

TeamCall Telephony Access Platform for macOS

Installation and Troubleshooting

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iLink Kommunikationssysteme GmbH
Kurfürstendamm 67
10707 Berlin, Germany
www.ilink.de

1 Overview

The TeamCall Telephony Access Platform (TAP) is a CTI server to connect computer systems with telephone systems.

TeamCall TAP is available for Windows, macOS, and Linux.

This document describes the installation and troubleshooting of TeamCall TAP for macOS release 3.8.19 or higher.

2 Installation requirements

2.1 System requirements

TeamCall TAP for macOS runs on macOS Yosemite (10.10) or newer. As of May 2018, this was tested with versions up to macOS High Sierra (10.13).

Administrator permissions are required to install TeamCall.

2.2 Hardware requirements

The hardware requirements of TeamCall TAP (processor, memory, storage, network traffic) are typically quite low. The main factors are the volume of phone calls and the number of users.

With up to 50 users TeamCall TAP does not require a dedicated server. It can be installed on an existing Mac as long as that Mac does not already run under high load.

Please note that this should be a server in the sense that it runs throughout the day and will not enter sleep mode or even switch networks (like a laptop might do).

3 Installation

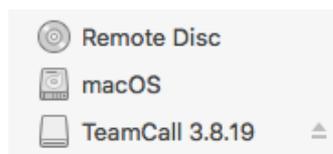
3.1 Installer package



TeamCall-3.8.19-
macos.dmg

TeamCall TAP is delivered as a macOS disk image containing the installer package and documentation.

Open the disk image with a double click, it will appear in Finder as a new volume:



3.2 TeamCall TAP components

TeamCall CSTA Server is the main component of TeamCall TAP.

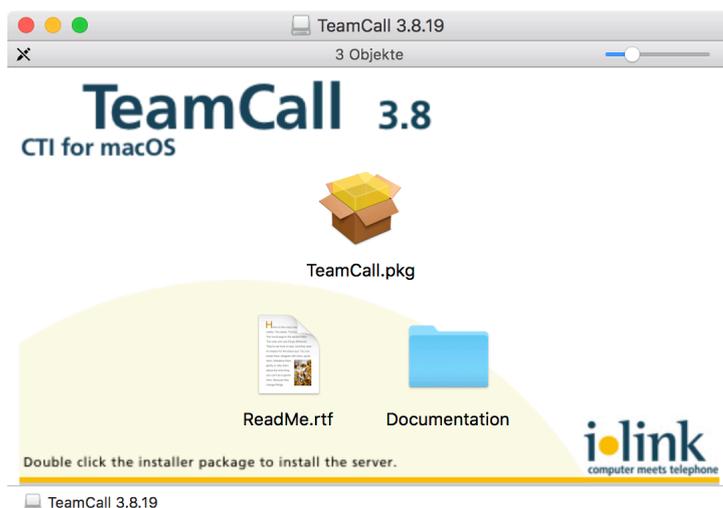
For connections to some phone systems, additional TeamCall components are required (TeamCall CA, TeamCall LinkTSP). You would receive these from iLink as well.

Under macOS only TeamCall CSTA Server is supported, not the other TeamCall components. You would need to install these under Windows or Linux. This is **not** covered in this document.

