



Advance Multi-domain Provisioning System

Anand Patil, DANTE

TNC'06 – Catania

17 May 2006



Connect. Communicate. Collaborate

Contents

- Overview of GÉANT2 and SA3
- Motivation
- Overview
- Design and Architecture
- Current Status
- Deployment
- Issues
- Future Plans
- Summary



Connect. Communicate. Collaborate

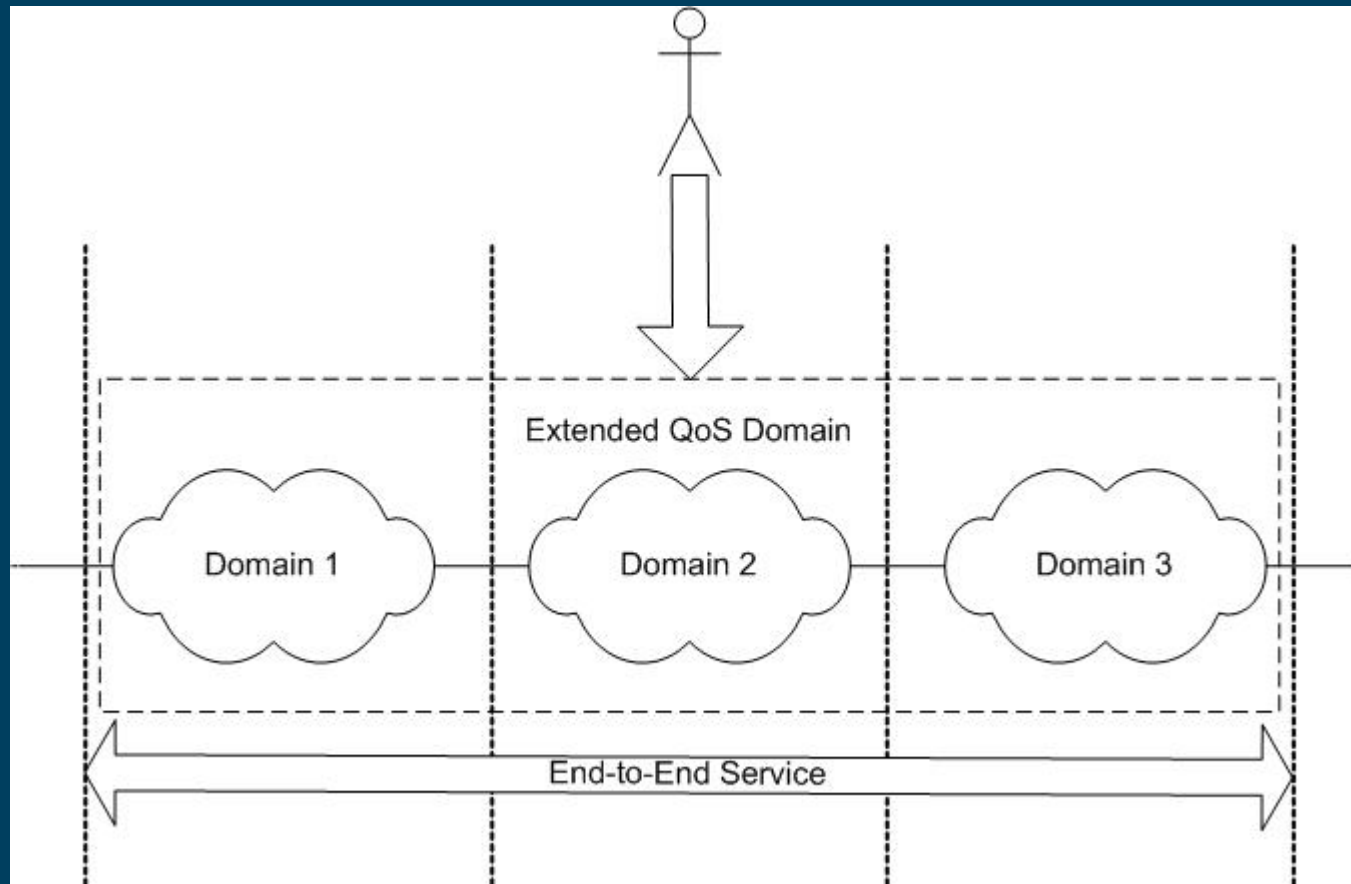
GÉANT2 SA3

- GÉANT2 is the seventh generation of pan-European research and education network
 - Continue to provide existing services – BE, LBE, PIP, multicast (v4), IPv6, multicast (v6)
 - Provide new L1 and L2 P2P switched services
- Develop a wider range of **value added** network services
- Service Activity 3 (SA3) or PACE
 - Performance and Allocated Capacity for End-users
 - **End-to-end Quality of Service provisioning**



