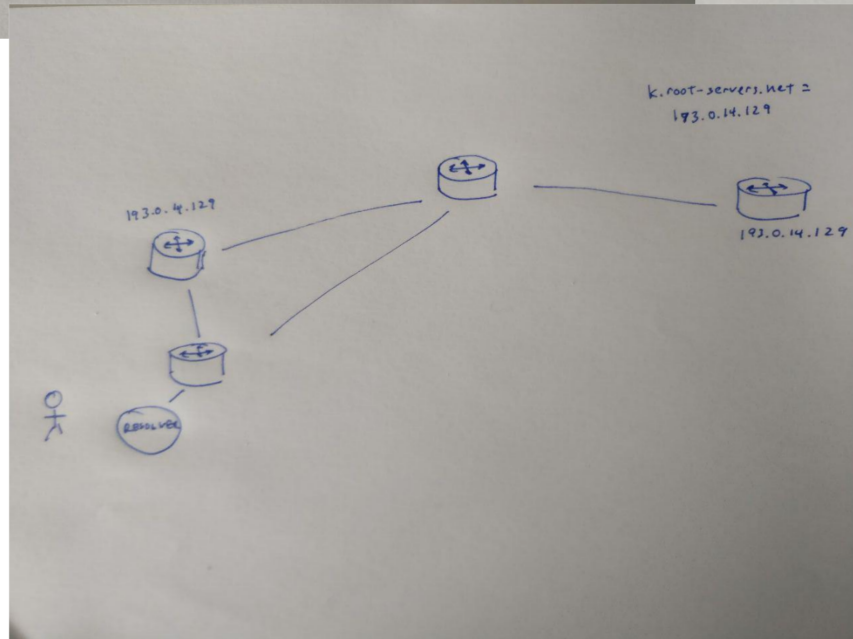
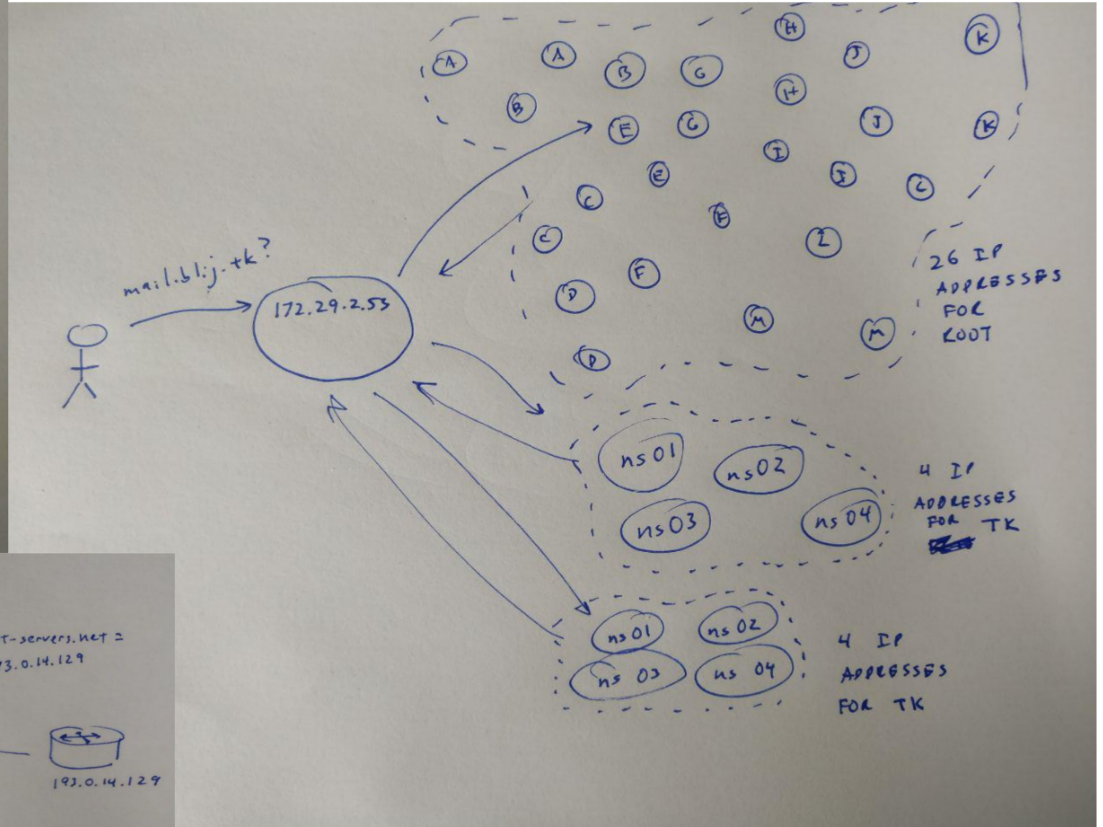
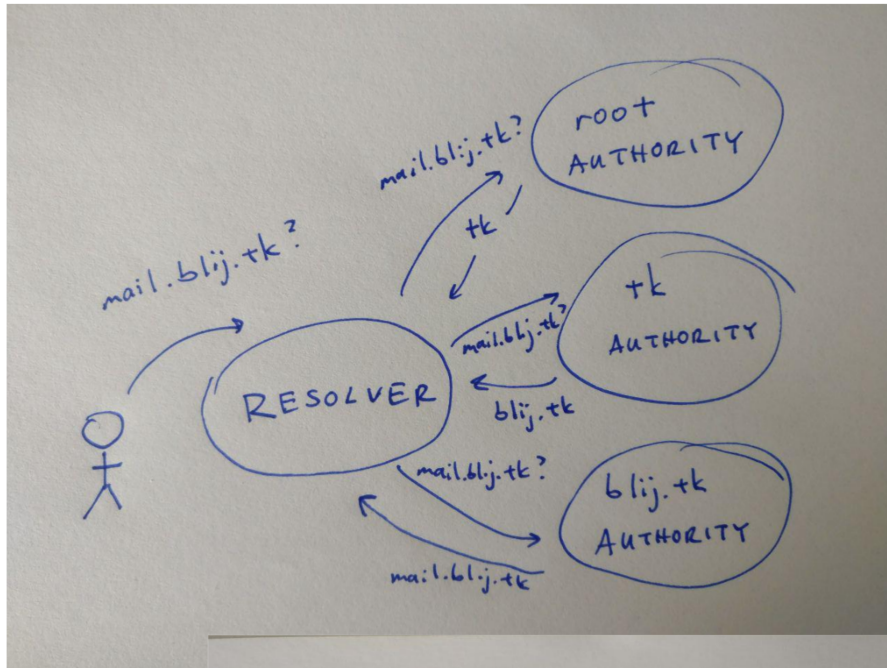


