

BusinessCom Traffic Engineering Server Platform

Ver. 2.1.0 User Guide

Copyright © 2006-2009, BusinessCom Networks, Ltd. All rights reserved. This guide may not be reproduced, in part or in whole, without the permission of BusinessCom Networks, Ltd.

The specifications and information regarding the products in this guide are subject to change without notice. All statements, information, and recommendations in this guide are believed to be accurate, but are presented without warranty of any kind, express, or implied. Users must take full responsibility for their application of any products.

Trademarks, brand names and products mentioned in this manual are the property of their respective owners. All such references are used strictly in an editorial fashion with no intent to convey any affiliation with the name or the product's rightful owner.

User Guide Revision 29 January 2009 2:55 PM

1 ABOUT THIS MANUAL	4
1.1 Required equipment and software	4
2 INTRODUCTION	6
2.1 Basic information.....	6
3 TES PLATFORM INSTALLATION.....	7
4 USING TES PLATFORM.....	9
4.1 Access to Administration/Configuration Panels.....	9
4.2 Web Administration Panel	11
4.2.1 System controls	11
4.2.2 Network Setup	12
4.2.3 Firewall Setup.....	17
4.2.4 Administration Panels User Management	19
4.2.5 Date and Time Setup.....	20
4.2.6 Network Interfaces Monitoring, Hardware and Miscellaneous Statistics	21
4.2.7 General Statistics.....	23
4.3 Terminal Access Panel.....	24
5 TES APPLICATION PACKAGE.....	27
6 INDEX	32

1 ABOUT THIS MANUAL

This user guide is intended for network administrators or field engineers deploying BusinessCom Traffic Engineering Server Platform; as well as any other personnel involved into the installation, operation or monitoring your networks running BusinessCom TES Platform.

Some basic knowledge of TCP/IP concepts, operating systems and networking is expected.

Background experience administrating Linux, BSD or similar UNIX based operating systems is recommended for advanced configuration tasks and custom tailored modifications, although is not required to employ all of the TES Platform features documented in the current user guide.

1.1 Required equipment and software

You will need the following equipment and software to successfully deploy the BusinessCom TES Platform into the network:

- A laptop (or PC) with web browser software installed and connected to Internet. We recommend having the firewall switched off to make sure you have the complete unblocked networking functionality.
- One blank CD disk.
- Hardware server (for TES Platform software) that meets the following requirements:
 - Architecture: x86
 - Processor (CPU): 1.5 GHz
 - Memory (RAM): 512 MB
 - Hard Drive (HDD): 80 GB
 - Network Adapter: two 10/100 Ethernet NICs (RJ-45)
 - Display Adapter: any
 - Optical Drive: CD (DVD or any other CD compatible)
 - Other Components: monitor and keyboard (required only during the installation)
- Two Ethernet LAN cables – straight or cross-over depending on your network topology, having both types in advance of the installation is desired.
- A single computer or a LAN with multiple computers to perform final routing and performance tests during the configuration stage.

A quick 10-minute installation workflow can be outlined in the following steps:

- Download TES Platform CD image from BusinessCom website www.bctes.com.
- Burn downloaded image to a blank CD and boot hardware server with it (section 3)
- Install TES Platform software (section 3)
- Connect your local network and Internet access gateway to TES Platform
- Establish a web browser connection with TES (section 4.)
- Configure TES Platform network interfaces (section 4.2.2)
- Re-initialize the TES (section 4.2.1)
- Do basic routing tests, setup additional TES features (rest of manual)

Upon completing these vital installation/configuration steps you may want to upgrade TES Platform functionality by installing TES Application Package which includes QoS, Bandwidth Management, L7 filter and other features. See section 5 and TES Application Package User's Guide for this.

2 INTRODUCTION

2.1 Basic information

BusinessCom TES Platform provides basic tools to monitor and manage traffic passing between a local network (LAN) and Internet. TES Platform is a basis for proprietary TES Application Package (TES AP) which incorporates advanced traffic engineering toolset for building an efficient Internet Service Provider or Enterprise network with exceptional performance and security.

The main goal of deploying TES Platform with TES AP is to achieve the best network performance, reliability and security by highly efficient Internet backbone resources utilization, malicious traffic filtering and effective bandwidth management implementation like Quality of Service as well as accurate and reliable traffic shaping.

TES Platform comes with Open Source Linux operating system and is convenient to be deployed into any Ethernet network environment.

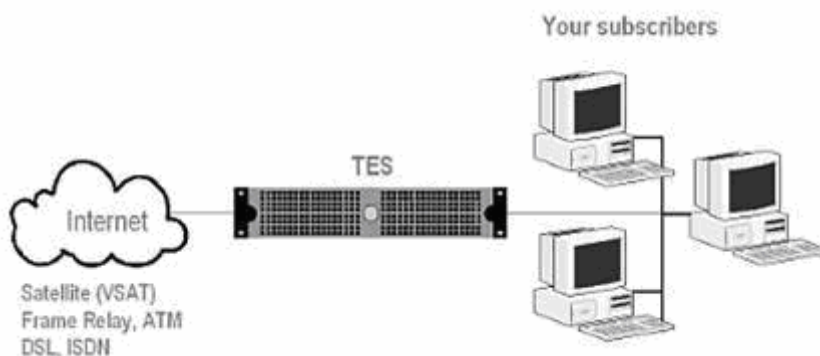


Figure - 1 An example of network running TES Platform

In the above example, the TES Platform is connected to Internet backbone and to the network with the subscribers' base or the end users. Herewith, TES Platform is used as a router and performs complete Network Address Translation (NAT) for the subscriber base network.

There are alternative TES Platform deployment scenarios available, such as VoIP PBX server, Web/FTP server etc. which can be designed upon request with BusinessCom. This particular user guide covers all the installation aspects involved with deploying TES Platform into a local network.

3 TES PLATFORM INSTALLATION

For installing TES Platform on hardware server which meets requirements in section 1.1 please follow instructions below:

- Download the latest ISO image from www.bctes.com and make sure it was downloaded successfully. You may use any web download manager available like FlashGet, ReGet, Download Accelerator Plus, wget etc.
- Burn downloaded ISO file onto a blank CD. ISO file contains entire contents of a CD and should be burnt using special burning software like Nero Burning ROM, Easy CD Creator, Magic ISO etc.



NOTE: It is not enough simply to drag and drop an ISO file on your CD icon to create a bootable CD. In order to create a bootable CD from your ISO image, you must be sure you specify that you are burning an ISO/disk image. Consult with the documentation or help for your CD burning software for further instructions.

- Connect monitor and keyboard to your hardware server.
- Boot the server with a CD prepared before. In order to do it restart server and press keyboard key you are told is needed to enter BIOS Setup. In the Boot section you should adjust the settings like Boot Order, Boot Device Priority or possibly some other section. Make sure that your CD drive is set to be your first boot device, save BIOS settings and restart computer to boot from bootable CD.



NOTE: Booting from a CD is a simple operation of starting up your computer with the bootable CD inserted. Do not forget to return back BIOS settings when installation is finished.

- Follow instructions on the screen to start the installation (see Figure 1a).

```
This is BusinessCom TES Platform 2.1.0 Installation CD [2009-16-01 14:42:59].
For more details please visit www.bctes.com and/or www.bcsatellite.net.

*****
* NOTE: THIS INSTALLATION WILL ERASE ALL DATA ON YOUR MASTER HARD DRIVE *
*****
***** PLEASE MAKE SURE YOU HAVE FRESH BACKUP *****
*****
***** IF YOU ARE READY - PRESS RETURN *****
*****

In order to set up HDD layout manually type 'no_autopart' and press return.
boot? _
```

Figure 1a – TES Platform installation prompt



NOTE: After starting this step all the data on the server will be lost. Do not forget to back it up before pressing Enter.

- When installation is finished (see Figure 1b), remove CD and restart server by pressing return.

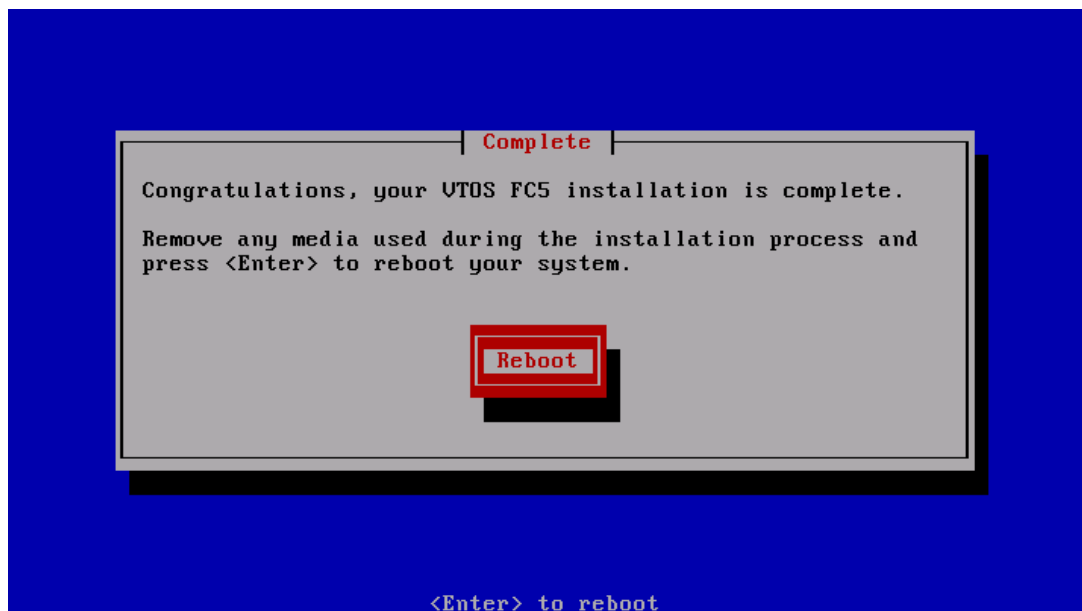


Figure 1b – TES operating system (VTOS OS) is finished

Just after server reboots and there is Linux (VTOS FC5) login prompt on the screen (see Figure 1c), TES Platform is ready for being configured (section 4).

```
BusinessCom Platform 2.1.0  
Kernel 2.6.15-1.2054_FC5.TES  
tes210platform login: _
```

Figure 1c – VTOS FC5 Linux login prompt

4 USING TES PLATFORM

4.1 Access to Administration/Configuration Panels

In order to configure TES Platform software, you will first have to gain access to its configuration panels. TES Platform supports two ways to be managed through:

- **Web Administration Panel (HTML GUI)** for main configuring purposes using Internet browser.
- **Terminal Access Panel** for basic configuration of TES Platform when HTML GUI is not available or for accessing features which are available only through Terminal Access Panel (e.g. real time network interfaces statistics).

We suggest using **HTML GUI** as it is the most intuitive way to get started. It is meant to be used via mostly any web browser including Mozilla Firefox, Opera and others. Every component and routine of TES Platform and TES AP (if installed) can be configured and controlled through web administration panel.

The TES Platform software comes pre-configured with LAN and WAN network interface cards (NIC) assigned Internet Protocol (IP) addresses: 192.168.1.1/ 255.255.255.0 and 192.168.0.1/255.255.255.0 respectively. In order to access web based administration panel it is necessary to connect your PC or laptop via Ethernet cable (e.g. UTP CAT5) to the server with TES Platform with the subnet set as 192.168.1.0/255.255.255.0 (or 192.168.0.0/255.255.255.0) and point your browser to the following URL: <https://192.168.0.1:2244> (or <https://192.168.1.1:2244>)

An example of physical connection is Figure 2 with a cross-over Ethernet cable assumed between the 192.168.1.2 and 192.168.1.1.

