



Timing and Synchronization Systems

Sysplex Timer

November 2015

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IBM® has published its long-standing requirement for accurate time and date information in data processing. As single systems have been replaced by multiple, coupled systems, this need has evolved into a requirement for both accurate and consistent clocks among systems.

In the context of the IBM Enterprise Systems Architecture/390 (ESA/390), each system is called a central-processing-complex (CPC). A CPC consists of at least one central-processing-unit (CPU) and associated hardware that can be configured to operate under the control of an operating system. A configuration of coupled CPCs that cooperate to process a common workload is called a parallel sysplex.

9037 Model 2 Sysplex Timer

IBM's 9037 Model 2 Sysplex Timer is a hardware device that synchronizes the time-of-day (TOD) clocks of multiple CPCs and thereby allows events started by different CPCs to be properly sequenced. When multiple CPCs update the same database, and database reconstruction is necessary, all updates must be time-stamped in proper sequence. In a sysplex environment, the allowable differences between TOD clocks in different CPCs are limited by inter-CPC signaling time. By synchronizing the TOD clocks of multiple processors, the Sysplex Timer allows events started by different processors to be properly sequenced.

The 9037 Model 2 provides precision (accurate synchronization between the clocks on the sysplex) but still requires an outside time source to provide accuracy (alignment with true Universal Time).

International Standard

Some environments require TOD clocks to be accurately set to an international time standard: Universal Time (UTC), formerly known as Greenwich Mean Time. The Sysplex Timer satisfies these requirements by providing an accurate clock-setting process, a common clock-setting signal, and an optional capability for attaching to an external time source that provides UTC to the Sysplex Timer.

Accuracy of Time

The most important benefit an external time source can provide is accurate time. There are three main contributors to accuracy: the time source, the availability of the time source, and the reliability of the time server to maintain accurate time once it has received the time from its source.

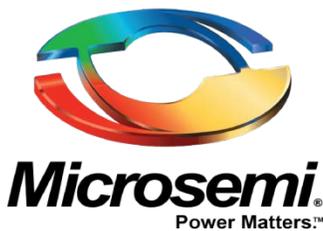
Security of Time

How organizations keep track of time has a major impact on the overall security of the organization's IT infrastructure for two reasons. First, because time mechanisms used to keep track of time are vulnerable to exploitation by a hacker, they need to be as secure as possible. Second, time stamps are critical evidence for retracing a hacker's movements inside a target system. They need to be protected to help harden the system against future attacks.

RS-232 Protocol for an External Time Source

The Sysplex Timer recognizes the RS-232 time code protocol used by Microsemi® SyncServer® network time servers. For this protocol, the data transmission type is serial asynchronous by character, and the American National Standard Code for information Interchange (ASCII) character code is used. Time information is interpreted as UTC time.

Microsemi's S200 and S250 time servers provide highly accurate, stable time sources for open NTP applications. These models can also be upgraded to a rubidium oscillator and are the most secure and comprehensive NTP/sysplex servers on the market.



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