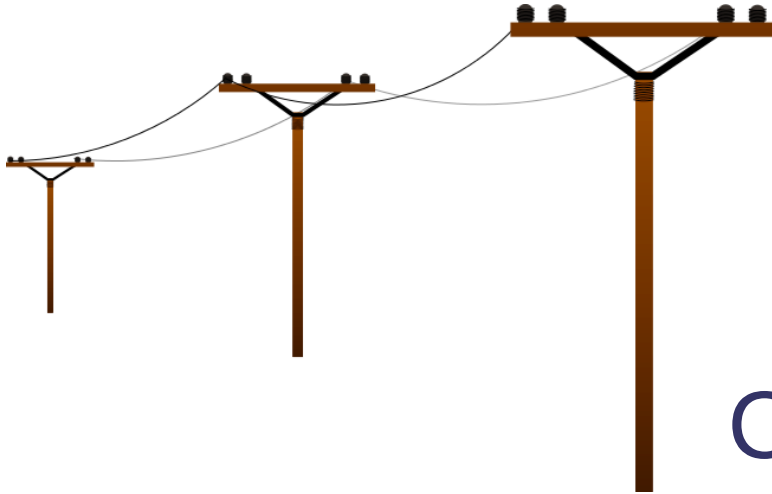
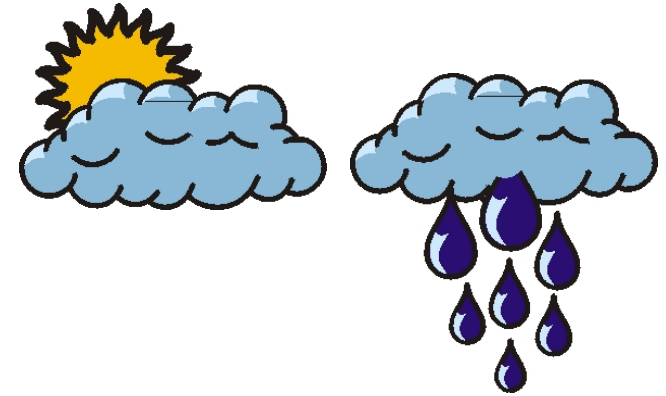


# 2011 OSG Summer School



## Grids

Comparing  
to



## Clouds

by Igor Sfiligoi  
University of California San Diego

# Cloud computing

(as described this morning)

- A mix between hosted computing and Grids
- Job-based like a Grid
  - But “jobs” are Virtual Machines, not just processes
- You get your own machines like in hosted cmp.
  - They just happen to be VMs
  - You install whatever you want in them
  - There is an economic factor  
(although there is a push for scientific clouds as well)

