



UNIVERSITAT POLITÈCNICA DE CATALUNYA
DEPARTAMENT D'ARQUITECTURA DE COMPUTADORS

LISPmon: Monitorizando la Internet del futuro

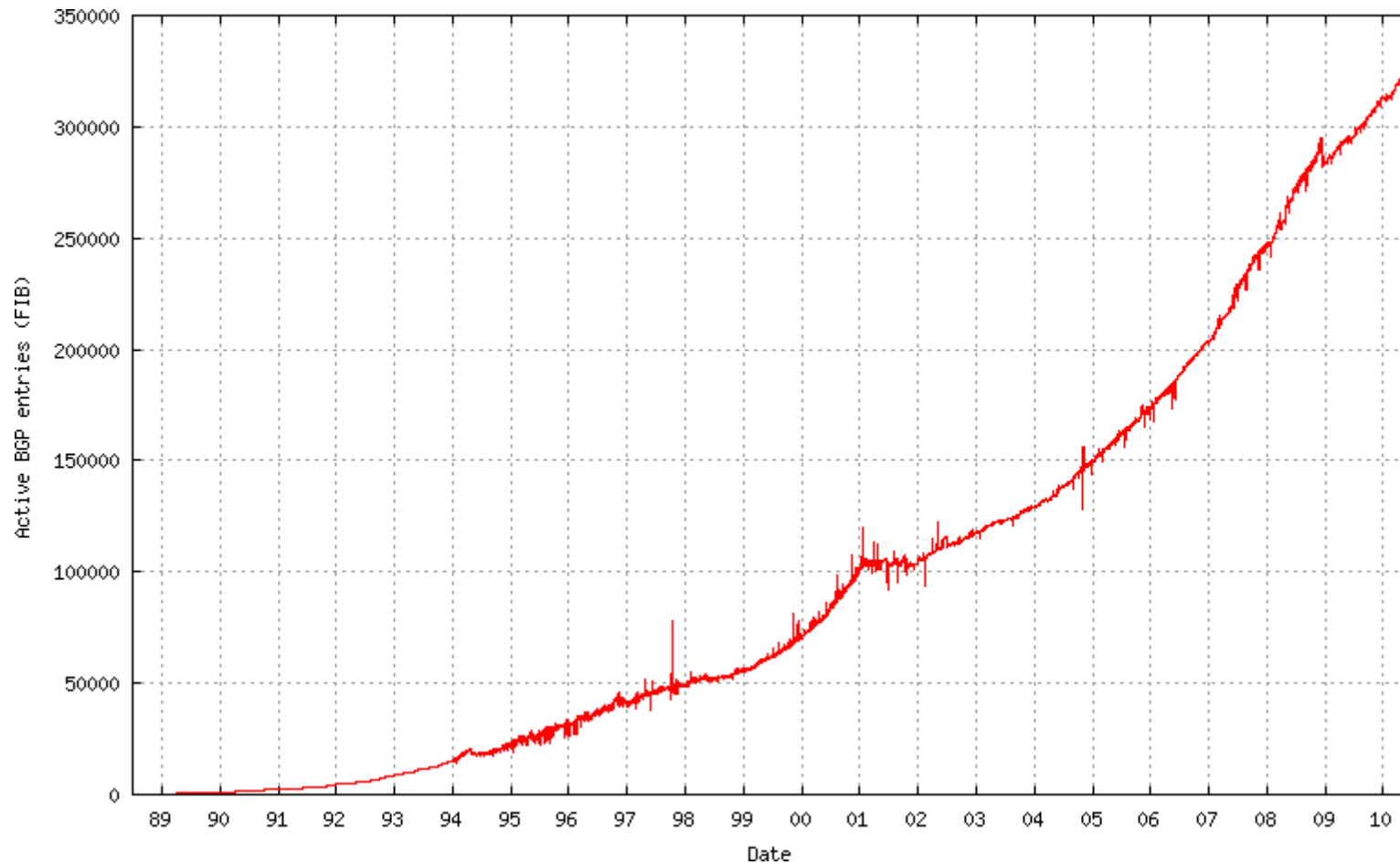
Loránd Jakab, Albert Cabellos-
Aparicio, Jordi Domingo-Pascual

Jornadas Técnicas de RedIRIS
17 de noviembre de 2010

“The workshop participants believe that routing scalability is the most important problem facing the Internet today and must be solved.”

