Developing the UAB Cloud

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What’s a Cloud?

Wikipedia Sez:

Cloud computing is Internet-based computing, whereby shared resources, software, and information are provided to computers and other devices on demand, like the electricity grid.
The Stuff of Clouds

Clouds have services....

...and clouds have structure

Picture credits to this point...Wikipedia: Cloud Computing
The “aaS” of Clouds

• **SaaS** – Software as a Service
  
  • This is the application layer. It’s what the ordinary consumer of cloud services sees, typically via their web browser or a dedicated app.

• **PaaS** – Platform as a Service
  
  • This is the layer on which applications are built. It’s what the ordinary consumer of developer services uses to build the applications delivered in the SaaS layer.

• **IaaS** – Infrastructure as a Service
  
  • This is the layer that makes everything possible. It’s deep in the stack and not typically seen by the consumer, but it’s the layer we’re leveraging to build a coherent service stack.
Our Foundations in the Cloud

• Service Exploration 2000-2003
  • Early service explorations, Internet2 Connectivity, Cluster Acquisition, NSF Middleware Initiative (NMI) Testbed

• Service Development 2003-2006
  • ANI-0330543 "NMI Enabled Open Source Collaboration Tools for Virtual Organizations"

• Service Pilot 2007-2010
  • UABgrid Pilot
  • Integrated open source tools suite for computing and group collaboration: Globus, MediaWiki, Trac, Mailing List, Revision Control
Our Cloud-y Vision circa 2006

*Ad Hoc collections of researchers will build collaboration environments with a combination of institutionally, commercially, and VO supplied applications which share a common understanding of identity, relationships and roles. A new desktop paradigm. Different applications can lead to different results. Consult your IT professional for correct dosage. Too much can induce nausea.

Credit: John-Paul Robinson, Common Solutions Group, invited presentation on myVocs
Tour Our Cloud

Our Cloud

Grid Computing
Statistical Genetics
Aggregate Cohort Estimation
Matlab
Collaboration Tools
Biobank
Cheaha HPC Platform
MatLab, Biobank, ACE
Software as Services Experiments

http://docs.uabgrid.uab.edu/wiki/MatLab

https://ace.ccts.uab.edu

http://biobank.uabgrid.uab.edu
Collaboration Tools
Services for Developers Experiments

MediaWiki, WordPress, Mailing List, Trac (docs & bugs), Git (file versioning)

Grid and Statistical Genetics: Platform Scaling Experiments

Open Science Grid Capacity

Projects.uabgrid.uab.edu/r-group
Cheaha HPC Platform
Infrastructure Service Experiments

Research Collaboration Environment

- Applications for Users
- Tools for Developers
- Resources for Operation

- Research Applications (e.g., R-tools, namd, biobank, proteomics, matlab, etc)
- Project and Collaboration Tools (e.g., mallet, mediawiki, trac, wordpress, confluence, glsdvm)
- Infrastructure (see infrastructure diagram for details)
What We’re Doing Now...

• In General
  – UABgrid Pilot projects wrapping-up
    • migrate to production
    • report our findings
  – High-bandwidth connectivity expansion
    • across the campus and state
  – Cloud exploration across UA System and the state
    • linked data centers and expanded HPC

• Two Specific Projects
  – Moving the @lab to the cloud
    • support virtual computing labs to build environments in the cloud
  – Extending the research notebook
    • exposing the value of archives, wikis, blogs, and managed development platforms to the research data collection
How to get Involved

Contact Us

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Find Us

http://www.uab.edu/it/research
http://uabgrid.uab.edu
http://dev.uabgrid.uab.edu
Experiments in the Cloud

• Building out Infrastructure
  – Cheaha compute and storage expansion
  – Research Network
  – Continuous resource improvement – non-disruptive

• SSG Project
  – Application Scaling
  – OSG Leveraging

• ASA Integration Exploration
  – Proving the idea of seamless resource access
  – Need to get back to it

• Cancer Center caBIG Support
  – Help complete getting connected – recognition by NCI for our design
  – Biobank: an exploration of caTissue electronic tissue banking solution (SaaS)

• Center for Clinical and Translational Science
  – Design information sharing network based on caGrid elements
  – Provided developer team building, process and tools (SaaS)

• Increase HPC Access to non-traditional users
  – Psychology graduate students under Dr. Taub
  – Training and application support

• Engaging in Research Repository
  – Platform and application development support

• Building Virtual Computing Laboratories
  – Migrating our lab to this fabric

• Building the Research Notebook
Collaboration Tools (SaaS)

• Environment for Developers
  – Trac – managing development process (wiki & tickets)
  – Git – managing software growth
  – MediaWiki – managing documentation
  – Mailing lists – managing communication
  – WordPress – managing activity logs

• Application Platforms
  – Perl, Python, R, C,
  – Adding PHP, Ruby