OSG HTCondor-CE Security Drill

We conducted a drill to verify we could determine both who ran a given job, and whether a given user had run any jobs at a site, when using the HTCondor-CE software as the OSG Compute Element.

We were looking to verify that we could both identify the credential used to submit a particular job running on a worker node at a site, as well as determine if a given credential was used to submit any jobs to a site.

The drill was conducted by submitting test jobs to the Nebraska Red cluster and asking the admin staff there to identify the submitted job by pid, or identify jobs by DN.

Test 1

The first test was to identify any jobs submitted by a specified credential.

The process to identify the job is to first, find a condor-ce jobs corresponding to the credential. Then, find the condor job id that the job was run as, and then get information about where the job ran.

The test job was designed to send back various general information about the node it was on in its job output, and sleep for a given amount of time.

test-1h.sh
```
#!/bin/bash

nap=1800
turns=8

wget -O- --no-check-certificate -q "https://pepperjack.fnal.gov:8443/cgi-
bin/checkin?p=$$&h=$(hostname)" || exit

i=0
while [[ $i -lt $turns ]]
do
        i=$((i+1))
        echo "This is a test job running on $(hostname)"
        echo "whoami:"
        id
        echo "It is now $(date)"
        echo "df:"
        df
        echo "w:"
        w
        echo "ifconfig:"
        ifconfig
        echo "env:"
        env
        echo "sleep for $nap, $i"
        sleep $nap
```

```
        echo "----------------------------------------------------"
done
```

The test job was submitted with the following submit file:

test-1h.submit
```
universe = grid
grid_resource = condor red.unl.edu red.unl.edu:9619

executable = test-1h.sh
output = out/test-1h.out.$(Cluster).$(Process)
error = out/test-1h.err.$(Cluster).$(Process)
log = out/test-1h.log.$(Cluster).$(Process)

ShouldTransferFiles = YES
WhenToTransferOutput = ON_EXIT

use_x509userproxy = true

queue
```

After the job was submitted, a request was sent to the red.unl.edu admins asking to identify any jobs submitted with the certificate used to generate the voms-proxy used to submit the test job.

On the HTCondor-CE, the DN for the test certificate, '/DC=com/DC=DigiCert-Grid/O=Open Science Grid/OU=People/CN=Kevin Hill 816', was found in the AuditLog. Here we find the Cluster ID (CID) which corresponds to the submitted job. Looking for lines about the proxy, we can see there were two jobs submitted.

```
12/09/14 14:40:29 (cid:3028275) AuthMethod=GSI, AuthId=/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816,/mis/Role=NULL/Capability=NULL,
CondorId=mis@users.opensciencegrid.org
12/09/14 14:40:34 (cid:3028521) AuthMethod=GSI, AuthId=/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816,/mis/Role=NULL/Capability=NULL,
CondorId=mis@users.opensciencegrid.org
12/09/14 14:40:39 (cid:3028523) AuthMethod=GSI, AuthId=/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816,/mis/Role=NULL/Capability=NULL,
CondorId=mis@users.opensciencegrid.org
12/09/14 14:40:39 (cid:3028523) proxy identity: /DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816
12/09/14 14:40:39 (cid:3028523) proxy subject: /DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816/CN=proxy/CN=limited proxy
12/09/14 14:40:39 (cid:3028523) proxy full fqan: /DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816,/mis/Role=NULL/Capability=NULL
12/09/14 14:40:39 (cid:3028525) AuthMethod=GSI, AuthId=/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816,/mis/Role=NULL/Capability=NULL,
CondorId=mis@users.opensciencegrid.org
…
12/10/14 08:35:36 (cid:3392866) AuthMethod=GSI, AuthId=/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816,/mis/Role=NULL/Capability=NULL,
CondorId=mis@users.opensciencegrid.org
12/10/14 08:35:42 (cid:3392913) AuthMethod=GSI, AuthId=/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816,/mis/Role=NULL/Capability=NULL,
CondorId=mis@users.opensciencegrid.org
12/10/14 08:35:53 (cid:3392944) AuthMethod=GSI, AuthId=/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816,/mis/Role=NULL/Capability=NULL,
CondorId=mis@users.opensciencegrid.org
```

```
12/10/14 08:35:53 (cid:3392944) proxy identity: /DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816
12/10/14 08:35:53 (cid:3392944) proxy subject: /DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816/CN=proxy/CN=limited proxy
12/10/14 08:35:53 (cid:3392944) proxy full fqan: /DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816,/mis/Role=NULL/Capability=NULL
12/10/14 08:35:53 (cid:3392985) AuthMethod=GSI, AuthId=/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816,/mis/Role=NULL/Capability=NULL,
CondorId=mis@users.opensciencegrid.org
12/10/14 08:35:57 (cid:3392993) AuthMethod=GSI, AuthId=/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816,/mis/Role=NULL/Capability=NULL,
CondorId=mis@users.opensciencegrid.org
…


# grep 3028523 AuditLog*
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) Command=SPOOL_JOB_FILES_WITH_PERMS,
peer=<131.225.80.77:22570>
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) AuthMethod=GSI,
AuthId=/DC=com/DC=DigiCert-Grid/O=Open Science Grid/OU=People/CN=Kevin Hill
816,/mis/Role=NULL/Capability=NULL, CondorId=mis@users.opensciencegrid.org
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) Transferring files for jobs 1137434.0
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) spoolJobFiles(): started worker process
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) Received proxy for job 1137434.0
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) proxy path: /var/lib/condor-
ce/spool/7434/0/cluster1137434.proc0.subproc0/x509up_u9945
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) proxy expiration: 1418200611
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) proxy identity: /DC=com/DC=DigiCert-
Grid/O=Open Science Grid/OU=People/CN=Kevin Hill 816
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) proxy subject: /DC=com/DC=DigiCert-
Grid/O=Open Science Grid/OU=People/CN=Kevin Hill 816/CN=proxy/CN=limited proxy
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) proxy email: kevinh@fnal.gov
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) proxy vo name: mis
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) proxy first fqan:
/mis/Role=NULL/Capability=NULL
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) proxy full fqan: /DC=com/DC=DigiCert-
Grid/O=Open Science Grid/OU=People/CN=Kevin Hill 816,/mis/Role=NULL/Capability=NULL
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) Transfer completed


# grep 3392944 AuditLog
12/10/14 08:35:53 (cid:3392944) Command=SPOOL_JOB_FILES_WITH_PERMS, peer=<131.225.80.77:24922>
12/10/14 08:35:53 (cid:3392944) AuthMethod=GSI, AuthId=/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816,/mis/Role=NULL/Capability=NULL,
CondorId=mis@users.opensciencegrid.org
12/10/14 08:35:53 (cid:3392944) Transferring files for jobs 1139016.0
12/10/14 08:35:53 (cid:3392944) spoolJobFiles(): started worker process
12/10/14 08:35:53 (cid:3392944) Received proxy for job 1139016.0
12/10/14 08:35:53 (cid:3392944) proxy path: /var/lib/condor-
ce/spool/9016/0/cluster1139016.proc0.subproc0/x509up_u9945
12/10/14 08:35:53 (cid:3392944) proxy expiration: 1418265154
12/10/14 08:35:53 (cid:3392944) proxy identity: /DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816
12/10/14 08:35:53 (cid:3392944) proxy subject: /DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816/CN=proxy/CN=limited proxy
12/10/14 08:35:53 (cid:3392944) proxy email: kevinh@fnal.gov
12/10/14 08:35:53 (cid:3392944) proxy vo name: mis
12/10/14 08:35:53 (cid:3392944) proxy first fqan: /mis/Role=NULL/Capability=NULL
12/10/14 08:35:53 (cid:3392944) proxy full fqan: /DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816,/mis/Role=NULL/Capability=NULL
12/10/14 08:35:53 (cid:3392944) Transfer completed
```

The account mapping was logged from the gums query:

```
09 Dec 2014 14:40:29,326 [INFO ]: GridID[/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=Services/CN=red.unl.edu] - Mapped on host '/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=Services/CN=red.unl.edu' the user '/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816' / '/mis/Role=NULL/Capability=NULL' to 'Account[user=mis]' 09
Dec 2014 14:40:39,254 [INFO ]: GridID[/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=Services/CN=red.unl.edu] - Mapped on host '/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=Services/CN=red.unl.edu' the user '/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816' / '/mis/Role=NULL/Capability=NULL' to 'Account[user=mis]' 10
Dec 2014 08:35:36,783 [INFO ]: GridID[/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=Services/CN=red.unl.edu] - Mapped on host '/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=Services/CN=red.unl.edu' the user '/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816' / '/mis/Role=NULL/Capability=NULL' to 'Account[user=mis]' 10
Dec 2014 08:35:53,004 [INFO ]: GridID[/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=Services/CN=red.unl.edu] - Mapped on host '/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=Services/CN=red.unl.edu' the user '/DC=com/DC=DigiCert-Grid/O=Open Science
Grid/OU=People/CN=Kevin Hill 816' / '/mis/Role=NULL/Capability=NULL' to 'Account[user=mis]'
```

