

Figure 146 – User Access

**Step 1** Configure your RADIUS server to use the "Billing-Class-of-Service" attribute as defined in the WISPr vendor specific attribute set (see appendix: **Vendor Specific Attributes**). If this BCoS attribute is set to the value "visitor\_access" during the authentication response, the AC will allow routing between the WLAN port and the LAN port for this specific user.

**Step 2** Use the **system | access | NAV** menu and enable **visitor access** function on **ixp0** (LAN).

Such a user (visitor) will have employee access rights and access to servers running in the LAN (see *Figure 146 – User Access*, employee traffic). In other words, the P-560 controls the client's access to the LAN via RADIUS attributes specifically addressing which clients are allowed to connect to the LAN.



**Visitor access** on selected interface can only function with **enabled authentication**. RADIUS server should authenticate the user, in order to control user's access to LAN.

If authentication is on enabled (visitor access enabled) user only receives the access to the Internet independently from his/her access rights.

## System | Access | SNMP

**SNMP** is the standard protocol that regulates network management over the Internet. With enabled **SNMP** service Hotspot-in-a-Box can act as SNMP agent. To communicate with SNMP manager you must set up the same **SNMP** communities and identifiers on both ends: manager and agent. For more information about SNMP see **Chapter 6 – SNMP Management**.

Use the **system | access | SNMP** menu to enable/disable SNMP service or change current SNMP configuration on your P560 controller.

SNMP						
description		value		action		
SNMP service		enabled		<a href="#">edit</a>		
name		name		<a href="#">edit</a>		
location		location		<a href="#">edit</a>		
contact		contact information		<a href="#">edit</a>		
read-only community		public		<a href="#">edit</a>		
read-write community		private		<a href="#">edit</a>		
default trap community name		private		<a href="#">edit</a>		
authentication failure traps generation		disabled		<a href="#">edit</a>		

SNMP users			
type	user name	password	action
RO user	public	password	<a href="#">edit</a>
RW user	private	password	<a href="#">edit</a>

SNMP proxies						
context name	type	community name	IP address	OID local	OID target	action
there are no SNMP proxies on system						
						<a href="#">new</a>

SNMP trap				
type	host	community name	port	action
there are no SNMP traps on system				
				<a href="#">new</a>

Figure 147 – SNMP Settings

**SNMP Table:**

**SNMP Service** – enable or disable SNMP service on AC [enabled/disabled]. By default SNMP service is enabled. With service enabled the AC acts as the SNMP agent.

If enabled, then device can be configured via SNMP:

**SNMP Name** – An administratively assigned name for this managed node [0-99 any string]. By convention, this is the node's fully qualified domain name.

**SNMP Location** – The physical location of this node (e.g., 'telephone closet, 3rd floor') [0-99 any string].

**SNMP Contact** – The textual identification of the contact person for this managed node, together with information on how to contact this person [0-99 any string].

**SNMP Read-Only Community** – Community name is used in SNMP version 1 and version 2c. Read-only (public) community allows reading values, but denies any attempt to change values [1-32 all ASCII printable characters, no spaces].

**SNMP Read-Write Community** – Community name is used in SNMP version 1 and version 2c. Read-write (private) community allows to read and (where possible) change values [1-32 all ASCII printable characters, no spaces].

**Default Trap Community Name** – The default SNMP community name used for traps without specified communities. The default community by most systems is "public". The community string must match the community string used by the SNMP network management system (NMS) 1-32 all ASCII printable characters, no spaces].

**Authentication Failure Taps Generation** – select [enable/disable] getting the authentication failure traps from your AC.

**SNMP Users Table:**

**SNMP Users** table is only used for **SNMP v3**.

**SNMP Users** – Users are used in SNMP version 3. They have the same access rights as communities, but instead of a single community name there are user name and password. Strong encryption is supported in SNMPv3.

SNMP users			
type	user name	password	action
RO user	public	password	<a href="#">edit</a>
RW user	private	password	<a href="#">edit</a>

**User Name** – enter user name for read-only (RO) or read-write (RW) SNMP access [1-32 all ASCII printable characters, no spaces].

**Password** – enter password for read-only (RO) or read-write (RW) SNMP access [8-32 all ASCII characters, no spaces].

**SNMP Proxies Table:**

**SNMP Proxies** – SNMP proxy configuration specifies that any incoming SNMP requests can be send to another host. SNMP proxy can be configured in such a way that can proxy only specified SNMP request under specific **OID** (OID local). Click the **new** button to create **SNMP proxy**:

SNMP proxies						
context name	type	community name	IP address	OID local	OID target	action
<input type="text" value="accesspoint"/>	<input type="text" value="v 2c"/>	<input type="text" value="public"/>	<input type="text" value="192.168.3.68"/>	<input type="text"/>	<input type="text"/>	<a href="#">update</a> <a href="#">cancel</a>

Figure 148 – Add SNMP Proxies

**Context Name** – enter the context name for SNMP proxy rule between client and AC. Context name only works with SNMP v3. If a "**context name**" is specified, it assigns the proxy rule to a particular context name within the local agent [1-32 all ASCII printable characters, no spaces]:

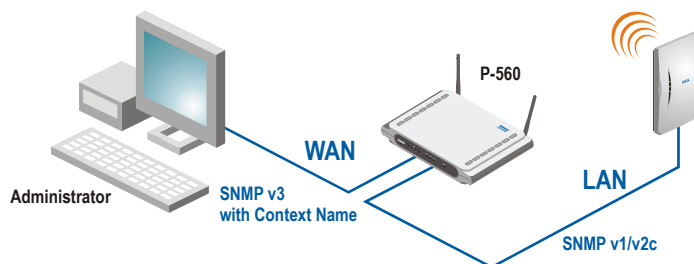


Figure 149 – SNMP and Content Name

This is the proper way to query multiple SNMP agents through a single proxy. Assign each remote agent to a different context name. Then you can use "*snmpwalk -n contextname1*" to walk one remote proxied agent and "*snmpwalk -n contextname2*" to walk another, assuming you are using SNMPv3 to talk to the proxy (snmpv1 and snmpv2c context mappings aren't currently supported but might be in the future) (see the *Figure 149 – SNMP and Content Name*).

**Type** – select SNMP version for SNMP proxy rule between AP and AC [v1/v2c].

**Community Name** – enter community name for communicating with the host (see *Figure 149 – SNMP and Content Name*, the host is AP in this case) [1-32 all ASCII printable characters, no spaces].

**IP Address** – specify the host address (AP in our case) to which any incoming requests should be re-sent [dots and digits].

**OID Local** – enter Object Identifier (OID) of MIB tree if you want to proxy only the specified SNMP requests under the specific OID in the MIB tree. That part is specified by OID local tree [optional, number and dots].

**OID Target** – Optionally, you can relocate the "OID local" tree to the new location at the "OID target"



If no OID is specified all SNMP request to the controller will be redirected to a specific host.

### SNMP Trap Table:

You can configure your SNMP agent to send **SNMP Traps** (and/or inform notifications) under the defined host (SNMP manager) and community name (optional).

SNMP trap				
type	host	community name	port	action
trap v1	192.168.2.27		162	<input type="button" value="update"/> <input type="button" value="cancel"/>

**Type** – select trap message type [v1/v2/inform].

**Host** – enter SNMP manager IP address [dots and digits].

**Community Name** – specify the community name at a SNMP trap message. This community will be used in trap messages to authenticate the SNMP manager. If not defined, the default trap community name will be used (specified in the SNMP table) [1-32 all ASCII printable characters, no spaces].

**Port** – enter the port number the trap messages should be send through [number].

## System | Status

Use the **system | status** menu to check the P-560 current status:

- **Device statistics** (including device name, model, firmware version, status, logged administrators, general uptime, memory, load, connected clients)

device statistics	
description	value
device name:	Gemtek Systems, 54Mb Hotspot-in-a-Box, model: P-560
firmware version:	P560.GSI.2.20.0372.1126184
device status:	running
currently connected administrators:	admin @ 192.168.3.2 Idling: 00:00:33 admin @ 192.168.2.27 Idling: 00:00:00
uptime:	00:10:17
software runtime:	00:10:00
total memory:	30896 kB
free memory:	752 kB
average load:	1min: 1.98 5min: 1.49 15min: 0.77
connected clients number:	6
connected clients input bytes:	74.33 Kb
connected clients output bytes:	37.18 Kb

Figure 150 – Device Statistics

**Device Name** – full device name and model.

**Firmware Version** – the current version of the firmware.

**Device Status** – current device status: running/warning.

**Currently Connected Administrators** – logged administrators list in format: [administrator name, IP address, and idling time in hours/minutes/seconds].

**Uptime** – indicates the time, expressed in days, hours and minutes since the system was last rebooted [days/hours/minutes/seconds].

**Software Runtime** – indicates the time, expressed in days, hours and minutes since the software reboot. The system itself can restart the software without rebooting the device [days/hours/minutes/seconds].

**Total Memory** – total operational memory of your P-560 [kB].

**Free Memory** – indicates the memory currently available in the controller [kB].

**Average Load** – indicates the average load of the P-560 processor in the period of the last 1minute, 5 minutes and 15 minutes (a larger value means a larger average load on the processor).

Minimum load – 0.0

Normal load – should not exceed 1.0 (including)

Processor is busy – more than 1.00.

