Configuring Avaya™ Communication Manager for the Avaya™ S8300 Media Server and Avaya™ G700 Media Gateway to support Avaya™ IP Softphones and Avaya™ IP Telephones behind D-Link and Linksys Broadband Routers with and without VPN Clients

- Issue 1.0

Abstract

These Application Notes present sample configurations to support multiple Avaya IP endpoints behind D-Link and Linksys Broadband Routers, with and without VPN clients. Cisco VPN clients with a Cisco VPN 3000 Concentrator and Avaya VPN clients with an Avaya VSU 5000 Gateway were verified in these Application Notes.

1. Introduction

Avaya Communication Manager can discover Network Address translated (NATed) IP endpoints through the registration process, after which it instructs them to use their NATed IP addresses for registration, call signaling and media control.

These Application Notes present a sample configuration to support multiple IP endpoints behind the D-Link and Linksys Broadband Routers as shown in **Figure 1, 2** and **3**. An Avaya S8300 Media Server with a G700 Media Gateway is located in the **Main Office** and two **SOHO 1** and **2** (small offices home office**)** are located remotely. **SOHO 1** and **2** use D-Link and Linksys Broadband Routers to access the **Main Office** respectively. In **Figure 1**, the S8300 Media Server is on the public data network, therefore, the IP endpoints behind these routers can access to the S8300 Media Server without using a VPN tunnel. In **Figure 2** and **3**, the S8300 Media Server is on the Intranet (private) network and the remote PCs must communicate with the Intranet in the **Main Office** through VPN clients. The Cisco VPN 3000 Concentrator is used in **Figure 2** and the Avaya VSU 5000 is used in **Figure 3**.

The D-Link and Linksys Broadband Routers are configured with one WAN (public) IP address to support all the devices on their private networks by network address port translation (NAPT).

