



Maritime 4.0: Fostering Transformation Through Adapting & Adopting New Technologies

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Maritime 4.0

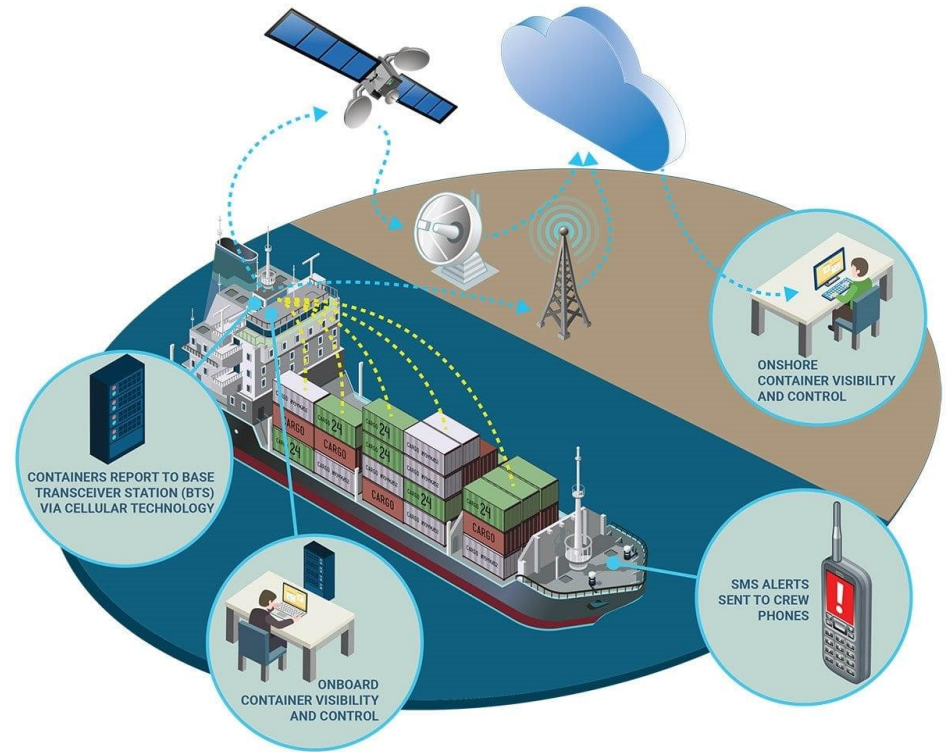
- Ongoing maritime **Digital Transformation** is essentially transforming vessels into managed remote branches.
- A **new era** of cloud computing, internet enabled devices, big data & artificial intelligence arises.
- Maritime industry is now able to **engage digital innovation** in a way not possible until recently.



Source: Public, "Trade 2.0: How Startups are Driving the Next Generation of Maritime Trade", 2019.
 Image: Via Satellite

The Connected Ship

- Technology that was science fiction a few decades ago has already been available across every industry, **except** shipping.
- Thanks to the recent **advances** in the commercial **space industry**, the **cost** of connecting a vessel to the Internet is **reducing** all the time.
- The **same world** of technological opportunities currently open to wider society is becoming **open** to the **global shipping fleet**.



Source: Public, "Trade 2.0: How Startups are Driving the Next Generation of Maritime Trade", 2019.
 Image: Food Logistics

Opportunities Ahead

- **Ship owners and operators:** to improve cost-efficiency and reduce downtime due to smarter vessels equipped with advanced ICT sensor systems.
- **Crew:** to enjoy improved welfare with Internet access also making possible to keep in touch with those at home, reducing the barrier for long voyages.
- **Other:** Yards, marine authorities, charterers, insurers and more.



Source: DNV-GL, "Ship Connectivity", 2015.

Image: Business Laws

Implications

(Ship Owner & Manager)

- Make **digitalization** a **priority**.

- Map your **current situation**
 - Data assets
 - Infrastructure & processes
 - Data usage
 - Culture & skills

- **Chart** the way **ahead**.

- Set yourself up for **continuous improvement**.

- Manage your **investments**.

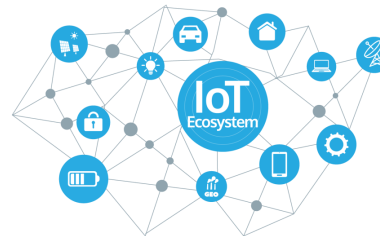


Source: DNV-GL, "Creating Value from Data in Shipping", 2017.
 Image: Ciberspring



6 + 1 Technologies That Impact Maritime (Overview)

- Sensors & Internet of Things (IoT)
- Handheld Devices
- Big Data & Analytics
- Platforms
- Cloud Computing
- Connectivity
- Cyber Security



6 + 1 Technologies That Impact Maritime

(Sensors & Internet of Things)

- Drastic **improvements** are expected as the industry learns and **adopts** proper **methods** for the design and maintenance of sensor systems.
- The full potential of **complex** condition **monitoring** systems will be reached when the transfer of data to shore **increases** with increased **connectivity**.



