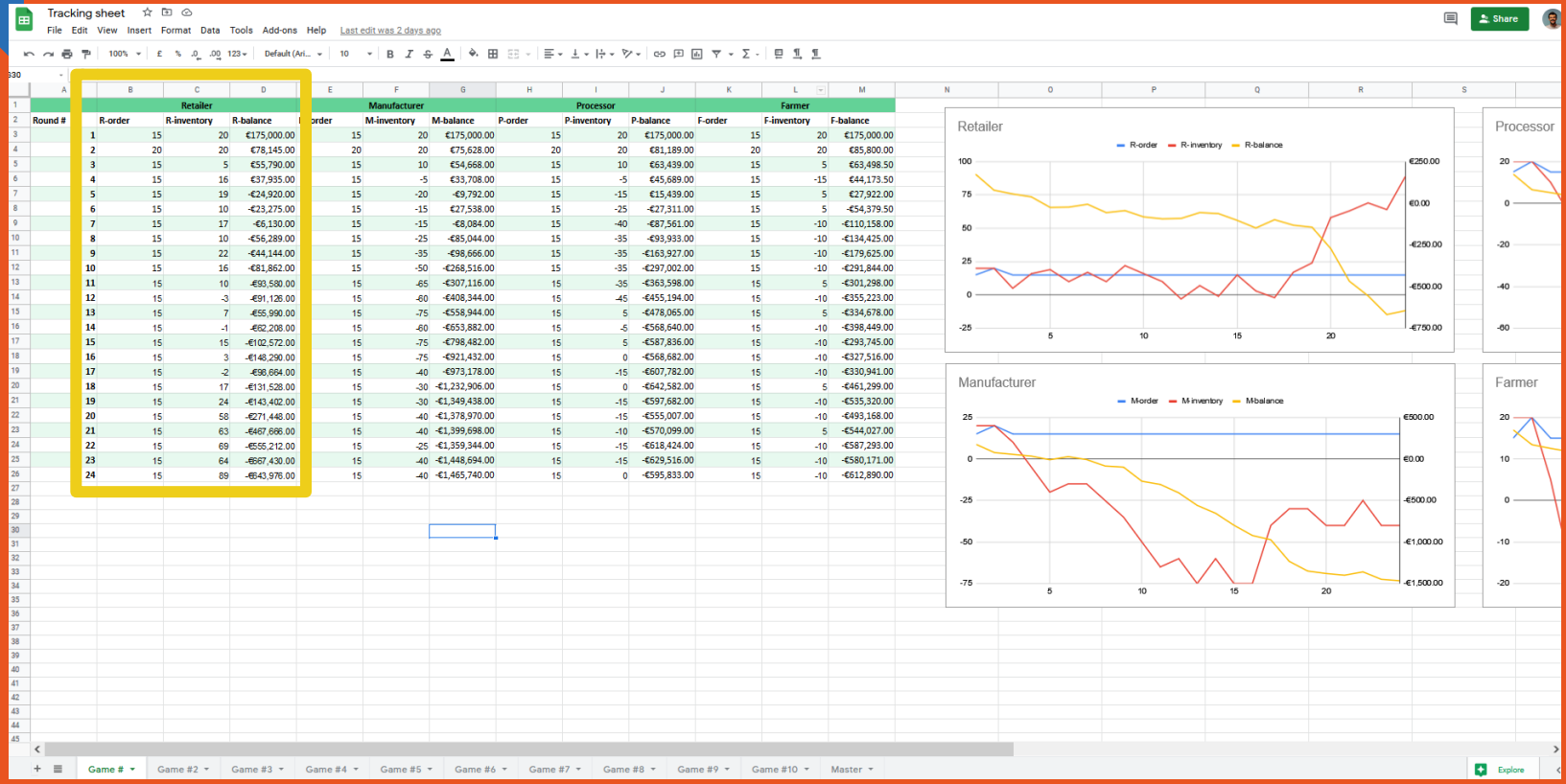
Find your game number, go to the corresponding tab



