
SMART LOGGER II

Multichannel Call Recording and Monitoring System

STC-L303

Overview

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Introduction

Guide Purpose

This paper is intended to give some basic information on major features and functions of the **Smart Logger II** Call Recording and Monitoring System.

These basic data include the information on system purpose, functionality and make-up, specifications, deployment scenarios, essential requirements, etc.

This paper refers to **Smart Logger II** software version 8.4.

Related Documentation

Before installing **Smart Logger II** software, it is recommended to check out the following documents, guides and papers:

- Smart Logger II Multichannel Call Recording and Monitoring System Installation and Configuration Guide
- Smart Logger II Multichannel Call Recording and Monitoring System User Guide

Technical Support

To request assistance regarding any **Smart Logger II** issues, use the contact details below.

Address: STC LTd, 4a Ul. Krasutskogo, 196084, St. Petersburg, Russia

Phone: +7 (812) 325-88-48

Fax: +7 (812) 327-92-97

Email: support@speechpro.com

Web Portal: <http://www.speechpro.ru>

When contacting Technical Support, please include detailed issue description and the following details into your call/ticket:





- Software module/component title(s) and version(s)
- Hardware and network configuration
- OS title and version
- **Smart Logger II** event logs
- Screenshot (if applicable)

Typographic Conventions

The following typographic conventions are applicable to this Guide:

Formatting	Description
Normal	Guide body text
<i>Italic</i>	Used when a term appears in the text for the first time
Bold	Used to highlight software component names, as well as interface element names (headers, buttons etc.)
<i>Bold Italic</i>	Indicates file names and access paths
Monospaced blue	Represents software code elements and file listings
<u>Underlined blue</u>	Hyperlinks to external resources or Guide sections
Element > Child	Menu selection. E.g., File > Exit means selecting the File menu and then clicking the Exit option.
<label>	Placeholder to be replaced with a real value. For example, in D:\<DirName>\file.txt , the <DirName> placeholder labels the file system directory.

Below there is a notification layout used in the Guide according to notification severity level.

	Important notices and instructions obligatory for fulfilling.
	Warnings and recommendations.
	Notes and information which may be of use.
	Links to other documents in the body text.

1 Overview

1.1 Purpose and Functionality

Smart Logger II Multichannel Call Recording and Monitoring System is designed to simultaneously record audio data coming from multiple input channels, as well as to further process and store these data. You can use a wide range of audio data sources while working with **Smart Logger II**, such as analog and digital phone lines, E1 lines, VoIP channels, microphones and radio facility and sound playing hardware line outputs.

Below you will find a list of basic **Smart Logger II** features and functions:

1. Recording calls through microphone and logging related info (phone number, call duration, etc.). Calls are recorded directly into audio files.
2. Managing a *recording database* (DB) which stores information on the calls logged. DB enables searching audio files and editing related data.
3. Playing back audio files in different modes, with optional audio file marking and advanced sound processing.
4. Agent screen capturing (continuously or during phone conversations only). Video and audio data are played back simultaneously.
5. Real-time video and audio playback (*live monitoring, live video*).
6. Saving the details of the call center agents, departments and phone numbers.
7. Automatic and manual call quality assessment, generating reports on assessment results.
8. Integration into call center hardware and software infrastructure, which enables getting and saving additional details on phone calls (CTI integration is performed with the **CTI Analyzer** module).
9. Managing recording, playback, storing, access rights and other system options.



Using **Smart Logger II** implies call recording warning. While choosing a warning method, consider the system structure and the production environment it is deployed into. This environment will determine the warning method under particular conditions.

In many cases it may be essential to carry out a pre-project study to determine technical feasibility of implementing this feature.

Smart Logger II is compatible with LDAP authentication based on Active Directory. This enables you leveraging the following advantages:

- Single authentication point;
- Single policy management point;
- Advanced data security;
- Integration into in-house hardware and software.

1.2 Scope of Use

Smart Logger II as a call recording hardware and software suite is intended for implementation into the following entities and departments:

- Emergency control centers;
- Service desks;
- Public security services;
- Hotlines and helplines;
- In-house security services;
- Call centers;
- Front offices.

2 System Structure

2.1 Hardware

2.1.1 I/O Boards

Below, you will find a complete list of I/O boards supported by **Smart Logger II** with their basic specifications and details. Any boards, as well as other hardware units used within the system, are manufactured by STC Ltd.

Board Title	Mezzanine Board	Interface	Channel Count	Line Type	Notes
STC-H199	–	PCI	6	Digital	Two-wire lines
STC-H199	STC-H207	PCI	12	Digital	Two-wire lines
STC-H537	–	PCI	6	Digital	Long lines
STC-H537	STC-H529	PCI	12	Digital	Long lines
STC-H199.01	STC-H204	PCI	30	E1 Trunk	–
STC-H205	–	PCI	8	Analog	–
STC-H205.4	–	PCI	4	Analog	–
STC-H205	STC-H248	PCI	8	Analog	STC-H250
STC-H205.2	–	PCI	4	Analog	Auto-pickup feature
STC-H433	–	PCI Express	8	Analog	–
STC-H433	STC-H465	PCI Express	16	Analog	–

2.1.2 Input USB Devices

Title	Interface	Channel Count	Line Type	Notes
STC-H219	USB	4	Analog	–
STC-H219D	USB	4	Analog	60 V phantom power supply

2.1.3 Ethernet Input Devices

Ethernet devices are connected to **Smart Logger II** via the **InetDevice** driver.

Below, you will find a complete list of Ethernet devices supported by **Smart Logger II** with their basic specifications and details.

Title	Channel Count	Line Type	Notes
STC-H345	2	Digital	Two-wire lines
	1	Digital	Four-wire lines
STC-H357	30	E1 Trunk	For Smart Logger II STC-H199
STC-H354	8	Digital	Two-wire lines
STC-H356	8	Analog	
STC-H356.01	8+2	Analog and digital	
STC-H493	32	Digital	Two-wire lines
STC-H494	24	Digital	Two-wire lines
STC-H538	30	E1 Trunk	
STC-H539	60	E1 Trunk	
STC-H671	8+6	Analog and digital	

2.1.4 Smallogger II Device

Smallogger II is a network device connected to **Smart Logger II** via the **Smallogger Connector** module.

Below, you will find a complete list of **Smallogger II** device models supported by **Smart Logger II** with their basic specifications and details.

Title	Channel Count	Line Type
STC-H413	8	Analog
STC-H413.01	8+2	Analog and digital

STC-H477	2	Digital
STC-H478	8	Digital
STC-H479	30	E1 Trunk
STC-H469	8	Analog
STC H560	16	Analog
STC-H545	24	Analog
STC-H469.01	8+2	Analog and digital
STC-H543	24+6	Analog and digital
STC-H513	8	Digital
STC-H559	16	Digital
STC-H544	24	Digital
STC-H553	30	E1 Trunk
STC-H558	60	E1 Trunk
STC-H589	90	E1 Trunk
STC H560.01	16+4	Analog and digital
STC-H668	8+8	Analog and digital

2.1.5 Other Devices

Smart Logger II is also compatible with the following devices:

- **STC-H277** Mixer;
- **STC-H300** Switch;
- **STC-H382** Microphone;
- **STC-H488** Recorder.

2.2 Software

Smart Logger II software comprises a suite of modules, each module being a part of a subsystem with a particular functionality.

2.2.1 Call Logging Subsystem

Call logging subsystem enables recording audio data coming from signal sources, as well as data processing and import.

Below, you will find a list of modules this subsystem consists of.

Module	Purpose
Line Recorder	Recording calls coming from analog, digital and E1 lines, as well as microphones
DECT Recorder	Recording calls coming from digital lines based on DECT wireless technology
SIP Recorder	Recording voice data transmitted in VoIP networks via SIP
RTP Recorder	Recording voice data transmitted in VoIP networks via RTP
Avaya DMCC Recorder	Recording voice data transmitted in VoIP networks via Avaya DMCC
Avaya DMCC Informer	Call recording warning through a recording station (Avaya DMCC Recorder is required)
IP Office Recorder	Recording audio data coming from VoIP channels based on Avaya IP Office and Samsung OfficeServ by logging the data from TAPI interfaces
Cisco UCM Recorder	Recording audio data coming from VoIP channels based on Cisco UCM
Cisco UCM Informer	Call recording warning through a recording station (Cisco UCM Recorder is required)
Siemens Trading Recorder	Recording voice data transmitted in VoIP networks via the Siemens Trading protocol
ARMTEL Recorder	Recording conversations from ARMTEL stations

Module	Purpose
BKS Recorder	Recording conversations from Elcom stations
Fax Reader	Decoding fax messages sent through telephone lines and saving the results as images in the system repository
Smallogger Connector	Backing up Smallogger server data into Smart Logger II database and repository
Gnome Importer	Importing audio files from Gnome recorders into Smart Logger II database and repository
Sound Importer	Importing audio files from internal servers into Smart Logger II database and repository
Post Processor	Audio file post processing (conversion, speech characteristic calculation, fax detection, etc.)
On-Demand Recording Service	Managing the recording process by commands sent from a telephone unit

2.2.2 Storage Subsystem

Storage subsystem is intended for global data storage and backup. It includes the **File Server** module which enables transferring audio files and related data from recording stations to a central storage.

