

# Feicim

## A browser for data and algorithms

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For

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# Overview



1. Motivation
2. Functions
3. Software architecture
4. Demonstration
5. Conclusions and outlook

## Image of “How physicists make measurements”

- ↓ View and understand detector level variables
- ↓ View and verify higher level quantities
- ↓ Create and view physics quantities
- ↓ Analyse physics quantities
- ↓ Create, view, analyse control channels/systematics
- ↪ Present, review and publish result

Image of “How physicists make measurements”

↓ View and understand detector level variables

Reality: All of that, **BUT...**

- ▶ Approx. 6 months to get comfortable with code
  - ▶ Data set discovery
  - ▶ Data discovery
  - ▶ Algorithm discovery
- ▶ Time spent finding and extracting information, particularly
  - ▶ During commissioning / detector understanding phase
  - ▶ For new-comers

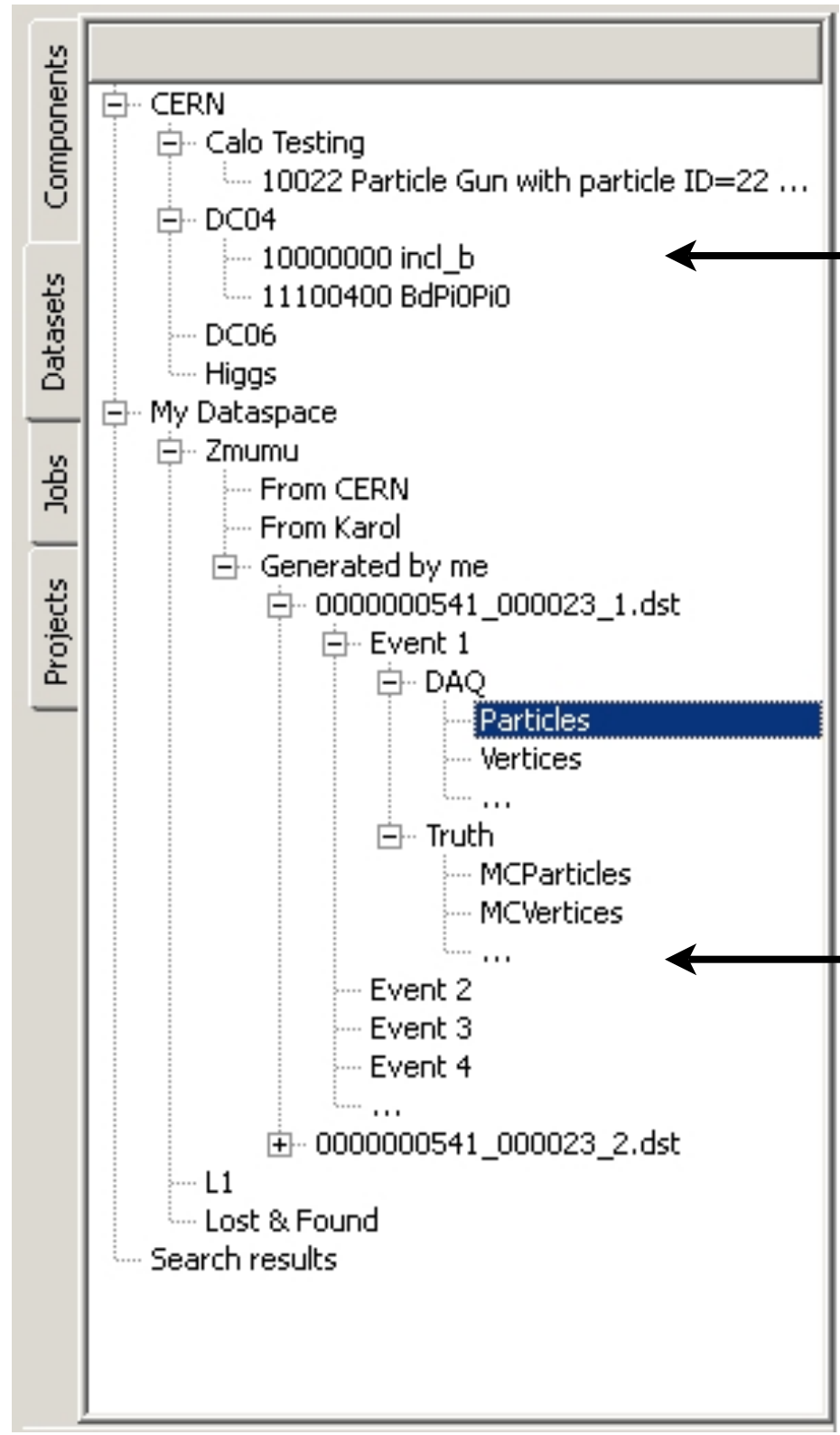




Feicim will be a  
browser for...

- ① Data-files (DSTs) location and content
  - ▶ Locate data (interface to Grid)
  - ▶ View data and histogram variable(s)
  - ▶ Simple filtering
  
- ② Algorithms and tools
  - ▶ View existing algorithms/tools
  - ▶ Create new algorithms/tools
  
- ③ Analysis jobs
  - ▶ Combine algorithms (visually)
  - ▶ Output subset of DST as a Root file or MicroDST
  - ▶ Run on grid using Ganga/Dirac

# ① Browse data location

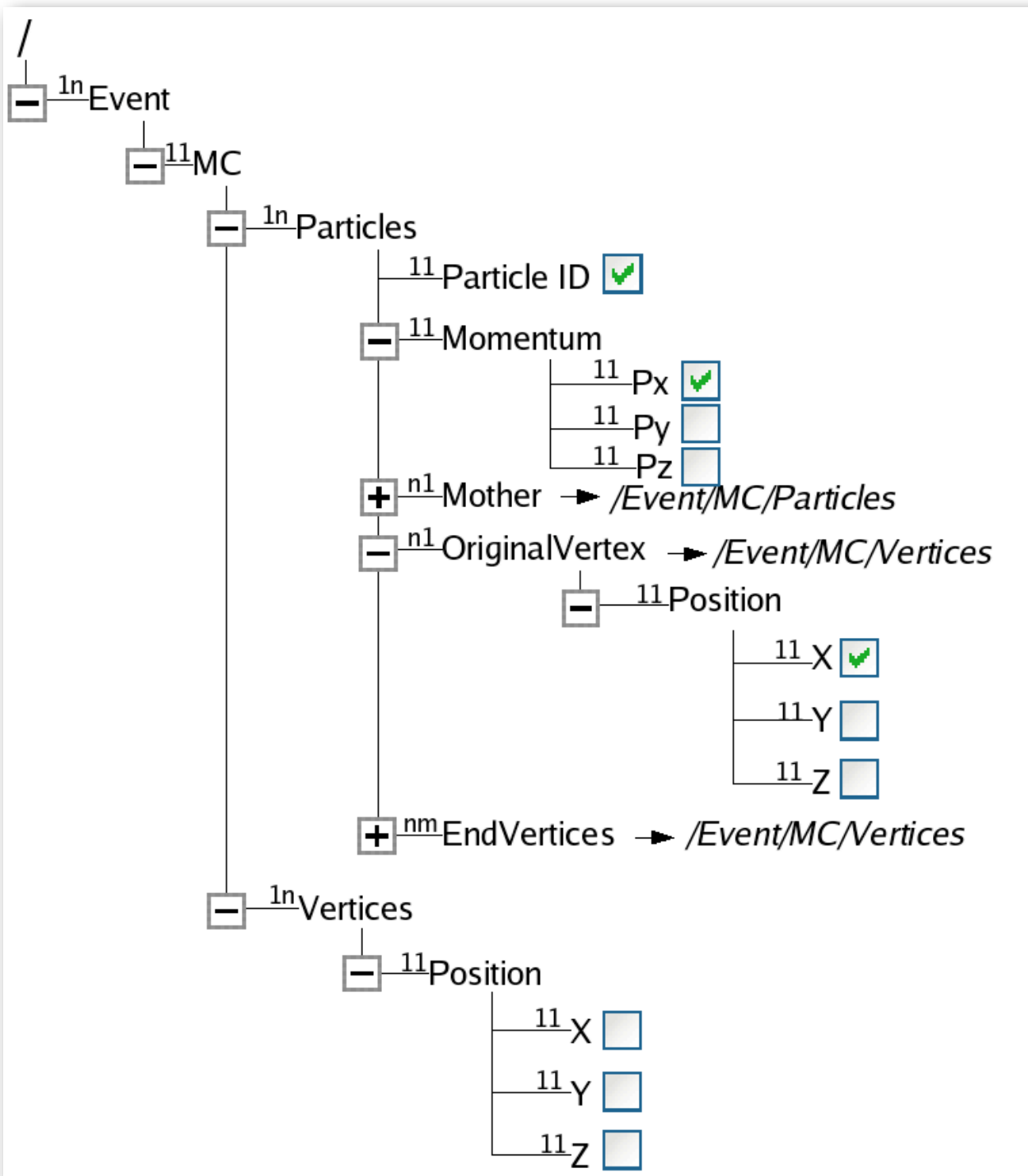


CERN data (via Grid)