RFC4984 – Report from the IAB Workshop on Routing and Addressing, October 2006

BGP Default-free Zone (DFZ) Table Growth



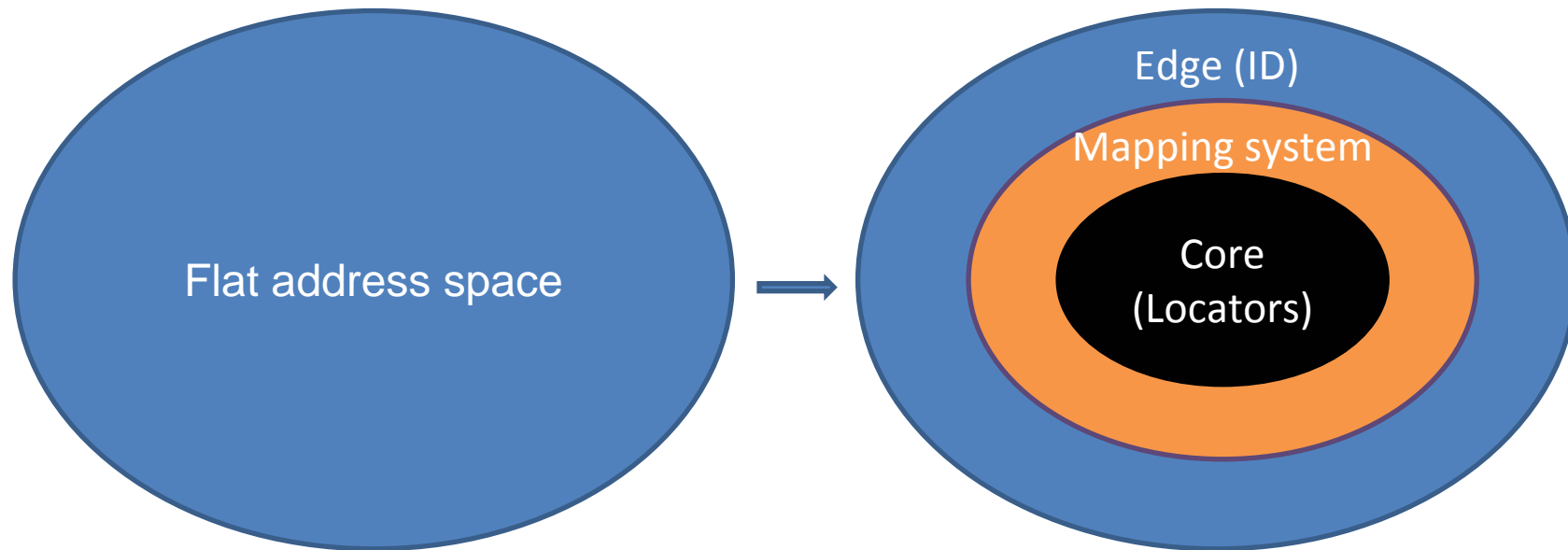
DFZ Table Growth Causes

- Multihoming
- Traffic engineering
- Non-aggregatable address allocations
- Mergers and acquisitions