2.2.3 Integration Subsystem

Integration Subsystem enables **Smart Logger II** communication with call center infrastructure (both hardware and software).

Below, you will find a list of modules this subsystem consists of.

Module	Purpose
Agent Mapper	Identifying agents and retrieving agent details when CTI integration is unavailable
CTI Analyzer	Logging advanced call details, as well as agent and caller statuses
SDMR Analyzer	Logging caller internal numbers when recording audio data via external analog or E1 lines
Siebel Connector	Oracle Siebel CRM integration

Module	Purpose
Cisco MediaSense Importer	Importing audio files and related data from Cisco MediaSense into Smart Logger II

2.2.4 Notification and Monitoring Subsystem

Notification and monitoring subsystem enables notifications and event logging. Below, you will find a list of modules this subsystem consists of.

Module	Purpose
Notifier	<ul style="list-style-type: none">• Sending system notifications from Windows Event Log to Smart Logger II• A dedicated GUI for centralized Smart Logger II performance monitoring
Message Service	Sending system messages to Smart Logger II Client GUI
Remote Panel	A dedicated GUI for channel remote monitoring

2.2.5 Video Capture Subsystem

Video capture subsystem enables agent screen video recording while the conversion is in progress, as well as storing the video files. Below, you will find a list of modules this subsystem consists of.

Module	Purpose
Screen Recorder	Agent screen video recording, storing video files
Video Storage	Copying, storing and processing video files, managing agent screen video recording

2.2.6 Automatic Agent Performance Quality Assessment Subsystem

Agent performance quality assessment subsystem enables assessing agent performance based on agent-customer conversations. **Smart Logger II** calculates automatically the assessment criteria and displays the result.

Below, you will find a list of modules this subsystem consists of.

Module	Purpose
QM Analyzer	A GUI and services for configuring and running scheduled tasks on automatic conversation assessment
ASR Engine	Searching for keywords in the recordings by specified search conditions
Emotion Analysis Engine	Assessing the emotional state of the conversation participants
Emo Digger Swift	A dedicated GUI for configuring emotional state assessment options

2.2.7 Manual Agent Performance Quality Assessment Subsystem

Manual agent performance quality assessment subsystem enables assessing agent performance based on audio and video screen recordings. Manual assessment is performed by filling out a survey form called a Score Card. The aggregate agent rating is calculated based on all answers marked in the score card. Below, you will find a list of modules this subsystem consists of.

Module	Purpose
Advanced Score Cards Server	Processing the data obtained in the course of manual agent performance assessment and calculating aggregate agent rating
Advanced Score Cards Client	A dedicated GUI for creating and running quality assessment tasks

2.2.8 Speech Analytics Subsystem

Speech analytics system enables analytical and search tasks solving based on audio database. Below, you will find a list of modules this subsystem consists of.

Module	Purpose
FTR Service	Transcription of The Russian continuous speech in phone call recordings

Module	Purpose
Thematic Clusterer	Dividing of phone call tracks in set number of thematic clusters in automatic and expert modes
Classifier	Thematic classifying of phone calls based on set hierarchy of thematic classes

2.2.9 UI Subsystem

UI subsystem enables user access to **Smart Logger II** features. Below, you will find a list of modules this subsystem consists of.

Module	Purpose
Smart Logger II Client	A dedicated GUI for performing the following actions: <ul style="list-style-type: none">• Configuring recording options• Monitoring channels and managing the recording process• Searching, sorting and filtering the recordings• Viewing and editing recording details• Audio and video playback• Managing agent, group and department lists• Managing user accounts, access rights, etc.
Soft Button	A dedicated GUI for managing audio recording from agent PC's
Smart Logger II Web Client	A dedicated web GUI for managing audio recording remotely

2.2.10 Advanced Software Options

Below there is a list of applications which you can optionally use for advanced recording processing in **Smart Logger II**

Application	Purpose
STC Caesar (Transcriber)	<ul style="list-style-type: none">• Automated recording transcription based on Microsoft Word• Saving transcriptions in the .doc format in the global repository• Exporting .doc transcriptions to removable media
Voice Digger Swift	<ul style="list-style-type: none">• Keyword search, saving search results in XML and CSV formats• Configuring and saving keyword search options for automatic recording assessment

3 Specifications

3.1 Audio Data Recording Formats

Smart Logger II records audio data in the following formats:

- .wav, mono/stereo, codecs: PCM (16 bit, 8/11/16 kHz), G.711 (A-law, μ -law), ADPCM, GSM 06.10, G.729A;
- .sl2, mono/stereo (protected audio data format supported only by **Smart Logger II**);
- multichannel audio files (for analog channels).

Spoofting protection and integrity check is enabled by means of digital signature, watermarks and metadata check features.

3.2 Audio Data Playback and Processing Formats

Smart Logger II desktop application supports playing back any files recorded with **Smart Logger II** software.

Speech analytics features, such as speech recognition, as well as playing back the recordings with **Smart Logger II Web** application, are only supported for *.sl2 and *.wav files recorded with PCM, G.711, ADPCM or GSM 06.10.

Playing back of G. 729A files is supported by **Smart Logger II** desktop application as well as by 32-bit version of **Smart Logger II Web** application.

3.3 Database Format

Smart Logger II uses **Microsoft SQL Server 2008 R2 SP2** to support its database. **Microsoft SQL Server 2008 R2 SP2 Express with Advanced Services** is included into **Smart Logger II** installation package.

Microsoft SQL Server 2008 R2 SP2 Express with Advanced Services edition allows to store up to 5 million recordings. **Microsoft SQL Server 2008 R2 SP2 Standard** edition allows to store up to 100 million recordings.

Maximum number of recordings stored in the database is determined by the hard disk space.

3.4 Network Communication

Communication between **Smart Logger II** server and client nodes is enabled through TCP/IP stack.

Network throughput requirements are determined by the number of channels.

Client access to audio and video files may be enabled through HTTPS or LAN (with shared access to audio and video file folders).

3.5 Electrical Parameters

The electrical parameters of the input and output chains are determined by those of the I/O boards in use. For more in-depth information on electrical parameters for each hardware device, refer to its respective datasheet.

Number of boards to install on a single PC at the same time is determined by the number of jacks available. You can use a number of interfaces to connect the boards: PCI, PCI-Express, Ethernet and USB.

3.6 Supported CTI Integration Method

Smart Logger II supports the following CTI integration methods:

- Avaya (AES TSAPI, DMCC/CMAPI);
- Cisco (CTI OS);
- Genesys (T-server).



The list of available integration methods is being continuously updated on the STC official website.

3.7 Signal Sources

Smart Logger II supports the following signal sources:

- FXO/FXS analog lines;
- Microphones;
- Radio facilities and line outputs;
- Two and four-wire digital lines, S/T/U/Up0 interfaces (ISDN BRI, enterprise signaling protocols);
- E1 lines (ISDN PRI (EDSS1), R2);

- IP trunks and enterprise VoIP networks (SIP, Avaya, Cisco, Nortel, Samsung, with audio data recorded in G.711 (A-law, μ -law) and G.729A);
- Conference circuit interfaces.

4 Deployment Scenarios

4.1 Local Deployment

Local deployment implies installing basic software and hardware components locally, on a single computer acting as a *Recording station* (Fig. 1).