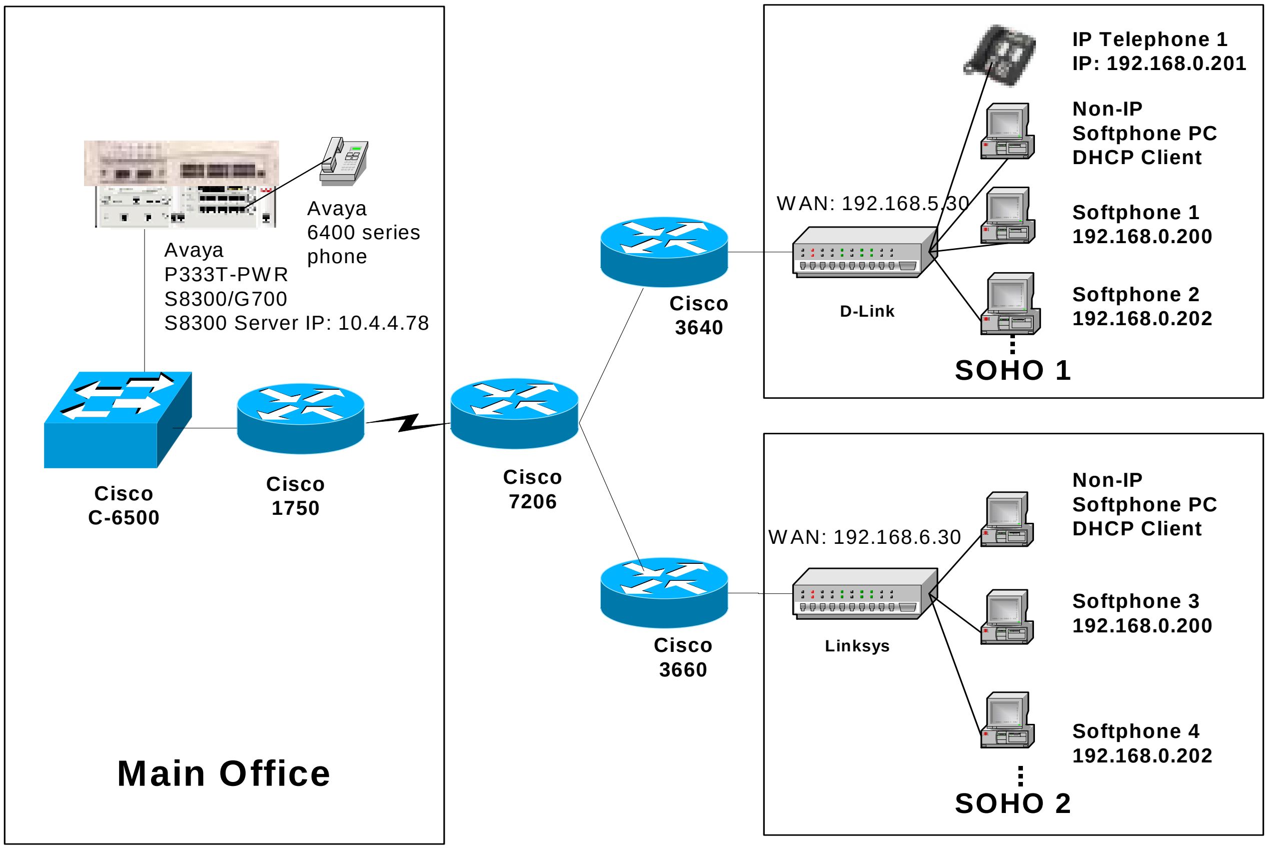


Figure 1: Multiple IP Endpoints Configuration

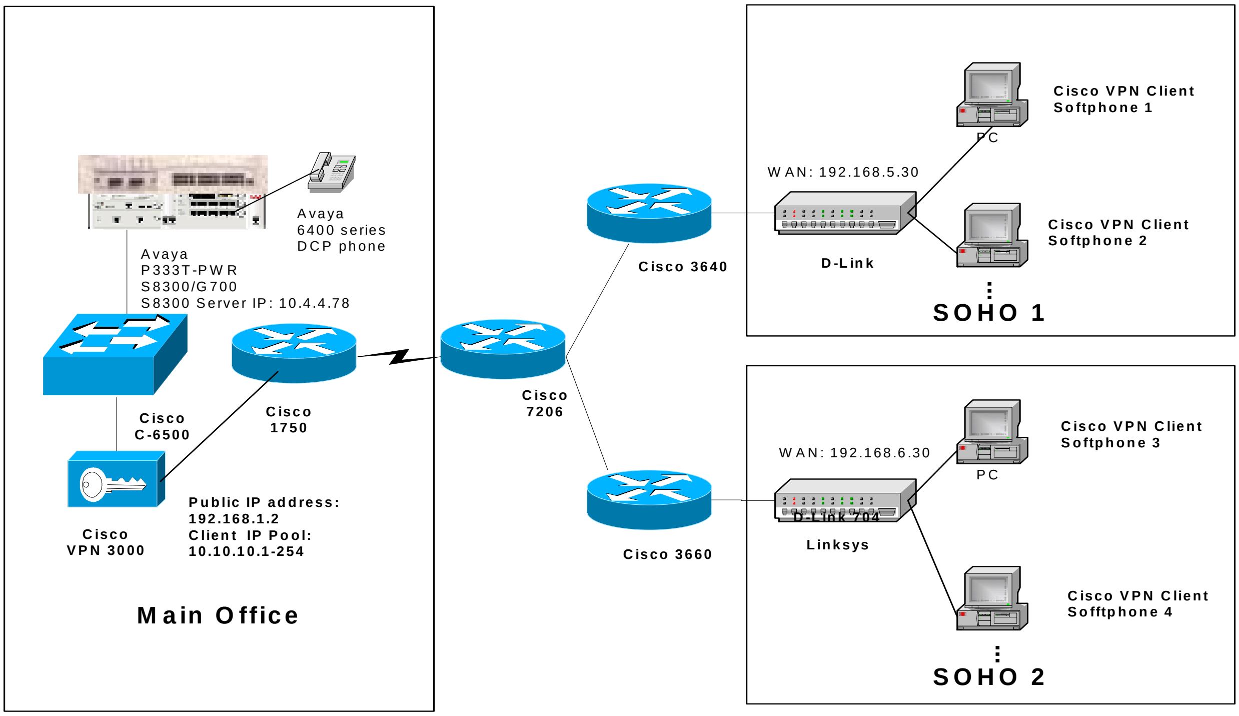


Figure 2: Avaya IP Softphones with Cisco VPN Clients

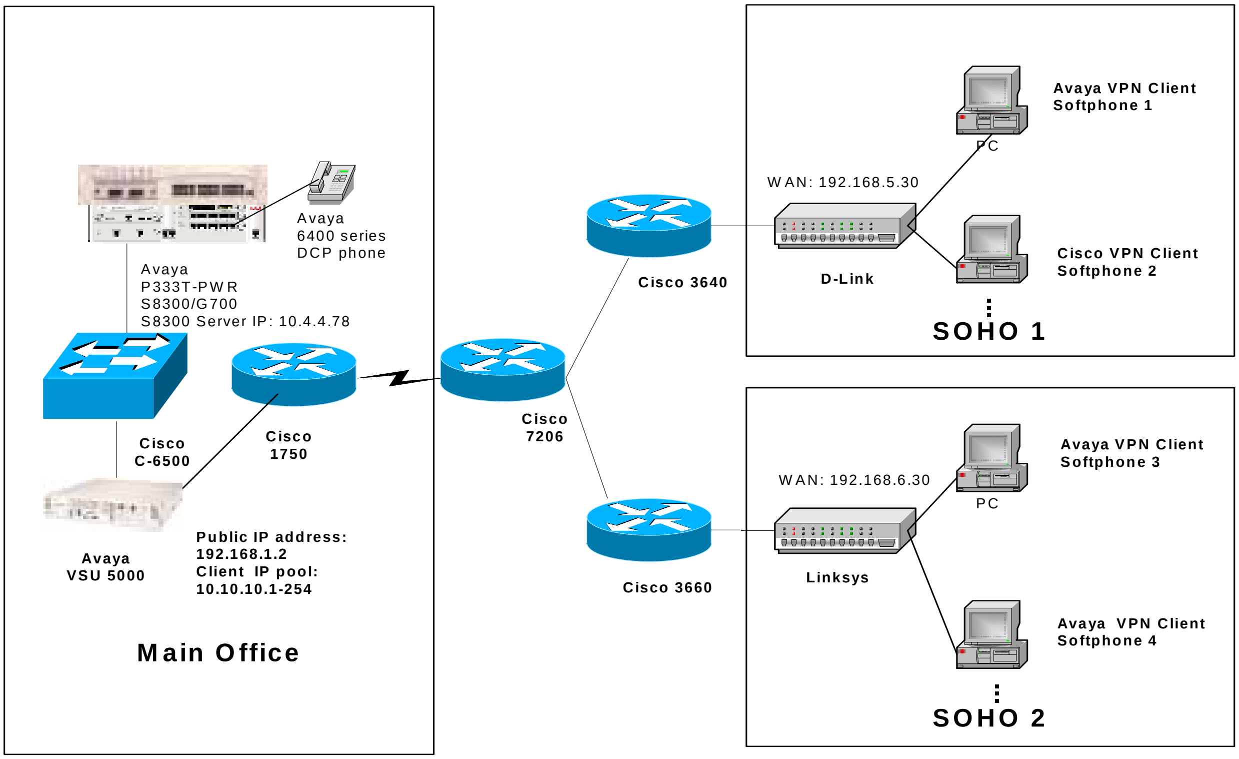


Figure 3: Avaya IP Softphones with Avaya VPN Clients

2. Software and Hardware Validated

This configuration was based on the following software versions:

Hardware Component	Software Version
Avaya™ S8300 Media Servers	R011X.02.110.4
Avaya™ IP 4612 telephone	1.72
Avaya™ IP Softphone	4.1.38
Avaya™ VPN Manager	3.2.14
Avaya™ VSU 5000	3.2.17
Avaya VPNremote® client	4.1.09
Cisco 3000 concentrator	3.6.3
Cisco 3000 client	3.6.3
D-Link DI-704P	2.6.1 build 2
Linksys BEFSR41	1.44.2

3. Considerations

3.1. Considerations for NATed Endpoints in Figure 1

a. Multiple IP Softphones can be supported behind the D-Link or Linksys routers. When multiple IP Softphones are configured with different port ranges, these port ranges can be configured as service ports on the D-Link or Linksys so that they are not changed across the D-Link or Linksys router. A local IP address must be configured to the WAN IP address for the IP Softphones behind the Linksys router (See Section 4.3.1).

b. Only one IP telephone can be supported behind the D-Link router. The reason is that the IP telephones within the same network region use the same source layer 4 (TCP or UDP) port or port range for registration and signaling.

c. The Linksys router cannot support any IP telephones. The reason is that the IP telephone cannot configure the local IP address as the IP Softphone does.

d. Direct IP-IP Audio Connections in section 4.1 must be set to “No” for remote IP network region 2 when the IP endpoints behind the same Linksys router need to communicate with each other (IP Softphones 3 and 4 in **Figure 1)**. There is no such limitation for the D-Link router, i.e. direct IP-IP Audio Connection can be set to either yes or no.

e. The D-Link router needs to be rebooted for new changes to take effect. Sometimes, it is necessary to restart the IP Softphone application for successful registrations.

3.2. Considerations for VPN Clients in Figures 2 and 3

The following observation apply to Cisco and Avaya VSU related VPN configurations:

a. For the D-Link and Linksys routers, multiple VPN clients can be supported. Regular NAPTed devices may not support multiple VPN clients behind them. D-Link and

Linksys can support ISAKMP (Internet Security Association and Key Management Protocol) not only based on UDP port 500, but also based on ISAKMP initiator cookies.

b. When a client VPN is up, all the application layer information including layer 4 and above is encapsulated into the VPN header, D-Link and Linksys only process the VPN header using NAPT and do not touch the application layer. Therefore, there is no NAPTed issue for the IP Softphones.
c. IPSec over UDP encapsulation must be configured in order to support multiple VPN clients behind the D-Link or Linksys router. If UDP encapsulation is used for the IPSec tunnel, there is no need to enable IPSec pass-through on the D-Link or Linksys router. In order to support IPSec over UDP encapsulation, it must be enabled on the Cisco VPN 3000 Concentrator and the Cisco VPN client or Avaya VPNremote Client.
d. The ‘change ip-network-map’ command in Communication Manager can be used to put the remote IP Softphone into a separate network region based on the IP address pool (10.10.10.1-254 in the example).

Cisco VPN related considerations:

a. For the Cisco VPN clients, the IP Softphone is a NATed device. The NATed IP address is the IP address obtained from the client IP address Pool (10.10.10.1-254 in the example).
b. When Split Tunneling Policy is configured to ether tunnel everything or only tunnel networks in a list that includes the client IP address pool, two remote clients can communicate with each other. Therefore, Direct IP-IP Audio Connections can be configured to “yes” for the remote network region so that the two IP Softphones can communicate with each other through Direct IP-IP.
c. If Split Tunnel Policy is configured to only tunnel networks in a list that does not include the client IP address pool, two remote clients cannot communicate directly with each other. Therefore, Direct IP-IP Audio Connections must be configured to “No” for the remote IP network region (Network region 2 in the example) so that the two IP Softphones can communicate with each other through IP-TDM.

Avaya VPN related considerations:

a. For Avaya VPNremote clients, the IP Softphone is a non-NATed device and the IP address is the address from the client IP address Pool.
b. Two VPN remote clients are not allowed to communicate with each other (even if the client IP address pool is included in the IP group) on the VSU. Direct IP-IP Audio Connections must be configured to “No” for the remote IP network region (Network region 2 in the example) so that two IP Softphones can communicate with each other through IP-TDM.

4. Device Configurations In Figure 1

A D-Link or Linksys Router must be configured so that any layer 4 ports used by the Avaya IP endpoints do not change across the router. The following layer 4 ports are used by Avaya IP telephones:

Registration: UDP 49300
Signaling: TCP range 1500 to 6500
Media (RTP): Obtained from ip-network-region configuration on S8300 Media Server
(See section 4.1)

Layer 4 ports used by Avaya IP Softphones are manually configured on the login screen: **Setting/Advanced** (See section 4.2.1 and 4.3.1). IP Softphones use these ports for registration, signaling, and media, and will ignore the port range obtained from the ip-network-region configuration on the MultiVantage Server during the registration process.

4.1. Avaya S8300 Media Server Configuration

Figure 4 shows the related Avaya S8300 Media Server configuration in **Figure 1**.
Based on the configuration in **Figure 4**, all the remote IP endpoints are put into default network region 2, considering the remote public IP addresses are unknown. The local IP endpoints are put into network region 1 by using the 'change ip-network-map' command. Remote IP endpoints are configured to communicate with the other IP endpoints using the G.729 (IP Codec-set 2) to save bandwidth. The remote IP telephones will use UDP port range 8000 to 9001 configured in IP-network-region 2 for media connections.

```
display ip-interfaces                                        Page   1 of  19
                                   IP INTERFACES

Enable                                                                 Net
Eth Pt Type   Slot  Code Sfx Node Name        Subnet Mask     Gateway Address Rgn
   y   PROCR                 10 .4   .4   .78  255.255.255.0   10 .4   .4   .1   2
   n                                          255.255.255.0      .   .   .
```

```
change ip-network-region 2                                  Page   1 of   2
                               IP Network Region
      Region: 2
        Name:

Audio Parameters                 Direct IP-IP Audio Connections? y
   Codec Set: 2                            IP Audio Hairpinning? y
    Location:
  UDP Port Range                                   RTCP Enabled? y
         Min: 8000             RTCP Monitor Server Parameters
         Max: 9001               Use Default Server Parameters? Y

DiffServ/TOS Parameters
 Call Control PHB Value: 34
   VoIP Media PHB Value: 46
          BBE PHB Value: 43
802.1p/Q Enabled? N
```

```
change ip-network-region 2                                      Page   2 of   3

                   Inter Network Region Connection Management

Region                             (Group Of 32)
        1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2
001-032 2 2
```

```
change ip-network-map                                           Page   1 of  32
                                   IP ADDRESS MAPPING
                                     Subnet
 From IP Address  (To IP Address   or Mask)  Region
 10 .4  .4  .0    10 .4  .4  .254             1
    .   .   .        .   .   .
```

```
change ip-codec-set 2                                           Page   1 of   1
                          IP Codec Set
    Codec Set: 2

    Audio      Silence      Frames   Packet
    Codec      Suppression  Per Pkt  Size(ms)
 1: G.729           n         2        20
 2:
```

