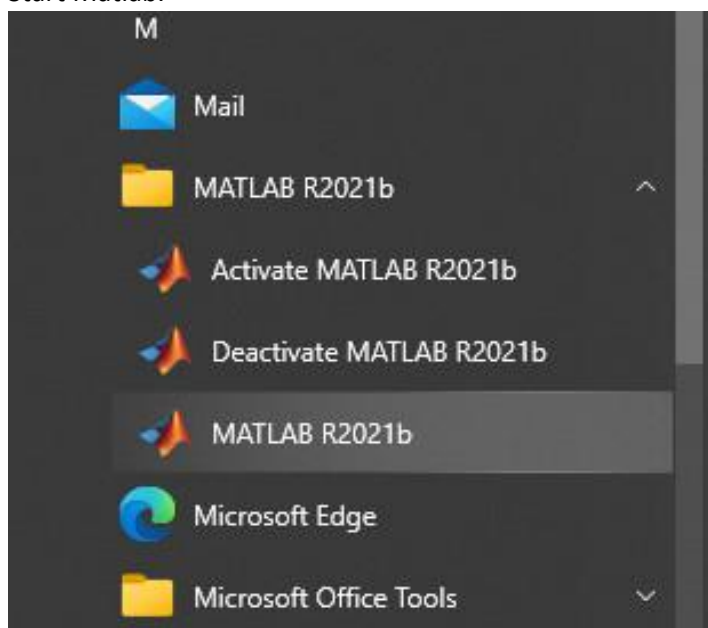


How to use Matlab R2021 in interactive session on Sabancı University HPC Cluster

by: Serdar Acir (serdar.acir@sabanciuniv.edu) on 2022-03-21

This tutorial will guide you how to send and run Matlab scripts interactively from a remote client machine (such as a windows labtop) to the Sabancı HPC cluster (such as toSUn).

1. Sabancı University has a campus-wide Matlab license to use all features of Matlab on every platform including HPC. But you should have a Mathworks account to install Matlab with Campus license. If not already installed, please install Matlab R2021 by following the instructions given here: <https://mysu.sabanciuniv.edu/it/en/software/matlab>
2. Start Matlab.



3. Go to Home -> Add-Ons -> Get Add-Ons
4. Search for "Parallel Computing Toolbox"

← R2022a now available Contribute | Manage Add-Ons

Parallel Computing Toolbox

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Parallel Computing Toolbox R2022a by MathWorks

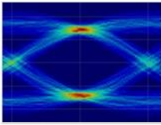
Perform **parallel** computations on multicore computers, GPUs, and clusters

Parallel Computing Toolbox™ lets you solve computationally and data-intensive problems using multicore processors, GPUs, and computer clusters. High-level constructs—**parallel** for-loops, special array

fx pctconfig - Configure settings for **Parallel Computing Toolbox** client session

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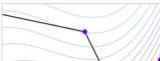


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- End to End System Simulation Acceleration Using GPUs - convolutional coding, illustrates the effect of code generation using the ...
- DVB-S.2 System Simulation Using a GPU-Based LDPC Decoder System Object - objects to simulate the DVB-S.2 system see DVB-S...

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Optimization Toolbox R2022a by MathWorks


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5. Click on Parallel Computing Toolbox link and click Install and click Continue.

Add-On Explorer

← R2022a now available



Parallel Computing To
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Perform parallel computations on multi...

MathWorks Toolbox

Overview Functions Examples

Parallel Computing Toolbox™ lets you solve computation... clusters. High-level constructs—parallel for-loops, speci... applications without CUDA or MPI programming. The tool... the toolbox with Simulink® to run multiple simulations of... The toolbox lets you use the full processing power of m... that run locally. Without changing the code, you can run... also use the toolbox with MATLAB Parallel Server to exe...

Confirm product installation

MATLAB will shut down now to install the selected product.

- Parallel Computing Toolbox

Save your work before continuing.

