SmartBundle
Specification

Version 2024

SmartSights
powered by WIN-911 and SyTech

The Complete Notification and Reporting Solution

Contents

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General

The solution shall be a .NET based software package that can be used on Windows 10, Windows 11 and Windows Server 2016, 2019 and 2022. The solution shall also include applications for mobile devices based on iOS 13 and higher and Android 8 and higher.

The solution shall consist of a set of modules which may be deployed across the network or to a single machine to function as a system. Source modules shall provide an interface to SCADA. Notifier modules shall provide an interface with communication modalities. A single Navigation module shall serve as a module registry for the system.

The solution shall monitor events from SCADA/event sources and allow the notification of such events.

Notifiers

The solution shall provide for the compilation and transmission of events and process information to various roles both on premises and remote via email, SMS, voice call, and applications for mobile devices (also via radio/plant-wide/local announcement – see Control Center section below).

The solution shall allow the customization of messages on a per user basis. Further, the solution shall support conditional formatting that can adapt to values of the event; e.g. present information about the actor and ack comment only for alarm events which are acknowledged.

- Email notification shall support rich, HTML formatting through XSL Transform.
- Voice notification shall support rich, SSML formatting through XSL Transform.
- Mobile notification shall allow the configuration of formatting from the mobile device.

The solution shall allow for the notification of current process values and/or alarm states through a basic formattable report.

The solution shall allow for the notification of advanced reports containing current and historical data and rich, graphical formatting (email and Mobile only).

The solution shall allow for bidirectional communication via email, SMS, voice, and mobile applications. Such communication shall allow for the following:

1. Acknowledgement of alarms, secured with password/numeric code authentication, which shall pass identifying information regarding the actor to the SCADA where possible, including the actor's ack comments where possible.
2. On-demand requests for alarms by state, severity, and/or organizational label.
3. On-demand requests for current process values and/or alarm states through a basic formattable report.
4. On-demand requests for advanced reports containing current and historical data and rich, graphical formatting (email and Mobile only)

The solution shall include a Mobile module responsible for notification to mobile devices and capable of interfacing with SmartSights cloud services through an edge gateway application.

The solution shall include a Voice module responsible for notification via voice calls and capable of interfacing with local PBX servers (e.g. Grandstream UCM) or internet-based SIP servers (e.g. SIP.US). The Voice module shall employ both Text-to-Speech (TTS) voice synthesis and voice recognition for hands-free acknowledgement.

The solution shall include an Email module capable of interfacing with local or external mail servers through POP/IMAP for incoming and SMTP for outgoing mail including TLS/SSL. The module shall also support Office365/Outlook OAuth authentication (internet access from Email module host and Workspace host required – see Configuration section below).

The solution shall include an SMS module capable of sending and receiving SMS messages (carrier contract required) via network hardware including:

- Sierra Wireless: Airlink RV50X, RV55, LX40 (LTE only)
- MultiTech: MTR-MNG2, MTR-H5

All Notifier modules shall be deployable across the network to facilitate their connectivity with external services without compromising the security of services on the internal network.

All Notifier modules shall allow the configuration of notification recipients through the definition of a Connection which includes the contact address, duty schedule, acknowledgement permissions, and organizational Role associations.

The solution shall allow Connections to be grouped in a one-to-many relationship with Contacts, which represent the people to whom notification will be sent.

The solution shall allow Connections and Contacts to be associated in a many-to-many relationship with Roles to support Role-based notification logic.

Sources

The solution shall include a set of Source modules, each module responsible for communicating with a particular SCADA or over a particular protocol. All Source modules shall be deployable across the network to facilitate their connectivity with external services without compromising the security of services on the internal network.

Where possible, a Source module shall support Subscriptions to simplify both initial setup and maintenance by allowing criteria to be defined for dynamically routing events. E.g. a Subscription can be created with a filter criteria matching high severity alarms in a particular area; then any matching alarms (including alarms newly defined in SCADA) would be routed to the Notification Policy assigned to the Subscription.

Where possible, a Source module shall support Tag-based configuration for the ability to override attributes of the alarm coming from SCADA. Where possible, a Source module shall support Online Import (network or local machine connection to SCADA/other server) and Offline Import (import from file) of tags for a tag-based configuration to facilitate initial setup.

When both Subscription and Tag-based configurations are supported by a Source module, events shall be routed according to the Tag configuration if defined; otherwise Subscriptions will be evaluated. If no matching Tag or Subscription exists in the configuration, the event shall be ignored.

Where possible, a Source module shall support Watchdogs which will create alarm conditions outside of SCADA upon prolonged absence of either alarm activity or data change on a particular point. Configuring such regular activity to occur on the point within SCADA will then allow the Watchdog to provide indication of communication failures to the WIN-911 side.