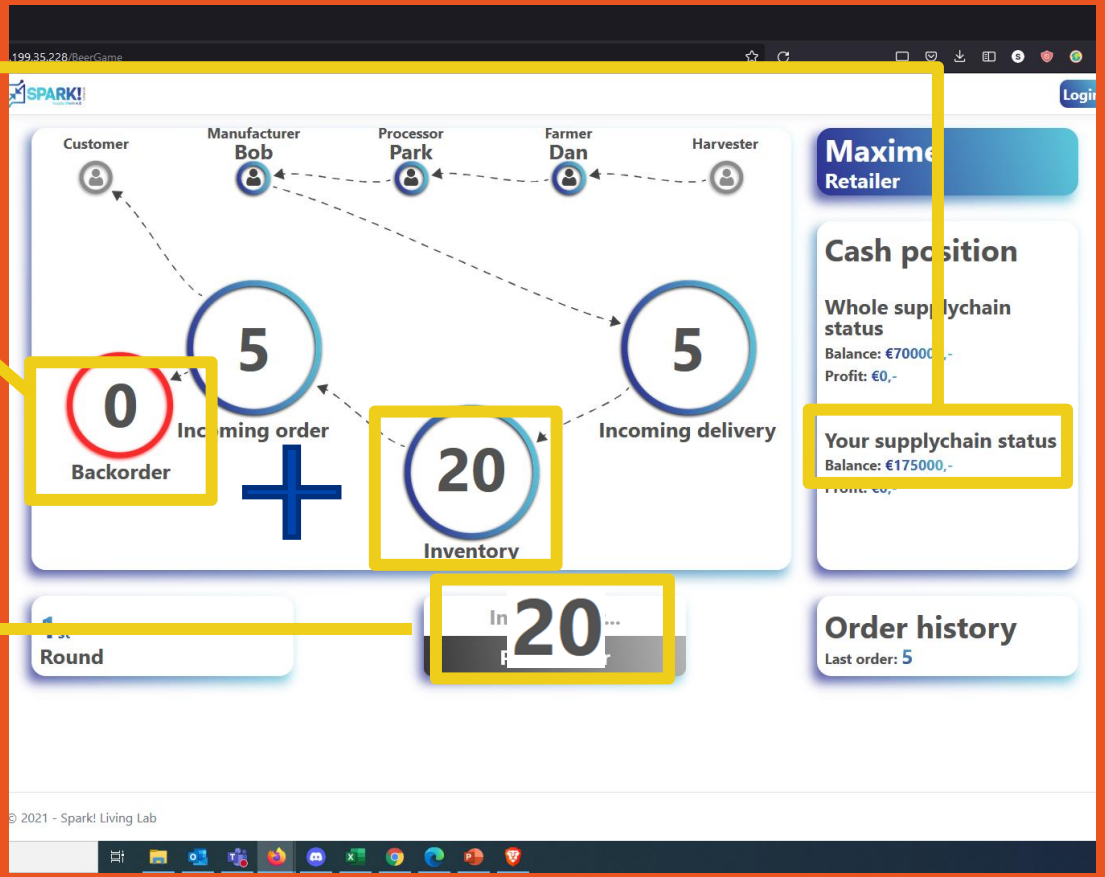
Find your role



Each line is a day, fill it in accordingly



	Retailer			
Round #	R-order	R-inventory	R-balance	
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				



	Retailer		
Round #	R-order	R-inventory	R-balance
1	5	20	€175,000.00
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
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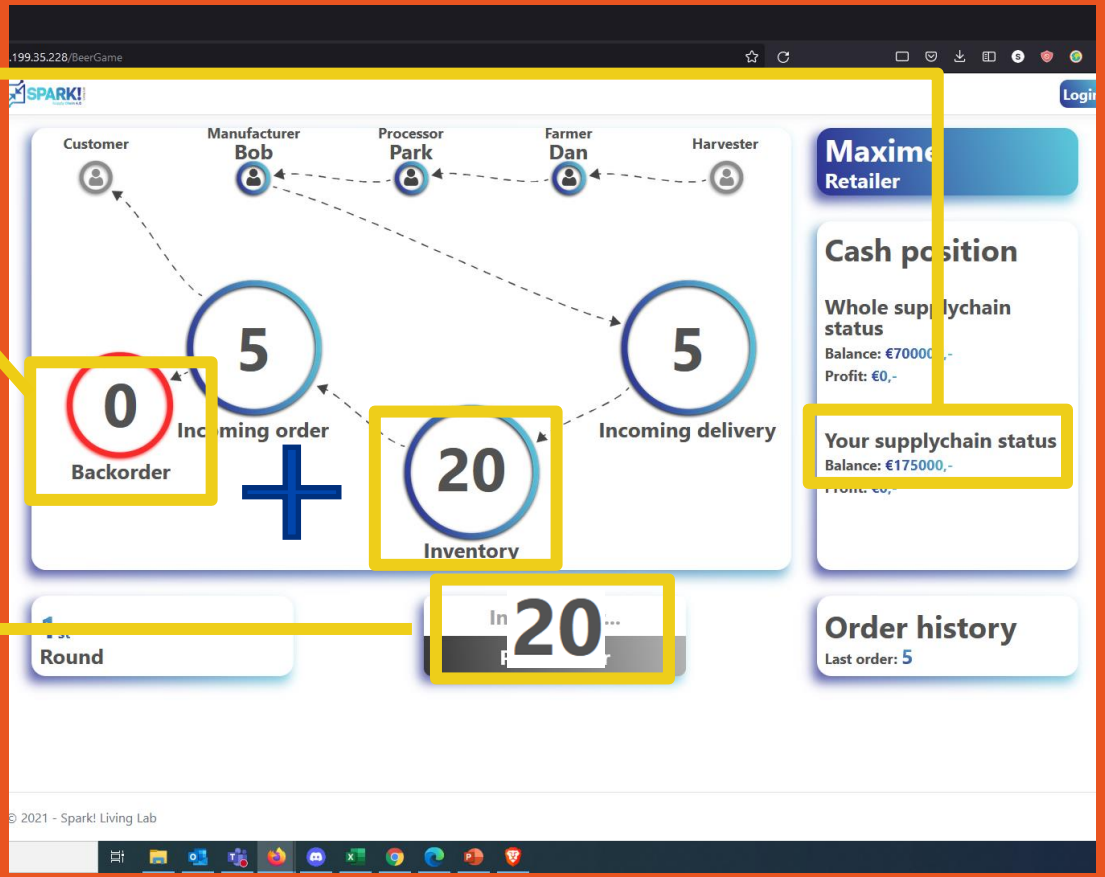
24			

