EGEE'06 Industry QA standards
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ITIL applied to Network Operations

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Network and Services management

- **Summary: This session is dedicated to the presentation of concrete experiences and benefits of the implementation of QA standards such as ITIL, CMMi, ISO. CS will present the benefit in having implementing ITIL for Network Operations**

  - CS NOC presentation

  - ITIL presentation

  - ITIL within NOC Operations

  - Conclusions

CSSI

- **CSSI is an IT services company with about 3500 employees**

- **CSSI's main customers belong to major economic sectors, such as aviation, space, defence, energy, banking and automotive**

- **Ranking first in France for industrial and critical applications and in top five position in computing infrastructure services**

  - For instance, CSSI contributes to the operation and management of the GÉANT pan-European Network

- **Industrial partner in EGEE-II since DataGrid**

  - Responsible for Quality Assurance

  - Participating to operation of Regional Operation Centre

  - Serving customers in the plastics industry (SMEs), large companies (CNES gLite prototype, etc.) and Fusion community
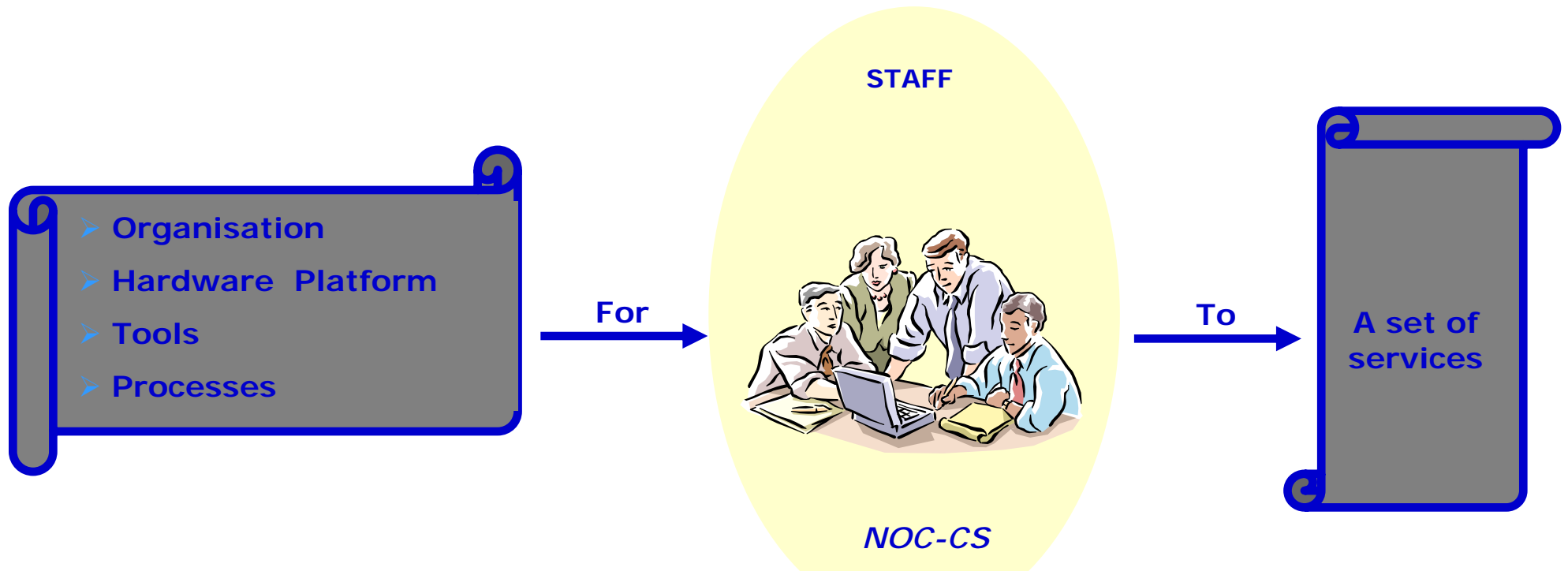
CS NOC presentation

Network Operations Centre CS

STAFF

➤ **Organisation**

➤ **Hardware Platform**

➤ **Tools**

➤ **Processes**

For

NOC-CS

To

A set of services

Network and Services management

- Personalised services for private enterprises or public entities, operation and management of critical communication services (voice and data)

- Value added services compared to classical network integrators and operators (independent, multi-provider, wider area)

- Flexible services, according to Client needs and scale

- Service level commitments based on process and methods: Time to Repair, Availability, Security

- Service level commitments on faults resolution or changes realisation delays

CS NOC organisation

- **Operational staff for Network Management**

  - **Level 1**: operator, reacting to alarms by applying defined procedures

  - **Level 2**: operator, reacting to alarms with self-capacity analysis and resolution for non procedured incidents. Operator is also able to deploy new configurations and validate their behaviour.