➤ Find data-files on Grid or local machine

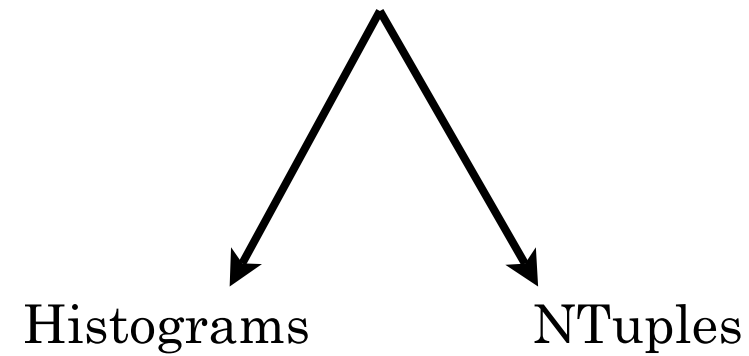
Local data

# ① Data browsing



➤ DST represented as tree

➤ Selection with box ticking



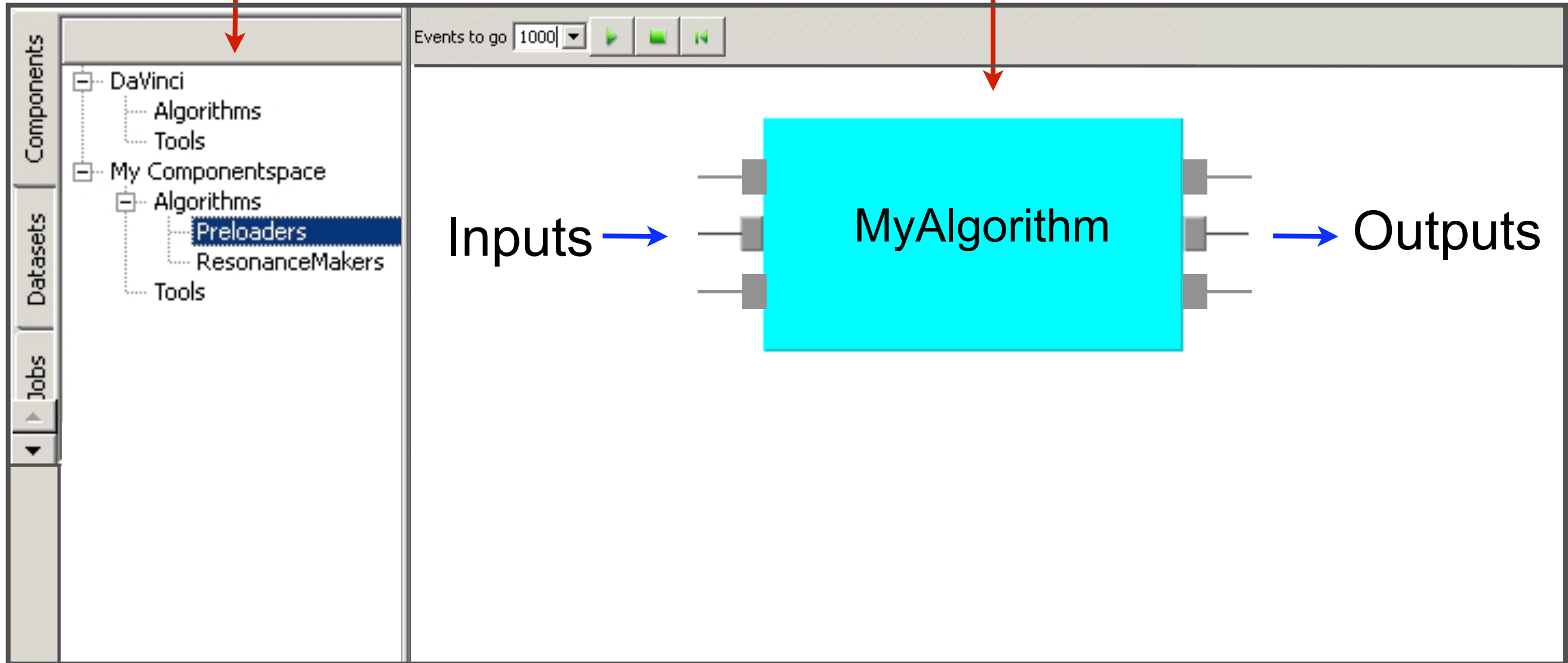
➤ Simple selection/filtering can also be done

## ② Browsing algorithms and tools

(Concept!)

Algorithm/tool list

Editing workspace



Drag algorithm from list  
into workspace for editing

## ② Browsing algorithms and tools (Concept!)

Algorithm/tool list

Editing workspace

The screenshot displays the LHCb software interface. On the left, a 'Components' tree shows a hierarchy: DaVinci (Algorithms, Tools) and My Componentspace (Algorithms, Preloaders, ResonanceMakers, Tools). The 'Preloaders' sub-item is selected. The main workspace, titled 'Editing workspace', features a control bar with 'Events to go' set to 1000 and play/pause/stop buttons. In the center, a cyan box labeled 'MyAlgorithm' has three input ports on the left and three output ports on the right, with blue arrows labeled 'Inputs' and 'Outputs'. A configuration window for 'ParticlePreLoader' is open, showing fields for 'Instance name' (ParticlePreLoader), 'DecayDescriptor' (Decayd), 'PrintSelResult' (value2), and 'AvoidSelResult' (radio buttons for value0, value1, value2). 'Apply' and 'Finished' buttons are at the bottom.

Click on algorithm box to see/configure parameters

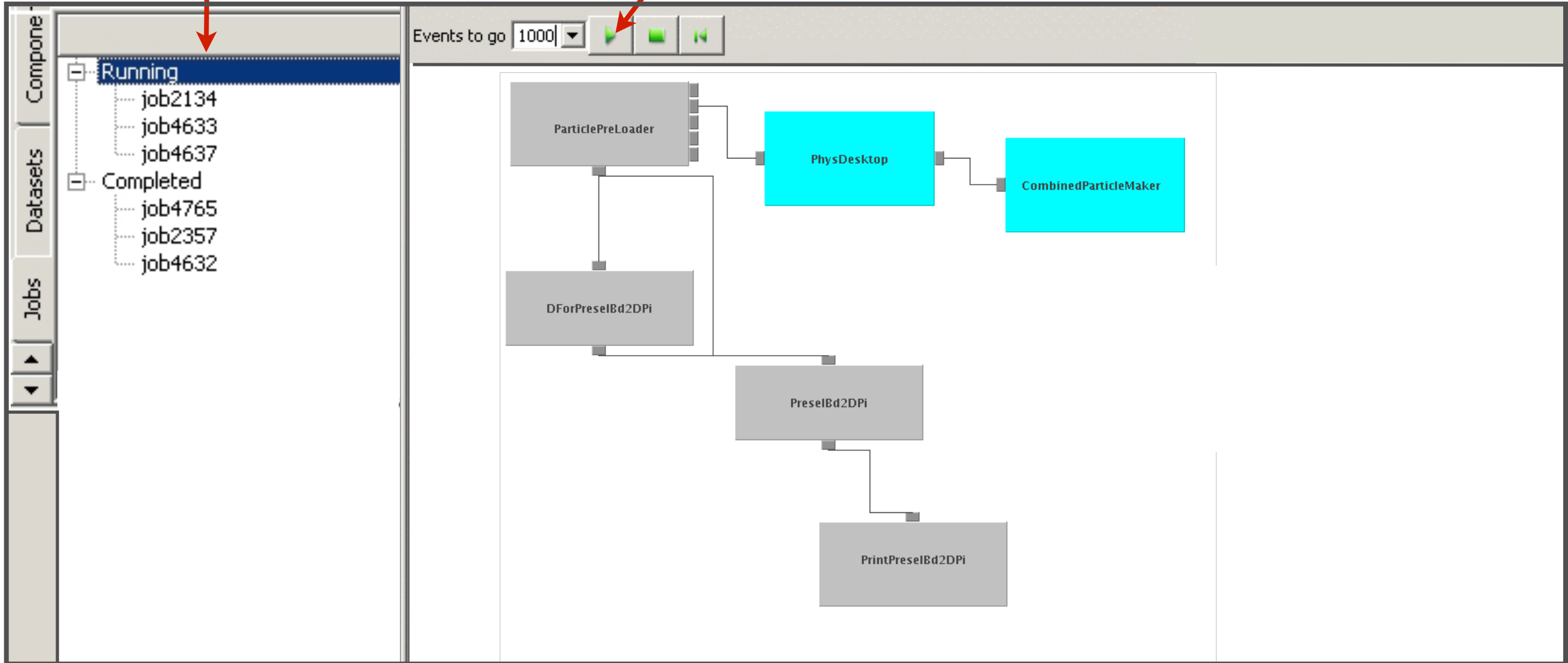
# ③ Browser for analysis jobs

(Concept!)

View jobs

Run jobs

→ To Grid  
(using Ganga/Dirac)



Connect algorithms together  
(built in type checking)

Choose number of evts and  
submit to Grid

# What is Feicim?



Fully tested

## ① Data-files (DSTs) location and content

- ▶ Locate data (interface to Grid)
- ▶ View data and histogram variable(s)
- ▶ Simple filtering

## ② Algorithms and tools

- ▶ View existing algorithms/tools
- ▶ Create new algorithms/tools

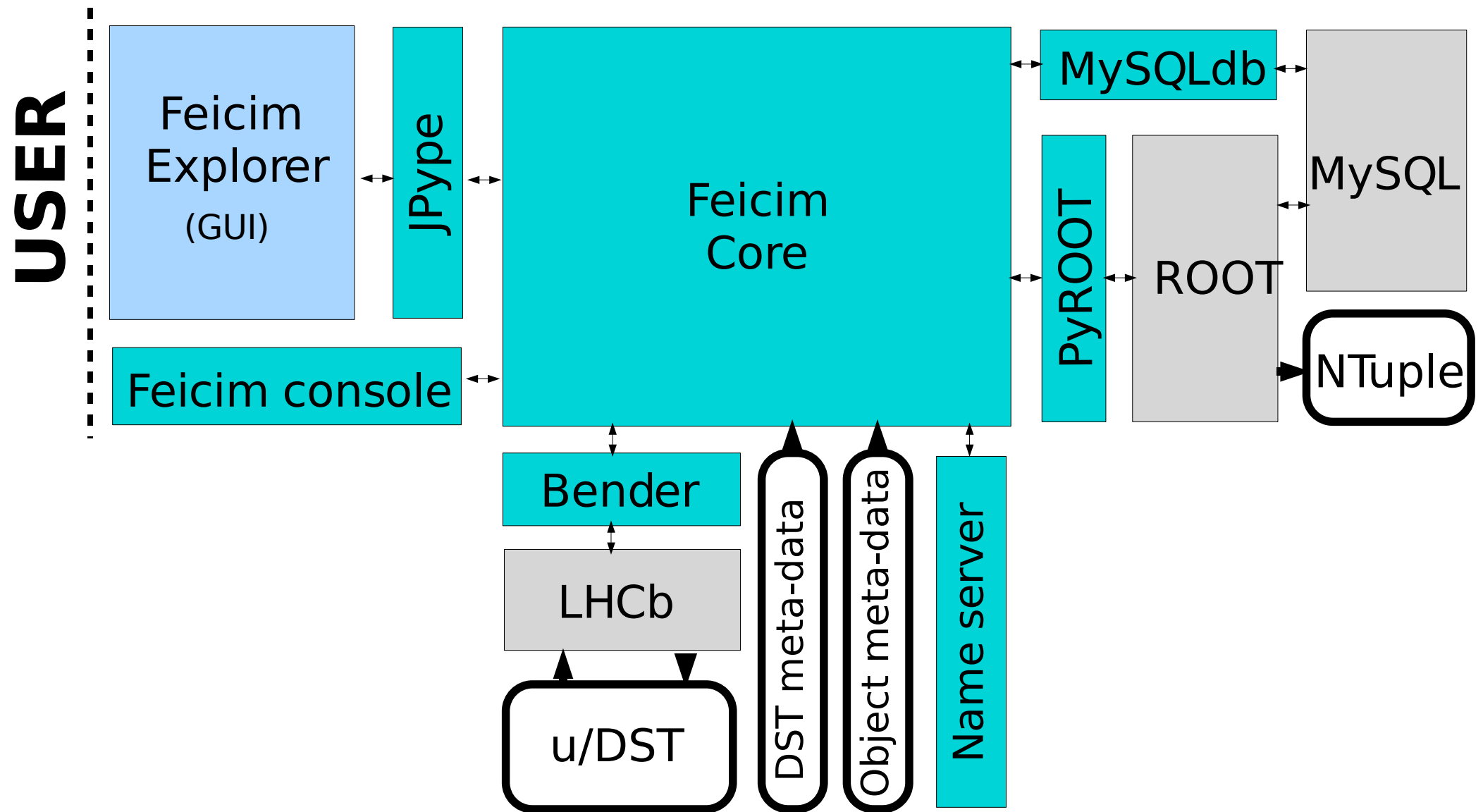
## ③ Analysis jobs

- ▶ Combine algorithms (visually)
- ▶ Output subset of DST as a Root file or MicroDST
- ▶ Run on grid using Ganga/Dirac