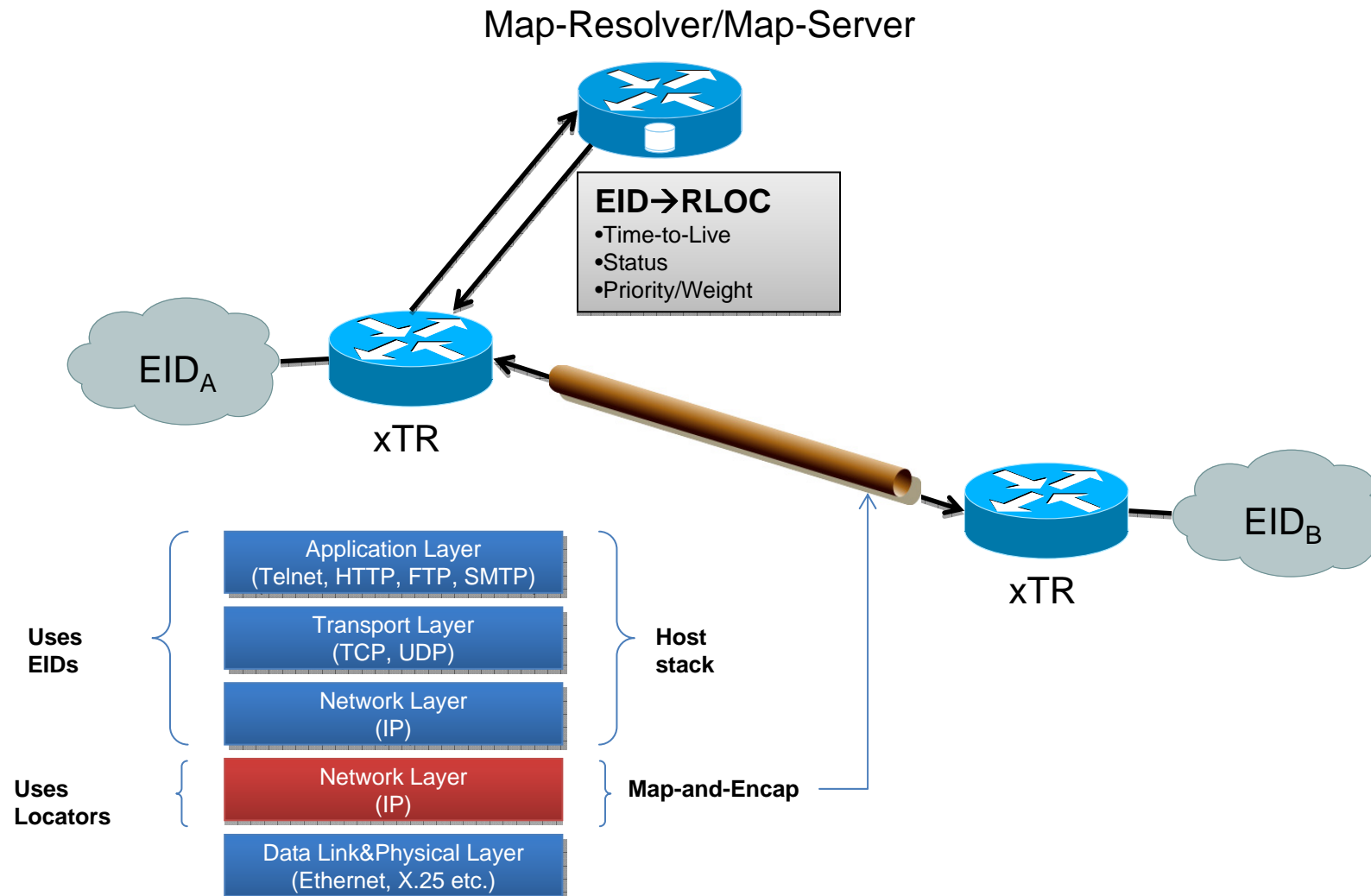
Proposals

- Routing Research Group (RRG) formed within the IRTF
 - Clean-slate vs. incremental upgrade
 - Consensus on the need for separating node location from identity
 - No consensus on engineering details → several proposals
 - Time will tell...

Separating Locators from Identifiers



Locator/ID Separation Protocol (LISP)



“*We reject kings, presidents and voting. We believe in rough consensus and **running code**.*”

David Clark: A Cloudy Crystal Ball – Visions of the Future, 24th IETF, 1992

Implementations

- Cisco NX-OS
 - Closed source, available to Cisco clients, best implementation
- Cisco IOS
 - Closed source, available to Cisco clients
- FreeBSD 7.x
 - Open source, incomplete
- Linux
 - Private development, incomplete

International LISP Infrastructure

Fri May 14 08:33:42 PDT 2010

Statistics:

of xTRs: 45
 # of MRs/MSs: 10
 # of ALT-routers: 6
 # of PITRs/PETRs: 4
Total boxes: 69
of countries: 11

Platforms:

ISR/7200 IOS: 19
 Titanium NX-OS: 46
 c200 NX-OS: 5
 Nexus 7000 NX-OS: 1
 ASR 1K IOS: 2

Legend:

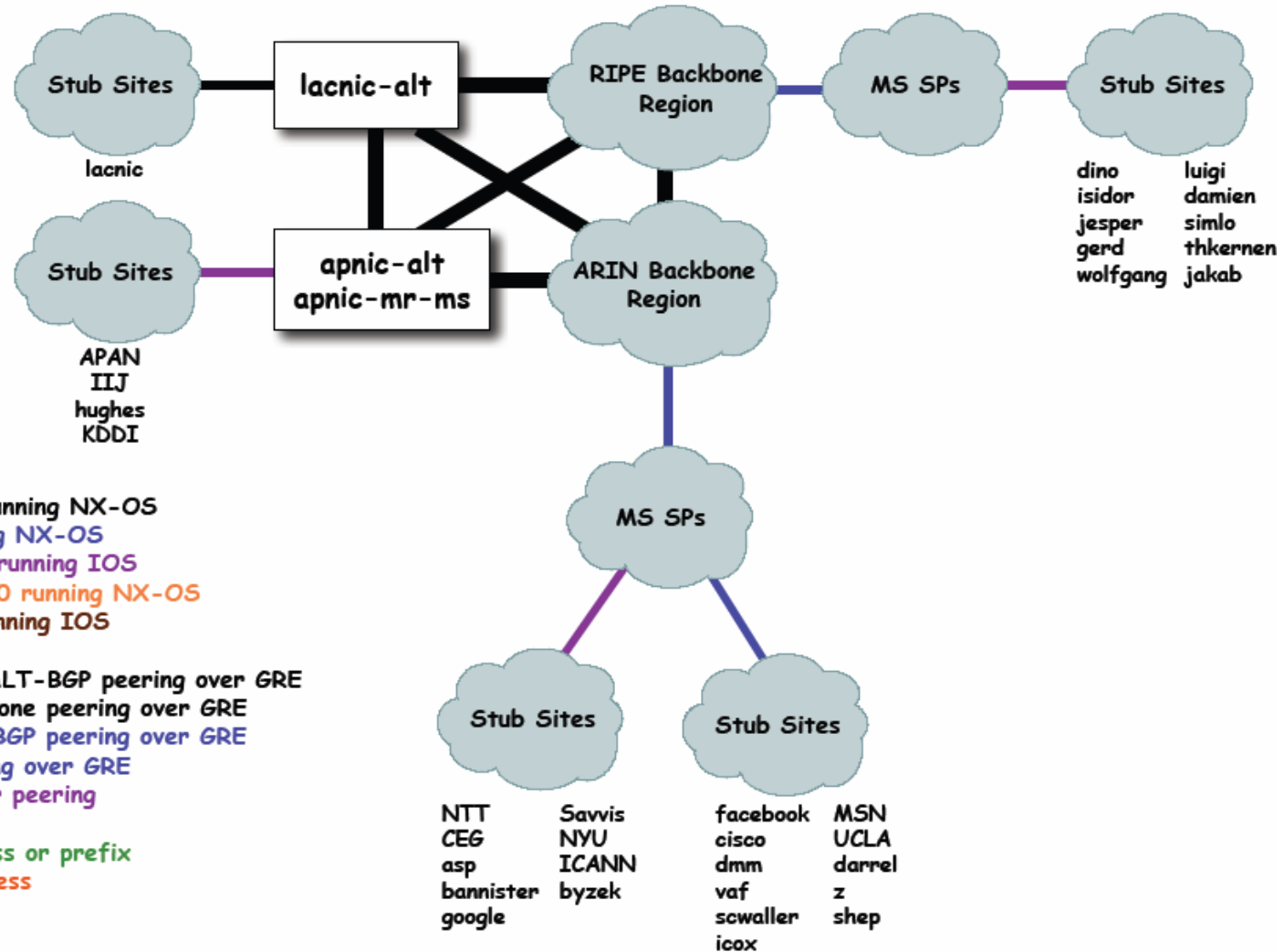
Black name: Titanium running NX-OS
Blue name: c200 running NX-OS
Violet name: ISR/7200 running IOS
Orange name: Nexus 7000 running NX-OS
Brown name: ASR 1K running IOS

Bold black line: backbone ALT-BGP peering over GRE
Dashed black line: iBGP backbone peering over GRE
Blue line: stub ALT-BGP peering over GRE
Dashed blue line: iBGP peering over GRE
Violet line: map-server peering

