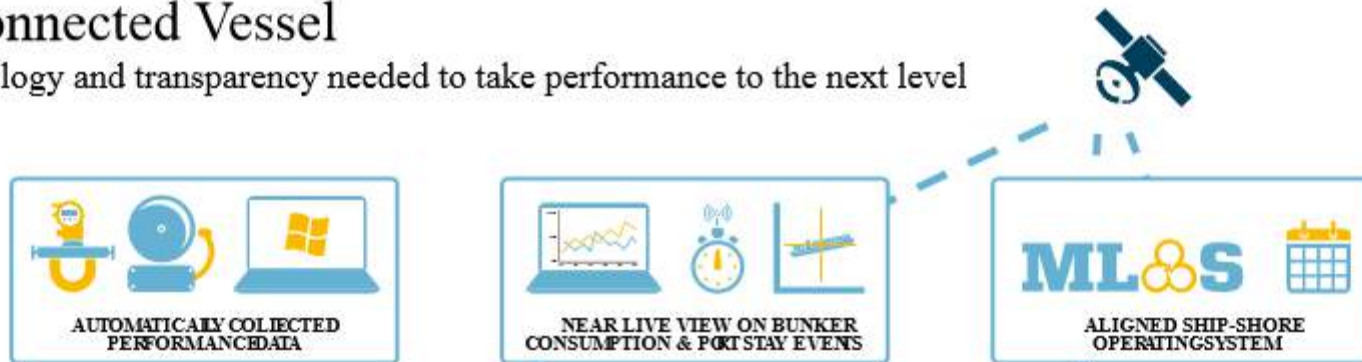


The Connected Vessel

The technology and transparency needed to take performance to the next level



SHARED VIEW

SHIP & SHORE



BUNKER SAVINGS

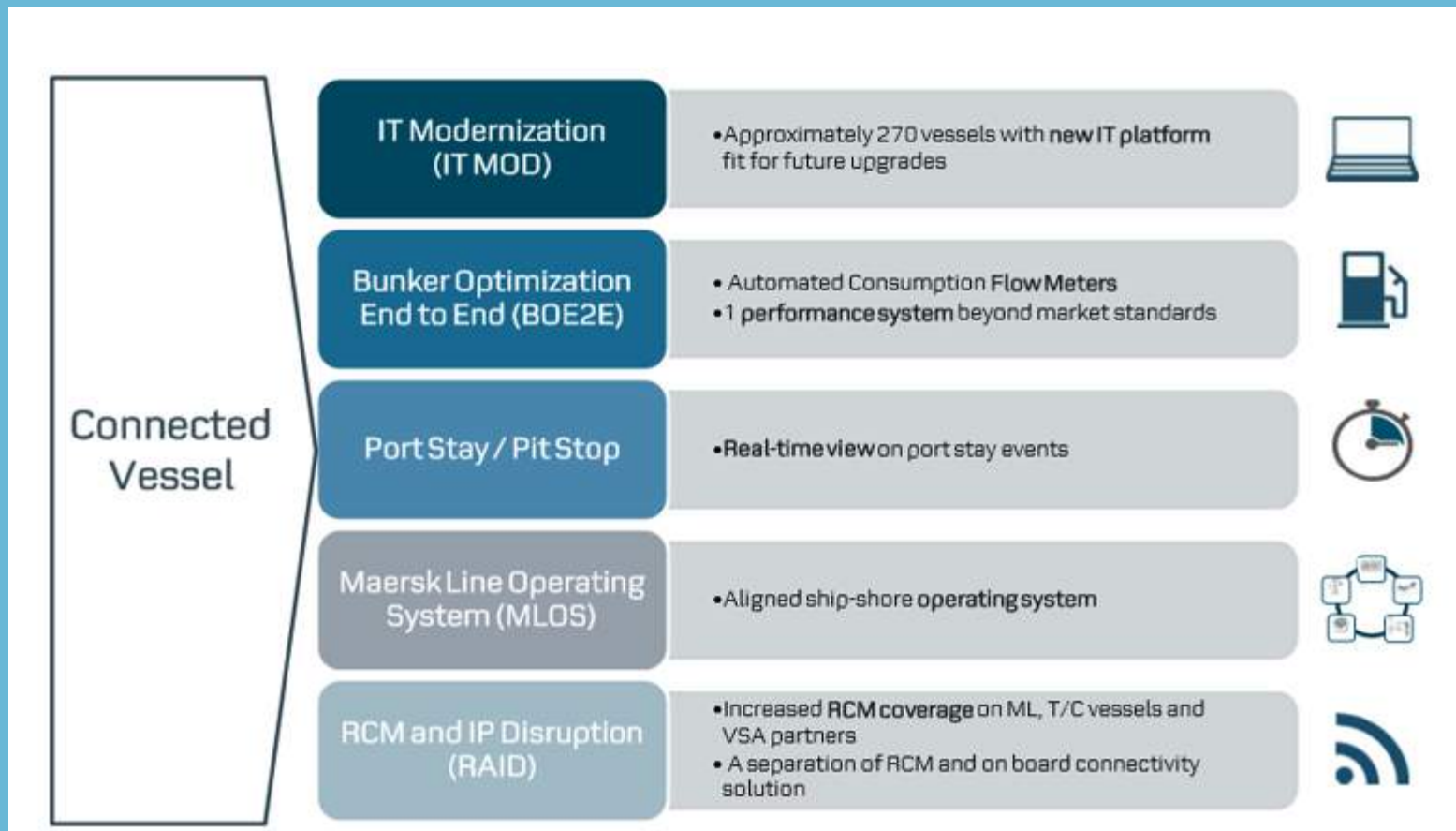


PROCESS OPTIMISATION



IT FIT FOR FUTURE

The solution is delivered by 5 projects

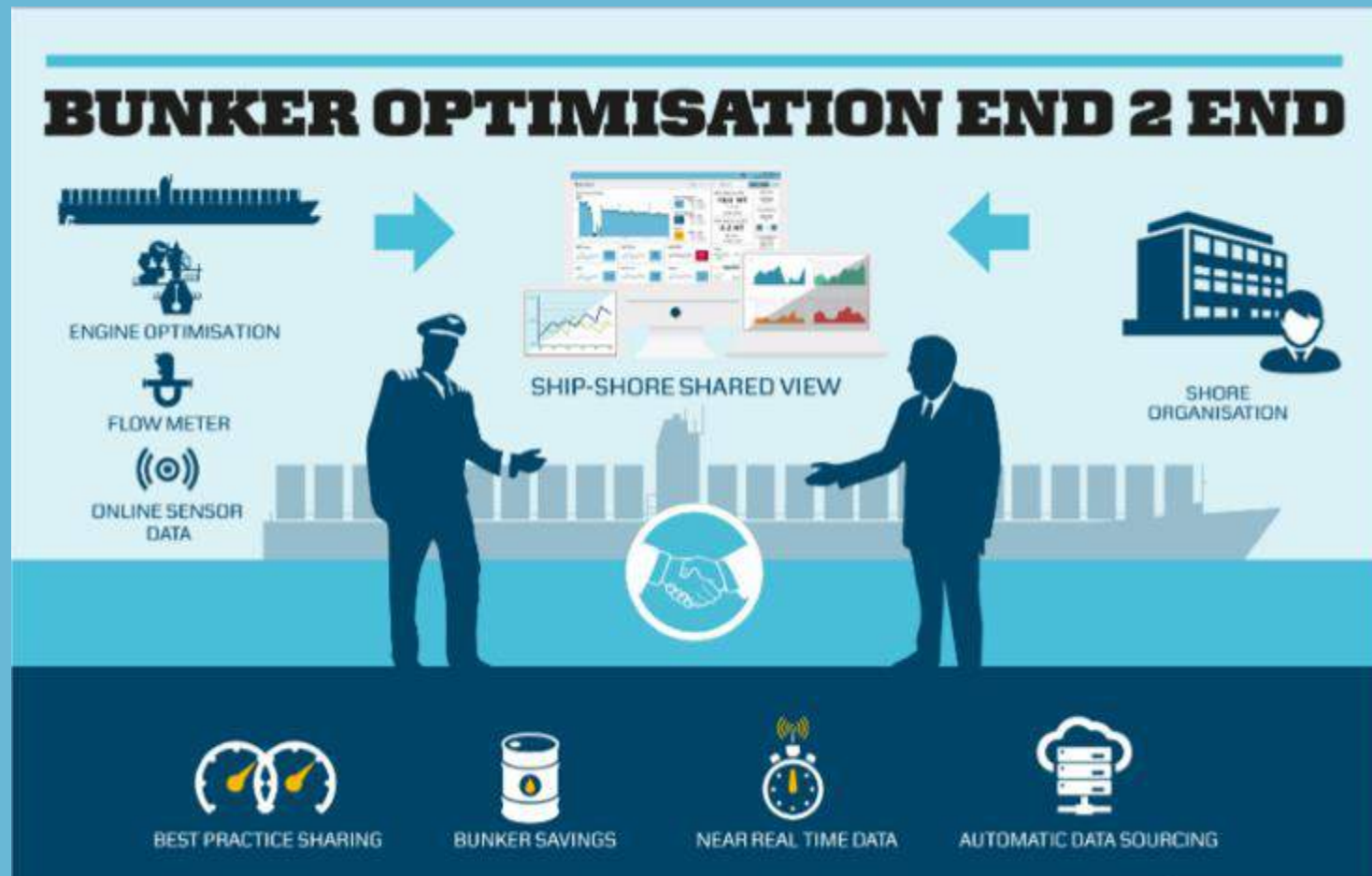


IT Modernization (IT MOD)

	<p>ROUTING SWITCHING VESSEL</p>  <ul style="list-style-type: none"> • Remotely managed, limited crew support required • Standardized, rack mounted, same solution on all vessels • Traffic prioritization and Quality of Service 	<p>WI-FI</p>  <ul style="list-style-type: none"> • 2 wireless network available called Crew & Admin. Crew browsing through self service windows • Crew Internet usage administration limited to certain amount • Equal access to bandwidth and data rate 	<p>NETWORK MANAGEMENT</p>  <ul style="list-style-type: none"> • Single point of contact on shore Maria handling all 1st line support • All vessels IT manageable remotely 	<p>SERVER & CLIENT</p>  <ul style="list-style-type: none"> • OS: Windows 7 → Move to: Windows 10 • Windows Server 2012 HA Cluster → Move to: Server 2016 • Post Cyber Attack: <ul style="list-style-type: none"> • Automated patch management • Tiering model for authentication • Evaluate Anti-Virus replacement. Trend AV did not perform well during recovery 	<p>SECURITY</p>  <ul style="list-style-type: none"> • Vessel to Shore business traffic all encrypted. • Automated Anti-virus updates and remoting on all client / server instances • Network Segmentation on-vessel
---	--	---	---	--	--

