Εισαγωγή στον Προγραμματισμό

Εισαγωγική ενότητα (25%) : Βασικές έννοιες και τομείς της Επιστήμης Υπολογιστών 5η και 6η ομιλία

Παναγιώτης Τζουνάκης

Φθινόπωρο 2021

Τμήμα Μαθηματικών
Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης

World Wide Web: Παρασκήνιο & Θεμέλια

Αντικείμενα παρουσίασης :

- Κέντρα Λειτουργίας Δικτύων (Network Operation Centers – NOCs)
- Οργανισμοί (Organizations)
- Σύλλογοι / Κοινότητες (Societies / Communities)
- Υποδομές (Infrastructures)
- Υπηρεσίες (Services)
- Δραστηριότητες (Activities)

World Wide Web: Παρασκήνιο & Θεμέλια

Στόχοι παρουσίασης:

- Present the most important real artificial network.
- Identify the infrastructures that make the web function.
- Identify the different interconnected networks. These networks are different, but there are harmonious correspondences which guarantee the overall functionality.

Σύντομο ιστορικό

http://en.wikipedia.org/wiki/History_of_the_Internet

Government-built Internet or private-sector-build?

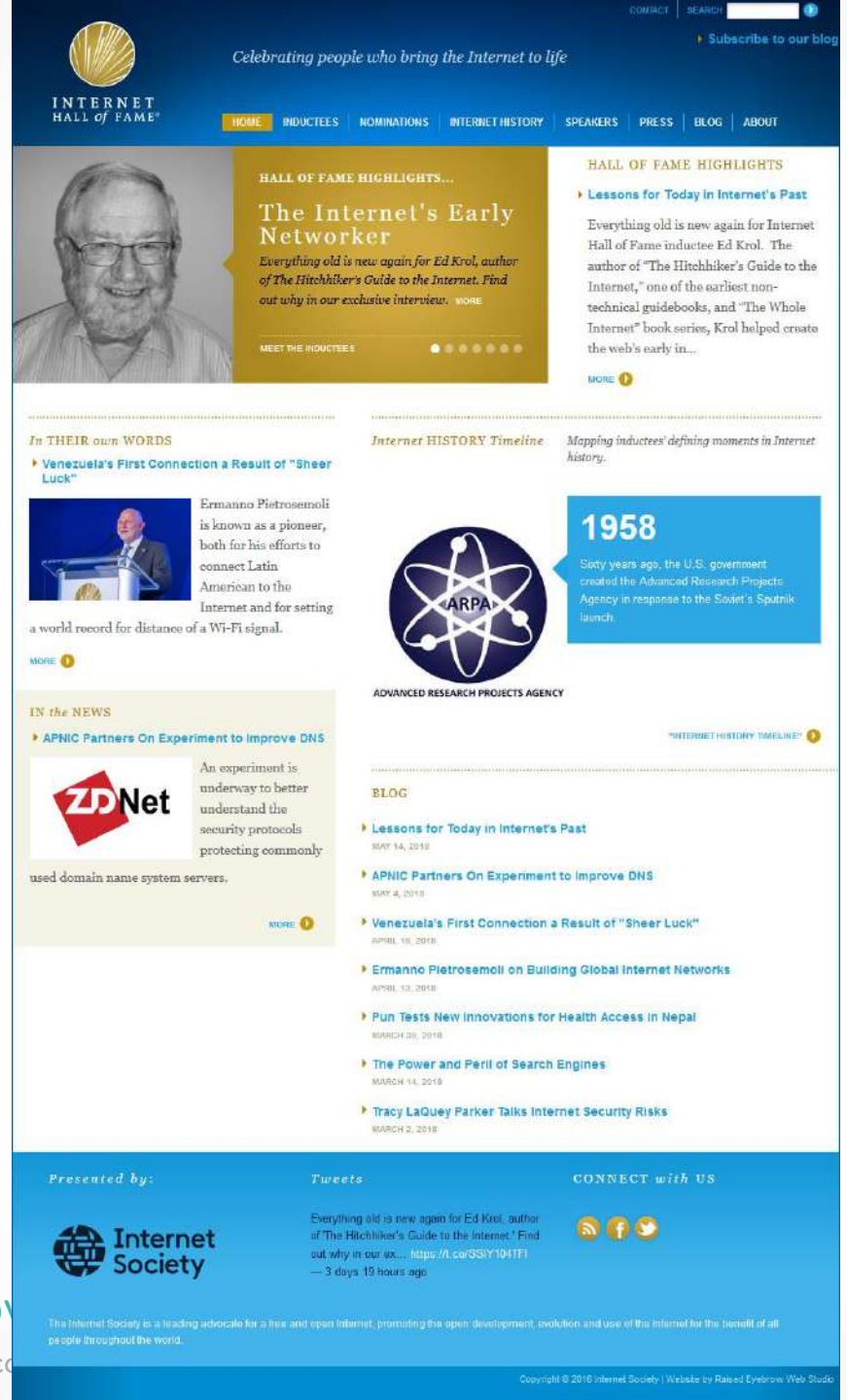
NEITHER & BOTH! Nowadays,

Internet = "commons-based peer production."

Build by a human open, decentralized, peer network

+

Web is built on Top of the Internet



http://www.internethalloffame.org/

INDUCTEES

2017 INTERNET HALL OF FAME INDUCTEES

GLOBAL CONNECTORS


Nabil Bukhalid


Ira Fuchs


Shigeki Goto


Mike Jensen


Ermanno Pietrosemoli


Tadao Takahashi


Florencio Utreras


Jianping Wu

INNOVATORS


Jaap Akkerhuis


Yvonne Marie Andrés


Alan Emtage


Ed Krol


Tracy LaQuey Parker


Craig Partridge

In this section:
- Inductees Alphabetically
- 2012 Inductees
- 2013 Inductees
- 2014 Inductees
- 2017 Inductees

http://www.internethalloffame.org/

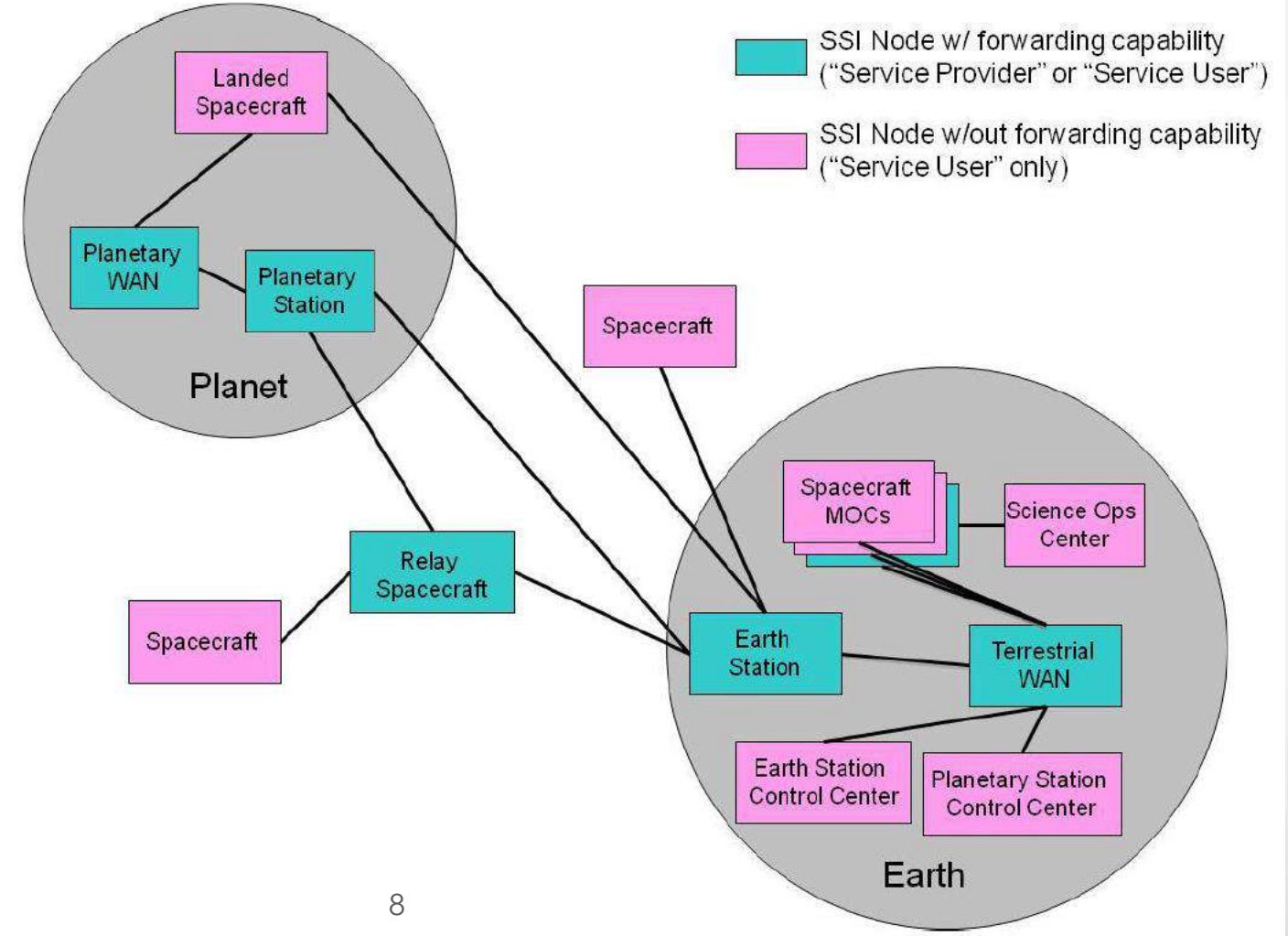
Τμήμα Μ
Αριστοτέλειο

World Wide Web Hall of Fame @ First International Conference on the World-Wide Web (1994)

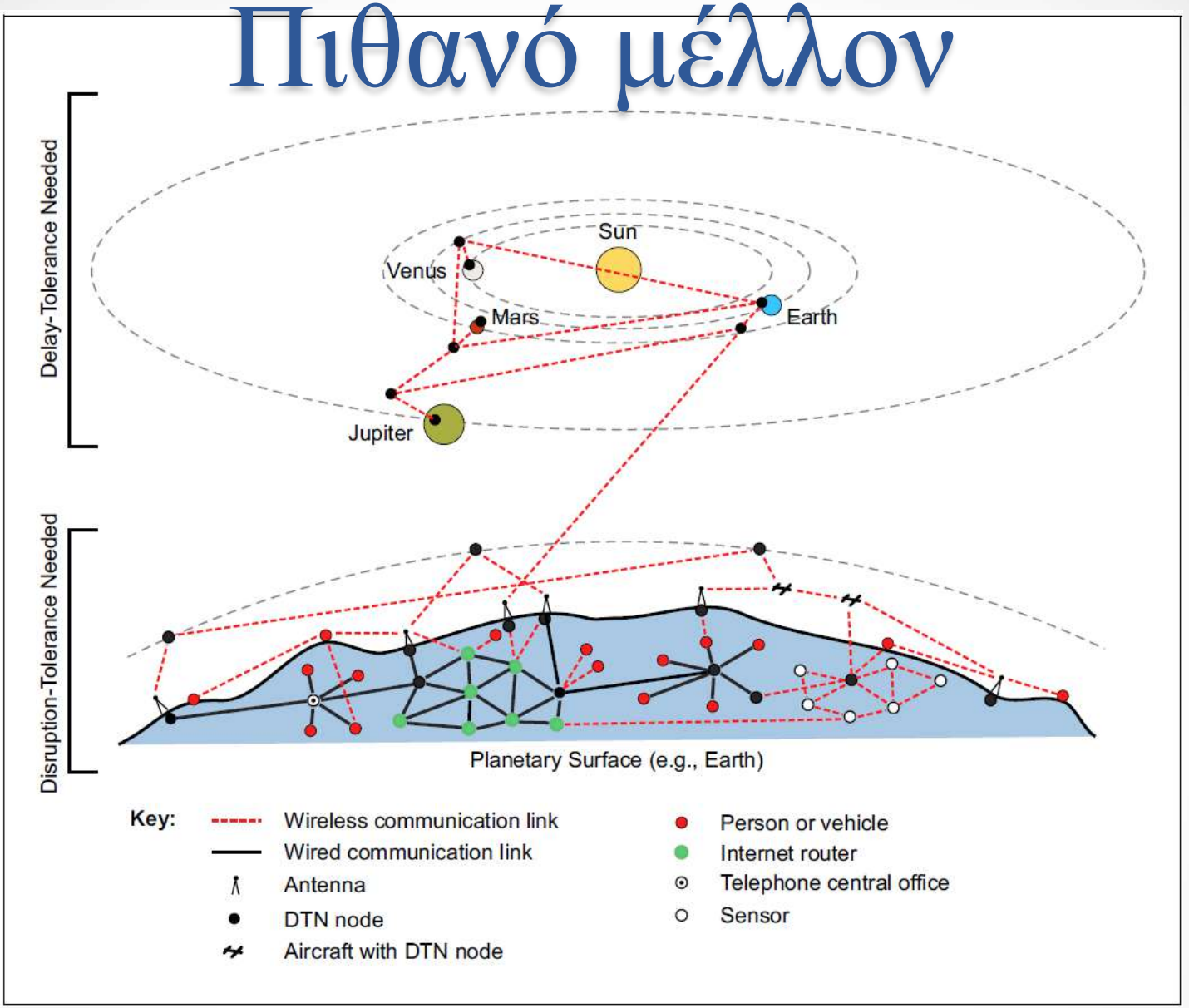
- Tim Berners-Lee, CERN
- Marc Andreessen, Netscape Communications Co., formerly at NCSA
- Eric Bina, Netscape Communications Co., formerly at NCSA
- Kevin Hughes, Honolulu C.C., now at Enterprise Information Technologies
- Rob Hartill, Los Alamos National Lab, formerly at U. Wales College at Cardiff
- Lou Montulli, Netscape Communications Co., formerly at U. Kansas

Πιθανό μέλλον

http://ipnsig.org/wp-content/uploads/2012/07/SISG-Operations-Concept-for-SSI-final-version.pdf



Πιθανό μέλλον

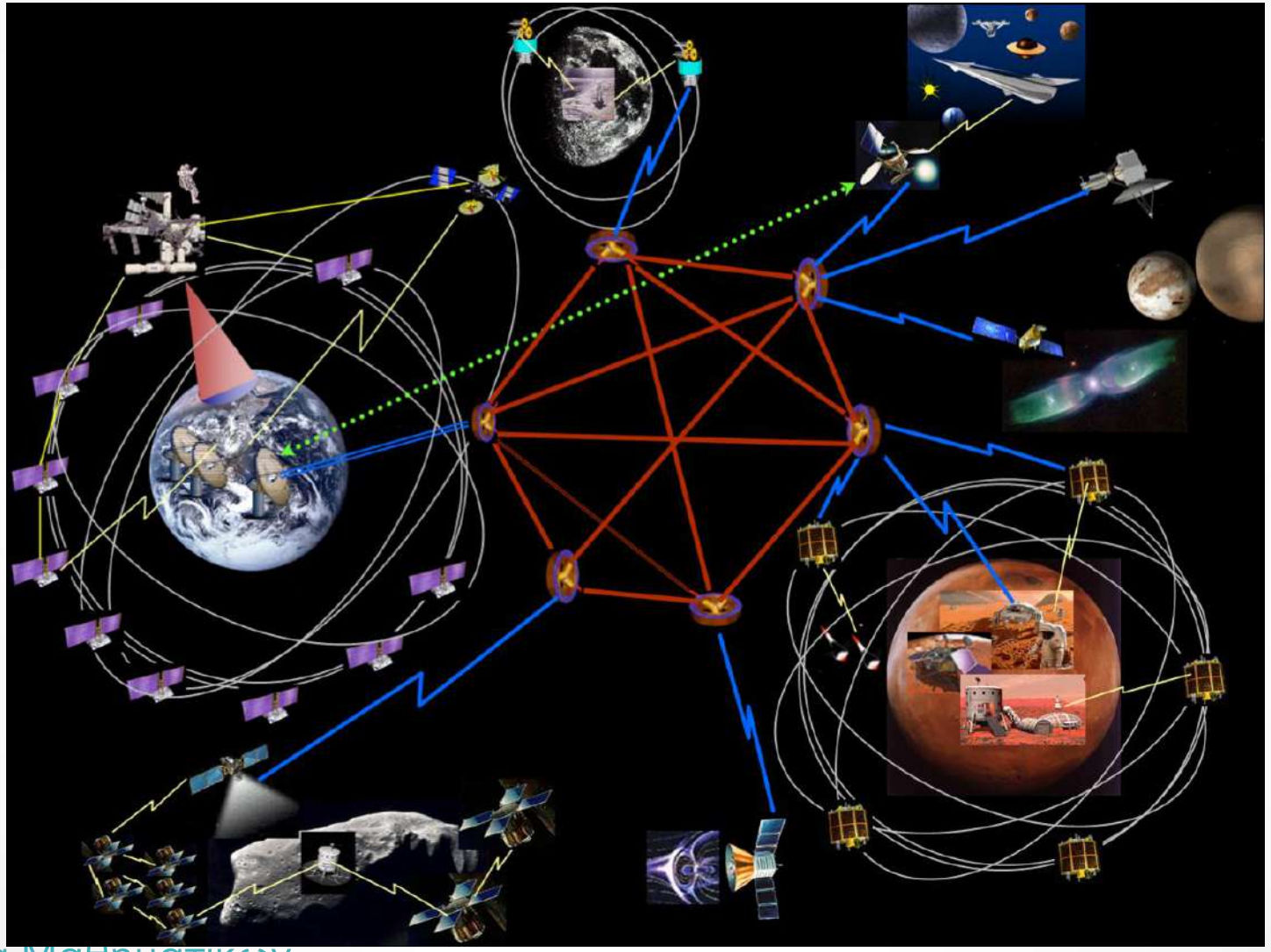


Delay- and Disruption-Tolerant Networks (DTNs): A Tutorial

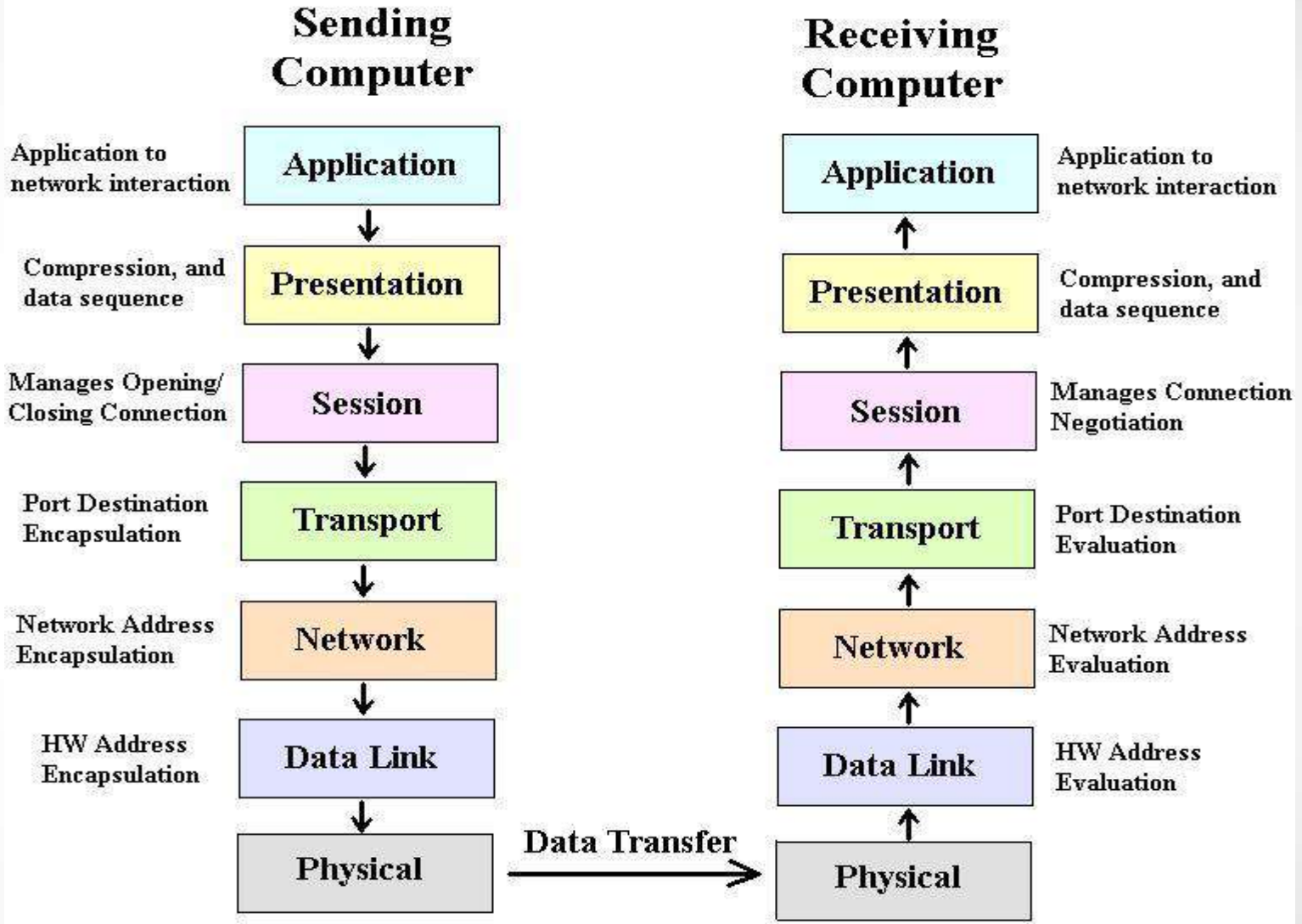
http://ipnsig.org/wp-content/uploads/2012/07/DTN_Tutorial_v2.04.pdf

