



## 25 years of CESNET – history and future challenges

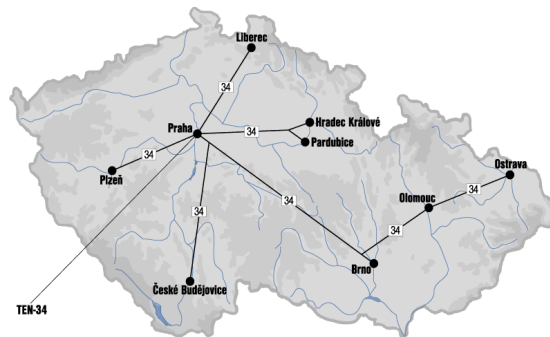


Helmut Sverenyák, CESNET

- Association of Czech public universities and Academy of Sciences
- Founded in 1996
- Mission
  - *to provide unique and complex e-infrastructure services in a quality comparable to top world standards and to support the concept of Open Science in the field to the science, research and education community.*
  - *To offer stable services with high added value covering the widest possible spectrum of needs of our users.*
  - *To contribute with our in-house research activities to development of ICT and practical applications of the outcomes of this development.*
- *445 000 users, from 460 organisations (incl. 27 members, 2 associated) dealing with RDE (libraries, musea, hospitals, schools, ..)*



- NREN Operator
- TEN-34 CZ network
  - 34 – 155 Mb/s
  - Videoconferencing
- MetaCentrum projects started (1999)
  - *interconnecting various owners' resources in order to create a uniform environment for the entire academic community*



- CESNET has operated only „academic“ network CESNET2
  - DWDM 2,5 -10 Gb/s, IPv6 implemented (2003)
  - Distributed cluster ran with nodes in Pilsen (32 CPUs), Prague (32 CPUs) and Brno (96 CPUs) and connected to European DataGrid infrastructure (2000)
  - First version of Perun as an account administration tool developed (2000)
  - eduroam was implemented (2004)
  - CESNET-CERTS established (2004) and accredited (2008)
  - National Academic Identity Federation eduID.cz established (2008)
  - MetaCentrum appointed as NGI to represent CR in EGI.eu (2009)
  - CESNET involved in ELIXIR CZ infrastructure building (2009)
- GÉANTx, EGEEx



- Roadmap of Large Research Infrastructures of the CR
  - Prepared by MEYS
  - Approved by Czech Government (2010)
  - ICT infrastructures/e–infrastructures
    - CESNET
    - CERIT-SC
    - IT4Innovations – National Supercomputing Center
  - CESNET got high-priority project status



Security, monitoring, helpdesk

eduID.cz, AAI, resource and identity management

MetaCentrum

Data Storage

CESNET

Community  
Inc. CERIT-SC

CESNET

Network, eduroam, multimedia



- Backbone at 100 Gb/s (2013)
- MetaCentrum Cloud, cloud access to MetaCentrum (2012)
- MetaCentrum Cloud connected to EGI FedCloud (2013)
- Distributed Storage Infrastructure with 21 PB (2013)
- GPU cluster *adan*, the first HPC cluster for ML/DL (2018)



- Roadmap update for 2020 – 2022 (2019)

- Integration of e-infrastructures
- e-INFRA CZ consortium established in 2019
  - CESNET – coordinating role
  - Masaryk University, CERIT-SC
  - VŠB – Technical University of Ostrava, IT4Innovations National Supercomputing Center





