



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΠΑΙΔΕΙΑΣ
ΔΙΑ ΒΙΟΥ ΜΑΘΗΣΗΣ ΚΑΙ ΘΡΗΣΚΕΥΜΑΤΩΝ



The Adoption of Cloud Computing by the Public Bodies

The GRNET Case

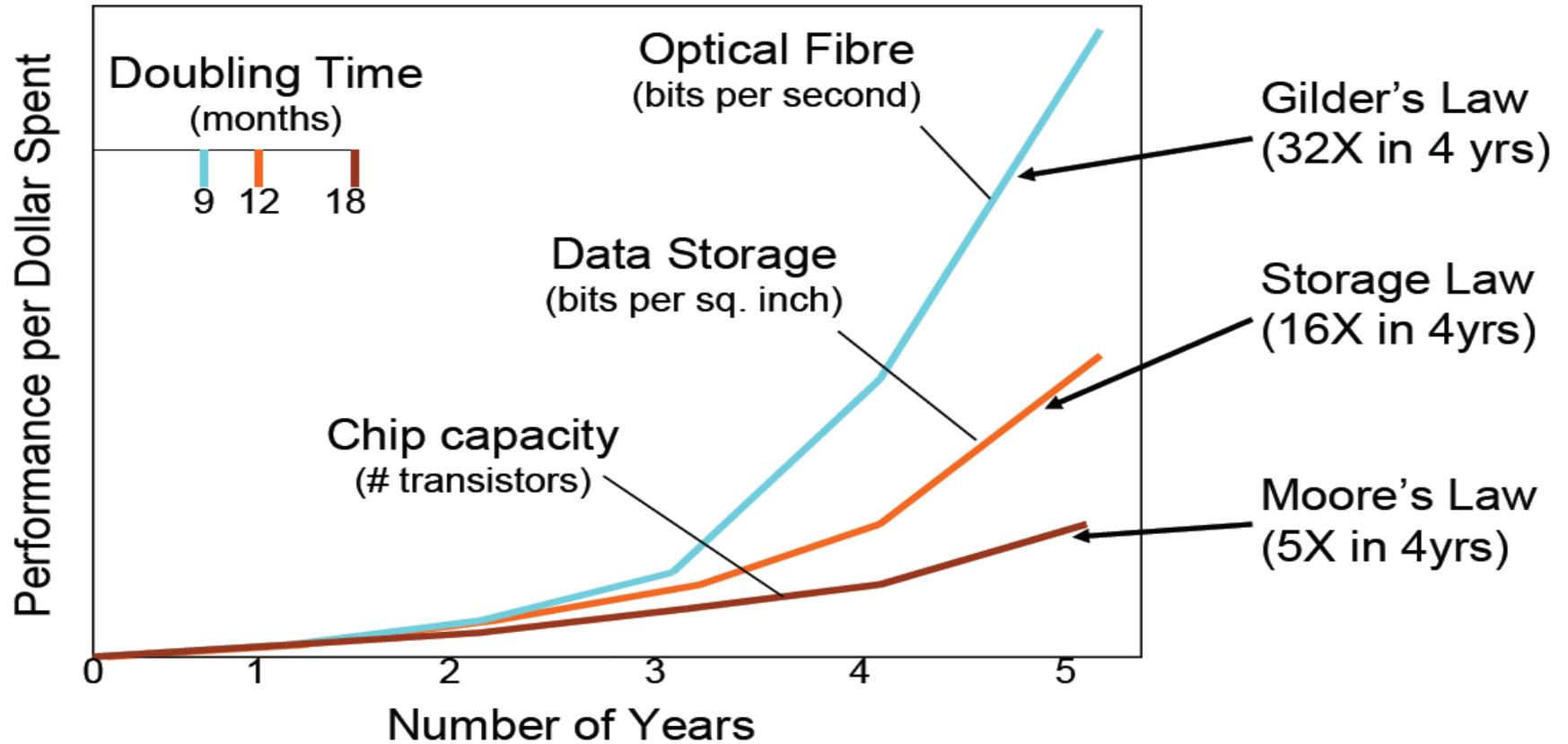
Prof Panayiotis Tsanakas
GRNET Chairman



GRNET ROLE

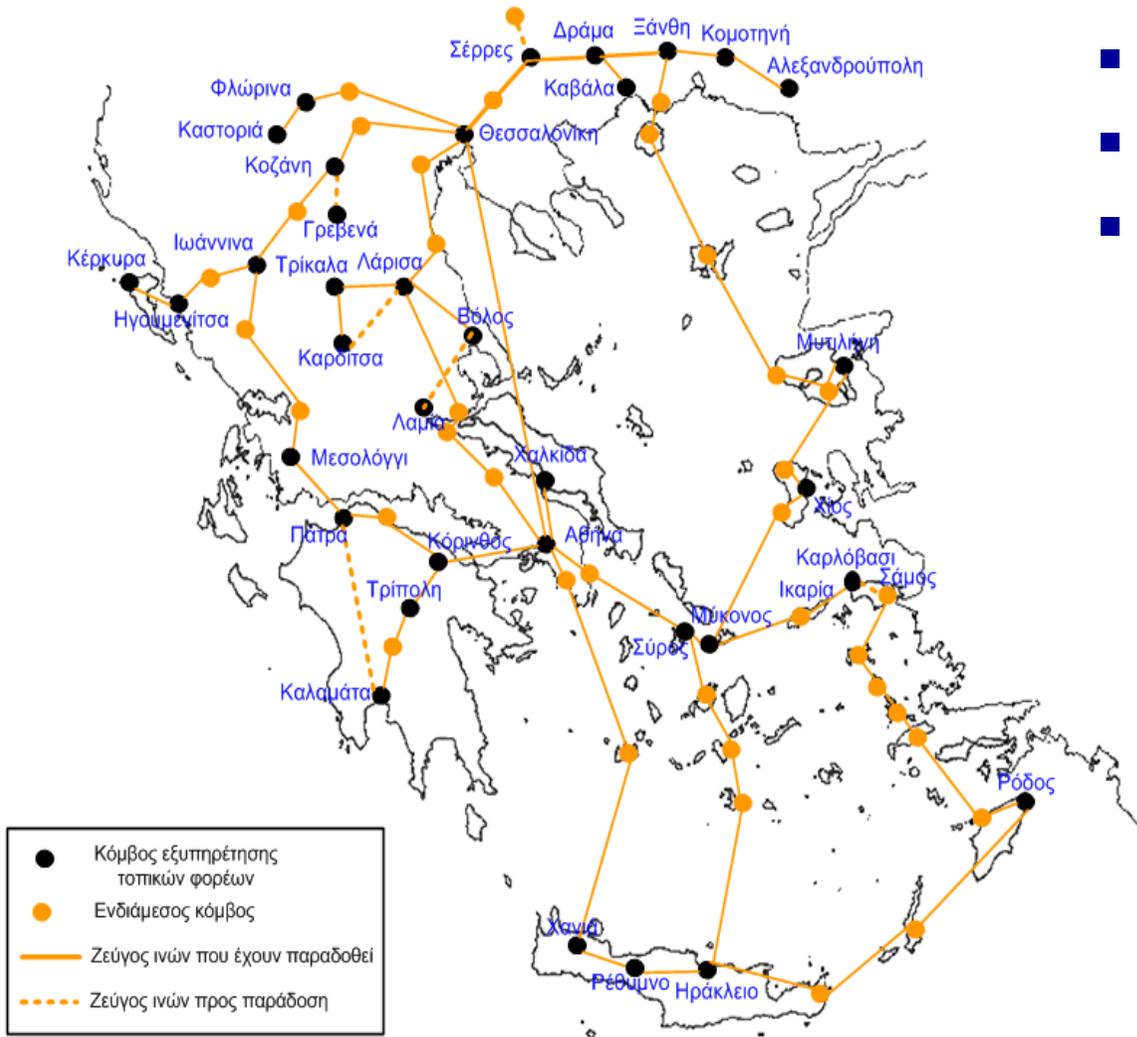
1. Develops **unified** e-Infrastructures (network-storage-computing)
2. **Operates 24/7** horizontal e-Infrastructures and services for the entire research and education community
3. Promotes open **knowledge communities** on ICT
4. Supports **massive initiatives** for the improvement of ICT utilisation in education
5. Advises/supports the **government** on strategic ICT issues
6. Consists the national Research & Education Network (NREN) for the **international research networking** bodies

