WIBEth to DAQ Communications and Configuration Generation

Ron Rechenmacher

ICEBERG Commissioning and Operation Meeting

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WIBEth to DAQ Communications and Configuration Generation

- WIBEth to DAQ Communications
  - Network interface for “CCM” (1Gb)
    - ssh server (TCP)
    - UDP
  - Network interfaces for data (2x10Gb)
    - UDP

- Configuration Generation
  - Input .json files
  - Scripts for generating “DAQ usable” WIB data flow and DAQ configuration directories

UDP data flow

- WIBEth data interfaces connect to network switch
- Switch can be configured to mirror data in on one port to be sent out on another
  - Switch “activity” lights are useful
- Standard linux tcpdump can be used to examine UDP packet details

Basic instructions for taking data

- https://wiki.dunescience.org/wiki/Taking_data_at_ICEBERG
  - Environment setup – directory to cd to; file to source; cd runarea
  - Configure – wibs, (WIBEths, daq)
  - Simple test – check data flow
  - Nominal Data Taking Script

- Not operations
  - no - Log book
  - no - Run description
  - no - Online DQM
  - no - Spreadsheet of run/output file description/details
  - ???

The runarea directory

- Directories in the runarea:
  - confgen – contains the configuration scripts and input configuration source
  - confs - the output from confgen – input to runs
  - RunConfs – record of conf from the run (has run #)

  - logs – logs for various daq components during a run

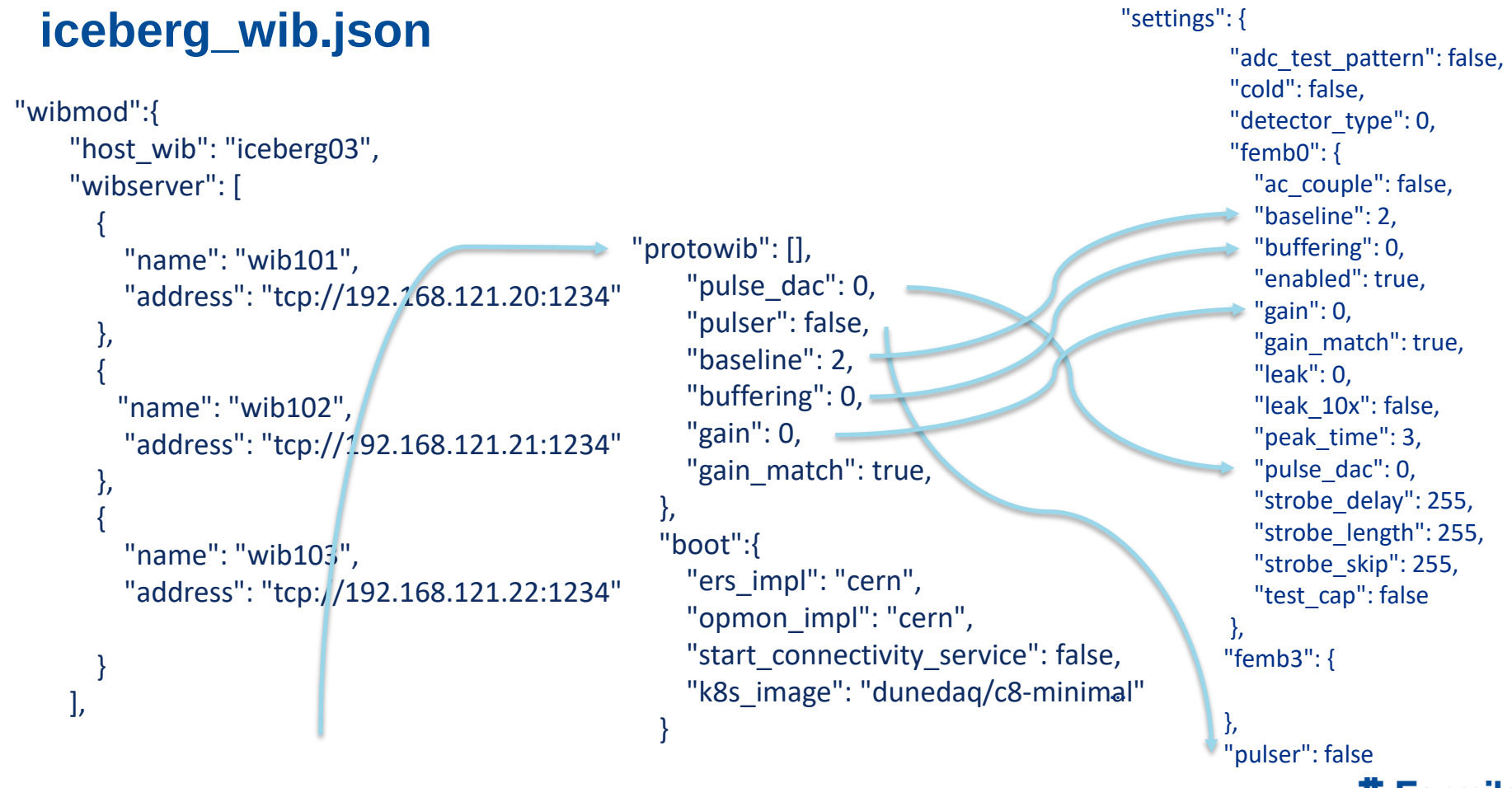
Input json config files

- Change contain a small portion of the total config
  - Generation programs will initial unspecified parameters to defaults