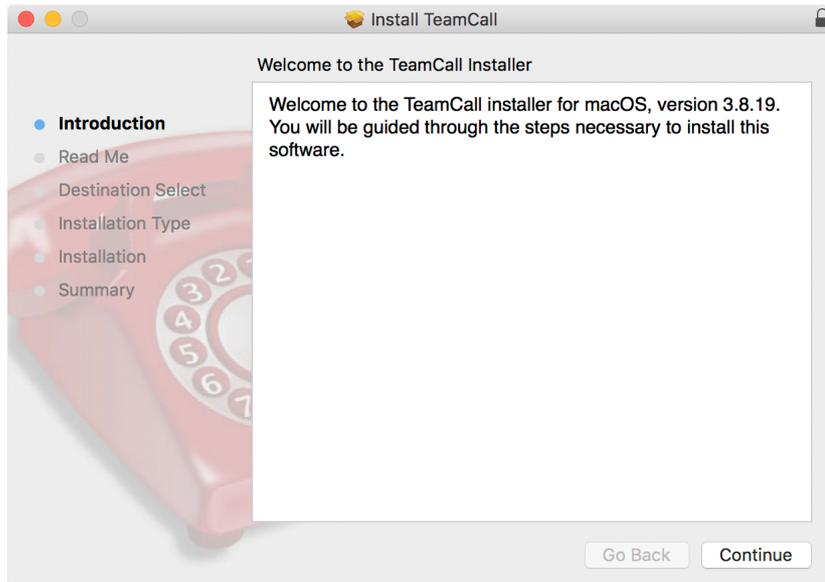
The file `Phone Systems.rtf` in the disk image folder `Documentation` contains an overview for which phone systems such additional TeamCall components are required.

3.3 Installation process

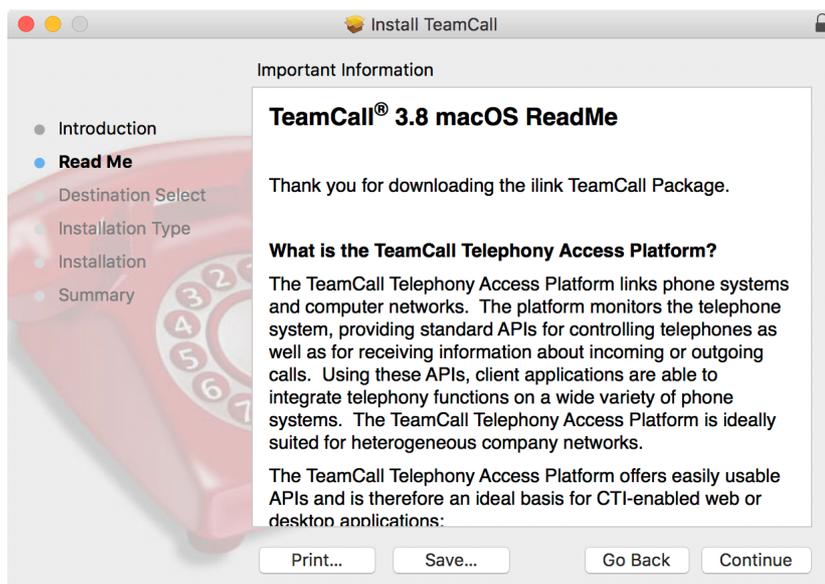
The installation is described using screen shots.



Open the installer package `TeamCall.pkg` with a double click.

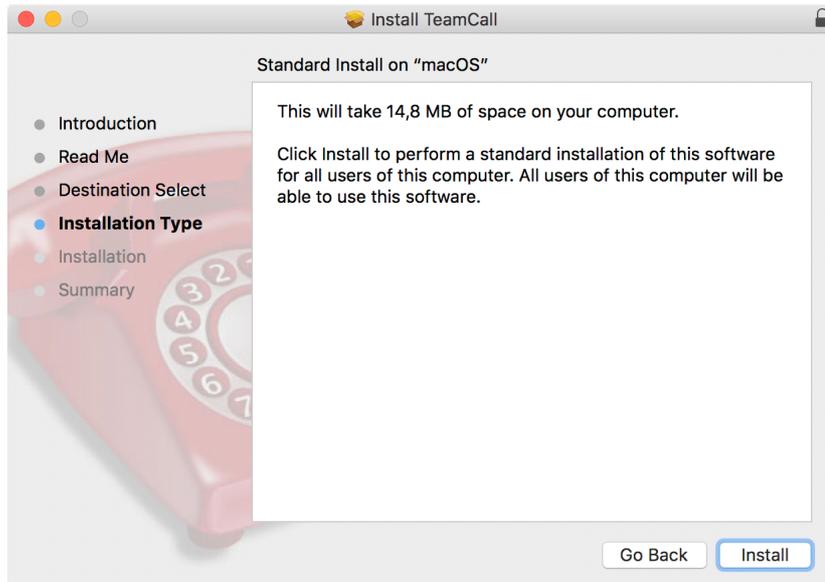


Click *Continue*.



