

# **The impact of IXPs on lowering the costs of international bandwidth**

**Session on economic issues in modern telecommunication/ICT market**

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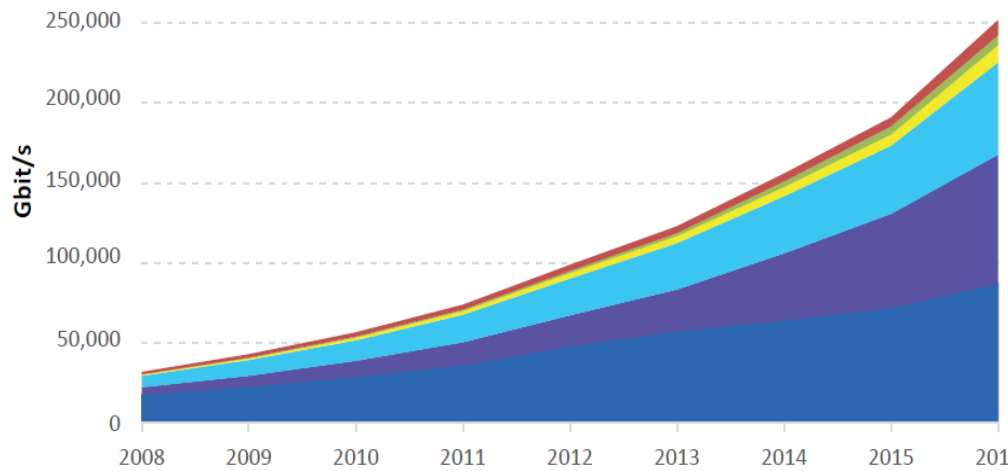
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- 1. Context**
- 2. Weaknesses**
- 3. Economic interest of IXP**
- 4. Conclusions**

# CONTEXT

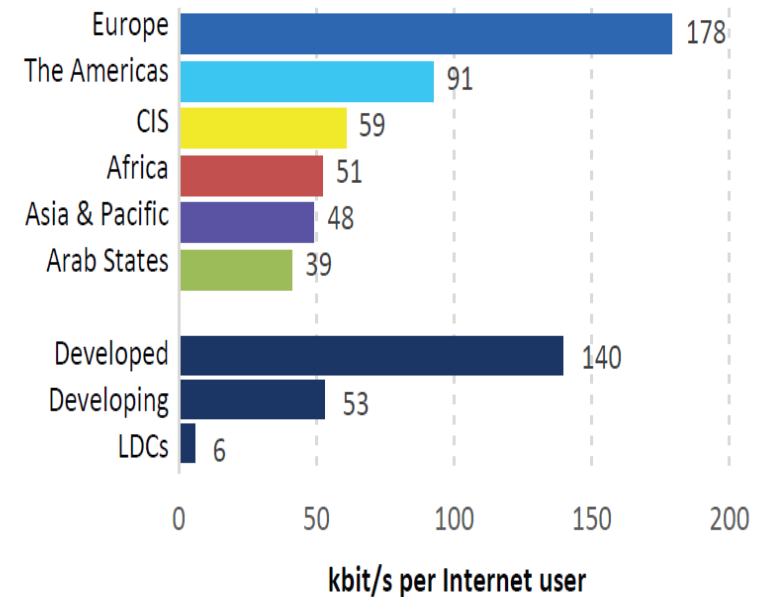
## International Internet bandwidth in Gbit/s, per region, 2008-2016



International Internet bandwidth grew worldwide by 32% between 2015 and 2016. Africa experienced an increase of 72% during this period, the highest of all regions.

