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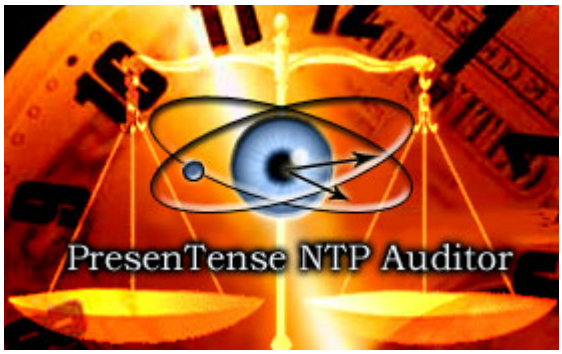
1 Overview

1.1 What is PresenTense NTP Auditor



PresenTense NTP Auditor monitors your computer's built-in clock and compares it's time to the real time. Most computer clocks lose or gain time so within a few days, your computer does not show the real time. Many software packages claim to synchronize your computer to atomic clocks or satellite clocks on the internet but how do you really know that your computer's clock is correct? PresenTense Auditor allows you to monitor and record your computer's time and graph the difference between it and up to three national reference clocks on the internet. PresenTense NTP Auditor gives you the assurance that your synchronization software keeps the correct time, all the time. The features of PresenTense NTP Auditor include :

- **Legal Accounting of Computer System Time**

  PresenTense NTP Auditor creates a primary, secondary and tertiary audit log of local system time with respect to legal sources of UTC and automatically archives logs according year and month.

- **NASD - Order Audit Trail System (OATS) & SEC**

  PresenTense Auditor allows companies to comply with the time auditing requirements of NASD Rule 6950 - 6957 as specified by the National Association of Securities Dealers and the Securities and Exchange Commission ruling SEC Rule 71a-4 on records keeping. If PresenTense Time Server and PresenTense Time Clients are installed, complete time compliance can be maintained. See also NASD OATS Regulatory Compliance.

- **UTC Traceability**

  The ***National Emergency Number Association (NENA)*** identifies time keeping requirements for ***P***ublic ***S***afety ***A***nswering ***P***oints (PSAP) such as 911 call centers. These requirements include continuous accuracy of 100 milliseconds to UTC. PresenTense NTP Auditor actively monitors your computer for conformance to the NENA standard.

- **NENA Time Display**

  PresenTense NTP Auditor allows the display of ***National Emergency Number Association (NENA)*** compliant time.

- **Real-Time Receipts**

  PresenTense NTP Auditor supports the generation of real-time logs to a dedicated line printer, creating an official record of system time at configurable intervals or in response to time changes

between intervals. Paper logs are created in real-time to safeguard against data loss. See also NASD OATS Regulatory Compliance.

- **Synchronization Software Watchdog**

  PresenTense NTP Auditor actively monitors your time synchronization software and raises an alarm condition if your time server or time client is not operating.

- **Email Alarm Action**

  PresenTense NTP Auditor can notify you by email if the computer system time drifts beyond the limits specified in the NENA 911 standard, if your time synchronization software fails, or if audit trails cannot be created.

- **Advanced Statistical Filters**

  PresenTense NTP Auditor employs advanced statistical algorithms to evaluate clock measurements and mitigate the effects of network jitter and other statistical errors. See also Standard Deviation Statistical Filter.

1.2 Audit Trails

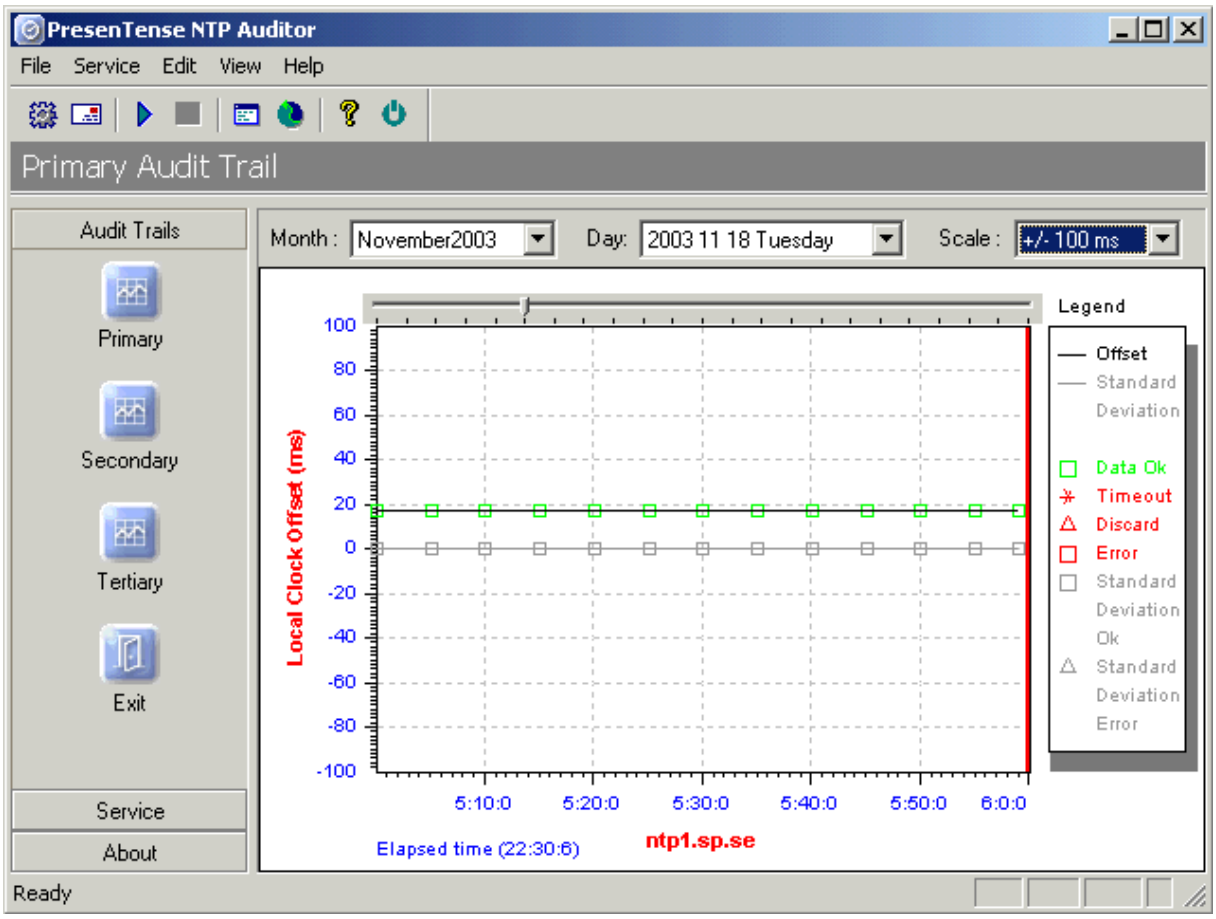
PresenTense NTP Auditor supports the generation of primary, secondary and tertiary audit trails, charting local system time with respect to legal sources of UTC and automatically archives logs according year and month. The display will automatically show the most recent day for which a log was created. See screenshot below.

