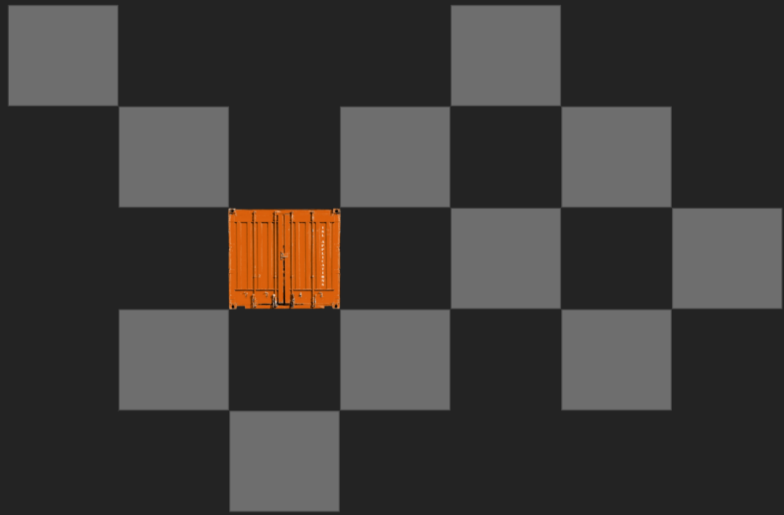
How does digitalization change the workflow of terminal planners?

Holger Schuett

ISL Applications GmbH

PTT 2017

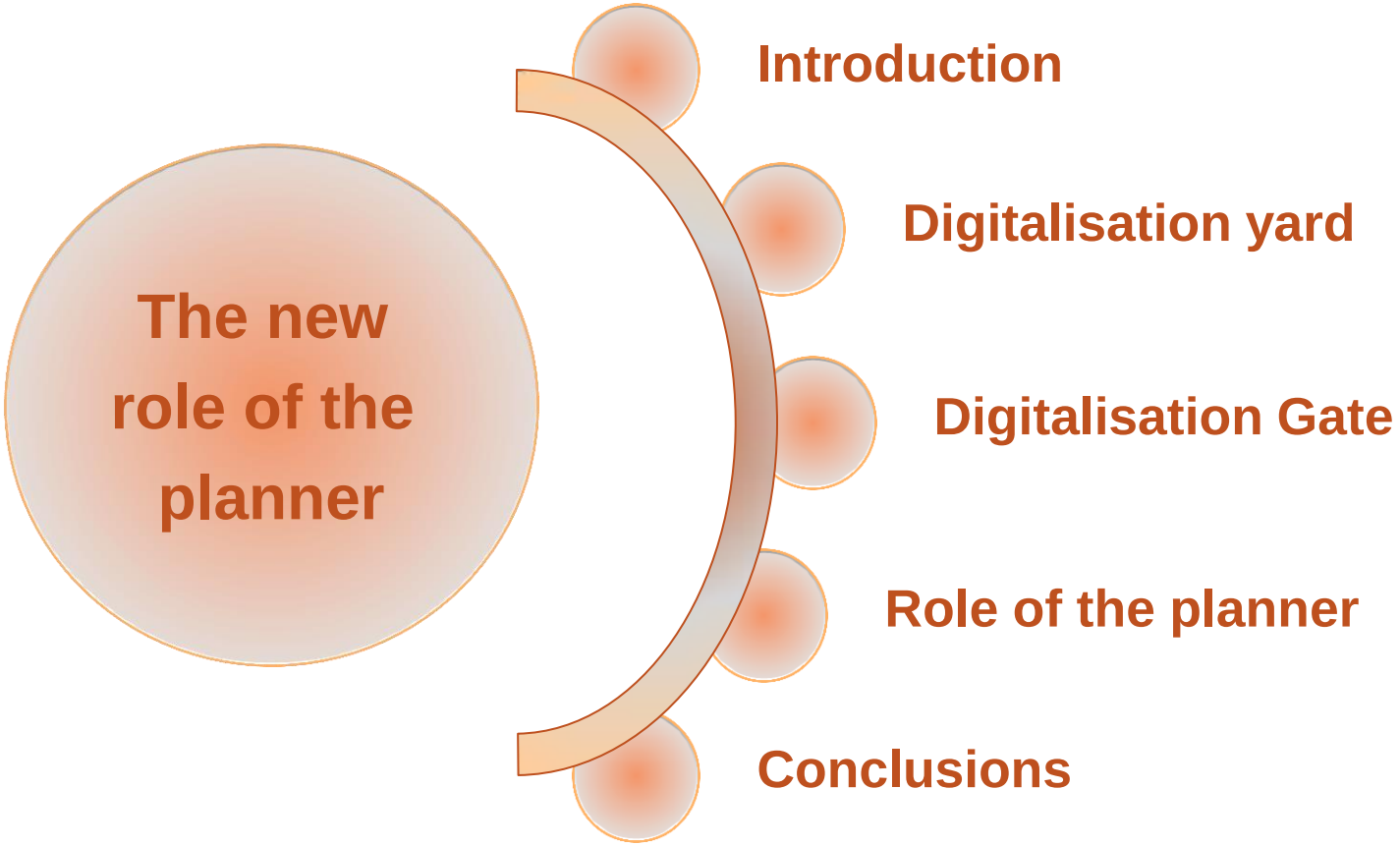
Charleston/USA, April 17th – 18th

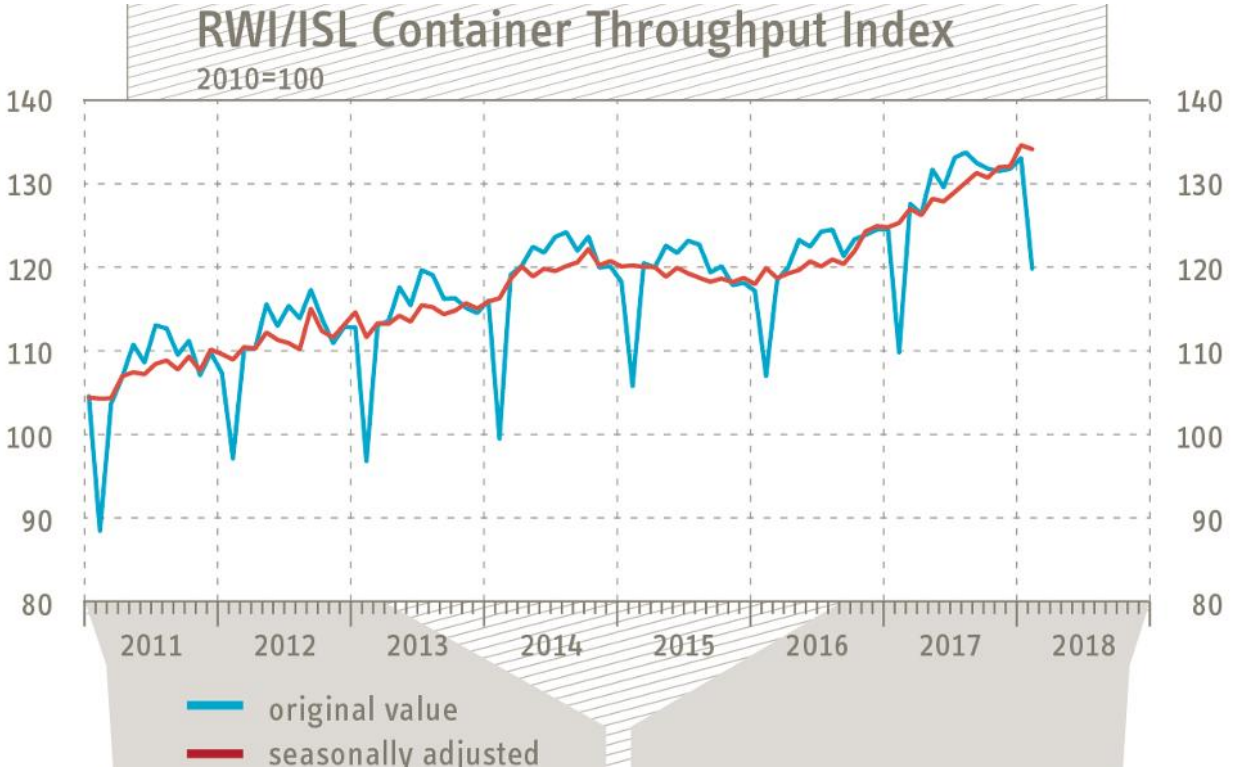


participation funded by:

European Union
Investing in Bremen's Future
European Regional
Development Fund

Agenda





The Container Throughput Index experienced a small decrease in February 2018 as it fell from 134,6 (revised figure of January) to 134,1. The Index remains on a high level, close to its all-time record. This development indicates a continuing strong world trade.

RWI/ISL Container Throughput index

- ***88 ports worldwide***
- ***~ 60 % of worlds throughput***
- ***available 3 weeks in new month www.isl.org → news***

More than 25 Years Simulation Experience

1989 1991 1993 1995 1998 2000 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2013 2015 2017

Products rebranding:
CAPS
SCUSY
ViTO

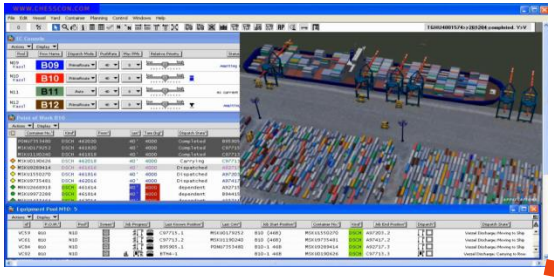
CHESSCON

Development funded by European Union Land Bremen Bremerhavener Gesellschaft für Investitionsförderung und Stadtentwicklung mbH bis

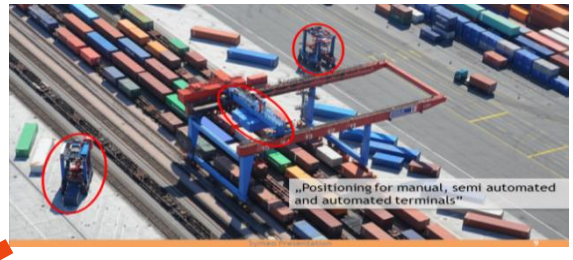
Optimisation and Simulation – References (selected)

ASEAN Terminals, Philippines
Bromma, Singapore
Centerm Terminal, Vancouver, Canada
CSX, Jacksonville, USA
DP World, Australia
EUROGATE, Germany
HHLA, Hamburg , Germany
HPA Hamburg Port Authority, Germany
HIT, Hong Kong
JadeWeserPort, Germany
Cargotec / Kalmar Industries, Finland
CMSA ICTSI, Manzanillo, Mexico
MCT, Gioia Tauro, Italy
MTL, Hong Kong
Noell Crane Systems, Germany
NTB, Bremerhaven, Germany
Port of Tacoma, USA
PORTEK International Ltd., Singapore
PSA International, Singapore
Red Sea Gateway Terminal, Jeddah, KSA
SPIA ICTSI, Columbia
Tata Consultancy Services, India
TCP Valparaiso, Chile
TecPlata ICTSI, Buenos Aires, Argentina
Terminal Investment Ltd, Netherlands
TotalSoftBank, Korea
TPT, South Africa
Warsteiner Brewery, Germany