Update: https://www.nasa.gov/content/dtn

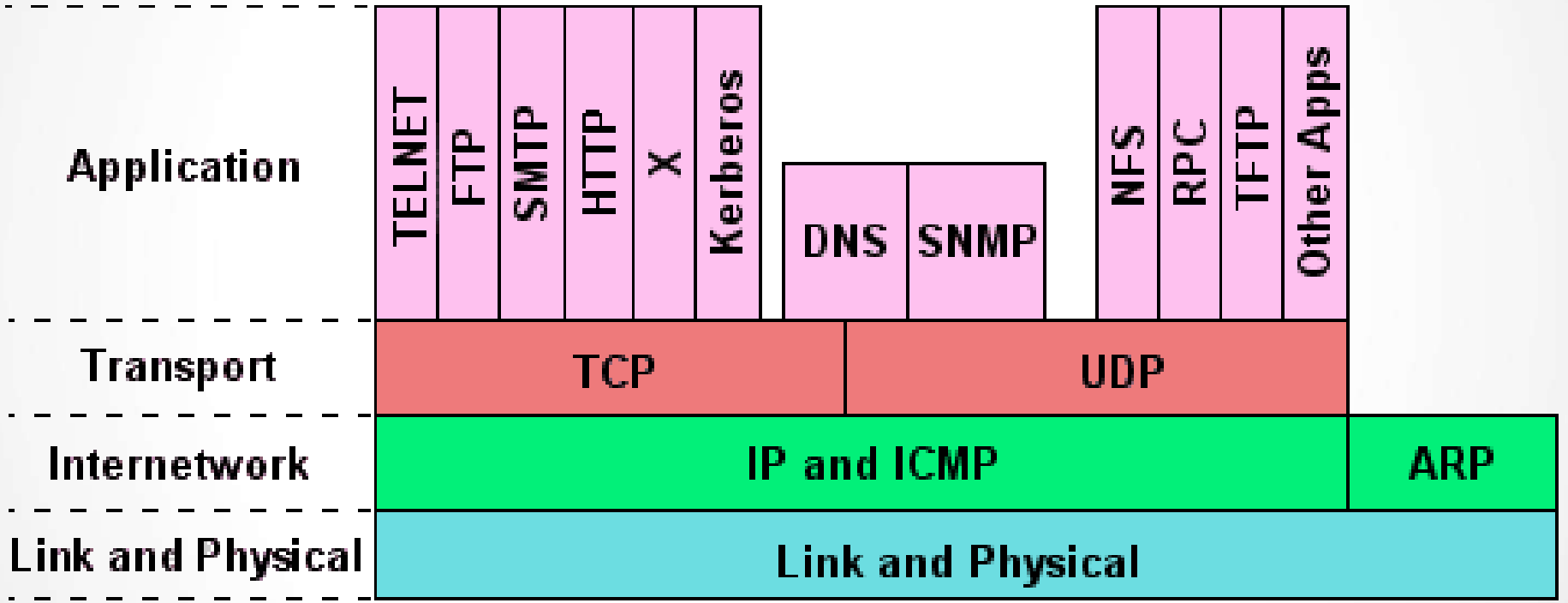
NASA Disruption Tolerant Networking



Network Layer Interaction



Ad hoc Internet protocol stack



OSI Model

<< Back

Layer #	Name	Mnemonic	Encapsulation Units	Devices or Components	Keywords/Description
7	Application	All	data	PC	Network services for application processes, such as file, print, messaging, database services
6	Presentation	People	data		Standard interface to data for the application layer. MIME encoding, data encryption, conversion, formatting, compression
5	Session	Seem	data		Interhost communication. Establishes, manages and terminates connection between applications
4	Transport	To	segments		End-to-end connections and reliability. Segmentation/desegmentation of data in proper sequence. Flow control
3	Network	Need	packets	router	Logical addressing and path determination. Routing. Reporting delivery errors
2	Data Link	Data	frames	bridge, switch, NIC	Physical addressing and access to media. Two sublayers: Logical Link Control (LLC) and Media Access Control (MAC)
1	Physical	Processing	bits	repeater, hub, transciever	Binary transmission signals and encoding. Layout of pins, voltages, cable specifications, modulation

OSI comparision with TCP/IP Protocol Stack

OSI #	OSI Layer Name	TCP/IP #	TCP/IP Layer Name	Encapsulation Units	TCP/IP Protocols
7	Application	4	Application	data	FTP, HTTP, POP3, IMAP, telnet, SMTP, DNS, TFTP
6	Presentation			data	
5	Session			data	
4	Transport	3	Transport	segments	TCP, UDP
3	Network	2	Internet	packets	IP
2	Data Link	1	Network Access	frames	
1	Physical			bits	

http://www.vlsm-calc.net/models.php

Εξέλιξη του Internet

1. Simplification of lower network layers, after the “Protocol Wars” (OSI, SNA, DECNET, appletalk, etc., ….. and TCP/IP) of the 1980s, and early 1990s.

“We reject kings, presidents and voting. We believe in rough consensus and running code.” :
David Clark at a 1992 talk describing the Internet Engineering Task Force

Εξέλιξη του Internet

2. Convergence of applications, technologies and networks

Voice Video Data Storage

||

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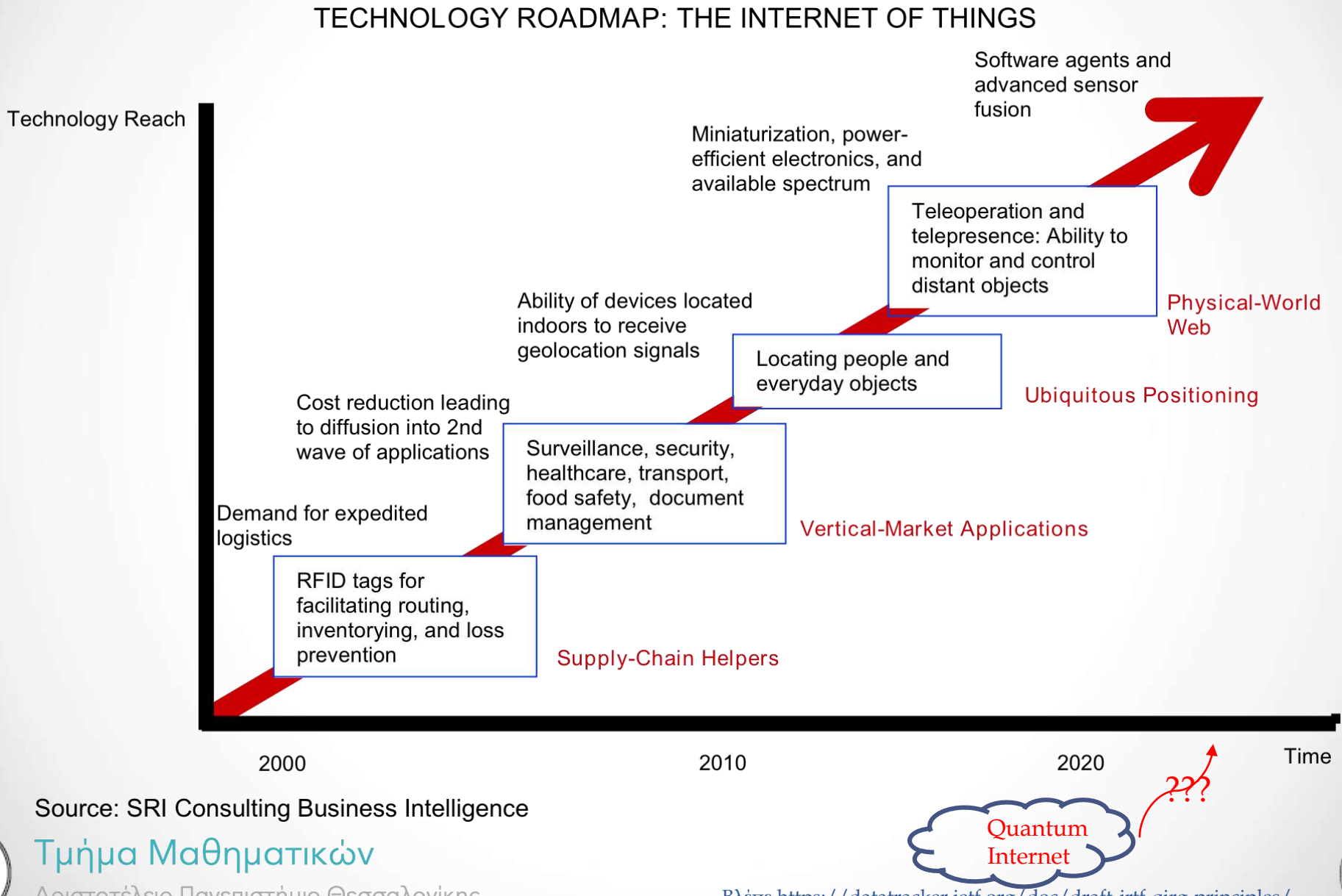
Broadband IP network

Εξέλιξη του Internet



Source: SRI Consulting Business Intelligence

Βλέπε https://datatracker.ietf.org/doc/draft-irtf-qirg-principles/

Εισαγωγή ευρυζωνικών υπηρεσιών (broadband services)

- High Return On Investment per user, leading to sustainable and (in long term) profitability
- Cut costs & increase productivity in public sector
- Sectors for immediate application: health, education, lift of social / geographical exclusions

Broadband services

- Basic network services are prerequisite
  - DNS, directory services, e-mail, web, ftp, etc.
- Value added network services
  - Application & document sharing, video/audio only conference, video e-mail, online gaming, streamed video, digital music, VoIP, sync/async distance learning, etc.

Προσφορά ευρωζωνικών υπηρεσιών

There is no single “killer application”!!!

SOLUTION: services ‘bouquets’:

- High speed
- “always on” characteristic
- flat fee

Ταξινόμηση υπηρεσιών

- security & data services
  - VPN, firewalls, parental controls
- entertainment
  - Video on Demand, Music on Demand, Internet Radio
- Advanced telecommunications
  - VoIP, Video telephony, mobility
- Tele-control / smart buildings
  - security, surveillance, utility management

Οργάνωση

- Networks (Classes A – E, + CIDR, IPv4/IPv6)
- Autonomous Systems (AS)
- Network Operations Centers (NOCs)
- Internet Operation =

"Collaboration, Collaboration, Collaboration"!!!

Since 9/2010 the Task Force on Network Operation Centers (TF-NOC) brings together NOC managers, engineers, developers, operators, controllers and project managers interested in NOC functions ...

See ~~http://www.[illegible].org/activities/tf-noc/~~

https://wiki.geant.org/display/SIGNOC/SIG-NOC+Special+Interest+Group+-+Network+Operations+Centre

http://www.geant.org

Οργάνωση

- Staff:
  - roles (request routing, specialized addressing of requests)
  - coverage (place – time of response / address of issues),
  - Jurisdiction – responsibilities (administrative boundaries, obligations)
- NOC organization (centralized hierarchy, distributed structures, external assignments)
- Integration of tools and methodology of work

Οργάνωση

- Profile of network users and NOC services
- A framework of NOC obligations against users (Service Level Agreements - SLAs, Service usage Regulations)
- Methods – Tools to communicate with users and manage them

Οργάνωση : Documentation at NOC

- What kind of information is documented at NOC?
- Internal / external documentation
- Tools to create, maintain, promote documentation
- Best Practices

Διοίκηση

Internet governance : shape the evolution and use of the Internet

Who? Governments, private sector, civil society

How? Develop and apply

What? norms, rules, decision-making procedures, and programs

Διοίκηση: Όργανα διακυβέρνησης

- Internet Assigned Numbers Authority (IANA) ==>> Internet Corporation for Assigned Names and Numbers (ICANN)
- Regional Internet Registries (RIRs)
  - ARIN, RIPE NCC, APNIC, LACNIC, AfriNIC
- Internet Society (ISOC)
- Internet Architecture Board -->> ISOC
- Internet Engineering Task Force (IETF) -->> ISOC
- Internet Engineering Steering Group (IESG)
- Internet Research Task Force
- Internet Research Steering Group
- Internet Governance Forum

Internet bodies

- Internet Engineering Task Force (IETF)
- Internet Assigned Numbers Authority (IANA)
- ICANN - the Internet Corporation for Assigned Names and Numbers
- Internet Society (ISOC)
- Number Resource Organization
- Regional Internet Registry (RIR)
- Internet Research Task Force (IRTF)
- Internet Architecture Board (IAB)

United Nations bodies

- Internet Governance Forum
- World Summit on the Information Society
- Working Group on Internet Governance

Internet & Web standards

- Recommendations published by the World Wide Web Consortium (W3C)
- Internet standard (STD) documents published by the Internet Engineering Task Force (IETF)
- Request for Comments (RFC) documents published by the Internet Engineering Task Force

  Internet Draft -> Proposed Standard (RFC) -> Internet Standard
- Standards published by the International Organization for Standardization (ISO)
- Standards published by Ecma International (formerly ECMA)
- The Unicode Standard and various Unicode Technical Reports (UTRs) published by the Unicode Consortium
- Name and number registries maintained by the Internet Assigned Numbers Authority (IANA)

Semantic Web

Convert the web of unstructured and semi-structured documents into a “web of (linked) data”

Frequently Asked Terms:

- Web 3.0
- Dataset
- Linked Data
- Open Data
- Resource Description Framework (RDF)
- DBpedia
- Ontologies
- Web Ontology Language (OWL)
- SPARQL
- Simple Knowledge Organization Systems (SKOS)
- Open Knowledge Foundation (OKFN)
- Comprehensive Knowledge Archive Network (CKAN)

Διοίκηση:
Χρηματοδότηση

- Sources
  - AUTh annual budget
  - AUTh Research Committee
  - Competitive Research projects
- Indicative Expenditure categories
  - Hardware, software, equipment
  - Other / maintenance support
  - disposables
  - Personnel salaries
  - Travel expenses

Αντικείμενα εργασίας στα NOC

1) Monitoring:

- Traffic monitoring
  - Observation and measurement of the evolution of the traffic on an interface or line.
- Fault monitoring
  - Checking and tracing of failures and errors in network equipment and lines.
- Physical Infrastructure monitoring
  - Observation of physical parameters like temperature, humidity, open doors, etc.
- Flow monitoring
  - Observation of the sets of packets passing a point in the network during a certain time interval.
- Routing monitoring
  - Viewing of the IP routes from/to an AS and the routing protocols employed.
- Multicast monitoring
  - Observation of multicast topology and availability.
- Logging
  - Storage of the records of events from devices.

Αντικείμενα εργασίας στα NOC

2) Problem management:

- Alarming
  - Getting warnings about problems or incidents.
- Diagnostic
  - Following a procedure in order to identify the source of a problem.
- Sniffing/analyzing
  - Investigating inside the packets of data to find the origin of a problem or malfunction.

3) Performance management

- Passive or active measurement of the throughput of a connection to analyze its efficiency.

4) Multi-domain management

- Management of connections that traverse several management domains.

5) Reporting and statistics

- Querying of data sources for reference and statistics.

Αντικείμενα εργασίας στα NOC

6) Ticketing

- Process for the tracking of incidents, problems or tasks

7) Change management

- Controlling and recording of changes in values, technologies, etc.

8) Configuration management and backup

- Control and backup of the configuration for the routers, switches and other pieces of equipment.

9) Chat/communication/coordination

- Communication with people, either in the same institution or in other institutions.

10) Knowledge management/documentation

- Storing and sharing knowledge information to improve the efficiency in an organization.

11) Security management

- Control of physical and logical resources to avoid third parts from attacking the resources of an institution.

Αντικείμενα εργασίας στα NOC

12) Inventory management

- Organization and control of information about an institution's devices, materials and products.

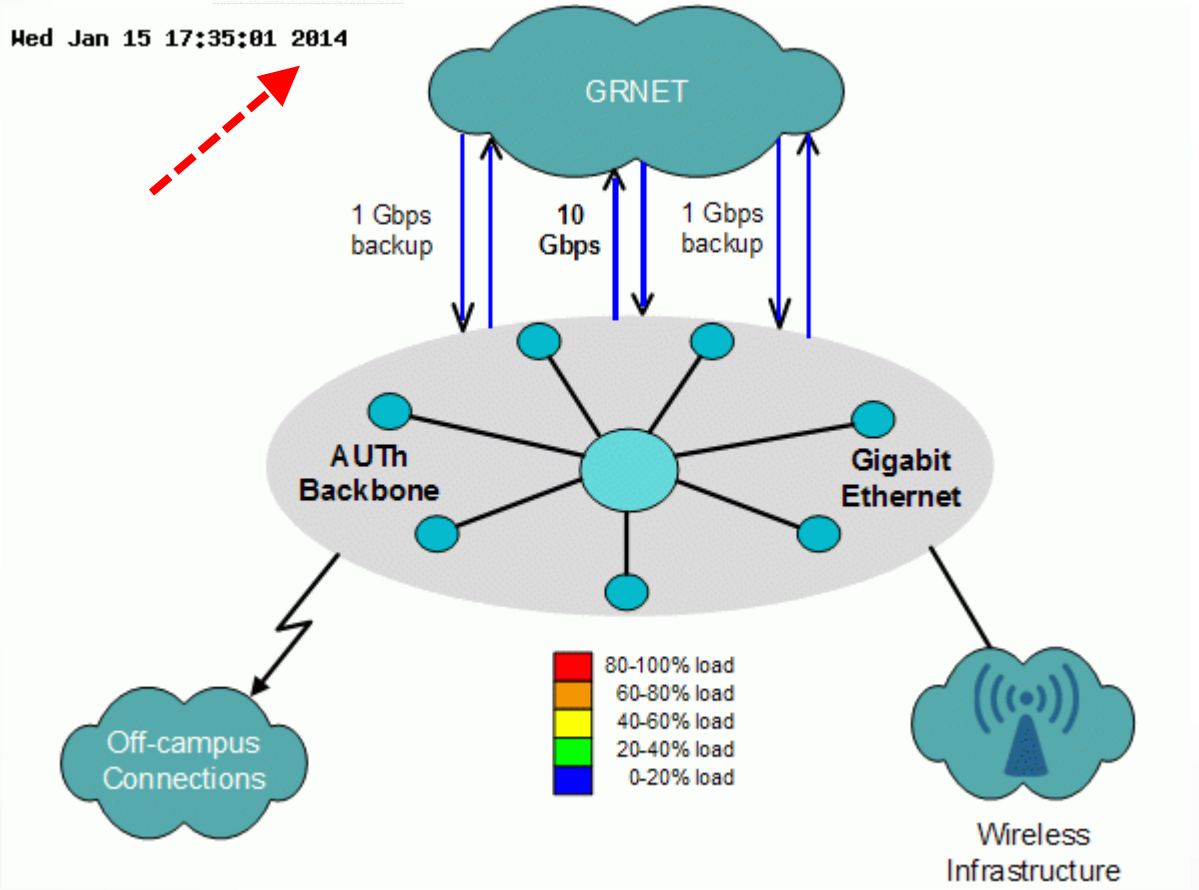
13) Resources management

- Organization and control of logical resources such as IP addresses, AS numbers, circuits numbers, topology documentation, etc.

14) Out-of-band access

- Access to the network devices of an institution from an external network

Internet infrastructures at A.U.Th.



The Network

- Intranet:
  - Networking for secretariats, datacenters, etc.
  - 10.0.0.0 , 192.168.0.0
- Internet (IPv4):
  - 155.207.0.0 (AUTH-NET)
  - 192.104.147.0 (AUTH-TO-OTHERS)
  - Autonomous System: AS-5470
  - auth.gr, απθ.gr
- Internet (IPv6 enabled):
  - ID: W1-GR-00002188

The Network

- Infrastructures at AUTh (fiber optic cabling, wireless links, switches, routers, servers, etc.)
- Services maintained and offered at AUTh (e-mail, voice, video, web services, etc.)
- E-infrastructures/“middleware”: LDAP, PKI, AAI)
- Tools for administration and monitoring of the network (netcop, nagios, etc.)

https://it.auth.gr/el

Πραγματοποιήστε μία τηλεδιάσκεψη

Είστε διδάσκων ή θέλετε να πραγματοποιήσετε μία τηλεδιάσκεψη με την ομάδα σας;

Δείτε τις οδηγίες για εφαρμογές τηλεδιασκέψεων (Zoom, BBB, Skype for Business, Google Meet) που παρέχονται στα μέλη του ΑΠΘ σε αυτήν την ιστοσελίδα.

Εφαρμογές τηλεδιασκέψεων

BigBlueButton | Zoom | Skype for Business | Google Meet | Microsoft Teams

Σύντομες οδηγίες

Θέλω να αποκτήσω ασύρματη πρόσβαση στο δίκτυο
Θέλω να αλλάξω/επαναφέρω τον κωδικό μου
Ποιό είναι το περιβάλλον που συγκεντρώνει όλες τις ηλεκτρονικές υπηρεσίες του ΑΠΘ σε ένα σημείο;

Περισσότερα...

