Documentation

HiPath 4000 V5
IP Solutions, H323 Connectivity

Service Documentation

A31003-H3150-S104-2-7620

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Service Manual HiPath 4000 V5 - IP Solutions - SIP Connectivity - Contents

1 Overview

In addition to AMO BFDAT the used B channels have to be specified for the selected trunking protocol in AMO CGWB. There are two options for H323 trunking (AMO CGWB):

TRPRH323	native H323 trunking
TPRH323A	H323 trunking with H323 Annex M (CorNet NQ over H323), e.g. HiPath 3000, HiPath 4000, Xpressions IP

1.1 Features

- CLIP / CLIR / COLP / COLR
- Name Display
- Hold / Retrieve / Toggle
- Transfer (blind, unattended, attended)
- Call forwarding
- Callback on busy subscriber / Callback no reply
- Message waiting indication
- Route optimization
- HiPath 4000 as survivability media gateway
- Signaling and payload encryption (TLS / SRTP)
- T38

1.2 Boards Used

The common gateway board HG 3500 is used as of HiPath 4000 V4. For details, see „HiPath Gateways HG 3500 and HG 3575“, Chapter 4, “Supported Gateways”.

2 Payload Switching DMC

2.1 Feature Description

IMPORTANT: This document describes „Payload Switching DMC“ based on H323.
For SIP please refer to „SIP Connectivity“ > Chapter 3, “Direct Media Connect (DMC)”.

2.1.1 Overview

To support the Payload Switching feature, the Direct Media Connection **DMC** feature is used for Voice over IP (VoIP) connections in HiPath 4000.

Direct Media Connections DMC can be described and defined in the following way:

- The payload (voice channel) of a HiPath 4000 internal or networkwide voice connection will be exchanged within a LAN in which a direct IP connection is possible without conversion into a TDM data stream.

2.1.2 Features

By the use of the feature "DMC Any-to-any" payload data is transported within a HiPath 4000 network directly between the IP Endpoints without several IP-TDM conversions of the payload. This direct payload connection is called **Direct Media Connection (DMC).**

2.1.3 Motivation

If two HFA IP phones are connected in a two-party call without the Direct Media Connection DMC feature, a double IP/TDM conversion of the payload would be performed. This causes a loss of quality of the voice transmission which results from the multiple conversion of the payload between IP and TDM and vice versa (status of HiPath 4000 V1.0). To avoid this loss of quality the IP payload is exchanged directly between the two subscribers if both are in a two party connection. This example refers to HFA IP phones but the same situation applies also for other IP endpoints.

IP Endpoints can be:

- HFA IP phones (e.g. optiPoint 400/600 >V2.0, optiPoint 410, optiClients 130 > V2.5)
- IP Trunking Gateways (HG 3500 V4, HG1500)
- IPDA boards (HG 3500 V4, HG 3575 V4)

The IP endpoints can be the real endpoints of the connection (i.e. there is a Master Connection between two IP phones) or the IP endpoints are only endpoints of a section within the Master Connection. E.g. an anate or digite may also profit from a DMC if it is connected to its partner via IPDA Access Point or IP Trunking Gateway.

The setup of a call is done within several steps.

Steps 1 and 2 are the normal call setup procedures as known in HiPath 4000 V1.0. The result is called Master Connection. The normal call setup procedure is extended by steps 3 and 4 to build the optional Direct Media connection.

1. In a first step, a signaling connection between the users is established.
2. Parallel to that signaling connection a so called Master Connection (MC) for the payload is established. The payload path of the Master Connection may be segmented into TDM and IP paths:
   - within a TDM network this is a specific B channel
   - within an IP network, this is a RTP connection.

   The RTP payload connection is established and controlled by H.323 procedures (in particular by the use of the fast connect procedure).
3. After the Master Connection between the users is established and connected, i.e. both users are in the talk state, a DMC connection between the IP endpoints of the Master Connection can be established. The called IP endpoint initiates the setup of the DMC connection.
4. When the DMC connection is established, the payload is transported using this H.323 connection. However, the Master Connection exists in parallel, but without conveying payload as long as the DMC connection exists (the Master Connection is on a "stand-by" mode).

   If the talk-state is released (e.g. for the setup of a consultation call) the IP endpoint switchs back immediately to the Master Connection and releases the DMC connection.

2.1.4 Notes concerning Direct Media Connections DMC

- The Direct Media Connection will be switched in the two-party call state, that means in the **basic call** and the simple **consultation call.** A DMC will also be switched if the call is set up via a feature like call forwarding or picking up a group call or if a secondary line answers a keyset call. A DMC is also switched for **conference calls**.
- If the involved parties aren‘t in a two party connection the IP/TDM conversion and the switching via the TDM switching network (MTS) is executed.
- If a Direct Media Connection is established the connection path via the MTS switching network for multiple IP/TDM conversion (Master Connection) has to stay switched in parallel to the direct IP connection so that immediately after termination of the two party call state the MTS with its capabilities for tones and conferenceing is available for any feature control by call processing.
- DMCs are established also for Fax/Modem connections.

2.1.5 Bandwidth Considerations

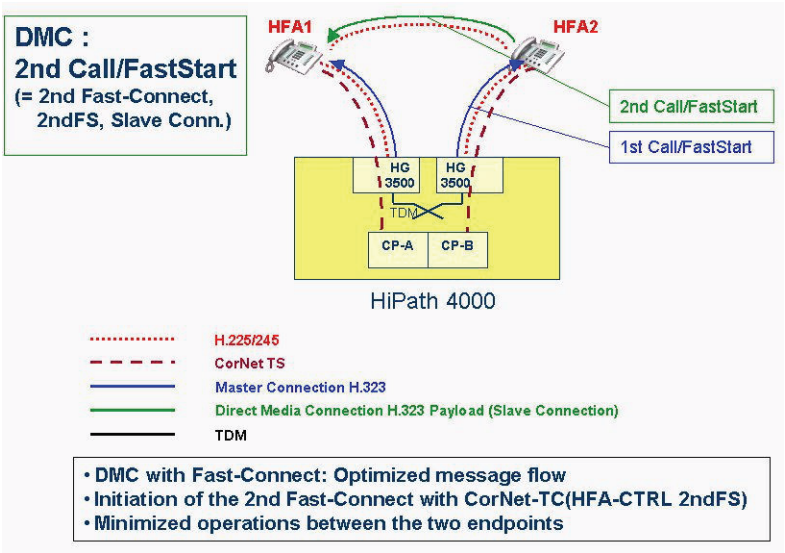
While a DMC is active only SID frames (idle frames) are sent on the master connection. Therefore this master connection needs only a reduced bandwidth.

You can find the tables for bandwidth in the document “HiPath Gateways HG 35000 and HG 3575”, Section 3.5.4, “Required Bandwidth per Connection”.

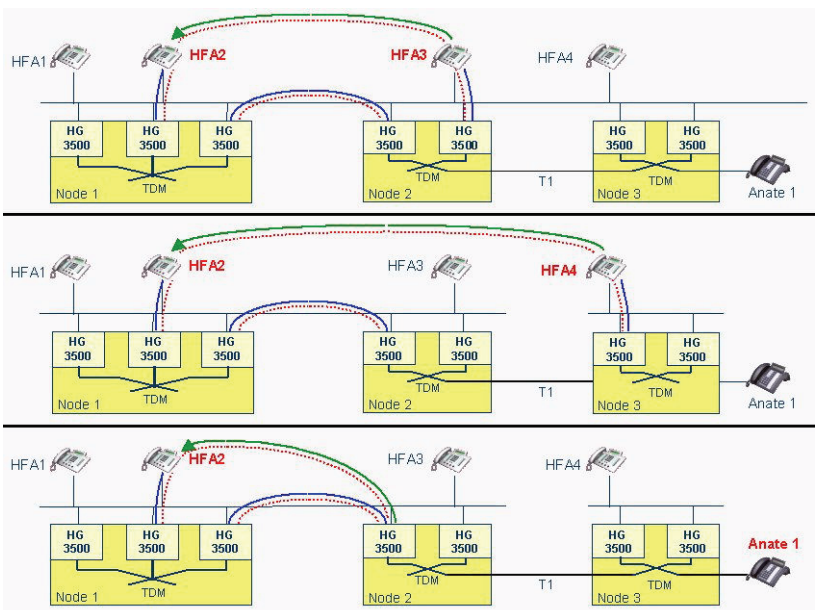
2.1.6 Scenarios

The following scenarios are being considered:

Scenario A: Direct Media Connection DMC within a single HiPath 4000 node.