  - **Level 3**: specialist taking charge of problem not solved by level 1 and level 2 support. The specialist prepares evolutions, validates their operations and plan their deployment.

- **Environment**

  - System Support

  - Software Support

  - Logistics Support

  - Housing Support

  - Quality Support

  - Maintenance (plateform)

  - Sales, Marketing and Financial Support

CS NOC CS technical platform

- **Around thirty servers (mainly Linux) housing Network Management tools and common services**
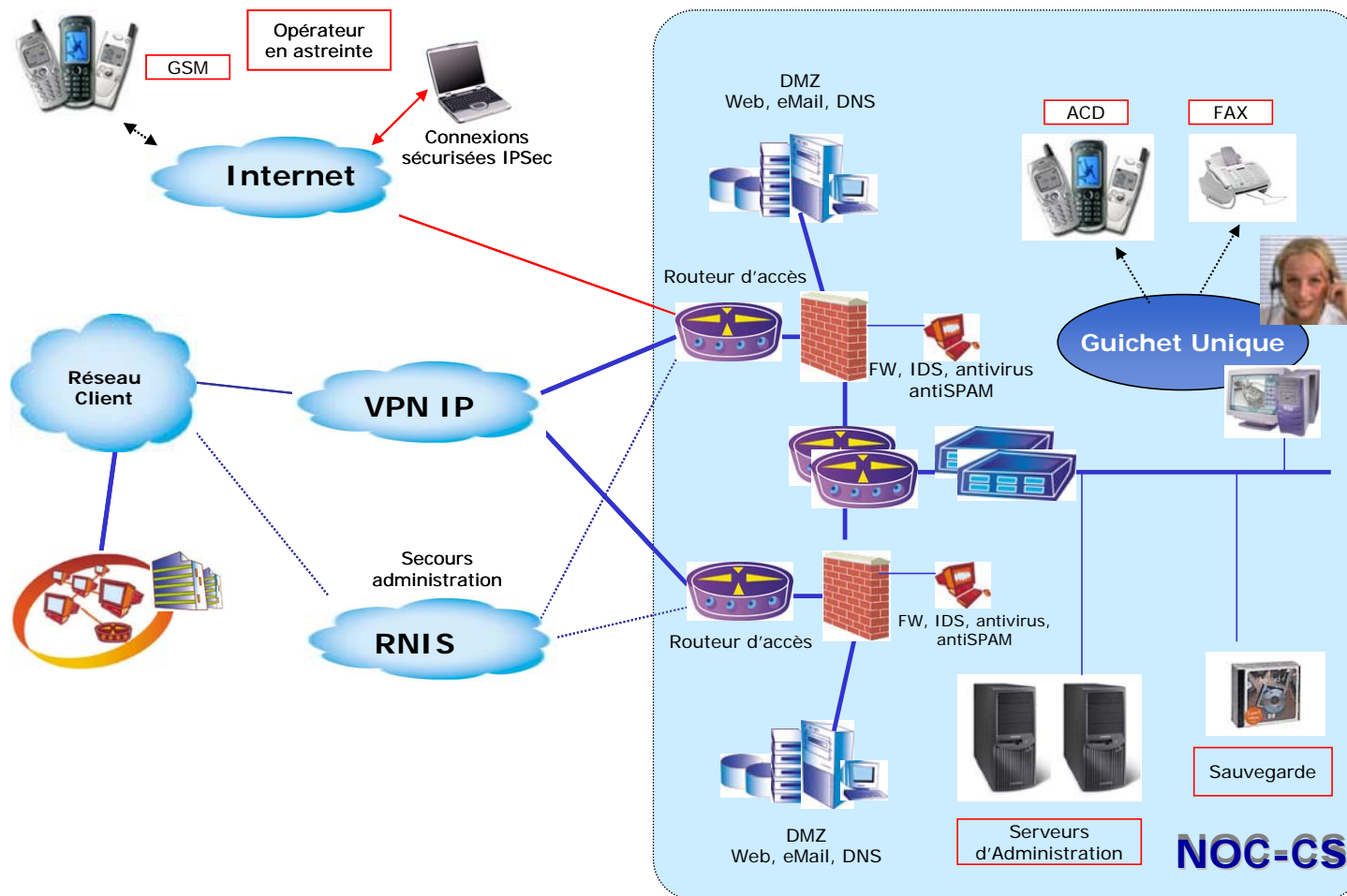
CS Network Management: a real experience

