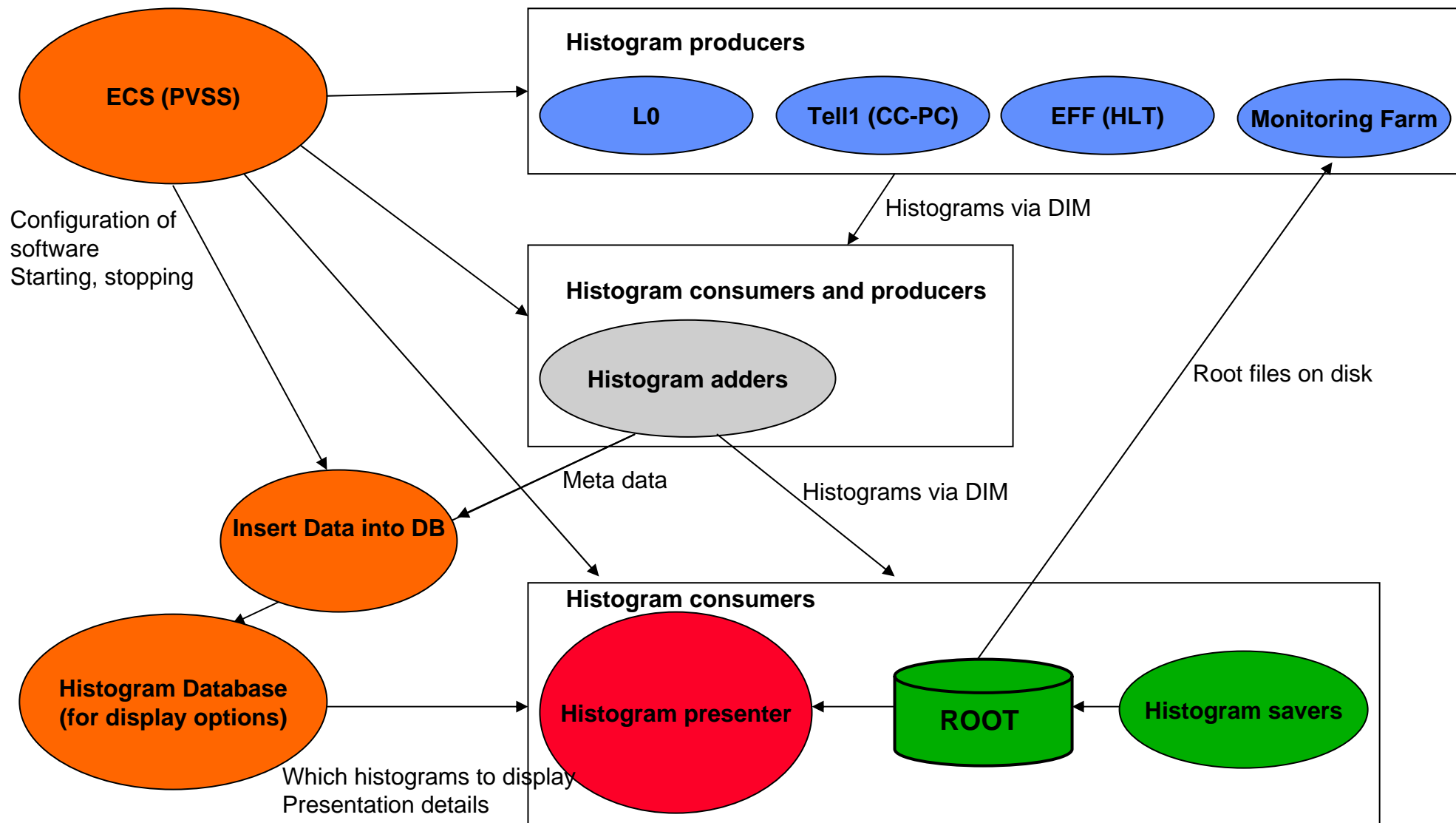


# **Root – LHCb Online meeting**

**Eric van Herwijnen**

**Thursday June 14, 2006**

# Monitoring architecture (in pit)



# Presenter requirements

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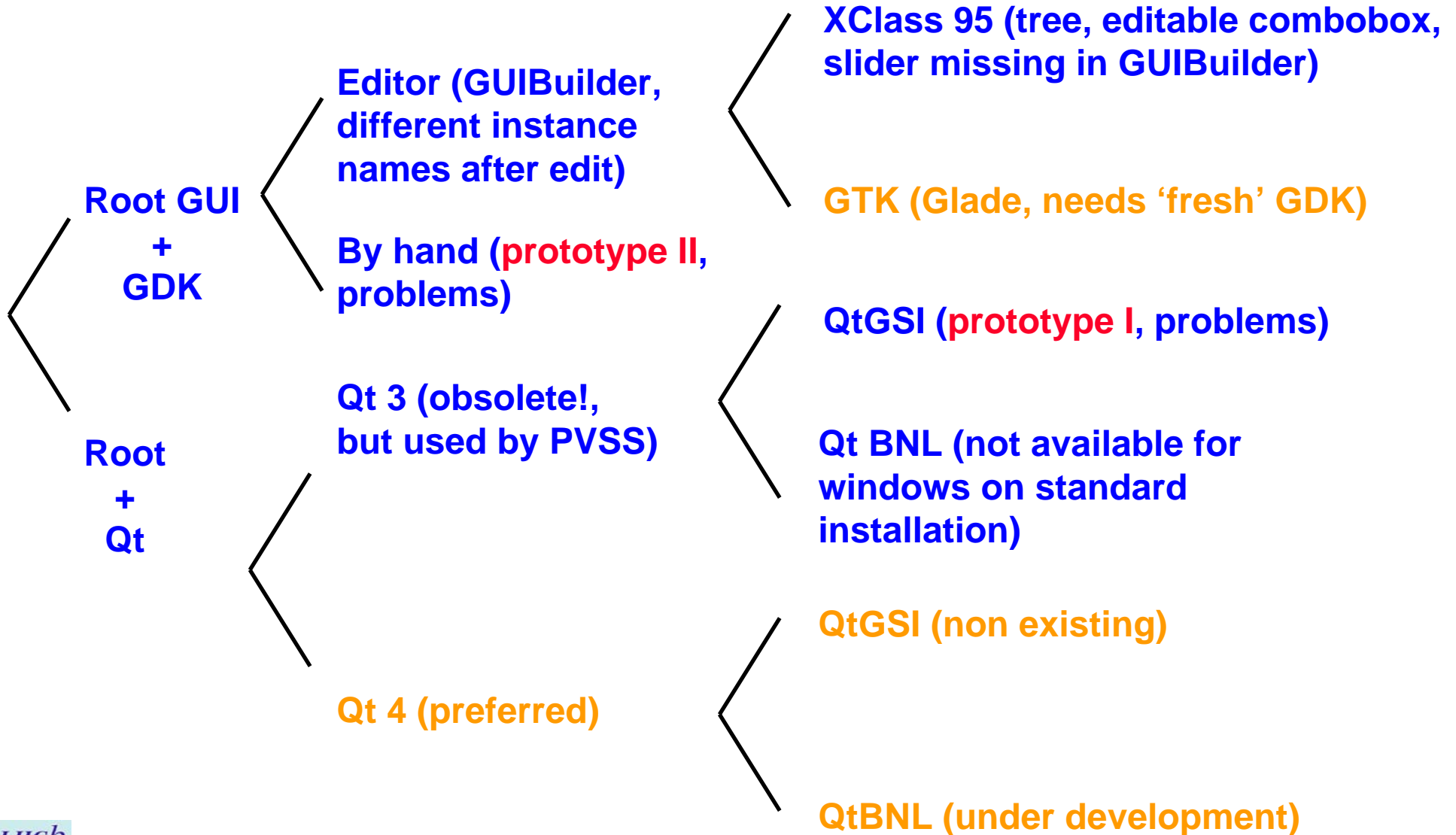
- ◆ **Tool to monitor the quality of the data**
- ◆ **Display histograms online (via DIM) and in history mode (from a Root file); build histograms over any time period**
- ◆ **1D, 2D, profiles, trend plots**
- ◆ **Use a central Oracle DB to determine which histograms/pages to present, and how (display details, page structure, dynamic gui)**
- ◆ **Predefined pages for shift crew and experts**
- ◆ **Friendly graphical page editor (for grouping histograms and selecting display options)**
- ◆ **Trigger analysis actions (compare with reference versions, fitting, spike/hole finding, etc.)**

# Boundary conditions

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- ◆ Part of LHCb online data quality monitoring project – presenter being designed by Peter Somogyi, Ph.D. student
- ◆ The presenter is a tool from the LHCb online group, integrated in the LHCb (online) environment
- ◆ Should work on Linux & Windows
- ◆ Distribute & release via CMT
- ◆ Uses Root, no requirement for running in a web browser
- ◆ Simple, reliable and maintainable over the lifetime of the experiment

