Media Relay Gateway (MRG)
- Step by Step -

Rev 2.6 JAN. 2021
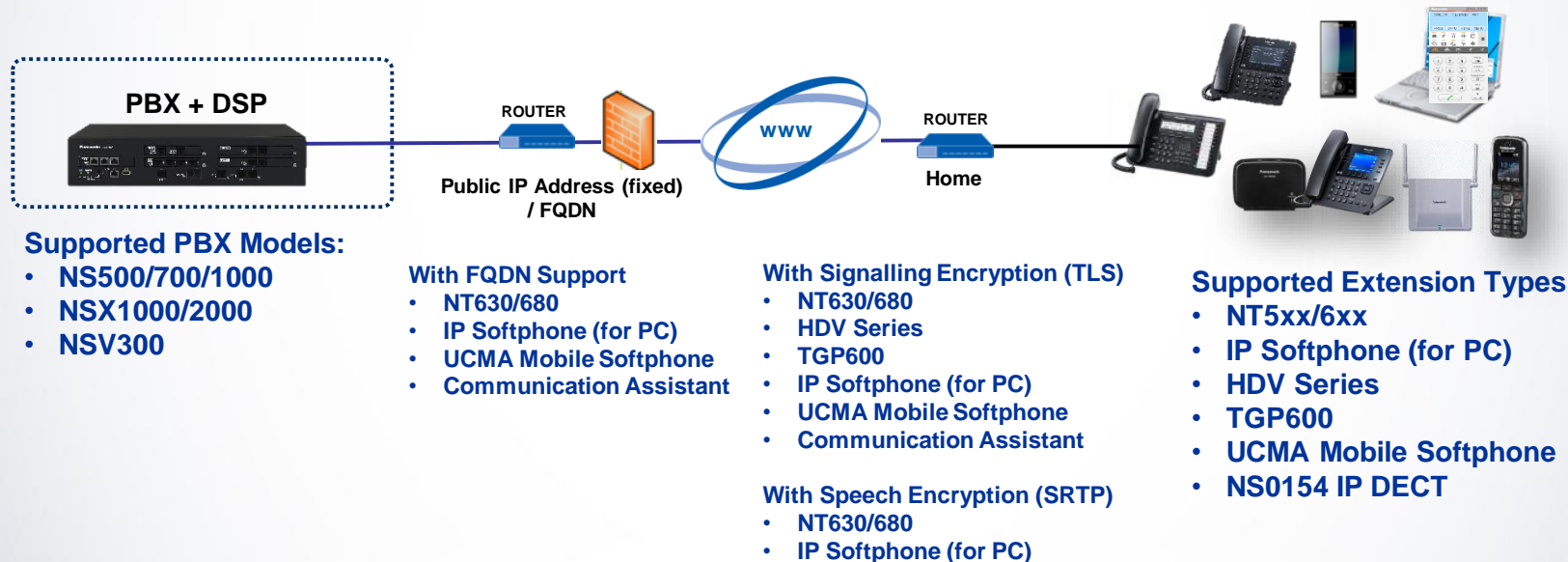
Contents for MRG Step by Step

Item	Contents
1	MRG Overview
2	Network Requirements
3	Router/Firewall Programming
4	PBX Programming
5	IP Device Configuration
6	Additional - FQDN
7	Appendix

Media Relay Gateway (MRG)

With supported IP device types, users can be connected over the internet without a VPN service, using port forwarding at the HQ router/firewall.

PBX + DSP

ROUTER

Public IP Address (fixed) / FQDN

WWW

ROUTER

Home

Supported PBX Models:
- **NS500/700/1000**
- **NSX1000/2000**
- **NSV300**

With FQDN Support
- **NT630/680**
- **IP Softphone (for PC)**
- **UCMA Mobile Softphone**
- **Communication Assistant**

With Signalling Encryption (TLS)
- **NT630/680**
- **HDV Series**
- **TGP600**
- **IP Softphone (for PC)**
- **UCMA Mobile Softphone**
- **Communication Assistant**

With Speech Encryption (SRTP)
- **NT630/680**
- **IP Softphone (for PC)**

Supported Extension Types
- **NT5xx/6xx**
- **IP Softphone (for PC)**
- **HDV Series**
- **TGP600**
- **UCMA Mobile Softphone**
- **NS0154 IP DECT**

MRG extensions do not require any additional AKs – activate the same as for local IP devices.

NOTE: P2P voice is not possible for MRG extensions so DSP card capacity is more heavily consumed.

Network Requirements

Example **Diagram of typical system configuration**

(including example IP addresses)

WAN / Public IP address
provided by ISP
e.g. 123.123.123.123

LAN: e.g. 192.168.0.254/24

Router1

PBX

LAN:192.168.0.101
DSP:192.168.0.102
GW:192.168.0.254

NAT/FW

www

WAN: Public IP address
provided by ISP

Router

NAT/FW

LAN:192.168.10.254/24
(DHCP)

Port Forwarding
- SIP

Open Ports
- MGCP
- PTAP
- RTP
- FTP
- NTP

Head office

Home / Remote office
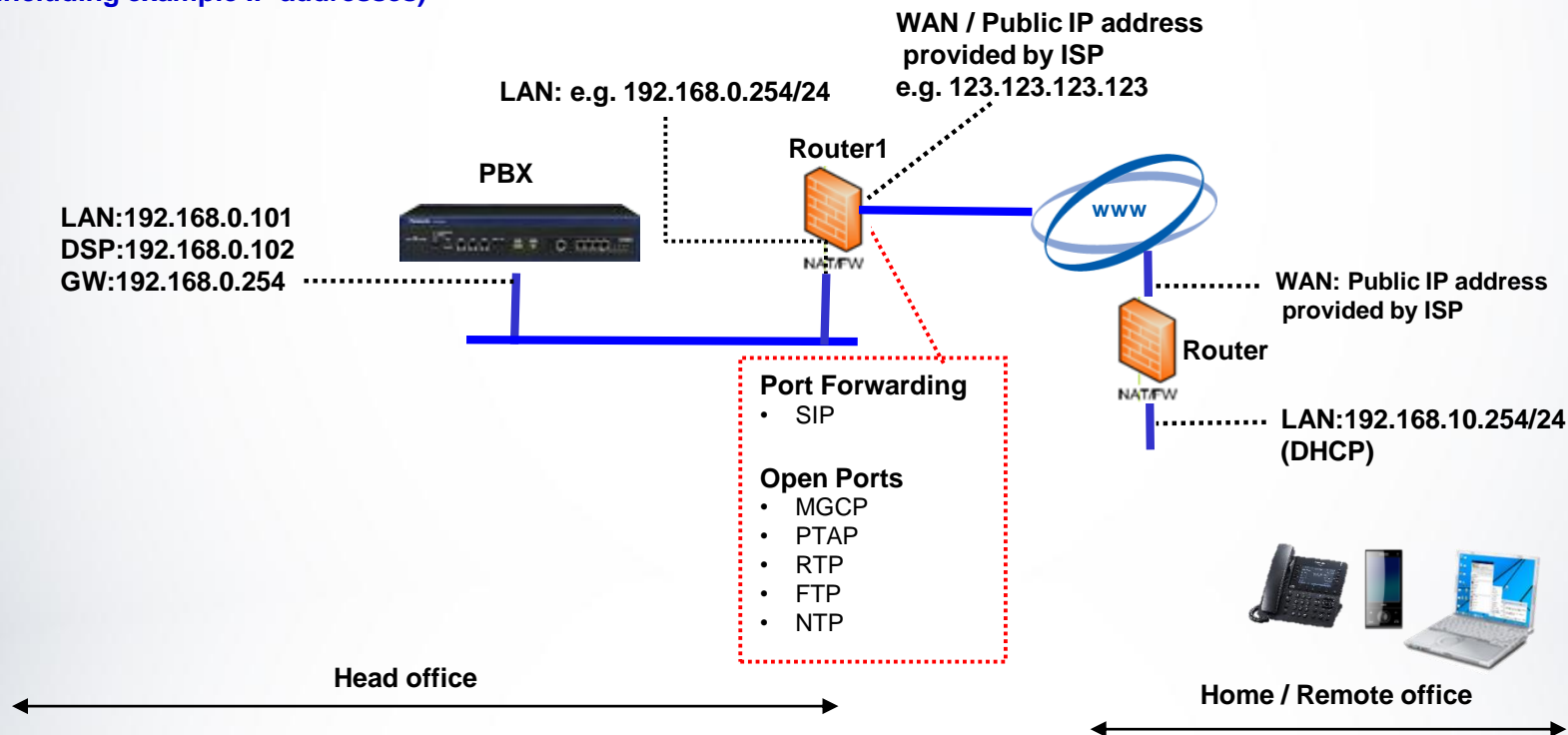
Mobile Softphone Network Requirements

UCMA Mobile Softphone has additional networking capability and can be configured to connect:
>   **Locally (e.g. office wireless LAN) or**
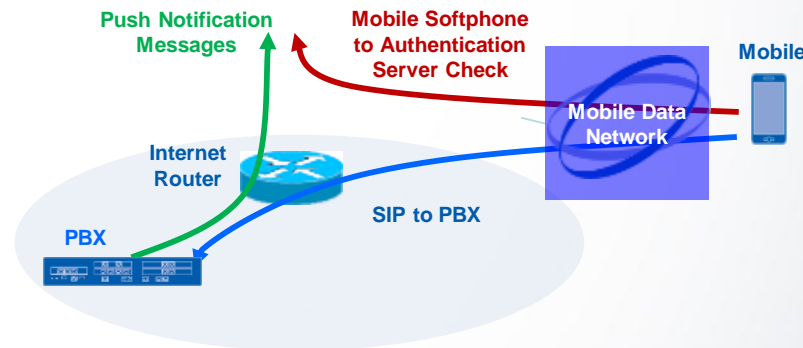>   **Remotely (over internet e.g. public Wifi hotspot or Mobile Data network).**

In either configuration, Mobile Softphone <u>must</u> have access to both PBX and Panasonic Authentication Server and must use the same network connection for both.

