Evolution of CESNET Services

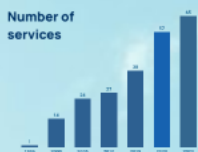**From Network Infrastructure to Open Science Cloud**

Jana Ernekerová

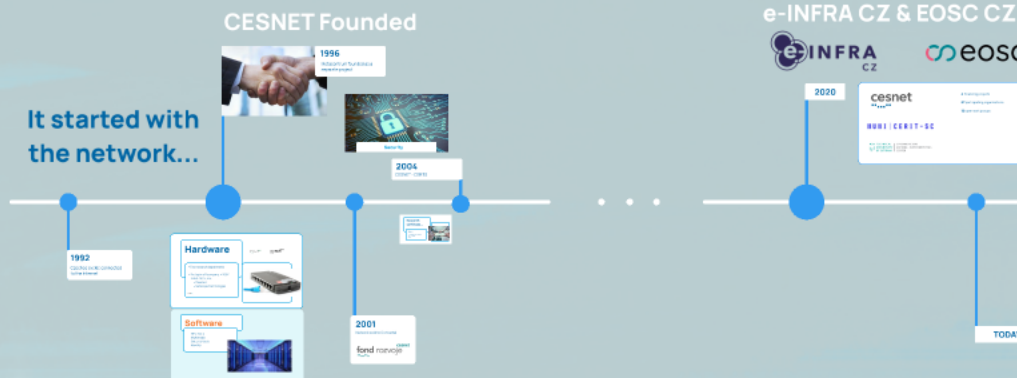cesnet

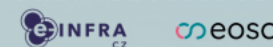## Timeline

It started with the network…

CESNET Founded

1996

2004

1992

Hardware

Software

2001

Future lies in…
e-INFRA CZ & EOSC CZ

e-INFRA CZ

eosc

2020

cesnet

TODAY

Services

Number of services

Security

Multimedia

Digitalisation & Visualisation

Collaboration

Identity

Network

Metacentrum

Data Storage

Data & Compute

Users

Universities
Research institutes
Schools
Hospitals
Libraries
Museums & Galleries
Public Services

500 000 individuals

350 connected organizations

Funding

Government financing

Funding Changes

Challenges

Challenges

What we did…

START

Organizational Transformation

Future Challenges

Discussion

I would love to hear from you!

Have you experienced a similar transformation?
What helped you?
Are you part of a similar cooperation consortium?
How do you lead it?
Have you adopted EOSC?
Any experience you would like to share?

Evolution of CESNET Services

From Network Infrastructure to Open Science Cloud

Mission

Vision

Jana Ernekerová

cesnet

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MUNI | CERIT-SC

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Mission

- Provide world-class, comprehensive e-infrastructure services,
- Support open science initiatives,
- Rely on and create open-source SW,
- Offer stable, high-value services to a wide range of users,
- Contribute to advancements in ICT research.

