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Massive Deployment of Kerrighed Virtual SMP Cluster using Diskless Remote Boot Linux

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Outline

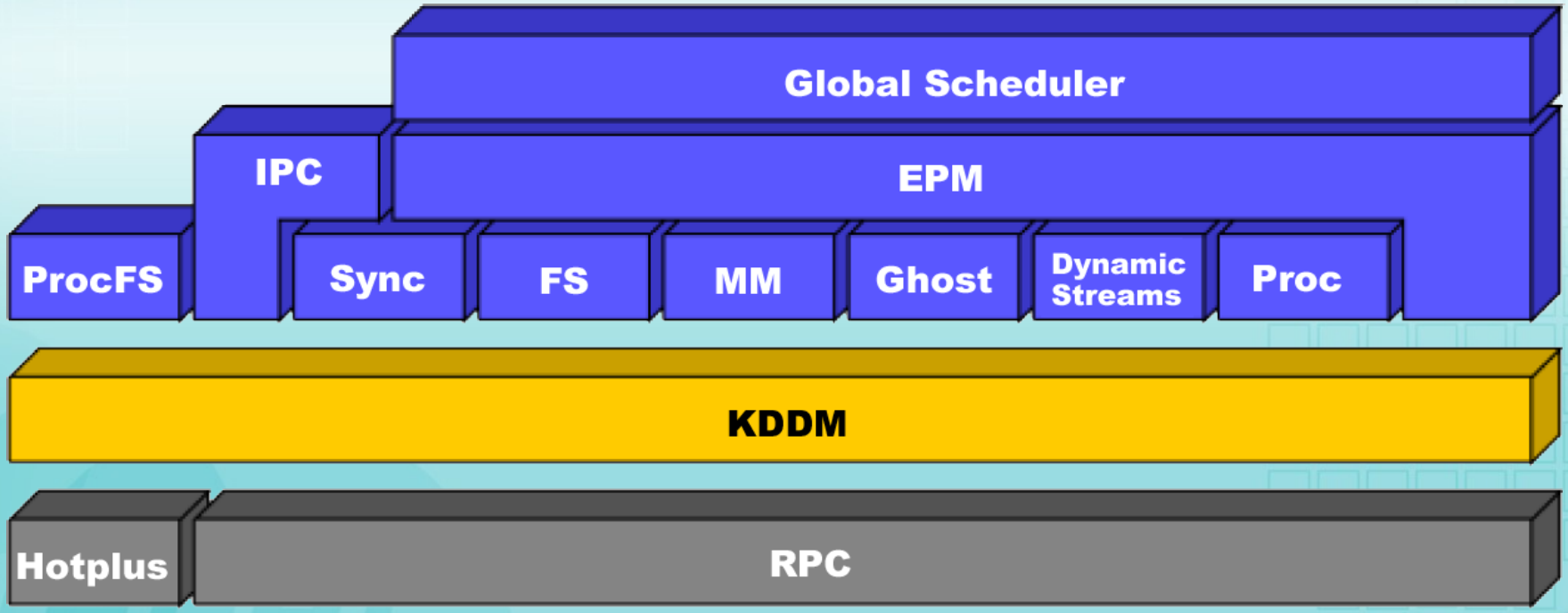
- Introduction
- IRISA/INRIA Kerrighed
- NCHC DRBL
- Testbed Architecture
- Demo Schedule
- Reference
- Question

Introduction

- Clusters are difficult Deployment
  - Single System Image
- Programming is complex in cluster
  - Cluster -> Virtual SMP
- Cluster management
  - Central management
  - Backup mechanism

