Institut de RadioAstronomie Millimétrique

New System Configuration at Bure

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1   Introduction

On Plateau de Bure, the computing facilities has been upgraded for 2 reasons, first to be ready to accept the 6th antenna and the expected extra amount of data to acquire and to process, but also to improve the overall system reliability.

The offline HP J200 workstation and the X terminals have been replaced by 5 new Linux PC workstations. bure2, the new Linux workstation for data reduction is located on the operator desk, on the left. In front of him, the operator still has the console of the real time HP-UX workstation J200 bure1. On his left, another PC:bure2-spare is the spare of bure2. In fact these 2 PCS are exactly identical but their configuration change at boot time according to the presence of the other. Bure2 and bure2-spare acts as a master/slave system. When bure2 and bure2-spare are down but both available, it is better to boot first bure2, which have a 21" screen (bure2-spare have a 17" screen).

The boot sequence is identical on both machines. When a machine boots, it first uses the bure3 IP address (195.83.131.5) and checks for the presence of the master address (bure2: 195.83.131.4) on the network by pinging. If no master address is found on the network but the router (195.83.131.2) is found, it terminates the boot sequence by setting its final IP address to the master address: bure2 (195.83.131.4).

If the master address has been found at boot time, it waits until the master is down and makes an incremental copy of all bure2 disks each hour. The check of bure2 is made each 10 seconds and bure2 (the master) must be down at least 60 seconds to be considered missing.

Because checks are made each 10 seconds, it is very important to never disconnect the 2 machines from the network.

On the right of bure2, the X terminal has been replaced by a Linux PC workstation bure5.

bure4 another Linux PC workstation is located on the astronomer desk and replaces an old X terminal. In front of this desk there is a MS Windows PC: tcppc14. This PC may be used by administrator to configure and checks the Raid Array controller of bure1 (the real-time machine).

In parallel the network has been improved by installing twisted pair Ethernet connections between a new ATI switch located in the computer room and the different PCs in the control room. bure1 (HP J200) and the PC workstations are connected to this switch at 100 Mbits/s (100 base T). For this connection a new twisted pair Ethernet controller has been added on bure1 on its internal PCI bus. With the first 100BT interface already installed 6 month ago for the connections with the correlator at 100 Mbits/s, there are now 2 interfaces 100BT for the 2 sub-networks seen from bure1. The old interface 10B2 Ethernet thin cable is no more configured. The previous bure2 HP J200 becomes a spare workstation for the real time acquisition workstation. This machine is called bure1 spare. It has the same hardware and software configuration. By consequence 2 Ethernet 100BT interfaces have been added on its internal PCI bus and as bure1 and bure1 spare share the same IP addresses they SHOULD NEVER run at the same time.

The router is connected to the switch through a transceiver and a media converter. The router Ethernet interface is in AUI. The transceiver translates the router AUI interface into coax thin Ethernet 10B2. On this thin Ethernet cable, the micro CLOCK, time distributor running on OS9, is connected. The media converter 10B2 to 10BT connects the thin Ethernet cable to the switch.

The Hirschmann box, which distributes the Ethernet signal to the antenna tracks and the living quarter through optical interfaces but also to the electronic lab and the assembly hall in thin Ethernet, is connected in twisted pair to the switch with the adjunction of a new Hirschmann 10BT interface.

For bure1, all control applications and user files have been moved to a dual controller raid array. This raid 5 system with its redundant controller and its dedicated UPS is a solution for high data availability. Errors and alarms will be monitored and reported to operators and computer group staff. It is configured by using a specific application running on tcppc14 which must be connected to the Raid by the means of 2 RS232 cables which link the 2 controllers to respectively the COM1 and COM2 ports of the PC.

2   Configuration

2.1   bure2 and bure2 spare

An AMD Athlon at 900MHz powers the 2 PCs.
On each PC there are 2 disks of 60 and 45GB, a DVD writer and 512MB of memory and a DAT drive
(12/24 Go) which are connected to a SCSI controller.
The first disk (IDE Primary Master of 60 GB) is dedicated to Linux system, applications, data and account
disk space.
The second disk (IDE Primary Slave of 45 GB) is dedicated to scratch.
The DVD writer is on the IDE Secondary controller in master.

Partitions on the disk Linux:
```
/dev/hda1          4 GB  /
/dev/hda2         10 GB  /users/PdB
/dev/hda3          6 GB  /project
/dev/hda5          4 GB  /users
/dev/hda7         31 GB  /copy
/dev/hdb1         44 GB  /scratch
```

The system is in /, the accounts of the PdB staff are in /users/PdB, the other users are in /users, data copied
from bure1 are in /copy, scripts and calibration data are stored in /project. /scratch is purged periodically.

Via NFS the following file systems are mounted
bure1:/data to /data
bure1:/users to /users1

Because bure2 and bure2-spare have not the same screen (respectively 21"and 17"), the resolution is set to
1024x768 when the login screen appears. Normally when you are using bure2 with a 21"screen, you must
switch to an higher resolution: 1280x1024 using the <CTL> <ALT> <+> sequence of key (<+> is the
keypad key) before login.

