Tools for Measurements & Analysis

Robert Kisteleki
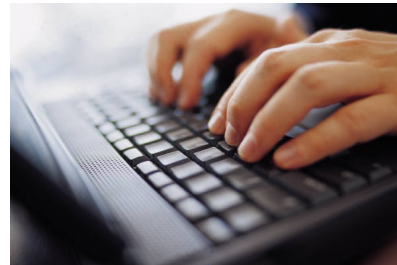R&D Manager
robert@ripe.net

RIPE
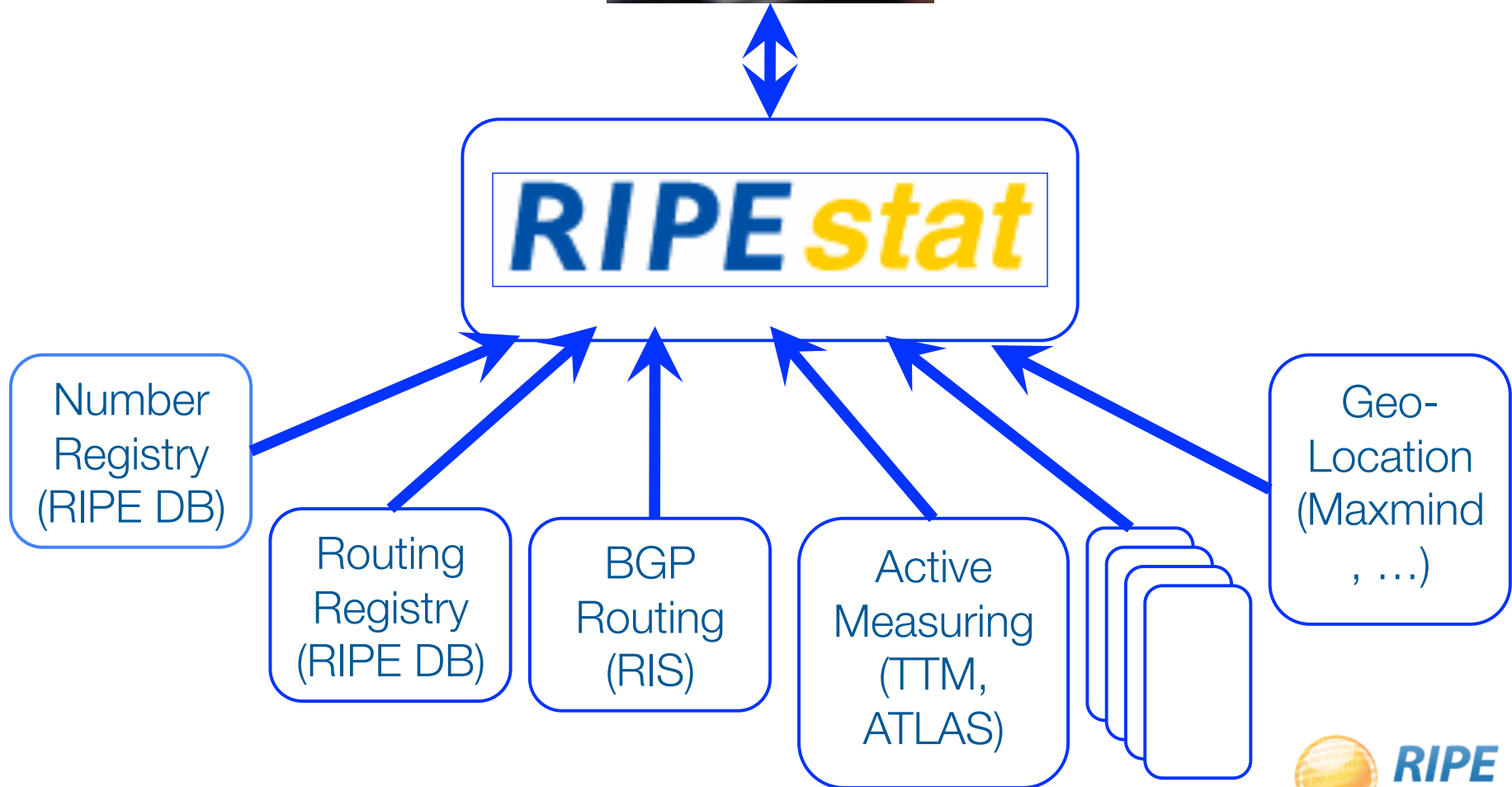NCC

Today's Topics

- RIPEstat

- RIPE Atlas

RIPE*stat*

- "Numbers are Us": IPv4/IPv6 Addresses, ASNs

- Modular & Extendable Toolbox

- "stat" means

  - Statistics (history, aggregation, zoom)

  - Status (real time, aggregation, zoom)

- Beta: `stat.ripe.net`

- Eventually to replace most measurement tools

RIPE*stat*

You

RIPE**stat**

Number Registry (RIPE DB)

Routing Registry (RIPE DB)

BGP Routing (RIS)

Active Measuring (TTM, ATLAS)

Geo-Location (Maxmind, …)

RIPE*stat*

RIPE*stat*

Resource Information (85.154.160.0/21)

this prefix is currently announced by

AS28885

this Autonomous System Number appears to currently be held by

OMANTEL-NAP-AS OmanTel NAP

104 ms / 406 B / c (Ref: Q1045353/6100484 R0)

Download raw data: yaml

Show: link I specification I methodology

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Whois Matches (85.154.160.0/21)

