Network of Choice

ProCurve Networking by HP

HP & CERN OPENLAB an R&D Partnership

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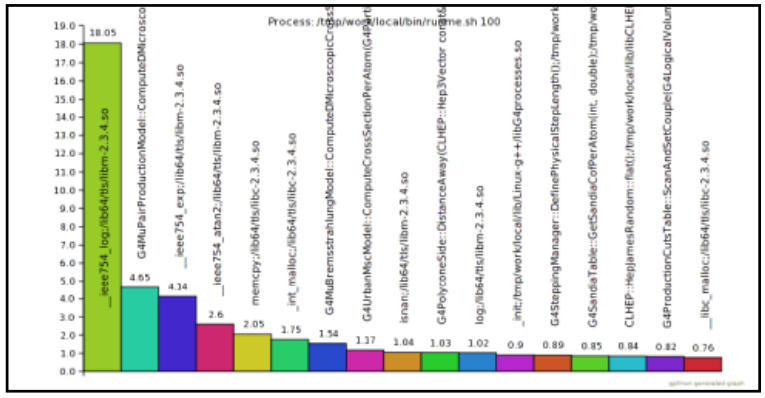
LABS hp

HP History of Engagement at CERN OpenLab

Since 2002, HP has been involved in several Openlab projects

-Performance Monitoring,
-High Performance test bed – OpenCluster
-Computational Fluid Dynamics
-10GigaBit Networking
-Grid Resources simulation
-SmartFrog
-Tycoon
-CINBAD…

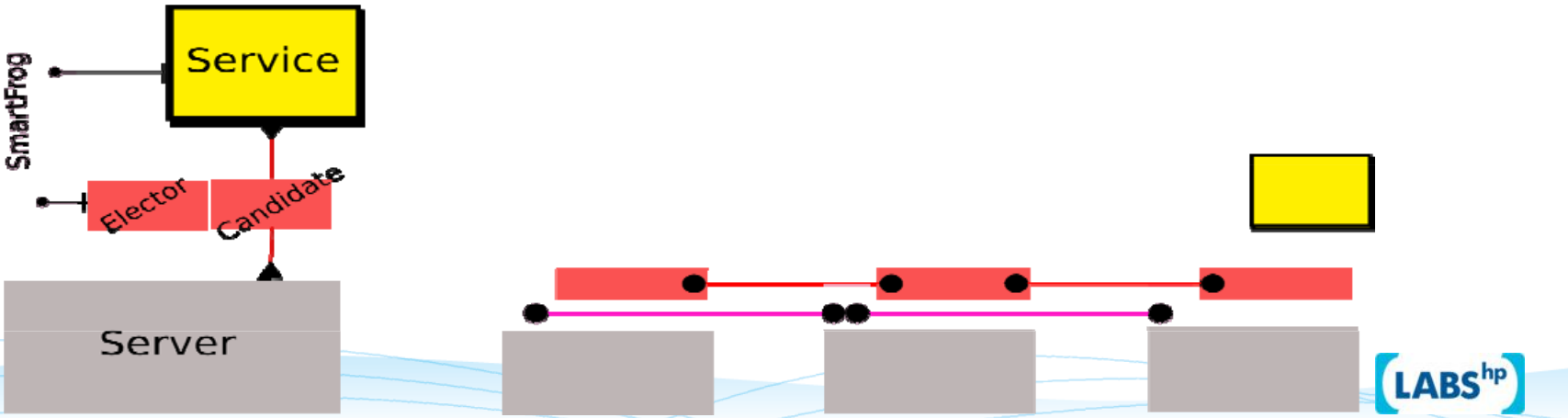


Smartfrog project

SmartFrog project in collaboration with HPLabs Bristol:

- Synthesis on Grid Scheduling
- VO management, resource access: EGEE, OSG, NorduGrid, Naregi, etc.
- Direct scheduling in a VO (Virtual Organisation, Federation users)
  - glideCAF, Cronus, GlideInWMS
  - AliEn2, DIRAC, Panda
- With the help of several grid developers at CERN
- Submitted to the Journal of Supercomputing
- Design of a P2P resource election mechanism
  - Decides where to (re-)deploy a service
- Development of SmartCitizens, based on SmartFrog

