CERIT Scientific Cloud (CERIT-SC)

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CERIT-SC Centre

- a research centre built at ICS MU
  - a transformation of the **Supercomputing Center Brno (SCB) into a new form**
  - focuses on an **application of top-level ICT in the science**

- an **important partner** of the **National Grid Infrastructure** (managed by MetaCentrum NGI)
  I. HW resources provider
     - extensive SW pool (including commercial SW) available
  II. services beyond the scope of a "common" HW centre –
  an environment for collaborative research

The Goals I.

- **computing & storage infrastructure**
  - highly flexible (without a-priori resource allocations)
  - convenient for experiments
    - allowing disruptive experiments
  - the provided infrastructure **primarily serves for research & development**
    - in the second level for common computations and data storage
    - the "dumb" power is available by centre integration to MetaCentrum NGI and european infrastructures (EGI)
  - **HW equipment:**
    - *SMP nodes* (1600 cores)
    - *HD nodes* (580 cores, goal Q1/2013 >2500 cores)
    - *storage capacity* (~ 3,2 PB, goal Q1/2013 >3,5 PB)

The Goals II.

- **research and development**
  - **own research** – focuses on improving the technologies and principles of the maintained eInfrastructure
    - *examples:* scheduling in distributed systems, virtual systems/clouds management, security, improving the efficiency of parallel/distributed computations, etc.
  - **collaborative (with research partners)** – researching IT problems of our partners in order to support/push their research
    - **analysing the research problems of our partners**
      - teams or single-users
      - comprises of a design and optimization of algorithms, models, tools, and the environment, etc.
    - collective "project" (research collaboration) – not only HW provider
      - → **a collaboration of** IT experts and users

Selected ongoing collaborations I.

- **Three-dimensional tree reconstructions from terrestrial LiDAR scans**
  - *partner:* CzechGlobe

- **An application of neural networks for filling in the gaps in eddy-covariance measurements**
  - *partner:* CzechGlobe

- **Virtual microscope, patologic atlases**
  - partner: *MED MU*

- **ELIXIR (ESFRI project) – bio-informatic infrastructure**
  - partner: *ÚOCHB AV ČR, BIOMED AV ČR*

- **Biobanking research infrastructure (BBMRI_CZ)**
  - *partner:* Masaryk Memorial Cancer Institute, Recamo

- **Propagation models of epilepsy and other processes in the brain**
  - *partner:* MED MU, ÚPT AV, CEITEC

Selected ongoing collaborations II.

- **Photometric archive of astronomical images**
  - *partner:* Institute of theoretical physics and astrophysics SCI MU
- **Extraction of photometric data on the objects of astronomical images**
  - *partner:* Institute of theoretical physics and astrophysics SCI MU
- **Automatic continuum fitting from echellet-spectra**
  - *partner:* Institute of theoretical physics and astrophysics SCI MU
- **Bioinformatic analysis of data from the mass spectrometer**
  - *partner:* Institute of experimental biology SCI MU
- **Identification of areas affected by geometric distortions in aerial landscape scans**
  - *partner:* CzechGlobe
- **Synchronizing timestamps in aerial landscape scans**
  - *partner:* CzechGlobe
- *…*

Research/Collaboration with industrial partners

- such a collaboration may also be established with an industrial partner

- **the basic expectations:**
  - *the results of such a research/collaboration have to be made public*
    - (i.e., be published)
  - *real collaboration* - there has to be a scope for our collaboration in the research
    - not just a "dumb" resource provider

Research/Collaboration with industrial partners

- **Ongoing collaborations:**
  - **CEZ Group**
    - an experiment of processing data being sent by huge number of sites (intelligent electric meters)
      - by increasing the number of sites in two orders of magnitude
      - including simulations of various network behaviours
    - the goal is to detect weak parts of such an infrastructure, including the proposal of the methods to overcome them

  - **AdMaS (Advanced Materials, Structures and Technologies)**
    - (@ VUT Brno)
    - improving the efficiency of Ansys (CFD, Mechanical) computations
      - (improving the throughput of such computations)
    - complex data processing
      - intelligent processing of the data generated by multiple sensors of different kinds

Summary

- **CERIT-SC Centre**
  - new name, long-term history (SCB *1994)
  - a transformation of a "dumb" resource provider into a **research partner**
    - efforts to use the resources in an intelligent way (not just *a brute force*)
  - **strong focus on the research**
    - the idea is to peform intensive collaboration with our research partners
  - a collaboration with industrial partners:
    - **public collaborative research**
    - meeting the basic requirements

Thank you for your attention!

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www.cerit-sc.cz