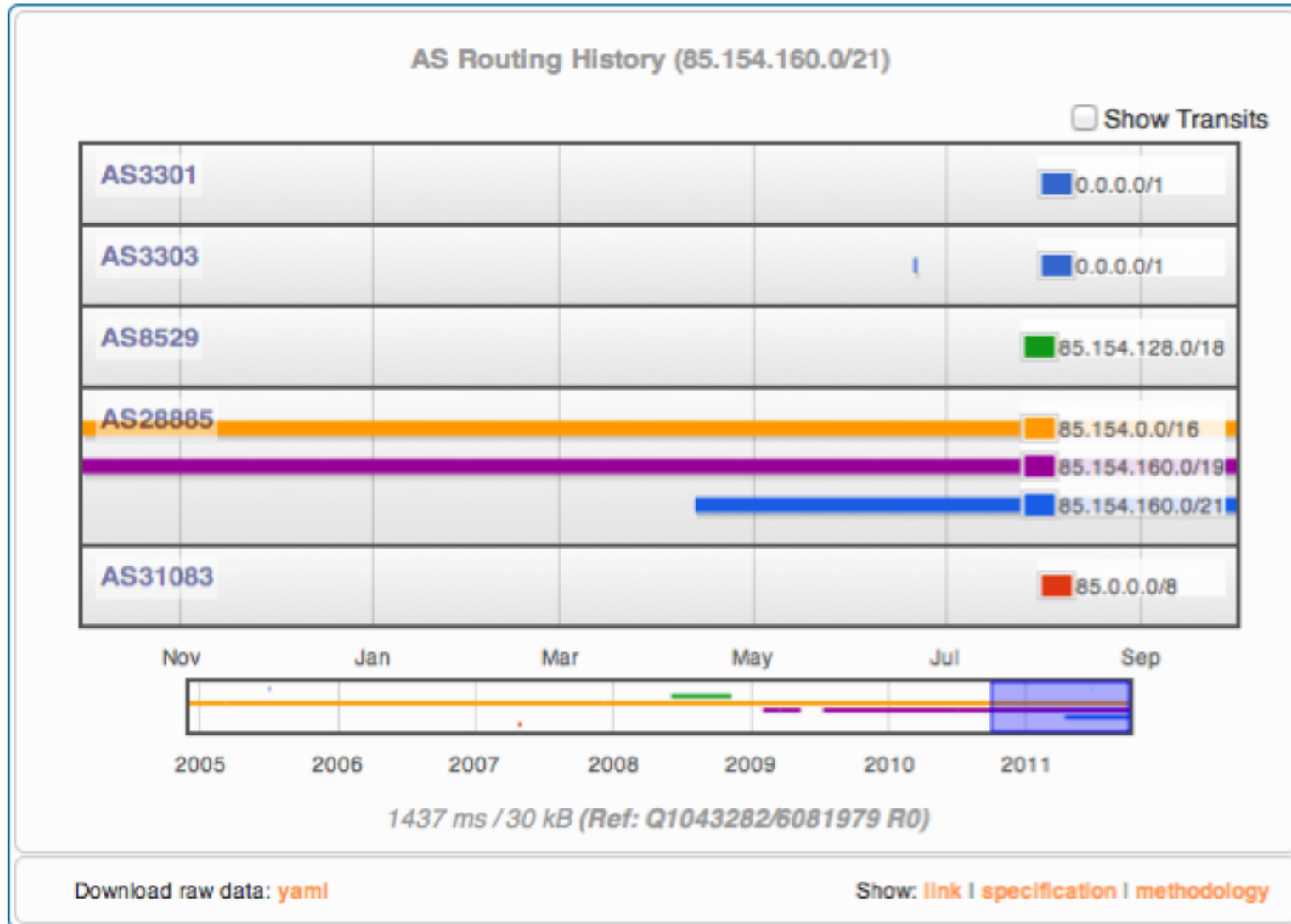Show all fields

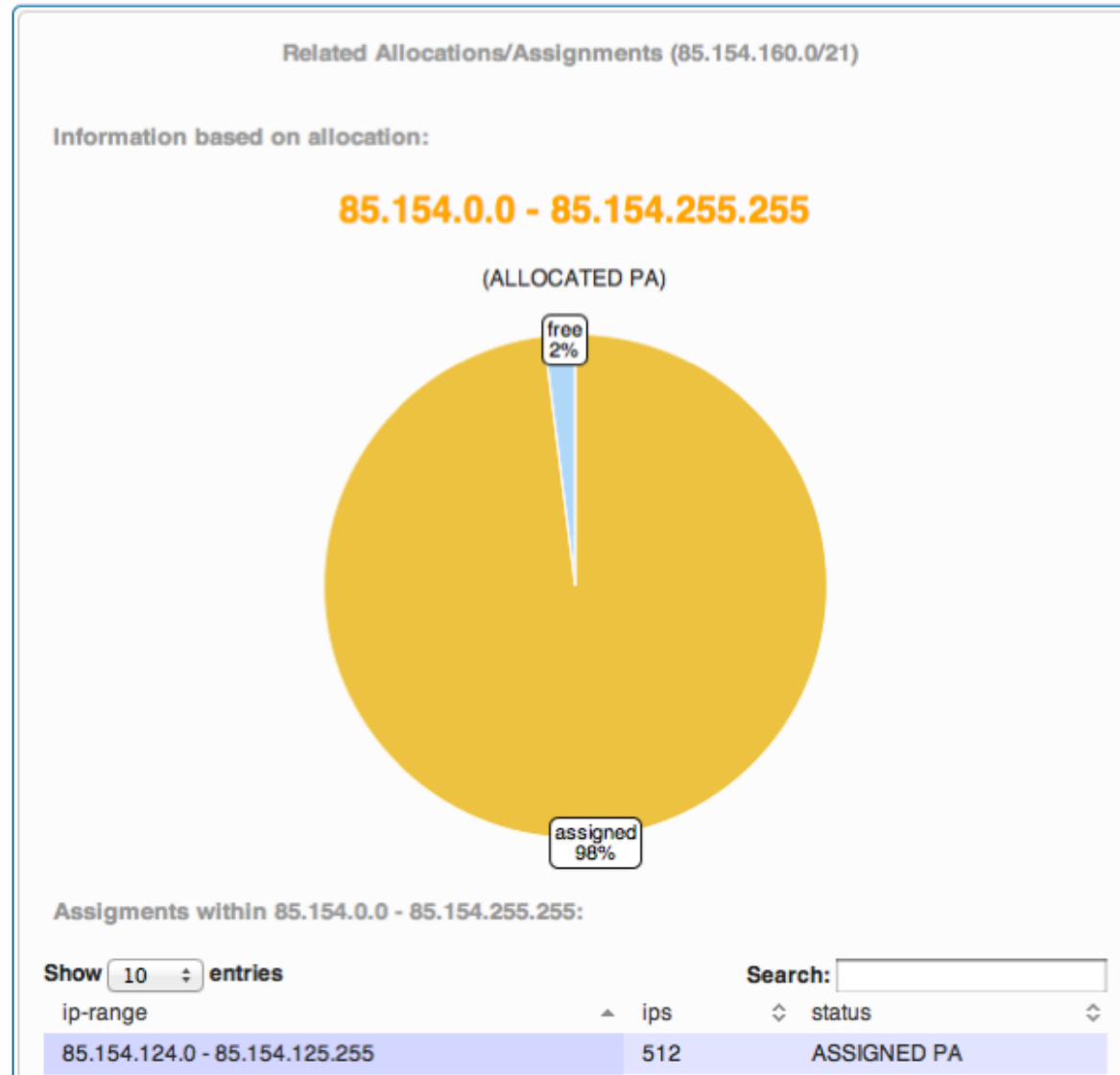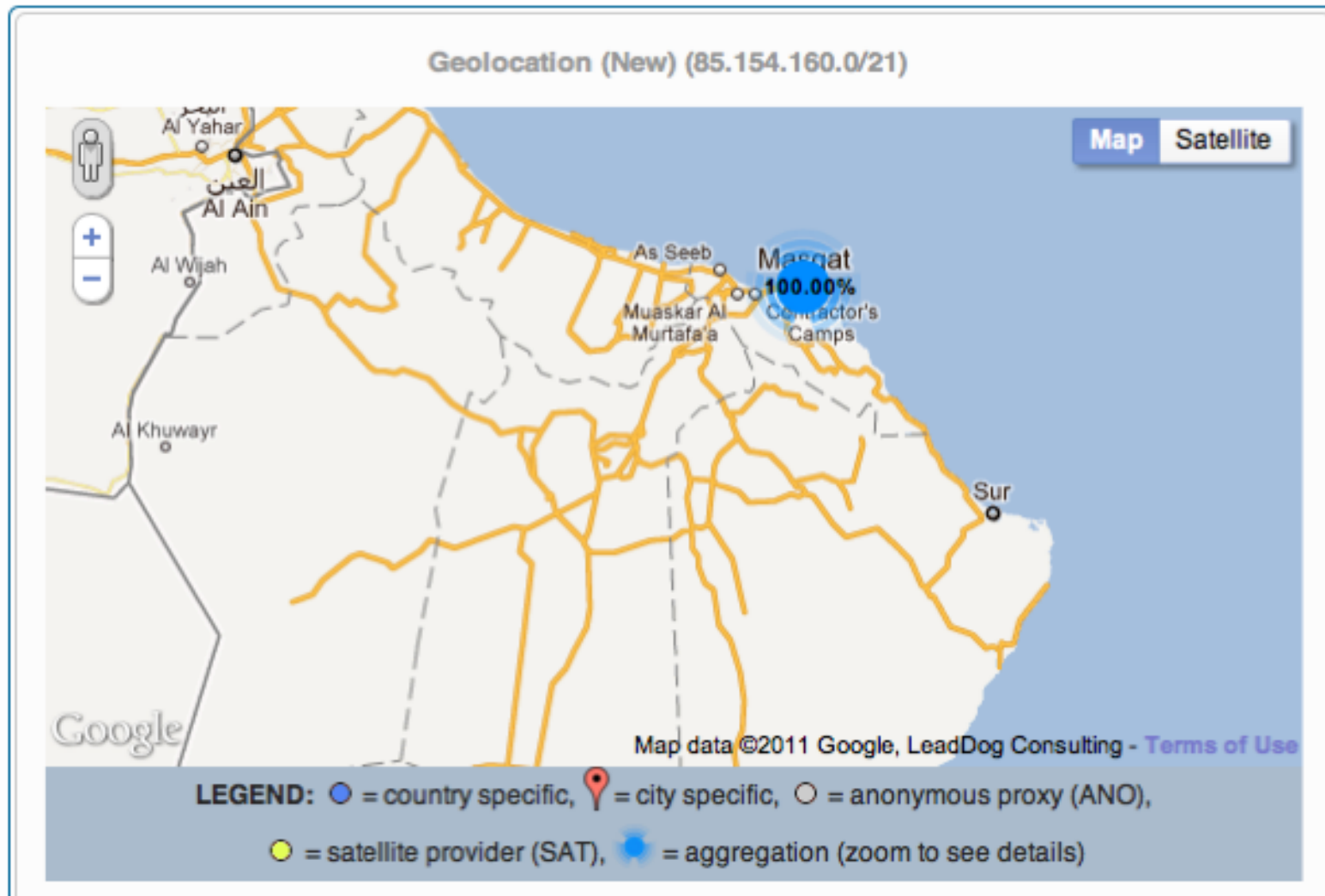|	
resource	85.154.160.0 - 85.154.167.255
netname	OMAN-EXP-2004
country	OM
status	ASSIGNED PA
description	PROVIDER

