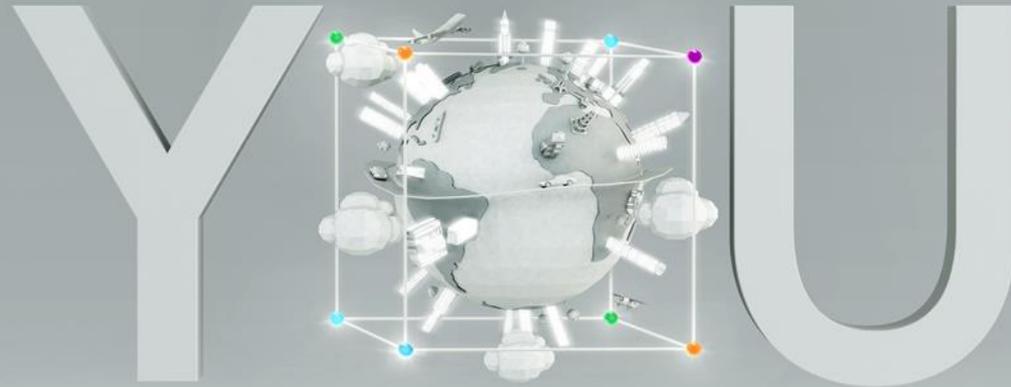


GLOBAL SOLUTIONS FOR



IP gravity dynamics in Regional HUBs

The Sicily Case:
*from Cable Landing Stations environment
to Multi-Tenant DCs and IXs ecosystem*

Giuseppe Valentino
MENOG 16 – Istanbul- March 2016



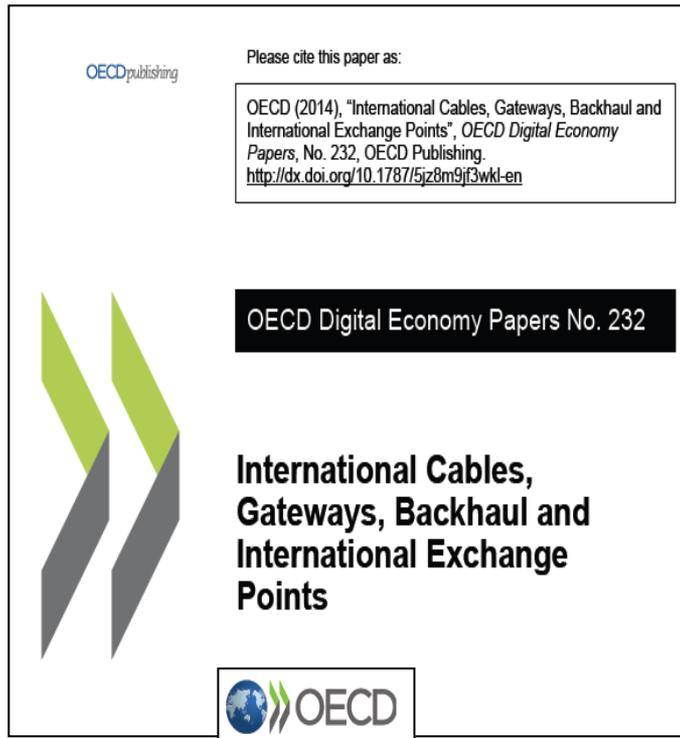
TELECOM ITALIA GROUP



Agenda

- Where Internet develops: the importance of the HUBs
- Geography really matters
- Sicily HUB: the IP gravitational force in the Med basin
- Lesson learnt: the key factors for a successful HUB
- Focus on Gulf Countries
- Conclusions

Where Internet develops: the importance of the HUBs



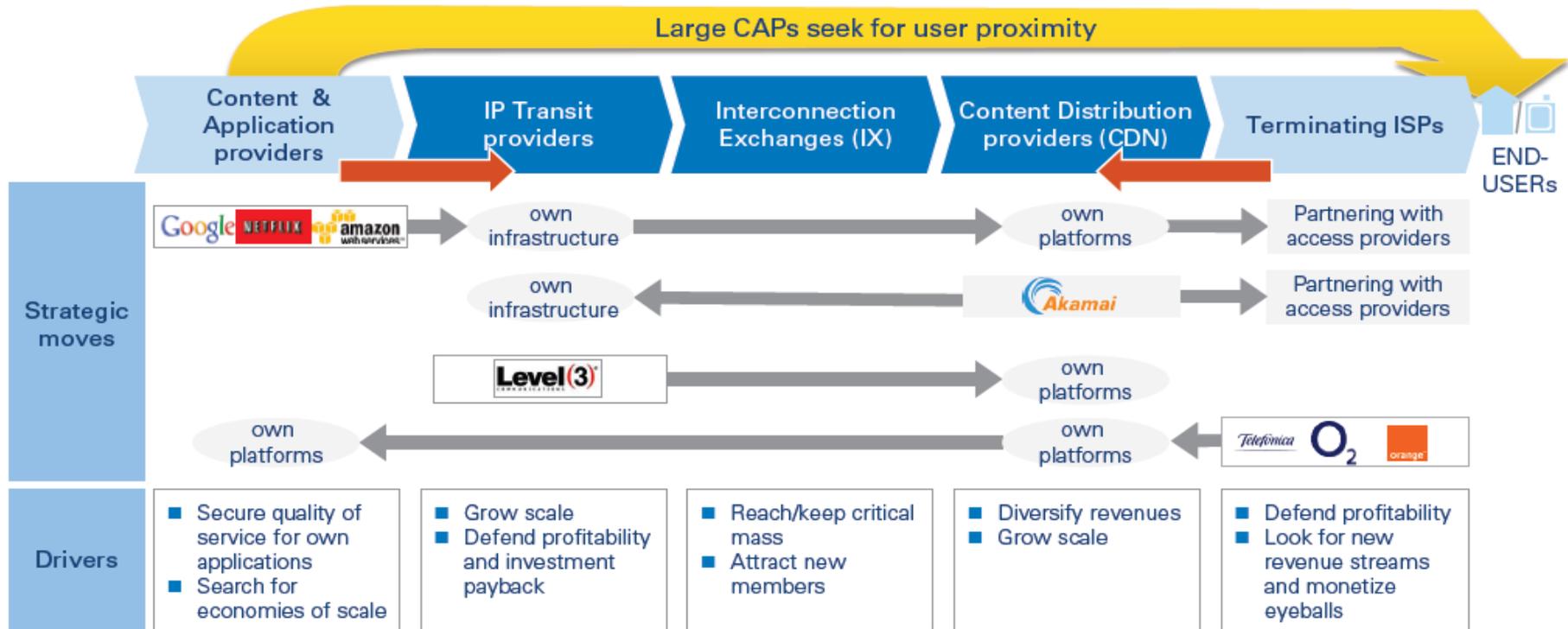
“Some in the Internet technical community have expressed the view that **the number of exchange points around the world has not yet reached a sufficient scale and that expansion should be proceeding at a faster pace.** ...

