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RECORDING SYSTEM

SYSTEM ARCHITECTURE OVERVIEW

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1 Introduction

This document gives a global overview of the system architecture and possibilities of Cybertech's recording system. It is intended for potential buyers of the recording system and provides an insight into the technical aspects of the system. It is not intended to be used as a commercial document nor as a user manual.

The overview of the recording system is divided into two main parts:
1. Hardware
2. Software

Overview
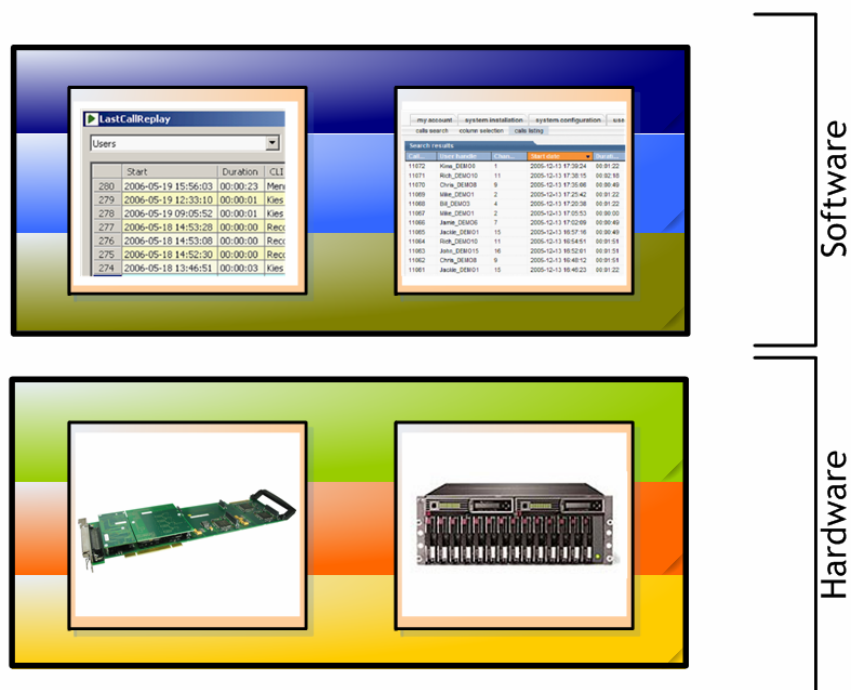
The hardware forms the basis of the recording system and comprises the CyberTech digital speech converter cards and commercial off-the-shelf (COTS) hardware.
The software that runs on top of the hardware consists of core services and user software.

This document describes the recording system in five parts;
1. **The architecture overview**
   An overview of the 6 layers that make up the recording system
2. **Configurations overview**
   The available configurations
3. **Hardware overview**
   An overview of the COTS hardware possibilities
4. **Software overview**
   An overview of the user interface and possible settings
5. **Applications**
   An overview of the value-added software applications available

2 Architecture overview

The concept for the CyberTech recording system was based on commercial off-the-shelf (COTS) hardware and web-based software. This has resulted in a layered architecture made up of 6 layers:

- **Input interface:** resources for input, like digital extensions, analogue lines and trunk lines
- **Converter layer:** converts the input sources to files
- **Recording interface:** transfers the software instructions to the converter layer
- **Services:** runs the main components of the recording system, including a web-server
- **User Interface:** lets the user control the recording system via a web-based interface
- **Applications:** additional applications for specific user groups.

Each layer interfaces with its adjoining layer to create a complete Voice Recording System:
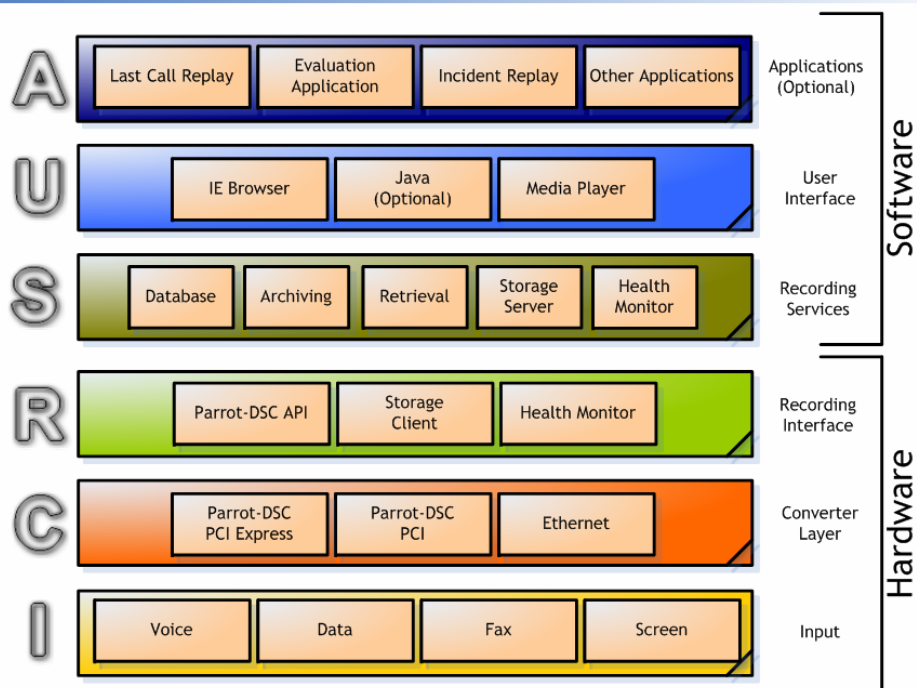
The bottom 3 layers are part of the Parrot-DSC product and mostly hardware-related. The middle hardware layer is either a hardware card (in the PCI or PCI-Express versions) for digital or analogue voice input, or a standard Ethernet card for VoIP input. The top hardware layer, the Parrot-DSC API, controls the hardware.
The top 3 layers of the recording system are software-related. The bottom software layer is comprised of the core software module, and the top software layer refers to the end-user applications.

2.4 Input layer

The input layer of the recording system accepts the inputs from the various sources; these sources may be:

- Voice: digital, analogue or VoIP
- Data: D-channel info, CDR or CTI
- Fax
- Screens

Input layer
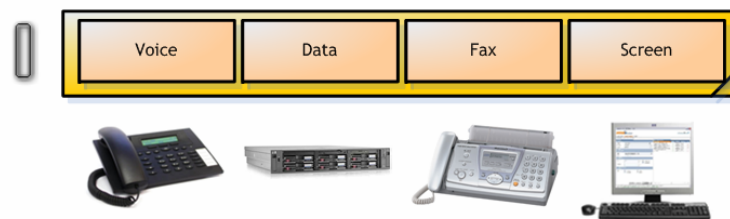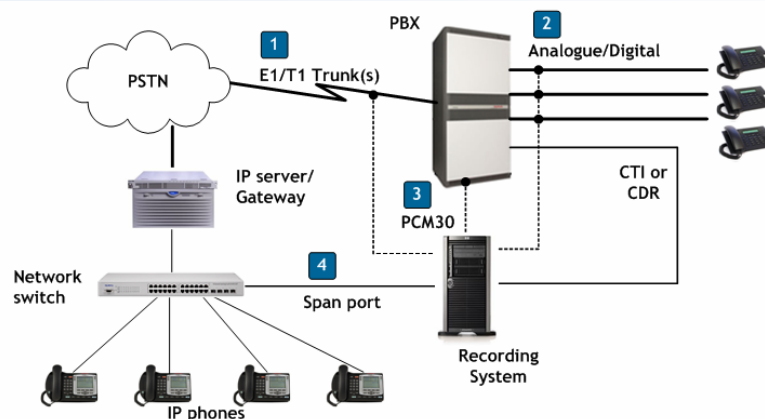

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The voice input is the most import input of the Recording System. Four types of voice input are accepted:

1. Trunk (E1, T1, CAS, DPNSS, Q.SIG)
2. Analogue or Digital Extensions
3. PBX Recording Port (PCM30/PCM32)
4. Span Port (VoIP extensions, SIP)

Input methods

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Passive tapping is used for all these inputs. In other words, a 'tap' is placed on the line which does not interfere with the actual information being transported.

Data input is the additional data of a call. It is usually supplied over the same line as voice but in the form of D-channel information. Other sources for call data can be Call Details Records (CDR) or Computer Telephony Integration (CTI).

Fax input can be detected as a special form of voice and can also be stored on the recording system.

The functionality to record from screens is currently being developed and will be available in Q3/2007.
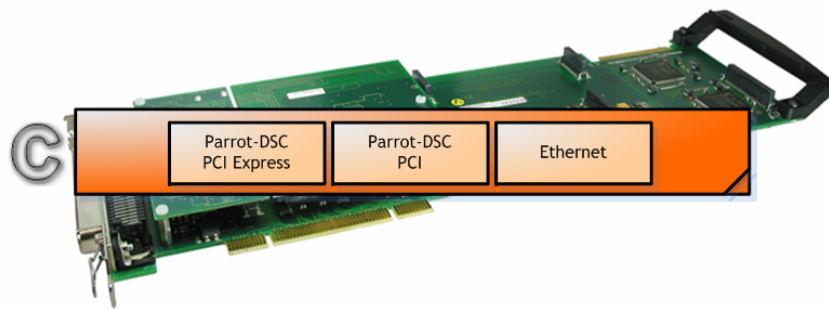
2.2   Converter layer

The converter layer converts the voice input into a voice stream that can be used by the recording software. There are two types of converters:
1.   a Digital Speech Converter (DSC) card that converts analogue or digital input
2.   a standard Ethernet card that converts VoIP input

The Digital Speech Converter cards (Parrot-DSC) are developed and manufactured by CyberTech.

Parrot-DSC cards are modular cards that use PCI or PCI-E baseboards with space for different detection circuit modules:

# modules	Full size	Medium Size	Short Size
PCI	3	n/a	1
PCI-Express	3	2	1

Detection modules are available in 4 versions:
1.   Analogue (8 input channels)
2.   Analogue + Beep tone (8 input channels)
3.   Digital Parallel (8 input channels)
4.   Digital Serial (4 input channels)
5.   Trunk (24 T1 or 32 E1 input channels).

By placing 1, 2 or 3 detection on a baseboard (one type per baseboard), many different card configurations are possible:

	Full size	Medium Size	Short Size
Analogue	24 channels	16 channels	8 channels
Analogue+Beeptone	24 channels	16 channels	8 channels
Digital Parallel	24 channels	16 channels	8 channels
Digital Serial	12 channels	8 channels	4 channels
Trunk	96 channels	64 channels	32 channels

See **Appendix A** for a complete list of the tapping cards available.

Each baseboard also contains a 'processor module'. This module contains the licenses for activating the modules, and firmware for configuring the card to the specified PBX extension.

CyberTech has developed specific firmware for almost every available PBX brand available. Since almost every extension type, digital or otherwise, uses a different protocol, there are currently more than 100 firmware protocols available for extension types for the following PBX brands:

Digital Parallel	- Generic	- Realitis DX 4-wire	**VoIP**
- Alcatel OmniPCX	- Goldstar	- Rockwell Spectrum	- Alcatel
- Ascom Ascotel	- Intertel Axxess	- Selta	- Avaya IP office
- Aspect	- ISDN2 ETSI/1TR6	- Siemens	- Cisco
- Avaya	- LG Starex-VSP	- Tadicom Coral	- Mitel
- Bosch Integral	- Nitsuko DX2E	- Toshiba Strata	- Nortel
- DMS-100 (BRI)	- Nortel	**Digital Serial**	- Siemens
- Ericsson	- Panasonic KX-TD	- Avaya Index (SDX)	- Ericsson
- Fujitsu Coral	- Philips/NEC	- Mitel X200/SX2000	- Selta

See **Appendix B** for a complete list of supported connectivity.

Each firmware protocol converter is able to decode the available data (D-channel). This means that not only can additional data like CLI and dialled number be decoded, but also any information that is displayed on the display of the extension.

For **VoIP recording**, only a standard (additional) Ethernet card in the chassis is required. The recording interface layer (see 2.3) monitors the IP-stream and detects the VoIP and the associated data packages and call data.

2.3   Recording interface layer

The recording interface layer controls the hardware input sources according to the commands issued by the recording software. This is done with the Parrot-DSC API. A Storage Client prepares the received calls for storage in the database. The Health monitors guards the hardware in the system and sends alarms in case of failures.
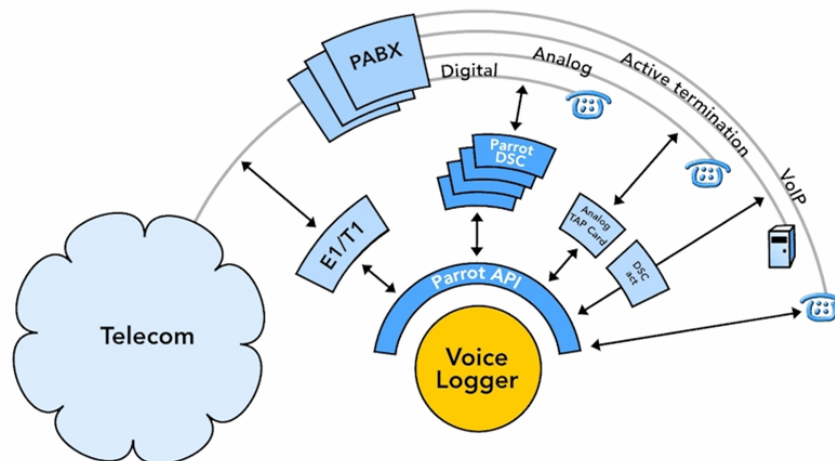
Recording Interface
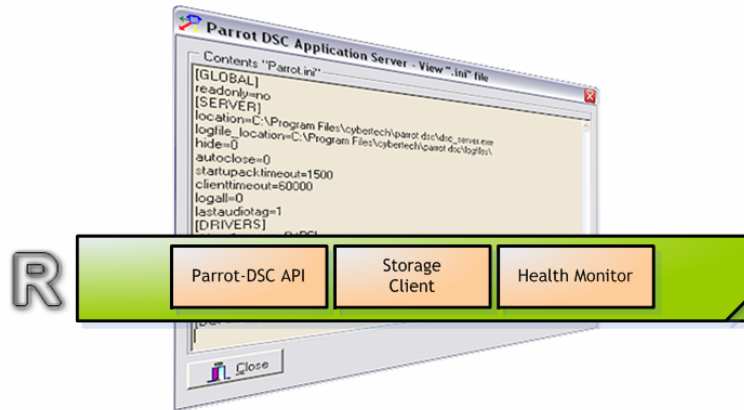
The Parrot-DSC API is developed by CyberTech and is a universal API that can be used for all 4 types of inputs:
1. Digital
2. Analogue
3. Trunk
4. VoIP

Recorder API

This means that the recording software is completely independent of the input sources. The input sources may even be changed without having to change the recording software. The recording interface API acts as middleware between the hardware and the software. Adding new media in the future as input sources will therefore not influence the software.

