Cray X1
System Administration/Configuration

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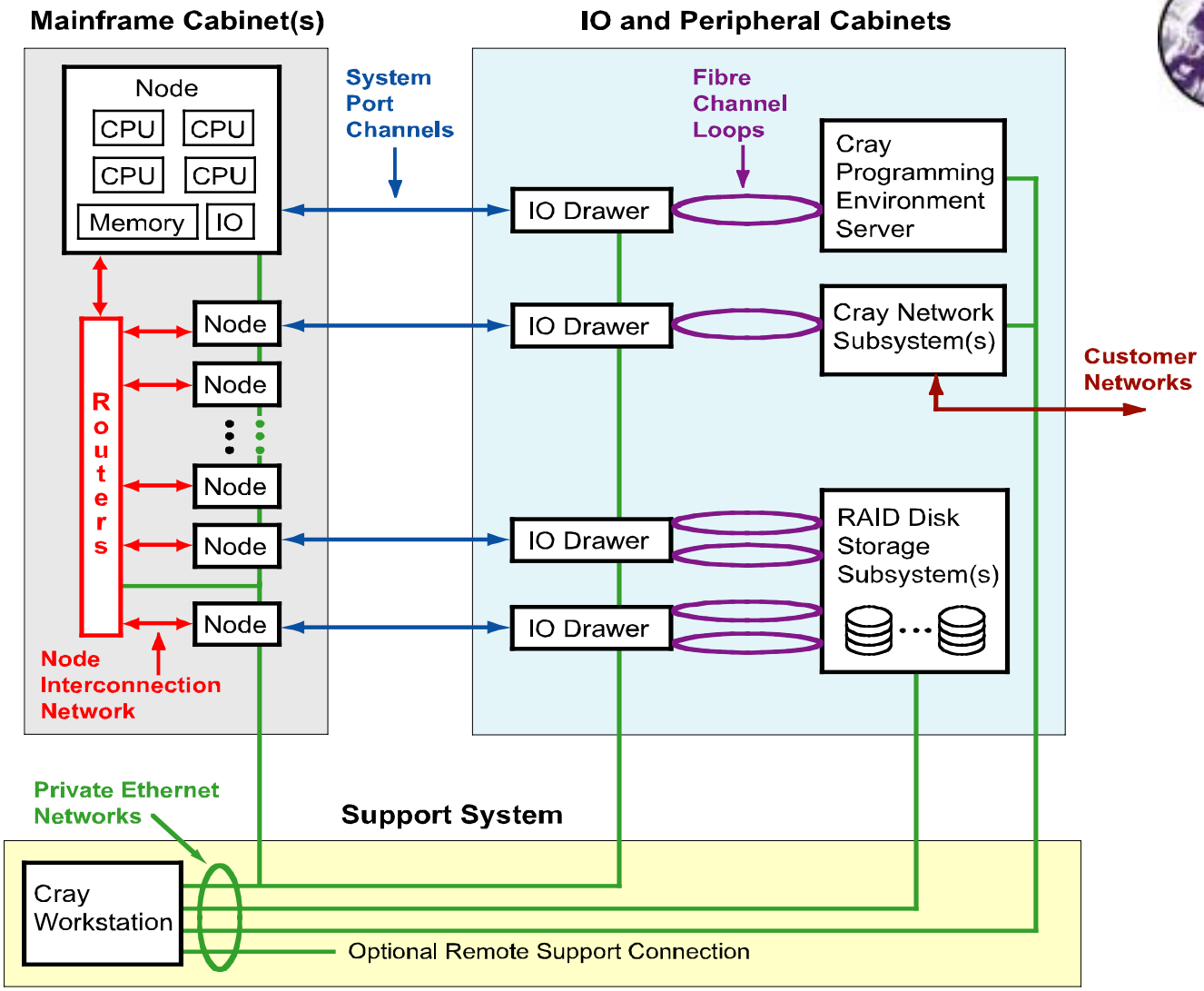
Cray X1 System Components

