

Linpro AS

Ledende på Linux og åpen programvare



Neste generasjons datasenter med Xen

Per Andreas Buer, avdelingsleder drift
Espen Braastad, systemkonsulent drift
2006-11-14

- Hvorfor virtualisering
- Alternative teknologier
- Xen
- Heartbeat
- Demo

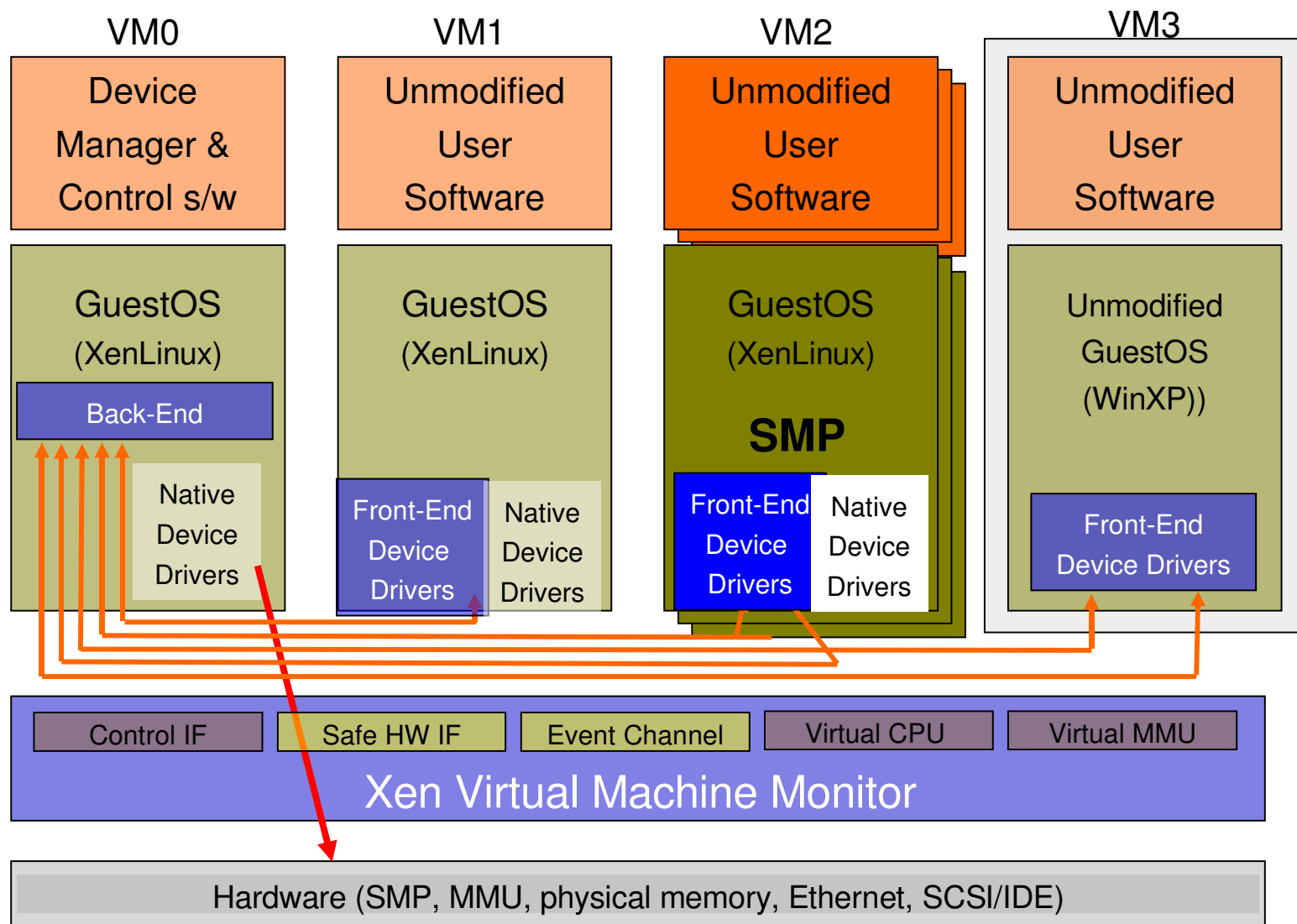
- Bedre utnyttelse av maskinvaren
- Enklere å sette opp og administrere
- Nye systemer settes opp på minutter
- Katastrofe-restore blir relativt enkelt
- Avansert funksjonalitet

- Vmware ESX
 - Dyrt. Dyrere hvis du vil ha noe som er kult.
 - Dårlig på IO (2.1)
 - “hackish” - usupportert av bl.a. Microsoft
 - Mulig at ESX blir bedre med VT-støtte (kommer i 3.0)

- chroot++
- Svak separasjon – felles VM er SPOF
- Ikke noe ytelsestap
- Enkelt å administrere
- Anderledes nok til at det bryter en del applikasjoner
- Solaris Zones / Linux Vserver / Virtuozzo

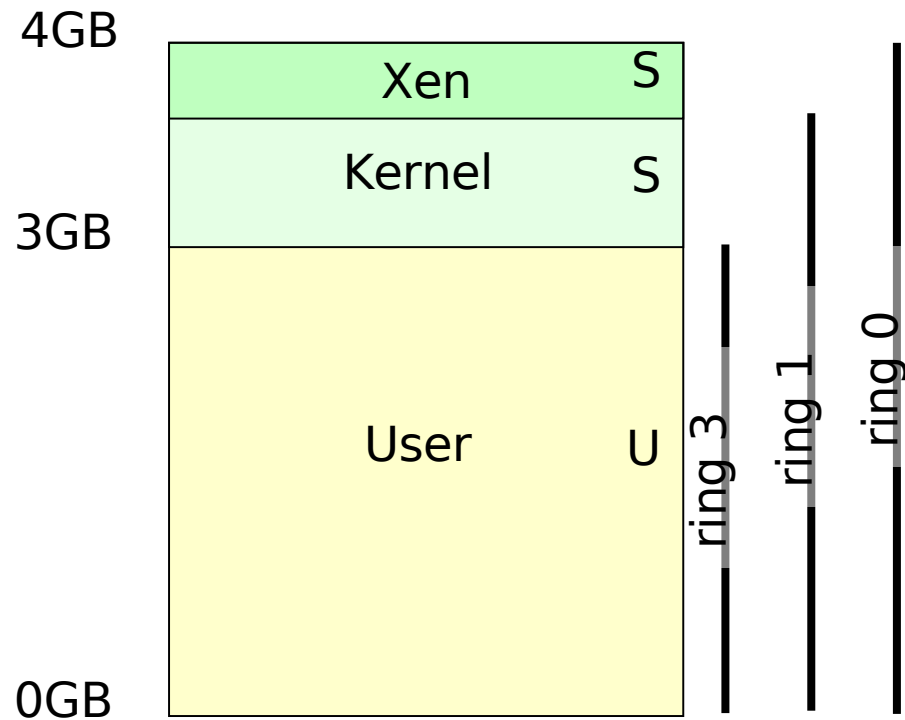
- Prosjekt fra Cambridge
- Utvikles idag av XenSource
- GPL-lisensiert
- Flere (snart) tilgjengelige mgmt-verktøy
- Ordentlig supportert i SLES10 og RHEL5
- Elsket av nesten alle leverandører

Xen 3.0 Architecture



- Modifiserer vertens kjerne
 - Tilpasser Oset til å kjøre uten tilgang til ring 0
 - Ikke noe problem for Linux og BSDene
- Verten gjør hyperkall i stedet for å snakke med HW
- Umodifisert “user space”
- Veldig bra ytelse – veldig lite emulering

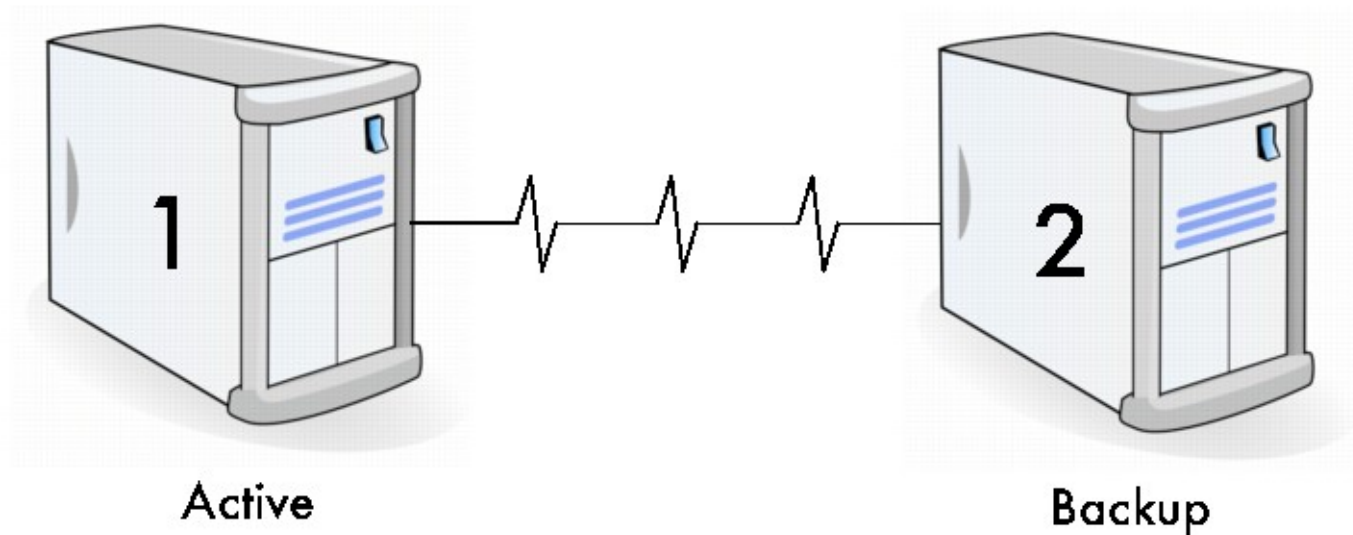
Xen 3.0 Architecture (2)

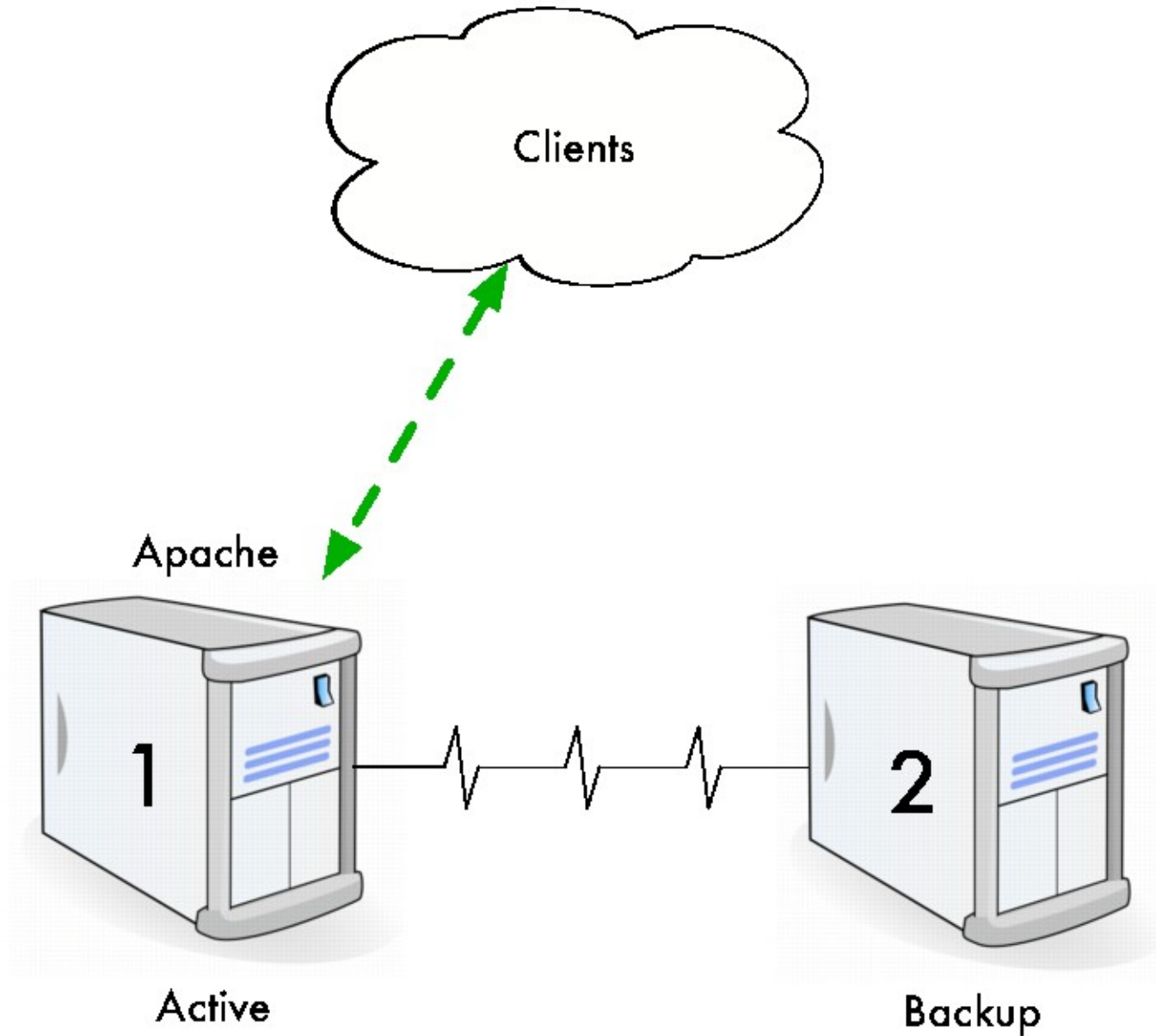


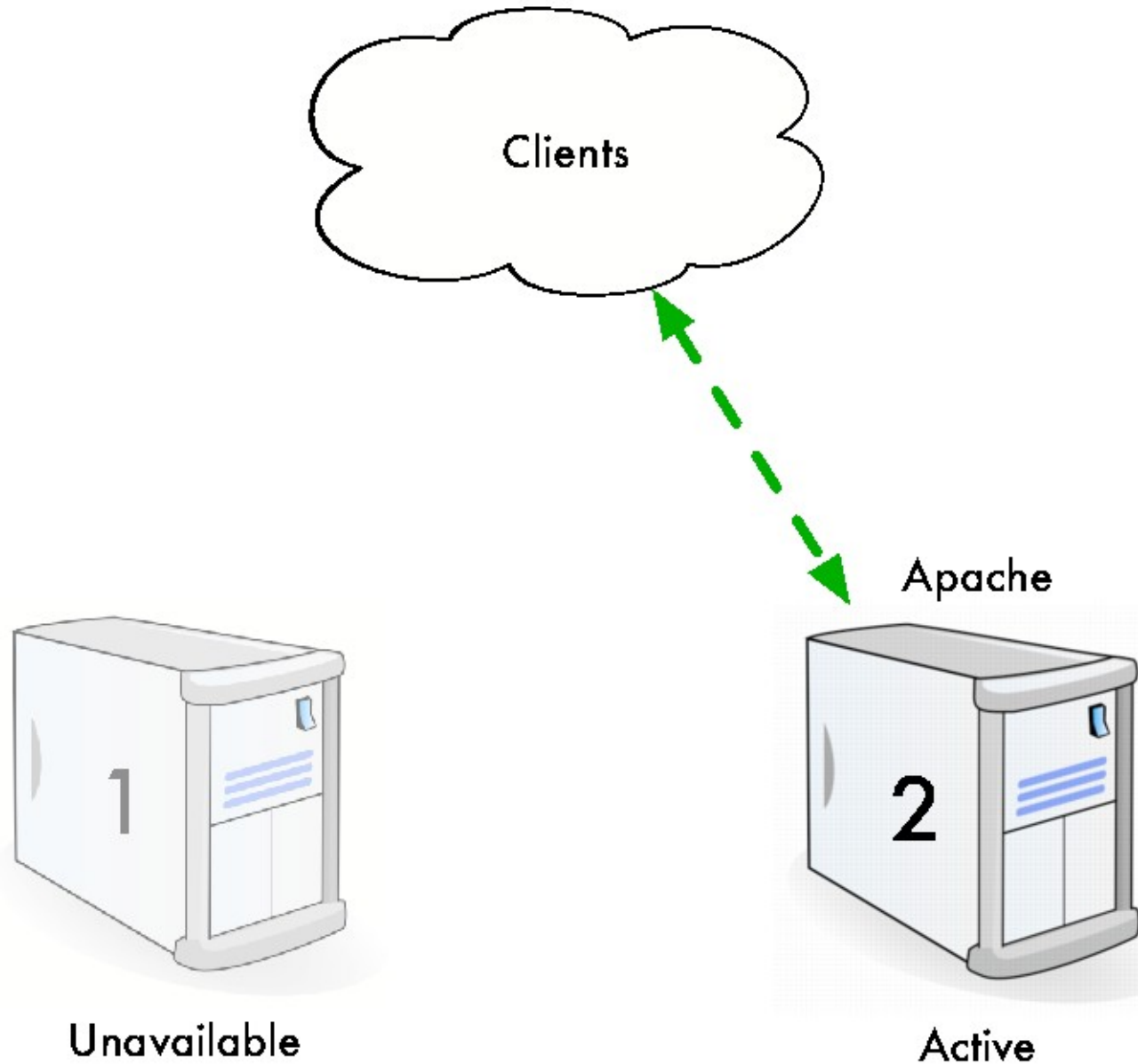
- Linux (RHEL5, SLES10, Ubuntu Edgy, Debian Etch)
- NetBSD
- Netware
- OpenSolaris
- FreeBSD
- Plan 9 from Bell Labs
- Minix

