IPv6 Quality of Service Measurement

Issues and Solutions

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6QM

- FP5 EU Project
- Finished … yesterday ☺
- Need for end2end IPv6 QoS measurements
- Need for secure inter- and intra-domain measurements
- 5 Partners:
  - Hitachi Sophia Antipolis Lab
  - France Télécom R&D
  - Hitachi SDL (Japan)
  - Consulintel
  - Fokus

HITACHI
Inspire the Next

Sophia Antipolis Laboratory (France)

france telecom
R&D

HITACHI
Inspire the Next

System Development Laboratory (Japan)

ConsulinTel
Consultores Integrales en Telecomunicaciones

FOKUS

IPv6 QoS M
IPv6 Quality of Service Measurement

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Comprehensive approach towards IPv6 QoS measurement

Objectives

- Development of a measurement device for IPv6. The measurement device inserts precise (micro second order) timestamp information when it captures the IPv6 packet. Each device has time synchronization functionality, by GPS

- Development of a measurement server to collect captured IPv6 packet. It provides usage data and QoS metrics (delay, loss, jitter and so on) for IPv6 traffic by analyzing the collected information through the measurement device.

- Generation of a set of guidelines for the possible application and further research of the IPv6 QoS Measurement in different scenarios.

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6QM and SoA

Name	IPv6	Passive /Active	Passive Delay	GUI	IPFIX	Inter-domain	Security
CMToolset	Yes	Active	No	Yes	No	No	Yes
D-ITG	No	Active	No	No	No	No	No
E2ETT	?	Active	No	Yes	No	?	?
eHealth	No	Both	No	Yes	No	?	?
NetMate	Yes	Passive	Yes (but no analysis)	Yes	No	No	Yes
QoSmetrix	Yes	Both	No	Yes	Yes	?	Yes
6QM tool	Yes	Both	Yes	Yes	Yes	Yes	Yes

Information taken from the MoMe database

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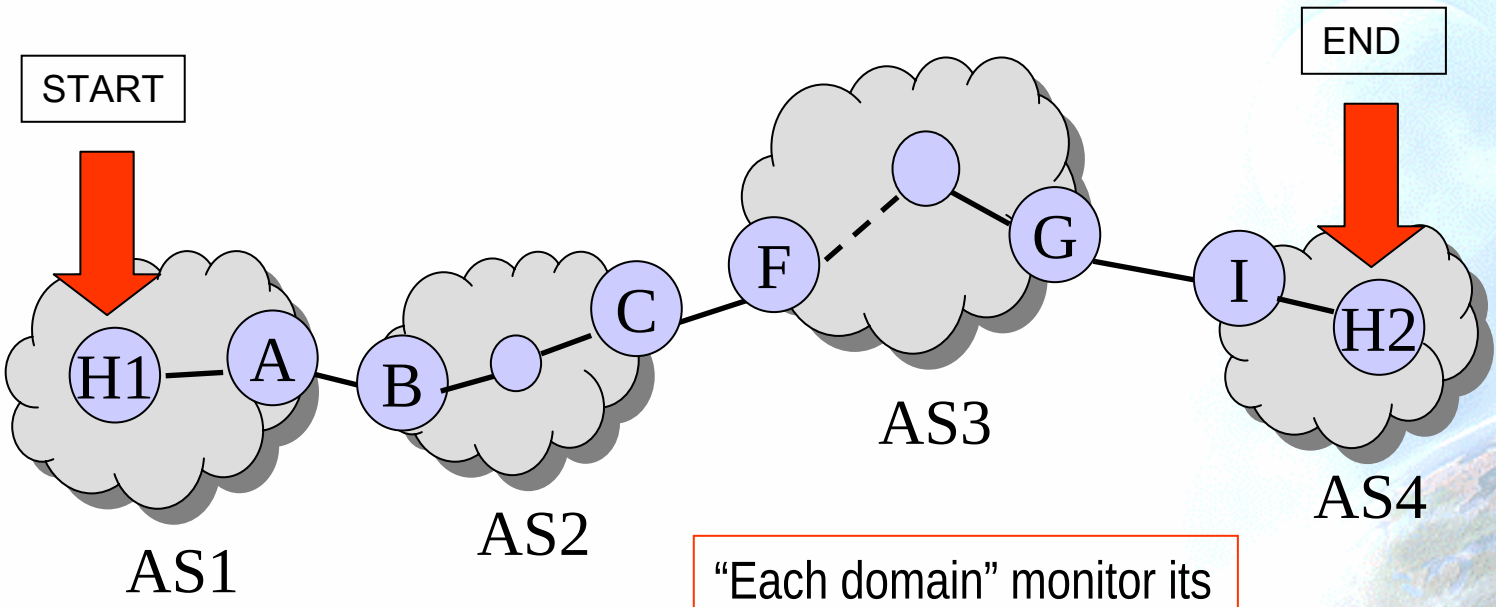
E2E Interdomain Measurement