IRISA/INRIA Kerrighed

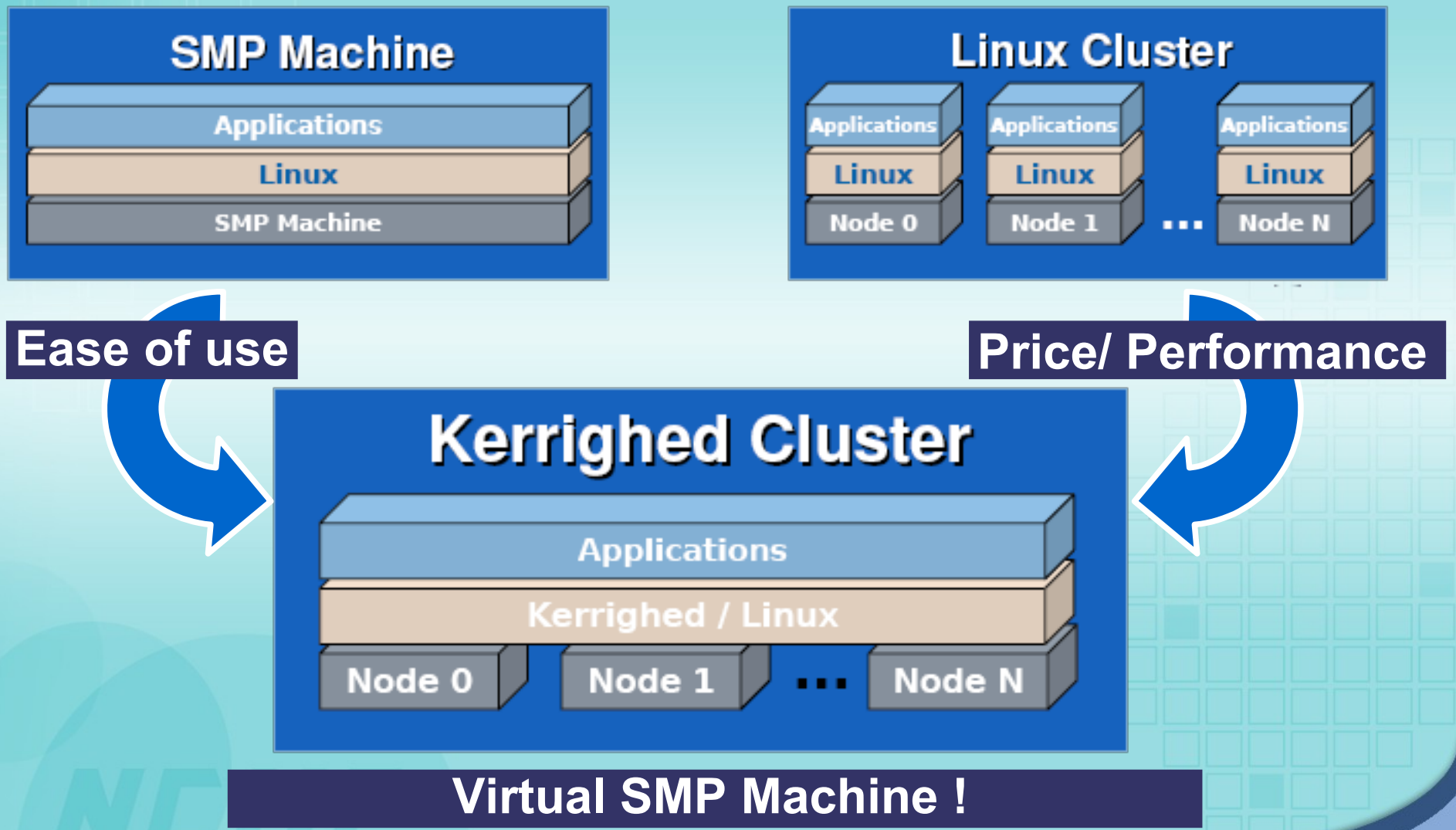
- A **SSI** operating system for clusters.
- Offers the view of a unique **SMP** machine on top of a cluster of standard PCs.



