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BVMS - Configure time services

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1 Document information	3
1.1 Version history	3
2 Introduction	4
2.1 Time: what is the challenge?	4
2.2 Synchronizing time	4
2.3 Windows Time Service	4
2.4 Summary	4
3 Management server configuration	6
3.1 Operating system configuration	6
3.2 BVMS Management Server configuration	8
4 Workstation configuration	9
5 Camera configuration	10

1 Document information

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1.1 Version history

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2 Introduction

Time is everything: meetings, public transportation, religion, transactions: the whole world is working because the concept of “time” exists. Within a security (or any other) system this is not different: recording schedules, logging, authorizations, encryption keys, timelines, all of these concepts can exist because of time. As a result, time can either make or break a system: problems can appear only due to a time difference of a couple of seconds between two system components.

2.1 Time: what is the challenge?

Each device has its own internal clock, which is based on a hardware mechanism. This mechanism acts like a watch: try to put two watches together and synchronize them on the millisecond. A security system consists out of more than two devices, it can consist of thousands of devices. Synchronizing the time of all these devices by hand is a very time consuming task. Additionally, due to small differences in electronic components, devices can have deviations from one another. These deviations cannot be detected by the human eye, but can result in considerable time differences when a device is running for months.

2.2 Synchronizing time

The Network Time Protocol (NTP) was created to solve these challenges. The Network Time Protocol is a network-based protocol for clock synchronization between system components. The protocol utilizes a standard IP network to communicate and can maintain a time difference (considering a local area network) of less than one millisecond between components. The Network Time Protocol is a standard protocol and documented in [RFC 5905](#).

The operation and configuration of the Network Time Protocol are complex: a hierarchical architecture needs to be set-up including several layers of systems which are able to run the Network Time Protocol. To reduce complexity the Simple Network Time Protocol (SNTP) was created. The Simple Network Time Protocol is mainly used when less accuracy (deviations of 1-2 seconds are acceptable).

2.3 Windows Time Service

The Bosch Video Management System is running on Microsoft Windows Server operating systems. Windows includes an internal time service, which is explained on Microsoft Technet:

“The Windows Time service, also known as W32Time, synchronizes the date and time for all computers running in an AD DS domain. Time synchronization is critical for the proper operation of many Windows services and line-of-business applications. The Windows Time service uses the Network Time Protocol (NTP) to synchronize computer clocks on the network so that an accurate clock value, or time stamp, can be assigned to network validation and resource access requests. The service integrates NTP and time providers, making it a reliable and scalable time service for enterprise administrators.

The W32Time service is not a full-featured NTP solution that meets time-sensitive application needs and is not supported by Microsoft as such. For more information, see Microsoft Knowledge Base article 939322, [Support boundary to configure the Windows Time service for high-accuracy environments \(http://go.microsoft.com/fwlink/?LinkID=179459\)](http://go.microsoft.com/fwlink/?LinkID=179459).”

Source: [Windows Time Service Technical Reference - Microsoft Technet](#)

The Windows Time service is based on the Simple Network Time Protocol.

2.4 Summary

The Network Time Protocol requires a very complex infrastructure, which impacts the total installation and configuration effort of the system. The Simple Network Time Protocol (also used for the Windows Time Service) reduces the complexity, but at the same time also reduces the accuracy.

- For most security applications the Simple Network Time Protocol provides sufficient accuracy. Bosch recommends to use the Windows Time service, based on the Simple Network Time Protocol, as basis for time synchronization in a security network. This document provides best-practices on how to configure the Bosch Video Management System and related components in a time synchronization environment based the Windows Time service.

- „Alternatively, the Network Time Protocol can be used whenever it is already existing inside an infrastructure or when event accuracy with a deviation less than one second is required. Due to the complexity of the infrastructure Bosch does not make any recommendations related to the Network Time Protocol.

3 Management server configuration

3.1 Operating system configuration

This section also applies for the Video Recording Manager and Mobile Video Service when these are not running on the management server.

Microsoft has prepared a lot of documentation related to time configuration. Go to the [Microsoft Support: How to configure an authoritative time server in Windows Server](#) page and scroll down to the section “Configuring the Windows Time service to use an external time source”. Click the download button under the “Here’s an easy fix” section.

Configuring the Windows Time service to use an external time source

To have us help you configure an internal time server to synchronize with an external time source, go to the “[Here’s an easy fix](#)” section. If you prefer to fix this problem manually, go to the “[Let me fix it myself](#)” section.