Figure 4: S8300 Media Server Configuration

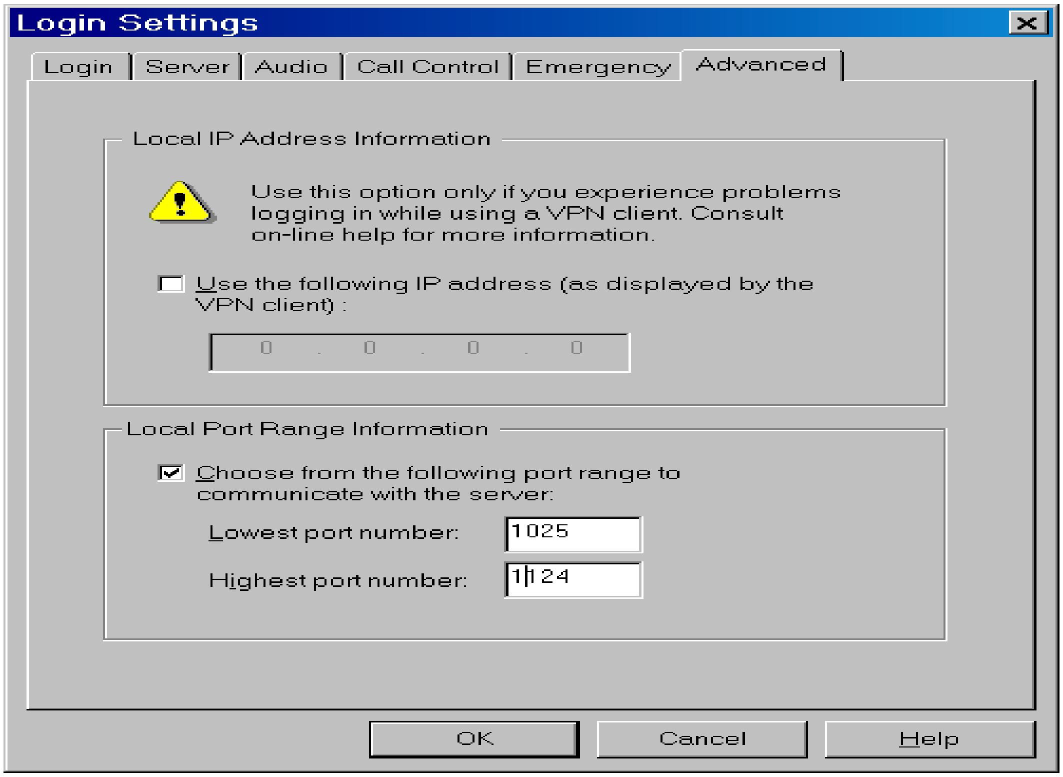
4.2. D-Link and related IP endpoints configuration

It is recommended to configure static IP addresses for the IP telephone and the PCs with IP Softphones (As shown in **Figure 1**: **SOHO 1**), because these IP addresses must be known for the virtual server/service ports configuration on the D-Link router. The Non-IP Softphone PCs can be configured as DHCP Clients.

4.2.1. IP Softphone 1 and 2 Configuration

Figure 5 and **6** show IP Softphone 1 and 2 configuration through Login/Setting/Advanced. IP Softphone 1 will use source layer 4 (TCP and UDP) port range 1025 to 1124 for RAS, signaling and media and IP Softphone 2 will use different source layer 4 (TCP and UDP) port range 7025 to 7124 for RAS, signaling and media.

Note: A WAN IP address can be configured as local IP address.



Local IP Address Information

Use this option only if you experience problems logging in while using a VPN client. Consult on-line help for more information.

☐ Use the following IP address (as displayed by the VPN client) :

0 . 0 . 0 . 0

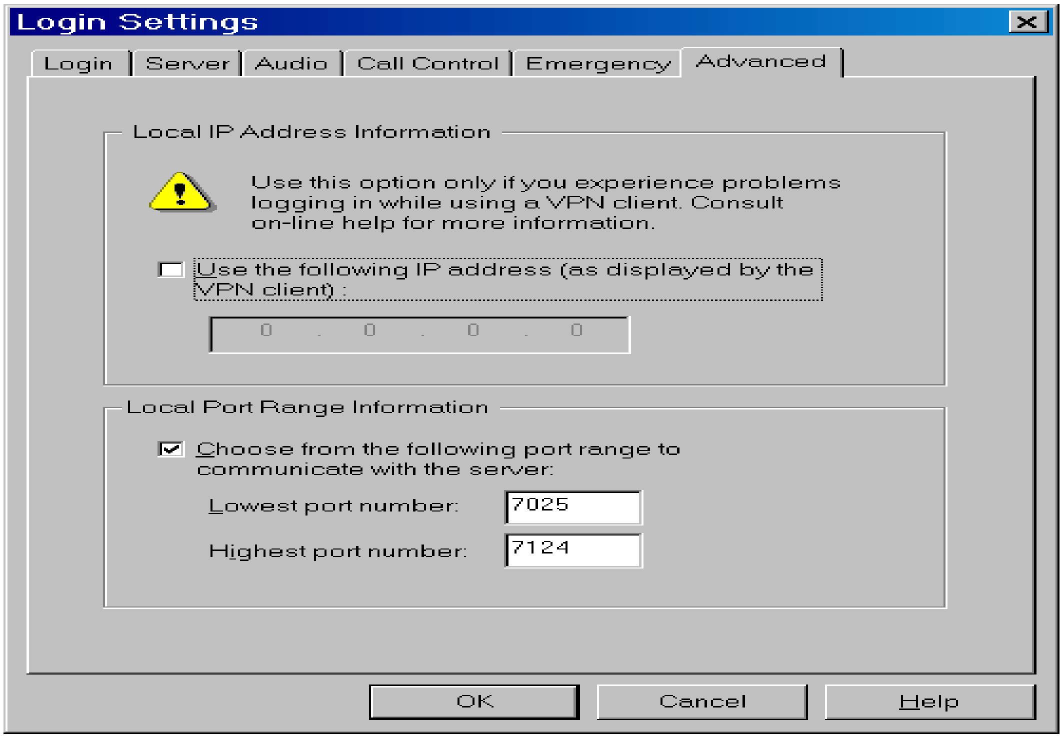
Local Port Range Information

☑ Choose from the following port range to communicate with the server:

Lowest port number: 1025

Highest port number: 1124

Figure 5: IP Softphone 1 Configuration



Local IP Address Information

Use this option only if you experience problems logging in while using a VPN client. Consult on-line help for more information.

☐ Use the following IP address (as displayed by the VPN client) :

0 . 0 . 0 . 0

Local Port Range Information

☑ Choose from the following port range to communicate with the server:

Lowest port number: 7025

Highest port number: 7124

Figure 6: IP Softphone 2 Configuration

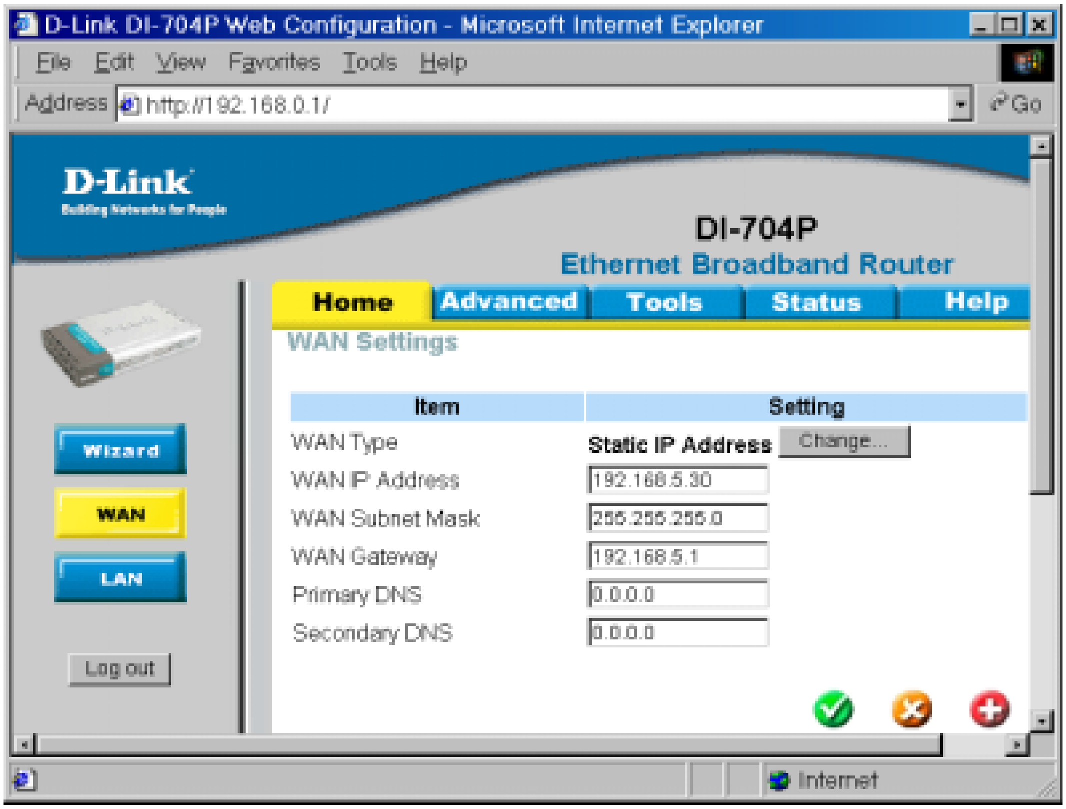
4.2.2. D-Link Configuration

Figure 7 shows WAN Configuration through Home/WAN with a WAN IP address 192.168.5.30 and Gateway: 192.168.5.1

Figure 8 shows LAN Configuration through Home/LAN. A DHCP server is enabled on the D-Link with the IP pool address range 192.168.0.100 to 192.168.0.199. The IP telephone should use the static IP addresses, which are not in the DHCP IP pool range. 192.168.0.200 to 202 are used for the IP telephone and IP Softphones.

