

IMHOTEK LTD.

Cost Comparison Tool

Installation and User Guide

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DISCLAIMER

Inmarsat cannot be held responsible for differences between data traffic measured by this application and data traffic as shown on customer bills.

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Overview

This chapter discusses the basic concepts of network monitoring using SNMP. This is followed by an overview of the Cost Comparison Tool

Overview of SNMP

Simple Network Management Protocol (SNMP) is an application protocol offering network management services in the Internet Protocol suite. SNMP is defined in several RFCs published beginning in 1990. During the last few years SNMP has been adopted by numerous vendors of network equipment as a main or secondary management interface.

SNMP defines a client/ server relationship. The client program (called the network manager) makes virtual connections to a server program (called the SNMP agent) executing on a remote network device. The database controlled by the SNMP agent is referred to as the SNMP Management Information Base (MIB), and is a standard set of statistical and control values. SNMP additionally allows the extension of these standard values with values specific to a particular agent through the use of private MIBs.

The Cost Comparison Tool queries SNMP to obtain details of network interfaces and traffic statistics. By using SNMP rather than other methods, means that the Cost Comparison Tool can monitor any network device that supports SNMP.

Overview of the Cost Comparison Tool

The Cost Comparison Tool enables monitoring of network interfaces on both the local machine, and remote devices. It uses SNMP to obtain statistics, and therefore requires SNMP to be installed on (both the machine running the cost comparison tool and) the machine/ device to be monitored.

Its purpose is to measure the bytes send and received over the chosen interface, and plot what the costs would be if the traffic were sent over the Inmarsat mobile ISDN and MPDS systems.

The mobile ISDN network is billed on a time basis, so the cost is directly related to the time taken for the traffic to complete its journey.

The MPDS network is billed on a per MegaBIT basis, so the cost is directly related to the number of bytes send and received.

Note: Using the tool over the mobile ISDN network gives a true indication of costs over the MPDS network, although there may be a slight difference in network traffic due to the different natures of the two networks. **However,** using the tool over the MPDS network *will NOT* give a true representation of costs over the mobile ISDN network, as MPDS is NOT time based; events will happen at a speed that is dependant on the number of users using the system and overall network traffic.

Supported Features

The cost comparison tool supports the following features:

- Graphical display of costs for:
 - The mobile ISDN network
 - The MPDS network
 - The MPDS forward channel (to mobile)
 - The MPDS reverse channel (from mobile)
- Textual display of utilisation of ISDN channel
- Textual display of statistics (bytes in/ out, packets in/ out, costs)
- The ability to start, pause, continue and stop monitoring
- The ability to save charts as .bmp files
- Full logging capability
- Full control over pricing figures used
- The ability to add overheads (to the MPDS channels)
- Full control over SNMP configuration

Hardware Requirements

The hardware requirements for the Cost Comparison Tool are:

- An Intel compatible PC capable of running Microsoft's Windows 9x, Me, NT and W2K operating systems
- A minimum of 15MB disk space
- A network device to monitor, or network connection to other devices to monitor

Software Requirements

The software requirements for the Cost Comparison Tool are:

- Microsoft's Windows 9x, Me, NT and W2K operating systems
- SNMP agent installed (on machine that is to be monitored)
 - Instructions for installation of SNMP can be found in this document

Installation and Configuration

Prerequisites

Ensure that you have installed SNMP on the device to be monitored

Installing SNMP

The installation of SNMP varies according to the operating system you are running. Please refer to the appropriate section

Note: If you have problems with installing SNMP, refer to chapter 5

Windows 95/98/Me

To install SNMP on Windows 95/ 98 follow the steps:

1. Start the Control Panel (Start → Settings → control panel)
2. Double click on the 'Network' icon
3. Press the 'Add...' button
4. Select the 'Service' option and press the 'Add...' button.
5. From the list of available services that appear, select the SNMP agent and follow all instructions
6. Should SNMP not appear, select the 'Have Disk' option, and, using the Cost Comparison Tool disk, select the directory X:\win9xsnmp. Then follow all instructions
7. You must restart your computer.

Windows NT

To install SNMP on Windows NT follow the steps:

8. Start the Control Panel (Start → Settings → control panel)

9. Double click on the 'Network' icon
10. Choose the 'Services' tab
11. Press the 'Add...' button
12. From the list of available services that appear, select the 'SNMP Service'. You will be prompted to insert the Windows NT installation disk.
13. On the screen that appears, you may take the defaults. You may wish to change the security settings, to only allow machines that may run the cost comparison tool access to SNMP on this machine. When finished, press 'OK', and then 'Close'
14. You must restart your computer.