- **Offset Graph :** The offset graph displays the difference between local system time and the primary, secondary, or tertiary legal source of Coordinated Universal Time. Each data point represents the average of the measurements collected at the sample interval and is marked as follows :

  1. A green square denotes a valid sample set. A statistical filter has been applied to discard measurement errors resulting from network jitter and the arithmetic mean of valid measurements has been computed to represent the local system time offset to the legal source of Coordinated Universal Time.
  2. A red star or "x" denotes that the connection to the server has timed out at the marked sample interval and the last known time offset is charted by default.
  3. If the measured offset exceeds the currently selected scale, the offset is marked as a red triangle at the top or bottom of the chart.
  4. If the measured offset has been discarded due to excessively high standard deviation in the sample set, the offset is marked as a red triangle. See Standard Deviation Statistical Filter.

- **Standard Deviation Graph :** The standard deviation graph shows the standard deviation of the sample set recorded at each sample interval.

- **Scale :** The default scale auto-adjusts to display the most recently recorded offset.



1.3 NENA Time

The ***National Emergency Number Association (NENA)*** identifies time keeping requirements for *P*ublic *S*afety *A*nswering *P*oints (PSAP) such as 911 call centers. These requirements include continuous accuracy of 100 milliseconds to UTC. PresenTense NTP Auditor actively monitors your computer for conformance to the NENA standard.

Typical time keeping scenarios include the use of GPS clocks to establish a traceable link to UTC and network time servers to synchronize site equipment via a local area network. In the United States UTC is provided by the National Institute of Standards and Technology (NIST) and the United States Naval Observatory (USNO). Various other countries define their own time keeping standards for sources of legal time. UTC is also known as GMT or Zulu time.

The NENA 911 standard requires display capabilities in 12 and 24 hour formats as well as status indicators that reflect the clock's current synchronization status with respect to the external UTC (Coordinated Universal Time) source.

The following status indicators are available for each external UTC source :

- **SYNCHRONIZED**

  PresenTense NTP Auditor is locked onto and synchronized to the respective UTC source.

- **LOCKED, NOT IN SYNC**

PresenTense NTP Auditor is locked onto the respective UTC source but the local clock is not synchronized to the respective UTC source. Statistical filters indicate that the network measurement is valid.

- **LOCKED**

  PresenTense NTP Auditor is locked onto the respective UTC source but the local clock may not be synchronized to the respective UTC source. A clock offset has been registered but has been discarded because of a large standard deviation value - network measurements are subject to excessive "white noise".

- **NO STATUS**

  The respective status file "***nena_primary.txt***", "***nena_secondary.txt***" or "***nena_tertiary.txt***" was not found in the PresenTense NTP Auditor application folder or the file contents could not be read

