Online Monitoring at CDF Run II

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Online Monitoring System

- The CDF experiment consists of many detectors.
- The online monitoring system is to identify problems of each component in real time.
- It analyzes online data with minimal interference to data taking.

Components of the Framework

- Consumers
  - Online monitor analysis programs (CDF jargon)
- Display Server
- Display Client
- Error Receiver
- State Manager

Programmed in C++ using ROOT
(~15000 lines except each Consumer code)

Consumer Framework

?^?C?g?< :
csf_overview3.eps
ì¡¬?Ò :
fig2dev Version 3.2 Patchlevel 1
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,±,Ì EPS ?'?®,ì?t?@?C?<,íA
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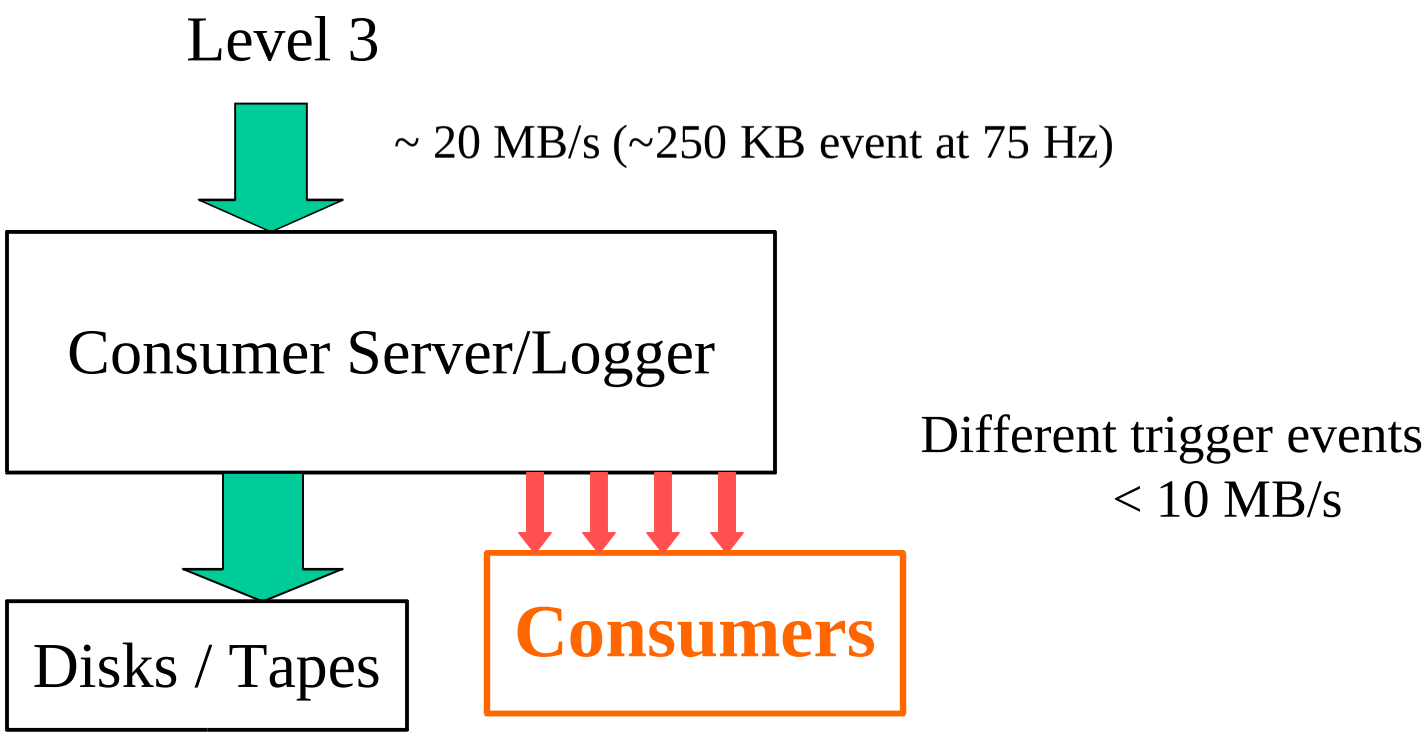
Data Input of Consumers



Consumer Server / Logger

- Receives data from Level 3 and logs into disks
  - at 20 MB/s (~ 250KB event at 75 Hz)
- Distributes to Consumers
  - different trigger events
  - without interference to data logging
  - at up to half of the logging rate

Consumers

- Analyze real−time events
- Produce
  - Histograms/tables/canvases to be monitored (ROOT objects) ? Display Sever/Client
  - Error messages/run summaries ? Error Receiver
- Inherit from a common base class