Windows 2000

To install SNMP on Windows 2000 follow the steps:

1. Start the Control Panel (Start → Settings → control panel)
2. Double click on the 'Add/ Remove Programs' icon
3. Click on the 'Add/ Remove Windows Components' icon
4. Select the 'Management and Monitoring Tools' option, and press the 'Details...' button
5. Check the box next to 'Simple Network Management Protocol' and press the 'OK' button. Then press the 'Next' button
6. You should now restart your computer.

Installing the Cost Comparison Tool

Follow these steps to install the Cost Comparison Tool

1. Insert the Cost Comparison Tool installation disk into the appropriate drive
2. If the disk auto-runs, select the 'Install Cost Comparison Tool' option
3. If the disk does not auto-run, from Start Menu, select 'Run...' and enter (with the appropriate drive letter): **X:\SETUP** and press RETURN
4. The Cost Comparison Tool is installed using a standard installation wizard. Follow all instructions through the wizard.
6. When this is complete you will be presented with a screen informing you that the installation has completed. Before correct operation, the Tool must be configured. You can do this immediately, by ticking the check box ticked before finishing the install, or leave it for later.

Quick Configuration

To install the Cost Comparison Tool, follow the steps:

1. Run the Cost Comparison Tool, from the Start menu. A box will appear prompting you to configure the tool.
2. Choose the 'Monitoring...' option from the 'Configure' menu
3. To add a new device to be monitored, press the 'Add Device...' button.
4. Enter a descriptive name for the device.
5. Enter the IP address of the device to be monitored. (Defaults to 127.0.0.1 for monitoring an interface on the local machine)
6. Enter the SNMP community of the device to be monitored. (Defaults to 'public' which is the default SNMP community)
7. Click the 'Get Interface List' button. This will query the chosen device and return a list of interfaces.
8. Choose an interface to monitor, and press OK.

9. Press OK to close the Configuration window. The tool is now ready for operation.

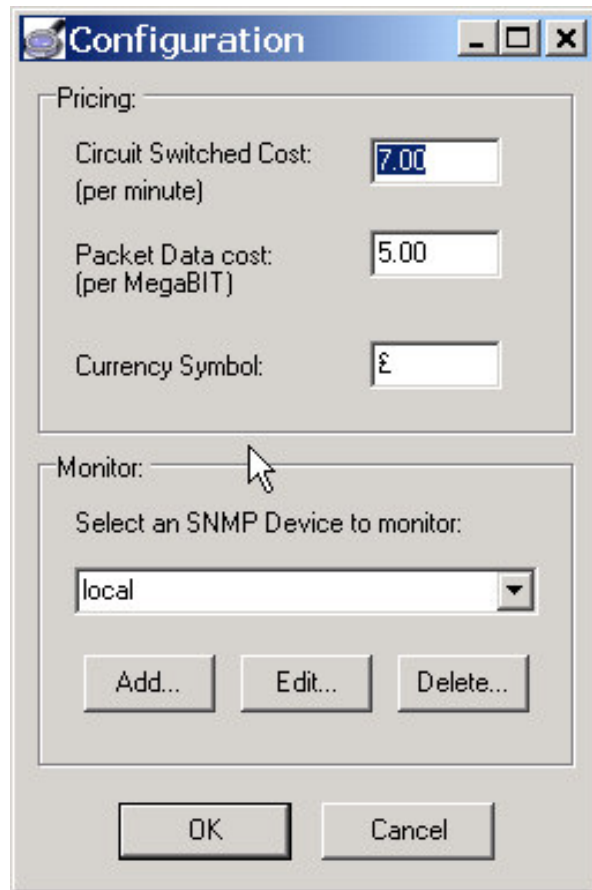
Configuration Options

This section explains the configurable options in detail.

The Configure Menu

Monitoring...

The configure menu brings up the following window:



Pricing

This section allows the prices used for mobile ISDN and MPDS to be set. The circuit switched cost (mobile ISDN) is in units per minute, the packet data cost (MPDS) is in units per MegaBIT (1 MegaBIT = 2^{20} = 1048576).

The currency symbol changes the symbol shown by the software.

Monitor

This section allows selection of the SNMP interface to monitor. Use the buttons to add, edit and delete entries in this list.

New interfaces are added by using the 'Add Interface' button, which brings up the window shown below:



Device Name

This allows the entry of a descriptive name for this device, which will be used in the list shown on the previous screen.

IP Address

This allows configuration of the IP address of the machine to be monitored.

