

Version: 1.2

(If your version is lower than that you can download an update [here...](#))

INFORMATION: This is the offline version of the documentation. Check the current version of the online documentation [here](#).

Icon:



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Foreword: This software was started as the expansion of the Windows-provided means to synchronize system clock. What was missing in the Microsoft implementation is the ability to specify how often I needed to do the sync. I was using my PC to record TV and radio programs on schedule but unfortunately my system clock was very inaccurate and could run ahead of time more than a minute a day. That was not acceptable!

There was also a need for me to synchronize computers on a local network. One was the Digital Video Recorder and the other ones provided Activity Logs that had a direct correlation with the DVR data. Unfortunately even a slightest variation in system clocks posed quite a challenge when analyzing video data recorded by the DVR. Of course I could've used the "net time" command, but that required additional set-up of a NET time server, plus I would need a script to automate it, and on top of it, it didn't have a visual interface and the capability to sync more than one machine at a time. That was not acceptable, either!

The tSync utility was able to not only solve the problems of synchronization, it also automated it for me and added additional features such as:

- Ability to specify the list of my own NTP accurate time servers to use for synchronization;
- Perform power operations, such as shutting down, rebooting, logging off users, going into Stand-by Mode, or hibernating the remote machine(s) from a single terminal running tSync;
- Turning monitors on and off, activating screen-saver, and locking the Work Station on remote machine(s) from a single terminal running tSync;
- Running files and commands on remote machine(s) from a single terminal using tSync.

Installation: tSync package does not require installation. The downloadable package includes the following files:

- tSync.exe - The main executable file needed for the Internet and/or network synchronization.

INFORMATION: Move this file to any location on your hard drive (Example: "C:\Program Files", or even "My Documents" folder);
IMPORTANT: Do not move this file to a removable or temporary medium and/or folder, such as Jump Drive, Flash card, floppy disc, CD, DVD, etc.

- tSyncRemote.exe - The executable file needed to be installed on each remote machine on a network if you'd like to use the tSync's remote interface features.

INFORMATION: Move this file to any location on your hard drive (Example: "C:\Program Files", or even "My Documents" folder);
IMPORTANT: Do not move this file to a removable or temporary medium and/or folder, such as Jump Drive, Flash card, floppy disc, CD, DVD, etc.

INFORMATION: This file is not necessary if Network Synchronization and interface is not used.

- RELEASE NOTES.txt - A text file giving developers' release notes for each version of the software.

INFORMATION: You can use this file to see what improvements were made in the latest version of the software;

INFORMATION: This file is not required for the operation of the software and should not be moved along with the files specified above.

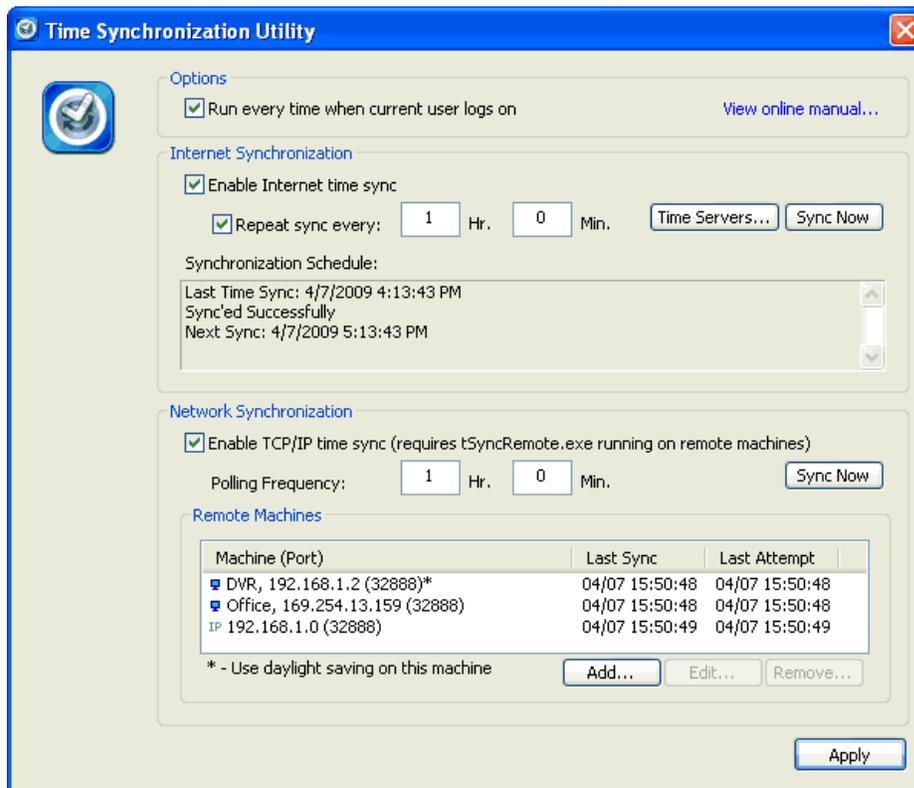
INFORMATION: If you run any of the executable files from a downloadable ZIP archive (or from a temporary or non-fixed location), you will see an automatic installation feature. In that case simply follow the on-screen commands to (re-)install the program.

Set-up: Once the main tSync.exe file is installed at a permanent location, simply run it by double-clicking its icon.

INFORMATION: Windows Vista/7 users read below for additional information and limitations.

When run for the first time you should see the tSync options window:

INFORMATION: This window can be also brought up by selecting Options from the tSync icon on the system tray.



The following options are available:

- *Apply* button - click this button to apply changes made in this window.

INFORMATION: Changes made in this window will be validated if you hit Apply button. An error message may be shown in case of an incorrect parameter.

INFORMATION: In case you close this window the changes made in it will be saved without validation. In case of an incorrect parameter its old value will be used instead.

- *Run every time when current user logs on* - set this checkbox if you want tSync to run in the background every time you log on to the current Windows user account;

INFORMATION: When activated in this mode, tSync will write itself into the Windows System Registry that may cause an anti-virus program warning.

IMPORTANT: This option should be unchecked if you decide to run tSync as a service (or when "Computer starts" from within the

Task Scheduler)!

- *Enable Internet time sync* - set this checkbox if you want to make tSync to synchronize the system time over the Internet:

INFORMATION: The Internet connection is required for this option to succeed. In case when Internet connection is not available at the time (as for dial-up connection) tSync will wait and attempt to synchronize the system time when the Internet connection is available.
INFORMATION: Precision of the system time synchronization depends on a particular NTP server, as well as the type of the Internet connection. For the most accurate time synchronization tSync relies on the principle that transmission time to send data packet equals to the time needed to receive the same-size data packet, thus network connections with a fairly equal "send" and "receive" times will provide the most accurate synchronization results.