H1 only knows:
- the destination of the flow
- the management point of its domain

"Each domain" monitor its network and knows the next step…

…but not details of the other networks

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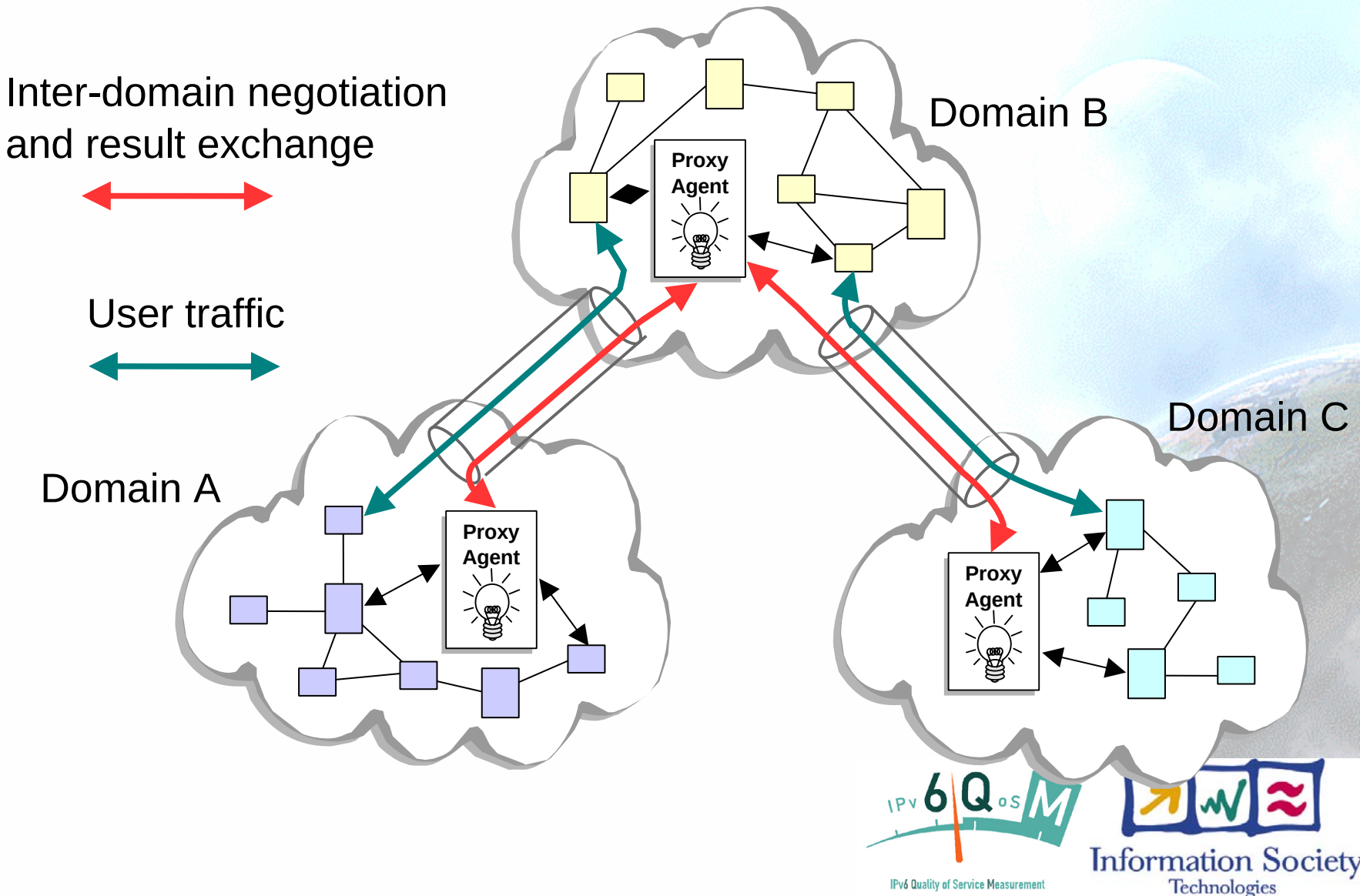
Interdomain Architecture



