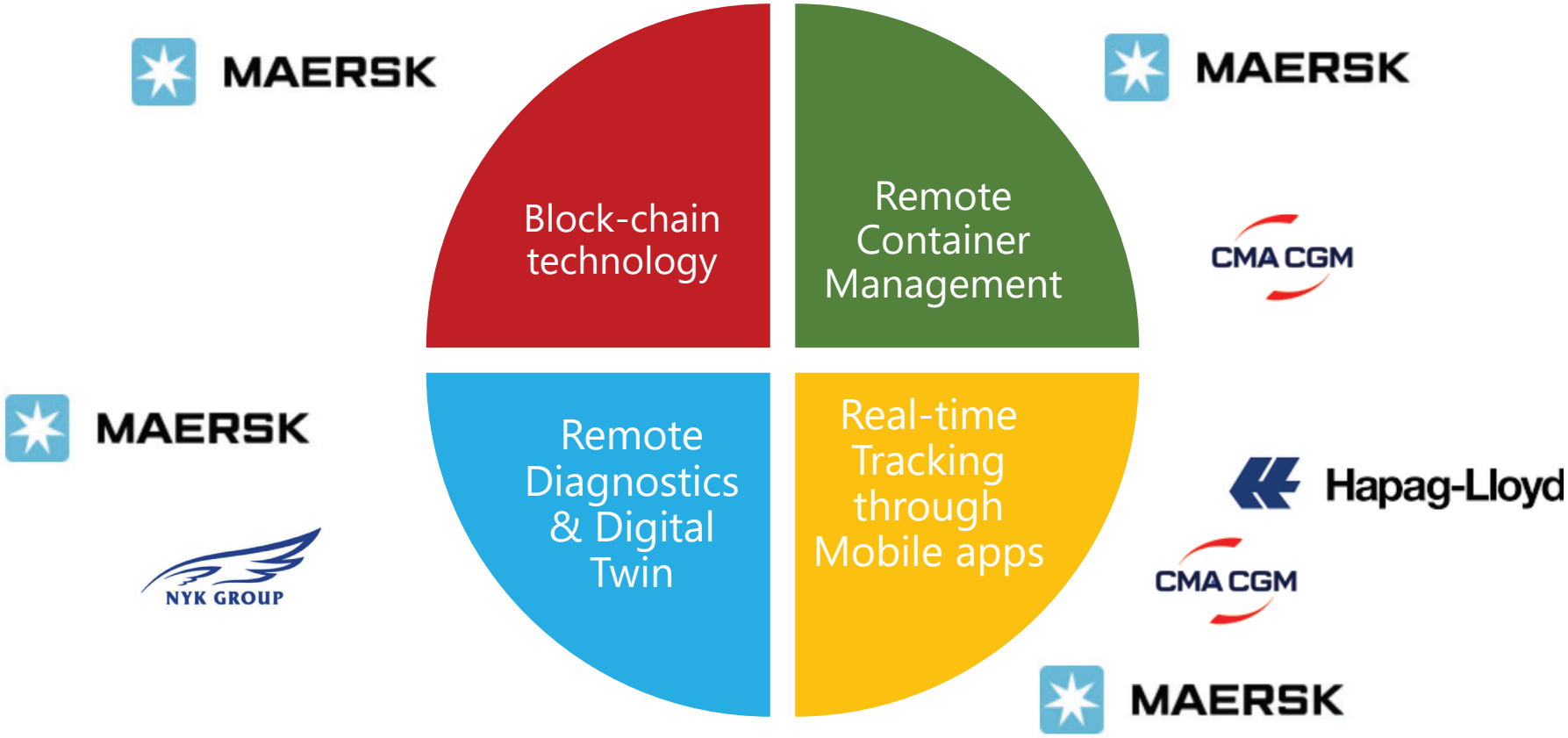
AI and Digital Transformation

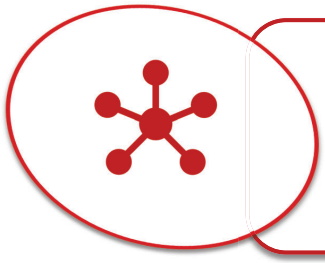
Susie Adams
CTO Microsoft Federal

How container shipping companies are being digitally transforme

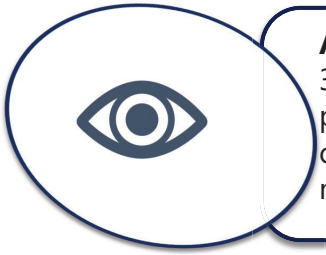
Reducing cost, driving operational efficiency and improving customer experience are the major goals for using digital technologies for container shipping companies



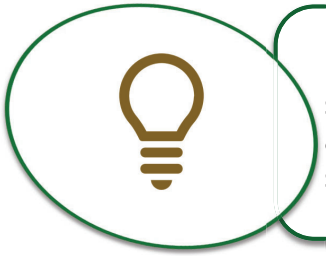
Top Technology Trends – Maritime Industry



Internet of Things
Reduced cost of small-scale hardware and connectivity (through ex. linking networks of sensors on their ships to onshore servers



Additive Manufacturing
