Adding new entry:

Click to add a new entry to the Static ARP Inspection table. Specify the Port, VLAN ID, MAC address, and IP address for the new entry. Click "Save".

Buttons:

Save – Click to save changes.

Reset – Click to undo any changes made locally and revert to previously saved values.

5.2.3 Dynamic Table

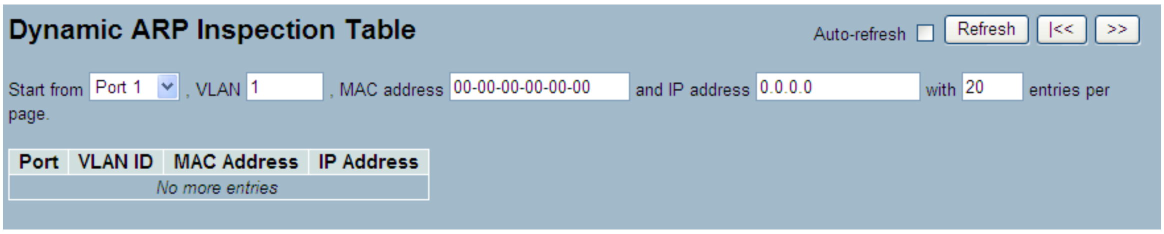
The section describes how to configure the Dynamic ARP Inspection Table parameters of the switch. The Dynamic ARP Inspection Table contains up to 1024 entries, and is sorted first by port, then by VLAN ID, then by MAC address, and then by IP address.

To configure a Dynamic ARP Inspection Table Configuration in the web interface:

1. Specify the Start from port, VLAN ID, MAC Address, IP Address, and entry per page.

2. Check “Auto-refresh”.

Figure 5-2.3: The Dynamic ARP Inspection Table



Dynamic ARP Inspection Table

Start from Port 1, VLAN 1, MAC address 00-00-00-00-00-00 and IP address 0.0.0.0 with 20 entries per page.

Port	VLAN ID	MAC Address	IP Address
No more entries			

Parameter description:

Port:

Switch Port Number for which the entries are displayed.

VLAN ID:

VLAN-ID in which the ARP traffic is permitted.

MAC Address:

User MAC address of the entry.

IP Address:

User IP address of the entry.

Auto-refresh:

Activate the auto-refresh to refresh the information automatically.

Refresh:

Refresh the Dynamic ARP Inspection Table manually

|<<, >>:

Go to previous/next entry or page.

5.3 DHCP Snooping

The section describes how to configure the DHCP Snooping parameters of the switch. The DHCP Snooping can prevent attackers from adding their own DHCP servers to the network.

5.3.1 Configuration

This section describes how to configure DHCP Snooping setting including:

Snooping Mode (Enabled and Disabled)

Port Mode Configuration (Trusted, Untrusted)

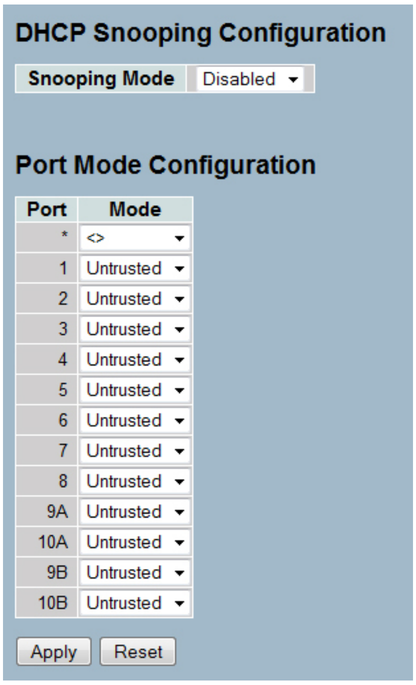
To configure DHCP Snooping in the web interface:

1. Select "Enabled" in the Mode of DHCP Snooping Configuration.

2. Select "Trusted" of the specific port in the Mode of Port Mode Configuration.

3. Click Apply.

Figure 5-3.1: The DHCP Snooping Configuration (GS-2310P)



DHCP Snooping Configuration

Snooping Mode: Disabled

Port Mode Configuration

Port	Mode
*	<>
1	Untrusted
2	Untrusted
3	Untrusted
4	Untrusted
5	Untrusted
6	Untrusted
7	Untrusted
8	Untrusted
9A	Untrusted
10A	Untrusted
9B	Untrusted
10B	Untrusted

Parameter description:

Snooping Mode:

Indicates the DHCP snooping mode operation. Possible modes are:

Enabled: Enable DHCP snooping mode operation. When DHCP snooping mode operation is enabled, the DHCP request messages will be forwarded to trusted ports and only allow reply packets from trusted ports.

Disabled: Disable DHCP snooping mode operation.

Port Mode:

Indicates the DHCP snooping port mode. Possible port modes are:

Trusted: Configures the port as trusted source of the DHCP messages.

Untrusted: Configures the port as untrusted source of the DHCP messages.

Buttons:

Save – Click to save changes.

Reset – Click to undo any changes made locally and revert to previously saved values.

