

IPv6 in Africa

How Africa is preparing for IPv6

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Content

Challenges

Initiatives to overcome some of the challenges

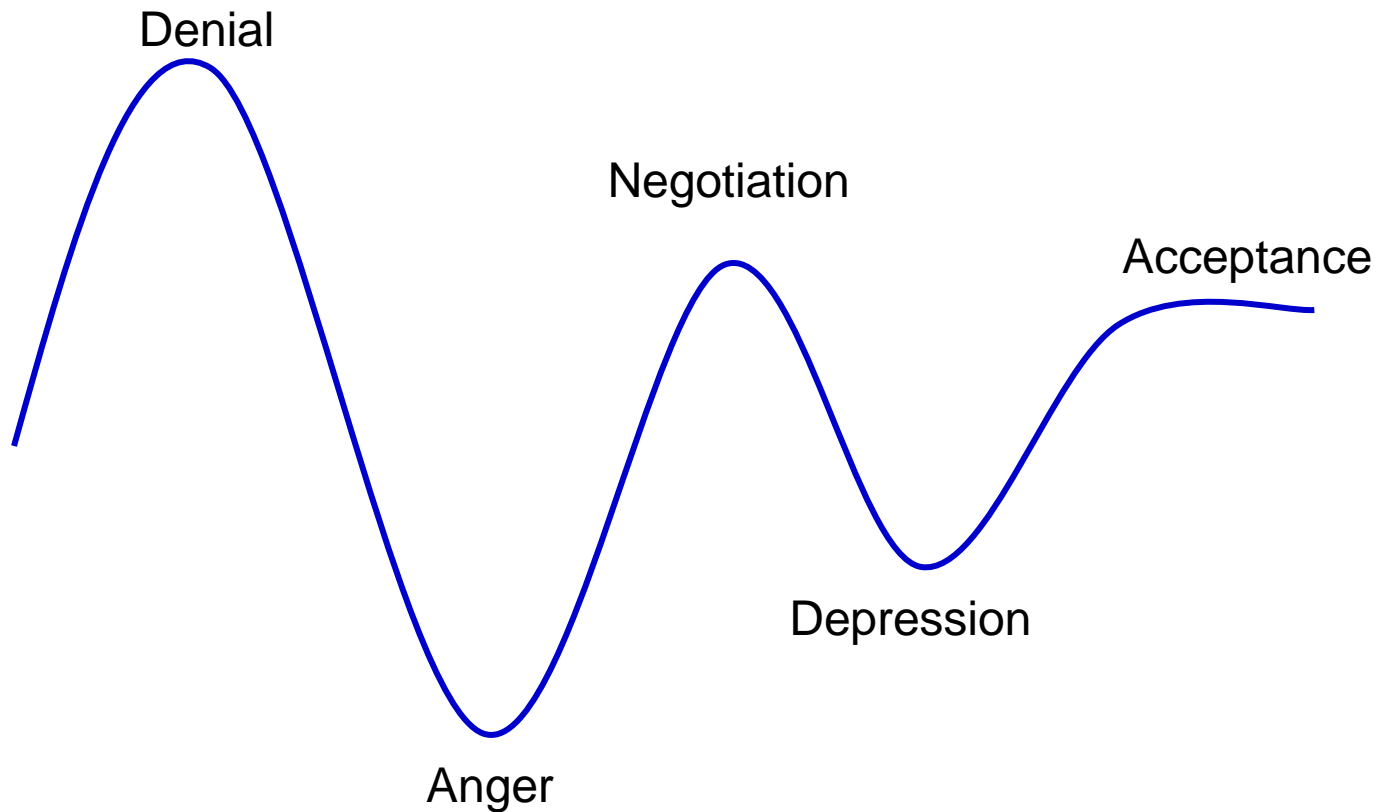
Achievement

