

Global Network Architecture Update on GNA Technical WG



global network architecture



Erik-Jan Bos

I2GS2017

Washington, DC, USA – 26 April 2017

- Network Architects from R&E Networks from around the world
- Sharing a vision, sharing a willingness to collaborate
- Status April 2017:
 - Six architecture docs v1.0 done
 - Three White Papers published
 - GNA Compliant Infra harvesting
 - Hardening, Documentation, Measurements & Monitoring



- Six Architecture documents:
 - Reference Architecture for a Global R&E Network
 - Specifications for Exchange Points in the Global Network Architecture
 - Multi-Layer Transport Service for the Global Network Architecture
 - Operations in the GNA-Compliant Network Infrastructure
 - GNA Technical Notes
 - Glossary for the Global Network Architecture

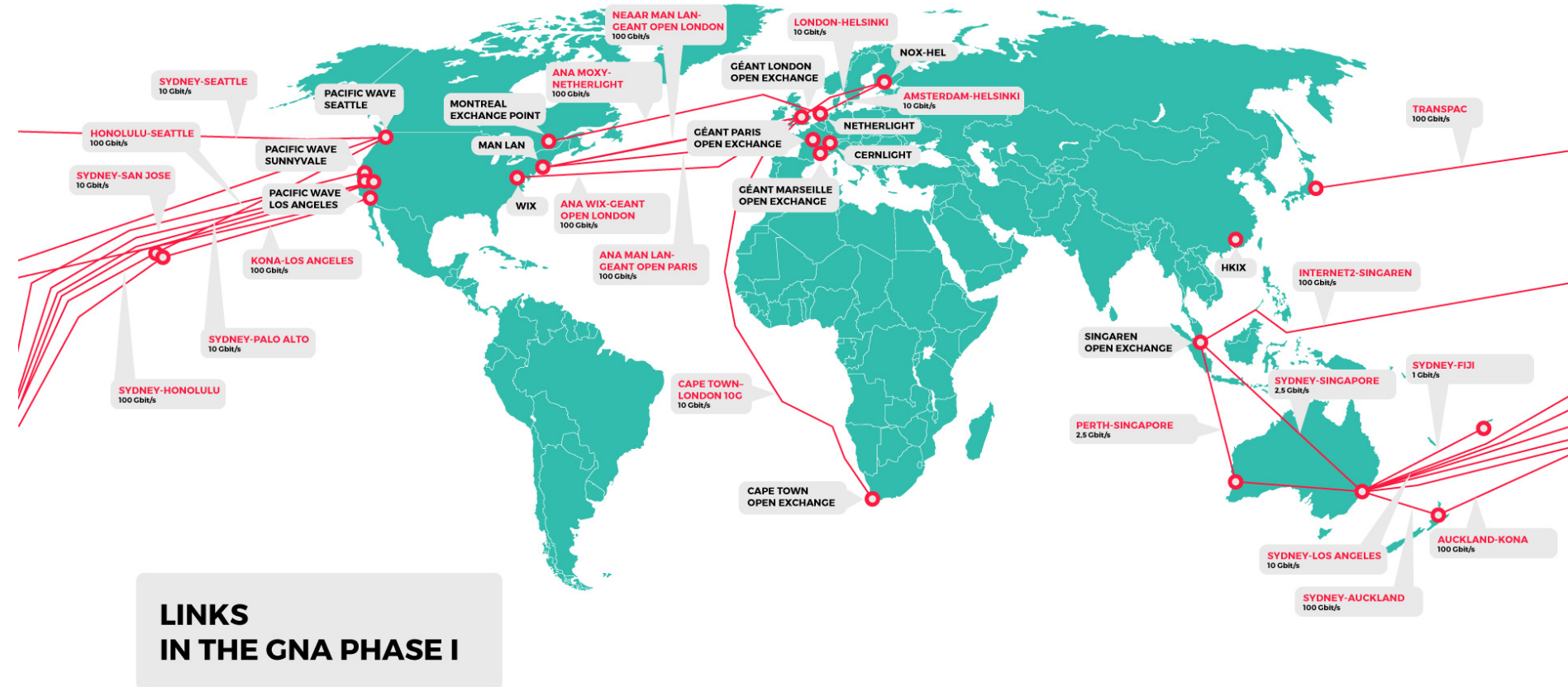


- Three White Papers:
 - The Commons in the GNA
 - The GNA Information Architecture
 - The Global Virtualization Architecture
- Location: <http://gna-re.net/>



- The GNA concept has achieved buy-in from many R&E Networks around the world
- A 'Proof of Concept' project (ANA) has proved successful and stable
- Consortia (similar to ANA) are developing in other regions
- The number of Global Exchange Points continues to grow
- Working towards GNA Phase One realization (I2 Global Summit 2017, here and now)





Thank You! Questions?