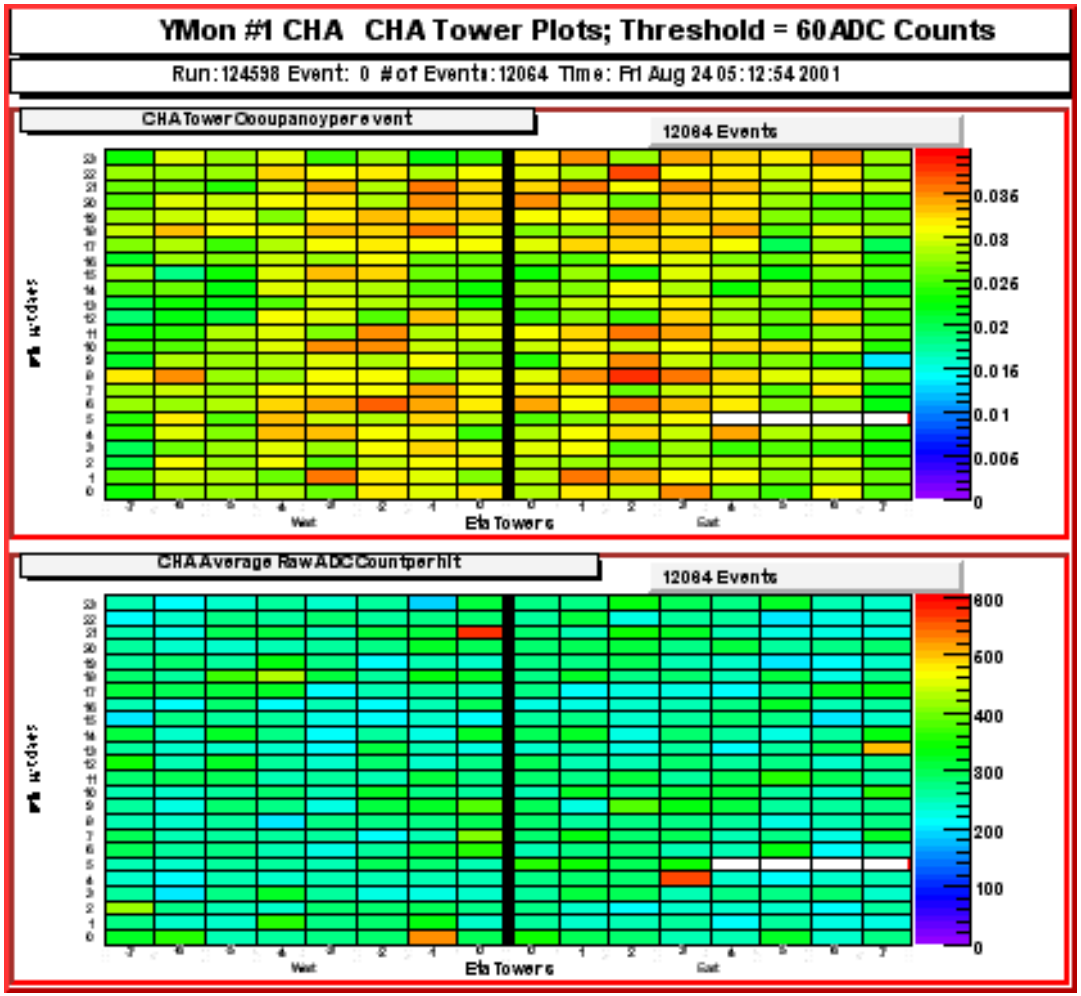
Use common interfaces

- AC++ modules

Examples of Consumers

YMon	Detector occupancies
TrigMon	Trigger bits
XMon	Trigger rates
LumMon	Luminosities
Stage0	COT parameters as a drift constant
BeamMon	Beam positions by track vertexing
ObjectMon	Higher level objects (jets, etc.)
SiliMon	Silicon detector hits
SVXMon	SVX Monitor

Example Output of YMon



Calorimeter tower occupancies are shown by colors.

Display Server

- Responds to requests from Display Clients
- Transports Consumer outputs via sockets
- Starts automatically with a Consumer

on the same machine

- Communicates with the State Manager

Error Receiver

- Collects error messages/run summaries from Consumers
- Sends them to
  - ? Web page
  - ? Run Control (serious errors)
  - ? Data base

State Manager

- Collects Consumer information: ? Display Server hostname, port, run no, status, etc.
- Writes a web page