- IA32 (PAE)
- amd64 (Vanderpool og Pacifica)
- IA64
- PPC
- Sparc

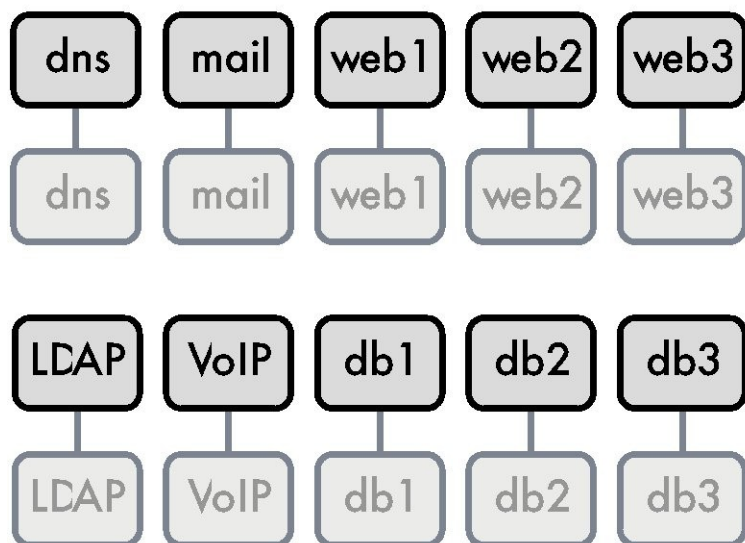
- Også kalt linux-ha
- Første implementasjon av HA i linux
- Eksistert i snart 10 år
- Brukes tradisjonelt for feilover av tjenester, IP-adresser og filsystemer (delt lagring)
- Linux, BSD, OS X, Solaris



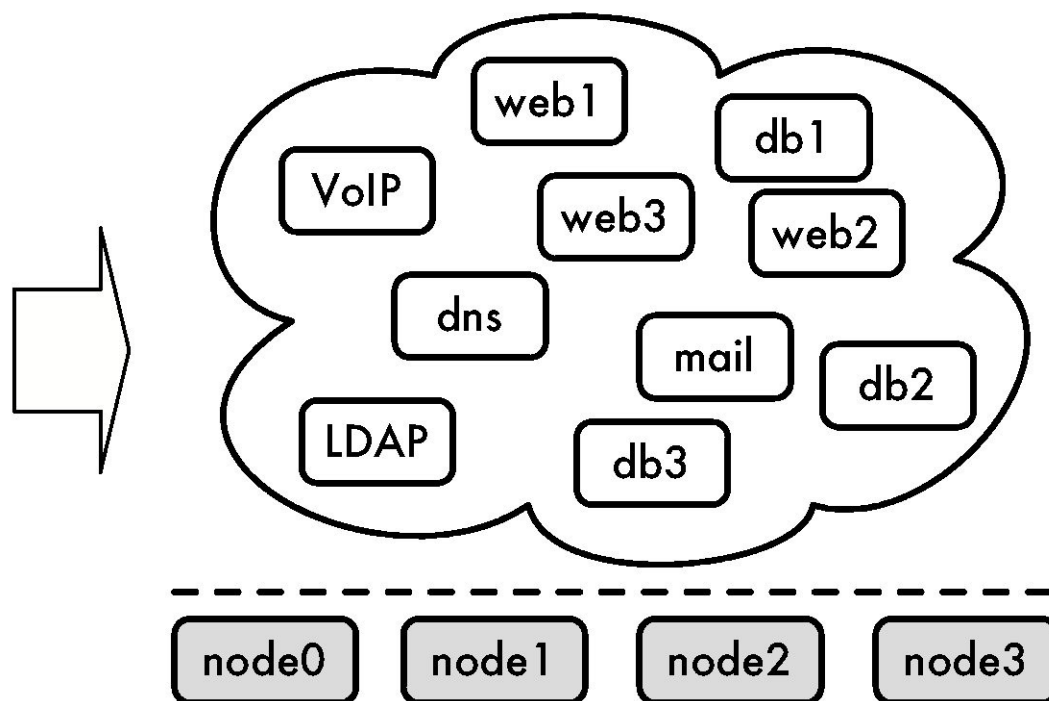




Tradisjonelt:



Med virtualisering:

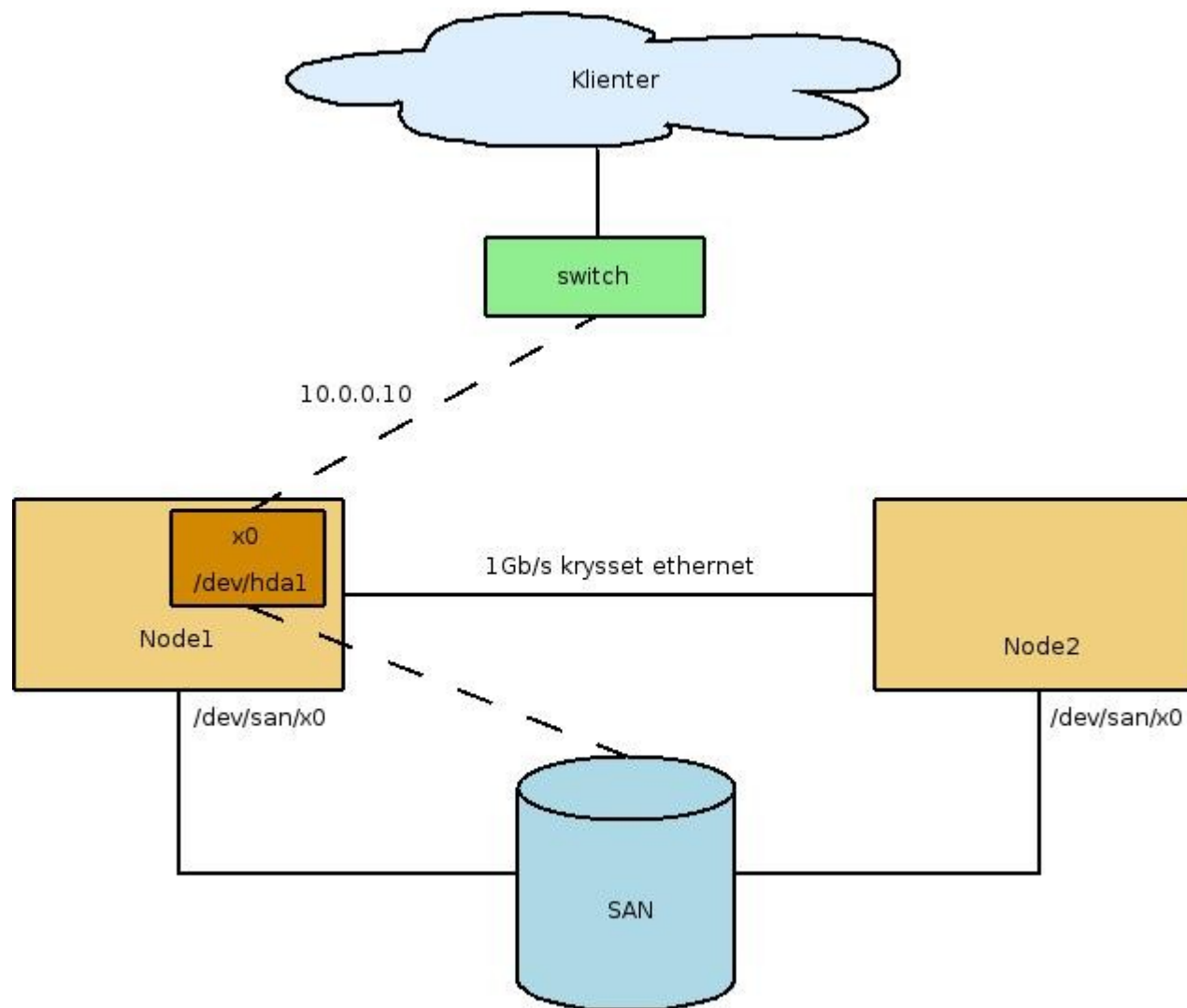


Utnytter “live migration”

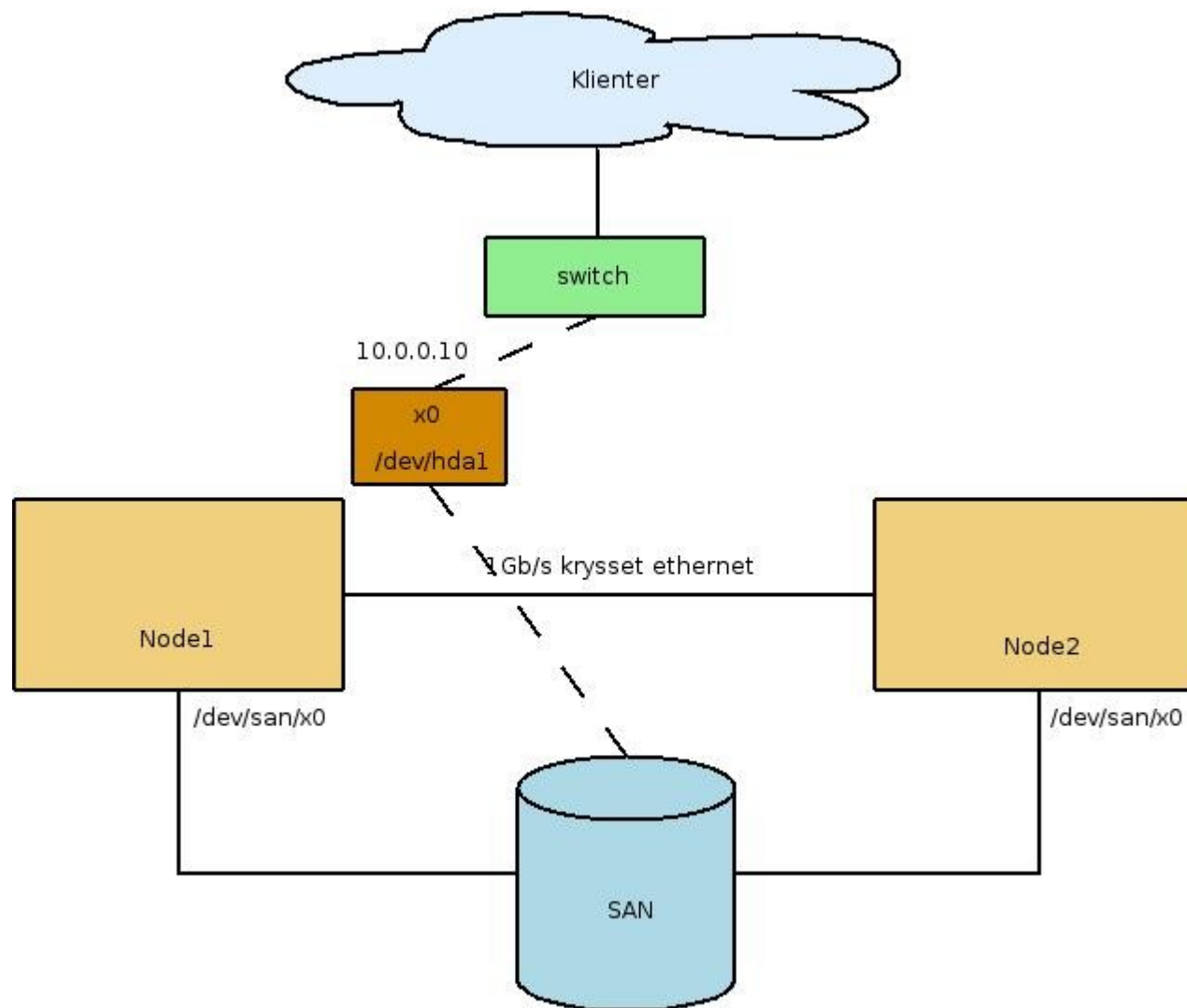
Krever HA software

- Flytte virtuelle maskiner mellom fysiske maskiner.
- Virtuelle harddisker i delt lagring, flytter kun ram
- Overordnet algoritme:
 - a)Reservere ressurser på ny fysisk maskin
 - b)Kopiere ram
 - c)Pause og resume av VM

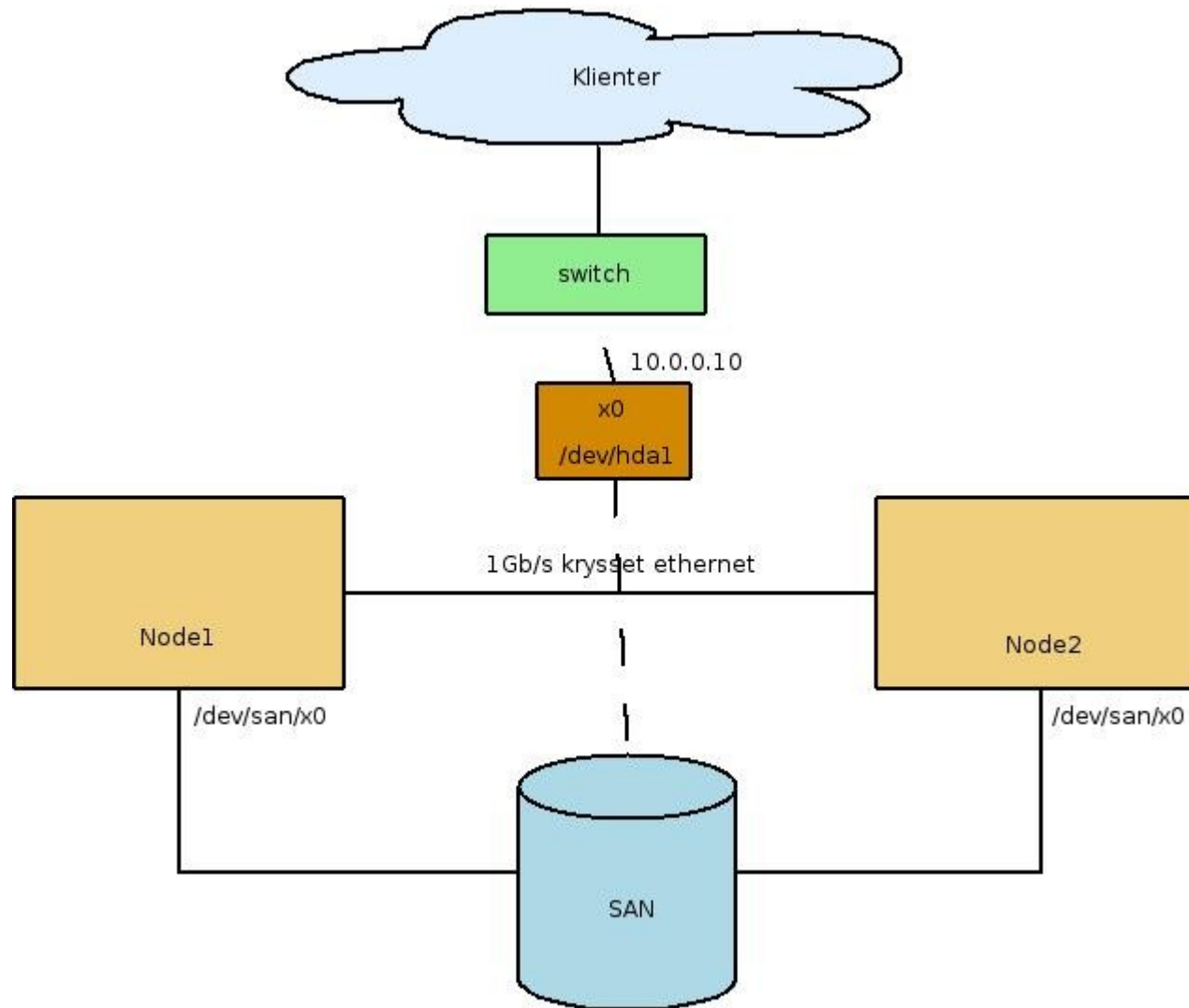
“live migration”



