Equipment Logistics Systems (ELS)
Logistic Optimization in ELS-Modules

Latest developments on ELS

VANDERLANDE
a TOYOTA AUTOMATED LOGISTICS company

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Before we start:
What happeds with Siemens Logistics?

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Company Update Siemens Logistics

- Siemens Logistics has been sold to Vanderlande on 1.5.2025
- New company name is Vanderlande Logistics
- Full portfolio transferred and supported by new owner
- Support and development for ELS now from another Siemens AG sub-supplier
- Continued cooperation confirmed by Vanderlande and Siemens, settled with a contract

- => No reason for any worries

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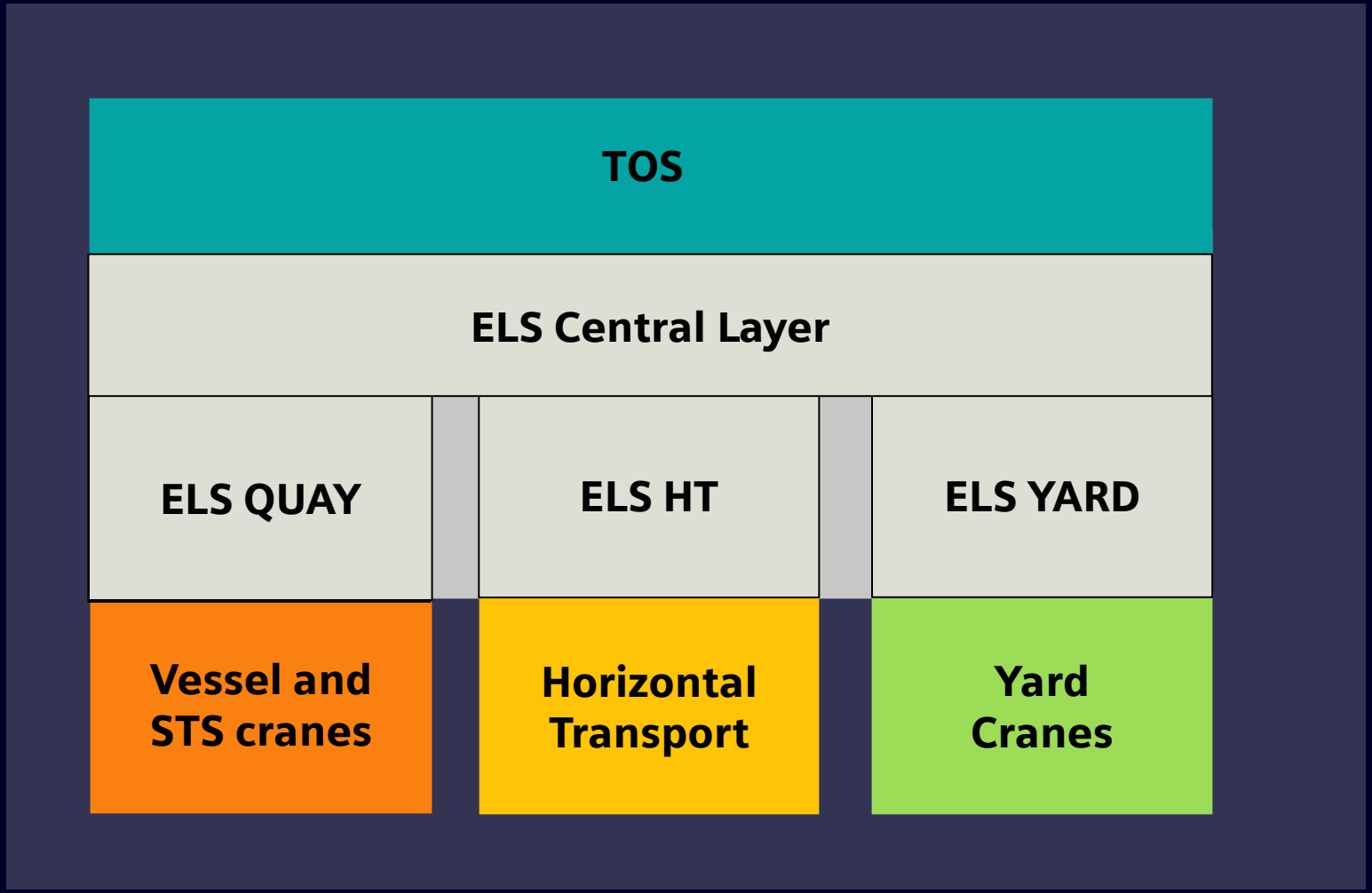
Introduction into ELS

Solution for integration in automated terminals

- Intelligent middleware for decoupling TOS and equipment
- Move instruction from TOS
- Central layer for transport and routing management
- Scheduling and dispatch in central layer and in each ELS module
- ELS modules send transport execution jobs to equipment
- ELS has a central database and an individual GUI incl 3D-visualization



