Condor Roll: Users Guide

Version 5.4 Edition

Condor Roll: Users Guide :
Version 5.4 Edition
Published Nov 02 2010
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Preface

The Rocks Condor Roll uses the latest stable Condor Release to provide High Throughput Computing environment for Rocks clusters. The Rocks Condor Roll builds on the very good work by the Condor team, to seamlessly install the *de facto* standard grid middleware on Rocks Clusters.

Please visit the Condor Project Homepage[1] to learn more about Condor and the software releases.

A local copy of their online manual pages is available on this cluster [2].

Notes

1. http://www.cs.wisc.edu/condor/

2. condor-Manual

Chapter 1. Overview

Table 1-1. Summary

Name	condor
Version	5.4
Maintained By	Rocks Group
Architecture	i386, x86_64
Compatible with Rocks®	5.4

Table 1-2. Roll Compatibility

Roll	Requires a	Optional b	Conflicts
alpha		X	
area51		X	
base	X		
bio		X	
condor		X	
ganglia		X	
grid		X	
hpc		X	
java		X	
kernel	X		
os (disk 1)	X		
os (disk 2)	X		
os (disk 3)		X	
os (disk 4)		X	
os (disk 5)		X	
os (disk 6)		X	
os (disk 7)		X	
pbs		X	
service-pack		X	
sge		X	
viz		X	
web-server		X	
xen		X	

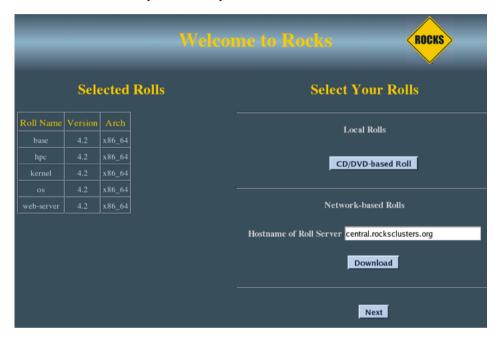| Roll	Requires a	Optional b	Conflicts
Notes:			
a. You may also substitute your own OS CDs for the Rocks® OS Roll CDs. In this case you must use all the CDs from your distribution and not use any of the Rocks® OS Roll CDs.			
b. Only Rolls that have been verified as compatible with this Roll are listed. Other Rolls will likely work, but have not been tested by the maintainer of this Roll.			

Chapter 2. Installing the Condor Roll

2.1. Adding the Roll

The Condor Roll can be installed during the Frontend installation or added to a running frontend. In either case, client nodes must be (re)installed.

The Condor Roll is added to a Frontend installation in exactly the same manner as the required base Roll. Simply select the Condor roll as you would any network- or CD-based roll.

Once the Condor Roll is loaded the installer will continue installation automatically with no further user input. The Frontend will be configured as a condor pool manager and a submit node. Nodes of appliance type "compute" will will be configured as submit/execute nodes. Other appliances can be made part of the execution pool through setting an appliance attribute and reinstalling those nodes.

2.2. Frontend Boot

On first boot, the Condor roll will complete its configuration of the Condor daemons.

2.3. Install on Running System

The Condor Roll can be installed on a running system. The following assumes that roll is available in .iso form and is called "condor.iso".

```
$ su - root
```

```
# rocks add roll condor.iso
# rocks enable roll condor
# rocks create distro
# rocks run roll condor | bash
# shutdown -r now
```

Chapter 3. Using the Condor Roll

3.1. Using Condor

This section explains the Condor pool configuration on Rocks clusters, and provides link to further documentation.

Machines in the Condor pool can serve a variety of roles:

- *Central manager* machine is the collector of information, and the negotiator between resources and resource requests. In any Condor pool one machine must be the Central Manager.
- *Submit machine* allows Condor jobs submission.
- *Execute machine* provides resources for Condor jobs execution.

The Frontend is configured as the pool's Central Manager, and the Submit machine. The rest of the nodes are configured as Submit/Execute machines.

