REALITY AND PERSPECTIVES OF INTERNET EXCHANGE POINTS IN THE ARAB REGION

"TOWARDS UNLOCKING REGIONAL INTERCONNECTION OPPORTUNITIES" CHRISTINE ARIDA | ITU EXPERT | MENOG 2019 BEIRUT

PURPOSE AND APPROACH

- Build on previous regional work
- Analyze data collected from the region
 - Survey conducted with stakeholders from the region
 - Regional traffic statistic reports from various sources
- Assess the peering ecosystem in the Arab region
- Elaborate a vision and roadmap
- Agree on the way forward
- Collaborate and plug with other regional activities to implement

Grow and develop the IXP ecosystem in the Arab region Boost regional connectivity and peering on a pan-Arab level

KEY FACTORS FOR IXP GROWTH

- IXPs follow growth patterns of the overall Internet ecosystem
- Regions with strong digital economy have more carriers – service providers – data centers …
 - \rightarrow Higher IXP density

Macro-economic factors	Level of infrastructure development
Supportive	Community
national	engagement and
regulations and	stakeholder
policies	support

DENSITY DISTRIBUTION WORLDWIDE

! IXPs are a critical enabler for the development of the Internet ecosystem



Source: Packet Clearing House, Internet exchange point directory reports – Sep'18

WHY GROW PEERING

Keep local traffic local? ... not only ...

- IXPs enhance the domestic Internet economy:
 - Affordability: more bandwidth at lower prices
 - Service quality / user experience: lower latency for local traffic
 - Economy of scale for local content industry: reach to broader customer base

ISP

ISP

ISP

IXP

International Carrier

International Carrier

- Competitive wholesale transit: wider options of carriers
- Reliability / resilience: quick rerouting scenarios in case of international cable disruptions
- IXPs are natural host for Internet key services: ccTLD DNS server, root server mirrors, traffic measurement tools ...

GROW INTO REGIONAL HUBS

Some IXPs have the opportunity ...

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If supported by a liberalized enabling environment and have access to competitively priced international cables

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Are able to grow a strong user base by adopting well-defined policies and developing a wellestablished facility

IS THERE A NEED ... ?

Internet traffic continues to grow in the Arab region

- Individuals using the Internet represent 43.7% (Source: ITU "ICT Facts and Figures 2017" Report)
- IP traffic is growing fastest in MEA with a 42% CAGR (Source: CISCO Visual Networking Index 2016-2021)
- Fixed BB subscribers >29.5 million and 269 million Mobile BB subscribers in MENA (Source: IDATE September 2017)

Opportunities for the region

- Geographical proximity of Arab countries
- Commonality of language and culture
- Similarity of online content needs and usage trends

Traffic between Arab countries continues to bounce through various paths across the world

Need becomes more tangible as demand grows for

- Bandwidth greedy content
- Time sensitive services

SUBMARINE CABLE MAP

EMEA region one of the most consistent growth regions of the world due to its size and important crossroads of Mediterranean Sea and Suez Canal. (Source: Submarine Telecoms Forum Industry Report October 2016)

Algeria 0 0 Kenya Grototole Map data @2017 Google, ORION-ME, SK telecom, ZENRIN Terms of Use

Source: TeleGeography

INTER-REGIONAL INTERNET BANDWIDTH

- Global Internet bandwidth in 2017
 295 Tbps out of which 66.5 remains intra-regional
- Africa and Middle East had highest growth rates for international Internet capacities between 2013 and 2017 - Compound annual rate for Africa 46% and for ME 43%

(Source: TeleGeography 2017)



CABLE INFRASTRUCTURE AND REGIONAL CONNECTIVITY

- Region enjoys good international connectivity through well developed submarine infrastructure
- Continued Internet traffic growth
- Geographic location and characteristics (no land-locked countries on the path between Asia and Europe)