(Not possible to use Wireless LAN for the PBX connection and Mobile Data for the Authentication Server connection).
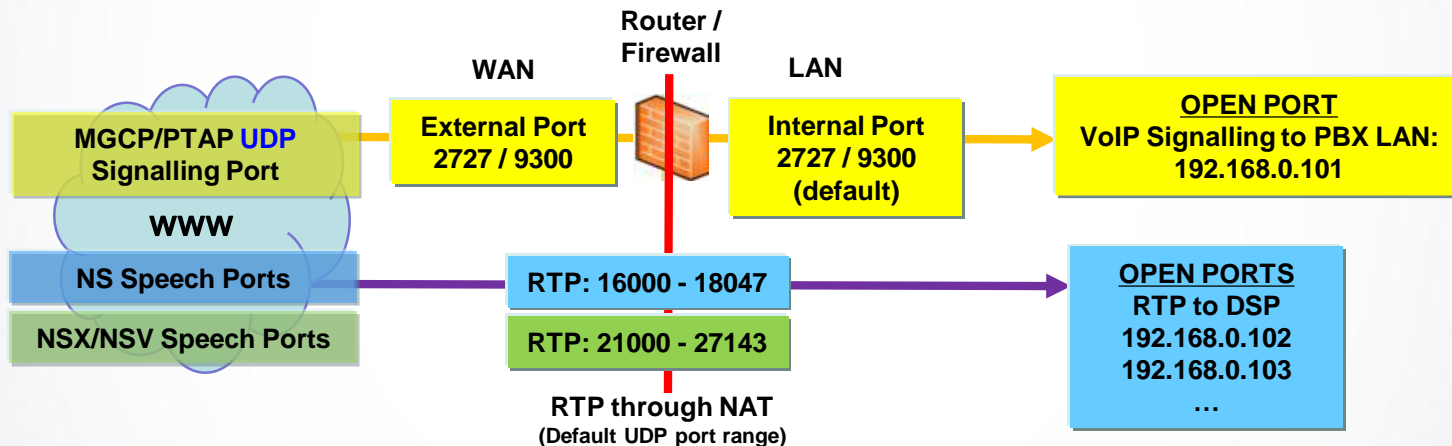
Push Notification Messages

Mobile Softphone to Authentication Server Check

Internet Router

PBX

Mobile

SIP to PBX

Wireless LAN

Local Network Access

Push Notification Messages

Mobile Softphone to Authentication Server Check

Mobile

Mobile Data Network

Internet Router

PBX

SIP to PBX
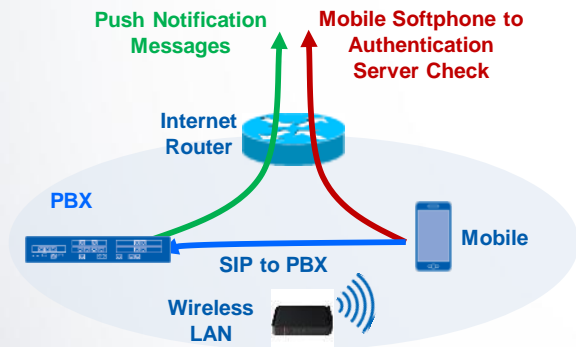
Remote Network Access

For Push Notification, the PBX must also have internet access and valid DNS configured.
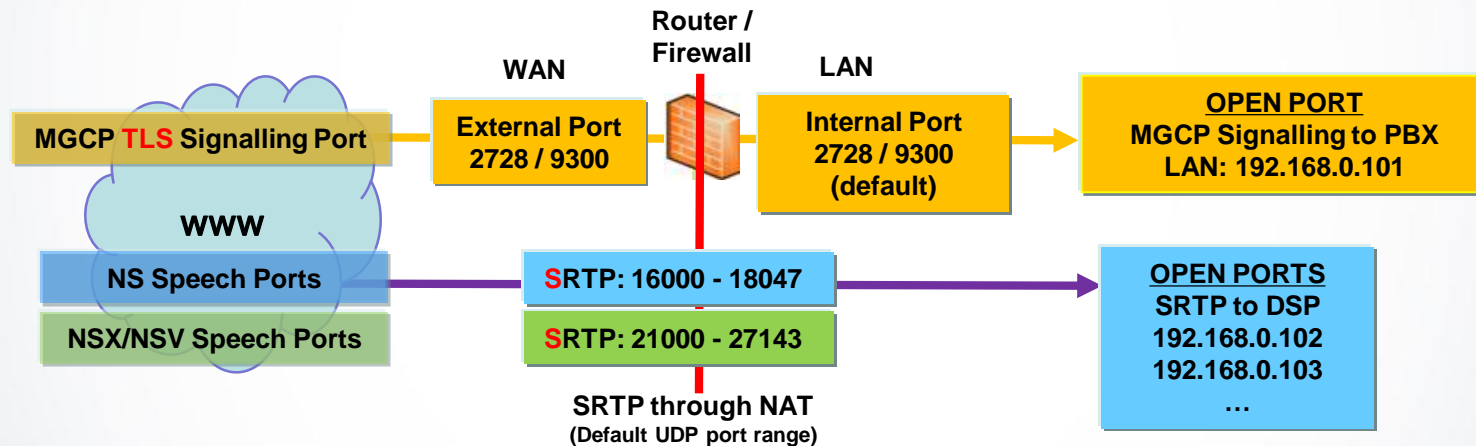
Panasonic
BUSINESS

Internet router/firewall must be configured for **Open Port** communication for NT5/NT6/IP Softphone (for PC) signalling data and **Open Ports** for the RTP/SRTP VoIP conversation data.
(SRTP only support with NT630/680)

Router /
Firewall

WAN   LAN

| MGCP/PTAP **UDP** Signalling Port | External Port 2727 / 9300 | Internal Port 2727 / 9300 (default) | **OPEN PORT** **VoIP Signalling to PBX LAN:** **192.168.0.101** |

WWW

| NS Speech Ports | RTP: 16000 - 18047 | **OPEN PORTS** **RTP to DSP** **192.168.0.102** **192.168.0.103** **…** |
| NSX/NSV Speech Ports | RTP: 21000 - 27143 | |

RTP through NAT
(Default UDP port range)

Protocol	Port numbers	Destination	Description
MGCP	2727 (UDP)	192.168.0.101	Send MGCP to **PBX LAN** IP Address
PTAP	9300 (UDP)	192.168.0.101	Send PTAP to **PBX LAN** IP Address
RTP	PBX Model dependent (UDP)	192.168.0.102 etc	Send RTP to **DSP** IP Address

All Port numbers referred to in the following guidance can be changed.
The examples shown are either sample port numbers or default values.

