SERVICE PLATFORM FOR E-SCIENCE PLATON

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Advanced Service Platform for e-Science

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(PSNC PL)

INNOVATIVE ECONOMY
NATIONAL COHESION STRATEGY

POZNAN

European Union
European Regional Development Fund

Project nr. POIG.02.03.00-00-028/08

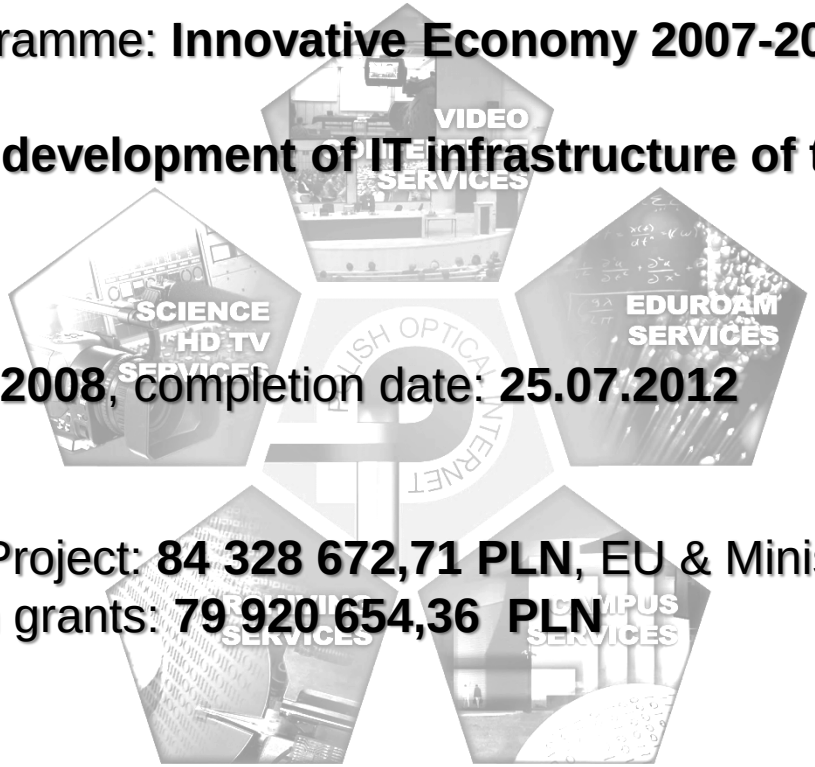
GRANTS FOR INNOVATION

Project co-financed by the European Union under the European Regional Development Fund

„PLATON – Service Platform for e-Science”

- ✓ Operational Programme: **Innovative Economy 2007-2013**

  Investments in development of IT infrastructure of the science



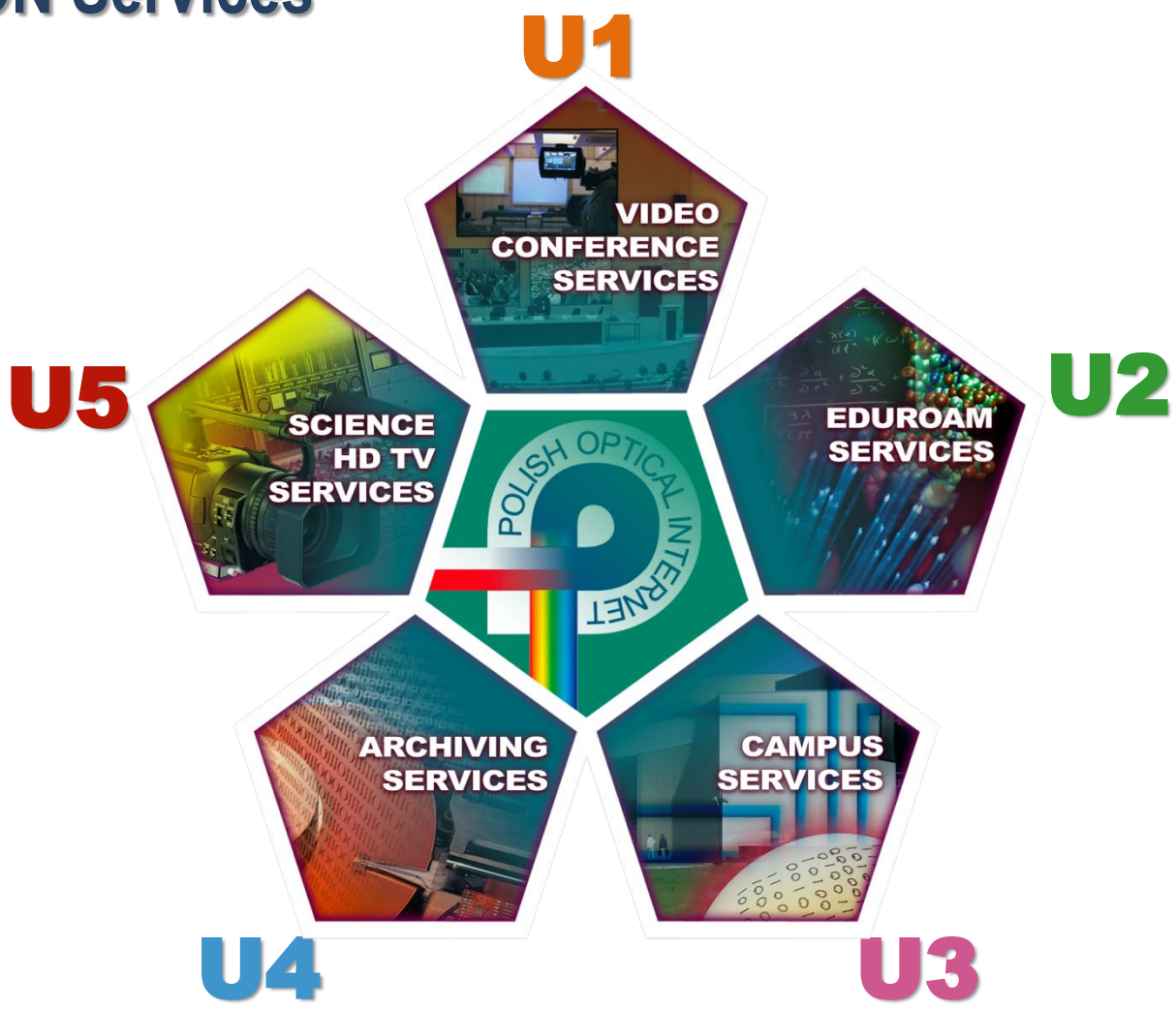
- ✓ Start date: **01.07.2008**, completion date: **25.07.2012**