INFORMATION: The current Windows user time zone is used to adjust the system time during synchronization.

INFORMATION: You may receive your firewall warning during the time when tSync attempts to synchronize time over the Internet.

- *Repeat sync every* - makes tSync to repeat Internet time synchronization at a certain frequency.

INFORMATION: The minimum allowed Internet sync frequency is 1 minute, the maximum allowed frequency is 9,999 hours and 59 minutes. In case Internet connection is not available during the next scheduled sync, tSync may extend the current waiting period for synchronization.

INFORMATION: If this option is off as well as the "Enable TCP/IP time sync", tSync will close automatically when the Internet time sync succeeds.

- *Time Servers* button - lets you edit the list of NTP time servers that tSync uses to synchronize system time over the Internet;

INFORMATION: tSync will use NTP servers in order presented in the "NTP Time Servers" window starting from the one on top and going down the list if that server doesn't respond.

IMPORTANT: It is recommended to keep at least several NTP time servers for tSync to choose from during the Internet time synchronization.

IMPORTANT: When adding new NTP time servers, it is strongly recommended to enable the Internet connection for tSync to validate them!

- *Sync Now* button - click this button to manually synchronize system time over the Internet.

INFORMATION: This option resets the "Repeat sync" waiting period.

- *Synchronization Schedule* window - displays the stats for the Internet time synchronization.

- *Enable TCP/IP time sync* - set this checkbox if you want to make tSync to synchronize system time on other computers on the network, or if you want to use tSync's remote interface features (see below):

INFORMATION: Read below for instructions on how to set up a simple Ethernet-based network connection.

INFORMATION: You may receive the firewall warning during the time when tSync attempts to synchronize time over a network.

- *Polling Frequency* - allows to specify how often tSync should repeat the network time synchronization.

INFORMATION: The minimum allowed network sync frequency is 1 minute, the maximum allowed frequency is 9,999 hours and 59 minutes. In case network connection is not available during the next scheduled sync, tSync may extend the current waiting period for synchronization.

- *Sync Now* button - click this button to manually perform network sync on all computers in the "Remote Machines" list;

INFORMATION: This option resets the "Polling Frequency" waiting period.

- *Remote Machines* list - displays IP addresses, connection ports and synchronization stats for all computers on the network that tSync will attempt to synchronize the system time for;

INFORMATION: Click Add button to add (or Edit button to edit) network addresses, connection ports and Daylight Saving options for other computers on the network to be used by tSync.

INFORMATION: The maximum number of network machines that tSync can adjust time for over the network is 1024.

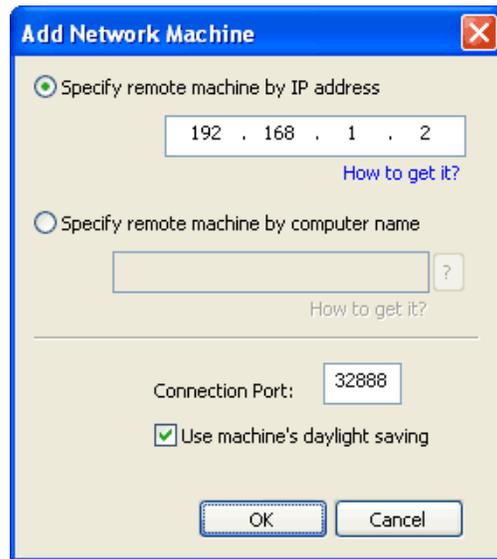
IMPORTANT: To be able to adjust time on remote machines on the network each of those machines must have a copy of tSyncRemote module running at the time. (Read below for more information.)

INFORMATION: In case network synchronization was attempted for a network machine the date & time of such attempt will be displayed in the "Last Attempt" column of the list. If synchronization succeeded its date & time will be displayed in the "Last Sync" column of the list.

INFORMATION. Precision of the network time synchronization depends on the type of the network connection. (See FAQ #9 below.) For the most accurate time synchronization tSync (and tSyncRemote) rely on the principle that transmission time to send data packet equals to the time needed to receive the same-size data packet, thus network connections with a fairly equal "send" and "receive" times will provide the most accurate synchronization results. For the Ethernet connection the variance in time precision should not exceed 1-2 seconds.

- When you click the *Add* or *Edit* button you should see the "Add/Edit Network Machine" window that will allow you to add a new machine, in case of the Add button, or to edit remote machine(s) entries that were selected in the "Remote Machines" list at the time:

INFORMATION: Selection of multiple machines for editing in the "Remote Machines" list is allowed.



- To specify a network machine by IP address use the same-named option;

INFORMATION: Use this option for remote machines with a static IP address.

INFORMATION: To read how to determine the IP address of a remote machine see below.

INFORMATION: Only IP (version 4) addresses are supported in this option.

- To specify a network machine by (DNS) computer name use the second option;

INFORMATION: Use this option for a remote machine with dynamic IP address, or when IP address is set to be obtained automatically.

INFORMATION: The DHCP server should be set up and configured on the tSync server machine to be able to use this feature. Almost all recent OS's have this feature set up for you by default on the background, so no user interaction is necessary.

INFORMATION: Allow some time delay (normally within a minute) for DHCP server to (re-)configure itself in case of an additional network connection, rebooting, or altered network configuration.

INFORMATION: To read how to determine the computer name of a remote machine see below.

- In case you want to resolve a computer name to its IP address(es) before adding (or saving) it, click the "?" button on the right.

- You must provide a TCP/IP protocol connection port to a remote machine;

IMPORTANT: Although accepted port numbers range from 1 to 65535, it is recommended to use port numbers above 1024. Also make sure that there's no conflict between existing software already using such port. The recommended port number is 32888.

IMPORTANT: Make sure that each copy of the tSyncRemote module is set up to use the same port number as specified here.

- In case you want to use the Daylight Saving and other time adjustments on a remote machine, check "Use machine's daylight saving" box. When unchecked this option will set the time on the remote machine exactly as it appears on the computer that tSync is running on;

INFORMATION: It is recommended to use this option on computers that receive regular updates from Microsoft, and to disable it for computers that don't.

IMPORTANT: When this option is disabled, make sure to uncheck the feature to automatically adjust the clock for the daylight saving in the system time settings window on the remote machine.