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## International Internet bandwidth per Internet user in kbit/s, 2016

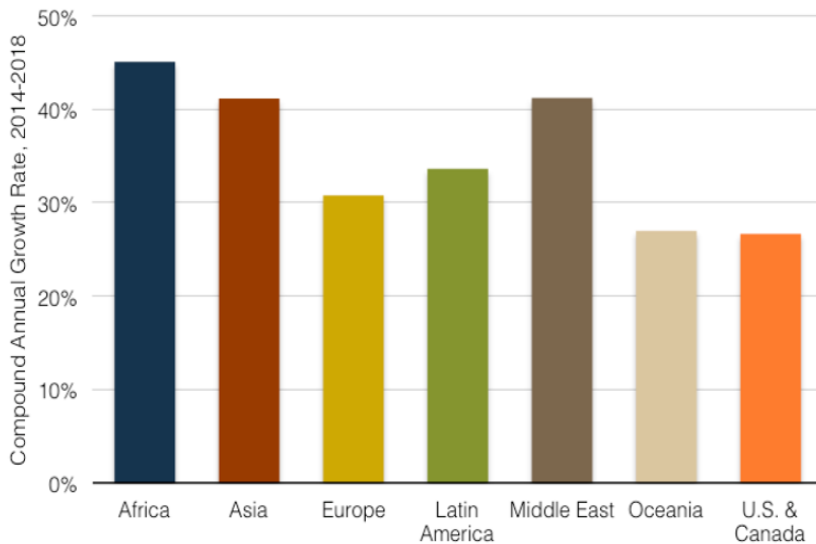


Source: ITU. Note: CIS refers to the Commonwealth of Independent States.



- Significant growth of uses Significant
- Growth in Internet bandwidth and internet flow
- Always high cost of Internet bandwidth
- IoT requirement to significantly reduce latency for better use of services offered
- OTT growth

International Internet Bandwidth Growth by Region, 2014-2018

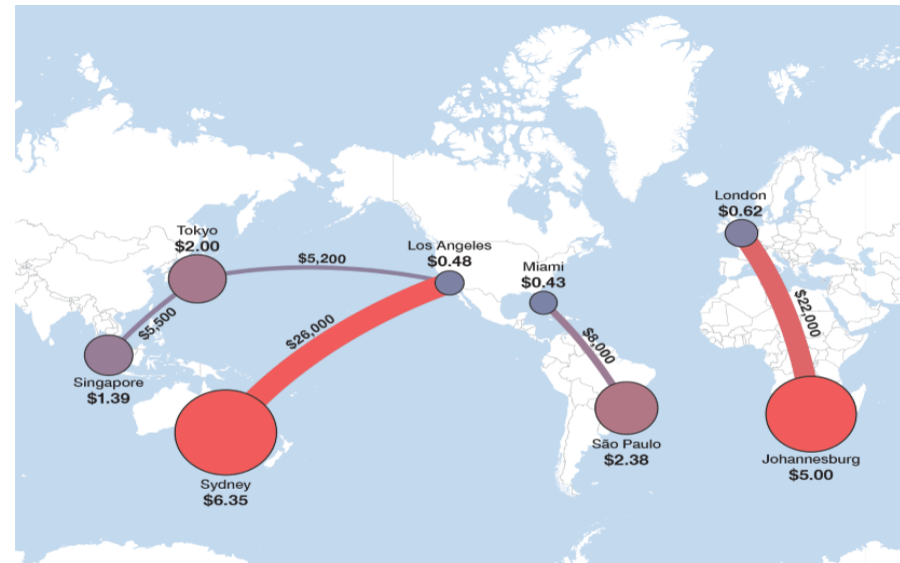


Notes: Data as of mid-year.

Source: TeleGeography

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Weighted Median 10 Gbps IP Transit & Wavelength Prices on Major International Routes, Q2 2018



Notes: Each line represents the weighted median monthly lease price for an unprotected 10 Gbps wavelenght on an individual route. Each circle represents the weighted median monthly price per Mbps for a 10 Gbps IP transit port in the listed city. Routes and cities are shaded corresponding to price, from least expensive in blue to most expensive in red. Prices are in USD and exclude local access and installation fees. 10 Gbps & 10 Gige = 10,000 Mbps.