Here’s an easy fix

To fix this problem automatically, click the **Download** button. In the File Download dialog box, click **Run** or **Open**, and then follow the steps in the easy fix wizard.

- When you run the easy fix solution to configure an external time source you will need to specify the name of your NTP server. The easy fix solution will have the placeholder names of Server1 and Server2. Replace these placeholder names with the name of your NTP server followed by “,0x1”. i.e SRV1.Contoso.com,0x1. You do not have to specify more than one server but it is recommended to do so for redundancy. If you have multiple entries they must be separated by a space.
- The unit of time for [SpecialPollInterval](#), [MaxPosPhaseCorrection](#) and [MaxNegPhaseCorrection](#) settings is in seconds.
- This wizard may be in English only. However, the automatic fix also works for other language versions of Windows.
- If you’re not on the computer that has the problem, save the easy fix solution to a flash drive or a CD, and then run it on the computer that has the problem.

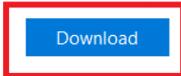


Figure: Download the Microsoft Windows Time service configuration utility

The utility will configure external time servers. To select these, browse to <http://pool.ntp.org> and select two servers which are related to the geographical location of the system, for example “de.pool.ntp.org” and “nl.pool.ntp.org”, referring to Germany and the Netherlands. Another (local or external) (S)NTP server can also be chosen.

Start the Microsoft configuration utility and configure it as indicated and shown in the figure below. Administrative access is required to run the utility.

pool.ntp.org: public ntp time server for everyone

ons of clients.
for most of the major Linux

always available on the

sts. The source code for the

GO UP

ailable at an alternate

: a better system for giving

led. in the meantime

Active Servers	
	Africa 26
	Antarctica 0
	Asia 176
	Europe 2625
	North America 823
	Oceania 91
	South America 47
	Global 3560
	All Pool Servers 3789

As of 2016-11-03

Figure: Pool.ntp.org locations

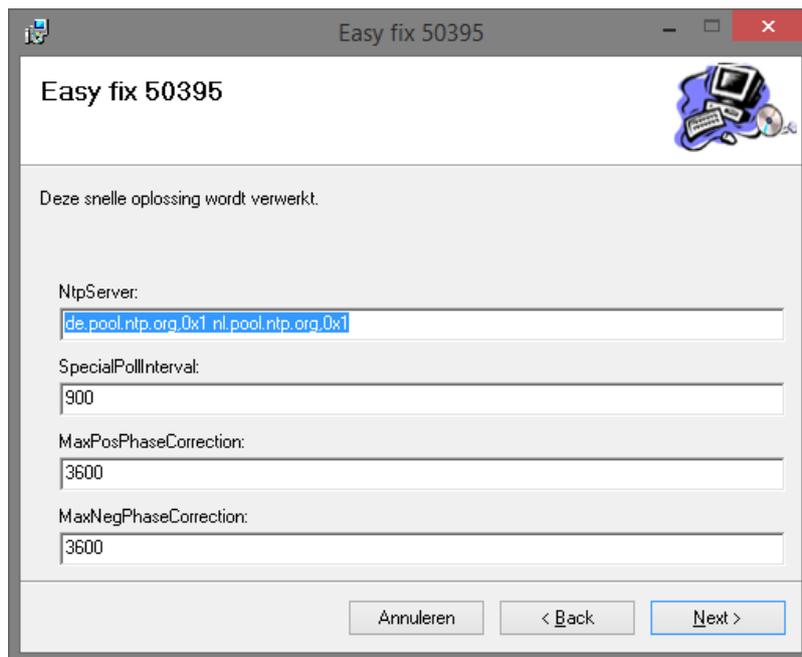


Figure: Windows Time service configuration

Alternatively the configuration can be done from the command-line, using the command shown below.

```
net stop w32time
w32tm /config /syncfromflags:manual /manualpeerlist:"nl.pool.ntp.org, de.pool.ntp.org"
net start w32time
```

The configuration can be verified by starting the Windows Command prompt and issuing the command “w32tm /query /status”, as shown in the figure below. Notice the time source, this should point towards the configured servers.

```

Leap Indicator: 0(no warning)
Stratum: 3 (secondary reference - syncd by (S)NTP)
Precision: -6 (15.625ms per tick)
Root Delay: 0.0377724s
Root Dispersion: 9.5380756s
ReferenceId: 0x94FB4464 (source IP: 148.251.68.100)
Last Successful Sync Time: 03-Nov-16 3:03:07 PM
Source: de.pool.ntp.org,0x1
Poll Interval: 10 (1024s)

```

Figure: verifying configuration

It can take up to one minute before the correct time source is displayed.