Way forward

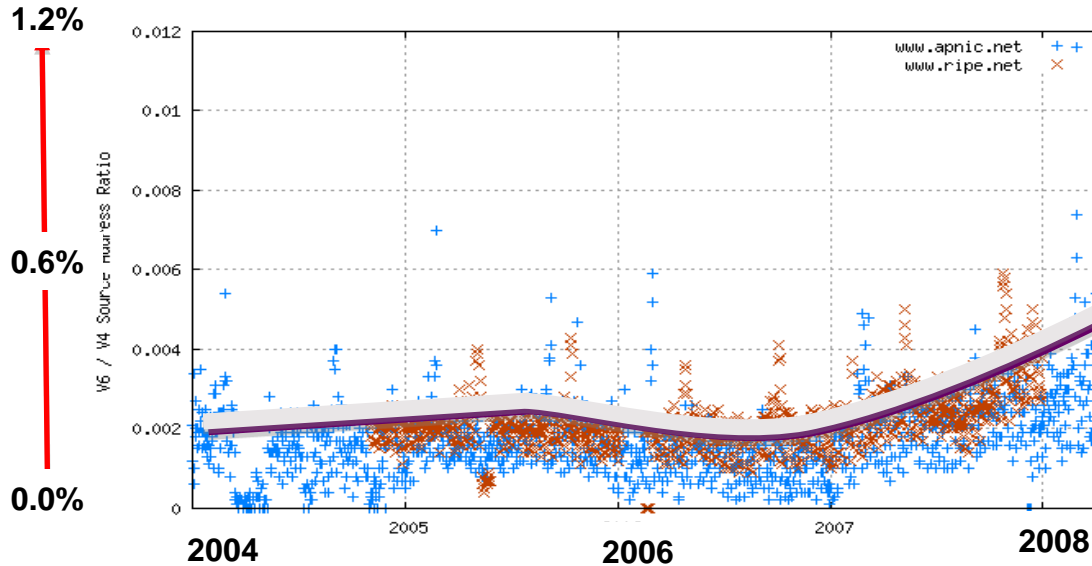
Conclusion

The transition from IPv4 to IPv6

Different stages of grief for transition

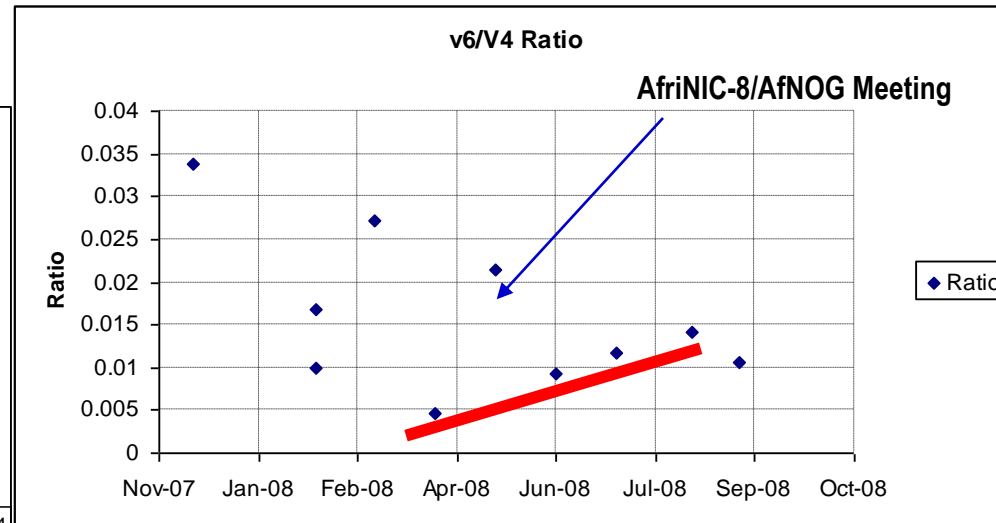
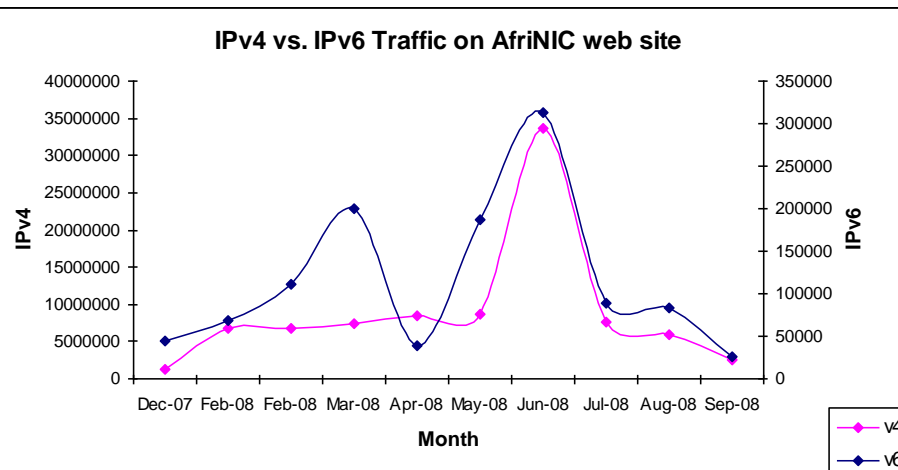


