Abstract

This document describes the configuration and installation of the LHCb EFF farm. The latest version of this document can be downloaded from the web at http://lhcb-online.web.cern.ch/lhcb-online/testbed/

Document Status Sheet

| 1. Document Title: [Project Name Qualification] User Requirements Document |
| 2. Document Reference Number: [Document Reference Number] |
| Draft   |  1     | 14 November 2006     | First version                           |
| Draft   | 1.1    | 15 January 2007      | Corrected paths of PVSS projects        |
| Draft   | 1.2    | 15 January 2007      | Clarified the path of PVSS components and projects; linux pcs for TFC and CC-PC |
Table of Contents
1. Introduction

The purpose of this note is to establish a documented and agreed procedure to obtain a coherent, working, reference installation of the Online software (Controls and Gaudi applications).

This procedure is to be applied to our testbed in building 157.

The reference installation should be used for copying to cracks, testbeam installations, and eventually the EFF in the pit.

Using this note, it should be at any time be possible to regenerate the PRO and DEV farms from scratch.
2. Farm architecture (hw)

There will be a PRO (production) farm and a DEV (development) farm on the daq.lhcb network. The DEV farm will be first setup; when it is working, it will be cloned to PRO.

The following hardware will be installed.

<table>
<thead>
<tr>
<th>PRO</th>
<th>DEV</th>
<th>remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 TFC – Readout Supervisor</td>
<td>1 TFC – Readout Supervisor</td>
<td></td>
</tr>
<tr>
<td>1 TFC – Throttle OR</td>
<td>1 TFC – Throttle OR</td>
<td></td>
</tr>
<tr>
<td>TFC - &gt;= 2 Tell1s</td>
<td>TFC - &gt;= 2 Tell1s</td>
<td>There is a problem obtaining Tell1s</td>
</tr>
<tr>
<td>1 Data switch</td>
<td>1 Data switch</td>
<td></td>
</tr>
<tr>
<td>1 Ctrl switch</td>
<td>1 Ctrl switch</td>
<td></td>
</tr>
<tr>
<td>20 Farm Nodes (called PROO00101-PROO00110, PROO00201-PROO00210)</td>
<td>20 Farm Nodes (called DEV00101-DEV00110, DEV00201-DEV00210)</td>
<td>Diskless (boot off controls pcs)</td>
</tr>
<tr>
<td>2 Linux controls PCs</td>
<td>2 Linux controls PCs</td>
<td>One per subfarm (DHCP, DNS)</td>
</tr>
<tr>
<td>2 Linux controls PCs’</td>
<td>2 Linux controls PCs</td>
<td>Controls Tell1s, TFC, bootserver.</td>
</tr>
<tr>
<td>1 Windows controls PC</td>
<td>1 Windows controls PC</td>
<td>Overall control</td>
</tr>
<tr>
<td>1 gateway</td>
<td>Share with PRO</td>
<td>afs + cvs access</td>
</tr>
<tr>
<td>Oracle Server</td>
<td>Oracle Server</td>
<td>Can 1 server serve both PRO and DEV? Installation could wait.</td>
</tr>
<tr>
<td>1 storage node</td>
<td>1 storage node</td>
<td></td>
</tr>
</tbody>
</table>

Access will be via a gateway from cern.ch to daq.lhcb.

Fig. X shows the logical topology of the farm related part of the testbed network. Two changes were made wrt the LHCb naming conventions, in order to accommodate the fact that a) there is no sub-detector involved, and b) there are two systems (PRO and DEV):

1) two additional sub-system names (TB for “test bed” general purpose devices, and TD for “test detector”), and two additional domain names (PRO and DEV).

2) CC-PCs names are extended to include the domain name (PRO or DEV).
3. Farm architecture (sw)

3.1. Operating systems

<table>
<thead>
<tr>
<th>PRO</th>
<th>Date</th>
<th>DEV</th>
<th>By</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux controls pc</td>
<td></td>
<td>SLC4, 32 bit + compatibility libraries</td>
<td>Artur, Niko (for compatibility libraries)</td>
<td></td>
</tr>
<tr>
<td>Windows controls pc</td>
<td></td>
<td>XP + terminal server</td>
<td>Loic</td>
<td></td>
</tr>
<tr>
<td>nodes</td>
<td></td>
<td>SLC4</td>
<td>Artur</td>
<td></td>
</tr>
</tbody>
</table>