5.3.2 Statistics

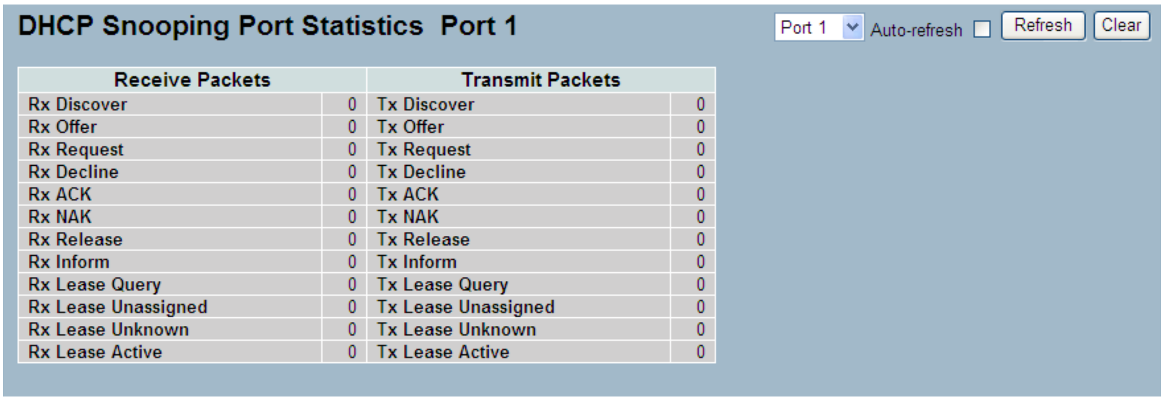
The section describes to show the DHCP Snooping Statistics information of the switch. The statistics shows only packet counters when DHCP snooping mode is enabled and relay mode is disabled. It doesn't count the DHCP packets for DHCP clients.

To configure a DHCP Snooping Statistics in the web interface:

1. Specify the Port which you want to monitor.

2. Check "Auto-refresh".

Figure 5-3.2: The DHCP Snooping Port Statistics



DHCP Snooping Port Statistics Port 1

Receive Packets		Transmit Packets	
Rx Discover	0	Tx Discover	0
Rx Offer	0	Tx Offer	0
Rx Request	0	Tx Request	0
Rx Decline	0	Tx Decline	0
Rx ACK	0	Tx ACK	0
Rx NAK	0	Tx NAK	0
Rx Release	0	Tx Release	0
Rx Inform	0	Tx Inform	0
Rx Lease Query	0	Tx Lease Query	0
Rx Lease Unassigned	0	Tx Lease Unassigned	0
Rx Lease Unknown	0	Tx Lease Unknown	0
Rx Lease Active	0	Tx Lease Active	0

Parameter description:

Rx and Tx Discover:

The number of discover (option 53 with value 1) packets received and transmitted.

Rx and Tx Offer:

The number of offer (option 53 with value 2) packets received and transmitted.

Rx and Tx Request:

The number of request (option 53 with value 3) packets received and transmitted.

Rx and Tx Decline:

The number of decline (option 53 with value 4) packets received and transmitted.

Rx and Tx ACK:

The number of ACK (option 53 with value 5) packets received and transmitted.

Rx and Tx NAK:

The number of NAK (option 53 with value 6) packets received and transmitted.

Rx and Tx Release:

The number of release (option 53 with value 7) packets received and transmitted.

Rx and Tx Inform:

The number of inform (option 53 with value 8) packets received and transmitted.

Rx and Tx Lease Query:

The number of lease query (option 53 with value 10) packets received and transmitted.

Rx and Tx Lease Unassigned:

The number of lease unassigned (option 53 with value 11) packets received and transmitted.

Rx and Tx Lease Unknown:

The number of lease unknown (option 53 with value 12) packets received and transmitted.

Rx and Tx Lease Active:

The number of lease active (option 53 with value 13) packets received and transmitted.

Auto-refresh:

Activate the auto-refresh to refresh the information automatically.

Refresh:

Refresh the DHCP Snooping Port Statistics manually.

Clear:

Clear the entries.

5.4 DHCP Relay

The section describes how to forward DHCP requests to another specific DHCP servers via DHCP relay. The DHCP servers may be on another network.

5.4.1 Configuration

This section describes how to configure DHCP Relay setting including:

Relay Mode (Enabled and Disabled)

Relay Server IP setting

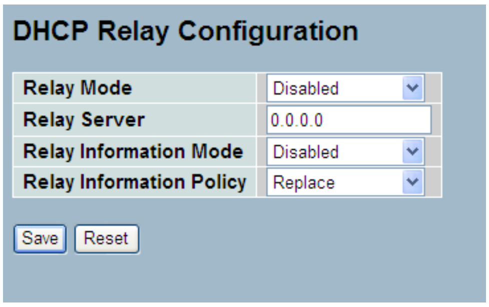
Relay Information Mode (Enabled and Disabled)

Relay Information Mode Policy (Replace, Keep and Drop)

To configure a DHCP Relay in the web interface:

1. Select “Enabled” in the Relay Mode of DHCP Relay Configuration.
2. Specify Relay Server IP address.
3. Select “Enabled” in the Relay Information Mode of DHCP Relay Configuration.
4. Specify Relay (Replace, Keep and Drop) in the Relay Information Mode of DHCP Relay Configuration.
5. Click Apply.

Figure 5-4.1: The DHCP Relay Statistics



DHCP Relay Configuration

Relay Mode	Disabled
Relay Server	0.0.0.0
Relay Information Mode	Disabled
Relay Information Policy	Replace

Parameter description:

Relay Mode:

Indicates the DHCP relay mode operation. Possible modes are:

Enabled: Enable DHCP relay mode operation. When DHCP relay mode operation is enabled, the agent forwards and transfers DHCP messages between the clients and the server when they are not in the same subnet domain. And the DHCP broadcast message won't be flooded for security considerations.

Disabled: Disable DHCP relay mode operation.

Relay Server:

Indicates the DHCP relay server IP address. A DHCP relay agent is used to forward and to transfer DHCP messages between the clients and the server when they are not in the same subnet domain.

