WHITE PAPER

INSIDER TECHNOLOGIES

RTLX

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1. Introduction

What are Sentra and RTLX?

Sentra is a Service Management facility from Insider Technologies that provides both Business and Operations users with a tailored view of the health of a chosen application. The product has the flexibility to provide the complete range of management views, from the transaction life cycle Business Activity Monitoring (BAM) capability necessary for a mission critical core application through to the monitoring of event logs for a small group of Windows Servers.

Insider has created a Sentra module - RTLX - to provide real time monitoring and comprehensive querying of the transaction flow information created by primary payment engines like the ACI BASE24™ ATM/POS application (email support@insidertech.co.uk for information about other payment engines supported).

RTLX also provides monitoring and querying of the HPE NonStop EMS messages for the payment application and supporting subsystems, e.g. XPNET, MQ.

This Sentra module will maintain a centralised database of both transaction and EMS data from one or more BASE24™ nodes and analyse the information in real time. The outcome of the analysis will be service level alerts, graphs depicting the behaviour of nominated metrics and management reports to help set and achieve Business objectives for the BASE24™ world.

Transaction and EMS data can be held for multiple years and nominated record fields masked and/or encrypted to comply with on-site PCI DSS directives. Legacy transaction log files can also be extracted using the RTLX batch module.

What This Document Provides

This paper provides a technical overview of the RTLX product, and includes a brief overview of the core Sentra facilities.

It describes the thinking behind the design of the product. The functionality of each of the RTLX software modules is also described in detail. A number of example screenshots are also provided at the back of this white paper illustrating the core visuals available.

Who Should Read This Document?

The document is aimed at people with a technical background.

The document will provide an excellent introduction to new users at an existing installation, or to individuals who are considering a product evaluation and who are looking for a more detailed product description outside of the information provided by Insider's Sales and website literature.

2. BASE24 Application

The BASE24™ application from ACI Worldwide is purchased predominantly by financial institutions. The product provides its users with an extensive and secure range of facilities that allow the customers and account holders of a financial institution to submit card based transactions from an ATM or POS terminal.

The BASE24™ application can route these transactions to other members of the ATM/POS service provider community, provide authorisation for funds for its own customers and link into payment systems for accounting purposes.

As part of the applications processing, activity relating to traffic to and from an ATM or POS device is logged to a set of files which reside on an HP NSK node. For ATM's, this file is known as the Transaction Logging File or the TLF. For the POS, this file is known as the POS Transaction Logging File or PTLF.

Examples of TLF and PTLF log messages include:

- Application response and advice
- Transaction reversals and adjustments
- Information requests
- POS settlements

The objective of the RTLX application is to transfer this log information (with BASE24, POS and ATM standard and custom record tokens) to a Sentra hosted database in real time.

Hosted transaction and EMS data can then be subjected to standard Sentra processing such as the graphical representation of data, analysis of data based upon rules coupled with alerts and the escalation of alerts to Enterprise Management or mobile technologies.

Additionslly, this log database can be retained and accumulated to become the subject of trending analysis along with comprehensive, secure transaction and EMS querying.

3. Sentra Overview

Sentra Overview

This section provides a brief overview of the Insider Technologies Sentra product. The level of detail available in this section will allow the reader to understand the Sentra terminology referenced in later sections of this 'RTLX White Paper'.

If further detailed technical Sentra information is required, then this can be obtained on request from Insider Technologies at support@insidertech.co.uk.

General Sentra Principles

The basic objective of the Sentra product is to allow users to create a centralised database of information that can then be processed by a variety of other Sentra modules to help provide a set of Service Management facilities.

Insider Technologies already markets a number of Sentra solutions that can create a centralised database from a range of sources. In this instance, the Sentra software will be accessing the BASE24™ TLF and PTLF and NonStop EMS logs but equally, modules already exist to relay service related information from remote email, payment, system log and performance counter databases.

Sentra Agents

The agent programs that read and relay the service data are known as 'extraction clients'. The client programs are installed, started, stopped and managed from the central server that also hosts the centralised database. You can view the status of all of the remote clients through a central 'program control' screen.

A variety of options exist to extract information from 'standard' locations such as SQL tables and structured log files. However it is sometimes necessary to create a bespoke client if the data source is of a proprietary nature. The BASE24™ client is one such example given that the target files in question are Enscribe entry sequenced files.

Once the client has been created, how it is installed, started, provided with its run time parameters and how it relays information to the central Sentra database are all based on standard Sentra practices whatever the nature of the client.