Note: This address is not necessarily the IP address of the *interface* to be monitored. Collecting SNMP stats by the very nature of SNMP stats creates traffic on the interface used to query SNMP. Therefore, it is better to choose an interface that will not affect the statistics that you are trying to collect.

For example, suppose a machine has 2 interfaces; 10.1.1.1 and 192.168.1.1 plus the loopback interface of 127.0.0.1.

If you wish to run the Cost Comparison Tool on this machine, then the best interface to use to connect to SNMP is 127.0.0.1, leaving the two interfaces unaffected by SNMP traffic.

If you wish to monitor this machine from another machine, and you wish to monitor traffic on the 10.1.1.1 interface, it is better to monitor from the 192.168.1 network, and specify 192.168.1.1 as the SNMP IP Address. Conversely if you wish to monitor traffic on the 192.168.1.1 interface, it is better to monitor from the 10.1.1 network, and specify 10.1.1.1 as the SNMP IP Address

Community

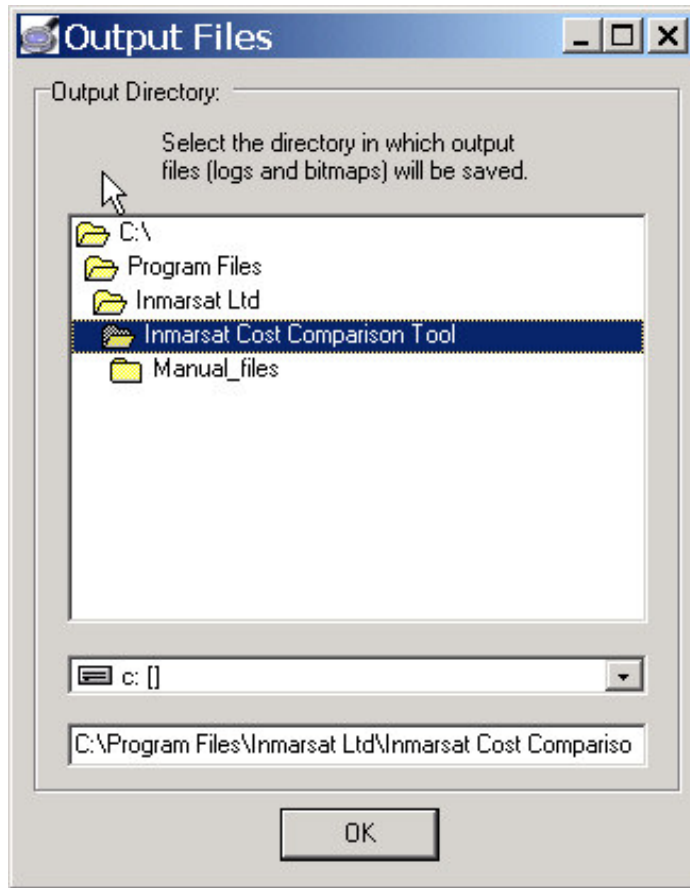
This allows configuration of the SNMP community for the machine to be monitored. The community used by default is 'public'. You must ensure that the machine to be monitored has a community that enables the iso.org.dod.internet tree to be read from the machine you are running the tool from. (If you don't understand this then use 'public'. Should problems arise, refer to the troubleshooting section).

Get Interface List

This button queries the chosen device and returns a list of Interfaces that may be monitored. Use the selection box to choose an interface to monitor.

Output Files...

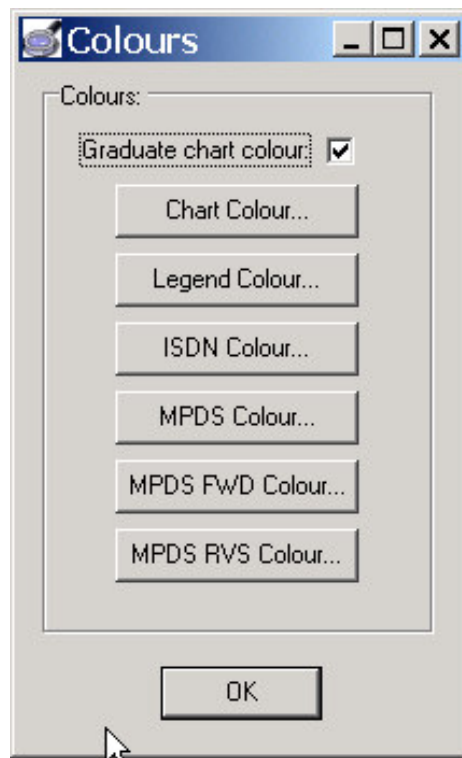
This menu brings up the window shown below:



Use this window to select the directory in which the log files and bitmaps should be saved. Alternatively, the directory name may be typed directly into the bottom field.