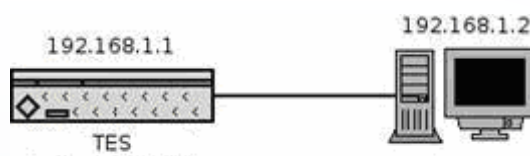


Figure 2 – The easiest way to access HTML GUI of TES Platform

After TES Platform and the computer are in the same network (e.g. 192.168.1.0/255.255.255.0), use your web browser to access HTML GUI as it is depicted at Figure 3. If your web browser shows Secure Connection Error (see Figure 3a) you can add security exception by pressing “add an exception” link or other depending on web browser you are using.



NOTE: In order to get your PC to the TES Platform default subnet 192.168.1.0/24, set up it's IP address to any IP inside the range of 192.168.1.2 to 192.168.0.254 (for example: '192.168.1.2') with the netmask set to '255.255.255.0'.

Terminal Access Panel can be used to set up TES Platform without connecting it to your network as well as via Secure Shell (SSH) protocol (see section 4.3). To use terminal access panel, connect standard VGA compatible monitor and keyboard to the corresponding connectors on the bottom panel of the server. After the monitor and the keyboard are connected and turned on, you will see the login prompt of VTOS FC5 Linux (see Figure 1c).



NOTE: You can find login and password for accessing both administration panels at www.bctes.com.

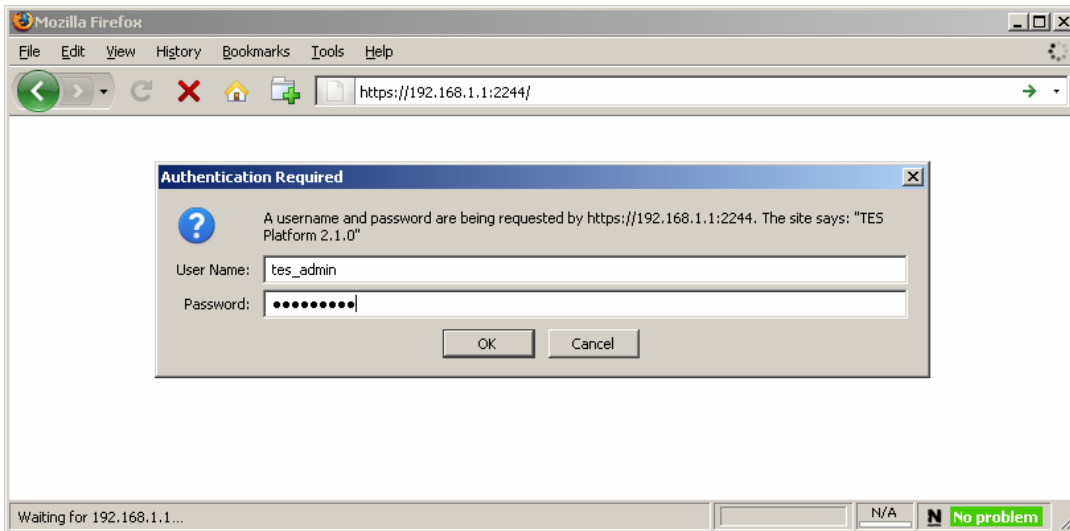


Figure 3 - Access to web administration panel

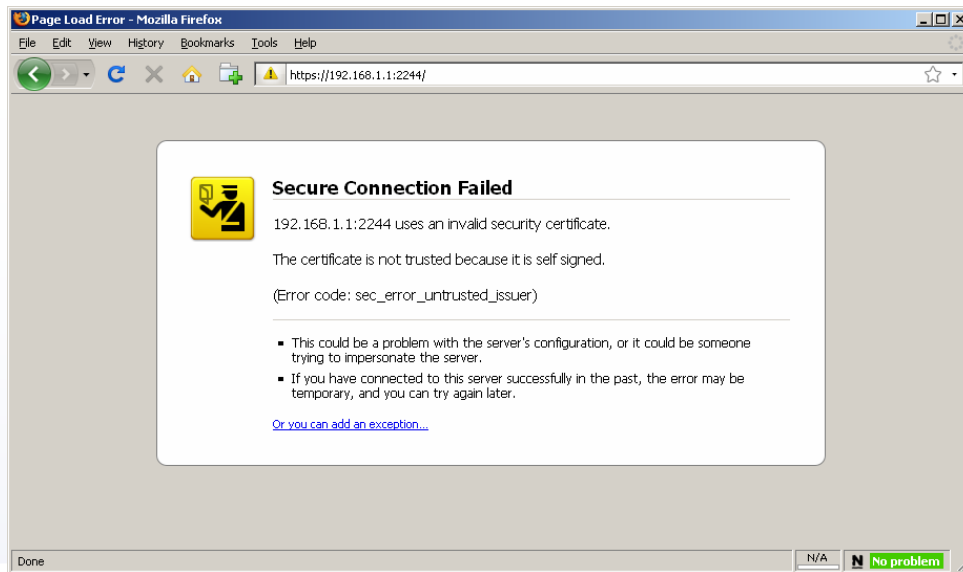


Figure 3a – Secure Connection Error

4.2 Web Administration Panel

Next paragraphs describe all the menus and settings accessible via the web administration panel. We suggest you browse through each of the menus to get familiar with the TES concepts and to create the first configuration of your TES Platform.

4.2.1 System controls

System controls page of TES Platform web administration panel is suggested to perform basic low level operations like re-initialization, rebooting and shutting down (see Figure 5).

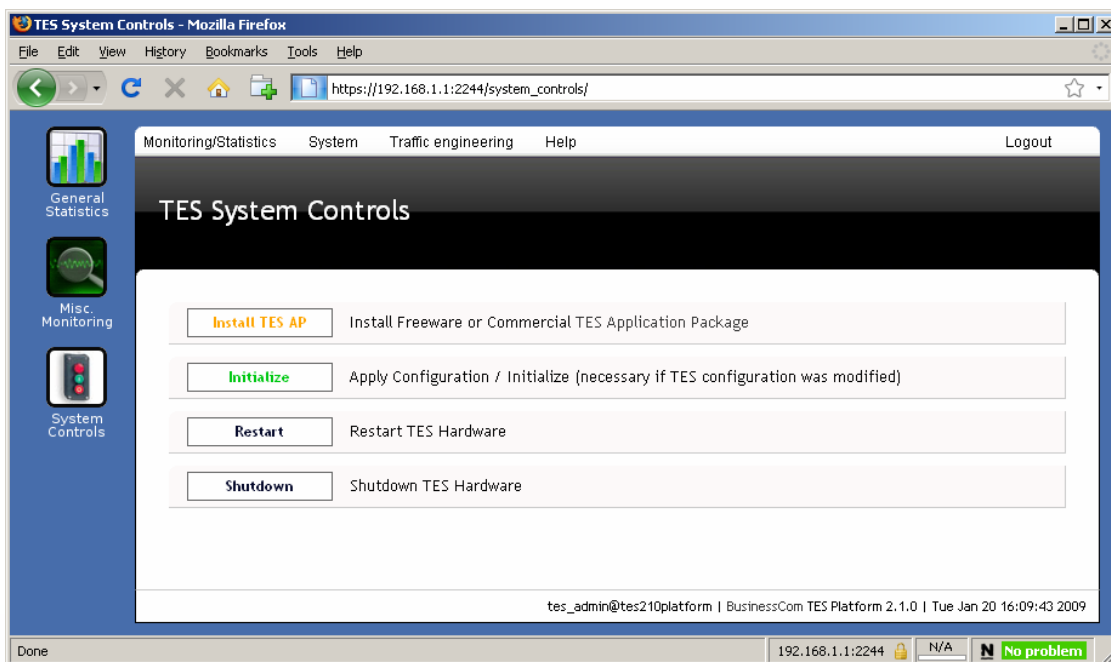


Figure 5 - TES system controls page



NOTE: After making any changes to TES Platform's and/or TES AP's (if installed) configuration it is required to **initialize** TES so the new settings take effect. Usually initialization takes approximately 1 minute but this can vary because of different conditions like current workload and network topology.

Install TES AP button is used for Freeware or Commercial TES Application Package (see section 5).

Restart and **Shutdown** are used to perform hardware reboot of TES Platform and to turn off TES completely when it is required.

4.2.2 Network Setup

After you have first gained access to TES Platform, it is recommended to setup your NICs so they correspond to your LAN and Internet access gateway settings. In order to get this done, click on the main menu and choose “Network Configuration” of the “System” menu as it's shown at Figure 6.

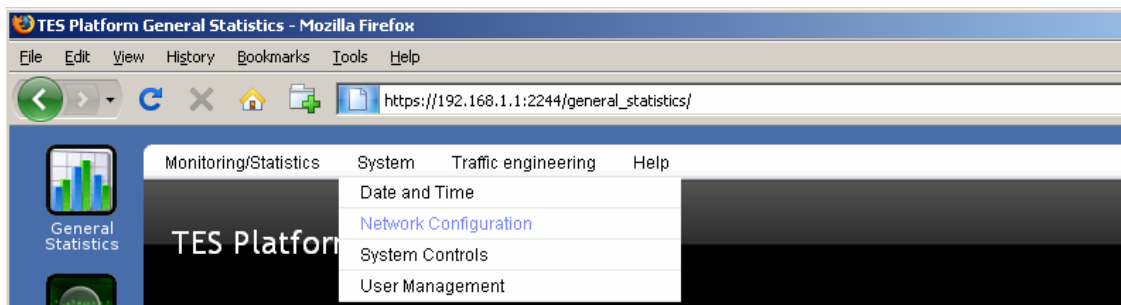


Figure 6 - “Network Configuration” at the top menu



NOTE: Internal Network Interface (LAN NIC) represents the TES Platform network card interfacing your local network; while **External Network Interface (WAN NIC)** represents the network card interfacing your Internet access gateway – for example your satellite modem or the WAN router.

Once you get into the network configuration page (Figure 7), please check each setting to make sure both cards are configured properly. A walk through network settings fields is below.

1. **Interface name** of external interface (**WAN NIC**) is a unique interface name of the NIC which is connected to the Internet backbone. Usually interface name of external NIC is set to 'eth0'. You may want to swap LAN and WAN NICs but usually this is not required and we recommend leaving the NICs layout as it comes by default.

2. External NIC **IP address** by syntax: '<ip address>/<netmask>'.

Netmask can be specified in CIDR notation (e.g. '/24') or in dot notation (e.g. '255.255.255.0'). For example: '110.13.89.14/255.255.255.0' or '110.13.89.14/24'.

TES Platform supports multiple IP addresses to be assigned to each NIC by setting up field “IP address” in the following syntax:

'<ip address 1>/<netmask 1> <ip address 2>/<netmask 2> <ip address 3>/<netmask 3> ...'

For example: after setting up the IP address of WAN NIC to
'110.13.89.14/24 110.13.89.15/24 110.13.89.16/24'

this particular NIC will have three IP addresses bound at the same time.

3. **Gateway** for Internet connection by syntax: '<ip address>'. Example: '110.13.89.1'. Gateway should be set to the IP address of a device (satellite modem, WAN router, etc) which is specified to provide

an Internet connection to your local network.

4. **Interface name** of internal NIC (**LAN NIC**) is unique hardware name of the NIC which is connected to your local network. Usually interface name of internal NIC is set to 'eth1'.

