# USA Site Report: DOSAR

## C.M. Jenkins

# Condor Cluster with Colinux Working!

- First got a mini Condor cluster working:
  - Two PC's running Scientific Linux 3.0.9 (Fermi)
  - Condor Master: orion
  - Worker node: gemini
- I have been able to see both machines with condor_status
- Submit jobs with condor_submit
- First used "loop" job from examples
- Wrote my own C++ program:
- Time/date loop
- Print out value of CONDOR_SCRATCH_DIR environment variable

# Major Steps to get Mini-Condor Cluster working

- Discovering the location of log files major help
- Problem was a mixture of systems-condor setup-internet.
- Solution path was non-linear
- Synchronized clocks (used time.nist.gov)
- condor_status on gemini-
- Saw orion and usouthal
- Changed /etc/host and /etc/hosts.allow on orion and gemini
- See orion and gemini with condor_status

- [condor@orion ~]$ date
- Thu Aug  6 09:52:08 CDT 2009
- [condor@orion ~]$ condor_status

- Name          OpSys      Arch  State   Activity LoadAv Mem  ActvtyTime

- gemini.physics.uso LINUX    INTEL  Unclaimed Idle   0.000   499 0+01:35:04
- orion.physics.usou LINUX    INTEL  Unclaimed Idle   0.000   499 0+01:05:04

-              Total Owner Claimed Unclaimed Matched Preempting Backfill

-      INTEL/LINUX   2    0     0      2       0        0       0

-              Total   2    0     0      2       0        0

## CurrentHost.1.out (orion)

Max =  10000000 | Modulo =   1000000
Date = 2009Aug6_00_50_21
Error getting HOST
Error getting PWD
Error getting CONDOR_HOST
Error getting COLLECTOR_HOST
Error getting FULL_HOST_NAME
CONDOR_SCRATCH_DIR: /opt/condor-7.0.4/local.orion/execute/dir_6543
m =      0 Time =  0.0000e+00 , rtime =  0.0000e+00
m =   1000000 Time =  1.0000e+00 , rtime =  4.9000e-01
m =   2000000 Time =  1.0000e+00 , rtime =  9.8000e-01
m =   3000000 Time =  2.0000e+00 , rtime =  1.4700e+00
m =   4000000 Time =  2.0000e+00 , rtime =  1.9600e+00
m =   5000000 Time =  3.0000e+00 , rtime =  2.4500e+00
m =   6000000 Time =  3.0000e+00 , rtime =  2.9300e+00
m =   7000000 Time =  4.0000e+00 , rtime =  3.4200e+00
m =   8000000 Time =  4.0000e+00 , rtime =  3.9000e+00
m =   9000000 Time =  5.0000e+00 , rtime =  4.3900e+00

## CurrentHost.3.out (gemini)

Max =  100000000 | Modulo =   10000000
Date = 2009Aug6_00_50_28
Error getting HOST
Error getting PWD
Error getting CONDOR_HOST
Error getting COLLECTOR_HOST
Error getting FULL_HOST_NAME
CONDOR_SCRATCH_DIR: /opt/condor-7.0.4/local.gemini/execute/dir_5898
m =      0 Time =  0.0000e+00 , rtime =  0.0000e+00
m =  10000000 Time =  6.0000e+00 , rtime =  5.6800e+00
m =  20000000 Time =  1.2000e+01 , rtime =  1.1330e+01
m =  30000000 Time =  1.7000e+01 , rtime =  1.7000e+01
m =  40000000 Time =  2.3000e+01 , rtime =  2.2680e+01
m =  50000000 Time =  2.9000e+01 , rtime =  2.8350e+01
m =  60000000 Time =  3.4000e+01 , rtime =  3.4020e+01
m =  70000000 Time =  4.0000e+01 , rtime =  3.9710e+01
m =  80000000 Time =  4.6000e+01 , rtime =  4.5380e+01
m =  90000000 Time =  5.2000e+01 , rtime =  5.1030e+01

# Resume Work on Colinux Cluster

- Picked one windows-based PC (Dirac)
- Multiple problems
- Brought up a linux console and logged in as root
- Condor was not setup and running
- Either scripts are not writing files properly or I am not setting up the scripts properly.
  - It looks like the condor_config file should be modified on the windows directory c:\condor\colinux3\condor **(as directions say it should)**
  - Changed the condor_config file on c:\condor\colinux3
  - condor_config file had "^m" instead of carriage returns **(probably is not a problem**).
  - condor_config not placed in /home/condor (i.e. ~ codor).
  - condor_config.local not placed in /opt/condor-6.8.4/local.localhost
- I had to manually start condor:
- /usr/condor/local/sbin/condor_master
  - Found on the log files that condor did not find condor_config and condor_config.local
  - Changing the condor_config to include nodes for local cluster