Relay Information Mode:

Indicates the DHCP relay information mode option operation. Possible modes are:

Enabled: Enable DHCP relay information mode operation. When DHCP relay information mode operation is enabled, the agent inserts specific information (option 82) into a DHCP message when forwarding to DHCP server and removes it from a DHCP message when transferring to DHCP client. It only works when DHCP relay operation mode is enabled.

Disabled: Disable DHCP relay information mode operation.

Relay Information Policy:

Indicates the DHCP relay information option policy. When DHCP relay information mode operation is enabled, if agent receives a DHCP message that already contains relay agent information it will enforce the policy. And it only works under DHCP if relay information operation mode is enabled. Possible policies are:

Replace: Replace the original relay information when a DHCP message that already contains it is received.

Keep: Keep the original relay information when a DHCP message that already contains it is received.

Drop: Drop the package when a DHCP message that already contains relay information is received.

Buttons:

Save – Click to save changes.

Reset – Click to undo any changes made locally and revert to previously saved values.

5.4.2 Statistics

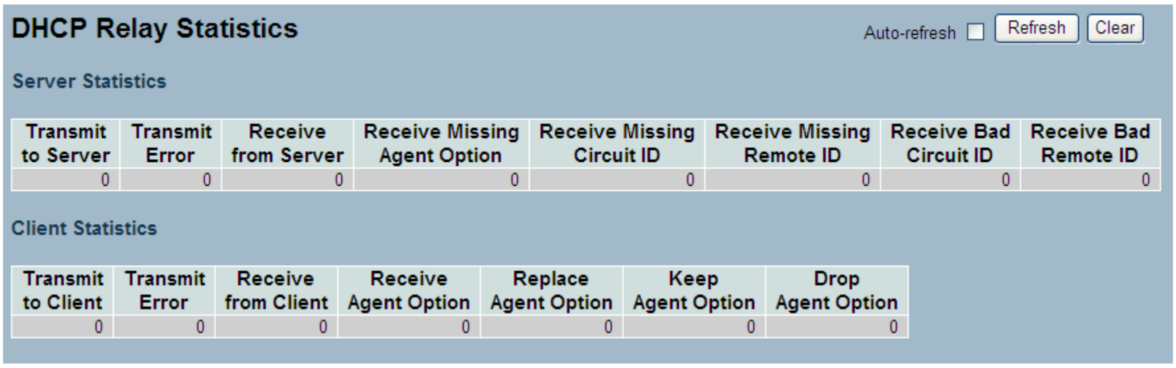
The section describes to show the DHCP Relay Statistics information of the switch. The statistics show both of Server and Client packet counters when DHCP Relay mode is enabled.

Web Interface

To configure a DHCP Snooping Statistics in the web interface:

1. Check “Auto-refresh”.

Figure 5-4.2: The DHCP Relay Statistics



Server Statistics

Transmit to Server	Transmit Error	Receive from Server	Receive Missing Agent Option	Receive Missing Circuit ID	Receive Missing Remote ID	Receive Bad Circuit ID	Receive Bad Remote ID
0	0	0	0	0	0	0	0

Client Statistics

Transmit to Client	Transmit Error	Receive from Client	Receive Agent Option	Replace Agent Option	Keep Agent Option	Drop Agent Option
0	0	0	0	0	0	0

Parameter description:

Transmit to Server:

The number of packets that are relayed from client to server.

Transmit Error:

The number of packets that resulted in errors while being sent to clients.

Receive from Server:

The number of packets received from server.

Receive Missing Agent Option:

The number of packets received without agent information options.

Receive Missing Circuit ID:

The number of packets received with the Circuit ID option missing.

Receive Missing Remote ID:

The number of packets received with the Remote ID option missing.

Receive Bad Circuit ID:

The number of packets whose Circuit ID option did not match known circuit ID.

Receive Bad Remote ID:

The number of packets whose Remote ID option did not match known Remote ID.

Client Statistics

Transmit to Client:

The number of relayed packets from server to client.

Transmit Error:

The number of packets that resulted in error while being sent to servers.

Receive from Client:

The number of received packets from server.

Receive Agent Option:

The number of received packets with relay agent information option.

Replace Agent Option:

The number of packets which were replaced with relay agent information option.

Keep Agent Option:

The number of packets whose relay agent information was retained.

Drop Agent Option:

The number of packets that were dropped which were received with relay agent information.

Auto-refresh:

Activate the auto-refresh to refresh the information automatically.

Refresh:

Refresh the DHCP Relay Statistics manually.

Clear:

Clear the entries.

5.5 NAS

The section describes how to configure the NAS parameters of the switch. The NAS server can be employed to connect users to a variety of resources including Internet access, conference calls, printing documents on shared printers, or by simply logging on to the Internet.

5.5.1 Configuration

This section describes how to configure NAS according to IEEE 802.1X, MAC-based authentication system, and port settings. The NAS configuration consists of two sections, system- and port-wide.