# Software architecture (for data browsing)



- Java
- Python
- Native
- Data

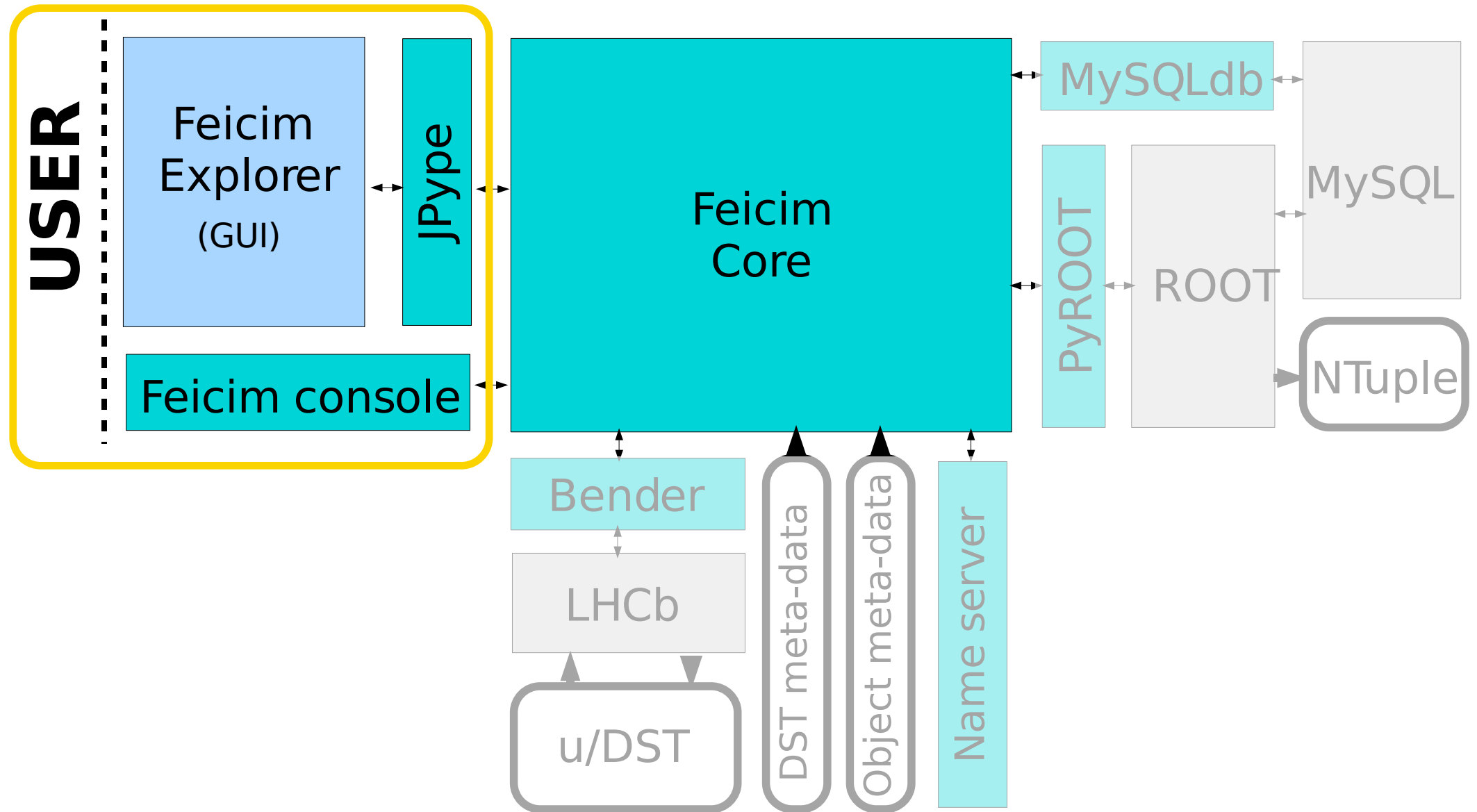




# Software architecture (for data browsing)



- Java
- Python
- Native
- Data

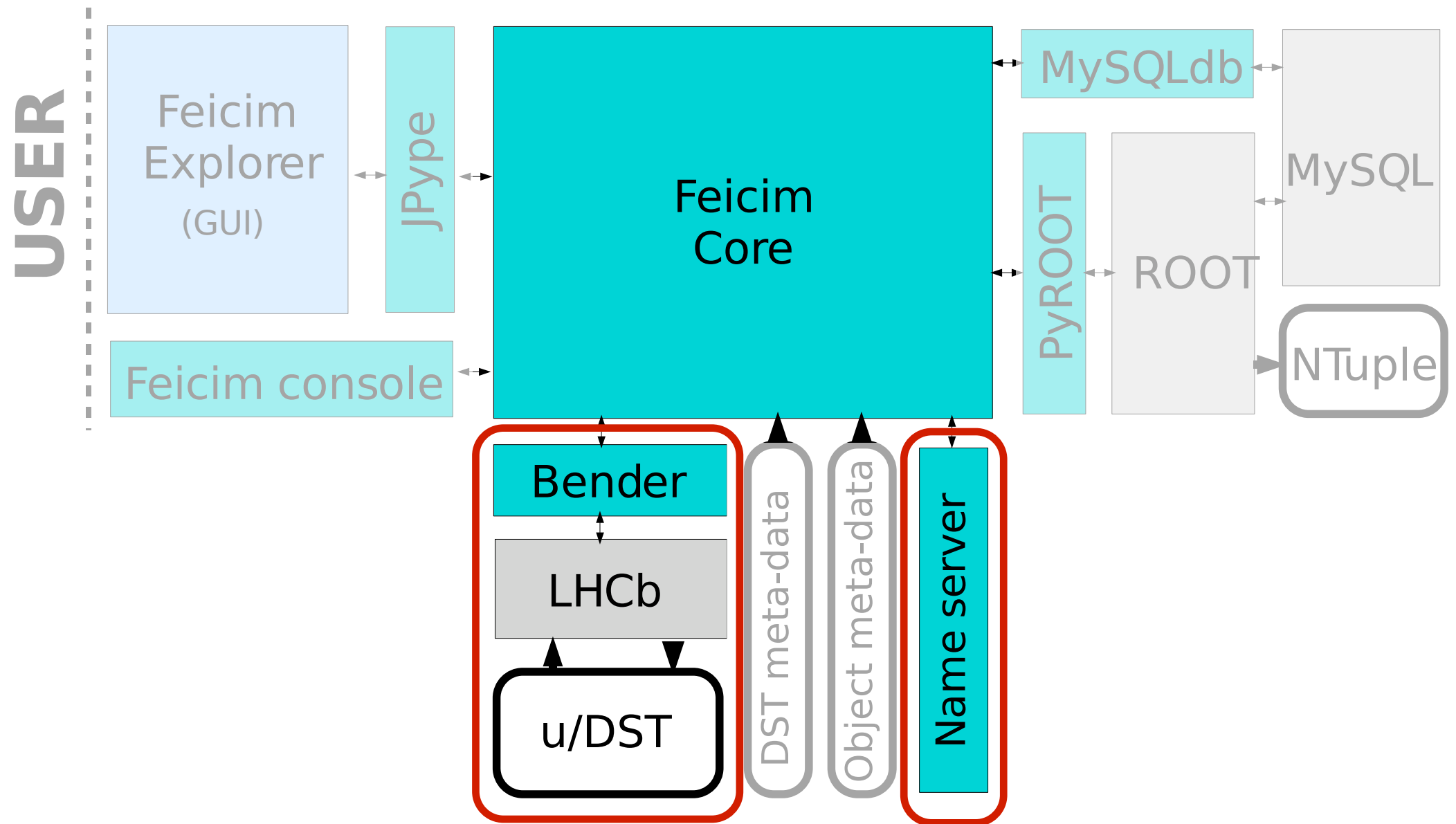


Feicim can be used via a GUI or a Python console

# Software architecture (for data browsing)



- Java
- Python
- Native
- Data

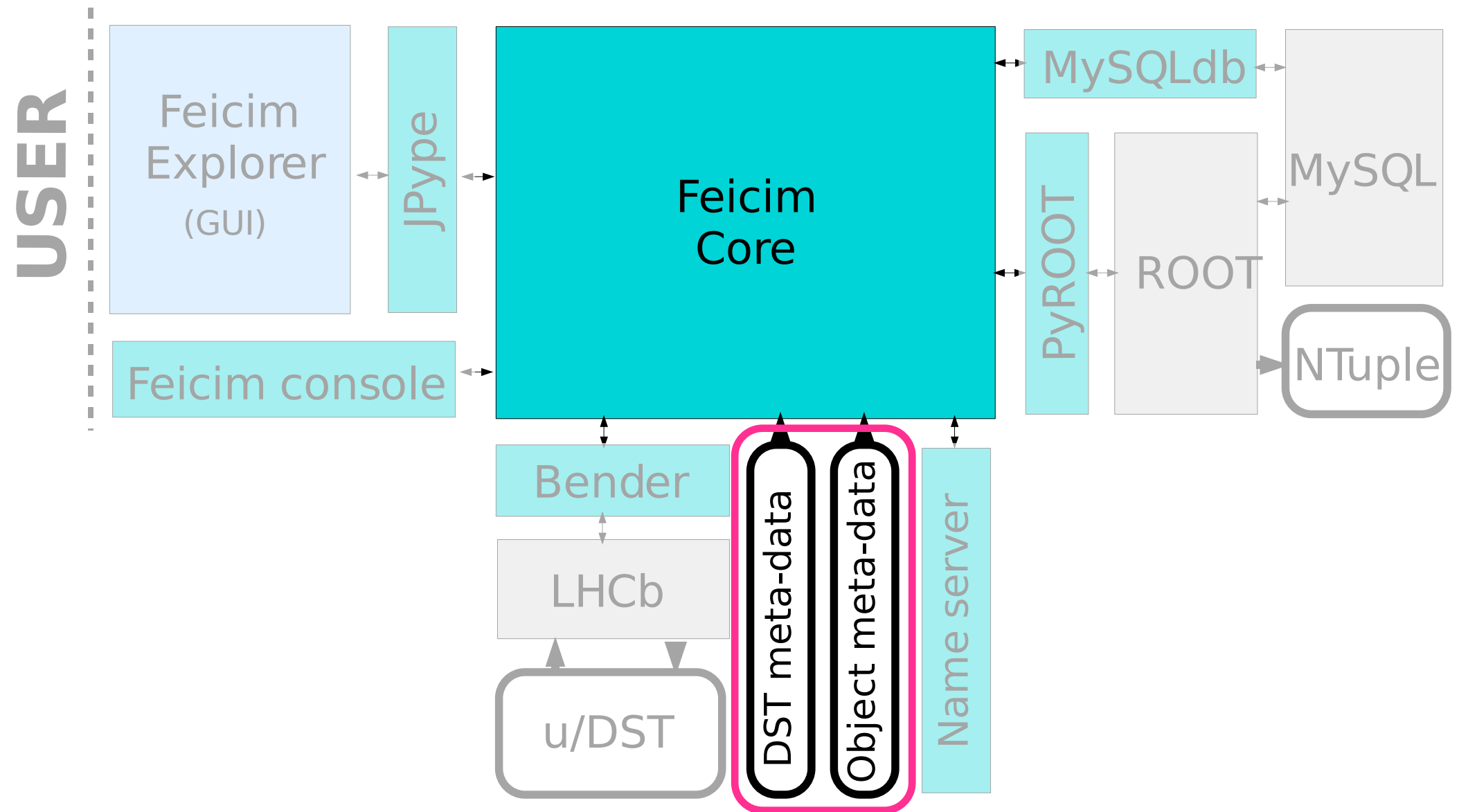


DST's are located (on Grid) using a Name Server and loaded using Bender as an interface to the LHCb software framework