2.4   Services layer

The services layer performs the core software features of the recording system. These services run continuously in the system's background and each performs a different activity:

Recording Services
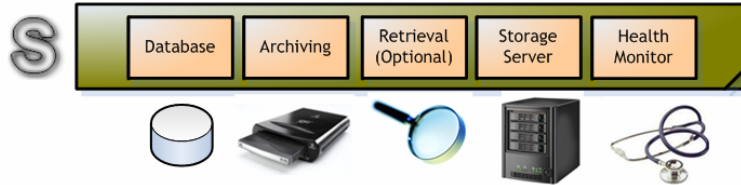
© CyberTech

2.4.1 Storage

The storage service provides online storage of the voice streams received from the various channels. Each received voice stream is stored as a WAV file on a hard disk in the recording system. In addition to the voice stream, additional call data is added at the end of each call to the WAV file.

A database is maintained of all the recorded calls on the system. This MySQL database contains one record for every call.

In addition to the standard fields in the database, 20 additional custom fields may be added. These fields may include additional data received from CDR or CTI connections.

If the 'encryption' option is enabled, all stored calls will be encrypted with the 256 bit Rijndael AES audio encryption. This means the WAV file can only be replayed if the encryption key is available.

The number of hours of recording storage depends on the size of the hard disk and compression used. Below is an example for 3 different hard disk sizes:

Compression Type	80 Gb HDD	180 Gb HDD	250 Gb HDD
Uncompressed 64Kb/s	2.625	5.906	8.203
ADPCM 32Kb/s	5.250	11.813	16.406
ADPCM 24Kb/s	7.000	15.750	21.875
GSM 13Kb/s	12.727	28.636	39.773
Fast GSM 13Kb/s	12.727	28.636	39.773
True Speech 8.5Kb/s	19.765	44.471	61.765
Speex 8Kb/s	21.000	47.250	65.625
Speex 5.95Kb/s	28.235	63.529	88.235
Speex 3.95Kb/s	42.532	95.696	132.911
Speex 2.15Kb/s	78.140	17.5814	244.186

Available columns
- Archive date
- Call type
- Censure list reason
- Censure list reason id
- Channel
- Channel group name
- Channel name
- Channel organisation name
- Compression
- Delete date
- End date
- Index
- Location
- Mark
- Mark name
- Recorder
- Recorder hostname
- Recorder Ip-address
- User first name
- User last name
- Userkey

2.4.2   Archiving

The archive service archives the calls to the storage media. Several types of storage media are supported:

1. DVD Ram
DVD Ram drives are the most commonly used archive media as they are cheap and widely available. Each DVD Ram can store 4.7 GB.

2. Iomega REV disks
The Iomega REV disks are removable hard disks in a cartridge and offer larger storage capacity than DVD Rams. The cartridges are available in 35 GB and 70 GB versions.

3. Network Attached Storage (NAS)
Any disk that can be reached through a drive letter can be used as archive media. This means that any NAS or SAN that can be accessed by the recording system can store the archived calls.

4. EMC
A special form of media is the EMC Centera, this archive media can also be used as archiving media.


2.4.3   Retrieval

The retrieval service performs the search & replay possibilities.

Users log on to the recording system's core server via a web browser. The core server has a standard web server that handles the user retrieval requests, searches for the required voice files, and sends the audio to the web browser. Audio is played in the web browser using Media Player.
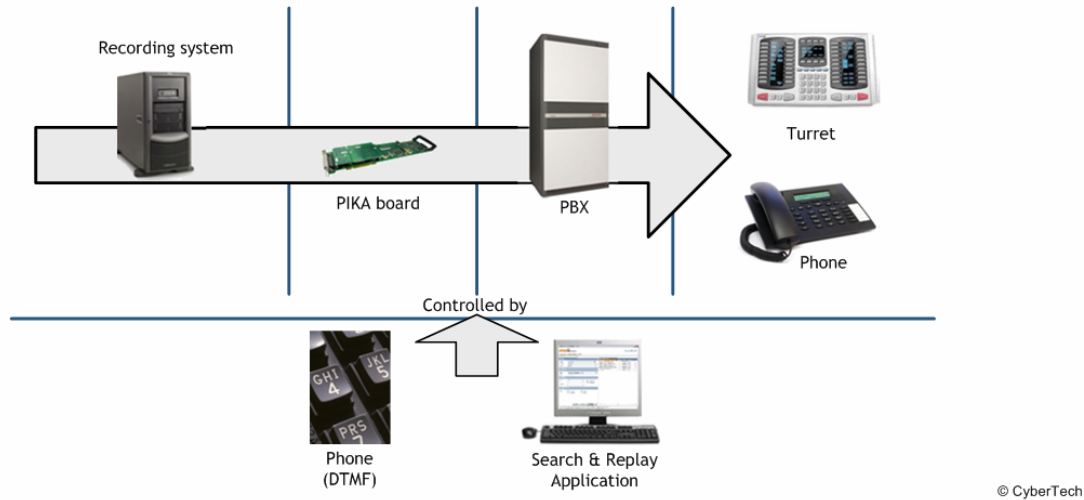
Search & Replay
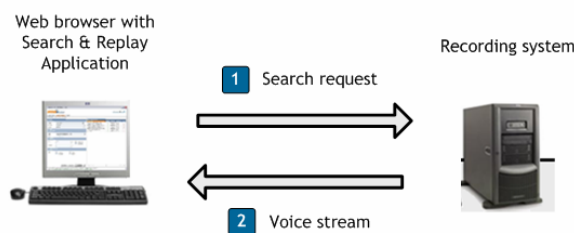
Optional features in the recording system are the 'Replay by Phone' and 'Replay to handset' functions which allow users to use a telephone with DTMF to select a call, and replay the call to the handset.

Replay by Phone

Recording system

PIKA board

PBX

Turret

Phone

Controlled by

Phone
(DTMF)

Search & Replay
Application

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In this case, a PIKA board in the recording system is used to stream the audio to the handset.

2.4.4   Health Monitor

The Monitor Service monitors the systems and gives alarms and warnings. There are several ways to raise alarms:

	E-mail	Alarm and warning messages can be send to designated e-mail addresses.
	SNMP	The recording system is able to produce SNMP traps to indicate recording failures. The following traps are supported: 1: Error 2: Keep Alive message Keep Alive messages are sent at definable intervals from every recorder system and server (both core servers and others), and satellites. 3: Service state message. Service state messages are sent when a recorder service starts or stops. SNMP messages can be used in SNMP monitoring systems such as 'HP Overview'.
	Relay contact	Via an optional relay contact, an external lamp, switch or audio device can be activated when an alarm is raised.

2.5   User Interface

The user interface allows the user to control the system and perform search and replay actions. It is browser-based, can use Java scripts and standard MS-Windows modules such as Windows Media Player.
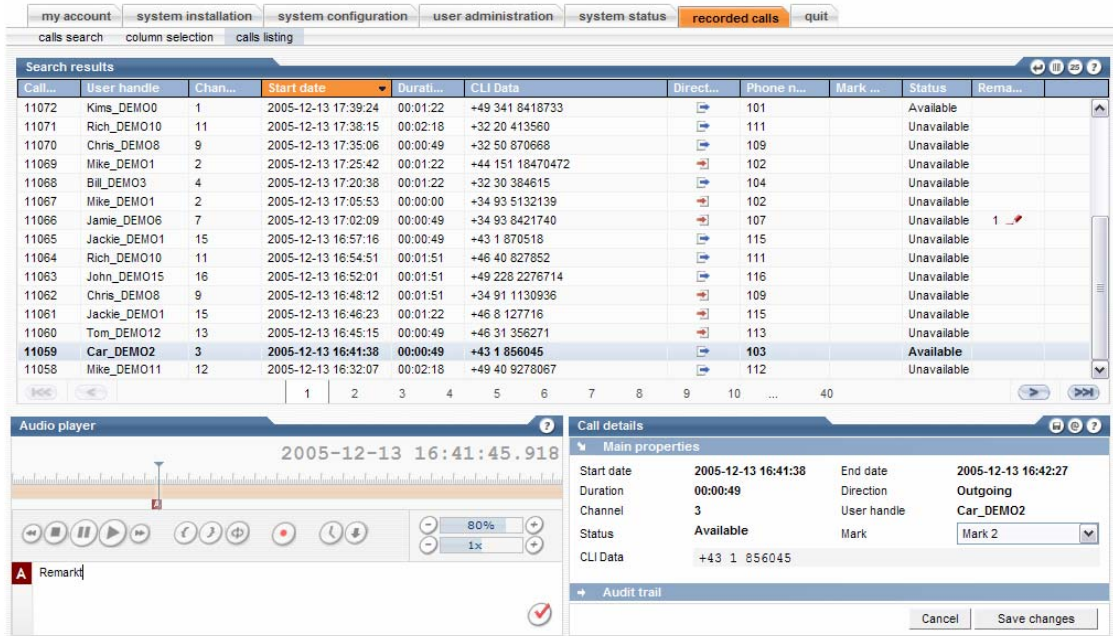
User Interface
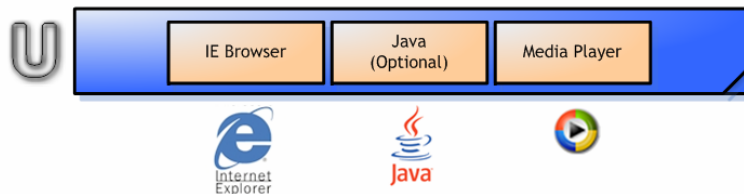
This means that any PC workstation with a network connection to the recording system server can access the recordings. The minimal PC Workstation requirements are that it runs MS Internet Explorer software.
Due to the nature of the web browser-based application, the user interface is very easy to use. Each window has a 'Help' button allowing access to additional information.

The user interface structure is described in Chapter 5, Software Overview.

2.6 Optional Applications

In addition to the standard user interface, the application layer adds additional functionality to the recording system.

Applications

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Several applications have been developed for specific markets and/or user groups and are described in Chapter 6.

2.6.1 Financial Institutions

For financial institutions, or any other user group needing instant access to the latest call, the **Last Call Replay Application** gives direct access to the latest calls without having to start the web browser-based Search & Replay application. The Last Call Replay application is described in Chapter 6.3.

2.6.2 Call Centers

For call centres and similar environments, the **Evaluation Application** provides a Quality Management (QM) system that helps assess and improve agent performance by retrieving agent call data and evaluating it against key factors, such as politeness and professionalism, using an online evaluation form. Once assessed, agents can be ranked, provided with feedback and, when necessary, recommended for additional training. In addition, agent activity can be assessed in real time by listening in on calls. This allows supervisors to provide the agent with tips or advice via Instant Messaging, and to take over the call if necessary.

QM systems benefit customers, employees and contact centre managers alike, with the main advantages being in improved efficiency, effectiveness, customer satisfaction and revenue generation. Future developments in call centre QM systems include call flow assessment, the use of speech analytics to mine recorded call data for keywords, and the use of emotion detection. The Evaluation Application is described in chapter 5.6.

2.6.3 Public Safety

TETRA is a combination of group voice communications, mobile telephony and mobile data services. It allows agencies to share information and perform duties as one unified workforce. TETRA is a purpose-built technology providing major advantages for public safety and security organisations compared to conventional radio systems. It was developed for public safety and security organisations that needed fast one-to-one and one-to-many radio communication of voice and data in their daily work. It forms the basis for communications interoperability between the different agencies involved in incidents. When safety is at stake, being able to respond quickly and efficiently is of vital importance, but it's almost equally important to be able to evaluate incidents, so as to learn from them and make improvements. In this way, incident recording is an essential tool in emergency management. What's more, it can also help in ensuring justice is carried out.

CyberTech has been an official partner of Motorola since 2003 and in 2006 it established an official partnership with EADS. These partnerships are recognition of the reliability and functionality of the solutions for mission-critical environments, such as public safety. What's more a strong relationship with these key suppliers means that CyberTech can work with them to constantly improve the solution offered and further tailor it to the needs of the customer.

The **Incident Replay Application** has been specifically developed for recording mission-critical public safety trunk radio installations.
With so much recorded information, reconstructing a specific situation or retrieving a specific fragment is a complex matter. The recording application not only records all communication, but also registers call data, such as time, the number called, the device number, and so on. This makes it easy to search for specific fragments. What's more, the Incident Replay Application lets users select a time-based graphical representation of the search results. The Incident Replay Application is described in chapter 6.2.

3 Configurations overview

The recording system can be used in many different configurations, depending on the number of locations and channels needed. Below are some example configurations to show how the different components are connected. There are many more configurations possible, but they are all based on the examples given.

The recording system is available in three versions:
- Standalone
- Server/Satellite

In addition to a Stand alone Server, or a Server of Server/Satellite configuration, a
- CTI/CDR Server

can be added optionally.

3.1 Stand alone server

A standalone server is a complete recording system in one chassis. The standalone server contains:
- **Hardware**
  - Server Chassis
  - Input Cards
- **Software**
  - Recording Services
  - MySQL Database
  - Web Server

One or more workstations can be connected to the standalone server using a LAN. The workstation contains a:
- Web browser

Stand alone configuration
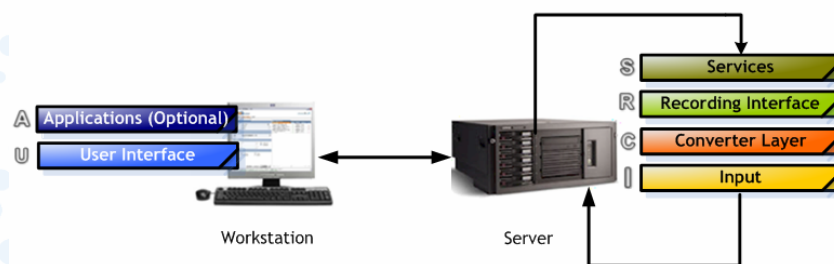
The standalone server software is available in two versions:
- **Myracle:** from 4 to 64 input channels max
- **Pro:** from 8 to ±1200 input channels

