Virtual Computing Lab (VCL) Concepts and Use

12 Feb 2010

Agenda

- What is a VCL?
- How could a VCL be used?
- What problems does a VCL address?
- How does a VCL work?
- What are limitations of VCLs?
- When can one use our VCL?

What is a VCL?

- Pool of computers
  - Remotely accessible (screen, keyboard, mouse)
  - Reusable
  - Real or virtual
  - Provisionable (ideally)
- NCSU and IBM popularized concept
  - Software is being open-sourced
- Applies mainly to CSS/ITS programs
  - Use in CES program would require more thought

How Could a VCL Be Used?

- Reserve computers for classroom exercise
  - E.g., every Tuesday from 2-4pm, need 30 computers with Windows XP and SQL Server installed
- Reserve computer for assignments/projects
  - E.g., student would reserve at a time convenient to them, and might request admin privileges
- Reserve several computers for demonstration/class use
  - E.g., Map-Reduce running on 10 computers
- Make expensive/complex software available remotely
  - Predefined OS and application that students can request to reserve (e.g., Clementine, Enterprise Architect)

What Problems Does a VCL Address?

- Lab computers are expensive to upgrade
  - Often underused and overpowered
  - Admin privileges sometimes not possible
- Students prefer using laptops
  - Inconsistent or inadequate computing environments
  - Varying skill levels for installing/configuring
- Classroom computers are largely inadequate
  - Inadequate and inconsistent capabilities
  - Installations must be scheduled weeks in advance
  - Admin privileges not possible

What Problems Does a VCL Address?

- Software licensing is restricted
  - Only installable on university-owned equip
  - Number of licenses is limited
  - Licenses limited to department-only use
- No short-term research/teaching computers
- Distance learning not possible if labs required

How Does a VCL Work?

- Using web
  - Person reserves computer at a time for a duration
    - Individual or Class
    - Ultimately, also requests what software is installed, etc.
  - Remote computer is prepared by system
  - Person receives IP address
- Using remote display software
  - Person connects to remote computer via IP
  - Uses remote computer until:
    - Quits session
    - Session duration time expires
  - System saves copy of remote computer

What Are Limitations of VCLs?

- Short-term use
  - Want to exploit reusability to minimize costs
- Resource intensity
  - CPU: probably okay with multicore CPUs
  - Disk: problem unless multiple real disks installed
  - Network: problem unless virtual network used
  - Dynamic Graphics
    - problem unless special software purchased
- Number of available computers
- Disk image load/store performance
- Users exchanging massive data with remote system

When Can One Use Our VCL?

- Status
  - Hardware was installed/configured Summer 2009
    - 10 blades (dual quadcore processors per blade)
    - 20 workstations (single quadcore processor)
  - Software is partly ready
    - Reservation system works
    - Storage system installed and configured but not tested
- Static provisioning possible
  - Manual process, requires planning and time
- Automatic provisioning in a year or two