



e-Infrastructures & ELIXIR CZ

Tomáš Košnar, CESNET



Common role of e-infrastructures

- consensual IT environment for any scientific area
- comprehensive, widely acceptable solutions and tools
 - data transport ~ network, data processing, storage, support for collaboration
 - identity management, AAI tools, monitoring, security
- robustness, performance, sustainability of resources

Building ELIXIR CZ

- **resources for storage, computing, data transport**
 - everything from the scratch → nonsense
(+ number of additional “hidden” services needed)
- let’s use what e-infrastructures offer
- customize / add something special for life science community



Role of e-infrastructures in ELIXIR CZ

- **IT resources and capacity building for ELIXIR CZ**
 - capacity purchased and operated by e-infrastructures
 - separate funding stream (EU development funds for capital investment)
 - current project - CERIT-SC/MU coordinating, CERIT-SC and CESNET delivering
 - integrate them into the national e-infrastructure
 - control by ELIXIR CZ
 - investment strategy → **computing capacity**, storage, some commercial SW
 - *side effect* → *automated/by default access to/utilization of back-end services that are “a must” for any infrastructure without needs to provide them separately.. (monitoring, security, ticketing systems, etc..)*

National e-infrastructure landscape

- **CESNET**

- legal body (a.l.e.) 1996 – public, state universities, CAS
- primary national network infrastructure; coordinating national grid, cloud and storage activities; collaborative environment, AAI, security, ...

- **CERIT-SC**

- @ Masaryk University in Brno
- flexible clouds, development, innovations

- long collaboration (since 1998 formally)
- MetaCentre – distributed grid & cloud environment
- founding members of ELIXIR CZ

- **IT4Innovations**

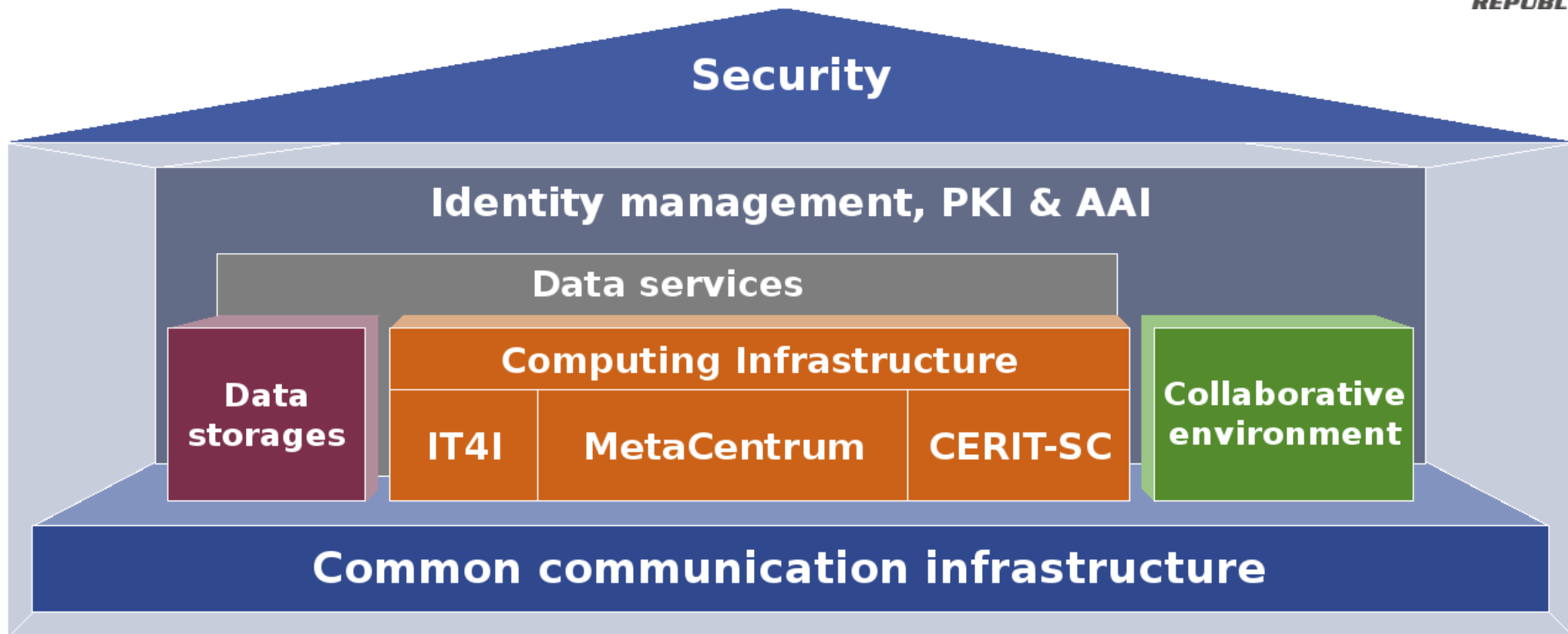
- @ Technical University Ostrava
- National Supercomputing Centre