3.2   Server/Satellite

The Server/Satellite configuration consists of a server chassis, and one or more satellite chassis. The server chassis can contain tapping cards with up to a maximum of 64 channels. The satellites can contain tapping cards with up to a maximum of 240 channels per satellite (see Appendix C). The services, the database and the web server are installed on the server while the satellite has only a small satellite application, which is the same as the server application but with a limited number of services activated.
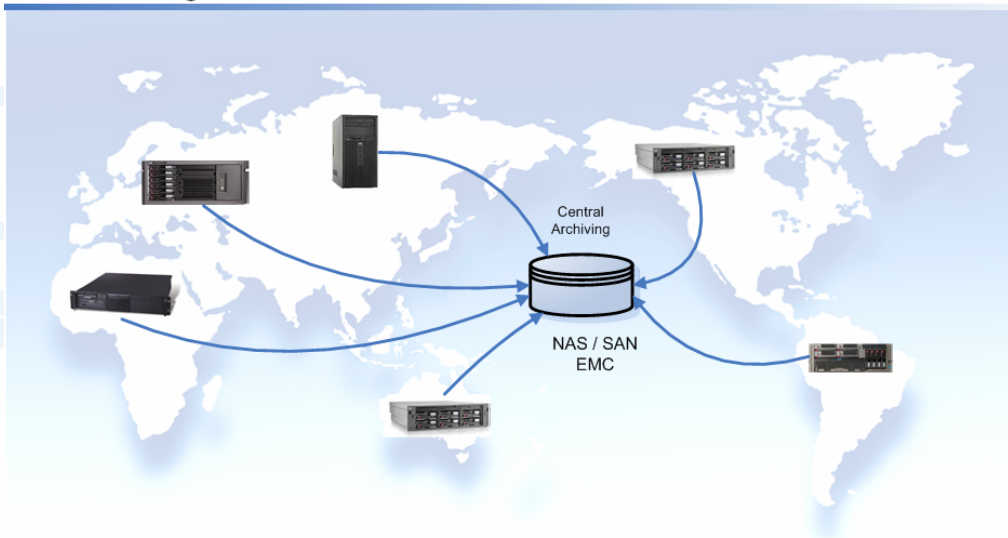
Server / Satellite configuration
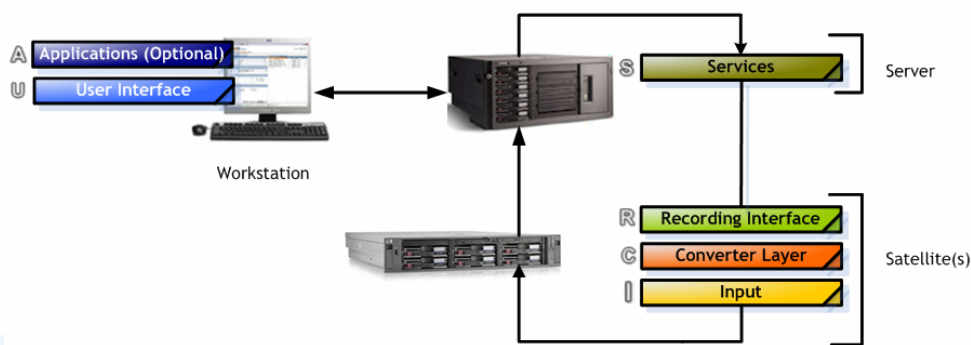
3.3   Multi-site

With a multi-site configuration, the recording system can be installed at several locations, and still maintain a central archiving possibility with all the calls being archived in a central location such as a main site.
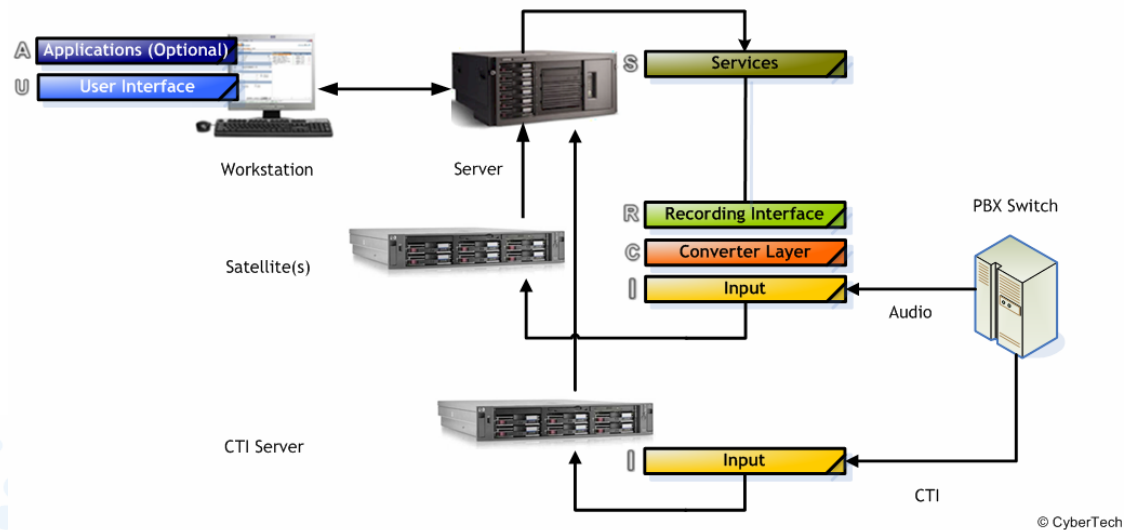
Multi site configuration

3.4 CTI configuration

By adding a feed with CTI (Computer Telephony Integration) or CDR (Call Detail Records) to the configuration, additional information about the call can be stored in the database.

Server/Satellite + CTI configuration

For the development of CTI and CDR integrations, CyberTech has technology partnerships with:

4 Hardware overview

The recording system can be used with any commercial off-the-shelf (COTS) hardware. Depending on the configuration used, the recording system hardware can either have:
- **Standalone configuration**
- **Server/Satellite configuration**

4.1 Stand-alone server configuration

A standalone configuration consists of one chassis with all the tapping cards, the server software, and the web servers.

4.1.1 Desktop PC

A desktop chassis is typically used for smaller configurations, with a maximum of 64 input channels. The selected desktop chassis should have at least enough PCI or PCI-E slots to hold the necessary tapping cards.

4.1.1.1 HP DX2200

Hardware	Specification
Height	Tower
PCI slots	2
PCI-E slots	2
DVD RAM slots	2
HDD Drive bay	2
RAID	Via additional PCI card
Specifications	**Requirement**
Software	
Operating system	Win XP Pro / Windows 2003 WE
Database (Core server only)	MySQL Pro
Hardware	
CPU	Intel Celeron 2.8 Ghz
Internal memory	1 GB
Video	Integrated
Sound	Integrated
Storage controller	Optional RAID1 controller (1 PCI slot)
Power supply	Optional, Dual power supply
DVD RAM	Optional, for archiving (LG GSA-4163B)
Network Interface Card	Ethernet TCP/IP
Weight	Approximately 30Kg
Dimensions	17,5x41,6x35,3 (lxdxh)
Options	
Iomega REV Drives	2

4.1.2   Industrial chassis

Instead of a desktop PC, a 19 inch, rack-mounted industrial chassis may be used as a standalone server.

4.1.2.1   Chenbro RM225

Hardware	Specifications
Height	2U
PCI slots	3
DVD RAM slots	2
HDD Drive bay	2
RAID	Via additional PCI card

Specifications	Requirement
Software	
Operating system	Win XP Pro / Windows 2003 WE
Database (Core server only)	MySQL Pro
Hardware	
CPU	Intel Pentium 4, 3 Ghz
Internal memory	1 GB
Video	Integrated
Sound	Integrated
Storage controller	Optional RAID1 controller (1 PCI slot)
Power supply	Optional, Dual power supply
DVD RAM	Optional, for archiving (LG GSA-4163B)
Network Interface Card	Ethernet TCP/IP
Options	
Iomega REV drives	2

4.1.2.2   HP ML370

Hardware	Specifications
Height	5U
PCI slots	4
DVD RAM slots	2
HDD Drive bay	6 Hot plug
RAID	Via additional PCI card

Specifications	Requirement
Software	
Operating system	Windows 2003 WE
Database (Core server only)	MySQL Pro
Hardware	
CPU	Intel Xeon 3,4 Ghz
Internal memory	1 Gb – 4 Gb
Video	Integrated
Sound	Optional
Storage controller	Optional RAID1-5, Smart Array 641 (1 PCI slot)
Power supply	Optional, Dual power supply
DVD RAM	Optional, for archiving (LG GSA-4163B)
Network Interface Card	Ethernet TCP/IP

4.2 Server/Satellite configuration

A server/satellite configuration consists of one chassis which is used for the server software, and one or more chassis for the tapping cards.

4.2.1   Server

Since a core server holds none or few tapping cards, it does not need a lot of PCI slots. It does, however, need the resources to perform the necessary core services.

4.2.1.1   HP Proliant DL380

Hardware	Specifications
Height	3U
PCI slots	3
DVD RAM slots	none
HDD Drive bay	6 Hot plug
RAID	Smart array 6i Ultra320 (RAID 1-5)
Specifications	**Requirement**
Software	
Operating system	Windows 2003 WE
Database (Core server only)	MySQL Pro
Hardware	
CPU	Intel Xeon 3,4 Ghz
Internal memory	1 Gb – 4 Gb
Video	Integrated
Sound	Optional
Storage controller	Integrated
Power supply	Optional, Dual power supply
DVD RAM	Not applicable
Network Interface Card	2x Ethernet TCP/IP

4.2.1.2   HP Proliant DL580

Hardware	Specifications
Height	4U
PCI slots	5+2 (Optional Mezzanine adds 2 PCI-X)
DVD RAM slots	none
HDD Drive bay	4 Hot plug
RAID	Smart array 6i Ultra320 (RAID 1-5)
Specifications	**Requirement**
Software	
Operating system	Windows 2003 WE
Database (Core server only)	MySQL Pro
Hardware	
CPU	Intel Xeon 3,4 Ghz
Internal memory	1Gb – 4 Gb
Video	Integrated
Sound	Optional
Storage controller	Integrated
Power supply	Optional, Dual power supply
DVD RAM	Not applicable
Network Interface Card	2x Ethernet TCP/IP

4.2.1.3   HP Proliant DL585

Hardware	Specifications
Height	4U
PCI slots	9: standard 3 PCI-Express (x8) 4 PCI-Express (x4) 2 PCI-X (100MHz)
DVD RAM slots	none
HDD Drive bay	8 Hot plug 2.5" SATA
RAID	Smart Array P400
Specifications	**Requirement**
Software	
Operating system	Windows 2003 WE
Database (Core server only)	MySQL Pro
Hardware	
CPU	Dual-core AMD Opteron
Internal memory	1Gb – 4 Gb
Video	Integrated
Sound	Optional
Storage controller	Integrated
Power supply	Dual power supply standard
DVD RAM	Not applicable
Network Interface Card	2x Ethernet TCP/IP

4.2.2   Satellite

A satellite is used for tapping cards only and does not run any services or databases. A satellite must contain enough PCI slots to place the tapping cards. For VoIP recording, only 1 PCI slot is required.

4.2.2.1   HP DL360

Hardware	Specification
Height	1U
PCI slots	2
DVD RAM slots	none
HDD Drive bay	2 Hot plug
RAID	Smart array 6i Ultra320 (RAID 1-5)
Specifications	**Requirement**
Software	
Operating system	Windows 2003 WE
Database (Core server only)	MySQL Pro
Hardware	
CPU	Xeon
Internal memory	1Gb
Video	Integrated
Sound	Optional
Storage controller	Integrated
Power supply	Optional, Dual power supply
DVD RAM	Not applicable
Network Interface Card	2x Ethernet TCP/IP

5 Software overview

The user interface has an easy menu structure, with two main functions:
- **System installation**: to enable the administrator to configure the system
- **Recorded calls**: to enable the user to search, replay and analyse recorded calls

Access to the software is restricted by a username/password.

If a user account is configured for a free seating agent, the menu 'Free Seat' is visible and can be selected. The user logs on to the recording system using his user name and password. The recorder will automatically link the user name to the right channel on the recorder. All calls made on this channel while the user is logged on will now contain the correct user name and extension.

When logging on as free seating agent, the IP-address or PC name of the agent PC is matched with the recorder channel configuration. The Recording System checks if this IP-address or PC name is linked to one of the free-seating channels. If so, this channel is assigned to the user. All calls on this channel will now contain the user settings for this user.

5.1 System Installation

The system installation section is used to set the parameters of the recording system. When the recording system is being installed, a number of variables can be adjusted to configure the system to the desired configuration. Below, follows an overview of all the possible settings.

The parameters of the system installation are usually set once, during the installation of the system. They are divided into six parts:

1. **Global settings**
2. **Settings per recorder**
3. **Locations**
4. **Archive rules**
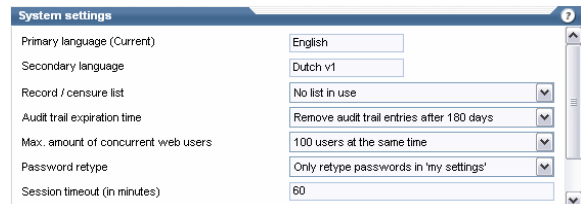5. **Archive schedules**
6. **Database fields**

Recording System

System Installation 5.1
- Global Settings 5.1.1
  - System settings 5.1.1.1
  - Calls settings/ preferences 5.1.1.2
  - Mail server settings 5.1.1.3
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- Settings per recorder 5.1.2
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5.1.1 Global settings

The global settings of the recording system apply to all the elements of the system.

5.1.1.1 System settings

The system settings are general settings that are valid for the entire system and to all users.

The following options can be configured:

Option	Value
Primary language	Primary language*
Secondary language	Secondary language*
Record/censure list	Use record/censure list or not
Audit trail expiration time	Remove entries every "" days
Max. amount of concurrent web users	Min. 5 and max. 100 users
Password retype	When to retype password
Session timeout (in minutes)	Time in minutes
Use strict user password	On/Off
Generate user passwords automatically	On/Off

*) Current available languages are:

- English
- Spanish
- French

- Dutch
- German
- Portuguese

- Arabic
- Turkish
- More on request

All labels and field names are stored in a separate language file. Any new language file can be added with the CyberTech 'online translator'. Users can log on via internet to a special recording system with online translating functionality. By retyping the labels, buttons and text-fields on-screen, a new language file can be created. CyberTech can capture this language file and re-distribute it to any installation requiring this new language.

5.1.1.2 Calls settings/preferences

The call settings and preferences apply to all the stored calls in the recording system. The following options can be configured:

Option	Value
Allow calls to be deleted manually	On/Off
Show calls in progress	On/Off
Playback calls from archive locations	On/Off
Maximum call length (in seconds)	Time in seconds
Query timeout (in seconds)	Time in seconds
Max. number of records to fetch	Number from 1 to 10000
Available call types	Specific type or all

5.1.1.3 Mail server settings

The mail server is used for sending alarms and warnings. The following options can be configured:

Option	Value
Mail server address (STMP)	Address of desired mail server
Mail server username	Username
Mail server password	Password
Default mail from address	Default 'from'-address
Default mail address/addresses for system messages	One or more e-mail addresses

5.1.1.4 Archive service settings

The general settings for the archiving services are set here. The following options can be configured:

Option	Value
Autostart archive service	On/Off
Backup run start hour	Hour to start backup automatically
Archiving interval	From every 15 minutes to 24 hours
Database backup interval	From every day to every 7 days
Overwrite existing database backups	On/Off
Enable beeping on archive media full	On/Off

5.1.1.5 Encryption settings

This provides the general settings for encryption. The following options can be configured:
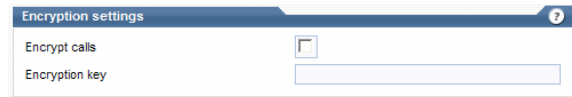
Option	Value
Encrypt calls	On/Off
Encryption key	Characters

When encryption is turned on, all calls will be stored with **256 bit Rijndael AES** audio encryption. The encryption key must be used in every recording system that replays calls, including the offline PC Replay Station application.

MD5 fingerprinting enables recorded calls to be used as admissible evidence in a court of law. It checks that audio files stored on the recorder have not been altered from the original by placing a unique digital signature on the file when it is recorded. If a file is changed in any way, the unique key will also change and the user will be made aware when replaying the call that it is different from the original recording. Fingerprinting cannot be turned on or off.

