

FORSTA LOCAL DIALER SYSTEM REQUIREMENTS

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1 About this Document

This document provides a list of Operating system requirements for both Forsta TCI (Telephony Computer Interface), the Forsta Local Dialer Web Service and the Forsta Open Dialer API.

This document also includes guidelines and best practices relating to configuration, setup and maintenance of the environment on which your Computer Assisted Telephone Interviewing ("CATI") operations will be based. This document is however not intended to be a full and exhaustive list in relation to this; you will need to work with the providers of the equipment to ensure proper functioning and stable operations.

According to the terms of the Agreement entered into between your company and FORSTA, your company has undertaken to have available at all times, senior personnel with a solid understanding and skills related to the equipment needed to run telephony-based data collection, as well as a thorough understanding of the way the Forsta Professional Software interacts with your CATI equipment. In our experience, these skillsets are essential to provide a stable CATI working environment. Such staff shall also always perform initial troubleshooting before issues are presented to FORSTA, by e-mail to support. An email will include an abstract of the staff's initial findings.

Please also make sure that whoever is assigned in your company to handle the CATI environment, is aware of the pre-CATI-deployment assessment program (the "PCD") which your company has, or will have worked through together with FORSTA and which has the aim of identifying potential bottlenecks in your infrastructure. You may from time to time be required to confirm that the necessary system requirements, as identified in the PCD and in this document, have been met in full. Please report any errors in this document to documentation@forsta.com.

2 Forsta Local Dialer Components

The Forsta local dialer components are used in conjunction with Forsta CATI to provide telephony-related capabilities. These components include:

- Forsta TCI
- Forsta Local Dialer Web Service for Forsta TCI
- Forsta Local Dialer Web Service for MSG Pro-T-S
- Forsta Open Dialer API

The requirements for using each of these components are covered individually in this document.

2.1 Forsta TCI

Forsta TCI (Telephony Computer Interface) is a powerful telephony add-on to Forsta CATI. The system fully automates the dialing of telephone numbers on behalf of the interviewers, dramatically increasing call centre productivity. Furthermore, features such as real time monitoring, full call recording and verbatim recording significantly increase call centre quality. For the full requirements for using Forsta TCI, refer to the list below:

2.1.1 Server Hardware

Server hardware from a reputable vendor is generally recommended due to the regular inclusion of support agreements that guarantee hardware replacement within a given time period in the case of a failure as spare parts are usually widely available.

The hardware recommendations provided here should be considered as examples only; the actual recommended hardware will depend heavily on the type and level of usage expected. Forsta can assist in setting up a tailored recommendation on request.

The typical hardware for a Confrimit TCI server would be:

- 2Ghz CPU
- 2GB RAM (more recommended for high-volume usage)

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- RAID-1 disk system for system partition and Forsta TCI application
- Separate RAID-1 or RAID-5 disk system for Forsta TCI data partition
- 100Mbit NIC
- UPS

Additional hardware details:

- Hyper-threaded server environments are not supported. It is strongly advised that hyper-threading is disabled within the server BIOS.
- Multi CPU servers are not supported. As Forsta TCI is not a CPU intensive system, dual CPU servers are not required for operational environments.
- Dialogic drivers do not support more than 4GB RAM

2.1.2 Operating System

The following operating system is supported:

- Windows 2008 Server R2 x64 (64bit) -

Recommended Dialogic drivers do not support Physical Address Extensions (PAE).

2.1.3 Environment Considerations

Before running Forsta TCI on any system a number of modifications may be needed to allow the software to run unimpeded by the operating system or any other 3rd party applications installed on the system. These are detailed below:

2.1.3.1 Time Synchronization

Over time, internal server clocks may drift at slightly different speeds. Running a multi-server installation may eventually lead to servers being out of sync. This can be avoided by updating the server clocks regularly, either by using an Internet time server, a domain server or synchronizing manually.

2.1.3.2 Server Temperature

High ambient operating temperatures have been a major factor in server failures. Under normal operating conditions the server must be installed in an environmentally controlled atmosphere as specified at installation time. However the operating temperatures of the Dialogic cards will rise significantly in the following scenarios:

- A continuous high level of concurrent users logged into the system
- Large numbers of concurrent users working on 'random digit dialing' surveys
- Interview recording enabled for a large number of users

2.1.3.3 Disk Management

Should the dialer be used for voice recording, it is advised that a non-obtrusive disk defragmenter be enabled on a regular basis and available disk space be closely monitored.

2.1.3.4 Virus Scanning Software

We do not recommend virus scanning software is totally removed from the server; however we strongly recommend that a number of modifications are made to the virus software if installed. We recommend that real time scanning should be disabled on the Forsta TCI server, however should this be enabled it is strongly recommended that the following folders are excluded from the real time scanning procedure:

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- The root Forsta TCI installed folder (including all sub folders)
- The location for Forsta TCI whole and partial recorded interviews (including all sub folders)
- The location for Forsta TCI system sound files (including all sub folders)
- The location for Forsta TCI playback sound files (including all sub folders)
- The root installation for the dialogic software (including all sub folders)

A full system scan without exclusions enabled can then be scheduled to run out of Forsta TCI operational hours.

