How to use Matlab R2021b in interactive session on Sabancı University HPC Cluster

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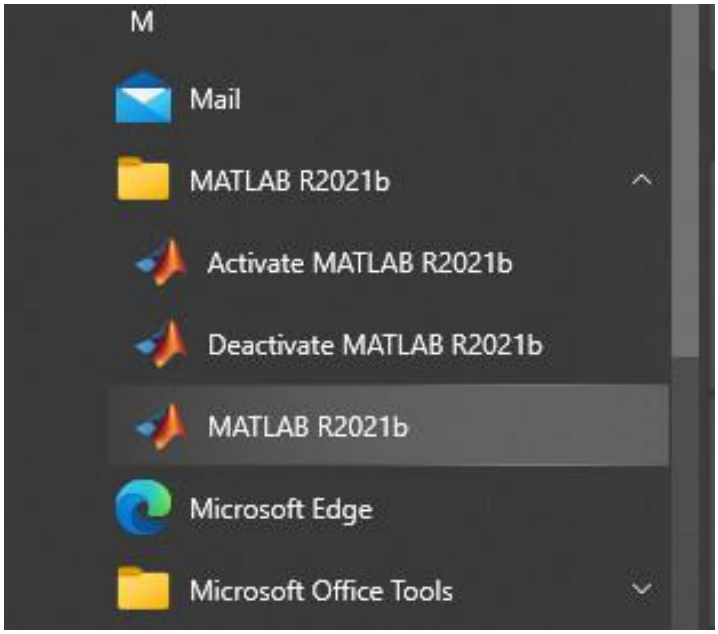
This tutorial will guide you how to send and run Matlab scripts interactively from a remote client machine (such as a windows labtop) to the Sabanci toSUn HPC cluster. Similar approach applies to other SU HPC clusters like Sakura HPC cluster with minor changes like the matlab path. This tutorial is for setting up Matlab for toSUn HPC.

Prerequisites:

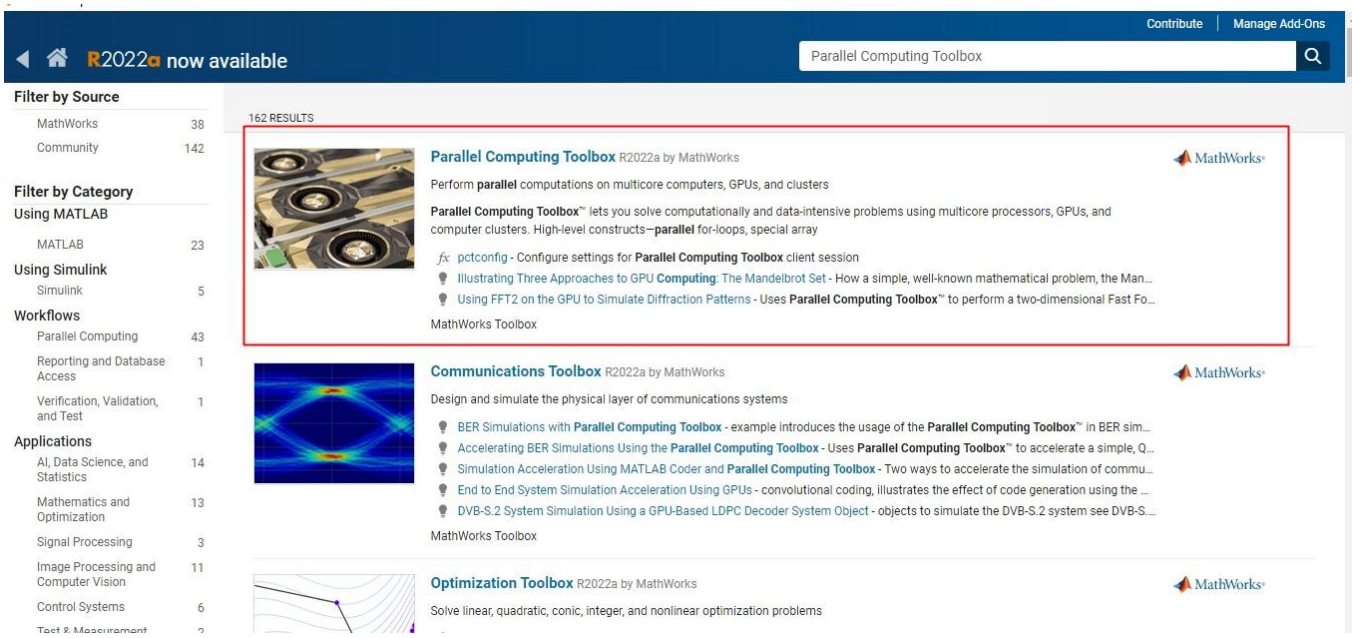
- You need to have an HPC Supercomputer account to execute your Matlab scripts on the HPC clusters. If not already got it, to request an HPC account you need to send an email to serdar.acir@sabanciuniv.edu stating your work area subject, the tool that you will use (matlab) and your current academic advisor. In return you will receive your Cluster host address (e.g. tosun.sabanciuniv.edu), your QOS (e.g. debug) and partition (e.g. debug), HPC username and HPC password.
- You need to install Matlab version R2021b to your computer. If not already installed, please install Matlab R2021 by following the instructions given here (may need an update): https://mysu.sabanciuniv.edu/it/en/software/matlab

