MATLAB for Managing Workflows

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MATLAB

- MatLab (Matrix Laboratory)
- High-level language for technical computing
- Interactive environment for algorithm development, data visualization, data analysis, and numeric computation
- Solve technical computing problems faster than with traditional programming languages, such as C, C++, and Fortran

MATLAB - TAH

- In January 2011, UAB acquired a site license for MATLAB that allows faculty, staff, post-docs, and graduate students to use MATLAB, Simulink, and 42 toolboxes (including the parallel toolbox) for research activities on campus and personal systems.
- DCS – 128 nodes on the Cheaha

Downloading & Installing MATLAB

- Create an account at the Mathworks site using your campus @uab.edu email address.
- Request an activation key.
- Associate your Mathworks account with the campus-wide MATLAB license using your activation key.
- Download the software from the mathworks download site and install MATLAB (contact asset managers for download rights)
- Activate the software using the activation scenario that best suits your particular needs.

MATLAB Installation Scenarios

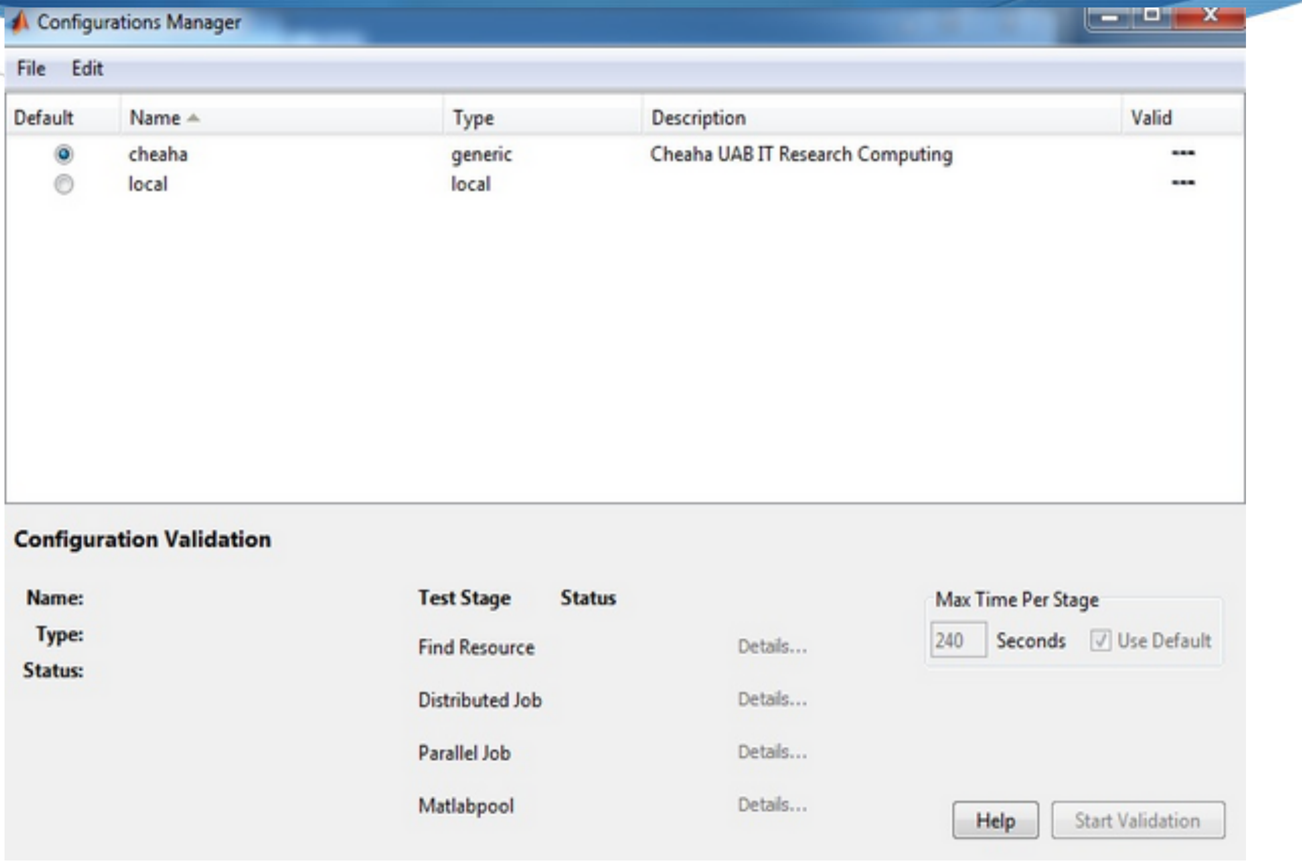
- **Simplified MATLAB Install** – For computers that remain connected to the campus network. This installation requires MATLAB software to be installed on your computer and provides a simple 2-line file to activate the software.

