Job Step Viewer

A new utility for working with jsrun on Summit

Jack Morrison
HPC Engineer, User Assistance
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What is Job Step Viewer?

- A new tool to generate graphical views of an application’s runtime layout on Summit
  - Resource Sets
  - Process placement
  - Thread binding
  - Node locality
  - Sanity checking
- [https://jobstepviewer.olcf.ornl.gov/](https://jobstepviewer.olcf.ornl.gov/)
jsrun is (still) new

• Generates a lot of questions
Goals for Job Step Viewer

1. Help end-users understand how jsrun options interact with their environment to launch applications on Summit
2. Lower the learning curve for new Summit users
3. Provide project teams and OLCF staff a way to discuss job steps
4. Encourage full utilization of Summit’s large multi-GPU nodes
Features

• Easy to use
• Stand-alone jsrun testing
• Informed by real runs on Summit & respects user’s runtime environment
• Warnings for common mistakes
• SMT{1,2,4} support
• NVMe (Burst Buffer) support
• Supports Explicit Resource Files (ERF)
• Easily sharable, unique URLs
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login1.summit$ bsub -W 10 -nnodes 1 -P $OLCF_PROJECT_ID -Is $SHELL

Job <993238> is submitted to default queue <batch>.

<<Waiting for dispatch ...>>

<<Starting on batch2>>

batch2.summit$ module load job-step-viewer

batch2.summit$ jsrun -n1 -a1 -c1 -g1

https://jobstepviewer.olcf.ornl.gov/summit/993238-7
Drill down into individual compute nodes
Summit Compute Node

- IBM Power System AC922 Compute Node (Redbook)

![Diagram of Summit Compute Node](image-url)

- GPU
- Physical Core
- Hardware Threads
- Burst Buffer
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$ jsrun -n6 -a1 -c7 -g1 -E OMP_NUM_THREADS=7 -brs

https://jobstepviewer.olcf.ornl.gov/summit/993238-8

OR

$ export OMP_NUM_THREADS=7
$ jsrun -n6 -a1 -c7 -g1 -brs
Summit Compute Node (h35n12)
IBM Power System AC922

```bash
psnr -n6 -a1 -c7 -p1 -e <INV_VAR> -bns
```
$ jsrun -n2 -c21 -g3 -a21 -dcyclic

https://jobstepviewer.olcf.ornl.gov/summit/993238-9

$ jsrun -n2 -c21 -g3 -a21 -dpacked

https://jobstepviewer.olcf.ornl.gov/summit/993238-10
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$ jsrun -n30 -r6 -c7 -g1 -a1 -EOMP_NUM_THREADS=7

Warning: OMP_NUM_THREADS=7 is greater than available PU's
Warning: OMP_NUM_THREADS=7 is greater than available PU's
Warning: OMP_NUM_THREADS=7 is greater than available PU's
Warning: OMP_NUM_THREADS=7 is greater than available PU's

<snip>

https://jobstepviewer.olcf.ornl.gov/summit/993224-11
Summit Compute Node (h32n10)
IBM Power System AC922

jrun -m30 -r6 -c7 -g1 -a1 -T <ENV_VAR>

Warning: Over subscribed Hardware Threads

Hardware Thread oversubscription may lead to decreased performance. Check task and thread binding.
$ jsrun -n30 -r6 -c7 -g1 -a1 -EOMP_NUM_THREADS=7

Warning: OMP_NUM_THREADS=7 is greater than available PU's
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Warning: OMP_NUM_THREADS=7 is greater than available PU's

<snip>

https://jobstepviewer.olcf.ornl.gov/summit/993224-11

$ jsrun -n30 -r6 -c7 -g1 -a1 -EOMP_NUM_THREADS=7 -brs

https://jobstepviewer.olcf.ornl.gov/summit/993224-16
Summit Compute Node (h32n10)
IBM Power System AC922

```bash
jsrun -n30 -b6 -c7 -g1 -a1 -e <ENV_VAR> -bns
```
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Summit Compute Node (g27n08)
IBM Power System AC922

`jrun -n6 -c7 -g1 -a14 -dstatic`

Socket 0

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>42</td>
<td>1</td>
</tr>
<tr>
<td>48</td>
<td>8</td>
<td>49</td>
</tr>
</tbody>
</table>

Socket 1

<table>
<thead>
<tr>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>3</td>
<td>46</td>
</tr>
<tr>
<td>51</td>
<td>9</td>
<td>52</td>
</tr>
</tbody>
</table>

Memory (256GB)

disabled

NVMe (1.6TB)
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$ cat erf.demo

cpu_index_using: physical

1 : {host: 1; cpu: {0:28}; gpu: 0}
1 : {host: 1; cpu: {28:28}; gpu: 1}
1 : {host: 1; cpu: {56:28}; gpu: 2}
1 : {host: 1; cpu: {88:28}; gpu: 3}
1 : {host: 1; cpu: {116:28}; gpu: 4}
1 : {host: 1; cpu: {144:28}; gpu: 5}

$ jsrun --erf_input $HOME/erf.demo

https://jobstepviewer.olcf.ornl.gov/summit/993224-3
Not Currently Supported

• MPMD modes

• jsrun *Process Management* options
  • `-e / --stdio_mode`
  • `-I / --stdin_rank`
  • `-k / --stdio_stderr`
  • `-o / --stdio_stdout`
  • `-t / --stdio_input`

• Other IBM Power Systems (Ascent, SummitDev,…)

• Profilers (*nvprov*)

If you feel we're missing a feature, please let us know!
Powered by Slate

• Job Step Viewer is built and runs with normal user permissions

• What is Slate?
  • User-facing service designed for hosting long running processes such as workflows, data portals, and databases

• Get in touch with us if you have a use case for such a service!
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