...These commentators expect a need for a significant increase in the number of Internet HUBs, in the next decade, **from the current 20 major locations to a future with 200 such locations.**

The basis for this assessment is the increased use of fixed and wireless broadband access throughout the world. A significant proportion of the users of these connections are in countries and regions that are under served.” OECD 2014

Which are next 20 key location supporting Internet development in emerging markets?

IP Interconnection: the value chain



Source: Arthur D. Little analysis

Interworking of 5 players categories enable Internet functioning, moving along the value chain:

- Content & Application providers
- IP backbone providers
- Neutral Internet Exchange providers (public peering)
- Content Distribution Network (CDN) providers
- Terminating ISPs (eyeball networks)
- **but ... content is still the king!!**

HUB: a magnetic point

A rich multi breed ecosystem, creating IP gravity at higher performance

HUB is an “open-place” where Players can meet each other and find the solution for all their needs, at reduced latency, exploiting the proximity and cost effective solutions

All the players of the value chain are participating to the HUB, creating a sophisticated market place coping with the different needs: peering (public and private), connectivity (Internet, networking), voice, roaming, cloud, etc

Community



Several real time applications are very sensitive to latency and jitter

Gaming

Real-time interactive applications

Trading

Betting

On-line transactions

E-commerce

Videoconferences

Proximity

These applications perform better if servers are close to end user
... so geography matters...

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Geography really matters for Regional HUBs!

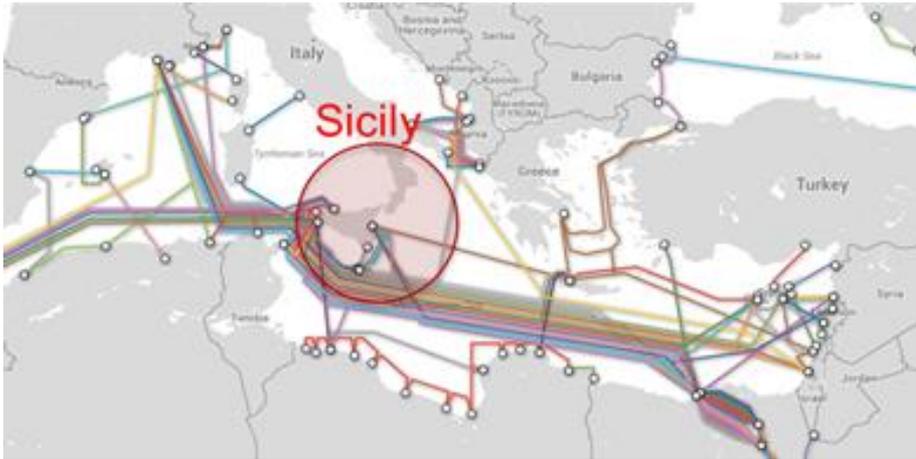
Mediterranean basin continues to be the **natural melting-pot between Europa and Africa/Asia** where transport and communication “roads” meet



In the past with ships bringing spices, food, gold...
now with cables bringing **Tbps of information**

... and Sicily is in the middle of the Mediterranean Sea!