To configure the Network Access Server in the web interface:

1. Select “Enabled” in the Mode of Network Access Server Configuration.

2. Check Reauthentication Enabled.

3. Set Reauthentication Period (Default is 3600 seconds).

4. Set EAPOL Timeout (Default is 30 seconds).

5. Set Aging Period (Default is 300 seconds).

6. Set Hold Time (Default is 10 seconds).

7. Check RADIUS-Assigned QoS Enabled.

8. Check RADIUS-Assigned VLAN Enabled.

9. Check Guest VLAN Enabled.

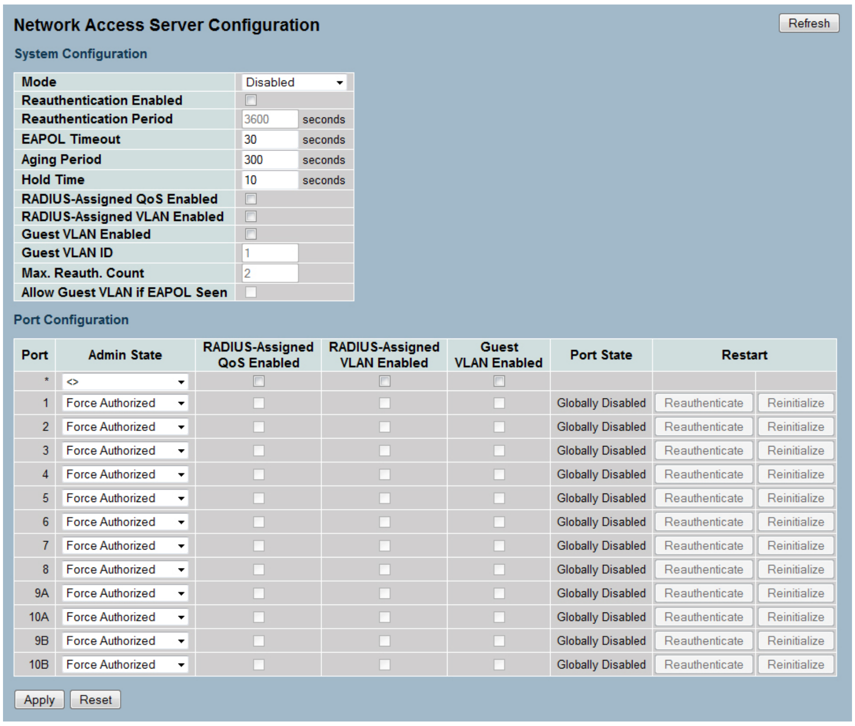
10. Specify Guest VLAN ID.

11. Specify Max. Reauth. Count.

12. Checked Allow Guest VLAN if EAPOL Seen.

13. Click Apply.

Figure 5-5.1: The Network Access Server Configuration (GS-2310P)



Network Access Server Configuration

System Configuration

Mode	Disabled	
Reauthentication Enabled	□	
Reauthentication Period	3600	seconds
EAPOL Timeout	30	seconds
Aging Period	300	seconds
Hold Time	10	seconds
RADIUS-Assigned QoS Enabled	□	
RADIUS-Assigned VLAN Enabled	□	
Guest VLAN Enabled	□	
Guest VLAN ID	1	
Max. Reauth. Count	2	
Allow Guest VLAN if EAPOL Seen	□	

Port Configuration

Port	Admin State	RADIUS-Assigned QoS Enabled	RADIUS-Assigned VLAN Enabled	Guest VLAN Enabled	Port State	Restart	
*	<>	□	□	□			
1	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
2	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
3	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
4	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
5	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
6	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
7	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
8	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
9A	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
10A	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
9B	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize
10B	Force Authorized	□	□	□	Globally Disabled	Reauthenticate	Reinitialize

Parameter description:

Mode:

Indicates if NAS is globally enabled or disabled on the switch. If globally disabled, all ports are allowed forwarding of frames.

Reauthentication Enabled:

If checked, successfully authenticated supplicants/clients are reauthenticated after the interval specified by the Reauthentication Period. Reauthentication for 802.1X-enabled ports can be used to detect if a new device is plugged into a switch port or if a supplicant is no longer attached.

For MAC-based ports, reauthentication is only useful if the RADIUS server configuration has changed. It does not involve communication between the switch and the client, and therefore doesn't imply that a client is still present on a port (see Aging Period below).

Reauthentication Period:

Determines the period, in seconds, after which a connected client must be reauthenticated. This is only active if the Reauthentication Enabled checkbox is checked. Valid values are in the range 1 to 3600 seconds.

EAPOL Timeout:

Determines the time for retransmission of Request Identity EAPOL frames.

Valid values are in the range 1 to 255 seconds. This has no effect for MAC-based ports.

Aging Period:

This setting applies to the following modes, i.e. modes using the Port Security functionality to secure MAC addresses:

- Single 802.1X
- Multi 802.1X
- MAC-Based Auth.

When the NAS module uses the Port Security module to secure MAC addresses, the Port Security module needs to check for activity on the MAC address in question at regular intervals and free resources if no activity is seen within a given period of time. This parameter controls exactly this period and can be set to a number between 10 and 1000000 seconds.

If reauthentication is enabled and the port is in an 802.1X-based mode, this is not so critical, since supplicants that are no longer attached to the port will get removed upon the next reauthentication, which will fail. But if reauthentication is not enabled, the only way to free resources is by aging the entries.

For ports in MAC-based Auth. mode, reauthentication doesn't cause direct communication between the switch and the client, so this will not detect whether the client is still attached or not, and the only way to free any resources is to age the entry.

Hold Time:

This setting applies to the following modes, i.e. modes using the Port Security functionality to secure MAC addresses:

- Single 802.1X
- Multi 802.1X
- MAC-Based Auth.

If a client is denied access - either because the RADIUS server denies the client access or because the RADIUS server request times out (according to the timeout specified on the "Configuration Security AAA" page) - the client is put on hold in the Unauthorized state. The hold timer does not count during an on-going authentication.

In MAC-based Auth. mode, the switch will ignore new frames coming from the client during the hold time.

The Hold Time can be set to a number between 10 and 1000000 seconds.

