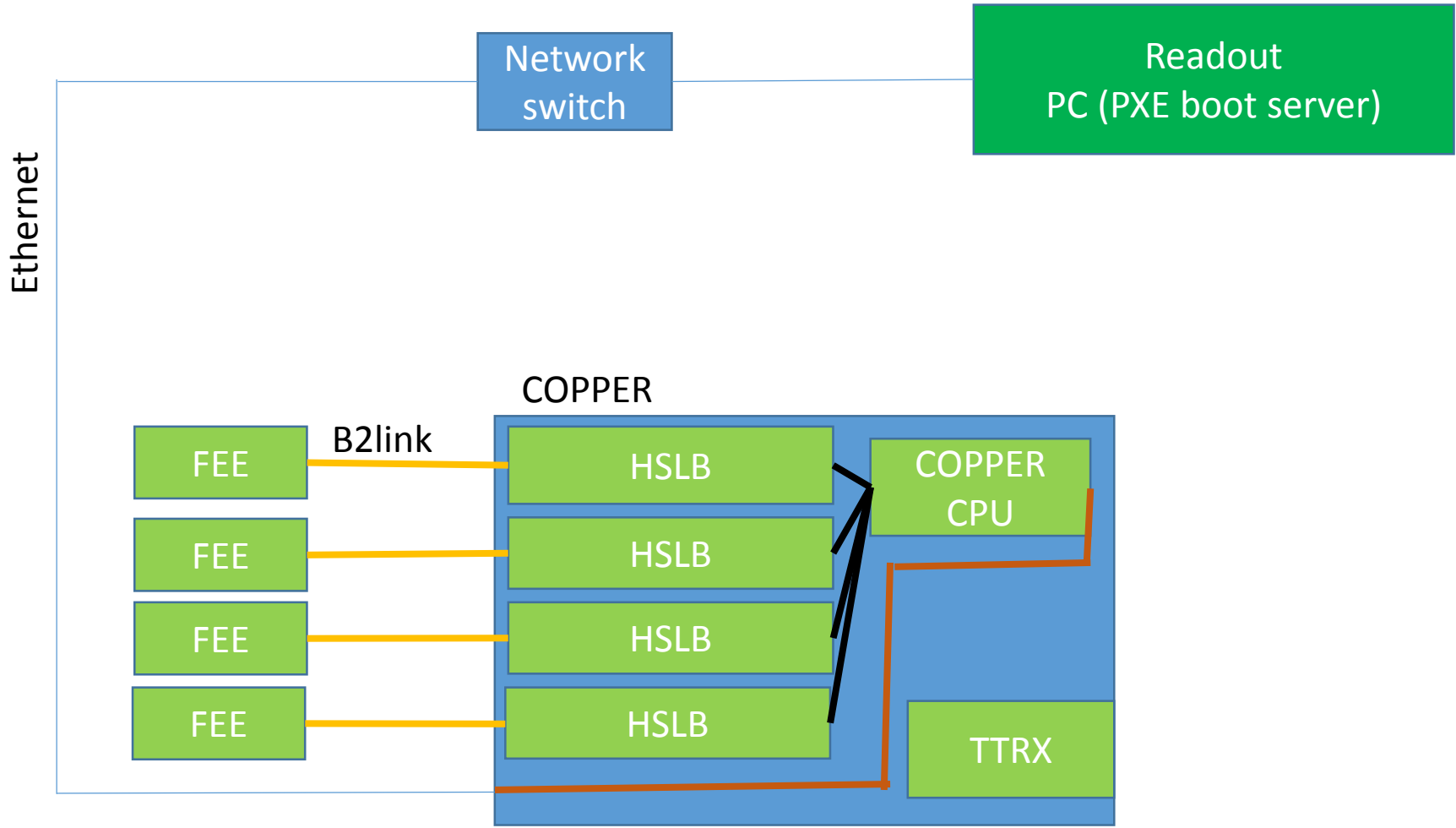


Pocket DAQ manual

(2014.8.8) rev.11654

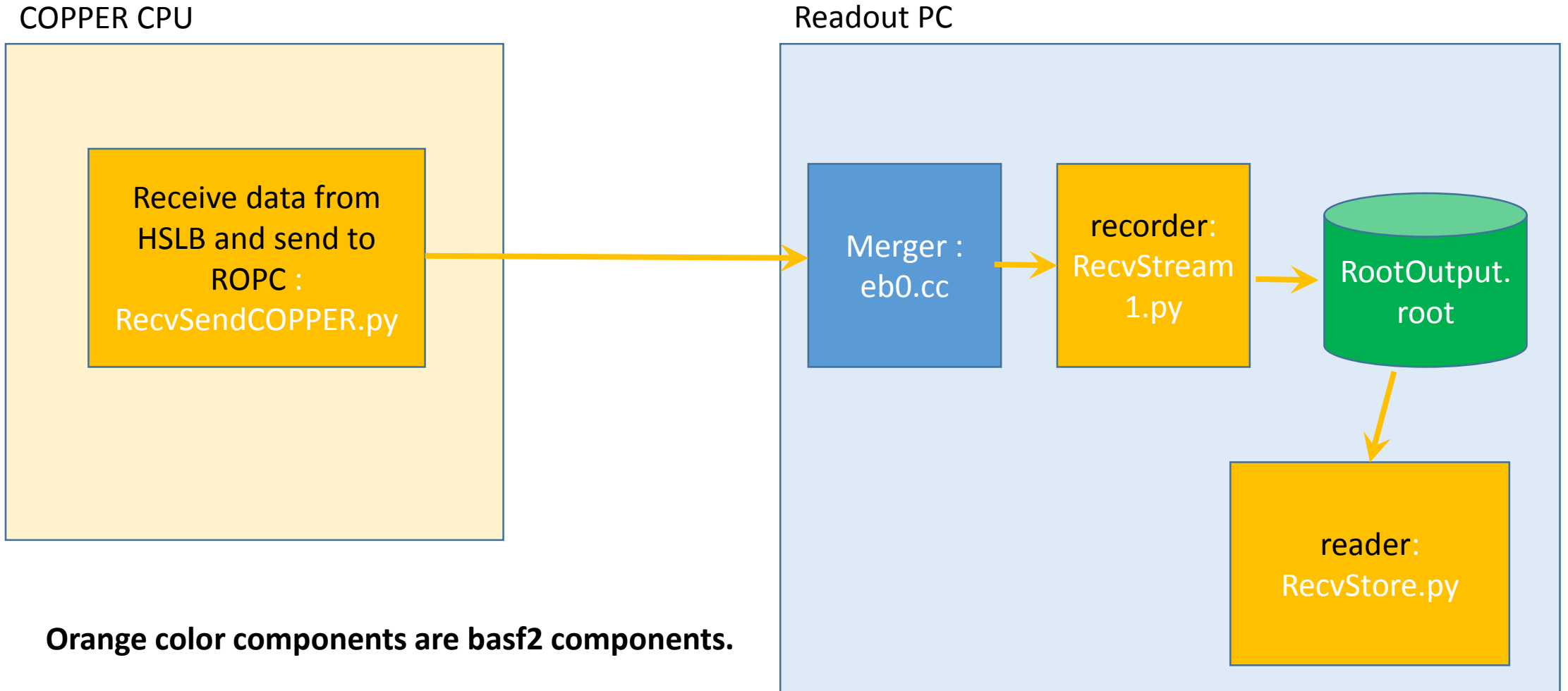
Satoru Yamada

Connection between components



Software components

These are stored under <https://belle2.cc.kek.jp/svn/trunk/software/daq>



Pocket DAQ w/o slow
controller and GUI

0. Before using pocket DAQ

- Setup a PXE boot server for COPPER CPU and install driver for COPPER etc
 - See <https://belle2.cc.kek.jp/~twiki/bin/view/Detector/DAQ/PocketDAQ>
- Install basf2 on both COPPER CPU and Readout PC
 - [See https://belle2.cc.kek.jp/~twiki/bin/view/Software/SoftwareInstallation](https://belle2.cc.kek.jp/~twiki/bin/view/Software/SoftwareInstallation) .
“addall” does not install the daq package. You need to do “addpkg daq”.
 - Check daq/Sconscripts and check if `env['CONTINUE'] = False` is commented out.
 - Compile with scon.
- Compile eventbuilder
 - `cd ${BELLE2_LOCAL_DIR}/daq/eventbuilder/evb0/ ; gmake eb0`

Install GLEW for running basf2 program

After external ver.0.5.0?, basf2 requires GLEW(The OpenGL Extension Wrangler Library).

The following procedure worked fine.