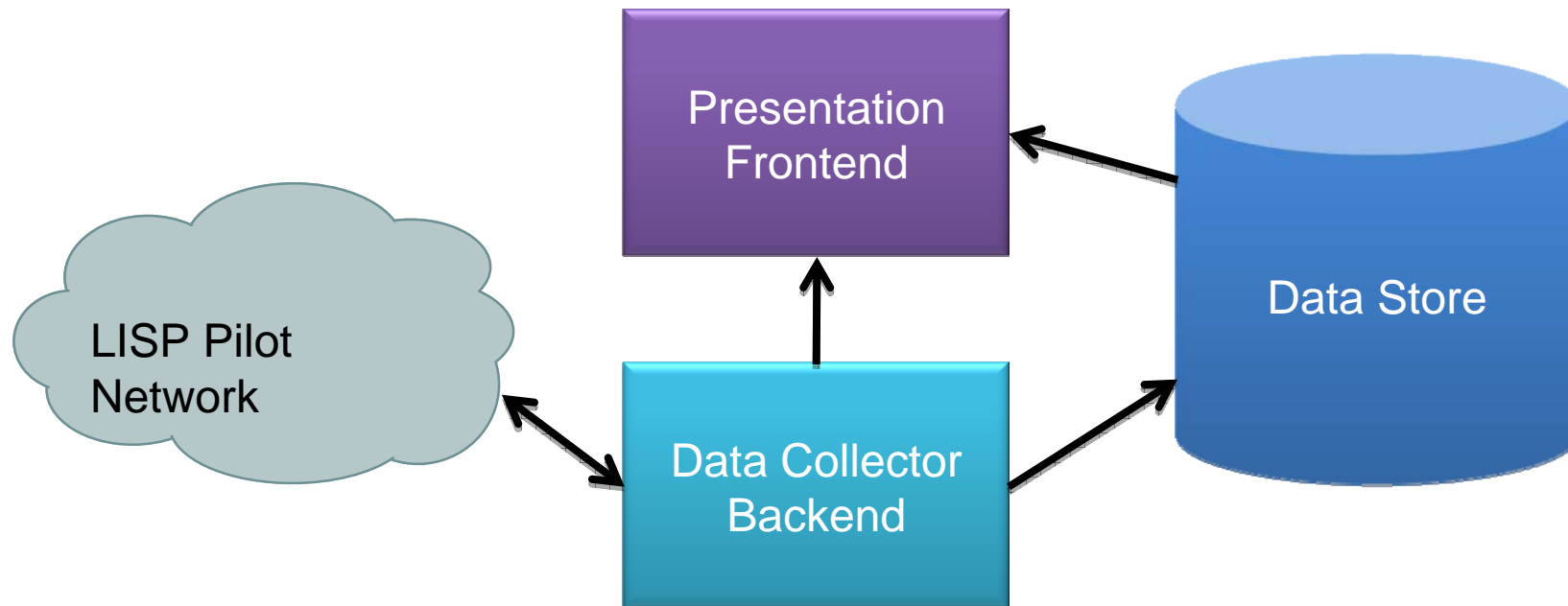
Green numbers: EID address or prefix
Red numbers: RLOC address

DNS Naming:

Locator: <name>.rloc.lisp[46].net
 EID: <name>.lisp[46].net
 ALT: <name>.alt.lisp[46].net



LISPmon Architecture



- Collection of *Perl* and *Bash* scripts, dynamically generated *JavaScript* and *HTML*

Collected Data

- Mappings (+ AS and geo data)– daily cron job
- Reverse DNS – weekly cron job

```
$ lig www.lisp4.net
```

```
Send map-request to 195.50.116.18 for www.lisp4.net ...
```

```
Received map-reply from 207.98.65.94 with rtt 0.25600 secs
```

```
Mapping entry for EID 153.16.10.6:
```

```
153.16.10.0/24, via map-reply, record ttl: 1440, auth, not mobile
```

Locator	State	Priority/Weight
128.223.156.134	up	1/50
207.98.65.94	up	1/50
2001:468:d01:9c::80df:9c86	up	2/100

```
$ dig -x 153.16.10.1 +short
```

```
dmm-xtr-1.lisp4.net.
```