- **DISABLED**

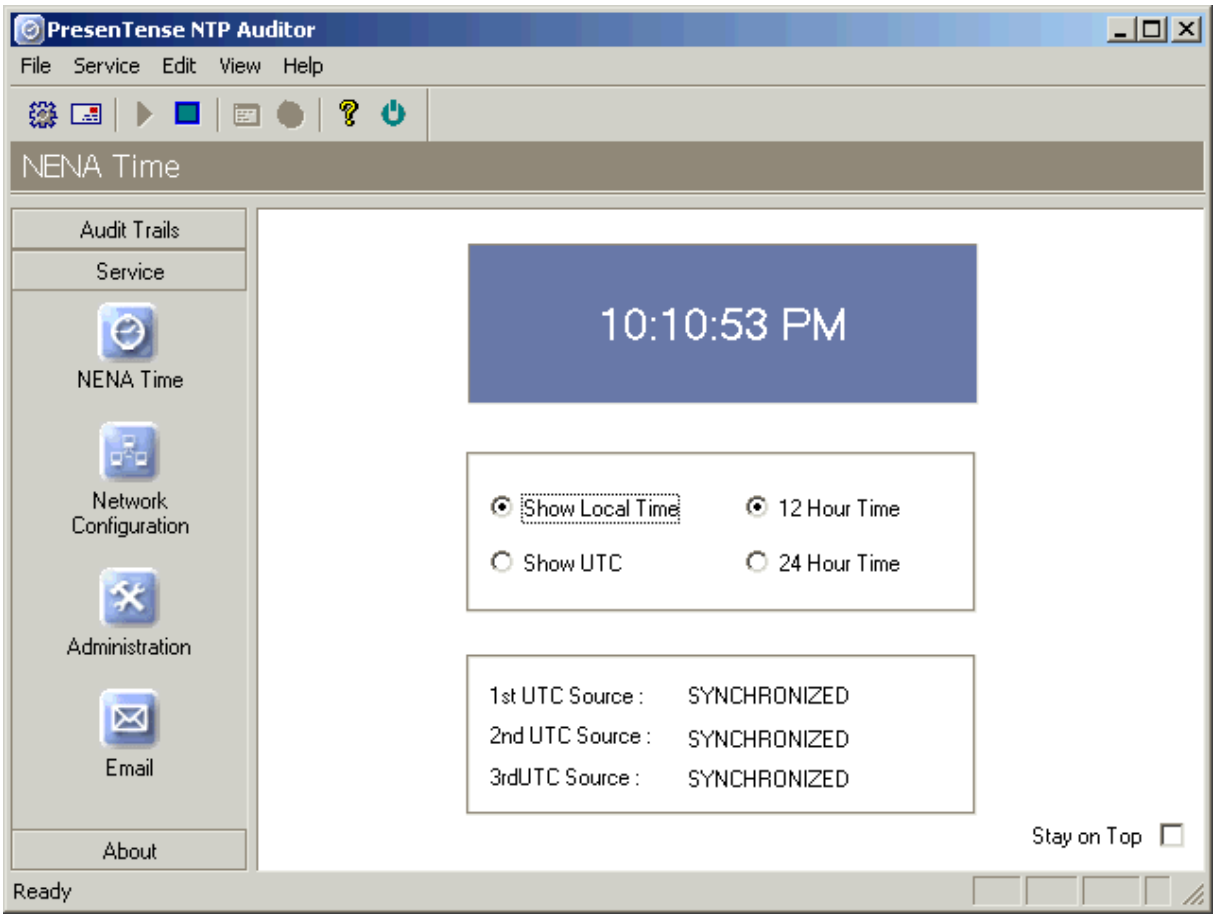
  The respective UTC source has been disabled on the network configuration screen.

- **UNLOCKED**

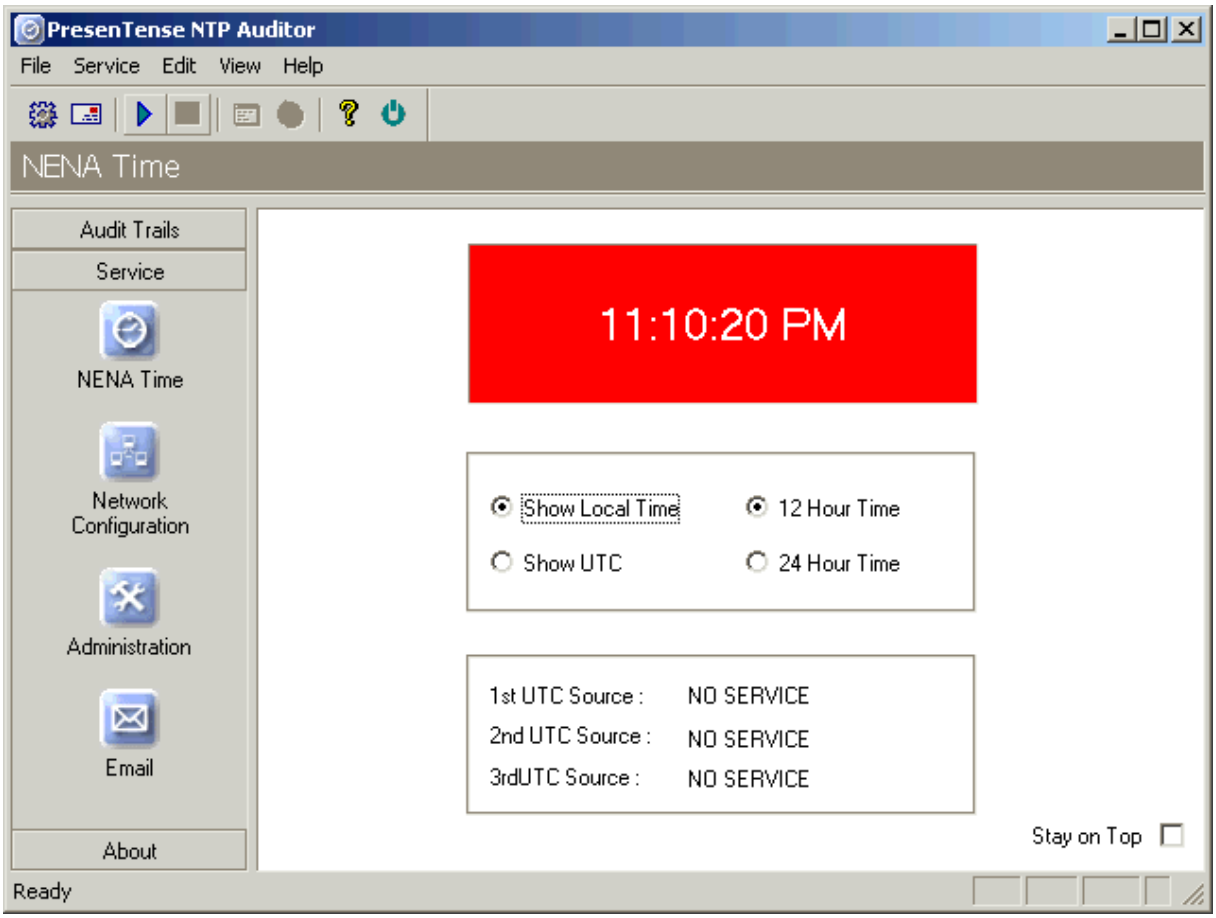
  PresenTense NTP Auditor is not locked onto the respective UTC source. Possible reasons for this are DNS lookup errors or network timeouts.

