Packet Clearing House

PCH ANYCAST AT .HU

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HUNOG 2023

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Outline

- whoami?
- about PCH?
- anycast technology
- plans to become a secondary for .HU zone
- plans about establishing a PoP at BIX

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whoami

- worked at a university
- at one of the 5 biggest banks
- nic.hu / ISZT
- now: PCH - DNS Services Engineer

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About PCH

- Packet Clearing House (PCH) is the global intergovernmental treaty organization responsible for providing operational support and security to critical Internet infrastructure, including Internet exchange points and the core of the DNS, since 1994.

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About PCH

- Providing DNS infrastructure for 2 root server administrators
    - instance D - University of Maryland
    - instance E - NASA
- about 400 TLDs including 130 ccTLDs
- the Quad9 recursive resolver
- ipv4: 9.9.9.9, ipv6: 2620:fe::fe

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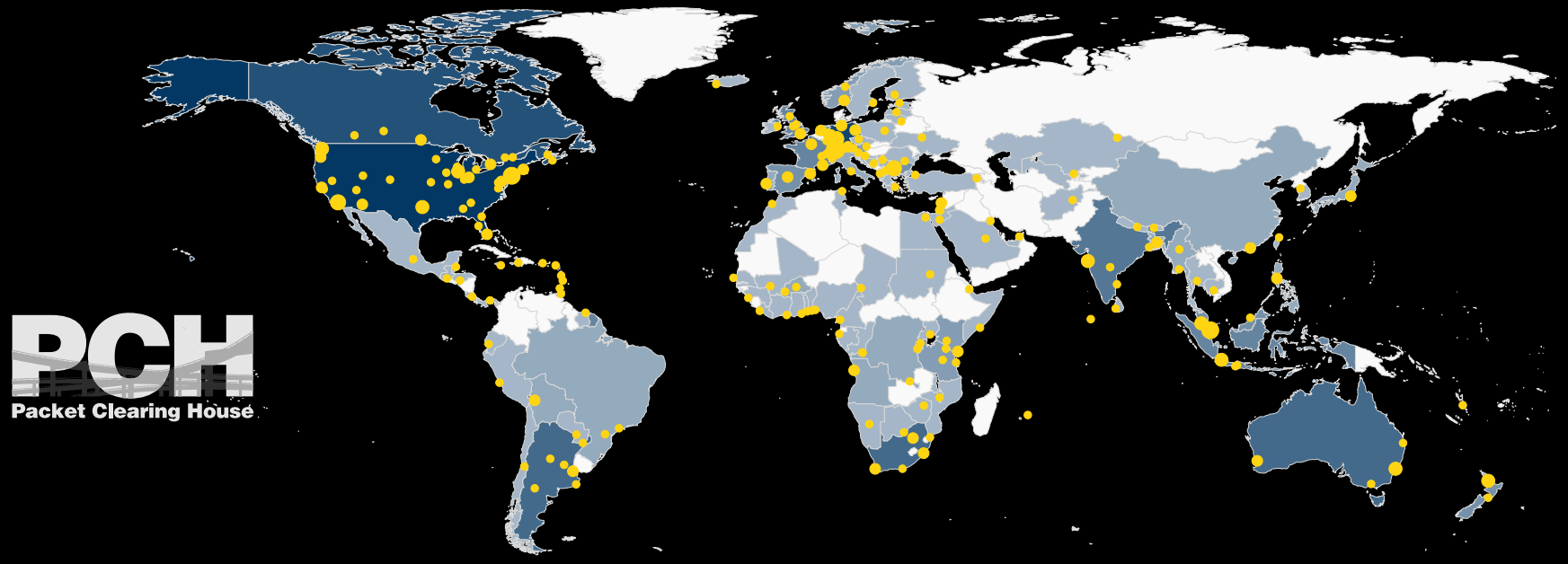
Anycast technology

- Anycast is a *special network configuration* that is used to have the same IP address online at various locations, at the same time.
- Via BGP, the Internet's global routing system routes users to the anycast node that is closest (topographically) to them.
- Anycast is a popular especially with DNS.