Presentation Frontend – CSV Files

- Mappings

```
153.16.10.0/24,1,207.98.65.94,1,0,1440,  
& 153.16.10.1 dmm-xtr-1.lisp4.net  
& 153.16.10.5 lambda.lisp4.net  
& 153.16.10.6 scheme.lisp4.net  
& 153.16.10.19 paren.lisp4.net  
> 128.223.156.134,up,1,50,titanium-dmm.lisp.uoregon.edu,3582,US,UONET - University of Oregon  
> 207.98.65.94,up,1,50,uo-pxtr.rloc.lisp4.net,3701,US,NERONET - Oregon Joint Graduate Schools of  
Engineering  
> 2001:468:d01:9c::80df:9c86,up,2,100,titanium-dmm.lisp.uoregon.edu,11537,US,ABILENE - Internet2
```

- Reverse DNS

```
[...]  
153.16.27.1 icann-xtr.lisp4.net  
153.16.29.1 ceg-xtr.lisp4.net  
153.16.30.1 google-xtr.lisp4.net  
153.16.32.1 thkernen-xtr.lisp4.net  
153.16.32.17 jakab-xtr.lisp4.net  
153.16.32.33 marc-xtr.lisp4.net  
153.16.33.1 gerd-xtr.lisp4.net  
153.16.34.1 luigi-xtr.lisp4.net  
[...]
```

Presentation Fontend – Interactive Map

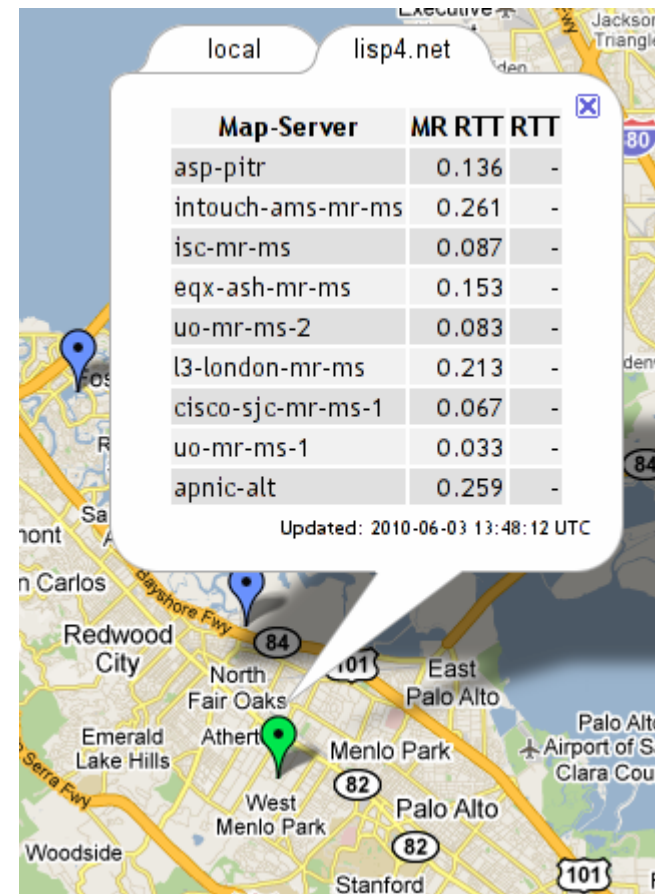
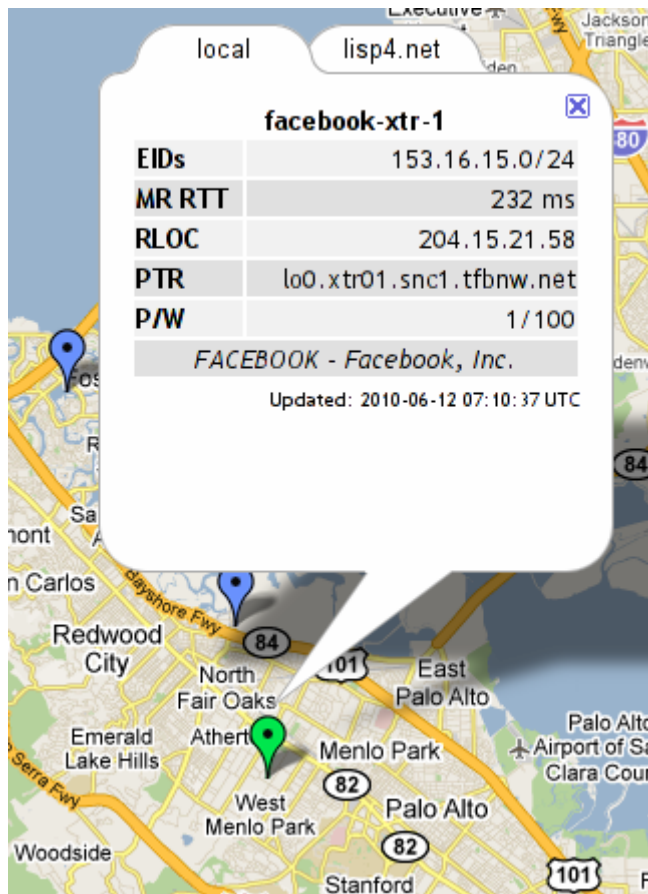
LISPmon