Logistics Software in Container Terminals

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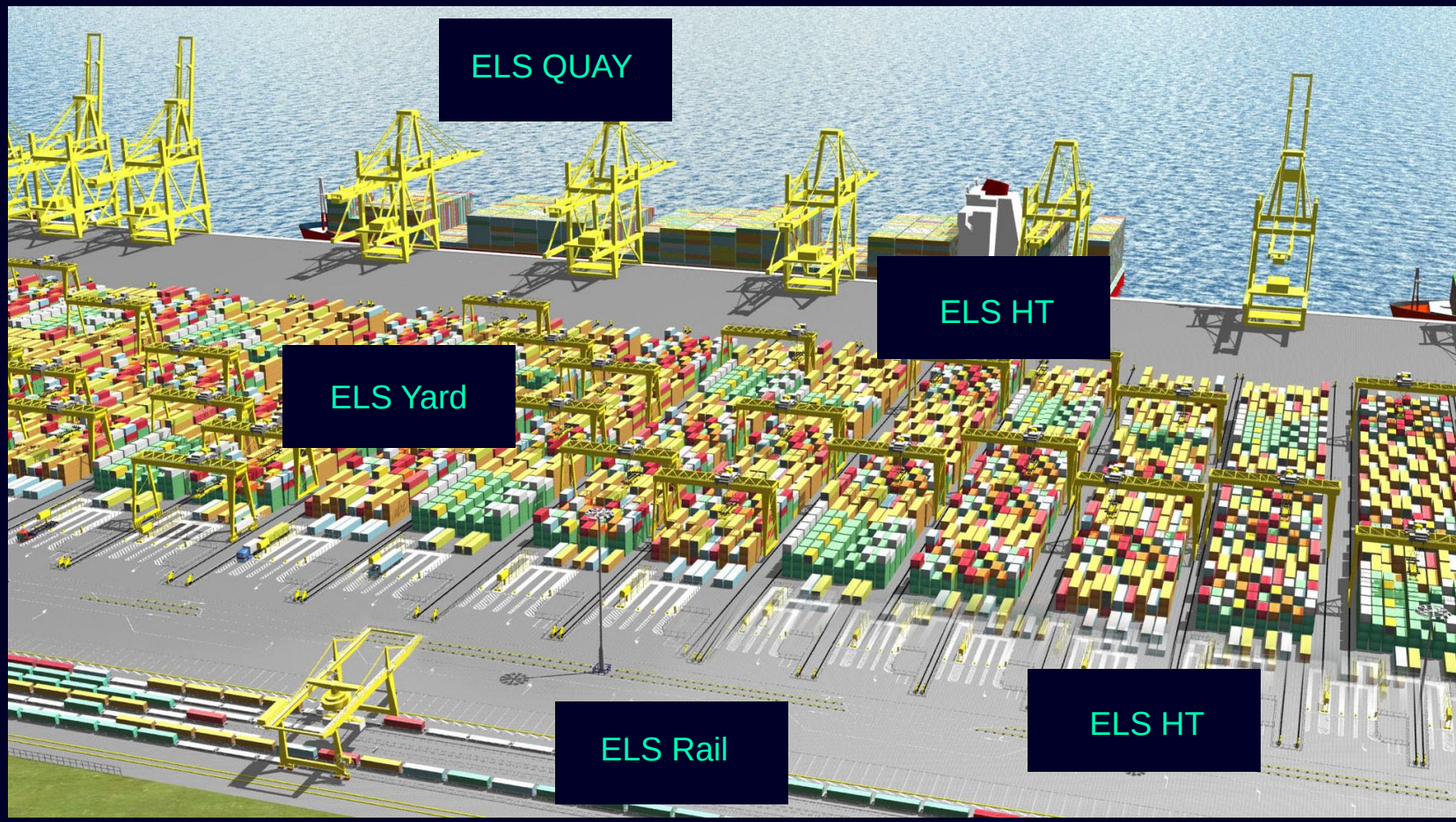
Intelligent solution for integration in automated terminals

ELS Modules

- **ELS Yard** (for ARTGs and ARMGs)
- **ELS Quay** (STS management for vessels)
- **ELS Rail/Intermodal** (including manual areas)
- **ELS HT** (horizontal transport)



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Equipment Logistics System
ELS Modules

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Main Software Functions

Inventory Control, data model and persistence

Movement Scheduling and Dispatching

Equipment management (Yarc cranes, STS cranes, trucks, TT, AGV, SC, …)