3.1.1. Userids/passwords

<table>
<thead>
<tr>
<th>PRO</th>
<th>Date</th>
<th>DEV</th>
<th>By</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux controls pc</td>
<td></td>
<td>Root, online, afs/lhcb userids. For cpc: TFC + account for Stefan</td>
<td>Root, online, afs/lhcb userids. For cpc: TFC + account for Stefan</td>
<td></td>
</tr>
<tr>
<td>Windows controls pc</td>
<td></td>
<td>Admin, online, nice userids</td>
<td>Admin, online, nice userids</td>
<td></td>
</tr>
<tr>
<td>nodes</td>
<td></td>
<td>Root, online, afs/lhcb userids. For cpc: TFC + account for Stefan</td>
<td>Root, online, afs/lhcb userids. For cpc: TFC + account for Stefan</td>
<td></td>
</tr>
</tbody>
</table>

N.B. All userids should be able to execute all programs on the system.

3.1.2. Login scripts

<table>
<thead>
<tr>
<th>PRO</th>
<th>Date</th>
<th>DEV</th>
<th>By</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux controls pc</td>
<td></td>
<td>path of standard login script (bash)</td>
<td>Niko</td>
<td></td>
</tr>
<tr>
<td>nodes</td>
<td></td>
<td>path of standard login script (bash)</td>
<td>Niko</td>
<td></td>
</tr>
</tbody>
</table>
## 3.2. 3rd party software

<table>
<thead>
<tr>
<th>PRO</th>
<th>Date</th>
<th>DEV</th>
<th>By</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux controls pcs</td>
<td></td>
<td>PVSS 3.1 (in /opt/pvss/pvss2_v3.0)</td>
<td>Loic</td>
<td></td>
</tr>
<tr>
<td>PCtrlRDBAccess-31Linux-0.1.zip</td>
<td></td>
<td>PCtrlRDBAccess-31Linux-0.1.zip</td>
<td>EvH</td>
<td>21/12/2006</td>
</tr>
<tr>
<td>DIM_DNS_NODE server</td>
<td></td>
<td>DIM_DNS_NODE server</td>
<td>Niko</td>
<td></td>
</tr>
<tr>
<td>Windows controls pcs</td>
<td></td>
<td>PVSS 3.1(in c:/etm/pvss2/3.0)</td>
<td>Loic</td>
<td></td>
</tr>
<tr>
<td>DIM_DNS_NODE server</td>
<td></td>
<td>DIM_DNS_NODE server</td>
<td>Niko</td>
<td></td>
</tr>
<tr>
<td>Build node (gateway)</td>
<td></td>
<td>AFS + cvs access; cmt</td>
<td>Loic</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Common Linux &amp; Windows filebase.</td>
<td>Artur</td>
<td></td>
</tr>
</tbody>
</table>

It is understood that AFS will only be installed to checkout. We will not run off AFS. Cmt is required to run the LHCb software.
4. LHCb software

The LHCb PVSS framework should be unzipped in the directory /home/online/frameworks/, e.g. /home/online/frameworks/lhcbfw-1.14. The directory /home/online is mounted on both windows and linux systems so this installation only needs to be done once.

All project owners can install the components from this directory. (As the place where to look for components; the directories for installed components are described below).

4.1. ECS

The projects should be installed and run using the generic userid online.

The projects should be installed in the directory /home/online/pvss_projects/ which is owned by userid online.

4.1.1. Runcontrol

<table>
<thead>
<tr>
<th>PRO</th>
<th>Date</th>
<th>DEV</th>
<th>By</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top level Windows controls PC</td>
<td>Runcontrol package v1r0 in /home/online/pvss_projects/runcontrol</td>
<td>Runcontrol package v1r?</td>
<td>Richard</td>
<td></td>
</tr>
<tr>
<td>LHCb framework 1.14 (in /home/online/pvss_projects/fwComponents_runcontrolpro, required components installed).</td>
<td>LHCb framework 1.4 (in /home/online/pvss_projects/fwComponents_runcontroldev)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.1.2. TFC

<table>
<thead>
<tr>
<th>PRO</th>
<th>Date</th>
<th>DEV</th>
<th>By</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows controls PC</td>
<td>TFC v2.4 in /home/online/pvss_projects/TFC_v2r4</td>
<td>TFC v2.4 in /home/online/pvss_projects/TFC_v2r4</td>
<td>Richard</td>
<td></td>
</tr>
<tr>
<td>LHCb framework 1.14 (in /home/online/pvss_projects/fwComponents_TFCpro; required components installed)</td>
<td>LHCb framework 1.4 (in /home/online/pvss_projects/fwComponents_TFCDdev)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 4.1.3. DAQ