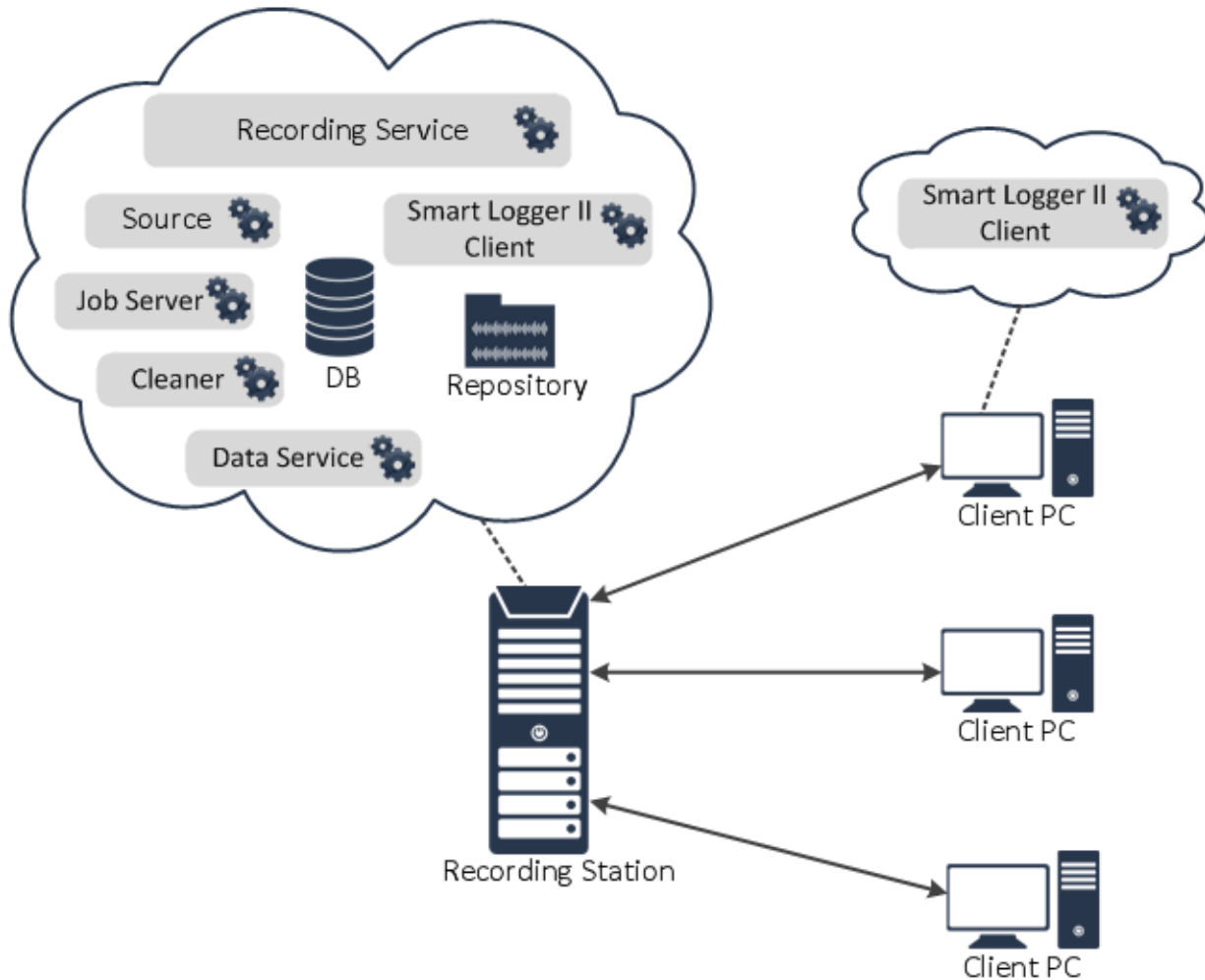


Figure 1: A chart showing local deployment scenario

The primary component deployed on the recording station is the recording service. The recording service is designed to manage the source, a software component which records voice data coming from various signal sources (analog or digital telephone lines, E1 lines, VoIP channels, etc.).

The recording station also houses the repository containing audio data and the database containing related info. Removing audio files and their related data is performed by means of the **Cleaner** module. To work with the DB, you have the **Job Server** component which enables running scheduled tasks (e.g. storage optimization).

The client software, **Smart Logger II Client**, may be deployed either on the recording station or on any other computer (Client PC) which has LAN access to the recording station. **Smart Logger II** application, which is a dedicated component of **Smart Logger II Client**, enables DB and repository access through the intermediary **Data Service**.

Smart Logger II application is designed to manage the recording service and other system options.

4.2 Basic Network Deployment

Basic network deployment scenario implies installing all software components on multiple PC's connected to a single LAN (Fig. 2).

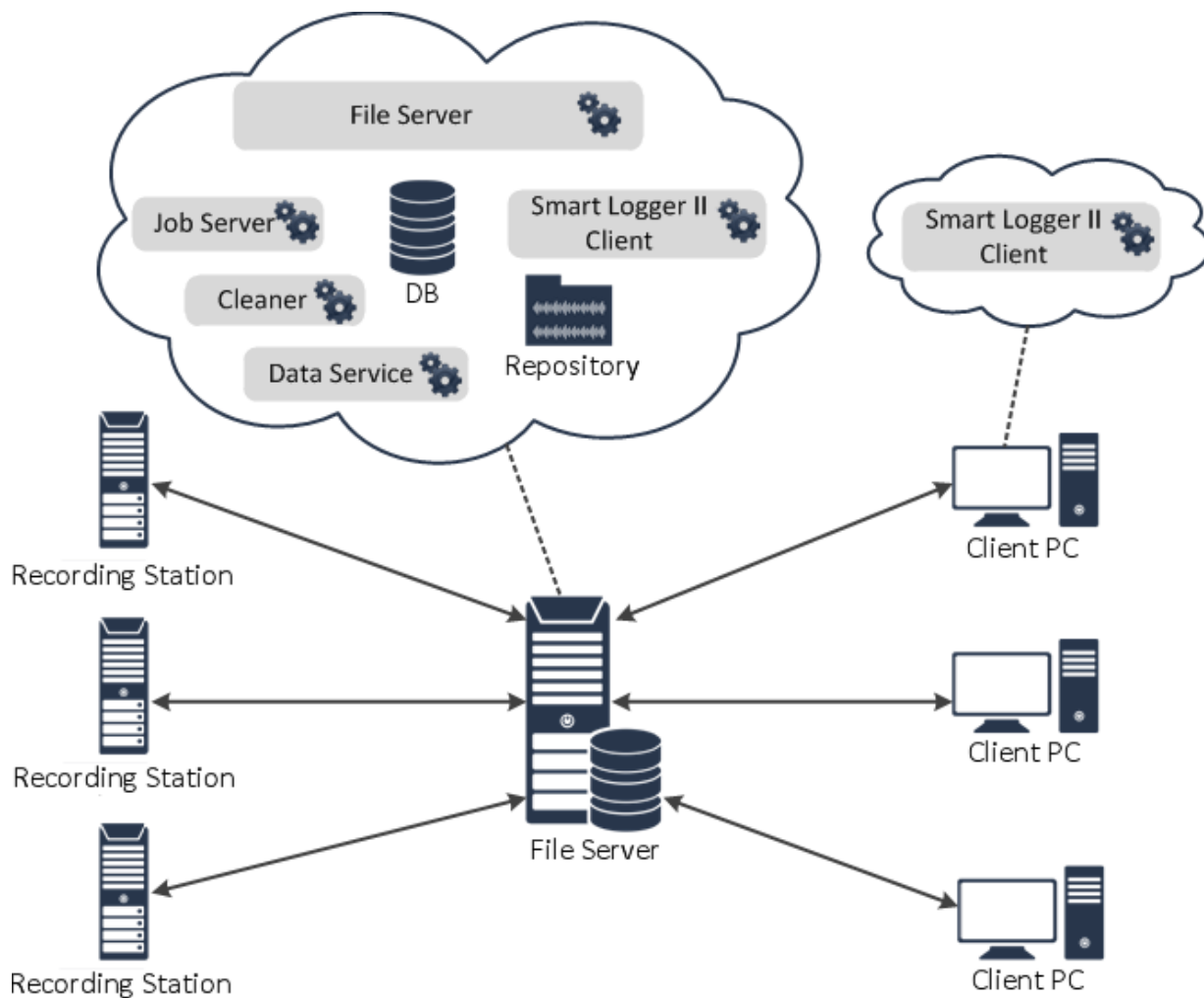


Figure 2: A chart showing basic network deployment scenario

A major feature of the basic network deployment scenario is that the repository and the database are located on a single server called *File Server*.

A basic network installation may include multiple recording stations, each of them housing a dedicated DB and a repository. Managing data on the recording station is done in the same way as with local deployment scenario.

To get the file server work, you will need to deploy the **File Server** module on it. This module enables copying recordings and their related data from the recording station database(s). Other software components deployed on the file server work in the same way as they would on a recording station.

The client software, **Smart Logger II Client**, may be deployed either on the file server or on any other computer (Client PC) which has LAN access to the file server. **Smart Logger II** application, which is a dedicated component of **Smart Logger II Client**, enables DB and repository access through the intermediary **Data Service**.

Smart Logger II Client may access the repository through HTTPS or the folder housing the recordings and shared through LAN.



For more in-depth information on the **File Server** module, please refer to File Server Storage and Backup Module Administrator Guide.

4.3 Advanced Network Deployment

Advanced Network Deployment implies deploying multiple servers with a single *Global Repository* (Fig. 3).