Vision

- Innovate ICT services beyond commercial offerings,
- Upgrade continuously the e-infrastructure to meet user needs,
- Educate and influence through outreach,
- Strenghten our role supporting science, research, and education in the Czech Republic.
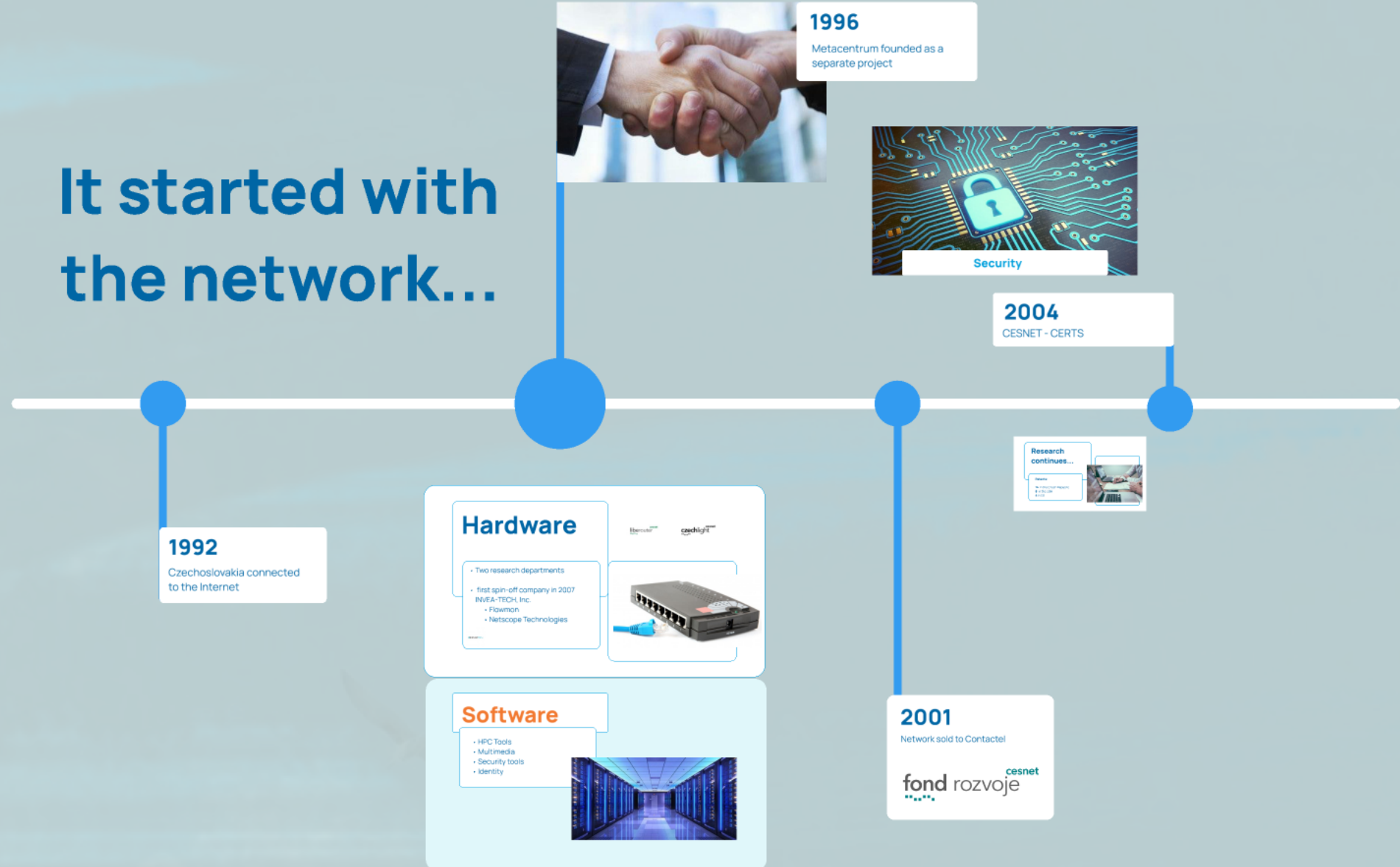
It started with the network…

Hardware

- Two research departments

- first spin-off company in 2007 INVEA-TECH, Inc.
  - Flowmon
  - Netscope Technologies

Research continues...

Patents:

14 in the Czech Republic
8 in the USA
4 in EU

Software

- HPC Tools
- Multimedia
- Security tools
- Identity

Security

Security

forenzní laboratoř **cesnet**

cesnet-certs **cesnet**

- Social engineering testing
- Penetration testing
- Phishingator
- Proactive security

- CESNET security team
  - Incident handling
  - Incident response
- Events Analysis
- Reactive protection

- Network monitoring

Multimedia: UltraGrid

Award:
- ACM Multimedia in 2012 for The Best Open-Source Software

Spin-Off:
- Comprimato - 2013

Live Cardiologic Cases Transmissions

May 2017

We continue to support the live cases transmissions at the congresses held by the Czech Society of Cardiology. We have deployed UltraGrid for interactive transmissions of interventional cardiology cases from the Institute for Clinical and Experimental Medicine in Prague and from the teaching hospital in Hradec Králové. A part of the programme was also an open heart surgery we have transmitted from the teaching hospital in Hradec Králové.

In all cases we have transmitted a live cases video including the imagery from variety of instruments and allowed for live and very interactive discussions over the live cases content between the workshop or congress chairs and participants and the surgeons and specialists conducting the cases in the remote hospitals.

Cardiology workshop

January 2017

We continue to support local medical communities by bringing live transmissions of cardiology interventions to the specialists from the local hospitals in the South Moravian region of the Czech republic. We have transmitted three cases during the St. Anne 2017 cardiology workshop including a not planned transmission of acute heart attack treatment. From a technical point of view, we are starting to bring HEVC video coding into production with the UltraGrid to allow for higher video quality on commodity network links available especially in local hospitals.