Continue Cancel

Categories

- Parallel Computing >
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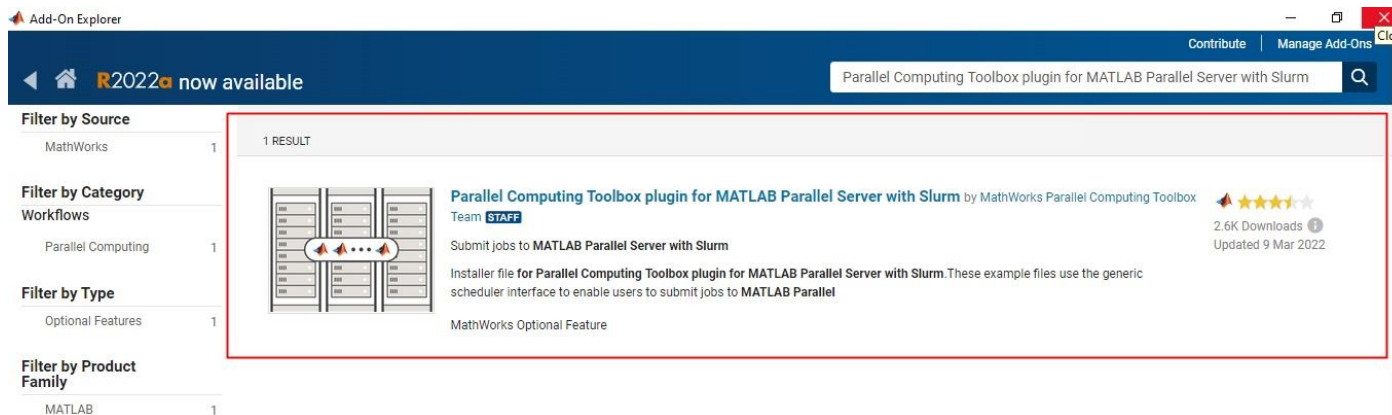
6. Click on Next, Accept the license agreement. Click Next and confirm the download.



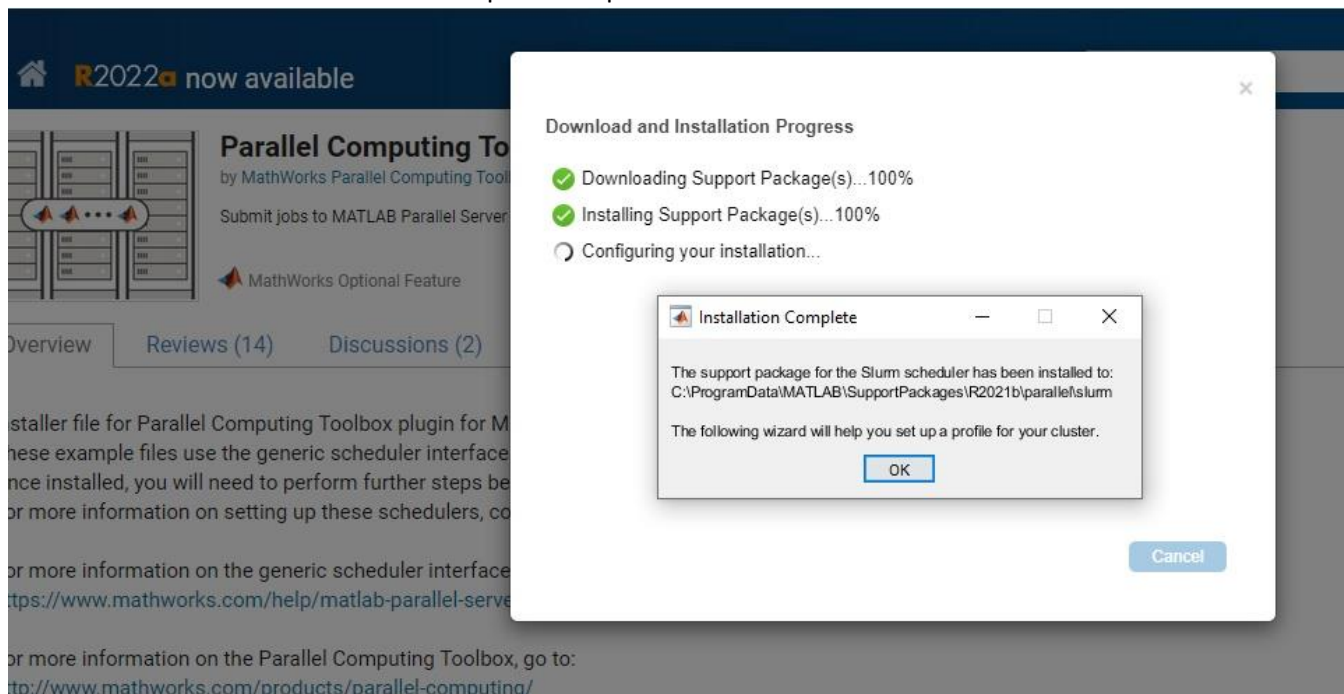
7. Click Close and launch the program.



