Is our HPC scheduler optimally configured?

- Lower is better.

- 10,

- 2,

- 0,

- 2

Compare to default scheduler

- Lower is better.  Default ok.

- Generate

- Lower is better.  Default ok.

- Identify 11 scheduler parameters of interest

- Test

- Simulate

- Validation

- Predict avg. queue time for each using GBTR model

- Technique shows promise and can be used by HPC administrators to optimize scheduler

2022

- True,

- 100,

- True, False

- simulator:

- Generate scheduler parameter values to test

- Avg job queue time

- RMSE on training data was ~250 sec.

- Optimizing scheduler parameters for a particular configuration can significantly improve

- In all cases, predicted best parameter settings decreased avg. queue time.

- Required over 840,000 HPC core hours for simulation

- SLURM simulator developed by SUNY University at Buffalo [2]

- Best predicted parameter settings decreased job avg. queue time by

- Inconclusive

- Predicted parameter settings decreased avg. job queue time 51.8% on average

- In all cases, predicted best parameter settings decreased avg. queue time.

- Inconclusive

- RMSE on training data was ~250 sec.

- Simulation was run in parallel using KSU HPC resources

- Best predicted parameter settings decreased job avg. queue time by

- Inconclusive

- Default too low

- Default ok.

- Default is good

- Default ok.

- Default is good

- Inconclusive

- Inconclusive

- See https://slurm.schedmd.com/slurm.conf.html for detailed parameter description

- Best predicted settings: 2,719s  Default: 12,970s

- Best predicted parameter settings decreased job avg. queue time by 79%

- Predicted parameter settings decreased avg. job queue time 51.8% on average

- In all cases, predicted best parameter settings decreased avg. queue time.

- Inconclusive

- RMSE on training data was ~250 sec.

- Best recommended scheduler parameters better utilize HPC resources than the default parameters and finish scheduling all jobs earlier

- Conclusion

- Optimizing scheduler parameters for a particular configuration can significantly improve system performance.

- Technique shows promise and can be used by HPC administrators to optimize scheduler settings for a particular HPC system for jobs its users frequently run

- References

