qacafe
ip test solutions

Cable/DSL Router Test Suite

User's Guide

cdrouter
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Configuration

You are now ready to run the test suite. The cdrouter test suite requires root access in order to use pktsrc. You can either run the test suite directly as root or setup sudo for buddy. However, before you begin, you must edit the configuration file 'local.conf' to match your test environment.

Basic Configuration

cdrouter can be run on a standard linux PC with 2 ethernet interfaces. The interfaces selected should not be connected to a 'real' network. These interfaces must be configured 'up', but they should not have any IP configuration.

Finding available interfaces

You can find the available network interfaces on your system using the 'ifconfig' command. From this list of interfaces, you can select 2 available network interfaces.

```
# -- example of interface configuration
# ifconfig eth2

eth2      Link encap:Ethernet  HWaddr 00:D0:B7:79:8C:DE
          UP BROADCAST PROMISC MULTICAST  MTU:1500  Metric:1
          RX packets:755666 errors:0 dropped:0 overruns:0 frame:6
          TX packets:39955 errors:0 dropped:0 overruns:201 carrier:0
          collisions:0 txqueuelen:100
          Interrupt:9 Base address:0xdd00
```

Cabling the test setup

The networks connecting the cdrouter linux PC to the router should be isolated networks with no other network devices. Generally, the ports can be directly cabled together using an Ethernet cross-over cable or cabled into a hub/switch so that other sniffer tools can be used.

The following is the typical configuration:

Lab Setup for cdrouter Test Suite
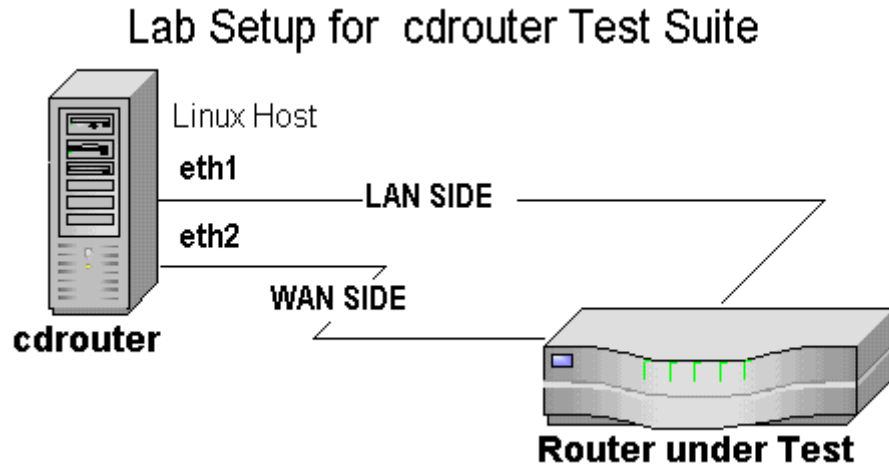
Configuring 'local.conf'

The 'local.conf' file lives in the top level directory of the cdrouter test suite. This file contains all the configuration information needed by the test suite to test the router. The configuration must match your actual test setup and configuration of your Cable/DSL Router.

The LAN and WAN sides of your test setup must be configured in the local.conf file.

LAN Interface Configuration

lanInterface	This is the name of the physical device attached to the LAN network. This should be one of the devices displayed using ifconfig such as eth0, eth1, etc. Note, this device should be configured up, but it should not have its own IP address configured.

LAN Interface Configuration

lanIp	This is the IP address of the Cable/DSL router on its LAN interface.
lanMask	This is the network mask on the LAN interface.
lanMac	This is the Ethernet MAC address to use on the LAN interface. If this variable is not specified, the test suite will use the real Ethernet MAC on the network card.

Wan Interface Configuration

wanInterface	This is the name of the physical device attached to the WAN network. This should be one of the devices displayed using ifconfig such as eth0, eth1, etc. Note, this device should be configured up, but it should not have its own IP address configured. Note: This device must be different from the lanInterface.
wanIspIp	This is the IP address of the ISP on the WAN side.
wanIspAssignIp	This is the IP address that will be assigned to the Cable/DSL router using PPPoE or DHCP. If a static mode configuration is used, this address should be configured to the static IP address configured on the routers WAN interface.
wanIspAssignGateway	This is the IP gateway that will be assigned to the Cable/DSL router using DHCP. By default, this IP address is the same as the wanIspIp address. However, if the cdrouter WAN interface is not directly connected to the router under test, you may configure a different address to be assigned as the gateway via DHCP. NOTE: This option is only used in topologies that use a DHCP-relay agent to forward DHCP requests to the cdrouter WAN interface.
wanIspGateway	This is the IP gateway address that the cdrouter WAN interface will use to reach the WAN. Normally, when the cdrouter WAN interface is directly connected to the WAN interface of the router under test, this IP address is the same as the wanIspAssignIp. However, in topologies that involve a DHCP-relay agent, you must configure the IP Gateway for the cdrouter WAN interface.
wanIspMask	This is the network mask on the WAN interface.

Wan Interface Configuration

wanMac	This is the Ethernet MAC address to use on the WAN interface. If this variable is not specified, the test suite will use the real Ethernet MAC on the network card.
wanNatIp	This is the IP address the router will use for any NAT connections. Normally, this address is the same as the wanIspAssignIp configuration. However, a different address may be used to support other topologies during end to end style testing.
wanDomainName	This is the domain name that will be assigned on the WAN side.
wanDnsServer	This is the IP address the primary DNS server.
wanBackupDnsServer	This is the IP address the backup DNS server.

