

# IoT solutions for smart MNO's

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# IoT Definition – Wiki

The Internet of Things (IoT) is the network of physical devices, vehicles, home appliances and other items **(the Things)** embedded with electronics, software, sensors, actuators, and connectivity which enables these objects **(IoT devices)** to connect and exchange data **(via Internet)**.



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# An example of a Thing?



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RoPax ferries are compared for m-ISPs  
in terms of size as a small town



These “Things” are high value  
hotspots for MNO's... **Why?**

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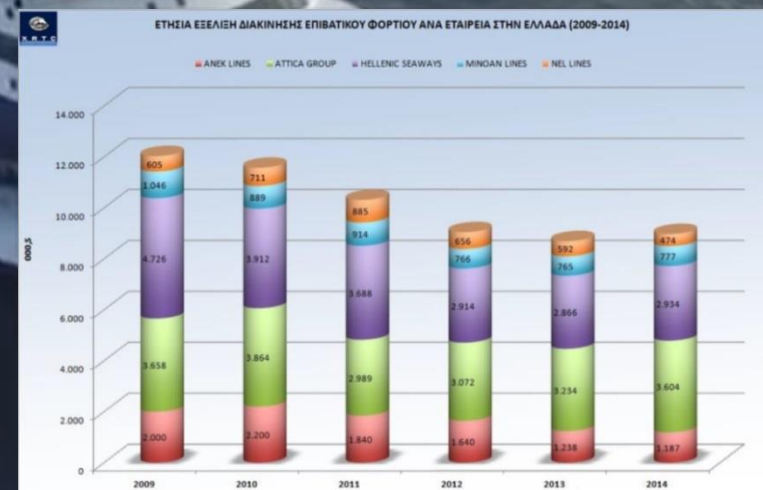
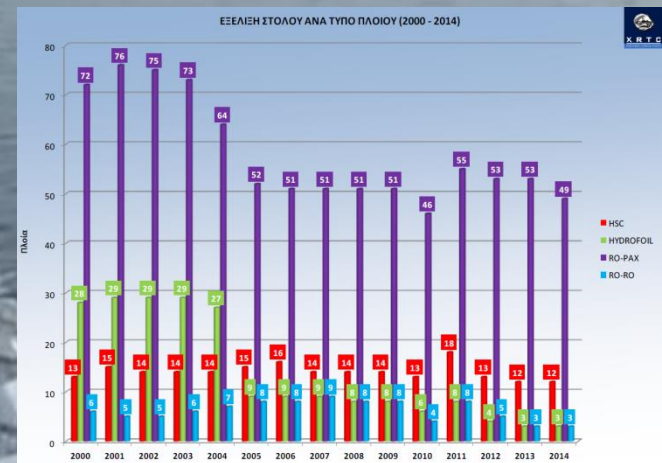
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# The GREEK FERRY market – RoPax and the importance for Greek m-ISPs..

According to XRTC ferry market report (2015), in Greece RoPax cargo is over **10.000.000 passengers annually!!!**

**These 10.000.000 passengers, are serviced by just 50 “Things”!!!**



# Vodafone example...

Over 5.000.000 of the  
RoPax ferry passengers  
carry a data capable phone  
and require high speed  
internet service!!!

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## Data

High speed, worry-free



### Context

- As smartphone penetration increases, customers want faster and more reliable data services
- Customers have multiple mobile devices and want a single, worry free bill
- Customers who are on the move demand high-definition video capabilities and low latency speeds (fast reaction time) for a more enjoyable experience