# Condor on Colinux Node

## From linux console as root

```
[root@localhost ~]#
[root@localhost ~]# lsb_release -a
LSB Version:    :core-3.1-ia32:core-3.1-noarch:graphics-3.1-
ia32:graphics-3.1-noarch
Distributor ID: FedoraCore
Description:    Fedora Core release 6 (Zod)
Release:        6
Codename:       Zod
[root@localhost ~]# date
Thu Aug  6 09:54:55 CDT 2009
[root@localhost ~]# ps -ef | egrep condor_
daemon   1200    1  0 Aug04 ?      00:01:25
/usr/local/condor/sbin/condor_master
daemon   1201 1200  0 Aug04 ?      00:00:00 condor_collector -f
daemon   1202 1200  0 Aug04 ?      00:00:00 condor_negotiator -f
daemon   1203 1200  0 Aug04 ?      00:00:00 condor_schedd -f
daemon   1204 1200  0 Aug04 ?      00:00:54 condor_startd -f
root     7009 6886  0 09:55 pts/0   00:00:00 egrep condor_
[root@localhost ~]#
```

## MasterLog file

```
8/5 08:34:28 *****************************************************
8/5 08:34:28 ** condor_master (CONDOR_MASTER) STARTING UP
8/5 08:34:28 ** /opt/condor-6.8.4/sbin/condor_master
8/5 08:34:28 ** $CondorVersion: 6.8.4 Feb  1 2007 $
8/5 08:34:28 ** $CondorPlatform: I386-LINUX_RHEL3 $
8/5 08:34:28 ** PID = 6154
8/5 08:34:28 ** Log last touched 8/5 08:33:18
8/5 08:34:28 *****************************************************
8/5 08:34:28 Using config source: /home/condor/condor_config
8/5 08:34:28 Using local config sources:
8/5 08:34:28    /usr/local/condor/condor_local/condor_config.local
8/5 08:34:28    /opt/condor-6.8.4/local.localhost/condor_config.local
8/5 08:34:28 FileLock::obtain(1) failed - errno 11 (Resource temporarily
unavailable)
8/5 08:34:28 ERROR "Can't get lock on "/tmp/condor-
lock.localhost0.794870938946591/InstanceLock"" at line 978 in file master.C
```

## CollectorLog file

```
8/5 13:06:24 DaemonCore: PERMISSION DENIED to unknown user from
host <127.0.0.1:64457> for command 1 (UPDATE_SCHEDD_AD)
8/5 13:07:05 DaemonCore: PERMISSION DENIED to unknown user from
host <127.0.0.1:64208> for command 0 (UPDATE_STARTD_AD)
8/5 13:11:24 (Sending 1 ads in response to query)
8/5 13:11:24 Got QUERY_STARTD_PVT_ADS
8/5 13:11:24 (Sending 0 ads in response to query)
8/5 13:11:24 NegotiatorAd  : Inserting ** "< localhost.localdomain >"
8/5 13:11:24 DaemonCore: PERMISSION DENIED to unknown user from
host <127.0.0.1:64630> for command 2 (UPDATE_MASTER_AD)
8/5 13:11:24 DaemonCore: PERMISSION DENIED to unknown user from
host <127.0.0.1:63618> for command 1 (UPDATE_SCHEDD_AD)
8/5 13:12:05 DaemonCore: PERMISSION DENIED to unknown user from
host <127.0.0.1:64989> for command 0 (UPDATE_STARTD_AD)
```
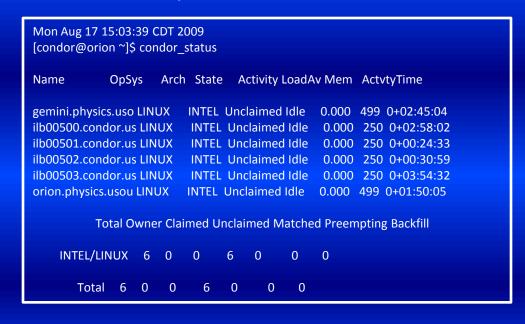
# Internet Problems

- Dirac is setup via DHCP
  - Logged in as root on dirac (using cooperative linux console)
  - Could ssh to orion
- Discovered that the IP address for the windows system is different than the linux (co-linux) operating system.
  - After discovering the linux IP address, I can ssh to dirac (use ip address) from orion
- I had to give the PC a host name on Colinux operating system: dirac
- After assigning the host name, this node became visible in the Mini Condor Cluster!

