

Grid IC

Major Review Meeting
18th September 2008

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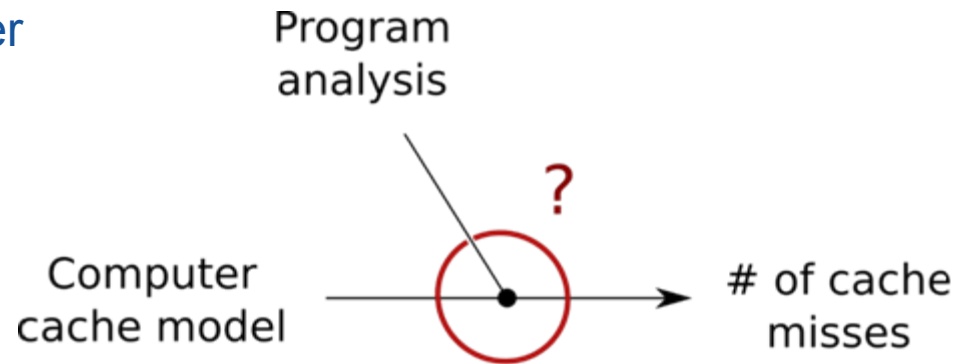


- Resource allocation (X. Grehant)
 - Tycoon (J.M. Dana)
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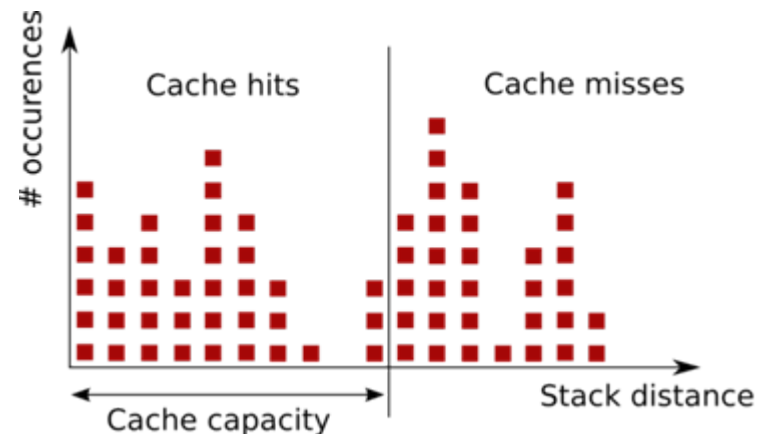
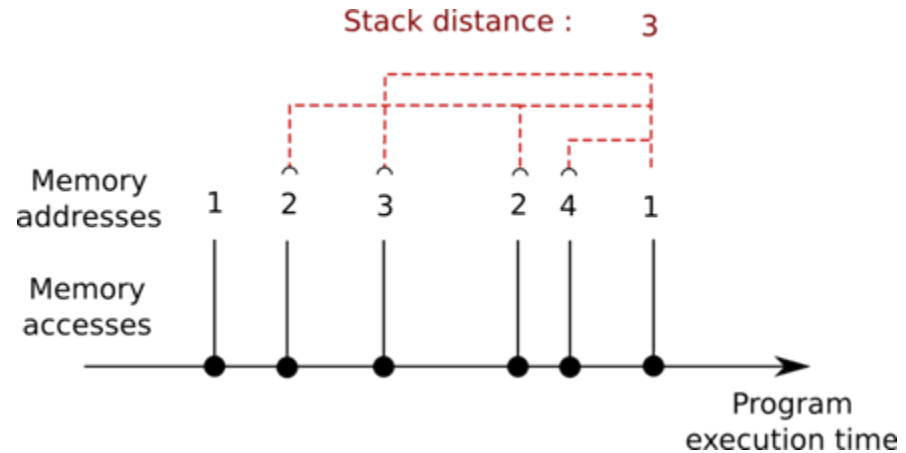
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A model to quantify performance

- From microarchitecture to grids
 - Quantify accuracy of job/server matching
 - What is the best microarchitecture for the job?
 - **What is the best memory hierarchy for the job?**
- Cache misses prediction
 - The ratio of cache misses determines the cost of stall conditions



- A metric and a method
 - New idea: statistical analysis of stack distance
 - New estimation algorithm: more accurate on high values
- Stack distance
 - Determines if a memory access is a cache miss
- Its probability distribution
 - Is estimated quickly
 - Let us do fast, cross-platform predictions