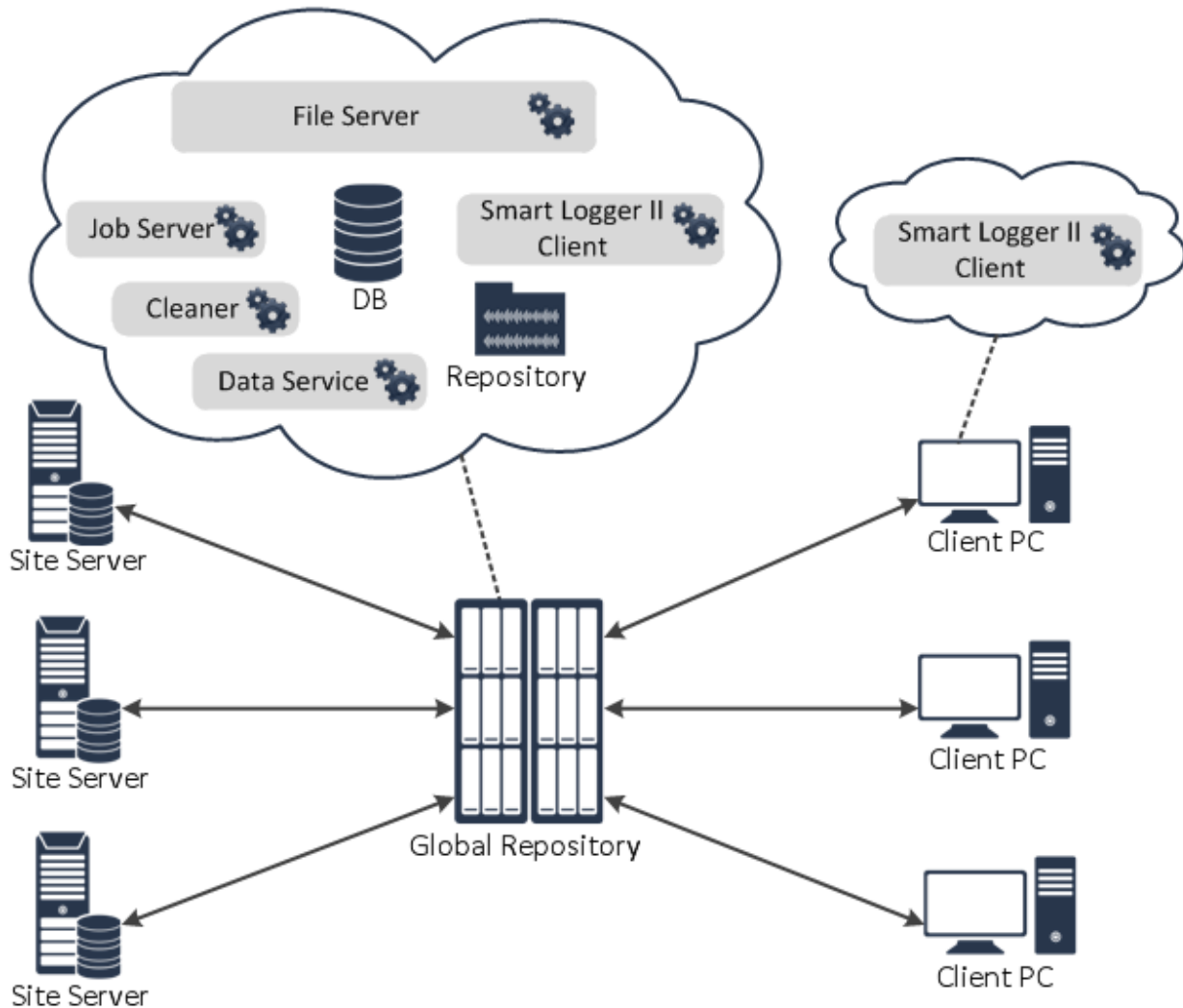


Figure 3: Chart showing advanced network deployment scenario

This deployment scenario involves multiple sites, each housing audio files and a dedicated database. A site server has the same system components as the file server in the basic deployment scenario.

On the server which you assign the role of the global repository, you will need to deploy the **File Server** module. This module enables copying recordings and their related data from the sites servers to the global repository. Other software components deployed on the global repository server work in the same way as they would within the basic network deployment scenario.

The client software, **Smart Logger II Client**, may be deployed either on the global repository server or on any other computer (Client PC) which has LAN access to this server. **Smart Logger II** application, which is a dedicated component of **Smart Logger II Client**, enables DB and storage access through the intermediary **Data Service**.

Smart Logger II Client may access the repository through HTTPS or the folder housing the recordings and shared through LAN.

Advanced network deployment is performed on-site by STC experts.

5 Client Application Deployment Scenarios

5.1 Local Deployment

Local deployment implies installing (**Smart Logger II Client**) on each client PC.

5.2 ClickOnce-based Deployment

ClickOnce-based deployment implies installing **Smart Logger II Client** only on the ClickOnce application server which may be any computer included into the network deployment scenario (Fig. 4).

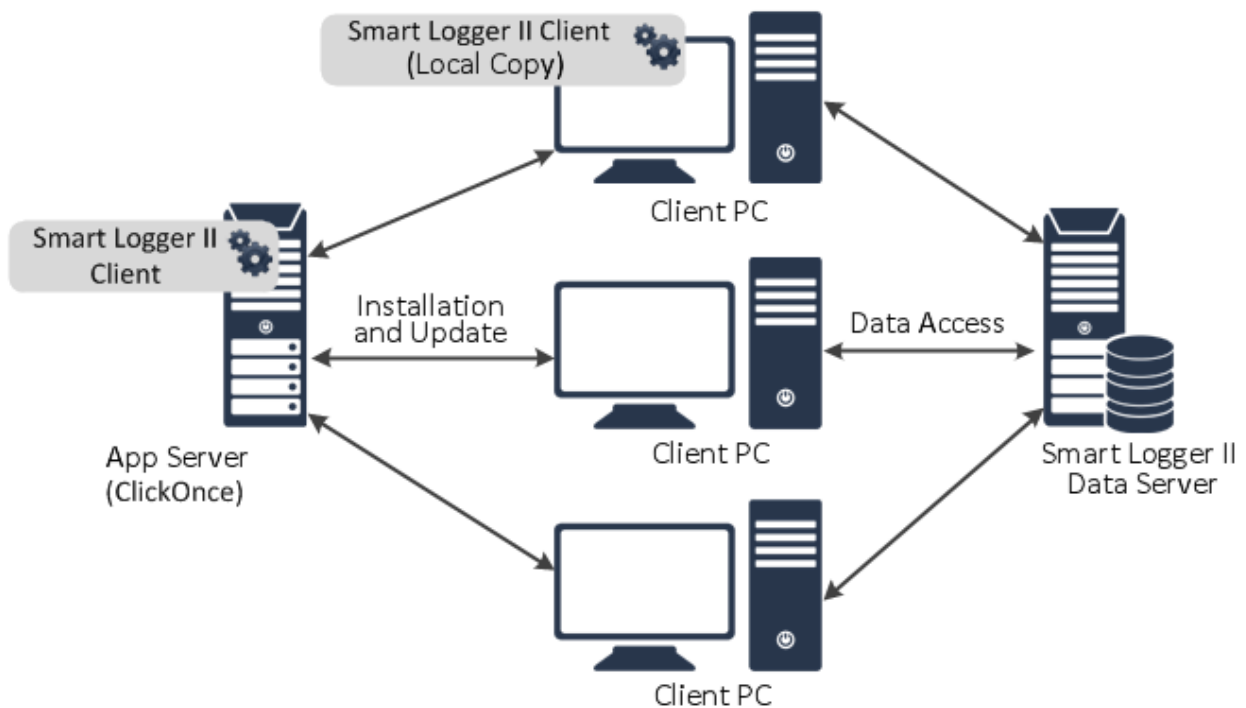


Figure 4: ClickOnce-based deployment

Each client PC houses a local copy of the module. After the module installed on the app server has been updated, the local copies will also be updated once the **Smart Logger II Client** is run from a client PC.

5.3 Citrix XenApp-based Deployment

When deploying the client application using the **Citrix XenApp** virtualization solution, **Smart Logger II Client** is deployed only on the **Citrix XenApp** server (Fig. 5).



ClickOnce-based deployment is not supported in the **Citrix XenApp** environment. For more information on this limitation, please go to <http://support.citrix.com>.

