Critical Internet Resources

East Africa IGF 11th – 13th August2010

Joe Kiragu
Administrative Manager .KE
kiragu@kenic.or.ke

Critical Internet Resources

1)DNS and TLD's
- Root Servers
- DNSSec
- ccTLD
- New GTLDs

2)Internet Exchange Points

3) IPV6

Root Servers

- The Domain Name System (DNS) is a critical component of the Internet infrastructure.
- DNS - Glue of the Internet
- 13 Root server A, B… M
- Root Server Anycasting -“cloning” one server in multiple locations
- There are many hundreds of root servers at over 130 physical locations in many different countries.
- There are twelve organisations responsible for the overall coordination of the management of these servers.

Distribution of Root Servers

Source: http://www.root-servers.org

J and K root Mirror in Nairobi : KIXP/KeNIC

Instances of Root Servers: Africa

Instances (local nodes) are deployed in three countries on the continent of Africa.

They are:

1. F/I/J in Johannesburg (South Africa)
2. F/J in Nairobi (Kenya)
3. J/F in Cairo (Egypt)

Kenya also has mirror instances (local nodes) for TLD's root server

.com

.net

Benefits of Localized Root Service

National infrastructure protection and self-sufficiency.
Domain name system resolvers continue to function in a predictable way even during a loss of international connectivity

Performance.
Resolvers have a much lower latency (and, often, a less congested) path to a local root name server than to a root name server that must be accessed across international transcontinental links.

Costs.
At a national level, it permits a reduction in router and link resources, as standard IP routing protocols will deliver packets over the shortest path to the closest available host.

Benefits of Localized Root Service

Resilience.

If a denial-of-service attack is launched at the F root name server in some other part of the world, the traffic will land at a different instance of F and hence the local community will not see any effects of the attack.

Emergency Response.

An indirect benefit is that in having a distributed set of sinks for attacks traffic makes it easier for the root server operators to identify and isolate the source of an attack.

DNSSec

The root zone is in the process of being signed where the global deployment of Domain Name System Security Extensions (DNSSEC) was achieve an important milestone on

- ***June 16, 2010*** ; ICANN hosts the first production DNSSEC key ceremony in a high security data centre in Culpeper, VA, outside of Washington, DC.
- ***July 15, 2010;*** Full deployment of DNSSEC in the root zone

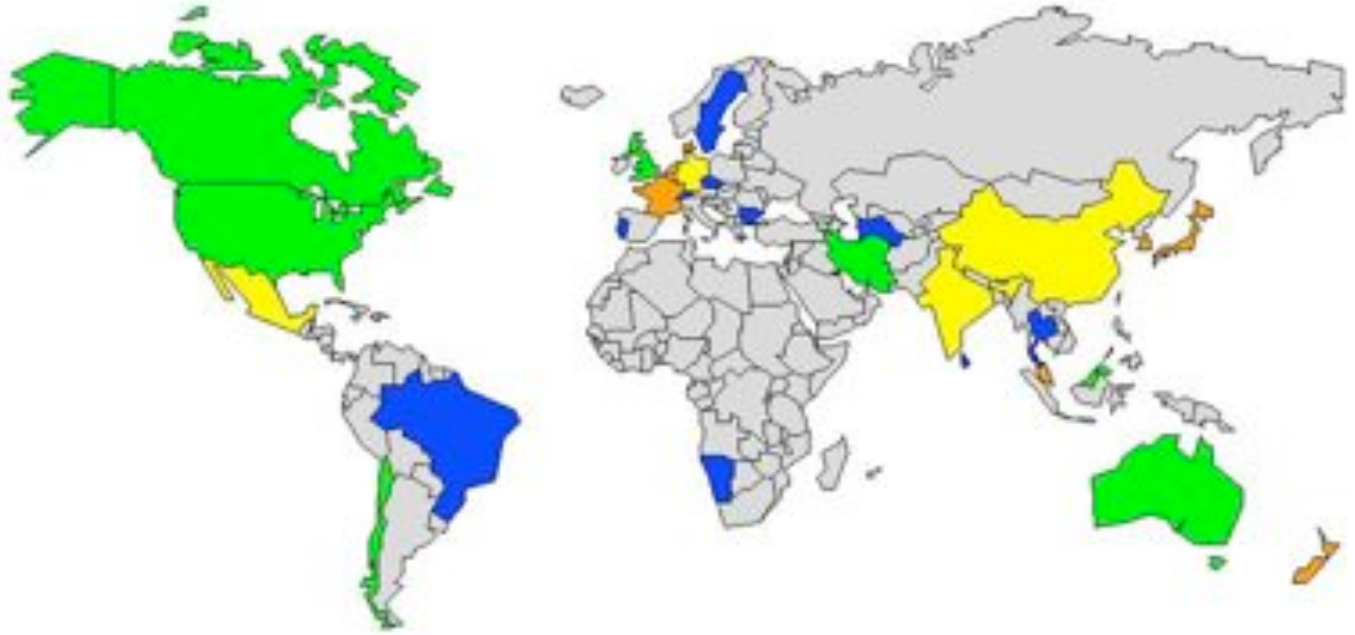
DNSSec

•DNSSEC was designed to protect the Internet from certain attacks, such as DNS cache poisoning .