1. Create a matlab directory in your HPC cluster account to store matlab files for the HPC.
    - Login to your HPC account with your HPC username and password. You can use a terminal like putty or Mobaxterm for this purpose.
    - Create your matlab folder in your HPC account.
        - sacir@login:~$ mkdir matlab
        - sacir@login:~$ cd matlab
        - sacir@login:~/matlab$ pwd

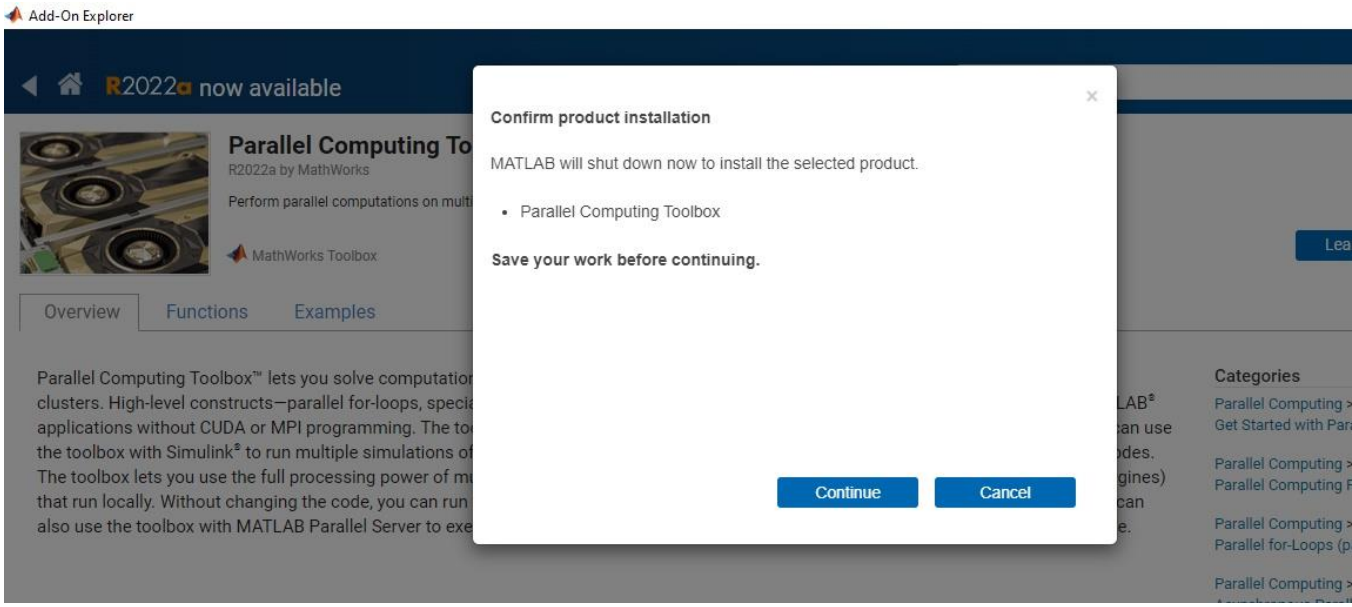
        /cta/users/sacir/matlab *(this will be used as* **RemoteJobStorageLocation** in the following sections*)*
2. Create a directory (e.g. matlab) on your local computer to store matlab files and wrapper files
    a. Make a new directory (e.g. matlab) (e.g. on your Desktop) (we will need this path as **JobStorageLocation** later in this document)
    b. Download the ***matlab-parallel-slurm-plugin-main.zip*** wrapper files to the matlab directory you just created. And unzip it. You can download this file at https://su-hpc-tutorials.readthedocs.io/en/latest/matlab/matlab/#
    c. So at the end you must have the ".m" wrapper files must be inside **matlab-parallel-slurm-plugin-main** directory (e.g. C:\Users\suuser\Desktop\matlab\matlab-parallel-slurm-plugin-main*.m)
3. Start Matlab.



