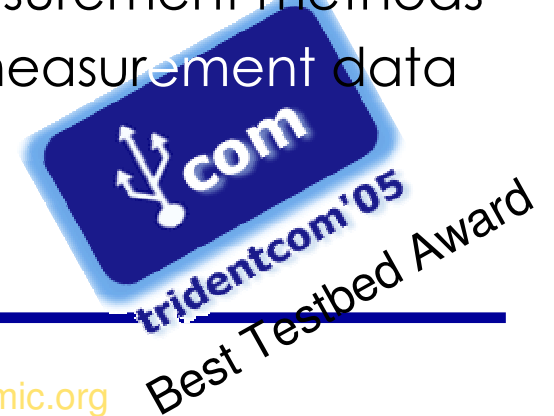


The etomic active probing infrastructure

I. Csabai, P. Hága, G. Simon,
J. Stéger, G. Vattay, E. Magana,
D. Morato, M. Izal, J. Aracil

History

- The European Traffic Observatory Measurement InfrastruCture (etomic) was created in 2004-05 within the Evergrow Integrated Project launched by the Future and Emergent Technologies Programme of the European Union.
- Its goals:
 - to provide an open access, public test bed for researchers investigating the Internet with active measurement methods
 - to serve as a Virtual Observatory active measurement data on the European part of the Internet



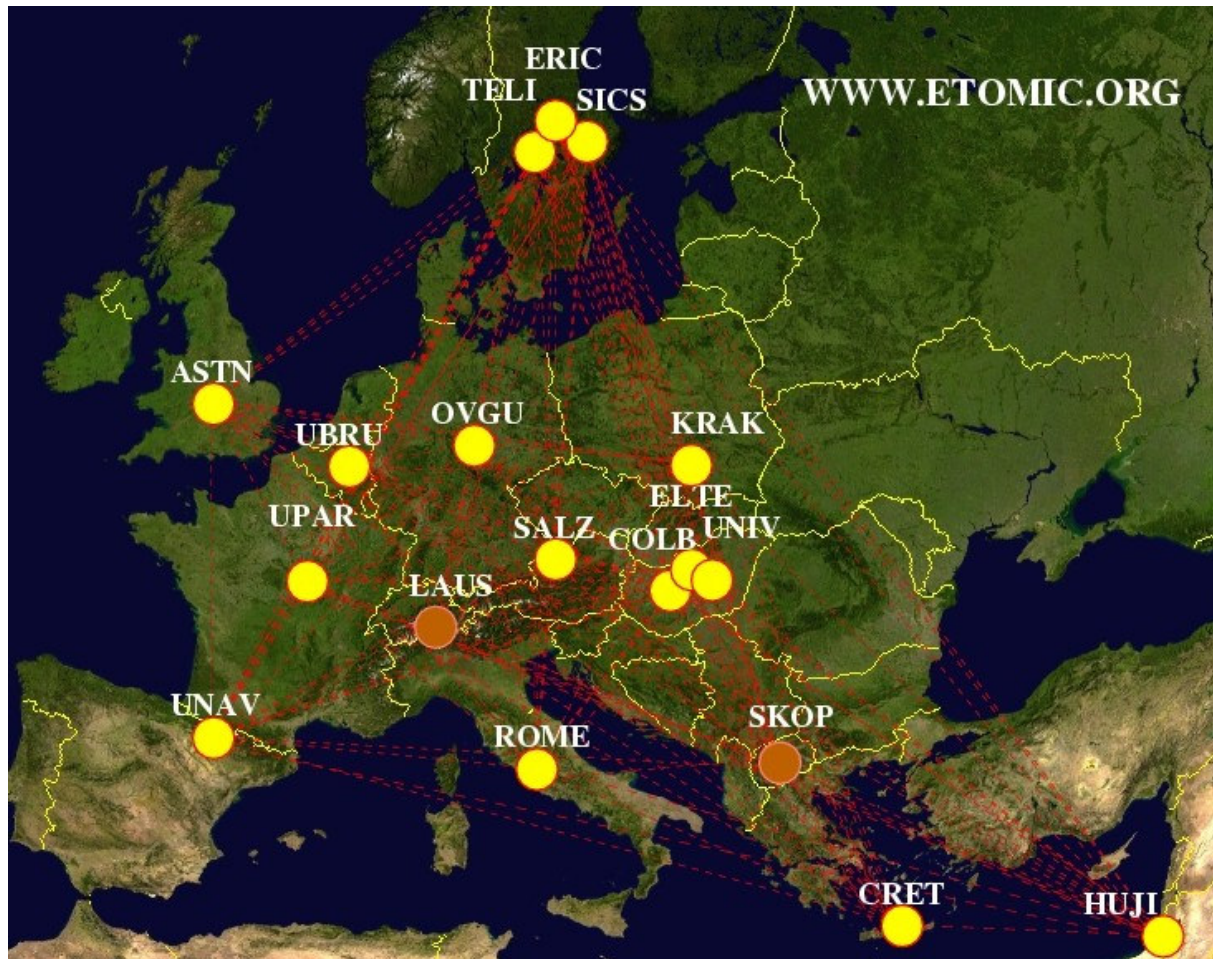
Founders

- Its Central Management System (CMS) has been developed by the Grupo de Redes, Sistemas y Servicios Telemáticos Departamento de Automática y Computación Universidad Pública de Navarra.
- Its hardware infrastructure has been designed and built by the Cooperative Center for Communication Network Data Analysis in Collegium Budapest Institute for Advanced Study.
- The measurement stations are hosted by European research groups collaborating in the Evergrow project.

