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# Consistent Time Implementation Guide

Developed by:  
Multimedia Development Corporation

For:  
Ministry of Health Malaysia

*Version: 1.0*

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## 1. Consistent Time Implementation Guidelines

### 1.1 Intended Audience

The intended audience of this document is:

- Members of health informatics sales and development organization in Malaysia, participating in MSC Malaysia IHE Connectathon
- Participating THIS/HIS/PMS Vendors in Malaysia
- Ministry of Health Malaysia
- Healthcare professionals involved in informatics

### 1.2 Related Information for the Reader

Please note that IHE documentation are available on their website at <http://www.ihe.net>. This effort however chooses to implement selective profiles for simplicity and most relevant profiles, suited for Malaysian context.

## 2. Introduction

This document serves as a reference for vendors in Malaysia to update and synchronize time amongst all time client actors within their real world application. This guides provides a means to ensure that the system clocks and time stamps of the many computers in a network are well synchronized. This Consistent Time Implementation Guide specifies synchronization with a median error less than 1 second. This is sufficient for most purposes.

### 2.1 What is NTP<sup>6</sup>?

NTP is a protocol designed to synchronize the clocks of computers over a network to a common time base (usually UTC, or also known as GMT – Coordinated Universal Time). NTP version 3 is an Internet draft standard, formalized in RFC 1305. NTP version 4 is a significant revision of the NTP standard, and is the current development version, but has not been formalized in an RFC. Simple NTP (SNTP) version 4 is described in RFC 4330.

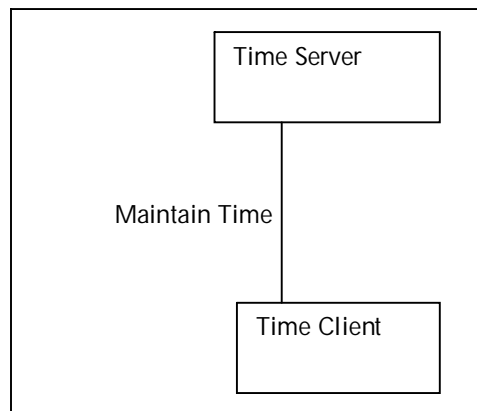
## 2.2 Why is NTP Important?

In a commercial environment, accurate time stamps are essential to everything from maintaining and troubleshooting equipment and forensic analysis of distributed attacks, to resolving disputes among parties contesting a commercially valuable time-sensitive transaction. In a programming environment, time stamps are usually used to determine what bits of code need to be rebuilt as part of a dependency checking process as they relate to other bits of code and the time stamps on them, and without good time stamps your entire development process can be brought to a complete standstill. Within law enforcement, they are essential for correlation of distributed communication events, forensic analysis, and potential evidentiary use in criminal proceedings. In essence, all debugging, security, audit, and authentication are founded on the basis of event correlation (knowing exactly what happened in what order, and on which side), and that depends on good time synchronization.

Additional information on this subject can be found at UC Berkeley, University of Wyoming, in Rik Farrow's Network Defense columns for Network Magazine, and in the Linux System Administrators Guide at the Linux Documentation Project.

### 3. IHE Time Client Actor<sup>6</sup>

The following diagram shows the actors directly involved in the Consistent Time Profile and the relevant transactions between them. Other actors that may be indirectly involved because of their participation in profiles that require consistent time are not shown.



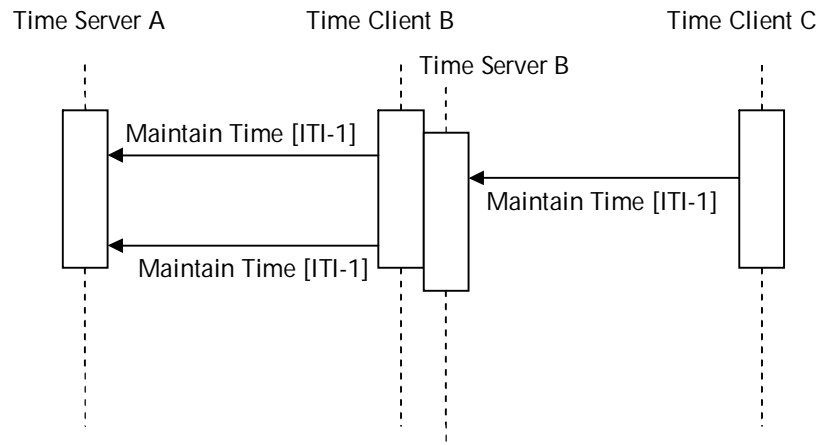
The following table lists the transactions for each actor directly involved in the Consistent Time Integration Profile. In order to claim support of this integration profile, an implementation must perform the required transactions (labeled "R" - Required)

Actors	Transactions	Optionality	Section Vol. 2
Time Server	Maintain Time [ITI-1]	R	ITI TF-2: 7.1
Time Client	Maintain Time [ITI-1]	R	ITI TF-2: 7.1

Details of this requirement can be found on the IHE Technical Framework for IT Infrastructure, Volume 2, Section 7.

#### 4. Consistent Time Process Flow

In a typical implementation, it is required for vendors to implement both Time Server and Time Client to claim conformance to the profile. This will greatly reduce unnecessary network traffic from a specific hospital to our designated network time server.



In the diagram above, Time Server A represents a server in SIRIM, Time Server B is the local, on-site time server for a typical hospital and Time Client C are various information systems software and hardware within the hospital.

#### 5. Update Server/Client Time

Application system vendors are expected to be fully aware of when their systems uses timestamp and how time is referenced in their application system codes, graphical user interface, agents, databases and servers in general.

In Malaysia, the official timekeeper is SIRIM, maintained by the National Metrology Laboratory.

NTP Time Server: [mst.sirim.my](http://mst.sirim.my)

Alternative Server: [time.nist.gov](http://time.nist.gov)

Please use the above address to update your software and hardware.

## **6. Acknowledgement**

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- NTP (ntp.org)
- Internet Engineering Task Force (IETF)