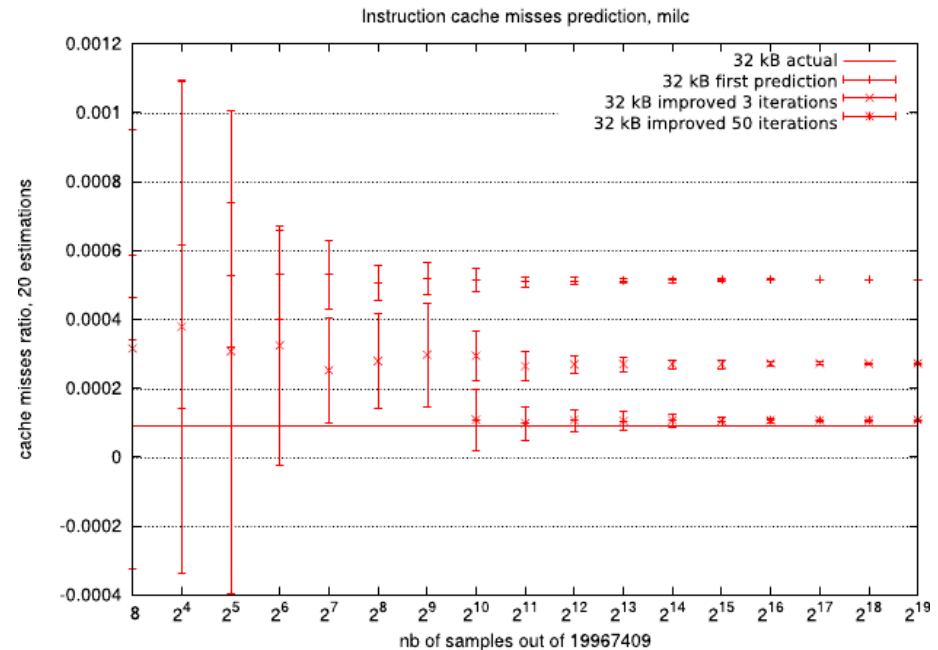


■ Results

- Around 99% accuracy
- Maximum 1 sample / 10 000 collected for program analysis
- Program signature = distribution parameters: 2 floats
- Instantaneous prediction: calculation of the cumulative density function of the distribution

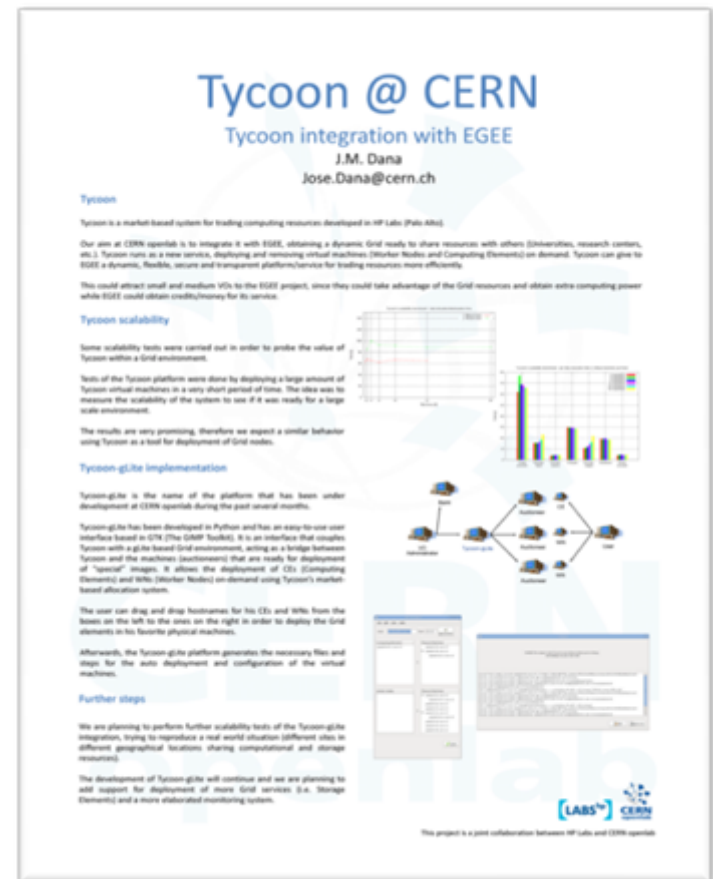
■ Status

- Presented at PDPTA'08 in July
- Code and data available at code.google.com/p/mtc-project
- Now working on Cache thrashing prediction



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- Tycoon was presented in the Distributed Computing Workshop held in London (UK) the 21st May 2008
- One of the topics of the workshop was “cloud computing”



Tycoon @ CERN
Tycoon integration with EGEE
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Tycoon
Tycoon is a market based system for trading computing resources developed in HP Labs (Palo Alto).
Our aim at CERN openlab is to integrate it with EGEE, obtaining a dynamic Grid ready to share resources with others (Universities, research centers, etc.). Tycoon runs as a new service, deploying and removing virtual machines (Market Nodes and Computing Elements) on demand. Tycoon can give to EGEE a dynamic, flexible, secure and transparent platform/service for trading resources more efficiently.
This could attract small and medium VOs to the EGEE project, since they could take advantage of the Grid resources and obtain extra computing power while EGEE could obtain credits/money for its service.