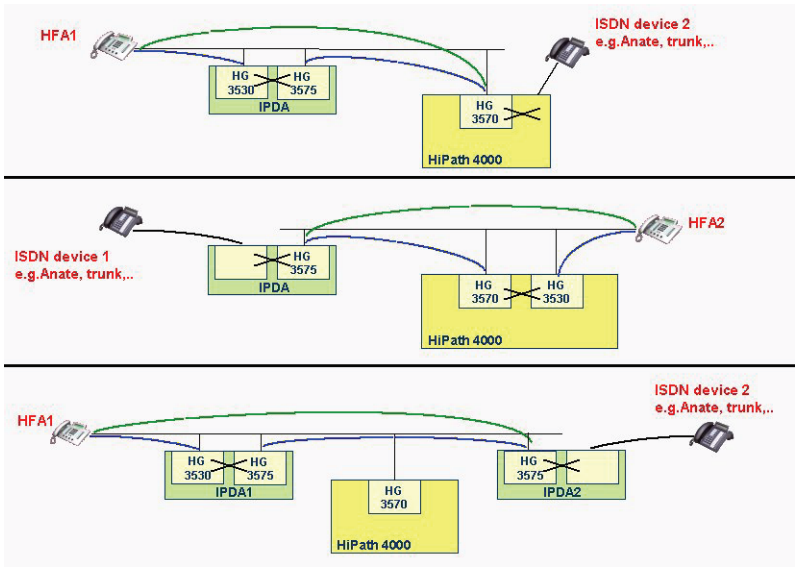


Scenario B: Direct Media Connection DMC between HFA IP phones within a HiPath 4000 network.

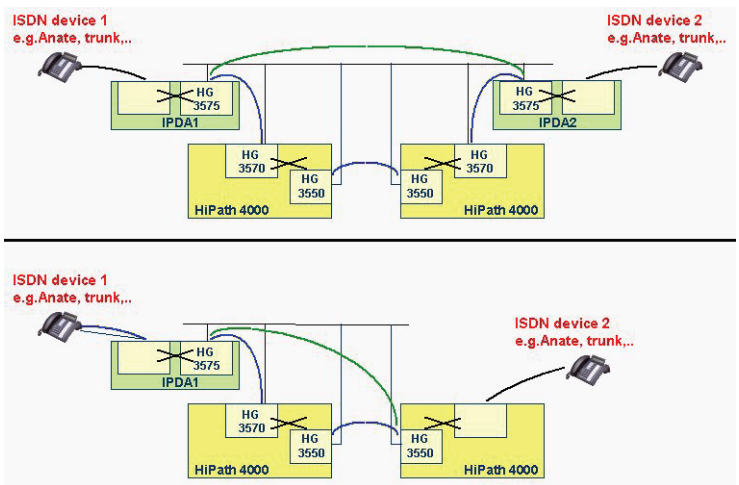


This scenario B is supported in HiPath 4000 in conjunction with the IP Gateway HG 3500 V4.

Scenario C: Direct Media Connections DMC between HFA IP phone and IPDA shelf within a single HiPath 4000 node.

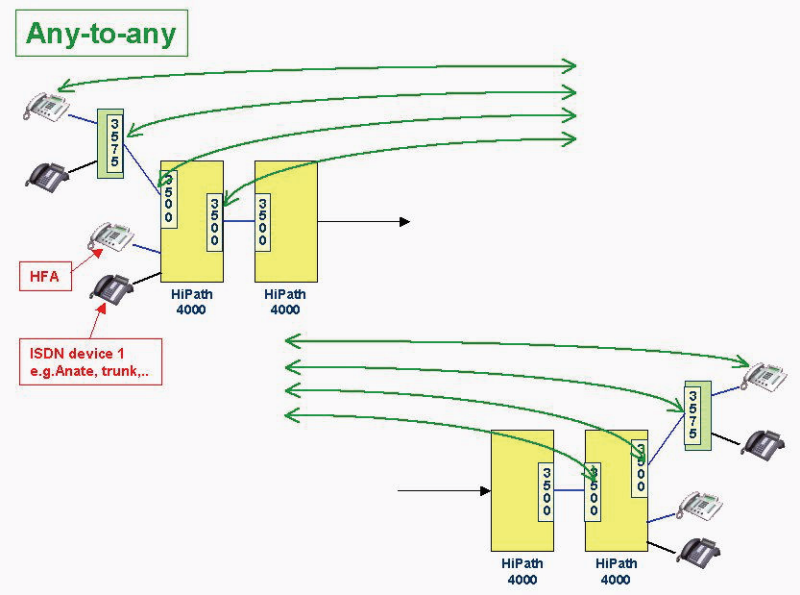


Scenario D: Direct Media Connections DMC between netwide IPDA-shelves.



DMC in mixed scenarios

In mixed scenarios the DMC is executed in the 2 party call state between the first possible IP address at the A-side (IP phone or HG 3575 or HG 3500 (FUNCTION=HG3570) or HG 3500 (FUNCTION=HG3550)) and the last possible IP address at the B-side (i.e. again HG 3500 (FUNCTION=HG3550) or HG 3500 (FUNCTION=HG3570) or HG 3575 or IP phone).

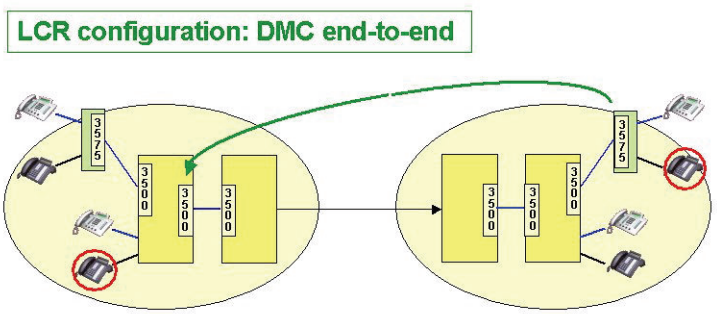


2.1.7 Domain concept

In very large enterprise networks it may be necessary to subdivide the network into several socalled domains. Depending on the configuration DMC connections may be allowed only within these domains or end-to-end over several domains.

Example 1: DMC possible from domain A until domain B:

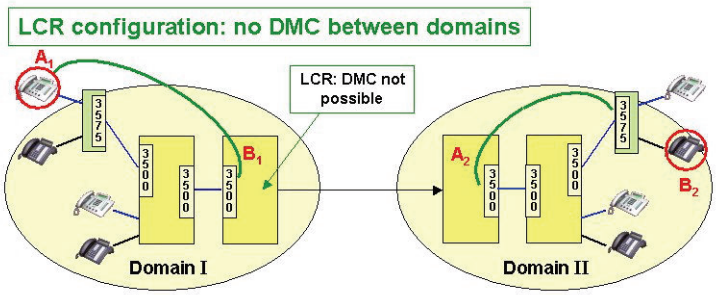
Note: for this scenario no special configuration is needed (default)



Example 2: DMC not possible from domain A to domain B, DMC only possible within domains A and B:

In this case both ends of the link between the domains have to be marked as domain end.

This is done with an attribute within LCR (see chapter Generation). This attribute has to be set in domain I for the LCR route leading to domain II, and in domain II for the LCR route leading to domain I.