<table>
<thead>
<tr>
<th>PRO</th>
<th>Date</th>
<th>DEV</th>
<th>By</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows controls PC</td>
<td></td>
<td>CCPC 2.0, Tell1 2.5 in /home/online/pvs__projects/daq</td>
<td></td>
<td>Stefan</td>
</tr>
<tr>
<td>LHCb framework 1.14 (in /home/online/pvs__projects/fwComponents_daqpro)</td>
<td></td>
<td>LHCb framework 1.4 (in /home/online/pvs__projects/fwComponents_daqdev))</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4.1.4. HLT

<table>
<thead>
<tr>
<th>PRO</th>
<th>Date</th>
<th>DEV</th>
<th>By</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux PC</td>
<td></td>
<td>Gaucho 2.14 in /home/online/pvs__projects/farm</td>
<td></td>
<td>Eric</td>
</tr>
<tr>
<td>LHCb framework 1.14 (in /home/online/pvs__projects/fwComponents_Gaucho pro)</td>
<td></td>
<td>LHCb framework 1.4 (in /home/online/pvs__projects/fwComponents_Gaucho dev)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 4.2. Gaudi applications

The Gaudi applications are installed on the head node. The directory structure should be an exact copy of the afs release area, without /afs/cern.ch/.

Multiple versions can be installed. Different versions can be executed by giving the directory path of the script to be executed. It should be possible to only make modifications on the DEV farm.

The currently required (but in some cases not yet tagged and released) versions are:

<table>
<thead>
<tr>
<th>PRO</th>
<th>date</th>
<th>DEV</th>
<th>by</th>
<th>date</th>
</tr>
</thead>
<tbody>
<tr>
<td>OnlineEnv v2r2</td>
<td>OnlineEnv v2r2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OnlineEnv v2r3</td>
<td>OnlineEnv v2r3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gaudi Applications</td>
<td>Gaudi Applications</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. Installation procedures

5.1. ECS software

5.1.1. The overall runcontrol

This section to be verified and completed.

The system is distributed. The port numbers and system names allocated to the subsystems are as follows. For the second digit: 1=crack1, 2=reserved, 3=velo testbeam, 4=crack2, 5=PRO, 6=DEV).

- TFC
  System Name: TFC_15
  System number: 15
  Config file:
  [general]
  pmonPort = 11500
  dataPort = 11501
  eventPort = 11502
  [dist]
  distPort = 11510

- TELL1
  System Name: DAQ_25
  System number: 25
  Config file:
  [general]
  pmonPort = 12500
  dataPort = 12501
  eventPort = 12502
  [dist]
  distPort = 12510

- FARM
  System Name: HLT_35
  System number: 35
  Config file:
  [general]
  pmonPort = 13500
  dataPort = 13501
eventPort = 13502
[dist]
distPort = 13510

- DCS/DAI
  System Name: DCS_45
  System number: 45
  Config file:
  [general]
  pmonPort = 14500
dataPort = 14501
eventPort = 14502
  [dist]
distPort = 14510

- RUN_CONTROL
  System Name: ECS_55
  System number: 55
  Config file:
  [general]
  pmonPort = 15500
dataPort = 15501
eventPort = 15502
  [dist]
distPort = 15510

- OT_FrontEnds
  System Name: FE_165
  System number: 165
  Config file:
  [general]
  pmonPort = 26500
dataPort = 26501
eventPort = 26502
  [dist]
distPort = 26510

Notes on applying these settings:

In order to create a second (or more) project for the same machine:

- If a project is running using the default port numbers
  1. It has to be stopped (including pmon)
  2. Create the project(s) (but don't start it/them)
Installation procedures

3. Modify the config file (with the settings above)
4. (Re)start the projects

- In order to change the port numbers for an existing project:
  1. Stop the project (from PA to make sure also pmon is stopped)
  2. Modify the config file
  3. (Re)start the project

The overall runcontrol runs on the top level controls PC. However, the panels of the embedded projects (TFC, DAQ and HLT) need to be accessible from the path. These components should not be installed. This is achieved by modifying the config file as follows:

```plaintext
[general]
pvss_path = "C:/ETM/PVSS2/3.0"
proj_path = "D:/downloads/lhcbfw-1.8"
proj_path = "D:/pvss_projects/TFC_20060926"
proj_path = "D:/pvss_projects/TELL1_20060926"
proj_path = "D:/pvss_projects/fwComponents_RunControl_v1"
proj_path = "D:/pvss_projects/RunControl_v1"
proj_version = "3.0"
userName = "root"
password = ""
langs = "en_US.iso88591"
distributed = 1

[general]
pmonPort = 16100
dataPort = 16101
eventPort = 16102

[dist]
distPort = 16110
distPeer = "crack1wi1:11110" 11
distPeer = "crack1wi1:12110" 21
distPeer = "crack1li1:13110" 31
```