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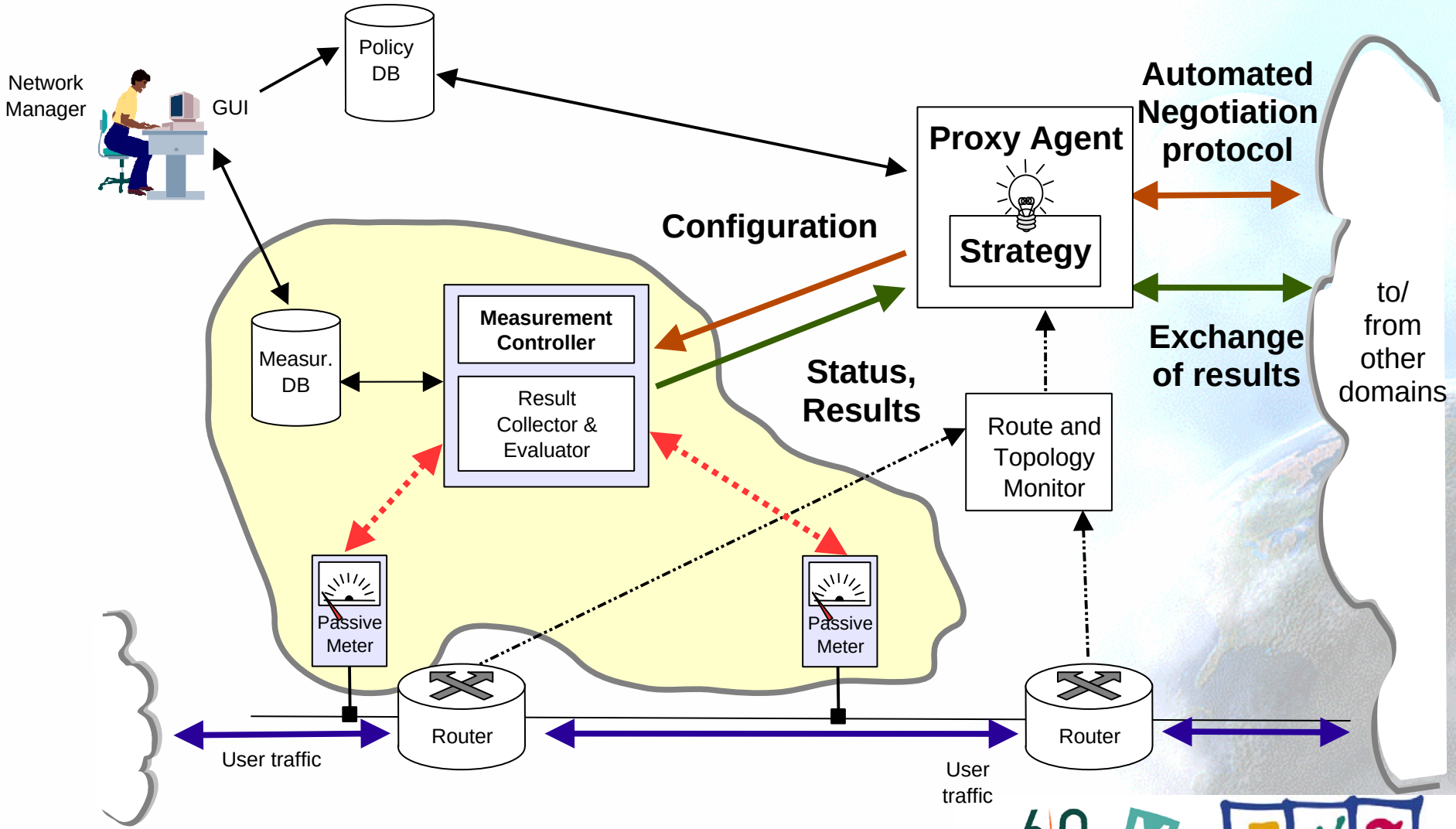
Intra-domain Architecture



