

OVERVIEW

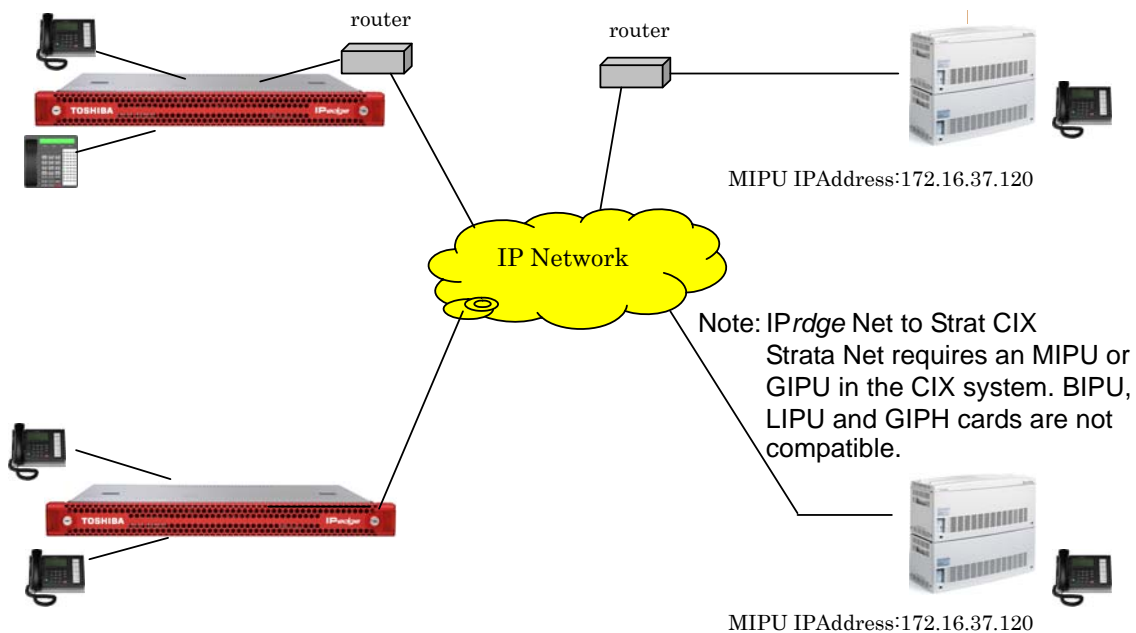
IPedge Net multi-system networking can be implemented over an IP network using IPedge systems and Strata CIX systems with MIPU or GIPU IP interface circuit cards. LIPU, BIPU and GIPH cards do not support IPedge Net operation.

This feature offers the same connection service as ISDN dedicated lines with the Strata Net protocol on the public network. IPedge Net does not support modemized data signals, such as modem signal and G3 fax because these signals require very low jitter and low delay on the networks.

Private Networking Over IP

Private Networking Over IP offers connectivity between IPedge Net servers and Strata CIX over an IP network.

Private Networking via IPedge Net:



Overview for private line

IPedge Net provides this feature via the following:

- IPedge Net private line
- SIP trunk used as if it is a private line
- An ISDN or T1 trunk is connected via a 3rd party gateway the same as private lines.

An Outgoing Line Group can be assigned to a Pooled Line button and a GCO button, but an Incoming Line Group cannot be assigned.

IPedge Net calls are handled in the same way as station calls which cannot be directed to an external line button.

Outgoing Call to IPedge Net An Outgoing call to IPedge Net is made as follows.

1. Direct dialing of Network DN (Network Directory Number)/Network Feature Access Code

When the network DN node ID has been registered as a Coordinated Directory Number Prefix in the IPedge Net system numbering plan, the network DN and Network Feature Access Code (node ID + access code) can be entered while hearing a dial tone after going Off-hook or pressing the DN key. In this case, after the node ID is completely entered, Entry Tone is not generated, and the dial is entered as a series. As for a Coordinated Directory Number Prefix, refer to the IPedge Net Private Network Numbering Plan.

The system analyzes the dial entry and when it determines that the call should be connected outside the node, it automatically selects an appropriate private network to reach the node and sends the call.

When the dial series entered in the format of network DN or Network Feature Access Code is determined to be the call related to the local node, the system provides service as if an ordinary DN or access code is dialed.

2. Private Network Access Code + Network DN/Network Feature Access Code

When the system station numbering plan conflicts with the network DN, a Coordinated Numbering Plan cannot be built.

In this case:

- Go off-hook or press the DN key.
- Dial the private network access code.
- Hear Entry Tone.
- Dial the network DN or Network Feature Access Code.

When the system determines whether the call is to be connected to the local node or the remote node (as when the network DN/Network Feature Access Code is directly dialed) the system provides service as if an ordinary DN or access code is dialed.

If the call is to be connected to another node, the system automatically selects an appropriate private network to reach the node and sends the call.

3. Trunk group access code (private network OLG) + Network DN/Network Features Access Code

When the system has one or more private network routes, a call can originate by specifying an Outgoing Line Group. The system selects a usable private network from the specified OLG and sends out dial numbers. However, in this case, the routing function and number changing function (Digit Modification) provided by IPedge Net are not provided.

When the network DN dialed after the trunk group access code is related to the local node, the call terminates to the station of the local node. If the Network Feature Access Code dialed after the trunk group access code is associated with the self node, the system stops making a call and sends ROT to the originator.

4. Least Cost Routing (LCR) call

A private network can set for an LCR call route. When using LCR, dial the public network number. Tool Restriction is normally applied.

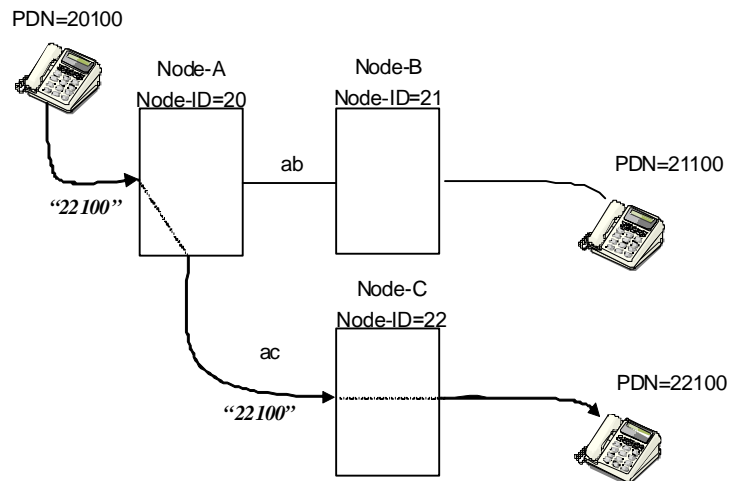
A call to the IPedge Net private network is made in Cut-through mode and the number of dial digits is determined in the destination node. When the node ID is analyzed and the route is determined, an outgoing call originates from the trunk and thereafter dial digits are sent to the trunk whenever the user dials the number. When it is known that the call has originated to the local node, the outgoing call is not made and the number of dial digits on the originator node is determined. If the trunk allows only Senderized mode, the number of dial digits is determined by time-out on the originator node.

Neither access restriction by FRL nor ground restriction by DRL is made in calling to a private network.

Routing in Private Network

The automatic private network selection procedure is outlined in the methods below.

1. Receive the dial digits (network DN/Network Feature Access Code) from the extension station or private network.
2. Analyze the received dial digits and determine whether the destination is the extension station/external line contained in the local node or those contained in another node.
3. When the destination is another node, analyze the received dial digits further, select the optimum private network to reach the object node, and send the network DN/Network Feature Access Code.



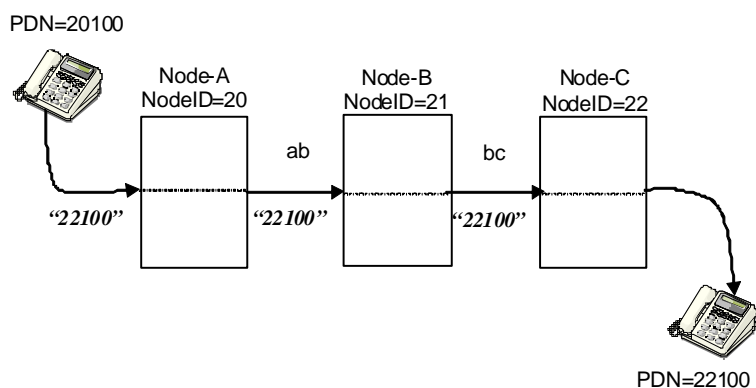
Note: Each node has a route choice table to choose the appropriate private line to reach the destination.

Tandem Connection

Tandem Connection in an IPedge Net private line is not recommended because of voice quality reduction. So this section is for the private line by SIP trunk or using a gateway.

It is also possible to terminate a call to the destination node via several nodes connected on a private network (a Tandem connection). In this case, each node selects the private network adjacent to the next node.

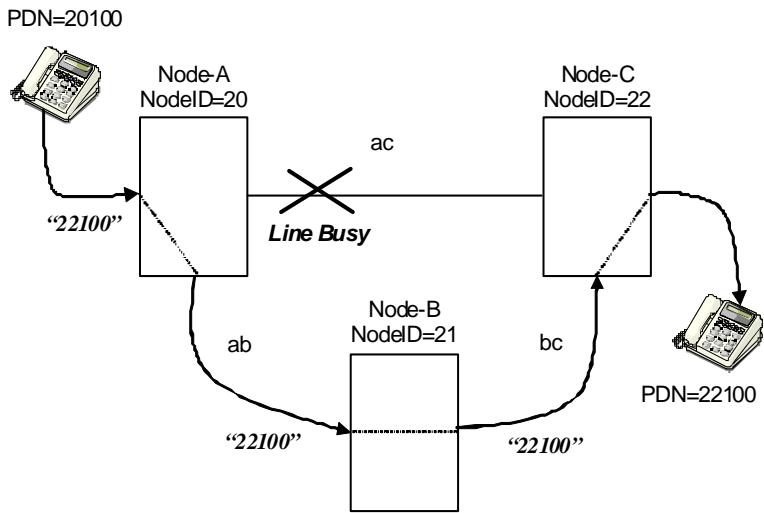
For example, when making a call from the extension station contained in node A and terminating the call to the extension station in node C, node A selects the private network "ab" that is connected to node B and sends the network DN (22100). Node B receives the call, selects the private network "bc" that is connected to node C (after analyzing the entered dial digit) and then sends the network DN (22100). Node C receives this call, analyzes that the received dial digits are identical to those of the local node, and calls the extension station contained in the local node.



Rerouting

By setting a table that specifies one or more routes of a private route as LCR, the system can make a call from another private route (OLG of this network) even when the selected private route (OLG) is busy and cannot be used (Rerouting).

By using this, IPedge Net is implemented to control the internodes connection without a tandem connection.



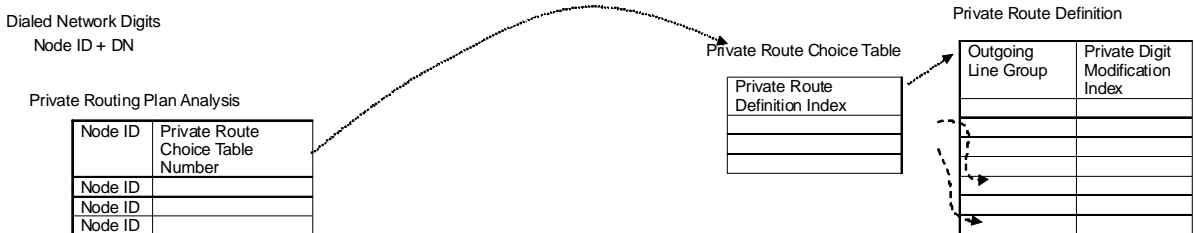
The routing function is set by the following table group.

Decision of Private Routing Plan Number

Private Routing Plan Analysis

Check the network DN/Network Feature Access Code dialed from the beginning, make a Private Routing Plan Analysis, and decide a Private Choice Table Number. If the node ID cannot be detected from the series of digits dialed by the originator, send ROT to the originator.

Up to six Route Definition Indexes are written in the Route Choice Table in the order of priority. Each index is made as a pair (Outgoing Line Group and Digit Modification Index).



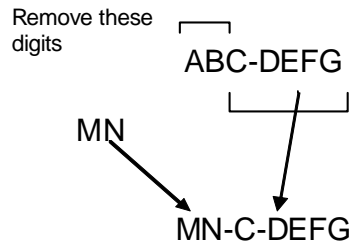
Network DN (NDN) is given to Private Routing Plan Analysis table, in which complete or a part of Node ID is listed together with Private Route Choice Table Number.

Private Route Choice Table stores up to the six Route Choices. By looking at the Private Route Definition Table, the system knows the Outgoing Line Group and the Private Digit Modification Table Index. The system attempts to seize an idle trunk starting from the first choice. If it is successful, then the system sends out the Network Directory Number with modification according to the Private Digit Modification Table.

When seizing a private route and sending dial digits as a result of analysis of Private Network Routing, edit the dial digits as specified by Private Digit Modification Index.

1. Delete the specified number of digits from the front.
2. Add the specified series of dial digits to the front.

Indexed by Private Digit modification index	Digits to be deleted	Addition in front
	2	MN



In the illustration above, the network directory number dialed by a user is modified by:

1. Deleting the first several digits
2. Adding the deleted digits in front

The Pause code of the DTMF code can be included in the digit string to be added.

Incoming Call from Private Network

When a call comes in to a private network, receive the network DN/ Network Feature Access Code from the remote station, terminate the call to the extension station, provide other service or repeat the call to another node by analyzing the series of dialed digits. If it is set to send a dial tone when a call comes in to a private network, then send a dial tone only when dial digits are not received.

An Incoming call to private network is handled as follows.

