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N/A

Version History

Version	Date	Revision Comments
1	March. 15, 2024	Initial Release

Item Version History

Warehouse Catalog #	Asset Suite #	Version	Date
85889	85889	1	3/22/2024
85890	85890	1	3/22/2024
85891	85891	1	3/22/2024
85892	85892	1	3/22/2024

1. Introduction

The Feeder Management System (FMS) is a device management application that provides powerful monitoring and data analytics for LUMA's fleet of 3 phase IntelliRupter PulseClosers. LUMA are deploying approximately 2000 IntelliRupter PulseClosers (Reclosers) that will be connected to the FMS system.

The FMS application must be a browser-based application that collects event and other nonoperational data from

the recloser fleet and must present the data in easy-to-read tables, charts, and graphs. This is critical information is required by LUMA Reliability, Protection, Engineering, Planning and Operational teams to operate and maintain the Distribution Network. The FMS is an essential tool that provides visibility to recloser operations and health to optimize reliability of supply to LUMA customers.

The FMS application must provide data analytics. This information will help LUMA to reduce operational expenses through automating otherwise manual tasks e.g. field visits to reclosers to collect fault event data for analysis, restoration and planning. LUMA will have diverse control sites and require main and backup FMS systems.

2. Special Requirements

FMS systems shall be demonstrated as requested by LUMA Energy. The system will be received at the LUMA's general warehouse (011) at Palo Seco, Puerto Rico. Shipping will include transportation and delivery at the indicated warehouse.

3. Literature

Descriptive and technical literature must be supplied by the vendor at time of bidding. This literature may include, but is not limited to details of material, drawings, documented testing, and instructions for use and installation. Failure to submit documents on time will cause bidder disqualification. If required by LUMA, final drawings shall be submitted by the vendor before the manufacturing and shipping process for approval.

4. Markings

4.1. Packages shall be marked outside with LUMA Energy's purchase order, item number, name and size, manufacturer's name, and lot number.

4.2. Packaging labels and tags shall be waterproof.

5. Compatible with

5.1. For compatible manufacturer and model see Table 1.

5.2. These models are examples of the equipment/material described in this document and do not represent a preference. LUMA will evaluate equally any model not listed here during any acquisition event.

6. Packaging

All equipment/material shall be packaged and marked in such a way as to facilitate handling and protection from damage and that the receiving warehouse can readily identify it and send it, in one complete unit, to a field location without opening crates or boxes to sort items and/or parts.

7. Number Per Package (Logistics)

7.1. Standard Package: One unit per box or as requested by LUMA.

7.2. Supplier shall indicate the logistics at opening bid or as required by LUMA Energy.

8. Acceptance Criteria

8.1. Test required: certified by external qualified laboratories indicating the device was built and tested to the limits set in ANSI/IEEE C37.30.

8.2. Latest applicable codes, standards, and other regulations: ASTM (A153), ANSI/IEEE C37.30, C37.32, C37.34, & C37.37 and UL.

8.3. Demonstration required: system must be fully demonstrated to LUMA.

8.4. Compliance to technical specification requirements.

8.5. Compliance with relevant industry standards and regulations for OT cybersecurity.

8.6. Servers in compliance with LUMA IT/ OT requirements.

9. Technical Specification

FMS Minimum Requirements

9.1. Data Collection

FMS synchronizes with recloser controllers to retrieve settings, and other data, which is stored in a database for later analysis.

9.2. Dashboard

Provides summary system data, with the ability to drill down to specific switching events and device status information. Data is graphed for trending analysis.

Dashboards that are required included are: Trip/Lockout, IntelliTeam ARS, Communications Status, Control Battery Status, Software Versions, and a customizable home dashboard comprised of user selected components from the other dashboards.

A reliability overview dashboard displays charts and tables of minutes saved and interruptions saved by S&C reclosers associated with a feeder or automated teams of reclosers after a lockout or loss of voltage event. These savings are approximations based on LUMA-defined preferences.