**Connected Clients Number** – total number of current connected clients on WAN interface. Click on the settings and get detailed connected clients list (clients page under the **connection | user**):

users					
no	user	user IP	session time	idle time	action
01.	a49	192.168.96.18	00:00:03	00:00:00	<a href="#">details</a> <a href="#">logout user</a>
02.	test0	192.168.96.68	00:02:29	00:00:00	<a href="#">details</a> <a href="#">logout user</a>
03.	a67	192.168.96.77	00:01:30	00:01:17	<a href="#">details</a> <a href="#">logout user</a>
04.	a14	192.168.96.81	00:01:01	00:00:46	<a href="#">details</a> <a href="#">logout user</a>
05.	a43	192.168.96.82	00:00:41	00:00:28	<a href="#">details</a> <a href="#">logout user</a>
06.	a22	192.168.96.84	00:00:35	00:00:23	<a href="#">details</a> <a href="#">logout user</a>
07.	a34	192.168.96.85	00:00:07	00:00:01	<a href="#">details</a> <a href="#">logout user</a>
					<a href="#">refresh</a>

Figure 151 – Connected Clients Detailed List

**Connected Clients Input Bytes** – current connected clients' total Input bytes [K, KB, MB, GB].

**Connected Clients Output Bytes** – current connected clients' total Output bytes [K, KB, MB, GB].

- **WAN interface (ixp1)** (including the IP address, netmask, gateway, MAC address of the WAN interface, DNS servers, RX/TX statistics)

WAN (ixp1)	
description	value
IP address:	192.168.2.237
netmask:	255.255.255.0
gateway:	192.168.2.1
MAC:	00:88:99:33:22:44
DNS servers:	195.14.162.78
	195.14.162.14
	193.219.32.13
	10.10.10.10
RX/TX:	947593/20928579

Figure 152 – WAN Interface Statistics

**RX** – indicates data volume received on the WAN interface since reboot.

**TX** – indicates data volume transmitted to the WAN interface since reboot.

- **Wireless LAN interface (eth0)** (including the IP address, netmask, MAC address of the WLAN interface, RX/TX statistics)

LAN (eth0)	
description	value
<a href="#">IP address:</a>	192.168.100.1
netmask:	255.255.240.0
MAC:	00:0C:41:8F:84:92
RX/TX:	7359953/3103918

Figure 153 – LAN Interface Statistics

**RX** – indicates data volume received on the WLAN interface since reboot.

**TX** – indicates data volume transmitted to the WLAN interface since reboot.

- **LAN interface (ixp0)** (including the IP address, netmask, MAC address of the LAN interface, RX/TX statistics)

LAN (ixp0)	
description	value
<a href="#">IP address:</a>	192.168.3.1
netmask:	255.255.255.0
MAC:	00:55:66:33:44:55
RX/TX:	378528/491404

**RX** – indicates data volume received on the WLAN interface since reboot.

**TX** – indicates data volume transmitted to the WLAN interface since reboot.

- **Services** (all services list with its status: enabled/disabled)

services	
description	value
<a href="#">VLAN:</a>	disabled
<a href="#">management subnet:</a>	disabled
<a href="#">route:</a>	disabled
<a href="#">port forwarding</a>	disabled
<a href="#">DHCP servers:</a>	enabled
<a href="#">RADIUS proxy:</a>	disabled
<a href="#">remote authentication:</a>	disabled
<a href="#">walled garden:</a>	disabled
<a href="#">web proxy:</a>	enabled
<a href="#">NTP status:</a>	disabled
<a href="#">default access control status:</a>	allow
<a href="#">telnet:</a>	enabled
<a href="#">SSH:</a>	enabled
<a href="#">UAM:</a>	enabled
<a href="#">EAP802.1X:</a>	disabled
<a href="#">MAC authentication:</a>	disabled
<a href="#">universal address translation:</a>	disabled
<a href="#">user isolation:</a>	disabled
<a href="#">NAT:</a>	enabled
<a href="#">client authentication status:</a>	enabled
<a href="#">visitor access:</a>	disabled
<a href="#">SNMP service status:</a>	enabled
<a href="#">e-mail redirection:</a>	disabled
<a href="#">ACL service:</a>	disabled
<a href="#">layer 2 isolation:</a>	disabled
<a href="#">SSID broadcasting:</a>	enabled
<a href="#">wireless security:</a>	enabled



Services are displayed as a link to the respective menu where status can be configured.

**Refresh** – click the button to refresh device status statistics.

## System | Reset



Check the Factory defaults values in the Appendix section: **B) Factory Defaults for the Access Controller**.

If you need to reboot your device or reset to factory defaults select the **system | reset** menu:

reset/reboot	
description	action
reset configuration to factory defaults	reset
reboot device	reboot

Figure 154 – Reset and Reboot

**Reset** – reset device to factory default values.



Keep in mind that resetting the device is an irreversible process.  
Please note that even the administrator password will be set back to the factory default.

**Reboot** – reboot device with the last saved configuration.

## System | Update



Check for new product updates at the Gemtek Systems website:  
<http://www.gemtek-systems.com>

To update your device firmware, use only the original firmware image and under **system | update** menu click the **upload** button:

firmware update		
description		action
current software version: P560.GSI.2.30-HEAD.1004.02021117		
use only the official firmware to update your device		upload
firmware auto-update		
description	value	action
status	disabled	
update URL		
update interval	48	
delay	0	
		edit

Figure 155 – Firmware Update

Specify the full path to the new firmware image and click the **upload** button:

firmware update	
description	
current software version: P560.GSI.2.30-HEAD.1004.02021117	
firmware image	<input type="text" value="C:\D\arbinis\P560\builds\update32-P560.GSI.2.30-HEAD.1004.02021117"/> <input type="button" value="Browse..."/>
<input type="button" value="upload"/> <input type="button" value="cancel"/>	

Figure 156 – New Firmware Upload

**Firmware Image** – enter the firmware image using the full path.

**Browse** – click the button to specify the new image location.

**Upload** – upload with new firmware.

**Cancel** – cancel the upload process.

New firmware image is uploaded into the controller. Now you need to upload this new firmware into the controller's FLASH memory, click the **flash** button:

firmware update	
description	
current software version: P560.GSI.2.30-HEAD.1004.02021117	
uploaded software version: P560.GSI.2.30-HEAD.1003.02020922	
Firmware image successfully uploaded to server. Press "flash" button to flash image now and reboot device.	
<input type="button" value="flash"/> <input type="button" value="cancel"/>	

Figure 157 – Flash New Image

**Flash** – flash new image, reboots the system.



Do not switch off and do not disconnect the P-560 from the power supply during the firmware update process because the device could be damaged.

### Firmware auto-update:

Auto-update function allows update device firmware automatically. This function will help for large enterprises, having hundreds of AC's, to keep them up to date.



firmware auto-update		
description	value	action
status	enabled ▾	
update URL	168.55.162/P560/update.bin	
update interval	48	
delay	0	
		<input type="button" value="save"/> <input type="button" value="cancel"/>

Figure 158 – Firmware Auto-update Configuration

**Status** - defines if auto-update is enabled or disabled. Default value disabled.

**Update URL** - defines where firmware should be downloaded from. It points directly to firmware update file. URL should be accessible without any user authentication. URL can use HTTP, HTTPS and FTP protocols. Default value - empty string.

**Update interval** – time interval between each update in hours [1-9999]. Time is counted from last device boot-on. Default value is 48 hours.

**Delay** – delays update process by given amount of hours. This should prevent from getting hundreds requests for firmware download at the same time [0-24]. Default value is 0.

**Save** - save new firmware auto-update settings.



On boot auto-update feature checks for available updates on specified server at given URL. If there is different version - device downloads, installs firmware update and reboots. If firmware version matches current version on device - no update takes place.

## Connection

Use the **connection** menu to view the connected user's statistics, set outgoing mail server or observe the connected station availability.

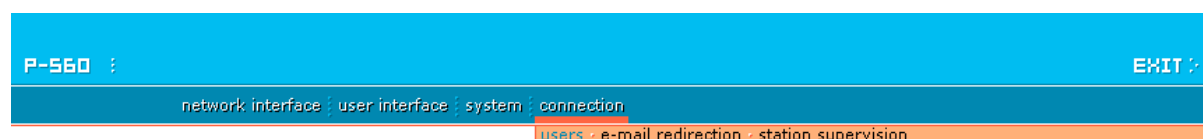


Figure 159 – Connection Menu

## Connection | Users

The **users** menu is for viewing the connected users' statistics. Also ability to **logout user** from the system is implemented here:

users						
no	user	interface	user IP	session time	idle time	action
01.	keba	eth0	192.168.4.2	00:08:37	00:00:00	details logout user
						refresh

Figure 160 – Users' Statistics

The users' statistics parameters are as follows:

**No** – number of the user's session connection.

**User** – username of the connected client.

**Interface** – name of interface, through which client is connected [eth0/ixp0].

**User IP** – IP address, from which the user's connection is established. Address is presented in digits and dots notation.

**Session Time** - session duration since the user login.

**Idle Time** - amount of user inactivity time [hours: minutes: seconds].

**Details** – click on user details to get more information about the client:

users		
description	value	action
user	keba	
interface	eth0	
user IP	192.168.4.2	
MAC address	0004E280A828	
authentication mode	UAM	
WISP		
session id	000000393BA1	
session time	00:09:54	
remaining time	04:50:06	
idle time	00:00:00	
input bytes	330.41 Mb	
output bytes	4.65 Mb	
remaining input bytes	unlimited	
remaining output bytes	unlimited	
remaining total bytes	unlimited	
bandwidth downstream	100.00 Mbps	
bandwidth upstream	100.00 Mbps	
		back logout user
		refresh

Figure 161 – User's Details

**User** – the username of the connected client.

**Interface** – name of interface, through which client is connected.

**User IP** – IP address, from which the user's connection is established. Address is presented in digits and dots notation.

**MAC Address** – hardware address of the network device from which the user is connected.

**Authentication mode** – authentication method which user uses to connect.

**WISP** – WISP domain name where the user belongs.

**Session ID** – the unique user's session ID number. This can be used for troubleshooting purposes.

**Session Time** – session time duration since user login [hours: minutes: seconds/unlimited].

**Remaining Time** – remaining user's session time [hours: minutes: seconds/unlimited]. Session time for user is defined in the RADIUS server.

**Idle Time** - amount of user inactivity time [hours: minutes: seconds].

**Input Bytes** - amount of data in bytes, which the user network device has received [Bytes].

**Output Bytes** - amount of data in bytes, transmitted by the user network device [Bytes].

**Remaining input/output/total bytes** – user session remaining input/output bytes. WISP Operator can define the user session in bytes. Remaining bytes is received from RADIUS [Bytes/unlimited].