- Mainframe
- IOC
- CWS
- CPES
- CNS
- System Control Facility


Mainframe Cabinet(s)
IO and Peripheral Cabinets
Node
CPU
CPU
CPU
CPU
Memory
IO
System Port Channels
Fibre Channel Loops
Routers
Node
Node
Node
Node
Node
IO Drawer
IO Drawer
IO Drawer
IO Drawer
Cray Programming Environment Server
Cray Network Subsystem(s)
RAID Disk Storage Subsystem(s)
Customer Networks
Node Interconnection Network
Private Ethernet Networks
Support System
Cray Workstation
Optional Remote Support Connection



System Control Facility

- L0 controller
  - monitor component state
  - L1-resident
- L1 controller
  - initial system startup/scan
  - driver interface for communication w/system modules
  - hardware error logging
  - module-resident (node, router, IOD, BCU)




CWS/Operations

- hardware configuration
  x1config, csm utilities
- boot
  bootsys -> bootx1
- monitor
  /opt/log files, x1wacs
- dump
  dumpsys

x1config utility

- /opt/craycfg/cray.cfg
- system component (e.g. LC chassis)
- 2 brick pairs (V, W):
    - 8 node slots
    - 4 router slots
    - 2 BCU slots
- nodemodule
- iomodule




Partitioning

- subdivide X1 system into multiple logical machines
- IO must be available on each partition
- configure in cray.cfg file
- boot, dump each partition independently, use –cfgpart option on cmds


CPES Environment

- compiler/loader execute on CPES
- Cray X1 file systems NFS mounted on CPES under specific mount point (e.g. /x1)
- /x1/opt/ctl on CPES mounted on Cray X1 as /opt/ctl
- “cc” from cross-mounted dir. on Cray X1 triggers compiler execution on CPES



UNICOS/mp OS

- based on IRIX
- Enhancements for MSP support
- Node flavors: application, os, support
- Limited device driver support (fiber channel disk, network)
- Political scheduler for applications
- XFS/XLV

UNICOS/mp user limits

- limit_mkdb(8) command
- batch vs. interactive
- command vs. application
- maximum, initial
- core size, memory, cputime, pes, …
- format:

username:limscope:limtype limname=value

/etc/acct/limit.db example

:ia: cpu=7200

:ba: cpu=unlimited

*:ba:max core=unlim

*:ia:max core=unlim

*:ba:init core=0

*:ia:init core=0

peggy:ia:* pe=32

UNICOS/mp Disk Configuration

- iod connections described in cray.cfg file
- RAID config. managed on CWS, using csm utilities
- RAID LUNs → logical units, disk devices to OS
- discovery at X1 boot time
- use parts(8) to partition LUNs
- use xlv_make(8) to create logical volumes

IO chassis

```
chassis 0I {
  slot I0 { module ioca0; }
  slot I1 { module ioca1; }
}
```

node SPC

```
nodemodule vn0 {
  I0.S0.SPC = 0I0B0;
  I0.S1.SPC = 0I0B1;
  I1.S0.SPC = 0I0A0;
  I1.S1.SPC = 0I0A1;
}
```

iod config

```
iomodule ioca1 {
A.0.1.func0 = Disk 0;
A.0.1.func1 = Disk 20;
A.0.2.func0 = Disk 2;

A.1.1.func0 = Network_qfa 0;
A.1.2.func0 = Network_qfa 1;

B.0.1.func0 = Console;
B.1.1.func0 = Disk 11;
}
```



