

Resource deployment

CERN openlab II quarterly review
20 September 2006

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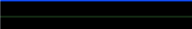
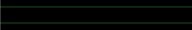



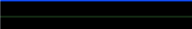
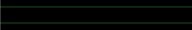



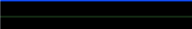
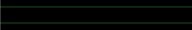

- CERN servers hosting services

<https://websvc02.cern.ch/WinServices/>

WoD - Windows On Demand

- You need a Windows 2003 Server for testing purposes ?
- You need a Windows 2003 Server where you are local administrator ?
- You want to test your new Windows software ?
- You want to play dangerously with Windows XP but avoid reinstallation ?

Windows On Demand is the solution:
Get your Windows environment in less than 10 minutes !
 New: WoD serves also Linux operating systems !

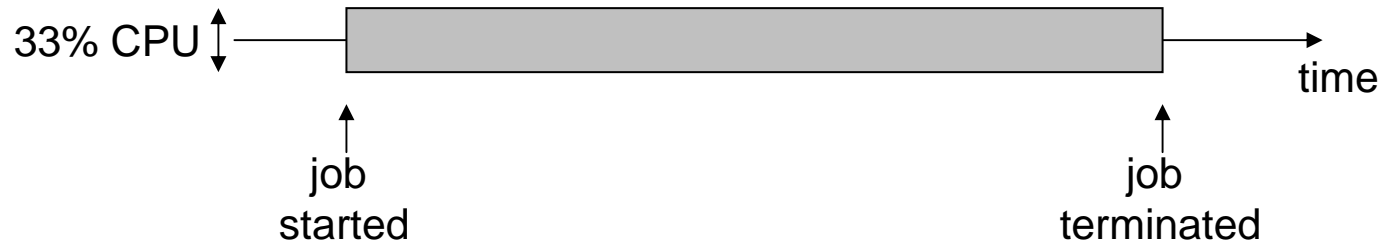
<div style="background-color: #e6f2ff; border: 1px solid #000080; padding: 2px;">WoD Server request</div> <p>Your login: pace Your Login will be set a local administrator of the test machine. For security reasons you cannot specify an alternate login.</p> <p>OS: <input type="text" value="[Select an OS]"/></p> <p>Domain: <input checked="" type="radio"/> Join CERN Domain <input type="radio"/> Standalone</p> <p>Duration: <input type="text" value="[Select a Server Lifetime]"/></p> <p>Budget code: <input type="text"/></p> <p>Cost: <input type="text"/></p> <p>Usage: <input type="text"/></p> <p style="text-align: right;"><input type="button" value="Request"/></p>	<div style="background-color: #90ee90; border: 1px solid #000080; padding: 2px;">Message of the day</div> <p>Linux SLC4 image currently has problems with AFS login, due to Time Synchronization problems. Investigations in progress.</p> <div style="background-color: #e6f2ff; border: 1px solid #000080; padding: 2px;">Guest Servers Status</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Hostname</th> <th>Guestname</th> <th>Status</th> <th>CPU</th> </tr> </thead> <tbody> <tr> <td>WINNEW05-005</td> <td>VirtualMachine01</td> <td>TurnedOff</td> <td></td> </tr> <tr> <td>WINNEW05-004</td> <td>VirtualMachine02</td> <td>Running</td> <td></td> </tr> <tr> <td>WINNEW05-003</td> <td>VirtualMachine03</td> <td>Running</td> <td></td> </tr> <tr> <td>WINNEW05-002</td> <td>VirtualMachine04</td> <td>TurnedOff</td> <td></td> </tr> <tr> <td>WINNEW05-001</td> <td>VirtualMachine05</td> <td>TurnedOff</td> <td></td> </tr> </tbody> </table> <div style="background-color: #e6f2ff; border: 1px solid #000080; padding: 2px;">Available OS</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Name</th> </tr> </thead> <tbody> <tr><td>Windows 2003 Standard Edition SP1</td></tr> <tr><td>Windows 2003 Standard Edition SP1 with Terminal Services</td></tr> <tr><td>Windows 2003 Enterprise Edition SP1</td></tr> <tr><td>Linux SLC3</td></tr> <tr><td>Linux SLC4</td></tr> </tbody> </table>	Hostname	Guestname	Status	CPU	WINNEW05-005	VirtualMachine01	TurnedOff		WINNEW05-004	VirtualMachine02	Running		WINNEW05-003	VirtualMachine03	Running		WINNEW05-002	VirtualMachine04	TurnedOff		WINNEW05-001	VirtualMachine05	TurnedOff		Name	Windows 2003 Standard Edition SP1	Windows 2003 Standard Edition SP1 with Terminal Services	Windows 2003 Enterprise Edition SP1	Linux SLC3	Linux SLC4
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snapshot from Emmanuel Ormancey, Alberto Pace, hepix.caspur.it/spring2006/TALKS/7apr.pace.virtsrv.pdf