# Software architecture (for data browsing)



- Java
- Python
- Native
- Data

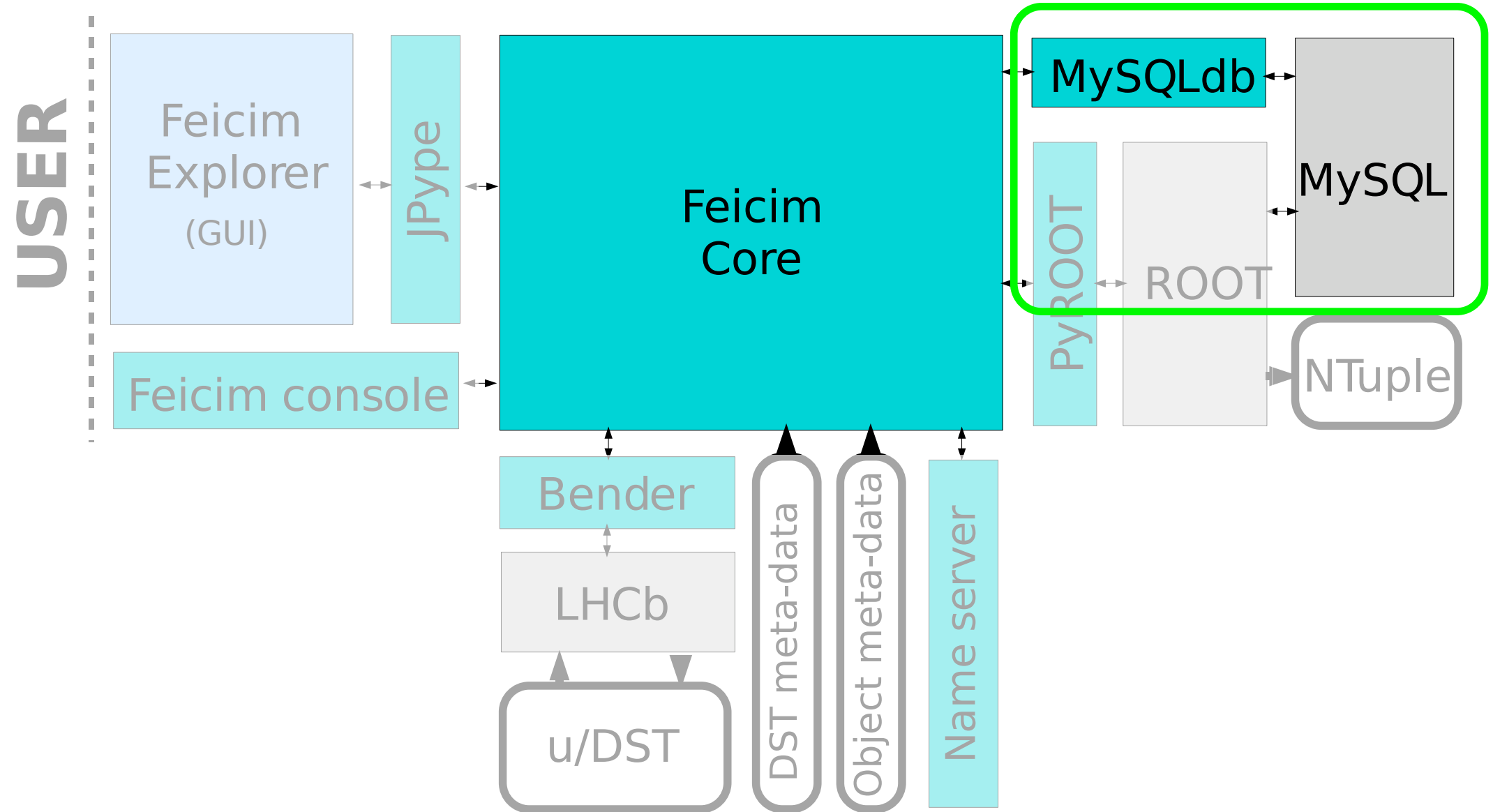


Associated DST and object meta-data is loaded

# Software architecture (for data browsing)



- Java
- Python
- Native
- Data

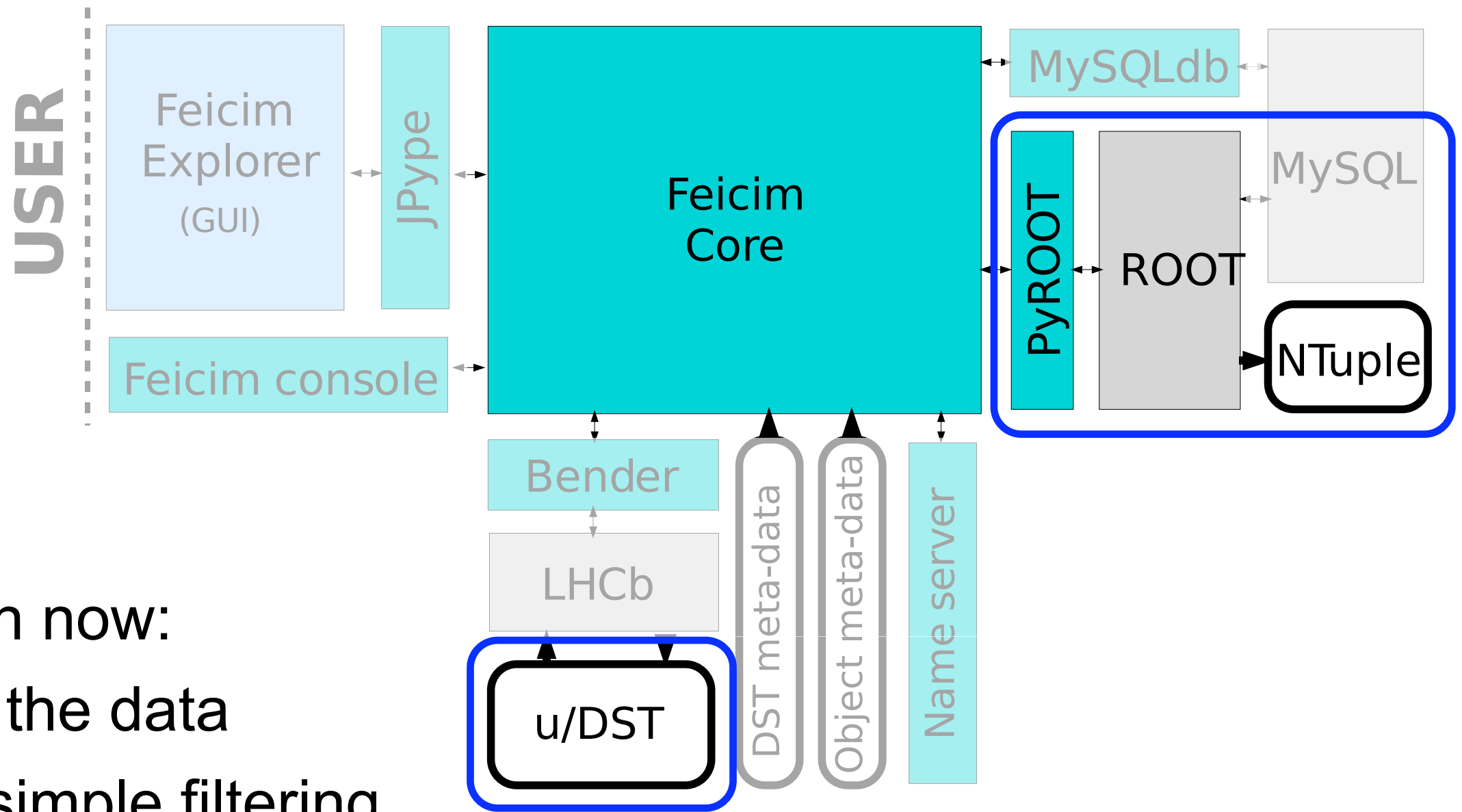


The data stored in the DST is put into a database using MySQL

# Software architecture (for data browsing)



- Java
- Python
- Native
- Data



The user can now:

- ▶ examine the data
- ▶ perform simple filtering
- ▶ create histograms/NTuples (ROOT)
- ▶ create MicroDST's (LHCb software)

# Demonstration



See these URLs for **videos**:

<http://www.ucd.ie/physics/lhcb/dget/demo.htm>

<http://www.ucd.ie/physics/lhcb/dget/demo1.htm>

# Demonstration

Choose between local or CERN file-space



Clicking is highlighted in red

The screenshot displays a web browser window with the URL `http://www.ucd.ie/physics/lhcb/dget/demo1.htm`. The page content is titled "Feicim Demo" and features a "Feicim Explorer" interface. On the left, a "Menu" section shows a tree view with "noname", "/Local", and "/CERN". The "/CERN" folder is circled in red, and a black arrow points from the yellow text box above to it. Below the menu are buttons for "Browse...", "Query", "Read", "Rewind", and "Export". A table with columns "name", "link", and "alias" is visible, containing "Event" and "MC". The status bar at the bottom shows "Done" and "Internet".



