Contribution ID: **56**   Type: **Poster**

Seamless Integration of BOINC Applications into MetaCentrum

Description of the work

The Laboratory of Security and Applied Cryptography (LaBAK), Faculty of Informatics, Masaryk University, Brno uses its simulation platform to run a wide set of computations generated by its current research focus - genetic programming of security protocols and optimization of intrusion detection systems for WSNs. Its demands exceed the capacity of the available 280-CPU computer lab. The research group has a strong potential to achieve more results if short-term peaks in demand of computing power are satisfied. The MetaCentrum virtual cluster service is based on the idea that providing a virtual machine is just another form of a computing job. Our scheduler controls resource assignment regardless of job type (job/VM) and we want to demonstrate that even Windows-based infrastructure controlled by BOINC workload manager can be seamlessly provided by our resources. 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. From previous experiments, we had MetaCentrum Windows golden image ready. Licenses represented an issue but turned out to be relatively cheap as long as research prices (MSAA) remain applicable. The networking-related part is important as well - all the virtual machines appear to be locally connected to the BOINC server. It is achieved by a dedicated VLAN which is by design part of the virtual cluster service. In our case the VLAN was connected directly to the BOINC server machine by a permanent OpenVPN tunnel. The new L2 segment is completely private, not routed to the Internet. It is permanently seen by BOINC, dynamically created machines are connected to this VLAN by MetaCentrum's virtual cluster management software. The BOINC-based workload manager proved itself well scalable simplifying the Windows image complexity (discovery, no need for other services) and the overall architecture (robustness, dynamic nature of VMs –an automatic resubmit).

Link for further information

http://www.metacentrum.cz/

Wider impact of this work

This work is important as a demonstration of Czech NGI's strategy to be flexible and accessible for established or emerging research groups who have specific requirements or already operate their own 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 and infrastructure tools. We also want to show that this can be done under one resource broker umbrella – without a resource pool dedicated solely for the virtualized services (cloud). From the research group's point of view we demonstrate the possibility to expand their current infrastructure and enter MetaCentrum with minimal changes in SW and computational model. We have already demonstrated a 500-CPU virtual cluster but we are heading for a bigger one.

Printable Summary

For MetaCentrum, the Czech NGI, the strategic aim is to narrow the gap an established user group must cross to use the NGI's infrastructure. We have developed "virtual cluster"virtualization technology to implement that strategy. This poster gives an example of one application group relying on stable and established infrastructure based on BOINC running on university computer lab hardware. The infrastructure runs security simulation experiments for wireless sensor networks (WSNs) with Sensor Security Simulator (S3), a software developed by this research group. Thanks to the virtual cluster service we have been able to provide Meta-Centrum's resources as a dynamically available extension to the group's current infrastructure seamlessly, without any significant investment on the user group's side. Additional resources appear as new BOINC worker nodes running original Windows environment available over the local network segment (VLAN).

Primary author: SITERA, Jiri (CESNET)

Co-authors: MULAČ, Miloš (CESNET); Mr RUDA, Miroslav (Cesnet); VONDRUŠKA, Pavel (CESNET); ŠVENDA, Petr (Masaryk university, Brno, Czech Republic); STIBOR, Tomáš (CESNET); SUSTR, Zdenek (CESNET); TÓTH, Šimon (CESNET)

Presenter: SITERA, Jiri (CESNET)

Track Classification: Virtualised Resources: challenges and opportunities (Michel Drescher: track leader)