Disk device name syntax

dksWdXlYsZ

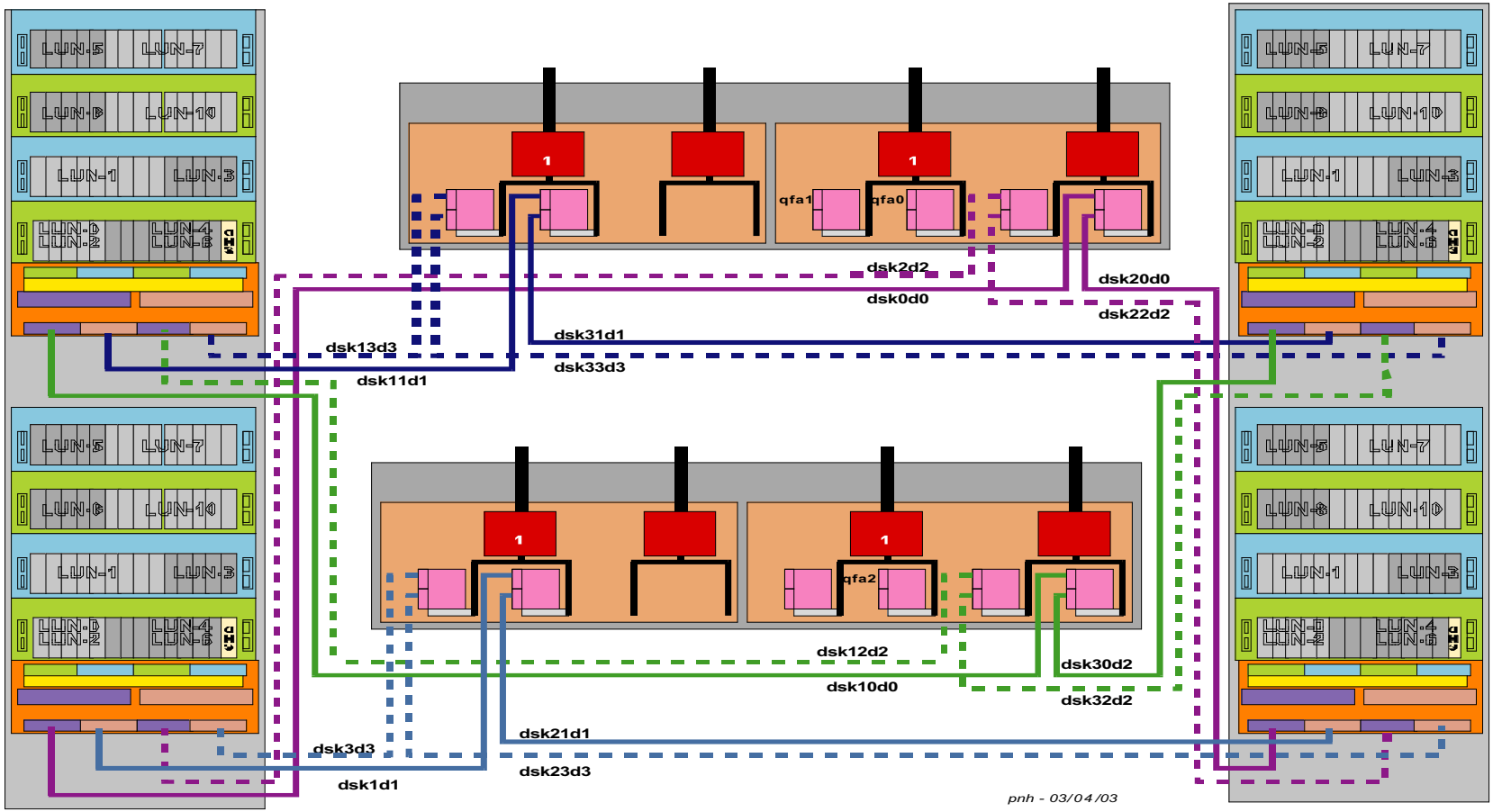
- dksW -> W is disk number assigned in cray.cfg file
- dX -> X is fibre channel loop-ID of host-port on a RAID controller (0-3)
- lY -> Y is logical unit (LUN) #
- sZ -> Z is slice #, as configured via parts(8)