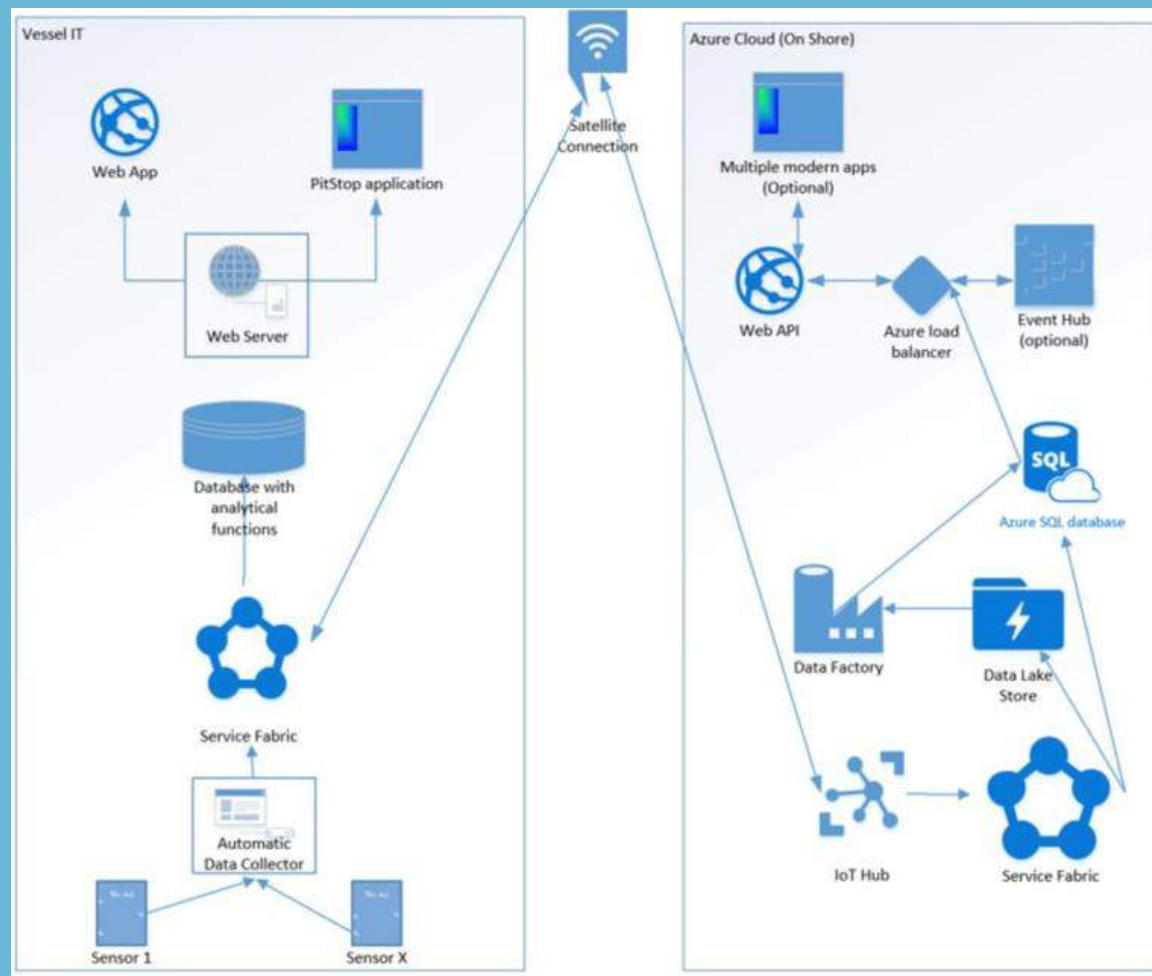
	<p>INDUSTRIAL CONTROL SYSTEM</p>  <ul style="list-style-type: none"> • Access to ICS secured, vendor remote access controlled from service center to the switch port on vessel. • M2M sensor gateways and servers on vessel and shore prioritized secured transfer 	<p>IMPROVED CONNECTIVITY</p>  <ul style="list-style-type: none"> • Integrate connectivity to new upgraded satellite connection. Used mainly for service management, business traffic and crew browsing (in Pilot) 	<p>FILE TRANSFER & MAIL</p>  <ul style="list-style-type: none"> • New file transfer system called File Catalyst will be replacing Mailink, meaning less crew involvement • Resumes file transfer in case of interruption • New mail system Icewarp, mail on local vessel server • Easier access to files and attachments
---	---	---	---