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4. Sentra Database

Sentra Database

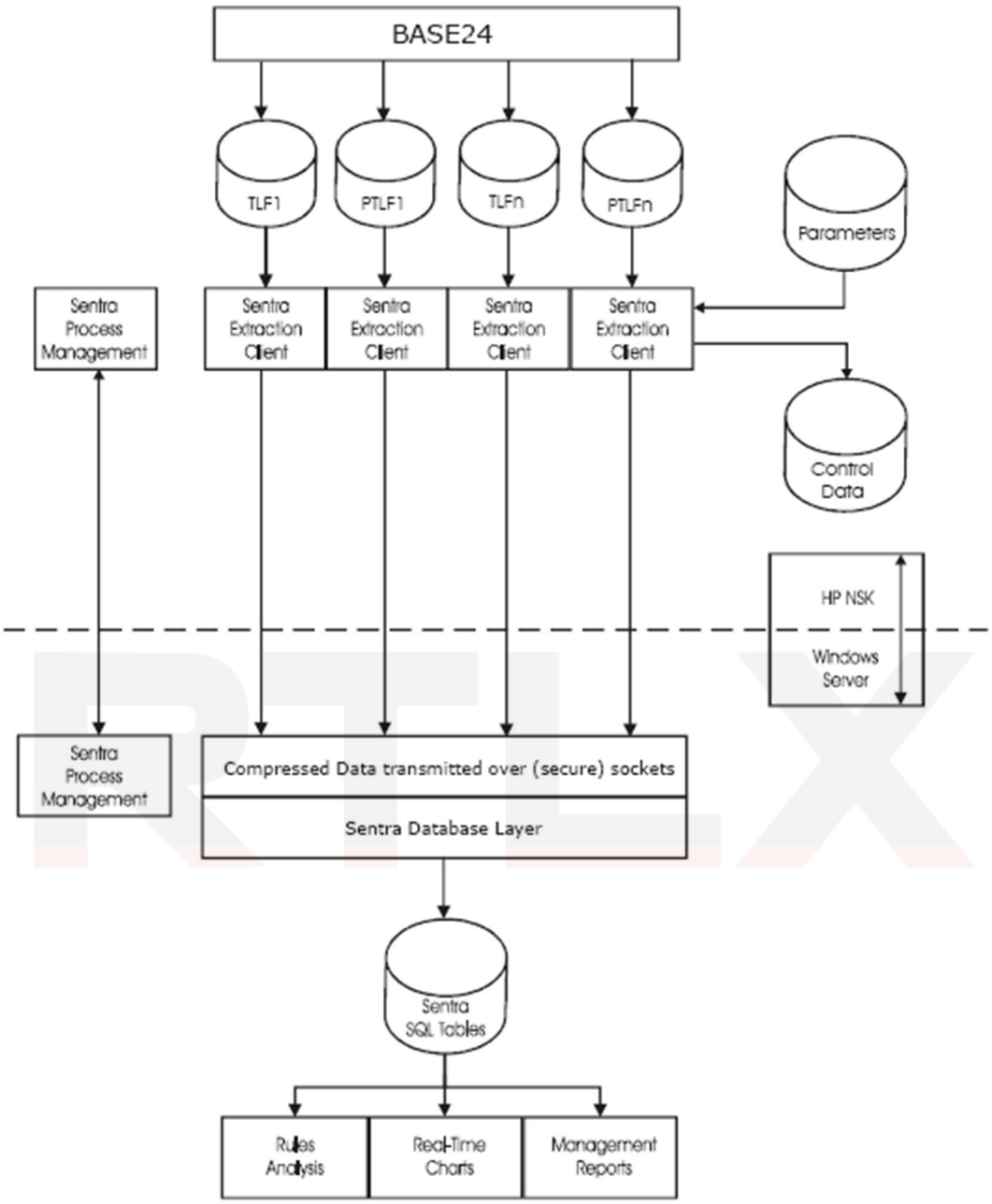
As the central database is being updated by the extraction clients, the information can be processed in real time by a variety of standard Sentra techniques.

Rules can be built to analyse the data and alert to a console, an email address, an enterprise manager or a mobile technology. The alert can be a simple case of checking the level of a value in a table row. More complicated rules based on aggregating data from a number of rows, or tables, or systems, or over time can be built on request as part of a customer installation.

Graphs or charts can be constructed to show the progression of real time metrics and alerts. An example would be transaction throughput. The charts can be linked together to create a drill down approach to identifying root causes. At the highest level, a non-technical Service oriented view, known as the Hypervisor, can be used as the entry point to the lower level charts. This graphical view is available through a browser and it is known as Sentra Console.

Finally, the Sentra database can provide a wealth of intra-day or longer term Management reporting using standard SQL reporting tools such as Microsoft SQL Reporting Services™. An example report would be to trend ATM activity during a calendar month. The product is equipped with standard reports, but users can also produce their own.

5. RTLX Architexture



Installation

Before the extraction clients are installed on the HPE NonStop node, the Sentra Process Management program - Minder - needs to be downloaded and started. The NonStop and Windows Process Management programs will then work together to install, configure, start and stop the extraction clients.