**Bandwidth downstream/upstream** – user upstream and downstream bandwidth [in bps].

**Back** – returns to connected client's statistics list.

**Logout User** – click this button to explicitly logout user from the network.

**Refresh** – click the button to refresh users' statistics.

## Connection | E-mail Redirection

The outgoing mail (SMTP) server redirection is performed using the **e-mail redirection** menu. By default such redirection settings is displayed:

e-mail redirection			
status	host	port	action
disabled	0.0.0.0	25	<a href="#">edit</a>

Figure 162 – E-mail Redirection Settings

Click the **edit** button to specify your outgoing mail server settings.

e-mail redirection			
status	host	port	action
<a href="#">enabled</a> ▼	<input type="text" value="mail.gemtek.lt"/>	<input type="text" value="25"/>	<a href="#">save</a> <a href="#">cancel</a>

Figure 163 – Edit E-mail Redirection

**Status** – enable/disable e-mail redirection function.

**Host** – SMTP server address where to redirect the outgoing clients e-mails [enter host name or host IP address].

**Port** – port number [number, by default: 25].

**Save** – save new e-mail redirection settings.

## Connection | Station Supervision

The **station supervision** function is used to monitor the connected host station availability. This monitoring is performed with ping. If the specified number of ping failures is reached (**failure count**), the user is logged out from the AC.

station supervision		
interval	failure count	action
20	3	<a href="#">edit</a>

Figure 164 – Station Supervision

To adjust the ping interval/failure count, click the **Edit** button.

station supervision		
interval	failure count	action
<input type="text" value="90"/>	<input type="text" value="5"/>	<a href="#">save</a> <a href="#">cancel</a>

Figure 165 – Edit Station Supervision

**Interval** – define interval of sending ping to host [in seconds].

**Failure Count** – failure count value after which the user is logged out from the system.

**Save** – save station supervision settings.

**Cancel** – cancel changes.

## Appendix

### A) Access Controller Specification

#### Technical Data

Wireless	
Standard	IEEE 802.11g (OFDM), IEEE 802.11b (DSSS), 2.4GHz ISM band, Wi-Fi compliant
Data Rate	802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps, 802.11b: 11Mbps, 5.5Mbps, 2, 1Mbps (auto fall back)
Client Stations	Max. 250 simultaneous client stations (depending on SW license Bronze, Silver, Gold)
Typical range	50 meters in indoor environments, up to 300m outdoors
Transmit Power	Max. 17 dBm (EIRP)
Antennas	Two 2dBi dipole antennas with space diversity, SMA connectors.
Encryption	WPA, TKIP, WEP64, WEP128
WDS	Wireless Distribution System for up to 7 APs
Network and Hotspot Access Control	
▪ IP Router with NAT/PAT, firewall filters	▪ Hotspot access controller with web browser log-on (UAM) and 802.1x/EAP support, Smart Client support, MAC authentication, WISPr compliant (Wi-Fi alliance)
▪ AAA RADIUS client and proxy server with EAP support	▪ Universal access method (web browser log-on) with XML support and walled garden (free web sites)
▪ Universal address translation and web proxy support (any client configuration is accepted)	▪ WISPr compatible log-on via web browser, SSL/TLS support UAT
▪ VPN client (PPTP, GRE)	▪ IEEE 802.1x authenticator with EAP-SIM, MD-5, TLS, TTLS, PEAP
▪ WPA support	▪ DHCP server, DHCP relay gateway, DHCP client
▪ VPN pass-through	▪ Layer 2 user isolation
▪ E-mail redirection	▪ Bandwidth management via RADIUS
Interface	
WAN	10/100Mb Ethernet, auto sensing, RJ-45
LAN	Four 10/100Mb Ethernet port switched, auto sensing, RJ-45, 802.1q VLAN support
WLAN	Two SMA antenna connectors
Management	
Interfaces	HTTPs, Telnet, SNMP (MIB II, Ethernet MIB, bridge MIB, private MIB), Terminal
Software Update	Remote software update via HTTPs
Reset	Remote reset / Manufacturing reset
Physical Specification	
Dimension	195 mm x 160 mm x 27 mm

Weight	-	
Environment Specification		
	Temperature	Humidity
Operating	0 to 55°C	10 % to 95%, non-condensing
Power Supply		
External	100-230V AC, 50/60Hz	
LEDs		
8 LEDs	Power, Online, WAN link, WLAN link, 4x LAN-link	
Warranty		
2 years		
Package Contents		
<div><div><div>▪ P560 Hotspot-in-a-Box</div><div>▪ Two Ethernet patch cables</div><div>▪ Two detachable antenna's SMA connector type</div><div>▪ CD-ROM with software and documentation</div></div><div><div>▪ Mounting Kit including tool to remove AP from wall mounting</div><div>▪ External power supply, 100-230 V, 50/60 Hz</div><div>▪ Power cord for EU</div><div>▪ Printed warranty note, release note</div></div></div>		
Related Products		
Controllers:	G-6000/G-4000/G-4100 Public Access Controller	
Access Points:	P-520 54Mb Operator	P-360 11Mb Hotspot-in-a-Box P-380 11MB Outdoor Router
Client Adapters:	T-316 11Mb Ethernet Client (2.4 GHz)	

## B) Factory Defaults for the Access Controller

### Network Interface Configuration Settings

Configuration   Interface Configuration	
Interface	Eth0
Status	Enabled
Type	LAN
IP Address	192.168.4.1
Netmask	255.255.255.0
Gateway	lxp1
Interface	lxp1
Status	Enabled
Type	WAN
IP Address	192.168.2.66
Netmask	255.255.255.0
Gateway	192.168.2.1
Interface	lxp0
Status	Enabled
Type	LAN
IP Address	192.168.3.1
Netmask	255.255.255.0
Gateway	lxp1
Configuration   VLAN	
No VLAN entries are defined on system.	
Configuration   Route	
No routes are defined on system.	
Configuration   Port Forwarding	
No port forwards defined.	
Configuration   Management Subnet	
Interface	Eth0
Status	Disabled
IP Address	0.0.0.0
Netmask	0.0.0.0
Remote Network	0.0.0.0
Remote Netmask	0.0.0.0
Interface	lxp0
Status	Disabled
IP Address	0.0.0.0
Netmask	0.0.0.0
Remote Network	0.0.0.0
Remote Netmask	0.0.0.0

DNS	
Hostname	None
Domain	None
Type	Primary
IP Address	0.0.0.0
Type	Secondary
IP Address	0.0.0.0
DHCP	
Status	DHCP Server
Interface	Eth0
IP Address from	192.168.4.2
IP Address to	192.168.4.254
WINS Address	0.0.0.0
Status	DHCP Server
Interface	lxp0
IP Address from	192.168.3.2
IP Address to	192.168.3.254
WINS Address	0.0.0.0
RADIUS Settings	
RADIUS Retries	5
RADIUS Timeout	2
NAS Server ID	-
User Session Timeout	18000
User Accounting Update	600
User Accounting Update Retry	60
User Idle Timeout	900
Location ISO Country Code	US
Location E.164 Country Code	1
Location E.164 Area Code	408
Location Network	Gemtek_Systems
Hotspot Operator Name	Gemtek_Systems
Location	Terminal_Worldwide
Bandwidth Up	128 Kbits
Bandwidth Down	128 Kbits
RADIUS Servers	
Name	DEFAULT (default)
Type	Authentication
IP Address	0.0.0.0
Port	1812
Secret	password (case sensitive)
Type	Accounting
IP Address	0.0.0.0



Port	1813
Secret	secret (case sensitive)
Reverse Accounting	disabled
Strip WISP	enabled
UAM authentication method	PAP
<b>WISP</b>	
No WISP defined on system.	
<b>Accounting Backup</b>	
Description	Backup via syslog
Status	Disabled
Host	0.0.0.0
Description	Backup to local file
Status	Disabled
Host	-
<b>Tunnels   PPPoE/PPTP/GRE</b>	
PPPoE/PPTP/GRE services are disabled.	
<b>Tunnels   PPTP Client for VPN</b>	
No PPTP client for VPN entries defined on system.	
<b>Tunnels   GRE Client for VPN</b>	
GRE Status	Disabled
GRE Remote Host	0.0.0.0
GRE Interface IP	0.0.0.0
GRE Interface Netmask	0.0.0.0
GRE Route	0.0.0.0/24
<b>Wireless   Basic</b>	
Primary SSID	P560
Wireless Network Mode	Mixed/G (WiFi)
Regulatory Domain	Manual
Default Channel	11
<b>Wireless   Advanced</b>	
Layer 2 Isolation	Disabled
SSID Broadcasting	Enabled
Fragmentation Threshold	2346
RTS Threshold	2347
Output Power	10
Antenna Gain	2
<b>Wireless   Security</b>	
WEP/WPA	Disabled
<b>Wireless   ACL</b>	
ACL Service	Disabled
Default ACL Policy	Allow

**Wireless | WDS**

No WDS links are specified.

**User Interface Configuration Settings**

<b>Pages</b>	
Page	Welcome
Use	Internal
Status	Enabled
Location	Welcome.xsl
Page	Login
Use	Internal
Status	-
Page	Logout
Use	Internal
Status	-
Location	Logout.xsl
Page	Help
Use	Internal
Status	-
Location	Images/help.html
Page	Unauthorized
Use	Internal
Status	-
Location	Images/unauthorized.html
<b>Caching</b>	
Description	Enabled
<b>Headers</b>	
Description	Content-Type
Status	Disabled
Description	Content-Language
Status	Disabled
<b>Remote Authentication</b>	
Remote Authentication	Disabled
Shared Secret	None
<b>Administrator</b>	
Username	admin (case sensitive)
<b>Start Page</b>	
Start Page URL	http://www.gemtek-systems.com
<b>Walled Garden</b>	

No free site (or walled garden) URL is specified.

### Web Proxy

Web Proxy	Enabled
Port	3128, 8080

## System Configuration Settings

### Configuration | Syslog

Remote Log Status	Disabled
Host	0.0.0.0
Level	Debug

### Configuration | Trace System

History Size	100
Level	Debug

### Configuration | Clock

Date Time	No further known parameter.
-----------	-----------------------------

### Configuration | NTP

NTP Service	Disabled
Host	0.0.0.0

### Configuration | Certificate

By default Gemtek System certificate is uploaded in the system with following certificate information:  
 Issuer Organization Name Gemtek Systems  
 Subject Organization Name Gemtek Systems  
 Validity Not Before Oct 7 7:46:53 2002 GMT  
 Validity Not After Mar 12 7:46:53 2019 GMT

### Configuration | Save and Restore

No further known parameters.

