xCAT

Extreme Cluster Administration Toolkit

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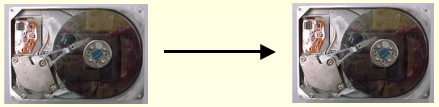
XCAT Cluster – Characteristics

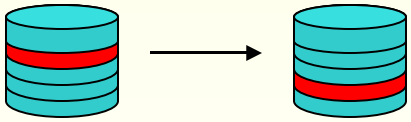
- Remote Power Control
- Remote Hardware Control
- Remote Software Reset
- Remote OS Console
- Remote POST/BIOS Console
- Remote Vitals
- Parallel Remote Shell
- Parallel Ping
- Single Operation Can Be Applied In Parallel To Group
- Network Installation (Kickstart)
- SNMP Alert
- Support For Various User Defined Node Type

XCAT Cluster – Installation Methods

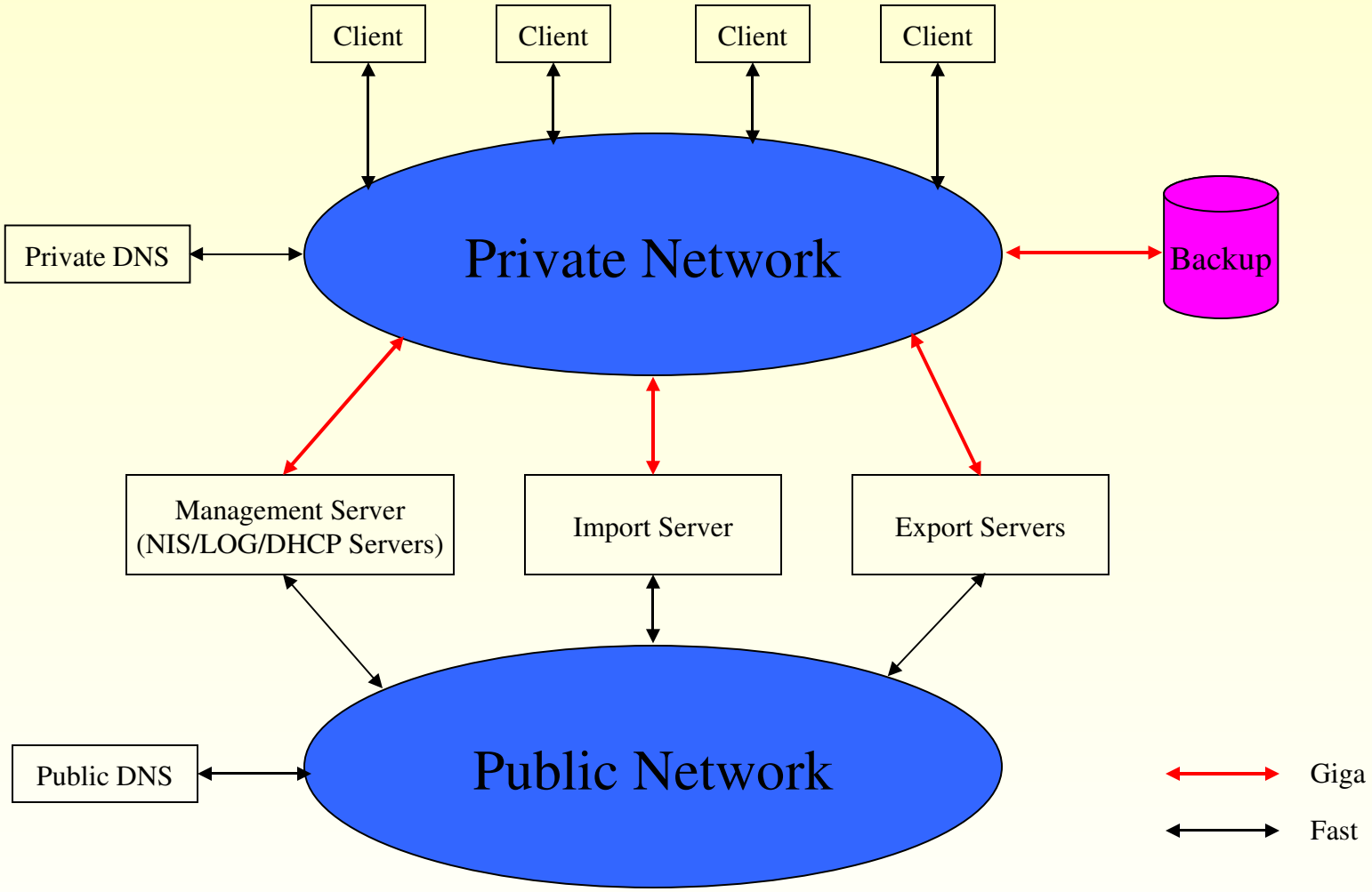
- **Kickstart**
  - **Kickstart use a configuration file during installation process**
- **Cloning (OS Indipendent)**
  - **copies a hard drive from one machine to another block-by-block, byte-by-byte, bit-by-bit**