MGCP-TLS is **highly recommended** for additional security. The same **Open Port** process is used but with a different MGCP signalling port number for TLS. RTP stream is also encrypted as SRTP data. (UDP Port range for **SRTP** Speech packets **does not change** when using MGCP-TLS).
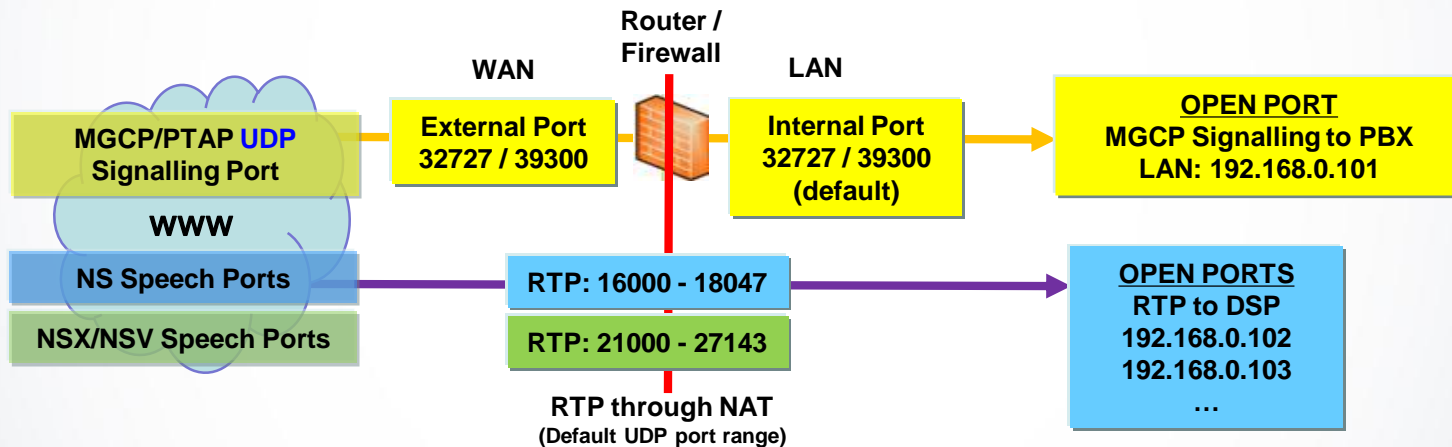
Router / Firewall

WAN

LAN

MGCP TLS Signalling Port

External Port 2728 / 9300

Internal Port 2728 / 9300 (default)

**OPEN PORT
MGCP Signalling to PBX
LAN: 192.168.0.101**

WWW

NS Speech Ports

SRTP: 16000 - 18047

NSX/NSV Speech Ports

SRTP: 21000 - 27143

**OPEN PORTS
SRTP to DSP
192.168.0.102
192.168.0.103
…**

SRTP through NAT
(Default UDP port range)

Protocol	Port numbers	Destination	Description
MGCP-TLS	2728 (TCP)	192.168.0.101	Send MGCP to PBX LAN IP Address
PTAP	9300 (UDP)	192.168.0.101	Send PTAP to PBX LAN IP Address
SRTP	PBX Model dependent (UDP)	192.168.0.102 etc	Send SRTP to DSP IP Address

All Port numbers referred to in the following guidance can be changed.
The examples shown are either sample port numbers or default values.

Panasonic BUSINESS

Internet router/firewall must be configured for **Open Ports** communication for NS0154 signalling data and **Open Ports** for the RTP VoIP conversation data.

Router / Firewall

WAN

LAN

MGCP/PTAP UDP Signalling Port	**External Port 32727 / 39300**	**Internal Port 32727 / 39300 (default)**	**OPEN PORT MGCP Signalling to PBX LAN: 192.168.0.101**

WWW

NS Speech Ports

RTP: 16000 - 18047

OPEN PORTS RTP to DSP 192.168.0.102 192.168.0.103 …

NSX/NSV Speech Ports

RTP: 21000 - 27143

RTP through NAT
(Default UDP port range)

Protocol	Port numbers	Destination	Description
MGCP	32727 (UDP)	192.168.0.101	Send MGCP to PBX LAN IP Address
PTAP	39300 (UDP)	192.168.0.101	Send PTAP to PBX LAN IP Address
RTP	PBX Model dependent (UDP)	192.168.0.102 etc	Send RTP to DSP IP Address

All Port numbers referred to in the following guidance can be changed.
The examples shown are either sample port numbers or default values.

Internet router/firewall must be configured for Port Forwarding of the communication ports for SIP Extensions and Open Ports for the RTP VoIP conversation.
NOTE: It is highly recommended to only use SIP-TLS for remote SIP devices whenever possible.

Router / Firewall

WAN

LAN

SIP UDP Signalling Port

External Port e.g. 36060

Internal Port e.g. 15060 (default 5060)

PORT FORWARDING SIP Signalling to PBX LAN: 192.168.0.101

WWW

NS Speech Ports

RTP: 16000 - 18047

OPEN PORTS RTP to DSP 192.168.0.102 192.168.0.103 …

NSX/NSV Speech Ports

RTP: 21000 - 27143

RTP through NAT
(Default UDP port range)
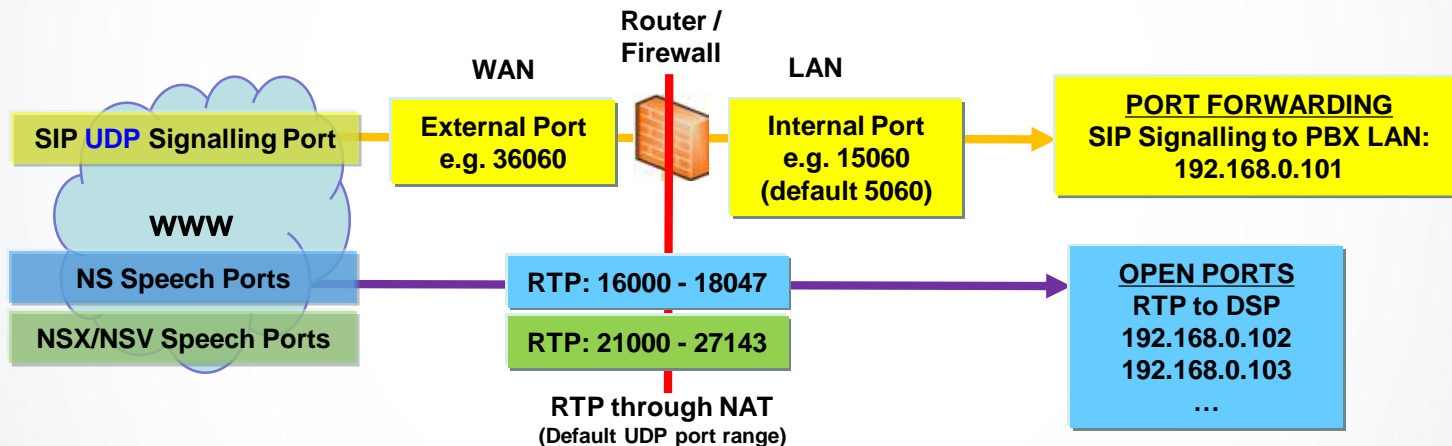
Protocol	Port numbers	Destination	Description
SIP	e.g. 15060 (UDP)	192.168.0.101	Send SIP to PBX LAN IP Address
RTP	PBX Model dependent (UDP)	192.168.0.102 etc	Send RTP to DSP IP Address

All Port numbers referred to in the following guidance can be changed. The examples shown are either sample port numbers or default values.
NOTE: It is highly recommended to use ambiguous External port numbers where possible to , reduce the chances of hacking attempts reaching the PBX – e.g. avoid ports ending xxx60, xxx61 etc.

SIP-TLS is highly recommended for additional security. The same Port Forwarding process is used but with a different SIP signalling port number for TLS. RTP Speech packets do not change when using SIP-TLS).

Router / Firewall

WAN

LAN

| SIP TLS Signalling Port | External Port e.g. 36061 | Internal Port e.g. 15061 (default 5061) | PORT FORWARDING SIP Signalling to PBX LAN: 192.168.0.101 |

WWW

| NS Speech Ports | RTP: 16000 - 18047 | OPEN PORTS SRTP to DSP 192.168.0.102 192.168.0.103 … |
| NSX/NSV Speech Ports | RTP: 21000 - 27143 | |

RTP through NAT
(Default UDP port range)
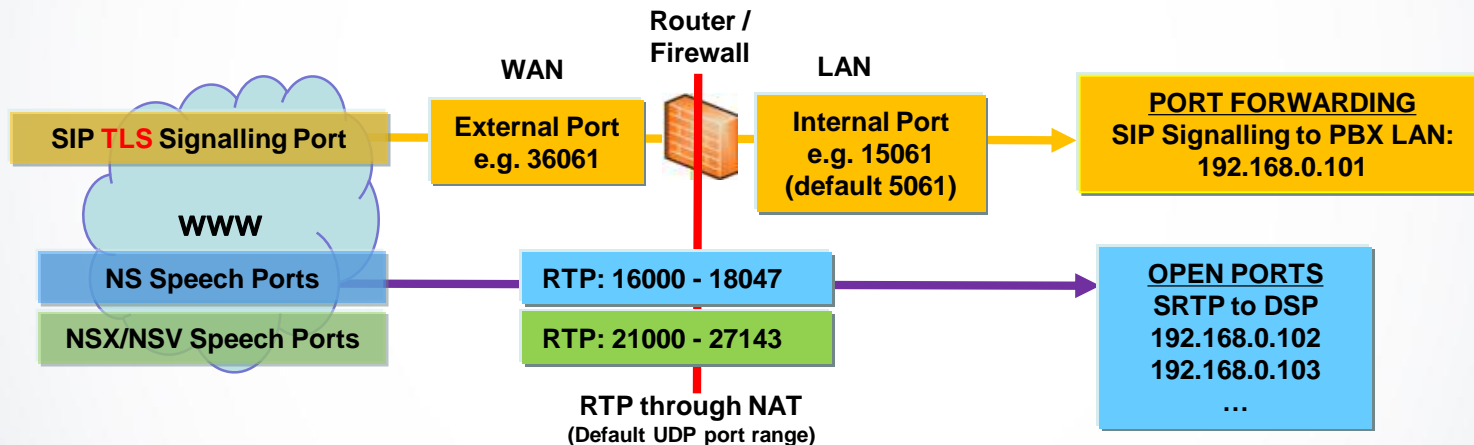
Protocol	Port numbers	Destination	Description
SIP-TLS	e.g. 15061 (TCP)	192.168.0.101	Send MGCP to PBX LAN IP Address
RTP	PBX Model dependent (UDP)	192.168.0.102 etc	Send RTP to DSP IP Address

All Port numbers referred to in the following guidance can be changed. The examples shown are either sample port numbers or default values.
NOTE: It is highly recommended to use ambiguous External port numbers where possible to , reduce the chances of hacking attempts reaching the PBX – e.g. avoid ports ending xxx60, xxx61 etc.