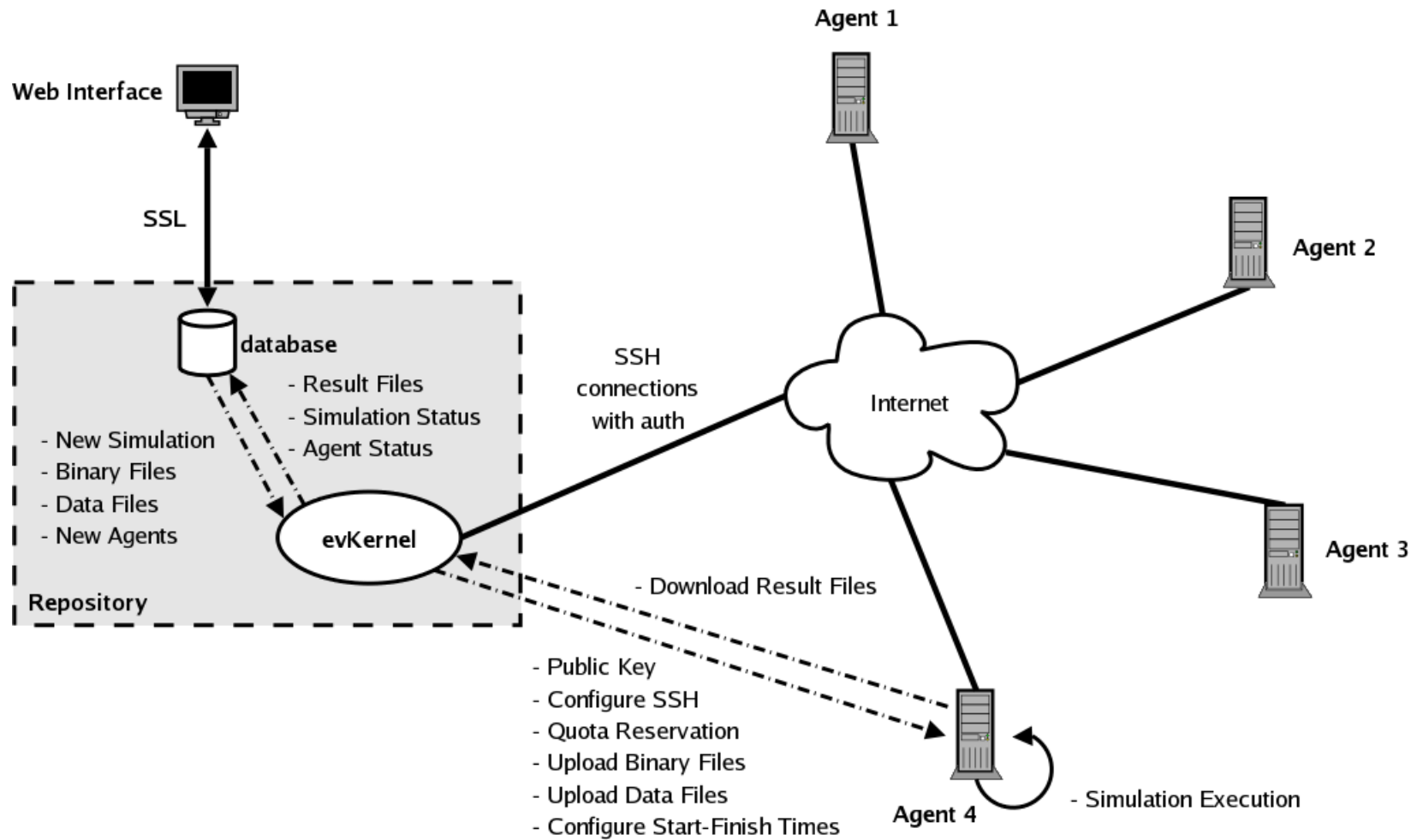
Hardware architecture

- Each measurement station consists of:
 - Standard server PC architecture
 - DAG 3.6 GE card with packet sending capability
 - own GPS antenna (Garmin 35 HVS) for time synchronization
- Repository and data processing:
 - Everlab IBM blade center (112 blades)