STS: Twin- / Tandem spreader

Alignment with other ELS modules

Yard: End loading and side loading support

2D/3D Visualization

KPI Dashboard and Data Warehouse Integration

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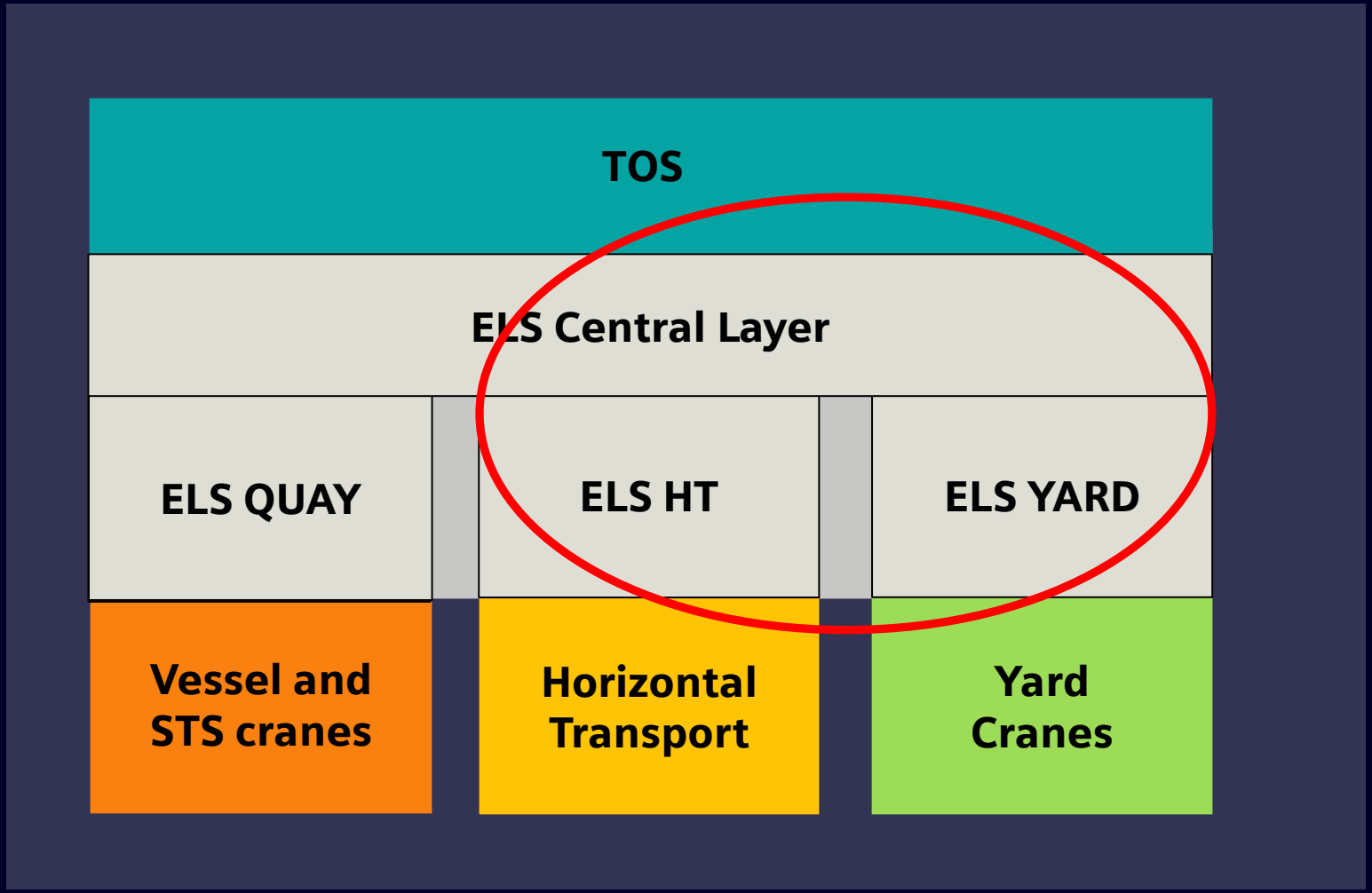
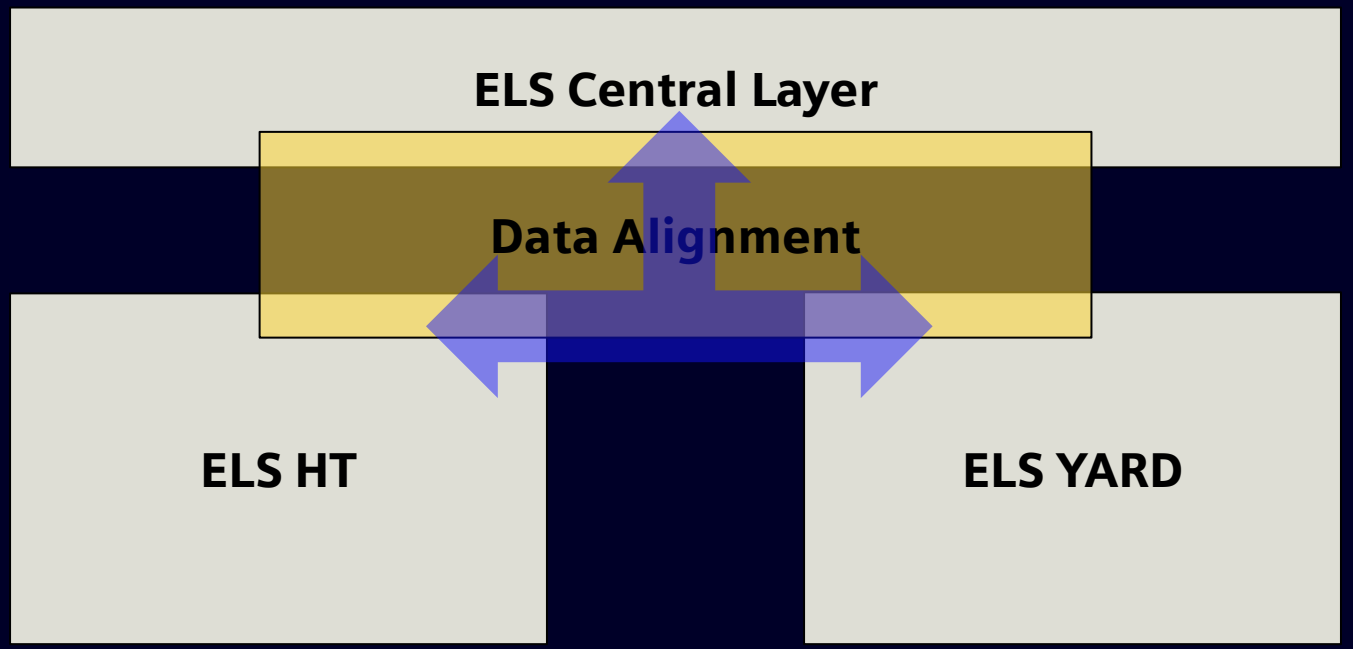


Equipment Logistics System
Alignment of ELS Modules

Alignment responsibilities between modules

- Planning global transport path
- Partial ways for different equipment



- Provide availability of resources
- Calculate transport paths
- Annouce arrival time of resources
- Forecast workload of vehicles