- **More than 30 Clients, mainly in France**

- **More than 100 points presence in 40 pays, in Europe but also in America and Asia**

- **More than 100 operators or providers in direct relationship for network operation/management**

- **More than 2500 core network equipments managed**

  - Routers, from Cisco C800 to CRS-1 and Juniper T-640, with up to 6000 lines configuration per router

  - Switches, C29xx up to C65xx/C76xx
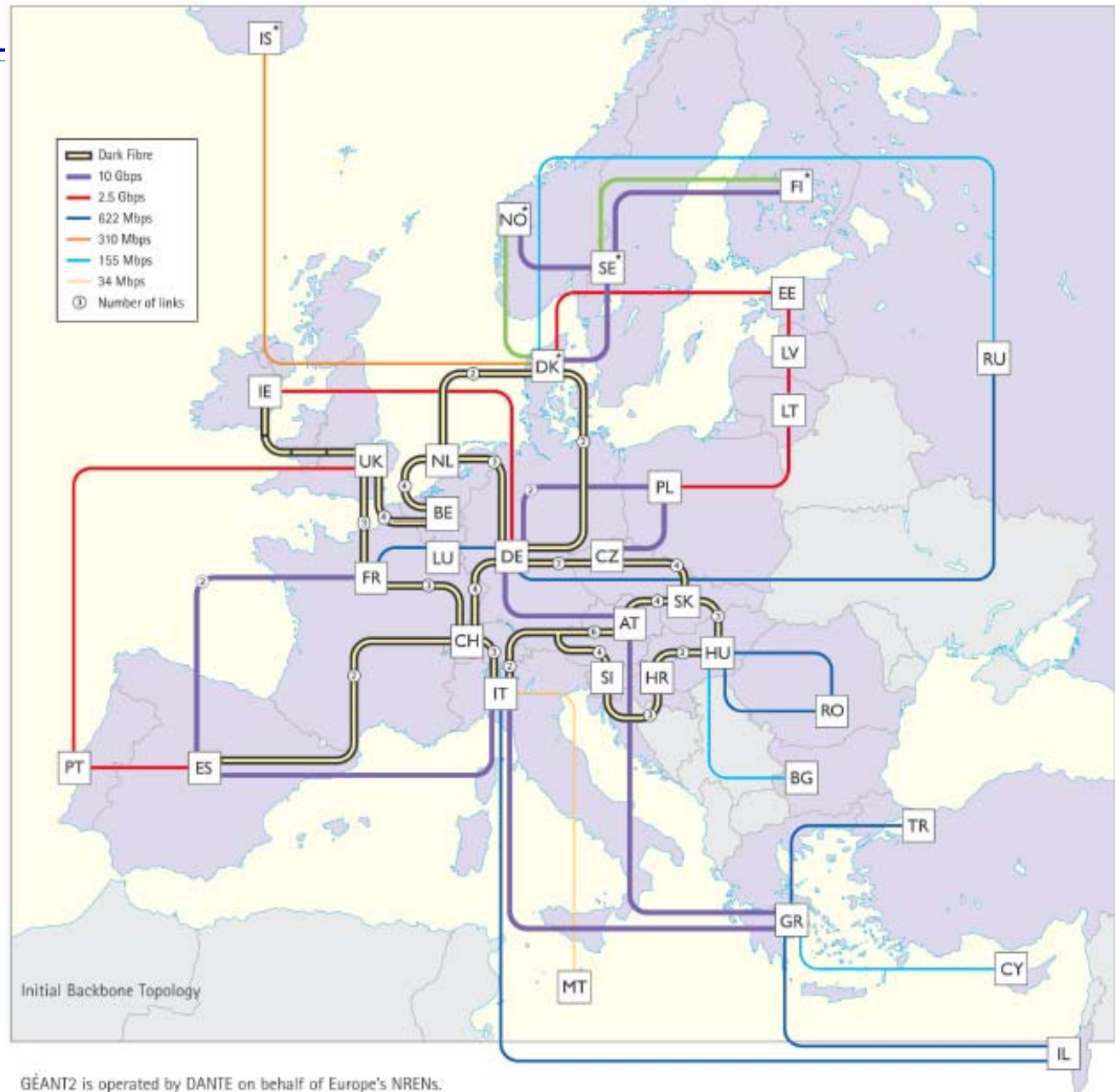
  - Security and Internet server