Where possible, a Source module shall support Heartbeats which will periodically change a data value on a specified point within SCADA, providing indication of communication failures to the SCADA side.

Where possible, a Source module shall support process variable data reads for Report generation.

Source modules shall allow for monitored alarmable objects to be organized, including into non-hierarchical groupings through association with Labels.

The solution shall include an AVEVA InTouch Source module supporting connectivity with the following versions of that SCADA: 2017 Update 3 SP1 P1, 2017 Update 3 SP1 P2, 2020, 2020 R2, 2020 R2 P1, 2020 R2 SP1, 2020 R2 SP1 P1, 2023, 2023 P01, 2023 P02, 2023 P03, 2023 R2.

The AVEVA InTouch Source module shall support Tag-based configurations with an Offline Import, Subscriptions, Watchdogs, and Heartbeats.

The AVEVA InTouch Source module shall additionally support a Heartbeat Suspension option to curtail the update of the Heartbeat upon partial communication loss.

The solution shall include an AVEVA System Platform Source module supporting connectivity with the following versions of that SCADA: 2017 Update 3 SP1 P1, 2017 Update 3 SP1 P2, 2020, 2020 R2, 2020 R2 P1, 2020 R2 SP1, 2020 R2 SP1 P1, 2023, 2023 P01, 2023 P02, 2023 P03, 2023 R2.

The AVEVA System Platform Source module shall support Subscriptions, Watchdogs, and Heartbeats.

The AVEVA System Platform Source module shall additionally support a Heartbeat Suspension option to curtail the update of the Heartbeat upon partial communication loss.

The solution shall include an AVEVA Edge Source module supporting connectivity with the following versions of that SCADA: 2020, 2020 R2, 2020R2SP1P1, 2020R2SP2, 2023.

The AVEVA Edge Source module shall support Tag-based configurations with an Offline Import, Subscriptions, Watchdogs, and Heartbeats.

The AVEVA Edge Source module shall additionally support a Health Alarm, which informs of reported communication losses.

The solution shall include a GE Digital iFIX Source module supporting connectivity with the following versions of that SCADA: 5.9, 6.0, 6.1, 6.5, 2022, 2023, 2024.

The GE Digital iFIX Source module shall support Tag-based configurations with an Online Import, Subscriptions, Watchdogs, and Heartbeats.

The GE Digital iFIX Source module shall additionally support a Health Alarm, which informs of reported communication losses.

The solution shall include a GE Digital CIMPLICITY Source module supporting connectivity with the following versions of that SCADA: 11, 11.1, 2022, 2023.

The GE Digital CIMPLICITY Source module shall support Tag-based configurations (no import), Subscriptions, and Watchdogs.

The GE Digital CIMPLICITY Source module shall additionally support a Health Alarm, which informs of reported communication losses.

The solution shall include an OPC Alarms Source module supporting connectivity with OPC A&E Classic 1.00,1.01, and 1.10 servers and OPC Unified Architecture 1.03 servers, including those found in SCADA and plant applications not enumerated above.

The OPC Alarms Source module shall support Subscriptions and Watchdogs.

The solution shall include an OPC Data Source module supporting connectivity with OPC DA Classic 1.00,1.01, and 1.10 servers and OPC Unified Architecture 1.03 servers, including those found in SCADA and plant applications not enumerated above.

The OPC Data Source module shall support Tag-based configuration with both Online and Offline imports, Watchdogs, and Heartbeats.

The OPC Data Source module shall allow the creation of alarm conditions on tags during or after import. These alarm conditions may match those of a SCADA tied to the same process variables; a mechanism for synchronizing the state of acknowledgement between WIN-911 and the SCADA is provided assuming the SCADA provides a separate tag for this purpose.

An available OPC UA server plugin for Inductive Automation Ignition shall provide connectivity for the following versions of that SCADA: 8.1.20-33.

Escalation and Scheduling

The solution shall support the many-to-many association between Connections and Schedules, including schedules with arbitrary recurrence e.g. “6 days on, 4 days off”.

The solution shall associate each monitored alarmable object with a Notification Policy allowing for:

- The notification of individual Connections
- The notification of dynamically composed sets of Connections through Roles
- The pushing of Reports to Connections or sets of Connections.
- Arbitrary delays for escalation.
- The automatic acknowledgement of alarms

The solution shall allow the actions of a Notification Policy to be executed a configurable number of times and/or with a configurable frequency. Further, such actions shall also support conditional execution based on the state of the alarm, priority of the alarm event, and/or date/time of occurrence of the event (e.g. for adapting to scheduled maintenance).

The solution shall support notification to be started, stopped, and restarted during the lifetime of the alarm based on state changes or elapsed time, allowing the resumption of notification for alarms which remain active an arbitrary timespan after acknowledgment.

