



ctopus

Managing Cloud Infrastructure

Antonio Cisternino

Marco Mura

Computer Science Dept.

and IT Center

University of Pisa



Introduction



ctopus

- Virtualization:
 - Key element in computing infrastructures
 - Optimization of hardware usage
 - Proved «green»
- Octopus is a Virtual Machine Scheduler



ctopus

Cloud is...

- ...about:
 - data
 - services
 - heterogeneous systems
 - Reliability
 - computing centers
- Suitable for Virtualization!
- Requirement for managing efficiently a large number of objects



ctopus

...interleaved...

DEMO



Mobile check of your VMs



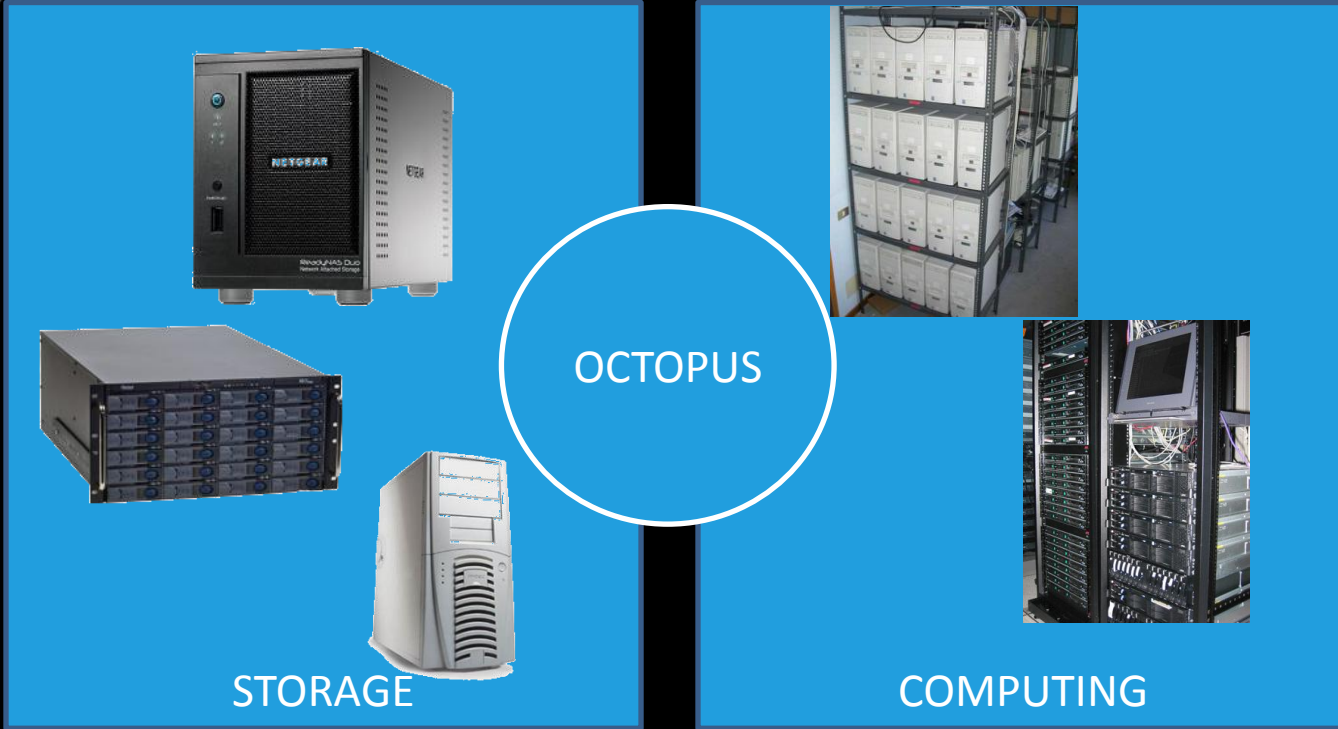
ctopus





ctopus

Architecture



Choose your own geometry as long you tell us!



Infrastructure

- Windows Server Hyper-V 2008
- Windows Active Directory
- Octopus service

Guest Operating Systems Tested

- Linux
- Win7
- Windows Server 2008
- Windows HPC services

Octopus and Hyper-F

Octopus

Hyper-F

WMI Hyper-V
calls

Shared Storage

DHCP
Networking
DNS



octopus



Differencing!... disks



ctopus

- Diff disks are a powerful tool
- Very efficient, you can «fork»
- But... They multiply number of objects to be tracked
- Octopus manages VHDs
- You can snapshot your own image
- You can *checkpoint* through policies



ctopus

Old refrain

- *Memory management is too important to be left to the programmer vs. Memory management is too important to be left to the system*
- Now we have garbage collectors almost everywhere!