Sicily, the center of the Mediterranean basin: market context

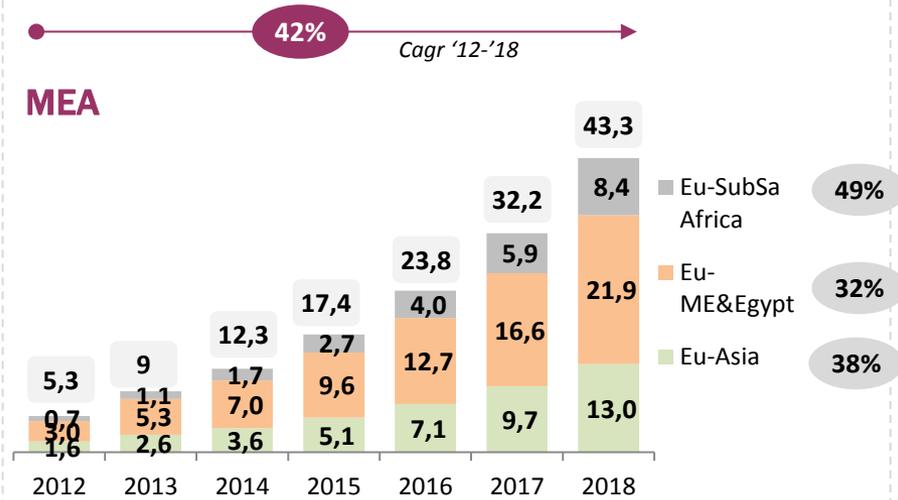


MEA traffic is growing with a rate higher than in other regions

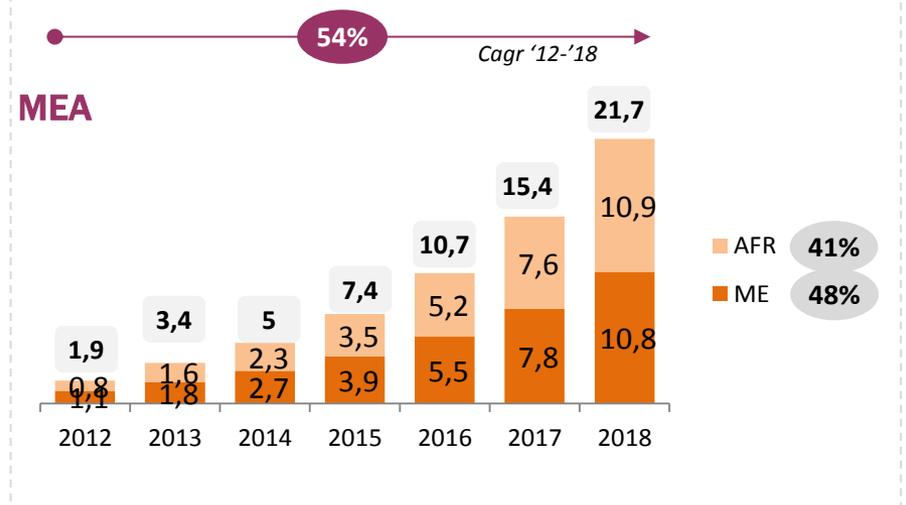
- **Middle East** is mainly hubbing into Frankfurt and Amsterdam through Sicily and France, with Turkey slowly rising its importance as a gateway to central Asia.
- **Africa**, landing in Europe is shared among 3 main doors: London, Marseille and Sicily. We can expect a balanced share between the three in 5 years.

Source: TIS estimates on Telegeography Data

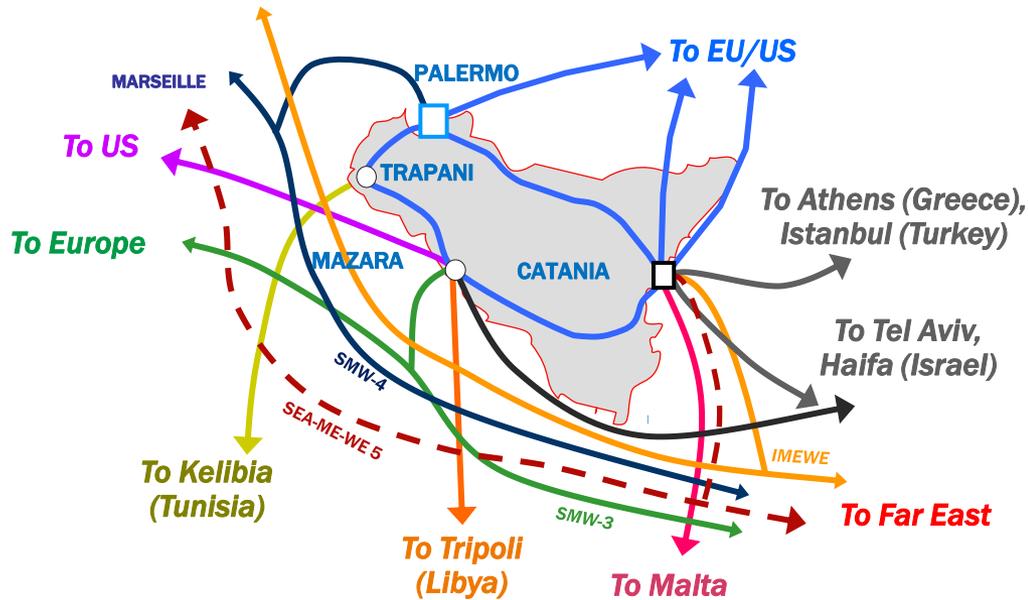
Managed Bandwidth Volume by MEA relevant routes - Tbps



IP Market Volume (Transit+Peering) - Tbps



Sicily: the Natural Cross Road of Cable Systems



A very rich ecosystem of submarine cables and landing stations, with a lack so far of an aggregation and integration force...

18+1 submarine cables land in Sicily

10+1 operated by TISparkle

PALERMO

Flag
SMW-4

CATANIA

IMEWE
MED
Italy-Malta
VMSCS (Vodafone Malta)
SMW-5 (2016)