How to improve terminal‘s efficiency



TOS
Control system



Process automation

Terminal efficiency

Equipment

The first ALV of KMI

Terminal staff

Terminal‘s productivity is driven by

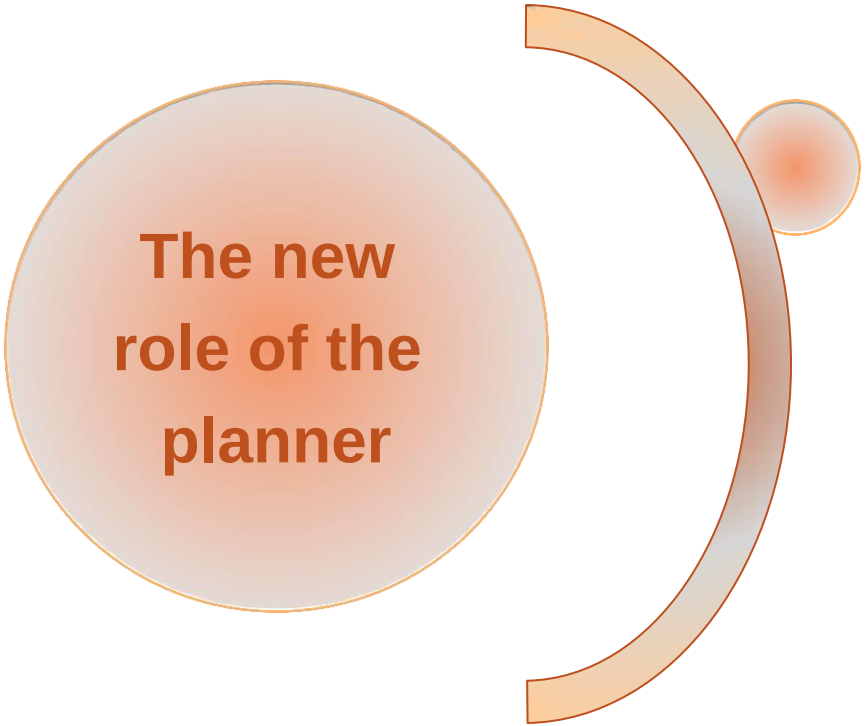
- The equipment
- The control system (TOS)
- The processes

Terminal Automation (processes as well as equipment) prepares for optimised operation, but more than ever very skilled control staff is required.

The last sentence within the Singapore Maritime Gallery (opened 09/2012):

„ It is man making the difference“

Agenda



Digitalisation yard

Digitalisation – a new technology???

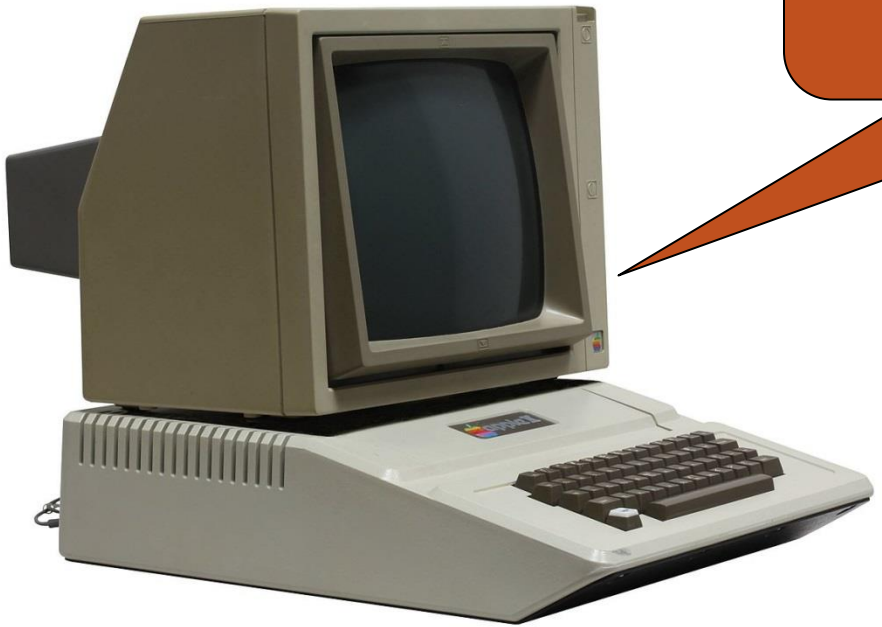
- Digitalisation is an ongoing process!
- Let's have a look at the yard planning

Wenn I started in CT logistics, container information was „stored“ in cards in a board at the wall

Digitalisation – a new technology???

- Digitalisation is an ongoing process!
- Let's have a look at the yard planning

… and first data was typed into computers



Source: Rama & Musée Bolo, modified by NeonZero - Apple II-IMG 7067.jpg

Digitalisation – a new technology???

- Digitalisation is an ongoing process!
- Let’s have a look at the yard planning

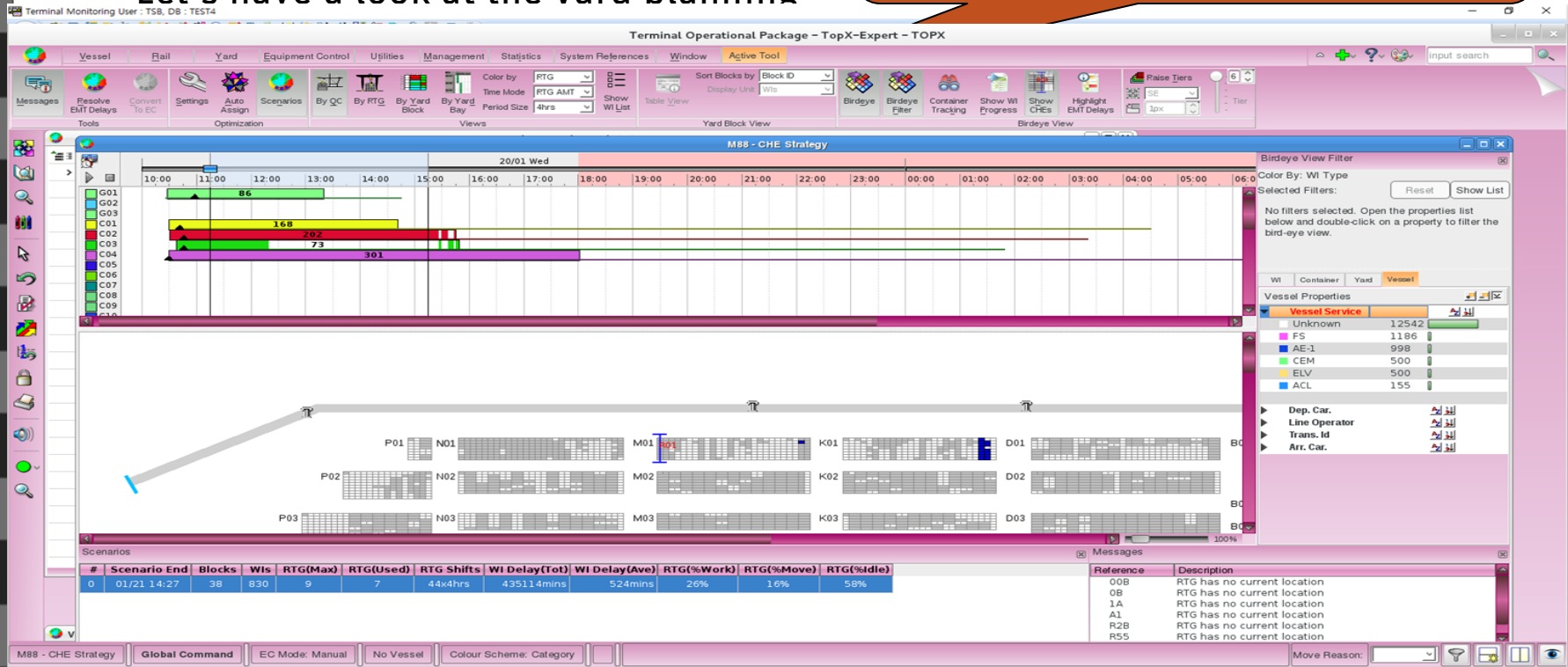
With the years more and more data is available

Source: https://pixabay.com/de/bin%C3%A4r-bin%C3%A4rsystem-daten-datenmenge-2728117/

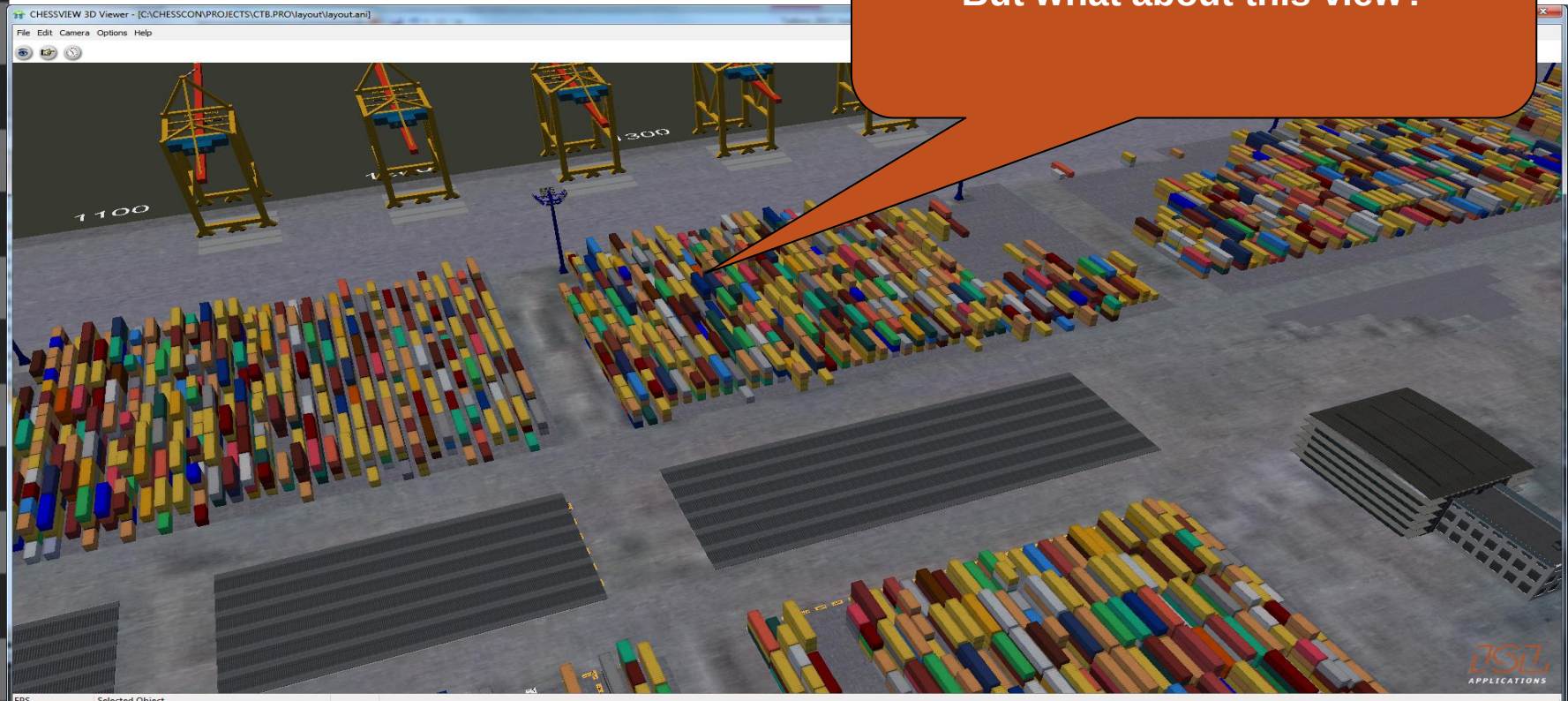
Digitalisation – a new technology???