TLS for CA is highly recommended for additional security. The Open Port process is used.

Router /
Firewall

WAN

LAN

TLS **Signalling Port**

WWW

**External Port
33334**

**Internal Port
33334
(default)**

**OPEN PORT
CA Signalling to PBX LAN:
192.168.0.101**
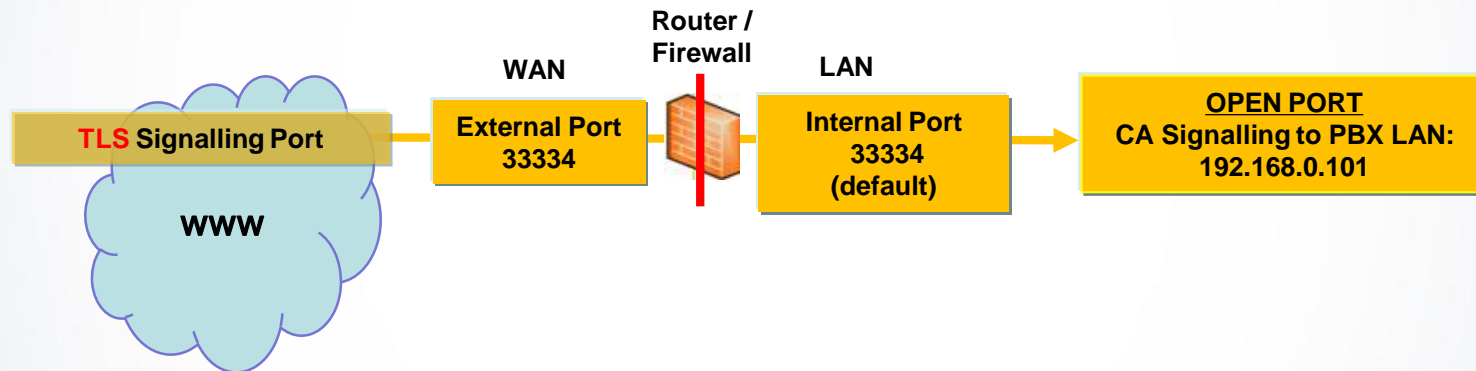
Protocol	Port numbers	Destination	Description
TLS for CA	33334 (TCP)	192.168.0.101	Send CA signaling to PBX LAN IP Address

**Port numbers referred to in the following guidance can be changed.
The examples shown are either sample port numbers or default values.**

For NT5/NT6 Series and IP Softphone (for PC)

Configure the following using **Open Ports** (not Port Forwarding) directed to the **PBX LAN** IP Address

Function	Protocol	Start Port	End Port	Target IP	Description
PTAP	UDP	9300	9300	192.168.0.101	Device Registration
MGCP	UDP	2727	2727	192.168.0.101	Signalling
MGCP-TLS*	TCP	2728	2728	192.168.0.101	Encrypted Signalling
FTP/FTPS	TCP	31021	31021	192.168.0.101	NT Firmware Update signalling
FTP/FTPS	TCP	40000	40095	192.168.0.101	NT Firmware Data (for NS)
FTP/FTPS	TCP	40000	40149	192.168.0.101	NT Firmware Data (for NSX/NSV)
NTP	UDP	123	123	192.168.0.101	Time Server

All Port numbers referred to can be changed.
The examples shown are either sample port numbers or default values.

* MGCP-TLS is not available for NT5 Series

Router/Firewall Config for NS0154

For NS0154 IP DECT

Configure the following using Open Ports (not Port Forwarding) directed to the PBX LAN IP Address

Function	Protocol	Start Port	End Port	Target IP	Description
PTAP	UDP	39300	39300	192.168.0.101	Device Registration
MGCP	UDP	32727	32727	192.168.0.101	Signalling
FTP/FTPS	TCP	31021	31021	192.168.0.101	Firmware Update signalling
FTP/FTPS	TCP	40000	40095	192.168.0.101	CS Firmware Data (for NS)
FTP/FTPS	TCP	40000	40149	192.168.0.101	CS Firmware Data (for NSX/NSV)
NTP	UDP	123	123	192.168.0.101	Time Server

All Port numbers referred to can be changed.
The examples shown are either sample port numbers or default values.

Router/Firewall Config for SIP

For SIP: HDV / TGP600 / Mobile Softphone

Configure the following using Port Forwarding (not Open Ports) directed to the PBX LAN IP Address.

MRG mechanism relies on Port Forwarding: External and Internal port numbers must be different.
Using Open Ports instead will not work.

Function	Protocol	External Port	Internal Port	Target IP	Description
SIP	UDP	36060	15060	192.168.0.101	Registration and Signalling
SIP-TLS	TCP	36061	15061	192.168.0.101	Registration and Signalling
NTP	UDP	123	123	192.168.0.101	Time Server

All Port numbers referred to can be changed.
The examples shown are either sample port numbers or default values.
NOTE: It is highly recommended to use ambiguous External port numbers where possible to , reduce the chances of hacking attempts reaching the PBX – e.g. avoid ports ending xxx60, xxx61 etc.

For all IP Devices – NS Series

Configure the following using **Open Ports** (not Port Forwarding) directed to the **DSP** IP Address

NS500/700	DSP Card	Start Port	End Port
DSP Slot 1	Card #1 IP address 1	16000	16511
DSP Slot 1 – Large DSP	Card #1 IP address 2	16512	17023

DSP-S and DSP-M have 1 IP Address.

DSP-L has 2 IP Addresses

NS1000	DSP Card	Start Port	End Port
DSP Slot 1	Card #1 IP address 1	16000	16511
DSP Slot 1 – Large DSP	Card #1 IP address 2	16512	17023
DSP Slot 2	Card #2 IP address 1	17024	17535
DSP Slot 2 – Large DSP	Card #2 IP address 2	17536	18047

Each DSP IP address is allocated a range of 512 ports for RTP/SRTP traffic.

The UDP Port range used by RTP/SRTP through NAT to each DSP card is controlled by the V-SIPGW Shelf Properties (trunks) not the SIP-EXT Shelf.

* SRTP available for NT630/680/IP Softphone (for PC) only when using MGCP-TLS (same port number range is used)

For all IP Devices – NSX Series

Configure the following using Open Ports (not Port Forwarding) directed to the DSP IP Address

NSX 1000/2000	DSP Card	Start Port	End Port
Standalone / Primary	Card #1 IP address 1	21000	21511
	Card #1 IP address 2	21512	22023
	Card #2 IP address 1	22024	22535
	Card #2 IP address 2	22536	23047
	Card #3 IP address 1	23048	23559
	Card #3 IP address 2	23560	24071
Hot-Standby Secondary	Card #1 IP address 1	24072	24583
	Card #1 IP address 2	24584	25095
	Card #2 IP address 1	25096	25607
	Card #2 IP address 2	25608	26119
	Card #3 IP address 1	26120	26631
	Card #3 IP address 2	26632	27143

DSP-S and DSP-M have 1 IP Address.

DSP-L has 2 IP Addresses

Each DSP IP address is allocated a range of 512 ports for RTP/SRTP traffic.

The UDP Port range used by RTP/SRTP through NAT to each DSP card is controlled by the V-SIPGW Shelf Properties (trunks) not the SIP-EXT Shelf.

* SRTP available for NT630/680/IP Softphone (for PC) only when using MGCP-TLS (same port number range is used)

Router/Firewall Configuration for RTP/SRTP*

For all IP Devices – NSV300

Configure the following using **Open Ports** (not Port Forwarding) directed to **NSV LAN** / **Software DSP** IP Address

NSV300	DSP Card	Start Port	End Port
Software DSP	NSV LAN IP address	21000	21511

NSV Software DSP has 1 IP Address

The NSV Software DSP is allocated a range of 512 ports for RTP/SRTP traffic.