Ανακοινώσεις | Δράσεις | Διαγωνισμοί | Εργασία

14/10/2020 Αποκλεισμός μηνυμάτων email με συνημμένα έγγραφα Microsoft Word

Είμαι

Φοιτητής
Διδάσκων
Προσωπικό
Απόφοιτος
Υπηρεσίες για όλα τα μέλη του ΑΠΘ

Κατάσταση υποδομής και υπηρεσιών

Πρόβλημα σε κύριο σύστημα παραγωγής που επηρεάζει όλους τους χρήστες

Υποστήριξη

Live Chat
2310 999000
2310 999100
support@auth.gr

Δημοφιλέστερες υπηρεσίες

Το email μου
Ιδρυματικός λογαριασμός
Ασύρματη πρόσβαση
Υπηρεσίες ηλεκτρονικής γραμματείας φοιτητών

Χρήσιμα links

Ευρετήριο προσώπων
Ευρετήριο μονάδων ΑΠΘ
Χάρτης σημείων παρουσίας ΑΠΘ

Cabling: Activities

- Study and supervision of new installations and expansions of network cabling infrastructure
- Location and repair of faults and maintenance of network cabling structure
- Maintenance and cleaning of network node locations
- Operation of the Cabling Management System (CMS) and data entry to it

Cabling: Activities

- Monitoring and administration of Uninterruptible Power Supplies (UPS) for NOC
- Study, supervision and maintenance of electrical power facilities in NOC and network premises
- Study and supervision of air conditioning facilities (NOC premises, data centers and network node locations)

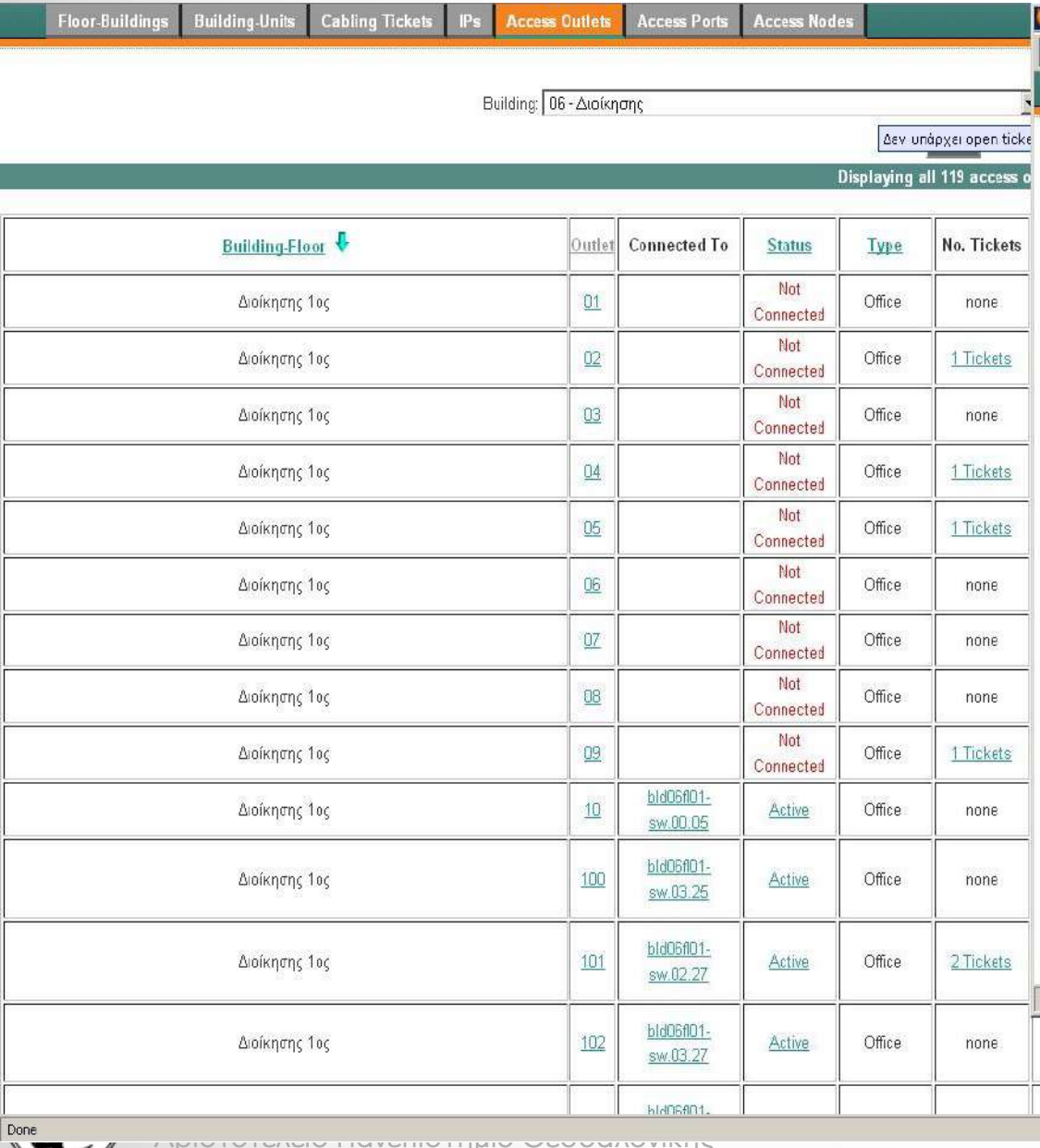
Network Documentation

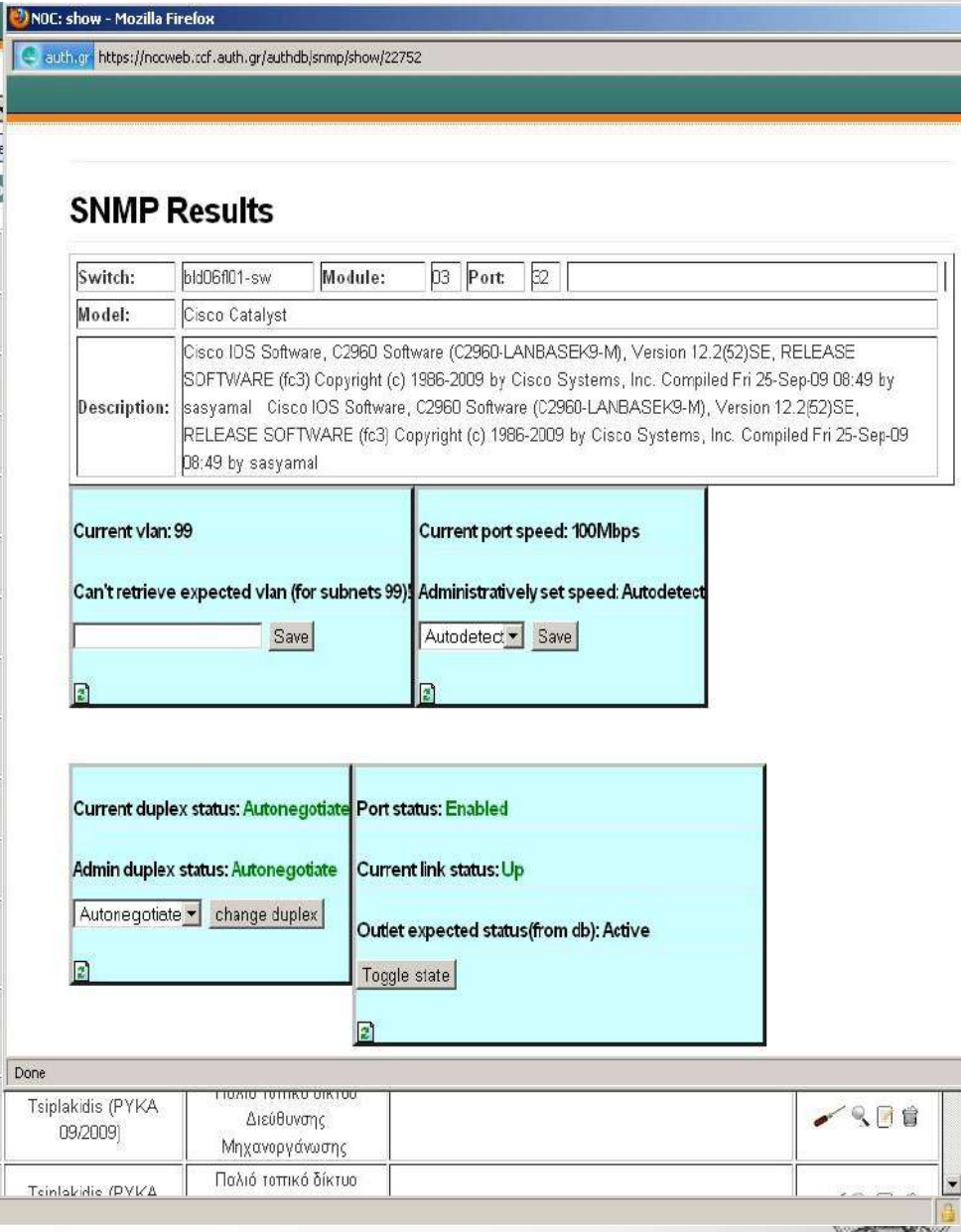
- Floor plans including network outlet positions (in Visio)
- Imprinting of copper distribution boxes in .doc format
- Imprinting of fiber optic distribution boxes in .xls format
- Data structures for network outlets per building, per floor in MySQL DB. Web based management application (NOCWeb).
- Files of measurement data and respective viewers for outlet certification

Floor plan with network outlets

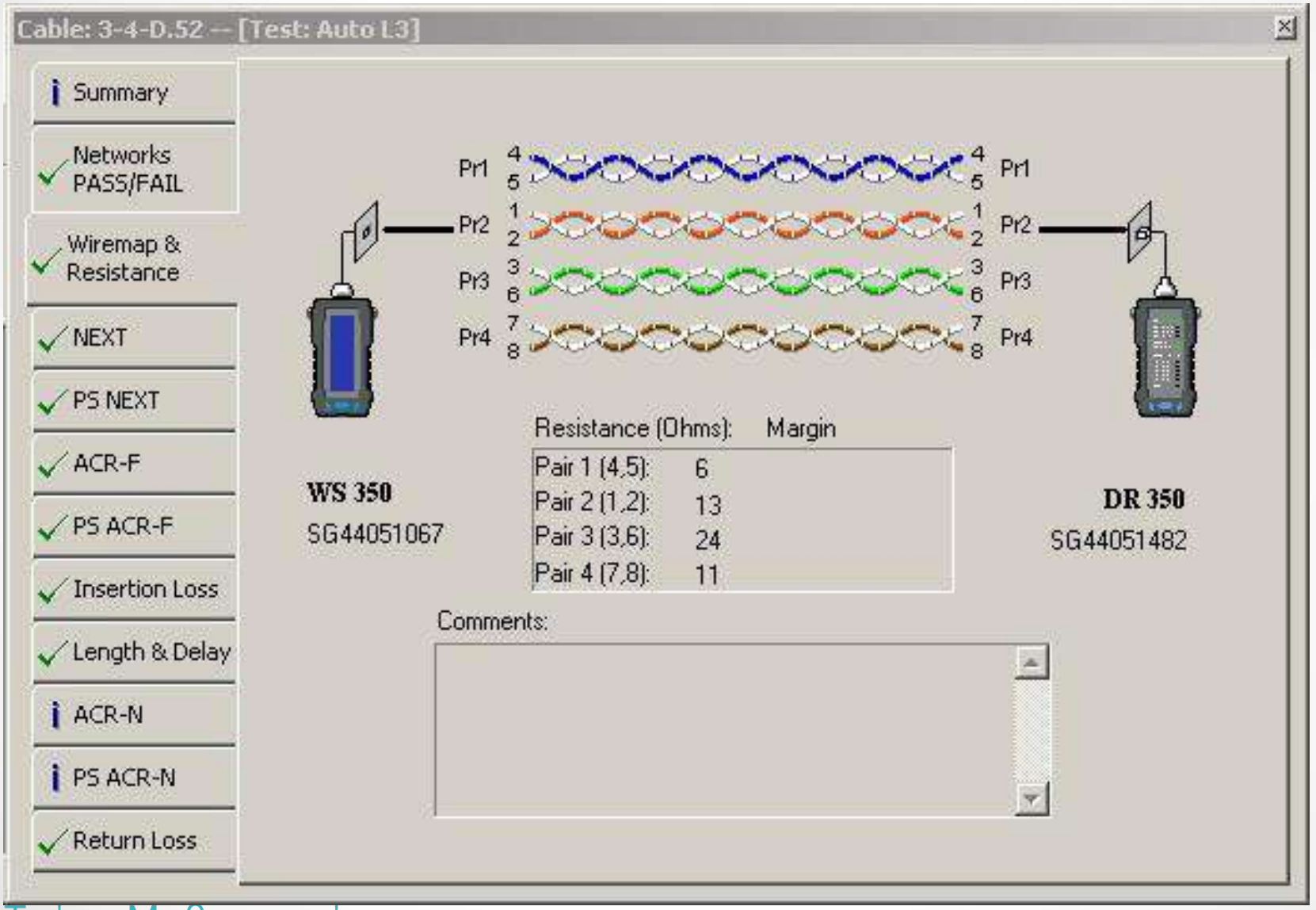
Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης
Τμήμα Μηχανικών Χωροταξίας και Ανάπτυξης
Βέροια- Κτίριο Α (γραμματεία)

Web/DB based outlet

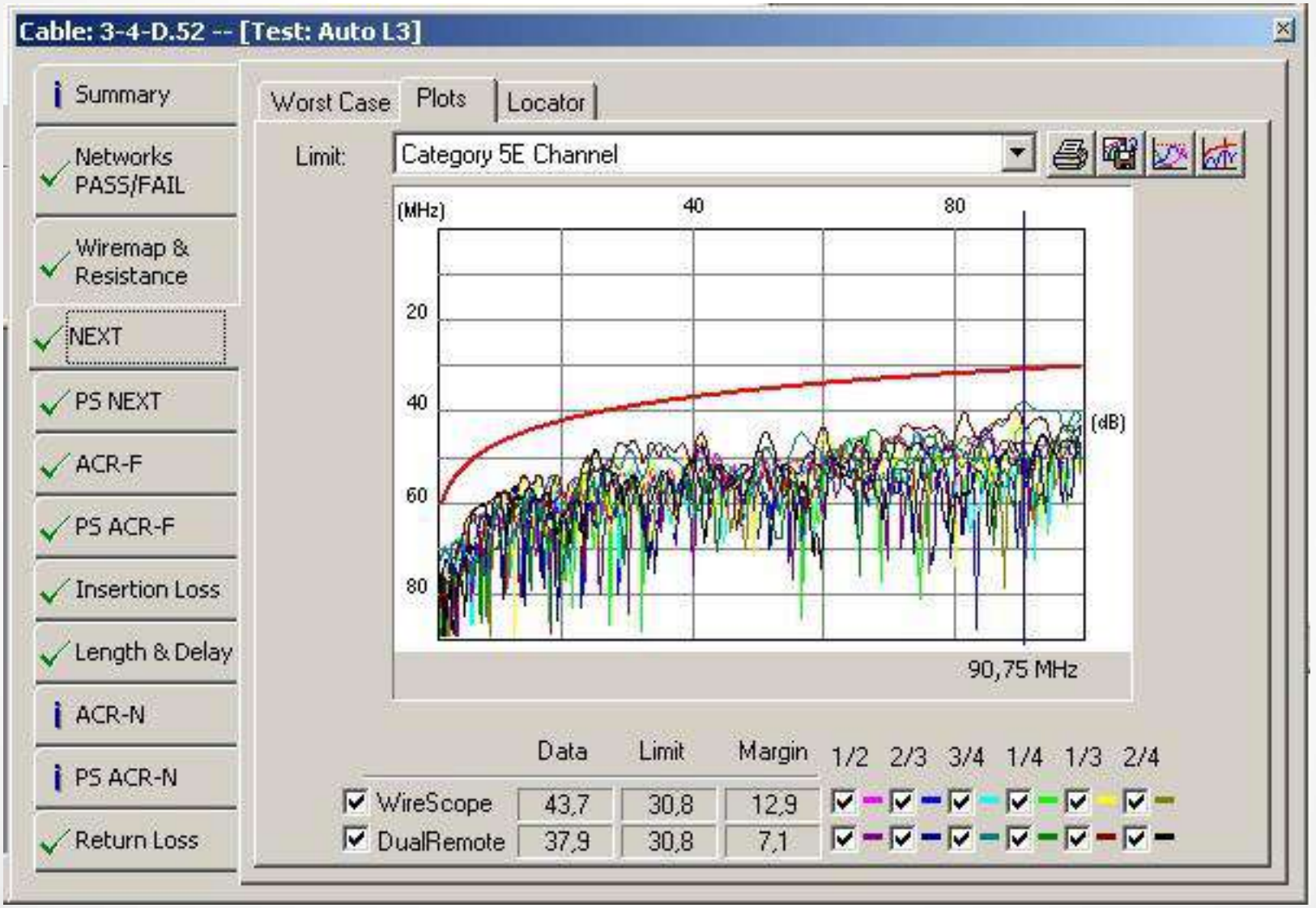




Outlet measurement &



Outlet measurement & certification



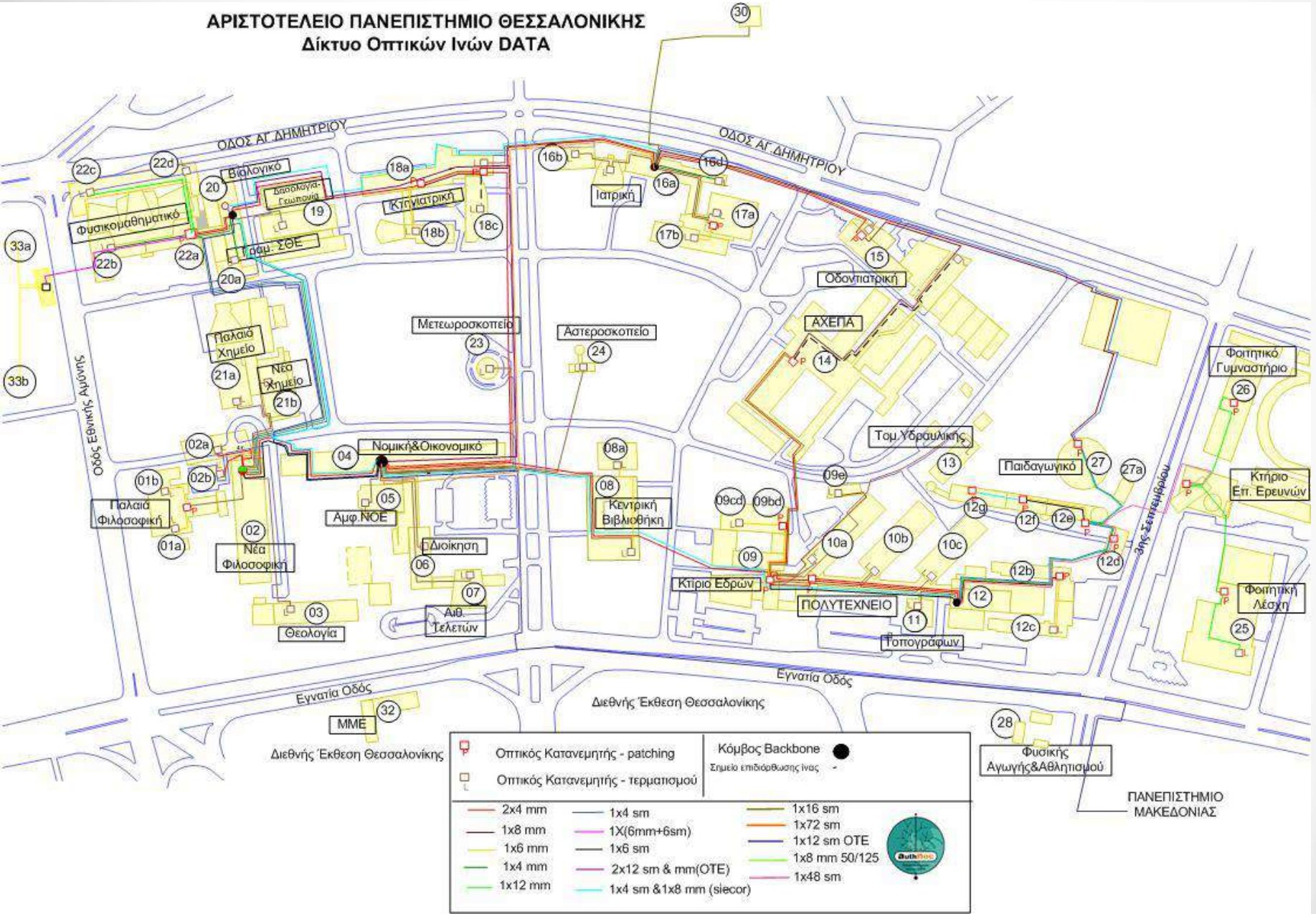
Cabling: Problem solving

- Registration of user problems through ticket opening from helpdesk.
- Locating faulty network outlets by checking data bases, floor plans, distribution boxes files and certification measurements
- Technician on site call
- Check of cabling and outlet
- Damage repair

Cabling: Tools

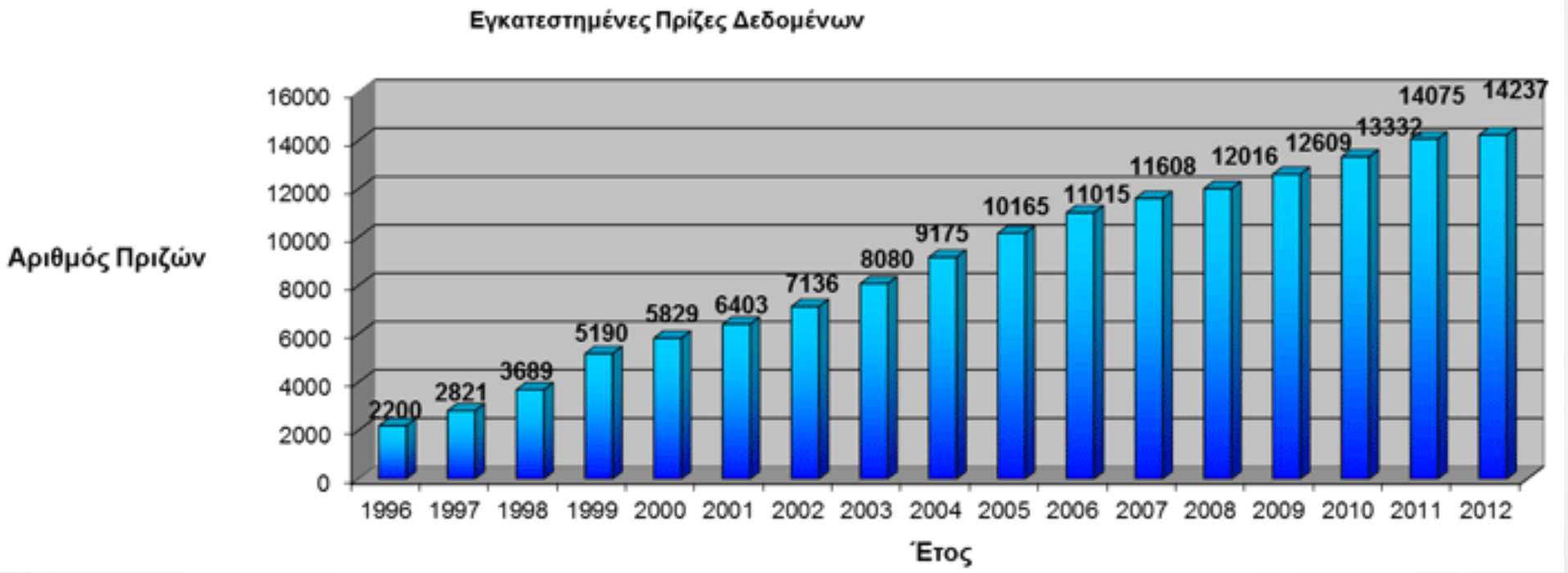
- Fiber and copper cabling control instrument (cable tester).
- Network function control instrument (network tester).
- Tools to terminate copper (UTP) outlets
- Tools to terminate cables at patch panels in network nodes.
- Various small tools for UTP and power cabling (stripper, screw drivers, multimeters, etc).

