GENERAL

Period
4th quarter 2010 - 1st quarter 2011

SW version
2.0.4 (00247), since 4/2011 2.1.0

Test version scope of delivery
Server components (19" rack), compare image on right side:
1x VidyoPortal
1x VidyoRouter
2x VidyoGateway
1x VidyoReplay (since 4/2011)

Device class
Client Server System for calls between registered Vidyo clients (proprietary), gateway to H.323 and SIP existent.

Licence conditions
The test version had the licence model "Ports License Model" with a maximum of 20 ports, a maximum of 150 seats and a maximum of 150 installs.

INSTALLATION AND INITIAL OPERATION

CLIENT:

The VidyoDesktop client installation is carried out the easiest way browser based via the VidyoPortal, after registering. From there on, the according version (Windows, Mac, Ubuntu) is selected, downloaded to the PC, installed and configured automatically. When installing the downloaded software on another PD separately, the IP address of the VidyoPortal needs to be entered manually.
There are small differences in the Windows and Mac client user interface: The remote control option and the possibility to determine the video quality on HD 720p is not provided for Mac users.

**SERVER:**

The infrastructure of a Vidyo installation includes several server components with different functionalities. All components need to be built into a 19 inch rack and configured with the according network information on initial operation. This is followed by configuration concerning the desired application.

1. **VIDYOPORTAL**

VidyoPortal represents the central access component for registered users and provides wide access alternatives to users and administrators via the web surface based on Flash. VidyoPortal falls back on an SQL database for user administration and enables client access with the integrated VidyoProxy via NAT or Firewalls. In the administration sector of the VidyoPortal, also the user licenses called VidyoLines are administered.

2. **VIDYOROUTER**

The Vidyo infrastructure component responsible for multi-point distribution is called VidyoRouter. In midget installations with up to 50 concurrent multi-point connections, this function is integrated in the VidyoPortal.

VidyoRouter can be operated in networks in order to increase the maximum number of 100 HD VidyoLines and scale it to higher user numbers (VidyoRoom and VidyoGateway calls are not referred to as VidyoLines). In VidyoRouter, no Transcoding of the single call participants is done, but respectively all participant data is transmitted without loss, by what transmission delay can be minimized. Depending on the available bandwidth, processor performance and resolution of the participant, the according data stream is transmitted in each case.

The VidyoRouter installation is not very extensive: after adjusting the network settings (IP address, netmask etc.), the system must be published to the VidyoPortal. Several settings concerning system security and firmware updates can be taken.

3. **VIDYOGATEWAY**

For transition to convenient H.323 or SIP environments, a VidyoGateway needs to be installed. In the tested installation, two VidyoGateways "MK-II" were in operation, which each enabled three simultaneous HD calls to H.323 systems (3x HD 720p30, 12x 4CIF or 24x CIF). The VidyoGateway supports G.711 and G.722 as audio protocols and H.264 AVC/SVC as well as H.263 as video protocols. Besides, H.239 is also implemented.

In order to use the VidyoGateways, gatekeepers need to be registered to enable global E.164 calls (Screenshot), and so-called services must be defined in addition, by which the connection parameters to H.323 are determined (Screenshot).

4. **VIDYOREPLAY**

VidyoReplay enables recording multi-point conferences which can be published as livestreams and on demand. The installation includes, next to the configuration of the network parameters, also the connection to VidyoPortal, since the recording control is launched by that.
Operation

VidyoClient:
After login (Screenshot), users can search for registered contacts or manage their own contact list. Every user registered in VidyoPortal gets his own virtual meeting room assigned via extension (e.g. 42199), which he can enter through the VidyoPortal itself. The user can also enter virtual rooms of other participants or initiate direct calls via the portal (graphic up right). In such a room, the video of 8 different participants at most can be shown, even if more participants attend this video conference. The meeting room is controlled by the VidyoPortal or the VidyoDesktop. The second option for video conferences is a direct call between (exactly) two conference participants. A direct call is always controlled by the client itself. Furthermore, a user logged in can control guest accesses to his room and secure it by PIN.

All incoming and outgoing calls to H.323 devices, so-called Legacy devices, go via VidyoGateways. Therefor, special service numbers must be defined on the VidyoGateway. By those service numbers, the used connection parameters such as audio and video codec, for example, are defined. For details, see VidyoGateway.

Using the VidyoDesktop (graphic on right side), a participant can share an application with other users. Double clicking the shared video picture, this is presented in a separate window which can be adapted in size individually. This is useful when one does not want to use the VidyoDesktop in full screen. Several participants can share an application, whereat the VidyoDesktop participant can chose which one he wants to see. A shared application can be displayed via VidyoDesktop. The H.323 devices including MCU participants (DFNVideoConference) are shown the first shared application. When this is finished, the next one (if available) is shown.