The UDP Port range used by RTP/SRTP through NAT to the NSV Software DSP is controlled by the V-SIPGW Shelf Properties (trunks) not the SIP-EXT Shelf.

* SRTP available for NT630/680/IP Softphone (for PC) only when using MGCP-TLS – same port number range is used

Router/Firewall Config for CA

For Communication Assistant (CA)

Configure the following using Open Ports (not Port Forwarding) directed to the PBX LAN IP Address

Function	Protocol	Start Port	End Port	Target IP	Description
TLS for CA	TCP	33334	33334	192.168.0.101	Encrypted Signalling

Port numbers referred to can be changed.
The examples shown are either sample port numbers or default values.

IP Addresses

PBX IP Address programming must be correctly configured for internet access and match the router/firewall programming.

Basic Settings | Advanced Settings | Reference

IP Address	**PBX LAN** 192.168.0.101
MAC Address	: 08:00:23:6B:70:43
Subnet Mask	: 255.255.255.0
Default Gateway	: 192.168.0.1

DNS Setting

Port Number	: 53

○ Obtain DNS server address automatically
● Use the following DNS server address

Preferred DNS IP Address	: 192.168.0.1
Alternative DNS IP Address	: 8.8.8.8

Mobile Softphone Push notification requires a valid DNS server.

DSP IP Setting

○ Obtain DSP IP address automatically
● Use the following DSP IP address

DSP Card - 1

IP Address	**DSP** 192.168.0.102
MAC Address	: 08:00:23:6B:70:44

For MRG, the PBX must be programmed with the <u>real</u> public IP address of the internet router/firewall.

System Property > Site > Media Relay > NAT-External IP Address e.g. 123.123.123.123 (enter real site IP address)

System Property - Site

« | Main | VoIP-DSP Options | Port Number | LAN Status | **Media Relay** | SIP Extension | »

Common

NAT - External IP Address	123.123.123.123

IP Extension / IP-CS

NAT - MGCP Server Port No.	: 2727
NAT - MGCP Server Port No. for IP-CS	: 32727
Keep Alive Packet Type	: Blank UDP
Keep Alive Packet Type for IP-CS	: Blank UDP
Keep Alive Packet Sending Interval Time (s)	: 20
NAT - FTP Server Port No.	: 31021

Restart to apply changes

Port Numbers - NT5/NT6/IP Softphone (for PC)

PBX Port programming for both Internal and External port numbers must be configured to match the router/firewall programming.

Site Property - Main

| Main | VoIP-DSP Options | VoIP-DSP Options 2 | **Port Number** | LAN Status | Media Relay | SIP Extension | Echo Cancellatio |

Field	Value	
Voice (RTP) UDP Port No. (Server)	:	12000
Voice (RTP) UDP Port No. (IP-PT / SIP-MLT)	:	8000
UDP Port No. for SIP Extension Server	:	15060
TLS Port No. for SIP Extension Server	:	15061
Signalling (PTAP) UDP Port No. (Server)	**Internal Port**	9300
Signalling (MGCP) UDP Port No. (Server)	**Internal Port**	2727
Signalling (MGCP) TLS Port No. (Server)	**Internal Port**	2728
CWMP (HTTP) Port No. for SIP-MLT	:	7547
CWMP (HTTPS) Port No. for SIP-MLT	:	37547
Data Transmission Protocol (HTTP) Port No. for SIP-MLT	:	7580
Data Transmission Protocol (HTTPS) Port No. for SIP-MLT	:	37580
Firmware Update Port No. for IP-PT/IP-CS (Media Relay)	**Internal Port**	31021

Default / Example port numbers displayed

Restart to apply changes

Site Property - Main

| « | Main | VoIP-DSP Options | VoIP-DSP Options 2 | Port Number | LAN Status | **Media Relay** | SIP Extension |

Common

Field	Value	
NAT - External IP Address / FQDN	:	
DNS Interval Time (min)	:	10

IP Extension / IP-CS

Field	Value	
NAT - MGCP Server Port No.	**External Port**	2727
NAT - MGCP-TLS Server Port No.	**External Port**	2728
NAT - MGCP Server Port No. for IP-CS	:	32727
Keep Alive Packet Type	:	Blank UDP
Keep Alive Packet Type for IP-CS	:	Blank UDP
Keep Alive Packet Sending Interval Time (s)	:	20
NAT - FTP Server Port No.	**External Port**	31021

Network Service

	FTP
1.IP Address/Ports	
2.Server Feature	**Connection Control**
1.DHCP (LAN)	Control Port number : 30021
3.FTP	**Data Transfer Port**
5.HTTP	Port number (Minimum) : 40000
6.NTP	Port number (Maximum) : 40149
7.SMTP	**Port Range**

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Set the IP-PT Extension Ports > Location > Phone Location to Remote + Local for all remote extension devices.

Set MGCP-TLS/SRTP to Enable for encrypted communication if required (NT630/680 & IP Softphone for PC only).

Port Property - Virtual IP Extension

[Registration] [De-registration] [Forced De-registration]

| Main | Option | Voice | Secondary Setting | **Location / P2P** | NT Local Settings |

	IP-PT Type	Shelf	Slot	Port	Connection	Phone Location	MGCP-TLS / SRTP	P2P Group
		ALL ▾			ALL ▾	ALL ▾	ALL ▾	ALL ▾
	-	Virtual	17	1	OUS	Remote + Local	Enable (Remote only)	-
	-	Virtual	17	2	OUS	Local only	Disable	1
	-	Virtual	17	3	OUS	Local only	Disable	1
		Virtual	17	4	Local only	Disable	1	

Port Numbers – NS0154

PBX Port programming for both Internal and External port numbers must be configured to match the router/firewall programming.

Card Property - Virtual IPCS

Site : 1   Shelf : Virtual   Slot : 15

Common Settings

Common Settings

Signalling (PTAP) UDP Port No. (Server)	**Internal Port**	39300
Signalling (MGCP) UDP Port No. (Server)	**Internal Port**	32727
Signalling (MGCP) UDP Port No. (IP-CS)	:	2427
Voice (RTP) UDP Port No. (IP-CS)	:	8000
Keep Alive Time-Out	:	20 s
First Resending Time (PTAP)	:	500 ms
Resending Time-Out (PTAP)	:	150 s

Users
Maintenance Personnel
PBX Configuration
1.Configuration
  1.Slot
  2.Portable Sta
  3.Option
  4.Clock Priority
  5.DSP Resour
2.System
3.Group
4.Extension
5.Optional Device
6.Feature
7.TRS

Default / Example port numbers displayed

Restart to apply changes

System Property - Site

« | Main | VoIP-DSP Options | Port Number | LAN Status | Media Relay | SIP Extension | »

Common

NAT - External IP Address : 123.123.123.123

IP Extension / IP-CS

NAT - MGCP Server Port No.	:	2727
NAT - MGCP Server Port No. for IP-CS	**External Port**	32727
Keep Alive Packet Type	:	Blank UDP
Keep Alive Packet Type for IP-CS	:	Blank UDP
Keep Alive Packet Sending Interval Time (s)	:	20
NAT - FTP Server Port No.	**External Port**	31021

Network Service

1.IP Address/Ports
2.Server Feature
1.DHCP (LAN)
3.FTP
5.HTTP
6.NTP
7.SMTP

FTP

Connection Control

Control Port number : 30021

Data Transfer Port

Port number (Minimum)	**Port Range**	40000
Port number (Maximum)		40149

25

Set the IP-CS Ports > Remote Place > Phone Location to Remote(MRG) for all remote NS0154.

Port Property - Virtual IPCS

[Registration] [De-registration] [Forced De-registration]

| Main | Option | Secondary Setting | **Remote Place** |

No.	Shelf	Slot	Port	CS Name (20 characters)	Connection	Phone Location
	ALL				ALL	ALL
1	Virtual	37	1		OUS	Remote(MRG)
2	Virtual	37	2		OUS	Local
3	Virtual	37	3		OUS	Local

NS0154 must always be configured within either an Air sync or LAN sync group.
To deploy multiple NS0154 units in multiple locations, configure each IP-CS port into different sync groups:

| Main | Option | Remote Place |

No.	Shelf	Slot	Port	Program Ver.	Air Sync Group No.	LAN Sync Group No.
	ALL				ALL	ALL
1	Virtual	26	1	000.000	None	1
2	Virtual	26	2		None	2
3	Virtual	26	3		None	3
4	Virtual	26	4		None	4
5	Virtual	26	5		None	1

It is also possible to use the Master CS2-1 and CS2-2 settings in each LAN sync group to achieve additional remote location capacity:

Port Numbers - SIP

PBX Port programming for both Internal and External port numbers must be configured to match the router/firewall programming.