When there is a problem, the configured (S)NTP server can be tested by issuing the “w32tm /stripchart /computer:de.pool.ntp.org”, which should result in the output displayed in the figure below.

```

Tracking de.pool.ntp.org [212.227.54.68:123].
The current time is 03-Nov-16 3:10:42 PM.
15:10:42, d:+00.0422624s o:-01.7535031s [ * | ]
15:10:44, d:+00.0973584s o:-01.7545681s [ * | ]
15:10:47, d:+00.0451979s o:-01.7413644s [ * | ]
15:10:49, d:+00.0407441s o:-01.7538596s [ * | ]
15:10:51, d:+00.0409345s o:-01.7527668s [ * | ]
15:10:53, d:+00.0277907s o:-01.7494706s [ * | ]

```

Figure: test the (S)NTP service

When an unexpected result is returned, it is recommended to check access to the specific (S)NTP server. A firewall might prevent the communication between the (S)NTP server and the management server.

3.2 BVMS Management Server configuration

BVMS automatically points devices to its own time-server. This can be changed by editing the BvmsCenterlServer.exe.config file, located in C:\Program Files\Bosch\VMS\bin\. Find the key "TimeServerIPAddress" and adjust the value, as shown in the example below (192.168.0.1).

```

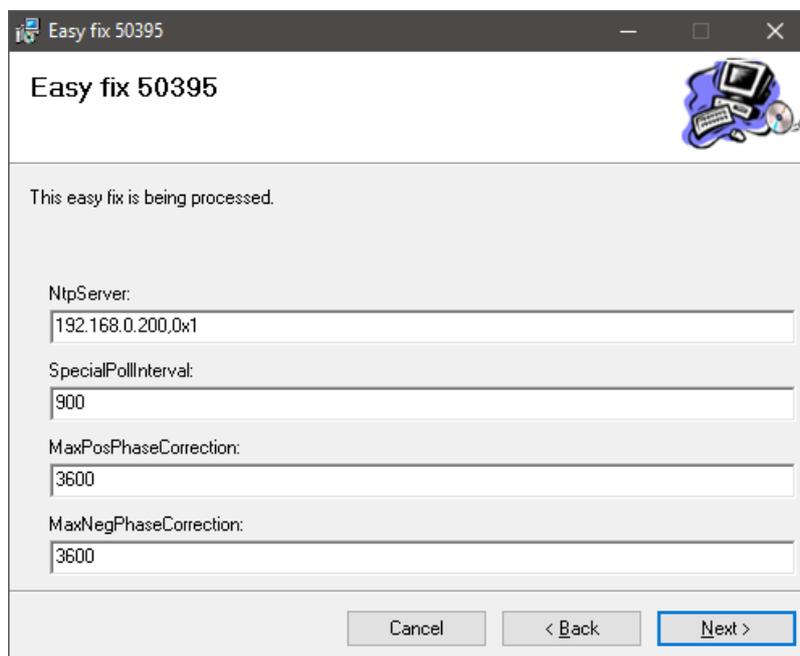
<!-- Ip address of the time server for VRM/NVR encoders(defaults to the Central-Server IP if
not set). -->
<add key="TimeServerIPAddress" value="192.168.0.1" />

```

Activate the configuration in the BVMS Configuration Client after changing this value!

4 Workstation configuration

The Bosch Video Management System Operator client runs on a Windows workstation. When the workstation and server are part of the same Microsoft Active Directory service domain, no manual time synchronization needs to be configured.



Easy fix 50395

This easy fix is being processed.

NtpServer:
192.168.0.200,0x1

SpecialPollInterval:
900

MaxPosPhaseCorrection:
3600

MaxNegPhaseCorrection:
3600

Cancel < Back Next >

Figure: workstation configuration, "192.168.0.200" needs to be replaced by the IP address or Fully Qualified Domain Name of the management server.

When the Bosch Video Management System workstation and management Server are not joined in a domain, or into the same domain, the workstation(s) need to be manually configured to use the management server as a time server. To achieve this, the description in Chapter 2 can be used. Instead of using the pool.ntp.org as a server, the management server is now entered.

5 Camera configuration

If a camera is connected to a BVMS system the time server will be automatically configured.