Handling Serial and GPIB Devices at Jefferson Lab

Pavel Chevtsov

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EPICS Collaboration

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Controls Group

- Application Management System

- Extensions to Handle GPIB and Serial Devices

- Conclusions

Application Management System
at Jefferson Lab

Control Applications

Applications
with EPICS
Databases

Device Support
Only
Applications

Control Applications

Development Area

Production Area

$(DVL)

Appl1   Appl2   ...   ApplN

Ver_1   Ver_2   Ver_K
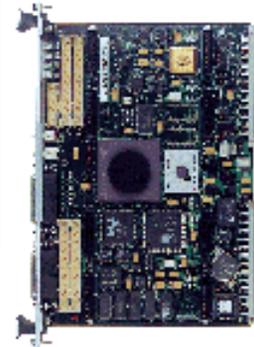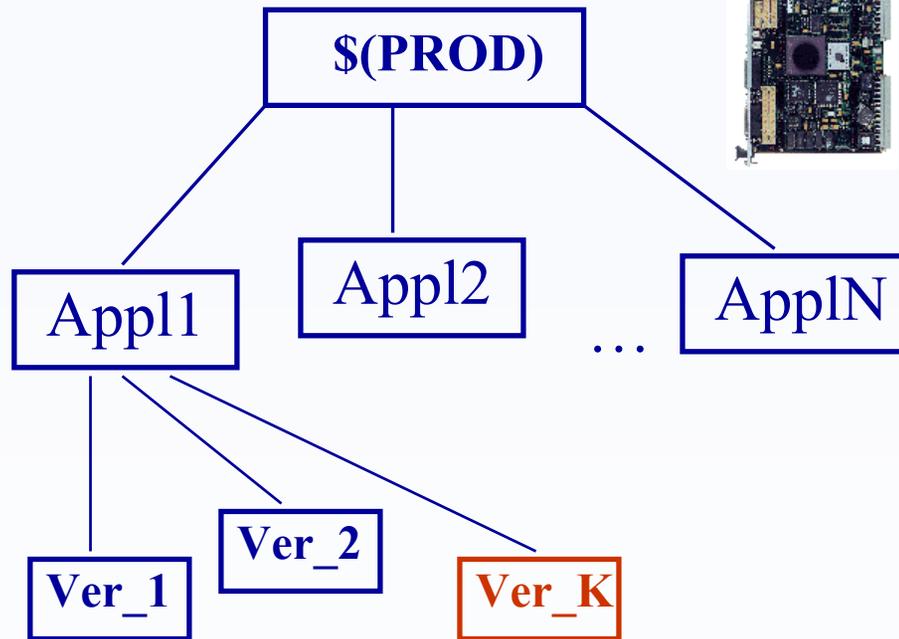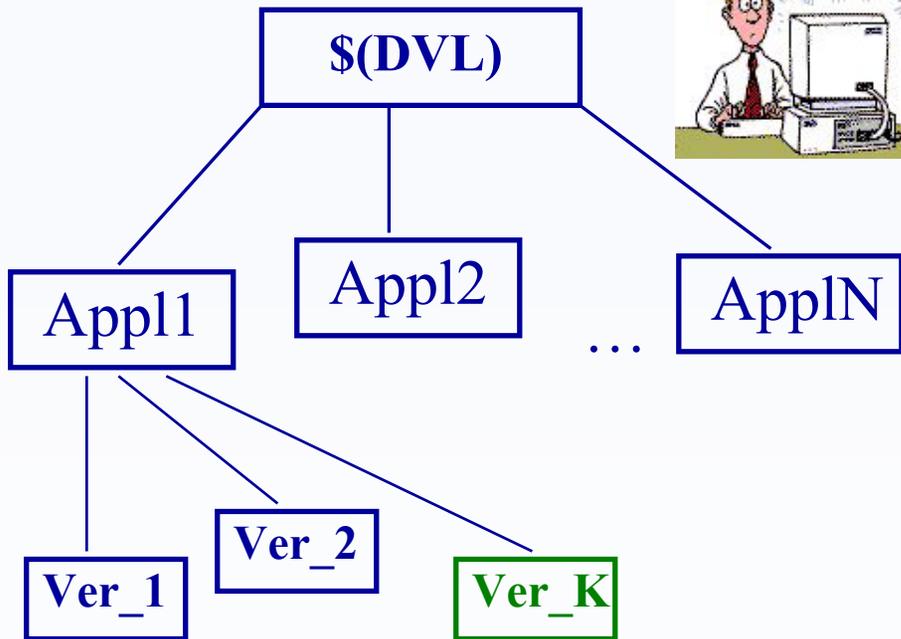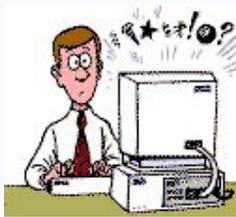
src   vxcmd