Source: DNV-GL, "Creating Value from Data in Shipping", 2017.

Image: IntelliNews

6 + 1 Technologies That Impact Maritime (Handheld Devices)

- Providing information to crews is becoming **mobile**, with access **wherever** and **whenever**.
- The collection of data on board is becoming **integrated** with standard **mobile** devices, **replacing entries** into paper logbooks, paper notebooks, checklists, stand-alone spreadsheets and more.



Source: DNV-GL, "Creating Value from Data in Shipping", 2017.
Image: Cogent

6 + 1 Technologies That Impact Maritime

(Big Data & Analytics)

- A modern vessel can contain thousands of sensors, generating **10 – 50 Gigabytes** of data already today.
- Modern **analytics** and **machine-learning** techniques are opening up new opportunities to **create** insights and thus **value** from this information.



Source: DNV-GL, “Creating Value from Data in Shipping”, 2017.

Image: Towards Data Science



6 + 1 Technologies That Impact Maritime (Platforms)

- **Digital platforms** allow many providers to **share** assets such as data, models, algorithms or services with many consumers of these.
- Platforms also allow the sharing of assets between users – who previously did not interact – to **create new value**.



Source: DNV-GL, "Creating Value from Data in Shipping", 2017.
Image: IT Venture

6 + 1 Technologies That Impact Maritime

(Cloud Computing)

- The ability to perform **high-speed** processing and computation in the **cloud**, along with the vast storage potential, is what will in the end enable the **digital transformation**.
- However, the notion that **data** is stored and **applications** are run on servers in a **remote location** is still discussed in many shipping companies.



Source: DNV-GL, "Creating Value from Data in Shipping", 2017.

Image: Just Science

6 + 1 Technologies That Impact Maritime (Connectivity)

- Improved **connectivity**, providing increased **bandwidth**, is becoming an **enabler** for the rush of new digital opportunities.
- Ships would benefit from upgrading to a **VSAT** system providing increased data **throughput** – allowing them to make more of today's data while preparing them for a more **data-rich** future.



Source: DNV-GL, "Creating Value from Data in Shipping", 2017.
Image: Clean Png

6 + 1 Technologies That Impact Maritime

(Connectivity – Cont'd)

- An unmistakable force, driving the **cost** and **capacity** of communications is the regular **doubling** in capacity of any information-related technology.
- This pattern was first identified by **Gordon Moore**, who, in 1965, formulated what is now known as Moore's law; this law states that the **density** of transistors on a chip **doubles** roughly every 2 years.