[About](#) | [Map](#) | [Looking Glass](#) | [Mappings](#) | [rDNS](#)



LISPmon v0.3.0, by **Loránd Jakab**

Presentation Frontend – xTR Info Popups



Presentation Frontend – Looking Glass

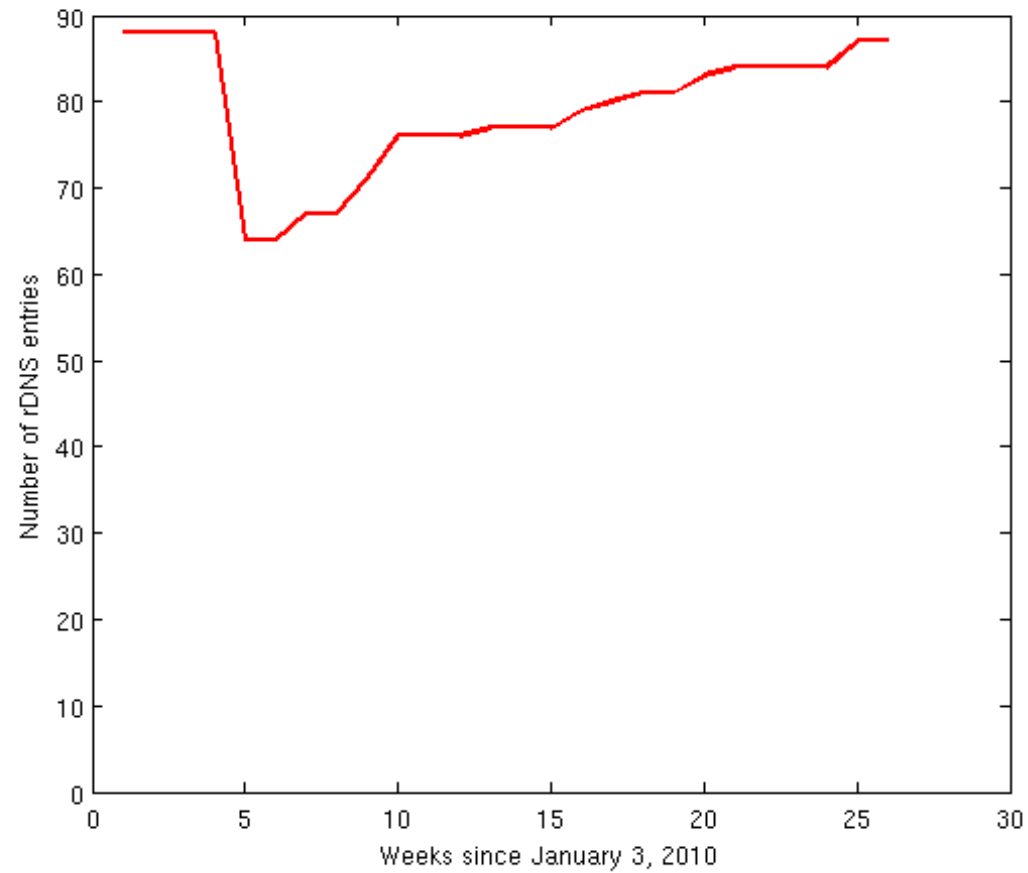
The screenshot shows a web browser window with the URL `http://lispmon.net/lig.cgi`. The page title is "LISPmon Looking Glass". The navigation menu includes links for "About", "Map", "Looking Glass", "Mappings", and "rDNS". A dropdown menu for "Choose Map-Server" is set to "Level 3, London (UK)". Below this is an input field for "EID or hostname" with a "Go!" button. A terminal window displays the following output:

```
Send map-request to 13-london-mr-ms.rloc.lisp4.net for www.lisp4.net ...
Received map-reply from 207.98.65.94 with rtt 0.33200 secs

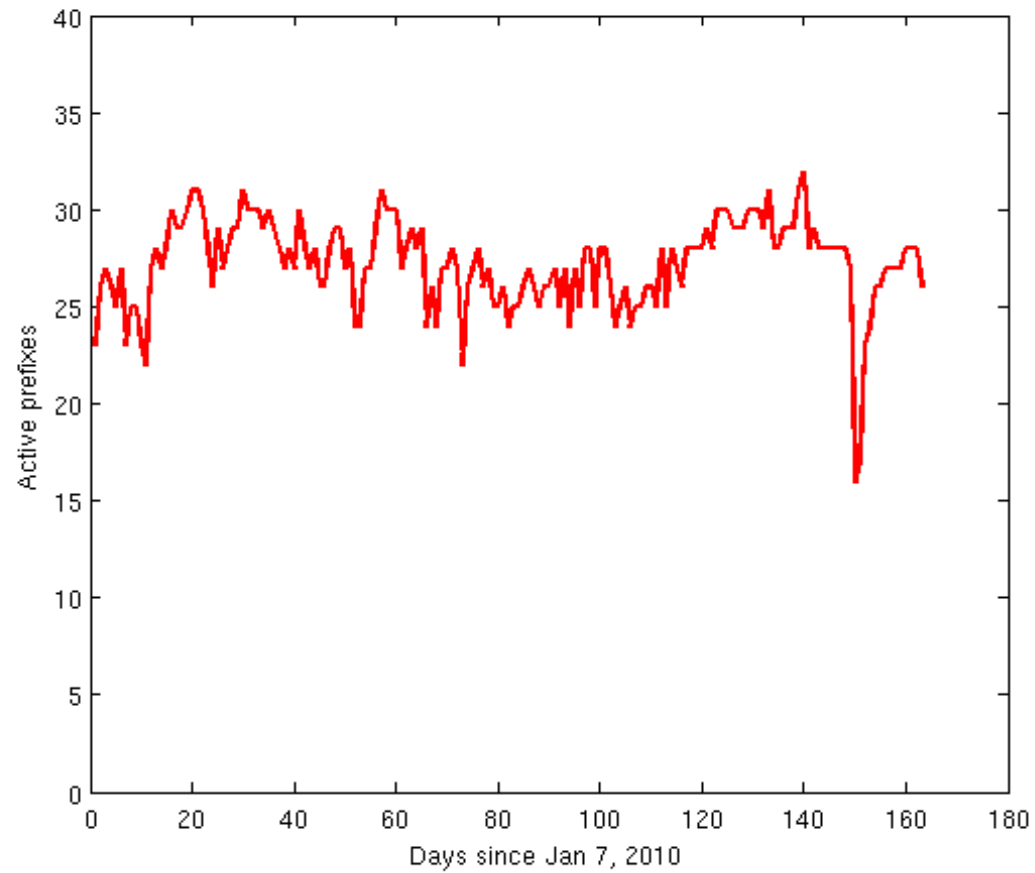
Mapping entry for EID 153.16.10.6:
153.16.10.0/24, via map-reply, record ttl: 1440, auth, not mobile
Locator                               State      Priority/Weight
128.223.156.134                        up         1/50
207.98.65.94                            up         1/50
2001:468:d01:9c::80df:9c86              up         2/100
```

The footer of the page indicates "LISPmon v0.3.0, by Loránd Jakab". The browser status bar shows "Done" and the IP address "Spain 84.88.81.123 CESCA - Anella Cientifica RREN AS13041 87.221.158.49".

Evolution of Registered EIDs



Evolution of Active EID Prefixes



Future Work

- IPv6 support
- Higher update frequency
- Public API to access available data and functionality
- Commercial monitoring service for subscribers (?)
- ...

Thank you!

<http://lispmon.net/>