Measurement sites

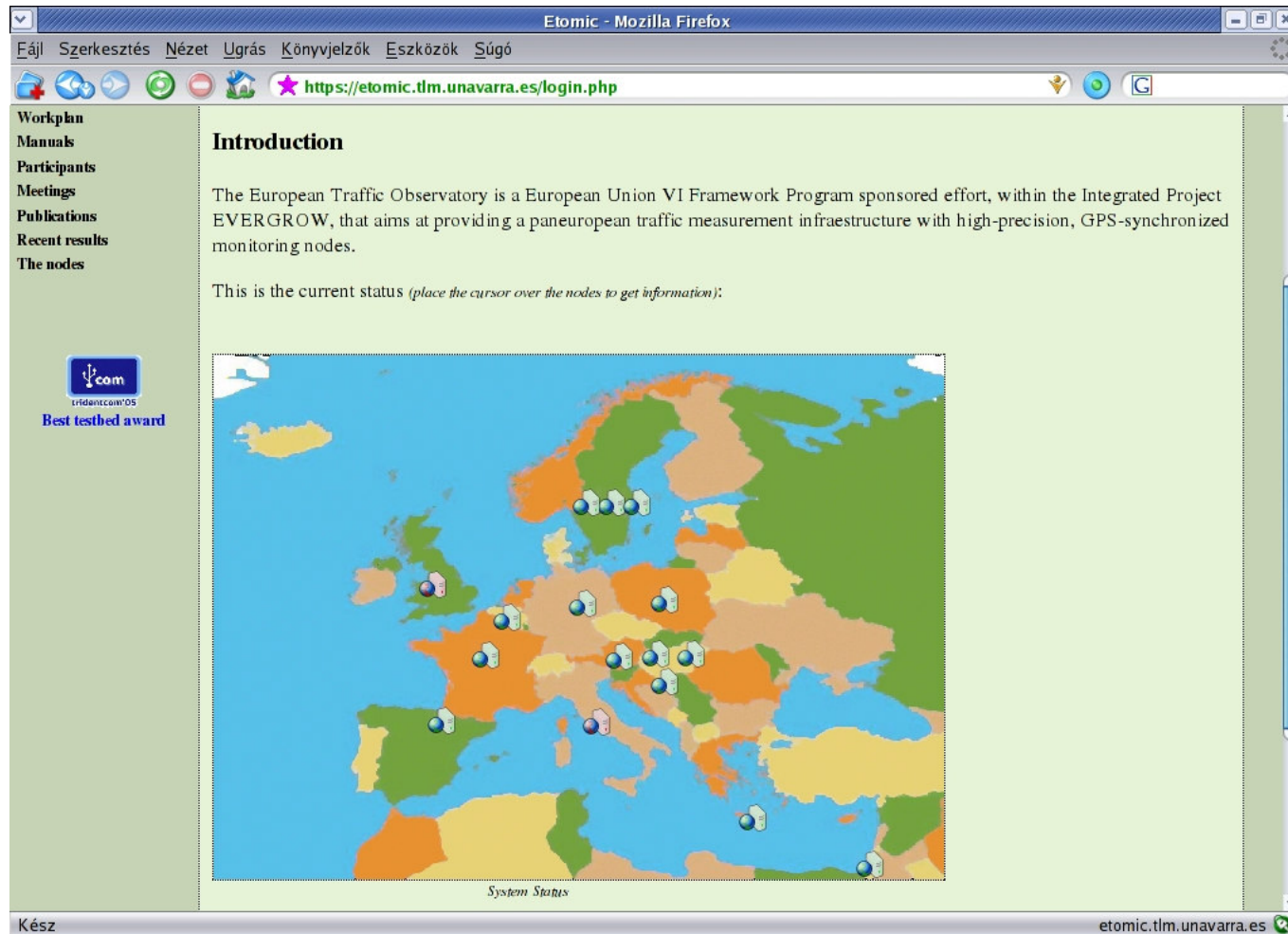


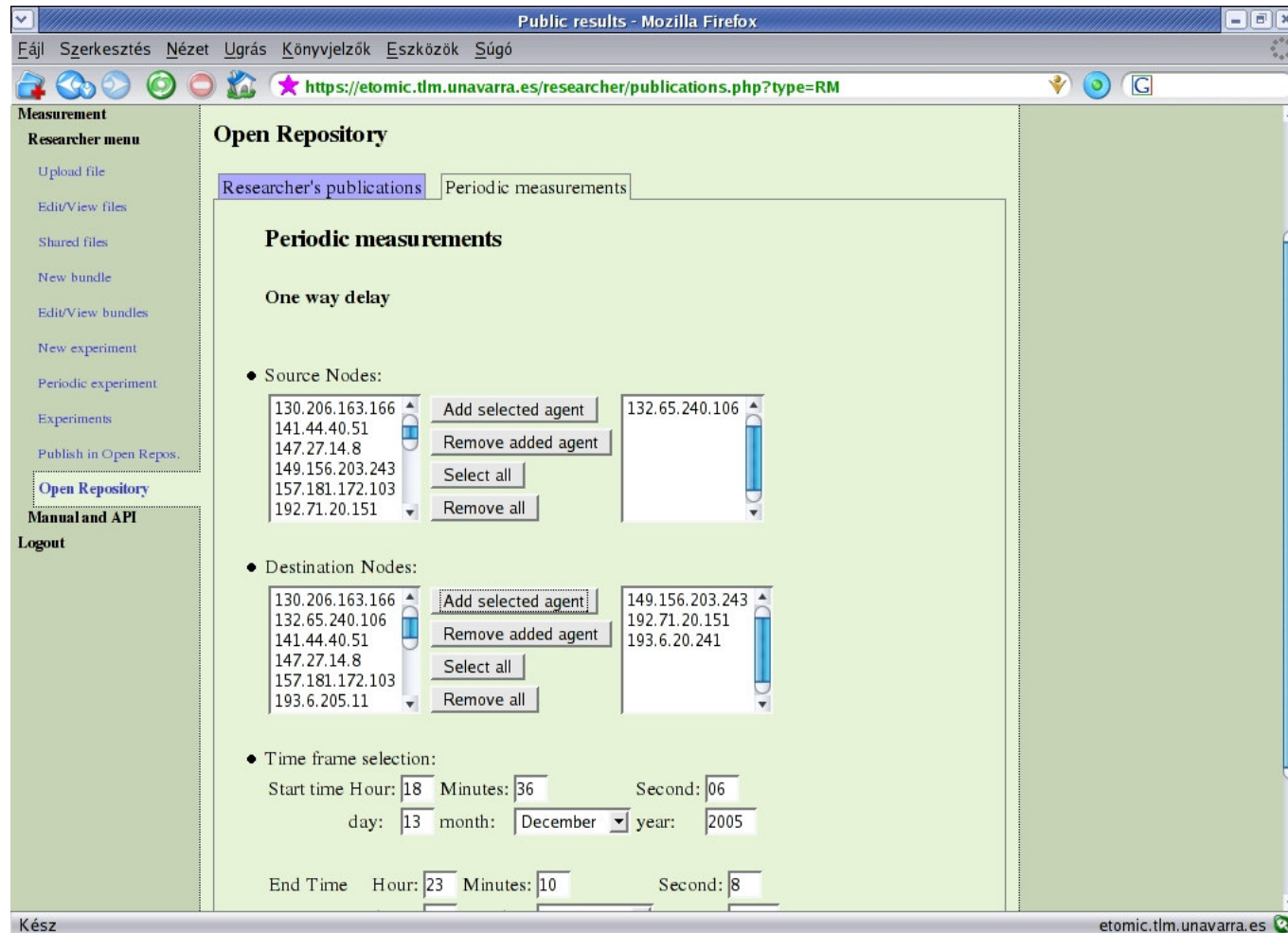
Central management system



Web interface

- Available via www.etomic.org
 - Account application -> own measurement design
 - Free access to periodic measurement end-to-end data
- Measurement time slot reservation for registered users
- Programming DAG card via the user friendly Application Programming Interface
- Measurements are distributed automatically to the measurement stations