@2014 Fiber optics network at AUTh



Indicative statistics

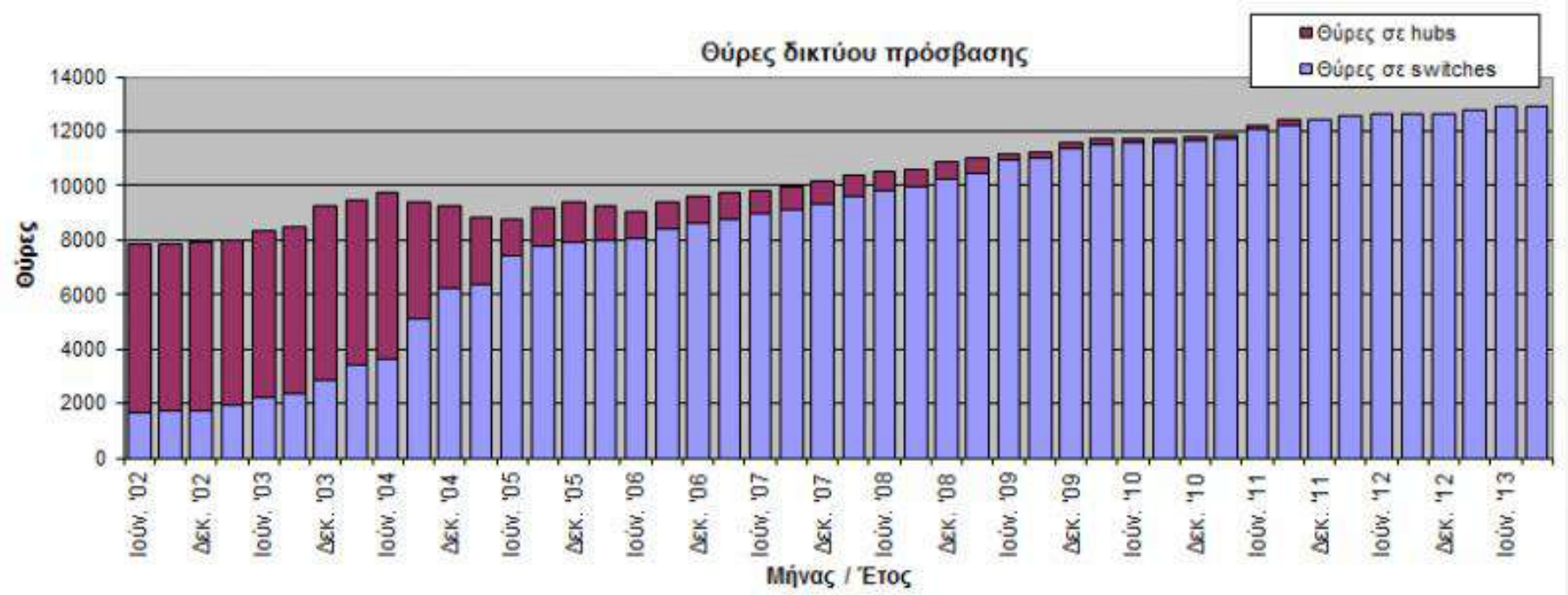
Long-term gradual deployment!



17 network expansion phases 1995 - 2011

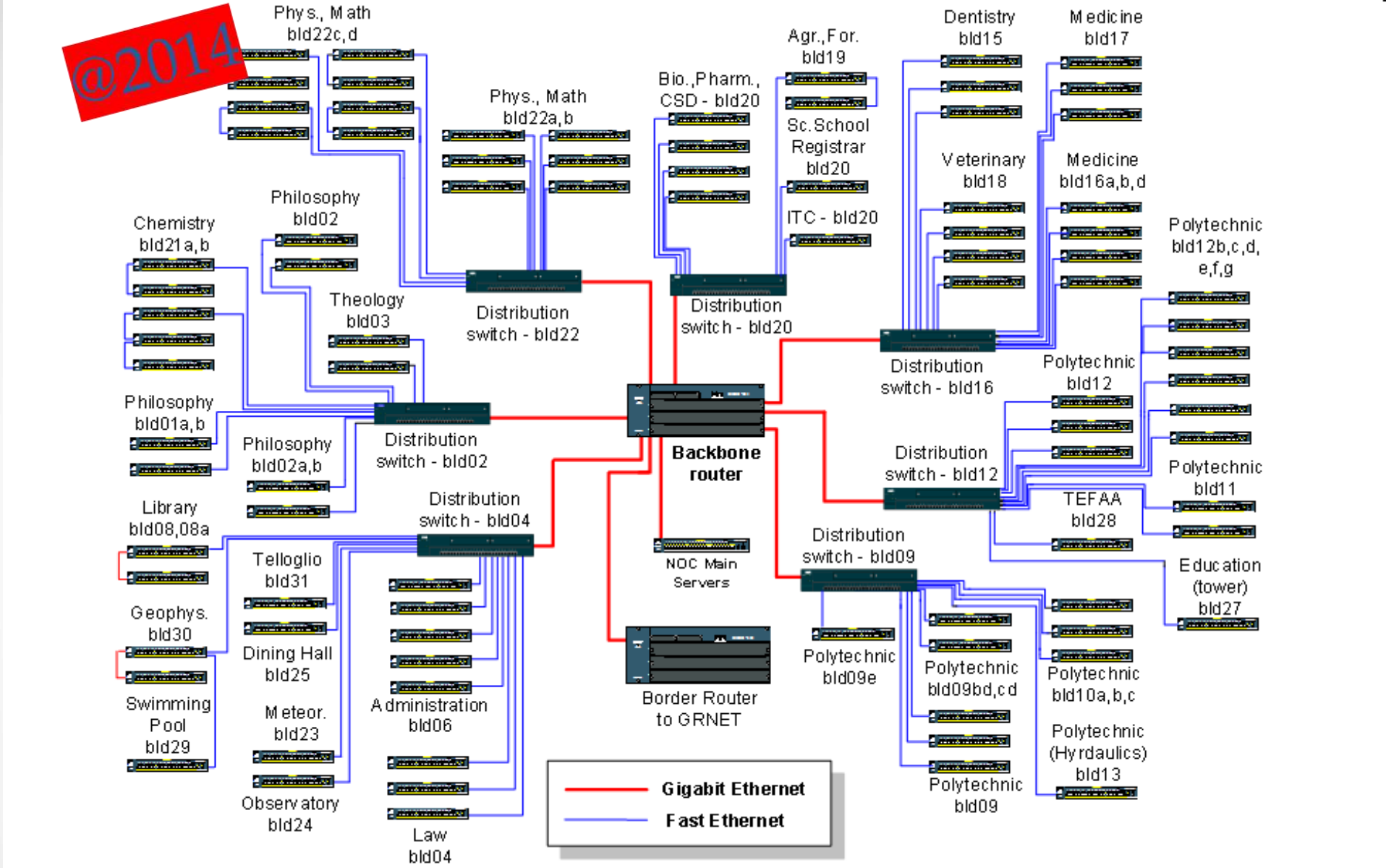
Indicative statistics

Long-term gradual deployment!



User access ports:

Transition from shared to switched ethernet 2002 - 2011



Active components @ AUTh

Activities

- Routers and ethernet switches
- Connections to remote units
- Connections to the Internet through GRNET
- Detection and resolution of security and network abuse incidents (“in-house” software development)
- Installation and configuration of firewalls
- Network traffic and usage statistics (MRTG, IP accounting)

Traffic Analysis for GRnet P...

stats.it.auth.gr/network/atlantas/grnet/grnet_traffic.html

stats.it.auth | AUTh IT Center statistics

MRTG statistics

Traffic Analysis for GRnet Primary Link

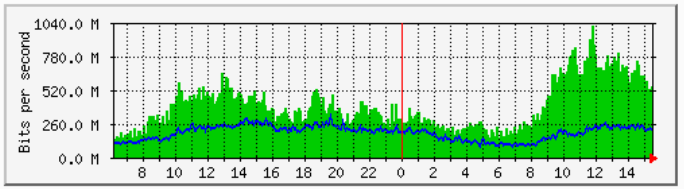
System: atlantas.ccf.auth.gr

Interface: Vlan503

Max Speed: 10 Gbps

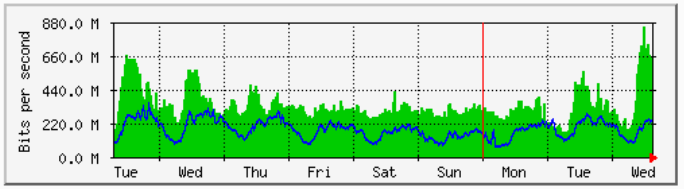
The statistics were last updated **Wednesday, 15 April 2015 at 15:30**, at which time **'atlantas.ccf.auth.gr'** had been up for **81 days, 2:37:04**.

`Daily' Graph (5 Minute Average)

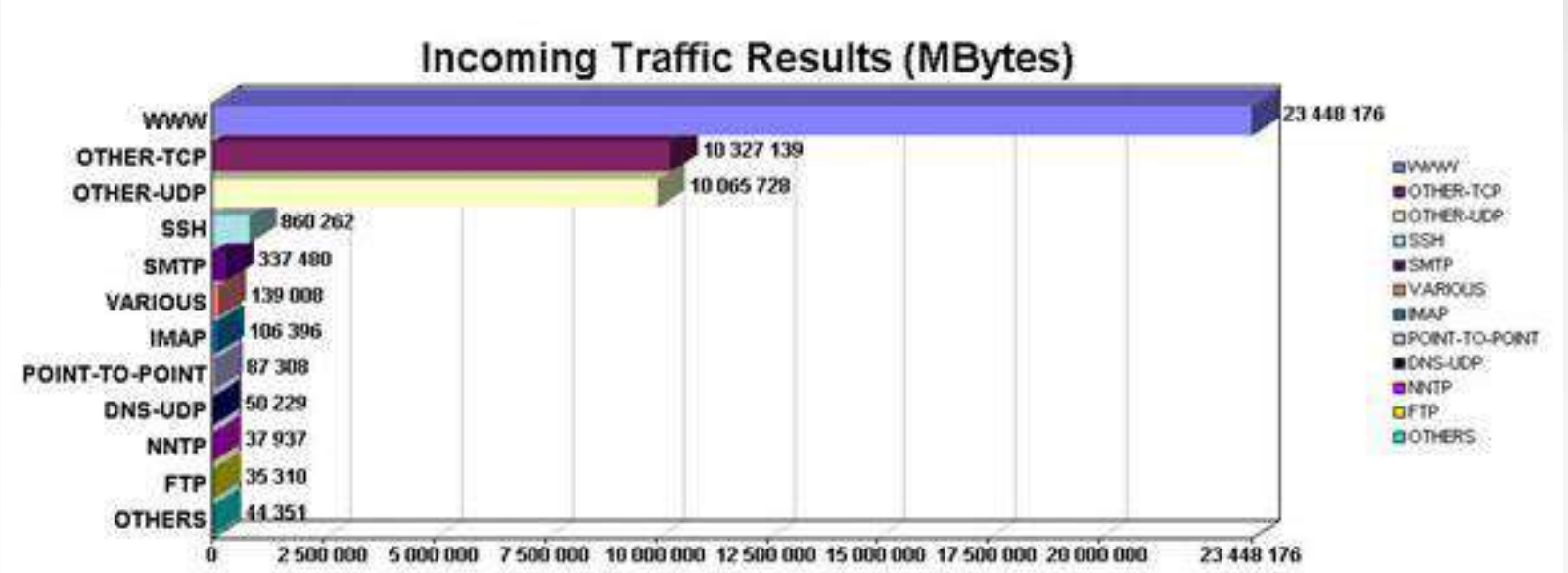


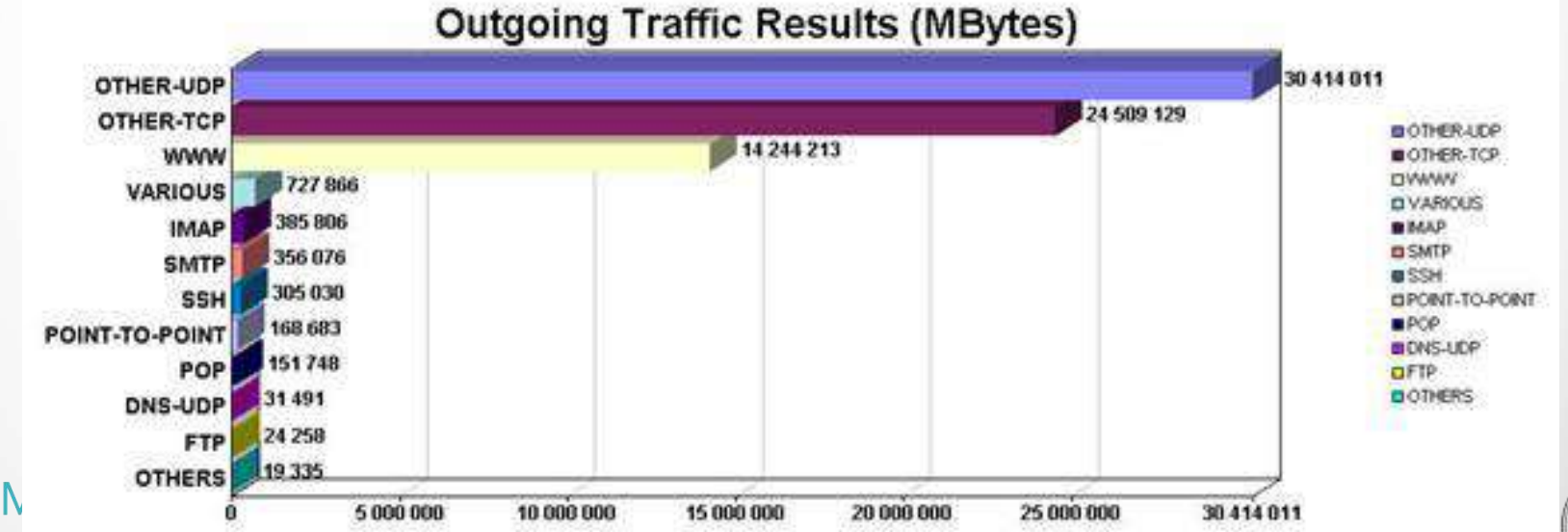
	Max	Average	Current
In	1013.3 Mbps (10.1%)	384.5 Mbps (3.8%)	543.0 Mbps (5.4%)
Out	332.4 Mbps (3.3%)	187.4 Mbps (1.9%)	219.9 Mbps (2.2%)

`Weekly' Graph (30 Minute Average)



IP accounting data

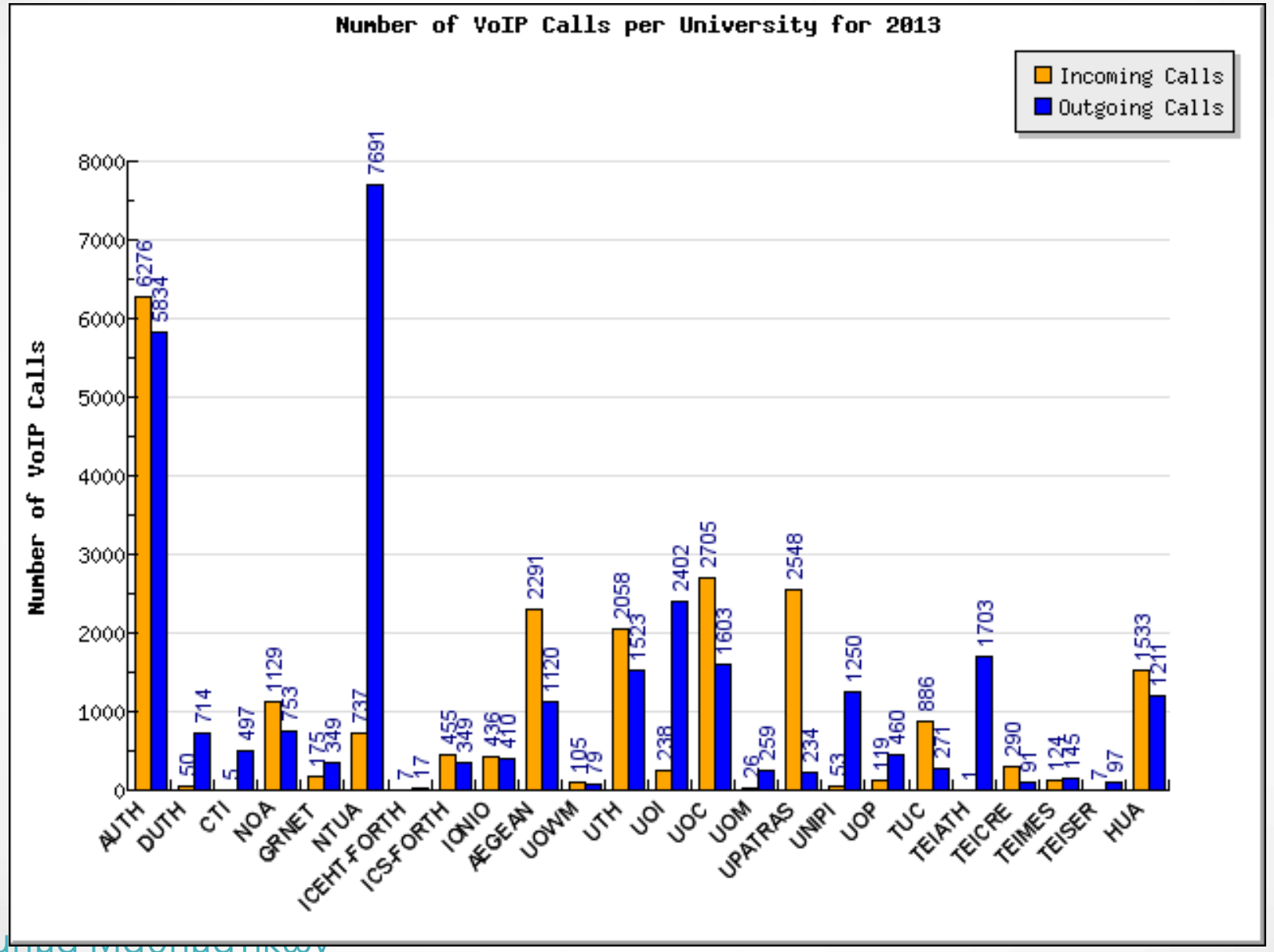




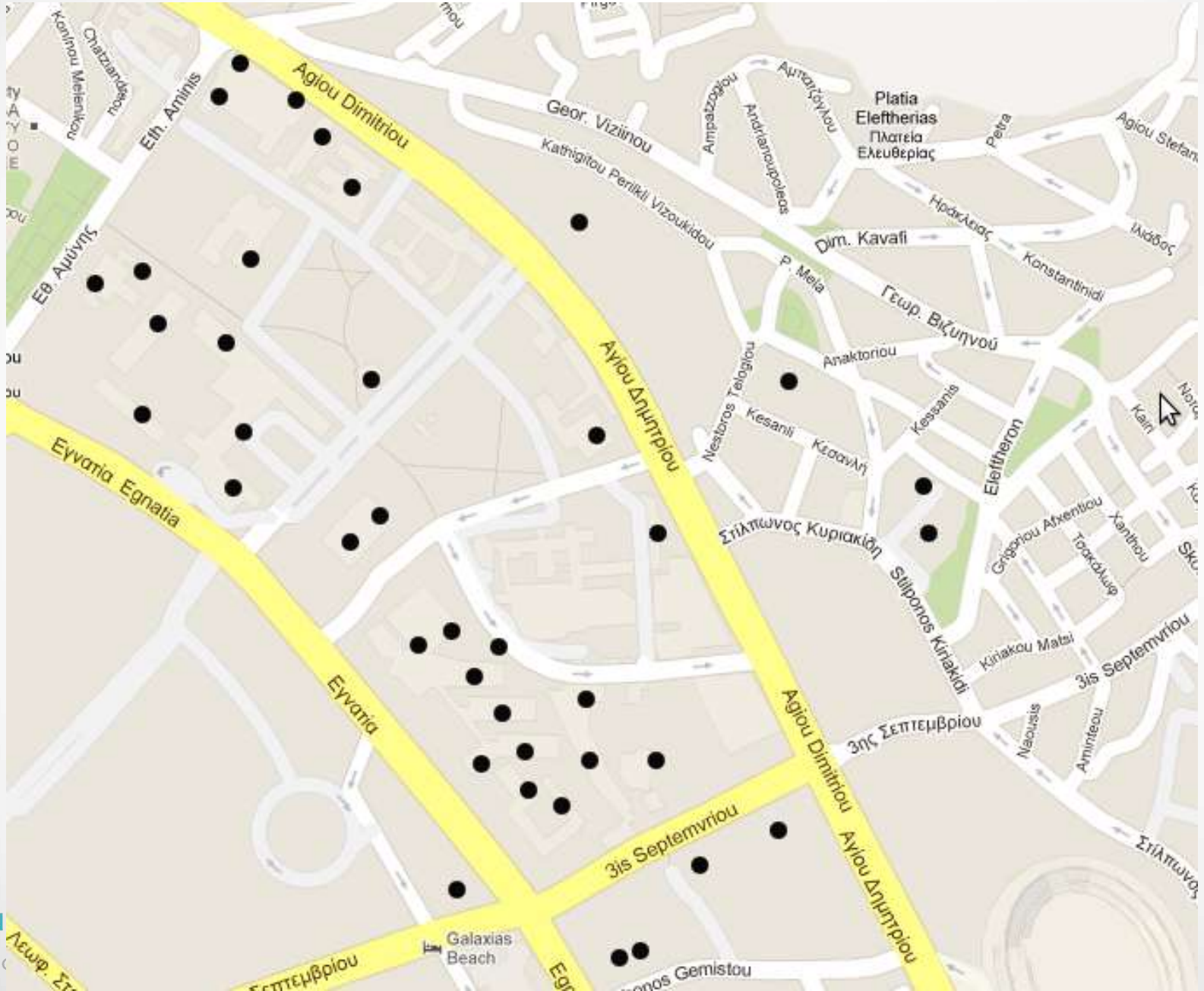
Activities

- IP telephony and Voice over IP
  - Call switching to other academic institutions
  - Telephony provision to 4 remote units
  - IP telephony for NOC
- “Contact Center” for NOC helpdesk (serving AUTh and Greek School Network users)
- Wireless LANs (hundreds of access points under NOC administration)
- Dial-up service (through PSTN)
- 2nd level support for the GSN