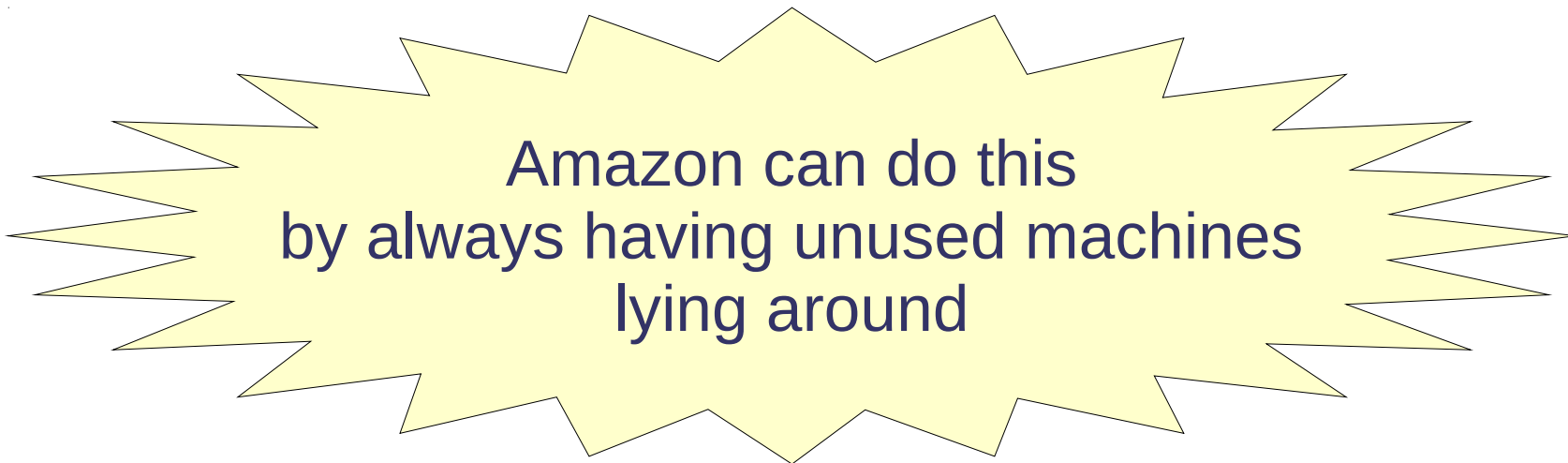
# Cloud computing vs Grids

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- Jobs are **whole system images**
  - You configure your own virtual machine
  - Grid nodes come with site-installed OS
- You **pay in \$\$** to use them
  - In Grids (and local HTC) systems you typically pay just in priority
- Instantaneous access
  - You get the resource within minutes of asking
  - In Grids you may wait a long time

# Pay to use

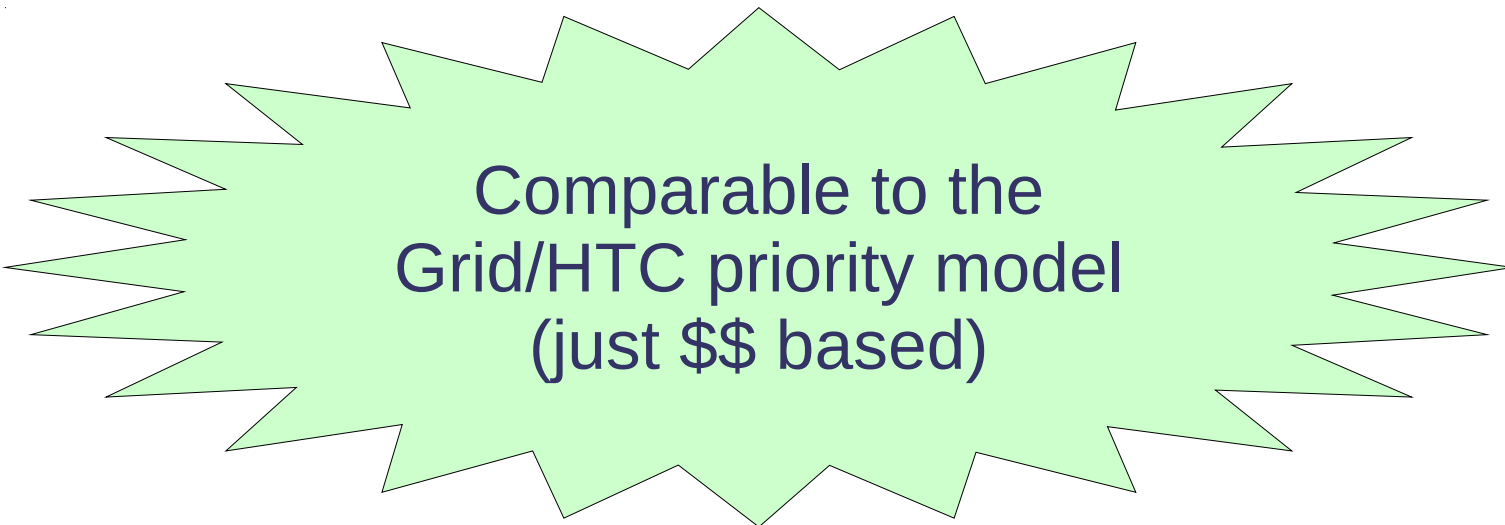
- Amazon EC2 made Cloud computing popular by defining a price in \$\$/hour
- A major selling point is also the fact that you will get the resources the moment you ask



Amazon can do this  
by always having unused machines  
lying around

# Even clouds have priorities

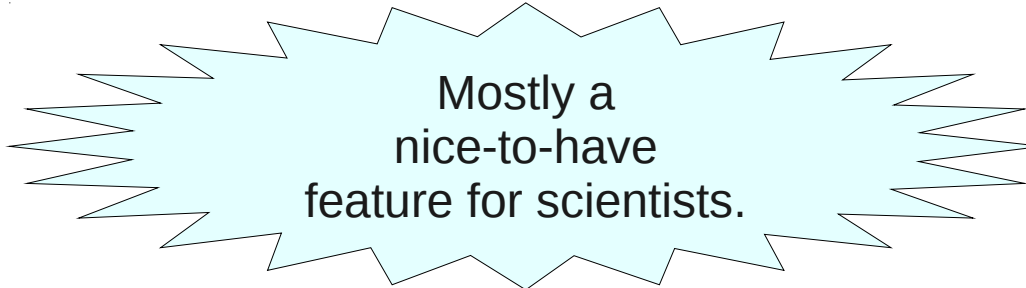
- Amazon EC2 now has “spot pricing”
- You bid for “unused resources”
  - If a higher bid comes in, you loose your machine