Public results - Mozilla Firefox

Fájl Szerkesztés Nézet Ugrás Könyvjelzők Eszközök Súgó

https://etomic.tlm.unavarra.es/researcher/publications.php?type=RM

Measurement

Researcher menu

- Upload file
- Edit/View files
- Shared files
- New bundle
- Edit/View bundles
- New experiment
- Periodic experiment
- Experiments
- Publish in Open Repos.
- Open Repository**

Manual and API

Logout

Open Repository

Researcher's publications | Periodic measurements

Periodic measurements

One way delay

- Source Nodes:
 - 130.206.163.166
 - 141.44.40.51
 - 147.27.14.8
 - 149.156.203.243
 - 157.181.172.103
 - 192.71.20.151

Add selected agent

Remove added agent

Select all

Remove all

 - 132.65.240.106
- Destination Nodes:
 - 130.206.163.166
 - 132.65.240.106
 - 141.44.40.51
 - 147.27.14.8
 - 157.181.172.103
 - 193.6.205.11

Add selected agent

Remove added agent

Select all

Remove all

 - 149.156.203.243
 - 192.71.20.151
 - 193.6.20.241
- Time frame selection:

Start time Hour: 18 Minutes: 36 Second: 06

day: 13 month: December year: 2005

End Time Hour: 23 Minutes: 10 Second: 8

Kész etomic.tlm.unavarra.es

Experimental bundle

Create a bundle - Mozilla Firefox

Fájl Szerkesztés Nézet Úgrás Könyvjelzők Eszközök Súgó

https://etomic.tlm.unavarra.es/researcher/bundle2.php#ericsson

Researcher menu


- Upload file
- Edit/View files
- Shared files
- New bundle**
- Edit/View bundles
- New experiment
- Periodic experiment
- Experiments
- Publish in Open Repos.
- Open Repository
- Manual and API**
- Logout

New bundle: etomic_demo

Next step is defining which files will be used in each agent. An agent will run a program or eventually more than one.

Name: ericsson
Description: N/A
Country: Sweden
Organization: Ericsson
Interfaces:

- ericsson.etomic.org - 192.71.20.150
- ericsson-dag.etomic.org - 192.71.20.151
DAG



(Click on a node name to configure it)

- brussels (Belgium)
- chania (N/A)
- colbud (Hungary)
- elte (Hungary)
- ericsson (Sweden)
- jerusalem (Israel)
- krakow (Poland)
- magdeburg (Germany)
- pamplona (Spain)
- paris (France)
- salzburg (Austria)
- sics (Sweden)
- telia (Sweden)
- univet (Hungary)

Configuring ericsson (Click on a node to configure it)

ericsson Add binary | data file | Hard disk: 75 MB.

Binary file: etomic_check.bash <parameters>

etomic_check.bash Select

From 0 h. 0 m. to 0 h. 0 m.
since experiment starts

delete	Start	End	Command
	+0h 0m	no limit	"etomic_check.bash "

Add command ->

Data file: etomic_check.tar.gz <tar zxf etomic_check.tar.gz>

Description:

<- go back | Display copy options | Save bundle

Kész etomic.tlm.unavarra.es

Requested experiments - Mozilla Firefox

Fájl Szerkesztés Nézet Ugrás Könyvjelzők Eszközök Súgó

https://etomic.tlm.unavarra.es/researcher/experiments.php

Measurement

Researcher menu

- Upload file
- Edit/View files
- Shared files
- New bundle
- Edit/View bundles
- New experiment
- Periodic experiment

Experiments

- Publish in Open Repos.
- Open Repository

Manual and API

Logout

Requested experiments UTC time: 06:05:23 ?

Select Month:

Month:

Results per page:

2006 April

Delete	Name	Start date (UTC) ▾▴	End date (UTC) ▾▴	Status	Results
	chk_all5-run9	Tue 04th 3:39:00	Tue 04th 3:49:00	waiting...	
	chk_all5-run8	Mon 03rd 4:39:00	Mon 03rd 4:49:00	waiting...	
	chk_all5-run7	Sun 02nd 5:39:00	Sun 02nd 5:49:00	waiting...	
	chk_all5-run6	Sat 01st 6:39:00	Sat 01st 6:49:00	waiting...	

[Back to top](#)

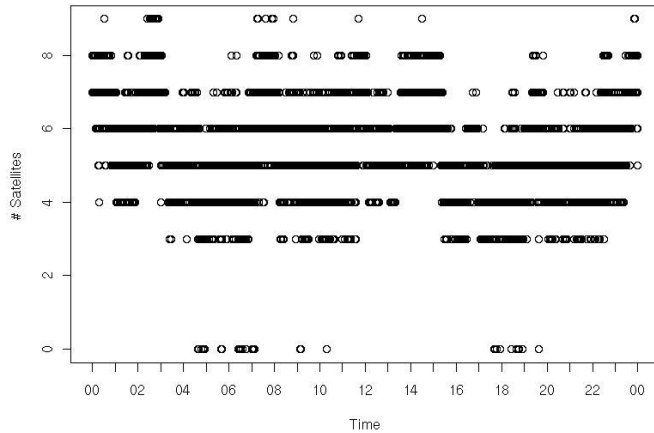
2006 March

Delete	Name	Start date (UTC) ▾▴	End date (UTC) ▾▴	Status	Results
	chk_all5-run5	Fri 31st 7:39:00	Fri 31st 7:49:00	waiting...	
	chk_all5-run4	Thu 30th 8:39:00	Thu 30th 8:49:00	finished	
	chk_all5-run3	Wed 29th 9:39:00	Wed 29th 9:49:00	finished	
	chk_all5-run2	Tue 28th 10:39:00	Tue 28th 10:49:00	finished	