- Provide order list based on scheduling
- Process announcements

Equipment Logistics System
Alignment of ELS Modules - Example

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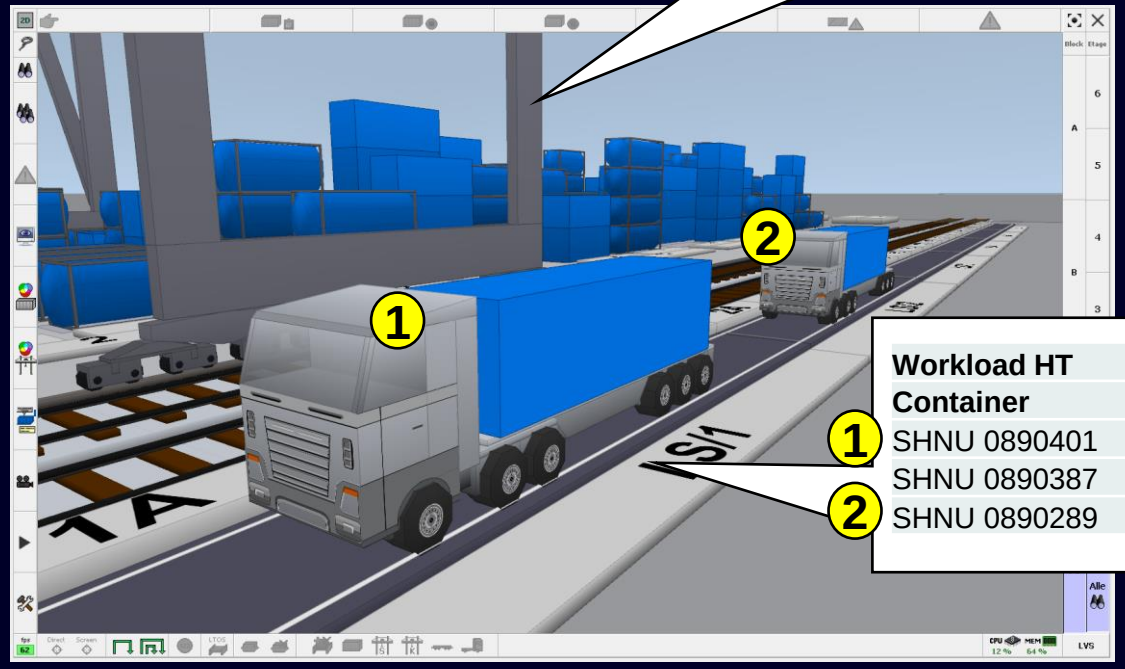
Workload Crane		
Container	Destination	Arrival
1 SHNU 0890401	LS1	11:20
3 NU 0890387	STACK	11:24
2 SHNU 0890289	STACK	11:31 2



ELS Central Layer

Sequence via Data Alignment

Workload HT				
Container	Truck	Type	Destination	Arrival
1 SHNU 0890401	HH-AD 2234	OUT	LS1	11:18
SHNU 0890387	34-NL-33	IN	LS3	11:29
2 SHNU 0890289	FI-2365-A	IN	LS2	11:21 2

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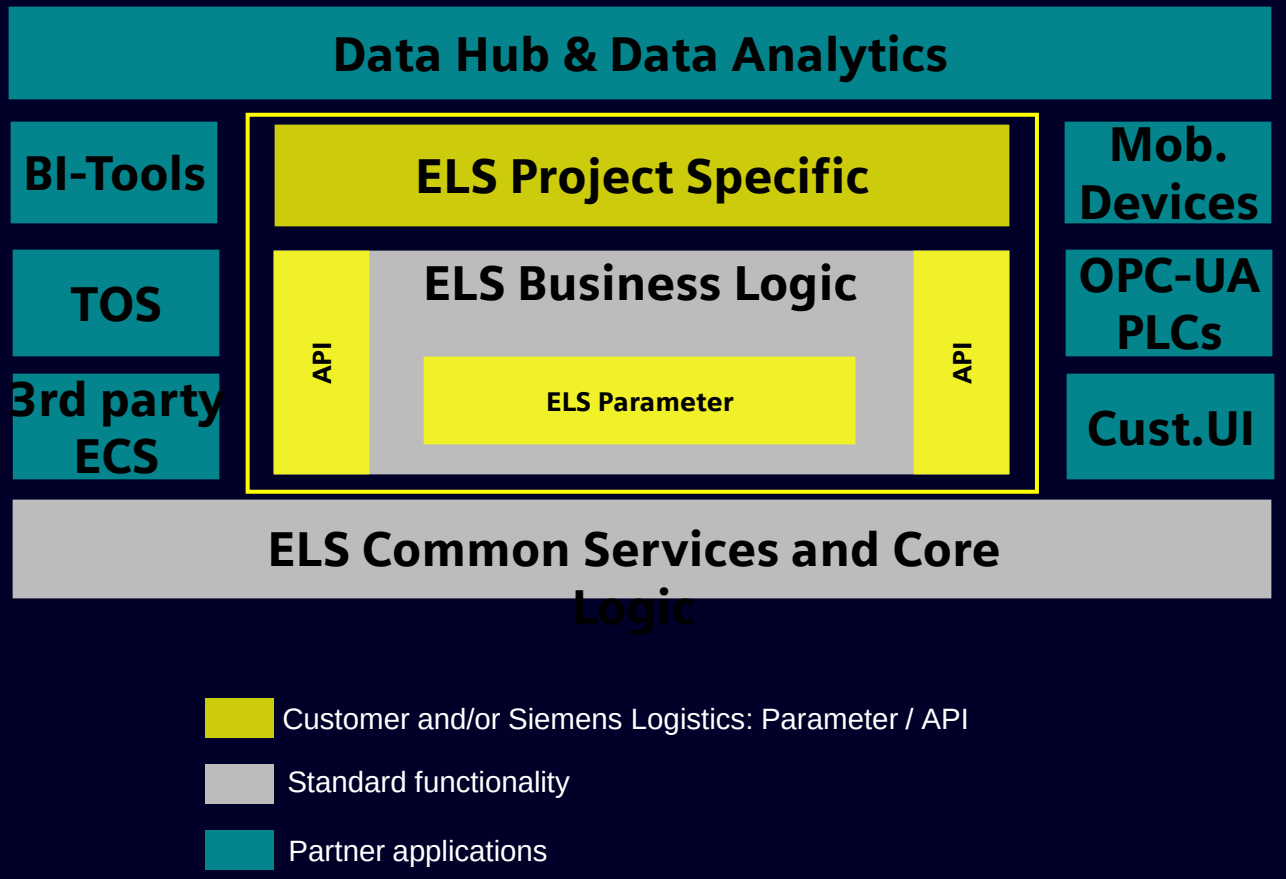
ELS – Platform Architecture

