
TMEIC
Port & Terminal Technology
International Conference and Exhibition
Charleston SC
Automation –
Are there Industry Standards worth
consideration ?
MAERSK

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Automation –
Are there Industry Standards worth consideration ?

Jim Gabbard,
Manager Automated Crane Systems
TMEIC Corp

How productive would we in the container business be today without Standardization?

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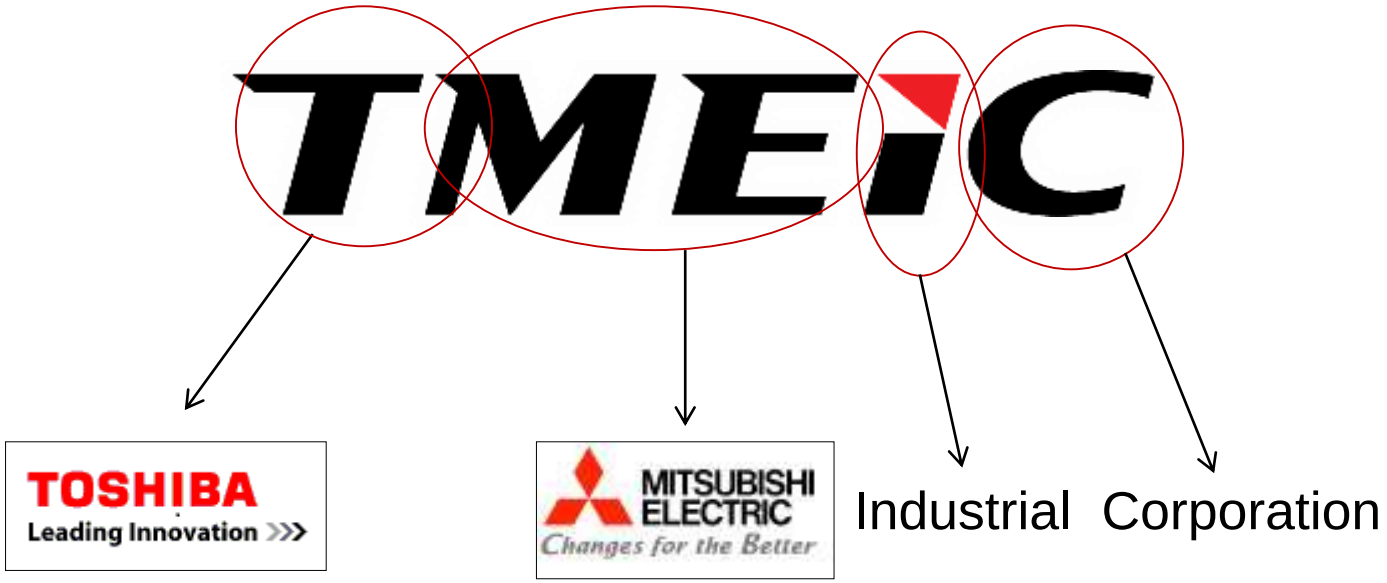


TMEIC is a global drive and automation systems supplier with manufacturing, engineering, sales, and service facilities around the World.

A Very Brief History Lesson

Early days – For centuries, freight was handled manually

Malcolm P. McLean

A truck driver who eventually built one of the largest trucking companies in America

He realized that there had to be a better way

Malcolm P. McLean

Where would we be today if Malcolm P. McLean had believed the guy who said…

"Cargo can only be moved by hand."

Malcolm P. McLean

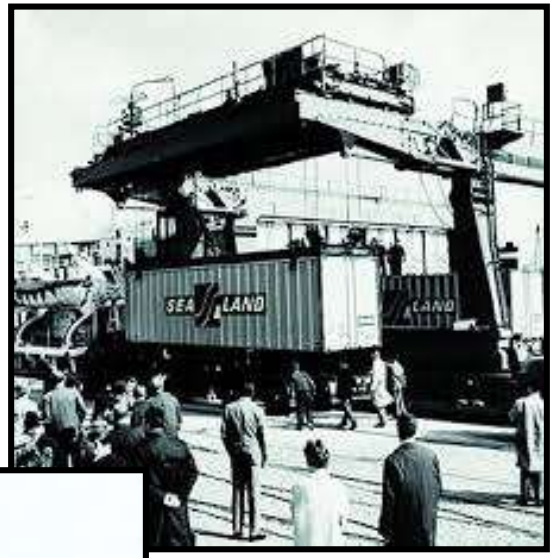
Where would we be today if Malcolm P. McLean had believed the guy who said…

"But, we've always done it this way"

Thankfully he knew better…

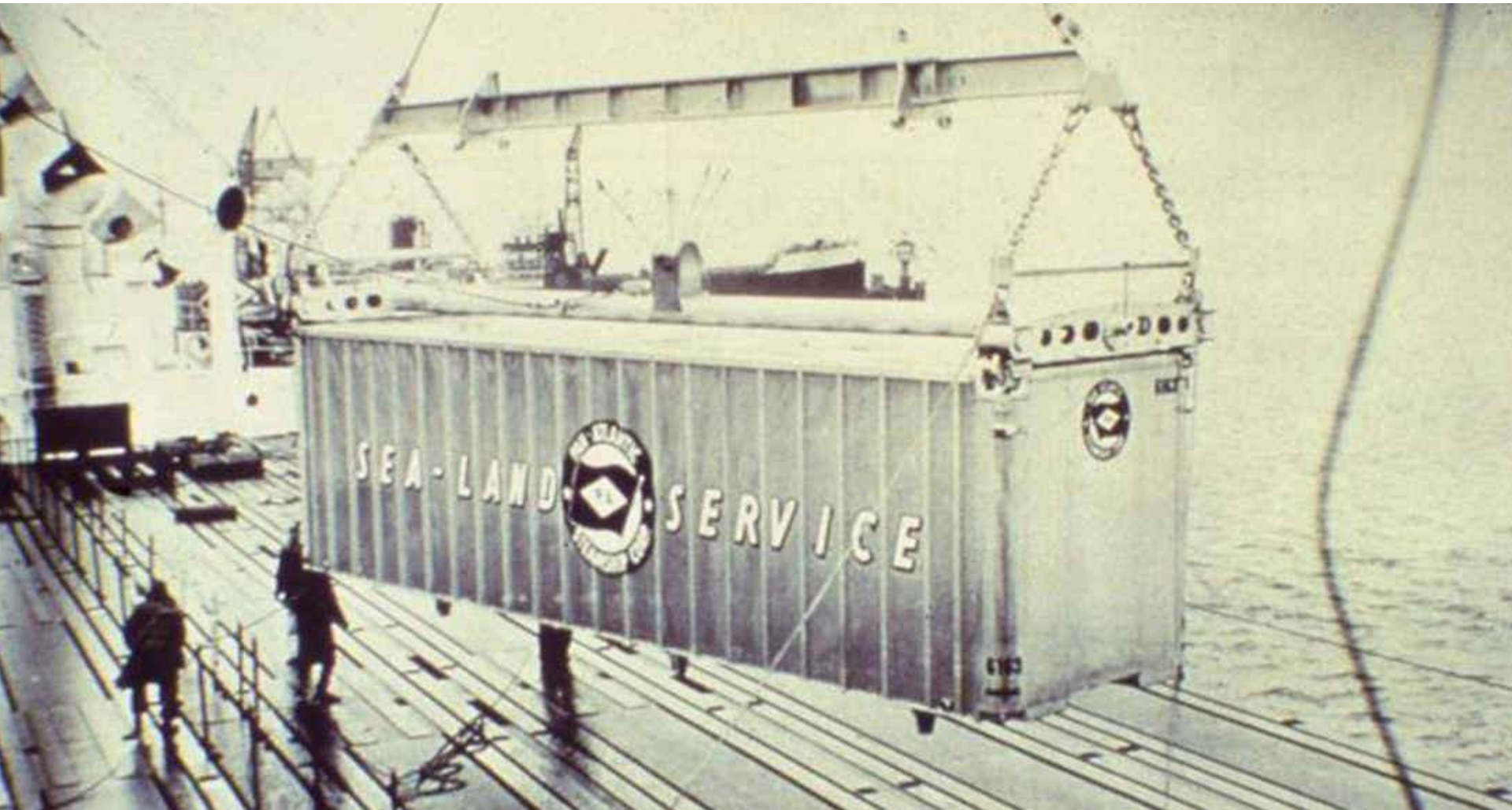
In 1956 Malcom changed the shipping world forever!

The ship carried 58 35-feet containers, along with a regular load of 15,000 tons of bulk petroleum from Newark to Houston in April 26, 1956.



Port Newark, 1959

Just 5 Years later, a Global Standard was set that improved production, safety and cut costs while improving the way that we move goods around the world



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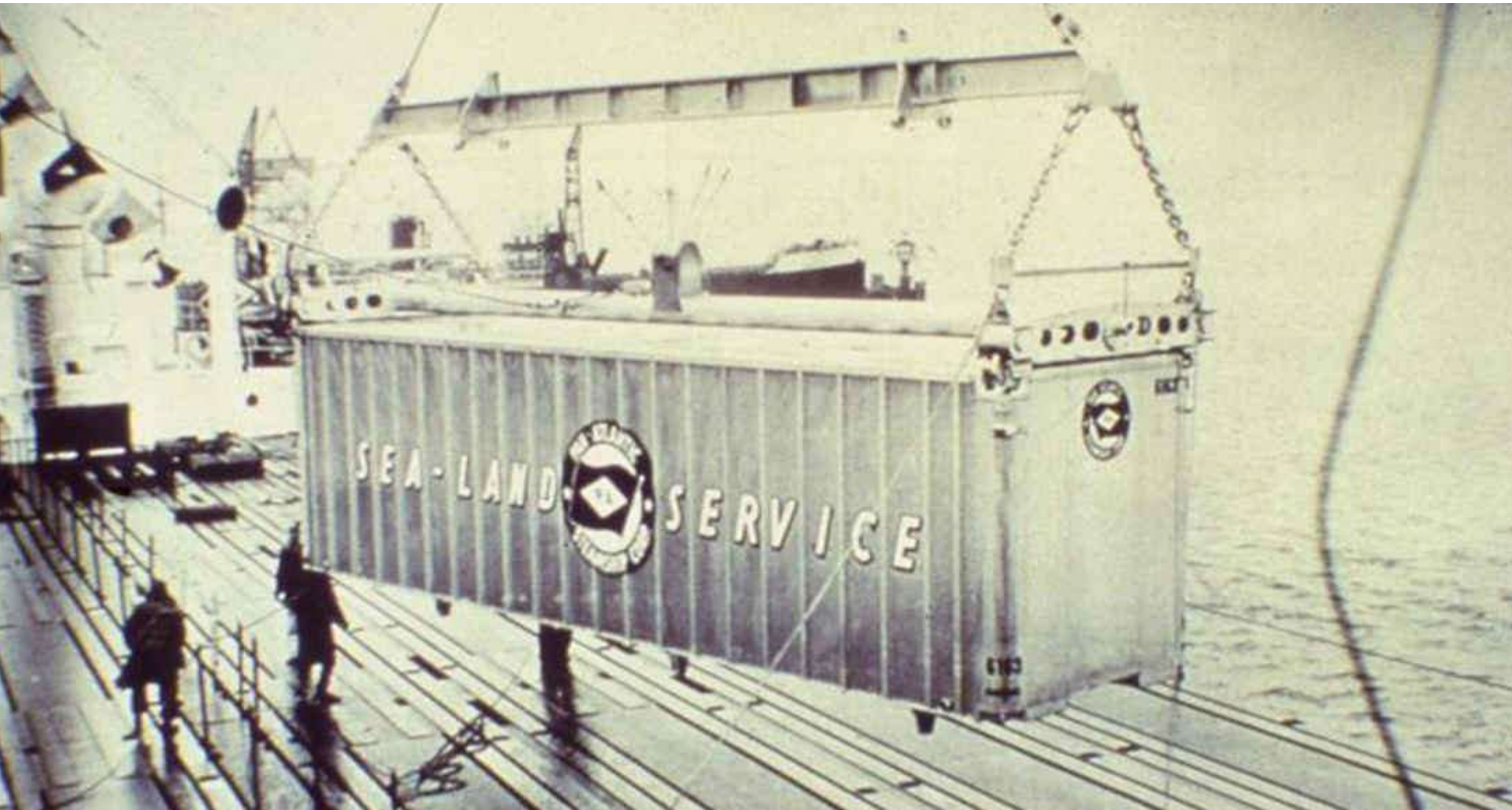
1961 – ISO set global standards for container sizes at 10’/20’/30’/40’



As reported on the PBS show
"Who Made America"
"As McLean's first container ship left Newark harbor, a man asked Freddy Fields, a top official of the ILA…
"What do you think of that new ship?"
Fields replied, "I'd like to sink that sonofabitch!"