- ✓ Total cost of the Project: **84 328 672,71 PLN**, EU & Ministry of Science and Higher Education grants: **79 920 654,36 PLN**

Partners:

1. Institute of Bioorganic Chemistry of the Polish Academy of Science – Poznań Supercomputing and Networking Center
2. University of Technology and Life Sciences in Bydgoszcz
3. AGH University of Science and Technology – Academic Computer Centre CYFRONET
4. Institute of Soil Science and Plant Cultivation – State Research Institute
5. Maria Curie – Skłodowska University in Lublin LUBMAN UMCS
6. Bialystok University of Technology
7. Czestochowa University of Technology
8. Gdansk University of Technology Academic Computer Centre TASK
9. Koszalin University of Technology
10. Technical University of Lodz
11. Technical University of Radom
12. Rzeszow University of Technology
13. West Pomeranian University of Technology Szczecin
14. Silesian University of Technology – Computer Centre
15. Kielce University of Technology
16. Wrocław University of Technology
17. Nicolaus Copernicus University
18. Opole University
19. University of Warmia and Mazury in Olsztyn
20. University of Warsaw – Interdisciplinary Centre for Mathematical and Computational Modelling
21. University of Zielona Góra
22. NASK Research and Academic Computer Network

PLATON Services



Roles in the PLATON project

Project Coordinator
IBCh PAS PSNC

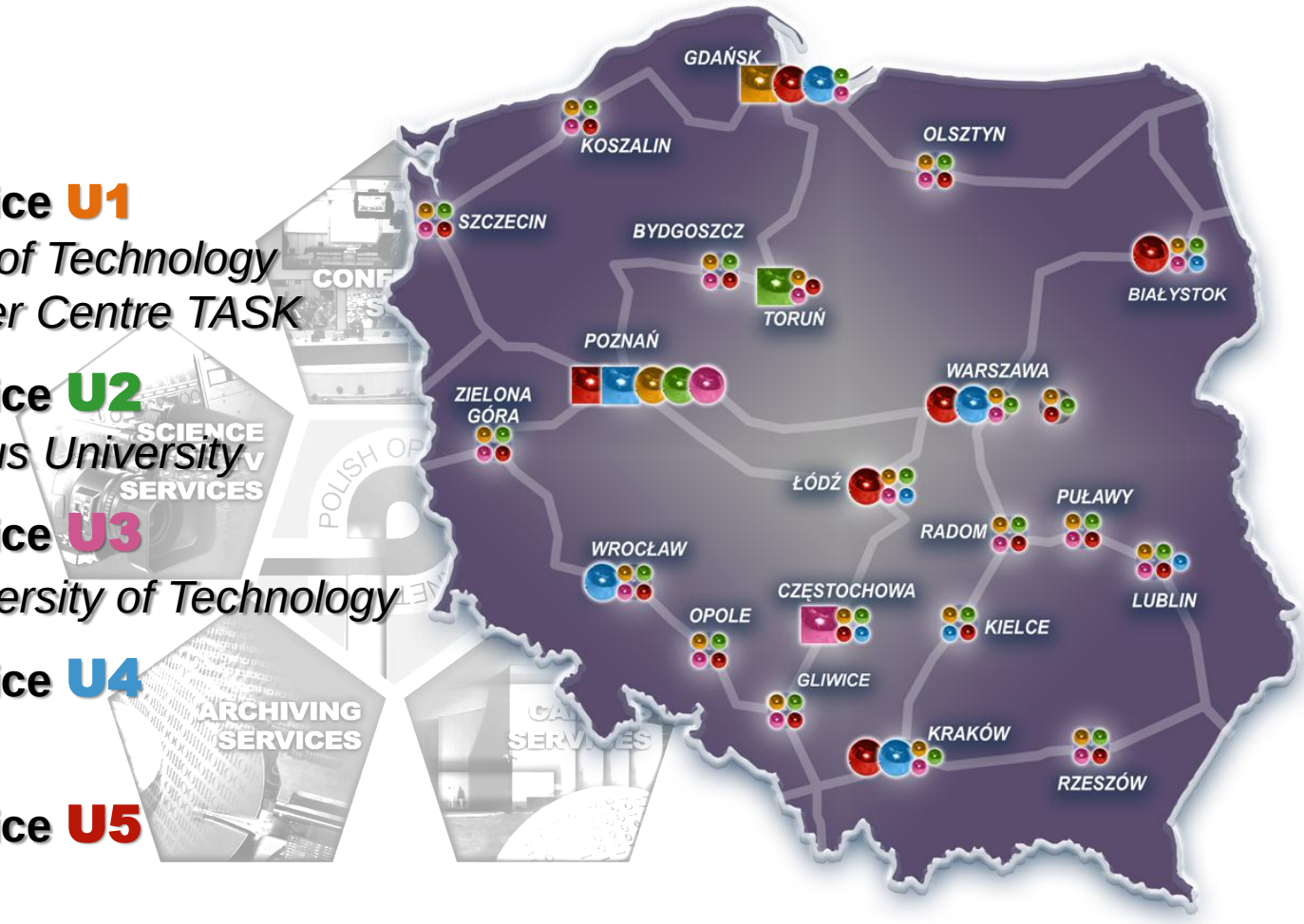
Coordinator of Service U1
Gdansk University of Technology
Academic Computer Centre TASK