Technological advances



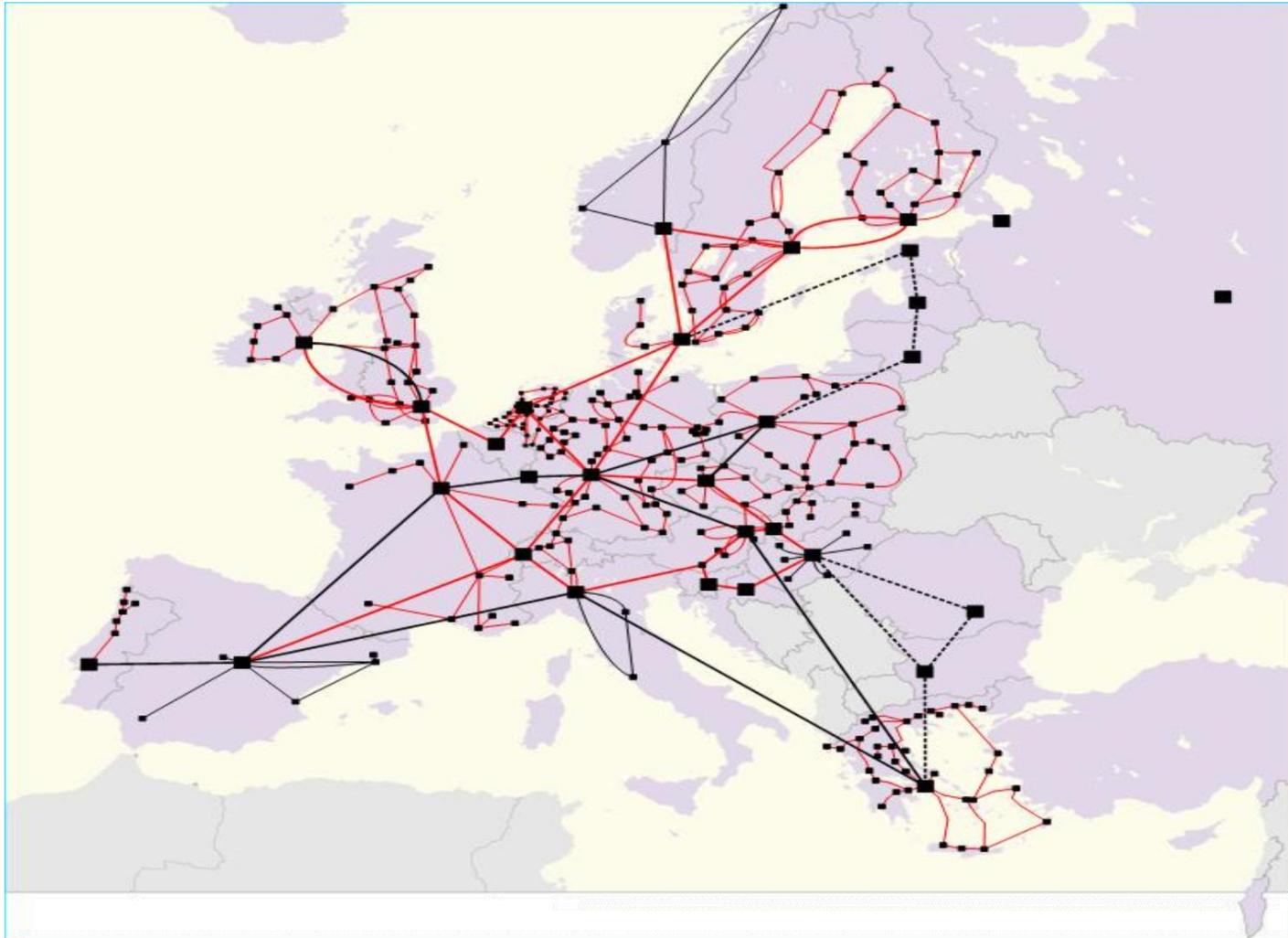
Triumph of Light – *Scientific American*. George Stix, January 2001

National backbone research network



- ~100 Institutes
- 35 Points of presence
- Optical fibers
 - 15yr dark fiber lease (IRU)
 - 8.410 Km
 - Metro networks in Athens and Thessaloniki
 - Local fiber connections in 34 cities