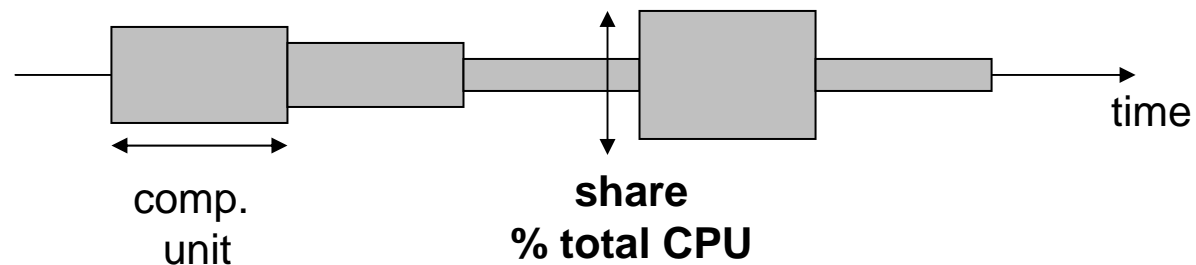
- Amazon Elastic Compute Cloud (EC₂)
 - Elastic = variable number of servers
 - Fixed server characteristics
 - 1.7Ghz Xeon CPU
 - 1.75GB of RAM
 - 160GB of local disk
 - 250Mbps of network bandwidth.
 - Pricing
 - 10 cents per server-hour consumed
 - 20 cents per GB transferred outside of Amazon
 - 15 cents per GB-month of Amazon S3 storage for images.