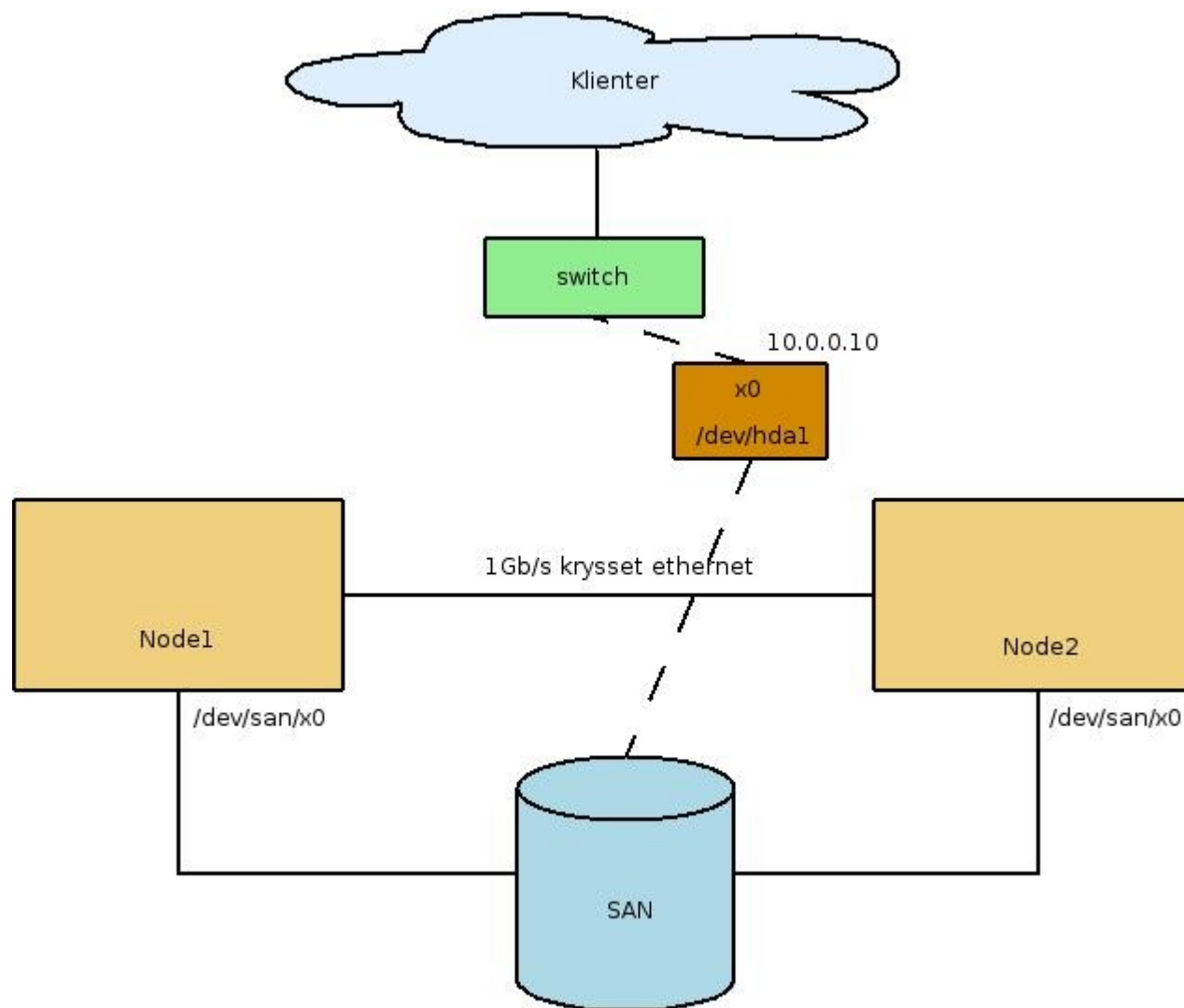
“live migration”



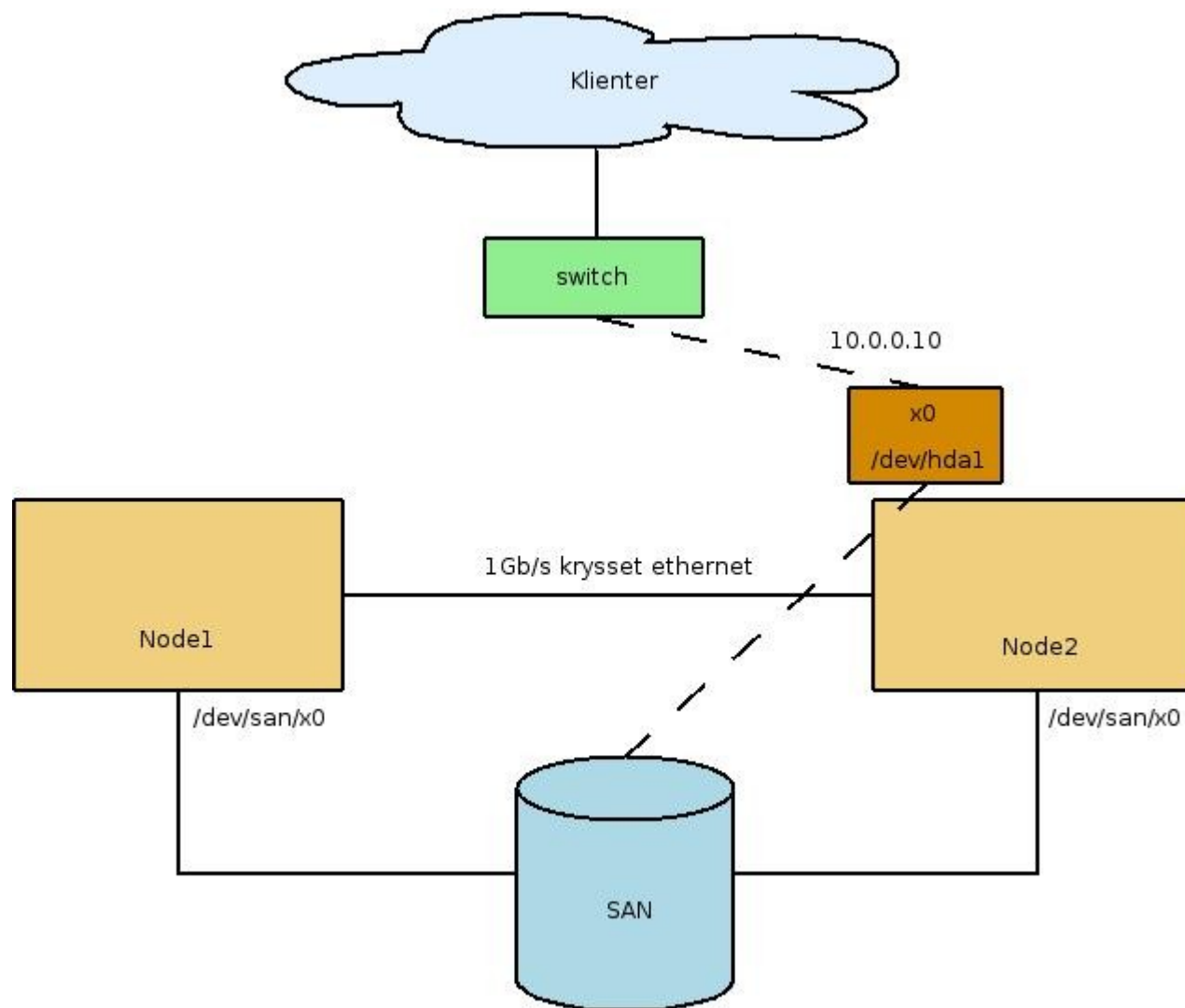
“live migration”



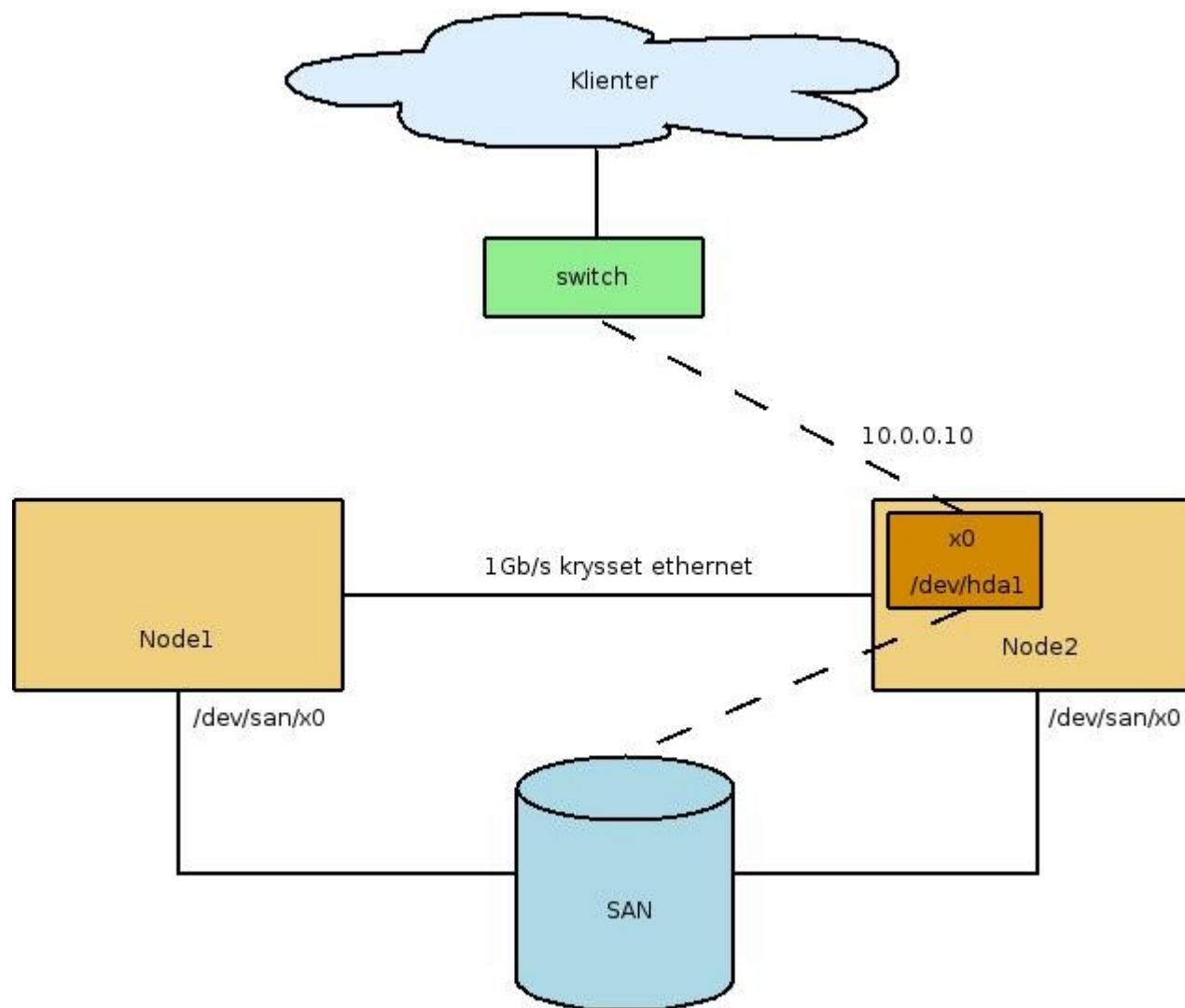
“live migration”

