Update on TopHat & measurement system interconnection

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ISMA'2011 - 3rd AIMS workshop – February 9-11, San Diego, CA

Outline

Introduction

Our challenge:
"How the interconnection of measurement systems can better serve users' needs"

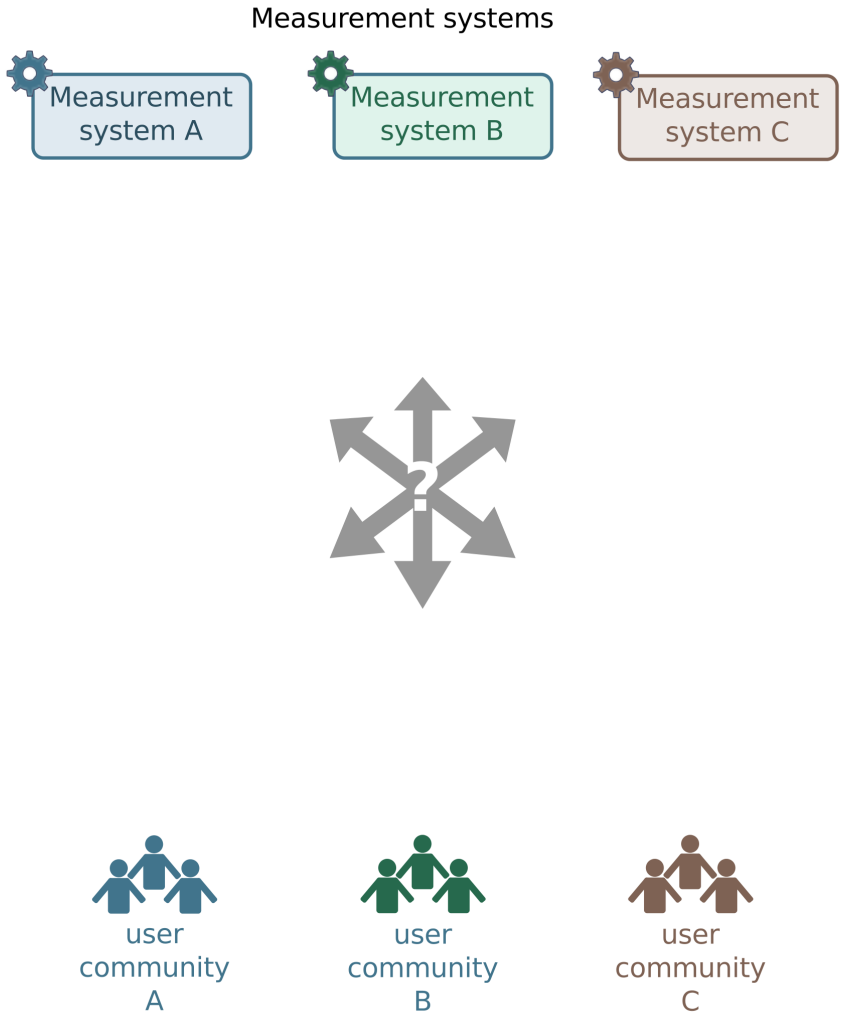
- In the spirit of the CONMI workshop

  k. claffy, M. Crovella, T. Friedman, C. Shannon, and N. Spring, "Community-Oriented Network Measurement Infrastructure (CONMI) Workshop Report", ACM SIGCOMM Computer Communication Review (CCR), vol. 36, no. 2, pp. 41–48, Apr 2006

- We focus on serving live measurements to users.

The challenge



The value to users

- Access to relevant data/services for their usage
- Convenient interfaces (habits, consistent formats, etc.)
- Some degree of transparency (source, timestamp)
- No new account subscription
- No new AUP compliance

Value to the platforms

- Reach users and get known
- Lower user management overhead
- Extend scale through collaboration
  - vantage points
  - tools

Added-value due to diversity

P. Antoniadis, S. Fdida, T. Friedman and V. Misra,
Federation of virtualized infrastructures: sharing the value of diversity,
ACM CoNEXT 2010

All this gets easier within a standard framework

Efforts towards harmonization

Some steps have already been taken

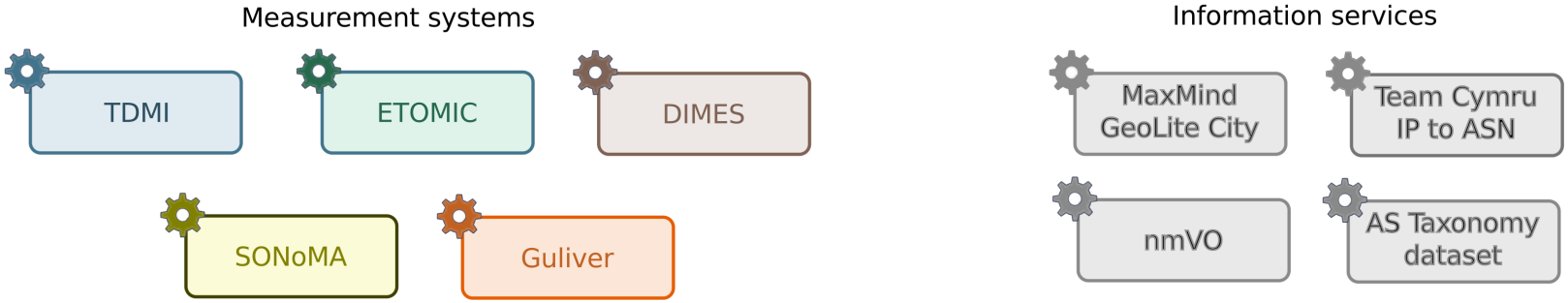
- by opening interfaces for collaboration
- by serving data from several systems

Some examples:

- perfSONAR webservice framework
- Oregon Routeviews streaming data
- iPlane serving data from their PlanetLab deployment + Looking Glass servers