Figure 9 shows the Virtual Server Configuration through Advanced/Virtual Server. IP Softphone 1 with IP address 192.168.0.200 is configured with service port range 1025 to 1124, IP telephone 1 with IP address 192.168.0.201 is configured with service port 49300 (RAS), 1500 to 6500 (Signaling) and 8000 to 9001 (Media). IP Softphone 2 with IP address 192.168.0.202 is configured with service port range 7025 to 7124.

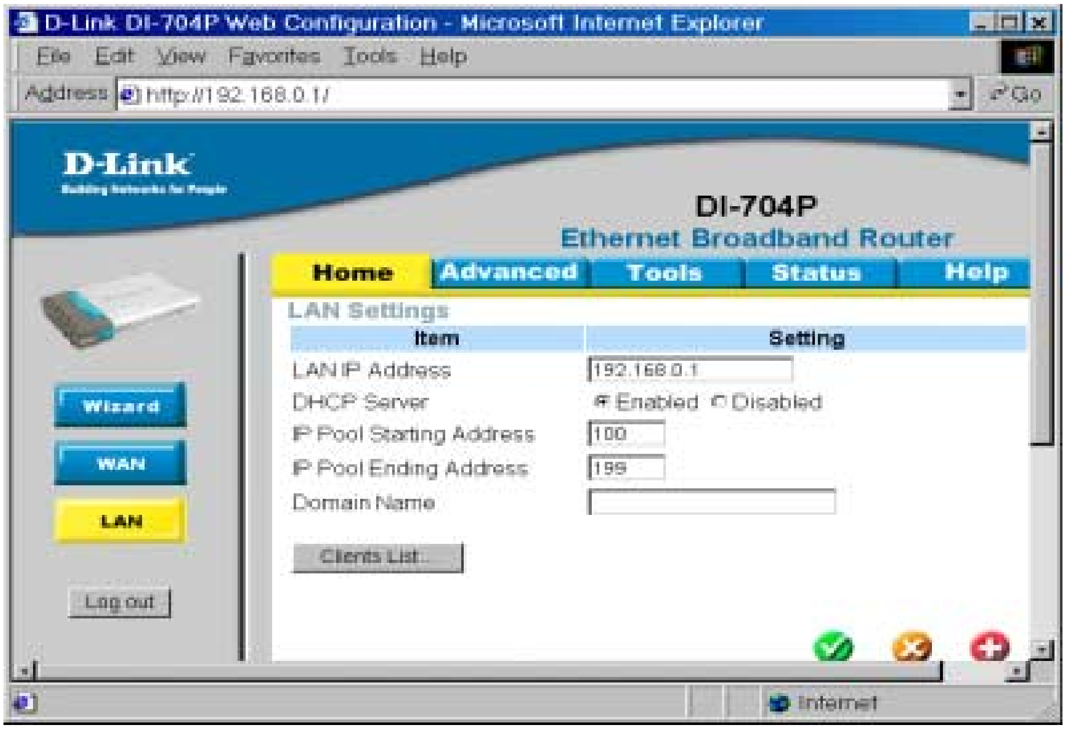
Note: There should be no overlap for service ports. These service ports associated with the IP endpoints apply to both TCP and UDP and are not changed through the D-Link.


D-Link DI-704P Web Configuration - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://192.168.0.1/
Go
D-Link
Building Networks for People
DI-704P
Ethernet Broadband Router
Home
Advanced
Tools
Status
Help
Wizard
WAN
LAN
Log out
Change...
Internet

WAN Settings

Item	Setting
WAN Type	Static IP Address
WAN IP Address	192.168.5.30
WAN Subnet Mask	255.255.255.0
WAN Gateway	192.168.5.1
Primary DNS	0.0.0.0
Secondary DNS	0.0.0.0

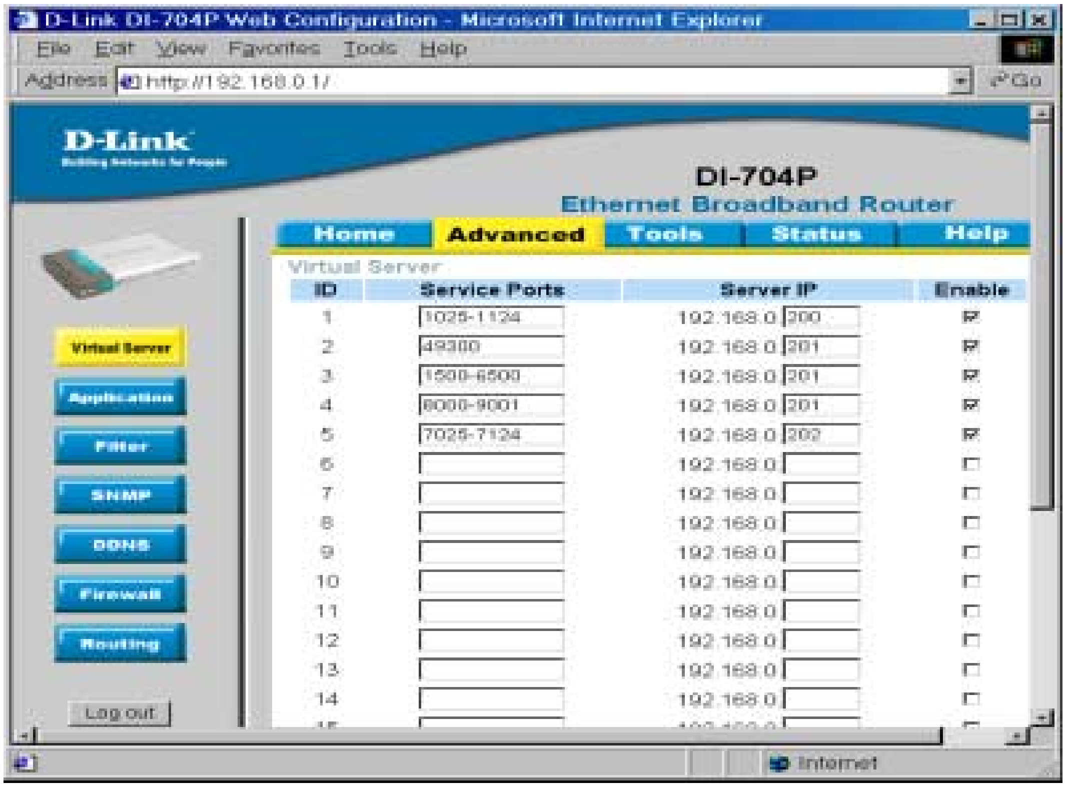
Figure 7: WAN Configuration for D-Link Router


D-Link DI-704P Web Configuration - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://192.168.0.1/
Go
D-Link
Building Networks for People
DI-704P
Ethernet Broadband Router
Home
Advanced
Tools
Status
Help
Wizard
WAN
LAN
Log out
Clients List...
Internet

LAN Settings

Item	Setting
LAN IP Address	192.168.0.1
DHCP Server	● Enabled ○ Disabled
IP Pool Starting Address	100
IP Pool Ending Address	199
Domain Name	

Figure 8: LAN Configuration for D-Link


D-Link DI-704P Web Configuration - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://192.168.0.1/
Go
D-Link
Building Networks for People
DI-704P
Ethernet Broadband Router
Home
Advanced
Tools
Status
Help
Virtual Server
Application
Filter
SNMP
DDNS
Firewall
Routing
Log out
Internet

Virtual Server

ID	Service Ports	Server IP	Enable
1	1025-1124	192.168.0.200	☑
2	49300	192.168.0.201	☑
3	1500-6500	192.168.0.201	☑
4	8000-9001	192.168.0.201	☑
5	7025-7124	192.168.0.202	☑
6		192.168.0.	☐
7		192.168.0.	☐
8		192.168.0.	☐
9		192.168.0.	☐
10		192.168.0.	☐
11		192.168.0.	☐
12		192.168.0.	☐
13		192.168.0.	☐
14		192.168.0.	☐

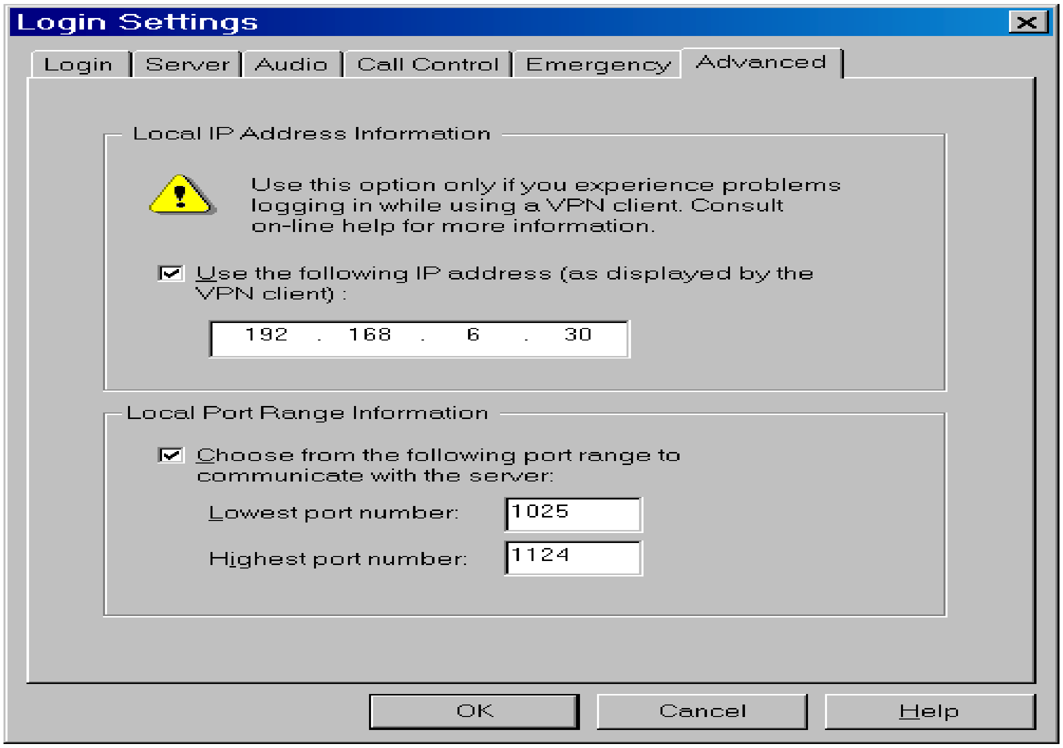
Figure 9: Virtual Server Configuration for D-Link Router

4.3. Linksys and related IP endpoints Configuration

It is recommended to configure static IP addresses for the IP telephone and the PCs with IP Softphones (as shown in **Figure 1**: **SOHO 2**), because these IP addresses must be known for port range forwarding configuration on the Linksys router. The Non-IP Softphone PCs can be configured as DHCP Clients.