VoIP statistics (GUnet)



Wireless Networks

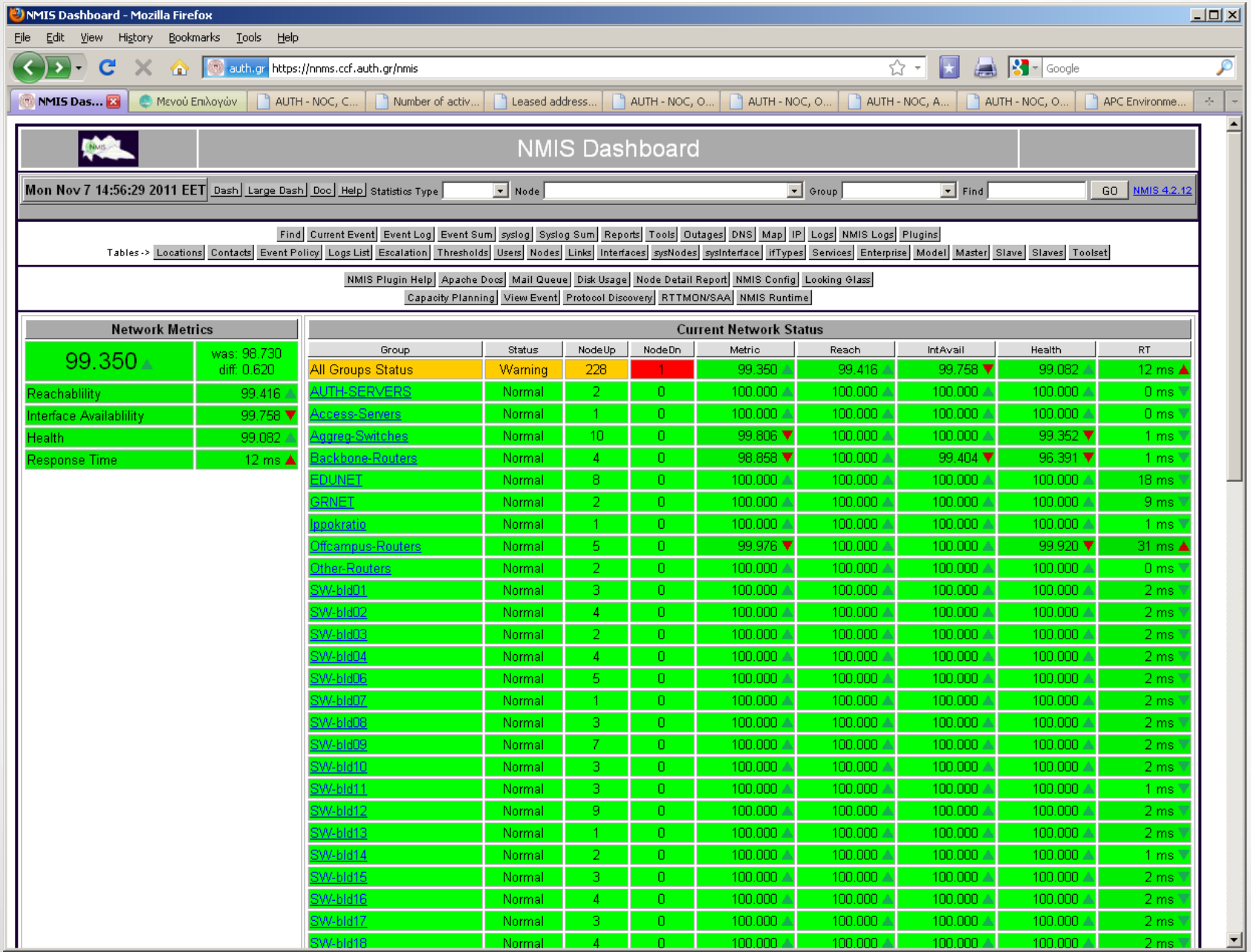


Wireless networks (AUTh startup)

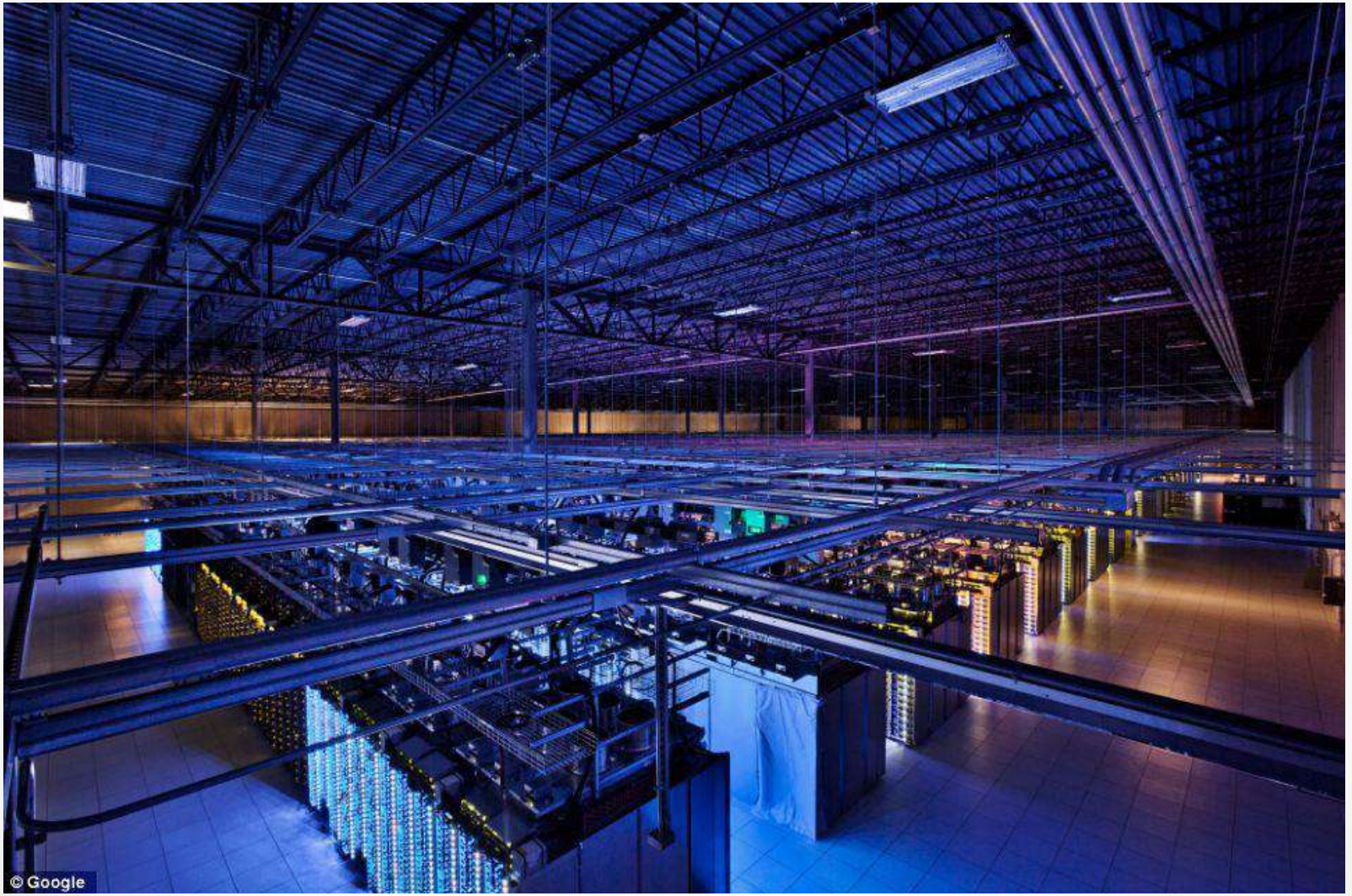
Platforms for management & services

- Network Monitoring:
  - NMIS (freeware)
  - Scripts developed “in-house”
- Statistics:
  - MRTG, Cacti, RRDtool, nfdump (freeware)
  - Scripts and sw application developed “in-house”
- Telephony & telephone user helpdesk system
  - Cisco Unified Communications Manager
  - Contact Center Express (Cisco)
- Access points Management
  - Wireless LAN Controller (Cisco)
  - Wireless Control System (Cisco)

NMIS


NMIS Dashboard - Mozilla Firefox
File Edit View History Bookmarks Tools Help
https://nnms.ccf.auth.gr/nmis
NMIS Dashboard
Mon Nov 7 14:56:29 2011 EET
Dash Large Dash Doc Help Statistics Type Node Group Find GO NMIS 4.2.12
Find Current Event Event Log Event Sum syslog Syslog Sum Reports Tools Outages DNS Map IP Logs NMIS Logs Plugins
Tables -> Locations Contacts Event Policy Logs List Escalation Thresholds Users Nodes Links Interfaces sysNodes sysInterface ifTypes Services Enterprise Model Master Slave Slaves Toolset
NMIS Plugin Help Apache Docs Mail Queue Disk Usage Node Detail Report NMIS Config Looking Glass
Capacity Planning View Event Protocol Discovery RTTMON/SAA NMIS Runtime
Network Metrics
99.350
was: 98.730
diff: 0.620
Reachablility 99.416
Interface Availablility 99.758
Health 99.082
Response Time 12 ms
Current Network Status
Group Status NodeUp NodeDn Metric Reach IntAvail Health RT
All Groups Status Warning 228 1 99.350 99.416 99.758 99.082 12 ms
AUTH-SERVERS Normal 2 0 100.000 100.000 100.000 100.000 0 ms
Access-Servers Normal 1 0 100.000 100.000 100.000 100.000 0 ms
Aggreg-Switches Normal 10 0 99.806 100.000 100.000 99.352 1 ms
Backbone-Routers Normal 4 0 98.858 100.000 99.404 96.391 1 ms
EDUNET Normal 8 0 100.000 100.000 100.000 100.000 18 ms
GRNET Normal 2 0 100.000 100.000 100.000 100.000 9 ms
Ippokratio Normal 1 0 100.000 100.000 100.000 100.000 1 ms
Offcampus-Routers Normal 5 0 99.976 100.000 100.000 99.920 31 ms
Other-Routers Normal 2 0 100.000 100.000 100.000 100.000 0 ms
SW-bld01 Normal 3 0 100.000 100.000 100.000 100.000 2 ms
SW-bld02 Normal 4 0 100.000 100.000 100.000 100.000 2 ms
SW-bld03 Normal 2 0 100.000 100.000 100.000 100.000 2 ms
SW-bld04 Normal 4 0 100.000 100.000 100.000 100.000 2 ms
SW-bld06 Normal 5 0 100.000 100.000 100.000 100.000 2 ms
SW-bld07 Normal 1 0 100.000 100.000 100.000 100.000 2 ms
SW-bld08 Normal 3 0 100.000 100.000 100.000 100.000 2 ms
SW-bld09 Normal 7 0 100.000 100.000 100.000 100.000 2 ms
SW-bld10 Normal 3 0 100.000 100.000 100.000 100.000 2 ms
SW-bld11 Normal 3 0 100.000 100.000 100.000 100.000 1 ms
SW-bld12 Normal 9 0 100.000 100.000 100.000 100.000 2 ms
SW-bld13 Normal 1 0 100.000 100.000 100.000 100.000 2 ms
SW-bld14 Normal 2 0 100.000 100.000 100.000 100.000 1 ms
SW-bld15 Normal 3 0 100.000 100.000 100.000 100.000 2 ms
SW-bld16 Normal 4 0 100.000 100.000 100.000 100.000 2 ms
SW-bld17 Normal 3 0 100.000 100.000 100.000 100.000 2 ms
SW-bld18 Normal 4 0 100.000 100.000 100.000 100.000 2 ms

Google 115.000 m² Datacenter @ Iowa



Datacenter @ Ministry of Education

AUThs' Central Datacenters at NOC: economies of scale at the University level

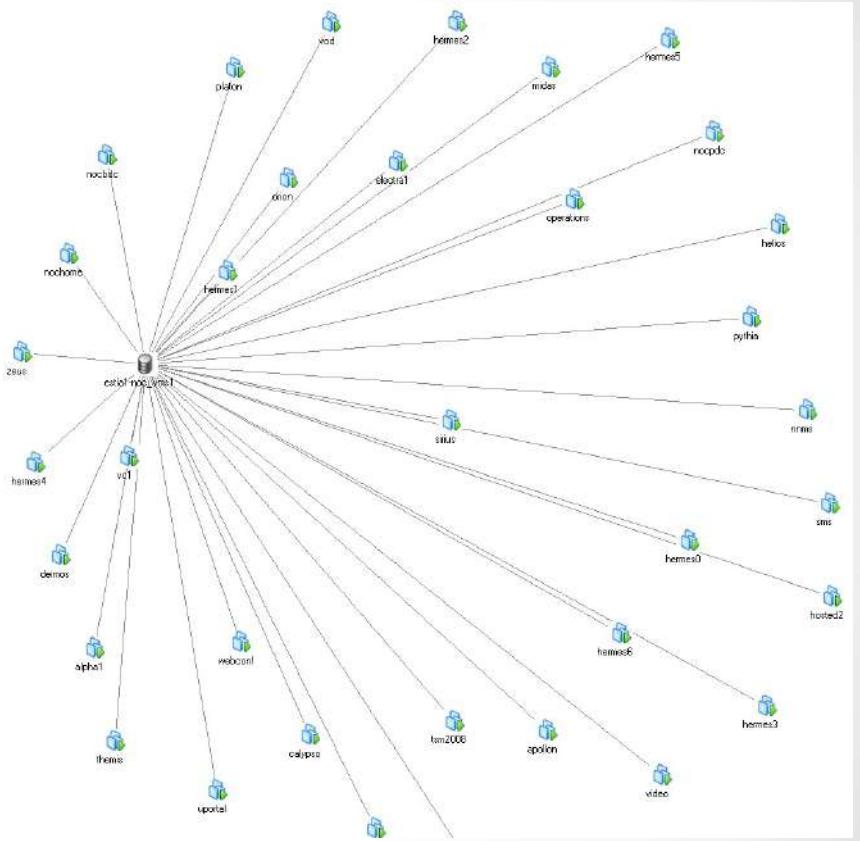
- Strategy
- Infrastructures
- Blade servers
- Network Attached Storage (NAS)
- Virtualization

Strategic issues

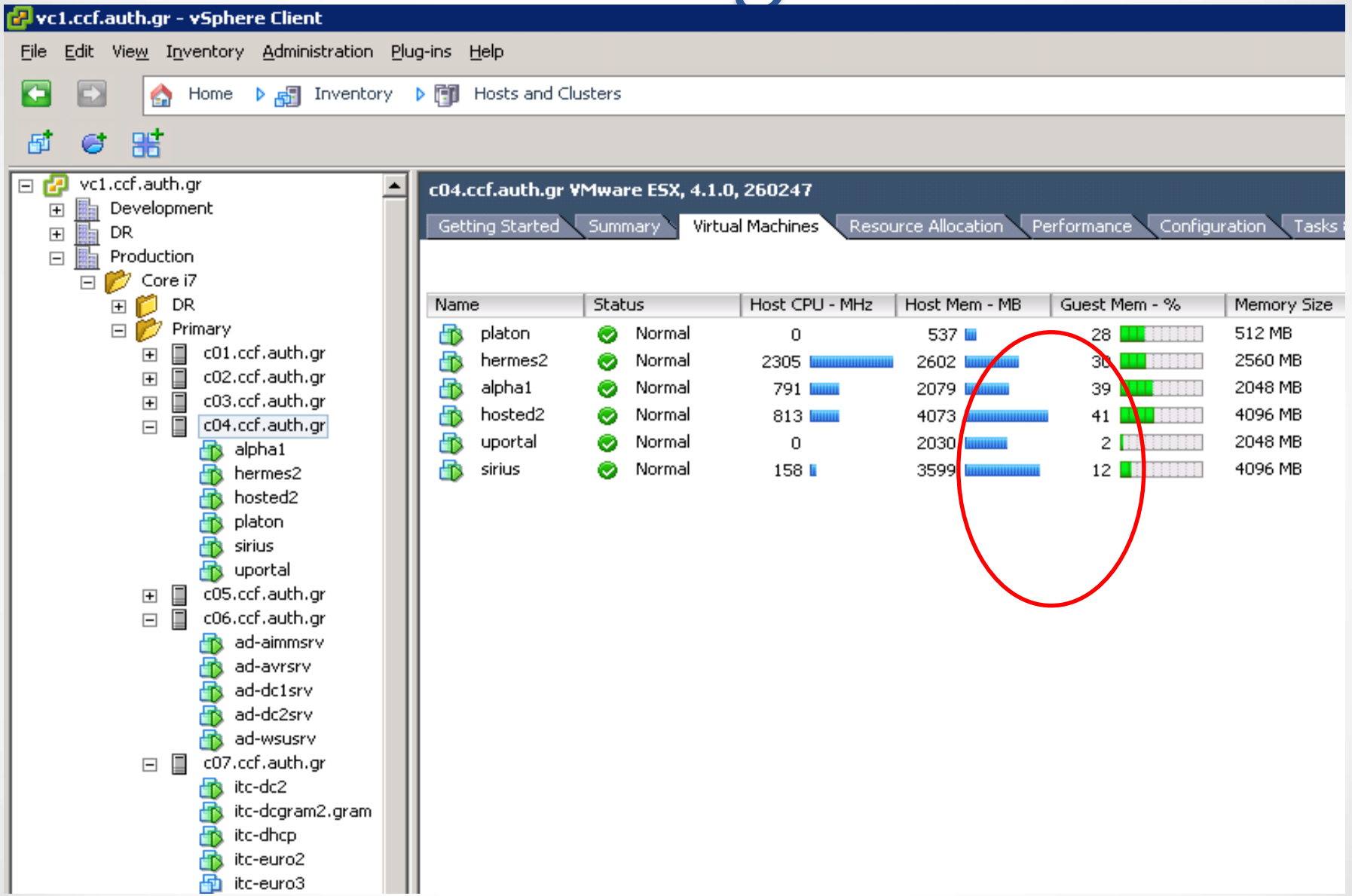
- Data protection
  - Central repository (storage consolidation)
  - Synchronization between two points (replication)
- Protection from hardware failures
  - Protection from faults in HW (servers + disks)
  - Live virtual machine migration
- Optimum resource exploitation
  - processor, memory, storage, network
  - Dynamic management
  - Easy allocation
- Economies of scale