Security, monitoring, helpdesk

eduID.cz, AAI, resource and identity management

MetaCentrum

Data Storage

IT4Innovations  
Supercomputers

CESNET

CERIT-SC

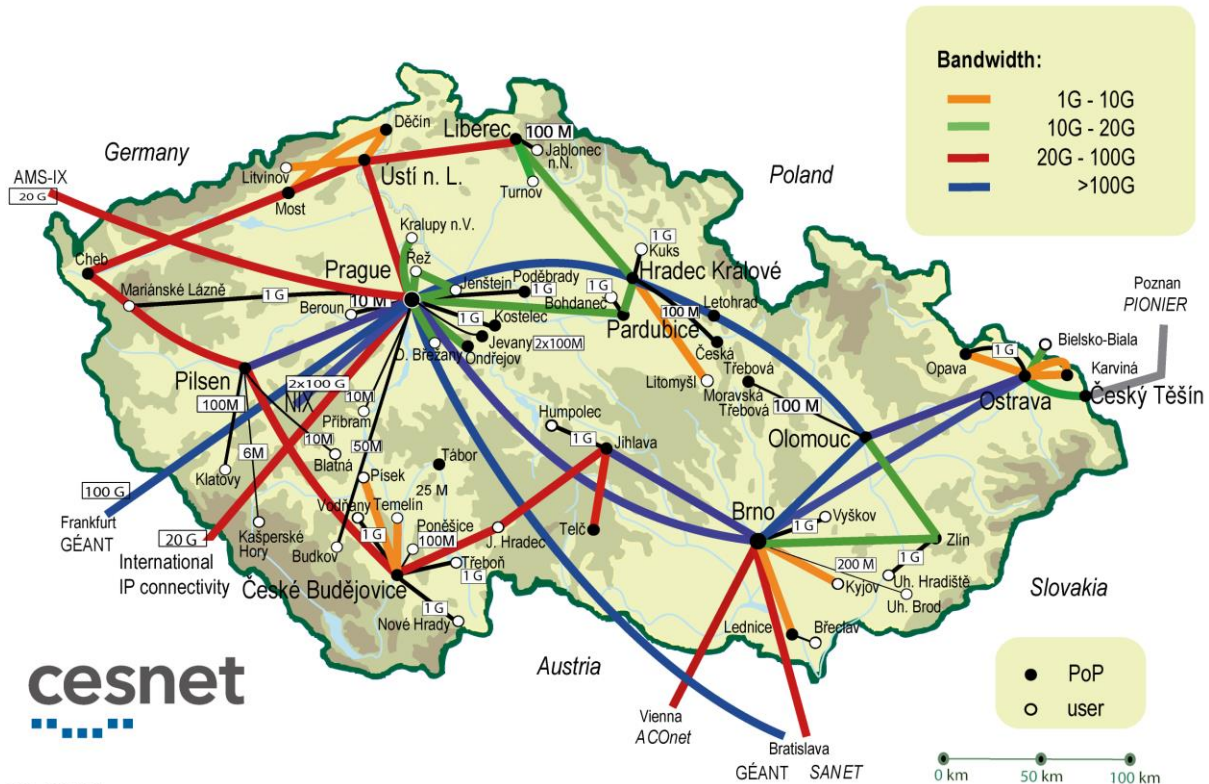
Community

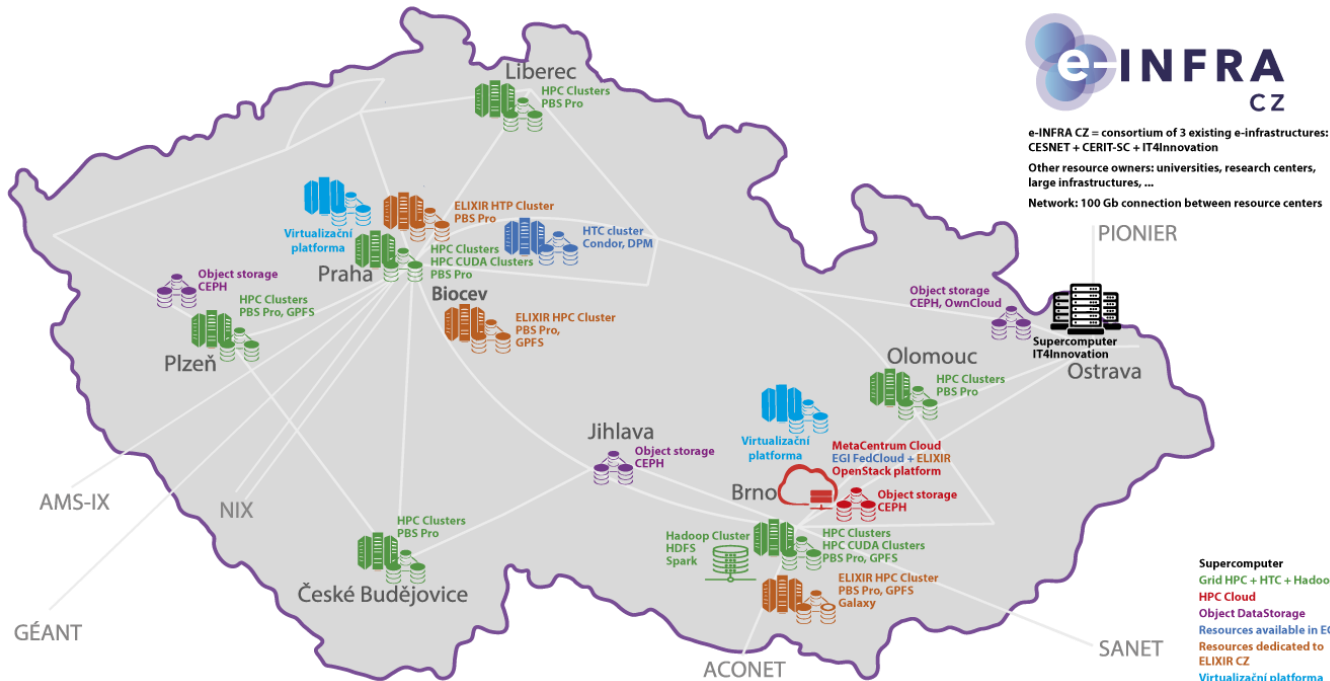
CESNET

Community

Network, eduroam, multimedia







- Grid Computing
- Cloud Computing
- Platforms (Hadoop, Galaxy, Kubernetes, JupyterLab)
- More than 1 000 SW packages of application for
  - Mathematic, Development tools, Simulations, Life Science
- 42 900 CPUs in total, 17 300 CPUs of CESNET
  - HD clusters
  - SMP servers
- 434 GPU cards, including NVIDIA A40 and A100, some of them in the Cloud environment, visible in FedCloud
- 15 PB disk space for data (semipermanent storage)
- Workshops
- Data Storage Infrastructure about 69 PB for backup an archiving
  - HSM (tape library/ disk array)
  - Object storages (ceph)
  - ownCloud