1. Terminating to an extension station (PDN, PhDN, pilot number)

When the received dial digits are analyzed by the system extension station numbering plan and determined to be the incoming call to the extension station of the local node, the call terminates to the extension station. At this time, the service as described in the specifications of each feature is provided.

When the call terminates to the extension station number, a tone call to the station with ownership of the PDN/PhDN becomes possible and a hands-free call/tone call can be selected by the dial input from the private network being called. Busy/DND/executive override by

dial input while hearing BT/FBT is available, but ACB while hearing RBT/BT is not available.

Depending on the design of the private network numbering plan, it is possible to receive an ordinary DN directly from the private network. However, in this case, the same service as mentioned above is provided.

2. Feature access

When the received dialed digits are analyzed by the system extension station numbering plan and determined to be the access node to the local node, service is provided according to the specifications of each feature. For the features usable by Private Networking, refer to Feature Interaction.

3. Tandem connection (Private Network)

When the received dialed digits are analyzed and determined to be connected to another node, make a tandem connection to the next node. At this time, the node functions as a repeater exchange node (tandem node). If the system detects whether the call can be connected without self node, as the result of calling remote nodes, rerouting is invoked and the tandem connection fails.

When the transit counter of the call is usable just like an IPedge Net private network, it is also possible to regulate the tandem connection to prevent infinite grouping of the call between one or more repeater stations.

4. Outgoing gateway

When an incoming call to IPedge Net requests a connection to a public network by the Feature Access Code or when routing for a tandem connection results in rerouting to a public network because of busy routes, the incoming call to IPedge Net can be connected to a public network.

When connecting an outgoing call to a public network, the external line access regulation and toll restriction are executed using default Class Of Service assigned to an Incoming Line Group. When a call comes in to IPedge Net and the originator's Class Of Service is provided by the originator node by Traveling Class Mark, use this Class Of Service.

When the received digits are wrong, send Reorder Tone and disconnect/release the line after a certain time. (Refer to Station Automatic Release.)

When terminating a call from IPedge Net to an extension station but the station is busy or it activates Do Not Disturb, send a tone to IPedge Net according to specifications. At the same time, set the timer defined by Station Automatic Release and disconnect/release IPedge Net at the timing out of the ROT timer.

Protocol Call control and Voice control protocols over IP consist of the following protocol groups. These protocol groups are divided roughly according to a function as follows.

1. IPedge Net protocol which added the media stream information for VoIP information to the Call control message of the IPedge Net protocol.
2. RTP/RTCP protocol for Voice control.

G711 G729A	Call Control (Q931)	Negotiation	IPedge Net ECMA-143
RTP/RTCP			Call control ECMA-336
UDP	TCP		
IP			
Ethernet			

When offering private line service, IPedge Net protocol is used.

There is no acquisition procedure of a voice channel, and it is the order of acquisition.

Bearer Capability The transfer capability of IPedge Net protocol is only sound (Speech) and a 3.1kHz audio.

A Data Call cannot be transmitted. However, a 3.1kHz audio is used to make a Data Call like a G3 FAX. IPedge Net does not support the protocol for Data Calls like T.38, so it cannot guarantee that data communications are trustworthy.

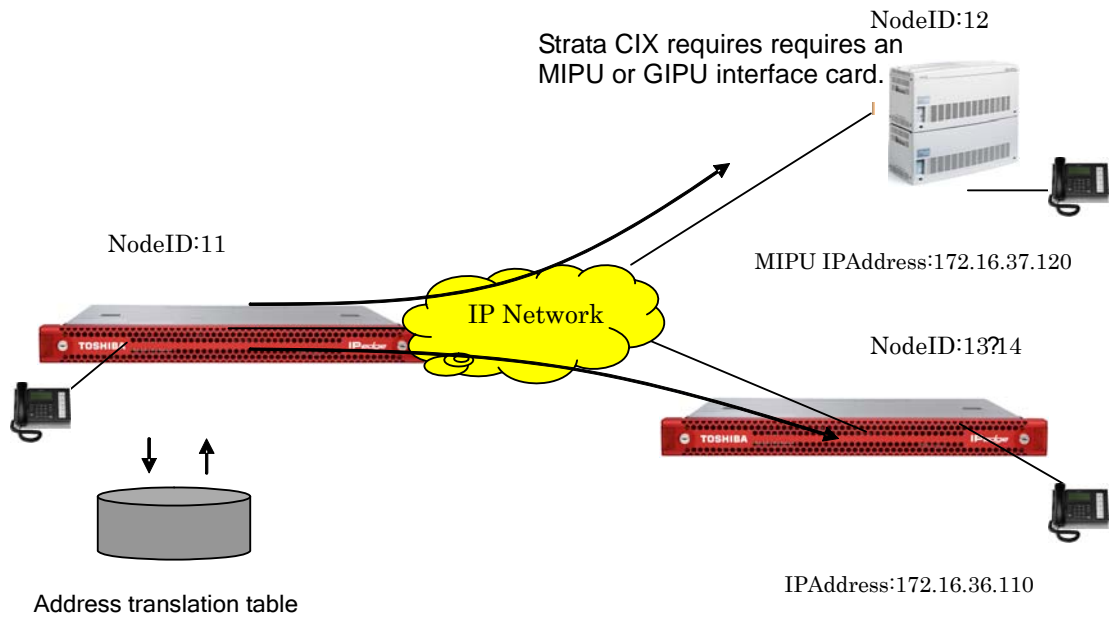
Address Translation Function

Address translation by the direct call signaling.

In IPedge Net , an address is solved by performing an IP address conversion from the Node ID, and the Call control procedure is shortened.

Regarding the Address translation program, the Originator System has destination Node IDs. Each destination Node ID has an IP address and protocol classification (IPedge Net). Therefore, the IP address and Protocol is selected by the Node ID. Following is an example.

1. When making an out-going call to node 12 from node 11, it is changed to 172.16.37.120.
2. When making an out-going call to node 13 from node 11, it is changed to 172.16.36.110.
3. When making an out-going call to node 14 from node 11, it is changed to 172.16.36.110.



Private Routing Plan Analysis

Node ID	Private Route Choice Table Number
12	1
13	2
14	3

Private Route Choice Table

Private Route Definition Index
1
2
3
4

Private Route Definition Table

Outgoing Line Group	Private Digit Modification Index
10	1
20	1
30	1
40	1
50	1

IP Address Convert Table

Node ID	Route1	Route2	Route3	Route4	..
12	172.16.37.120	172.16.37.121	172.16.37.122		
13	172.16.36.110				
14	172.16.36.110				

Node ID Detail information

Node ID	Protocol	Voice Property table index	TCP Connection	Fast connect procedure	Negotiation procedure	Voice encoding method
12	IP-QSIG	1	On demand(*1)	applicable	Not applicable	G.711 MU
13	IP-QSIG	2	On demand	-	-	G.711 MU
14	IP-QSIG	3	On demand(*1)	applicable	Not applicable	G.729A

(*1) Fixed

1. There are six IP Addresses as Translation tables for one Node ID.
2. The Protocol classification has IPedge Net.
3. The Address translation table Index has the information on one Node ID.

Outgoing Call -Press OLG
Feature Access Code

In this case, it is necessary to dial from the destination node ID.

D channel Establishment
procedure/ Releasing
procedure

Currently, IPedge Net provides the method to release the TCP connection when the call is released.

There are two methods for D channel Establishment and Release.

1. TCP connection released with call clearing.

The TCP connection is disconnected when the call is cleared.

2. TCP connection NOT released with call clearing.

The TCP connection is never disconnected, even if the call is cleared. TCP connection is not established immediately if the connection is disconnected by some reasons. But TCP connection is established when the next call is originated and D channel is released.

Either method must be set in the Web-Based User Administration Application in Enterprise Manager.

Protocol Timer

The protocol timer is set for the IPedge s Net system as a longer value.

Call Control Channel (D
Channel)

The control signal (D channel) between IPedge Net servers is transferred using IPedge Net protocol. Basic messages defined in ECMA-143 and messages defined in ECMA-165 can be sent to the IP network using IPedge Net protocol.

Voice channel (B channel)

The Voice signal on IP Network will be transferred using RTP/RTCP.

Voice Coding Procedure

G.711, non-compression coding, and G.729A, compression coding, are supported by IPedge Net.

Voice codec is chosen from G.711 MU, G.711A, and G.729A per node. Only the chosen codec is provided. G.711 (G.711 MU and G.711 A) conversions cannot be done. Moreover, a packet time conversion is also not supported.

Audio Codec supported by IPT/IPedge Net

Audio Codec	Coding Method	rate (kbps)
G.711 (ITU-T G.711)	mu-law PCM	64
G.711 (ITU-T G.711)	A-law PCM	63
G.729A (ITU-T G.7.29 Annex A)	CS-ACELP	8

In addition to this, the classification of a packet sending-out interval can perform the configuration in connection with speech processing. The

contents of a setting are as follows.

Configuration Parameters	Values
packet transmission interval (msec)	10 / 20 / 30 / 40 / 80

20ms is recommended when a coding system is G.711MU/A. 40ms is recommended when G.729A.

These parameters are managed by every voice attribute table. Two or more voice attribute tables exist in a system, and the voice configuration of a node can be grouped by assigning a table index to each node unit. Prepare the table (which does not need to set configuration information per each station) and set up the suitable value according to the location, a circuit zone, a circuit use situation, etc., and to assign the index of the table which met the node conditions.

However, in the IPedge Net system these parameters are controlled by the endpoint, such as the station and trunk (the far end party). Thus IPedge Net cannot handle this by using a voice configuration table.

The Audio codec and packet interval between IPedge Net servers are determined by negotiation of media information by SETUP, SET UP ACK, and CALL PROC messages following programming. The Audio codec and packet interval between the IPedge Net server and endpoints are determined by negotiation per protocol. At this time, audio codec and packet interval of IPedge Net server are negotiated by IPedge Net programming. It is necessary to match audio codec between IPedge Net server and endpoint, or between IPedge Net servers.

A call is established even if packet intervals are not matched. From the endpoint specification, negotiated between the IPedge Net server and the endpoint, there may be a case when the endpoint packet interval cannot be changed to that of the IPedge Net server, so the packet interval of the call via IPedge Net is also established if packet intervals for both are not matched.

Translation for DTMF Procedure

There are two ways to transmit the DTMF signal. One is using RTP/RTCP, the other one is using the Signaling Channel. It is selectable by Programming.

When a DTMF tone is transmitted by using the Voice channel, Codec negotiation is done between the IPedge Net trunk and the station or the trunk in the local node "nodeIdDetailInfoRFC2833Status," per the programming setting.

The negotiation result DTMF tone is transmitted as either RFC2833 or inband tone. If inband tone is sent, Voice codec is set as G.711 MU/ A.

Even though it is possible to use G.729A by setting programming between nodes, it is not recommended to use this because a DTMF inband tone cannot be transmitted. If inband tone is sent, feature invocation by using

Dial For Quick Launch or entering a forced account code is not supported because there is no inband tone DTMF detector in the IPedge Net system.

If the signal channel is used to transmit DTMF, the IPedge Net INFO message is sent to the far end node "nodeIdDetailInfoDTMFTranslation" if the programming is set to "Enable." The far end IPedge Net server receives the INFO message, obtains digit information, and transmits the RFC2833 packet to the station or the trunk inside a local node (adding on RTP packets received from the far end node). RFC 2833 packets are generated 1 for DTMF dial on and 3 for DTMF dial off. Duration of RFC 2833 packet is set per ptime.

ptime	Duration (Only for codec using 8000 Hz sampling)
Duration in dial ON	
10mns	0x0050
20mns	0x00A0
40mns	0x0140
80mns	0x0280
Duration in dial OFF	
10mns	0x00A0
20mns	0x0140
40mns	0x0280
80mns	0x0500

An RFC 2833 packet cannot be generated if the far end node does not send an RTP packet because RFC 2833 packet is sent by editing the RTP packets from the far end node which sends the INFO message.

RFC 2833 packets may be sent delaying because the far end node sends RTP packet delaying if the originator's DTMF sending time is very long.

Connection Settings:

1. Between IPedge Net servers: Either INFO or inband (RFC2833) can be chosen.
 - For INFO case "INFO" is set for both nodes.
 - For inband case "RFC2833 enable" is set for both nodes.
 - For both cases "RFC2833 enable" is set for both nodes.
2. Between IPedge Net and CIX: INFO is set for both nodes. For IPedge Net server "RFC2833 enable" is set.

For limitations regarding DTMF transmitting, refer to Limitations regarding DTMF transmitting.

Data Call	<p>The following settings are required for a data call.</p> <ul style="list-style-type: none">• Non-restricted digital (Data Call) case:<ul style="list-style-type: none">• Originating by OLG feature access code to public trunk or private line is set.• Must set OLG connection to a private line or public trunk in the route selection because a Non-restricted digital call cannot be connected to IP network.• The terminating call from IP network is rejected.
Non-Permissible Network Composition	<p>IPedge Net must run over a network that is capable of carrying voice. If the network is inadequate, the delay deterioration of voice quality and failure may occur.</p>
Interwork with IPedge Net Private Line	<p>IPedge Net offers basic calls and additional services when interconnected with other IPedge and CIX systems.</p>
Priority Control	<p>IPedge Net supports voice packet prioritization. See the section on Priority Control.</p>
QoS Measurement	<p>IPedge Net cannot measure QoS of an IPedge Net call because it does not have DSP.</p>
Fault detection	<p>Following are faults which IPedge Net supports:</p> <ul style="list-style-type: none">• Fault in IPedge Net converter• Network fault• Protocol fault <p>Fault information from IPedge Net converter or fault information that fault detection function gets in IPedge Net server is written to error log files. The following fault information is recorded.</p> <ol style="list-style-type: none">1. Fault in IPedge Net converter<ul style="list-style-type: none">• Software fault – Media transfer resource – Process Failure etc.<p>Fault Information that IPedge Net converter detects is sent to IPedge Net central software.</p>2. Network fault – Detection of LAN cable unplugged.<ul style="list-style-type: none">• Fault detection when the call is originating.<p>Fault is detected within 8 seconds at most by protocol timer. Once the system detects a fault, there is a method to reduce the timer when the fault is detected – the fault is detected – the alarm for fault detection</p>

is notified – the alarm is canceled if originating or terminating is successful.