Our approach fits within this movement, as well as GENI/FIRE testbed work

Our ecosystem



PlanetLab Europe users

PlanetLab Central users

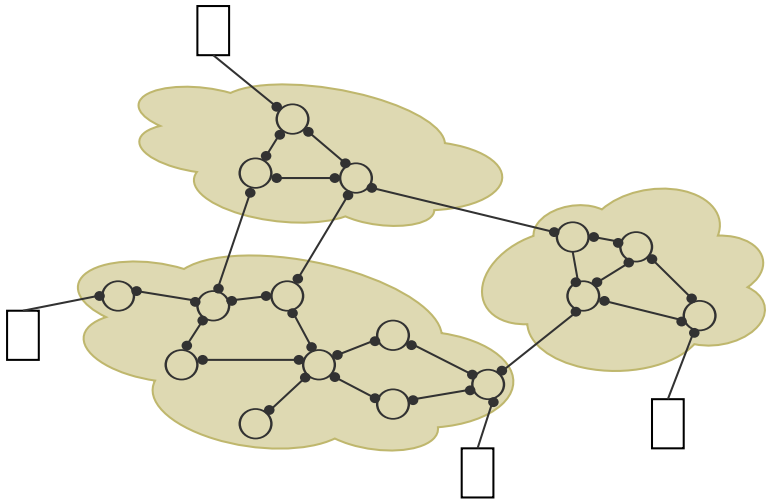
DIMES users

ETOMIC users

SONoMA users

Gulliver users

PlanetLab users' needs



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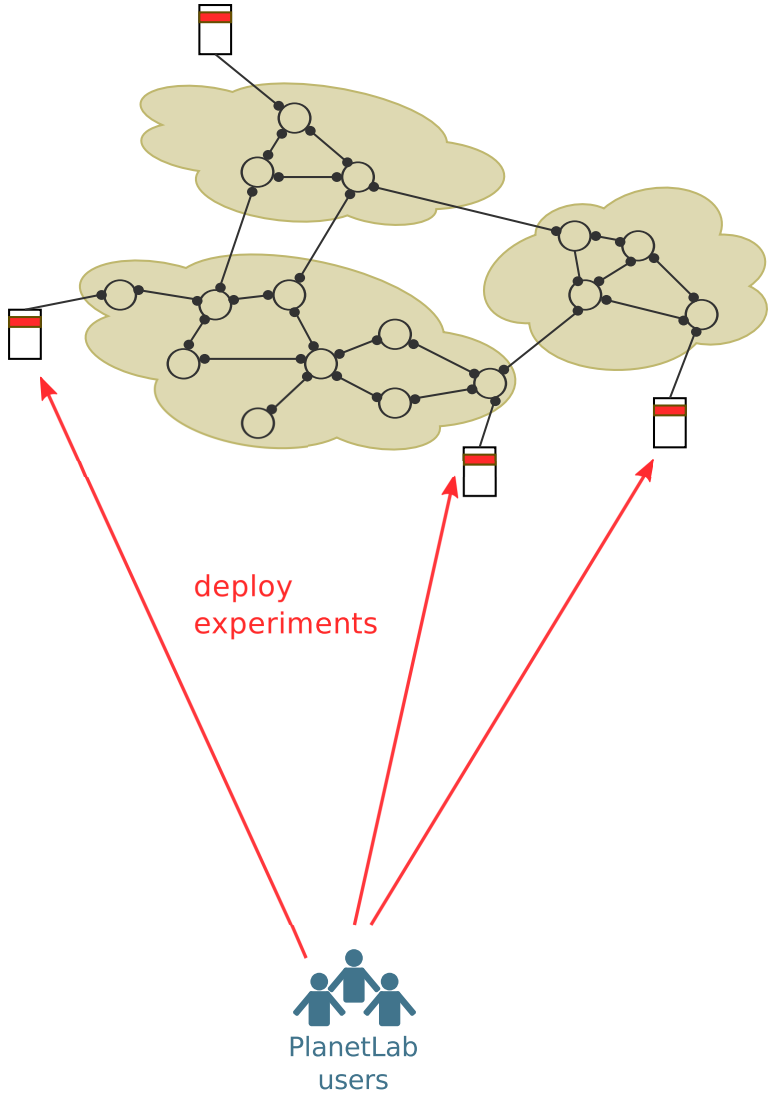

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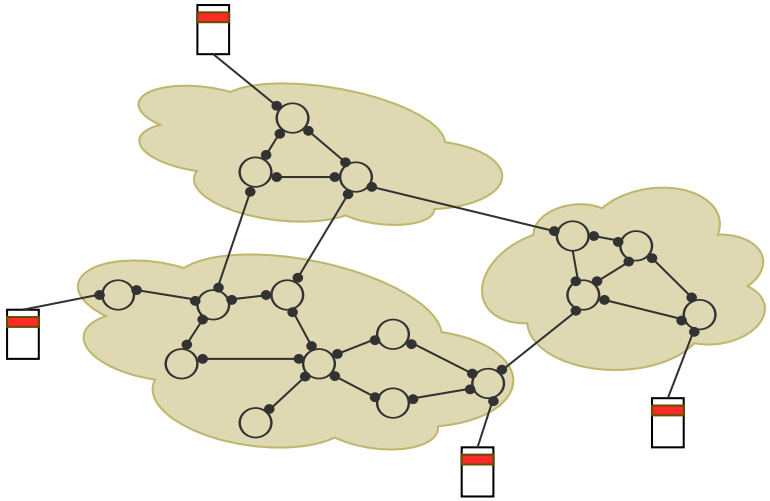

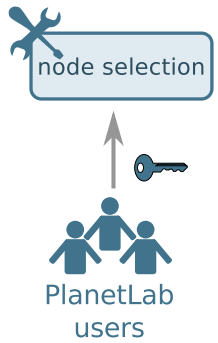

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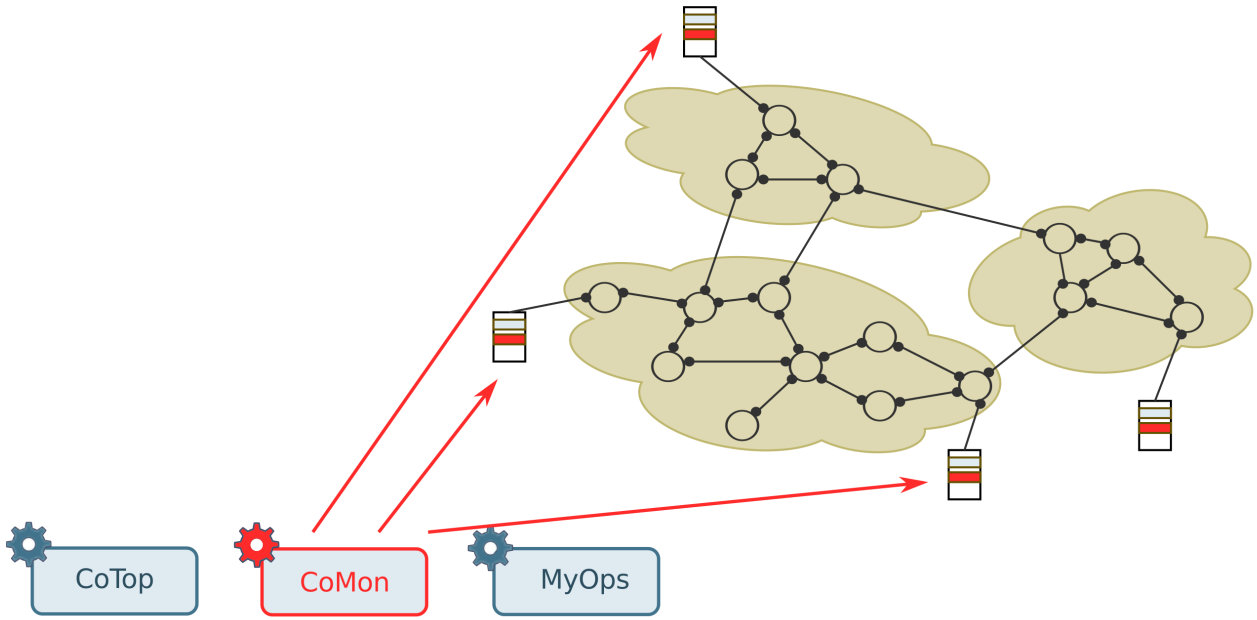