The Minder, which is a NonStop process pair (and can also run inside a Pathway environment), will also monitor the execution of the extraction clients and restart them if they fail.

Parameters

The parameters needed by the extraction client are configured and stored in the Sentra Windows server database and downloaded to the NonStop node where they are held in local parameter files, one per extraction client.

The parameters can be split into the following types:

- Log file placement
- Restart details
- Data Formatting
- Performance

The 'log file placement' parameters detail the location of the TLF and PTLF files. The log file to be tracked can be created directly by the primary BASE24™ application or it can be a copy created by one of the database replication tools available in the NonStop arena. If available, the latter option may alleviate some of the file contention issues placed on the core application.

The log file name will be a generic file name, e.g. $DISC.SUBVOL.TL, and the suffix will map on to a processing date in the format, YYMMDD. The extraction client will recognise when the log file has been rolled and it will close redundant files and automatically track the latest log information held in 'today's' new file.

The 'restart parameters' are used to allow the extraction client to reconnect to the TLF or PTLF file at the last known point of processing. This capability will be used following either a planned or unplanned BASE24™ or Sentra outage. A control file, one per extraction client, will be updated with details of the file name being processed, the timestamp of the last record read, and positioning information for that record. This combination of information will allow the extraction client to identify and read an exact record without the need for a sequential read of the entire file.

The 'data formatting' parameters are used to suppress the transmission of certain parts of the PTLF and TLF data. This will help to reduce network and processing workloads.

The 'performance' parameters are discussed in detail in a subsequent section.

Data Extraction Process

There will be one extraction client installed for every TLF or PTLF file that needs to be tracked. Extraction clients can also be deployed to extract (in Batch mode) from legacy (P)TLF files. As log information is appended to the live files by the BASE24™ application, the information is retrieved by the extraction client and relayed to a co-operative Sentra extraction process on the Windows server.

The 'Performance' section of this paper discusses the options for tuning this part of the application.

The Windows extraction process will parse and format the data before committing it to the Sentra SQL tables.

Note: The majority of the TLF and PTLF record information is of a standard content. However, the record also contains areas where individual user installations can create their own data attributes in a token format. If this information needs to be captured by Sentra then the extraction layer software would need to be updated to include this extra information. Insider is willing to review these requirements on a case by case basis. Currently, 25 BASE24, ATM and POS standard tokens are extracted as part of the RTLX standard product delivery.

The transmission of data is via an IP socket using Insider Technologies FastPipe™ libraries. Data compression and secure socket connections are available at this level of the product. Data fields can be masked and / or encrypted in line with on-site PCI DSS directives, e.g. PAN numbers.

Any loss of connectivity in the client-server connection is protected by the client's ability to reconnect to the Enscribe database at the last known point of processing and to read forward, as described earlier.

Sentra Database

The retention period for the database is set by the Sentra Administrator; data older than 'x' days will be deleted automatically by the Sentra 'database clean' module.

Sentra is equipped with its own database replication facilities; alternatively RAID technology can be used to protect data.

The Sentra Console facilities can be used to construct a top level service view of the BASE24™ network. The underlying charts can show alerts that have been configured in the rules engine, or the progression of a performance metric such as a throughput rate, over time. If the alert has been generated for a specific transaction, e.g. a targeted account number or ATM, then the full transaction image can be displayed.

The content, style and display sequence of the charts are totally at the discretion of the user. Example alerts and charts can be found at the end of this paper.

Users can also build and submit ad-hoc database queries by creating a filter consisting of a selection of database fields and values. This query can be saved for regular submission. Transactions and EMS messages can be securely queried, concurrently across many departments for multiple years.

The RTLX product is also equipped with a standard set of reports, produced using the Microsoft SQL Reporting Services facility. Users can create their own reports using an ODBC compliant application. Reports executed by Sentra can be scheduled to run automatically and the results can be emailed if required.

An example report can be found at the end of this paper.

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6. RTLX Performance

Performance

When Insider Technologies investigated the requirements for the RTLX module, it was evident that irrespective of the graphical views and alerts that could be made available, of equal importance to users was the need to create an extraction client that would not adversely impact the core NonStop BASE24™ application.

This section provides details of the design that was implemented to help achieve this key product objective.

Windows Server Storage

Historically, the architecture of the core Sentra product means that the vast majority of the processing and storage of captured data takes place on the central Windows Server. Conversely, his means that the extraction client and a non-intrusive management process are the only pieces of NonStop software required and this represents the thinnest possible layer of the processing cycle.

The only objective of the BASE24™ extraction client is to read new logging file data and relay it to a co-operative process on the central Sentra server. The parsing and reformatting of the record data nd the subsequent committal of the record to a local SQL table is the responsibility of Windows based Sentra software.