4.3.1. IP Softphone 3 and 4 configurations

Similar to the section 4.2.1, IP Softphone 3 and 4 are configured to use different source layer 4 port ranges (port range 1025 to 1124 for IP Softphone 3 in **Figure 10** and 7025 to 7124 for IP Softphone 4 in **Figure 11)**. Note that these port ranges must not be overlapped.
Note: For successful registration, local IP address must be configured to the WAN IP address: 192.168.6.30.



Local IP Address Information

Use this option only if you experience problems logging in while using a VPN client. Consult on-line help for more information.

☑ Use the following IP address (as displayed by the VPN client) :

192 . 168 . 6 . 30

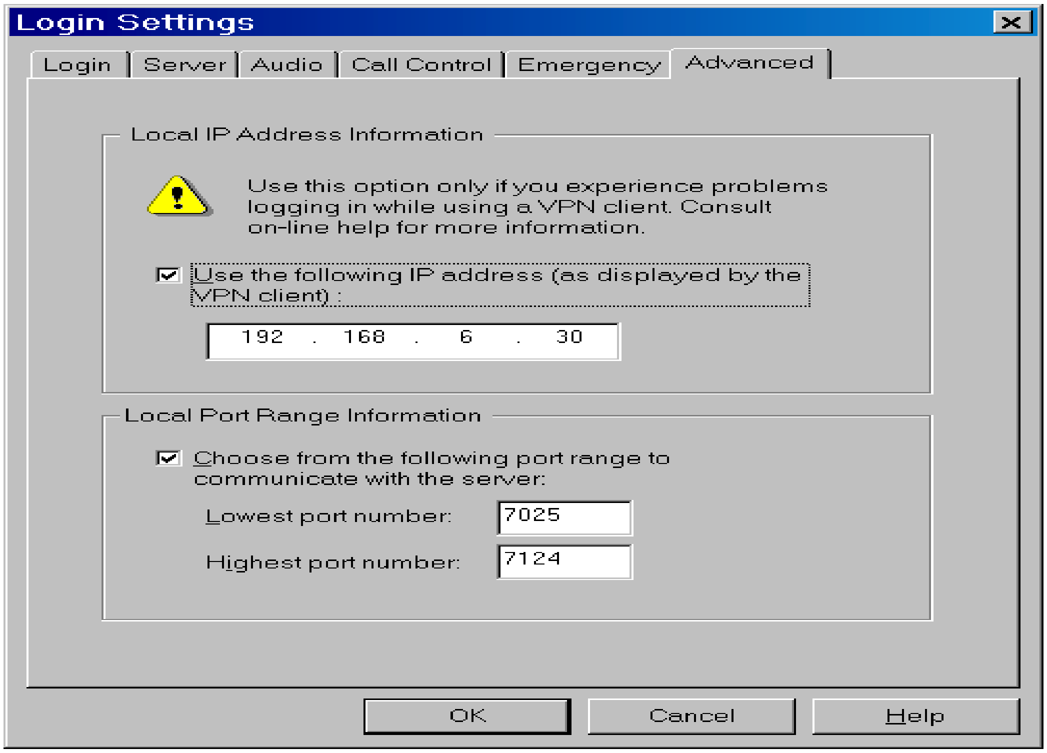
Local Port Range Information

☑ Choose from the following port range to communicate with the server:

Lowest port number: 1025

Highest port number: 1124

Figure 10: IP Softphone 3 Configuration



Local IP Address Information

Use this option only if you experience problems logging in while using a VPN client. Consult on-line help for more information.

☑ Use the following IP address (as displayed by the VPN client) :

192 . 168 . 6 . 30

Local Port Range Information

☑ Choose from the following port range to communicate with the server:

Lowest port number: 7025

Highest port number: 7124

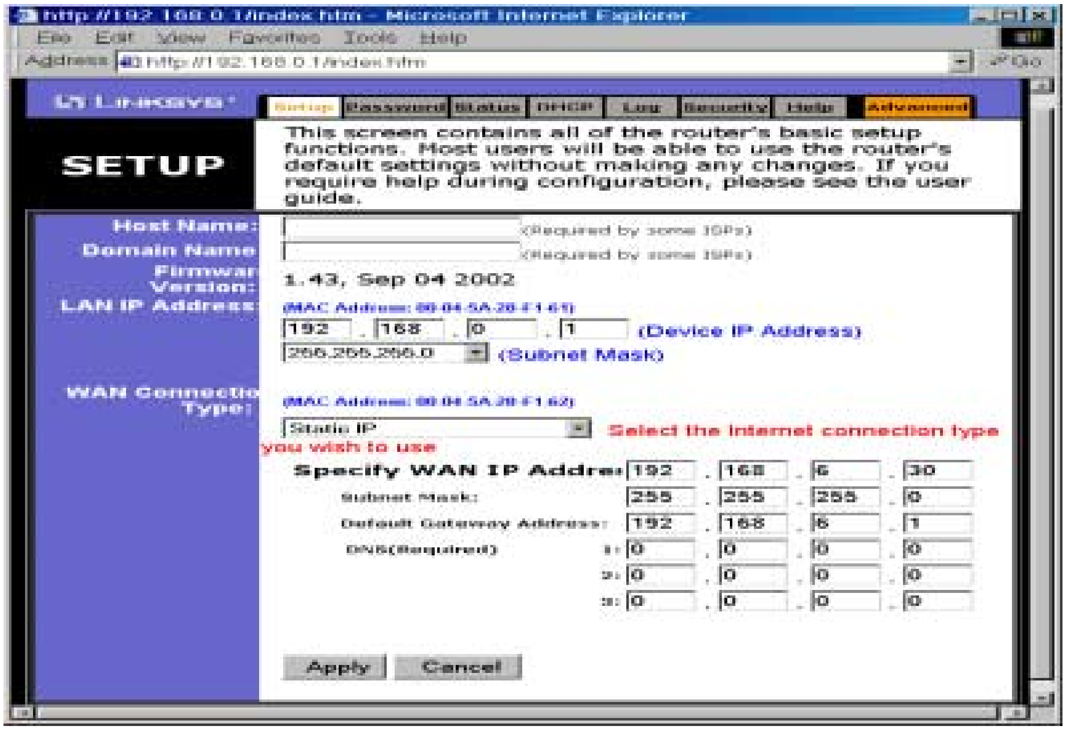
Figure 11: IP Softphone 4 Configuration

4.3.2. Linksys Configuration

Figure 12 shows setup configuration for WAN and LAN. WAN IP address: 192.168.6.30; WAN Gateway: 192.168.6.1; LAN IP address: 192.168.0.1.

Figure 13 shows DHCP configuration. The DHCP server uses an IP pool address from 192.168.0.2 to 192.168.0.51 (50 IP addresses) for the Non-IP Softphone PCs installed. IP Softphone 3 and 4 use static IP addresses 192.168.0.200 and 192.168.0.202, which are not in the DHCP IP address pool.

Figure 14 shows Port Range Forwarding Configuration. IP Softphone 3 with IP address 192.168.0.200 is configured with service port range 1025 to 1124 (TCP and UDP). IP Softphone 4 with IP address 192.168.0.202 is configured with service port range 7025 to 7124 (TCP and UDP). Make sure that protocol TCP and UDP are selected and enabled.


http://192.168.0.1/index.htm - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://192.168.0.1/index.htm
Go
LINKSYS
Setup
Password
Status
DHCP
Log
Security
Help
Advanced
SETUP
Apply
Cancel

This screen contains all of the router's basic setup functions. Most users will be able to use the router's default settings without making any changes. If you require help during configuration, please see the user guide.