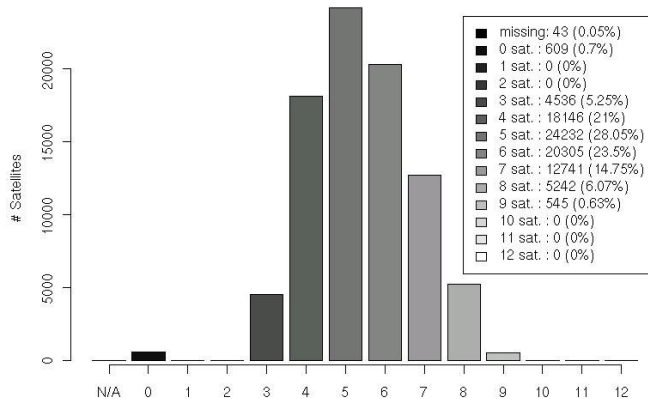
Kész etomic.tlm.unavarra.es

GPS visibility information

Satellites in use (GPGGA) in date 210405

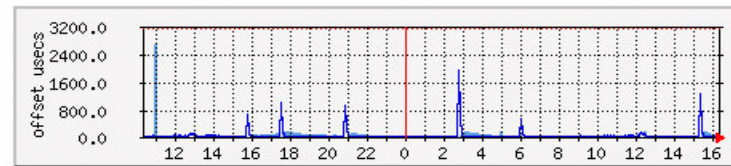


Histogram of satellites in use (GPGGA) in date 210405



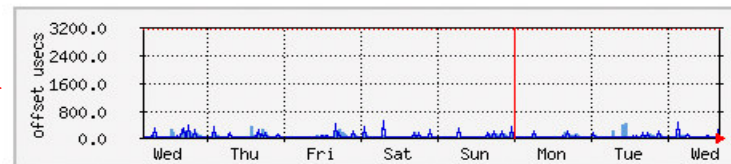
unavailability: 5188 (6%)

'Daily' Graph (5 Minute Average)



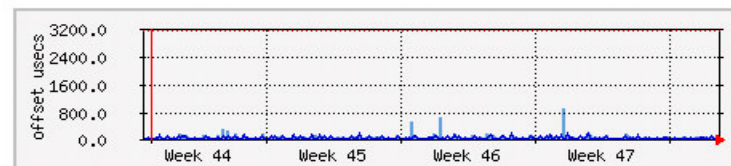
Max Positive Offset 2697.0 uses Average Positive Offset 51.0 uses Current Positive Offset 75.0 uses
Max Negative Offset 1935.0 uses Average Negative Offset 34.0 uses Current Negative Offset 0.0 uses

'Weekly' Graph (30 Minute Average)



Max Positive Offset 449.0 uses Average Positive Offset 53.0 uses Current Positive Offset 154.0 uses
Max Negative Offset 507.0 uses Average Negative Offset 27.0 uses Current Negative Offset 0.0 uses

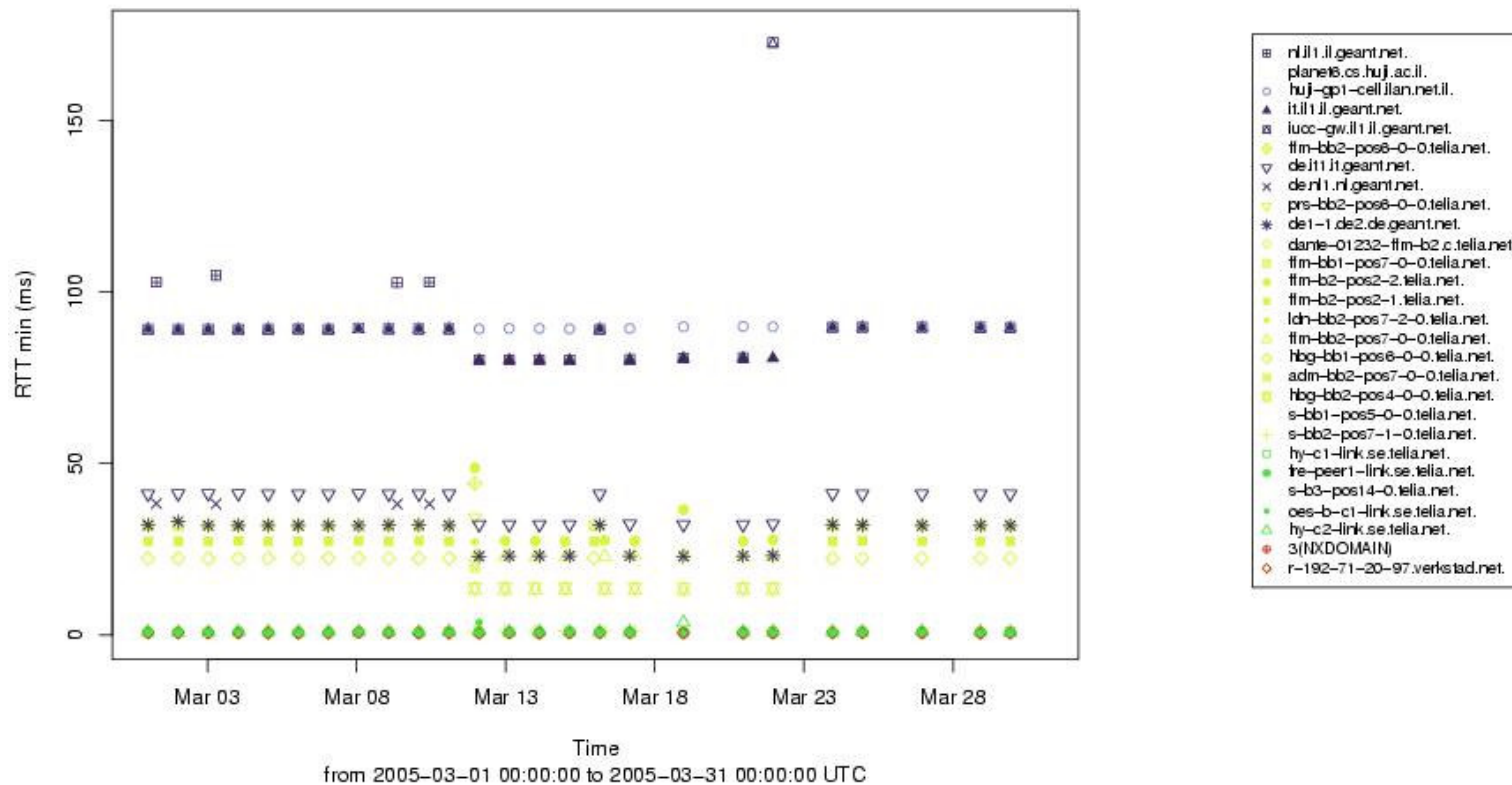
'Monthly' Graph (2 Hour Average)