• It is a set of extensions to DNS, which provide:

a) origin authentication of DNS data,
b) data integrity, and
c) authenticated denial of existence.

DNSSEC Adoption 31 Mar 10



12	7	7	6
Operational	Partial Operation	Announced	Experimental

Created 26 Apr 10

DNSSec – Deployment Chalanges

- Operational Challenges
  - Preparing Your Firewall for DNSSEC
    - ** >512 bytes packets.*
    - ** UDP/TCP*
  - Preparing Your Slaves
    - ** slaves must understand how to respond to queries requesting signed data. Slaves must be upgraded to BIND 9.3 or better to understand the Next Secure (NSEC)[14] standard.*

DNSSec – Deployment Chalanges

- Operational Challenges
  - Preparing Your Firewall for DNSSEC
    - ** >512 bytes packets.*
    - ** UDP/TCP*
  - -Preparing Your Slaves
    - ** slaves must understand how to respond to queries requesting signed data. Slaves must be upgraded to BIND 9.3 or better to understand the Next Secure (NSEC)[14] standard.*
  - -Key Management
- increase bandwidth demand

ccTLD – Critical Internet Resource

- The Internet is part of a Country's Virtual Real Estate
- The ccTLD is one of the virtual real estate's inherent natural resource
- The resource should be developed for the benefit of all
- As with any natural resource, governance issues are paramount
- Therefore the right approach is fundamental in overcoming the issues and challenges

ccTLD Challenges

Legacy Issues

- Perception - Myths .com's are global ccTLDs are local

Social Political

- Social political stability is paramount for growth of ccTLDs
- Normally affects the technical and administrative operational stability of ccTLD
- most cases propagates the myths

The sustainability model

- Costing per Domain name
- Other Revenue Streams i.e Membership support and contributions

Domain Up-take

- Domains Retention rate

New gTLD's

•New gTLD Program: an initiative that will enable the introduction of new gTLDs (including both ASCII and IDN) into the domain name space.

•There are eight (8) gTLDs that predate the formal establishment of ICANN:

– ***.com .edu .gov .int .mil .net .org .arpa.***

• After the formation of ICANN in 1998, there were two (2) application rounds:

  – In 2000, approximately 50 applications were submitted and evaluated and the following seven (7) gTLDs were approved: ***.aero .biz .coop .info .museum .name .pro.***

  – In 2003-4, ten (10) applications were submitted and evaluated and the following six (6) gTLDs were approved: ***.asia.cat .jobs .mobi .tel .travel.***

New gTLD's …. Rationale

The incentive to introduce new gTLDs was as follows:

– has the potential to promote competition in the provision of registry services,
– Need to add to consumer choice
– Need for market differentiation
– Need for geographic and service-provider diversity

New gTLD's….. Process

•***December 2005***: GNSO began work on a policy towards issuing new gTLDs. The process to establish the New gTLD Program entailed a detailed and lengthy consultation process with all constituencies of the global Internet community. – Governments, individuals, civil society, business and intellectual property constituencies and the technology community were engaged in discussions for more than 18 months.

•***June 2008***: The ICANN Board of Directors adopts new gTLD policy proposal.

•***After June 2008*** (policy implementation): ICANN then began devising rules and procedures, drafting materials for applicants, putting those rules, procedures, and materials out for comment, and revising them accordingly.

• ***Today:*** The process is still ongoing. Draft Application Guidebook version 4 (DAGv4) discussed during the most recent ICANN meeting (ICANN38).

New gTLD's ….Benefits

• New gTLDs might provide competition to existing gTLDs resulting in lower prices

• New gTLDs may support new business models through the offering of new or differentiated services -innovation

• New gTLDs might relieve scarcity in domain names –names with meaning

New gTLD's ….Challenges

- Increased search costs due to customer confusion
- Increased registration costs in an effort to register names in many TLDs to ensure reach by customers
- Intellectual property/Trademark infringement
- Bandwidth constraints with the expansion of the root zone

IXP

.Interconnection (peering and Transit) are important aspects of the Internet ecosystem and important to be addressing most of the IGF issues.

Why Peering ?

- Keeping regional/national traffic local
  - – Shorter route to content thus better end user experience (i.e speeds)
  - – Lower cost of content access and delivery
  - –Lower costs encourage content development and hosting
- Redundancy
  - – Alternative route to path ensures availability and reliability
- Control of traffic flow
  - – Choose what goes over transit vs peering

Interconnection Actors

- Government
- Private Sector
- Academia/Research and Education Networks
- Civil Society