▸ known issues / limitations:

99 ms / 2 kB / c (Ref: Q1045353/6100485 R0)

Download raw data: yaml

Show: link | specification | methodology

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AS Routing History (85.154.160.0/21)

☐ Show Transits

AS3301		■ 0.0.0.0/1
AS3303		■ 0.0.0.0/1
AS8529		■ 85.154.128.0/18
AS28885		■ 85.154.0.0/16 ■ 85.154.160.0/19 ■ 85.154.160.0/21
AS31083		■ 85.0.0.0/8

Nov   Jan   Mar   May   Jul   Sep

2005   2006   2007   2008   2009   2010   2011

1437 ms / 30 kB (Ref: Q1043282/6081979 R0)

Download raw data: yaml   Show: link I specification I methodology

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Related Allocations/Assignments (85.154.160.0/21)

Information based on allocation:

85.154.0.0 - 85.154.255.255

(ALLOCATED PA)

free
2%

assigned
98%

Assigments within 85.154.0.0 - 85.154.255.255:

Show [10 ‡] entries   Search: [   ]

ip-range	▲	ips	◊	status	◊
85.154.124.0 - 85.154.125.255		512		ASSIGNED PA	

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BGP Looking Glass (85.154.160.0/21)

Search: [ ]

Amsterdam, Netherlands (RRC00)
```
3333 8529 28885, (aggregated by 28885 62.231.255.121)
   193.0.0.56 from 193.0.0.56 (193.0.0.56)
      Origin incomplete, localpref 100, valid, external, atomic-aggregate, best
      Community: 8529:10 8529:30
      Last update: Thu Sep 22 13:33:12 2011
```
⤸ Show more (18)

London, United Kingdom (RRC01)
```
42708 8529 28885, (aggregated by 28885 62.231.255.121)
   195.66.225.159 from 195.66.225.159 (80.67.4.5)
      Origin incomplete, localpref 100, valid, external, atomic-aggregate, best
      Last update: Tue Sep 13 21:37:05 2011
```
⤸ Show more (13)