Locations

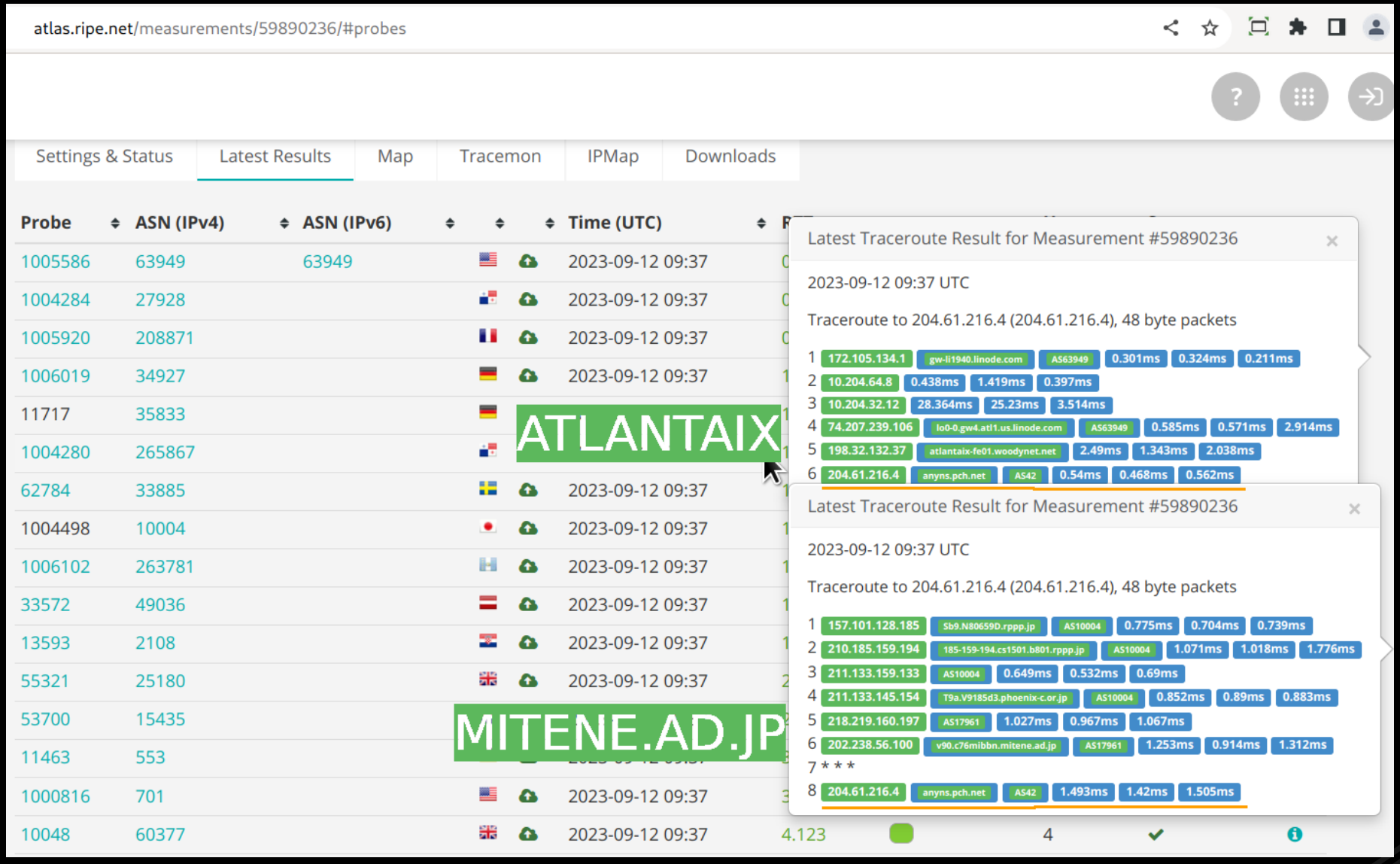
- As of September 2023, PCH has Points of Presence (PoPs) in 283 Internet Exchange Points in 125 countries.