- Fault detection while talking

Fault is detected within 3 minutes by TCP “keep alive” feature which the IPedge Net server sets. After the detection, the call is disconnected. At this time, no alarm is notified.

- Fault detection when no call exists

IPedge Net cannot detect faults in the far end node or network fault between nodes.

- Protocol fault

Obstacle for TCP/IP Link Failure and Protocol Error. (Recorded in log files.)

Make Busy applies the case of the Failure Make Busy by the crash of IPedge Net converter, and command Make Busy.

DTMF Transmitting Limitations

Because the IPedge Net server does not have hardware DSP, and it establishes the internal node call by P2P connection, the following limitations that CIX can provide are known.

1. IPedge Net establishes inter-node connections by Peer to Peer. The following interactions with CIX/Strata Net should be considered:
 - When the IPedge Net server is connected with CIX via IPedge Net and INFO message is used to notify DTMF information from the IPedge Net station, there is a gap between timing of the DTMF transmission from the originator and timing of DTMF receipt by the receiver.
 - This gap is caused by the gap from OS scheduling because conversion from RFC 2833 to INFO message is done by software at media transferring function. The size of this gap is depends on the system traffic. To absorb this gap means increasing the system traffic so that the gap is allowed based on the consideration of the influence on the entire system.
2. Changing DTMF transmission time received by IPedge Net server
 - When the IPedge Net server is connecting via IPedge Net, and receives DTMF information by INFO message from the remote node, media transferring function changes the duration in the DTMF information to fixed. This means the receiver's IPedge Net server converts to the fixed DTMF duration (*) even if the originator sends DTMF information by the Continuous DTMF tone feature, and the DTMF information is not treated as a Continuous DTMF tone.
 - This limitation causes no problem because DTMF transmission using an RFC 2833 packet will not leak DTMF information as long as RFC 2833 packets are lost.
 - (*) The fixed DTMF duration: the fixed duration following the packet interval in the table of DTMF duration in 1.3.7 Translation for DTMF procedure.

IPedge Net

IPedge Net is a private networking application based on QSIG, an international standard for interconnecting telephone systems. IPedge Net delivers a rich set of calling features across multiple systems throughout the enterprise. Users benefit from transparent dialing and simple feature operation.

Advanced networking features include Centralized Voice Mail, Centralized Attendant, Network SMDR, and Station DSS button appearances across all nodes. Alternate routing provides for toll bypass configurations and automatic recovery from network disruptions.

IPedge Net provides full connectivity and capabilities over an IP network (VPN WAN, Internet, intranet Frame Relay, fiber, or wireless).

Up to 128 nodes can be accommodated within the IPedge Net numbering plan. As with any network design, transport delay, speech volume and other issues must be carefully considered.

You can set up network DN tables across nodes. Through system programming, you can attach a node ID to non-redundant DNs, PhDNs, and Pilot numbers. This enables someone in one node to call an extension in another node without having to dial the node ID number. The caller dials the extension and the system automatically routes the call to the node in which the called extension is located and rings the called extension.

IPedge Net

IPedge Net is used as the basic call connection protocol for IPedge to perform data transmission required for provision of internal/outgoing call connections over two or more switchboards by connecting IPedge to IPedge Net or other telephone systems and button telephones directly or through PSTN.

IPedge is the protocol to define layer 3 or higher and is not the physical line definition.

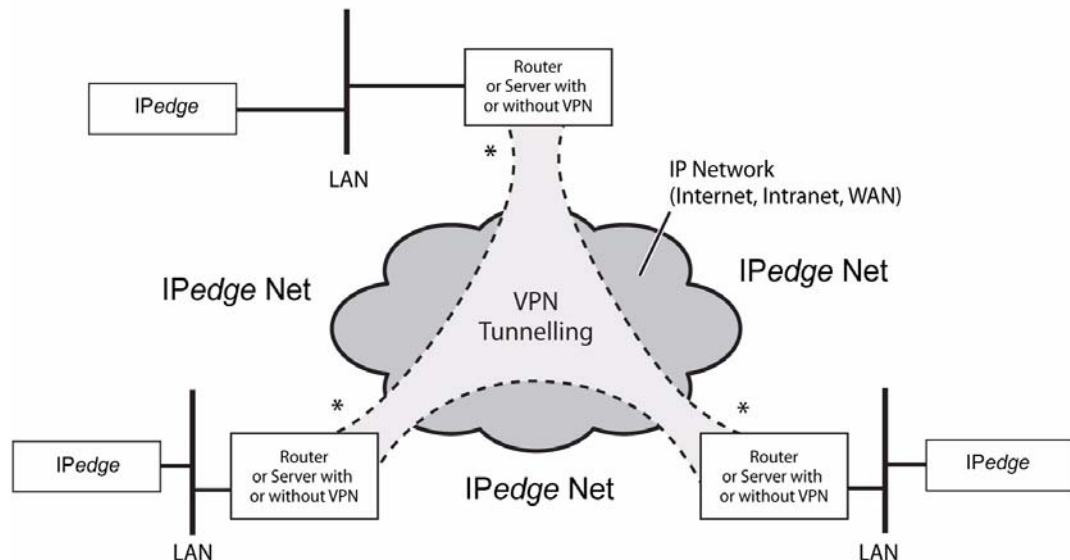
IPedge Net private networking over IP can support up to 128 separate nodes. For bandwidth requirements, Refer to the table below:

Table 1 Strata Net IP and IPT Quality of Service

IP Network Quality Parameters		Speech			
		Excellent: No one perceives delay. ¹	Good: Very few people perceive delay. ¹	Fair: Some people may perceive delay. ¹	Poor: Many people may perceive delay. ¹ IPT is usable even with a "Poor" rating if delay is acceptable.
Latency (Round trip delay) ²		20ms or less	50ms or less	100ms or less	20ms or less
Jitter ²		20ms or less (-10 ms ~ +10ms)	50ms or less (-25ms ~ +25ms)	50ms or less (-25ms ~ +25ms)	50ms or less (-25ms ~ +25ms)
Packet loss ²		1×10 ⁻³ or less	1×10 ⁻³ or less	1×10 ⁻³ or less	1×10 ⁻³ or less
Packet error ²		1×10 ⁻⁴ or less	1×10 ⁻⁴ or less	1×10 ⁻⁴ or less	1×10 ⁻⁴ or less
Speech quality dependency on CODEC parameters		Speech quality as the combination of the above network environment and the CODEC parameters.			
CODEC and packet interval in ms	Bandwidth per channel (Single direction, control channel included)				
G.711 at 20ms i	88kbps ³	Excellent	Good	Fair	Poor
G.711 at 40ms i	76kbps ³	Excellent	Good	Fair	Poor
G.729A at 40ms	20kbps ³	Good	Good	Fair	Poor
G.729A at 80ms	14kbps ³	Good	Fair	Poor	Poor

- 1 Ratings of Excellent, Good, Fair, Poor were based on the tester in a quiet room and the tester could not see the other call party.
- 2 When selecting router equipment, the Latency, Jitter, Packet loss, and Packet error conditions above should be considered as well as the bandwidth. Bandwidth can be calculated with the CODEC and packet size. For better results, more bandwidth may be required, depending on the amount of overall data traffic. For more details on QoS refer to "A Handbook for Successful VoIP Deployment: Network Testing, QoS, and More" by John Q. Walker, NetIQ
- 3 Use this number to estimate the bandwidth needed for the CODEC and IP headers required to achieve an expected Quality of Service (Excellent, Good, etc.). When planning you should allow extra bandwidth, especially when mixing voice and data.

IPT Example:



0018-IPedge

The IPedge Net line interface is provided as one of the protocols on PRI line supported by IPedge, as well as ISDN user/network interface such as Bellcore National ISDN, ETSI and TTC. They can be switched for each interface, depending upon the setting.

IPedge Net standard defines only the circuit switched call control procedures and does not define the packet switched call control procedures. Thus, IPedge also provides only the circuit switched call control procedures. The circuit switched call control procedures provide all establishment at the originating interface based on IPedge Net protocol, the call establishment at the destination interface, the call clearing, in-band tones and announcement, restart procedure, call collisions, handling of error conditions, and user communication procedures.

In IPedge, no matter whether it is a IPedge Net line or non IPedge Net line, the tone is provided by a service providing node to a user when a

user encounters a busy destination or denial of service at the remote node. Then, the service providing node will wait for a user's clearing the call or activating the subsequent feature. When the timer for this tone expires, the service providing node clears the connection. As soon as the conversation with the remote node is finished, IPedge Net is cleared.

Bearer Capability IPedge Net supports the bearer capabilities, listed in the table below. However, whether IPedge supports each function depends on each channel group.

Speech, 3.1 kHz audio and 64-kbps non-restricted digital are supported as a default. the transmission capability is used for the following purposes:

1. Specify the originator's transmission capability when making a call to an ISDN network or an ISDN extension housed at another node.
 - When a non-ISDN trunk or extension makes a connection to an ISDN trunk/extension housed at another node, the transmission capability of the non-ISDN, upon originating a call, is set to 3.1 kHz audio. This is the same as when making a connection with the self-node ISDN (changeable to Speech, depending on the setting).
 - When an ISDN trunk or extension makes a connection with an ISDN trunk or extension, housed at another node, the transmission capability will pass over the IPedge Net line.
2. Determine whether to connect trunks or stations over the nodes in a private network.
3. Determine whether to perform IPedge Net routing (path selection) depending upon the transmission capability.
 - The call transmission capacity, other than Speech and 3.1 kHz audio, seizes only IPedge Net line or ISDN trunk line.
 - The call transmission capacity, other than Speech and 3.1 kHz audio, does not supply in-band tone.

Bearer Services		IPedge	Bellcore National ISDN	ETSI	TTC	
circuit mode	Speech	X	X	X	X	
	3.1kHz Audio	X	X	X	X	
	7kHz Audio			X	X	
	unrestricted digital information	64-kbps	X	X	X	X
		Rate adaptation from 56-kbps		X		
		2X64-kbps			X	X
		384-kbps(H0)	X(NOTE)	X(NOTE)	X(NOTE)	X(NOTE)
		1536-kbps(H11)	X(NOTE)	X(NOTE)	X(NOTE)	X(NOTE)
		1920-kbps(H12)	X(NOTE)		X(NOTE)	
		Multi-rate (n X64-kbps, 2<n<=24)	Bellcore only. No Support in NHS			
restricted digital information	X		X	X		
video			X	X		
Packet mode	unrestricted digital information					

(NOTE) Not available in R1.

- Selection of B-Channel
1. When originating a call to an IPedge Net line, two alternatives are provided for each channel group.
 - Channel is indicated, no acceptable alternative, exclusive
 - Channel is indicated, no acceptable alternative, preferred
 2. When terminating a call:

- The incoming call from IPedge Net provides channel alternatives IPedge depending upon the specified channel negotiation.
3. Selection of the B-channel
- The following four alternatives are provided as a method of selecting an idle B-channel.
- Select B-channel cyclically in the ascending order.
 - Select B-channel cyclically in the descending order.
 - Select the youngest number B-channel (the low-low B-channel selection).
 - Select the oldest number B-channel (the high-high B-channel selection).

To prevent collision of incoming and outgoing calls at the B-channel, it is desirable to set opposite B-channel selection methods in IPedge at both ends of the same IPedge Net line.

Collective/Split Call
Origination and Termination

Collective/split call origination and termination are supported. Split call is the default. The timing to originate a call to an IPedge Net line is:

1. Collective call origination.
 - A call originates when the preset dialing time between dial digits expires.
 - A call originates when “#” is entered at the end of dialed digits. The “#” entered first when entering sub-address access code is the delimiter of the sub-address.
 - A call originates when pause is detected in a string of dialed digits like Speed Dial. Then the following dialed digits are sent by in-band tone.
2. Split call origination and call origination by dialing the network DN/Network feature access code.
 - When the destination node number is dialed and the route is determined, an IPedge Net line is seized and a call is originated. The remaining destination number (Called Party Number) is sent by INFO message.
3. Split call origination and call origination by dialing the tie line group (OLG).
 - An IPedge Net line is seized without dialing and a call is originated. The remaining destination number is sent by INFO message.

For the network DN/network feature access code and call origination by tie line group (OLG), refer to private Networking.

IPedge Net Inter-Working

This feature has the function of processing inter-working between IPedge Net line and non-IPedge Net line that occurs in a private network.

When the call transmission capability is speech or audio, connection between an IPedge Net line and a non IPedge Net line is allowed. But, in case of a data call, IPedge Net lines are connected to each other or

IPedge Net lines and ISDN trunk lines are connected. Thus, they are connected only when the appropriate transmission capability is set in both lines.

When a connection is deemed impossible and another appropriate route is not found, the call is disconnected/released. Even in case of inter-working from non-IPedge Net to IPedge Net line or when the originating switchboard is not IPedge, in the case of connecting IPedge Net lines, it is impossible to receive the originator's line type and Traveling Class Mark information from the originating node. In these cases, the information is handled as follows:

- Originator's extension type:
Set "line type = unknown" at the node to inter-work to the IPedge Net line and transmit it to the terminating node through the IPedge Net line.
- Traveling Class Mark:
Set that no traveling class mark is received at the terminating node and use COS, FRL, DRL, or QPL assigned to ILG of the IPedge Net line.