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Inter domain measurement requirements

- Common data format
  - How to compare data
  - IPFIX
- Configuration protocol
  - How to share data among ISPs
  - SMS (Specification of Monitoring Service)
- Common measurement framework and common metrics
  - Measurement tools are often ISP specific
  - OpenIMP and most of all common metrics
- Security and Policies
  - 6QM Inter Domain Architecture

- … and cooperation between ISPs !!!

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Monitoring Configuration

- Specification of Monitoring Service (SMS)
- The configuration process splits the document into a
  - Intra-domain SMS
  - Inter-domain SMS sent to “next hop”
- Different configuration granularity

Specification of Monitoring Service (SMS)

- ID
- Scope source – destination *(changing every time)*
- SRC controller
- Collector
- **Flow identification** filter *(Complex field)*
- Metric
- Time schedule
- Report schedule
  - Periodically
  - At the end of the monitoring process
  - In alarm mode **(notification threshold)**
  - Random mode
  - Real time mode
  - Custom mode
- Reporting document type {IPFIX template,Custom, …}
- **Options**
  - **Sampling**
    - Method
    - **parameters**
  - Completeness
  - Refinement
  - Random shipment
  - Overload behaviour
  - Flow expiration (given time interval, FIN or RST bit in a TCP connection)

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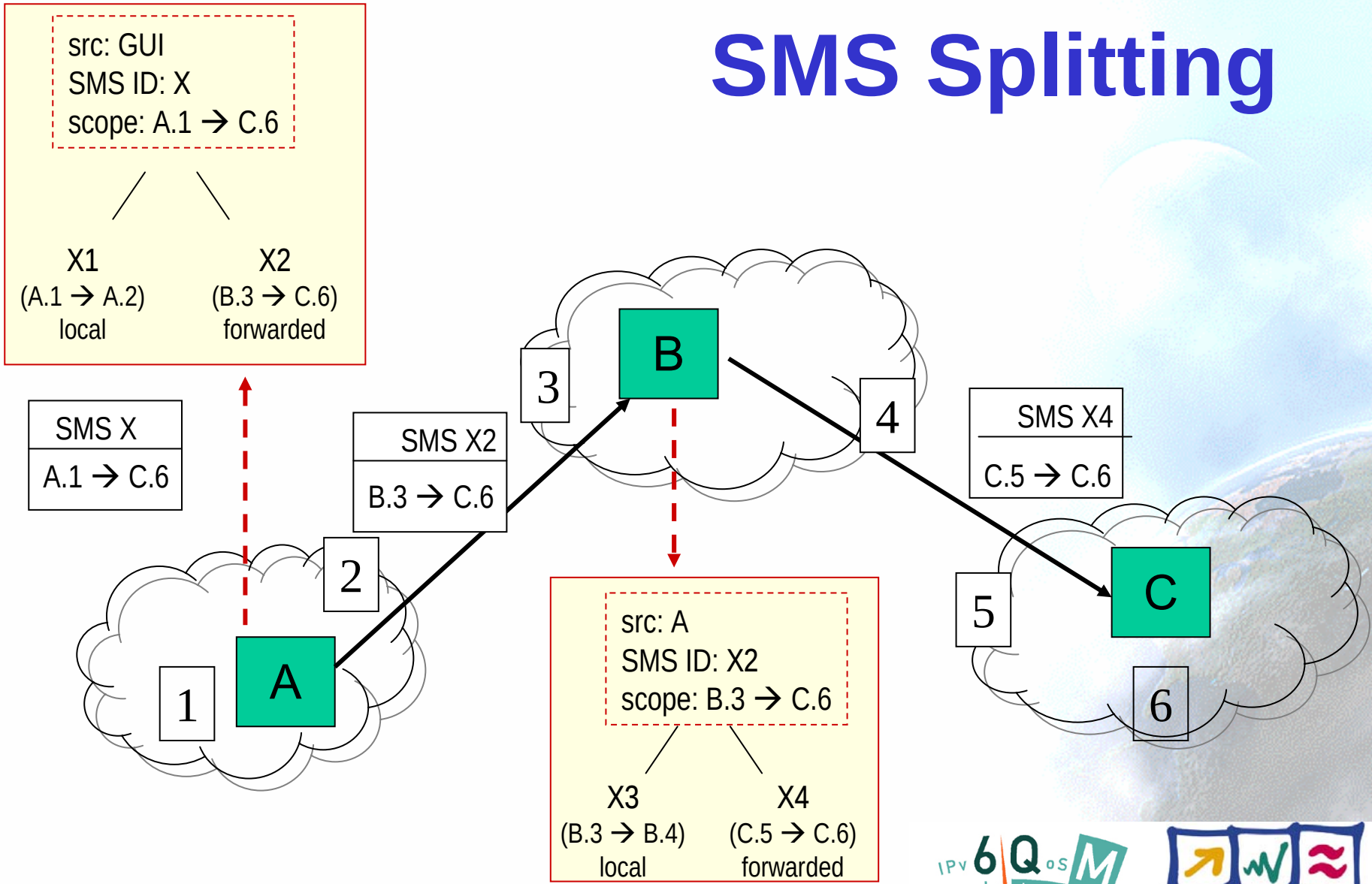
SMS Splitting