2.1.3.5 Backup Software

Server backups should be scheduled to run out of Forsta TCI operational hours.

2.1.3.6 Windows Updates

Windows updates should be scheduled to run out of Forsta TCI operational hours.

2.1.3.7 Other 3rd Party Applications

Additional 3rd party components should not be installed on the Forsta TCI server. Any processes running that consume CPU or memory can impact the performance of Forsta TCI.

2.1.4 Telephony Specific Requirements

2.1.4.1 Dialogic DNA Drivers

The following DNA versions are supported by Forsta TCI:

- DNA 6.0 System Release with SU 257

2.1.4.2 Analogue Connection to the PSTN

Most Dialogic telephony network cards require a direct connection into analogue telephone lines. These cards must have a direct connection to analogue ports. Cabling formats can be either RJ-11 or RJ-45 depending on geographic region.

Break out boxes are again used to interface the card to the incoming analogue PSTN port.

2.1.4.3 PRI ISDN Connection to the PSTN

Forsta TCI can use PRI ISDN cards, providing outbound dialing capabilities over an ISDN network. The following cards are supported:

- Dialogic D/300JCT-1e1-75, 30 port PRI ISDN card (75ohm connector)
- Dialogic D/300JCT-1e1-120, 30 port PRI ISDN card (120ohm connector)
- Dialogic D/600JCT-1e1-75, 60 port PRI ISDN card (75ohm connector)
- Dialogic D/600JCT-1e1-120, 60 port PRI ISDN card (120ohm connector)

Forsta TCI relies on PRI ISDN connections to provide outbound dialing capabilities. Furthermore, the digital information received on these connections is used by the Forsta TCI software to determine call outcomes. It is therefore critical that any PRI ISDN line used with Forsta TCI conforms to the following criteria:

- The PRI must conform to ETSI Q.931 PRI format.
- The PRI must run the EuroISDN (NET5) PRI ISDN protocol.
- UK NTL customers should specify ETSI 110 when ordering ISDN trunks.
- CAS / DASS2 PRI formats are not supported.
- CRC should be enabled.
- No D channel inversion.

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- Any PRI ISDN circuit used with Forsta TCI should be configured as an outbound only circuit. Inbound traffic will lock specific channels and cause low level ISDN timeslot allocation issues.
- Match G.903 physical connections – Dialogic cards are available in both 75 ohm BNC or 120 RJ-45 formats.
- Standard IE/Cause values must be passed back to the Dialogic hardware. Failure to have the correct IE/Cause Value codes returned will prevent Forsta TCI correctly determining the call outcome.
- Typically, the Dialogic ISDN cards should be setup in USER/SLAVE mode. Clock synchronisation should be derived from the network unless specifically changed by Forsta.

2.1.4.4 PRI ISDN connection to a PBX

When using Forsta TCI, it is possible to configure both the Dialogic drivers and Forsta TCI software to support PRI ISDN connections to a PBX. This allows Forsta TCI to call PBX extensions, connecting both local and remote interviewers to the dialer. Before any Forsta TCI system is commissioned where it will be operating in a PBX environment, it is imperative that a bench test is performed to ensure interoperability between the two systems.

2.1.4.5 Analogue hardware connections to channel banks

Forsta TCI uses frequency and cadence detection to calculate call outcomes. It has been observed that when outbound analogue ports are supplied to the Dialogic network interface card via channel banks, the quality of the frequencies and cadences supplied by these devices can fluctuate significantly. Therefore, under these conditions the Dialogic card cannot accurately determine the call outcome. Forsta will endeavour to 'tune' the cards to maximise call detection rates, however we are unable to guarantee this process.

2.1.4.6 Direct analogue hardware connections to Telco ports

Forsta TCI uses frequency and cadence detection to calculate call outcomes. It has been observed that when outbound analogue ports are supplied to the Dialogic network interface card using direct analogue hardware connections to Telco ports, the quality of the frequencies and cadences supplied by the Telco can fluctuate significantly. Therefore, under these conditions the Dialogic card cannot accurately determine the call outcome. Forsta will endeavour to 'tune' the cards to maximise call detection rates, however we are unable to guarantee this process.

2.1.4.7 Analogue hardware connections to PBX extensions

Forsta TCI uses frequency and cadence detection to calculate call outcomes. It has been observed that when outbound analogue ports are supplied to the Dialogic network interface card using direct connections to analogue PBX ports, the quality of the frequencies and cadences supplied by the PBX hardware can fluctuate significantly. Therefore, under these conditions the Dialogic card cannot accurately determine the call outcome. Forsta will endeavour to 'tune' the cards to maximise call detection rates, however we are unable to guarantee this process.

2.1.4.8 PRI ISDN Call outcomes

Forsta TCI with PRI front-end ISDN connections use IE codes (also known as Q.931 cause values) to determine call outcomes. In certain environments, these IE codes can be missing from the returning Telco ISDN data, resulting in a CALL PROGRESS message. In this environment, Forsta TCI will attempt to pass the call immediately to the interviewer. However, it may be the case that some calls are detected incorrectly - without valid IE values, we are unable to fully guarantee the call outcome.