The Problem Space

Connect. Communicate. Collaborate





Connect. Communicate. Collaborate

Motivation

- New projects need a high performance network
- Dedicated fixed point-to-point end-to-end circuits
 - Cost versus Performance issues
- Several theoretical frameworks for IP Quality of Service
- Heterogeneous systems exist at intra-domain level
 - No practical, unified end-to-end model
 - Ad hoc processes with high lead times
- Users will benefit from a single service access point
- AMPS aims to build a practical federation of services to realise automated end-to-end QoS



Connect. Communicate. Collaborate

Overview

- Successor to the GÉANT Premium IP Provisioning System
- Regulate amount of prioritised IP traffic (SEQUIN model)
- ‘Advance’ implies users book in advance
- Multi-domain implies that a single request can book an end-to-end path traversing multiple domains
- To be built incrementally (with certain assumptions)
- Inclusive approach – Premium IP or Overprovisioning
- Being developed by GRNet, PSNC and DANTE



Connect. Communicate. Collaborate

Architecture

- Service oriented architecture
- Multi-domain peer-to-peer federated architecture
- Service interfaces specified in XML – web services
- SOA facilitates integration with existing components
 - Need to implement defined interfaces
 - Reference implementation in Java
- Domains only aware of their neighbours



Connect. Communicate. Collaborate

Design

- Asynchronous user interface
- Use 'Traceroute' to find path and next hop
- Transaction management
 - One phase commit
- Trust relation established between neighbours
- Forwarding layer for message transport
- Period database for abstract resource management
- Accurate 'rejection reason' reporting
- Manual configuration by NOC