The subsequent analysis of the data for the purposes of rules evaluation, and any database queries to drive real time service views and to provide longer term management reporting, all take place on the Windows Server.

With this split of responsibilities, the impact on the HP NSK system can be minimised.

NonStop Extraction Client Principles

Careful attention has also been paid to the performance of the extraction client itself and this section describes the facilities that have been implemented to allow the tuning of this part of the application.

An ACI BASE24™ customer may have multiple TLF and PTLF files that could be spread across single or multiple NonStop systems. The Sentra configuration and installation tools allow users to specify which files are to be tracked, so that users can be selective about the amount and type of data to be processed. There is no concept of 'auto-discover and track all'.

A further design principle is the ability to install and create an extraction client for each individual TLF and PTLF file. This approach allows users to distribute client processes, splitting the workload and taking advantage of the NonStop parallel processing architecture.

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NonStop Extraction Client Configuration

For each individual extraction client, there are also a range of configuration options that allow further lower level tuning.

Each extraction client can have a process name, CPU location and process priority allocated to it. With this flexibility at their disposal, users can fit the RTLX processing into their existing capacity planning model, and allow processes to execute efficiently in relation to the location of the BASE24™ application and its log files. By default the extraction client will read and process a record as it is added to the end of a log file.

However, there are three further options that will allow users to reduce the file processing when required.

- One or more extraction clients can be closed down from the central Sentra 'Program Control' screen. A subsequent restart will see the client reconnect to the log file at the last point of processing and read forward. This is a manual operation and it is used most often during planned system outages, but it could be used during intensive processing periods if required.

- Users can create a calendar parameter, which will allow the extraction client to sleep at busy times of the day. If this value was set to 12:00-13:30, for example, then the Sentra software would not access the logging files during this 90 minute period, and it would then resume processing from the last known point. A maximum of 5 calendar values per 24 hour period are allowed. This is an automatic feature.

- Finally, users can specify a transaction rate. This equates to the maximum number of records that will be read from the log files per minute. This parameter will allow users to throttle the amount of activity on the log files and to spread the processing curve over a 24 hour period. This is also an automatic feature.

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RTLX Performance

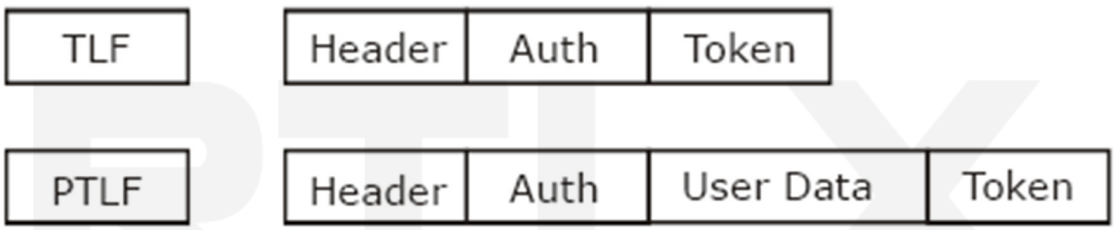
Although one of the major benefits of the Sentra processing is to track the TLF and PTLF files in real time, it is possible to execute the extraction client in batch mode so that it processes the content of a og file once it has been rolled at the end of a processing day.

The final configuration option is to choose the data that will be dispatched to the central d atabase for analysis.

The TLF record can have a maximum of 3 components (header, auth and token data); the PTLF record can have a maximum of 4 components (header, auth, user and token data).

The 'Header' and 'Auth' information is always present and always transmitted. The 'Token' and 'User data' area is not always present, but if it is, the transmission of it to the Sentra central database can be suppressed, reducing the workload further.