RADIUS-Assigned QoS Enabled:

RADIUS-assigned QoS provides a means to centrally control the traffic class to which traffic coming from a successfully authenticated supplicant is assigned on the switch. The RADIUS server must be configured to transmit special RADIUS attributes to take advantage of this feature (see RADIUS-Assigned QoS Enabled below for a detailed description)

The "RADIUS-Assigned QoS Enabled" checkbox provides a quick way to globally enable/disable RADIUS-server assigned QoS Class functionality. When checked, the individual ports' ditto setting determine whether RADIUS-assigned QoS Class is enabled on that port. When unchecked, RADIUS-server assigned QoS Class is disabled on all ports.

RADIUS-Assigned VLAN Enabled:

RADIUS-assigned VLAN provides a means to centrally control the VLAN on which a successfully authenticated supplicant is placed on the switch. Incoming traffic will be classified to and switched on the RADIUS-assigned VLAN. The RADIUS server must be configured to transmit special RADIUS attributes to take advantage of this feature (see RADIUS-Assigned VLAN Enabled below for a detailed description).

The "RADIUS-Assigned VLAN Enabled" checkbox provides a quick way to globally enable/disable RADIUS-server assigned VLAN functionality. When checked, the individual ports' ditto setting determine whether RADIUS-assigned VLAN is enabled on that port. When unchecked, RADIUS-server assigned VLAN is disabled on all ports.

Guest VLAN Enabled:

A Guest VLAN is a special VLAN - typically with limited network access - on which 802.1X-unaware clients are placed after a network administrator-defined timeout. The switch follows a set of rules for entering and leaving the Guest VLAN as listed below.

The "Guest VLAN Enabled" checkbox provides a quick way to globally enable/disable Guest VLAN functionality. When checked, the individual ports' ditto setting determines whether the port can be moved into Guest VLAN. When unchecked, the ability to move to the Guest VLAN is disabled on all ports.

Guest VLAN ID:

This is the value that a port's Port VLAN ID is set to if a port is moved into the Guest VLAN. It is only changeable if the Guest VLAN option is globally enabled.

Valid values are in the range [1; 4094].

Max. Reauth. Count:

The number of times the switch transmits an EAPOL Request Identity frame without response before considering entering the Guest VLAN is adjusted with this setting. The value can only be changed if the Guest VLAN option is globally enabled.

Valid values are in the range [1; 255].

Allow Guest VLAN if EAPOL Seen:

The switch remembers if an EAPOL frame has been received on the port for the life-time of the port. Once the switch considers whether to enter the Guest VLAN, it will first check if this option is enabled or disabled. If disabled (unchecked; default), the switch will only enter the Guest VLAN if an EAPOL frame has not been received on the port for the life-time of the port. If enabled (checked), the switch will consider entering the Guest VLAN even if an EAPOL frame has been received on the port for the life-time of the port.

The value can only be changed if the Guest VLAN option is globally enabled.

Port Configuration:

The table has one row for each port on the selected switch and a number of columns, which are:

Port:

The port number for which the configuration below applies.

Admin State:

If NAS is globally enabled, this selection controls the port's authentication mode. The following modes are available:

Force Authorized:

In this mode, the switch will send one EAPOL Success frame when the port link comes up, and any client on the port will be allowed network access without authentication.

Force Unauthorized:

In this mode, the switch will send one EAPOL Failure frame when the port link comes up, and any client on the port will be disallowed network access.

Port-based 802.1X:

In the 802.1X-world, the user is called the supplicant, the switch is the authenticator, and the RADIUS server is the authentication server. The authenticator acts as the man-in-the-middle, forwarding requests and responses between the supplicant and the authentication server. Frames sent between the supplicant and the switch are special 802.1X frames, known as EAPOL (EAP Over LANs) frames. EAPOL frames encapsulate EAP PDUs (RFC3748). Frames sent between the switch and the RADIUS server are RADIUS packets. RADIUS packets also encapsulate EAP PDUs together with other attributes like the switch's IP address, name, and the supplicant's port number on the switch. EAP is very flexible, in that it allows for different authentication methods, like MD5-Challenge, PEAP, and TLS. The important thing is that the authenticator (the switch) doesn't need to know which authentication method the supplicant and the authentication server are using, or how many information exchange frames are needed for a particular method. The switch simply encapsulates the EAP part of the frame into the relevant type (EAPOL or RADIUS) and forwards it.

When authentication is complete, the RADIUS server sends a special packet containing a success or failure indication. Besides forwarding this decision to the supplicant, the switch uses it to open up or block traffic on the switch port connected to the supplicant

Suppose two backend servers are enabled and that the server timeout is configured to X seconds (using the AAA configuration page), and suppose that the first server in the list is currently down (but not considered dead).

Now, if the supplicant retransmits EAPOL Start frames at a rate faster than X seconds, then it will never get authenticated, because the switch will cancel on-going backend authentication server requests whenever it receives a new EAPOL Start frame from the supplicant.

And since the server hasn't yet failed (because the X seconds haven't expired), the same server will be contacted upon the next backend authentication server request from the switch. This scenario will loop forever. Therefore, the server timeout should be smaller than the supplicant's EAPOL Start frame retransmission rate.