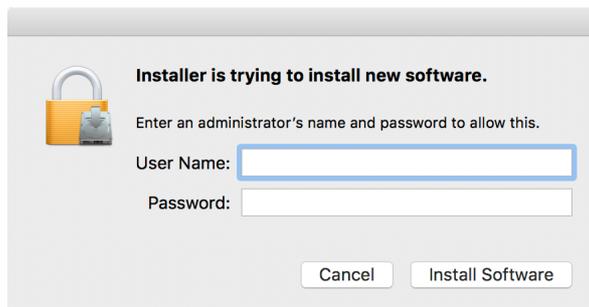
The content of the file `ReadMe.rtf` is displayed. You'll also find this file on the disk image.

Click *Continue*.

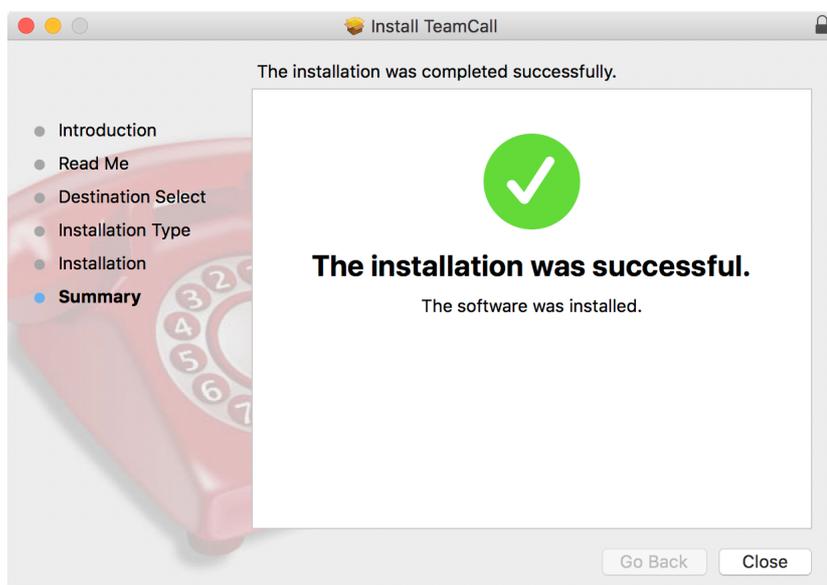


Click *Install* to start the installation.

You'll need administrator permissions for the installation. If asked, enter the name and password of a user with administrator permissions and click *Install Software*.



The installer will display the installation progress up to its successful completion.



Click *Close* to close the installer window.

3.4 Installed files

The installer package installs the following folders and files:

For TeamCall CSTA Server:

```
/var/CSTAServer/
```

For starting and stopping of the TeamCall service:

```
/Library/LaunchDaemons/de.iolink.TeamCall.plist
```

By default, both folders (`/var` and `/Library`) are not visible in Finder. You can access these folders as follows:

Select the Finder menu option *Go > Go to Folder...*

A small input window will open. Please enter the path (`/var` or `/Library`) and click *Go*.

3.5 Update installation

The installer will install default versions of the configuration files `Default.conf` and `DialPlan.conf` (in `/var/CSTAServer/conf/`).

If these files already existed (e.g. in an update installation) backups of the existing files will be made (`Default.conf.backup.0` and `DialPlan.conf.backup.0`). Afterwards you can copy your previous settings (TeamCall license, IP address of the phone system, ...) from the backup files into the new files.