MAZARA

Columbus III
Italy-Libya
LEV
SMW-3
Didon
GO-1
Hannibal
MENA
GBICS

TRAPANI

Italy-Tunis

POZZALLO

Melita1

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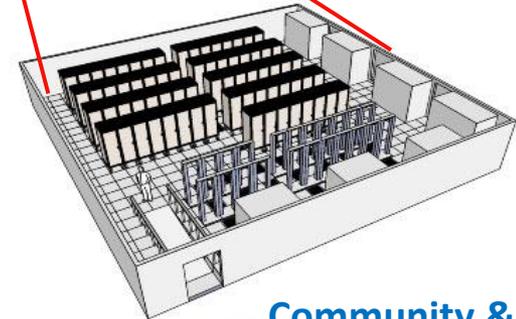
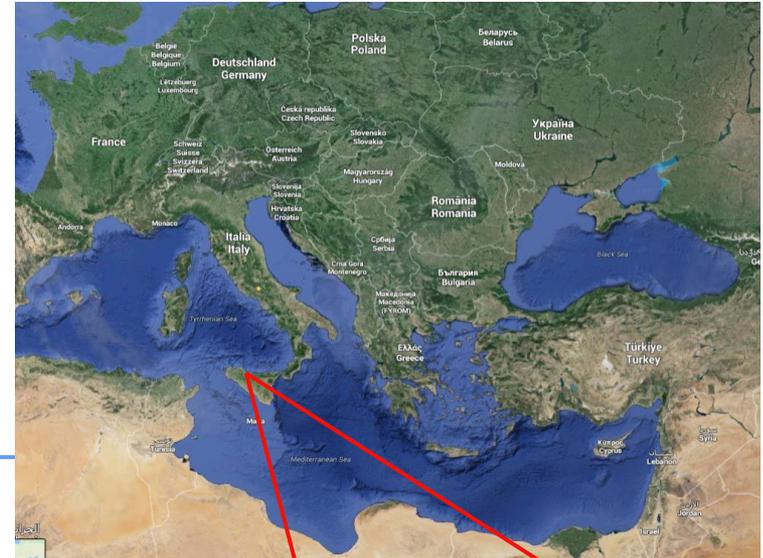
Sicily HUB: the IP gravitational force in the Med basin

From Cable Landing Stations to Multi-Tenant DCs and IXs ecosystem

*Pioneering cooperation
between the Carrier
world and the neutral
IX world*

Sicily HUB features

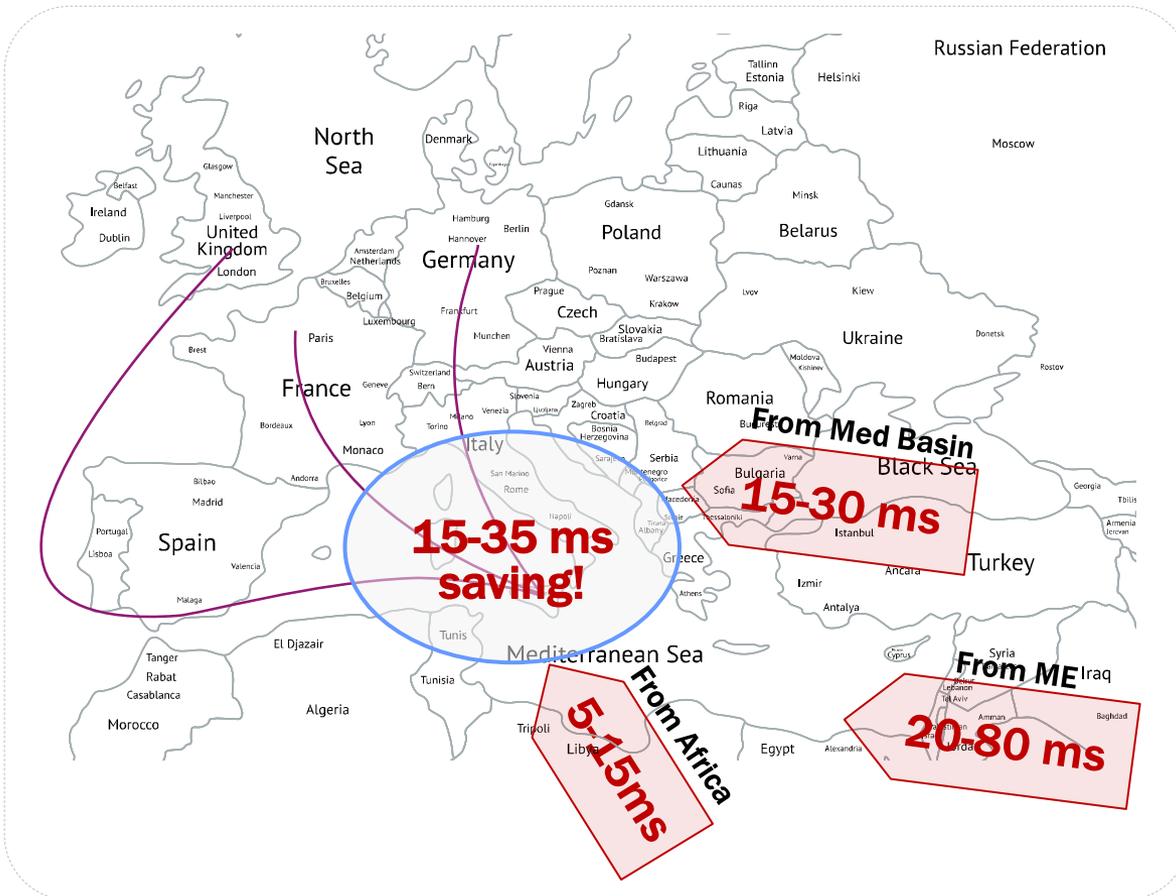
- **Open** colocation facility (tier 3+ DC)
- **Connected** with all key landing stations in Sicily
- **Private** interconnection or **public peering** through:
 - **DE-CIX**, the world largest neutral IX and
 - IXConnect by **NaMeX-Rome** & **Topix**, key Italian neutral IXs
- **Content**, the most important players (es. Google, Limelight), have chosen Sicily HUB to interconnect with **ISPs** with improved performance
- **Flexibility**, to manage submarine and terrestrial capacity efficiently
- **Marketplace**, to purchase/sell any telecommunication and cloud solution in a competitive environment



