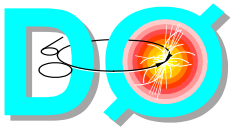
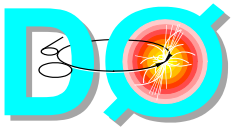
COMICS
DØ Detector Download Tutorial

J. Frederick Bartlett



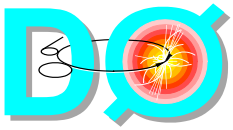
Outline - Part I

- Overview of the detector download system components
  - The relationship between COMICS and COOR
  - The relationship between COMICS and EPICS
  - The relationship between COMICS and ORACLE calibration databases

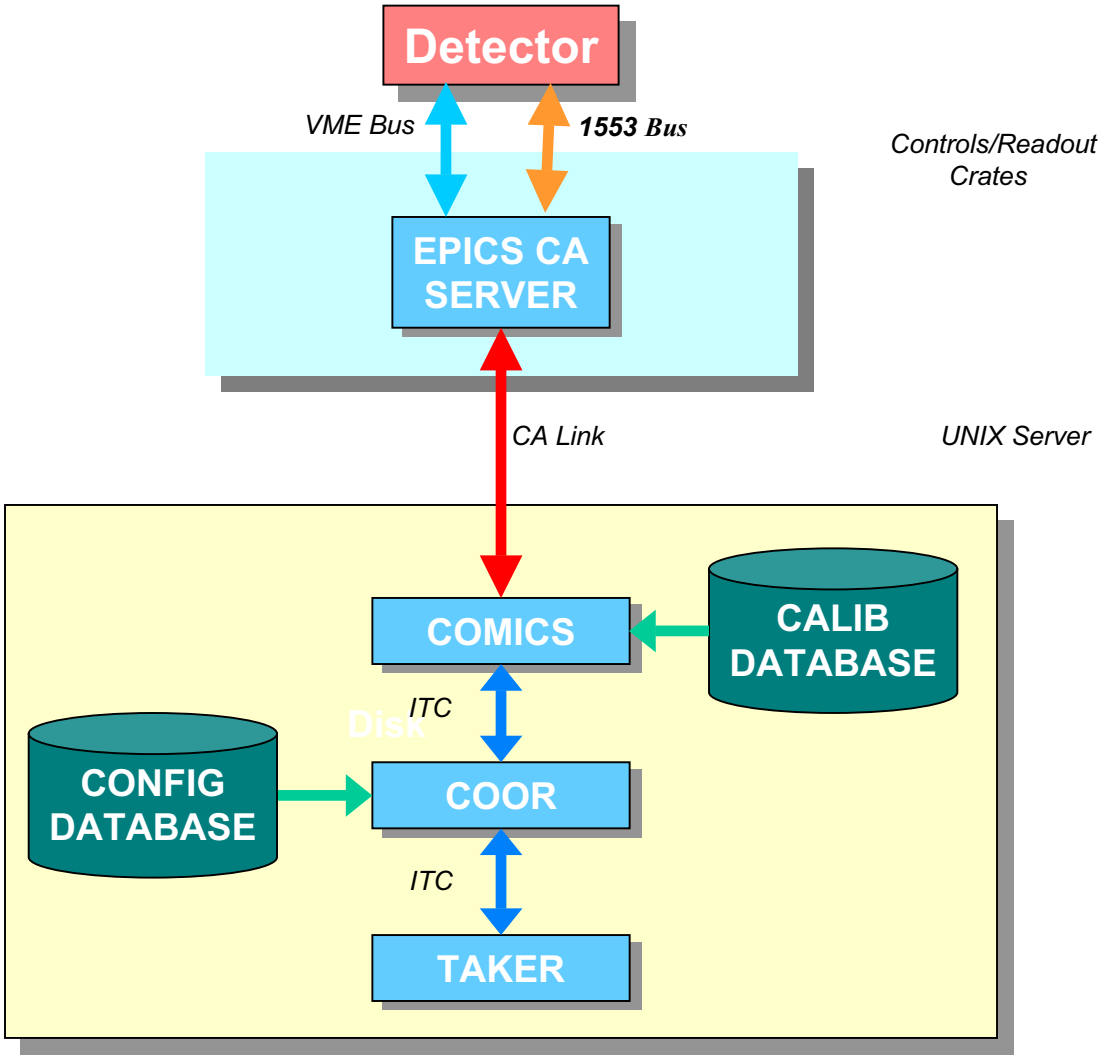


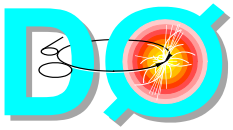
Outline - Part II

- How COMICS is structured
  - Download tree
  - Class diagram
  - Tree Nodes
  - Action Nodes



