ISC, F-Root, BIND & DHCP Updates
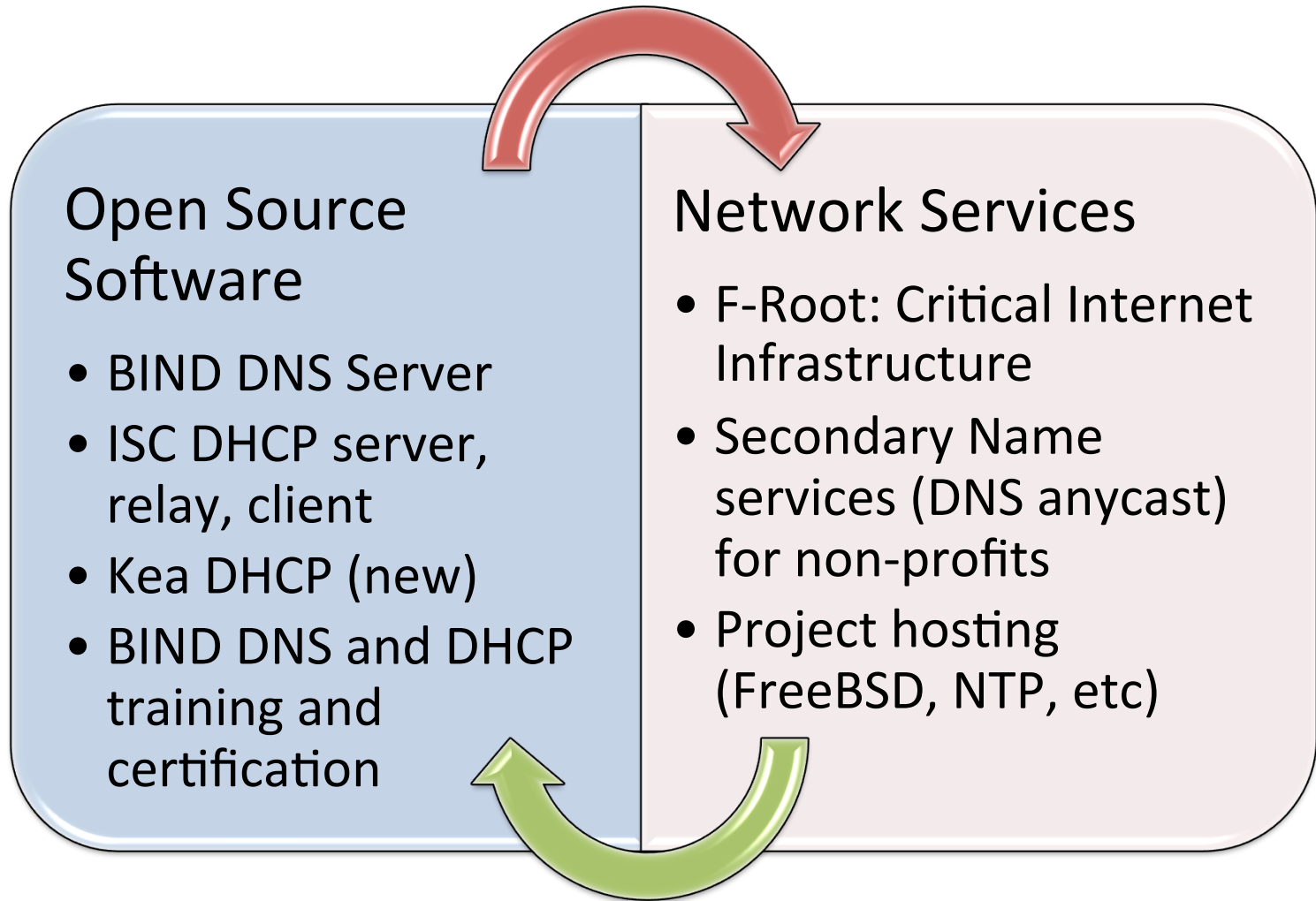
AFRINIC-21

Eddy Winstead

Agenda

- ISC overview
- F-Root in Africa
- ISC Open Source
  - BIND roadmap update
  - DHCP update
  - How to get involved in the projects
- ISC certification program

