Supply Chain Digital Twin

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DELIVERING EXCELLENCE FOR OUR CUSTOMERS AND COLLEAGUES

Who

Peter De Coninck
SE Consulting Belgium

Mobile : +32 477 61 80 83
Email : pdeconin@dxc.com

Company Supply Chain Vision:

What if we could transform the way we operate faster to serve customers better and reduce costs, with AI creating solutions beyond what we can imagine today.

“Our business sits at the intersection of the physical and digital worlds. We need to develop the capability to re-imagine our business in a virtual world, allowing us to apply learnings and solutions more quickly to the physical.

Increasingly we need to think beyond incremental functional improvement, to reinvent how we serve customers with new ways to operations outside of our existing experience.”

Digital Twin

A digital twin is a virtual supply chain replica that consists of hundreds of assets, warehouses, logistics and inventory positions. Using advanced analytics and artificial intelligence, the digital twin simulates the supply chain's performance, including all the complexity that drives value loss and risks. It identifies where volatility and uncertainty exists, as well as where optimization is possible. A digital twin also enables scenario planning to allow a company to make decisions on the basis of business needs, rather than resolving issues as and when they arise.

https://supplychaindigital.com/technology-4/evolution-digital-twins-supply-chain

A digital twin is, in essence, **a computer program that uses real world data to create simulations that can predict how a product or process will perform**. These programs can integrate the internet of things (Industry 4.0), artificial intelligence and software analytics to enhance the output.

https://www.twi-global.com/technical-knowledge/faqs/what-is-digital-twin

Supply Chain Digital Twins
Not new, but new technologies widen the scope...

Digitalized (operational) Supply Chain

Registration/data

Act/alert

From Process generated Data To Data piloted process

Supply Chain Digital Twins
Demand, Forecast and Supply Planning

Since more than 20 years

Using internal and now also external data

Still fast changing to new tecnologies using AI/(deep) reinforced learning and combining more and more information (Demand planning >> Demand sensing)

Modify the future data / parameters and start What-If scenario simulations to check the flexibility and needed changes/investments

Started as a repetitive planned process is now moving more and more to a permanent ‘forecasting’ process

Supply Chain Digital Twins
Location determination/simulation

Take the future forecasted data and assumption/parameters

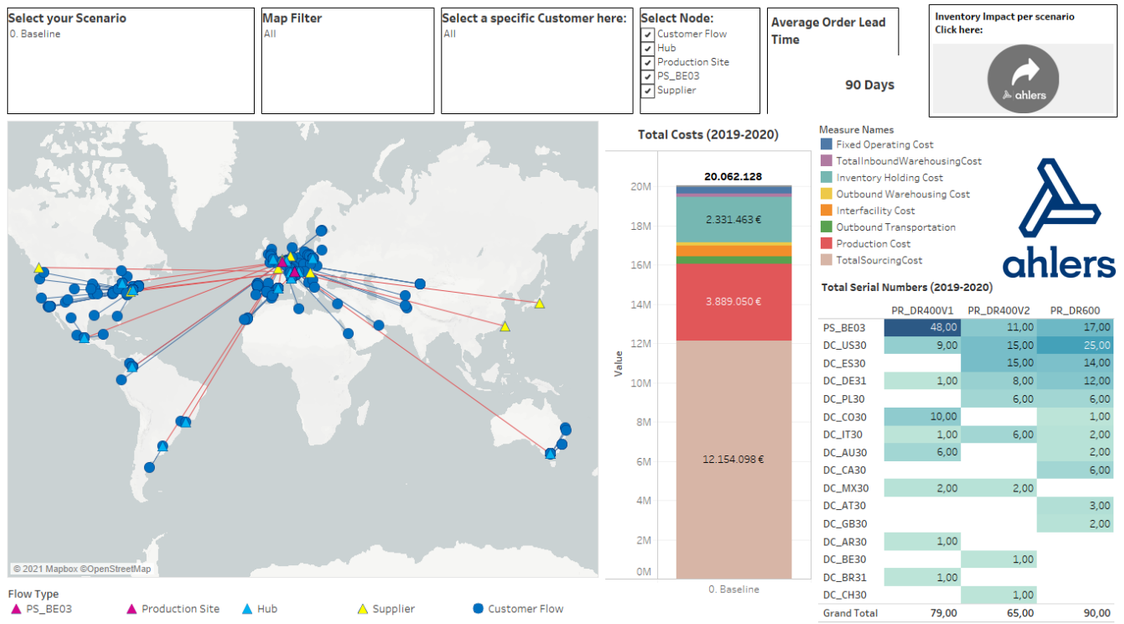
Take flexibility and costs into account

Calculate the different ‘volume’ cases taking into account the total global supply network of your company (E2E)