Download Overview

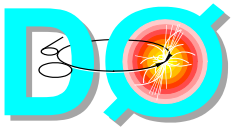




September 29, 2003

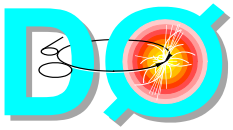
Download System Components

- TAKER
  - Operator interface for COOR
- COOR
  - Run state manager
- COMICS
  - Detector configuration manager
- EPICS
  - Distributed control system
- Detector
  - If you don't know what this is, you are in the wrong tutorial

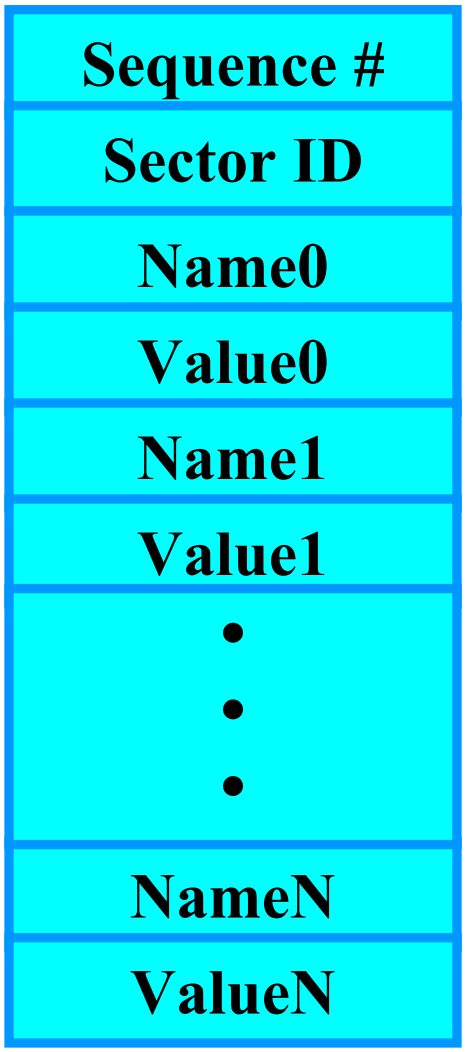


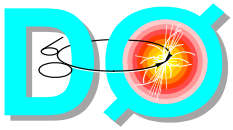
COOR Message

- Message is a text string composed of words separated by white space
- Order of word units
  - Sequence number (generated by COOR)
  - Sector name
  - Name/Value pairs
    - Unspecified number
    - Value may be:
      - String
      - Integer number
      - Floating point number



COOR Message Format

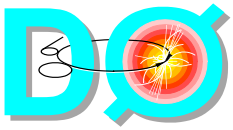




September 29, 2003

COOR Message

- Proposed convention: a required name/value pair designates the run type
  - Name - RUNTYPE
  - Values: DATA, CALIB, PEDS, GAINS, ••• ?
  - Used to select a set of download values for each device



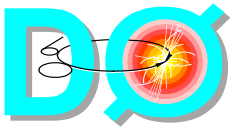
EPICS Naming Convention

- **Name elements**
  - Detector <det> CAL
  - Sub-det <sub> N
  - Device <dev> VBD
  - Locator <loc> 01
  - Attribute <attr> STATUS
  - I/O <io> W
  - Field <field> SCAN
- **Template**