Colours...

This menu brings up the window shown below:



Use this window to change the colours on the chart. It is possible to change the background colour of the chart, along with the background of the legend box and all the line colours. It is not possible to change the text colour.

View Options Menu

This menu allows control of the different options available to view during monitoring.

Always On Top

This option, when checked, makes the Cost Comparison Tool window stay on top of other windows at all times.

Show Forward/Reverse MPDS Costs

This option, when checked, shows the forward and reverse costs for the MPDS channel as separate lines on the monitoring graph.

Show Total MPDS Costs

This option, when checked, shows the total (forward + reverse) costs for the MPDS channel as a line on the monitoring graph.

Show Statistics in Title Bar

This option, when checked, shows the numbers of bytes and packets send and received in the title bar.

Show Statistics in Status Bar

This option, when checked, shows the numbers of bytes and packets send and received in a status bar at the bottom of the window.

Show Utilisation of ISDN Channel

This option, when checked, shows the utilisation of the ISDN channel in a status bar at the bottom of the window.

Show Summary Window On Stop

This option, when checked, shows a window that gives a summary of the monitoring session once the stop button is pressed.

Save Chart Menu

This menu option allows the current chart to be saved as a bitmap file. It will be saved in the directory set-up in your 'Output Files' configuration. The filename is created using a combination of the device name that you are monitoring, the date and the number of files saved this session:

<device name>_yyyymmdd_<no>.bmp

e.g.

local_20011220_1.bmp

Help Menu***Help... Option***

The help option brings up your web browser, and opens the help file. If this does not work as expected, the help files can be found in the Cost Comparison Tools directory.

Hot Keys... Option

Hot Keys enable the Cost Comparison Tool to be controlled from outside its main window. The following hot keys are defined:

<CTRL> + F9: Simulates pressing the Start button
<CTRL> + F10: Simulates pressing the Pause/ Continue button
<CTRL> + F11: Simulates pressing the Stop button
<CTRL> + F12: Hides and un-hides the main window

<CTRL> + F12 toggles the main window between normal size, and simply its title bar, which is placed at the top left of the screen, set to always on top and displays the statistics.

About... Option

This option shows the about box.

Register Menu

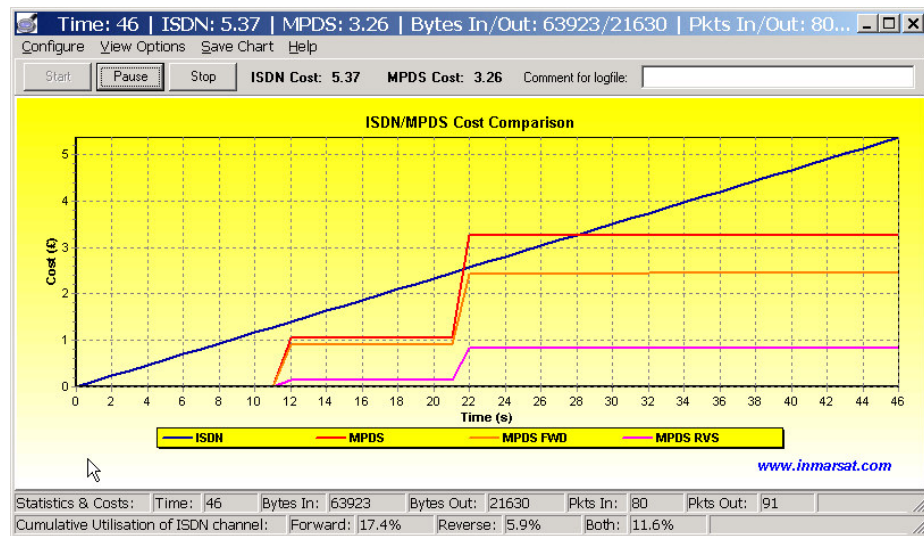
This menu option brings up the register window, which allows a serial number to be entered. This enables the application to run for more than 5 minutes at a time.

Using the Cost Comparison Tool

This chapter describes using the Cost Comparison Tool.

Main Screen

The main screen of the Cost Comparison Tool is shown below:



Other than the main menu options, the following items are accessible from the main screen:

Start Button

This button starts a monitoring session. This button can be simulated by pressing <CTRL> + F9.