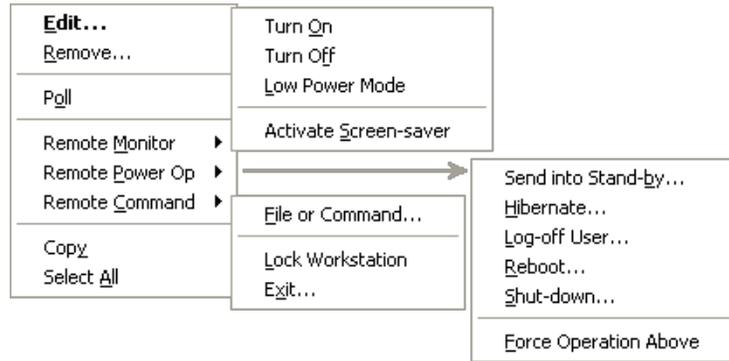
- When ready click OK to add a new network machine (or to save changes).

- Click the *Remove* button to remove network machines currently selected in the "Remote Machines" list;

INFORMATION: Selection of multiple machines for removal in the "Remote Machines" list is allowed.

INFORMATION: You will see a confirmation warning before entries are removed.

- Select one or more entry in the "Remote Machines" list and right-click it to see the additional options menu:



The following remote interface options are available from a pop-up menu:

- *Edit* - open selected remote machine entries for editing (see above);
- *Remove* - removes selected remote machine entries;
- *Poll* - polls selected remote machines for availability. Use this command to check the state of the tSyncRemote module(s), to see if remote machine(s) are available to communicate with the tSync server, and whether tSyncRemote module(s) are running in a non-interactive desktop;

INFORMATION: This command is executed asynchronously and will display the window with the results of the execution of this command when ready (see more).

INFORMATION: If this command succeeds it will also return the idle user time and CPU clock reading on a remote machine. The CPU reading is more accurate if the remote machine is running on Windows XP SP1, or later OS. The idle user time is available if remote machine is running on Windows 2000, or later OS.

INFORMATION: In case tSyncRemote module is running in a non-interactive desktop (or if it was started as a service, more here) some commands may not be supported. Also exercise caution when running files and commands on such remote machine(s) since they will not be provided with a user output.

INFORMATION: This command may fail if tSyncRemote module on a remote machine is set up not to receive commands.

- *Remote Monitor* - allows to control screens on selected remote machines:

INFORMATION: This command is executed asynchronously and will display the window with the results of the execution of this command when ready (see more).

INFORMATION: This command may fail if tSyncRemote module on a remote machine is set up not to receive commands.

- *Turn On* - attempts to turn the screen on on a remote machine;
INFORMATION: This command may fail even if tSyncRemote module reports success. The execution is OS dependent.
- *Turn Off* - attempts to turn the screen off on a remote machine;
INFORMATION: This command may fail even if tSyncRemote module reports success. The execution is OS dependent.
- *Low Power Mode* - attempts to send the screen on a remote machine into a low power mode (if supported);
INFORMATION: This command may fail even if tSyncRemote module reports success. The execution is OS dependent.
INFORMATION: If low power screen mode is not supported this command will have no effect.
- *Activate Screen-saver* - attempts to start a screen-saver on a remote machine (if screen-saver is set up on that machine).
INFORMATION: This command may fail even if tSyncRemote module reports success. The execution is OS dependent.
INFORMATION: This command will fail on a non-interactive desktop, which is OS specific.

- *Remote Power Op* - allows to perform a power operation on selected remote machines:

INFORMATION: This command is executed asynchronously and will display the window with the results of the execution of this command when ready (see more).

INFORMATION: This command may fail if tSyncRemote module on a remote machine is set up not to receive commands.

INFORMATION: A warning will be shown on the tSync server before executing any of the power operations below, but no warning will be displayed on the remove machines!

- *Send into Stand-by* - send remote machine into a stand-by (or sleep) mode;

WARNING: This command will be executed without a warning on a remote machine. Make sure that no user is present at the time by polling a remote machine first and checking the idle timer.

INFORMATION: This command is executed in the delayed mode on a remote machine to insure a timely

response back for tSync. In light of this, tSyncRemote may report success even if this power operation may fail later.

INFORMATION: This command may be canceled by other running software on a remote machine if this operation is not forced.

- *Hibernate* - hibernate remote machine;

WARNING: This command will be executed without a warning on a remote machine. Make sure that no user is present at the time by polling a remote machine first and checking the idle timer.

INFORMATION: This command is executed in the delayed mode on a remote machine to insure a timely response back for tSync. In light of this, tSyncRemote may report success even if this power operation may fail later.

INFORMATION: This command may be canceled by other running software on a remote machine if this operation is not forced.

- *Log-off User* - log off user on a remote machine;

WARNING: This command will be executed without a warning on a remote machine. Make sure that no user is present at the time by polling a remote machine first and checking the idle timer.

INFORMATION: This command may fail on a remote machine even if tSyncRemote reports success. This behavior is OS specific.

INFORMATION: This command may be canceled or delayed if it is not forced and if other running software on the remote machine reports unsaved data.

WARNING: In case this operation is run as forced, this may cause the loss of unsaved user data on a remote machine!

INFORMATION: This operation is not supported on a remote machine running on Windows 95/98/ME.

- *Reboot* - reboot a remote machine;

WARNING: This command will be executed without a warning on a remote machine. Make sure that no user is present at the time by polling a remote machine first and checking the idle timer.

INFORMATION: This command may fail on a remote machine even if tSyncRemote reports success. This behavior is OS specific.

INFORMATION: This command may be canceled or delayed if it is not forced and if other running software on the remote machine reports unsaved data.

WARNING: In case this operation is run as forced, this may cause the loss of unsaved user data on a remote machine!

- *Shut-down* - shut-down a remote machine;

WARNING: This command will be executed without a warning on a remote machine. Make sure that no user is present at the time by polling a remote machine first and checking the idle timer.

INFORMATION: This command may fail on a remote machine even if tSyncRemote reports success. This behavior is OS specific.

INFORMATION: This command may be canceled or delayed if it is not forced and if other running software on the remote machine reports unsaved data.

WARNING: In case this operation is run as forced, this may cause the loss of unsaved user data on a remote machine!

- *Force Operation Above* - toggle value that specifies whether the power operation in this menu should be forced or not.