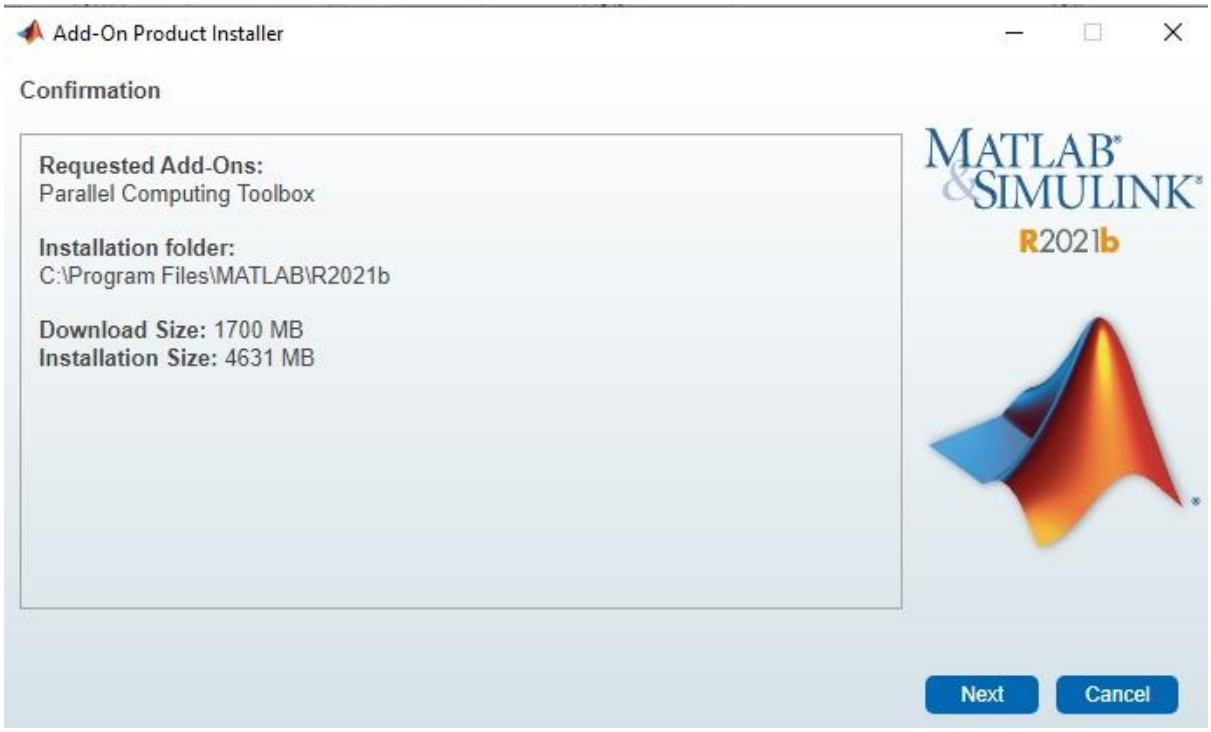
4. As probably your computer does not resolve back to an ip address like a subdomain ,at the Matlab command prompt run these commands to notify Matlab about your ip address. This step is not critical to send jobs to HPC but necessary if you want to pass the Validation test fully in the following steps in this document.
   ip = java.net.InetAddress.getLocalHost.getHostAddress().string
   pctconfig('hostname',ip);
5. Go to Home -> Add-Ons -> Get Add-Ons
6. Search for “Parallel Computing Toolbox”