A WHIRLWIND TOUR OF DNS IN ATLAS

SHANE KERR

[<shane@time-travellers.org>](mailto:shane@time-travellers.org)

RIPE ATLAS AND DNS ANYCAST



DNS: LOTS OF SERVERS

- **DNS** IS HOW WE LOOK UP NAMES ON THE INTERNET
- DNS **RECURSIVE RESOLVERS** TALK TO **AUTHORITATIVE SERVERS** TO LOOKUP INFORMATION
- EACH AUTHORITATIVE SERVER MAY HAVE MANY **IP ADDRESSES**
 - PROVIDES REDUNDANCY
 - RESOLVERS USE “ROUND TRIP TIME” (**RTT**) TO PICK THE FASTEST
- BUT...
 - TO DELIVER SERVICE WORLDWIDE WE NEED **MANY** SERVERS
 - HAVING TOO MANY SERVERS BREAKS RTT

DNS: WE LOVE ANYCAST

- IN DNS WE USE **ANYCAST**, WHERE WE HAVE THE SAME IP ADDRESS IN MANY LOCATIONS
- THE BGP ROUTING SYSTEM TRIES TO GET A “CLOSE” SERVER FOR AN IP ADDRESS
- FIRST USED FOR THE **ROOT SERVERS**, WHICH HAD A LIMITED NUMBER OF IP ADDRESSES AND WAS UNDER ATTACK

DNS: WE HATE ANYCAST

- MANY DIFFERENT ANYCAST SERVERS LOOK THE SAME
 - BY DESIGN!
- DIFFICULT TO KNOW WHICH SERVER YOU ARE USING
- DIFFICULT FOR OPERATORS TO DEBUG PROBLEMS
 - WHICH SERVER IS A USER ACTUALLY USING?
 - HOW CAN I BE SURE THAT MY SERVICE IS WORKING?