5.1.1.6 SNMP server settings

These are SNMP server settings for receiving SNMP traps. The following options can be configured:
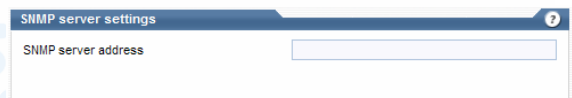
Option	Value
SNMP server address	IP address

SNMP (Simple Network Management Protocol) is used to send the following types of message:
1. Error messages
2. Keep Alive messages
3. Service state messages

The SNMP messages can be processed with SNMP monitoring systems such as 'HP Overview' (not included).

5.1.2 Settings per recorder

In addition to the general system settings for the recording system as a whole, settings can also be configured for each individual recorder that is part of the recording system. An important aspect of this is the reporting of **error messages** which can be sent in five different ways:

- By using the buzzer on the recording server hardware
- By using SNMP traps
- By examining the event logs
- By e-mailing directly to the system administrator
- By using the alarm relay contacts on the Auxiliary Alarm Card (optional)

5.1.2.1 Recorder setup

This configures the initial setup of the recorder parameters. The following options can be configured:
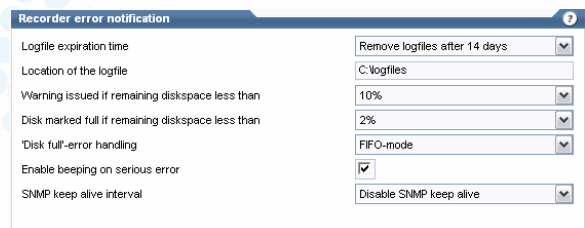
Option	Value
Audio files location	Drive letter & directory*
Start channel	Channel Number
Autostart recorder	On/Off

*) location can be any media that can be accessed through a drive (e.g. A: B: C: …)

5.1.2.2 Recorder error notification

A log file lists all the actions, warnings and errors. The parameters for the log file and alarms can be configured using the following options:

Option	Value
Log file expiration time	Expiration time of log file
Location of the log file	Where the log file is located
Warning issued if remaining disk space less than	Percentage
Disk marked full if remaining disk space less than	Percentage
"Disk full"-error handling	Mode (FIFO, LIFO)
Enable beeping on serious error	On/off
SNMP keep alive interval	Disable or enable

5.1.2.3   General recorder settings

These are the general settings for the recorder. The following options can be configured:

Option	Value
Enable 'Automatic Gain Control' on record	On/Off
Inlaw	A or U law
Compression type	Compression type*

*) in addition to uncompressed 64Kb/s, the following compression types are available:

- ADPCM 32Kb/s
- ADPCM 24Kb/s
- GSM 13Kb/s

- Fast GSM 13Kb/s
- True Speech 8.5Kb/s
- Speex 8Kb/s

- Speex 5.95Kb/s
- Speex 3.95Kb/s
- Speex 2.15Kb/s

5.1.3   Locations

One or more locations can be created for archiving calls.

5.1.3.1   Location properties

Each location has a name and properties. The following options can be configured:

Option	Value
Alias (for primary language)	Alias name
Alias (for secondary language)	Alias name
Location	Location drive letter & directory
Auto format new (blank) media	On/off

*) location can be any media that can be addressed by a drive (e.g. A: B: C: …)

Supported archive locations are:
- DVD-RAM drive (4,7 GB)
- Iomega drive (35 GB or 70 GB per disk) →
- Network Attached Share (NAS) or SAN
- EMC Centera (via CUA - Centera Universal Access)

5.1.3.2   Location Authentication

If log-in to an archive location is needed, the following parameters can be configured:

Option	Value
User account	User name
Password	Password

5.1.4　　Archive rules

Through the provision of network-attached storage technology, the recording system can archive recordings to a physically separate location from the recording servers, thus enabling a high degree of physical security in the event of a disaster.

The recorder archives calls to a physically separate location on the basis of the archive rule settings and the status the calls are given. This may be on a per channel basis or associated to the call mark.

5.1.4.1　Archive rule settings

These are the general settings of the archive rule. The following options can be configured:
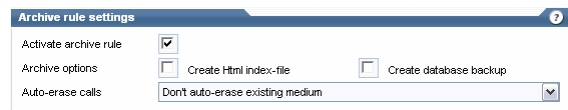
Option	Value
Activate archive rule	On/off
Archive Options	Create HTML index file　On/off Create database backup　On/off
Auto-erase calls	Select days or years

5.1.4.2　Archive locations

The archive locations can be used in either sequential or mirrored mode. The following options can be configured:

Option	Value
For all archive locations	Mirrored or Sequential

5.1.4.3　Calls to archive

The calls to be archived can be selected based on marking and/or channel IDs. The following options can be configured:
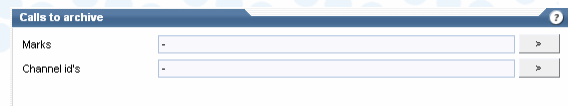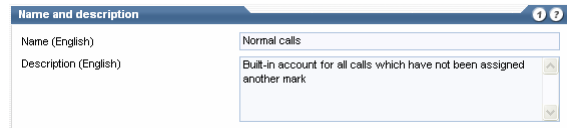
Option	Value
Marks	Select single, multiple or all marks
Channel id's	Select single, multiple or all channel IDs

5.1.5   Archive schedule

The archiving rules are executed using one or more archiving schedules.

5.1.5.1   Name and description
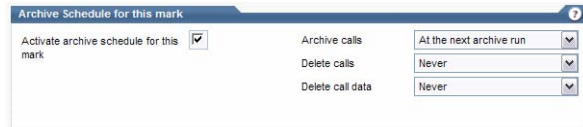
Each rule has a name and description. The following options can be configured:

Option	Value
Name (primary language)	Name
Description (primary language)	Description of the archiving schedule

5.1.5.2   Activate schedule

Archive schedules can be activated using the following options:
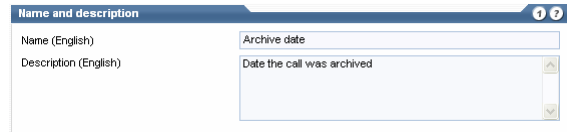
Option	Value
Activate archive schedule	On / Off
Archive calls	Next archive run / Older than <time period>
Delete calls	Never / Next archive run / Older than <period>
Delete call data	Never / Next archive run / Older than <period>

5.1.6 Database fields

In addition to the standard database fields, up to 20 additional custom fields can be added to the database. These fields can be filled by

5.1.6.1 Name and description

Each custom database field has a unique name and description. The following options can be configured:

Option	Value
Name	Name for the new database field
Description	Description for the new database field

5.1.6.2 Database field settings

Each custom field is specified. The following options can be configured:

Option	Value
Column	Name
Size	Number
Type	Date/Time, Text, Number
Default	Value

5.1.6.3 Database field properties

Each custom field has settings. The following options can be configured:

Option	Value
Searchable	On/Off
Sortable	On/Off
Editable	On/Off*
Visible	On/Off
Scalable	On/Off
Coverage based on content	On/Off*

*Can only be modified before the first save

5.1.6.4 Database field special formatting

The following options can
be configured:

Option	Value
Lookup list	Special formatting

5.2 System configuration

One of the primary functions of the recording system is managing and administering the system. All of the settings available on any recorder in the configuration can be administered and configured using the web-based user interface. Within the system configuration part of the recording system, channels and groups for a specific recorder can be configured and maintained.

5.2.1 Channels

Each recorder has at least 4 channels and a maximum of 1000 channels. The number of channels is determined by the number of activated licenses in the Parrot-DSC cards.

5.2.2 Channel groups

One or more channels can be combined in a channel group.

5.2.2.1 Name and Description

Each channel group has a name and
description. The following options can be
configured:

Option	Value
Name	State a name for the new channel group
Description	State a description for the new channel group

5.2.2.2 Channel group properties

Each channel group can have an alias that can be used by external applications, and has one or more channels assigned. The following options can be configured:

Option	Value
Alias used by external applications	Alias name
Channel id's	Single, multiple or all channel IDs
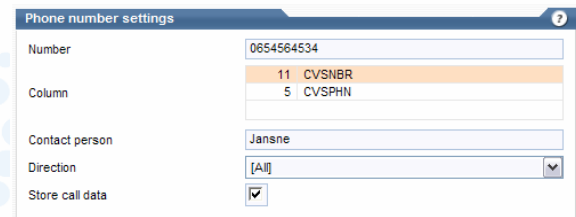
5.2.3 Record/censure list

An unlimited list of telephone numbers (CLI) can be entered. The list of telephone number can be used as a:

- Record list: only these telephone numbers will be recorded
- Censure list: none of these telephone numbers will be recorded

5.2.3.1 Phone number settings

Details can be set for each phone number. The following options can be configured:

Option	Value
Number	Telephone number
Column	One or more column names
Contact person	Name
Direction	In, Out, All
Store call data	Yes/No

5.3 User administration

The user administration maintains those users with access to the recording system.
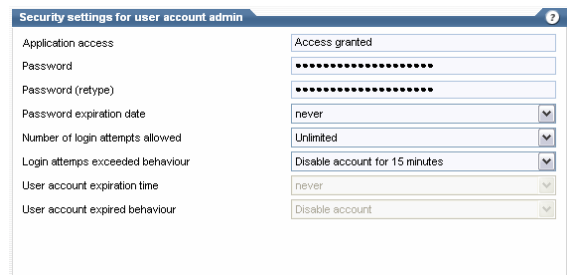
5.3.1 Users

Each user has an extensive profile that determines access privileges.

5.3.1.1 Security settings for user account admin

In this section, a password for each user can be set and behaviour determined for when access is violated.

The following options can be configured:
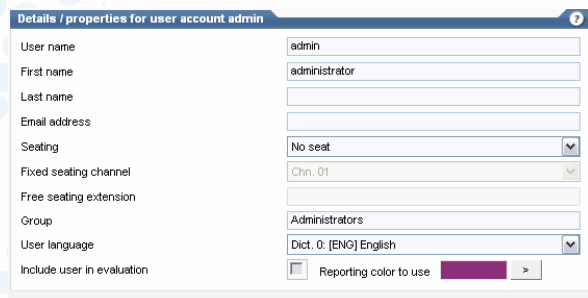
Option	Value
Application access	Access mode*
Password	Password
Password expiration date	Period of time
Number of login attempts allowed	Number of attempts
Login attempts exceeded behaviour	How to disable account
User account expiration time	Expiration time
User account expired behaviour	Expired behaviour

5.3.1.2 Details/properties for user account admin

Each user has general properties.

In this section, the following options can be configured:

Option	Value
Username	User name
First name	First name
Last name	Last name
E-mail address	E-mail address
Seating	Select between no, fixed and free seating
Fixed seating channel	Only applicable if seating is fixed
Free seating extension	Only applicable if seating is free
Group	User group
User language	Language
Include user in evaluation	On/Off select mark colour(optional)

With the free seating option, an extension number can be linked to a user name.

5.3.1.3   Access permissions

Access permission for each menu item of the software can be set according to the following configurations:
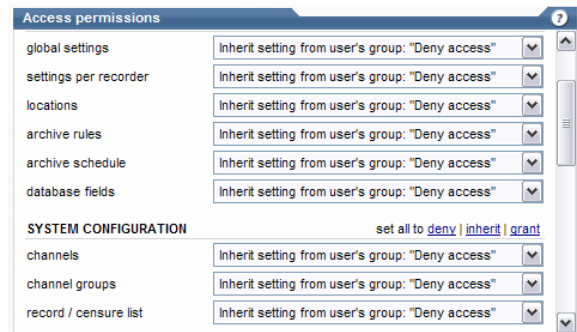
Option	Value
My Account	
My settings	Deny / Inherit / Grant
System Installation	
Settings per recorder	Deny / Inherit / Grant
Locations	Deny / Inherit / Grant
Archive rules	Deny / Inherit / Grant
Archive schedule	Deny / Inherit / Grant
Database fields	Deny / Inherit / Grant
System Configuration	
Channels	Deny / Inherit / Grant
Channel groups	Deny / Inherit / Grant
Record / censure list	Deny / Inherit / Grant
User Administration	Deny / Inherit / Grant
Users	
User details scope	Deny / Inherit / Grant
User permissions scope	Deny / Inherit / Grant
User groups	Deny / Inherit / Grant
Coverages	Deny / Inherit / Grant
System Status	
General info	Deny / Inherit / Grant
Recorder storage	Deny / Inherit / Grant
System messages	Deny / Inherit / Grant
Channel overview	Deny / Inherit / Grant
Audit trail	Deny / Inherit / Grant
Evaluation	
Schedule	Deny / Inherit / Grant
Projects	Deny / Inherit / Grant
Evaluate	Deny / Inherit / Grant
Review	Deny / Inherit / Grant
Reports	Deny / Inherit / Grant
Recorder Calls	Deny / Inherit / Grant
Call search	
Column selection	Deny / Inherit / Grant
Call listing	Deny / Inherit / Grant

5.3.1.4 Call permissions

Permissions for all call activities can be set according to the following configurations:
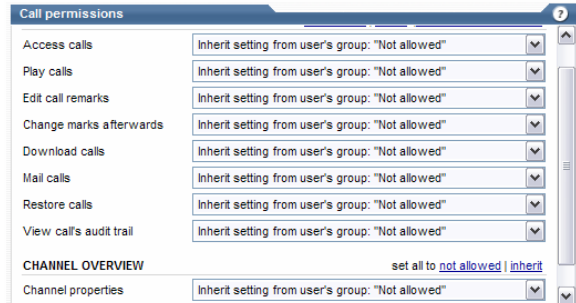
Option	Value
Recorded calls	Not allowed / inherit / same as 'access calls'
Access calls	Not allowed / inherit / same as 'access calls'
Play calls	Not allowed / inherit / same as 'access calls'
Edit call remarks	Not allowed / inherit / same as 'access calls'
Change marks afterwards	Not allowed / inherit / same as 'access calls'
Download calls	Not allowed / inherit / same as 'access calls'
Mail calls	Not allowed / inherit / same as 'access calls'
Restore calls	Not allowed / inherit / same as 'access calls'
View call's audit trail	Not allowed / inherit / same as 'access calls'
Channel overview	
Channel properties	Not allowed / inherit
Real time playback	Not allowed / inherit

5.3.2 User groups

Users can be combined into user groups.

5.3.2.1 Name and description

Each user group can have a name and description. The following options can be configured:
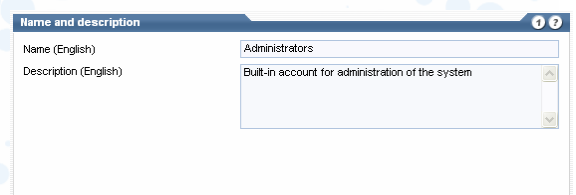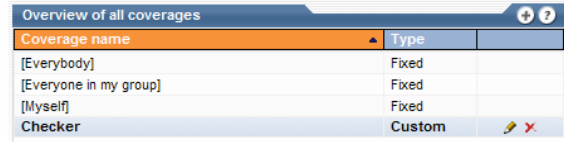
Option	Value
Name	User group name
Description	Description of selected user group

5.3.2.2 Access and call permissions
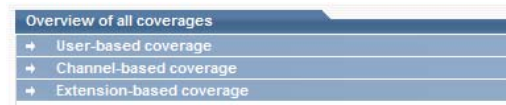
Access and Call permissions can be set for user groups in the same way as they are set for individual users. See 5.3.1.2 and 5.3.1.4.