The reliability calculations must support the following:

a. IntelliRupters on a radial feeder.

b. Faults and Loss of Source events managed by IntelliTeam and reclosers in a radial feeder.

c. Up to 30 seconds of misaligned device clocks

d. Multiple concurrent events on the same feeder

e. Minutes and interruptions saved on teams or reclosers upstream from the fault.

f. Minutes saved on teams restored via an alternate source Minutes saved on teams not restored because the time to restore power is reduced because line crews can start resolving the issue sooner.

g. Power outages that last up to 5 days

9.3. Alarms/Alerts

Includes device alarms, warnings, and errors, which are displayed as counts, historical lists, or recent events.

This information is used by LUMA to find system anomalies, for investigation and resolution before they cause operational issues. FMS must receive alerts from devices outside of the configured data retrieval times.

9.4. Reports

The FMS system must provide system reports that can be scheduled or run on-demand. These reports will be downloaded in multiple data formats or sent to a LUMA users via e-mail.

Reports that are required include: Device Alert Report, Device Status Report, Team Not Ready Report, Daily Lockout and Abnormal Switch Status Report, and a Disturbance Summary Report.

9.5. Device Filtering

Must provide details specific to a single device such as settings, metering, diagnostics, calibration, and IntelliTeam status.

9.6. Device Setting Management

Must have ability to push and tracks settings changes to devices. This feature must allow multiple settings changes over a group of like devices associated with an automated switching system or a redial feeder. Device settings must be captured and recorded so that current state can be displayed and tracking of changes can be analyzed.

9.7. Device file retrieval

Provides remote download of the compact flash contents of a single device or group of devices. This is required for the collection of waveform captures and event files for analysis of system events.

9.8. Custom Alerts & Actions

Allows LUMA to define Alert conditions with if/then statements that are tested against FMS data. These alerts must tie to customer-defined actions such as an email or device file retrieval, which are triggered by the alert conditions.

9.9. Sequence of Events

Allows you to analyze an event across reclosers. FMS must display relevant event file data in consolidated time series. Certain event types must have to ability be categorized.

9.10. Firmware Upgrade Module

This feature will allow LUMA staff to upgrade or downgrade the firmware for one or more devices. Multiple workflows must be supported from manual to fully automated based on a schedule along with options for error handling.

9.11. Device Communication

The FMS systems must manage device communication and include the following.

a. User-configurable data-collection intervals

The frequency at which FMS contacts a device for various types of data that can be adjusted from seconds to days based on needs and the bandwidth available.

b. Staged Communications

FMS must have the ability to communicate with only a single device at a time on each feeder. Communicating with random devices could cause bottlenecks at the head-end unit if multiple devices on a feeder are responding to requests concurrently.

c. Adaptive Communications

FMS must communicate with a set number of devices concurrently for collecting various types of data, and it adapts to network-response time. If responses are delayed, then FMS will not schedule new data-collection requests until the previous requests are completed.

10. FMS Server/Appliance and environment

The FMS application must run in a Virtual Machine (VM) environment on VMware. The necessary VM environment will be provided by LUMA. The FMS vendor must provide a VM installation package.

(e.g., OVA file) to install all necessary OS and application components. The FMS vendor will provide servers to the minimum requirements for the VM environments required.

10.1. FMS server functions

IntelliTeam FMS is delivered as an OVA file that is imported into an enterprise virtual environment.

The FMS server runs on a Linux virtual guest machine and supports the functionality needed for the IntelliTeam FMS application, which includes the following:

a. User and administrator browser sessions via HTTP(s)
b. If available, IntelliTeam® Designer integration to import and configure devices.
c. Storage for system data, statistics, and measurements.
d. Communications with field devices using the DNP3 protocol.
e. Email (SMTP) to send reports and system-level call- home alerts.