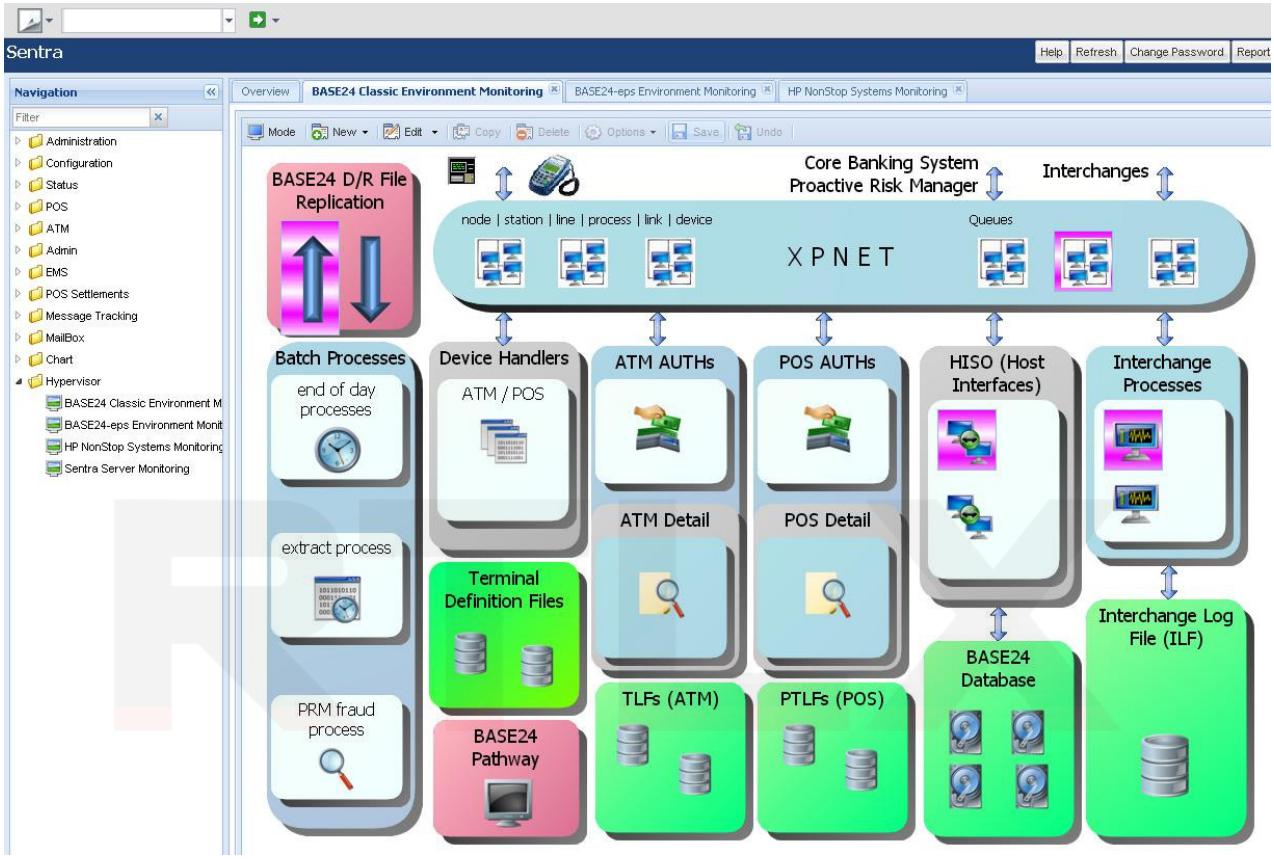
With these options available, users can consider the equation of the required immediacy of the data versus the processing cycles required to obtain it and select the appropriate configuration values.



7. Sample Alerts, Graphs, Reports

Once the data has been transferred to the Sentra Server, it is available for analysis and reporting.

The top level service view is called the Hypervisor and this screen can be built to reflect the structure of your BASE24 related network as shown below. This view is used as an entry point into lower level performance metrics and alerts.