GRNET: Part of the pan-European research network



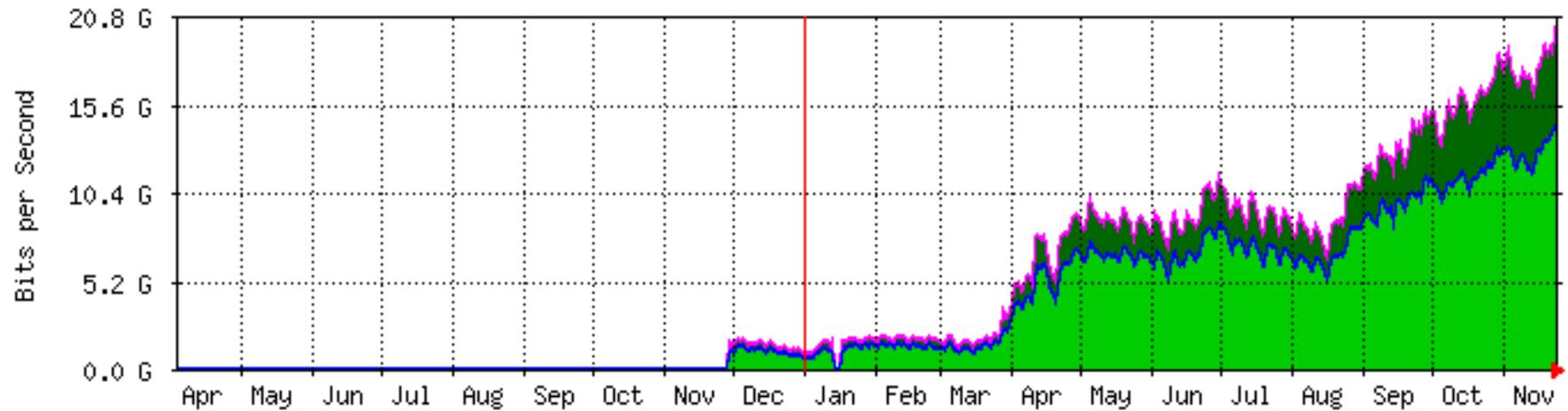
Main GRNET DataCenter

- 25 racks
- 400+ dense servers
- 30.000 Virtual Machines
- 4PetaBytes storage
- 1.7MW /16KW per rack
- 10Gbps secure interconnection
- Disaster Recovery Datacenter (outside Athens)
 - To be deployed nearby a hydroelectric station of PPC (Green Datacenter)





GR-IX: National Greek Internet Exchange



Pithos

On-line storage service (Cloud Storage)

- 50GByte per user (member of the R&E community)
- Application integration
- File sharing and synchronisation
- User authentication via federated AAI



The screenshot shows the GRNET Storage Service web interface in Mozilla Firefox. The browser address bar displays "http://gss.grnet.gr/gss/". The interface includes a menu bar with "Quit", "File", "Edit", "Group", "Settings", and "Help". A search bar is visible, and the user's name "Panagiotis Tsanakas, panag@ntua.gr" is shown. The main content area displays a file list with columns for Name, Owner, Path, Version, Size, and Date. The file list includes:

Name	Owner	Path	Version	Size	Date
ModernMoneyMechanics.pdf	panag@ntua.gr	/	1	1.3 MB	29/3/2009 1:17 AM
ftth_final.pdf	panag@ntua.gr	/	1	3 MB	13/3/2009 7:44 PM
open_cloud_manifesto.pdf	panag@ntua.gr	/	1	113.8 KB	29/3/2009 1:17 AM
r2000_v4.xls	panag@ntua.gr	/	1	120.5 KB	29/3/2009 1:18 AM
singapore_ftth.pdf	panag@ntua.gr	/	1	1.5 MB	13/3/2009 11:02 PM
sp500_v1.xls	panag@ntua.gr	/	1	352.5 KB	29/3/2009 1:19 AM

Totals: 7 files, 6.5 MB used, 10 GB free. Showing: 6 files (6.4 MB)

~Okeanos

a new Infrastructure-as-a-Service facility

- Server, network, storage for All:
 - Universities, Research Centers/Institutes, Labs, Courses, Ac. Staff, Students, Researchers, Adm. Personnel
- Fast set-up, using friendly on-line tools
- Equivalent to Amazon, Rackspace, Nimbula, Nebula, GoGrid commercial services
- Based on open-source components
- Now in alpha testing (300 users)
- More than 30.000 virtual machines - 4PetaBytes storage