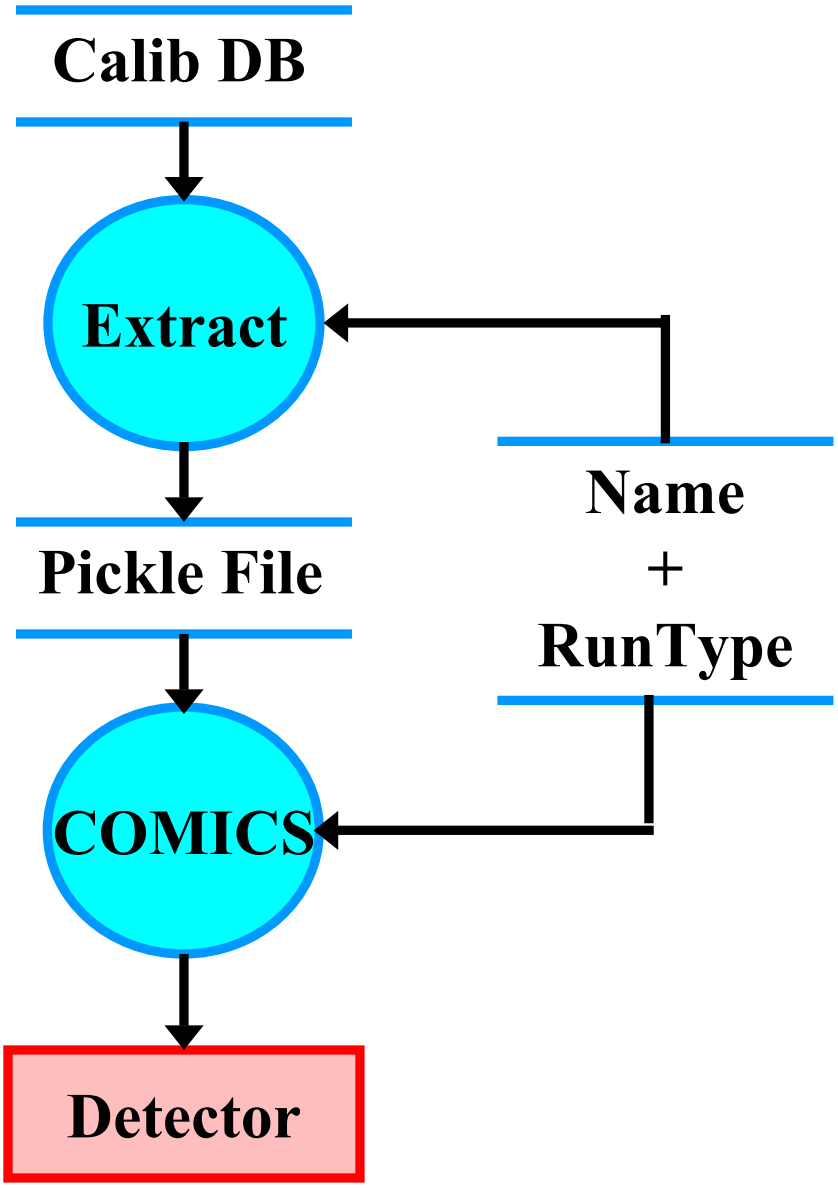
<det>[<sub>]_<dev>_<loc>[/<attr>[:<io>]].[<field>]

- **Example**

CALN_VBD_01/STATUS:W.SCAN



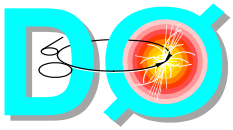
ORACLE Database Extraction



Pickle File Name Convention

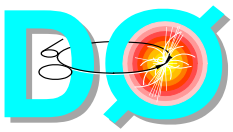
- Pickle file name elements
  - EPICS PV name <name> (CALN_VBD_01)
  - Run type (STD) <rtype>
  - Extension (.pic)
- Template

  <name>:<rtype>.pic
- Example
  - CALN_VBD_01:CALIB.pic



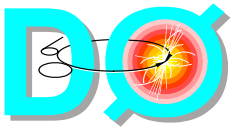
Generating a Pickle File

```
# Python program to write a pickle file

import sys, pickle

# Construct the data table

table = [0, 1, 2, 3, 4]

# Construct the pickle file name

dirName = '/online/comics/muo/'
devName = 'MUO_HV_01:CALIB'
fileName = dirName + devName + '.pic'

# Open the pickle-format file

file = open(fileName, 'w')
p = pickle.Pickler(file, 1)

# Write the table to the file

p.dump(table)
file.close()
```



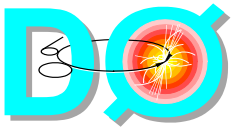
COMICS

- Manages the configuration of the detector
- Coded in the Python language
- Receives sector load requests from COOR
  - A sector is the smallest detector component managed by COOR
  - Sectors may be shared by different runs if the sector configurations match



COMICS

- Download map is a directed graph (tree)
  - Tree node (intermediate)
  - Action node (leaf)
- COOR run parameters
  - Encapsulated in a ComicsRunParams object
  - Passed to all nodes
- Constructed on the server model with multiple clients sending commands

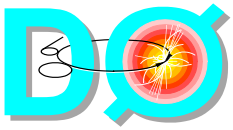


ComicsTalk Client

- COMICS may be activated independently for configuring detector components
- Start with shell commands

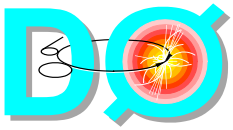
  setup comics
  ComicsTalk.*py*

- Commands
  - exec <statement>
    - Execute a Python statement in the COMICS context (expert)
  - exit
    - Exit ComicsTalk and disconnect from the COMICS server

