Parallel Computing Toolbox™
The 5Ws

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Who should use it?

- You!
- .... if you are a MATLAB or Simulink user
- .... if you have multiple cores in your computer
- .... if you have a GPU
- .... if you can access a cluster or grid
- Even if you have nothing!
Where is my hardware?
**Haystacks**

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Haystacks
Where is my hardware?
Where is my hardware?
What just happened?

MATLAB Desktop (Client)

Worker
Worker
Worker
Worker
Worker
Worker
Worker
Worker
Using Local Workers
Pool on many machines
Task Oriented Problems

- Independent tasks or iterations
- No dependencies or communications between tasks
- Examples: parameter sweeps, Monte Carlo simulations
Data Oriented Problems

Who
Where
What
When
Why
Programming Parallel Applications

- Built-in support with toolboxes: UseParallel
- Simple programming constructs: parfor, parfeval, mapreduce, batch, distributed
- Advanced programming constructs: createJob, labSend, spmd
Programming Parallel Applications (GPU)

- Built-in support with toolboxes
- Simple programming constructs:
  $>300$ mathematical functions,
  gpuArray, gather
- Advanced programming constructs:
  arrayfun, spmd
- Interface for experts:
  CUDAKernel, MEX support

www.mathworks.com/help/distcomp/run-cuda-or-ptx-code-on-gpu
www.mathworks.com/help/distcomp/run-mex-functions-containing-cuda-code
Why use Parallel Computing Toolbox?

- Offload computation:
  - Free up desktop
  - Access better computers

- Scale speed-up:
  - Use more cores on multiple computers
  - Use more cores on GPUs

- Scale memory:
  - Utilize distributed arrays or mapreduce
  - Solve larger problems without re-coding algorithms