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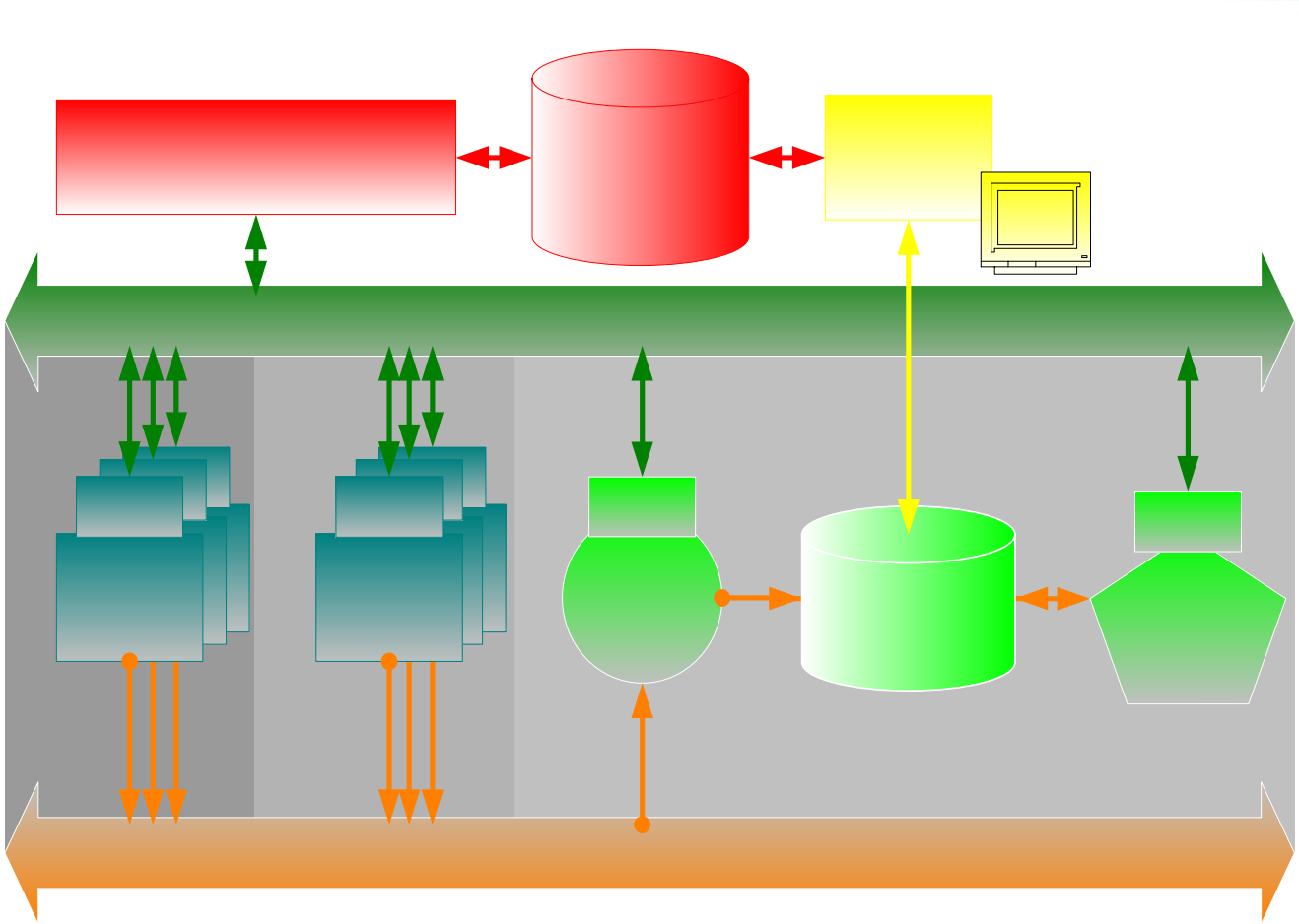
Prototype Structure