Site Property - Main

Main	VoIP-DSP Options	VoIP-DSP Options 2	**Port Number**	LAN Status	Media Relay	SIP Extension	Echo Cancellatio

Voice (RTP) UDP Port No. (Server)	: 12000
Voice (RTP) UDP Port No. (IP-PT / SIP-MLT)	: 8000
UDP Port No. for SIP Extension Server	**Internal Port** 15060
TLS Port No. for SIP Extension Server	**Internal Port** 15061
Signalling (PTAP) UDP Port No. (Server)	: 9300
Signalling (MGCP) UDP Port No. (Server)	: 2727
Signalling (MGCP) TLS Port No. (Server)	: 2728

System Property - Site

«	Main	VoIP-DSP Options	Port Number	LAN Status	**Media Relay**	SIP Extension	»

Common

NAT - External IP Address	: 123.123.123.123

IP Extension / IP-CS

NAT - MGCP Server Port No.	: 2727
NAT - MGCP Server Port No. for IP-CS	: 32727
Keep Alive Packet Type	: Blank UDP
Keep Alive Packet Type for IP-CS	: Blank UDP
Keep Alive Packet Sending Interval Time (s)	: 20
NAT - FTP Server Port No.	: 31021

SIP Extension / UT Extension

NAT - SIP Proxy Server Port No.	**External Port** 36060
NAT - SIP TLS Server Port No.	**External Port** 36061

Default / Example port numbers displayed

Restart to apply changes

All Port numbers referred to in the following guidance can be changed. The examples shown are either sample port numbers or default values.

NOTE: It is highly recommended to use ambiguous External port numbers where possible to , reduce the chances of hacking attempts reaching the PBX – e.g. avoid ports ending xxx60, xxx61 etc.

Set the SIP Extension Ports > Location > Phone Location to Remote + Local for all remote extension devices.

A complex Password is recommended for SIP extension ports but greater security can be applied by configuring "Panasonic SIP Phone only" option to Enable for HDV / TGP600 / Mobile Softphone.

The UDP Port range for RTP (through NAT) is found in V-SIPGW Shelf Properties (not SIP-EXT Shelf) > Nat Traversal 1 (regardless of whether SIP Trunks are used in the PBX or not).
There should be no need to change from the default unless there is a clash with existing customer protocols.

"Fixed IP Addr." should be set on NAT Traversal 1 table to enable this RTP port range:

SIP RTP Port starting number.
NS Series: 16000
NSX/NSV: 21000

PBX Port programming for both Internal and External port numbers must be configured to match the router/firewall programming.

Site Property - Main

| Main | VoIP-DSP Options | VoIP-DSP Options 2 | **Port Number** | LAN Status | Media Relay | SIP Extension | Echo Cancel |

Voice (RTP) UDP Port No. (Server)	: 12000
Voice (RTP) UDP Port No. (IP-PT / SIP-MLT)	: 8000
UDP Port No. for SIP Extension Server	: 5060
TLS Port No. for SIP Extension Server	: 5061
Signalling (PTAP) UDP Port No. (Server)	: 9300
Signalling (MGCP) UDP Port No. (Server)	: 2727
Signalling (MGCP) TLS Port No. (Server)	: 2728
CWMP (HTTP) Port No. for SIP-MLT	: 7547
CWMP (HTTPS) Port No. for SIP-MLT	: 37547
Data Transmission Protocol (HTTP) Port No. for SIP-MLT	: 7580
Data Transmission Protocol (HTTPS) Port No. for SIP-MLT	: 37580
Firmware Update Port No. for IP-PT/IP-CS (Media Relay)	: 31021
LOGIN Port Number	: 33321
CTI Port Number	: 33333
Built-in Communication Assistant Server	**Internal Port** 33334
FOS Interface Port Number	: 31000

Restart to apply changes

Communication Assistant ▬ ☐ ✕

User Login

CA Server Address

First
192.168.0.101 : Port: 33334

Second
123.123.123.123 : Port: **33334**

Public IP Address   **External Port**

102 ▾

Password
●●●●●

NOTE: Example using "Second" IP address assuming that the "First" IP Address is for local access when PC is inside the LAN

Default port numbers displayed

Device Programming

Panasonic
BUSINESS

Unless DHCP Server configuration is possible at the remote location, NT devices need to be configured with the public/global NAT IP address as the Primary PBX address manually.

Searching...

Setup

-> PBX

-> PBX IP Address

-> Primary PBX

PBX IP Address ?
123.123.123.123

Key in IP address on dial pad

-> Primary PBX
NEXT   EXIT   ENTER

-> PBX IP Address
NEXT   EXIT   ENTER

-> PBX
STORE   EXIT   CONT   ENTER

Terminal Restarts
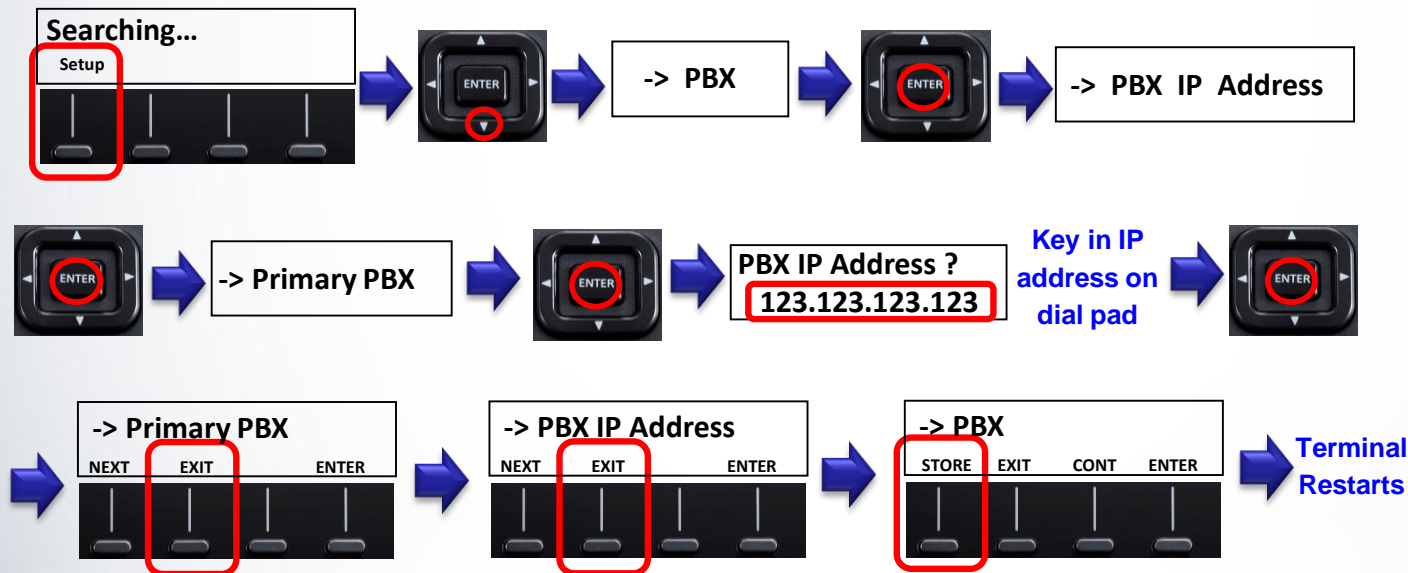
NT551 Keys

PAUSE/PROGRAM		Setup
SP-PHONE		Enter
HOLD		Exit
AUTO DIAL/STORE		Store

IP-Softphone (for PC) must be manually configured with the public/global NAT IP address for the target PBX to register/connect to:

On first start up:

If already configured for another IP address:

NOTE: Example using "Second" IP address assuming that the "First" IP Address is for local access when PC is inside the LAN

NS0154 Configuration

Panasonic BUSINESS

Unless DHCP Server configuration is possible at the remote location, NS0154 units need to be configured with the public/global NAT IP address as the Primary PBX address manually.

WebMC Offline Tool:

Panasonic BUSINESS

Unless DHCP Server or configuration provisioning is available at the remote location, HDV and TGP600 devices must manually be configured through local Web Admin.

| Status | Network | System | **VoIP** | Telephone | Maintenance |

SIP Settings

User Agent

| User Agent | Panasonic-{MODEL}/{fwver} ({mac}) |

NAT Identity

Enable Rport (RFC 3581)	⦿ Yes ○ No
Enable Port Punching for SIP	20 seconds [10-300, 0: Disable]
Enable Port Punching for RTP	20 seconds [10-300, 0: Disable]

[Save] [Cancel]

Under VoIP – SIP Settings

1. Enable Rport (Yes)

2. Change both SIP and RTP Port Punching to 20 seconds

3. Save

Unless DHCP Server or configuration provisioning is available at the remote location, HDV and TGP600 devices must manually be configured with public/global NAT IP and SIP-TLS port number

Panasonic

KX-HDV130

| Status | Network | System | **VoIP** | Telephone | Maintenance |

SIP Settings [Line 1]

Logout

Web Port Close

VoIP

- SIP Settings
  - Line 1
  - Line 2
- VoIP Settings
  - Line 1

Basic

Phone Number	301
Registrar Server Address	123.123.123.123
Registrar Server Port	36061 [1-65535]
Proxy Server Address	123.123.123.123
Proxy Server Port	36061 [1-65535]

| Transport Protocol | ○ UDP ○ TCP ● TLS |
| TLS Mode | ○ SIPS ● SIP-TLS |

Under VoIP – SIP Settings (Line 1)

1. Enter global NAT address for both Registrar and Proxy Server Address

2. Change both Registrar and Proxy Server port number to public side SIP-TLS port number e.g. 36061

3. Change both Transport protocol and TLS Mode to TLS

4. Save

For HDV Series and TGP600 to authenticate and assure registration is only possible to the configured target PBX SIP Server, the PBX Root_CERT.cfg file can be exported from the PBX and imported to the SIP device via the configuration file provisioning process (see appendix).