Source: TeleGeography

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- International Internet capacity reaches 296 Tbps
- Content networks have grown faster than Internet backbones and account for slowing growth.
- Overall capacity and traffic growth rates are slowing as the global internet matures.
- Evolution of broadband subscribers and average subscriber bandwidth in Africa, 2014-2018

A full 10 GigE port in Johannesburg, the most competitive and connected city on the continent, was \$ 5 per Mbps, eight times the price of a comparable port in London. The largest cost of transport to Europe is the most important factor of high prices in Africa. The maturation of the hubs is still ongoing, the majority of traffic from Africa is not traded locally, but rather in Europe

**Despite all these advances, we note that access to broadband remains expensive in Africa**

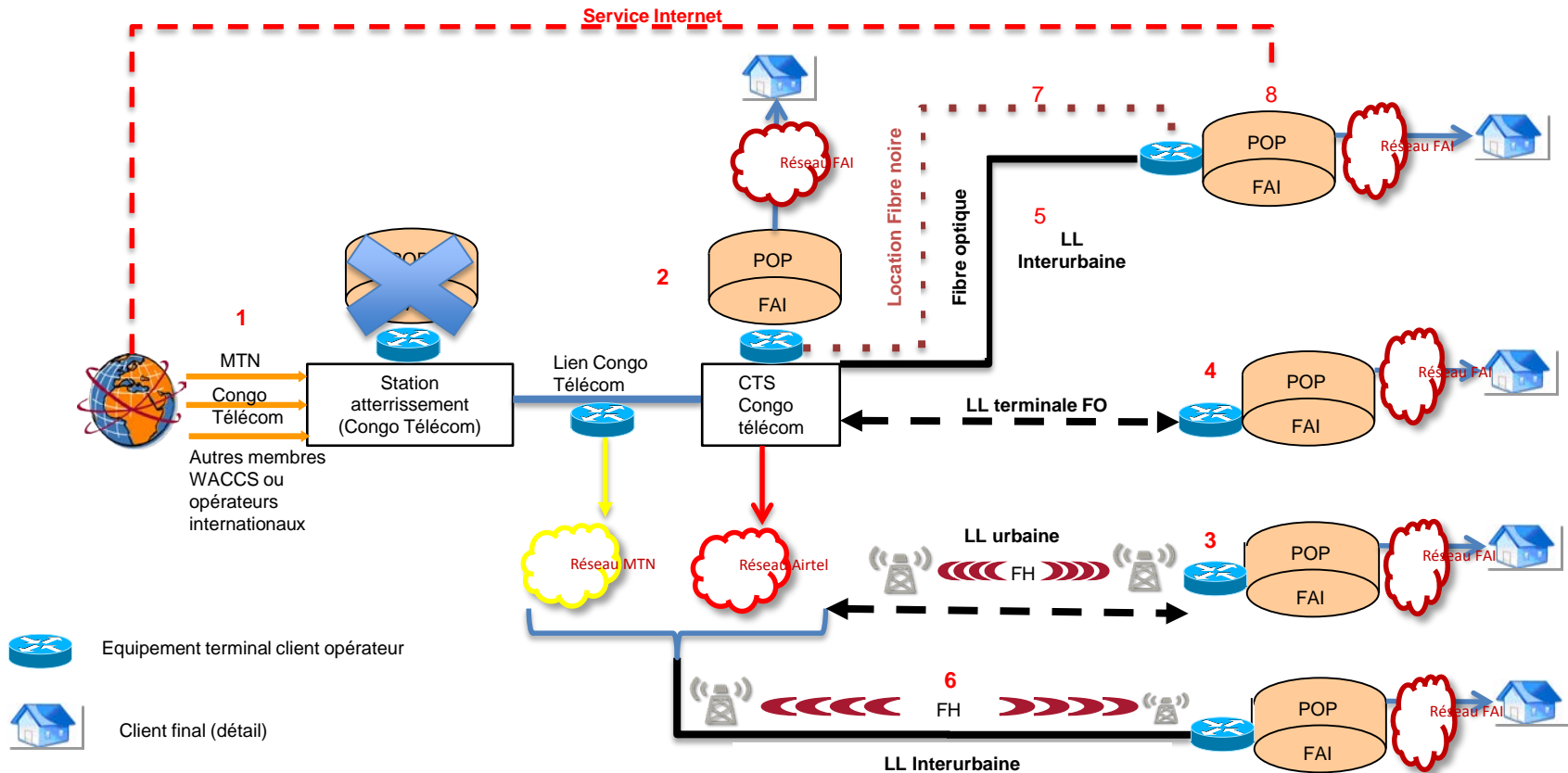
# WEAKNESSES



he cost segments:

- National capacity segment is often the monopoly of incumbent operator;
- Backhaul segment on fiber optics is almost non-existent because it is poorly adapted to the needs of ISPs in terms of granularity of offers;
- International bandwidth: the proposed "prohibitive" prices
- Access to the landing station is impossible;
- The colocation offer of the incumbent operator is empty of content;
- The rates charged for collocation at the CTS level are too high and discourage access
- The weight of taxation on the Data
- No access market to terrestrial infrastructures;
- The only wholesale market that really exists is the internet leased lines.