In-Band Tone and Announcement

When in-band tone and announcement is supplied from the line/station connected to a remote node, the remote node adds appropriate information element to the message sent to IPedge Net line or passes the information notified from the line/station, thereby transmitting the in-band tone/announcement to a local user.

The in-band tone provided by the remote node is transmitted to the local user through an IPedge Net line, but a transit node does not provide the in-band tone. When the call is disconnected, due to any reason at the transit node, the node immediately notifies the disconnection to the local node and remote node and the local node/remote node provides the in-band tone to the local user/ remote user (if necessary).

The information element the remote node receives from the remote user is handled as follows:

1. Progress Indicator

When the transmission capability is speech or 3.1 kHz audio:

- When receiving the progress indicator #8, ALERTing including "in-band information or appropriate pattern now available," or progress indicator #8 "in-band information or appropriate pattern now available," or #1 "call is not end-to-end ISDN; further call progress information may be available in-band," the remote node deems it in-band tone information available (ring-back tone, etc.) and connects the speech channel of the receiver side up to the local node. The local user hears the in-band tone.
- When receiving the message that includes progress indicator #1 "call is not end-to-end ISDN, further call progress information may be available in-band," the remote node deems it in-band tone information available and connects the speech channel of the receiver side up to the local node.

- When receiving the message that includes progress indicator #8 “in-band information or appropriate pattern now available,” the remote node deems it in-band tone information available and holds the B-channel connection for a predetermined time.
2. Cause
- When the transmission capability is speech or 3.1 kHz audio, a tone is generated according to the cause:
- When receiving the disconnection message that includes cause value #17 “user busy,” a busy tone is sent to the IPedge Net line.
 - When receiving the disconnection message that includes cause value other than the above, recorder tone is sent to the IPedge Net line.
 - IPedge does not supply voice grade announcements according to cause value when the line is disconnected.
 - When the disconnection message includes a progress indicator, the indicator has priority over the cause.
3. Signal
- When receiving the ISDN message that includes a signal from a remote user, the signal is passed.

Sending Destination Number Set Numbering Plan Identification and Numbering Type of destination unknown.

In case of split call origination, the destination number is sent only by the called party number information element and keypad protocol is not used.

Sub-Address The sub-address received from the ISDN trunk is merely transitioned through the IPedge Net line and is not used for the selection of the tie line route.

Cause When IPedge receives the cause information element from an ISDN trunk line and it is connected to an IPedge Net line (i.e., the cause information element generated in other than IPedge), it is notified.

IPedge may generate the following cause against the IPedge Net line.

1. Normal/semi-normal class
- *#1 Unallocated (unassigned) number*
The call coming in from IPedge Net is a wrong dial.
 - *#3 No route to destination*
Destination route is not found for the call coming in from IPedge Net.
 - *#6 Channel unacceptable*
The channel selected as a result of negotiation is unavailable.
 - *#17 User busy*
The destination of the call coming in from IPedge Net is busy and does not accept the call.

2. Transmission is consistent.
 - *#16 Normal clearing*
The line is normally cleared.
 - *#18 No user responding*
For the call coming in from IPedge Net, the calling or the message indicating response is not received from the destination.
 - *#19 User alerting no answer*
For the call coming in from IPedge Net, no answer is obtained within specified time during calling the destination.
 - *#27 Destination out of order*
For the call coming in from IPedge Net, the station is not connected due to coming off of the modular at the destination.
 - *#30 Response to STATus ENQuiry*
Status indicating message is sent to answer a status enquiry message.
 - *#31 Normal unspecified*
Normal status is reported although it cannot be indicated by other reasons.
3. Resources unusable class
 - *#34 Circuit/channel congestion*
The channel notified preferably from IPedge Net and other channels not available in IPedge.
 - *#41 temporary failure*
For the call coming in from IPedge Net, the layer 2 at the destination is disconnected and the call is turned off.
 - *#44 Requested channel not available*
The channel notified exclusively from IPedge Net is not available in IPedge.
4. Services unusable class
Nil
5. Service non-provided class
 - *#65 Bearer capability not implemented*
The transmission capability not provided is requested.
6. Invalid message class
 - *#81 Invalid call reference value*
The message with the call number from that used between IPedge Net and an interface is received.
7. Protocol error class
 - *#96 Mandatory Information element is missing*
The message received from IPedge Net lacks mandatory information element.
 - *#97 Message type nonexistent or not implemented*
Undefined message or message not provided in interface is received.
 - *#99 Information element nonexistent or not implemented*
Undefined information element or information element not provided in interface is received.

- *#100 Invalid information element contents*
The information element that is the code not provided by one of information elements or two or more fields is received.
- *#101 Message not compatible with call state*
The received message is not compatible with the call state.
- *#102 Recovery or timer expiry*
Processing is recovered on expiry of the layer 3 timer.

Channel Group All B-channels included in the IPedge Net line, controlled by the same D-channel, belong to the same channel group. The PRI circuit in which only the specified B-channel is usable by the fractional contract can be used as an IPedge Net line.

PROGRAMMING

Multi-system networking can be implemented over an IP network.

Strata CIX systems require an MIPU or GIPH interface card. LIPU, BIPU and GIPH cards do not support IPedge Net, interface parameters include:

- 100Base-TX: Automatic recognition and switch
- Transmission: TCP/IP, UDP/IP
- Protocol: Based on IPedge (ECMA -336), NAT compatible
- Protocol: RTP/RTCP for voice transport
- Voice coding: G.711, G.729A, selectable
- Priority process: Diffserv/IEEE802.1p

Set the Transit Counter

1. Click on **System > System Data**.
2. Select the Server from the dropdown.
3. Set the Transit counter to the number of servers in the network plus one (+ 1).
4. Click on **Save** icon or select **Apply To** to assign the parameter to multiple servers.

Create Node Numbers

1. Select **System > Flexible Access Codes**.
2. Click on **New** icon.
3. Enter the remote node Access Code from 1-6 digits.
4. Select the Network Access Code for Remote Node from the dropdown.
5. Click on **Save** icon.
You should receive confirmation the data was saved, if the save is successful. If there is a conflict or the access code already exists you will see an error.
6. Repeat steps 2 through 5 for each node including the local node.

Create IPedge Net Trunk Group

Create the ILG:

1. Select **Trunk > Trunk Group**.
2. Select the Server from the dropdown.
3. Click on **New** icon.
4. Select Incoming and Outgoing in the popup and click **OK**.
5. Select a group from the dropdown (or the next available group will be offered automatically).
6. Set the Group Type to IPedge Net, the Line Type to TIE, and the Private Service Type to Q-SIG.
7. Click on **Save** icon.

Create the Channels:

1. Select **Trunk > Full IPedge Net**.

2. Select the Server from the dropdown.
3. Click on **New** icon.
4. Select a Channel Group 1~220.
5. Assign the number of channels and the ILG and OLG created above.
6. Click on **Save** icon.

If the save is successful you will receive confirmation, if the number of licenses or interface maximum channels is exceeded the system will respond with an error.

Using Wizard for First Time setup

Prior to starting the wizard, enter all node numbers in Flexible Access Codes, Create the Full IPedge Net Trunk, and set the Transit Counter in System Data.

1. Click on **IPedge Net > IPedge Net Guide**.
 2. Click on **Start Guide**.
 3. Select the Server to Program from the dropdown.
 4. On the Node ID page, enter the local node number in the Primary Node ID field. For most applications leave the Primary Overlap Code blank. Node IDs can be from 1 to 6 digits, however, single digit nodes will quickly cause a numbering conflict.
 5. Click on **Save** icon.
 6. Click on **Next** icon.
 7. On the Route Plan Analysis page, Click **New**, then in the pop-up click **Edit**.
 8. Enter the remote Node ID number and select a route table 1~64 in the Pvt. Ntwk Choice Number field. Please note this setting is for a table of up to 6 choices, not to be confused with a single Pvt. Ntwk Choice assigned in step 15.
 9. Click on **OK**.
 10. Click on **Next** or select the **Route Choice tab**.
 11. Click on the Route Choice Table Number assigned in step 8.
 12. Enter up to 6 paths to the remote node in the Remote Definition Table 1 ~ 6 fields.
- Note:** Please note these are six choices within this table, not 6 separate tables as labeled. Entry 1 is your first choice, 2 is the second choice, etc.
13. Click on **Next** or select the **Route Definition tab**.
 14. Click on **New** icon.
 15. In the pop-up, enter the Route Definition Number 1~64 entered in the Remote Definition Table Fields 1~6 in step 11. Enter the trunk group (1~120) assigned to the IPedge Net trunks under **Trunks > Full IPedge Net**, and modified digits table 0~64 required to route to the remote node. We strongly recommend not using modified digit table 0.
 16. Repeat steps 13 and 14 for all route choices assigned in step 11.

17. Click on **Next** or select the **Digit Modification tab**.
18. Select a Pvt Ntwk Digit Modification Table 1~64. Note that 0 is not a valid option as shown in the Route Definition table fields.
19. Enter the number of leading digits to delete and/or the leading digits to insert for calls to the remote node.
20. Click on **OK**.

In addition to the IPedge Net Wizard the remote node IP address and network over IP settings must be programmed.

For easy dialing, the network DN assignments allow calling DNs on other nodes without dialing the node ID.

You can also directly access any of the pages discussed above by accessing the IPedge Net Guide Page and selecting the shortcut to the page.

Assign the Remote Node Data

1. Select **IPedge Net > IPedge Net Guide**.
2. Click on **Remote Node Data**.
3. Click on **New** icon.
4. Select the Server to be programmed.
5. Enter the remote node Access Code from 1-6 digits that was created in Flexible Access Codes.
6. Enter the IP address of the Remote Node.
7. Enter the Remote Node Port 0~65535. Default is no data. Recommend 3000.
8. Click on **Save** icon.
9. Repeat steps 3 through 7 for each remote node.

Assign the Remote Node IP Address

1. Select **IPedge Net > IPedge Net Guide**.
2. Click on **Remote Node Data**.
3. Select the Server to be programmed.
4. Click on **New**.
5. Click on **Edit** in the popup.
6. Enter the remote node Access Code from 1-6 digits that was created in Flexible Access Codes.
7. Enter the IP address of the Remote Node IP interface.
8. Click on **OK**.

Note: Up to six IP addresses can be assigned to a remote node.

Assign Remote Node Detail Information

1. Select **IPedge Net > IPedge Net Guide**.
2. Click on **Network Over IP**.
3. Select the Server to be programmed.

4. Select the Remote Node ID to be programmed.
5. For most applications the default settings should suffice, however, changes can be made for audio codec, voice packet table, E911 priority, etc.
6. Click on **Save** icon.

View a Network DN

1. Select **IPedge Net > IPedge Net Guide**.
2. Click on **Network DN Assignment**.
3. Select the Server to be viewed.

Note: The Network DN Table should populate automatically as Stations are created on the Enterprise nodes.

Initializing System Data

1. Click on **System > Data Initialize**.
2. Check the program(s) to be reset to default.
3. Click on **Execute**.
4. You will be asked to confirm deleting the current programming.

IPedge NET WIZARD

Using the IPedge Net wizard can reduce installation time in the IPedge systems. The new IPedge Net Wizard, available in R1.2 and later systems, optimizes IPedge Net programming by providing the basic IPedge configuration and reduces manual input significantly. Technicians can still use the Guide page and individual programs for advanced configuration. Only IPedge servers that are attached as member servers can be configured. The IPedge Net Wizard does not remove or clean up any previous IPedge Net programmed data nor does the wizard support rollback or IPedge Net removal.

A new menu called, "IPedgeNet Wizard" is included in Enterprise Manager under the IPedge Net menu. The following screen displays when you select the wizard.

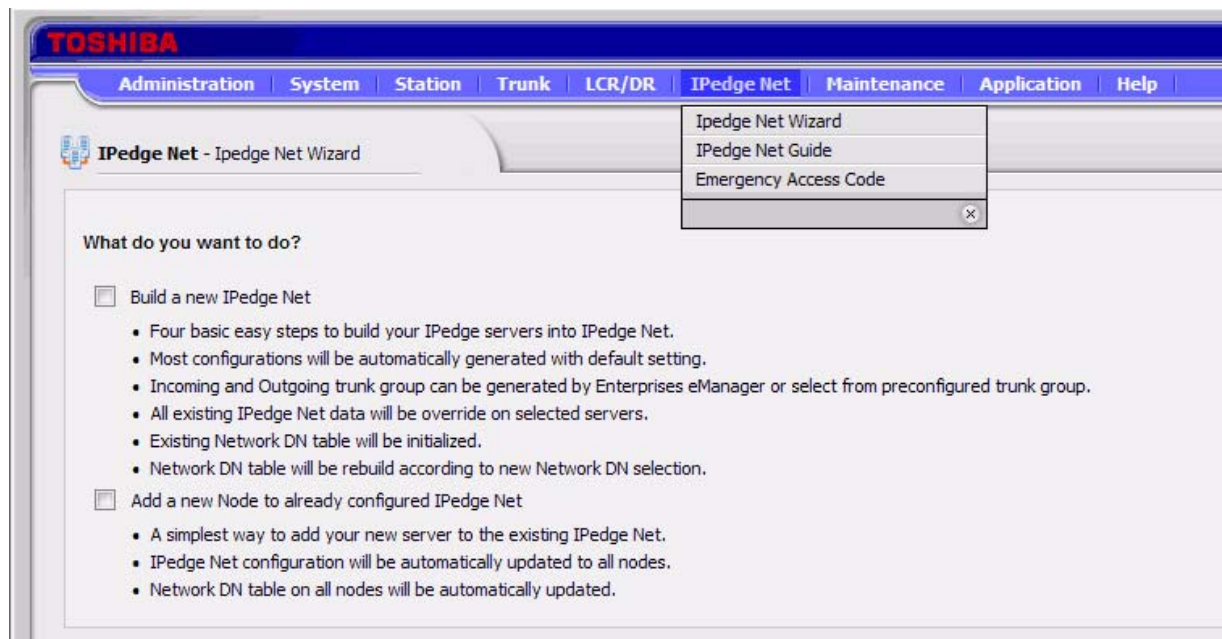


Figure 1 IPedge Net Wizard

There are two options for running the IPedge Net Wizard:

- Option 1 – Build a new IPedge Net
- Option 2 – Add a new Node to an existing IPedge Net.