Acceptance ???

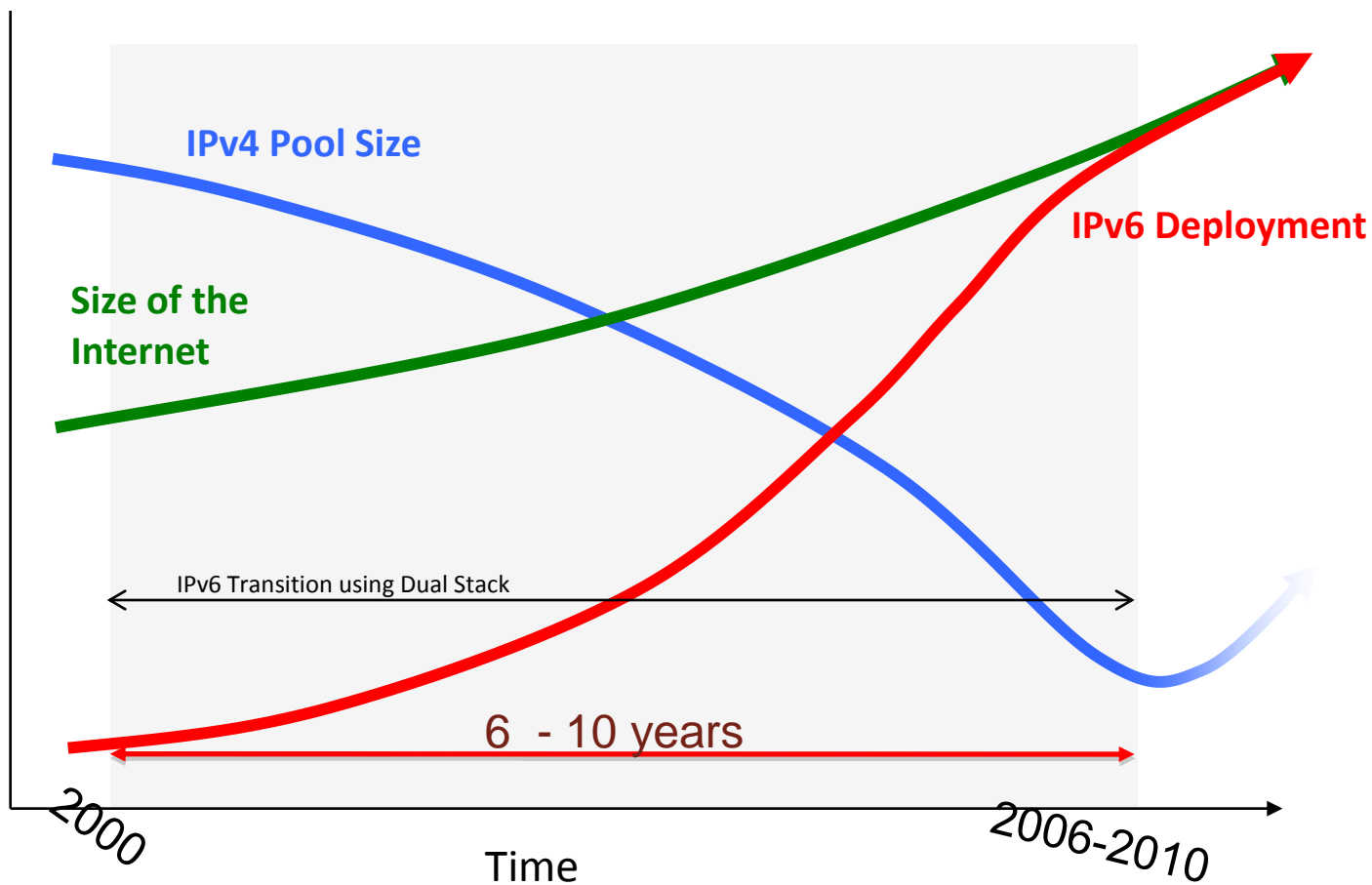


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