This document is a basic guide to using the conserver console server program within the school. It covers the use of the sshconsole and console commands, issues relating to the hardware and the specifics of the local configuration.

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Overview

The School maintains a number of console servers in order to remotely administer some of our servers. Each server is configured to provide a console session on its first serial port (com1 on PC’s, ttya on workstations), which is in turn linked via a series of RJ45 and DB9/25 serial connections to a serial port on the PC acting as the console server. A daemon, conserver, runs on each console server allowing network access. (ssh)console allows administrators to connect to the appropriate console server and access any console.

console

console [-aAfFs] [-r] [-e esc] [-M server] [host]

console is a client command which establishes a session with the appropriate conserver daemon running on a PC with a serial connection to the console specified on the command line. When invoked console connects to the master conserver server to establish which server is physically attached to the console you wish to connect to. If the console is not on one of the master server’s serial ports console drops the connection and connects to the server which is attached.

Originally console did not support encryption, however from Version 7.2.4 some support for ssl encryption has been introduced, Until this been tested you should use sshconsole which uses a perl script to provide ssh encryption and takes the same arguments as console.

Using sshconsole interactively

sshconsole [-aAfFs] [-r] [-e escape sequence] [-M server] [host]

sshconsole is a wrapper script using ssh. console as currently installed does not support encrypted connections and it is not possible to tunnel the connections through ssh, kerberos or ssl. sshconsole establishes a transparent ssh connection to the console server and runs console locally on the loopback address, any command line arguments are passed though to console so any valid console arguments can be used though the use of

sshconsole [-M hostname]

is discouraged.

For a list of all the command line options and details on their usage see the man page for console
A guide to using (ssh)console and conserver.

Basic usage

To connect to the serial console on a host run sshconsole with the hostname as an argument, the script should connect to the appropriate host and ask for your password (it uses the username of whoever has run the script). i.e.

[mince]iainr: sshconsole beatty
Scanning servers for console, please wait.
Connecting to smoo.inf.ed.ac.uk to perform scan.
Checking server connectivity:
claise.inf.ed.ac.uk is reachable.
smoo.inf.ed.ac.uk is reachable.
cam.inf.ed.ac.uk is reachable.
bradhan.inf.ed.ac.uk is reachable.
dog.inf.ed.ac.uk is reachable.
acasta.inf.ed.ac.uk is reachable.
Connecting to beatty on smoo.inf.ed.ac.uk.
Enter iainr@localhost’s password: (1)
[Enter `^[` for help] (2)
(replay) (3)
Jun 6 07:03:07 beatty fstab: failed: no cleanlog_freq resource
[MARK - Fri Jun 6 08:00:00 2003 .. Sat Jun 7 07:00:00 2003 - MARK - ]
Jun 7 07:03:05 beatty localhome: failed: no cleanlog_freq resource
Jun 7 07:03:05 beatty symlink: failed: no cleanlog_freq resource

(1) This is the password, the encrypted form of which is held in your entry in the conserver.passwd taglist.
(2) This prompt may vary on how the escape sequence is defined, you can override the built in default of `^[` using the -e argument.
(3) By default sshconsole will connect using the -A option which will replay the previous 20 lines, if you override with the -a option then you may have to hit <cr> a couple of times to get the console.

If your kerberos TGT has expired you may find that you are prompted for a password at each ssh connection, this should be your normal DICe password.

Once attached the terminal should behave as if you were using a dumb terminal physically attached to the serial console. Depending on which program you are using there may be problems with control key combinations if you hit any then let me know (<iainr@inf.ed.ac.ac.uk>) and I’ll take a look.

If you want to use any of the conserver features then you need to drop out of the session using the escape sequence followed by the one character command. For a list of commands hit the escape sequence followed by ?. i.e.

[magrathea]iainr: sshconsole heather
Enter iainr’s password:
[Enter `^[` for help]

heather console login: [help] (1)
 . disconnect a attach read/write
c toggle flow control d down a console
e change escape sequence f force attach read/write
g group info L toggle logging on/off
11 send break (halt host!) o (re)open the tty and log file
p replay the last 60 lines r replay the last 20 lines
A guide to using (ssh)console and conserver.

A
s  spy read only
v  show version info
x  show console baud info
<cr> ignore/abort command
^R  short replay

u  show host status
w  who is on this console
z  suspend the connection
?
\ooo  send character by octal code

(1) This will display a [] prompt when you type the control sequence and fill in the rest when you hit the one character command.