Longshoreman strikes ensued,
but the cost of shipping
dropped by 90%

Modern containerization was born.

As a result of Standardization…

Cost to move goods dropped from
$5.86/Ton to $0.16/Ton

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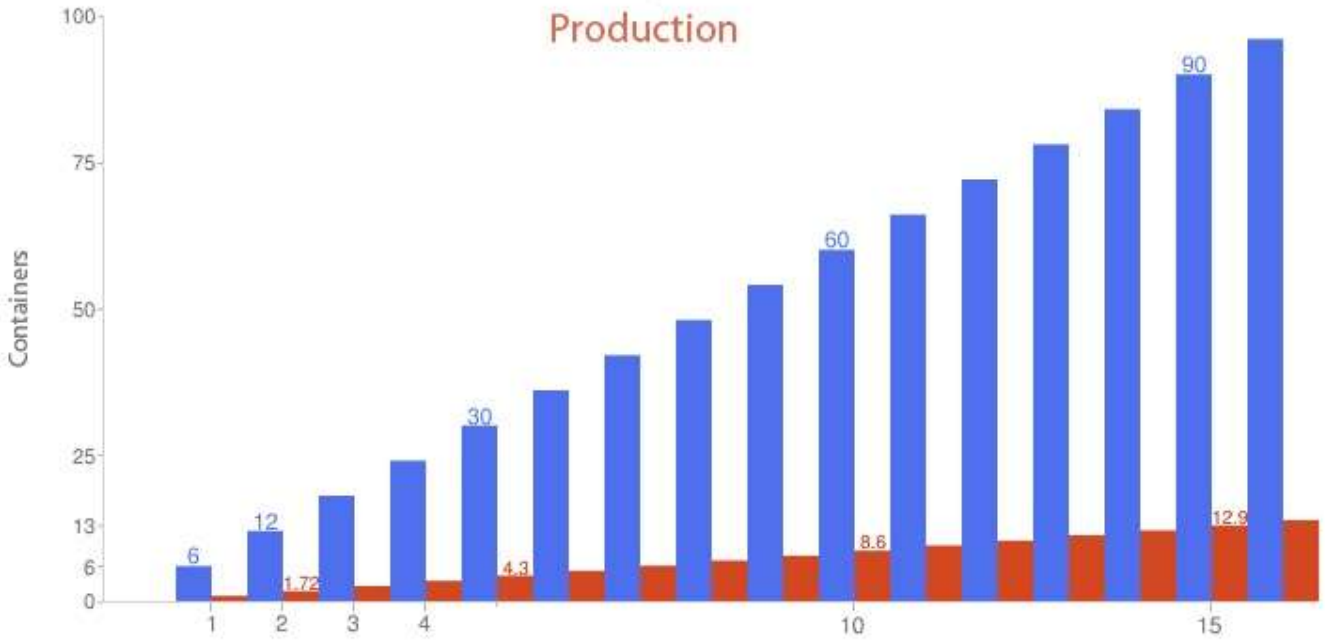
As a result of Standardization…

Production went from a rate of
1.3 Tons/Hour to > 30 Tons/Hour



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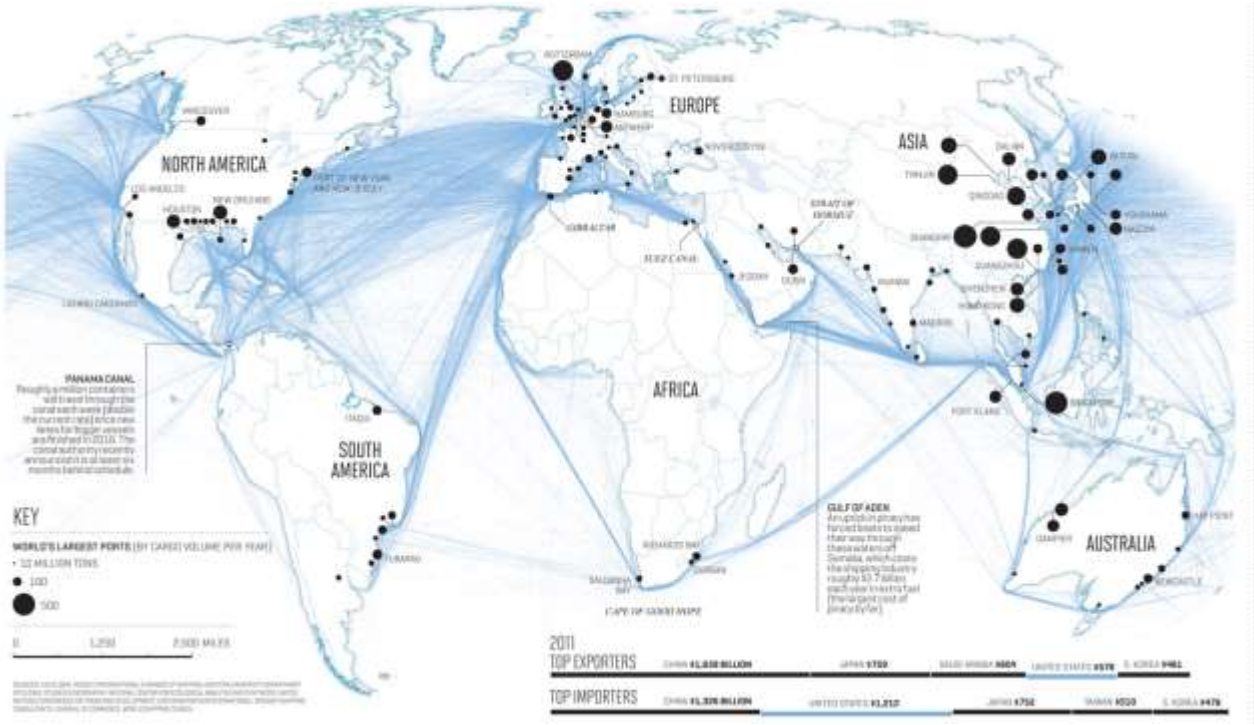
As a result of Standardization…

In 1966 Only 1% of Countries had container ports. By 1983 > 90% had Container Terminals



As a result of Standardization…

A sweater made in China, can travel 3,000 miles by sea for ONLY pennies

As a result of Standardization…

There are over 17 Million containers which make over 200 million trips per year

As a result of Standardization…

There are over 6,000 container Vessels in service globally

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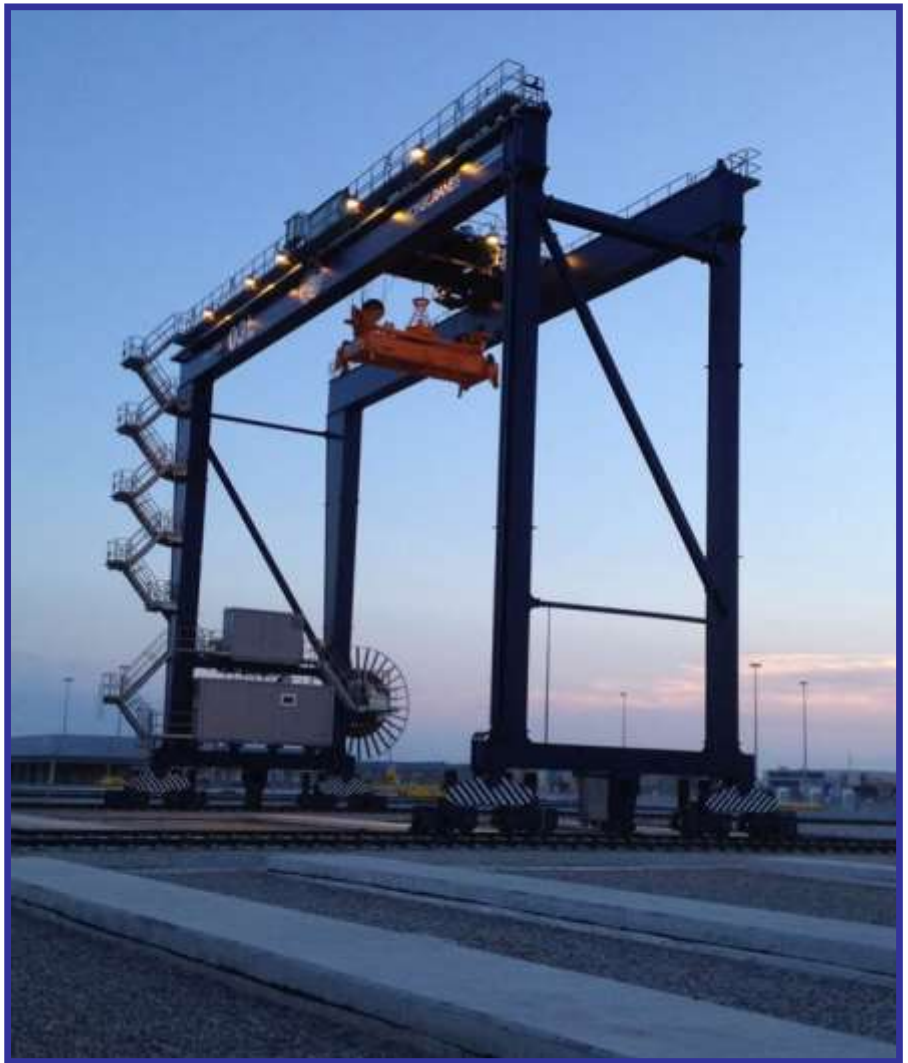
We find ourselves, once again, at the threshold of a new vision in terminal production, safety and cost savings