### Configuration | Pronto

Gold Pronto Status	Disabled
HNS server URL	0.0.0.0:9989
Heartbeat interval	Disabled
Remote host	0.0.0.0
Remote port	7788

### Access | Access Control

Default Access Status	Deny
Network Address	All
SNMP Service	Allow
Network Address	All

### Access | Telnet

Telnet Status	Disabled
---------------	----------

<b>Access   AAA</b>	
UAM	Enabled
EAP802.1x	Disabled
MAC	Disabled
Use Password	RADIUS secret
Password	password (case sensitive)
<b>Access   UAT</b>	
Interface	Eth0
UAT Status	Disabled
IP Address	0.0.0.0
Netmask	0.0.0.0
Interface	lxp0
UAT Status	Disabled
IP Address	0.0.0.0
Netmask	0.0.0.0
<b>Access   Isolation</b>	
Bindmac	Disabled
Isolation	Disabled
<b>Access   NAV</b>	
Interface	Eth0
IP Address	192.168.3.1
NAT	Enabled
Authentication	Enabled
Visitor Access	Disabled
Interface	lxp0
IP Address	192.168.2.4.1
NAT	Enabled
Authentication	Enabled
Visitor Access	Disabled
<b>Access   SNMP</b>	
SNMP Service	Enabled
Name	Name
Location	Location
Contact	Contact information
Public Community Name	Public
Private Community Name	Private
Default Trap Community Name	Private
Authentication Failure Traps Generation	Disabled
Type	RO User
User Name	public (case sensitive)
Password	password (case sensitive)
Type	RW User

User Name	private (case sensitive)
Password	password (case sensitive)
There are no SNMP proxies on system.	
There are no SNMP traps on system.	
<b>Update</b>	
Status	Disabled
Update URL	None
Update interval	48
Delay	0

## Connection Settings

<b>E-mail Redirection</b>	
Status	Disabled
Host	0.0.0.0
Port	25
<b>Station Supervision</b>	
Interval	20
Failure count	3

## C) Regulatory Domain/Channels

Channels Identifiers	Frequency in MHz	USA, Canada (FCC)	European Union (CE/ETSI)	WORLD (CE/FCC)	France	China	Japan	Manual
1	2412	•	•	•	—	•	•	•
2	2417	•	•	•	—	•	•	•
3	2422	•	•	•	—	•	•	•
4	2427	•	•	•	—	•	•	•
5	2432	•	•	•	—	•	•	•
6	2437	•	•	•	—	•	•	•
7	2442	•	•	•	—	•	•	•
8	2447	•	•	•	—	•	•	•
9	2452	•	•	•	—	•	•	•
10	2457	•	•	•	•	•	•	•
11	2462	•	•	•	•	•	•	•
12	2467	—	•	—	•	•	•	•
13	2472	—	•	—	•	•	•	•
14	2484	—	—	—	—	—	•	•
<b>Maximum Power Levels</b>		<b>30dBm</b>	<b>20dBm</b>	<b>20dBm</b>	<b>20dBm</b>	<b>20dBm</b>	<b>20dBm</b>	<b>20dBm</b>



Mexico is included in the Americas regulatory domain; however, channels 1 through 8 are for indoor use only while channels 9 through 11 can be used indoors and outdoors. Users are responsible for ensuring that the channel set configuration complies with the regulatory standards of Mexico.

## D) CLI Commands and Parameters

### Network Commands

<b>network</b>	
configuration	Network Interfaces configuration.
dhcp	Dynamic Host Configuration Protocol services configuration.
dns	DNS Server settings.
radius	Configuration set for changing RADIUS Server settings.
tunnels	Tunnels configuration commands.
<b>network configuration</b>	
interface	Network Interfaces configuration.
portforward	Port forwarding setup.
routes	Static IP routing settings.
subnet	Management subnet configuration.
vlan	VLANs configuration.
<b>network configuration interface</b>	
<interface>	Standard UNIX interface name. This name cannot be changed.
-s <status>	The interface status. Possible values are enabled and disabled.
-a <ip_address>	Interface IP address in digits and dots notation, e.g. 192.168.2.27.
-m <netmask>	Interface subnet mask e.g. 255.255.255.0.
-g <gateway>	Interface gateway in digits and dots notation or name of other interface.
-d <dhcpclient>	The status of dhcp client for the interface. May have values enabled and disabled. Can be used with WAN interface only.
-q <masquerade>	Masquerade status for interface: enabled or disabled.
-u <authentication>	Authentication status on interface: enabled and disabled.
-v <visitor_access>	Visitor access for interface: values enabled and disabled.
<b>network configuration portforward</b>	
<action>	Action to take upon Port Forwarding entry: A(dd), E(dit), D(elete).
<id>	Port Forwarding entry id. Needed with actions E(dit) and D(elete).
-s <status>	PortForwarding rule status: enabled or disabled.
-p <protocol>	Rule protocol.
-a <ip>	Source ip address.
-l <port>	Source port.
-d <ip>	Destination ip address.
-r <port>	Destination port.
<b>network configuration routes</b>	
<action>	Action to take upon the route. May have values A(dd), E(dit), D(elete).
<id>	Route id. Needed only with actions E and D.
<status>	Route status. May have values active or inactive.

<device>	Interface name.
<target>	Target ip address.
<netmask>	Target netmask.
<gateway>	Gateway for the target address.
<b>network configuration subnet</b>	
<interface>	Interface name on which the management subnet is configured.
-s <status>	Interface ip address for management subnet.
-a <ip_address>	Interface ip address for management subnet.
-m <netmask>	Interface netmask for management subnet.
-n <filterNetwork>	Network from which users are allowed to access management subnet.
-t <filterNetmask>	Netmask of network from which users are allowed to access management subnet.
<b>network configuration vlans</b>	
<action>	Action to take upon VLAN interface: A(dd), E(dit), D(elete).
<id>	Vlan interface id. Needed only when adding VLAN interface.
<interface>	Name of interface on which VLAN interface exists. Needed only when adding VLAN interface.
<name>	Name of VLAN interface. Needed only when editing or deleting VLAN interface.
<b>network dhcp</b>	
<interface>	Interface name for DHCP server instance.
-s <status>	Status of DHCP server for interface. May be server, relay or disabled.
-f <from>	Start of IP address range supported for DHCP service. Needed only with server status.
-t <to>	End of IP address range supported for DHCP service. Needed only with server status.
-w <wins>	WINS Address (Windows Internet Naming Service Address) if it is available on the network. Needed only with server status.
-l <lease_time>	DHCP Server lease time. Needed only with server status.
-d <domain>	DHCP domain name. Needed only with server status.
-c <circuit_id>	Circuit ID - a unique NAS identifier. MAC address will be used by default. Needed only with relay status.
-n <dns_list>	List of up to two DNS servers IP addresses.
<b>network dns</b>	
<type>	DNS Server type. May be primary or secondary.
<nameserver>	DNS Server IP address in digits and dots notation, e.g. 192.168.2.27.

## Network Radius Commands

<b>network radius</b>	
accounting_log	For sending RADIUS accounting via syslog.
proxy	RADIUS Proxy configuration.
servers	Up to 32 different RADIUS servers' configuration.



settings	General RADIUS settings configuration.
wisp	WISP information and setup.
<b>network accounting_log</b>	
-l <status>	Local accounting log status. Possible values are enabled or disabled.
-r <status>	Remote accounting log status. Possible values are enabled or disabled.
-a <host>	The host IP address where to send the accounting information.
<b>network radius servers</b>	
accounting	Accounting RADIUS servers' configuration.
authentication	Authentication RADIUS servers' configuration.
backup	Accounting information backup servers configuration.
<b>network radius servers accounting</b>	
<id>	RADIUS server id.
-a <ip_address>	RADIUS server IP address used for Radius accounting.
-p <port>	RADIUS server port used for Radius accounting.
-s <secret>	Shared secret key for accounting (must be the same on RADIUS server and RADIUS client).
<b>network radius servers authentication</b>	
<action>	Action to take upon radius server. May have values A(dd), E(dit), D(elete).
<id>	RADIUS server id.
-n <name>	RADIUS server name.
-a <ip_address>	RADIUS server IP address.
-p <port>	RADIUS server port.
-s <secret>	Shared secret key (must be the same on RADIUS server and RADIUS client).
-d <default>	Sets the server as default. Possible values: yes. Note: there can be only one default Radius server.
-r <status>	Reverse accounting. May have values enabled or disabled.
-w <status>	Strip WISP name before sending to RADIUS. May have values enabled or disabled.
-u <method>	UAM authentication method for RADIUS server. May have values pap, chap, mschap1 and mschap2.
<b>network radius servers backup</b>	
<id>	RADIUS server id.
-b <status>	If RADIUS Backup Server feature is on. May have values enabled or disabled.
-a <ip_address>	Backup RADIUS server IP address used for Radius accounting.
-p <port>	Backup RADIUS server port used for Radius accounting.
-s <secret>	Shared secret key for backup server(must be the same on RADIUS server and RADIUS client).
<b>network radius settings</b>	
-r <retries>	Retry count of sending RADIUS packets before giving up.

-t <timeout>	Maximal amount of time before retrying RADIUS packets (in seconds).
-n <nas>	NAS Server identification string.
-o <user_timeout>	Amount of time from user side (no network carrier) before closing the connection (in seconds).
-a <acct_update>	Period after which server should update accounting information (in seconds).
-c <acct_retry>	Retry time period in which server should try to update accounting information before giving up (in seconds).
-i <idle>	Amount of user inactivity time, before automatically disconnecting user from the network (in seconds).
-u <bandwidth>	Default Radius user upload bandwidth.
-d <bandwidth>	Default Radius user download bandwidth.
<b>network radius wisp</b>	
<action>	A(dd), D(elete)
<id>	WISP Id. Usable only with D action.
<name>	WISP name. Usable only with A action.
<radius_id>	WISP Radius server id (from Radius authentication server list). Usable only with A action.
<interface>	Interface name to which the WISP should be bound or none. Usable only with A action.

## Network Tunnels Commands

<b>network tunnels</b>	
gre	GRE client setup.
ppp	PPTP, PPPoE and GRE setup.
pptp4vpn	PPTP for VPN setup.
<b>network tunnels gre</b>	
-s <status>	Gre status: enabled or disabled. When enabling, gre tunnel will be created.
-r <ip>	Remote host ip.
-d <ip>	GRE device ip
-m <netmask>	GRE device netmask. e.g. 255.255.255.0
-n <ip/netmask>	Gre route. e.g. 192.168.6.0/24.
<b>network tunnels ppp</b>	
-s <status>	Status: disabled/PPTP/PPPoE/GRE.
-n <name>	PPPoE/PPTP username.
-p <password>	PPPoE/PPTP password.
-e <encryption>:	PPPoE/PPTP encryption status: enabled or disabled.
-a <server>	PPTP server ip address/GRE remote address.
-i <ip>	GRE interface address.
-m <netmask>	GRE interface netmask.
<b>network tunnels pptp4vpn</b>	
<action>	A(dd), D(elete) or E(dit) entry.

-c <channel>	PPTP channel. Used only with A and E actions.
-s <server>	PPTP server ip address. Used only with A and E actions.
-u <username>	PPTP username. Used only with A and E actions.
-p <password>	PPTP password. Used only with A and E actions.
-e <encryption>	PPTP encryption status: enabled or disabled. Used only with A and E actions.
-a <network>	PPTP remote network address. Used only with A and E actions.
-m <netmask>	PPTP remote network netmask. Used only with A and E actions.