**Community &
Proximity**

Proximity, a key driver for an HUB development

Latency to Sicily is less than half compared to the other European HUBs

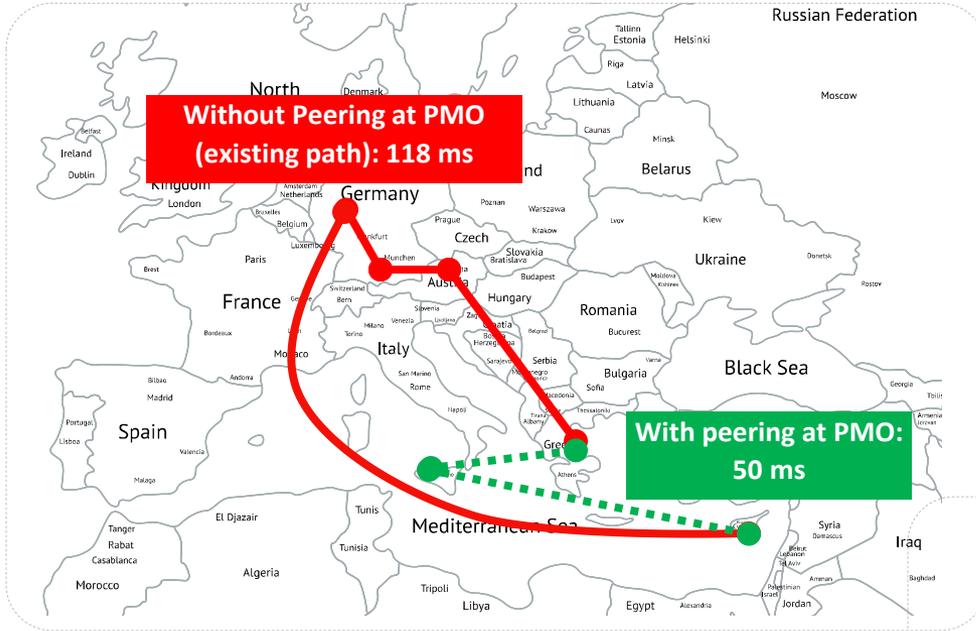


- Sicily HUB latency is:**
- 5-15 ms only from North Africa
 - 15-30 ms far from Mediterranean Basin countries
 - 20-80 ms from ME

Saving 15-35 ms compared to other European HUBs like London, Amsterdam, Paris, Frankfurt

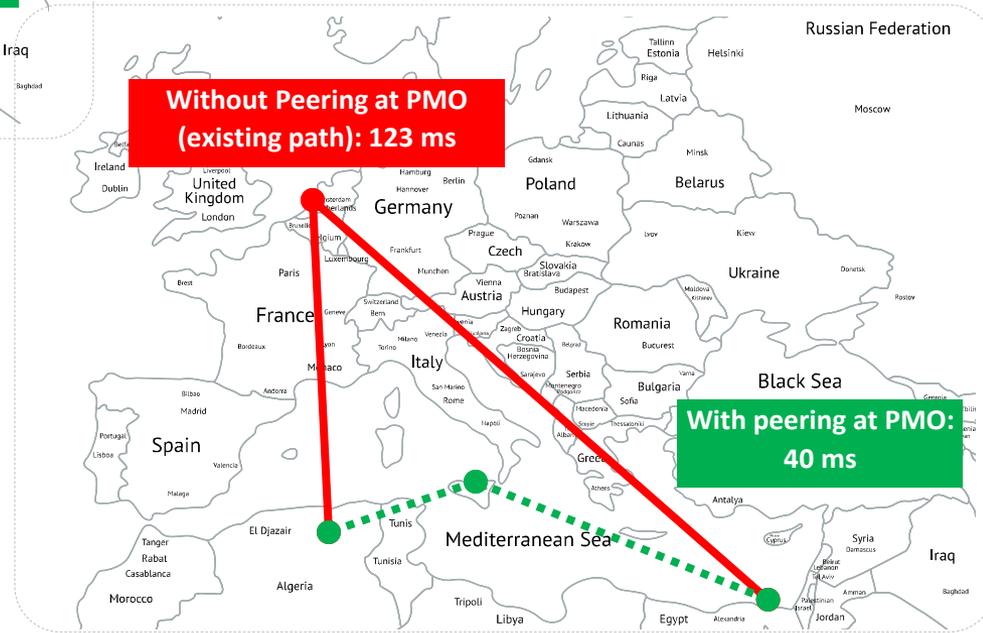
Sicily HUB dramatically reduces latency to content and peers supporting the consumption of applications sensitive to delay