ISC Overview

- Founded in 1994
- Non-profit, self-funding
- 36 Employees
  - 1/3 sales, marketing, technical support
  - 1/3 software develMin
  - 1/3 network and business operations
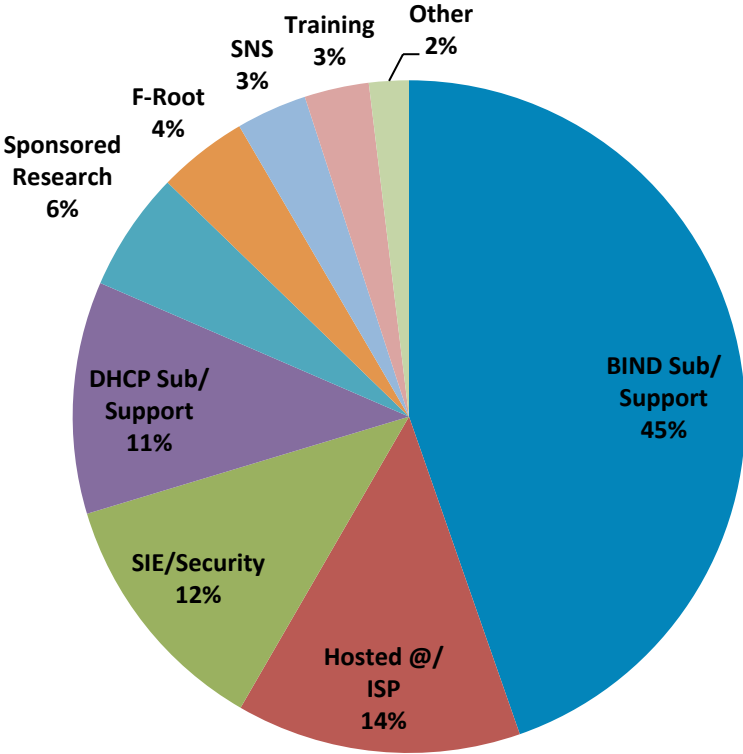- Based in Redwood City, CA with employees and network nodes all over the world
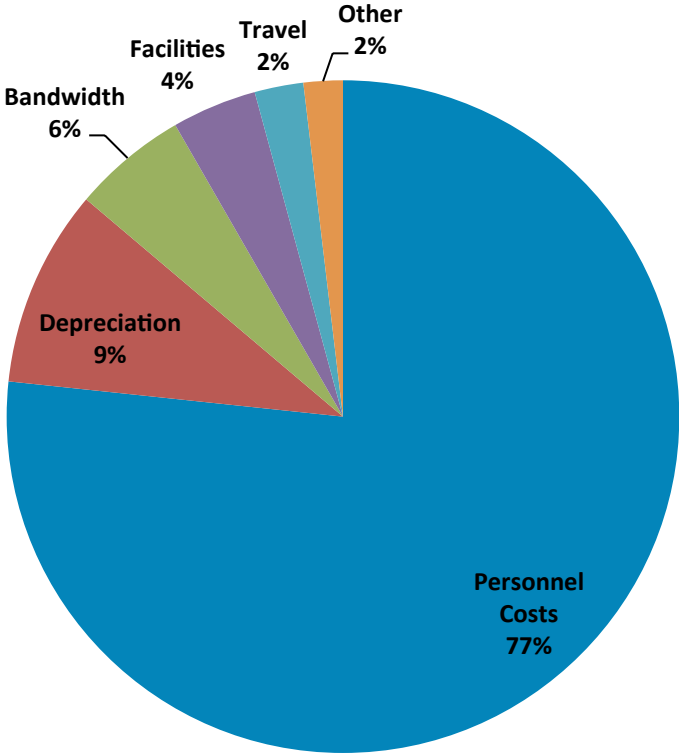
ISC Project Focus

Open Source Software

- BIND DNS Server
- ISC DHCP server, relay, client
- Kea DHCP (new)
- BIND DNS and DHCP training and certification

Network Services

- F-Root: Critical Internet Infrastructure
- Secondary Name services (DNS anycast) for non-profits
- Project hosting (FreeBSD, NTP, etc)

2013 Financials posted

ISC 2013 Revenue

- BIND Sub/Support 45%
- Hosted @/ISP 14%
- SIE/Security 12%
- DHCP Sub/Support 11%
- Sponsored Research 6%
- F-Root 4%
- SNS 3%
- Training 3%
- Other 2%

ISC 2013 Expenses

- Personnel Costs 77%
- Depreciation 9%
- Bandwidth 6%
- Facilities 4%
- Travel 2%
- Other 2%

We have adequate stable funding now, based almost entirely on support subscriptoins

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F-Root – funded by sponsors

- ISC has operated F-root since 1994

- F-root is one of 13 root servers

- There are 55 local F-root nodes world wide

- The number of nodes fluctuates, as sometimes the hardware becomes obsolete and is not refreshed, or carriers or hosts move or are acquired

F-Root in Africa Today

- Lagos, Nigeria (IPv4)
- Nairobi, Kenya (IPv4)
- Dar Es Salaam, Tanzania (IPv4 & IPv6)
- Johannesburg, South Africa (IPv4 & IPv6)
- Cairo, Egypt (IPv4)
- New sites?!