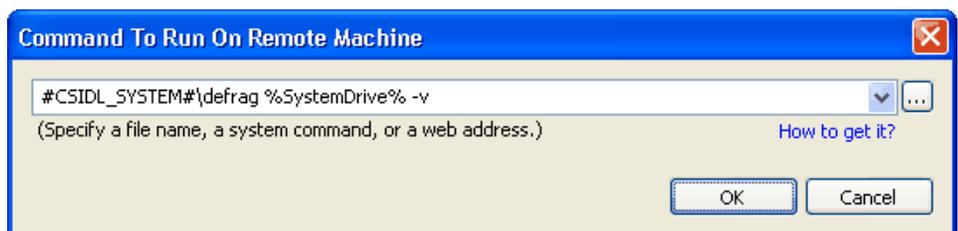
WARNING: Forcing power operations may lead to the loss of unsaved user data on a remote machine. Read warnings for each command above!

- *Remote Command* - allows to execute a special command on selected remote machines:

INFORMATION: This command is executed asynchronously and will display the window with the results of the execution of this command when ready (see more).

INFORMATION: This command may fail if tSyncRemote module on a remote machine is set up not to receive commands.

- *File or Command* - run a file, system command, or open a web page on a remote machine. When clicked you should see the following window that will allow you to specify a command to run:



Specify command in the edit field of the window. You can do so by using any of the following means:

- By simply typing a command in the command line;
- By selecting a previously used command from a drop-down list (click the down-arrow on the right);

INFORMATION: The drop-down list has a memory of 12 commands maximum.

- By clicking the "... " button on the right and selecting "File" from a pop-up menu;

INFORMATION: This option will allow you to select a file on the tSync server station to be run on a remote machine. Keep in mind that the file and folder structure can be different on a remote machine.

INFORMATION: The beginning of the selected path can be substituted with a special word and/or environment string to insure that it can be found on a remote machine.

INFORMATION: You should see the warning if you select a file that is not located in the system folder. Executing such command on a remote machine will most certainly lead to an error of that file not being found.

- You can insert an environment string or a special word that tSyncRemote understands by clicking the "... " button on the right and selecting "Environment String", or "Special Word", respectively.

INFORMATION: Each environment string should be enclosed in the % symbols on each side. To learn more about environment strings and how to use them check here;

INFORMATION: In case you want to use the environment string that is not provided in the pop-up menu you can simply type it in the command window. In this case make sure that such environment variable is supported by the OS on a remote machine.

INFORMATION: Each special word string should be enclosed in the # symbols on each side. The special words represent CSIDL values for the tSyncRemote module. To learn more about CSIDL values check here.

INFORMATION: In case you want to use the CSIDL value that is not provided in the pop-up menu do the following: Learn the CSIDL value's hexadecimal number. Type in a special word in the following format: #xN# (or a pound sign, followed by small letter x, followed by a hexadecimal value of CSIDL, followed by a pound sign). For example, since the value of CSIDL_DESKTOPDIRECTORY is 10, or 0xA, the following special words will represent the same for the tSyncRemote module: #CSIDL_DESKTOPDIRECTORY# and #xA#.

INFORMATION: The list of environment strings and special words that you may see in a pop-up menu are the ones that are supported by the OS the tSync server was run on.

INFORMATION: Keep in mind that environment strings and special words supported by tSyncRemote module are OS specific.

The following types of commands are acceptable by the tSyncRemote module:

- System and common files: Any file located in the Windows, System32, My Documents, Desktop etc. folder.
- Files located in the same folder as tSyncRemote module: In this case you can specify them by name.
- Files located on a single network machine: Specify those using the network drive notation. (Example: \\OFFICE15\shareddocs)
- System commands: You don't need a path to specify those. (Example: cmd)
- Web links and URLs: Precede those with a qualified designator. (Example: http:, ftp:, etc.)

Here are some examples of commands supported by tSyncRemote module:

- Run "do_cmd.exe" on a remote machine located in My Documents folder:
#CSIDL_PERSONAL#\do_cmd
- Defrag the system drive on a remote machine:
#CSIDL_SYSTEM#\defrag %SystemDrive% -v
- Open the Google web page on a remote machine:
INFORMATION: Make sure that tSyncRemote module is not running in a non-interactive desktop [more info].
http://www.google.com

Click OK when command is ready to be sent to a remote machine.

INFORMATION: This command may fail if tSyncRemote module on a remote machine is set up not to receive commands.

INFORMATION: The tSyncRemote module is set up to wait for command to begin execution before returning a result code. This will insure that if specified file or command is not found on a remote machine, or if it cannot be run, an appropriate error code is returned back to the tSync server.

WARNING: Exercise caution when running commands on a remote machine when tSyncRemote module is started as a service (or when it's running in a non-interactive desktop). In this case some commands

and files may behave differently since no user desktop will be provided for them. To check if tSyncRemote module is running in a non-interactive desktop on a remote machine use the command to poll it. [More info]

INFORMATION: Some commands may fail on a remote machine even if tSyncRemote module returns success. This behavior is OS specific.

- *Lock Workstation* - lock the work station on a remote machine. You will normally use this option to prevent access to a remote machine until a user logs in.

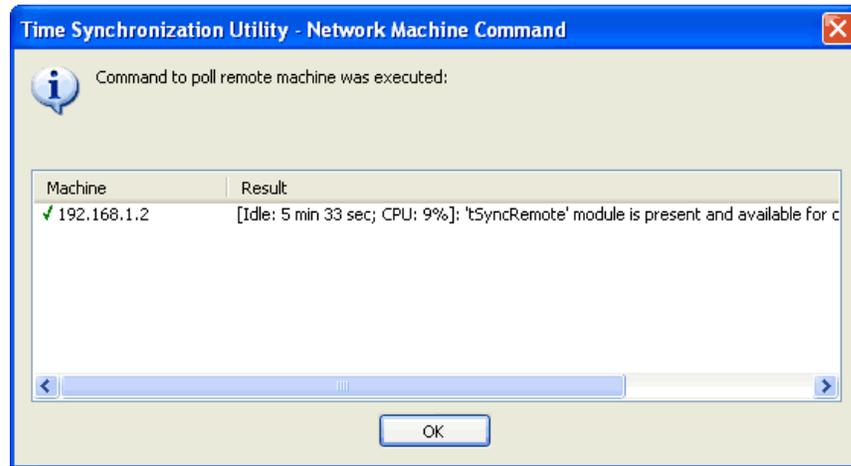
INFORMATION: This option is only supported if tSyncRemote module is running in an interactive desktop on the Windows-NT based OS, such as Windows 2000, XP, 2003, Vista, 7, etc.