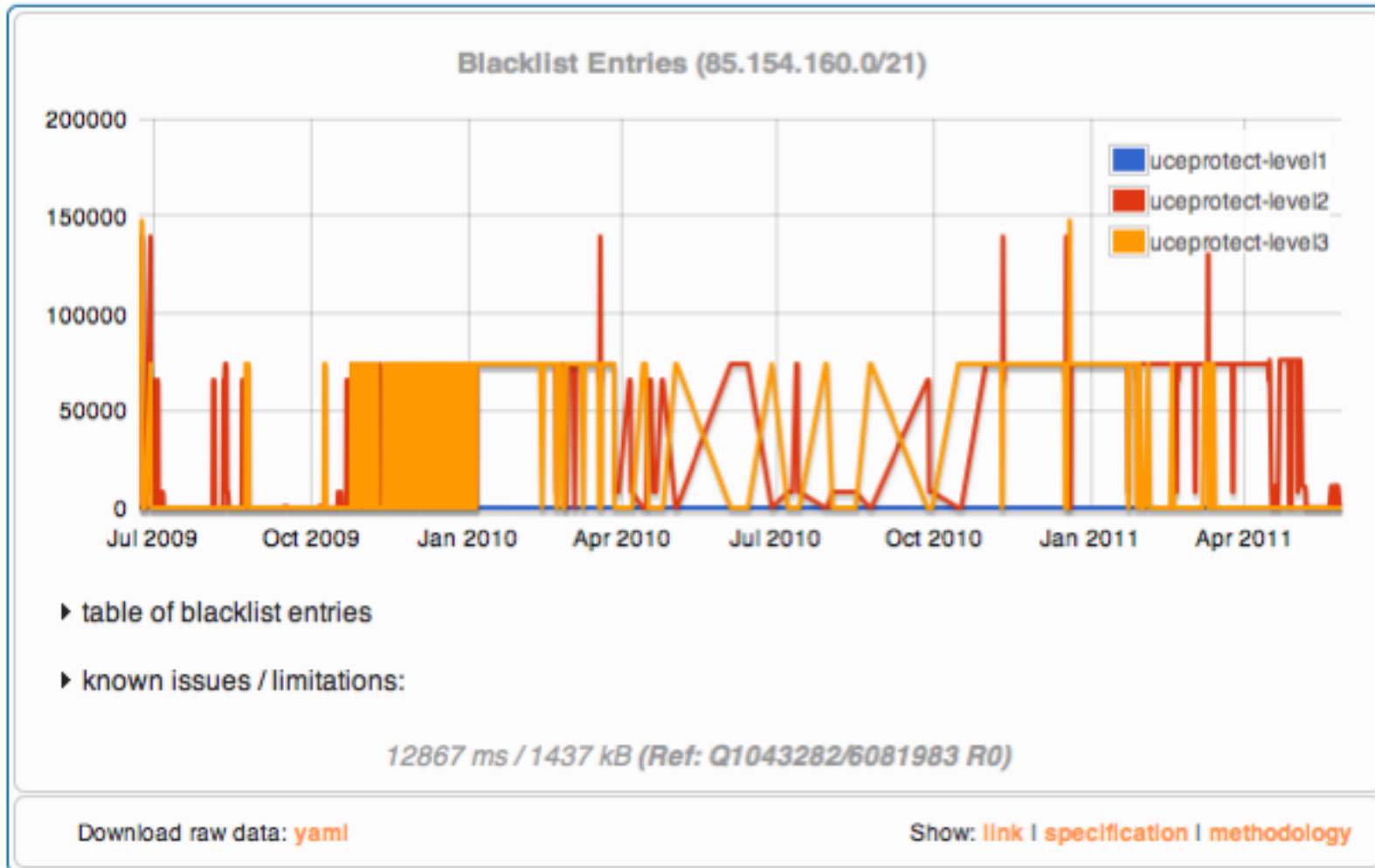**Amsterdam, Netherlands (RRC03)**
```
1103 8529 28885, (aggregated by 28885 62.231.255.121)
   195.69.144.30 from 195.69.144.34 (145.145.127.8)
      Origin incomplete, localpref 100, valid, external, atomic-aggregate, best
      Community: 1103:1000 8529:10 8529:30
      Last update: Tue Sep 13 21:36:46 2011
```
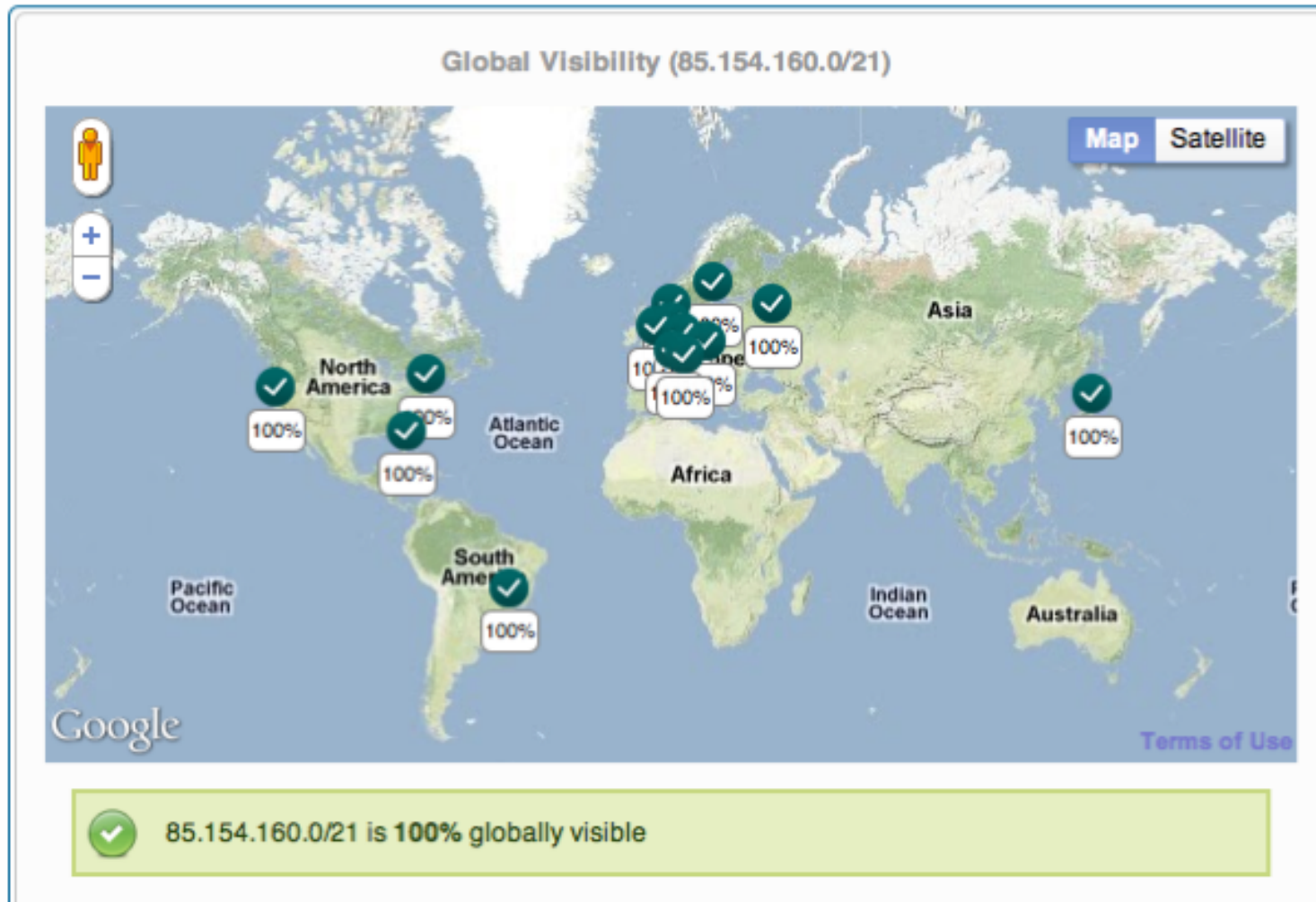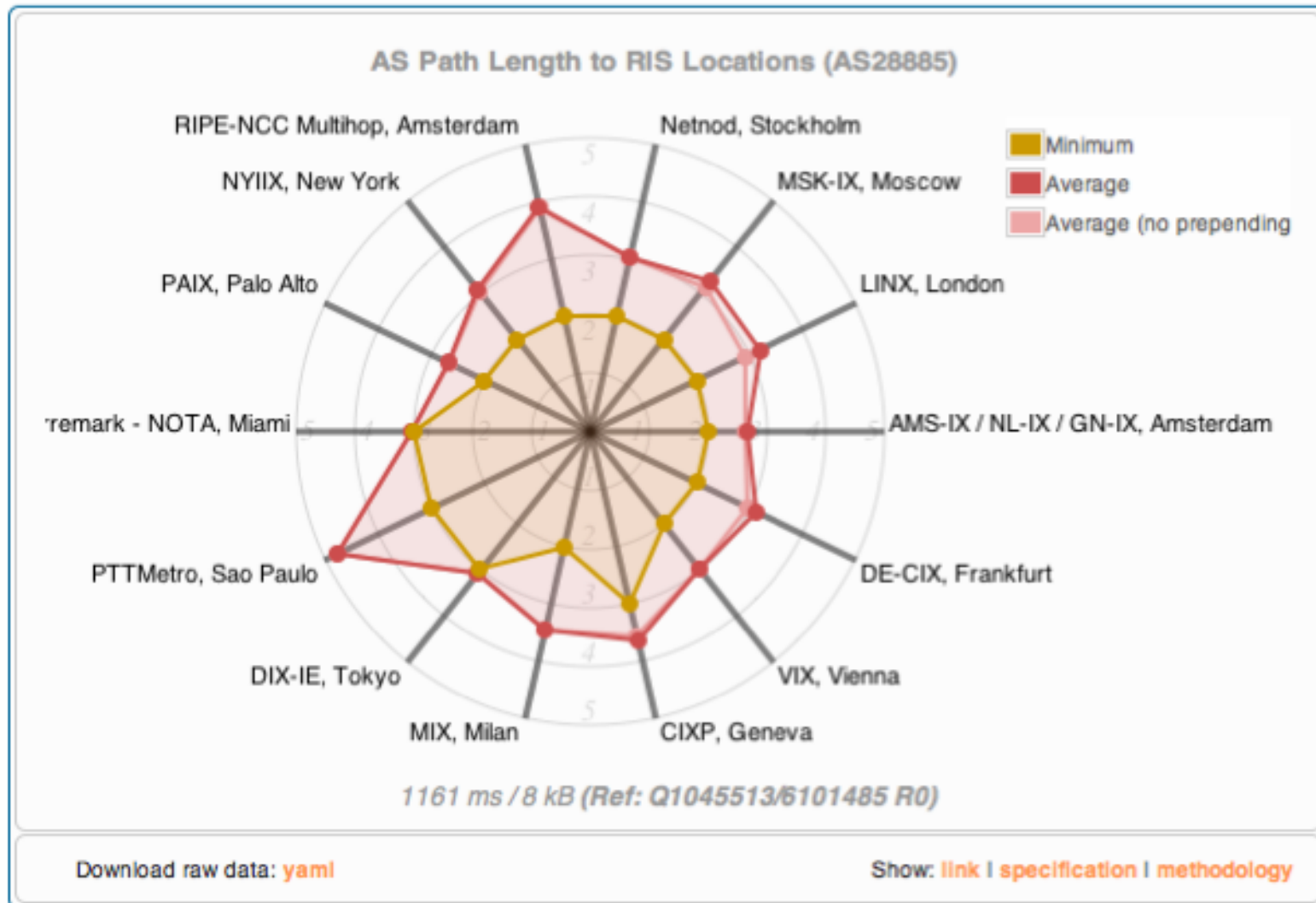⤸ Show more (8)

Geneva, Switzerland (RRC04)
```
29222 286 8529 28885, (aggregated by 28885 62.231.255.121)
   192.65.185.140 from 192.65.185.140 (84.16.64.30)
      Origin incomplete, localpref 100, valid, external, atomic-aggregate, best
      Last update: Wed Sep 14 17:52:14 2011
```
⤸ Show more (5)

RIPE*stat*

RIPE*stat*

Global Visibility (85.154.160.0/21)

85.154.160.0/21 is **100%** globally visible

RIPE*stat*

AS Path Length to RIS Locations (AS28885)

1161 ms / 8 kB (Ref: Q1045513/6101485 R0)

Download raw data: yaml

Show: link I specification I methodology

RIPE*stat* Strategy

- Immutable, sharable URLs for each result

- Add more history

- Multiple output formats (command line tool?)