All video conferences can be recorded in case a VidyoReplay server belongs to the hardware equipment. VidyoPortal provides the option Control meeting room. After selecting the desired video format (CIF, SD or HD), the recording or a webcast can be controlled. The recorded videos can be found in the VidyoReplay library. Here, access rights to own applications can be managed and existing recordings can be edited, too. The recorded format is Flash video (flv).

Server administration:
The server administration is mostly self-explanatory and completely web-based. The central administration is carried out in the VidyoPortal either as admin (compare screenshot on right side) or as superadmin (Screenshot). Latter owns extended rights concerning infrastructure management (e.g. adding new devices), licence management (e.g. refresh or extend licences) and client management. An admin can manage users and user groups and monitor the provisioning of the clients, which means he can provide current software versions of the clients. Moreover, he can adopt presettings for formulations and logo design.

VideoGateway configuration is also web-based. The basic configuration is intuitional and logging in on a gatekeeper is simple (Screenshot). Configuration of the service numbers is less intuitional, since different service numbers must be generated for different services here (e.g. H.239 yes/no, H.264/H.263), which is very tricky (compare screenshot on the right side). There is a need for improvement on manufacturer side.

Gatekeeper connection within the DHN gatekeeper structure works without problems, hence multi-point conferences running on Codian MCU can be joined. In case it is desired to call single VidyoClients via extension from H.323 terminals, on the other hand, a great deal of configuration must be done at the gatekeeper. Thus, a separate zone must be assigned to the VidyoClient which is logged on, and its zone number should accord to a service number defined on the VidyoGateway. Prior to this configuration is a complete generation of an adequate call number scheme.

Audio/Video

VidyoClient:

For transmission of the video channel, Vidyo uses the codec SVC (Scalable Video Coding) which is described in Annex G of the H.264 standard. The high scalability of the procedure compensates variabilities in connection quality and transfer rate. Since also low package loss rates can be compensatet by the procedure, a high video quality during a video conference is reached even in narrow-band networks.

In all tests, quality of the transmitted and received picture was always good at least, in most scenarios even very good. The aspect ratio was negotiated very flexibly, in very different resolutions (ranging from QCIF to 720p), according to the technical possibilities of the remote system.

Connection setup to Polycom PVX took about 1 minute to complete. Before that, the connection was not usable. So the user of the PVX needs a lot of tolerance and patience. Once the channels are connected, however, the conference runs well.

The audio quality was always good up to very good. Only during the connection to the Polycom client server solution CMA, there were a few audio dropouts sporadically.

Data presentation

VidyoClient
The transmission of slide presentations according to the H.239 standard in the second video channel always worked very well except for one case. Sending as well as receiving the data ran fluently and without errors. Only with Polycom CMA, the transmitted slides were indecipherable. Receiving a CMA presentation, however, worked without problems.

Transmission of moving pictures in the second channel, on the other hand, was not at all useable in any connection. SD as well as HD resolutions were received in completely unacceptable frame rates in both directions, and those made slide shows out of the original videos on receiver side. Again, there is need for improvement.

**MCU**

**VidyoClient**

In connections to the Codian MCU (SW 4.1) of the DFNVideoConference service, an identical behaviour as in all other tests with H.323 remote systems could be seen. Audio worked and the video quality was very good. The quality of the audio can not be tested on quality in a single connection to the MCU.

The data presentation according to H.239 also runs correctly for slides analogue to the other test results. Transmission of video in the second channel, however, is not reasonably applicable.

Layout adjustment per DTMF is possible for Vidyo in connections to the MCU.

The Dial-Out string from Codian MCU to Vidyo is structured like this: (IP VidyoGateway)!(service number of VidyoPortal)(participant extension), for example 141.30.67.182!8135653

**Firewall**

Vidyo is able to initiate connections across firewalls. Even connections with https via an intermediary Proxy work. In order to be able to use these options, the [Proxy] setting must be changed from "No Proxy" to "LocalProxy" at the VidyoPortal by the according user.

**Miscellaneous**

The systems does not offer encoding to H.323 devices. When the remote system tries to force encoding, no connection is set up (compare screenshot on right side).

The remote control is not supported in connections to H.323 devices.

**CONCLUSION**

The Vidyo client server system especially stands out due to the high quality of the video transmission and the well structured and intuitional user interface, which is comprehensible also for beginners. The connection quality in audio and video was strong even with standard equipment and connections to the DFNVC MCU worked well, too. Different clients are available for different operating systems and mobile end devices are also supported. A good cost / performance ratio speaks for the product as well.

Slides could be transmitted without problems (even to H.323 end devices), deficits, however, showed up while transmitting desktop videos as dual transmissions. It is also not possible at the moment to record a data presentation separately using VidyoReplay.

Due to the modularity of the separate servers, the system can be integrated flexibly, but the bottleneck for the use in a wide, heterogene VC infrastructure is the "VidyoGateway" component. Its low performance together with a difficile configuration effort stand against a cross network use.

**Documentation**

Manufacturer: www.vidyo.com
Out thank goes to the mentioned company for providing the test components.