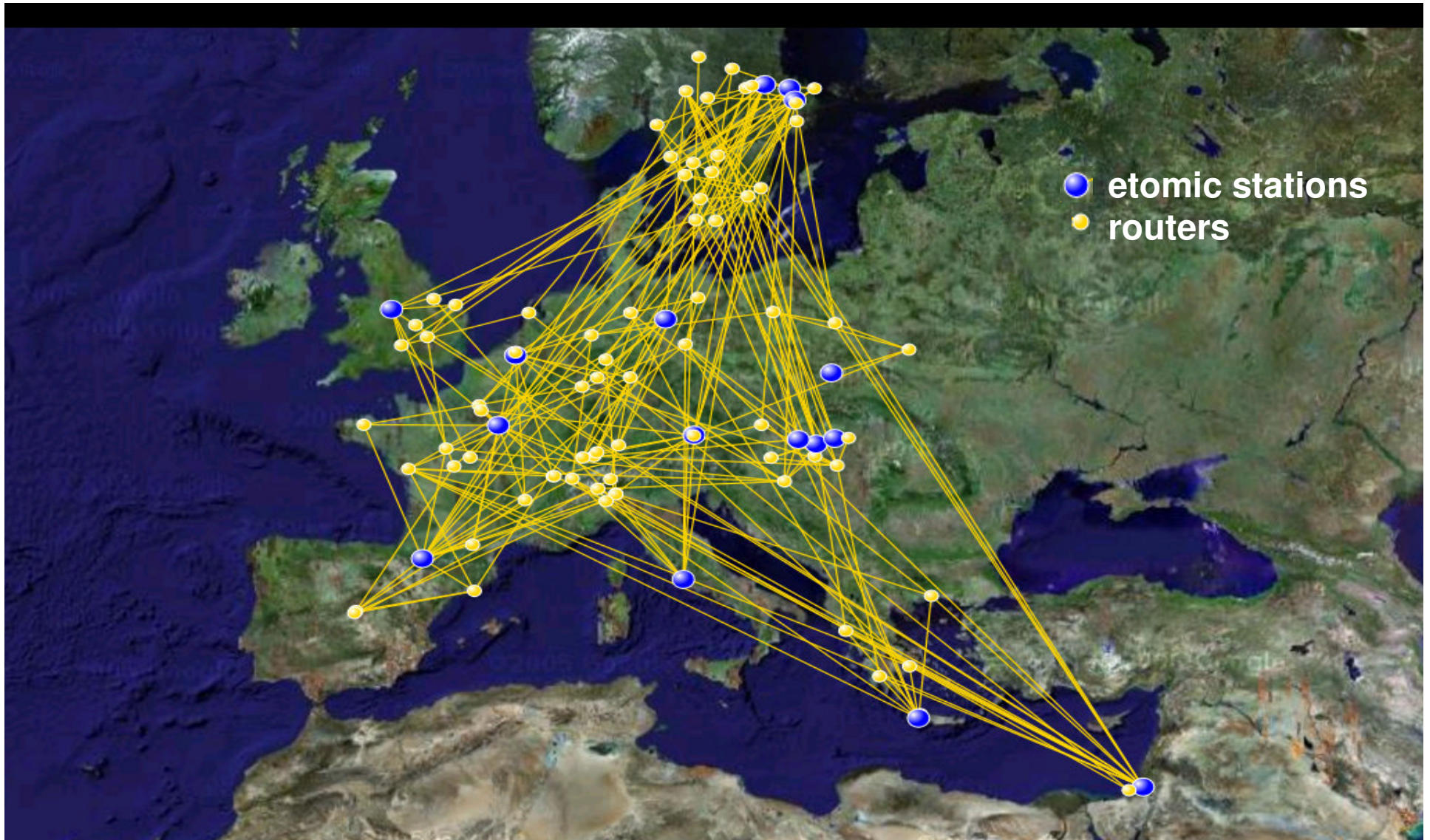
Max Positive Offset 919.0 uses Average Positive Offset 66.0 uses Current Positive Offset 14.0 uses
Max Negative Offset 209.0 uses Average Negative Offset 33.0 uses Current Negative Offset 24.0 uses