5. Internal NIC (LAN NIC) **IP address** is given by the same syntax as IP address of WAN NIC: '<ip address>/<netmask>' (e.g. '192.168.0.1/24 192.168.1.1/24'), as well as it can also accept multiple IP assignments similar to the WAN NIC.

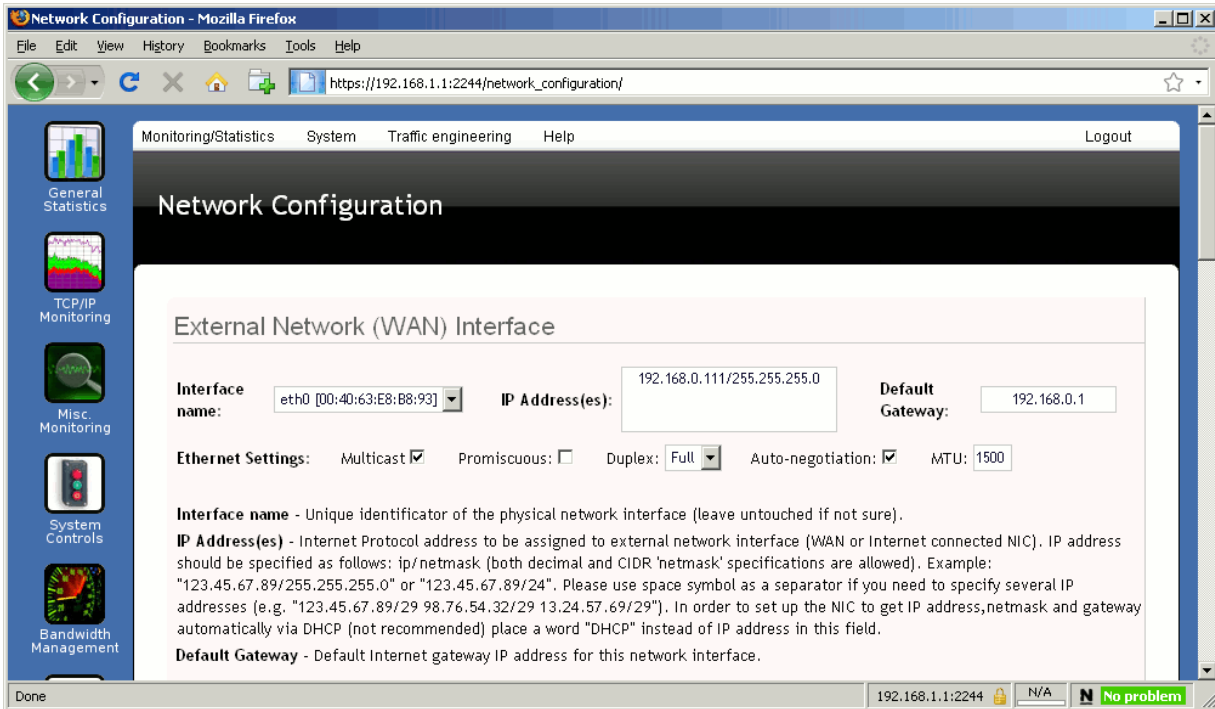


Figure 7 - Network configuration page

6. **Ethernet Settings** options allow to set up various Ethernet specific flags to LAN and WAN interfaces including MULTICAST, PROMISCUOUS and AUTO-NEGOTIATION flags, DUPLEX mode as well as MTU value (it is recommended to keep "1500" as an MTU value).

7. **DNS servers** list should contain DNS server's IP address(s) that will be used by TES to resolve domain names into IP addresses. Syntax: '<ip1> <ip2> ...' e.g. '4.2.2.4 10.12.34.12'.



NOTE: If your WAN router supports DNS caching, you may want to include its IP address in the DNS server list. Some satellite modems, particularly iDirect Infiniti™ series support this DNS caching feature.

8. **Static Routes.** In order to add, remove or modify static route(s) use sub-section named "Static Routes Setup" in Network Configuration section of HTML GUI (see Figure 7a). For example, to add the rule forwarding traffic destined to 172.16.137.0/255.255.255.0 via 192.168.1.20 host fill in the following fields:

Interface: 'eth1' (out interface hardware name – may be WAN or LAN NIC)
 Network: 172.16.137.0
 Netmask: 255.255.255.0
 Gateway: 192.168.1.20 (next hop IP address)

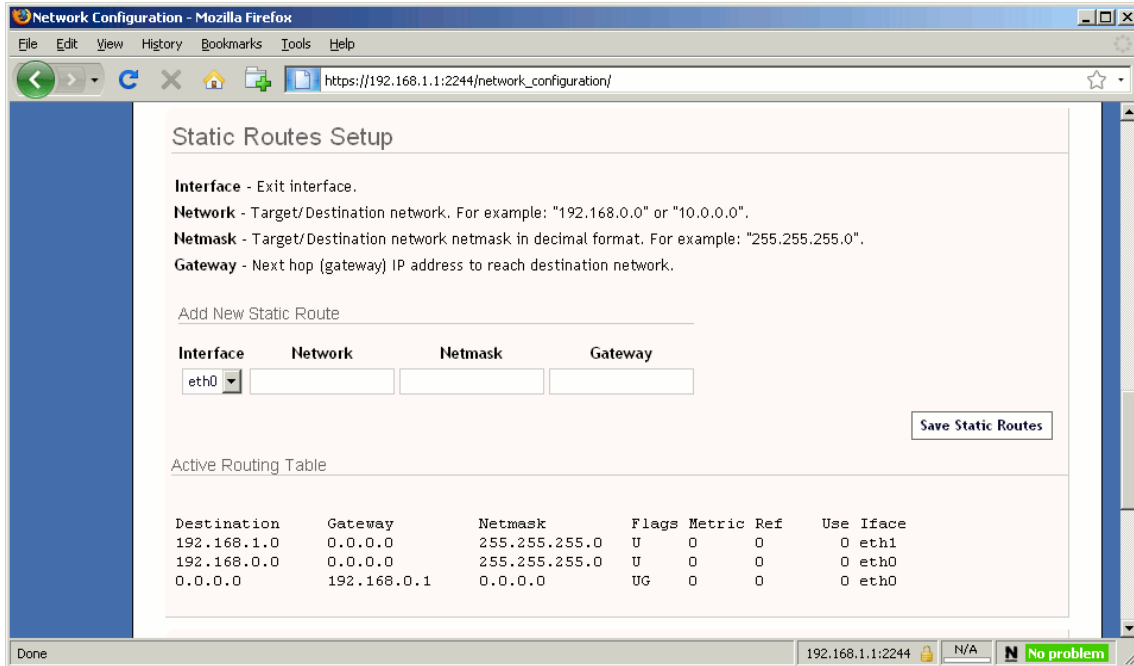


Figure 7a – Static Routes Setup section

9. **NAT** feature allows enabling, disabling and configuring static **Network Address Translation**. By default NAT is enabled with **Automatic Configuration** which implies TES Platform masquerades private IP addresses in LAN with IP address assigned first to WAN interface. You may want to disable NAT or configure it according to your networking needs using TES Platform's advanced NAT configuration (see Figures 7b and 7c).

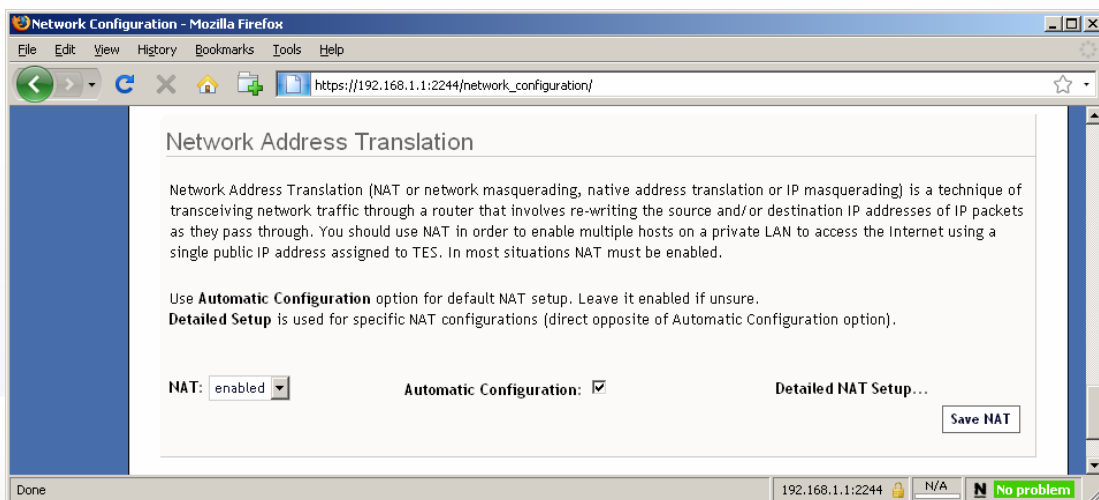


Figure 7b – NAT setup section

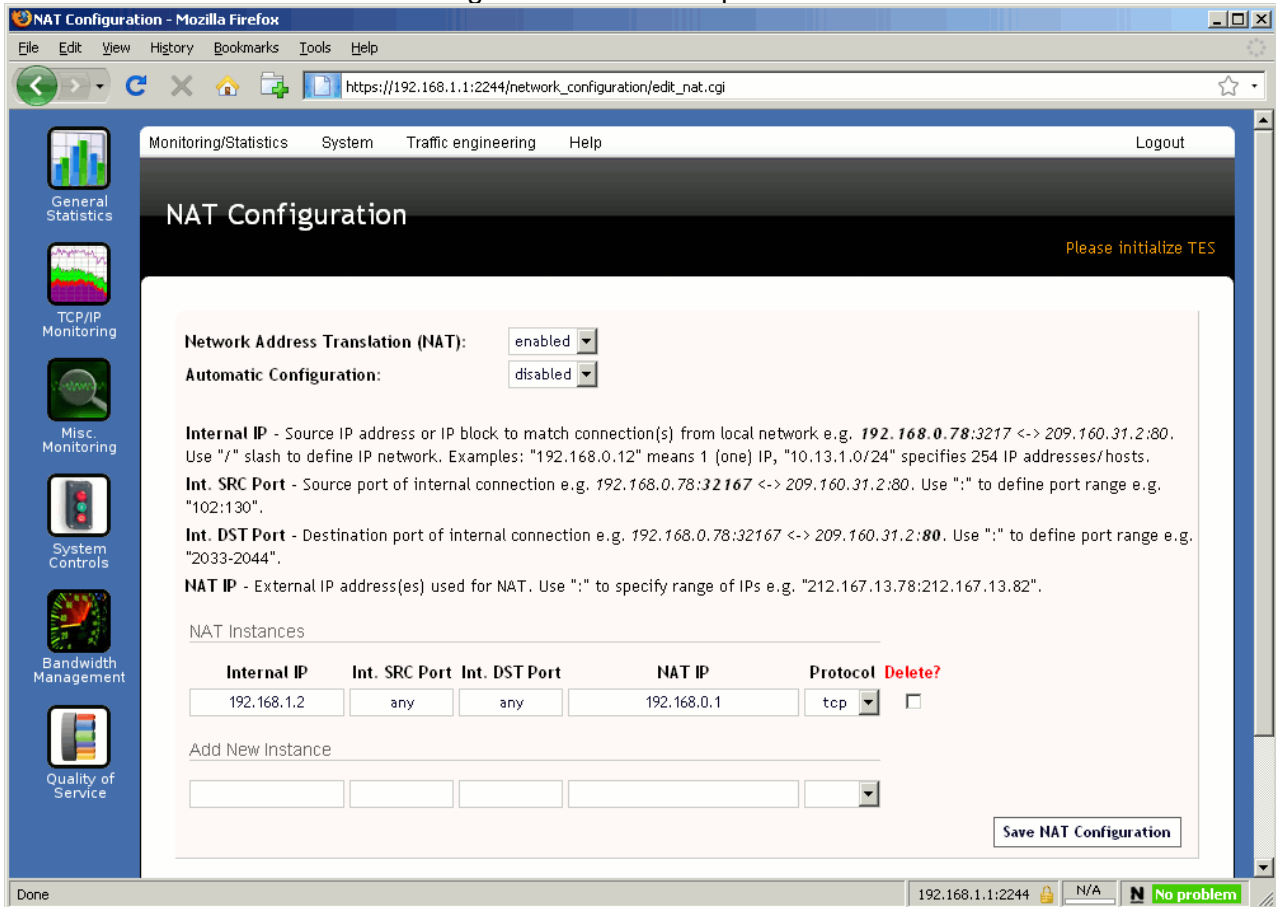


Figure 7c – Advanced NAT configuration

Figure 8 below demonstrates an example of deploying TES Platform into a simple network with 'Netmodem' device being a modem providing Internet access and two local subnets with subscribers requiring Internet access. In order to deploy TES into such a network, it is required to set up its NICs in the following way (all IPs in example are assumed and may be different in real configuration):

WAN NIC Interface name: 'eth0';
 WAN NIC IP address: '212.90.121.14/29';
 Gateway: '212.90.121.13';

LAN NIC Interface name: 'eth1';
 WAN NIC IP address: '192.168.1.1/24 192.168.0.1/24';
 DNS servers list: '212.90.121.13'.
 NAT: 'enabled'.
 NAT Automatic Configuration: 'enabled'.