Sample Alerts, Graphs, Reports

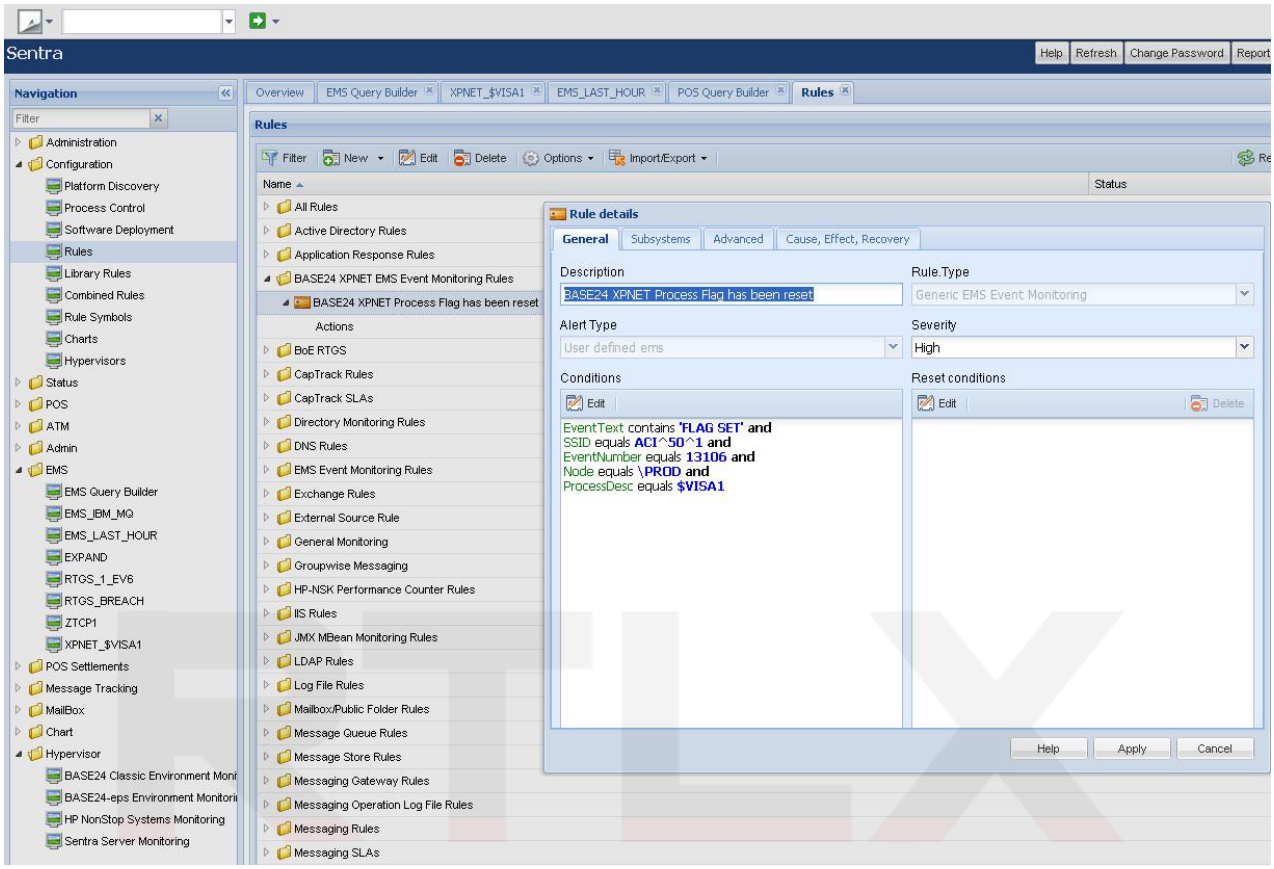
More than one Hypervisor can be configured (Business or System focused) to be accessed by authorised users looking at different areas of the card processing service.

Sample Alerts, Graphs, Reports

From the previous Hypervisor view, users can access real-time charts that display performance metrics or service level alerts. The content of the underlying charts and the sequence in which they are displayed is at the discretion of the user.