4 Configuration

TeamCall CSTA Servers is configured in the text file
`/var/CSTAServer/conf/Default.conf`.

You will need administrator permissions to modify this file.

4.1 Configuration using a GUI editor

If you prefer to edit the file with GUI editor (e.g. *TextEdit*), you should be logged on as an administrator user.

Please make sure to save the file in plain text format and not, for example, as an RTF file.

By default, the folder `/var` is not visible in Finder. You can access it as follows:

Select the Finder menu option *Go > Go to Folder...*

A small input window will open. Please enter the path `/var` and click *Go*.

4.2 Configuration using a command line editor

If you prefer to edit the file with a command line editor (e.g. *nano*) you may do so using the `sudo` command – you will then be asked for your password:

```
sudo nano /var/CSTAServer/conf/Default.conf
```

(Your user account needs `sudo` permissions for you to be able to use `sudo`).

4.3 Configuration settings

All lines in `Default.conf` that begin with a number sign (`#`) are comment lines that are ignored by TeamCall CSTA Server.

Some of these contain descriptions of the various configuration settings, others are disabled settings that are not used in typical setups. (To activate these, you would need to remove the number sign from before the name of the setting.

Each setting starts with the name of the setting, followed by an equals sign and the corresponding value. Space characters will be ignored.

4.3.1 license

Insert the TeamCall CSTA Server license key from the license file. Please make sure to enter the license string in a single contiguous line without a line break.

If no valid license key is configured, TeamCall CSTA Server will run in demo mode. This only allows use of a single telephone device.

4.3.2 pbxType

This setting configures the phone system type via a phone system specific key (e.g. `aastra5000`, `generic`, `innovaphone`, `panasonic`).

Many of these keys are valid for multiple phone system types. The file `Phone Systems.rtf` in the disk image folder `Documentation` contains an overview over which key is used for which phone system.

4.3.3 cstaLinkAddress / cstaLinkPort

These settings configure the IP address and TCP port number of the phone system's CTI interface.

In most phone systems this port number can be freely configured. However many phone systems use a default value that is typically left unchanged. The file `Phone Systems.rtf` in the disk image folder `Documentation` contains an overview over the standard port numbers of the CTI ports of various phone systems, as far as we are aware of them.

4.3.4 PBXUsername / PBXPassword

Some phone systems require a user name and password for access to their CTI interface. Examples are the phone systems of the *Aastra OpenCom 1xx* or *Unify OpenScape Business* series.

If this is the case for your phone system, these two settings allow to configure the user name and password. To do so, you'll need to remove the number sign from the name of the two settings.

4.3.5 Other settings

All other settings do not typically need to be changed. Their function is described in comments in the configuration file.

5 TeamCall Security Server

It is optionally possible to restrict the list of devices that can be accessed by TeamCall CSTA Server. For this, a list of devices can be configured, for which access is permitted. All other devices can then no longer be used by TeamCall CSTA Server. This allows an administrator to restrict use of CTI functions to certain users.

This feature is optional – without configuration of a list of permitted devices TeamCall CSTA Server can access all devices of the phone system.

5.1 Definition of the permitted devices

The pool of permitted devices is defined using the optional file `DeviceLicense.conf` in the TeamCall configuration folder. All devices listed in this file can be monitored. A MonitorStart request for devices not listed in this file will be answered negatively and no device monitor will be started.

If the file is present during start of TeamCall CSTA Server it will be evaluated and TeamCall CSTA Server will be started in the security mode in which only the devices listed in the file can be monitored.

If this file is not present, TeamCall CSTA Server will be started without the Security Server feature and there will be no restriction of devices that can be monitored.

Note: If the file exists but is empty, no device is permitted and no device monitor can be started.

5.2 File structure

The file is a plain text file with one line per permitted device.

Each line contains one (or potentially multiple) fields that are separated by tab characters. The first field contains the number of the permitted device.

Additional fields will not be evaluated by TeamCall CSTA Server. They can be used to add customer specific information that help to understand the configuration (e.g. the corresponding employee number or cost center).