Single 802.1X:

In port-based 802.1X authentication, once a supplicant is successfully authenticated on a port, the whole port is opened for network traffic. This allows other clients connected to the port (for instance through a hub) to piggy-back on the successfully authenticated client and get network access even though they really aren't authenticated. To overcome this security breach, use the Single 802.1X variant. Single 802.1X is really not an IEEE standard, but features many of the same characteristics as does port-based 802.1X. In Single 802.1X, at most one supplicant can get authenticated on the port at a time. Normal EAPOL frames are used in the communication between the supplicant and the switch. If more than one supplicant is connected to a port, the one that comes first when the port's link comes up will be the first one considered. If that supplicant doesn't provide valid credentials within a certain amount of time, another supplicant will get a chance. Once a supplicant is successfully authenticated, only that supplicant will be allowed access. This is the most secure of all the supported modes. In this mode, the Port Security module is used to secure a supplicant's MAC address once successfully authenticated.

Multi 802.1X:

In port-based 802.1X authentication, once a supplicant is successfully authenticated on a port, the whole port is opened for network traffic. This allows other clients connected to the port (for instance through a hub) to piggy-back on the successfully authenticated client and get network access even though they really aren't authenticated. To overcome this security breach, use the Multi 802.1X variant.

Multi 802.1X is really not an IEEE standard, but features many of the same characteristics as does port-based 802.1X. Multi 802.1X is - like Single 802.1X - not an IEEE standard, but a variant that features many of the same characteristics. In Multi 802.1X, one or more supplicants can get authenticated on the same port at the same time. Each supplicant is authenticated individually and secured in the MAC table using the Port Security module.

In Multi 802.1X it is not possible to use the multicast BPDU MAC address as destination MAC address for EAPOL frames sent from the switch towards the supplicant, since that would cause all supplicants attached to the port to reply to requests sent from the switch. Instead, the switch uses the supplicant's MAC address, which is obtained from the first EAPOL Start or EAPOL Response Identity frame sent by the supplicant. An exception to this is when no supplicants are attached. In this case, the switch sends EAPOL Request Identity frames using the BPDU multicast MAC address as destination - to wake up any supplicants that might be on the port.

The maximum number of supplicants that can be attached to a port can be limited using the Port Security Limit Control functionality.

MAC-based Auth.:

Unlike port-based 802.1X, MAC-based authentication is not a standard, but merely a best-practices method adopted by the industry. In MAC-based authentication, users are called clients, and the switch acts as the supplicant on behalf of clients. The initial frame (any kind of frame) sent by a client is snooped by the switch, which in turn uses the client's MAC address as both username and password in the subsequent EAP exchange with the RADIUS server. The 6-byte MAC address is converted to a string on the following form "xx-xx-xx-xx-xx-xx", that is, a dash (-) is used as separator between the lower-cased hexadecimal digits. The switch only supports the MD5-Challenge authentication method, so the RADIUS server must be configured accordingly.

When authentication is complete, the RADIUS server sends a success or failure indication, which in turn causes the switch to open up or block traffic for that particular client, using the Port Security module. Only then will frames from the client be forwarded on the switch. There are no EAPOL frames involved in this authentication, and therefore, MAC-based Authentication has nothing to do with the 802.1X standard.

The advantage of MAC-based authentication over port-based 802.1X is that several clients can be connected to the same port (e.g. through a 3rd party switch or a hub) and still require individual authentication, and that the clients don't need special supplicant software to authenticate. The advantage of MAC-based authentication over 802.1X-based authentication is that the clients don't need special supplicant software to authenticate. The disadvantage is that MAC addresses can be spoofed by malicious users - equipment whose MAC address is a valid RADIUS user can be used by anyone. Also, only the MD5-Challenge method is supported. The maximum number of clients that can be attached to a port can be limited using the Port Security Limit Control functionality.

RADIUS-Assigned QoS Enabled:

When RADIUS-Assigned QoS is both globally enabled and enabled (checked) on a given port, the switch reacts to QoS Class information carried in the RADIUS Access-Accept packet transmitted by the RADIUS server when a supplicant is successfully authenticated. If present and valid, traffic received on the supplicant's port will be classified to the given QoS Class. If (re-)authentication fails or the RADIUS Access-Accept packet no longer carries a QoS Class or it's invalid, or the supplicant is otherwise no longer present on the port, the port's QoS Class is immediately reverted to the original QoS Class (which may be changed by the administrator in the meanwhile without affecting the RADIUS-assigned).

This option is only available for single-client modes, i.e.

- Port-based 802.1X
- Single 802.1X

RADIUS attributes used in identifying a QoS Class:

Refer to the written documentation for a description of the RADIUS attributes needed in order to successfully identify a QoS Class. The User-Priority-Table attribute defined in RFC4675 forms the basis for identifying the QoS Class in an Access-Accept packet.

Only the first occurrence of the attribute in the packet will be considered, and to be valid, it must follow this rule:

- All 8 octets in the attribute's value must be identical and consist of ASCII characters in the range '0' - '3', which translates into the desired QoS Class in the range [0; 3].

RADIUS-Assigned VLAN Enabled:

When RADIUS-Assigned VLAN is both globally enabled and enabled (checked) for a given port, the switch reacts to VLAN ID information carried in the RADIUS Access-Accept packet transmitted by the RADIUS server when a supplicant is successfully authenticated. If present and valid, the port's Port VLAN ID will be changed to this VLAN ID, the port will be set to be a member of that VLAN ID, and the port will be forced into VLAN unaware mode. Once assigned, all traffic arriving on the port will be classified and switched on the RADIUS-assigned VLAN ID.

If (re-)authentication fails or the RADIUS Access-Accept packet no longer carries a VLAN ID or it's invalid, or the supplicant is otherwise no longer present on the port, the port's VLAN ID is immediately reverted to the original VLAN ID (which may be changed by the administrator in the meanwhile without affecting the RADIUS-assigned).

This option is only available for single-client modes, i.e.

