About Tractor

Tractor distributes tasks to a farm of execution servers. It manages large queues of concurrent jobs from many users, enforcing dependencies and scheduling policies.

Tractor is designed to be a compact system, relative to the complex role that it plays:

- Tractor-Engine: The central job queue manager, self-contained single install. Low overhead operation with engineering emphasis on high throughput job distribution for large farms.
- Tractor-Blade: Simplified “plug-and-play” server deployment on any size farm.
- Tractor-Dashboard Web UI for ubiquitous access to job feedback and farm status.
- Scripting and command-line tools for wranglers and advanced users.
- Component architecture based on common web technologies.

Tractor can drive all of the computational tools used in modern VFX and animation pipelines. It is used to run everything from rendering and compositing to simulation, transcoding, archiving, database updates, code builds, online asset delivery and notifications. Tractor can launch almost any executable available on your Linux, Windows, and Mac OS X systems.

A tractor Job describes what needs to get done. Jobs are comprised of Tasks, which represent the steps required to complete the job. A job definition describes the resources that are required for each task, and whether the task will run serially or in parallel with other tasks in the job. Jobs can be created by hand, by scripts, by the supplied Python API, or by plug-in job generators in content-creation applications.

Jobs are spooled to the Engine, the central process that maintains the job queue. Tractor-engine selects an appropriate Tractor Blade execution node on the farm for each command, using an abstract keyword matching scheme and resource limit restrictions. The engine also takes care of enforcing dependencies between tasks, as well as finding opportunities for parallel execution, allowing different jobs or independent parts of a single job to run on different servers concurrently. Tractor provides flexible schemes for job prioritization, compute resource access controls, dynamic server availability, and user limit policies.

The Tractor Dashboard web interface provides users and administrators with simple feedback on job status, errors, and overall system status. It also provides drill-down access to detailed information on job structure, attributes, and output logs, as well as detailed data on the blades. The Tractor Query tools provide access to more complex relational queries into the job queue and past execution data. There are query tool interfaces in the web Dashboard, or through a Python API, or on the command line to provide wranglers with quick diagnostics or to build custom reports.

Tractor components around the network communicate using common web-based technologies such as HTTP, JSON, and AJAX. Studios can develop their own custom extensions or external applications that communicate with Tractor using these same standard tools.