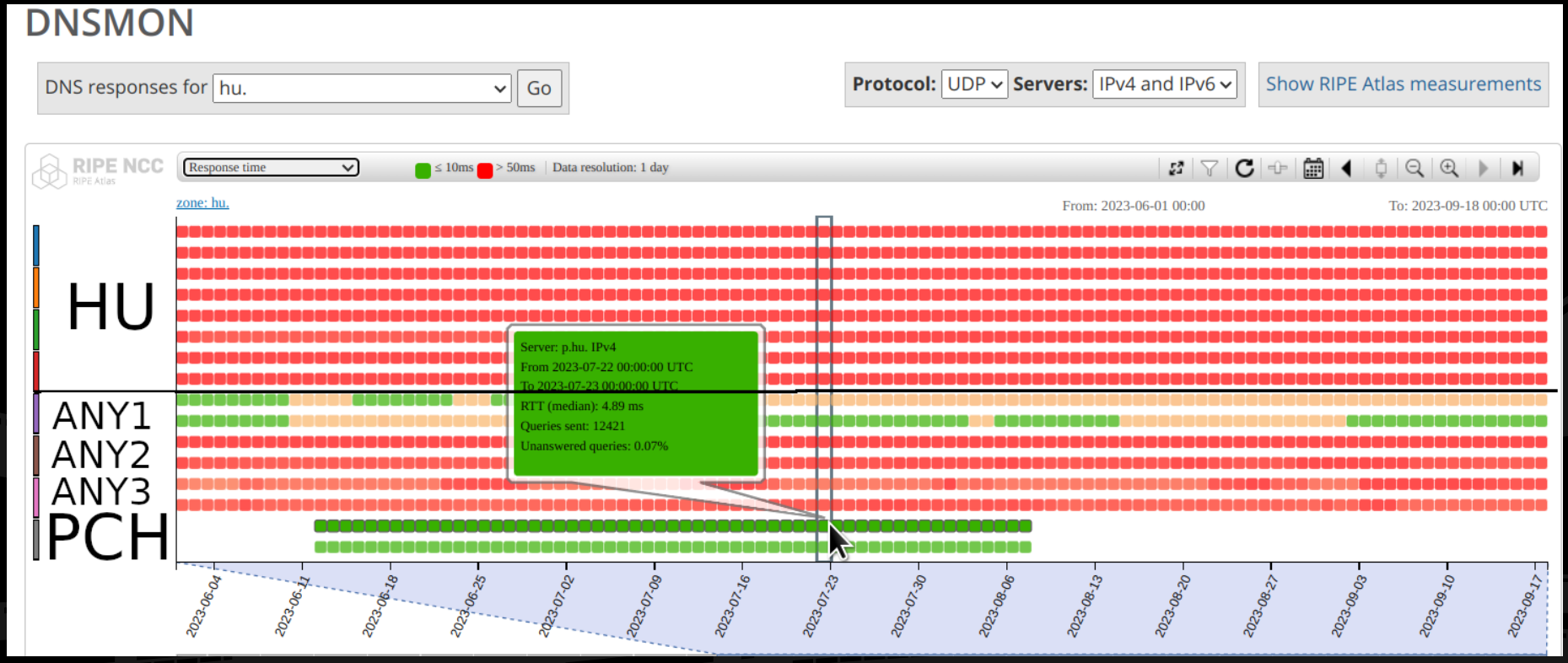
Locations EU

RTT, traceroute for PCH anycast

atlas.ripe.net/measurements/59890236/



DNSmon HU testing



Root servers RTT from HU

There are 13: a, b, c ... m
in milliseconds

e.root-servers.net : 3.62 3.67 3.80
f.root-servers.net : 3.79 4.05 3.56
c.root-servers.net : 5.85 5.96 6.13

^ these are at BIX

Root servers RTT from HU

```
l.root-servers.net : 11.8 13.1 37.3
h.root-servers.net : 18.1 18.2 18.7
i.root-servers.net : 18.7 20.5 21.1
k.root-servers.net : 20.6 22.0 31.6
                ...
```

^ K is at BIX, routing issue?

Root servers availability from HU

- common locations...
  - in the US
  - Frankfurt
  - Amsterdam
  - France - multiple locations
  - London

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In progress #1

- finalizing a contract with the registry
- to serve .HU zone on the anycast

In progress #2

- with help from the registry
- ...to deploy a node at BIX (Dataplex)
- which would get all the zones on the anycast locally available
- 2 root DNS servers
- Quad9 resolver

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the end

- questions?
- give feedback
    - to me - tom at pch.net
    - to the registry - HU nyilvántartó
    - domain.hu/impresszum

extra slides

Deployments

- small, medium and full cluster installations
- routing vendor redundancy: Cisco, FRR and Quagga
- Cisco servers with hardware specs based on deployment types
- VMware ESXi clusters, supporting any x86_64 OS
- hosted servers fully integrated with BGP routing architecture

Deployments

- os redundancy: CentOS and Debian (new installs)
- name server redundancy: nsd, bind9, dnsdist
- long-term strategic relationships with all involved vendors
- Cisco, AMD, VMware, CZ.NIC, ISC, NLnet Labs, PowerDNS

Monitoring

- multiple layers of monitoring to proactively detect issues that could be leading to a degradation of the service
- hardware layer: CPU, temperature, RAM, Disks
- interconnection layer: ports and traffic levels
- routing layer: AS-PATH and prefix announcements
- service layer: queries per second, replies per second

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Monitoring

- passive monitoring tools
- Cacti/Nagios/Prometheus/LibreNMS with custom plugins for DNS and DNSSEC
- netflow monitoring traffic levels
- active monitoring of global performance using RIPE Atlas and RIPE DNSMon measurements on a regular basis