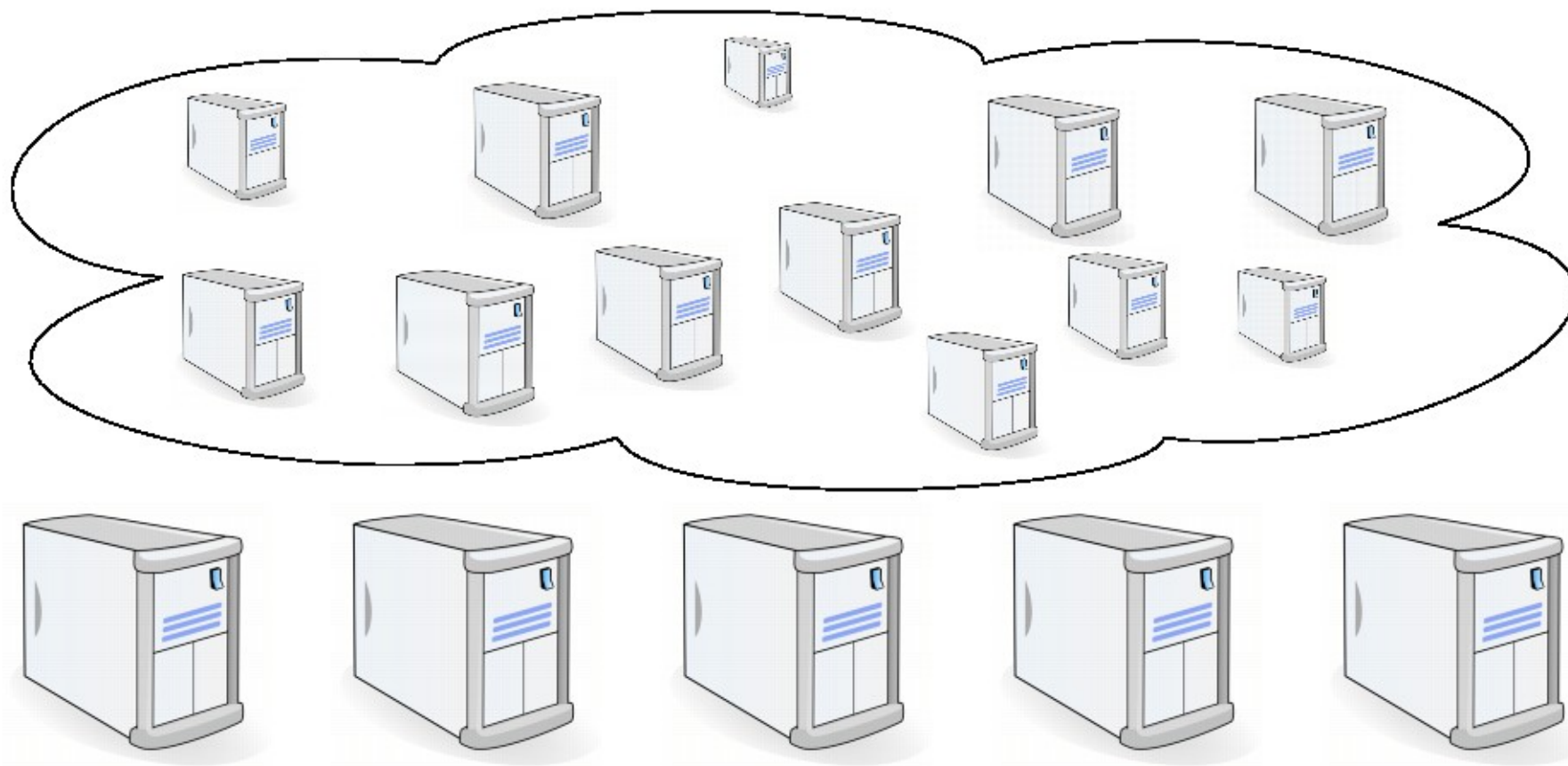


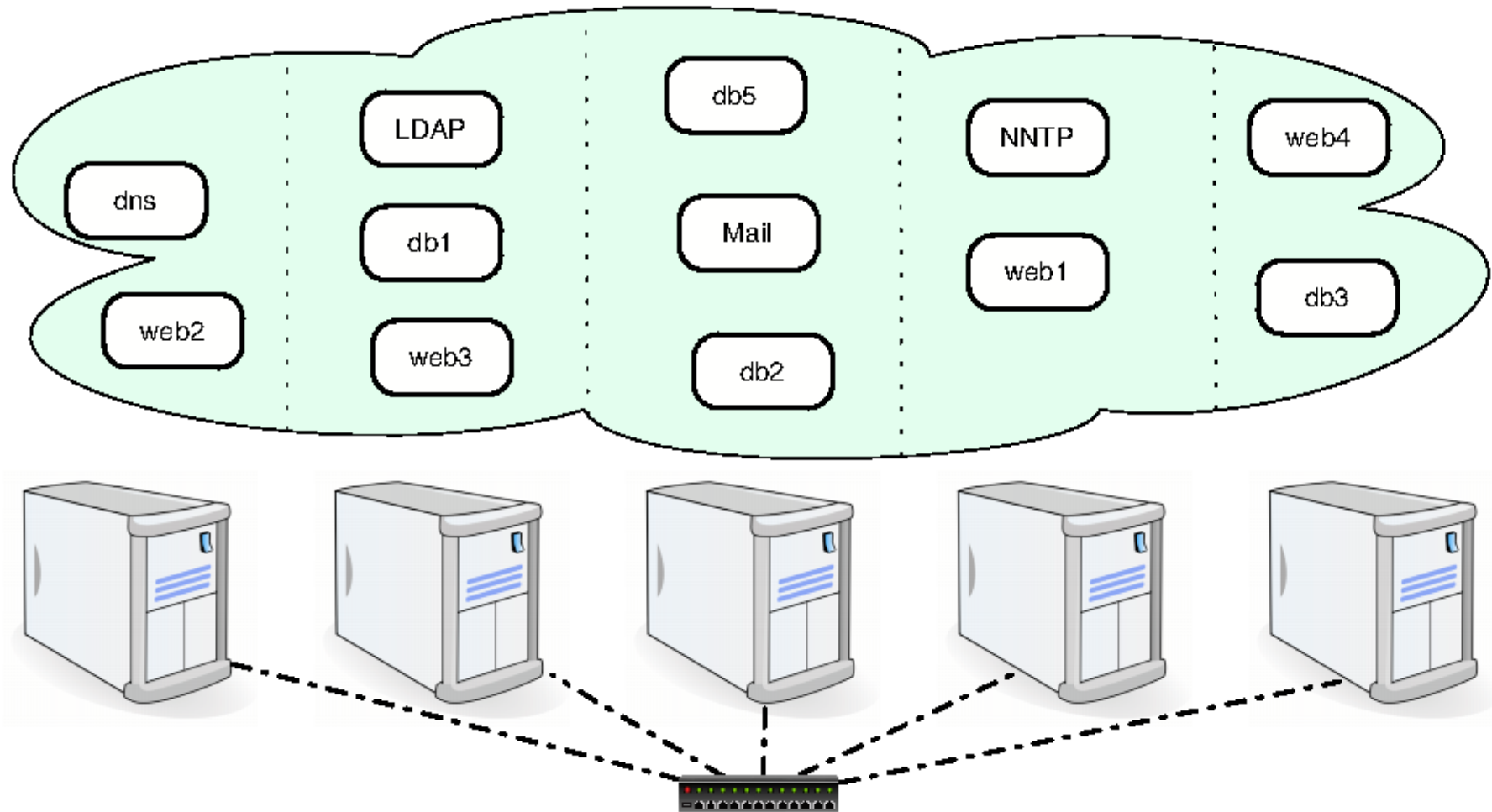
“live migration”

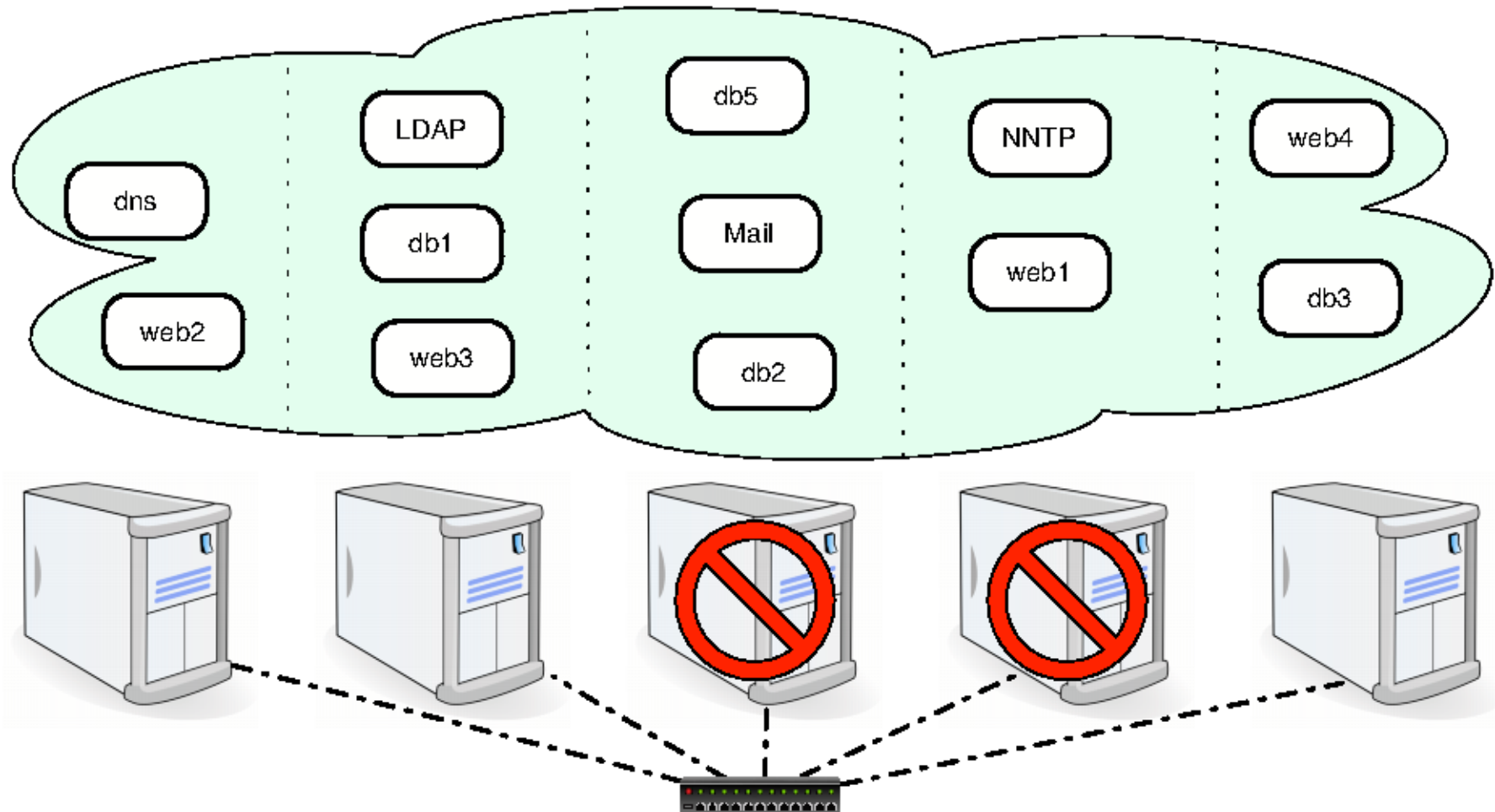


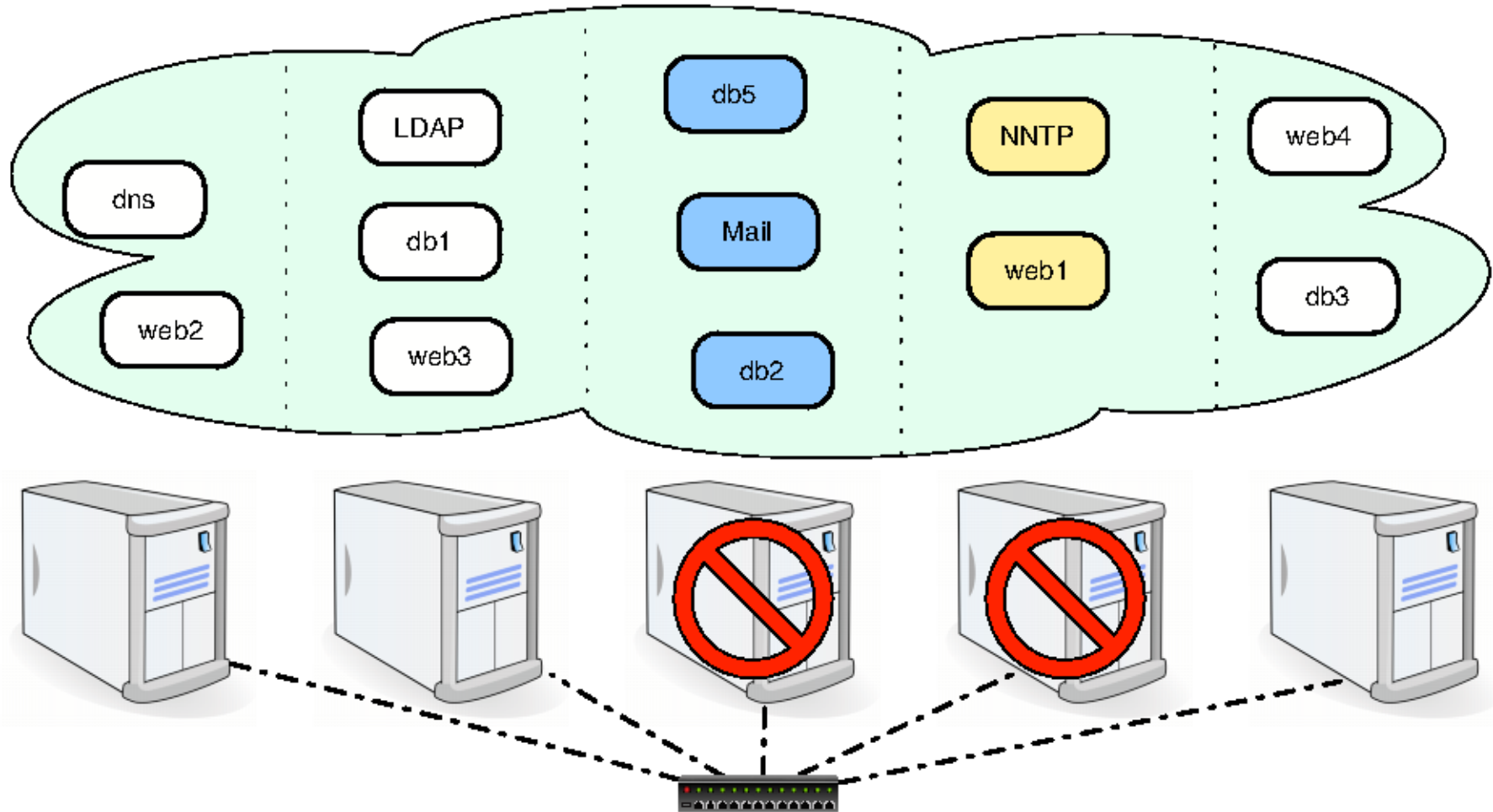
“live migration”

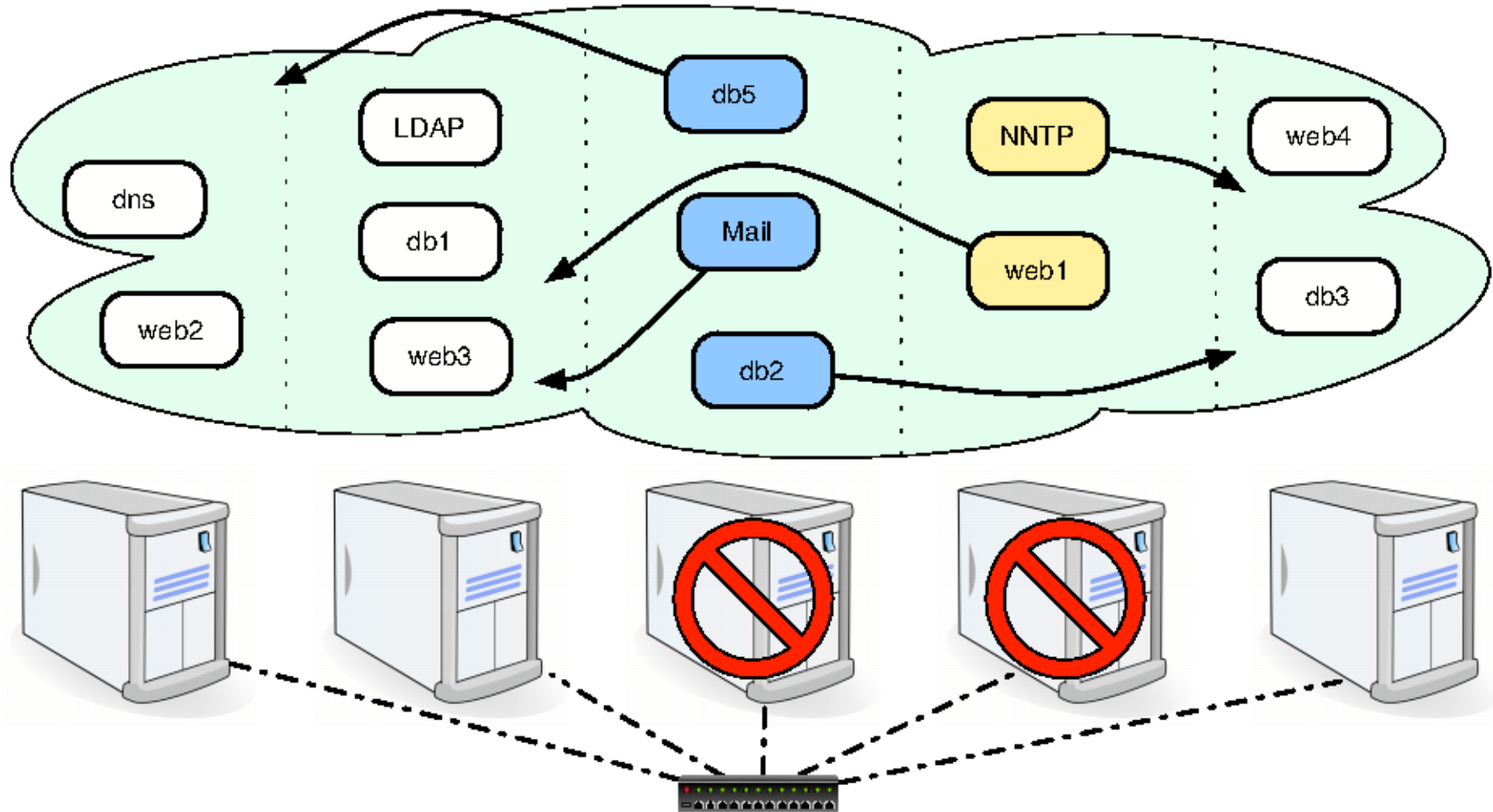


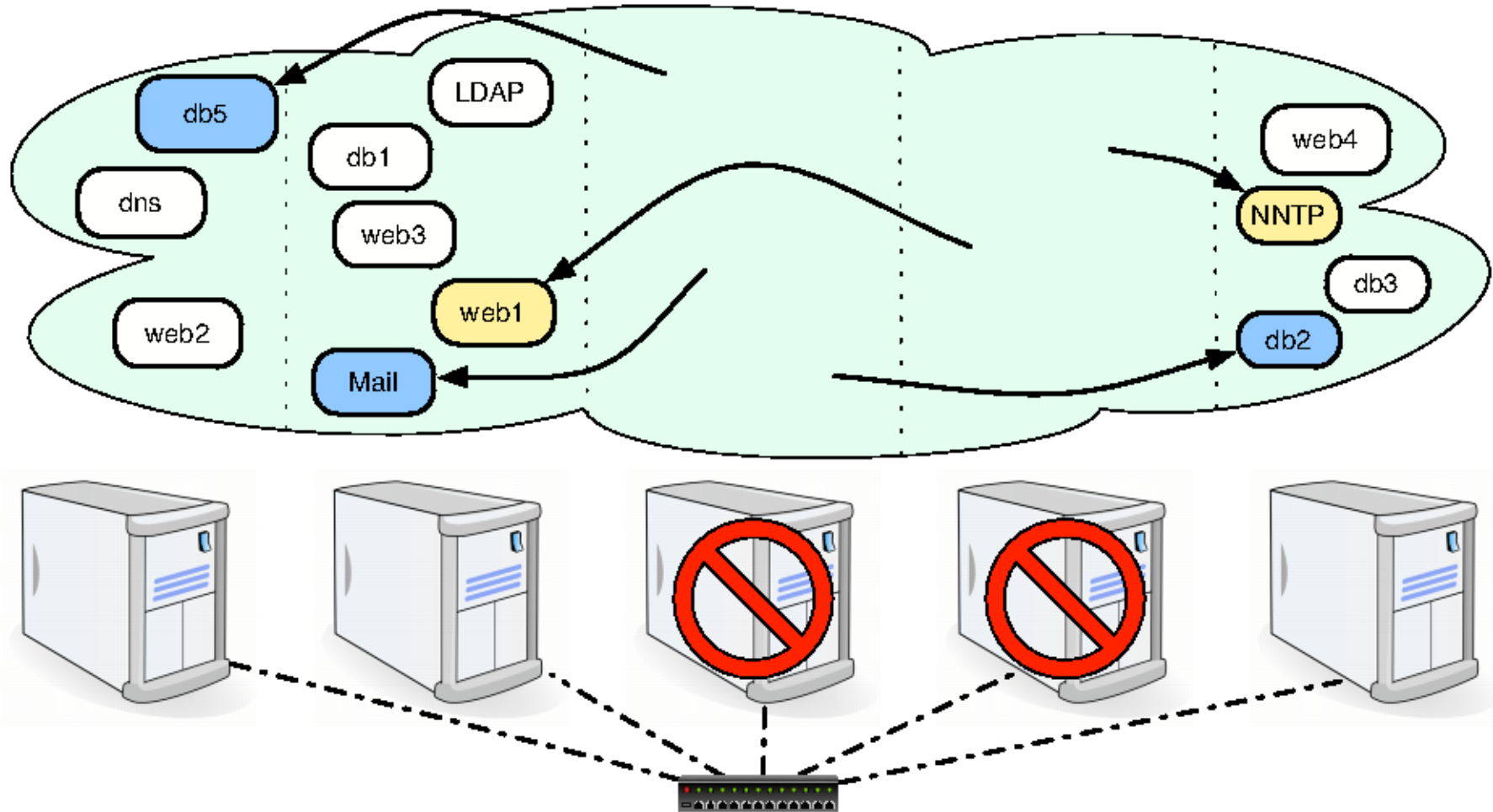


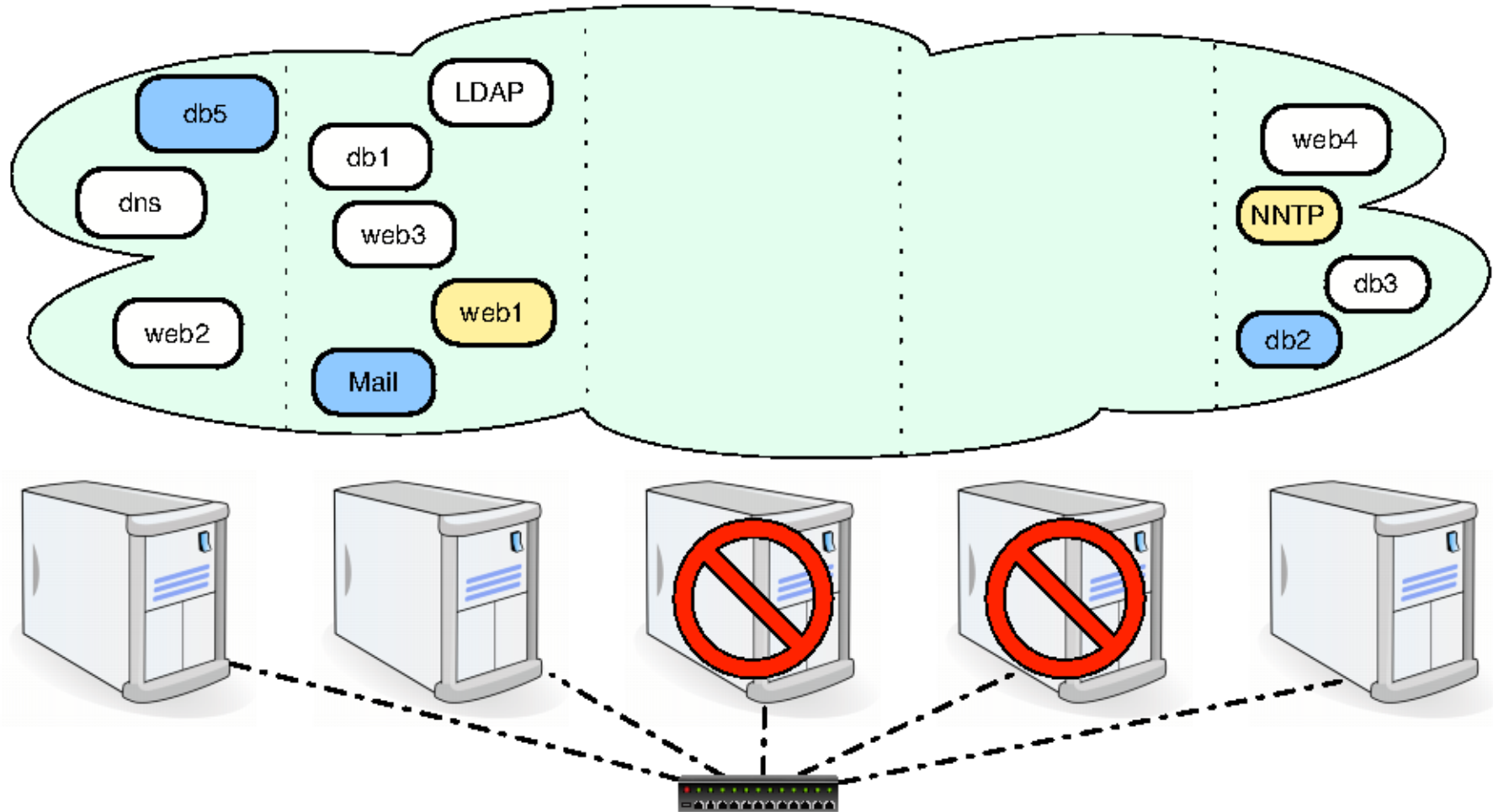


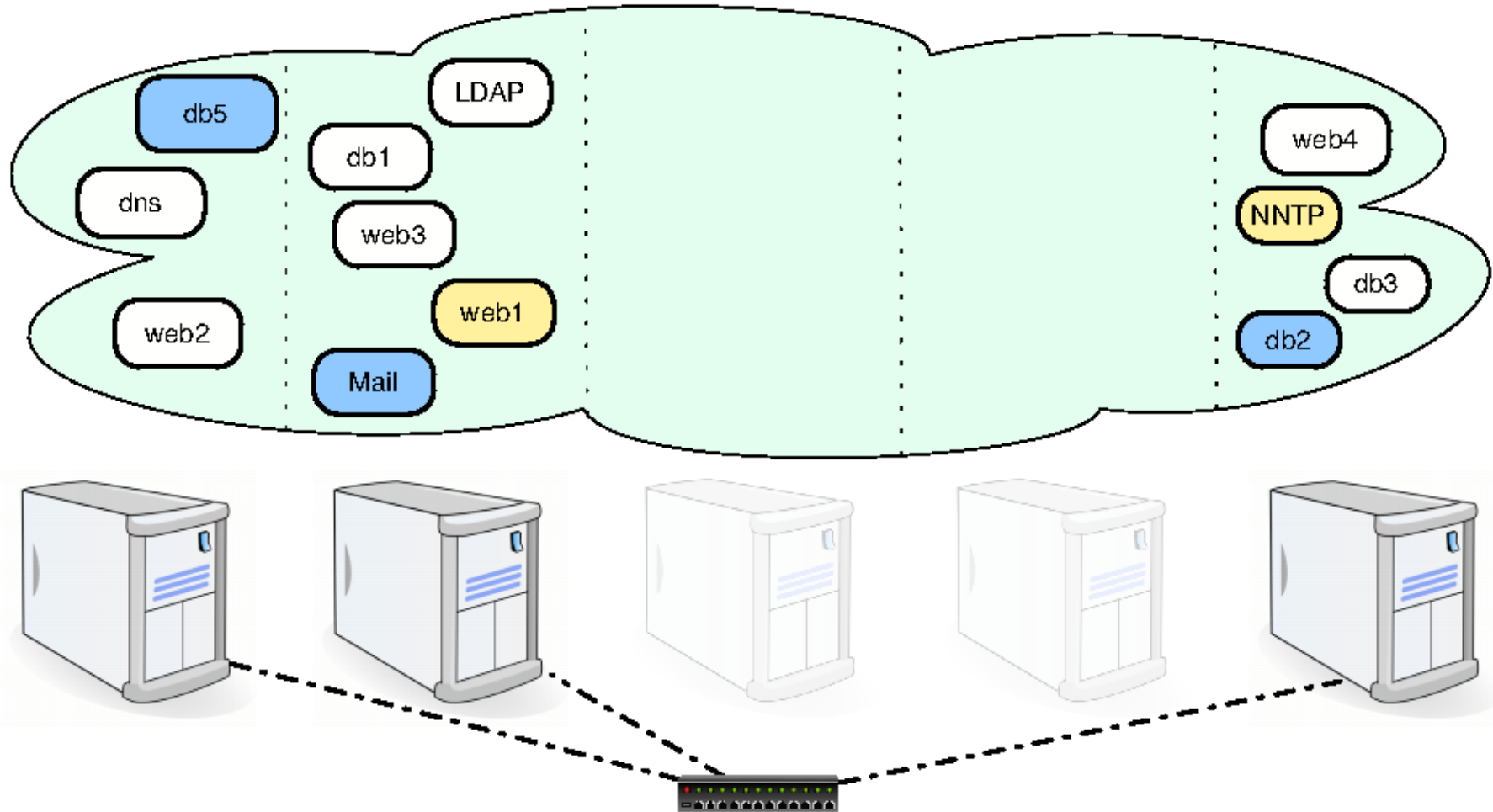


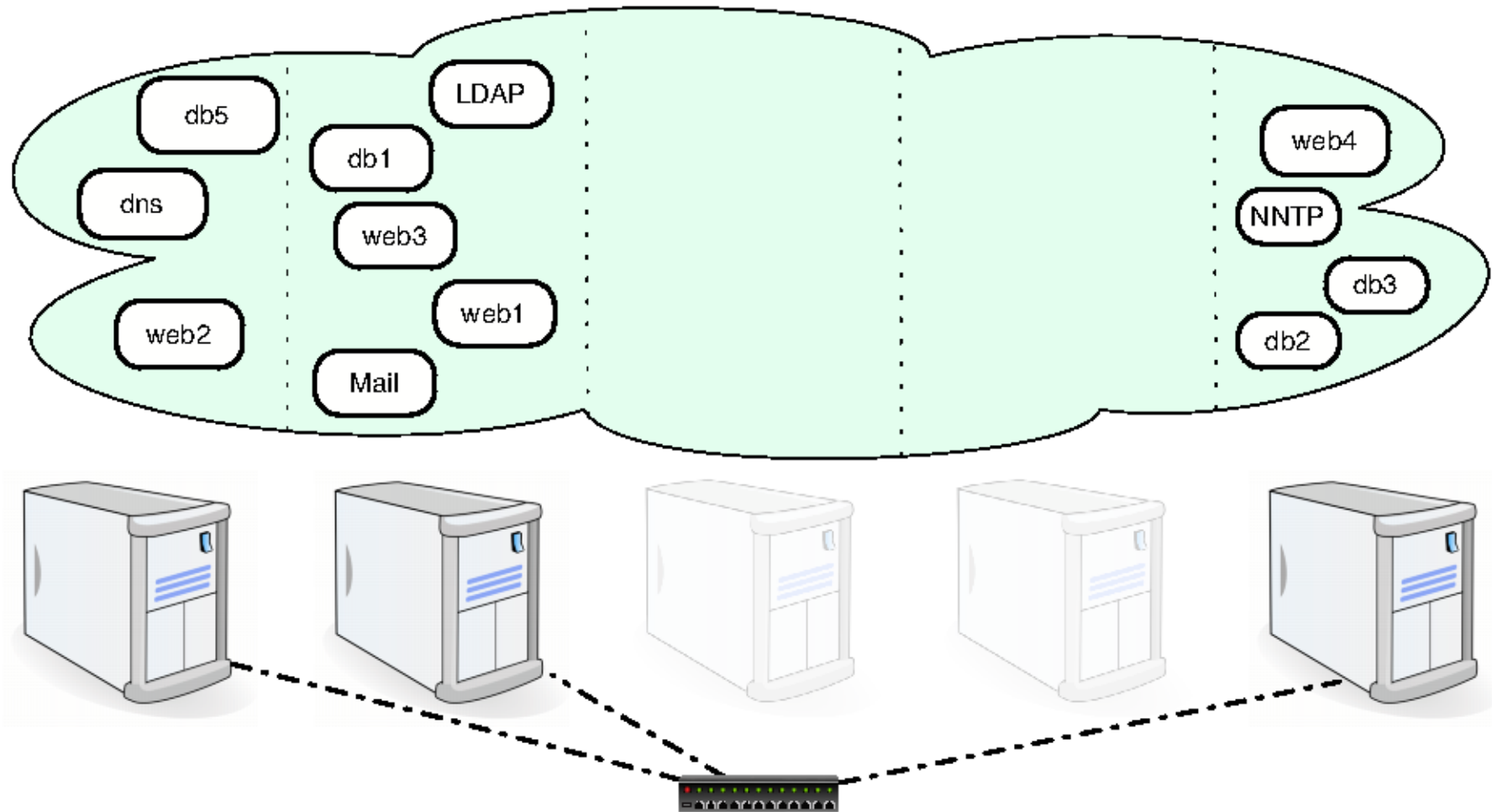


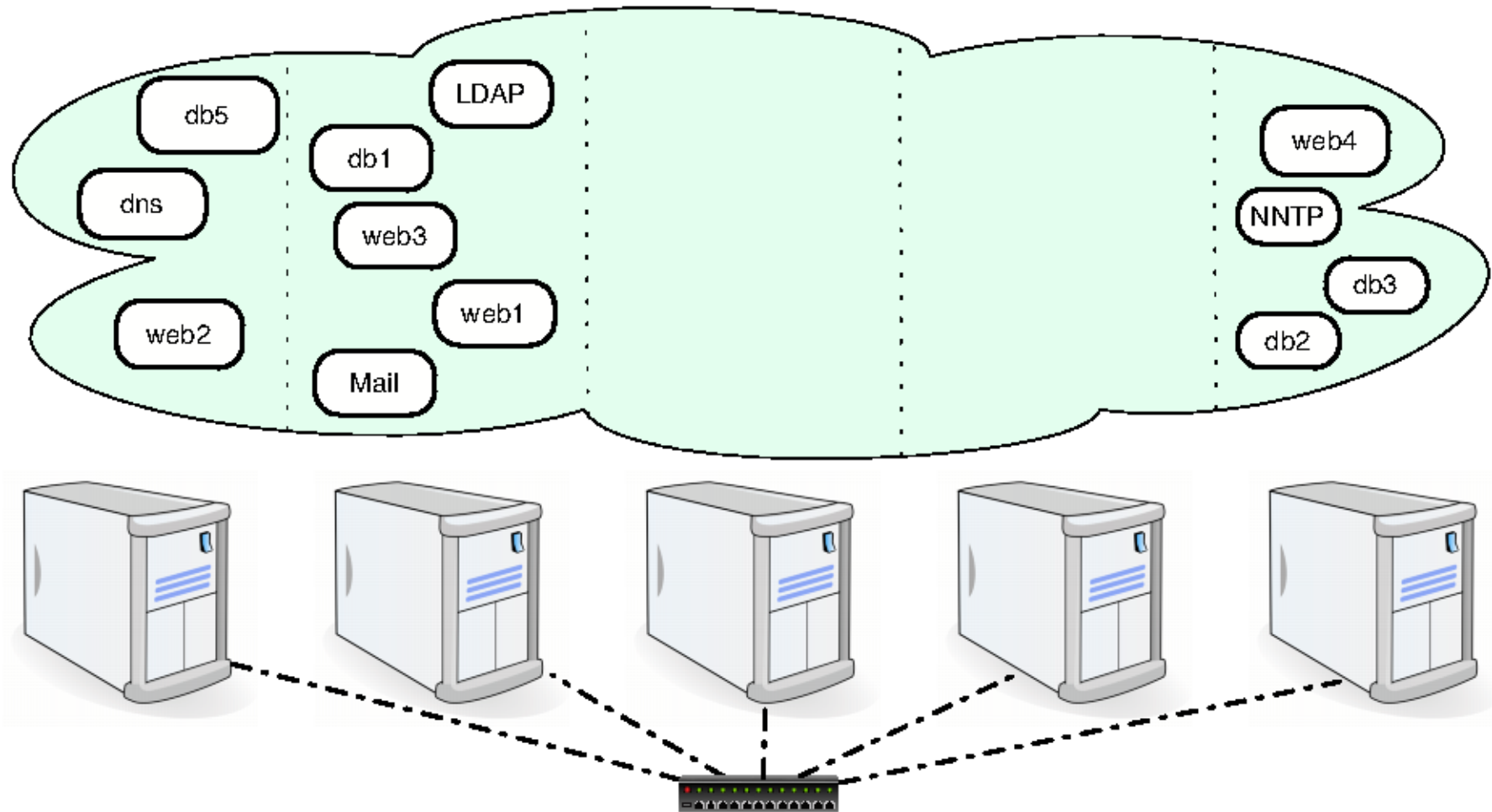


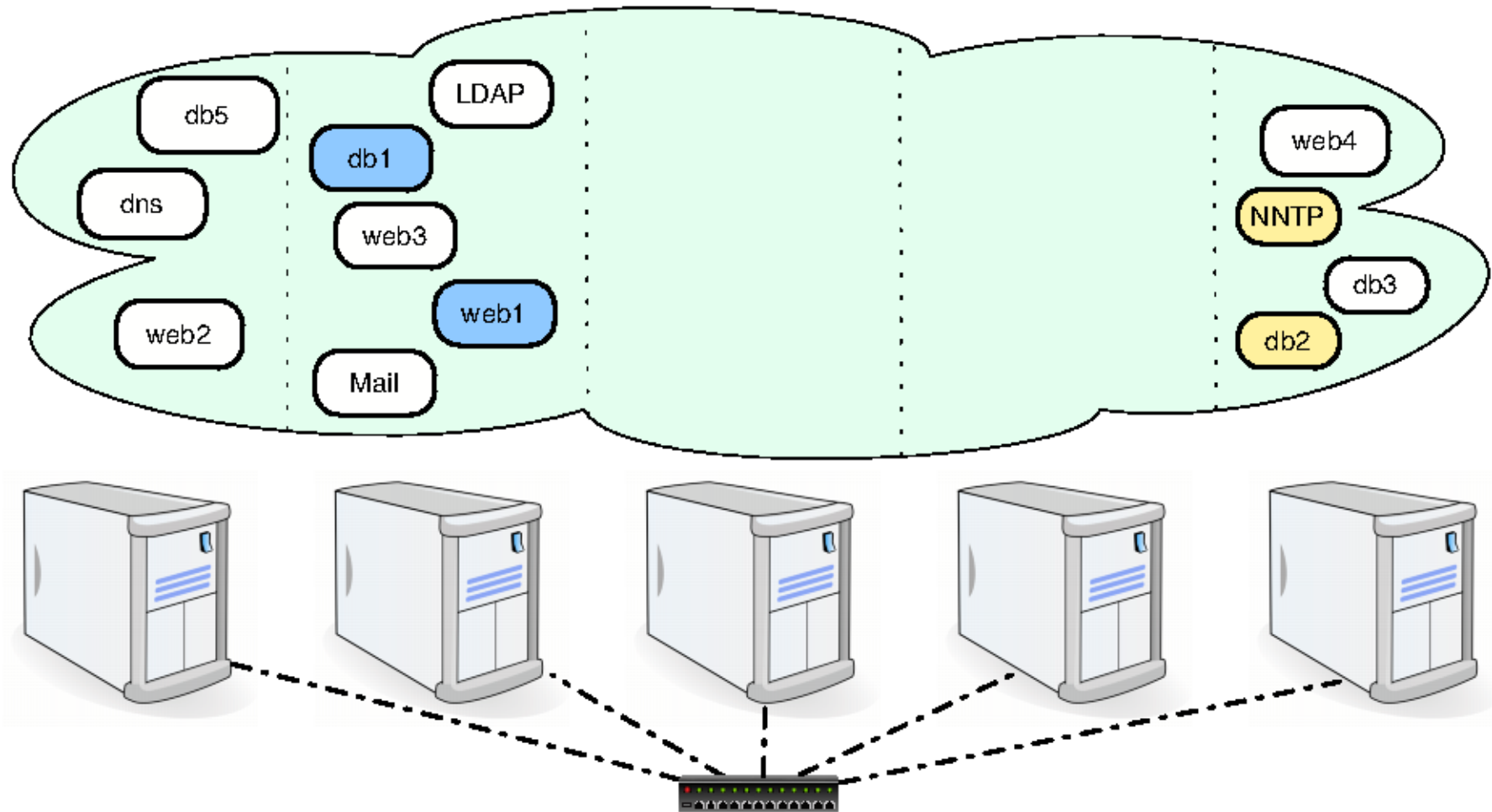


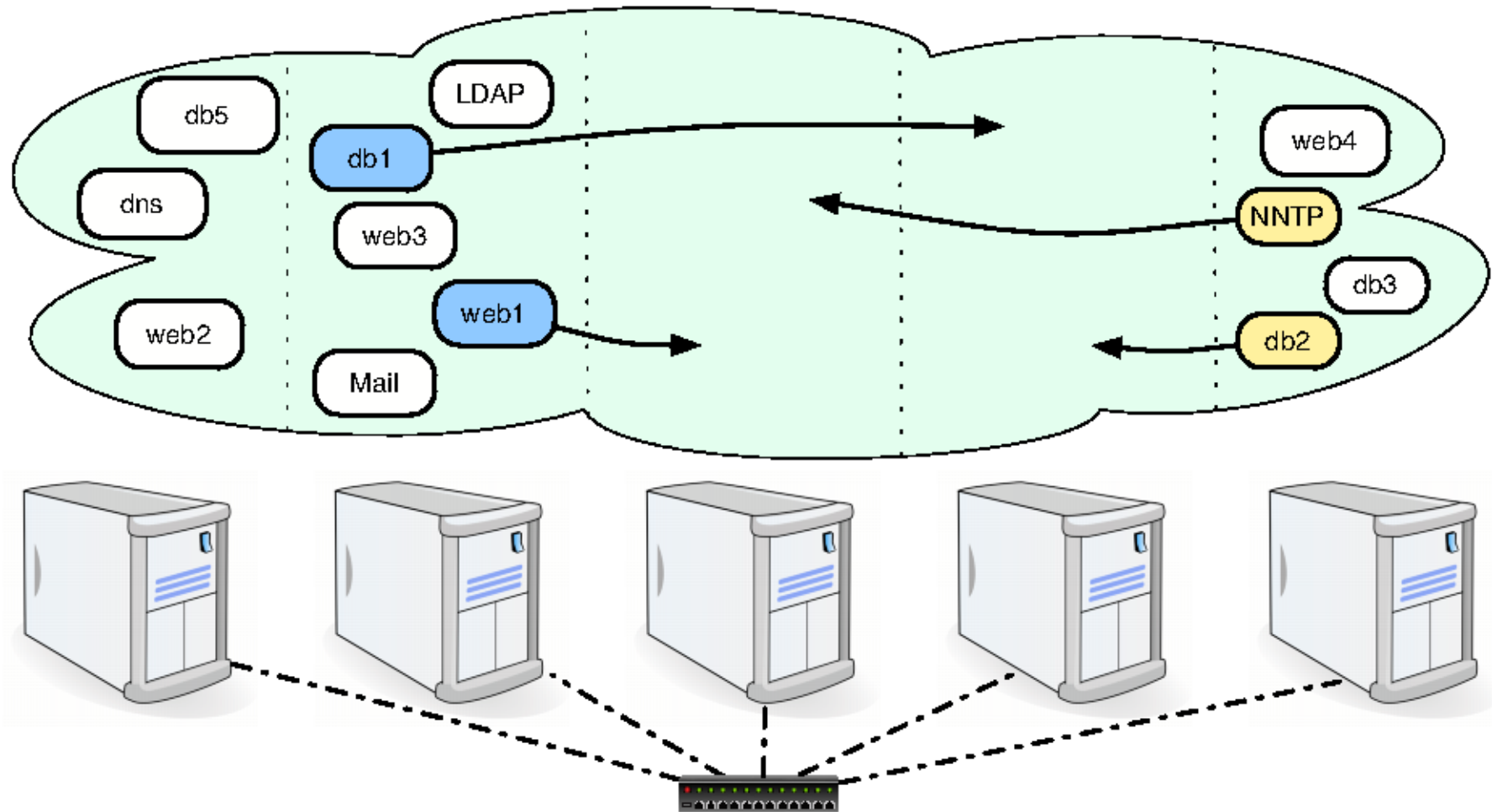


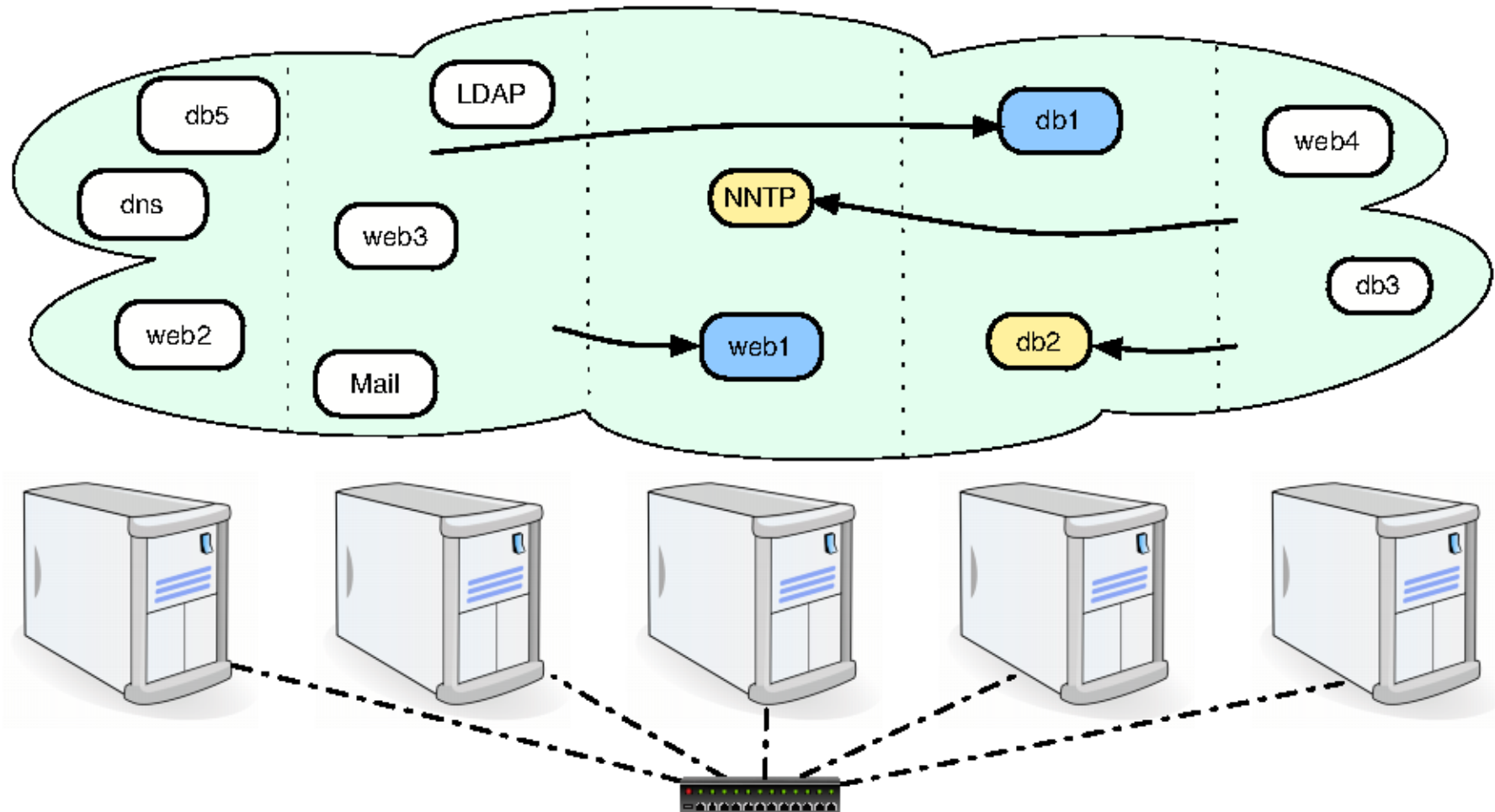


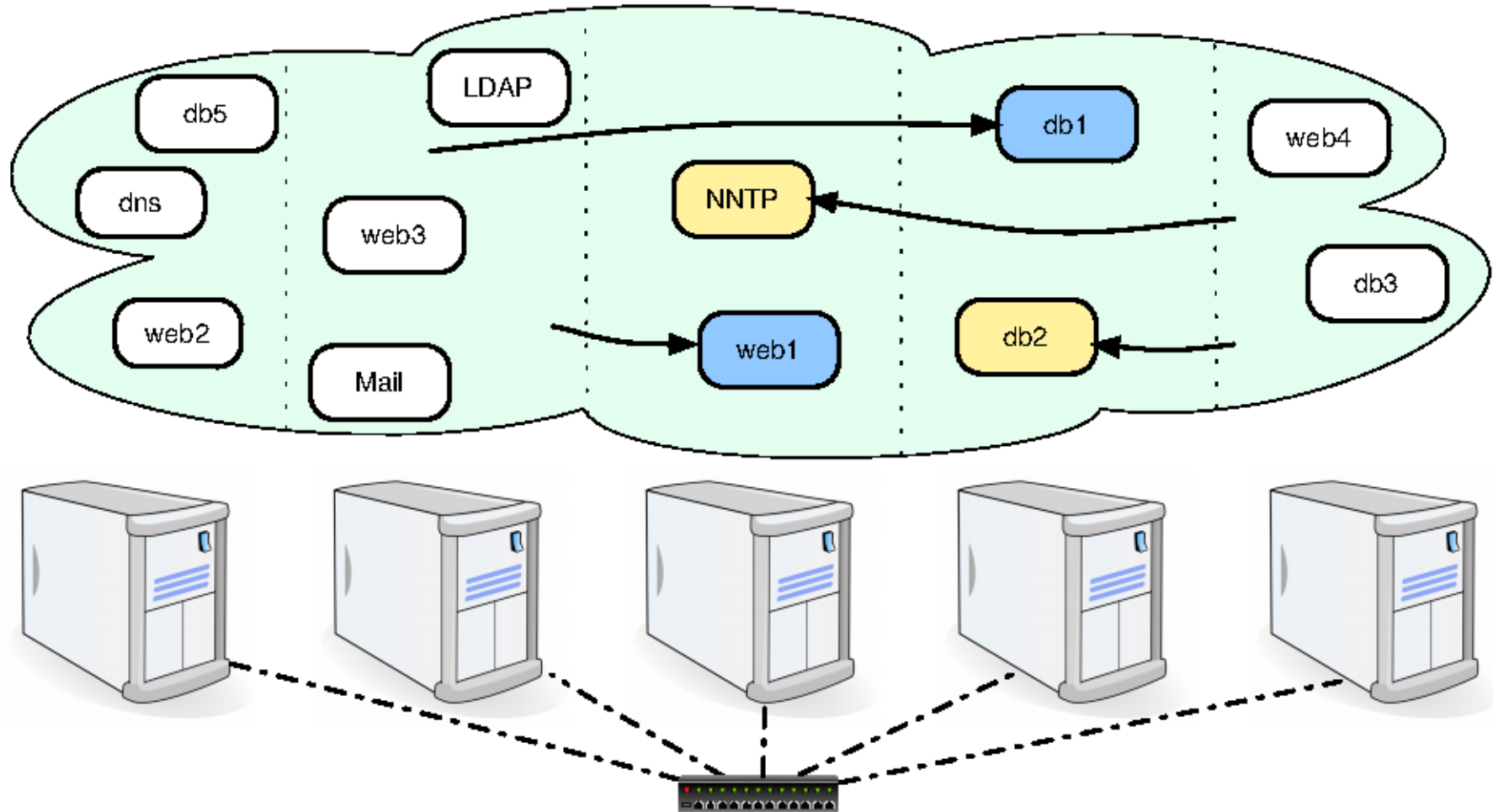


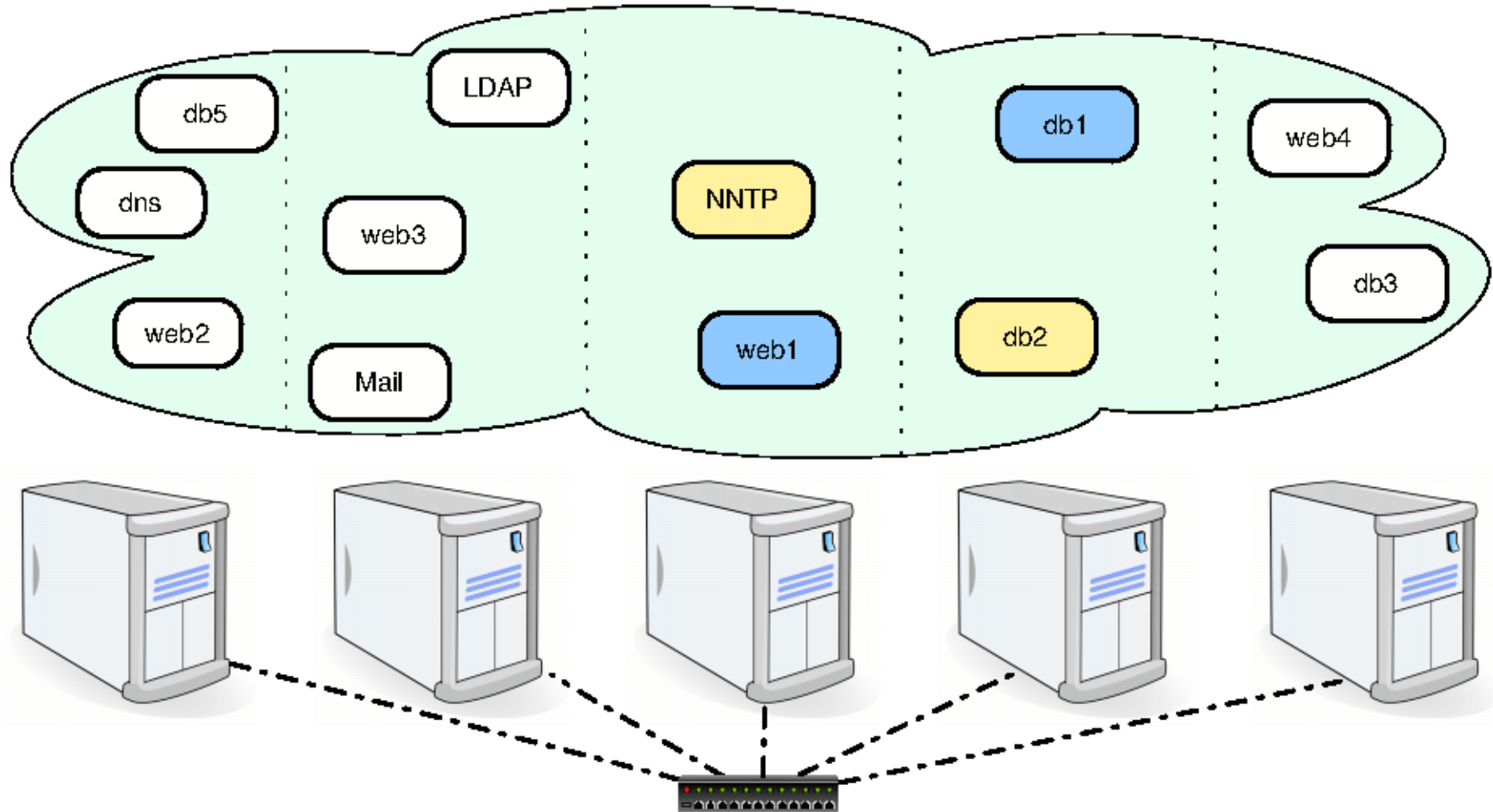


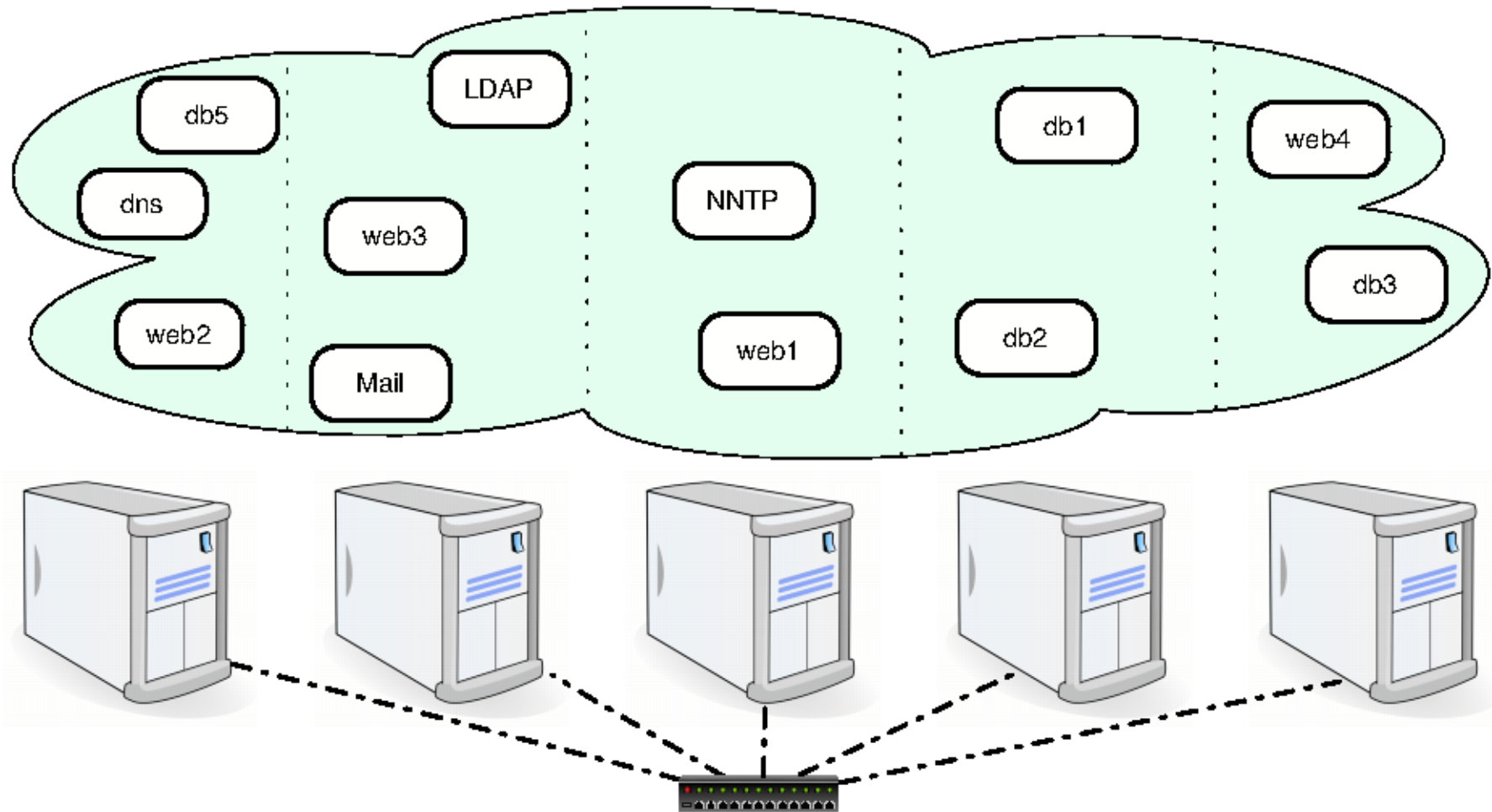




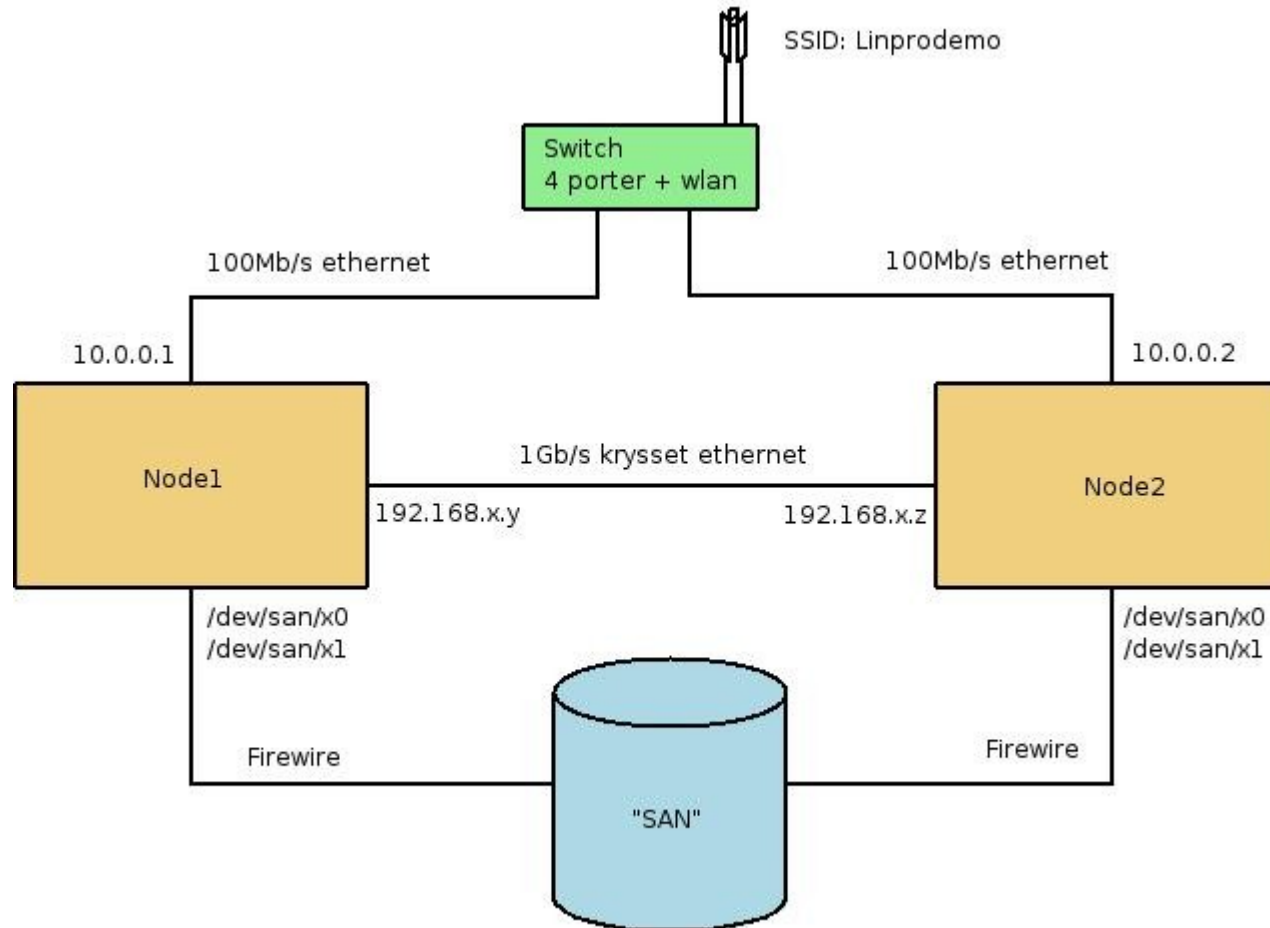


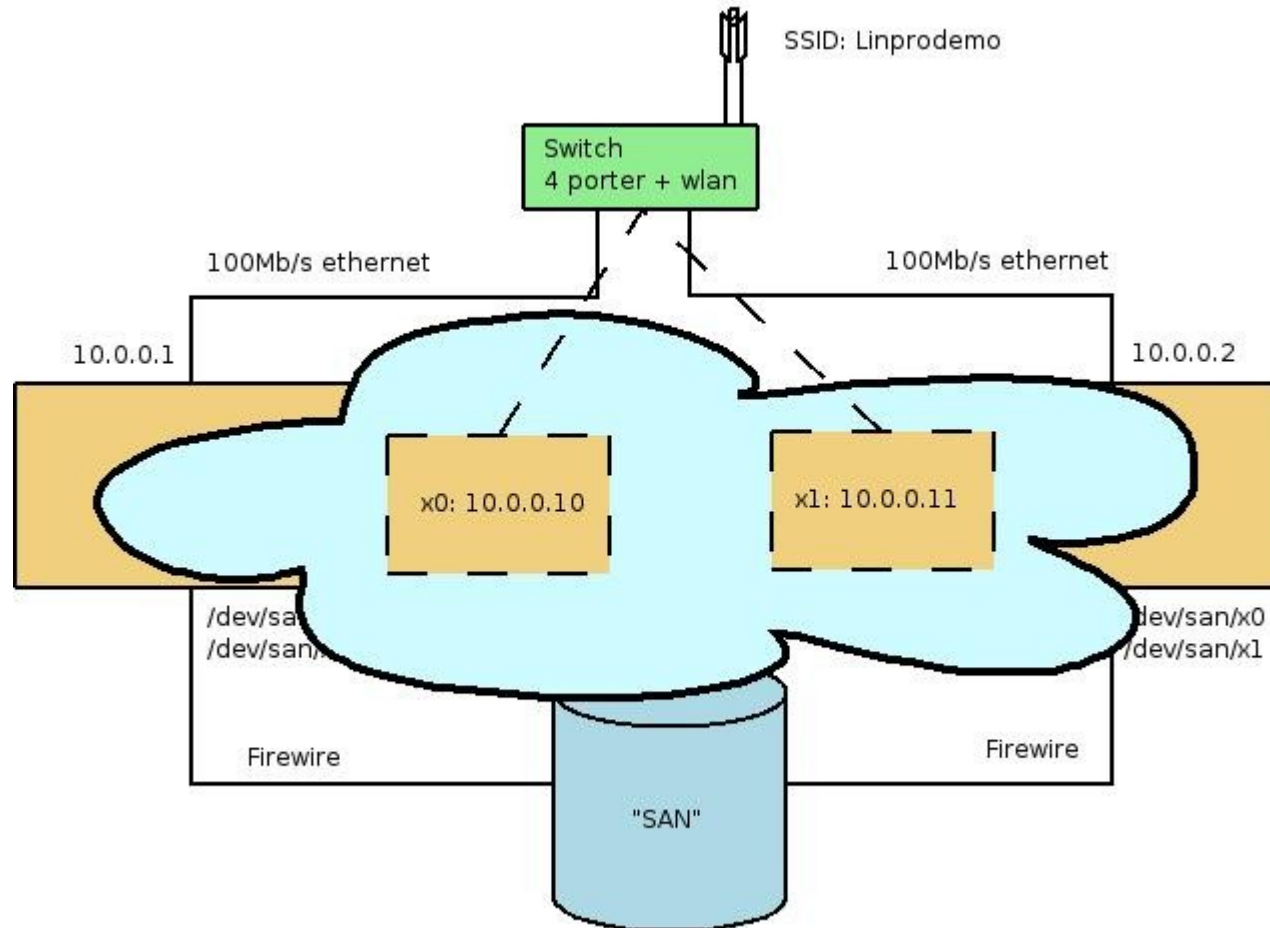


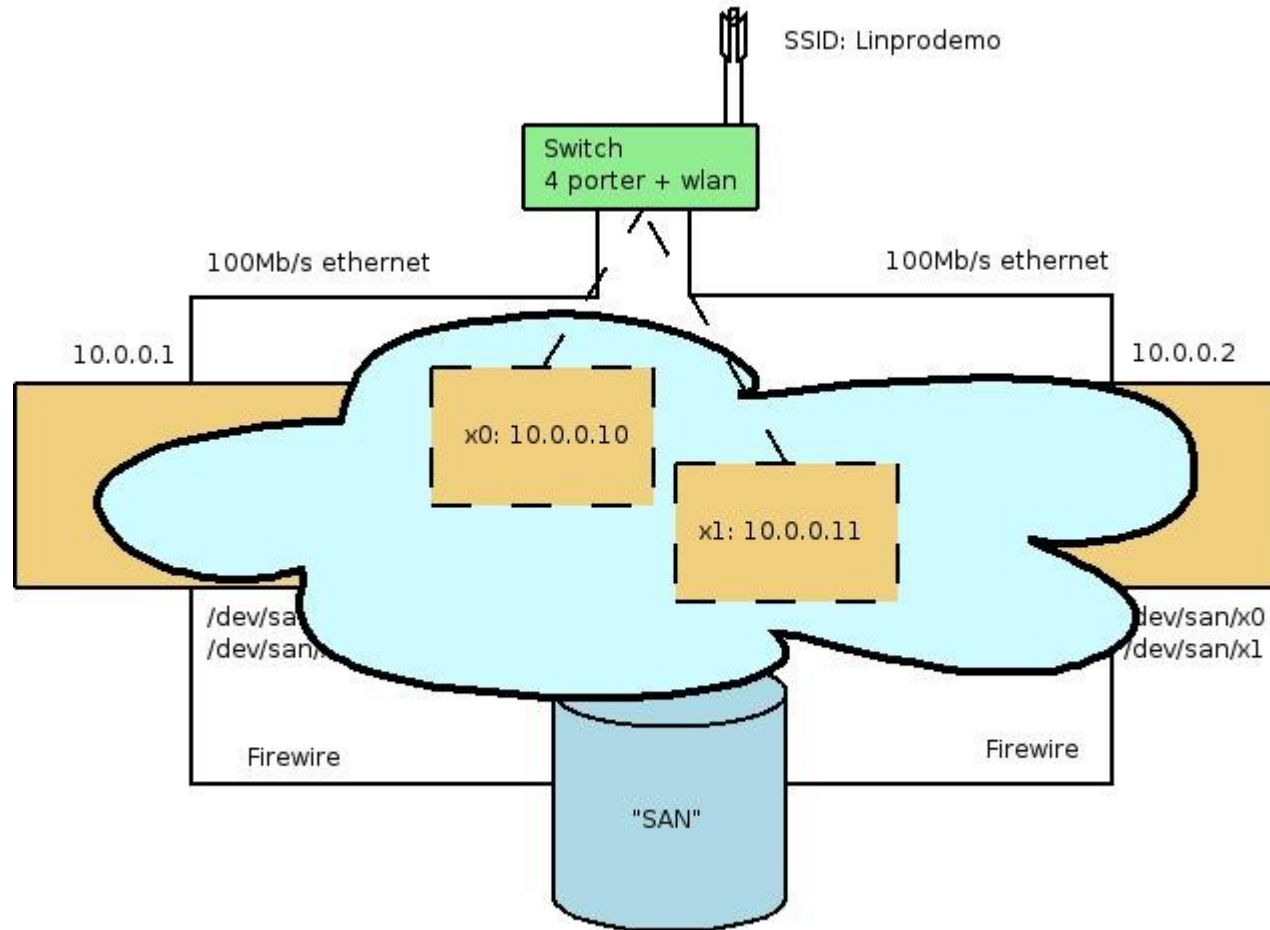


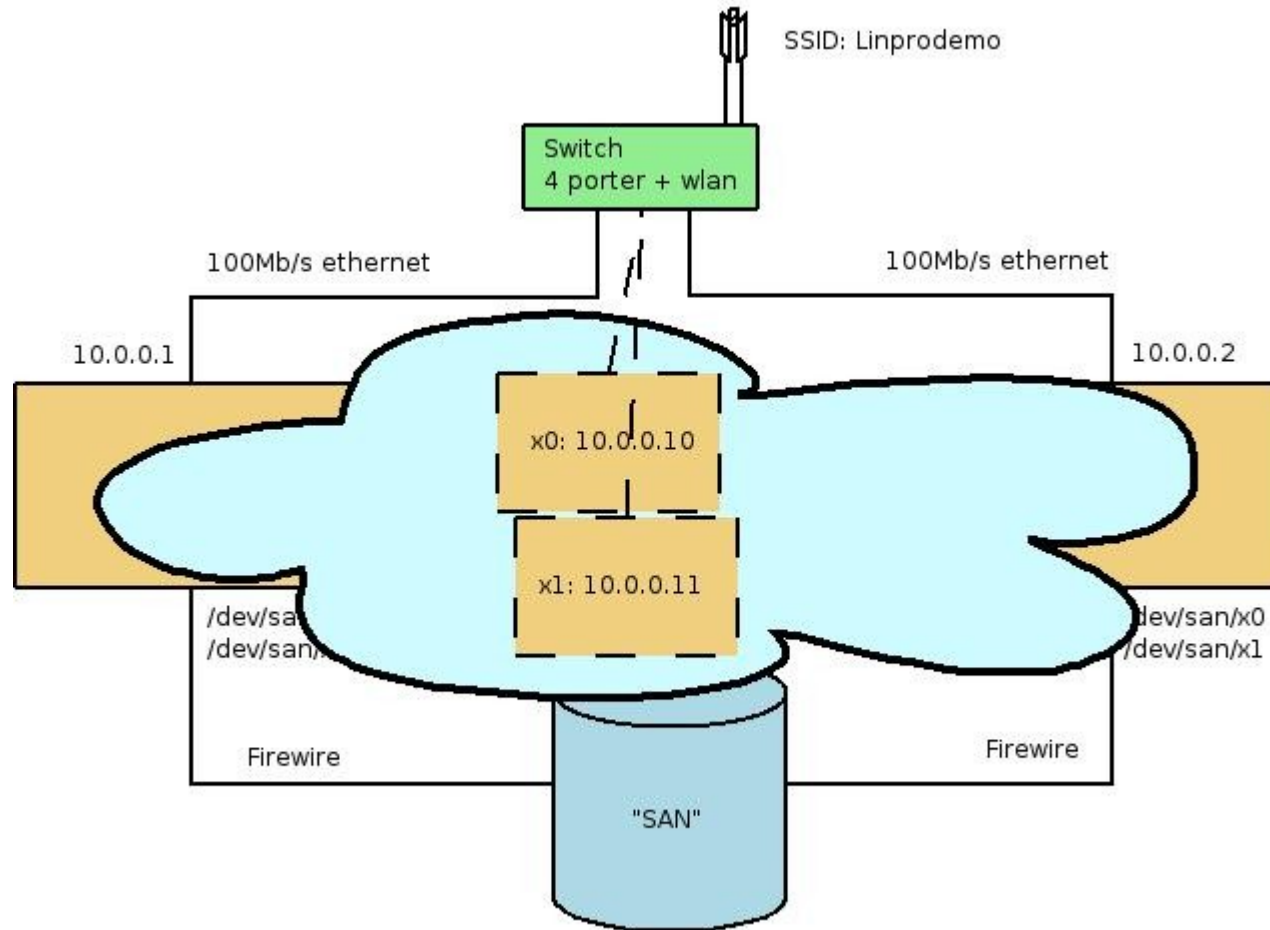


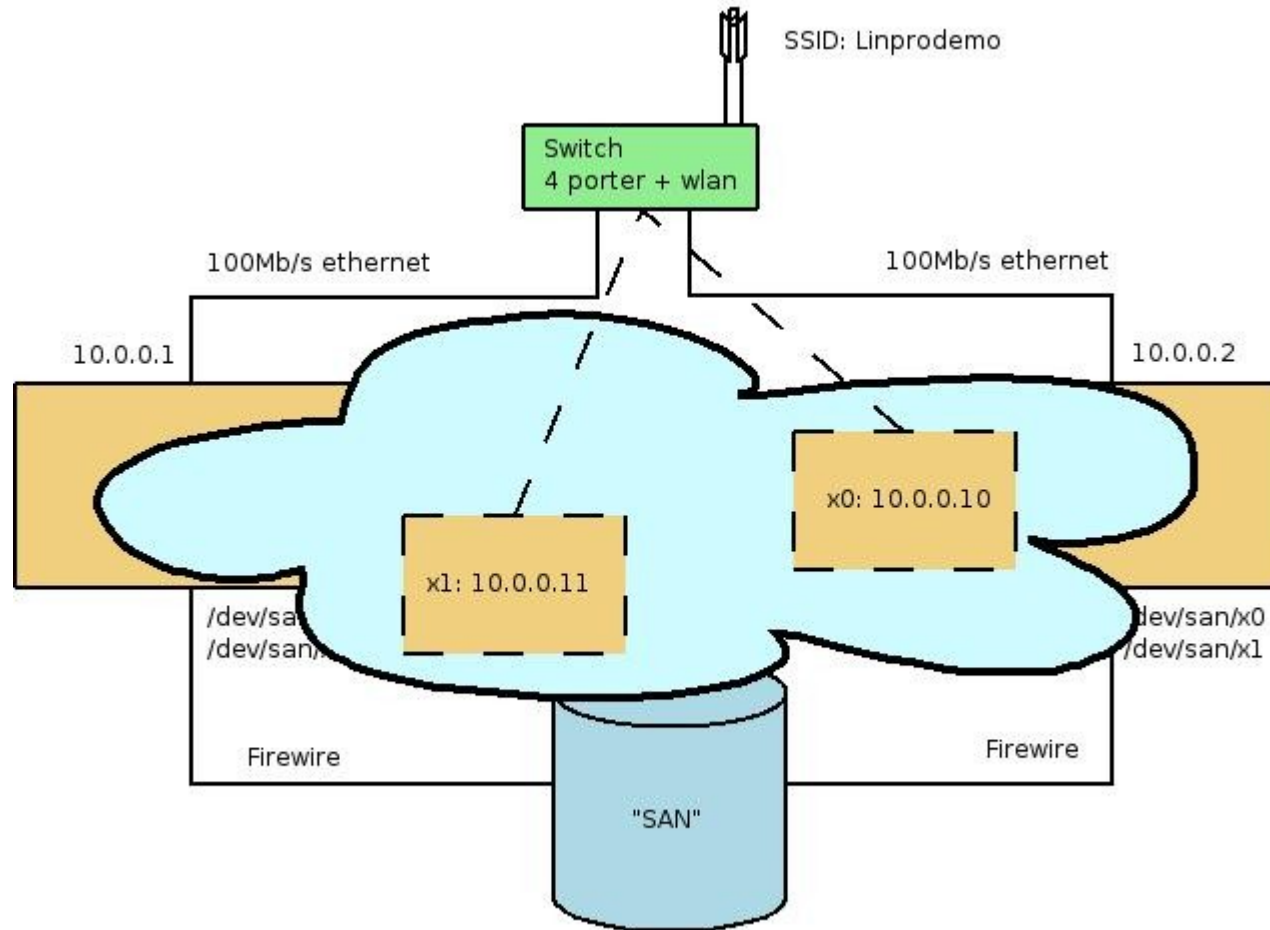
- 2 fysiske maskiner
 - AMD Athlon XP cpu
 - 1GB ram
- Gigabit backend (krysset kabel)
- Ekstern Firewiredisk som delt lagring

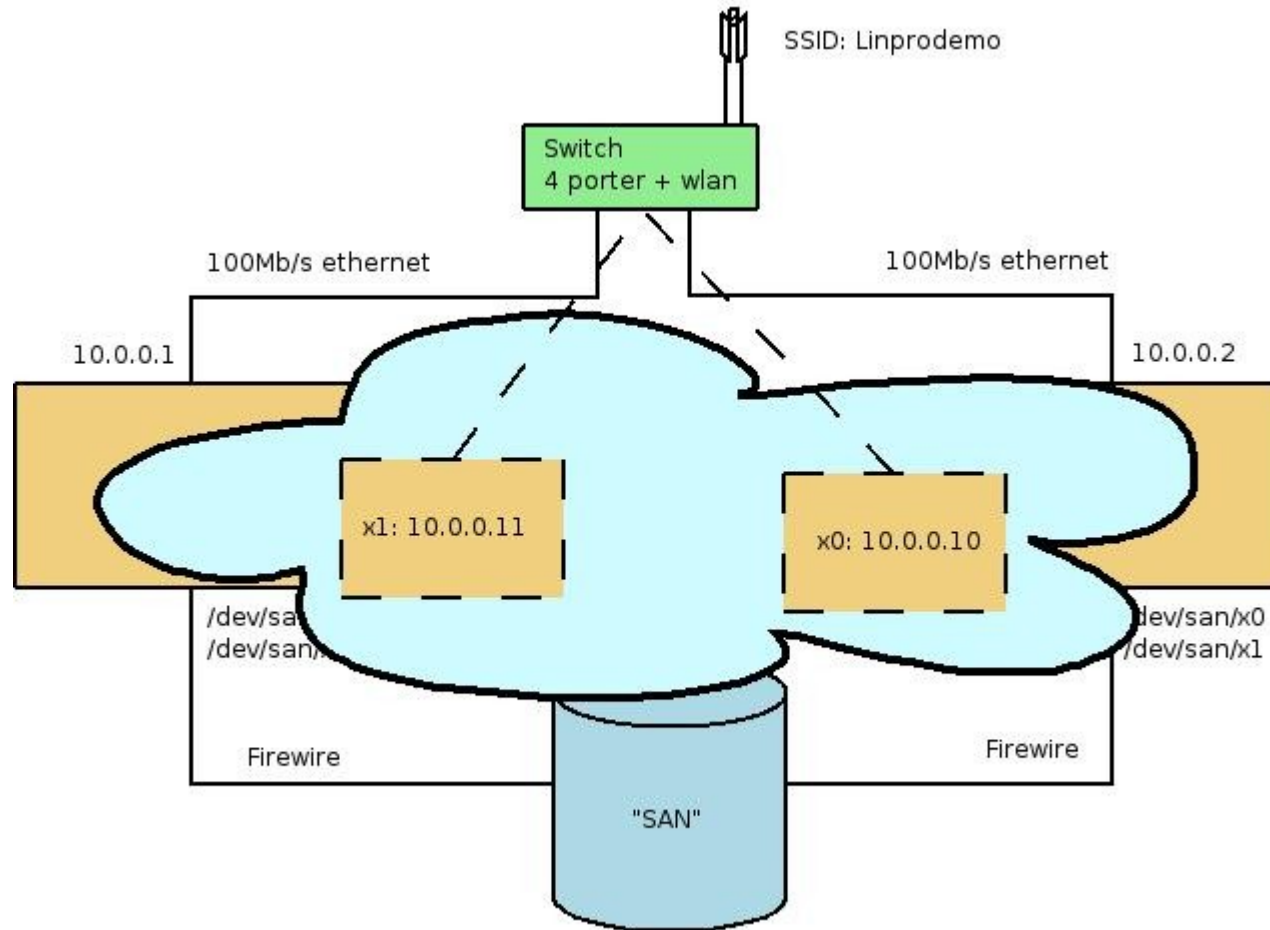












- x0 (10.0.0.10)
 - 128MB ram, 2GB rotdisk + 512MB swap
 - Tjenester:
 - DHCPD
 - Apache (<http://10.0.0.10>)
 - IceCast2 nettradio (<http://10.0.0.10:8000/musikk.ogg.m3u>)
 - ssh (login: test / test)
- x1 (10.0.0.11)
 - 518MB ram, 5GB rotdisk + 1GB swap
 - Tjenester:
 - NX remote desktop (login: test / test)
 - BZFlag spillserver
 - ssh (login: test / test)

Demo – (planlagt) hendelsesforløp



1. Skru på node1
2. Se at x0 og x1 kommer opp av seg selv
3. Koble på nettradio og remote desktop
4. Skru på node2
5. Se at heartbeat flytter VM
6. Skru av node1
7. Se at både x0 og x1 kjører på node2

- Xen: www.cl.cam.ac.uk/research/srg/netos/xen/
- Heartbeat: www.linux-ha.org
- NX: www.nomachine.com
- BZFlag: www.bzflag.org
- Icecast2: www.icecast.org