More details about both jobs were discovered in the JobRouter and Scheduler logs on the gateway. The Job Router will show how the HTCondor-CE CID is mapped to the local Condor CID. (showing just first job for brevity):

```
# grep 1137434 *
AuditLog.20141208T180000:12/09/14 14:40:34 (cid:3028521) Submitting new job 1137434.0
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) Transferring files for jobs 1137434.0
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) Received proxy for job 1137434.0
AuditLog.20141208T180000:12/09/14 14:40:39 (cid:3028523) proxy path: /var/lib/condor-
ce/spool/7434/0/cluster1137434.proc0.subproc0/x509up_u9945
AuditLog.20141208T180000:12/09/14 15:23:04 (cid:3042763) Transferring files for jobs 1137434.0
AuditLog.20141208T180000:12/09/14 15:23:09 (cid:3042806) Set Attribute for job 1137434.0,
LeaveJobInQueue = false
AuditLog.20141208T180000:12/09/14 15:23:09 (cid:3042806) Set Attribute for job 1137434.0,
CurrentTime = time()
JobRouterLog:12/09/14 14:40:52 JobRouter (src=1137434.0,route=Local_Condor): found candidate job
JobRouterLog:12/09/14 14:40:52 Initializing Directory: curr_dir = /var/lib/condor-
ce/spool/7434/0/cluster1137434.proc0.subproc0
JobRouterLog:12/09/14 14:40:52 Initializing Directory: curr_dir = /var/lib/condor-
ce/spool/7434/0/cluster1137434.proc0.subproc0.tmp
JobRouterLog:12/09/14 14:40:52 JobRouter (src=1137434.0,route=Local_Condor): claimed job
JobRouterLog:12/09/14 14:40:52 JobRouter (src=1137434.0,dest=4188380.0,route=Local_Condor):
submitted job
JobRouterLog:12/09/14 14:40:52 JobRouter (src=1137434.0,dest=4188380.0,route=Local_Condor):
submitted job has not yet appeared in job queue mirror or was removed (submitted 0 seconds ago)
JobRouterLog:12/09/14 14:41:06 JobRouter (src=1137434.0,dest=4188380.0,route=Local_Condor):
updated job status
JobRouterLog:12/09/14 14:52:21 JobRouter (src=1137434.0,dest=4188380.0,route=Local_Condor):
updated job status
JobRouterLog:12/09/14 15:07:20 JobRouter (src=1137434.0,dest=4188380.0,route=Local_Condor):
updated job status
JobRouterLog:12/09/14 15:22:29 JobRouter (src=1137434.0,dest=4188380.0,route=Local_Condor):
updated job status
JobRouterLog:12/09/14 15:22:29 JobRouter (src=1137434.0,dest=4188380.0,route=Local_Condor): found
target job finished
JobRouterLog:12/09/14 15:22:29 (1137434.0) Writing terminate record to user logfile
JobRouterLog:12/09/14 15:22:29 JobRouter (src=1137434.0,dest=4188380.0,route=Local_Condor):
finalized job
JobRouterLog:12/09/14 15:22:29 Initializing Directory: curr_dir = /var/lib/condor-
ce/spool/7434/0/cluster1137434.proc0.subproc0
JobRouterLog:12/09/14 15:22:29 JobRouter (src=1137434.0,dest=4188380.0,route=Local_Condor):
yielded job (done=1)
JobRouterLog:12/09/14 15:22:29 JobRouter (src=1137434.0,dest=4188380.0,route=Local_Condor):
Cleaned up and removed routed job.
```

```
JobRouterLog:12/09/14 15:25:55 JobRouter (src=1137434.0,dest=4188380.0): job mirror synchronized;
removing job from internal 'retirement' status
SchedLog.old:GlobalJobId = "red.unl.edu#1137434.0#1418157634"
SchedLog.old:Iwd = "/var/lib/condor-ce/spool/7434/0/cluster1137434.proc0.subproc0"
SchedLog.old:ClusterId = 1137434
SchedLog.old:12/09/14 14:40:40 Job 1137434.0 released from hold: Data files spooled
SchedLog.old:ClusterId = 1137434
SchedLog.old:GlobalJobId = "red.unl.edu#1137434.0#1418157634"
SchedLog.old:Iwd = "/var/lib/condor-ce/spool/7434/0/cluster1137434.proc0.subproc0"
```

Condor_ce_history provided more details:

```
# condor_ce_history 1137434.0
 ID      OWNER          SUBMITTED   RUN_TIME     ST COMPLETED   CMD
1137434.0   mis            12/9  14:40   0+00:30:04 C  12/9  15:22 test-1h.sh
```

```
# condor_ce_history -l 1137434.0
MaxHosts = 1
Managed = "ScheddDone"
User = "mis@users.opensciencegrid.org"
JobFinishedHookDone = 1418160430
OnExitHold = false
CoreSize = 0
LastHoldReason = "Spooling input data files"
WantRemoteSyscalls = false
MyType = "Job"
Rank = 0.0
CumulativeSuspensionTime = 0
MinHosts = 1
ReleaseReason = "Data files spooled"
PeriodicHold = false
PeriodicRemove = ( StageInFinish > 0 ) =!= true && time() > QDate + 28800
Err = "_condor_stderr"
ProcId = 0
EnteredCurrentStatus = 1418158341
NumJobStarts = 0
JobUniverse = 5
StageOutStart = 1418160184
In = "/dev/null"
SUBMIT_TransferOutputRemaps = "_condor_stdout=out/test-1h.out.487.0;_condor_stderr=out/test-
1h.err.487.0"
Requirements = true
ClusterId = 1137434
WhenToTransferOutput = "ON_EXIT"
CompletionDate = 1418160132
x509UserProxyVOName = "mis"
BufferSize = 524288
Environment = ""
TargetType = "Machine"
LeaveJobInQueue = false
x509UserProxyExpiration = 1418200611
JobNotification = 0
Owner = "mis"
CommittedTime = 0
x509userproxy = "x509up_u9945"
QDate = 1418157623
JobLeaseDuration = 1200
TransferIn = false
ExitStatus = 0
RootDir = "/"
```

```
NumJobMatches = 1
JobCurrentStartDate = 1418158328
CurrentHosts = 0
GlobalJobId = "red.unl.edu#1137434.0#1418157634"
RemoteSysCpu = 1.0
TotalSuspensions = 0
x509UserProxyFirstFQAN = "/mis/Role=NULL/Capability=NULL"
WantCheckpoint = false
RoutedToJobId = "4188380.0"
ManagedManager = ""
x509userproxysubject = "/DC=com/DC=DigiCert-Grid/O=Open Science Grid/OU=People/CN=Kevin Hill 816"
PeriodicRelease = false
NumCkpts_RAW = 0
Out = "_condor_stdout"
ShouldTransferFiles = "YES"
DiskUsage = 1
JobRunCount = 1
CumulativeSlotTime = 0
CommittedSlotTime = 0
LocalUserCpu = 0.0
JobStartDate = 1418158330
ExitBySignal = false
StreamErr = false
NumSystemHolds = 0
NumRestarts = 0
RequestDisk = DiskUsage
JobPrio = 0
NumCkpts = 0
BufferBlockSize = 32768
StageInStart = 1418157639
ImageSize = 300
DiskUsage_RAW = 1
CommittedSuspensionTime = 0
x509UserProxyEmail = "kevinh@fnal.gov"
Cmd = "test-1h.sh"
LocalSysCpu = 0.0
LastHoldReasonCode = 16
Iwd = "/var/lib/condor-ce/spool/7434/0/cluster1137434.proc0.subproc0"
TransferInputSizeMB = 0
SubmitterId = "pepperjack.fnal.gov"
StageOutFinish = 1418160184
LastSuspensionTime = 0
ExecutableSize_RAW = 1
BytesSent = 28538.0
TransferOutputRemaps = undefined
ExitCode = 0
JobStatus = 4
ExecutableSize = 1
ShadowBday = 1418158328
ImageSize_RAW = 300
RemoteWallClockTime = 1804.0
OnExitRemove = true
Arguments = ""
KillSig = "SIGTERM"
SpooledOutputFiles = ".site.ad"
SUBMIT_x509userproxy = "/tmp/x509up_u9945"
StreamOut = false
CurrentTime = time()
BytesRecvd = 8330.0
RequestMemory = ifthenelse(MemoryUsage =!= undefined,MemoryUsage,( ImageSize + 1023 ) / 1024)
NiceUser = false
RemoteUserCpu = 0.0
```

```
RequestCpus = 1
SUBMIT_Cmd = "/home/kevinh/condor_ce_drill/test-1h.sh"
SUBMIT_Iwd = "/home/kevinh/condor_ce_drill"
WantRemoteIO = true
x509UserProxyFQAN = "/DC=com/DC=DigiCert-Grid/O=Open Science Grid/OU=People/CN=Kevin Hill
816,/mis/Role=NULL/Capability=NULL"
StageInFinish = 1418157639
LastJobStatus = 2
```