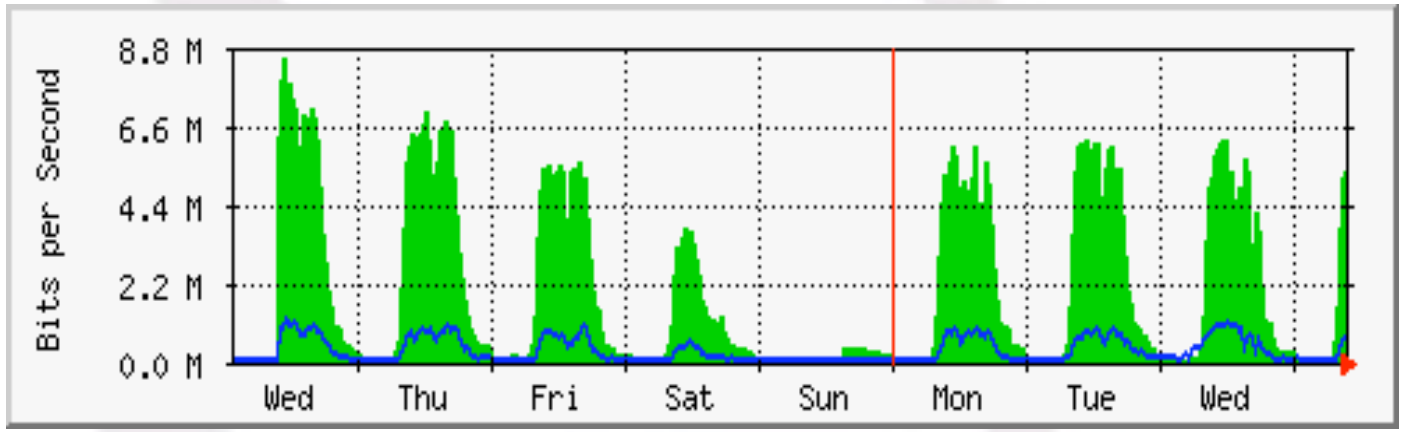
IXP – Government role

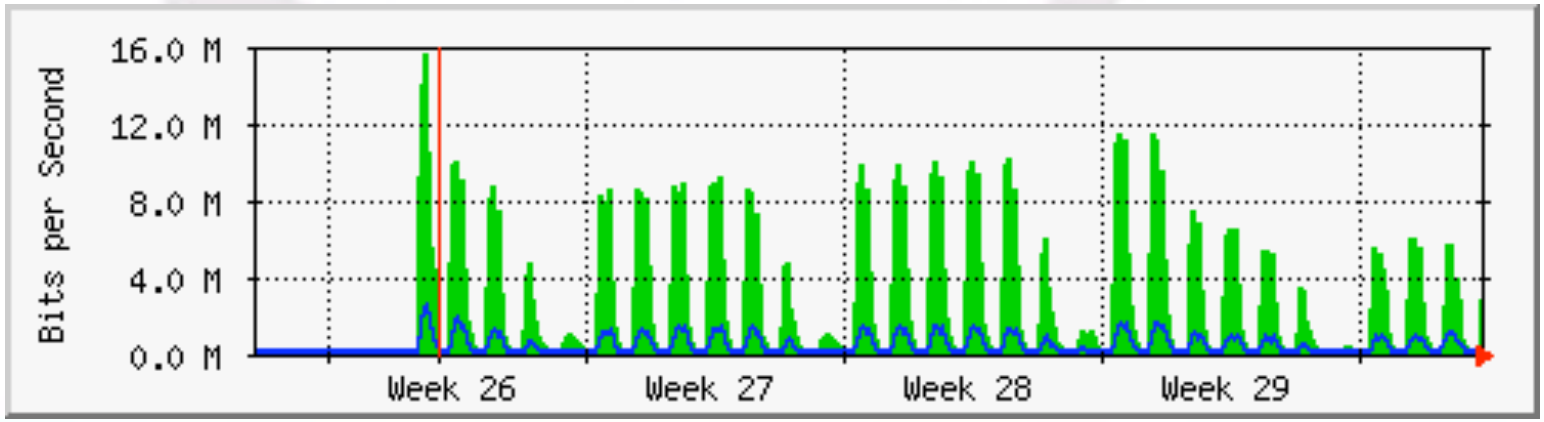
- Policy and regulatory role
  - Encourage national peering/interconnection
  – Regulatory policy to allow cross-border interconnection
  – Policy that allows competition in national and regional terrestrial infrastructure development

- Potentially the largest content providers
  – e-Government
  – e-Health

IXP – Government role

Content Case Study: KRA Online Tax Returns





IXP – Private Sector role

- Content Providers
  - -Content distribution
  - -Content development/hosting

- Connect the eyeballs
  - -Last mile connections

- Infrastructure development
  - -Backhaul Terrestrial Fiber

IXP – Academia/Research and Education role

- Content Distribution
  - -Potentially the largest content creators
  - -e-learning
- Capacity Building
  - -Technical capacity development
- Research and Development
  - -Innovation starts here
  - -Research based content sharing

IXP – Civil Society role

- Content Creators
  - Blogs, podcasts, wiki's etc

- Awareness
  - IGF and other forums to discuss role of interconnection

IXP – Academia/Research and Education role

- Content Distribution
  - -Potentially the largest content creators
  - -e-learning
- Capacity Building
  - -Technical capacity development
- Research and Development
  - -Innovation starts here
  - -Research based content sharing

Thank You !