Debugging Common Problems in HTCondor

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Typical User Problems

› Administrators should also understand these problems and solutions.

› User problems become the administrators problem, and being able to explain to the user what is happening with their jobs will be necessary.

Typical User Problems

› Can't submit jobs

› Jobs never start

› Jobs start but go on hold

› Jobs start but go back to idle unexpectedly

From the User's Perspective

› Basics
  - Is HTCondor installed?
  - Are the tools in the path?
› If the administrator has done a typically install, the path and environment should be fine.
› Run 'condor_version' to verify it works.

Can't Submit Jobs

› When submitting, HTCondor checks the locations specified for your output files to make sure they are writable after the job completes

  • UNIX file permissions
  • Typo in a pathname

› Same for the job's log file

Can't Submit Jobs

› When submitting, HTCondor also checks your input files to make sure they are readable.
  - UNIX file permissions
  - Typo in a pathname

› HTCondor also checks that the job's log can be written to.

Can't Submit Jobs

› Unable to contact the condor_schedd

› Are you logged into a submit machine? Or is this an execute machine or central manager?

› You can us 'ps' to see if any HTCondor daemons are running

› Is the condor_schedd overwhelmed or system load very high?
- Not necessarily a user problem

Can't Submit Jobs

› Unable to authenticate to the condor_schedd.

- Shouldn't be an issue if you are submitting on the same machine where the schedd is running
- Can be an issue if you do "remote submits" since those authentication mechanisms require special configuration by the administrator

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Can't Submit Jobs

› Not authorized

› SUBMIT_REQUIREMENTS check not met
  - For example, to restrict which executable is run
  - To enforce which Account_Group a user claims to be part of
  - Controlled by your HTCondor administrator

Jobs Never Start

› So, you were successful at submitting the job, but now when you run 'condor_q' you see it stay in the "Idle" state forever.

› First, the Matchmaking process is NOT instantaneous, so some patience is required. We are a High-Throughput system.

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Jobs Never Start

› Depends a lot on the pool policy

› Will another user's job get evicted or do you need to wait for a free slot?

› Are your job requirements reasonable?

- Are you asking for an amount of CPU, Disk, Memory, or other resource that doesn't exist in your pool?

- Or even if it's rare, you may have to wait quite a while to get access that resource

Jobs Never Start

› Is there some attribute in your job that is not satisfying the StartD requirements?

› Is there some attribute in your job that is making it "unattractive" to the StartD rank?

› Remember that each StartD might have a different configuration for Requirements and Rank (like the Owners of machines)

Jobs Never Start

› Helpful tools:
  - condor_q –analyze
  - condor_q –better-analyze
  - condor_q –better-analyze –reverse

› Will check and analyze the requirements expression of the job (or machine) to see if it matches

› Offers suggestions when it doesn't match

Jobs Go On Hold

› Many reasons jobs could go on hold:

› Job's own periodic_hold expression

› The adminstrators
"SYSTEM_PERIODIC_HOLD" expression

› These are typically used to hold the job
when it violates some condition (using too
much RAM, Disk, or CPU)

Jobs Go On Hold

› When file transfer fails

› Unable to write the input files into the Job Sandbox (rare)

› Unable to find an output file that was specified in the submit file (common)

› Unable to write the output back to the submit machine (rare)

Jobs Go On Hold

› You can run 'condor_q –held' to see which jobs are held and also the reason why.

› You can edit already-queued jobs using 'condor_qedit' to change the command line arguments or the name of an output file (among many other things).

› After editing, you can run 'condor_release' to let the job run again.

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Jobs Run but then Become Idle

› This doesn't necessarily indicate a problem!

› Your job may have been evicted due to user priority and is simply waiting to be rescheduled by the system

› The machine's "PREEMPT" or "KILL" policy may have stopped your job for using too many resources

  • In this case, you should edit your Request_Cpus / Request_Memory / Etc.

Jobs Run but then Become Idle

› Remember you can always look in your job's log file for hints

› You are specifying a log file for your job, right?

› If you see excessive "Shadow Exception" messages, that may indicate a mis-configuration of the system by the administrator.

My Job Doesn't Run Correctly!

› Does it work correctly outside HTCondor?
  - ARE YOU SURE?!?!?

› Check that the environment for the job is the same as when it is running from the command line.

My Job Doesn't Run Correctly!

› Use 'condor_ssh_to_job' while it is running and you can check on it in real-time.

- Check memory footprint, disk usage, load.
- Output files being written correctly?
- Attach to it with gdb to inspect the stack.

› Also, 'condor_submit –interactive'

- Sets up the job environment and input files
- Gives you a command prompt where you can then start job manually to see what happens

From the Admin's View

› Each running HTCondor daemon keeps a log file:

- MasterLog
- SchedLog
- ShadowLog
- etc.

› These logs can contain an enormous amount of information. The level of verbosity is configurable per-daemon.