# Options



# Prototype I (Root + Qt3)

LHCb Presenter Page Editor

File Help

Filter database histograms:

Name

- lhcbweek
- Standard Pages
- unsorted
- z/yPage
  - z1/GaudiExample/eventtype
  - z1/GaudiExample/Mass
  - z1/GaudiExample/xyPosit
  - z/GaudiExample/eventtyp
  - z/GaudiExample/Mass
  - z/GaudiExample/xyPositi
- unsorted2
- unsorted3
- unsorted4
- test1
- unsorted5
  - z1/GaudiExample/eventtyp
  - z1/GaudiExample/Mass
  - z1/GaudiExample/xyPosit
  - z/GaudiExample/eventtyp
  - z/GaudiExample/Mass
  - z/GaudiExample/xyPositi
- test2
- test3
- test4
- test5
- test6

Canvas ready.

z/GaudiExample/xyPositionPlot (histo\_4): 3D histogram showing event distribution. Statistics: Entries: 19, Mean x: 200.6, Mean y: 149.3, RMS x: 114, RMS y: 86.3.

z/GaudiExample/xyPositionPlot (histo\_2): 3D histogram showing event distribution. Statistics: Entries: 19, Mean x: 200.6, Mean y: 149.3, RMS x: 114, RMS y: 86.3.

z/GaudiExample/eventtype (histo\_2): 2D histogram showing event type distribution. Statistics: Entries: 19, Mean: 2.326, RMS: 1.584.

z/GaudiExample/Mass (histo\_3): 2D histogram showing mass distribution. Statistics: Entries: 19, Mean: 3078, RMS: 58.47.

Folder name:

Page name:

Save Page Stop Integrate Investigate

| Name           | Algorithm      | Task | Type |
|----------------|----------------|------|------|
| DIM Services   |                |      |      |
| nodeMF001_z_01 |                |      |      |
| eventtype      | GaudiExample z |      | H1D  |
| Mass           | GaudiExample z |      | H1D  |
| xyPositionPlot | GaudiExample z |      | H2D  |

# Problems/Questions

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- ◆ **Choose this direction because of convenience for building platform independent GUIs**
  - PVSS 3.6 uses QT 3
- ◆ **QTGSI part of Root distribution since july 2006**
- ◆ **Root – QT integration problems**
  - Both use different event loops, synchronization problems
- ◆ **Same problems experienced by ATLAS -> modified QTGSI**
  - Attempt to fix synchronization
- ◆ **Distribution problems**
  - CMT on windows doesn't support make fragments for QT applications

# Prototype II (Root only)

The screenshot displays the LHCb Online Presenter interface. On the left, a 'Subsystems' tree shows a hierarchy starting with 'DEADB10', 'ECAL', and 'GAS'. The main area contains four histograms:

- histo\_1**: A 2D histogram with 'Entry' 36649, Mean x 150, and RMS 36.58. The x-axis ranges from 0 to 300, and the y-axis from 1250 to 1500.
- histo\_2**: A 3D histogram with 'Entry' 36682, Mean x 50, Mean y 49.99, RMS x 28.88, and RMS y 28.83. The x-axis ranges from 0 to 100, the y-axis from 0 to 100, and the z-axis from 100 to 170.
- histo\_3**: A 2D histogram with 'Entry' 43325, Mean 50, and RMS 28.84. The x-axis ranges from 0 to 100, and the y-axis from 1350 to 1550.
- histo\_4**: A 2D histogram with 'Entry' 43359, Mean 100, and RMS 57.83. The x-axis ranges from 0 to 200, and the y-axis from 1350 to 1550.

On the right, a file tree shows folders like 'lxplus213' and 'DEADB10'. The taskbar at the bottom shows the 'Start' button, 'ROOT session', 'Total Commander 6.56', and 'LHCb Online Presenter'.



# Problems/Questions

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- ◆ **Pure Root – like ALICE (requirements much like LHCb with MySQL for DB and DIM for communication)**
- ◆ **Creating GUIs with Root difficult – are there plans for a more developer friendly GUI editor?**
- ◆ **Unexpected behaviour of X11 based Root GUI widgets**
  - **Widget coordinates hardwired**
  - **Multiple selections awkward**
  - **Problems with editable dropdown combobox, reported in Savannah**
- ◆ **What do the Root team recommend for building GUIs on the longer term?**