VCR 2.0k Restrictions

PUMA:037/VCR2/RSTR Revision 1.8

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1 Overview

Rather than hide restrictions in the VCR system, we choose to document them here to inform users of potential trouble-spots. Section 2 of this note is relevant to applications programmers since it details problems with the Inmos product `occam` compiler. The problems in sections 3 and 4 are only of concern to the systems manager requiring to re-compile up the VCR 2 system, and are therefore of no consequence to the user. The assumptions described in Section 5 are pertinent to the generation of new VCR topologies from `check` descriptions.

Problems with the virtual configurer in earlier releases of the VCR 2.0 system have now been corrected. Thus, channel ends with no visible usage are correctly handled (although they could *always* be worked around anyway) and configuration tables of constants are usable. Alias checking of virtual configuration files is an experimental feature in this release and has been *disabled* in the `vconf` script and drivers. Configuration-level `occam` is therefore not checked for variable aliasing; ample checking is still applied to virtual channels, however, as this is required to ascertain their connectivity. This option can be re-enabled, if desired, by using the command `voc /m` rather than `vconf` to invoke the configurer.

2 Compilation Errors

We are aware of an error in the Inmos *product* `occam` D(4/5/6/7)205 compiler; this bug exists even when VCR is not employed. It occurs when an unsized two-dimensional array is passed down a subscripted channel,

```
PROC test([]CHAN OF ANY out, [][]REAL32 a)
  SEQ j = 0 FOR SIZE out
    out[j] ! a
:
```

The generated code overflows the transputer's evaluation stack when computing the length of the array. A simple dummy retype corrects the compiler's action,

```
PROC test([]CHAN OF ANY out, [][]REAL32 a)
  SEQ j = 0 FOR SIZE out
    []BYTE a RETYPES a :
    out[j] ! a
:
```

3 Early C Toolset Limitations

Bugs in the run-time library of early versions of the Inmos C Toolset, version D(4/5/6/7)214b, require special care when recompiling the VCR release under this environment. We understand that these problems have been corrected in subsequent releases of the Inmos software.

The original product Inmos C Toolset, version D(4/5/6/7)214b, has an error in the run-time library for the `server_transaction` call. Valid `iserver` packets are rejected by this function due to an incorrect length test. Unfortunately, this routine is used by the VCR to produce all user host interaction (it is the basis of the `hosthook` call). The VCR system is delivered in a state where this problem has been corrected; recompilation of the system under an early C Toolset will lose this bug fix.

Behaviour without the patch is as follows. The `iserver` packet tags `Fclose`, `Fflush`, `Ftell`, `Feof`, `Time`, `CommandLine` and `Version` are rejected with messages like:

```
Error-upr-p?-../source/vcr/vhost.c(???)- iserver transaction failed
```

If recompilation of the system is required then it is necessary to use the `libc.lib` in later C Toolsets, version D(4/5/6/7)214c, or to contact the authors for patching instructions.

4 Library Versions

The Inmos occam Toolset ensures that object files referenced at link-time are identical to those referenced at compile-time. This creates problems for VCR which replaces certain Inmos libraries with versions referencing our virtual library. In particular, the VCR distribution includes the files `vhostio.lib` and `vstream.lib` which reference other libraries outside of the VCR system (such as `convert.lib`). If the installation's versions of these included libraries are different to those required by the distribution files then `out of step` errors will be generated at link-time of user applications. Updates of the Inmos Toolset run-time libraries would thus prevent the compilation of VCR applications.

In order to resolve any further library version problems, the VCR release has been extended to permit the compilation of the `vhostio.lib` and `vstream.lib` libraries on the user machine. If `out of step` errors are encountered the following steps should be undertaken in strict order. These notes assume a PC host, that the `ioctools` distribution is in `\d7205` and that VCR is in `\vcr`. If VCR is not in this default or if the host is UNIX-based then the makefiles will need modification.

- Ensure installation is correct (see user guide). In particular VCR must be on the `ISEARCH` path before the occam Toolset.
- Copy necessary files to the library source directory,

```
copy \vcr\source\libs\vhostio\*.* \d7205\source\libs\hostio
copy \vcr\source\libs\vstream\*.* \d7205\source\libs\streamio
```

- Compile up `vhostio.lib` using `pdmake` (or equivalent),
  ```
  cd \d7205\source\libs\hostio
  pdmake /f vhostio.mak
  ```
- Compile up `vstream.lib` using `pdmake` (or equivalent),
  ```
  cd \d7205\source\libs\streamio
  pdmake /f vstream.mak
  ```

5 Parsing `check` files with `routegen`

There are a few assumptions that the `routegen` program makes about its input `check` files:

- Processor labelling is assumed to be contiguous.
- Processors are required to be T4s or T8s.

Note that in particular these conditions preclude the presence of T2s or C004s in the target network. Check files violating these assumptions will require editing before they can be accepted by `routegen`. Wiring diagrams can, of course, still be used as an alternative description of the target network.

6 Performance Reports

We would be grateful if users discovering any VCR run-time or configurer bugs would reduce the problem to the smallest amount of source which produces the bug, and send it by e-mail to `md@uk.ac.soton.ecs` or by post to:


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