

ANNUAL REPORT 2025

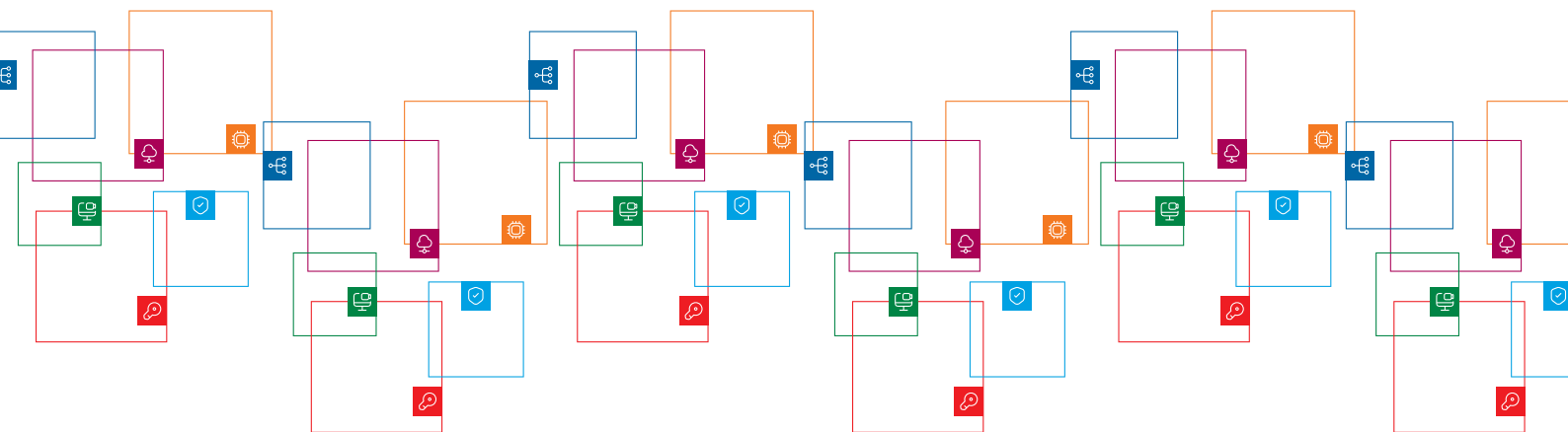


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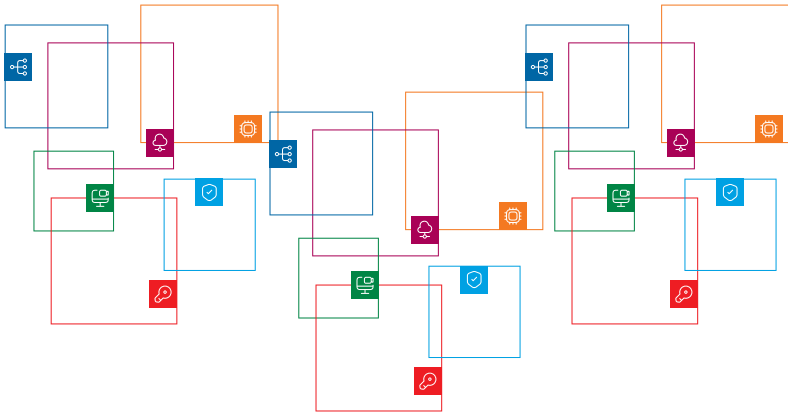
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DIRECTOR'S FOREWORD

In 2025, CESNET continued to strengthen the foundations of the national e-infrastructure, combining reliable operation with further innovation to support science, research, and education in the Czech Republic. While maintaining the reliability and security of our infrastructure, we continued to expand our network, computing, and data capacities, improve services for our users, and deepen our collaboration with academic and professional communities.

A major milestone was the significant expansion of our network infrastructure. We connected our first member institution – the Institute of Physics of the Czech Academy of Sciences – to the CESNET3 backbone network at 400 Gbps and strengthened our external connectivity through a connection to DE-CIX in Frankfurt, one of the world's largest Internet exchange points. In Ostrava, we resolved an overlap in fiber routes and established a backup connection for the University of Ostrava, while relocating network nodes in Brno and Hradec Králové. We also deployed the DDoS Protector system and expanded our fiber infrastructure management tools, further enhancing the security and efficiency of our operations.

Within the MetaCentrum computing infrastructure, we modernized the GRID infrastructure management system, expanded computing and storage capacities, and updated user documentation. We deployed new HD and GPU nodes, established a shared SCRATCH space in Pilsen, and prepared new object storage for cloud services. At the same time, we continued developing the Jupyter Notebook environment, Galaxy workflows, and portals supporting FAIR data, while contributing to international projects such as EOSC EU Node, ENVRI-Hub, and EOSC Beyond.

In the area of data services, we continued implementing the National Repository Platform, including the delivery of the first hardware components, connection of pilot repositories to the CESNET authentication infrastructure, and preparation of new support services. The migration of certificate services to the new TCS provider and implementation of the ACME protocol further improved the security and efficiency of server certificate management.

We also continued to enhance the security and reliability of our services by expanding the hSOC-VRF infrastructure, onboarding additional healthcare facilities, introducing new security reports, and piloting DeepSeek and log management systems.

2025 was also a busy year for our educational and community activities. We hosted the seventh CSNOG community meeting, which brought together 219 participants, revamped our Forensic Training I and II courses, and welcomed 246 participants to our Network and Services Security Seminar. We also organized working groups for connected organizations and legal professionals from our member institutions.

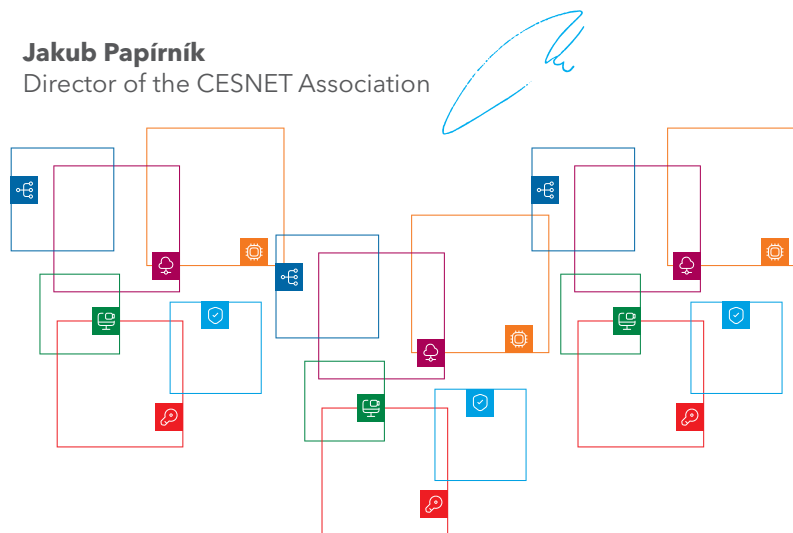
Our international activities included the EOSC National Tripartite Event and the 10th anniversary edition of the IPv6 Day conference. We also placed a special focus on bringing science to a wider audience, including a lecture on quantum cryptography held to mark the International Day of Light.

I would like to thank all our staff, partners, and member institutions for their hard work, dedication, and continued support. The achievements of 2025 confirm CESNET's position as a key e-infrastructure provider for Czech research and education and provide a strong foundation for the continued development of our services.



Jakub Papírník

Director of the CESNET Association



THE CESNET ASSOCIATION

The History of the Association and its Current Role

The CESNET Association was founded in 1996 by public universities and the Academy of Sciences of the Czech Republic (ASCR).

The mission of the CESNET Association is

- to provide the scientific, research, and educational community with unique and comprehensive e-infrastructure services at a level comparable to the global forefront, and to support the concept of Open Science;
- to offer stable, high value-added services that cover the widest possible range of our users' needs;
- to contribute to the advancement of information and communication technologies through our own research activities and to apply the results in practice.

After its establishment, the Association also operated as a commercial Internet provider, with the aim of generating additional resources to support its core activities. This activity was discontinued in 2000. Since then, CESNET has focused exclusively on **developing and operating e-infrastructure for science, research, and education**, along with related activities.

A major milestone in the Association's history came in 2010, when the CESNET e-infrastructure was included in the **Roadmap of Large Research Infrastructures of the Czech Republic**¹. Subsequently, between 2011 and 2015, the national research and education network was transformed into a comprehensive e-infrastructure for research and develop-

ment in the Czech Republic through the Large Research Infrastructure CESNET project. In connection with the update of the roadmap in 2019, the three e-infrastructures (CESNET, CERIT-SC, and IT4Innovations) merged into a single national e-infrastructure, hereinafter referred to as e-INFRA CZ. e-INFRA CZ, for which CESNET serves as the host organization, is being developed in cooperation with its partner institutions: Masaryk University and VŠB – Technical University of Ostrava.

In 2021, the CESNET Association, Masaryk University, and the VŠB – Technical University of Ostrava were accepted as **members of the EOSC (European Open Science Cloud) Association**.

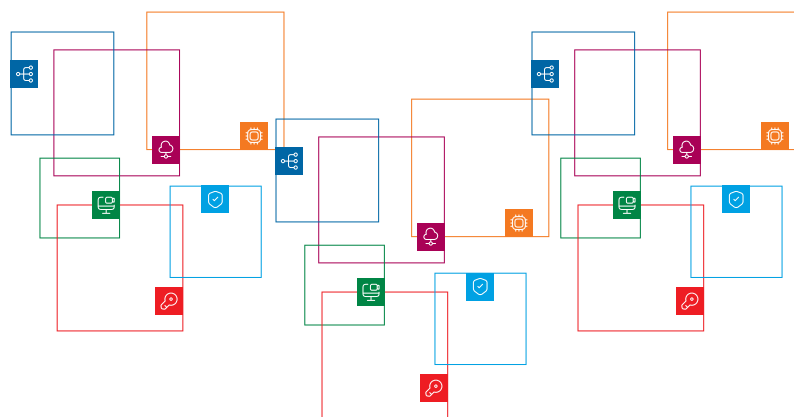
On January 27, 2022, a measure of a general nature (OOP) came into effect, designating the CESNET Association as a **critical infrastructure entity** pursuant to Section 2(k) of the Crisis Act and as the administrator of a critical information infrastructure communication system pursuant to Section 3(d) of the Cybersecurity Act (ZKB).

Effective January 1, 2025, the Polytechnic University in Jihlava became the 28th regular member of the Association. Following an amendment to the Association's Statutes at the General Assembly in December 2024, membership relations were further formalized through Membership Framework Agreements governing the relationship between the CESNET Association and its members.

Three more institutions joined the ranks of associate members: University Hospital Brno, University Hospital Olomouc, and the Institute for Clinical and Experimental Medicine.

¹ A Large Research Infrastructure is a research facility essential for comprehensive research and development activities with high financial and technological demands, which is approved by the Government and established for use also by other research organizations." pursuant to Section 2(2)(d) of Act No. 130/2002 Coll.

"Research infrastructure means facilities, resources, and related services used by the scientific community to conduct research in their respective fields, encompassing scientific equipment and research materials, knowledge-based resources such as collections, archives, and structured scientific information, information and communication technology infrastructures such as GRID networks, computing and software resources, communication tools, as well as any other unique elements essential for conducting research." pursuant to Article 2(91) of Commission Regulation (EU) No. 651/2014.



THE CESNET ASSOCIATION

Scope of Activities

The core activities of the CESNET Association are:

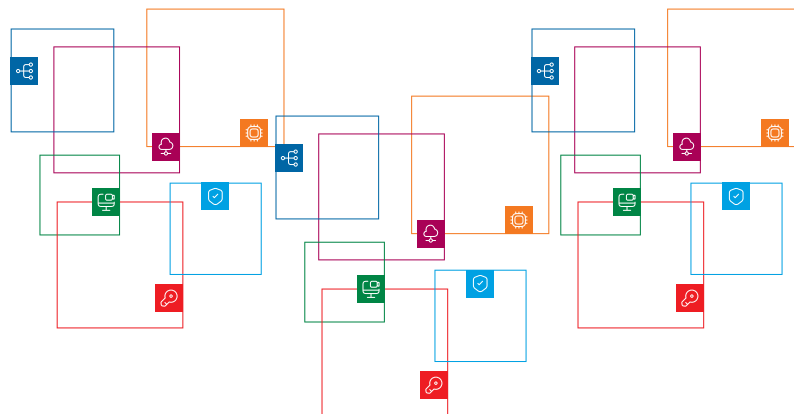
1. to carry out independent research and development activities in the field of information and communication technologies and to provide research services in this area;
2. to promote education in the field of information and communication technologies;
3. to carry out the following activities for the benefit of its members, the organizations established by them, as well as for the benefit of other entities:
 - develop and operate the national communications and information infrastructure, enabling their infrastructures to be interconnected, providing access to the CESNET infrastructure, and connecting them to similar external infrastructures (including Internet access),
 - develop shared technical, communication, and software tools and information services,
 - test new applications and foster collaboration and complementarity among members' activities at a level comparable to leading international academic and research infrastructures.

The Association performs and supports its activities within the limits of the subsidies received and partial reimbursements of the associated costs. The Association does not engage in these activities for the purpose of making a profit.

In addition to its core activities, the Association also carries out supplementary activities, but solely for the purpose of making more effective use of its assets and in a manner that does not compromise the fulfillment of the Association's objectives. The services are not provided as publicly available services.

Any potential loss arising from supplementary activities shall be settled by the end of the accounting period, or the respective supplementary activity shall be terminated before the start of the next accounting period.

The Association uses all profits to support research and development.



THE CESNET ASSOCIATION

Membership in international and national organizations

In 2025, CESNET was a member of the following prominent organizations:

International Organizations



EOSC AISBL – an international association of institutions involved in developing the concept of the European Open Science Cloud (<http://www.eosc.eu>).



GÉANT Association – an association of European national research networks focused on the operation and development of the GÉANT European communication infrastructure and the coordination of related activities (<http://www.geant.org>).



EGI.eu – an organization focused on coordinating European computing grids used for scientific computations and supporting their sustainable development (<http://www.egi.eu>).



