



# **Sysadmin Training**

in the

# **Virtual Unix Lab**

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# Background

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- 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

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- 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

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A user's perspective:

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



# VUlab: Admin Area

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An admin's perspective:

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



# Slideshow Time!



# Server Machine

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



# Lab Machines

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- 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!

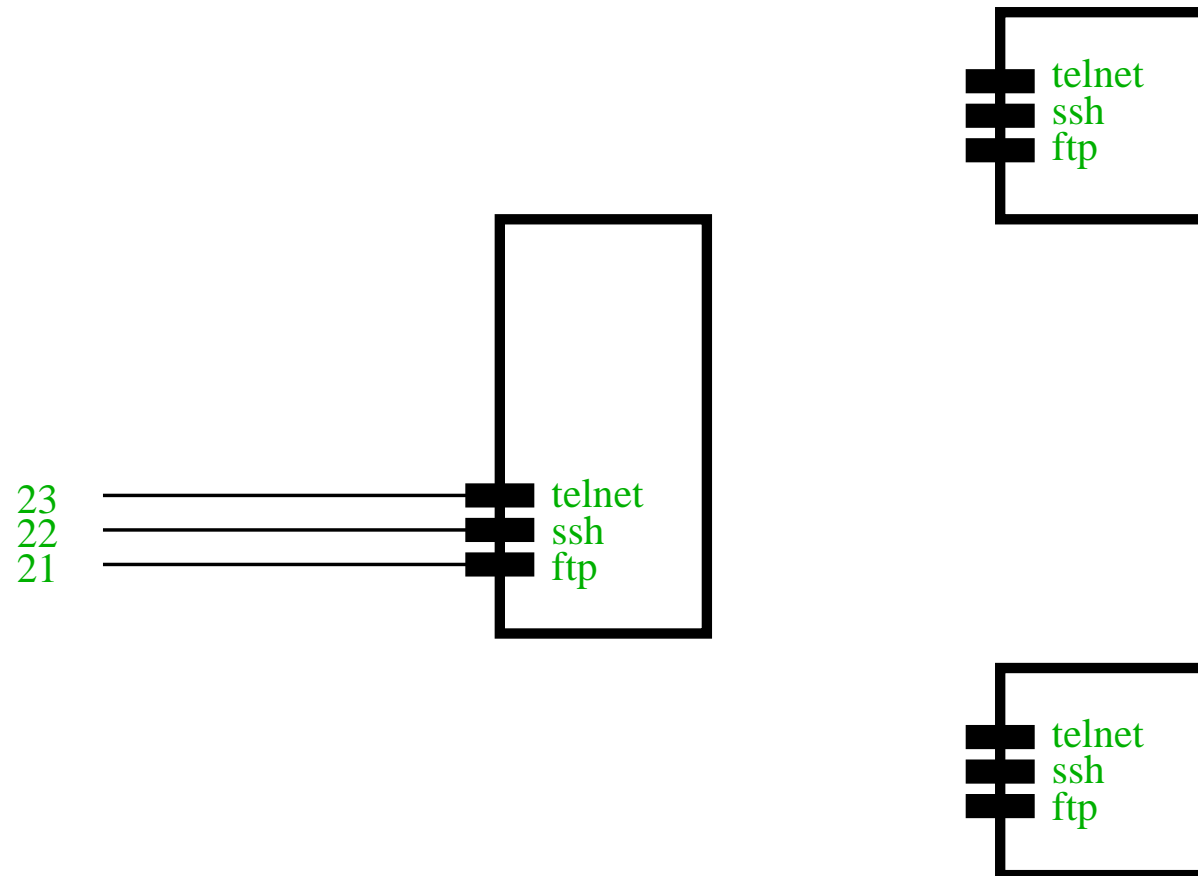




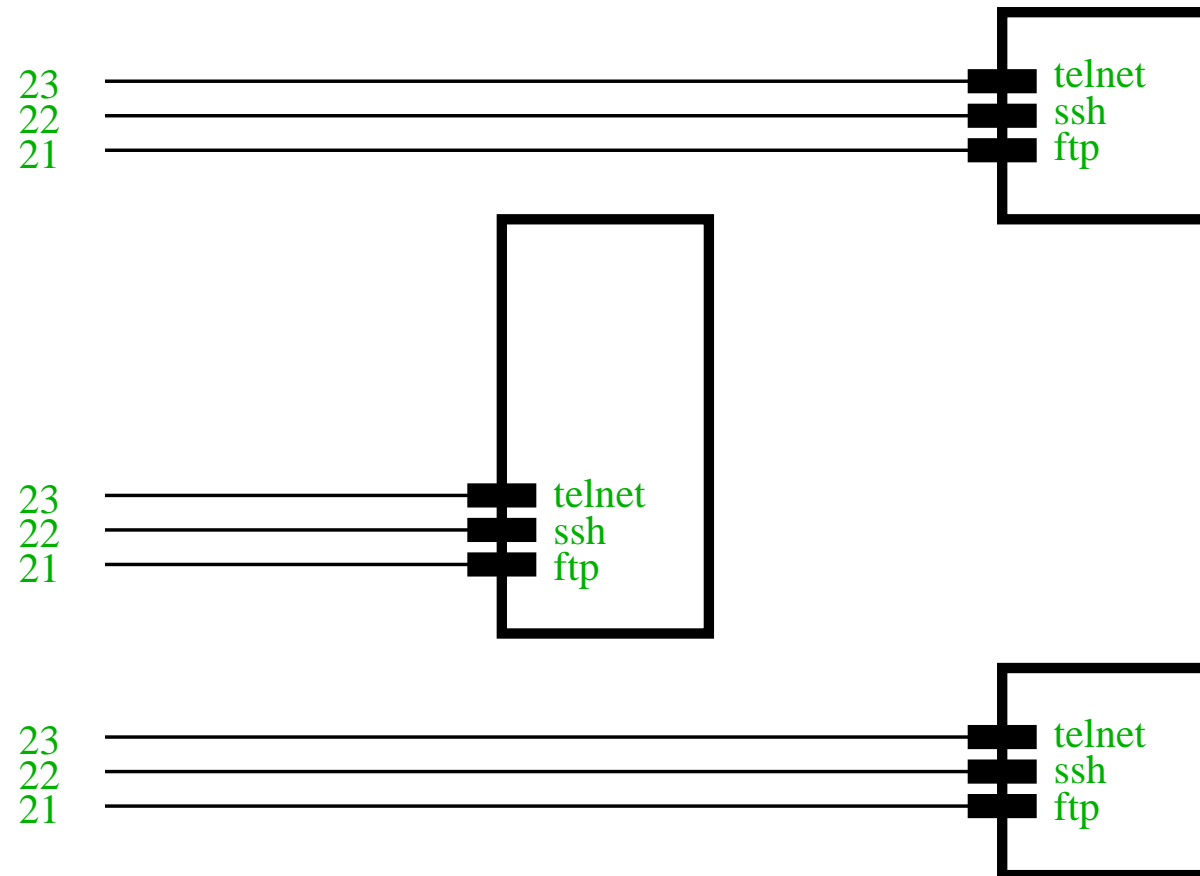
# Lab Machine Installation

- 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 :-)