From the HTCondor-CE jobRouter log we can see the corresponding Condor job id this ran as,
and we can use that to get details about the job that actually ran:

```
# condor_history 4188380
 ID      OWNER          SUBMITTED   RUN_TIME     ST COMPLETED   CMD
4188380.0   mis            12/9  14:40   0+00:30:04 C  12/9  15:22 test-1h.sh
```

```
# condor_history -l 4188380
MaxHosts = 1
MemoryUsage = ( ( ResidentSetSize + 1023 ) / 1024 )
AccountingGroup = "other.mis"
User = "mis@unl.edu"
JobFinishedHookDone = 1418160132
remote_SMPGranularity = 1
OnExitHold = false
MachineAttrCpus0 = 1
LastHoldReason = "Spooling input data files"
WantRemoteSyscalls = false
MyType = "Job"
Rank = 0.0
CumulativeSuspensionTime = 0
MinHosts = 1
ReleaseReason = "Data files spooled"
PeriodicHold = false
PeriodicRemove = false
Err = "_condor_stderr"
ProcId = 0
EnteredCurrentStatus = 1418160132
remote_NodeNumber = 1
BlockWriteKbytes = 0
Remote_JobUniverse = 5
NumJobStarts = 1
RoutedJob = true
AutoClusterAttrs =
"JobUniverse,LastCheckpointPlatform,NumCkpts,_condor_RequestCpus,_condor_RequestDisk,_condor_Requ
estMemory,RequestCpus,RequestDisk,RequestMemory,Draining,JobStart,LastDrainStartTime,null,QueueAg
e,RemoteGroup,SubmitterGr
oup,x509userproxyfirstfqan,x509userproxysubject,DynamicSlot,PartitionableSlot,Slot1_TotalTimeClai
medBusy,Slot1_TotalTimeUnclaimedIdle,Owner,Slot1_ExpectedMachineGracefulDrainingCompletion,Slot1_
JobStarts,Slot1_SelfMonitorAge,MOUNTS_OK,Dis
kUsage,Requirements,Rank,NiceUser,ConcurrencyLimits"
JobUniverse = 5
AutoClusterId = 6385
RoutedBy = "jobrouter-ce"
In = "/dev/null"
SUBMIT_TransferOutputRemaps = "_condor_stdout=out/test-1h.out.487.0;_condor_stderr=out/test-
1h.err.487.0"
```

```
Requirements = ( TARGET.Memory >= RequestMemory ) && ( IS_GLIDEIN =!= true ||
TARGET.GLIDECLIENT_Group =?= "T2Overflow" ) && ( TARGET.Arch == "X86_64" ) && ( TARGET.OpSys ==
"LINUX" ) && ( TARGET.Disk >= RequestDisk ) && ( TARGET.HasFileT
ransfer )
ClusterId = 4188380
NumPids = 0
WhenToTransferOutput = "ON_EXIT"
LastMatchTime = 1418158328
remote_queue = ""
CompletionDate = 1418160132
RecentBlockWrites = 0
x509UserProxyVOName = "mis"
Environment = "HOME=/grid_home/mis OSG_GRID='/etc/osg/wn-client/' OSG_SQUID_LOCATION='red-
squid1.unl.edu:3128' OSG_SITE_READ='None' OSG_APP='/opt/osg/app'
OSG_GLEXEC_LOCATION='/usr/sbin/glexec' OSG_DATA='UNAVAILABLE' OSG_HOSTNAME='red.unl
.edu' OSG_STORAGE_ELEMENT='True' OSG_SITE_NAME='Red' GLOBUS_LOCATION='/usr' OSG_WN_TMP='/tmp'
OSG_SITE_WRITE='None' OSG_DEFAULT_SE='srm.unl.edu' OSG_JOB_CONTACT='red.unl.edu/jobmanager-
condor' "
StartdPrincipal = "execute-side@matchsession/129.93.182.4"
TargetType = "Machine"
LeaveJobInQueue = false
x509UserProxyExpiration = 1418200611
RouteName = "Local_Condor"
RecentStatsLifetimeStarter = 1200
WantIOProxy = true
JobNotification = 0
Owner = "mis"
CommittedTime = 1804
x509userproxy = "x509up_u9945"
QDate = 1418157652
JobLeaseDuration = 1200
PILOT_AD_FOUND = false
RecentBlockWriteKbytes = 0
TransferIn = false
ExitStatus = 0
ProportionalSetSizeKb_RAW = 290
PILOT_AD_FRESH = false
RootDir = "/"
NumJobMatches = 1
JobCurrentStartDate = 1418158328
CurrentHosts = 0
GlobalJobId = "red.unl.edu#4188380.0#1418157652"
RemoteSysCpu = 1.0
TotalSuspensions = 0
JobState = "Exited"
x509UserProxyFirstFQAN = "/mis/Role=NULL/Capability=NULL"
remote_cerequirements = "CondorCE == 1"
WantCheckpoint = false
LastJobLeaseRenewal = 1418160131
LastRemoteHost = "slot1@red-d8n4.unl.edu"
TerminationPending = true
LastRejMatchTime = 1418158267
x509userproxysubject = "/DC=com/DC=DigiCert-Grid/O=Open Science Grid/OU=People/CN=Kevin Hill 816"
JobDuration = 1801.292485
PeriodicRelease = false
StatsLifetime = 1801
LastPublicClaimId = "<129.93.182.4:51689>#1409070498#16550#..."
NumCkpts_RAW = 0
orig_environment = ""
StarterIpAddr = "<129.93.182.4:35202>"
Out = "_condor_stdout"
ShouldTransferFiles = "YES"
```

```
BlockReads = 0
DiskUsage = 47
JobRunCount = 1
CumulativeSlotTime = 1804.0
CommittedSlotTime = 1804.0
ProportionalSetSizeKb = 300
LocalUserCpu = 0.0
RecentBlockReads = 0
JobStartDate = 1418158330
InputRSL = ifThenElse(GlobusRSL =?= null,[  ],eval_rsl(GlobusRSL))
ExitBySignal = false
StreamErr = false
NumRestarts = 0
NumSystemHolds = 0
RequestDisk = DiskUsage
OrigMaxHosts = 1
ResidentSetSize_RAW = 0
JobPrio = 0
NumCkpts = 0
RoutedFromJobId = "1137434.0"
ImageSize = 300
StatsLifetimeStarter = 1801
DiskUsage_RAW = 47
CommittedSuspensionTime = 0
x509UserProxyEmail = "kevinh@fnal.gov"
Cmd = "test-1h.sh"
Iwd = "/var/lib/condor-ce/spool/7434/0/cluster1137434.proc0.subproc0"
LastHoldReasonCode = 16
LocalSysCpu = 0.0
BlockReadKbytes = 0
GridResource = undefined
TransferInputSizeMB = 0
SubmitterId = "pepperjack.fnal.gov"
RecentStatsLifetime = 1200
RecentBlockReadKbytes = 0
ExecutableSize_RAW = 1
LastSuspensionTime = 0
LastRejMatchReason = "PREEMPTION_REQUIREMENTS == False "
BytesSent = 28538.0
TransferOutputRemaps = undefined
osg_environment = "OSG_GRID='/etc/osg/wn-client/' OSG_SQUID_LOCATION='red-squid1.unl.edu:3128'
OSG_SITE_READ='None' OSG_APP='/opt/osg/app' OSG_GLEXEC_LOCATION='/usr/sbin/glexec'
OSG_DATA='UNAVAILABLE' OSG_HOSTNAME='red.unl.edu' OSG_STORAG
E_ELEMENT='True' OSG_SITE_NAME='Red' GLOBUS_LOCATION='/usr' OSG_WN_TMP='/tmp'
OSG_SITE_WRITE='None' OSG_DEFAULT_SE='srm.unl.edu' OSG_JOB_CONTACT='red.unl.edu/jobmanager-
condor'"
ExitCode = 0
JobStatus = 4
ExecutableSize = 1
MachineAttrSlotWeight0 = 1
ImageSize_RAW = 296
RemoteWallClockTime = 1804.0
OnExitRemove = true
KillSig = "SIGTERM"
Arguments = ""
SpooledOutputFiles = ".site.ad"
SUBMIT_x509userproxy = "/tmp/x509up_u9945"
StreamOut = false
ResidentSetSize = 0
CurrentTime = time()
RequestMemory = 2500
BytesRecvd = 8330.0
```

```
NiceUser = false
RemoteUserCpu = 0.0
NumShadowStarts = 1
RequestCpus = 1
SUBMIT_Cmd = "/home/kevinh/condor_ce_drill/test-1h.sh"
SUBMIT_Iwd = "/home/kevinh/condor_ce_drill"
JobPid = 4806
WantRemoteIO = true
x509UserProxyFQAN = "/DC=com/DC=DigiCert-Grid/O=Open Science Grid/OU=People/CN=Kevin Hill
816,/mis/Role=NULL/Capability=NULL"
LastJobStatus = 2
JobCurrentStartExecutingDate = 1418158330
BlockWrites = 0
```

Test Two

The second test was to verify that a given job on a given worker node can be traced back to the credential used to submit that job. To do this, a test job was submitted that when ran reported its pid and the hostname it was running on. This information was submitted to the admins of the condor-ce and they were asked to trace it to the credential used to submit it.