2.1.8 DMC Interworking to HiPath 3000/5000

Supported scenarios:

Scenario 1: HG 3500 terminates the HiPath 3000 payload switching

This scenario applies to two cases:

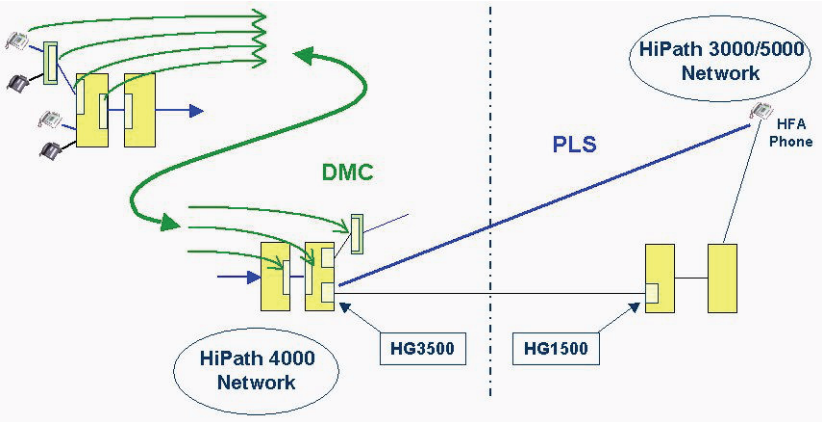
- the endpoint in the HiPath 4000 network is a TDM device or
- DMC interworking between HiPath 4000 and HiPath 3000/5000 is not allowed (this scenario can be achieved by setting the LCR domain end attribute in the HiPath 4000 for the route leading to the HiPath 3000/5000 network).

In the first case the end-to-end connection consists of a TDM connection on the HiPath 4000 side and an IP connection between the HG 3500 and the IP endpoint on the HiPath 3000/5000 side.

In the second case the connection between the endpoint in the HiPath 4000 network and the endpoint in the HiPath 3000/5000 network consists of

- a DMC part in the HiPath 4000 network and
- Payload Switching (PLS) in the HiPath 3000/5000 network, i.e. the PLS is terminated by the HG 3500 on the HiPath 4000 side.

This second case is shown in the following picture:

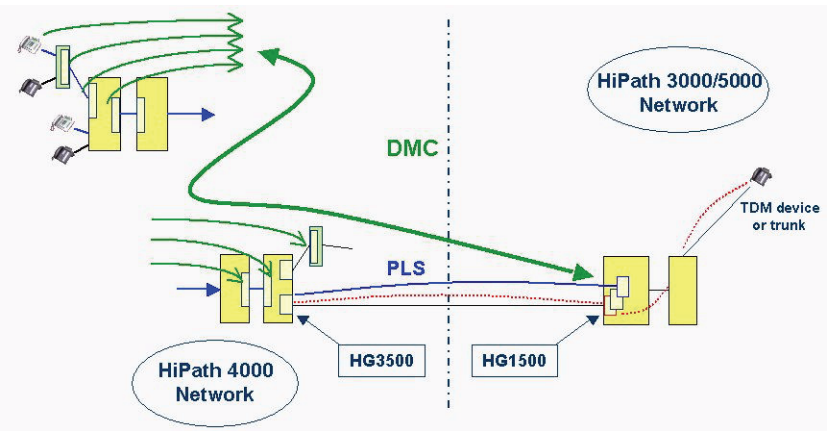


- DMC within HiPath 4000 network:
  From the 1st possible A-side IP adress to 1st possible B-side IP adress. Signaling of A- and B-IP address takes place via CorNet-NQ (SETUP/ CONNECT-messages)
- PLS (Payload Switching) within HiPath 3000/5000 network:
  The IP-Gateway HG 3500 serves as Payload Switching HFA Proxy of HiPath 3000/5000.

Scenario 2: HG 1500 terminates HiPath 4000 Direct-Media-Connection

DMC to HG1500 in HiPath 3000/5000

When interworking between HiPath 4000 and HiPath 3000/5000 is allowed and the endpoint in the HiPath 3000/5000 network is a TDM device the HG1500 terminates the DMC.

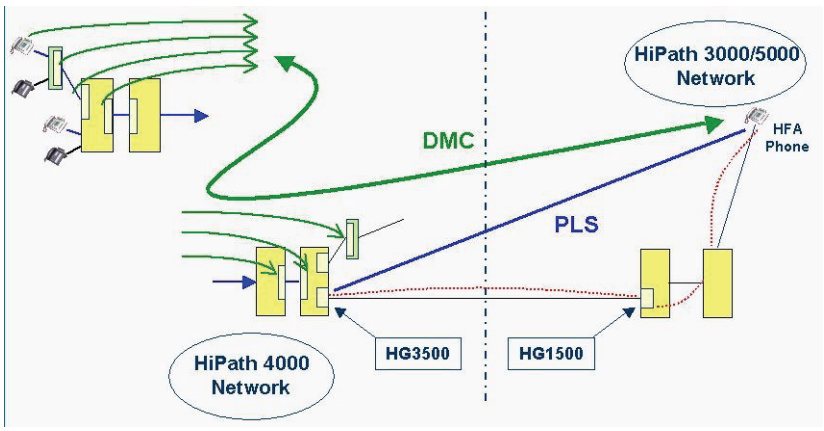


RTP stream between the HiPath 3000/5000 HG1500 and the HiPath 4000 HG 3500 belongs to the master-connection.

Scenario 3: Direct-Media-Connection between HFA IP phones end-to-end

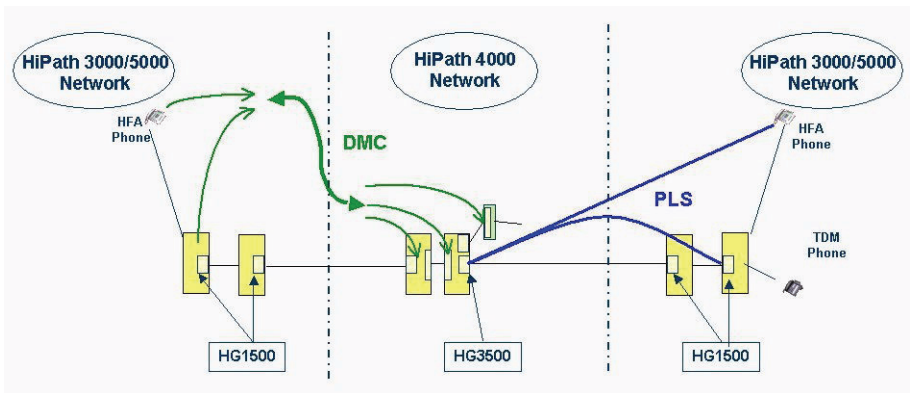
DMC to HFA Phone in HiPath 3000/5000

When interworking between HiPath 4000 and HiPath 3000/5000 is allowed and the endpoint in the HiPath 3000/5000 network is a HFA phone a DMC can be established end-to-end.



RTP stream between the HiPath 3000/5000 HFA phone and HG 3500 belongs to the master-connection.

Scenario 4: HiPath 4000 as transit node between two HiPath 3000/5000 nodes



In this case, no end-to-end DMC connection can be set up between the HiPath 3000 IP devices (IP phones or HG1500). On the A side, a DMC is established to the most distant HiPath 4000 DMC endpoint (HG 3500 (FUNCTION=HG3550 or HG3570) or HG3575). This DMC overlies a HiPath 3000 PLS connection (not depicted in the figure) and the IP parts of the HiPath 4000 network.

If the HiPath 4000 network has no IP parts, the DMC connection is omitted and the payload is transmitted on the PLS connection. This applies if, instead of a HiPath network or an IPDA configuration, an individual HiPath 4000 connected on both sides with HiPath 3000 systems or networks is involved. So a DMC connection on the A side only exists if an optimization is necessary.

On the B side, a payload switching connection is established.

So it always involves a connection with 2 IP hops.