Open Architecture

- Stable core functionality
- Business logic configured by parameters
- Open API, i.e. to TOS, PLCs, HT, BI, Data Warehouse, …
- APIs can be used by other ECS or customer UI
- Project specific part planned to be fully open

API-Guide now available



Equipment Logistics System
Example Brownfield Integration based on Open Platform

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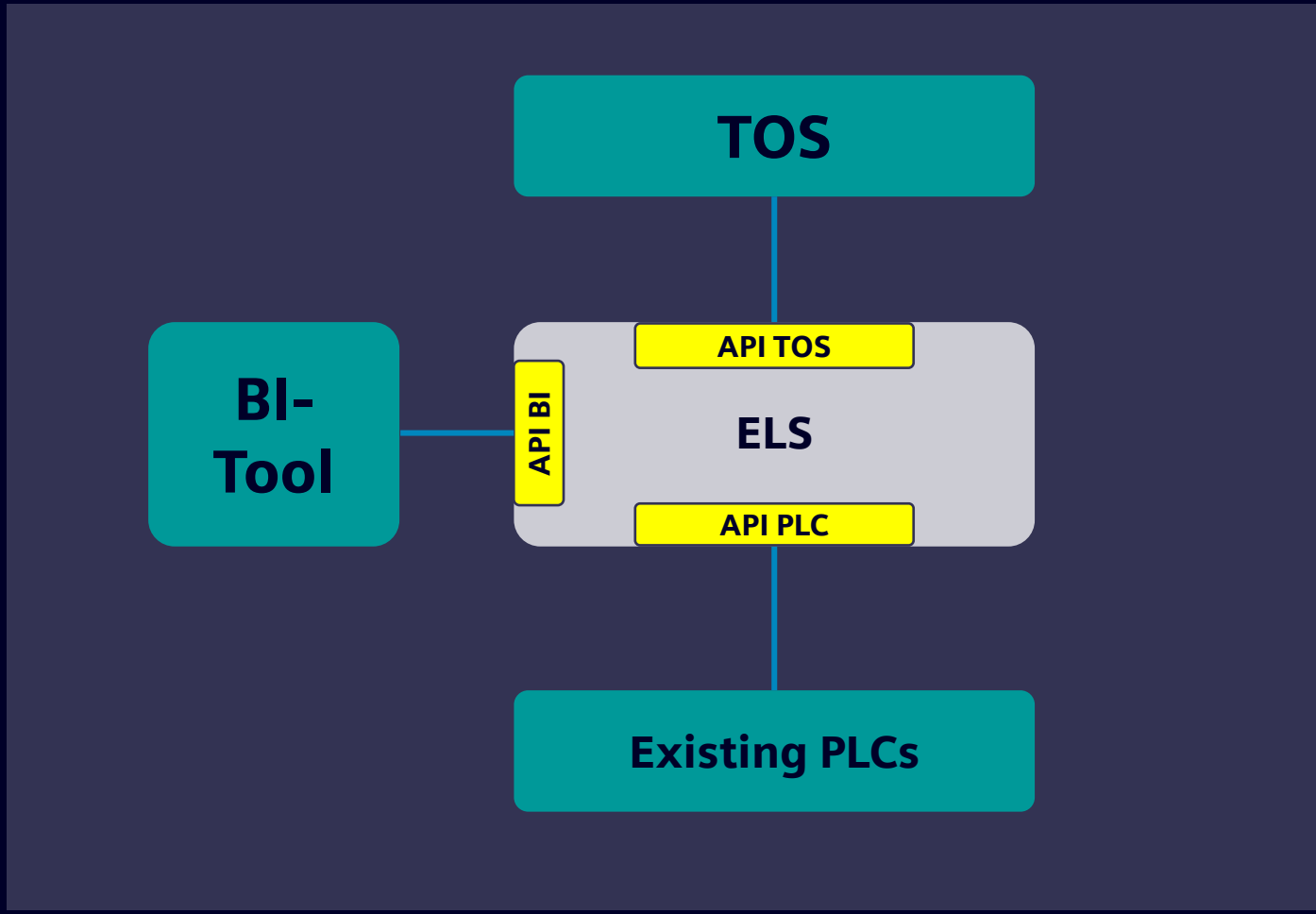
Integration in a brownfield terminal