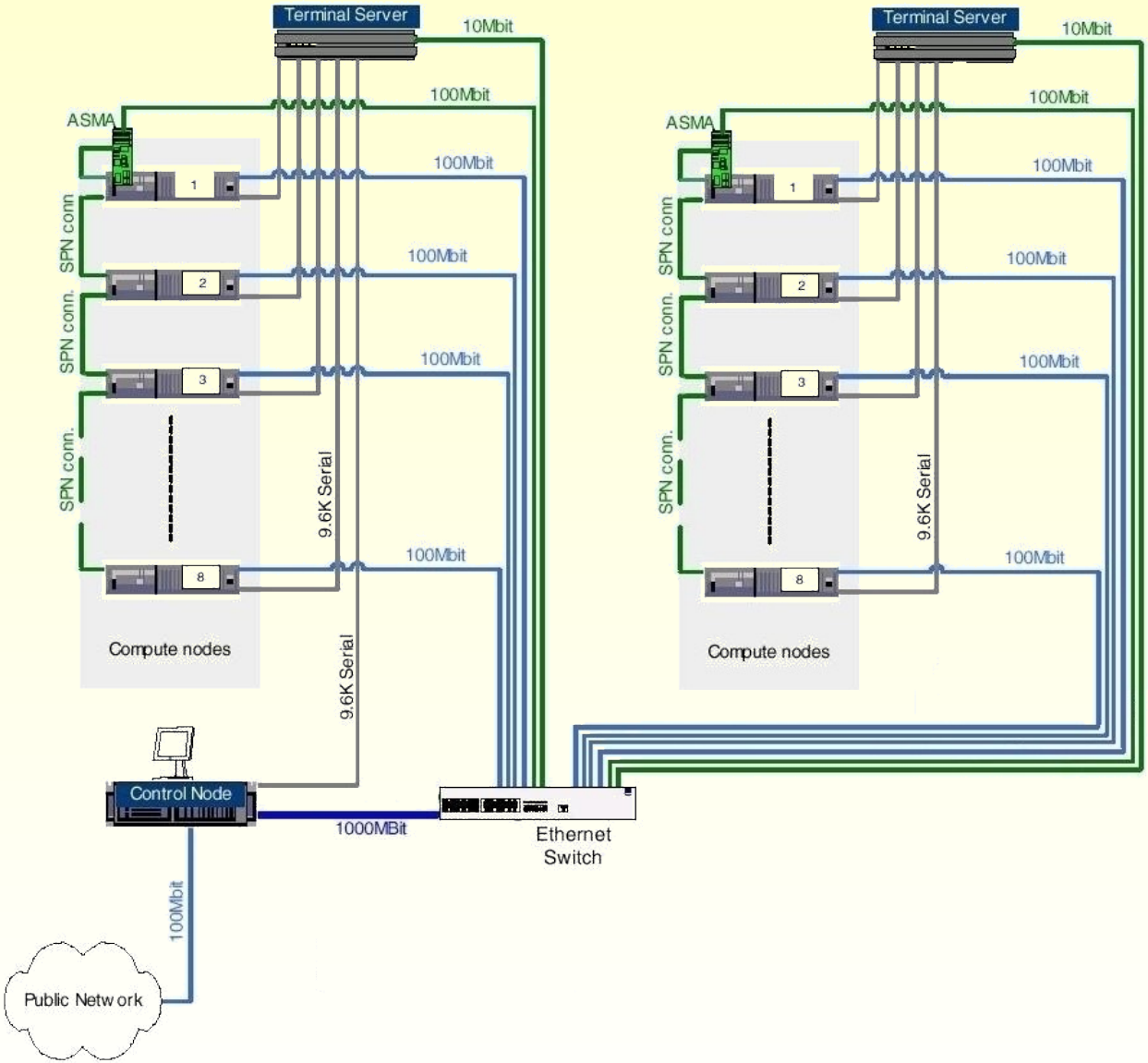
- **Imaging (OS Dipendent)**
  - **copies a hard drive's partition images from a central NFS server partition-by-partition, file-by-file**



