



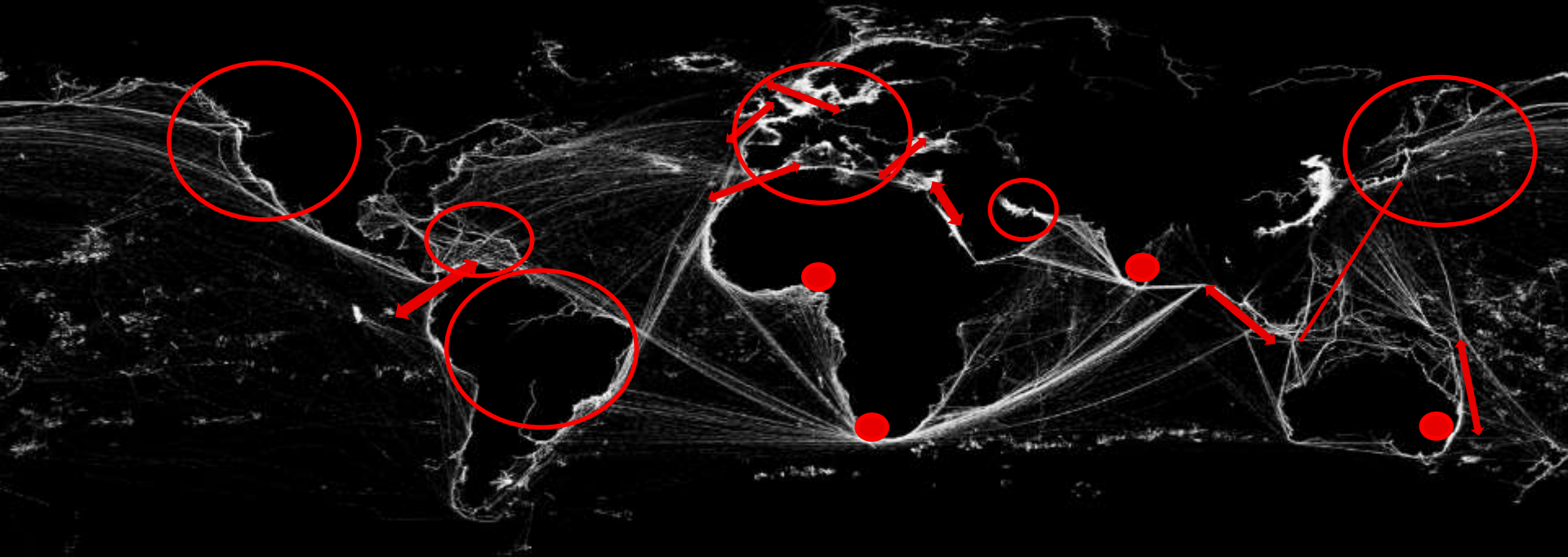
Transforming Shipping Connectivity through 4G

Gerrit Jan Konijnenberg, Vodafone

13 & 14 November 2019



Coastal waters of largest trade routes are under Vodafone coverage



Partner with the world's leading roaming provider

Capacity & cost benefits

67 countries (Vodafone & partner markets)

Best maritime coverage

4G for 93% of coastlines, 99% including 3G/3G+

Strong quality focus

Pro-active tests, real time monitoring for 700M customers

Flexible pricing models

PAYG, regional bundles or per-country pricing





**We connect for
a better future**



1BN

**By 2025, we want to improve
the lives of a billion people**

An aerial, night-time view of a city, likely Singapore, showing a dense urban landscape with illuminated buildings and roads. A large, white, stylized speech bubble graphic is overlaid on the center of the image. The text "Digital Society" is written in white, bold, sans-serif font inside the speech bubble. To the left of the text, there are two small red squares stacked vertically.

Digital Society

A circular fisheye photograph capturing a massive, diverse crowd of people gathered for an outdoor event. The crowd is dense and fills the entire circular frame, with individuals of various ages and ethnicities visible. The scene is set outdoors under a bright blue sky with scattered white clouds. In the background, some green trees and a modern building with a glass facade are visible. Overlaid on the center of the image is the text "Inclusion For All" in a white, sans-serif font. The text is enclosed within a white, hand-drawn style circular outline that has a slight gap at the top and bottom, resembling a stylized infinity symbol or a continuous loop.

