NetWhere

User's Guide Version 2.0

June 2007

Software License Agreement

Schedule

Support Services

1. Support Hours

The Support Hours during which Fluke shall supply the Support Services shall be between 9.30am and 5pm on Working Days.

2. Support Services

Fluke shall provide You during the Support Hours with:

2.1. technical advice and assistance by telephone, facsimile, e-mail or other electronic means as shall be necessary to resolve your difficulties and queries in relation to the Product and the Updates which You may require;

2.2. an error correction and problem solving service as follows:

if You shall discover that the then current supported version of Product fails to conform with any part of the description of the Product provided to you by Fluke then Fluke, on receiving notification of the error, shall use its reasonable endeavours to:

2.2.1 diagnose and resolve the reported error or problem; and

provide the required solution to remedy or correct the error or problem; and

2.2.3 provide You with all assistance reasonably required by You to enable You to implement the error correction supplied as soon as possible; and

2.2.4 correct errors by "fix" where Fluke, in its sole discretion, considers such to be appropriate.

2.3 Response times to technical advice and assistance queries and reported errors and problems are set out in clause 3 below.

2.4 Remote connection support shall only be provided by Fluke in the event that telephone, fax or email support does not resolve a problem.

3. Response Times

3.1 In the event of any problem arising in relation to the Product's installation and functioning, Fluke shall respond within 8 Support Hours after the logging of such an incident by You provided that the incident was logged by You during normal Support Hours. Fluke shall in turn endeavour to resolve the problem as soon as possible.

4. Exceptions to Support Services

4.1 The Support Services described in clause 2 of this Schedule shall not include service in respect of:

4.1.1 defects or errors resulting from any modifications of the Product or Updates made by any person other than Fluke;

4.1.2 incorrect use of the Product or Updates or operator error;

4.1.3 any fault in Your hardware, computer equipment or in any programs used in conjunction with the Product or Updates; or

4.1.4 defects or errors caused by the use of the Product or Updates on or with equipment or programs not approved by Fluke.

Contents

NetWhere Manual

Introduction

This document is the user manual for NetWhere, a network management software product designed to provide easy access to all resources in the managed network.

This manual is regularly updated. Visit http://www.crannog-software.com to download the latest version.

What is NetWhere?

Netwhere is primarily a powerful database kept up to date by monitoring the managed devices through SNMP. The user interface presents this information in an intuitive and easy to use fashion.

Features and Benefits

- Searchable Database allows an operator to find a particular device or group among hundreds.
- Web-based front end allows users anywhere on the network to use the system.
- Switch Port Connectivity shows which hosts are connected to the ports of a switch.
- Security and User Access Control, the system administrator can restrict a user group to a subset of the network managed by the system or a subset of the features offered by Netwhere.
- Cisco Configuration Management, the running configurations of (supported) Cisco equipment are archived on a configurable schedule to allow an operator to access them later.
- Straightforward installation and configuration.

Installation

Minimum System Requirements

The type of system required to run NetWhere depends on the number of devices to be managed. The following requirements are a guideline; the only way to determine your requirements is by testing the software's performance in your network environment.

- 3.2Ghz Xeon processor.
- 2Gb RAM, although performance will increase with the amount of RAM available for the disk cache and database buffers.
- 2 * 80 Gb SATA 7200rpm+ disks (raid 1) Provides mirroring.
- Windows 2003 server.

Pre-installation Checks

Before installing, there are a few things you need to check:

- NetWhere puts a heavy load on the system. It is strongly recommended that you install it on a dedicated server.
- You must be logged in as an administrator in order to install the software.
- NetWhere contains an embedded web server. Web servers normally run on port 80, but this may be in use by another web server on your system. You can choose a different port during installation or disable other web servers prior to installation if you wish.
- Open firewall on ports 69(tftp), 80 (or chosen http port), 8002 (or chosen SNMP response port)
- Port mapping from port 69 on router to port 69 on NetWhere server.

Installation on Microsoft Windows™

Installation is straightforward and should take no more than a few minutes. If you received NetWhere on CD the setup program should start automatically. If not, simply open the CD drive in My Computer and double-click "setup.exe". If you downloaded the software simply double-click the file you downloaded. Installation involves several steps. At each step, you can click the "Next >" button to accept the default choices and continue.

Enter Root Password

The software comes with a default user, the root user, who has access to all features and all devices managed in the system. It is therefore very important to choose a good password which will be very hard to guess.

MySQL database access port

The MySql packaged with Netwhere can be run on a machine with other installations provided the port selected does not conflict any other software running on the target machine. The third screen on the installation wizard allows the installer to choose the database access port.

Choosing the database access port for MySQL

Configure Web Application Server

The application server is responsible for serving up the web based user interface. The HTTP port is the port which through which the server receives HTTP requests from the operators web browser.

Setting the HTTP Port

Post-installation Tasks

Access the web front-end

You can access the web front-end from any workstation on the network by opening the following address in a web browser:
http://address:port
Where "address" is the address of the server and "port" is the http port you chose, or 80 if you didn't choose a port.

Login as Root

Enter "root" and the password you chose in fro root in the installer

Install your licence

When you start up NetWhere for the first time, it runs in evaluation mode. This means that it will run for seven days without a licence. If you already have a licence, navigate to *home* > *system administration* > *licensing* to apply the licence. If you require an evaluation licence, please contact your Crannog Software representative.

Using NetWhere

Devices and Device Groups

Devices are managed in device groups, device groups can serve as user defined categories e.g. the 'backbone' device group can be the group of all backbone routers in a large network. Device Groups enhance the power NetWhere since user defined device groups can be specified in a search or in user access control specifications e.g. one can enter 'backbone' into the search engine and find all managed backbone devices or an administrator can allow users to view all devices in the 'backbone' device group.

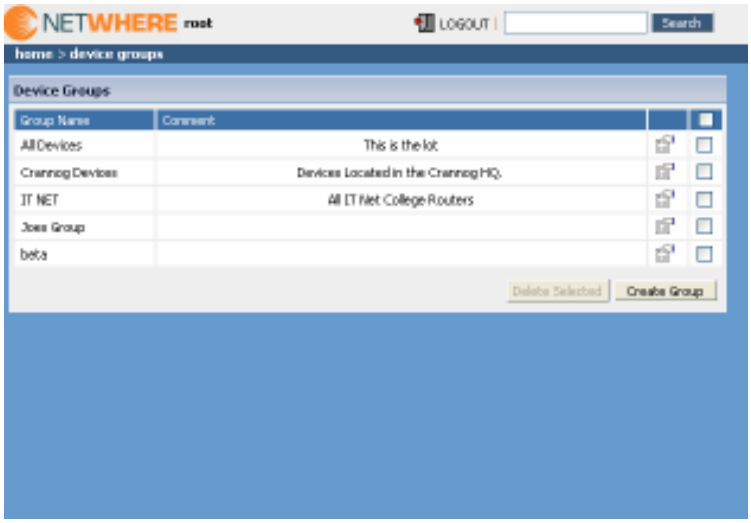
Create Device Groups

To create a device group select the **Create Group** button in the **Device Groups** page. The devices available in the system are listed down the left hand side of the selection menu to add devices to the new group select one or more of the devices on the left of the selection menu and press the button marked with the left-to-right arrow **>**. The selected devices will appear on the right side of the selection menu, remove any of the devices from the group select the unwanted devices from the right hand side of the menu and press the right-to-left arrow **<**.

Creating a device group

Browse Device Groups

The browser can be accessed from the main menu. The device group browser lists all of the device groups for which a user has **View** privileges. The contents of a device group can be viewed by selecting the icon beside the desired group. With sufficient privileges, the user can edit the contents of a device group i.e. add/remove devices to/from the selected group by pressing the **Edit Members** tab in the **Group Properties** page.



Browsing device groups

Edit Device Groups

The **Device Group Editor** is reached by selecting the group editor icon beside the device group on the **Device Groups** page. The **Edit Device Group** page is similar to the **Create Device Group** page, devices can be added to or removed from the group, the group name can be changed and a comment can be added to the device group. To commit the changes to the device group press **ok**.

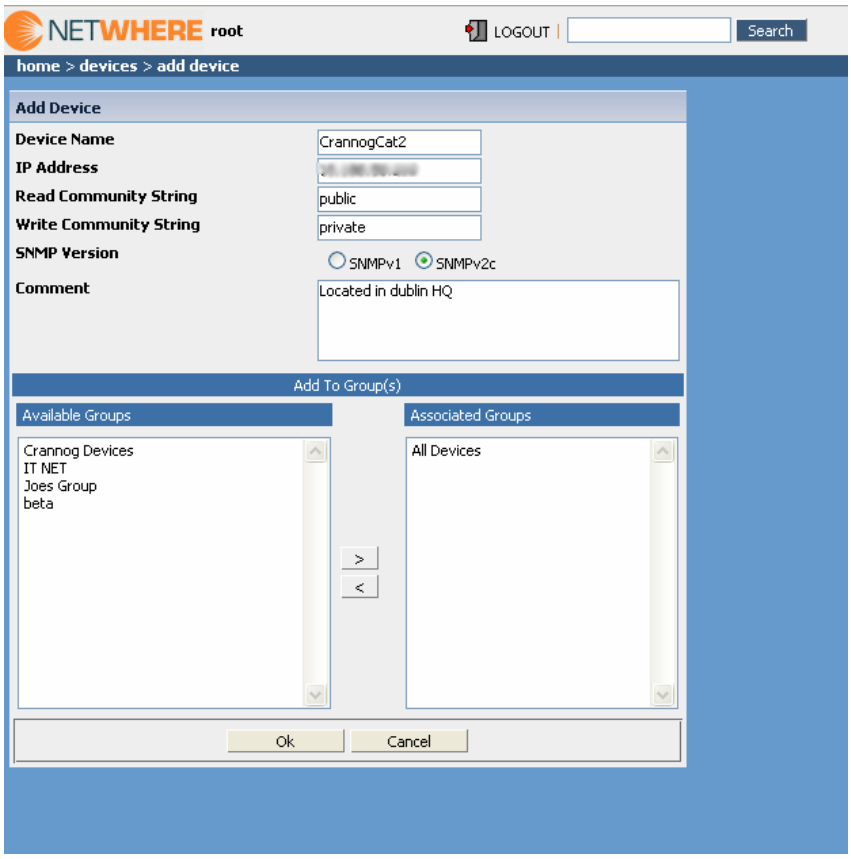
Adding Devices

Devices can be added to the system singularly or in bulk. Adding devices is done from the **Devices** page.

Add a device

Select the **Add Device** button from the **Devices** page. The **Add Device** page has fields required for managing a device over SNMP. The fields of particular importance are the IP Address and the Read and Write community strings. The name and comments fields are optional. The purpose of name field is to enable a user to specify a user-friendly name for the device. If the name field is left blank it will be filled in by NetWhere with the system name on the device itself. The comments field allows users to attach notes to a device the use of this field is discretionary it could be used as description of the device.

The device can also be added to one or more groups using the selection boxes on this page.



Adding a device

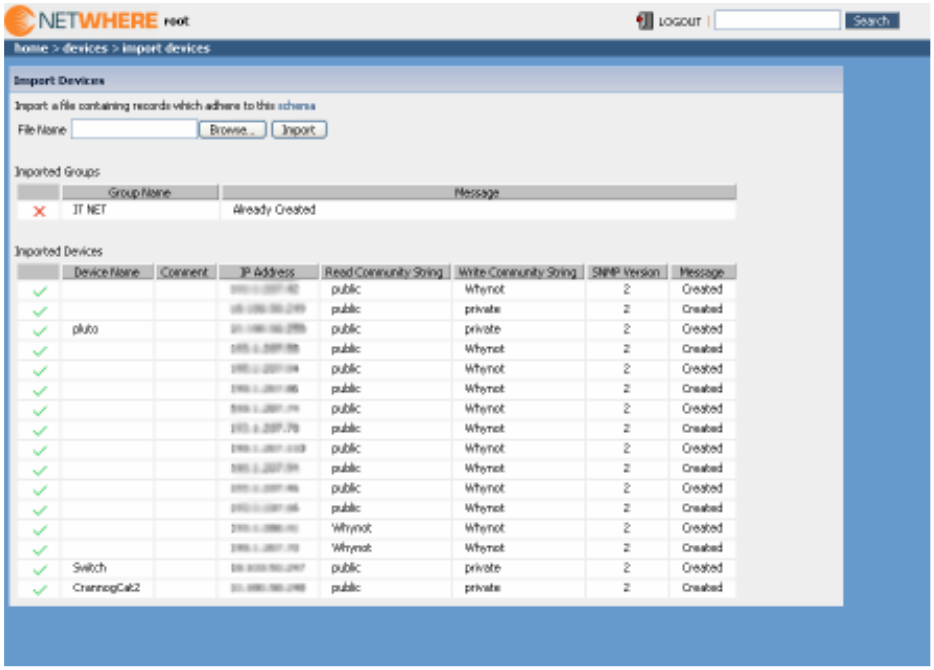
Import (Add Devices in Bulk)

Devices can be added to the system by specifying their details in an XML file and uploading the file to the NetWhere server. The format of the XML file must adhere to the schema specified in Appendix 1: The NetWhere XML schema.

Follow the steps below to import devices to the system

- Select the **Import Devices** button from the **Devices** page
- Press the **Browse** button
- Choose the xml file to upload and press **open**
- Press the **Import** button

The results of the import will show whether the groups and devices specified in the xml document were added



Importing Devices

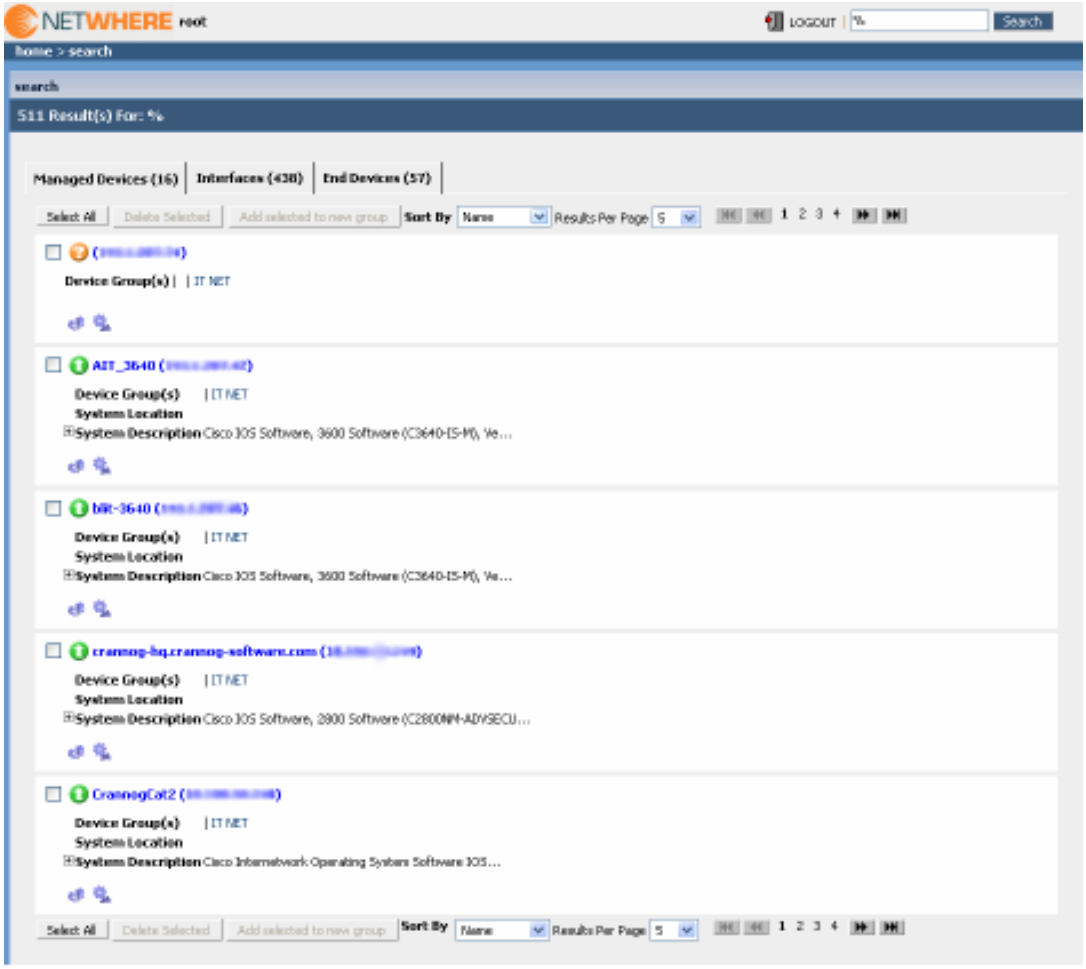
Searching

A key feature of NetWhere is its searching capability. There are three types of search result in NetWhere: **Managed Devices, Interfaces** and **End Devices**. When a search is requested, all available results are presented in each of these categories.

Searching for Managed Devices

The device search finds devices registered in the system. The search tries to match the text entered by the user on any device whose fields match any of the following categories

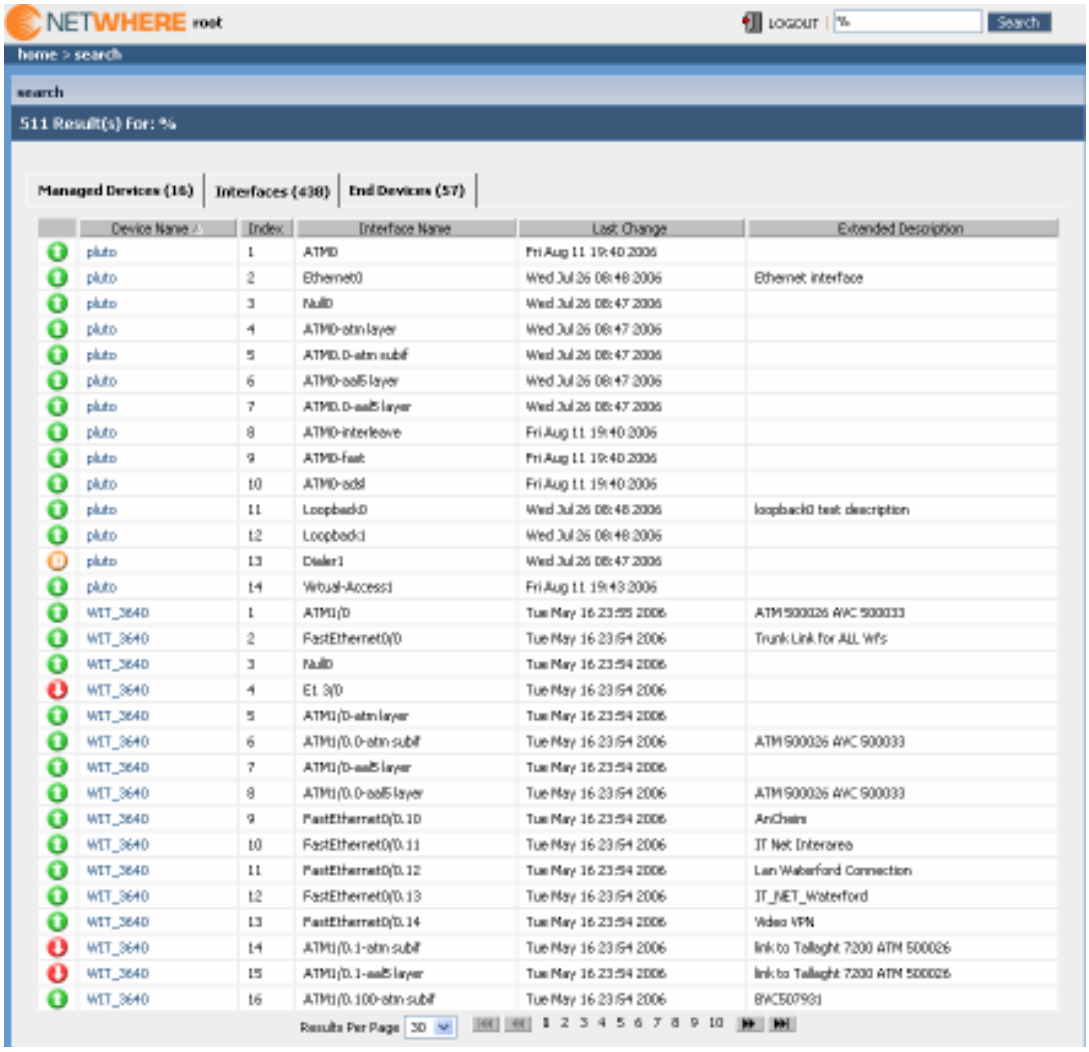
- **Device name** – user defined name for the device/or system name if not specified
- **Device comments** – any note attached to the device record
- **Device IP Address** – IP address through which the device is managed
- **Device Description** – the system description on the device
- **Device Location** – the system location on the device
- **Contact** – a contact name for the device
- **Device Group Name** – any device group of whose name matches the query string entered by the user
- **Device Group Comment –** any device in a group whose comment matches the query string entered by the user.



Managed device search results

Searching for Interfaces

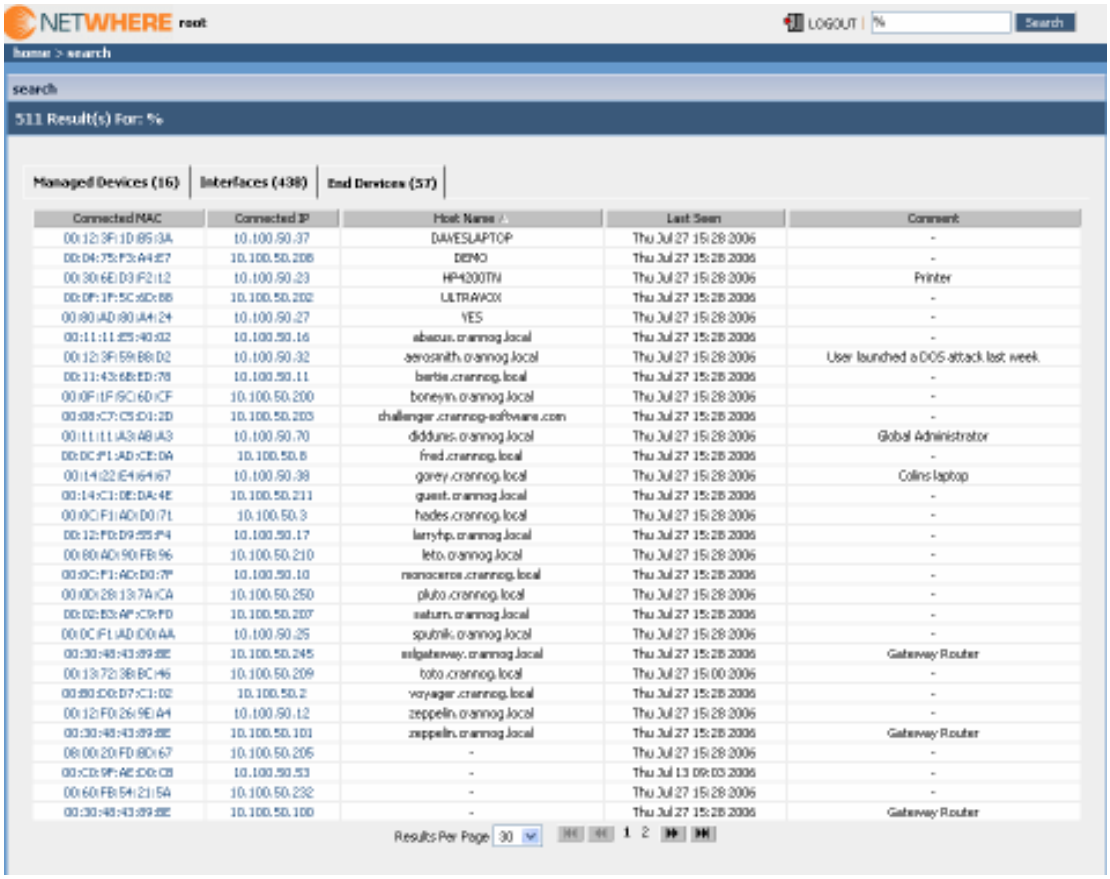
The interface search will find all interfaces on any managed device whose **interface name**, **interface description** or **interface physical address** matches the query string entered by the user.



Interface Search results

Searching for End Devices

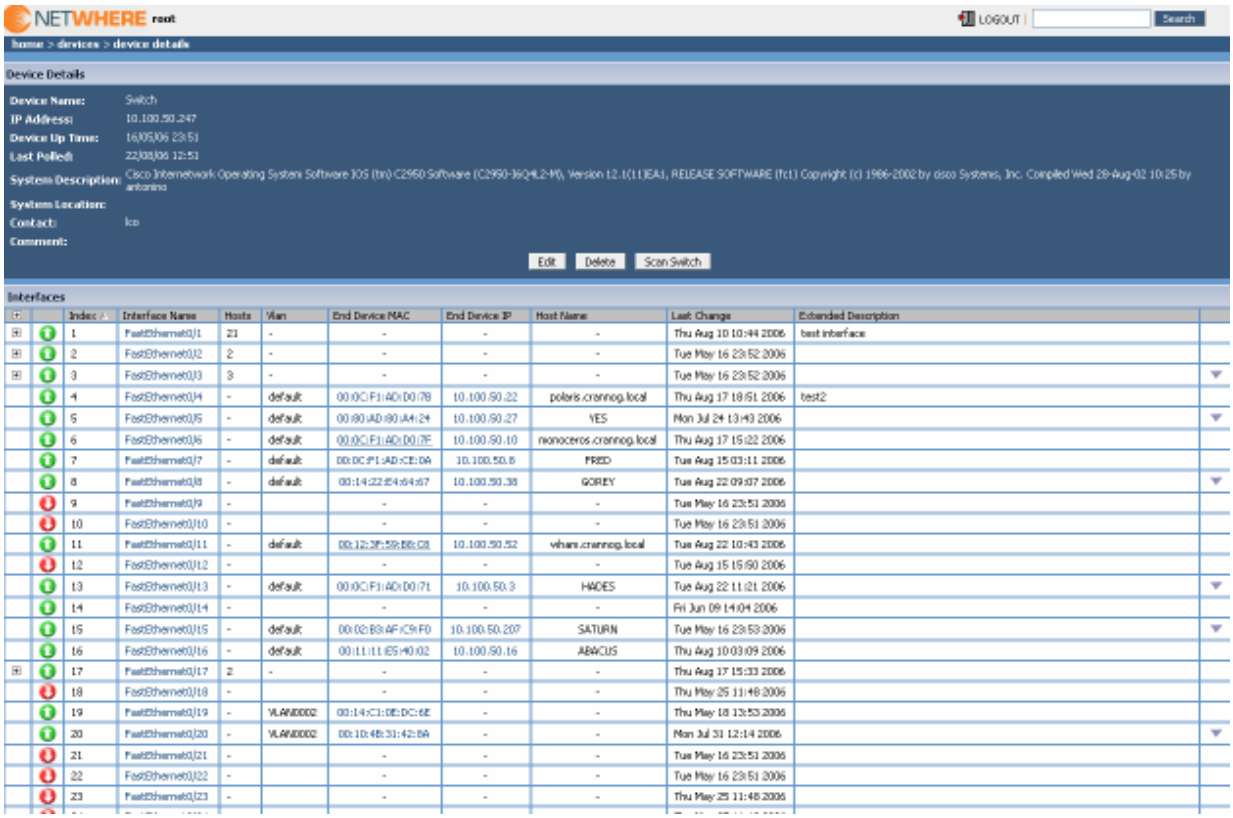
The end device search will find all end devices attached to any switch managed by the system whose **hostname**, **IP Address**, **MAC Address** or **description** matches the query string entered by the user.



End Device Search Results

Managing Devices

The **Device Details** page can be reached by selecting a device from the **Devices** page, selecting a device from a device group or selecting a device from the managed device search results. The **Device details** page shows the interfaces on the device and their status. NetWhere makes a distinction between switches and other devices, a switch will be shown with all of its interfaces and all devices attached to the switch ports where as a router will be shown with all of its interfaces and the IP Addresses associated with the interfaces.



Device view page

Resetting Interfaces

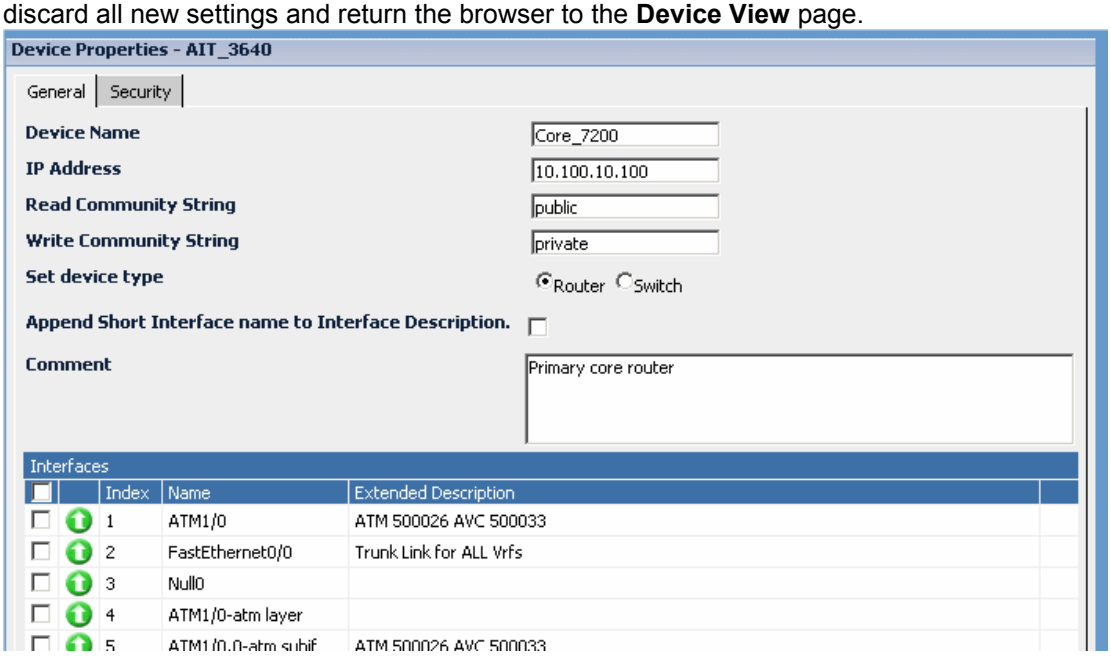
In both the switch and router views a privileged operator can enable/disable interfaces which have that feature associated with it. The enable and disable buttons are respectively shown as up and down arrows at the right-most column on the interface table. Pressing the **enable/disable** button will not have immediate visual impact on the user interface, it can take up to 30 seconds for the status of the interface to change on the users view of the device.

Caution: Disabling an interface can render its device unreachable from NetWhere if the interface selected is the one that NetWhere uses to manage the device. In this scenario NetWhere will not be able to contact the device to bring that interface back up. It is for this reason that great care should be taken when using the feature. Only ever provide the minimum required access to this feature.

Resetting Interfaces

By pressing the **Edit** button in the **Device Details** page the settings for a device can be configured. The fields described in the '

Add a device' section can be edited here. The interfaces for which the reset feature is enabled can be set here. To enable reset on interfaces simply select those interfaces for which the reset feature is desired and select the **Enable Interface Reset** option on the **Select Operation** control. Pressing OK will commit the changes to the system and Cancel will discard all new settings and return the browser to the **Device View** page.



Editing a device

Switch Reporting

Introduction

The switch reporting in NetWhere provides the user with valuable information on the whereabouts of end devices on the network and the port usage of switches. It does this by taking a snapshot of the entire network every half an hour (this may be increased or reduced by the user. See registry settings section). From the database, the following reports can be generated:

- **Uplinks** – Tracks multiple addresses visible on one switch port
- **Free Ports –** Capacity report showing unused switch ports
- **Newly Used Ports –** Capacity / security report showing recently used ports that were unused
- **Roaming End Devices** – Security report showing end-devices (by MAC address) that have changed location, IP address or hostname.
- **New End Devices –** Capacity / security report showing new end-devices recently found on the network
- **End-Device History** - Forensics security report on the past movements and address assignments of an End-Device on the network, identified by its MAC address.
- **IP Address History** – Forensics report on the past movements and address assignments of an IP address.
- **Port History** – Full connectivity history of a switch port.

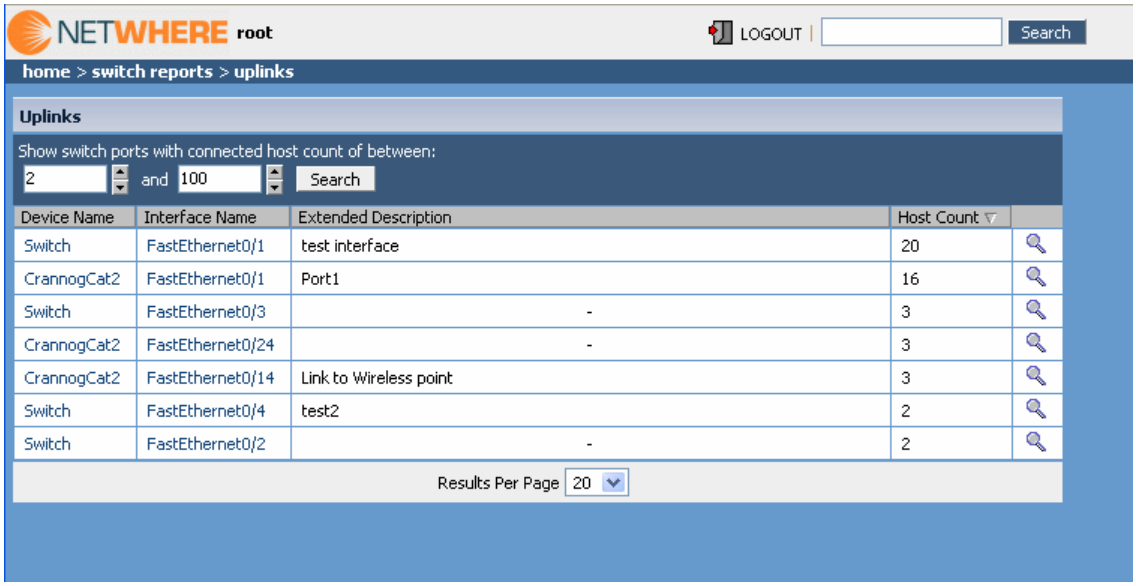
Uplinks

A switch port that has more than one end-device connected to it is deemed to be an **Uplink Port**. For capacity planning, engineering and security, it is important to know where your uplink ports are and how busy they are. The user may filter out certain results so he can only see uplinks of a certain size using the controls at the top of the report. For example, users with VoIP phones that have built-in hubs will see multiple devices on a single switch-port when a PC or other network device is plugged into the phone. Filtering the count value will remove these items from the report.

Report Details

- **Device Name** - The device the uplink is on, this may be selected to go to the device view of that device.
- **Interface name** - This may be selected to view the history page for that interface.
- **Extended Description** of the interface
- **Host Count** - The number of end devices connected to that interface.
- If you have *switch forensics permission*, click the magnifying glass icon beside an uplink to see a list of all the end devices currently connected to that interface.

To view the uplink interface on only one switch, navigate to *home > switch reports > switches.*



Uplink reports page

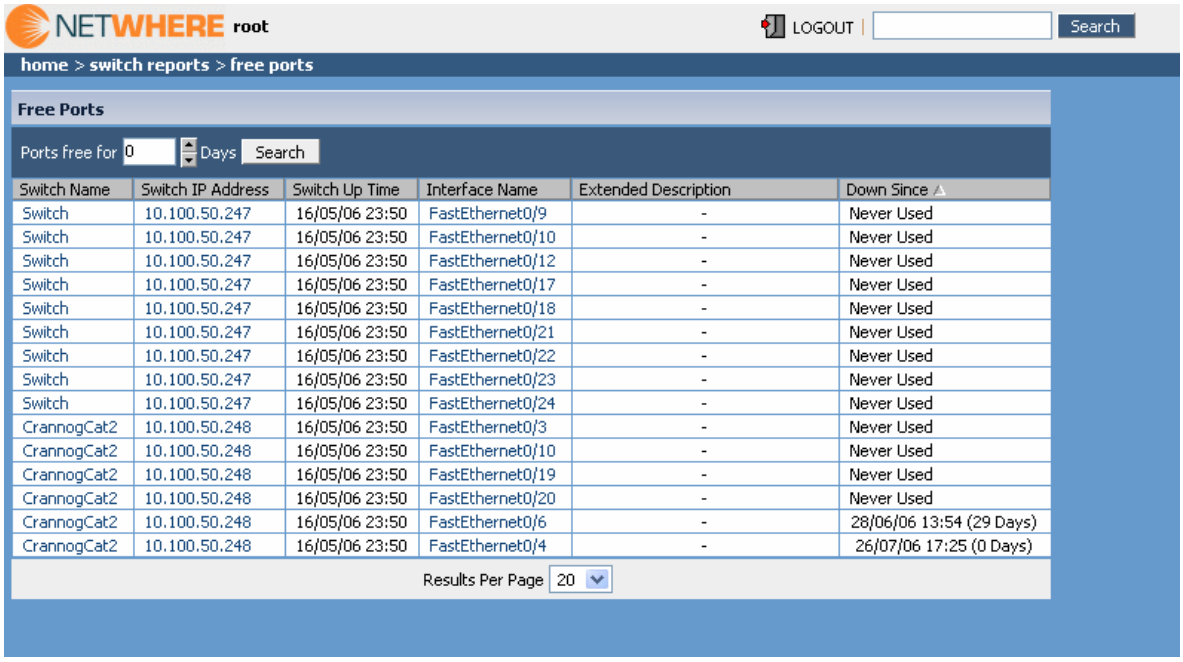
Free Ports

The **Free Ports** report shows all the currently unused ports in the system. Using this report, an administrator can quickly identify where new hardware can be added on the network. Using the control at the top of the report the user may filter the report to only show ports which have been unused for at least a stated number of days.

Report Details

- **Name** and **IP Address** of the switch containing the unused port - These can be selected to bring you to the device view page for that device.
- **Switch Up-time -** Shows when the switch was last rebooted.
- **Interface Name** of the unused port - This can be selected to go to the interface history page for that interface.
- **Extended Description** of the unused port - Shows how long the interface has been free for or "never used" if it has not been used since NetWhere has been installed.

To view unused ports on a single switch, navigate to *home* > *switch reports* > *switches*.



Free ports on managed switches

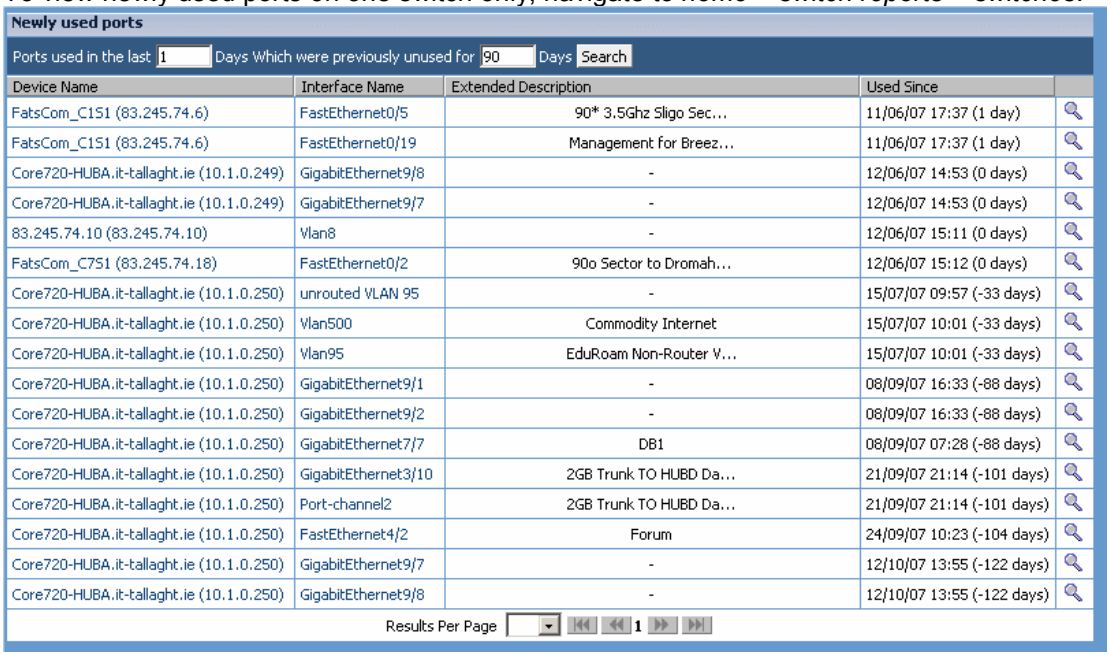
Newly Used Ports

The **Newly Used Ports** report shows ports which have recently been in use but were previously unused. Using the controls at the top of the page the user can filter the report to show ports that have been used at some stage in the last x amount of days which were previously down for the entire y amount of days before that.

Report Details

- **Device Name** and **IP Address** of the switch – This can be selected to bring you to the device view page.
- **Interface Name -** This can be selected to bring you to the interface history page.
- **Extended Description** of the interface.
- **Used Since –** The time when the switch port changed from "unused" to "newly used".
- **Session History –** Click on the magnifying glass icon in the right hand column to view a report of the session history of that port

To view newly used ports on one switch only, navigate to *home* > *switch reports* > *switches*.



Newly used ports

Newly used ports

Ports used in the last 1 Days Which were previously unused for 90 Days Search

Device Name	Interface Name	Extended Description	Used Since	
FatsCom_C1S1 (83.245.74.6)	FastEthernet0/5	90* 3.5Ghz Sligo Sec...	11/06/07 17:37 (1 day)	
FatsCom_C1S1 (83.245.74.6)	FastEthernet0/19	Management for Breez...	11/06/07 17:37 (1 day)	
Core720-HUBA.it-tallaght.ie (10.1.0.249)	GigabitEthernet9/8	-	12/06/07 14:53 (0 days)	
Core720-HUBA.it-tallaght.ie (10.1.0.249)	GigabitEthernet9/7	-	12/06/07 14:53 (0 days)	
83.245.74.10 (83.245.74.10)	Vlan8	-	12/06/07 15:11 (0 days)	
FatsCom_C7S1 (83.245.74.18)	FastEthernet0/2	90o Sector to Dromah...	12/06/07 15:12 (0 days)	
Core720-HUBA.it-tallaght.ie (10.1.0.250)	unrouted VLAN 95	-	15/07/07 09:57 (-33 days)	
Core720-HUBA.it-tallaght.ie (10.1.0.250)	Vlan500	Commodity Internet	15/07/07 10:01 (-33 days)	
Core720-HUBA.it-tallaght.ie (10.1.0.250)	Vlan95	EduRoam Non-Router V...	15/07/07 10:01 (-33 days)	
Core720-HUBA.it-tallaght.ie (10.1.0.250)	GigabitEthernet9/1	-	08/09/07 16:33 (-88 days)	
Core720-HUBA.it-tallaght.ie (10.1.0.250)	GigabitEthernet9/2	-	08/09/07 16:33 (-88 days)	
Core720-HUBA.it-tallaght.ie (10.1.0.250)	GigabitEthernet7/7	DB1	08/09/07 07:28 (-88 days)	
Core720-HUBA.it-tallaght.ie (10.1.0.250)	GigabitEthernet3/10	2GB Trunk TO HUBD Da...	21/09/07 21:14 (-101 days)	
Core720-HUBA.it-tallaght.ie (10.1.0.250)	Port-channel2	2GB Trunk TO HUBD Da...	21/09/07 21:14 (-101 days)	
Core720-HUBA.it-tallaght.ie (10.1.0.250)	FastEthernet4/2	Forum	24/09/07 10:23 (-104 days)	
Core720-HUBA.it-tallaght.ie (10.1.0.250)	GigabitEthernet9/7	-	12/10/07 13:55 (-122 days)	
Core720-HUBA.it-tallaght.ie (10.1.0.250)	GigabitEthernet9/8	-	12/10/07 13:55 (-122 days)	

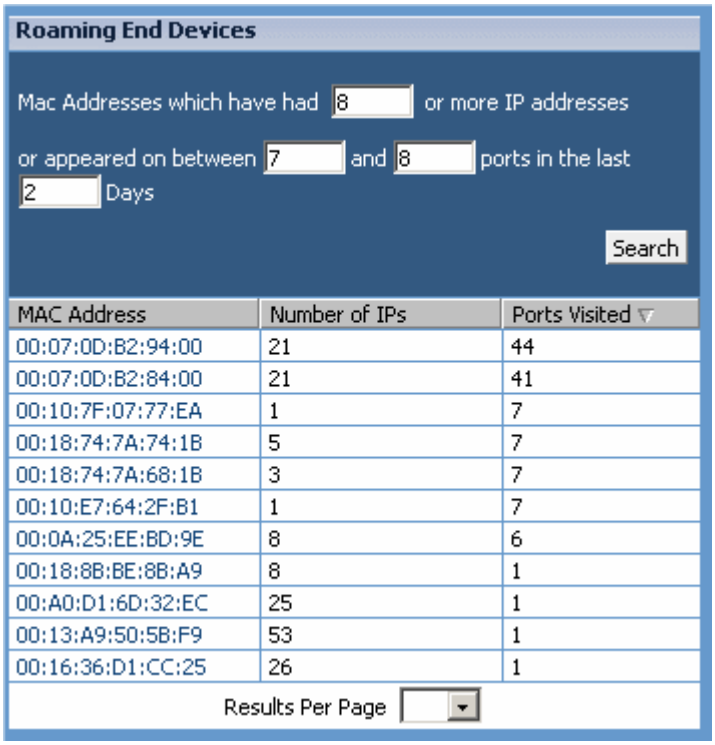
Results Per Page 1

Roaming End Devices

(Requires Switch Forensics Permission)

A major security feature in NetWhere is the ability to track devices that have changed location, IP address and/or hostname. Any of these changes should be subject to scrutiny as they may constitute a breach of your network policy.

This report shows end devices which have been assigned more than one IP address or have appeared on more than one interface in a certain amount of time. Using the controls at the top of the report the user can specify the number of IP addresses assigned to the end device, the number of interfaces the end device has appeared on and how long ago to consider. The search returns end devices which satisfy either of the parameters. The roaming end device report shows the MAC address of the roaming end device, the number of IP addresses assigned to the end device and the number of ports visited by the end device. Click on the MAC address entry to see a detailed End-Device report showing the details of assigned addresses and locations.



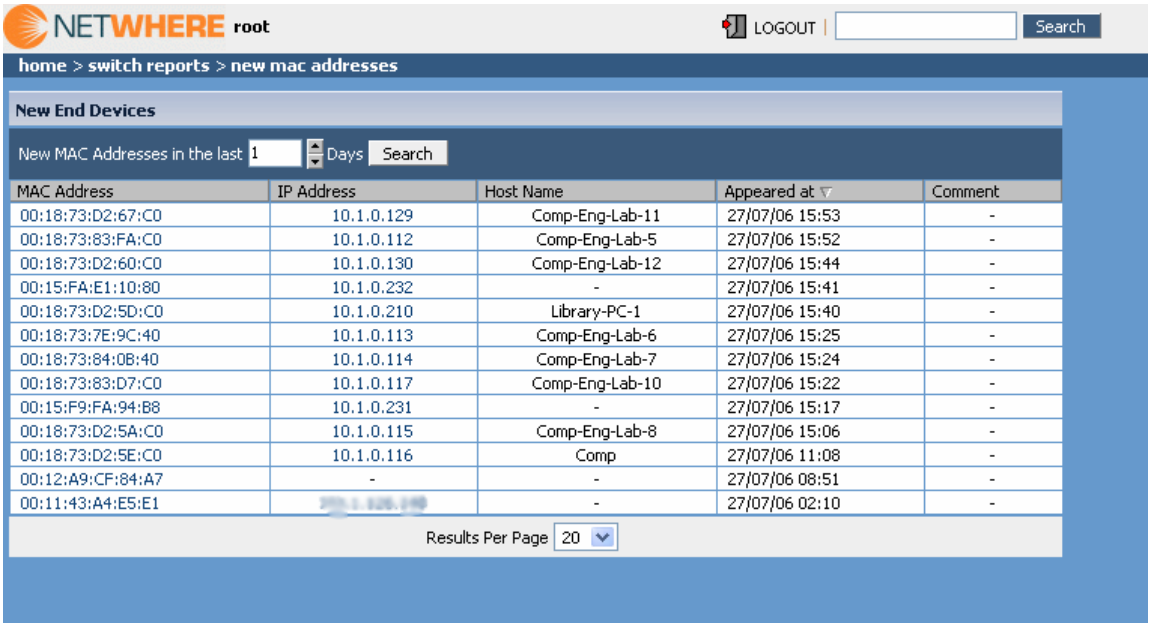
Roaming End Devices

New End Devices

Another useful report in the security and capacity planning fields is the **New End Devices** report. This highlights the devices that have recently appeared on the system. The administrator should be interested in these new devices and should identify if they are authorised devices (capacity planning) or if they are clandestine devices that may constitute a security breach (security).
Using the controls at the top of the report specify the time span for which to run the new-device search.

Report Details

- **MAC Address** – The hardware address of the newly discovered end-devices. Click on this to see a detailed history of the address assignments and locations of the device.
- **IP Address –** The IP address assigned to the new device. Click this to see a full history of assignments for that IP address.
- **Hostname** – The assigned host name of the end device.
- **Appeared At –** The time at which the device was first seen on the network.
- **Comment** - An administrator-specified comment on the end-device. Use this feature to flag suspect devices on the network or to simply identify them. The comment can be searched for easy retrieval.



New End Devices

End Device History

The End Device History report gives a full forensic view of the connectivity and address assignment behaviour of that device on the network over time. There are two main sections to this report, dealing with the connectivity history and the IP and hostname assignment history, respectively.

Report Header Details

First Seen – The first time the device was detected on the network by NetWhere.
Last Seen – The most recent detection of the device on the network
Host Count Greater than – The report will omit any interfaces from the connectivity history where the host count is greater than that specified here. This will remove uplink ports from the report. Normally, this value should be set to 1 or 2, depending on whether or not each host has an exclusive connection to a switch port.
Comment – User-specified comment for that device (linked to the MAC address). This can be edited by any user with the relevant security permission.

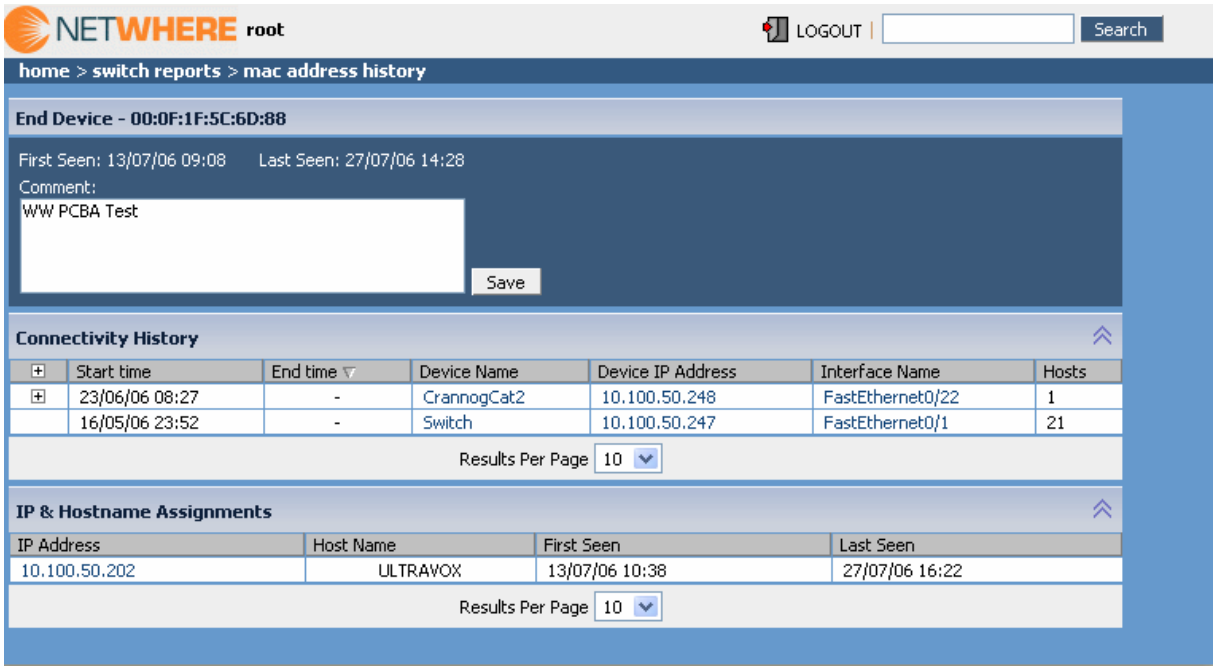
Connectivity History Details

Expand icon – the icon on the left hand side of each row. If a device has appeared and disappeared on a single interface, it is shown as one item on this list until the "expand" button is clicked, when the individual connections are listed with their start and end times.
Start Time – The start time of the connection
End Time – The end time of the connection or "-", if the connection is still active.
Device Name & IP Address – Name and address of the managed device to which this end device is connected.
Interface Name – The interface to which the device was connected
Hosts – The total number of network hosts sharing that interface. This indicates whether the connection is direct or via an uplink.

IP & Hostname Assignment Details

IP Address – The Assigned IP address
HostName – The name resolution of that IP address to hostname at the time of detection.
First Seen / Last Seen – The times between which the IP address and hostname were assigned to the device.

Use the **Results Per Page** to adjust the item count for each of the report sections. Click the collapse/expand icons on the right-hand-side of the title bars to hide or show either of the two sections.



End Device History

IP address history

Use this report to see the history of an IP address on the network. There are also two sections in this report. The connectivity history shows the history of the IP address and any movements it has made on the network. The second section is of particular interest to security, as it shows changing IP address and hostname assignments. Any network, apart from DHCP setups with a short or no address lease, should have static host-to-IP assignments. A changing IP address may be a sign of an attempted security breach.

Report Header Details

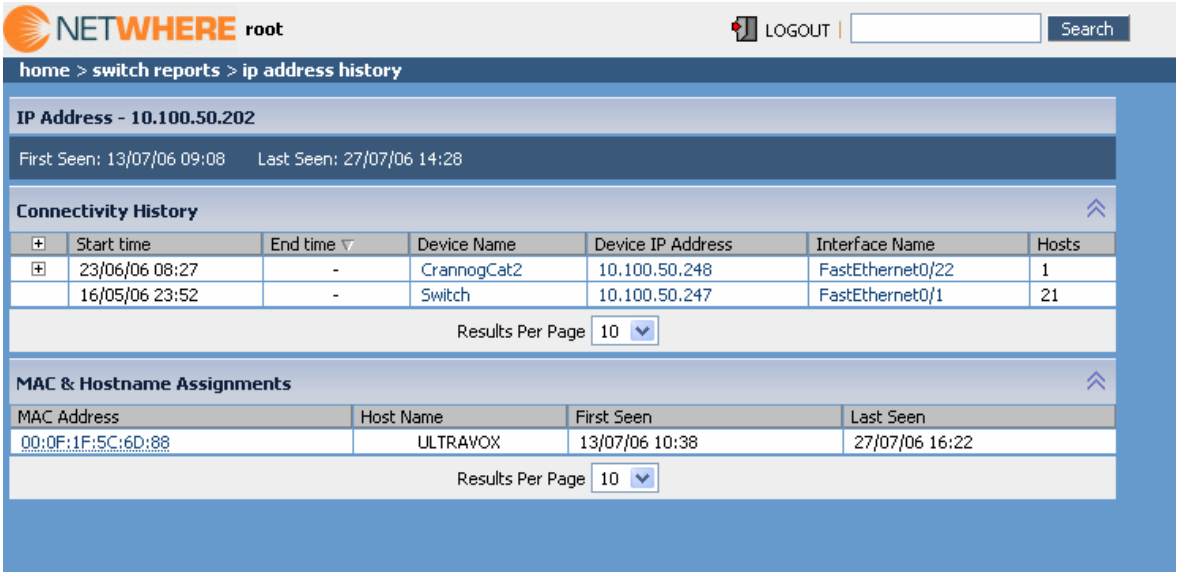
First Seen / Last Seen – the times between which the IP address has been detected on the network.

Connectivity History Details

Expand icon – the icon on the left hand side of each row. If a device has appeared and disappeared on a single interface, it is shown as one item on this list until the "expand" button is clicked, when the individual connections are listed with their start and end times.
Start Time / End Time – The start and end times for that specific connection.
Device Name / IP Address – Name and address of the managed device to which this end device is connected.
Interface Name – The interface to which the IP address was connected
Hosts – The total number of addresses seen on this port. This figure indicates whether or not the interface is an uplink.

MAC & Hostname Assignments Details

MAC Address / Host Name - The MAC Address and hostname assignments detected.
First Seen / Last Seen – The first and last times the above assignment was detected.



IP address history

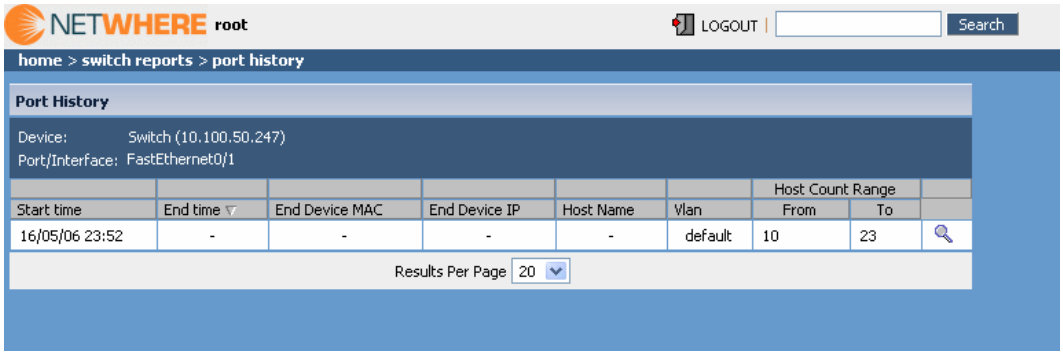
Port History

Another view of the connectivity history, this is simply a view of everything that has been connected into a particular switch port over time. This easily translates to "who has been sitting at that desk connecting to the network" and can provide a powerful security tool in tracing user movements.

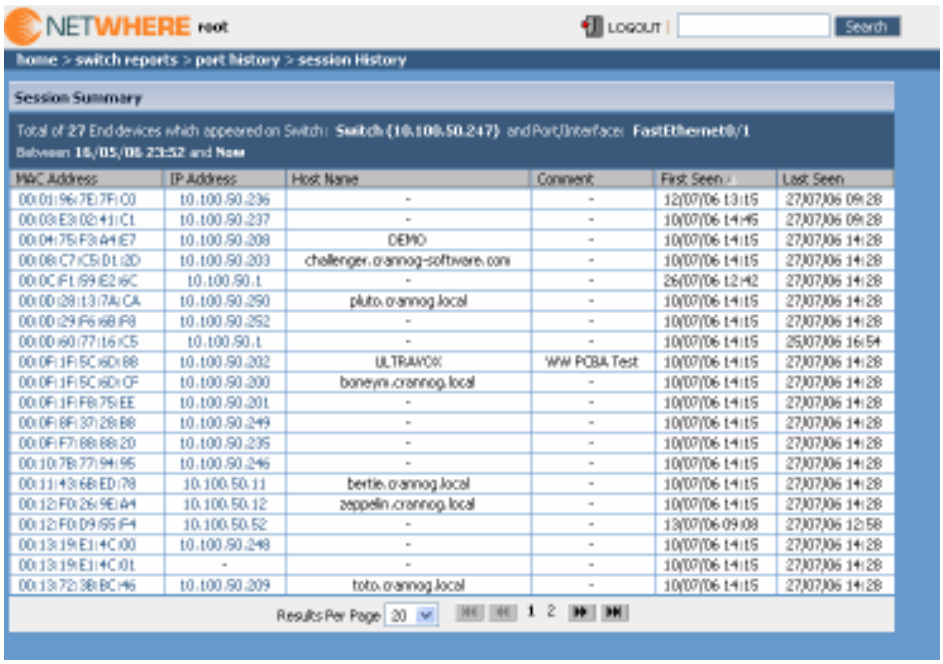
Report Details

Start Time / End Time– The time the connection began and ended. End time is shown as "-" if the connection is still active.
End Device MAC /IP / Hostname – Details of the end device connected to the port (single host connections only… see below)
Host Count Range – the maximum and minimum number of hosts connected to this port.

If more than one host has been connected, the port is an uplink and the End Device MAC, IP address or hostname are not shown on the line. To get the details of all hosts connected, click the magnifying glass icon for a detailed **Session History**, shown below.



Port History



Session History on a port

Advanced

Registry Settings

Note: Only experienced administrators should attempt to edit the registry. Editing the registry can result in irreparable damage and an un-bootable computer if care is not taken. Always take a backup of your system before performing these changes.

Netwhere's switch reporting module uses some registry settings to set variables like scan frequency and how long data is kept. If the user needs to these settings can be changed. Before attempting to change registry settings make a back up of all the current settings. After changing registry settings you must restart the netwhere service for the changes to take effect. The values in the registry are given in milli seconds. So the following shows how you would calculate 30 days:

*30 days * 24 hours * 60 mins * 60 secs * 1000 ms = 2592000000 ms*

To navigate to the Netwhere registry settings:

1. Click Start | Run and type in Regedit to open the Windows Registry Editor.
2. Navigate to and expand the HKEY_LOCAL_MACHINE | SOFTWARE | JavaSoft | Prefs | com | crannogsoftware | netwhere

The following keys are of interest in the switch forensics folder.

1. **historicsessiondataageout** – This key determines the storage period for connectivity data. By default it is set to 30 days. If you wish to keep data for longer you may increase this value. This will result in NetWhere taking up more disk space. Reducing this value will free up disk space.
2. **datapurgeperiod** – This value determines how often data that has aged out is purged. By default it is set to every 24 hours.
3. **switchscanperiod** – This value determines how often NetWhere scans all the switches in the system. By default it is set to every 30 minutes. Decreasing this value will make the scans run more often so the data will be more accurate however the amount of disk space needed will increase. Increasing this value will make the scans run less often and reduce the disk space needed.

The following keys are of interest in the maciphostservice folder:

1. **cachepurgeperiod** – This determines how often MAC to IP to hostname associations that have aged out are purged. By default it is set to every 6 hours.
2. **ipaddressageout** – This determines how often MAC to IP to hostname associations are stored for. By default this is set to 30 days. If you wish to keep data for longer you may increase this value. This will result in NetWhere taking up more disk space. Reducing this value will free up disk space.
3. **macageout** - This determines how often MAC addresses are stored for. By default this is set to 30 days. If you wish to keep data for longer you may increase this value. This will result in NetWhere taking up more disk space. Reducing this value will free up disk space.

Configuration Management

Introduction

The configuration management functionality allows the user to download the configuration of their devices at scheduled times or on demand. This functionality is only available on devices that support the CISCO-CONFIG-COPY-MIB. This MIB is not supported on Catalyst Switches. You must also be logged in as a user with configuration management permission to access this functionality.

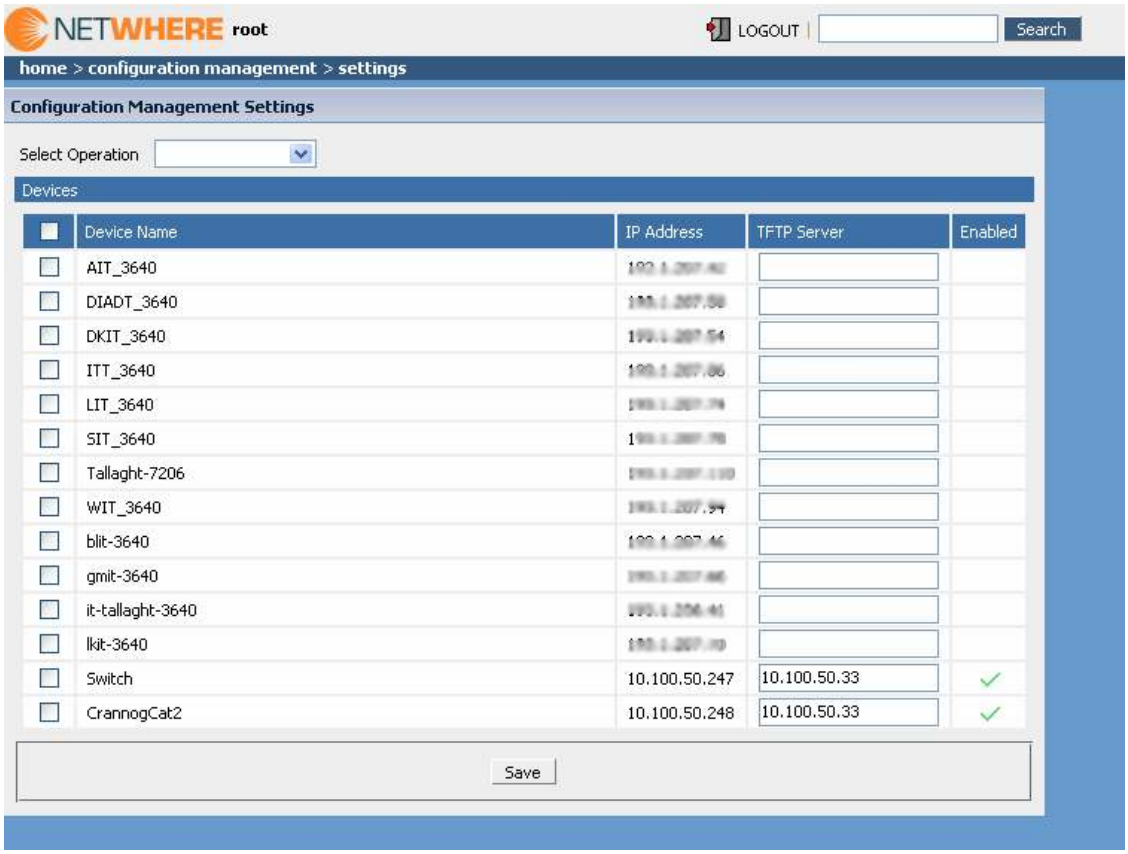
To enable or disable Configuration Management

By default, the configuration management feature is disabled in NetWhere. To enable the feature follow these steps. Note that care must be taken when modifying registry settings. Making the wrong changes could render your system unusable. Always make a full backup before performing any registry changes.

- Stop the NetWhere service
- In Regedit, open the key: HKEY_LOCAL_MACHINE\SOFTWARE\JavaSoft\Prefs\com\crannogsoftware\netwhere\tftp
- To enable the config management feature, set "enabled" to 1. To disable, set it to 0.
- If required, the TFTP port number can be set to a custom value in the same key
- Start the NetWhere service

Configuration Management Settings

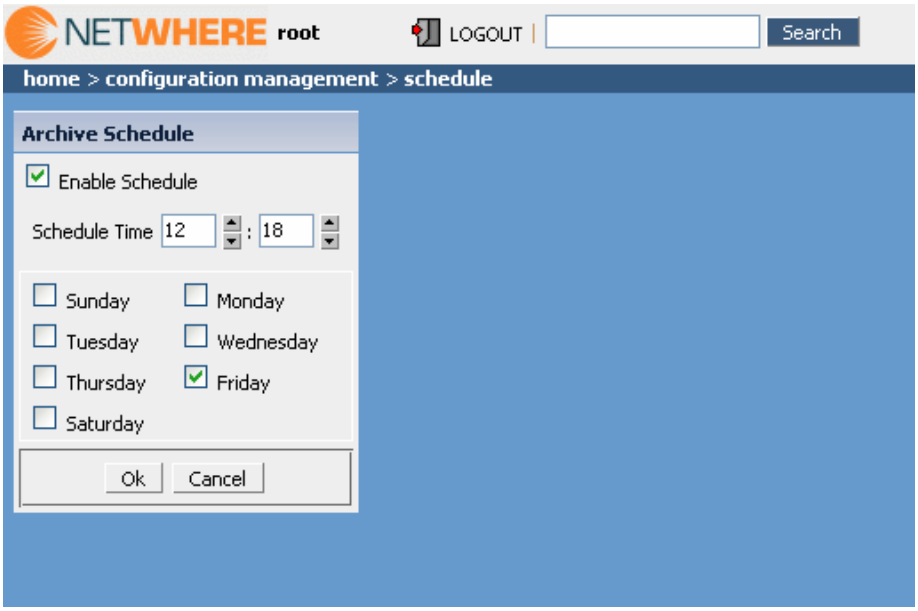
To access the **Configuration Management Settings** page browse to *home* > *configuration management* > *settings***.** You will be presented with the list of managed devices in your system that supports the configuration management functionality. To enable configuration management on a device select the checkbox beside that device and select **Enable Selected** from the dropdown list. You must also enter a valid tftp server for that device. Then select the **Save** button at the bottom of the page.



Editing Configuration management settings

Manage Configuration Archive schedule

To access the configuration management archive schedule navigate to *home* > *configuration management* > *schedule*. The archive schedule sets the times that the devices you have enabled configuration management on upload their configurations. You must first select the **Enable Schedule** checkbox. This must be selected if you want devices to upload their configurations. Then select the time and as many days as you would like to get the configurations from devices. Select the **Ok** button to save.



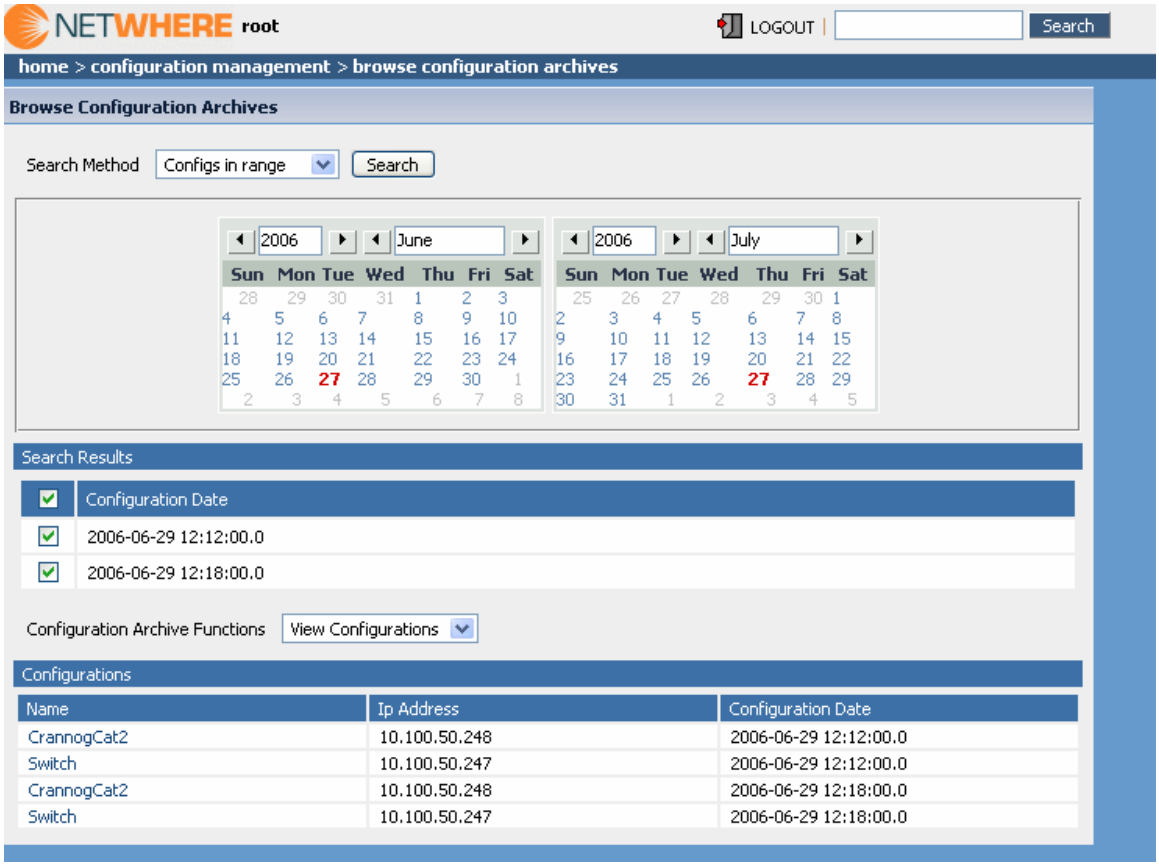
Setting the configuration archive schedule

Browse Configuration Archive

To access the Configuration archive browser navigate to *home* > *configuration management* > *browse configuration archives*. This section allows you to access the configuration archives in a number of ways, selected in the **Search Method** drop-down:

- **Find All Configs** – Search for every configuration that has been downloaded.
- **Select Single Day** – Search for configurations downloaded on a specified day
- **Configs From Date –** Retrieve configurations downloaded after a specified day
- **Configs to Date –** Retrieve configurations downloaded before a specified day
- **Configs in Range –** Find configurations downloaded between two dates

Once the search method is selected and dates specified, where applicable, the results will appear in the search results section with the download date and time for each. Select the checkbox beside the configs you wish to view and select **View Configurations** from the drop-down box. The list of devices that uploaded their configs on this date will then appear in the configurations section. Select the device name to view the configuration for that device.



Browsing the configuration archives

System Administration

Users and User Groups

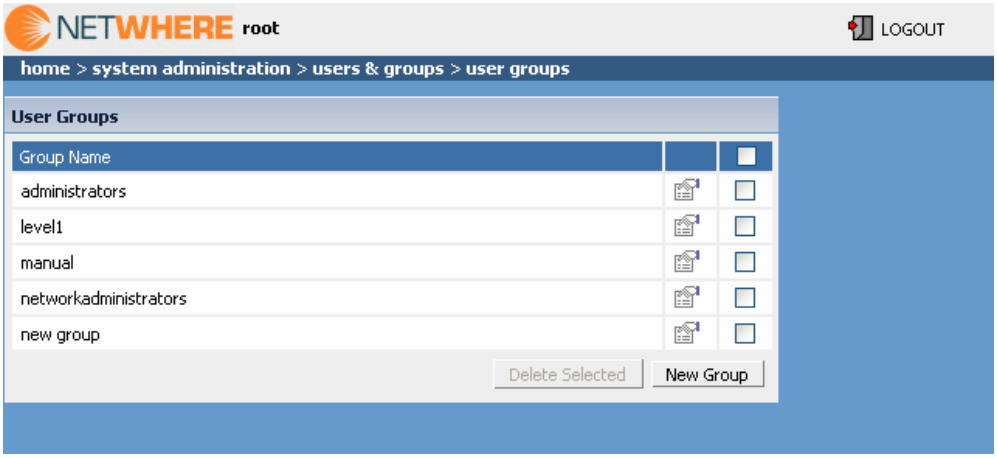
Just like devices the users of a system are managed in groups. User groups are defined by privileged users, the names of the groups and can reflect the organizational structure of the IT department e.g. 'administrators', 'first level operators' etc. The same benefits of grouping users apply here since an administrator can grant/revoke privileges to groups of users. The power of this feature becomes apparent when a new employee joins the IT department as a first level operator, in this case the administrator creates a new user for the employee and adds the user to the 'first level operator group'. The overhead of defining permissions for individual users is avoided by using user groups.

Create User Group

- Select the **New Group** button from the **User Groups** window
- Enter a name for the new user group
- Select (if required) users to add to the new group
- Press **OK**

Browse User Groups

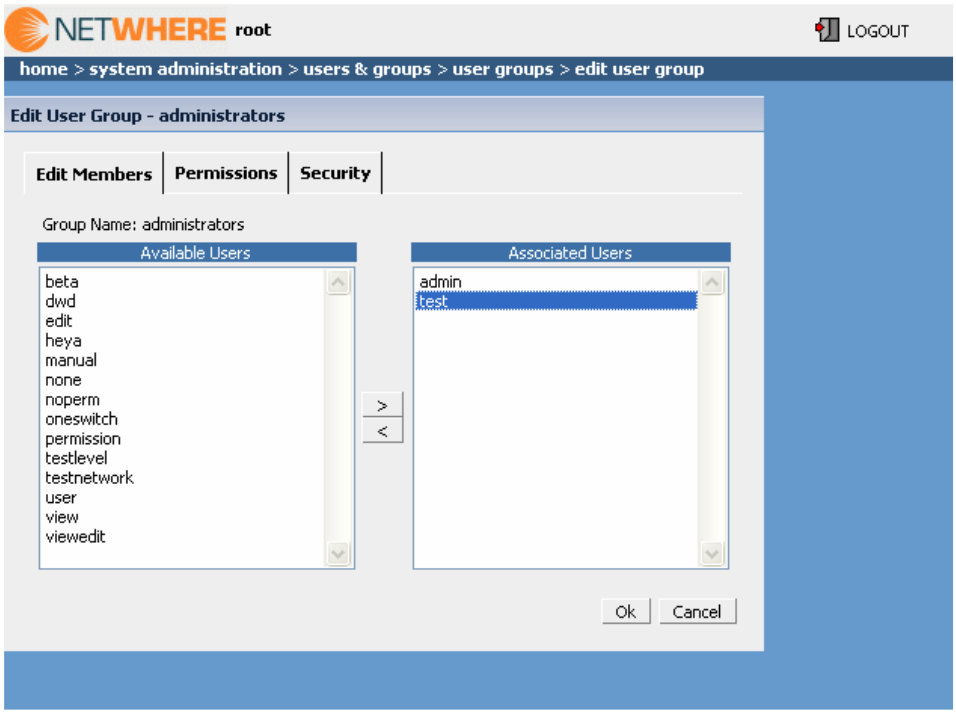
The browser can be accessed from the *System administration> users and groups menu*. The user group browser lists all of the user groups for which a user has **view privileges**. The contents of a user group can be viewed by selecting the properties icon beside the group. If a user has sufficient privileges the user can edit the contents of a user group i.e. add/remove devices to/from the selected group by pressing the properties icon beside the group to edit



Browsing user groups

Edit User Groups

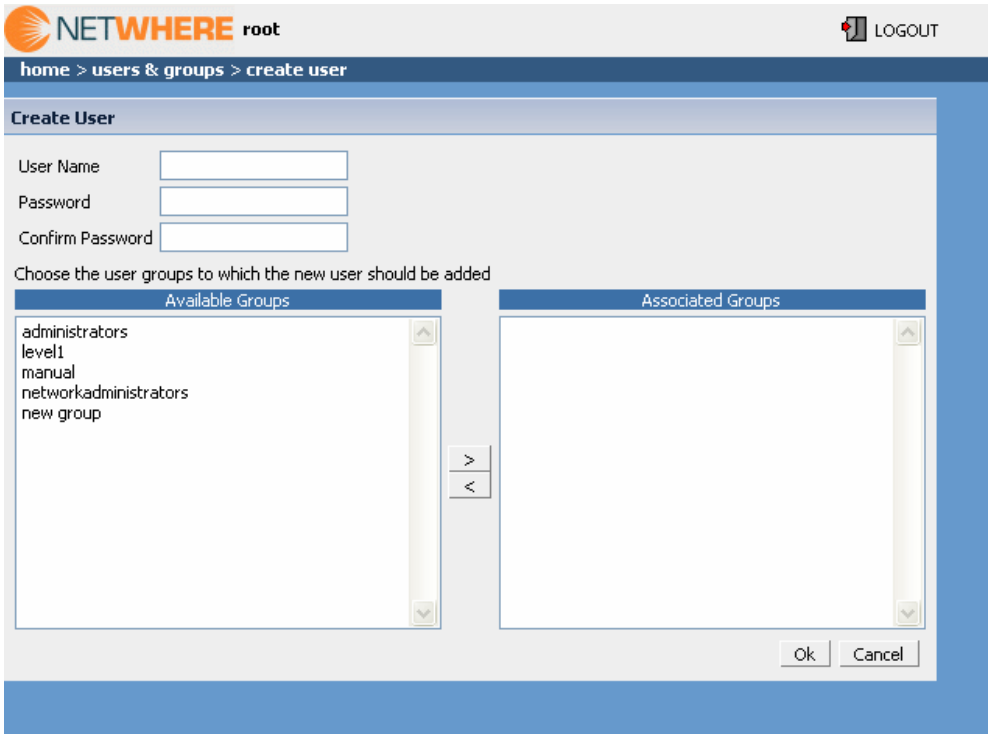
The user group editor is reached by selecting the properties icon beside the user group to edit. Users can be added to or removed from the group. If you have permission you may edit the permissions this user group has and in the **Security** tab edit the users and user groups who have permissions on this user group. To commit the changes to the user group press **Ok**.



Editing user groups

Adding Users

Select the **New User** button from the **User's** page. Enter the user name and a password. If you wish you may also add the user to a group.



Creating a user

User Access Control

NetWhere has a highly granular access control system which prevents users without sufficient privileges from getting access to managed devices or features on the system. Privileges are granted to user groups and users.

There are eight permission types:

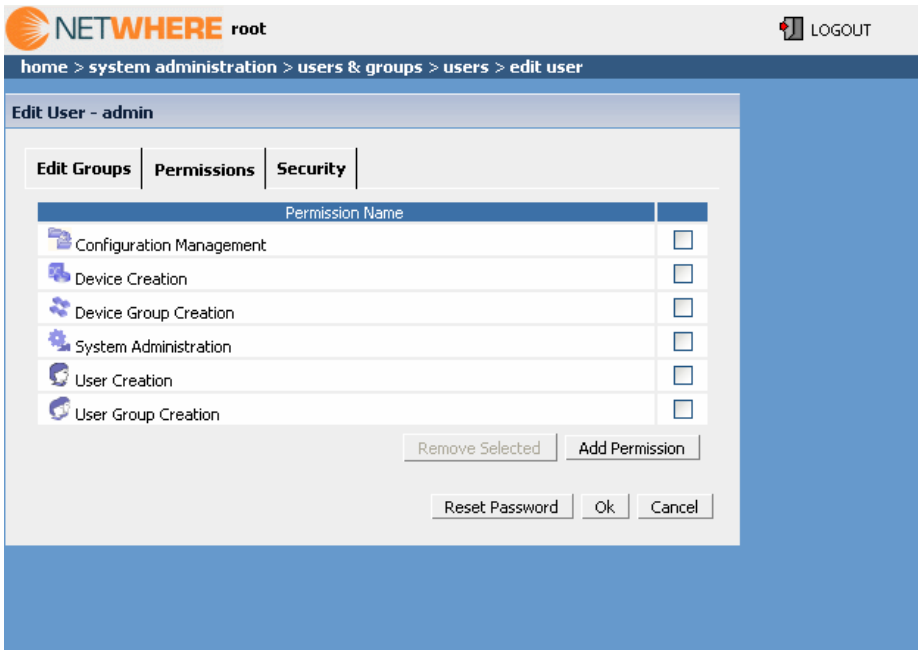
- **Device addition -** allows users to add new devices into the system
- **Device group creation** - allows users to add new device groups into the system
- **User creation** - allows users to add new users into the system
- **User group creation** - allows the user to add user groups into the system
- **System Administration Permission** - allows users to change settings of the NetWhere software
- **Configuration Management Permission -** allows users to view and retrieve device configurations stored in the system
- **Switch forensics -** allows the user to see the activity of end devices on the network
- **Switch Forensics with editing -** allows users to see and track end devices on the network and also to edit the comments associated with them

The following sections describe how to setup access control from scratch, however **Appendix 2: Example setup of access control** shows how to setup a simple access control system to illustrate the features of Netwhere's access control system.