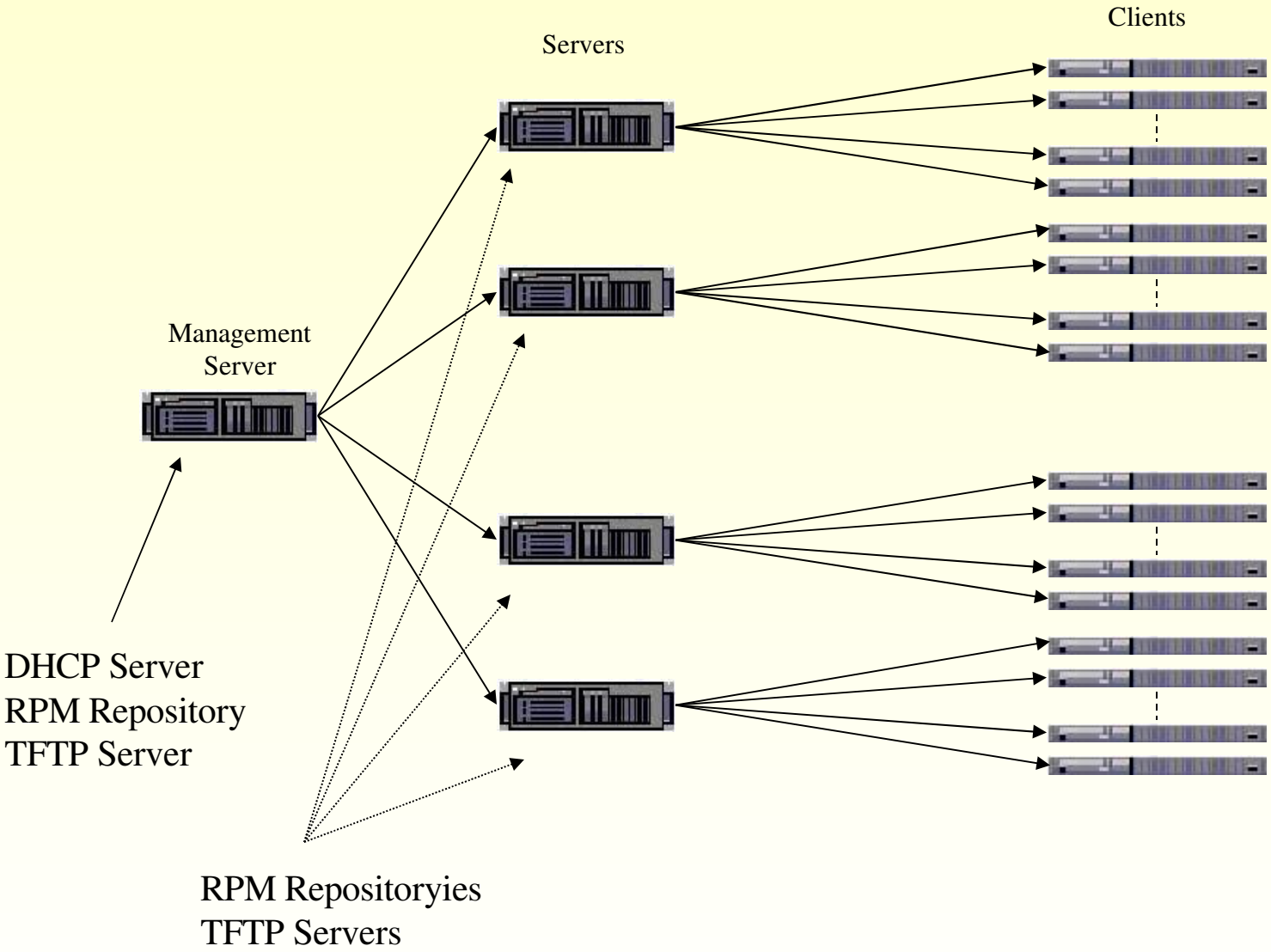
XCAT Cluster – Network Structure



XCAT Cluster – Hardware Structure



XCAT Cluster – Installation Tree



XCAT Cluster – Hardware Resources

18 Objy servers (2×PIII 1.26 Ghz 1GB RAM)

110 processing nodes (2×PIII 1.26 Ghz 1GB RAM)