The procedure here was to find the condor job id for the pid on the given worker node, from there find the corresponding condor-ce job, which can then give more information on who submitted the job to the site.

First, on the worker node, the starter log contained entries for the given pid, which will point us to the corresponding job ID:

```
12/18/14 10:20:48 (pid:140796) *********************************************************
12/18/14 10:20:48 (pid:140796) ** condor_starter (CONDOR_STARTER) STARTING UP
12/18/14 10:20:48 (pid:140796) ** /usr/sbin/condor_starter
12/18/14 10:20:48 (pid:140796) ** SubsystemInfo: name=STARTER type=STARTER(8) class=DAEMON(1)
12/18/14 10:20:48 (pid:140796) ** Configuration: subsystem:STARTER local:<NONE> class:DAEMON
12/18/14 10:20:48 (pid:140796) ** $CondorVersion: 8.3.1 Aug 09 2014 PRE-RELEASE-UWCS $
12/18/14 10:20:48 (pid:140796) ** $CondorPlatform: X86_64-CentOS_6.5 $
12/18/14 10:20:48 (pid:140796) ** PID = 140796
12/18/14 10:20:48 (pid:140796) ** Log last touched 12/18 10:20:00
12/18/14 10:20:48 (pid:140796) *********************************************************
12/18/14 10:20:48 (pid:140796) Using config source: /etc/condor/condor_config
12/18/14 10:20:48 (pid:140796) Using local config sources:
12/18/14 10:20:48 (pid:140796)    /etc/condor/config.d/01-red
12/18/14 10:20:48 (pid:140796)    /etc/condor/config.d/02-red-worker
12/18/14 10:20:48 (pid:140796)    /etc/condor/config.d/05-red-external
12/18/14 10:20:48 (pid:140796)    /etc/condor/config.d/09-el6
12/18/14 10:20:48 (pid:140796)    /etc/condor/config.d/09-pilot-ads
12/18/14 10:20:48 (pid:140796)    /etc/condor/config.d/60condor-qmf.config
12/18/14 10:20:48 (pid:140796)    /etc/condor/condor_config.local
12/18/14 10:20:48 (pid:140796) config Macros = 154, Sorted = 153, StringBytes = 5899, TablesBytes
= 5640
12/18/14 10:20:48 (pid:140796) CLASSAD_CACHING is OFF
12/18/14 10:20:48 (pid:140796) Daemon Log is logging: D_ALWAYS D_ERROR
12/18/14 10:20:48 (pid:140796) DaemonCore: command socket at <129.93.182.168:32920>
12/18/14 10:20:48 (pid:140796) DaemonCore: private command socket at <129.93.182.168:32920>
12/18/14 10:20:48 (pid:140796) Communicating with shadow <129.93.239.129:42369?noUDP>
12/18/14 10:20:48 (pid:140796) Submitting machine is "red.unl.edu"
12/18/14 10:20:48 (pid:140796) setting the orig job name in starter
12/18/14 10:20:48 (pid:140796) setting the orig job iwd in starter
12/18/14 10:20:48 (pid:140796) Job has WantIOProxy=true
12/18/14 10:20:48 (pid:140796) Chirp config summary: IO true, Updates true, Delayed updates true.
```

```
12/18/14 10:20:48 (pid:140796) Initialized IO Proxy.
12/18/14 10:20:48 (pid:140796) Done setting resource limits
12/18/14 10:20:48 (pid:140796) File transfer completed successfully.
12/18/14 10:20:49 (pid:140796) Job 4213562.0 set to execute immediately
12/18/14 10:20:49 (pid:140796) Starting a VANILLA universe job with ID: 4213562.0
12/18/14 10:20:49 (pid:140796) IWD: /var/lib/condor/execute/dir_140796
12/18/14 10:20:49 (pid:140796) Output file: /var/lib/condor/execute/dir_140796/_condor_stdout
12/18/14 10:20:49 (pid:140796) Error file: /var/lib/condor/execute/dir_140796/_condor_stderr
12/18/14 10:20:49 (pid:140796) Using wrapper /usr/local/bin/condor_nfslite_job_wrapper.sh to exec
/var/lib/condor/execute/dir_140796/condor_exec.exe
12/18/14 10:20:49 (pid:140796) Running job as user mis
12/18/14 10:20:50 (pid:140796) Create_Process succeeded, pid=140813
12/18/14 10:20:50 (pid:140796) Limiting memory usage to 2621440000 bytes
12/18/14 10:20:50 (pid:140796) Limiting memsw usage to 135157059584 bytes
```

From here the Condor job classad can be looked up:

```
# condor_q -name red.unl.edu -l 4213562.0
MaxHosts = 1
MemoryUsage = ( ( ResidentSetSize + 1023 ) / 1024 )
AccountingGroup = "other.mis"
User = "mis@unl.edu"
remote_SMPGranularity = 1
OnExitHold = false
MachineAttrCpus0 = 1
LastHoldReason = "Spooling input data files"
WantRemoteSyscalls = false
MyType = "Job"
Rank = 0.0
CumulativeSuspensionTime = 0
MinHosts = 1
ReleaseReason = "Data files spooled"
PeriodicHold = false
PeriodicRemove = false
Err = "_condor_stderr"
ProcId = 0
EnteredCurrentStatus = 1418919647
remote_NodeNumber = 1
BlockWriteKbytes = 0
Remote_JobUniverse = 5
NumJobStarts = 1
RoutedJob = true
AutoClusterAttrs =
"JobUniverse,LastCheckpointPlatform,NumCkpts,_condor_RequestCpus,_condor_RequestDisk,_condor_Requ
estMemory,RequestCpus,RequestDisk,RequestMemory,Draining,JobStart,LastDrainStartTime,null,QueueAg
e,RemoteGroup,SubmitterGr
oup,x509userproxyfirstfqan,x509userproxysubject,DynamicSlot,PartitionableSlot,Slot1_TotalTimeClai
medBusy,Slot1_TotalTimeUnclaimedIdle,Owner,Slot1_ExpectedMachineGracefulDrainingCompletion,Slot1_
JobStarts,Slot1_SelfMonitorAge,MOUNTS_OK,Dis
kUsage,Requirements,Rank,NiceUser,ConcurrencyLimits"
JobUniverse = 5
AutoClusterId = 17730
RoutedBy = "jobrouter-ce"
In = "/dev/null"
SUBMIT_TransferOutputRemaps = "_condor_stdout=out/test-1h.out.492.0;_condor_stderr=out/test-
1h.err.492.0"
Requirements = ( TARGET.Memory >= RequestMemory ) && ( IS_GLIDEIN =!= true ||
TARGET.GLIDECLIENT_Group =?= "T2Overflow" ) && ( TARGET.Arch == "X86_64" ) && ( TARGET.OpSys ==
"LINUX" ) && ( TARGET.Disk >= RequestDisk ) && ( TARGET.HasFileT
ransfer )
ClusterId = 4213562
NumPids = 2
```