Makefile(s)
Appl1_code.c (c++)
O.mv162 O.mv167
O.mv177 O.mv2700

startup.appl1
startup.appl1init

$(PROD)

Appl1   Appl2   ...   ApplN

Ver_1   Ver_2   Ver_K

mv162   mv167   vxcmd

mv177   mv2700

startup.appl1
startup.appl1init
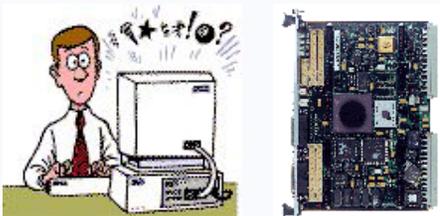
IOC basic directory:
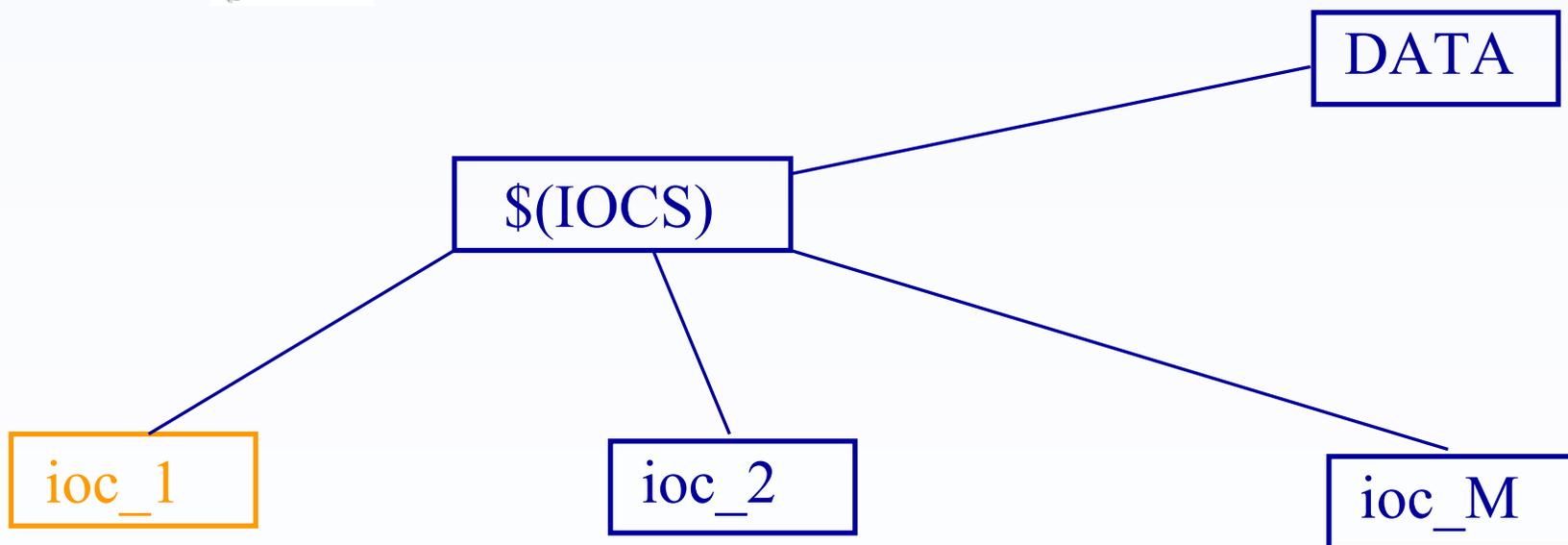
startup   config/config
links: applV   applO   startup.appl   startup.applinit