# USA Condor Cluster with Colinux Nodes

- Advised to give a different host name for the colinux operating system vs. the windows operating system hostname.

- Convention: ILB room number, node number in room.

- fermi→ilb00500

- dirac→ilb00501

- curie→ilb00502

- pauli→ilb00503

```
Mon Aug 17 15:03:39 CDT 2009
[condor@orion ~]$ condor_status

Name              OpSys    Arch   State   Activity LoadAv Mem   ActvtyTime

gemini.physics.uso LINUX    INTEL  Unclaimed Idle    0.000   499 0+02:45:04
ilb00500.condor.us LINUX    INTEL  Unclaimed Idle    0.000   250 0+02:58:02
ilb00501.condor.us LINUX    INTEL  Unclaimed Idle    0.000   250 0+00:24:33
ilb00502.condor.us LINUX    INTEL  Unclaimed Idle    0.000   250 0+00:30:59
ilb00503.condor.us LINUX    INTEL  Unclaimed Idle    0.000   250 0+03:54:32
orion.physics.usou LINUX    INTEL  Unclaimed Idle    0.000   499 0+01:50:05

          Total Owner Claimed Unclaimed Matched Preempting Backfill

INTEL/LINUX   6    0      0       6        0        0         0

     Total    6    0      0       6        0        0         0
```

# Problems with Colinux Script?

- The problems with the colinux setup script seem to be associated with dhcp.
- I have found a work-around by
- Using a static address (currently, the IP address assigned by the lease)
- Assigning a host name
- Changing the /etc/hosts to include the new host name and IP address
- Copying the condor_config file to /usr/local/condor/etc /condor_config file as there are symbolic link to /home/condor (~condor)
  - C:\condor\conlunx3\condor (windows)
  - /usr/local/condor/condor_comm/
  - Both point to the same area
- Moving the /opt/condor-6.8.4/localhost.local directory to /opt/condor-6.8.4/localhost.dirac (or other host name)
- Edit the condor_config.local file
  - CONDOR_HOST =Condor master name
  - CONDOR_ADMIN = Email address
  - UID_DOMAIN = $(FULL_HOSTNAME)
  - FILESYSTEM_DOMAIN = $(FULL_HOSTNAME)
  - COLLECTOR_NAME = Collector Pool name
- We will give static IP addresses to the linux operating systems on these PC's.

# Test Program on Condor Colinux Cluster

- Compile and build job:
  - condor_compile g++ -o CurrentHost CurrentHost.cc
- Submit job to cluster
  - condor_submit CurrentHost
- Check on job status
  - condor_status
  - condor_q
- Determined the node that the job runs on by printing out the environment variable
  - CONDOR_SCRATCH_DIR

# Output from CurrentHost

## CurrentHost.0.out  (orion)

```
Max =   10000000 | Modulo =   1000000
Date = 2009Aug13_19_15_41
Current Host: orion
 Error getting MYHOST
Current Directory: /orion2/condor/CurrentHost
 Error getting CONDOR_HOST
 Error getting COLLECTOR_HOST
 Error getting FULL_HOST_NAME
CONDOR_SCRATCH_DIR: /opt/condor-7.0.4/local.orion/execute/dir_20418
_CONDOR_SLOT: slot1
m =        0 Time =  0.0000e+00 , rtime =  0.0000e+00
m =   1000000 Time =  1.0000e+00 , rtime =  5.4000e-01
m =   2000000 Time =  1.0000e+00 , rtime =  1.0200e+00
m =   3000000 Time =  2.0000e+00 , rtime =  1.5100e+00
m =   4000000 Time =  2.0000e+00 , rtime =  2.0000e+00
m =   5000000 Time =  3.0000e+00 , rtime =  2.4800e+00
m =   6000000 Time =  3.0000e+00 , rtime =  2.9700e+00
m =   7000000 Time =  4.0000e+00 , rtime =  3.4500e+00
m =   8000000 Time =  4.0000e+00 , rtime =  3.9400e+00
m =   9000000 Time =  5.0000e+00 , rtime =  4.4300e+00
```