Kerrighed Architecture

[From Kerrighed web site]

IRISA/INRIA Kerrighed



[From KerLabs web site]

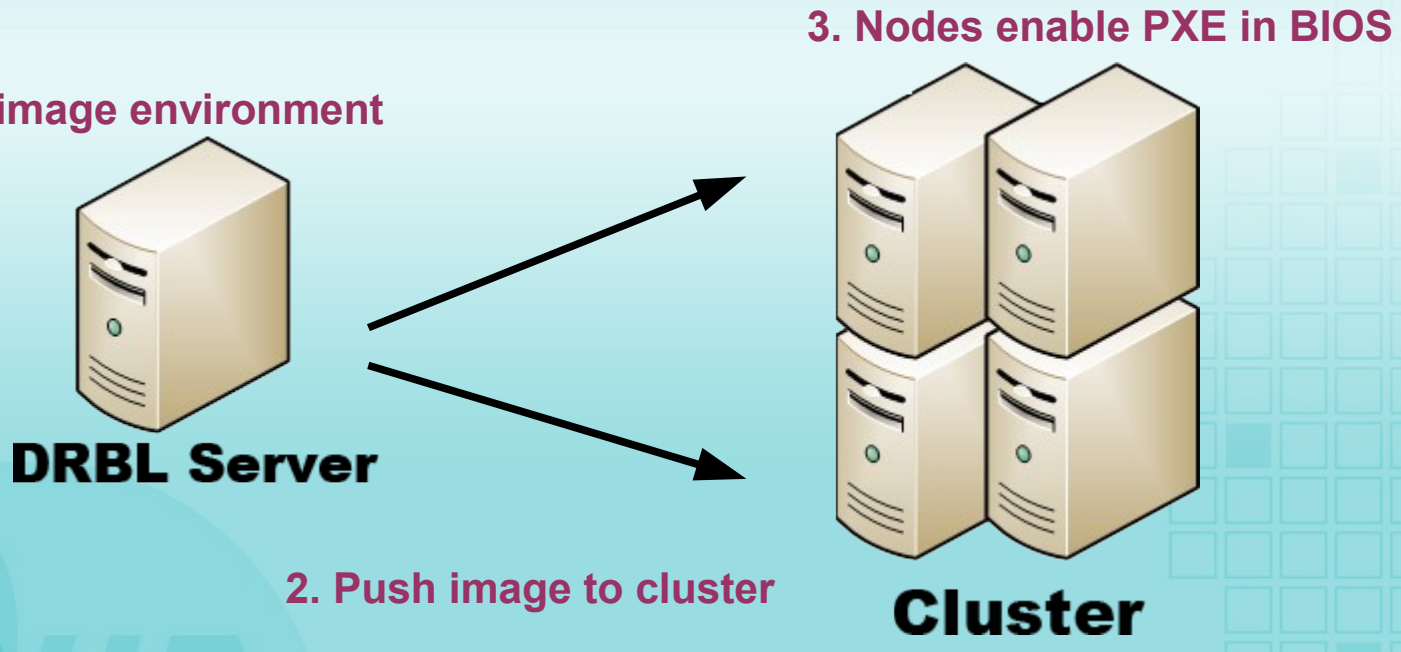
Programming for Kerrighed

- Sequential
  - Launch any application
- Message passing
  - Use MPICH, LAM_MPI...
- Shared memory
  - DSM -> Use OpenMP...

NCHC DRBL

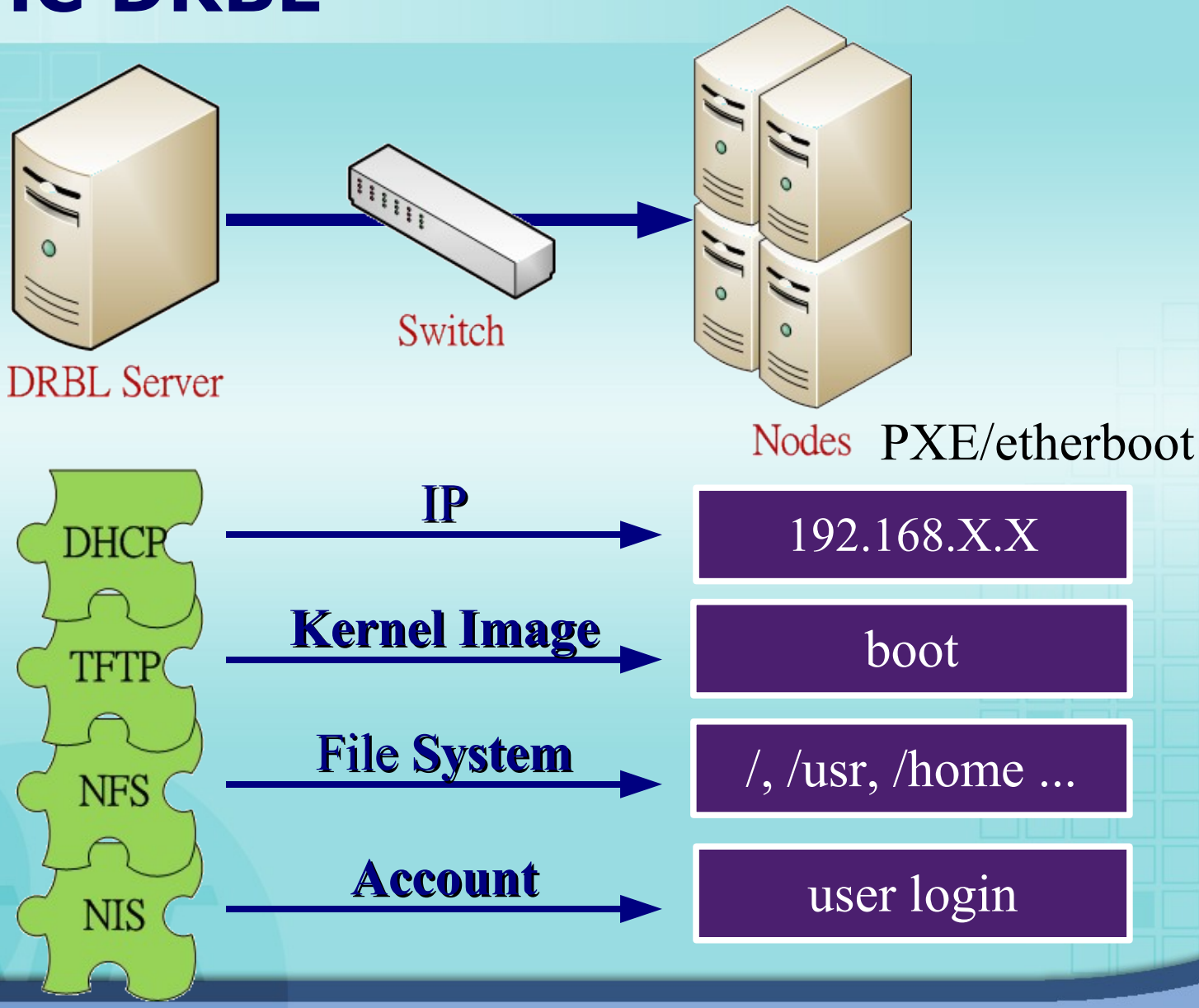
- **Diskless Remote Boot in Linux**

  provides a diskless or systemless environment for client machines.

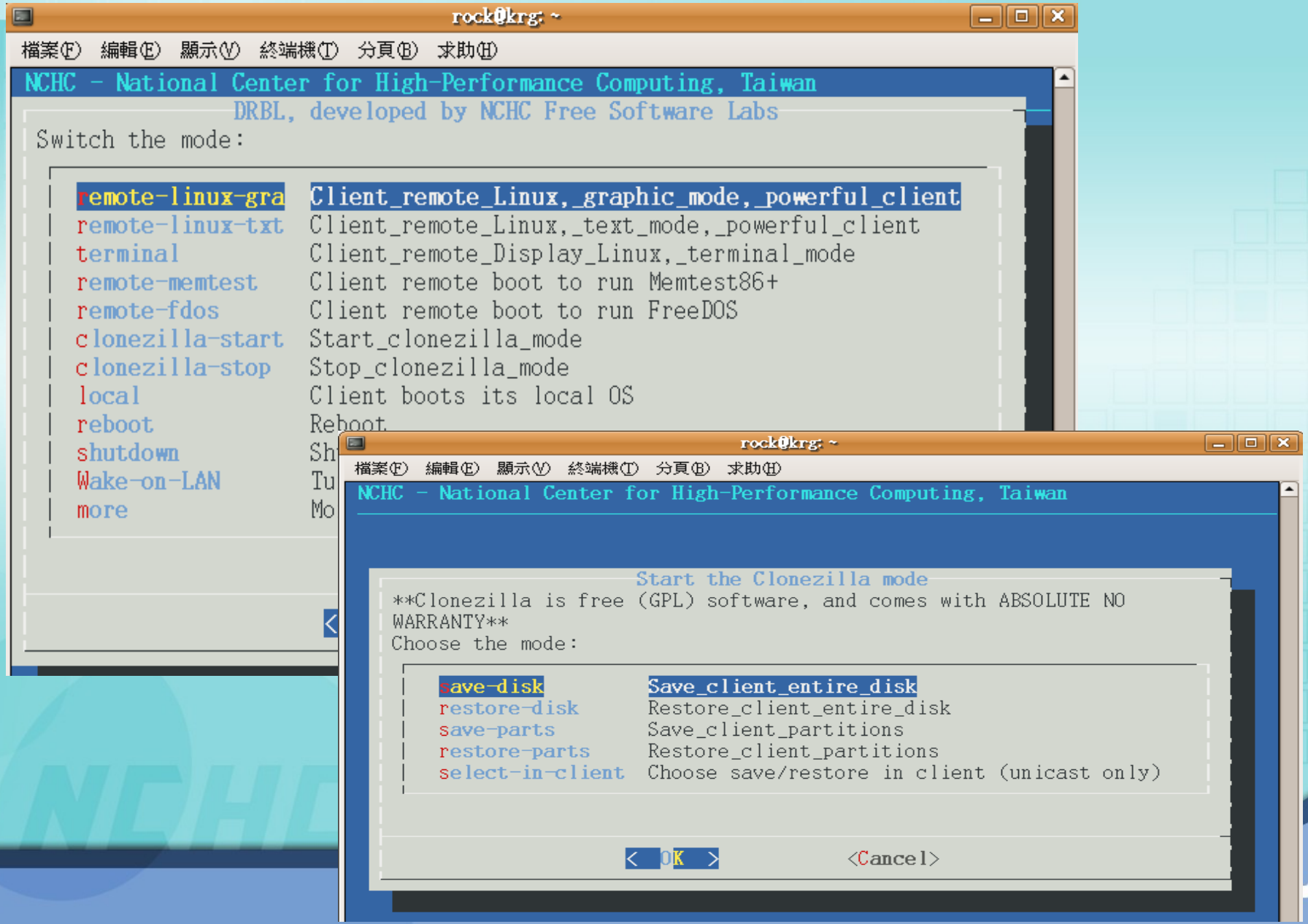


DRBL Operation Architecture

NCHC DRBL


DRBL Server
Switch
Nodes
PXE/etherboot
DHCP
TFTP
NFS
NIS
IP
Kernel Image
File System
Account
192.168.X.X
boot
/, /usr, /home ...
user login

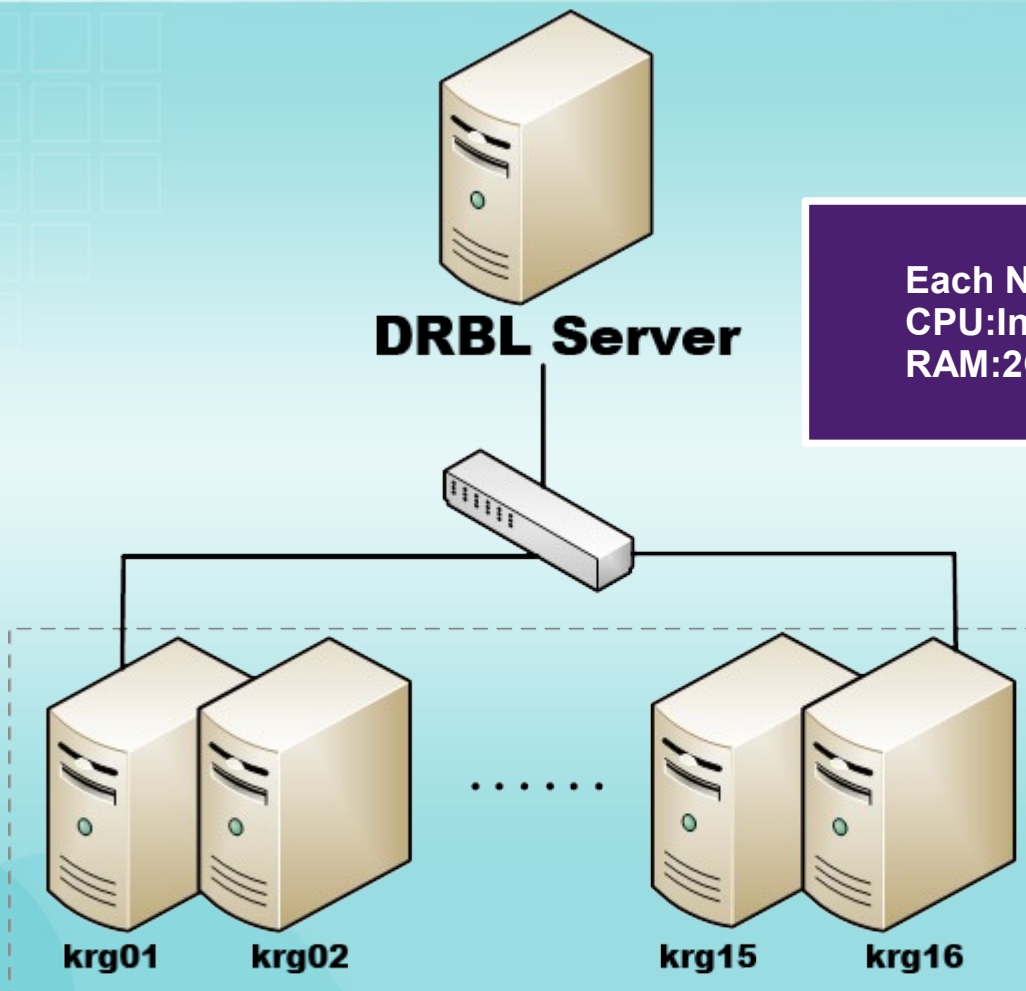
NCHC DRBL


rock@krg: ~
檔案(F) 編輯(E) 顯示(V) 終端機(T) 分頁(B) 求助(H)
NCHC - National Center for High-Performance Computing, Taiwan
DRBL, developed by NCHC Free Software Labs
Switch the mode:
remote-linux-gra Client_remote_Linux,_graphic_mode,_powerful_client
remote-linux-txt Client_remote_Linux,_text_mode,_powerful_client
terminal Client_remote_Display_Linux,_terminal_mode
remote-memtest Client remote boot to run Memtest86+
remote-fdos Client remote boot to run FreeDOS
clonezilla-start Start_clonezilla_mode
clonezilla-stop Stop_clonezilla_mode
local Client boots its local OS
reboot Reboot
shutdown Sh
Wake-on-LAN Tu
more Mo
rock@krg: ~
檔案(F) 編輯(E) 顯示(V) 終端機(T) 分頁(B) 求助(H)
NCHC - National Center for High-Performance Computing, Taiwan
Start the Clonezilla mode
Clonezilla is free (GPL) software, and comes with ABSOLUTE NO WARRANTY
Choose the mode:
save-disk Save_client_entire_disk
restore-disk Restore_client_entire_disk
save-parts Save_client_partitions
restore-parts Restore_client_partitions
select-in-client Choose save/restore in client (unicast only)
< OK >
<Cancel>

Why use DRBL & Kerrighed?

