Tardis
for Windows NT

Version 1.0
17 September, 1994

Copyright Notice

Table of Contents

1. Shareware

Tardis for windows NT is Shareware. This is a complete working version.
There are no annoying reminder screens about what it costs, and there are no
disabled features. If you continue to use it after evaluating it please send
US$20 (or the rough equivalent in your local currency) to be sent by post to:

H. C. Mingham-Smith
33 Arthur Rd.
Wokingham,
Berkshire RG11 2SS
England.

A cheque made payable to H.C. Mingham-Smith would be acceptable.
For sites where multiple copies are used I would request US$40 for the right
to use on any machine at the site.

Please send e-mail regarding Tardis to `tardis@kaska.demon.co.uk`.

2. Introduction

This manual describes the Tardis Time Service for Intel PCs running the Windows NT operating system. This manual assumes you have a reasonable degree of competence in the use of Windows NT.

Tardis is a Windows NT service that synchronises your machine's clock to another server's. A typical use would be to synchronise the clocks in a LAN environment correcting them once an hour. Another would be to periodically contact a site with the 'correct' time across the Internet.

The Tardis Server for Windows NT implements RFC 868 (TCP only, no UDP). It runs as a Windows NT "service", just like the FTP Server which comes with Windows NT. It acts as both a RFC868 server *and* client.

I.e. It can get the time from a timeserver with the 'correct' time and then make the 'correct' time available to local clients.

Tardis for NT running on a central server can be used as a master time source for the domain by running the Windows 3.11 version of Tardis on the other workstations of the domain and specifying the NT machine as the server. Multiple NT machines can also be synchronised to a master too of course.

I would like to thank EMWAC for showing how to produce a nice manual.

I would also like to thanks the people who have helped me with the testing and suggestions. Particularly the two Dans, Dan Peterson, and Dan Shearer who have provided support and kind words.

3. Installation
3.1.   Requirements

To use Tardis, you must to have a computer with the following characteristics:
- Intel processor.
- Windows NT 3.1 or 3.5, with TCP/IP software installed.
- At least 16Mb of memory.
- Network connection - typically Ethernet.

3.2.   Installing

1. You should have already unpacked the .zip file to have read this so I assume that bit went OK.

2. Log into your Windows NT system as a user with administrative privileges.

3. You should have the following files extracted from the .zip file:

    TARDSERV.EXE   The Tardis service itself.
    TARDIS.CPL   The Control Panel applet.
    TARDIS.WRI   This manual in Write format.

        TARDIS.HLP   On-line help.

4. Decide which directory you are going to put TARDSERV.EXE in, and move it there. A good choice is the \WINNT\SYSTEM32 directory, which is where many other services live. Using the Security/Permissions menu option in the File Manager, ensure that the SYSTEM user has read permission for the file.

5. Move the TARDIS.CPL and TARDIS.HLP files to the \WINNT\SYSTEM32 directory. Start the Control Panel from the Program Manager to verify that the TARDIS Server applet is represented as an icon in the Control Panel.

Install TARDSERV into the table of Windows NT Services (and simultaneously register it with the Event Logger) by running the program from the Windows NT command line, specifying the *add* flag. (NOTE - it is vital that you execute this command specifying the copy of TARDSERV.EXE which you placed in the \WINNT\SYSTEM32 directory, and not using some other copy which you plan subsequently to delete.) For instance:

```
TARDSERV add c:\winnt\system32\tardserv.exe
```

The program will register itself and its location with the Service Manager

and with the Event Logger, and will report success or failure. In the case of failure, see the section on Installation Problems below.

To verify that the installation has succeeded, start the Windows NT Control Panel and double-click on the Services icon. The resulting dialog should list Tardis as one of the installed services. If so, see the Configuration section for further instructions.

3.3. Installation Problems

The system says that TARDSERV.EXE is not a Windows NT program
This is probably because you are trying to run an executable for the wrong sort of processor or the file is damaged.

"Failed to create service."
This error message occurs if you type try to install Tardis when it is already installed.

"could not create registry key"
Tardis could not register itself in the registry. It won't work.

"could not set event message file"
Tardis could set its message file key in the registry. Event logging won't work properly.