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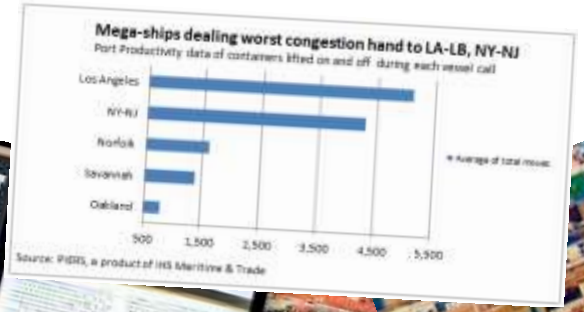
Pick up any Trade/Industry magazine and we see that Automation is here to stay

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PEPPERL+FUCHS
ABB
BROMMA
CONDUCTIX wampfler
Franz Wölfer Elektromaschinenfabrik Osnabrück GmbH
SANY
CAVOTEC
PINTSCH BUBENZER
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TECHNOLOGIES
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cascade
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TERBERG
BROSA
CRANEPORTS
SEOHO
ELECTRIC CO., LTD.
LEHNERT
crane intelligence
SYMEO
MGM
OMG
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stinis
HÜBNER
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TEREX
MALMEDIE
TIMARS
TBA
PORTEK
BANNER
more sensors, more solutions

PEMA has taken new technology, and worked to provide a non-vendor specific standard to help Terminals enjoy the maximum benefit and minimize cost

Our friends at PEMA have worked to introduce some basic standards to simplify the complex task of

A U T O M A T I O N

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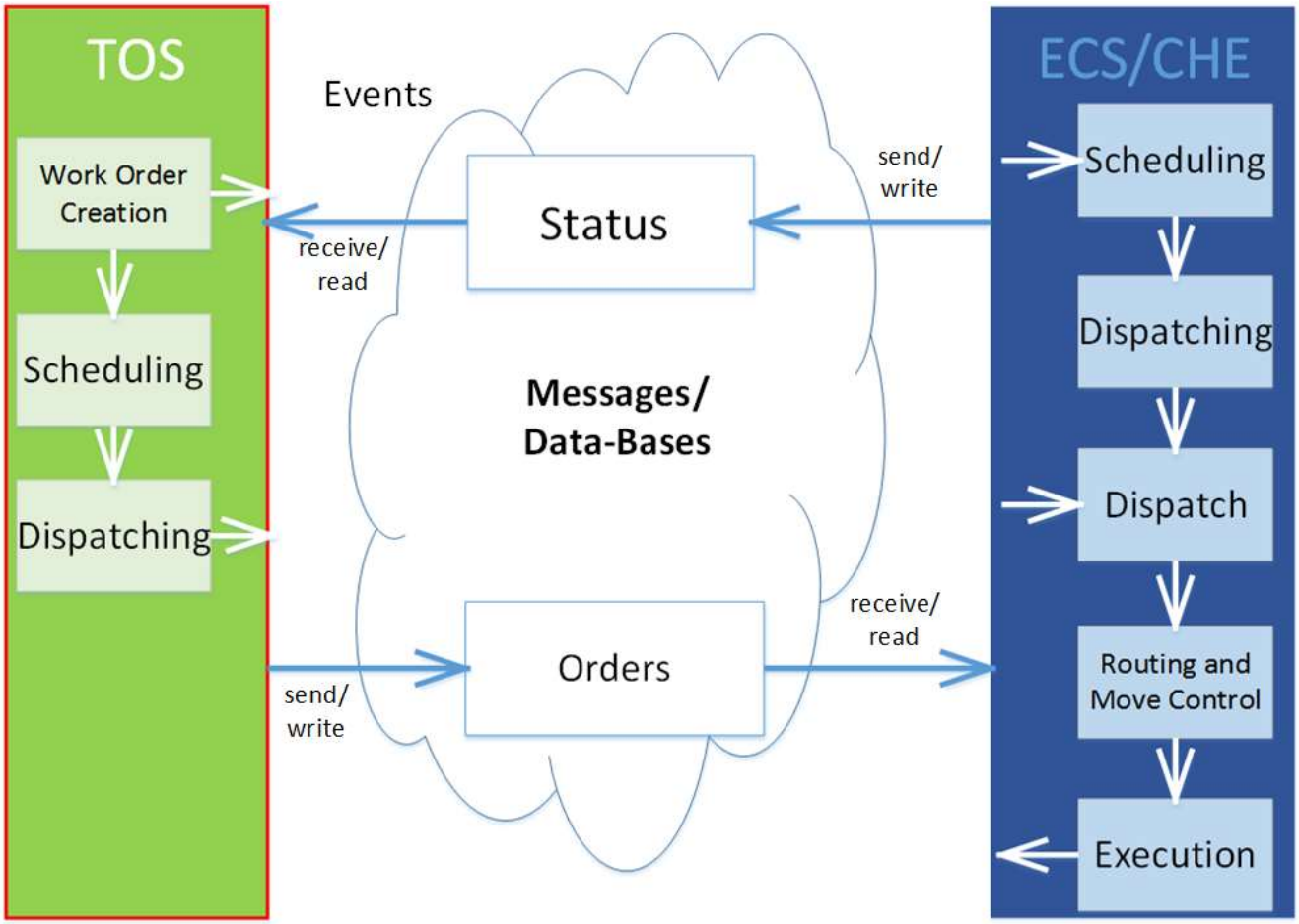
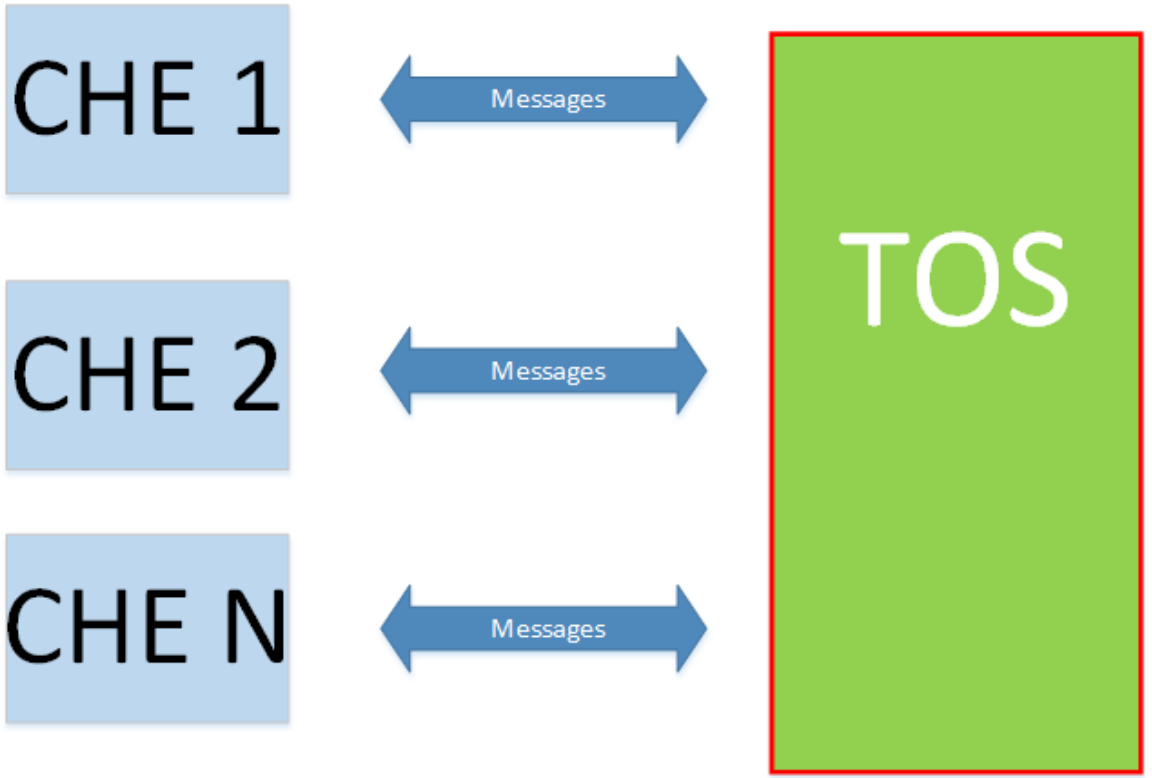
Today, I want to discuss the task of interfacing the TOS with the CHE and how TMEIC has utilized a proven technology to provide On-Time on Budget RESULTS

PEMA proposes a standardized interface structure between TOS –ECS - CHE

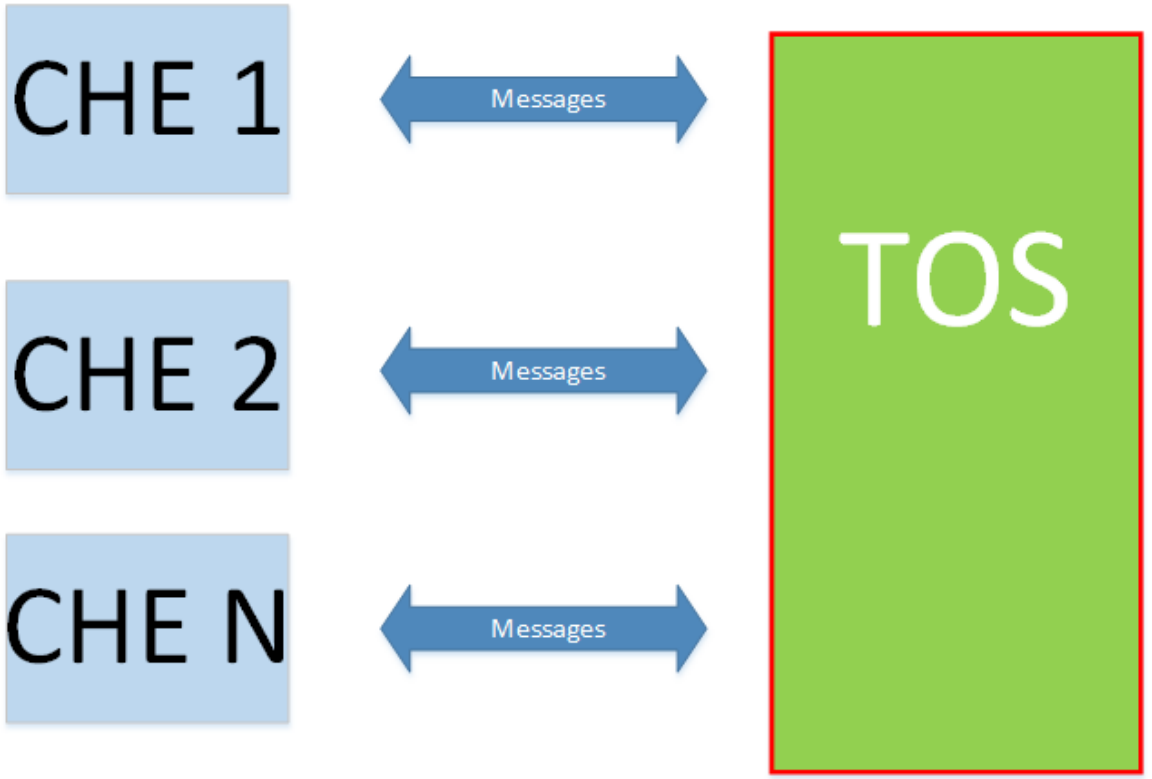


PEMA reminds us that there are three primary protocols to interface with the TOS (Communication Architectures)

First is through direct connection between TOS - CHE



TOS decides which CHE will execute an action. Messages are then exchanged directly with the selected equipment. Messages are in an ASCII or binary data format.