Shibboleth – an international consortium coordinating the development of a service that provides single sign-on solutions, allowing users to access multiple protected network resources with a single login. Shibboleth forms the foundation of academic identity federations (<http://www.shibboleth.net>).



QUAPITAL – a Central European partnership for secure communication with quantum-level security and quantum internet (<http://www.quapital.eu>).



ELIXIR – the European bioinformatics infrastructure ELIXIR brings together advanced computing environments, data resources, and unique tools across Europe to support research in the field of bioinformatics (<https://elixir-europe.org>).

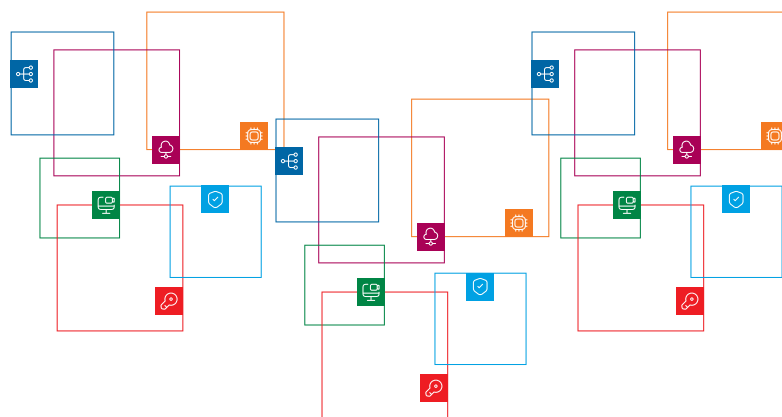
National Organizations



NIX.CZ – CESNET is one of the founding members of NIX.CZ, z. s. p. o. (Neutral Internet Exchange), an association of Internet service providers in the Czech Republic that enables mutual connectivity between the networks of its members (<http://www.nix.cz>).



CZ.NIC – the Association is also one of the founding members of CZ.NIC, z. s. p. o., which manages the .cz domain, supports public-benefit projects, and engages in activities related to the Internet (<http://www.nic.cz>).



THE CESNET ASSOCIATION

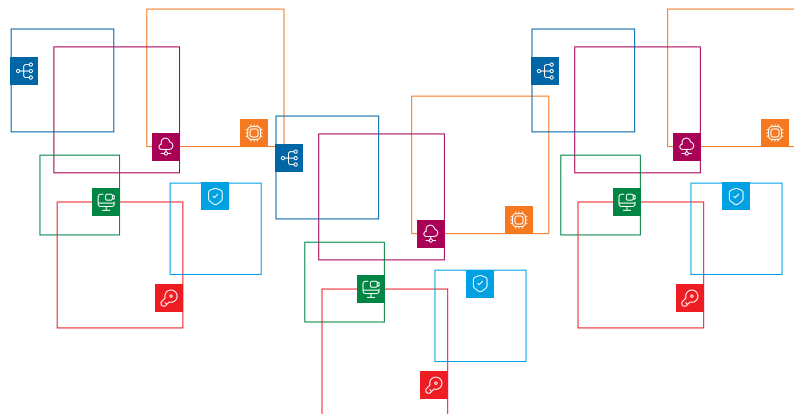
Members of the Association

In 2025, the regular members of the Association included the following institutions:

- Academy of Performing Arts in Prague
- Academy of Sciences of the Czech Republic
- Academy of Fine Arts in Prague
- Czech University of Life Sciences in Prague
- Czech Technical University in Prague
- Janáček Academy of Performing Arts
- University of South Bohemia in České Budějovice
- Masaryk University in Brno
- Mendel University in Brno
- University of Ostrava
- Police Academy of the Czech Republic in Prague.
- Silesian University in Opava
- Technical University of Liberec
- The University of Hradec Králové
- Jan Evangelista Purkyně University in Ústí nad Labem
- Charles University
- University of Defence
- Palacký University in Olomouc
- University of Pardubice
- Tomas Bata University in Zlín
- University of Veterinary Sciences Brno
- VŠB – Technical University of Ostrava
- University of Economics, Prague
- University of Chemistry and Technology, Prague
- College of Polytechnics Jihlava
- Academy of Arts, Architecture and Design in Prague
- Brno University of Technology
- University of West Bohemia

Associate Members:

- Extreme Light Infrastructure ERIC
- University Hospital Brno (since October 1, 2025).
- Olomouc University Hospital (since October 1, 2025).
- Institute for Clinical and Experimental Medicine (since October 1, 2025).
- Moravian Gallery in Brno
- Moravian-Silesian Data Center
- National Museum



THE CESNET ASSOCIATION

Internal Organizational Structure

CESNET, as an association of legal entities, has the following bodies:

- General Assembly
- Board of Directors
- Supervisory Board
- Director of the Association

In 2025, the Board of Directors consisted of the following members:

- Mgr. Michal Bulant, Ph.D.
- Ing. Jan Gruntorád, CSc.
- Ing. Radek Holý, Ph.D.
- Mgr. František Potužník
- doc. RNDr. Pavel Satrapa, Ph.D.
- prof. Ing. Miroslav Tůma, CSc.
- Ing. Tomáš Zouhar

In 2025, the position of Chair was held by prof. Ing. Miroslav Tůma, CSc. The positions of Vice-Chair were held by Ing. Radek Holý, Ph.D. and Mgr. František Potužník.

In 2025, the Supervisory Board consisted of the following members:

- Mgr. Kamil Gregorek, MBA
- Mgr. Martin Maňásek
- prof. JUDr. Radim Polčák, Ph.D.
- RNDr. David Skoupil
- Ing. Michal Sláma

In 2025, the Chair of the Supervisory Board was Ing. Michal Sláma. The position of Director of the Association was held by Ing. Jakub Papírník.

Development Fund Council

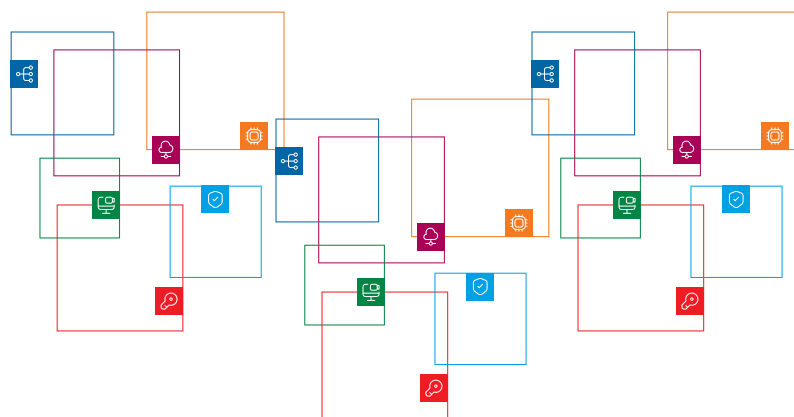
In the first half of 2025, the Development Fund Council consisted of the following members:

- doc. RNDr. Eva Hladká, Ph.D.
- Ing. Jaromír Holec
- Mgr. Monika Hrabáková
- Ing. Marek Kalika, Ph.D.
- Ing. Olga Klápšřová
- Ing. Tomáš Podermaňski
- prof. Ing. Zbyněk Škvor, CSc.

At the General Assembly held on June 26, 2025, a new Development Fund Council was elected, consisting of the following members:

- doc. RNDr. Jiří Filipovič, Ph.D.
- Ing. Jaromír Holec
- Mgr. Monika Hrabáková
- Ing. Marek Kalika, Ph.D.
- Ing. Olga Klápšřová
- Ing. Tomáš Podermaňski
- prof. Ing. Zbyněk Škvor, CSc.

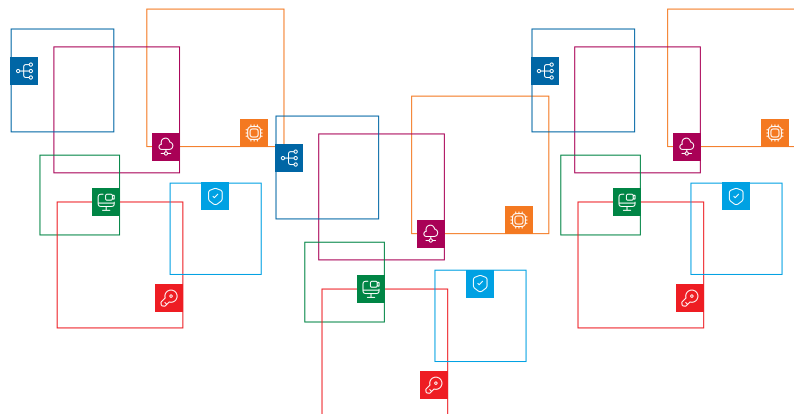
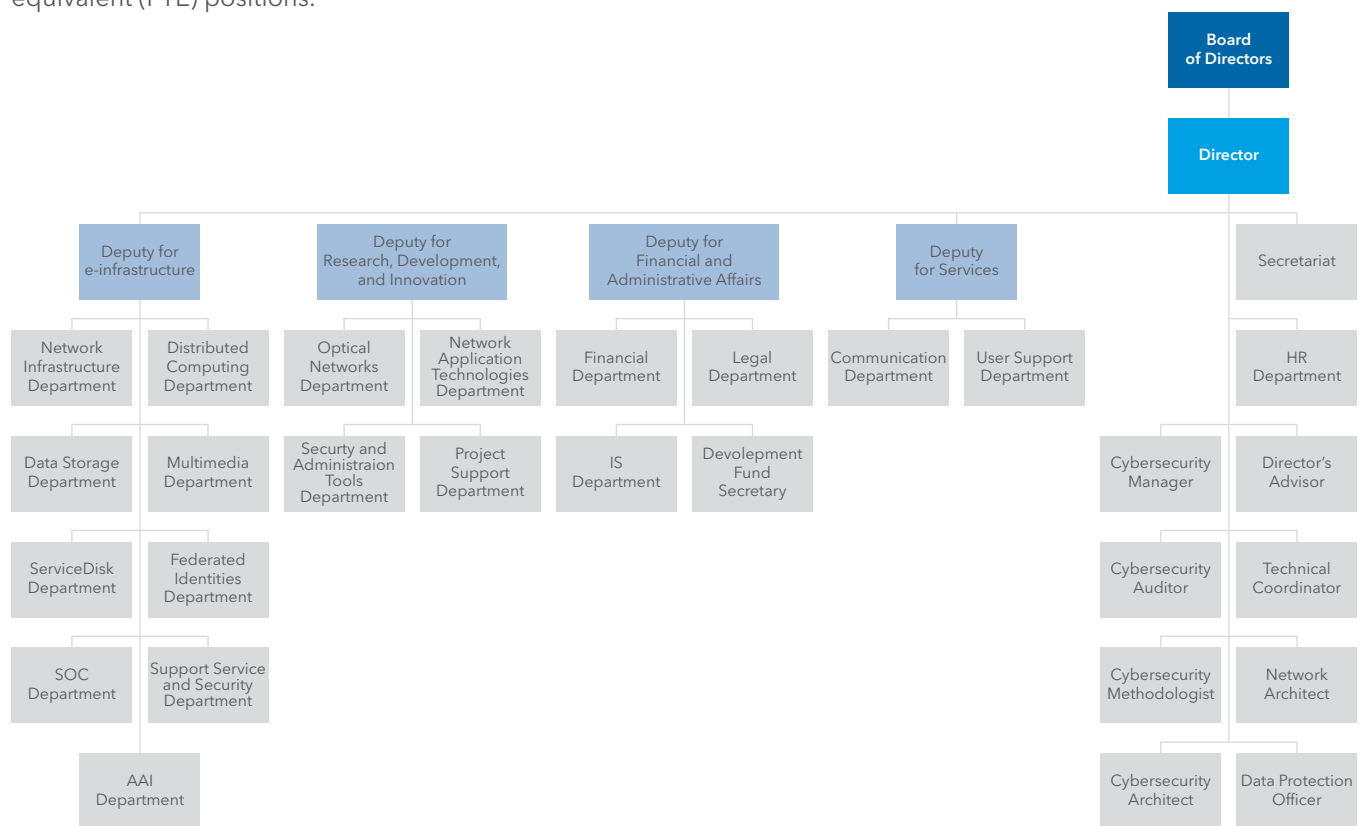
In accordance with the applicable CESNET Development Fund Financial Management Rules, Ing. Olga Klápšřová was elected Chair and prof. Zbyněk Škvor Vice-Chair of the Council.



THE CESNET ASSOCIATION

Organizational Chart

The Association's basic organizational structure consists of departments grouped into divisions. Within this structure, management is handled by so-called line managers. In In 2025, the Association had a total of 252.66 full-time equivalent (FTE) positions.





E-INFRASTRUCTURE

The CESNET Association is the host organization of the large research infrastructure – e-Infrastructure CZ (acronym e-INFRA CZ), a key component of the Roadmap of Large Research Infrastructures of the Czech Republic for 2023-2026. It provides a universal environment, independent of any specific field of research, for the transmission, processing, sharing, and storage of scientific data and for user collaboration – an essential foundation for modern research, development, and innovation across all disciplines.

e-INFRA CZ is the result of cooperation of three e-infrastructures:

- **CESNET e-infrastructure**, operated by CESNET,
- **CERIT Scientific Cloud** operated by Masaryk University, and
- **IT4Innovations national supercomputing center**, operated by VŠB – Technical University of Ostrava.

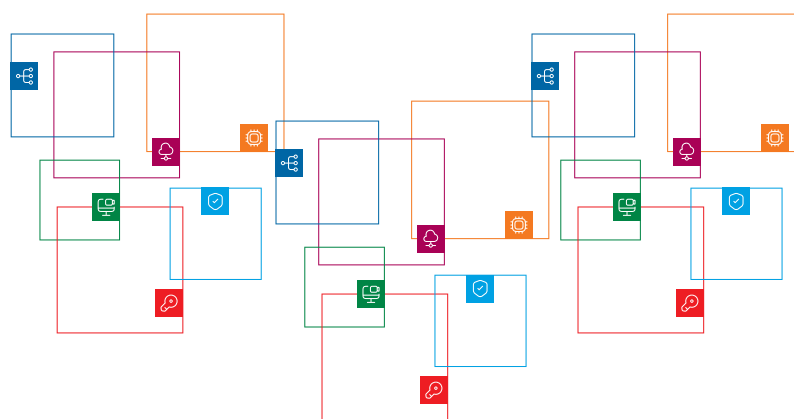
Within the consortium, the CESNET Association serves as the host organization – that is, the organization responsible for the operation of the entire e-INFRA CZ.