- **Eventually integrate current RIPE NCC tools**

RIPE*stat* Regular Public Demos

- Modular design --> agile development

- We demo new functionality every 4 weeks

  - we receive comments and feedback

- We monitor usage, ... and you can too

- Based on usage and feedback we will adjust

- You get the tools you deserve: get involved!

- *Please do not consider the demos as finished !*

RIPE*stat*

News
- **Upcoming 9th public demo**
- **Egyptian Network Outage**
- **Japanese Earthquake**

RIPEstat Development
- **Introduction to Demos**
- **25 January 2011** `HD` `SD`
- **22 February 2011** `HD` `SD`
- **22 March 2011** `HD` `SD`
- **19 April 2011** `HD` `SD`
- **17 May 2011** `HD` `SD`
- **14 June 2011** `HD` `SD`
- **12 July 2011** `HD`
- **6 September 2011** `HD` `SD`
- 4 October 2011
- 1 November 2011
- 29 November 2011
- 27 December2011

Today's Topics

- **RIPEstat**

- **RIPE Atlas**

Introduction

RIPE Atlas:

- There are many Atlases, this is *RIPE Atlas*

- next generation Internet measurement network

  - To scale to thousands of measurement nodes

  - Potentially "be everywhere" and ready to run different measurements

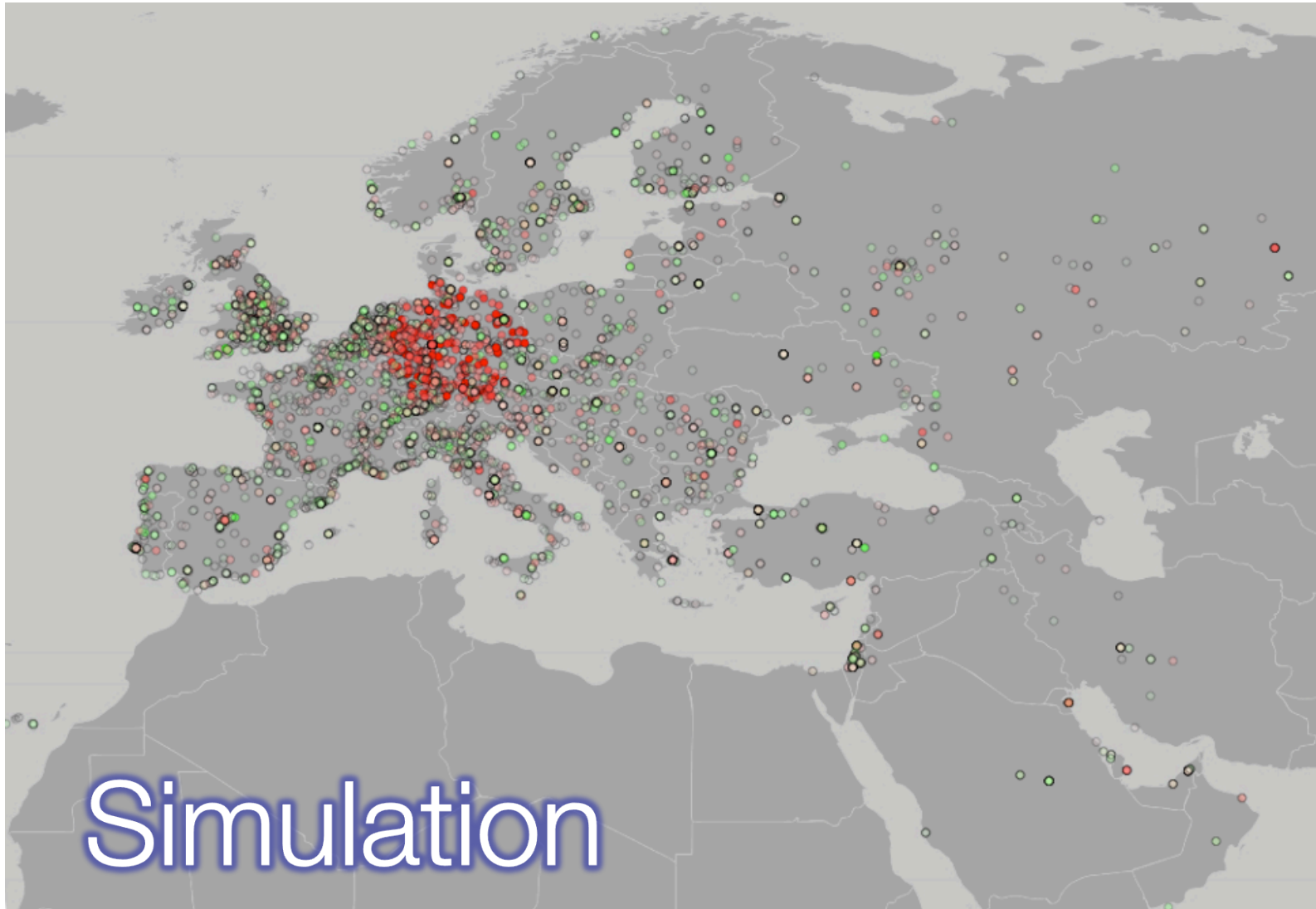 - Started last November, we're still just building it and exploring possibilities

Light Map of Europe

Intuition: 10k Probes & 1 AS

Simulation

Ambitious Community Effort

Instead of building small, separate,

individual & private infrastructures,

build a

huge common infrastructure

that serves *both* the private goals

*and* the community goals.