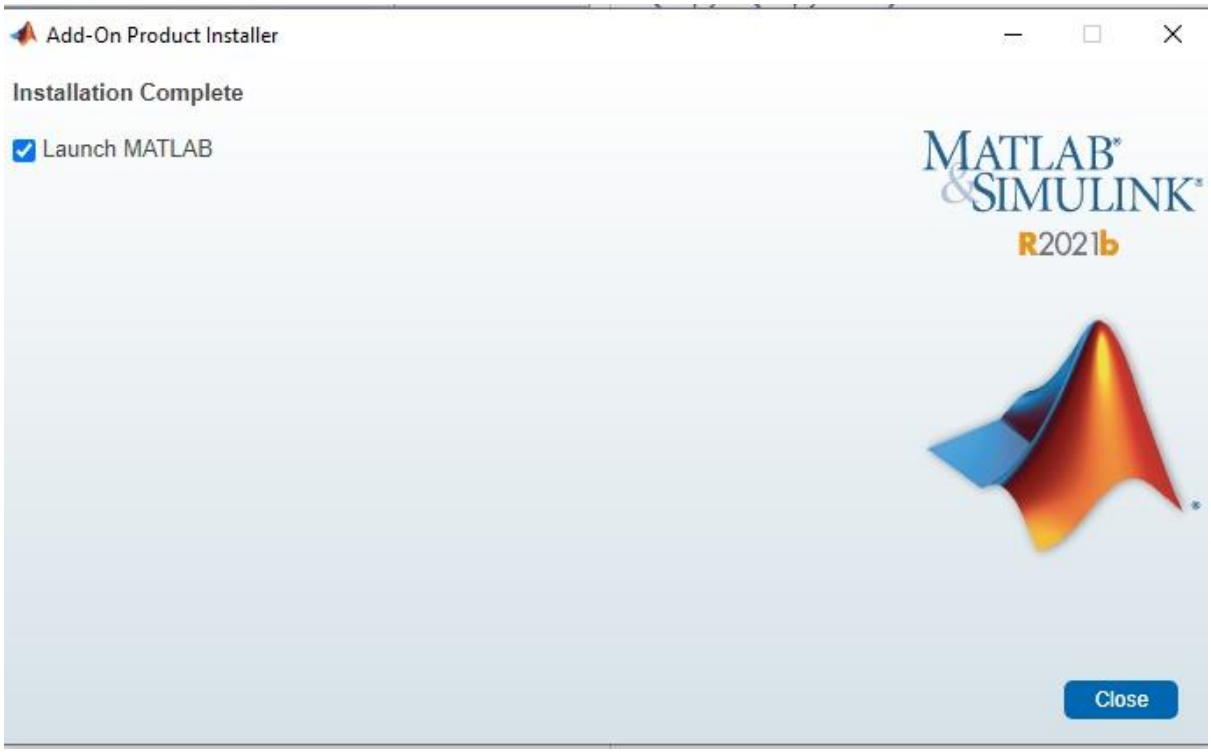
7. Click on Parallel Computing Toolbox link and click Install and click Continue.



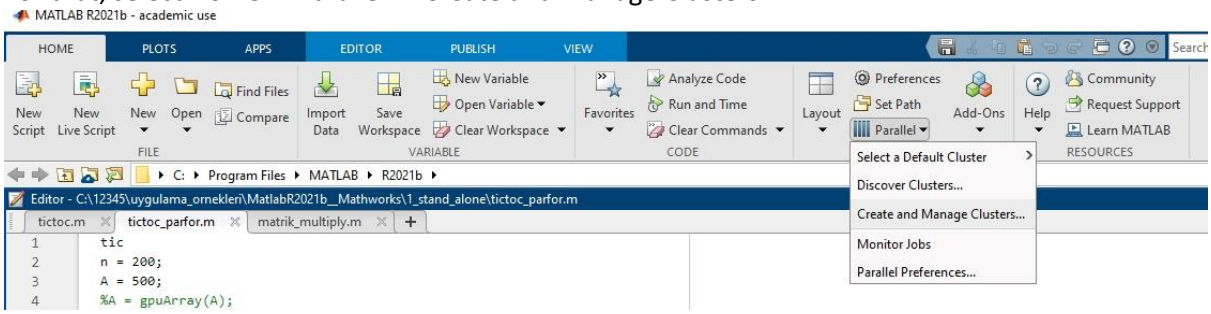
8. Click on Next, Accept the license agreement. Click Next and confirm the download.