The configuration of condor is done during the install, the resulting configuration files are located in /opt/condor/etc. To reconfigure condor pool use /opt/condor/sbin/CondorConf command, and then restart condor daemons so the new configuration takes an effect. CondorConf takes *-h* flag that gives the usage explanation on stdout. Usually, the reconfiguration is only needed when you have multiple network interfaces on your nodes, and the default configuration is not using your desired interface.

By default, on the frontend condor daemons are running on *eth1* interface, and on the compute nodes on *eth0* interface.

Here is en axample command for configuring condor as the pool manager and the submit machine on the frontend, assuming the forntend has IP 198.202.89.155:

```
/opt/condor/sbin/CondorConf -n frontend -t sm -m 198.202.89.155
```

The following command will configure compute nodes as Submit/Execute machines:

```
/opt/condor/sbin/CondorConf -n compute -t se -m 198.202.89.155
```

To find information about administrering and using Condor Pools please see the original Condor manual at Condor manuals[1]

3.2. Testing the Condor Roll

1. First, make sure condor daemons are running by executing:

   ```
   # ps -ef | grep condor
   ```

   On the frontend, the output should be similar to following:

   ```
   condor    2623     1  0 Apr19 ?        00:04:26 /opt/condor/sbin/condor_master
   condor    2646  2623  0 Apr19 ?        00:20:25 condor_collector -f
   ```

```
condor    2647  2623  0 Apr19 ?         00:04:56 condor_negotiator -f
condor    2649  2623  0 Apr19 ?         00:00:02 condor_schedd -f
```

And on the compute nodes, the output should be similar to following:

```
condor   17007     1  0 Apr19 ?         00:01:09 /opt/condor/sbin/condor_master
condor   17009 17007  0 Apr19 ?         00:00:02 condor_schedd -f
condor   17010 17007  0 Apr19 ?         00:09:09 condor_startd -f
```

2. Try a test job submission. If you don't already have a non-root user account, you'll need to create one:

```
# useradd testuser
# rocks sync users
```

Then, to run a test job submission, execute:

```
# su - testuser
$ cp /opt/condor/tests/hello.* .
$ condor_submit hello.sub
```

3. Check if jobs are submitted by executing:

```
$ condor_q
```

The output should be similar to:

```
-- Submitter: jeebs.rocksclusters.org : <172.19.119.241:44626> : jeebs.rocksclusters.org
 ID      OWNER           SUBMITTED     RUN_TIME ST PRI SIZE CMD
   2.0   testuser       12/12 09:38   0+00:00:01 R  0   0.0  hello.sh

1 jobs; 0 idle, 1 running, 0 held
```

R in status column(ST) means running. *I* means idling.

4. Once the queue is empty (above command shows no jobs) can see the history of jobs execution with:

```
$ condor_history
```