## Browse CERN file-space



Clicking is highlighted in red

Feicim Demo

Feicim Explorer

Menu

- /CERN
  - CFG\_RobustnessTest Spring03 - 1
  - CFG\_DC04 - v1noM1
  - CFG\_Calo-Testing -
  - CFG\_Calo-Testing - v1**
  - CFG\_RTTC - v1
  - CFG\_RobustnessTest Spring03 - 4
  - CFG\_RobustnessTest Spring03 - 5
  - CFG\_RobustnessTest Spring03 - 6
  - CFG\_RTTC - v1-lumi-3
  - CFG\_DC04 - v2-lumi-1
  - CFG\_RobustnessTest Spring03 - 2
  - CFG\_Rich Testing -
  - CFG\_tagHLT - v1
  - CFG\_Calo Testing -
  - CFG\_DC06 - phys-v2-lumi2
  - CFG\_DC06 - phys-v2-lumi5
  - CFG\_Stripping-DC06 - v1-lumi5
  - CFG\_GaussBooleBrunelTest - v1
  - CFG\_DC04 - v2r3
  - CFG\_DC06 - phys-v2-450GeV-CloseVelo-BOff
  - CFG\_Stripping-DC06 - v1
  - CFG\_BeamGas - v1
  - CFG\_RTTC - v1r0
  - CFG\_DC06 - v1-lumi5
  - CFG\_DC06 - v1-lumi2
  - CFG\_Higgs - v1-AcerMC
  - CFG\_DC06 - phys-v2-450GeV-OpenVelo-BOff
  - CFG\_DC04 - v2-lumi-5-matt
  - CFG\_DC06 - phys-v2-lumi2-HidValley
  - CFG\_Calo Testing - v1

Files Query result

name
[CFG_RobustnessTest Spring03 - 1]
[CFG_DC04 - v1noM1]
[CFG_Calo-Testing - ]
[CFG_Calo-Testing - v1]
[CFG_RTTC - v1]
[CFG_RobustnessTest Spring03 - 4]
[CFG_RobustnessTest Spring03 - 5]
[CFG_RobustnessTest Spring03 - 6]
[CFG_RTTC - v1-lumi-3]
[CFG_DC04 - v2-lumi-1]
[CFG_RobustnessTest Spring03 - 2]
[CFG_Rich Testing - ]
[CFG_tagHLT - v1]
[CFG_Calo Testing - ]
[CFG_DC06 - phys-v2-lumi2]
[CFG_DC06 - phys-v2-lumi5]
[CFG_Stripping-DC06 - v1-lumi5]
[CFG_GaussBooleBrunelTest - v1]
[CFG_DC04 - v2r3]
[CFG_DC06 - phys-v2-450GeV-CloseVelo-BOff]
[CFG_Stripping-DC06 - v1]
[CFG_BeamGas - v1]
[CFG_RTTC - v1r0]
[CFG_DC06 - v1-lumi5]
[CFG_DC06 - v1-lumi2]
[CFG_Higgs - v1-AcerMC]
[CFG_DC06 - phys-v2-450GeV-OpenVelo-BOff]
[CFG_DC04 - v2-lumi-5-matt]
[CFG_DC06 - phys-v2-lumi2-HidValley]
[CFG_Calo Testing - v1]
[CFG_GlobalRobustness Spring03 - ]
[CFG_Stripping - v1]
[CFG_Stripping - v2]



## Browse CERN file-space



Clicking is highlighted in red

http://www.ucd.ie/physics/lhcb/dget/demo1.htm - Windows Internet Explorer

http://www.ucd.ie/physics/lhcb/dget/demo1.htm

Google

Go

Bookmarks

297 blocked

Check

AutoLink

AutoFill

Send to

Settings

http://www.ucd.ie/physics/lhcb/dget/dem...

Home

Page

Tools

Intranet settings are now turned off by default. Intranet settings are less secure than Internet settings. Click for options...

### Feicim Demo

Feicim Explorer

Menu

- /CERN
  - CFG\_RobustnessTest Spring03 - 1
  - CFG\_DC04 - v1noM1
  - EVT\_13144000**
  - EVT\_30000000
  - EVT\_11911000
  - EVT\_15911000
  - EVT\_13911000
  - EVT\_12911000
  - CFG\_Calo-Testing -
  - CFG\_Calo-Testing - v1
  - CFG\_RTTC - v1
  - CFG\_RobustnessTest Spring03 - 4
  - CFG\_RobustnessTest Spring03 - 5
  - CFG\_RobustnessTest Spring03 - 6
  - CFG\_RTTC - v1-lumi-3
  - CFG\_DC04 - v2-lumi-1
  - CFG\_RobustnessTest Spring03 - 2
  - CFG\_Rich Testing -
  - CFG\_tagHLT - v1
  - CFG\_Calo Testing -
  - CFG\_DC06 - phys-v2-lumi2
  - CFG\_DC06 - phys-v2-lumi5
  - CFG\_Stripping-DC06 - v1-lumi5
  - CFG\_GaussBooleBrunelTest - v1
  - CFG\_DC04 - v2r3
  - CFG\_DC06 - phys-v2-450GeV-CloseVelo-BOff
  - CFG\_Stripping-DC06 - v1
  - CFG\_BeamGas - v1
  - CFG\_RTTC - v1r0
  - CFG\_DC06 - v1-lumi5

Files

Query result

name
[EVT_13144000]
[EVT_30000000]
[EVT_11911000]
[EVT_15911000]
[EVT_13911000]
[EVT_12911000]

Done

Internet

100%

## Browse CERN file-space



Clicking is highlighted in red

http://www.ucd.ie/physics/lhcb/dget/demo1.htm - Windows Internet Explorer

http://www.ucd.ie/physics/lhcb/dget/demo1.htm

Google

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http://www.ucd.ie/physics/lhcb/dget/dem...

Page

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### Feicim Demo

Feicim Explorer

Menu

- /CERN
  - CFG\_RobustnessTest Spring03 - 1
  - CFG\_DC04 - v1noM1
    - EVT\_13144000
      - RPL\_Lyon
      - RPL\_GridKa**
      - RPL\_CERN
      - RPL\_RAL
      - RPL\_PIC
      - RPL\_NIKHEF
      - RPL\_CNAF
    - EVT\_30000000
    - EVT\_11911000
    - EVT\_15911000
    - EVT\_13911000
    - EVT\_12911000
  - CFG\_Calo-Testing -
  - CFG\_Calo-Testing - v1
  - CFG\_RTTC - v1
  - CFG\_RobustnessTest Spring03 - 4
  - CFG\_RobustnessTest Spring03 - 5
  - CFG\_RobustnessTest Spring03 - 6
  - CFG\_RTTC - v1-lumi-3
  - CFG\_DC04 - v2-lumi-1
  - CFG\_RobustnessTest Spring03 - 2
  - CFG\_Rich Testing -
  - CFG\_tagHLT - v1
  - CFG\_Calo Testing -
  - CFG\_DC06 - phys-v2-lumi2
  - CFG\_DC06 - phys-v2-lumi5
  - CFG\_Stripping-DC06 - v1-lumi5

Files

Query result

name
[RPL_Lyon]
[RPL_GridKa]
[RPL_CERN]
[RPL_RAL]
[RPL_PIC]
[RPL_NIKHEF]
[RPL_CNAF]

Done

Internet

100%



## Browse CERN file-space



Clicking is highlighted in red

http://www.ucd.ie/physics/lhcb/dget/demo1.htm - Windows Internet Explorer

http://www.ucd.ie/physics/lhcb/dget/demo1.htm

Google

Go

Bookmarks

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http://www.ucd.ie/physics/lhcb/dget/dem...

Home

Page

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### Feicim Demo

Feicim Explorer

Menu

- /CERN
  - CFG\_RobustnessTest Spring03 - 1
  - CFG\_DC04 - v1noM1
    - EVT\_13144000
      - RPL\_Lyon
      - RPL\_GridKa
      - RPL\_CERN
      - FLT\_SIM 1**
      - FLT\_DST 1
      - FLT\_DIGI 1
    - RPL\_RAL
    - RPL\_PIC
    - RPL\_NIKHEF
    - RPL\_CNAF
  - EVT\_30000000
  - EVT\_11911000
  - EVT\_15911000
  - EVT\_13911000
  - EVT\_12911000
  - CFG\_Calo-Testing -
  - CFG\_Calo-Testing - v1
  - CFG\_RTTC - v1
  - CFG\_RobustnessTest Spring03 - 4
  - CFG\_RobustnessTest Spring03 - 5
  - CFG\_RobustnessTest Spring03 - 6
  - CFG\_RTTC - v1-lumi-3
  - CFG\_DC04 - v2-lumi-1
  - CFG\_RobustnessTest Spring03 - 2
  - CFG\_Rich Testing -
  - CFG\_tagHLT - v1
  - CFG\_Calo Testing -

Files Query result

name
[FLT_SIM 1]
[FLT_DST 1]
[FLT_DIGI 1]

Done Internet 100%

## Browse CERN file-space



Clicking is highlighted in red

http://www.ucd.ie/physics/lhcb/dget/demo1.htm - Windows Internet Explorer

http://www.ucd.ie/physics/lhcb/dget/demo1.htm

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### Feicim Demo

Feicim Explorer

Menu

- /CERN
  - CFG\_RobustnessTest Spring03 - 1
  - CFG\_DC04 - v1noM1
    - EVT\_13144000
      - RPL\_Lyon
      - RPL\_GridKa
      - RPL\_CERN
        - FLT\_SIM 1
        - FLT\_DST 1
          - DBV\_v22r2**
          - DBV\_ANY
        - FLT\_DIGI 1
      - RPL\_RAL
      - RPL\_PIC
      - RPL\_NIKHEF
      - RPL\_CNAF
    - EVT\_30000000
    - EVT\_11911000
    - EVT\_15911000
    - EVT\_13911000
    - EVT\_12911000
  - CFG\_Calo-Testing -
  - CFG\_Calo-Testing - v1
  - CFG\_RTTC - v1
  - CFG\_RobustnessTest Spring03 - 4
  - CFG\_RobustnessTest Spring03 - 5
  - CFG\_RobustnessTest Spring03 - 6
  - CFG\_RTTC - v1-lumi-3
  - CFG\_DC04 - v2-lumi-1
  - CFG\_RobustnessTest Spring03 - 2
  - CFG\_Rich Testing -

Files Query result

name
[DBV_v22r2]
[DBV_ANY]

Done Internet 100%

## Browse CERN file-space



Clicking is highlighted in red

The screenshot shows a web browser window with the following elements:

- Address bar: `http://www.ucd.ie/physics/lhcb/dget/demo1.htm`
- Browser toolbar: Includes navigation buttons, search, and various utility icons.
- Page title: **Feicim Demo**
- Application window: **Feicim Explorer**
- Menu (Left):
  - /CERN
    - CFG\_RobustnessTest Spring03 - 1
    - CFG\_DC04 - v1noM1
      - EVT\_13144000
        - RPL\_Lyon
        - RPL\_GridKa
        - RPL\_CERN
          - FLT\_SIM 1
          - FLT\_DST 1
            - DBV\_v22r2
            - FT0\_DST 1** (highlighted in red)
            - DBV\_ANY
          - FLT\_DIGI 1
        - RPL\_RAL
        - RPL\_PIC
        - RPL\_NIKHEF
        - RPL\_CNAF
      - EVT\_30000000
      - EVT\_11911000
      - EVT\_15911000
      - EVT\_13911000
      - EVT\_12911000
    - CFG\_Calo-Testing -
    - CFG\_Calo-Testing - v1
    - CFG\_RTTC - v1
    - CFG\_RobustnessTest Spring03 - 4
    - CFG\_RobustnessTest Spring03 - 5
    - CFG\_RobustnessTest Spring03 - 6
    - CFG\_RTTC - v1-lumi-3
    - CFG\_DC04 - v2-lumi-1
    - CFG\_RobustnessTest Spring03 - 2

- Files (Right):
- Files
- Query result
  - name
  - [FT0\_DST 1]



## Browse CERN file-space



Clicking is highlighted in red

The screenshot shows a Windows Internet Explorer browser window displaying the 'Feicim Demo' page. The browser's address bar shows the URL 'http://www.ucd.ie/physics/lhcb/dget/demo1.htm'. The page content includes a 'Feicim Explorer' window with a tree view of the CERN file system. The tree view shows a hierarchy of folders under '/CERN', with 'PR0\_ANY' highlighted in red. The 'Files' pane on the right shows a single folder '[FT1\_DIGI 1]'. The browser's status bar at the bottom shows 'Done' and 'Internet'.