A unique knowledge and experience in network management, independent from network operators and equipments manufacturers
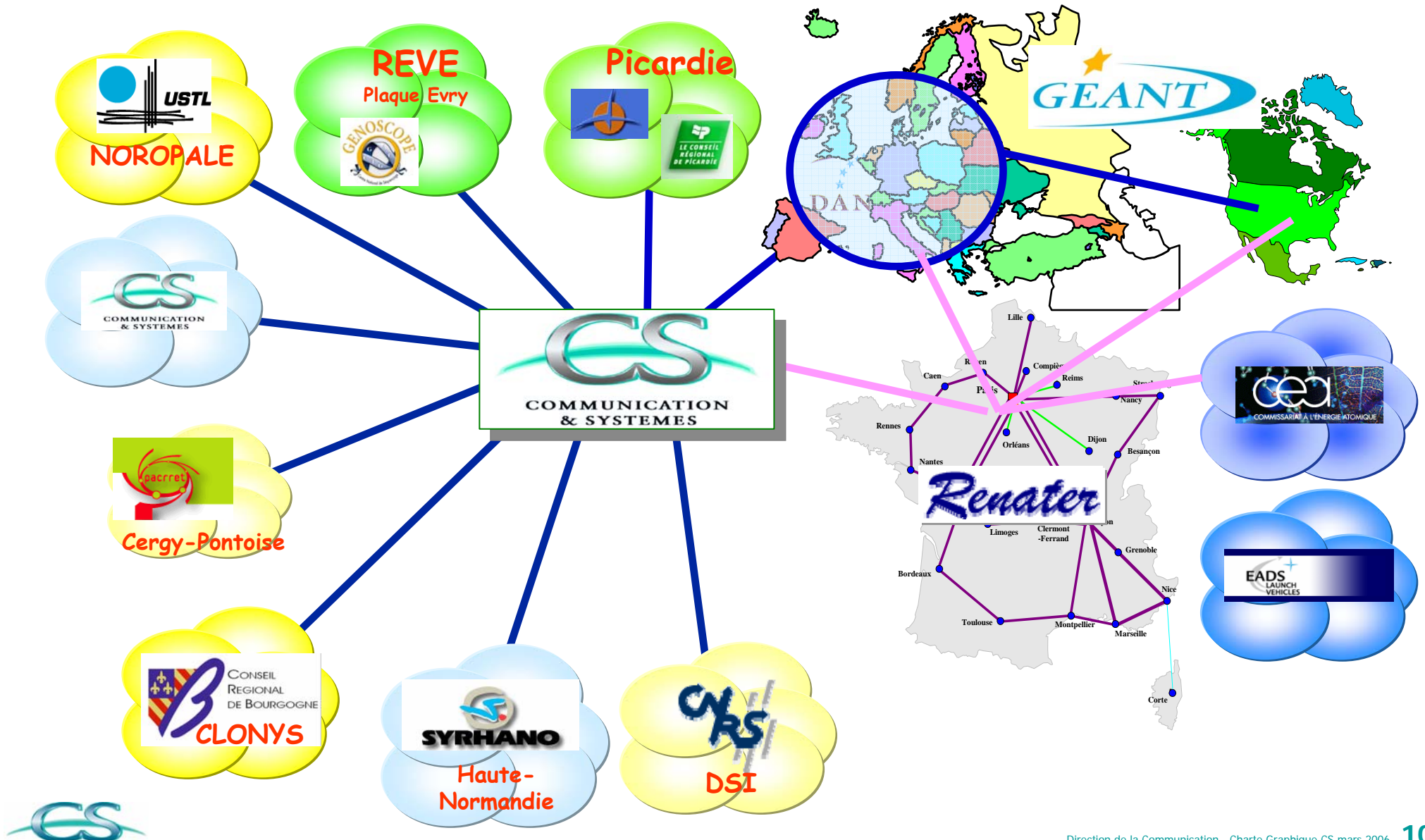
GÉANT2

- 34 countries in extended Europe

- 155Mbit/s to n x 10Gbit/s links

- Native IPv4 and IPv6, unicast and multicast, Ethernet switching, WDM

- Alcatel WDM tx & sw and Juniper IP routers equipments

- 3000 universities

- 3M R&E people

Dark Fibre
10 Gbps
2.5 Gbps
622 Mbps
310 Mbps
155 Mbps
34 Mbps
③ Number of links

Initial Backbone Topology

GÉANT2 is operated by DANTE on behalf of Europe's NRENs.