- *Exit* - send command for the tSyncRemote module on a remote machine to exit.

INFORMATION: If this operation succeeds you will no longer be able to communicate with a remote machine using this software.

- *Copy* - allows to copy selected entries for the remote machines on to the Windows Clipboard;
- *Select All* - selects all entries in the "Remote Machines" list.

When sending commands or polling remote machine(s) the operation is run asynchronously, meaning that control is returned back immediately to the tSync server. It may take from several seconds to up to a minute to process some commands. When ready you should see the following results window:



The exact contents of this window will depend on the command/operation sent for the remote machine(s). See above for details.

Operation: After the tSync options are applied (see above for details), tSync will be minimized to the system tray. You should see its icon next to the Windows system clock:



After that tSync does not require any additional attention.

You can access tSync context menu by right-clicking its icon in the system tray. A pop-up menu will appear with the following options:

- *Options...* - displays the Options window that allows to change tSync settings (See above);
- *About* - option displays the About tSync window with the information about the program.
- *Sync Internet Time Now* - option allows to manually synchronize the system time over the Internet;

INFORMATION: Read above for more information.

- *Sync Network Time Now* - option allows to manually synchronize the system time over the network on all computers specified in the "Remote Machines" list;

INFORMATION: Read above for more information.

- *Exit* - closes the tSync program and removes it from the Windows System Registry, preventing it from running again when the current user logs on;

Set-up Remote Machine:

In case "Enable TCP/IP time sync" option is enabled in the tSync server program you will also need to set up tSyncRemote module to run on each remote computer that you'd like tSync to adjust the system time for, or to enable tSync's remote interface features (see above).

INFORMATION: The tSyncRemote module establishes communication with the tSync program via the TCP/IP protocol.

INFORMATION: The tSyncRemote module by itself will not be able to synchronize the system time, it can do so only after a successful communication with the tSync server program.

Follow these simple steps to set up the tSyncRemote module:

- Move the tSyncRemote.exe file to each remote computer that you'd like tSync to adjust system time for;

INFORMATION: If you run this file from a downloadable ZIP archive (or from a temporary or non-fixed location), you will see an automatic installation feature. In that case simply follow the on-screen commands to (re-)install the program.

- Run tSyncRemote module by double-clicking its icon.

IMPORTANT: You may receive the firewall warning when running tSyncRemote module. It is important that you allow bidirectional (full duplex) access to the port used for communication. It is advisable that you set up your firewall (anti-virus program) beforehand to accept incoming and outgoing TCP/IP protocol connections to a port number specified in tSyncRemote (32888 by default).

INFORMATION: tSyncRemote module writes itself into the Windows System Registry auto-start key to be able to start next time when the current user logs on.

IMPORTANT: Do not run tSyncRemote module if you decide to activate it as a service (or when "Computer starts" from within the Task Scheduler).

INFORMATION: Windows Vista/7 users read below for additional information and limitations.

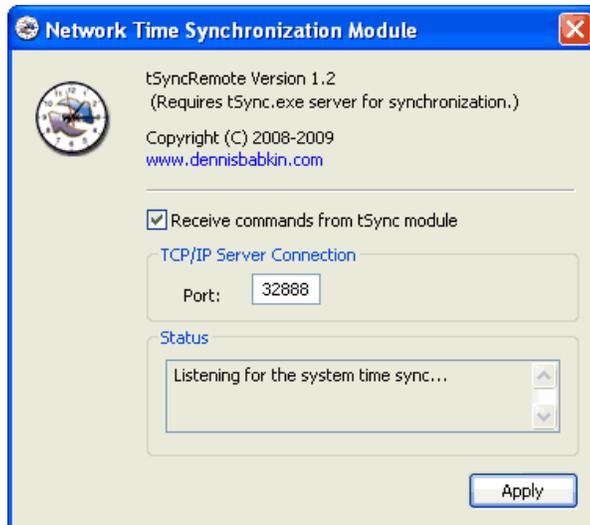
- It's done!

To access the tSyncRemote module context menu options right-click its icon on the system tray (located next to the system clock):



The following commands are available:

- *Receive Commands* (check) - shortcut check box that duplicates the "Receive commands from tSync module" option (see below);
- *Exit* - closes the tSyncRemote module and removes itself from the Windows System Registry, preventing it from running again when the current user logs on.
- *Open* - opens the window with the following controls:



Receive commands from tSync module - specifies whether this tSyncRemote module should receive additional tSync remote interface commands:

- When checked will enable the tSyncRemote module to process the following:
 - Time synchronization command from tSync server;
 - If polled this module will report readiness to operate, idle time on the current machine (i.e. when no user input was present), and CPU clock reading at the time of the polling;
 - Performing screen operations, such as turning it on and off, sending it to a lower power mode and activating a screen-saver;
 - Performing power operations, such as shut-down, rebooting, logging off user, going into stand-by mode or hibernation;
 - Running files, opening URLs and system commands;
 - Locking the work station (if supported);
 - Exiting this module upon request from tSync server.
- When unchecked will prevent tSync remote interface commands from being processed by the tSyncRemote module, except the following:
 - Time synchronization command from tSync server;
 - If polled this module will respond that it is available for time synchronization only.
INFORMATION: The idle time and CPU clock reading will not be reported.
- *TCP/IP Server Connection* - allows to specify the port number that will be used for communication with the tSync server;

IMPORTANT: It is important to set up your firewall to allow the full bidirectional access to this port for the tSyncRemote module!
IMPORTANT: Make sure to specify the same port number as the one used by the tSync server.
IMPORTANT: Although accepted port values range from 1 to 65535, it is recommended to use port numbers above 1024. Also make sure that there's no conflict between existing software already using such port. The recommended port number is 32888.
- *Status window* - displays the stats for the system time synchronization and execution of the tSync remote interface commands;

INFORMATION: You should see a message after each time synchronization attempt and remote interface command in this window.
- *Apply button* - click this button to apply changes made in this window.

INFORMATION: Some changes made in this window will take effect only when you hit the Apply button.