"could not set supported types"
Tardis could not set the event types it supports in the registry. Event logging won't work properly.
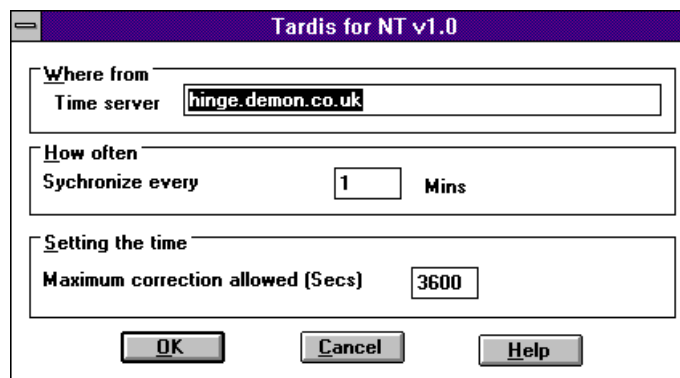
3.4. Deinstalling

This section describes what to do if you want to remove Tardis from your computer, or if you want to move the program to a new location.

1. If it is running, stop Tardis using the Stop button in the Services dialog in the Control Panel.

2. At the Windows NT command line, run TARDSERV with the `remove` option:
    `TARDSERV remove`
    This will remove Tardis from the Service Manager's list of services.

3. If you are deinstalling the Tardis service, simply delete the `TARDSERV.EXE` program , the `TARDIS.HLP` file, and the `TARDIS.CPL` Control Panel applet.

4. If you want to move `TARDSERV.EXE` to a new location, you must move the file, then type `TARDSERV add` *filename.* This informs the Service Manager and Event Logger of the new location of the program.

4. Configuration

Tardis is configured using the Tardis applet in the Control Panel. The Tardis control panel applet looks like this:

4.1. Timeserver

This defines where you get your time from. I use demon so the time server is `158.152.1.65` or `hinge.demon.co.uk`

4.2. Synchronise every x Mins

This tells Tardis to get and set the time every x minutes.

4.3. The maximum correction

This allows you to limit the size of time correction you are willing to accept, useful if your time server has gone temporarily mad.

4.4. OK

This button makes the settings shown in the dialog box active. This causes the service to be stopped and restarted.

4.5. Cancel

This cancels any changes you have made to the settings.

4.6. Help

This invokes the on-line help.

5. Operation
5.1. Using the Services Dialog

You use the Services dialog in the Windows NT Control Panel for managing `Tardis` operation.

After you install `Tardis`, you can start it running by selecting it from the list of services in the dialog and clicking the Start button. If all goes well, a message box containing a rotating timer will appear while the service starts up, and will then disappear. Tardis will then appear in the list of services with status "Started".

If the service fails to start, it can be for one of several reasons. See the chapter on troubleshooting later in this manual for further details.

You may want to arrange for Tardis to start automatically when the system is started. You can do this using the **Startup** button in the Services dialog.

5.2.   Logging

If an error in the operation of the service occurs, the error will be logged in the Application Event Log. This log may be viewed with the Event Viewer, which you will find in the Administrative Tools program group in the Program Manager. See your Windows NT documentation for details of how to use the Event Viewer.

The events logged in the Application Event Log can be associated with a `Tardis` problem (e.g. a file I/O error, or a system call failure caused by lack of resources, or a problem with the configuration information).

Problems associated with the network are recorded in the Application Event Log as Warning events.

Tardis also logs information such as Time updates and service starts and stops.

Further information on events which may be logged by Tardis is given in the chapter on troubleshooting later in this manual.

Note that the Event Viewer uses the `TARDIS.CPL` program to interpret messages associated with events. Therefore, if you delete the `TARDIS.CPL` file, Tardis events in your Application Event Log will be unintelligible.

6. Troubleshooting

This chapter lists some of the problems which you may have in Tardis, and describes how to overcome them.

6.1. Errors Starting Tardis

When starting the Tardis service, you may see one of the following error messages.

Could not start Tardis time service on \\yourmachine.Error 0002: The system cannot find the file specified.

The Service Manager could not locate TARDSERV.EXE. This probably means it has been moved, or has not been installed correctly. Remove and reinstall TARDSERV - see section above for details.

Could not start Tardis time service on \\yourmachine.Error 0005: Access is denied.

TARDSERV.EXE is inaccessible to the SYSTEM user. By default, the Service Manager starts the TARDSERV process running under a user ID of SYSTEM. The executable file for the service must be readable by this user.

Could not start Tardis time service on \\yourmachine.Error 2140: An internal Windows NT error occurred.