Proximity of Sicily - examples



Athens to Cyprus:
Saving: 68 ms

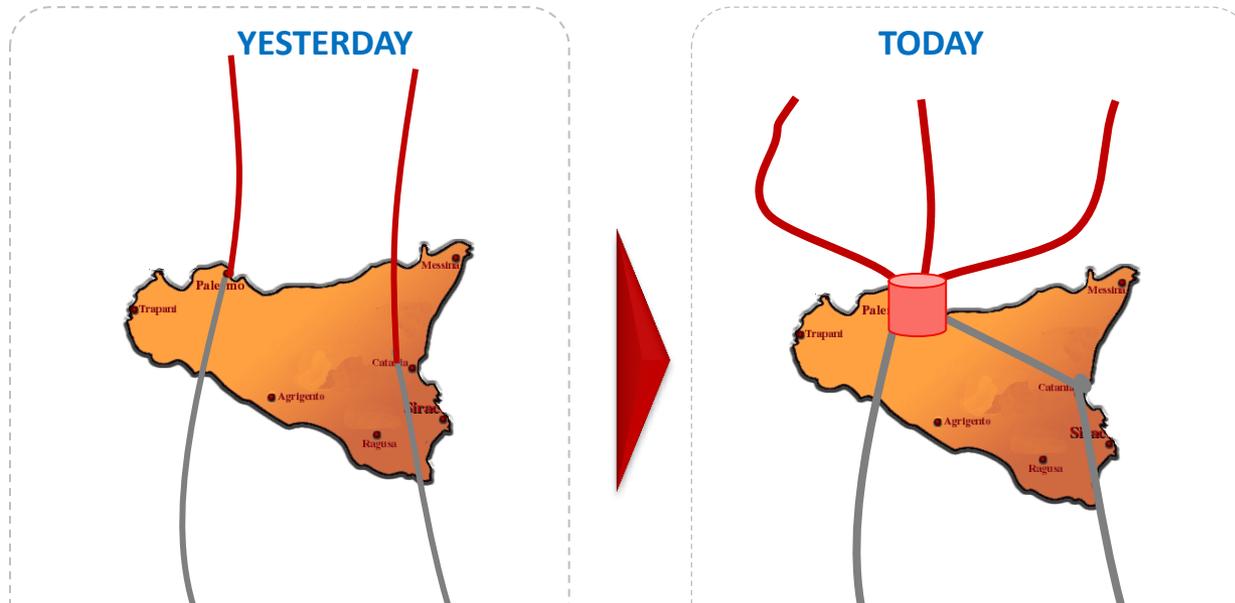
Algeria to Cairo:
Saving: 83 ms



PMO: Palermo
Source: Dyn/Renesys; TIS values

Network architecture: from gateway to smart node

Carriers using submarine cables to Europe can now improve capacity usage and cost efficiency



- Carriers using submarine cables to Europe can now improve **capacity usage and cost efficiency**
- **Grooming** of:
 - submarine capacity
 - terrestrial backhails
- Implement **self-protection** network plan to **promptly react** at submarine cable faults

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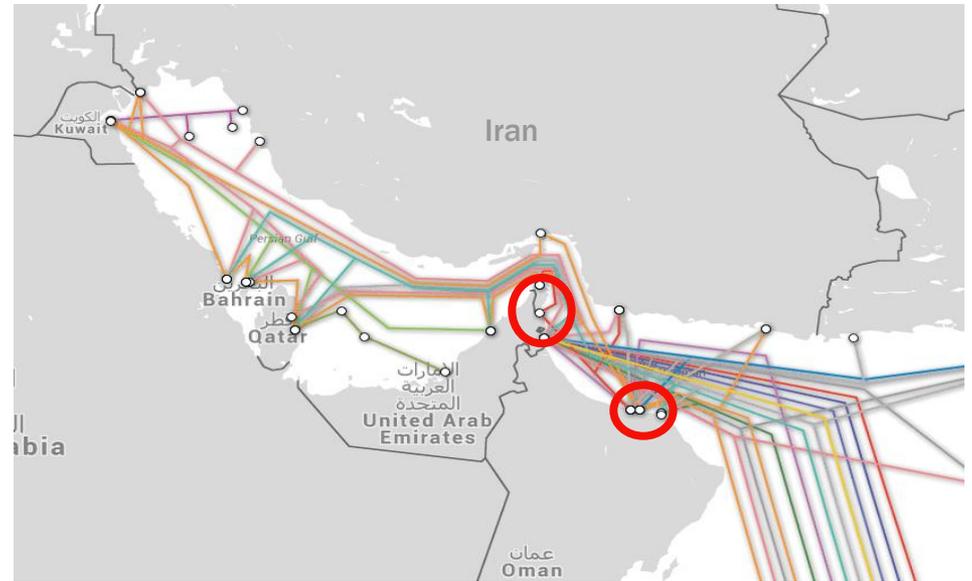
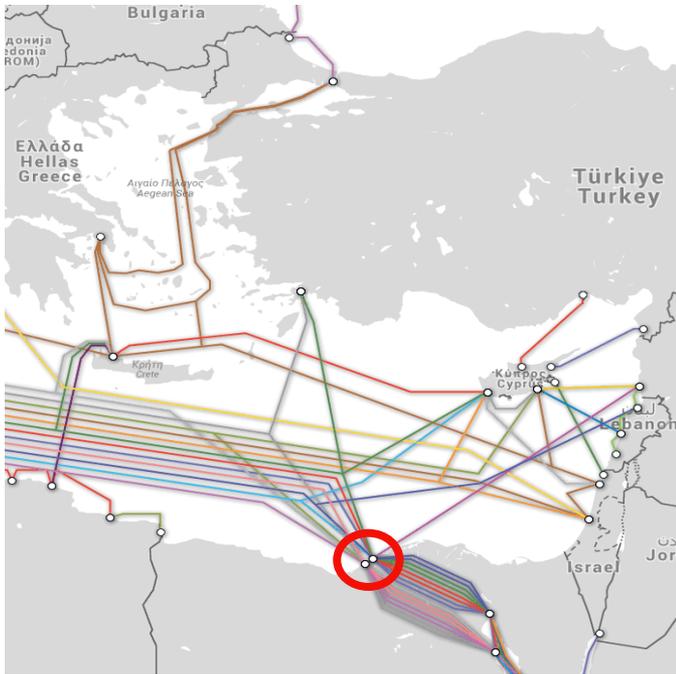
Lesson learnt: the key factors for a successful HUB

Proximity	High volumes of traffic, mainly due to multimedia, and need of low latency and jitter of real time applications request to HUB content in locations geographically very close to the end users (eyeballs)
Accessibility	The HUB has to be connected with the highest number of neighboring countries being the crossroad of local, regional and Int'l infrastructures to attract many Providers and allow an efficient usage of the infrastructure. Logistics also matters.
Affordable Interconnection	The interconnections (backhaul to submarine or terrestrial cables) have to be reasonably priced and not constitute a barrier to the access
Ecosystem	The HUB should reach the right balance between content and eyeball networks to keep it self sustainable. End users attract content and content attract end users. Neutral IXs are key accelerators and facilitators
Open Marketplace	The HUB has to offer a complete portfolio of telecommunication services provided by different players to grant competition

