qsub arrays and pbsdsh

Options for many similar jobs (array jobs and pbsdsh):

- `-t 1,10,50-100`
  Submit an array of jobs with array ids as specified. Array ids can be specified as a numerical range, a comma-separated list of numbers, or as some combination of the two. Each job instance will have an environment variable `$PBS_ARRAYID`
- `-t 1,10,50-100%5`
  As above, but the appended "%5" specifies the maximum number of array items (in this case, 5) which should be running at one time
- Submit a single "shepherd" job requesting multiple processes and from it start individual jobs with `pbsdsh`.

The naive approach to running a large set of jobs based on the same script is to repeatedly `qsub` the script at the command line, perhaps changing a few environment variables, directories or input files each time.

A slightly less naive approach is to parameterize the script with some variables and `qsub` it in a shell loop.

Torque offers two methods, both more elegant than either of the above, for managing such workflows:

1. A job array groups a set of jobs under the same `$PBS_JOBID`, each with a unique `$PBS_ARRAYID`. Batch system commands such as `qstat`, `qdel`, etc can be called on individual jobs or on the job array as a whole.
2. If the individual jobs are small, the queuing overhead is relatively large. In this circumstance it is better to launch a single parallel job which uses `pbsdsh` to run the set of small jobs.

Job Arrays

(degree basics of monitoring them too, ie the syntax for qstat, qdel etc)

Using pbsdsh for many small jobs

(cover that it is best for many small jobs, mention unevenness in job run times)