3D Digital Twin of real ships to navigate, perform measurements and annotate objects & for technical lifecycle management.



Big Data
Data analytics could lead to more support for crew from shore and could also be used to improve the design of ships and onboard systems to make them more effective, efficient and streamlined

Automation
Automation has allowed businesses across every industry the chance to optimize services. For customers, this means a faster, more convenient experience.

Artificial Intelligence (AI)
Advances in artificial intelligence, machine vision & M2M communication
(Fire fighter robots; Hull cleaning robots; Robot ship inspectors; Anti-piracy robots; Robotic vessels)

What’s AI ? Why NOW ?

I Robot - 2004

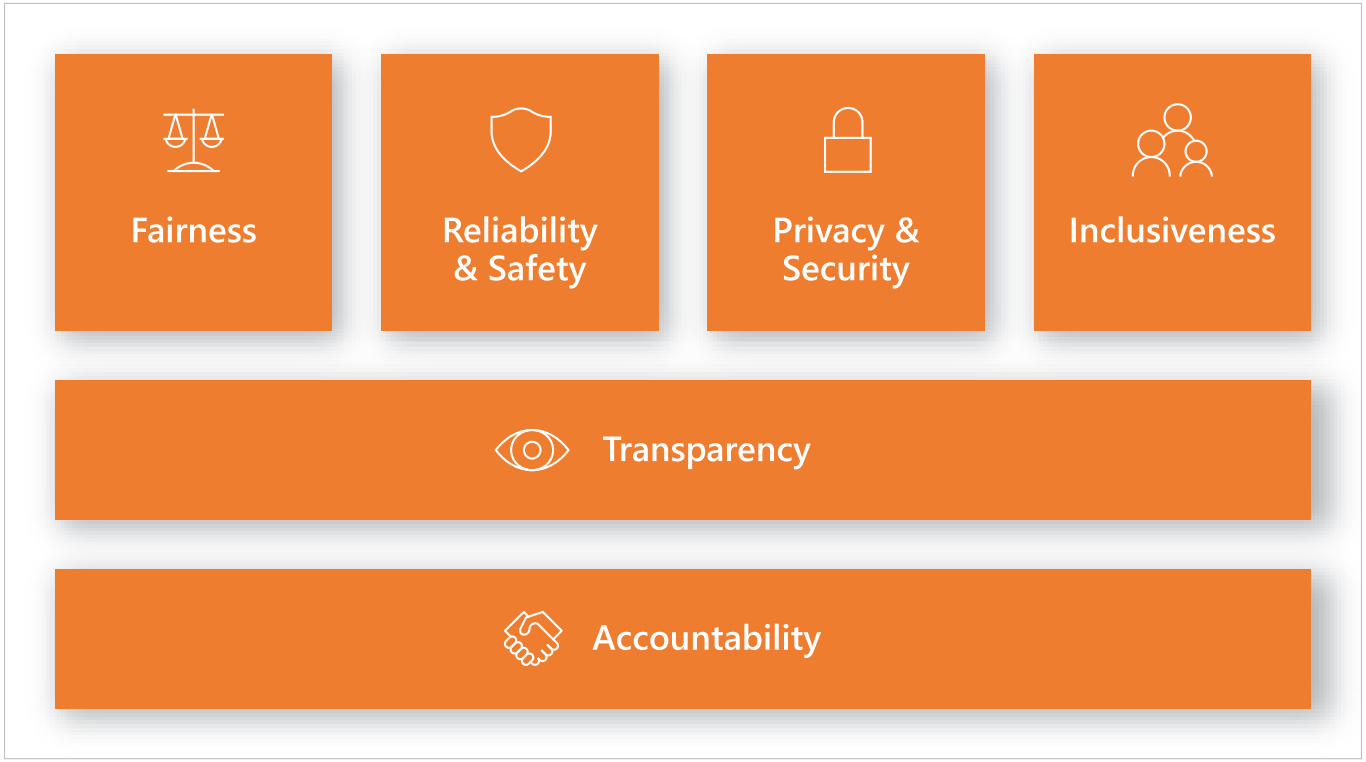
The 3 laws are:

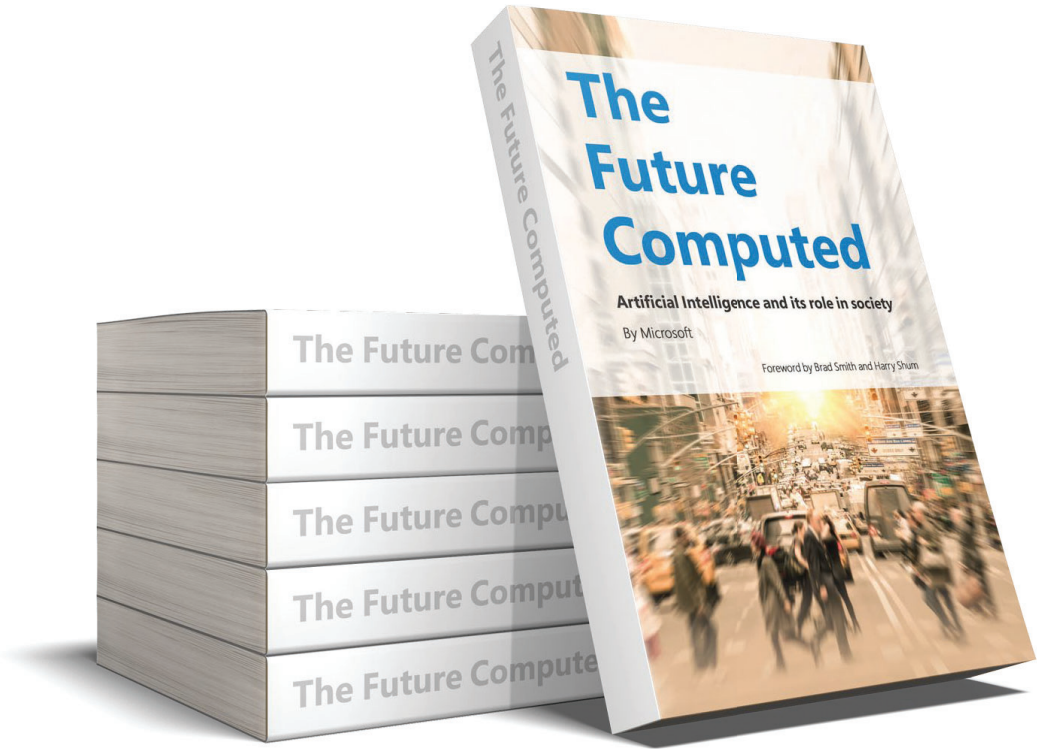
- A robot may not injure a human being or, through inaction, allow a human being to come to harm.
- A robot must obey orders given to it by human beings except where such orders would conflict with the First Law.
- A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

As computers behave more like humans, how will they impact real people?