**GNA:
You're Welcome to Participate**

Erik-Jan Bos <bos@nordu.net>



Backup Slides



- Technical and operational considerations for components of the GNA:
 - Ability to deliver services, any place, any time with same characteristics as locally
 - GNA enables new capabilities → new possibilities for R&E
 - Important role for End-to-End SLAs or SLSs



- Global Research and Education Exchange Points (GXPs): recommendations and proposals for services and capabilities
- Fundamental characteristics:
 - Non-blocking switch connecting participant circuits
 - Ability to create non-blocking connections
 - Carrier neutral colocation facility for switch
- GXP Colocation Characteristics
- GXP Principles of Operation
- Community Engagement by GXP leadership
- Measurements: Publish basic statistics
- Privacy of Data Policy Statement: GXP does not own data
- Performance Assurance Node and Ad Hoc Testing: PerfSONAR



- Classes:
 - Layer 1 or Wavelength transport
 - Layer 2 or Ethernet transport
 - Layer 3 or IPv4/IPv6 transport
- Private Layer 3 (IPv4/IPv6 VPN)
- Academic Layer 3 access
- Any Layer or Layer Independent Transport
- Transport based in a combination of multiple layers
- All transport service must have defined:

Attribute	Options
List of Endpoints	- Two or more Endpoints to be part of the service
Topology	- Point-to-Point - Multi-Point
Scheduled services	- Start and finish time - Duration
Endpoint throughput guarantees	- Best effort - Guaranteed bandwidth



- Outlines services and mechanisms that participating NOCs agree to follow
- Federated Operations is key corner stone
- Detailing:

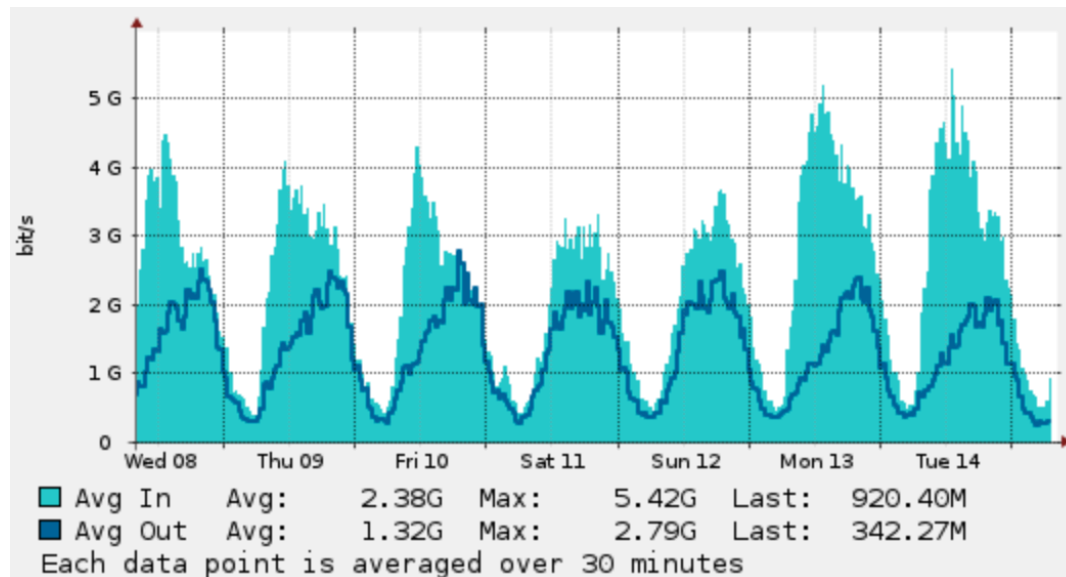
Function	Description
Change Management	Procedures and systems, either manual or automated, required for: - provisioning or decommissioning services; and - planned maintenance of services and/or infrastructure.
Capacity Management and Planning	Systems and processes enabling identification and anticipation of capacity or congestion issues and procedures to deal with these.
Incident Management	Ticketing systems, troubleshooting procedures, communication and escalation protocols required for managing unplanned incidents that may have an impact on performance.