Pause/Continue Button

This button pauses a monitoring session. Pressing it again restarts the session. This button can be simulated by pressing <CTRL> + F10.

Stop Button

This button stops a monitoring session. This button can be simulated by pressing <CTRL> + F11.

Comment for Logfile

Any text typed into this box will be saved to the log file when the stop button is pressed, as part of the log entry for that session. Thus, it enables a method of keeping track of the tests that you may be carrying out.

]

Miscellaneous Information

Log File Format

The Cost Comparison Tool records a log file. Each time the Stop button is pressed, a new line is written to this file.

Log files are stored in the configured output directory, which defaults to the directory where the Cost Comparison Tool binary is located. The log file is named 'cost.log'.

The lines are comma separated, with the following fields:

Field No.	Contains
1	Start Date (dd/ mm/ yy)
2	Start Time (hh:mm:ss)
3	Comment (from text box on main window)
4	Elapsed Time (secs)
5	Number of Bytes In
6	Number of Bytes Out
7	Number of Packets In
8	Number of Packets Out
9	Cost for ISDN Channel
10	Cost for MPDS Channel

Application Customisation

The Cost Comparison Tool is customised to use the Inmarsat Logo etc. It may be customised to use your own logo, at a small charge made by Inmarsat.

SNMP variables used

SNMP gives access to a vast amount of information. The Cost Comparison Tool only uses a small number of SNMP variables, and only reads them (never writes). SNMP information is stored in an information tree known as a Management Information Block (MIB).

The Cost Comparison Tool uses the following variables, under the tree levels:

.iso.org.dod.internet.mgmt.mib-2.interfaces

.ifNumber: The number of interfaces available

.iso.org.dod.internet.mgmt.mib-2.interfaces.ifTable.ifEntry

ifInOctets: The total number of octets received on the interface, including framing characters.

ifOutOctets: The total number of octets transmitted out of the interface, including framing characters.

ifInUcastPkts: The number of subnetwork-unicast packets delivered to a higher-layer protocol.

ifOutUcastPkts: The total number of packets that higher-level protocols requested be transmitted to a sub network unicast address, including those that were discarded or not sent.

Troubleshooting

This section details troubleshooting methods

Basic Troubleshooting

The Cost Comparison Tool is designed to be easy to use, and should not give any problems during operation. The most likely cause for problems is the installation and configuration of SNMP, or connecting to SNMP on another machine.

This manual cannot cover all SNMP problems. There is a very good website devoted to SNMP which is a good place to start when the methods used in this section fail.

<http://www.wtcs.org/snmp4tpc>

SNMP problems will all be due to the mis-installation or mis-configuration of SNMP on the machine that you are monitoring. Some common problems are detailed below:

SNMP Service

On NT and W2K, SNMP installs as a service. This service should be started on the machine you are configuring. If it is not started, check the event log, and determine a reason. Usually, it is because there is a file missing, or the service does not have a valid NT account to use. Some common dll files can be found on the Cost Comparison Tool distribution CD.

DLLs

Either the Cost Comparison Tool, or the SNMP service may complain that certain (SNMP) files are missing, or corrupt. Some of these files can be found on the Cost Comparison Tool distribution CD. Others can be found either on the Microsoft Windows installation CD, or the web site shown above.

SNMP security

Use of the 'public' SNMP community is normally allowed by other machines on the same network. However, it is possible to put access restrictions on SNMP communities, so that access is denied for your machine. In this case, either access must be given, or a special community set-up for the Cost Comparison Tool, to have read access to the required values (detailed in the previous chapter)

Network Issues

If you are attempting to monitor a remote machine, be sure that there is a network path between the two machines, by pinging one machine from the other. There may also be routers and firewalls between the two machines which block SNMP access.

SNMP Test Tool

There is a handy tool available that allows connection to an SNMP device. This can be used to determine problems, and check connectivity. This is called 'GetIf' and is available from the website mentioned above, as well as from the Imhotek website (www.imhotek.com).

Known Issues

Windows 2000 does not maintain static SNMP information for interfaces when they are not connected (e.g. dial-up connections). Thus, it is not possible for the Cost Comparison Tool to detect these interfaces whilst disconnected. However, it will detect them when connected and retain the settings.

When an interface is disconnected during monitoring the tool will effectively pause monitoring until the interface is reconnected. This is because Windows 2000 removes the SNMP information for the interface. Once the interface is reconnected, the SNMP information is restored. ***However, the SNMP information is not restored to the same state as the previous connection, so strange results may appear on the graphs.***

It is advisable to stop and restart monitoring when the interface is reconnected