Source: Grid Today

- Fixed CPU capacity allocation
 - e.g: Batch system, Amazon EC₂, CERN WoD

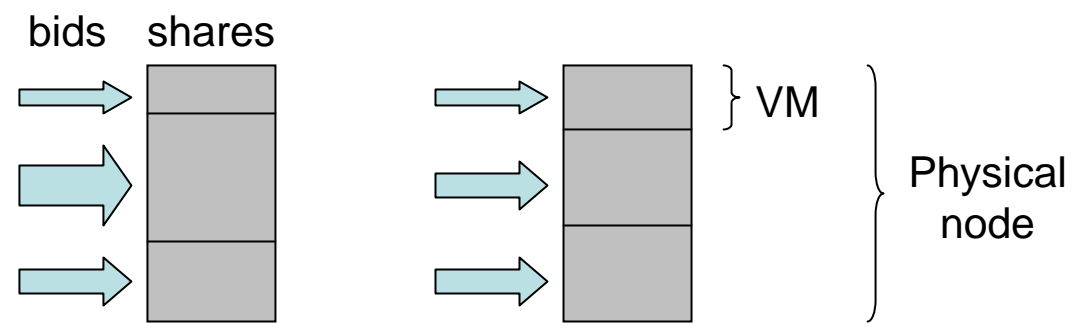


- Variable computational unit share
 - e.g: DGAS, Tycoon

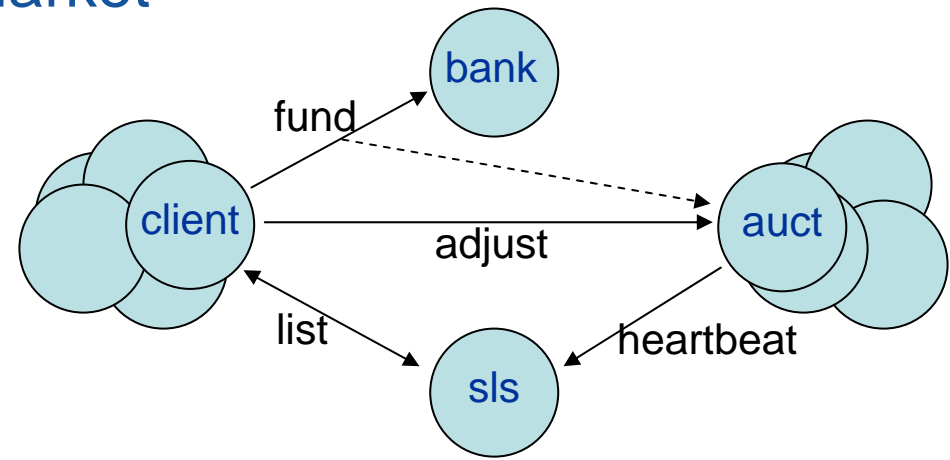


- Architecture

- Auctioneer: Xen VM management with Python



- Market



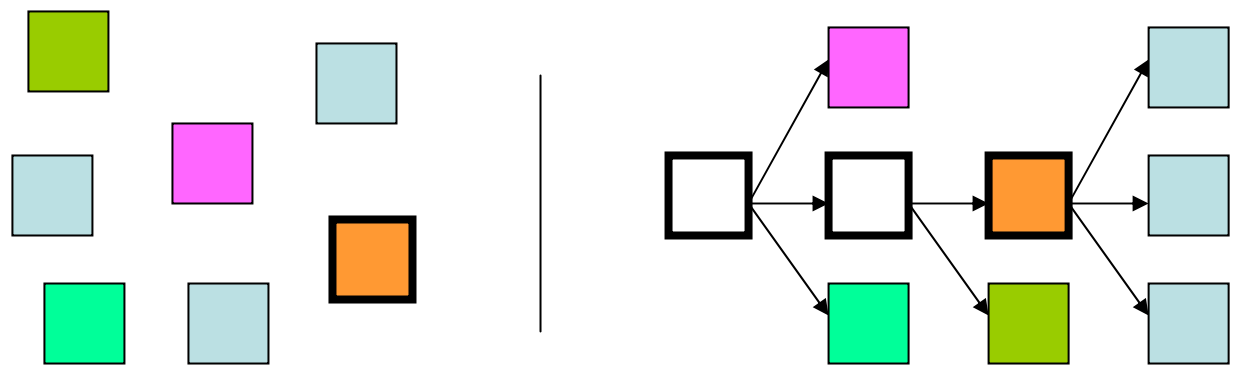
- Former version tested
 - Multiple CPUs not handled
 - Memory, disk not handled
 - Memory overflow : crash

- New version
 - Bid on memory
 - Overbid (=overflow) : account closed

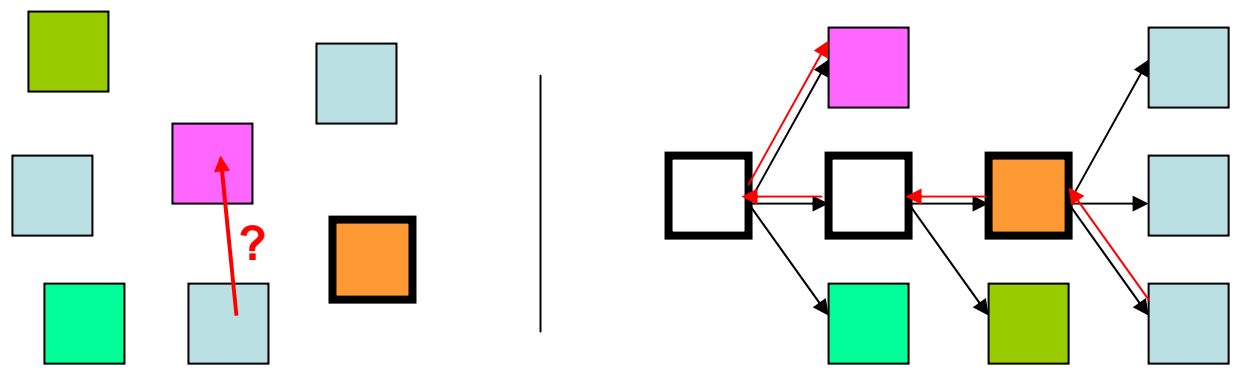
- Live migration?
 - Ok if we restart your job elsewhere ...
 - ... from 0 after 10h run?