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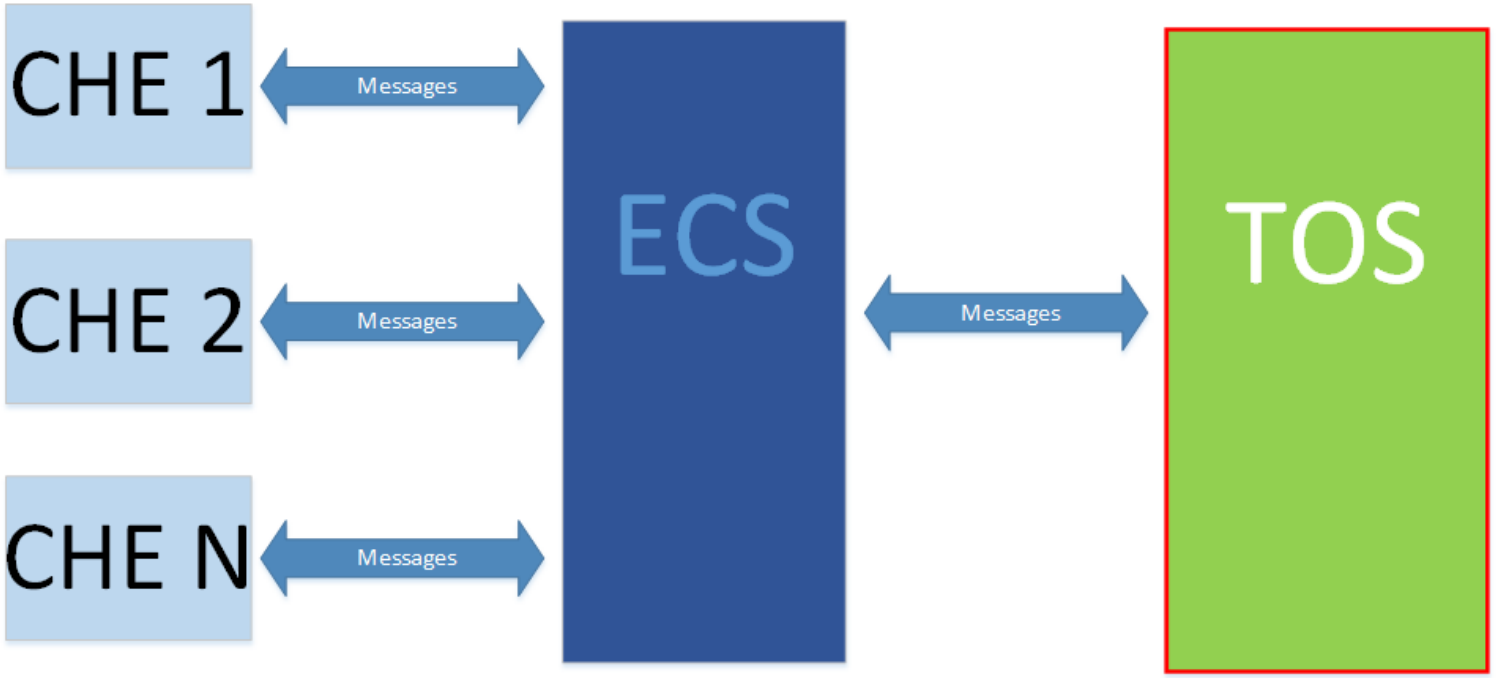
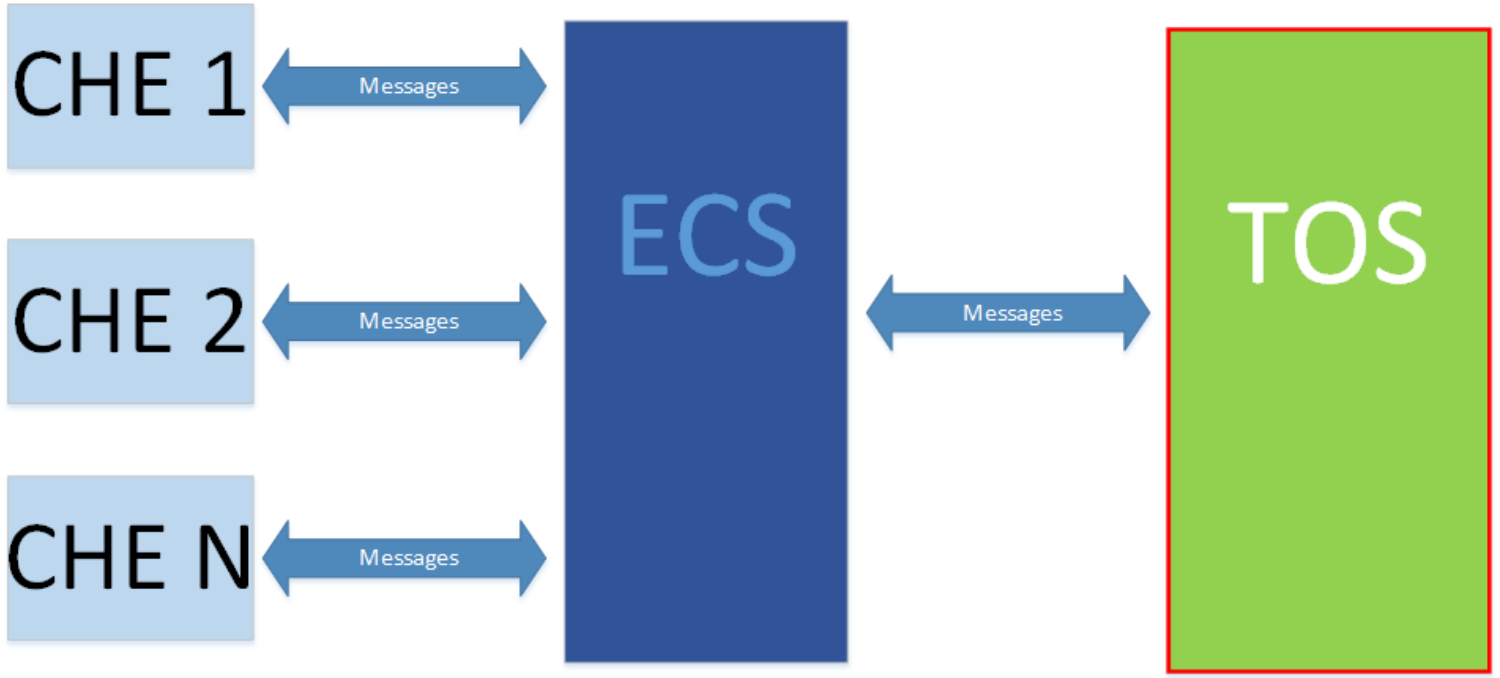
Second type of protocol is through a CHE fleet server or ECS

The server software decides and optimizes which CHE will execute the container move.

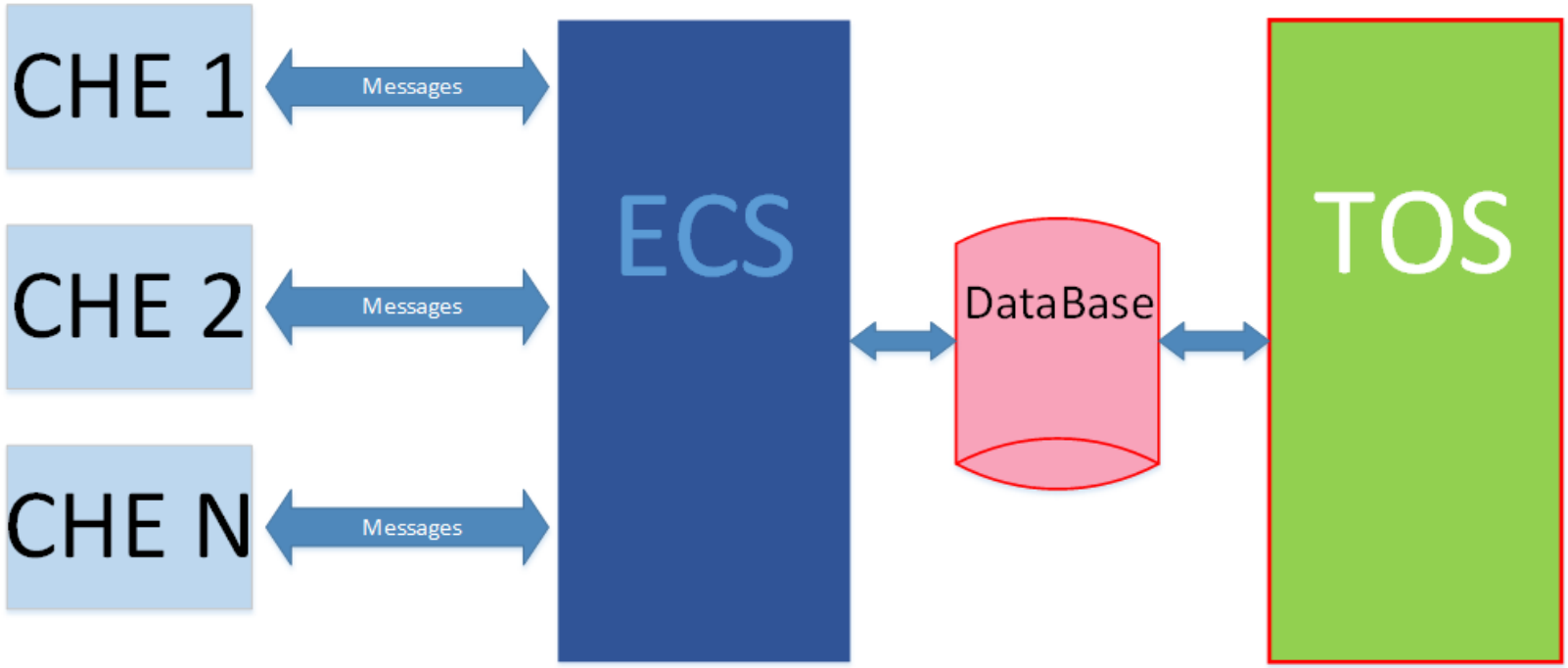


Message are still passed between the TOS – ECS and the ECS – CHE. Each section relies on the other to execute the appropriate code or action.



The third allows the TOS to communicate and direct CHE through a data-base server.

This method has been utilized successfully over several automation projects and has allowed TMEIC to provide our customers with successful start-up communication between TOS - CHE the first time it is tried.



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So…

How does TMEIC do this?

Crane Automation Systems

TOS Interface Overview

Back in the early days…

TOS Development Team

Speaking Different Languages

Crane Automation Development Team

Back in the early days…

TOS Development Team

TASK: “Go pickup container ABC”

Code: “//Go_pickup\\bigyellowbox**%abc”

“OK… let us work on that.”

“We will write special code into our system to accept your code”

“//Go_pickup\\bigyellowbox**%abc”

Crane Automation Development Team

Back in the early days…

TOS Development Team

TASK: “We need to change something a little bit…”

Code: “//Go_pickup\\bigBLUEbox**%abc”

“OK… let us work on that.”