5.3.3 Coverages

Coverages are a combination of users, channels and/or extensions. They can be used to give certain users or groups of users the same access to recorded calls.

5.4 System status

With the systems status overview, detailed information on the current status of the recording can be retrieved.

5.4.1 General info

The general information section provides details of:

- Installed version numbers
- DLL version numbers
- Dictionary information
- Installed licenses
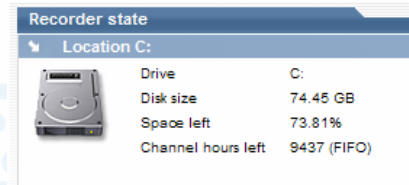
5.4.2 Recorder storage

5.4.2.1 Recorder & Archive media

The recorder and archive state provide an overview of the status of

- Online storage media
- Archive media

5.4.3 System messages

An overview of all system messages can be retrieved from the system. Messages can then be transferred to other applications using standard clipboard functions.

5.4.4 Channel overview

The channel overview gives an overview of all the channels in the recording system.

5.4.4.1 Real-time channel playback

Each individual channel can be monitored in near real time. There is a 2-second delay.

5.4.4.2 Channel properties

The channel status of each individual channel can be changed and manual recording started and stopped. The following options can be configured:
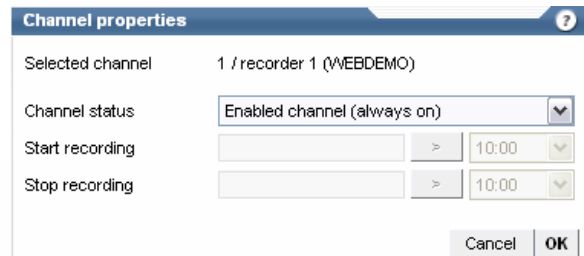
Option	Value
Channel status	Enable / Disable
Start recording	Date & time
Stop recording	Date & time

5.5 Recorded calls

All recorded calls are stored as WAV files (encryption is optional), and all call data is stored in the MySQL database on the server. The Recorded Call and Evaluation menus search and replay calls and, optionally, allow calls to be evaluated.

Recording Overview
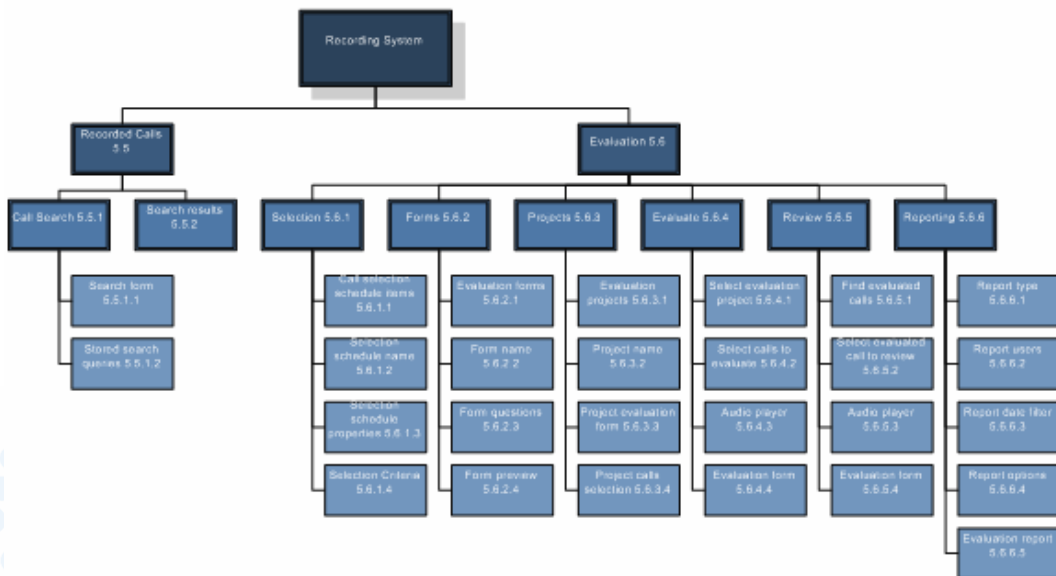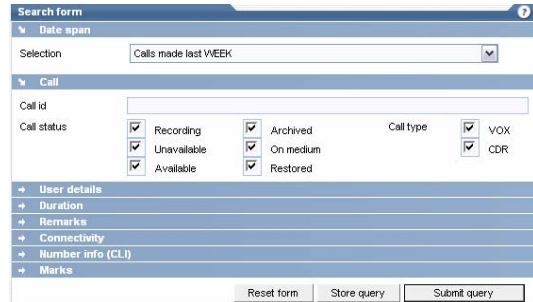
5.5.1 Call search

All recorded calls are stored as WAV files (encryption is optional), and all call data is stored in the MySQL database on the server. The Recorded Call and Evaluation menus search and replay calls and, optionally, allow calls to be evaluated.
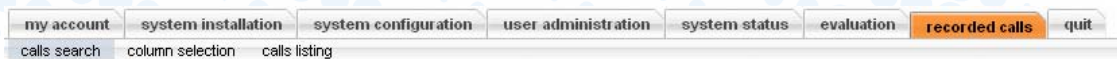
5.5.1.1   Search form
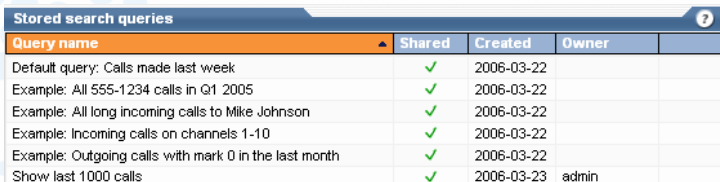
The recording server supports web-based search and replay. The associated browser enables the user to enter a number of search criteria which are then used to return a list of matching call records. Users can search the calls database by channel name, the date and time of the call, the caller's number, the dialled number, the call direction and call marks.

Option	Value
Date span	Date period
Call	Call ID, status and type
User details	User name and criteria to look for
Duration	Duration period
Remarks	Keywords
Connectivity	Channels, extensions, in and/or outgoing calls
Number info (CLI)	Keywords
Marks	Select a mark

5.5.1.2   Stored search queries

The stored search queries provide an overview of the saved search queries. By clicking the query for fast call searching is re-run.
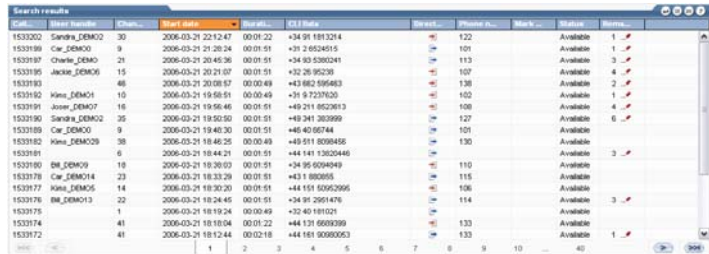
The calls which meet the selection criteria appear in the call overview window. The functions that are available depend on the rights given. They may include Listen to call, Add note to call, View notes to call, Remove call, Store call, and E-mail call.

5.5.2   Search results

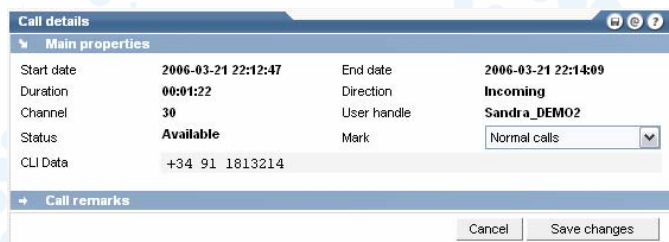This window shows the results of a query. Select a call to commence playback.

The audio player enables calls to be played back. This may be through an external speaker, through the sound card on a PC connected to the WAN or LAN or, as an additional option, through a telephone on the desktop.
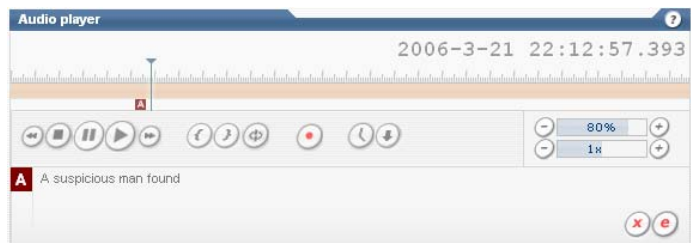
The audio player has the following options:

Option
Play / Pause / Stop
Forward / Backward
Set Loop
Add / Edit comments
Change time display format
Set Volume
Set Speed

The playback window illustrates how the user has full control of audio replay, ranging from simply starting and stopping playback to more advanced control such as adjusting playback speed without pitch distortion. The call can also be sent as a .WAV file to a remote location.


The replay application also enables the user to transcribe free text to each of the calls. Any text which has been annotated to the call can then be used as search criteria.

5.6 Evaluation

The evaluation application is integrated into the search & replay application. Using a separate menu, the calls for evaluation can be selected, evaluated and reviewed. A report module is available for generating individual, group or company reports.
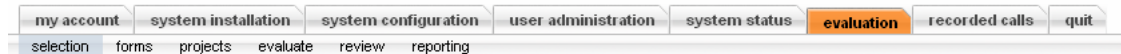
The evaluation application consists of 6 parts:

1. **Selection**
2. **Forms**
3. **Projects**
4. **Evaluate**
5. **Review**
6. **Reporting**

5.6.1 Selection

In the selection part, the calls that need to be evaluated are selected from all the recorded calls.

5.6.1.1 Selection schedule name
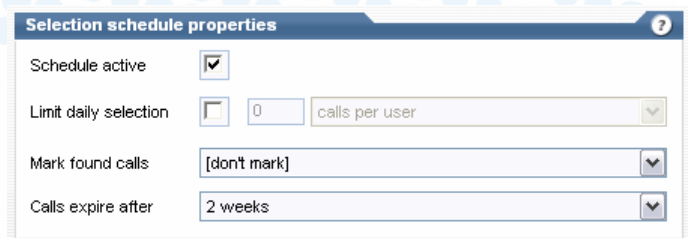
Each schedule for selecting calls is given a name.

Option	Value
Schedule name	State a schedule name

5.6.1.2 Selection schedule properties

The parameters for selecting the calls can be set using the following configurations:

Option	Value
Schedule active	Enable/Disable
Limit daily selection	Max. number of calls per user/day
Mark found calls	Yes/No
Calls expire after	Time period

5.6.1.3 Selection Criteria

Selection criteria are used for the query of the search. A call selection is based on date, weekday & hour, user or user group, duration, direction, CLI data and mark.
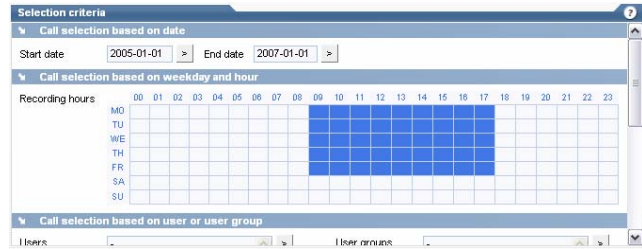
The following options can be configured:

Option	Value
Call selection based on date	Date period
Call selection based on weekday and hour	Weekday and hour periods
Call selection based on user or user group	User or user group
Call selection based on duration	Time period
Call selection based on direction	Incoming/outgoing
CLI data	Keywords
Mark	Single or multiple marks

5.6.2 Forms

Electronic forms are used to rate the performance of an agent. Each form is made up of a series of sections and questions, with each section and question carrying an individual weighting in the total score.

5.6.2.1 Form name

Each form is given a name.

Option	Value
Form Name	Name

5.6.2.2 Form questions

The questions are grouped into sections with each question having 2, 5 or 10 possible answers with minimum and maximum values (e.g., using words like Yes/No, Bad/Good or numbers (1...10). There is no limit to the number of questions or sections. Each section and question is weighted in the total score.

5.6.2.3 Form preview

Each question in the form has a score bar. The score is dragged to the required positions using a mouse. The score is re-calculated each time a question is answered.

5.6.3 Projects

Each evaluation project consists of three parts:

- The selection schedule
- A form
- The assigned project evaluators

5.6.3.1 Project name

Each project is given a name. The following options can be configured:

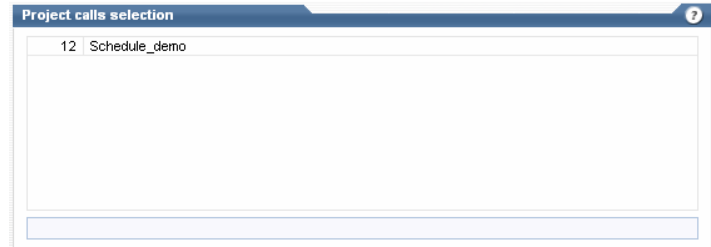| Option	Value
Project Name	Name
Assigned project evaluators	Selected user(s)

5.6.3.2 Project evaluation form

Each project is assigned a form. The following options can be configured:

Option	Value
Evaluation form	Evaluation form name

5.6.3.3 Project calls selection

One or more selection schedules can be assigned to the project.

5.6.4   Evaluate

The evaluation starts when an evaluator selects a project that is assigned to them.

5.6.4.1 Select evaluation project
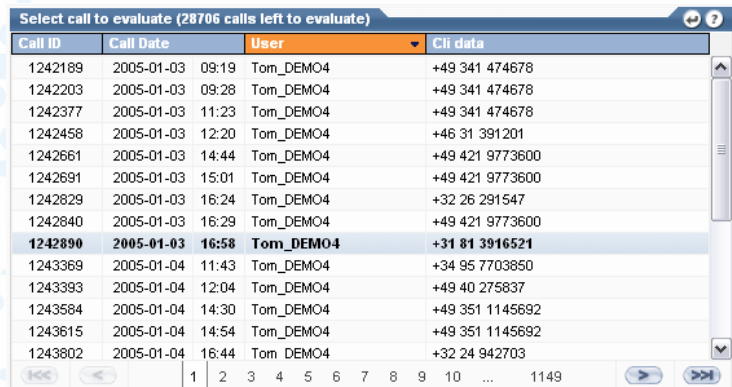
Here, a project can be selected for evaluation.

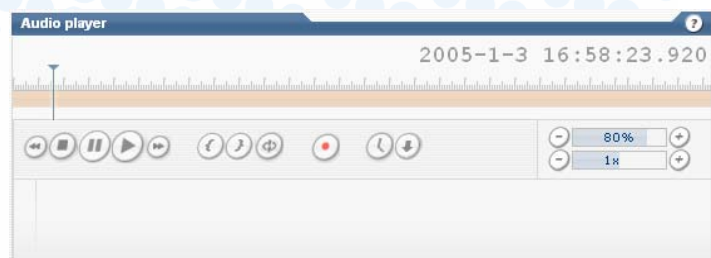| Option	Value
Evaluation project	Project name

5.6.4.2 Select calls to evaluate

From the list of calls generated by the selection schedule, the evaluator can select a call to evaluate.