- Digitalisation is an ongoing process!
- Let's have a look at the yard planning

And is displayed in the TOS (examples TSB, Navis, RBS)



Examples



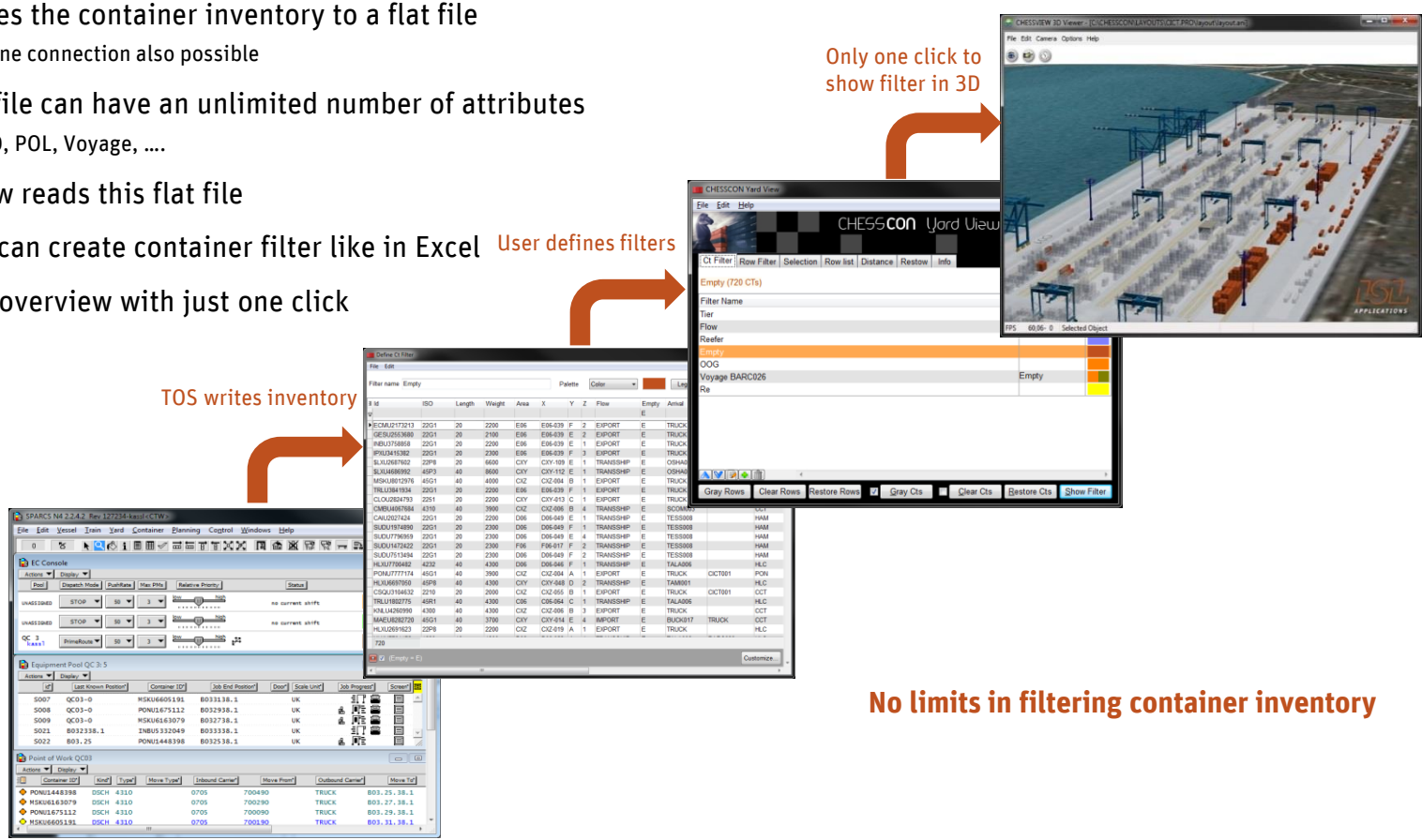
How does it work

- TOS writes the container inventory to a flat file
  - ✓ online connection also possible
- this flat file can have an unlimited number of attributes
  - ✓ POD, POL, Voyage, ….
- Yard View reads this flat file
- the user can create container filter like in Excel
- get a 3D overview with just one click