An aerial, top-down view of a tropical island. The island is covered in dense green forest and has a white sandy beach. The surrounding water is clear and turquoise. A white outline, resembling a stylized leaf or a drop shape, is drawn around the island. The word "Planet" is written in white, bold, sans-serif font across the center of the island. The background is a bright blue sky with scattered white clouds.

Planet



$1/2$

By 2025, we will halve our
greenhouse gas emissions

Are you ready for the future of shipping?

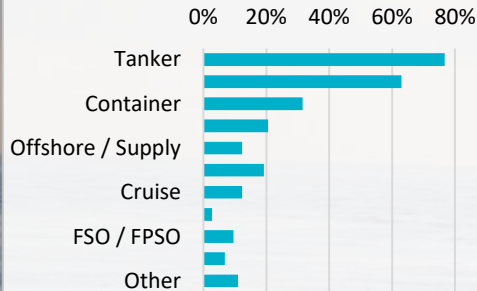


What does the market think?

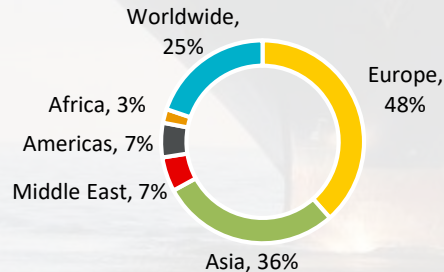
Survey 1: Operators

- 73 Ship operating companies
- Controlling 5,779 ships
- Average fleet size: 79 ships
- Average 17.4 days/month in port /coastal waters

Vessel types



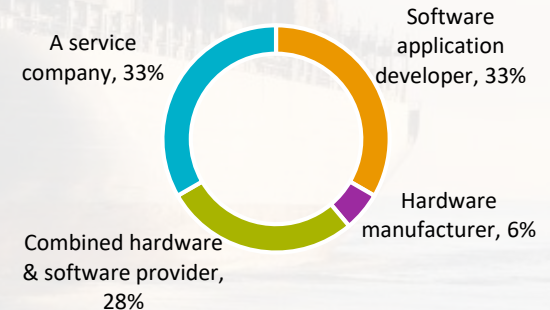
Regional Representation



Survey 2: Suppliers

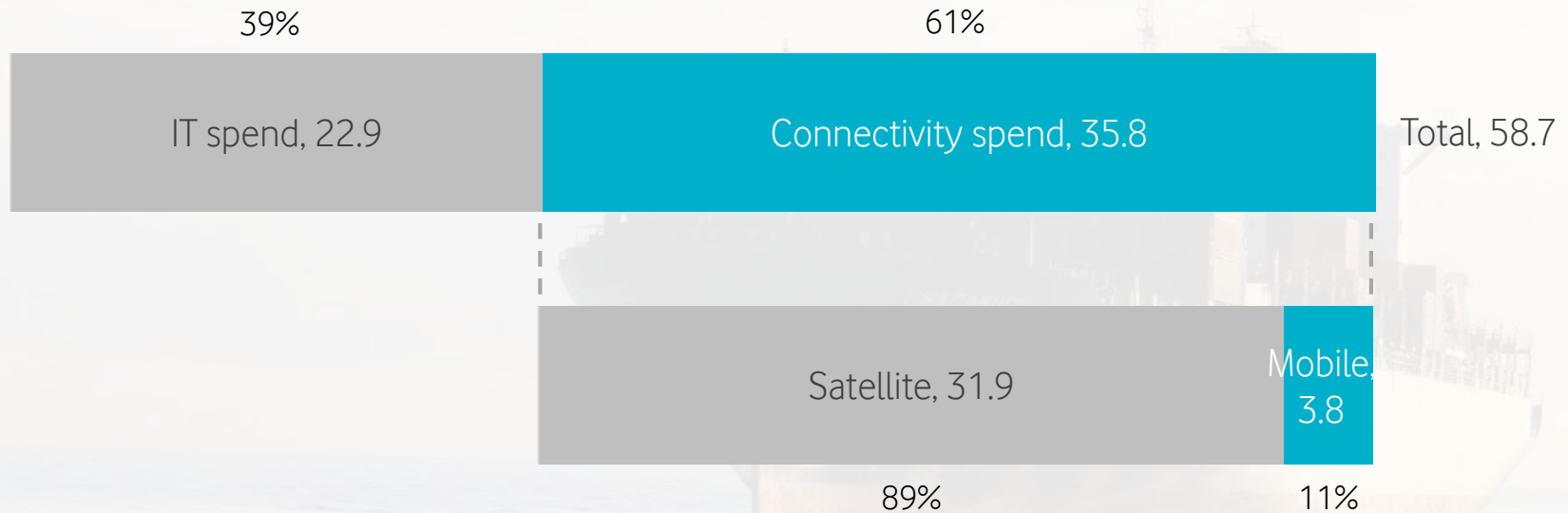
- 37 Supplier organisations
- Total vessel installations 67,308
- Average 1,870 installations per supplier