8. Next we need to install a Slurm profiler program which will enable us to generate a Slurm profile to use with the Sabanci HPC system. To get that program one more time go to Home -> Add-Ons -> Get Add-Ons and search for "Parallel Computing Toolbox plugin for MATLAB Parallel Server with Slurm"



9. Click on “Parallel Computing Toolbox plugin for MATLAB Parallel Server with Slurm” link and click Install. Wait until the installation to complete and push the OK button.



10. Profile wizard will automatically launch. Push the Next button and Next again until the Submission Mode page. Select “No” as your computer and the HPC cluster do not share the same job storage location and push the Next button.

Generic Profile Wizard for Slurm

Submission Mode

MATLAB provides plugin scripts for three submission modes. Answer the following questions to determine which submission mode is appropriate for your cluster.

Can your cluster and client machines read and write to a shared job storage location? **Note:** If yes, MATLAB uses the location specified in the `JobStorageLocation` property of the cluster profile.

☐ Yes

☒ No

You have selected the **nonshared** submission mode. The default plugin scripts are located at 'C:\ProgramData\MATLAB\SupportPackages\R2021b\parallel\slurm\nonshared'.

Previous Next Cancel

11. Enter the HPC cluster sub-domain and your HPC username at the Connection Details page, and click Next. In our example our HPC cluster name is `tosun.sabanciuniv.edu`.

Generic Profile Wizard for Slurm

Connection Details

Set up additional properties required for the nonshared submission mode.

Specify the hostname of the cluster submission host:

Cluster host:

Specify the username to connect to the cluster:

Username (optional):

Do you want to use an identity file to log in to the cluster?

☐ Yes

☒ No

replace it with your own username

Previous Next Cancel

12. Enter remote job storage location at the Cluster Details page. For this purpose, you can create a new folder in your account in the HPC cluster. To determine your root folder in the HPC cluster you can run ***echo \$HOME*** command at the HPC terminal.

Generic Profile Wizard for Slurm

Cluster Details

Set up additional properties required for cluster configuration.

Specify the location on the cluster to store MATLAB job files for clients:

Remote job storage location:

☒ Use unique subfolders

replace it with your own username

Select this option to prevent conflicts between jobs submitted from different users and MATLAB versions. MATLAB does this by storing job files in subfolders of the remote job storage location based on client username and MATLAB version.

Previous Next Cancel

13. Enter the number of workers that the HPC cluster and the Matlab license supports. Also enter the installation directory of the program, which in our case is /cta/capps/matlab/R2021a

Generic Profile Wizard for Slurm

Workers

Job submission requires the following information about workers in your cluster.

Specify the maximum number of MATLAB workers you want to use on your cluster (this must be less than or equal to the maximum number of workers your license supports):

Number of workers:

Specify the root folder of the R2021b MATLAB installation for workers (same for all workers):

MATLAB installation folder for workers

> ⚠ Advanced configuration

Previous Next Cancel

14. Choose "Network license manager" as the license verification method.

Generic Profile Wizard for Slurm

License

You must have a MATLAB Parallel Server license that supports the number of workers in your cluster.