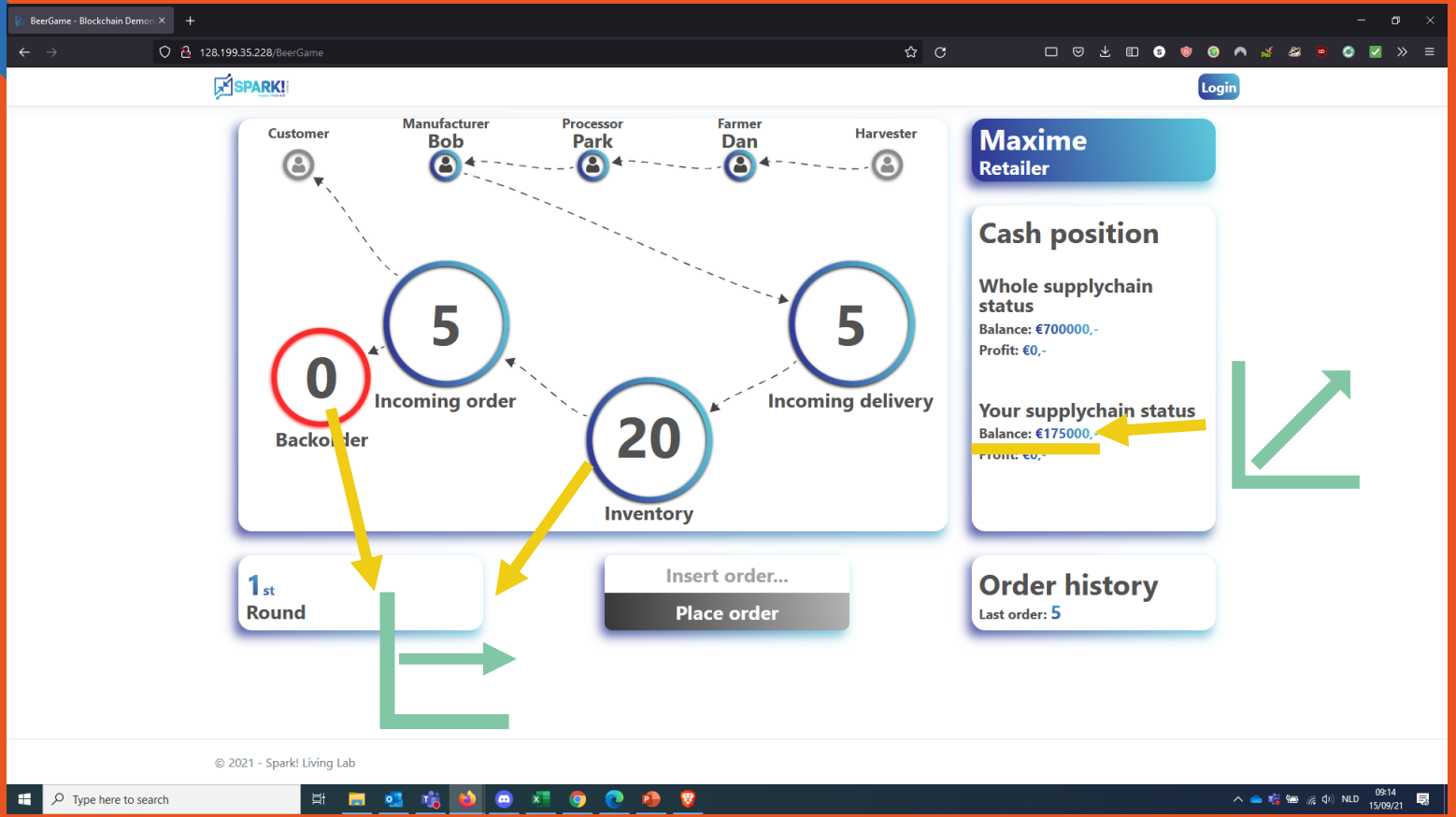


Before we start

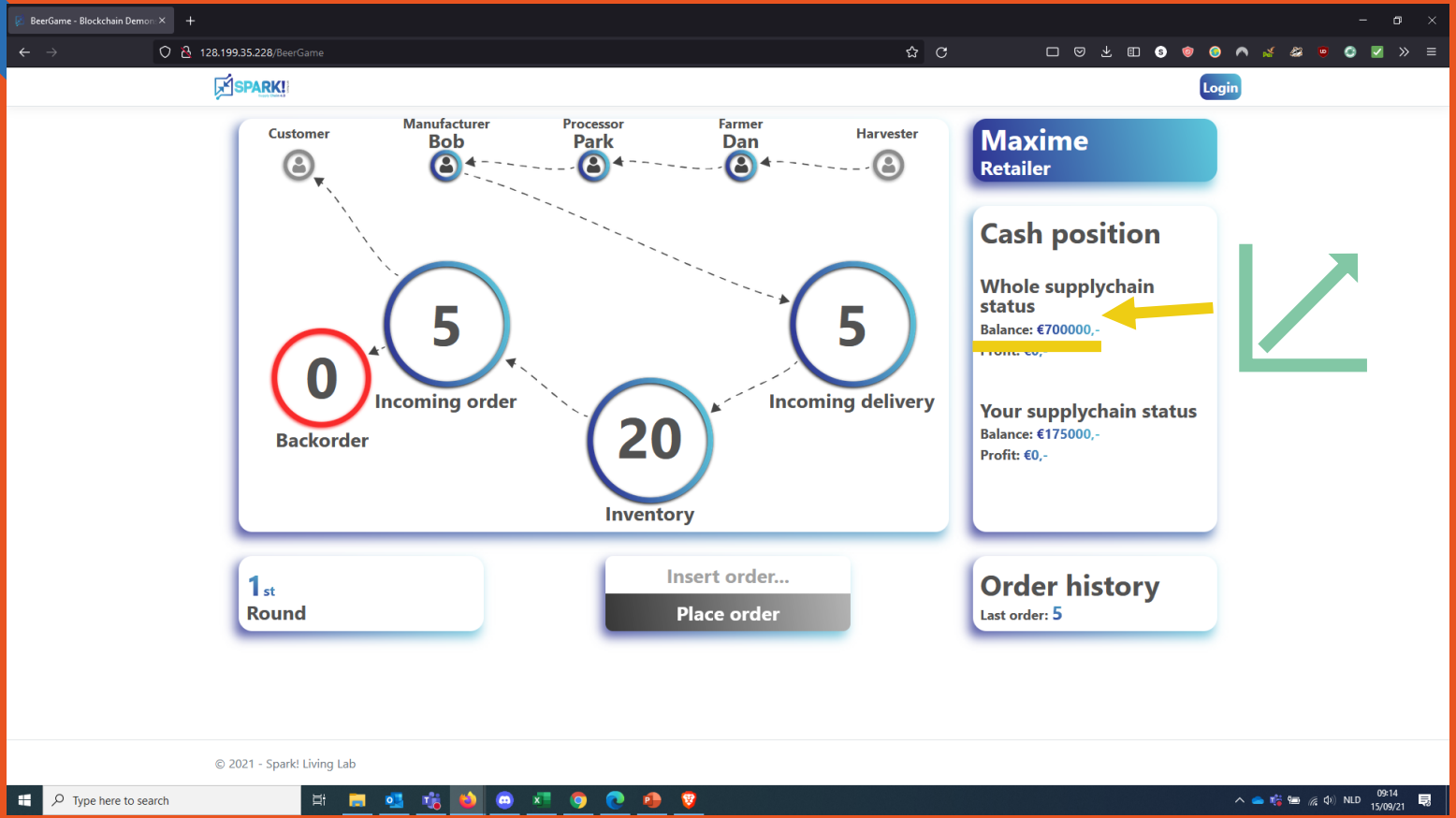
Some questions

- What is the chain total physical lead time?
- What is the chain total information lead time?
- What are the expenses?
- What are the earnings?

As a DUO, what you will want to



As a **CHAIN**, what you will want to



Last few tips

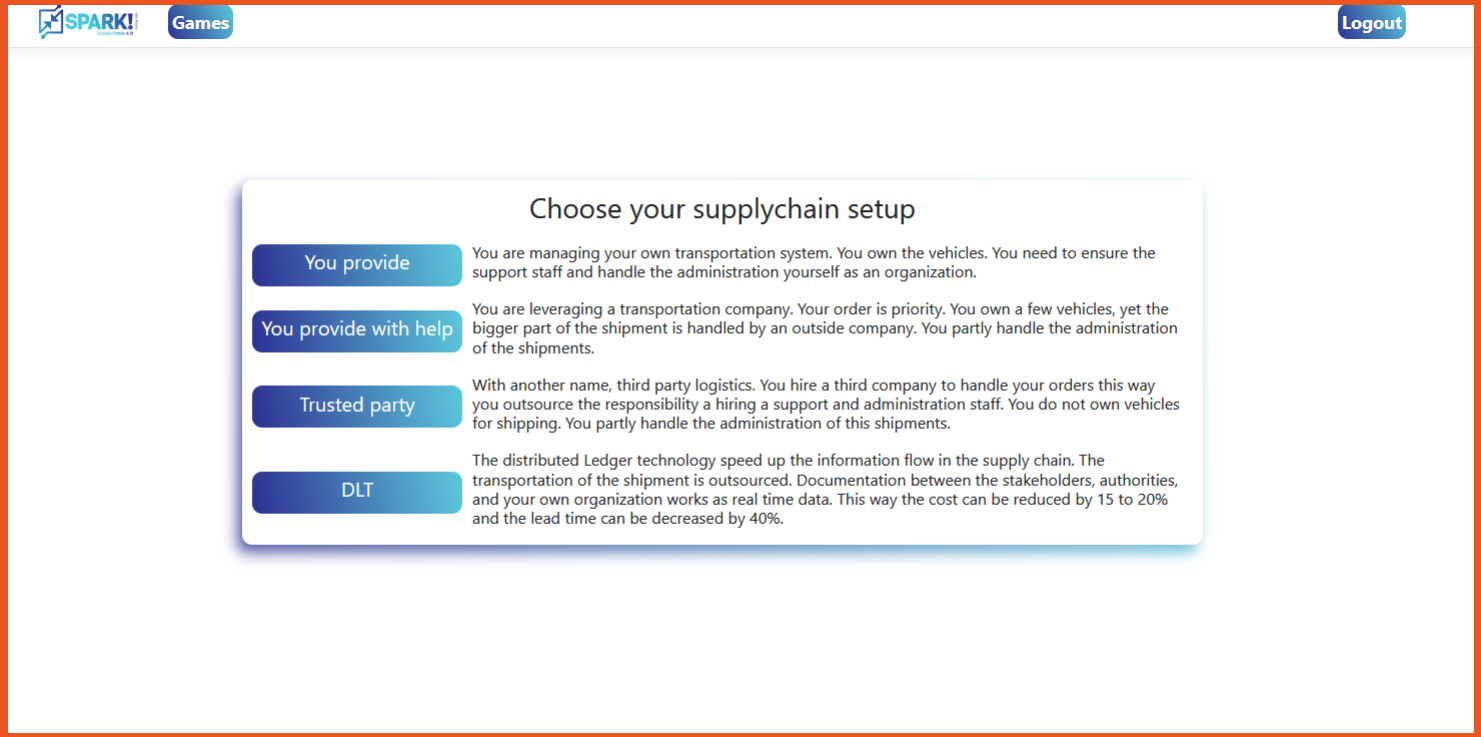
- Manage inventory
- You handle different products: Seeds, barley, malt, beers & packs
  –> they have different prices!
- Inventory is cheaper than Backlogs!!
- Incoming order comes delayed, as well as cash from your customer
- Pay attention to inventory and not your turn overs
- By managing inventory, you can control your income/turn over, NOT the other way around

Let’s play ! -> Game 2

Troubleshooting sheet

- One duo per role on a same chain
- One chain per duo
- Use Google Chrome
- If stuck, refresh
- Close as many unused tabs
- Don’t rush it, it’s still a beta version

Stop at this screen!