The solution shall allow for the assignment of a “Do Not Notify” or an alternative strategy during maintenance downtime.

The solution shall also allow for each monitored alarmable object to be temporarily Bypassed and thereby ignored by the system during maintenance downtime (see Control Center section below).

The notification software shall log alarm state changes and Notification Policy actions, including notification attempts, notification results, acknowledgement attempts, and acknowledgement results

Notification Configuration

The solution shall include a primary utility for configuration called Workspace, which may be installed on any computer with network access to the Navigation module. Workspace shall allow the configuration of all modules in the system across the network.

Each module shall maintain its own configuration within MS SQL Server 2017-2022 (2022 Express included), though module databases typically may cohabitate on the same instance.

Additional applications shall allow for portions of the system configuration to be edited by operators. Most notably, Operator Workspace allows for the partial editing of Connections and Notification Policies to provide operators with the ability to edit callout order, on-call role, and schedules without access to other aspects of the configuration. The same functionality exists within the Mobile apps.

The solution shall include a Backup and Restore Utility allowing for the configuration of the entire system to be managed across the network for disaster recovery.

Reporting

The software shall be capable of creating reports directly from live values in HMI and OPC servers, historical values from proprietary historians/OPC-HDA servers and any relational database. Creation and modification of the report templates shall not require any changes to the system source code or to the configuration of the real-time and historical data servers.

The software shall be capable of producing analytics directly from live values, from historians, from databases and from text files produced by data recorders. Connectors shall be included to provide easy access to the analytical data for reporting purposes.

The software shall be capable of managing manually entered data such as operator rounds and laboratory results, using forms designed in its design studio or Excel. A centrally located database shall be created in the background without the need of any database programming. Data stored into the database shall be available for reporting along with any other data described above.

The software shall be able to produce reports from an Excel template in two distinct ways, automatically and interactively.

Automatic reports shall be produced periodically or on events by a scheduler that can be run as a Windows service. All the features of Excel such as creating and naming workbooks, creating and updating worksheets, saving worksheets, printing and publishing shall be performed automatically, in the background with resources used when required.

Interactive reports shall be produced on demand by a user specifying report parameters such as dates and tags. Interactive reporting shall take place on the local station, from any place on the network or any mobile device with a web browser, enabling viewing and sharing of Excel reports and forms from multiple locations (clients) with user privilege assigned by an administrator.

Designing Report Templates

The software shall produce reports and manage manual data entry from Excel templates. Ready-to-use templates for reports and forms shall be provided.

The solution has its own template design studio. Microsoft Excel can be used to design templates but is not required. Support for Excel 2010, 2013, 2016, 2019, 2021 and Office 365 (full install) should be available. Excel is not required for producing reports. The software shall provide its own point and click features in the Excel environment so the user can specify their data connections to the process using built-in tag browsing. The software shall take advantage of the new file formats and the fluent user interface technology by providing its own ribbon menu in Excel.

Report templates shall be used to create reports, automatically or on-demand. Form templates shall be used to collect and store manual data to a central database.

The software shall provide tools to simplify the template design process. During the design, the user shall select the real-time and historical tag names from tag browsers provided by the reporting software. The content of the tag browser shall reflect the list of current tags that are configured in the

real-time and historical databases. Database tables that store user data entry shall be created and maintained.

The software shall allow for the importing of existing Excel workbooks developed by the end user and government or regulatory agencies as templates from which to generate reports.

The software shall provide means for the user to configure and test their requirement from the data sources with no programming, scripting or knowledge of specialized languages such as Structured Query Language.

The software shall provide a simulation environment. The simulation environment shall be used to simulate the production of reports to verify that the format, content and links to the data sources are functional and correct. The simulation shall take place before the report templates are deployed for general use. The simulation environment shall also be used for off-line development.

The software shall provide standard charts and templates containing graphical elements such as bar charts, pie charts, scatter plots etc. The graphic elements shall be associated with process values in the report and will automatically update each time the process values in the report change.

The software shall have the capability of handling dynamic ranges i.e., ranges that have a dynamic number of rows and columns. Components, such as and formula, shall be adjusted automatically to reflect the content of a dynamic range.

The software shall provide reports containing automated data management, such as sorting, filtering, color coding etc. In addition, statistical calculations shall be associated with process values in the report and will automatically update each time the process values in the report change.

The software shall be designed to effectively and clearly report historical data. The ordering and the amount of historical data shall be selectable. Configuration of a report by the user shall consist of simply selecting the process inputs that are to appear in the report and their relative placement across the page, title of the page and column heading for each point. The reporting function shall automatically print the accumulated value, and if necessary, scale the value.

Producing Reports

The reporting software shall produce reports from the real-time database (that is continuously updated to reflect the values of process parameters), historical database, relational database and/or manually entered data.