Select the license management that your cluster is using:

☒ Network license manager

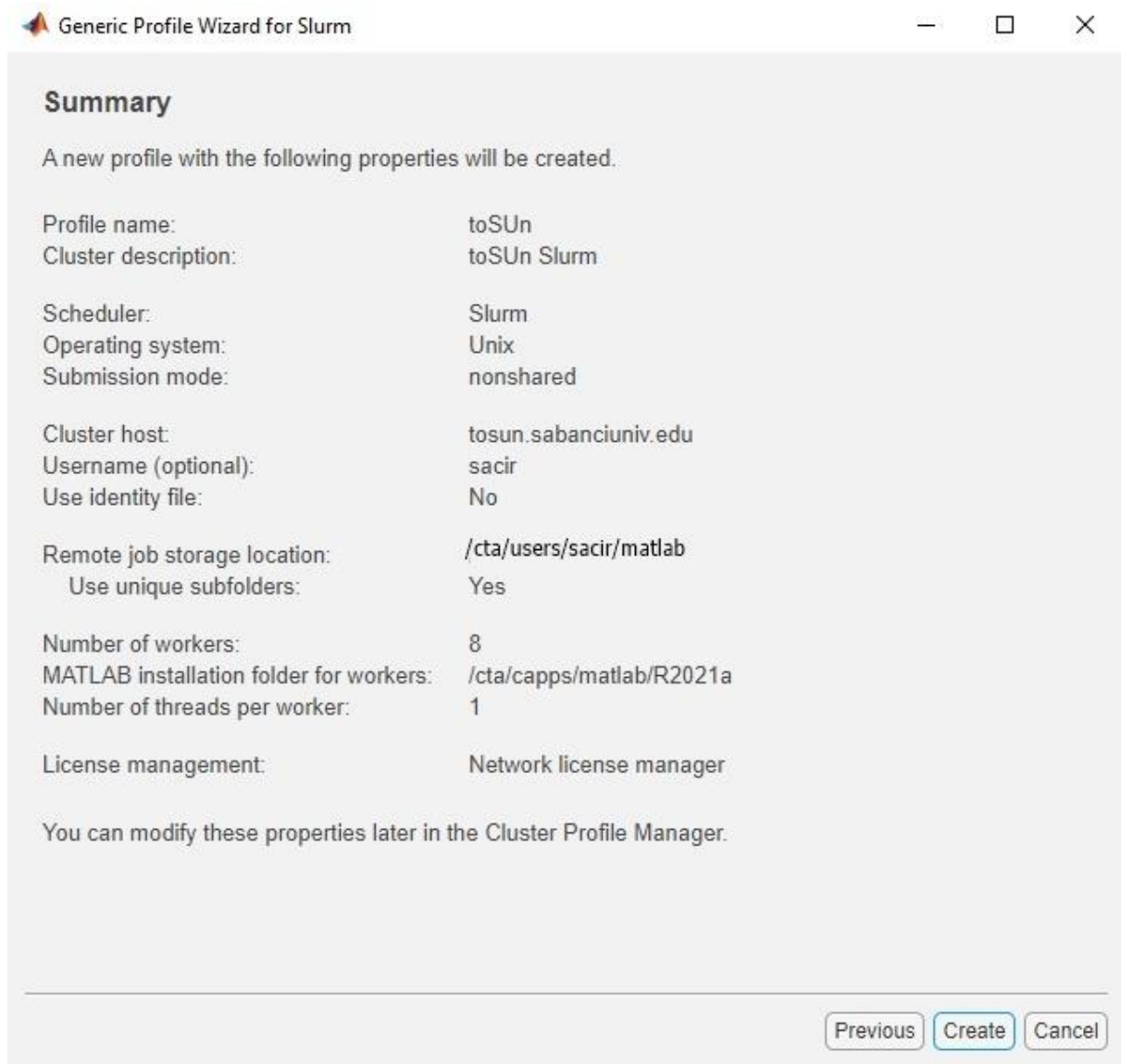
☐ Online licensing

☐ Other

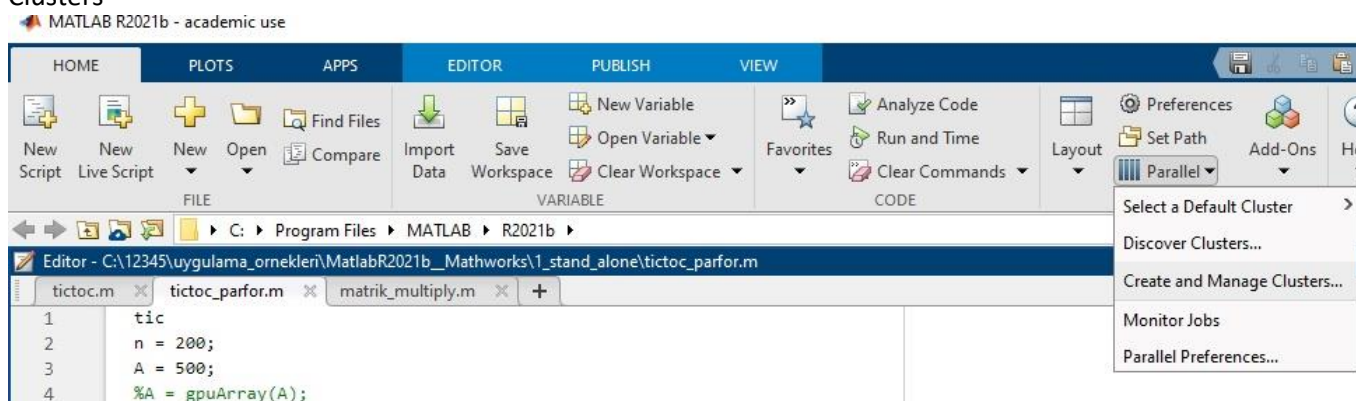
Select this option for all other license management.