Coordinator of Service U2
Nicolaus Copernicus University

Coordinator of Service U3
Czestochowa University of Technology

Coordinator of Service U4
IBCh PAS PSNC

Coordinator of Service U5
IBCh PAS PSNC

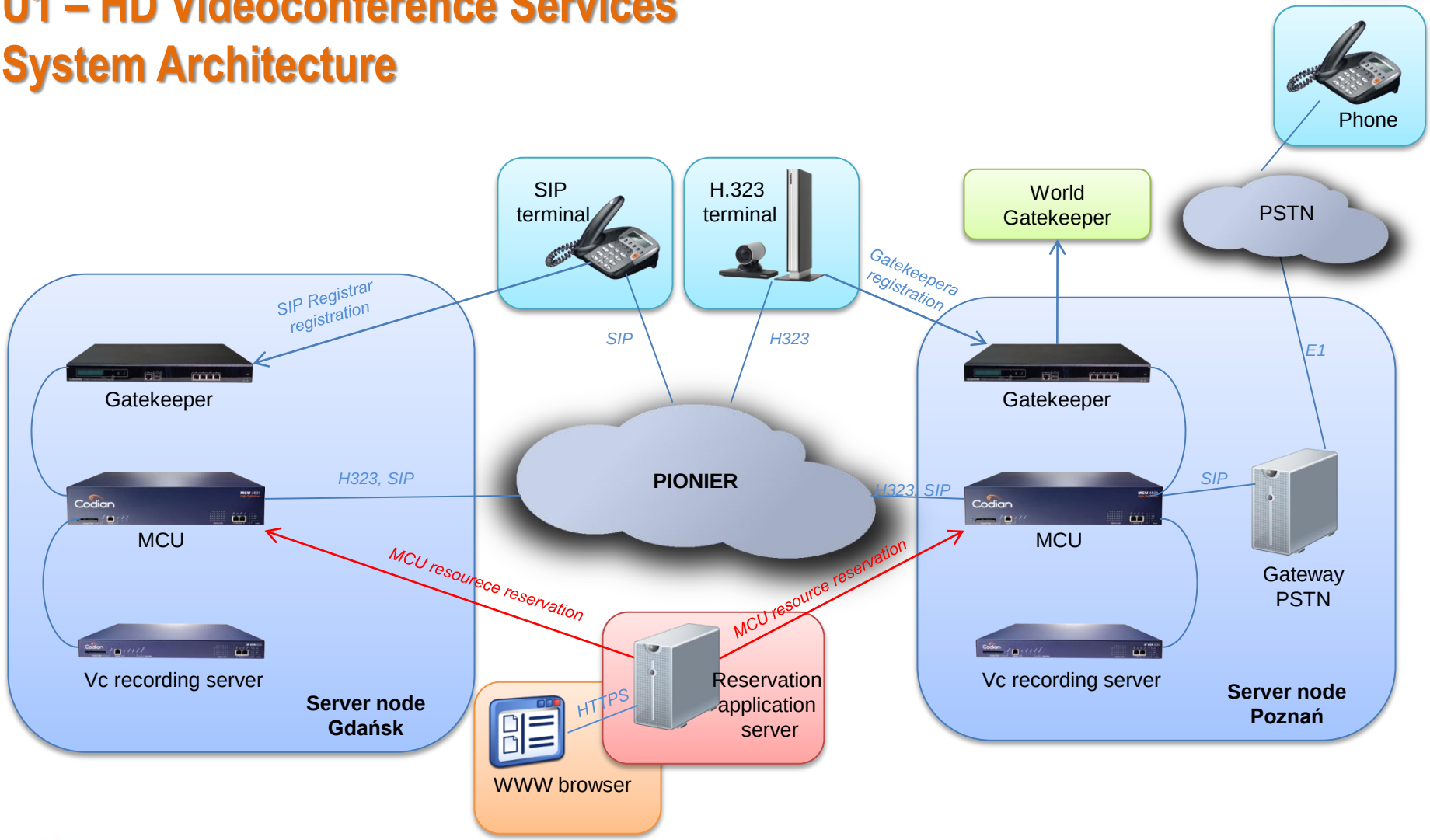


Coordinator of Service Main Node of Service Service Partners

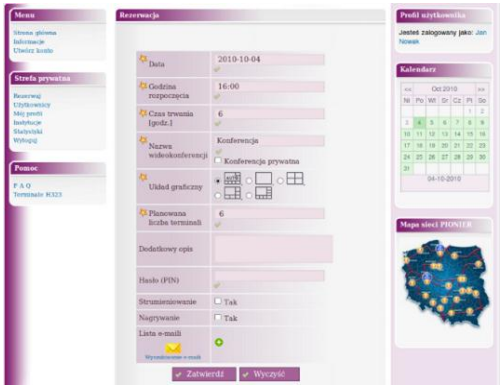
U1 – HD Videoconference Services

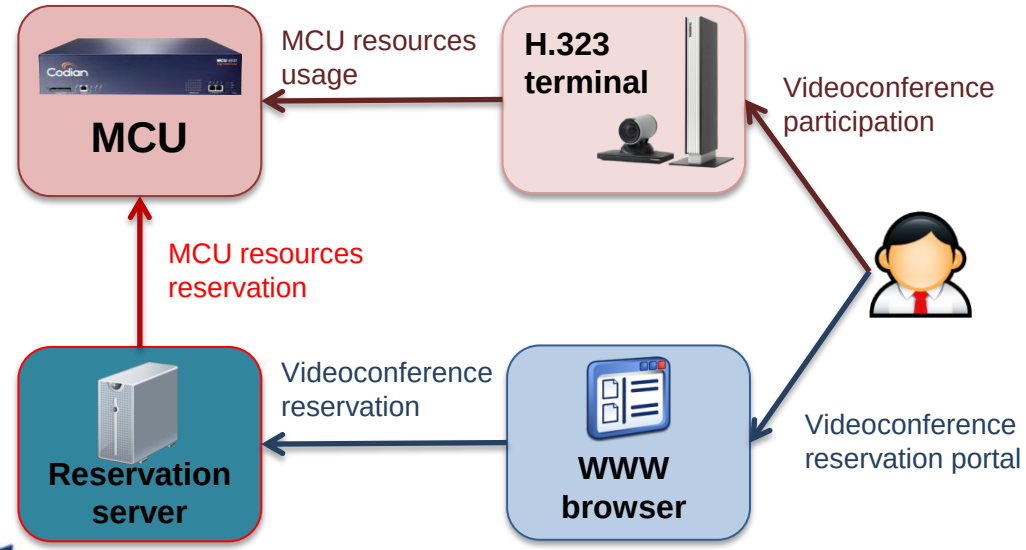
- ✓ **2 redundant server nodes** (MCU, gatekeeper, streaming and recording systems) **with Full HD 1080p support**
- ✓ **22 VC hardware sets** (codec, camera, microphone, speakers, monitor, projector) **with Full HD 1080p support,** over **100 VC software clients**
- ✓ **H.323/SIP, VoIP SIP, PSTN support**
- ✓ **80 parallel Full HD VC sessions**
- ✓ **Reservation system for users**

U1 – HD Videoconference Services
System Architecture



U1 – HD Videoconference Services
Reservation System





Functionality:

- ✓ VC rooms reservation
- ✓ VC management
- ✓ Users authorization and authentication
- ✓ Infrastructure monitoring and statistics

Features:

- ✓ Scalable & secure
  - ✓ Multi MCU support
  - ✓ Privileges hierarchy
- ✓ Openess
  - ✓ Open source tools and library
  - ✓ Modular architecture

U1 – HD Videocoference Services - Examples of application

Scientifc Discussion

Virtual Scientific Conference

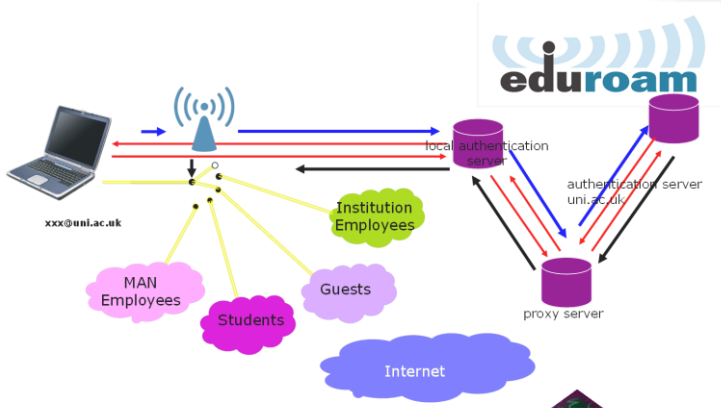
Virtual art events

Interactive remote education, virtual interactive meetings with the master.