This usually means a problem with the configuration of the Tardis service. Further information detailing the precise problem will be recorded in the Application Event Log - see the subsection on Logging elsewhere in this manual for details on how to view this information. A description of some of the most common errors is given below.

6.2. Events Recorded in the Event Log

This section records the Tardis messages that may appear in the Application Event Log.

6.2.1. Fatal errors

Tardis could not change the time because the account it runs under isn't allowed to.
The account does not have the correct privileges.

Tardis couldn't set the time.
The time could not be set because of an internal error.

WSAStartup failed.
TCP/IP probably isn't installed.

Could not create socket.
Internal error.

6.2.2. Warnings

Time correction too large to be reasonable.
The time correction is outside the acceptable range set in the Tardis control

panel.

Tardis could not connect to the time server.
A connection could not be made to the time server. This might be due to the
server being down or some other error,

Tardis lost connection.
A network error occurred while Tardis was connected to a server.

Connect returned an error.
The winsock *connect* function returned an error. Possibly an invalid server
name has be specified or the server is down.

6.2.3. *Information*
Tardis time service started.
Like the message says.

Tardis has set the time.
Tardis has obtained a time and set the system time.

Tardis time service stopped.
Tardis was stopped by the system or by a configuration change.

7. Appendix I TARDIS.INI

This should be fairly obvious so I won't go into the three settings. Tardis doesn't use the registry for its configuration, it use the traditional .ini file. I did this because it means I can edit them more easily than using regedt32. These options are created and configured using the Tardis control panel in normal circumstances. A typical one would look like this:-

```
[WinTardis]
Server=hinge.demon.co.uk
Frequency=1
Max=3600
```

8. Appendix II- Registry Entries

This appendix lists interesting (to Tardis) in the Windows NT. A number of other entries are added to the Registry implicitly by the Service Control Manager

The Service Control Manager creates the following entry in the `HKEY_LOCAL_MACHINE` database:

```
SYSTEM\CurrentControlSet\Services\Tardis
```

Under this entry, Tardis itself creates the following entries, which are used to hold the configuration information.

> ```
> DisplayName
> REG_SZ
> ```
> Name of the service displayed in the control panel.
>
> ```
> ImagePath
> REG_SZ
> ```
> Where TARDSERV.EXE lives. As entered using *add*.

9. Appendix III RFC868

                              Time Protocol

This RFC specifies a standard for the ARPA Internet community. Hosts on
the ARPA Internet that choose to implement a Time Protocol are expected
to adopt and implement this standard.

This protocol provides a site-independent, machine readable date and
time. The Time service sends back to the originating source the time in
seconds since midnight on January first 1900.

One motivation arises from the fact that not all systems have a
date/time clock, and all are subject to occasional human or machine
error. The use of time-servers makes it possible to quickly confirm or
correct a system's idea of the time, by making a brief poll of several
independent sites on the network.

This protocol may be used either above the Transmission Control Protocol
(TCP) or above the User Datagram Protocol (UDP).

When used via TCP the time service works as follows:
  S: Listen on port 37 (45 octal).
  U: Connect to port 37.
  S: Send the time as a 32 bit binary number.
  U: Receive the time.
  U: Close the connection.
  S: Close the connection.

   The server listens for a connection on port 37. When the connection
is established, the server returns a 32-bit time value and closes the
connection. If the server is unable to determine the time at its site,
it should either refuse the connection or close it without sending
anything.

When used via UDP the time service works as follows:
  S: Listen on port 37 (45 octal).
  U: Send an empty datagram to port 37.
  S: Receive the empty datagram.
  S: Send a datagram containing the time as a 32 bit binary number.
  U: Receive the time datagram.

   The server listens for a datagram on port 37. When a datagram
arrives, the server returns a datagram containing the 32-bit time value.
If the server is unable to determine the time at its site, it should
discard the arriving datagram and make no reply.

```
The Time

The time is the number of seconds since 00:00 (midnight) 1 January 1900
GMT, such that the time 1 is 12:00:01 am on 1 January 1900 GMT; this
base will serve until the year 2036.

For example:
  the time  2,208,988,800 corresponds to 00:00  1 Jan 1970 GMT,
            2,398,291,200 corresponds to 00:00  1 Jan 1976 GMT,
            2,524,521,600 corresponds to 00:00  1 Jan 1980 GMT,
            2,629,584,000 corresponds to 00:00  1 May 1983 GMT,
      and -1,297,728,000 corresponds to 00:00 17 Nov 1858 GMT.
```