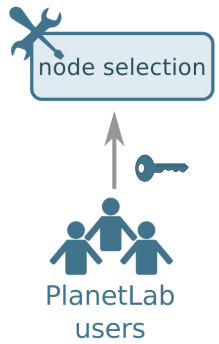

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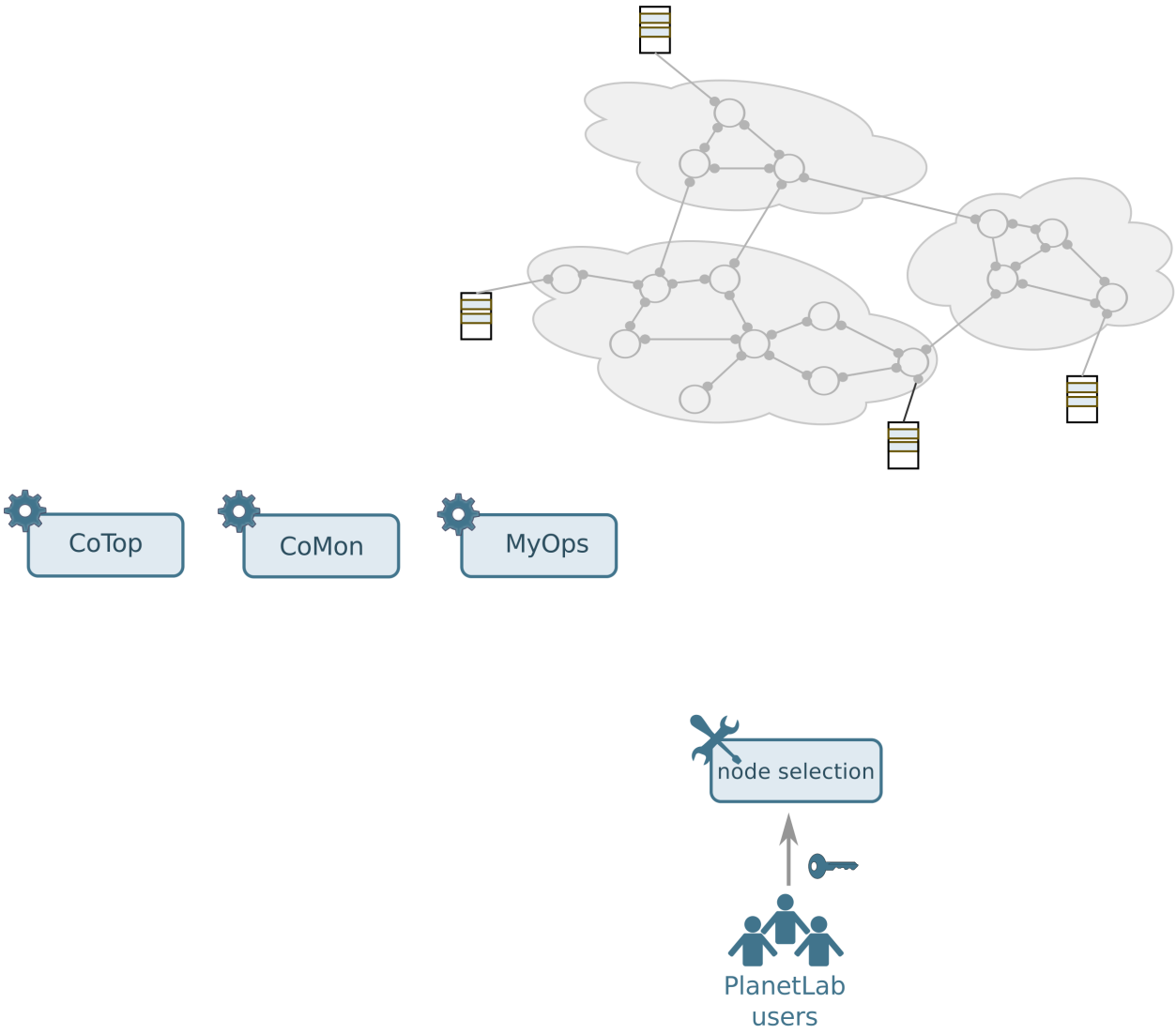

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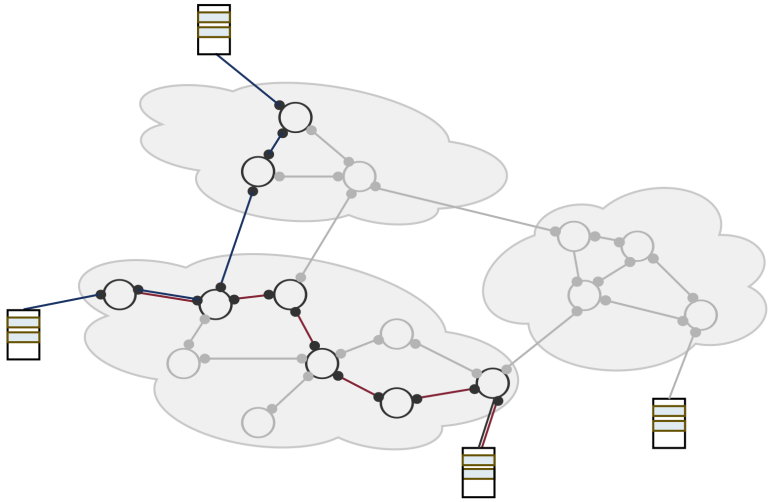