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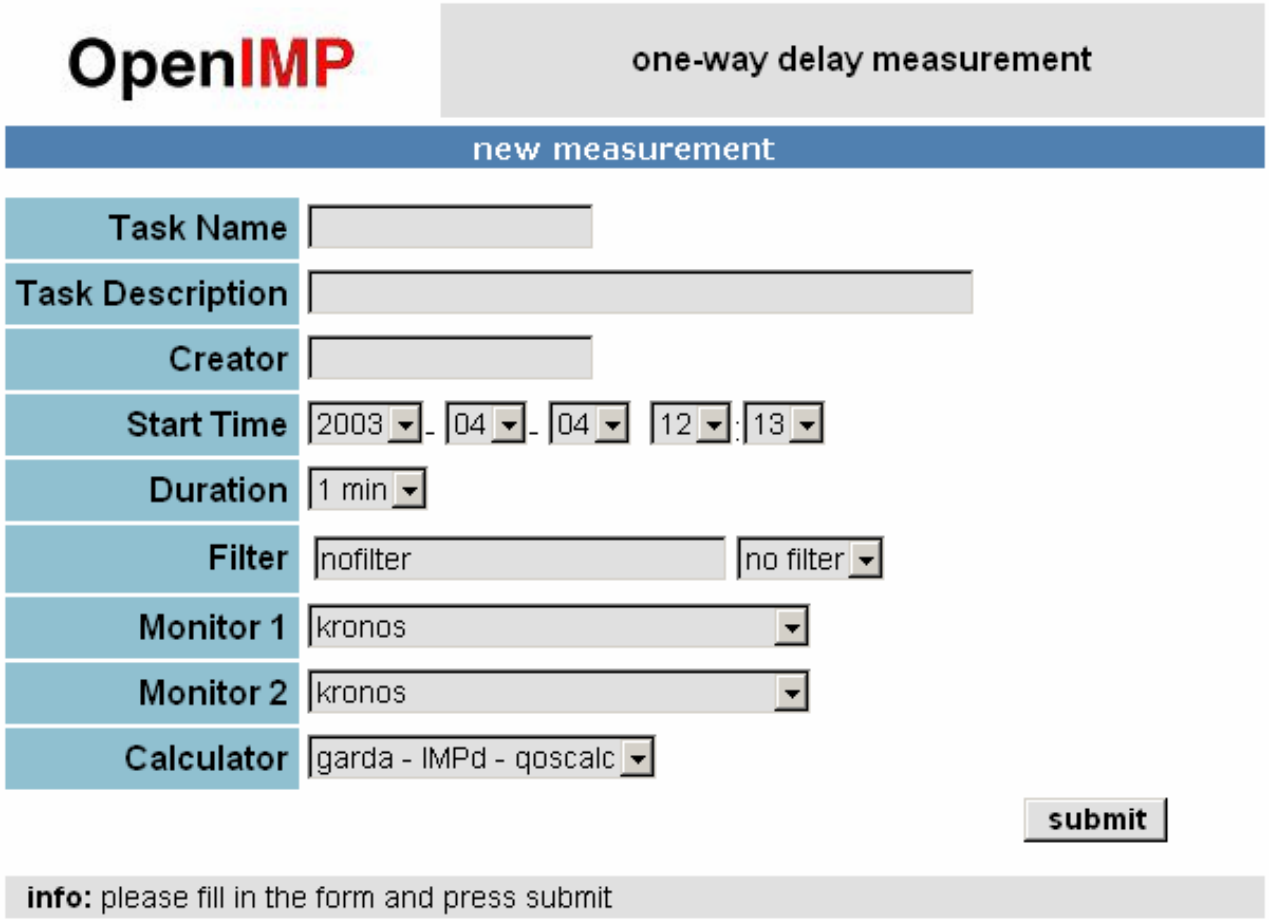
6QM Interface



meteor@fokus.fraunhofer.de

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6QM Interface

OpenIMP — **server status**

current measurement servers

server_id	name	description	ipaddr	port	status	last_update
1	kronos.fokus.gmd.de	IMPd v0.09	kronos.fokus.gmd.de	6789	alive	2003-04-03 19:04:02
2	tt99.fokus.gmd.de	IMPd - .55	tt99.fokus.gmd.de	6789	down	2003-03-07 15:54:04
3	tt98.fokus.gmd.de	IMPd - .76	tt98.fokus.gmd.de	6789	down	2003-03-07 15:54:04
4	garda	IMPd - qoscalc	garda	6789	alive	2003-04-03 19:04:02
5	hawk	IMPd - GiRouter	[redacted]	6789	alive	2003-04-03 19:04:02
6	neo	IMPd .56	neo	6789	alive	2003-04-03 19:04:03
7	groth.fokus.gmd.de	IMPd .55	groth.fokus.gmd.de	6789	alive	2003-04-03 19:04:03

update back

info: press update to get current status

meteor@fokus.fraunhofer.de

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access to project outcomes: www.6QM.org

- Project Deliverables and Supporting Material
- Direct access to
  - Papers / Publications
  - Standardization documents
- Open Source Policy for the OpenIMP part of the Project Toolset
- New Download Page made available:
  - OpenIMP
  - IPFIXlib – offered as separate module
- Preparation of OpenSource projects on Sourceforge.net