PublicClaimId = "<129.93.182.168:43965>#1418764603#602#..."
WhenToTransferOutput = "ON_EXIT"
LastMatchTime = 1418919647
remote_queue = ""
CompletionDate = 0
RecentBlockWrites = 0
x509UserProxyVOName = "mis"
Environment = "HOME=/grid_home/mis OSG_GRID='/etc/osg/wn-client/' OSG_SQUID_LOCATION='red-
squid.unl.edu:3128' OSG_SITE_READ='None' OSG_APP='/cvmfs/oasis.opensciencegrid.org'
OSG_GLEXEC_LOCATION='/usr/sbin/glexec' OSG_DATA='UNAVAILABLE' OS
G_HOSTNAME='red.unl.edu' GLOBUS_LOCATION='/usr' OSG_STORAGE_ELEMENT='True' OSG_SITE_NAME='Red'
OSG_WN_TMP='/tmp' PATH='/bin:/usr/bin:/sbin:/usr/sbin' OSG_DEFAULT_SE='srm.unl.edu'
OSG_SITE_WRITE='None' "
StartdPrincipal = "execute-side@matchsession/129.93.182.168"
TargetType = "Machine"
LeaveJobInQueue = JobStatus == 4
x509UserProxyExpiration = 1418961906
RouteName = "Local_Condor"
RecentStatsLifetimeStarter = 601
WantIOProxy = true
JobNotification = 0
Owner = "mis"
CommittedTime = 0
x509userproxy = "x509up_u9945"
QDate = 1418918788
JobLeaseDuration = 1200
RecentBlockWriteKbytes = 0
TransferIn = false
ExitStatus = 0
StartdIpAddr = "<129.93.182.168:43965>"
ProportionalSetSizeKb_RAW = 280
RootDir = "/"
NumJobMatches = 1
JobCurrentStartDate = 1418919647
CurrentHosts = 1
GlobalJobId = "red.unl.edu#4213562.0#1418918788"
RemoteSysCpu = 0.0
TotalSuspensions = 0
JobState = "Running"
x509UserProxyFirstFQAN = "/mis/Role=NULL/Capability=NULL"
remote_cerequirements = "CondorCE == 1"
WantCheckpoint = false
LastJobLeaseRenewal = 1418921249
x509userproxysubject = "/DC=com/DC=DigiCert-Grid/O=Open Science Grid/OU=People/CN=Kevin Hill 816"
PeriodicRelease = false
StatsLifetime = 610
NumCkpts_RAW = 0
orig_environment = ""
StarterIpAddr = "<129.93.182.168:32920>"
Out = "_condor_stdout"
ShouldTransferFiles = "YES"
BlockReads = 17
DiskUsage = 25
JobRunCount = 1
CumulativeSlotTime = 0
CommittedSlotTime = 0
ProportionalSetSizeKb = 300
LocalUserCpu = 0.0
RecentBlockReads = 17
JobStartDate = 1418919650
InputRSL = ifThenElse(GlobusRSL =?= null,[ ],eval_rsl(GlobusRSL))
ExitBySignal = false

```
StreamErr = false
DelegatedProxyExpiration = 1418961906
NumSystemHolds = 0
NumRestarts = 0
TransferringInput = false
ResidentSetSize_RAW = 272
RequestDisk = DiskUsage
OrigMaxHosts = 1
JobPrio = 0
NumCkpts = 0
RoutedFromJobId = "1161766.0"
StatsLifetimeStarter = 610
ImageSize = 275
RemoteHost = "slot1@red-d17n8.unl.edu"
DiskUsage_RAW = 24
CommittedSuspensionTime = 0
x509UserProxyEmail = "kevinh@fnal.gov"
Cmd = "test-1h.sh"
LocalSysCpu = 0.0
LastHoldReasonCode = 16
Iwd = "/var/lib/condor-ce/spool/1766/0/cluster1161766.proc0.subproc0"
BlockReadKbytes = 672
GridResource = undefined
TransferInputSizeMB = 0
RecentStatsLifetime = 601
SubmitterId = "pepperjack.fnal.gov"
RecentBlockReadKbytes = 672
ServerTime = 1418921281
LastSuspensionTime = 0
ExecutableSize_RAW = 1
BytesSent = 0.0
osg_environment = "OSG_GRID='/etc/osg/wn-client/' OSG_SQUID_LOCATION='red-squid.unl.edu:3128'
OSG_SITE_READ='None' OSG_APP='/cvmfs/oasis.opensciencegrid.org'
OSG_GLEXEC_LOCATION='/usr/sbin/glexec' OSG_DATA='UNAVAILABLE' OSG_HOSTNAME='red.
unl.edu' GLOBUS_LOCATION='/usr' OSG_STORAGE_ELEMENT='True' OSG_SITE_NAME='Red' OSG_WN_TMP='/tmp'
PATH='/bin:/usr/bin:/sbin:/usr/sbin' OSG_DEFAULT_SE='srm.unl.edu' OSG_SITE_WRITE='None'"
TransferOutputRemaps = undefined
JobStatus = 2
ShadowBday = 1418919647
ExecutableSize = 1
MachineAttrSlotWeight0 = 1
ImageSize_RAW = 272
OnExitRemove = true
Arguments = ""
KillSig = "SIGTERM"
KillSig = "SIGTERM"
RemoteSlotID = 1
SUBMIT_x509userproxy = "/tmp/x509up_u9945"
ResidentSetSize = 275
StreamOut = false
CurrentTime = time()
BytesRecvd = 8441.0
RequestMemory = 2500
RemoteUserCpu = 0.0
NiceUser = false
NumShadowStarts = 1
TransferQueued = false
RequestCpus = 1
SUBMIT_Cmd = "/home/kevinh/condor_ce_drill/test-1h.sh"
SUBMIT_Iwd = "/home/kevinh/condor_ce_drill"
JobPid = 140813
WantRemoteIO = true
```

```
x509UserProxyFQAN = "/DC=com/DC=DigiCert-Grid/O=Open Science Grid/OU=People/CN=Kevin Hill
816,/mis/Role=NULL/Capability=NULL"
JobCurrentStartExecutingDate = 1418919649
LastJobStatus = 1
BlockWrites = 0
```

From here, the HTCondor-CE job this was routed from can be looked up:

```
# condor_ce_q -l 1161766.0
MaxHosts = 1
Managed = "External"
User = "mis@users.opensciencegrid.org"
CoreSize = 0
LastHoldReason = "Spooling input data files"
WantRemoteSyscalls = false
MyType = "Job"
Rank = 0.0
CumulativeSuspensionTime = 0
MinHosts = 1
ReleaseReason = "Data files spooled"
PeriodicRemove = ( StageInFinish > 0 ) =!= true && time() > QDate + 28800
Err = "_condor_stderr"
ProcId = 0
EnteredCurrentStatus = 1418919664
NumJobStarts = 0
JobUniverse = 5
In = "/dev/null"
SUBMIT_TransferOutputRemaps = "_condor_stdout=out/test-1h.out.492.0;_condor_stderr=out/test-
1h.err.492.0"
Requirements = true
ClusterId = 1161766
WhenToTransferOutput = "ON_EXIT"
CompletionDate = 0
x509UserProxyVOName = "mis"
BufferSize = 524288
Environment = ""
TargetType = "Machine"
LeaveJobInQueue = JobStatus == 4
x509UserProxyExpiration = 1418961906
JobNotification = 0
Owner = "mis"
CommittedTime = 0
x509userproxy = "x509up_u9945"
QDate = 1418918756
JobLeaseDuration = 1200
TransferIn = false
ExitStatus = 0
RootDir = "/"
NumJobMatches = 1
JobCurrentStartDate = 1418919647
CurrentHosts = 0
GlobalJobId = "red.unl.edu#1161766.0#1418918767"
RemoteSysCpu = 0.0
ScheddBday = 1418919118
TotalSuspensions = 0
x509UserProxyFirstFQAN = "/mis/Role=NULL/Capability=NULL"
WantCheckpoint = false
RoutedToJobId = "4213562.0"
ManagedManager = "jobrouter-ce"
x509userproxysubject = "/DC=com/DC=DigiCert-Grid/O=Open Science Grid/OU=People/CN=Kevin Hill 816"
NumCkpts_RAW = 0
Out = "_condor_stdout"
```

```
ShouldTransferFiles = "YES"
DiskUsage = 1
JobRunCount = 1
CumulativeSlotTime = 0
CommittedSlotTime = 0
LocalUserCpu = 0.0
JobStartDate = 1418919650
ExitBySignal = false
StreamErr = false
NumSystemHolds = 0
NumRestarts = 0
RequestDisk = DiskUsage
JobPrio = 0
NumCkpts = 0
BufferBlockSize = 32768
StageInStart = 1418918772
ImageSize = 275
DiskUsage_RAW = 1
CommittedSuspensionTime = 0
x509UserProxyEmail = "kevinh@fnal.gov"
Cmd = "test-1h.sh"
LocalSysCpu = 0.0
LastHoldReasonCode = 16
Iwd = "/var/lib/condor-ce/spool/1766/0/cluster1161766.proc0.subproc0"
TransferInputSizeMB = 0
SubmitterId = "pepperjack.fnal.gov"
ServerTime = 1418921505
LastSuspensionTime = 0
ExecutableSize_RAW = 1
BytesSent = 0.0
TransferOutputRemaps = undefined
JobStatus = 2
ExecutableSize = 1
ShadowBday = 1418919647
ImageSize_RAW = 275
RemoteWallClockTime = 0.0
Arguments = ""
KillSig = "SIGTERM"
SUBMIT_x509userproxy = "/tmp/x509up_u9945"
StreamOut = false
CurrentTime = time()
RequestMemory = ifthenelse(MemoryUsage =!= undefined,MemoryUsage,( ImageSize + 1023 ) / 1024)
BytesRecvd = 8441.0
RemoteUserCpu = 0.0
NiceUser = false
RequestCpus = 1
SUBMIT_Cmd = "/home/kevinh/condor_ce_drill/test-1h.sh"
SUBMIT_Iwd = "/home/kevinh/condor_ce_drill"
WantRemoteIO = true
StageInFinish = 1418918772
x509UserProxyFQAN = "/DC=com/DC=DigiCert-Grid/O=Open Science Grid/OU=People/CN=Kevin Hill
816,/mis/Role=NULL/Capability=NULL"
LastJobStatus = 1
```