>> network optmization studies

First cases of ‘more permanent’ use to decide on transactional flows, check actual<>optimal stock levels and leadtimes

Online Analytics to support supply chain execution decisions



Supply Chain Digital Twins
Asset Tracking and Subsequent Planning/Actions

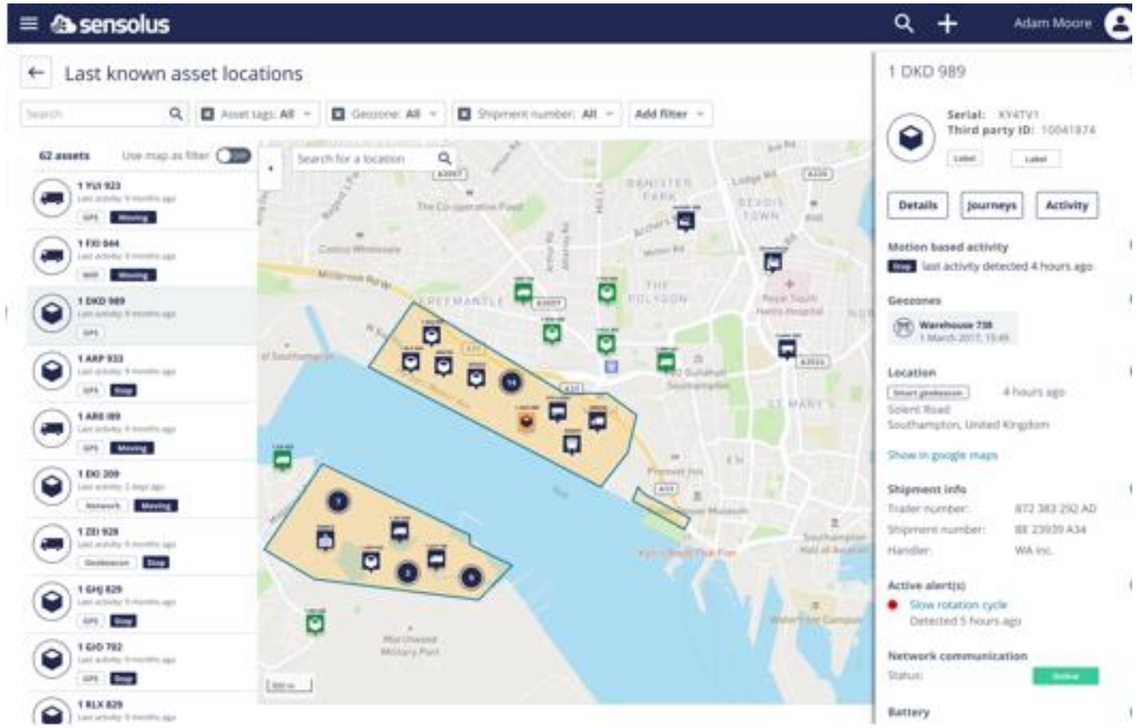
In the last 20-30 years, logistics has moved from ‘stock’ and location management to traceable unit and detailed warehouse operational management.

The ‘Packing’ becomes a ‘standard’ step.

To automate/simplify/Track packing assets are now ‘physically’ traced, so we also know where the content is.

Packing in transport gives the full ‘Content’ visibility of the arriving transport

By tracking the transports (containers/trucks/bikes/…) companies can now better plan their site and near future operation planning

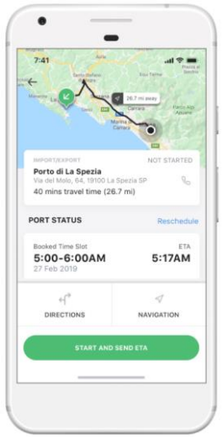


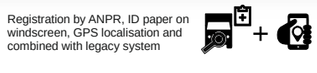
Supply Chain Digital Twins
Geofencing and Congestion Avoidance

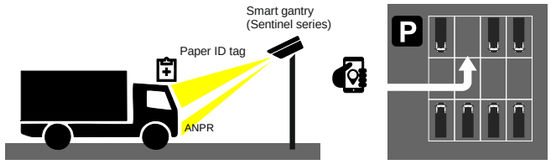
But operations are not (always) executed as planned, so the visibility needed to be extended to all movements from and to your site

Actual transports, stock levels, locations are to be aligned in the best way to have the most ideal operation