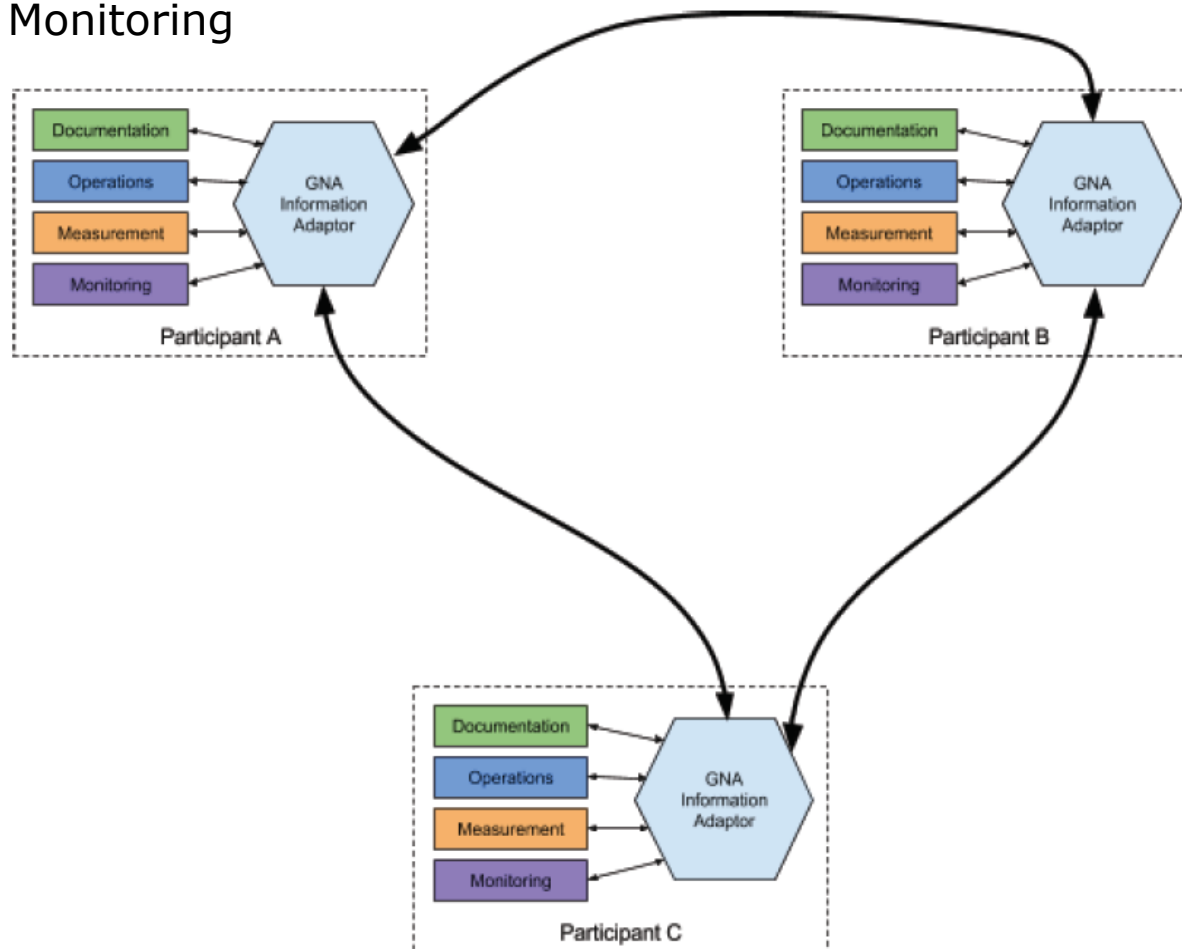
- GNA Technical Notes:
 - Encryption
 - Security
 - Acceptable Use Policy
 - Privacy
 - Sharing Traffic at Global Exchange Points
- GNA Glossary:
 - Definitions
 - Abbreviations



- Commons is derived from common land in medieval English law
- Fuster Morrell characterized Digital Commons
- “The willingness of organizations to adopt policy for sharing GNA resources within the R&E community and with noninvesting 3rd parties as means of expanding R&E reach”
- No single NREN can create a global network
- Explicitly sharing each others’ non-used capacity



- Four categories:
 - Documentation
 - Operations
 - Measurement
 - Monitoring



- Vision is:
 - to virtualize each inter-regional network system
 - allowing each participant to control a complete global virtual and resilient system,
 - with predefined & deterministic characteristics
 - extend to storage and compute
- Use case: 4 Gbit/s virtual system for e-VLBI
- Example technology: GÉANT Testbeds Service (GTS)