## Wireless Commands

<b>wireless</b>	
acl	Static ACL configuration.
advanced	Advanced wireless settings
basic	Basic wireless settings.
security	Wireless security configuration.
wds	Wireless Distribution System (WDS) configuration.
<b>wireless acl</b>	
-s <status>	Static ACL status: enabled or disabled.
-d <policy>	Default ACL policy: allow or deny.
-aa <mac>	Add MAC address to 'allow' list.
-ad <mac>	Add MAC address to 'deny' list.
-ra <mac>	Remove MAC address from 'allow' list.
-rd <mac>	Remove MAC address from 'deny' list.
<b>wireless advanced</b>	
-i <isolation>	Layer 2 isolation: enabled or disabled.
-s <ssid_broadcasting>	SSID broadcasting: enabled or disabled.
-f <fragmentation>	Fragmentation threshold: 256-2346.
-r <rts>	RTS threshold: 0-2347.
-p <power>	Wireless card output power in dBm.
-a	Print valid output power range for current regulatory domain.
-g <gain>	Wireless card antenna gain in dBi.
<b>wireless basic</b>	
-s <ssid>	SSID name.
-d <domain>	Regulatory domain name.
-l	Print available regulatory domains.
-m <mode>	Wireless network mode: B-only, B(WiFi), Mixed(WiFi), Mixed, Mixed/G (WiFi), G(WiFi).
-c <channel>	Channel selection.
-a	Print available channels for current regulatory domain
<b>wireless security</b>	
-s <mode>	Wireless security mode: disabled, wep64, wep128, wpakey.
-k <key>	Pre-shared key.

<b>wireless wds</b>	
-a <mac>	Add WDS MAC address.
-r <mac>	Remove WDS MAC address.

## User Commands

<b>user</b>	
administrator	Administrator login and password change.
connected	Connected users list.
start_page	Definition of first URL after user login.
walled_garden	Free Web sites list.
webproxy	Web proxy configuration.
<b>user administrator</b>	
Enter for wizard	Follow the wizard and complete administrator settings changes.
<b>user connected</b>	
<action>	D(etail) user statistics for or L(ogout) user with specified ip.
<ip>	User ip address.
<b>user start_page</b>	
<url>	The web page to which the user is redirected after login.
<b>user walled_garden</b>	
host	Configures free web sites that are not displayed to users.
url	Configure free web sites that are displayed to users.
<b>user walled_garden host</b>	
<action>	Action to take on free web site. May have values A(add), E(edit), D(delete).
<id>	Walled Garden entry id. Used only with E(dit) and D(elete) actions.
-h <host>	Host address.
-p <port>	Network port, which is used to reach the host.
-t <type>	Used protocol type. May have values tcp or udp.
-m <netmask>	Host subnet mask e.g. 255.255.255.255.
<b>user walled_garden url</b>	
<action>	Action to take on free web site. May have values A(add), E(edit), D(delete).
<id>	Walled Garden entry id. Used only with E(dit) and D(elete) actions.
-u <url>	URL address used for link.
-s <display>	URL description visible for user.
<b>user webproxy</b>	
-s <status>	Web proxy status: enabled or disabled.
-a <port> [<port>... [<port>]]	Add list of Web proxy ports.
-d <port> [<port>... [<port>]]	Delete list of Web proxy ports.

## System Commands

<b>system</b>	
access	System access configuration.
configuration	System configuration.
<b>system access</b>	
aaa	Multimode settings.
control	Allow or deny management access depending on user network address.
isolation	Isolation setup.
snmp	Configuration of SNMP service.
telnet	Enabling or disabling of telnet protocol.
uat	Universal Address Translation of all IP and proxy settings.
<b>system configuration</b>	
clock	Manual setting of internal device clock
ntp	Configuration of Network time Protocol service.
syslog	For sending system and debug messages via syslog protocol.
trace	Displays the last logged messages.

## System Access Commands

<b>system access aaa</b>	
-m <mode_list>	Either disabled or space separated list of modes. Modes may be: uam, 802.1x, mac.
-u <use_password>	Mac authentication mode password usage: 'radius' - use radius shared secret key, 'user' - use of user-defined password.
-p <password>	User defined mac authentication password.
<b>system access control</b>	
<action>	Action to take upon management access entry: A(dd), E(dit), D(elete) or default.
<id>	Management access entry id. Needed only when editing or deleting entry.
-s <service>	Services for which the policy should be set: ssh, snmp, telnet or all.
-a <ip/bitmask>	'all' or network ip address and bitmask to (dis)allow service to.
-p <policy>	Management access policy: allow or deny(default is deny).
<b>system access isolation</b>	
-b <status>	Mac binding status: enabled or disabled.
-i <status>	Isolation status: enabled or disabled.
<b>system access snmp</b>	
proxies	SNMP proxies settings.
settings	SNMP service settings.
traps	SNMP traps settings.
users	SNMP users settings.

**system access snmp proxies**

<action>	Action to take upon SNMP proxy entry: A(dd), E(dit) or D(elete).
<id>	Entry id. Needed only with Edit and Delete actions.
-t <type>	Proxy type. May have values v1, v2c. Can be used only when adding or editing proxy.
-a <ip_address>	Proxy ip address.
-c <community_name>	Proxy community name.
-l <oid_local>	Proxy local OID.
-r <oid_target>	Proxy target OID.

**system access snmp settings**

-s <status>	Status of SNMP service.
-n <name>	System name.
-l <location>	Location of the device.
-c <contact>	Contact information.
-b <public_name>	Public name of SNMP service.
-r <private_name>:	Private name of SNMP service.

**system access snmp traps**

<action>	Action to take upon SNMP trap entry: A(dd), E(dit) or D(elete)
<id>	Entry id. Needed only with Edit and Delete actions.
-c <community>	SNMP community string.
-a <ip_address>	SNMP trap host address.
-p <port>	SNMP trap port.
-t <type>	SNMP trap type: v1, v2 or inform.

**system access snmp users**

<id>	User id.
-n <name>	SNMP user name.
-p <password>	SNMP user password.

**system access telnet**

<status>	Change telnet service status: enabled or disabled.
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**system access uat**

<interface>	Active LAN interface.
-s <status>	UAT status on interface.
-a <ip>	Network of UAT address pool.
-m <netmask>	Netmask of UAT address pool.

**System Configuration Commands****system configuration**

clock	Manual setting of internal device clock.
ntp	Configuration of Network time Protocol service.
syslog	For sending system and debug messages via syslog protocol.
trace	Displays the last logged messages.

<b>system configuration clock</b>	
<date>	New date values in YYYY.MM.DD format.
<time>	New time in hh:mm format.
<zone>	New time zone (time from GMT in minutes).
<b>system configuration ntp</b>	
<action>	Action: A(dd), E(dit), D(elete) server or set NTP S(tatus).
<id>	Server id. Needed only with E and D actions.
-a <server>	NTP server address.
-s <status>	NTP service status: enabled or disabled. Needed only with S action.
<b>system configuration pronto</b>	
-s <status>	Pronto compatibility agent status: enabled or disabled.
-u <server_url>	HNS server url in format host:port.
-h <interval>	Heartbeat interval in seconds, 'disabled' or 'server' to obtain it from the server.
-a <remote_host>	Remote host ip address.
-p <remote_port>	Remote host port.
<b>system configuration syslog</b>	
-s <status>	Syslog status. Possible values are enabled or disabled.
-h <host>	The host IP address where to send the syslog. Needed only when enabling syslog.
-l <level>	The lowest level of messages that will be logged. Possible levels: debug, info, warning, error, fatal.
<b>system configuration trace</b>	
clear	Clears trace history.
size <number>	Sets trace history size.
level <level>	Sets level of trace messages. Possible levels: debug, info, warning, error, fatal.

## Status Commands

<b>status</b>	
device	General system information.
network	Network information.
service	Services information.

## Connection Commands

<b>connection</b>	
email	Outgoing Main (SMTP) Redirection settings.
supervision	Settings for station availability monitoring with ARP-Pings.
<b>connection email</b>	

<status>	SMTP redirection status: enabled or disabled.
<host>	New SMTP server host IP address.
<port>	New port number.
<b>connection supervision</b>	
<seconds> <number>	ARP-Ping interval in seconds and failure number after reaching which user is automatically logged out.



## E) Standard RADIUS Attributes

The following standard RADIUS attributes and messages are supported by the Hotspot-in-a-Box.



The Gemtek System vendor specific attributes are described at the client point of view (**reverse accounting** is disabled).

Required Attribute	#	Type	Auth Req	Auth Reply	Acctg Req	Comment
User-Name	1	String	X		X	User enters full NAI
User – Password	2	String	X			Password of the user to be authenticated
NAS-IP-Address	4	Ipaddr	X		X	IP Address of the Hotspot-in-a-Box
Service-Type	6	Integer	X			Must be set to Login (1)
Framed-IP-Address	8	Ipaddr	X		X	IP Address of the User
Reply-Message	18	String		X		Text of reject reason if present
State	24	String	X	X		AC does not interpret the attribute locally
Class	25	String		X	X	Attribute provided by the Auth. Server, forwarded to the accounting server
Session-Timeout	27	Integer		X		Forced logout once timeout period reached (seconds)
Idle-Timeout	28	Integer		X		Implicit logout inactivity timeout period (seconds)
Called-Station-ID	30	String	X		X	This field should contain the MAC address or other information identifying the Hotspot-in-a-Box
NAS-Identifier	32	String	X		X	String identifying the NAS
Acct-Status-Type	40	Integer			X	1=Start, 2=Stop, 3=Interim Update
Acct-Delay-Time	41	Integer			X	Delay (seconds) between Acctg Event and when Acct-Req sent (doesn't include estimated network transit time)
Acct-Input-Octets	42	Integer			X	Indicates how many octets have been received from the port over the course of this service being provided
Acct-Output Octets	43	Integer			X	Indicates how many octets have been sent to the port in the course of delivering this service
Acct-Session-ID	44	String	X	X	X	Unique Accounting ID to make it easy to match start and stop records in a log file

Acct-Session-Time	46	Integer		X	Call duration in seconds (already compensated for idle timeout)
Acct-Input-Packets	47	Integer		X	Indicates how many packets have been received from the port over the course of this service being provided
Acct-Output-Packets	48	Integer		X	Indicates how many packets have been sent to the port in the course of delivering this service
Acct-Terminate-Cause	49	Integer		X	1=Explicit Logoff, 4=Idle Timeout, 5=Session Timeout, 6=Admin Reset, 9=NAS Error, 10=NAS Request, 11=NAS Reboot
Acct-Input-Gigawords	52	Integer		X	This attribute indicates how many times the Acct-Input-Octets counter has wrapped around $2^{32}$ over the course of this service being provided
Acct-Output-Gigawords	53	Integer		X	This attribute indicates how many times the Acct-Output-Octets counter has wrapped around $2^{32}$ in the course of delivering this service
NAS-Port-Type	61	Integer	X		15=Ethernet, 19=802.11
Acct-Interim-Interval	85	Integer		X	Interval (seconds) to send accounting updates

## Vendor Specific Attributes

The Wi-Fi Alliance recommends a list of certain Vendor Specific Attributes (VSA). The VSA values are intended to provide location information to the backend processing system or to deliver service type information back to the Hotspot-in-a-Box.