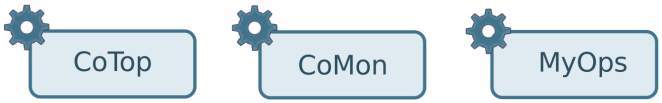

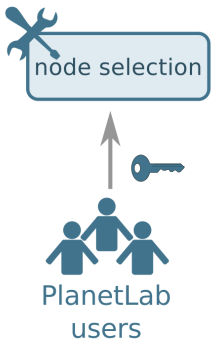

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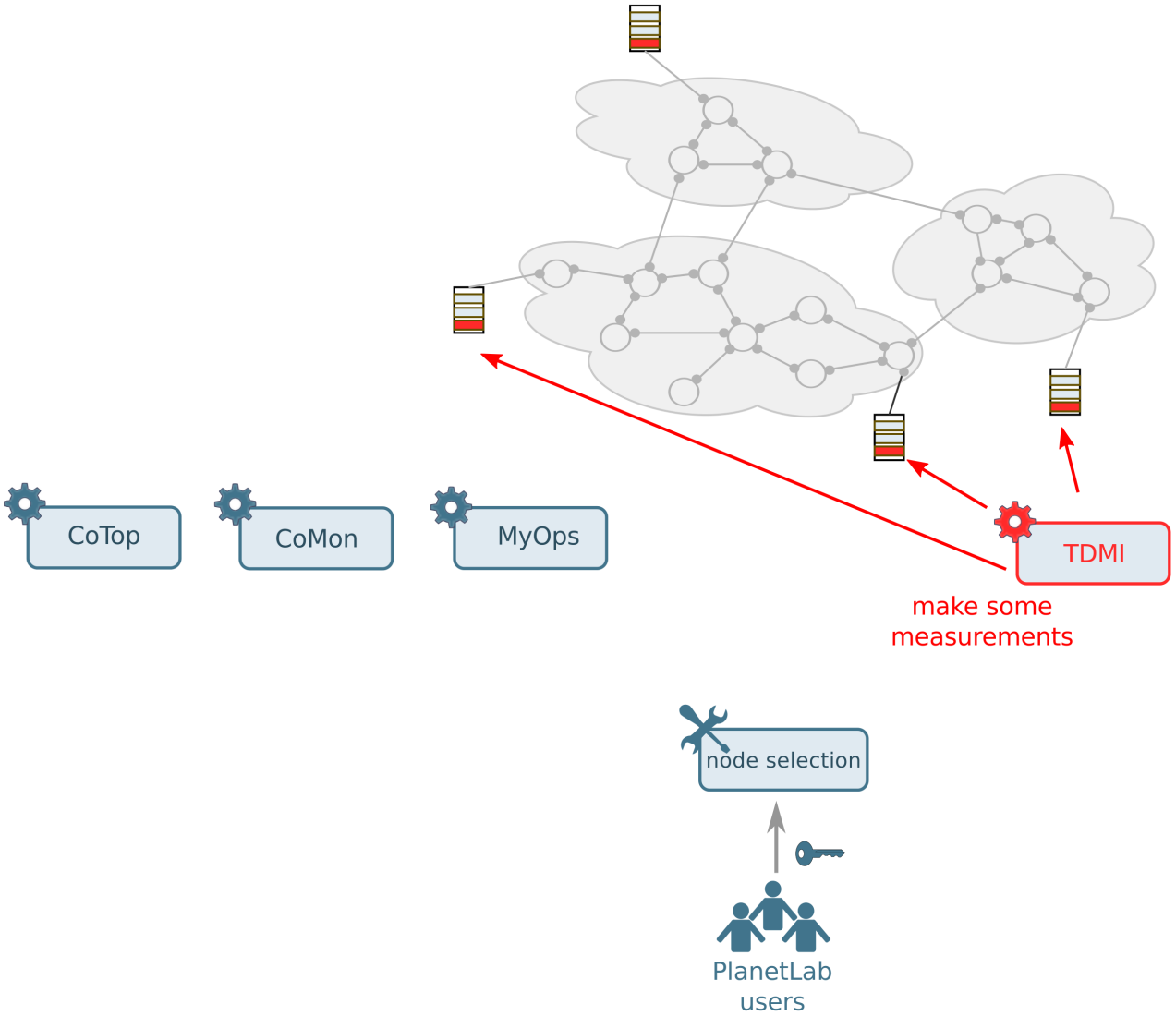


TDMI characteristics

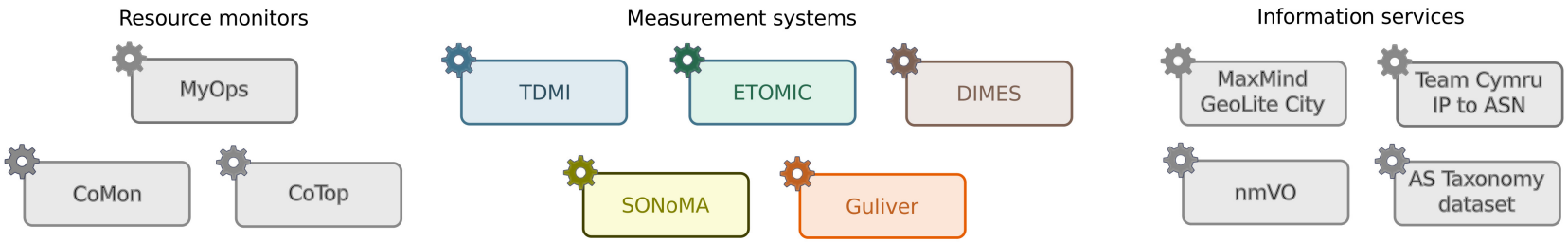
Sources: ∼400 active PlanetLab nodes

Tools: ping, traceroute, Paris Traceroute, dnsprobe

Measurements:

- Full-mesh measurements towards all PL nodes every 5 minutes
- Extending to a set of external destinations