To see all the nodes in the condor pool do:

```
$ condor_status
```

The output should be similar to:

```
Name           OpSys       Arch   State      Activity   LoadAv Mem   ActvtyTime

vm1@compute-0 LINUX        INTEL  Unclaimed  Idle       0.000  506   0+00:40:04
vm2@compute-0 LINUX        INTEL  Unclaimed  Idle       0.000  506   0+00:45:05
vm3@compute-0 LINUX        INTEL  Unclaimed  Idle       0.000  506   0+00:45:06
vm4@compute-0 LINUX        INTEL  Unclaimed  Idle       0.000  506   0+00:45:07
vm1@compute-0 LINUX        INTEL  Unclaimed  Idle       0.000  506   0+00:35:04
vm2@compute-0 LINUX        INTEL  Unclaimed  Idle       0.000  506   0+00:40:05
vm3@compute-0 LINUX        INTEL  Unclaimed  Idle       0.000  506   0+00:40:06
vm4@compute-0 LINUX        INTEL  Unclaimed  Idle       0.000  506   0+00:40:07
vm1@compute-0 LINUX        INTEL  Unclaimed  Idle       0.000  506   0+00:25:04
vm2@compute-0 LINUX        INTEL  Unclaimed  Idle       0.000  506   0+00:30:05
vm3@compute-0 LINUX        INTEL  Unclaimed  Idle       0.000  506   0+00:30:06
vm4@compute-0 LINUX        INTEL  Unclaimed  Idle       0.000  506   0+00:30:07
vm1@compute-0 LINUX        INTEL  Unclaimed  Idle       0.000  506   0+00:15:05
vm2@compute-0 LINUX        INTEL  Unclaimed  Idle       0.000  506   0+00:20:06
vm3@compute-0 LINUX        INTEL  Unclaimed  Idle       0.000  506   0+00:20:07
vm4@compute-0 LINUX        INTEL  Unclaimed  Idle       0.000  506   0+00:20:08
```

```
vm1@compute-0 LINUX      INTEL   Unclaimed  Idle      0.000   506  0+00:10:04
vm2@compute-0 LINUX      INTEL   Unclaimed  Idle      0.000   506  0+00:15:05
vm3@compute-0 LINUX      INTEL   Unclaimed  Idle      0.000   506  0+00:15:06
vm4@compute-0 LINUX      INTEL   Unclaimed  Idle      0.000   506  0+00:15:07
vm1@compute-0 LINUX      INTEL   Unclaimed  Idle      0.000   506  0+00:00:04
vm2@compute-0 LINUX      INTEL   Unclaimed  Idle      0.000   506  0+00:05:05
vm3@compute-0 LINUX      INTEL   Unclaimed  Idle      0.000   506  0+00:05:06
vm4@compute-0 LINUX      INTEL   Unclaimed  Idle      0.000   506  0+00:05:07
vm1@compute-0 LINUX      INTEL   Owner      Idle      0.860   506  0+00:00:09
vm2@compute-0 LINUX      INTEL   Unclaimed  Idle      0.000   506  0+00:00:05
vm3@compute-0 LINUX      INTEL   Unclaimed  Idle      0.000   506  0+00:00:06
vm4@compute-0 LINUX      INTEL   Unclaimed  Idle      0.000   506  0+00:00:07


            Machines Owner Claimed Unclaimed Matched Preempting

 INTEL/LINUX     28     1      0       27       0          0

       Total     28     1      0       27       0          0
```

Notes

1. http://www.cs.wisc.edu/condor/manual

Chapter 4. Customizing the Condor Roll

4.1. Customizing the Condor Roll

This section describes the default Condor configuration and some simple cusomizations that can be applied in Rocks with version >= 5.4

By default, Condor execution daemons are only installed on Rocks *compute* appliances. For Rocks 5.2 and newer, the Condor roll makes use of *attributes* to enable Condor to be installed on any appliance. This may be particularly useful to groups who are including the Xen roll and would like Condor to install on VM Container appliances.

The basic customizations that can be applied without and scripting/programming by setting global, appliance, or host attributes. Please see the commands `rocks set attr help` and `rocks list attr help`

Table 4-1. Attributes Used in Condor Roll

Attibute Name	Description
Condor_Client	Enable/Disable Condor Client Installation on any particular Appliance or Host
Condor_PasswordAuth	Use a shared pool password, instead of host-based authentication. Default: no.
Condor_HostAllow	Comma separates list of allowed readers/writers for Condor. Translates to HOSTALLOW directive in Condor Configuration file.
Condor_EnableMPI	Configure a local scheduler for MPI Universe Support
Condor_Master	Redefine the Condor Master that nodes use
Condor_Network	Define which network interface is used for Condor traffic. Default: frontends are set to public, clients are set to private.
Condor_PortHigh:	Upper Port range that Condor will use to communicate among daemons. Removal of this Attribute will result in removal of the HIGHPORT entry in condor_config.local after syncing the configuration. Default: 50000
Condor_PortLow	Lower Port range that Condor will use to communicate among daemons. Removal of this Attribute will result in removal of the LOWPORT entry in condor_config.local after syncing the configuration. Default: 40000

4.2. Using a pool password to secure Condor

Communications

The default Rocks configuration is to use host-based authentication. This is a good and simple choice for a cluster with a private network. With the Rocks 5.4 version of the Condor Roll, it is straightforward to set up a "Pool Password" that utilizes a shared secret among pool members. This is especially useful when allowing remote systems to report directly to the Condor collector on your cluster. The EC2 Roll can utilize a pool password for a higher security.