Virtualization implementation

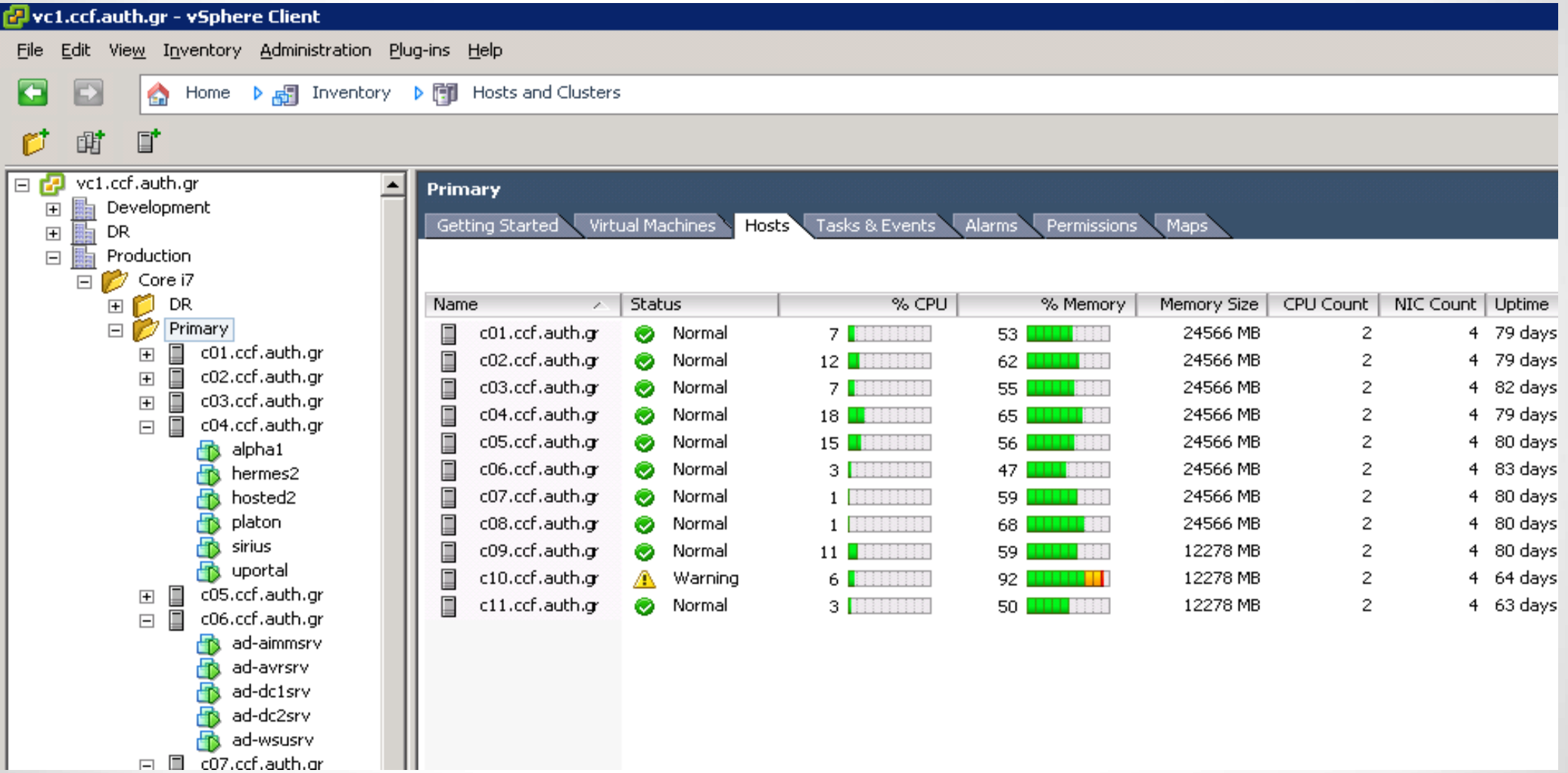
- 2006 – first try of «virtual servers» through vServers
- 2009 – after trials and comparison, the VMware commercial solution is adopted
- 2011- 30+1 hosts host 103 VMs
- Enough “horse power’ to double VM population



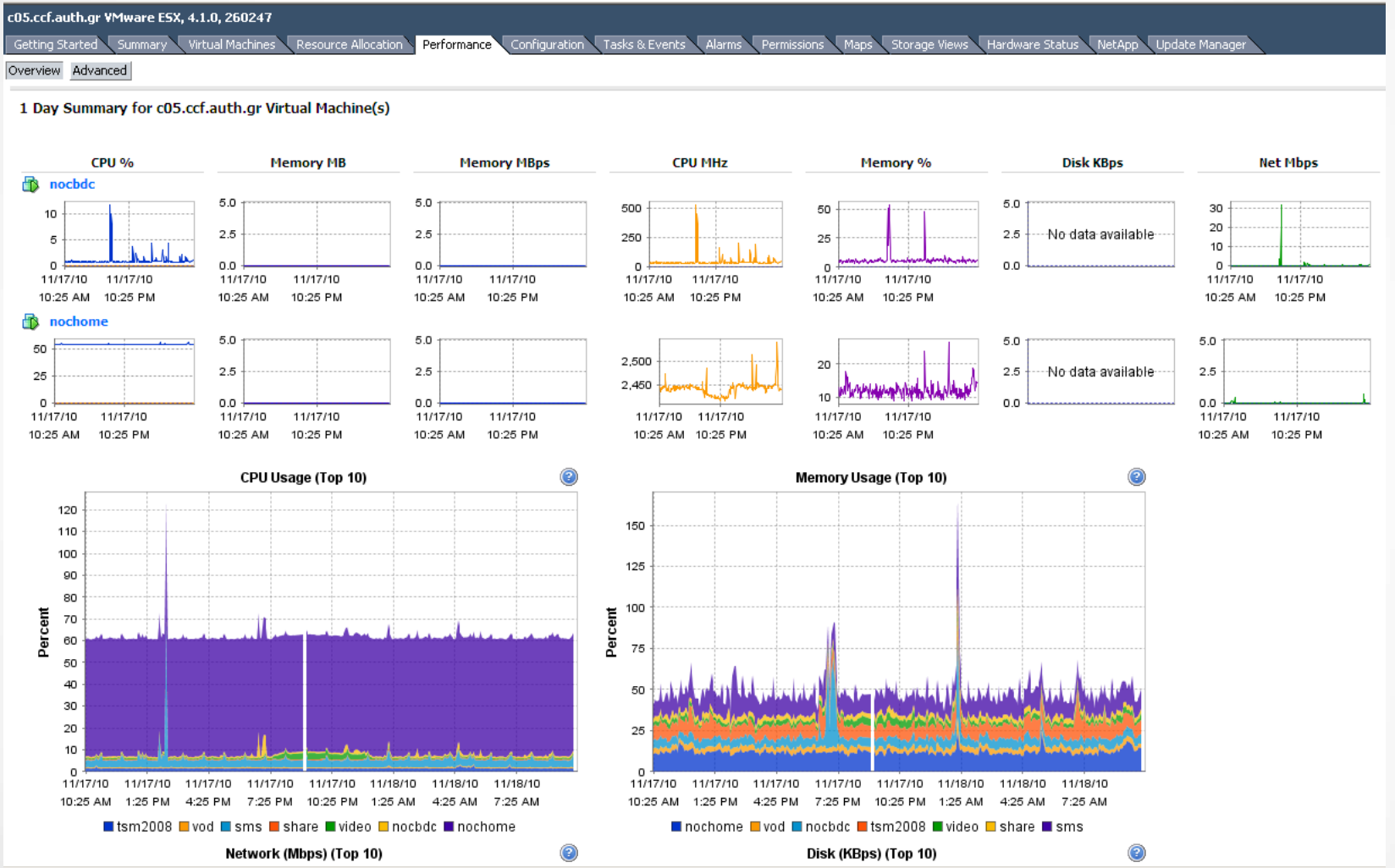
VM management



Host management



Resource monitoring



Virtualization advantages

- Make servers independent of specific hardware
- Live migration of a VM between blades
- Live resource addition (disks, memory, CPU)
- Flexibility in management
- Manager without need for physical access
- Survival from catastrophes and failures (business continuity)
- Centralized mechanism to make backup copies
  - snapshots of whole VMs are taken easily
- Centralized monitoring of state («health») of VMs

NOC Services (indicative)

- Electronic mail (e-mail)
- Personal Online Storage – Personal Webpages
- Wireless Access (Wi-Fi)
- Access to electronic resources (eduroam)
- Detailed description of services : http://noc.auth.gr/services
- Detailed service usage instructions : http://noc.auth.gr/manuals

Landscape of services

Personal

User authentication is required in order to access services:

NOC, ITC, University Library, Secretariats, other Service Providers

Network Access

Connection to AUThnet

- Wired
- Wireless
- Through a secure channel

Web services

Website development

AUTh and NOC

Infrastructure for website hosting

Other AUTh units

Interfaces development

Press news, tele-education

Directory services, e-university

Voice and Video

Cooperative activities

- telephony
- Video transmissions
- teleconference

Personal

Services available to all members of AUTh after user authentication

- mail - antispam - antivirus
- Web pages + personal data storage
- digital certificates
- login.auth.gr – access to services without password exposure (through Single Sign On - SSO)

Web services

Web services address users inside or outside AUTh

- Websites for NOC and AUTh
- Interface for institutional user account
- Application for press news press.auth.gr
- Web site hosting for units and users (plesk)
- Application for electronic lessons (eclass)
- Search engines and point maps
- webmail.auth.gr server

Voice and video services

Services that support activities and meeting live

- web conferencing
- video - lecture streaming
- voice over IP
- instant messaging

Special Services

- Queries from AUTh units to the University Catalog (ΠΥΚΑ)
  - Access to AUTh members' data
- (e-mailing lists)
  - members of collaboration teams exchange email
- mass-mail tool
  - Massive e-mail delivery to all users, or special interest groups. Recipients addresses are pooled dynamically from user management platform
- Proxy services
  - Accelerated access to web pages through web proxy
- Quarantine of virus infected computers
  - special VLAN for communication through quarantine server
- Computer time synchronization (clock.auth.gr)

Middleware

Infrastructure service, supporting production services

- Computer naming-addressing (DNS-DHCP)
  - Assignment of IP address and FQDN to computers at AUTh
- University Catalogue (ΠΥΚΑ)
  - Data base containing data for AUTh members
- User management platform (uManage)
  - Handling of institutional user accounts at AUTh
- Directory Services (LDAP)
  - Serves queries from all production services for user data
- Authentication Authorization Accounting (RADIUS AAA)
  - User access and rights control for core υπηρεσίες
- Authentication Authorization Infrastructure (AAI)
  - Access control especially for web services

User Management

uManage – software developed in-house to facilitate management of user accounts at AUTh

Consists of :

- Websites for users
  - register.auth.gr
    - Automated registration using one-time password
  - accounts.auth.gr
    - Management of account's settings and services
- Website for administrators
  - umanage.ccf.auth.gr
    - Creation, renewal, expiration, locking, check for proper functionality of user accounts
- backend
  - database, sql procedures-triggers, soap web interfaces
  - scripts to update LDAP
  - cronjobs for account expiration and informational message sending

Directory Services

Offer info about users and services users are granted

- ΠΥΚΑ db
  - Connected to secretariat db + Personnel db
- Master LDAP
  - schema - attributes
- Slave LDAP redundant servers
- Queries for user data from:
  - NOC production services
  - Other AUTh units
  - User mailers and search tools

Access control AAA

Access control for production services

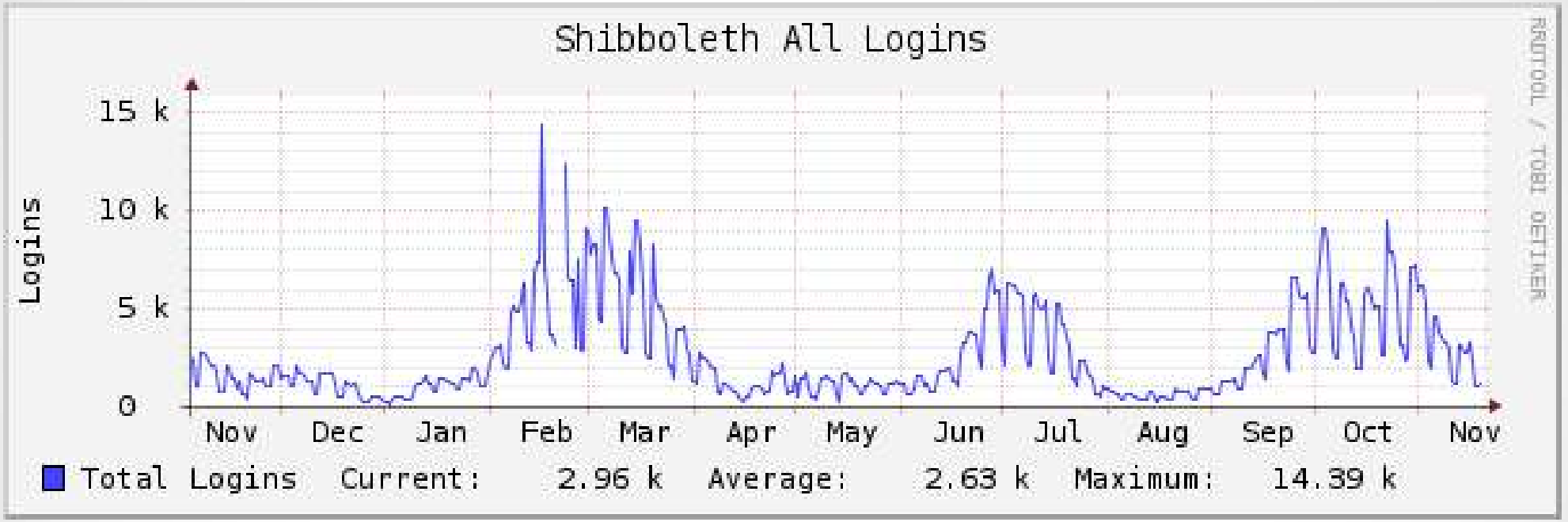
- Radius AAA – cooperates with core services wifi, wired, dialup, voip, vpn,
  - Authentication + Authorization from LDAP
  - Accounting to databases

Access control AAI

Access control for web services
using Authentication Authorization Infrastructure

- Identity provider
  - Single sign-on (PubCookie)
  - Identity Provider (Shibboleth)
- Service providers at AUTh and third parties
  - Federated service
  - User-controlled attribute release
    - Secretariat services, Technical Depts, HEAL-LINK, GRNET, GUNET

Cacti statistics



The Greek School Network (GSN)

@2014

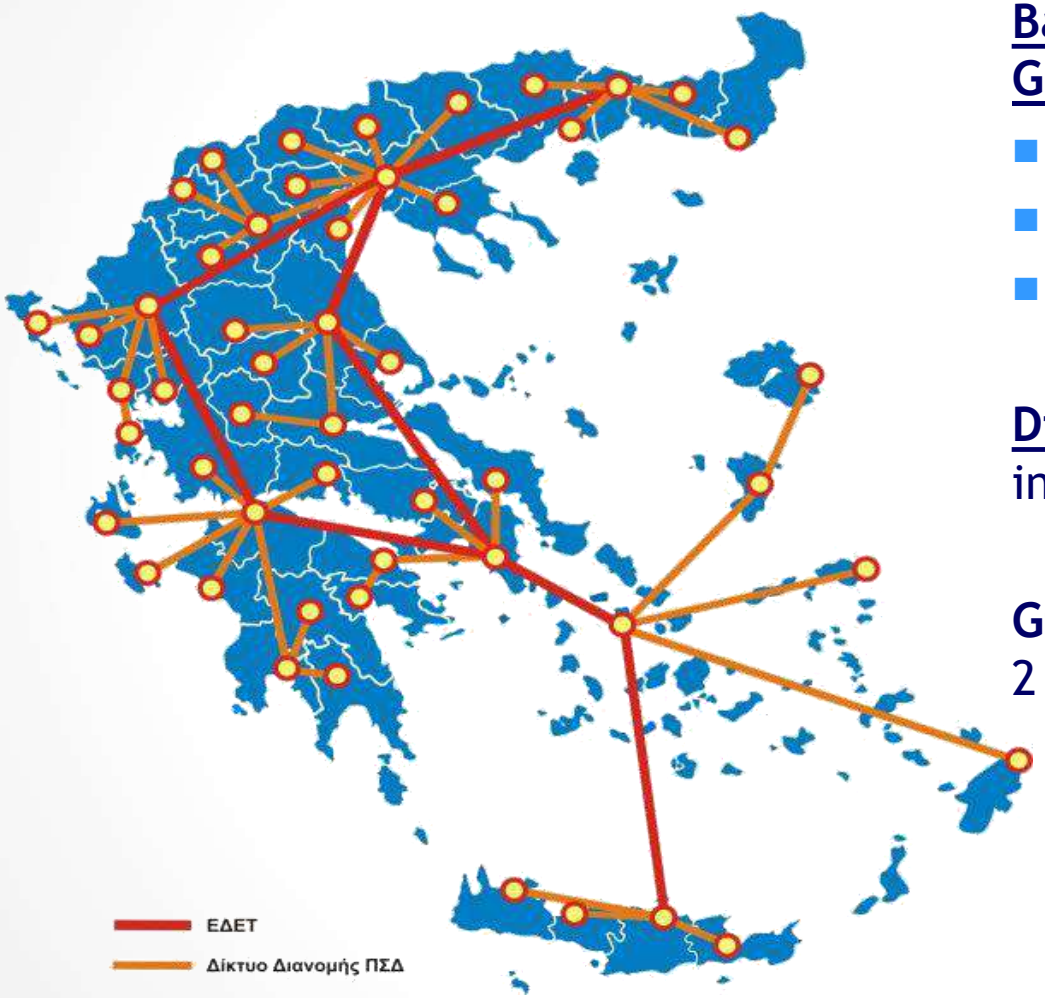
- Largest public network in Greece
- Connects more than **14.300 schools**, **3.400** educational units and libraries
- Closed educational intranet – student **safety** is a primary target.
- Value added network services for the education
- Based on open source development
- User support and training for the services GSN provides
- Network infrastructure complementary to GRNET
- **Broadband** access GSN is a central target

GSN operations

- **Part of ministry's strategic planning to introduce and utilize ICT in education**
- **Implemented by a cooperating human network:**
  - Ministry of education
  - 2 Research Centers, 9 Universities, 2 TEI
  - AUTH participates through NOC which is responsible for:
    - User helpdesk (at Thessaloniki, Pella, Serres)
    - Service Level Agreement (SLA) framework for ICT services
    - Computer Security Incident Response Team - CSIRT for the GSN
- **Best Practice at a national and international level**

Network backbone

@2014



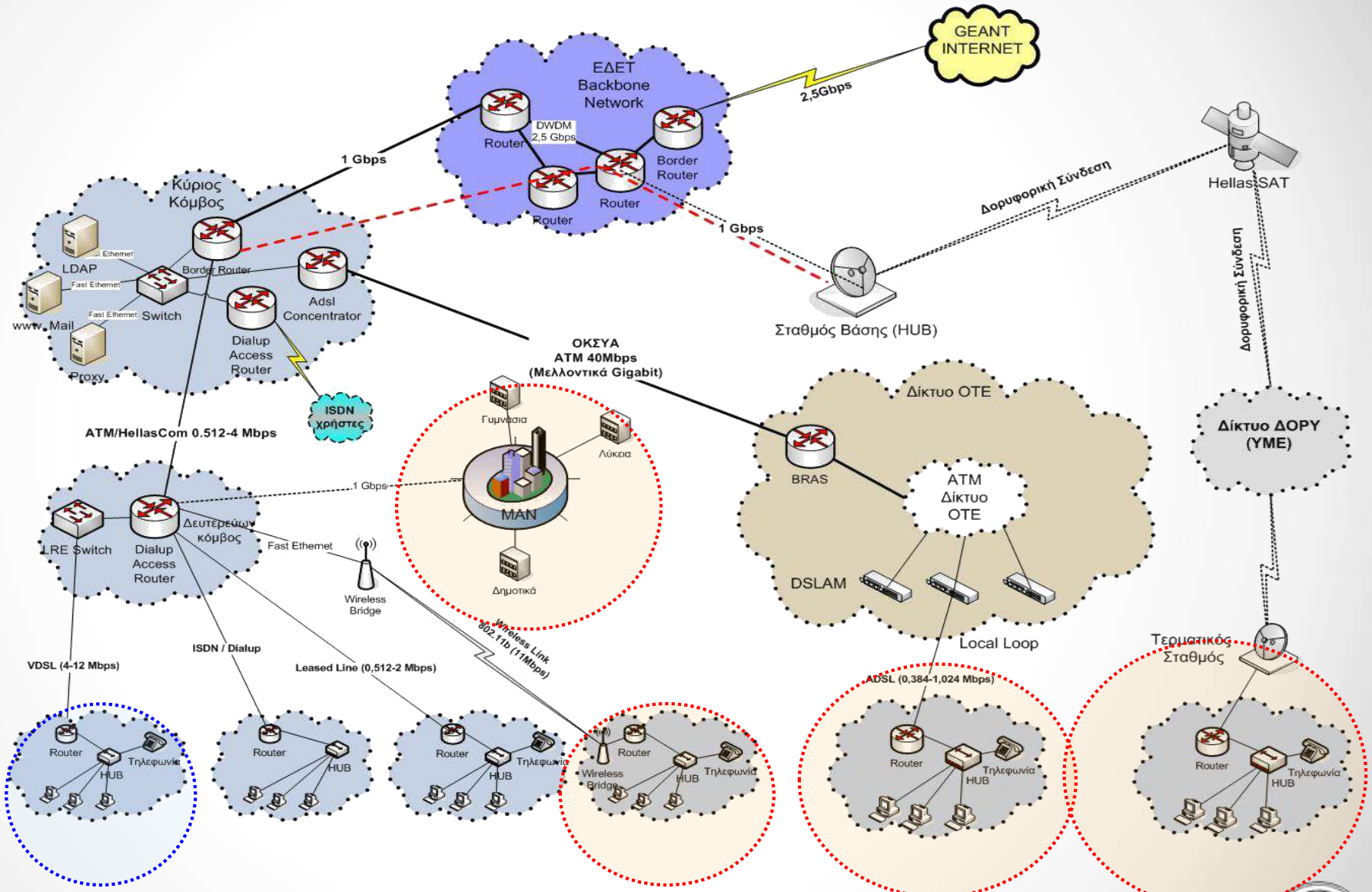
Backbone network provided by GRNET:

- very good collaboration
- complimentary operations
- minimizing OPEX

Distribution network : 51 nodes installed inside OTE premises

Gigabit interconnections to GRNET-2 in more than 10 major cities

GSN Network architecture



User helpdesk

- **Provides assistance to AUTh and GSN users**
  - Handles user requests and provides help to solve technical problems
  - Organizes briefings, collects, organizes and presents statistics for NOC services
  - Coordinates training activities and edits training material
  - Creates user manuals and provides information for NOC services (telephone and on counter at AUTh campus)

User helpdesk

- **Handles requests for:**
  - creation/renewal of user accounts
  - Connection/registration to the network for new and moving computers
  - Creation/update of e-mail aliases
  - Creation/update of computer CNAMEs
  - Hosting of webpages/websites at web.auth.gr
  - Connection/registration of new wireless infrastructure networks

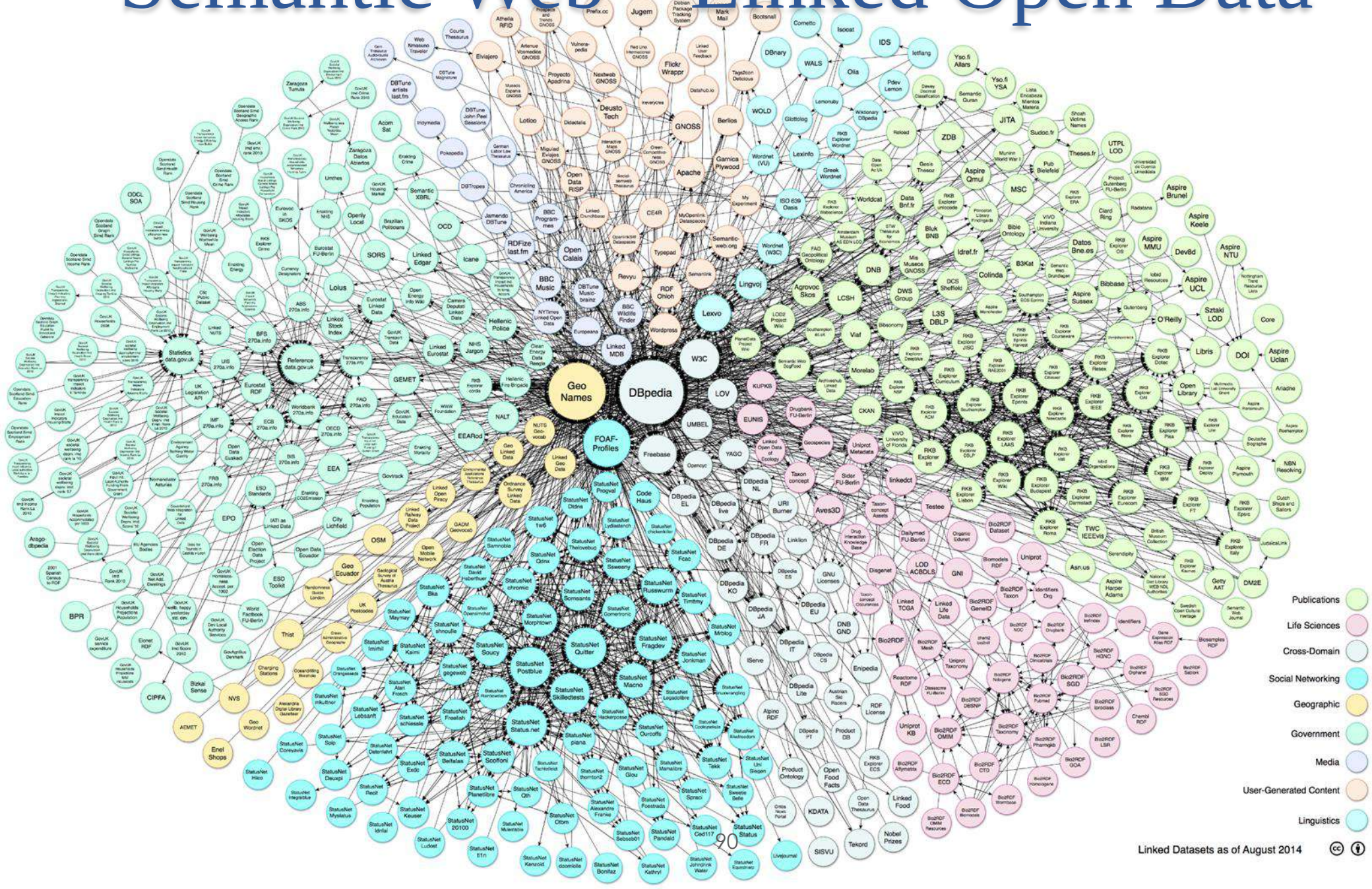
User helpdesk

- **Problem solving and technical assistance provision for:**
  - Acquisition of digital certificates and connection through the VPN service
  - Computer connections to the network (wired, wireless, dialup)
  - e-mail settings for lots of applications and operating systems
  - Settings for personal storage space
  - Settings for all e-services provided by NOC

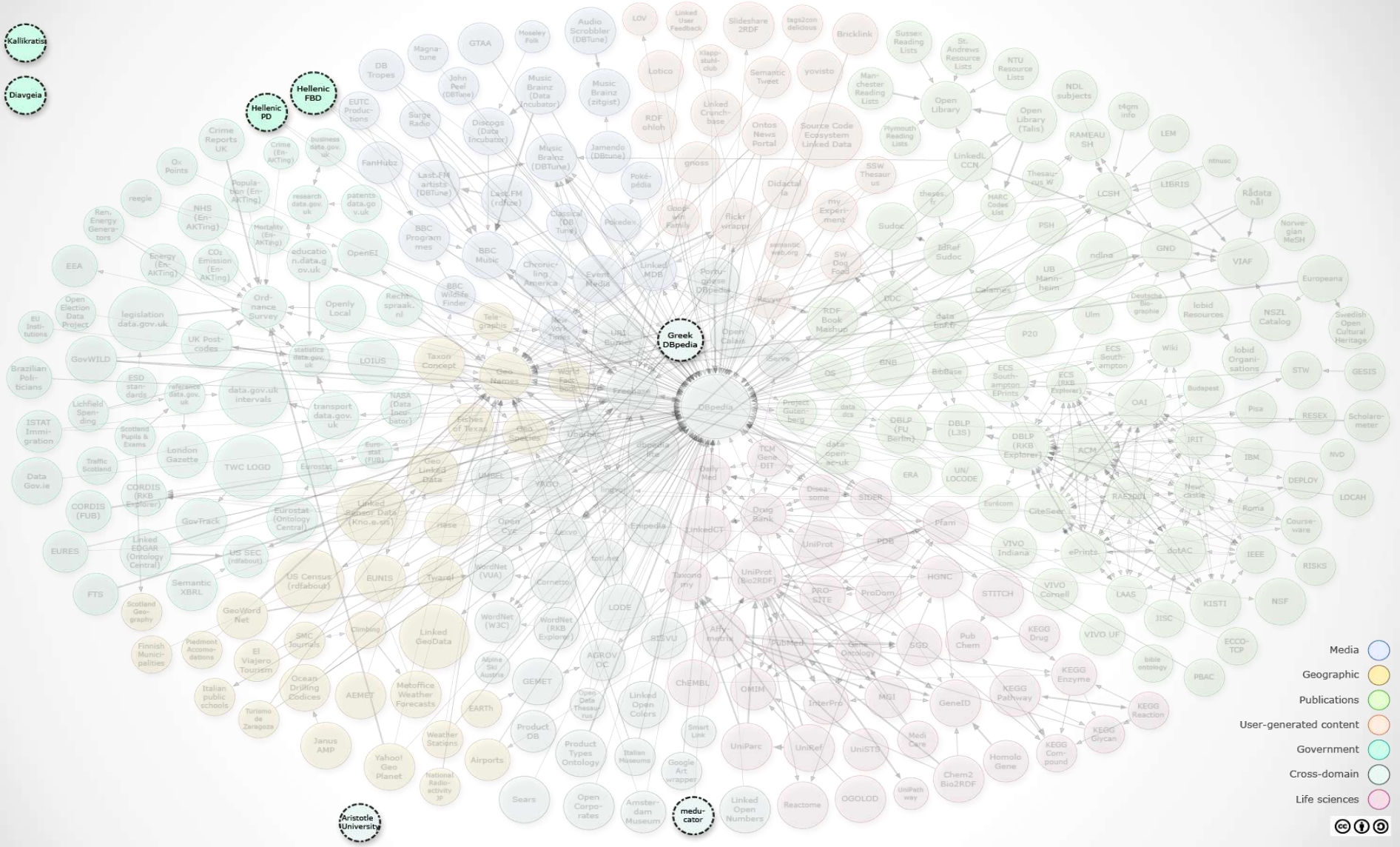
Helpdesk activities

- NOC helpdesk is in charge of **security incident handling** for computers connected to AUTHnet. It handles**:**
  - Complains involving computers from AUTh (including ‘home’ computers from ΔΙΟΔΟΣ)
  - Cases of illegal content distribution (copyrights violations)
  - Cases of virus infected computers that try to infect other computers on the Internet

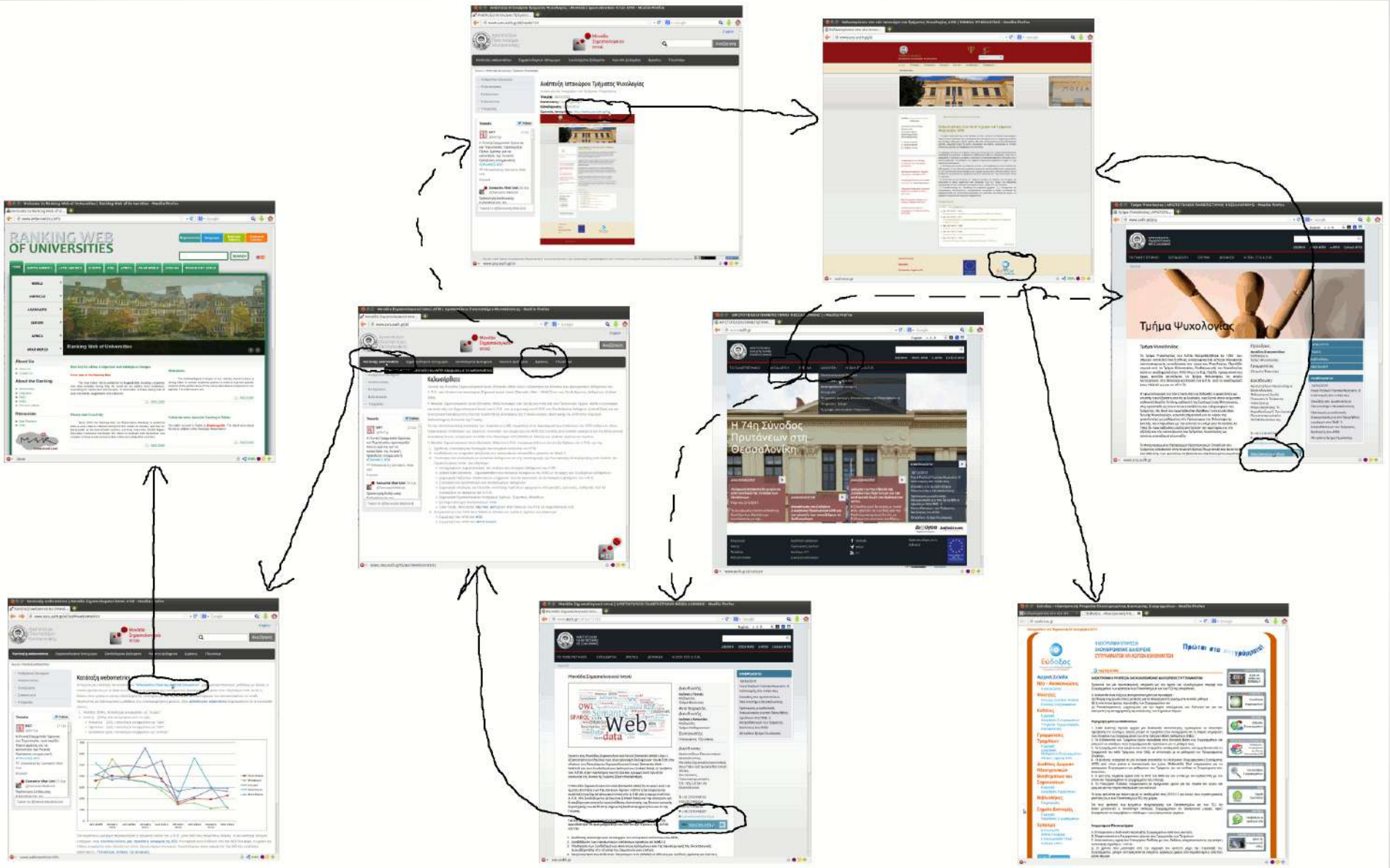
Semantic Web – Linked Open Data



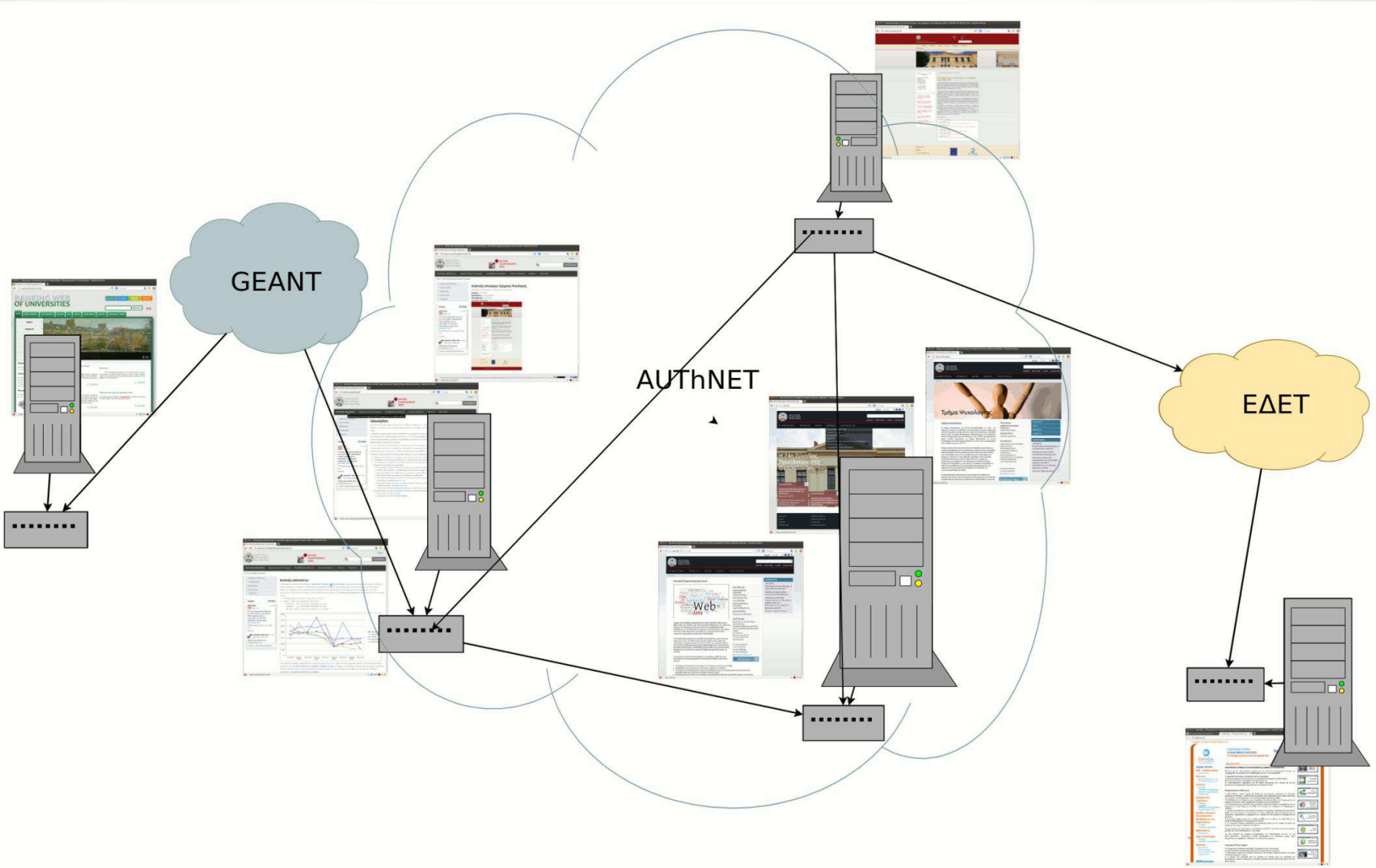
AUTh presence in Linked Open Data

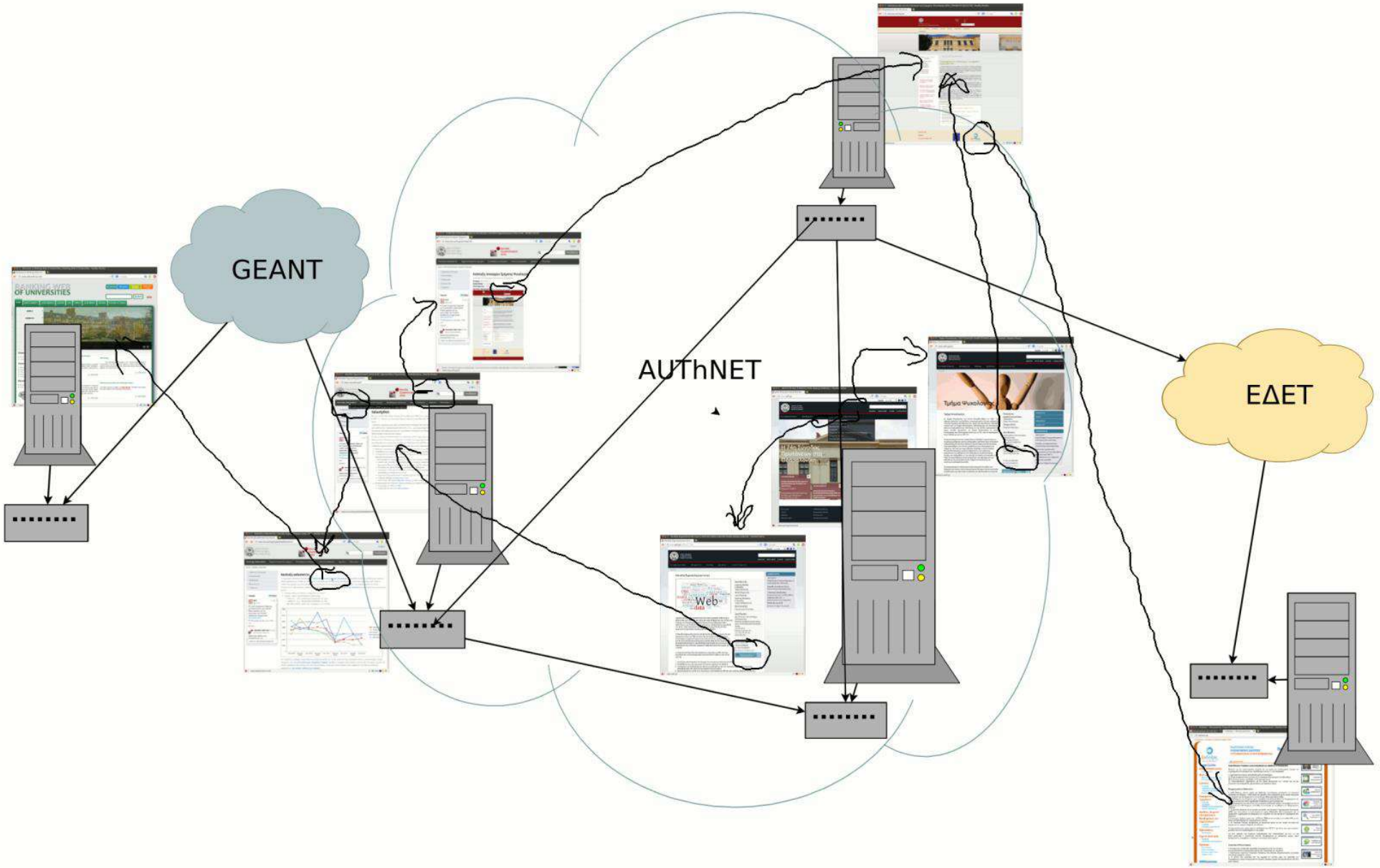


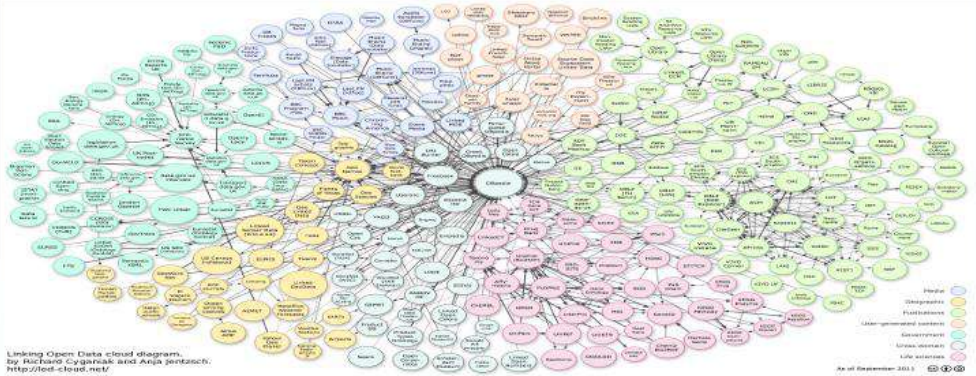
Web of Documents (Web1.0)