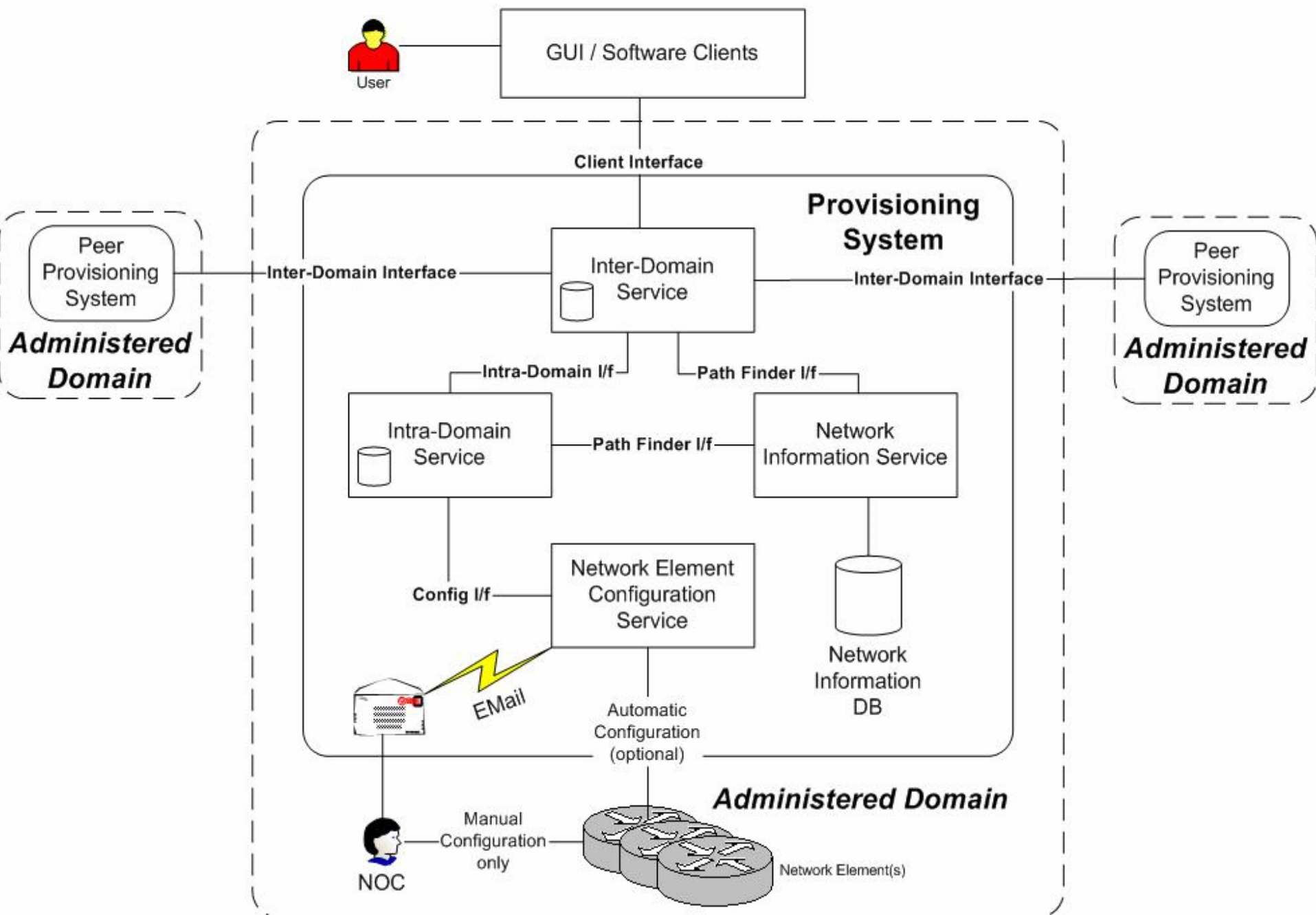


Connect. Communicate. Collaborate

Services and Interfaces

- Services
 - Inter-domain Provisioning Service (multi-domain)
 - Intra-domain Provisioning Service (single-domain)
 - Network Information / Pathfinder Service
 - Configuration Service, Policy Service, AA Service
- Interfaces
 - Inter-domain control plane (E-NNI)
 - Intra-domain control plane (I-NNI)
 - Client interface (UNI)
 - NIS interface

GÉANT2 PACE Provisioning System High Level Architecture Design (Phase 1)





Connect. Communicate. Collaborate

Current Status

- Bandwidth based provisioning only
- Inter-domain tests successful
- AMPS version 1 released in December 2005
- Includes all basic functionality for provisioning
 - GUI, Inter-domain, Intra-domain & NIS/ Pathfinder
- Bug fixing and enhancements (esp. User Interface)
- Policy and Configuration services under development
- Simplified Authentication and Authorisation
- Interoperability testing with GRNet ANS, ESN Net OSCARS and Internet2 BRUW



Connect. Communicate. Collaborate

Deployment

- Test-bed deployed in GÉANT2, GRNET, PSNC, DANTE
- **Production** system deployed on GÉANT2
- **Sandbox** available on GÉANT2
 - Both accessible via <http://stats.geant.net>
- Pilot service will be implemented in:
 - GARR, GRNET, UKERNA
- Production service in all GÉANT2 partner networks



Connect. Communicate. Collaborate

Issues

- Traceroute problems
- Multi-homing and Asymmetric routing
 - Ingress has to be specified
- NIS population / maintaining topology
- Steady-state v/s actual topology
- Fair allocation policy
- Configuration Lead Time
 - Automatic network element configuration



Connect. Communicate. Collaborate

Future Plans

- Policy implementation
- Automatic Network Element Configuration
 - Actual implementation depends upon domains
- Add MPLS functionality
 - Single-domain LSPs only
- Integration with GN2-JRA3 (Lightpath Services)
- Integration with GN2-JRA5 (AA Services)
- Taking into account planned maintenance
- Use components to create new services
 - e.g. BE LSP management service



Connect. Communicate. Collaborate

Summary

- AMPS being developed as a part of SA3 in GÉANT2
- A multi domain system enabling end-to-end provisioning
- Service oriented architecture facilitating reuse
- Version 1 released in December 2005
- Deployed in GÉANT2, pilot in some NRENs soon
- More NRENs should participate
 - Full trans-European provisioning system
- Plans to enhance the system
- Cooperating with ESNNet/Internet2 for trans-Atlantic trials



Thank You

Connect. Communicate. Collaborate

Any further Questions, Comments, Feedback or Suggestions

please contact

Anand Patil

anand.patil@dante.org.uk