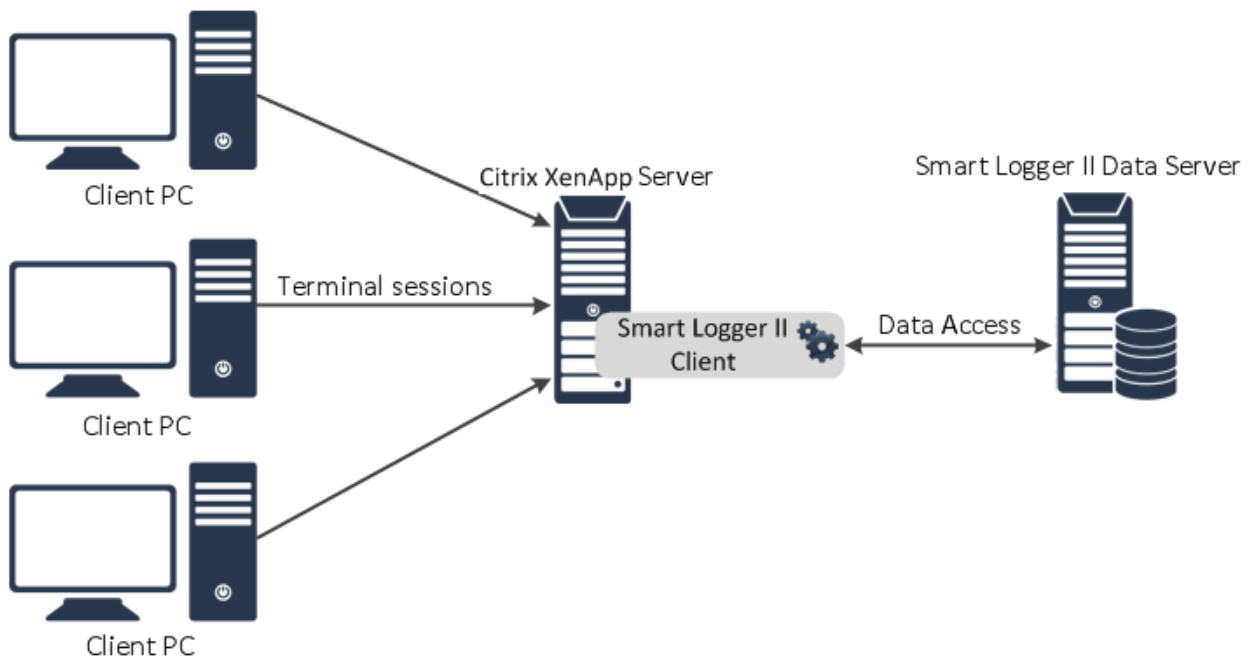


Figure 5: Citrix XenApp-based Deployment

You will not need to install any software on client PC's. The users will connect to the server through web interface supplied by **XenApp**. **Smart Logger II** application is run within a dedicated terminal session. For more in-depth information on **XenApp**, please see <http://www.citrix.com>.

6 Licensing

Smart Logger II licensing is based on HASP technology. The following types of HASP keys are supported:

- **HASP HL:** local hardware USB key installed on the PC which houses the software
- **HASP NET:** network hardware USB key installed on any PC which makes a part of **Smart Logger II** installation
- **HASP SL:** software key installed on the PC which houses the software

For **Smart Logger II** client applications, the key is deployed only on data servers (you do not need to install them on each client PC).

The key stores the software configuration data, as well as info on maximum number of concurrent recording sessions and client connections. All licenses are concurrent.

7 System Requirements

Below you will find a list of minimum and recommended system requirements to hardware and software. For in-depth information on module-specific requirements, please refer to the relevant documents. Recommended number of simultaneously recorded channels on a single recording station: up to 300. Number of digital and analog channels recorded simultaneously by a single recording station depends of the following:

- Number of PCI slots on the computer which is assigned the role of the recording station
- I/O device configuration

7.1 Requirements for up to 100-Channel Simultaneous Recording

7.1.1 Minimum Requirements

		Intel CPU	RAM	OS	Additional Requirements
Client PC		Celeron G440	2 GB	Windows 7, Windows 8, Windows 8.1, Windows Server 2008 R2 SP1, Windows Server 2012 R2	1 NIC
Analog/digital and E1 line recording station		Core i3-2100	4 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2	1 NIC
VoIP recording station	G.711	Core i3-2100	4 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2	2 NICs 2 WD Caviar Black HDDs

	G.729A	Core i5-2300	4 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2	2 NICs 2 WD Caviar Black HDDs
File server		Core i3-2100	4 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2	1 NIC

You may use other CPU's and HDDs than the specified, provided the devices in use feature the same or better performance.

Requirements to the number of HDDs are based on the following configuration:

- HDD 1 houses **Smart Logger II** software and the database
- HDD 2 houses the audio file repository

7.1.2 Recommended Requirements

		Intel CPU	RAM	OS	Additional Requirements
Client PC		Pentium G620	2 GB	Windows 7, Windows 8, Windows 8.1, Windows Server 2008 R2 SP1, Windows Server 2012 R2	1 NIC
Analog/digital and E1 line recording station		Core i5-2300	4 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2	1 NIC
VoIP recording station	G.711	Core i5-2300	4 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2	2 NICs 3 WD Caviar Black HDDs

	G.729A	Core i5-2500	4 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2	2 NICs 3 WD Caviar Black HDDs
File server		Core i5-2500	8 GB	Windows 7 x64, Windows Server 2008 R2 SP1 Windows Server 2012 R2	1 NIC

You may use other CPU's and HDDs than the specified, provided the devices in use feature the same or better performance.

Requirements to the number of HDDs are based on the following configuration:

- HDD 1 houses **Smart Logger II** software
- HDD 2 houses **Smart Logger II** database
- HDD 3 houses the audio file repository

7.2 Requirements for up to 200-Channel Simultaneous Recording

7.2.1 Minimum Requirements

	Intel CPU	RAM	OS	Additional Requirements
Client PC	Pentium G620	2 GB	Windows 7, Windows 8, Windows 8.1, Windows Server 2008 R2 SP1, Windows Server 2012 R2	1 NIC

Analog/digital and E1 line recording station		Core i3-2100	4 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2	1 NIC
VoIP recording station	G.711	Core i5-2400	4 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2	2 NICs 4 WD Caviar Black HDDs
	G.729A	Core i7-2600	4 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2	2 NICs 3 WD Caviar Black HDDs
File server		Core i7-2600	4 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2	1 NIC

You may use other CPU's and HDDs than the specified, provided the devices in use feature the same or better performance.

Requirements to the number of HDDs are based on the following configuration:

- HDD 1 houses **Smart Logger II** software
- HDD 2 houses **Smart Logger II** database
- Additional HDDs house the audio file repository For G.711 format, number of additional HDD's is determined at up to 150 channels per disk. For G.729A format, number of additional HDD's is determined at up to 300 channels per disk.

7.2.2 Recommended Requirements

	Intel CPU	RAM	OS	Additional Requirements
Client PC	Pentium G620	2 GB	Windows 7, Windows 8, Windows 8.1,	1 NIC

			Windows Server 2008 R2 SP1, Windows Server 2012 R2	
Analog/digital and E1 line recording station		Core i5-2300	4 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2 1 NIC
VoIP recording station	G.711	Core i5-2500	4 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2 2 NICs 4 WD Caviar Black HDDs
	G.729A	Core i7-2700K	4 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2 2 NICs 3 WD Caviar Black HDDs
File server		Core i7-2700K	8 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2 1 NIC

You may use other CPU's and HDDs than the specified, provided the devices in use feature the same or better performance.

Requirements to the number of HDDs are based on the following configuration:

- HDD 1 houses **Smart Logger II** software
- HDD 2 houses **Smart Logger II** database
- Additional HDDs house the audio file repository For G.711 format, number of additional HDD's is determined at up to 150 channels per disk. For G.729A format, number of additional HDD's is determined at up to 300 channels per disk.

7.3 Requirements for up to 300-Channel Simultaneous Recording

7.3.1 Minimum Requirements

		Intel CPU	RAM	OS	Additional Requirements
Client PC		Pentium G620	2 GB	Windows 7, Windows 8, Windows 8.1, Windows Server 2008 R2 SP1, Windows Server 2012 R2	1 NIC
VoIP recording station	G.711	Xeon, 4-core (8-thread)	8 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2	2 NICs 4 WD Caviar Black HDDs
	G.729A	2 Xeon CPU's (4-core, 8-thread)	8 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2	2 NICs 3 WD Caviar Black HDDs
File server		Xeon, 4-core (8-thread)	16 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2	1 NIC

You may use other CPU's and HDDs than the specified, provided the devices in use feature the same or better performance.

Requirements to the number of HDDs are based on the following configuration:

- HDD 1 houses **Smart Logger II** software
- HDD 2 houses **Smart Logger II** database

- Additional HDDs house the audio file repository For G.711 format, number of additional HDD's is determined at up to 150 channels per disk. For G.729A format, number of additional HDD's is determined at up to 300 channels per disk.