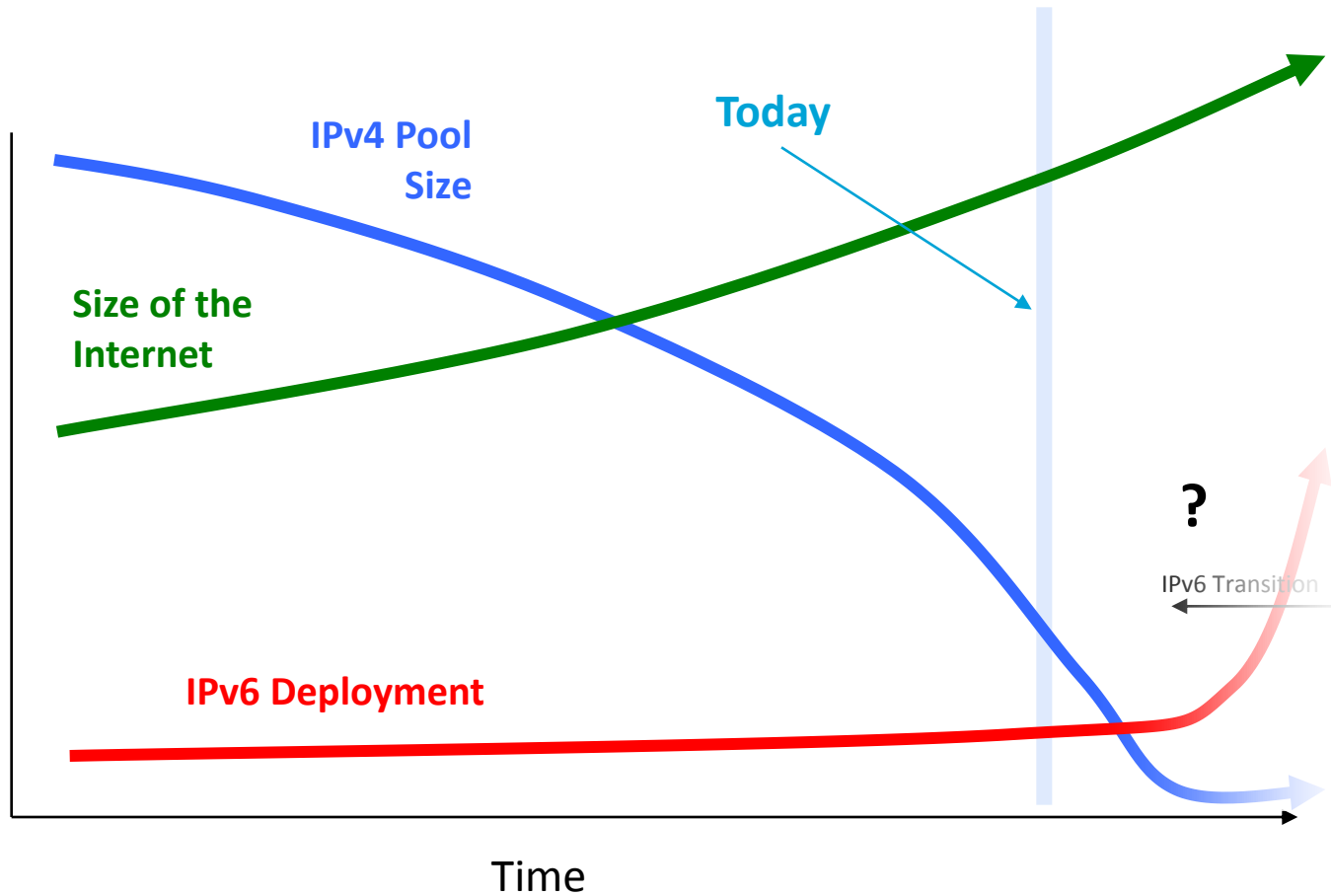
Graph: Geoff Huston - Measuring IPv6 Deployment



What was planned 10 years ago?