Lines that begin with two forward slashes (//) are treated as comment lines and will not be evaluated by TeamCall CSTA Server. Empty lines will be ignored as well.

5.2.1 Character encoding and line ending

Only the following characters are being considered by TeamCall CSTA Server during evaluation if the file: 0 to 9, *, #, +, /, <TAB> (tabulator), and <LF> (line feed).

These characters need to be ASCII encoded. All other characters can be encoded in an arbitrary encoding.

This means that the file can be encoded in encodings like ISO 8859-1, UTF-8, or MacOS Roman because all of these encodings represent the characters relevant to TeamCall CSTA Server in the same way as ASCII encoding.

TeamCall CSTA Server expects lines to end with <LF> character (ASCII 0x0a), i.e. in the UNIX standard.

Lines that end with <CR><LF> (ASCII 0x0d0a), i.e. in the Windows standard, are supported as well because this sequence does contain an <LF> and TeamCall CSTA Server will ignore the <CR>.

5.2.2 Evaluation of the device identifier

The first field of each line (all character before the first <TAB> or <LF>) contains the device number (or more general: the device identifier).

This identifier can be arbitrarily formatted (using space characters, parentheses, hyphens, etc.). TeamCall CSTA Server will only evaluate the following characters and will ignore all other characters:

```
0123456789*#+
```

So TeamCall CSTA Server will convert +49 (30) 285 26 - 555 into +493028526555. If no character is left after this conversion, TeamCall CSTA Server will ignore this line.

The result of this conversion needs to exactly match the string that is used to set the monitor in the phone system. So the example +493028526555 will only work with phone systems that expect the device that shall be monitored to be specified in international format.

Instead, most phone systems expect the device to be indicated by just the extension (e.g. 555). In such cases only extension numbers should be configured in the file.

If the file contains duplicate entries, the duplicates will be ignored.

If no valid devices can be parsed from the file, no device is permitted and no device monitor can be started. This would not only happen in the case of an empty file but also when the file only contains comments or non-evaluated characters before the first <TAB> of each non-comment line.

5.2.3 Example of the file structure

```
// Shipping department
1412 Jeannine Snyder
1493 Wilbur Miller

// Engineering department
1731 Louis Bressault
1755 Eva Przbylla
```

5.3 Reloading the file at run time

The following request on the SuperVisor session of TeamCall CSTA Server reloads the file at run time and updates the internal list of permitted devices:

```
ReloadDeviceLicense
```

This can be used to add or remove permitted devices at run time.

Note: Existing device monitors for devices that are no longer included in the file when `ReloadDeviceLicense` is called will remain active until TeamCall CSTA Server is restarted. But new device monitors can immediately no longer be started for these devices.

6 Starting and stopping the service

TeamCall CSTA Server is installed as a so called *launch daemon* (a type of macOS background service).

To start and stop the service please use the command line of a user with sudo permissions:

6.1 Starting the service

The following command starts TeamCall CSTA Server and also registers the service as macOS launch daemon, so that it will be started automatically when the computer is restarted:

```
sudo launchctl load /Library/LaunchDaemons/de.iolink.TeamCall.plist
```

If the following message appears the service had already been registered as a launch daemon (it will still be started if it did not already run):

```
/Library/LaunchDaemons/de.iolink.TeamCall.plist: service already loaded
```

6.2 Test if the service is running

The following command shows a list of all running processes whose name contains the string `csta`:

```
ps auxww | head -1; ps auxww | grep -v grep | grep -i csta
```

If TeamCall CSTA Server is running, you'll see an appropriate line below the header line (spread over two lines in the following example due to lack of space):

```
USER          PID  %CPU %MEM    VSZ   RSS  TT  STAT  STARTED  TIME  COMMAND
root          23133  0,0  0,0  665136  7684  ??  Ss    3:09pm  0:00.07 /var/
CSTAServer/CSTAServer -c /var/CSTAServer/conf/Default.conf
```