Ambitious Community Effort

- Individual Benefits

  - Less expensive than rolling your own

  - More vantage points available

  - More data available

- Community Benefits

  - Unprecedented situational awareness

  - Wealth of data, …

Intuition -> Plan

- For accurate maps we need more probes

- Deploying very many TTM boxes too expensive

- Smaller probes

- Easily deployable

- USB powered

- 24 x 365 capable
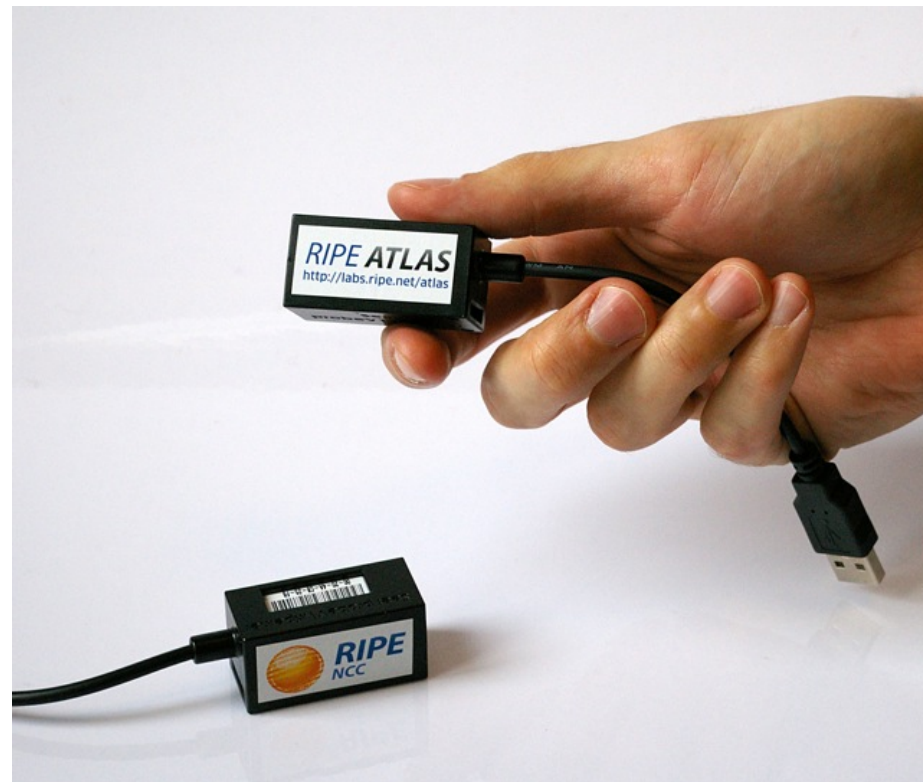
Probe Deployments

Versions

- Version 0

  - Ping to fixed targets (IPv4 & IPv6) ✔

  - Traceroute to 1st two upstream hops ✔

- Version 1 (beta with selected testers this month)

  - Ping & Traceroute to variable targets

  - DNS queries to variable targets

- Version 2

  - Your ideas?

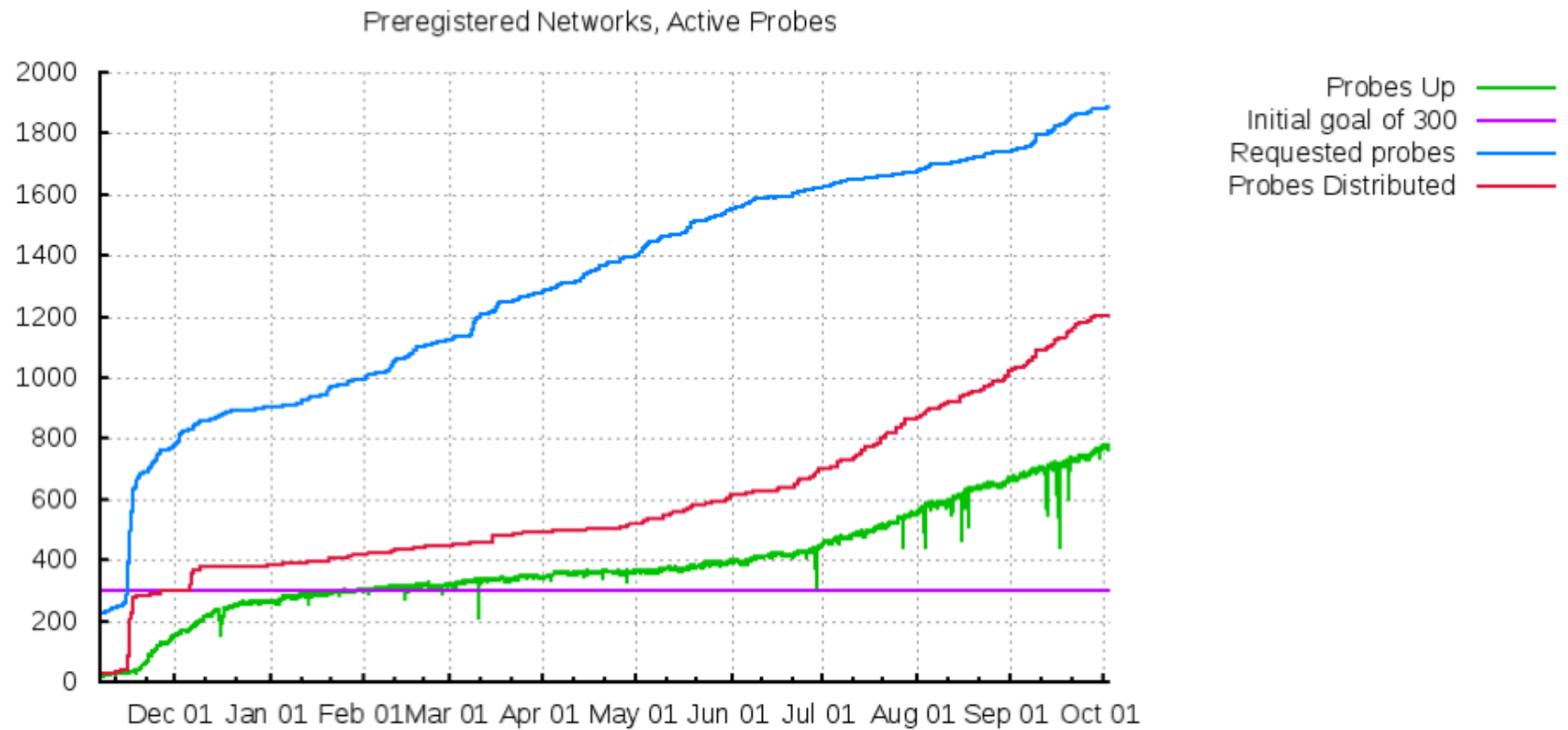- A non-goal: last-mile performance measurements

Probes Deployed Today

Probes Deployed Today

Probes Deployed Today

Preregistered Networks, Active Probes

Legend:
- Probes Up
- Initial goal of 300
- Requested probes
- Probes Distributed

Hosting = Credits = Measurements

- We cannot be everywhere without your help

Become a probe host!