## CurrentHost.1.out  (ilb00500)

```
Max =   10000000 | Modulo =   1000000
Date = 2009Aug13_19_22_15
Current Host: orion
 Error getting MYHOST
Current Directory: /orion2/condor/CurrentHost
 Error getting CONDOR_HOST
 Error getting COLLECTOR_HOST
 Error getting FULL_HOST_NAME
CONDOR_SCRATCH_DIR: /opt/condor-6.8.4/local.ilb00500/execute/dir_5854
 Error getting _CONDOR_SLOT
m =        0 Time =  0.0000e+00 , rtime =  1.0000e-02
m =   1000000 Time =  3.5000e+01 , rtime =  3.4980e+01
m =   2000000 Time =  7.0000e+01 , rtime =  6.9990e+01
m =   3000000 Time =  1.0500e+02 , rtime =  1.0503e+02
m =   4000000 Time =  1.4000e+02 , rtime =  1.3998e+02
m =   5000000 Time =  1.7500e+02 , rtime =  1.7504e+02
m =   6000000 Time =  2.1000e+02 , rtime =  2.1015e+02
m =   7000000 Time =  2.4500e+02 , rtime =  2.4516e+02
m =   8000000 Time =  2.8000e+02 , rtime =  2.8013e+02
m =   9000000 Time =  3.1600e+02 , rtime =  3.1516e+02
```

## CurrentHost.2.out (ilb00502)

```
Max =   10000000 | Modulo =   1000000
Date = 2009Aug13_19_14_25
Current Host: orion
 Error getting MYHOST
Current Directory: /orion2/condor/CurrentHost
 Error getting CONDOR_HOST
 Error getting COLLECTOR_HOST
 Error getting FULL_HOST_NAME
CONDOR_SCRATCH_DIR: /opt/condor-6.8.4/local.ilb00502/execute/dir_1491
 Error getting _CONDOR_SLOT
m =        0 Time =  0.0000e+00 , rtime =  5.0000e-02
m =   1000000 Time =  3.4000e+01 , rtime =  3.4200e+01
m =   2000000 Time =  6.8000e+01 , rtime =  6.8340e+01
m =   3000000 Time =  1.0200e+02 , rtime =  1.0251e+02
m =   4000000 Time =  1.3600e+02 , rtime =  1.3664e+02
m =   5000000 Time =  1.7100e+02 , rtime =  1.7076e+02
m =   6000000 Time =  2.0500e+02 , rtime =  2.0491e+02
m =   7000000 Time =  2.3900e+02 , rtime =  2.3906e+02
m =   8000000 Time =  2.7300e+02 , rtime =  2.7319e+02
m =   9000000 Time =  3.0700e+02 , rtime =  3.0733e+02
```

## CurrentHost.3.out  (ilb00501)

```
Max =   10000000 | Modulo =   1000000
Date = 2009Aug13_19_15_47
Current Host: orion
 Error getting MYHOST
Current Directory: /orion2/condor/CurrentHost
 Error getting CONDOR_HOST
 Error getting COLLECTOR_HOST
 Error getting FULL_HOST_NAME
CONDOR_SCRATCH_DIR: /opt/condor-6.8.4/local.ilb00501/execute/dir_1164
 Error getting _CONDOR_SLOT
m =        0 Time =  0.0000e+00 , rtime =  1.0000e-02
m =   1000000 Time =  3.5000e+01 , rtime =  3.4760e+01
m =   2000000 Time =  7.0000e+01 , rtime =  6.9520e+01
m =   3000000 Time =  1.0400e+02 , rtime =  1.0418e+02
m =   4000000 Time =  1.3900e+02 , rtime =  1.3896e+02
m =   5000000 Time =  1.7400e+02 , rtime =  1.7358e+02
m =   6000000 Time =  2.0800e+02 , rtime =  2.0824e+02
m =   7000000 Time =  2.4300e+02 , rtime =  2.4297e+02
m =   8000000 Time =  2.7800e+02 , rtime =  2.7764e+02
m =   9000000 Time =  3.1300e+02 , rtime =  3.1233e+02
```

# Steps to Get Colinux/Condor to work

- Install colinux according to the instructions on:
  - **http://www.oscer.ou.edu/CondorInstall/condor_colinux_howto.php**
- Start a cooperative linux console
  - C:\condor\colinux\colinux-console-ftlk
- Log in as root
  - Assign a host name
  - Change /etc/hosts to include the new hostname and the hostname / IP address of the condor_master
  - Add condor_master to /etc/hosts.allow

# Changes in Condor_config

- On Windows system use note pad to
  - C:\condor\colinux3\condor\condor_config
    - Part 1
      - CONDOR_HOST = (your condor master)
      - CONDOR_ADMIN = (your E-mail)
      - Add the environment variable:
        - » FULL_HOSTNAME = (computer hostname)
      - COLLECTOR_NAME = (your collector pool name)
    - Part 2
      - FLOCK_FROM = (all nodes in cluster)
      - FLOCK_TO = (condor master node)
      - HOSTALLOW_READ = (all nodes in cluster)
- HOSTALLOW_WRITE = (all nodes in cluster)
- cp /usr/local/condor/condor_comm/condor_config    /usr/local/condor/etc/.
- Remember C:\condor\colinux3\condor and /usr/local/condor/condor_comm point to the same area on disk.