Comparative DNS Root RTT

The map below shows a **comparison of response times for DNS SOA queries to all the root DNS servers**.

For each probe, a marker shows the "best" root server with colours identifying the related minimum response time. Clicking on a probe reveals all the measurements to reachable root servers, ordered by response time. It is possible to filter by protocol (IPv4, IPv6, or both).

We display measurement results only from the last hour.

Address Family: [All ⇕]

Filter by ASN, prefix, or country: [   ] [▼] [⟳]
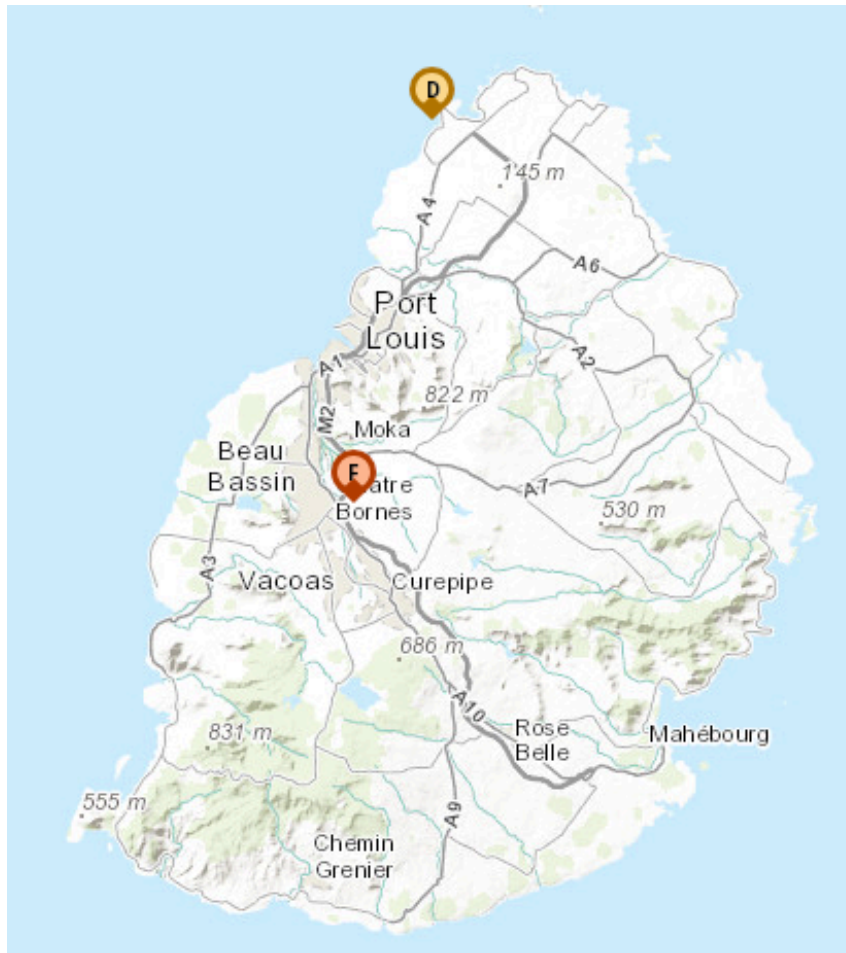

Leaflet | Tiles © Esri — Esri, DeLorme, NAVTEQ, TomTom, Intermap, iPC, USGS, FAO, NPS, NRCAN, GeoBase, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri Chin Kong), and the GIS User Community

< 10ms < 20ms < 30ms < 40ms < 50ms < 100ms < 200ms < 300ms < 500ms No Data

https://atlas.ripe.net/results/maps/comparative-dns-root-rtt/

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Root Access in Mauritius

F-Root Nodes

- ISC manages F-Root for the public good, to provide DNS stability, access and good response time to users
- Nodes are located where there are sponsors who request and can support them.
- Sponsor provides rackspace with good interconnection/peering, power and remote hands, and purchases the equipment. ISC will specify the equipment, install and manage the nodes
- Nodes are available to anyone who can meet the technical requirements

