Institut für Kommunikations-Technik

Xen Configuration Management and Xen Experiment

Future Internet Communication Technologies

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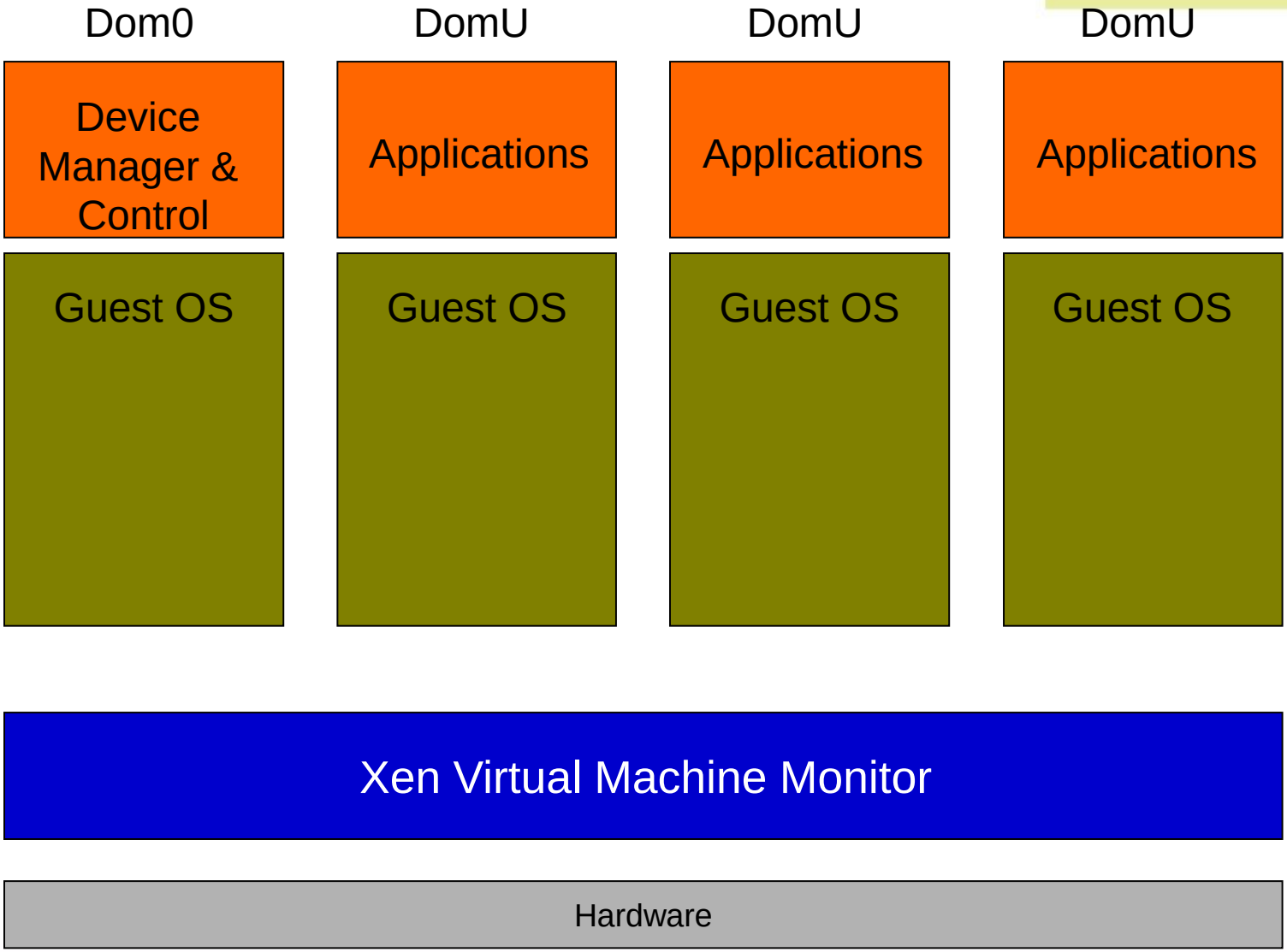
Xen Overview

