NAME

dynmnd

Mobile Node for Dynamics - HUT Mobile IP, the hierarchical Mobile IP system.

SYNOPSIS

dynmnd [--fg] [--config <file>] [--debug] [--no-wireless] [--wireless-policy] [--disconnect] [--help] [--version]

OPTIONS

--fg Starts the daemon in the foreground. This option can be used to monitor the operation and for debugging. Without this option the daemon is forked into the background.

--config <file> By default, the daemon uses configuration file /usr/local/etc/dynmnd.conf. This default path can be overridden with the '--config <file>' option.

--debug Enable debug printing. This option makes the daemon to print debugging messages. It should be used with --fg in order to see the messages.

--no-wireless Disable wireless enhancements. Without this option wireless interface enhancements are used if the kernel supports SIOCGIWSPY ioctl. The support is automatically detected.

--wireless-policy <num> Set wireless handoff policy, where <num> can be either 0 or 1 to select how long the Mobile Node will keep agent advertisement information stored, if new advertisements from that agent have not been received.

0 : Use MN's default agent advertisement expiration policy. The default expiration time for the stored agent advertisement is the arrival time plus lifetime in the message.

1 : Use advertisement lifetime divided by three as the advertisement information expiration time.

--disconnect Start the MN in the disconnected state.

--help Prints the help screen for Dynamics MN daemon.

--version Prints the version of the Mobile Node executable.

DESCRIPTION

The **Mobile Node** manages the mobility related issues of networking at the mobile host using Dynamics - HUT Mobile IP. Tasks taken care of by the Mobile Node software are e.g. initiating and controlling the connections to mobility agents and managing IP-within-IP tunneling. Mobile Node makes the movements of the mobile user transparent so that the movements have minimal affect on the networking abilities. Mobile Node term often covers the mobile host and the Mobile Node software running in the mobile host. Every Mobile Node has its own **Home Agent**.

Foreign Agents are used between the end nodes (Mobile Node and Home Agent) to provide connection between the end nodes and efficient hierarchical location updates.

Tunneling is started after the Mobile Node has found a **Foreign Agent** in visited network who is willing to

forward the packets. Connect call returns after connection has been set up and accepting reply is received. Tunnel is taken down whenever MN has not found an agent within a specified tunnel lifetime or it's requested to disconnect.

Mobile Node works also in home network, where tunneling is not needed. If the MN is using MN decapsulation and a co-located care-of-address and a location update to same co-located care-of-address as mobile's own home address is done, MN drops the tunnel and starts to use directly the local network. If later a new location update to a foreign network is done, MN begins the tunneling again. If the MN is using FA decapsulation and FA care-of-address and receives an agent advertisement from the HA, it then deregisters, stops tunneling and moves to state "At Home".

MANAGEMENT INTERFACES

Mobile Node can be controlled via an API interface. An example tool, **dynmn_tool**(8) is provided with the Dynamics package.

The dynmn_tool allows users to connect and disconnect to tunneling system and perform location updates. Also status information from the agent is available. In wireless environment the dynmn_tool can be used to show the heard Foreign Agents.

There is also a graphical front end, **tkagent_tool**, to the example tools. The corresponding tool is started by giving the tool name as a startup argument for the tkagent_tool: './tkagent_tool <tool_name>'. For example: **tkagent_tool** dynmn_tool

Own tools may be created using **libdynmn**(3).

OPERATING REQUIREMENTS

The specific requirements are listed in the Dynamics source code distribution's README file. In general, the hardware requirements are low: a PC with Intel 486 processor is very capable of acting as a Mobile Node. The more Mobile Nodes and traffic there is the higher the requirements.

The Dynamics Mobile Node does not change the addresses assigned to the network interfaces. With FA decapsulation, the correct home IP address of the Mobile Node must be configured to the interface before starting the MN daemon (see your distribution's documentation for further instructions on network configuration). With MN decapsulation, the current temporary IP address must be acquired and assigned to an interface by an external program, e.g., a DHCP client. Dynamics MN monitors changes to the interface addresses and performs a registration if a change is detected. In addition, dynmn_tool can be used to inform the daemon about the change with 'update' command.

The mechanisms for obtaining an IP address when using MN decapsulation are not bound to any particular solution. One recognized method of obtaining a temporary IP address in a foreign network for the MN is DHCP - Dynamic Host Configuration Protocol defined in RFC 2131.

To use DHCP with the Mobile Node requires that there is a DHCP service in the Foreign Network. To make IP address management use DHCP you need to:

- Install the DHCP client (dhcpcd) and configure it.

