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GÉANT2 IP QoS

Premium IP and AMPS

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Motivation

- GN2 project keen to offer a wider range of services, including a ‘better than best effort’ IP service
- Not all National Research and Education Networks (NRENs) “over provisioned”
  - Congestion already experienced in some parts of Europe

Background - SEQUIN

- Service Quality across Independent Networks (SEQUIN)
  - Nov 00 to Apr 02
  - DANTE, DFN (DE), GARR (IT), POL-34 (PL), RENATER (FR), SWITCH (CH), UKERNA (UK)
- SEQUIN's findings: to ensure an uncongested IP path,
  - "Premium" traffic must be prioritised over non-premium traffic (e.g. using diffserv)
  - Premium traffic must be policed to avoid mutual congestion caused by parallel premium flows

Background – GÉANT

- Based on SEQUIN findings, GÉANT Provisioning System developed in May 2003, and operational later that year
- Basic operation
  - Users requested, via web-based form, a Premium IP service between two edge points of the GÉANT network
  - Prov Sys calculated routed path between edge points (using cached topology model)
  - If spare capacity existed for new reservation, then request accepted
  - Prov Sys drafted router configuration (firewall filters) and e-mailed GÉANT NOC for action

GN2 Project

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- Successor project to GÉANT, started in Sep 2004
- Service Activity 3 (“Support for Multi-domain Services”) tasked with expanding the single domain (GÉANT) Premium IP (PIP) service to be multi-domain, across the European NRENs
  - Must support any QoS technique – diffserv, “over provisioning” etc