“We will rewrite our special code into our system”

“//Go_pickup\\bigBLUbox**%abc”

Crane Automation Development Team

Back in the early days…

TOS Development Team

Wastes Time

Complex

Crane Automation Development Team

Both Teams Must Play

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What should we expect from a good TOS Interface?

- Simple
- Easy to adapt to any TOS system
- Expected to work the very first time you turn it on.
- Easy to use at the terminal engineering talent level.
- Easy to trouble shoot and manage after start up.
- Scalable
- NO ‘BLACK BOXES’

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TOS Development Team

Crane Automation Development Team

Status Table	
CHE_ID	ID of ASC
ONLINE_STATUS	Status of ASC
WORK_STATUS	Work status of ASC
TO_GKEY	Transport order being executed
CQ_GKEY	Command being executed
LOC_BLOCK	Current Block of ASC
LOC_BAY	Current Bay of ASC
CONTAINER_1	Current Container 1
CONTAINER_2	Current Container 2
SEQUENCE_STATUS	Additional status info.
. . .	

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TOS Development Team

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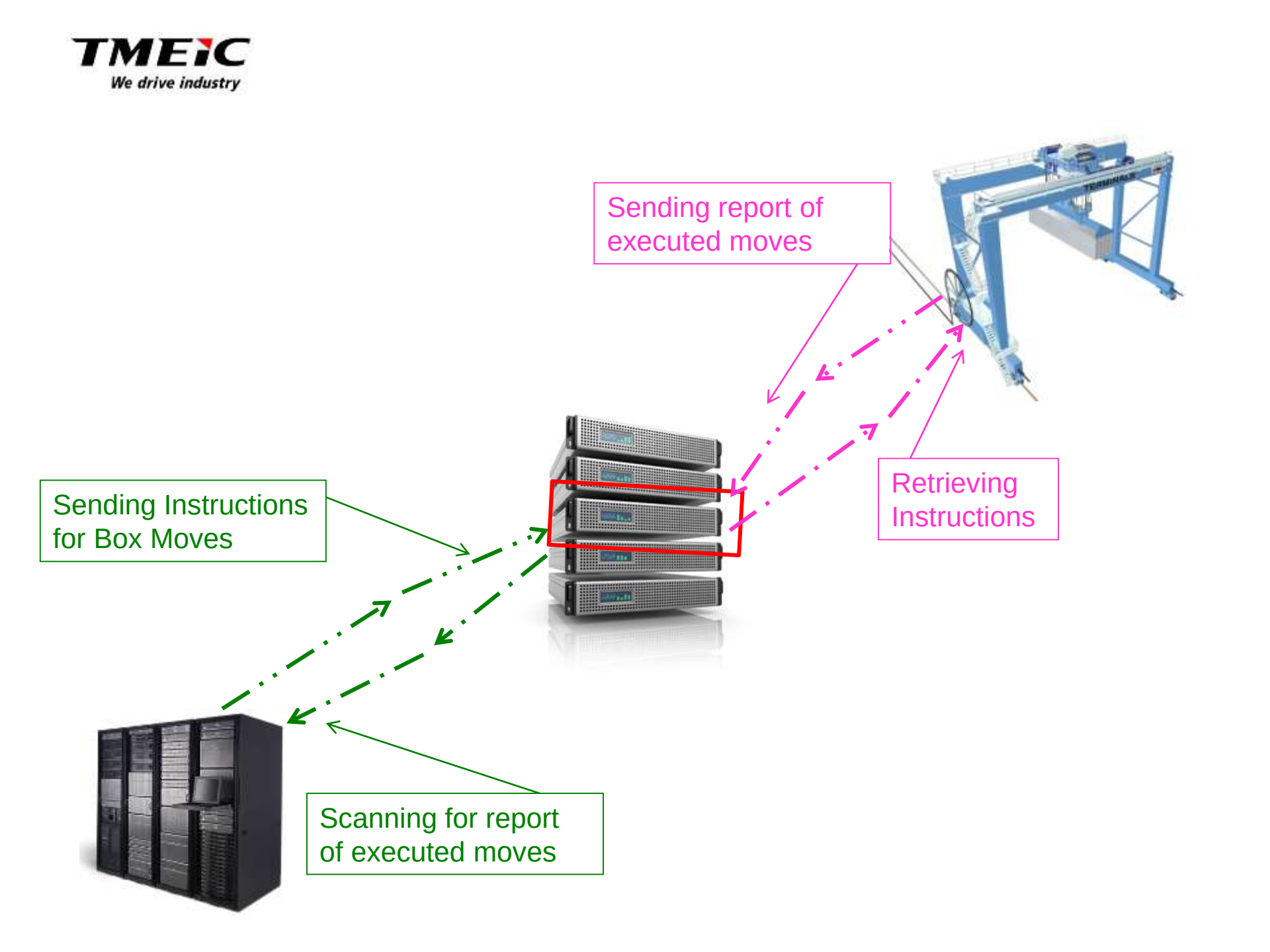
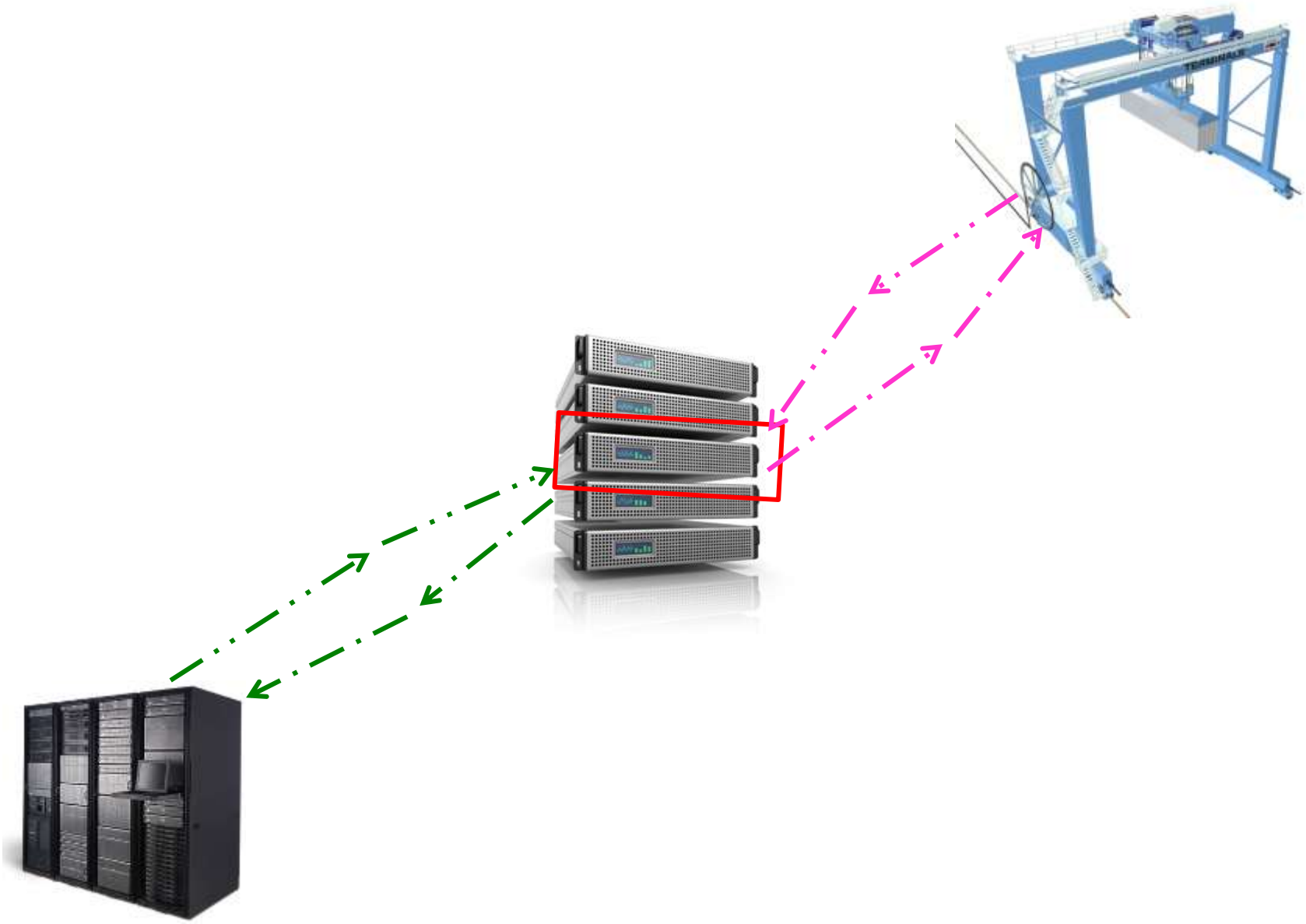
Crane Automation Development Team


Sending report of executed moves
Retrieving Instructions
Sending Instructions for Box Moves
Scanning for report of executed moves



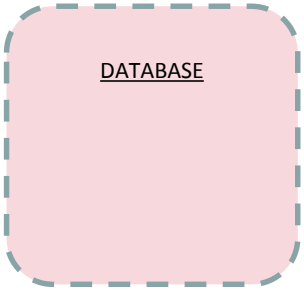
How does this work in Terminal Automation ?

Responsible for the tracking/inventory of all containers

Responsible for tracking position of CHE

Generates work orders that the CHE performs.

- *TMEIC can work with any TOS*
- *Proven method of interface data transfer*
- *Works the first time… every time.*

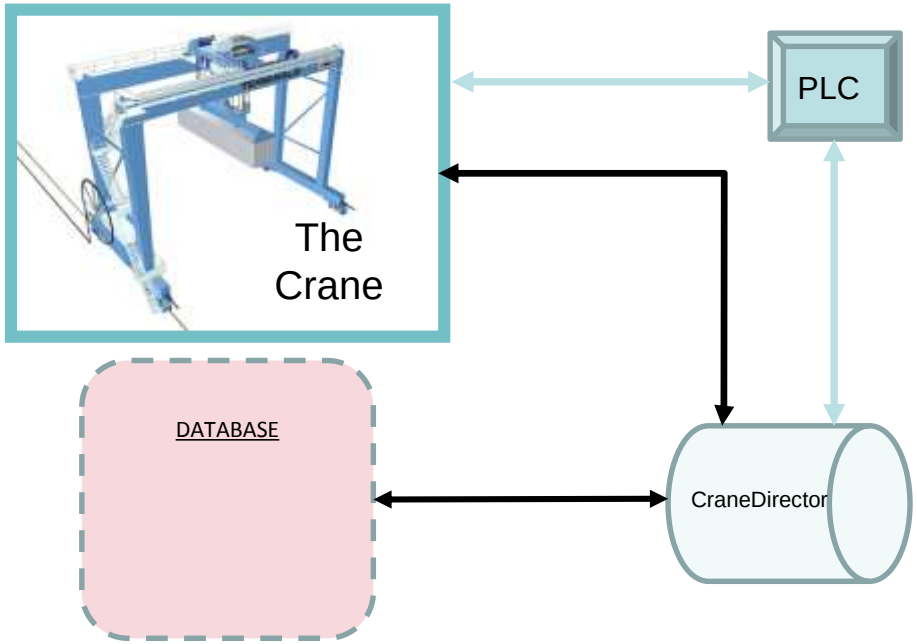


The database can reside on any SQL Server

Accessible by the TOS and CHE automation systems

Both systems have Read permission for all tables.

Both Systems have a group of tables that they alone can Write data to.



This crane computer is called the CraneDirector™.

It communicates between the crane and the database

The CraneDirector™ monitors and reports the status of the crane

CraneDirector™ updates the appropriate tables in the database.

CraneDirector and Crane's PLC communicate via Ethernet

The TOS Interface

TOS

DATABASE

- ZONE TABLE
- TRANSPORT ORDERS TABLE
- COMMAND QUEUE TABLE
- STATUS TABLE

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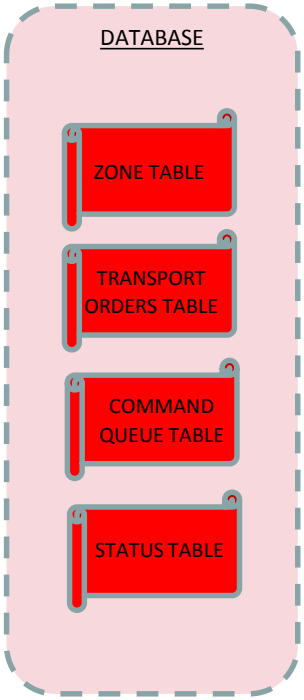
The TOS Interface

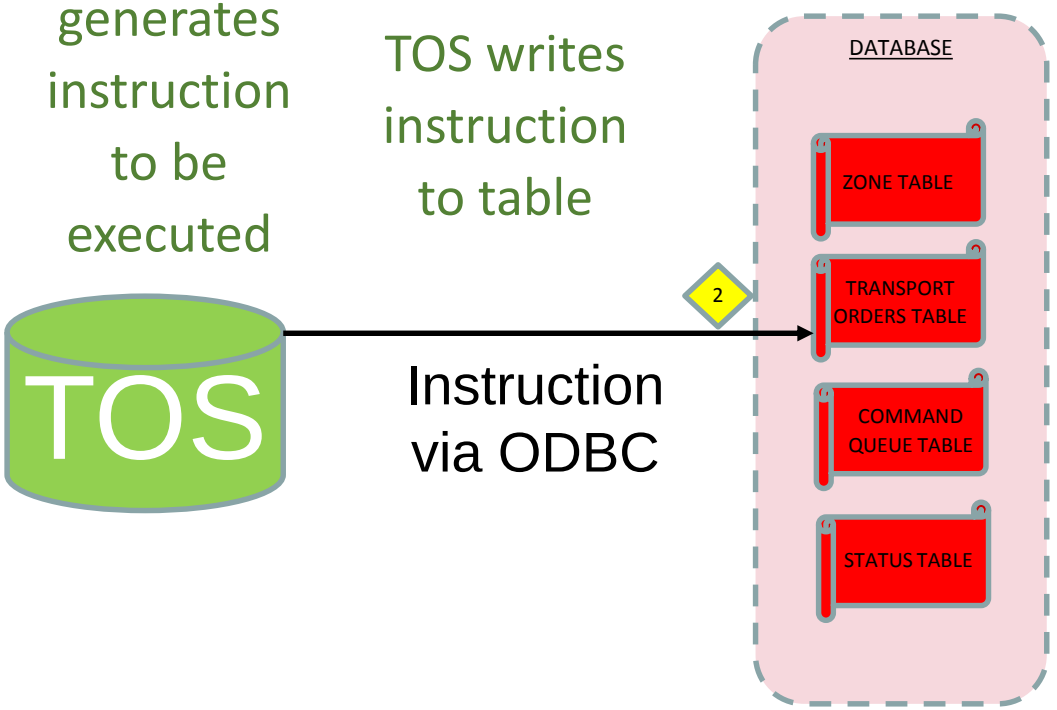
TOS generates instruction to be executed



The TOS Interface

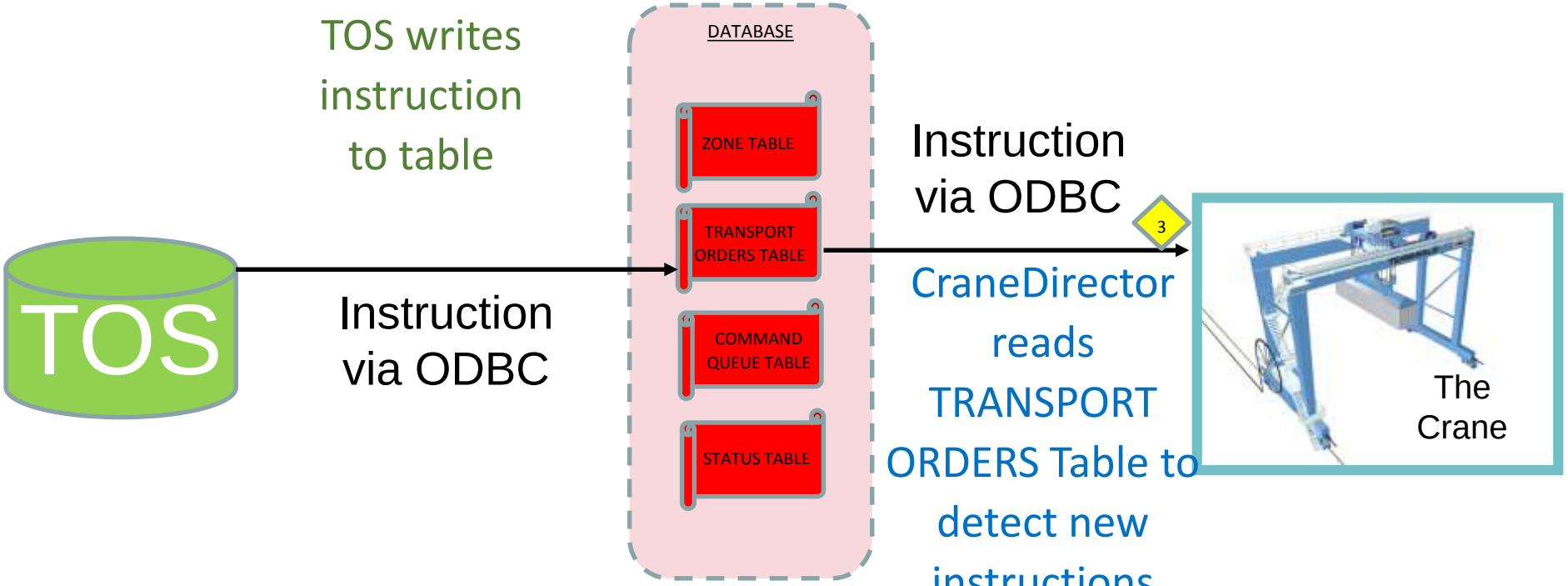
TOS generates instruction to be executed

TOS writes instruction to table



The TOS Interface

TOS writes instruction to table



CraneDirector reads TRANSPORT ORDERS Table to detect new instructions

So… What is ODBC ?

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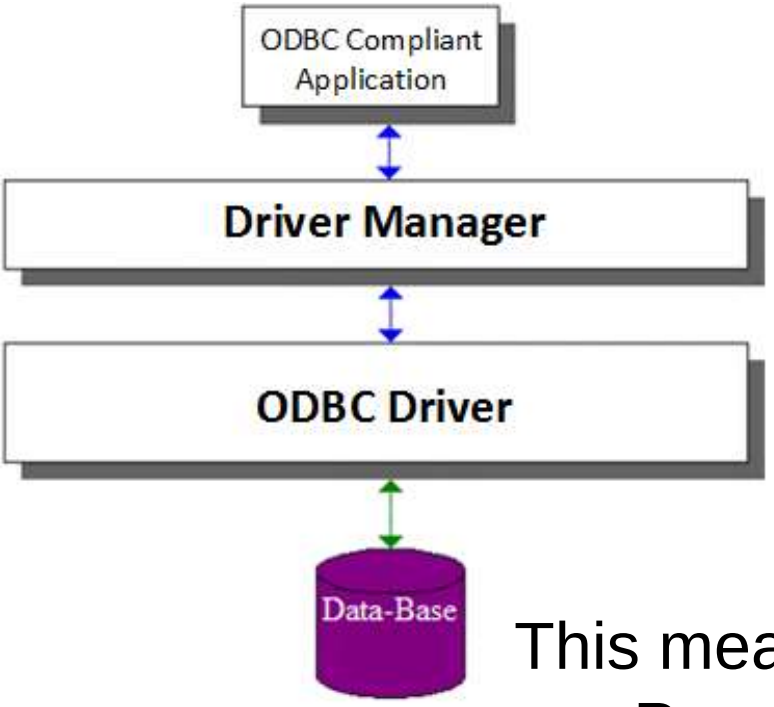
ODBC

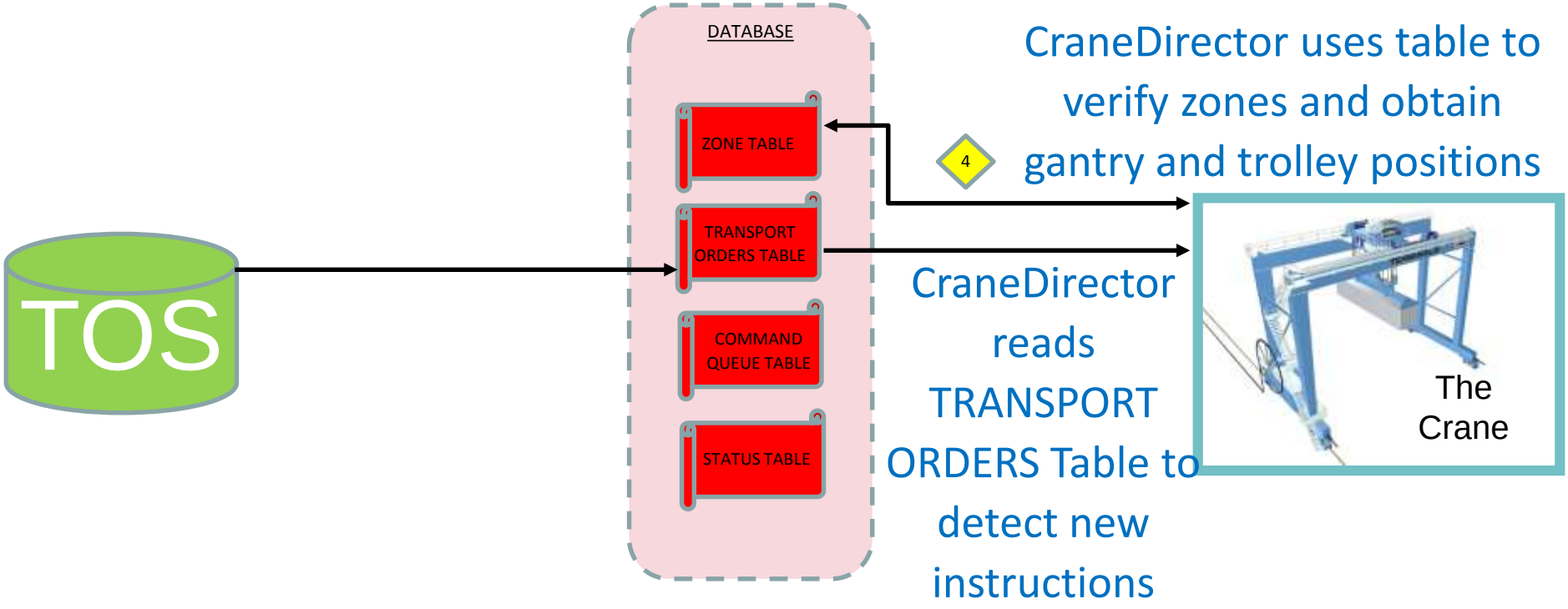
Open Data Base Connectivity



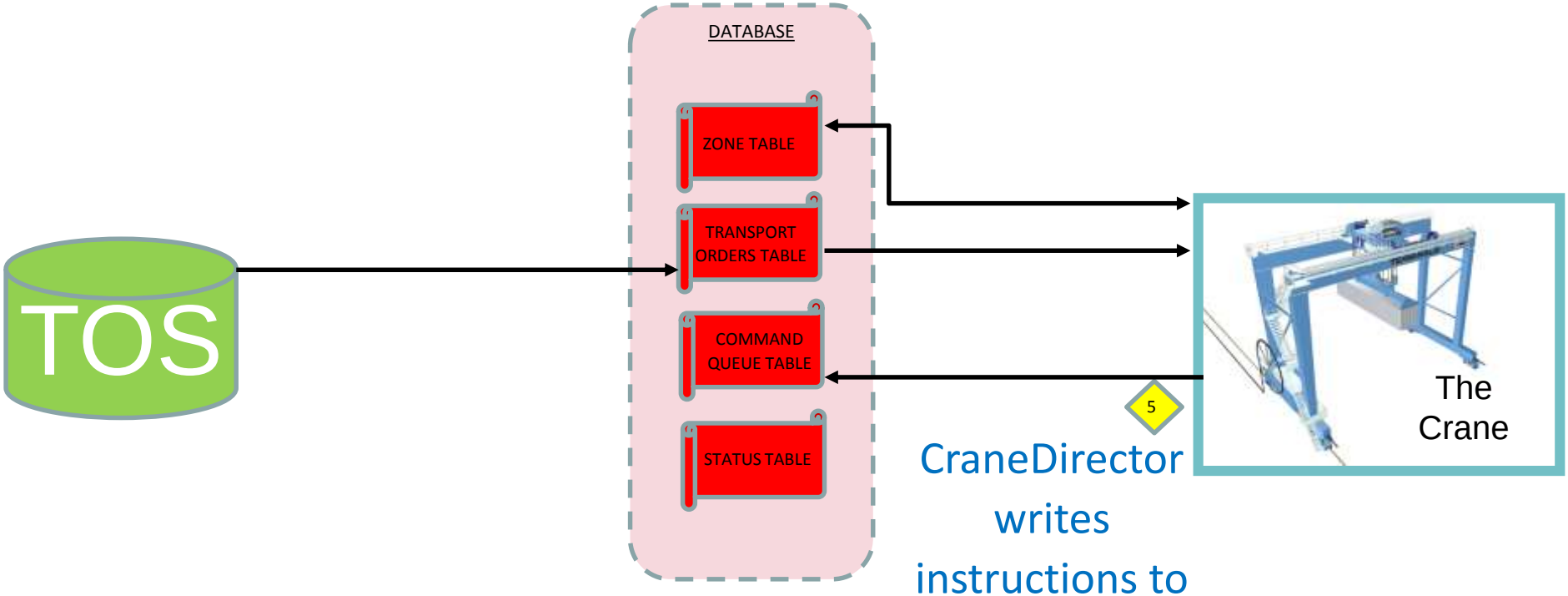
- Microsoft Communication Protocol
- Developed in the early 90's
- Easy to use and adapt
- Allows data base platforms to communicate and share information easily

This means that formats like Microsoft Access, Paradox, dBase and FoxPro can read; spreadsheets like Microsoft Excel; and connect to external database servers such as Oracle, Informix or Microsoft SQL Server.