Disconnecting

hitting ^[]^], will cause the session to terminate.

[magrathea]iainr: sshconsole heather
Enter iainr's password:
(Enter `^][^]' for help]

heather console login: [disconnect]
Connection to console closed.

Non-interactive commands

sshconsole [-v] [-hdDuVwx] [-b message]

We can use sshconsole without actually logging in to do a number of things, seeing who is attached to which consoles, console status, broadcasting messages and information about the daemons

"who" and console status

The -u, -w and -x commands provide information about the status of the consoles, who is attached and what consoles are active respectively.

examples

[claise]iainr: sshconsole -u
Scanning servers for console, please wait.
Servers are:
claise.inf.ed.ac.uk
smoo.inf.ed.ac.uk
cam.inf.ed.ac.uk
bradhan.inf.ed.ac.uk
dog.inf.ed.ac.uk
acasta.inf.ed.ac.uk

Hosts connected to claise.inf.ed.ac.uk.

spuir  up  <none>
trieste  up  <none>
thassos  up  <none>
dye  up  <none>
lion  up  <none>
siligga  up  <none>
mor  up  <none>
sunniva  up  <none>
A guide to using (ssh)console and conserver.

... sowans up <none> Connection to claise.inf.ed.ac.uk closed.
Hosts connected to smoo.inf.ed.ac.uk.
harris up <none>
tomato up <none>...
gutenberg up <none> Connection to smoo.inf.ed.ac.uk closed.
... Connection to dog.inf.ed.ac.uk closed.
acasta.inf.ed.ac.uk NOT responding (1)

(1) If a console server is uncontactable (not responding to pings) then it will be listed at the end.

[claise]iainr: sshconsole -w
Scanning servers for console, please wait.
Servers are:
claise.inf.ed.ac.uk
smoo.inf.ed.ac.uk
cam.inf.ed.ac.uk
bradhan.inf.ed.ac.uk
dog.inf.ed.ac.uk
acasta.inf.ed.ac.uk
Hosts connected to claise.inf.ed.ac.uk.
iainr@localhost attach 0:00 smoo
Connection to claise.inf.ed.ac.uk closed.
Hosts connected to smoo.inf.ed.ac.uk.
Connection to smoo.inf.ed.ac.uk closed.
Hosts connected to cam.inf.ed.ac.uk.
Connection to cam.inf.ed.ac.uk closed.
Hosts connected to bradhan.inf.ed.ac.uk.
Connection to bradhan.inf.ed.ac.uk closed.
Hosts connected to dog.inf.ed.ac.uk.
Connection to dog.inf.ed.ac.uk closed.
Hosts connected to acasta.inf.ed.ac.uk.
Connection to acasta.inf.ed.ac.uk closed.

sshconsole will show the servers it is polling for information, if it fails to connect you will get an error message. NB the “up” reported by -u refers to the port connection within conserver, not to whether there is anything active on the port. In the example above there is nothing connected to /dev/cub31.

Broadcasting messages

we can send short messages using the -b option, these should be quoted. The message will be broadcast on all consoles on all servers (that sshconsole can find in lcfg), there is currently no way of sending messages to a specific console or user. sshconsole will pool servers in turn attempting to send the message, you will get error messages if it cannot connect but won’t stop until it has tried all servers.

[marmion]iainr: ./sshconsole -b "this is a test"
servers are:claise
Connection to claise closed.
[marmion]iainr:

Anyone attached will see
A guide to using (ssh)console and conserver.

Red Hat Linux release 6.2 (Zoot)
Kernel 2.2.16_public-3.dcs.9 on an i686

minibw1.dcs.ed.ac.uk login: [- Console server shutting down -]
Connection to console closed.
[magrathea]iainr: sshconsole heather
Enter iainr’s password:
[Enter ‘^Ec?’ for help]

heather console login: [Broadcast: this is a test]

Spying and bumping other users

sshconsole [-s] [-S] [-f] [-F]

[^][^][^][^][F] [^][^][s][^][^][S]

Conserver allows multiple users to be connected to a console but only one can be
using the console at any one time (is attached). Usually this will be the first person to
connect, and any subsequent connection will be read only (spy mode). If this is the
case then running sshconsole -w will show who is attached and who is running in
spy mode,

Scanning servers for console, please wait.
Servers are:
claise.inf.ed.ac.uk
smoo.inf.ed.ac.uk
cam.inf.ed.ac.uk
bradhan.inf.ed.ac.uk
dog.inf.ed.ac.uk
acasta.inf.ed.ac.uk
Hosts connected to claise.inf.ed.ac.uk.
Connection to claise.inf.ed.ac.uk closed.
Hosts connected to smoo.inf.ed.ac.uk.
iainr@localhost attach 18:04 beatty
doing ^[^][w will show similar information if you are using sshconsole.