- Port-based 802.1X
- Single 802.1X

For trouble-shooting VLAN assignments, use the "Monitor VLANs VLAN Membership and VLAN Port" pages. These pages show which modules have (temporarily) overridden the current Port VLAN configuration.

RADIUS attributes used in identifying a VLAN ID:

RFC2868 and RFC3580 form the basis for the attributes used in identifying a VLAN ID in an Access-Accept packet. The following criteria are used:

- The Tunnel-Medium-Type, Tunnel-Type, and Tunnel-Private-Group-ID attributes must all be present at least once in the Access-Accept packet.
- The switch looks for the first set of these attributes that have the same Tag value and fulfill the following requirements (if Tag == 0 is used, the Tunnel-Private-Group-ID does not need to include a Tag):

  - Value of Tunnel-Medium-Type must be set to "IEEE-802" (ordinal 6).
  - Value of Tunnel-Type must be set to "VLAN" (ordinal 13).
  - Value of Tunnel-Private-Group-ID must be a string of ASCII chars in the range '0' - '9', which is interpreted as a decimal string representing the VLAN ID. Leading '0's are discarded. The final value must be in the range [1; 4094].

Guest VLAN Enabled:

When Guest VLAN is both globally enabled and enabled (checked) for a given port, the switch considers moving the port into the Guest VLAN according to the rules outlined below.

This option is only available for EAPOL-based modes, i.e.:

- Port-based 802.1X

- Single 802.1X
- Multi 802.1X

For trouble-shooting VLAN assignments, use the "Monitor VLANs VLAN Membership and VLAN Port" pages. These pages show which modules have (temporarily) overridden the current Port VLAN configuration.

Guest VLAN Operation:

When a Guest VLAN enabled port's link comes up, the switch starts transmitting EAPOL Request Identity frames. If the number of transmissions of such frames exceeds Max. Reauth. Count and no EAPOL frames have been received in the meanwhile, the switch considers entering the Guest VLAN. The interval between transmission of EAPOL Request Identity frames is configured with EAPOL Timeout. If Allow Guest VLAN if EAPOL Seen is enabled, the port will now be placed in the Guest VLAN. If disabled, the switch will first check its history to see if an EAPOL frame has previously been received on the port (this history is cleared if the port link goes down or the port's Admin State is changed), and if not, the port will be placed in the Guest VLAN. Otherwise it will not move to the Guest VLAN, but continue transmitting EAPOL Request Identity frames at the rate given by EAPOL Timeout.

Once in the Guest VLAN, the port is considered authenticated, and all attached clients on the port are allowed access on this VLAN. The switch will not transmit an EAPOL Success frame when entering the Guest VLAN.

While in the Guest VLAN, the switch monitors the link for EAPOL frames, and if one such frame is received, the switch immediately takes the port out of the Guest VLAN and starts authenticating the supplicant according to the port mode. If an EAPOL frame is received, the port will never be able to go back into the Guest VLAN if the "Allow Guest VLAN if EAPOL Seen" is disabled.

Port State:

The current state of the port. It can undertake one of the following values:

Globally Disabled: NAS is globally disabled.

Link Down: NAS is globally enabled, but there is no link on the port.

Authorized: The port is in Force Authorized or a single-supplicant mode and the supplicant is authorized.

Unauthorized: The port is in Force Unauthorized or a single-supplicant mode and the supplicant is not successfully authorized by the RADIUS server.

X Auth/Y Unauth: The port is in a multi-supplicant mode. Currently X clients are authorized and Y are unauthorized.

Restart:

Two buttons are available for each row. The buttons are only enabled when authentication is globally enabled and the port's Admin State is in an EAPOL-based or MAC-based mode.

Clicking these buttons will not cause settings changed on the page to take effect.

Reauthenticate: Schedules a reauthentication whenever the quiet-period of the port runs out (EAPOL-based authentication). For MAC-based authentication, reauthentication will be attempted immediately.

The button only has effect for successfully authenticated clients on the port and will not cause the clients to get temporarily unauthorized.

Reinitialize: Forces a reinitialization of the clients on the port and thereby a reauthentication immediately. The clients will transfer to the unauthorized state while the reauthentication is in progress.

Buttons:

Save – Click to save changes.

Reset – Click to undo any changes made locally and revert to previously saved values.

Refresh:

Refresh the NAS Configuration manually.

5.5.2 Switch Status

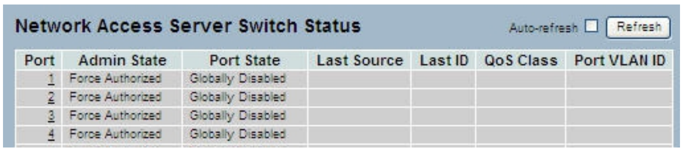
The section describes how to show the each port NAS status information of the switch. The status includes Admin State Port State, Last Source, Last ID, QoS Class, and Port VLAN ID.

To show the NAS Switch Status in the web interface:

1. Go to NAS, Switch Port Status

2. Check "Auto-refresh"

Figure 5-5.2: The Network Access Server Switch Status



Port	Admin State	Port State	Last Source	Last ID	QoS Class	Port VLAN ID
1	Force Authorized	Globally Disabled				
2	Force Authorized	Globally Disabled				
3	Force Authorized	Globally Disabled				
4	Force Authorized	Globally Disabled				

Parameter description:

Port:

The switch port number. Click to navigate to detailed NAS statistics for this port.

Admin State:

The port's current administrative state. Refer to NAS Admin State for a description of possible values.

Port State:

The current state of the port. Refer to NAS Port State for a description of the individual states.

Last Source:

The source MAC address carried in the most recently received EAPOL frame for EAPOL-based authentication, and the most recently received frame from a new client for MAC-based authentication.

