_restrictionsSyntax

Job and Worker Restrictions

Restrictions are used to allow or restrict where jobs run, and are applied to both jobs and workers. Restrictions are based on cluster names, but differ from the clusters themselves by an important difference:

> ⚠️ **Jobs and workers can belong to 1 and only 1 cluster, but can be restricted to none, 1, or several clusters**

This seems a bit hard to fathom, until you remember that a job has preferential priority on a worker whose cluster matches the job's cluster, but the job is free to run on any host in other clusters. The job's restriction value can be used to limit what other clusters the job could possibly run on.

Restrictions defined for jobs

When a job has a restriction defined, it means **only run on hosts that satisfy the restriction expression**. Hosts that don't satisfy the restriction expression won't be considered as dispatch candidates (the job will never be sent to that worker).

Restrictions defined for worker hosts

When a worker has a restriction defined via its worker_restrictions value, it means **only run jobs whose cluster value matches one of the clusters in that worker's restriction expression.** The worker won't accept jobs whose cluster doesn't match one of the clusters in the worker's restriction expression.

Restrictions Syntax

A restriction is really defined as a "filter" for hosts based upon information in the queuing algorithm; the values are one or more cluster names. In the priority/cluster queuing system, a user specifies their restrictions by directory structure format:

`/[<segment>/][<segment>/][+|*]`

- * means **only the first level below**.
- + means **all levels below that level, regardless of depth** in the hierarchy.

> ✓ The restriction value is actually evaluated as an expression, and multiple clusters are specified in a "this cluster **OR** that cluster **OR** the other cluster" type of string, with the "**||**" symbol to mean **OR.**

Examples

Worker Restrictions

Define a host that will **only** run jobs in /private/very/deep

```
worker_cluster = "/private/very/deep"

worker_restrictions = "/private/very/deep"
```

Define a host that will run jobs in any cluster at **/private or 1 level below** - done with the *

```
worker_cluster = "/private"

worker_restrictions = "/private or /private/*"
```

Define a host that will only run jobs in **/private/very or any level below** - done with the **+**

```
worker_cluster = "/private/very"

worker_restrictions = "/private/very or /private/very/+"
```

Job Restrictions

Submit a job that will have highest priority in /private and run **only** in /private:

```
qbsub -cl /private -restr /private <cmd>
```

Submit a job that will have highest priority in /private/very, but could run in **any host in /private or in the first level below /private**

```
qbsub -cl /private/very -restr '/private or /private/*' <cmd>
```

Submit a job that will have highest priority in /private/very/deep, but could run in **any host at any level at /private or below**

```
qbsub -cl /private/very/deep -restr '/private or /private/+' hostname
```