2.1.5 Installation Prerequisites

The following items need to be addressed before the Forsta TCI software is installed on any system:

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- Forsta PCD (Pre-CATI Deployment) has been completed
- Installation and configuration of the Dialogic system drivers
- Testing and configuration of any telephony service required by the dialer
- All cabling should be completed and tested
- It is critical that this document has been studied and is fully understood before the system is installed
- A suitable installation environment has been prepared and discussed with Forsta
- Remote connectivity must be available for Forsta engineers

2.2 Forsta Local Dialer Web Service for Forsta TCI

Forsta CATI and Forsta TCI communicate through a Web Service component called Forsta Local Dialer WebService for Confrimit TCI (TciDialerWS). This is a WCF Web Service acting as a proxy between Forsta CATI and Forsta TCI.

2.2.1 Server Hardware

Server hardware from a reputable vendor is generally recommended due to the regular inclusion of support agreements that guarantee hardware replacement within a given time period in the case of a failure, as spare parts are usually widely available.

The hardware recommendations provided here should be considered as examples only; the actual recommended hardware will depend heavily on the type and level of usage expected. Forsta can also assist in setting up a tailored recommendation on request.

The typical hardware for a TciDialerWS server would be:

- 2Ghz CPU
- 2GB RAM (more recommended for high-volume usage)
- 100Mbit NIC
- UPS

2.2.2 Operating System

The following operating system is supported:

- Windows Server 2008 R2 x64 - Recommended

2.2.3 Additional Components

The following additional components are required:

- NET 4.5 for Windows 2008
- IIS 7

2.2.4 Installation Requirements

The TciDialerWS requires a static, externally accessible IP address to receive inbound Web traffic (http and https), and it must be able to communicate with the environment hosting Forsta CATI via Web traffic (http and https).

Important:

From a security perspective it is recommended that the access to the TciDialerWS be locked down to the specific IP addresses used by the Forsta environment. The details regarding the Forsta SaaS environment are available from the Forsta Extranet.

The ability to listen to any audio recordings stored on the dialer is delivered via direct web traffic to the TciDialerWS, therefore if this is locked down, only CATI supervisors that have direct access will be able to hear the recordings. For access to the audio recordings, the TciDialerWS can be

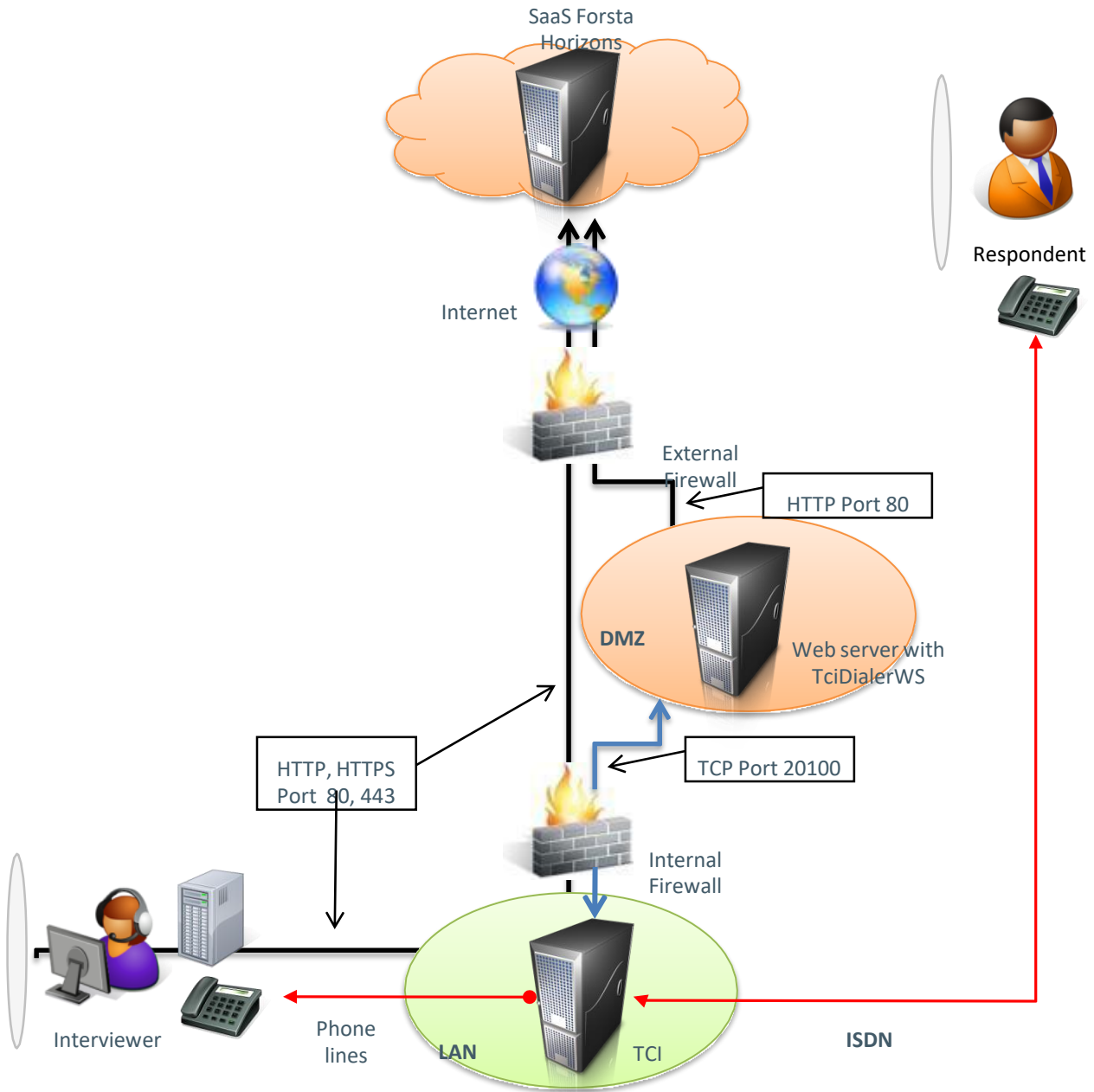
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configured to connect to a specific IP address. This can either be an internal or external IP address.

