iS3000 and SIP@Net server

Networking solutions

At a Glance

- Networking applications for private networks using iS3000 and SIP@Net

- iSNet is designed to support a large variety of network standards

- Networking over data networks, public switched networks and leased lines

- Comprehensive IP and QSIG support

Linking individual sites is one of the most effective ways in which organisations with a distributed structure can make their business processes more efficient and economical. iSNet provides the iS3000 hybrid communication platform as well as the SIP@Net server platforms with powerful networking solutions.

Any distributed organisation, such as universities, government departments, local authorities and companies with a national or worldwide network of branches and/ or sales offices, can bring sites and staff together in a single virtual network. Within this network, users can enjoy transparent access to all the functions and features of the iS3000 and SIP@Net communication systems.

Empowered by Innovation

NEC

iSNet applications support not only traditional, circuit-switched TDM telephony, but also packet-switched IP telephony. The high degree of flexibility typical of iSNet applications safeguards the varying requirements of different organisational structures. Supported by mixed TDM and IP environments, iSNet meets all the preconditions organisations demand for migrating to an IP-based, converged voice-data network, making it future-proof while also protecting existing investments.

Key features
- Networking applications for private networks using iS3000 and SIP@Net communication systems
- All networked iS3000 and SIP@Net systems act as a single integrated system
- iSNet is designed to support a large variety of network standards (IP, PVN, QSIG, DPNSS)
- Networking over leased lines, public switched networks and data networks
- Comprehensive IP and QSIG support (for multi-vendor environments)

Main advantages of a private network

iSNet links multi-site communications platforms, enabling them to act as a single integrated system, which can be organised and managed centrally, as part of an open and flexible private network. This enables the construction or addition of systems and applications to perform in a company- or campus wide environment. iSNet includes various multifunctional and economical networking applications that can be freely mixed to suit different organisational structures, geographies and system types.

The private network not only provides an important integration function between sites, supporting daily operations and accommodating different traffic environments, but it has also been designed to satisfy the key principles outlined below.

Cost efficiency and budget considerations
- Immediate cost savings on telecom traffic. Investments in services such as operators, voice/fax systems and network management can be optimised through centralised networking. Options such as Least Cost Call Routing (LCCR) and IP based networking contribute to additional savings on call routing and optimise traffic costs.

- iSNet enables the cost-effective combination into a single company network of virtually unlimited branches, small offices and/or teleworkers in home offices. This promotes consistent customer service levels across the organisation.
- The modularity of SOPHO iSNet, along with its broad range of interconnection and IP networking options, offers organisations a high degree of flexibility in migrating to IP telephony and converged voice-data networks. In addition, it safeguards investments in existing infrastructure.

Operational efficiency at the desired service levels
- Functions such as call forwarding, follow me and number pre-select reduce the need for operator intervention to an absolute minimum.
- Service levels can be automated selectively, through the deployment of functions such as ACD or auto attendant, relieving operators from repetitive routine tasks.
- Operator, supervisor, administrator and manager resources can be centralised selectively across the network. This means reduced costs for you and better service for your customers.

A higher degree of flexibility
- iSNet is highly flexible: service levels and networking functions/applications are entirely configurable. This means that, as circumstances change, the customer's network can be customised at any time to meet new, business-specific parameters.
- iSNet's high degree of flexibility enables the deployment of applications on demand.
- All systems and applications controlled by iSNet are managed via LAN-ready IP-telephony tools, with simultaneous and remote device set-up and management available across all sites and systems.

Networking capabilities

iSNet supports a large variety of connections, in order to network distributed sites in the most cost-effective way. iSNet's networking capabilities are so versatile and flexible, only a broad outline can be provided here.

For a more in-depth overview, contact your NEC consultant. Using the actual structure of your organisation as a basis, the NEC consultant will provide you with details of how iSNet can save you costs and help your staff to work more efficiently and productively.

iSNet distributed PBX

The iSNet distributed PBX application enables different iS3000 Fault Tolerant processor systems, distributed over several locations, to operate as a single integrated system. This is achieved by applying the same system software to each individual node and integrating the nodes in a distributed PBX environment.

The iSNet distributed PBX application supports:
- Free numbering: standard: 10 digits optional
- Centralised maintenance
- Centralised management
- Centralised operator
- Transparent user features (except groups)

Connections
- IMP 2Mbit/s G.703 fixed lines
- External IP gateway

IP Networking

iSNet enables the iS3000 hybrid communication systems and the SIP@Net servers to interlink via WAN or LAN Networks. By adding an In-System Gateway to the iS3000 PBX a 10/100 Mbit/s Ethernet connection offers the IP link via your company's Wide Area Network to the IP enabled iS3000 or SIP@Net server at your remote office.
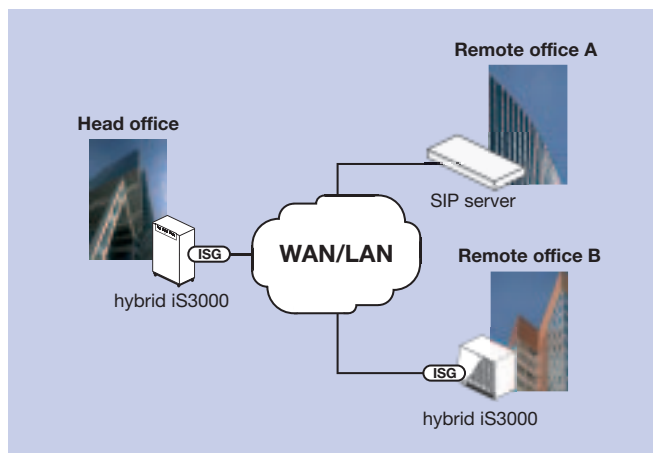
IP Networking

iSNet offers three types of IP-based networking each with its own specific application:

Basic IP networking
For basic IP-based networking between the iS3000 system this type of networking requires the In-System Gateway and offers the following functionality:
- Call forwarding
- Call transfer
- Enquiry
- Follow-me
- Three party call
- Uniform numbering plan (12 digits)

iPVN-based networking
This type of IP networking is ideally suited for the pure iS3000 networks where a very high level of functionality is required. For new IP based networks as well as replacing existing traditional iS3000 network connections by IP connections iPVN-based networking offers a cost effective networking solution. The following iSNet Private Networking features are supported:

Extension features
- Abbreviated dialling
- Automatic camp on busy (COB)
- Basic telephone call
- Break-in protection
- Call-charge display
- Call diversion:
  - follow-me active (immediate)
  - on no reply
  - on busy
  - to external (immediate)
- Call hold (start enquiry)
- Calling-line/name display
- Call offer (COB by originator)
- Call waiting (COB by destination)
- Connect-line/name display
- Data call
- Executive intrusion
- Intercom
- Message-waiting indicator
- Mobility
- Number-presentation restriction
- Silent monitoring
- Three-party conference
- Transfer before answer (new party)
- Twinning
- User-to-user text messaging

System features

- Charge reporting
- Distinctive ringing
- Free numbering
- Loop avoidance
- Night-assistance routing
- Paging:
  - call indication
  - meet me
  - non-meet me
  - answer
- Route optimisation
- Trunk identity
- Uniform numbering plan (12 digits):
  - closed
  - open

Operator features

- Automatic COB extension
- Automatic repeat on busy/no answer
- Break-in on busy extension/trunk
- Centralised operator
- Display of:
  - calling-line identity
  - called-line identity
  - called-line status
  - cost accounting
  - last party
- Fast call handling
- Last (external) number repetition
- Transfer before answer

Call-routing features

- Access-code repetition (fixed)
- Alternative routing on:
  - congestion
  - time of day
  - link failure
- Number conversion (originator)
  - out-of-area exchange line
  - forced-on-net routing
  - break-out accounting
- Overflow routing
- Preferred routing
- Remote public network break out

CCIS-based networking

This type of networking is based on the CCIS protocol used between the UNIVERGE IP servers. The iS3000 systems with SIP@Net fully support this CCIS protocol.

Adding a UNIVERGE IP communication server to your iS3000 by means of the IP-based CCIS protocol offers a future proof networking concept and a wide variety of features. Full interworking with the iSNet functionality is also offered, including:

- Abbreviated dialling
- Automatic ring back on busy
- Basic call
- Calling name and number display
- Called name and number display
- Call forwarding, diversion
  - on busy
  - immediate
  - on no reply
- Camp on busy extension/attendant
- Centralised operator
- DDI fail/assistance
- Distinctive ringing
- Enquiry, shuttle, transfer
- Follow-me
- Free numbering
- Full FDCR support on CCIS routes
- Location diversity
- Message waiting
- Paging answering
- Route optimisation (media, signalling)
- SOPHO Mobility Access (SMA)
- Three-party conference
- Trunk identity
- Uniform numbering plan open/closed 8 digits

Connections

The In-System Gateway allows a maximum of 30 channels each for trunking on a 10/100 Mbit/s Ethernet interface. G711 and G729a/b/ab coding is supported on a per-port basis. Between iS3000 network nodes the T38 fax protocol is supported.

iSNet Virtual Networking (VN)

iSNet Virtual Networking is provided as either Basic Virtual Networking (BVN) or as Private Virtual Networking (PVN). Virtual networks are especially attractive when the volume of data traffic between sites is too small to justify an expensive point-to-point connection. VN networks are software-based and are ideal for connections that handle extensive data traffic as an overflow for fixed lines in peak traffic.
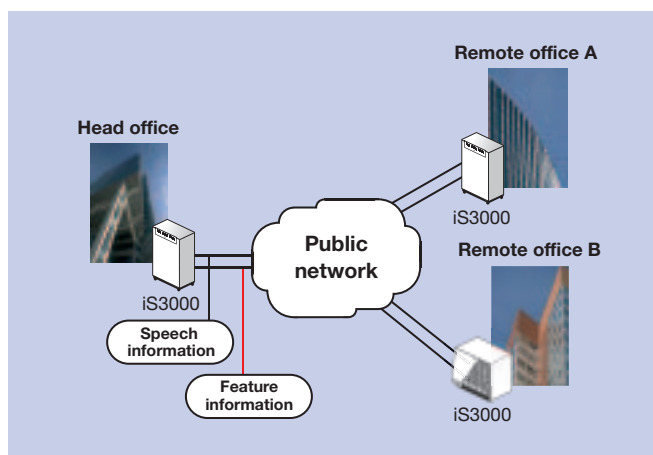
Basic Virtual Networking (BVN)

Once calls are routed via the public network, the available ISPBX features are limited to:
- Call forwarding
- Call transfer
- Enquiry
- Follow-me
- Three-party call
- Uniform numbering plan (12 digits)

Private Virtual Networking (PVN/iPVN)

iSNet Private Virtual Networking (PVN) supports all standard and additional iSNet Private Networking features, via PSTN, ISDN, QSIG or IP networks. iSNet PVN/iPVN enables the interconnection of private network nodes that handle little telephony traffic. This eliminates the need to invest in costly fixed lines, since with PVN, site-independent networking services and iS3000 ISPBX features are available to all network users in a uniform and transparent way.

Private Virtual Networking with full iSNet functionality

iSNet PVN/iPVN is especially attractive as an overflow for fixed lines. The IP-routing protocol allows fully meshed networks to be created. The functionality supported is the iSNet Private Networking features set as mentioned before under IP Networking.

Connections

The following options are available for connecting iSNet nodes in a Private (Virtual) Network with fixed or ISDN lines:
- IP network with In-System Gateway (ISG)
- QSIG/DPNSS 2 Mbit/s G.703 fixed line (30B+D)
- QSIG/DPNSS 192 kbit/s I.430 fixed line (2B+D)

Multi-vendor networking

iSNet supports various open networking protocols, enabling iS3000 nodes to be included in any type of multivendor network.
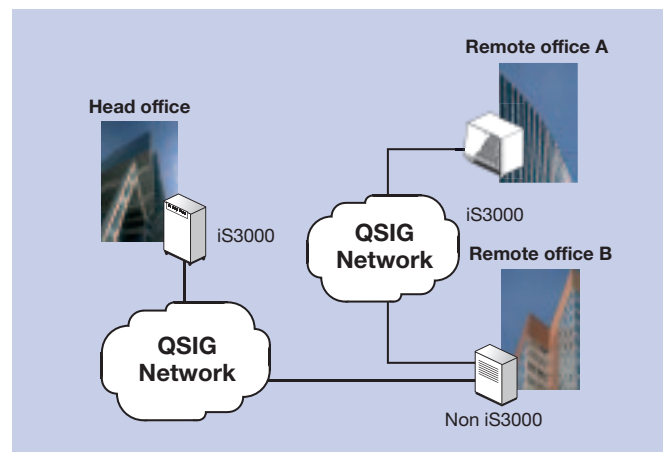
Multi-vendor Networking

iSNet over QSIG

Linking the iS3000 ISPBX with third-party systems is made possible through the iS3000 series' comprehensive support of the QSIG protocol. This enables manufacturer-independent networking at the ECMA standard's high performance level. With iSNet over QSIG, iS3000 users gain access to all iSNet features, even in non-iS3000 QSIG network and PBX installations. Low-cost dial-up connections over Private Virtual QSIG Networks (Q-PVN) can also be used.

QSIG features:

The applicable QSIG standard is indicated in brackets
- Basic call at Q (ETS 300 172)
- Number Identification (ETS 300 173)
- Calling Line Identification Presentation (ETS 300 173)
- Connection Line Identification Presentation (ETS 300 173)
- Calling/Connected Line Identification Restriction (ETS 300 173)
- Call Completion to Busy Subscriber (ETS 300 365)
- Call Completion on No Reply (ETS 300 365)
- Name Identification (ETS 300 238)
- Calling Name ID Presentation (ETS 300 238)
- Connected Name ID Presentation (ETS 300 238)
- Calling/Connected Name ID Restriction (ETS 300 238)
- Message Waiting (EN 301 255/260)
- Do Not Disturb (ETS 300 363/364)
- Call Transfer (ETS 300 260/261)
- Call Diversion Services (ETS 300 256/257)
  - Call Forwarding Unconditional
  - Call Forwarding on Busy
  - Call Forwarding on No Reply
- Call Offer Service (ETS 300 361/362)
- Advice of Charge, End of Call (EN 301 264)
- Advice of Charge, During Call (EN 301 264)
- Path Replacement (ETS 300 259)
- Segmenting (EN 300 172)
- Transit Counter (EN 301 048)
- Generic Functional Procedures (ETS 300 239)
- Call Intrusion Service (EN 300 425/426)

IP networking in multi-vendor networks

Multi-vendor linking over IP connections is made possible by the iS3000 Gateways, which support the H.323 and SIP protocol.
The following features are available:
- Call forwarding
- Call transfer
- Direct dialling in (DDI)
- Direct dialling out (DDO)
- Enquiry
- Three-party call
- Uniform numbering plan (12 digits)

Operator Networking

Networking with IP-based Operators can be performed with the In-System Gateway and the IETF SIP 2.8 protocol.
Related RFCs:
- RFC 3261 Basic call handling
- RFC 2833 DTMF support
- Fax (G711, T38)
- RFC 3555 Payload formats in SDP
- QoS IEEE 802.1Q
- RFC 2617, 3216, 3261 section 22 Registration/Authentication
- RFC 3550 RTP
- RFC 2327, RFC 3264 SDP handling
- RFC 3711 Secure Realtime Transport Protocol (SRTP)
- RFC 4568 transport of encryption keys for SRTP.
- RFC 3262 SIP reliability (
- RFC 2246 Transport Layer Security (TLS)
- RFC 2326 Diversion
- RFC 3326 SIP CANCEL with Reason header
- draft-levy-sip-diversion-08.txt Original Called Number
- draft-ietf-sip-asserted-identity Connected party number display
- draft-ietf-sip-privacy-general Connected party number display
- draft-levy-SIP-diversion-08 Diversion Header

Analogue features

The following iSNet features are available on analogue tie-lines:
- Call forwarding
- Call transfer
- Direct dialling in (DDI)
- Direct dialling out (DDO)
- Three-party call
- Uniform numbering plan (12 digits)

DPNSS features

The applicable BTNR 188 sections are indicated in brackets.
- Basic telephone call (section 1-6)
- Call back when free (section 9)
- Call back when next used (section 31)
- Call offer (section 14)
- Call waiting (section 17)
- Centralised operator (section 26)
- Charge reporting (section 40)
- Data call (section 7)
- Diversion (section 11)
- Do not disturb (section 32)
- DPNSS/ISDN networking (189-I)
- Executive intrusion (section 10)
- Hold, shuttle (section 12)
- Loop avoidance (section 37)
- Non-specified information (section 15)
- Number presentation restriction (section 48)
- Redirection (section 22)
- Route optimisation (section 19)
- Service independent string (section 16)
  - text messaging
  - names
  - message index
  - trunk identity
  - assistance information
- Three-party conference (section 13)

DSS1 features

- Advice of Call Charge (AOC) master mode
- Basic call master/slave mode
- Calling Line Identification Presentation (CLIP)
- Calling Line Identification Restriction (CLIR)

Interconnection methods

The supported protocol is mentioned in combination
with the interconnection method:
- CEPT-L1
- E&M (2/4 wire)
- Fixed analogue lines (only basic networking possible)
- Loop disconnect
- QSIG/DPNSS 2 Mbit/s G.703 fixed line (30B+D)
- QSIG/DPNSS 192 kbit/s I.430 fixed line (2B+D)

Features and connections support

Features and connections are supported by the call-processing software SIP@Net. SIP@Net is available for all models in the iS3000 series and SOPHO-S installations. SOPHO-S systems may require a hardware upgrade, depending on the system level. iSNet distributed ISPBX is only available on the iS3070 and iS3090 or iS3000 fault tolerant processor models.

Expert Services

iSNet is fully supported by our Expert Services. This extensive portfolio of services provides the insight and support needed to get the most out of equipment and applications. The services offered comprise advice, design, customisation, integration, training, maintenance, continuous optimisation and Business Partner services.

UNIVERGE®360 is NEC's approach to unifying business communications. It places people at the center of communications and delivers on an organization's needs by uniting infrastructure, communications and business.

UNIVERGE® 360

About NEC Corporation: NEC Corporation (NASDAQ: NIPNY) is one of the world's leading providers of Internet, broadband network and enterprise business solutions dedicated to meeting the specialized needs of its diverse and global base of customers. NEC delivers tailored solutions in the key fields of computer, networking and electron devices, by integrating its technical strengths in IT and Networks, and by providing advanced semiconductor solutions through NEC Electronics Corporation. The NEC Group employs more than 150,000 people worldwide. For additional information, please visit the NEC home page at: http://www.nec.com

For further information please contact your local NEC representative or:

EMEA (Europe, Middle East, Africa)	**North America (USA)**	**Corporate Headquarters (Japan)**
NEC Unified Solutions	NEC Corporation of America	NEC Corporation
www.nec-unified.com	*www.necam.com*	*www.nec.com*

Empowered by Innovation

NEC