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Focus on Gulf Countries: cable grooming spots



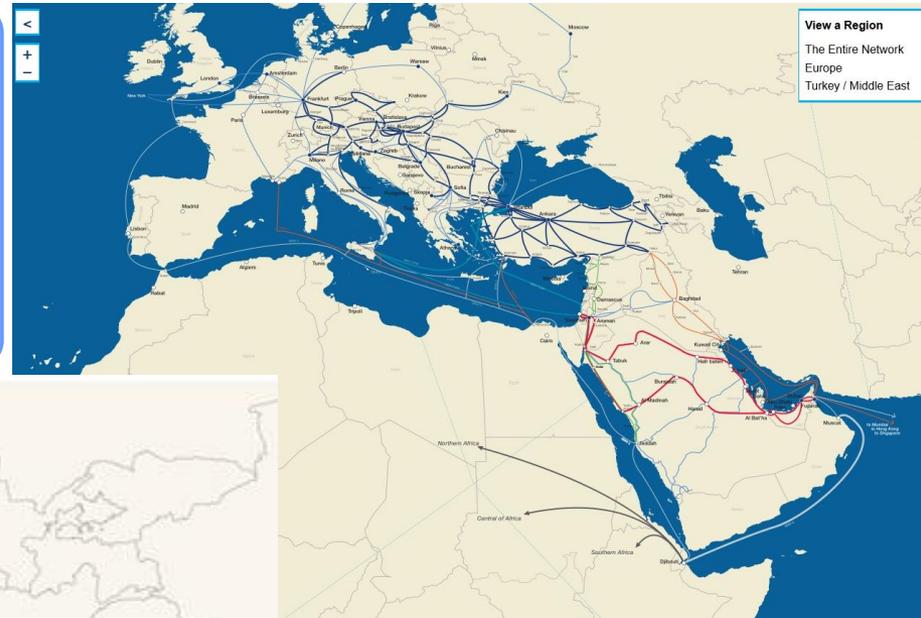
- **Very rich ecosystem of submarine cables**
 - **Regional**
 - **Long distance/intercontinental**
- **but..... high barriers (\$\$\$) for landing and interconnection**

Source: Telegeography

Focus on Gulf Countries: cross border infrastructure

Several cross border infrastructure under development:

- **AMEER** (Turkey-Palestine-S.A.-U.A.E.)
- **JADI** (S.A.-Jordan)
- **RCN** (Jordan-S.A.-U.A.E.)
- **EPEG** (Germany, Russia, Azerbaijan, Iran, Oman)



Source: Telegeography

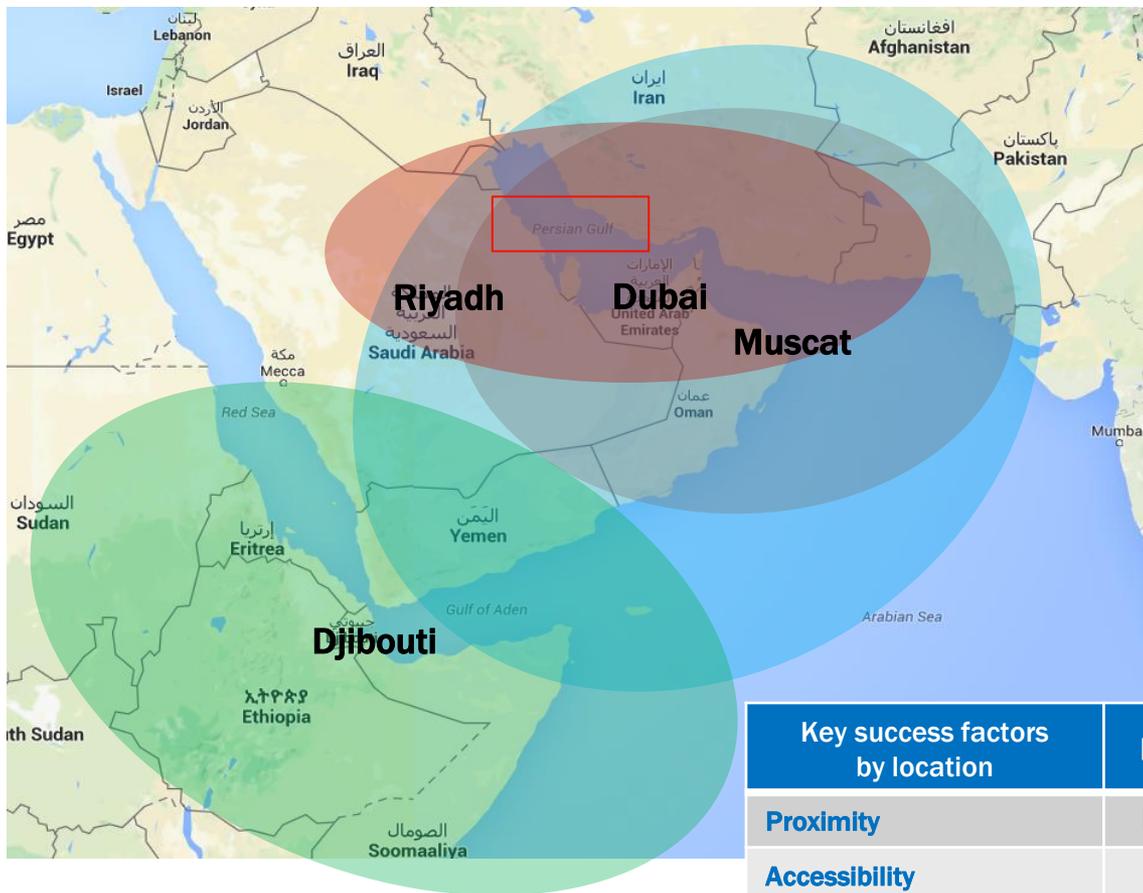
- **GBI-North** (Iraq-Turkey-Europe)
- **MEETS** (Gulf Countries)