Aggregating topology information with TopHat



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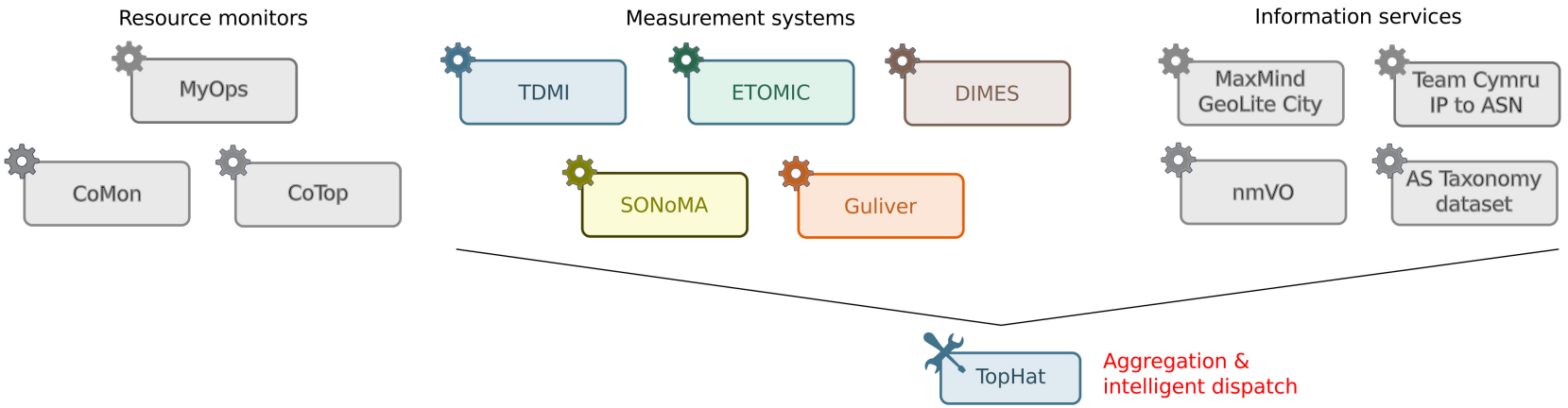
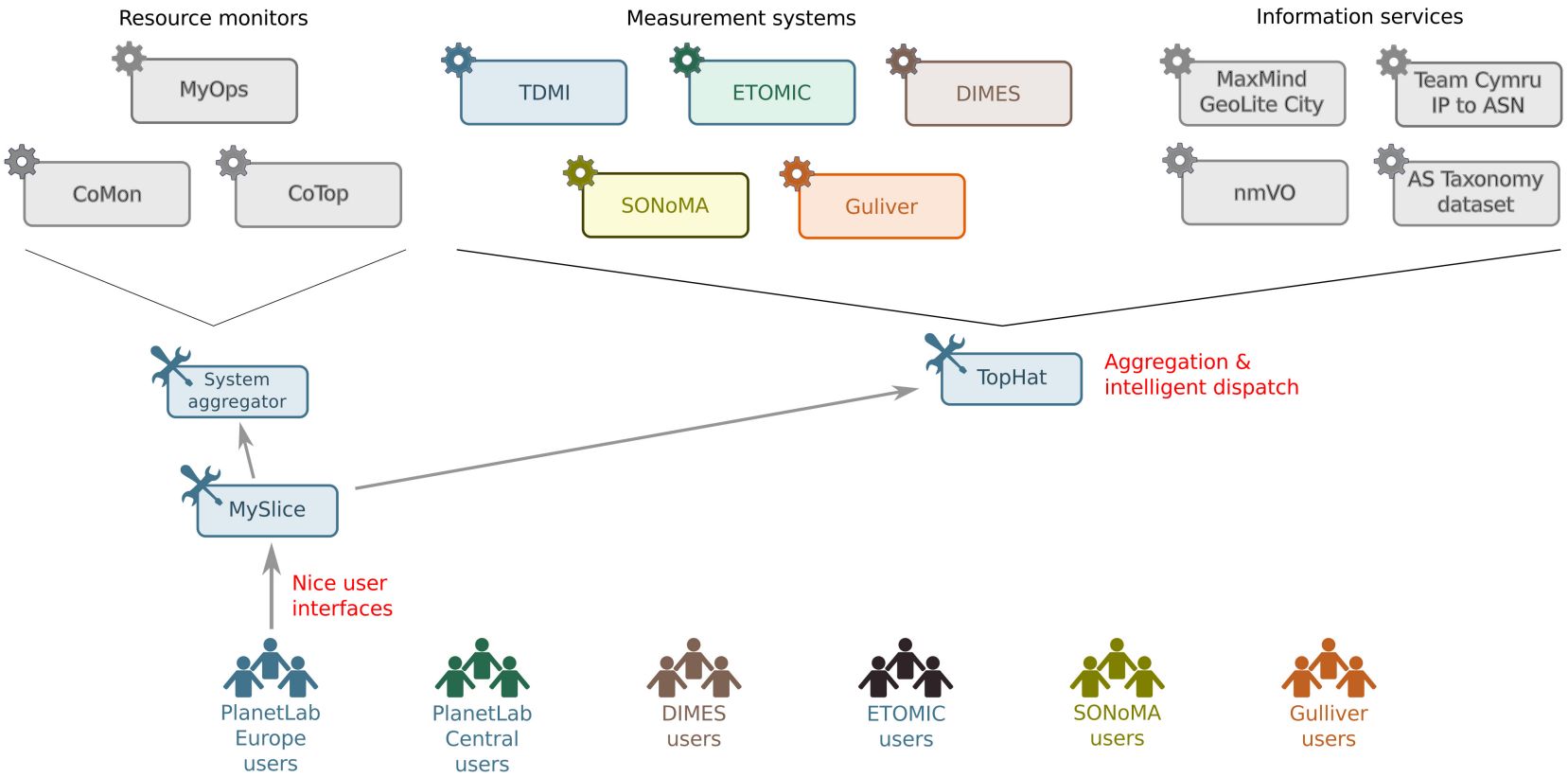


Serving users with MySlice



Serving users with MySlice

Measurement data available through MySlice, the default PLE interface

- Geolocalization (city, country, etc.) & AS-level information
- Consolidated data from previous measurements (averages, etc.)

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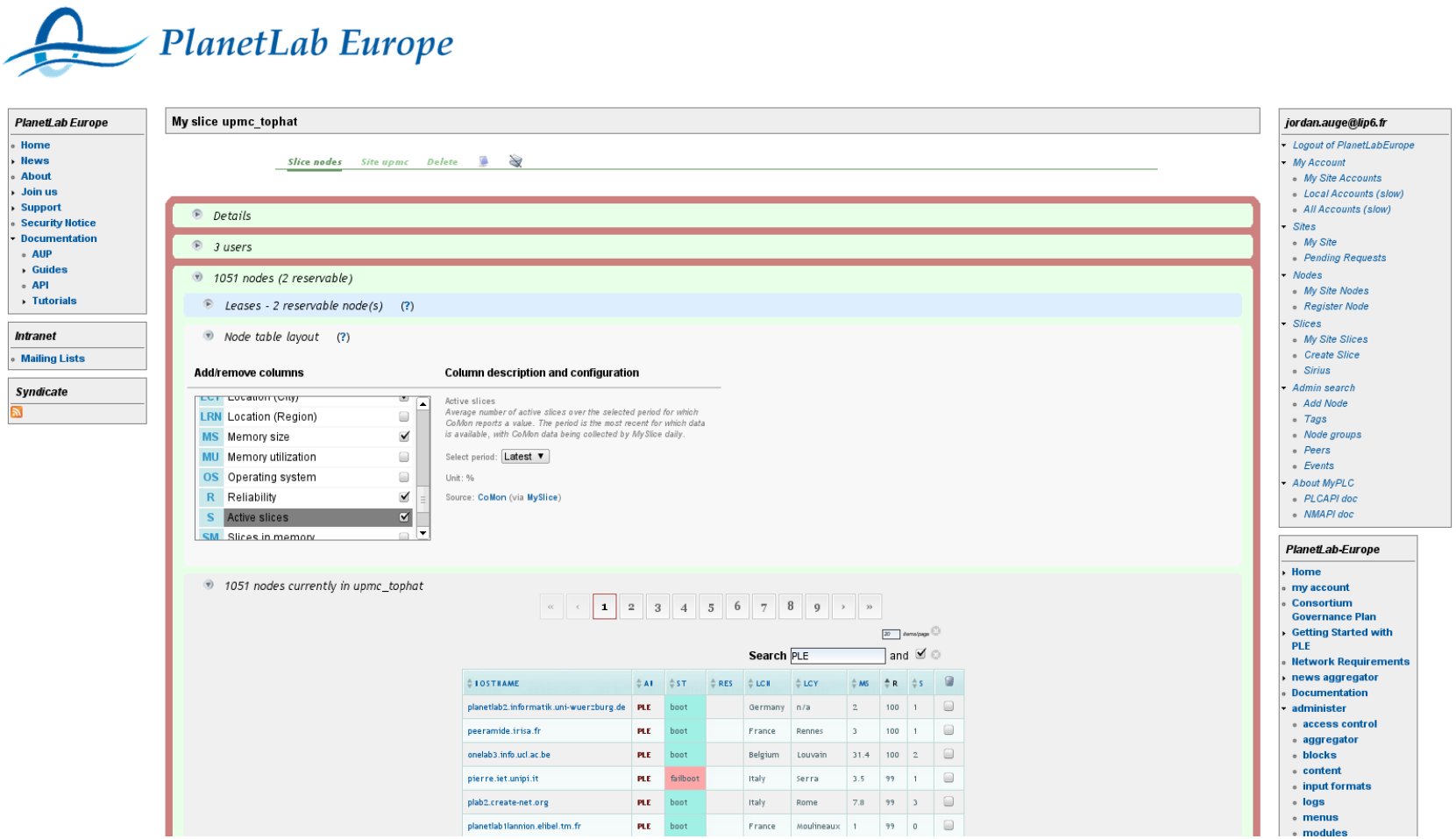
Goal: Leverage PLE topological and geographical diversity