2.2 Service Information

2.2.1 Devices supporting DMC

The DMC feature is supported by the following IP devices:

- Phone/client:

IP Phone types and DMC	DMC support
optiPoint IP adapter	-
optiPoint 400 V1.0	-
optiPoint 600 V1.0	-
optiClient 130 V2.5	-
optiPoint 400 >V2.0	+
optiPoint 600 >V2.0	+
optiClient 130 > V2.5	+
optiPoint 410/420	+
OpenStage 20/40/60/80 and OpenStage 20 G/40 G/60 G/80 G	+
AC Win IP	+

- Boards:

  DMC is supported for STMI2 (HG 3550, HG 3570), STMI4 (HG 3500) and NCUI2+/4 (HG 3575).

DMC connections with an IPDA board or IP trunking gateway as originating or terminating endpoint will exist, if the endpoint of the basic connection at the IPDA shelf is an Anate, a Digite (optiset E, optiPoint 500, etc.), a CMI Cordless phone or an analog or digital trunk, but not for attendant console.

2.2.2 Features with DMC

The following list shows for which features a DMC is established:

- Basic call
- Basic call with reroute internal
- Basic call with rerouting (NW)
- Consultation call (including toggle, end of consultation (back to held party))
- Transfer talking with or without Path Replacement
- Transfer ringing with or without Path Replacement
- Immediate recall
- Centralized attendant transfer
- CFU, CFNR with forwardswitching or with rerouting or mixed (rerouting in transit switch)
- Call back (message waiting, busy, no reply)
- Pickup of a call in a pickup group
- Directed call pickup
- Call to Hunt group
- Application establishes call (ACL make call)
- ACD call
- Reduction of conference to 2-party call
- Call to Keyset (secondary line answers the call)
- executive/secretary (CHESE) (secretary answers the call)

2.2.3 Feature activation while DMC is active

When a DMC is active for a two party call and a feature is being activated the DMC is released and the call is switched back to the master connection.

This applies for features that are activated by one of the involved parties and also for features activated by a third party (e.g. campon, override).

When the feature is finished and the call returns to the normal two party talk state the DMC is not reactivated except for the features that are listed in the chapter above.

Feature response in exception situations:

- DTMF Handling

  A DMC is released if the endpoint requests the sending of DTMF via SIU (signalling unit). E.g. a HFA phone requests the sending of DTMF via access code.

- DTMF transmission over DMC

  DTMF tones are recognized in DMCs and transmitted, e.g. if the tone is received by the HiPath system at a CO interface or a DTMF enabled anate sends DTMF by itself.

2.3 Generation

2.3.1 DMC authorization

Possible IP endpoints have to be allowed to switch a DMC.This is done with the following AMO commands:

- IP phones:

  ```
  CHANGE-SDAT:STNO=<extension
  number>,TYPE=ATTRIBUT,AATTR=DMCALLWD;
  ```

- NCUI:

  ```
  CHANGE-STMIB:MTYPE=NCUI2,LTU=xx,TYPE=DMCDATA,DMCALLWD=YES;
  ```

- STMI pool for IPDA:

  ```
  CHANGE-SIPCO:TYPE=DMCDATA,DMCALLWD=YES;
  ```

- IP trunking:

  ```
  CHANGE-TDCSU:PEN=<ltg-ltu-slot-cct),DEV=HG3550IP,DMCALLWD=Y;
  ```

2.3.2 Maximum number of DMC connections on IP boards

Please refer to „HiPath Gateways HG 35000 and HG 3575“, Section 3.6, “B Channels”.

AMO commands:

- NCUI:

  ```
  CHANGE-STMIB:MTYPE=NCUI2,LTU=xx,TYPE=DMCDATA,DMCCONN=<number
  of allowed DMC connections>;
  ```

- STMI - IP trunking:

  ```
  CHANGE-CGWB:MTYPE=CGW,LTU=xx,TYPE=DMCDATA,DMCCONN=<number of
  allowed DMC connections>;
  ```

2.3.3 Voice Activity Detection (VAD)

In order to save bandwidth Voice Activity Detection (VAD) has to be activated for IP connections. When a DMC is established and VAD is set only idle frames are sent on the master connection.

VAD is activated with the following AMO commands:

- Station:

  ```
  CHANGE-SDAT:STNO=<ext.
  number>,TYPE=DATA1,CLASSMRK=VAD&EC&G711&G729OPT;
  ```

- Digital trunks:

  ```
  CHANGE-TDCSU:PEN=<ltg-ltu-slot-
  cct),CLASSMRK=VAD&EC&G711&G729OPT;
  ```

- Analog trunks:

  ```
  CHANGE-TACSU:PEN=<ltg-ltu-slot-
  cct),CLASSMRK=VAD&EC&G711&G729OPT;
  ```

- IP trunking:

  VAD has to be activated on the board with the board configuration tool.

- HFA: VAD must be activated at both ends of the HFA master connection.

  For IP phones (where available), that can be done in the IP phone's configuration menu.

  For HG 3500:

  ```
  CHANGE-CGWB:MTYPE=CGW,LTU=x,SLOT=xx,TYPE=ASC,VAD=YES;
  ```

2.3.4 Domains

It may be necessary to subdivide a very large enterprise network into several areas (domains) where DMC is only possible within a domain and not between domains.

In order to achieve this an LCR mark has to be set at each domain end. When this mark is set DMCs are not established beyond this point.

AMO command:

```
CHANGE-LDAT:LROUTE=<route number>,LATTR=<existing
attributes>&DMCEND;
```

2.3.5 H.323 stack on IPDA boards

The H.323 stack on IPDA boards has to be configured using the following AMO commands:

- NCUI:

  ```
  CHANGE-STMIB:MTYPE=NCUI2,TYPE=H323,GWNAME=<string>;
  ```

- STMI:

  These settings are not possible via AMO at the moment. Please use WBM of the board.

  For the correct numerical values please refer to the configuration manual for IPDA boards.

In addition, the codecs used for the DMC must be configured (Master Connection codecs see AMO SDAT / AMO TACSU / AMO TDCSU).

- NCUI:

  ```
  CHANGE-
  STMIB:MTYPE=NCUI2,LTU=xx,TYPE=ASC,PRIO=PRIO1,CODEC=G729;
  ```

  ```
  CHANGE-
  STMIB:MTYPE=NCUI2,LTU=xx,TYPE=ASC,PRIO=PRIO2,CODEC=G711;
  ```

- STMI:

  ```
  CHANGE-
  CGWB:MTYPE=CGW,LTU=xx,SLOT=xx,TYPE=ASC,PRIO=PRIO1,CODEC=G729;
  ```

  ```
  CHANGE-
  CGWB:MTYPE=CGW,LTU=xx,SLOT=xx,TYPE=ASC,PRIO=PRIO2,CODEC=G711;
  ```

  WBM > Explorers > Voice Gateway > Codec Parameters

2.4 Relevant AMOs

AMO	Parameter	Sprache/ Language	Beschreibung/ Description
CGWB	MTYP=CGW	d	Konfiguration von HG 3500
	MTYPE=CGW	e	Configuration of HG 3500
	TYP=DMCDATA	d	DMC-spezifische Daten konfigurieren
	TYPE=DMCDATA	e	Configure DMC specific data
	DMCCONN	d	Anzahl der DMC-Verbindungen