If however the only output is the header line the service is not running:

```
USER          PID  %CPU %MEM    VSZ   RSS  TT  STAT  STARTED  TIME  COMMAND
```

6.3 Stopping the service

The following command stops TeamCall CSTA Server und also deregisters the service as a macOS launch daemon, so that it will no longer be started automatically when the computer is restarted:

```
sudo launchctl unload /Library/LaunchDaemons/de.ilink.TeamCall.plist
```

If the following message appears the service had already been deregistered as a launch daemon:

```
/Library/LaunchDaemons/de.ilink.TeamCall.plist: Could not find specified service
```

6.4 Restarting the running service

If you would like to restart the running TeamCall CSTA Server service (for example after the configuration has changed) just run both commands:

```
sudo launchctl unload /Library/LaunchDaemons/de.ilink.TeamCall.plist  
sudo launchctl load /Library/LaunchDaemons/de.ilink.TeamCall.plist
```

7 Test of the installation

Typically it is not necessary to explicitly run a function test after TeamCall CSTA Server has been installed. Instead you could continue with the installation of the CTI application that uses TeamCall to communicate with the phone system (e.g. *direct* for macOS).

However if the CTI function does not work in your application you can test TeamCall CSTA Server as follows:

7.1 Is the service running?

A requirement for working CTI is that the TeamCall CSTA Server service is running. See section 8.1.

Once the service is running you can continue with the test of connecting to CSTA Server from the local host.

7.2 Is it possible to connect to the service from the TeamCall host?

If the service is running you can test if the service accepts local connections from the same host. See section 8.3.

If you can establish a local connection you can continue with the test of connection to CSTA Server from the CTI application's computer.

7.3 Is it possible to connect to the service from a client computer?

If a local connection to the service can be established you can test if the service accepts connections from the CTI application's computer. See section 8.4.

7.4 Is it possible to monitor an extension using an STLI session?

If a connection to the service can be established from the CTI application's computer you can test if an STLI session can be started from that computer and if telephony events for an extension are received in the STLI session.

So do so, connect to TeamCall CSTA Server from the CTI application's computer using `nc` (from macOS) or `telnet` (from Linux and Windows). See section 8.4.

Once the connection has been established, enter the following command to start the STLI session:

```
STLI
```

Note: This first command may not start with a space or tab character because that would cause TeamCall CSTA Server to switch to a binary session.

Windows: Please note that you will need to type this first command blindly under Windows (what you type will not be displayed). Please further note that it is not possible to correct STLI input from the Windows command line, i.e. the backspace, delete, and cursor keys cannot be used. Instead just send the mistyped command using the return key (this will lead to an error message) and then reenter the correct command.

If successful, the response to this command will be:

```
error_ind SUCCESS STLI
```

Now please enter the following (replacing `<extension>` with the internal extension number of the telephone with which you want to perform the test):

```
MonitorStart <extension>
```

If successful, the response to this command will be:

```
error_ind SUCCESS MonitorStart
```

Now pick up the receiver of the selected telephone. This should cause a line like this to be printed to the command line (possibly followed by additional lines):

```
Initiated <extension> normal
```

If everything happened as described above, the test was successful and TeamCall CSTA Server works as expected. You may terminate the STLI connection by entering the command `BYE`.

If something else happened there may be a problem. Perhaps the sections on STLI error messages in chapter 8 (Troubleshooting) help in analyzing and fixing the problem.

8 Troubleshooting

This section covers a few typical problem cases, their root causes, and potential troubleshooting steps. We assume the typical know how of an IT administrator and will not explicitly explain the individual tools used in troubleshooting.

8.1 Log files

Often it is helpful for troubleshooting to take a look in the log files of TeamCall CSTA Server.

The log files are located in the folder `/var/CSTAServer/log/`

By default, the folder `/var` is not visible in Finder. You can access it as follows:

Select the Finder menu option *Go > Go to Folder...*

A small input window will open. Please enter the path `/var` and click *Go*.