GÉANT2

- **Interconnexion**
  - 34 NRENs
  - USA R & E interconnexion
  - Commodity Internet traffic access
  - EumedConnect : 9 countries on the Mediterranean border
  - ALICE link to south America
  - TEIN2 links to Asia

- **GÉANT2 NOC**
  - Around 12 FTEs working 24x7 for level 1 and level 2 support
  - Around 4 Specialists / Expert providing level 3 support
  - 1 Manager

ITIL presentation

Network Operations key objectives

- **Availability (Service Level guarantee)**

- **Control**

- **Cost effectiveness**

ITIL: Information Technology Infrastructure Library

- **A set of specifications to help IT manager and FTE achieve good services delivery to their users**

  - ITIL provides a comprehensive and consistent set of best practices for IT service management, promoting a quality approach to achieving business effectiveness and efficiency in the use of information systems.

  - ITIL is based on the collective experience of commercial and governmental practitioners worldwide. This has been distilled into one reliable, coherent approach, which is fast becoming a de facto standard used by some of the world's leading businesses.

- **Initiated in UK in 1990's**

- **Used by more and more companies**

- **Reference: http://www.itil.com (http://www.ogc.gov.uk/index.asp?id=2261)**

ITIL Domains

- **Service Support**
  - Service Desk
  - Incident Management
  - Problem Management
  - Configuration Management
  - Change Management
  - Release Management

- **Service Delivery**
  - Availability Management
  - Service Level Management
  - Capacity Management
  - IT Service Continuity Management
  - Financial Management for IT services

- **Security**

ITIL summary

- **Service Desk**

  - The Service Desk provides a vital day-to-day contact point between Customers, Users, IT services and third-party support organisations. Service Level Management is a prime business enabler for this function. At an operational level, its objective is to provide a single point of contact to provide advice, guidance and the rapid restoration of normal services to its Customers and Users

- **Incident Management**

  - The primary goal of the <u>Incident</u> Management process is to restore normal service operation as quickly as possible and minimise the adverse <u>impact</u> on business operations, thus ensuring that the best possible levels of service quality and <u>availability</u> are maintained. 'Normal service operation' is defined here as service operation within <u>Service Level Agreement</u> (SLA) limits.

- **Problem Management**

  - The goal of <u>Problem</u> Management is to minimise the adverse <u>impact</u> of <u>Incident</u>s and Problems on the business that are caused by errors within the IT Infrastructure, and to prevent recurrence of Incidents related to these errors. In order to achieve this goal, Problem Management seeks to get to the root cause of Incidents and then initiate actions to improve or correct the situation.

    The <u>Problem</u> Management process has both reactive and proactive aspects. The reactive aspect is concerned with solving Problems in response to one or more <u>Incident</u>s. Proactive Problem Management is concerned with identifying and solving Problems and <u>Known error</u>s before Incidents occur in the first place

ITIL summary

- ## Configuration Management

  - The goals of Configuration Management are to:
    - account for all the IT assets and configurations within the organisation and its services.
    - provide accurate information on configurations and their documentation to support all the other Service Management processes.
    - provide a sound basis for Incident Management, Problem Management, Change Management and Release Management.
    - verify the configuration records against the infrastructure and correct any exceptions.

- ## Change Management

  - The goal of the Change management process is to ensure that standardised methods and procedures are used for efficient and prompt handling of all Changes, in order to minimise the impact of Change-related Incidents upon service quality, and consequently to improve the day-to-day operations of the organisation.

ITIL summary

- **Release Management**

  - The goals of Release Management are:
    - to plan and oversee the successful rollout of software and related hardware
    - to design and implement efficient procedures for the distribution and installation of Changes to IT systems
    - to ensure that hardware and software being changed is traceable, secure and that only correct, authorised and tested versions are installed
    - to communicate and manage expectations of the Customer during the planning and rollout of new Releases
    - to agree the exact content and rollout plan for the Release, through liaison with Change management
    - to implement new software Releases or hardware into the operational environment using the controlling processes of Configuration management and Change Management – a Release should be under Change Management and may consist of any combination of hardware, software, firmware and document C
    - to ensure that master copies of all software are secured in the Definitive software library (DSL) and that the Configuration management database (CMDB) is updated
    - to ensure that all hardware being rolled out or changed is secure and traceable, using the services of Configuration Management.

