HTCondor-CE Overview

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Troubleshooting Jobs: HTCondor Edition
Troubleshooting Jobs: Non-HTCondor Edition

CE Schedd

Gridmanager

Job Router

1. Grid Job

2. Routed Job

CE Host

Firewall

Auth

1. Grid Job

2. Routed Job

CE Host
HTCondor-CE Requirements

- Installation details: https://opensciencegrid.github.io/docs/compute-element/install-htcondor-ce/
- Open port (TCP) 9619
- Shared FS for non-HTCondor batch systems for file transfer
- Ensure mapped users exist
  http://opensciencegrid.github.io/docs/security/lcmaps-voms-authentication/
- Minimal hardware requirements
  - Handful of cores
  - HTCondor backends should plan on ~½ MB RAM per job
  - Expecting high rates of jobs? HTCondor-CE SPOOL dir should live on an SSD
    - Default /var/lib/condor-ce/spool (condor_ce_config_val -v SPOOL)
    - Same thing applies for HTCondor backends
      Default: /var/lib/condor/spool (condor_config_val -v SPOOL)
- For example, our Hosted CEs run on 2 vCPUs/2GB RAM
Configuring Authentication

- HTCondor-CE maps incoming pilot x509 credentials to unix users using LCMAPS
  http://opensciencegrid.github.io/docs/security/lcmaps-voms-authentication/
- Default VO to unix account mappings live in
  /usr/share/osg/voms-mapfile-default
- For opportunistic usage, create the following unix accounts on your CE and cluster:
  cmsuser, fnalgrid, glow, gluex, hcc, osg,usatlas3
HTCondor-CE Configuration

- Our configuration tool, osg-configure, handles most of the complicated configuration
  - Configuration files for osg-configure live in /etc/osg/config.d/*.ini
  - Run `osg-configure -v` then `osg-configure -c`

- Site policy (max walltime, number of cores, etc.) are described in the HTCondor-CE Job Router configuration
  - [https://opensciencegrid.github.io/docs/compute-element/job-router-recipes/](https://opensciencegrid.github.io/docs/compute-element/job-router-recipes/)
  - Job router filters and transforms incoming grid jobs into “routed” jobs
  - Configured using declarative ClassAds with the `JOB_ROUTER_ENTRIES` variable
  - Each entry in `JOB_ROUTER_ENTRIES` is combined with the `JOB_ROUTER_DEFAULTS` configuration variable to create each job route
Alice has an HTCondor pool and she wants CMS jobs submitted to her CE to be forwarded to her pool and requesting x86_64 Linux machines and setting the attribute “foo” on her routed job to “bar”. All other jobs should be submitted to the pool without any changes.

```plaintext
JOB_ROUTER_ENTRIES = [
    name = "condor_pool_cms";
    TargetUniverse = 5;
    Requirements = target.x509UserProxyVOName == "cms";
    set_requirements = (Arch == "X86_64") && (TARGET.OpSys == "LINUX");
    set_foo = "bar";
]
[
    name = "condor_pool_other";
    TargetUniverse = 5;
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        'set_requirements': (Arch == 'X86_64') && (TARGET.OpSys == 'LINUX'),
        'set_foo': 'bar'
    },
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        'name': 'condor_pool_other',
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Bob has a Slurm pool and he wants ATLAS jobs submitted to his CE to be forwarded to his pool. All other jobs should be submitted to his pool with a 1GB memory limit.

```
JOB_ROUTER_ENTRIES = [ \
    name = "slurm_pool_cms"; \\
    TargetUniverse = 9; \\
    GridResource = "batch slurm"; \\
    Requirements = target.x509UserProxyVOName =?= "atlas"; \\
] \\
[ \
    name = "slurm_pool_other"; \\
    TargetUniverse = 9; \\
    GridResource = "batch slurm"; \\
    Requirements = target.x509UserProxyVOName =!= "atlas"; \\
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    GridResource = "batch slurm"; 
    Requirements = target.x509UserProxyVOName =!= "atlas"; 
    set_default_maxMemory = 1000; 
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    name = "slurm_pool_atlas"; \n    TargetUniverse = 9; \n    GridResource = "batch slurm"; \n    Requirements = target.x509UserProxyVOName =?= "atlas"; \n] \n[ \
    name = "slurm_pool_other"; \n    TargetUniverse = 9; \n    GridResource = "batch slurm"; \n    Requirements = target.x509UserProxyVOName =!= "atlas"; \n    set_default_maxMemory = 1000; \n]
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```

https://opensciencegrid.github.io/docs/compute-element/job-router-recipes/
HTCondor-CE Monitoring

- For graphs showing pilot jobs and CE load:
  
  `yum install htcondor-ce-view`

- Configuration lives in `/etc/condor-ce/config.d/05-ce-view.conf`
  
  - Uncomment `DAEMON_LIST`
  - Defaults to port 80 but can be configured by changing `HTCONDOR_VIEW_PORT`
  - Restart `condor-ce` service after config changes

[Link to installation guide](https://opensciencegrid.github.io/docs/compute-element/install-htcondor-ce/#install-and-run-the-htcondor-ce-view)
Validation

From the CE host:

1. Verify that local job submissions complete successfully from the CE host, e.g. `sbatch`, `condor_submit`, `qsub`, etc.
2. Verify that all required daemons are running with `condor_ce_status`
3. Verify the CE’s network configuration with `condor_ce_host_network_check`
4. Verify end-to-end job submission with `condor_ce_trace`
   a. First, from the CE host
   b. Next, from a remote host with the `htcondor-ce-client` tools