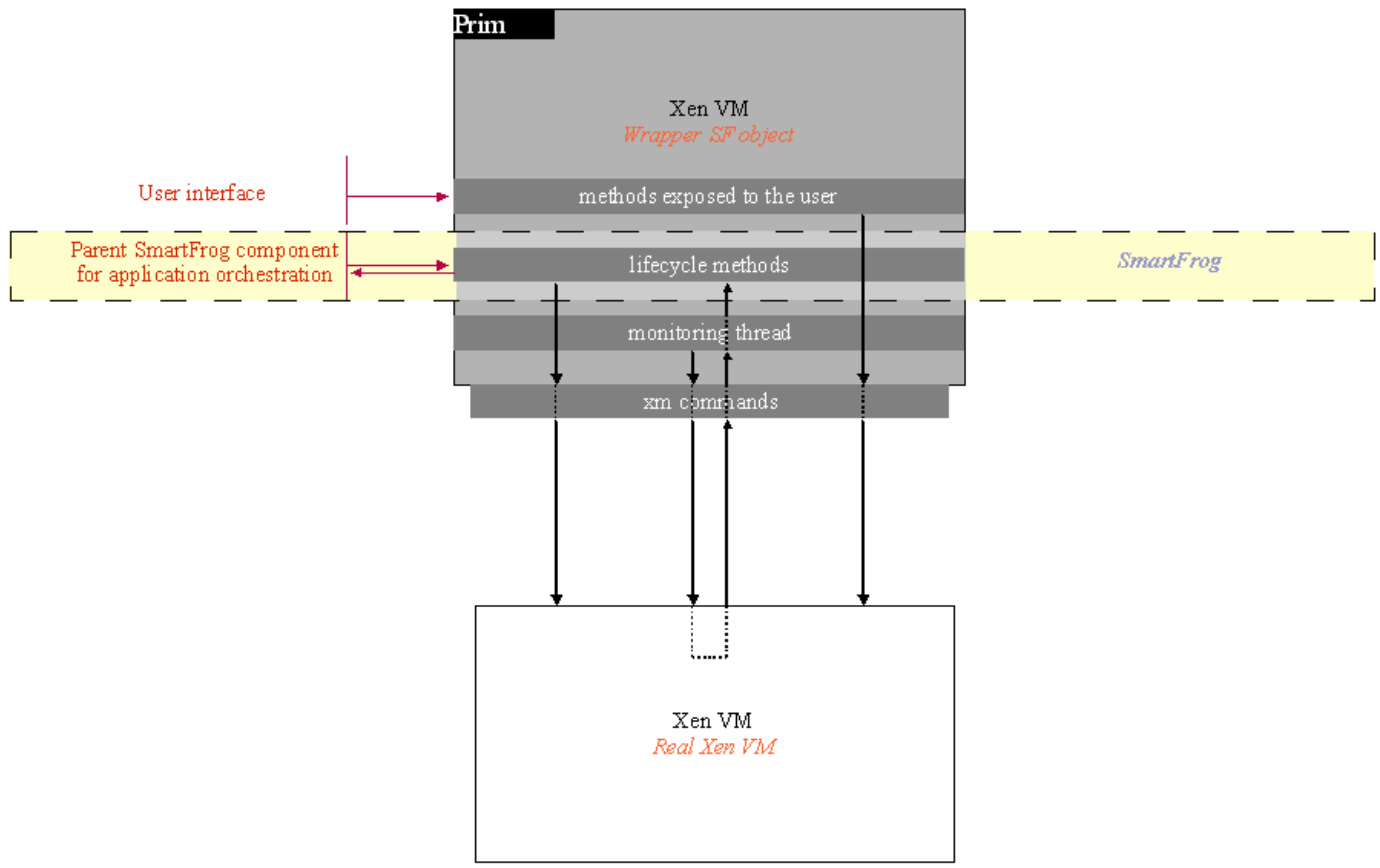
- Good to use Xen: no VM overhead.
- Too fine-grained for scientific grids?
 - HEP vs Biomed & generic apps
 - Sharing CPU: ok. But memory?
- What configuration?
 - Empty fc6 image. Happy?
 - No. We want slc4 with Geant4, AFS client ...
- Outside the grid
 - Independent cluster
 - Service level agreements?