CESNET is also the coordinator of two complementary projects for the development and operation of e-INFRA CZ:

- **e-Infrastruktura CZ** (LM2018140, 2023–2026), funded under the Large Research Infrastructures Projects program (2010–2026). The targeted support provided in the form of a subsidy is intended to cover part of the operating costs associated with running the e-infrastructure.
- **Modernization of e-INFRA CZ II** (CZ.02.01.01/00/23_016/0008329), funded under OP JAK (Jan Amos Komenský Operational Programme), which serves as the main source of investment funding for the qualitative upgrade of the e-infrastructure.

The objective is to modernize the individual components of e-INFRA CZ and ensure their operation. The consortium members thus build on the previous activities of their respective e-infrastructures, while user access to e-infrastructure resources is consolidated so that users experience e-INFRA CZ as a unified whole.

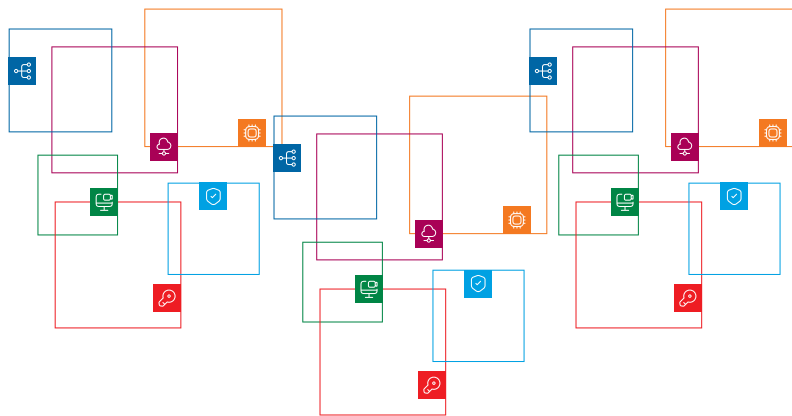
The CESNET e-infrastructure provides **services supporting the needs of Czech science, research, development, and education**. The following chapters describe the development of the e-infrastructure, the portfolio of services provided, and related research activities. The Association provides these services not only to its members but also to entities that meet the Conditions of Access to the CESNET e-infrastructure.



DEVELOPMENT OF THE CESNET E-INFRASTRUCTURE

In 2025, alongside maintaining the routine operation of the CESNET e-infrastructure, we focused primarily on modernizing the components of e-INFRA CZ. The following are among the most significant outcomes of our work on developing and operating the CESNET e-infrastructure:

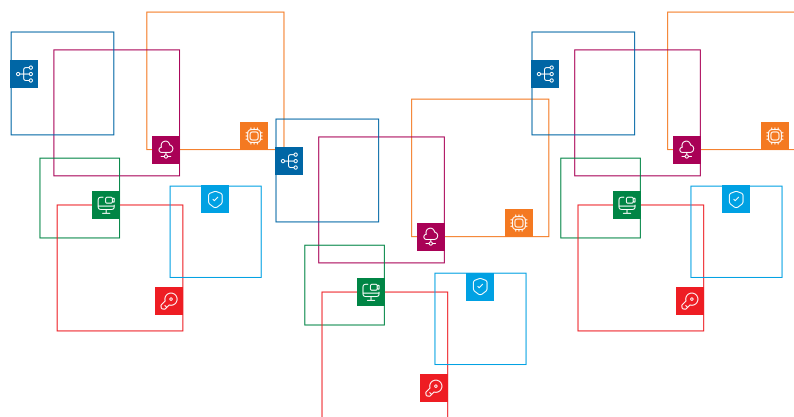
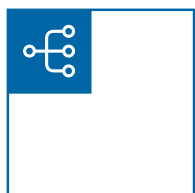
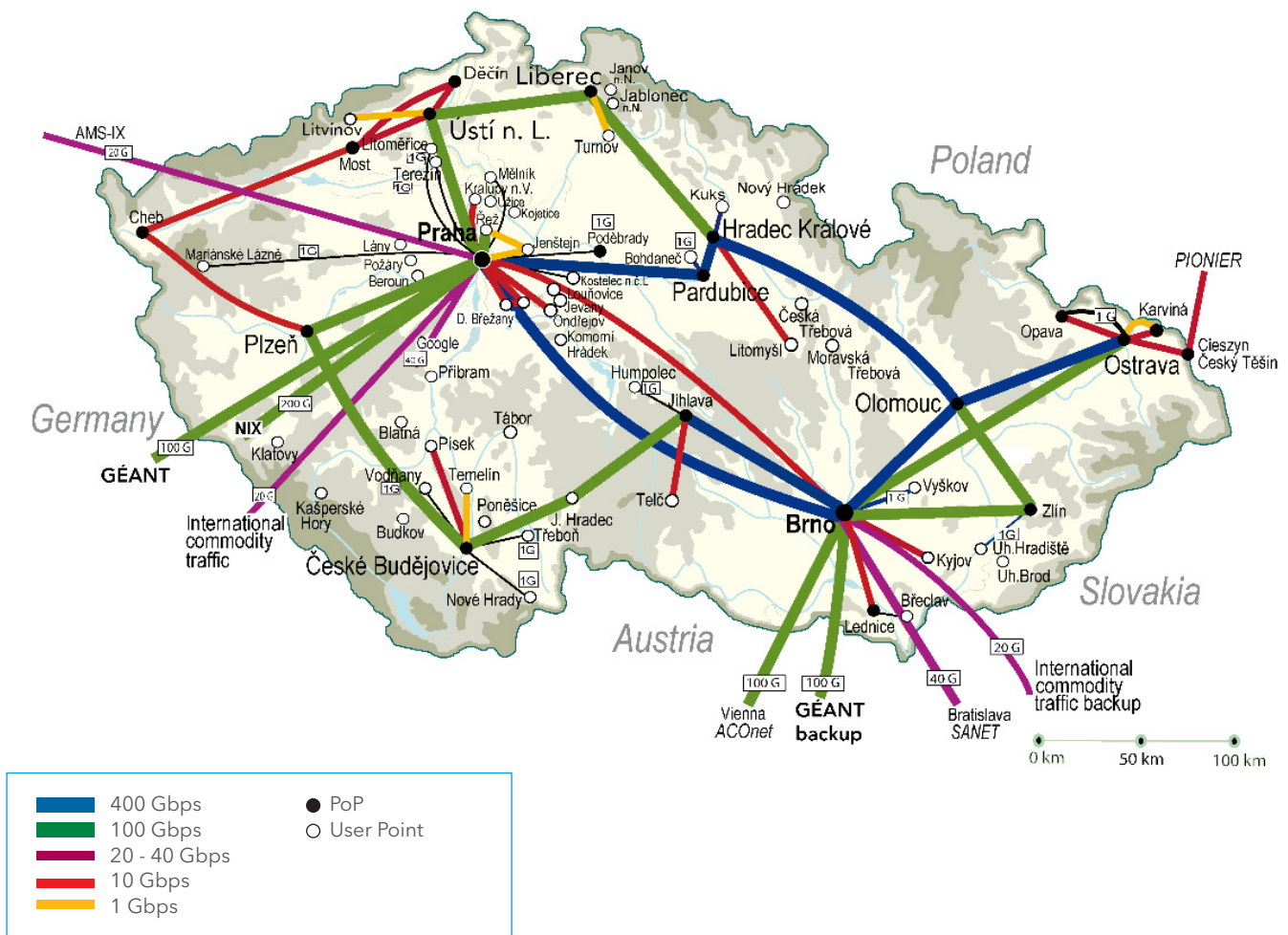
- The Institute of Physics of the Czech Academy of Sciences became the first member institution to connect to the CESNET3 backbone network at 400 Gbps. ELI's connection was also upgraded to 100 Gbps.
- The connection to the GÉANT network was upgraded to 400 Gbps.
- External connectivity was strengthened by establishing a connection to DE-CIX in Frankfurt, one of the world's largest Internet exchange points. We established the 20 Gbps connection through the national NIX.CZ peering exchange.
- The network nodes in Brno and Hradec Králové were relocated.
- Within the network infrastructure, we resolved an overlap in fiber routes in Ostrava and established a backup connection for the University of Ostrava.
- In the area of certificate services, we continued the migration to the new TCS certificate provider, the Greek company HARICA. The ACME protocol was also implemented for server certificates.
- The DDoS Protector was integrated into the network infrastructure's automated defense system. DDoS Protector is an internally developed system based on hardware-accelerated traffic processing, capable of mitigating even network attacks that cannot be effectively addressed using the standard capabilities of active network devices.
- A module for managing network circuits was developed for the NetBox asset management system, enabling their physical routes to be displayed on a map and helping improve the efficiency of fiber infrastructure management.
- The acquisition of switches featuring White Rabbit technology, a key component for implementing the distribution of precise time and stable frequency across the CESNET e-infrastructure.
- Expansion of MetaCentrum grid and cloud computing capacity, including HD and GPU nodes in Brno, Prague, and Pilsen; renewal and expansion of distributed disk storage; development of a new shared SCRATCH space in Pilsen and new object storage for the cloud; and expansion of ELIXIR computing and storage capacity.
- Development of the Jupyter Notebook environment, including international activities under EOSC EU Node, ENVRI-Hub, and EOSC Beyond; further development of the Galaxy analytics environment and the ESA Data Hub Relay data portal.
- Modernization of the object storage facility in Jihlava. The data migration to the new equipment was seamless for users and resulted in a slight overall increase in the storage system's physical capacity.
- Installation of the first hardware delivered for the National Repository Platform at two geographically separate locations.
 - Connection of the first repositories and core support services of the National Repository Platform to the AAI (authentication and authorization infrastructure) operated by CESNET.
 - Connection to the global FABRIC testbed. The infrastructure will be used, for example, to test network applications developed by the CESNET Association and for educational purposes through student projects carried out in cooperation with the Faculty of Information Technology at the Czech Technical University in Prague.
 - Accession to the new OCRE2024+ Framework Agreements facilitating access to services from commercial cloud providers.
 - Addition of three healthcare facilities to the hSOC-VRF hospital network: the Institute of Hematology and Blood Transfusion, Pardubice Hospital, and the Military Hospital Brno. The hSOC-VRF network currently includes 23 hospitals.
 - Launch of a new Scanning service and implementation of alerts concerning DeepSeek technology in response to the NÚKIB Warning, made available through the My CESNET portal. Pilot testing of the Log Management as a Service system was also launched.
 - Extension of the infrastructure to an off-site location of the CESNET Virtualization Platform.



COMMUNICATION INFRASTRUCTURE

At the core of the e-infrastructure is a high-quality, high-speed, low-latency backbone communication network with extensive international connectivity. It offers a wide range of advanced features and capabilities, including dedicated transmission channels and non-IP services such as precise time and stable frequency transfer and quantum key distribution.

Map - CESNET Network Topology



COMMUNICATION INFRASTRUCTURE

The CESNET Association develops and operates a modern communication infrastructure designed to interconnect the resources, services, and users of the e-infrastructure and other large research infrastructures, as well as connect them with their international partners.

At its core is a backbone infrastructure designed to provide sufficient capacity for data transmission and maximum resilience to route and technology failures. The infrastructure is connected through a variety of links with capacities of up to 400 Gbps. These include global connectivity through a Tier 2 operator and Internet exchange points, as well as links to research networks through GÉANT and several cross-border fibers. Together, they provide users with sufficient capacity and redundancy, as well as dedicated connections for specific applications.

Network access services include:

- redundant, high-capacity connectivity to the CESNET3 backbone network,
- dedicated circuits and networks,
- lambda services with physically dedicated capacity and stable latency,
- photonic services for the most demanding applications, providing a fully optical path between endpoints,
- management of Internet number resources (CESNET NIC), including the Sponsoring LIR service,
- authoritative and secondary DNS services,
- primary Stratum 2 time servers with their own time source,
- multi-level infrastructure monitoring and tracking,
- services provided by the internationally accredited CESNET-CERTS security CSIRT team,
- continuous network availability monitoring (NOC),
- 24/7 service desk - a central support contact point combining the network operations center and helpdesk.

In 2025, we continued to develop the CESNET3 backbone network, expanding its capacity and enhancing its resili-

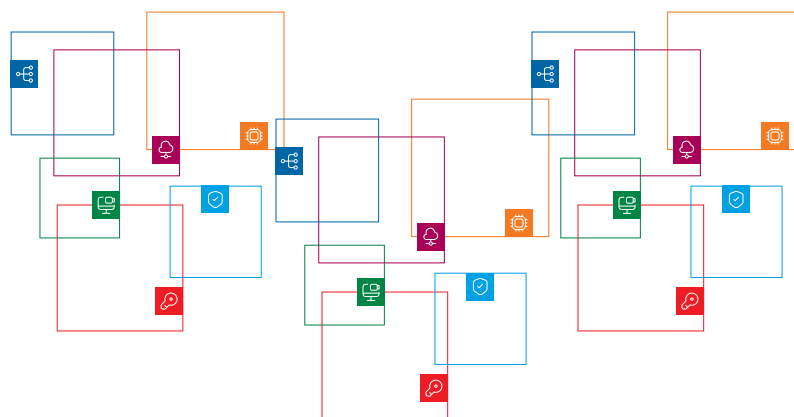
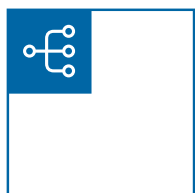
ence and security. The first member institution – the Institute of Physics of the Czech Academy of Sciences – was connected to the network at 400 Gbps, while the capacity of the connection to the GÉANT network was also increased to 400 Gbps.

External connectivity was expanded by establishing a connection to DE-CIX in Frankfurt, a major global Internet exchange point, through NIX.CZ. In terms of physical infrastructure, network nodes in Brno and Hradec Králové were relocated. The network's resilience was further improved by resolving the overlap in fiber routes in Ostrava.