5.6.4.3 Audio player
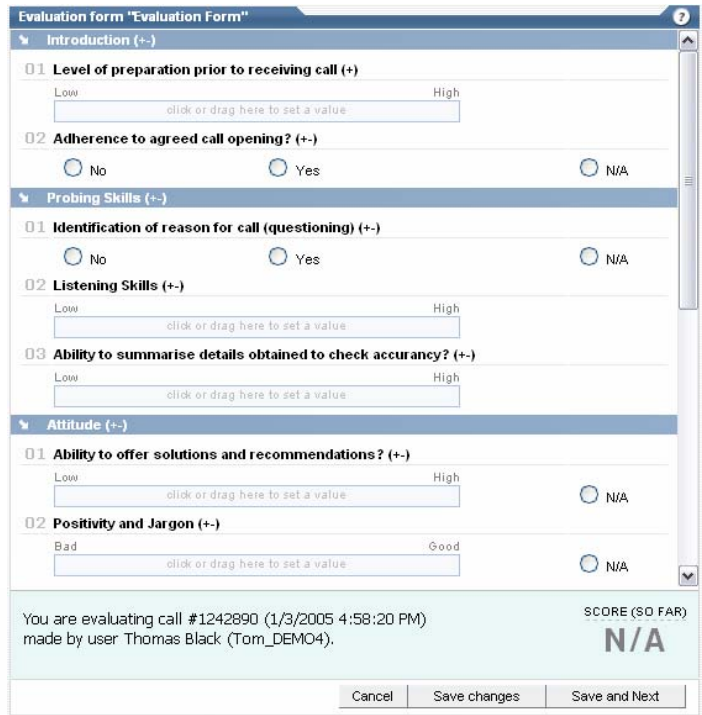
When a call is selected for evaluation, the standard integrated audio player will play the call.

5.6.4.4 Evaluation form

The evaluator can complete the evaluation form while listening to the call. The score is re-calculated automatically after each question.

After completing the form, the data is saved in the database. The next call from the list can then be selected for evaluation.

5.6.5 Review
Once the evaluations have completed, the results can be reviewed.

5.6.5.1 Find evaluated calls
The calls that need to be reviewed after evaluation can be found according to a variety of parameters:

Option	Value
Evaluation project	Project name
Select date span	Date(s)
From users	User(s)

5.6.5.2 Select evaluated call to review

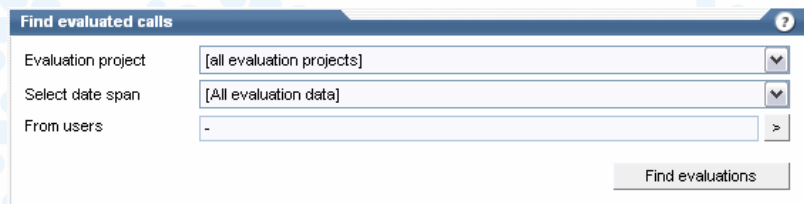From the list of calls, a call can be selected for review. Once the call has been selected, it will be replayed using the standard audio player. The evaluation form can also be viewed, but the data in the form can no longer be modified.

5.6.6 Reporting

A range of reports can be generated using the stored evaluation scores.

5.6.6.1 Report type

This allows the type of report to be selected:

- Agent – scoring averages
- Group(s) – scoring averages
- Agent(s) compared to Group(s)
- Agent(s) compared to Company Average
- Group(s) compared to Company Average
- Agent(s) and Group(s) compared to Company Average

Option	Value
Select report	Select report type
Include deleted users	On/off
Include deleted projects	On/off

5.6.6.2 Report users

The users and/or user groups on who the report should be generated can be selected in this section. The following options can be configured:

Option	Value
Users	Select users
Groups	Select groups
Explode groups	On/off
Incl. company average	On/off

5.6.6.3   Report date filter

Reports can be generated for a specific project or data span. The following options can be configured:

Option	Value
Select project	Select project
Select date span	Date
Start date	Date
Search and report by	Select type

5.6.6.4   Report options

An optional feature displays the report data. The following options can be configured:

Option	Value
Show report data	On/off
Include empty entries	On/off

5.6.6.5   Evaluation report

Once the parameters have been set, a report can be generated. By hovering over a bar on the graph, more details will appear. Clicking on a bar will 'zoom in' on the specific results and generate a new graph:
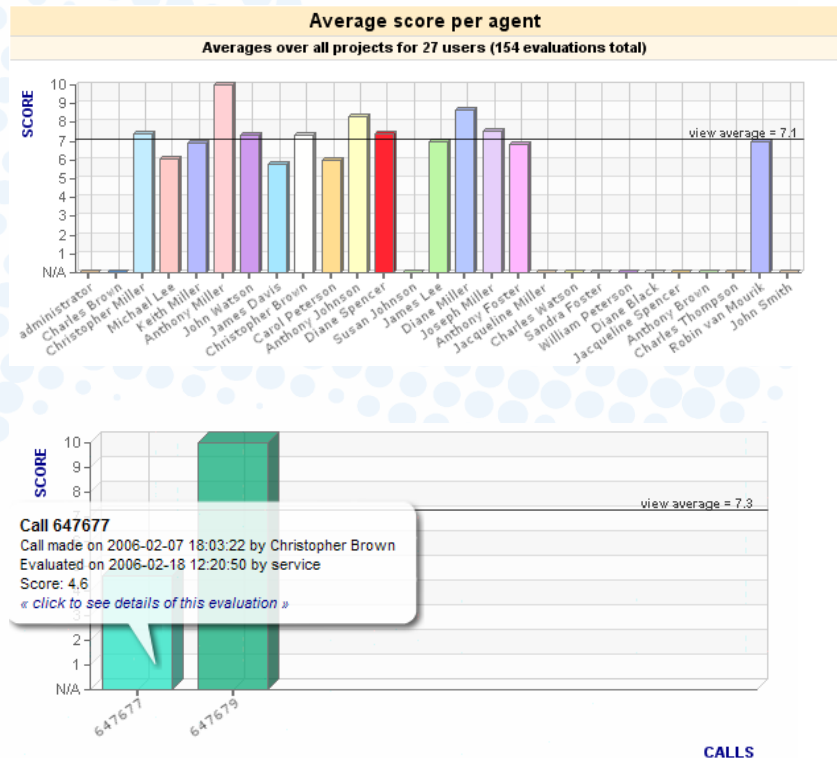
6 Applications

The standard 'search & replay' features may be supplemented by additional, optional applications which are available through the standard web-based user interface. There are two types of applications:

- **Client applications**
- **Module applications**
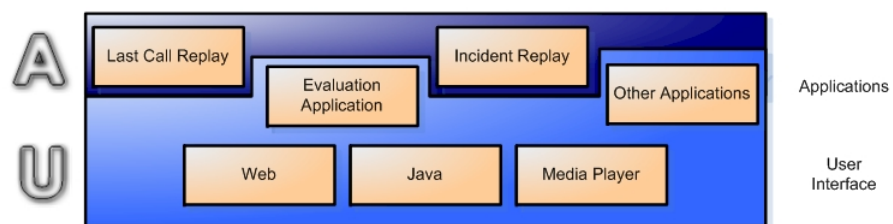
The client applications are 'fat' clients which need to be installed on each workstation that requires the application. Two client applications are currently available:

- **Incident Replay Application**
- **Last Call Replay Application**

A module application is fully integrated into the standard 'search & replay' application. It is web-based and does not need to be installed on workstations. Module applications are licensed by a license key. One module is currently available:

- **Evaluation Application**

6.1 Evaluation Application

The Evaluation Application is integrated into the recording system's standard user interface. The application is described in Chapter 5.6 Evaluation.

6.2 Incident Replay Application

The Incident Replay Application has been specially developed for the search and replay of digital radio recordings. The Incident Replay Application is an intuitive and easy-to-use application for rapid and accurate incident reconstruction from different audio sources (Radio, PBX, etc.), as captured by the recording system.

The Incident Replay Application satisfies the most common requirement in control rooms for analysing specific emergency situations where the simultaneous replay of all communications is necessary to accurately reconstruct a scenario. Valuable time can be saved in collecting the required evidential information which can then be used to more quickly resolve the incident.

The Incident Replay Application can also be used to analyse operational efficiency by providing a clear overview of how teams operate, helping to improve their interaction.

Additionally, Incident Replay is a powerful tool for training new team members by allowing them to easily review real life scenarios.
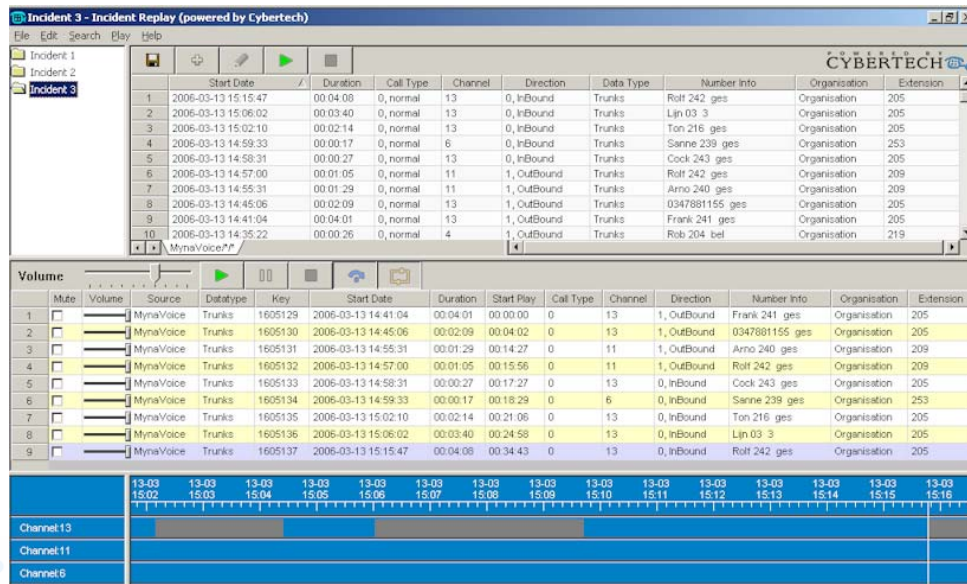
The Incident Replay Application:

- Connects to different data sources at the same time and combines the search results into one scenario

- Reproduces search and replay in the same window, making it very easy for the end user to search and play directly

- Enables easy replay of complete scenarios

- Is a user friendly application with a familiar 'look and feel' for Windows users

- Has low implementation costs due to its compatibility with standard recording systems

- Can save a complete scenario and write it to DVD or e-mail it. Once saved the calls can be replayed using programs such as Microsoft Media.

- Has configurable columns. Name and data type for each column can be changed and columns can be added or removed.

- Has a configurable time line with different colours for each data type

- Can mute selected channels to improve understanding of the way in which events unfolded

The Incident Replay Application provides a powerful array of search capabilities to enable to retrieve any case easily. Searching a call or a series of calls is easy using the following search criteria:

Option	Value
Description	Select
Start time	Select date en time On/off
Data Source	Select
End time	Select date, time On/off
Data type	Select type
Minimal duration	Select duration On/off
Maximal duration	Select duration On/off
Organisation	Select organisation
Search criteria	• channel • direction • duration • extension • key • number info • start date
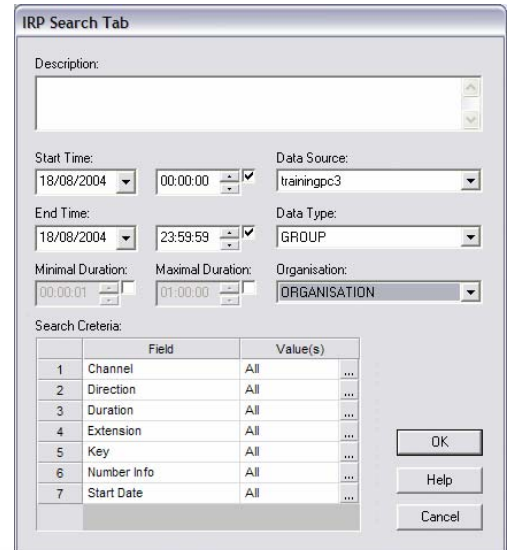
By adding the Incident Replay Application to the recording system, incidents can be replayed exactly as they occurred, combining different audio sources into one complete application.

6.3 Last Call Replay Application

With this small and easy to use application, the last calls from the recording system can be easily found and replayed.

The Last Call Replay Application resides in the MS-Windows XP system tray and can be used in two ways:

1. Immediately replay the last call.

2. List the last calls and select one for replay.

By clicking on the icon in the MS-Windows XP system tray, the last call from the recording system is automatically played again.
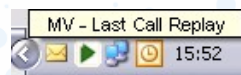
By starting the Last Call Replay Application, a selection for replay can be made from the last available calls.

![CYBERTECH logo] CYBERTECH
TELECOM DEVELOPMENT
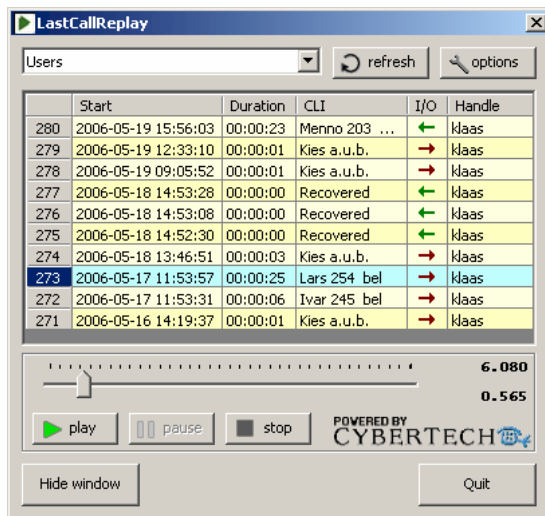
The Last Call Replay Application:

• Replays last call(s) with one click, eliminating the need for starting the Search & Replay application.

• Has easy-to-use software

• Includes configurable user selection

• Automatically searches the recorder of the logged-on recording system

• Provides the same access rights to the main recording system as the Last Call Replay Application

6.4 PC Replay Application

The PC Replay Station Application allows users to search and replay calls from an archive location without having a live connection to the recording system. Calls can be retrieved using any PC from all the available archive locations, such as DVD RAM media or a network archive location (NAS/SAN).

The PC Replay Station Application is compatible with the latest versions of the recording system and uses the standard web browser based graphical user interface. The application can be installed on any standalone PC with the following minimal configuration:

• MS-Windows XP Operating System

• MS-Explorer version 5 or higher

Calls are first imported from the archive media into the PC Replay Station Application database, from where the selected calls can be replayed.

6.5 Recorder API

An API (or Application Program Interface) is a set of routines, protocols, and tools for building software applications. The Recorder API makes it easier to develop a software application that talks to the recording system by providing the building blocks. A programmer then puts the blocks together. With the Recorder API the recording system can be integrated into the customers own IT environment.