Previous Next Cancel

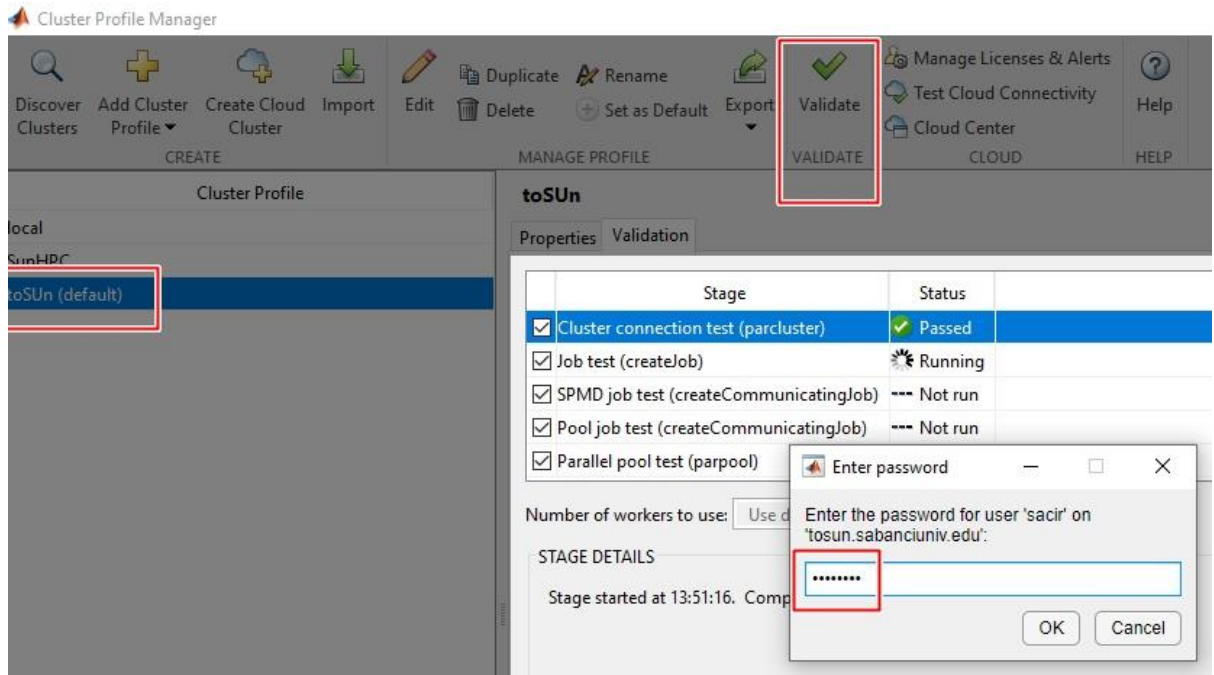
15. Enter profile details, click Next and at the Summary page push the Create button. Then complete the wizard by pushing the Complete button.