- **NO SERVICE**

  The PresenTense NTP Auditor system service is not running.



Click "**Stay on Top**" to lock this screen on your desktop. The time flashes red and an audible alarm sounds if an alarm condition occurs. See E-Mail Alarm Action for alarm notification options.



1.4 NASD OATS Regulatory Compliance

PresenTense Auditor allows companies to comply with the time auditing requirements of NASD Rule 6950 - 6957 as specified by the National Association of Securities Dealers and the Securities and Exchange Commission ruling SEC Rule 71a-4 on records keeping. If PresenTense Time Server and PresenTense Time Clients are installed, complete time compliance can be maintained.

- 6953.Synchronization of Member Business Clocks

"Each member shall synchronize its business clocks that are used for purposes of recording the date and time of any event that must be recorded pursuant to the By-Laws or Rules of the Association, with reference to a time source as designated by the Association, and shall maintain the synchronization of such business clocks in conformity with such procedures as are prescribed by the Association."

- OATS Technical Reporting Specifications

Section 2 Clock Synchronization requires : "...member firms must document and maintain their clock synchronization procedures. In addition, member firms should keep a log of the times when they synchronize their clocks and the results of the synchronization

process. This log should include notice of any time the clock drifts more than 3 seconds. This log should maintained for the period of time and accessibility specified in SEC Rule 17a-4(b), and it should be maintained and preserved for the time period in paper format or in a format permitted under SEC Rule 17a-4(f)."

Bytefusion Ltd. has no affiliation with any of the above listed organizations or web sites referred to above. Furthermore, Bytefusion Ltd makes no representation regarding the accuracy of the information listed and assumes no liability for damages, real or consequential, arising from the use of this information.

1.5 National Time Sources

PresenTense NTP Auditor references sources of legal time. Depending on your jurisdiction, the availability of legal time will vary. If you know of a source of legal time in your country which is not listed here, kindly notify us at support@bytefusion.com.

- **United States of America**

Authority: U.S. Naval Observatory, Washington, DC
DNS: ntp2.usno.navy.mil
Service Area: USA Eastern time zone
Public Access: stratum-2 time servers only please

Authority: NASA Lewis Research Center, Cleveland, Ohio
DNS: lerc-dns.lerc.nasa.gov
Service Area: NSFNET, OARNET
Public Access: open

Authority: National Center for Atmospheric Research, Boulder, Colorado
DNS: time.nist.gov
Service Area: NSFnet, WESTnet
Public Access: stratum-2 time servers only please

Authority: NIST Boulder Laboratories, Boulder, Colorado
DNS: time-a.timefreq.bldrdoc.gov
Service Area: NSFnet, WESTnet
Public Access: stratum-2 time servers only please

- **Switzerland**

Authority: Swiss Federal Institute. of Technology, Zurich
DNS: swisstime.ethz.ch
Service Area: Switzerland/Europe
Public Access: open

- **Sweden**

  Authority: Swedish National Testing and Research Institute, Boras
  DNS: ntp1.sp.se
  Service Area: Global
  Public Access: open

- **Germany**

  Authority: National Institute of Natural and Engineering Sciences (PTB)
  DNS: ptbtime1.ptb.de
  Service Area: Europe
  Public Access: open, please notify ntp-admin@ptb.de

- **Italy**

  Authority: Istituto Elettrotecnico Nazionale Galileo Ferraris, Torino
  DNS: ntp1.ien.it
  Service Area: Europe
  Public Access: open, please notify ntp.info@ien.it

- **Mexico**

  Authority: Centro Nacional de Metrologia, Queretaro
  DNS: cronos.cenam.mx
  Service Area: Mexico and USA
  Public Access: open

1.6 Standard Deviation Statistical Filter

Standard Deviation is a statistical measure of variance in a sample set. It is calculated from the square root of the variance of the sample set as shown below :

$$S = \sqrt{\frac{1}{n-1} \sum_{i=0}^{n-1} (X_i - \bar{X})^2}$$

where **n** is the number of data samples
and $\bar{X}$ denotes the arithmetic mean of the sample set.

The standard deviation of time measurements is important to PresenTense NTP Auditor because it reflects the quality of the network connection to the legal source of Coordinated Universal Time and therefore reflects the quality of the time measurements themselves. As the quality of service on the internet is subject to variation, the standard deviation is computed for every set of measurements. If the standard deviation is excessively large or varies substantially from previous measurements, the affected measurements are marked as discarded.

1.7 Real-Time Receipts

PresenTense NTP Auditor supports the generation of real-time logs to a dedicated line printer, creating an official record of system time at configurable intervals or in response to time changes between intervals. Paper logs are created in real-time to safeguard against data loss. A sample print is shown below. This feature is part of PresenTense NTP Auditor's NASD OATS Regulatory Compliance. See also Service Administration for information on how to configure Real-Time Receipts.