Amplifying human ingenuity with intelligent technology

The ethics of AI





"We can't afford to look at this future with uncritical eyes."

– The Future Computed

Brad Smith ✓
@BradSmi

harryshum ✓
@harryshum

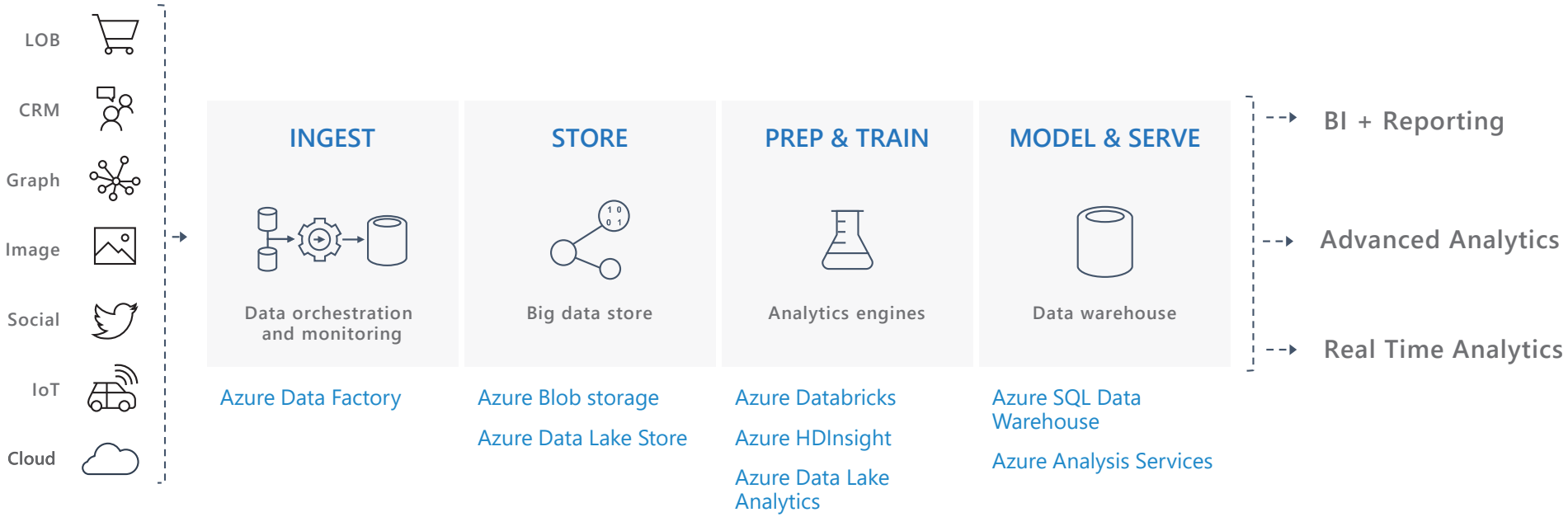
AI for Good

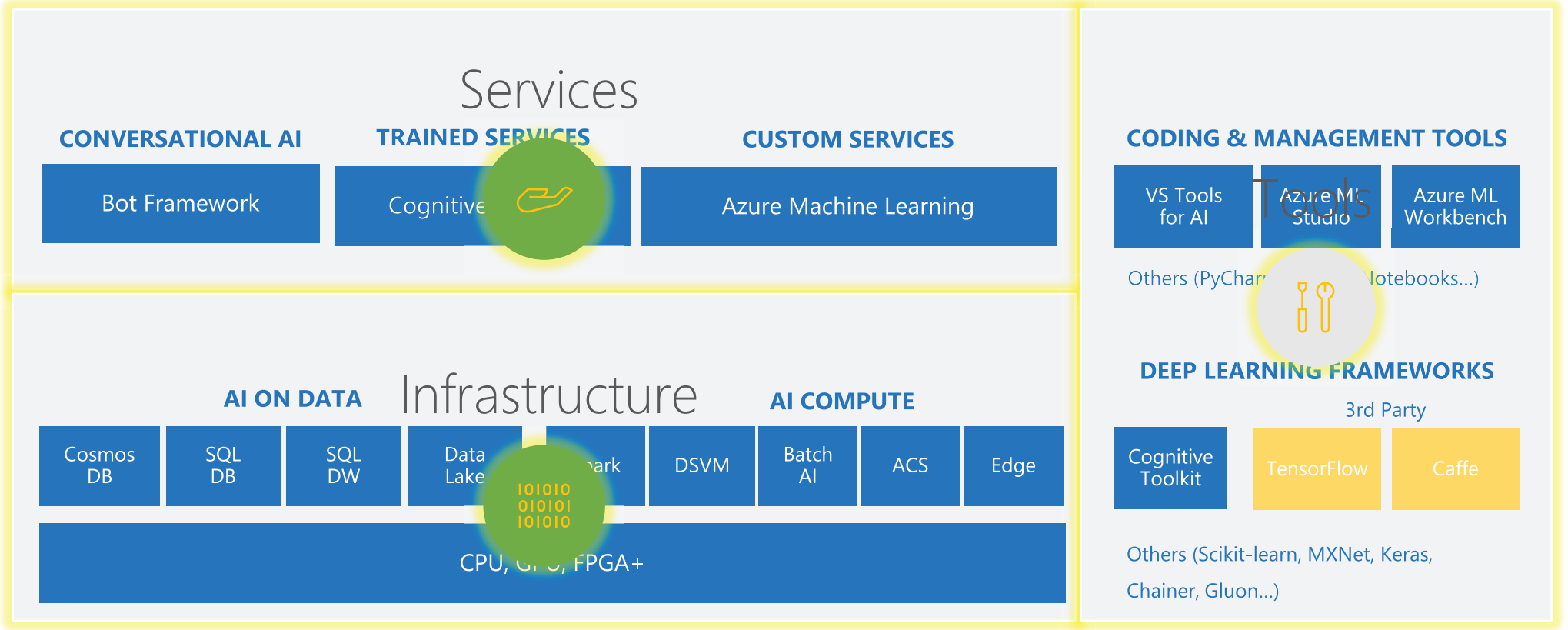
AI for Earth

AI for Accessibility

AI for Humanitarian Action

Great AI Needs Great Data and Cloud Scale Analytics




Services
CONVERSATIONAL AI
TRAINED SERVICES
CUSTOM SERVICES
Bot Framework
Cognitive
Azure Machine Learning
CODING & MANAGEMENT TOOLS
VS Tools for AI
Azure ML Studio
Azure ML Workbench
Tools
Others (PyChar
lotebooks...)
AI ON DATA
Infrastructure
AI COMPUTE
Cosmos DB
SQL DB
SQL DW
Data Lake
ark
DSVM
Batch AI
ACS
Edge
CPU, G
FPGA+
DEEP LEARNING FRAMEWORKS
3rd Party
Cognitive Toolkit
TensorFlow
Caffe
Others (Scikit-learn, MXNet, Keras, Chainer, Gluon...)

Cognitive Services

Vision

- Custom Vision Service
- Computer Vision
- Content Moderator
- Emotion
- Face
- Video
- Video Indexer

Speech

- Custom Speech Service
- Bing Speech
- Speaker Recognition

Language

- Bing Spell Check
- Language Understanding Intelligent Service
- Linguistic Analysis
- Text Analytics
- Translator
- Web Language Model

Knowledge

- Custom Decision Service
- Academic Knowledge
- Entity Linking Service
- Knowledge Exploration Service
- Recommendations
- QnA Maker

Search

- Bing Custom Search
- Bing Autosuggest
- Bing Image Search
- Bing News Search
- Bing Video Search
- Bing Web Search
- Bing Entity Search