- Input to generate_*.sh scripts
  - cpupin-iceberg.json
  - iceberg_daq_eth.json
  - iceberg_dromap_*.json
  - iceberg_hermes.json

- Input to recreate_wib_configuration.sh
  - iceberg_wib.json

iceberg_wib.json



Fermilab

Config scripts confgen/generate_*.sh

- generate_wib10*.sh scripts
  - hermesmodules_gen
    - Output config for WIBEth boards (UDP)
      - boot.json
        - Params to starting Hermes daq_application on the WIBEth
      - init.json (data/hermes_init.json
        - Make a connection
      - conf.json (data/Hermes_conf.json)
        - UDP parameters

Config scripts confgen/generate*.sh (continued)

- fddaqconf_gen (receive (dpdk) and write to disk)
  - Output config
    - boot.json
      - Apps { 1.dataflow, 2.dfo, 3.fakehsi(HardwareSignalsInterface), 4.ruiceberg03eth0, 5. trigger }
      - Thread pinning
      - Etc (dpdk)
    - init.json
      - connections
    - dromap.json
      - det_id, crate_id, slot_id, stream_id
    - conf.json
      - All kinds of params for each daq app

Config script confgen/recreate_wib_configuration.sh

- wibconf_gen
  - Output config
    - boot.json
      - Daq_application_ssh (looks like Hermes)
    - init.json
      - connection
    - conf.json
      - Wib parameters

confs config out directories – actual

/home/dunecet/dunedaq/fddaq-v4.2.1-a9/runarea
(dbt) dunecet@iceberg03 $ ls -d confs/iceberg_*
drwxr-x--- 4 dunecet 128 Feb 7 00:26 confs/iceberg_daq_conf/
drwxr-x--- 4 dunecet 113 Feb 7 00:26 confs/iceberg_hermes_conf/
drwxr-x--- 3 dunecet 93 Feb 6 19:19 confs/iceberg_wib_conf/
--2024-02-07_00:31:32_CST--

Daq nanorc reads from these directories at the beginning of a run.

Times

- Config
  - Recreate_wib_configuration..
    - 0m2.614s
  - Daq and Hermes config
    - 0m6.819s
- 60 second run…
  - time ./nanorc_run.sh
    - 2m30-ish to 3m30-ish (Currently small data runs, but data written to NFS!!!)

Log files

- Log files are put in the logs directory with the date included in the file name

```
-rw-r----- 1 dunecet 201K Feb  6 16:48 log_2024-02-06_164625_ruiceberg03eth0_3436.txt
-rw-r----- 1 dunecet  85K Feb  6 16:48 log_2024-02-06_164620_fakehsi_3433.txt
-rw-r----- 1 dunecet  49K Feb  6 16:48 log_2024-02-06_164629_trigger_3434.txt
-rw-r----- 1 dunecet  21K Feb  6 16:48 log_2024-02-06_164611_dataflow0_3437.txt
-rw-r----- 1 dunecet  37K Feb  6 16:48 log_2024-02-06_164616_dfo_3435.txt
-rw-r----- 1 dunecet 7.6K Feb  6 16:48 log_2024-02-06_164602_hermes_3383.txt
-rw-r----- 1 dunecet 9.4K Feb  6 16:48 log_2024-02-06_164551_wib101_3333.txt
-rw-r----- 1 dunecet   67 Feb  6 16:47 logbook_iceberg_1041_TEST.txt
-rw-r----- 1 dunecet 3.3K Feb  6 16:44 log_2024-02-06_164440_hermes_3333.txt
```

Recap –
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    - ssh server (TCP) – start servers
    - UDP server
  - Network interfaces for data (2x10Gb)
    - UDP WIB data

- Configuration Generation
  - Input .json files – can be hand or machine editted
  - Scripts for generating “DAQ usable” WIB data flow and DAQ configuration directories
    - Nanorc daq runs will read from these directories

Issues and What's Next

- Issues:
  - Run number – not using a "run number service"
  - Since, currently, ssh is used as a part of data taking, one can get "permission denied" errors if/when your kerberose ticket expires.
    - I'll soon add a check for expired ticket
  - Currently, the configure scripts need to be run only from the runarea directory
  - Scripts and input config files need to be added to some repo
    - In case they're accidently deleted or messed up.
  - Data written to NFS
- What's Next
  - Shekhar talked about automated runs that explore the parameter space.