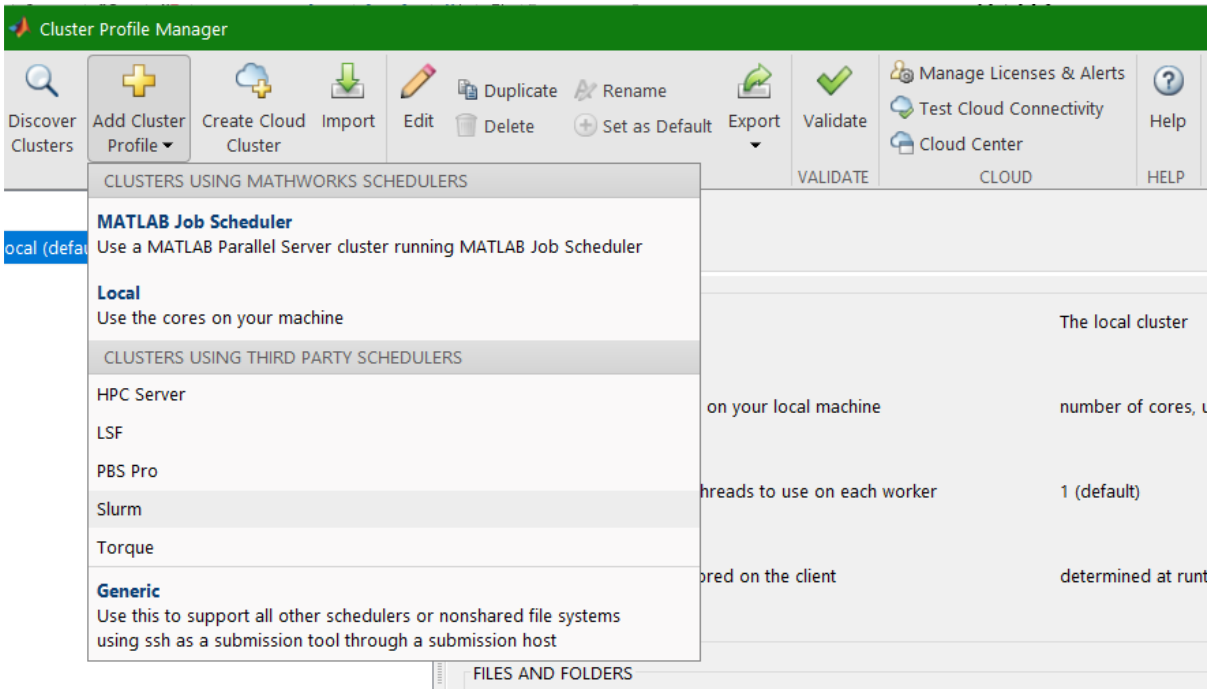
9. Click Close and launch the program.



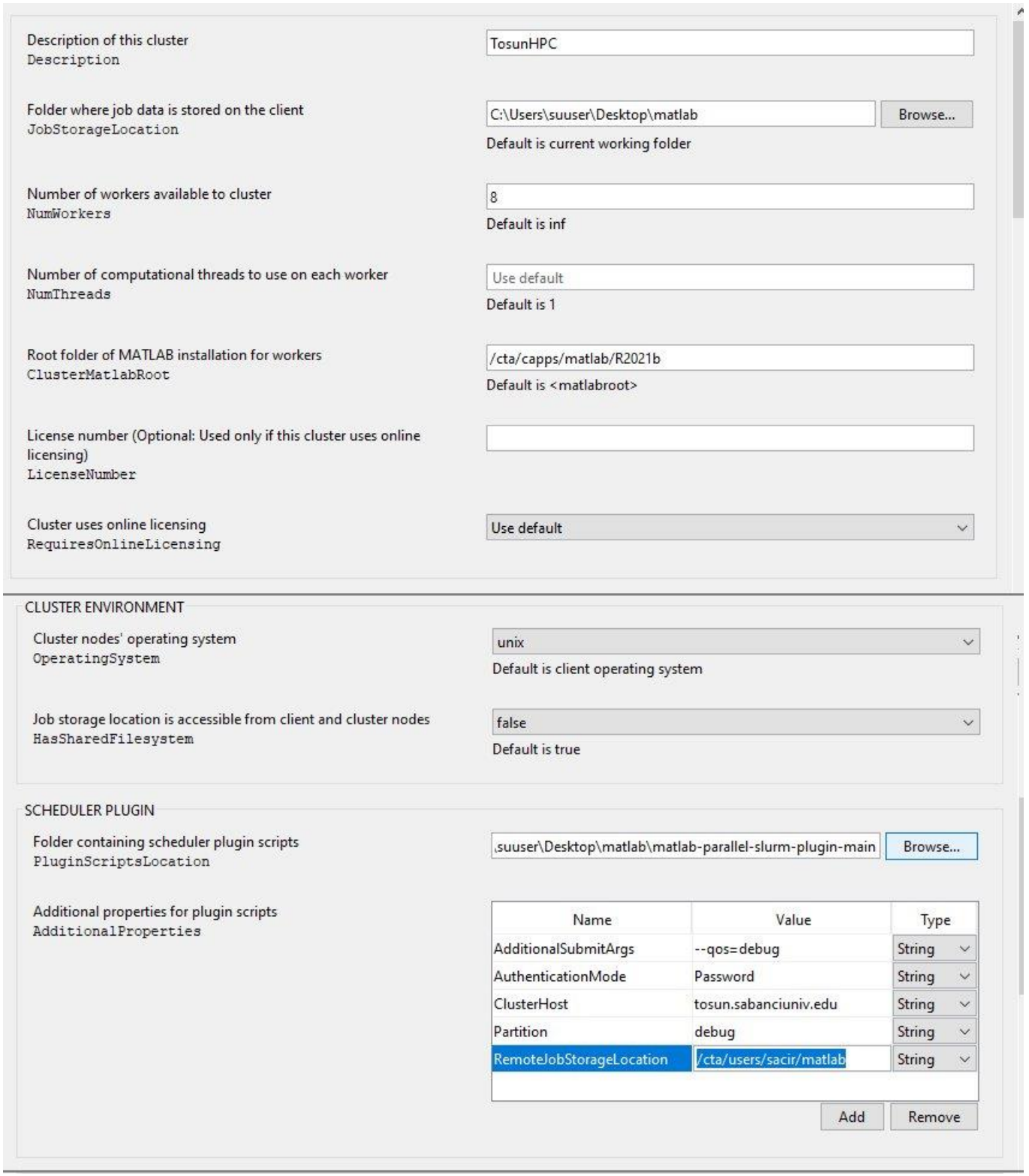
10. Next we need to setup our HPC profile which will enable us to send jobs to Sabanci HPC systems. For that, select Home -> Parallel -> Create and Manage Clusters

