DON'T PANIC

Folklore, bugs, kludges, hacks and features
February 18, 1993

1 Hardware

- The Transmission board

  Holding the transmission card in reset causes violation LED to light.

  The links on the transmission board are set to 1 (UP) to disable

- The Multicast Fabric

  If the control node is reset, you have to reset all the other nodes. Let the control node come up from reset a little earlier than the other slave nodes. It's OK to reset a slave node though at any time.

- The Teaching Board acting as a PROM emulator

  The teaching board won't program correctly if it is not plugged into a PROM socket.

  Never unplug a teaching board while the device to which it is connected is still turned on. It will draw its power from the device through one of the inputs to the teaching board Xilinx chip.

  Xilinx chips may fail to program from teaching boards. This is usually indicated by all eight LEDs on the teaching board flickering. Turn off immediately (as this may damage the Xilinx chip) and try again. Possible solutions to this problem include providing a good common earth for the device and the teaching board and connecting $\overline{INIT}$ on the Xilinx chip to $RESET/\overline{OE}$ on the PROM emulator through an inverter.

- The CFR

  1. Ring Broken
     The "Ring broken" interrupt actually tells you when the ring has successfully reformed - i.e. the period when you can't get traffic through is actually *before* the status message. Single breaks of the ring happen every time the ring is reframed, this happens each time a machine is switched on or off and occasionally at other times. If you see continual ring broken messages then something is badly wrong and you should talk to a guru.

     The "ring not responding" report indicates that the card has not seen any MetroBridge traffic recently — this is usually an indication that the ring is broken.

  2. VCI stealing
     The CFR cards sometimes steal cells intended for other machines. Wanda reports the message `0: intr_rx(CFR 0): VPI 0xXXXX (not me)` when it sees this happen. If you occasionally see one of these messages don't worry, but if you see a lot of them then there is probably something wrong with the card.

     Any kernel hackers should take note of the comment associated with this message:

     ```
     /*
      * Removal of this test and associated printf informing
      * about H/W error is considered a capital offence.
      * By order of MDH, MJD, RJB.
      */
     ```

  3. 32 bit CFR cards
     The 68k CFR cards are usually accessed in the VME short addressing space. This only allows 16 bit wide access. So cards are sometimes put in the main VME addressing range (at address EDCF000) to allow 32 bit access. This speeds things up, but may cause problems with older boot ROMs. Currently all the cards are in the short space. Only change it if you know what you are doing. If you make the change you will have to reconfigure your kernel.

     The usual answer to the configuration question: "Do you want the CFR in the VME 32 bit address space?" is NO.

  4. Fibre Cluster Controllers
     The ORL fibre cluster controllers do not completely isolate cards from the ring. If the switch is set to "off" then the card will still receive data but will be unable to send. The older Caman cluster controllers completely isolate the card.

  5. Reframe errors
     The MetroBridge, which acts as monitor station, sometimes goes bananas when reframing the ring. It attempts to set up a ring with too many slots (e.g. 6) and hundreds of extents. The current ring size can be read on the MetroBridge by pressing the "B" key from the "Central OK" prompt. It is currently 1 slot and a few extents (7 to 28 depending on the number of machines turned on).

  6. Station addresses
     The CFR card has a set of switches setting its "station" address. The bottom few bits of this set its MDL link layer address. Some cards have addresses which

have also been used at ORL and these (which are marked) should not be used on the Pandora ring.

The penalty for changing the address of a CFR card is that you are condemned to spend two days finding a CMOS chip, DRAM and NAND gate which works with the new address. So don't do it!

7. 10000000 cell re-tune...
   The CFR cards occasionally need re-tuning to allow them to correctly lock on to the ring clock. Usually cards which are left alone don't have any problems, but any that are pulled in and out of machines a lot may get knocked out of tune. Symptoms of the card being wrong are:
   (a) It not seeing anything on the ring.
   (b) Others not seeing or seeing incorrect data from the card.
   (c) The ring being unable to reframe or reframing frequently with the card in.

   Again if you see problems like this talk to a guru.

- The Yes V2 board

  Be *very* careful when plugging a YES board cable in to a powered board. If you short any pins while doing this, you see some pretty sparks.