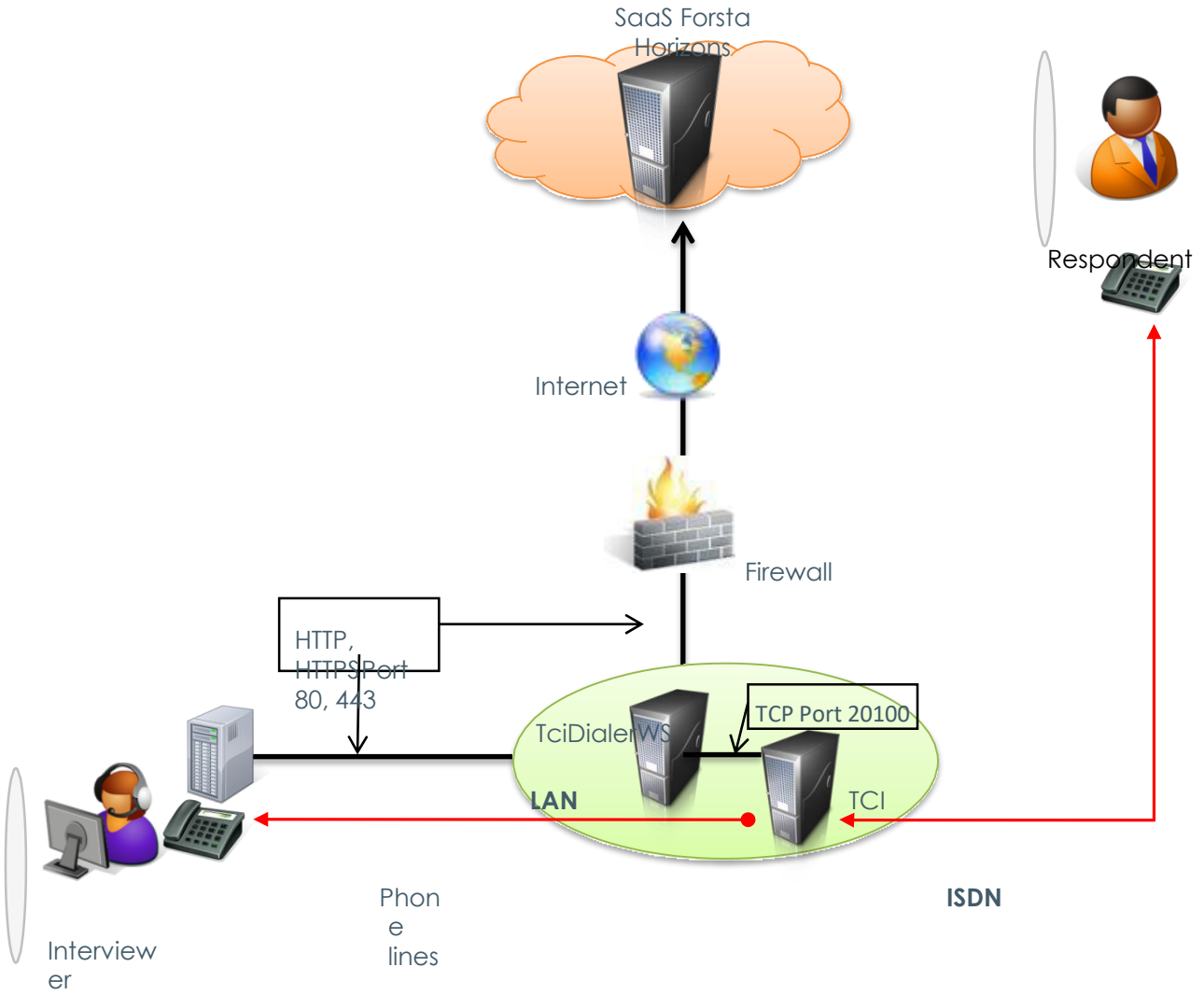
2.2.5 Installation Scenario's

TciDialerWS can be installed on the same server as Forsta TCI or, alternatively, on a dedicated server. Supported scenarios include:

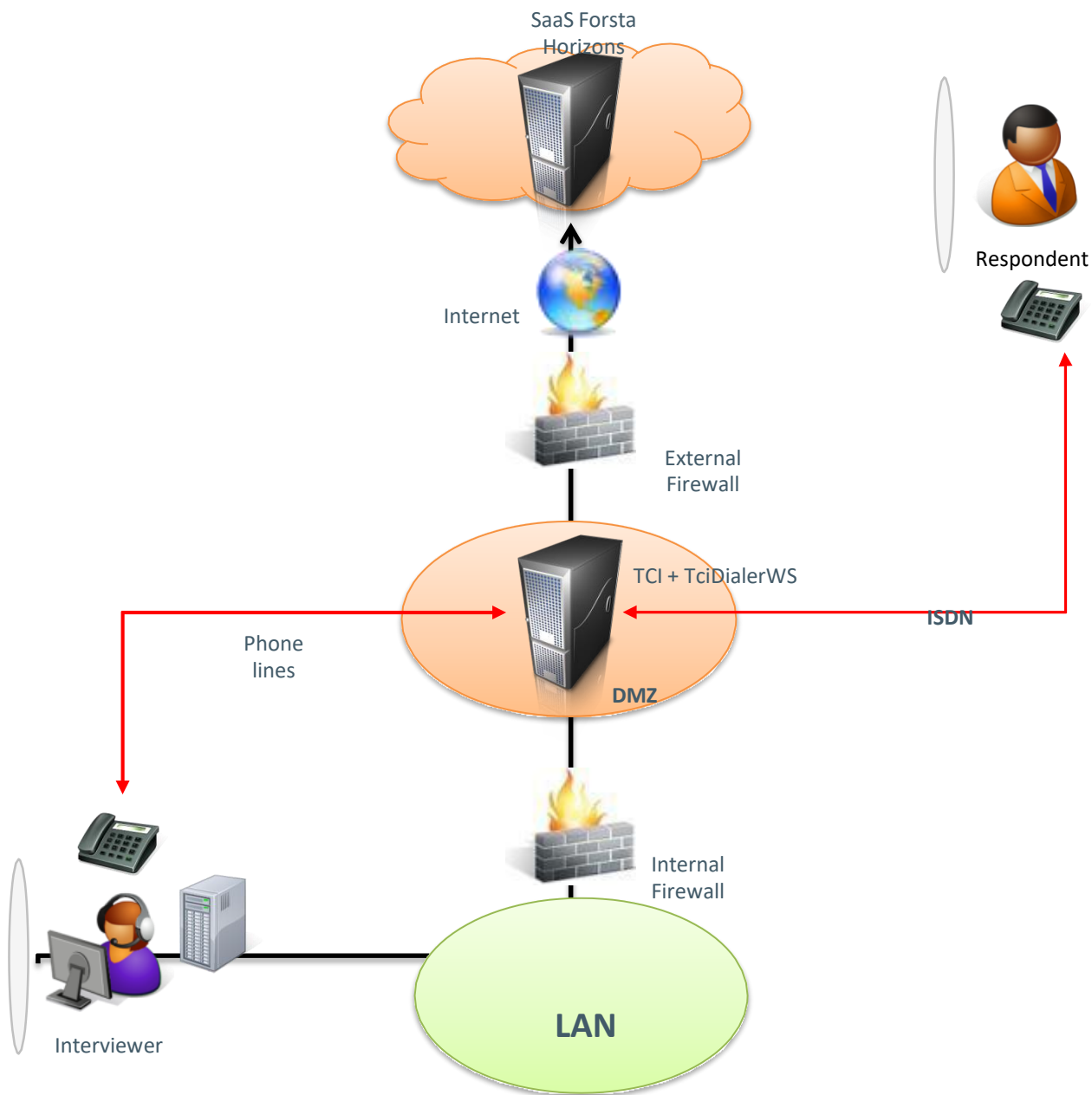
- TciDialerWS installed on a dedicated server. TciDialerWS server is in the DMZ (i.e. visible to Internet) and Forsta TCI on the LAN. See below:



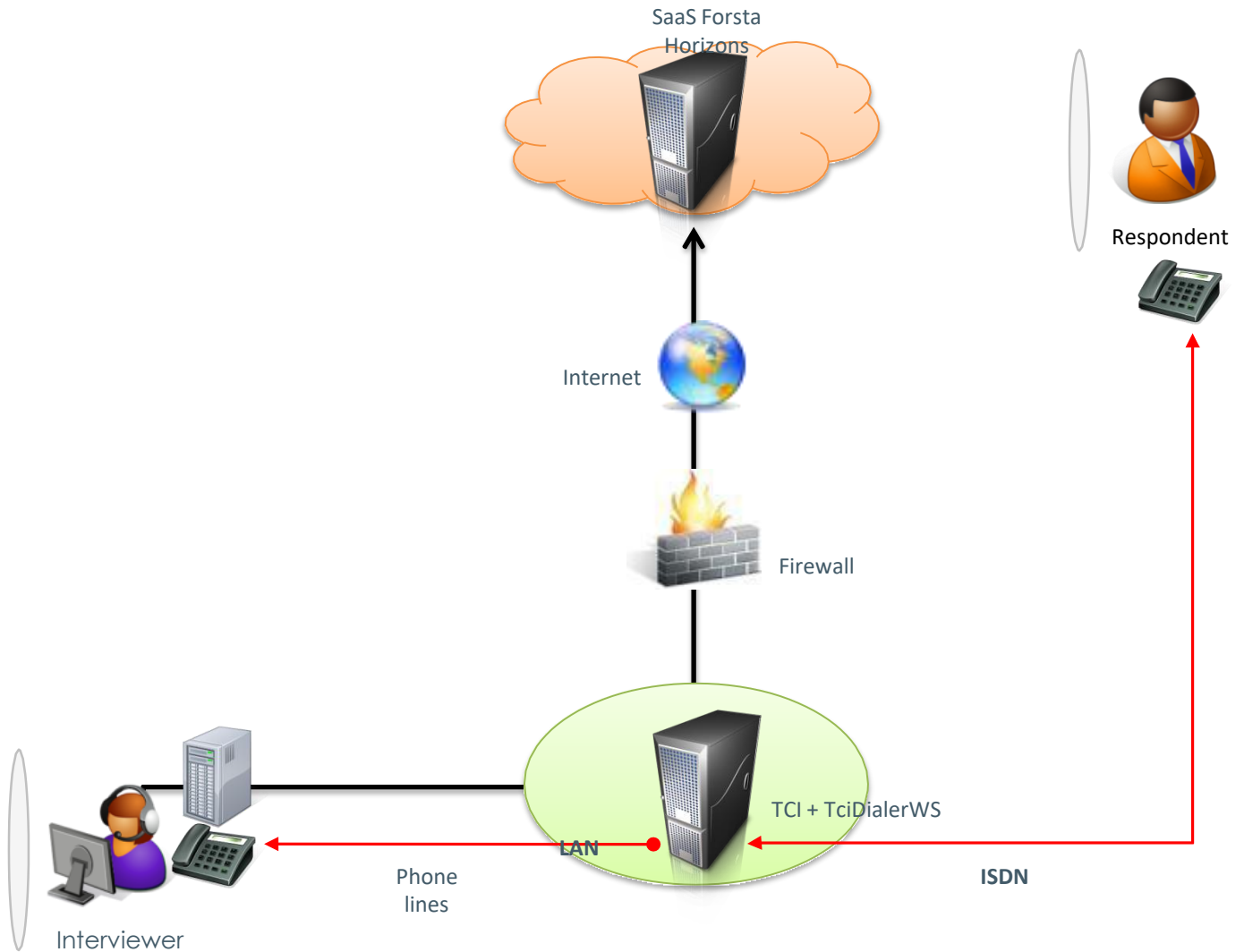
- TciDialerWS installed on a dedicated server. Both TciDialerWS and Forsta TCI servers are on the same local network (LAN). See below:



- TciDialerWS and Forsta TCI installed on same server in the DMZ. See below:



- TciDialerWS and TCI installed on same server in the LAN. See below:



Unless Forsta TCI and TciDialerWS are installed on the same server, a TCP socket with port 20100 should be open on the Forsta TCI server for communication with TciDialerWS.

2.3 Forsta Local Dialer Web Service for MSG Pro-T-S

Forsta CATI and MSG Pro-T-S communicate through a Web Service component called Forsta Local Dialer Web Service for Pro-T-S (ProtsDialerWS). This is a WCF Web Service acting as a proxy between Forsta CATI and Pro-T-S.

2.3.1 Server Hardware

A dedicated server for ProtsDialerWS is required.

Server hardware from a reputable vendor is generally recommended due to the regular inclusion of support agreements that guarantee hardware replacement within a given time period in the case of a failure, as spare parts are usually widely available.

The hardware recommendations provided here should be considered as examples only; the actual recommended hardware will depend heavily on the type and level of usage expected. Forsta can also assist in setting up a tailored recommendation on request.

The typical hardware for a ProtsDialerWS server would be:

- 2Ghz CPU
- 2GB RAM (more recommended for high-volume usage)
- 100Mbit NIC
- UPS

2.3.2 Operating System

The following operating systems are supported:

- Windows Server 2008 R2 x64 (64bit)

2.3.3 Additional Components

The following additional components are required:

- .NET framework 4.5 and IIS 7

2.3.4 Installation Requirements

The MSG dialer has been installed and configured by a MSG representative.

The ProtsDialerWS requires a static, externally accessible IP address to receive inbound Web traffic (http and https), and it must be able to communicate with the environment hosting Forsta CATI via Web traffic (http and https).