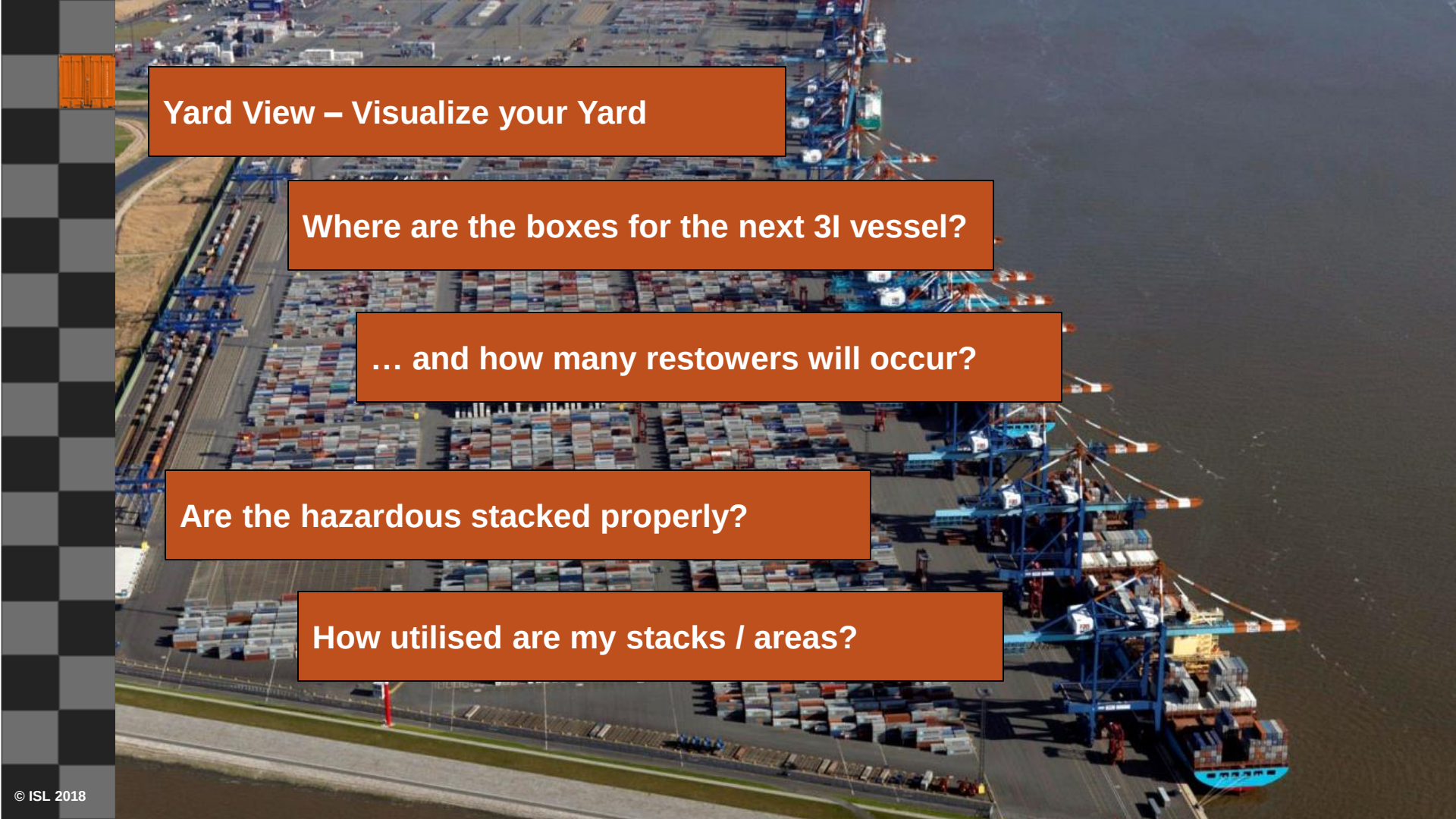
Only one click to show filter in 3D

User defines filters

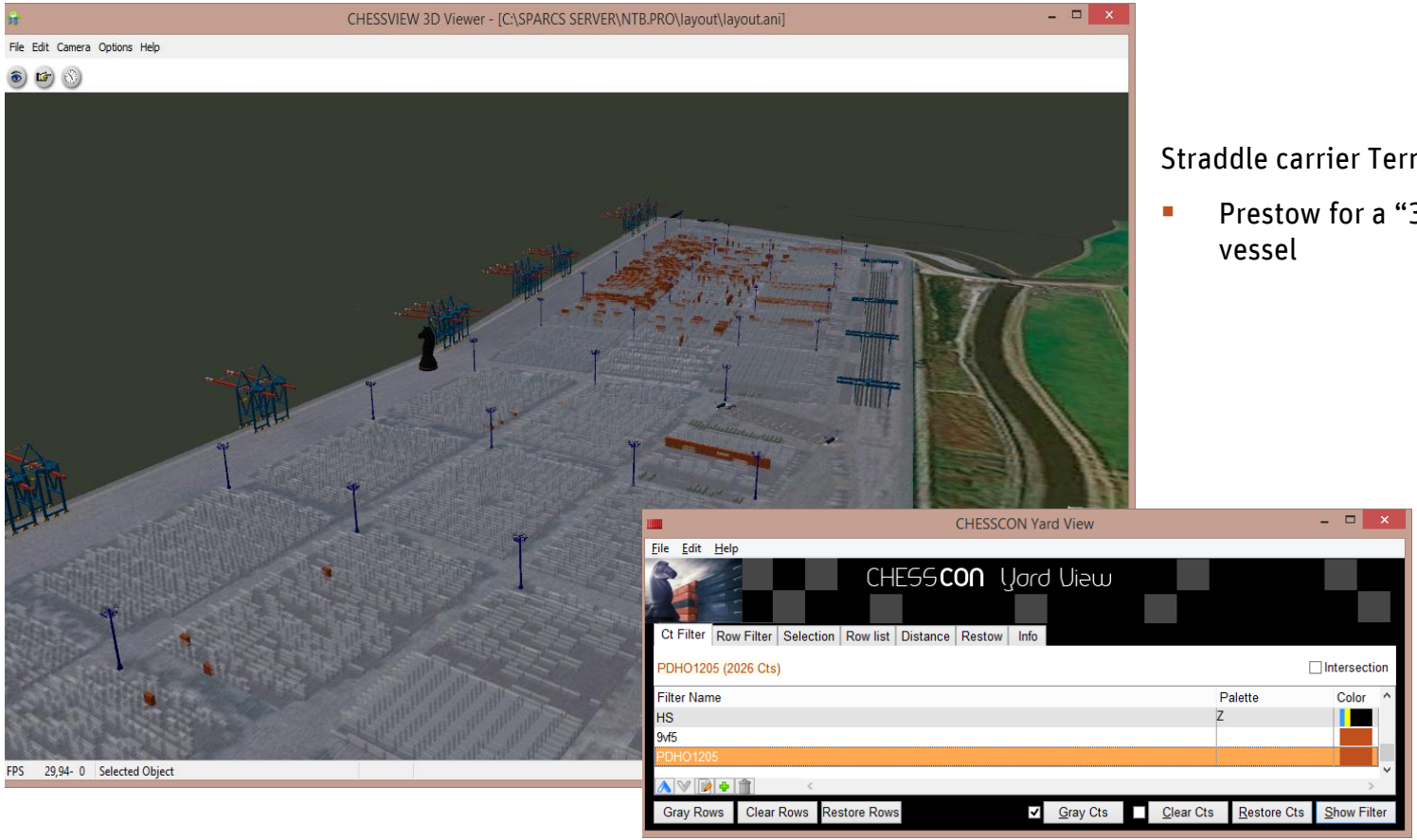
TOS writes inventory



No limits in filtering container inventory


Yard View – Visualize your Yard
Where are the boxes for the next 3I vessel?
… and how many restowers will occur?
Are the hazardous stacked properly?
How utilised are my stacks / areas?