By broadband wholesale market, it is meant all wholesale markets that allow ISPs to replicate a broadband type retail offering using infrastructure or services provided by a third party operator.



Principle (case of Congo Brazzaville)

La modélisation du coût de la Bande passante internationale

On average governments have paid 25 million USD to have a capacity of 672 704 SMT1.km, capacity rental rates depend on the following parameters:

- Purchase price of the MIU \* km;
- Matrix of distances;
- Depreciation period ;
- Annual operating and maintenance costs (generally valued between 3% and 5% of the price of the MIU \* Km);
- Annual management and marketing fees

## Results

Without taxation, the cost of international bandwidth Mbs is around 96 USD / Mbs / month to Portugal.

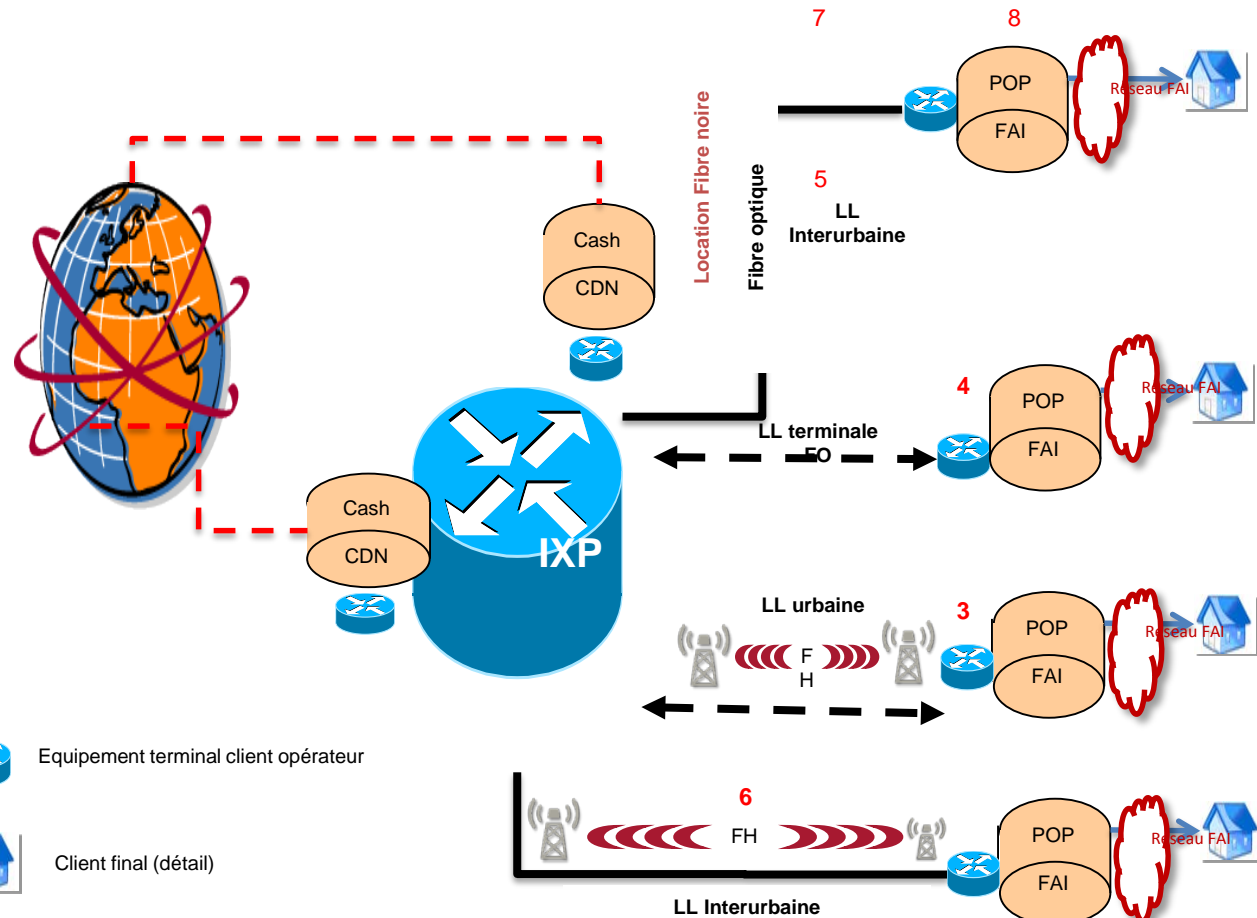
With taxation, the cost of Mbs of international bandwidth is around 284 USD / Mbs / month to Portugal.

