



Sysadmin Training

in the

Virtual Unix Lab

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Background

- Context: system admin training
- Problem: root access for users
- No Root - no practicing of many things
- Root - unknown state after exercise
⇒ Reinstall to be safe
- Reinstall not always an easy option!



The Virtual Unix Lab

- Installs lab machines on demand
- Users can book exercises for a certain time
- All machines will be setup identically
- Exclusive access during exercises
- Evaluation of exercise results
- Feedback on success of exercise
- Machines are re-installed from scratch for next user



VUlab: User Area

A user's perspective:

- Login and account creation
- List of exercises
- Booking an exercise
- Taking an exercise
- Retrieving feedback afterwards



VUlab: Admin Area

An admin's perspective:

- Manage users
- Manage booked exercises
- See group statistics
- Create new exercises



Slideshow Time!



Server Machine

- Sun SPARCstation 5, 85MHz
- 192 MB RAM
- 3* external SCSI disk
- additional SBus ethernet card
- Runs NetBSD 1.6.2/sparc



Lab Machines

- 2*
- Sun SPARCstation 4, 110MHz
- 64 MB RAM
- 1 GB internal SCSI disk
- Run NetBSD 1.6.2/sparc or Solaris 9/sparc

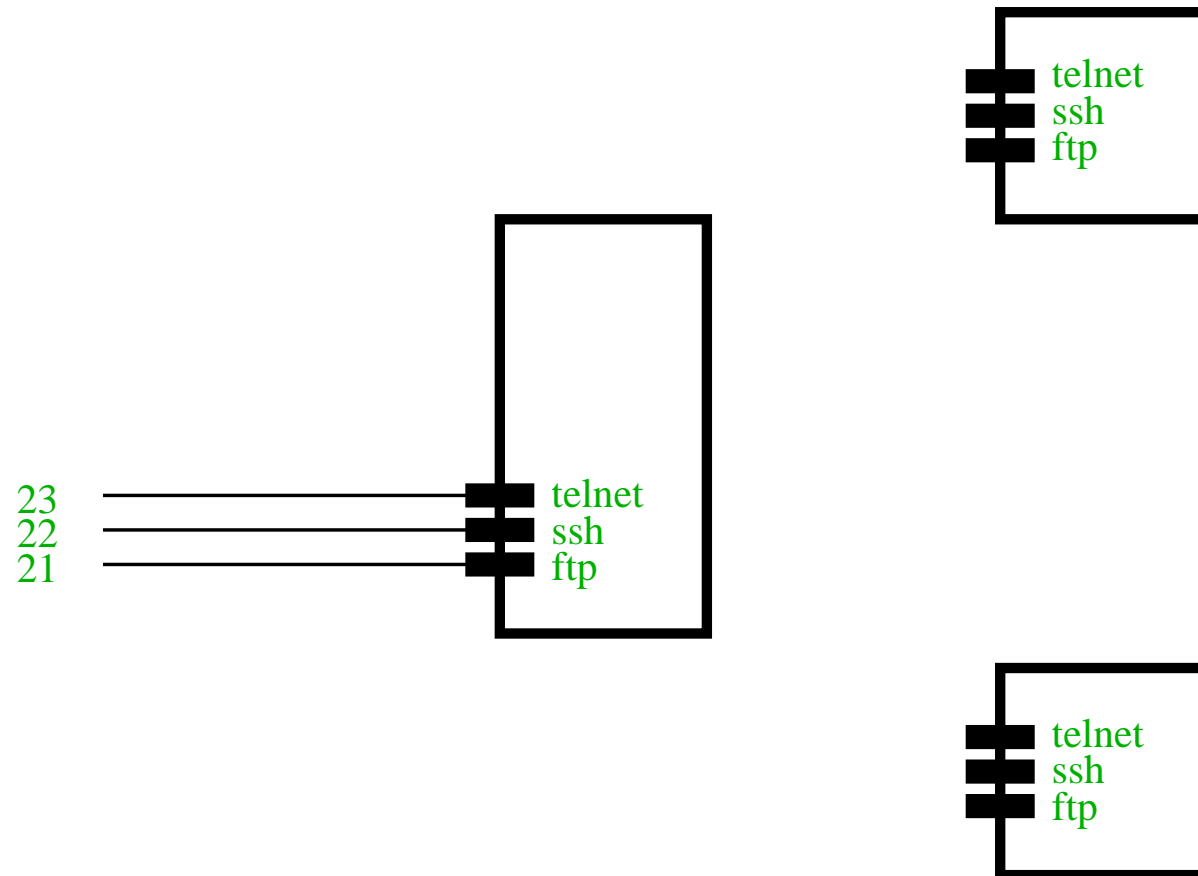
Goal: Virtual Machines!