Host Name: (Required by some ISPs)

Domain Name: (Required by some ISPs)

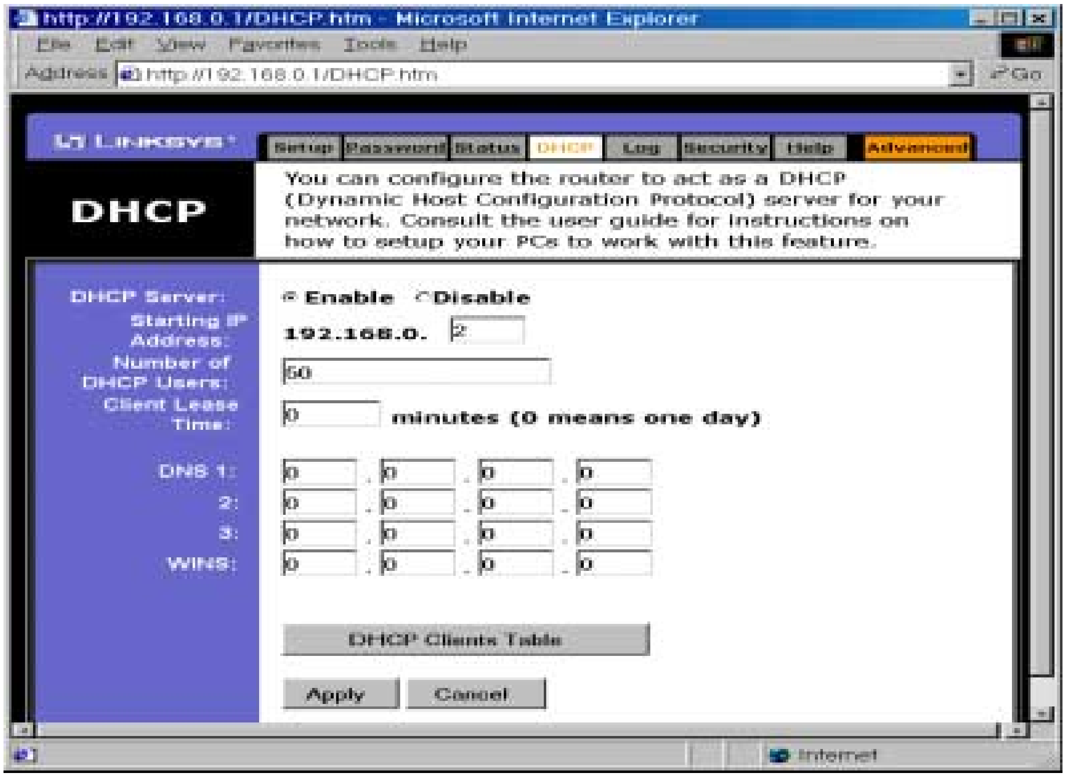
Firmware Version: 1.43, Sep 04 2002

LAN IP Address: (MAC Address: 00-04-5A-28-F1-61)
192 . 168 . 0 . 1 (Device IP Address)
255.255.255.0 (Subnet Mask)

WAN Connection Type: (MAC Address: 00-04-5A-28-F1-62)
Static IP Select the internet connection type you wish to use

Specify WAN IP Address: 192 . 168 . 6 . 30
Subnet Mask: 255 . 255 . 255 . 0
Default Gateway Address: 192 . 168 . 6 . 1
DNS(Required) 1: 0 . 0 . 0 . 0
2: 0 . 0 . 0 . 0
3: 0 . 0 . 0 . 0

Figure 12: Setup Configuration on WAN and LAN for Linksys Router


http://192.168.0.1/DHCP.htm - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://192.168.0.1/DHCP.htm
Go
LINKSYS
Setup
Password
Status
DHCP
Log
Security
Help
Advanced
DHCP
DHCP Clients Table
Apply
Cancel
Internet

You can configure the router to act as a DHCP (Dynamic Host Configuration Protocol) server for your network. Consult the user guide for instructions on how to setup your PCs to work with this feature.

DHCP Server: ● Enable ○ Disable

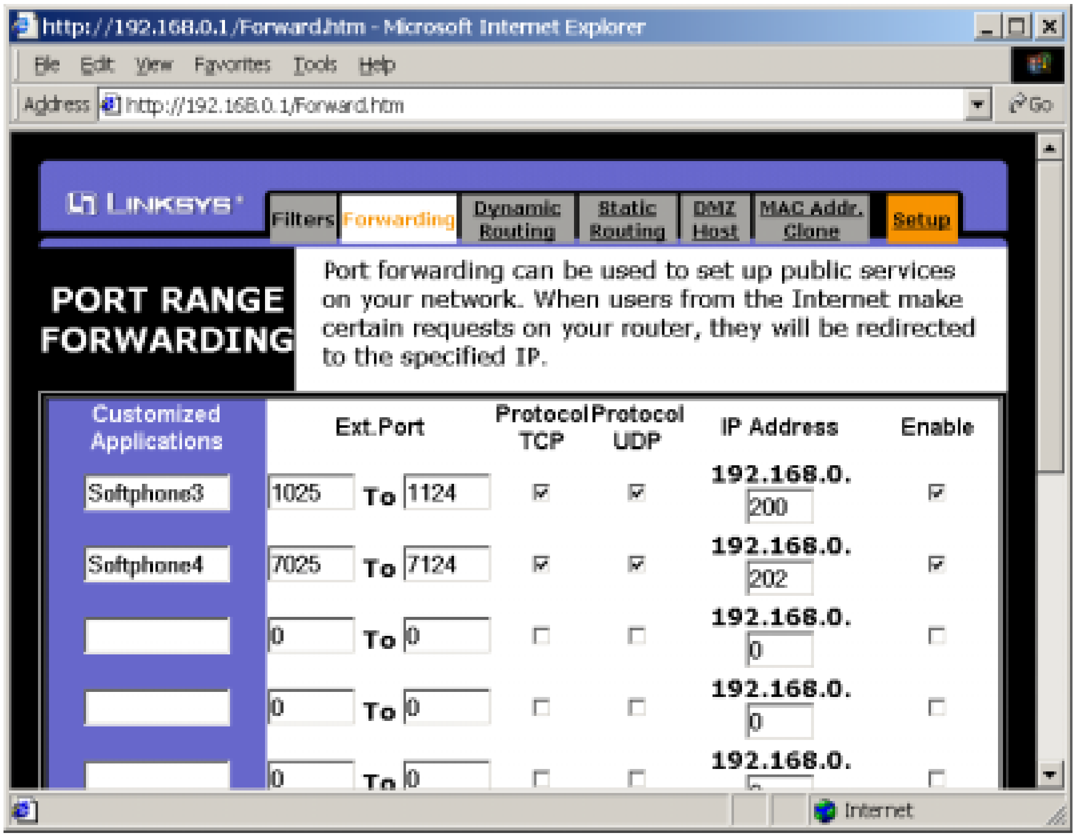
Starting IP Address: 192.168.0. 2

Number of DHCP Users: 50

Client Lease Time: 0 minutes (0 means one day)

DNS 1: 0 . 0 . 0 . 0
2: 0 . 0 . 0 . 0
3: 0 . 0 . 0 . 0
WINS: 0 . 0 . 0 . 0

Figure 13: DHCP Configuration for Linksys Router


http://192.168.0.1/Forward.htm - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://192.168.0.1/Forward.htm
Go
LINKSYS
Filters
Forwarding
Dynamic Routing
Static Routing
DMZ Host
MAC Addr. Clone
Setup
Internet

PORT RANGE FORWARDING

Port forwarding can be used to set up public services on your network. When users from the Internet make certain requests on your router, they will be redirected to the specified IP.

Customized Applications	Ext.Port			Protocol TCP	Protocol UDP	IP Address	Enable
Softphone3	1025	To	1124	☑	☑	192.168.0. 200	☑
Softphone4	7025	To	7124	☑	☑	192.168.0. 202	☑
	0	To	0	☐	☐	192.168.0. 0	☐
	0	To	0	☐	☐	192.168.0. 0	☐
	0	To	0	☐	☐	192.168.0.	☐

Figure 14: Port Range Forwarding Configuration for Linksys Router

5. Device Configurations In Figures 2 and 3

See **Section 8** for general Cisco and Avaya VPN client configuration references.

5.1. Avaya S8300 Media Server Configuration

Figure 15 shows the related Avaya S8300 Media Server configuration. The local IP endpoints are put into the default network region 1 and the remote IP Softphones are put into network region 2 by the 'change ip-network-map' command based on the client IP address pool. The remote IP endpoints are configured to communicate with the other IP endpoints using G.729 (IP Codec-set 2) to save bandwidth.

```
display ip-interfaces                                           Page   1 of  19

                                   IP INTERFACES

Enable                                                                     Net
Eth Pt Type   Slot  Code Sfx Node Name       Subnet Mask     Gateway Address Rgn
   y   PROCR                 10 .4  .4  .78  255.255.255.0   10 .4  .4  .1   1
   n                                         255.255.255.0      .   .   .
```

```
change ip-network-map                                           Page   1 of  32

                                   IP ADDRESS MAPPING

                                     Subnet
 From IP Address  (To IP Address   or Mask)  Region
 10 .10 .10 .0    10 .10 .10 .255     24       2
    .   .   .         .   .   .
```