Teleconsultation, telementoring (eg. remote participation in Surgery)

U2 – Eduroam Services

- ✓ **2 national proxy servers** (Poznań, Toruń)
- ✓ **22 regional proxy servers**
- ✓ **21 WiFi Systems** (2 controlers, 50 access points and management system)
- ✓ Own **system for collecting statistics**

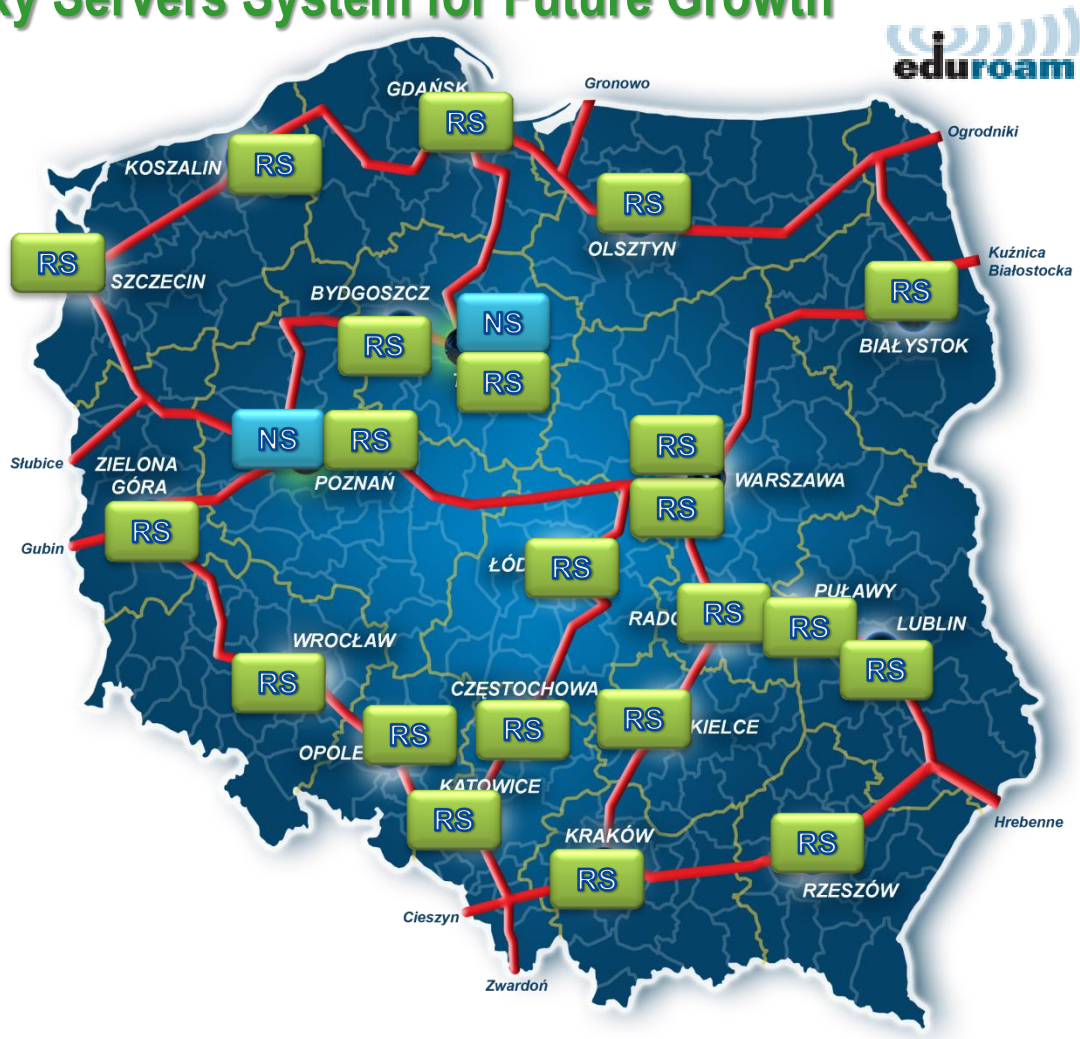


U2 – Eduroam Services
Scalable Architecture of the Proxy Servers System for Future Growth

- 2 National Proxy Servers
- 22 Regional Proxy Servers

Features:

- Hierarchical structure
- All servers - redundand mode
- Based on RadSec standard
- Monitoring and statistics



