



6QM inter-domain architecture

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elisa.boschi@hitachi-eu.com boschi@fokus.fraunhofer.de

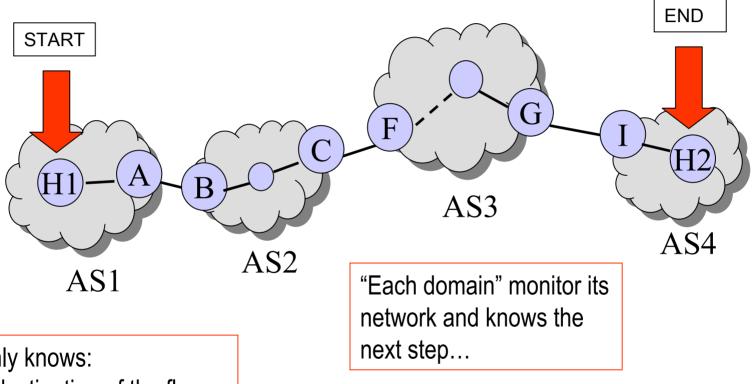
OUTLINE



- Need for End-to-End measurements
- Requirements
- Monitoring configuration
- Data export
- 6QM architecture
- Components in detail
- Security (AAA)

E2E measurement





H1 only knows:

- the destination of the flow
- the management point of its domain

...but not details of the other networks



- Common data format
 - How to compare data
 - IPFIX
- Configuration protocol
 - How to share data among ISPs
 - SMS
- Common measurement framework and common metrics
 - Measurement tools are often ISP specific
 - OpenIMP and most of all common metrics
- And of course: cooperation between ISPs!

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

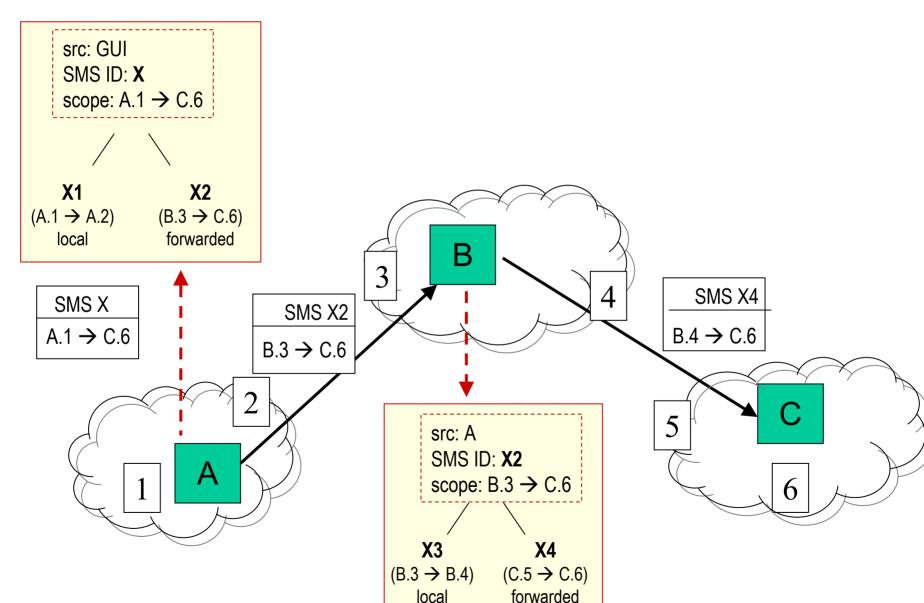
SMS



- 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)