- Make the DHCP client inform the Mobile Node about the change of an IP address. This can be done e.g. with a shell script run each time the DHCP client gets a new IP address (dhcpcd start option: -c script_filename). The script should run the command:
'dynmn_tool -p <agent API socket path> update <interface>'

Help in installing and configuring the DHCP client can be obtained from the Linux DHCP-howto and DHCP FAQ documents.

New versions of the Linux DHCP-howto document will be periodically posted to the newsgroup comp.os.linux.answers. They will also be added to the various anonymous FTP sites who archive such information, including:

ftp://sunsite.unc.edu/pub/Linux/docs/HOWTO [referred 01-Sep-2001]

In addition, you should generally be able to find this document on the Linux Documentation Project page via:

http://www.linuxdoc.org/ [referred 01-Sep-2001]

The DHCP FAQ document is available at:

http://www.dhcp-handbook.com/dhcp_faq.html [referred 01-Sep-2001]

SECURITY

Mobile Node uses a Shared Secret to authenticate itself with the Home Agent. Mobile Node authenticates itself with the Foreign Agents by using the delivered session key for message authentication code calculations with MD5 algorithm. Timestamps or nonces are used for replay protection. Additionally, a specific signaling packet extension is used to provide sequence number based replay protection between FA and MN in localized location updates.

In addition to pre-configured security associations with Home Agent and Foreign Agents, Mobile Node can also be configured to use an AAA infrastructure to obtain dynamic security association with mobility agents. Example configuration file has more information about how to configure needed options for AAA operation.

INSTALLATION

Dynamics supports binary packets in Red Hat Linux RPM and Debian Linux deb formats. You can also compile the software from the source code distribution. Check for the latest software release from http://www.cs.hut.fi/Research/Dynamics/. Make sure your Linux kernel fulfills the requirements listed in the README document.

Install the binary package or compile the Mobile Node and edit the dynmnd.conf configuration file. After that, you are ready to run Dynamics MN. More help for configuration from **dynmnd.conf**(5).

For more information about installing the Dynamics system, see the README and INSTALL files of the source code distribution.

For more information about configuring the system, see **dynhad.conf**(5), **dynfad.conf**(5), and **dynmnd.conf**(5). There is also a configuration checklist document **dynamics_config_checklist** available with the source code distribution.

RUNNING DYNAMICS MN

First, make sure you have sufficient privileges to do all the required operations. Adding the IPIP tunneling module, enabling the IP forwarding and running the daemons require root privileges.

In order to be able to use the IPIP tunneling you must make sure that the IPIP tunneling module (ipip.o) is loaded. This can be done with 'modprobe ipip' if the module is compiled to the Linux kernel as a loadable module.

The Mobile Node is used as a normal daemon program that forks into background and the calling process returns immediately.

The software can be debugged in detail by following the instructions of the **debug_flags** file in the **doc** directory of the source code distribution. The logging is done via syslog service. Refer to the /etc/syslog.conf file for instructions on syslog facilities, see **syslog.conf**(5) for more information.

FILES

/usr/local/etc/dynmnd.conf

The system wide configuration file. See **dynmnd.conf**(5) for further details.

DIAGNOSTICS

The following diagnostics may be issued to stderr:

This program must be run by root.

The daemon needs privileges to change the network settings. Log in with super user rights and try again.

Initialization failed.

Program could not initialize itself. Check that configuration file **dynmnd.conf** is valid.

BUGS

Notice that this is a prototype version of Dynamics - HUT Mobile IP software. This software has not yet been thoroughly tested and may contain some bugs. If you find a bug from this software, please contact the authors.

EXAMPLES

Here is an example shell script file to be run to inform the Mobile Node about the change of the co-located care-of IP address.

Example

```
# ----BEGIN-DHCP-EXAMPLE---------
#!/bin/sh
# This script informs the Dynamics Mobile Node
# of a change of the co-located care-of address.
# This script can be run e.g. when the mobile host
# gets a new IP address via DHCP.
# Copyright 1999 Dynamics group <dynamics@cs.hut.fi>
# Here we assume the Mobile Node communicates with the
# DHCP server and the Foreign Agents through interface
# "eth0".
/usr/local/bin/dynmn_tool -p /var/run/dynamics_mn_admin update eth0
#
# ----END-DHCP-EXAMPLE---------
```

AUTHOR AND COPYRIGHT

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SEE ALSO

dynmnd.conf(5), **dynfad**(8), **dynhad**(8), **libdynmn**(3), **dynmn_tool**(8), **dynamics**(8), **dhcpd**(8), **DHCP howto**, **DHCP FAQ**