It is recommended to run regular disk defragmentation.

7.3.2 Recommended Requirements

		Intel CPU	RAM	OS	Additional Requirements
Client PC		Pentium G620	2 GB	Windows 7, Windows 8, Windows 8.1, Windows Server 2008 R2 SP1, Windows Server 2012 R2	1 NIC
VoIP recording station	G.711	2 Xeon CPU's (4-core, 8-thread)	8 GB	Windows Server 2008 R2 SP1, Windows Server 2012 R2	2 NICs 4 WD Caviar Black HDDs
	G.729A	2 Xeon CPU's (6-core, 12-thread)	8 GB	Windows Server 2008 R2 SP1, Windows Server 2012 R2	2 NICs 3 WD Caviar Black HDDs
File server		2 Xeon CPU's (4-core, 8-thread)	32 GB	Windows 7 x64, Windows Server 2008 R2 SP1, Windows Server 2012 R2	1 NIC

You may use other CPU's and HDDs than the specified, provided the devices in use feature the same or better performance.

Requirements to the number of HDDs are based on the following configuration:

- HDD 1 houses **Smart Logger II** software
- HDD 2 houses **Smart Logger II** database
- Additional HDDs house the audio file repository For G.711 format, number of additional HDD's is determined at up to 150 channels per disk. For G.729A format, number of additional HDD's is determined at up to 300 channels per disk.

It is recommended to run regular disk defragmentation.

7.4 Software Requirements

To install **Smart Logger II**, you will first need to install the following pre-requisites:

- **MS .Net Framework 3.5 SP1**
- **MS .Net Framework 4 (Full)**
- **MS Visual C++ 2010 Redistributable package**

To work with the DB, you will be required to install **Microsoft SQL Server 2008 R2 SP2 Express with Advanced Services** (or later). **Microsoft SQL Server 2008 R2 SP2 Express with Advanced Services** (or later) is recommended (SP2 service pack installation is required).

For in-depth information on the module-specific software requirements, see the relevant documents.

The specified software (including **Microsoft SQL Server 2008 R2 SP2 Express with Advanced Services**) is included into the **Smart Logger II** installation package. The wizard will prompt you to install these pre-requisites, should they be missing, before deploying **Smart Logger II** modules.

Smart Logger II supports the virtualization technology based on **XenApp 6.5**. To view **XenApp** server hardware and software requirements, go to <http://www.citrix.ru>.

7.5 Calculating DB Size

To calculate the required DB size, use the following formula:

$$V = C * N * R * T$$

Where:

V : database size in kB

C : number of channels

N : number of audio files recorded per one channel daily

R : database entry size (4.4 kB)

T : number of days to store audio files

E.g., if you need a database to support 200 channels with 100 audio files per channel daily and the retention period of 30 days, you get:

$$V = 200 * 100 * 4,4 * 30 = 2,640,000 \text{ kB} \approx 2.5 \text{ Gb}$$

7.6 Calculating Audio File Repository Volume

To calculate the required repository size, use the following formula:

$$V = N * D * B * T * K$$

Where:

V : required volume

N : number of audio files recorded daily

D : average recording duration in seconds

B : data transfer rate for the codec in use

T : number of days to store audio files

K : coefficient which equals 1.13

E.g., if you have 10,000 audio files recorded daily during 2 months, using the G.711 codec (A-law) with the average duration of 2 minutes, you get:

$$V = 10,000 * 120 * 64 * 60 * 1.13 = 5,207,040,000 \text{ Kbit} \approx 620.7 \text{ GB}$$

7.7 Calculating Recording Time

The table below details the sizes of mono audio files with 1-hour duration recorded with 8 kHz sampling rate using basic codes:

Codec	Data Transfer Rate	HDD Space
PCM 16 bit	128 Kb/s	56.25 MB
G.711	64 Kb/s	28.13 MB
ADPCM	32 Kb/s	14.06 MB
GSM 06.10	13 Kb/s	5.71 MB
G.729A	8 Kb/s	3.52 MB

To calculate the time required to record an audio file, divide the free HDD space (in MB) by the relevant value specified in the table.

7.8 Technical and Organizational Requirements

7.8.1 Connecting to Physical Lines

To connect the system to physical lines, use the interface boards or the external I/O devices manufactured by STC. The connection must be parallel and run through a high-resistance input with a dedicated galvanic separation unit for each channel.

You may perform the connection at any point you consider feasible. The connection point and the recording station may be separated by hundreds of meters with no issue. Please specify the interface cable length when ordering the product.

7.8.2 Connecting to VoIP Lines

When connecting to VoIP lines, you need no adapters, proxy servers or any other devices to analyze the traffic. Instead, you just need to connect VoIP lines to the recording station via Ethernet.

For successful connection, you will need to create a VoIP traffic point on any port of the central switch or group switch. Technically, this is performed by means of the mirroring feature which is available on most modern switches. Look for the following option in your switch (may vary across manufacturers): **Port Monitoring**, **Port Mirroring** or **SPAN port (Switched Port Analyzer)**.

When logging VoIP traffic on **Cisco** or **Avaya** platforms, **Smart Logger II** uses the active recording mode which does not require concentrating traffic around a particular port.

7.8.3 File System

All HDDs must use NTFS. To boost HDD performance, it is recommended to change the cluster size to 64 KB if the recording station logs more than 30 channels.

7.8.4 Power Supply, Grounding and Lightning Overvoltage Protection

To boost safety and reliability, it is recommended to connect the computers to uninterruptive power supply units and use standard grounding.

Interface boards and other devices included into **Smart Logger II** have no native anti-lightning protection features. Make sure to use certified anti-lightning devices globally, i.e. within the entire PBX, etc.

8 Backup and Data Protection

8.1 Data Protection Methods

To guarantee data protection (ensure that audio files, video files and database entries are safe in case of hardware or software failure), you may want to use the following options:

1. Storing audio files, video files and temporary data on an independent HDD included into RAID.
2. Storing audio files on a global repository enabled with the **File Server** module. You may also use file server clusters for backup and replication purposes.
3. Using various system configuration options enabling reliable data storage and file access protection.

Below, you will find basic backup and replication strategies that can boost your data protection.

8.2 Recording Station Mirroring

To ensure audio data protection and minimize the risk of loss, you can enable recording station replication, or mirroring, i.e. simultaneously record the same audio data to two recording stations instead of one.

This will protect your data in case either recording station fails.

To avoid unnecessary duplicates, **Smart Logger II** uses the **Record Synchronizer** component.

Figure 6 shows how recording station replication work.

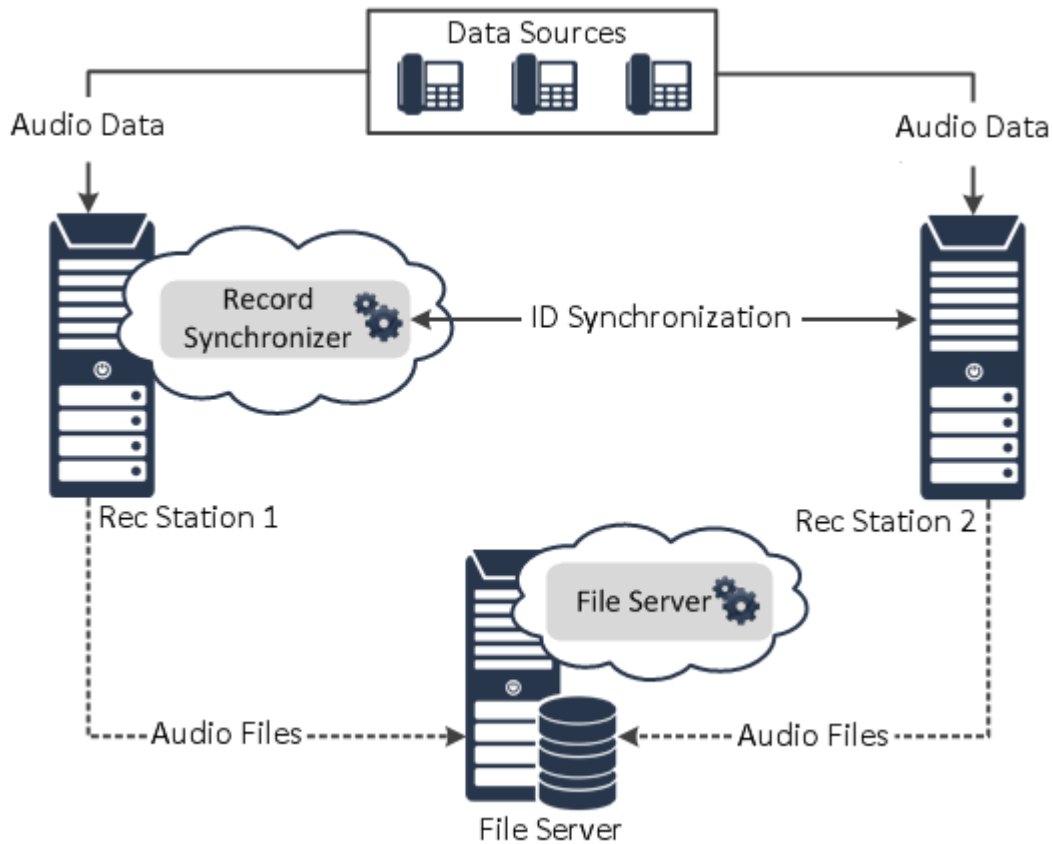


Figure 6: Replicating recording station

Basically, this data protection method implies logging audio data with two recording stations.