The Wi-Fi Alliance has registered an IANA Private Enterprise Number (PEN) of 14122, which can be used to pass Vendor-Specific attributes to international roaming partners.

WISPr Vendor Specific Attributes	#	Type	Auth Req	Auth Reply	Acctg Req	Comment
Location-ID	1	String	X		X	Hotspot Location Identifier
Location-Name	2	String	X		X	Hotspot Location and Operator's Name
Logoff-URL	3	String	X			URL for user to perform explicit logoff
Redirection-URL	4	String		X		URL of Start Page
Bandwidth-Min-Up	5	Integer		X		Minimum Transmit Rate (bps)
Bandwidth-Min-Down	6	Integer		X		Minimum Receive Rate (bps)
Bandwidth-Max-Up	7	Integer		X		Maximum Transmit Rate (bps)
Bandwidth-Max-Down	8	Integer		X		Maximum Receive Rate (bps)

Session-Terminate-Time	9	String	X	YYYY-MM-DDThh:mm:ssTZD
Session-Terminate-Time-End-of-Day	10	Integer	X	Flag zero or one indicating termination rule.
Billing-Class-Of-Service	11	String	X	Text string indicating service type e.g. used for the visitor access feature



The Gemtek System vendor specific attributes are described at the client point of view (**reverse accounting** is disabled).

Gemtek Systems Vendor Specific Attributes	#	Type	Auth Req	Auth Reply	Acctg Req	Comment
Acct-Session-Input-Octets	21	Integer		X		Session download volume limitation in bytes. Forced logout once volume limitation is reached.
Acct-Session-Input-Gigawords	22	Integer		X		Session download volume limitation in bytes. Forced logout once volume limitation is reached
Acct-Session-Output-Octets	23	Integer		X		Session upload volume limitation in bytes. Forced logout once volume limitation is reached
Acct-Session-Output-Gigawords	24	Integer		X		Session upload volume limitation in bytes. Forced logout once volume limitation is reached
Acct-Session-Octets	25	Integer		X		Upload and download limitation
Acct-Session-Gigawords	26	Integer		X		Upload and download limitation

## F) Location ID and ISO Country Codes

This list states the **country names** (official short names in English) in alphabetical order as given in ISO 3166-1 **and** the corresponding **ISO 3166-1-alpha-2 code elements**.

It lists 239 official short names and code elements.

Location ID	Country	Location ID	Country
AF	Afghanistan	LI	Liechtenstein
AL	Albania	LT	Lithuania
DZ	Algeria	LU	Luxembourg
AS	American Samoa	MO	Macao
AD	Andorra	MK	Macedonia, the former Yugoslav republic of
AO	Angola	MG	Madagascar
	Anguilla	MW	Malawi
AQ	Antarctica	MY	Malaysia
AG	Antigua and Barbuda	MV	Maldives
AR	Argentina	ML	Mali
AM	Armenia	MT	Malta
AW	Aruba	MH	Marshall islands
AU	Australia	MQ	Martinique
AT	Austria	MR	Mauritania
AZ	Azerbaijan	MU	Mauritius
BS	Bahamas	YT	Mayotte
BH	Bahrain	MX	Mexico
BD	Bangladesh	FM	Micronesia, federated states of
	Barbados	MD	Moldova, republic of
BY	Belarus	MC	Monaco
BE	Belgium	MN	Mongolia
BZ	Belize	MS	Montserrat
	Benin	MA	Morocco
BM	Bermuda	MZ	Mozambique
BT	Bhutan	MM	Myanmar
	Bolivia		Namibia
BA	Bosnia and Herzegovina	NR	
BW	Botswana	NP	Nepal
BV	Bouvet island	NL	Netherlands
BR	Brazil	AN	Netherlands Antilles
IO		NC	New Caledonia
BN	Brunei Darussalam	NZ	New Zealand
BG	Bulgaria	NI	Nicaragua
BF	Burkina Faso	NE	Niger
BI	Burundi	NG	Nigeria

KH	Cambodia	NU	Niue
CM	Cameroon	NF	Norfolk island
CA	Canada	MP	Northern Mariana islands
CV	Cape Verde	NO	Norway
KY	Cayman islands	OM	Oman
	Central African republic	PK	Pakistan
TD	Chad	PW	
CL	Chile	PS	Palestinian territory, occupied
CN	China	PA	Panama
CX	Christmas island	PG	
CC	Cocos (keeling) islands	PY	Paraguay
CO	Colombia	PE	Peru
KM	Comoros	PH	Philippines
CG	Congo	PN	Pitcairn
CD	Congo, the democratic republic of the	PL	Poland
CK	Cook islands	PT	Portugal
	Costa Rica	PR	Puerto Rico
CI	Côte d'Ivoire	QA	
HR		RE	Réunion
	Cuba	RO	Romania
CY	Cyprus	RU	Russian federation
CZ	Czech republic	RW	Rwanda
	Denmark		Saint Helena
DJ	Djibouti	KN	Saint Kitts and Nevis
DM		LC	Saint Lucia
DO		PM	
EC		VC	Saint Vincent and the Grenadines
	Egypt		Samoa
	El Salvador	SM	
GQ		ST	Sao Tome and Principe
	Eritrea	SA	Saudi Arabia
EE	Estonia	SN	Senegal
ET	Ethiopia	SC	Seychelles
FK	Falkland islands (Malvinas)	SL	Sierra Leone
FO	Faroe islands	SG	Singapore
FJ	Fiji	SK	Slovakia
FI	Finland	SI	Slovenia
FR	France	SB	Solomon islands
GF	French Guiana	SO	Somalia
PF	French Polynesia	ZA	South Africa
TF	French southern territories	GS	South Georgia and the South Sandwich islands

GA	Gabon	ES	Spain
	Gambia	LK	Sri Lanka
GE	Georgia	SD	Sudan
DE	Germany	SR	Suriname
	Ghana	SJ	Svalbard and Jan Mayan
GI	Gibraltar	SZ	Swaziland
GR	Greece	SE	Sweden
GL	Greenland	CH	Switzerland
GD	Grenada	SY	Syrian Arab republic
GP	Guadeloupe	TW	Taiwan, province of china
GU	Guam	TJ	Tajikistan
GT	Guatemala	TZ	
GN		TH	Thailand
GW	Guinea-Bissau	TL	Timor-leste
GY	Guyana	TG	Togo
HT		TK	Tokelau
HM	Heard island and McDonald islands	TO	Tonga
VA	Holy see (Vatican city state)	TT	Trinidad and Tobago
HN	Honduras	TN	Tunisia
HK	Hong Kong		Turkey
HU	Hungary	TM	Turkmenistan
IS	Iceland	TC	Turks and Caicos islands
	India	TV	Tuvalu
	Indonesia	UG	Uganda
IR	Iran, Islamic republic of	UA	
IQ	Iraq	AE	United Arab emirates
IE	Ireland	GB	United kingdom
IL	Israel	US	United states
IT	Italy	UM	United states minor outlying islands
JM	Jamaica	UY	
JP		UZ	Uzbekistan
JO	Jordan	VU	Vanuatu
KZ	Kazakhstan		Vatican city state see holy see
KE	Kenya	VE	Venezuela
	Kiribati	VN	Viet nam
KP	Korea, democratic people's republic of	VG	Virgin islands, British
KR		VI	Virgin islands, u.s.
KW	Kuwait	WF	Wallis and Futuna
KG	Kyrgyzstan	EH	
LA	Lao people's democratic republic	YE	Yemen
LV	Latvia	YU	Yugoslavia

LB	Lebanon		Zaire see Congo, the democratic republic of the
LS	Lesotho	ZM	Zambia
LR	Liberia		Zimbabwe
LY	Libyan Arab Jamahiriya		

## G) User Pages Templates Syntax

In this section you will find syntax for the writing of the user pages with examples for the writing of XSL templates. The P560 web server creates XML, having data inside its structure:

### Example:

```
<?xml version="1.0"?>
<Gemtek>
<Header Script_Name="login.user" Title="Login" charset=""; charset=ISO8859-
1" language="en"/>
<Data nasid="TestLab" version="P-560" help="images/help.html"
ip="192.168.4.1"
mac="00923456789A" original_url="https://192.168.4.4:7777/login.user";
type="2" username="g1">
<entry descr="Gemtek Baltic" id="0" url="http://www.gemtek.lt";
<entry descr="Gemtek Systems, Inc." id="1" url="http://www.gemtek-
systems.com";
</Data>
<WISPAccessGatewayParam MessageType="120" ResponseCode="100">
<entry ReplyMessage="Your password has expired."/>
</WISPAccessGatewayParam>
<Errors id="4102"/>
</Gemtek>
```

Current script filename (to be used in forms action attribute) can be located in the XML tree at:  
/Gemtek/Header/@Script\_Name

Page title at:

/Gemtek/Header/@Title

Custom char set (if enabled on administration pages) for user pages at:

/Gemtek/Header/@charset

### Welcome.xsl

**Welcome** page is the first page that the user sees while not registered on the network. This page provides welcome text to the user who is connected to the controller and supplies a link to the login page.

Attribute in XML tree at /Gemtek/Data/@cmd defines the link to the **login** page. This link should be used to point the user from the **welcome** screen to login screen. The **Welcome** page also lists defined walled garden entries, informing the user where to browse without registering on the network.

Walled Garden information is located in the XML tree under /Gemtek/Data with multiple "entry" branches. These branches have the following attributes:

- descr - website description;
- url - website URL;
- id - website id for P560 configuration, which is not needed for the user connecting to the network through the P560.