Before switching from bure2 to bure2-spare, you MUST first shutdown bure2 (not simply disconnect bure2
from the network). To be sure that the 2 machines are identical, wait (on the bure2-spare log screen) for the
end of the backup (syncing) starting every hour. Take care of the fact that if you can't wait for the syncing
time, bure2-spare will be in the state of bure2 one hour earlier.

2.2   bure4

An AMD Duron at 800MHz powers this PC.
There is 1 disk of 30GB, a CD drive and 256MB of memory.
```
/dev/hda1         2GB    /
/dev/hda6         10GB  /calib
/dev/hda7         15GB  /scratch
```

Via NFS the following file systems are mounted
```
bure2:/copy          to /copy
bure2:/users         to /users
bure2:/users/PdB    to /users/PdB
bure2:/usr/local      to /usr/local
```

2.3   bure5

An AMD Duron at 800MHz powers this PC.
There is 1 disk of 30GB, a CD drive and 256MB of memory.

```
/dev/hda1          2GB   /
/dev/hda6          25GB  /scratch
```

Via NFS the following file systems are mounted
```
bure2:/copy         to /copy
bure2:/users        to /users
bure2:/users/PdB    to /users/PdB
bure2:/usr/local    to /usr/local
```

2.4   Accounts

All the user accounts have been created with the password bure<account>. For instance: bureoper for oper.
As there is a file /etc/passwd per Linux workstation, the passwords should be changed on bure2, bure4 and bure5 (on bure3 the password file is copied during the backup operation).

2.5   Gnome desktop customization

It is a suggested customization.

Remove the icons www.redhat.com, RedHat Network and Dialup Configuration from the desk (If they are still present):
RClick(one_of_those_icons>Delete)
 Confirm with Yes in the window [Delete]

Click(Floppy 0) and drag the icon just under the Trash icon

Remove the lock icon in the panel (at the screen left bottom, if it exists):
RClick(lock_icon>Remove from panel)

2.5.1   Creation of the Remote Hosts icon

Click(gnomeFoot_icon>Panel>Add to panel>Menu>Favorites menu)

RClick(new favorite menu>Properties...)
 In the window [Menu properties/icon]
  Click(Use custom icon for panel button)
  Clik(no icon)
   In [/usr/share/pixmaps]
    Click(Browse...)
     In [Browse]
      Selection:/usr/share/pixmaps/logo.png
     Click(OK)
    Click(OK)
  Click(OK)

In a terminal window at a shell prompt:
$ cp /root/.gnome/apps/* ~/.gnome/apps
$ cp /root/.gnome/apps/.* ~/.gnome/apps
They copy the files *.desktop, .order and .directory into ~/.gnomes/apps.

2.5.2   Terminal window setup

In a terminal window (opened by clicking on the terminal icon in the panel at the screen bottom)
Click(Settings>Preferences...)
 In [gnome-terminal/Colors]
  Background Colour: Custom colors
  Foreground color: value=0.00
  Background color: value=1.00
 Click(OK)

However for the window bure1 another files has to created in your home: .Xresouces
It should contain:
*background: #ffffff

2.5.3   Session setup

Click(toolBox) (icon looking like a tool box in the panel)
In [Control Center]
 Click(Startup Programs)
  Set Option Automatically save change to session
Close the window

2.5.4   Edit .rhosts

for instance :
bure1 oper
bure2 observer
bure3 observer
bure4 oper
bure5 oper

2.5.5   Mails

The mails addressed to the operators and in general to all staff working to Plateau de Bure are forwarded to
bure2.iram.fr when the mail destination is someone@iram.fr.
On the Linux PC we suggest to use netscape mail to read your mails with the following configuration:
In a Netscape window:
Click(Edit>Preferences…)
In the window [Netscape:Preference/Mail&Newgroups/Mail Servers]
     Edit the Incoming Mail Servers
          Server name: 195.83.13.4
          Server Type: POP
          User name: <your Linux account on bure2>
          Set Remenber password
               Check for mail every 10 minutes
               Automatically download any new messages
     Outgoing Mail Server
          Outgoing mail (SMTP) server: 195.83.131.4
          Outgoing mail server user name: <your Linux account on bure2>

     Click(OK)

For the other PC under Windows use the same information for the incoming and outgoing mail servers

3   Savedata

Savedata has been modified:
Data are saved both on DVDs and on the filer datasrv2 (See PdB Archiving process documentation for more details).

4   bure2 backup

Since bure2 and bure2-spare acts has a master/slave system, the backup of bure2 is automatically performed and initiated every hour by the slave machine bure2-spare.