P&L of the chain

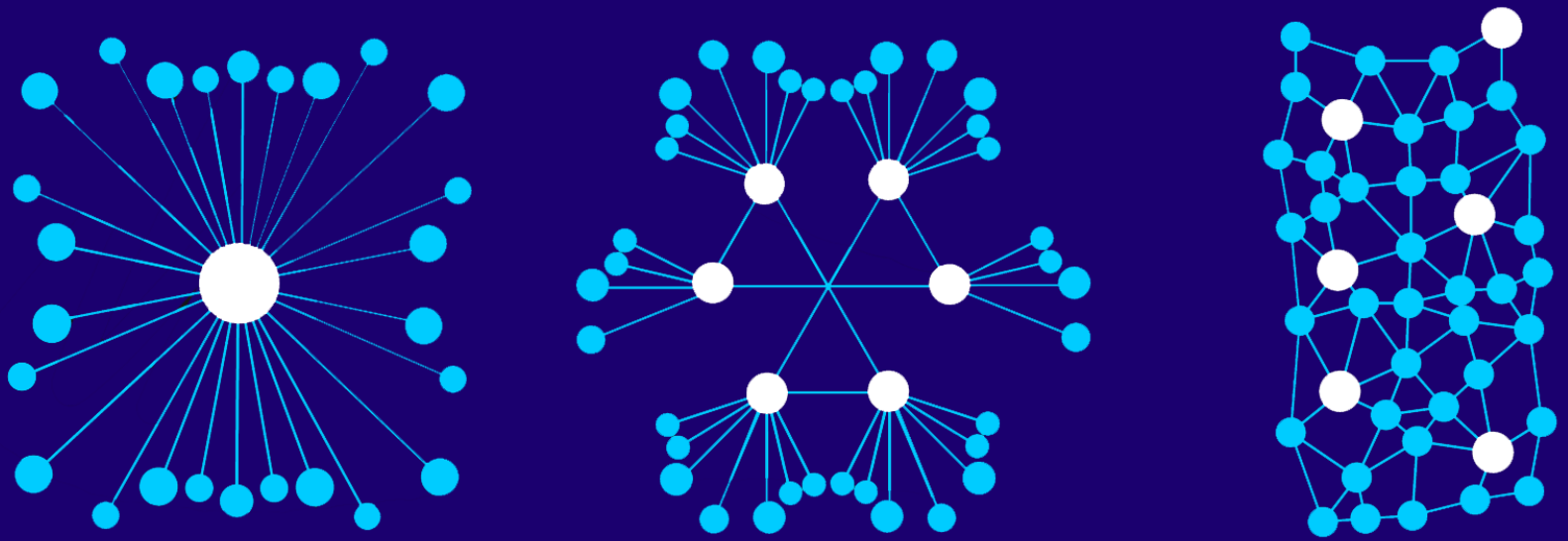
Profit

Product sale

Loss

Inventory
Backorder
Maintenance
Transport
Product purchase from supplier

Centralized vs Decentralized vs Distributed Network: An Overview

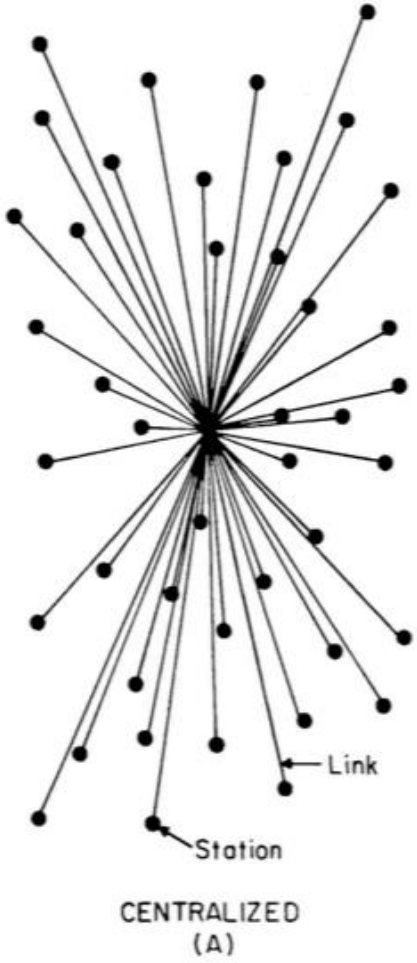


Centralized network

Advantage
- Simple deployment
- Can be developed quickly
- Affordable to maintain
- Practical when data needs to be controlled centrally

Inconvenient
- Prone to failures
- Higher security and privacy risks for users
- Longer access times to data for users who are far from the server

Examples
- Dictatorship
- Single server ERP



Decentralized network

Advantages
- Less likely to fail than a centralized system
- Better performance
- Allows for a more diverse and more flexible system

Inconvenients
- Security and privacy risks to users
- Higher maintenance costs
- Inconsistent performance when not properly optimized