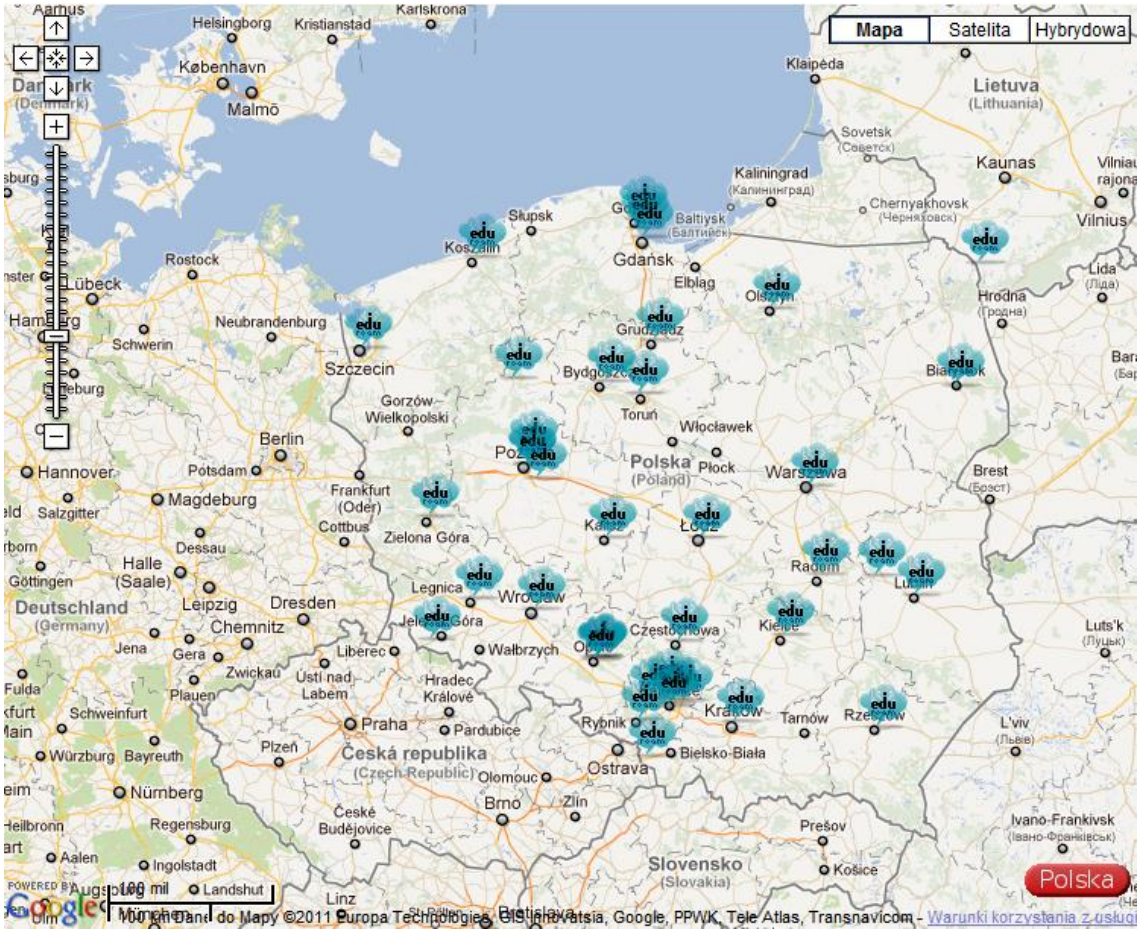
NS National Proxy Server

RS Regional Proxy Server

U2 – Eduroam Services - Current coverage of the service

- **41** cities
- **497** locations

Current coverage of eduroam services is on site http://www.eduroam.pl



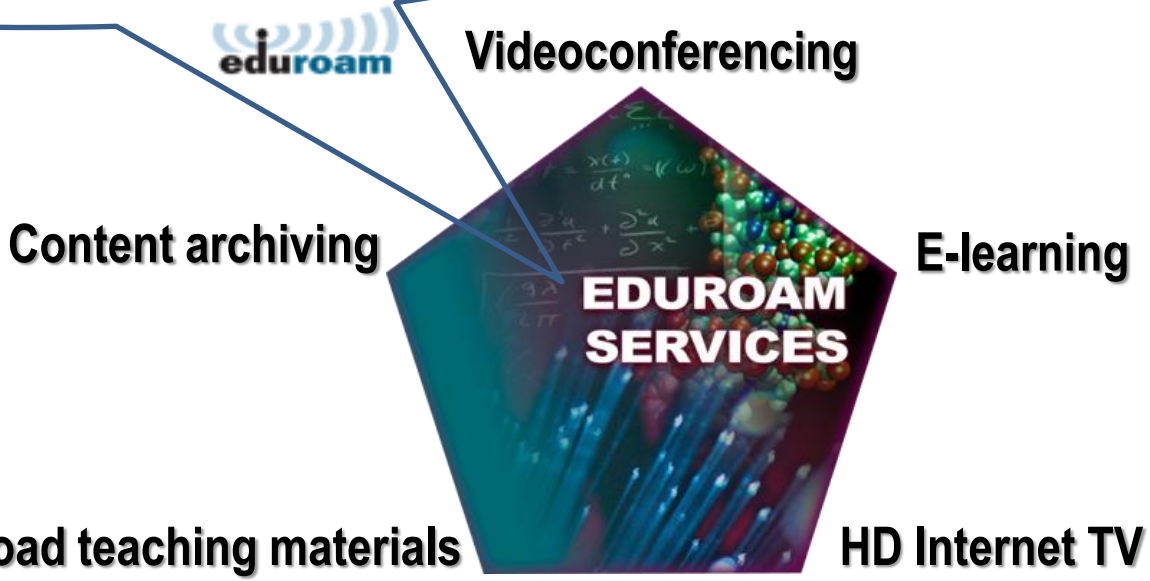
U2 – Eduroam Services - Examples of application

Access and presence „always and everywhere” – in every place:

Authorized, No additional activities related to logging

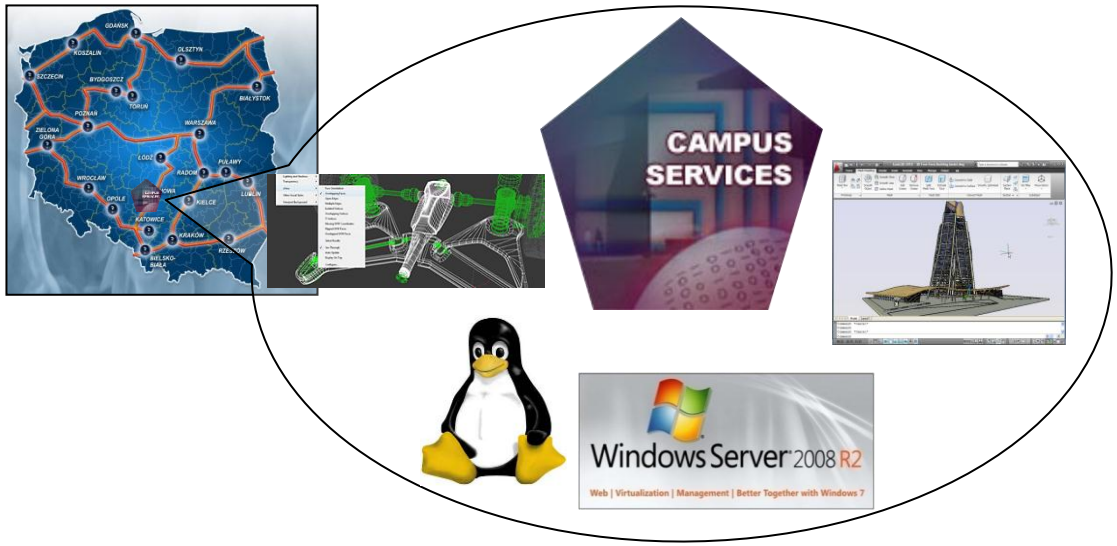
Independent of hardware platform

(laptops, netbooks, tablets, mobile phones with WiFi)