On a sub-regional level cable infrastructure is less developed

- Inter-regional connectivity and inter-linking of sub-regions not well served by submarine cable
- Internet traffic exchanged mainly through Europe over submarine cables as terrestrial infrastructure predominantly used for voice
- Operators from the region constantly growing connectivity to Europe and increasing interconnection capacities at major European exchange points
- ISPs within the region deploy caches to improve efficiency and lower cost
- Localization of traffic in the region (through cache like solutions) raises outbound traffic → indicating increased appetite for usage and high potential for growth

IP TRAFFIC FLOW IN THE ARAB REGION

Country-to-country peering relationship far less developed in the Arab region

Poor interconnection between Arab countries



INTERCONNECTION AND TRAFFIC FLOW IN THE REGION

- A vicious circle that needs to be broken
 - Highly priced local interconnection at landing stations → Operators collocated within same facility do not have meaningful interconnections
 - Scarcity of local content and locally hosted content → lack of need for interconnection among operators in the region
- Commercial decision of ISPs/TELCOs to expand infrastructure regionally and use it as direct route paths:
 - Not enough business incentive to peer at neighbouring countries
 - Traffic exchanged not worth investment in capacities and interconnection (highly priced in comparison to Europe)
- Global and regional content players need incentives to expand networks into the region
- Local content and regional infrastructure need to reinforce each other
- Concrete measures needed to effectively eliminate regulatory hurdles and regional interconnection barriers

REGIONAL LANDSCAPE AS PER GLOBAL IXP DIRECTORIES ...

Region	Members Avg.		
Africa	22		
Asia-Pacific	50		
Europe	69		
Latin America	39		
North America	40		
Arab Region	13		



Source: Packet Clearing House

A LOOK AT ANOTHER REGION

✓ Africa - Q4 2017: 21 IXPs established in the last 10 years (Source: AU AXIS project)

An example from Africa:

- Study performed by ISOC within the African Union AXIS project
- Quantifying the impact of growing IXPs on ISPs
- Explore different ratios of peering vs. transit traffic percentage
- Measure respective monthly saving for ISP



POLITICAL COMMITMENT TO BRIDGE THE GAP

- Support among Arab leaders to interconnect Arab Internet networks (2011 Sharm El Sheikh declaration of the Arab Economic, Development and Social Summit)
- Expert groups formed the Council of Arab Ministers of Communications and Information Technology
- Studies and reports conducted in cooperation with the ITU Arab Regional Office (2011-2016)
- Need expressed to establish a peering forum for the region
- Importance of cooperation among policy makers and operators stressed

SURVEY OF IXPS IN THE ARAB REGION

13 responses from 9 Arab countries (spanning IXPs – ISPs & Operators – Policy Makers & Regulators)

Peering membershi	g and p policies	Role of g	overnment	Peering win and dor	th incumbent ninant ISP	Membership composition
Neutrality of	the facility	Infrastru services transit co	ucture and (including onnections)	Fees and s	sustainability	Structure and operational model
Future expansion plans Future op content		requirement gulatory ns of cross- erators and providers	Traffic exchanged and impact on local Internet services			

RESPONSE ANALYSIS AND FINDINGS

- Traffic exchanged during peak differs significantly (from 1 to >80 Gbps)
- Membership size varies greatly (from only a few to >50)
- Both traffic and membership size not proportional to respective Internet market
- Many IXPs are carrier/ISP collocated – noting that location neutrality is key to membership growth

 Avg. age across respondent IXPs 7.2 years



- Mandatory multilateral peering policy is prevailing (for 56% of respondents) – Possibly discouraging for large ISPs and an obstacle for IXP growth
- No transit services provided at almost all (with one exception)
- Membership policies seemingly progressive (some still restricting to local ISPs) – Yet members composition most generally covering ISPs only (with few exceptions)

RESPONSE ANALYSIS AND FINDINGS

- Governments play a prevailing role mainly in IXP setup (also in operation & management) – with few exceptions
- Incumbents rarely peer if government or incumbent are not involved in IXP operation & management
- Mostly either license is needed to operate IXP or regulatory restrictions are imposed on peering members

 with very few exceptions

 Cross-border interconnection almost non-existent – with very few exceptions



- Mix of different institutional/governance models: independent nonprofit, commercial or government-run entity
- Almost all respondents indicated IXP has positive impact on local Internet services (reducing latency and keeping local traffic local)
- Future plans to extend to new cities/regions and grow into regional hub indicated by most