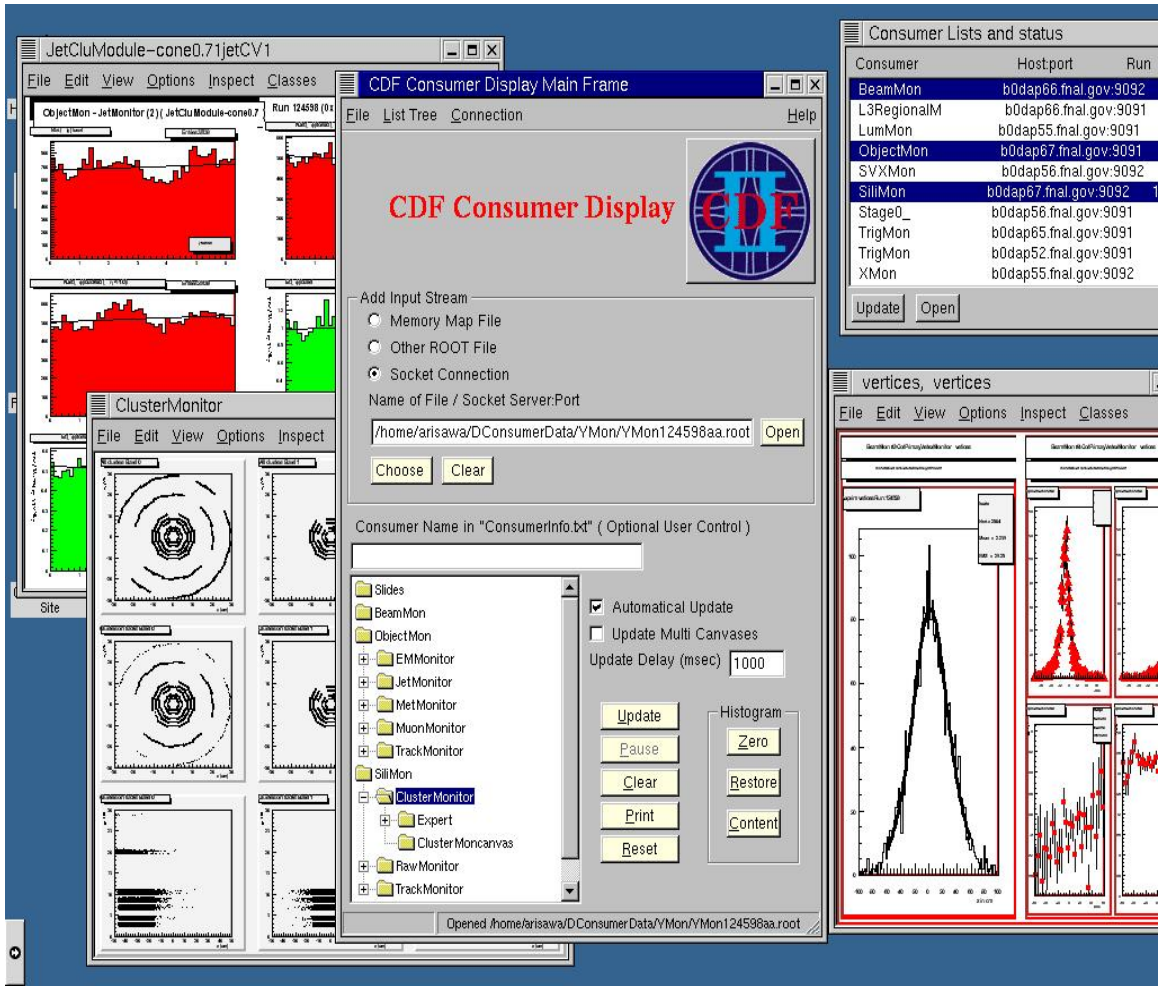
Display Client

- Draws Consumer outputs (ROOT objects)
- User−friendly Graphical User Interface
- Connects to
  - Currently running Display Servers ? State Manager
  - Local/remote ROOT files
  - Shared memories
- Mouse selections from a list tree
  - Selected objects are downloaded and displayed

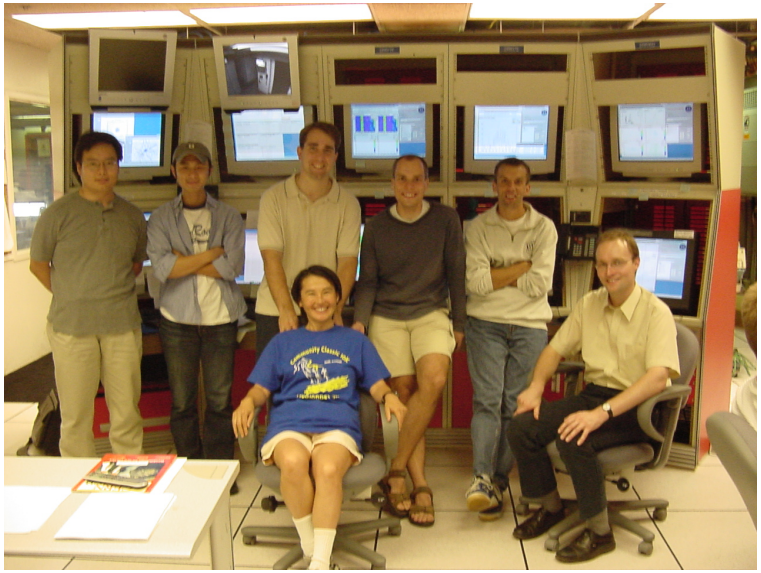
Display Client (~cont.)

- Specific features for online monitoring
  - Automatic update
  - Slide show (periodical change of objects on a canvas)
  - Pop−up warning window
- Drawing options / layouts / axis ranges /etc.
  - Set by Consumers (by default)
  - Can be modified by users and maintained by updates

GUI of the Display Client



In CDF Control Room



Consumer Framework group

Running Consumers