
IXP economic aspect and benefits

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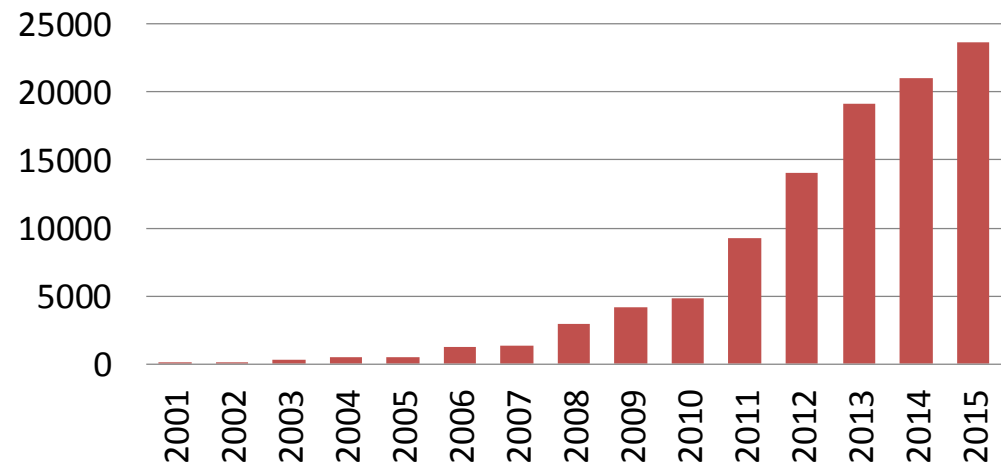
- Context
- Content Distribution and Hosting
- Interconnections Model
- Investment Cost : sonatel use case
- Internet Transit Cost
- Enablers for Internet Development in Africa
- Benefits and Value of an IXP
- What's next for Africa?

Context...

- ENTERPRISES AND CONSUMERS RAPIDLY ADOPTING IP-ENABLED APPLICATIONS : Driving demand for bandwidth and integrated services
- USERS EXPECTATIONS SOARING: Demanding differentiated services and exceptional service levels
- Strong Growth of the Internet Traffic

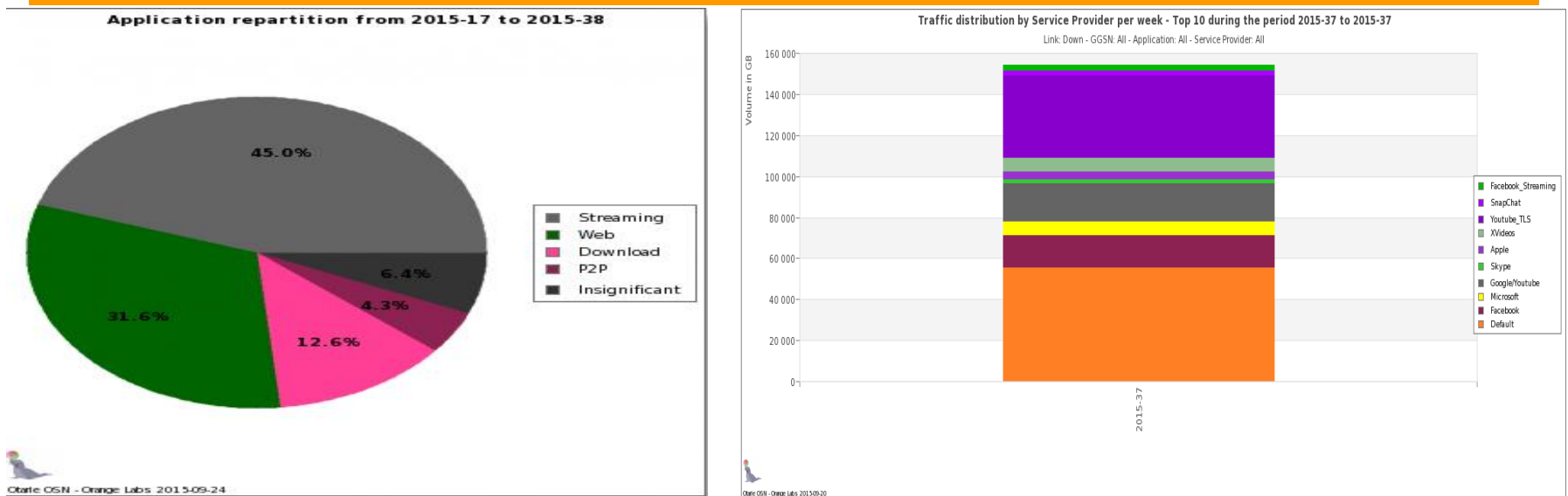
- 53 Mbps in 2002 to 23,12Gbps in 2015 : (CAGR of 60%)

Sonatel Internet Bandwidth Evolution



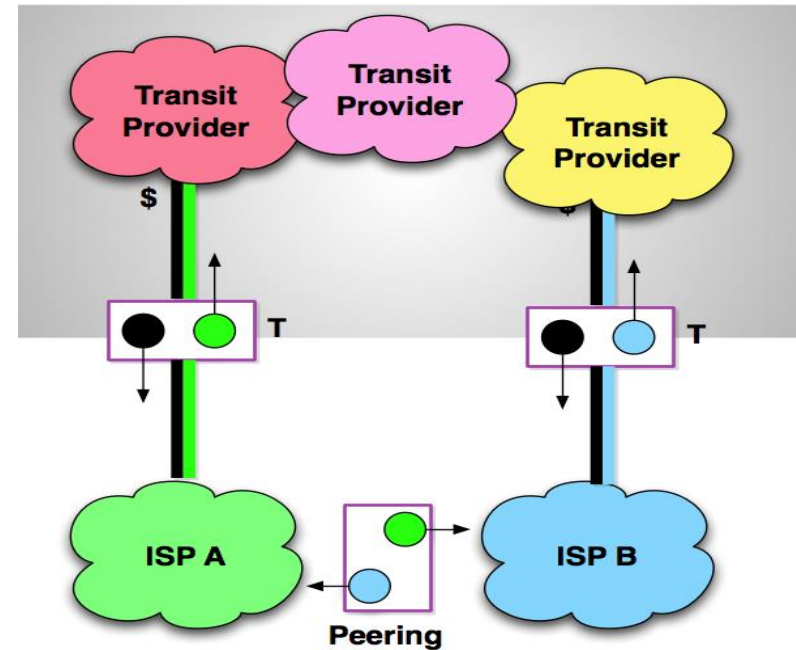
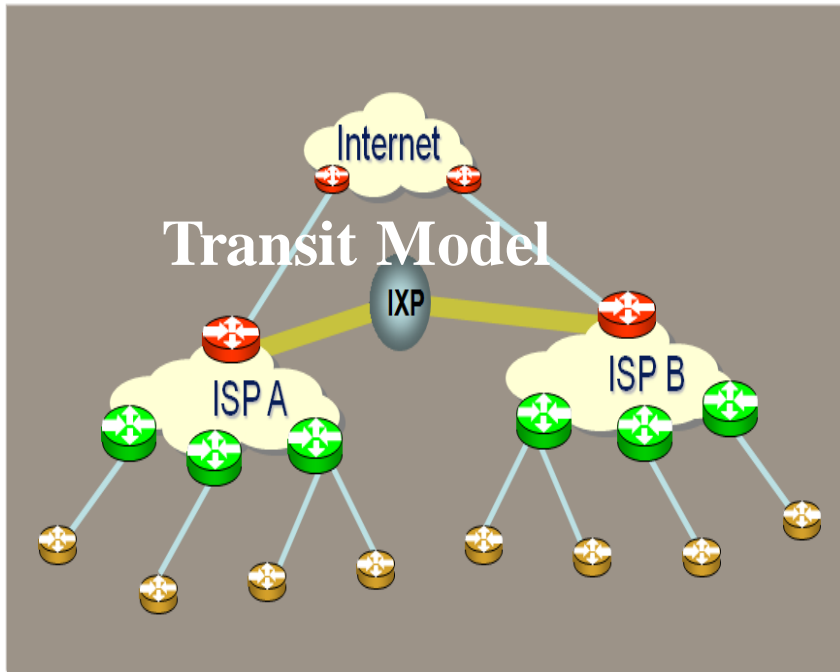
- Internet's contribution to GDP of 3.3% in Senegal (Mc Kinsey, november 2013)

Content distribution and hosting...



- 45% of Internet Traffic is video streaming
- The TOP 10 most popular websites are international global content (facebook, Google Youtube etc..)
- The most visited senegalese web portal are located in Europe or USA
- Local content (TV, Theater, movies, Music etc..) is mainly distributed from Youtube Platform

Interconnections Model



- For Internet Connection in Africa, we are still in Transit Mode. **We pay for Internet Connectivity**
- The following impacts are noted within the Internet Transit mode :
 - Internet cost for the last mile and the users
 - Content Distribution with a non Guaranteed Quality of Service (QoS) and Quality of Experience (QoE)
 - Internet penetration still low

Investment Cost : sonatel use case

Internet is a critical resource with very high impact on the national economy, and internet access should be available at anytime, anywhere, with any devices.

The following investments are already done :

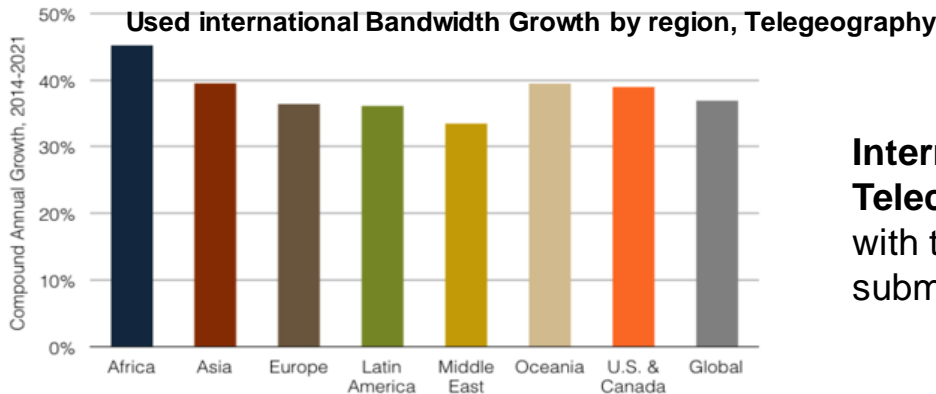
- Investment on the submarine cable ACE, SAT3, ATLANTIS2 for more capacity and network securization
- Two Internet peering nodes deployment with Internet Gateway Routers and Regional Gateway
- Acquisition of Internet links towards Orange France, Tatacommunication and Telefonica in transit mode with a Bandwidth of 23.12Gbps
- A WDM Transport, IP/MPLS, EPC (Evolved Packet Core), xDSL, FTTx and 3G networks as enabler for Internet development

Internet Transit Cost ...

Internet Transit cost remains a barrier for Internet Growth in Africa !

Telecom Operators pays less to a Transit Internet Provider to move traffic between network (but pays more for infrastructure!)

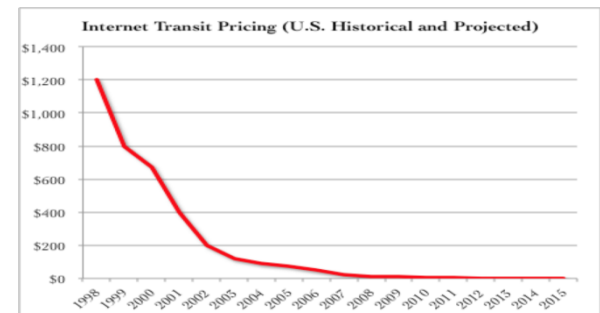
- **CAPEX \$\$\$\$** on submarine cable, Internet Gateways (Routers), Transmission nodes and the backhaul
- **OPEX \$\$\$\$** with maintenance costs, fixed monthly fees to pay to the Transit Providers



Internet Bandwidth forecasted by some Telecom Operators will reach 100Gbps in 2019, with the need of Capacity expansion on the submarine cable and the Internet value chain.

Internet transit cost has an impact on the price charged to the end users.

“Some studies show that the cost of access to broadband Internet in sub-Saharan Africa are 30 to 40 times higher than in the US” - Internet development and Internet governance in Africa, ISOC may 2015



Enablers for Internet development in Africa...

- Accelerate IXP (Internet Exchange Point) deployment with the involvement of all the Internet actors : Telecoms Operators, ISP (Internet Service Provider), Universities, Media Companies, Government etc...
- Building of Tier III & Tier IV Datacenters at national and regional level
- To setup IP/MPLS network cluster at regional level with the interconnection of the existing Telecom Operators IP/MPLS networks
- Content Delivery Network deployment in order to have the content as close as possible to the users
- Hosting of Internet Critical Infrastructure : L-root Servers, .com/.net root servers etc.

Benefits and Value of an IXP (1)

- Substantial Cost Savings with the local content in local, and the hosting of international global content thanks to the content delivery network
- Availability of more bandwidth for the users
- Improvement of the Quality of Experience with reduced latency in traffic, fewer hops to get destination
- A Robust local Internet Infrastructure with more reliability during Internet connections outage
- Datacenter creation with the improvement of hosting conditions, local applications development
- IXP encourage and promote the local content creation which will interest the rest of the world
- Opening an IXP to a non traditionnal members : Banking for online banking, IPTV and VoIP providers, National Research and Education Network (NRENs), Country Code Level Domain (CcTLD) registries, CDN Edge Caching

Benefits and Value of an IXP (2)

- **Agriculture** : access to market prices and weather informations thanks to the database located at the IXP (incomes will increase !)
- **E-learning** : development of virtual universities with the hosting of the servers at the IXP which enable better Quality of Service
- **Small and Medium Enterprise (SME)** : better access to customers and improvement of the customer relationship management
- **Financial Inclusion** : potential to extend financial services to the unbanked, to drive eCommerce—and to grow markets. online and mobile web to deliver a suite of payment solutions for the users

What's next for Africa?

- To push for tax reduction for mobile devices (smartphone, tablet,...), camera, personal computer etc.
- To promote Regional Internet Carrier & IXP
- To develop CDN platform and Datacenter deployment
- To accelerate local content creation
- To accelerate Broadband deployment (4G!)

Thank You!