The Recorder API will:

- Start/stop/monitor call recording of a specific channel (standalone system or core server only. The Recorder API cannot be used for satellites)

- Write additional information to the database (e.g., Account nr, Customer ID, marking, etc.)

- Read call information from the database

- Retrieve audio files from the recording system

- Register free seating agents

- Call Replay actions

- Collect real-time channel status information (core server only, not for satellites)

The Recorder API can be used for three types of events:
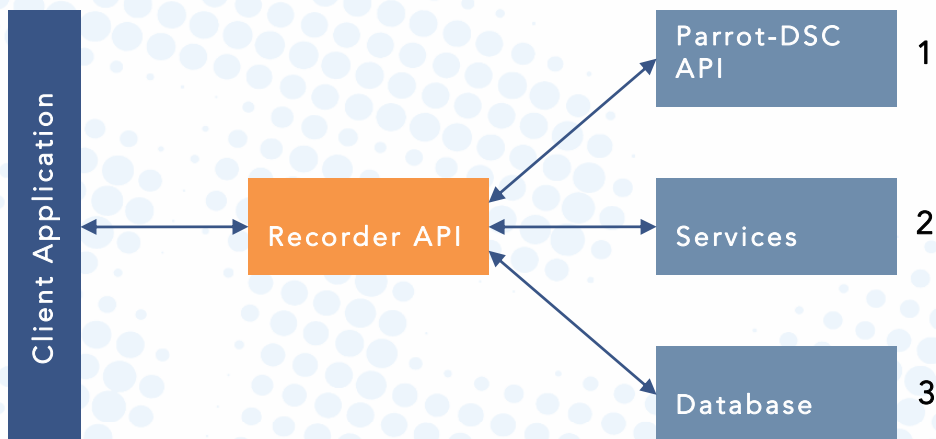
Appendix A - Available tapping cards

Myracle

Boards: Analogue, incl. software
Myracle, 4 Analog ch., Parallel, Short size PCI
Myracle, 4 Analog ch., Parallel, Short size PCI-E
Myracle, 8 Analog ch., Parallel, Short size PCI
Myracle, 8 Analog ch., Parallel, Short size PCI-E
Myracle, 8 Analog ch., Parallel, Medium PCI-E
Myracle, 8 Analog ch., Parallel, Full size PCI
Myracle, 8 Analog ch., Parallel, Full size PCI-E
Myracle, 16 Analog ch., Parallel, Medium PCI-E
Myracle, 16 Analog ch., Parallel, Full size PCI-E
Myracle, 16 Analog ch., Parallel, Full size PCI
Myracle, 24 Analog ch., Parallel, Full size PCI
Myracle, 24 Analog ch., Parallel, Full size PCI-E

Boards: Analogue + Beep Tone, incl. software
Myracle, 4 Analog+BT ch., Parallel, Short PCI-E
Myracle, 8 Analog+BT ch., Parallel, Short PCI
Myracle, 8 Analog+BT ch., Parallel, Short PCI-E
Myracle, 8 Analog+BT ch., Parallel, Med. PCI-E
Myracle, 8 Analog+BT ch., Parallel, Full PCI-E
Myracle, 8 Analog+BT ch., Parallel, Full PCI
Myracle, 16 Analog+BT ch., Parallel, Med. PCI-E
Myracle, 16 Analog+BT ch., Parallel, Full PCI-E
Myracle, 16 Analog+BT ch., Parallel, Full PCI
Myracle, 24 Analog+BT ch., Parallel, Full PCI
Myracle, 24 Analog+BT ch., Parallel, Full PCI-E

Boards: Digital Parallel, incl. software
Myracle, 4 Digital ch., Parallel, Short size PCI
Myracle, 4 Digital ch., Parallel, Short size PCI-E
Myracle, 8 Digital ch., Parallel, Short size PCI
Myracle, 8 Digital ch., Parallel, Short size PCI-E
Myracle, 8 Digital ch., Parallel, Medium PCI-E
Myracle, 8 Digital ch.,Parallel, 2 wires, Full PCI
Myracle, 8 Digital ch.,Parallel, 2 wires, Full PCI-E
Myracle, 16 Digital ch., Parallel, Medium PCI-E
Myracle, 16 Digital ch., Parallel, Full size PCI-E
Myracle, 16 Digital ch., Parallel, Full size PCI
Myracle, 24 Digital ch., Parallel, Full size PCI-E
Myracle, 24 Digital ch., Parallel, Full size PCI

Boards: Digital Serial, incl. software
Myracle, 4 Digital ch., Serial, Short size PCI
Myracle, 4 Digital ch., Serial, Short size PCI-E
Myracle, 4 Digital ch., Serial, Medium PCI-E
Myracle, 4 Digital ch., Serial, Full size PCI-E
Myracle, 4 Digital ch., Serial, Full size PCI
Myracle, 8 Digital ch., Serial, Medium PCI-E
Myracle, 8 Digital ch., Serial, Full size PCI
Myracle, 8 Digital ch., Serial, Full size PCI-E
Myracle, 12 Digital ch., Serial, Full size PCI-E
Myracle, 12 Digital ch., Serial, Full size PCI

Boards: Trunks, incl. software
Myracle, first 8 ch., E1/T1, Short size PCI
Myracle, first 8 ch., E1/T1, Short size PCI-E
Myracle, first 16 ch., E1/T1, Short size PCI
Myracle, first 16 ch., E1/T1, Short size PCI-E
Myracle, first 24 ch., E1/T1, Short size PCI
Myracle, first 24 ch., E1/T1, Short size PCI-E
Myracle, 32 ch., E1/T1, Short size PCI
Myracle, 32 ch., E1/T1, Short size PCI-E
Myracle, 32 ch., E1/T1, Medium size PCI-E
Myracle, 32 ch., E1/T1, Full size PCI-E
Myracle, 32 ch., E1/T1, Full size PCI
Myracle, 64 ch., E1/T1, Medium size PCI-E
Myracle, 64 ch., E1/T1, Full size PCI-E
Myracle, 64 ch., E1/T1, Full size PCI

Boards: VoIP, incl. software
Myracle, VoIP 4 ch. base license (incl. SPCI-E)
Myracle, VoIP 4 ch. base license (incl. SPCI card)
Myracle, VoIP from 4 to 8 ch. licenses upgrade
Myracle, VoIP 8 ch. base license (incl. SPCI-E)
Myracle, VoIP 8 ch. base license (incl. SPCI card)
Myracle, VoIP 8 ch. additional licenses

Baseboards only
Myracle Baseboard, Short size PCI-E
Myracle Baseboard, Short size PCI
Myracle Baseboard, Medium size PCI-E
Myracle Baseboard, Full size PCI-E
Myracle Baseboard, Full size PCI

Modules excl. licenses
Module, 8 Analog ch., Parallel
Module, 8 Analog ch., Parallel, +Beep Tone
Module, 8 Digital ch., Parallel
Module, 4 Digital ch., Serial
Module, 32 ch., E1/T1

Licenses only
Myracle, 4 ch. Analogue recording license
Myracle, 8 ch. Analogue recording license
Myracle, 8 ch. Analogue+Beep recording lic.
Myracle, 4 ch. Digital par. recording license
Myracle, 8 ch. Digital par. recording license
Myracle, 4 ch. Digital serial recording license

Myracle, 8 ch. additional E1/T1 recording license
Myracle, 32 ch. E1/T1 recording license
Myracle, VoIP from 4 to 8 ch. licenses upgrade
Myracle, VoIP 8 ch. additional licenses

Additional VoIP options
VoIP G.729A license for 8 channels
VoIP conc. channels, ratio 0%..25%, additional
VoIP conc. channels, ratio 26%.50%, additional
VoIP conc. channels, ratio 51%..100%, additional

Pro

Boards: Analogue, incl. software
Pro, 4 Analog ch., Parallel, Short size PCI-E
Pro, 8 Analog ch., Parallel, Short size PCI
Pro, 8 Analog ch., Parallel, Short size PCI-E
Pro, 8 Analog ch., Parallel, Medium PCI-E
Pro, 8 Analog ch., Parallel, Full size PCI
Pro, 8 Analog ch., Parallel, Full size PCI-E
Pro, 16 Analog ch., Parallel, Medium PCI-E
Pro, 16 Analog ch., Parallel, Full size PCI
Pro, 16 Analog ch., Parallel, Full size PCI-E
Pro, 24 Analog ch., Parallel, Full size PCI
Pro, 24 Analog ch., Parallel, Full size PCI-E

Boards: Analogue + Beep Tone, incl. software
Pro, 4 Analog+BT ch., Parallel, Short PCI-E
Pro, 8 Analog+BT ch., Parallel, Short PCI
Pro, 8 Analog+BT ch., Parallel, Short PCI-E
Pro, 8 Analog+BT ch., Parallel, Medium PCI-E
Pro, 8 Analog+BT ch., Parallel, Full size PCI
Pro, 8 Analog+BT ch., Parallel, Full size PCI-E
Pro, 16 Analog+BT ch., Parallel, Medium PCI-E
Pro, 16 Analog+BT ch., Parallel, Full size PCI
Pro, 16 Analog+BT ch., Parallel, Full size PCI-E
Pro, 24 Analog+BT ch., Parallel, Full size PCI
Pro, 24 Analog+BT ch., Parallel, Full size PCI-E

Boards: Digital Parallel, incl. software
Pro, 8 Digital ch., Parallel, Short size PCI
Pro, 8 Digital ch., Parallel, Short size PCI-E
Pro, 8 Digital ch., Parallel, Medium PCI-E
Pro, 8 Digital ch., Parallel, Full size PCI
Pro, 8 Digital ch., Parallel, Full size PCI-E
Pro, 16 Digital ch., Parallel, Medium PCI-E
Pro, 16 Digital ch., Parallel, Full size PCI
Pro, 16 Digital ch., Parallel, Full size PCI-E
Pro, 24 Digital ch., Parallel, Full size PCI
Pro, 24 Digital ch., Parallel, Full size PCI-E

Boards: Digital Serial, incl. software
Pro, 4 Digital ch., Parallel, Serial, Short size PCI
Pro, 4 Digital ch., Parallel, Serial, Short size PCI-E
Pro, 4 Digital ch., Parallel, Serial, Medium PCI-E
Pro, 4 Digital ch., Parallel, Serial, Full size PCI
Pro, 4 Digital ch., Parallel, Serial, Full size PCI-E
Pro, 8 Digital ch., Parallel, Serial, Medium PCI-E
Pro, 8 Digital ch., Parallel, Serial, Full size PCI
Pro, 8 Digital ch., Parallel, Serial, Full size PCI-E

Pro, 12 Digital ch., Parallel, Serial, Full PCI
Pro, 12 Digital ch., Parallel, Serial, Full PCI-E

Boards: Trunks, incl. software
Pro, first 8 ch., E1/T1, Short size PCI
Pro, first 8 ch., E1/T1, Short size PCI-E
Pro, first 16 ch., E1/T1, Short size PCI
Pro, first 16 ch., E1/T1, Short size PCI-E
Pro, first 24 ch., E1/T1, Short size PCI
Pro, first 24 ch., E1/T1, Short size PCI-E
Pro, 32 ch., E1/T1, Short size PCI
Pro, 32 ch., E1/T1, Short size PCI-E
Pro, 32 ch., E1/T1, Medium PCI-E
Pro, 32 ch., E1/T1, Full size PCI
Pro, 32 ch., E1/T1, Full size PCI-E
Pro, 64 ch., E1/T1, Medium size PCI-E
Pro, 64 ch., E1/T1, Full size PCI
Pro, 64 ch., E1/T1, Full size PCI-E
Pro, 96 ch., E1/ T1, Full size PCI
Pro, 96 ch., E1/ T1, Full size PCI-E

Boards: PCM, incl. software
Pro, 32 ch., PCM32, Short size PCI
Pro, 32 ch., PCM32, Short size PCI-E
Pro, 32 ch., PCM32, Medium size PCI-E
Pro, 32 ch., PCM32, Full size PCI
Pro, 32 ch., PCM32, Full size PCI-E
Pro, 64 ch., PCM32, Medium PCI-E
Pro, 64 ch., PCM32, Full size PCI
Pro, 64 ch., PCM32, Full size PCI-E
Pro, 96 ch., PCM32, Full size PCI
Pro, 96 ch., PCM32, Full size PCI-E

Boards: VoIP, incl. software
Pro, VoIP 4 ch. base license (incl. s-PCI card)
Pro, VoIP 4 ch. base license (incl. s-PCI-E card)
Pro, VoIP from 4 to 8 ch. licenses upgrade
Pro, VoIP 8 ch. base license (incl. s-PCI card)
Pro, VoIP 8 ch. base license (incl. s-PCI-E card)
Pro, VoIP 8 ch. additional licenses

Baseboards only
Pro Baseboard, Short size PCI
Pro Baseboard, Short size PCI-E
Pro Baseboard, Medium size PCI-E
Pro Baseboard, Full size PCI
Pro Baseboard, Full size PCI-E

Modules excl. licenses

Module, 8 Analog ch., Parallel

Module, 8 Analog ch., Parallel, + Beep Tone

Module, 8 Digital ch., Parallel

Module, 4 Digital ch., Parallel, Serial

Module, 32 channels E1/T1, Parallel

Licenses only

Pro, 8 ch. Analogue recording license

Pro, 8 ch. Analogue+Beep recording lic.