- Interfaces (APIs) to TOS and PLC
- Use full logic of ELS
- Use further APIs, i.e. business intelligence tools of customer
- Performance verification by mockup possible
- Replacement of existing systems by ELS



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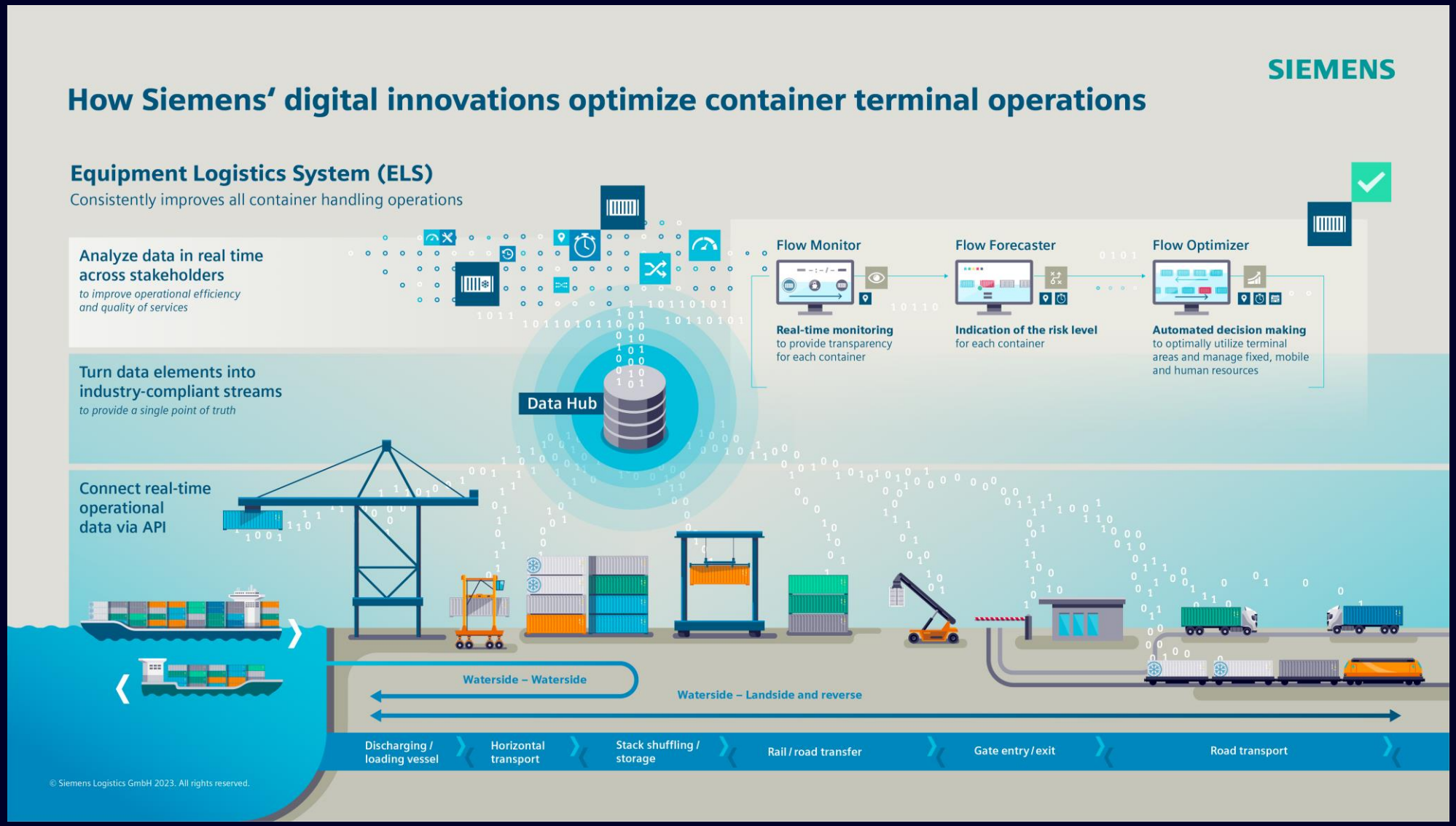
Digitalization



Digitalization, Data Warehouse and Data Analytics, Examples

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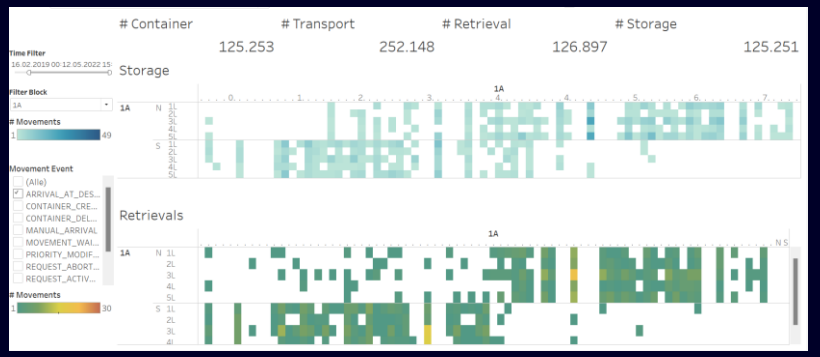
System → Cloud / On premise → Dashboard → Visualize → Analyze