For both, Option #1 and Option #2, the user will be asked to provide the following values:

- Node ID
- Incoming Line Group
- Outgoing Line Group
- Number of IPedge Net channels
- Specify the Network DNS

Once the required information is submitted, Enterprise Manager automatically builds the IPedge Net and Network DN programming. The final screen (Figure 2) displays with all DNs that were successfully created.

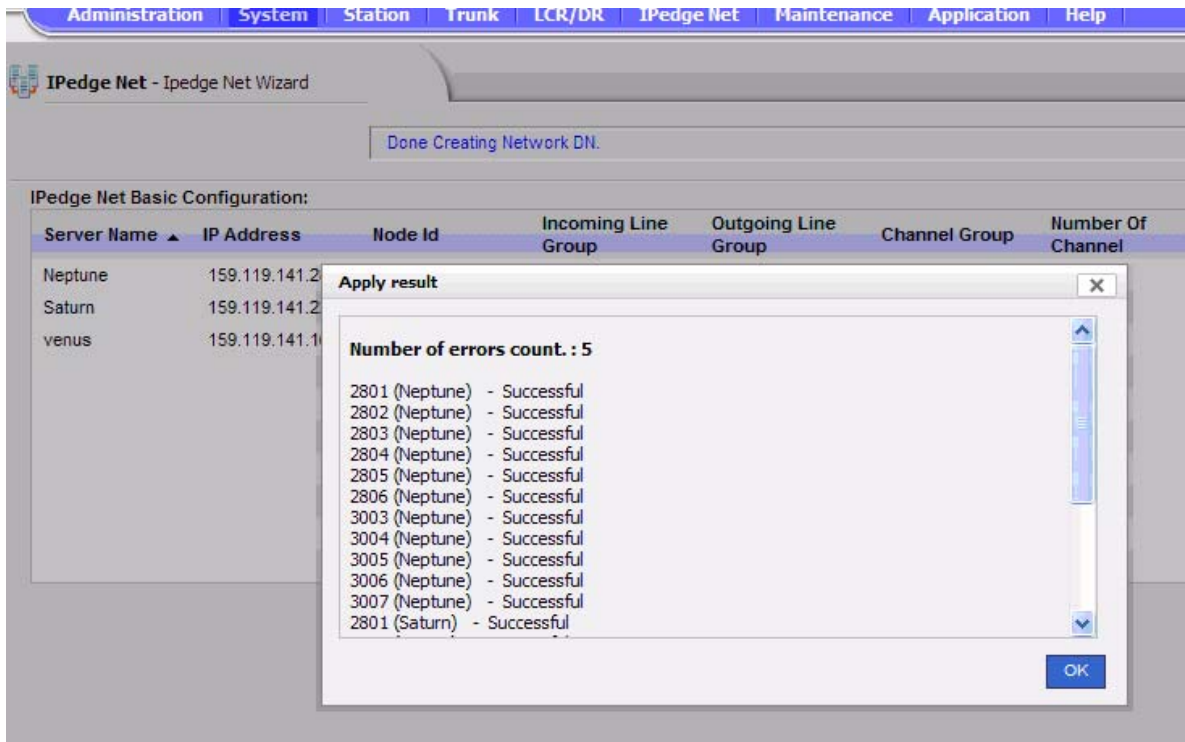


Figure 2 IPedge Net Wizard Final screen

CAPACITY

Private Route Choice Entry Table capacity is 64.

The number of voice attribute table is 256 (attribute table for MEGACO is used).

The maximum number of voice Simultaneous connections is 440 (SIP trunk and IPedge share this).

AVAILABILITY

Terminal/Line	Descriptions
IPT	Applied
Soft IPT	Applied
IP Attendant	Applied
SIP compliant station	Applied
SLT (via FXS gateway)	Applied
Paging Device (via FXS gateway)	Applied for termination from remote nodes
Door Phone (via FXS gateway)	Applied
SIP trunk	Applied
ISDN trunk (via FXO gateway)	Applied
T1 trunk (via FXO gateway)	Applied
Voice Mail – MAS	Applied
Voice Mail – SIP	Applied

The IPedge Net Wizard is available in software R1.2 and later.

RESTRICTION

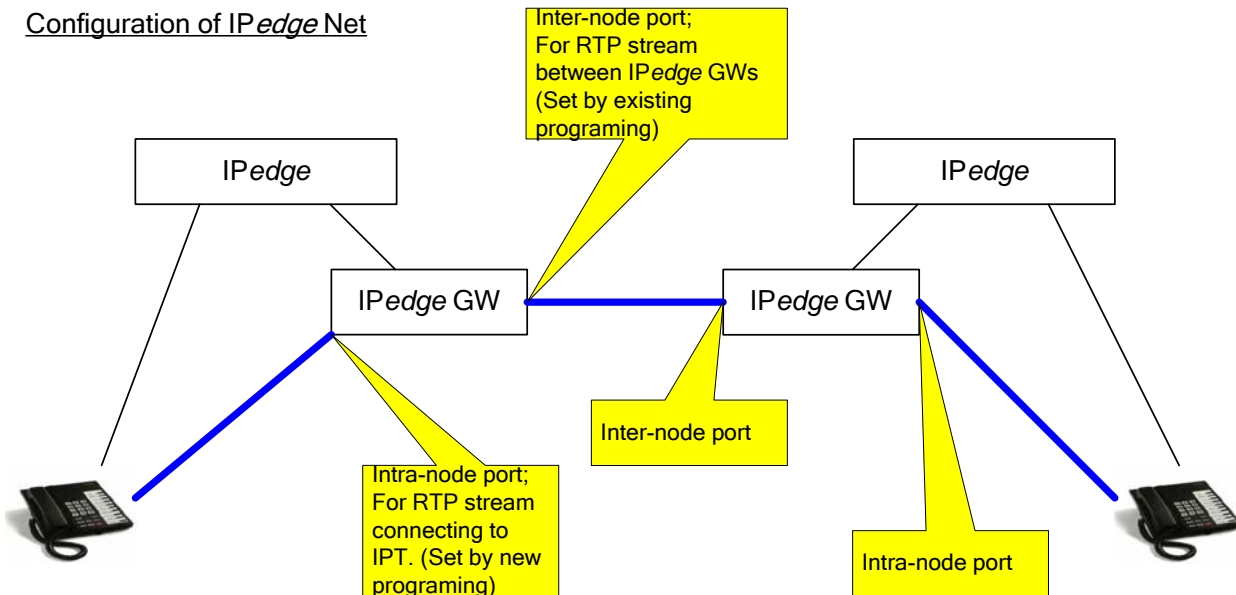
1. The TCP port number does not support dynamic assignment.
2. Peer-to-Peer (P2P) connection for IPedge Net call is not supported. Because IPedge does not provide the method to change the IP address of the far end party after the call is established.
3. TCP connection is always disconnected when the call is cleared.
4. Need to confirm the network configuration because Media Transfer function does not provide conversion between G.711u and G.711 A, or ptime.
5. When final destination is an external line, Toll Restriction is executed on the node that contains the destination external line, not on the node that contains the originator extension station/external line.
6. SIP trunk and IPedge Net cannot co-exist on the same ILG.
7. From the endpoint spec which is negotiated between the IPedge server and the endpoint, there may be a case when the packet

interval of endpoint cannot be changed to that of the IPedge server, so the packet interval of the call via IPedge is also established if packet intervals for both are not matched.

Limitations for Media Transfer Function

IPedge Net protocol does not have the capability to change an IP address after a call is established. Instead, use the Media Transfer Function to receive the RTP stream between nodes and forward to stations or trunks in the local node.

Configuration of IPedge Net



Limitations:

- doesn't support Codec translation
- doesn't supportptime translation

IPedge connection with Megaco+ (IPT/Soft IPT/IP-VM/IP-ATT/IP-VA)		
Limitation	1	The codec setting in Enterprise Manager Station > Station Assignment, IPT Data tab, Audio Codec and Secondary Audio Codec parameters is ignored.
	Reason	<ul style="list-style-type: none"> – IPedge Gateway does not have the function of transcoding codec. – The Codec setting in IPedge Net > Network Over IP, Audio Codec parameter is selected without depending on the codec setting in Station Assignment.
Limitation	2	For packet interval, the setting for IPedge is selected, but it is not guaranteed that the far end party will transmit the RTP packet according to this setting.
	Reason	<ul style="list-style-type: none"> – IPedge Gateway does not have the function of changing the packet interval. – The SIP-related RFC does not forbid transmitting RTP packets by a different interval from the interval appointed in SIP SDP. – It is not guaranteed that the far end party will transmit the RTP packets according to the same interval selected by negotiation when the far end party is a SIP endpoint.

	memo	<ul style="list-style-type: none"> – In the case of a P2P connection with SIP endpoint, this limitation is applied. – IPedge endpoints must process RTP packets appropriately when it receives RTP packets whose packet interval is different from the interval decided by the negotiation with a far end party.
IPedge connection with Media Server		
Limitation	3	<p>The IPedge codec setting (in IPedge Net > Network Over IP, Audio Codec parameter) is selected.</p> <p>When Media Server cannot handle the selected codec, Media Server cannot communicate with this call.</p>
	Reason	<ul style="list-style-type: none"> – The IPedge Gateway does not have the function of transcoding codec. – In codec negotiation, the codec setting for IPedge in IPedge Net > Network Over IP, Audio Codec parameter is selected.
	memo	<ul style="list-style-type: none"> – When the limitation of "System-2" is not satisfied, this limitation is applied. – IPedge Server determines the unmatched codec and packet interval. When the codec or packet interval is unmatched, the IPedge server does not order to the Media Server.
Limitation	4	<p>The packet interval is selected by the packet interval setting for IPedge (in IPedge Net > Network Over IP, Voice Packet Table parameter and System > Voice Packet Configuration, Transmission Interval for IPedge server parameter). However, it is not guaranteed that the far end party will transmit the RTP packet according to this setting.</p>
	Reason	<ul style="list-style-type: none"> – The IPedge Gateway does not have the function of changing packet interval. – The SIP-related RFC does not forbid transmitting an RTP packet by different interval from the interval appointed in SIP SDP. – It is not guaranteed that the far end party will transmit the RTP packets according to the same interval selected by negotiation when the far end party is a SIP endpoint.
	memo	<ul style="list-style-type: none"> – Toshiba Media Server must process RTP packets appropriately, when it receives an RTP packet whose packet interval is different from the interval ordered by the IPedge Server.
IPedge connection with SIP Extension / 3rd Party SIP Product / SIP Trunk		
Limitation	5	<p>When the codec (set to codec setting for IPedge in IPedge Net > Network Over IP, Audio Codec parameter) is not included in an offer by INVITE from the SIP endpoint, "480 Temporarily Unavailable" is replied by the IPedge server. So this SIP endpoint cannot communicate.</p>
	Reason	<ul style="list-style-type: none"> – IPedge Gateway does not have the function of transcoding codec. – In codec negotiation, the codec setting for IPedge in IPedge Net > Network Over IP, Audio Codec parameter is selected.
	memo	<ul style="list-style-type: none"> – When the limitation of System-2 is not satisfied, this limitation is applied. – SIP endpoint must support all 3 codecs – G.711A, G.711Mu, and G.729A. – SIP endpoints must include all 3 – G.711A-law, G.711Mu-law, and G.729A in SDP by an offer by INVITE.

Limitation	6	By the offer in INVITE of the communication via <i>IPedge</i> , only the codec set in <i>IPedge</i> Net > Network Over IP, Audio Codec parameter is appointed. When the SIP endpoint cannot handle the appointed codec, the SIP endpoint cannot communicate. The behavior of the SIP endpoint when the codec is unmatched depends on the implementation of the SIP endpoint. In this case, the call of the far end party is disconnected.
	Reason	– <i>IPedge</i> Gateway does not have the function of transcoding codec. – In codec negotiation, the codec setting for <i>IPedge</i> (in <i>IPedge</i> Net > Network Over IP, Audio Codec parameter) is selected.
	memo	– When the limitation of System-2 is not satisfied, this limitation is applied. – SIP endpoint must supports all 3 codecs G.711A, G.711Mu, and G.729A.
Limitation	7	The packet interval is selected by the packet interval setting for <i>IPedge</i> (in <i>IPedge</i> Net > Network Over IP, Voice Packet Table parameter and System > Voice Packet Configuration, Transmission Interval for <i>IPedge</i> server parameter). But the behavior of the packet interval depends on implementation of endpoints. Thus, it is not guaranteed that the RTP packets are transmitted by the same packet interval with that setting.
	Reason	– <i>IPedge</i> Gateway does not have the function of changing the packet interval. – The SIP-related RFC does not forbid transmitting an RTP packet by different interval from the interval appointed in SIP SDP. – It is not guaranteed that the far end party will transmit the RTP packets according to the same interval selected by negotiation when the far end party is a SIP endpoint.
	memo	– In the case of a P2P connection with SIP endpoint, this limitation is applied. – <i>IPedge</i> endpoints must process RTP packets appropriately when it receives an RTP packet whose packet interval is different from the interval decided by the negotiation with a far end party.