- Donate a fraction of your bandwidth
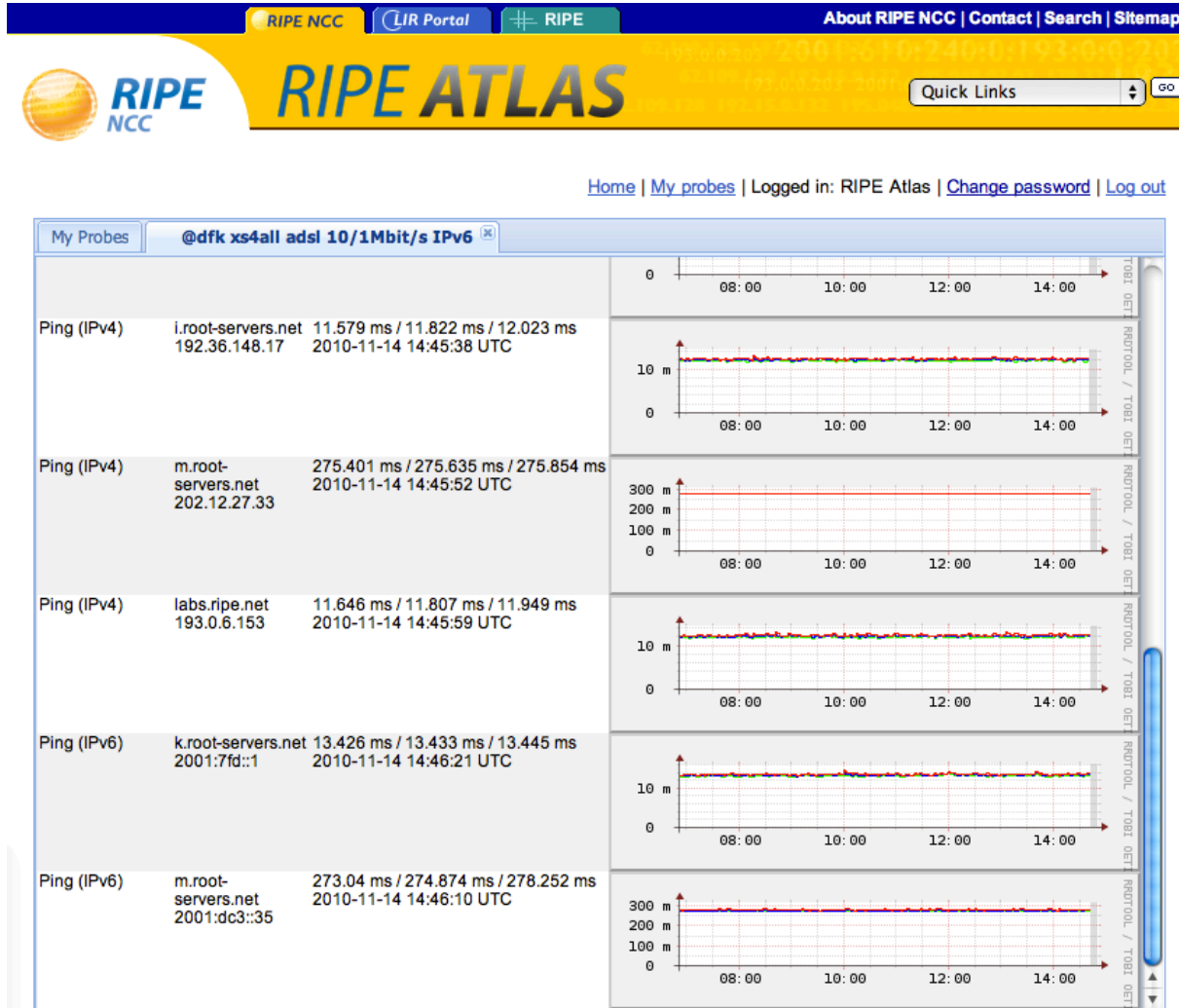
- Donate a very small amount of electricity

You get:

- Recognition

- Access to fixed measurements from your probe

- Credits = Measurements from any probe (Q3/11)

Sponsorship = Credits = Measurements

Credits – a "measurement ecosystem"?

- Hosting a probe or sponsoring will earn you credits

- Scheduling your own measurements will cost credits

  - Simpler measurements are cheaper

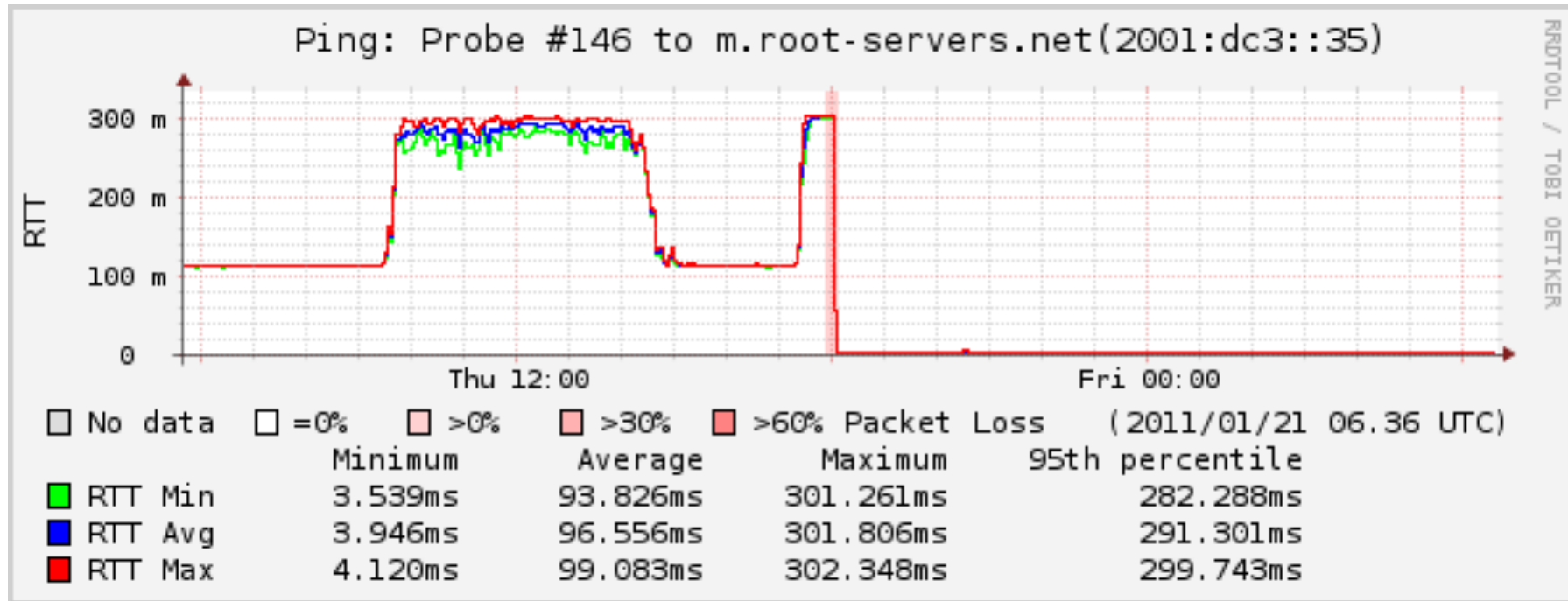 - More complex or more frequent measurements cost more
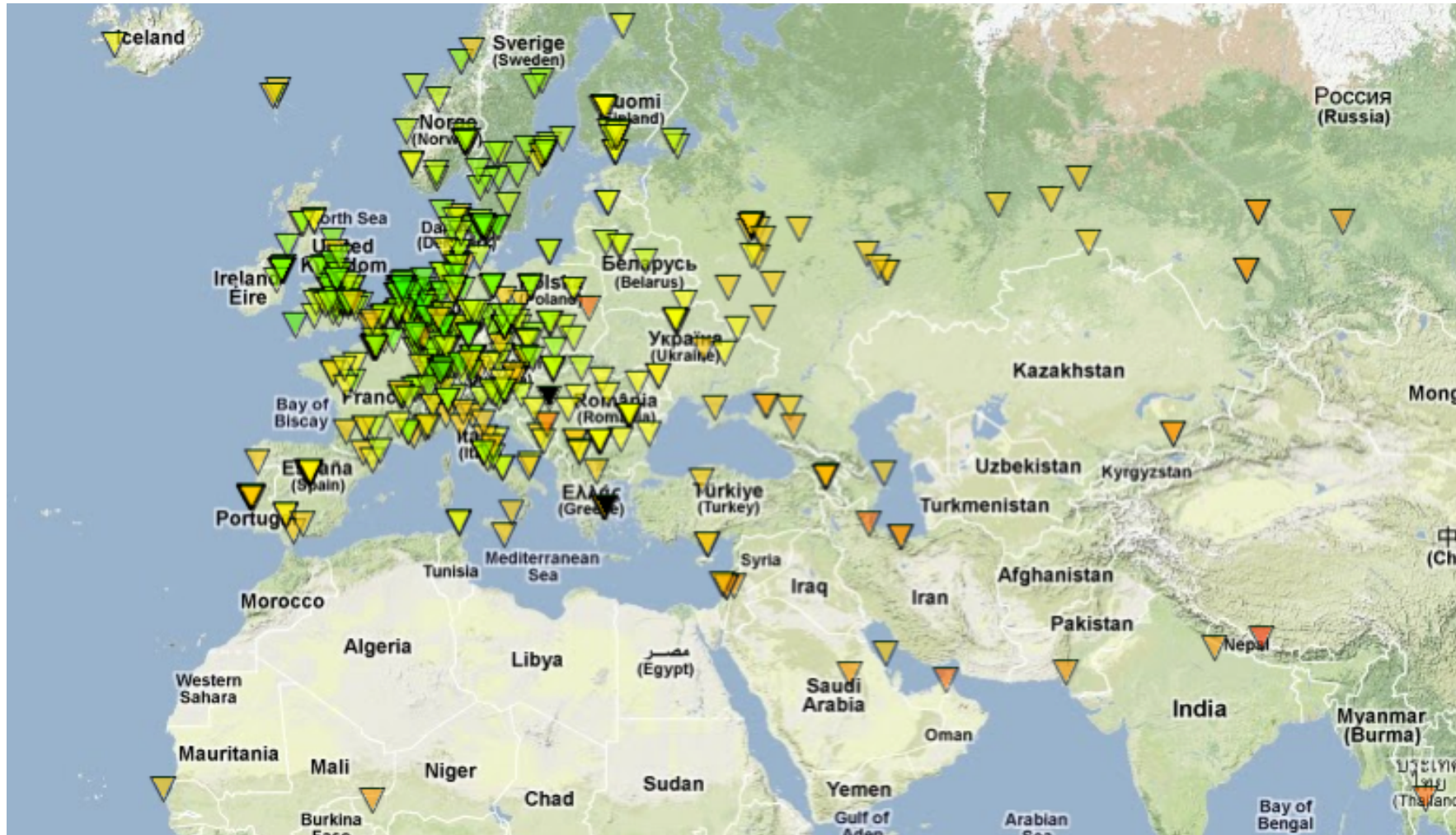
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What you see is what you get