Figure: SmartCitizens Integration inside a node, and between nodes



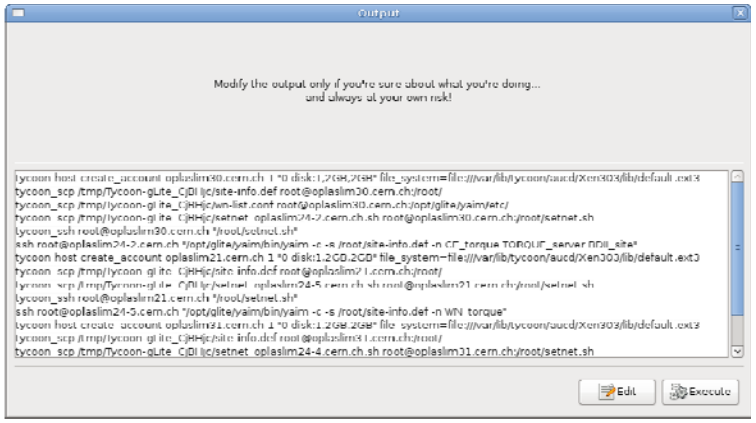
Tycoon Project

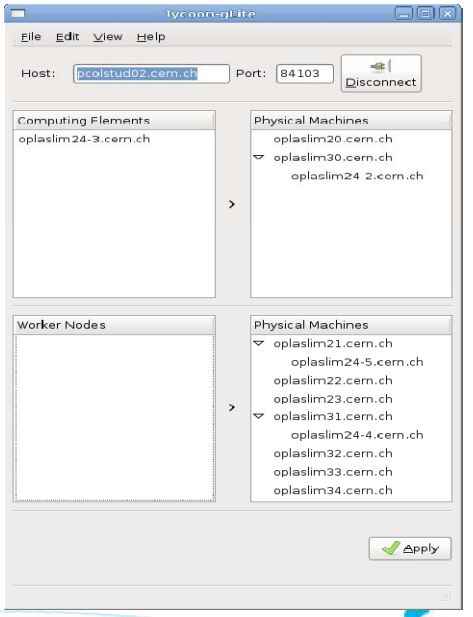
In collaboration with HPLabs Palo Alto

- Allocating CPUs resources project
- Collaborations (HP Labs, EGEE, NorduGrid, Russia…)
- Scalability verified
- Addresses Security and trust concerns

Adapted for CERN/LCG grid middleware, Tycoon-gLite implementation

- Deploy different kinds of nodes more easily (i.e. Storage Elements)
- Allow modification of output





HP-Intel contribution

HP granted in collaboration with Intel equipment to OpenLab projects:

In 2006-07 Upgrade of Itanium Madison 100 CPUs to Montecito Dual Core used for

- CINBAD
- IT's security team
  - Correlating data from the CERN firewall
- Benchmarking, compiler testing, etc.

In 2008,HP-Intel granted Blade System w/128 Xeon Harpertown processors used for:

- Benchmarking, Performance monitoring, Compiler testing,
- Virtualization tests, Grid testing, New processor simulation,
- New language testing, etc.
- hands-on workshops and teaching.

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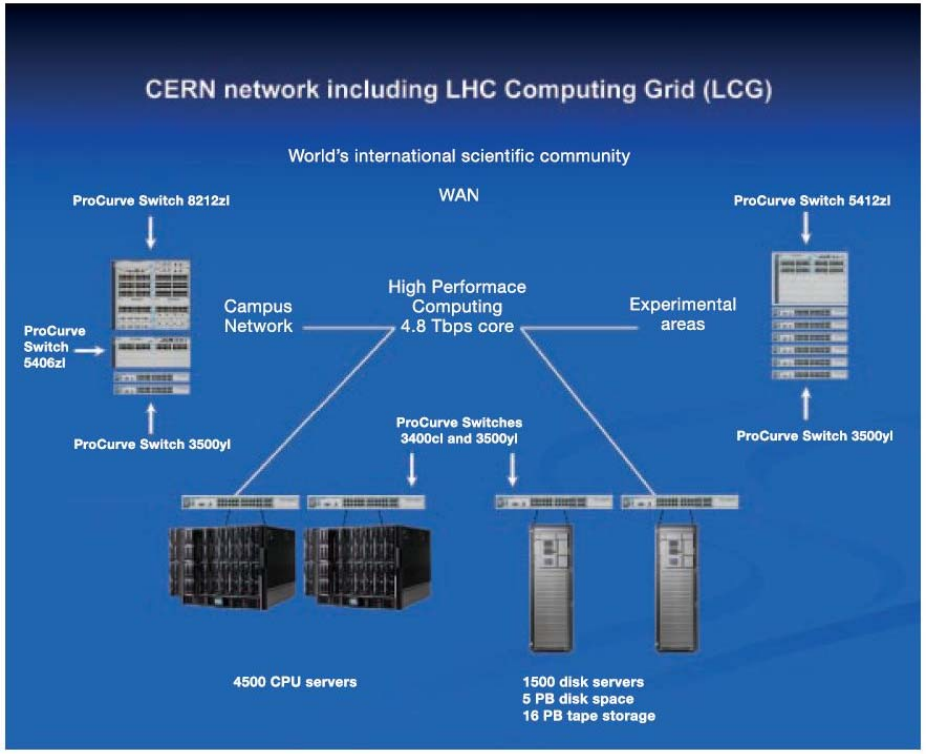
Cinbad
HP ProCurve/CERN Openlab project

The Network is the Test Bed

8212	10
5400	130
3500	1132
3400	940
Ten gigabit ports	780
Number of Gigabit user ports	~70,000



CINBAD

Cern **I**nvestigation of **N**etwork **B**ehavior **A**nomaly **D**etection

Behaviour of large computer networks (high performance computing / large campus)

- Detect traffic anomalies in the system
- Be able to perform trend analysis
- Automatically take counter measures
- Provide post-mortem analysis facilities

An open-ended challenging <u>research</u> activity

Large scale issues

- Collection of large quantity of data
- Storage & post mortem
- Analysis

Precise definitions and heuristics

- Anomalies
- Trends
- Counter measures…

CINBAD: First achievements

Actively collecting data

- Multistage Scalable data collector implemented

Anomalies detected

- misbehaving devices
- external DNS users
- unauthorized use of NATs
- the security team activities in the network

Triggered actions at CERN

- Security team now blocks traffic outside DNS servers
- A policies regarding specific usage now deployed

And all that just within this “small” amount of data we have from the initial testing and experimentation!

CERN – HP Collaboration

HP Labs has been an OpenLab partner from the beginning in 2002

Long-term commitment and partnership

Research adapted to changing needs and evolution

Very successful collaboration for many years in multiple domains

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