The main log file is `Error.log`. In addition to other data it contains error messages and information regarding the communication with the phone system.

The file `Sys.log` contains information about service starts and stops, errors in connecting to the phone system, and missing licenses.

It is possible to activate other optional log files via the TeamCall configuration. These are used for root cause analysis by the ilink support.

8.2 The service does not run

Problem

The TeamCall CSTA Server service does not run.

Detection

See section 6.2 for how to check if the service is running.

Troubleshooting steps

- Start the service if it does not run (see section 6.1).
- If the service still does not run, check the TeamCall log file `Error.log` (see section 8.1), it may contain information about the root cause.

For example, TeamCall CSTA Server exits right after it started if no valid `pbxType` is configured.

8.3 No connection to the service from the TeamCall host

Problem

It is not possible to locally connect to TeamCall CSTA Server from the TeamCall host.

Detection

Open a command line window on the TeamCall host and open a TCP connection to the TeamCall CSTA Server service:

```
nc localhost 26535
```

(On Linux or Windows you would use `telnet` instead of `nc`).

If the connection cannot be established, you'll immediately see the next command line input prompt.

Otherwise, i.e. if the connection is established, you will not see anything – the CSTA Server is now waiting for commands entered on the command line. If you enter the command `BYE` followed by the return key, you'll leave the TCP connection (output: `error_ind SUCCESS BYE`).

Troubleshooting steps

- Verify that you try to connect to the correct port. `26535` is the standard port of the CSTA Server. If you have changed the `loginPort` in the TeamCall configuration file then connect to the configured port instead of port `26535`.
- If you're using the correct port you could test if it is possible to establish any network connection via the local network interface:

```
ping localhost
```
- If you cannot ping localhost please check the network configuration of the TeamCall host or try to use the host's IP address instead of the local network interface:

```
ping 10.0.137.12
nc 10.0.137.12 26535
```
- It is possible that a local firewall would block access to the CSTA Server port. If so you should change this to allow access (in this case it's best to not only do this for local access but as well for remote access from the computers on which the CTI applications are running).
- If you can ping the computer but cannot establish a connection to the CSTA Server port, or the connection is closed immediately after having been established or after you've entered the first character, it is likely that some other service already uses port `26535` so that TeamCall CSTA Server cannot use this port.

To check if the port is already in use you can use the following command on the command line of the TeamCall host (on macOS and Linux):

```
netstat -an | grep 26535
```

For a TeamCall CSTA Server on Windows the command would be:

```
netstat -an | find 26535
```

If the port is already in use set a different `loginPort` in the TeamCall configuration file and restart the service.

Please make sure to also change the configuration of your CTI application, e.g. *direct*, to now use the new TeamCall port.

8.4 No connection to the service from a client computer

Problem

It is not possible to connect to TeamCall CSTA Server from the CTI application's computer.

Detection

Open a command line window on the computer on which the CTI application is running and open a TCP connection to the TeamCall CSTA Server service:

From macOS

```
nc 111.112.113.114 26535
```

Use the host name or IP address of your TeamCall host instead of the address `111.112.113.114`.

If the connection cannot be established you'll immediately see the next command line input prompt.

Otherwise, i.e. if the connection is established, you will not see anything – the CSTA Server is now waiting for commands entered on the command line. If you enter the command `BYE` followed by the return key, you'll leave the TCP connection (output: `error_ind SUCCESS BYE`).

From Linux or Windows

```
telnet 111.112.113.114 26535
```

Use the host name or IP address of your TeamCall host instead of the address `111.112.113.114`.

If the connection cannot be established you'll see a message similar to this:

```
Trying 111.112.113.114...
```

After a while you'll then see a message similar to the one below and you'll be back at the command line input prompt:

```
telnet: connect to address 111.112.113.114: Connection timed out
```

It can take several minutes until the connection times out. If you want to cut this short, you can abort the process right after the first message by entering `Ctrl-C`.