Un-installation: Since both tSync program and tSyncRemote module do not require installation, they do not require de-installation, either. To completely remove both do the following:

In case of tSync program:

1. Right-click on the tSync icon in the system tray (next to the system clock) and select Exit;
2. Remove the tSync.exe file from the location where you moved it to during the installation (described above);
3. Although not necessary, if you'd like to clean up the System Registry values used by the program, remove the following key:
HKEY_CURRENT_USER\Software\from Dennis Babkin\tSync

In case of tSyncRemote module:

1. Right-click on the tSyncRemote icon in the system tray (next to the system clock) and select Exit;
2. Remove the tSyncRemote.exe file from the location where you moved it to during the installation (described above);
3. Although not necessary, if you'd like to clean up the System Registry values used by the program, remove the following key:
HKEY_CURRENT_USER\Software\from Dennis Babkin\tSyncRemote

For Windows Vista/7 Users:

Windows Vista/7 imposes additional limitations on the programs, thus the following may apply when running tSync server program and tSyncRemote module:

1. Both tSync and tSyncRemote require administrative privileges to be able to change the system time. Under Windows Vista/7 this triggers the UAC warning when these programs are run for the first time, as

well as when the system is rebooted. Check the following workarounds available at this time:

- Allow tSync and tSyncRemote to run with elevated privileges by manually doing so;

IMPORTANT: You will also have to manually allow both programs to run when system reboots by responding to the system message, "Windows has blocked some startup programs". There's no means to automate this process. We understand your inconvenience but we're unable to change anything at this time. You may want to direct your complaints to Microsoft.

- Run tSync and tSyncRemote as a service at the Windows startup;

INFORMATION: For details see FAQ Question #1.

IMPORTANT: Although possible, this option is not favored by the developers of this software!

- Turn off the User Account Control (UAC).

INFORMATION: By doing so you will make your system more "XP-like". Click here to learn how.

FAQs:

The following Frequently Asked Questions were submitted to us:

1. **tSync and tSyncRemote can run when the current user logs on, but can I make it run when the system boots up (before any user logs in)?**

Although not designed specifically to run as a service (or from a non-interactive desktop) you may set up both tSync program and tSyncRemote module to run when computer starts up. The downside of such approach is that you will not be able to see the programs' icons on the system tray to be able to control them or to see the status of their operation.

For *Windows 2000/XP*:

- Run tSync (or tSyncRemote) under a user account with administrative privileges and set it up the way you want it to operate (see above);
- Exit the program. In either case of tSync or tSyncRemote right-click its icon in the system tray (next to the system clock) and select Exit;
- Go to Start -> Control Panel, and click "Switch to Classic View" on the left, then double-click Scheduled Tasks;
- In the Scheduled Tasks window double-click Add Scheduled Task and find the tSync.exe (or tSyncRemote.exe) file by clicking the Browse button;
- Specify to "Perform this task" "When my computer starts";
- Specify the Windows user name (that you used above) and the password for that user, if applies;
- Click Finish to add new task;
- Reboot computer.

For *Windows Vista/7*:

- Run tSync (or tSyncRemote) under a user account with administrative privileges and set it up the way you want it to operate (see above);
- Exit the program. In either case of tSync or tSyncRemote right-click its icon in the system tray (next to the system clock) and select Exit;
- Go to Start -> Control Panel, and click "Classic View" on the left, then Administrative Tools and double-click Task Scheduler;
- Click "Task Scheduler Library" in the pane on the left;
- Click "Create Task" in the Actions pane on the right;
- Give this task some descriptive name (Example: tSync or tSyncRemote);
- Check "Run whether user is logged on or not";
- Make sure that "Do not store password" is unchecked;
- Check "Run with highest privileges";
- Go to the Triggers tab and click New button;
- Specify "At startup" in the "Begin the task" box, make sure that "Enabled" is checked and click OK;
- Go to the Actions tab and click New button;
- Specify "Start a program" in the "Action" box, then click Browse and locate the tSync.exe (or tSyncRemote.exe) file and click Open, then OK;
- Click OK again and specify the Windows user name (that you used above) and password for that user (if applies) to add new task;
- Restart computer.

In case you'd like to remove tSync (or tSyncRemote) from the auto-start, do the following:

Windows 2000/XP:

- Go to Start -> Control Panel, double-click Scheduled Tasks;
- In the Scheduled Tasks window right-click the tSync (or tSyncRemote) task icon and select Delete. Confirm deletion;
- Reboot computer.

Windows Vista/7:

- Go to Start -> Control Panel -> Administrative Tools and double-click Task Scheduler;
- Click "Task Scheduler Library" in the pane on the left;
- In the pane listing tasks in the middle right-click the tSync (or tSyncRemote) task line and select Delete. Confirm deletion;
- Reboot computer.

2. How do I set up a network for tSync to synchronize time, or to send commands to a remote machine?

You will need the following components:

- Version of Microsoft Windows that supports networking (recommended: Windows ME/2000/XP/Server 2003, or Vista/Server 2008/7 - see limitations);
- Network card on each computer (the network card may be already built in your motherboard - in this case check for presence of the Ethernet jack);
- In case of more than two computers you will need a network router;
- In case of more than two computers you will need Ethernet cables to connect each computer to the router;
- In case of only two computers you will need a "cross-over" Ethernet cable to connect two computers directly.

Perform the following steps to set up the network required by tSync program (only if not set up before):

- In case of more than two computers, connect each computer's network card to a router using Ethernet cables. In case of only two computers connect their network cards directly using the "cross-over" Ethernet cable;

IMPORTANT: In case of connecting two computers directly it is important to use the "cross-over" Ethernet cable instead of a regular/patch Ethernet cable.

- Power on computers and the router, if present;
- When Windows boots up it should detect new network connections and initialize them;

INFORMATION: You may need to install additional drivers for the network card(s) before you will be able to use the network. Refer to the network card documentation, if the card was not installed before.

INFORMATION: You may need to set up a network connection manually for the older versions of Windows.

INFORMATION: Your router may need additional set-up before it is ready to accept network connections. Refer to the router documentation for additional information.

- At this point your network connections should be available for tSync. You may skip to the next step.

In case you want to use a static IP to connect remote computers you can set it up as follows:

INFORMATION: Static IP configuration is faster and thus is recommended over the use of computer names if you do not plan to share Internet connection and/or enable file sharing between remote machines.

- *Windows ME:* Go to Start -> Settings -> Control Panel -> Network. Scroll down the "The following network components are installed" list in the Configuration tab until you see the line for the "TCP/IP -> <Your network adapter name>". Highlight that line and click Properties button below. In the "TCP/IP Properties" window go to the "IP Address" tab. Put a check next to "Specify an IP address" and specify the following: "Subnet mask" should be 255.255.255.0, and "IP address" should be 192.168.1.N, where N = the number between 1 and 255, that is unique per each computer on the network. When done, click OK. You will be required to reboot computer.