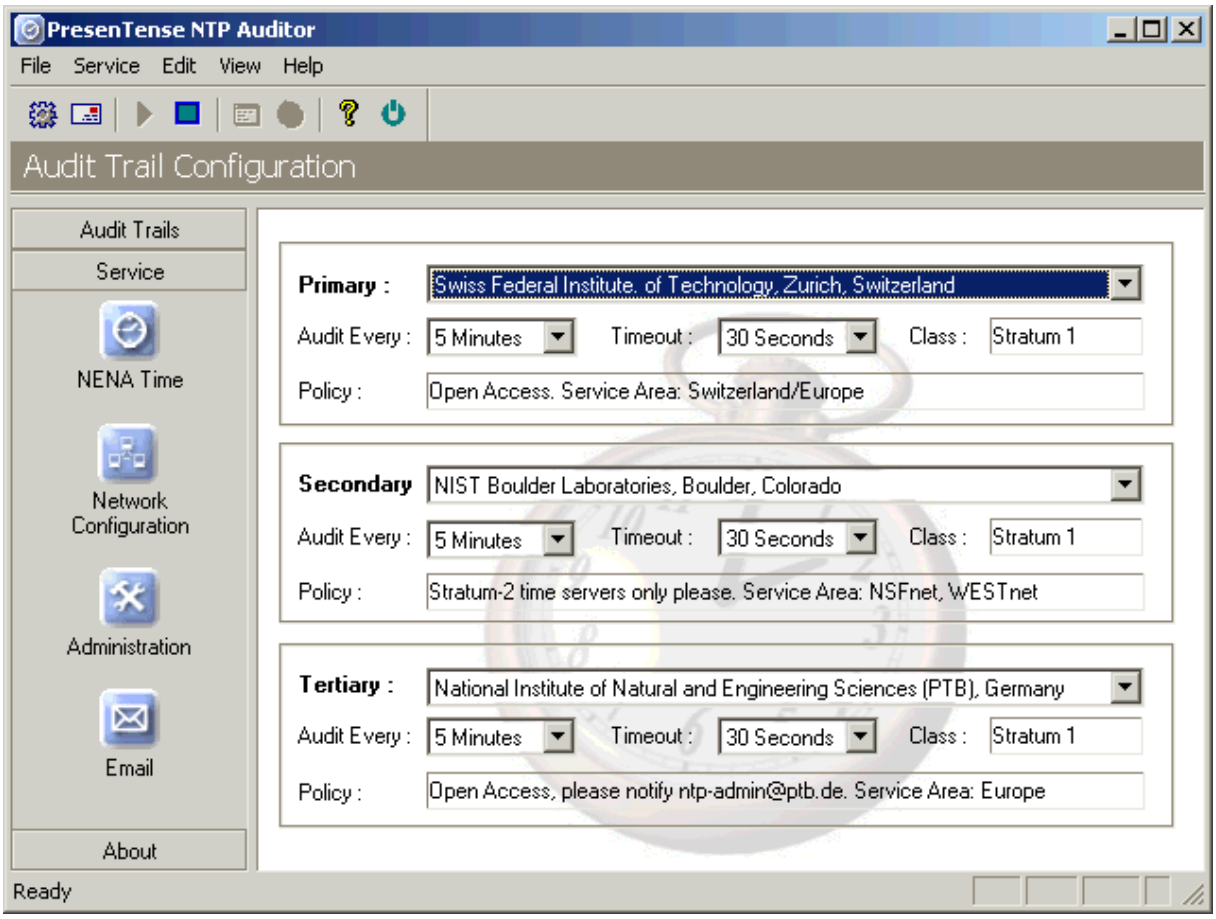
```
************************************************
*                                              *
*            Offical Real-Time Receipt         *
*            PresenTense NTP Auditor           *
*                                              *
*            A member of the                   *
*            PresenTense product family        *
*                                              *
*            "Because time is money"           *
*            www.bytefusion.com                *
*                                              *
************************************************

17:59:05.862 -> PresenTense NTP Auditor Version 3.6
17:59:05.872 -> Copyright (C) 2003, Bytefusion Ltd.
17:59:05.882 -> All Rights Reserved
17:59:05.972 -> Official real-time receipt for: bismarck
17:59:05.982 -> Process priority normal
17:59:05.982 -> DATE NOW 2003 December 15
17:59:06.503 Primary   -> OFFSET 0.004041 STDDEV 0.001229
17:59:06.763 Secondary -> OFFSET 0.012460 STDDEV 0.000312
17:59:06.763 Tertiary  -> OFFSET 0.005778 STDDEV 0.001352
17:59:06.964 Tertiary  -> OFFSET 0.005800 STDDEV 0.000227
17:59:06.974 Primary   -> OFFSET 0.005461 STDDEV 0.000827
```

2 Configuration

2.1 Network Configuration

The network configuration screen displays settings for the primary, secondary and tertiary audit trails. Use this screen to set the national UTC (Coordinated Universal Time) sources for PresenTense NTP Auditor and the associated audit intervals. Audits are performed automatically by the PresenTense NTP Auditor background service at the specified intervals or in response to time changes between intervals - the graphical user interface may be closed safely after network and audit trail configuration has been completed. Kindly observe the access policies of the operators as detailed in the "***Policy***" field.