ITIL summary

- **Availability Management**

  - The goal of the Availability Management process is to optimise the capability of the IT Infrastructure, services and supporting organisation to deliver a cost effective and sustained level of <u>Availability</u> that enables the business to satisfy its business objectives.

    <u>Availability</u> Management should ensure the required level of Availability is provided. The measurement and monitoring of IT Availability is a key activity to ensure Availability levels are being met consistently. Availability Management should look continuously to optimise the Availability of the IT Infrastructure, services and supporting organisation, in order to provide cost effective Availability improvements that can deliver evidenced business and User benefits.

- **Security**

  - Security is a global subject, applying to every aspects of Network Operations.

  - The goal of Security Management is to ensure by specific configurations or actions, the usage and the operation of the Network will be limited to people (group of people / communities) explicitly known and measures will prevent other people to have access.

ITIL within NOC Operations

CS NOC: ITIL benefits

- **CS has developed its own Best Practices for years**

- **CS complies to ISO Quality standards (ISO 9001)**

- **CS began to move from its own BP to ITIL two years ago**

  - Because ITIL was not very different of CS own BP

  - Because ITIL was becoming an IT industry standard

  - It will help communicate with CS clients using the same vocabulary and the same processes

CS NOC ITIL application

- **ITIL methodoloy**

  - Level 1 and 2 Service Desk
    - Client network operations direct access

  - Availability Management
    - Enhanced monitoring tool: efficient alarms filtering

  - Incident Management
    - Client communication oriented TTS

  - Capacity Management
    - Complete performance monitoring and reporting

  - Problem Management
    - Incident analysis (recurrent or wrongly handled incidents)

  - Change Management
    - Performed by level 3 support, following client orientations

  - Release Management
    - Performed by level 2 support

CS NOC tools

- **Service Desk, incident management**
  - Dedicated access for Clients, personalised phone support (PABX+ACD)
  - CS Trouble Ticketing System
  - Operator WEB Portal

- **Availability management (pro-activ)**
  - CS tool SGTI, based on Nagios with CS monitoring plugins and extensions

- **Capacity management**
  - RRDtool based tool, CACTI, Infovista,NetFlow, ... etc.

- **Configuration Management**
  - RANCID / CVS, MySQL or PostGreSQL database (CMDB)

- **Reporting**
  - Apache WEB Portal, Postfix Mail system
  - MS Office, PageMaker

- **Security Management**
  - FW, SSH, PGP, VPN, VLAN, ...
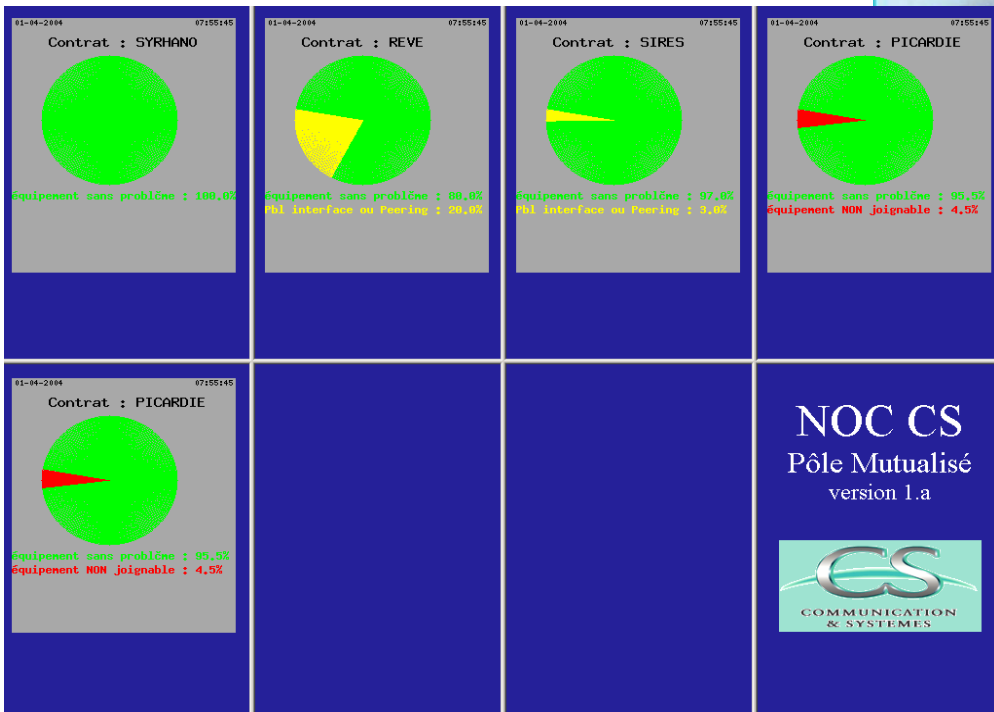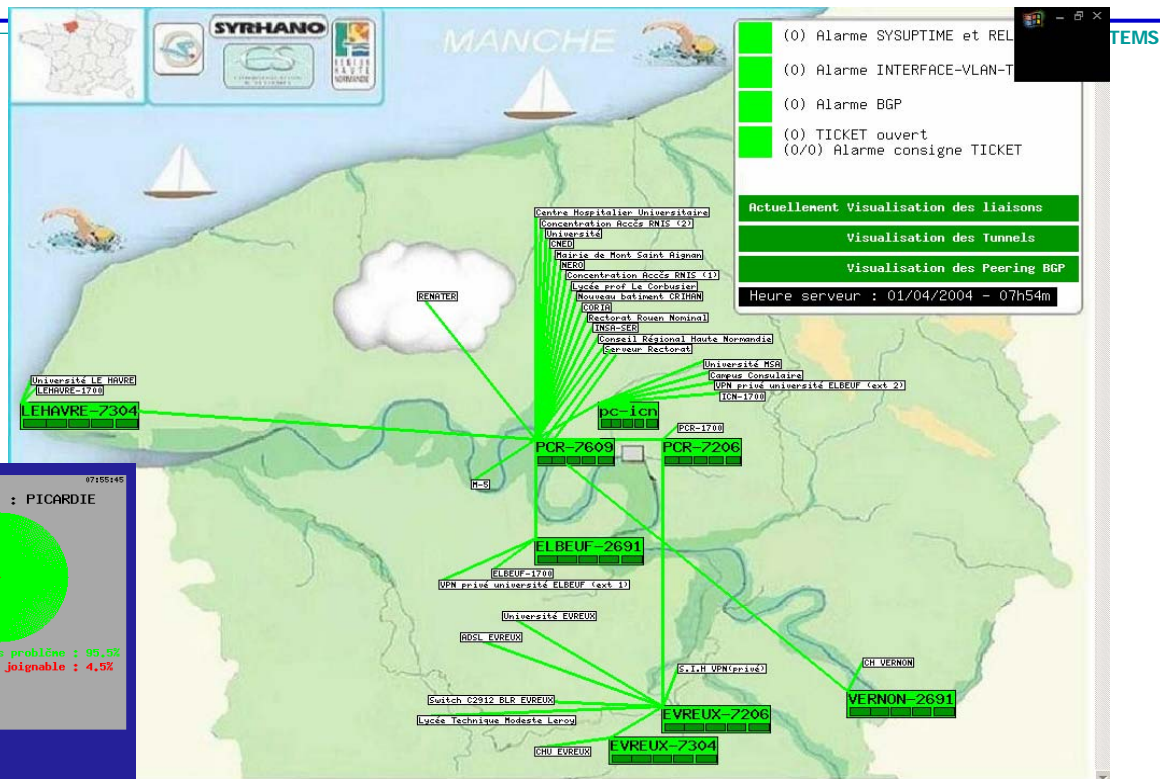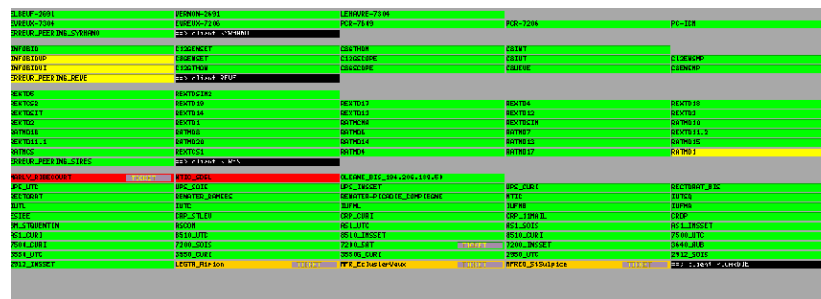 - Backup server, backup site, backup out-of band access links, ...