System Structure		
Limitation	1	Two <i>IPedge</i> systems, consisting of 2 nodes connected by SIP trunk to each other, must have all of the <i>IPedge</i> codec settings set to the same value.
	Reason	– In the case of connection through <i>IPedge</i> of each system, the <i>IPedge</i> codec setting is selected during the negotiation of the SIP trunk to connect two systems. – When each codec setting is unmatched, neither system can communicate with each other by SIP trunk.

memo	
<p>The diagram illustrates a SIP Trunk connection between System A and System B. System A consists of an Endpoint, an IPedge server, and an IPedge Net. System B consists of an IPedge server, an IPedge Net, and an Endpoint. The SIP Trunk connects the IPedge servers of both systems. Arrows indicate Codec A settings for System A and Codec B settings for System B. The SIP Trunk also shows Codec A and Codec B settings.</p>	
	<ul style="list-style-type: none"> – In the case of connection through IPedge, IPedge Server selects the codec for IPedge. – When the codec setting for System A (Codec A) IPedge is different from that of System B (Codec B), the SIP trunk cannot connect them. – In this case, the behavior of each endpoint is as follows: IPT: hear ROT SIP: An error (System Call Forward Assignment) is sent by the IPedge Server after 10 sec silence in a sending state. The SIP endpoint behavior when a System Call Forward Assignment error is replied depends on the implementation of the SIP endpoint.
Limitation	2 Endpoints in an IPedge Net network must have compatible codec settings.
Reason	<ul style="list-style-type: none"> – To reduce the opportunity of an unmatched codec when an endpoint connects through IPedge in a network system. – To reduce the chance of packet interval mismatch when a P2P connection with SIP endpoint and connection through IPedge is made.

IPedge		
Limitation	1	G.711 must not be selected on the codec setting for IPedge (in IPedge Net > Network Over IP, Audio Codec parameter) Either G.711A or G.711Mu or G.729A must be selected in IPedge Net > Network Over IP, Audio Codec parameter).
Reason		<ul style="list-style-type: none"> – IPedge Gateway does not have the function of transcode between A-law and Mu-law. – When G.711 is selected in IPedge Net > Network Over IP, Audio Codec parameter, the IPedge Server selects A-law or Mu-law by the regional setting (Enterprise Manager > Servers, click on Server Edit tab, Region parameter). So there is a possibility that the IPedge Server cannot connect through IPedge if the countries are different.
Limitation	2	All of the codec settings for IPedge in IPedge Net > Network Over IP, Audio Codec parameter must be set to the same value in the IPedge network system using IPedge Server.
Reason		<ul style="list-style-type: none"> – IPedge Gateway does not have the function of transcoding codec. – In the case of the connection through more than two nodes, when each codec setting for IPedge is unmatched, the IPedge Server cannot communicate with each other through IPedge.

Limitation	3	The codec setting for IPedge in IPedge Net > Network Over IP, Audio Codec parameter - must select the codec that each endpoint in the system can handle.
	Reason	<ul style="list-style-type: none">- IPedge Gateway does not have the function of transcoding codec.- The codec setting for IPedge is selected on the codec negotiation.

HARDWARE

No additional hardware in the *IPedge* system is necessary for this feature.

Strata CIX system connection to an *IPedge* system over *IPedge* Net requires an MIPU or GIUP card in the Strata CIX system. BIPU, LIPU and GIPH cards are not compatible with *IPedge* Net operation.

FEATURE INTERACTION

Account Codes	<p>When a forced account code is requested while making a trunk call from a remote node after connecting to the remote node by the Network Feature Access Code; the account code is collected at the remote node and verified as needed. When the forced account code is requested at a local node, (e.g., in case of LCR) or a certain account is entered, the account code is collected at the local node and collated as needed.</p> <p>When the account code is collected at the local node where the originating party belongs and the class of service is changed, the changed class of service is notified to the specified remote node as a Traveling Class Mark.</p> <p>When the account code is collected at a remote node and the class of service is changed, the changed class of service is not notified to the local node where the originating party belongs.</p>
ACD Overflow to Voice Mail	<p>You can specify the Network Directory Number as an Overflow destination.</p>
Advisory Message	<p>This is not applied to IPedge calls.</p>
Audible Tone	<p>If an incoming call from a private network via IPedge Net made by another node is a DID call then Ring Back Tone, Reorder Tone, and Busy Tone that IPedge provides to DID lines will be selected out of regions by Region Code.</p> <p>The terminating call via a private line also provides audible tone from the terminating node. No tone is provided from the transmitting node.</p> <p>It is possible to provide tone from the remote node because 3rd party products may provide the difference tone.</p> <p>In a DID termination via gateway, such as ISDN trunk, the gateway provides tone. It depends on the location of gateway to provide tone. This means that Ring Back Tone and Reorder Tone are provided based on the region where gateway installs.</p>
Automatic Busy Redial (ABR)	<p>Because there is no way to notify the ABR setting between nodes, ABR cannot be invoked to the trunk in remote node.</p>
Automatic Callback (ACB)	<p>Automatic Callback extending over two or more nodes does not provide the function.</p>
Automatic Camp On	<p>When an incoming call from IPedge Net terminates to an extension at the terminating node but the extension is busy, the call is an Automatic Camp</p>

	<p>On to the extension (if Automatic Camp On option is set in the Incoming Line Group connected to that call). However, if the connected Incoming Line Group is an IPedge line and the call type is not a trunk call, Automatic Camp On is not activated.</p> <p>In the transit node, Automatic Camp On is not applied.</p>
Automatic Line Selection	<p>In Ringing Preference, when a call is recognized as an incoming call from IPedge Net and the originator is recognized as a trunk, the system has the order of priority of the incoming call from the trunk. The other call types or an incoming call from a non-IPedge Net are handled as internal calls.</p>
Automatic Release of SIP Trunk	<p>When release of a trunk line is detected in the incoming or outgoing gateway in a trunk call executed over two or more nodes, the connected IPedge line is immediately disconnected/released.</p>
Background Music (BGM)	<p>Playing BGM across nodes is not supported. Hearing BGM from the IPT is reserved at that node.</p>
Basic Survivability	<p>Both the primary and the secondary server are required to connect via IPedge Net.</p>
Behind Connection	<p>There are two ways to originate a call from the trunk with Behind Connection. One is to use the trunk group access code and the other is to dial the number which follows IPedge Private Networking Plan. In the trunk group access, the system seizes an appropriate trunk from the specified group and sends out the digits to the adjunct node as a user enters. If the dial number which follows IPedge Private Networking Plan is entered, then the system selects the most appropriate route for the call and sends the digit to the adjunct node modifying based on the arrangement for that route.</p>
Call by Service Selection	<p>All calls are handled as POTS on IPedge Net line. CBC service is usable by dialing the access code relevant to CBC of the ISDN trunk where a local user is connected to a remote trunk.</p>
Call Forward	<p>The Call forwarding feature is applied even if the call terminates via the private line.</p> <p>The directory number of the extension station in IPedge Net or the external number using the trunk line via the IPedge Net can be set as the call forward destination. It is also possible to remote set or reset the extension's Call Forward at a remote node by using the Network Feature Access Code. The Network Directory Number is accepted as a PDN, but if it does not match the node specified by the Network Feature Access Code, an error occurs.</p>

The above is common to IPedge Net and non-IPedge Net lines.

In the case of IPedge Net, Call Forward is performed in the re-routing format and any unnecessary use of the line is removed.

When a forwarded call is going outside from an outgoing gateway through IPedge Net, the Class Of Service of the forwarding party is referenced.

If a station or an attendant with Call Forward Override privilege calls a station at a remote node through IPedge Net, the call forward will not take place even if it is activated. To make this happen, the attribute of the originator has to be delivered to the destination node by the Travelling Class Mark feature.

The Network DN/Network Feature Access Code and IPedge Net access code + parameter can be registered as the destination of Call Forward and System Call Forward.

Whether the call can reach the destination station or whether the access to the remote nodes' features is permitted or not are not checked on the registration.

Call History In IPedge Net, when an incoming call is from a trunk line, it is recorded as the terminating extension's Call History. If the incoming call is not from a trunk or it comes from non-IPedge Net, it is not recorded as Call History.

When calling back by searching Call History, take appropriate outgoing call originating operation. A callback is not always made in the same route as an incoming call.

Call Monitor Calls with networked VM devices cannot be monitored.

Call Park Orbits When a call is parked by Call Park while speaking, it is parked at the extension node that activates Call Park. Parking a call at remote nodes through IPedge Net is not supported.

It is possible to answer a parked call from the remote node. To do this, dial the Network Feature Access Code and Orbit number. The Network directory number is accepted as the orbit number, but if the node ID is different from the specified Network Feature Access Code, an error occurs. Note that only a DN can be prefixed with a Node ID. The system orbit number cannot be prefixed with a Node ID.

Call Pickup It is not possible to pick up an incoming call to a remote node as if picking up an incoming call to a local node by using Call Pick Up.

However, it is possible to pick up a call terminated to another node by using the Network Feature Access Code. When picking up the call via IPedge Net, the originating station's class of service (including attendant console) is notified to the service-providing node to determine whether

Pick Up is possible. When IPedge Net is used but the call originator is not an extension station or when the call is picked up via a non-IPedge Net, Class of Service set for Line Group of IPedge Net is referenced to determine whether Pick Up is possible.

Building up a Call Pick Up group over two or more nodes is not supported. Thus, when the Pick Up destination station does not allow Pick Up from out of the group, Pick Up fails.

Call Transfer Immediate When a transferring party is allowed and the Network Directory Number is dialed as the transfer destination, the call will not be transferred immediately, even after the last digit is dialed. When the user hangs up after dialing, then the call is transferred.

The call is ring transferred as join and no rerouting function is executed if the conference call or consultation call state is the transferred party.

Call Transfer With Camp On When an incoming call from IPedge Net is transferred to an extension but the extension is busy, the system handles the call according to the description of Call Transfer with Camp On.

When an extension call, trunk call, or IPedge Net call is transferred through IPedge Net but the outgoing line group local to the originating node is all busy, the system camps on the call to the local outgoing group.

When these calls are transferred to the terminating node and encounter a busy extension or trunk, Call Transfer with Camp On is applied. In this case, the originator's Class Of Service at the originating node is tested.

Call Transfer With Camp On is not applicable to calls via non-IPedge Net. If the transferring party hangs up while the transfer destination is busy, the transferring party is immediately recalled.

Call Transfer It is possible to transfer a conference, including an incoming call, from IPedge Net to a local extension or to a trunk and extension at a remote node through IPedge Net. It is also possible to transfer a call or conference with a local extension and trunk to a trunk and extension at a remote node via IPedge Net.

As a result of transferring a call, a tandem connection between trunks is made. Refer to Tandem SIP trunk connection.

The call is call transferred as join and no rerouting function is executed if the conference call or consultation call state is the transferred party or transferred-to party.

Call Waiting When an incoming call from IPedge camps on a busy extension, a call waiting tone or LCD message is provided according to the description of this feature.

	<p>An incoming call from a non-IPedge Net is handled as an internal call. A call waiting tone for an internal call is used. In case of an incoming call from IPedge Net, the originating station's number and name provided by the originating node display on the busy extension's LCD. The call waiting tone can be switched according to the call type.</p>
Caller Identification	<p>Information such as the originator number and name received through an incoming gateway is notified to a terminating node via IPedge Net. When ISDN is used as a tie line among non-IPedge tie line, only the originator number is notified. When the non-IPedge tie line except ISDN is used, the information is not notified.</p>
Calling Number Identification	<p>The caller Id information from SIP and ISDN trunk in the local node can be transmitted to the remote node via a private line.</p>
Class Of Service	<p>For an incoming or outgoing call from non-IPedge Net, refer to the class of service set for each line group. For an incoming or outgoing call from IPedge Net, refer to the class of service at the originating node and the terminating node provided by Traveling Class Mark. For details, refer to Traveling Class Mark.</p> <p>When accessing the features of other nodes using the Network Feature Access Code, determine the Class Of Service depending on the node to provide service. When features such as Traveling Class Of Service are used, follow the specifications for the feature. When such services are not used, refer to the default Class Of Service set on Line Group.</p>
Class Of Service Override	<p>When accessing the remote nodes' features using the Network Feature Access Code, determine the Class Of Service depending on the node to provide service. When features such as Traveling Class Of Service are used, follow the specifications of that feature. When such services are not used, refer to the default Class Of Service set on Line Group.</p> <p>Class of Service Override code is controlled closed at each node. It is possible to set the same code for the same contents in reference to two more nodes for the programming convenience, but these codes are not necessarily associated.</p> <p>When a call with the Class of Service Override Code entered is connected to a remote node via IPedge Net, the class of service associated with the Class Of Service Override Code is notified to the remote node.</p> <p>By entering the Network Feature Access Code it is possible to dial the Class Of Service Override feature access code in the remote node. It is also possible to change the override feature access code in the remote node by dialing the Network Feature Access Code if the Class Of Service is allowed.</p>

Conferencing	<p>It is possible to make a conference that includes a remote node party. If the private line is IPedge Net, then the participating stations' LCDs can display the appropriate information. A Conference circuit hunts in the node where the call goes from a 2 way connection to a 3 way conference.</p> <p>The station and the trunk in the local node can create a conference with stations in the remote node and can be added to the conference in the remote node. In this case, the conference in the local node is treated in the remote node as one party of the private line.</p> <p>The private line (IPedge, etc.) cannot know if the far end party is the conference and the conference is treated as one party of the private line. As a result the number of participants may exceed the maximum number of parties in the conference.</p> <p>The party in the local node becomes the next conference master if the conference master hangs up. The conference master does not move across nodes. As the result of the conference master hanging up, if all participants are trunks and no stations, it is determined by the CoS setting for Tandem Connection whether the conference remains or disconnects.</p> <p>When the conference call changes to a 2 way call, it is not controlled by any re-routing method so there is an invalid connection of the private line.</p>
Conference on Hold	<p>It is possible to hold a conference that includes IPedge Net.</p>
Conference Split/Join/Drop	<p>Nodes can split the far end party for each other because there is no way to know the status if the remote node splits the call.</p>
Consultation Hold	<p>Consultation Hold of the conference including an IPedge or an IPedge Net call is possible.</p> <p>When an extension talks with attendant via IPedge, the extension may Consultation Hold the attendant even if the line is IPedge.</p>
Continuous DTMF Tone	<p>When transmitting a DTMF signal though the voice channel, it must be the voice coding system G.711, or use RFC 2833.</p>
Credit Card Calling	<p>Extension lines and trunk lines make Credit Card Calling from a remote node via IPedge Net. The outgoing gateway node determines whether to allow this feature. When Credit Card Calling is allowed by the class of service of the caller provided by Traveling Class Mark or the default class of service set for the Incoming Line Group of IPedge and when the outgoing line group used for Outgoing Call allows Credit Card Calling, the number of digits for Credit Card Calling is checked.</p>