2.2 Service Administration

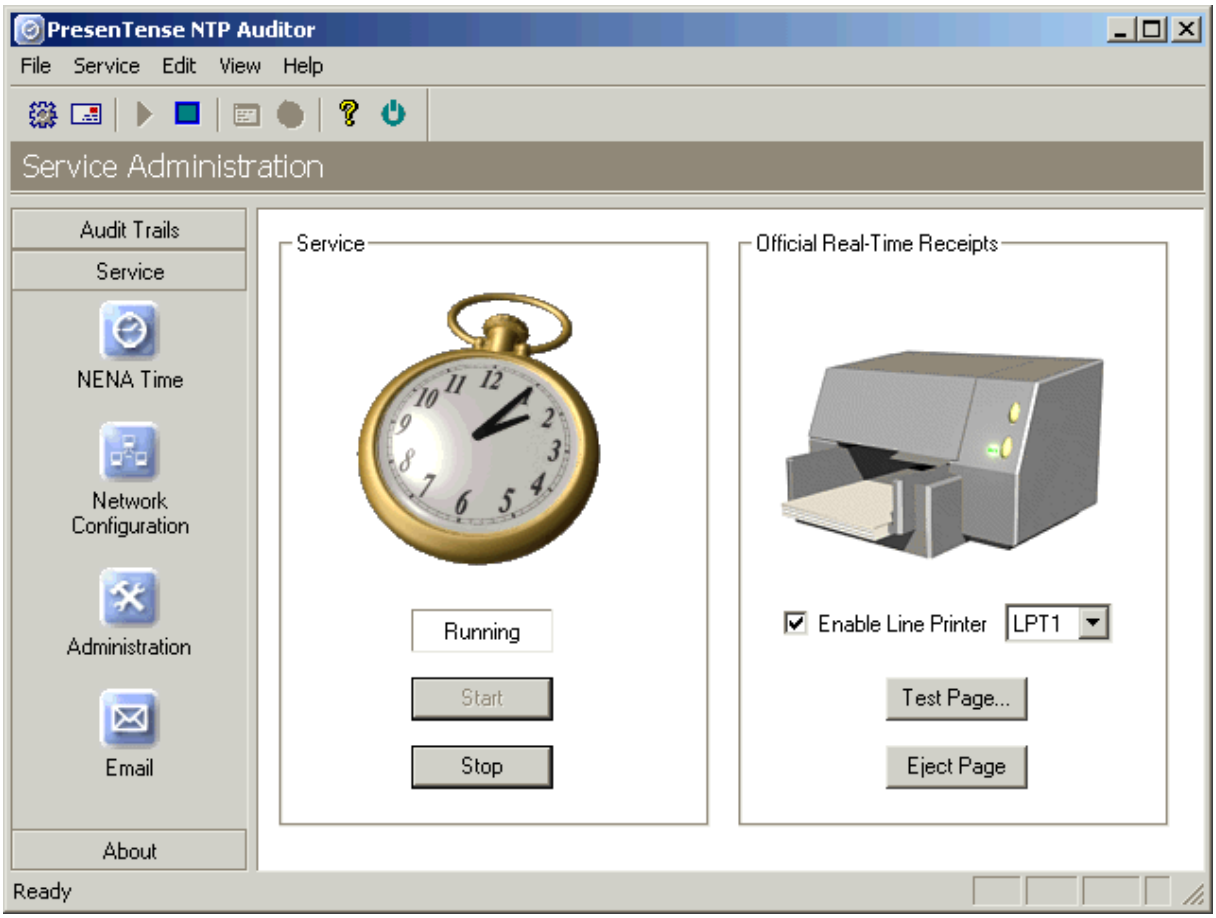
The service administration screen allows you to start and stop the PresenTense NTP Auditor service and configure the generation of official real-time receipts via a dedicated line printer.

- **Service**

  Use the ***Start*** and ***Stop*** button to manage the running state of the PresenTense NTP Auditor system service. If the service is running the clock display is animated and indicates that the service is "running" as shown below.

- **Official Real-Time Receipts**

  PresenTense NTP Auditor supports the generation of real-time logs to a dedicated line printer, creating an official record of system time at configurable intervals or in response to time changes between intervals. Paper logs are created in real-time to safeguard against data loss. Please note that a shared network printer used via a print spooler is not suitable for this task. Print spoolers typically operate a non real-time queue of "page oriented" print jobs whereas PresenTense NTP Auditor requires real-time print job control - time stamps are printed one line at a time and the printer paper is advanced a single line at a time only. Any printer connected to your PC via the parallel port is suitable, both continuous feed line printers and page printers such as ink-jets.



2.3 E-Mail Alarm Action

PresenTense NTP Auditor can notify you by email if the computer system time drifts beyond the limits specified in the NENA 911 standard, if your time synchronization software fails, or if audit trails cannot be created.