# ECONOMIC INTEREST OF IXP

- For Internet providers and users, local routing of Internet traffic via a common exchange point has many advantages:
- it provides substantial savings by eliminating the need to move all traffic through expensive, longer distance links to the rest of the world.
- Local users have increased bandwidth due to lower costs of local capacity.
- Local links are often up to 10 times faster, because of the reduced waiting time for traffic, which makes fewer "jumps" to its destination.
- New local content and service providers come into play; using ultra-fast, low-cost connections, they have a wider user base than the IXP has made possible.
- Internet service providers have more options for sending upstream traffic over the Internet - it therefore contributes to a better functioning and more competitive mass transit market.
- The creation of an IXP also has indirect benefits, relating to the price of telecommunications capacity.

The need to bring users closer to services, leads to the implementation of cash server

The caches are often installed in the African Internet exchanges (IXs). This approach allows multiple ISPs to access content stored in the cache, but also to share the cost of international transit required.



**The rise in global traffic often offsets the decline in international traffic**

To take a simple example, assume that three networks **have a 10 Mbps connection** to the upstream Internet cloud; in a developing country this could cost them **about US \$ 30,000 per month x 12 months x 3 networks = US \$ 1,080,000 per year.**

Suppose that **only 20% of the traffic is local; this means that they spend about US \$ 216,000 to route local traffic via the upstream Internet link.** If the three networks can provide their own IXP connections for free, for example via a wireless circuit or by sharing facilities located in the same building, an IXP will be profitable within a few months. In practice, networks may need, to connect to the IXP, to lease connections to an authorized telecommunications provider; in this case, the cost of local bandwidth could reach **US \$ 1,000 per Mbps per month in a developing country.**

In terms of the annual cost of local links, the amount would be as follows: **20% x 30 Mbps x US \$ 1,000 per month x 12 months = US \$ 72,000 - an annual saving of almost US \$ 150,000** (one portion this amount will however have to be applied to the operation of the IXP).

The monthly MTN Bundle of 10GB / month at 26,500 FCFA represents a volume of 10GB of data with a guaranteed rate per service but limited in time because you can finish your 10GB in less than 10 min (ex: download a movie of 4K quality of a size 7GB).

**Traffic total (in et Out ) traded on the CGIX= 7 To (7.000 Go)**

At the level of operator bundles we will consider that of MTN because it is the cheapest and is the main engine of CGIX Bundle monthly = **10Go/mois à 26.500 FCFA**

**Bundle monthly= 120Go (12\*10Go) pour 318.000FCFA (26.500\*12)**

**Saving Cost =**

**120Go-----→ 318.000 FCFA**

**7.000 Go-----→ ?????**

**Saving Cost annuel = (7000\*318.000)/120= 18.550.000 FCFA**



# CONCLUSIONS

International Internet bandwidth connected to African countries increased by 45% in 2018

Users and uses are increasing

International bandwidth prices remain a drag despite lower international capacity prices

The Exchange Point allows, in addition to an improvement of the quality, a minimum decrease of 20% of the Internet traffic to the various

By locating internal traffic and avoiding international links, local operators and users can realize significant savings, provide substantial local bandwidth, and significantly increase the local performance of the Internet.

**END**