1 tape library (~70 TB not compressed) StorageTek L700

Tape library+ tape server

Datamover

OprServer

GigabitEthernet

FastEthernet

Clienti

Journal + catalog server

Lockserver

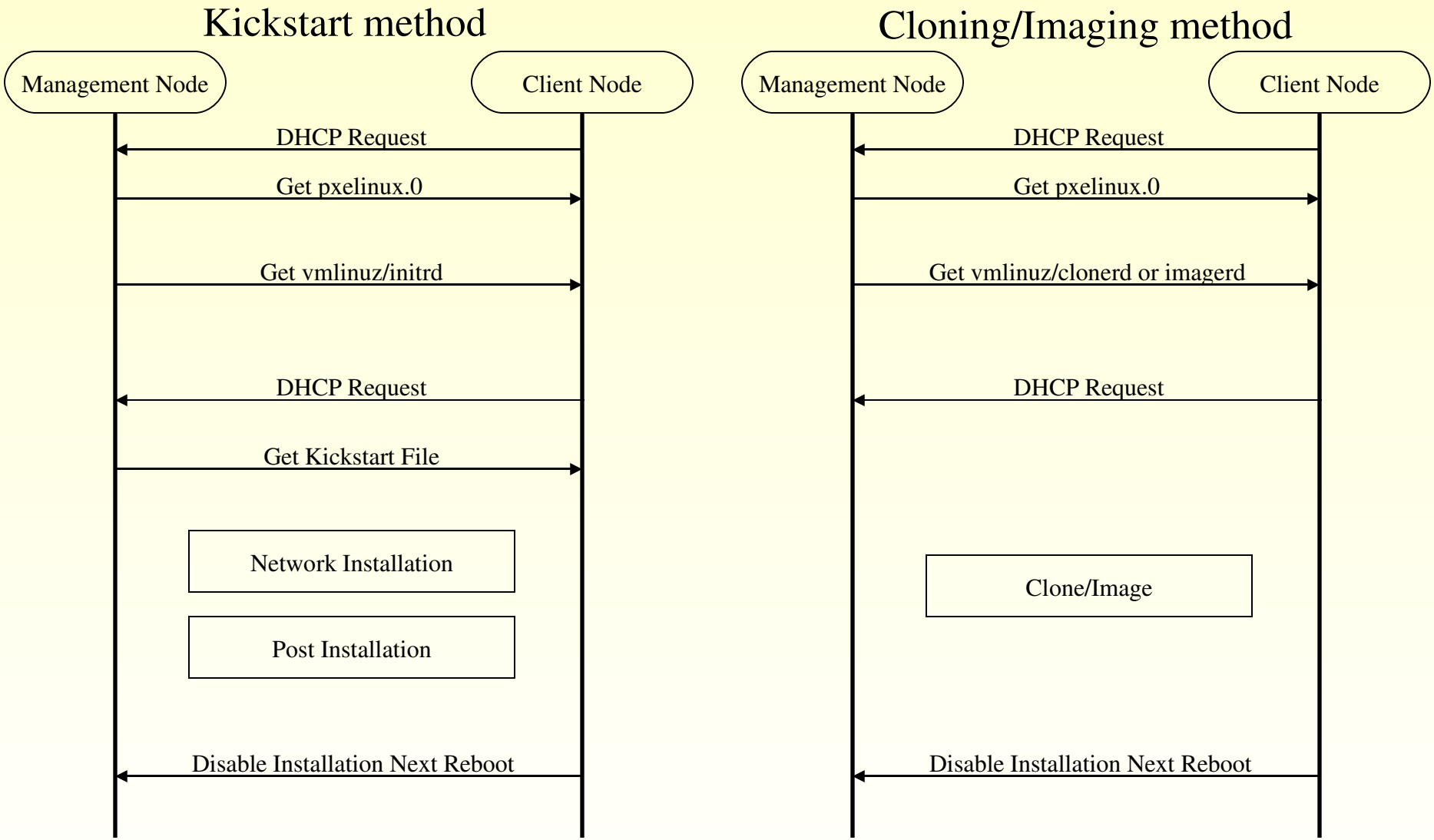
Clustering + OID server

Boot server

MySQL + E-logbook

30 machines (2×PIII 1.26 Ghz 1GB RAM) for other services

XCAT Cluster – Boot Sequence



XCAT Cluster – Files Configuraton

Site.tab

xCAT xCluster main configuration file. Contain information about the environment that the cluster runs in.

```
rsh                 /usr/bin/ssh
rcp                 /usr/bin/scp
gkhfile             /usr/local/xcat/etc/gkh
tftpdir             /tftpboot
tftpxcatroot        xcat
domain              pd.babar
nameservers         192.168.101.10
nets                NA
dnsdir              NA
dnsallowq           NA
domainaliasip       NA
mxhosts             NA
mailhosts           NA
master              bbr-mngservpriv
homefs              NA
localfs             NA
pbshome             NA
pbsprefix           NA
pbsserver           NA
scheduler           NA
xcatprefix          /usr/local/xcat
keyboard            us
timezone            Europe/Rome
offutc              1
```

```
mapperhost          NA
serialmac           1
serialbps           9600
snmpc               public
snmpd               192.168.101.1
timeservers         bbr-mngservpriv
logdays             7
installdir          /install
clustername         BABAR
dhcpver             2
dhcpconf            /etc/dhcpd.conf
clusternet          192.168.101.0
dynamic             192.168.101.1,255.255.255.0,
                    192.168.101.2,192.168.101.254
dynamictype         ia32
usernodes           bbr-mngservpriv
usermaster          bbr-mngservpriv
nisdomain           babar
nismaster           bbr-mngservpriv
nisslaves           NA
homelinks           NA
chagemin            0
chagemax            60
chagewarn           10
chageinactive       0
mpcliroot           /usr/local/xcat/lib/mpcli
```

XCAT Cluster – Files Configuraton

Nodelist.tab

xCAT node, group, and node alias table.

```
# This file contains a list of included nodes for all commands
# Use # to comment out excluded nodes
#
bbr-mngservpriv    all,rack11,mng
bbr-sqlservpriv    all,rack11,sql
bbr-tape01         all,rackst,tape
bbr-tape02         all,rack11,tape
bbr-importpriv     all,rack11,import
bbr-datamove01     all,rack11,datamove,objectivity,ams
bbr-farm001        all,rack11,test
bbr-farm002        all,rack11,test
bbr-farm003        all,rack17,client
       .
       .
       .
bbr-rsa01          rsa
bbr-termserv01     ts
```

XCAT Cluster – Files Configuraton

Noderes.tab

describe where the node find the resources.

```
#noderes.tab
#
#TFTP          = Where is my TFTP server?
#                Used by makedhcp to setup /etc/dhcpd.conf
#                Used by mkks to setup update flag location
#NFS_INSTALL   = Where do I get my files?
#INSTALL_DIR   = From what directory?
#SERIAL        = Serial console port (0, 1, or NA)
#USENIS        = Use NIS to authencate (Y or N)
#INSTALL_ROLL  = Am I also an installation server? (Y or N)
#ACCT          = Turn on BSD accounting
#GM            = Load GM module (Y or N)
#PBS           = Enable PBS (Y or N)
#ACCESS        = access.conf support
#INSTALL NIC   = eth0, eth1, ... or NA
#
#node/group  TFTP,NFS_INSTALL,INSTALL_DIR,SERIAL,USENIS,
#           INSTALL_ROLL,ACCT,GM,PBS,ACCESS,INSTALL_NIC
#
#noser             neptune,jupiter,/install,NA,Y,N,N,Y,Y,Y,eth0
#s0                neptune,jupiter,/install,0,Y,N,N,Y,Y,Y,eth0
bbr-sqlservpriv    bbr-mngservpriv,bbr-mngservpriv,/install,0,Y,N,Y,N,Y,Y,eth1
bbr-userpriv       bbr-mngservpriv,bbr-mngservpriv,/install,0,Y,N,Y,N,Y,Y,eth1
bbr-importpriv     bbr-mngservpriv,bbr-mngservpriv,/install,0,Y,N,Y,N,Y,Y,eth0
bbr-tape01         bbr-mngservpriv,bbr-mngservpriv,/install,0,Y,N,Y,N,Y,Y,eth0
datamove           bbr-mngservpriv,bbr-mngservpriv,/install,0,Y,N,Y,N,Y,Y,eth0
all                bbr-mngservpriv,bbr-mngservpriv,/install,1,Y,N,Y,N,Y,Y,eth0
```


XCAT Cluster – Files Configuraton

Nodetype.tab

describe the name of the kickstart file to use for the installation.

```
# nodetype.tab maps nodes to types of installs.
#
bbr-sqlservpriv     bbr-sqlserv
bbr-tape01          bbr-tape
bbr-tape02          bbr-tape
bbr-importpriv      bbr-import
bbr-datamove01      bbr-datamove
bbr-farm001         bbr-farm-promise
bbr-farm002         bbr-farm-dell
bbr-farm003         bbr-farm
```

XCAT Cluster – Files Configuraton

Nodehm.tab

xCAT node hardware management table.

```
#nodehm.tab
#
#node hardware management
#
#power     = mp,apc,apcp,NA
#reset     = mp,apc,apcp,NA
#cad       = mp,NA
#vitals    = mp,NA
#inv       = mp,NA
#cons      = conserver,tty,rtel,NA
#bioscons  = mp,NA
#eventlogs = mp,NA
#getmacs   = rcons,cisco3500
#netboot   = pxe,eb,ks62,elilo,NA
#eth0      = eepro100,pcnet32,e100
#gcons     = vnc,NA
#
#node  power,reset,cad,vitals,inv,cons,bioscons,eventlogs,getmacs,netboot,eth0,gcons
#
bbr-mngservpriv     NA,NA,NA,NA,NA,conserver,NA,NA,NA,NA,NA,NA
bbr-sqlservpriv     NA,NA,NA,NA,NA,conserver,NA,NA,rcons,pxe,eepro100,NA
bbr-tape01          NA,NA,NA,NA,NA,conserver,NA,NA,rcons,pxe,e1000,NA
bbr-tape02          NA,NA,NA,NA,NA,conserver,NA,NA,rcons,pxe,e1000,NA
bbr-importpriv      NA,NA,NA,NA,NA,conserver,NA,NA,rcons,pxe,eepro100,NA
bbr-datamove01      NA,NA,NA,NA,NA,conserver,NA,NA,rcons,pxe,e1000,NA
bbr-farm001         NA,NA,NA,NA,NA,conserver,NA,NA,rcons,pxe,eepro100,NA
bbr-farm002         NA,NA,NA,NA,NA,conserver,NA,NA,rcons,pxe,eepro100,NA
bbr-farm003         mp,mp,mp,mp,mp,conserver,mp,mp,rcons,pxe,eepro100,NA
```


XCAT Cluster – Pro e Contro

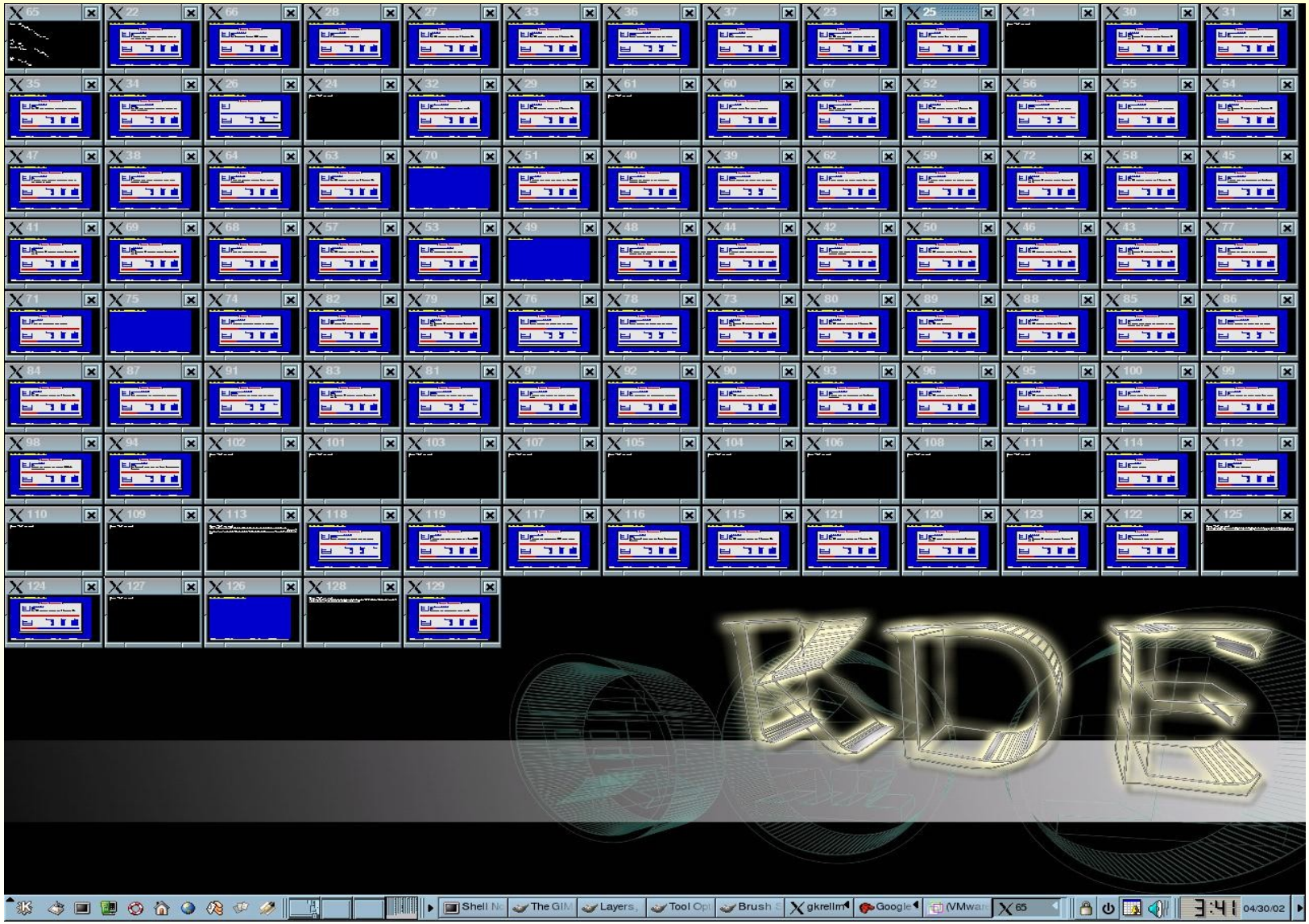
PRO

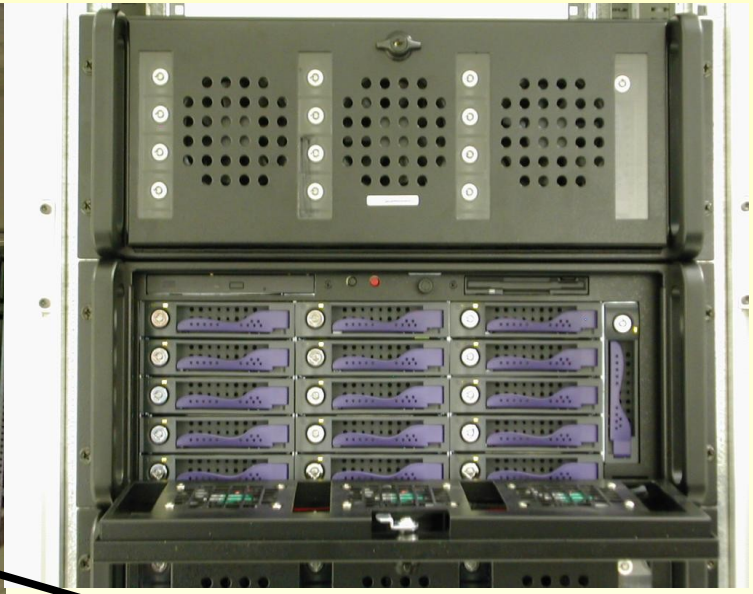
- Configurazione semplice
- Struttura Installazione Gerarchica
- Monitoring Hardware
- Personalizzazione Script
- Gestione Remota
- Supporta Anche Macchine Non IBM
- Gestione Gruppi

CONTRO

- Scarso supporto post installazione
- Alcune funzionalita' sono strettamente legate all'hardware

XCAT Cluster – Installation Example





SCSI/IDE RAID +
Objectivity Servers

Processing
nodes

Machines for other
services

StorageTek L700
Tape library