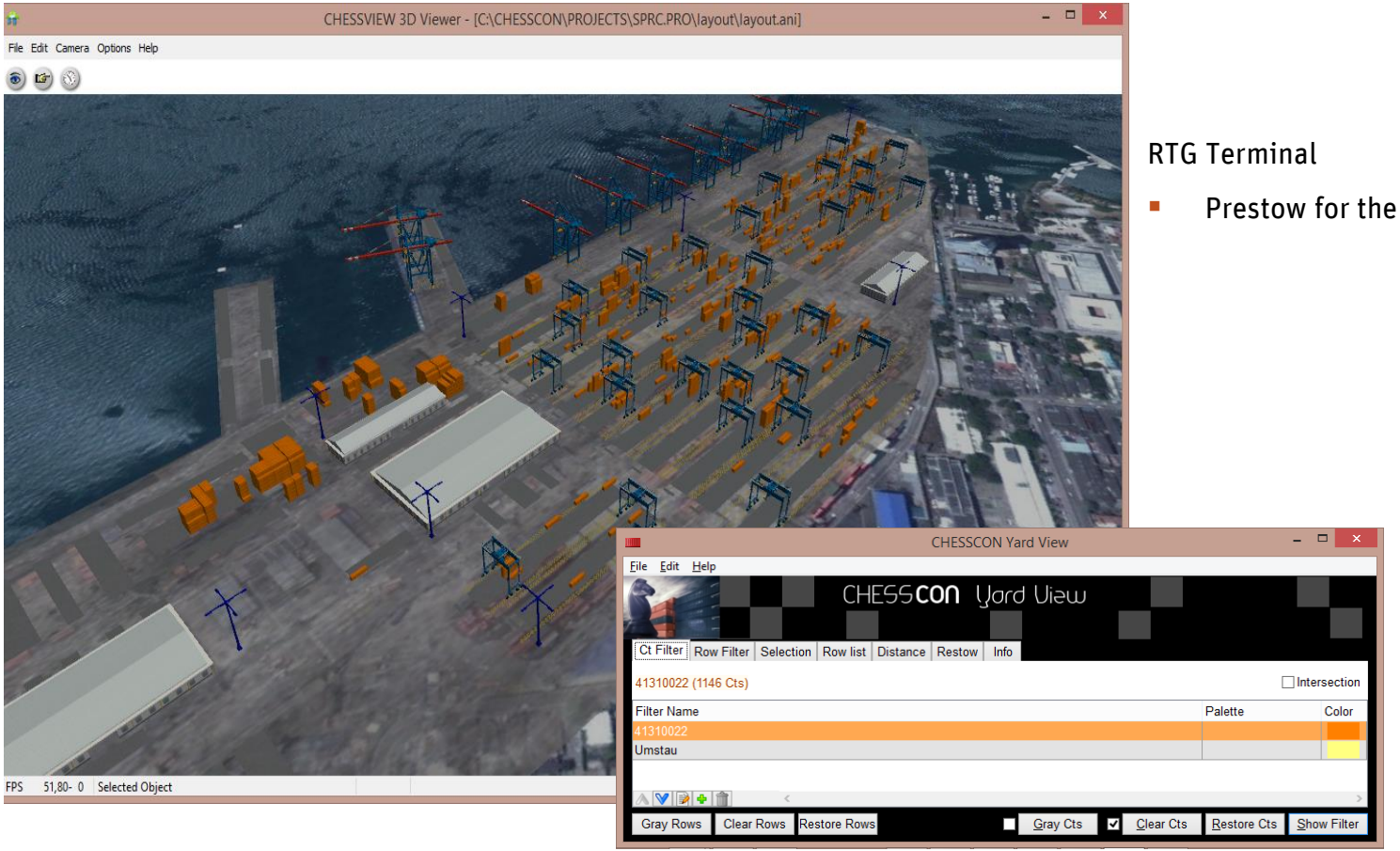
EXAMPLES



Straddle carrier Terminal

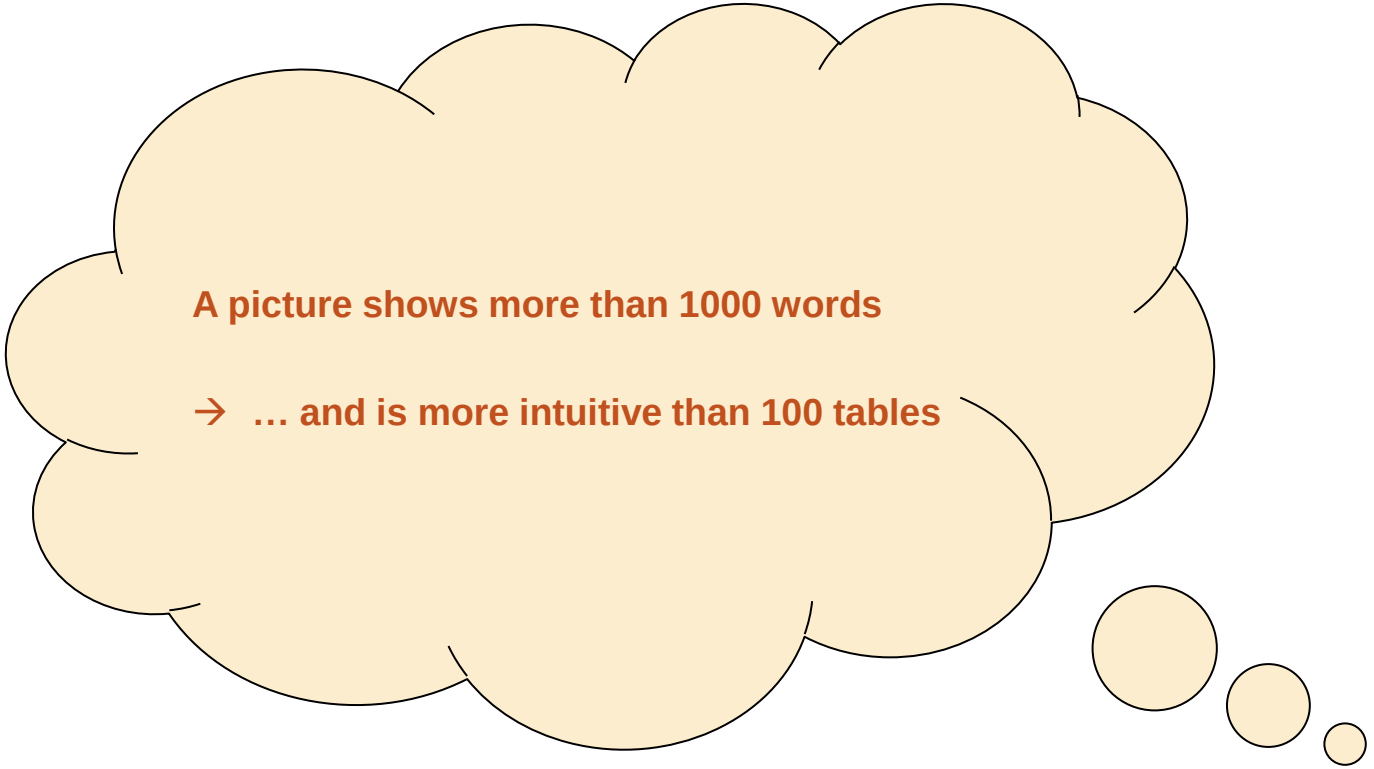
- Prestow for a “3I” class vessel

Examples

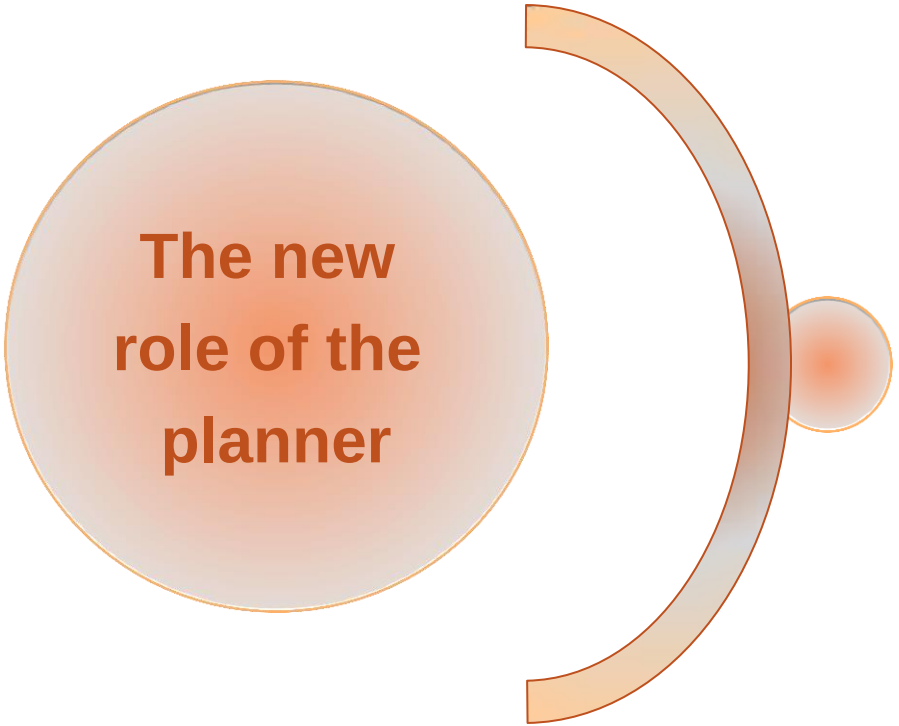


RTG Terminal

- Prestow for the next vessel


A picture shows more than 1000 words
→ … and is more intuitive than 100 tables

Agenda

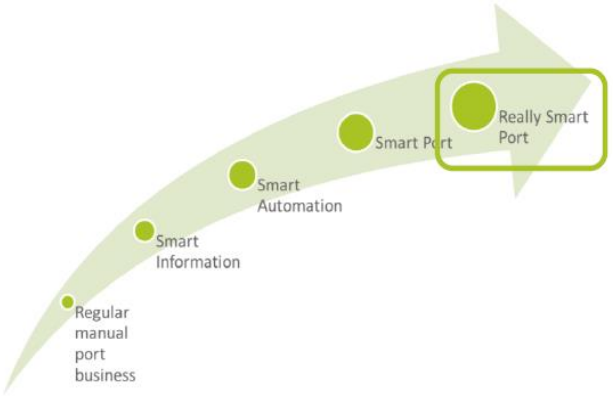


Digitalisation Gate

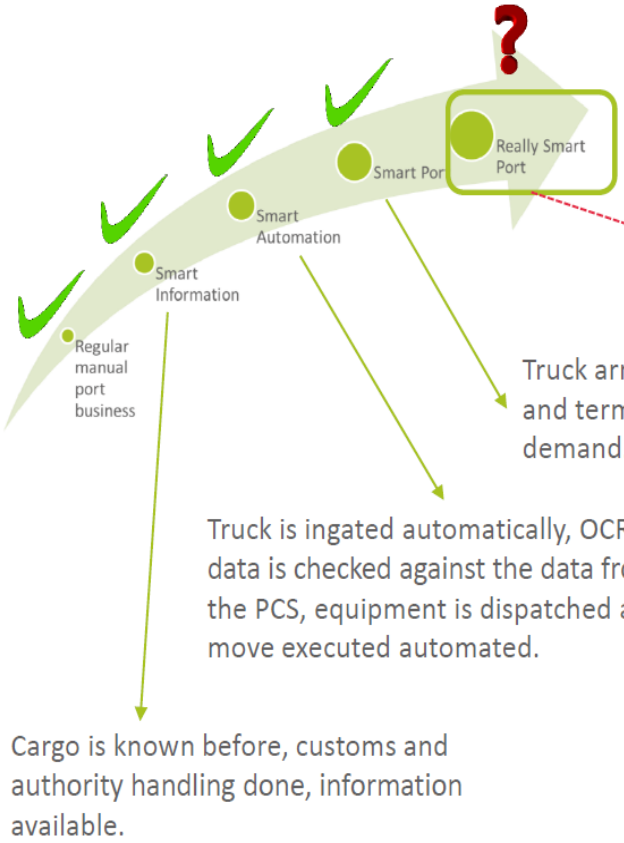
Digitalisation Gate

Which truck is arriving at the terminal
Who‘s the driver (access allowed?)?
Which container is on it?
What‘s about the container content?
- hazardous?
- reefer?
Where will the container go next?
What‘s the final destination?
…

Smart Port Approach – Step-wise: More smart?



Smart Port Approach – Step-wise: More smart?



Coming back to the initial question:
What if the right truck would come always at the right time to a terminal and uses the best rout through the port?

The vision on this process:
Based on the demand, capacity and the actual traffic conditions, truck flow in the port is actively and smart managed. E.g.

1. Trucks are called of the highway to take a break and park, if the container is not ready yet, the terminal is jammed or other things.
2. The traffic flow to available capacity is smoothened by intervention with traffic lights, bridges and other infrastructure.

MANILA

< BEFORE

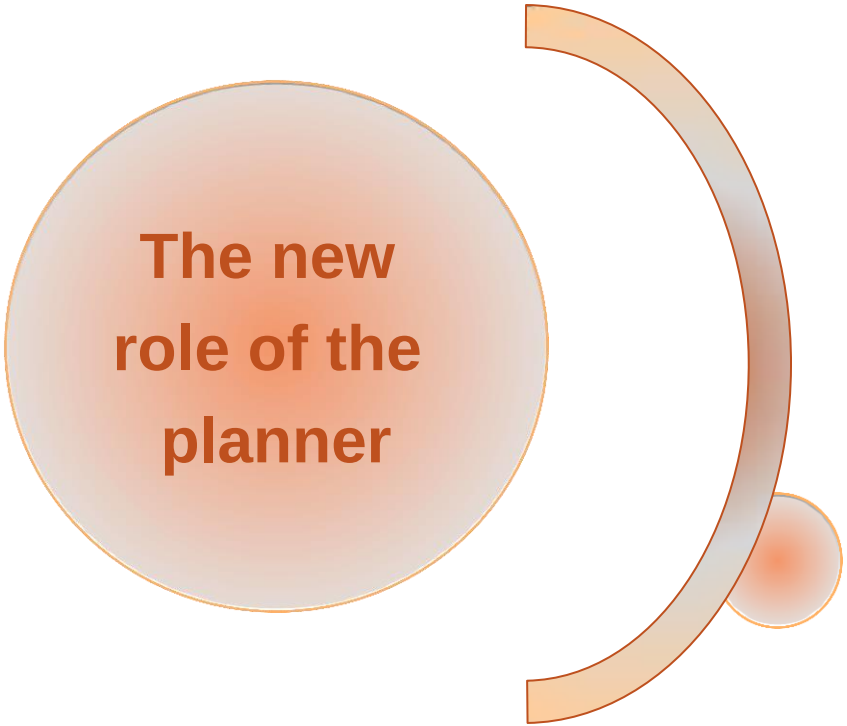
Source: 9th Philippine Ports and Shipping 2017, Manila, February 23th – 24th 2017

MANILA

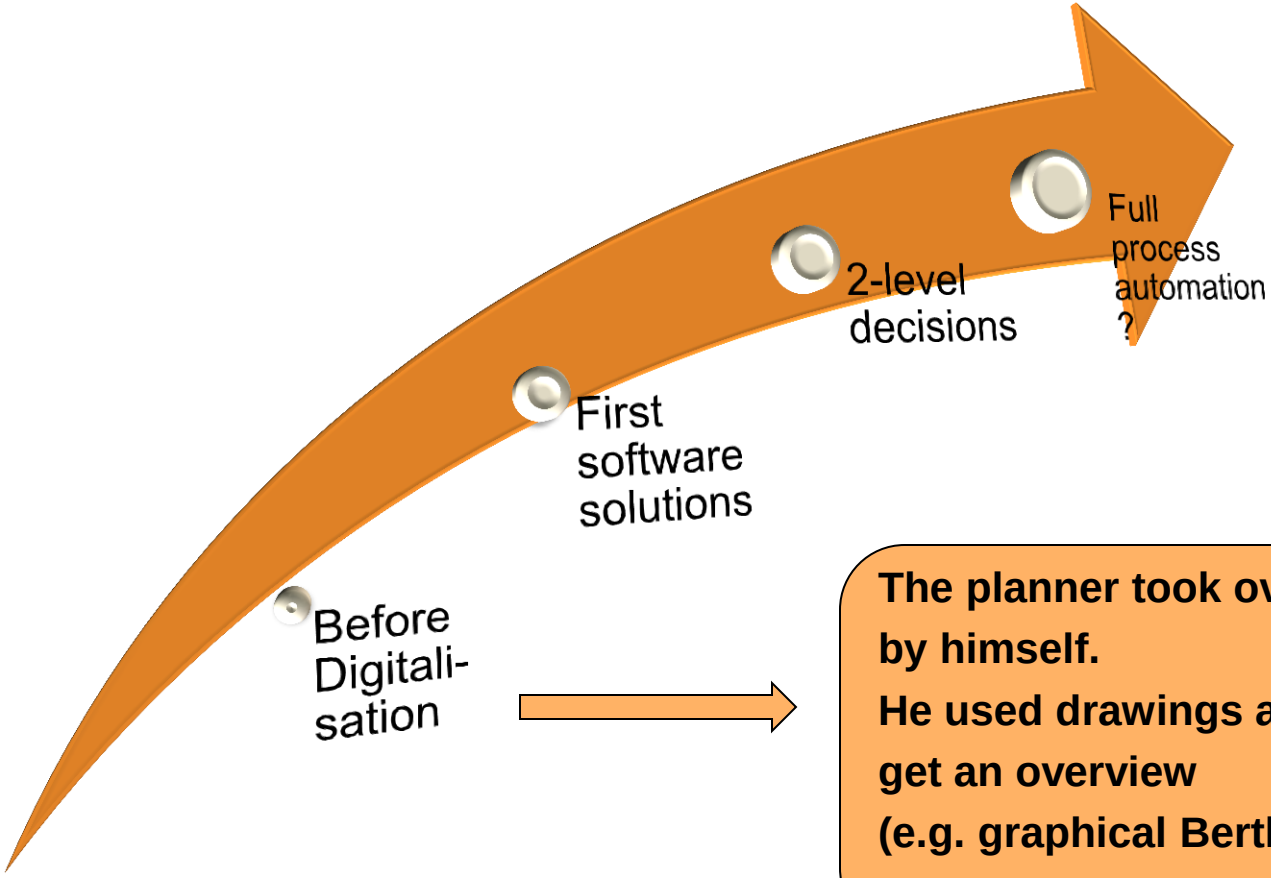
AFTER >

Source: 9th Philippine Ports and Shipping 2017, Manila, February 23th – 24th 2017