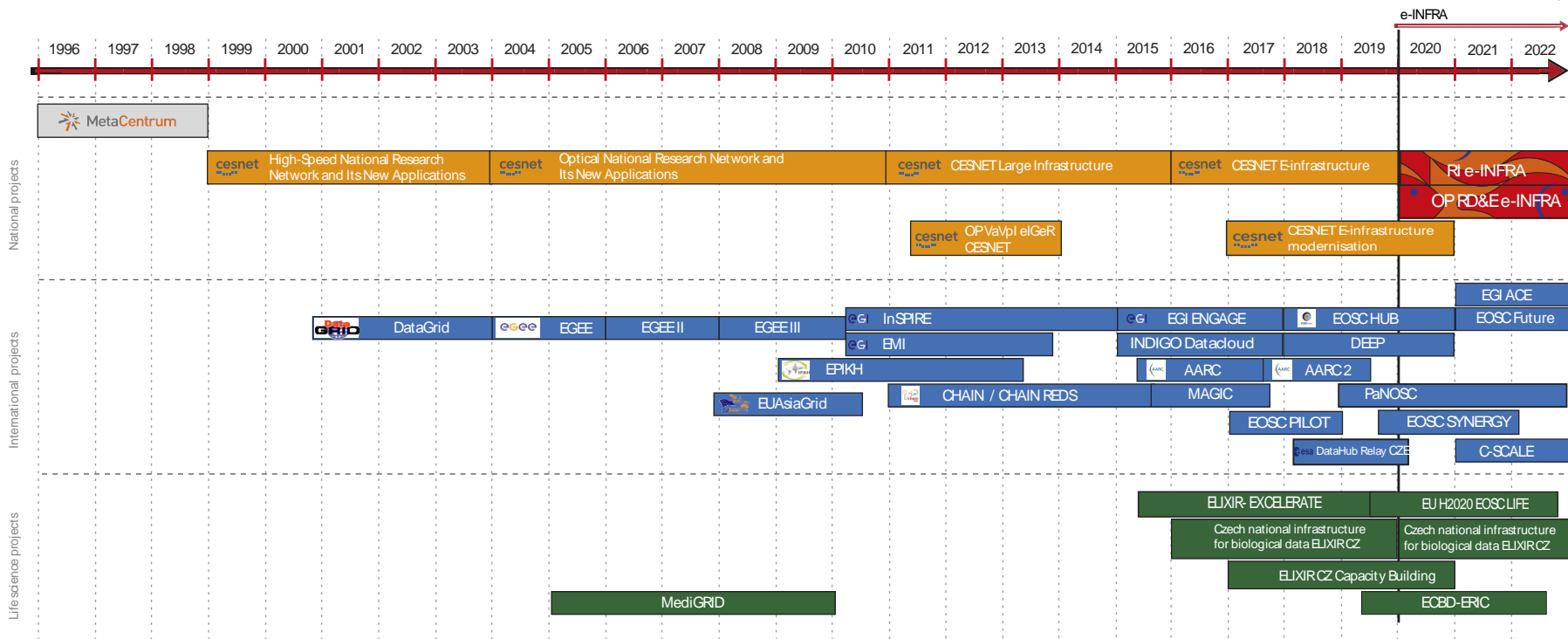


- EGI.eu
  - MetaCenter sites contribute to EGI HTC and Cloud Federations
  - MetaCenter enables to users from CR to use EGI.eu services
  - Support of international user groups: ATLAS, ALICE, Belle, FermiLab, AUGER, CTA, ELI, BBMRI, CLARIN, ICOS
  - Perun used in EGI Check-in, ELIXIR AAI, LifeScience AAI
  - Responsibility of EGI Jupyter Notebook in EGI-ACE
- Research infrastructures
  - CzechGlobe, EIRENE, Recetox,
  - ESA – CollGS, Data Relay Hub
- ELIXIR CZ - national bioinformatics infrastructure
  - MetaCenter involved in building (since 2009)
  - CESNET member of consortium of 14 institutes led by IOCB CAS
  - Responsible for computing and storage resources



cesnet  
meta**centrum**

cesnet



- R&D&I activities focused on infrastructure and its services improvement
  - Security and e-infrastructure
  - Distributed computing
  - Identity and access management
  - Optical technologies
  - High-resolution and low latency multimedia transfers
  - ICT technologies in humanities



- Further development of e-INFRA CZ and its services
- Setting up the unified environment in data computing and storing services
- Proceed on unification of the user access to the service provided by individual e-INFRA CZ partners
  - Common AAI
  - Common Security (CSIRT, monitoring)
  - Common user proactive/reactive support
  - Common PR
  - Solving legal issues that will occur





- EOSC aisbl member (2020), mandated organisation (appointed by MEYS)
- Leading organisation on the National EOSC Platform
- National Data Infrastructure building 2023-2029
  - **National repository platform**
  - Metadata directory
  - Scientific disciplines repositories
  - **National EOSC Secretariat**
  - Working Groups





Thank you for attention.



CESNET

[www.cesnet.cz](http://www.cesnet.cz)

E-INFRA CZ

[www.e-infra.cz](http://www.e-infra.cz)

MetaCenter

[www.metacentrum.cz](http://www.metacentrum.cz)

National Roadmap

[www.vyzkumne-infrastruktury.cz/cestovni-mapa-velkych-vyzkumnych-infrastruktur-cr/](http://www.vyzkumne-infrastruktury.cz/cestovni-mapa-velkych-vyzkumnych-infrastruktur-cr/)

National Data Infrastructure (in Czech, for now)

[www.e-infra.cz/eosc](http://www.e-infra.cz/eosc)

ELIXIR CZ

[www.elixir-czech.cz](http://www.elixir-czech.cz)