Infrastructure security was enhanced by integrating the DDoS Protector system into the network's automated defense system. For infrastructure management, the NetBox system was expanded to support circuit tracking and visualization. At the same time, switches featuring White Rabbit technology were acquired for precise time and frequency distribution.

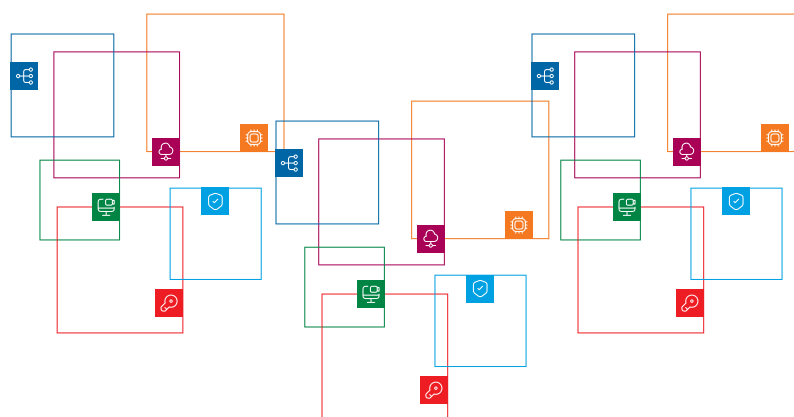
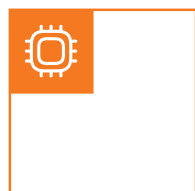
Other activities included connecting to the global FABRIC testbed, expanding specialized networks including hSOC-VRF, and increasing connection capacity for selected sites, such as upgrading the ELI infrastructure to 100 Gbps.

The CESNET Association continues to participate in the hSOC (Hospital SOC) initiative, which aims to better protect connected hospitals against cyber threats and attacks. It is a dedicated network within the CESNET e-infrastructure, separated from regular traffic and governed by specific policies and rules, with a range of security tools for monitoring and managing communication between participating organizations.



HIGH-PERFORMANCE COMPUTING

Topologie sítě CESNET



HIGH-PERFORMANCE COMPUTING



The MetaCentrum distributed computing infrastructure connects high-performance computing resources across Czech academic institutions and offers a range of services and solutions to meet the diverse needs of both research teams and individual users. From a user perspective, the main innovations are changes to the range of services offered.

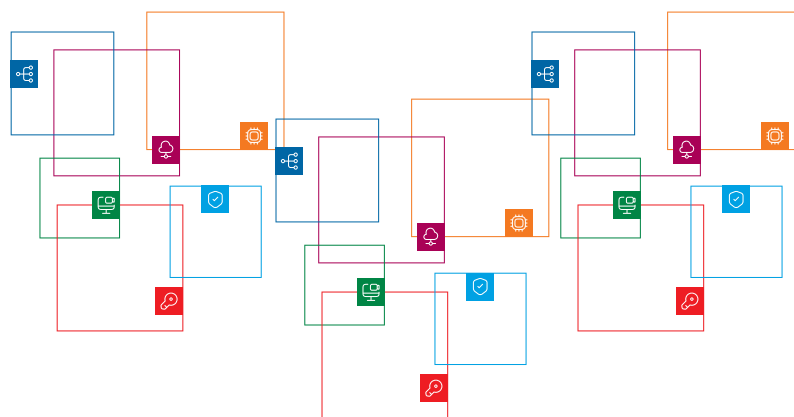
These primarily concerned artificial intelligence, support for computing workflows, and graphical user interfaces. At the same time, 2025 was also a year of significant behind-the-scenes progress. MetaCentrum carried out a major expansion of its computing and storage capacity while deploying a range of new technologies. Perhaps the most notable of these is the introduction of shared high-performance scratch storage, which significantly expands the possibilities for working with large-scale datasets. By the end of 2025, 4,600 users had access to 60,000 CPU cores and 500 GPUs across a wide range of computing environments, including a batch processing system, cloud services, Kubernetes, GUI-based tools, custom platforms, and the international EGI federation. We are pleased to report that the number of users of the MetaCentrum computing infrastructure increased by 32% year over year.

What were the key highlights of 2025?

In terms of computing capacity, MetaCentrum added 19,000 CPU cores and 88 GPU accelerators in 2025. A further major expansion of both CPU and GPU capacity followed shortly thereafter, in early 2026. The new computing resources were deployed across the Czech Republic, with installations in Prague, České Budějovice, Brno, and Pilsen. As for the new high-performance scratch storage, we are on track to deploy it across three locations. The first is already operational in Brno, work on the second

began around the turn of the year in Pilsen, and a third is planned for Prague. Each of these facilities will provide short-term storage (typically for several months) for large volumes of data, allowing the data to be accessed directly from compute nodes and processed without the need for additional data transfers. From the compute nodes' perspective, the storage will perform much like locally attached storage.

For home storage, we added 8 PB of new capacity across four locations: Prague, Brno, Pilsen, and České Budějovice. Technically, these are NFS-based storage systems optimized for performance rather than capacity. For capacity-oriented storage ("storage" and "project" type), we are gradually transitioning to the next generation of this service, in which medium-term data are stored in a unified object storage platform provided by the Data Storage Department. Technically, this is based on CephFS technology, which makes it possible to present object storage as a mounted file system. From the users' perspective, the transition is virtually transparent, while enabling major operational and architectural improvements to the underlying infrastructure. The final major behind-the-scenes innovation involved the network. The transition to a new architecture, featuring a 100 Gbps backbone and 10/25 Gbps connectivity for compute nodes, was successfully completed in Pilsen and partially rolled out in Prague. Brno and České Budějovice will follow.



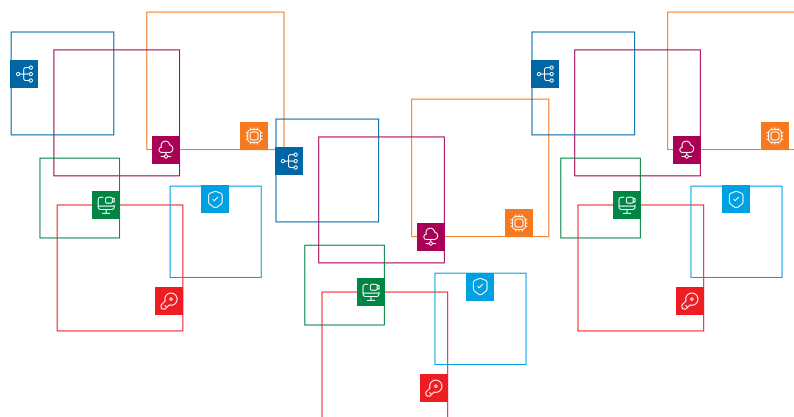
HIGH-PERFORMANCE COMPUTING



Users have access to a comprehensive suite of AI tools and computing resources. In addition to providing GPUs across all computing environments – including the cloud, grid, Kubernetes, and GUI-based platforms – MetaCentrum also offers access to an NVIDIA DGX node, where the GPUs are interconnected using high-speed NVLink technology. In collaboration with CERIT-SC at Masaryk University, MetaCentrum provides access to locally hosted LLMs for inference, including a web-based chat interface, API access, a broad selection of models, and the assurance that data never leaves the MetaCentrum infrastructure. The MetaCentrum cloud environment was upgraded to the next-generation OpenStack Besar Cloud distribution and is now fully operational at two sites: Brno and Ostrava. MetaCentrum Cloud now enables users to deploy and manage their own Kubernetes clusters.

A key part of MetaCentrum is its user support, complemented by a broad portfolio of software and consulting services for deploying and optimizing scientific computing workflows. In 2025, we significantly enhanced our user documentation by introducing a unified documentation platform and an AI chatbot. We also continued to update both

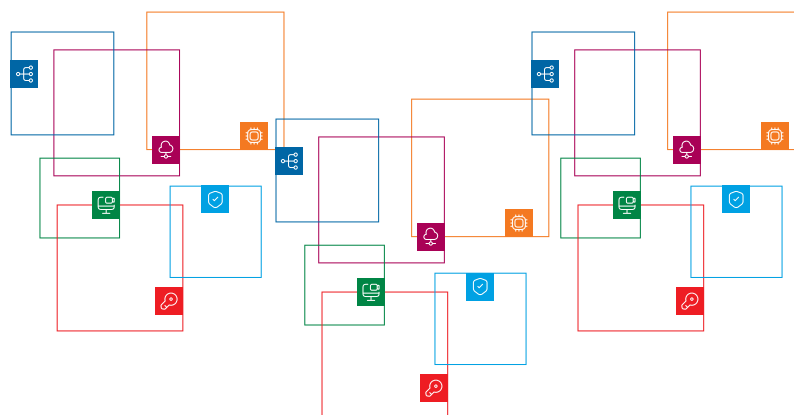
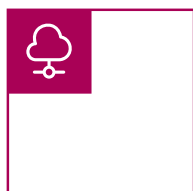
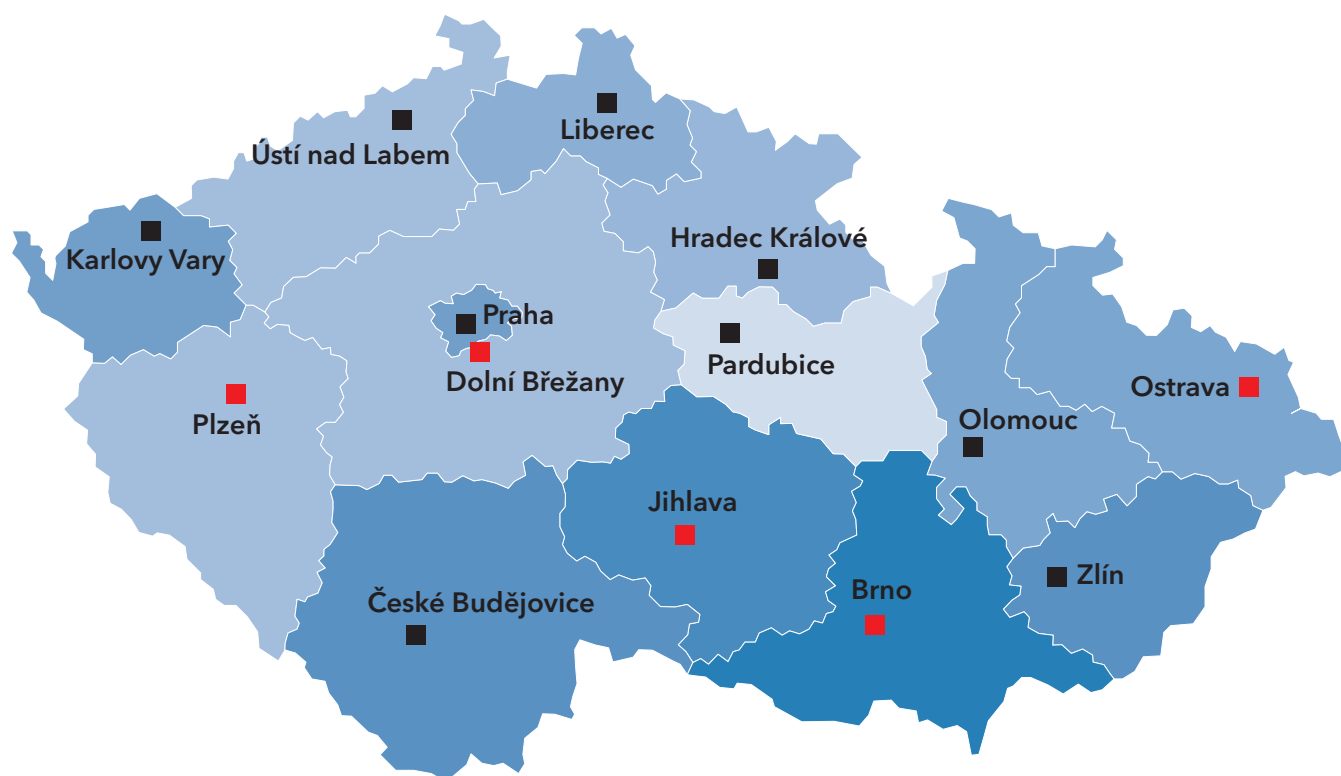
the computing environments (batch, cloud, and Kubernetes) and the software portfolio in response to users' evolving needs. Particular attention was given to graphical user interfaces – including Open OnDemand, Rancher, and Jupyter Notebooks – as well as to the integrated Galaxy workflow platform. In key areas, MetaCentrum is supported by its own research activities and active participation in international collaborative projects. MetaCentrum maintains long-term strategic collaborations with the European EGI infrastructure and the EOSC Federation, as well as with major research initiatives in the life sciences (ELIXIR), high-energy physics (LHC), and Earth observation (ESA). Our research focuses on scheduling and resource management, while we also contribute to the design and delivery of services within the EGI Federation – including Jupyter Notebooks – and the European Open Science Cloud (EOSC), through projects such as EOSC Beyond and EOSC EU Node. We also play an active role in developing the National Data Infrastructure, particularly through the National Repository Platform (NRP). Our research also spans green computing, the further development of the Galaxy platform, and monitoring and accounting tools for distributed computing infrastructures.



DATA STORAGE



Data Storage Map



DATA STORAGE



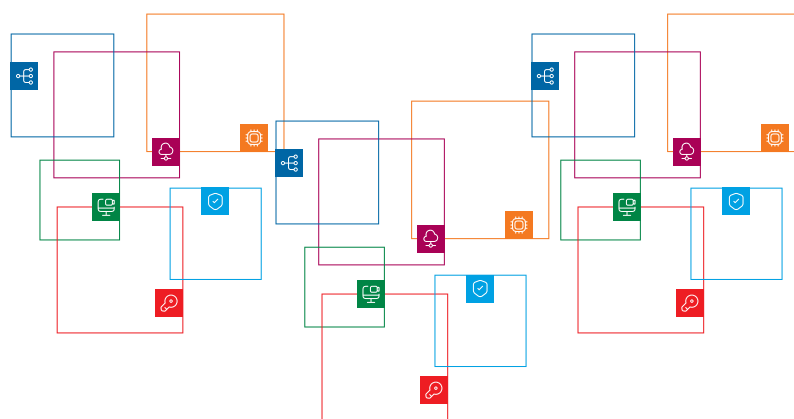
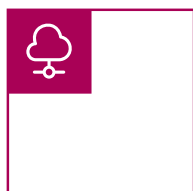
The chief goals of the Data Storage infrastructure were to maintain reliable operations, advance its services and international collaborations, and support its user communities. All storage services remained fully operational throughout the year, including access to file systems and object storage, as well as tools for data transfer, synchronization, and sharing. The oldest object storage deployments are being gradually modernized as part of an ongoing technology refresh.