## Browse CERN file-space



Clicking is highlighted in red

The screenshot shows a web browser window with the URL `http://www.ucd.ie/physics/lhcb/dget/demo1.htm`. The page title is "Feicim Demo". The main content area is divided into two panes. The left pane, titled "Menu", shows a hierarchical tree structure of folders under the root "/CERN". The right pane, titled "Files", shows a "Query result" table with a single column "name". The table contains two entries: "[PR1\_Boole - v5r9]" and "[PR1\_ANY]". The entry "[PR1\_Boole - v5r9]" is highlighted in red, and a mouse cursor is pointing at it. The status bar at the bottom of the browser shows "Done" and "Internet".







# Demonstration

Browse CERN file-space... view DSTs available



Clicking is highlighted in red

The screenshot displays a web browser window with the following elements:

- Address Bar:** `http://www.ucd.ie/physics/lhcb/dget/demo1.htm`
- Browser Tools:** Includes search, go, and various utility buttons.
- Page Title:** Feicim Demo
- Menu:** A tree view of the file system under `/CERN`. The folder `PR2_auus - v15` is highlighted in red.
- Files:** A table with a single column labeled 'name' containing a list of files, each named `00000725_000000XX_5.dst`.
- Status Bar:** Shows 'Done' and 'Internet'.



## Choose DST



Clicking is highlighted in red

The screenshot shows a Windows Internet Explorer browser window displaying a website titled 'Feicim Demo'. The website content includes a 'Menu' on the left with a tree view of folders under the path '/CERN'. The main area shows a 'Query result' table with a single column 'name' containing a list of files. The file '00000725\_0000054\_5.dst' is highlighted in red, and a red circle is drawn around it.

name
00000725_0000048_5.dst
00000725_0000060_5.dst
00000725_0000056_5.dst
00000725_0000062_5.dst
00000725_0000021_5.dst
00000725_0000058_5.dst
00000725_0000070_5.dst
00000725_0000045_5.dst
00000725_0000064_5.dst
00000725_0000061_5.dst
00000725_0000043_5.dst
00000725_0000069_5.dst
00000725_0000054_5.dst
00000725_0000065_5.dst
00000725_0000049_5.dst
00000725_0000067_5.dst
00000725_0000059_5.dst
00000725_0000050_5.dst
00000725_0000053_5.dst
00000725_0000057_5.dst
00000725_0000063_5.dst
00000725_0000055_5.dst
00000725_0000051_5.dst
00000725_0000007_5.dst
00000725_0000026_5.dst
00000725_0000052_5.dst
00000725_0000066_5.dst
00000725_0000042_5.dst
00000725_0000046_5.dst
00000725_0000047_5.dst
00000725_0000005_5.dst
00000725_0000002_5.dst
00000725_0000027_5.dst

Read in 10 events



Clicking is highlighted in red

The screenshot shows a web browser window displaying the 'Feicim Demo' interface. The browser's address bar shows the URL `http://www.ucd.ie/physics/lhcb/dget/demo.htm`. The interface includes a sidebar with navigation options like 'TWM Icon Manage', 'VNC config', and 'zotyo@lazar:~/workspace/Feicim/src'. The main content area features a 'Feicim Explorer' window with a menu containing 'Read', 'Rewind', 'Query', and 'Export' buttons. The 'Read' button is circled in red. Below the menu is a file list with columns for 'name', 'link', 'time', and 'fullpath'. The file list contains three entries: '[b]', 'jaja.txt', and 'comodi0.1.t...'. A log window on the left displays various system messages, including 'SUCCESS Property', 'INFO The histogram path is set', 'WARNING Service', and 'INFO Added successfully'.

name	link	time	fullpath
[b]	false	3:03 PM	/home/zot.
jaja.txt	false	2:56 PM	/home/zot.
comodi0.1.t...	false	2:12 PM	/home/zot.



# Demonstration

## LHCb software working in background



Clicking is highlighted in red

The screenshot shows a Windows Internet Explorer browser window displaying a VNC session. The browser address bar shows the URL `http://www.ucd.ie/physics/lhcb/dget/demo.htm`. The VNC session displays a terminal window with the following log output:

```
zotyo@lazar:~/workspace/Feicim/src
c
EventPersistenc... INFO Added successfully Conversion service:PoolRootTreeEvtC
nvSvc
EventPersistenc... INFO Added successfully Conversion service:PoolRootKeyEvtCn
vSvc
ApplicationMgr INFO Removed duplicate entries for modules : GaudiPoolDb(3)
ApplicationMgr INFO Successfully loaded modules :
EventPersistenc... INFO 'CnvServices':[ 'PoolRootEvtCnvSvc' , 'PoolRootTreeEv
tCnvSvc' , 'PoolRootKeyEvtCnvSvc' ]
start reading with <gaudimodule.AppMgr object at 0xb49747ac>
EventSelector INFO Stream:EventSelector_2 Def:DATAFILE='/home/zotyo/worksp
pace/dc06a,dst' TYP='POOL_ROOT' OPT='READ'
/home/zotyo/workspace/dc06a,dst Always Root file version:51200
/home/zotyo/workspace/dc06a,dst Always Root file version:51200
EventSelector SUCCESS Reading Event record 1. Record number within stream 1:
1
ChronoStatSvc INFO Number of skipped events for MemStat-1
Writing event 1
Writing event 2
Writing event 3
Writing event 4
Writing event 5
Writing event 6
```

The VNC session also shows a file explorer window with a query result table:

name	link	time	fullpath
[b]	false	3:03 PM	/home/zot.
jaja.txt	false	2:56 PM	/home/zot.
comodi0.1.t...	false	2:12 PM	/home/zot.

# Demonstration

10 events loaded... explore data



Clicking is highlighted in red

http://www.ucd.ie/physics/lhcb/dget/demo.htm - Windows Internet Explorer

http://www.ucd.ie/physics/lhcb/dget/demo.htm

Google

Go

Bookmarks

297 blocked

Check

AutoLink

AutoFill

Send to

Settings

http://www.ucd.ie/physics/lhcb/dget/dem...

Page

Tools

Intranet settings are now turned off by default. Intranet settings are less secure than Internet settings. Click for options...

### Feicim Demo

- TWM Icon Manage
- VNC config
- zotyo@lazar:~/workspac
- zotyo@lazar:~/workspac
- zotyo@lazar:~/workspace/Feicim/src

vSvc  
ApplicationMgr INFO Removed duplicate entrie  
ApplicationMgr INFO Successfully loaded modu  
EventPersistenc... INFO 'CnvServices':[ 'PoolRo  
tCnvSvc', 'PoolRootKeyEvtCnvSvc' ]  
start reading with <gaudimodule.AppMgr object at  
EventSelector INFO Stream:EventSelector\_2 I  
pace/dc06a.dst' TYP='POOL\_ROOT' OPT='READ'  
/hone/zotyo/workspace/dc06a.dst Always Root file  
/hone/zotyo/workspace/dc06a.dst Always Root file  
EventSelector SUCCESS Reading Event record 1.  
1  
ChronoStatSvc INFO Number of skipped event  
Writing event 1  
Writing event 2  
Writing event 3  
Writing event 4  
Writing event 5  
Writing event 6  
Writing event 7  
Writing event 8  
Writing event 9  
Writing event 10

### Feicim Explorer

zotyo@lazar:~/workspace/Feicim/src

Menu

zotyo/workspace/dc06a.dst Browse... Query

10 Read Rewind Export

Event

MC

Files Query result

name	link	time	fullpath
[b]	false	3:03 PM	/home/zot.
jaja.txt	false	2:56 PM	/home/zot.
comodi0.1.t...	false	2:12 PM	/home/zot.

Done

Internet

100%



## Browse MC particles



Clicking is highlighted in red

name	link	time	fullpath	access	size
[b]	false	3:03 PM	/home/zot...	rw	4096
jaja.txt	false	2:56 PM	/home/zot...	rw	0
comodi0.1.L...	false	2:12 PM	/home/zot...	rw	32349

## Browse MC particle momenta



Clicking is highlighted in red

http://www.ucd.ie/physics/lhcb/dget/demo.htm - Windows Internet Explorer

http://www.ucd.ie/physics/lhcb/dget/demo.htm

Google

Go

Bookmarks

297 blocked

Check

AutoLink

AutoFill

Send to

Settings

http://www.ucd.ie/physics/lhcb/dget/dem...

Page

Tools

Intranet settings are now turned off by default. Intranet settings are less secure than Internet settings. Click for options...

### Feicim Demo

TWM Icon Manage

Feicim Explorer

Menu

ityo/workspace/dc06a.dst

Browse...

Query

10

Read

Rewind

Export

Event

MC

Particles

EndVertices

Momentum

Mother

Vertices

Files

Query result

name	link	time	fullpath	access	size
[b]	false	3:03 PM	/home/zot...	rw	4096
jaja.txt	false	2:56 PM	/home/zot...	rw	0
comodi0.1.L...	false	2:12 PM	/home/zot...	rw	32349

Done

Internet

100%



Select Pz



Clicking is highlighted in red

The screenshot shows a web browser window displaying the 'Feicim Demo' application. The browser's address bar shows the URL <http://www.ucd.ie/physics/lhcb/dget/demo.htm>. The application interface has a menu on the left with a tree view. Under the 'Particles' folder, the 'Momentum' folder is expanded, and the 'Pz' option is selected, highlighted with a red circle. The 'Query result' table on the right shows the following data:

name	link	time	fullpath	access	size
[b]	false	3:03 PM	/home/zot...	rw	4096
jaja.txt	false	2:56 PM	/home/zot...	rw	0
comodi0.1.L...	false	2:12 PM	/home/zot...	rw	32349

Click query button



Clicking is highlighted in red

The screenshot shows a Windows Internet Explorer browser window displaying the Feicim Demo. The address bar shows the URL <http://www.ucd.ie/physics/lhcb/dget/demo.htm>. The browser's toolbar includes navigation buttons, a search box, and various utility icons. A yellow warning bar at the top of the page content states: "Intranet settings are now turned off by default. Intranet settings are less secure than Internet settings. Click for options...".

The main content area is titled "Feicim Demo" and contains several components:

- Menu:** Includes a text input field with the value "ityo/workspace/dc06a.dst", a "Browse..." button, and a "Query" button which is circled in red. Below these are "Read" and "Rewind" buttons, and an "Export" button.
- Files:** A tabbed interface with "Files" and "Query result" tabs. The "Query result" tab is active, displaying a table of query results.
- Tree View:** A hierarchical tree structure on the left side of the interface, showing folders like "Event", "MC", "Particles", "EndVertices", "Momentum", "Mother", and "Vertices". Under "Momentum", the "Pz" checkbox is checked.