Last ID:

The user name (supplicant identity) carried in the most recently received Response Identity EAPOL frame for EAPOL-based authentication, and the source MAC address from the most recently received frame from a new client for MAC-based authentication.

QoS Class:

QoS Class assigned to the port by the RADIUS server if enabled.

Port VLAN ID:

The VLAN ID that NAS has put the port in. The field is blank, if the Port VLAN ID is not overridden by NAS.

If the VLAN ID is assigned by the RADIUS server, "(RADIUS-assigned)" is appended to the VLAN ID. Read more about RADIUS-assigned VLANs here.

If the port is moved to the Guest VLAN, "(Guest)" is appended to the VLAN ID. Read more about Guest VLANs here.

Auto-refresh:

Activate the auto-refresh to refresh the information automatically.

Refresh:

Refresh the NAS Switch Status manually.

5.5.3 Port Status

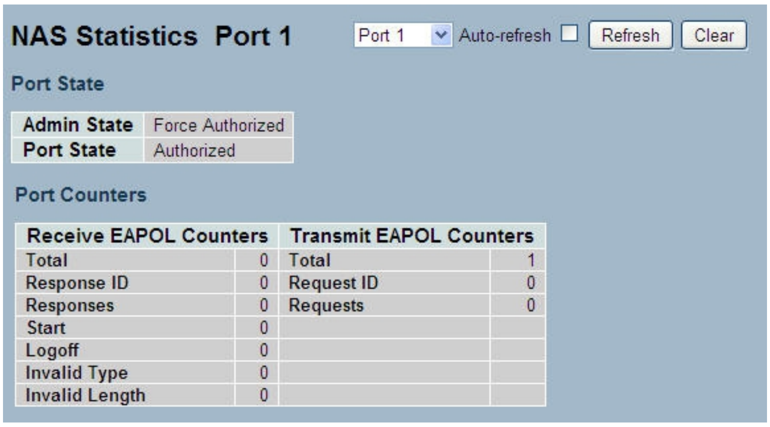
The section describes how to provide detailed NAS statistics for a specific switch port running EAPOL-based IEEE 802.1X authentication.

To configure a NAS Port Status in the web interface:

1. Specify Port to check.

2. Checked “Auto-refresh”.

Figure 5-5.3: The NAS Statistics



NAS Statistics Port 1

Port State

Admin State	Force Authorized
Port State	Authorized

Port Counters

Receive EAPOL Counters		Transmit EAPOL Counters	
Total	0	Total	1
Response ID	0	Request ID	0
Responses	0	Requests	0
Start	0		
Logoff	0		
Invalid Type	0		
Invalid Length	0		

Parameter description:

Port State

Admin State:

The port's current administrative state. Refer to NAS Admin State for a description of possible values.

Port State:

The current state of the port. Refer to NAS Port State for a description of the individual states.

QoS Class:

The QoS class assigned by the RADIUS server. The field is blank if no QoS class is assigned.

Port VLAN ID:

The VLAN ID that NAS has put the port in. The field is blank, if the Port VLAN ID is not overridden by NAS.

If the VLAN ID is assigned by the RADIUS server, "(RADIUS-assigned)" is appended to the VLAN ID. Read more about RADIUS-assigned VLANs here.

If the port is moved to the Guest VLAN, "(Guest)" is appended to the VLAN ID. Read more about Guest VLANs here.

Port Counters

EAPOL Counters:

These supplicant frame counters are available for the following administrative states:

- Force Authorized
- Force Unauthorized
- Port-based 802.1X
- Single 802.1X
- Multi 802.1X

Backend Server Counters:

These backend (RADIUS) frame counters are available for the following administrative states:

- Port-based 802.1X
- Single 802.1X

- Multi 802.1X
- MAC-based Auth.

Last Supplicant/Client Info:

Information about the last supplicant/client that attempted to authenticate. This information is available for the following administrative states:

- Port-based 802.1X
- Single 802.1X
- Multi 802.1X
- MAC-based Auth.

Selected Counters

Selected Counters:

The Selected Counters table is visible when the port is in one of the following administrative states:

- Multi 802.1X
- MAC-based Auth.

The table is identical to and is placed next to the Port Counters table, and will be empty if no MAC address is currently selected. To populate the table, select one of the attached MAC Addresses from the table below.

Attached MAC Addresses

Identity:

Shows the identity of the supplicant, as received in the Response Identity EAPOL frame.Clicking the link causes the supplicant's EAPOL and Backend Server counters to be shown in the Selected Counters table. If no supplicants are attached, it shows No supplicants attached.

This column is not available for MAC-based Auth.

MAC Address:

For Multi 802.1X, this column holds the MAC address of the attached supplicant. For MAC-based Auth., this column holds the MAC address of the attached client.

Clicking the link causes the client's Backend Server counters to be shown in the Selected Counters table. If no clients are attached, it shows No clients attached.

VLAN ID

This column holds the VLAN ID that the corresponding client is currently secured through the Port Security module.

State:

The client can either be authenticated or unauthenticated. In the authenticated state, it is allowed to forward frames on the port, and in the unauthenticated state, it is blocked. As long as the backend server hasn't successfully authenticated the client, it is unauthenticated. If an authentication fails for one or the other reason, the client will remain in the unauthenticated state for Hold Time seconds.

Last Authentication:

Shows the date and time of the last authentication of the client (successful as well as unsuccessful).

Auto-refresh:

Activate the auto-refresh to refresh the information automatically.

Refresh:

Refresh the NAS Statistics manually.

Clear: