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Internet connectivity in Senegal

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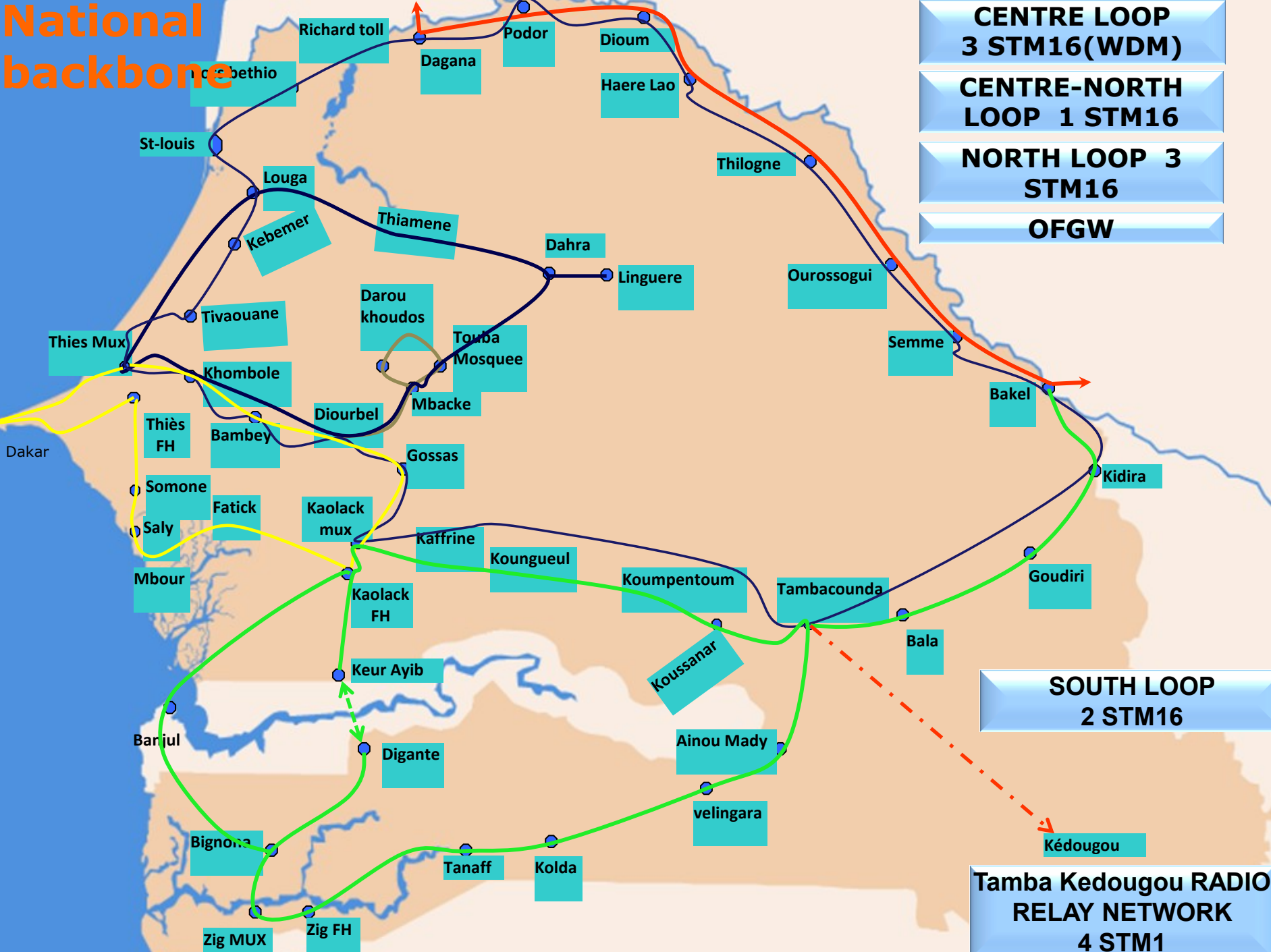
1. Introduction

- Since 1976, submarine cable systems have been used to connect Senegal to the global network and give it international connectivity.
- Overland fibre-optic systems were first deployed in 1993. This was reinforced by a national backbone renewed thanks to a policy of sustained investment that enabled the migration to land cables.
- Landlocked countries in the subregion naturally found an opportunity to connect and open themselves to the world via the Dakar platform.

2. National connectivity

- Fibre-optic terrestrial systems were first deployed in 1993.
 - over 3500 km of fibre-optic cables laid
 - 25 fibre-optic transmission loops covering the entire national territory, in particular the 14 main towns of Senegal.
- The systems continue to be deployed, with 10 GB systems to be installed on all links by 2015.

National backbone



3. Rural connectivity

- One of the objectives of the Senegalese Government's sector policy is to connect the country's 14,275 villages to the telephone network before 2010.
- Sonatel, Senegal's incumbent operator, undertook to connect the 14,275 villages by using wireless technologies such as CDMA, GSM and VSAT.
- The deployment of point-to-multipoint systems until 2004, fixed-line to GSM (2005 - 2006), followed by CDMA, served to expand the range more rapidly while significantly reducing access costs.
- CDMA 450 MHz low frequency hence very large range appropriate for low-traffic areas
- Today 95% of villages with more than 500 inhabitants are covered.

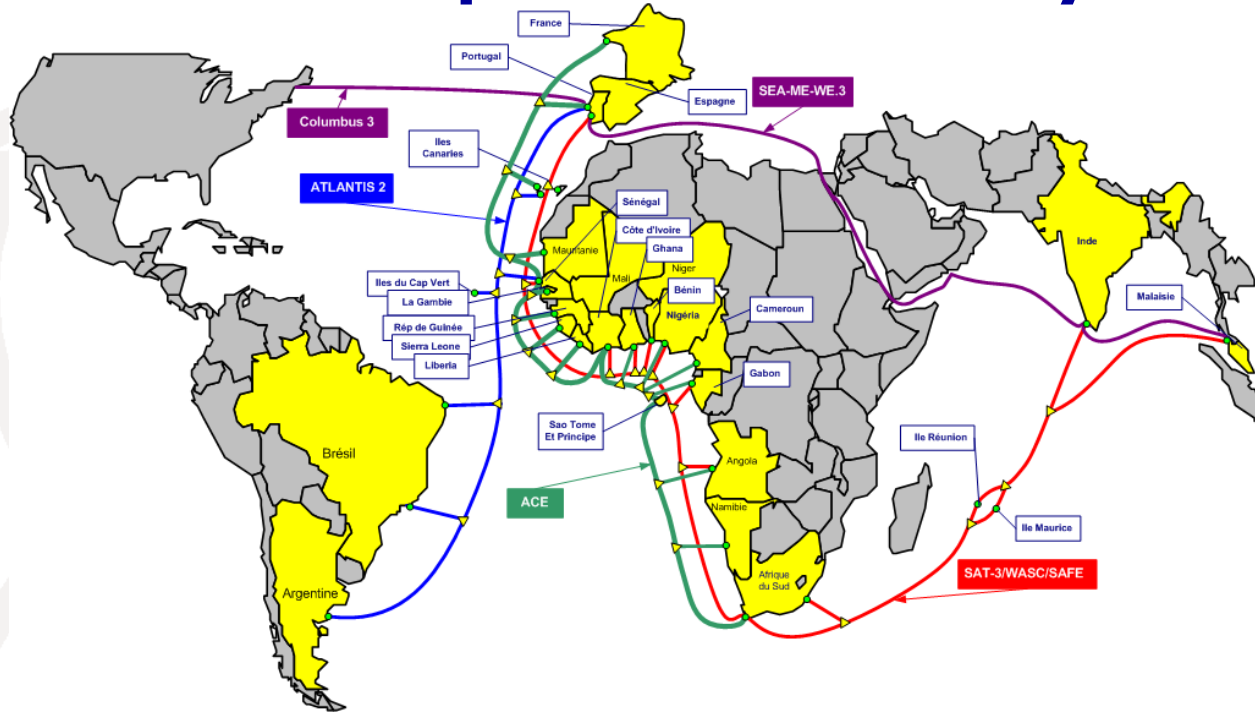
3. Rural connectivity

- Self-financed rural investments between 1997 and late October 2008 totalled 44 billion CFAF, or 88 million USD, by the end of October 2008 (Connect Africa commitment).
- Those investments gave people access to basic services: fixed and mobile telephony, the Internet.

4. International connectivity: from analogue submarine systems ...

- Sonatel and its predecessors started to promote and develop submarine cable networks in 1976.
- A stake was acquired in several analogue cables around the world, 3 of which make landfall in Dakar:
 - Antinéa, brought into use in 1977, connecting Senegal to Morocco, capacity 5 MHz (640 circuits);
 - Fraternité, brought into use in 1978, connecting Senegal to Côte d'Ivoire, capacity 5 MHz (480 circuits);
 - Atlantis1, brought into use in 1982, connecting Senegal to Brazil with a capacity of 14 MHz (1,380 circuits) and Senegal to Portugal with a capacity of 25 MHz (2,580 circuits).

... to fibre-optic submarine systems



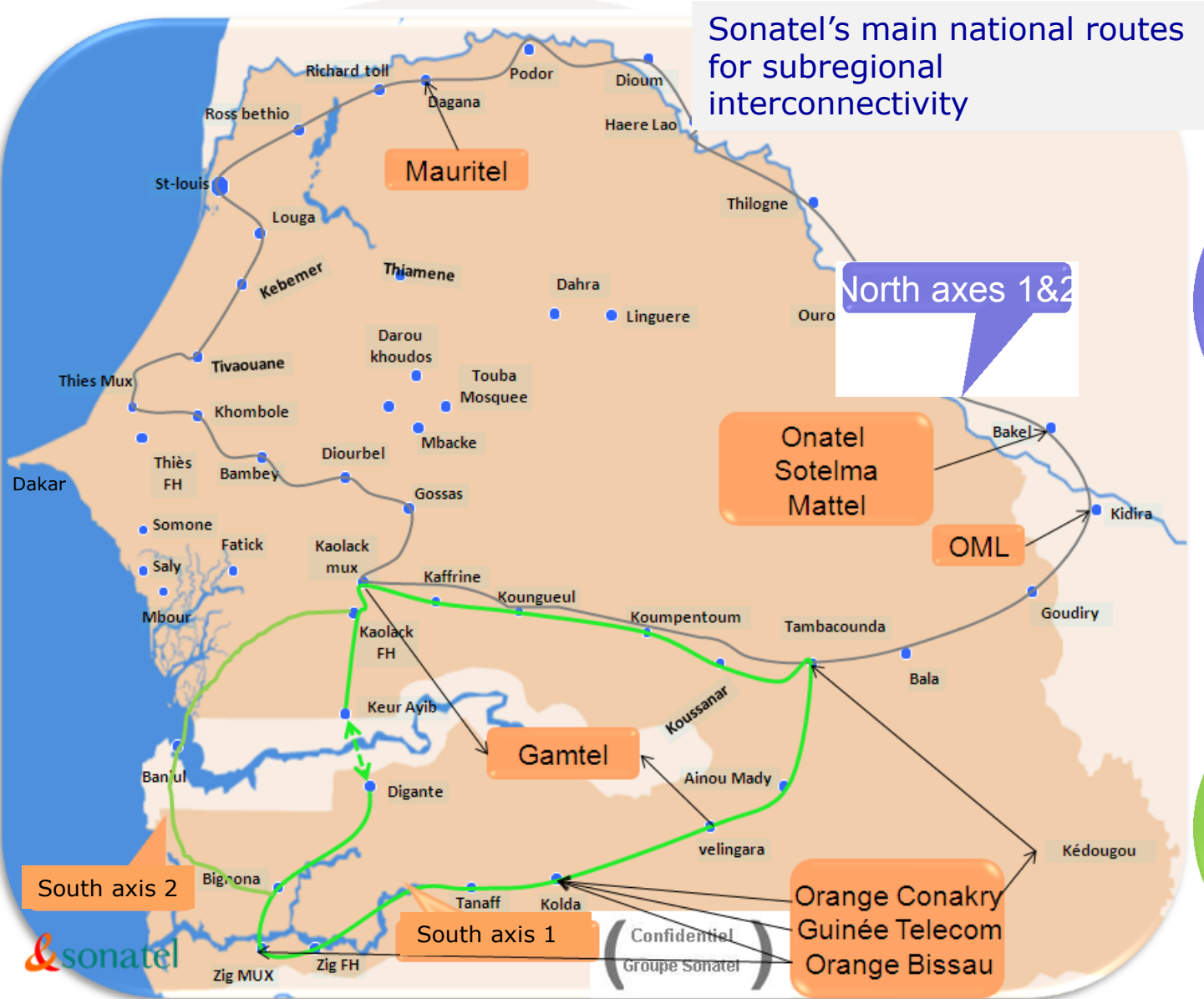
- Atlantis 2 (ATL2): brought into service in February 2000, connecting Portugal, Spain, Cape Verde, Brazil and Argentina, capacity 20 Gbit/s
- SAT-3/WASC/SAFE (S3WS): brought into service in April 2002, connecting Europe, Africa and Asia, capacity 380 Gbit/s
- Africa Coast to Europe (ACE): 17,000 km long, connecting 19 countries (16 of them African) – being implemented, to be operational in second half 2012, capacity 5.2 Tbits/s

4. International connectivity:

subregional terrestrial connectivity

- Development of the national backbone and terrestrial extensions to promote access by landlocked countries to the global submarine network. This partnership enabled Gambia, Mali, Mauritania and Guinea Bissau to increase their respective bandwidths.
 - ➔ The 2.5 Gbits/s optical fibre ground wire (OFGW) linking Senegal to Mauritania and Mali extended to Burkina Faso and Côte d'Ivoire
 - ➔ The 2.5 Gbit/s Kidira - Bamako optical fibre also extended to Burkina Faso and Côte d'Ivoire
 - ➔ A 622 Mbit/s terrestrial fibre-optic link and a 155 Mbits/s digital radio-relay system linking Senegal to Gambia
 - ➔ A 622 Mbits/s fibre-optic link with Guinea Bissau coupled with a 34 Mbits/s digital radio-relay system extended to Guinea Conakry

4. International connectivity



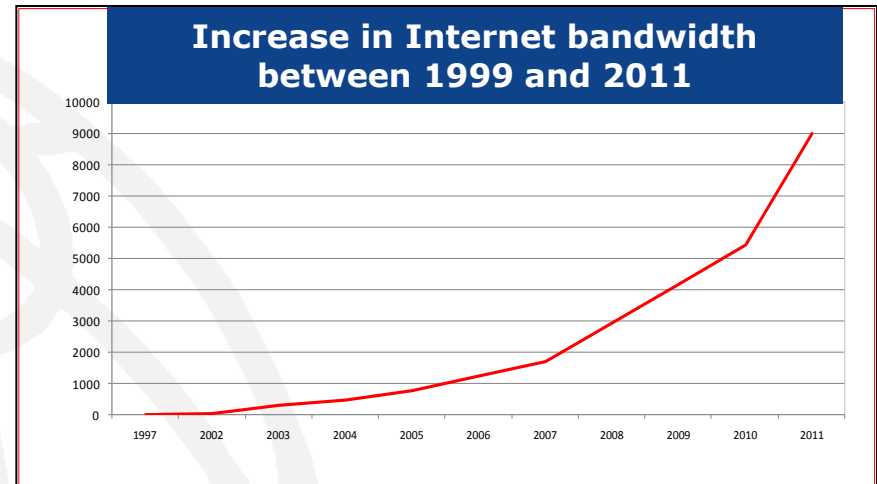
2012

North axis
17.5 Gbits

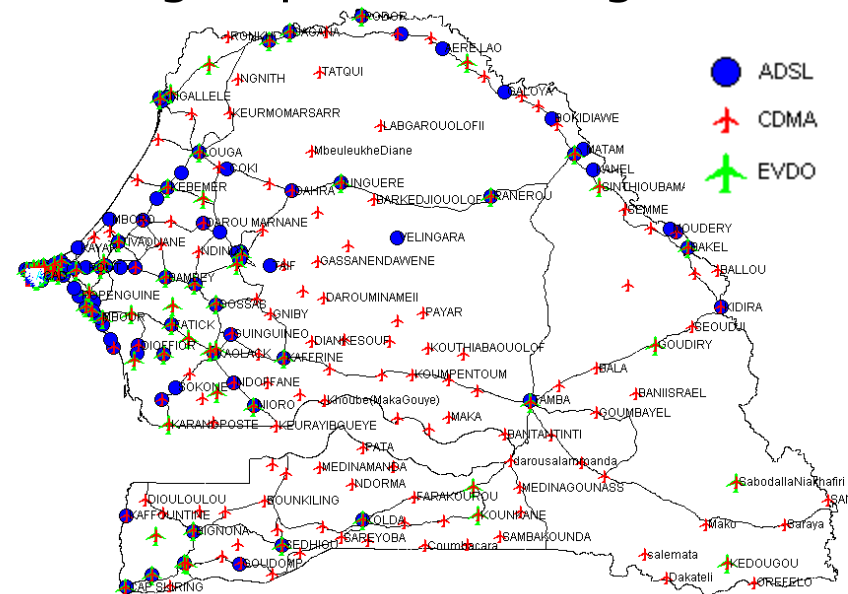
South axis
15 Gbits/s

5. Internet: high speed nationwide

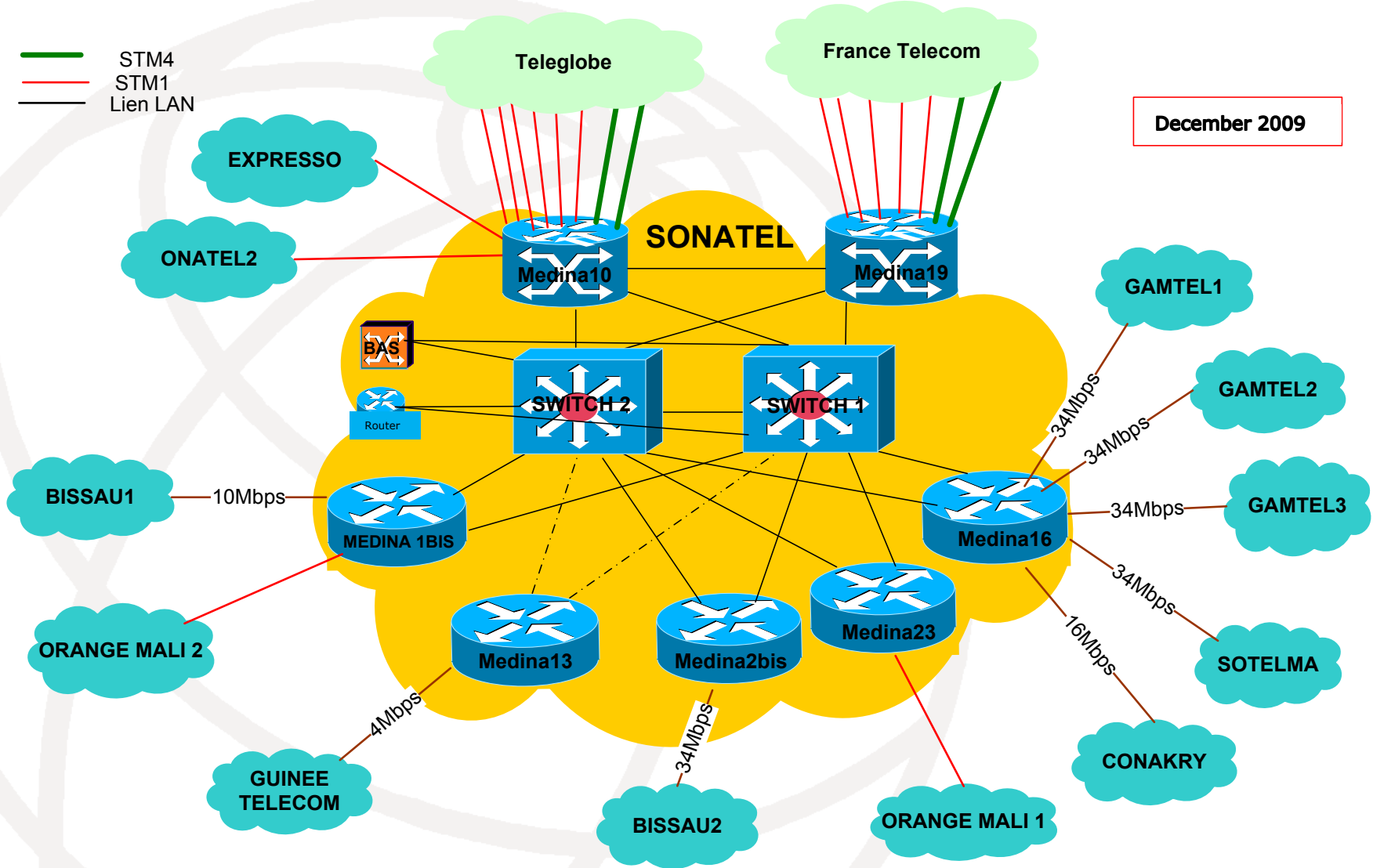
- Steadily increasing 9,014 Gbits/s Internet bandwidth