5   bure1 to bure1-spare

bure1 and bure1-spare are 2 HP workstations with the same Ethernet configuration. They have one internal disk and one external disk each. They should have also one DAT drive each for the maintenance and there is a CD drive only on bure1 needed sometimes to install/upgrade the system.
All data and applications are located in a high reliable RAID array subsystem. This array is composed of 6 disks in RAID 5 plus a spare disk. Its reliability is increased by a second (redundant) controller unit and a dedicated UPS.
Because a problem on bure1occured or just for a training test, the real time operations which include the antenna, receiver and correlator control, monitoring and data acquisition, can be switched from bure1 to bure1 spare.

First, bure1 should be turned off. The 2 workstations bure1 and bure1 spare SHOULD NEVER be on at the same time, since they have the same Ethernet addresses.
- Shut down bure1 by using SAM from an **oper** account.
  Switch bure1 power off, switch the Raid array off and then switch the external disk bure1 FWscsi5 off. So when bure1 and bure1-spare are off do the following:
- Remove the SCSI terminator from the external disk bure1-spare FWscsi5.
- Disconnect the SCSI cable (bure1 FWscsi5 - RAID array) from the external disk bure1 FWscsi5 and screw the SCSI terminator on the free SCCI connector of the bure1 FWscsi5 external disk (just to avoid to loose it).
- Connect the SCSI cable free end to the free SCCI connector of the bure1-spare FWscsi5 external disk. Now the Raid array is connected to bure1-spare.

In order to continue to use the same console, keyboard and mouse, the keyboard-mouse cables keyboard1 and keyboard2 and the video cables console1 and console2 need to be swapped at the back of bure1 and bure1-spare. For the keyboard cables, a small box attached with a scratch strip needs to be disconnected from a short link ended by a RJ11 connector and pulled off before swapping.

Now bure1-spare is ready to be turned on:

- Switch the Raid array on and wait until the 2 controller LEDs behind the door at the left top blink green with a period roughly of 2s.
- Switch the external disk bure1-spare FWscsi5 on.
- Power bure1-spare on.

DO NOT switch the other workstation on.

6   Command Console V2.0 for RAID Array

In case of a disk crash in the RAID array, the RAID array subsystem will automatically replace the faulty disk by the spare disk. The operators and the computer staff at Grenoble will be noticed of this failure. The faulty disk indicated by a red light will have to be replaced by another spare disk and some configuration will need to be performed from bure2 spare booted under Windows2000.
For the time being this operation is performed under administrator and you will need to ask its password to Grenoble computer staff.

First you need to make 2 serial connections between the Raid array and tcppc14: There are cables named com1 and com2 well winded next to the RAID array and go to the terminal room under tcppc14, to the ports com1 and com2 of the bure2 spare PC.

Under administrator account use the monitoring and configuration application:

Click(Start>Programs>Command Console V2.0>HSZ22 Storage Window
 In the window [HSZ22 Management]
  Select Serial
  Click(OK)
 In the window [HSZ22 Management Serial Connection]
  Select COM1
  Click(Connect)
 In the widow [Connection Status]
  The connection status is displayed and when it is OK continue with COM2.
 In the window [HSZ22 Management Serial Connection]
  Select COM2
  Click(Connect)
 In the widow [Connection Status]
  The connection status is displayed.

The window [Storage Window for COM1 and COM2] shows the RAID array status.
Double click on any element to see its properties.
The current disk configuration is
Channel 0 target ID 8/9/10/11
Channel 1 target ID   9/10
Spare disk: channel 1 ID 8

When a new spare disk is inserted in the cabinet, it should be configured:
Right Click(new spare disk) and then Click(Make Spare)

7   Network layout

Bure network

6 x ATI Media Converters
AT-MC 103XL

100BT
Full-Duplex

100BT		SC <---> E2000	To Optical
	100BFX	100BFX	Patch Panel

100BT
Full-Duplex

100BT		SC <---> E2000	To Optical
	100BFX	100BFX	Patch Panel

100BT
Full-Duplex

100BT		SC <---> E2000	To Optical
	100BFX	100BFX	Patch Panel

Full-Duplex 1   8
10/100 Switch
ATI
FH708L

100BT
Full-Duplex

100BT		SC <---> E2000	To Optical
	100BFX	100BFX	Patch Panel

100BT To Switch FS-524

100BT
Full-Duplex

100BT		SC <---> E2000	To Optical
	100BFX	100BFX	Patch Panel

100BT
Full-Duplex

100BT		SC <---> E2000	To Optical
	100BFX	100BFX	Patch Panel

Computer Room

100BT Full-Duplex

ATI Media Converter
AT-MC 103XL

To Optical
Patch Panel

SC <---> E2000

100BFX

100BFX
100BT

Full-Duplex 1   5
10/100 Switch
ATI
FH705L

10BT
Half-Duplex

ATI Media Converter
AT-MC 15

10BT	10B2	To uPs
10B2		

"Antenna" Network

Bure network

10BT

10B2

Old Coaxial Network

1   **8**

**SWITCH
10/100**

**ATI
FS716**

**Batiment
Vie**

9   **16**

**ATI Media Converter
AT-FS 200**

100FX

100TX

100 FX

To Computer Room

"Batiment Vie" network

Bure network