THE GAP

- A considerable number of Arab countries with no active IXP only a dozen in the region many dormant
- Cross-border interconnection between local networks rare
- Regional gap between Arab countries in terms of IXP development
- Quality and price of Internet services affected by lack of adequate IXP infrastructure (Only 5% of popular web content hosted within the region and 85% of the region's local traffic routed through Europe)
- Peering landscape in the region not adequately measured / analyzed

• No inclusive platform for sharing experiences – no IXP association – only sub-regional initiatives

THE GAP

- Local hosting and local content industry underdeveloped little interest in regional peering ISPs reverting to cashing to save on expensive international transit
- IP transit prices higher than the global market (driven by highly priced local infrastructure) price erosion trends slower than elsewhere
- Many incumbents consider peering a threat to transit business
- Legal environment governing the digital economy in the region still to mature causing slower move by international content players towards the region
- Cross-border policies and regulations require regional harmonization
- Political will still to be translated into concrete actions to eliminate barriers and create an enabling environment

CHALLENGES OF THE REGULATORY ENVIRONMENT

 International connectivity and cross-border interconnection key drivers for regional peering

Access policies to submarine cable infrastructure not conducive

• Limited competition in terrestrial crossborder fiber provision

• Exclusive rights to incumbents or regulatory barriers to entry

Licensing for international connectivity combined with fixed/mobile licenses

• Coverage obligation / large investments inhibit focused business models

High interconnection costs at landing stations

- \rightarrow Limitations on effective use of regional infrastructure
- → High cross-border / international connectivity charges
- →Limitations on cross-border network expansions and regional/international growth of IXPs

CHALLENGES OF THE REGULATORY ENVIRONMENT

Lack of regional harmonization of the regulatory landscape

- Serving the region from a single PoP complicated
- Less incentives for International carriers to invest in regional PoPs

→ More difficult to develop hub cities for regional traffic exchange

Licensing obligations required for peering at IXP

• Content heavy networks remain absent

→ IXP critical growth factors (membership/traffic) limited

A REGIONAL ROADMAP IS NEEDED

Regional harmonization for an enabling environment

> Review costs of cross-connect and associated regulatory fees border interconnection between neighbouring Arab countries

Increase competition for terrestrial crossborder connectivity Harmonize legal, policy & regulatory frameworks between Arab countries

Lift regulatory restrictions for IXP operation and peering

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A REGIONAL ROADMAP IS NEEDED

Developing a vibrant content industry

> **Review legal** frameworks are digitally relevant and conducive to Ensure dataonline content rich and industry contentdevelopment platforms are entitled to peer

heavy

Ensure policies do not hinder flow of Internet traffic between Arab countries

Study and address security & data protection concerns leading to data localization

Support interconnection of Arab NRENs, regional ecommerce and pan-Arab Internet trade

A REGIONAL ROADMAP IS NEEDED

Community buildup and the creation of a knowledge platform



Establish measurement tools Expand partnerships to NOGs and IXPAs

IMPORTANT TO CONSIDER

Advancing a regional agenda is a joint responsibility & requires collaborative work among stakeholders

Roadmap should combine political will of governments with proper business case by operators to address gap

No silver-bullet or one-model-fits-all

IP peering cannot be grown through regulatory enforcement – rather regulatory incentives are needed

We need to learn lessons from other regions

IXP ecosystem is only one building block – holistic approach needed as gains can be limited by other bottlenecks across the value chain

Periodic review of regional peering and stock-taking of implemented policies needed

ALWAYS REMEMBER

Developing IXPs and regional peering is not an objective in itself ... It should serve the wider objective of developing the Internet economy to improve regional integration and economic development in the Arab region.