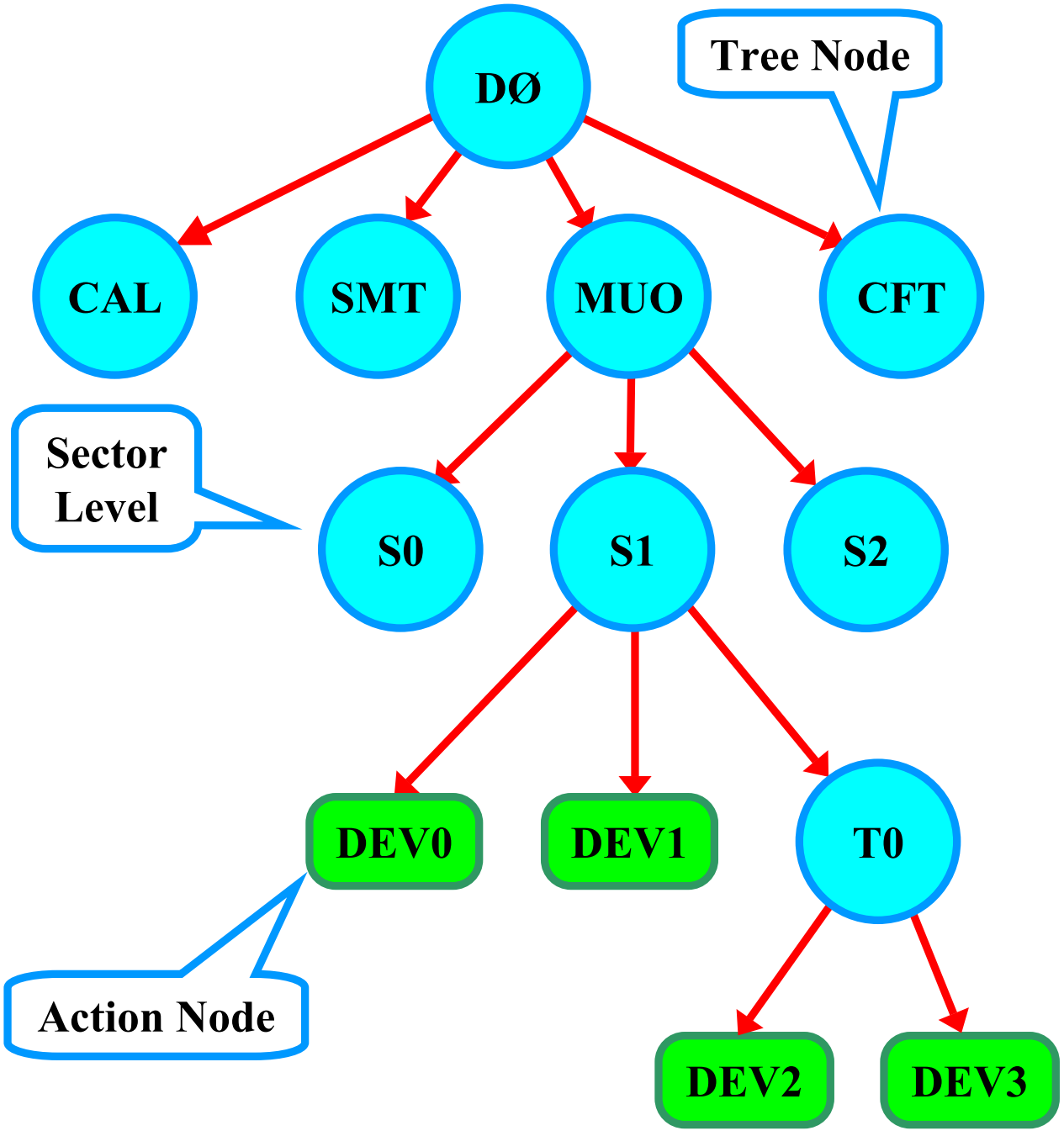


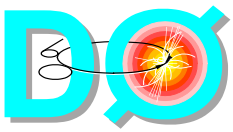
ComicsTalk Client

- Commands (continued)
  - help
    - Display help text
  - quit
    - Exit ComicsTalk and terminate the COMICS server
  - set <sub-tree> [<args>]
    - Load a sub-tree
    - Optional arguments
      - name/value pairs
      - provides load variations
      - example - “RUNTYPE CALIB”
  - show <sub-tree>
    - Show a sub-tree structure



Download Tree Structure





September 29, 2003