IMPORTANT: The above instructions apply only if the network connection was not set up before.

INFORMATION: If you fail to make tSync communicate with tSyncRemote using this static IP method, make sure to undo changes made to the network connection and try using connection method by specifying a remote machine using

its (DNS) computer name (more here).

- *Windows XP:* Go to Start -> Control Panel -> Network Connections, then right-click the network connection (it may be called something like, "Local Area Connection") and select Properties. Make sure that "Internet Protocol (TCP/IP)" is checked, then select that line and click Properties. Put a check next to "Use the following IP address" and specify the following: "Subnet mask" should be 255.255.255.0, and "IP address" should be 192.168.1.N, where N = the number between 1 and 255, that is unique per each computer on the network. The "DNS Server addresses" could be left blank. When done, click OK.

IMPORTANT: The above instructions apply only if the network connection was not set up before.

INFORMATION: If you fail to make tSync communicate with tSyncRemote using this static IP method, make sure to undo changes made to the network connection and try using connection method by specifying a remote machine using its (DNS) computer name (more here).

- *Windows 2000:* Go to Start -> Settings -> Control Panel -> Network and Dial-up Connections, then right-click the network connection (it may be called something like, "Local Area Connection") and select Properties. Make sure that "Internet Protocol (TCP/IP)" is checked, then select that line and click Properties. Put a check next to "Use the following IP address" and specify the following: "Subnet mask" should be 255.255.255.0, and "IP address" should be 192.168.1.N, where N = the number between 1 and 255, that is unique per each computer on the network. The "DNS Server addresses" could be left blank. When done, click OK.

IMPORTANT: The above instructions apply only if the network connection was not set up before.

INFORMATION: If you fail to make tSync communicate with tSyncRemote using this static IP method, make sure to undo changes made to the network connection and try using connection method by specifying a remote machine using its (DNS) computer name (more here).

- *Windows Vista/7:* Go to Start -> Control Panel -> Network and Sharing Center. Click "View Status" next to the network connection and click Properties. Make sure that "Internet Protocol Version 4 (TCP/IPv4)" is checked, then select that line and click Properties. Put a check next to "Use the following IP address" and specify the following: "Subnet mask" should be 255.255.255.0, and "IP address" should be 192.168.1.N, where N = the number between 1 and 255, that is unique per each computer on the network. The "DNS Server addresses" could be left blank. When done, click OK.

IMPORTANT: The above instructions apply only if the network connection was not set up before.

INFORMATION: If you fail to make tSync communicate with tSyncRemote using this static IP method, make sure to undo changes made to the network connection and try using connection method by specifying a remote machine using its (DNS) computer name (more here).

Perform the following steps to set up the tSync program:

- Set up tSync program on the main computer by adding remote machine(s) to its "Remote Machines" list (read above). In case you skipped the step of setting up a static IP above, make sure to specify that remote machine by its computer name (read how to get it), or if you set up connection using a static IP address, make sure to specify the remote machine by its IP address (read how to get it);

IMPORTANT: To be able to connect using remote computer names, make sure that each computer on the network has a different DNS computer name [more here].

INFORMATION: tSync requires basic TCP/IP connection for its communication. It does not require presence of the Internet connection or file sharing between remote machines.

INFORMATION: It is recommended for network time synchronization to select a computer that has the (fast) Internet connection to put tSync server program on. This way you can also synchronize time over the Internet on all computers on the network.

- Run tSyncRemote module on each remote machine (see above).

Refer to the manual above for more detailed information about the software setup.

3. How do I learn the IP address of a remote machine on my network?

Perform the following steps on remote machine which IP address you'd like to learn:

- *Windows ME:* Go to Start -> Programs -> Accessories -> MS-DOS Prompt. Type `ipconfig` in the Command Prompt window and hit Enter. The desired address will be displayed in the "IP Address" field for your network adapter.
- *Windows XP/2000:* Go to Start -> Run. Type `cmd` and click OK. Type `ipconfig` in the Command Prompt window and hit Enter. The desired address will be displayed in the "IP Address" field for

your network connection.

- *Windows Vista/7*: Go to Start and type `cmd` in the search bar, hit Enter. Type `ipconfig` in the Command Prompt window and hit Enter. The desired address will be displayed in the "IPv4 Address" field for your network connection.

4. **When tSync (or tSyncRemote) is run I see the following message, "Another instance of the program is already running. Close it to re-start it again..."**

This message could be displayed in one of the following cases:

1. You just exited the tSync (or tSyncRemote module) and it didn't have enough time to close completely (it may take up to several seconds to close all connections);
2. You just re-installed the tSync (or tSyncRemote module), that caused the previously running version to close. In this case you did not let enough time for the old version to close. Wait for a couple seconds and repeat it again.
3. tSync program (or tSyncRemote module) was already started either by another user, or as a service in a non-interactive desktop. You do not need to run another instance of the program in this case. In case you want to change settings for the program, or to uninstall it you will have to either log in as the user that initially started the program, or remove it from the Windows auto-start if it's run as a service. Refer to the Question #1 for more information. In case of tSyncRemote module you can also close it using tSync's remote interface "Exit" command ([more info here](#)).

5. **When I run tSync (or tSyncRemote) it resets my clock one hour behind (or forward). How do I fix that?**

The main reason why this may happen is because your daylight saving option is off:

- *Windows XP*: Double-click on the system clock on the Windows taskbar (in most cases it is located in the bottom right corner of the screen). In the "Date and Time Properties" window switch to the Time Zone tab and make sure that "Automatically adjust clock for daylight saving changes" is checked. Click OK to save the changes.
- *Windows Vista/7*: Left-click on the system clock on the Windows taskbar (in most cases it is located in the bottom right corner of the screen) and select "Change date and time settings". In the "Date and Time" window click "Change time zone" button and make sure that "Automatically adjust clock for Daylight Saving Time" is checked. Click OK to save the changes in every window that was opened.

The issue may also manifest itself because you do not have the latest update for your operating system from Microsoft. This is especially true for users in U.S. where in 2007 and in 2008 the Congress passed several changes to the way the daylight saving is observed. There are two ways to resolve this issue:

1. Download and install tSync v. 1.2 or later (and tSyncRemote module v. 1.2 or later) and specify not to use "Machine's daylight saving" in the tSync Options window for each network connection, or

INFORMATION: In this case you will also have to disable automatic adjustment of the system time according to the daylight savings schedule on each remote machine that causes this issue.