What is happening today?



Few challenges for IPv6 in Africa

- ▶ IPv6 adoption is an important challenge worldwide but more importantly in our region:
 - Perception of lack of demand from the users
 - *“Lack of end-users applications”*
 - Perception of huge costs related to transitioning
 - Lack of awareness on real IPv6 development cases
 - Lack of transparent compatibility with IPv4
 - Passiveness regarding IP issues in our community
 - People are still struggling to properly deploy IPv4 Networks: Too extensive usage of NAT in the region

Killer application?

- ▶ IPv6 is *NOT* a feature! While everyone wants a source of additional revenue, “*fundamental transport is difficult to monetize*” (Tony Hain – Cisco System)).
 - Carriers use IPv6 deployment cost as a defensive play but the reality is that they will still have to absorb the costs of an IPv4 routing system (that will be growing unconstrained once the central pool is gone and addresses may started to be traded) ... and this until they can get their customers to leave IPv4 behind.
 - Revenue generating applications are most likely to be peer-to-peer, because client-server can be hacked in using nat.

Or Killer constraint?

- ▶ Google Maps opens ~ 70 parallel connections
- ▶ iTunes store has been shown to open as many as 300 parallel connections
- ▶ *New apps that have not emerged yet ???*
 - *IPv4/nat multiplexes multiple users through the port range, so 64k divided by 300 parallel connections results in ~200 customers per ISP based nat address (assuming each customer is only allowed to run one simultaneous instance of iTunes or similar apps).*

Cost of deployment

- ▶ The largest cost for most network managers will be training.
 - *It is packet based (IP), but other than that it is a different protocol.*
- ▶ Another major cost will be retooling custom apps and scripts.
 - *Frequent shortcuts assuming an address will always be 32 bits.*
- ▶ Is IPv6 deployment could be seen as an opportunity to integrate other engineering changes that have not been large enough to justify by themselves?
 - *What costs will be attributed to IPv6 vs. general evolution?*

Africa & IPv6

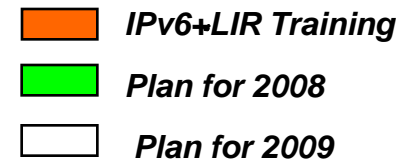
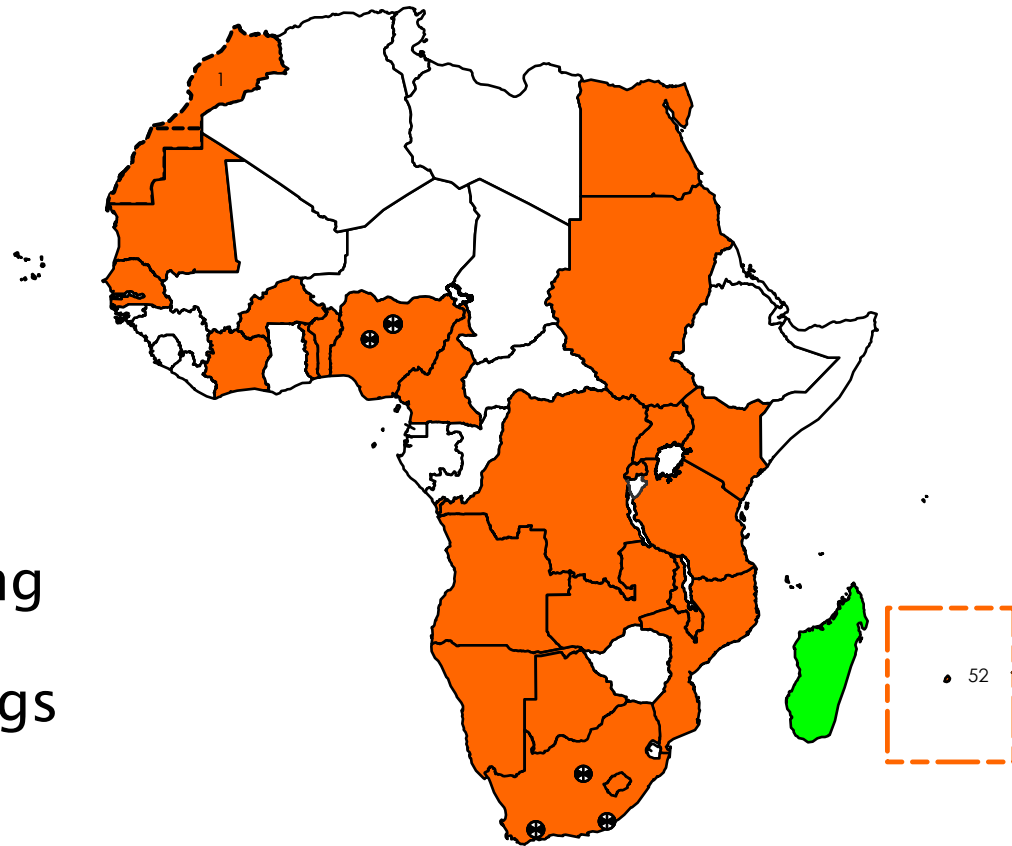
- ▶ As requested by the community during Afrinic-2 meeting (Maputo), the project aims to create an environment which favors smooth transition to IPv6 in Africa through:
 - Creation of an environment which allows exchange within IPv6 initiatives throughout the Continent. (afripv6-discuss@afriNIC.net)
 - Creation of an IPv6 Forum for Africa. (3rd during Afrinic-9)
 - Conducting IPv6 Training across the Continent.
 - Providing Lab and Internships to Engineers to play live with IPv6
 - Supporting research based on IPv6 and Mobile Infrastructure
 - Creation of an IPv6 ready platform to offer v6 support to the community (IPV6 ready at IXP to offer tunnels).
 - Bringing major African connectivity/content providers to the game by encouraging them to provide v6 ready services.
 - Developing a case study documentation for the use of African operators (based on local experiences).