If registering to main system:
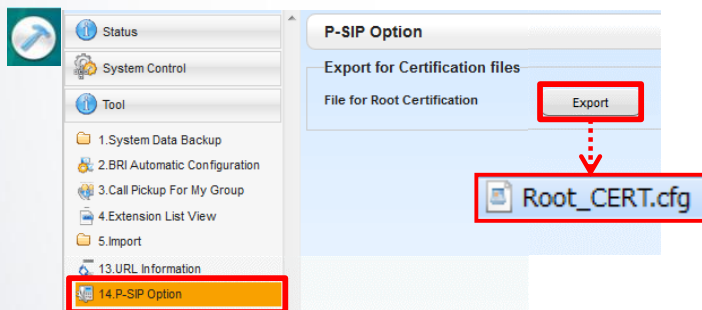
If registering to NSX ExpansionGW:

Mobile Softphone Client Configuration
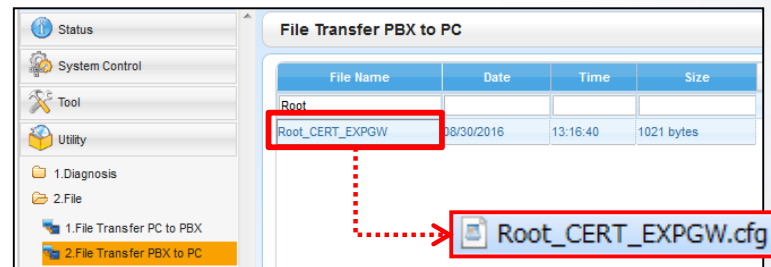
From V3 Mobile Softphone client, settings can be configured by either QR Code, CSV import or manually within the app itself.
(refer to V3 Mobile Softphone technical guidance for further details on QR Code/CSV Settings).
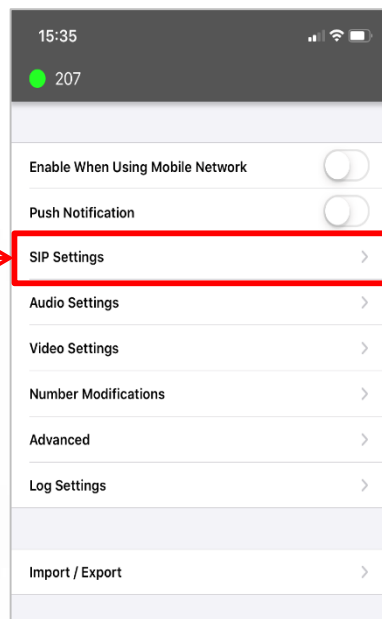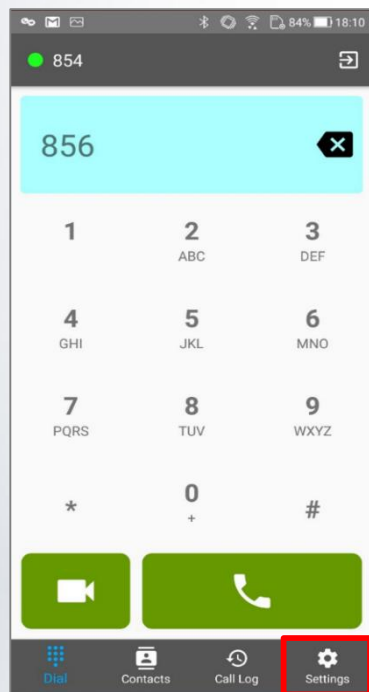
1. Enter the global NAT address for SIP Server Address (Remote)

2. Enter port number for public side SIP-TLS port number e.g. **36061**

3. Select TLS and select the appropriate certificate for the PBX in use.

CA must be manually configured with the public/global NAT IP address for the target PBX to register/connect to:

NOTE: Example using "Second" IP address assuming that the "First" IP Address is for local access when PC is inside the LAN

Additional - FQDN
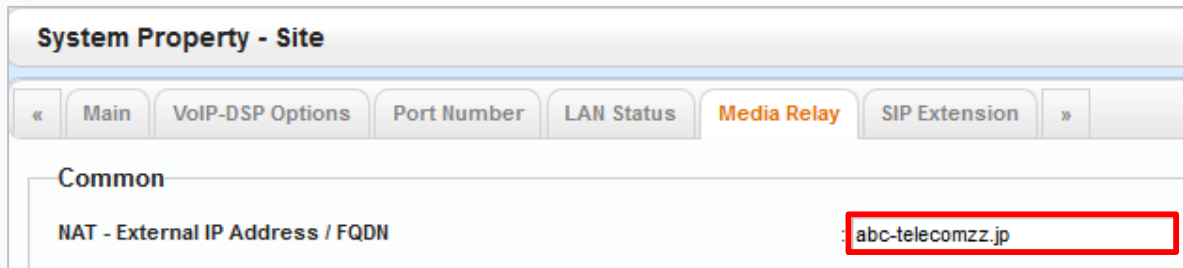
FQDN can be assigned as PBX instead of global IP address for MRG Remote IP extensions.
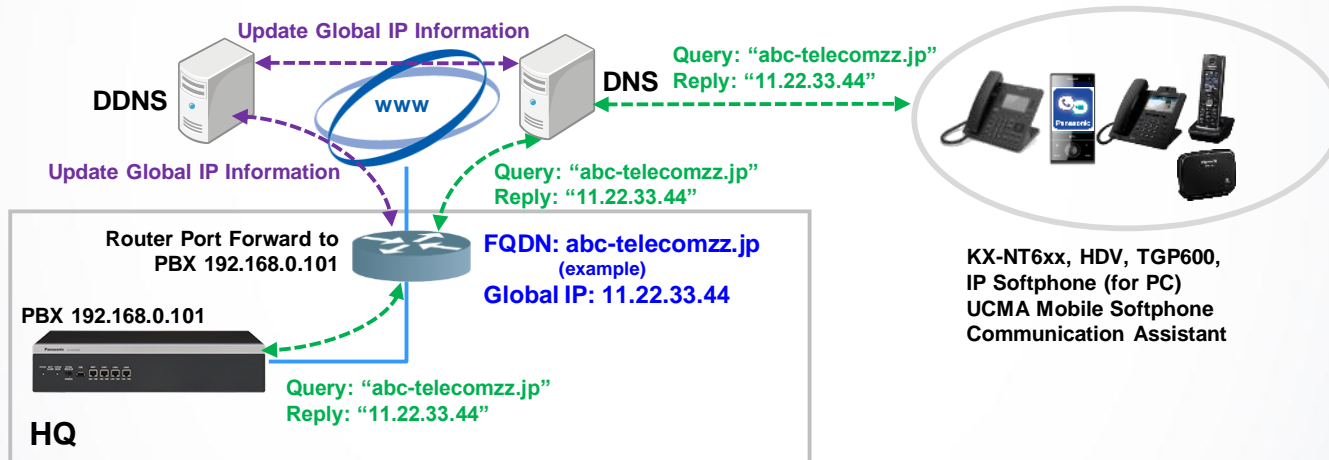
NOTE: internet / edge router must use DDNS in order to update the IP address when it is changed.

FQDN is entered in place of External IP Address for Media Relay NAT settings:

System Property - Site

| « | Main | VoIP-DSP Options | Port Number | LAN Status | Media Relay | SIP Extension | » |

Common

NAT - External IP Address / FQDN : abc-telecomzz.jp

FQDN and IP Address method can technically be used simultaneously but if FQDN is used due to changing Global IP Address then IP address only configured devices will lose connection when Global IP Address changes.

(NT5xx/NS0154 do not support FQDN configuration for PBX address).