SMS splitting





Nested SMSs

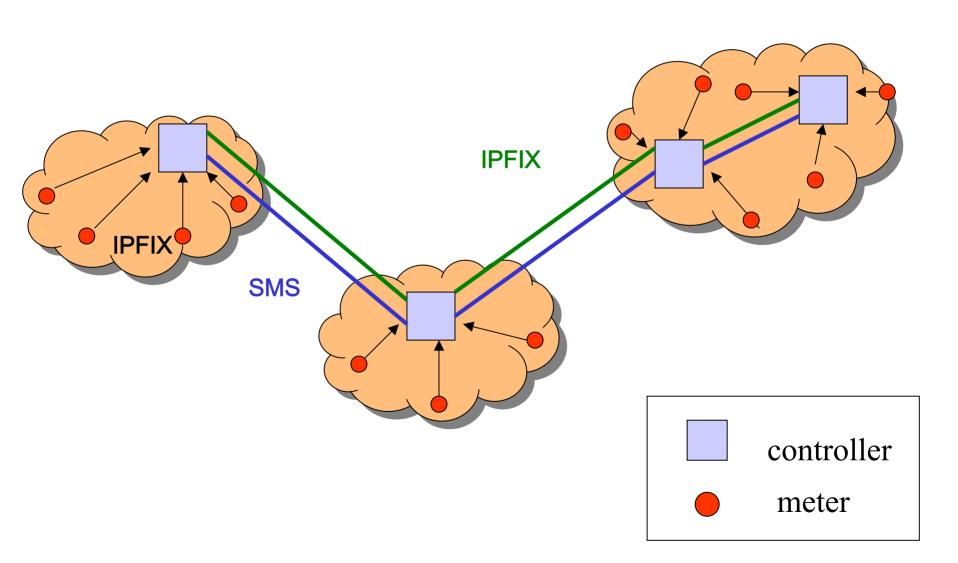


ID SMS ID: 1 Scope • SMS ID: 1.1 SRC controller • SMS ID: 1.2 Collector Metric SRC controller Time schedule Collector Flow identification **Options OWD** Metric - Granularity: Time schedule Report schedule ID Scope Reporting document type **Options** - Granularity: endpoint SRC controller Collector

ID **SMS ID: 1.1** Scope Source destination Flow identification pkt header Report schedule Reporting document type endpoint **SMS ID: 1.2** source destination Flow identification Metric pkt header Time schedule Report schedule Reporting document type **Options** - Granularity: endpoint

Data export

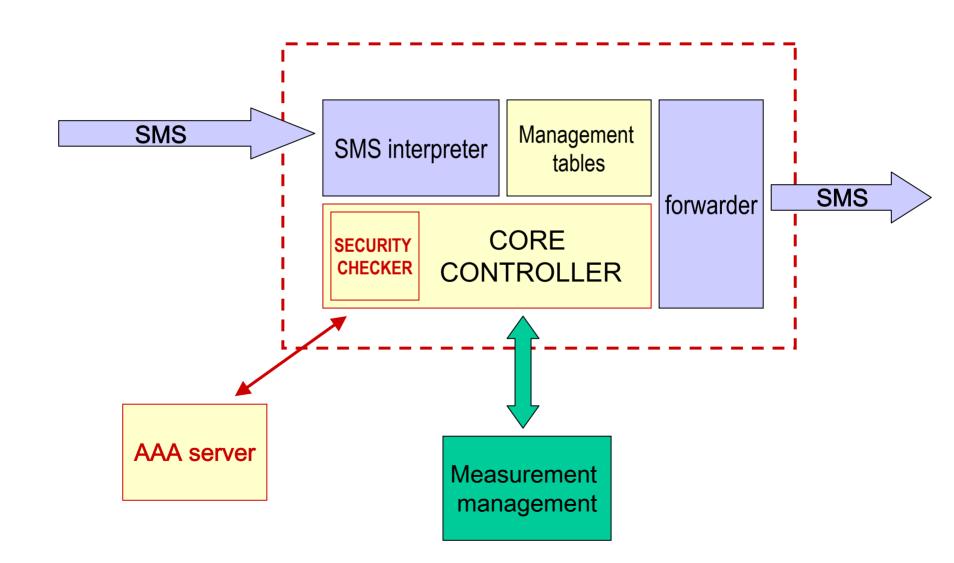




6QM initial functional architecture IPV 6 QOS Results Other domains... Inter-domain Controller + Collectors Requests Get IPFIX data User 6QM Evalua Manager 6QM Measureme Interface GUI Store control & Calculate Monitor meters Store result management Info Generate task Control **IPFIX Collector** Data Flow **Active Meter Passive Meter Active Meter Passive Meter** capture generate generate capture analyze analyze capture capture analyze analyze Test packet LAN WAN LAN User traffic