The test was repeated with a job submitted via GlideinWMS. In this case, the pid reported by the test job was a child of the Glidein process. The procedure was about the same, except first the Glidein parent process of the running job pid must be found on the worker node:

```
condor   33524  0.0  0.0 106044  8208 ?        Ss   12:43   0:00      \_ condor_starter -f -a
slot1_22 red.unl.edu
```

```
osg      33624  0.0  0.0  22624  1892 ?        SNs  12:43   0:00     |   \_ /bin/bash
/var/lib/condor/execute/dir_33524/condor_exec.exe -v std -name v3_0 -entry CMS_T2_US_Nebraska_Red
-clientname osg-flock-grid-iu-edu_OSG_gWMSFrontend.ma
osg      41988  0.0  0.0  22352  1584 ?        SN   12:43   0:00     |       \_ /bin/bash
/var/lib/condor/execute/dir_33524/glide_GwK1Qg/main/condor_startup.sh glidein_config
osg      43014  0.0  0.0 102396  8144 ?        SN   12:43   0:00     |           \_
/var/lib/condor/execute/dir_33524/glide_GwK1Qg/main/condor/sbin/condor_master -f -pidfile
/var/lib/condor/execute/dir_33524/glide_GwK1Qg/condor_master2.p
osg      43016  0.3  0.0  26248  8084 ?        SN   12:43   0:12     |               \_
condor_procd -A /var/lib/condor/execute/dir_33524/glide_GwK1Qg/log/procd_address -L
/var/lib/condor/execute/dir_33524/glide_GwK1Qg/log/ProcLog -R 100
osg      43017  0.0  0.0 103224  9032 ?        SN   12:43   0:03     |               \_
condor_startd -f
osg      45648  0.0  0.0 102680  8368 ?        SN   12:43   0:00     |                   \_
condor_starter -f xd-login.opensciencegrid.org
osg      45659  0.0  0.0  22236  1476 ?        SN   12:44   0:00     |                       \_
/bin/bash /var/lib/condor/execute/dir_33524/glide_GwK1Qg/execute/dir_45648/condor_exec.exe
osg      38860  0.0  0.0   4076   516 ?        SN   13:44   0:00     |
\_ sleep 1800
```

From here, the pid of the Glidein pilot process can be found in the starter log on the worker node and we can find the HTCondor job id:

```
12/18/14 12:43:25 (pid:33524) ********************************************************
12/18/14 12:43:25 (pid:33524) ** condor_starter (CONDOR_STARTER) STARTING UP
12/18/14 12:43:25 (pid:33524) ** /usr/sbin/condor_starter
12/18/14 12:43:25 (pid:33524) ** SubsystemInfo: name=STARTER type=STARTER(8) class=DAEMON(1)
12/18/14 12:43:25 (pid:33524) ** Configuration: subsystem:STARTER local:<NONE> class:DAEMON
12/18/14 12:43:25 (pid:33524) ** $CondorVersion: 8.3.1 Aug 09 2014 PRE-RELEASE-UWCS $
12/18/14 12:43:25 (pid:33524) ** $CondorPlatform: X86_64-CentOS_6.5 $
12/18/14 12:43:25 (pid:33524) ** PID = 33524
12/18/14 12:43:25 (pid:33524) ** Log last touched 12/18 12:42:21
12/18/14 12:43:25 (pid:33524) ********************************************************
12/18/14 12:43:25 (pid:33524) Using config source: /etc/condor/condor_config
12/18/14 12:43:25 (pid:33524) Using local config sources:
12/18/14 12:43:25 (pid:33524)    /etc/condor/config.d/01-red
12/18/14 12:43:25 (pid:33524)    /etc/condor/config.d/02-red-worker
12/18/14 12:43:25 (pid:33524)    /etc/condor/config.d/05-red-external
12/18/14 12:43:25 (pid:33524)    /etc/condor/config.d/09-el6
12/18/14 12:43:25 (pid:33524)    /etc/condor/config.d/09-pilot-ads
12/18/14 12:43:25 (pid:33524)    /etc/condor/config.d/60condor-qmf.config
12/18/14 12:43:25 (pid:33524)    /etc/condor/condor_config.local
12/18/14 12:43:25 (pid:33524) config Macros = 154, Sorted = 153, StringBytes = 5900, TablesBytes
= 5640
12/18/14 12:43:25 (pid:33524) CLASSAD_CACHING is OFF
12/18/14 12:43:25 (pid:33524) Daemon Log is logging: D_ALWAYS D_ERROR
12/18/14 12:43:25 (pid:33524) DaemonCore: command socket at <129.93.183.110:52252>
12/18/14 12:43:25 (pid:33524) DaemonCore: private command socket at <129.93.183.110:52252>
12/18/14 12:43:25 (pid:33524) Communicating with shadow <129.93.239.129:19943?noUDP>
12/18/14 12:43:25 (pid:33524) Submitting machine is "red.unl.edu"
12/18/14 12:43:25 (pid:33524) setting the orig job name in starter
12/18/14 12:43:25 (pid:33524) setting the orig job iwd in starter
12/18/14 12:43:25 (pid:33524) Job has WantIOProxy=true
12/18/14 12:43:25 (pid:33524) Chirp config summary: IO true, Updates true, Delayed updates true.
12/18/14 12:43:25 (pid:33524) Initialized IO Proxy.
12/18/14 12:43:26 (pid:33524) Done setting resource limits
12/18/14 12:43:26 (pid:33524) File transfer completed successfully.
12/18/14 12:43:26 (pid:33524) Job 4214063.0 set to execute immediately
12/18/14 12:43:26 (pid:33524) Starting a VANILLA universe job with ID: 4214063.0
12/18/14 12:43:26 (pid:33524) IWD: /var/lib/condor/execute/dir_33524
12/18/14 12:43:26 (pid:33524) Output file: /var/lib/condor/execute/dir_33524/_condor_stdout
12/18/14 12:43:26 (pid:33524) Error file: /var/lib/condor/execute/dir_33524/_condor_stderr
```

```
12/18/14 12:43:26 (pid:33524) Using wrapper /usr/local/bin/condor_nfslite_job_wrapper.sh to exec
/var/lib/condor/execute/dir_33524/condor_exec.exe -v std -name v3_0 -entry CMS_T2_US_Nebraska_Red
-clientname osg-flock-grid-iu-edu_OSG_gWMSF
12/18/14 12:43:26 (pid:33524) Running job as user osg
12/18/14 12:43:26 (pid:33524) Create_Process succeeded, pid=33624
12/18/14 12:43:26 (pid:33524) Limitting memory usage to 2621440000 bytes
12/18/14 12:43:26 (pid:33524) Limitting memsw usage to 135223062528 bytes
12/18/14 12:43:26 (pid:33524) Unable to set OOM control to 1 for starter: 22 Invalid argument
```