  There are two versions of the YES V2 pals. The older versions generate one extra Turbo Channel DMA cycle than asked for in both directions. The documentation is wrong about this.

  The Yes V2 boards are slightly longer than the TURBO-channel mechanical specification specifies. This can be remedy by filing out the front panel mounting holes to move them closer to the front of the board or simply removing the front panel

  For 12.5 MHz TURBO-channels, capacitor C46 should be changed from 15pf to 30pf.

  Resistors R14 and R15 should be 150Ω and R11 (the terminating resister) should be 51Ω.

- The Colour Splitter

  If the colour splitter stops working, fiddle with the LM1881 sync extractor chip.

2 Software

- Fairisle Port Controllers

  Types of bus error:
  A "Barfbarf" is a particular type of bus error generated voluntarily on a port controller when the Xilinx receive buffer overflows. It indicates that you are flooding the port controller with more data than it can handle. All other bus errors are more serious and should be investigated.

  Kernel panics with message:
  `Kernel contains wrong hardware! Xi`*n* `detected`
  The Xilinx programming bits are linked into the kernel. This message is produced if the hardware and software are inconsistent. For FPC2 n will be 2 or 3.

Kernel hangs after printing:
`If it hangs here check the fabric clock`
This message is printed just before the first access through the Xilinx to the SRAM. The most likely reason for this failing is a missing or bad crystal in the fabric or clock board.

Kernel hangs after programming the Xilinx chip:
As above, but for kernels built before the message was put in (e.g. many boot ROMs)

- All Machines

  `ARP host %I cannot be active on pod %d. :`
  Machine %I has been seen active on a pod for which this wanda machine has been instructed (via its routeing information) should be on a different pod. The active request has been ignored by the kernel. Although there are some cases when this scenario can legally occur (typically when there are multiple routeing paths between networks with different routers load balancing). It was put in because people were booting machines with random routeing tables and then grumbling or getting confused when weird things happened (i.e. multiple active gateways leading to bad context requests)

  GATEWAY-controls :
  This gives a comma separated list of things that this gateway will search to decide whether to gateway a particular connection request. Each entry is of the form `(Bool=net-mask->net-mask)`. Bool is either "T" or "F". It should be pronounced as "It is true/false that net under mask may connect to net under mask".

  GATEWAY-redirectors :
  This provides a hack for moving a service from one machine to another. It also allows deliberate loop introduction because the target address will be transformed. It is a comma separated list of the form `"%I-%I->%I-%I"`. The values are host *and port* not host and net so explicit entries are needed per service.

- Hostinfo
  When machines boot they sometimes fail to get their hostinfo file. This is usual apparent because they don't know who they are. This is usually due to one or more of the following:

  1. The hostinfo file is not executable by UID wanda.
  2. The kernel has not been stripped.
  3. The kernel was built without user processes configured.

- MSRPC library

  Client side of msrpc:
  If a client call returns `MSRPC_CANT_ENCODE_ARGS`, check that you haven't tried to encode arguments which require a buffer in excess of 2 KB to store the MSDR format of the arguments. If you have then you have no option but to reduce the size of the arguments you are encoding. The same applies at the server side but the error may be `MSRPC_CANT_ENCODE_RESULTS`.

  The msrpc library looks for a buffer of size `WandaIPCMaxMsg(PROTOCOL_MSNL)` by default. This, of course, may be less than 2KB if you are working on a kernel which has no large IO bufs. If the msrpc library can't get hold of a buffer of the largest size then it will return the error `MSRPCSTAT_CANT_SEND`. You then need to do a `clnt_control()` to set the buffer size to the size of the largest IO buf which the library can expect to get its hands on.

If you get things like `MSRPCSTAT_NO_MEMORY` then you have run out of memory, possibly because you are neglecting to call `clnt_freeres()` after finishing with the results returned to you from a server.

If the library crashes, your name is probably Paul Barham.

- Name Server

  Symptom:
  Wanda: `gethostbyname()` or `WandaGetHostName()` or `WandaGetHostByName()` fails.
  Unix: `gethostname()` or `getmsnlhostname()` fails.