U3 – Campus Services
- „Cloud" for Scientific Computing and Education

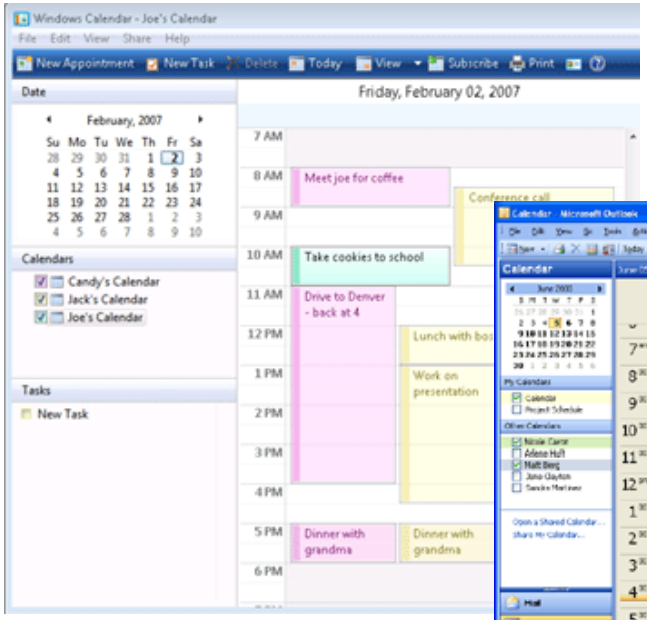
- ✓ Remote access to interactive applications using the GUI in MS Windows environment (eg. MS Development Tools, MathCad, Mathematica, Maple, Comsol, Ansys, AutoCad)
- ✓ Virtual servers „on demand" (with MS Windows or Linux environment)

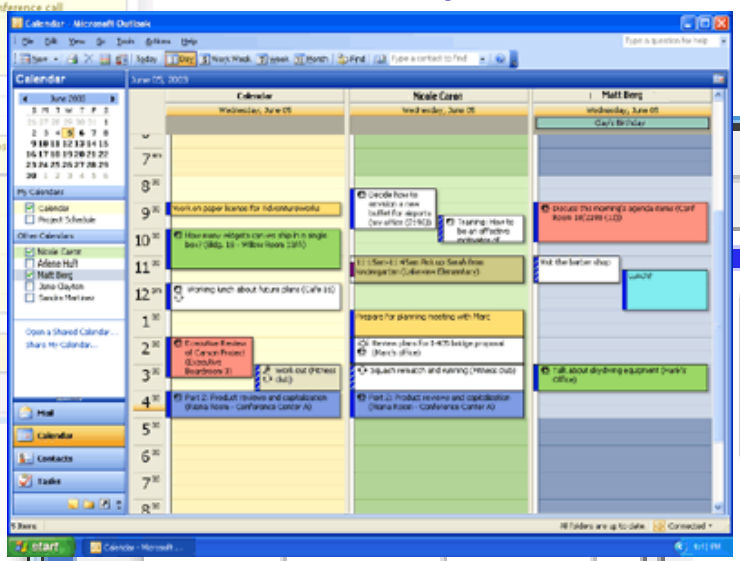


- ✓ Batch jobs, eg. animations, visualisations, etc.
- ✓ **New licensing models**
- ✓ Model of the Services: RAAS/SAAS, Virtual Labs

U3 - Campus Services
- „Natural" Resource Reservation Via the User Portal

- ✓ user chooses the time when he/she needs the resources
- ✓ calendar-like interface (example):