- **MATLAB Designated Computer Install** - For systems which may not have network access when MATLAB is being used. This install type authorizes an individual computer to run MATLAB, allowing MATLAB to run regardless of where the computer is located.

Configure MATLAB

- Install MATLAB with the Parallel Computing Toolbox on your Windows / Linux / Mac workstation
- Download and extract the MATLAB task submission functions to your workstation MATLAB environment
- Define the "cheaha" parallel configuration in your workstation MATLAB environment to submit tasks to Cheaha
- Run the validation tests to ensure your "cheaha" parallel configuration works

Configuration Manager



Default	Name	Type	Description	Valid
●	cheaha	generic	Cheaha UAB IT Research Computing	---
○	local	local		---

Configuration Validation

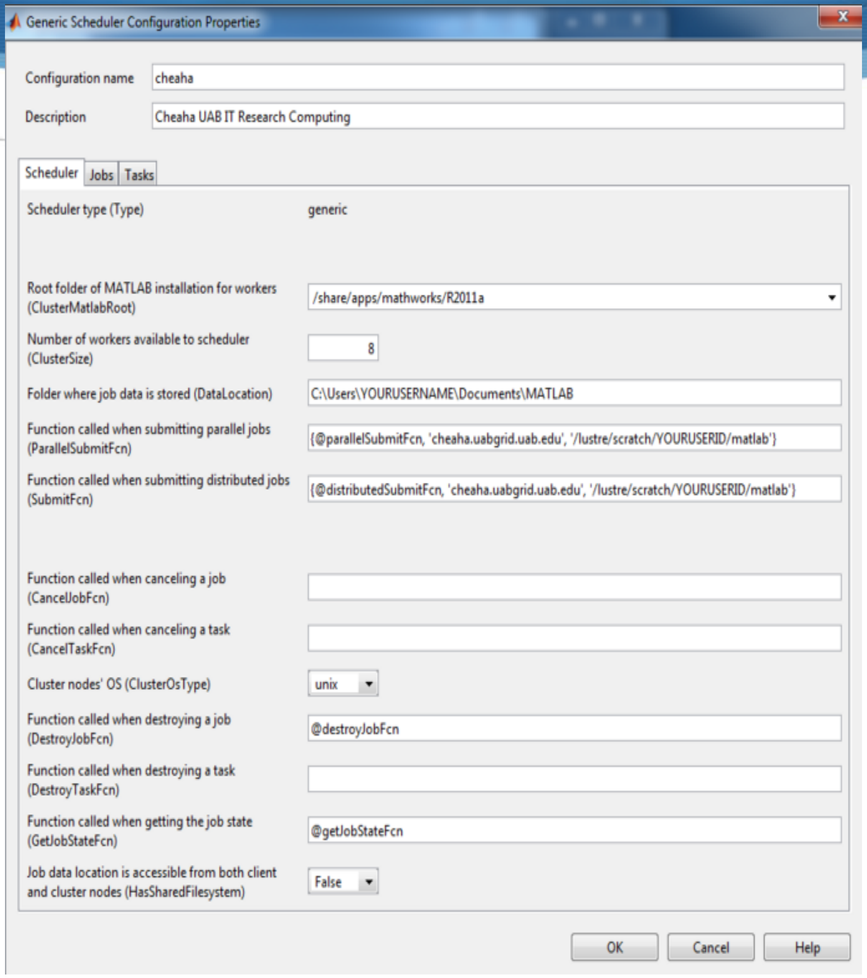
Name:
Type:
Status:

Test Stage	**Status**	
Find Resource		Details...
Distributed Job		Details...
Parallel Job		Details...
Matlabpool		Details...