So, optimization routines will track the incoming transport, stop them when needed to avoid congestion (taking the taco info into account) and follow the ‘site’ approach in detail so that the site-time can be reduced to the minimum







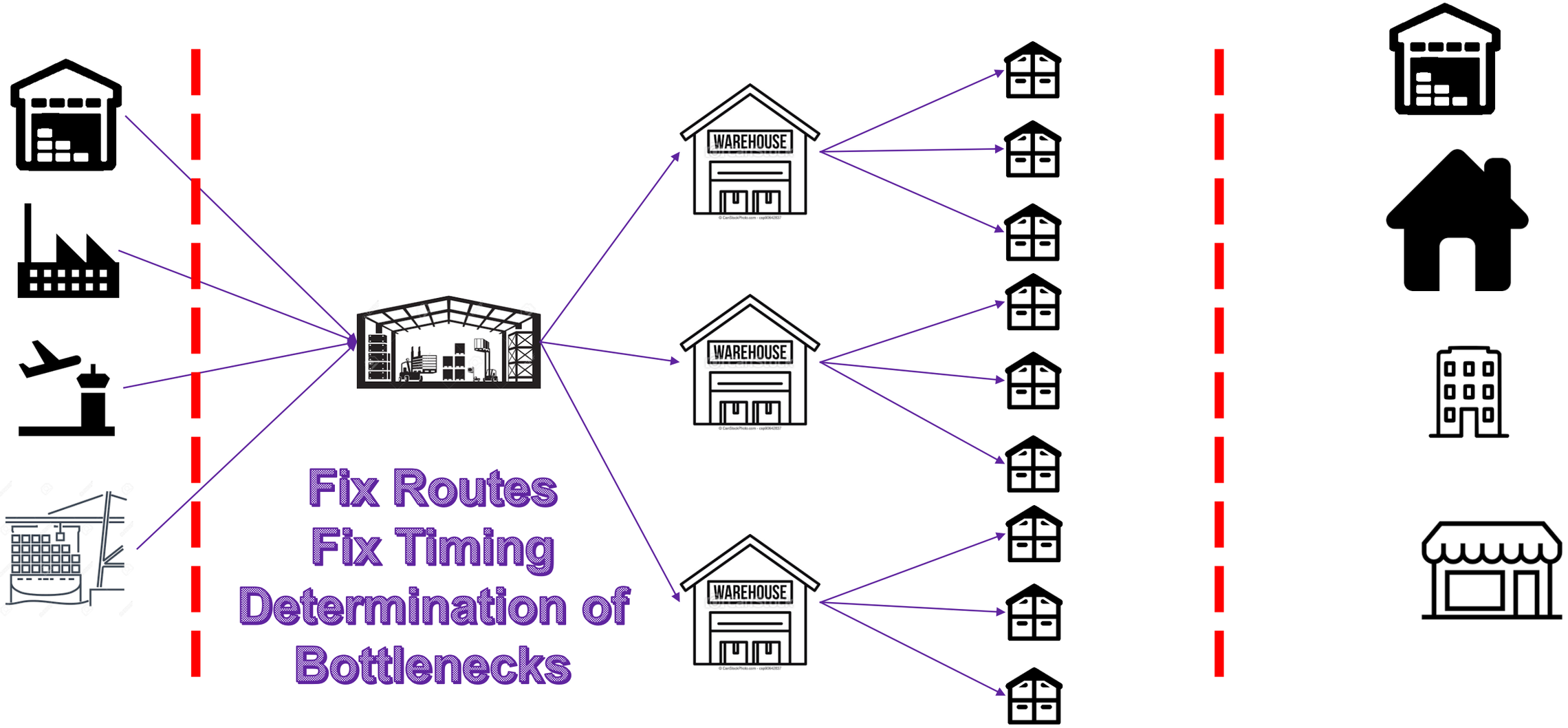
Supply Chain Digital Twins
Manage the execution in your full Supply network