Company Type



Connectivity budget exceeds IT budget

Breakdown of annual connectivity and IT expenditure
(in USD '000 / vessel)



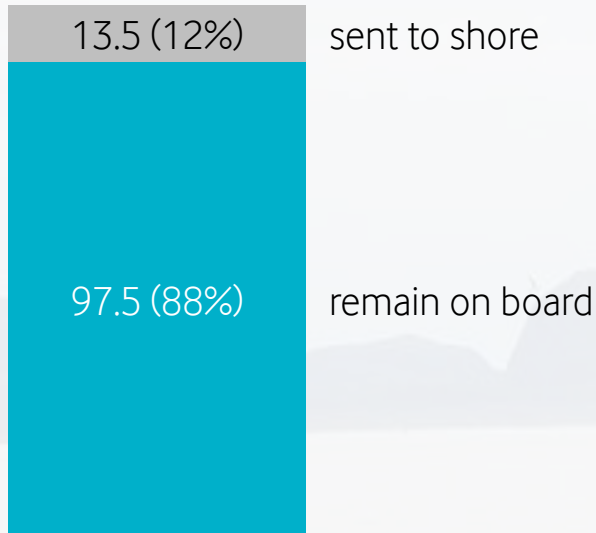
Source: Near Shore Connectivity Survey 2019, Futureonautics / Vodafone Roaming Services



However most data is never sent ashore... but this will change!

Data generated per vessel
(in GB / vessel / month)

111



Source: Near Shore Connectivity Survey 2019,
Futureautics / Vodafone Roaming Services

But growing over 5 years

Analytics
ashore +238%

Analytics
on-board +137%

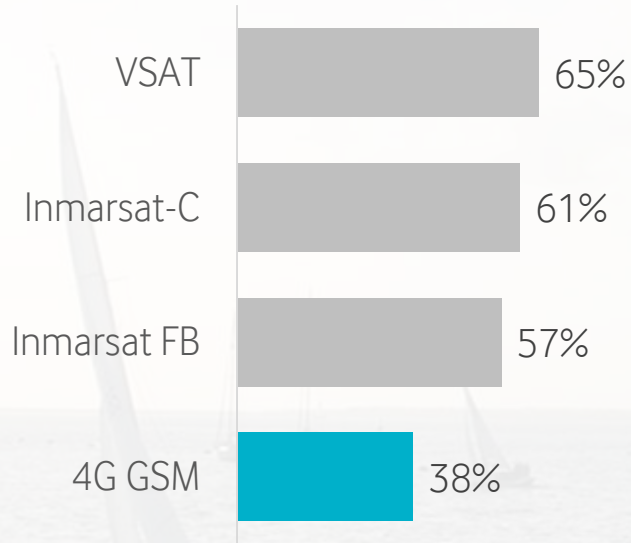
- Evolving towards central analytics
- Requires strong and reliable connectivity

Source: Near Shore Connectivity Survey 2019,
Futureautics / Vodafone Roaming Services