Labs

- Abu Dhabi – distance matrix
- Cuzco – events
- Joburg – routing
- Nanjing – isochrones
- Prague – gestures
- Wollongong – location

Maritime Industry – Global Megatrends

Emissions Reduction and Electrification

Reducing the carbon footprint of the maritime industry will become a priority for governments and regulators in order to force that industry to make its contribution to the reduction of greenhouse gases

Automation and Electrification

Everything that can be automated will be automated. Also on board, the engine room and the bridge will merge and become a single command and operational center, and they will be closely integrated with the shore side operational centers of the vessel owner

Automation of Work

The integration of the vessels' resource planning system with the shore side, and with the suppliers' means that people need to spend less time on coordination activities

Digitalization and Connectivity

Satellite connectivity and software advancement will improve further and allow fast and reliable ***connectivity between the vessel and the shore side***

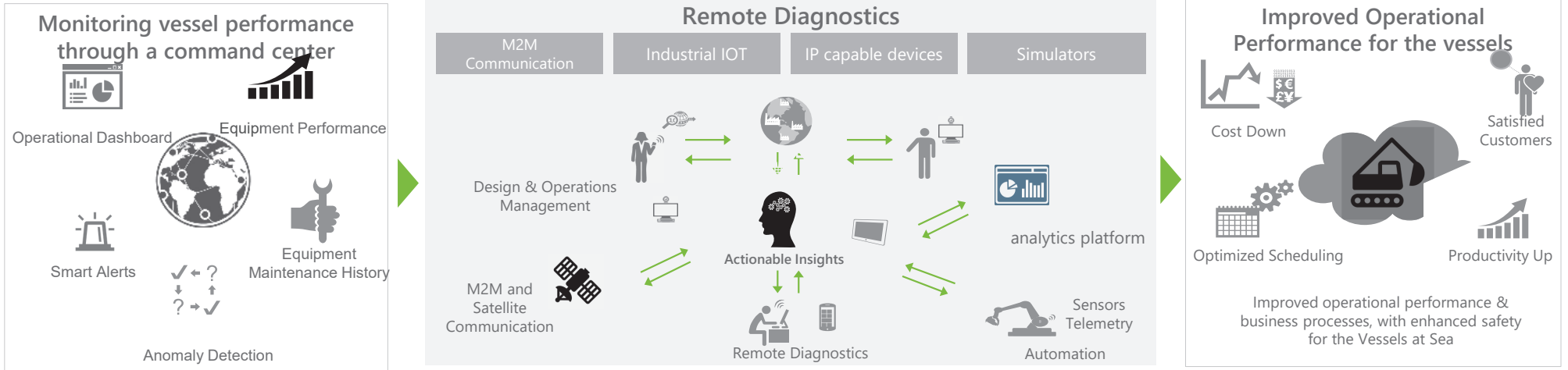
Big Data in Big Ships

Closer data networking can be measured in fuel savings. If routes are plotted around low pressure zones, weather data etc. with safety in mind

Digital Twins of Vessel Components

[redacted]

Solution Storyboard



Scenario- Remote Inspection and Certification

MSC's Goal

- Develop methods and systems to enable real time inspection and certification systems – Visual and UAV