To provide Internet access routing for subscribers in the 192.168.1.0/24 network, set up subscriber computers with the following settings:

IP address: one from range '192.168.1.2' - '192.168.1.254';
Netmask: '255.255.255.0';
Gateway: '192.168.1.1';
DNS entry: '192.168.1.1'.

Example subscriber computer configurations to provide Internet access routing for the 192.168.0.0/24:

IP address: one from range '192.168.0.2' - '192.168.0.254';
Netmask: '255.255.255.0';
Gateway: '191.168.0.1';
DNS entry: '192.168.0.1'.

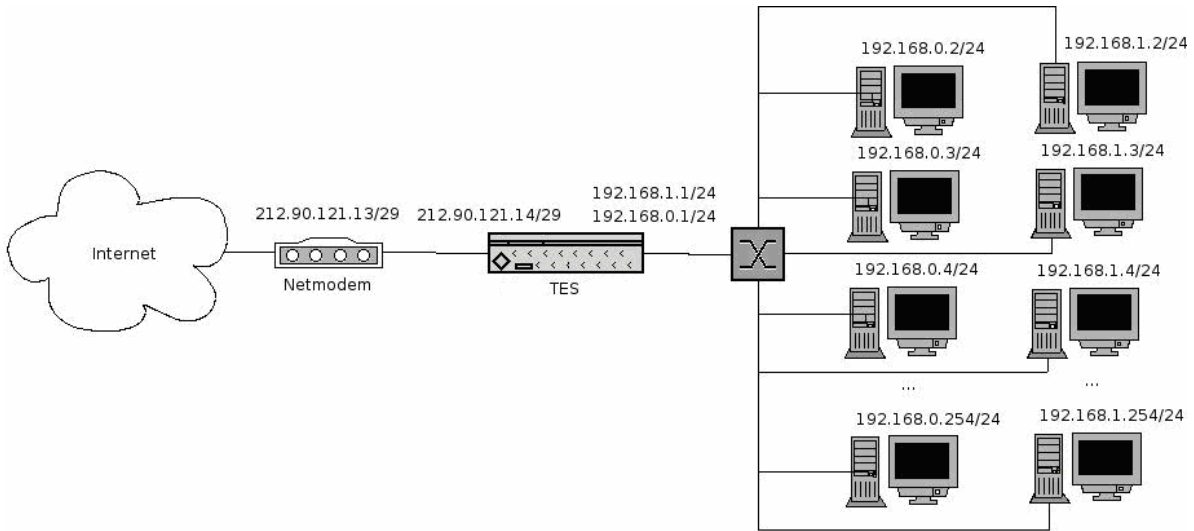


Figure 8 - Sample network running TES

4.2.3 Firewall Setup

TES Platform provides semiautomatic firewall that restricts network connections to increase security and integrity of the network infrastructure. You can permit or block specific connections on the Internet interface (WAN) or local interface (LAN) by specifying them in firewall rules list (see Figure 9 and 9a).

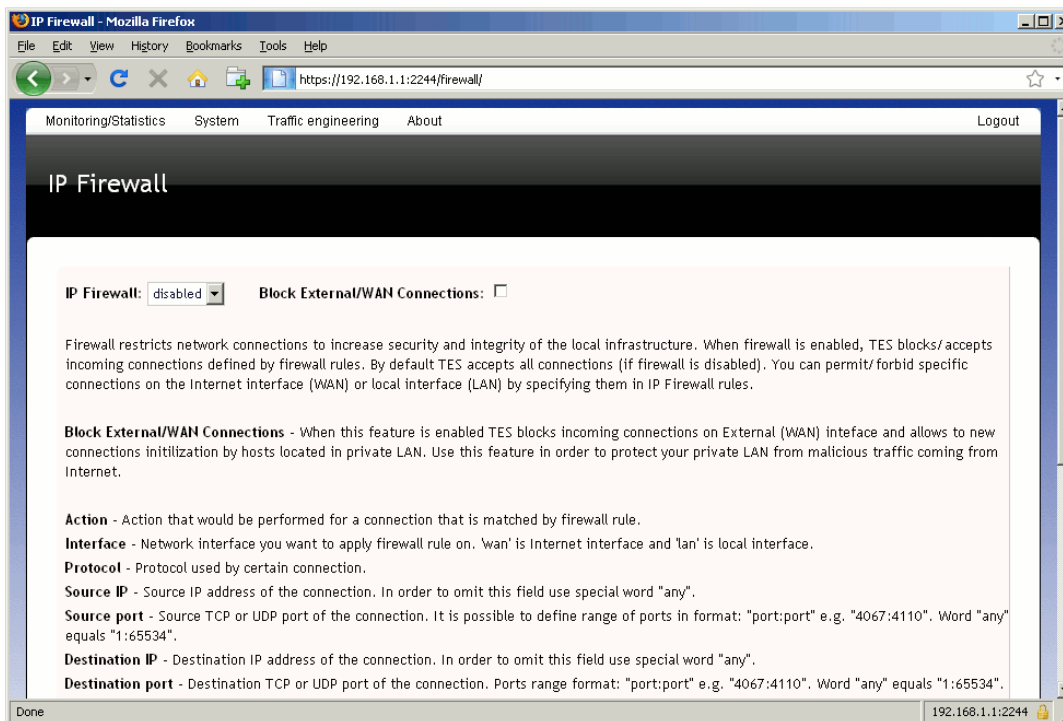


Figure 9 – Firewall configuration page

In order to permit or forbid certain kind of inbound connections you can specify them by filling the following setting fields in “Add Firewall Rule” sub-section (see Figure 9a):

Action field specifies how IP firewall should handle matched connection – permit or forbid.

Interface field is used to specify what kind of connection is to be permitted/forbidden: traffic coming from the Internet or from the network(s) where subscribers are located at.

Protocol specifies OSI layer 4 protocol used by network connection to be permitted (TCP or UDP).

Source IP, Source Port, Destination IP, Destination Port fields are to be filled with the corresponding IP and port values or with the value 'any'.

To delete certain connection definition use “Delete” check box (see Figure 16a). Please be careful in order not to lost connection to web based administration panel (it's recommended that port 2244 should be opened at LAN NIC constantly).

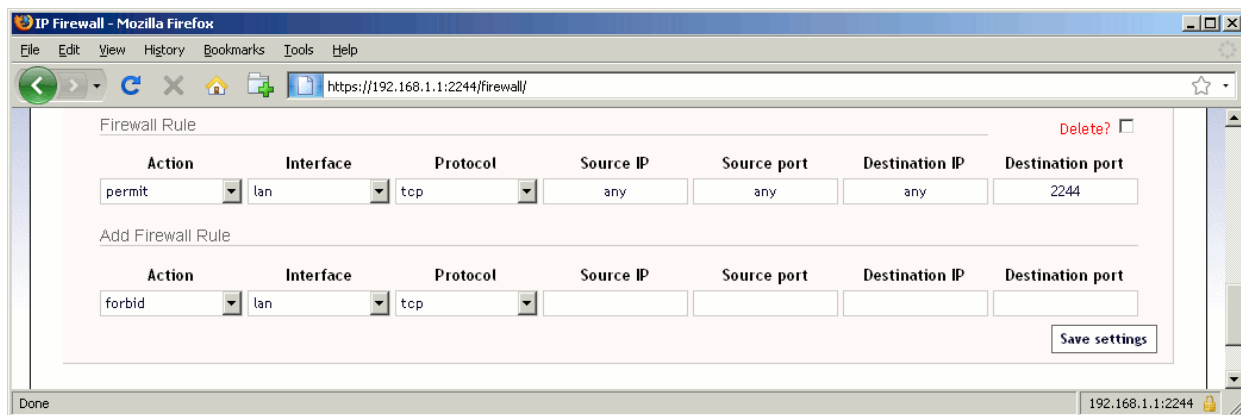


Figure 9a – Part of IP Firewall configuration page

Another recommended TES Firewall feature is **Block external/WAN Connections** one. When it is enabled TES blocks all incoming connections coming from WAN except those which are specified as permitted in IP Firewall rules list or associated with existing sessions initialized by LAN users.

This feature makes it possible to easily configure secure IP Firewall keeping LAN safe from outside attacks.

4.2.4 Administration Panels User Management

Access to HTML GUI and Terminal Access Panel is restricted by login and password that user should type to get access. In order to provide access for some TES operators/administrators, forbid for others or change passwords use “User management” page of web administration panel (see Figure 10).