Optimizing your ‘goods’ journey accross all steps in your E2E Supply Chain

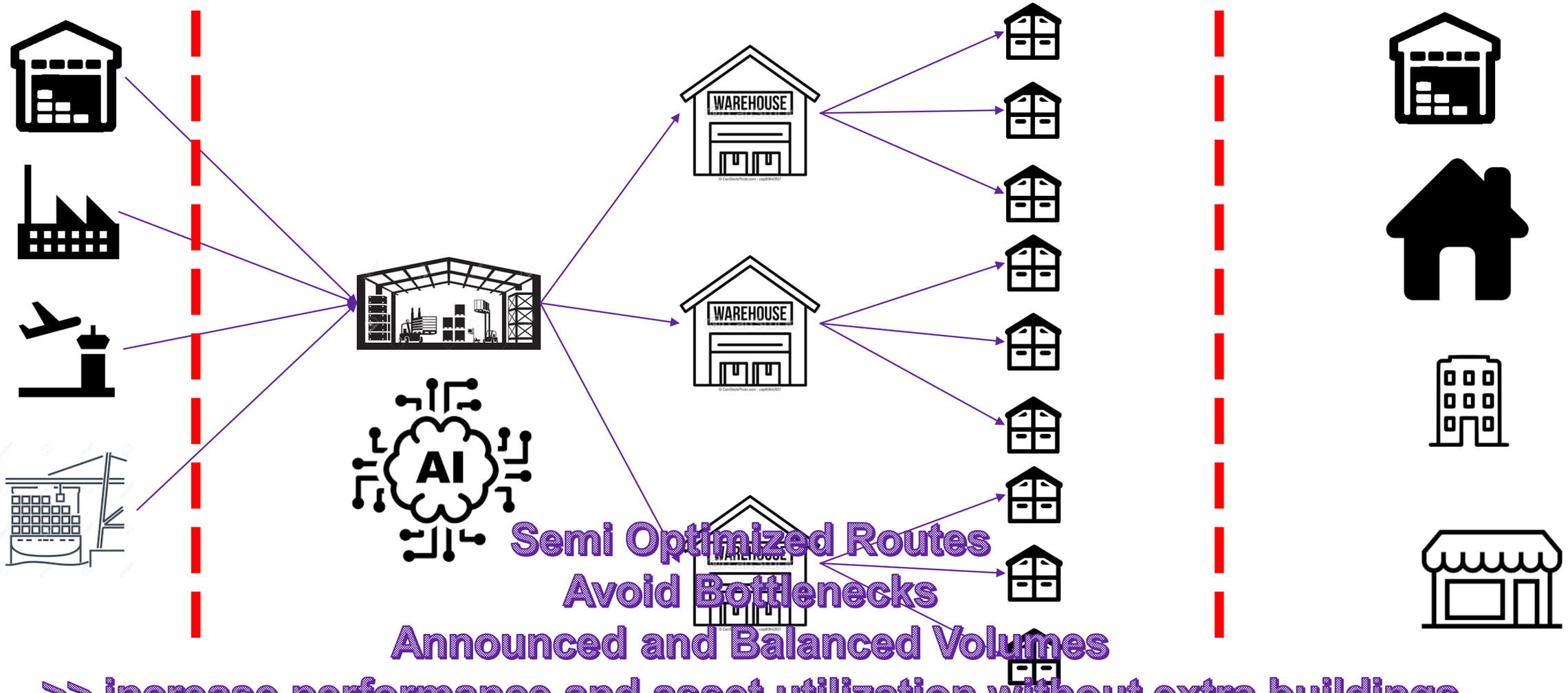
- Actual data
- Actual volumes
- Announced actions
- Permanent Optimization / bottleneck checks
- Decide on next steps without changing started once
- Parameters change by own and external actions/decision

The future is here

Operational Case – Complex Goods Distribution



Operational Case – Goods Distribution
What If...we permanently replan the remaining actions...



Semi Optimized Routes
Avoid Bottlenecks
Announced and Balanced Volumes

>> increase performance and asset utilization without extra buildings

How does this next step in Supply Chain optimization impact the traditional ERP backbone systems?

ERP driven Supply Chain exection

- Push or Pull model, but ERP-order driven. Not dynamically changed.
- Execution follows original plan
- Registration
  - Point of entry
  - Point of delivery
  - Transfers
  - Timings

How will this impact these admin backbones

- Permanent change unitary combinations (Box/Pallet/Container)
  - Do not change executed steps
  - Permanently recheck destination of next step
  - Number of ‘intermediate’ steps can change
  - Acting on lowest ‘Handling’ level
  - Optimize on every step of the way for the following actions
  - Decide on volume and activities, not on planning

What is still known (?)

- Target delivery date / location (and even that)
- Last moment handlover location between supplier and own Supply Chain

Taking this even one step further

Optimizing your ‘goods’ journey accross all steps in its E2E Supply Chain >> Physical Internet - announced for 2050, but...will this speed up?

- Accros all actors in the chain
- Full integrated in units
- Open, Dynamic, fast and secure
- The Physical Internet?

Excelerated Evolution/Integration
OR
Abrupt Revolution?

If we go that far…will the Supply Chain Digital Twin bring us to the Physical Internet and speed-up the Green Deal Delivery…?


Thank You
Questions?