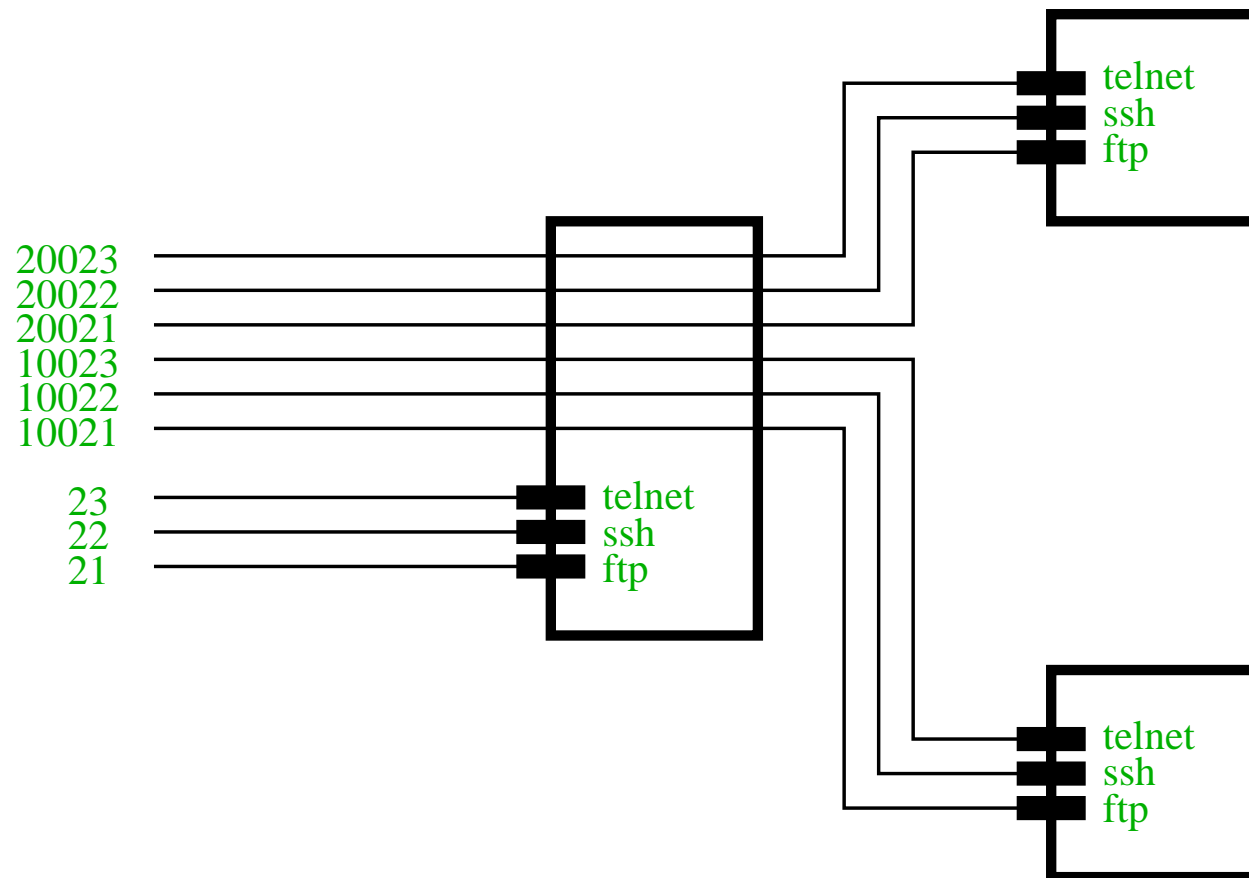
# Restricting Access to Lab Machines



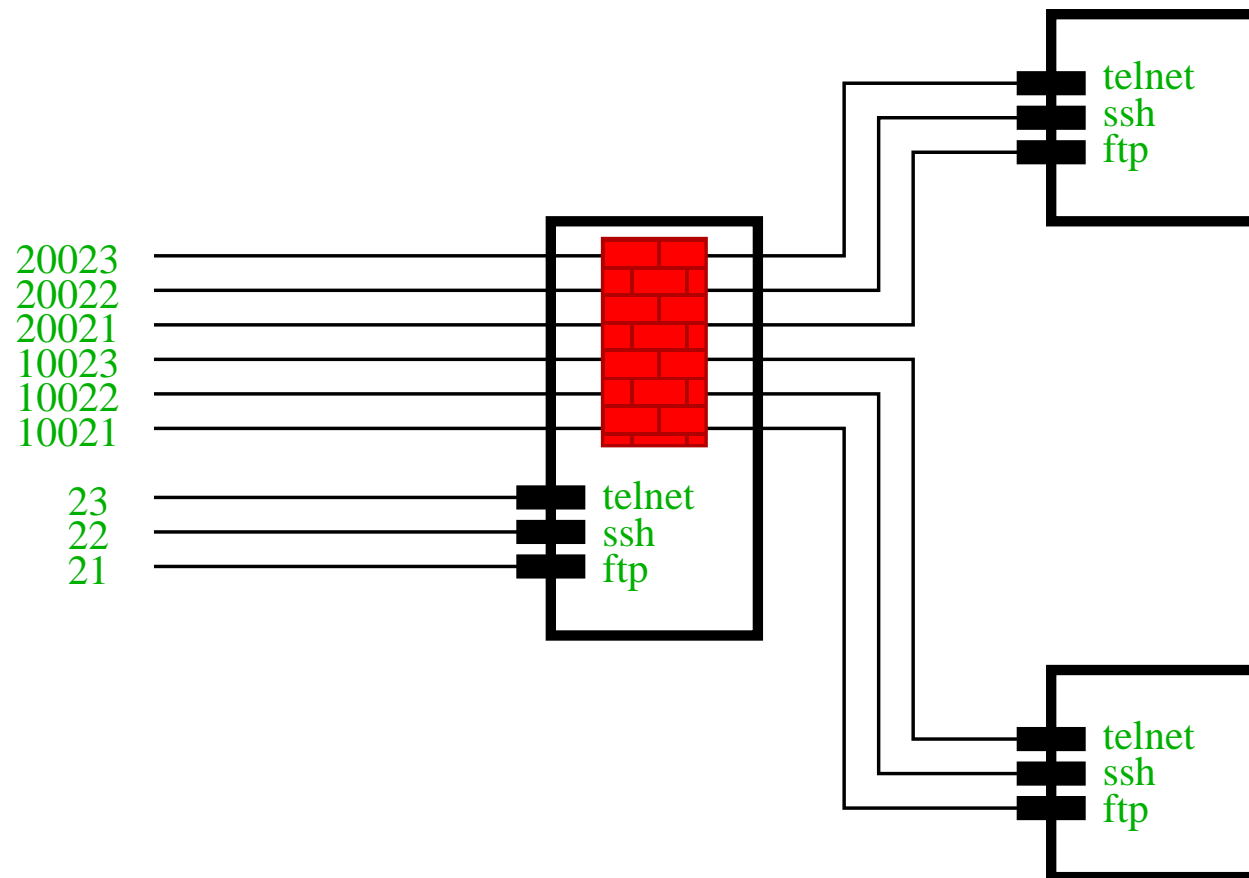
# Restricting Access to Lab Machines



# Restricting Access to Lab Machines



# Restricting Access to Lab Machines





# Software

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



# Current Status

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- 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

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- 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!*