Root Node Cost

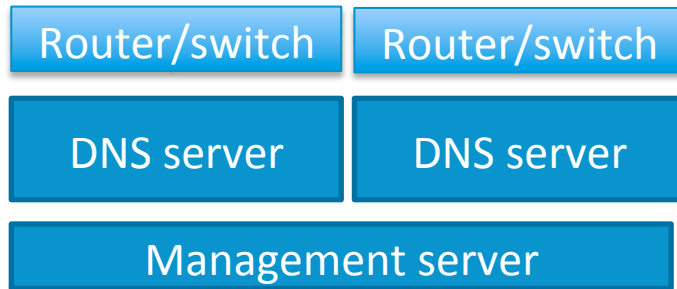**Cost of Hardware ($??? - $???)** + **Annual Management fee (up to $10K USD)** = **Cost of Node**

- Cost depends on node size
- Subsidies are available, through ISC or the AfriNIC root server program
  http://www.afrinic.net/en/initiatives/root-server-copy

Node sizes

Traditional Redundant Node

Router/switch	Router/switch
DNS server	DNS server
Management server	

New 'F-single' node

| DNS server |

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F-Root Nodes

Traditional Node

- Redundant platform
- Two router/switches
- Three DNS servers
- Designed for high traffic Internet Exchange Points
- Example: AMS-IX, LINX

New 'F-single' Node

- Single-box solution
- Smaller footprint, lower power/AC requirements
- Lower hardware cost
- Suited for smaller IXPs where all peers connect to a shared route server

ISC will decide which platform is appropriate based on site review

6 – 24 months

Request Information
- ISC sends Sponsorship requirements

Traditional or F-Single node?
- ISC reviews the site and determines which is appropriate

Sponsorship?
- Determine funding for the node
- Annual operation $10K USD
- Equipment cost

Sign MoU

Sponsor purchases HW
- specified by ISC
- wait for equpment receipt

Installation
- ISC Engineer for traditional node
- ISC remote engineer + local hands for mini-node

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2014 Development Initiatives

- Refocusing on BIND9
  - ✓ Released BIND 9.10.0, 9.10.1
  - ✓ DDOS mitigation, simulation test bed
  - ✓ Fuzz testing (Codenomicon CROSS)
  - – Improving automated test coverage
  - – Creating new DNSSEC documentation
- Writing NEW DHCP server for 2015 release **kea.isc.org**
- Open source contributors, OS packagers **source.isc.org**
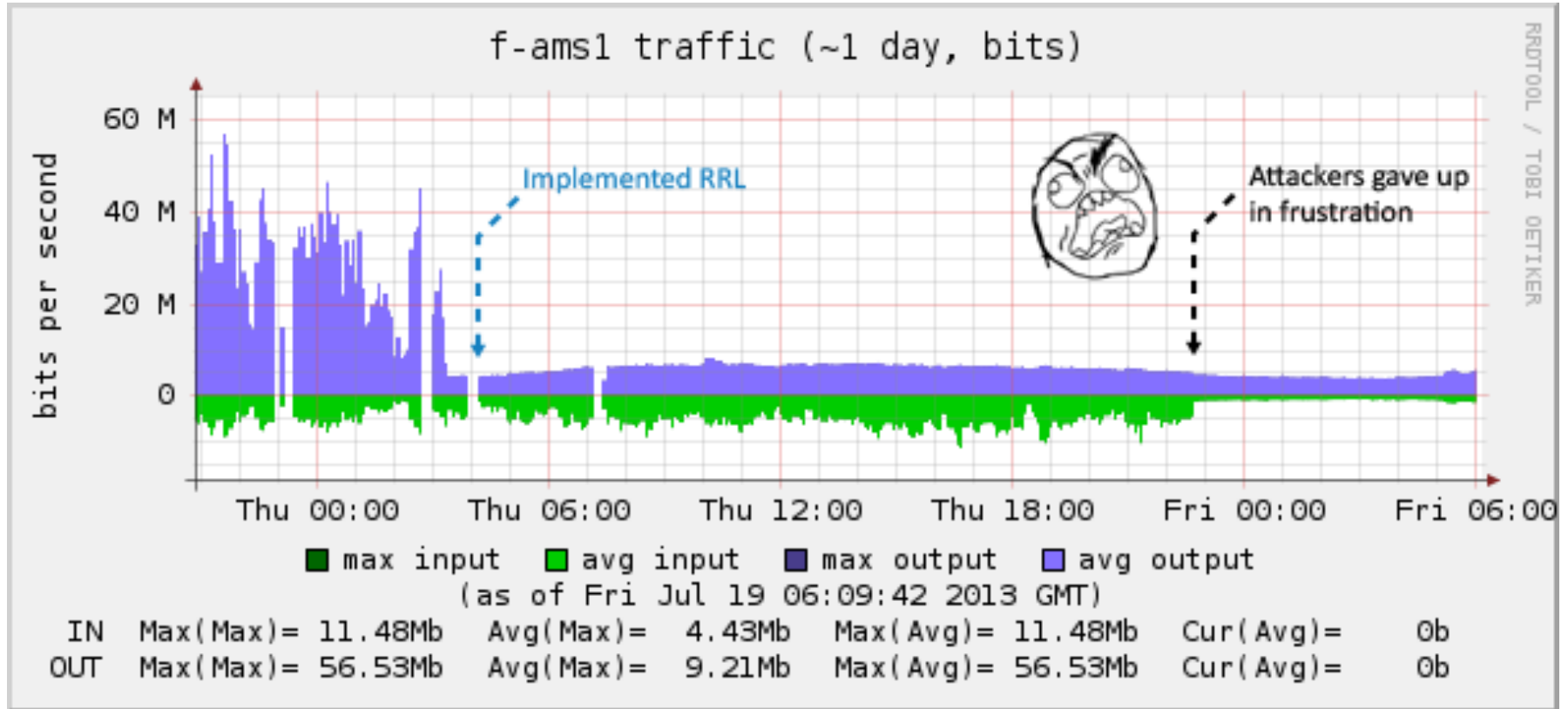- Re-hosted DLV site, upgrading bug db