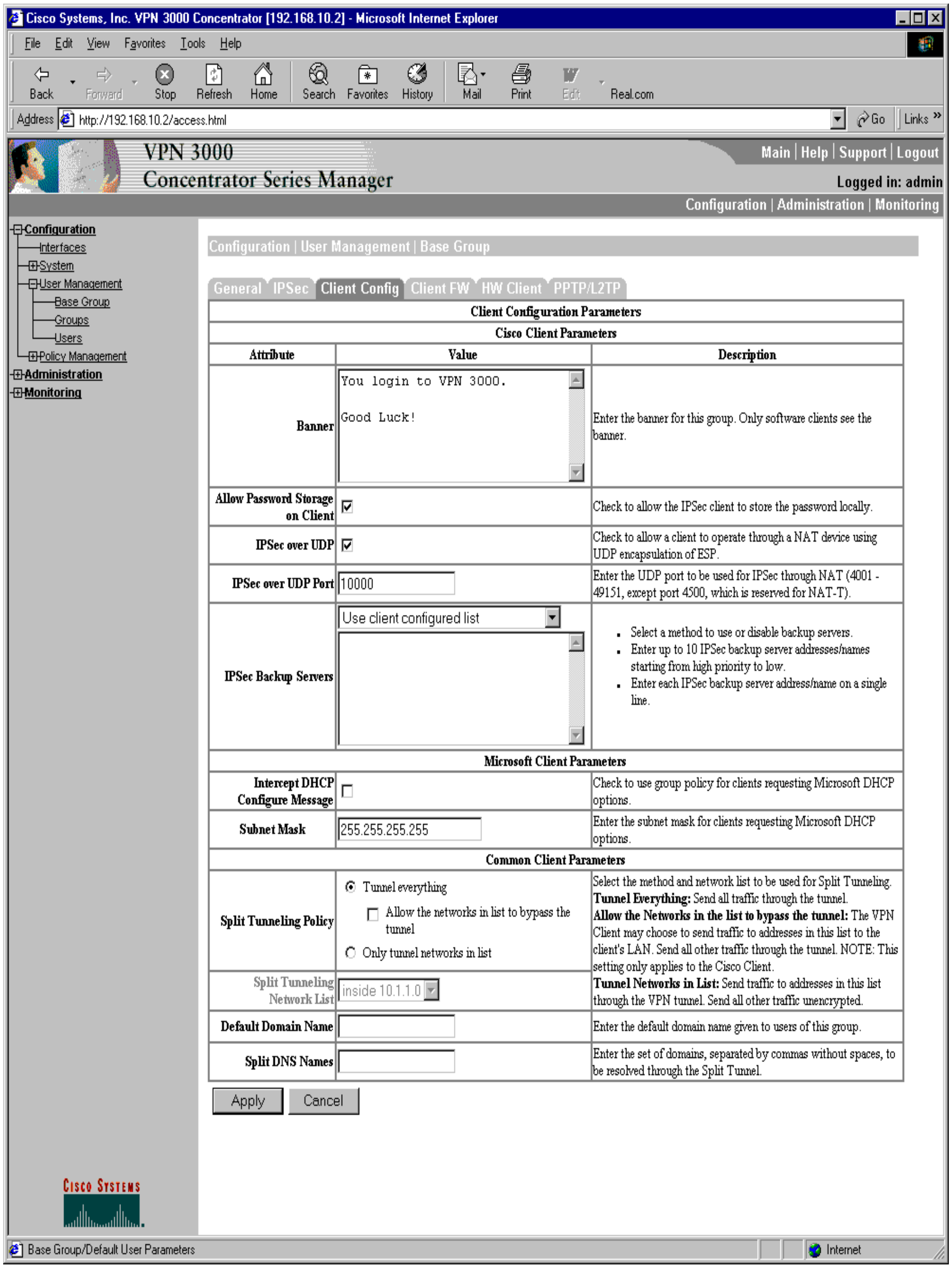
```
change ip-network-region 2                                      Page   1 of   2
                               IP Network Region

      Region: 2
        Name:

Audio Parameters                Direct IP-IP Audio Connections? n
   Codec Set: 2                           IP Audio Hairpinning? y
    Location:
  UDP Port Range                                  RTCP Enabled? n
         Min: 2048
         Max: 3028

DiffServ/TOS Parameters
 Call Control PHB Value: 34
   VoIP Media PHB Value: 46
          BBE PHB Value: 43

             802.1p/Q Enabled? N

change ip-network-region 2                                      Page   2 of   2

                   Inter Network Region Connection Management

Region                            (Group Of 32)
        1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2
001-032 2 2
033-064
```

```
change ip-codec-set 2                                           Page   1 of  1

                         IP Codec Set

   Codec Set: 2

   Audio      Silence      Frames   Packet
   Codec      Suppression  Per Pkt  Size(ms)
1: G.729           n         2        20
2:
```

Figure 15: S8300 Media Server Configuration for VPN Clients

5.2. Cisco VPN 3000 Concentrator Configuration

Figure 16 shows Basic Group Configuration for Client Configuration through **Configuration> User Management>Base Group>Client Config**. Make sure that IPSec over UDP is checked. Split Tunneling Policy is configured to tunnel everything for strong security in **Figure 16**. If Split Tunneling Policy is configured to only tunnel network in a list, include the client IP address pool in the list. Network List can be configured through **Configuration>Policy Manage>Traffic Management>Network Lists>Add**. **Figure 17** shows a network list named “Intranet” configuration and the list includes private IP network 10.4.4.0/24 and client IP Pool 10.10.10.0/24.


Cisco Systems, Inc. VPN 3000 Concentrator [192.168.10.2] - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Real.com
Address http://192.168.10.2/access.html
Go Links
VPN 3000
Concentrator Series Manager
Main | Help | Support | Logout
Logged in: admin
Configuration | Administration | Monitoring
Configuration
Interfaces
System
User Management
Base Group
Groups
Users
Policy Management
Administration
Monitoring
Configuration | User Management | Base Group
General IPSec Client Config Client FW HW Client PPTP/L2TP
Cisco Systems
Base Group/Default User Parameters
Internet

Client Configuration Parameters

Cisco Client Parameters

Attribute	Value	Description
Banner	You login to VPN 3000. Good Luck!	Enter the banner for this group. Only software clients see the banner.
Allow Password Storage on Client	☑	Check to allow the IPSec client to store the password locally.
IPSec over UDP	☑	Check to allow a client to operate through a NAT device using UDP encapsulation of ESP.
IPSec over UDP Port	10000	Enter the UDP port to be used for IPSec through NAT (4001 - 49151, except port 4500, which is reserved for NAT-T).
IPSec Backup Servers	Use client configured list	- Select a method to use or disable backup servers. - Enter up to 10 IPSec backup server addresses/names starting from high priority to low. - Enter each IPSec backup server address/name on a single line.

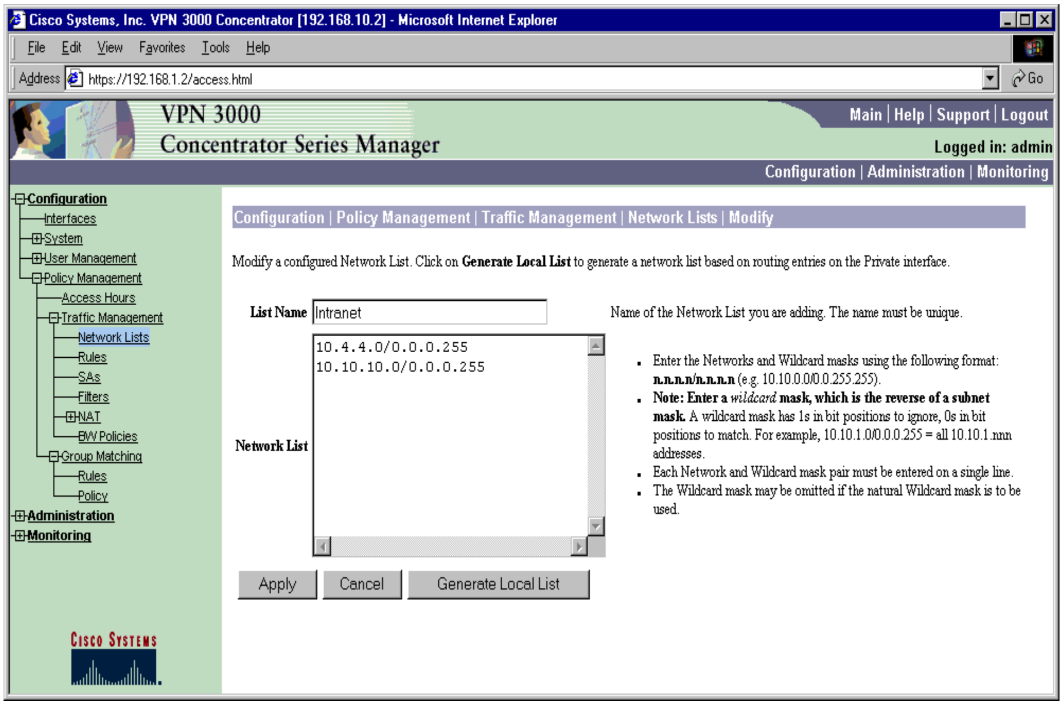
Microsoft Client Parameters

Attribute	Value	Description
Intercept DHCP Configure Message	☐	Check to use group policy for clients requesting Microsoft DHCP options.
Subnet Mask	255.255.255.255	Enter the subnet mask for clients requesting Microsoft DHCP options.

Common Client Parameters

Attribute	Value	Description
Split Tunneling Policy	● Tunnel everything ☐ Allow the networks in list to bypass the tunnel ○ Only tunnel networks in list	Select the method and network list to be used for Split Tunneling. **Tunnel Everything:** Send all traffic through the tunnel. **Allow the Networks in the list to bypass the tunnel:** The VPN Client may choose to send traffic to addresses in this list to the client's LAN. Send all other traffic through the tunnel. NOTE: This setting only applies to the Cisco Client. **Tunnel Networks in List:** Send traffic to addresses in this list through the VPN tunnel. Send all other traffic unencrypted.
Split Tunneling Network List	inside 10.1.1.0	
Default Domain Name		Enter the default domain name given to users of this group.
Split DNS Names		Enter the set of domains, separated by commas without spaces, to be resolved through the Split Tunnel.