1, install the yum epel repository.

```
ropc01$ wget http://ftp-srv2.kddilabs.jp/Linux/distributions/fedora/epel/5/i386/epel-release-5-4.noarch.rpm
```

```
ropc01$ ssh cpr** -lroot
```

```
cpr**# rpm -ivh epel-release-5-4.noarch.rpm
```

```
cpr**# ls -l /etc/yum.repos.d/
```

```
cpr**# exit
```

2, install glew on COPPER

```
ropc01$ sudo yum install glew --installroot=/tftpboot/copper/root
```

1, Set parameters(1)

```
[ROPC] % cd ${BELLE2_LOCAL_DIR}/daq/copper/daq_scripts
```

```
[ROPC] % emacs run_start.sh
```

Set arguments of start_copper.sh

Usage : start_copper.sh **<HOSTNAME> <COPPER node> <FINNESSE bit flag: A=1, B=2, C=4, D=8> <Use network shared memory : Yes=1, No=0> <node name(used for Network Shared Memory)>**

e.g.)

```
/usr/bin/xterm -fn 7x14 -geometry 102x10+0+642 -e ${BELLE2_LOCAL_DIR}/daq/copper/daq_scripts/start_copper.sh cpr006 1 1 0 0&
```

```
/usr/bin/xterm -fn 7x14 -geometry 102x10+750+642 -e ${BELLE2_LOCAL_DIR}/daq/copper/daq_scripts/start_copper.sh cpr007 2 3 0 0&
```

<COPPER node ID> will be attached to RawCOPPER header.

1, Set parameters(2)

NOTICE : Environment variables for basf2

In `${BELLE2_LOCAL_DIR}/daq/copper/daq_scripts/copper.sh`, a line, “source ~/.bash_profile”, is for setting up basf2 environment. You need to add basf2 setting commands in your `.bash_profile` (or other script file).

Please see "Setup of Software Tools" at <https://belle2.cc.kek.jp/~twiki/bin/view/Software/SoftwareInstallation> for details.

```
[ ${BELLE2_LOCAL_DIR}/daq/copper/daq_scripts/copper.sh ]
```

```
#
```

```
# setup basf2 environment (See "Setup of Software Tools" at  
https://belle2.cc.kek.jp/~twiki/bin/view/Computing/SoftwareInstallation
```

```
#
```

```
source ~/.bash_profile
```


1, Set parameters(3)

Specify whether communication with GUI via shared memory will be used or not :

1, Edit \${BELLE2_LOCAL_DIR}/daq/rawdata/examples/RecvStream1.py

If you use GUI, set 'UseShmFlag' = 1

```
receiver.param('UseShmFlag', 1)
```

If you don't use GUI set 'UseShmFlag' = 0

```
receiver.param('UseShmFlag', 0)
```

2, Edit \${BELLE2_LOCAL_DIR}/daq/rawdata/examples/RecvStream1.py

If you use GUI, set 'UseShmFlag' = 1

```
receiver.param('UseShmFlag', 1)
```

If you don't use GUI set 'UseShmFlag' = 0

```
receiver.param('UseShmFlag', 0)
```

2, Setting of merger (eb0) (1)

1, compile

```
$ cd ${BELLE2_LOCAL_DIR}/daq/eventbuilder/evb0
```

```
$ make
```

2, edit eb0.sh

```
cd /home/usr/b2daq/eb # change to cd "your local BelleII directroy"/daq/eventbuilder/evb0/eb-xinetd  
( e.g. cd /home/usr/yamada/basf2/release/daq/eventbuilder/evb0/eb-xinetd )
```

If you wan to read data from COPPERs with hostnames of cpr010, cpr011 and cpr012, use the following
./eb0 cpr010:33000 cpr011:33000 cpr012:33000

2, Setting of merger (eb0) (2)

3, edit eb0's part in `${BELLE2_LOCAL_DIR}/daq/eventbuilder/evb0/eb-xinted`

Modify **user** and **server**.

service eb0

```
{
    bind = 127.0.0.1
    socket_type = stream
    type = UNLISTED
    port = 5101
    wait = no
    user = g0cdc # Change to your user name (e.g. yamagata)
    server = /home/usr/b2daq/eb/eb0.sh
    # change to "your Belle2 local directory"/daq/eventbuilder/evb0/eb0.sh
    # (e.g. /home/usr/yamagata/basf2/release/daq/eventbuilder/evb0/eb0.sh)
}
```

You need to change **the other services in eb-xinetd** (eb1tx, eb1rx, eb2tx, eb2rx) **in the same way.**

2, Setting of merger (eb0) (3)

4, Set link to eb-xinetd

```
# cd /etc/xinetd.d/  
# ln -s ${BELLE2_LOCAL_DIR}/daq/eventbuilder/evb0/eb-  
xinetd eb-xinetd  
# /sbin/service xinetd restart
```

The eb0 daemon will be automatically invoked when a basf2 program on a readout PC connects to a port specified in eb-xinted.