# Changes for local host

- As the root user:
  - cd /opt/condor-6.8.4/local.localhost/
  - Modify: condor_config.local  file
    - CONDOR_HOST = condor master
    - CONDOR_ADMIN = email address
    - UID_DOMAIN = $(FULL_HOSTNAME)
    - FILESYSTEM_DOMAIN = $(FULL_HOSTNAME)
    - COLLECTOR_NAME = Collector pool name
- Move the local.localhost directory to use the host name in place of "localhost".
- Suppose the local host is ilb00502
- cd /opt/condor-6.8.4/
- mv local.localhost   local.ilb00502

# Start Up Condor

- Reboot
-  log in as the root user in colinux console
- Find new IP address and change /etc/hosts
- Start condor manually:
- /usr/local/condor/sbin/condor_master
- Check:
- ps –ef | egrep condor_

# Tried Running Test Root Progam

- Used the vanilla universe.
- Here programs do not have to be built with condor_compile.
- The program only ran on the condor master
- Also produced a condor_procd process that never stopped.
- Found out the vanilla universe needs a commonly accessible disk area.
- Need to introduce another node to the condor cluster with a commonly mounted disk area.
- (Will remote mount do?)

# Colinux running in background?

- Colleague started to use these nodes for advanced lab this week.

- He found the computers very sluggesh.

- We stopped the colinux service

- Computers started to run "normally"

- I wrote a benchmark program (in C++) to run on the windows operating system.

- Ran this benchmark without then with colinux started.

# Benchmark Program Results

- This program runs on the Windows operating system.
- The benchmark program is a loop that gets the current time.
- Periodically the number of cycles through the loop and the time are printed.
- Found very little differences without and with the colinux service running.

## Without colinux service

```
Program myBenchmark
Start Benchmark Program: 2009 Sep 02  16:06:01
Current Host = (null)
 Interations   =   1000000
 ReportInterval =    100000
   cycle        Date          Run Time (sec)
      0 | 2009 Sep 02  16:06:01 |  0.0000e+00
  100000 | 2009 Sep 02  16:06:02 |  8.4400e-01
  200000 | 2009 Sep 02  16:06:03 |  1.6720e+00
  300000 | 2009 Sep 02  16:06:03 |  2.5160e+00
  400000 | 2009 Sep 02  16:06:04 |  3.3440e+00
  500000 | 2009 Sep 02  16:06:05 |  4.1720e+00
  600000 | 2009 Sep 02  16:06:06 |  5.0160e+00
  700000 | 2009 Sep 02  16:06:07 |  5.8910e+00
  800000 | 2009 Sep 02  16:06:08 |  6.7190e+00
  900000 | 2009 Sep 02  16:06:08 |  7.5630e+00
End  Benchmark Program: 2009 Sep 02  16:06:09
```

## With colinux service

```
Program myBenchmark
Start Benchmark Program: 2009 Sep 02  16:00:19
Current Host = (null)
 Interations   =   1000000
 ReportInterval =    100000
   cycle        Date          Run Time (sec)
      0 | 2009 Sep 02  16:00:19 |  3.1000e-02
  100000 | 2009 Sep 02  16:00:20 |  8.5900e-01
  200000 | 2009 Sep 02  16:00:21 |  1.6870e+00
  300000 | 2009 Sep 02  16:00:22 |  2.5310e+00
  400000 | 2009 Sep 02  16:00:23 |  3.3590e+00
  500000 | 2009 Sep 02  16:00:24 |  4.1870e+00
  600000 | 2009 Sep 02  16:00:25 |  5.0470e+00
  700000 | 2009 Sep 02  16:00:25 |  5.8900e+00
  800000 | 2009 Sep 02  16:00:26 |  6.7190e+00
  900000 | 2009 Sep 02  16:00:27 |  7.5470e+00
End  Benchmark Program: 2009 Sep 02  16:00:28
```

# To The Future

- Need to include root into condor jobs
- Will try to include a node with a remote mount disk area.
- I will need to reconfigure each condor node
- CMSSW uses Scientific Linux 4
  - Will there be a Scientific Linux 4 released of colinux?
- Include condor libraries into CMSSW build
- (major undertaking)