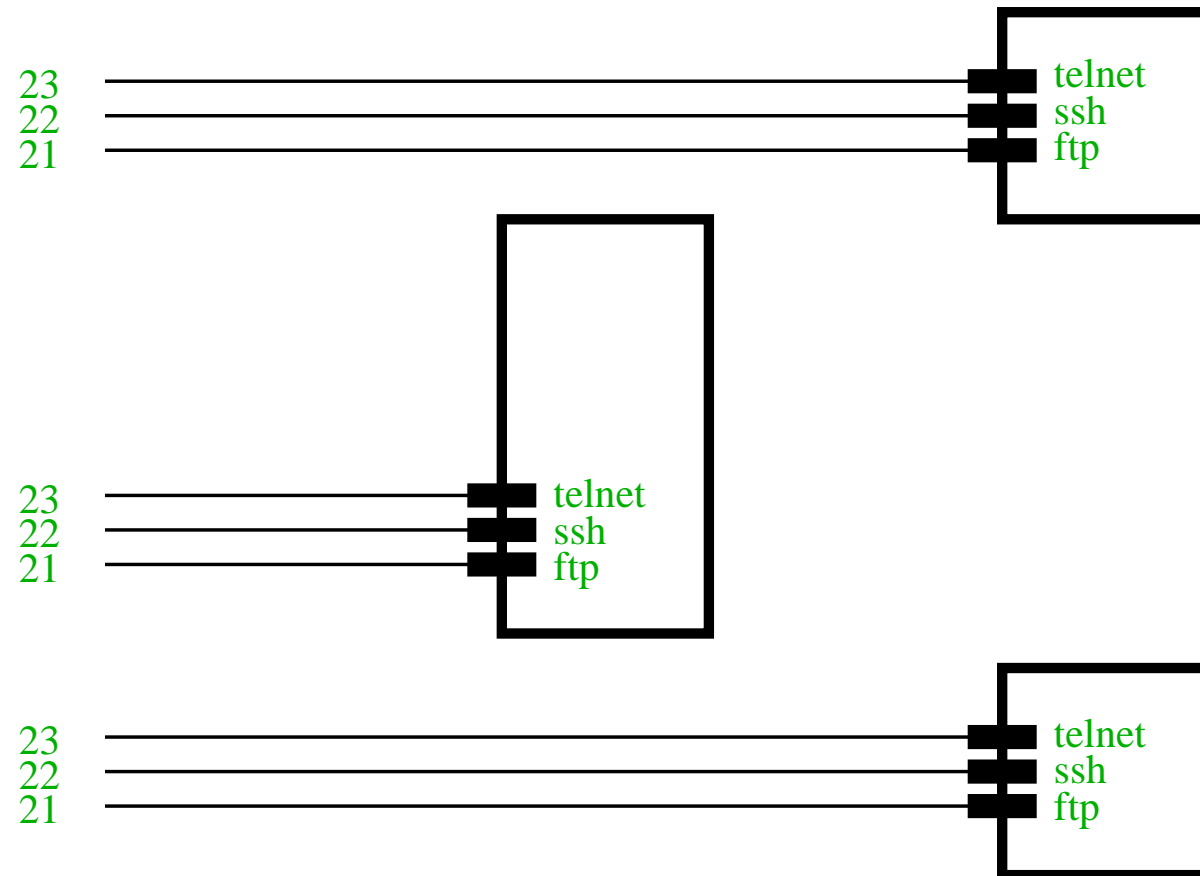
Lab Machine Installation

- Server acts as DHCP, RARP and NFS server to lab network
- Netbooting of lab machines, after end of previous exercise (independent of running OS!)
- Image-deployment to lab machines via NFS (w/ some experiences from the g4u project :-)