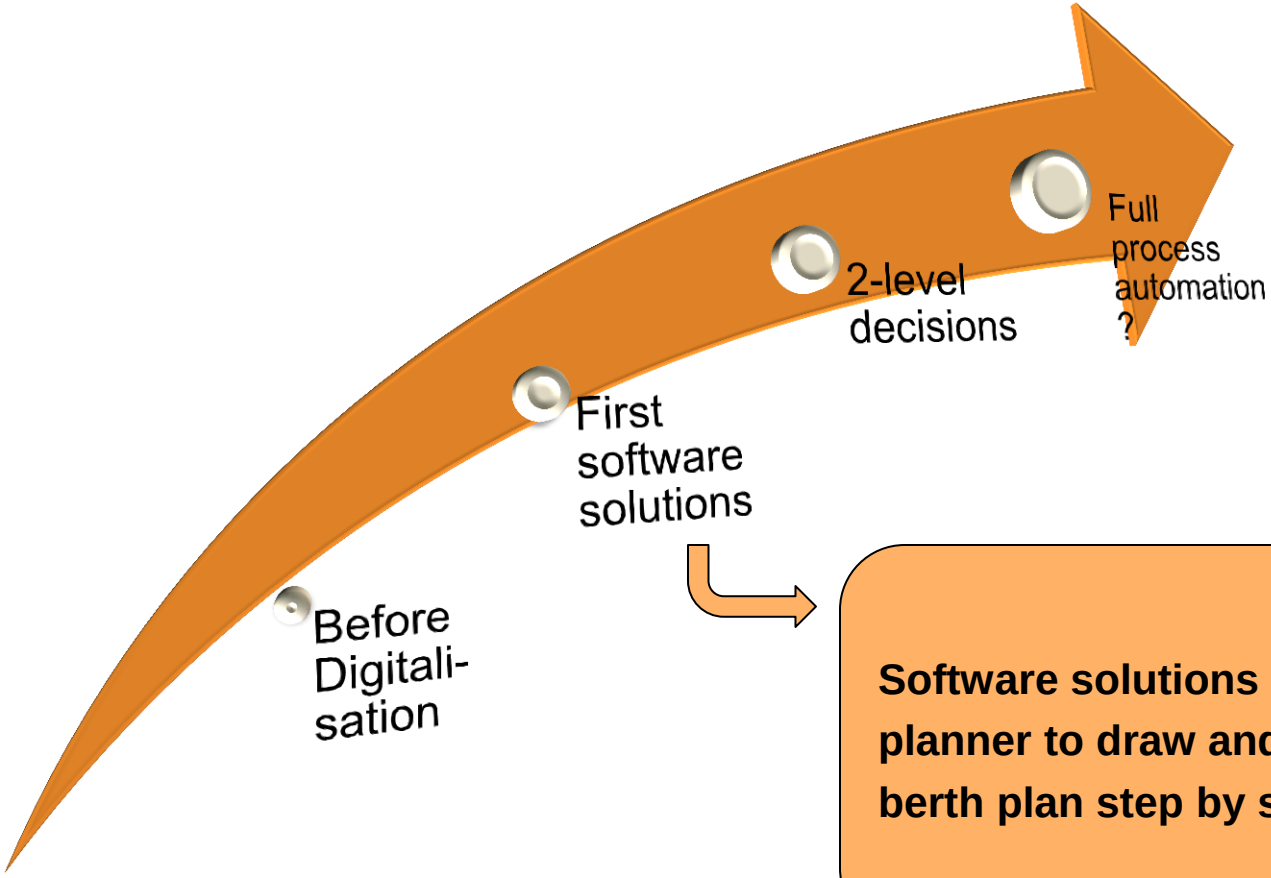
Agenda



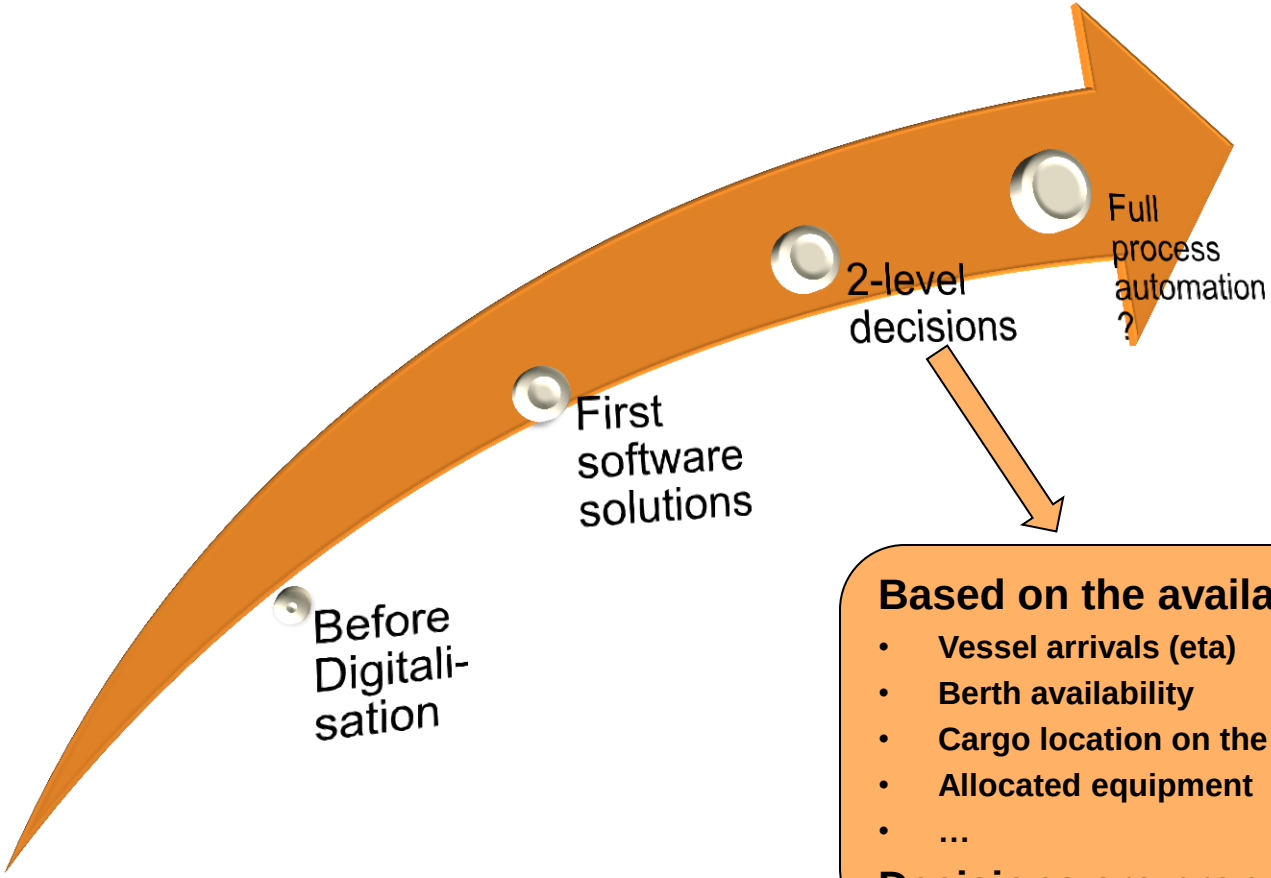
Role of the planner



The planner took over all decisions by himself.
He used drawings and tables to get an overview
(e.g. graphical Berth-plan – to be Revised 5-times a day)



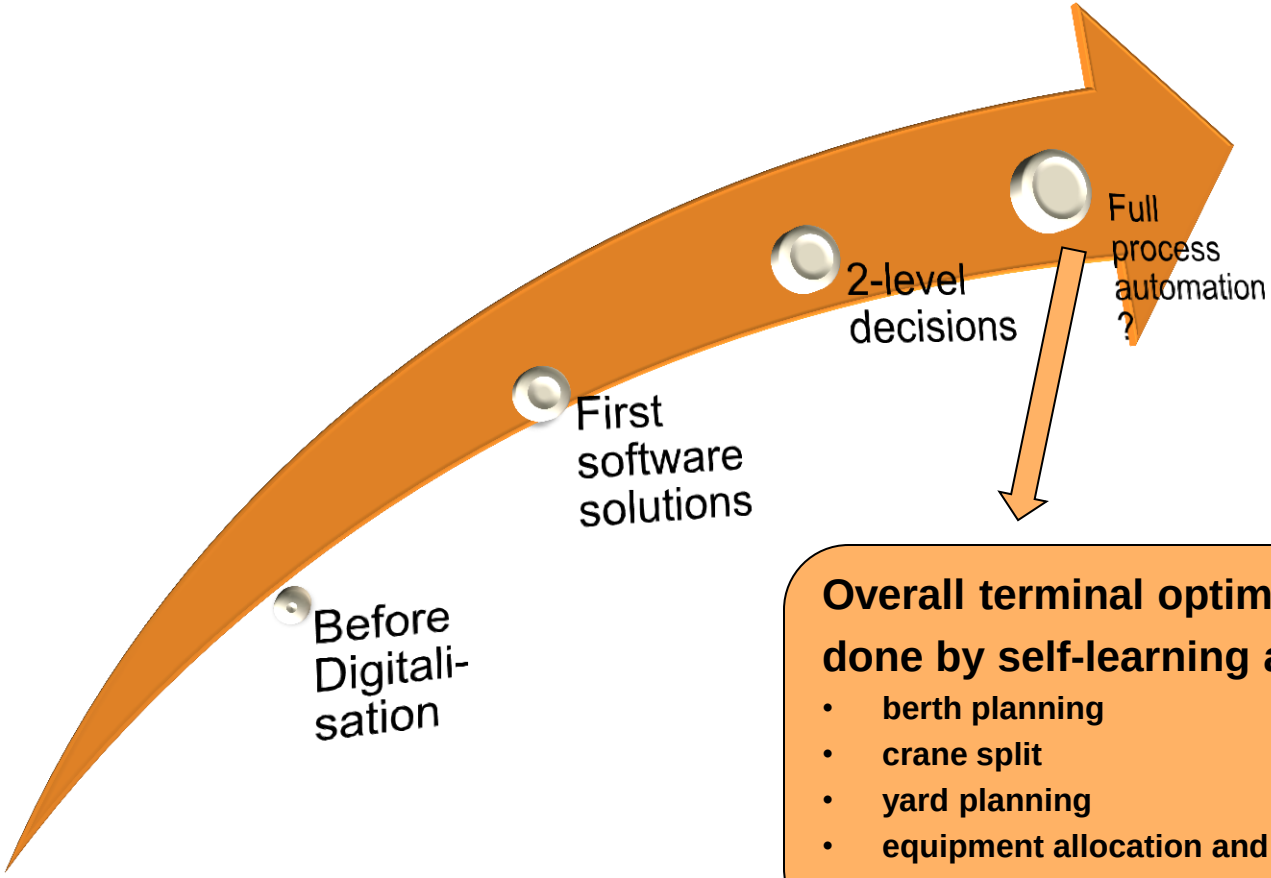
Software solutions supported the planner to draw and change the berth plan step by step.