The department also contributed to the international High Performance Language Technologies (HPLT) project, providing direct technical support for the development of large language models (LLMs). This is a good example of how the role of storage infrastructure is evolving - from repositories for unstructured data to platforms for large-scale computational datasets that exceed the capabilities of conventional storage directly attached to compute clusters. Over time, much of the role traditionally served by archival storage will be assumed by data repositories.

The Data Storage team played a major role in the implementation of EOSC in the Czech Republic. Work also continued on implementing the data repository system, laying the groundwork for the forthcoming National Repository Platform project. The project supports the development of high-capacity data repositories with rich metadata, providing the broader research community with a platform for storing and sharing data in line with the FAIR principles. Although repositories are often viewed primarily as archives for scientific data, a repository infrastructure is much more

than an archival system - it is a living platform for data that remains actively used throughout the research lifecycle.

The National Repository Platform (NRP) project continued to advance, with the goal of providing a framework for deploying repository systems tailored to the needs of different user communities. It builds on the six-year EOSC-CZ IPs project. As part of that project, the core components of the National Data Infrastructure were developed, laying the foundation for the National Repository Platform. In addition to services such as the National Metadata Directory, which aggregates metadata from the National Repository Platform and related repositories, domain-specific scientific repositories also began to come online. The NRP project also provides a general-purpose research data repository designed to meet the needs of smaller research groups. Implementation of the National Repository Platform spanned the entire technology stack - from repository systems, storage software layers, and application runtime environments to the procurement, deployment, and commissioning of the underlying hardware.



SECURITY OF THE CESNET E-INFRASTRUCTURE

Od roku 2018 je sdružení CESNET nositelem mezinárodně uznávané certifikace systému managementu bezpečnosti informací (ISMS) podle normy ČSN EN ISO/IEC 27001:2014, která specifikuje požadavky na systém řízení bezpečnosti informací v rámci činnosti a poskytovaných služeb organizace s cílem eliminovat rizika narušení dostupnosti, důvěrnosti a integrity dat.

Since 2018, the CESNET Association has held internationally recognized **certification of its Information Security Management System (ISMS) under the ISO/IEC 27001:2014 standard**, which specifies the requirements for managing information security across an organization's operations and services to minimize the risks to the availability, confidentiality, and integrity of information.

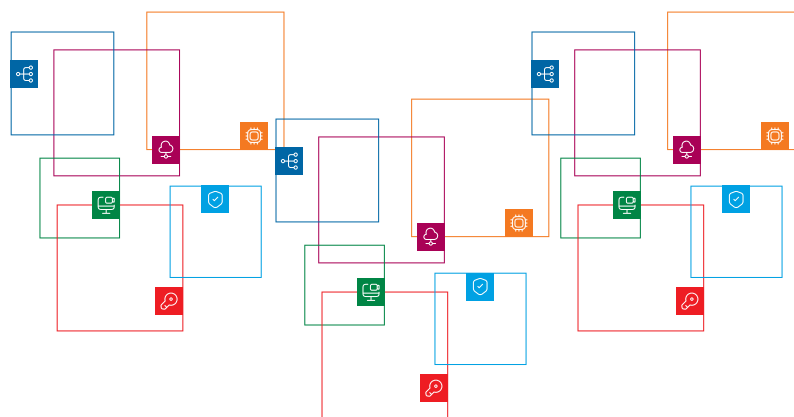
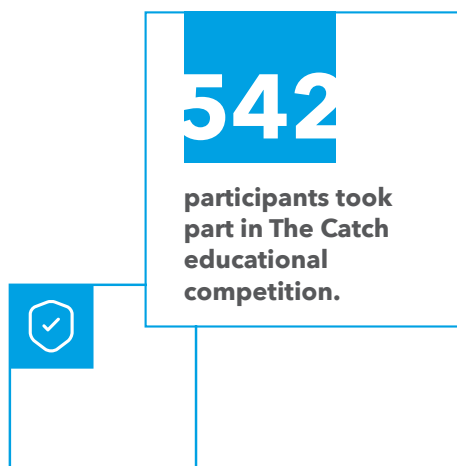
A key component of the security architecture is the technology platform for **monitoring the backbone network, detecting security events and incidents, and sharing this information through the FTAS, G3, Warden, and Mentat services**. It provides the foundation for both preventing security incidents and responding to them effectively when they occur. All of these systems continued to evolve throughout the year, with ongoing enhancements driven by the needs of both the Association as the operator of the e-infrastructure and its users, including members and participating organizations. All of these systems continued to prove their stability and value, while also demonstrating strong potential to support compliance with the Czech Cybersecurity Act – not only

for CESNET, but also for connected institutions subject to the Act's requirements.

In 2025, we continued to expand our cybersecurity services through the **Security Operations Centre (SOC)**. We also held several meetings of the CSIRT Working Group, where participants addressed operational and service security topics.

In 2025, the CESNET Forensic Laboratory (FLAB) completed **five external penetration testing engagements, two external phishing assessment engagements**, and delivered several training courses in digital forensics. The Phishingator service also continued to gain traction as a platform for conducting simulated phishing campaigns to strengthen users' awareness and resilience against phishing attacks.

As in previous years, FLAB also organized **"The Catch"**, its educational cybersecurity competition held during Cybersecurity Awareness Month (October), attracting 542 participants.



NETWORK IDENTITIES



The authentication infrastructure provides trusted digital identities and seamless access to the services of the CESNET e-infrastructure.

At the core of this infrastructure is the Czech Academic Identity Federation (eduID.cz), which brings together member organizations that securely share identity information, enabling their users to access a wide range of online services with a single trusted digital identity. Each full member of the federation may act in one or both of the following roles:

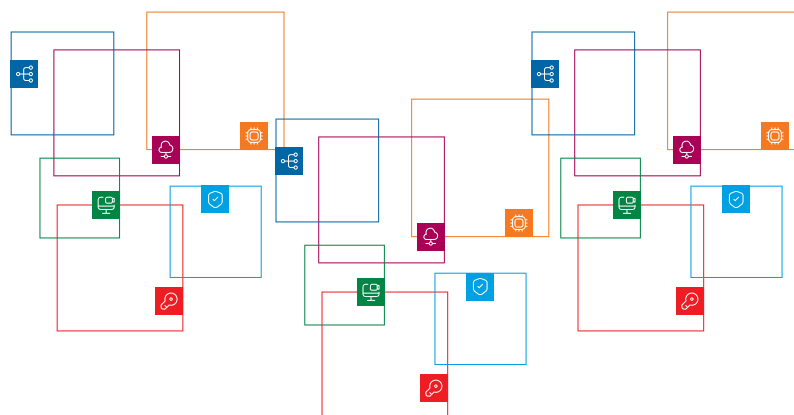
- An Identity Provider (IdP) manages its users' usernames, passwords, and other identity information, and shares selected attributes with service providers to enable authentication and access to services.
- A Service Provider (SP) operates a web application or network service and uses information about a user's identity and, where applicable, other user attributes to control access to the service..

The eduID.cz federation currently includes 289 identity providers: 44 operated by universities, 51 by institutes of the Czech Academy of Sciences, 14 by hospitals, 126 by libraries, and 39 by other institutions, including international research groups, museums, archives, and regional authorities.

The CESNET Association has prepared guides to federated authentication for the INTOSH, Pythia, and RefereNTKa services for members of the eduID.cz federation. We also updated the guides for the AIP and DNNT services to reflect recent changes to those services. The European Union plans to launch the European Digital Identity Wallet (EUDIW), based on Verifiable Credentials, by the end of 2026. The European Union plans to launch the European Digital Identity Wallet (EUDIW), based on Verifiable Credentials, by the end of 2026. OpenID Connect is used in digital wallets. In line with REFEDS recommendations, we participated in preparatory discussions on supporting OpenID Connect in national federations and on planning for the use of academic identities in digital wallets at both the European and global levels. Many services used by members of the eduID.cz federation who will gradually begin adopting digital wallets are hosted outside the European Union, particularly in the United States. The specifications for digital wallets therefore need to be harmonized at the global level. In the Czech Republic, the Digital and Information Agency (DIA) operates a test version of the EUDIW.

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There are currently
289 identity
providers in the
eduID.cz federation.



NETWORK IDENTITIES



After many years, the global eduroam Compliance Statement was updated, reflecting not only changes to technical requirements. On behalf of the CESNET Association, the updated policy was signed by the Association's Director. Ansible playbooks were created for all supporting applications in the eduroam federation, enabling servers to be restored quickly in the event of a failure. The eduroam mobile service was also redesigned and modernized to address its outdated technical infrastructure. This involves providing broadcast support and eduroam connectivity at events and presentations for the CESNET Association's internal purposes. In practice, the service is provided using a Turrus Omnia Wi-Fi 6 router equipped with a 5G module for wireless connectivity. In 2025, 69 new organizations joined the eduroam project, bringing the total to 565 realms.

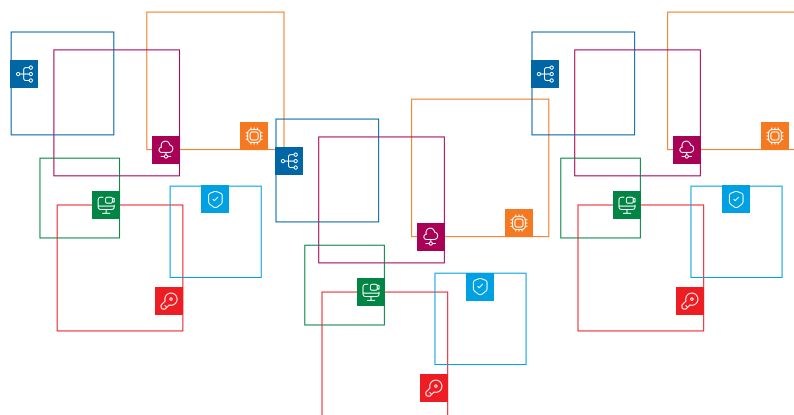
The new CESNET CA 5 grid certification authority was accredited with a 4096-bit key. It is signed by a new root certification authority, also using a 4096-bit key, significantly enhancing security. We began evaluating a containerized solution for issuing CESNET TSA time stamps, with production deployment planned for 2026.

The eIDAS service continued operating in production, with additional information systems joining throughout the year. Six new systems were connected, bringing the total to 42 across 22 participating organizations, including four that joined the service during the year. Among the newly connected organizations was a hospital, whose integration prompted us to begin implementing support for the XAdES signature format. In 2025, a total of 1,469 valid qualified certificates were managed, an increase of 453 over the previous year, along with 26 qualified electronic seals. The service continues to evolve based on user feedback.

We were required to reimplement a substantial portion of the TCS service portal following the unexpected change of provider to the Greek certification authority HARICA. In particular, we had to rewrite the libraries responsible for communicating with the certification authority, as well as the automated workflows that synchronize the certificate and domain databases to accommodate the provider's revised processes. We also made significant improvements to the user interface. We also introduced automated certificate issuance via the ACME protocol. The LDAP directory supporting the TCS portal was separated from the directory now used exclusively to store employee information.

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**nových organizací
se v roce 2025
připojilo do projektu
eduroam**



AUTHENTICATION AND AUTHORIZATION INFRASTRUCTURE (AAI)

Perun, a proprietary software system developed in accordance with the international AARC Blueprint (Authentication and Authorisation for Research and Collaboration) standard, is deployed and operated in a production environment (24/7 with 99.9% availability) for several international and national research infrastructures, as well as for the Academy of Arts, Architecture and Design in Prague.

In order of number of users, these are:

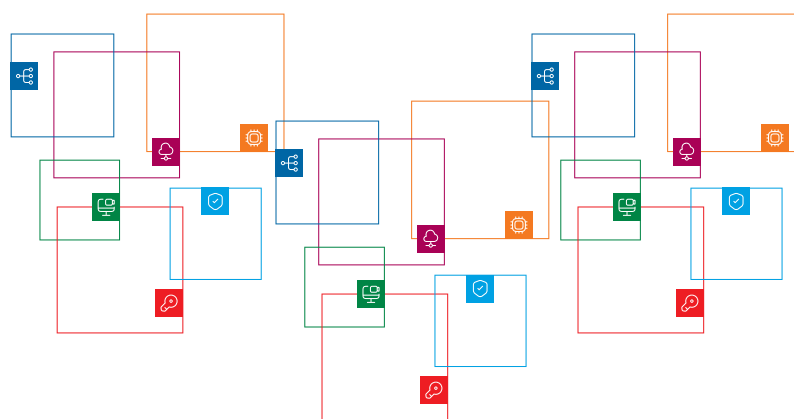
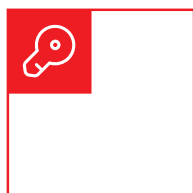
- the MyAcademicID student mobility project, including Erasmus+ (myacademic-id.eu)
- e-INFRA CZ / EOSC CZ (e-infra.cz)
- LifeScience Login for the ELIXIR, GDI, BBMRI, and EJP RD research infrastructures (lifescience-ri.eu)
- GÉANT, the pan-European organization connecting national research and education networks (geant.org)
- The Academy of Arts, Architecture and Design in Prague (UMPRUM) (umprum.cz)
- SURF, the Dutch national research and education network (surf.nl)
- MyAccessID, the central authentication service for the EOSC AAI Federation
- EOSC EU Node, the EOSC node operated by the European Commission (eosc-federation.eu)
- EGI, the European Grid Infrastructure (egi.eu)
- UmbrellaID, the digital identity service for the photon and neutron research communities (umbrellaid.org)
- FENIX Research Infrastructure, the federation of super-computing centers (fenix-ri.eu)
- EUROfusion, the European Consortium for the Development of Fusion Energy (euro-fusion.org)
- eduTEAMS, the identity and access management service for research and education communities (eduteams.org)
- eLTER, the European Long-Term Ecosystem, Critical Zone and Socio-Ecological Research Infrastructure (elter-ri.eu)

The Perun AAI system consists of two components:

- IdM (Identity Management) – provides application management, user account administration, user data management, group management, and the provisioning of authorization data to managed systems.
- Proxy IdP – a component that brokers user authentication from identity providers in the Czech academic federation eduID.cz, the global eduGAIN interfederation of research and education organizations, and selected social identity providers (Google, Microsoft, Apple, ORCID, and GitHub) to web-based services.

