

Seamless Integration of BOINC Applications into MetaCentrum

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Goal

Czech NGI's strategy is to be flexible and accessible for established or emerging research groups who have specific requirements or already operate their own customized infrastructure. One of the key roles of an NGI consists in covering the peaks in demand of established groups otherwise satisfied by their own resources, admins, policies and infrastructure tools.

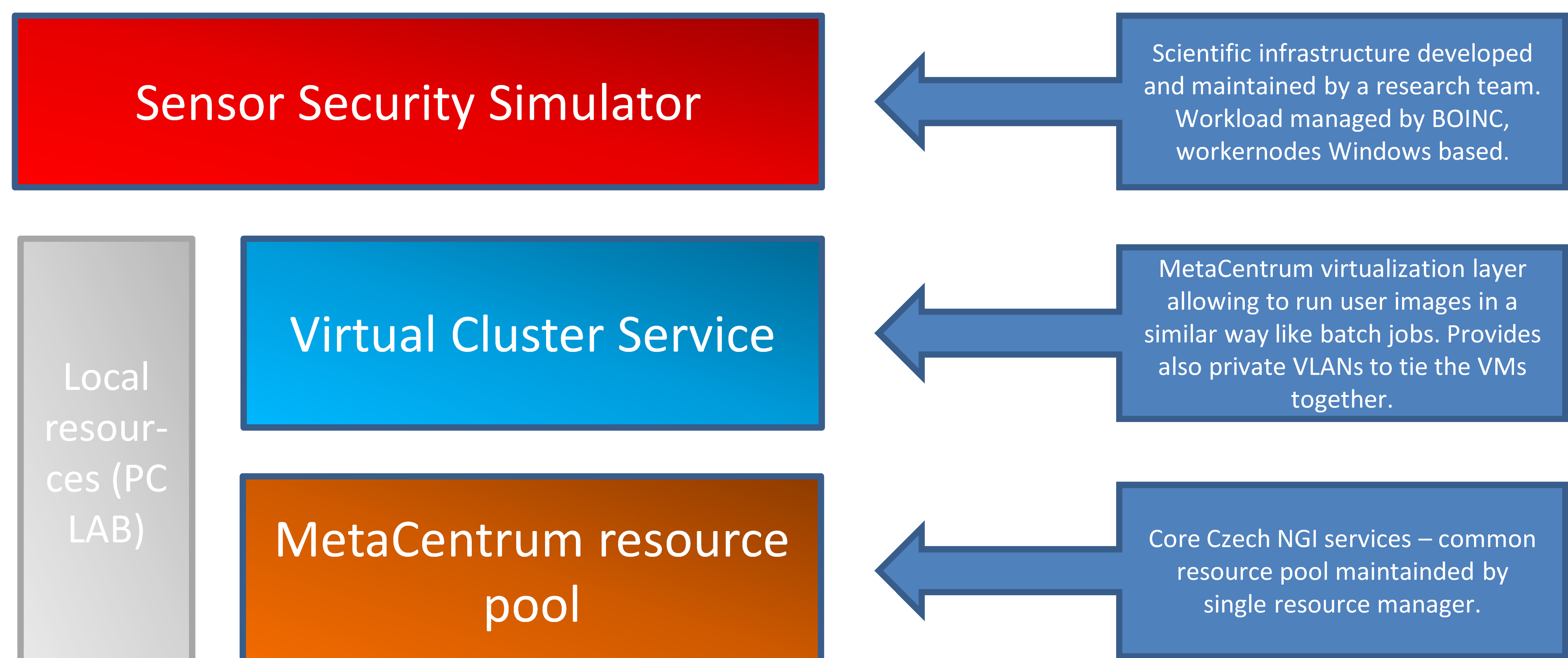


Fig. 1: Overview of the situation, the role of virtual cluster service.

About Sensor Security Simulator

The simulator is used for genetic programming of security protocols and optimization of intrusion detection systems for wireless sensor networks.

The research group, The Laboratory of Security and Applied Cryptography (LaBAK), Faculty of Informatics, Masaryk University, Brno, developed this simulator platform to run on resource pool formed by a local computer lab. The application is an in-house Windows-based development of the research group with port to the MetaCentrum (Debian Linux, batch manager) possible, but costly. With virtual cluster service the MetaCentrum resources are available with no significant additional cost.

Provided computational capabilities allowed us to find new secrecy amplification protocol that outperforms existing, human designed protocols, in terms of provided level of security as well as the message complexity. The vast search space was explored to obtain robust information about protocol behavior. Availability of high peak computation resources shortened parallel search for partial hash collisions with complexity of 2^{47} SHA-2 operations used for novel key predistribution protocol from several days down to the tens of hours, allowing us to quickly abandon unviable initial settings and focus on the viable ones.

■ Smolka, T. and Švenda, P. and Sekanina, L. and Matyáš, V. *Evolutionary Design of Message Efficient Secrecy Amplification Protocols*, Proceedings of the EuroGP 2012.

■ Kur, J. and Matyáš, V. and Švenda, P. *Two Improvements of Random Key Predistribution for Wireless Sensor Networks*, Proceedings of the SecureComm 2012 (to appear).

Virtual clusters for your team

If you have your own infrastructure or specific requirements, the virtual clusters service is here for you.

- Users do not need any new training and support. Only the local administrator interacts with MetaCentrum services and its support unit.
- Any OS/libraries combination supported (even MS Windows).
- Users can focus on the scientific essence of their problem.
- Local conventions and configuration (authentication, data storage, software installations and exact versions, workload manager like BOINC) stay untouched.
- Local security and network policy is fully followed. Private VLAN is an integral part of the virtual cluster service.
- Technologies not suitable for MetaCentrum due to scalability or security reasons (such as ID-based NFS authentication) can remain in use.
- You can satisfy short-term peaks in demand of computing power without significant investments.

The BOINC-based workload management system proved itself well suited for highly dynamic environment (discovery, recovery/resubmits, robustness) of virtual clusters service.

■ Ruda, M. et al. *Virtual Clusters as a New Service of MetaCentrum, the Czech NGI*, technical Report 17/2009, CESNET.