BIND 9.10 – April, 2014

- RRL is now on by default
- MAP zone file format
- DNS Pre-fetch (Hammer time)
- Zones shared between views
- New stats, new style sheet
- Delv – DNSSEC troubleshooting
- Native PKCS#11
- DNS Cookies (experimental)

22,825 copies downloaded since 2/25/14
Considered experimental until at least 9.10.3

ISC F-Root Before and After RRL

9.10 Performance

- DNS Pre-fetch – early refresh of cache records due to expire soon

- EDNS(0) processing change to reduce the # of round-trips on slow or lossy connections.

- MAP zone file format – image of zone db that can be loaded directly into memory. Recommended only for slaves.

Native PKCS#11 Benefits

- Fewer software components
  with native PKCS #11 feature
- Highest security for your keys
  - (HSMs are generally FIPS certified)
- HSM-provided key management
- HSMs are required for some domains

BIND planned features

- Streamlined zone addition
- DNSSEC Key policy manager
- Wire-speed logging with DNStap
- Parent updating (CDNS, CDNSKEY rr)
- On-the fly IPv6 ptr records
- DNSSEC Negative Trust Anchor
- DDOS mitigations (resolver features)

In Planning & Design phase
Targeted – mid 2015

DHCP Update

ISC DHCP

- 4.3.0 December 2013 provided IPv6 parity
- 4.3.1 released July 2014
- 4.3.2 planned for January 2015
- Release 4.2 will EOL March 2015
- Extended Release 4.1 EOL indefinitely (smaller footprint)

Kea

- New DHCP server
- No client, no relay
- UNIX/BSD only
- Higher performance
- Easily extensible with 'hooks' to your own applications
- Release 0.91 planned for March, 2015, with Host reservation, MAC address associated with IPv6

How to get involved

- Use www.isc.org or source.isc.org to pull the latest code
- Report bugs (www.isc.org for more information)
- Follow @ISCdotORG on Twitter
- Look for the new DNSSEC guide in Q1, 2015
- Subscribe (support) ISC's open source developers

ISC Training and Certification

How does one send a DNS query towards a specific DNS server with "dig"?

dig -s server -q query

On the dig command prompt, enter "server <servername>"

dig @server request

dig server request

edit "/etc/resolv.conf" and then use "dig query"

dig request @server

QUESTIONS?

Thank You

ISC Internet Systems Consortium

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