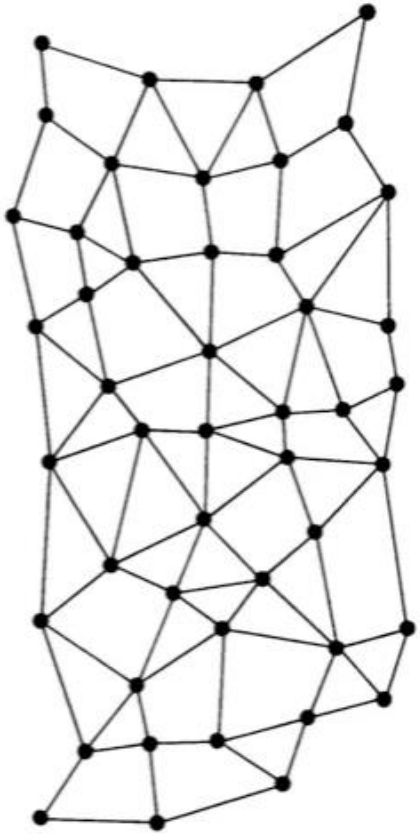
Examples
- Internet
- SAP

Distributed network

Advantages
- Fault-tolerant
- Transparent and secure
- Promotes resource sharing
- Extremely scalable

Inconvenients
- More difficult to deploy
- Higher maintenance costs

Examples
- Blockchain



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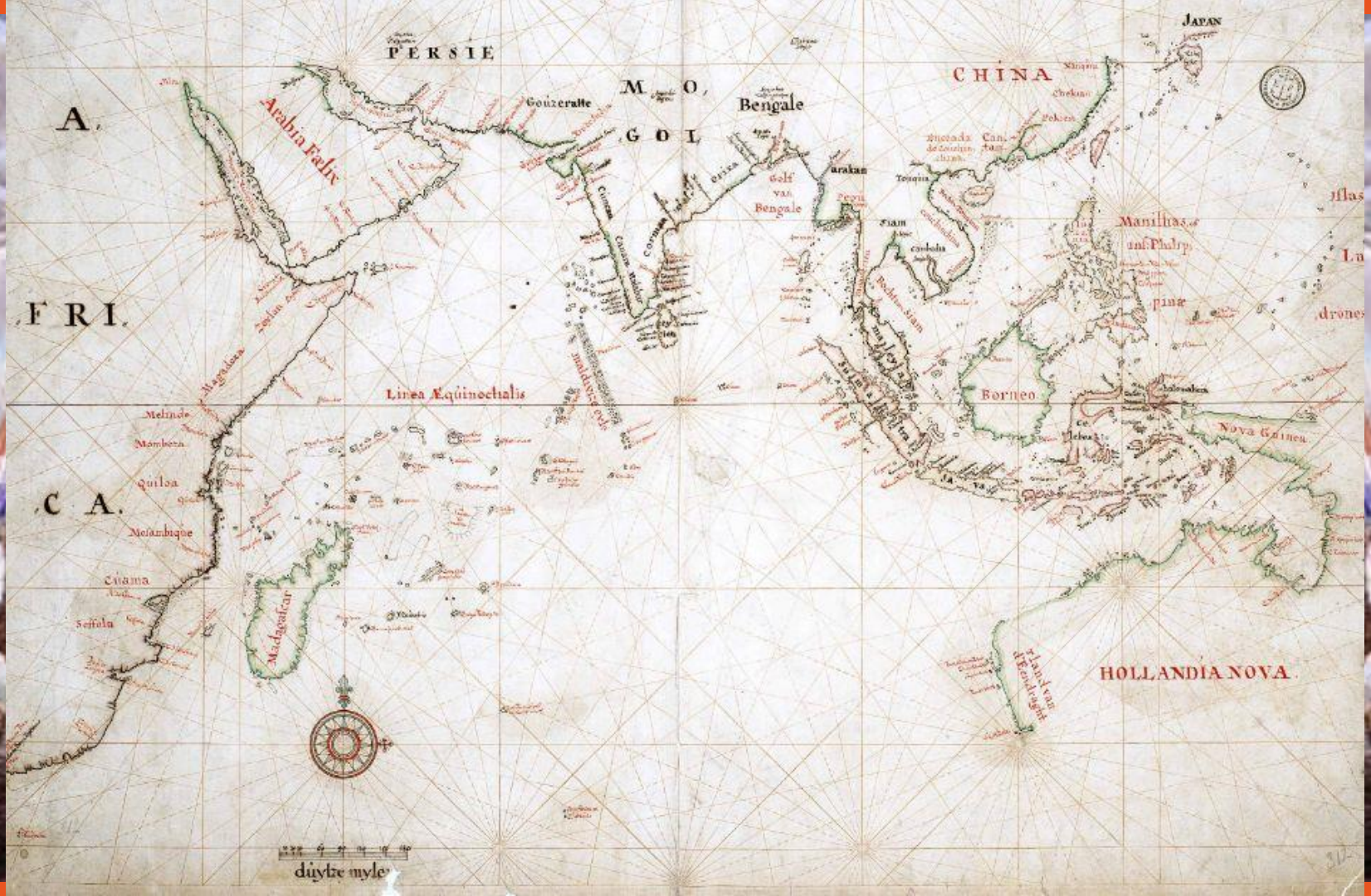
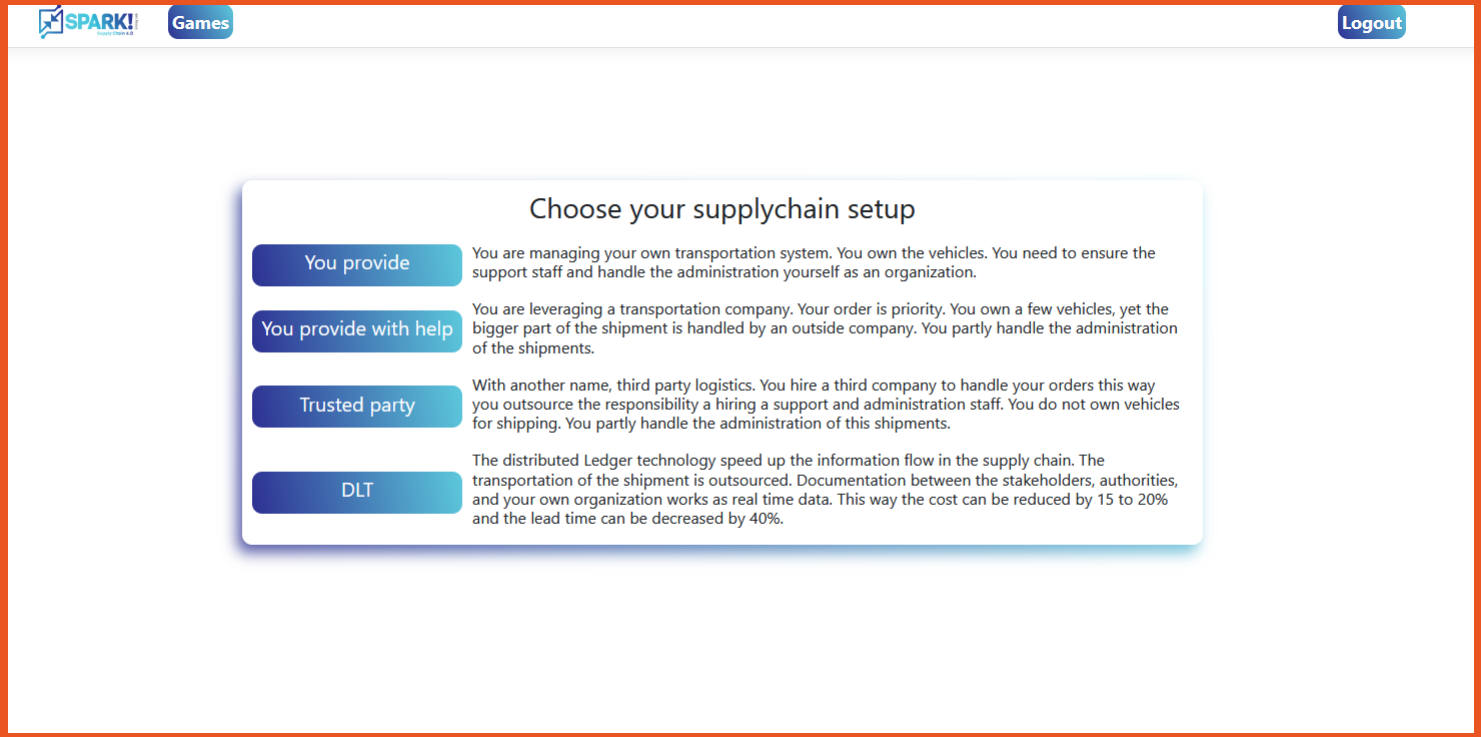
(C)