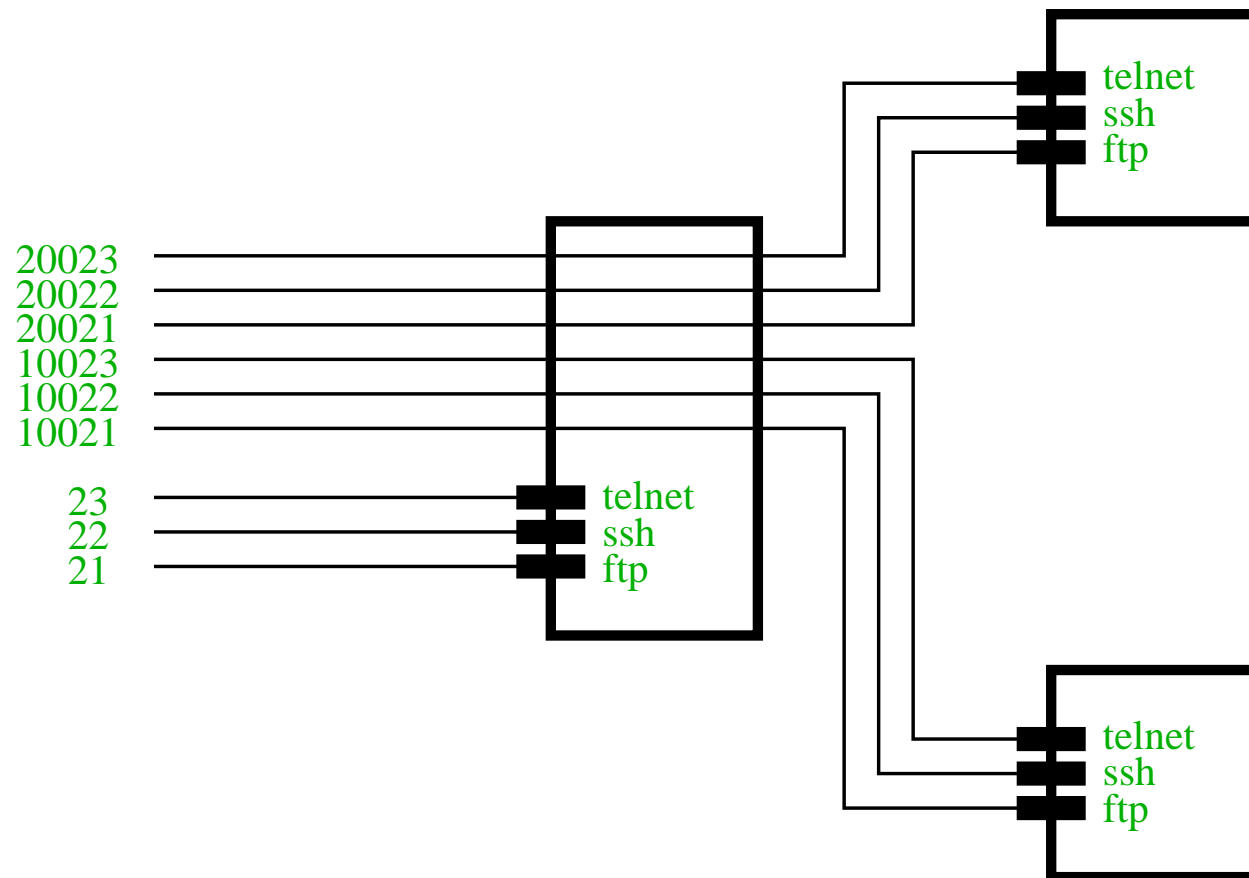
Restricting Access to Lab Machines



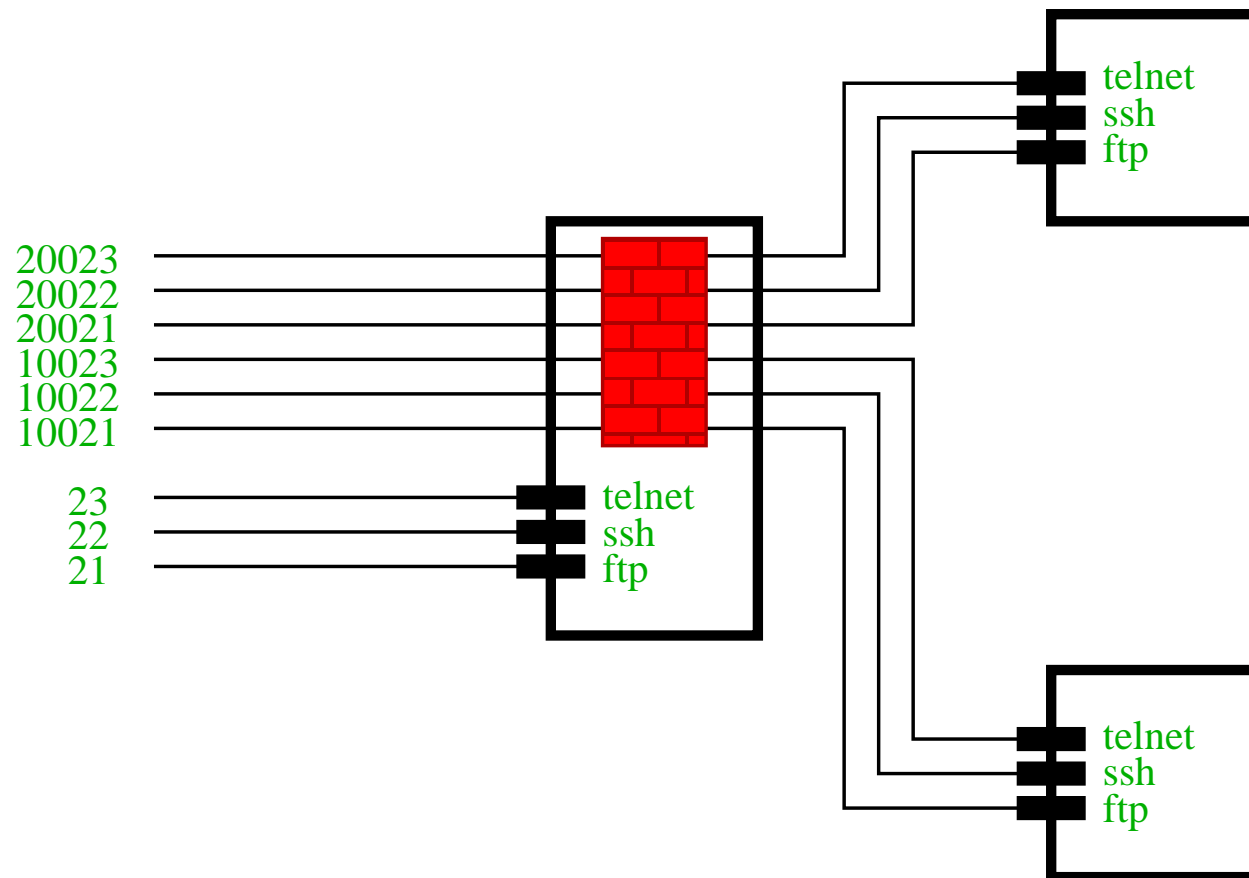
Restricting Access to Lab Machines



Restricting Access to Lab Machines



Restricting Access to Lab Machines





Software

- Apache
- Postgres
- IPfilter
- NetBSD
- Solaris
- PHP
- Perl
- Bourne shell



Current Status

- The system works
- Available Exercises:
 - Network Information System (NIS)
 - Network File System (NFS)
- Tested successfully in summer semester 2004 w/ 40 students during course “System Administration”
- Server-upgrade pending



Future Perspectives

- Funding
- Define more exercises:
 - Web- and Mail server
 - DNS
 - DHCP
 - LDAP
 - Samba
- Funding!



Future Perspectives

- Add more options for lab machines:
 - Real hardware
 - Emulated (virtual) hardware
 - More operating systems: Linux, Windows
- Funding!!!
- Internationalisation
- Implement a tutoring system
- Think about user modeling
- Funding! Very very badly wanted!



Thank you!

<http://www.feyrer.de/vulab/>

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Funding offers welcome!