Africa & IPv6 (con't)

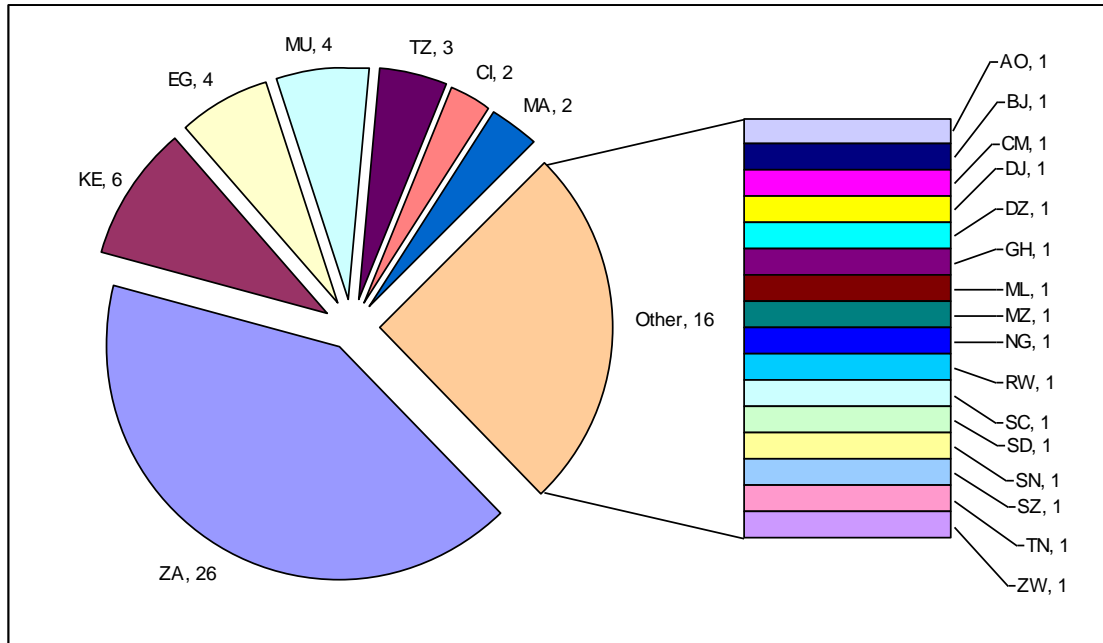
- ▶ We have identified in 2005 that training is one of the key factors that will support IPv6 deployment.
 - More than 35 trainings conducted in different 30 countries throughout Africa (1–3 day events)
- ▶ Policy proposal to ease IPv6 allocation in our region has been proposed and adopted by the community in 2006.
 - No need to justify 200 end-users allocation to get IPv6 addresses.
 - Waived any additional fee for IPv6 allocations.
 - Integrate 'IPv6' into Afrinic training program.
- ▶ End User assignment Policy proposed and adopted in 2007