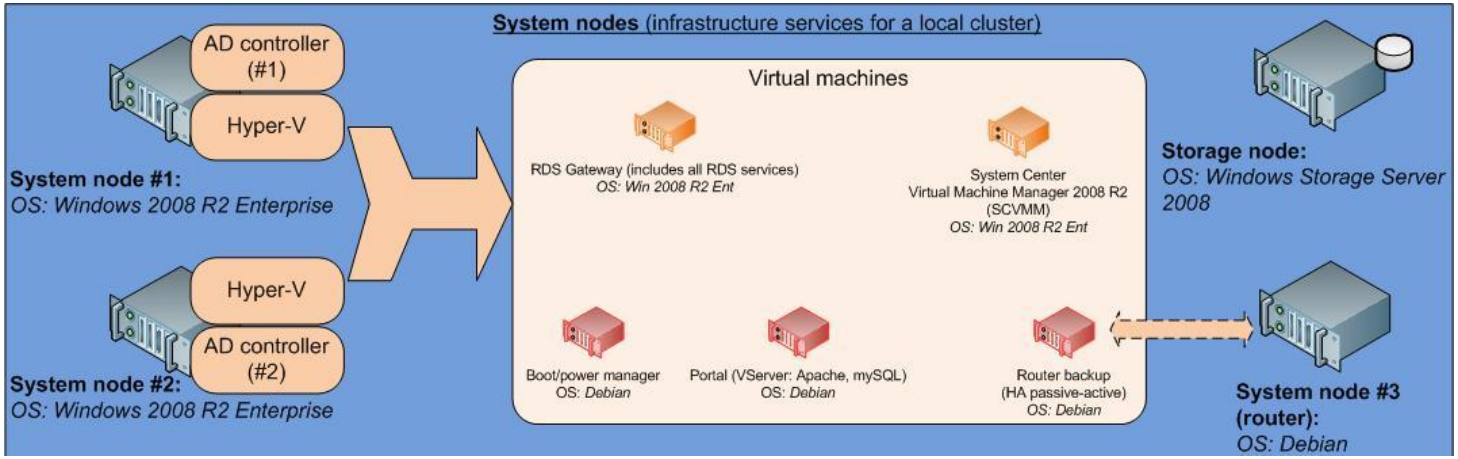


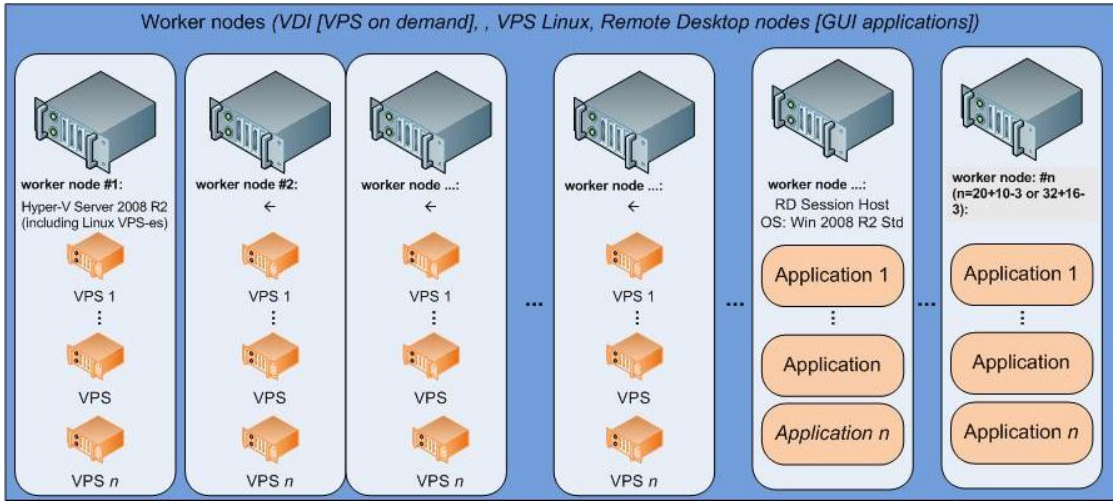


•I want to user application X for one month everyday 3-5 p.m.

• I need 10 virtual machines to run a lab every Tuesday 8-9 a.m. for 6 months

U3 - Campus Services
- Cloud Platform Architecture for Academic Community





Implementation:

744 servers

784 TB of disk space

23 TB of RAM

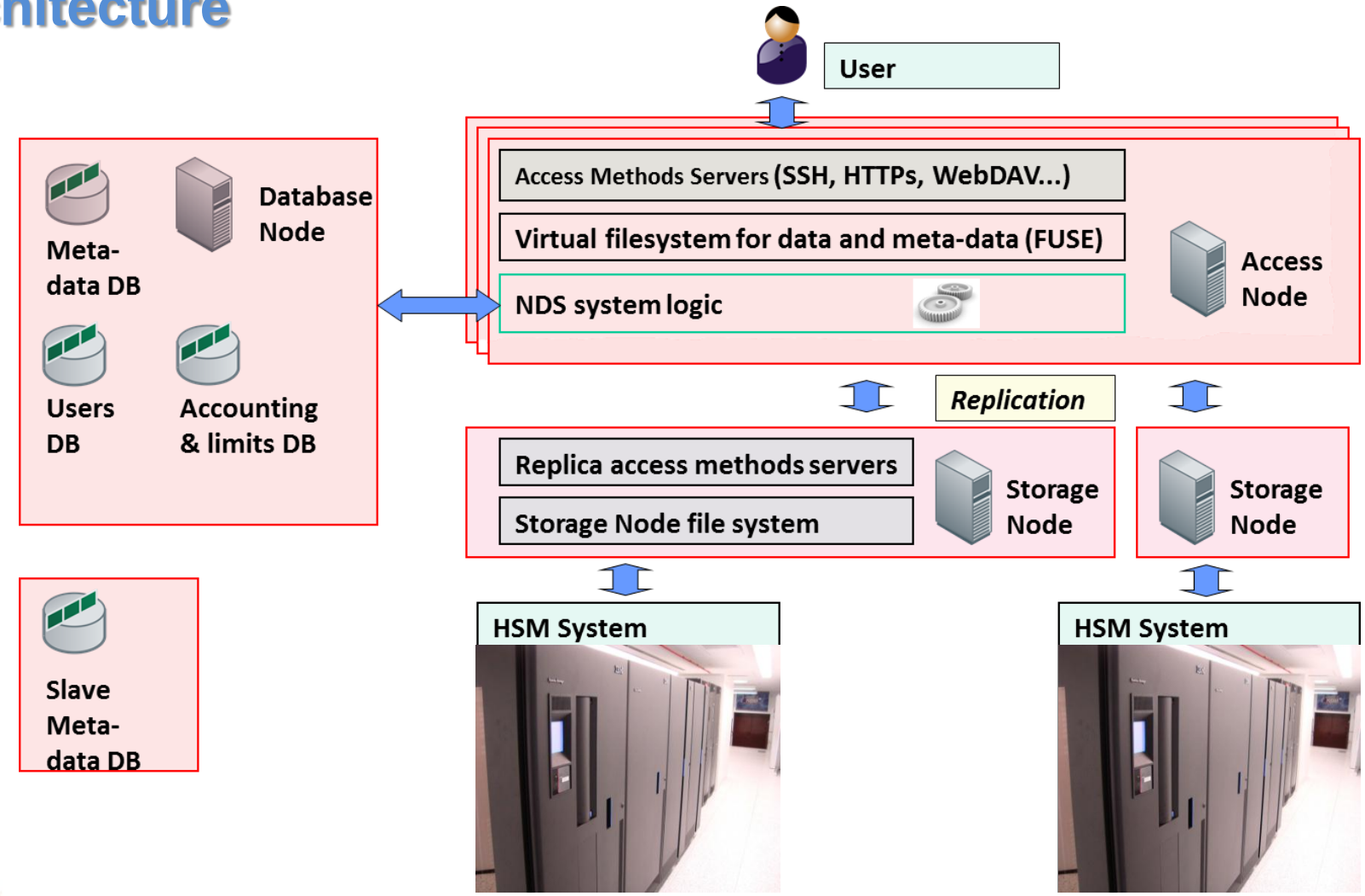
57 TFLOP performance

U4 – Archiving Services

Support scientific and academic community in protecting and archiving data

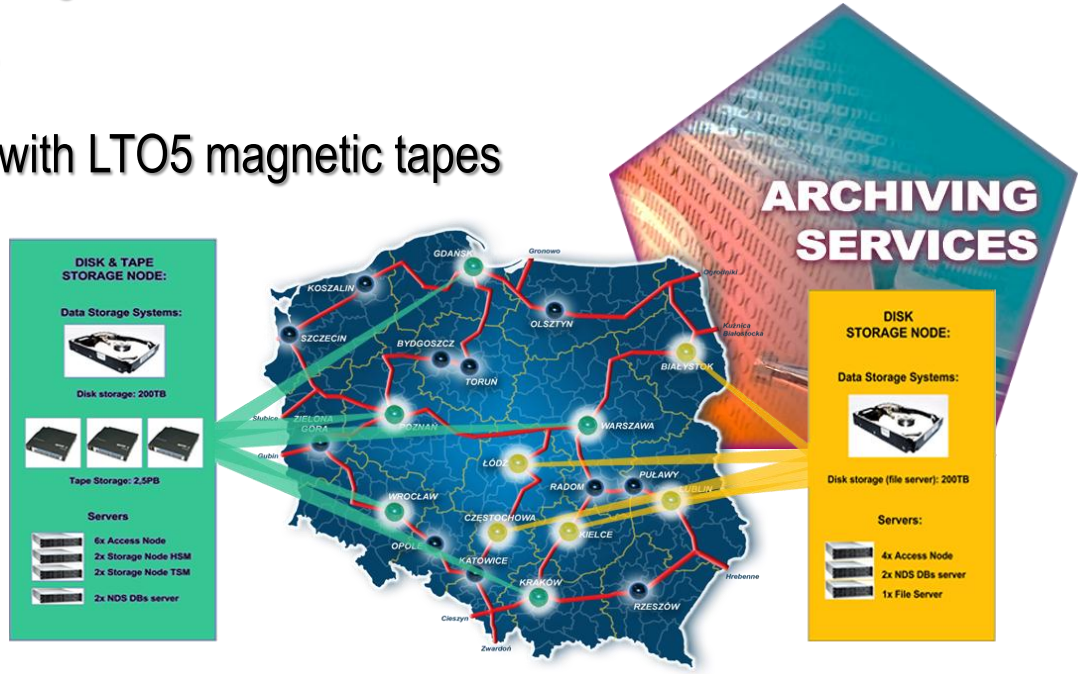
- ✓ Physical protection of data (replication, *but also safe storage*)
- ✓ Keeping logical consistency of data
- ✓ To address secondary storage applications:
  - ✓ Long-term data archival
  - ✓ Short-term backup

