2nd Workshop on adapting applications and computing services to multi-core and virtualization

Welcome and Introduction

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21-22 June 2010

Outline

- Background and Motivation
- Actions from last Workshop
- Practical Information

Some Background

- Early 2008 started two R&D projects in PH department (under White Paper Theme 3)
  - WP8 – Parallelization of Software Frameworks to exploit Multi-core Processors
  - WP9 – Portable Analysis Environment using Virtualization Technology
- Workshops
  - The 'kickoff' workshop took place on 14-16 April 2008. **Initial plans** for both projects were laid down
  - The first workshop on adapting applications and computing services to multi-core and virtualization. A number of **follow up actions** were identified.

Motivation

- Both R&D projects, and other initiatives from other groups, have continued to deliver useful results for the experiments
  - Expected more to come in the near future
- The current computational services at CERN and at the Grid are not well adapted to support these new kind of applications
  - For example, you can not ‘submit’ a user job exploiting all the available cores in a node
  - You cannot ‘schedule’ a number of virtual appliances

Continuum Analysis Activity

- Typically the analysis follows the following process:
  - Algorithm development and testing starts locally and small
    - Single computer → small cluster
  - It grows to a large data and computational task
    - Large cluster → the Grid
  - The final analysis is again more local and small
    - Small cluster → single computer
- Ideally the analysis activity should be a continuum in terms of tools, paradigms, software frameworks, models, etc.
  - Identical analysis applications should be able to run the same way on a desktop/laptop, a small cluster, a large cluster and the Grid

Workshop Goals

- Applications being developed to exploit new hardware architectures and virtualization technology impose new requirements on the computing services provided by the local computer centers or by the Grids.
- The goals of this workshop are to **review the progress of a number of follow-up actions** identified in the first workshop, to get new **feedback from the experiments** and **set directions** for the two R&D work packages.

Actions from Last WS

- Transition of CernVM beyond the R&D phase
  - Experiments would like to be reassured that CernVM will be a supported 'platform'
- Using CernVM images in virtualized batch systems
  - Investigate what would be needed to add to CernVM as one of the possible images to be supported by the various batch service virtualization initiatives (CERN, INFN)
- Prototype an 'lxcloud' solution for submitting user jobs using the EC2/Nimbus API

Actions from Last WS (2)

- Establish procedures for creating *trusted* images (e.g. CernVM) acceptable for Grid sites
  - Ensure image integrity and the safeguard of the possibly included credentials. Define the hooks (API) that will be needed by the sites to monitor activity and enable traceability
- Investigate scenarios for reducing the need for public IP addresses on WNs
- Try submission of parallel jobs (multi-threaded, multi-process, MPI) with the existing LSF infrastructure

Actions from Last WS (3)

- Deploy multi-core performance and monitoring tools
  - Typically this requires different Linux kernel configurations. Examples are KSM, PERFMON
- Running multi-core jobs on the Grid
  - **Provide input to initiatives for running multi-core jobs Grid-wide** (requirements may be covered by the EGEE MPI WG recommendations)

Agenda of the Workshop

- Monday 21 June 2010
  - 13:30->18:30 Welcome, R&D Status and ”NEEDS” session
- Tuesday 22 June 2010
  - 09:00->12:30 "ACTIONS" Session
  - 14:00->18:30 “FUTURE: Session Final wrap-up and discussion

Practical Information

- Presentation slides
  - Uploaded into agenda
  - Speakers should have submission access rights
  - If problems send them to one of the session conveners
- EVO conference
  - In ”WLCG" community titled “2nd Workshop on adapting applications ….”
  - Possible to phone in: Phone Bridge ID:2031509
- Coffee breaks
  - Coffees will be available in the main hall of B.40