What you see is what you get

Ping: Probe #146 to m.root-servers.net(2001:dc3::35)

	Minimum	Average	Maximum	95th percentile
RTT Min	3.539ms	93.826ms	301.261ms	282.288ms
RTT Avg	3.946ms	96.556ms	301.806ms	291.301ms
RTT Max	4.120ms	99.083ms	302.348ms	299.743ms

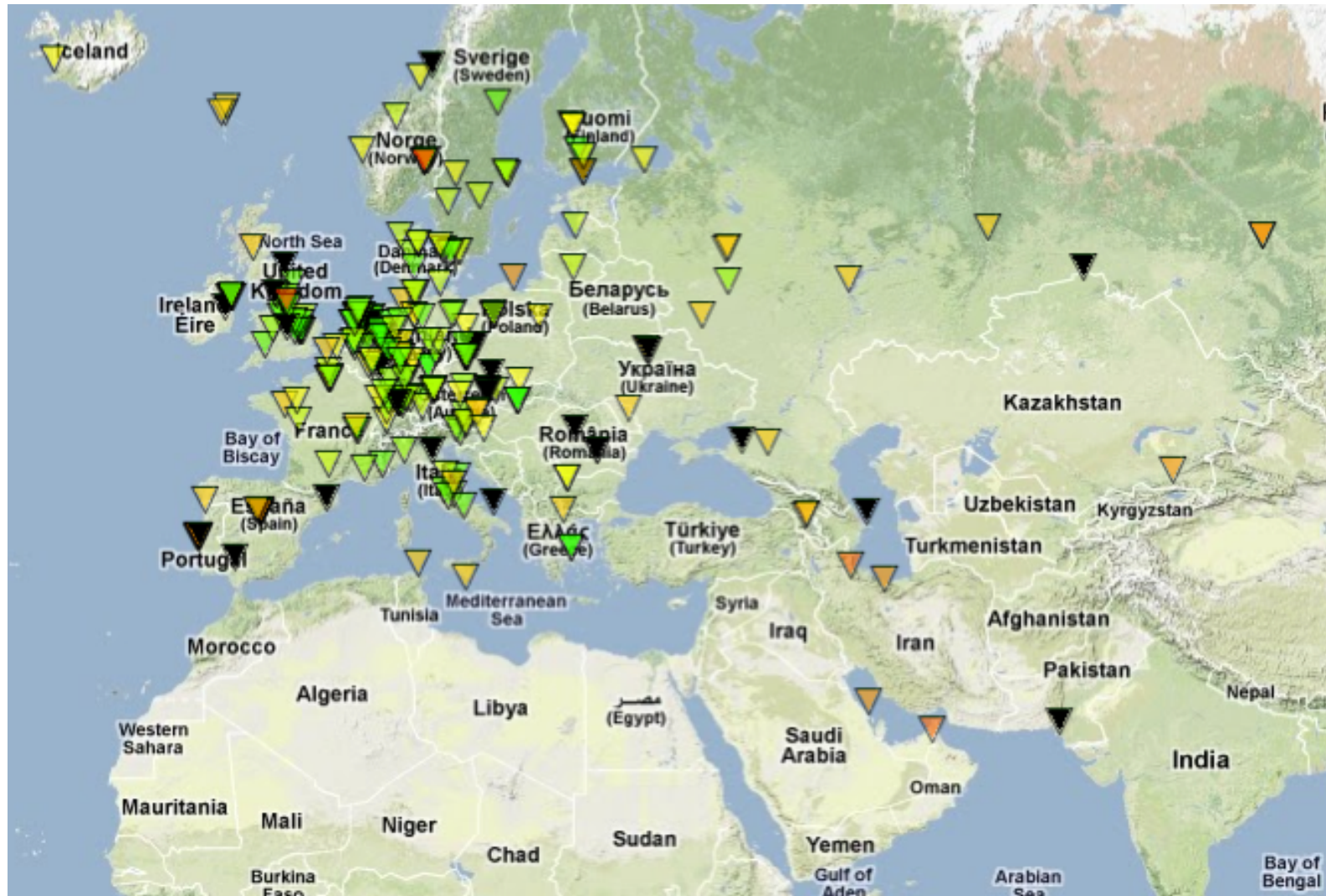No data =0% >0% >30% >60% Packet Loss (2011/01/21 06.36 UTC)

How we see labs.ripe.net (IPv4 RTT)

RIPE NCC

How we see k.root-servers.net (IPv4 RTT)

How we see k.root-servers.net (IPv6 RTT)

Sponsorship = Credits = Measurements

- 50k probes too expensive for RIPE NCC alone

- Sponsorship Plans:

2K €	8 probes
4K €	16 probes
	…
64K €	256 probes

- Recognition and many more credits

- Access to fixed measurements from probes now

- Credits = Measurements from any probe (Q4/11)

Sponsorship = Credits = Measurements

- 50k probes too expensive for RIPE NCC alone

- Sponsorship Plans:

  that is 2048€ 2K €   8 probes

  4K €   16 probes

  geek compatible pricing℠

  …

  64K €   256 probes

- Recognition and many more credits

- Access to fixed measurements from probes now

- Credits = Measurements from any probe (Q3/11)

Measurement nodes – "Probes"

- Probe (v1 / generation 1):
  - Lantronix XPortPro
  - Very low power usage
  - 8MB RAM, 16MB flash
  - Runs uClinux
  - No FPU, no MMU, virtually no UI
  - A reboot costs <15 (<5) seconds
  - An SSH connection costs ~30 seconds
  - We can remotely update the firmware
  - Form factor of the finished probe is "just right"

RIPE Atlas - Security aspects

- Probes have hardwired trust material (registration server addresses / keys)

- The probes don't have any open ports, they only initiate connections

  – This works fine with NATs too

- Probes don't listen to local traffic, there are no passive measurements running

  – There's no snooping around

Today's Topics

- RIPEstat

- RIPE Atlas

RIPE NCC Measurement Tools

- Tools for YOU

- Please support us by

  - Using the tools

  - Giving us feedback and ideas

  - Telling your friends about them

  - Finding sponsors for RIPE Atlas

Questions?

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