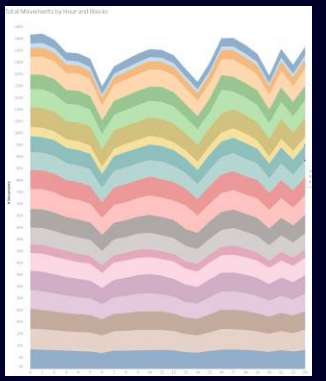
Collecting data from ELS and other systems

Combining data in dashboards to support operation

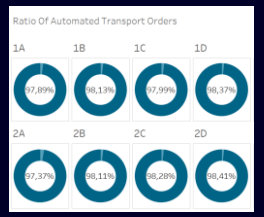
Easy modification and creation of individual sheets possible



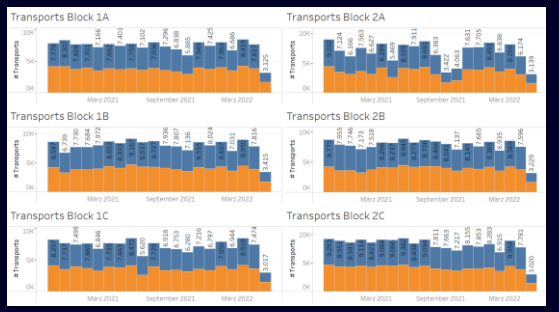
Heatmap occupation



Hourly moves per shift



Completion without operator



Transport statistics

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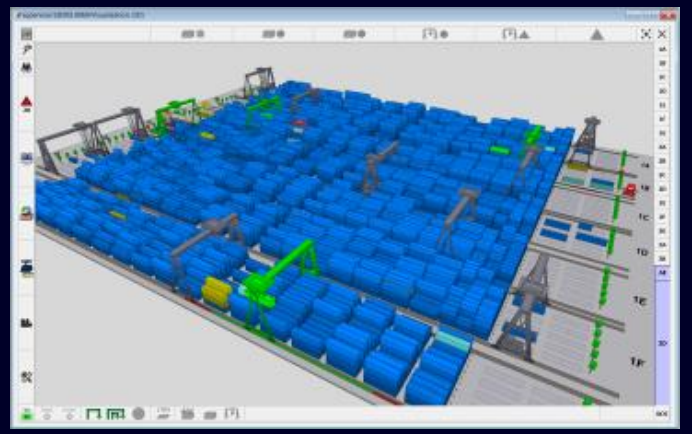
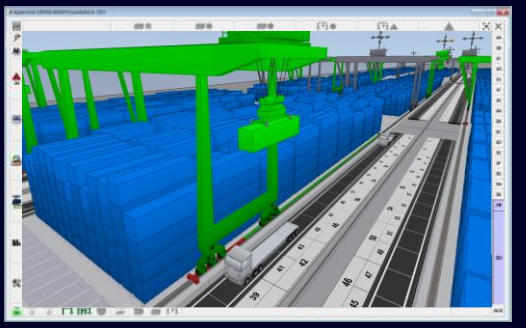
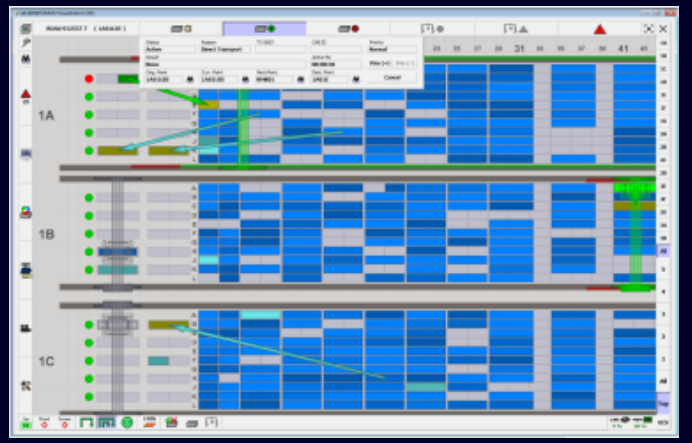
Equipment Logistics System
ELS Yard

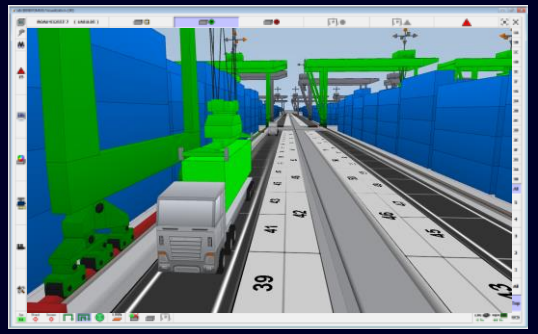
Main Software Functions

Inventory Control, data model and persistence	Movement Scheduling and Dispatching
Equipment management (ARMGs, ARTGs, …)	KPI Dashboard and Data Warehouse Integration
End loading and side loading support	2D/3D Visualization