- till 2019 formally independent (each on the national roadmap)

- **now → single national e-infrastructure e-INFRA CZ**

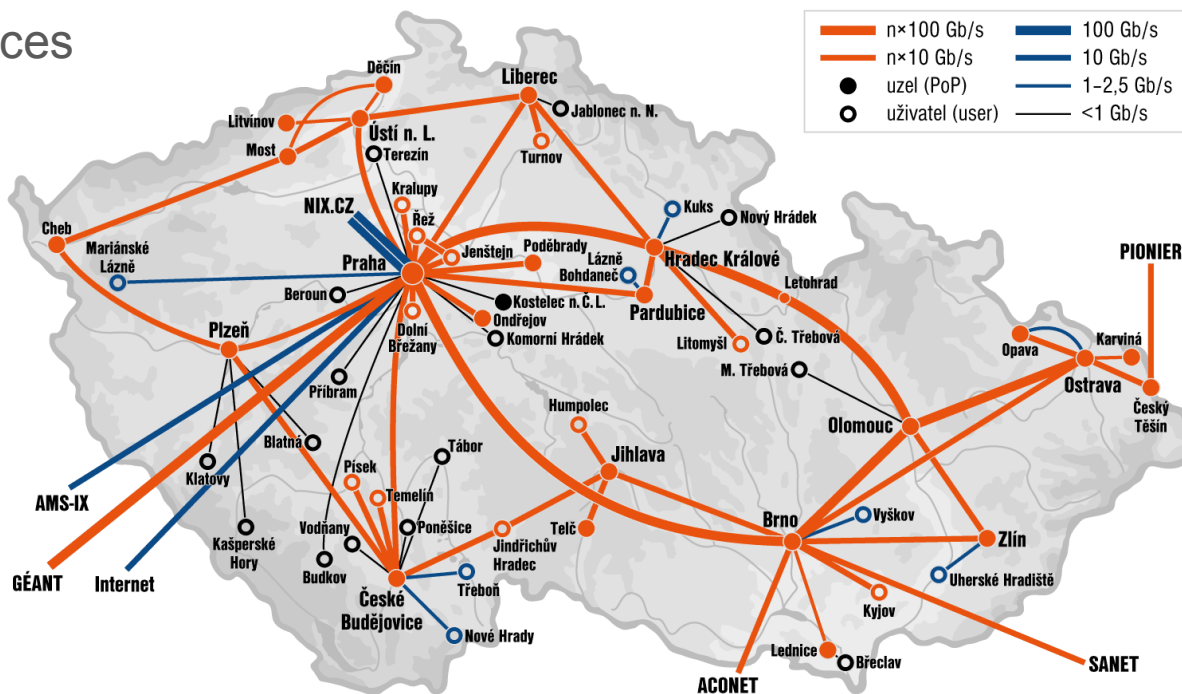
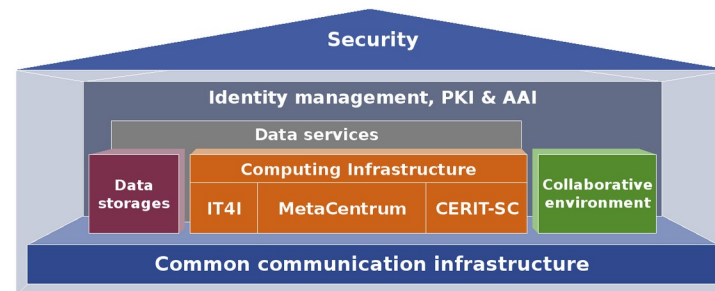
- consortium (formal agreement); coordinated by CESNET





e-INFRA CZ – communication infrastructure

- 100 Gbp/s core (→ 400 Gbps)
- 40 Gbp/s access (→ 100 Gb/s)
- standard access for ELIXIR CZ members
- special solutions for ELIXIR CZ significant/specific resources



e-INFRA CZ - computing infrastructure

- **MetaCentrum**
- <https://www.metacentrum.cz/>
- distributed (universities, CAS), resources - CESNET, CERIT-SC, universities
- unified management, monitoring, user support
- currently 18000 CPU cores, nodes with NVIDIA GP-GPU, 6 PB storage
- computing environments