Max Time Per Stage

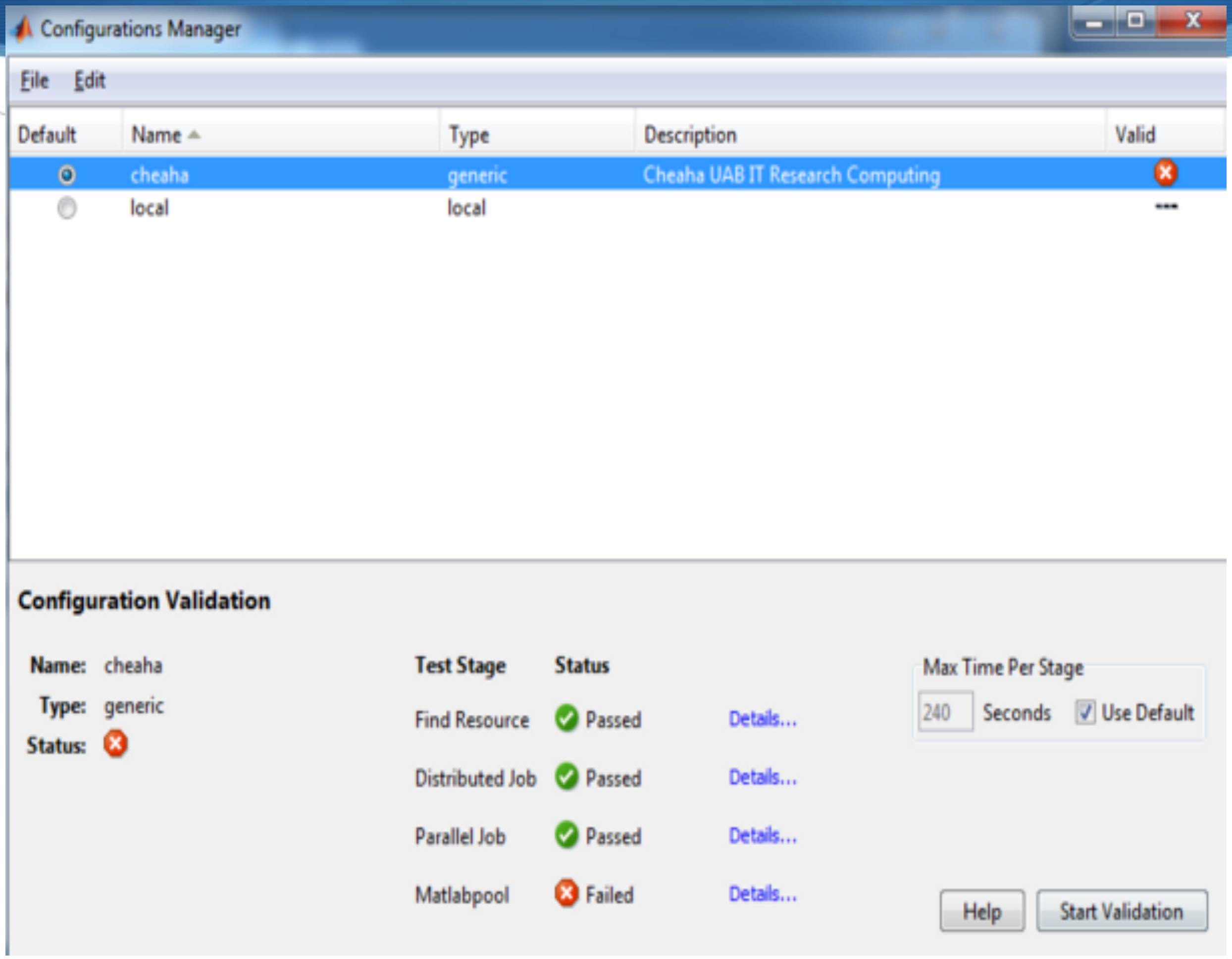
240 Seconds ☑ Use Default

Cheaha Parallel Configuration



Configuration name	cheaha
Description	Cheaha UAB IT Research Computing
Scheduler type (Type)	generic
Root folder of MATLAB installation for workers (ClusterMatlabRoot)	/share/apps/mathworks/R2011a
Number of workers available to scheduler (ClusterSize)	8
Folder where job data is stored (DataLocation)	C:\Users\YOURUSERNAME\Documents\MATLAB
Function called when submitting parallel jobs (ParallelSubmitFcn)	{@parallelSubmitFcn, 'cheaha.uabgrid.uab.edu', '/lustre/scratch/YOURUSERID/matlab'}
Function called when submitting distributed jobs (SubmitFcn)	{@distributedSubmitFcn, 'cheaha.uabgrid.uab.edu', '/lustre/scratch/YOURUSERID/matlab'}
Function called when canceling a job (CancelJobFcn)	
Function called when canceling a task (CancelTaskFcn)	
Cluster nodes' OS (ClusterOsType)	unix
Function called when destroying a job (DestroyJobFcn)	@destroyJobFcn
Function called when destroying a task (DestroyTaskFcn)	
Function called when getting the job state (GetJobStateFcn)	@getJobStateFcn
Job data location is accessible from both client and cluster nodes (HasSharedFilesystem)	False

Validation



Default	Name	Type	Description	Valid
●	cheaha	generic	Cheaha UAB IT Research Computing	☒
○	local	local		---

Configuration Validation

Name: cheaha
Type: generic
Status: ☒

Test Stage	Status	
Find Resource	✓ Passed	Details...
Distributed Job	✓ Passed	Details...
Parallel Job	✓ Passed	Details...
Matlabpool	☒ Failed	Details...

Max Time Per Stage
240 Seconds ☑ Use Default

Demo

- Serial job
- Offload the serial job to Cheaha
- Convert serial job to parallel and run it locally
- Offload the parallel job to Cheaha
- Distributed Job
- Small shell script using MATLAB

Acknowledgements

- David Shealy, Ph.D.
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