The following applications: need to be started as Windows services:

```plaintext
ApplicationList.txt
c:/etm/pvss2/3.0/bin/PVSS00pmon -proj TELL1_20060926 -port 12100
c:/etm/pvss2/3.0/bin/PVSS00pmon -proj TFC_20060926 -port 11100
c:/etm/pvss2/3.0/bin/PVSS00pmon -proj RunControl_v1 -port 16100
```

The software to do this can be found at: [http://sergueev.home.cern.ch/sergueev/hcal/AppliMon.zip](http://sergueev.home.cern.ch/sergueev/hcal/AppliMon.zip)

Allocating subfarms needs to be done according to a prototype of Clara’s.
5.1.2. The DAQ

This section to be written.

5.1.3. The TFC

This section to be written.

5.1.4. The HLT

To install the HLT control system proceed as follows.

1. export DIM_DNS_NODE=linuxcontrols.pc.daq.lhcb
2. startPA
3. make a new distributed project with name 'farm'
4. give it System Name: HLT_35 and System number: 35
5. edit the config file:

   [general]
   pmonPort = 13500
   dataPort = 13501
   eventPort = 13502

   [dist]
   distPort = 13510

6. copy the fwInstallation tool into the project directory and unzip -a
7. download and unzip -a the latest LHCb Framework 1.10
8. install the 7 components:
   - fwAccessControl 2.4.6
   - fwConfigurationDB 3.0.95
   - fwCore 2.3.7
   - fwFSM 24.13
   - fwDIM 14.15.0
   - fwEFF 1.1.4
   - fwFarmMonitorControl 3.2
Installation procedures

- fwGaucho 2.13

9. add a Motif User Interface to the project with options -menuBar -cionBar -p fwEFF/fwEFFNavigator.pnl

10. remove the corresponding windows ui

11. run the fwEFF/fwEFFNavigator.pnl manager

12. configure the nodes and tasks to run on the farm:
   - add the following tasktypes (right click):
     - MBMinit
     - ErrorSrv
     - EvtHolder
     - EvtProd
     - MEPRx
     - MDFWriter
   - add 2 subfarms
   - inside the subfarm, add 10 nodes, give the name in uppercase: FARMxxx
   - for each node, add the tasks:
     - the 5 above, click the 'enabled' button for all, the 'deamon' button for MBMinit and ErrorSrv to indicate they are class1 tasks
     - GauchoHLT (4x)
     - MON - leave the panel empty, but click on enabled
   - for the tasks, the paths are ./MBMinit.sh, ./ErrorSrv.sh, ./EvtHolder.sh, ./EvtProd.sh, ./MEPRx.sh, ./MDFWriter.sh
   - the working directory is /home/daq/cmtuser/Online/OnlineTasks/job (to be verified)
   - the UTGID is node001%d_taskname_%n (same as the Process Name)
   - the user is daq (to be verified)
   - make sure the nodenames are correct FARM00101, etc.
   - note that copy/paste doesn't work when you are filling in the panels

13. configure the farm monitoring control (Bologna part), start the manager -p fwFarmMonitorControl/fwFMCMainPanel.pnl:
o choose the tab DataPoint Utilities, create all
o choose fwEFF, Update FMC's DPs (3 times)

```
14. start the manager -p fwGaucho/GauchoConfig.pnl:
```

```
o create the FSM
o start PVSSDIM -num 30 (DimCowboy)
o set the startup for all PVSSDIM managers to always
o run the discovery jobs
o click on create panels (redo steps 1-4 in case of problems)
```

15. start the device editor navigator, FSM, start all, right click on subfarm001, view

5.2. Gaudi applications

5.2.1. CMT/CVS

This section to be written.

5.2.2. The LHCb offline software base

Use Florence's script which takes the source tarballs, debug version.

Build on Farm.

Have latest version always available on the DEV farm.

Propose Radu to make an automatic procedure which does this.

Deletion of old versions will be require prior approval.
6. Modification procedures

The PRO farm is supposed to always be in a working state. (Responsible?)

When a change is required, the DEV farm is reserved by the person making the change.

The changes are applied to the DEV farm.

When the DEV farm is working, it is copied to the PRO farm. The version numbers in this note are updated, and the modifications are documented in this note. Perhaps we should use ELOG?