The following, straightforward will create, copy and enable a system-wide shared-secret pool password.

1. Create a pool password. Use `rocks create condor password`

2. Enable pool password security. Use `rocks set attr Condor_Password yes`

3. Reconfigure Condor Daemons and copy new pool password. Use `rocks sync host condor syncpassword=yes localhost compute`

4.3. Examples of Condor Configuration

The following are short examples of how to customize Condor using Rocks commands.

- Enable Condor Client on all VM-Containers Appliances: `rocks add appliance attr vm-container Condor_Client true`

- Disable Condor on particular node: `rocks set host attr compute-0-0 Condor_Client false`

- Define a New Condor Master: `rocks set attr Condor_Master central-master.my.edu`

4.4. Reconfiguring Condor after Installation

The configuration of Condor is done during the install, the resulting configuration files are located in /opt/condor/etc. To reconfigure Condor on a node, make appropriate attribute using the commands above and then run

```
# rocks sync host condor <hostname>
```

This will rewrite the condor_config.local on the file and then calls the Condor command `/opt/condor/sbin/condor_reconfigure`

To view the contents of the condor_config.local before making changes, use `rocks report host condor config <hostname>`

To find information about administrating and using Condor Pools please see the original Condor manual at Condor manuals[1] or locally [2].

4.5. Programatically changing the Contents of condor_config.local

Condor configuration is localized into /opt/condor/etc/condor_config.local. This file is generated programatically from the output of `rocks report host condor config <hostname>`.

The command `rocks report host condor config` is defined by the Condor roll and is written in Python. This report command is extensible through Rocks command plugins.

To see a sample Condor plugin, view the file in location `/opt/rocks/lib/python2.4/site-packages/rocks/commands/report/host/condor/config/plugin_sample.py`, which is reproduced here.

```
# $Id: customizing.sgml,v 1.7 2010/10/26 16:44:00 phil Exp $
import rocks.commands

class Plugin(rocks.commands.Plugin):

 def provides(self):
  return 'sample'

 def run(self, argv):
  # Argv contains the hostname and the in memory key-value store
        # that is eventually written to
  # /opt/condor/etc/condor_config.local
  # plugins can add/change/remove keys from the store

  # 1. Get the hostname and the key-value store, which
  #    is a python dictionary
  host, kvstore = argv

  # The following would add CONDOR_SAMPLE=Sample Plugin
  # the key = value dictionary (kvstore)  that is written out
  #
  # Example 1. Read an attribute from the database and set
  # the values
  value = self.db.getHostAttr(host, 'Condor_HostAllow')
  kvstore['CONDOR_SAMPLE'] = value

  # Example 2. Set the key CONDOR_SAMPLE to the hostname
  kvstore['CONDOR_SAMPLE'] = host

  # Example 3. Remove a key from the dictionary
  if 'CONDOR_SAMPLE' in kvstore:
   del kvstore['CONDOR_SAMPLE']

RollName = "condor"
```

Users/Roll Developers can add their own plugins for the "report host condor config" command to overwrite, add, and/or delete key,value pairs that are written into /opt/condor/etc/condor_config.local.

In the above code sample, the Condor report command driver passes the hostname and the dictionary of already defined key,value pairs (kvstore in the sample code). The sample code shows several different examples of changing the key 'CONDOR_SAMPLE'.

Plugins are written in Python, are called in random order, and must be named "plugin_<name>.py".

Plugins also enable any desired configurations to be properly applied with the command `rocks sync host condor config`.

Notes

1. http://www.cs.wisc.edu/condor/manual

2. condor-Manual

Appendix A. Rocks Copyright

```
                          Rocks(r)
                    www.rocksclusters.org
                    version 5.4 (Maverick)
```

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                     Version 2.0, January 2004
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