Otherwise, i.e. if the connection is established, you'll see messages like this on Linux:

```
Trying 111.112.113.114...  
Connected to teamcall  
Escape character is '^]'.  
^C
```

On Windows you will not see anything.

The CSTA Server is now waiting for commands entered on the command line. If you enter the command `BYE` followed by the return key, you'll leave the TCP connection (output: `error_ind SUCCESS BYE`).

Note: On Windows you will not see the characters you type for this first command, so you'll need to type this command blindly.

Troubleshooting steps

- Check if a firewall prevents access from the client computer to the CSTA Server port on the TeamCall host. If so you should change this to allow access. This could be a firewall in the network between the two computers as well as a local firewall on the client computer or on the TeamCall host.

8.5 Error message LINKOUTOFSERVICE

Problem

The connection between TeamCall CSTA Server and the phone system could not be established or has been disconnected.

Detection

The following error message appears in an STLI session of TeamCall CSTA Server (see section 7.4):

```
error_ind LINKOUTOFSERVICE
```

This message could be the response to a previous STLI request (e.g. `MonitorStart`) or it can appear out of the blue if the connection is interrupted.

If no active STLI session is open in which the error message would appear the TeamCall log files `Error.log` and `Sys.log` should be checked (see section 8.1). They should contain a similar error message.

Troubleshooting steps

- Perhaps the phone system type (`pbxType`) in your TeamCall configuration does not match the type of your phone system. See section 4.3.2. Check this and update the TeamCall configuration if necessary. You will need to restart the service in order to activate the new configuration (see section 6.4).

- Perhaps the IP address of the phone system's CTI interface is different from what is set in the TeamCall configuration (`cstaLinkAddress`).

Check this and update the TeamCall configuration if necessary. You will need to restart the service in order to activate the new configuration (see section 6.4).

- Perhaps the phone system's CTI interface is different from what is set in the TeamCall configuration (`cstaLinkPort`). For example in the unlikely case of the phone system vendor having changed the default settings so that the default port number given in the file `Phone Systems.rtf` is no longer valid. Or if you phone system administrator has manually changed the port number.

Check this and update the TeamCall configuration if necessary. You will need to restart the service in order to activate the new configuration (see section 6.4).

- Perhaps the connection to the phone system cannot be established because either the TeamCall host or the phone system's CTI interface is not connected to the network.

Try to send a ping from the TeamCall host to the phone system. If you run into a timeout, there may be a network problem. In this case please also check if there is a firewall between TeamCall CSTA Server and the phone system that prevents the communication.

- Perhaps the CTI interface of the phone system is deactivated, e.g. because a license is missing that may be required for this in the phone system.

Please check this with your phone system administrator.

8.6 Error message LICENSEERROR

Problem

No valid license is available or the number of used devices exceeds the licensed number.

Detection

After trying to set a monitor (`MonitorStart`) in der TeamCall CSTA Server's STLI session (see section 7.4) the following error message is shown:

```
error_ind LICENSEERROR MONITORINGPOINTSEXCEEDED Monitor not set
```

If no active STLI session is open in which the error message would appear the TeamCall log file `Error.log` should be checked (see section 8.1). It should contain a similar error message.

Troubleshooting steps

- Check if a license has been configured (see section 4.3.1).
- Ask the ilink support at support@ilink.de to verify that the configured license is valid.

8.7 TeamCall Reference Guide

The chapter *Troubleshooting* of the TeamCall Reference Guide in the disk image `Documentation` folder contains additional troubleshooting information.

9 Uninstalling TeamCall CSTA Server

The script `uninstall.sh` is used to uninstall TeamCall CSTA Server and all related files.

This script is located both in the disk image `Documentation` folder and in the TeamCall installation folder `var/CSTAserver`

You can run this script from the command line of a user with sudo-permissions:

```
sudo sh /var/CSTAserver/uninstall.sh
```