- **E-Mail Alarm Notification (SMTP)**

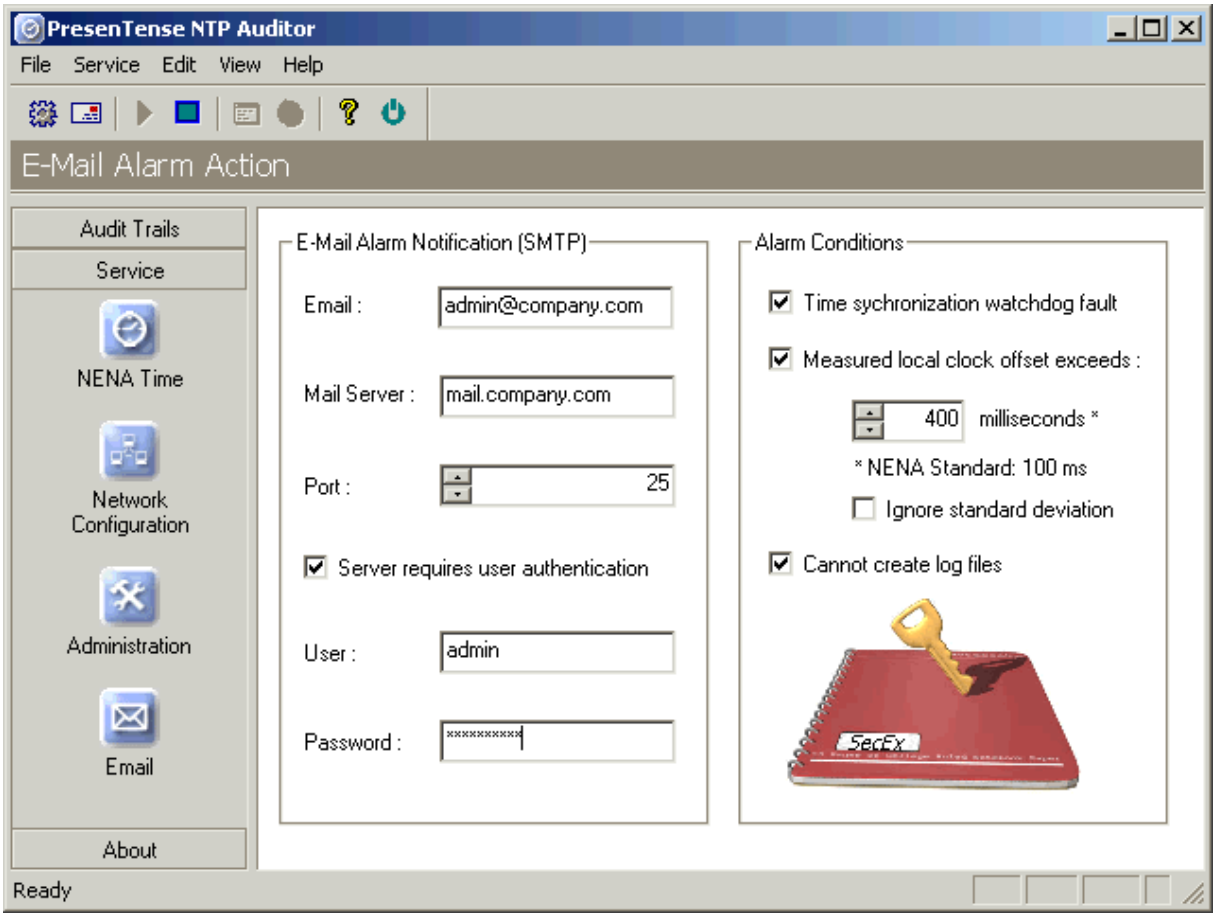
1. **Email :** Enter your administrator email address here.
2. **Mail-Server :** Enter your SMTP mail server DNS name or IP address here.
3. **Port :** If your SMTP server operates a non standard port, enter the port number here.
4. **Server requires user authentication :** Click this option is your mail server uses SMTP AUTH.
5. **User :** Where applicable, enter the SMTP authentication user name here.
6. **Password :** Where applicable, enter the SMTP authentication password here.

- **Alarm Conditions**

1. **Time synchronization watchdog fault :** This fault indicates that time PresenTense Server or PresenTense Client synchronization software is not operating.
2. **Measured local clock offset exceeds :** This fault indicates that the local clock offset to a configured source of Coordinated Universal Time exceeds the specified limit. Note that the NENA 911 standard requires accuracy to within 100ms.
3. **Ignore standard deviation :** Network measurements which are subject to excessively large standard deviation are marked as discarded in the audit trail display and no alarm notification takes place. However, you may chose to be notified of clock offsets which exceed the specified

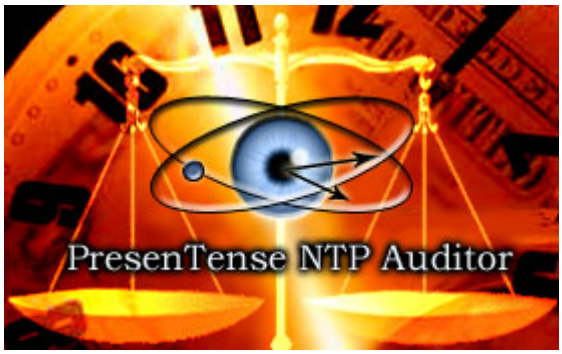
limit even where the standard deviation indicates network connectivity may have degraded the quality of the measurements.

4. **Cannot create log files :** This fault indicates that audit trails logs cannot be created as may be the case when insufficient disk space is available.



3 About

3.1 About PresenTense NTP Auditor



PresenTense NTP Auditor

for Windows NT / 2000 / XP / 2003
Version 3.7

3.2 About PresenTense Server

PresenTense Time Server - Advantages at a glance

- **Accurate and reliable** (microsecond accuracy, 24/7 availability)
- **Easy to install and maintain** (most users up and running in less than a minute)
- **Versatile** (able to use almost any reference time source including GPS and internet time servers)
- **Low total cost of ownership** (support included meaning no yearly support fees)

PresenTense Time Server is a multi protocol time server designed for PresenTense time clients. PresenTense Server incorporates both client as well as server components. This means you can use PresenTense Server to synchronize your PC to a primary time source such as an atomic clock on the internet and offer time services to clients on your local area network. PresenTense server also allows synchronization to GPS receivers via RS-232 and the NMEA 0183 protocol.

PresenTense Server operates three server components concurrently on the ports shown below :

1. Port 123 UDP (SNTP - RFC 2030)
2. Port 37 UDP (TIME - RFC 868)
3. Port 37 TCP (TIME - RFC 868)
4. Port 123 UDP (NTP3 / NTP4 - RFC 1305) ***Free Plug-In***

This feature enables you to operate time clients on your network using different time protocols simultaneously depending on your requirements for accuracy. To obtain the latest version of our NTP4 plug-in for PresenTense Server free of charge at any time, kindly email us at support@bytefusion.com.

PresenTense Server features include :

- **Multi Protocol Support**

When operating as a secondary time server, PresenTense Server can synchronize to primary, network time servers of the following protocol families :

1. NTP/SNTP

2. Network Time UDP
3. Network Time TCP

- **GPS Receiver Support**

When operating as a primary time server, PresenTense Server can synchronize to GPS receivers via the PC's serial port and the NMEA 0183 protocol. In order to be compatible with PresenTense Server, GPS receivers must emit the GPRMC NMEA sentence (recommended minimum coordinates) at one or two second intervals. Special support is included for the Garmin GPS 2 Plus and the Garmin 38 hand held GPS receivers. You may use either PresenTense Server's native GPS support or the GPS support furnished by the NTP4 plug-in's reference clock support.

