

HiPath DX networking

HiPath DX offers a best in class private networking capability for all organisations with more than one site and with the need for cost-effective voice and data communications. HiPath DX is supported by features familiar to the traditional voice user such as callback, call waiting, diversions and name/number presentation.

The HiPath DX builds upon the proven technology and reliability of the UK's best in class networking communications server; the Realitis DX and iSDX. It is the natural progression for existing Realitis DX and iSDX systems providing the transparency and functionality required for expanding digital networks. There is also a comprehensive application portfolio which is compatible with the HiPath DX, Realitis DX and the iSDX.

Throughout the world, DX customers use the most advanced private network services available in the form of the well-known DPNSS signalling system (digital private network signalling system). Thus, multi-site organisations are able to operate as an integrated unit by forming their own private network and can achieve operational efficiencies and cost savings by routing traffic across their own network rather than through the public network.

It is equally possible to use DPNSS with the DX on large campuses, by realising the advantages of modular growth with resiliency. Features such as keysystem working, manager/secretary, hunt groups, pickup groups, call park and call pickup have been networked for cases where neighbouring telephones are wired from different, adjacent DXs.

QSIG, a new protocol for private networking being standardised by ISO, is also available.

Both signalling systems work off a digital link interface (DLI) 30 channel card and can be configured on site, per trunk main group.

Benefits

Private networking benefits include:

- Cheaper than equivalent public network calls. Rentals of inter-PBX leased circuits per annum will be far cheaper than using public network calls between company locations, once a certain threshold of calls per annum is reached
- Virtual public network (VPN) services can also be applied to the DX using DPNSS protocol. The same network features exist which would be in dedicated private networks, but the costs can be cheaper for global private networking and for national networks,

depending upon the traffic levels and the tariffs on offer by public carriers and resellers

- Opportunities arise for centralising attendant and voice mail management functions, thus saving costs
- Least cost routing can be used to ensure that the cheapest option is used for routing any call, including a routing of the call through the private network before breaking out at the point closest to the public destination and therefore cheapest
- Resilience, in switching traffic between alternative private and public routes
- Calls dialled using a public number for a destination on the private network can be routed using only the private network
- Ease of access to work colleagues around the world
- Features such as calling name display, call-back when free/next used, camp-on, conference and diversion are needed between sites of an organisation
- Large corporations need advanced networks for voice and data because they are globally based but need to work as one unit, with consistent levels of advanced communications
- Networks can be designed to provide the level of operational resilience and redundancy an organisation requires, avoiding out of service or busy links or nodes and using alternative routes

DPNSS

DPNSS is the world's most widely used and feature rich digital private network signalling protocol.

HiPath DX builds upon the extensive DPNSS implementation of the Realitis DX and iSDX. Full interworking is possible between HiPath DX, Realitis DX and iSDX systems.

DPNSS carries speech and data traffic between PBXs over a PCM (pulse code modulation) link. The link supports 30 traffic channels at a speed of 64kbit/s per channel.