The Cable/DSL Router supports three main modes of operation depending on the WAN side configuration of the router. The 'wanMode' variable must be set to one of the following.

- static - The router is configured with a static IP address on the WAN
- DHCP - The router is configured to run a DHCP client on the WAN
- PPPoE - The router is configured to run a PPPoE client on the WAN

DHCP Configuration

DHCP Configuration

dhcpLeaseTime	This is the the DHCP lease time in seconds that will be used by the DHCP server on the WAN side. Some of the tests wait for the lease to expire on the WAN side. The value of this variable will deterime how long the tests run.
dhcpClientStart	The is the first address in the DHCP client address pool. The Cable/DSL should be configured to assign addresses beginning with this address.
dhcpClientEnd	The is the last address in the DHCP client address pool. The Cable/DSL should be configured to assign addresses from the dhcpClientStart value to the dhcpClientEnd value.

DHCP Configuration

DNStoDHCP	If yes, this router relays the DNS server information learned on the WAN side through a DHCP option on the LAN side. If no, the router annouces its own IP address as the DNS server and forwards all DNS requests to the real DNS server.

PPPoE Configuration

Your Cable/DSL router must be configured to automatically initiate a new PPPoE session when the router restarts, or if the session is terminated by the PPPoE server. Most Cable/DSL routers do this by default. 'Connect-on-demand' configurations are not supported by the cdrouter suite.

PPPoE Configuration

pppoeConnectOnDemand	Some routers will only initiate a connection on the WAN interface if there is traffic on the LAN side. If pppoeConnectOnDemand is set to yes, the test suite will start the LAN side before waiting for a WAN side connection from the router. Without this option, the test suite waits for the router to initiate a WAN side PPPoE connection without any traffic on the LAN side. Note: This feature is only used during the initial startup.
pppAuthType	This option is used to set the PPP authentication protocol used by the router. Valid types include PAP, CHAP, and None. If not specified, it defaults to PAP.
pppoeUser	This is the the PPP user name that will be used for PAP authentication on the WAN side.
pppoePassword	This is the password that will be accepted for the pppoeUsername on the WAN side.
pppoeServiceName	This is the PPPoE service that will be used by the PPPoE server. This service name will be returned in the PPPoE Offer packet from the server. If the name is configured to any, the server will use the null string "". The default service name is qacafe.

Chapter 4
End to End Testing

Normally, the cdrouter test suite is used to test a single IP device. However, the test suite can be configured to test through a network that contains additional IP devices. Typically, this is used to test a Cable/DSL router connected to a DSLAM device through a cable/xDSL modem.

```
linux host --/WAN/-- router 1 -- DSLAM -- X modem -- Cable/DSL router
w/cdrouter                                                         |
    |                                                              |
    +--------/LAN/--------------------------------------------+
```

If multiple IP routers are connected between the Cable/DSL Router and the WAN interface on the test host, the WAN mode can be configuredto 'static' or 'DHCP'. The DHCP mode will only work if one of the devices in the topology is configured as a DHCP-relay agent.

Static Mode

The wanIspIp and wanIspAssignIp addresses should be set based on the IP addresss of the first router connected to the WAN side of the test suite. In the topology above, 'wanIspAssignIp' would be set to router 1's IP address on the WAN side and 'wanIspIp' would be set to an available IP address on the same network.

DHCP-Relay Mode

To run in DHCP-relay mode, two additional configuration parameters are needed. The wanIspIp and wanIspGateway addresses should be set based on the IP addresss of the first router connected to the WAN side of the test suite.

The 'wanIspAssignIp' and 'wanIspAssignGateway' should be configured to an IP host and gateway addresses that should be assigned to the Cable/DSL router.

The 'wanNatIP' variable should be set to the expected WAN side address of the Cable/DSL router.

The distribution includes an example DHCP-relay configuration local.conf-dhcp-relay

Configuring the number of IPv4 hops

Since the additional IP routers change the expected IPv4 hop count between the LAN and WAN interfaces, the 'IPv4HopCount' variable should be set to the number of IPv4 hops. Normally, this is set to 1.

Getting More out of the cdrouter test suite

There are several techniques that can be used to increase your testing mileage with the cdrouter test suite.

Repeat a single test or repeat multiple tests

You can setup a test run that repeats a single test or collection of tests. This is helpful to verify that the router continues to function correctly over time.

Example.

```
# -- repeat all the nat tests until one fails.
# buddy -module nat.tcl -repeat -until-fail
```

Skip individual tests or test modules

During your testing, you may run into problems where the router gets into a state where it can not recover. If this becomes a road block to additional testing, you can skip these tests or modules in order to setup long duration test runs. The -skip-test and -skip-module options provide this type of control.

Capture test output

It is often useful to save the test output for later analysis. There are several ways of doing this, but one useful technique is 'tee'.

Example.

```
# -- capture output with tee
# buddy | tee testrun.log
```

Use trace options

There are three tracing options that can display different levels of output.

- -trace display all protocol track log messages
- -trace2 display decodes of all packets in/out
- -trace3 display hex dumps of all packets in/out

Combine with other tools

It is often useful to combine 'cdrouter' with other tools to get different views of events as they happen. tcpdump or ethereal are good examples.