**Introduction**

- MLF is a muon and neutron experimental facility of the J-PARC.
- Beam operation of the MLF started in May 2008.
- Operator interface PCs and database server of the MLF control system need replacement. (Windows OS lifetime)

We considered about upgrade of the Operator Interfaces and Data Servers of the MLF General Control System (MLF-GCS)

**MLF Control Room and Control Screens**

- Life cycle of the system
  - Decided by the support period of the operating system (Windows)
  - Version compatibility
  - Version specification of the different versions is not supported.
  - Software license
    - Software license is expensive and the number of the client license is limited
  - Scalability
    - VBA script only
- Upgrade to the new system

**Issues of Present System**

- Inheritance of the present system
  - Change to the next system without discomfort
  - Influence of update cycle of the OS
    - Independent on the technology of OS specific
    - Version compatibility of the software
    - Use the general purpose protocol
  - Compatibility with EPICS
    - EPICS device driver developed already.
    - Ease of the system modification
    - Not require complex programming in the screen creation.
    - Maintainability
    - Components are replaceable quickly.
    - Cost performance in long term

**System Requirement**

- Compatibility with EPICS
  - EPICS device driver developed already.
- Ease of the system modification
  - Not require complex programming in the screen creation.
  - Maintainability
  - Components are replaceable quickly.
  - Cost performance in long term

**Functions of MLF-GCS**

- Integrated remote control and monitoring of the other systems in the MLF (PLCs)
- Operator interfaces (OPI)
- Operating data storage (Database)
- Interlock system (MPS, PPS, TPS)
- Networking equipment
- Data sharing (WEB and EPICS IOC)
- Building monitoring system (Camera system)
- Timing distribution system

**Comparison of Upgrade System Candidate**

<table>
<thead>
<tr>
<th>Feature</th>
<th>OPI</th>
<th>OPC</th>
<th>CSS</th>
<th>Windows/Linux</th>
<th>EPICS OPC</th>
<th>EPICS OPC</th>
<th>TPS</th>
<th>OK</th>
<th>Other</th>
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</thead>
<tbody>
<tr>
<td>Fix and historian</td>
<td>LabView</td>
<td>LabView</td>
<td>SQL</td>
<td>Win/Mac/Linux</td>
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<td>LabView/SQL</td>
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<tr>
<td>OPI</td>
<td><strong>Fix</strong></td>
<td><strong>Win/Mac/Linux</strong></td>
<td><strong>SQL</strong></td>
<td><strong>Win/Mac/Linux</strong></td>
<td><strong>OK</strong></td>
<td><strong>OK</strong></td>
<td><strong>OK</strong></td>
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<tr>
<td>OPC server</td>
<td><strong>IFIX</strong></td>
<td><strong>Ni OPC</strong></td>
<td><strong>TLP</strong></td>
<td><strong>Win/Mac/Linux</strong></td>
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<tr>
<td>Function of OPI</td>
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<td>OK</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
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<tr>
<td>OPC to EPICS</td>
<td>OK</td>
<td>Not easy</td>
<td>OK</td>
<td>OK</td>
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<td>OK</td>
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<td>Software fee</td>
<td>Expensive</td>
<td>Reasonable</td>
<td>Free</td>
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<td>Build effort</td>
<td>High</td>
<td>Very High</td>
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<td>Ver. compatibility</td>
<td>Not enough</td>
<td>Unconfirmed</td>
<td>Good</td>
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<td>Modification of OPI</td>
<td>Easy</td>
<td>Difficult/complex</td>
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<tr>
<td>EPICS/IOC</td>
<td>EPICS OPC/CSS</td>
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**Summary**

- We compared three kinds of the software as candidates for a new OPI and DB of the MLF-GCS.
- The EPICS and CSS system is considered to be the best candidate in terms of practicality and design concept.
- Performance of the upgraded system is confirmed with prototype system.
- Now we are developing the upgraded system with EPICS and CSS and its operation will start in December 2013.