Important:

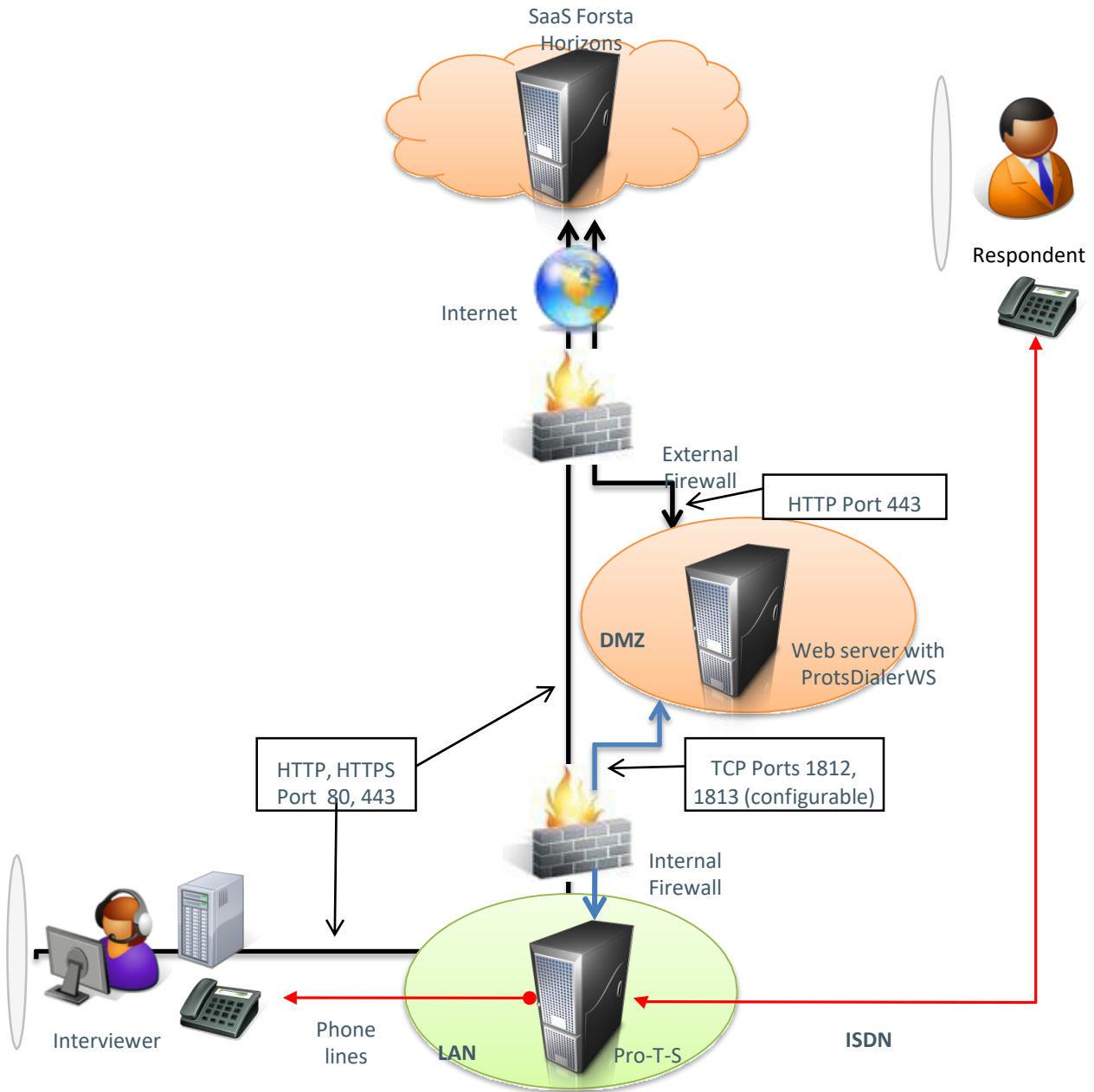
From a security perspective it is recommended that the access to the ProDialerWS be locked down to the specific IP addresses used by the Forsta environment. The details regarding the Forsta SaaS environment are available from the Forsta Extranet.

The ability to listen to any audio recordings stored on the dialer is delivered via direct web traffic to the ProDialerWS, therefore if this is locked down, only CATI supervisors that have direct access will be able to hear the recordings. For access to the audio recordings the ProDialerWS can be configured to connect to a specific IP address, this can either be an internal or external IP address.