[comprimato]

Multimedia

• MVTP technology

2020

EUROPA NOSTRA

2022

ČESKÁ HLAVA

cesnet MVTP-4K

Digitalization & Visualization

Prague City Museum

MUSAEUM NATIONALE 1818 | NATIONAL MUSEUM

Collaboration

] pexip [

zoom

Metacentrum

37 628   CPU cores

455   GPU cards

11.135.099   computational tasks

Data Storage

📦⚖️ **FILESENDER** 🌶️

ownCloud @ CESNET

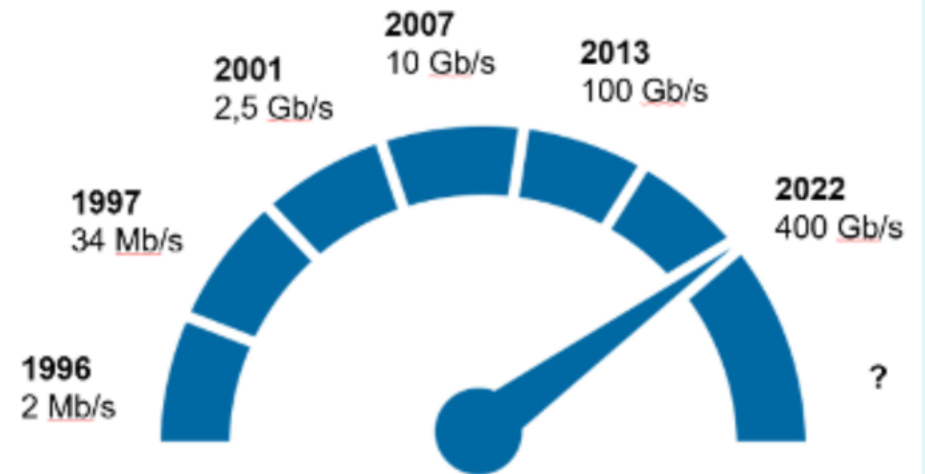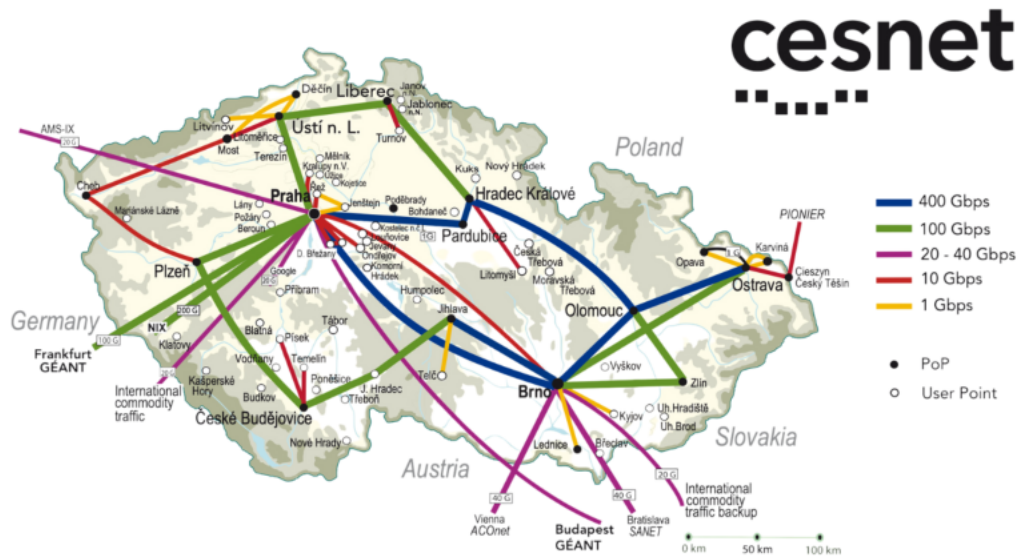- **129 PB** capacity
- Object storages (S3)

Data & Compute

Identity

- TCS certificates, CESNET CA
- eIDAS: document digital signing
- AAI: single sign-on across e-infrastructure

Network

- 24 x 7 Service Desk
- redundancy

Security

- Social engineering testing
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forenzní laboratoř cesnet

cesnet-certs cesnet

Multimedia

2020 EUROPA NOSTRA   2022 ČESKÁ HLAVA

- MVTP technology

Digitalization & Visualization

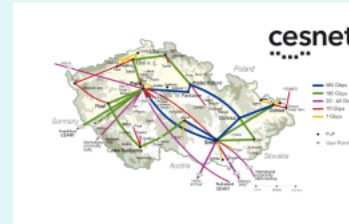NATIONAL MUSEUM

Identity

perun cesnet   eduid.cz cesnet

- TCS certificates, CESNET CA
- eIDAS: document digital signing
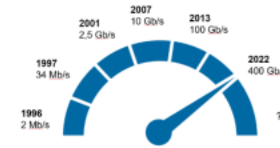- AAI: single sign-on across e-infrastructure

