Grid IC

Quarterly Review Meeting
29th January 2007

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S. Jarp
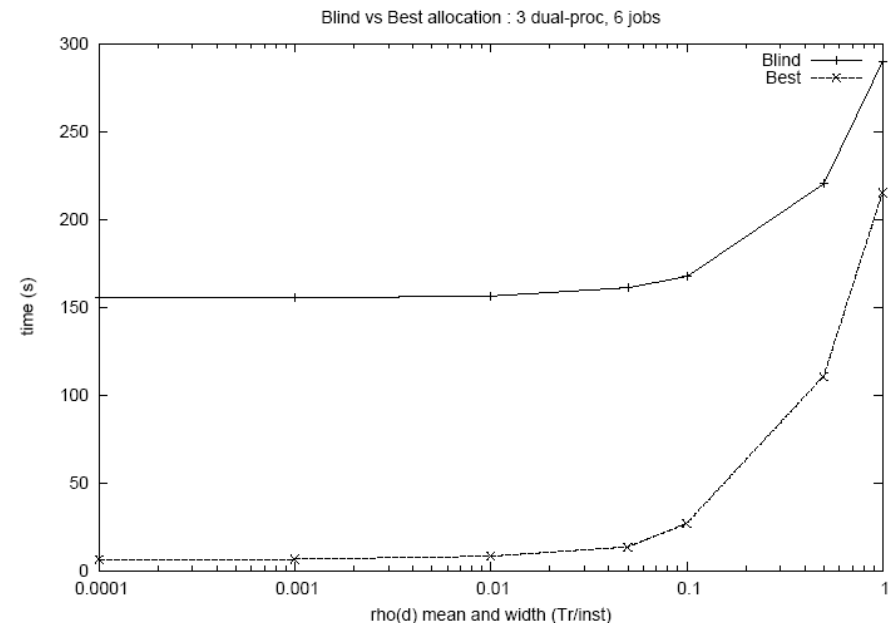
- Scheduling (X. Grehant)
- Tycoon (J.M. Dana)
- Virtualization (H. Bjerke)

- **Scheduling (X. Grehant)**
- Tycoon (J.M. Dana)
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- **Synthesis on Grid Scheduling**

- **VO* management, resource access**
  - EGEE, OSG, NorduGrid, Naregi, etc.
- **Direct scheduling in a VO***
  - glideCAF, Cronus, GlideInWMS
  - AliEn2, DIRAC, Panda
  - DIANE
    - * VO: Virtual Organization, federation of users.

- **With the help of several grid doers at CERN**
- **Submitted to the Journal of Supercomputing**

- Resource supply / consumption is heterogeneous
  - ↳ Benefits of careful allocation and migration?

- Design of a resource model
- Development of Levellab, a simulator

- Example simulation:
  - Optimal dynamic vs random allocation

- Submitted to HPDC

Blind vs Best allocation : 3 dual-proc, 6 jobs

- Resource availability is transient
  - ↳ Resilient service deployment

- Design of a P2P resource election mechanism
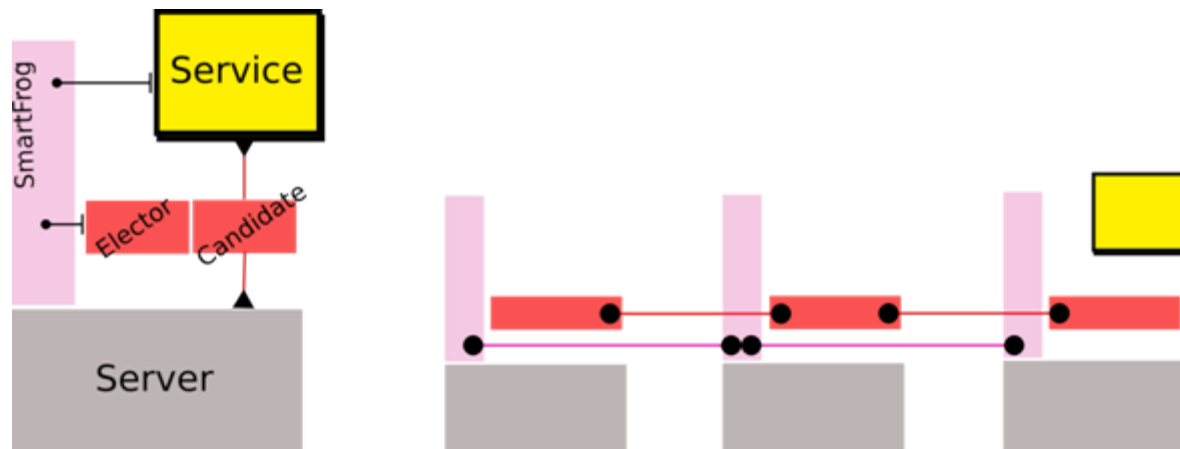 - Decides where to (re-)deploy a service
- Development of SmartCitizens, based on SmartFrog

Figure: SmartCitizens Integration inside a node, and between nodes

- Scheduling (X. Grehant)
- **Tycoon (J.M. Dana)**
- Virtualization (H. Bjerke)

- A technical report about Tycoon activities at CERN openlab in 2007 and our future plans for 2008 has been written and sent to HP Labs (Palo Alto)

- Several modifications in the Tycoon-gLite implementation

- Collaboration with BalticGrid has been resumed

- Worth highlighting:
    - Collaborations (HP Labs, EGEE, BalticGrid)
    - Tycoon-gLite integration
    - Scalability tests
    - Issues concerning security and trust
    - Conferences
    - Future collaboration with Constellation Technologies?