KPIs to Achieve

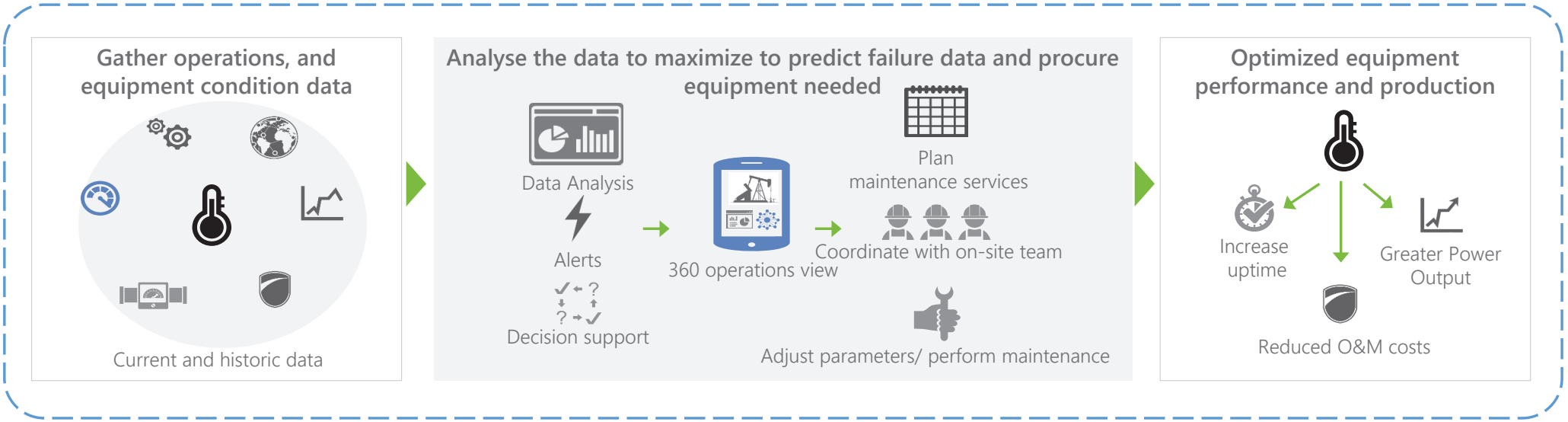
321.6* – 10 year average of dangerous incidents on offshore platforms - Reduce

Future Scenario –

MSC is using drone to inspect maritime and offshore assets. During one such inspection for renewing the classification for an offshore asset, the surveyors control a drone to the offshore location, while sitting at the remote location. The drone flies to the offshore location, captures information in terms of images of the asset. This information is being relayed to the control center offshore. This feed is then analyzed using complex Machine learning and image processing algorithms to look for issues / defects – like corrosion of metals, specific metal strains etc. that are deemed to be dangerous. The application at the control center then flags off the issue and the surveyors can determine the root cause of the issue using all the telemetry data of the asset captured using the sensors installed in the asset while building it. Using complex simulation tools, the surveyor is able to determine the root cause of the problem and determine the steps needed to be taken to correct the same

Enabling Services

- Advanced Analytics
- Machine Learning
- Cloud and Datacenter
- CRM



Kongsberg Maritime AS

Innovative Big Data Platform Revolutionizes Maritime Fleet Management

KONGSBERG

Engage Customer | Empower Employees | Optimize Operations | Transforming Products

Business Challenge

- Kongsberg Maritime (KM) delivers products and systems for dynamic positioning, navigation and automation to merchant vessels and offshore installations.
- Kongsberg Maritime's objective was to develop a communications platform that could take advantage of big data in the maritime sector in order to maximize vessel, fleet and operational performance. It would deliver shared situational awareness and the ability to provide the right information in the right format, at the right time, to the right users.

Solution Description

- The communication foundation was the **satellite connection and transmission to multiple devices**, including Windows 8 mobile devices, Surface tablets, Surface table, large-screen monitors and PCs.
- A wide range of **Microsoft technologies** has been used to develop the platform, e.g. Microsoft Windows Communication Foundation (WCF) 4.0.
- **Web-based dashboard applications** were developed that provide comprehensive and customizable visualization of data from a particular vessel. Customized dashboards can be created by users, even those using mobile devices. The interface has a set of user-definable instruments to represent the data required for a specific dashboard.

Benefits Realized

- The benefits are many, but one of the most visible is the monitoring of fuel-usage in real time. K-IMS enables the **quickest, most cost-effective routes** to be established and communicated to the vessel in **real-time, ensuring optimal efficiency.**

"You can monitor critical infrastructure where ever it is. The system provides data access to the people who have supplied different components. It gives early warning about component production and reduces downtime to a minimum." - **Stein Arne Riis: K-IMS Product Manager, Kongsberg Maritime**