Simple Approach

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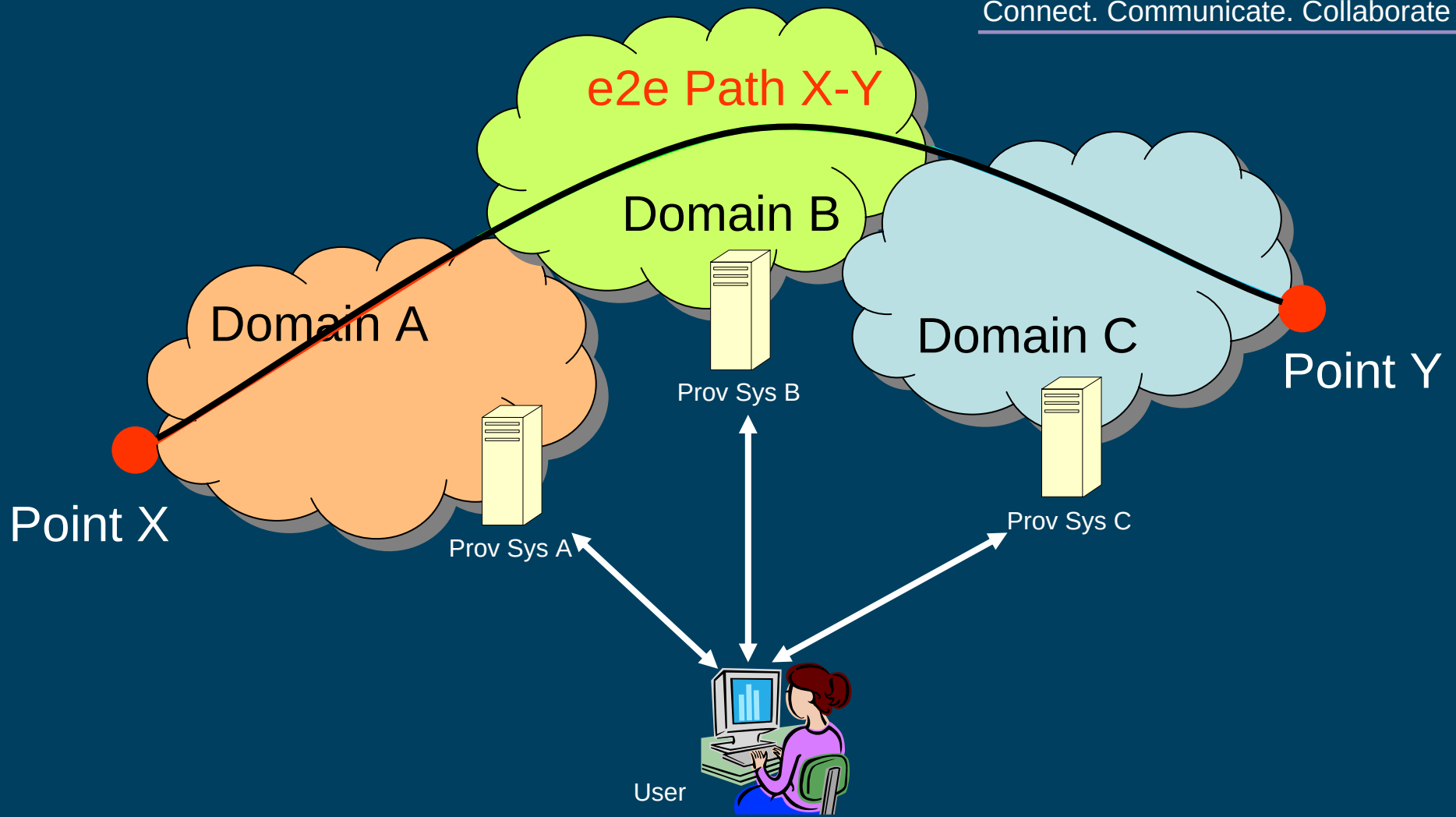
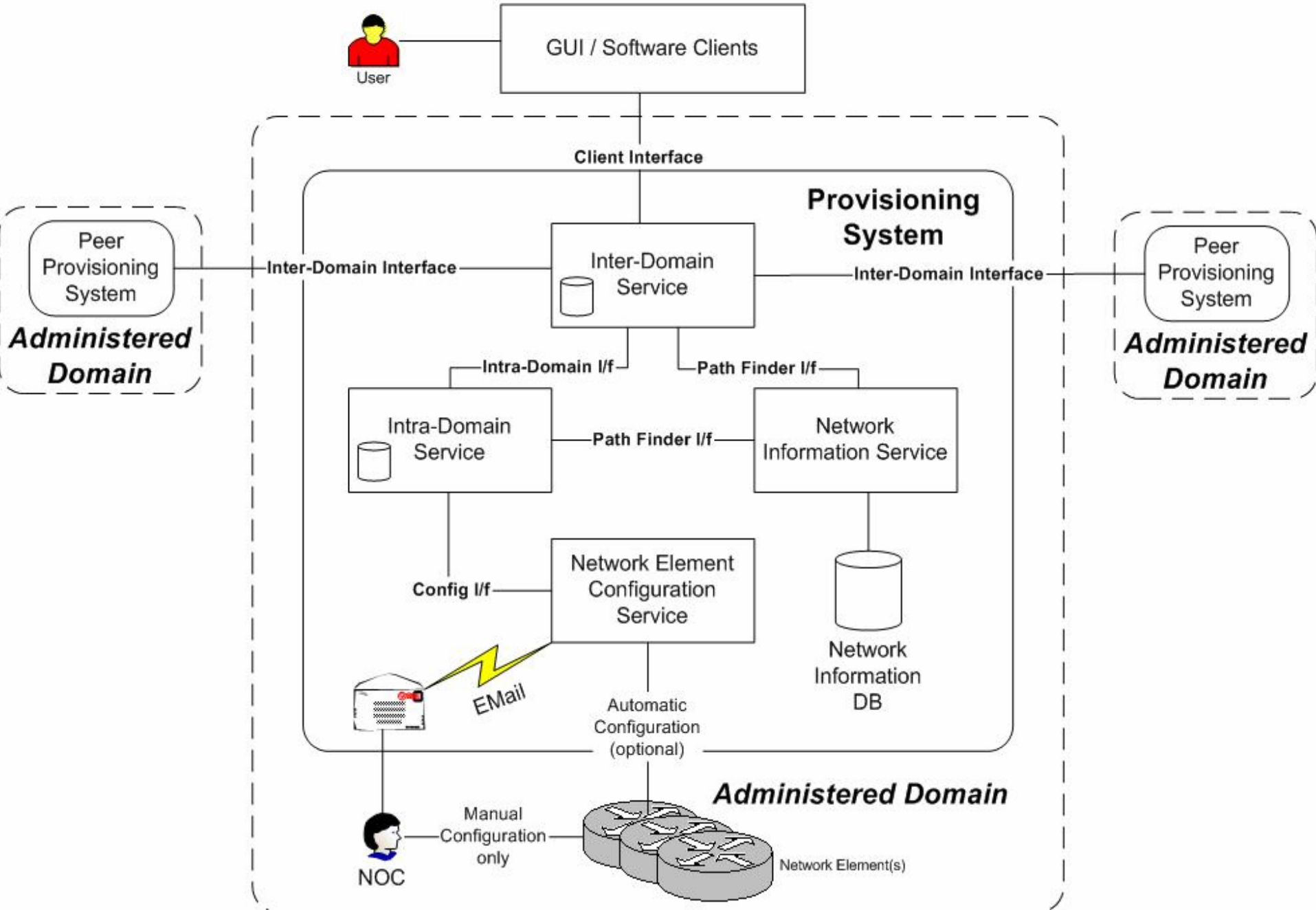


AMPS

- Advance Multi-domain Provisioning System
- Reservations not “on demand” but made in advance (2-90 days)
  - Path based on expected network topology, not actual current topology
  - Admission control decision made by AMPS – not routers
- To ensure scalability, AMPS is distributed
  - One system per participating network
  - Each system peers with just its neighbours
- Policy Module allows AMPS administrator to control who can reserve what (normally by group membership)
- Service oriented architecture – 4 services with appropriate interfaces
  - simpler to adapt existing systems to be AMPS compatible

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



AMPS Operation

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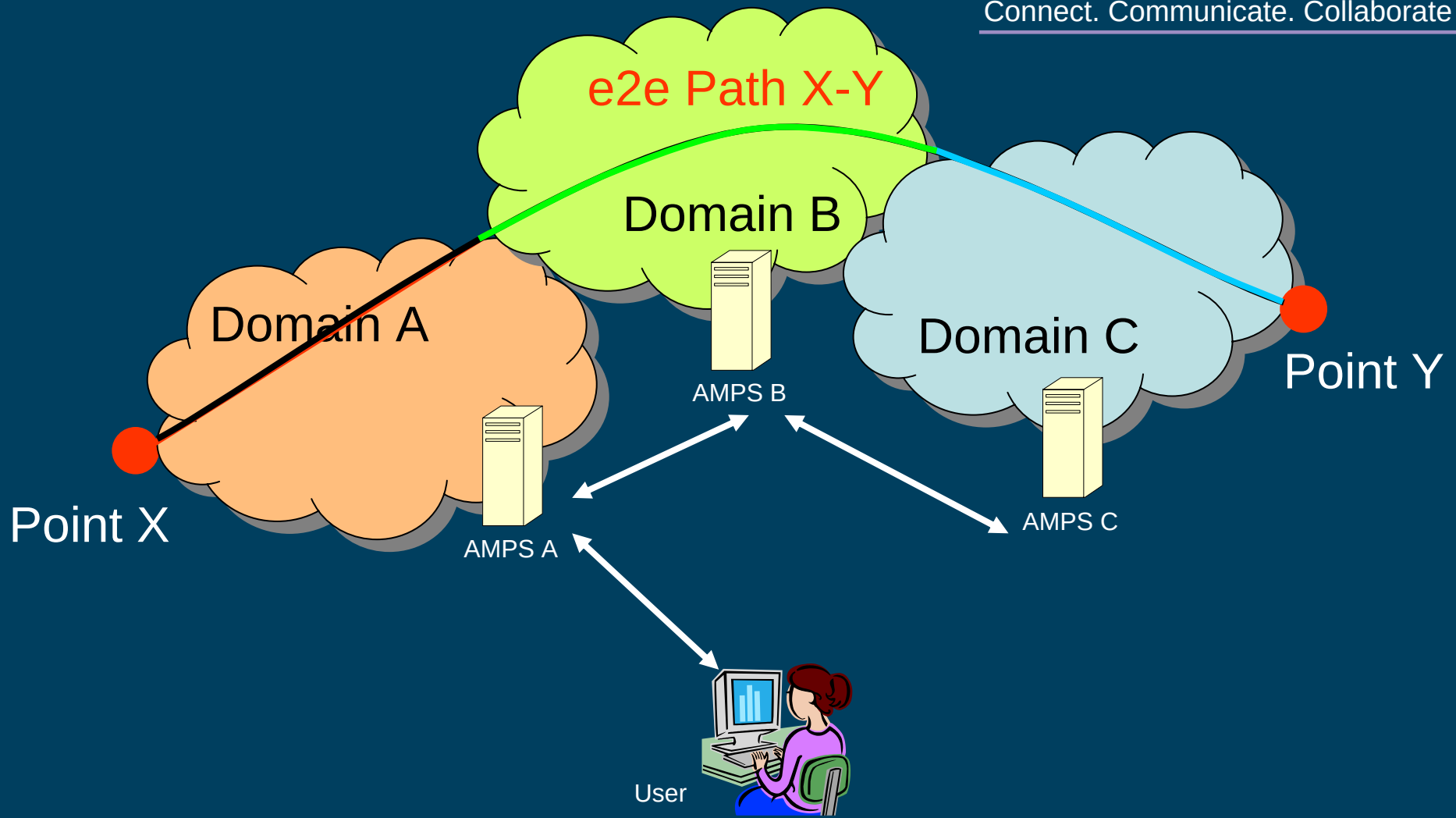

Global Collaboration

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- AMPS developed by DANTE, PSNC (Poland) and GRNet (Greece)
- AMPS in production on GÉANT2 network, with test instances in Poland, Greece and Italy
- Successful interoperation with GRNet's existing provisioning system - ANS
- Test instance was temporarily deployed, successfully, by ESnet in the US
- Interoperability tests planned with ESnet (OSCARS) and Internet2 (BRUW)
- Pilot multi-domain service (France, Slovenia, Lithuania and Ireland) due to begin by the end of the year

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Future Plans

- MPLS functionality to be added – will enable alternative paths to be specified
- Configuration service to support Cisco; automatic configuration of routers to be made possible
- AA module to be added
- Standardisation of the interdomain interface (working with ESnet and Internet2)
  - All welcome!
- AMPS addresses QoS on the backbone ‘edge to edge’
  - Would like to develop interfaces with end-systems

Conclusion

- AMPS will be the inter-domain IP QoS management sytem for the European academic/research backbone network
- AMPS is technoloy agnostic
  - diffserv is recommended, but over-provisioning or any other type of QoS mechanism can be accommodated
- AMPS provides for advance, not ‘on demand’ QoS reservations
  - Admission control decision made by AMPS, so is basically incomaptible with existing ‘on-demand’ QoS techniques, such as RSVP-TE

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Thank You

Any further Questions, Comments, Feedback or Suggestions

please contact

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