Evaluation Plan

Indicators
- Basic benchmark
- JUNO software

Scenarios
- VMs
- hardware
- OS
- VM size
- KVM configuration

Automation tool

Analysis Plots
JUNO software benchmark(2)

<table>
<thead>
<tr>
<th></th>
<th>PerfLoss(H1)</th>
<th>PerfLoss(H2)</th>
<th>PerfLoss(H3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DetSim</td>
<td>9.25%</td>
<td>5.5%</td>
<td>5.1%</td>
</tr>
<tr>
<td>ElecSim</td>
<td>14.1%</td>
<td>18.5%</td>
<td>7.5%</td>
</tr>
<tr>
<td>ElecSim* (no out)</td>
<td>3.4%</td>
<td>1.8%</td>
<td>2.8%</td>
</tr>
<tr>
<td>PmtRec</td>
<td>1.2%</td>
<td>0.6%</td>
<td>9.5%</td>
</tr>
<tr>
<td>EvtRec</td>
<td>1.4%</td>
<td>1.8%</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

- Three hardware has different loss, H3 has the best I/O performance, H2 has better CPU performance.
- DetSim based on Geant4 has more CPU loss than Rec.
- ElecSim with more I/O has higher penalty than others, which is proved by *ElecSim without output test.
- Most of loss is under 5%, a few need concern.
Summary

- JUNO Evaluations showed
  - CPU-bound processes are suitable to run on virtualization form
  - I/O penalty is still a key issue in I/O intensive processes
  - Simulation has bigger CPU loss than Reconstruction

- Many factors influence penalty, including hardware, application, KVM parameters, OS,….
  - Tuning can achieve certain improvements

- Automatic test and monitoring tool needed to keep watch on performance issues in various scenarios and changing environment