Tracking topology changes

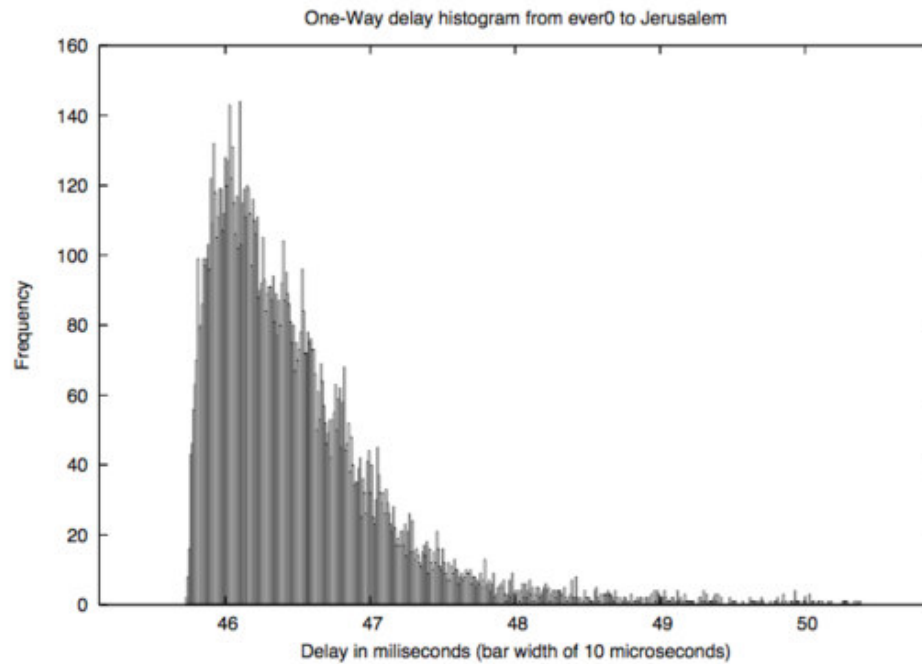
Traceroute from ericsson to hujl



Topology of routers

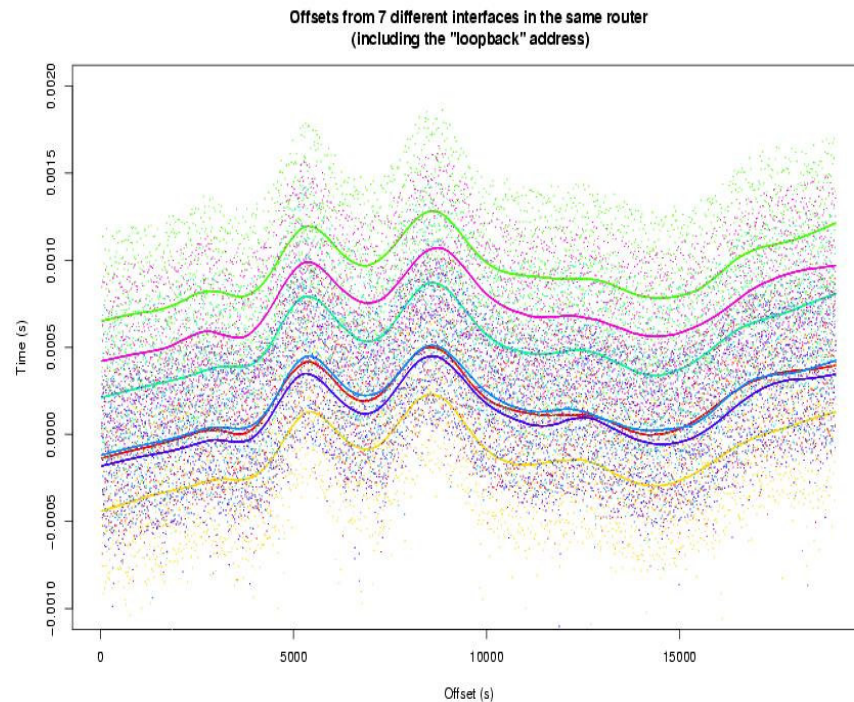
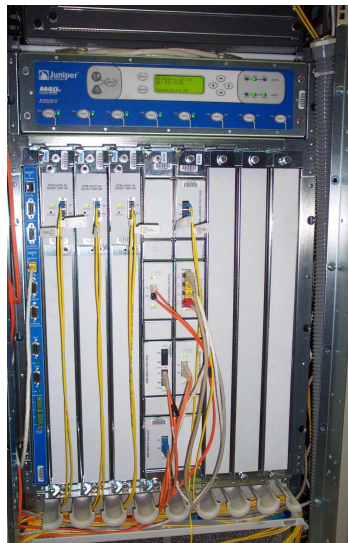