The status bar at the bottom of the browser shows "Done", "Internet", and a zoom level of "100%".

name	link	time	fullpath	access	size
[b]	false	3:03 PM	/home/zot...	rw	4096
jaja.txt	false	2:56 PM	/home/zot...	rw	0
comodi0.1.L...	false	2:12 PM	/home/zot...	rw	32349



## View query result



Clicking is highlighted in red

The screenshot shows a web browser window displaying the Feicim Demo. The browser's address bar shows the URL <http://www.ucd.ie/physics/lhcb/dget/demo.htm>. The page title is "Feicim Demo". The interface includes a menu with options like "Browse...", "Query", "Read", "Rewind", and "Export". The "Query" button is highlighted in red. Below the menu, there is a tree view showing a hierarchy of folders: Event, MC, Particles, EndVertices, Momentum, Pz (checked), Px, Py, Mother, and Vertices. The "Query result" table is displayed, showing columns for "pz", "name", and "Event". The table contains 30 rows of data, with the "Event" column consistently showing "1.0".

pz	name	Event
19521.099609375	#1	1.0
19521.099609375	#2	1.0
17167.599609375	#3	1.0
2353.510009765625	#4	1.0
857.0700073242188	#5	1.0
410.0400085449219	#6	1.0
-217.27000427246094	#7	1.0
820.6400146484375	#8	1.0
1.4199999570846558	#9	1.0
-32.310001373291016	#10	1.0
-118.91000366210938	#11	1.0
0.0	#12	1.0
17.68000030517578	#13	1.0
-17.68000030517578	#14	1.0
-23.020000457763672	#15	1.0
6.019999980926514	#16	1.0
17.190000534057617	#17	1.0
0.0	#18	1.0
24.760000228881836	#19	1.0
-24.760000228881836	#20	1.0
-8.260000228881836	#21	1.0
0.9100000262260437	#22	1.0
7.550000190734863	#23	1.0
9941.009765625	#24	1.0
0.0	#25	1.0
387.6700134277344	#26	1.0
0.0	#27	1.0
0.6399999856948853	#28	1.0
39639.0	#29	1.0
28805.000300625	#30	1.0

# Demonstration

Right click on Pz column and make histogram



Clicking is highlighted in red

Feicim Demo

Menu

Files Query result

pz	name	Event
19521.000500275	#1	1.0
19521.000500275	#2	1.0
17167.599609375	#3	1.0
2353.510009765625	#4	1.0
857.0700073242188	#5	1.0
410.0400085449219	#6	1.0
-217.27000427246094	#7	1.0
820.6400146484375	#8	1.0
1.4199999570846558	#9	1.0
-32.310001373291016	#10	1.0
-118.91000366210938	#11	1.0
0.0	#12	1.0
17.68000030517578	#13	1.0
-17.68000030517578	#14	1.0
-23.020000457763672	#15	1.0
6.019999980926514	#16	1.0
17.190000534057617	#17	1.0
0.0	#18	1.0
24.760000228881836	#19	1.0
-24.760000228881836	#20	1.0
-8.260000228881836	#21	1.0
0.9100000262260437	#22	1.0
7.550000190734863	#23	1.0
9941.009765625	#24	1.0
0.0	#25	1.0
387.6700134277344	#26	1.0
0.0	#27	1.0
0.6399999856948853	#28	1.0
39639.0	#29	1.0
28805.000300625	#30	1.0



View histogram



Clicking is highlighted in red

The screenshot shows a Windows Internet Explorer browser window displaying a web page titled "Feicim Demo". The browser's address bar shows the URL <http://www.ucd.ie/physics/lhcb/dget/demo.htm>. The main content area features a histogram plot for a variable named "pz". The histogram shows a single sharp peak at approximately 0 on the x-axis, which is labeled "pz" and has a multiplier of  $\times 10^3$ . The y-axis represents frequency, ranging from 0 to 35,000. A red box highlights the histogram plot. To the right of the histogram is a table with two columns: "name" and "Event". The "name" column contains the value "1.0" repeated 30 times, and the "Event" column contains the value "1.0" repeated 30 times. Below the histogram, there is a summary table for the "htemp" variable:

htemp	
Entries	34693
Mean	156.9
RMS	1.381e+05

Below the histogram, there is a list of data points for the "pz" variable, showing values and event numbers:

9941.009765625	#24
0.0	#25
387.6700134277344	#26
0.0	#27
0.6399999856948853	#28
39639.0	#29
28805.000300625	#30

# Demonstration

Select more variables (Px and Py)



Clicking is highlighted in red

The screenshot shows a web browser window displaying the 'Feicim Demo' interface. The browser's address bar shows the URL 'http://www.ucd.ie/physics/lhcb/dget/demo.htm'. The interface includes a menu with buttons for 'Browse...', 'Query', 'Read', 'Rewind', and 'Export'. A tree view on the left shows a hierarchy of data categories: Event, MC, Particles, EndVertices, Momentum, Mother, and Vertices. The 'Momentum' category is expanded, and the checkboxes for 'Pz', 'Px', and 'Py' are highlighted with a red circle. The 'Query result' table displays columns for 'pz', 'px', 'name', and 'Event', with rows of numerical data and event identifiers.

pz	px	name	Event
19521.099609375	880.4199829101...	#1	1.0
19521.099609375	880.4199829101...	#2	1.0
17167.599609375	698.9000244140...	#3	1.0
2353.510009765...	181.5099945068...	#4	1.0
857.0700073242...	165.0500030517...	#5	1.0
410.0400085449...	-449.350006103...	#6	1.0
-217.270004272...	608.8099975585...	#7	1.0
820.6400146484...	-12.1999998092...	#8	1.0
1.419999957084...	583.7199707031...	#9	1.0
-32.3100013732...	-44.4300003051...	#10	1.0
-118.910003662...	224.0	#11	1.0
0.0	0.0	#12	1.0
17.68000030517...	-20.4099998474...	#13	1.0
-17.6800003051...	20.40999984741...	#14	1.0
-23.0200004577...	17.36000061035...	#15	1.0
6.019999980926...	14.97000026702...	#16	1.0
17.19000053405...	-32.6899986267...	#17	1.0
0.0	0.0	#18	1.0
24.76000022888...	14.27999973297...	#19	1.0
-24.7600002288...	-14.2799997329...	#20	1.0
-8.26000022888...	-35.7099990844...	#21	1.0
0.910000026226...	39.33000183105...	#22	1.0
7.550000190734...	-3.72000002861...	#23	1.0
9941.009765625	143.5200042724...	#24	1.0
0.0	0.0	#25	1.0
387.6700134277...	-643.450012207...	#26	1.0
0.0	0.0	#27	1.0
0.639999985694...	-4.71000003814...	#28	1.0
20620.0	-660.100085351...	#29	1.0



## Query again and view result



Clicking is highlighted in red

The screenshot shows a Windows Internet Explorer browser window displaying the 'Feicim Demo' web application. The browser's address bar shows the URL 'http://www.ucd.ie/physics/lhcb/dget/demo.htm'. The application interface includes a menu with buttons for 'Browse...', 'Query', 'Read', 'Rewind', and 'Export'. The 'Query' button is circled in red. Below the menu is a tree view showing a hierarchy of data objects: Event, MC, Particles, EndVertices, Momentum (with sub-items Pz, Px, Py), Mother, and Vertices. To the right, a 'Query result' table displays a list of data points with columns for pz, px, py, name, and Event. The status bar at the bottom indicates 'Done' and 'Internet'.

pz	px	py	name	Event
19521.09960...	880.4199829...	-1246.77001...	#1	1.0
19521.09960...	880.4199829...	-1246.77001...	#2	1.0
17167.59960...	698.9000244...	-1061.68994...	#3	1.0
2353.510009...	181.5099945...	-185.080001...	#4	1.0
857.0700073...	165.0500030...	-124.959999...	#5	1.0
410.0400085...	-449.350006...	-131.130004...	#6	1.0
-217.270004...	608.8099975...	157.2799987...	#7	1.0
820.6400146...	-12.1999998...	-15.4899997...	#8	1.0
1.419999957...	583.7199707...	-6.63999986...	#9	1.0
-32.3100013...	-44.4300003...	212.0500030...	#10	1.0
-118.910003...	224.0	-174.520004...	#11	1.0
0.0	0.0	0.0	#12	1.0
17.68000030...	-20.4099998...	-12.5900001...	#13	1.0
-17.6800003...	20.40999984...	12.59000015...	#14	1.0
-23.0200004...	17.36000061...	-2.25	#15	1.0
6.019999980...	14.97000026...	-25.2700004...	#16	1.0
17.19000053...	-32.6899986...	27.81999969...	#17	1.0
0.0	0.0	0.0	#18	1.0
24.76000022...	14.27999973...	8.399999618...	#19	1.0
-24.7600002...	-14.2799997...	-8.39999961...	#20	1.0
-8.26000022...	-35.7099990...	-26.4799995...	#21	1.0
0.910000026...	39.33000183...	9.350000381...	#22	1.0
7.550000190...	-3.72000002...	17.57999992...	#23	1.0
9941.009765...	143.5200042...	506.6900024...	#24	1.0
0.0	0.0	0.0	#25	1.0
387.6700134...	-643.450012...	153.6100006...	#26	1.0
0.0	0.0	0.0	#27	1.0
0.639999985...	-4.71000003...	4.550000190...	#28	1.0
20620.0	-660.100085	686.3800048	#29	1.0



## Histogram Py



Clicking is highlighted in red

The screenshot shows a web browser window displaying the 'Feicim Demo' interface. The browser address bar shows the URL <http://www.ucd.ie/physics/lhcb/dget/demo.htm>. The interface includes a menu with buttons for 'Browse...', 'Query', 'Read', 'Rewind', and 'Export'. A tree view on the left shows a hierarchy of event data, including 'Event', 'MC', 'Particles', 'EndVertices', 'Momentum', 'Mother', and 'Vertices'. A table of query results is displayed, with columns for 'pz', 'px', 'py', 'name', and 'Event'. A red circle highlights the 'Histo' button in the table.