- **The implementation has been modified in order to:**
  - Deploy different kinds of nodes more easily (i.e. Storage Elements)
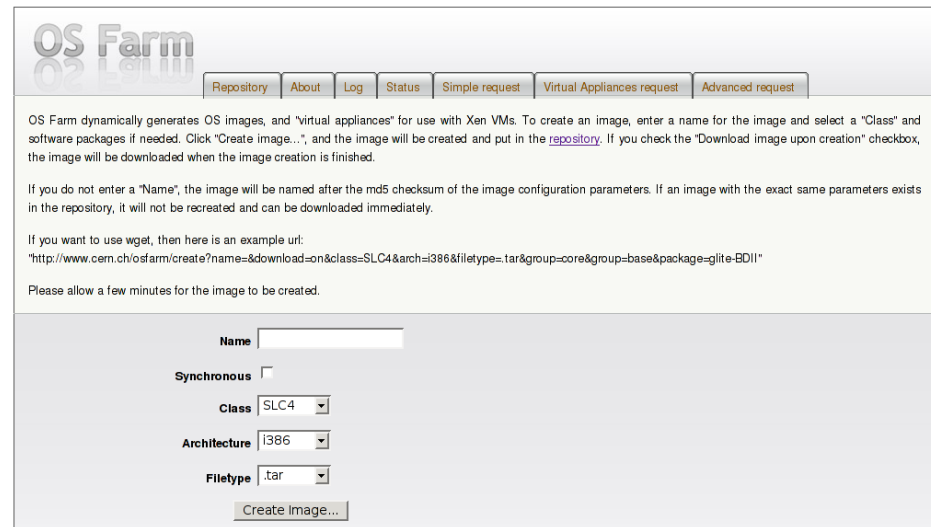 - Allow the modification of the output

Contents

- Scheduling (X. Grehant)
- Tycoon (J.M. Dana)
- **Virtualization (H. Bjerke)**

- Benchmarks run on paravirtualized and hardware-assisted virtualization platforms
  - point to strengths and weaknesses in hypervisors

Comparative Performance of Hypervisors/Kernels

Tests: ROOT Real time, ROOT CPU Time, ROOTMARKS, geant4, MMU

Legend:
- KVM (2.6.23-rc3)
- XEN PVM (2.6.18-xen)
- XEN HVM (SLC4 SMP)
- 2.6.18
- SLC4 (2.6.9-55.0.2.EL.cernsmp)
- 2.6.18(nonSMP)

Y-axis: Normalized Performance (0–100)
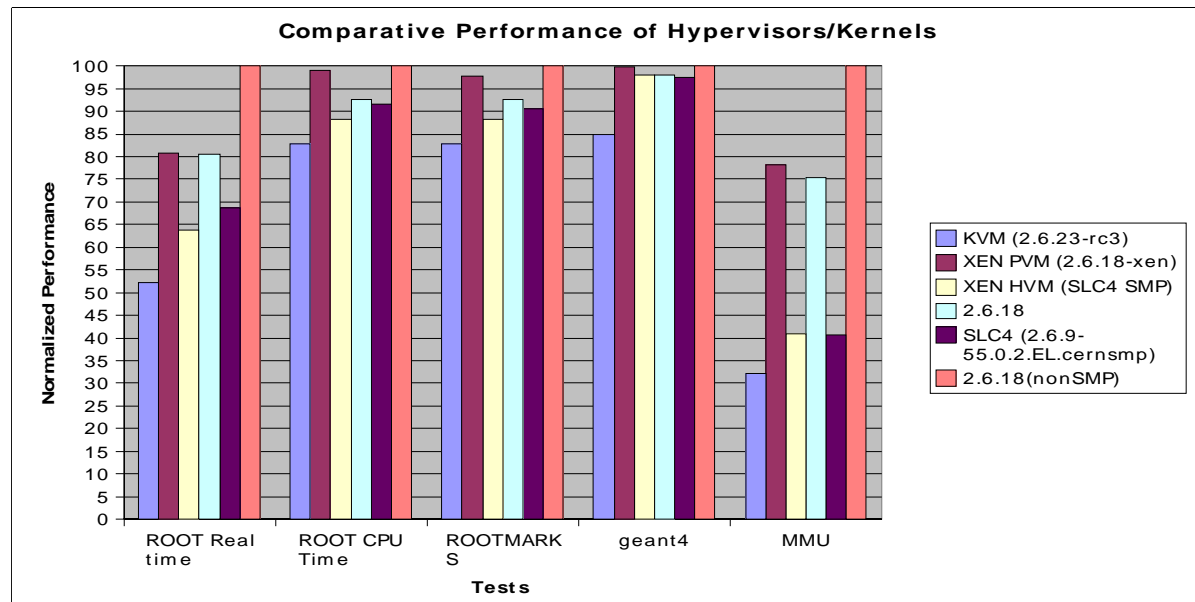
- VM images generated using a layered cache

    - Core layer is instantaneous, using copy-on-write

    - Supports Debian and Red Hat based distributions

- Contextualization - customizes images according to deployment context

- Web service interface w/ example Java client

- XML image descriptions

Content Based Transfer

- **Most VM images are relatively similar**
  - Transfer only the delta between images
- **Efficiency close to hypothetical max (infinite CPU power)**
- **Integration with OS Farm**

MB/s

delta

Legend:
- Hypothetical max bandwidth
- Measured bandwidth