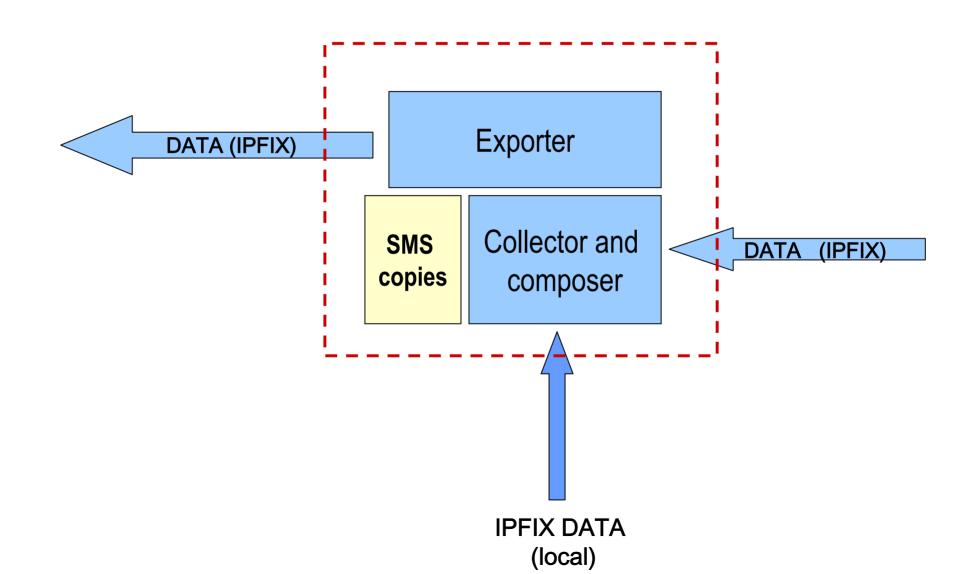
CONTROLLER





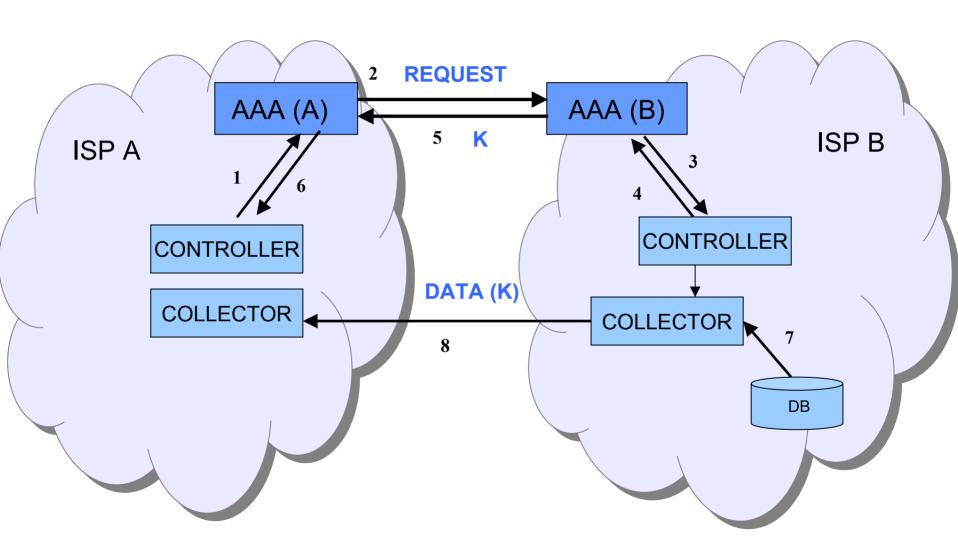
COLLECTOR





AAA







Thank you...