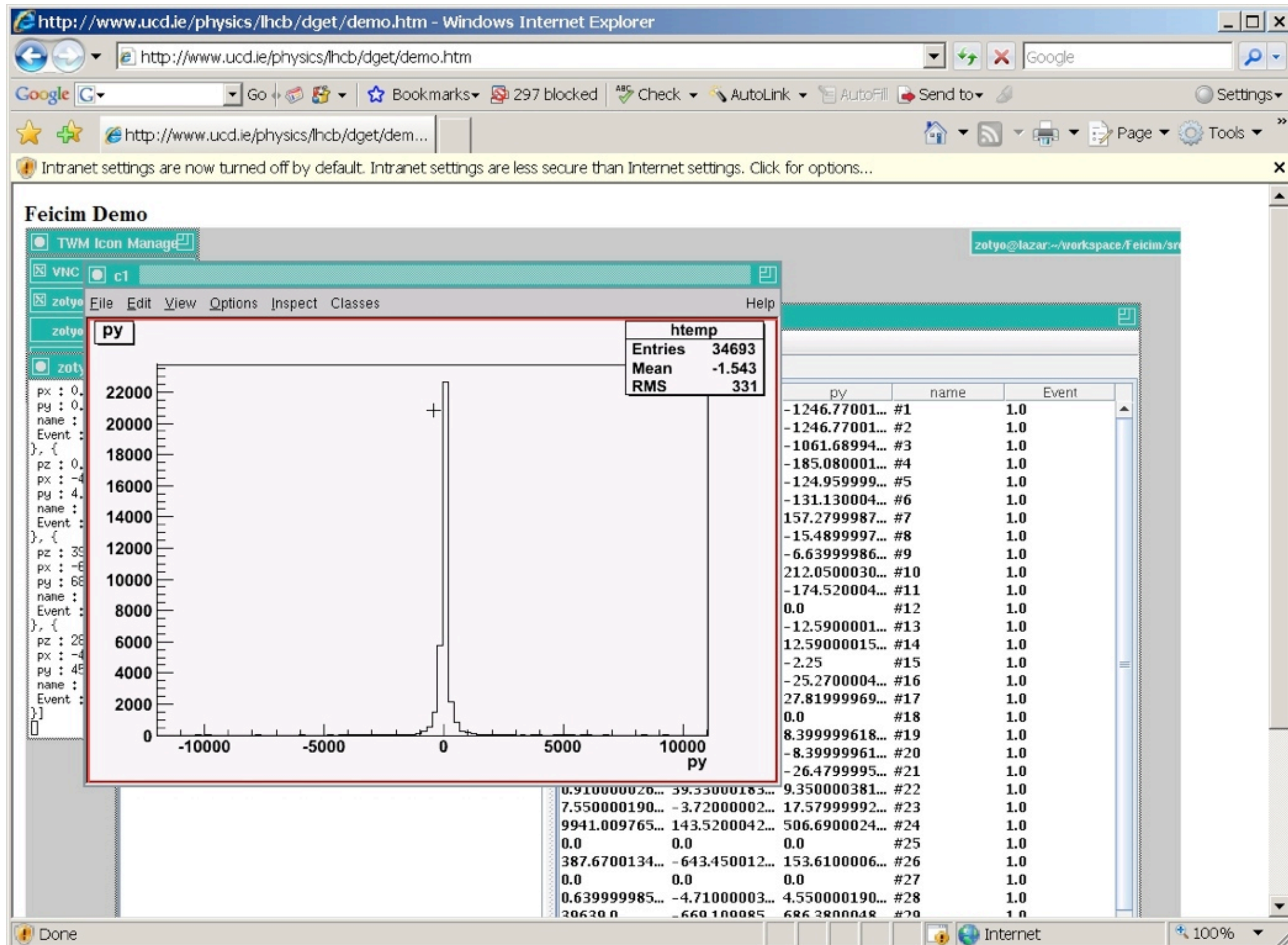
pz	px	py	name	Event
19521.09960...	880.4199829...	-1246.77...	#1	1.0
19521.09960...	880.4199829...	-1246.77...	#2	1.0
17167.59960...	698.9000244...	-1061.68994...	#3	1.0
2353.510009...	181.5099945...	-185.080001...	#4	1.0
857.0700073...	165.0500030...	-124.959999...	#5	1.0
410.0400085...	-449.350006...	-131.130004...	#6	1.0
-217.270004...	608.8099975...	157.2799987...	#7	1.0
820.6400146...	-12.1999998...	-15.4899997...	#8	1.0
1.419999957...	583.7199707...	-6.63999986...	#9	1.0
-32.3100013...	-44.4300003...	212.0500030...	#10	1.0
-118.910003...	224.0	-174.520004...	#11	1.0
0.0	0.0	0.0	#12	1.0
17.68000030...	-20.4099998...	-12.5900001...	#13	1.0
-17.6800003...	20.40999984...	12.59000015...	#14	1.0
-23.0200004...	17.36000061...	-2.25	#15	1.0
6.019999980...	14.97000026...	-25.2700004...	#16	1.0
17.19000053...	-32.6899986...	27.81999969...	#17	1.0
0.0	0.0	0.0	#18	1.0
24.76000022...	14.27999973...	8.399999618...	#19	1.0
-24.7600002...	-14.2799997...	-8.39999961...	#20	1.0
-8.26000022...	-35.7099990...	-26.4799995...	#21	1.0
0.910000026...	39.33000183...	9.350000381...	#22	1.0
7.550000190...	-3.72000002...	17.57999992...	#23	1.0
9941.009765...	143.5200042...	506.6900024...	#24	1.0
0.0	0.0	0.0	#25	1.0
387.6700134...	-643.450012...	153.6100006...	#26	1.0
0.0	0.0	0.0	#27	1.0
0.639999985...	-4.71000003...	4.550000190...	#28	1.0
20620.0	-660.100085	686.3800048	#29	1.0



## View histogram



Clicking is highlighted in red



# Demonstration



Selection criteria can be applied

Clicking is highlighted in red

The screenshot shows a web browser window displaying the 'Feicim Demo' interface. At the top, a yellow box contains the text 'Selection criteria can be applied'. An arrow points from this box to a red circle around the 'Selection' field in the interface, which contains the query: `mom_pz >= 20000 AND mom_py > 0`. The interface includes a menu with buttons for 'Browse...', 'Query', 'Read', 'Rewind', and 'Export'. Below the menu is a tree view showing event data structure with folders for 'Event', 'MC', 'Particles', 'EndVertices', 'Momentum', 'Mother', and 'Vertices'. The 'Momentum' folder is expanded, showing checkboxes for 'Pz', 'Px', and 'Py'. To the right, a table titled 'Query result' displays columns for 'pz', 'px', 'py', 'name', and 'Event', with rows of numerical data. The status bar at the bottom shows 'Done' and 'Internet'.



# Demonstration

Save table as NTuple by clicking 'Export'



Clicking is highlighted in red

The screenshot shows a web browser window displaying the 'Feicim Demo' interface. The browser address bar shows 'http://www.ucd.ie/physics/lhcb/dget/demo.htm'. The interface includes a menu with buttons for 'Browse...', 'Query', 'Read', and 'Rewind'. The 'Export' button is circled in red. Below the menu is a tree view showing a hierarchy of data objects: Event, MC, Particles, EndVertices, Momentum, Mother, and Vertices. The 'Momentum' object is expanded, showing sub-objects Pz, Px, and Py, each with a checked checkbox. To the right of the tree view is a table titled 'Query result' with columns for 'pz', 'px', 'py', 'name', and 'Event'. The table contains 28 rows of data, each representing a particle event with numerical values for momentum components and a name identifier.

pz	px	py	name	Event
19521.09960...	880.4199829...	-1246.77001...	#1	1.0
19521.09960...	880.4199829...	-1246.77001...	#2	1.0
17167.59960...	698.9000244...	-1061.68994...	#3	1.0
2353.510009...	181.5099945...	-185.080001...	#4	1.0
857.0700073...	165.0500030...	-124.959999...	#5	1.0
410.0400085...	-449.350006...	-131.130004...	#6	1.0
-217.270004...	608.8099975...	157.2799987...	#7	1.0
820.6400146...	-12.1999998...	-15.4899997...	#8	1.0
1.419999957...	583.7199707...	-6.63999986...	#9	1.0
-32.3100013...	-44.4300003...	212.0500030...	#10	1.0
-118.910003...	224.0	-174.520004...	#11	1.0
0.0	0.0	0.0	#12	1.0
17.68000030...	-20.4099998...	-12.5900001...	#13	1.0
-17.6800003...	20.40999984...	12.59000015...	#14	1.0
-23.0200004...	17.36000061...	-2.25	#15	1.0
6.019999980...	14.97000026...	-25.2700004...	#16	1.0
17.19000053...	-32.6899986...	27.81999969...	#17	1.0
0.0	0.0	0.0	#18	1.0
24.76000022...	14.27999973...	8.399999618...	#19	1.0
-24.7600002...	-14.2799997...	-8.39999961...	#20	1.0
-8.26000022...	-35.7099990...	-26.4799995...	#21	1.0
0.910000026...	39.33000183...	9.350000381...	#22	1.0
7.550000190...	-3.72000002...	17.57999992...	#23	1.0
9941.009765...	143.5200042...	506.6900024...	#24	1.0
0.0	0.0	0.0	#25	1.0
387.6700134...	-643.450012...	153.6100006...	#26	1.0
0.0	0.0	0.0	#27	1.0
0.639999985...	-4.71000003...	4.550000190...	#28	1.0
20620.0	-660.100085	686.3800048	#29	1.0



## Save NTuple to local directory



Clicking is highlighted in red

The screenshot shows a web browser window displaying the 'Feicim Demo' interface. A 'Save' dialog box is open, showing a file list and a 'File Name' field containing 'prb2.root', which is circled in red. The background shows a table of query results with columns for pZ, px, py, name, and Event.

pZ	px	py	name	Event
19521.09960...	880.4199829...	-1246.77001...	#1	1.0
19521.09960...	880.4199829...	-1246.77001...	#2	1.0
17167.59960...	698.9000244...	-1061.68994...	#3	1.0
0009...	181.5099945...	-185.080001...	#4	1.0
0073...	165.0500030...	-124.959999...	#5	1.0
0085...	-449.350006...	-131.130004...	#6	1.0
0004...	608.8099975...	157.2799987...	#7	1.0
0146...	-12.1999998...	-15.4899997...	#8	1.0
9957...	583.7199707...	-6.63999986...	#9	1.0
0013...	-44.4300003...	212.0500030...	#10	1.0
0003...	224.0	-174.520004...	#11	1.0
0030...	-20.4099998...	-12.5900001...	#13	1.0
0003...	20.40999984...	12.59000015...	#14	1.0
0004...	17.36000061...	-2.25	#15	1.0
9980...	14.97000026...	-25.2700004...	#16	1.0
0053...	-32.6899986...	27.81999969...	#17	1.0
0022...	14.27999973...	8.399999618...	#19	1.0
0002...	-14.2799997...	-8.39999961...	#20	1.0
0022...	-35.7099990...	-26.4799995...	#21	1.0
0026...	39.33000183...	9.350000381...	#22	1.0
0190...	-3.72000002...	17.57999992...	#23	1.0
9765...	143.5200042...	506.6900024...	#24	1.0
0000...	0.0	0.0	#25	1.0
387.6700134...	-643.450012...	153.6100006...	#26	1.0
0.0	0.0	0.0	#27	1.0
0.639999985...	-4.71000003...	4.550000190...	#28	1.0
20620.0	-660.100085	686.3800048	#29	1.0

# Conclusions and outlook



- Feicim will reduce computing overhead for physicists
  - Faster, intuitive access to data
  - Particularly useful for new users
  - Encourages data exploration (aids with detector commissioning)
  
- Will allow data browsing and analysis to be done visually
  - Output as NTuple or MicroDST
  - Job submission to Grid (via Ganga/Dirac)
  
- Partially complete, work in progress!

## Fully tested

### ① Data-file (DST) browser

- ▶ Can view any DST variable as a histogram
- ▶ Simple filtering

### ② Algorithm browser

- ▶ View existing algorithms
- ▶ Create new algorithms

### ③ Analysis tool

- ▶ Combine algorithms (visually)
- ▶ Output subset of DST as a Root file or MicroDST
- ▶ Potential to run on grid using Ganga/Dirac

## In testing...

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