the *Availability Digest*

Time Synchronization for NonStop Servers

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In our companion article, Time Synchronization for Distributed Systems – Part 1 (November, 2007, *Availability Digest*), we described the Network Time Protocol (NTP) so ubiquitous on the Internet for maintaining time synchronization between nodes in a distributed system and a civil time reference source. NTP is an open source facility that is available on a wide variety of platforms, including Windows, Unix, and Linux. SNTP (Simple Network Time Protocol) is a stripped-down version of NTP that supports clients interacting with a single time server.

Unfortunately, there is not an NTP open source port available for HP NonStop servers. Rather, these services are provided by proprietary products that are compatible with NTP running on other systems. In this article, we review two of these products. One is from Bowden Systems, and the other is from HP.

NSK-NTP and NSK-SNTP from Bowden Systems

Bowden Systems, Inc., offers both NTP and SNTP products for NonStop S-series and Integrity systems.

NSK-NTP

NSK-NTP is a full implementation of NTP as found on Unix systems. It is fully compliant with NTP version 3 and is compatible with NTP versions 1 and 2. It complies fully with RFC 1305, the specification for NTP version 3.[1] It runs under HP's Guardian 90 operating system.

NSK-NTP supports all NTP configurations, including symmetric active/passive (peer-to-peer), client/server, and broadcast/multicast. A broadcast/multicast client can discover remote servers, compute server-client propagation delay correction factors, and configure itself automatically. An NTP client can synchronize to multiple time sources and maintain an accuracy of 10 to 40 milliseconds.

The period for polling a time server is variable. It starts at about one minute and lengthens over time to whatever poll time is necessary to maintain clock accuracy, up to a maximum of seventeen minutes.

If the client clock offset is less than seventeen minutes, NSK-NTP will slew the clock by 128 msec. every poll period until the clock has been properly adjusted. If the offset is greater than seventeen minutes, NSK-NTP will abort; and the time must be manually reset.

NSK-NTP provides secure authentication to prevent attacks on the time synchronization network. It has a very small footprint, typically imposing a CPU utilization of less than 2%.

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[1] http://www.eecis.udel.edu/~mills/database/rfc/rfc1305/

Bowden Systems claims that SNK-NTP can be installed in less than 30 minutes. It can be configured for automatic startup and restart.

NSK-SNTP

NSK-SNTP is a client implementation of NTP version 3, and it retains compatibility with NTP versions 1 and 2. It runs under HP's Guardian 90 operating system.

NSK-SNTP supports one time source and typically delivers accuracies in the order of 100 to 500 milliseconds.

It uses a fixed poll interval that can range from 10 to 60 seconds, depending upon the clock accuracy desired; and it can handle up to an eight-minute clock offset error on startup.

NSK-SNTP offers no security.

As with NSK-NTP, it has a very light footprint and installs quickly.

Primary Reference Clocks

Both NSK-NTP and NSK-SNTP can synchronize with other NTP time servers, or they can synchronize directly with primary reference clocks. Both products have been tested by Bowden with a variety of primary reference clocks, such as those from Symmetricom (www.symmetricom.com). Symmetricom has a line of reference clocks that include both cesium atomic clocks and GPS receivers.

Pricing

As of this writing, the license fee for either NSK-NTP or NSK-SNTP is $7,000 for NonStop S-series systems and $8,000 for NonStop Integrity systems.

Bowden Systems

Bowden Systems is located in Norcross, Georgia, USA. The company was founded in 1991 and has been an HP partner since 1992.

NonStop Time Synchronization from HP

NonStop Time Synchronization from HP (www.hp.com/go/nonstop). synchronizes clocks among NonStop servers and between NonStop servers, Windows systems, Linux systems, and NTP or SNTP time sources. It is fully compatible with NTP or SNTP open source facilities running on Linux and Windows systems. It can use either NTP or SNTP time servers as a reference time.

HP NonStop Time Synchronization is not an open source offering. It is a proprietary product that is compatible with both NTP and SNTP, and includes full support from HP.

The HP NonStop Time Synchronization product was created to fill two separate but related objectives:

- to synchronize clocks within a distributed network of computers, and
- to synchronize these clocks with the real-world civil time.

It can be used to achieve either goal independently or to achieve both goals. That is, it can be used to synchronize clocks within a network but with no relation to the real outside time; it can be

used to synchronize a single system with an independent reference time source; or it can be used to synchronize the clocks in a network with each other and with a reference time source.

NonStop Time Synchronization is offered as three products:

- HP NonStop Time Synchronization, which provides clock synchronization services for NonStop servers.

- HP NonStop Time Synchronization – Linux Edition, which provides clock synchronization services between NonStop servers and Linux servers.

- HP NonStop Time Synchronization – Windows Edition, which provides clock synchronization services between NonStop servers and Windows servers

NonStop Servers

HP NonStop Time Synchronization can be deployed on NonStop S-series servers and on NonStop Integrity servers. On these servers, it can run either under Guardian or under the Open System Services (OSS) operating systems.

HP NonStop Time Synchronization can operate across NonStop Expand networks or NonStop clusters. It can also operate with NonStop servers in hybrid networks comprising Linux and Windows systems.

A NonStop server can operate either as an NTP or SNTP client, or it can be a NonStop Time Synchronization server. The product supports NTP and SNTP time sources as well as NonStop Time Synchronization servers.

This product replaces earlier NonStop time synchronization products, including SNTP Lite, which was sold out of the NonStop Denmark office.

Linux

The HP NonStop Time Synchronization – Linux Edition product can run under Red Hat Enterprise Linux 3.0 or later or under SUSE 9.0 or later. It runs as a daemon under Linux.

The hardware platforms that are supported include any i386, AMD32, or AMD64-based platform.

Windows

The HP NonStop Time Synchronization – Windows Edition product can run under Windows XP, Windows Server 2003, and Windows Vista. It runs as a service under Windows.

As with the Linux Edition, the hardware platforms that are supported include any i386, AMD32, or AMD64-based platform.

General Features

Subsecond accuracy can be provided – typically 100 milliseconds or less.

Any platform in the network can act as a Time Synchronization server. Alternatively, HP NonStop Time Synchronization can use any NTP or SNTP time server.

A Time Synchronization server can be used as a time source for any NTP or SNTP client or for any HP NonStop Time Synchronization client.

HP NonStop Time Synchronization integrates with the native event management system on each platform to provide logging of critical events.

A command interpreter is provided to dynamically alter the configuration and to obtain status information.

Clock readings from multiple sources can be averaged according to NTP algorithms to provide more accurate clock adjustments.

A report-only mode is provided. It reports time differences without actually making clock adjustments.

Summary

There is no open source port of NTP or SNTP available today for NonStop servers. However, there are available proprietary products for NonStop servers that are completely compatible with NTP and SNTP version 3.

One set of products comprises NSK-NTP and NSK-SNTP, very mature products with many installations from Bowden Systems. Another is HP NonStop Time Synchronization, a new product offered directly by HP. Both vendors offer complete support for their products.