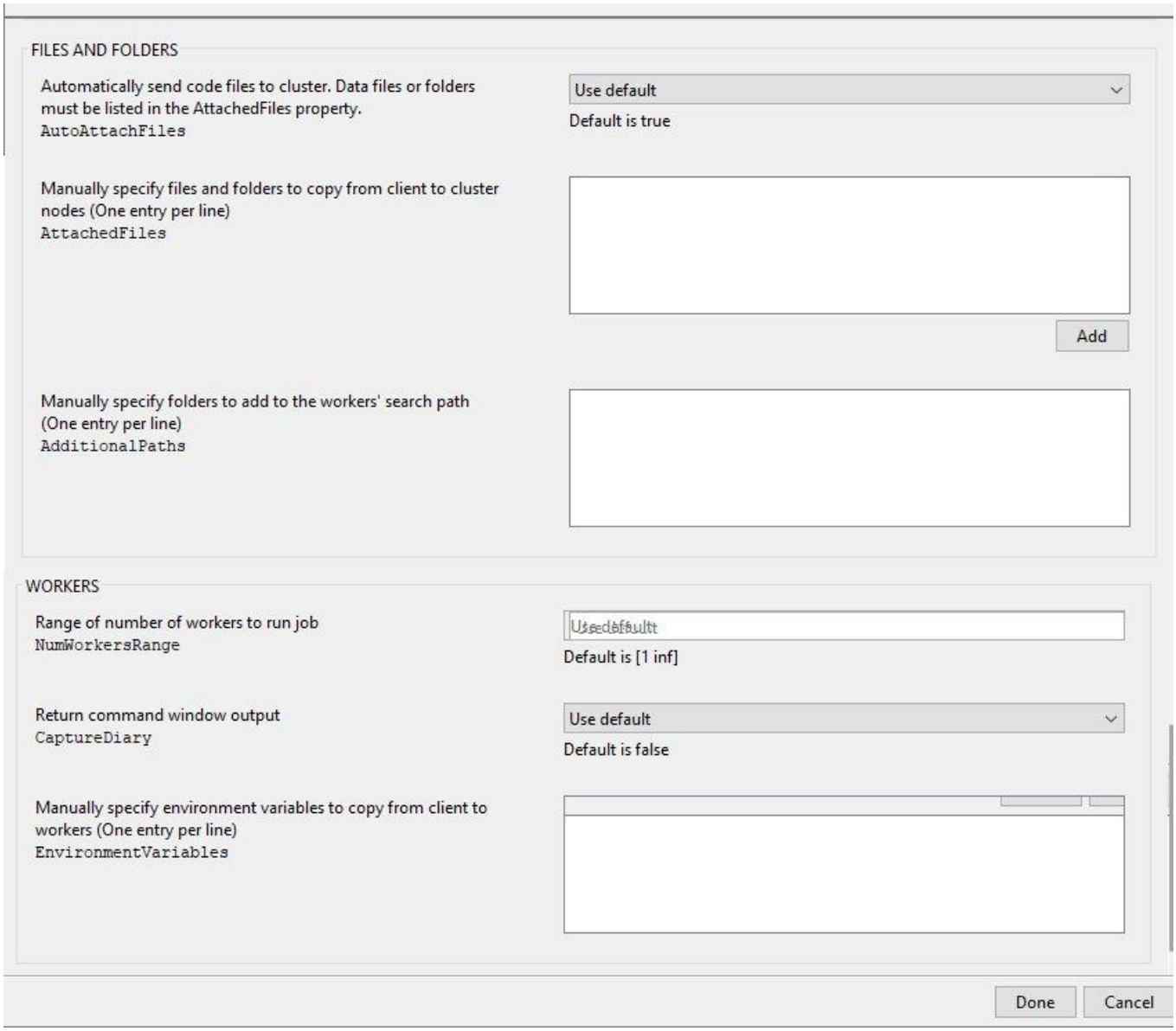


11. Choose “Add Cluster Profile” and select “Generic”

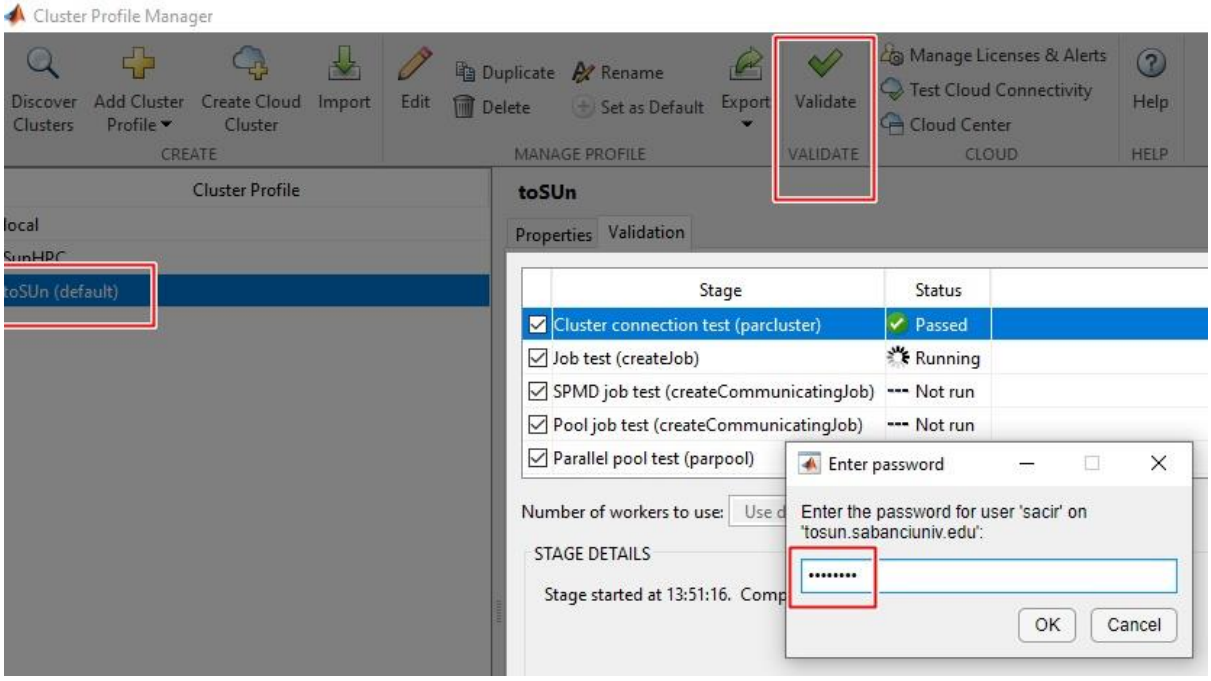


12. Choose “Edit” and fill in the sections.
    a. For Description, enter the name of the cluster (e.g. toSUn HPC)
    b. For *JobStorageLocation*, use the path you created in Step 2.
    c. For *NumWorkers*, enter the number of CPU cores you would like to use.
    d. For *ClusterMatlabRoot* enter /cta/capps/matlab/R2021b if using toSUn HPC cluster. For other clusters please contact us or check it on the particular cluster.
    e. For OperatingSystem, select unix.
    f. For HasSharedFileSystem, select False.
    g. For PluginScriptsLocation enter the path to the directory containing the wrapper files (***matlab-parallel-slurm-plugin-main***) you downloaded and extracted.
    h. To the AdditionalProperties section enter the following items
        i. AdditionalSubmitArgs --qos=<enter your qos here>
        ii. AuthenticationMode Password
        iii. ClusterHost <your cluster host address> (*tosun.sabanciuniv.edu* for toSUn HPC)
        iv. Partition <enter your partition here>
        v. RemoteJobStorageLocation path to you matlab folder at HPC (e.g. /cta/users/sacir/matlab (obtained at Step 1))