Focus on Gulf Countries: growing and nascent HUBs

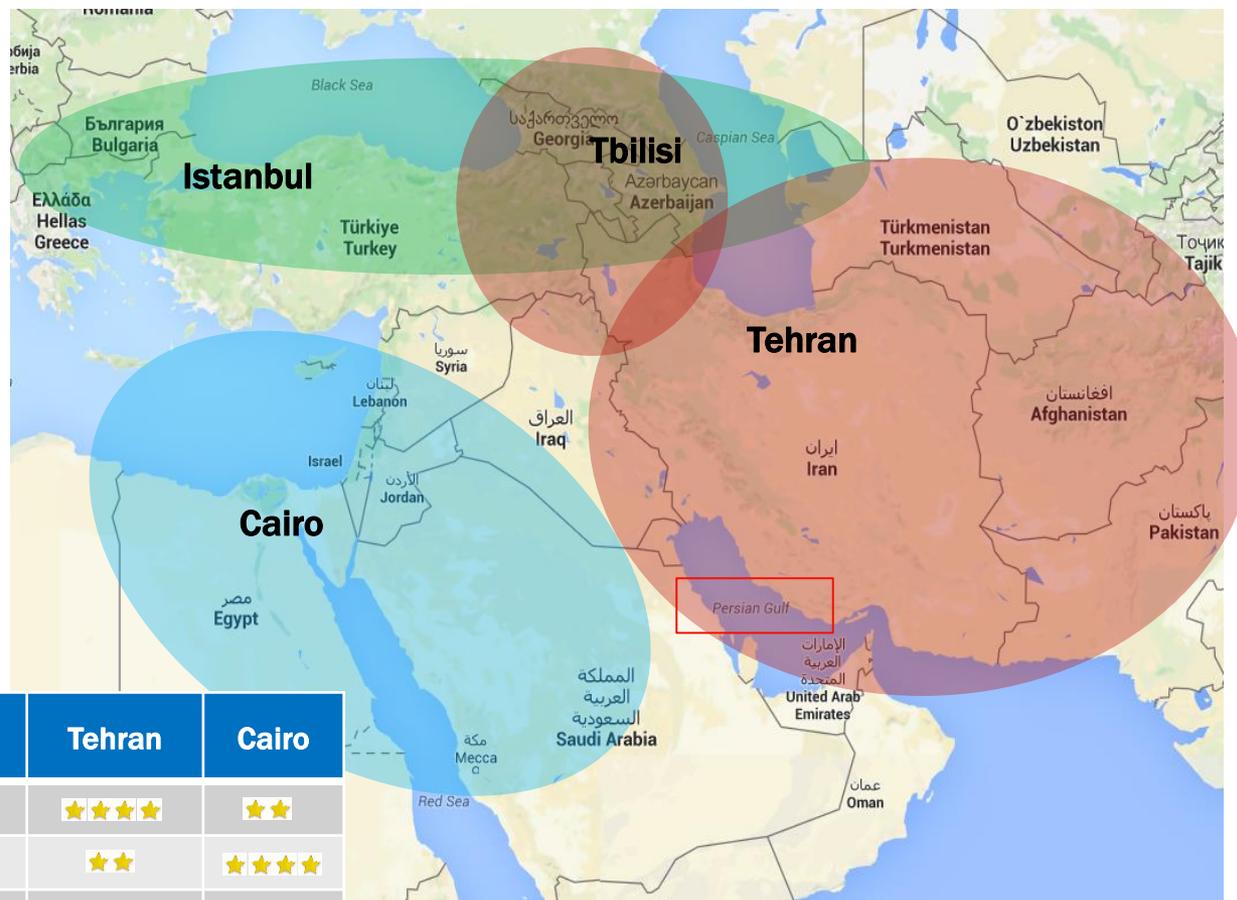


Let's try to rank their key success factors:

- Proximity, to the Gulf countries
- Accessibility
- Interconnection
- Ecosystem
- Open Marketplace



Key success factors by location	Muscat	Djibouti	Dubai	Riyadh
Proximity	★★★★★	★★★★	★★★★★	★★★★★
Accessibility	★★★★	★★★★	★★★★★	★★★★
Ecosystem	★★	★	★★★	★
Marketplace	★★	★	★★	★
Interconnection	★★★★	★★★★	★★	★
DC/Telehouse (Peering DB)	Omantel	Djibouti data Center	- DataMena - SmartHub - UAE-IX	/



Key success factors by location	Istanbul	Tbilisi	Tehran	Cairo
Proximity	★★	★★★★	★★★★★	★★
Accessibility	★★★★	★★	★★	★★★★★
Ecosystem	★★	★	★	★
Marketplace	★★★★★	★	★	★
Interconnection	★★★★★	★★★★	★★	★★★★
DC/Telehouse (peering DB)	Teknotel Verizon CityNet Ciklet TIS/MEDNau		I.P.M. HomaTelecom Afrooz Chabahar LS	CAIX

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Conclusions

A HUB is a networks interconnection facilitator

Content Providers

IXPs

ISPs

Getting closer to ISPs eyeball networks

Facilitating ISPs to access contents and vice versa

- Peering and traffic exchange
- Diversification and Protection
- Selling and purchasing services



We saw how Sicily is becoming a new key IP gravitational HUB in the Med basin.
Which are the key growing HUBs in the Gulf geography?

We believe several HUBs will progressively develop, but currently Dubai and Muscat, followed by Istanbul, are leading the race!



Thank you!

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