Cloud Computing and Grid Computing 360-Degree Compared

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Outline

- Business model
- Architecture
- Resource management
- Programming model
- Application model
- Security model
• Grids:
  – Largest Grids funded by government
  – Largest user-base in academia and government labs to drive scientific computing
  – Project-oriented: service units

• Clouds:
  – Industry (i.e. Amazon) funded the initial Clouds
  – Large user base in common people, small businesses, large businesses, and a bit of open science research
  – Utility computing: real money
Why is this a big deal?
- No owned infrastructure
- All resources rented on demand

Critical for startups with risky business plans

Not possible without Cloud Computing and a credit card
- Launched in 2007/2008 timeframe
An Example of an Application in the Cloud

- Animoto
  - Makes it really easy for people to create videos with their own photos and music.
• Grids:
  – Application: *Swift, Grid portals (NVO)*
  – Collective layer: *MDS, Condor-G, Nimrod-G*
  – Resource layer: *GRAM, Falkon, GridFTP*
  – Connectivity layer: *Grid Security Infrastructure*
  – Fabric layer: *GRAM, PBS, SGE, LSF, Condor, Falkon*

• Clouds:
  – Application Layer: *Software as a Service (SaaS)*
  – Platform Layer: *Platform as a Service (PaaS)*
  – Unified Resource: *Infrastructure as a Service (IaaS)*
  – Fabric: *IaaS*
Resource Management

- Compute Model
  - batch-scheduled vs. time-shared
- Data Model
  - Data Locality
  - Combining compute and data management
- Virtualization
  - Slow adoption vs. central component
- Monitoring
- Provenance
Questions