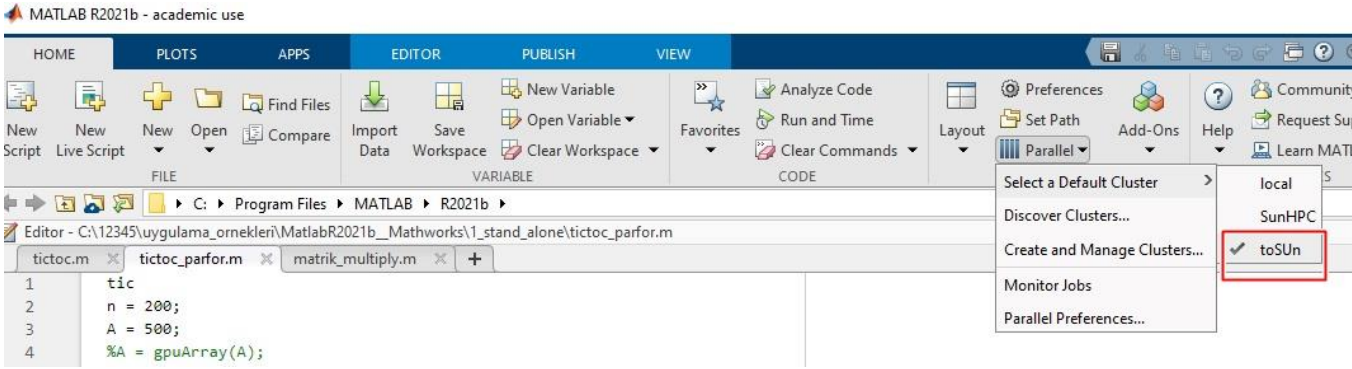

Description of this cluster
Description
TosunHPC
Folder where job data is stored on the client
JobStorageLocation
C:\Users\suuser\Desktop\matlab
Browse...
Default is current working folder
Number of workers available to cluster
NumWorkers
8
Default is inf
Number of computational threads to use on each worker
NumThreads
Use default
Default is 1
Root folder of MATLAB installation for workers
ClusterMatlabRoot
/cta/capps/matlab/R2021b
Default is <matlabroot>
License number (Optional: Used only if this cluster uses online licensing)
LicenseNumber
Cluster uses online licensing
RequiresOnlineLicensing
Use default
CLUSTER ENVIRONMENT
Cluster nodes' operating system
OperatingSystem
unix
Default is client operating system
Job storage location is accessible from client and cluster nodes
HasSharedFilesystem
false
Default is true
SCHEDULER PLUGIN
Folder containing scheduler plugin scripts
PluginScriptsLocation
,suuser\Desktop\matlab\matlab-parallel-slurm-plugin-main
Browse...
Additional properties for plugin scripts
AdditionalProperties
Name
Value
Type
AdditionalSubmitArgs
--qos=debug
String
AuthenticationMode
Password
String
ClusterHost
tosun.sabanciuniv.edu
String
Partition
debug
String
RemoteJobStorageLocation
/cta/users/sacir/matlab
String
Add
Remove



13. Complete the profiler wizard by pushing the Done button.
14. As the wizard completes we need to make sure we set-up the HPC profile correctly.
15. 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 username and password.



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



You can now send your computations to the HPC cluster. If you will be using an .m file then please make sure your .m file is in the path. You can send additional parameters to the cluster from the command line too. For descriptions of these parameters please refer to Matlab documentation.

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.

3. “Error using getRemoteConnection (line 180) Could not find remote host tosun.sabanciuniv.edu . Check the hostname is correct and this machine is connected to the same network.”
   At the profile replace ClusterHost with the ip address. (section 12) h) iii above). For tosun.sabanciuniv.edu it is 10.3.5.102.

for questions please contact:
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