Compact Muon Solenoid (CMS) Electromagnetic Calorimeter (ECAL) Detector Control System (DCS)

- Based on WinCC Open Architecture (formerly PVSS)
- Uses Joint COntrols Project (JCOP) Framework
- 24/7 two-level on-call service (operations / expert)
- Almost no ECAL down time associated with DCS

<table>
<thead>
<tr>
<th>DCS computers</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low voltage channels</td>
<td>&gt;1000</td>
</tr>
<tr>
<td>Bias voltage channels</td>
<td>&gt;1400</td>
</tr>
<tr>
<td>Temperature sensors</td>
<td>972</td>
</tr>
<tr>
<td>Humidity sensors</td>
<td>180</td>
</tr>
<tr>
<td>Water leakage detection sensors</td>
<td>40</td>
</tr>
</tbody>
</table>

Software Analysis Project

- Reduction of long term maintenance effort
- Removal of duplicated feature implementation
- 20% reduction of control and data processing code

Software Re-Development Approach

- Create generic reusable components
- Piece-by-piece implementation minimizes risk of change
- Matching of development cycle to LHC technical stops

Use of Configuration Database (ConfigDB)

- Storing CMS ECAL DCS hardware and software configuration
- Storing bias and low voltage channel settings
- Channel settings applied and verified before switching on
- Periodic verification of hardware setting consistency

Action: Switch ON

1. Load settings from DB
2. Apply settings to channel
3. Verify readback of settings
4. If OK, switch on channel
   Else, go back to step 2

Modified architecture and interfaces to external systems

Unified CMS ECAL DCS Installation Mechanism

- Replaces individual mechanism for each DCS application
- Fully automated installation and upgrades
- Data-driven method

New Features Improve On-Call Efficiency

Extended alert and SMS notifications
Faster problem detection
Faster problem resolution

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