16. As the wizard completes we need to make sure we set-up the HPC profile correctly. For that we need to open and run a validation tool by selecting Home -> Parallel -> Create and Manage Clusters



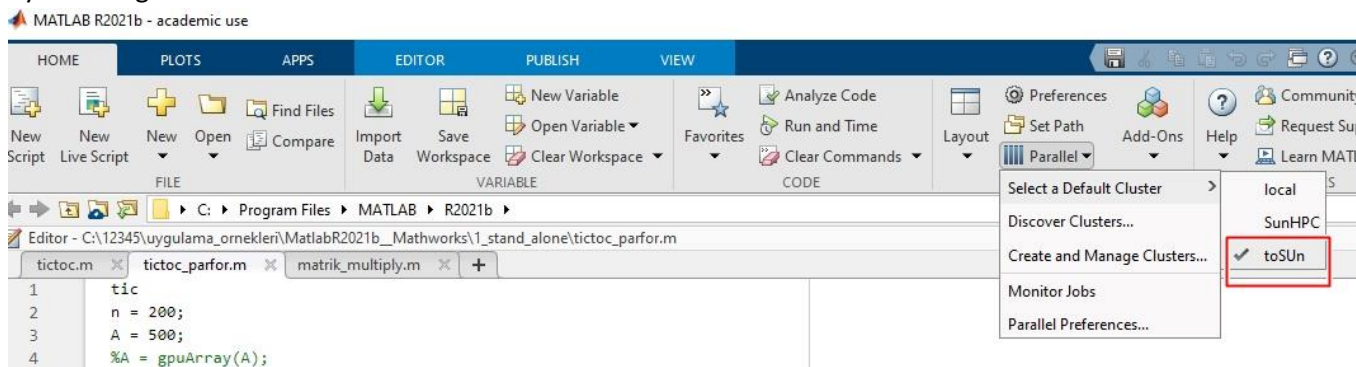
17. Choose the profile you just created and push the Validate button. As the tests are fired up the cluster will prompt you to enter your HPC password.



Failure of parpool test is not important as probably your computer does not resolve back to an ip address like a subdomain. But if you want to pass this test too then at the Matlab command prompt run these commands and then repeat the test.

```
ip = java.net.InetAddress.getLocalHost.getHostAddress().string
pctconfig('hostname',ip);
```

- As the profiling is now finished, you are now ready to submit your script to the cluster. For this first of all select the cluster that you will submit the job to. In our case we choose toSUN cluster by selecting Home -> Parallel -> Select a default cluster -> toSUN



- Make sure your testfile.m file is in the path. Run these commands to tweak your settings for the cluster:

```
>> c = parcluster %to create a cluster
>> c.AdditionalProperties.AdditionalSubmitArgs=['--partition=public --
mem-per-cpu=10G --time=2-00:00:00'] %to finetune your job
>> c.saveProfile %to make the profile persistant
>> j=c.batch(@testfile, 1, {}, 'AutoAddClientPath', false);
```

You can wait for the job to finish at the Matlab window.

```
>>j.wait
```

In case you decide not to, you can always Ctrl-C the process. When the task finished you can now collect the results.

```
>>fetchOutputs(j)
```

Troubleshooting

Here are solutions to a few very common errors that you may experience:

1. “.... s in the future”
Make sure your computer’s time is close to the time of the cluster. You can see the time of the cluster with “*date*” command in the HPC cluster terminal.
2. “ sbatch: error: Batch job submission failed: Invalid qos specification”
Make sure you are submitting your job to a partition that you are allowed to submit.