Now the classAd for the Condor job can be queried, and we can find the HTCondor-CE job id this was routed from:

```
# condor_q -name red.unl.edu 4214063.0 -l
MaxHosts = 1
GlideinSlotsLayout = "fixed"
MemoryUsage = ( ( ResidentSetSize + 1023 ) / 1024 )
GlideinFactory = "OSGGOC"
GlideinCredentialIdentifier = "907675"
AccountingGroup = "other.osg"
User = "osg@unl.edu"
remote_SMPGranularity = 1
OnExitHold = false
MachineAttrCpus0 = 1
LastHoldReason = "Spooling input data files"
WantRemoteSyscalls = false
MyType = "Job"
Rank = 0.0
CumulativeSuspensionTime = 0
MinHosts = 1
ReleaseReason = "Data files spooled"
PeriodicHold = false
PeriodicRemove = false
Err = "_condor_stderr"
ProcId = 0
EnteredCurrentStatus = 1418928204
remote_NodeNumber = 1
BlockWriteKbytes = 0
Remote_JobUniverse = 5
NumJobStarts = 1
RoutedJob = true
AutoClusterAttrs =
"JobUniverse,LastCheckpointPlatform,NumCkpts,_condor_RequestCpus,_condor_RequestDisk,_condor_Requ
estMemory,RequestCpus,RequestDisk,RequestMemory,Draining,JobStart,LastDrainStartTime,null,QueueAg
e,RemoteGroup,SubmitterGr
oup,x509userproxyfirstfqan,x509userproxysubject,DynamicSlot,PartitionableSlot,Slot1_TotalTimeClai
medBusy,Slot1_TotalTimeUnclaimedIdle,Owner,Slot1_ExpectedMachineGracefulDrainingCompletion,Slot1_
JobStarts,Slot1_SelfMonitorAge,MOUNTS_OK,Dis
kUsage,Requirements,Rank,NiceUser,ConcurrencyLimits"
JobUniverse = 5
AutoClusterId = 18026
RoutedBy = "jobrouter-ce"
In = "/dev/null"
SUBMIT_TransferOutputRemaps =
"_condor_stdout=/usr/local/share/gfactory/clientlogs/user_feosgflock/glidein_v3_0/entry_CMS_T2_US
_Nebraska_Red/job.1787996.7.out;_condor_stderr=/usr/local/share/gfactory/clientlogs/user_feosgflo
ck/glidein_v3_
0/entry_CMS_T2_US_Nebraska_Red/job.1787996.7.err"
Requirements = ( TARGET.Memory >= RequestMemory ) && ( IS_GLIDEIN =!= true ||
TARGET.GLIDECLIENT_Group =?= "T2Overflow" ) && ( TARGET.Arch == "X86_64" ) && ( TARGET.OpSys ==
"LINUX" ) && ( TARGET.Disk >= RequestDisk ) && ( TARGET.HasFileT
ransfer )
ClusterId = 4214063
```

```
NumPids = 8
PublicClaimId = "<129.93.183.110:59131>#1417811779#3732#..."
WhenToTransferOutput = "ON_EXIT"
LastMatchTime = 1418928204
remote_queue = ""
CompletionDate = 0
RecentBlockWrites = 0
x509UserProxyVOName = "osg"
Environment = "HOME=/grid_home/osg OSG_GRID='/etc/osg/wn-client/' OSG_SQUID_LOCATION='red-
squid.unl.edu:3128' OSG_SITE_READ='None' OSG_APP='/cvmfs/oasis.opensciencegrid.org'
OSG_GLEXEC_LOCATION='/usr/sbin/glexec' OSG_DATA='UNAVAILABLE' OS
G_HOSTNAME='red.unl.edu' GLOBUS_LOCATION='/usr' OSG_STORAGE_ELEMENT='True' OSG_SITE_NAME='Red'
OSG_WN_TMP='/tmp' PATH='/bin:/usr/bin:/sbin:/usr/sbin' OSG_DEFAULT_SE='srm.unl.edu'
OSG_SITE_WRITE='None' "
StartdPrincipal = "execute-side@matchsession/129.93.183.110"
TargetType = "Machine"
LeaveJobInQueue = JobStatus == 4
x509UserProxyExpiration = 1419274261
RouteName = "Local_Condor"
RecentStatsLifetimeStarter = 1200
WantIOProxy = true
JobNotification = 0
Owner = "osg"
CommittedTime = 0
x509userproxy = "credential_osg-flock-grid-iu-edu_OSG_gWMSFrontend.main_907675"
QDate = 1418924658
JobLeaseDuration = 1200
RecentBlockWriteKbytes = 0
TransferIn = false
ExitStatus = 0
StartdIpAddr = "<129.93.183.110:59131>"
ProportionalSetSizeKb_RAW = 19012
RootDir = "/"
NumJobMatches = 1
JobCurrentStartDate = 1418928204
GlideinWebBase = "http://glidein.grid.iu.edu/glidefactory//stage/glidein_v3_0"
CurrentHosts = 1
GlobalJobId = "red.unl.edu#4214063.0#1418924658"
RemoteSysCpu = 15.0
TotalSuspensions = 0
JobState = "Running"
x509UserProxyFirstFQAN = "/osg/Role=NULL/Capability=NULL"
remote_cerequirements = "CondorCE == 1"
WantCheckpoint = false
LastJobLeaseRenewal = 1418931520
x509userproxysubject = "/DC=com/DC=DigiCert-Grid/O=Open Science Grid/OU=Services/CN=pilot/osg-
flock.grid.iu.edu"
PeriodicRelease = false
GlideinLogNr = "20141218"
StatsLifetime = 3314
NumCkpts_RAW = 0
orig_environment = ""
StarterIpAddr = "<129.93.183.110:52252>"
Out = "_condor_stdout"
ShouldTransferFiles = "IF_NEEDED"
BlockReads = 24
DiskUsage = 35000
GlideinWorkDir = "Condor"
JobRunCount = 1
CumulativeSlotTime = 0
CommittedSlotTime = 0
ProportionalSetSizeKb = 20000
```

```
LocalUserCpu = 0.0
RecentBlockReads = 0
JobStartDate = 1418928206
InputRSL = ifThenElse(GlobusRSL =?= null,[  ],eval_rsl(GlobusRSL))
ExitBySignal = false
StreamErr = false
TransferringInput = false
DelegatedProxyExpiration = 1419263462
NumSystemHolds = 0
NumRestarts = 0
ResidentSetSize_RAW = 12904
OrigMaxHosts = 1
RequestDisk = DiskUsage
JobPrio = 0
NumCkpts = 0
RoutedFromJobId = "1161981.0"
StatsLifetimeStarter = 3314
ImageSize = 20000
RemoteHost = "slot1@red-d22n10.unl.edu"
DiskUsage_RAW = 33710
CommittedSuspensionTime = 0
GlideinSecurityClass = "frontend"
Cmd = "glidein_startup.sh"
LocalSysCpu = 0.0
LastHoldReasonCode = 16
Iwd = "/var/lib/condor-ce/spool/1981/0/cluster1161981.proc0.subproc0"
BlockReadKbytes = 248
GlideinFrontendName = "OSG_Flock:frontend"
GridResource = undefined
TransferInputSizeMB = 0
RecentStatsLifetime = 1200
SubmitterId = "schedd_glideins4@glidein.grid.iu.edu"
RecentBlockReadKbytes = 0
ServerTime = 1418932137
LastSuspensionTime = 0
ExecutableSize_RAW = 75
GlideinName = "v3_0"
BytesSent = 0.0
osg_environment = "OSG_GRID='/etc/osg/wn-client/' OSG_SQUID_LOCATION='red-squid.unl.edu:3128'
OSG_SITE_READ='None' OSG_APP='/cvmfs/oasis.opensciencegrid.org'
OSG_GLEXEC_LOCATION='/usr/sbin/glexec' OSG_DATA='UNAVAILABLE' OSG_HOSTNAME='red.
unl.edu' GLOBUS_LOCATION='/usr' OSG_STORAGE_ELEMENT='True' OSG_SITE_NAME='Red' OSG_WN_TMP='/tmp'
PATH='/bin:/usr/bin:/sbin:/usr/sbin' OSG_DEFAULT_SE='srm.unl.edu' OSG_SITE_WRITE='None'"
TransferOutputRemaps = undefined
TransferOutput = ""
GlideinProxyURL = "OSG"
JobStatus = 2
ShadowBday = 1418928204
ExecutableSize = 75
MachineAttrSlotWeight0 = 1
GlideinEntryName = "CMS_T2_US_Nebraska_Red"
ImageSize_RAW = 19040
OnExitRemove = true
KillSig = "SIGTERM"
Arguments = "-v std -name v3_0 -entry CMS_T2_US_Nebraska_Red -clientname osg-flock-grid-iu-
edu_OSG_gWMSFrontend.main -schedd schedd_glideins4@glidein.grid.iu.edu -proxy OSG -factory OSGGOC
-web http://glidein.grid.iu.edu/glidefactory//sta
ge/glidein_v3_0 -sign b07077888b419dfcb97c27307dbccb577b316dad -signentry
716a04b6d4de9095d16a890e028d61b32b1ca1f0 -signtype sha1 -descript description.eccfck.cfg -
descriptentry description.eashWx.cfg -dir Condor -param_GLIDEIN_Client osg
```

```
-flock-grid-iu-edu_OSG_gWMSFrontend.main -submitcredid 907675 -slotslayout fixed -clientweb
http://osg-flock.grid.iu.edu/vofrontend/stage -clientsign
428e9f59740375b3596fc6afffdfaa8071b82796 -clientsigntype sha1 -clientdescript descriptio
n.ec4gi0.cfg -clientgroup main -clientwebgroup http://osg-
flock.grid.iu.edu/vofrontend/stage/group_main -clientsigngroup
1f11ec241b7e9f597bc8cccaf536d2bdbeec98a6 -clientdescriptgroup description.ec3jmf.cfg -
param_CONDOR_VERSION 8.dot,2.do
t,x -param_GLIDEIN_CLAIM_WORKLIFE 604800 -param_GLIDEIN_Job_Max_Time 36000 -
param_GLIDECLIENT_ReqNode glidein.dot,grid.dot,iu.dot,edu -param_GLIDEIN_Glexec_Use NEVER -
param_MIN_DISK_GBS 1 -param_GLIDECLIENT_Rank 1 -param_GLIDEIN_Monitorin
g_Enabled False -param_OSG_GLIDEIN_VERSION 56 -param_CONDOR_ARCH default -
param_UPDATE_COLLECTOR_WITH_TCP False -param_USE_MATCH_AUTH True -param_CONDOR_OS rhel6 -
param_GLIDEIN_Report_Failed NEVER -param_GLIDEIN_Collector osg.minus,flock.
dot,grid.dot,iu.dot,edu.colon,9700.minus,9999 -cluster 1787996 -subcluster 7"
RemoteSlotID = 1
SUBMIT_x509userproxy =
"/usr/local/share/gfactory/clientproxies/user_feosgflock/glidein_v3_0/credential_osg-flock-grid-
iu-edu_OSG_gWMSFrontend.main_907675"
ResidentSetSize = 15000
StreamOut = false
CurrentTime = time()
CmdHash = "CmdMD5-7a27272894713c8a06445863287026a2"
BytesRecvd = 61666.0
RequestMemory = 2500
RemoteUserCpu = 23.0
NiceUser = false
NumShadowStarts = 1
TransferQueued = false
RequestCpus = 1
SUBMIT_Cmd = "/usr/local/share/gfactory/glideinsubmit/glidein_v3_0/glidein_startup.sh"
SUBMIT_Iwd = "/usr/local/share/gfactory/glideinsubmit/glidein_v3_0"
JobPid = 33624
WantRemoteIO = true
x509UserProxyFQAN = "/DC=com/DC=DigiCert-Grid/O=Open Science Grid/OU=Services/CN=pilot/osg-
flock.grid.iu.edu,/osg/Role=NULL/Capability=NULL"
JobCurrentStartExecutingDate = 1418928206
GlideinClient = "osg-flock-grid-iu-edu_OSG_gWMSFrontend.main"
LastJobStatus = 1
BlockWrites = 0
```