[Link to validation page](https://opensciencegrid.org/docs/compute-element/install-htcondor-ce/#validating-htcondor-ce)
Troubleshooting Startup

systemctl start condor-ce
service condor start
condor_ce_on

Legend:
- Startup
- Authorization
- Command/Logs

Master

Schedd

Collector

Job Router

/var/log/condor-ce/MasterLog
/var/log/condor-ce/SchedLog
/var/log/condor-ce/CollectorLog
/var/log/condor-ce/JobRouterLog
## Troubleshooting Startup

```
# condor_ce_status -any

<table>
<thead>
<tr>
<th>MyType</th>
<th>TargetType</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector</td>
<td>None</td>
<td>My Pool - <a href="mailto:fermicloud068.fnal.gov@fermicloud068.fnal.gov">fermicloud068.fnal.gov@fermicloud068.fnal.gov</a></td>
</tr>
<tr>
<td>Scheduler</td>
<td>None</td>
<td>fermicloud068.fnal.gov</td>
</tr>
<tr>
<td>DaemonMaster</td>
<td>None</td>
<td>fermicloud068.fnal.gov</td>
</tr>
<tr>
<td>Job_Router</td>
<td>None</td>
<td><a href="mailto:htcondor-ce@fermicloud068.fnal.gov">htcondor-ce@fermicloud068.fnal.gov</a></td>
</tr>
</tbody>
</table>
```
Troubleshooting Startup

```
systemctl start condor-ce
service condor start
condor_ce_on
```

Legend:
- Startup
- Failed AuthZ
- Command/Logs

```
03/20/19 16:05:58 ERROR: AUTHENTICATE:1003:Failed to authenticate with any method
```

**Potential Solutions:** Run fetch-crl, update osg-ca-certs, verify host cert validity, verify system time
## Troubleshooting Jobs

```
# condor_ce_q -nobatch

-- Schedd: lhcb-ce.cttc.wisc.edu : <128.104.100.65:9618?... @ 03/20/19 21:31:19

<table>
<thead>
<tr>
<th>ID</th>
<th>OWNER</th>
<th>SUBMITTED</th>
<th>RUN_TIME</th>
<th>ST</th>
<th>PRI</th>
<th>SIZE</th>
<th>CMD</th>
</tr>
</thead>
<tbody>
<tr>
<td>153501.0</td>
<td>nu_lhcb</td>
<td>3/18 13:30</td>
<td>2+07:56:31</td>
<td>R</td>
<td>0</td>
<td>733.0</td>
<td>DIRAC_clpM0A_pilotwrapper.py</td>
</tr>
<tr>
<td>154043.0</td>
<td>nu_lhcb</td>
<td>3/19 13:43</td>
<td>1+07:41:29</td>
<td>R</td>
<td>0</td>
<td>1709.0</td>
<td>DIRAC_RpJK9Q_pilotwrapper.py</td>
</tr>
<tr>
<td>154066.0</td>
<td>nu_lhcb</td>
<td>3/19 13:43</td>
<td>1+07:41:31</td>
<td>R</td>
<td>0</td>
<td>1465.0</td>
<td>DIRAC_RpJK9Q_pilotwrapper.py</td>
</tr>
<tr>
<td>154088.0</td>
<td>nu_lhcb</td>
<td>3/19 14:09</td>
<td>1+07:14:33</td>
<td>R</td>
<td>0</td>
<td>1709.0</td>
<td>DIRAC_ekQezG_pilotwrapper.py</td>
</tr>
<tr>
<td>154091.0</td>
<td>nu_lhcb</td>
<td>3/19 14:09</td>
<td>1+07:14:32</td>
<td>R</td>
<td>0</td>
<td>1709.0</td>
<td>DIRAC_ekQezG_pilotwrapper.py</td>
</tr>
<tr>
<td>154258.0</td>
<td>nu_lhcb</td>
<td>3/19 17:36</td>
<td>1+03:37:18</td>
<td>R</td>
<td>0</td>
<td>1221.0</td>
<td>DIRAC_lIr4FB_pilotwrapper.py</td>
</tr>
</tbody>
</table>
```
Troubleshooting Jobs

# condor_ce_q -help status
[...]
  JobStatus codes:
  1 I IDLE
  2 R RUNNING
  3 X REMOVED
  4 C COMPLETED
  5 H HELD
  6 > TRANSFERRING_OUTPUT
  7 S SUSPENDED

See hold reasons with condor_ce_q -held
Troubleshooting Jobs: HTCondor Edition

1. Grid Job
   - CE Schedd
     - /var/log/condor-ce/SchedLog
   - Job Router
     - /var/log/condor-ce/JobRouterLog

2. Routed Job
   - Local Schedd
     - /var/log/condor/SchedLog
Troubleshooting Jobs: Non-HTCondor Edition

CE Schedd → Job Router

1. Grid Job
2. Routed Job

Firewall → Auth

Routed Job

Gridmanager

/var/log/condor-ce/GridmanagerLog
Additional Resources

- Overview
  https://opensciencegrid.org/docs/compute-element/htcondor-ce-overview/

- Install Guide
  https://opensciencegrid.org/docs/compute-element/install-htcondor-ce/#validating-htcondor-ce

- Job Router Configuration Guide
  https://opensciencegrid.org/docs/compute-element/job-router-recipes/

- Troubleshooting Guide
  https://opensciencegrid.org/docs/compute-element/troubleshoot-htcondor-ce/

- Additional Help
  https://opensciencegrid.org/docs/common/help/
Questions?