One way delay

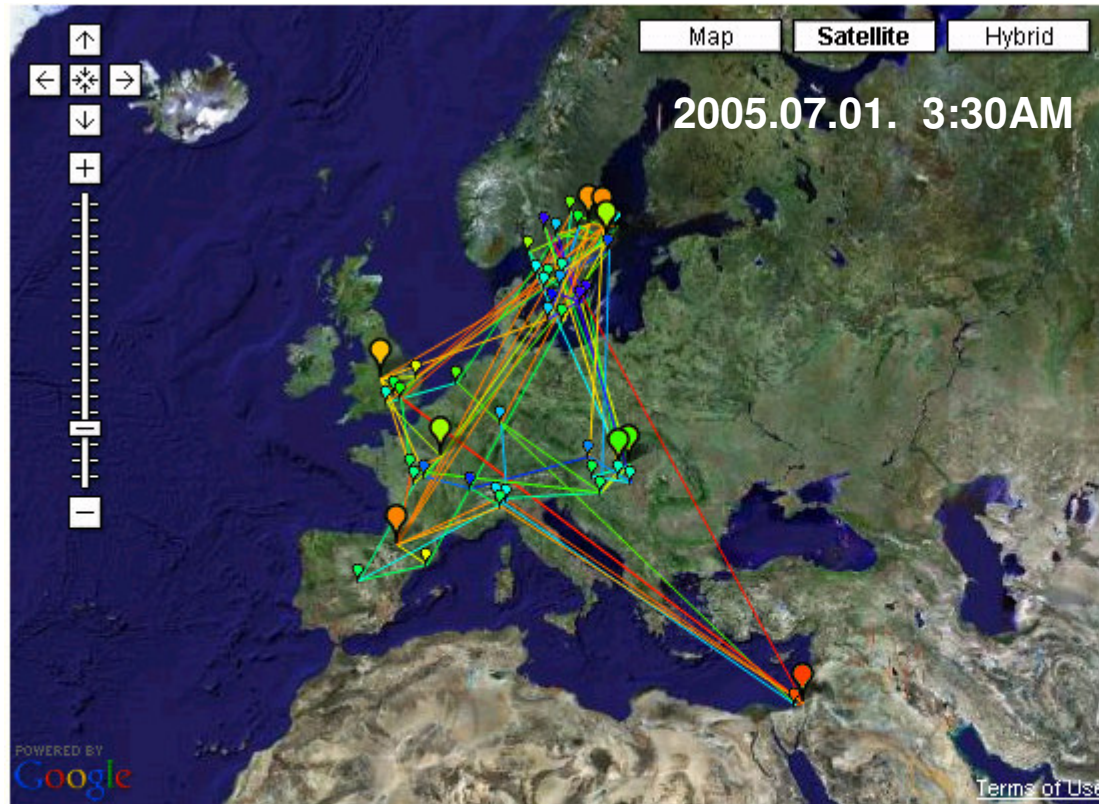


Remote router fingerprinting

- With our high precision measurements the clock skew of routers can be detected and interfaces of the same router can be identified.



Visualization




Visualization

DATA TYPE	<input checked="" type="radio"/> Mean
	<input type="radio"/> Standard Deviation
TOPOLOGY	<input type="radio"/> End to End
	<input checked="" type="radio"/> Resolved

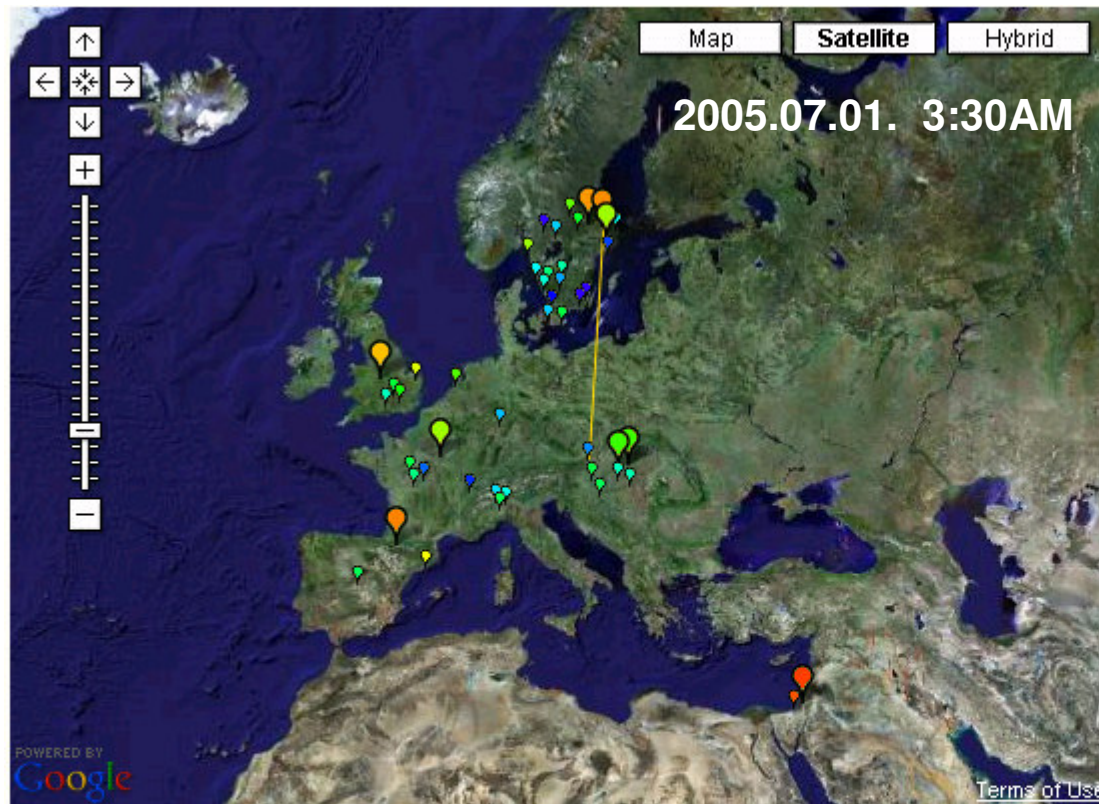
Info



SOURCE NODE	
DESTINATION NODE	
MEAN	
STANDARD DEVIATION	

ETOMIC node



Visualization

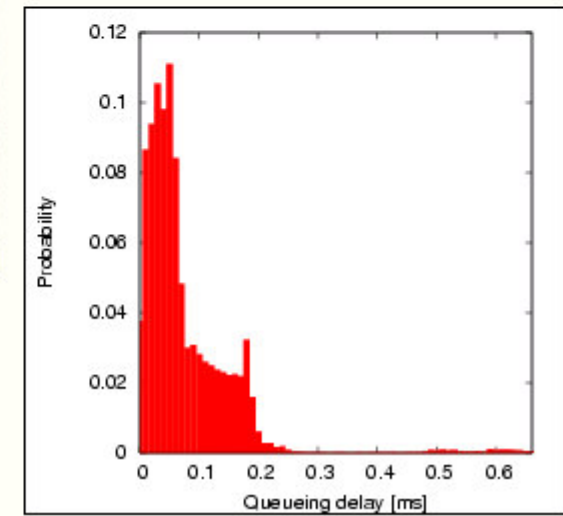


 ETOMIC node
 inner node



Visualization	
DATA TYPE	<input checked="" type="radio"/> Mean <input type="radio"/> Standard Deviation
TOPOLOGY	<input type="radio"/> End to End <input checked="" type="radio"/> Resolved

Info	
SOURCE NODE	62.40.96.177
DESTINATION NODE	193.10.64.81
MEAN	78 μ s
STANDARD DEVIATION	97 μ s



Thanks!



IST Future and Emerging Technologies