



# Introduction to the NRENs and Grids workshops

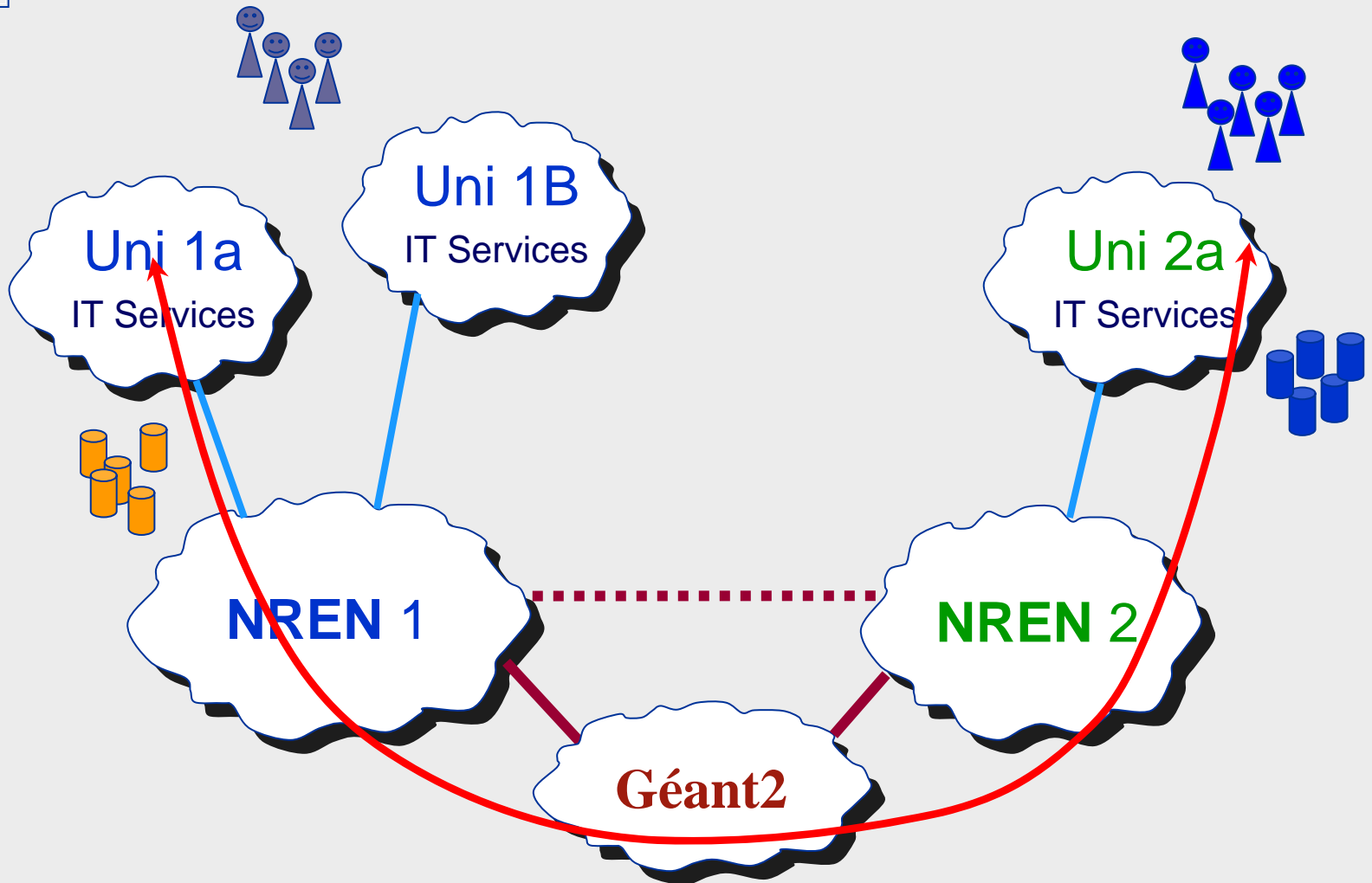
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# Overview

- NRENs ?
- Grids ?
- Common issues, common approaches
- Overview of past workshops
- NRENs and Grids, 4<sup>th</sup> edition
- SLA basics

# What are NRENs ?



Slide adapted from  
Licia Florio



# NRENs today

- Providers of connectivity *and* services on top of the bandwidth
- Large and heterogeneous user community
- Services (non-exhaustive!)
  - Connectivity: generic (IPv4, IPv6) or dedicated (lightpaths, circuits, BoD, Premium IP)
  - Network Operation Centres
  - Computer Security and Incident Response Teams (CSIRTs)
  - AAA collaboration beyond institutional boundaries: federations (eduroam); confederations (eduGAIN)



# What is a Grid ?

- Beyond Web++  
“The flexible, secure, coordinated resource sharing among dynamic collections of individuals, institutions, and resources.” (Ian Foster et al)
- Categories of shared resources
  - Storage
  - Computing power
  - Scientific instruments: particle accelerators, electronic microscopes, radio-telescopes
- Addressing the need of certain categories of expert, power users, for a *coordinated problem solving* environment



# Grids today

- From distributed computing experiments to *running* a reliable infrastructure
- Developer and User communities increasing
  - Overlaid on classical organisational structures
- Sharing resources raises issues of:
  - Trust
  - Policy: access, usage
  - Negotiation
  - Payment
  - ...



# Common issues case study: AAI

- Both NRENs and Grid AA aim at:
  - sharing resources across organisational boundaries using fine grained AuthN and AuthZ
- Using same CA for NRENs and Grids
  - Already accomplished: shared PKI in a number of countries
- Toward a common AAI for both Grid and NRENs
  - Preliminary ideas:
    - grid cert for eduroam authN,
    - eduGAIN user id for accessing the grid,
    - using federation middleware for controlling lightpaths ex: GLIF

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# TERENA NRENs and Grids workshops

- One aspect of TERENA's support for the Grid community
- Mandate
  - Exchange information on current practice
  - Reach a common understanding about the likely impact of Grids on NRENs
  - Investigate the organisational and political issues that need to be addressed
  - Consider which initiatives and/or projects need to be engaged
- First edition, broad spectrum
- Second edition, focus on AAI
- Third edition, focus on Grid security aspects



# 4<sup>th</sup> TERENA NRENs and Grids workshop

- Focus on the interoperability of network resources and Grids
  - Service Level Agreements - definition and implementation in campuses and NRENs
  - End-to-end SLA issues for Grids
  - Automatic configuration of network resources in a Grid environment
  - Network monitoring frameworks in NRENs and campuses, and integration with Grid middleware
  - Fault detection and interactions between networks and Grids in such cases



# SLA – basics

- Contractual agreements between a *service provider* and a *service consumer*
  - aim 1: describe the service through a set of parameters and agree on minimal values
    - details customer needs and priorities
    - shields the provider from unreasonable demands
    - tool for objective performance assessment
  - aim 2: specify commitments for each party
    - identify responsibilities
    - describe the workflows for resolving service disruptions
- Good intro talk: M. Gerndt, “Automatic Performance Tuning of Grid Applications Based on Service Level Agreements”,  
<http://www.lrr.in.tum.de/~gerndt/home/Vita/Presentations/2006/Aurora.pdf>



# SLA – what can be covered

- Every service can be described by dissecting it according to categories (category = what there is in terms of most general kinds of entities, Aristotle). See T. Sandholm, “The Philosophy of the Grid: Ontology Theory – From Aristotle to Self-Managed IT Resources”, <http://www.pdc.kth.se/~sandholm/trita/SandholmOntologyV2.pdf>
- Example – Grid computing job
  - Substance: bandwidth, storage, cpu power
  - Quantity: 10 Mb/s, 1 TB, 30000 SpecINT2k marks
  - Quality: 99.999% reliability
  - Place: list of 101 locations in Europe
  - Time: during peak hours
  - State: scheduled, running, finished
  - Action: schedule, run, migrate
  - Affection (as in “the state of being affected”): the job transitions from “scheduled” state to “running” state when ...



# SLA – beyond the paper

- Measurement and monitoring
- Auditing
- Optimisations
  - Allocating resources based on SLA promises
  - Reconfiguration of resources in case of SLA violation
- All these are end-to-end issues



# 4<sup>th</sup> TERENA NRENs and Grids workshop

- Focus on the interoperability of network resources and Grids
  - Service Level Agreements – definition, implementation and end-to-end issues
    - any rules for combining SLAs?
  - Monitoring and measurement issues – (N/G)OC
    - Where, when, how
  - What happens if something breaks? (N/G)OC