D-channel Sharing	D-channel Sharing is not supported on IPedge Net. Assign D-channel for each port.
Day/Night Modes	Day/Night mode is controlled for individual nodes. An extension cannot manually switch the day/night mode of other nodes.
Delayed Ringing	This is applicable to IPedge calls. Regardless of call type, the delayed timer value of IPedge calls is used.
Dial For Quick Launch	<p>When the extension station or external line of the remote node is called, other services except Automatic Call Back can be activated by Dial For Quick Launch.</p> <p>When transmitting a DTMF signal for Dial For Quick Launch through the voice channel, it must be the voice coding system G.711, or use RFC 2833.</p> <p>Busy Override, Executive Override, OCA, and Message Waiting features cannot be invoked if Busy Tone is provided at the local node.</p> <p>An IPT cannot send a DTMF tone so that feature cannot be invoked if the remote node cannot hunt media resources to provide a tone.</p>
Dialed Number Identification Service (DNIS)	<p>When DNIS call is terminated to a remote node extension via IPedge Net, the information related to DN'S (VM-ID, destination number, destination name, etc.) is notified to the remote node together with the information stating the DNIS call.</p> <p>At the node where the DNIS call is terminated via IPedge Net, transfer to Voice Mail is provided according to the description of individual specification.</p> <p>When the DNIS call is terminated via a non-IPedge Net, the call type cannot be determined, and the call is handled as an IPedge Net call (specifically almost the same as an internal call).</p>
Digital PAD	Digital PAD is set for each node. When PAD value needs correction in reference to specific route, it is possible to use the function of PAD group.
Direct Inward Dialing (DID)	<p>If an incoming call from a private network via IPedge Net made by another node is a DID call, then IPedge provides audible tones to the DID lines (selected out of regions by Region Code).</p> <p>The network directory number and network feature access code indicating the attendant at the remote node can be set as the destination of a DID call. A DID call cannot be terminated by specifying the group CO button or Pooled Line button at a remote node.</p>

	<p>When a DID call terminates to an extension at a remote node via <i>IPedge</i> Net, the information related to the DID call (destination number, etc.) is notified to the remote node together with the information stating the DID call. The destination number is converted to the domestic complete number beginning with the area code. In order to make it a completed number, the prefix is added per the incoming line group at the incoming gateway node.</p> <p>When a DID call terminates to an extension at a remote node via non-<i>IPedge</i> Net, the call cannot be determined as a DID call and is handled as an <i>IPedge</i> Net call (specifically almost the same as an internal call) at the terminating node.</p>
Direct Inward Termination (DIT)	DIT calls are treated the same as DID calls.
Direct Station Selection Button/Network Direct Station Selection Button	The DSS button is associated with the internal call at a remote node. Refer to Network Direct Station Selection Button.
Directory Number Presentation	When an extension station number is notified to a remote node and a display DN has been set for that station, DN for display is notified. At this time, DN for display is converted to the Network Directory Number.
Distinctive Ringing	<p>When the call is recognized as an incoming call from <i>IPedge</i> Net and the originator is a trunk, the call is handled as an incoming call from the trunk. When the call is another type or is an incoming call from a non-<i>IPedge</i> Net, the call is handled as an internal incoming call.</p> <p>A call from a private line is an object for pitch change because the call from a private line is treated the same as an internal call.</p>
Do Not Disturb Override	<p>At the node where a call comes in from <i>IPedge</i> Net, when Do Not Disturb is activated in the terminating station, the caller hears a Fast Busy Tone. Dial For Quick Launch is used to override Do Not Disturb. At this time, the class of service set in the incoming line group of <i>IPedge</i> Net is referenced. (Usually, this feature is prohibited as a default.) In <i>IPedge</i> Net, when the class of service of the originating station can be referenced at the terminating node, this is done to provide service.</p> <p>An IPT cannot send a DTMF tone so that feature cannot be invoked when the remote node cannot hunt media resources to provide a tone.</p>
Do Not Disturb (DND)	<p>At the node where a call comes in from <i>IPedge</i> Net, when Do Not Disturb is activated in the terminating station, a Fast Busy Tone is sent to <i>IPedge</i>.</p> <p>The Network Feature Access Code is used to set and reset Do Not Disturb at a remote node extension.</p>

DND/ Busy Override	<p>At the node where a call comes in from IPedge, when the terminating station is busy or Do Not Disturb is activated in the terminating station, the caller hears Busy Tone or Fast Busy Tone. Dial For Quick Launch is used to override Busy or Do Not Disturb. At this time, the class of service set in the incoming line group of IPedge is referenced. (Usually, this feature is prohibited as default.) In IPedge Net, when the originating station's class of service can be referenced at the terminating node it provides service.</p> <p>An IPT cannot send a DTMF tone so that feature cannot be invoked if the remote node cannot hunt media resources to provide a tone.</p>
Door Phone	<p>It is possible to set stations or trunks in the remote node as a door phone destination. However, the terminating tone is a normal tone and the special terminating tone for a door phone is not provided.</p> <p>It is possible to call the set door phone in the remote node or answer the call from the set door phone in the remote node by using the Network Feature Access Code.</p>
DP/DTMF Mode Change	<p>This is applicable to IPedge.</p>
Emergency Call	<p>An Emergency Call is possible from IPedge. The Network extension station number of another node can be specified as the destination of an emergency call, based on the Coordinated Numbering Plan.</p>
Emergency ring-down	<p>Emergency Ring Down is not applied to an incoming call from IPedge.</p> <p>Only stations or attendant consoles within the same node can be a destination. This is a constraint of the current software.</p>
Enhanced 911 (E911 Interface)	<p>An E911 call originating function is provided via a node. IPedge Net might be included in the list of outgoing line groups used for an emergency call group although some constraints are enforced. If an emergency call originates from a remote node at a different location, the originating place is not specified by PSAP (Public Safety Answering Position).</p> <p>For the destination of internal notification for an E911 call, refer to the emergency call list. Attendants or stations in the remote node can be included in this list.</p> <p>An E911 call can be disconnected if the originating SIP station hangs up the call via IPedge. If the originator is an IPT, the E911 call cannot be hang up.</p>
End-to-End Signaling	<p>When transmitting a DTMF signal though the voice channel, it must be the voice coding system G.711 or use RFC 2833.</p>

	This is applicable to IPedge calls.
Exclusive Hold	This holds a conference containing IPedge Net calls and IPedge lines.
Executive Override	<p>When an extension at a remote node is called by using IPedge Net, the originating party's class of service is notified to the terminating node by Traveling Class Mark, and the originator determines whether Executive Override is allowed. When an extension at a remote node is called by using non-IPedge Net, refer to the Incoming Line Group's class of service of the line connected to the terminating node.</p> <p>When Executive Override is performed for the members of a conference through IPedge, the conference members are not identified at that node, and the conference may be cascaded. This is allowed. To override a conference, all conference members must allow overriding by Executive Override. However, when a conference is held through a non-IPedge system, this check is impossible. In this case, if the class of service for each party is known by Traveling Class Mark in the node where Executive Override is activated, reference it. Reference the class of service set in the line group connected to that system and determine whether Executive Override is possible.</p> <p>IPT cannot send a DTMF tone so that feature cannot be invoked if the remote node cannot hunt media resources for providing a tone.</p>
Flexible Numbering Plan	<p>The IPedge Private Network Numbering Plan allows that:</p> <ul style="list-style-type: none"> • The extension station number and feature access code is five digits maximum • The Network Directory Number is seven digits maximum • The Feature Access Code is 11 digits maximum (except parameter).
Group CO Button	<p>A Group CO button is allocated to an Outgoing Line Group consisting of IPedge. An Incoming Line Group cannot be allocated.</p> <p>The GCO button can only indicate the state of the private line, this is not the state of the trunk in the remote node.</p> <p>A Node ID is required for address translation so the node ID must be dialed after the feature access code when an OLG outgoing call is attempted.</p>
Group Paging/Emergency Page	<p>A Paging device can be specified as the destination of a call.</p> <p>The device list for All Call Paging and Group Paging cannot include an IPT of remote nodes and external paging devices. Thus, a paged call over two or more nodes is not supported.</p>

	<p>By dialing the Group Paging's Network Feature Access Code from an extension station, Group Paging at a remote node becomes possible.</p> <p>Calling a paging group in the remote node from a SIP station is not supported. However, it is possible by using SIP inband mode.</p>
Hands Free Answer Back	<p>When the originator requests a voice first call via IPedge by Dial For Quick Launch, the call becomes the voice first call. However, as the destination is not automatically released, if Release Supervision is not set in IPedge, the call does not become a voice fist call. For Release Supervision in IPedge connection, refer to Tandem CO Line Connection listed in this section.</p> <p>The call always terminates by tone call even if the destination station set the called type as Voice First.</p>
Hot-dialing	<p>When a Coordinated Numbering Plan has been set, the network DN/ Network Feature Access Code can be entered by pressing the dial pad directly while the station is idle.</p>
Intercept	<p>It is possible to specify a Network Directory Number or Network Feature Access Code indicating attendant console as the intercept destination.</p> <p>If the call is transmitting nodes and encounters the error to apply intercept during the connection, the intercept feature is applied in the incoming gateway where the call from the trunk is terminating.</p>
Interdigit Times	<p>Inter-digit timer set in Incoming Line Group is used for an incoming call from IPedge.</p>
IP Phone User Mobility	<p>An IPT can log in to the remote node if the programming is set to allow it.</p>
LCD Display	<p>This provides an appropriate display for calls, especially, when a call is made via IPedge Net and the originator is recognized as an extension station or a trunk, this provides a display conforming to the internal call or trunk call.</p>
Least Cost Routing (LCR)	<p>When a public network number is dialed, an LCR table can be formed to make bypass routes using IPedge Net. Toll Restriction is executed for the public network number dialed by the user.</p> <p>It is possible to originate an LCR call from a remote node by dialing the Network Feature Access Code. In case of IPedge Net, refer to the originating party's class of service. In case of non-IPedge Net, refer to the class of service relevant to the incoming line group.</p>

Line Group	An IPedge Net trunk is contained in the group as Incoming Line Group or Outgoing Line Group.
Line Hold	The call or the conference with the remote node or the conference with the remote node party can be put on hold.
Lost Call Treatment	<p>It is possible to set the Network Directory Number or Network Feature Access Code indicating attendant console as the destination of Lost Call Treatment.</p> <p>When Lost Call terminates via IPedge Net, the incoming lost call attribute is notified to the node where the lost call destination belongs. When the destination is busy, Off-hook Camp On is activated for the destination. When the destination does not answer within a certain time, the call is disconnected/released at the node where Lost Call occurs.</p> <p>When Lost Call terminates via non-IPedge Net, the node requesting Lost Call Treatment becomes a controlling node. The incoming lost call is handled as an ordinary call termination at the terminating node. When the originator does not answer within a certain time, the call is disconnected/ released at the node that requests Lost Call Treatment.</p> <p>Set DTMF notification by "INFO" message between IPedge Net and IPedge. If the setting is "inband," then features cannot be invoked because DTMF signals are not transmitted.</p>
Make Busy	<p>The time to detect the fault in the route in IPedge is 8 seconds max after origination and 3 minutes during talk.</p> <p>The IPedge server cannot detect the fault in the remote node or network. This is because the TCP connection disconnects when the call is cleared.</p>
Manual Voice Recording	<p>A conversation with IPedge and a conference including IPedge can be manually recorded. Whether the voice mail unit is installed on the local node or not doesn't matter if the station to start voice recording is related to the voice mail.</p> <p>It is possible to listen to the recorded contents by playing the voice recorded at a certain node from a remote node.</p>
Message Waiting	Station Message Waiting can be sent when an extension station calls a station at a remote node or when calling an extension station at a remote node but the station is busy, provided the nodes are connected via IPedge Net and given common numbers by the Coordinated Numbering Plan. When the voice mail unit connected to a certain node receives the message sent to a certain station at a remote node, Voice Mail Message Waiting can be sent to that station.

If the nodes are connected via non-IPedge Net and not given common numbers by the Coordinated Numbering Plan, the information about the Message Waiting originator is not sent to a remote node and Message Waiting cannot be sent.

A transit node cannot determine the possibility of providing Message Waiting in a network where IPedge Net and non-IPedge Net coexists. Thus, only when a Message Waiting receiving node receives Message Waiting and the originator's information can be recognized, can Message Waiting be accepted.

The station or local node receiving Message Waiting can view the message and can make callback.

Message Waiting can be canceled by operating the sending station or the receiving station. Message Waiting can also be reset when the sending station and the receiving station talk to each other via IPedge Net. In this case, Message Waiting is automatically reset regardless which line key the sending station and the receiving station use for conversation.

An IPT cannot send a DTMF tone so that feature cannot be invoked if the remote node cannot hunt media resources for providing a tone.