Africa & IPv6 (con't)

- Annual AfrIPv6 meeting back-to-back with Afrinic Spring meetings (December 2005, Nov'2006, Sept'2007, **Nov'2008**)

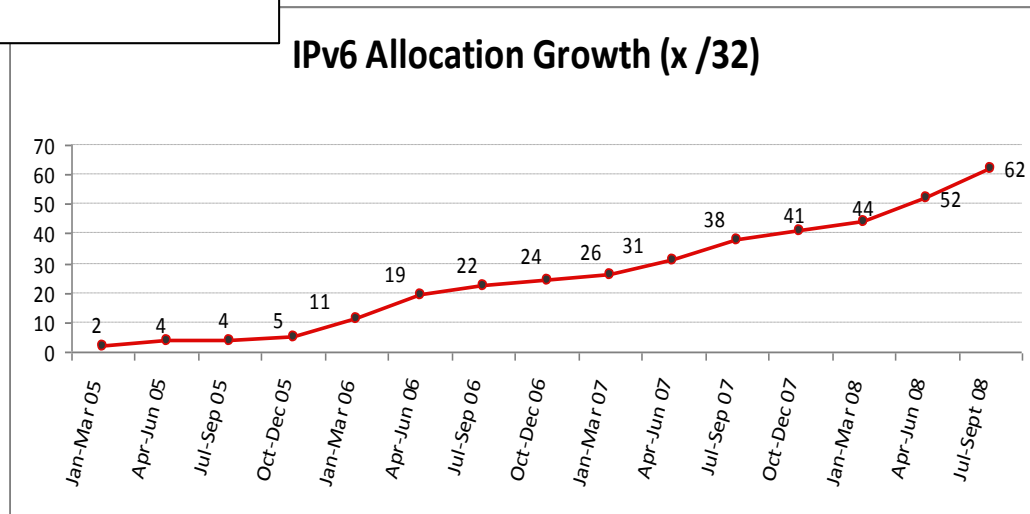


Result: IPv6 allocation growth



From these allocations, only 33% are announced and visible in the global routing table. (46% in AP, 33.6% in ARIN, 32% in LAC, 49% RIPE)

IPv6 Allocation Growth (x /32)



There is a clear need for further assistance to deploy.

So how Africa is preparing for IPv6?

- Very slowly
- Following the trend of the rest of the world
- Trying to understand what is on stake

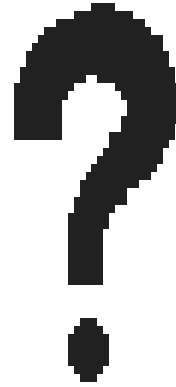
- ▶ We need to
 - Push for more action from Operators (Train, Plan and implement Dual-stack, allow user to access v6 network)
 - Be innovative and explore the opportunity of developing application that can directly benefit from IPv6 and its “features”.
 - Involve Research and Education community into the game.

- ▶ Governments need to lead by making sure:
 - their own internet-based services are IPv6-ready (early adopters)
 - The public is aware and educated on the transition
 - Appropriate policies are developed to foster national transition to IPv6

.... Education seems to be the critical part of this long journey

Conclusion

- ▶ IPv6 is an opportunity for Africa (innovation and sustainable growth)
- ▶ With our initiatives we hope to make Operators in Africa not be the one who are always catching up with other.
- ▶ We would like to bring this campaign to another level and create an environment for an exchange of information, training, and for sharing best practices.
- ▶ Having our own Regional Internet Number Registry, we have the opportunity to define policies and plans that will help IPv6 adoption and support a sustainable Internet growth in Africa



Thank you