Network

- 24 x 7 Service Desk
- redundancy

cesnet   eduroam

2001 2,5 Gb/s   2007 10 Gb/s   2013 100 Gb/s
1997 34 Mb/s   2022 400 Gb/s
1996 2 Mb/s

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Number of services
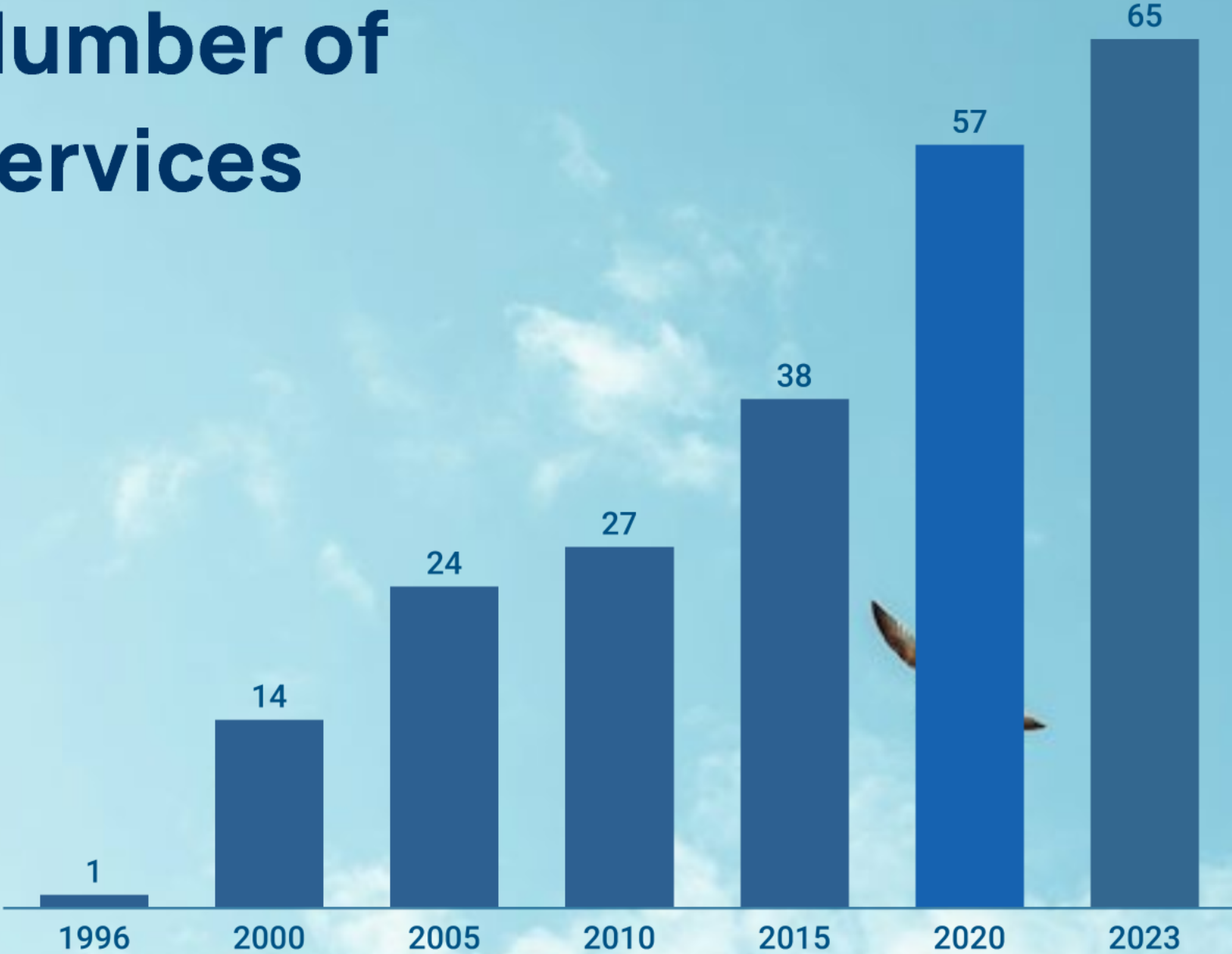
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Funding

Government financing

- money from government and connected organizations
- the purpose of funding changes over the years

Funding Changes

1) Network infrastructure
2) E-infrastructure Services
3) e-INFRA CZ & EOSC

Challenges

Organizational Transformation

- Academia vs. telco, idealism vs. users demands,
- Startup to middle sized company,
- Products led by tech leads.

What we did...

- Defined service guarantee for networking services,
- Adopted service life-cycle management,
- Started asking busines questions,
- Undergoing an external product analysis.

Future Challenges

- Cooperation with many different organisations within e-INFRA CZ & EOSC.

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