After this we can look up the classAd for the HTCondor-CE job this was routed from:

```
# condor_ce_q -l 1161981.0
[62/1809]
MaxHosts = 1
GlideinSlotsLayout = "fixed"
GlideinFactory = "OSGGOC"
GlideinCredentialIdentifier = "907675"
Managed = "External"
User = "osg@users.opensciencegrid.org"
CoreSize = 0
LastHoldReason = "Spooling input data files"
WantRemoteSyscalls = false
MyType = "Job"
Rank = 0.0
CumulativeSuspensionTime = 0
MinHosts = 1
ReleaseReason = "Data files spooled"
PeriodicRemove = ( StageInFinish > 0 ) =!= true && time() > QDate + 28800
Err = "_condor_stderr"
ProcId = 0
EnteredCurrentStatus = 1418928232
```

NumJobStarts = 0
JobUniverse = 5
In = "/dev/null"
SUBMIT_TransferOutputRemaps =
"_condor_stdout=/usr/local/share/gfactory/clientlogs/user_feosgflock/glidein_v3_0/entry_CMS_T2_US
_Nebraska_Red/job.1787996.7.out;_condor_stderr=/usr/local/share/gfactory/clientlogs/user_feosgflo
ck/glidein_v3_
0/entry_CMS_T2_US_Nebraska_Red/job.1787996.7.err"
Requirements = true
ClusterId = 1161981
WhenToTransferOutput = "ON_EXIT"
CompletionDate = 0
x509UserProxyVOName = "osg"
BufferSize = 524288
Environment = ""
TargetType = "Machine"
LeaveJobInQueue = JobStatus == 4
x509UserProxyExpiration = 1419263462
JobNotification = 0
Owner = "osg"
CommittedTime = 0
x509userproxy = "credential_osg-flock-grid-iu-edu_OSG_gWMSFrontend.main_907675"
QDate = 1418924613
JobLeaseDuration = 1200
TransferIn = false
ExitStatus = 0
RootDir = "/"
NumJobMatches = 1
JobCurrentStartDate = 1418928204
GlideinWebBase = "http://glidein.grid.iu.edu/glidefactory//stage/glidein_v3_0"
CurrentHosts = 0
GlobalJobId = "red.unl.edu#1161981.0#1418924619"
RemoteSysCpu = 15.0
TotalSuspensions = 0
x509UserProxyFirstFQAN = "/osg/Role=NULL/Capability=NULL"
WantCheckpoint = false
RoutedToJobId = "4214063.0"
ManagedManager = "jobrouter-ce"
x509userproxysubject = "/DC=com/DC=DigiCert-Grid/O=Open Science Grid/OU=Services/CN=pilot/osg-
flock.grid.iu.edu"
GlideinLogNr = "20141218"
NumCkpts_RAW = 0
Out = "_condor_stdout"
ShouldTransferFiles = "IF_NEEDED"
DiskUsage = 75
GlideinWorkDir = "Condor"
JobRunCount = 1
CumulativeSlotTime = 0
CommittedSlotTime = 0
LocalUserCpu = 0.0
JobStartDate = 1418928206
ExitBySignal = false
StreamErr = false
NumSystemHolds = 0
NumRestarts = 0
RequestDisk = DiskUsage
JobPrio = 0
NumCkpts = 0
BufferBlockSize = 32768
StageInStart = 1418924626
ImageSize = 20000
DiskUsage_RAW = 75

```
CommittedSuspensionTime = 0
GlideinSecurityClass = "frontend"
Cmd = "glidein_startup.sh"
LocalSysCpu = 0.0
LastHoldReasonCode = 16
Iwd = "/var/lib/condor-ce/spool/1981/0/cluster1161981.proc0.subproc0"
GlideinFrontendName = "OSG_Flock:frontend"
TransferInputSizeMB = 0
SubmitterId = "schedd_glideins4@glidein.grid.iu.edu"
ServerTime = 1418932200
LastSuspensionTime = 0
ExecutableSize_RAW = 53
GlideinName = "v3_0"
BytesSent = 0.0
TransferOutputRemaps = undefined
TransferOutput = ""
GlideinProxyURL = "OSG"
JobStatus = 2
ExecutableSize = 75
ShadowBday = 1418928204
GlideinEntryName = "CMS_T2_US_Nebraska_Red"
ImageSize_RAW = 20000
RemoteWallClockTime = 0.0
Arguments = "-v std -name v3_0 -entry CMS_T2_US_Nebraska_Red -clientname osg-flock-grid-iu-
edu_OSG_gWMSFrontend.main -schedd schedd_glideins4@glidein.grid.iu.edu -proxy OSG -factory OSGGOC
-web http://glidein.grid.iu.edu/glidefactory//sta
ge/glidein_v3_0 -sign b07077888b419dfcb97c27307dbccb577b316dad -signentry
716a04b6d4de9095d16a890e028d61b32b1ca1f0 -signtype sha1 -descript description.eccfck.cfg -
descriptentry description.eashWx.cfg -dir Condor -param_GLIDEIN_Client osg
-flock-grid-iu-edu_OSG_gWMSFrontend.main -submitcredid 907675 -slotslayout fixed -clientweb
http://osg-flock.grid.iu.edu/vofrontend/stage -clientsign
428e9f59740375b3596fc6afffdfaa8071b82796 -clientsigntype sha1 -clientdescript descriptio
n.ec4gi0.cfg -clientgroup main -clientwebgroup http://osg-
flock.grid.iu.edu/vofrontend/stage/group_main -clientsigngroup
1f11ec241b7e9f597bc8cccaf536d2bdbeec98a6 -clientdescriptgroup description.ec3jmf.cfg -
param_CONDOR_VERSION 8.dot,2.do
t,x -param_GLIDEIN_CLAIM_WORKLIFE 604800 -param_GLIDEIN_Job_Max_Time 36000 -
param_GLIDECLIENT_ReqNode glidein.dot,grid.dot,iu.dot,edu -param_GLIDEIN_Glexec_Use NEVER -
param_MIN_DISK_GBS 1 -param_GLIDECLIENT_Rank 1 -param_GLIDEIN_Monitorin
g_Enabled False -param_OSG_GLIDEIN_VERSION 56 -param_CONDOR_ARCH default -
param_UPDATE_COLLECTOR_WITH_TCP False -param_USE_MATCH_AUTH True -param_CONDOR_OS rhel6 -
param_GLIDEIN_Report_Failed NEVER -param_GLIDEIN_Collector osg.minus,flock.
dot,grid.dot,iu.dot,edu.colon,9700.minus,9999 -cluster 1787996 -subcluster 7"
KillSig = "SIGTERM"
SUBMIT_x509userproxy =
"/usr/local/share/gfactory/clientproxies/user_feosgflock/glidein_v3_0/credential_osg-flock-grid-
iu-edu_OSG_gWMSFrontend.main_907675"
StreamOut = false
CurrentTime = time()
CmdHash = "CmdMD5-7a27272894713c8a06445863287026a2"
BytesRecvd = 61666.0
RequestMemory = ifthenelse(MemoryUsage =!= undefined,MemoryUsage,( ImageSize + 1023 ) / 1024)
RemoteUserCpu = 23.0
NiceUser = false
RequestCpus = 1
SUBMIT_Cmd = "/usr/local/share/gfactory/glideinsubmit/glidein_v3_0/glidein_startup.sh"
SUBMIT_Iwd = "/usr/local/share/gfactory/glideinsubmit/glidein_v3_0"
WantRemoteIO = true
StageInFinish = 1418924626
x509UserProxyFQAN = "/DC=com/DC=DigiCert-Grid/O=Open Science Grid/OU=Services/CN=pilot/osg-
flock.grid.iu.edu,/osg/Role=NULL/Capability=NULL"
LastJobStatus = 1
```

```
GlideinClient = "osg-flock-grid-iu-edu_OSG_gWMSFrontend.main"
```

.

Conclusion

These tests show that HTCondor-CE provides adequate traceability for both credentials and jobs. We were able to locate credential DNs for jobs submitted both directly and via GlideinWMS. Determining the user that submitted the job to the GlideinWMS system would still require getting more information from the Glidein Factory.

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