Development of real time framework for parallel streaming data processing

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- Real Time framework for Parallel streaming data Processing framework (RT-ParaPro)
  - This framework used to develop programs that simultaneously process streaming data transmitted over a real-time network and send data over a network and archive them in real time.
  - This framework consists of pairs of thread and buffer which implements parallel producer/consumer design pattern (C++).

- Structure of RT-ParaPro

- Architecture

![Diagram of RT-ParaPro and Real Time Application Tools](attachment:image.png)
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- Performance test & use case
  - The period of the thread has a jitter of about 8usec not only in the low control cycle rate (1kHz) but also in the control cycle rate of 100kHz.
  - By using this framework, KSTAR developed two real time data processing application which need to have microsecond(μsec) order latency.
    - L/H Transition Detection System.(1kHz)
    - RFM data archiving System.(2kHz)

<table>
<thead>
<tr>
<th>Thread Period</th>
<th>Mean(nsec)</th>
<th>Std(nsec)</th>
<th>Max - Min(nsec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1kHz</td>
<td>100000 nsec</td>
<td>999999.9996</td>
<td>176.9456</td>
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<tr>
<td>2KHz</td>
<td>500000 nsec</td>
<td>499999.9994</td>
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<tr>
<td>5KHz</td>
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<tr>
<td>10KHz</td>
<td>100000 nsec</td>
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<tr>
<td>100KHz</td>
<td>10000 nsec</td>
<td>9999.9995</td>
<td>164.9920</td>
</tr>
</tbody>
</table>

- thread period

- Performance test result
Thank you for attention.

If you have interested, please come to see my poster.