In 2025, the number of registered users of the MyAcademicID AAI instance increased significantly, rising by 37% from 488,258 users in January 2025 to 670,908 in January 2026. The number of registered users of the LifeScience Login instance also grew substantially, increasing by 26% to 29,656 users. The e-INFRA CZ instance had a total of 91,109 registered users as of January 2026.

Throughout 2025, significant activities continued in support of the European Open Science Cloud (EOSC), focusing on the management of FAIR (Findable, Accessible, Interoperable, Reusable) research data.



AUTHENTICATION AND AUTHORIZATION INFRASTRUCTURE (AAI)

Within the EOSC Beyond project, work continued on connecting nodes to the EOSC Federation. The Perun instance serving the national e-INFRA CZ computing infrastructure and the Perun instance known as LifeScience Login, supporting the ELIXIR and BBMRI-ERIC life science communities, together provide the AAI for three EOSC Federation nodes. In 2025, the ELIXIR and BBMRI-ERIC EOSC Federation nodes were formally established. A similar process is expected in 2026 for e-INFRA CZ. Once the Czech national EOSC Federation node is formally established, its AAI is expected to be admitted to the EOSC AAI Federation.

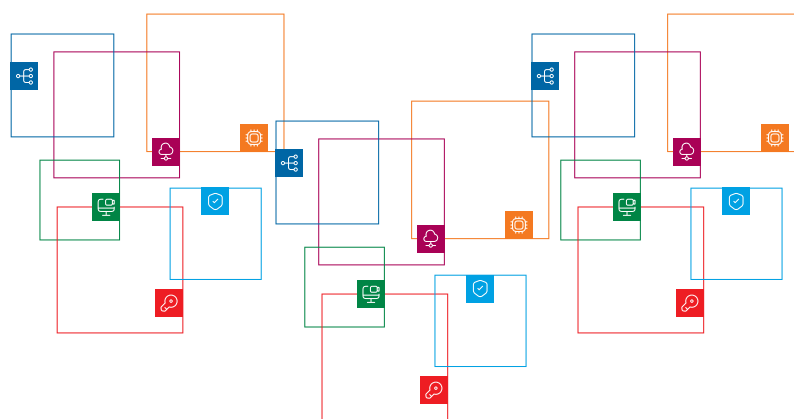
At the national level, work continued on the National Repository Platform (NRP) for research data. The Perun instance operated for the national e-INFRA CZ computing infrastructure also serves as the authentication and authorization infrastructure for connecting repositories to the NRP. In 2025, several pilot repositories and supporting services were connected, including the National Repository, the National Document Repository, the National Biodiversity Data Repository, the Molecular Biophysics Database, ASEP/ARL, Archeo Vault, the Data Stewardship Wizard, and DDRApp TUL.

The Perun system supporting the national e-INFRA CZ computing infrastructure also underwent significant enhancements in 2025. User management for CEITEC VUT (the Central European Institute of Technology, a consortium of six Brno universities and research institutions, of which Brno University of Technology is one) was migrated from Masaryk University's Perun instance to the Perun instance operated for e-INFRA CZ by the CESNET Association. This migration followed the transfer of operation and administration of Masaryk University's Perun instance from the CESNET Association to Masaryk University in 2025. This migration makes it easier for external users to access CEITEC's Core Facilities—shared laboratories that provide state-of-the-art instrumentation and specialized research services.

A similar migration was carried out for the Viničná Microscopy Core Facility at the Faculty of Science, Charles University, which provides state-of-the-art imaging technologies to researchers across a wide range of disciplines.

To support the provision of user management services to organizations outside the e-INFRA CZ consortium, such as the CEITEC and Viničná Microscopy Core Facilities described above, template legal agreements for AAI service provision were prepared, and the e-INFRA CZ AAI Terms of Service were established.

A significant improvement was made to the way data is propagated from the Perun system to managed systems. Data is now provided in a unified JSON format, eliminating the need to define and implement a custom data exchange format for each newly integrated managed system. This significantly speeds up the integration of new managed systems. By January 2026, the e-INFRA CZ Perun instance was propagating data to 777 target systems ("facilities") across 2,649 machines ("destinations"). The distinction between a facility and a destination is particularly evident in computing clusters, where a single cluster may consist of hundreds of identically configured machines. Through the use of the LifeScience Login Perun instance in the European Genomic Data Infrastructure (GDI) and EOSC-ENTRUST projects, which is building a European federation of Trusted Research Environments (TREs) for processing sensitive data, and through our participation in the EOSC AAI Working Group and the Global Alliance for Genomics and Health (GA4GH) Data Security Work Stream, we contributed to the development of authentication and authorization standards for the secure processing of sensitive data, particularly genomic data.



USER COLLABORATION AND MULTIMEDIA

CESNET Association's remote collaboration and multimedia services are used by virtually all member institutions, including 50 of the 55 institutes of the Czech Academy of Sciences, 11 university hospitals, and more than 40 additional connected organizations.

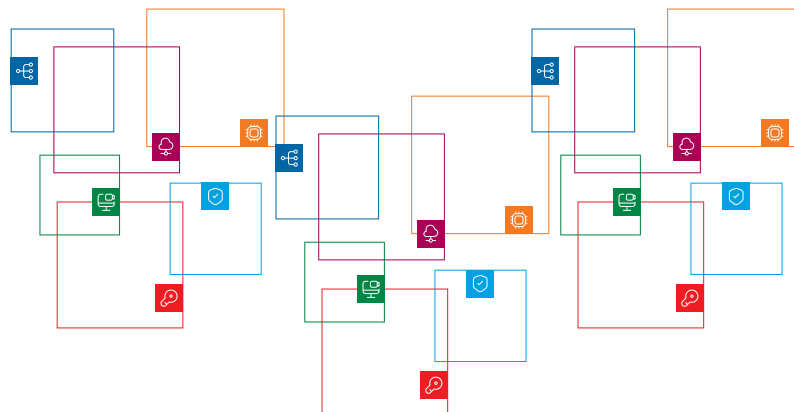
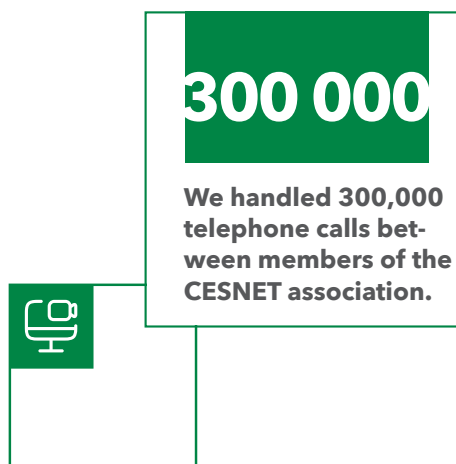


In 2025, our videoconferencing infrastructure hosted more than 140,000 meetings for over 700,000 users. Compared with the previous year, demand for remote and hybrid work continued to grow. Year over year, the use of our videoconferencing services increased by more than 20%. The CESNET Streaming service continues to see steady growth in user adoption. In 2025, the volume of streamed video reached 1.7 PB. The volume of recorded video stored on our infrastructure increased by nearly 40% year over year. Following the addition of several new user groups. Demand for our IP telephony service, which interconnects the traditional telephone systems of member institutions and other connected organizations, has remained virtually unchanged from previous years. Our infrastructure handled 300,000 telephone calls between CESNET Association member institutions.

In 2025, we released another stable version of the UltraGrid software, which enables low-latency transmission of high-quality video and audio. UltraGrid now supports the open, interoperable AES67 standard for high-quality audio-over-IP and audio-over-Ethernet streaming. This

also ensures interoperability with established protocols such as Dante and Ravenna. As part of the ongoing development of UltraGrid, we also introduced native support for Unreal Engine. This combination of technologies makes it possible to combine live video from real-world scenes with virtual environments rendered in Unreal Engine, all with very low latency. We continue to deploy UltraGrid to support video-assisted surgical procedure transmissions at university hospitals across the Czech Republic. In 2025, we supported the live transmission of several dozen procedures across a range of medical specialties, primarily for postgraduate medical education.

At the end of 2025, we successfully completed the SAGE4EU project, implementing the Scalable Adaptive Graphics Environment (SAGE) within the GÉANT infrastructure and integrating it with the eduGAIN AAI infrastructure, making the system accessible exclusively to users from the academic community. Within the campus 5G network environment supporting millimeter-wave technology, we collaborated with VŠB - Technical University of Ostrava to reimplement the network core using open-source components. This enables the use of standard mobile devices with their own SIM cards and makes it possible to build a fully standalone 5G network for testing voice and video services, including Quality of Service (QoS) deployment.



COLLABORATION WITH LARGE RESEARCH INFRASTRUCTURES

The CESNET e-infrastructure is part of the corresponding European e-infrastructures, providing the communication and information environment for national large research infrastructures across a wide range of scientific disciplines while facilitating collaboration with their international partners.



GÉANT - The European backbone network interconnects national research and education networks across Europe and provides connectivity to comparable infrastructures on other continents. CESNET serves as the national node of this infrastructure, operating the Czech National Research and Education Network (NREN). In 2025, collaboration within GÉANT was funded through the GN5-2 project, in which CESNET contributed primarily to the further development of AAI and the strengthening of infrastructure security.



EGI.eu - The European distributed computing infrastructure coordinates national efforts across Europe to implement grid computing technologies. Collaboration among the members of this infrastructure took place primarily through the EOSC-Future project and the EGI-ACE program under Horizon 2020. As part of this collaboration, CESNET contributes to all core operational activities, operates the Czech national EGI grid node, and provides computing resources drawn from both the Association's own computing infrastructure and the computing capacities of the Institute of Physics of the Czech Academy of Sciences. These computing resources are also part of MetaCentrum and make use of its virtualized infrastructure. We continue to support the ELIXIR (bioinformatics), Auger (cosmic ray research), Belle (particle physics), and CTA (gamma-ray astronomy) virtual organizations, as well as Czech research groups seeking to use the pan-European EGI grid. Our priority is to address the specific needs of these research communities and the international projects in which they participate.



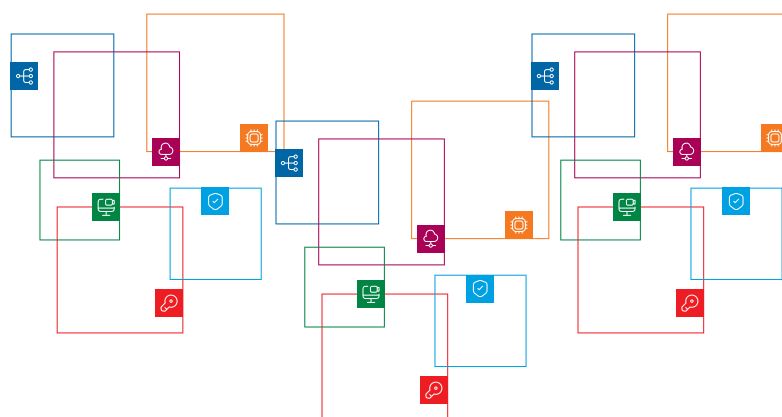
ELIXIR is the European research infrastructure for bioinformatics, bringing together advanced computing environments, data resources, and specialized tools from across Europe to support bioinformatics research. CESNET contributes to the development of the European infrastructure through the Technical Services activity of the ELIXIR Compute Platform, which focuses on establishing a common framework for providing computing and data storage services, as well as through the development of the Life Science AAI. CESNET is also directly involved in national activities in this area, being one of the founding members of the ELIXIR CZ infrastructure, which provides advanced computing environments, data resources, and unique tools to the bioinformatics research community in the Czech Republic and across Europe. CESNET is a direct participant in the Czech National Infrastructure for Biological Data project, funded under the Large Research Infrastructures program, which supports the operation of this infrastructure.



QUAPITAL is a partnership focused on quantum-secure communications in Central Europe and the development of the quantum internet. The initiative aims to build a quantum-compatible infrastructure connecting quantum experiments across research facilities throughout Central Europe.



The EOSC Association (EOSC AISBL) is an international association of institutions involved in implementing the European Open Science Cloud (EOSC) vision. CESNET serves as the Czech Republic's mandated organization within the Association. CESNET representatives also participate in the Association's working groups: AAI Architecture, Long-Term Data Preservation, and Financial Sustainability.



COLLABORATION WITH LARGE RESEARCH INFRASTRUCTURES

National Large Research Infrastructures

Beyond its close collaboration with international e-infrastructures and its involvement in the ELIXIR CZ research infrastructure, CESNET partners with the other large research infrastructures on the Czech Roadmap of Large Research Infrastructures for 2023–2026, supporting their ICT needs and working together on solutions. Examples include:

- Collaboration on service delivery and cybersecurity for the European Open Science Cloud EU Node.
- Collaboration between e-INFRA CZ, ELIXIR CZ, and EATRIS to provide high-performance computing resources for the Institute of Molecular and Translational Medicine at the Faculty of Medicine, Palacký University Olomouc.