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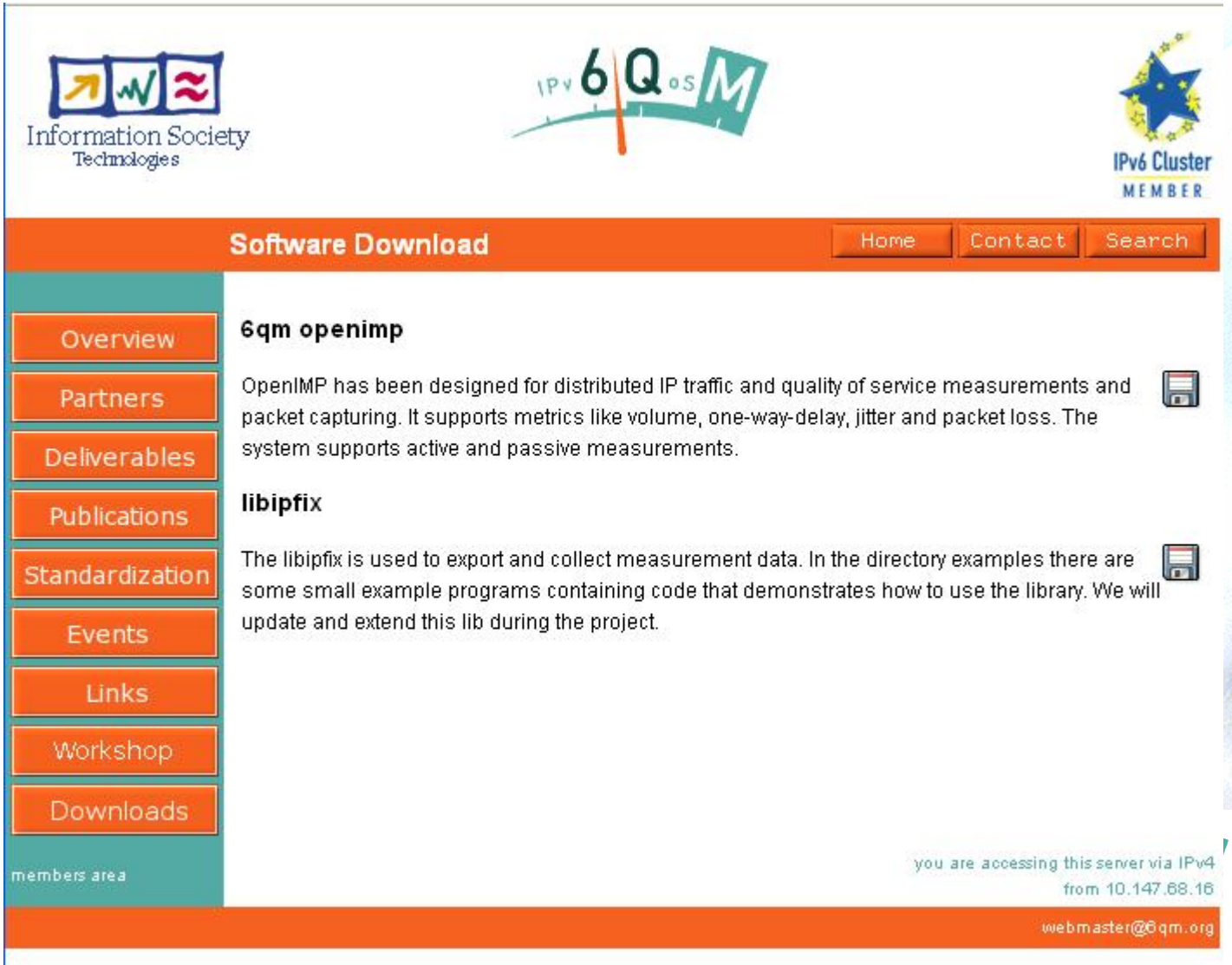
www.6QM.org



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Conclusions

The measure of quality is an important affair

ISP must be sure their bill will be fair

With 6QM probes

Your worries are gone

Just need to install what's already there

(and it's open source .. ☺)

That’s all folks …