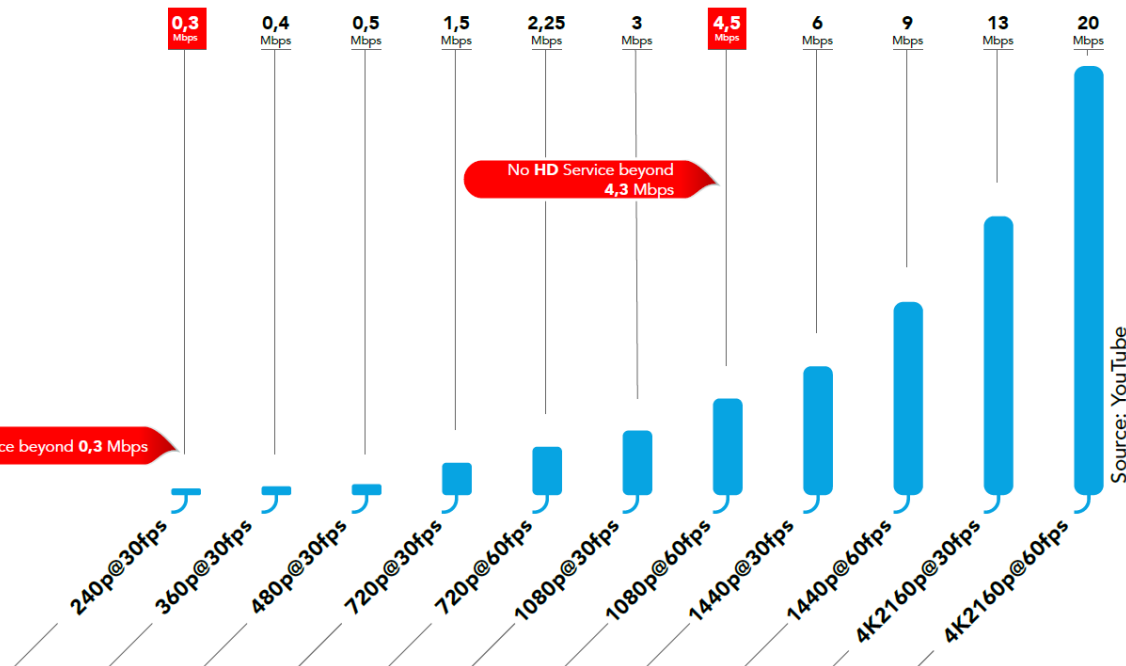
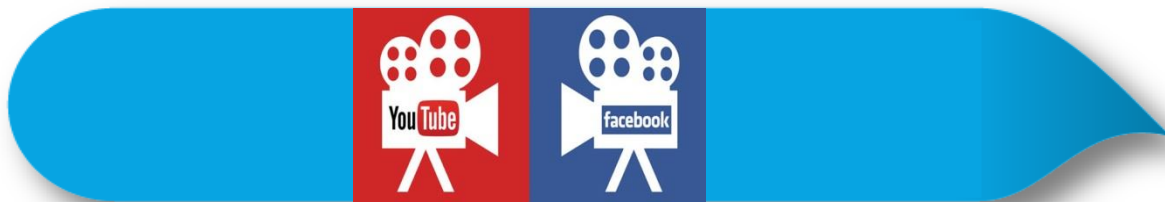
### What we're aiming for

- Increasing smartphone penetration also helps drive data usage. 58% of our customers have a smartphone in Europe, compared to 52% last year
- We want our customers to use our services wherever they are. Our 4G roaming network reaches 93 countries

### Average smartphone usage in Europe

MB/month

2014	473
2015	755
2016	1,120



**Video requires >0,3Mbps connection speeds**

**HD Video requires >4,5Mbps connection speeds**

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# Vodafone example...

**Vodafone network  
on ships need to  
offer >4,5Mbps  
internet speeds  
everywhere!!!**



## Data

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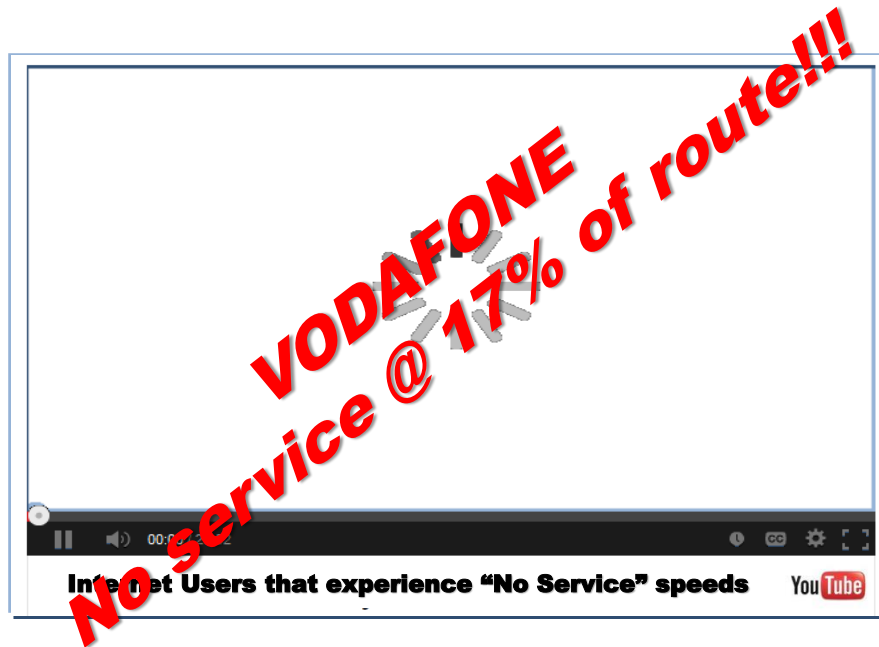


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# What is Vodafone's Video service on a ship route in Greece?