- CDMA 1x: national coverage
- EVDO: coverage of all regional capitals and over 95% of departmental capitals
- ADSL: 95% of distribution frames covered
- Services available:
 - Internet access via ADSL, ADSL2+, VDSL2, with speeds of 512K to 10 Mbit/s
 - Internet rented links (64 Kbits/s to 1 Gbits/s)
 - MPLS VPN
 - IP TV with about 100 channels
 - VoD with a catalogue of about 300 films



High-speed coverage



5. Internet: a subregional hub



Internet transit provided to 9 subregional operators

6. Conclusions

- Senegal has secure international connectivity thanks to the Atlantis 2 and SAT-3/WASC/SAFE submarine cable systems, which will be reinforced by ACE in the second half of 2012.
- The connections to those systems provide Internet bandwidth of 9,014 Gbits/s. This will grow in response to the needs of businesses, Internet access providers, value-added service operators, cybercentres, call centres, etc.
- The countries bordering on Senegal (Mali, Mauritania, Guinea, Guinea Bissau, Gambia, Burkina Faso) are connected to the global submarine cable network and the international Internet backbone through the Sonatel hub via a secure, nationwide fibre-optic transmission network.
- Sustained investment in submarine cables and in transmission and high-speed access networks fosters the development of Internet-related broadband services (ADSL, TV on ADSL, IP/MLS, video telephony on ADSL).

7. Outlook

- Senegal, like the other countries of Africa, continues to pay (a great deal!) for its Internet bandwidth because of lack of content of interest to others.
- In addition to network investment, operators could consider initiatives to lower the high cost of Internet access for their customers:
 - Development of local content
 - Introduction of cache and CDN (Content Delivery Network) solutions to host the most popular content on our networks and thus optimize the use of Internet bandwidth
 - Installation of Root.com/.net servers, for example to meet DNS requests without using Internet links
 - Establishment of subregional data centres for content-related services (TV, VoD, etc.), content hosting, cloud computing
 - Last but not least, secure Internet access