Figure 16: Base Group Client Configuration for Cisco VPN 3000 Concentrator


Cisco Systems, Inc. VPN 3000 Concentrator [192.168.10.2] - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address https://192.168.1.2/access.html
Go
VPN 3000
Concentrator Series Manager
Main | Help | Support | Logout
Logged in: admin
Configuration | Administration | Monitoring
Configuration
Interfaces
System
User Management
Policy Management
Access Hours
Traffic Management
Network Lists
Rules
SAs
Filters
NAT
BW Policies
Group Matching
Rules
Policy
Administration
Monitoring
Configuration | Policy Management | Traffic Management | Network Lists | Modify
Apply
Cancel
Generate Local List
Cisco Systems

Modify a configured Network List. Click on **Generate Local List** to generate a network list based on routing entries on the Private interface.

List Name Intranet

Name of the Network List you are adding. The name must be unique.

Network List

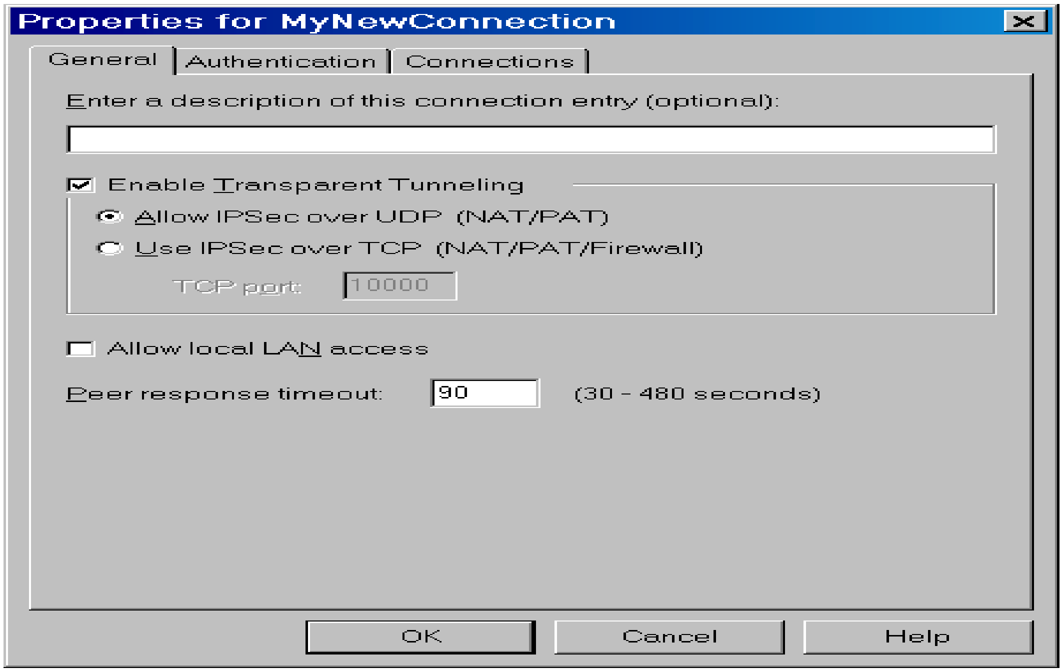
```
10.4.4.0/0.0.0.255
10.10.10.0/0.0.0.255
```

- Enter the Networks and Wildcard masks using the following format: **n.n.n.n/n.n.n.n** (e.g. 10.10.0.0/0.0.255.255).
- **Note: Enter a *wildcard* mask, which is the reverse of a subnet mask.** A wildcard mask has 1s in bit positions to ignore, 0s in bit positions to match. For example, 10.10.1.0/0.0.0.255 = all 10.10.1.nnn addresses.
- Each Network and Wildcard mask pair must be entered on a single line.
- The Wildcard mask may be omitted if the natural Wildcard mask is to be used.

Figure 17: Network List Configuration for Cisco VPN 3000 Concentrator

5.3. Cisco VPN Client Configuration

Figure 18 shows how to enable IPSec over UDP encapsulation for a Cisco VPN Client. **Transparent tunneling** and **Allow IPSec over UDP** must be enabled on the Cisco VPN Client.



Enter a description of this connection entry (optional):

☑ Enable Transparent Tunneling

● Allow IPSec over UDP (NAT/PAT)

○ Use IPSec over TCP (NAT/PAT/Firewall)

TCP port: 10000

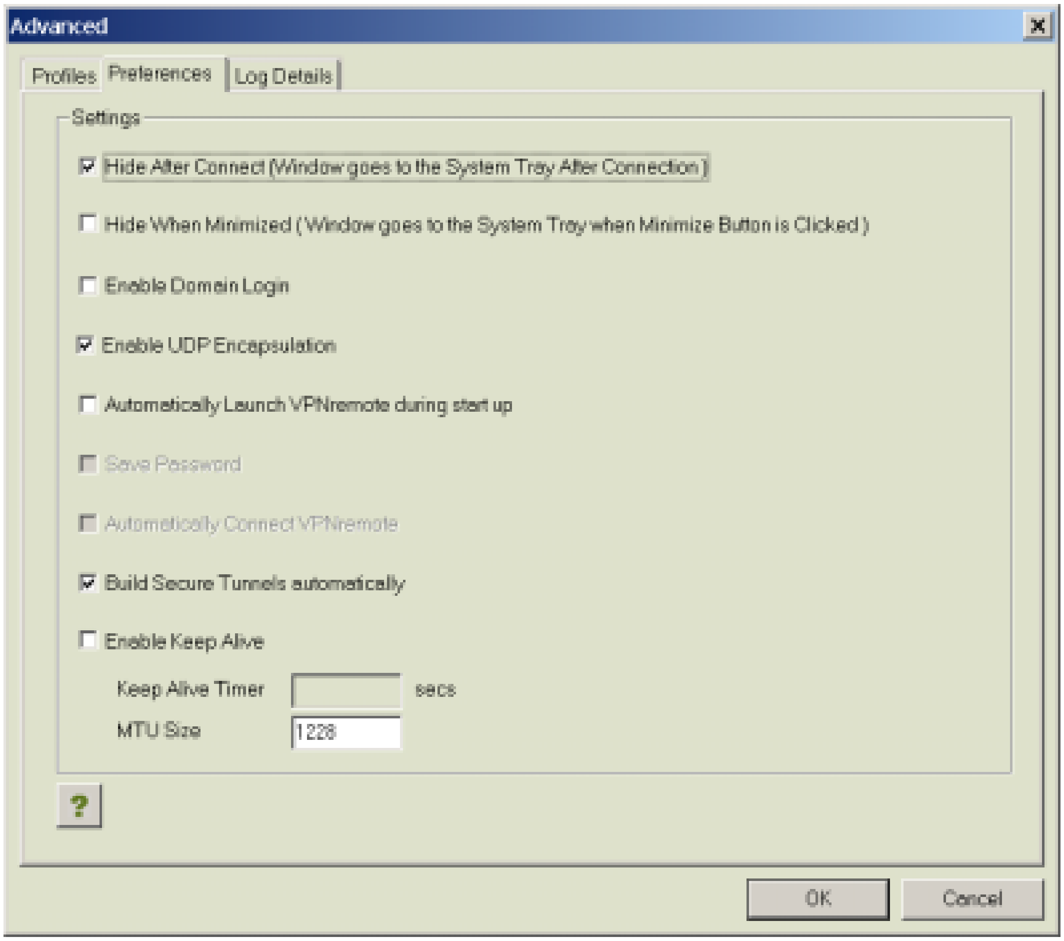
☐ Allow local LAN access

Peer response timeout: 90 (30 - 480 seconds)

Figure 18: Cisco VPN Client Configuration for IPSec over UDP

5.4. Avaya VPNremote Client Configuration

Figure 19 shows how to enable IPSec over UDP Encapsulation for an Avaya VPN remote client through Advanced/Preferences. Enable UDP encapsulation must be checked on the Avaya remote client. Note: There is no configuration needed on the Avaya VSU.



☑ Hide After Connect (Window goes to the System Tray After Connection)

☐ Hide When Minimized (Window goes to the System Tray when Minimize Button is Clicked)

☐ Enable Domain Login

☑ Enable UDP Encapsulation

☐ Automatically Launch VPNremote during start up

☐ Save Password

☐ Automatically Connect VPNremote

☑ Build Secure Tunnels automatically

☐ Enable Keep Alive

Keep Alive Timer secs

MTU Size 1228

Figure 19: Avaya VPNremote Configuration for IPSec over UDP

6. Verification Steps

The verification includes two parts:

1. Verify that the IP endpoints can register to the S8300 Media Server successfully. Use the command 'status station <phone number>' to verify that IP endpoints register to the S8300 Media Server with correct IP addresses.
   For the scenario without VPN, IP endpoints should register to the S8300 Media Server with the public IP address. For the scenario with VPN, IP endpoints should register to the S8300 Media Server with IP addresses obtained from the IP address pool.

2. Verify that phone calls can get through for remote IP endpoints with correct IP addresses among Main Office, SOHO 1 and 2 with the command ‘status station <phone number>’.

7. Conclusion

As illustrated in these Application Notes, Avaya Communication Manager Software can discover NATed endpoints. D-Link and Linksys Broadband routers can be configured to support multiple IP endpoints for SOHO with and without IPSec tunnels. For the scenario without VPNs (**Figure 1**), different configuration considerations apply, depending on the router used.

8. References

Refer to http://www.cisco.com/en/US/products/sw/secursw/ps2308/index.html for Cisco VPN 3000 Concentrator and VPN Client Configuration.

Refer to
http://support.avaya.com/japple/css/japple?PAGE=avaya.css.CSSLvl1&temp.groupID=125617
for Avaya VPNmanager® and VPNremote Client Configuration.

Please e-mail any questions or comments pertaining to these Application Notes along with the full title name and filename, located in the lower right corner, directly to the Avaya Solution & Interoperability Test Lab at interoplabnotes@list.avaya.com