### Login.xsl

**Login** page appears when the user is not registered to the network and tries to open a webpage. The user proceeds to the **login** page, following the link from the welcome page. The **Login** page has variables that can be used:

/Gemtek/Header/@Script\_Name - script name to send back to the P560 user login information;

/Gemtek/Data/@username - the username to be entered into the user name field – usually the name the user entered before while unsuccessful in registering on the network;



/Gemtek/Data/@ip - detected user IP from which he/she tries to register on the network;

/Gemtek/Data/@mac - detected users MAC address;

/Gemtek/Errors/@id - returned error code, which can be as follows:

error	description
4101	Failed to authorize.
4102	Login or/and password incorrect.
4103	Network connection failed.
4104	Accounting error.
4105	Unknown authorization error.
4106	Could not get redirection URL.
4107	Already logged in.

/Gemtek/Data/@type - returns to P560 response for login request. Type values are as follows:

error	description
0	Ok - logged in, redirect user to start page
1	Failed to authorize
	Login or/and password incorrect
3	Network connection failed
4	Accounting error
5	User already logged in

It is advisable to first check the error codes, because they return more precise information. Branch "Type" returns RADIUS server response, which gives additional information about the user status. This can help in detecting whether the user is just logged in or has come to this page while already logged-in.

/Gemtek/WISPAccessGatewayParam/entry/@ReplyMessage - the RADIUS server response message on user login [optional]. This parameter supports multiple messages.

This optional RADIUS Reply-Message's could provide more detailed information, why user login failed.

/Gemtek/Data/@cmd - link to **logout** page. The logout page displays network usage statistics and provides the logout from the network function.

/Gemtek/Data/@url - the URL of **start** page to where the user is redirected after successful login. Usually it can be the website of the company or organization providing the P560 controller and configuring the users to visit their website.

/Gemtek/Data/@help - link to **help** page regarding how the user should register on the network.

When the user clicks the **login** button, information is sent to: /Gemtek/Header/@Script\_Name location with following information:

username - user name to register to network;

password - user password.

When the form is submitted, user information is checked and indication of success or failure is returned.

## Logout.xsl

The **logout** page displays network usage statistics and the user ability to logout from the network. The **Logout** page is displayed after the successful login and with usage statistics which are automatically refreshed after a defined time period.

Logout page has variables:

/Gemtek/Header/@Script\_Name - current script name, to send command to logout or refresh the statistics on page.

/Gemtek/Data/entry/@auth - authentication method.

/Gemtek/Errors/@id - returned error code. Error code is a follows:

error	description
4107	Already logged in. This error code usually comes from login screen, when redirecting.

Following error codes are sent when other than the LOGOUT command is submitted:

error	description
4201	Failed to authorize.
4202	Login failed.
4203	
4204	Accounting error.
	Undefined error return from RADIUS client on P560.
4206	Already logged in.

Following error codes are sent when other than LOGOUT command is submitted:

error	description
4210	Already logged in.
4211	Failed authorization.
4212	Login failed.
4213	Network connection failed.
4214	Accounting error.
4215	Undefined error return from RADIUS client on P560.

/Gemtek/Data/@cmd - link to **logout** page.

/Gemtek/Data/@login - link to **login** page. This is used when the user is logged-off and to provide a quick link to be used to register again.

/Gemtek/Data/entry/@username - username with which user is logged in.

/Gemtek/Data/entry/@ip - detected user IP address from which the user has made his attempt to register on the network.

/Gemtek/Data/entry/@mac - detected users MAC address.

/Gemtek/Data/entry/@time - session time.

/Gemtek/Data/entry/@idle - idle time.

/Gemtek/Data/entry/@in - input bytes sent.

/Gemtek/Data/entry/@out - output bytes sent.

/Gemtek/Data/entry/@remain\_down - input bytes left.

/Gemtek/Data/entry/@remain\_up - output bytes left.

/Gemtek/Data/entry/@remain\_total - total bytes left.

/Gemtek/Data/entry/@remain\_time - session time remaining.

/Gemtek/Data/entry/@down - bandwidth downstream.

/Gemtek/Data/entry/@up - bandwidth upstream.

If there is no /Gemtek/Data/entry in XML tree, it indicates that the user is not logged in.

Logout page has two purposes:

- Log off the user
- Show the user usage statistics.

To log off the user, call the script defined in /Gemtek/Header/@Script\_Name with variable cmd set to logout. This could be done through POST or simply GET methods supplying simple link with parameters:

```
<a href="/logout.user?cmd=logout">.
```

To get user usage statistics, simply refresh the script defined in /Gemtek/Header/@Script\_Name with no variables set. This could be done by defining the simple link:

```
<a href="/logout.user">.
```

## Help.html

This is a HTML file with no embedded cgi prepared. It is advisable to write instructions for the user on how to register to the network or what to do in the case of troubleshooting.

## Unauthorized.html

This page appears if the user is not registered on the network or the web authentication is not provided on the AC. It is recommended to include information on how to contact the network administrator (e.g. phone number).

## Smart Client

The P560 cannot only be used with a browser, but with a smart client connected to the P560 through HTTPS connection; thus, retrieving information given as XML in the same login.user output. To support a smart client, the following lines should be included in all user XSL templates:

```
<xsl:import href="xml-in-comments.xsl"/>
```

```
<xsl:apply-templates select="Gemtek/WISPAccessGatewayParam"/>
```

## Commands for User Pages

A user who is not logged in and trying to browse the Internet will be redirected to the welcome page automatically.

The **welcome** page address is:

```
https://P560_ip_address/welcome.user
```

The **login** page address is:

```
https://P560_ip_address/login.user
```

The **logout** and session information page address is:

```
https://P560_ip_address/logout.user
```

For the user who is logged in, the form should be posted to /login.user address and the form should have the following parameters:

- username - username to log on;
- password - user password;
- 'cmd' with value 'login'.

To receive connected user session information, the following address should be used:

```
https://P560_ip_address/logout.user
```

To disconnect a user who is currently connected, the following address should be used:

`https://P560_ip_address/logout.user` with parameter 'cmd' with value 'logout'.

Entering the following address into the browser will disconnect the currently logged in user:

`https://P560_ip_address/logout.user?cmd=logout`

## Upload Templates

All user pages files (welcome.xsl, login.xsl, logout.xsl, help.html, unauthorized.html) can be on an external server or on the P560. Which templates are to be used is found in **user interface | configuration | pages**. The P560 has default user templates that can be replaced by uploading new templates. Any uploaded templates and images overrides the default templates.

Next to predefined templates, there are supported image types:

- PNG
- GIF
- JPG

Supported cascading style sheets:

- CSS

Uploaded file types are detected by their extension.

Use of cascading style sheets (css) is not required, but recommended.

The Hotspot-in-a-Box administrator is responsible to conduct tests to ensure that all uploaded templates are correct and work as expected. After the upload, the controller does not verify the correctness of the uploaded templates. If the controller is not able to load the uploaded xsl template, it will use the default build-in templates.

## Image Location

Designers who prepare custom user templates should take note of the location of the images used. All uploaded images, style sheets and static HTML pages (help.html and unauthorized.html) are located at the virtual directory 'images'. Uploaded image example.gif will be accessible at the following path: 'images/example.gif'

Using other paths like 'webserver/example.gif' or 'example.gif' will redirect to 'images/unauthorized.html' or if UAM is enabled to user page (welcome.user, login.user or logout.user depending on device configuration and user status).

This is an example of how to use an image in a XSL template:

```

```

## Glossary

### Symbols:

**802.11:** 802.11 is a family of specifications for wireless local area networks (WLANs) developed by a working group of the Institute of Electrical and Electronics Engineers (IEEE). The original specification provides for an Ethernet Media Access Controller (MAC) and several physical layer (PHY) options, the most popular of which uses GFSK modulation at 2.4GHz, enabling data rates of 1 or 2Mbps. Since its inception, two major PHY enhancements have been adopted and become "industry standards".

802.11b adds CCK modulation enabling data rates of up to 11Mbps, and 802.11a specifies OFDM modulation in frequency bands in the 5 to 6GHz range, and enables data rates up to 54Mbps.

### A

**AAA:** Authentication, Authorization and Accounting. A method for transmitting roaming access requests in the form of user credentials (typically user@domain and password), service authorization, and session accounting details between devices and networks in a real-time manner.

**authentication:** The process of establishing the identity of another unit (client, user, device) prior to exchanging sensitive information.

### B

**backbone:** The primary connectivity mechanism of a hierarchical distributed system. All systems, which have connectivity to an intermediate system on the backbone, are assured of connectivity to each other. This does not prevent systems from setting up private arrangements with each other to bypass the backbone for reasons of cost, performance, or security.

**Bandwidth:** Technically, the difference, in Hertz (Hz), between the highest and lowest frequencies of a transmission channel. However, as typically used, the amount of data that can be sent through a given communications circuit. For example, typical Ethernet has a bandwidth of 100Mbps.

**bps:** bits per second. A measure of the data transmission rate.

### D

**DHCP:** Dynamic Host Configuration Protocol (DHCP) is a communications protocol that lets network administrators manage centrally and automate the assignment of Internet Protocol (IP) addresses in an organization's network. Using the Internet Protocol, each machine that can connect to the Internet needs a unique IP address. When an organization sets up its computer users with a connection to the Internet, an IP address must be assigned to each machine. Without DHCP, the IP address must be entered manually at each computer and, if computers move to another location in another part of the network, a new IP address must be entered. DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network.

**DNS:** Domain Name Service. An Internet service that translates a domain name such as gemtek-systems.com to an IP address, in the form xx.xx.xx.xx, where xx is an 8 bit hex number.

### E

**EAP:** Extensible Authentication Protocol. Defined in [RFC2284] and used by IEEE 802.1x Port Based Authentication Protocol [8021x] that provides additional authentication methods. EAP-TLS (Transport Level Security) provides for mutual authentication, integrity-protected ciphersuite negotiation and key exchange between two endpoints [RFC2716]. EAP-TTLS (Tunneled TLS Authentication Protocol) provides an authentication negotiation enhancement to TLS (see Internet-Draft <draft-ietf-pppext-eap-ttls-00.txt>).

## G

**gateway:** A gateway is a network point that acts as an entrance to another network. On the Internet, a node or stopping point can be either a gateway node or a host (end-point) node. Both the computers of Internet users and the computers that serve pages to users are host nodes. The computers that control traffic within your company's network or at your local Internet service provider (ISP) are gateway nodes.