BOE2E enables automatic data collection



Sensors collect data

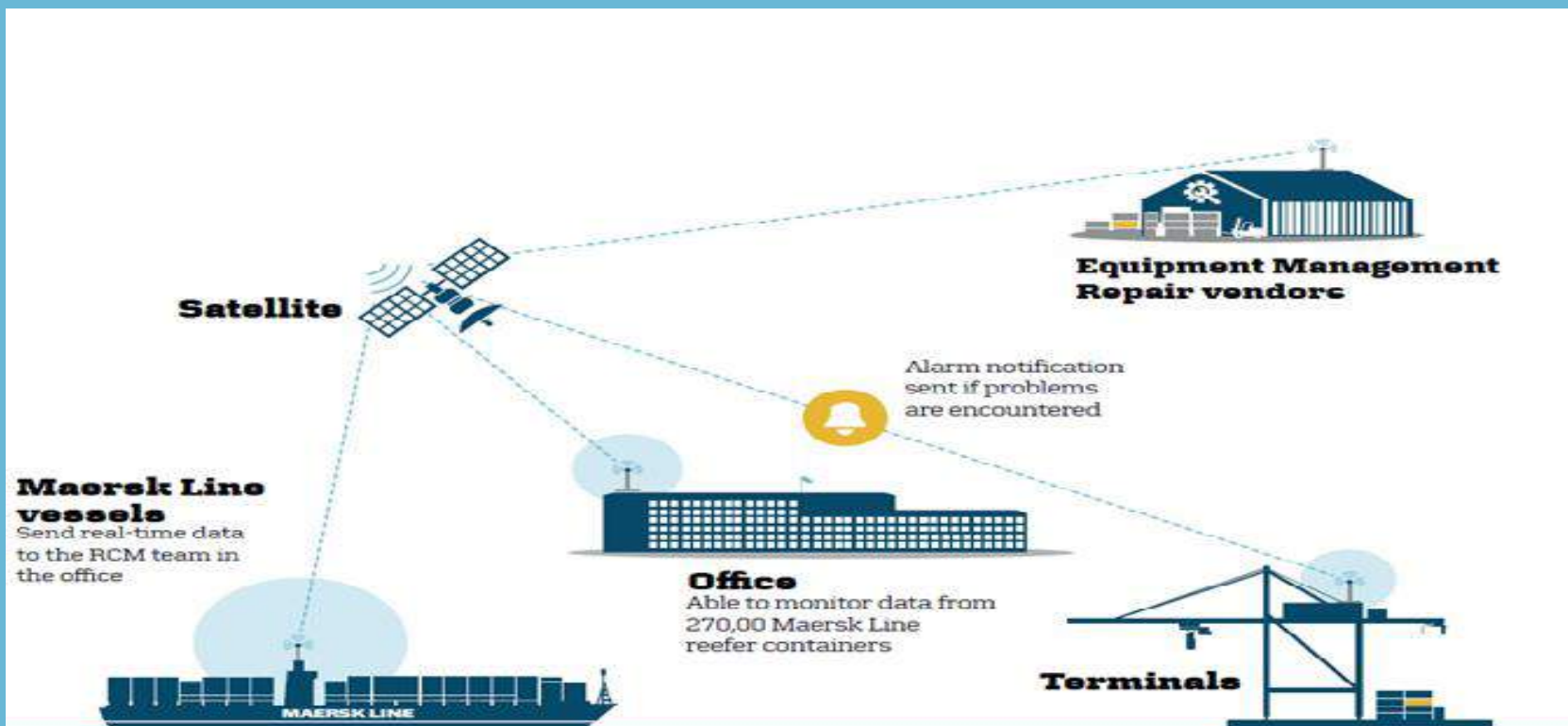
- Sensors collect data:
 - Trim
 - Current
 - Wind
 - Fuel consumption
 - Speed
 - Engine data
 - Course



Port Stay /Pit Stop ensures smoother port stays



RCM and IP disruption RAID



VSAT equipped vessels

~270 + ~130

Vessels owned

Long-term charter vessels

The RCM solution consists of:

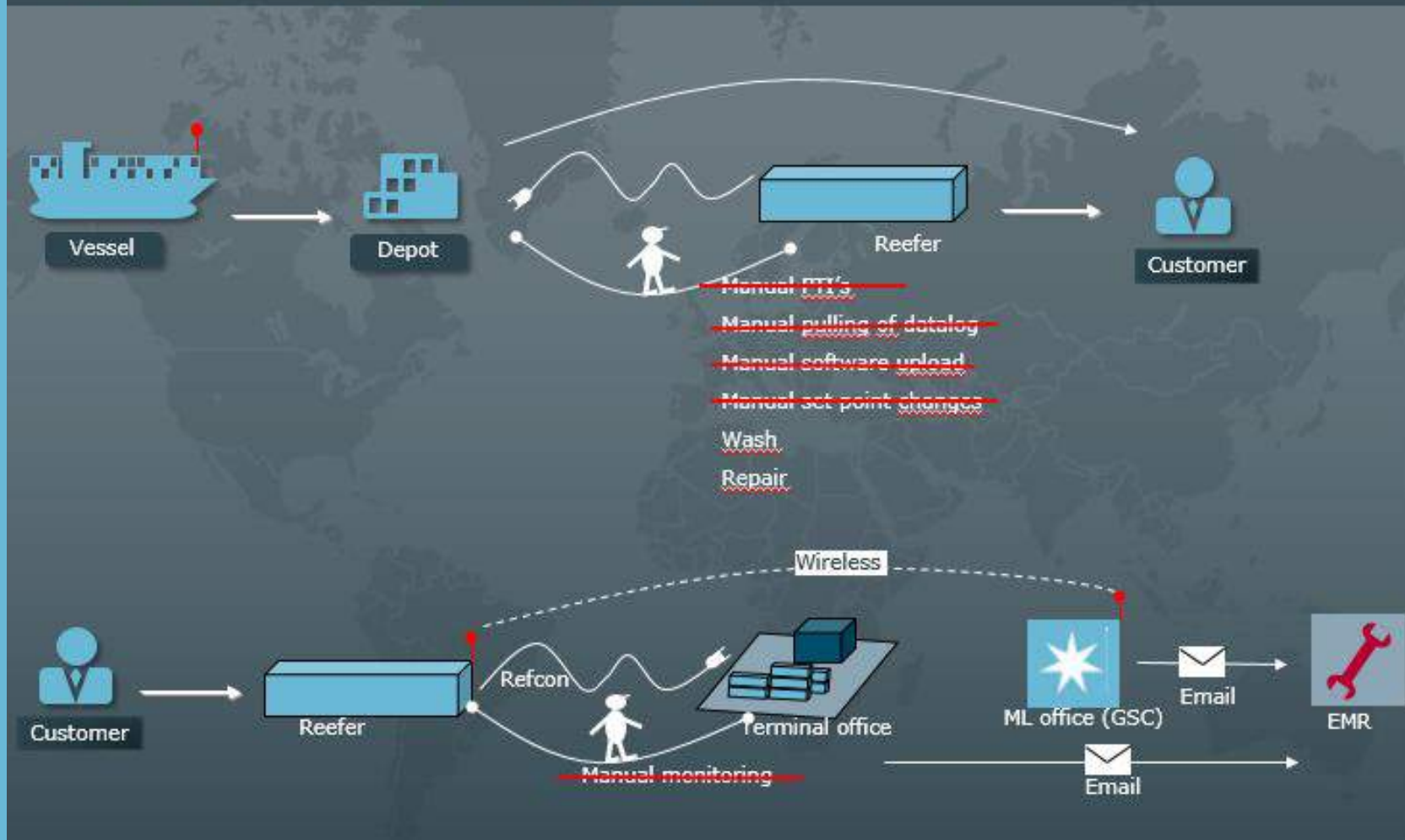
1

GPS Unit

2

GSM antennae

RCM - Business Process Area



The Connected Vessel

The technology and transparency needed to take performance to the next level