AMO	Parameter	Sprache/ Language	Beschreibung/ Description
	DMCCONN	e	Number of DMC connections
	TYP=ASC,VAD=J/N	d	VAD in Senderichtung erlaubt / nicht erlaubt,Wert=JA / NEIN
	TYPE=ASC,VAD=Y/N	e	VAD enabled / not enabled in send direction, value = YES / NO
LDAT	LATTR	d	LCR Attribut, neuer Wert: DMCENDE = Ende der DMC Domaine
	LATTR	e	LCR attribute, new value: DMCEND = end of DMC domain
SDAT	EMERK & AMERK	d	Teilnehmermerkmal, Wert: DMCERL = DMC erlaubt
	AATTR & DATTR	e	subscriber attribute, value: DMCALLWD = DMC allowed
	CLASSMRK	d	Classmark, Wert VAD = Voice Activity Detection
	CLASSMRK	e	Classmark, value VAD = Voice Activity Detection
SIPCO	TYP	d	Datentyp (Verzweigungsparameter), Wert: DMCDATA
	TYPE	e	type of data (branching parameter), value: DMCDATA
	DMCERL	d	DMC erlaubt, Wert = JA/NEIN
	DMCALLWD	e	DMC allowed, value = YES/NO
STMIB	MTYP=NCUI2	d	Konfiguration der HG 3575
	MTYPE=NCUI2	e	Configuration of HG 3575
	TYP=DMCDATA	d	DMC-spezifische Daten konfigurieren
	TYPE=DMCDATA	e	Configure DMC specific data
	DMCERL	d	DMC erlaubt, Wert = JA/NEIN
	DMCALLWD	e	DMC allowed, value = YES/NO
	DMCCONN	d	Anzahl der DMC-Verbindungen
	DMCCONN	e	Number of DMC connections
TDCSU	GER=HG3550IP	d	Integriertes IP-Gateway HG 3500
	DEV=HG3550IP	e	Integrated IP Gateway HG 3500
	DMCERL	d	DMC erlaubt, Wert = JA/NEIN
	DMCALLWD	e	DMC allowed, value = YES/NO
	CLASSMRK	d	Classmarks für IP Verbindungen, Wert VAD = Voice Activity Detection
	CLASSMRK	e	classmarks for IP connections, value VAD = Voice Activity Detection

AMO	Parameter	Sprache/ Language	Beschreibung/ Description
TACSU	CLASSMRK	d	Classmarks für IP Verbindungen, Wert VAD = Voice Activity Detection
	CLASSMRK	e	classmarks for IP connections, value VAD = Voice Activity Detection

3 Configuration Example

3.1 Configuration using AMOs

3.1.1 Trunking Protocol

The same protocols must always be set in the AMO CGWB and AMO GKREG.

AMO CGWB	AMO GKREG	Protocol
TRPRH323	H323	native H323
TPRH323A	H323ANN	H323 Annex

Table 1 Protocols in AMO CGWB and AMO GKREG

If H323 Annex is set in the AMO CGWB/AMO GKREG, this protocol is only used if it was also set in the peer or if the peer can use this protocol.

3.1.2 Configuring an HG 3500 as a Local Gateway

The following diagram shows a HG 3500 scenario for a fictitious customer in Frankfurt. It shows node 10-69-100 (Frankfurt-Bockenheim) and node 10-69-200 (Frankfurt-Sachsenhausen). Both systems have a common gateway board that should be configured as HG 3500. LEGK should be active on both systems (two local gateways). This constellation is relatively easy to explain because both nodes can be configured more or less symmetrically. The figure shows all necessary parameters. Node 10-69-100 is located in IP network 1.69.11.0/24 and node 10-69-200 is located in IP network 1.69.21.0/24. The networks reach each other over the routers R_a and R_b.

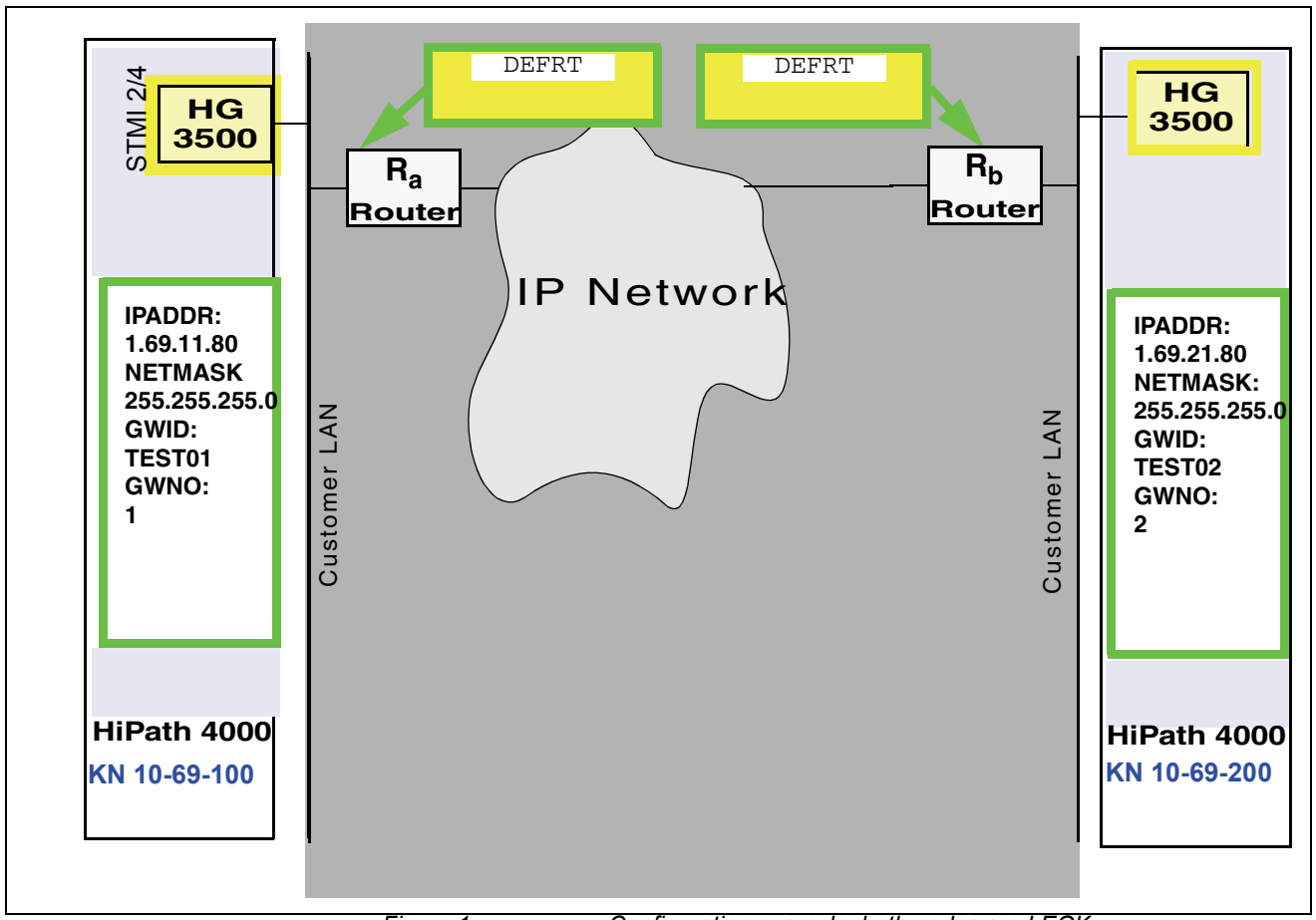


Figure 1 Configuration example: both nodes are LEGK

3.1.2.1 Configuration in Node 10-69-100

Start by configuring the board as HG 3500 in node 100. To avoid repeated restarts, do not insert the board until configuration is complete.

Step 0:

Configure LEGK in node 10-69-100.

```
CHANGE-ZANDE:TYPE=ALLDATA,GATEKPR=YES;
```

Step 1:

The Common Gateway Board Q2316-X is configured as HG 3500. Q2316-X is the version with 60 B channels. You can configure the board as a pure IP trunking board or in mixed operation with IP trunking and LAN connectivity (WAML) and many other features.