## H

**hotspot:** A hotspot is wireless public access system that allows subscribers to be connected to a wireless network in order to access the Internet or other devices, such as printers. Hot-spots are created by WLAN access points, installed in public venues. Common locations for public access are hotels, airport lounges, railway stations or coffee shops.

**hotspot operator:** An entity that operates a facility consisting of a Wi-Fi public access network and participates in the authentication.

**HTTP:** The Hypertext Transfer Protocol (HTTP) is the set of rules for exchanging files (text, graphic images, sound, video, and other multimedia files) on the World Wide Web. Relative to the TCP/IP suite of protocols (which are the basis for information exchange on the Internet), HTTP is an application protocol.

**HTTPS:** HTTPS (Hypertext Transfer Protocol over Secure Socket Layer, or HTTP over SSL) is a Web protocol developed by Netscape and built into its browser that encrypts and decrypts user page requests as well as the pages that are returned by the Web server. HTTPS is really just the use of Netscape's Secure Socket Layer (SSL) as a sublayer under its regular HTTP application layering.

## I

**ICMP:** ICMP (Internet Control Message Protocol) is a message control and error-reporting protocol between a host server and a gateway to the Internet. ICMP uses Internet Protocol (IP) datagrams, but the messages are processed by the IP software and are not directly apparent to the application user.

**IEEE:** Institute of Electrical and Electronics Engineers. The IEEE describes itself as the world's largest professional society. The IEEE fosters the development of standards that often become national and international standards, such as 802.11.

**IP:** The Internet Protocol (IP) is the method or protocol by which data is sent from one computer to another on the Internet. Each computer (known as a host) on the Internet has at least one IP address that uniquely identifies it from all other computers on the Internet. When you send or receive data (for example, an e-mail note or a Web page), the message gets divided into little chunks called packets. Each of these packets contains both the sender's Internet address and the receiver's address. Any packet is sent first to a gateway computer that understands a small part of the Internet. The gateway computer reads the destination address and forwards the packet to an adjacent gateway that in turn reads the destination address and so forth across the Internet until one gateway recognizes the packet as belonging to a computer within its immediate neighborhood or domain. That gateway then forwards the packet directly to the computer whose address is specified.

**IPsec:** IPsec (Internet Protocol Security) is a developing standard for security at the network or packet processing layer of network communication. Earlier security approaches have inserted security at the application layer of the communications model. IPsec will be especially useful for implementing virtual private networks and for remote user access through dial-up connection to private networks. A big advantage of IPsec is that security arrangements can be handled without requiring changes to individual user computers. Cisco has been a leader in proposing IPsec as a standard (or combination of standards and technologies) and has included support for it in its network routers.

IPsec provides two choices of security service: Authentication Header (AH), which essentially allows authentication of the sender of data, and Encapsulating Security Payload (ESP), which supports both authentication of the sender and encryption of data as well. The specific information associated with each of these services is inserted into the packet in a header that follows the IP packet header. Separate key protocols can be selected, such as the ISAKMP/Oakley protocol.

**ISP:** An ISP (Internet Service Provider) is a company that provides individuals and other companies access to the Internet and other related services such as Web site building and virtual hosting. An ISP has the equipment and the telecommunication line access required to have a point-of-presence on the Internet for the geographic area served.

## L

**LAN:** A local area network (LAN) is a group of computers and associated devices that share a common communications line and typically share the resources of a single processor or server within a small geographic area (for example, within an office building). Usually, the server has applications and data storage that are shared in common by multiple computer users. A local area network may serve as few as two or three users (for example, in a home network) or many as thousands of users (for example, in an FDDI network).

## M

**MAC:** Medium Access Control. In a WLAN network card, the MAC is the radio controller protocol. It corresponds to the ISO Network Model's level 2 Data Link layer. The IEEE 802.11 standard specifies the MAC protocol for medium sharing, packet formatting and addressing, and error detection.

## N

**NAT:** NAT (Network Address Translation) is the translation of an Internet Protocol address (IP address) used within one network to a different IP address known within another network. One network is designated the inside network and the other is the outside. Typically, a company maps its local inside network addresses to one or more global outside IP addresses and unmaps the global IP addresses on incoming packets back into local IP addresses.

NAT is included as part of a router and is often part of a corporate firewall.

## P

**POP3:** POP3 (Post Office Protocol 3) is the most recent version of a standard protocol for receiving e-mail. POP3 is a client/server protocol in which e-mail is received and held for you by your Internet server. Periodically, you (or your client e-mail receiver) check your mail-box on the server and download any mail. POP3 is built into the Netmanage suite of Internet products and one of the most popular e-mail products, Eudora. It's also built into the Netscape and Microsoft Internet Explorer browsers.

**PPP:** PPP (Point-to-Point Protocol) is a protocol for communication between two computers using a serial interface, typically a personal computer connected by phone line to a server. PPP uses the Internet protocol (IP) (and is designed to handle others). It is sometimes considered a member of the TCP/IP suite of protocols. Relative to the Open Systems Interconnection (OSI) reference model, PPP provides layer 2 (data-link layer) service. Essentially, it packages your computer's TCP/IP packets and forwards them to the server where they can actually be put on the Internet.

PPP is a full-duplex protocol that can be used on various physical media, including twisted pair or fiber optic lines or satellite transmission. It uses a variation of High Speed Data Link Control (HDLC) for packet encapsulation.

PPP is usually preferred over the earlier de facto standard Serial Line Internet Protocol (SLIP) because it can handle synchronous as well as asynchronous communication. PPP can share a line with other users and it has error detection that SLIP lacks. Where a choice is possible, PPP is preferred.

**PPPoE:** PPPoE (Point-to-Point Protocol over Ethernet) is a specification for connecting multiple computer users on an Ethernet local area network to a remote site through common customer premises equipment, which is the telephone company's term for a modem and similar devices. PPPoE can be used to have an office or building-full of users share a common Digital Subscriber Line (DSL), cable modem, or wireless connection to the Internet. PPPoE combines the Point-to-Point Protocol (PPP), commonly used in dialup connections, with the Ethernet protocol, which supports multiple users in a local area network. The PPP protocol information is encapsulated within an Ethernet frame.

PPPoE has the advantage that neither the telephone company nor the Internet service provider (ISP) needs to provide any special support. Unlike dialup connections, DSL and cable modem connections are "always on." Since a number of different users are sharing the same physical connection to the remote service provider, a way is needed to keep track of which user traffic should go to and which user should be billed. PPPoE provides for each user-remote site session to learn each other's network addresses (during an initial exchange called "discovery"). Once a session is established between an individual user and the remote site (for example, an Internet service provider), the session can be monitored for billing purposes.

**PPTP:** Point-to-Point Tunneling Protocol (PPTP) is a protocol (set of communication rules) that allows corporations to extend their own corporate network through private "tunnels" over the public Internet. Effectively, a corporation uses a wide-area network as a single large local area network. This kind of interconnection is known as a virtual private network (VPN).

## R

**RADIUS:** RADIUS (Remote Authentication Dial-In User Service) is a client/server protocol and software that enables remote access servers to communicate with a central server to authenticate dial-in users and authorize their access to the requested system or service. RADIUS allows a company to maintain user profiles in a central database that all remote servers can share. It provides better security, allowing a company to set up a policy that can be applied at a single administered network point. Having a central service also means that it's easier to track usage for billing and for keeping network statistics.

## S

**SNMP:** Simple Network Management Protocol (SNMP) is the protocol governing network management and the monitoring of network devices and their functions. It is not necessarily limited to TCP/IP networks.

SNMP is described formally in the Internet Engineering Task Force (IETF) Request for Comment (RFC) 1157 and in a number of other related RFCs.

**SSL:** The Secure Sockets Layer (SSL) is a commonly-used protocol for managing the security of a message transmission on the Internet. SSL has recently been succeeded by Transport Layer Security (TLS), which is based on SSL. SSL uses a program layer located between the Internet's Hypertext Transfer Protocol (HTTP) and Transport Control Protocol (TCP) layers. The "sockets" part of the term refers to the sockets method of passing data back and forth between a client and a server program in a network or between program layers in the same computer. SSL uses the public-and-private key encryption system from RSA, which also includes the use of a digital certificate.

## T

**TCP:** TCP (Transmission Control Protocol) is a set of rules (protocol) used along with the Internet Protocol (IP) to send data in the form of message units between computers over the Internet. While IP takes care of handling the actual delivery of the data, TCP takes care of keeping track of the individual units of data (called packets) that a message is divided into for efficient routing through the Internet.

TCP is a connection-oriented protocol, which means that a connection is established and maintained until such time as the message or messages to be exchanged by the application programs at each end have been exchanged. TCP is responsible for ensuring that a message is divided into the packets that IP manages and for reassembling the packets back into the complete message at the other end. In the Open Systems Interconnection (OSI) communication model, TCP is in layer 4, the Transport Layer.



**TCP/IP:** TCP/IP (Transmission Control Protocol/Internet Protocol) is the basic communication language or protocol of the Internet. It can also be used as a communications protocol in a private network (either an intranet or an extranet). When you are set up with direct access to the Internet, your computer is provided with a copy of the TCP/IP program just as every other computer that you may send messages to or get information from also has a copy of TCP/IP.

TCP/IP is a two-layer program. The higher layer, Transmission Control Protocol, manages the assembling of a message or file into smaller packets that are transmitted over the Internet and received by a TCP layer that reassembles the packets into the original message. The lower layer, Internet Protocol, handles the address part of each packet so that it gets to the right destination.

**Telnet:** Telnet is the way to access someone else's computer, assuming they have given permission. (Such a computer is frequently called a host computer.) More technically, Telnet is a user command and an underlying TCP/IP protocol for accessing remote computers. On the Web, HTTP and FTP protocols allow to request specific files from remote computers, but not to actually be logged on as a user of that computer.

## U

**UAM:** Universal Access Method is the current recommended methodology for providing secure web-based service presentment, authentication, authorization and accounting of users is a WISP network. This methodology enables any standard Wi-Fi enabled TCP/IP device with a browser to gain access to the WISP network.

## W

**WAN:** A wide area network (WAN) is a geographically dispersed telecommunications network. The term distinguishes a broader telecommunication structure from a local area network (LAN). A wide area network may be privately owned or rented, but the term usually connotes the inclusion of public (shared user) networks. An intermediate form of network in terms of geography is a metropolitan area network (MAN).

## X

**XSL** (Extensible Style sheet Language), formerly called Extensible Style Language, is a language for creating a style sheet that describes how data sent over the Web using the Extensible Markup Language (XML) is to be presented to the user.

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