~Okeanos virtual components



Virtual Machines



Virtual Ethernets

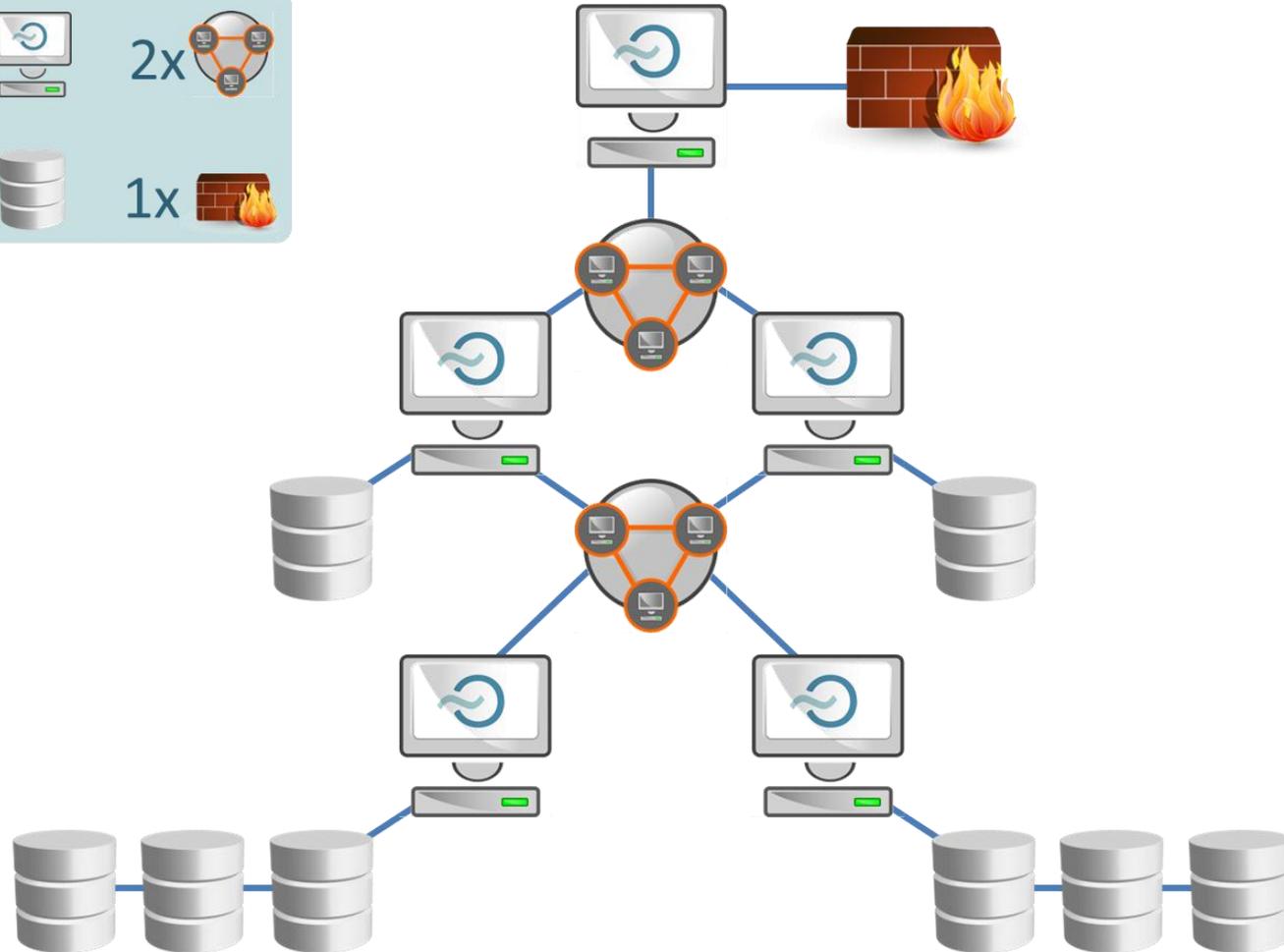


Virtual Disks



Virtual Firewalls

~Okeanos typical virtual set-up



~Okeanos service characteristics

- **Goal:** Production-quality IaaS
- **Target group:** GRNET's customers
 - direct: IT depts of connected institutions
 - indirect: university students, researchers in academia
- **Users manage resources over**
 - a simple, web UI, or
 - a REST API, for full programmatic control

Cloud-based Services for R&E

- Gr/SSaS
- e:Presence
- Eudoxus
- live@GRNET
- Student discount cards service
- Anafandon
- HPC delivery
- Digital school services

GRNET Vision

Unified e-infrastructures: network, computing & storage:

- **Feasible** (Economies of scale)
- **Sustainable** (low TCO)
- **Reliable** (professional support)
- **Advanced** (high-performance for all member institutions)
- **Scalable** (standards-based)
- **Adding value** (enhanced R&E applications)



Thank you!

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