- SmartFrog
 - Orchestrating components easily

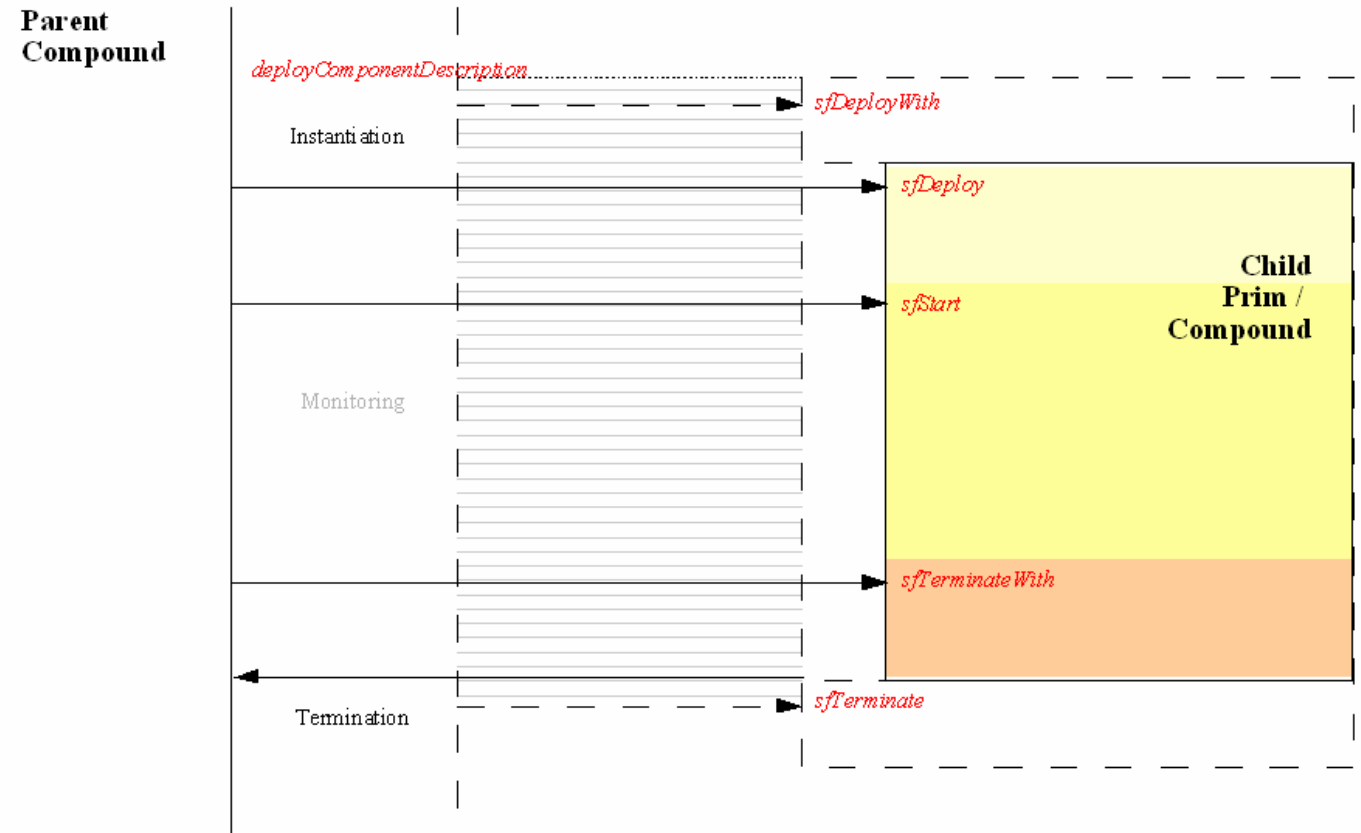


- Wherever they sit

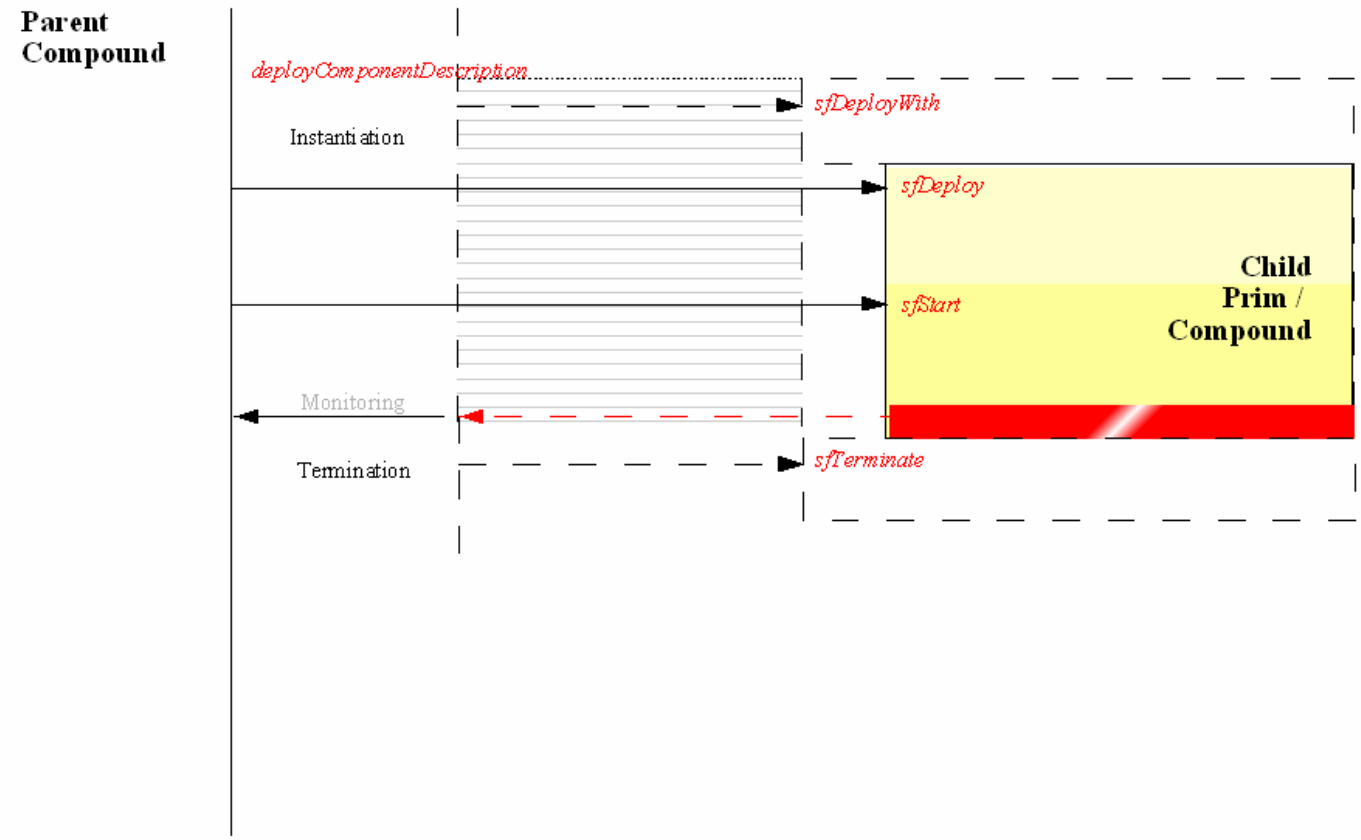




Orchestrating VM managers



Orchestrating VM managers



- VM managers
 - Migrateable
 - Fine-grained, dynamic resource binding

- Orchestration
 - Multi-VMs node, single image
 - Load balancing, migration
 - Grid integrated service

- Tycoon
 - Project from HP Labs Palo Alto
 - Summer student: Salman Toor
 - Grid relevance & integration
 - Discussions with EGEE
 - Large-scale tests to come
 - Kurchatov institute
 - Greek Research and Technology Network SmartFrog
 - EGEE'06 presentation
- SmartFrog
 - Core from HP Labs Bristol
 - Summer student: Olivier Pernet
 - SA3 certification testbed
 - Andreas Unterkircher and Omer Khalid
- PhD thesis
 - ENST Paris, Pr. Isabelle Demeure
 - “Loose virtual environments
for efficient computing resources supply on a grid.”