Configuration of the board for IP trunking only:

```
ADD-BFDAT:FCTBLK=1,FUNCTION=HG3550,BRDBCHL=BCHAN60&BCHAN120;
```

```
CHANGE-
BFDAT:CONFIG=CONT,FCTBLK=1,FUNCTION=HG3550,LINECNT=1,UNITS=3; /*
30 B channels for HG3550 functionality (H323 trunking, SIP
trunking, SIP subscriber)

CHANGE-BFDAT:CONFIG=OK,FCTBLK=1,ANSW=YES; /* Close the
configuration

ADD-BCSU:TYPE=IPGW,LTG=1,LTU=1,SLOT=37,PARTNO="Q2316-X
",FCTID=1,LWVAR="0",FCTBLK=1,BCHAN3550=30,ALARMNO=0;
```

or

IP Trunking & WAML:

```
ADD-
BFDAT:FCTBLK=1,FUNCTION=HG3550&WAML,BRDBCHL=BCHAN60&BCHAN120;

CHANGE-
BFDAT:CONFIG=CONT,FCTBLK=1,FUNCTION=HG3550,LINECNT=1,UNITS=3; /*
30 B channels for HG3550 functionality (IP trunking, SIP
trunking, SIP subscriber)

CHANGE-BFDAT:CONFIG=CONT,FCTBLK=1,FUNCTION=WAML,UNITS,LINECNT=1;
/* Board will be configured with one circuit, i.e. 10 B channels
for WAML

CHANGE-BFDAT:CONFIG=OK,FCTBLK=1,ANSW=YES; /* Close the
configuration

ADD-BCSU:TYPE=IPGW,LN=1,LTU=1,SLOT=37,PARTNO="Q2316-X
",FCTID=1,LWVAR="0",FCTBLK=1,BCHL3550=30,BCHLWAML=10,ALARMNO=0;
```

Step 2:

The AMO CGWB allows the board to receive the IP address in the customer LAN (LAN1), the subnet mask and the protocol variants (H323A / SIP-Q / NONE (board is only configured for SIP subscribers).

IMPORTANT: Only one trunking protocol may be configured for each board! There are no restrictions on interworking with other functions!

```
ADD-
CGWB:LTU=1,SLOT=37,SMODE=NORMAL,IPADDR=1.69.11.80,NETMASK=255.25
5.255.0,TPRH323A=10;/*10 B channels for H323A trunking
```

or

```
ADD-
CGWB:LTU=1,SLOT=37,SMODE=NORMAL,IPADDR=1.69.11.80,NETMASK=255.25
5.255.0,TRPRH323=10;/*10 B channels for H323 trunking
```

=> 20 B channels remain for other functions

Step 3:

The default router is now set in the customer LAN:

```
CHANGE-
CGWB:MTYPE=CGW,LTU=1,SLOT=37,TYPE=GLOBIF,DEFRT=1.69.11.254;
```

Step 4:

The HG 3500 requires an ID that is unique in the network. This is the parameter **GWID** in AMO CGWB:

```
CHANGE-CGWB:MTYPE=CGW,LTU=1,SLOT=37,TYPE=GWDATA,GWID1="TEST01";
```

GWID1 and **GWID2** together form a contiguous value consisting of 128 characters.**Entries are case-sensitive.**

Step 5:

The HG 3500 boards are administered using one gateway number (**GWNO**). This number must also be unique.

```
CHANGE-CGWB:MTYPE=CGW,LTU=1,SLOT=37,TYPE=LEGKDATA,GWNO=1;
```

Step 6:

IMPORTANT: Multiple boards are permitted in one trunk group!

This step consists of several configuration commands. We need to set up the trunk group and circuit, via which the B channels between gateway and HiPath 4000 are switched.

First you need a trunk group:

```
ADD-BUEND:TGRP=50,NAME="IP TRUNK GWID 1   ",NO=30;
```

A digital trunk is then required (AMO TDCSU). The device type is **HG3550IP** (for H323/H323A and native SIP/SIP-Q trunking). If you want to permit DMC, set **DMCALLWD=Y**. This is only possible when the partner systen supports DMC. The <number> in the parameter **LWPAR** must identify the trunk as MASTER.

```
ADD-TDCSU:OPT=NEW,PEN=1-01-037-0,COTNO=36,COPNO=32,DPLN=0,ITR=0,
COS=2,LCOSV=1,LCOSD=1,CCT="CIRCUIT from
GW2",PROTVAR="ECMAV2",SEGMENT=8,
ISDNIP=00,ISDNNP=0,TRACOUNT=31,SATCOUNT=MANY,NNO=1-69-
1499,ALARMNO=12, COTX=36,CCHDL=SIDEA,CLASSMRK=EC&G711,TCCID="IP
RS",TGRP=50,SRCHMODE=DSC,
INS=Y,DEV=HG3550IP,BCHANNEL=1&&30,BCNEG=N,BCGR=1,LWPAR=0,DMCALLW
D=YES;
```

If DMC has been activated for a H323/H323A trunking path, Voice Activity Detection should also be activated. Otherwise the same bandwidth is required for the master connection as for the slave connection!

```
CHA-
CGWB:MTYP=CGW,LTU=<ltu>,SLOT=<slot>,TYP=ASC,PRIO=PRIO1,VAD=YES;
```

Otherwise the same bandwidth is required for the master connection as for the slave connection.

IMPORTANT: It is recommended to reset the board:
`RESET-BSSU:ADDRTYPE=PEN,LTG=1,LTU=1,SLOT=37;`

IMPORTANT: The command CHANGE-FUNSU can prevent the complete reloading of the STMI board.
Reloading is only necessary in the case of loadware changes.
`CHANGE-FUNSU:PIT=FLASH,PARTNO="Q2316-X ",FCTID=2,ACTION=RESET;`

Step 7:

The LEGK must now still be informed about the existence of the HG 3500 gateway in the AMO GKREG. The **GWNO** must match the entry from the AMO CGWB. In the case of a local gateway, the AMO GKREG automatically loads the IP address (**IPADR**) from the AMO CGWB. You must also set the attributes **INTGW** (internal -local- gateway) and **HG3550V2** (version ID). The parameter **REGGW** is not necessary because the gateway does not have to register at another gateway.

`ADD-GKREG:`**`GWNO=1`**`,GWATTR=`**`INTGW`**`&HG3550V2&`**`H323ANN or H323`**`,DIPLNUM=0,DPLN=0,LAUTH=1;`

If a local gateway is configured, **REGISTERED=NO** is always displayed with `DISPLAY-GKREG;`.

Now the HG 3500 board in node 10-60-100 is configured properly and is communicating with the LEGK. However, the gateway is still missing in the partner node.

3.1.2.2 Configuration in Node 10-69-200

An LEGK should also be active in node 10-69-200. As the configuration procedures for nodes 10-69-200 and 10-69-100 are identical, this section only lists the appropriate AMO commands for the steps described above.

Step 0:

`CHANGE-ZANDE:TYPE=ALLDATA,`**`GATEKPR=YES`**`;`

Step 1:

`ADD-BFDAT:FCTBLK=1,FUNCTION=HG3550,BRDBCHL=BCHAN60&BCHAN120;`

```
CHANGE-
BFDAT:CONFIG=CONT,FCTBLK=1,FUNCTION=HG3550,LINECNT=1,UNITS=3;
CHANGE-
```

```
BFDAT:CONFIG=CONT,FCTBLK=1,FUNCTION=HG3550,LINECNT=1,UNITS=3; /*
30 B channels for HG3550 functionality (IP trunking, SIP
trunking, SIP subscriber)

CHANGE-BFDAT:CONFIG=OK,FCTBLK=1,ANSW=YES; /* Close the
configuration

ADD-BCSU:TYPE=IPGW,LN=1,LTU=2,SLOT=49,PARTNO="Q2316-X
",FCTID=1,LWVAR="0",FCTBLK=1,BCHAN3550=30,ALARMNO=0;
```