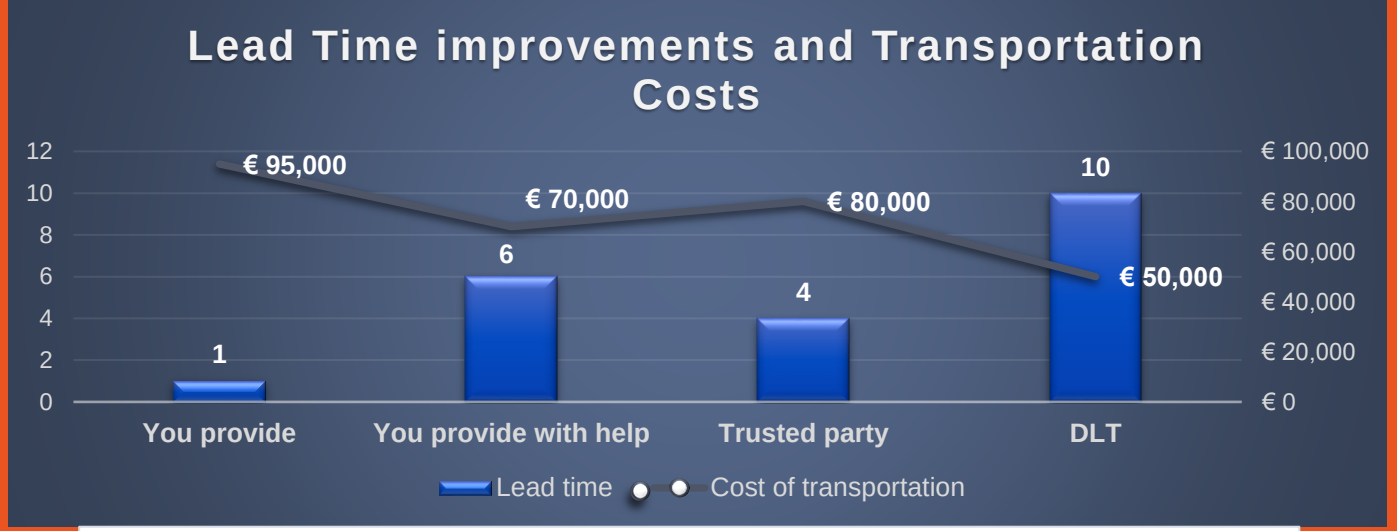

PERSIE
A.
FRI.
CA.
Arabia Felix
Gouzeratte
MO.
GOL
Bengale
CHINA
JAPAN
Golf van Bengale
Arakan
Siam
Manilhas
Linea Æquinoctialis
Borneo
Nova Guinea
Melinde
Mombaza
Quiloa
Mosambique
Cuama
Sofala
Madagascar
HOLLANDIA NOVA
duytze myle

