Lies, !* lies, and Statistics

Job statistics in the SCHEDD

www.cs.wisc.edu/Condor
Motivation

› My jobs keep failing!
› I’m seeing IO spikes on network!
› How much execution time is badput?
› How big/long running are the jobs in the pool?
“Statistics” in the SCHEDD

- Most are counters that always increase
- Lost when the SCHEDD exits
- Published to the Collector (or not)
- `Condor_status -direct name -schedd`
- more stats with `-statistics SCHEDD:2`
Instantaneous stats

› Shadows/Jobs running
› Using/Waiting for Transfer Queue
› Histogram of memory use
  64Kb, 256Kb, 1Mb, 4Mb, 16Mb, 64Mb, 256Mb, 1Gb, 4Gb, 16Gb, 64Gb, 256Gb
› Histogram of accumulated run time
  30Sec, 1Min, 3Min, 10Min, 30Min, 1Hr, 3Hr, 6Hr, 12Hr, 1Day, 2Day, 4Day, 8Day, 16Day

www.cs.wisc.edu/Condor
Aggregate stats

› Job counts and accumulated time
› Shadows recycled, reconnected
› Histograms of memory and runtime
› Over SCHEDD lifetime
› Over last 1200* seconds
  • (yes there’s a knob for that)
Attribute Name Pattern

› Jobs* are over SCHEDD lifetime
› Shadows* are over SCHEDD lifetime
› RecentJobs* are over last 20 min
› RecentShadows* are over last 20 min
› TransferQueue* are current values
$ condor_status -direct submit -schedd -long | grep ^RecentJobs

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RecentJobsStarted</td>
<td>714</td>
</tr>
<tr>
<td>RecentJobsSubmitted</td>
<td>1057</td>
</tr>
<tr>
<td>RecentJobsCompleted</td>
<td>428</td>
</tr>
<tr>
<td>RecentJobsExited</td>
<td>987</td>
</tr>
<tr>
<td>RecentJobsCheckpointed</td>
<td>0</td>
</tr>
<tr>
<td>RecentJobsCoreDumped</td>
<td>0</td>
</tr>
<tr>
<td>RecentJobsDebugLogError</td>
<td>0</td>
</tr>
<tr>
<td>RecentJobsExecFailed</td>
<td>0</td>
</tr>
<tr>
<td>RecentJobsExitedAndClaimClosing</td>
<td>18</td>
</tr>
<tr>
<td>RecentJobsExitedNormally</td>
<td>428</td>
</tr>
<tr>
<td>RecentJobsExitException</td>
<td>151</td>
</tr>
<tr>
<td>RecentJobsKilled</td>
<td>1</td>
</tr>
<tr>
<td>RecentJobsMissedDeferralTime</td>
<td>0</td>
</tr>
<tr>
<td>RecentJobsNotStarted</td>
<td>46</td>
</tr>
<tr>
<td>RecentJobsShadowNoMemory</td>
<td>0</td>
</tr>
<tr>
<td>RecentJobsShouldHold</td>
<td>11</td>
</tr>
<tr>
<td>RecentJobsShouldRemove</td>
<td>0</td>
</tr>
<tr>
<td>RecentJobsShouldRequeue</td>
<td>350</td>
</tr>
<tr>
<td>RecentJobsTimeToStart</td>
<td>1019765</td>
</tr>
<tr>
<td>RecentJobsAccumRunningTime</td>
<td>787867</td>
</tr>
<tr>
<td>RecentJobsAccumBadputTime</td>
<td>7199</td>
</tr>
<tr>
<td>RecentJobsAccumPreExecuteTime</td>
<td>6616</td>
</tr>
<tr>
<td>RecentJobsAccumPostExecuteTime</td>
<td>6246</td>
</tr>
<tr>
<td>RecentJobsBadputRuntimes</td>
<td>&quot;78, 0, 0, 4, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0&quot;</td>
</tr>
<tr>
<td>RecentJobsBadputSizes</td>
<td>&quot;74, 0, 0, 0, 0, 4, 0, 0, 0, 0, 0, 0&quot;</td>
</tr>
<tr>
<td>RecentJobsCompletedRuntimes</td>
<td>&quot;246, 0, 0, 4, 1, 39, 14, 3, 0, 0, 0, 0, 0&quot;</td>
</tr>
<tr>
<td>RecentJobsCompletedSizes</td>
<td>&quot;246, 0, 0, 11, 0, 4, 43, 4, 4, 0, 0, 0&quot;</td>
</tr>
<tr>
<td>JobsRuntimeHistogramBuckets</td>
<td>&quot;30Sec, 1Min, 3Min, 10Min, 30Min, 1Hr, 3Hr, 6Hr, 12Hr, 1Day, 2Day, 4Day, 8Day, 16Day&quot;</td>
</tr>
<tr>
<td>JobsSizeHistogramBuckets</td>
<td>&quot;64Kb, 256Kb, 1Mb, 4Mb, 16Mb, 64Mb, 256Mb, 1Gb, 4Gb, 16Gb, 64Gb, 256Gb&quot;</td>
</tr>
</tbody>
</table>
$ condor_status -direct submit -schedd -long -statistics SCHEDD:2 | grep Shadows

ShadowsRunning = 2347
ShadowsRunningPeak = 4463
ShadowsRecycled = 234773
RecentShadowsRecycled = 378
ShadowsStarted = 766014
RecentShadowsStarted = 1015
ShadowsReconnections = 0
RecentShadowsReconnections = 0
SCHEDD_COLLECT_STATS_FOR_*

- A ClassAd expression
  - Evaluated against the JobAd
  - Returns true or false
- Produces a whole new set of stats
  - Attribute names begin with “*”
  - Counts only jobs where <expr> is true
SCHEDD_COLLECT_STATS_FOR_SOAR

SCHEDD_COLLECT_STATS_FOR_SOAR = Owner=="soaruser"

$ condor_status -l -direct name -schedd | sort | grep ^Soar
SoarJobsAccumBadputTime = 11434
SoarJobsAccumExecuteTime = 1982281
SoarJobsAccumPostExecuteTime = 1947
SoarJobsAccumPreExecuteTime = 9060
...and 50 more attrs...
Graphing the stats

▶ Some values are useful as-is
  • TransferQueueNumUploading

▶ Some values should be shown as diffs
  • JobsStarted/JobsExited
Making a Ganglia Plugin

› Create a script to query Condor
› Calculate deltas between current data and previous query
› Publish the results to Ganglia
Ganglia Graphs – I/O issues

![Graphs showing I/O issues](https://www.cs.wisc.edu/Condor)
Ganglia Graphs – Badput
Histogram stats

![Histogram graph showing job completion times.](image-url)
Coming soon

SCHEDD_COLLECT_STATS_BY_* = <expression>

SCHEDD_COLLECT_STATS_BY_OWNER = Owner

$ condor_status -l -direct name -schedd | grep ^Owner
Owner_smith_RecentJobsCompleted = 0
Owner_jones_RecentJobsCompleted = 0
... and many many more...