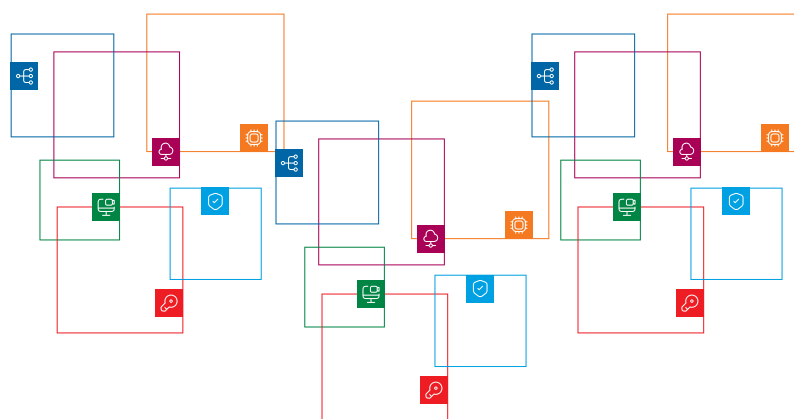
EOSC

As part of e-INFRA CZ, CESNET contributes to implementing the Open Science concept in the Czech Republic, with the goal of building a national data infrastructure for storing, sharing, and working with FAIR (Findable, Accessible, Interoperable, Reusable) data.

The national data infrastructure

comprises the national repository platform, the metadata repository, domain-specific repositories, and the National EOSC Secretariat. Within this initiative, CESNET and e-INFRA CZ are expected to develop the national repository platform and support the National EOSC Secretariat. The National Data Infrastructure is planned to be funded through the Jan Amos Komenský Operational Programme (OP JAK).

At the beginning of the year, the e-INFRA CZ consortium launched the first of these projects, European Open Science Cloud Czech Republic, which aims to establish a shared framework by the end of 2028 comprising a secretariat, a national metadata registry, and a training center. Following the Open Science I call under OP JAK, we also began preparing the National Repository Platform project, which will be developed in parallel with EOSC-CZ to establish the core infrastructure for FAIR data repositories.



RESEARCH, DEVELOPMENT, AND INNOVATION

Innovation is essential to the continued development of the CESNET e-infrastructure. In addition to developing and operating its e-infrastructure, the Association conducts research and development in information and communication technologies, with a particular focus on the areas listed below.

Optical Transmission Systems

CESNET has long been engaged in research on software-defined optical networking, the transfer of precise time and stable frequency, quantum key distribution, and the use of optical networks as sensors for physical phenomena.

Security of the CESNET e-Infrastructure

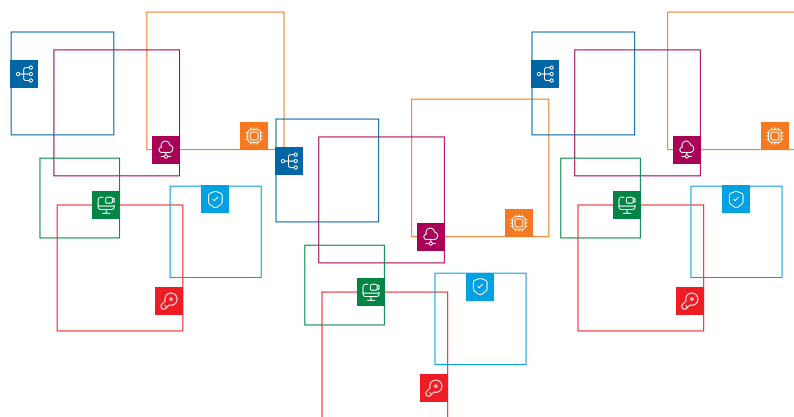
CESNET has long placed a strong emphasis on the security of its e-infrastructure. In addition to developing tools that protect user privacy and data security and support the sharing of information about security incidents, CESNET is also actively developing network monitoring and traffic anomaly detection tools to identify potential cyberattacks. The Association continues to develop its own protection system against distributed denial-of-service (DDoS) attacks (DDoS Protector).

Network Identity

In the area of identity and access management, the CESNET Association, in collaboration with Masaryk University, develops Perun, a system that enables users to be organized into virtual organizations and groups, assigns them access to resources, and manages their permissions.

New Applications

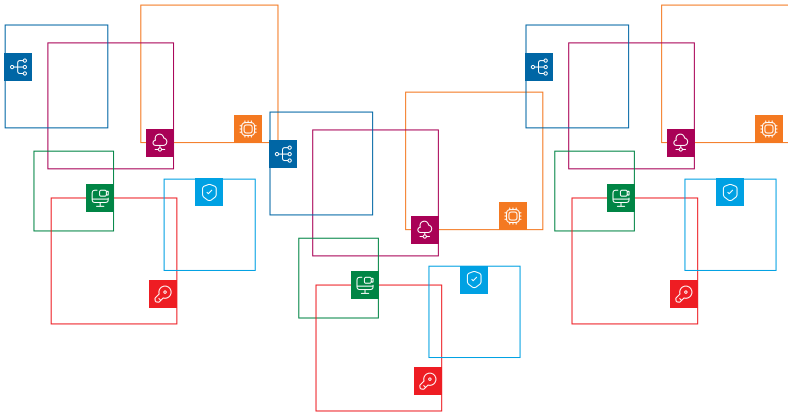
The CESNET Association continually seeks new ways to apply its e-infrastructure in fields such as medicine, cultural heritage, architecture, and beyond. Research in this area includes the development of two platforms: the MVTP hardware platform and the UltraGrid software platform (developed in collaboration with Masaryk University), both designed for low-latency transmission and processing of ultra-high-resolution video, including 8K. The Association is also actively engaged in the digitization and presentation of cultural heritage objects, as well as research and development in the Internet of Things (IoT).



PROJECTS CARRIED OUT IN 2025

International Projects

Acronym	Project name	Program	Provider
Large infrastructures			
GN5-2	Research and Education Networking - GÉANT	Horizon Europe	EU
EOSC			
EuroScienceGateway	leveraging the European compute infrastructures for data-intensive research guided by FAIR principles	Horizon Europe	EU
GraspOS	GraspOS: next Generation Research Assessment to Promote Open Science	Horizon Europe	EU
EOSC Beyond	Advancing Innovation and collaboration for research	Horizon Europe	EU
ENVRI-Hub NEXT	ENVironmental Research Infrastructures delivering an open access Hub and NEXT-level interdisciplinary research framework providing services for advancing science and society	Horizon Europe	EU
Cybersecurity			
SEQRET	Secure and Industrialized Quantum Key Distribution for European Telecom Networks	Digital Europe	EU
SOCCER	Developing and deploying SOC capabilities for the academic sector - a teamwork of Universities and RTOs in the CEE region	DIGITAL JU SIMPLE	EU
Advanced technologies and applications			
GreenDIGIT	Greener Future Digital Research Infrastructures	Horizon Europe	EU
GREAT	The Green Deal Data Space Foundation and its Community of Practice	Digital Europe	EU
HPLT	High Performance Language Technologies	Horizon Europe	EU
interTwin	An interdisciplinary Digital Twin Engine for science	Horizon Europe	EU
SUBMERSE	SUBMarine cablEs for ReSearch and Exploration	Horizon Europe	EU
FOCAL	FOCAL - Efficient exploration of Climate data Locally	Horizon Europe	EU



PROJECTS CARRIED OUT IN 2025

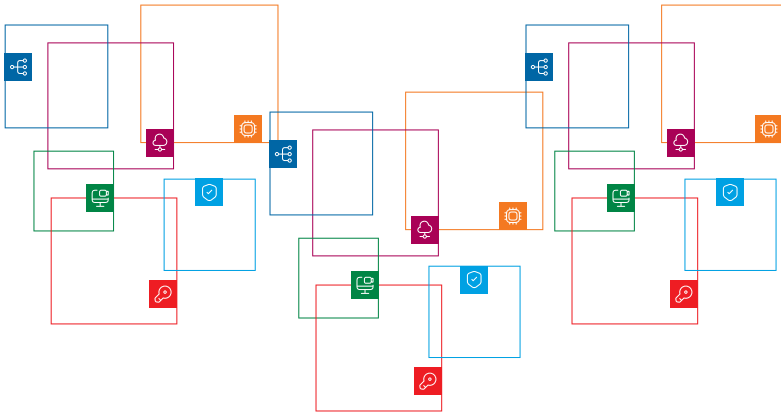
Other National Projects

Akronym	Project name	Program	Provider
Large infrastructures			
e-INFRA CZ	e-infrastruktura CZ	Large Research Infrastructure Projects	Ministry of Education, Youth and Sports (MŠMT)
e-INFRA CZ	Modernization of e-INFRA CZ II	OP JAK	MŠMT
ELIXIR-CZ	Czech National Infrastructure for Biological Data	Large Research Infrastructure Projects	MŠMT
ELIXIR-CZ: Capacity Extension	ELIXIR-CZ: Capacity Extension	OP JAK	MŠMT
EOSC			
EOSC-CZ	European Open Science Cloud Czech Republic	OP JAK	MŠMT
NRP	National Research Data Repository	OP JAK	MŠMT
Cybersecurity			
CYBYRTHREATS	CYBERTHREATS - Using Artificial Intelligence for Defense Against Cyber Attacks	Ambition	MO
CZQCI	Czech National Quantum Communication Infrastructure	Digital Europe	EU
FETA	Analysis of Encrypted Traffic Using Network Flows	IMPAKT 1	Ministry of the Interior of the Czech Republic (MV ČR)
HALOGEN	Hardware Acceleration of High-Speed DPDK SmartNIC	TREND	Technology Agency of the Czech Republic (TA ČR)
NeSPoQ	Cybersecurity of networks in the post-quantum era	IMPAKT 1	MV ČR
NU-CRYPT	Quantum-Encrypted Communication with Enhanced Physical Layer Security	OPSEC	MV ČR
HSPF	High-speed network traffic filtration	SECTECH	MVČR
HUGO Honeynet	Cross-sectoral cooperation to build a honeypot network	Digitální Evropa	NÚKIB
AI4LOG	Intelligent Log Analytics	TREND	TAČR
Advanced technologies and applications			
HPLT	High-performance language technologies	Horizon	EU
DigiOrloj	Digitalization of the Old Town Astronomical Clock	SIGMA	TA ČR
QUEENTEC	Quantum Engineering and Nanotechnology	OP JAK	MŠMT

The Association gratefully acknowledges all funding providers for their financial support of the projects described in this report.

R & D Results

Research activities in 2025 resulted in 17 articles published in peer-reviewed scientific journals (including one in Nature), 36 conference papers, 6 datasets (digital data collections), 1 utility model, 1 pilot-scale implementation, 2 functional prototypes, and 11 software outputs.



CESNET ASSOCIATION DEVELOPMENT FUND

At the end of 2024, the Fund Council prepared and launched the first call for project proposals for 2025. In addition to the Association's full members, the call was also open to associate members.

In consultation with the Association, the following thematic areas were selected:

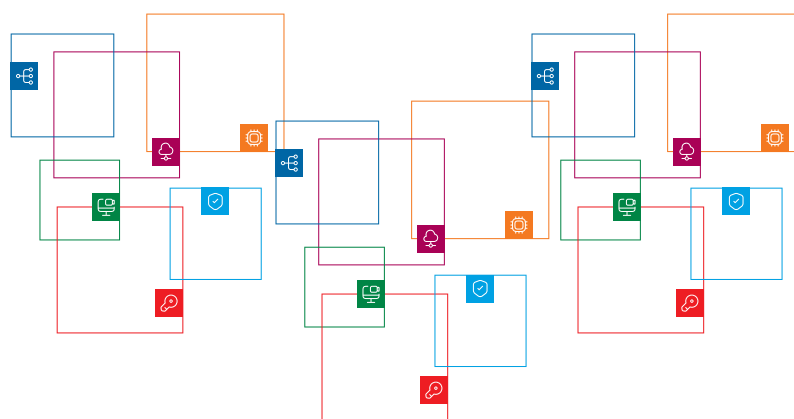
- Use and advancement of the CESNET e-infrastructure and modern information and communication technologies in teaching and learning, research and scholarly activities, and the administration of public universities and the Czech Academy of Sciences
- Advanced Applications Leveraging the CESNET e-infrastructure

The objectives and scope of each thematic area were specified in the call documentation.

A total of 17 project proposals were submitted in response to the call. Eleven projects were approved for co-funding, including three that were accepted after revision. An overview of the projects selected for funding is provided in the following table.

Project num.	Project leader	Project name
774/2025	ČVUT – Czech Technical University in Prague	Integration of the Cybersecurity Laboratory for Use within the CESNET Network
775/2025	AV ČR – Czech Academy of Sciences	Measurement and Optimization of Network Transmission Capacity
776/2025	MU – Masaryk University	Advanced Semantic Search Tool for Molecular Dynamics Data
777/2025	UHK – University of Hradec Králové	Support for the Digitalization of Public University Processes
779/2025	MU – Masaryk University	Automated Pipeline for Single-Cell RNA Sequencing in Galaxy and Invenio
783/2025	AV ČR – Czech Academy of Sciences	ABiLAS – An EnviLAB Platform Module for Automated Assessment of Forest Aboveground Biomass Using Airborne Laser Scanning Data
767/2025	VŠB – Technical University of Ostrava	Development of an Experimental LoRaWAN Network in Alternative Frequency Bands Using the CESNET Infrastructure
768/2025	ČVUT – Czech Technical University in Prague	Time-Division Multiplexing for Quantum Entanglement Distribution
770R1/2025	UP – Palacký University in Olomouc	Modernization of .NET Libraries for User Authentication in the eduID.cz Federation
771R1/2025	MU – Masaryk University	Enhancing Microsoft 365 and Microsoft Azure Security at Public Universities
773R1/2025	MU – Masaryk University	Optimization of Protein Structures Predicted by Artificial Intelligence

Final project reviews for completed projects were also conducted during 2025. In total, 20 projects were successfully completed. For several projects, the Development Fund Council recommended that the results be presented at a CESNET project meeting, an appropriate conference, or, where suitable, published in a peer-reviewed journal. The Council also recommended that several projects expand their deliverables to ensure the results could be used by other members of the Association as well. The final reports for projects funded through the CESNET Development Fund are available on the CESNET Development Fund website: <https://fondrozvoje.cesnet.cz/>.



EXTERNAL RELATIONS

Throughout 2025, the CESNET Association actively strengthened its collaboration with the research community, academia, and partners across the public sector. A key part of these efforts was the organization of professional events and educational activities, as well as participation in major conferences.