- new columns for node-related information
- we are currently integrating pair-wise data

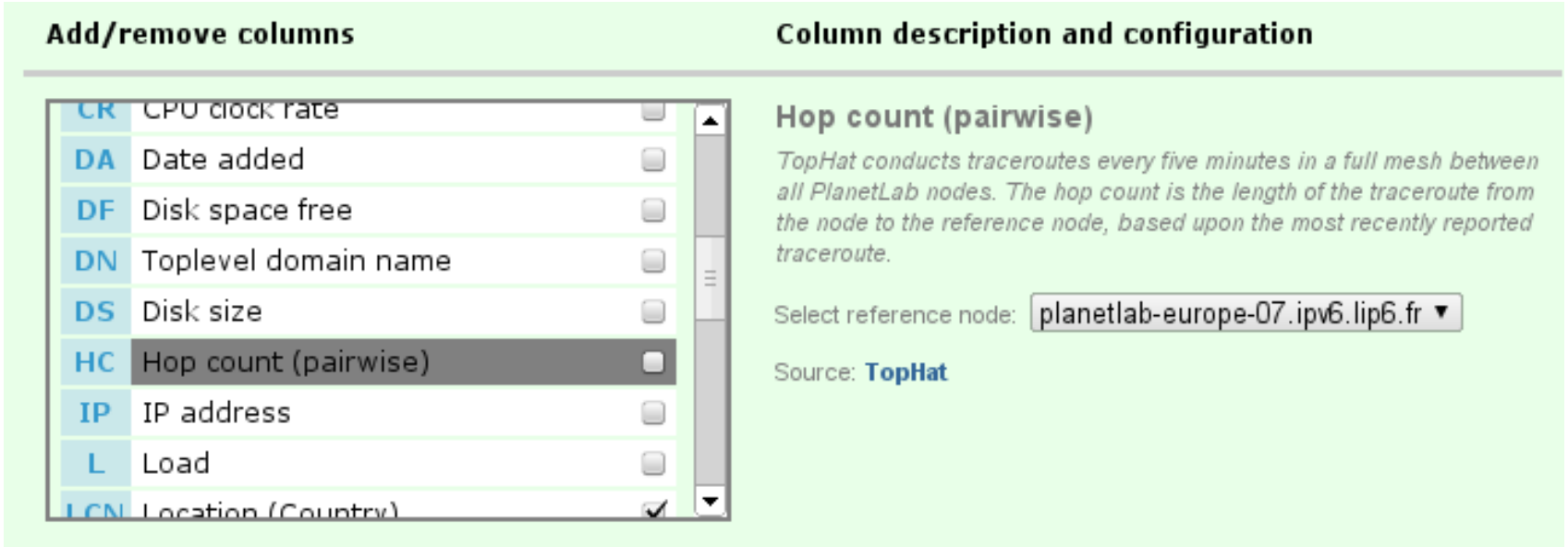
Serving users with MySlice



Serving users with MySlice

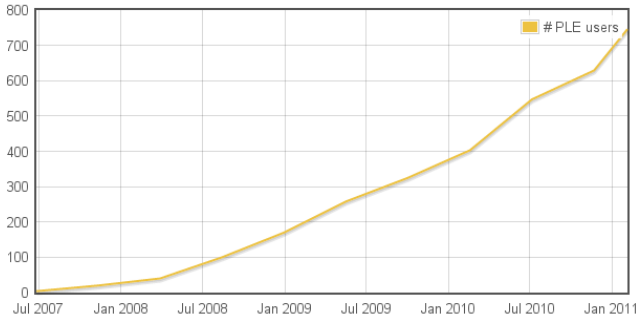
HOSTNAME	AU	ST	RES	LCN	LCY	R	?
cs-planetlab3.cs.surrey.sfu.ca	PLC	boot		Canada	Vancouver	100	
planetlab-01.cs.princeton.edu	PLC	boot		United States	Princeton	100	
planetlab2.unl.edu	PLC	boot		United States	Lincoln	100	
ttu1-1.nodes.planet-lab.org	PLC	boot		United States	n/a	100	
ttu2-1.nodes.planet-lab.org	PLC	boot		United States	n/a	100	
planetlab-node-01.ucd.ie	PLC	boot		Ireland	Dublin	0	
planetlab3.eecs.northwestern.edu	PLC	boot		United States	Evanston	100	
planetlab4.warsaw.rd.tp.pl	PLC	boot		Poland	n/a	100	
planetlab2.informatik.uni-erlangen.de	PLC	boot		Germany	Erlangen	100	
planetlab2.pop-pa.rnp.br	PLC	boot		Brazil	n/a	98	

