

An Integrated Data Acquisition System for J-PARC Hadron Experiments

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Requirements

We have many legacy DAQ subsystems, CAMAC/FERA, TKO (traditional KEK local standard DAQ bus), and network oriented DAQ module KEK-VME/COPPER. We need to use every legacy and new DAQ subsystem at the early stage of the J-PARC hadron hall experiments.

Our solution

Development of a network based distributed DAQ system

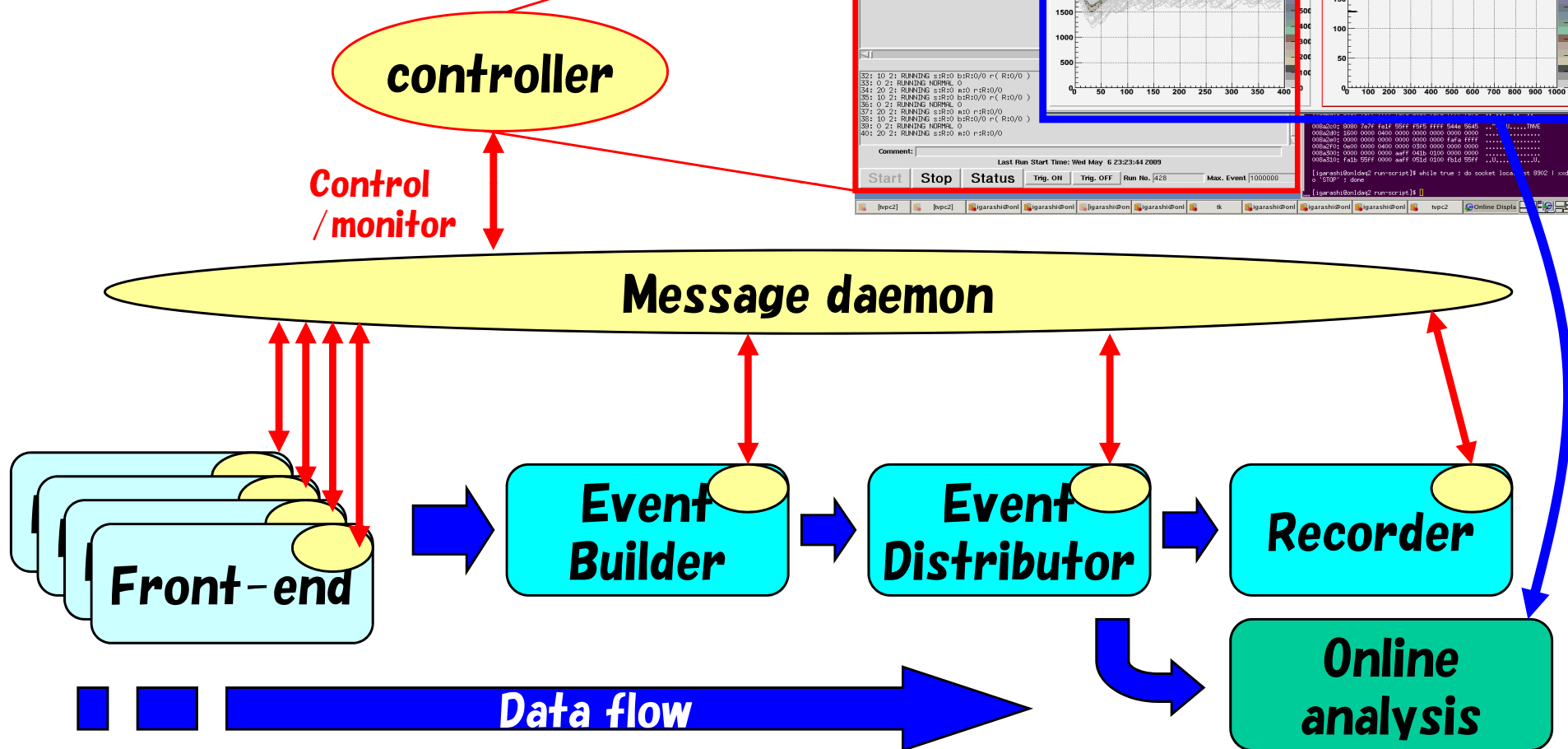
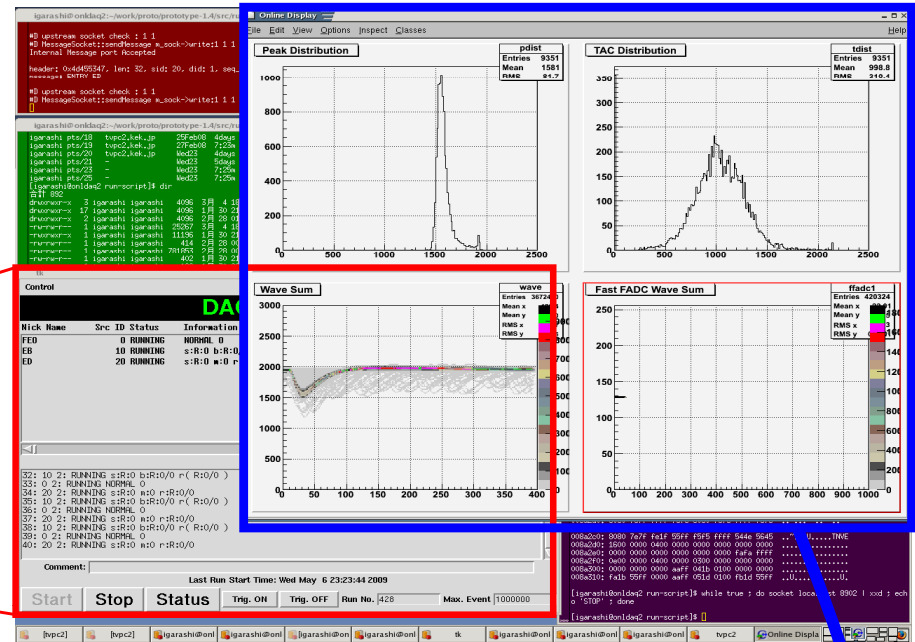
All DAQ subsystems have network interfaces or controllers equipped with network interfaces.

Develop a simple network based DAQ software

Develop a simple trigger/tag distribution system

Overview of the network based DAQ software

- The DAQ works with many simple function processes. All communications between each process are used TCP/IP protocol.
- The DAQ software has two communication paths.
 - **DATA PATH** for the detector data
 - **MESSAGE PATH** for the control message



A Trigger / Tag distribution system

The trigger / tag distribution system distribute the event tag (serial number) to all the DAQ front-end subsystems to identify the event fragments in the distributed asynchronous DAQ system using a pair of category 6 network cables.

System components

- Master Trigger Module (MTM)
- Repeater
- Receiver Module (RM)
 - KEK-VME/VME RM, TKO RM, CAMAC/FERA RM

Signal specification

- A pair of category 6 cables
 - MLVDS level
 - Cable length : up to 50m
- Signals
 - Downstream:
 - Trigger1 (level1 trigger), Trigger2 (level2 trigger), Clear, Spill, reserve 1
 - Upstream:
 - Busy, reserve2
- Serial link
 - Spill No. TAG 8bit
 - Event No. TAG 12bit
 - Transfer speed 224Mbps