Panasonic
BUSINESS

"NT Local Settings" must be used on the IP Ext ports with registered NT6xx to change the Primary PBX address on the device to FQDN value (handset reboot required to apply changes):

| Main | Option | Voice | Location / P2P | **NT Local Settings** |

No.	Extensic Number	Extension Name (20 characters)	IP-PT Type	Primary PBX IP Address	Secondary PBX IP Address
1	103	User_0003	KX-NT680	abc-telecomzz.jp	

After the NT6xx Terminal has been reprogrammed with the FQDN value from the PBX NT Local Settings configuration, the PBX server address cannot be seen within the terminal Setup screens:

```
PBX IP Address ?
    ███.---.---.---
    EXIT CLEAR ENTER
```

When using FQDN, IP address DNS resolution is initiated only during NT6xx start up process. **The process will not be repeated during normal operation but when FQDN related IP address changes, NT6xx devices will lose connection with PBX following Keep Alive timeout and so will reboot and reconnect with refreshed FQDN IP resolution.**

FQDN - HDV/TGP600 Programming

HDV and TGP600 SIP Line settings can use FQDN entry in place of public/global IP address. PBX real IP address must also be entered in the Service Domain parameter.

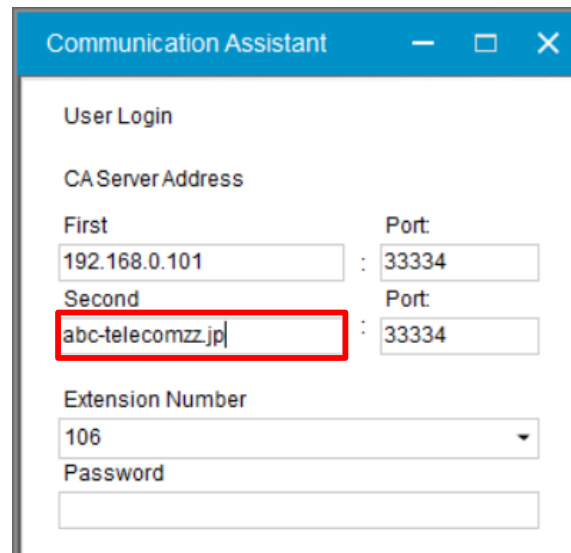**Mobile Softphone SIP settings can use FQDN entry in place of public/global IP address. PBX real IP address must also be entered in the Service Domain parameter.**

IP Softphone (for PC) and CA settings can use FQDN entry in place of public/global IP address. PBX real IP address must also be entered in the Service Domain parameter.

IP Softphone

Communication Assistant

Appendix

HDV/TGP600 Configuration can be completed using DHCP Options and TFTP Server delivery of predefined configuration files.

HDV/TGP600 will accept TFTP Server location for configuration file provisioning using DHCP Option 66 parameter.


```
DHCP Discover

DHCP Offer
    Option: (66) TFTP Server Name
        Length: 14
        TFTP Server Name: 192.168.0.210

TFTP read request

Download "KX-HDV430x.cfg"
Trivial File Transfer Protocol
    [Source File: KX-HDV430X.cfg]
    Opcode: Read Request (1)
    Source File: KX-HDV430X.cfg
```

DCHP server

TFTP server
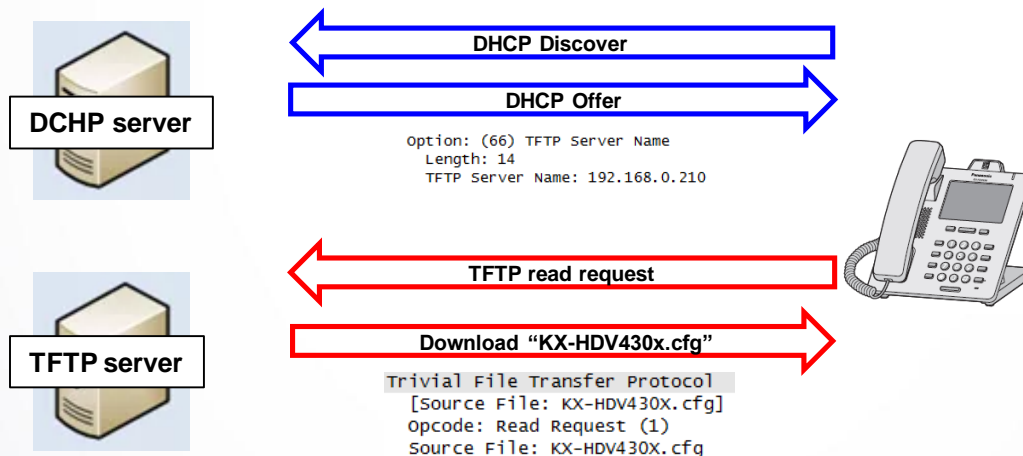
Configuration file requested depends on model number and region code suffix:
"KX-HDV430NE.cfg" for HDV430NE model
"KX-HDV130X.cfg" for HDV130X model
"KX-TGP600UK.cfg" for TGP600UK model

HDV/TGP600 SIP-SRTP/-TLS related setting

The "Product" configuration file can set common parameters across all similar phone models.
It can then also direct the individual device to specific configuration based on their unique MAC address to provide separate configuration to each device such as SIP registration details or button programming etc.

Example configuration file for Common settings and MAC based configuration file setup:

```
# PCC Standard Format File # DO NOT CHANGE THIS LINE!

SIP_TRANSPORT_1="2"
SIP_TLS_MODE_1="1"
SIP_TLS_VERIFY_1="1"
SIP_TLS_ROOT_CERT_PATH="tftp://192.168.0.210/Root_CERT.cfg

## NTP Settings
NTP_ADDR="192.168.0.101"
TIME_SYNC_INTVL="60"
TIME_QUERY_INTVL="43200"


CFG_STANDARD_FILE_PATH="tftp://192.168.0.210/Config{mac}.cfg"
```

- **Enables TLS for encrypted registration**
- **Enables SIP-TLS mode for encrypted type**
- **Enables verification of the PBX Root Certificate**
- **Certification file name for PBX is "Root_CERT.cfg"**
(Certification file name for NSX ExpansionGW is "Root_CERT_EXPGW.cfg")

Set NTP server address

- Direct each device to look for individual configuration file based on MAC address e.g. "Config080023c8a249.cfg"

HDV/TGP600 SIP-SRTP/-TLS related setting

Individual configuration details can be provided to the HDV/TGP600 terminals using the MAC based configuration:

Example configuration file for "VoIP > SIP > Line1 Settings"

```
# PCC Standard Format File # DO NOT CHANGE THIS LINE!

PHONE_NUMBER_1="301"
SIP_AUTHID_1="301"
SIP_PASS_1="SIP301P4ssw0rd"

SIP_RGSTR_ADDR_1="123.123.123.123"
SIP_RGSTR_PORT_1="36061"
SIP_PRXY_ADDR_1="123.123.123.123"
SIP_PRXY_PORT_1="36061"

SIP_ADD_RPORT="Y"
PORT_PUNCH_INTVL="20"
RTP_PORT_PUNCH_INTVL="20"
```

Device registration parameters:
- **PBX extension number and password**

- **Public/Global IP address and port number**

- **Port punching for MRG use**

HDV430 needs additional command for SIP-TLS:

```
SIP_TLS_RANDOM_PORT="N"
```

Announce Mode

Remote Setup for multiple IP-PT/IP-CS in same location

A function that can simplify the set up of remote devices is the Announce Mode feature of V-IPEXT and V-IPCS4 ports. With the first remote IP-PT or IP-CS manually registered and Announce Mode Enabled on that port allows other IP Terminals on the same LAN to learn the Primary PBX IP Address from that first device, avoiding the need to manually program every remote device.

PBX (Registration Enabled)

Public IP = 123.123.123.123

DHCP Enabled

IP-PT1   IP-PT2   IP-CS

Port Property - Virtual IP Extension

[Registration] [De-registration] [Forced De-registration]

| Main | Option | Voice | Location / P2P | NT Local Settings |

▲ No.	Extension Number	Extension Name (20 characters)	IP-PT Type	eserved	Announce Mode
				-	ALL ▼
1	109		-		Enable
2	110		-		Disable
3	111		-		Disable

IP-PT1- Extension 109 – from default
- Connect to LAN – DHCP assigned IP address
- Manual input Primary PBX IP Address on IP-PT
- Registered Successfully
- Announce Mode Enabled at PBX

IP-PT2 – Extension 110 – from new/default
- Connect to LAN - DHCP assigned IP address
- Broadcast for Primary PBX IP address
- IP-PT1 responds with PBX IP address = 123.123.123.123
- Router passes PBX Registration request to network
- Registered Successfully

SIP-ALG

In all cases, for MRG to function correctly, router SIP-ALG/MGCP-ALG etc should be disabled. For guidance on how to disable ALG settings, please check following article:

https://icomplete.freshdesk.com/support/solutions/articles/11000006588-how-to-disable-sip-alg-on-some-popular-routers-

For further detail on SIP-ALG also check the following article:

https://icomplete.freshdesk.com/support/solutions/articles/1000165155-what-is-the-sip-alg-setting-on-my-router-and-how-can-this-affect-my-voip-service-