The links are created by the linkmaker script:

linkmaker.pl -i ioc_name –f config_file

_____

config_file:
_____

ioc_name:
arch, mv2700

…
serialDrv, 313g2   -> 4-2
gpibGSlib, 313f   -> 2-2
dnetDrv, 313a   -> 1-1

serialDrvV   ->
$(PROD)/serialDrv/4-2

serialDrvO   ->
$(PROD)/serialDrv/4-2/mv2700

startup.serialDrv ->
serialDrvV/vxcmd/startup.serialDrv

To install the version K of the control application appl on the IOC_ABC, all you have to do is:

In the $(DVL)/Ver_K/src directory:
- Compile your code (do not forget to prepare startup.appl and
  startup.applinit files in vxcmd)
- Run "make install". It will copy the object code, startup.appl
  and startup.applinit files into the $(PROD)/Ver_K directory.
  Now they are available for the IOC_ABC

In the $(IOCS)/IOC_ABC directory:
- Add the information about your appl into the config/config file
- Run linkmaker script. This will create the links to
         applV, applO, startup.appl, startup.applinit
- Add the info about your appl into the startup file

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Reboot IOC_ABC

Enjoy your new application on the IOC !!!

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The extensions to the Application Management System to simplify handling communication hardware

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Serial (RS-232) and GPIB devices.

Common Serial Driver	GPIB Support Library	PLC Support Library

All this software is activated with the use of a very limited number of library calls.

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Common Serial
Driver

initCommHardware(carrier_board_type, parameters)

serialPortConfig(carrier, slot, port, baud, parity, stop,
bits, flow, intNumb)

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Extension 1

$(IOCS)/DATA/CommHardware

ioc_name.commconfig   ioc_name.gpibconfig

ioc_name.serialconfig   ioc_name.plcconfig

Text Editor — iocCOMM.commconfig

File   Edit   Format   Options   Help

```
-------------------------------------------------------------------
#
# iocCOMM.commconfig
#
# -----------------------------------------------------------------
initCommHardware("IPAC", &vipc616, "0x0000")
initCommHardware("IPAC", &vipc616, "0x6000")
```

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```
Text Editor – iocSERIAL.serialconfig

File   Edit   Format   Options                                           Help

#----------------------------------------------------------------
#
# iocSERIAL.serialconfig
#
# *****************************************************************
#
#
#  Carrier 0, Slot "A" that is slot number 1, port 0, 9600 baud,
#     no parity, 1 stop bit, 7 bits for a word, no flow control,
#          intVec number is 0x42
#  Carrier 0, Slot "B" that is slot number 1, port 1, 19200 baud,
#     no parity, 2 stop bits, 8 bits for a word, no flow control,
#          intVec number is 0x44
#
serialPortConfig(0, 0, 0, 9600, 'N', 1, 7, 'N', 0x42)
serialPortConfig(0, 1, 1, 19200, 'N', 2, 8, 'N', 0x44)
```

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Text Editor – iocGPIB.gpibconfig

File   Edit   Format   Options   Help

```
#-------------------------------------------------------------------
#
# iocGPIB.gpibconfig
#
#  The registration of every GPIB IP module which is handled
#    by the IOC is done with the next two GPIB IP driver and device
#      support library calls (the order is important !!!):
#
#   initGpibGsLib( CarrierNumber, SlotNumber, IntVec )
#   GsGpibLinkConfig( LinkNumber, CarrierNumber, SlotNumber )
#
#
# -------------------------------------------------------------------
initGpibGsLib(0, 1, 0x47)
GsGpibLinkConfig(10, 0, 1)
initGpibGsLib(0, 2, 0x49)
GsGpibLinkConfig(11, 0, 1)
```

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```
#
# iocBD1.plcconfig
#
# ******************************************************************************
#
#   Create our plc information entry
# ----------------------------------------------------------------------------
#
#   Carrier 0, Slot "A" that is slot number 0, port 0,
#       for the PLC HADUMP
#   Carrier 0, Slot "A" that is slot number 0, port 1,
#       for the PLC HCDUMP
#
createDnSerialPLC("HADUMP", 0, 0, 0, 1)
createDnSerialPLC("HCDUMP", 0, 0, 1, 1)
```

Text Editor – iocBD1.plcconfig

File   Edit   Format   Options   Help

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Extension 2

```
#
# APP: serialDrvLib
#
serialDrvLib_loaded=1

# load module for serialDrvLib
ld<serialDrvO/serialDrvLib


#
#
#
```