The TOS Interface

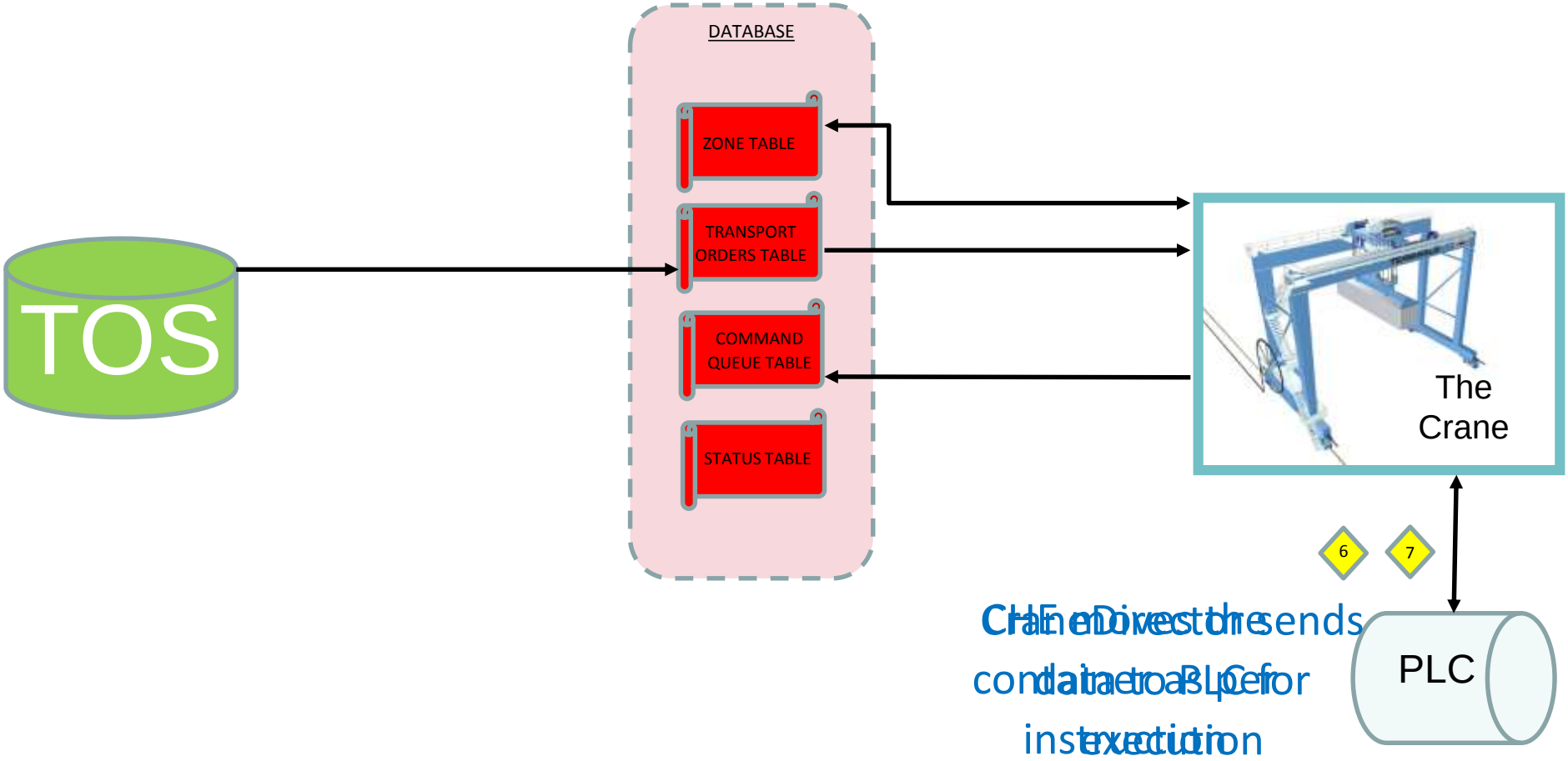


The TOS Interface

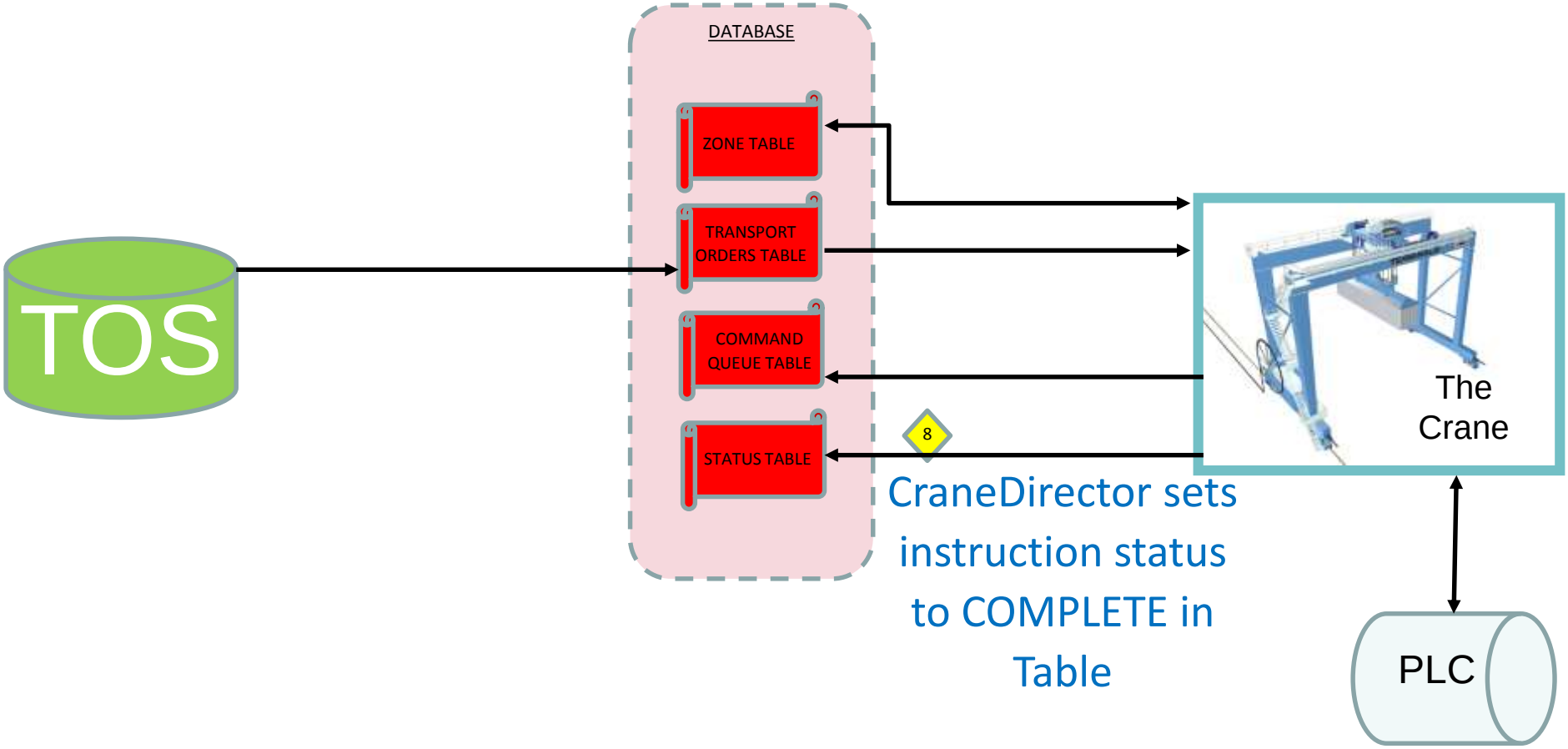


CraneDirector writes instructions to the COMMAND QUEUE Table

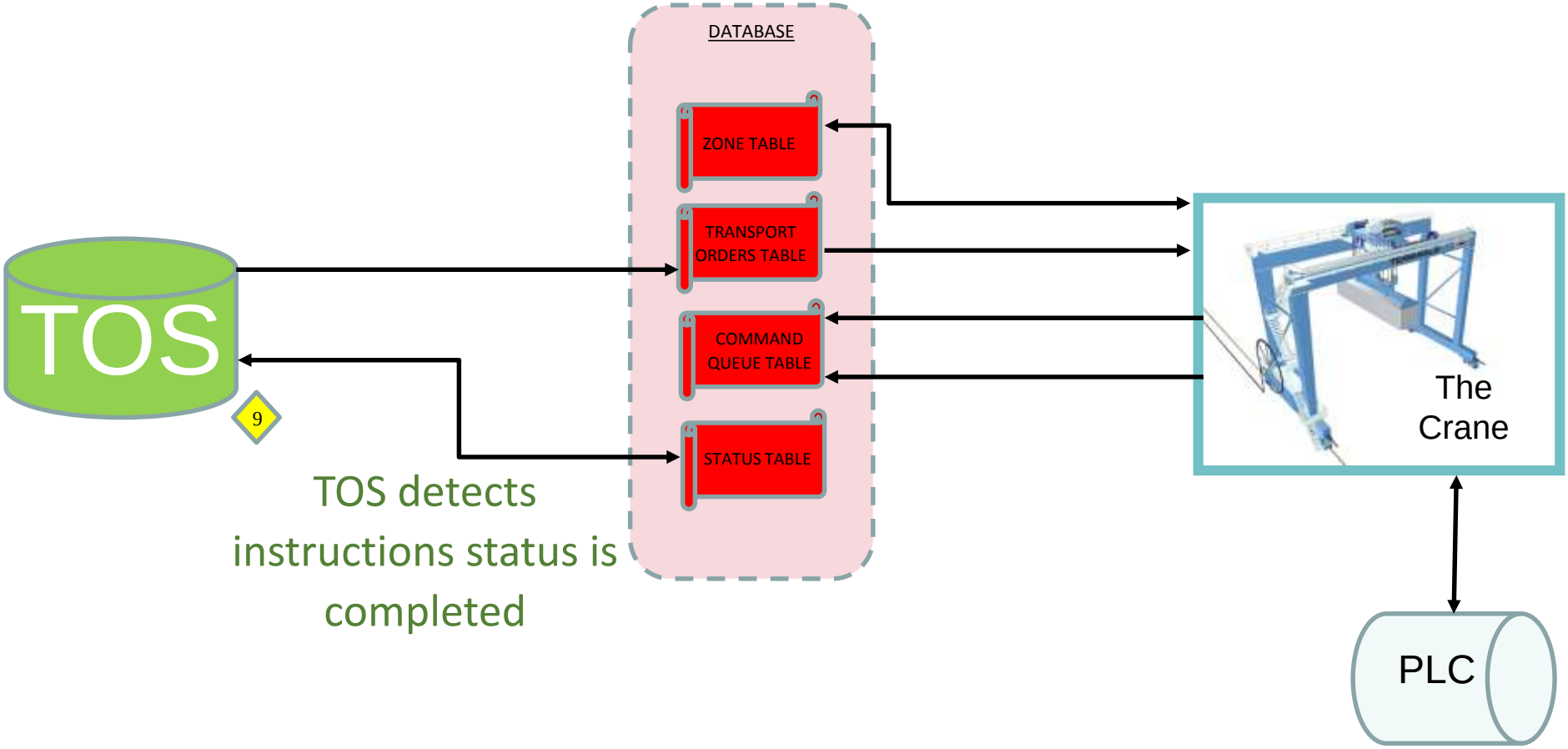
The TOS Interface



The TOS Interface

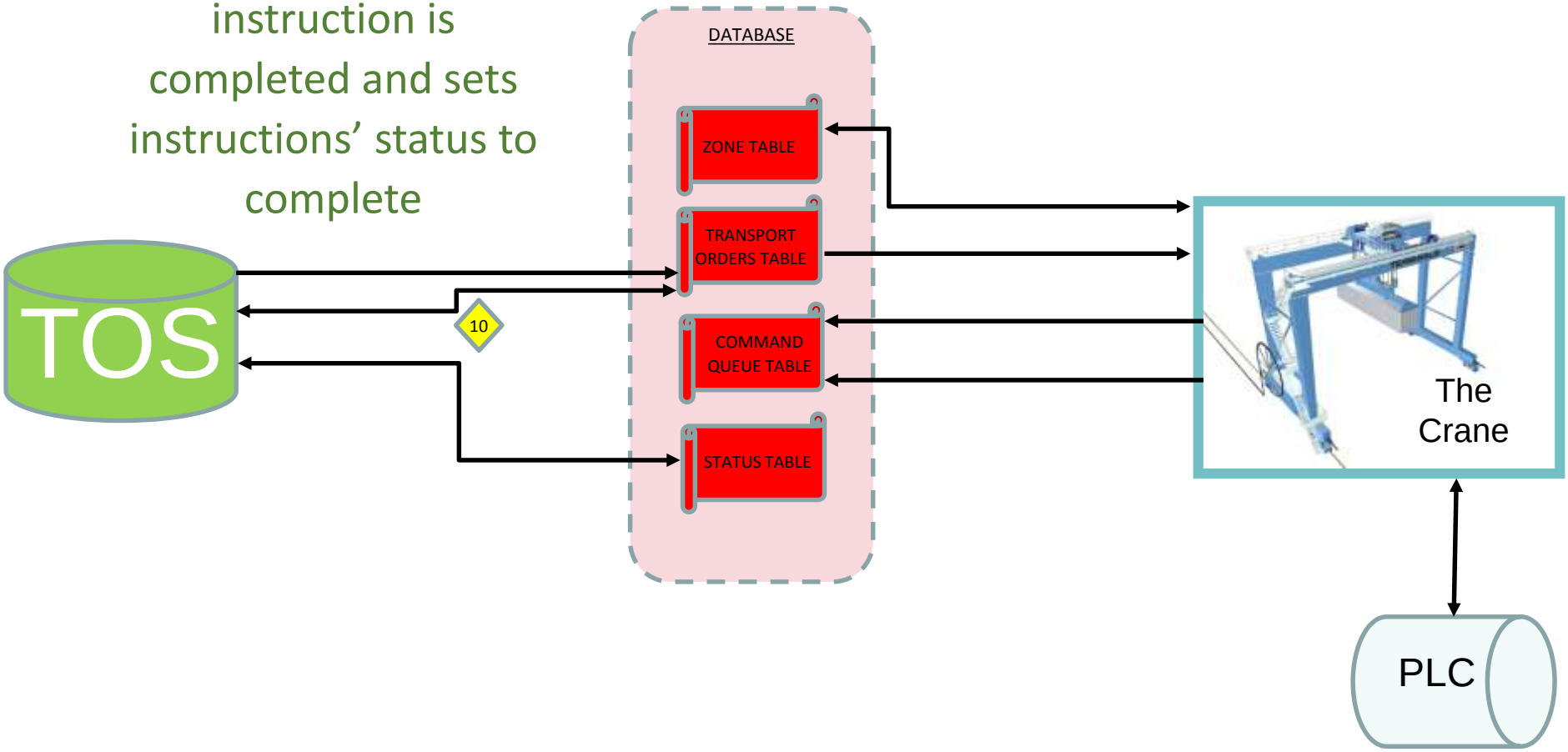


The TOS Interface



The TOS Interface

TOS confirms instruction is completed and sets instructions' status to complete



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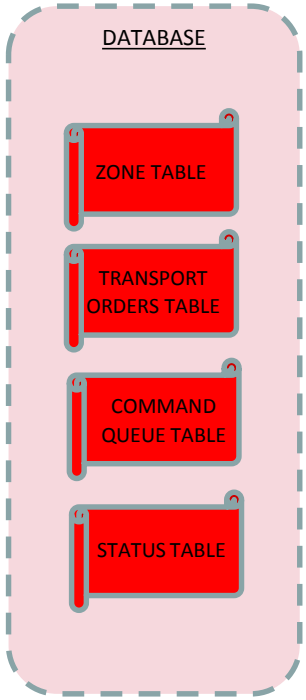
The TOS Interface

TOS generates instruction to be executed



The TOS Interface

TOS

DATABASE

- ZONE TABLE
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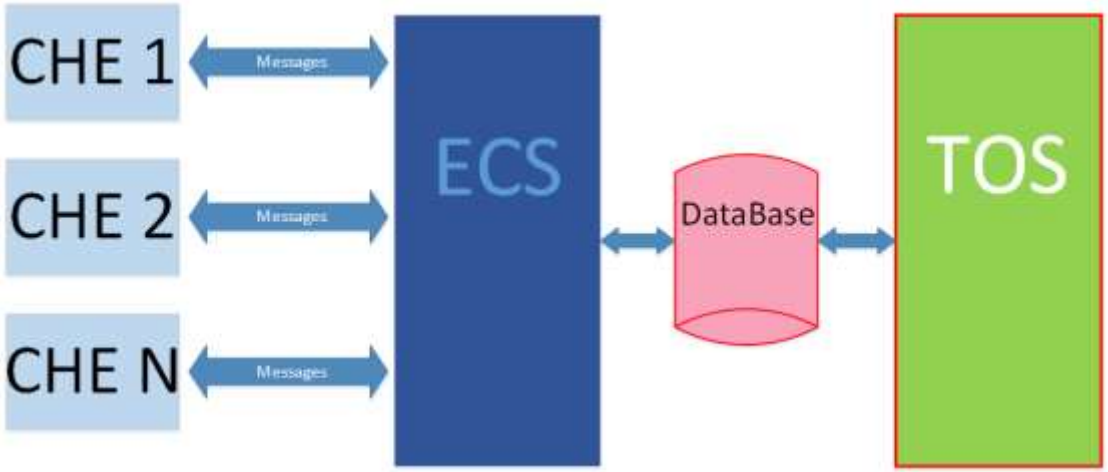
In 2007…

"TMEIC saved Navis 20,000 *hours of start-up commissioning time by insisting on doing the TOS Interface their way."*

Eric Klein
Navis Project Manager
APMT Virginia 2007

At this exciting time in our industry, Terminals rely on the efficiency of their TOS to keep operational processes running productively. Standardization of these processes as we move towards automation will help us all to cut cost, improve on safety and keep our terminals Productive and cost efficient



Standardization has proven itself to be a great way to benefit from the best that our industry can provide

Since the earliest days of containerization…

There have been a lot of major changes in the way we do business. Standardization will allow us to work effectively and utilize the best that technology has to offer.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Since 2007…
Multiple Successful Terminal
Automation Projects
On Time… & On Budget

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Around the world, we continue to provide
Automated Terminal Projects

ON TIME & ON BUDGET


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Delivering Customer Success,
Every Project,
Every Time . . .