DATABASE SCHEME FOR ON-DEMAND BEAM ROUTE SWITCHING OPERATIONS AT SACLA.

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**SACLA beam route switching**

SACLA(inac) → BL2, BL3, SPring-8 (storage ring)
BL2, BL3, BLx, SPring-8-II

Route information is distributed via a reflective memory network

**Database at the site: The key for the unified operation**

<table>
<thead>
<tr>
<th>Online DB spec &amp; data volume</th>
<th>SACLA</th>
<th>SPring-8</th>
</tr>
</thead>
<tbody>
<tr>
<td>#Cassandra nodes</td>
<td>44</td>
<td>20</td>
</tr>
<tr>
<td>pol rate [kHz*]</td>
<td>18.4</td>
<td>13.9</td>
</tr>
<tr>
<td>sync rate [kHz*]</td>
<td>114.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

*∑; rate i

DAQ components (VME, etc.)

**Operational problems since 2018**

<table>
<thead>
<tr>
<th>Date</th>
<th>problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/12/2018</td>
<td>Parameter DB: TRX down + LAG setting error</td>
</tr>
<tr>
<td>12/5/2018</td>
<td>SACLA Cassandra node #17 hung-up</td>
</tr>
<tr>
<td>3/1/2019</td>
<td>SACLA Cassandra node #36 hung-up</td>
</tr>
<tr>
<td>4/30/2019</td>
<td>SACLA Cassandra node #40 hung-up</td>
</tr>
</tbody>
</table>

This fault rate itself is within expectation. But, it revealed a weakness of the DAQ logic. Detection and recovery logic were reinforced.

**Pros of using the unified data format**

Common access API:
C-library, Python, Rest-API

Applications:
- Correlation type analysis
- Standard data viewer

Values are simply connected to (id, key)
@work / $store area in PARAMETER DB

**Toward on-demand beam switching operation**

Operation parameter pre-fixed patterns of 60 routes (1 second pack)

Preparation for post processes
The route map (event # - route) is one of sync data. To build an event of a certain route, the route map data needs to be read.

Concern: performance degradation due to this additional task.

Prospect: Applied on Data viewer and Archive process. It is within the allowable range.

**Conclusion and outlook**

The SACLA/SPring-8 control system integrates databases in the data stream. It is ready to adapt the on-demand route switching operation.

In the fall 2019, SACLA starts to determine its route with the new scheme through the reflective memory network. In 2020, the plan is to promote SACLA to the main injector.