U4 – Archiving Services Architecture



U4 – Archiving Services - System Deployment Infrastructure

- ✓ 5 Disk Service Nodes – cumulative 2 PB
- ✓ 5 Disk & Tape Storage Nodes – cumulative 12,5 PB
- ✓ System Software
- ✓ Nodes equipped with LTO5 magnetic tapes



- ✓ **Deployment of own NDS (National Data Storage) Software**

U4 – Archiving Services - Examples of application

Repository of scientific data (research, computing, virtual laboratories)

Repository for knowledge bases and platforms

Long-term archiving

2-nd level backups

Repository for Digital Libraries Federation

Storing trasmission data of scientific operators (annual needs of about 600 TB for PIONIER Consortium)

Backup monitoring and safety/surveillance systems

U5 – Science HD TV Services

Scientific HD TV Services based on HD quality content for:

- ✓ HD content production
- ✓ HD content storage & automatic recoding
- ✓ Creation, management & broadcast of live HD *virtual* channels
- ✓ Scalable HD content distribution & delivery
- ✓ HD content access & creative use

Platform services & application development & deployment

U5 - Science HD TV Services

- ✓ **System Infrastructure**
  - ✓ 5 x Regional Content Center
  - ✓ 5 x Proxy/Cache for RCC
  - ✓ 16 x Proxy/Cache
  - ✓ 2 x Content Repository
  - ✓ 5 x Virtual Channel System
  - ✓ 1 x AoD System
- ✓ **A/V Infrastructure**
  - ✓ 15 Recording Studios
  - ✓ 6 Production Studios
  - ✓ OB-Van
- ✓ **Own application software**

U5 - Science HD TV Services Content Storage, Distribution, Delivery and Usage

A/V INFRASTRUCTURE

- Production Studio (x 6)
- Recording Studio (x 15)
- OB-VAN (x 1)

IT INFRASTRUCTURE - subsystems

- Repository
- Virtual Channel System
- Application on Demand

HD CONTENT DELIVERY SYSTEM

- Regional Data Center
- HD Proxy/cache

U5 – Science HD TV Services - Examples of application

Research infrastructure to deploy
<u>new models</u> of television with viewers interact

Documenting events and scientific experiments

Preparation and distribution of teaching materials

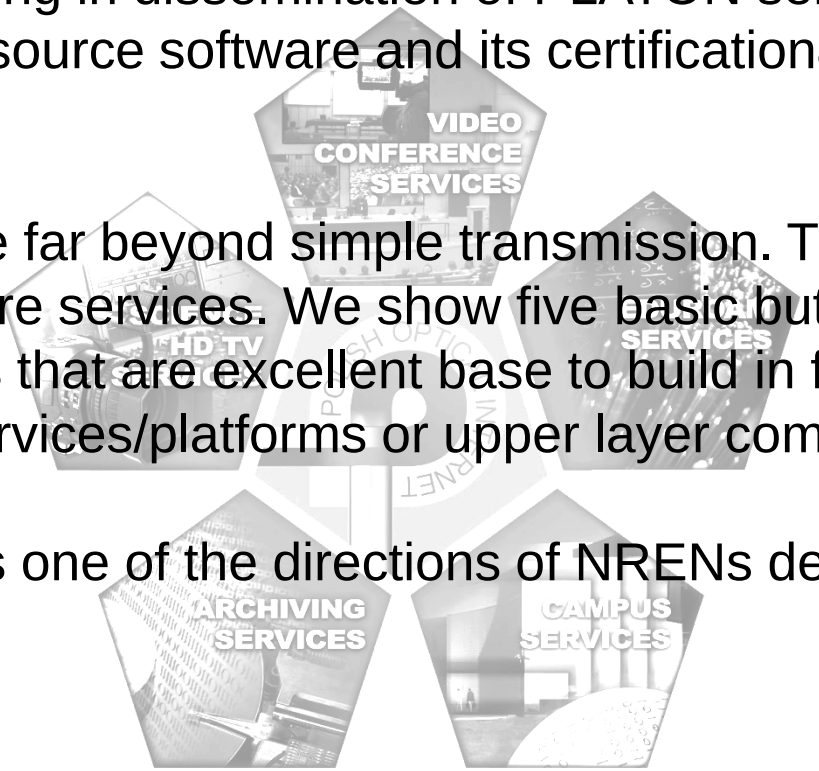
Local Internet TV

Popularization of science

Possibility of building a dedicated TV specialized for virtual scientific community

SUMMARY

- ✓One important thing in dissemination of PLATON services process is the role of open-source software and its certification&support by the PIONIER teams.
- ✓ NG networks are far beyond simple transmission. The integral part of such networks are services. We show five basic but important and modern services that are excellent base to build in future more sophisticated services/platforms or upper layer complex services.
- ✓Such approach is one of the directions of NRENs development



SERVICE PLATFORM FOR E-SCIENCE PLATON

POLISH OPTICAL INTERNET

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PARTNERS:

Akademickie Centrum Informatyki, BIAMAN, UTP, TASK, CYFRONET, CzestMAN, POZNAN, icm, Kielman, Politechnika Łódzka Centrum Komputerowe, LODMAN, LUBMAN, RAMAN, Uniwersytet Opolski, KOS MAN, PulMan, NASK, OLMAN, Centrum Zarządzania Miejską Siecią Komputerową, TORMAN, WCSS, MAN

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