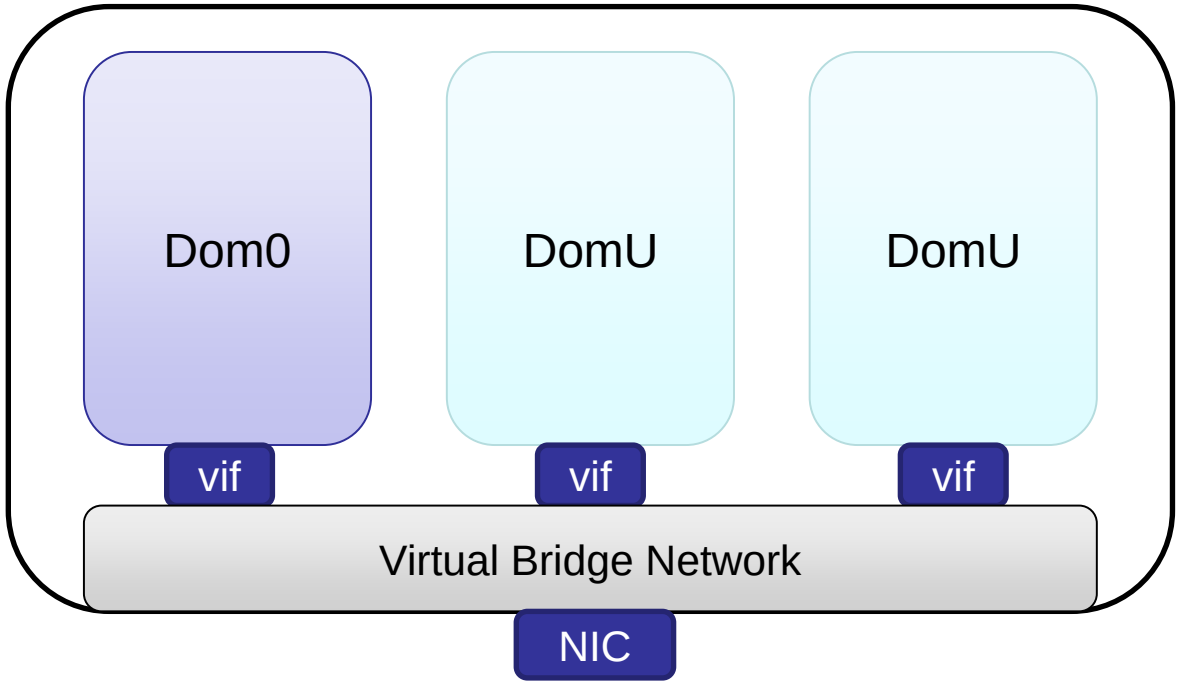
Xen Overview



Xen Networking

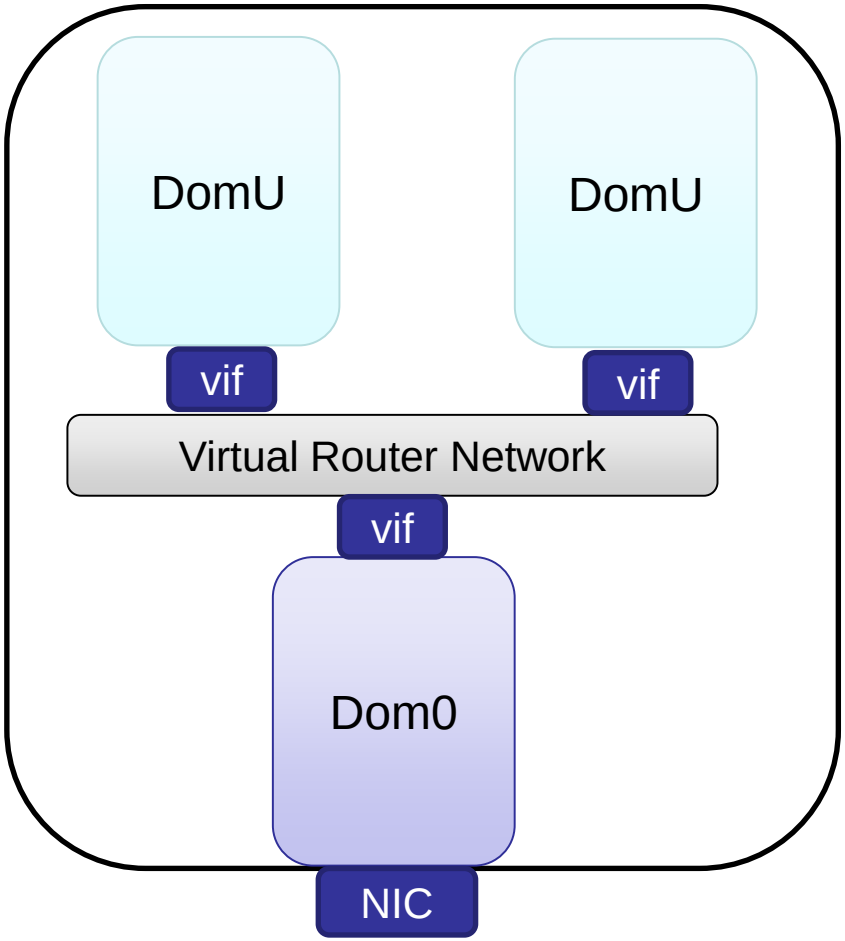
- Xen Network Modes:
  - Bridging
  - Routing