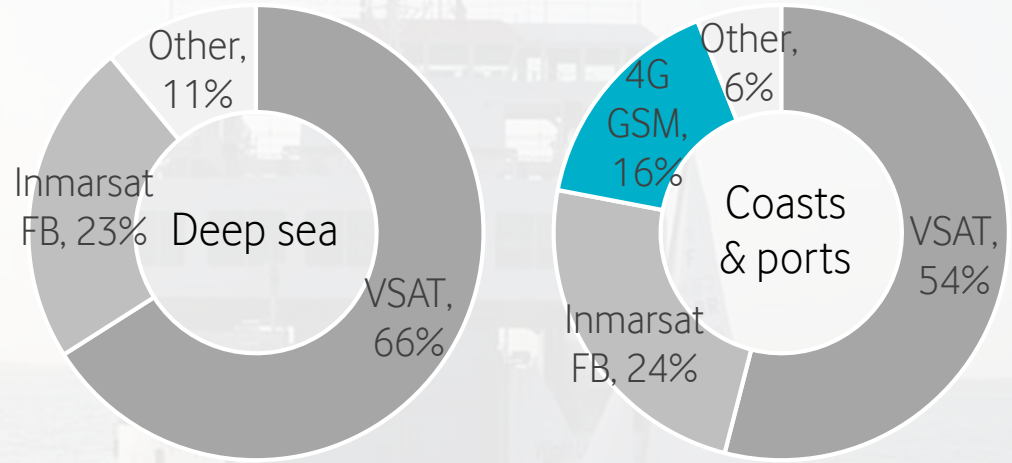
Even in coastal waters, satellite is the primary channel

On-board installations



Source: Near Shore Connectivity Survey 2019, Futureonautics / Vodafone Roaming Services

Just 16% use 4G as primary channel in coastal waters



Source: Near Shore Connectivity Survey 2019, Futureonautics / Vodafone Roaming Services



4G can enable large data offload... ...and creates a big opportunity for data analytics

Good reasons for mobile networks

Maritime 4G
users see strong
benefits

44% Reduces overall comms costs

33% Backup to existing satellite systems

17% Cheaper alternative for crews

Enable more
data analytics

88% of generated data remain on board

42% of data are not time critical

Widely available

18 days per month under mobile coverage

Source: Near Shore Connectivity Survey 2019, Futureautics / Vodafone Roaming Services



The future is **hybrid!**

Top 3 satellite constraints

63% Limited bandwidth

50% Too expensive

19% Service unreliable

Source: Near Shore Connectivity Survey 2019,
Futureonautics / Vodafone Roaming Services

Benefit from strength of both solutions

Satellite best for:

- Deep sea
- Time critical data

Mobile best for:

- Coastal waters & ports
- Large volumes
- Cost saving



For more details on
the survey &
whitepaper series:



maritime.vodafone.com

How about real life examples?



1



Telenor Maritime

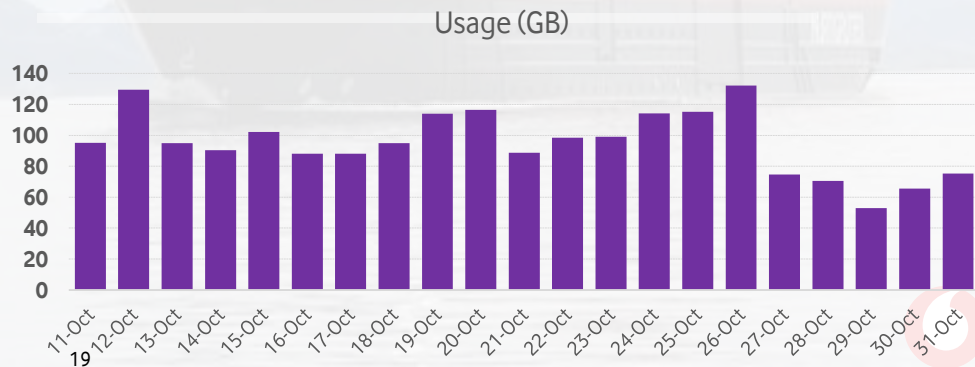
- Nordic geographic zone + EU
- 250 international ferries/cruises
- 25m Passengers per year



ColorLine Fantasy Int. Ferry

- Sea route covers 4 countries
- Fast roll-out - No equipment installation needed
- Data backhauling + passengers + crew

Oct 2019: **95 GB/day** (peak 132 GB)



2

Nordic IT
Marine Communication



Nordic IT



- Over 170 countries covered under a single contract
- Hardware and service support LTE/4G.
- No bill shock
- East cost routing & auto-switching

Reederei Jens & Waller / Germany



- Up to 30km offshore
- Usage 2-10 GB/month
- x30 more GSM traffic
- Reduce Satellite Connectivity Cost
- Free for crew & improved morale
- Remote access for ship managers via VPN





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