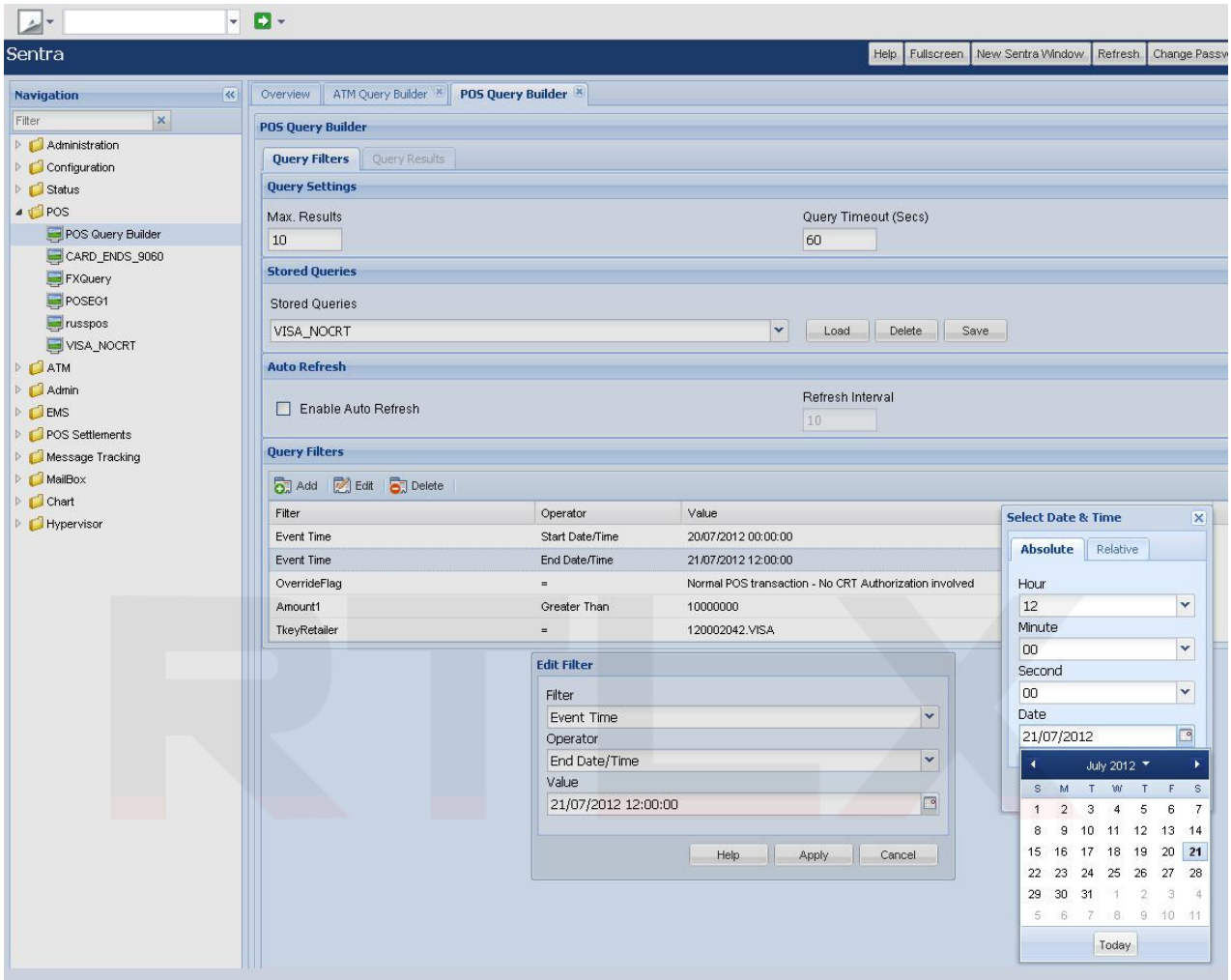
8. RTLX Rules Engine

The Rules engine can trap pre-defined conditions. Associated errors can be escalated to a local console linked into the Hypervisor view as depicted below, an Enterprise Management platform or to a mobile technology such as SMS or Email.



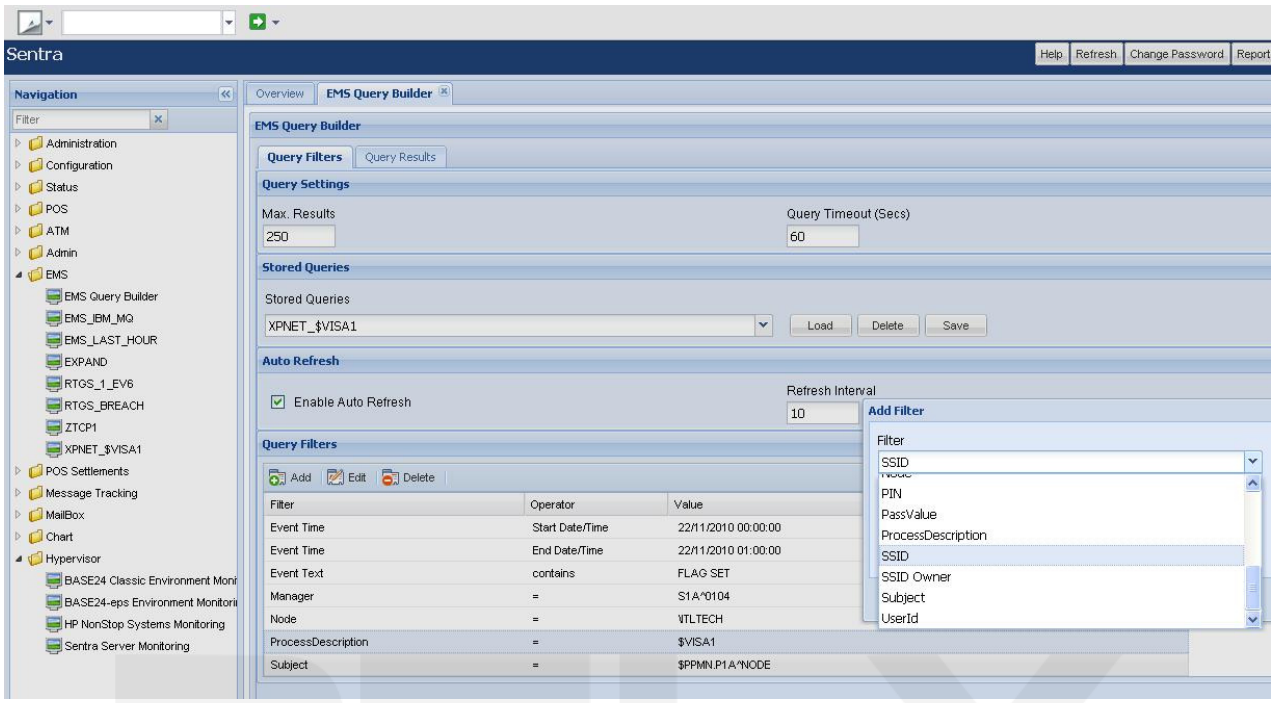
9. RTLX Query Engine

Users can build an ad-hoc query against the collected transaction and / or EMS data, using a combination of data attributes. The query can be saved and resubmitted at a later date if required.