  - Network Address Translation

Xen Bridging Mode



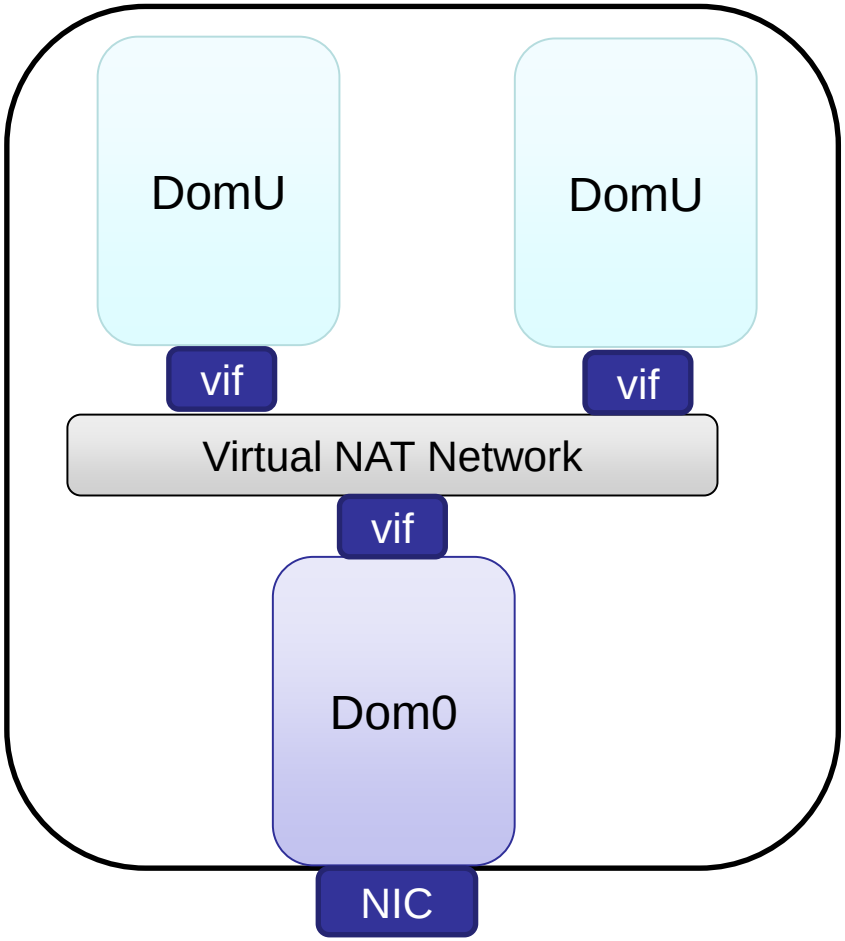
- DomUs are transparently on the same network as Dom0