2016 measurements, KNOSSOS PALACE route, source: FASMETRICS SA



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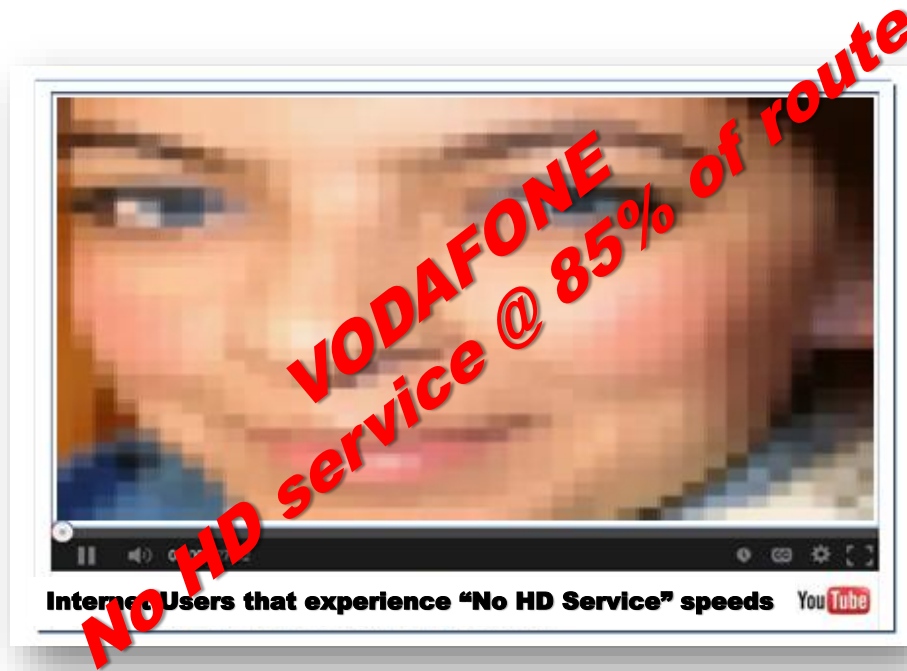
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# What is Vodafone's HD Video service on a ship route in Greece?



2016 measurements, KNOSSOS PALACE route, source: FASMETRICS SA



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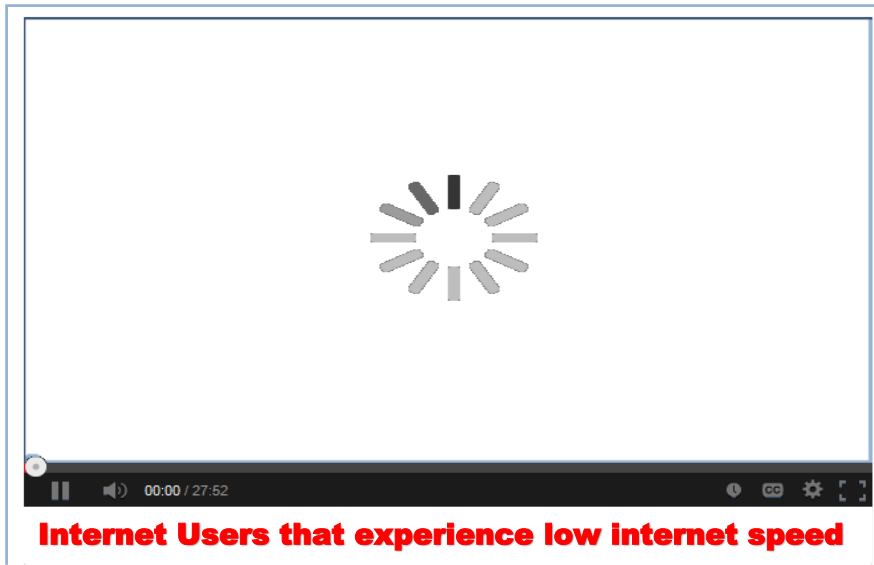
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# How Video & HD Video impacts MNO's revenues?