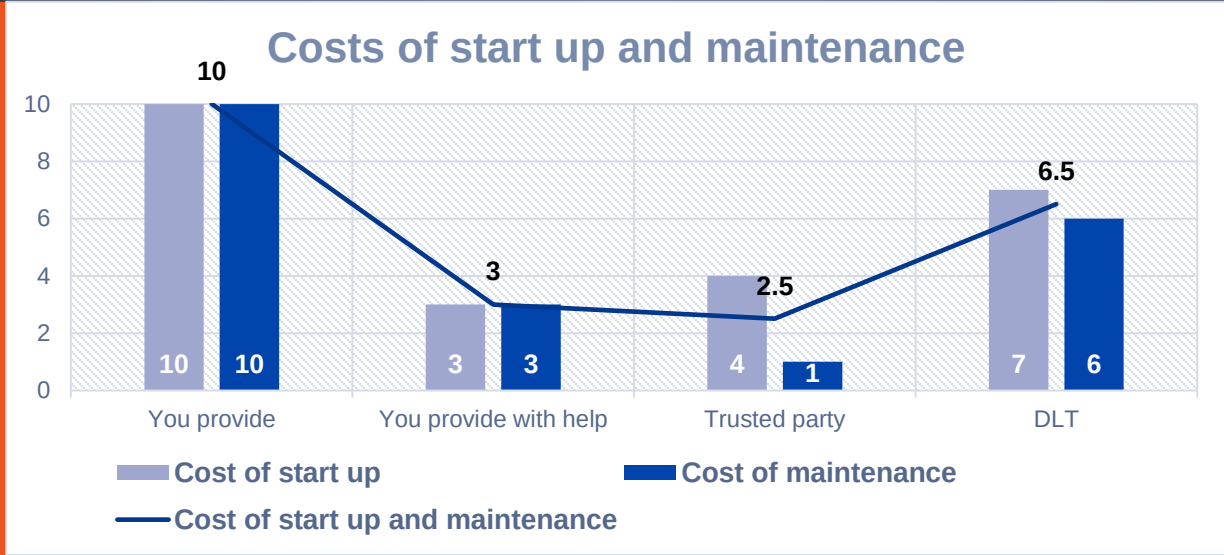
Data sharing technologies ?

Stop at this screen!



Deal with problems	PRO	CON
You provide (your own fleet)	To be seen, heard, applauded for the work that has been done.	Costs a lot of money and high administration
You rent a small fleet	You only have part of the costs and you are only dependable on yourself	You are dependable on others, high rent costs if business is slow
You use a trusted partner	You let someone else deal with the problem of transport	You are dependable (vendor locked) on others, lead times may jump up
You let the blockchain decide	Less paperwork, insightful lead times, Automatic contract negotiation,	High implementation costs, data-sharing


Lead Time improvements and Transportation Costs
12
10
8
6
4
2
0
€ 100,000
€ 80,000
€ 60,000
€ 40,000
€ 20,000
€ 0
€ 95,000
€ 70,000
€ 80,000
€ 50,000
1
6
4
10
You provide
You provide with help
Trusted party
DLT
Lead time
Cost of transportation


Costs of start up and maintenance
10
8
6
4
2
0
10
10
3
3
4
1
7
6
10
3
2.5
6.5
You provide
You provide with help
Trusted party
DLT
Cost of start up
Cost of maintenance
Cost of start up and maintenance

Type	Name	Example	Communication	Storage	Network	Relational complexity
You provide	Own network	Pepsi Co. , PB America, Wayne Farms LLC (small fleet)	mail/ fax/ calls	***own server:*** own PC or shared cloud within the organization	**own fleet**	there is no added actor, not complex
You provide with help	3PL (Third-party Logistics)	Faurecia	call/ mail/ messages/ API	***SQL DB:*** evergreen and always up to date, with AI-powered and automated features that optimize performance and durability	**outsourced fleet**	there are added actors, complex. communication more complicated
Trusted party	Freight forwarder= DCC (Dedicated Contract Carrier)	DHL, DSV, XPO log	calls/ messages/ social media platform (like WhatsApp)/ API	***SQL DB:*** evergreen and always up to date, with AI-powered and automated features that optimize performance and durability	**outsourced fleet**	there are added actors, complex. communication more complicated
DLT	Blockchain Partners	TradeLens	IoT/ API/ smart contacts(automatic data transport regarding shipments)	***ledger storage, and off chain or side DB storage:*** decentralized peer-to-peer system, data stored in blocks which connects with hashes. Data non changable one block refers to the previous one creating a chain. Off chain data stored in SQL DB,	**outsourced fleet**	there is no added actor , not complex

Let’s finish it!

Feedback 1 -> Jamboard

Learning objectives

What is a supply chain?

What are important flows in a supply chain? How do they move?

What typical supply chain reaction does the beer game show?

What are data sharing technologies (DST)? Their role? Their potential impact?

What effect DST have on the supply chain reaction shown in the beer game?

What are recommended behaviors in a supply chain?

Feedback 2

Learning objectives

What is a supply chain?

What are important flows in a supply chain? How do they move?

What typical supply chain reaction does the beer game show?

What are data sharing technologies (DST)? Their role? Their potential impact?

What effect DST have on the supply chain reaction shown in the beer game?

What are recommended behaviors in a supply chain?

Outro

Thank you !