In the first half of the year, CESNET organized a range of events for the professional community. Together with CZ.NIC and NIX.CZ, CESNET organized the seventh CSNOG 2025 community meeting in January, which was attended by 219 participants. At the end of January, the Forensic Training I and II series was launched, focusing on network traffic forensic analysis. The next session took place in June.

In February, the traditional Network and Service Security Seminar took place, focusing on the protection of networks, services, and Internet applications. The event was attended by 246 participants. The seminar was followed by a meeting of the CESNET connected organizations working group.

In May, CESNET organized a technical lecture marking the International Day of Light, focusing on quantum cryptography. In collaboration with Masaryk University and VŠB – Technical University of Ostrava, CESNET also helped organize the EOOSC National Tripartite Event in Brno. In June, the 10th anniversary edition of the IPv6 Day conference followed.

CESNET also participated as a partner in a number of major events, including the Information Security Summit, GÉANT Security Days, and the NECS Ph.D. Winter School. In the second half of the year, activities focused on knowledge sharing and strengthening the professional community continued. CESNET organized community seminars, workshops, and working meetings, including meetings of

virtualization platform administrators, grid computing seminars, a series of workshops on the new Cybersecurity Act, and sessions of working groups focused on network infrastructure and cybersecurity.

As part of the Czech Digital Week initiative, CESNET contributed expert and outreach activities focused on quantum cryptography and the risks of the digital environment. In September, CESNET also participated in Researchers' Night by opening the SAGELab laboratory to the general public.

CESNET also partnered with a number of conferences and professional events, including Digital Transformation of Universities, Cyber_CON, Linux Days, OpenAlt, and Metamorfosa. In October, CESNET organized another edition of the cybersecurity competition The CATCH, with scenarios focused on energy infrastructure.

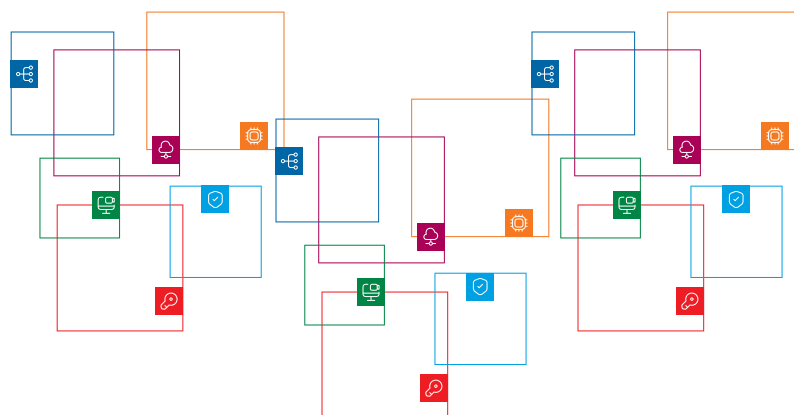
We continue to regularly share updates, highlight the activities and achievements of our employees, and publish information about events and other news through our website, social media channels, and the e-News newsletter.

We also manage the websites of the Czech Republic's Large Research Infrastructures and the e-INFRA CZ consortium.

In 2025, we issued five press releases and recorded several hundred media mentions. Our colleagues also regularly appeared in the media, providing expert commentary on technical topics on television and radio.

219

**participants attended
the seventh CSNOG
2025 community
meeting.**



EXTERNAL RELATIONS



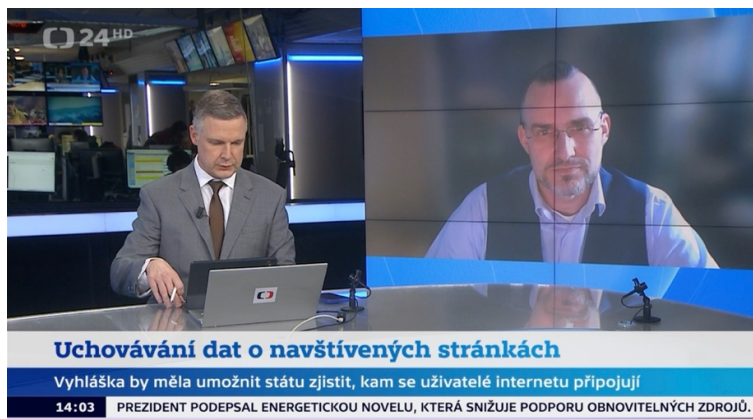
◀ CESNET Colleagues at the Czech Digital Week



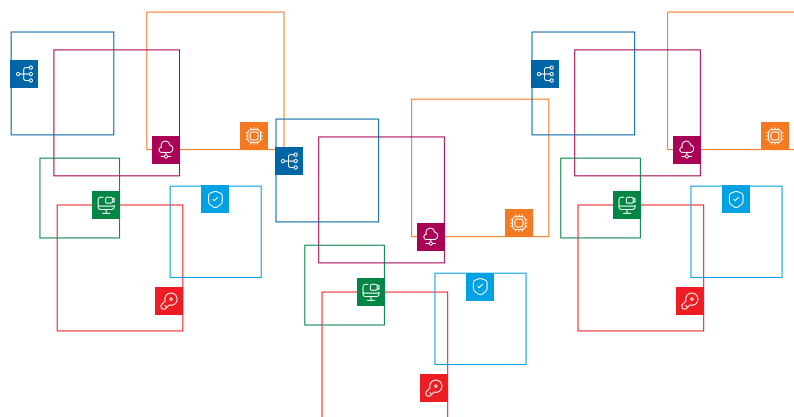
▲ We presented CESNET through exhibition booths at a number of events.



▼ Another edition of the successful IPv6 Day conference



▶ Our colleague Jan Kolouch appeared on Czech Television several times during 2025.



ECONOMIC RESULTS

CESNET, an association of legal entities, maintains its accounting records and prepares its financial statements in accordance with Act No. 563/1991 Coll., on Accounting, as amended, Decree No. 504/2002 Coll., and the Czech Accounting Standards applicable to accounting entities reporting under Decree No. 504/2002 Coll. As of 31 December 2025. The accounting period is the calendar year.

The accounting records comply with the general accounting principles set out in the Accounting Act. The Association did not deviate from standard accounting methods. The accounting records are processed using computer technology and the ABRA Gen information system developed by ABRA Software a.s. Accounting documents are archived at the Association's registered office.

Tangible and intangible fixed assets are valued at acquisition cost, which typically includes customs duties, transportation costs, and costs related to installation and commissioning.

Securities are valued at acquisition cost, including related acquisition fees. Securities are revalued at fair value as of 31 December of the relevant accounting period.

Receivables and liabilities denominated in currencies other than CZK are revalued as of 31 December of the relevant accounting period using the exchange rate published by the Czech National Bank.

The following Czech National Bank exchange rates applicable on the balance sheet date were used for the revaluation of foreign currency cash holdings, foreign currency bank accounts, receivables, and liabilities: CZK/USD 20.632, CZK/EUR 24.245, CZK/GBP 27.789, and CZK/CHF 26.041.

Tangible and intangible fixed assets are depreciated on a straight-line basis on a monthly basis. Depreciation begins in the month in which the asset is put into use. For tax purposes, fixed assets are depreciated using accelerated depreciation, except for intangible fixed assets, which are depreciated on a straight-line basis. The depreciation period is determined based on the asset's classification into a depreciation category under the Income Taxes Act.

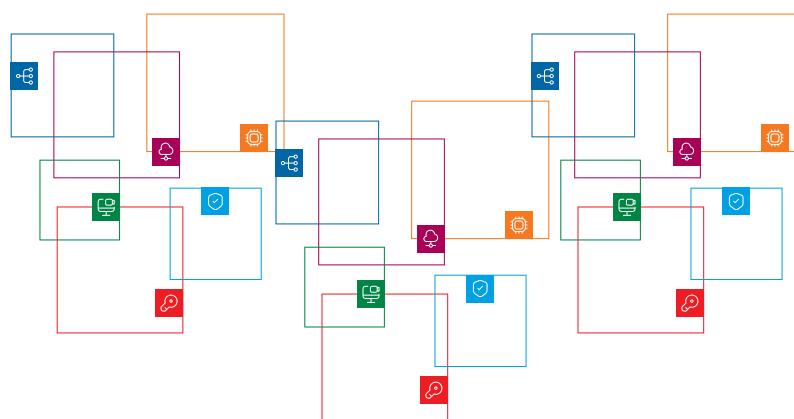
The activities of the CESNET Association are, in accordance with its Articles of Association, divided into two categories: Main Activities and Supplementary (Economic) Activities.

Core activities

As part of its core activities, the Association continued developing the next-generation CESNET e-infrastructure, providing members and other eligible entities with a comprehensive set of services. In 2025, a grant of CZK 365,612 thousand was received to support the operation of the e-infrastructure (project identification code: LM2023054; provider: Ministry of Education, Youth and Sports).

The Association also participated in international research projects under the Horizon 2020 and Horizon Europe programs, national projects supported by the Ministry of Education, Youth and Sports, the Technology Agency of the Czech Republic, the Ministry of the Interior, and the Ministry of Culture, as well as projects funded by the CESNET Development Fund, as described in the previous section of this annual report.

The Association's Core activities in 2025 resulted in an accounting loss before tax of CZK 18,320 thousand. Revenue from the Association's Core activities amounted to CZK 800,035 thousand, while expenses totaled CZK 818,355 thousand.



ECONOMIC RESULTS

Economic activities

The Association's Economic activities in 2025 primarily consisted of managing the Development Fund Council's investment portfolio comprising bonds and mutual funds, as well as other economic activities, mainly including revenue from contract research and supplementary services. The Association's Economic activities in 2025 resulted in an accounting profit of CZK 19,272 thousand. Revenue from the Association's Economic activities amounted to CZK 60,636 thousand, while expenses totaled CZK 41,364 thousand.

Total Accounting and Tax Profit/Loss

The Association's total accounting profit before tax for 2025 amounted to CZK 3,572 thousand. The income tax base is determined based on the accounting profit/loss

adjusted for deductible and taxable items in accordance with the Income Taxes Act. The income tax base is reduced pursuant to Section 20(7) of the Income Taxes Act. Funds obtained through tax relief are used to finance the Association's Core (non-economic) activities in accordance with its Articles of Association.

The Association's total income tax base amounted to CZK 11,434 thousand. The Association's total corporate income tax for 2025 amounted to CZK 2,620 thousand, resulting in a profit after tax of CZK 952 thousand.

In 2025, the financial result for the previous accounting period was also settled. Of the 2024 financial result amounting to CZK 2,139 thousand, the full amount of CZK 2,139 thousand was allocated to funds.

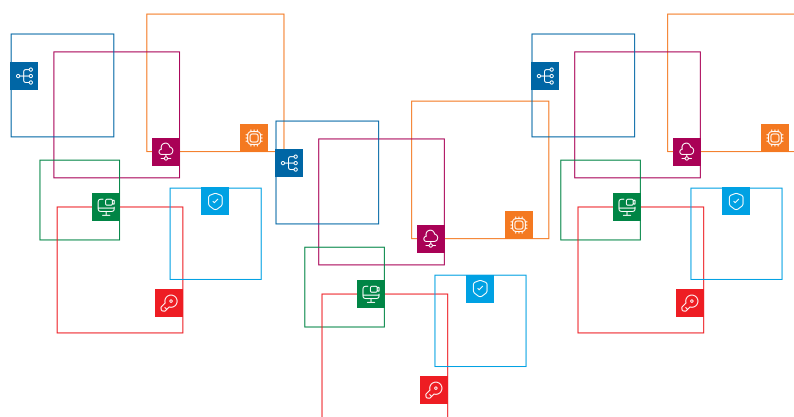
Fixed Assets

Fixed asset items

	Opening balance	Additions	Disposals	Closing balance
Software	48,353	452	5,982	42,823
Intangible assets under development	245	534	0	779
Buildings	14,221	112	0	14,333
Tangible movable assets	1,606,290	243,831	275,628	1,574,493
Construction in progress	0	0	0	0
Long-term financial assets	9,454	768	516	9,706

Oprávký

	Opening balance	Additions	Disposals	Closing balance
Software	43,985	2,827	5,981	40,831
Buildings	6,696	466	0	7,162
Tangible movable assets	1,358,980	184,997	275,628	1,268,349



ECONOMIC RESULTS

Shares & Funds

Fund units held as of 31 December, 2025 (amounts stated in full CZK)

ISIN code	Number of units	Valuation as of 31 December, 2025 in CZK
CZ0008474509	13,950,180	CZK 26,969,883
770000001116	21,136,843	CZK 28,864,473
CZ0008044856	14,797,460	CZK 31,666,564
MT000006987	86,617	CZK 13,546,102
MT7000024899	4,142,023	CZK 8,782,333
MT7000024857	1,259,428	CZK 2,141,910

The Association's total investment portfolio held as of the financial statement date had a value of CZK 361,153 thousand.

Employees and personnel expenses

The average number of full-time equivalent employees as of the balance sheet date was 252.66.

Of which:

- Employees with an indefinite-term employment contract 120,60
- Employees with a fixed-term employment contract 113,75
- Employees under an agreement to perform work (DPČ)..... 18,31

Breakdown of personnel expenses:

- Wages CZK 289,493 thousand
- Statutory social insurance CZK 95,961 thousand
- Other social insurance CZK 0 thousand
- Statutory social costs CZK 7,885 thousand
- Other social costs CZK 3,116 thousand

Remuneration of members of the Association's bodies:

- Board of Directors CZK 5,816 thousand
- Supervisory Board CZK 1,275 thousand
- CESNET Development Fund Council.. CZK 971 thousand

Final Notes

Sdružení CESNET v uplynulém roce zodpovědně a řádně nakládalo se svěřenými prostředky, dostalo všem svým závazkům vyplývajícím z legislativy, rozhodnutí MŠMT ČR i uzavřených smluv.

Auditorská společnost BDO Audit s. r. o. se sídlem V Parku 2316/12, Praha 4, Chodov, číslo oprávnění KA ČR č. 018, provedla auditorské ověření roční účetní závěrky.