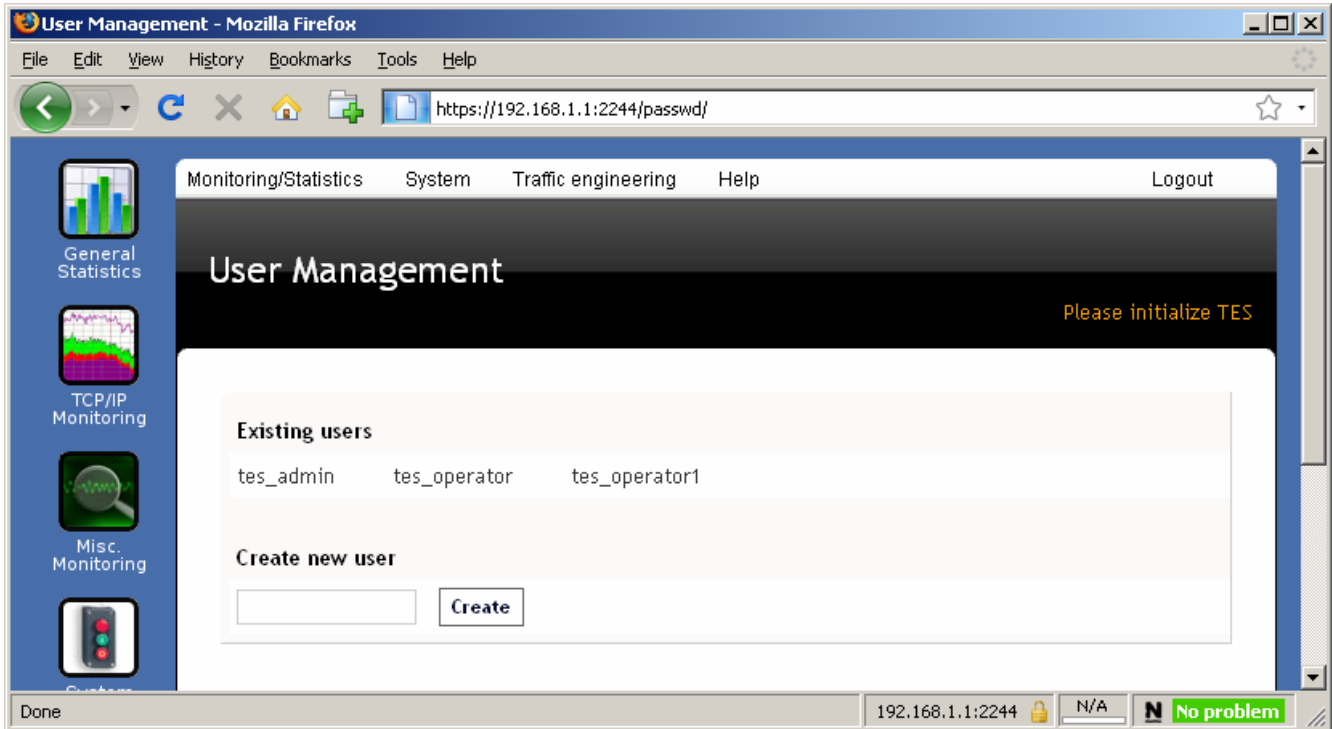


Figure 10 – User management administration page

User Management main page shows existing user accounts which are allowed to access TES Platform administration panels.

Figure 10 displays three existing users 'tes_operator' and 'tes_operator_2'. In this example to set up or change password for existing user or delete user account you can click at the link which is named as 'tes_operator' or 'tes_operator_2' and perform corresponding operations.

To create new user account type desirable name to field “Create new user” and press “Create”. After this is done new account will be created but it won't be allowed to access administration panels until the password is set up for it.



NOTE: Every created username will have prefix “tes_” so to create user with name 'tes_operator_1' it necessary to type 'operator_1' into field “Create new user”.

4.2.5 Date and Time Setup

In order to set up date and time of TES Platform choose “Date and Time” item at the top menu of web administration panel (Figure 11).

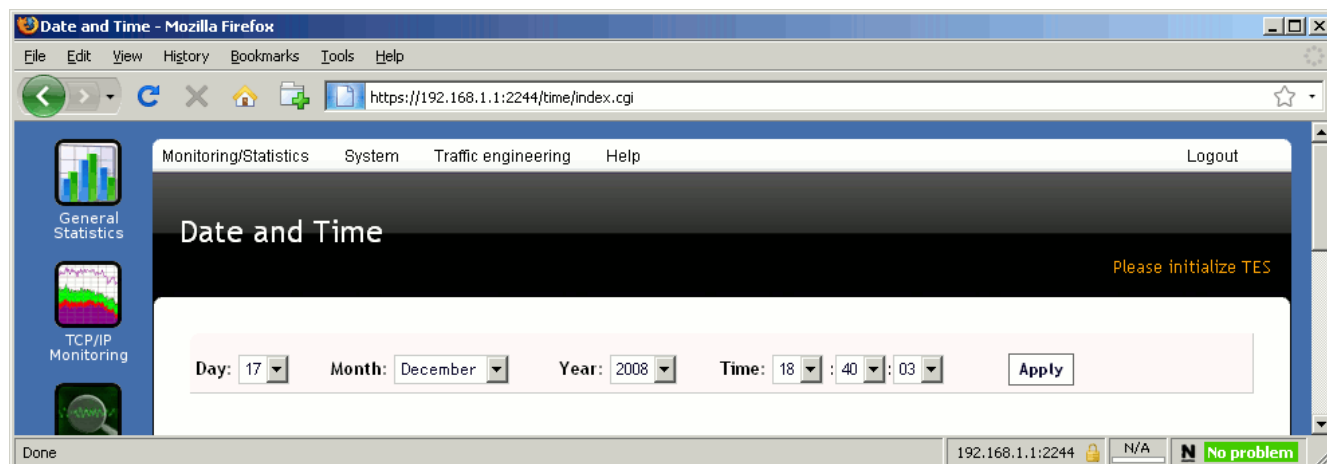


Figure 11 – “Date and Time” configuration page



It's crucial you set up the correct date and time during the very first configuration setting to make sure that traffic reports are generated with a correct data.

4.2.6 Network Interfaces Monitoring, Hardware and Miscellaneous Statistics

TES Platform provides tools for hardware monitoring including network interfaces throughput and errors monitoring, system load average, memory monitoring and others.

To get networking interfaces monitoring information choose “Network interfaces monitoring” at the main menu of TES web administration panel (see Figure 12a). In order to start hardware monitoring select “Hardware monitoring” at the top menu (see Figure 12), to get information regarding TES Platform uptime, network connections and other data select “Miscellaneous monitoring” (see Figure 12b).

To change time period of provided graphs select link which corresponds to desirable time period at the bottom of every graph.

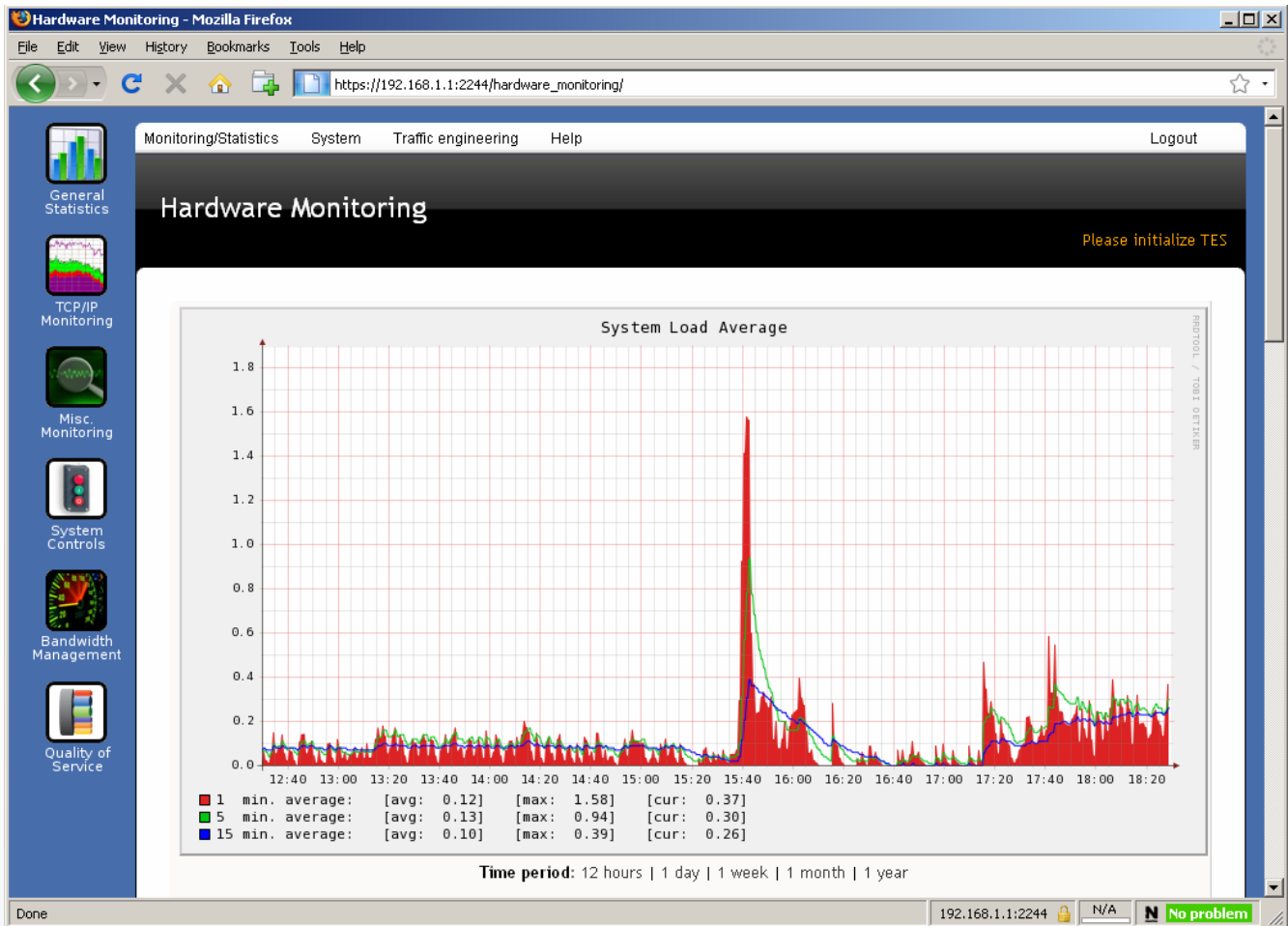


Figure 12 – Hardware monitoring



Figure 12a – Part of “Hardware Monitoring” page of HTML GUI

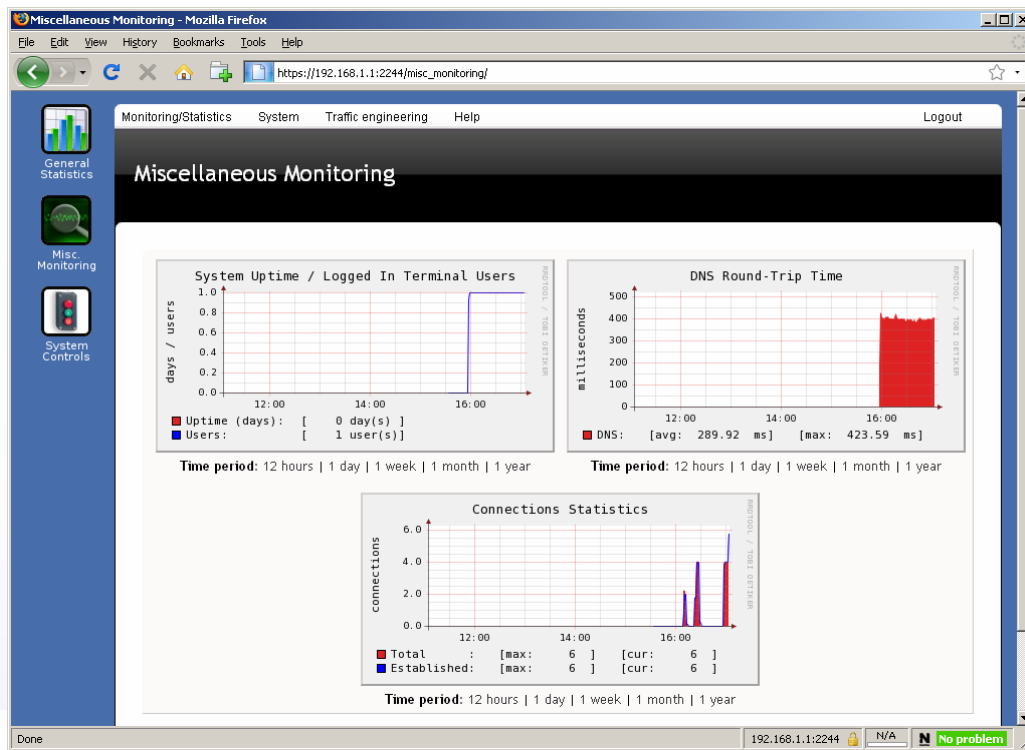


Figure 12b – “Miscellaneous Monitoring” page

4.2.7 General Statistics

TES Platform comes with General Statistics page allowing to get cumulative information about TES health status, TES Application Package version information (if installed) etc. Figure 13 shows a screenshot of the sample general statistics page.