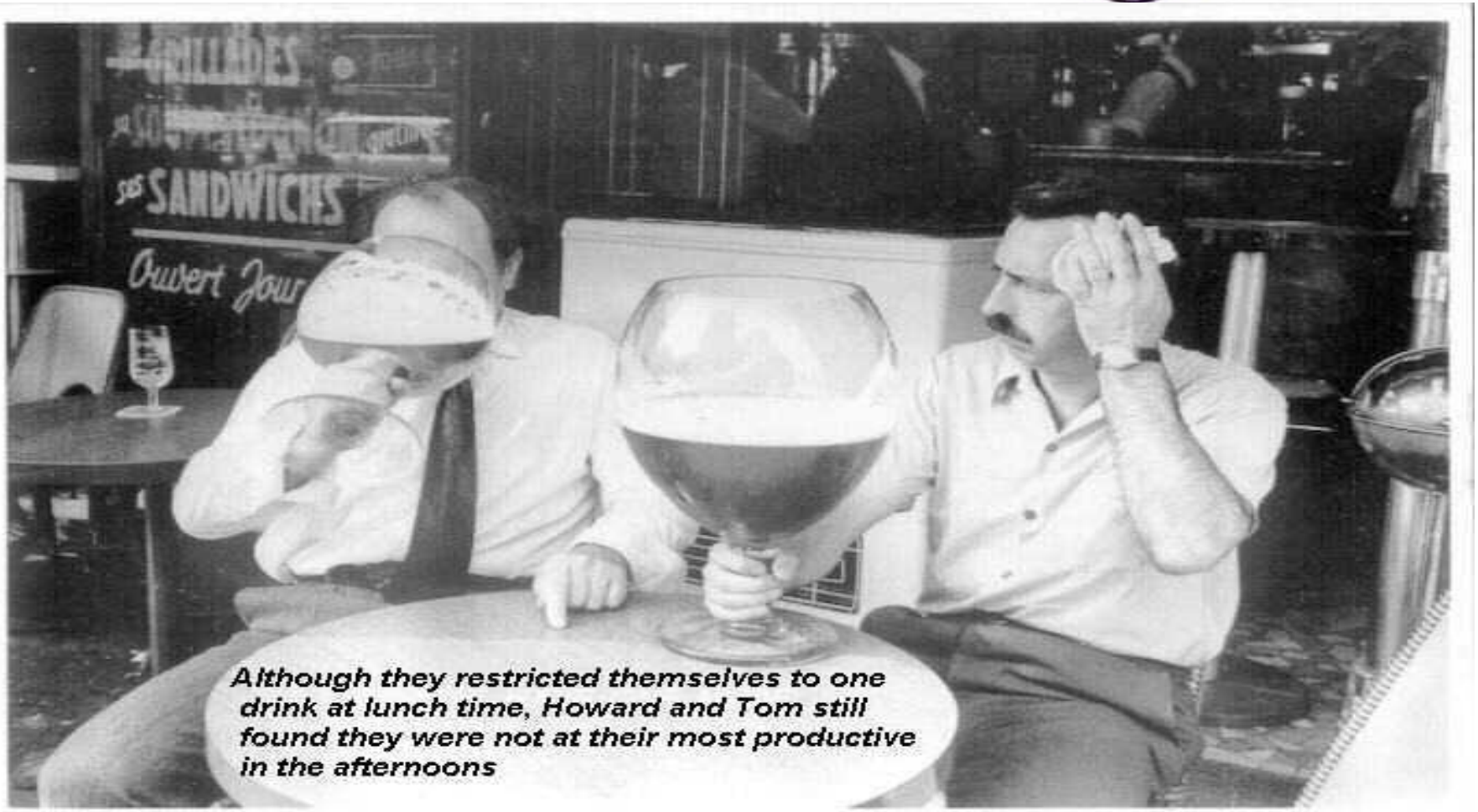
```
# parts dks20d0l4

dks20d0l4 {

    capacity = 80.000 GBytes  ctqdepth = 8

    part  type     blocks                          mbytes              %
    ----  -------  ------------------------------  ------------------  ----
      8   volhdr           0 +       4096              0 +       2
      0   xfs           4096 +   39061504              2 +   19073    25%
      1   swap      39065600 +   23437312          19075 +   11444    15%
      2   xfs       62502912 +   46874624          30519 +   22888    30%
      3   xfs      109377536 +   46872464          53407 +   22887    29%
     10   vol              0 +  156250000              0 +   76294   100%
}
```


LUN-5
LUN-7
LUN-8
LUN-10
LUN-1
LUN-3
LUN-2
LUN-4
LUN-6
CM
1
qfa1
qfa0
qfa2
dsk2d2
dsk0d0
dsk20d0
dsk22d2
dsk13d3
dsk11d1
dsk31d1
dsk33d3
dsk12d2
dsk10d0
dsk30d2
dsk32d2
dsk3d3
dsk1d1
dsk21d1
dsk23d3
pnh - 03/04/03


SANDWICHES
Ouvert Jour
Although they restricted themselves to one drink at lunch time, Howard and Tom still found they were not at their most productive in the afternoons