2. Follow the link below to download and install the update on each computer where you're running tSync (or tSyncRemote):

<http://support.microsoft.com/kb/951072>

6. **How do I learn the computer name of a remote machine on my network?**

Perform the following steps on remote machine which computer name you'd like to learn:

- *Windows ME*: Go to Start, then Settings and Control Panel. Double-click Network and switch to

Identification tab. The name of interest should be displayed on the "Computer name" line.

- *Windows 2000*: Right click My Computer icon on the desktop and select Properties. In the System Properties window switch to "Network Identification" tab. The name of interest should be displayed on the "Full computer name" line.
- *Windows XP/2003*: Go to Start. Right click My Computer and select Properties. In the System Properties window switch to "Computer Name" tab. The name of interest should be displayed on the "Full computer name" line.
- *Windows Vista/7*: Click the Microsoft logo (i.e. Start button at the bottom left corner of the screen). From a pop-up menu right-click Computer and select Properties. In the "View basic information about your computer" window the name of interest should be displayed on the "Full computer name" line.

7. Can I set up tSync to synchronize time and execute commands between two or more machines over the Internet?

Yes, you can. Although time synchronization over the Internet connection between two or more remote machines is not recommended due to possible accuracy issues, but you can use both tSync and tSyncRemote module to send remote interface commands ([read more](#)) between computers on the Internet. To do that you will need the following:

- One (server) computer connected to the Internet that will run tSync server module. (Note that static Internet IP address on this computer is not required.)
- One or more (client) computer with a static Internet IP address that will run tSyncRemote module;
- tSync server program has to be set up on the host (server) computer ([more here](#));
- tSyncRemote module(s) have to be set up on each (client) machine ([more here](#)).

Refer to the manual for more information on how to set up both tSync ([more here](#)) and tSyncRemote module ([more here](#)). In case of tSync, you can set it up to use static Internet IP addresses to connect to each (client) remote machine.

8. Can I connect more than one tSync server program to a single tSyncRemote machine?

Yes, you can. In this case make sure not to cause a conflict between multiple-server time synchronizations and/or remote interface commands.

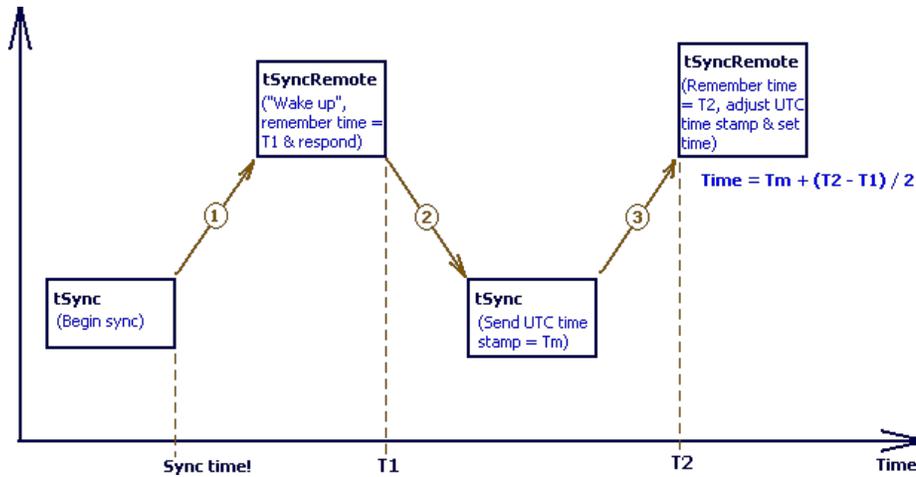
9. How accurately can tSync synchronize time over network on remote machine(s)?

To answer this question you need to understand how the network synchronization is performed by tSync (and tSyncRemote module). Each time you instruct tSync to synchronize time on your network the following sequence takes place for each remote machine. (Note that tSync works with one machine at a time and continues on until every machine in the list has been serviced):

1. tSync sends a request for tSyncRemote to "wake up". (Arrow 1 in the diagram below.)
2. tSyncRemote remembers the exact time when it received the "wake up" command (T1 in the diagram) and sends response back to tSync. (Arrow 2 in the diagram)
3. tSync reads the system time, converts it to UTC format (Tm in the diagram) and sends it back to tSyncRemote. (Arrow 3 in the diagram)
4. tSyncRemote remembers the exact time when it received the UTC time stamp from tSync (T2 in the diagram). At this point the tSyncRemote module has all the information it needs to set the time. It acts in one of two ways:
 - a. If the setting to use the daylight saving was specified, the tSyncRemote converts the UTC time stamp it received from tSync into the local time according to the Windows daylight saving settings and sets the time according to the following formula:
$$\text{Time} = T_m + (T_2 - T_1) / 2 + \text{DaylightSavingAdjustment}$$
 - b. If the daylight saving was not used for this particular remote machine, tSyncRemote sets the time according to the UTC time stamp it received from tSync without adjusting it according to the local daylight saving settings:
$$\text{Time} = T_m + (T_2 - T_1) / 2$$

5. Lastly, tSyncRemote sends a confirmation back to tSync that the time synchronization was successful.

The following diagram illustrates time synchronization over a network connection performed by tSync and tSyncRemote module:



The internal timers (T1 and T2 in the diagram) used by tSyncRemote are very precise, capable of measuring time intervals down to tens of nanoseconds. The UTC time stamp sent by tSync (Tm in the diagram) has a gradation down to 100-nanosecond intervals. But, still the exact precision used by your system will depend on your hardware.

So, as you can see the mechanism of time synchronization can be very accurate. It has only one weak spot though -- it relies on the fact that the transmission times (arrows 2 and 3 in the diagram) are roughly the same, thus if they are not, the precision of the time synchronization will be diminished.

10. **If remote time synchronization is so precise as described in FAQ #9, why don't I see it on my system?**

Although tSync (and tSyncRemote module) can synchronize time very accurately with the initial time variation measured in tens of milliseconds, the further precision is relegated to your system clock. Unfortunately many systems were not designed to maintain accurate system time down to milliseconds, thus due to this reason you may see a significant variation between two or more systems even within a few minutes. (Just FYI, on one of our older Dell systems the time difference grows to several seconds within 10 minutes after the initial time synchronization.) The only workaround in this case could be performing time synchronization more often. In normal circumstances, done once an hour, the time synchronization between remote machines should maintain a sufficient system clock accuracy within several seconds.

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