- **Redundancy**

An automatic fail-over mechanism switches to a redundant network time source if the primary time source becomes unavailable (only available when synchronizing to a primary network time server).

- **Email Alarm Action**

PresenTense Server can notify you by email if the time source becomes unavailable or critical errors are encountered during operation (SMTP only) .

- **NT Service**

PresenTense Server operates as an NT service - invisibly in the background. Configuration changes are made via the PresenTense Server applet in the system control panel.

- **Highly Customizable**

PresenTense Server features advanced configuration options, including the ability to evaluate the accuracy of its time source to within milliseconds.

- **Security**

Initial setup and later configuration via the control panel require administrator privileges. This minimizes the risk of tampering with system parameters by unauthorized users.

- **Remote Monitoring and Administration**

PresenTense Server may be administered fully by remote and monitored over the network to ensure accurate time keeping. Please check www.bytefusion.com for availability of monitoring software.

Please note that while PresenTense Server should work with other time clients that comply with the relevant RFCs, the software has only been tested with PresenTense time clients, and no support is available for the operation of PresenTense Server with non PresenTense time clients.

Trademarks

3.3 About PresenTense Client NT/2000/XP

PresenTense Time Client - Advantages at a glance

- **Accurate and reliable** (microsecond accuracy, runs as a service)
- **Easy to install and maintain** (most users up and running in less than a minute)
- **Versatile** (able to connect to almost any NTP or SNTP time server)
- **Low total cost of ownership** (support included meaning no yearly support fees)
- **Supports Free Run** to keep your clock correct even when a time server is not available

PresenTense Time Client is a network time client for Windows NT / 2000 / XP. It synchronizes your PC system clock to a network time server. The features of PresenTense include :

- **Multi Protocol Support**

  Time sources of all major protocol families are supported :

1. SNTP/NTP (RFC 2030)
2. Free Plug-In (NTP 3 & 4) (RFC 1305)
3. Network Time UDP (RFC 868)
4. Network Time TCP (RFC 868)

- **Redundancy**

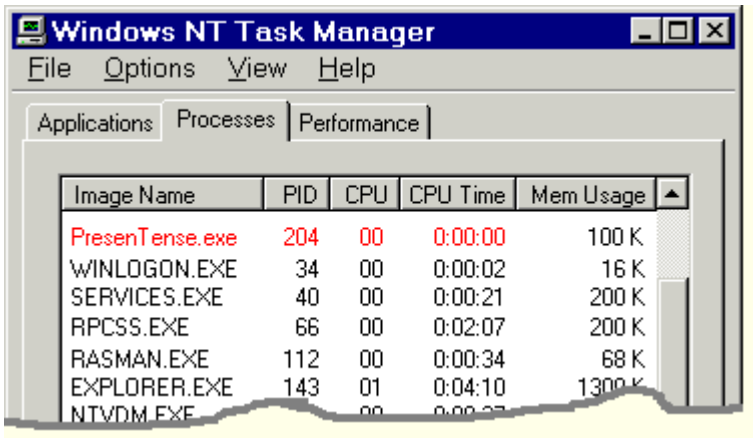
  An automatic fail-over mechanism switches the time client to a redundant time server if the primary time server becomes unavailable.

- **Email Alarm Action**

  PresenTense can notify you by email if the time server becomes unavailable (SMTP only) .

- **Lightweight Design**

  The RAM footprint of PresenTense is approximately 100 Kilobytes. This makes PresenTense unobtrusive and
  versatile. It operates with minimum impact on other applications.



- **NT Service**

  PresenTense operates as an NT service - invisibly in the background. Configuration changes are made
  via the PresenTense Manager (PTM) applet in the system control panel.

- **Highly Customizable**

  PresenTense features advanced configuration options, including the ability to evaluate the accuracy of server
  time stamps to within milliseconds.

- **Security**

  Initial setup and later configuration via the control panel require administrator privileges. This minimizes
  the risk of tampering with system parameters by unauthorized users.

- **Remote Monitoring and Administration**

  PresenTense clients may be administered fully by remote and monitored over the network to ensure accurate
  time keeping. Please check www.bytefusion.com for availability of monitoring software.

Trademarks

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3.4 About PresenTense Client 95/98/ME

PresenTense98 is a network time client for Windows 95 / 98 / ME. It synchronizes your PC system clock to a network
time server. The features of PresenTense98 include :

- **Multi Protocol Support**

  Time sources of all major protocol families are supported :

  1. NTP/SNTP
  2. Network Time UDP
  3. Network Time TCP

- **Lightweight Design**

  The idle time RAM footprint of PresenTense98 is approximately 100 kilobytes. This makes PresenTense98 unobtrusive and versatile. It operates with minimum impact on other applications.

- **Windows 95/98 System Service**

  PresenTense98 operates as an Windows 95/98 system service, invisibly in the background, similar to Windows NT system services. Specifically, this means that PresenTense98 launches before user log-on and survives user log-off.
  Configuration changes are made via the PresenTense98 Manager (PTM) applet.

- **Redundancy**

  An automatic fail-over mechanism switches to a redundant time server if the primary time server becomes unavailable.

- **Email Alarm Action**

  PresenTense can notify you by email if the time source becomes unavailable (SMTP only) .

- **Highly Customizable**

  PresenTense98 features advanced configuration options, including the ability to evaluate the accuracy of server
  time stamps to within milliseconds.

- **Remote Monitoring and Administration**

  PresenTense98 clients may be administered fully by remote and monitored over the network to ensure accurate
  time keeping. Please check www.bytefusion.com for availability of monitoring software.

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3.5 About Bytefusion Ltd.

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