From the Admin's View

› Find the location of the log directory:
  - condor_config_val LOG

› Look at the debug levels for each daemon:
  - condor_config_val –dump _DEBUG

From the Admin's View

› Let's consider the SCHEDD_DEBUG setting in the condor_config.

› Controls the verbosity of the SchedLog

› Individual subsystems can be added:

- • D_NETWORK
- • D_SECURITY
- • D_COMMAND
- • etc.

› D_ALL:2 is the most verbose level

From the Admin's View

› Because log files can be huge, they have a certain maximum size and are rotated as needed.

› See Section 3.3.4 in the manual for full debugging subsystem configuration.

From the Admin's View

› You can remotely fetch a log:

› condor_fetchlog <machine> <subsys>
- condor_fetchlog abc.wisc.edu SCHEDD

› By default, you can only fetch logs from an "administrator" authorized machine (like the Central Manager).
- Like everything, this is configurable

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condor_master Won't Start

› It is possible that the condor_master cannot write to its own log file. In this case, it will refuse to start and exist with status 44.

› The condor_master also checks to see if another instance of HTCondor is already running. In this case it does not start a new instance and instead prints a message in the MasterLog file.

condor_master Won't Start

› Possible error in the configuration file that made it unparsable

› Specified a condor_config file that doesn't exist or has permissions that make it unreadable.

› Almost all other situations should result in at least something being written to log file.

From the Admin's View

› Okay, now that we have the logs, we have access to the information that we will need to debug problems.

› Let's move on to some common problems and how they are identified.

From the Admin's View

› When I run condor_status, I don't see any output!

› This means that the condor_startd is unable to advertise the slots to the collector

- Is the condor_startd running? (Use 'ps')

- Network connectivity issue? (Firewall?)

- Authorization issue?

- Start by looking at the StartLog of an execute machine that should be reporting

From the Admin's View

› Obvious errors in the StartLog:

- Is the right collector specified?
- Do you see messages about "Can't connect"?
- Error sending data?
- Timing out?
- Update was denied?

From the Admin's View

› You should also check the CollectorLog on the central manager to see if the information is coming in correctly

- Do you see "Command received"?
- Error reading data?
- Timing out?
- Update was denied?

From the Admin's View

> Authorization issue
>> • You will see "PERMISSION DENIED" in the CollectorLog on the Central Manager

> It generally means that the ALLOW_WRITE or ALLOW_DAEMON setting on the Central Manager is not permitting the other machines to send updates

> Run 'condor_config_val –dump ALLOW_' on the Central Manager

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From the Admin's View

› Check the list of authorized IP addresses

› Wildcards and netmasks are permitted:
  - 10.0.0.*
  - *.wisc.edu
  - 192.168.0.0/24

› Make sure to condor_reconfig the Central Manager after making any changes.

From the Admin's View

› The entire pool is "Idle" even though there are jobs in the queues!

› Any Ideas?

From the Admin's View

› The entire pool is "Idle" even though there are jobs in the queues!

› Negotiator is not making matches…

From the Admin's View

› The entire pool is "Idle" even though there are jobs in the queues!

› Negotiator is not making matches…

- Is it running?

- What are the Machines' "START" expressions?

- Would you expect jobs to match?

From the Admin's View

› Negotiator *is* making matches, but somehow the SchedD is failing to finalize the match when claiming the StartD

› Examine the SchedD, StartD logs

› Look for "ERROR", "WARNING", "FAILED"

› Look at the preceding lines of the log to try to determine what led to the failure

› If needed, increase the verbosity level to get more information in the log.

From the Admin's View

› When examining logs, also pay attention to the time stamps.

  • Long gaps could indicate a problem where HTCondor was forced to block while waiting for something to happen

  • Example: Your DNS server is down or very slow, and HTCondor can't resolve hostnames

› Number of open file descriptors can be seen as well. See if you are perhaps bumping against the 'limits'.

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The Wrong Jobs Are Running!

› Double check the user priorities using 'condor_userprio'

› There is an entire tutorial on "Matchmaker Policy" by Jaime at 3:45pm today.

› A handy way to see what's happening:
- condor_q –allusers –global –run
- condor_status –run

From the Admin's View

› Suppose some user has submitted "too many" jobs

› The SchedD may become unresponsive, and you'll be unable to examine or modify the job queue.

› Similarly, too many simultaneous updates to the Collector can cause it to slow down

› Examine the logs to see if it is excessively busy, or possible hung or blocked.

From the Admin's View

› Use the condor_sos command!
  - condor_sos condor_q
  - condor_sos condor_status

› This sends the command in such a way that it moves to "the front of the line" and is serviced first.

› Useful for admins to diagnose and fix system problems.

Still Stuck?

› Send email to htcondor-users@cs.wisc.edu

- Community mailing list which is very responsive

- Always include OS and distro, version of HTCondor, specific error messages or problematic behavior

› Email htcondor-admin@cs.wisc.edu

- Best-effort support from HTCondor developers

- Include the same information