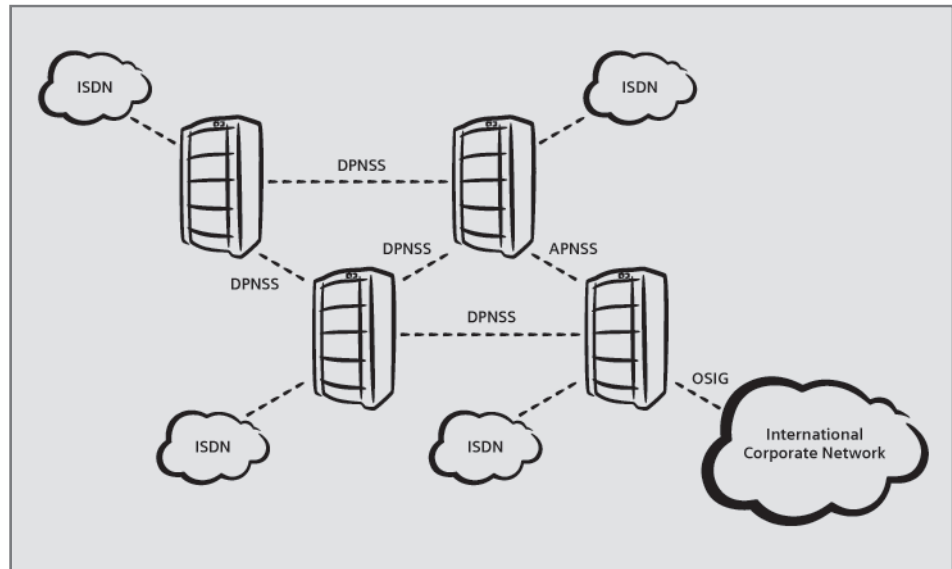
HiPath DX

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Fig.1: Typical network configuration



DPNSS facilities

The following is a complete list of the facilities available to users of DPNSS between two or more HiPath DX, Realitis DX or iSDX systems, using the standard descriptions:

- basic calls with CLI of calling/called ends
- data calls at up to 64kb/s (higher rates use external inverse multiplexers to set up Nx64kb/s)
- swap voice to data (transit only)
- call back when free
- call back when next used
- executive intrusion
- call diversion immediate, busy, ring no reply
- call hold
- three party working – enquiry, shuttle, transfer, conference
- call offer
- call waiting
- non-specified information (NSI proprietary codes)
- service independent strings
- bearer service selection
- route optimisation
- extension status call
- controlled diversion for operators
- redirection
- series calls
- three party take-over (transit only)
- night service
- centralised operator working
- traffic channel maintenance
- remote alarm reporting (NSI)
- add-on conference
- time synchronisation
- do not disturb
- remote registration/cancellation of diversion
- priority breakdown (also called take-over)

- call back messaging (transit only)
- loop avoidance
- forced release (transit only)
- text messaging (e.g. name information)
- charge reporting (transit only)
- network address extension (data call sub-addresses)
- call park
- call distribution (transit only)
- wait on busy (transit only)
- call pickup (NSI)
- travelling class of service (transit only)
- number presentation restriction (transit only)

In addition, many extra services are supplied to control the use of the following within a DX network:

- hot-desking
- keysystem
- manager/secretary
- 'home working'
- enhanced calling line identity
- integrated voice messaging
- integrated paging
- pick-up groups
- hunt and distribution groups
- communication groups
- remote PSTN/ISDN outgoing access
- call follow-me
- direct extension selection
- remote direct trunk selection (controlled usage)
- permanent calls
- alternative routing
- least cost routing

A 64kbit/s signalling channel allows messages to be passed between DX's relating to calls in progress or such items as alarm reporting, text messaging and feature requests. This enables DX features to be invoked across the network, i.e. the network is transparent to the user.

The same features/services can also be applied across analogue or low-speed digital routes, by the use of APNSS (analogue private network signalling system). This is logically the same as DPNSS, but its interface - the ALI or analogue link interface - contains an integrated modem for speeds of data up to 9.6kb/s. It can also be used for connection to an external 64kb/s digital trunk, or to one B channel in a digital primary rate link.

QSIG

Alongside continuing commitment to the support and further development of DPNSS, Siemens Communications is committed to the definition of the ETSI and ISO QSIG standards. It was able to provide an iSDX QSIG link for the British Rail Telecommunications (BRT) channel tunnel network between England and France, one of the first live implementations of QSIG. Siemens Communications is a leading member of both the IPNS forum of manufacturers for the promotion of QSIG and the ECMA, ETSI and ISO committees for its definition. A fully integrated version of QSIG for the DX was introduced at software release 6.1.201.

QSIG is based upon the public ISDN Q.931 standards and is the product of work done over the last six years by ECMA and published by ETSI in Europe. Siemens Communications has been a leading member of both the ECMA Committee for QSIG and also of the IPNS Forum. The ISO is now adopting the QSIG features as they are developed by ECMA.

Customers with DPNSS networks will be able to migrate to a QSIG network as the services available with QSIG develop. The rate of changeover will depend on the services required across the gateway with DPNSS and the availability of those services on the DX. QSIG basic calls are supported now and supplementary services will be considered for future software releases, starting with those which are most useful and which are defined by the ISO.