Network monitoring

- **CS tools:**
  - Network maps
  - Events log
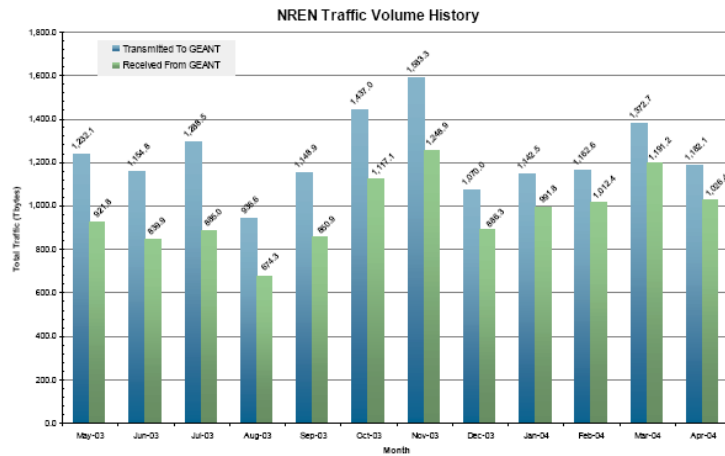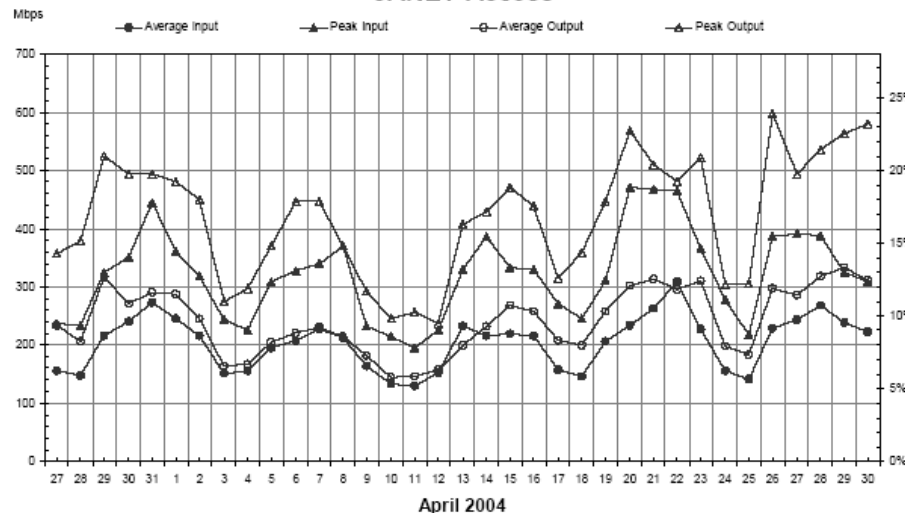 - Network load monitoring (links, CPU, delays, ...)

Report samples

PERFORMANCE REPORT   ACCESS PORTS

NREN Traffic Volume History

JANET Access

April 2004

Performance Overview		See Page
Top 3 NRENs (Average Traffic)	GRNET	
	HUNGARNET	26
	NORDUNET	
Top 3 Trunks (Average Traffic)	AT - CH	
	AT - HU	76
	DE - NL	
NREN Access loaded 0-10%	15	
NREN Access loaded 10-50%	14	26
NREN Access loaded over 50%	0	
Fault Overview		
Number of Tickets	96	
Number of Line Faults	25	16-17
Number of Escalations	0	
NREN Availability > 99.95%	27	
NREN Availability 99% - 99.95%	2	20
NREN Availability < 99%	0	
Volume Overview		
NREN Accesses	1,182.1 Tbytes	26
Interconnect Circuits	249.9 Tbytes	60
= Total Amount of Traffic	1,432.0 Tbytes	
Trunks	2,002.7 Tbytes	76
IPv6 Volume Overview		
NREN Accesses	9,645 Gbytes	116
Interconnections	554 Gbytes	118
= Total Amount of Traffic	10,200 Gbytes	

Conclusions

ITIL

- **Benefits**

  - Same vocabulary between parties

  - A complete set of processes assuring that nothing's left for IT operations

  - A improvement process, that could start from nothing and grew up for years

- **Prerequisite**

  - Need Management and staff collaboration

  - Need to have an ISO background for Quality Assurance

  - Need a bit training to understand the concepts

- **Deployment**

  - Need some work to implement, depends on the previous experiences and actual formalism of IT operations (if no experience, count one or two years to deploy significantly)

THE END

Thank you for your attention