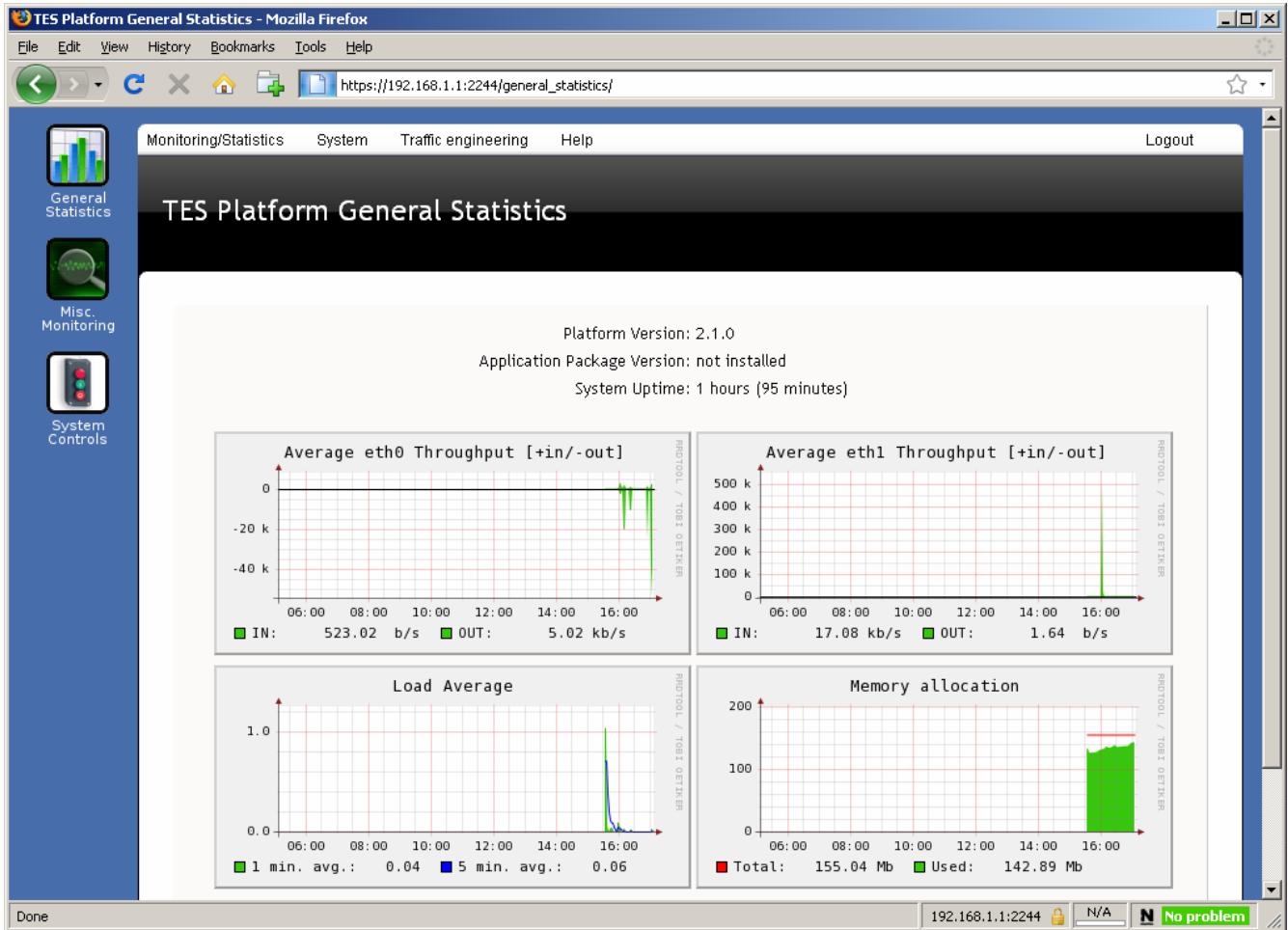


Figure 13 – General Statistics Page

4.3 Terminal Access Panel

Terminal access administration panel (TES Platform Terminal Shell) is meant to be used when Web based Administration panel is unavailable. To access Terminal Shell of TES Platform connect standard monitor and keyboard to corresponding slots of server's back panel. After monitor is turned on press any key to see Linux VTOS FC5 login prompt (see Figure 1c).



Another way to manage TES Platform via Terminal Access Panel is to get connected via Secure Shell (ssh) protocol. You can use any SSH client software like Putty, SecureCRT, OpenSSH. To access Terminal Shell via SSH please use IP address assigned to one of TES Platform's NICs (e.g, '192.168.0.1') as SSH server and port '2233'.

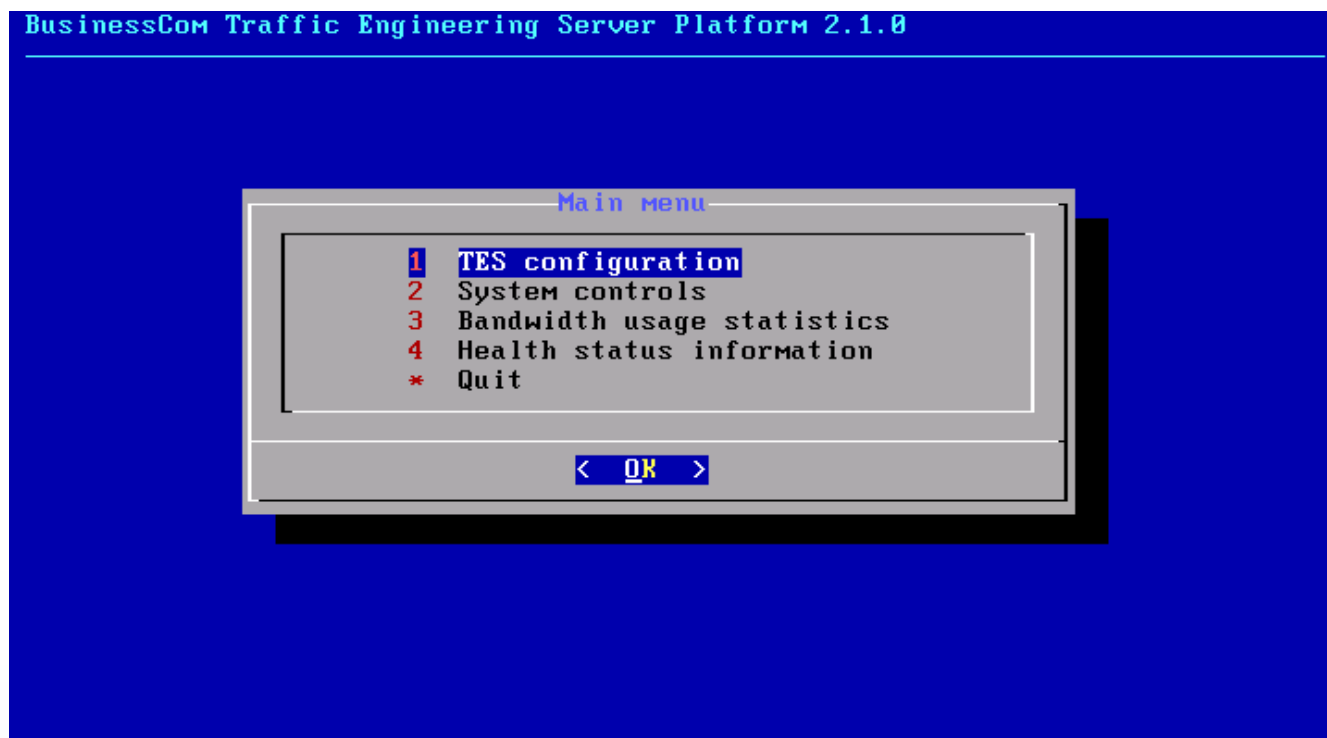


Figure 14 – Terminal access panel main menu



Figure 14 displays main menu of Terminal access administration panel. To move between items of main menu and other dialogs of Terminal Shell use 'Up', 'Down' as well as 'Tab' keyboard buttons, to select any element use 'Enter'.

“TES Configuration” menu item allows changing TES Platform's settings like network and Firewall settings. (Figure 15). Configuration of TES Platform's components via Terminal Shell is similar to configuring them through Web administration panel.

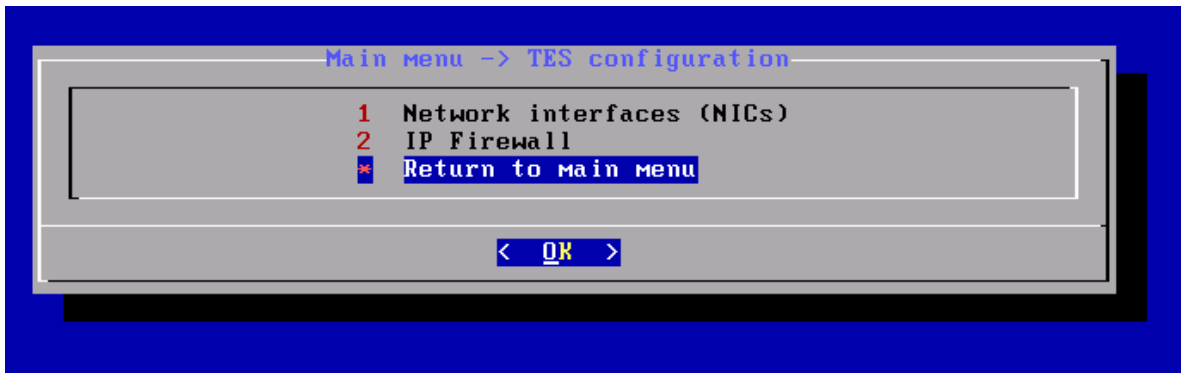


Figure 15 – “TES Configuration” menu of Terminal Shell

Item “System controls” of Terminal Shell main menu is meant to perform basic operations like TES re-initialization, reboot and shutdown (see Figure 16).

The next item of Terminal Shell main menu is “Bandwidth usage statistics” which displays real-time bandwidth usage by network subscribers (Figure 17).



It is possible to watch bandwidth usage statistics by both network interfaces of TES Platform in order to get as more information regarding Internet resource consumption as possible (Figure 18 shows bandwidth usage statistics by network interface connected to Internet).



Figure 16 - “System control” menu of Terminal Shell

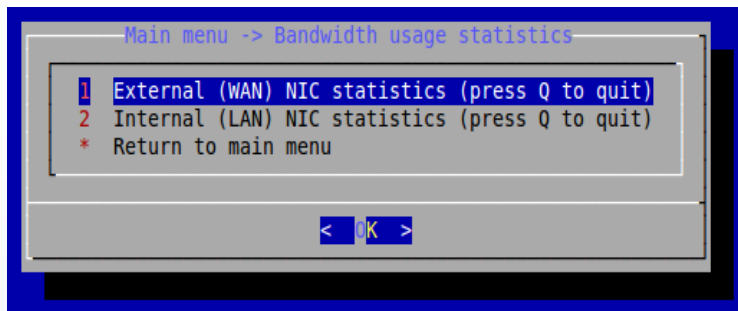


Figure 17 - “Bandwidth usage statistics” menu item

Menu item of Terminal Shell “Health status information” provides information regarding loading of TES, hardware health statistics and other useful data.