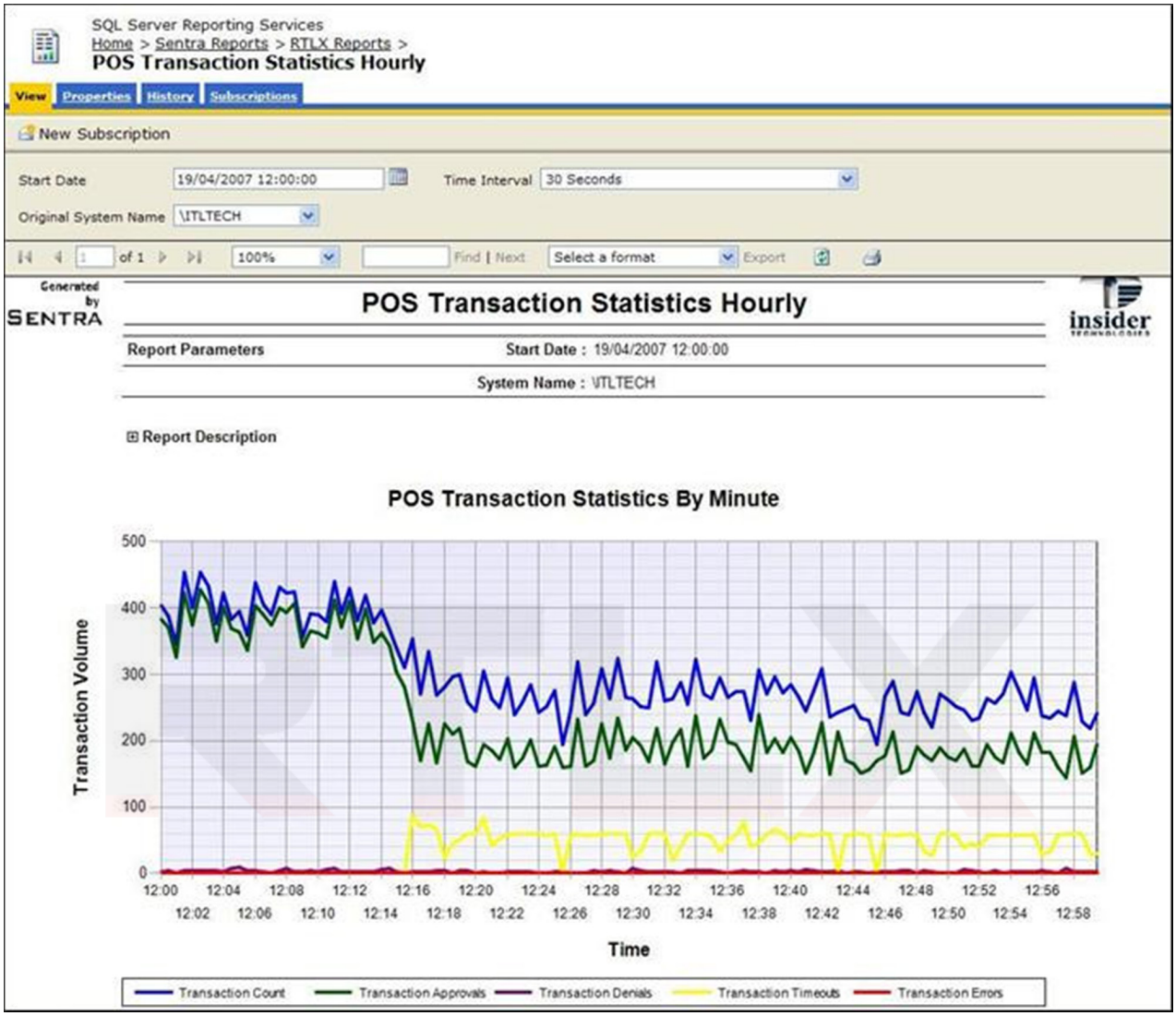
RTLX Query Engine

An example screenshot of NonStop EMS message data being queried for the BASE24™ XPNET subsystem.



10. RTLX Reportds

This graphic shows a snapshot view of POS transaction rates with contention, timeout issues occurring.



Company Information

Insider Technologies is a UK based software and services company operating in the Financial, Government and Messaging markets.

It provides Systems and Service Management, Tracking, Bespoke Software and Information Mediation solutions. A cross section of our customers include Banking and Financial Services, Telecommunications Providers and Government and Military Institutions.

For details about the full range of products and services available from Insider Technologies Limited, please contact us at:

Insider Technologies Limited
2 City Approach
Albert Street
Eccles
Manchester M30 0BL
United Kingdom

Tel: +44 (0)161 876 6606
Fax: +44 (0)161 868 6666

E-mail: **support@insidertech.co.uk**
Website: **https://www.insidertech.co.uk**

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