- **Fast** deploy Kerrighed nodes
  - Only two command
- DRBL offer **management command** & **backup mechanism**
  - Central Management interface
- Kerrighed offer **computing environment**
  - Kerrighed can support MPI and OpenMP programming

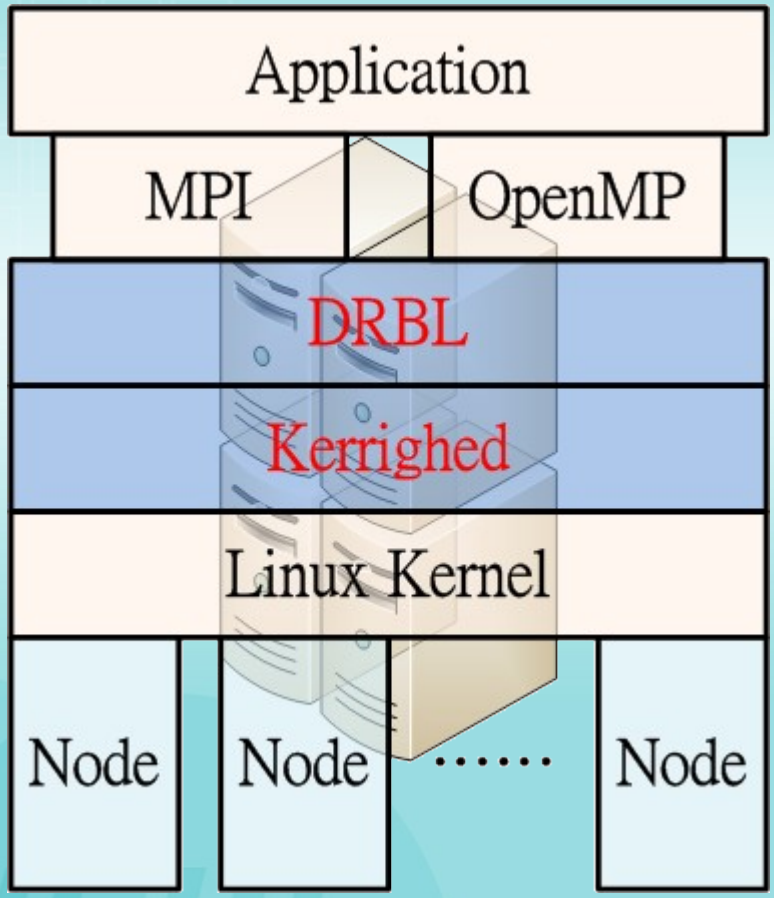
Testbed Architecture



Each Node
CPU:Intel(R) Core(TM)2 Quad 2.40 GHz
RAM:2GB DDR667 RAM

Total Node:16
Total CPU:64
Total RAM:32GB

Testbed Architecture



DRBL version 1.8.2-63

Kerrighed version 2.2.1

Kernel version 2.6.20

Demo Schedule

- Demo 1: Use DRBL to Deploy
  - drblsrv -i
  - drblpush -i
  - dcs
- Demo 2: Test Kerrighed
  - krgadm
  - top, ps
  - time make -j {num} kernel

Reference

- **IRISA/IRNIA Kerrighed website**

  http://www.kerrighed.org

- **NCHC DRBL website**

  http://drbl.sourceforge.net

- **KerLabs website**

  http://www.kerlabs.com

- **NCHC Grid Architecture Research Group**

  http://trac.nchc.org.tw/grid

Question