Step 2:

```
ADD-
CGWB:LTU=2,SLOT=49,SMODE=NORMAL,IPADDR=1.69.21.80,NETMASK=255.25
5.255.0, TPRH323A=10;
```

or

```
ADD-
CGWB:LTU=2,SLOT=49,SMODE=NORMAL,IPADDR=1.69.21.80,NETMASK=255.25
5.255.0, TRPRH323=10;
```

Step 3:

```
CHANGE-
CGWB:MTYPE=CGW,LTU=2,SLOT=49,TYPE=GLOBIF,DEFRT=1.69.21.254;
```

Step 4:

```
CHANGE-CGWB:MTYPE=CGW,LTU=2,SLOT=49,TYPE=GWDATA,GWID1="TEST02";
```

Step 5:

```
CHANGE-CGWB:MTYPE=CGW,LTU=2,SLOT=49,TYPE=LEGKDATA,GWNO=2;
```

Step 6:

```
ADD-BUEND:TGRP=50,NAME="IP TRUNK GWID 2   ",NO=30;

ADD-TDCSU:OPT=NEW,PEN=1-02-049-0,COTNO=36,COPNO=32,DPLN=0,ITR=0,
COS=2,LCOSV=1,LCOSD=1,CCT="CIRCUIT from
GW2",PROTVAR="ECMAV2",SEGMENT=8,
ISDNIP=00,ISDNNP=0,TRACOUNT=31,SATCOUNT=MANY,NNO=1-69-
1499,ALARMNO=12,COTX=36,CCHDL=SIDEA,CLASSMRK=EC&G711,TCCID="IP
RS",TGRP=50,SRCHMODE=DSC,
INS=Y,DEV=HG3550IP,BCHANNEL=1&&30,BCNEG=N,BCGR=1,LWPAR=0(=Master
),DMCALLWD=YES;

CHA-
CGWB:MTYP=CGW,LTU=<ltu>,SLOT=<slot>,TYP=ASC,PRIO=PRIO1,VAD=YES;
```

Step 7:

The GKREG contains the configuration for **both** HG 3500 boards. Here, **GWNO=2** is now the local gateway in node 10-69-200 with the attributes **INTGW** and **HG3550V2** (for H323/H323A and native SIP/SIP-Q) while **GWNO=1** (the partner gateway in node 10-69-100) contains the attributes **EXTGW**, **HG3550V2** and **H323/H323A** in this system. The IP address and the **GWDIRNO** must be specified for the external gateway because the associated AMO CGWB is configured in the partner system. The parameter **REGGW** is not necessary because the gateway does not have to register at another gateway.

```
ADD-GKREG:GWNO=1,GWATTR=EXTGW&HG3550V2&H323ANN or
H323,GWIPADDR=1.69.11.80,DIPLNUM=0,DPLN=0,LAUTH=1;

ADD-GKREG:GWNO=2,GWATTR=INTGW&HG3550V2&H323ANN or
H323,DIPLNUM=0,DPLN=0,LAUTH=1;
```

3.1.2.3 Extension in Node 10-69-100

The HG 3500 in node 10-69-200 must be retrofitted in node 10-69-100 for LEGK (AMO GKREG). For node 10-69-100, this HG 3500 (**GWNO=2**) is an external gateway (attributes **EXTGW&HG3550V2&H323ANN or H323**) and is not registered in node 10-69-100.

```
ADD-GKREG:GWNO=2,GWATTR=EXTGW&HG3550V2&H323ANN or
H323,GWIPADDR=1.69.21.80, DIPLNUM=0,DPLN=0,LAUTH=1;
```

Node 10-69-100

Now `DIS-GKREG;` should display in node 10-69-100:

- **GWNO=1** is registered and
- **GWNO=2** is not registered.

Node 10-69-200

Now `DIS-GKREG;` should display in node 10-69-200:

- **GWNO=1** is not registered and
- **GWNO=2** is registered.

3.1.2.4 Call from Node 10-69-100 to Node 10-69-200

LCR should now be configured for node 10-69-100 in our example so that a station using open numbering (**UNKNOWN**) in this node can reach a station in node 10-69-200 over the IP trunk. Closed numbering or ISDN numbering plans are also supported and configured in the same way.

A station in node 10-69-100 reaches node 10-69-200 over the tie number 902.

```
ADD-WABE:CD=902,DAR=TIE;
```

LRTE 520 should route to node 10-69-200 and use trunk group 50 (see above):

```
ADD-RICHT:MODE=LRTENEW,LRTE=520,LSVC=ALL,NAME="IP TO KN 69
200",TGRP=50,DNNO=1-69-499;
```

The following is a simple outdial rule:

```
ADD-LODR:ODR=520,CMD=ECHO,FIELD=2;
ADD-LODR:ODR=520,CMD=END;
ADD-LODR:ODR=520,INFO="TIE TO GW2";
```

Enter **GW1=2-0** in LRTE 520 now. The **2** refers to the parameter **GWNO** in AMO GKREG (section Section 3.1.2.3, “Extension in Node 10-69-100”). In AMO GKREG for node 10-69-100, the HG 3500 with **GWNO=2** is the IP address 1.69.21.80. The **0** stands for the sector path number. Sector path 0 means there is unlimited bandwidth for this path. If the destination gateway is not reachable, you can use the parameters **GW2** to **GW5** to configure an alternative route.

```
ADD-
LDAT:LROUTE=520,LSVC=ALL,LVAL=1,TGRP=50,ODR=520,LAUTH=1,GW1=2-0;
```

IMPORTANT: In contrast to S0/S2 connections (point-to-point), an IP connection is a point-to-multipoint connection and therefore the same trunk number to the different destination gateways (**GW1-GW5**) in the AMO LDAT!

The tie number is entered in the AMO LDPLN. The directory number is entered in the default dial plan with **DIPLNUM=0**. A profile index can also be used instead of LRTE (AMO-LPROF):

```
ADD-LDPLN:LCRCONF=LCRPATT,DIPLNUM=0,LDP="902"-
"X",LROUTE=520,LAUTH=1;
```

If you want to be able to reach node 10-69-100 from node 10-69-200, perform the following configuration. You then point to the **GWNO=1** in AMO LDAT.

3.1.3 Backup & Restore of the WBM Configuration Data

All configuration data configured via WBM must be saved on a backup server. Otherwise all configuration data will be lost after a board replacement, a reset of the board or loadware upgrade and the H323/H323A trunking connection can’t be automatically reestablished. This is done with the HiPath Backup & Restore.

Therefore it is important to have a working connection to the backup server. If the backup server is not available, the configuration data can also be saved in the flash memory of the board and then can be retrieved from there.

HiPath Backup & Restore

Configuration of a connection to backup server and HiPath 4000 Assistant.

```
CHANGE-
CGWB:MTYPE=CGW,LTU=1,SLOT=37,TYPE=MGNTDATA,MGNTIP=<ip_address_as
sistant>,MGNTPN=<port_number_assistant>,BUSIP=<ip_address_backup
_server>,BUSPN=<port_number_backup_sever>;
```

Note: The values for **MGNTPN** und **BUSPN** won’t be restored after a reset of the board. They have to be configured again manually.

Loacal Flash

IMPORTANT: It is recommended to additionally use the local flash as a backup media. If the connection to the backup server is broken the configuration data will be automatically restored from the local flash.

WBM > Maintenance > Actions > (double-click) Automatic Actions > Saving Local Configuration for Upgrade

For more information please refer to „HiPath Gateways HG 3500 and HG 3575“, Chapter 8, “Save Configuration Data in Local Flash”.

3.1.4 Displaying Link Status

The link status of the LAN interface (link signal Ethernet, LAN speed, and LAN interface) can be displayed at each level with the AMO SDSU using the usual commands (**PER1**, **PER2,** and **PER3**):

```
DISPLAY-SDSU:TYPE=PEN,LEVEL=PER1,LTG=1,LTU=<ltu no>,SLOT=<slot
no>;
```

3.1.5 Procedure for Adding Supplementary HG 3500 Boards to the Network

Additional LEGKs can be configured in the same way as node 10-69-100. The AMO BFDAT, AMO BCSU, AMO CGWB, AMO GKREG and AMO LDAT are in a single node.

IMPORTANT: The GKREG must recognize **all** HG 3500 boards in the network.