Based on the available data

- **Vessel arrivals (eta)**
- **Berth availability**
- **Cargo location on the yard**
- **Allocated equipment**
- **…**

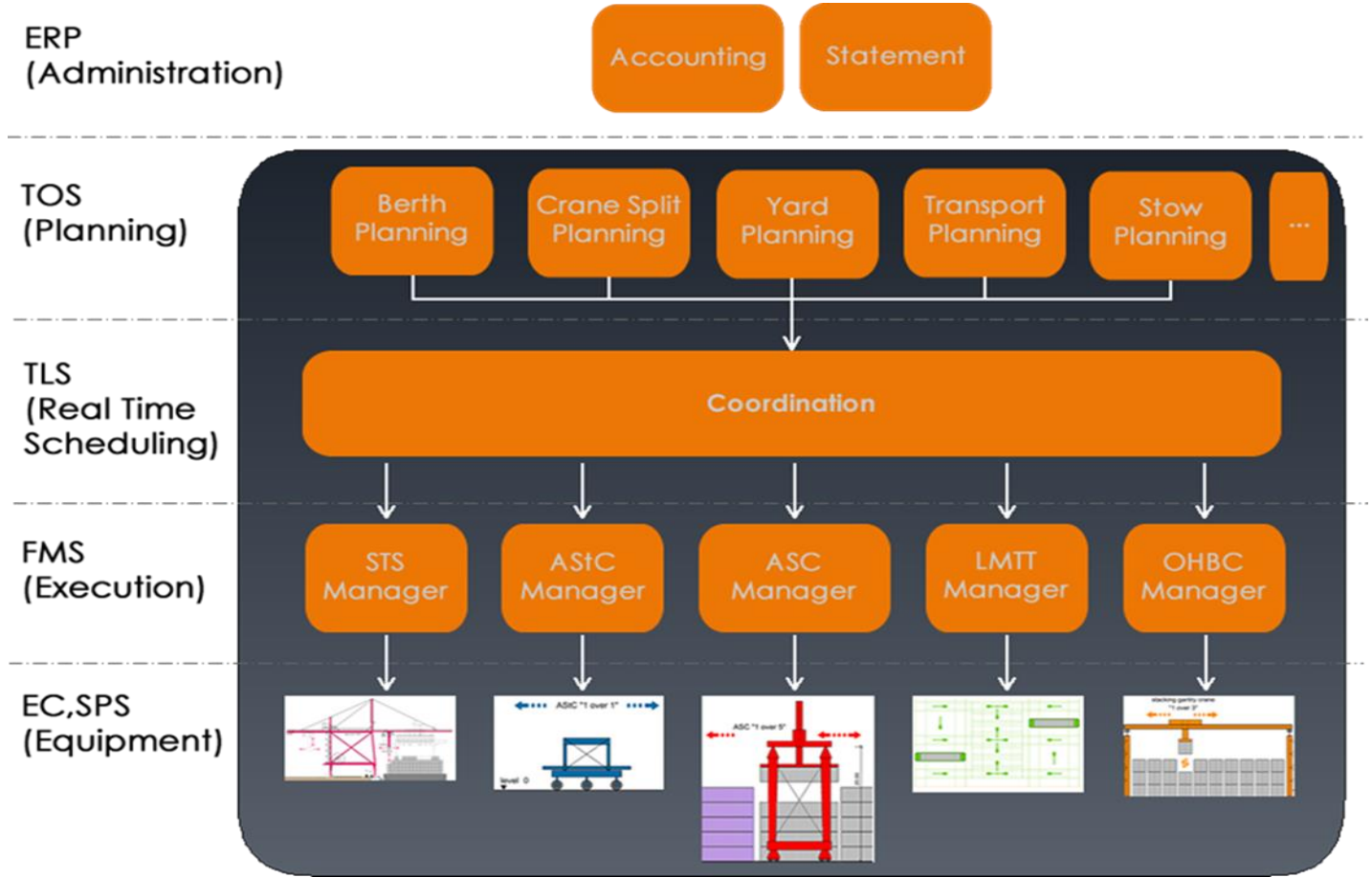
Decisions are proposed automatically



Overall terminal optimisation will be done by self-learning algorithms

- **berth planning**
- **crane split**
- **yard planning**
- **equipment allocation and control**
- **stowage planing**

IT architecture



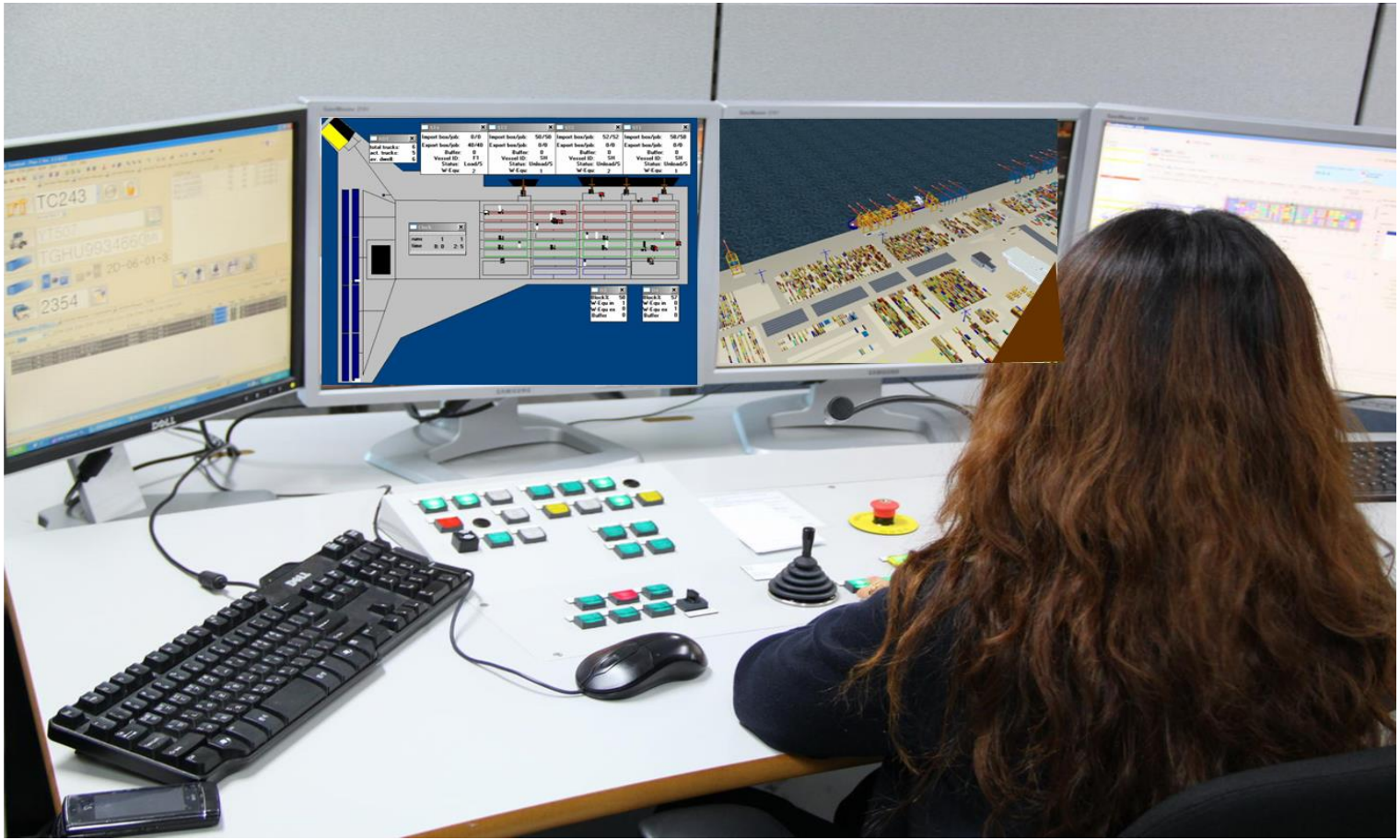
Vessel simulator

- train your control staff (as shipping lines do)

Crane simulator

- train your control terminal staff (as you do with crane drivers, e.g. Liebherr:)

Learning from the huge ones

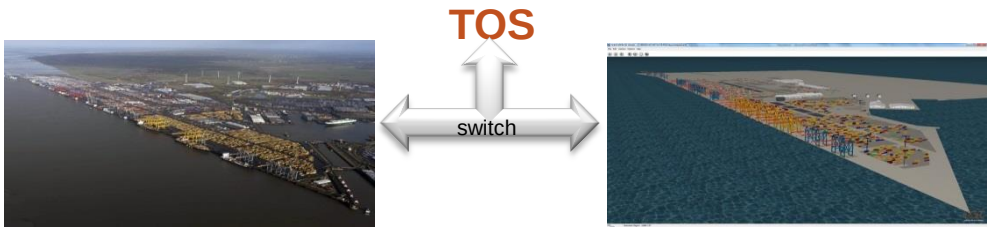


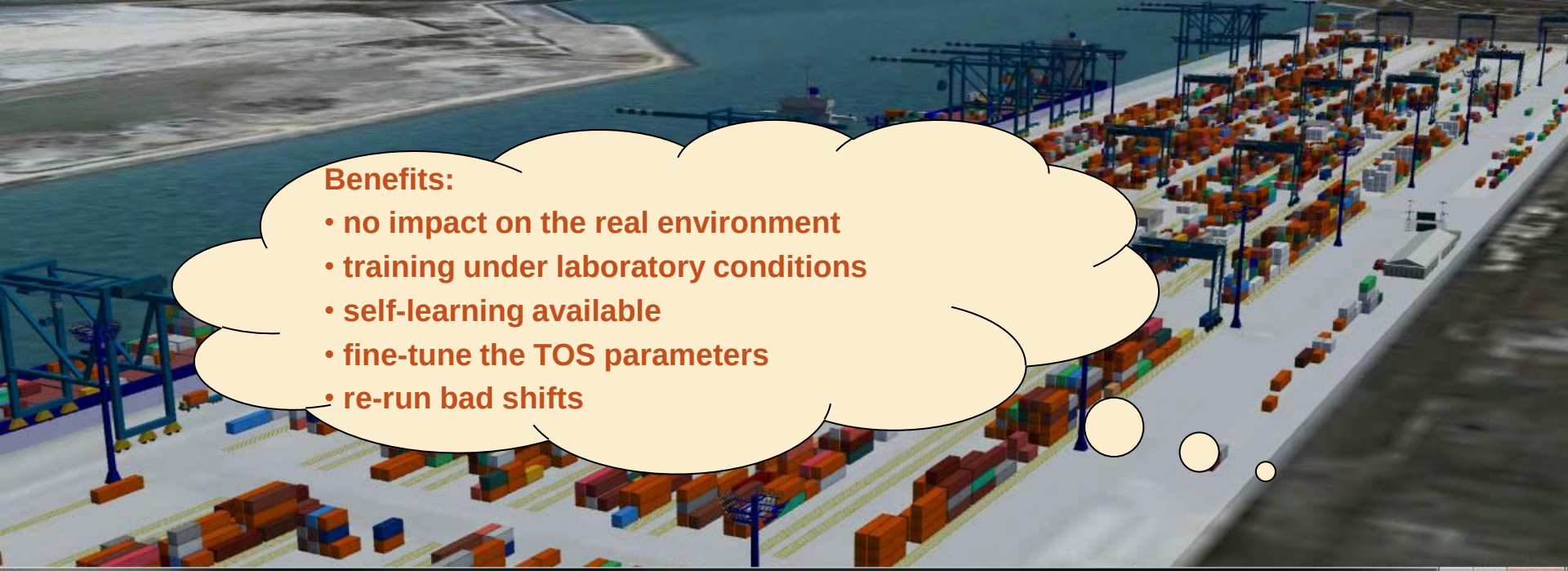
The main mission of CHESS**CON** VIRTUAL TERMINAL

what you can do with CHESS**CON**

Emulation:

- use your Terminal Operation System (TOS)
- use your software interfaces
- but use a **Virtual Container Terminal**





SPARCS 3.7.24.1 - Kassl

File Edit Vessel Yard Container Planning Control Windows Help

navis

Equipment Pool QC06: 6

Actions Display

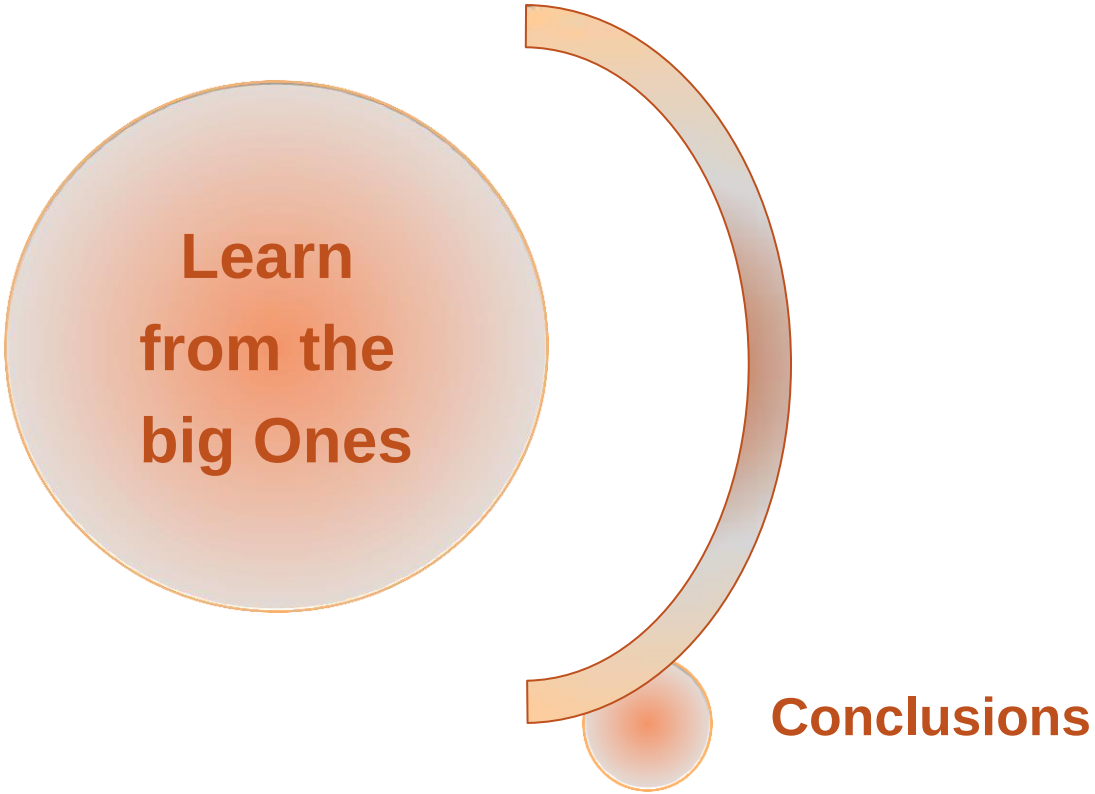
Handler id	Icon Only	Screen	Dispatch State	Move D
121			Carrying a container; Waiting at Row	1321+
122			Go to crane; Waiting at Ship	1321+
124			Go to crane; Waiting at Ship	1321+
125			Go to crane; Waiting at Ship	1321+
C06				

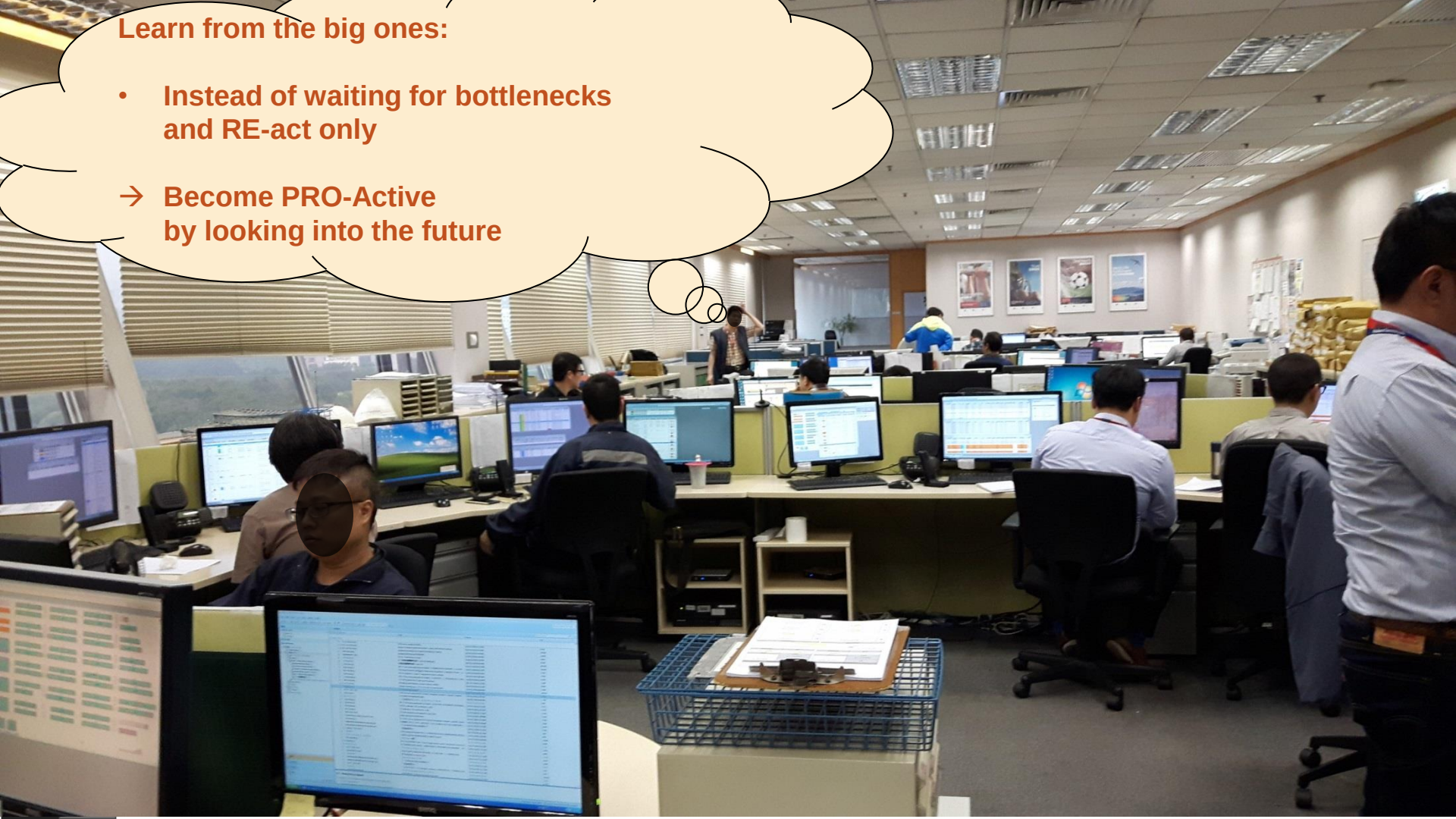
Point of Work Q06

Actions Display

Sequence	Container No.	Type	Current Position	Handler id	Dispatch State
1	GATU8091789	45G1	*TR-121*	121/R33	In Progress
2	GATU8588121	45G0	CANX020*0361490	124	Go to Crane
3	FSCU6472343	45G1	CANX020*0361290	125	Go to Crane
4	HLXU6350672	45G1	CANX020*0361090	122	Go to Crane
5	HLXU6273703	45G1	CANX020*0361688		(not evaluated)
6	CPSU6439396	45G1	CANX020*0361488		(not evaluated)

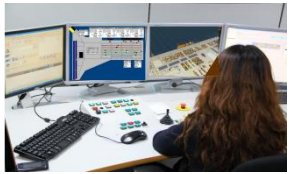
Agenda

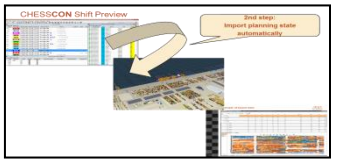



Learn from the big ones:
• Instead of waiting for bottlenecks and RE-act only
→ Become PRO-Active by looking into the future

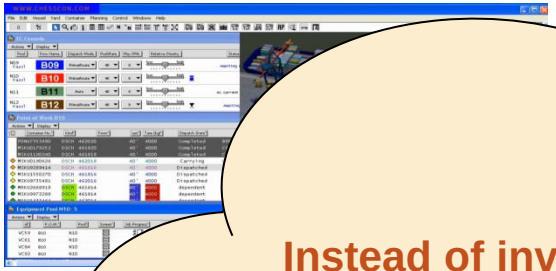
Conclusion

- Visualise your actual container inventory
- Train your staff with Virtual Terminals
- Look into the future operation



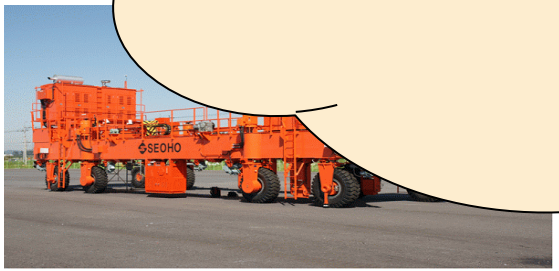


How to improve terminal‘s efficiency

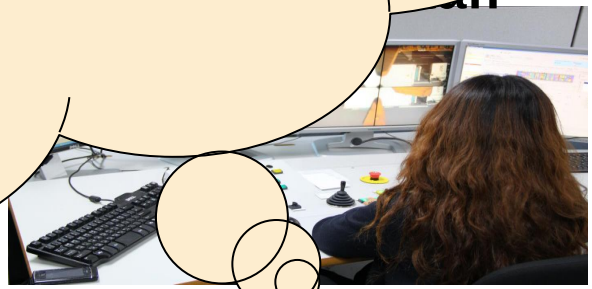


Instead of investing in more and more man and machines:

Get more out of your existing resources



The first ALV of KMI



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