A mixture of real-time, historical, relational and manual data for a single report shall be supported.

Reports generated from the real-time database shall contain either a single snapshot of the process parameters taken once in the reporting period or multiple snapshots taken over a specific reporting period. For reports that contain multiple snapshots, each snapshot shall be entered into the report according to the user's specification e.g., in column or row format. It shall be possible to include derived information, such as the sum, minimum, maximum, or the average, etc., over the rows and columns.

The software shall indicate any value that was not valid during any part of the reporting period.

The software shall place minimal CPU load.

Any completed report shall be exportable to PDF, Web pages, ASCII data (CSV or TXT) so that it is available to other software packages. The report shall be automatically distributed to printers, servers, e-mail and FTP servers.

Reporting Methods

The software shall support three operating methods.

a) Automatically and in the Background.

The software shall provide a Scheduler to automatically initiate the generation of reports, periodically, i.e., hourly, daily, weekly, monthly, end of month, quarterly and yearly or on an event, i.e., a process condition or exception.

Reports shall be generated from pre-configured report templates without any user intervention. The reports shall contain real-time or historical information. In the case of automatic historical reports, the reporting software will calculate the time frame according to the user's specification e.g., the last 24 hours from the current time.

It shall be possible to automatically execute special instructions or calculations in a report. These instructions shall be contained in user defined macros associated with the report.

b) On Demand from Process Displays

The software shall provide adequate tools so that reports can be generated and printed on-demand from an HMI process display. For real-time reports, the user shall select the report and request the generation, e.g., from a pushbutton press. For historical reports, the user shall select a time frame and check off which report template they want to print for that time frame. The software shall also allow a "shell report" to be provided where the user can select dates, times and parameters for the report.

c) Interactively any Node on the network

The software shall provide adequate tools so that reports can be used from any authorized Node (client) on the network or any mobile devices with a web browser. This method of report generation would normally be performed by users that require 'ad hoc' reports.

The software shall provide form templates from any authorized Node (client) on the network.

Storage

For reports that are produced automatically, the software shall immediately store report files to the local or networked hard drive. A report naming convention shall be provided to link a report to a specific date or time of generation. Optionally, the reporting software shall automatically archive reports to a remote storage location.

The software will provide the option to transfer information from worksheets to a real time server. An application of this feature would be a "hand shake" with the process HMI or PLC.

The software will provide the option to transfer information from worksheets to an external relational database.

Report File Protection

The software shall protect reports from unauthorized modifications, while they are in the process of being completed, and after they are complete. Reports shall optionally be created with a built-in password protection, such that only authorized personnel can modify them.

The software will also provide the option to save reports in encrypted PDF format.

Report Printing

The software shall print completed reports to any specified network printer, in any configured page setup. Margins, headers, footers, pagination and orientation (i.e., landscape vs. portrait) shall be configurable for each report.

Report Publishing

The software shall be capable of saving reports as HTML files, for publication on a Web Server.

The software shall provide a web creation utility that will create a web site from reports that have been saved as web pages. The utility will not require any knowledge of HTML programming.

The software shall provide an emailing option that will email reports, either as attachments or embedded HTML pages. The list of recipients can be specified of retrieved from an existing database.

Emailing reports will be performed automatically (in the background) or on-demand.

Control Center

The solution shall provide for the real-time visual display and audible announcement of alarms to windows desktop clients running an instance of the application called Control Center.

Control Center shall provide for sorting and filtering the visible set of alarms.

Control Center shall provide for each monitored alarmable object to be temporarily Bypassed and thereby ignored by the system during maintenance downtime.

Control Center shall support a customizable format for audio enunciation to a local sound device in order to support radio/plant-wide/local announcement.

Control Center shall support viewing historical alarms including the historical logs of Notification Policy execution, notification attempts, acknowledgements, etc.

Control Center shall provide configurable dashboards allowing for the display of real-time and historical process information including calculated ISA 18.2 alarm management metrics and XLReporter report snippets.

Additional

The solution shall include a Status module allowing for the operational status of each module of the system to be displayed and an overall system status to be determined. Configurable tolerances shall be provided such as the number of consecutive notification attempts that must fail before a Notifier module is considered unhealthy.

The solution shall support high availability and may be used in Hot Backup or Redundant SCADA applications. The SCADA software can put the notification software in "Standby" or "Active" mode through script.

The solution shall include a Failover Utility which removes the need for scripting and automatically activates a secondary WIN-911 system when a primary system is determined to be unhealthy by its Status module.

The solution shall include a Workspace Launcher utility providing for an instance of Workspace to be launched on the local computer targeting a remote Navigation module. This can be used to compare and update configurations between a primary and secondary system.

The solution shall include a Security Configuration Utility allowing for machine-to-machine communication trust to be established for secure communications.