Υποκείμενες Υποδομές στο Web1.0




GEANT
AUThNET
ΕΔΕΤ
Web



Linked-ΑΠΘ

Η δράση Linked-ΑΠΘ (Linked-AUTh) αφορά στη δημοσιοποίηση των ανοιχτών δεδομένων του ΑΠΘ με τις αρχές των Συνδεμένων Δεδομένων. Εντάσσεται στο πλαίσιο της πρωτοβουλίας των Linked Universities όπου ήδη συμμετέχει το Α.Π.Θ. μεταξύ πολλών ευρωπαϊκών Πανεπιστήμιων, όπως το Southampton University, το Open University UK και το University of Münster που πρωταγωνιστούν στο χώρο των Συνδεδεμένων Δεδομένων παγκοσμίως.
Στόχος είναι η αξιοποίηση του πλούτου των ηλεκτρονικών δεδομένων του Α.Π.Θ., για την παρουσίαση, ανάδειξη, αλλά και εκμετάλλευση του ερευνητικού και εκπαιδευτικού έργου του ΑΠΘ. Για την υλοποίηση των παραπάνω η ΜΣΙ δημιουργεί ήδη την σημασιολογική υποδομή του Α.Π.Θ. ως απαραίτητο πλαίσιο εντός του παγκόσμιου Σημασιολογικού Ιστού (Semantic Web – Web3.0) και των Συνδεδεμένων Δεδομένων (Linked Data) του Διαδικτύου. Το όραμα του Linked-AUTh είναι, μέσω της σημασιολογικής περιγραφής και της διασύνδεσης των δεδομένων του ΑΠΘ, να δημιουργηθεί ένα έξυπνο ψηφιακό οικοσύστημα με πολλαπλά οφέλη για το Πανεπιστήμιο αλλά και για την κοινωνία. Στα οφέλη συμπεριλαμβάνονται:

- Διαφάνεια και κοινωνικός έλεγχος
- Συμμετοχή και αυτό-ενδυνάμωση
- Βελτιστοποίηση νέων προϊόντων και υπηρεσιών
- Ενθάρρυνση της καινοτομίας
- Βελτίωση της αποδοτικότητας και της αποτελεσματικότητας των υπηρεσιών
- Ενίσχυση των διαδικασιών εσωτερικής και εξωτερικής αξιολόγησης των ακαδημαϊκών μονάδων του Ιδρύματος
- Ανακάλυψη, συσσώρευση και αξιοποίηση νέας γνώσης από το συνδυασμό διαφορετικών πηγών σε μεγάλους όγκους δεδομένων.

Η δημοσιοποίηση των ανοικτών δεδομένων του Α.Π.Θ ως Διασυνδεδεμένα Ανοικτά Δεδομένα δίνει

Αναζήτηση Δημοσιεύσεων
Αναζήτηση Ερευνητικών Έργων
Αναζήτηση Υποτροφιών

ΗΜΕΡΟΛΟΓΙΟ

06/12/2013
Food Festival Yummy Museums: Ο πολιτισμός στο πιάτο σας

Διεθνές Συνέδριο με τίτλο: «Ο Μ. Κωνσταντίνος και η εποχή του. 1700 χρόνια από το διάταγμα των Μεδιολάνων»

Πρόχειρος δημόσιος μειοδοτικός διαγωνισμός «Προμήθεια υλικών για έκδοση πιστοποιητικών περιοδικού ελέγχου 2 ανελκυστήρων Κτιρίου Διοίκησης Α.Π.Θ.»

Πρόσκληση Εκδήλωσης Ενδιαφέροντος για την παροχή υπηρεσίας με τίτλο «Επισκευή αντλίας in-line WILO IP 100/160 στη γραμμή τηλεθέρμανσης της Θεολογικής Σχολής και κυκλοφορητή Grundfos 65-180F στο θερμικό υποσταθμό της επέκτασης της Φιλοσοφικής Σχολής»

Επιστημονικές Δημοσιεύσεις

Έτος

Τίτλος

Όνομα Μέσου Δημοσίευσης (Περιοδικού / Συνεδρίου)

Search

Έτος: 2013
Τίτλος: Mathematical and Numerical Aspects of the Adaptive Fast Multipole Poisson-Boltzmann Solver
Όνομα περιοδικού: COMMUNICATIONS IN COMPUTATIONAL PHYSICS
Συγγραφείς:
Bo Zhang http://www.auth.gr/resource/people/BoZhang
Benzhuo Lu http://www.auth.gr/resource/people/BenzhuoLu

Έτος: 2013
Τίτλος: Preparation and characterization of composite sodium caseinate edible films incorporating naturally emulsified oil bodies
Όνομα περιοδικού: FOOD HYDROCOLLOIDS
Συγγραφείς:
Anthia Matsakidou http://www.auth.gr/resource/people/AnthiaMatsakidou
Costas G. Biliaderis http://www.auth.gr/resource/people/CostasGBiliaderis

Έτος: 2013
Τίτλος: Acid-induced gelation of aqueous WPI-CMC solutions: Effect on orange oil aroma compounds retention
Όνομα περιοδικού: FOOD HYDROCOLLOIDS
Συγγραφείς:
A. Paraskevopoulou http://www.auth.gr/resource/people/AParaskevopoulou
E. Triqa http://www.auth.gr/resource/people/ETriqa

ΗΜΕΡΟΛΟΓΙΟ

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→ Ανθρώπινο δυναμικό
→ Ανακοινώσεις
→ Εκδηλώσεις
→ Επικοινωνία
→ Υπηρεσίες

Συνδεδεμένα Δεδομένα
→ Χρήστες
→ Σχολές & Τμήματα
→ Εκδηλώσεις
→ Προσβασιμότητα & Υπηρεσίες Μεταφοράς
→ Δημοσιεύσεις
→ Ερευνητικά Έργα
→ Υποτροφίες

Επιστημονικές Δημοσιεύσεις

Τα σύνολα δεδομένων για τις επιστημονικές δημοσιεύσεις προέρχονται από διάφορες πηγές και αφορούν σε επιστημονικές δημοσιεύσεις μελών του Α.Π.Θ.

Η αναπαράστασή τους έχει γίνει με βάση τις οντολογίες Dublin Core, Foaf και bibo.

Τα Συνδεδεμένα Δεδομένα των δημοσιεύσεων είναι διαθέσιμα στο SPARQL Endpoint του Linked Data Server της Μονάδας Σημασιολογικού Ιστού Α.Π.Θ.

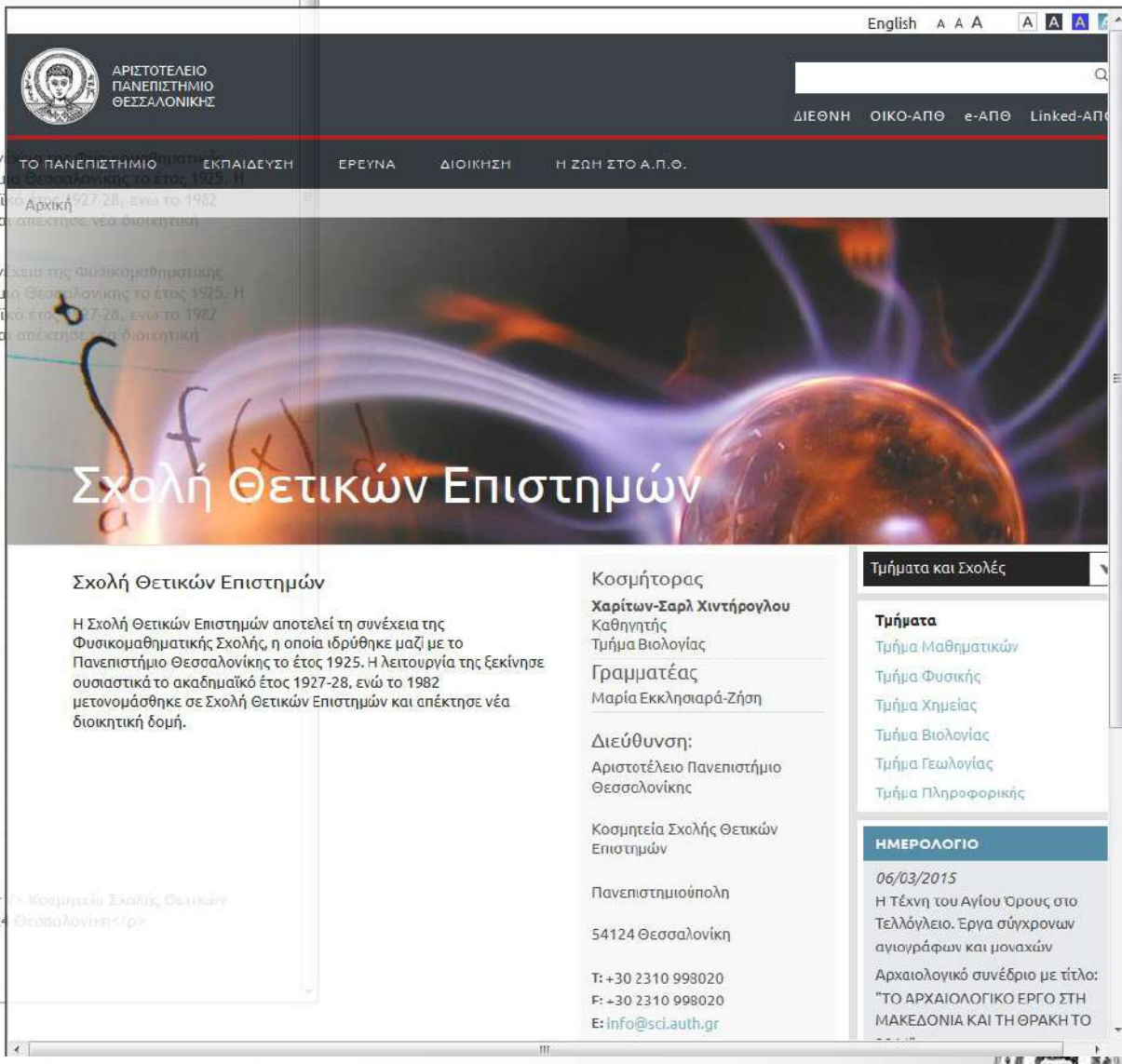
Παράδειγμα αναζήτησης:

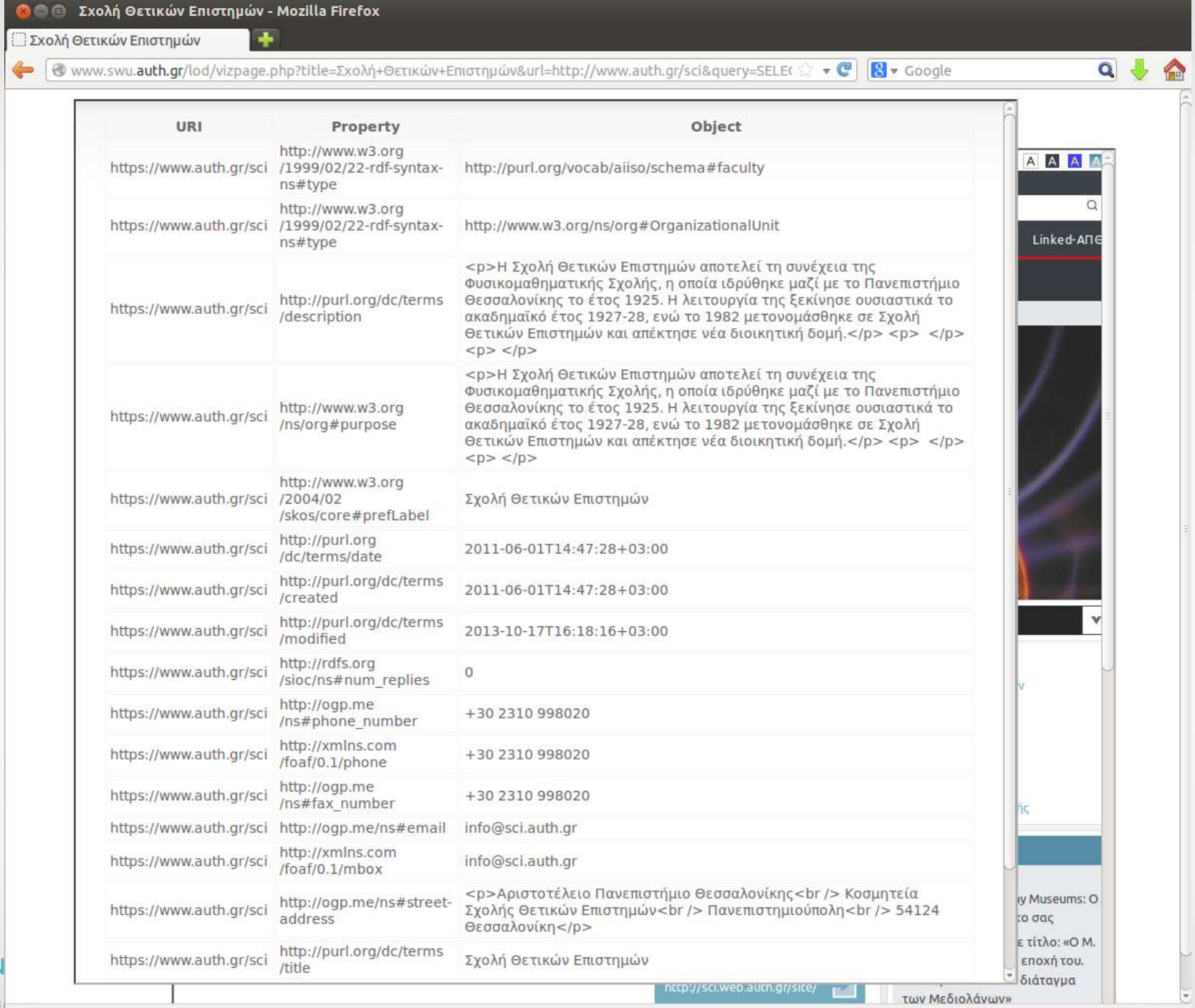
- Αναζήτηση τίτλου και όλων των συγγραφέων επιστημονικών δημοσιεύσεων που έχουν δημοσιευτεί στο περιοδικό *Discrete Dynamics in Nature and Society. An International Multidisciplinary Research and Review Journal* με συγγραφείς τουλάχιστον τους *I. Antoniou* και *I. Prigogine*.

```
prefix bibo: <http://purl.org/ontology/bibo/>
prefix dcterms: <http://purl.org/dc/terms/>
select ?title ?authors {
?author1 a foaf:Person ;
foaf:givenName "I." ;
foaf:familyName "Antoniou" .
?author2 a foaf:Person ;
foaf:givenName "I." ;
foaf:familyName "Prigogine" .
?jour a bibo:Journal ;
dcterms:title "Discrete Dynamics in Nature and Society. An International Multidisciplinary Research and Review Journal" .
?paper dcterms:title ?title ;
dcterms:isPartOf ?jour ;
dcterms:creator ?author1 ;
dcterms:creator ?author2 ;
dcterms:creator ?authors .
}
```

Εκτέλεση του ερωτήματος.

URI	Property	Object
https://auth.gr/sci	http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://purl.org/vocab/aiiso/schema#faculty
https://auth.gr/sci	http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.w3.org/ns/org#OrganizationalUnit
https://auth.gr/sci	http://purl.org/dc/terms/description	Η Σχολή Θετικών Επιστημών αποτελεί τη συν Σχολής, η οποία ιδρύθηκε μαζί με το Πανεπιστήμ λειτουργία της ξεκίνησε ουσιαστικά το ακαδημαϊ μετονομάσθηκε σε Σχολή Θετικών Επιστημών κα δομή.
https://auth.gr/sci	http://www.w3.org/ns/org#purpose	Η Σχολή Θετικών Επιστημών αποτελεί τη συν Σχολής, η οποία ιδρύθηκε μαζί με το Πανεπιστήμ λειτουργία της ξεκίνησε ουσιαστικά το ακαδημαϊ μετονομάσθηκε σε Σχολή Θετικών Επιστημών κα δομή.
https://auth.gr/sci	http://www.w3.org/2004/02/skos/core#prefLabel	Σχολή Θετικών Επιστημών
https://auth.gr/sci	http://purl.org/dc/terms/date	2011-06-01T14:47:28+03:00
https://auth.gr/sci	http://purl.org/dc/terms/created	2011-06-01T14:47:28+03:00
https://auth.gr/sci	http://purl.org/dc/terms/modified	2013-10-17T16:18:16+03:00
https://auth.gr/sci	http://rdfs.org/sioc/ns#num_replies	0
https://auth.gr/sci	http://ogp.me/ns#phone_number	+30 2310 998020
https://auth.gr/sci	http://xmlns.com/foaf/0.1/phone	+30 2310 998020
https://auth.gr/sci	http://ogp.me/ns#fax_number	+30 2310 998020
https://auth.gr/sci	http://ogp.me/ns#email	info@sci.auth.gr
https://auth.gr/sci	http://xmlns.com/foaf/0.1/mbox	info@sci.auth.gr
https://auth.gr/sci	http://ogp.me/ns#street-address	Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης Επιστημών Πανεπιστημιούπολη 5412
https://auth.gr/sci	http://purl.org/dc/terms/title	Σχολή Θετικών Επιστημών





URI	Property	Object
https://www.auth.gr/sci	http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://purl.org/vocab/aiiso/schema#faculty
https://www.auth.gr/sci	http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.w3.org/ns/org#OrganizationalUnit
https://www.auth.gr/sci	http://purl.org/dc/terms/description	Η Σχολή Θετικών Επιστημών αποτελεί τη συνέχεια της Φυσικομαθηματικής Σχολής, η οποία ιδρύθηκε μαζί με το Πανεπιστήμιο Θεσσαλονίκης το έτος 1925. Η λειτουργία της ξεκίνησε ουσιαστικά το ακαδημαϊκό έτος 1927-28, ενώ το 1982 μετονομάσθηκε σε Σχολή Θετικών Επιστημών και απέκτησε νέα διοικητική δομή.
https://www.auth.gr/sci	http://www.w3.org/ns/org#purpose	Η Σχολή Θετικών Επιστημών αποτελεί τη συνέχεια της Φυσικομαθηματικής Σχολής, η οποία ιδρύθηκε μαζί με το Πανεπιστήμιο Θεσσαλονίκης το έτος 1925. Η λειτουργία της ξεκίνησε ουσιαστικά το ακαδημαϊκό έτος 1927-28, ενώ το 1982 μετονομάσθηκε σε Σχολή Θετικών Επιστημών και απέκτησε νέα διοικητική δομή.
https://www.auth.gr/sci	http://www.w3.org/2004/02/skos/core#prefLabel	Σχολή Θετικών Επιστημών
https://www.auth.gr/sci	http://purl.org/dc/terms/date	2011-06-01T14:47:28+03:00
https://www.auth.gr/sci	http://purl.org/dc/terms/created	2011-06-01T14:47:28+03:00
https://www.auth.gr/sci	http://purl.org/dc/terms/modified	2013-10-17T16:18:16+03:00
https://www.auth.gr/sci	http://rdfs.org/sioc/ns#num_replies	0
https://www.auth.gr/sci	http://ogp.me/ns#phone_number	+30 2310 998020
https://www.auth.gr/sci	http://xmlns.com/foaf/0.1/phone	+30 2310 998020
https://www.auth.gr/sci	http://ogp.me/ns#fax_number	+30 2310 998020
https://www.auth.gr/sci	http://ogp.me/ns#email	info@sci.auth.gr
https://www.auth.gr/sci	http://xmlns.com/foaf/0.1/mbox	info@sci.auth.gr
https://www.auth.gr/sci	http://ogp.me/ns#street-address	Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης Κοσμητεία Σχολής Θετικών Επιστημών Πανεπιστημιούπολη 54124 Θεσσαλονίκη
https://www.auth.gr/sci	http://purl.org/dc/terms/title	Σχολή Θετικών Επιστημών

Relevant Movies!

Lo and Behold, Reveries of the Connected World (2016) http://www.imdb.com/title/tt5275828/

The Circle (2017) http://www.imdb.com/title/tt4287320/

Zero Days (2016) http://www.imdb.com/title/tt5446858/

Banking on Bitcoin (2016) http://www.imdb.com/title/tt5033790/

Deep Web (2015) http://www.imdb.com/title/tt3312868/

Trust Machine: The Story of Blockchain (2018) https://www.imdb.com/title/tt7407496/

Bonus tracks :

http://www.matrix24.gr/2018/03/kalifornia-epiase-doulia-se-fastfountadiko-to-proto-rompot-psistis/

The X-Files S11E07 Story Line: In a world of ever-increasing automation and artificial intelligence, Mulder and Scully find themselves targets in a deadly game of cat-and-mouse.
https://www.imdb.com/title/tt6803124/?ref_=ttep_ep7

Exercise 1: Separate reality from sci-fi....

Ερωτήσεις & Απαντήσεις