After 4 seconds 10% of internet users ABANDON online videos

After 10 seconds 40% of internet users have given up

This translates into a **great loss of revenues** for MNO's

Source: Ericsson



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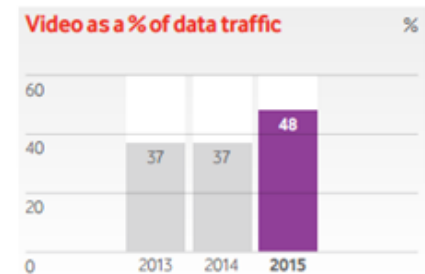
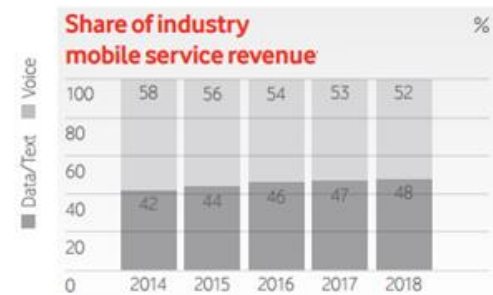
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# Vodafone example...

**Video offers more than 25% of Vodafone's revenues!!!**



of the world's total traffic on mobile networks is data. The data services most used are video streaming and internet browsing which require high speed networks. Therefore, operators are investing more in 4G in European markets

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# Our IoT device (3skelion) for MNO's



3skelion scans, detects & auto selects the direction of the optimum radio base station area. By using directional x-polar antennas, it manages to filter out the interference from neighboring (unwanted) cells and boost the donor (needed) cells. As such, “clean” & “boosted” radio signals feed the in-ship RF repeaters. In this way, wireless connections lead to fast internet speeds.



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# Typical 3skelion installation for Cosmote



## COSMOTE Case Study

June - December 2016 @ Knossos Palace Ferry





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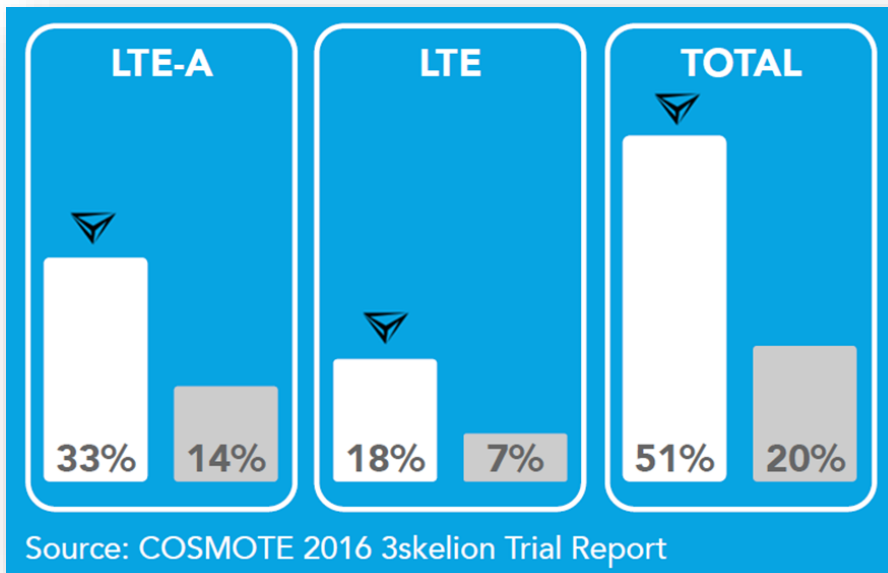
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# Cosmote 4G network has been boosted!

As it was expected, RF coverage boost increased  
LTE dominance along the ship route...