Pro, 8 ch. Digital par. recording license

Pro, 4 ch. Digital serial recording license

Pro, 8 ch. additional E1/T1 recording license

Pro, 32 ch. E1/T1 recording license

Pro, VoIP from 4 to 8 ch. licenses upgrade

Pro, VoIP 8 ch. additional licenses

Additional VoIP options

VoIP G.729A license for 8 channels

VoIP concurrent channels, ratio 0%..25%

VoIP concurrent channels, ratio 26%..50%

VoIP concurrent channels, ratio 51%..100%

Appendix B - Supported connectivity

VoIP	(via Spanning port)
Alcatel VoIP	IP Touch 4018, IP Touch 4028, IP Touch 4038, IP Touch 4068 4010 IP e-Reflexes Easy / D351 IP 4020 IP e-Reflexes Premium / D352 IP, 4980 Soft phone 4035 IP e-Reflexes Advanced / D354 IP, PIMphony (Basic / Pro / Team)
Avaya VoIP	4601 IP,4601 IP, 4610SW IP, 4620 IP, 4621SW IP, 4622SW IP 4625 IP, 4630SW IP, 4690 IP Speakerphone, 5601 IP, 5602 IP 5610 IP, 5620 IP
Cisco VoIP	7902G, 7905G, 7906G, 7910G, 7911G, 7912G, 7920 Wireless 7935 Conference Station, 7936 Conference Station, 7940G, 7941G/GE, 7960G, 7961G/GE, 7970G, 7971G/GE, 7985G-GE
Ericsson VoIP	Dialog 4422 IP Office, Dialog 4425 IP Vision
VoIP h323/ h225	H323 / H225 (start-stop + nr info)
Mitel VoIP	5201 IP Phone, 5207 IP Phone, 5215 IP Phone (Dual Mode) 5220 IP Phone (Dual Mode), 5230 IP Phone, 5235 IP Phone 5240 IP Phone
Nortel VoIP	IP Phone 2001, IP Phone 2002, IP Phone 2004, IP Phone 2007 IP Phone 1110, IP Phone 1120E, IP Phone 1140E , WLAN Handset 2210, WLAN Handset 2211 IP Audio Conference Phone 2033, Mobile Voice Client 2050 IP Softphone 2050, Mobile USB Headset Adapter for IP Softphones
Selta VoIP	Netfon 200, Netfon 400
VoIP SIP	SIP
VoIP VOX	RTP Audio

Digital Parallel	
Alcatel 4200/4400/	4003, 4011, 4012, 4023, 4034, 4004 Reflex first, 4010 Reflex easy 4059 PC operator, 4019 (9-series), 4029 (9-series), 4039 (9-series) 4020 Reflex premium, 4035 Reflex advanced
Ascom Alcatel	Office 20, Office 30, Office 40, Office 25, Office 35, Office 45/45pro, Office 130/130pro, Crystal (use S0 ETSI protocol)
Aspect	Teleset Model 3010, Teleset Model 3190, Teleset Model 3192
Avaya 5ESS	8510 ISDN, 8520 ISDN, 8528 ISDN, 75xx series (firmware fp3.x)
Avaya Definity 2-wire	24xx series, 64xx series, 84xx series, Call Master III, Call Master IV Call Master V, Call Master VI, 302 Attendant Console
Avaya Definity 4-wire	74xx series, 84xx series, 94xx series, CallMaster I, CallMaster II CallMaster III, CallMaster IV, CallMaster V, 302 Attendant Console

Avaya Merlin Legend MLX 2-wire	Avaya Merlin Magix MLX, OpenCom 1000, Telrad IS, Varix 840
Avaya Merlin Legend MLX 4-wire	Realitis DX, BRI ETSI, BRI 1TR6, BRI Euro ISDN, BRI 5ESS BRI National ISDN NI-1, BRI DMS-100, Avaya Merlin Magix (BRI) MLX Avaya Definity 75xx series, Bosch Integrall 4-wire sets Opencom 1000, Telrad IS, Varix 840
Avaya/Tenovis Integral 2-wire	TB13, TE13, TH13, TM13, TS13, TH93, TH93C, T3 Classic, T3 Comfort
Avaya/Tenovis Integral 4-wire	Realitis DX, BRI ETSI, BRI 1TR6, BRI Euro ISDN, BRI 5ESS BRI National ISDN NI-1, BRI DMS-100, Avaya Merlin Magix (BRI) MLX Avaya Definity 75xx series, Bosch Integrall 4-wire sets Opencom 1000, Telrad IS, Varix 840
Bosch Integral 2-wire	TB13, TE13, TH13, TM13, TS13, TH93 TH93C, T3 Classic, T3 Comfort
Bosch Integral 4-wire	Realitis DX, BRI ETSI, BRI 1TR6, BRI Euro ISDN, BRI 5ESS BRI National ISDN NI-1, BRI DMS-100, Avaya Merlin Magix (BRI) MLX Avaya Definity 75xx series, Bosch Integrall 4-wire sets Opencom 1000, Telrad IS, Varix 840
DMS-100 (BRI)	Realitis DX, BRI ETSI, BRI 1TR6, BRI Euro ISDN, BRI 5ESS BRI National ISDN NI-1, BRI DMS-100, Avaya Merlin Magix (BRI) MLX Avaya Definity 75xx series, Bosch Integrall 4-wire sets Opencom 1000, Telrad IS, Varix 840
EADS	MC401, MC405, MC420, MC520, MC620, MC640
Ericsson Business Phone Elu25/28	DBC199, DBC210 (Dialog 3210), DBC201/211 (Dialog 3201/3211) DBC202/212 (Dialog 3202/3212), DBC203/213 (Dialog 3203/3213) DBC214 (Dialog 3214), DBC220 (Dialog 4220 Lite) *(*))* DBC222 (Dialog 4222 Office) (*) DBC223 (Dialog 4223 Professional) (*) DBC224 (Dialog 4224 Operator) (*) DBC225 (Dialog 4225 Vision) (*) DBC601 (Dialog 2601), DBC631 (Dialog 2631), DBC661 (Dialog 2661) DBC662 (Dialog 2662), Operator Workstation (OWS) Operator Console (OPI II), Operator Console (OPI 3213) Trader Panel CTT10 / CTT11, Trader Panel TIU, Business Phone Sets
Ericsson MD110 Elu25/28	DBC199, DBC210 (Dialog 3210), DBC201/211 (Dialog 3201/3211) DBC202/212 (Dialog 3202/3212), DBC203/213 (Dialog 3203/3213) DBC214 (Dialog 3214), DBC220 (Dialog 4220 Lite) (*) DBC222 (Dialog 4222 Office) (*) DBC223 (Dialog 4223 Professional) (*) DBC224 (Dialog 4224 Operator) (*) DBC225 (Dialog 4225 Vision) (*) DBC601 (Dialog 2601), DBC631 (Dialog 2631), DBC661 (Dialog 2661) DBC662 (Dialog 2662), Operator Workstation (OWS) Operator Console (OPI II), Operator Console (OPI 3213) Trader Panel CTT10 / CTT11, Trader Panel TIU, Business Phone Sets

Fujitsu Coral	DKT-E 1110, DKT-E 2320, DKT-E 2311, DKT-E 2321, DKT-E 2322 DST-E, FLEXSET 120 series, FLEXSET 280 series
Generic S0 (BRI)	Realitis DX, BRI ETSI, BRI 1TR6, BRI Euro ISDN, BRI 5ESS BRI National ISDN NI-1, BRI DMS-100, Avaya Merlin Magix (BRI) MLX Avaya Definity 75xx series, Bosch Integrall 4-wire sets Opencom 1000, Telrad IS, Varix 840
Generic Up0	Avaya Merlin Magix MLX, OpenCom 1000, Telrad IS, Varix 840
Intertel Axxess	550.4000 Standard Display Phones, 550.4100 Executive Display Phone 550.4300 Basic Phone, 550.4400 Standard Display Phone 550.4500 Executive Display Phone, 550.8500 Intertel Axxess Basic Digital Phone 550.8520 Intertel Axxess Standard Display Phone 550.8560 Intertel Axxess Executive Display Phone
ISDN2 ETSI/1TR6	ETSI, 1TR6, National ISDN1, INS-64
LG Aria (Lucky Goldstar)	LKD-2NS (2-Button Non-Display Keyphone) LKD-8DS (8-Button Display Keyphone) LKD-30D (30-Button Display Keyphone) LKD-30LD (30-Button Large Display Keyphone) LDP-7004D (4-Button Non-Display Keyphone) LDP-7008D (8-Button Display Keyphone) LDP-7016D (16-Button Display Keyphone) LDP-7024D (24-Button Display Keyphone), LDP-7024LD (24-Button Large Display Keyphone), LGP-xxx
LG Starex-VSP	LKD-2NS (2-Button Non-Display Keyphone) LKD-8DS (8-Button Display Keyphone) LKD-30D (30-Button Display Keyphone) LKD-30LD (30-Button Large Display Keyphone) LDP-7004D (4-Button Non-Display Keyphone) LDP-7008D (8-Button Display Keyphone) LDP-7016D (16-Button Display Keyphone) LDP-7024D (24-Button Display Keyphone), LDP-7024LD (24-Button Large Display Keyphone), LGP-xxx
NEC	DTP-8-1, DTP-16-1, DTP-8D-1, DTP-16D-1, DTP-32D-1, DTP-32DE-1 DTU-8-1, DTU-16-1, DTU-32-1, DTU-8D-1, DTU-8D-2, DTU-16D-1 DTU-16D-2, DTU-32D-1, DTU-32D-2, ETJ-8-2, ETJ-16DC-1 (or 2) ETJ-16-2DD, SN716 Desk Console
NEC Aspire/Aspila	Soon Available
Nitsuko DX2E	Soon Available
Nortel Matra	MC401, MC405, MC420, MC520, MC620, MC640
Nortel Meridian M1	M2006 (Aries), M2008 (Aries), M2009 (Aries), M2018 (Aries) M2216 (Aries), M2316 (Aries), M2616 (Aries), M3110 (Orion) M3310 (Orion), M3820 (Orion), M2250 (single extension only) M3901 (Taurus), M3902 (Taurus), M3903 (Taurus), M3904 (Taurus) M3905 (Taurus)

Nortel Norstar	M7100, M7208, M7310, M7316, M7324, M7410, T7100, T7208, T7316
Panasonic KX-TD/TDA	KX-T 70xx, KX-T 72xx, KX-T 73xx, KX-T 74xx, KX-T 75xx, KX-T 76xx, KX-T 77xx
Philips Sopho 2-wire	d310 /2 Ergoline mod 1 2-wire, d320 /2 Ergoline mod 2 2-wire d325 /2 Ergoline mod 3 2-wire, d330 /2 Ergoline mod 3 2-wire d340 /2 Ergoline mod 4 2-wire
Philips Sopho 4-wire	d622S, d623S, d624S, d310 / Ergoline mod 1 4-wire d320 / Erogline mod 2 4-wire, d325 / Ergoline mod 3- 4-wire d330 / Ergoline mod 3 4-wire, d340 / Ergoline mod 4 4-wire Sopho Operator Phone B630, Sopho Console Model 60E
Realitis DX 4-wire	Realitis DX, BRI ETSI, BRI 1TR6, BRI Euro ISDN, BRI 5ESS BRI National ISDN NI-1, BRI DMS-100, Avaya Merlin Magix (BRI) MLX Avaya Definity 75xx series, Bosch Integrall 4-wire sets Opencom 1000, Telrad IS, Varix 840
Rockwell Spectrum 4-wire	Realitis DX, BRI ETSI, BRI 1TR6, BRI Euro ISDN, BRI 5ESS BRI National ISDN NI-1, BRI DMS-100, Avaya Merlin Magix (BRI) MLX Avaya Definity 75xx series, Bosch Integrall 4-wire sets Opencom 1000, Telrad IS, Varix 840
Selta SAEkey/ SAExxIPX	SAEFON CL08, SAEFON CL08D, SAEFON CL16D, SAEFON CL28D SAEFON CL76D, OP2 Attendant Console, Large Display SAEFON LE, SAEFON B, SAEFON T, SAEFON TK, SAEFON E
Siemens Hicom	Optiset E entry, Optiset E basic, Optiset E standard Optiset E comfort / advance plus, Optiset E conference, Optiset E AC 3.0 / 4.0 , ACWIN 3.0 / 4.0, OptiPoint 500 entry, OptiPoint 500 OptiPoint 500 economy, OptiPoint 500 standard, OptiPoint 500 adv.
Siemens Hipath	Optiset E entry, Optiset E basic, Optiset E standard Optiset E comfort / advance plus, Optiset E conference, Optiset E AC 3.0 / 4.0 , ACWIN 3.0 / 4.0, OptiPoint 500 entry, OptiPoint 500 OptiPoint 500 economy, OptiPoint 500 standard, OptiPoint 500 adv.
Siemens Hipath DX 4-wire	Realitis DX, BRI ETSI, BRI 1TR6, BRI Euro ISDN, BRI 5ESS BRI National ISDN NI-1, BRI DMS-100, Avaya Merlin Magix (BRI) MLX Avaya Definity 75xx series, Bosch Integrall 4-wire sets Opencom 1000, Telrad IS, Varix 840
Tadiran/ Tadicom Coral	DKT-E 1110, DKT-E 2320, DKT-E 2311, DKT-E 2321, DKT-E 2322, DST-E FLEXSET 120 series, FLEXSET 280 series
Toshiba Strata	DKT2001, DKT2004, DKT2010, DKT2030, DKT2501, DKT2510, DKT2520, DKT3010, DKT3020, DKT35xx

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Digital Serial

Avaya Index SDX	INDeX DT1, INDeX DT3, INDeX DT4, INDeX DT5, INDeX DT6 INDeX 2010, INDeX 2030, INDeX 2050, INDeX 2060, INDeX 20CC
Mitel SX200/SX 2000	Superset 4001, Superset 4015, Superset 4025, Superset 4125, Superset 4150

Analogue Parallel

Analogue (incl. recording beep tone)	All Sets All Trunks All Handset All Radio

E1/T1 digital passive trunk

E1 CCS Trunks	DASS2, DPNSS, ISDN30, QSIG, PCM30
T1 CAS Trunks	FXO/FXS D4 loopstart, FXO/FXS ESF loopstart, FXO/FXS Groundstart E&M (Winkstart[FGB] / doublewink[FGD] / immediate)
T1 CCS Trunks	4ESS, 5ESS, DMS-100, National ISDN1, National ISDN2, INS-1500

Appendix C – Channel capacities

These are the channels capacities per chassis, for processors versus the compressions and codec's.

Stand Alone Server Celeron 2.8Ghz, 1GB RAM

Compression/channels	Analogue	Digital	Trunk	G.711	G.729A
Uncompressed	96	96	80	128	64
ADPCM32	96	96	80	128	64
(Fast) GSM	96	96	80	128	64
True Speech	40	40	32	40	32

Stand Alone Server Pentium 4.3 Ghz, 1GB RAM

Compression/channels	Analogue	Digital	Trunk	G.711	G.729A
Uncompressed	128	128	104	168	80
ADPCM32	128	128	104	168	80
(Fast) GSM	128	128	104	168	80
True Speech	48	48	40	56	40

Satellite Pentium 4.3 Ghz, 1GB RAM

Compression/channels	Analogue	Digital	Trunk	G.711	G.729A
Uncompressed	144	144	120	200	96
ADPCM32	144	144	120	200	96
(Fast) GSM	144	144	120	200	96
True Speech	56	56	48	64	48

Stand Alone Server Xeon 3.4 Ghz, 1GB RAM

Compression/channels	Analogue	Digital	Trunk	G.711	G.729A
Uncompressed	128	128	104	168	80
ADPCM32	128	128	104	168	80
(Fast) GSM	128	128	104	168	80
True Speech	48	48	40	56	40

Satellite Xeon 3.4 Ghz, 1GB RAM

Compression/channels	Analogue	Digital	Trunk	G.711	G.729A
Uncompressed	144	144	120	200	96
ADPCM32	144	144	120	200	96
(Fast) GSM	144	144	120	200	96
True Speech	56	56	48	64	48

Stand Alone Server Dual Xeon 3.4 Ghz, 2 GB RAM

Compression/channels	Analogue	Digital	Trunk	G.711	G.729A
Uncompressed	248	248	248	240	168
ADPCM32	248	248	248	240	168
(Fast) GSM	248	248	248	240	168
True Speech	96	96	80	112	80

Satellite Dual Xeon 3.4 Ghz, 2 GB RAM

Compression/channels	Analogue	Digital	Trunk	G.711	G.729A
Uncompressed	288	288	240	240	192
ADPCM32	288	288	240	240	192
(Fast) GSM	288	288	240	240	192
True Speech	120	120	96	128	96

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