Comparable to the  
Grid/HTC priority model  
(just \$\$ based)

# The VM business

- Amazon EC2 success arguably lies in the fact that they allow customers to provide **their own system image**
  - Most customers are not running compute jobs
  - They want to install a Web server and a database!
- This is less important for scientific users
  - Most scientific jobs don't need root/admin access!
  - Although it can make life easier (more homogeneous)



Mostly a nice-to-have feature for scientists.

# Using Cloud resources

- The problem is similar to using Grid resources
  - Find a client and submit the job
- If your job is not a system image, you need someone to create the OS image for you
  - You, if you submit directly
  - The pilot will do it automatically, if you use an overlay system



# Cloud clients

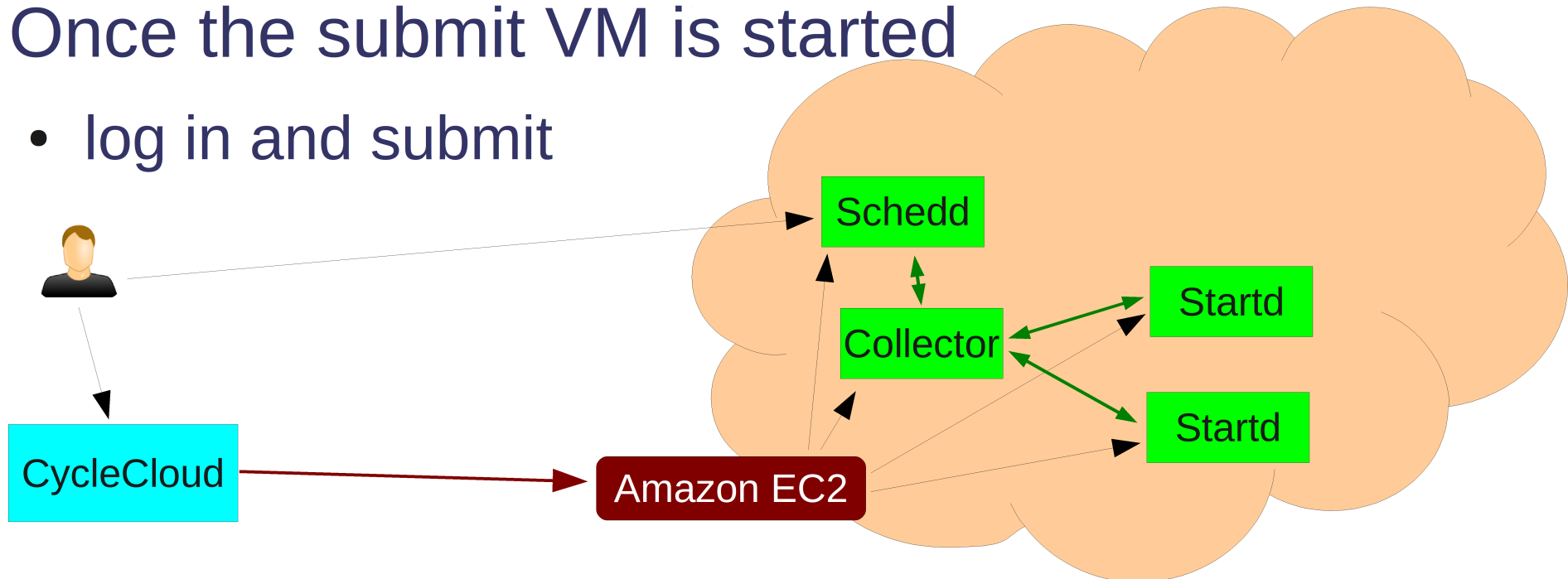
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- Direct submission
  - Cloud provider clients (EC2, Eucalyptus, OpenStack, ...)
  - Condor-G
- Overlay systems
  - glideinWMS (in prototype stage for now)
  - CycleCloud



# CycleCloud

- Starts a whole Condor cluster on Amazon EC2
  - A service run by Cycle Computing
  - Just give them the money
- Once the submit VM is started
  - log in and submit



# Get your hands dirty

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- This is all the theory you need to know for now
- Demo/Exercise time
- Feel free to ask questions