Smart VxWorks Shell Script

$(IOCS)/DATA/CommHardware

IOC_ABC

<startup.serialDrv

Loads and
Activates software

IOC_ABC.serialconfig
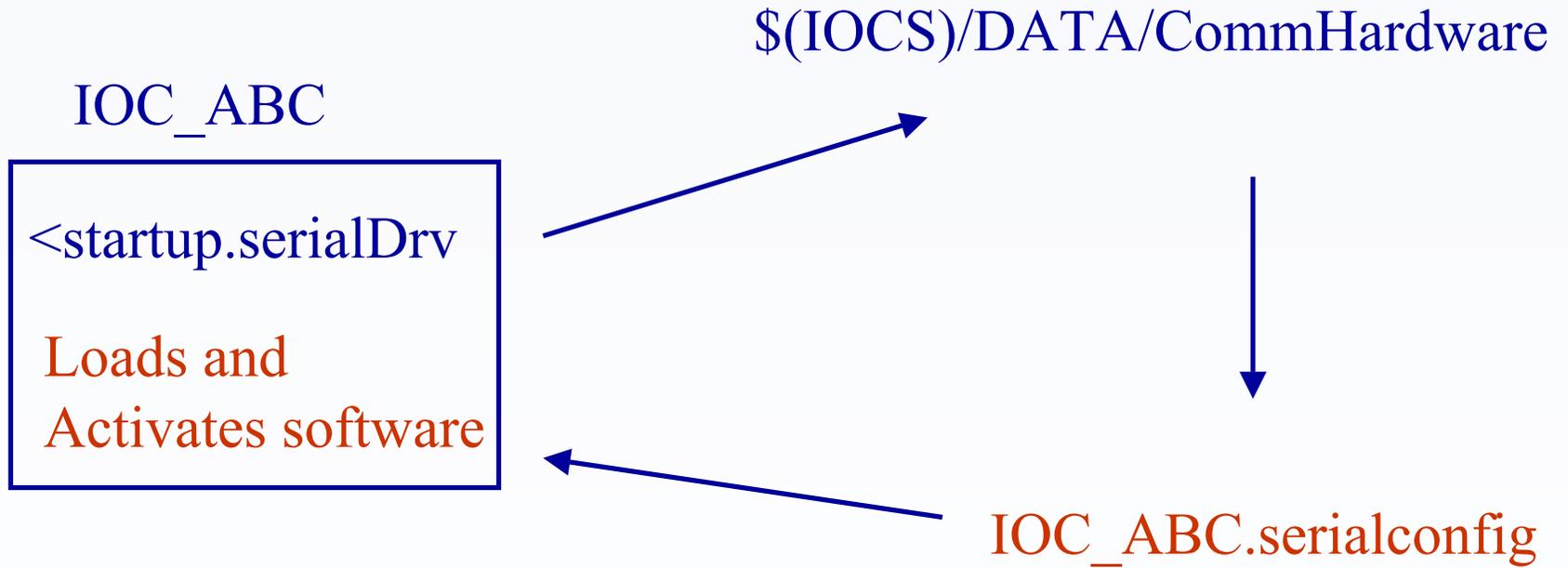
To connect a new serial or GPIB control device to IOC_ABC, all that you have to do is:

Into $(IOCS)/DATA/CommHardware directory:

- add the information about the data communication hardware
  into IOC_ABC.commconfig file
- register your new communication channel into the proper
  IOC_ABC. (gpibconfig, serialconfig, plcconfig) file

  Into the $(IOCS)/IOC_ABC directory:

- make all necessary references to the used device support
  libraries into the startup file

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Connect your control device to the data communication hardware (use the proper connection cables !)

Create your database that uses serial or GPIB communication interface and make the references to it for the IOC_ABC with the use of the Application Management System Tools

Reboot IOC_ABC

Enjoy your new application on the IOC !!!

Benefits:

- The information about all control devices and the used
  data communication hardware is kept in one standard place.
  This makes it easy to support existing and add new
  hardware components throughout the whole control system.

- Each device support library has only one startup.appl file.
  This file makes all the work on loading the device support
  software into the IOC.

All this works if:

- The device support software is reliable and provides troubleshooting mechanisms

- You have a Control Device Information System with

  - documentation on the device control software
  - documentation on the data communication hardware
  - examples on the use of this software and hardware

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"Information-Control Software for Handling Serial Devices in an EPICS Environment", ICALEPCS-2001

"PLC Support Software at Jefferson Lab", PCaPAC-2002

Extension 3

Control Device Information System

THANK YOU

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