Browsing and Managing Permissions

To view the permissions granted to a user group/User:

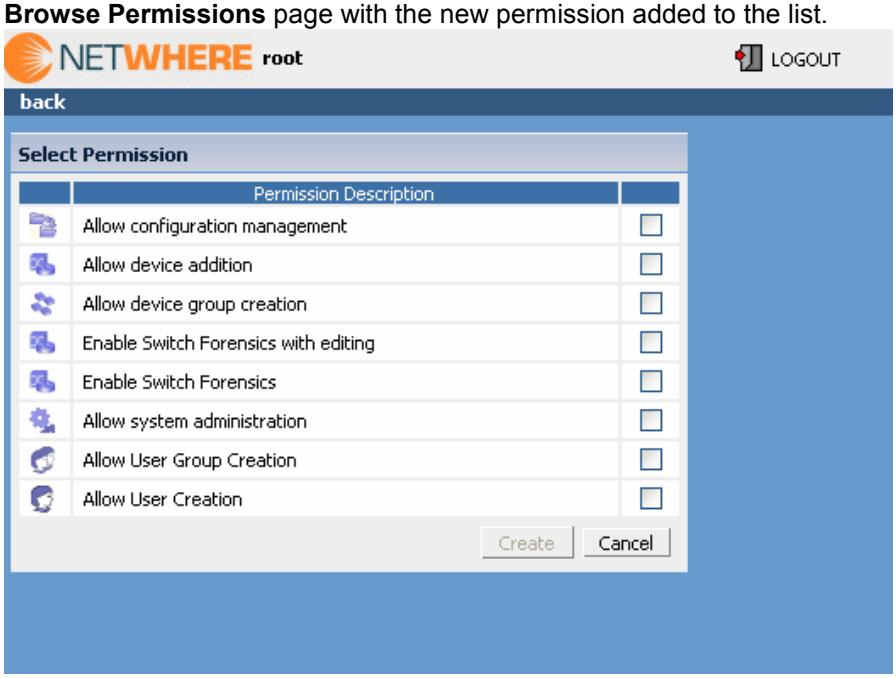
1. Select the **Properties** icon beside the user group/User in the user group's/User's page.
2. Select the **Permissions** tab. A table with the permission names are displayed.
3. Select permissions and click **Remove Selected** to delete permissions
4. Create new permissions by selecting permissions and clicking **Add Permission**



Editing user permissions

Granting Permissions

New permissions are granted to user groups/users by pressing the **Add Permission** button in the **Permissions** tab on the **User group editor**/**User Editor** page. The required permission type must be selected followed by pressing **Create**. This will return the browser to the **Browse Permissions** page with the new permission added to the list.



Selecting user permissions

Security

There is a **Security** tab in the properties page for four items: Users, User groups, Devices and Device Groups. In this security tab you specify which users/user groups have permissions on this item.

The different levels of permissions are:

- **View**- allows the user/user group to see this item in the system
- **Edit** - allows the user/user group to edit this item in the system
- **Delete -** allows the user/user group to delete this item from the system
- **Read Permissions -** allows the user/user group to view the permissions and security tab of this item
- **Change Permissions -** allows the user/user group to edit the permissions in the permissions and security tab for this item

Appendix 1: The NetWhere XML schema

The NetWhere xml schema governs the structure and format an import file must have when importing devices into NetWhere. A listing of the schema follows:

The XML Schema

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema"
        xmlns:n="csw:3n21"
        targetNamespace="csw:3n21" >

        <xsd:element name="deviceSet"  type="n:DeviceSet"/>

        <xsd:complexType name="DeviceSet">
                <xsd:sequence>
                        <xsd:element
                                name="group"
                                type="xsd:string"
                                minOccurs="1"
                                maxOccurs="100"/>

                        <xsd:element
                                name="device"
                                type="n:Device"
                                minOccurs="0"
                                maxOccurs="100"/>
                </xsd:sequence>
        </xsd:complexType>

        <xsd:complexType name="Device">
                <xsd:sequence>
                        <xsd:element
                                name="name"
                                minOccurs="0"
                                type="n:Name"/>
                        <xsd:element
                                name="description"
                                minOccurs="0"
                                type="n:Description"/>
                        <xsd:element
                                name="ipaddress"
                                type="n:IPAddress"/>
                        <xsd:element
                                name="readCommunityString"
                                default="public"
                                type="xsd:string"/>
                        <xsd:element
                                name="writeCommunityString"
                                default="private"
                                type="xsd:string"/>
                        <xsd:element
                                name="snmpVersion"
                                default="2"
                                type="n:SNMPVersion"/>
                </xsd:sequence>
        </xsd:complexType>

        <xsd:simpleType
                name="Name">
                <xsd:restriction
                        base="xsd:string">
                        <xsd:maxLength value="50"/>
                </xsd:restriction>
        </xsd:simpleType>
```

The XML Schema (cont'd)

```
        <xsd:simpleType name="Description">
                <xsd:restriction base="xsd:string">
                        <xsd:maxLength value="255"/>
                        <xsd:pattern value="([a-z]|[0-9]|[A-Z]|\s)*"/>
                </xsd:restriction>
        </xsd:simpleType>

        <xsd:simpleType name="IPAddress">
                <xsd:restriction base="xsd:string">
                        <xsd:pattern value="((1?[0-9]?[0-9])|(2[0-5][0-9])).((1?[0-
9]?[0-9])|(2[0-5][0-9])).((1?[0-9]?[0-9])|(2[0-5][0-9])).((1?[0-9]?[0-9])|(2[0-5][0-
9]))"/>
                </xsd:restriction>
        </xsd:simpleType>

        <xsd:simpleType name="SNMPVersion">
                <xsd:restriction base="xsd:integer">
                        <xsd:minInclusive value="1"/>
                        <xsd:maxInclusive value="2"/>
                </xsd:restriction>
        </xsd:simpleType>
</xsd:schema>
```

For an import document to be valid at least one device group name must be specified, the device groups listed will be the device groups to which the devices specified in the document will be added. NetWhere will create device groups for each device group specified if those groups do not already exist in the system. There is an upper limit of one hundred device groups which can be specified in an import document.

Following the device group specifications are the device specifications, there is a limit of one hundred devices per import document. For a device spec to be valid an ip address, a read and write community string and an SNMP version must be entered. A device name and description are optional. The schema also supplies default values for read and write community strings and SNMP version as 'public', 'private' and '2' respectively.

Sample Import Document

The following is an example of a valid import document:

```
<?xml version="1.0"?>
<d:deviceSet xmlns:xsi='http://www.w3.org/2001/XMLSchema-instance'
      xsi:schemaLocation="csw:3n21
http://www.3n21.com/3n21/devices.xsd"
      xmlns:d="csw:3n21">
      <group>All Devices</group>
      <device>
            <name>My Device</name>
            <description>My Device description</description>

            <ipaddress>10.1.1.1</ipaddress>

            <readCommunityString>public</readCommunityString>

            <writeCommunityString>private</writeCommunityString>

            <snmpVersion>2</snmpVersion>
      </device>

      <device>
            <ipaddress>10.1.1.2</ipaddress>

            <readCommunityString/>

            <writeCommunityString/>

            <snmpVersion/>
      </device>
</d:deviceSet>
```

Appendix 2: Example setup of access control

The following steps are an example of how the security features of NetWhere be can used to good effect. In this example we will have three types of user, system administrators, network administrators and level one operators. System administrators should be able to add users to the system, manage their permissions and add devices to the system and control access to them. Network Administrators should be able to see all devices in the system and perform certain operations on them. Level one operators should be able to see certain devices but not perform any operations on them.

Create 'administrators' user group

- Login as root.
- Create a user group called 'administrators' as outlined in the system administration section.
- Open the **Permission Browser** for the new group.
- Create new device permission for the administrator selecting **Allow Device Group Creation** and **Allow Device Addition**.
- Create a User Permission for the 'administrators' group selecting **Allow User Group Creation** and **Allow User Creation** and select the 'administrators' user group under the group specific permission section and select **View**. Press **OK**.
- Create a **System Administration** permission for the administrators user group
- Create a **Configuration Management** permission for the 'administrators' user group.
- Create a **Switch Forensics** permission for the administrators group by selecting **Enable Switch Forensics** and **Enable Switch Forensics with editing**.
- Now that the administrators user group has been created create a user 'test_administrator' and add it to the 'administrators' user group.
- Logout.

Populate Database

Now devices can be added to the system.

- Login as 'test_administrator'.
- Create a device group called 'All Devices'.
- Add devices to the system as outlined in the 'Devices and Device Groups' section selecting the 'All Devices' group to which the new devices should be added.
- Alternatively an xml file can be created which contains all of the details of all of the devices to add and can be imported in the 'Import devices' page.

Create Network Administrators and Level One Operators

Now that devices are added to the system, users need to be added to the system to manage these devices.

- Still logged in as 'test_administrator' create a new user group called 'network administrators'.
- Assign new device permission for the 'network administrators', these users should be allowed to create device groups (but not devices).
- Go to the **Device Groups** page. Select the properties icon beside the 'All Devices' group. Select the **Security** tab. Select **Add Permission**. Select 'network administrators' and **View**.
- Create another user group called 'level1' and assign **View** permission on the 'All Devices' device group.
- Create user 'test_networkadmin' for the 'network administrators'.
- Create users 'test_level1' for the 'level1' user group.

The effects of these steps is best seen by logging into the system as different users (being members of one of the groups created above).
When logged in as a 'test_level1' most of the menus are disabled, the only menus available to this operator are the devices and device groups menu items in the main menu.
When logged in as 'test_networkadmin' the create group button is enabled in the device groups page.

Appendix 3: Third Party Software Components

NetWhere makes use of several third party libraries, distributed under various licenses.

MM.MySQL

NetWhere includes MM.MySQL v 4.1.11, available at http://sourceforge.net/projects/mmmysql/. This is distributed under the lesser GNU Public License, a copy of which is available at http://www.gnu.org/licenses/lgpl.html.

Jakarta Log4j

This product includes software developed by the Apache Software Foundation (http://www.apache.org/).
NetWhere includes Jakarta Log4j v1.2.9, available at http://jakarta.apache.org/log4j/. This is distributed under the Apache Software License, a copy of which is available at http://www.apache.org/LICENSE.

Jakarta Tomcat

This product includes software developed by the Apache Software Foundation (http://www.apache.org/).
NetWhere includes Jakarta Tomcat v5.0.28, available at http://jakarta.apache.org/tomcat/. This is distributed under the Apache Software License, a copy of which is available at http://www.apache.org/LICENSE.

joeSNMP

NetWhere includes joeSNMP v0.2.6, available at http://www.opennms.org/files/releases/joeSNMP/. This is distributed under the Lesser GNU Public License, a copy of which is available at http://www.gnu.org/licenses/lgpl.html.

References

XML Schema Primer http://www.w3.org/TR/xmlschema-0/#Intro