Record Synchronizer, which enables audio file synchronization, is deployed as a single instance on a single recording station. Thus, each audio file recorded on Recording Station 1 is synchronized with the one recorded on Recording Station 2. As a result, duplicate audio files on both recording stations will have the same unique ID.

This replication infrastructure may also be complemented with a file server enabling shared data access. In this case, the **File Server** copies the data from the recording stations to the server DB without replicating them.

In case either recording station is down, **File Server** will copy data from the other station.

8.3 Mutual Replication (Mirroring)

Basically, the users access recorded audio files through the file server. This means that, if you have only one file server in your infrastructure, the users will lose access to the audio files, should this server fail. To enable high data availability in case of server failure, you may want to deploy another file server (Fig. 7). Thus, you will enable Mutual Replication or Mirroring.

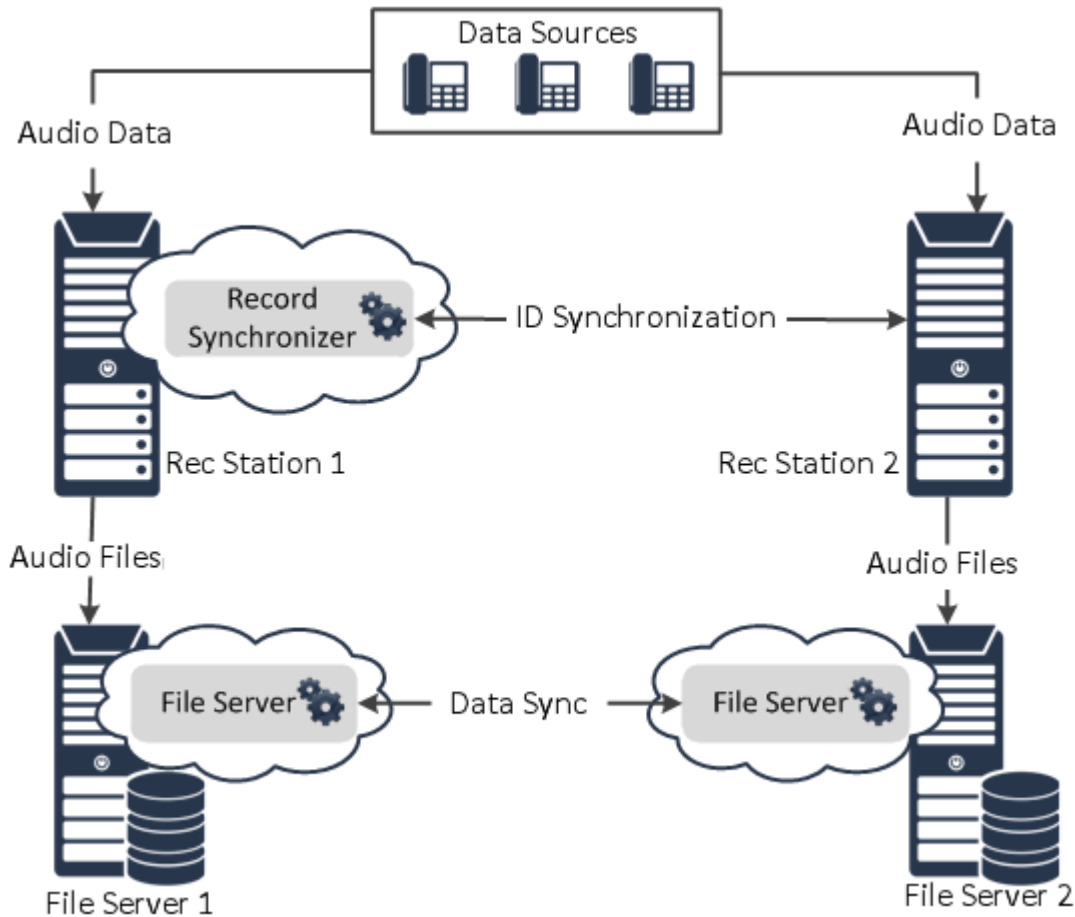


Figure 7: A chart showing basic mirroring model

Here, **Record Synchronizer** works in much the same way as described in Section [8.2](#).

Each file server works with its dedicated recording station. After copying the data from the recording stations, the servers start the mirroring process (replicate data from one another). Thus, each file server acts as target for its recording station and both as source and target for the other server.

Therefore, this data protection method implies two-tier replication: replicating recording stations as tier 1 and mirroring file servers as tier 2. This enables utmost data protection and security.

You may also assign different roles to the mirrored file servers; e.g., Server 1 may be a production server enabling client connections, while Server 2 may be a standby failover server which takes the role of a production server as soon as Server 1 is down.

8.4 Complex Backup Infrastructure

Leveraging a complex backup infrastructure enables copying data from a single source to multiple file servers which do not share any connection. You can see an example of a complex backup infrastructure with two file servers on Figure 8.

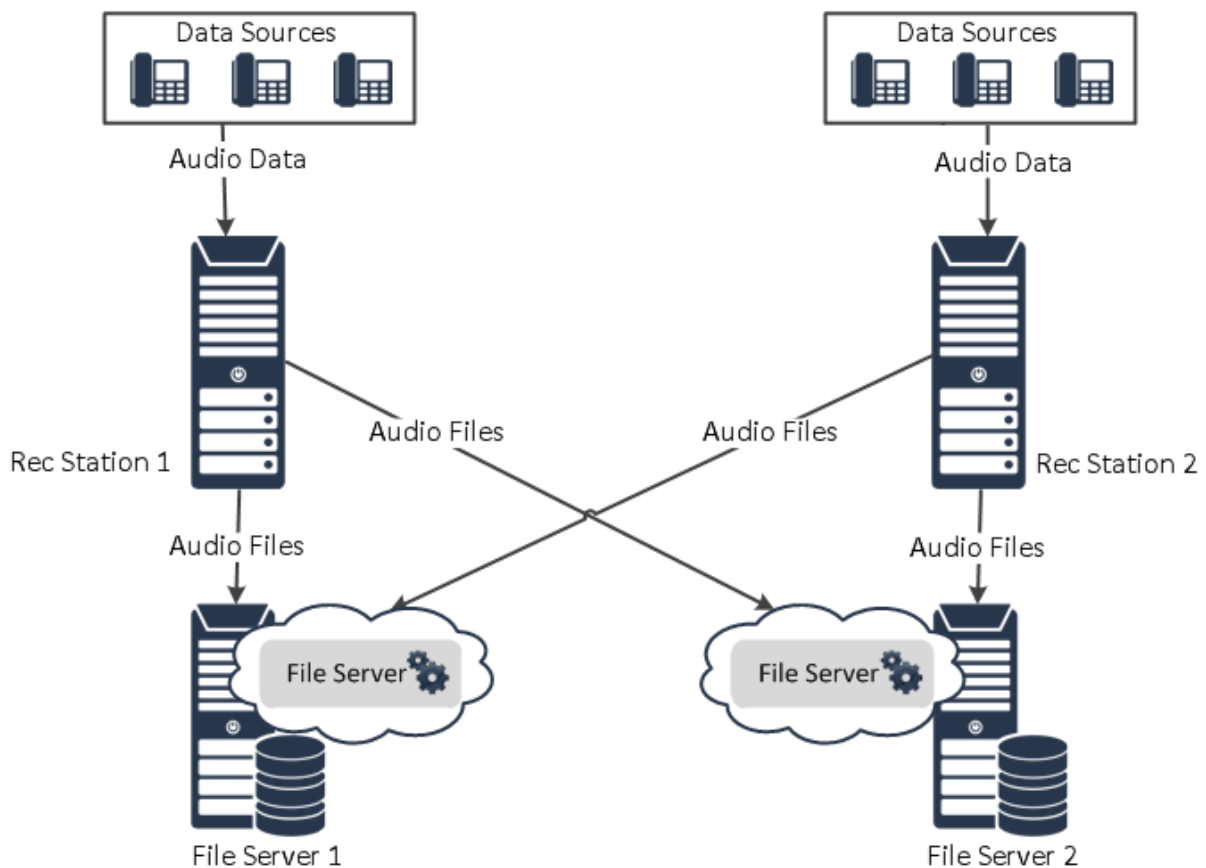


Figure 8: Example of a complex backup infrastructure

This data protection method involves copying audio files from each recording station to each file server. For utmost security, you may also implement recording station mirroring (see Section 8.2) into your backup infrastructure. In this case, the data will be still available for users even if both the file server and the recording station are down.

