Options for Retrieving Remaining Time Under Moab

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Introduction

Users will typically write code to run for a set period, write a checkpoint file or save state, and then exit gracefully before the job’s wall clock limit is reached. There are two basic ways for a running job to discover when its wall clock limit is about to be reached. It can either request a signal from the scheduler at a certain time prior to its wall clock expiration, or periodically call an API that returns its remaining time.

Requesting a Signal from Moab

Those who prefer that their jobs receive a signal as it approaches its time limit can specify that request as part of the msub invocation:

```
msub -l signal=<sig_num>[@<secs_remaining>]
```

The user must write a signal handler to catch the signal Moab will send when the job has `secs_remaining` seconds left to go.

Polling for Remaining time from Moab or SLURM

There are three separate API’s for retrieving a job’s remaining time. Each has their own advantages and disadvantages. All three follow this basic pattern:

```
while (work) {
    if (get_remaining_time() < gracetime) {
        save_state();
        exit(0);
    }
    do_work();
}
```

Here is a summary of the three APIs available in order of recommendation.

The Yogrt Library

For users who want high accuracy and tri-lab compatibility, a custom API has been provided, the yogrt library (see “man libyogrt” for details). `yogrt_remaining()` will return the number of seconds remaining in the job allocation.

`yogrt_remaining()` is designed to be fast, with internal caching of the remaining time reported by the resource manager, so calling it relatively often should not result in negative performance impacts.
**SLURM’s API**

For jobs running on machines controlled by Moab / SLURM, SLURM’s native API, `slurm_get_rem_time()`, provides a simple and very accurate method for determining when a job’s time is about to expire.

**Moab’s API**

For users running jobs on any of the Tri-Lab Moab machines, Moab’s native API, `MCCJobGetRemainingTime()`, provides the remaining time, no matter what the underlying resource manager is. It is documented in Appendix H of the Moab Workload Manager Administrator’s Guide. While accurate to within a minute, this library call is not as accurate or as responsive as `yogrt_remaining()` or `slurm_get_rem_time()`.

**Summary - Scenarios**

The following tables summarize the recommendations for users running jobs under Moab at LLNL and at the other Tri-Lab facilities.

**Requesting a Signal and Writing a Signal Handler:**

<table>
<thead>
<tr>
<th>Compiled for machines running under…</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moab at LLNL</td>
<td><code>msub -l &lt;sig_num&gt;@&lt;secs_remaining&gt;</code> or <code>psub -S &lt;sig_num&gt;@&lt;secs_remaining&gt;</code></td>
</tr>
<tr>
<td>Moab at any Tri-Lab</td>
<td><code>msub -l &lt;sig_num&gt;@&lt;secs_remaining&gt;</code></td>
</tr>
</tbody>
</table>

**Polling for Remaining Time**

<table>
<thead>
<tr>
<th>Compiled for machines running…</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moab at LLNL or on any TLCC2 cluster</td>
<td><code>yogrt_remaining()</code></td>
</tr>
<tr>
<td>Moab/SLURM</td>
<td><code>slurm_get_rem_time()</code></td>
</tr>
<tr>
<td>Moab at any Tri-Lab</td>
<td><code>MCCJobGetRemainingTime()</code></td>
</tr>
</tbody>
</table>