Display paused	25.0Kb	50.0Kb	75.0Kb	100Kb	125Kb			
:57587	<=>	209.143.137.70:80	0b	24.9Kb	6.22Kb			
:47770	<=>	84.53.138.64:80	0b	24.0Kb	6.00Kb			
:40901	<=>	213.42.24.46:80	87.6Kb	17.5Kb	4.38Kb			
:35656	<=>	66.36.238.199:80	63.2Kb	15.3Kb	3.82Kb			
:49510	<=>	213.42.24.46:80	0b	15.0Kb	3.76Kb			
:38239	<=>	213.42.24.46:80	0b	14.4Kb	3.61Kb			
:59019	<=>	213.42.24.46:80	0b	6.72Kb	1.68Kb			
:58157	<=>	213.42.24.46:80	2.33Kb	3.44Kb	880b			
:37012	<=>	216.73.86.152:80	0b	1.98Kb	506b			
:54823	<=>	216.73.86.152:80	0b	1.97Kb	504b			
:37716	<=>	72.14.217.93:80	0b	1.50Kb	384b			
:53789	<=>	66.249.93.147:80	0b	1.39Kb	355b			
:49843	<=>	209.143.137.70:80	5.02Kb	1.00Kb	257b			
:40932	<=>	209.143.137.70:80	5.01Kb	1.00Kb	257b			
:60570	<=>	209.143.137.70:80	0b	1.00Kb	256b			
:59815	<=>	209.143.137.70:80	208b	1.00Kb	256b			
:38867	<=>	209.143.137.70:80	4.77Kb	1.00Kb	256b			
:42015	<=>	84.53.138.66:80	0b	0.99Kb	253b			
TX:	cum:	267KB	peak:	64.0Kb	rates:	45.4Kb	28.5Kb	8.68Kb
RX:		1.17MB		252Kb		162Kb	124Kb	36.1Kb
TOTAL:		1.44MB		316Kb		208Kb	153Kb	44.8Kb

Figure 18 – Bandwidth usage statistics by WAN NIC

Columns are laid out as follows:

Source_IP_address: Port	↔	Destination_IP_address : Port	BW1	BW2	BW3
192.168.1.2:60570	↔	209.143.137.70:80	340Kb	50Kb	253b
....					

Where BW51 is 5 second average bandwidth utilization, BW5 is 5-second average bandwidth usage in kbit/s, BW2 is 30 second average and BW3 is 60 second average.

5 TES APPLICATION PACKAGE

Application Package (TES AP) is the extension for TES Platform containing proprietary toolset for advanced traffic engineering e.g. bandwidth management, QoS, filtering, traffic monitoring etc. TES AP adds extra functionality to already running TES Platform and doesn't require operating system reinstallation.

The list of traffic engineering features carried together by TES Platform and Application Package:

1. Bandwidth Management
 - 1.1. Accurate and flexible traffic shaping on Rx and Tx
 - 1.2. Hard and burstable bandwidth management
 - 1.3. Customizable bandwidth management groups
 - 1.4. Bandwidth management by IP address
 - 1.5. Smart Throttle Engine
2. Quality of Service (QoS)
 - 2.1. 8 customizable QoS levels
 - 2.2. OSI Layer 7 QoS capabilities
 - 2.3. Wide range of Layer 7 fingerprints
 - 2.4. QoS for Peer-2-peer, VoIP, games etc.
 - 2.5. Congestion avoidance mechanisms
 - 2.6. QoS for inbound and outbound traffic flows
 - 2.7. Lowest priority level for unwanted traffic
3. Web Cache
 - 3.1. Semiautomatic Web Cache engine
 - 3.2. HTTP response time minimizing techniques
 - 3.3. Adjustable storage size
 - 3.4. Failover engine preventing web cache fails
 - 3.5. Transparent/interception web cache proxy
4. Acceleration
 - 4.1. BusinessCom Performance Enhancing Proxy (PEP)
 - 4.2. Transparent HTTP acceleration
5. Security
 - 5.1. Integrated semiautomatic Firewall
 - 5.2. MAC, IP and linked MAC+IP Filtering
 - 5.3. Network Intrusion Detection System (NIDS)
6. Traffic Monitoring and Analyzing

- 6.1. Network throughput monitoring, netflow capabilities
 - 6.2. Informative TCP/IP Monitoring
 - 6.3. Detailed subscribers' activity statistics
 - 6.4. Top 20 pie charts
 - 6.5. Long term monitoring data storage
 - 6.6. Interactive traffic analysis capabilities
 - 6.7. Real-time OSI layer 3 and layer 7 monitoring
7. Networking/Routing Features
- 7.1. Static routes
 - 7.2. Adjustable Ethernet settings (duplex, multicast, mtu etc.)
8. Network Address Translation (NAT) and DHCP
- 7.1. Automatic or fully customizable static NAT
 - 7.2. Automatic or fully customizable DHCP
9. HTML Graphical User Interface (GUI) and Terminal Panel
- 8.1. Intelligent HTML GUI via secure HTTP (HTTPS)
 - 8.2. Local and remote (via SSH) access to Terminal Panel
10. Miscellaneous features
- 10.1. Health status monitoring
 - 10.2. E-mail reports and alerts
 - 10.3. Automatic Updates
 - 10.4. Completely failsafe operation
 - 10.5. One-click backup/restore

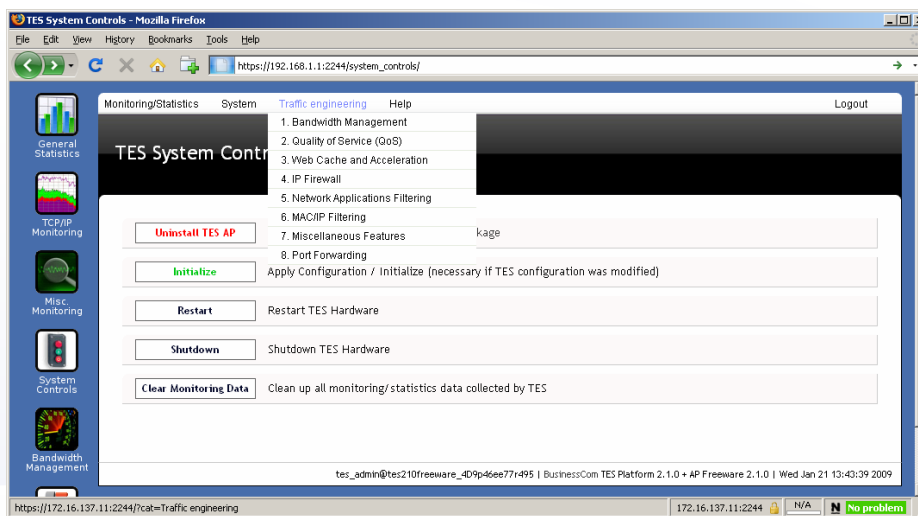


Figure 19 – Menu “Traffic Engineering” after TES AP installation

TES Application Package is available in two variants: Freeware and Commercial. The installation procedure is the same for both versions (see below).

TES AP Freeware provides full range of traffic engineering functionality listed above free of charge for evaluating and testing. It can be easily installed over TES Platform by everybody and can handle up to 30 PCs in the LAN behind TES Platform. TES AP Freeware doesn't have PEP subscription Commercial TES AP comes with.

TES AP Commercial brings complete range of traffic engineering functionality without any limitations and comes with full Performance Enhancing Proxy (PEP) subscription which allows to save expensive bandwidth and/or connect more subscribers to LAN without a need to buy more bandwidth on Rx and Tx. Consult with BusinessCom representative on how to get Commercial TES AP installed on your TES Platform.

TES Application Package installation procedure:

1. Connect TES Platform to Internet (see section 4.2.2).
2. Go to "System Controls" section TES Platform's HTML GUI (see Figure 20).
3. Press "Install TES AP" button to move to the first step of installation (see Figures 21 and 22).
4. Follow instructions on the screen: if you want to get Commercial TES AP please send TES Platform license key (shown in green) to BusinessCom representative or just press "Next" to proceed with Freeware TES AP installation (see Figure 23).
5. As soon as TES AP installation is finished you will see confirmation message (see Figure 23) and will need to re-init TES Platform so that TES AP components become accessible from HTML GUI and Terminal Access Panel (follow instructions on the screen clicking "Finish").
6. If installation was successful you will see [tes.free] or [tes.comm] initialization steps during TES Platform reinit (see Figure 24).

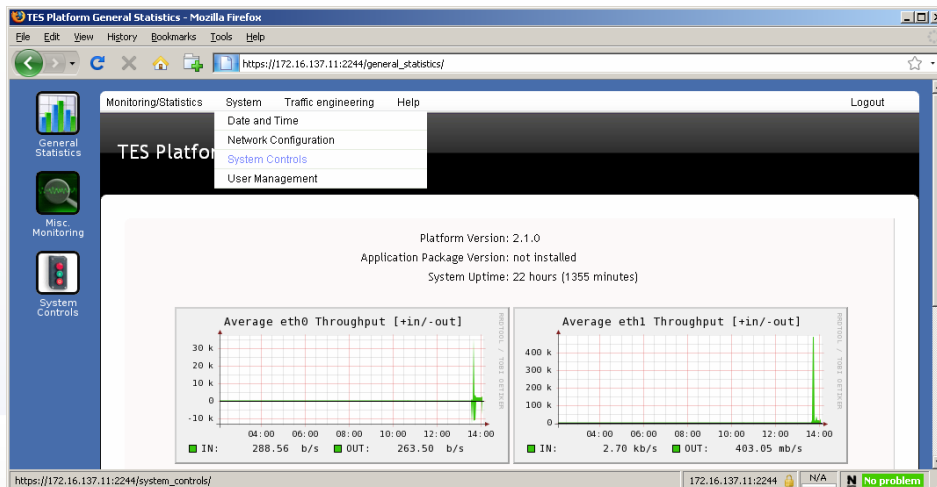


Figure 20 – "System Controls" item in HTML GUI

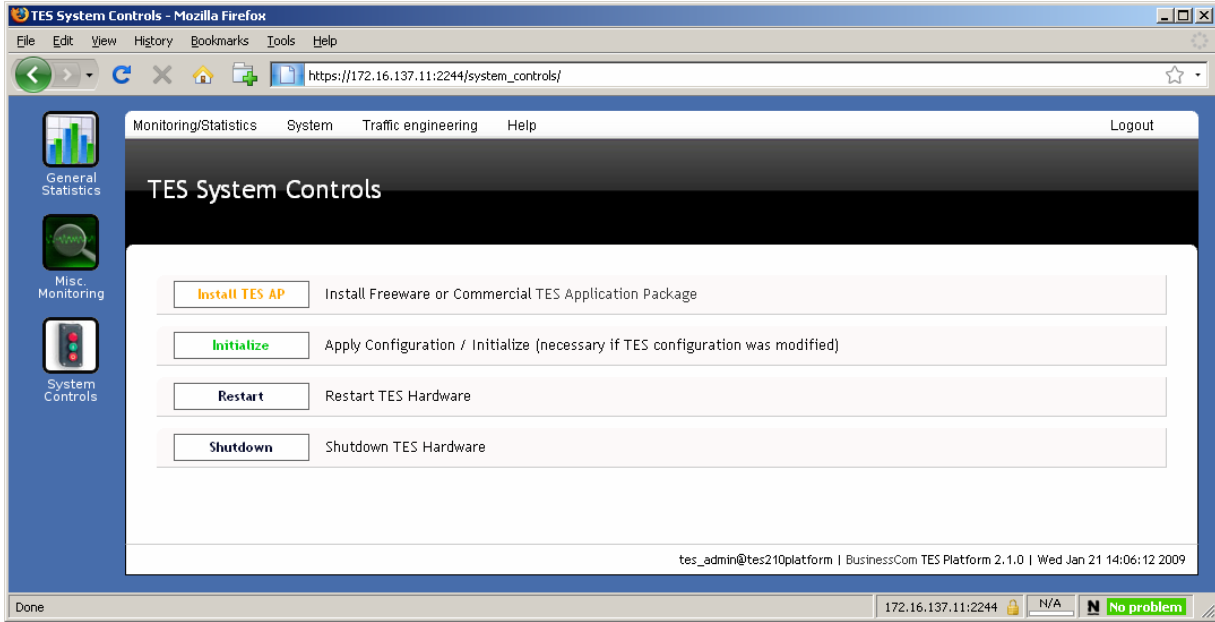


Figure 21 – “System Controls” section, button “Install TES AP”