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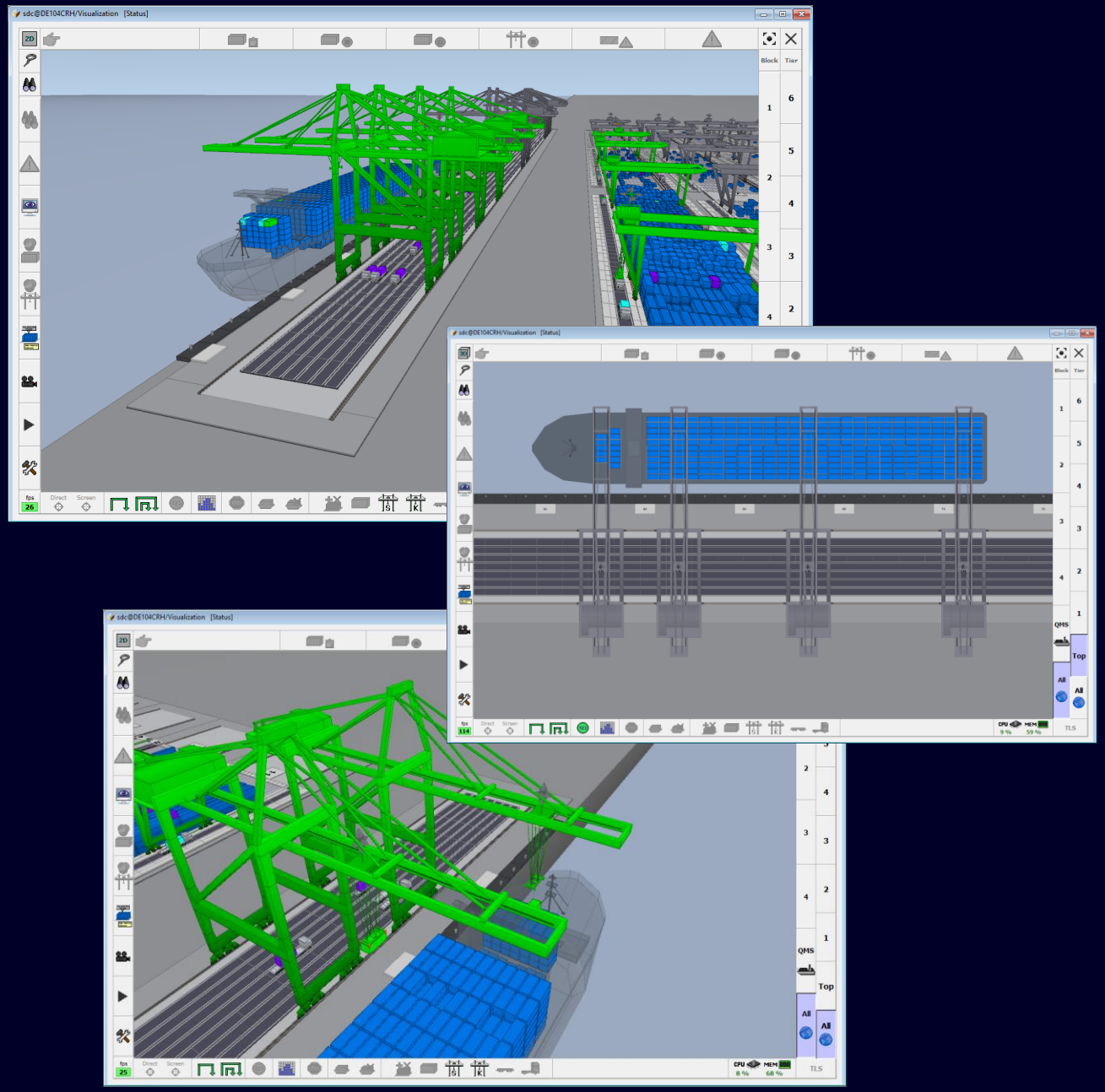
Equipment Logistics System
ELS Quay

Main Software Functions – similar to ELS yard

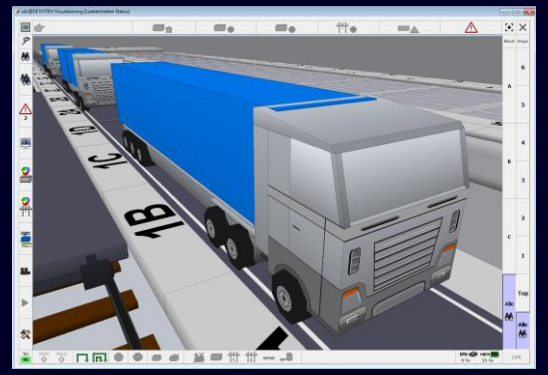
- Inventory control, own data model
- Scheduling of TOS job orders
- Equipment management (STS)
- Movement dispatching & execution
- Interface lanes under STS
- Twin- / Tandem spreader



Equipment Logistics System
ELS Horizontal Transport

Main Software Functions

Inventory Control, data model and persistence	Assignment of Movements to Vehicles
Equipment management (Truck, AGV, SC, …)	KPI Dashboard and Data Warehouse Integration
Interfaces to Yard Cranes and STS Cranes	2D/3D Visualization



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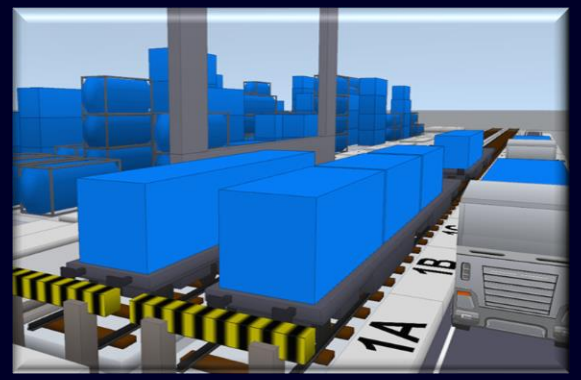
Equipment Logistics System
ELS Intermodal TOS

Software Functions in Intermodal /Trimodal TOS

Gate information / interface	Barge management / loading plan
Customer host instead of TOS	Manual areas / manual devices
Train management tain gate / train scan	Option: Semi-mode for crane



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