This backup infrastructure also supports server clusters where each server or a group of servers may be assigned a dedicated role. E.g., some servers may store VoIP data, while others may be used for storing data recorded from both VoIP and analog/digital sources.

While clustering the servers, you can configure custom synchronization rules. When specifying the target, you will need to configure the *copy tier*; the file server will copy the data only from the tier specified.



For more in-depth information on configuring data sources and targets, please refer to the File Server Storage and Backup Module Administrator Guide.

9 Virtual Environment Operation

9.1 VMware ESXi

Smart Logger II recording station and file server software supports **VMware ESXi 5.5**.

Below, you will find all **Smart Logger II** software modules which support **VMware ESXi 5.5**.

- **IP Office Recorder;**
- **SIP Recorder;**
- **RTR Recorder;**
- **File Server.**



By operating in **VMware ESXi** up to 150 channels can be recorded simultaneously. In order to avoid data loss it is recommended to deploy 2 (or more) stations recording the same traffic on different computers (see Section [8](#)).

Minimum requirements for one recording station:

- Intel Core i5 760 2.8 GHz CPU;
- 8 GB RAM;
- 2 HDDs;
- 2 network interfaces with **TCP Offload Engine (TOE)** function;
- **ESXi-5.5.0-1331820-standard** virtualization product;
- At least 30% of available system resources.

Virtual machines must be installed directly on physical disks. Otherwise you must use high-performance.

Minimum virtual machine requirements:

- 1 GHz CPU;
- 3072 MB RAM;
- 2 HDDs situated in files from 2 different physical disks (one disk contains **Smart Logger II** SW and DB, the other stores audio files);
- 2 network interfaces (one interface enables virtual machine external access, the other logs traffic).

For more in-depth information on virtual machine installation, please refer to **Smart Logger II** File Server Storage and Backup Module. Administrator Guide. Other virtual machine requirements comply with **Smart Logger II** node parameters for virtualization-free operation.

9.2 Microsoft Hyper-V Server 2012 R2

Smart Logger II recording station software supports **Microsoft Hyper-V Server 2012 R2 6.3**.

Below, you will find all **Smart Logger II** software modules which support **Microsoft Hyper-V Server 2012 R2 6.3**:

- **Line Recorder** with Ethernet or **Smallogger II** input devices;
- **Avaya DMCC Recorder**;
- **Cisco UCM Recorder**.

Minimum host computer requirements:

- Intel Core i5-4670 3.40 GHz CPU;
- 8 GB RAM;
- 2 HDDs;
- 2 network interfaces;
- **Microsoft Hyper-V Server 2012 R2 6.3.9600** virtualization product;
- At least 30% of available system resources.

Virtual machines must be installed directly on physical disks. Otherwise you must use high-performance RAID.

Minimum virtual machine requirements:

- Intel Core i5-4670 3.40 CPU;
- 4GB RAM;
- 2 HDDs (one disk contains **Smart Logger II** SW and DB, the other stores audio files);
- 2 network interfaces (one interface enables virtual machine external access, the other logs traffic).

For more in-depth information on virtual machine installation, please refer to **Smart Logger II** File Server Storage and Backup Module Administrator Guide. Other virtual machine requirements comply with **Smart Logger II** node parameters for virtualization-free operation.

Appendix A

Legal Warning

Smart Logger II is a call recording system which enables logging and storing voice recordings with some personal data. Before implementing this system into your infrastructure, you are encouraged to make yourself familiar with any laws and regulations regarding voice recording and personal data applicable to your country.

Terms and Abbreviations

Terms

Advanced Network Deployment: a system deployment scenario that implies multiple data centers run under a single system server.

Agent: an employee of a call center whose telephone calls are recorded and monitored with **Smart Logger II**.

Basic Network Deployment: a system deployment scenario implying multiple recording stations run under a single central server.

Copy Tier: a number defining the count of the data servers which the user successively copies the same recording on (when deploying a network installation with multiple file servers).

File Server: a computer housing the **File Server** module (see Basic and Advanced Network Installation).

IP Trunk (VoIP Trunk, SIP Trunk, Digital Trunk): virtual communication line between agent and customer telephone exchanges which works over IP network.

Local Deployment: a system deployment scenario when basic **Smart Logger II** software components are installed on the recording station. Client software can access the recording station through LAN.

Recording: an audio file containing phone conversation data and its metadata (duration, start time, subscriber number).

Recording Service: a software component designed to analyze the data coming from I/O boards and/or from other sources and to create an audio file when the recording start conditions are met.

Recording Station: a computer housing the **Recording service** and a source of any type.

Source: a **Smart Logger II** software component which provides interaction between recording service and signal source (phone line or microphone).

Abbreviations

A-law, μ -law: Irregular speech signal sampling algorithms.

ADPCM: Adaptive Pulse Code Modulation.

Avaya AES: Avaya Application Enablement Services, a server enabling services to work with AvayaCM communication platform.

BRI: Basic Rate Interface, a standard ISDN (2B + D) network interface.

Cisco (CTI OS): Cisco Computer Telephony Integration Object Server.

CTI: Computer Telephony Integration, a common name for any technology that allows interactions on a telephone and a computer to be integrated or coordinated.

CUCM: Cisco Unified Communication Manager.

DB: Database.

DBMS: Database Management System.

DMCC: Device, Media and Call Control, an AES server protocol.

E1: digital data transmission carrier.

EDSS1: European Digital Signal System, ISDN customer network signaling system.

FXO port: Foreign Exchange Office port, an analog voice interface used to connect a device to a recording station.

FXS port: Foreign Exchange Subscriber port, a customer line, an analog voice interface to connect an ordinary phone to a device.

G.711, G.729A: codecs meeting ITU-T standard.

Genesys (T-server): a method of CTI integration.

GSM: Global System for Mobile Communications, a global mobile communication digital standard.

H.323: a signaling protocol family used in VoIP networks.

HDD: Hard Disk Drive.

HTTP: HyperText Transfer Protocol.

HTTPS: HyperText Transfer Protocol Secure, an HTTP extension that supports data encryption.

IPBX: Industrial Private Branch eXchange.

ISDN: Integrated Services Digital Network, a telephone network that can send voice and computer messages.

ITU-T A-law stereo: a companding algorithm primarily used in the digital telecommunication systems of North America and Japan. This algorithm implies A-law stereo recording.

ITU-T μ -law stereo: a companding algorithm primarily used in the digital telecommunication systems of North America and Japan. This algorithm implies μ -law stereo recording.

NTFS: New Technology File System.

OS: operating system.

PBX: Private Branch eXchange.

PCI : Peripheral Component Interconnect, an I/O bus used to connect periphery devices to PC motherboard.

PCI-Express: a computer bus that uses PCI bus software model and a high performance physical protocol based on serial data communication.

PCM: Pulse Code Modulation, a method of converting an analog signal into digital form.

PRI: Primary Rate Interface, a standardized telecommunications service level within the Integrated Services Digital Network (ISDN) specification for carrying multiple voice and data transmissions between a network and a user.

PSTN: Public Switched Telephone Network.

R2: a type of signaling through a dedicated signal channel.

RAID: Redundant Array of Independent Disks, an array of multiple hard drives managed by a controller, interlinked with high-speed channels and treated as a single unit by the external system.

RTP: Real-time Transport Protocol, a standardized packet format for delivering audio and video over IP networks.

S/T/U/Up0: basic types of BRI interface.

SIP: Session Initiation Protocol, an IETF-defined signaling protocol widely used for controlling communication sessions such as voice and video calls over Internet Protocol (IP).

TAPI: Telephony Application Programming Interface, applied programming interface for telecommunication industry, allows you to connect Windows-based machines to voice data transfer systems.

TCP/IP: Transmission Control Protocol/Internet Protocol, a protocol stack of various network layers used in computer networks.

TSAPI, DMCC/CMAPI: Telephony Server Application Programming Interface, Data and Maintenance Control Center/ Communication Manager Application Program Interface, interfaces designed to work with Avaya AES.



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