ANYCAST DNS: ATLAS TO THE RESCUE

- RIPE ATLAS HAS A LARGE NUMBER OF DEDICATED PROBES THAT CAN MAKE DNS MEASUREMENTS
- RIPE ATLAS HAS MANY OPTIONS THAT YOU CAN USE WHEN PERFORMING DNS MEASUREMENTS
- RIPE ATLAS HAS A NUMBER OF ONGOING DNS MEASUREMENTS THAT RESEARCHERS CAN USE

RIPE ATLAS DNS KNOBS

▼ DNS measurement to ns1.p04.dynect.net.

Target: ns1.p04.dynect.net
Target of the measurement (for example IP adress)

Address Family*: IPv6

Query Class*: IN

Query Type*: MX

Query Argument*: oracle.com

Use Macros:
Allow \$p (probe ID), \$r (random hex number) and \$t (timestamp) in the query argument

Description: DNS measurement to ns1.p04.dynect.net

Interval: 240
How often this should be done (seconds between samples). Note that this value is ignored for one-off measurements.

Use the Probe's Resolver(s):
Use the probe's list of local resolvers instead of specifying a target to use as the resolver.

Resolve on Probe:
Force the probe to do DNS resolution

Set NSID bit:
DNS Nameserver Identifier (NSID, RFC5001)

Advanced Options

Daily cost: 36000 credits

166.7%

This measurement would cost 166.7% of your daily income

The new cost of all your measurements would be 166.7% of your daily income

You will not run out of credits in a year

Balance
Total Expenses

Date	Balance	Total Expenses
11/9/2017	~1000	~1000
21/2/2018	~1500	~1500
31/5/2018	~2000	~2000
31/9/2018	~2500	~2500

DNS PROBLEM? THERE'S A KNOB FOR THAT!

- RIPE ATLAS CAN CRAFT PACKETS AND SEND THEM FROM AND TOO ALMOST ANYWHERE
- IPv4/IPv6 – SPOT PROBLEMS WITH IP TRANSIT
- UDP/TCP – CHECK DIFFERENT TRANSPORT PROTOCOLS
- NSID – ASK FOR SERVER NAME INFORMATION
- ENDS BUFFER SIZE – TWEAK MAXIMUM REPLY PACKET SIZE
- DNSSEC – GET DNS SECURITY INFORMATION

REDUCE, REUSE, RECYCLE

- RIPE ATLAS HAS MANY PRE-EXISTING MEASUREMENTS
 - MOST OF THEM FOR DNS!
- IN THE **WEB UI** YOU CAN GET A LIST:
<https://atlas.ripe.net/measurements/?page=1#tab-builtin>
- YOU CAN ALSO SEE MANY OF THEM IN THE DNSMON PAGE:
<https://atlas.ripe.net/dnsmon/>
- IF YOU WANT TO DO SERIOUS ANALYSIS, CONSIDER USING THE **API** TO GET THE DATA IN JSON FORMAT
- THE **ICMP PING** AND **TRACEROUTE** MEASUREMENTS ARE ALSO USEFUL!

DOMAINMON FOR FUN AND PROFIT

- PROVIDES VISUALIZATION SIMILAR TO DNSMON
- USE ON YOUR OWN DOMAINS
- WIZARD GUIDES YOU THROUGH THE PROCESS
 - RESULTS IN “NORMAL” RIPE ATLAS MEASUREMENTS
- USEFUL FOR:
 - YOUR NOC
 - PRESENTATIONS TO CUSTOMERS AND MANAGEMENT

ON-GOING MONITORING A.K.A. “THE CREDIT CRISIS”

- USERS GAIN CREDITS BY HOSTING PROBES, ANCHORS, OR HELPING RIPE IN OTHER WAYS
- HOWEVER, A LARGE-SCALE DEPLOYMENT WILL NEVER HAVE ENOUGH CREDITS TO USE RIPE ATLAS FOR FULL MONITORING
- RIPE ATLAS IS EXCELLENT FOR RESEARCH, MONITORING SMALL DEPLOYMENTS, AS AN EXTRA SOURCE OF INFORMATION, AND AS AN INDEPENDENT RESOURCE
- BE PREPARED TO ALSO USE OTHER TOOLS FOR DNS MONITORING