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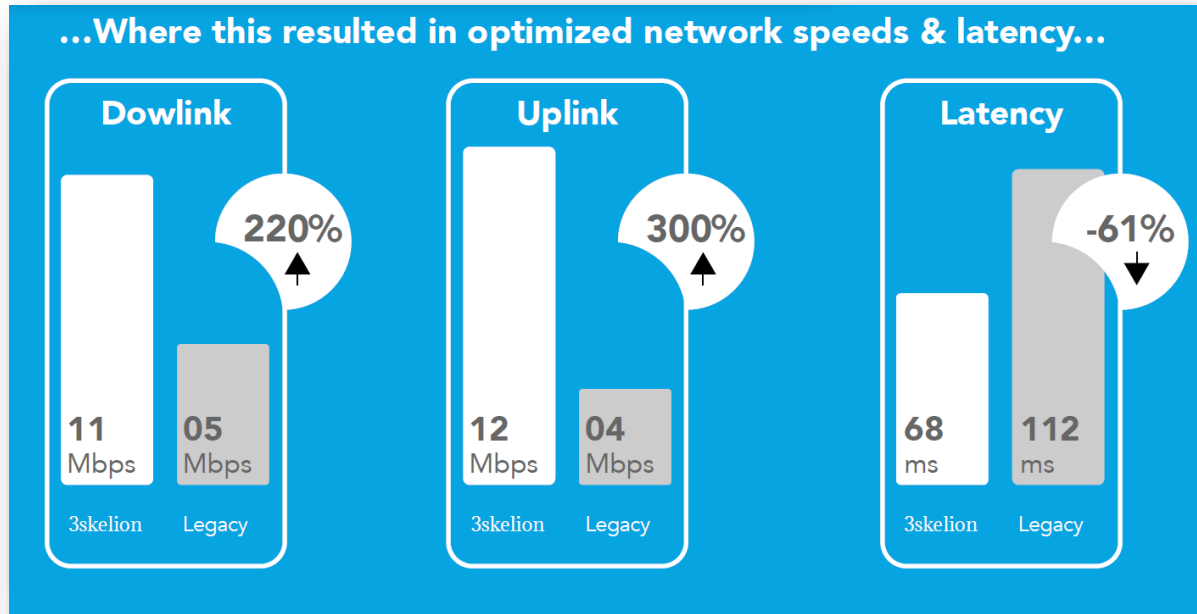
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# More capacity & speeds are now offered



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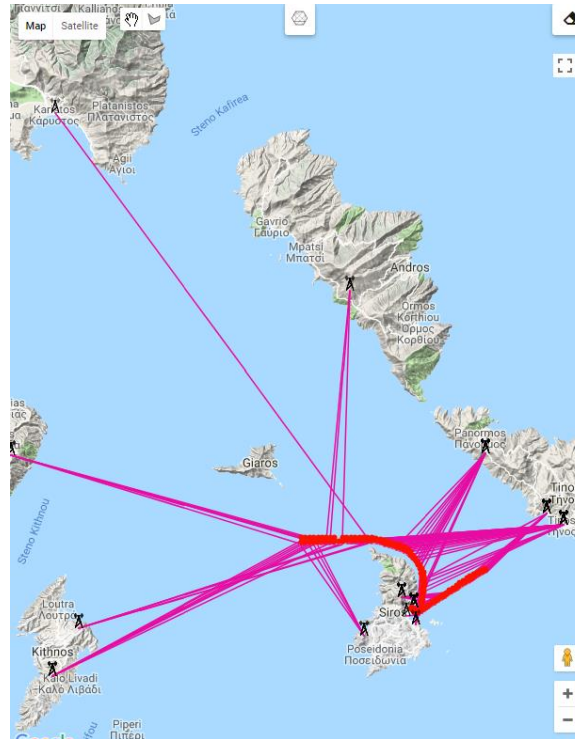


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# 3skelion: An IoT device for network tuning

Location	Coverage	RSCP	ECN0	Distance
SIROS_TK L	5.06	-36.00	-5.44	0.49
TINOS T/K M	1.78	-60.00	-8.59	19.85
SIROS_TK K	1.11	-52.00	-6.50	1.05
KIONIA_X M	0.89	-58.00	-5.94	18.24
ISTERNIA T/K I	0.78	-59.00	-8.43	20.25
MERICHAS/X2	0.39	-71.00	-6.00	36.48
SIROS_RRS2 K	0.28	-52.00	-5.60	5.76
KEA_RRS2 L	0.28	-67.00	-8.80	43.14
ERMOUPOLI N	0.22	-61.00	-7.25	5.19
GALISSAS/X M	0.22	-70.00	-5.50	13.12
LOUTRAX L2	0.22	-67.00	-9.50	38.74
ZAGANIARIS T	0.17	-70.00	-7.67	32.16

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# IoT Solution for smart operators



**Significant boost on LTE & LTE-A network utilization!!!**

**Increased HSPA & HSPA+ performance!!!**

**Superb video service coverage!!!**

**High Quality internet browsing & video streaming experience!!!**



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