Xen Routing Mode



- Packets are relayed from Dom0 to DomUs and vice-versa

Xen Network Address Translation (NAT) Mode



- Packets are relayed from Dom0 to DomUs and vice-versa
- DomUs use Dom0's IP address to send/receive packets

Xen Guest Configuration

Xen Guest Configuration

- Xen Guest Configuration Categories:
  - General
  - Kernel
  - Networks
  - Storage

General Configuration Options

- `name`:
  - name of the guest
  - default: configuration filename
- `memory`:
  - amount of memory (MB) allocated to guest
  - default: 128 MB
- `vcpus`:
  - number of virtual CPUs allocated to guest
  - default: 1

Kernel Configuration Options

- `kernel`:
  - full path and name of the kernel for the guest
- `ramdisk`:
  - full path and name of the ramdisk for the guest (may not be required)
- `root`:
  - partition to be used as root inside the guest
- `extra`:
  - additional parameters (e.g., console)

Network Setup Configuration

- Modify /etc/xen/xend-config.sxp
  - Bridging setup:
    - (network-script network-bridge)
    - E.g. *network-script 'network-bridge netdev=eth24'*
    - (vif-script vif-bridge)
  - Routing setup:
    - (network-script network-route)
    - (vif-script vif-route)
  - NAT setup:
    - (network-script network-nat)
    - (vif-script vif-nat)

Network Configuration Options

- `vif[]`:
  - specifies an array with the following network configuration options:

- `MAC`:
  - MAC address for the virtual interface
  - MAC should typically be in the form: 00:16:3e:xx:xx:xx

- `bridge`:
  - bridge for attaching the virtual to a physical interface
  - bridge should have been set up beforehand

- `IP` / `netmask` / `gateway`:
  - IP address, netmask and gateway for the virtual interface

Sample Xen Guest Configuration


```
  kernel = '/users/student/xen/vmlinuz-2.6.31.6'

  name = 'vm1'
  memory = 256
  vcpus = 1
  vif = [ 'mac=00:16:3e:00:00:11,bridge=eth24' ]
  ip = '10.1.1.11'
  netmask = '255.255.255.0'
  broadcast = '10.1.1.255'
  disk =
['file:/users/student/group1/xen/vm1.img,xvda1,w']
  root = '/dev/xvda1'
```

Xen Management

Xen Daemon

- `xend`:
  - Xen daemon enables communication with the hypervisor
  - Available parameters include:
    - `#xend start`
    - `#xend restart`
    - `#xend stop`