- grid – batch systems, PBSPro
- cloud – OpenNebula, OpenStack
- map-reduce – Hadoop, Spark
- large application/SW portfolio

- **IT4innovations**



..data don't leave administrative domain of the community..

e-INFRA CZ - computing infrastructure

- **ELIXIR CZ capacity building**

- compute cluster (located at IOCB Prague and ICS MU) + other dedicated servers (at ICS MU)

- Repeat Explorer (BC ČB)
- small molecule DB (IOCB)

- specific SW

- PEAKS Studio
- MASCOT



..data don't leave administrative domain of the community..

e-INFRA CZ - storages

- first gen. built as backup/archive with filesystem access
- towards **object storage technology** (S3, Ceph, RBD)
 - *expected investment ~ 27MKč/year ?*
- total physical capacity – 34 PB (27+7) now, 62 PB (+28 os) in 2020
- **storage services** - <https://du.cesnet.cz/>
 - file transfer/temporary storage (FileSender)
 - sync'n'share (ownCloud)
 - **for personal use** → register to VO Storage
 - **for group use** → contact support
 - object storage access → contact support
 - special archival storage (inc. regular check-sums), repositories → contact support
 - CESNET storage support: support@cesnet.cz



e-INFRA CZ - storages

- **ELIXIR CZ capacity building**
 - focusing working space
 - 2 PB (GPFS) for distributed computing
 - object storage 1 PB for cloud use
 - data of ELIXIR CZ services
 - copies of widely used databases
 - copies of data in home directories



Community based capacity building @ IMG

- **building IT capacities together across several RI/institutions**
 - IMG, ELIXIR CZ, CZBI, OPENSOURCE, CCP, e-INFRA CZ
 - coordinated by ELIXIR CZ
 - "data lake" model support → data from several sources/infrastructures for more effective processing, cross correlations etc..
 - appropriate network architecture/capacity → e-INFRA CZ (CESNET)
 - model of cooperation to follow at other localities/institutions
- **Other use cases, examples**
 - secured environment for services (incl. virtualization services and containerization)
 - cpPredictor, CCMI, web ELIXIR CZ
 - Chipster, Galaxy, RepeatExplorer, FireProt

ELIXIR CZ ↔ e-INFRA CZ can help you !

- need compute resources and don't want to buy / take care of HW
- need to store/backup/archive data without additional costs / HW
- building a tool / application and need help how to prepare it for production mode without taking care of HW and additional services
- have an application to switch to widely accessible mode and don't want to take care of HW and additional services
- want to use application SW available in ELIXIR infrastructure ~ CLC Workbench, PEAKS Studio, Mascot,...without buying own licenses
- have / plan to have a significant data resource / device that has to be accessed by others
- have / plan to have a significant data resource / device that has to have excellent access to other shared resources (compute, storage)
- ...have plans/problems in IT area and want to help/discuss them..
- ...

e-infrastructures for ELIXIR CZ summary

- **providing and operating IT resources**
 - <https://www.elixir-czech.cz/>
 - <https://wiki.metacentrum.cz/wiki/Elixir>
 - support@elixir-czech.cz
- **developing specific IT solutions**
 - resources configuration...SW development
 - fully integrated with national and international “pure” e-infrastructure activities
- **helping collaboration with other research infrastructures**

International scope

- co-leadership of the ELIXIR Compute platform
 - task co-leadership in AAI and Clouds
- leadership of the EOSC-Life project wp on access control and mgmt.
 - active involvement in cloud wp
- leadership of the CINECA project AAI wp
- ELIXIR **A**uthentication and **A**uthorization Infrastructure
 - CZ solution applied in ELIXIR AAI



Thank you !