3.1.6 Relevant AMOs

AMO	Parameter	Sprache/ Language	Beschreibung/ Description
BCSU	TYP=IPGW	d	CGW einrichten
	TYPE=IPGW	e	Configure CGW
	BKAN3550	d	Anzahl der B-Kanäle für IP-Trunking
	BCHAN3550	e	Number of b channels for IP trunking

AMO	Parameter	Sprache/ Language	Beschreibung/ Description
BFDAT	FUNCTION=HG3550	d	CGW mit IP-Trunking
	FUNCTION=HG3550	e	CGW with IP trunking
	BGBKAN	d	Maximale Anzahl der verfügbaren B-Kanäle der Baugruppe (entweder 60 oder 120)
	BRDBCHL	e	Maximum number of available b channels (60 or 120)
	ANZSATZ	d	Anzahl der Sätze für IP-trunking
	LINECNT	e	Number of lines for IP trunking
	ANZEINH	d	Anzahl der vordefinierten Blöcke mit ausgewählter Funktion pro Satz.
	UNITS	e	Defines the number of predefined blocks with the selected function per line.
CGWB	DEFRT	d	IP-Adresse des Default Routers
	DEFRT	e	IP address of the default router
	GWID1	d	Gateway ID
	GWID1	e	Gateway ID
	VAD	d	Voice Activity Detection
	VAD	e	Voice Activity Detection
GKREG	GWATTR	d	Gateway Attribut
	GWATTR	e	Gateway attribute
	GWNR	d	Gateway ID (muss dem Eintrag im AMO CGWB entsprechen)
	GWNO	e	Gateway ID (must correspond to the vaule in AMO CGWB)
TDCSU	DMCERL=NEIN	d	DMC wird verhindert
	DMCALLWD=NO	e	DMC not allowed
ZANDE	GATEKPR=JA	d	PBX mit Gatekeeper
	GATEKPR=YES	e	PBX with gatekeeper

3.2 Configuration using HiPath 4000 Assistant

3.2.1 Configure Common Gateway HG 3500

In order to configure CGW board do the following:

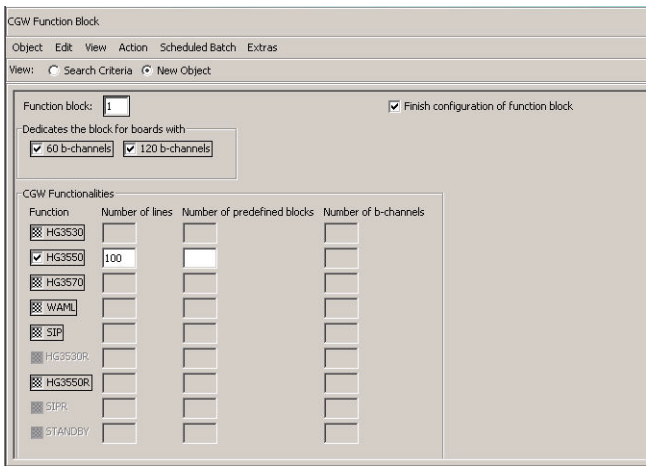
- Step 1: Configure function block
- Step 2: Search for a free slot

- Step 3: Open Board configuration menu in HiPath 4000 CM Assistant
- Step 4: Add new board
- Step 5: Filling in the mask
- Step 6: Open STMI2-IGW Board Data dialog and fill mandatory fields

Step 1: Configure function block

Start **CM > System Data > Board > CGW Function Block**

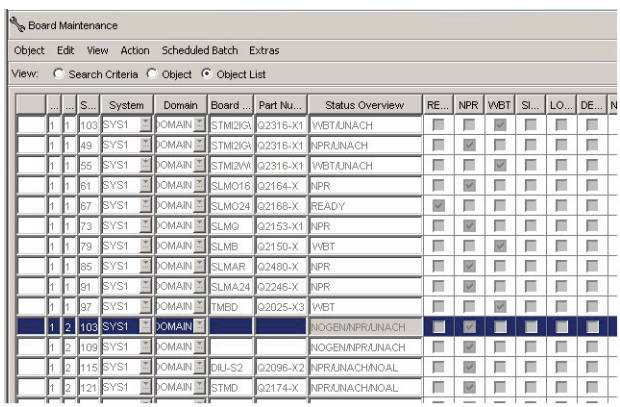
Click **Search** for searching for a free function block number. Click **New** for adding a new function block. Enter the required data and click **Save**.



Step 2: Search for a free slot

Before entering LTU and SLOT number it is recommended to check if desired SLOT is free by **CM > System Data > Maintenance > Board Maintenance**.

After search is performed in Object list view free LTU and SLOT is marked with **NOGEN/NPR/UNACH** under **Status Overview** column.



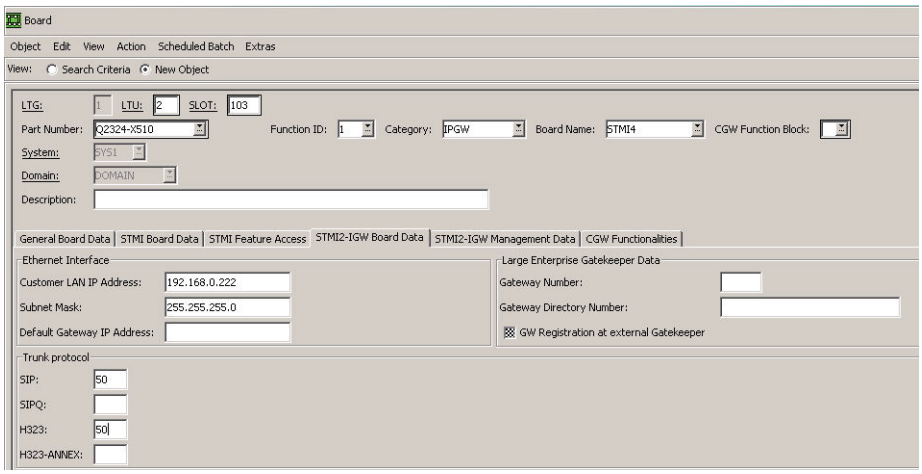
Step 3: Open Board configuration menu in HiPath 4000 CM Assistant

CM > System Data > Board > Board

Step 4: Add new board

Press **New** button in order to add new board

Step 5: Filling in the mask



- **Part Number**: Q2316-X or Q2316-X10 or Q2324-X500 or Q2324-X510
- **Function ID**: is always 1
- **Category**: IPGW
- **Board Name**: STMI2 or STMI4
- **CGW Function Block**: enter created function block (see Step 1: Configure function block)
- **LTU** and **SLOT**: select free slot (see Step 2: Search for a free slot)

Step 6: Open STMI2-IGW Board Data dialog and fill mandatory fields

Customer LAN IP Address and **Subnet Mask**.

Trunk Protocol: number of b-channels (e.g. **H323/H323-Annex**: 50).

IMPORTANT: Only one trunk protocoll per board is supported! A combination of different trunking prorotocols on one board is not possible!

After all needed data is entered into required fields press **Save** button.

The board is now added and can be found in **Board Dialog** or in **Board Maintenance**.

3.2.2 Delete IPGW

To delete IPGW board do the following:

- Step 1: Open Board configuration menu in HiPath 4000 CM Assistant
- Step 2: Search for IPGW
- Step 3: Select IPGW and delete it

Step 1: Open Board configuration menu in HiPath 4000 CM Assistant

CM > System Data > Board > Board

Step 2: Search for IPGW

Search Criteria > Category: IPGW

Step 3: Select IPGW and delete it

Choose the board that has to be deleted from the list and cklick **Delete**. After pressing **Delete** button dialog appears that board is removed from system.

3.2.3 Modify Board Data of IPGW

In order to modify board data follow those steps:

- Step 1: Open Board configuration menu in HiPath 4000 CM Assistant
- Step 2: Select IPGW
- Step 3: Carrying out desired changes
- Step 4: Checking the changes

Step 1: Open Board configuration menu in HiPath 4000 CM Assistant

CM > System Data > Board > Board

Step 2: Select IPGW

Select **IPGW** in **Category** list and press **Search** button.

Step 3: Carrying out desired changes

Do the needed changes in board dialog (eg. IP address) and save changes with the **Save** button.

After changes are saved dialog about successful action pops up.

Step 4: Checking the changes

Make new board search in order to check if new data is accepted.

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