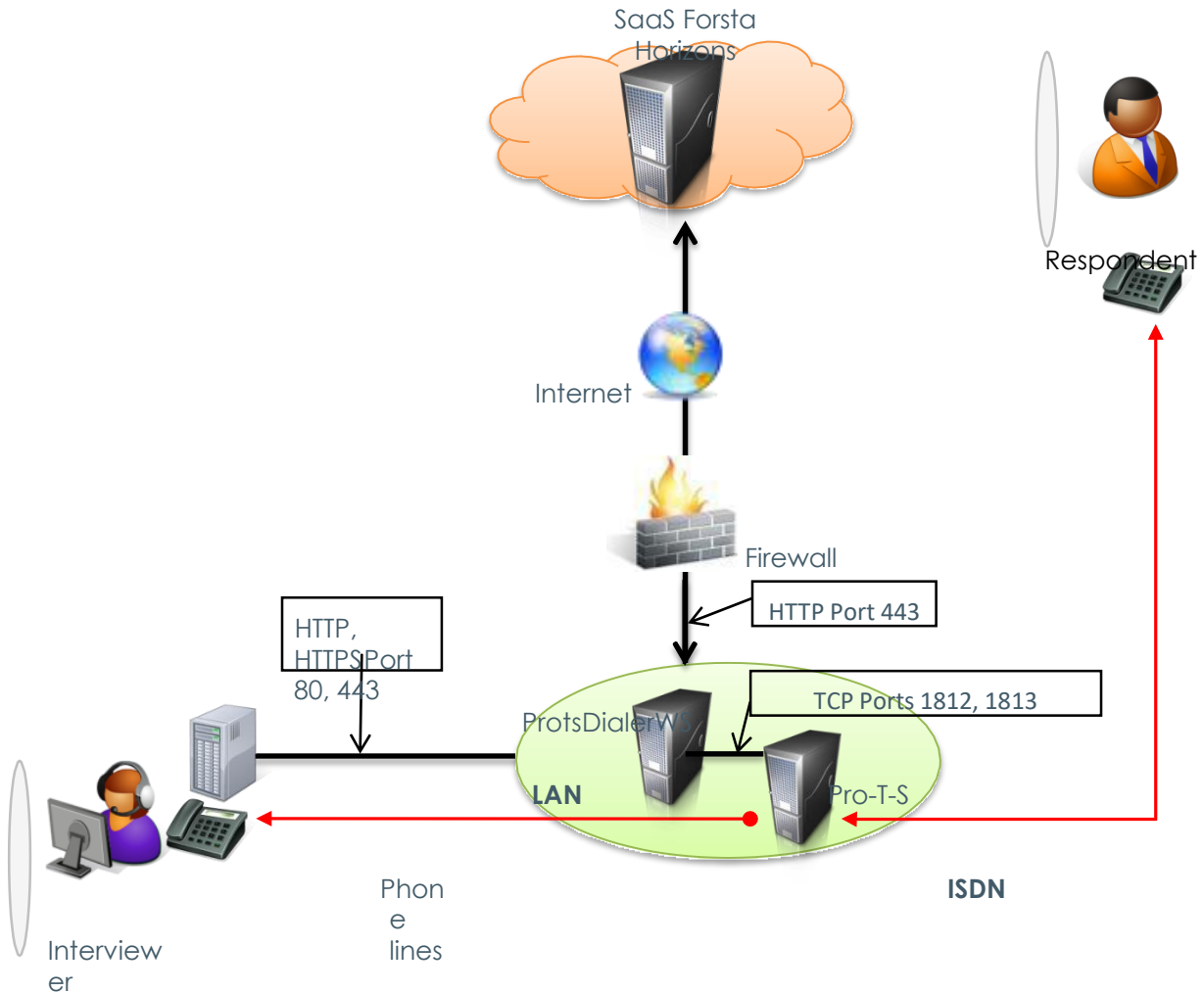
2.3.5 Installation Scenario's

ProtsDialerWS cannot be installed on the same server as the Pro-T-S dialer. Supported scenarios include:

- ProtsDialerWS installed on a dedicated server. ProtsDialerWS server is in the DMZ (i.e. visible to Internet) and Pro-T-S on the LAN. See below:



- ProtsDialerWS installed on a dedicated server. Both TciDialerWS and Pro-T-S servers are on the same localnetwork (LAN). See below:



The Pro-T-S dialer requires inbound and outbound TCP traffic with the ProDialerWS in 2 specific (configurable) ports.

2.4 Forsta Open Dialer API

Forsta CATI and the Forsta Open Dialer API allows third party dialers to be controlled by Forsta CATI. ForstaCATI uses a WCF Web Service (GenericDialerWS) to communicate with the third part dialer via the Forsta Open Dialer API.

2.4.1 Server Hardware

A dedicated server for GenericDialerWS is required.

Server hardware from a reputable vendor is generally recommended due to the regular inclusion of support agreements that guarantee hardware replacement within a given time period in the case of a failure, as spare parts are usually widelyavailable.

The hardware recommendations provided here should be considered as examples only; the actual recommended hardware will depend heavily on the type and level of usage expected. Forsta can also assist in setting up a tailoredrecommendation on request.

The typical hardware for a server hosting GenericDialerWS would be:

- 2Ghz CPU
- 2GB RAM (more recommended for high-volume usage)
- 100Mbit NIC
- UPS

2.4.2 Operating System

The following operating systems are supported:

- Windows Server 2008 R2 x64 (64bit)

2.4.3 Additional Components

The following additional components are required:

- .NET framework 4.5 and IIS 7

2.4.4 Installation Requirements

The third party dialer has been installed and configured by a dialer vendor representative.

The GenericDialerWS component requires a static, externally accessible IP address to receive inbound Web traffic (http and https), and it must be able to communicate with the environment hosting Forsta CATI via Web traffic (http and https).

For security reasons, web traffic through https (port 443) is highly recommended; https traffic requires TSL/SSL authentication and the installation of server/client certificates.

Important:

From a security perspective it is recommended that the access to the server hosting the Forsta Open Dialer API be locked down to the specific IP addresses used by the Forsta environment. The details regarding the Forsta SaaS environment are available from the Forsta Extranet.

The ability to listen to any audio recordings stored on the dialer is delivered via direct web traffic to the Forsta Open Dialer API server, therefore if this is locked down, only CATI supervisors that have direct access will be able to hear the recordings. For access to the audio recordings the Forsta Open Dialer API server can be configured to connect to a specific IP address, this can either be an internal or external IP address.

2.4.5 Installation Scenarios

Different installation scenarios can be provided by dialer vendors depending on requirements.