If you connect to a console and someone else is already connected you will drop into
spy (read-only) mode like this.

Enter foo’s password:
[Enter ‘^][?] for help]
[no, iainr@ is attached] (1)
iainr
Password:
CTRL/C To stop x11
^C[heather]iainr: [who heather]
foo@ * spy 0:00 Sun Mar 11 18:14:53 2001 (2)
iainr@ attach 0:04 Sun Mar 11 18:14:34 2001
A guide to using (ssh)console and conserver.

(1) iainr is already attached to this console so foo drops to read-only (spy) mode.

(2) The “*” indicates which session this is.

If we need to get access to a console and someone else is attached we can take over (bump) their session, this will show a message on the other user’s screen showing who has taken over the session.

```
[claise]foo: sshconsole heather
Enter foo’s password:
[Enter ‘^[]^’? for help]
[no, iainr@ is attached]
[replay]
heather console login:
heather console login: iainr
Password:
Last login: Mon Mar 12 09:43:53 on console
CTRL/C To stop x11
^C[heather]iainr: pwd
/a/bigga/disk/home/u8/iainr
[heather]iainr: [who heather]
foo@ * spy 0:00 Mon Mar 12 09:48:27 2001
iainr@ attach 0:00 Mon Mar 12 09:47:56 2001
[bumped iainr@]
```

(1)

heather@ console login:
heather@ console login: iainr
Password:
Last login: Mon Mar 12 09:43:53 on console
CTRL/C To stop x11
^C[heather]iainr: pwd
/a/bigga/disk/home/u8/iainr
[heather]iainr: [who heather]
foo@ * attach 0:00 Mon Mar 12 09:48:27 2001
iainr@ spy 0:07 Mon Mar 12 09:47:56 2001

(2)

foo takes over the console by hitting escape_sequence f, iainr drops back to spy mode

(3) If foo does ^[^w we can see that he is now shown as attached

The equivalent session shown on iainr’s terminal looks like.

```
[heather]iainr: ls
6.2installdir.tgz 806-3814.pdf Articles Astronomy-HOWTO.sgml Astronomy-HOWTO.tex DEADJOE Desktop Mail News annex.def
[heather]iainr: [who heather]
foo@ * attach 0:00 Mon Mar 12 09:48:27 2001
iainr@ spy 0:07 Mon Mar 12 09:47:56 2001
```

(1)

foo logs in and as iainr is attached drops into spy mode, foo gets to see the last 20 lines on the console.

(2)

foo takes over the console by hitting escape_sequence f, iainr drops back to spy mode

(3) If foo does ^[^w we can see that he is now shown as attached

The equivalent session shown on iainr’s terminal looks like.

```
[magrathea]iainr: sshconsole heather
Enter iainr’s password: (1)
[Enter ‘^[]^’? for help]
heather console login: iainr
Password:
Last login: Mon Mar 12 09:43:53 on console
CTRL/C To stop x11
^C[heather]iainr: pwd
/a/bigga/disk/home/u8/iainr
[heather]iainr:
```

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[forced to 'spy' mode by foo@](2)

[heather]iainr: ls
  6.2installdir.tgz
  806-3814.pdf
  Articles
  Astronomy-HOWTO.sgml
  Astronomy-HOWTO.tex
  DEADJOE
  Desktop
  Mail
  News
  annex.def

(1) iainr logs in and starts doing things.
(2) foo has bumped iainr and iainr’s session is now read-only (spy)

Maintaining the server.

This section gives step-by-step instructions on adding and removing consoles and some things to watch out for.

Adding consoles.

1. Configure your server to use a serial console.
   - Add `<lcfg/opts/serialconsole.h>` to the lcfg entry for the host.
   - Run the nilo object (if you’re using grub this should happen when the profile is updated).