Tycoon scalability
Some scalability tests were carried out in order to probe the value of Tycoon within a Grid environment.
Tests of the Tycoon platform were done by deploying a large amount of Tycoon virtual machines in a very short period of time. The idea was to measure the scalability of the system to see if it was ready for a large scale environment.
The results are very promising, therefore we expect a similar behavior using Tycoon as a tool for deployment of Grid nodes.

Tycoon-gLite implementation
Tycoon-gLite is the name of the platform that has been under development at CERN openlab during the past several months.
Tycoon-gLite has been developed in Python and has an easy-to-use user interface based on GTK (The GNOME Toolkit). It is an interface that couples Tycoon with a glite based Grid environment, acting as a bridge between Tycoon and the machines (environment) that are ready for deployment of “virtual” images. It allows the deployment of CE (Computing Elements) and VMs (Market Nodes) on-demand using Tycoon’s market-based allocation system.
The user can drag and drop resources for his CE and VMs from the boxes on the left to the ones on the right in order to deploy the Grid elements in his favorite physical machines.
Afterwards, the Tycoon-gLite platform generates the necessary files and steps for the auto deployment and configuration of the virtual machines.

Further steps
We are planning to perform further scalability tests of the Tycoon-gLite integration, trying to reproduce a real world situation (different sites in different geographical locations sharing computational and storage resources).
The development of Tycoon-gLite will continue and we are planning to add support for deployment of more Grid services (i.e. Storage Elements) and a more elaborated monitoring system.


LABSTM CERN
The project is a joint collaboration between HP Labs and CERN openlab.

The Open Cloud Computing initiative

- *Cloud Computing” is a style of computing where IT-related capabilities are provided “as a service”, allowing users to access technology-enabled services "in the cloud" without knowledge of, expertise with, or control over the technology infrastructure that supports them*

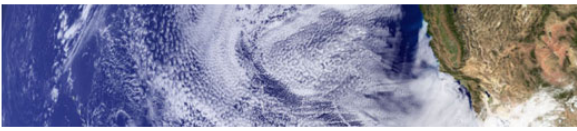
- Cloud computing research testbed with 3 initial sponsors:
 - HP
 - Intel
 - Yahoo!

- Tycoon is being used as a resource allocation system in “the cloud”
- We believe that our collaboration with HP Labs has helped Tycoon to be part of this new research initiative

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HP Labs cloud-computing test bed: VideoToon demo



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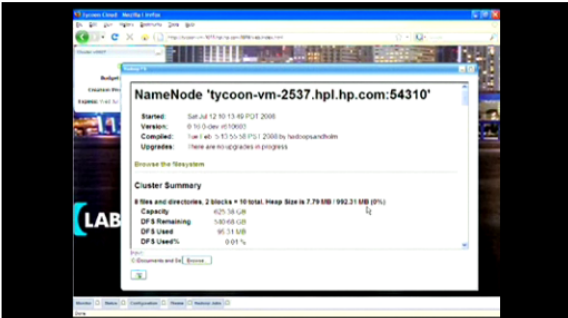
The HP, Intel and Yahoo! Cloud Computing Research Test Bed will provide efficient and powerful hardware platforms managed by flexible and scalable system services that support a variety of application domains. Its main objective is to support researchers who are developing new ways of managing data centers and experimenting with new cloud services.

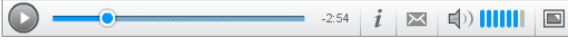
To make this concrete, we showcase on this page an example of one such experiment: testing out a new combination of some unique HP, Yahoo!, and Intel® technologies working together to build a cloud-computing service.

In this example, Thomas Sandholm wants to make the HPL VideoToon processing technology available as a service to cartoon-ize videos. To do so he combined VideoToon with Intel® VT Virtualization Technology to provide efficient performance isolation, HP Labs Tycoon to do agile market-based allocation, and Yahoo! Apache Hadoop to simplify parallelization. The entire test was pulled together in less than 2 weeks. It's now ready for trying out at scale, to explore the effects of multiple users competing for resources.

The goal of the testbed is to make this kind of experimentation equally easy for many other users.

Demo Video







HP Labs' 2008 Request for Proposals

- CERN submitted 6 different proposals in June
 - From FIO, DM, GS groups
 - Also visit to Palo Alto by A. Pierson/S. Jarp
 - Discussions with R. Friedrich (Director of Open Innovation Project) and several Directors of relevant Labs
 - Unfortunately none of the CERN proposals were accepted!
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CERN
openlab

Q & A