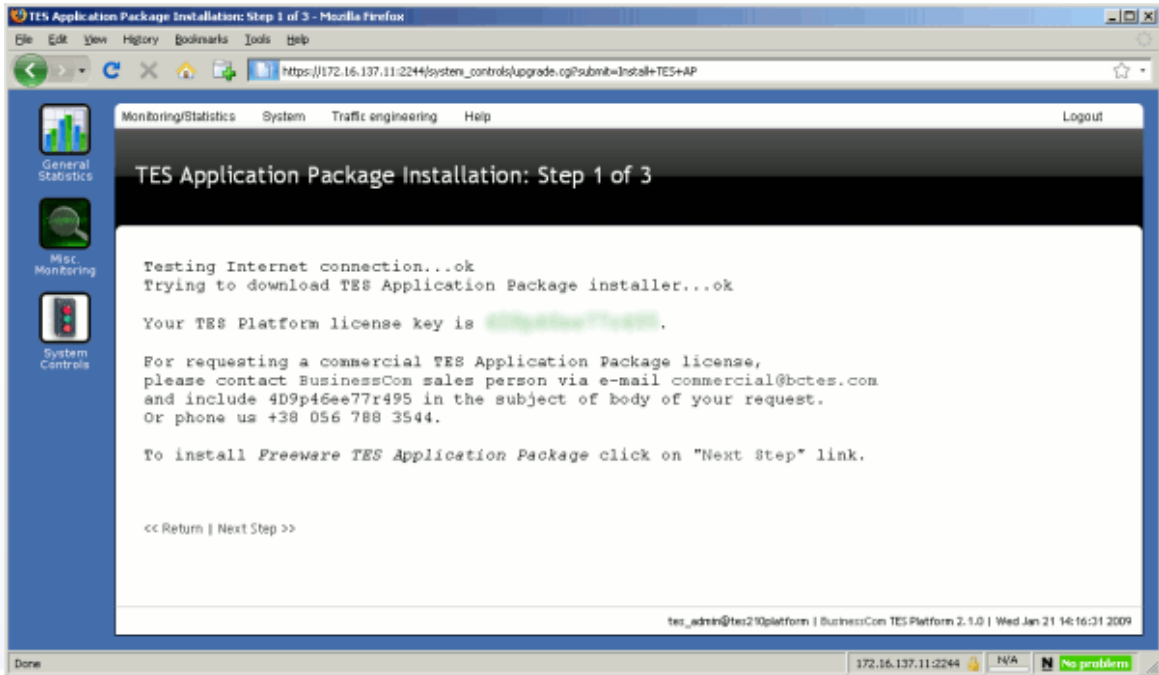


Figure 22 – First step of TES AP installation

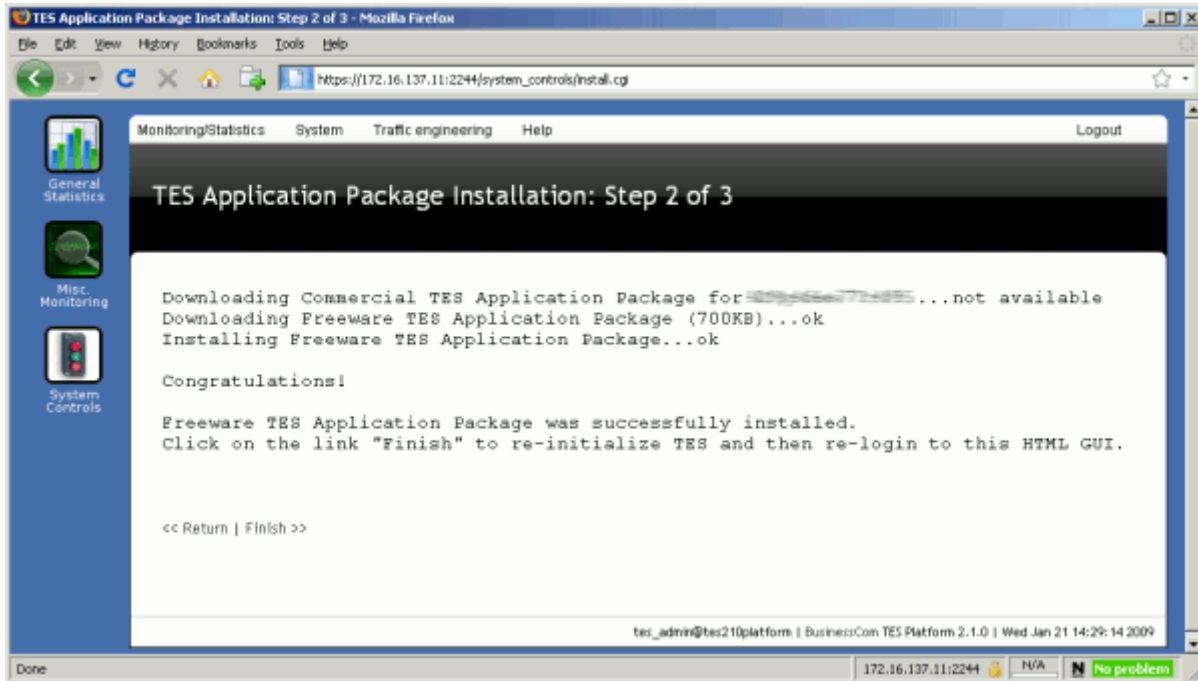


Figure 23 – Second step of TES AP installation

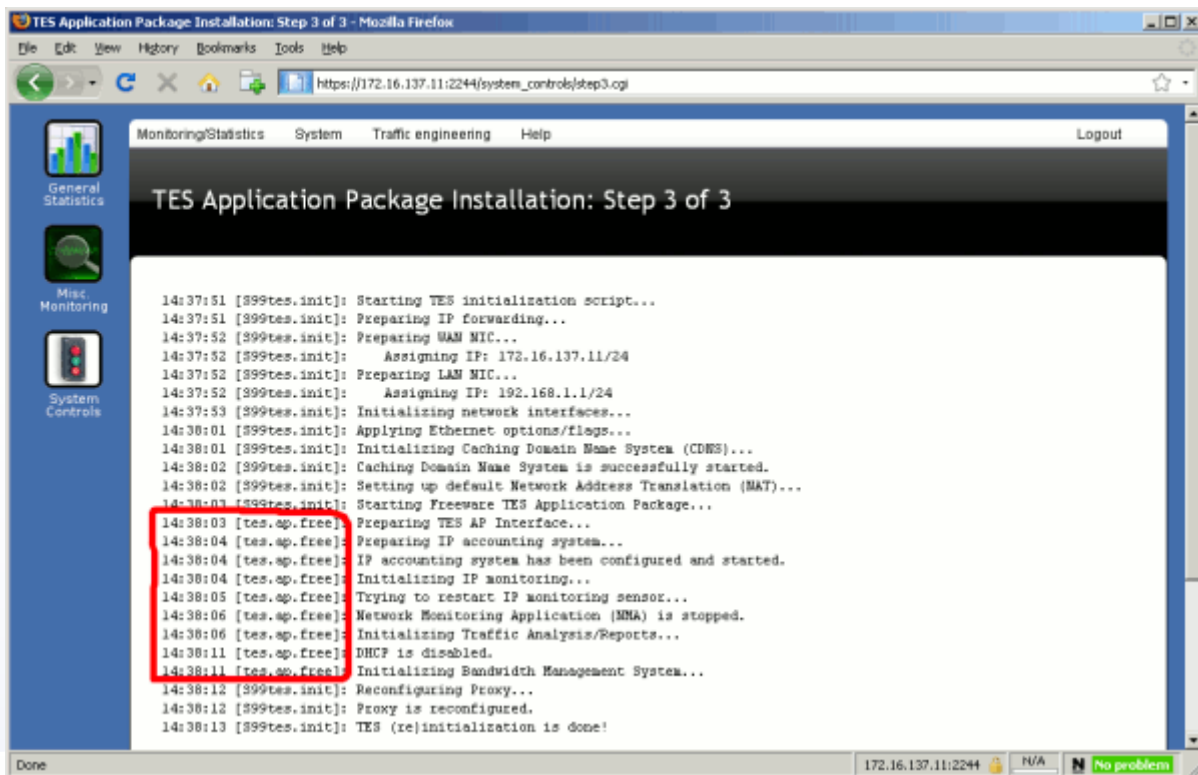


Figure 24 – Third step of TES AP installation

6 INDEX

A

administration
panel, 9, 10, 11,
17, 19, 20, 21,
24

B

bandwidth, 6, 25,
26
browser, 4, 5, 9
4, 6

C

cable, 9
CIDR, 12
computer, 4, 9, 15,
16
connection, 5, 6, 9,
12, 17
cross-over, 4, 9

D

date, 20
DNS, 13, 15, 16

E

equipment, 4
ethernet, 4, 6, 9

F

filtering, 6
firewall, 4, 17

G

gateway, 12, 15, 16
graph, 21

H

hardware, 11, 13,
21, 25
health statistics, 25

I

interface, 12, 13,
15, 17
Internet, 5, 6, 9, 12,
15, 16, 17, 25
IP, 4, 9, 12, 13, 15,
16, 17, 24, 26

K

kbit/s, 26
keyboard, 10, 24

L

LAN, 4, 12, 13, 15,
17
laptop, 4, 9
linux, 4
local network, 6, 12
login, 10, 19

M

main menu, 12, 21,
24, 25
management, 6, 19
modem, 12, 15
monitor, 6, 10, 24

monitoring, 4, 21
Mozilla, 9

N

NAT, 6
netmask, 9, 12, 13
network, 4, 5, 6, 9,
10, 11, 12, 13,
15, 16, 17, 21,
25
network topology, 4
networking, 4, 21
NIC, 9, 12, 13, 15,
17, 26

P

password, 10, 19
PC, 4, 9
performance, 4, 6
protocol, 9, 17

Q

Quality of Service,
6

R

rebooting, 11, 25
re-initialization, 11,
25
restart, 11
router, 6, 12, 13
routing, 4, 5, 15, 16

S

satellite, 12, 13
Secure Shell, 9, 24

security, 6, 17
server, 4, 6, 13
Service Provider, 6
setup, 5, 12, 13, 20
shaping, 6
shutdown, 11
shutting down, 11
software, 4, 24
ssh, 24
subnet, 9
subscriber, 6, 15,
16, 17, 25
system control, 11,
25

T

TCP, 4
terminal access
panel, 9, 24
Terminal Shell, 24,
25
time, 20
traffic, 6, 17, 20

U

URL, 9
user, 4, 6, 19

V

VGA, 10
VoIP, 6

W

WAN, 12, 13, 15,
17, 26
workload, 11