Xen Management

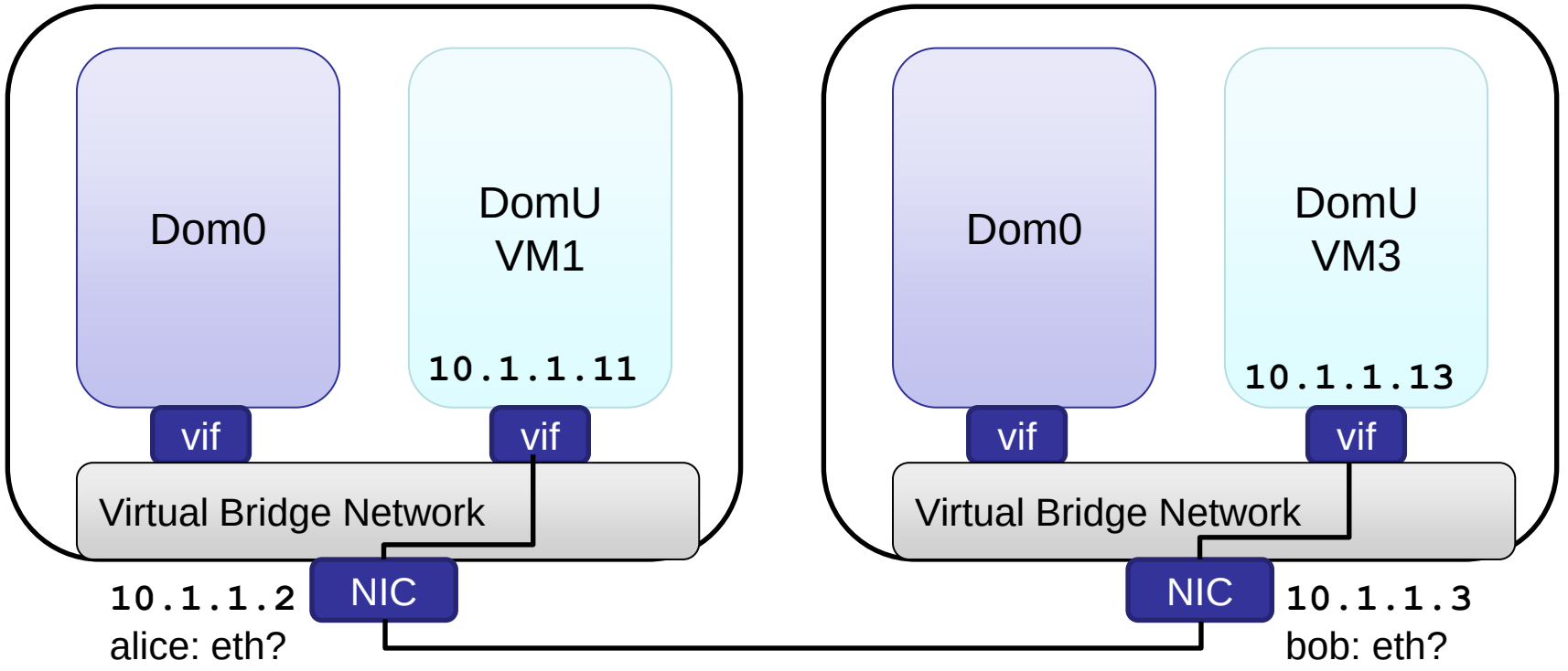
- `xm`:
  - Xen command-line tool for creating and managing guests
  - Basic parameters include:
    - `#xm create configfile`: creates a guest
    - `#xm destroy domID`: terminates a guest
    - `#xm migrate domID host`: migrates a guest to another host
    - `#xm list`: prints information for existing guests
    - `#xm vcpu-list domID`: prints vcpu information for a guest
    - `#xm vcpu-pin domID vcpu cpu`: assigns vcpus to CPU cores
    - `#xm sched-cred -d domID -w weight`: adjusts the number of credits allocated to guests

Management Access to Xen Guests

- Xen guests can be accessed via:
  - xm console interface:
    - `#xm console guest_name`
    - Exit with <Ctrl+5>
  - ssh:
    - `$ssh username@guest_IP`
    - Guest IP address from VM configuration file

Xen Experiment

- Two hosts, each with one guest
- Virtual bridge network



ssh student@[alice|bob|carol|dave].xen4.nmlab.filab.uni-hannover.de

Group 1 – alice Group 2 – bob
Group 3 – carol Group 4 – dave

Xen Experiment (2)

- Configure *xend* to use a bridge connected with the physical interface *eth?*
  - The configuration file *is /etc/xen/xend-config.sxp*
- Start *xend*
- Create your guest configuration file in your group directory
  - (See the sample configuration file on p.14)
- Start the VM with *xm create*
- Login to your VM
  - User: root
  - Password: password