  Problem:
  On Unix, if you're using `gethostname()` to obtain the MSNL address of a host, then you're a bozo. Use `getmsnlhostbyname()` instead. Make sure you link with the MSRPC library (see the chapter on MSRPC).

  If you are attempting to get the MSNL address of a host using the appropriate routine, and are getting the reply "no such host", then the following could be the reason: When you do a `gethostbyname()` (Wanda) / `getmsnlhostbyname()` (unix) the libraries attempt to obtain information from the MSNL name server. The name server is normally up and running on a service machine in the lab. See the chapter on the MSNL Name Server. If the name server has crashed, then report the error to someone responsible and it will be restarted. You can see if it has crashed by using the program `hostlookup <name>` where `<name>` is the symbolic name of the host which you are trying to look up. Hostlookup will return the appropriate results if an entry is in the name server. It will return "no such host" if there is no host entry for the name, and it will report an error if it cannot find the name server.

  To find the name server to use, both the libraries (Wanda & Unix) and the hostlookup program use the environment variable `MSNL_NAME_SERVERS` to obtain the address of the name server. This environment variable MUST be present to permit MSNL name resolution. Any number of alternative name servers can be listed in this variable. The format is:

  $$\texttt{MSNL\_NAME\_SERVERS} \;=\; "h_{10}.h_{11}.h_{12}.h_{13} : \mathsf{0.0.0.223}, h_{20}.h_{21}.h_{22}.h_{23} : \mathsf{0.0.0.223}"$$

  Where h_{ij} is the j^{th} octet in internet dotted notation of the MSNL address of host h_i. The port `0.0.0.223` is the MSNL name server port.

  Information returned from the name server is returned to the calling process by means of a static area of memory. Results of such calls should thus be copied to ensure they remain valid. On Wanda there is no concurrency protection for this static memory area. Session bindings to the name server are cached.

- Using xi3tester

  Make sure you have set IFAB in the environment (or code). Newer versions use FIFO in the environment to mean L for loopback, T for transmit and B for both. See table for #defines.

#define	meaning
REG_ACCESS_MOD2	must be defined for Xi3 bits
ONEATATIME	must be defined for Xi3 bits
TEST_REMAP	tests vci remapping
TEST_NOTX	test sending cell with NoTx bit set
LAZARUS	recovery from lost cell
TEST_SRAM	Only do write/read test of SRAM
SRAM_PRALL	verbose test
SRAM_RANGE	report range of errors
SRAM_ANA	do bit analysis of errors
FILL_BUFFERS	fill all words with their buffer number at start
SWAP_TEST	before main tests check SWP and LDM/STM accesses to SRAM
LDMSTM_TEST	before main tests check SWP and LDM/STM accesses to SRAM
TEST_ARM_RELOADS	forever test reloading of ARMP on status read
TEST_ARM_REGACC	before main tests do random writes/reads to ARMP and HEADP
IAN	Define if you are using a fabric
COLLECT_CELLS	read cell and inc ARMP (undef to block to test NACKs)
WHOLE_MEMORY	allow queue through all of SRAM
TEST_WANDA	do one request of a cell for Wanda
SEND_SHORT	Sometimes send a short cell to check timeouts
WAITRARP	Dally to allow the machine to RARP
CORRECT_COUNTS	Correct inconsistencies to make sure only one message issued
ERROR_ANA	Do bit analysis on errors

When it does not work you have to start reading from the startup of xi3tester as it may well be a problem early on (eg not setting registers) that causes failure.

3 Tools

- The Logic Analyser

  When data has been downloaded from the Logic Analyser, you will need to hit the shift key to re-enable the keypad before you can use it again.

- The Oscilloscope

  Don't leave things on top of the oscilloscope when it is turned on — they'll get very hot.

  Never plug the oscilloscope directly into a power socket — any tension on the cable will cause it to break.

- xwcons

  Problem: xwcons claims the machine is in use but I don't think it is.
  Use `wcheck <machine>` to attempt to locate the process. If the machine is really not

in use, use `wunlock [-r] <machine>` to release the lock. The only problem then is xwcons might say 'remote is busy' when you try to connect. In this case you will have to ask someone to clear the call using local pad management.

4 Quiz

Who said:

1. "It's always the software!"
2. "It's always the hardware!"
3. "It's always the hostinfo!"