10.2. Bundled Third-Party Software

The following third-party software must be included as part of the

IntelliTeam FMS virtual appliance:

a. Oracle/Red Hat® Linux – IntelliTeam FMS Linux operating system
b. Embedded Oracle Database – 12c database
c. Embedded Oracle WebLogic – 12c application server

10.3. LUMA Provided Third-Party Software

The following third-party software must be included as part of the

IntelliTeam FMS virtual appliance:

a. Oracle/Red Hat® Linux – IntelliTeam FMS Linux operating system
b. Embedded Oracle Database – 12c database
c. Embedded Oracle WebLogic – 12c application server

10.4. LUMA Provided Third-Party Software

Deploying to an enterprise virtual environment must provide and use the following third-party software to deploy and run the IntelliTeam FMS virtual appliance:

a. VMWare ESXi – Versions >= 4.2 and < 6.5 are supported

10.5. Minimum VM Specifications

The vendor must review and supply final hardware- and share purchase decisions with LUMA for S&C software deployments to ensure the hardware is fully supported.

10.6. FMS VM Guest Server

a. 4 CPU Cores

b. 16-gygabyte (GB) RAM

c. Minimum of storage for up to 2000 devices on SAN with capability to expand by 50 GB for every additional 100 devices (i.e., 300 devices = 200 GB) (Note that the IntelliTeam FMS virtual appliance supports resizing the disk without taking the application offline.)

d. Minimum disk I/O at VM guest level—Should be able to sustain 80 MBs average disk reads.

10.7. Redundancy

The FMS systems will be deployed in diverse sites as depicted in figure 1. The primary site will have an active primary FMS system running and gathering data from the field devices. LUMA will be responsible at the primary site to backup it's FMS databased daily to the diverse or secondary site. Failure of the primary site will allow LUMA personnel to update the secondary FMS with the backed up primary database and activate the secondary system.

11. Inspection

The acceptance of any software and hardware shall in no way relieve the vendor from his responsibility to meet all the requirements of this specification, and it would not prevent subsequent rejection if such software were found later to be defective.

12. Proposal Information

12.1. Submitted proposals must include:

a. Technical functional description.

b. Table of compliance completed by the bidder with reference (see Appendix)

c. Server guest hardware and software information for the FMS systems.

d. Suggested deployment procedure.

a. **Table 1: Warehouse and Asset Suite Identification Number**

Item	Warehouse Catalog #	Asset Suite #	Compatible Manufacturer & Model
IntelliRupter FMS license fee (2000)	85889	85889	S&C FMS Lic
FMS Server / Appliance	85890	85890	S&C FMS Server
Installation Support Services	85891	85891	S&C FMS Inst & Sup
Annual Software Maintenance	85892	85892	S&C FMS Maint. Soft.

— End of Specification —

Appendix

Table of compliance

Line	Criteria	Description	Pass/Fail (P / F)	Comments
1	FMS Rquirement	FMS Requirement		
2		a. IntelliRupters on a radial feeder.		
3		b. Faults and Loss of Source events managed by IntelliTeam and reclosers in a radial feeder.		
4		c. Up to 30 seconds of misaligned device clocks		
5		d. Multiple concurrent events on the same feeder		
6		e. Minutes and interruptions saved on teams or reclosers upstream from the fault. f. Minutes saved on teams restored via an alternate source Minutes saved on teams not restored because the time to restore power is reduced because line crews can start resolving the issue sooner.		
7				
8		g. Power outages that last up to 5 days		
9	Server Appliance	FMS Server/Appliance and environment		
10		a.User and administrator browser sessions via HTTP(s)		
11		b.If available, IntelliTeam® Designer integration to import and configure devices.		
12		c.Storage for system data, statistics, and measurements.		
13		d.Communications with field devices using the DNP3 protocol.		
14		e.Email (SMTP) to send reports and system-level call- home alerts.		
15		a.Oracle/Red Hat® Linux – IntelliTeam FMS Linux operating system		
16		b.Embedded Oracle Database – 12c database		
17		c.Embedded Oracle WebLogic – 12c application server		
18	VM Spec	VM Specifications		
19				
20		a.4 CPU Cores		
21		b.16-gygabyte (GB) RAM		
22		c.Minimum of storage for up to 2000 devices on SAN with capability to expand by 50 GB for every additional 100 devices (i.e., 300 devices = 200 GB) (Note that the IntelliTeam FMS virtual appliance supports resizing the disk without taking the application offline.)		
23		d.Minimum disk I/O at VM guest level—Should be able to sustain 80 MBs average disk reads		

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