Private network interworking

HiPath DX/Realitis DX/iSDX interworking

DX 7.1 New World software is DPNSS network compatible with previous releases of DX software. However, the older the other DX software releases are in the same network, the less the latest networkable features can be fully used. Particular note should be taken of the following:

- DX 6.1 release of software introduced support for digit strings up to 30 digits in length. Previous releases only accept up to 18 digits. Truncation to 18 digits will occur with previous releases when a digit string of more than 18 digits is received
- The extension of the name text to 22 characters introduced at release 6.1 will not be effective if the terminating DX, is not also at release 6.1 or above. Previous releases will truncate the text to eight characters before displaying it at a telephone

QSIG is not available before release 6.1.201 and so there are no interworking issues within a DX network for QSIG.

QSIG will interwork with DPNSS or APNSS for all the QSIG services defined in this data sheet.

Interworking with other systems

The DX has proved itself to be the best networking PBX on the market by offering the features previously listed. Therefore, a total DX solution will always be the best networking solution. Many networks are however composed of a mixture of different PBXs using the open standard DPNSS and in such cases the DX has been extensively used.

Interworking has been proven with numerous other PBXs, including Nortel Meridian, Philips Sopho, Ericsson MD110, Mitel SX2000 and others from Avaya (SDX), Harris and Alcatel. Public network VPNs can also be interworked with DX using the DPNSS standard.

In all cases, the basic call is guaranteed to work, and a varying degree of supplementary facilities will also work, depending upon the level of implementation by the other systems.

Fig.2: The following is a list of the QSIG services supported by the DX at 6.1.201

| QSIG service name | ISO/IEC standard | ETSI standard | ECMA standard |
|---|------------------|-----------------|---------------|
| Basic call (64kb/s unrestricted, 3.1kHz audio and speech bearer services) | IS 11574/11572 | ETS 300 171/172 | ECMA 142/143 |
| Calling line identification presentation | IS 14136/11572 | ETS 300 173/172 | ECMA 148/143 |
| Connected line identification presentation | IS 14136/11572 | ETS 300 173/172 | ECMA 148/143 |
| Calling/connected line identification restriction | IS 14136/11572 | ETS 300 173/172 | ECMA 148/143 |
| Private network addressing | IS 11571 | ETS 300 189 | ECMA 155 |



Simple private interworking

This category includes all the analogue and digital variants of simple line signalling systems.

Analogue systems

- DC10 2 wire
- loop disconnect 2 wire
- AC13 2 wire
- AC signalling 2 wire and 4 wire, variants A,B,C (note AC15C is for long line extensions), CEPT L1, China #1
- DC5 2 wire and 4 wire, variants A and B (UK E and M type signalling)
- E & M 2 wire and 4 wire

MF4 (DTMF) tones can be configured for routing digits transmitted in both directions. Rotary pulse code routing digits are also available if required.

Digital systems

Channel associated signalling (CAS) is used within time slot 16 of a 30 channel digital line interface (DLI) card to represent the equivalent of analogue line signalling systems.

- DC5, variants A and B
- DC10A with variant SCDC inter-register signalling available, using MF4 tones, for the digit sending

Public networking

Interworking with the public network is available to the following specifications:

- BTNR 190 DASS2 signalling:
 - basic voice, data and 3.1kHz audio calls
 - originating/terminating line identity
 - call charge data
 - closed user groups
 - network address extension
 - incoming call barring
 - backward transmission path
- ISDN to ETSI ETS 300 standards (primary rate and basic rate):
 - basic voice, data and 3.1kHz audio calls
 - calling and connected line identity presentation and restriction
 - DDI
 - sub-addressing
 - malicious call trace
- ISDN to Australian standard TPH 1856
- digital R2, including variants for China, Finland, Oman, Australia
- DB2 for Holland
- earth calling analogue exchange trunks
- loop calling analogue exchange trunks

Subscriber's private metering (SPM) is optionally provided for the analogue earth calling/loop calling exchange trunks:

50Hz meter pulses in UK, 12kHz or 16kHz in other countries.

All the digital signalling types use the digital link interface card, except basic rate ISDN, which uses the basic rate interface card. Analogue exchange trunks use the trunk interface 1 card.

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• Publication no. 1QHA 50239 AAA-CAA

• Issue 06

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FS 261



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