Serving users with MySlice

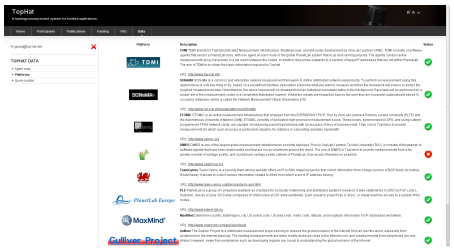


Incentives for interconnection

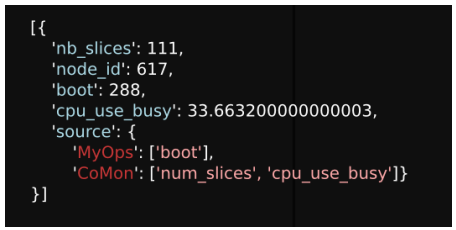
Target more than 800 active users



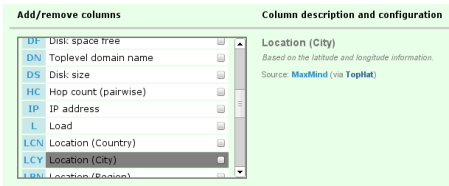
Get credit for your data



on our website



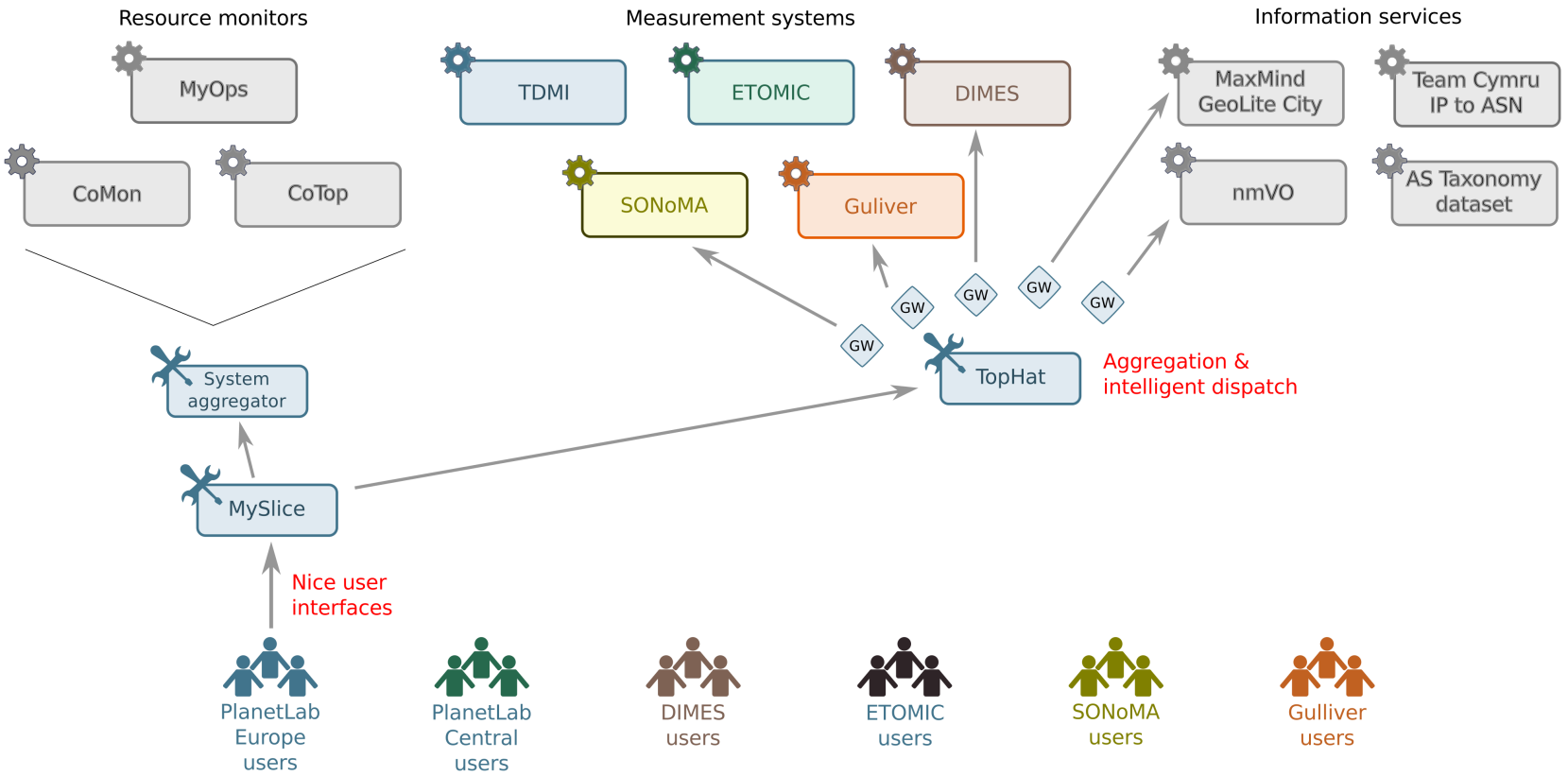
in the API results



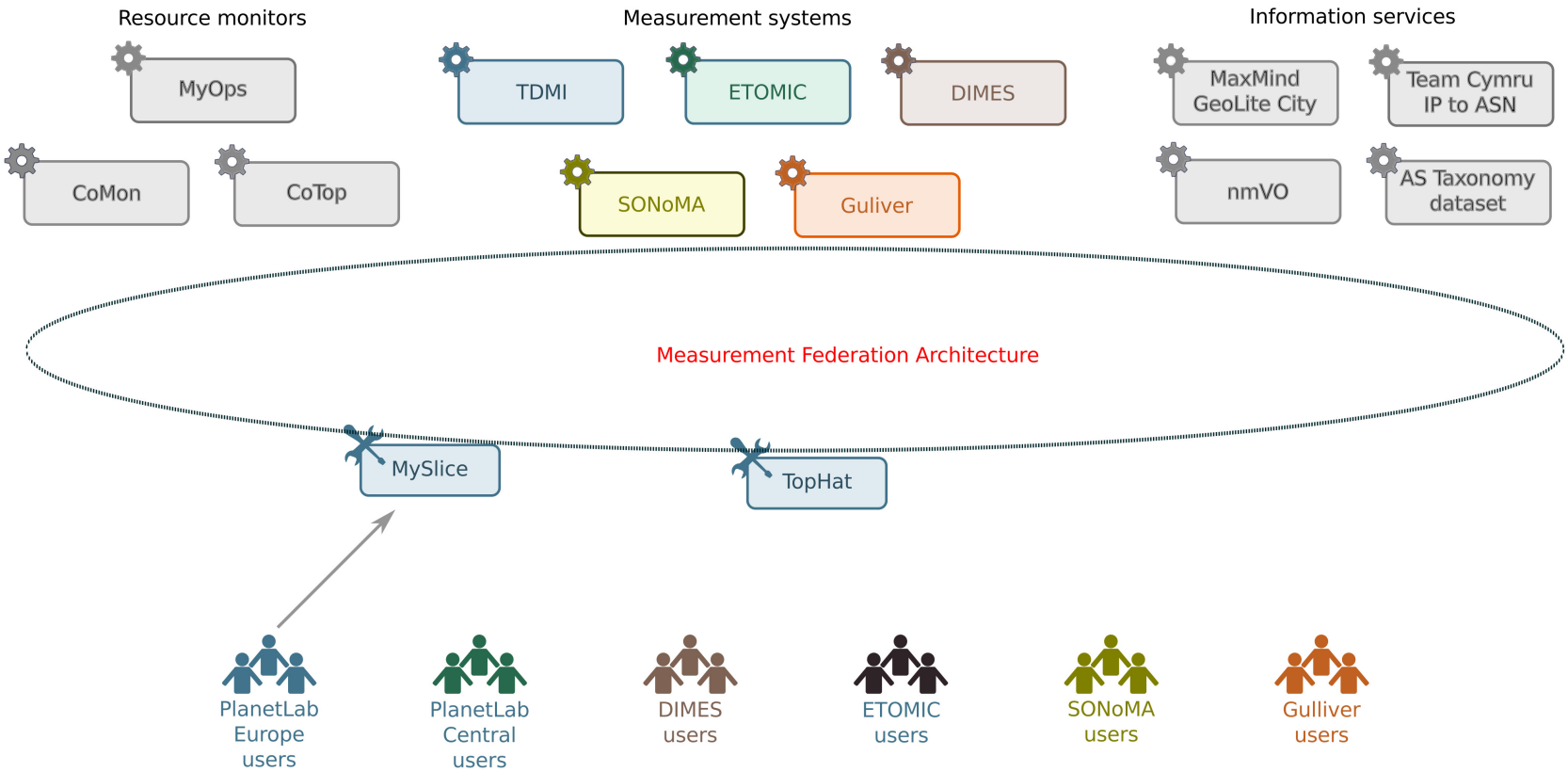
in our GUI

Basic accounting mechanism in place

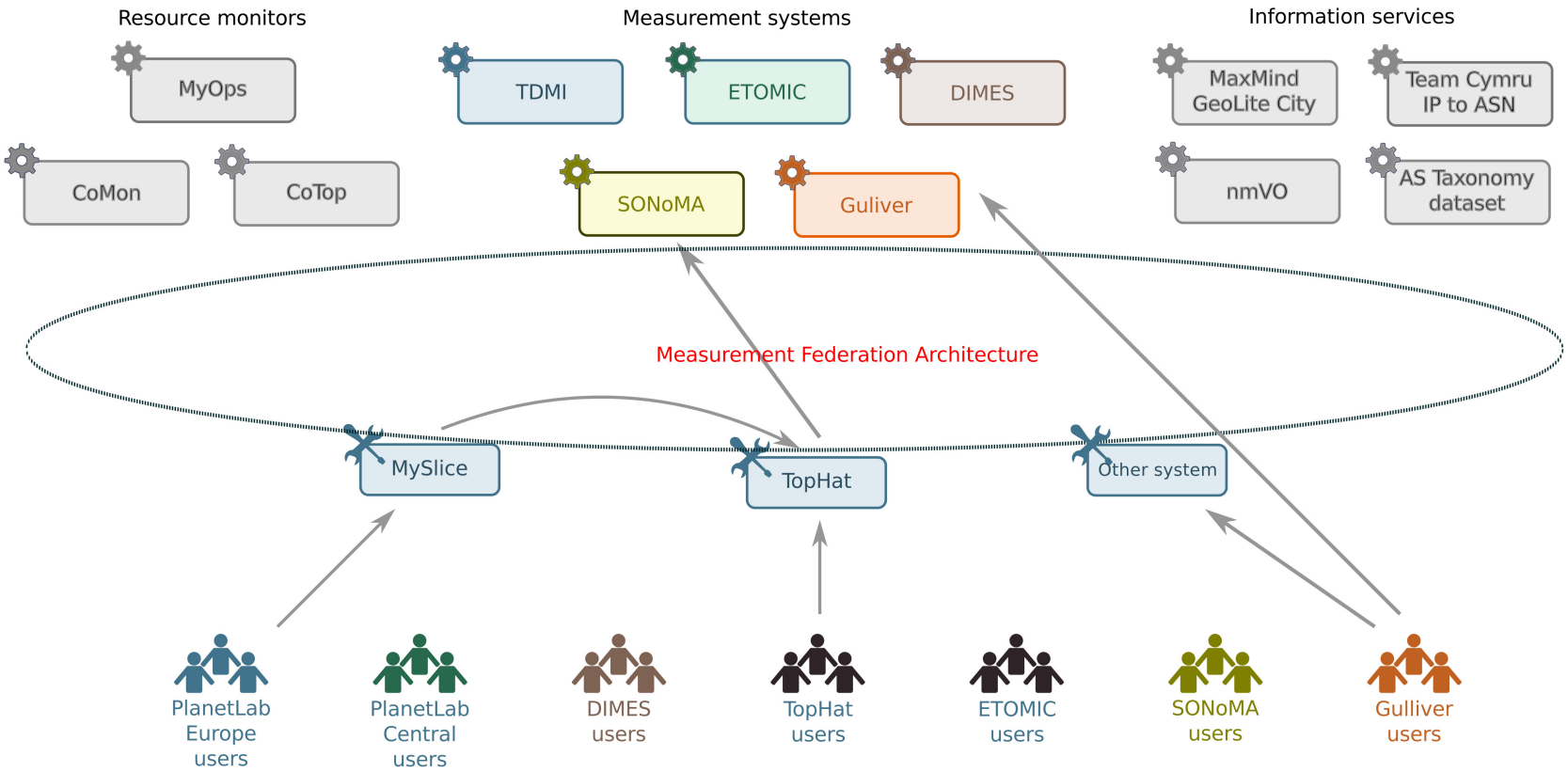
Current interconnection framework



Towards a Measurement Federation Architecture ?



Towards a Measurement Federation Architecture ?



Requirements for interface

- Learning about resources and services
- Learning about their capabilities
- Using those services (possibly across systems)
- Authorization and authentication

Similar challenges as in the GENI/FIRE communities for the testbed federation

Interconnected measurement systems

TopHat Dedicated Measurement Infrastructure (UPMC)
http://www.top-hat.info

ETOMIC (ELTE, Universidad Autónoma de Madrid)
http://www.etomic.org

SONoMA (ELTE)
http://www.etomic.org/sonoma

DIMES (Tel-Aviv University)
http://www.netdimes.org

Gulliver (University of Tokyo)
http://www.gulliver.wide.ad.jp

Interconnected information systems

IP to ASN mapping service (Team Cymru)

http://www.team-cymru.org

GeoLite City (MaxMind)

http://www.maxmind.com/app/geolitecity

AS Taxonomy (Georgia Tech)

http://www.ece.gatech.edu/research/labs/MANIACS/as_taxonomy/

CoMon / CoTop (Princeton University)

http://http://comon.cs.princeton.edu/

http://codeen.cs.princeton.edu/cotop/

Network Measurement Virtual Observatory (ELTE)

http://nm.vo.elte.hu

~~Conclusion~~ Getting started!

You can use our system now

- PlanetLab user? just log in
- if not, contact us

You can interconnect your measurement system with ours

You can plug in your tools

Visit our website: http://www.top-hat.info