3, How to start DAQ

```
[ROPC] % cd ${BELLE2_LOCAL_DIR}/release/daq/copper/daq_scripts
```

```
[ROPC] % ./run_start.sh
```

4, How to stop DAQ

- No stop button for now (If you use GUI, you have.)
- You need to specify max # of events or time to stop the run on a basf2 python file.

```
ROPC % cd ${BELLE2_LOCAL_DIR}/daq/rawdata/examples  
Edit RecvStream1.py
```

You can set following paramters to stop a run.

```
receiver.param('MaxTime', 300.)
```

```
receiver.param('MaxEventNum', 30.)
```

-1 means infinite.

5. Read an output file and extract FEE buffer

- Output file name
 - `${BELLE2_LOCAL_DIR}/daq/copper/daq_scripts/root_output.root`
 - You can change the filename by editing `${BELLE2_LOCAL_DIR}/daq/rawdata/examples/RecvStream1.py`
- Read the root file
 - Please see dataformat and unpacker manuals.
 - Data format
 - https://belle2.cc.kek.jp/svn/trunk/software/daq/copper/doc/SetupPocketDAQ_4p1_RawCOPPERDataHandling.pdf
 - Unpacker
 - https://belle2.cc.kek.jp/svn/trunk/software/daq/copper/doc/SetupPocketDAQ_4p5_RawDataUnpackerPacker.pdf

Revision history

- 2013/10/16
 - Change explanation about option of run_start.sh script
- 2014/7/15 (rev. 11619)
 - To specify FINESSE bit field, you need to use decimal value (not hexadecimal).
 - Add an argument of RecvSenDCOPPER.py
 - Update eb0 related issues.
 - About eb0.sh
 - About eb0-xinted
- 2014/7/16(rev. 11654)
 - eb0.sh and eb-xinetd need more modification
- 2014/7/19
 - Add a comment about “addpkg daq”
- 2014/8/8
 - Modify usage of start_run.sh. (nodename is only used for NSM)

Appendix

A-1, yum setting for COPPER

Sometime yum fails when you try to install software to COPPER directory;

```
readoutPC # yum install **** --installroot=/tftpboot/copper/root
```

In that case, you need to change yum setting for COPPER host:

1, Copy yum repository files.

```
readoutPC # cp /etc/yum.repo.d/* /tftpboot/copper/root/etc/yum.repo.d/*
```

2, Set a proxy server in /tftpboot/copper/root/etc/yum.conf **same as** readoutPC:/etc/yum.conf

A-2, Socket parameters on COPPER, readout PC and etc..

1, Enable "Jumbo Frame" in network switch's setting, if necessary (e.g. HP1810-24G)

If the switch does not support Jumbo frame, setting MTU a large value may cause a problem.

2, Change socket parameters

```
# /sbin/ifconfig eth? mtu 9000
```

```
# /sbin/sysctl -w net.ipv4.tcp_rmem="8388608 8388608 8388608"
```

```
# /sbin/sysctl -w net.ipv4.tcp_wmem="8388608 8388608 8388608"
```

```
# /sbin/sysctl -w net.ipv4.tcp_mem="9000000 9000000 9000000"
```

```
# /sbin/sysctl -w net.core.rmem_default=8388608
```

```
# /sbin/sysctl -w net.core.wmem_default=8388608
```

```
# /sbin/sysctl -w net.core.rmem_max=8388608
```

```
# /sbin/sysctl -w net.core.wmem_max=8388608
```

3, edit /etc/rc.local(or /tftpboot/copper/root/etc/rc.local) if you want the parameters automatically set at boot time

A-3, Use ntpd to adjust time on COPPER

1, Edit /tftpboot/copper/root/etc/rc.d/init.d/ntpd

```
# Source networking configuration.
```

```
. /etc/sysconfig/network
```

```
ntpddate 192.168.10.1
```

```
if [ -f /etc/sysconfig/ntpd ];then
```

```
    . /etc/sysconfig/ntpd
```

```
fi
```

2, check ntpd is started at boot time

```
cpr*** $ chkconfig --list | grep ntp
```

A-4, syslogd

Install syslogd :

readoutPC # yum install syslogd --installroot=/tftpboot/copper/root

Add entry to /tftpboot/copper/root/etc/syslogd.conf if needed:

Log anything (except mail) of level info or higher.

Don't log private authentication messages!

*.info;mail.none;news.none;authpriv.none;cron.none /var/log/messages

B-1, Test bench at Tsukuba B3