Multiple Appearance	Multiple Appearance cannot be set over two or more nodes.
Multiple Calling	<p>It is possible to call from the local node to the multiple calling pilot DN in the remote node.</p> <p>Configuring multiple calling members across nodes is not supported.</p>
Music On Hold	<p>The source of Music On Hold is closed in a node (two or more nodes cannot share the music-on-hold source). When an extension station holds an incoming call from IPedge Net (Line Hold, Exclusive Hold, Consultation Hold, Call Park), the music-on-hold source is at the node where the extension station holding the call belongs .</p> <p>For the call connected via IPedge Net and terminated by dial-in from an incoming gateway, the incoming gateway notifies the music-on-hold source number associated with that call (following the terminating node definition) to the terminating node. When the terminating node holds this call, the specified music-on-hold source is used. The information on this music-on-hold is not succeeded when the call is transferred to another node.</p> <p>When a station makes an outgoing call through IPedge Net, if it is obvious that the far end is an external party, the music-on-hold source defined as a default per the OLG at the originating node is used. If the type of far end is ambiguous or other than external parties, the music-on-hold source defined as system default at the holding node is used.</p>

	<p>When no music-on-hold source is specified, the call is not a dial-in call or the call is connected via non-IPedge Net, the default music-on-hold is used.</p>
OFF-hook Call Announce (OCA)	<p>When the incoming call from IPedge requests OCA by Dial For Quick Launch, OCA is provided.</p> <p>When the call is connected via IPedge and the originator's class of service is usable, reference the originator's class of service.</p> <p>When the originator's class of service is not usable or when the call is connected via a non-IPedge, reference the default class of service set for the Incoming Line Group of IPedge.</p> <p>An IPT cannot send a DTMF tone so that feature cannot be invoked if the remote node cannot hunt media resources to provide a tone.</p>
Off-hook Camp On	<p>When an extension station attempts to make a call to an extension station or an external line at a remote node via IPedge Net but the destination is busy, Off-hook Camp On can be activated by Dial For Quick Launch or timeout. In this case, the originator's Class Of Service is tested at the originating node in order to determine whether the service is provided or not. Among the nodes, IPedge protocol is used.</p> <p>When the outgoing route is busy at a transit node, the calling party hears busy tone but cannot activate Off-hook Camp On.</p> <p>When an extension station attempts to connect to a remote node via IPedge Net or non-IPedge Net but these local outgoing line groups are busy, Off-hook Camp On can be activated for these outgoing line groups.</p> <p>An IPT cannot send a DTMF tone so that feature cannot be invoked when the remote node cannot hunt media resources to provide a tone.</p>
One Touch Button	<p>This allows programming of a dial string including the Network Directory Number and the Network Feature Access Code.</p>
Outgoing Call	<p>It is possible to make an outgoing call from the remote node by using the Network Feature Access Code.</p> <p>A Node ID is required for address translation. The node ID must be dialed after the feature access code when an OLG outgoing call is attempted.</p>
Overflow	<p>Setting the Network Directory Number as an Overflow destination is not supported.</p>
PC Attendant	<p>You can call the attendant in the remote node via the private line.</p>

	Configuring attendant group with attendants across nodes is not supported.
Phantom DN Button	The Phantom DN's Secondary button cannot be set across nodes.
Pooled Line Button	<p>A Pooled Line button is allocated to Outgoing Line Group consisting of IPedge Net. An Incoming Line Group cannot be allocated.</p> <p>A Pool button can only indicate the state of the private line, this is not the state of the trunk in the remote node.</p> <p>A Node ID is required for address translation so that node ID must be dialed after the feature access code when OLG outgoing call is attempted.</p>
Privacy/Non-privacy	When an extension station is talking with IPedge, the third party may override the extension station at a remote node.
Position Busy Mode	The Network DN/Network Feature Access Code or IPedge access code + parameter can be set as the destination of the Attendant Alternative Destination.
Recall Treatment	<p>When a service such as Ring Transfer from IPedge is provided but it is not completed, recall occurs. When the service is provided from IPedge Net and the service-providing station (including attendant console) can be specified, the call terminates to the originating station via the IPedge Net line.</p> <p>When an incoming recall occurs via IPedge Net, the recall termination attribute is notified to the node where the recall destination station belongs. When the destination is busy, Off-hook Camp On is activated for Prime DN at the destination. When the destination does not answer within a certain time, Lost Call Treatment is applied to the node where the recall occurs.</p> <p>When recall occurs via a non-IPedge Net, the node to make the recall becomes a controlling node. An incoming recall at the terminating node is handled as an ordinary call termination. When the originator does not answer within a certain time, Lost Call Treatment is applied to the node that originated the recall.</p> <p>When the service provider is IPedge but the originator is not an extension station or when the originator cannot be specified, the recall is not originated to IPedge but Lost Call Treatment is applied.</p>
Repeat Last Number Dialed	The dials originated using IPedge are stored in the redial buffer.

Ring Over Busy	This is applicable to IPedge calls. For handling of call types, refer to Automatic Line Selection.
Ringing Assignment	This is applicable to IPedge calls.
Ring Transfer	<p>It is possible to ring transfer an incoming call from IPedge or a conference containing an incoming call from IPedge to a local extension station or to a trunk or extension station at a remote node via IPedge. It is also possible to ring transfer a call to local extension station or trunk or a conference to a trunk or extension station at a remote node via IPedge.</p> <p>When Ring Transfer is executed by re-routing via IPedge Net, the no-answer timer is started at the node where the transferred party belongs. When Ring Transfer is executed by Join via IPedge Net, the timer is started at the node of joining. If the call is not answered even after the set time expires, the station transferring the call is called back. When the recall destination station is located at the remote node and the recall destination does not answer or when the recall destination station is unknown, Lost Call Treatment is applied.</p> <p>If the Ring Transferred call is forwarded to another destination by any Call Forwarding features, the Ring Transfer no answer timer runs until the call is answered.</p> <p>If the conference call or consultation call state is the transferred party, the call is ring transferred as join and no rerouting function is executed.</p>
Simplified Message Desk Interface (SMDI)	<p>An SMDI connection can be performed across nodes. The voice mail device located at a local node can be directly controlled by SMDI located at a remote node.</p> <p>It is possible to associate the voice mail device DN or pilot number located at a remote node for each DN. In this case, use the Network Directory Number.</p> <p>The Node ID is set in the top 6 digits of the VM-callid in the DC packet, if the Node ID is set on the IPedge server. Without setting Node ID, "0" is set for the top 6 digits.</p>
SIP Extension	<p>The Rejected Call Forward feature can forward a call to the extension in the remote node. Note that the Rejected Call Forward call to the remote node is not disconnected even if the destination is busy. The call camps on the destination.</p> <p>It is possible to invoke features by Dial For Quick Launch while hearing Busy Tone when the call terminates on the remote node.</p>

Specified Caller Identification	<p>When making a call from MAS (FF PCH) or Varaha to a station or a trunk of another node, a specified caller number is informed.</p>
Speed Dial (System/Station)	<p>The Network Directory Number or Network Feature Access Code can be programmed at Speed Dial. A call can be routed to the public network via IPedge (according to the LCR data) when the LCR access code has been programmed at Speed Dial.</p> <p>It is also possible to make a call by the System Speed Dial list located at a remote node by using the Network Feature Access Code.</p>
Station Automatic Release	<p>When the extension station or external line making a call via IPedge is disconnected/released, IPedge is also immediately disconnected/released.</p> <p>When IPedge is disconnected/ released while IPT is making a call via a IPedge Net, follow Station Automatic Release.</p> <p>When receiving service from the remote node using the Network Feature Access Code or when a call is attempted from the remote node to the external line but regulated, then Reorder Tone or Success Tone is supplied from the service providing node. When these tones time out, IPedge is disconnected/ released at the service providing node.</p>
Station CO Line Access	<p>When an extension station attempts to originate a call to a remote node via the Outgoing Line Group of IPedge, then Station CO Line Access by FRL is not applied. Instead, a new Class Of Service is created to dial the Node ID. Without the created Class Of Service, a station call cannot access IPedge using the Network Directory Number and the Network Feature Access Code.</p> <p>When connecting a DID call or a DIT call to a remote node via IPedge according to the setting or IPedge lines are mutually connected at a transit node, Station CO Line Access by FRL is not applied to simplify the design of IPedge Net.</p> <p>At a remote node, when the incoming call from IPedge is connected to the outgoing side of the public network, Station CO Line Access is applied. When the incoming call is from IPedge Net and the originating party's class of service is usable, reference it. When the incoming call is from IPedge Net but the originating party's class of service is not usable or when the call is an incoming call from a non-IPedge Net, reference the default class of service set in the incoming line group of the incoming IPedge line.</p>
Station Hunting	<p>Building up a hunting group over two or more nodes is not supported.</p> <p>When a call terminates to a Station Hunting group from IPedge, the call terminates to an idle station in the group like an ordinary incoming call.</p>

Station Message Detail Record (SMDR)	A call via IPedge generates SMDR at each node.
Station To Station Connection	A Station-to-station call is possible via IPedge. To originate a call to a station located at a remote node, refer to the IPedge Private Network Numbering Plan.
System Call Forward	<p>It is possible to set the extension station in the IPedge network or the trunk number via IPedge Net as the destination of System Call Forward. The call forwarded to a node different from the destination is handled as an ordinary transfer call. Thus, it may be further transferred to another destination by Call Forward.</p> <p>When IPedge Net is used, Call Forward is executed in the re-routing format to avoid using the line unnecessarily.</p> <p>The Network DN/Network Feature Access Code and IPedge access code + parameter can be registered as the destination of Call Forward and System Call Forward. Whether the call can reach the destination station or whether the access to the features of other nodes is permitted or not are not checked on the registration.</p> <p>In the following case, calls are routed to the overflow destination configured by the DH Pilot System Call Forward No Answer destination and UCD Pilot Overflow Timer.</p> <ol style="list-style-type: none"> 1. If the UCD Pilot Overflow timer expires while the call is queued to UCD pilot, the call is forwarded to the Call forward destination assigned to the Pilot DN in System Call Forward-No Answer. The overflow time is set in the Distributed Hunt Group UCD overflow timer. 2. If all agents in the group are in a logout, DND, or Make Busy state the call is forwarded to a Call forward destination assigned to the Pilot DN in System Call Forward-DND. <p>If an overflow destination is not assigned or is invalid, the call stays in the queue.</p>
Tandem CO Line Connection	<p>Trunk lines can be tandem connected manually or automatically via IPedge.</p> <p>The system assumes that the Release supervision is always available in the networking environment. The system designer is fully responsible for allowing the SIP trunk without the Release Supervision, e.g. Loop trunks, connected to the networking. This might cause the trunk to lock up.</p>
Through Dialing	The party in the remote node can be transferred as the transferred party.
Toll Restriction	When an Outgoing Line Group for IPedge is set to behind connection, Toll Restriction is applied according to Behind Connection. The Behind

	<p>Connection feature is used when making regulations at a terminating node or a transit node.</p> <p>Using Least Cost Routing function, when a call originates to a public network from a remote node via IPedge , Toll Restriction is examined at the originating node.</p> <p>Using other functions, when a call originates to a public network from a remote node via IPedge, Toll Restriction is examined at an outgoing gateway. When a call originates to a public network via IPedge Net and the originator's class of service can be used at the outgoing gateway, reference it and check regulations.</p> <p>When the originator's class of service cannot be used even if IPedge Net is used or when a call originates to the public network via non-IPedge Net, refer to the default class of service set in the incoming line group of the IPedge line at the outgoing gate.</p>
Toll Restriction Override by System Speed Dial	<p>When a call originated using System Speed Dial is routed to a remote node via IPedge Net, the class of service set as System Speed Dial is notified to a terminating node. Thus, as long as System Speed Dial is used, an extension station with a low class of service can make a call to the public network through IPedge.</p> <p>When a call, originated using System Speed Dial, is routed to a remote node via non-IPedge Net the default incoming line group's class of service where the incoming call is connected at a terminating node is referenced.</p>
Tone First/Voice First	<p>When an incoming call from IPedge Net terminates to an extension station, it is handled as Tone First even if Voice First has been set for the terminating station.</p>
Transfer Direct To VM	<p>You cannot specify the extension station number located at a remote node when specifying an extension station number by Transfer Direct To Voice Mail. This is because the data on the remote node extension station does not exist at a local node. Also, you cannot receive the services of the remote nodes by using Access Code. When transferring to Voice Mail for the extension stations at the remote nodes, dial the station number of the Voice Mail unit and dial VM-ID manually after the voice mail unit answers.</p> <p>When the voice mail unit at the remote node has been associated to the extension station number specified by Transfer Direct To Voice Mail, the call is transferred to the voice mail unit at the remote node.</p>
Transfer Privacy	<p>Applied if the GCO button is assigned to the private line.</p>
Travelling Class Mark	<p>When IPedge Net can be used and Traveling Class Mark is sent, provide the service according to Traveling Class Mark. For the detail, refer to the</p>

specifications for Traveling Class Mark.

Universal Call Distribution
(UCD)

Including a DN in the remote node in UCD member is not supported.

An overflow destination may be set as the remote station. However, the call is not diverted to the overflow destination and keeps in the queue if the overflow destination is a UCD pilot DN in the remote node and all agents are logged out, DND, or make busy.

Voice Mail

The SMDI message is generated by the node where the call from the private line is answered.

When transmitting the DTMF signal as VM-ID through the voice channel, it must be the voice coding system G.711, or use RFC 2833.

Voice Mail Conference

This allows calling and adding Voice Mail unit to a conference by dialing the extension station number of the voice mail unit located at a remote node (or the hunting pilot number). In this case, control of the voice mail unit is DTMF only. At the node where Conference Master is set, whether Voice Mail is called or not cannot be determined. When IPT at the same node presses the dial pad, a DTMF tone is sent to all conference members, and the members are permitted to control the voice mail unit.