2. Plumb your serial cable in, remembering to document the connection as per local usage,
   - AT: The console server is on rack 2 and you should patch connections through the normal network patch panels to the rack your server is on and then use one of the RJ45->DB9 modular convertors to connect to the correct serial port.
   - BP, FH: The console servers use direct connections with trailing RJ45 cables to modular convertors.
   - KB: The console servers are patched into patch panels 21 and 22 on rack 7.

3. Now fire up rfie and edit the lcfg entry of the console server you’re plugged into, there should be a series of entries like
   ```
   conserver.host_cub0  heather  /* 6839 */
   conserver.host_cub1  sowans  /* 6840 */
   conserver.host_cub2  elchaig  /* 6841 */
   conserver.host_cub3  denhaag  /* 6842 */
   conserver.host_cub4  hipper  /* 6843 */
   conserver.host_cub5  fechlin  /* 6844 */
   conserver.host_cub6  farg  /* 6845 */
   ```
A guide to using (ssh)console and conserver.

you need to put an entry for (or edit the entry for) conserver.host_<portname>,
defaults are set for portspeed (9600) parity(no parity), and the generation of
timestamps. These can be overridden if desired (see man lcfg-conserver the
component will update /etc/conserver.cf and signal the daemon to re-read
when the profile is updated.
You should now be able to sshconsole onto the console.

Removing consoles from the server

1. Edit the lcfg entry for the server the console is attached to.
2. Remove all the cabling.
3. Ermmm..... that’s it.

Rebooting, shutting down and powering off.

When switched off the cyclades breakout boxes send a voltage pulse which unfor-
tunately is treated as a BREAK signal by SUN and other workstations. Rebooting or
Resetting the Optiplexes will not trigger this, however power cycling them will.
If you need to powerdown the console server then you should either disconnect the
RJ45 cable (at either end) or ensure that the SUN workstation has been patched to use
the alternate break command (man kbd).

Modular connectors.

We use RJ45->DB9 modular convertors to connect the cyclades breakout boxes to the
serial ports on the servers.
the RJ45->serial modular converters come disassembled and can be fairly easily configured with whatever pinout is required.

There are currently two pinouts in use, the patch panels at KB are wired to suit the old annex system (unfortunately there doesn’t seem to be a standard for RS232 over cat5) and we are using two sets of colour coded converters.

Red converters are in use at KB only and are wired as follows:

```
# Modified from Iain Rae’s pinout
# For KB
# Use red connectors
#
+---------------------------------+  
| Modular connector pinout for KB server area | 
+---------------------------------+

NOTE THAT THESE COLOURS REFER TO THE UNSHIELDED CONNECTORS SUPPLIED BY CPC, OTHER SUPPLIERS MAY USE A DIFFERENT COLOUR CODING. USE WITH CAUTION
```

<table>
<thead>
<tr>
<th>RJ45</th>
<th>Colours</th>
<th>DB9F or DB25M</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BLUE</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>Orange</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>Black</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>Red</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>Green</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Yellow</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>Brown</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>White</td>
<td>7</td>
<td>4</td>
</tr>
</tbody>
</table>

Blue converters can be used elsewhere and for directly connecting Cyclades breakout boxes to serial ports. The following pinout is used:

```
# modified from Iain Rae’s pinout
# For SB/FH/BP
# Use Blue connectors
#
+---------------------------------+  
| Modular connector pinout for direct connection | 
+---------------------------------+

NOTE THAT THESE COLOURS REFER TO THE UNSHIELDED CONNECTORS SUPPLIED BY CPC, OTHER SUPPLIERS MAY USE A DIFFERENT COLOUR CODING. USE WITH CAUTION
```

<table>
<thead>
<tr>
<th>RJ45</th>
<th>Colours</th>
<th>DB9F</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BLUE</td>
<td>7</td>
<td>RTS</td>
</tr>
<tr>
<td>2</td>
<td>Orange</td>
<td>4</td>
<td>DTR</td>
</tr>
</tbody>
</table>
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3 <------ Black -------> 2  RxD
4 ------- Red -------> 5  Com
5 <------ Green -------> 8  CTS
6 ------ Yellow -------> 3  TxD
7 ------ Brown -------> 1  DCD
8 <------ White -------> 6  DSR

Things it doesn’t do that I would like it to do.

• Integrate console with ssh or kerberos in order to provide a properly secured session
• RFC1437 compliance would be really usefully when you absolutely have to hit the power button

Notes

1. http://www.conserver.com