ctopus

Management

- Management is important!
- GUIs rarely scale well: for-each is expressed badly
- Octopus feature 3 interfaces:
 - Final users: Web
 - Sysadms: Web **and** F# interactive
 - Programs: .NET (by means of F#)

Policies



ctopus

- Octopus (will) implement policies for managing resources
- Conditions
 - VM status
 - User based policies
 - SysAdmin based policies
- Actions
 - Shut down machines
 - Delete machines
 - Move machines



ctopus

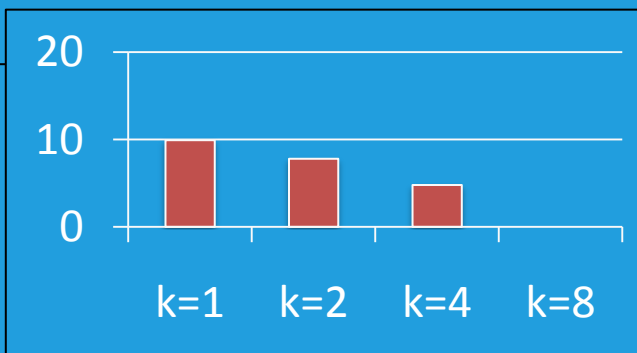
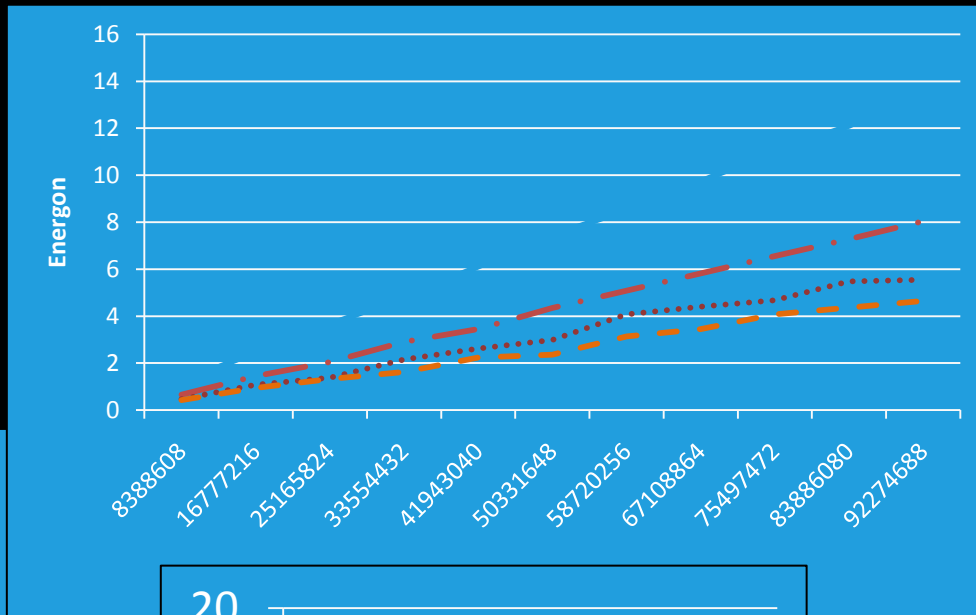
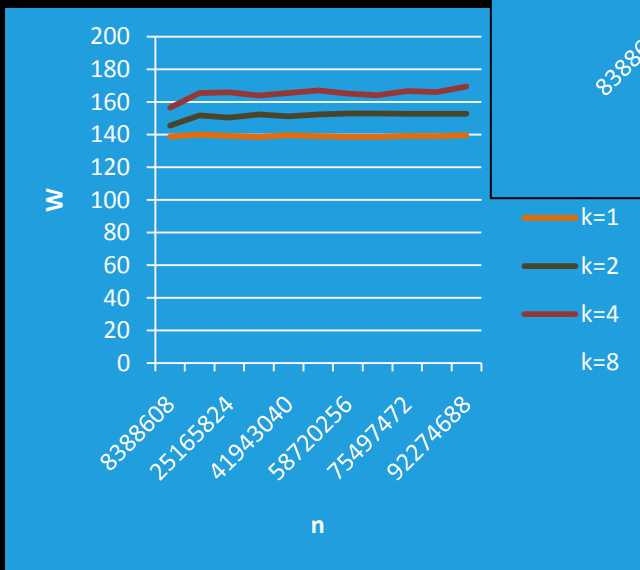
Scheduling Virtual Machines

- Scheduler assigns Virtual Machines to compute nodes
- Policy is implemented by scheduler
- Scheduler always decides if it makes sense to migrate a VMs for saving power
- It turns on/off computing nodes as required



ctopus

Power matters



Conclusion



ctopus

- Octopus is a VM scheduler
- It is only a manager, already production quality
- It eases the management of Cloud computing resources
- May contribute to achieve better usage of computation resources



ctopus

Questions?

<http://octopus.codeplex.com>