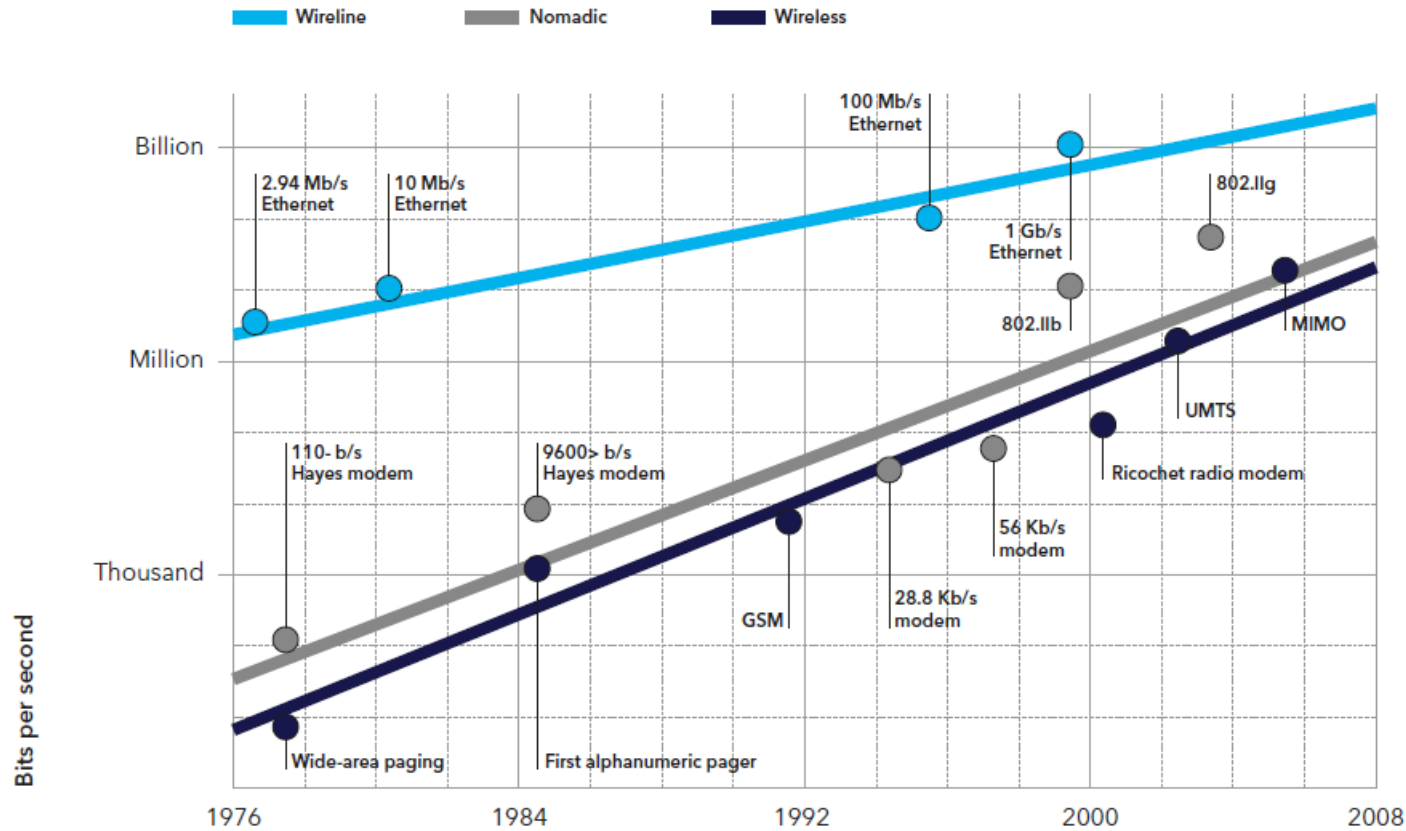


Source: DNV-GL, "Creating Value from Data in Shipping", 2017.

Image: Clean Png

6 + 1 Technologies That Impact Maritime

(Connectivity – Cont'd)



In the simplest terms, the **Edholm’s “Law of Bandwidth”** depicted here indicates that **current** bandwidth limitations will **disappear** to allow IoT and broadband applications to **expand** into the **entire** shipping industry.

Source: DNV-GL, “Ship Connectivity”, 2015.

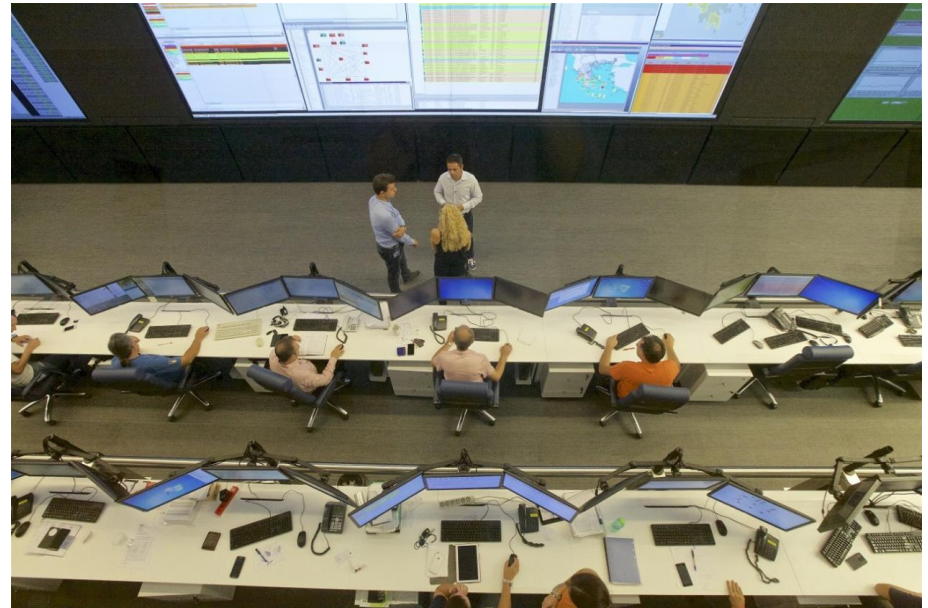
Image: IEEE Spectrum

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6 + 1 Technologies That Impact Maritime

(Cyber Security)

- Given the rapid **growth** in the reach and **complexity** of cyber-attacks in the shipping industry, **cyber security** has become a concern and should be considered as an **integral part** of overall safety management.
- According to industry **best-practices**, it is much more **effective & efficient** to utilize **Managed Security Services**.



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