SYSTEM AND METHOD FOR PRE-PROCESSING MESSAGES

Field Of Invention

The present invention generally relates to a system and a method for pre-processing messages from external systems, such as servers.

Background

A plant control system manages and controls plant assets including field devices, rotating equipment and reciprocating equipment arranged in a plant. The plant control system has a device inventory for storing information of the plant assets, provides diagnosis for the plant assets by status and message, and provides additional information for the device inventory, such as information on schedule, memo and document.

The plant control system comprises two features for diagnosing the plant assets. The first feature is basic diagnosis in which the plant control system determines the status of a field device for control modules with pre-defined status decision logic, and the second feature is advanced diagnosis in which a user can develop the status decision logic for the plant control system to execute.

Commonly, field devices from different vendors are used in a plant. The field devices from the different vendors usually use different systems to provide the status of each field device. The plant control system supports integration with the different systems, which are considered external systems. This is to support external diagnoses of the field devices from the different vendors.

Currently, external systems are integrated into the plant control system by hard coding their respective pre-processing logic in a message pre-processing module of the plant control system. In the event that a message generated from one of the external systems is received by the message pre-processing module, the message pre-processing module executes the hard coded pre-processing logic that corresponds to the external system which generated the message.

However, it is disadvantageous to integrate by hard coding the pre-processing logic of an external system to the message pre-processing module. Each time a new external system needs to be integrated into the plant control system, the message pre-processing module needs to be manually modified to include the pre-processing logic for the new external system. Specifically, the pre-processing logic for the new external system needs to be hard coded in the message pre-processing module for integration of the new external system into the plant control system.

As the pre-processing logic is hard coded in the message pre-processing module, the pre-processing logic cannot be easily modified, thus, causing integration of external systems to be cumbersome. Further, after any modification is carried out on the message pre-processing module, the modified module has to be re-compiled before being executed in the plant control system, and human resources and downtime are required to implement each modification in the plant control system.

Therefore, there is a need for a system and a method for integrating external systems into a plant control system for pre-processing messages generated from the external systems to provide external diagnoses.

Summary

The present embodiment of the invention disclosed herein provides a system and a method for integrating external systems into a plant control system for pre-processing messages generated from the external systems to provide external diagnoses. By providing pre-processing definition files defining pre-processing logics specific to the external systems, the pre-processing logics do not need to be hard coded in the system for integration of the external systems into the plant control system. As such, the pre-processing logic can be easily modified without having to modify the system, which results in integration of external systems to be less cumbersome.

In accordance with a first aspect of the invention, there is disclosed a system for pre-processing messages from an external system. The system comprises at least one pre-processing definition file defining a pre-processing logic specific to the external system, a message pre-processing module for retrieving the at least one pre-processing definition file and a message acquisition module for acquiring at least one

message from the external system. The message acquisition module is connected to the message pre-processing module, in which the message acquisition module communicates with the message pre-processing module for pre-processing the acquired at least one message by correlating the acquired at least one message to the retrieved at least one pre-processing definition file specific to the external system.

In accordance with a second aspect of the invention, there is disclosed a system for pre-processing messages from at least two external systems. The system comprises first and second pre-processing definition files defining first and second pre-processing logics specific to first and second external systems, a message pre-processing module for retrieving the first and second pre-processing definition files, and a message acquisition module for acquiring first and second messages from the first and second external systems. The message acquisition module is connected to the message pre-processing module, in which the message acquisition module communicates with the message pre-processing module for pre-processing the acquired first and second messages by correlating the acquired first message to the retrieved first pre-processing definition file specific to the first external system and correlating the acquired second message to the retrieved second pre-processing definition file specific to the second external system.

In accordance with a third aspect of the invention, there is disclosed a system for pre-processing messages from an external system integrated into a plant control system. The system comprises at least one pre-processing definition file defining a pre-processing logic specific to the external system, a message pre-processing module for retrieving the at least one pre-processing definition file, and a message acquisition module for acquiring at least one message from the external system. The message acquisition module is connected to the message pre-processing module, in which the message acquisition module communicates with the message pre-processing module for pre-processing the acquired at least one message by correlating the acquired at least one message to the retrieved at least one pre-processing definition file specific to the external system.

In accordance with a fourth aspect of the invention, there is disclosed a method for pre-processing messages. The method comprises retrieving at least one pre-

processing definition file, in which the at least one pre-processing definition file defines a pre-processing logic specific to an external system. The method also comprises acquiring at least one message from the external system, in which the acquired at least one message is being pre-processed by correlating the acquired at least one message to the retrieved at least one pre-processing definition file specific to the external system.

In accordance with a fifth aspect of the invention, there is disclosed a method for pre-processing messages. The method comprises retrieving at least one pre-processing definition file by means of a message pre-processing module, in which the at least one pre-processing definition file defines a pre-processing logic specific to an external system. The method also comprises acquiring at least one message from the external system by means of a message acquisition module. The message acquisition module is connected to the message pre-processing module, in which the message acquisition module communicates with the message pre-processing module for pre-processing the acquired at least one message by correlating the acquired at least one message to the retrieved at least one pre-processing definition file specific to the external system.

Brief Description Of The Drawings

An embodiment of the invention is described hereinafter with reference to the following drawings, in which:

FIG. 1 shows a system for pre-processing messages from a plurality of external systems according to an embodiment of the invention;

FIG. 2 shows a process flow diagram of the system of FIG. 1; and

FIG. 3 shows the system of FIG. 1 integrated into a plant control system.

Detailed Description

A system and a method for integrating external systems into a plant control system for pre-processing messages generated from the external systems to provide external diagnoses are described hereinafter for addressing the foregoing disadvantage.

An embodiment of the invention is described in the detailed description provided hereinafter is in accordance with Fig. 1 to Fig. 3 of the drawings, in which like elements are numbered with like reference numerals.

With reference to Fig. 1 and Fig. 2, a system 20 and a method 100 for pre-processing messages 22 according to an embodiment of the invention are described. The system 20 comprises pre-processing definition files 24, 26, 28, a message pre-processing module 30 and a message acquisition module 32, in which the message pre-processing module 30 is connected to the message acquisition module 32.

The pre-processing definition files 24, 26, 28 are specific to external systems 34, 36, 38, respectively, and each of the pre-processing definition files 24, 26, 28 defines a pre-processing logic (not shown) therein. Specifically, the pre-processing definition file 24 defines a pre-processing logic that is specific to the external system 34; the pre-processing definition file 26 defines a pre-processing logic that is specific to the external system 36; and the pre-processing definition file 28 defines a pre-processing logic that is specific to the external system 38. Examples of the external systems 34, 36, 38 are servers. The servers include an open connectivity via open standards ("OPC") server that provides a specification for managing current messages, such as an alarms and events specification. The OPC server which provides the alarms and events specification, provides alarm and event notifications on demand. The servers also include an OPC server that provides a specification for accessing historical messages, such as a historical data access specification. The OPC server which provides the historical data access specification provides access to data that has already been stored.

In the method 100 for pre-processing the messages 22 as shown in Fig. 2, in a step 110, the pre-processing definition files 24, 26, 28 are retrieved by the message pre-processing module 30. Each of the pre-processing definition files 24, 26, 28 is in a form of a text-based language, such as Extensible Markup Language (XML) and Comma Separated Value (CSV) language.

Next in a step 112, the message acquisition module 32 connects and subscribes to the external systems 34, 36, 38. Following the step 112, the message acquisition module 32 acquires the messages 22 generated from the external systems 34, 36, 38 in a step 114. The messages 22 include alarm messages and event messages.

Next in a step 116, the message pre-processing module 30 determines whether any one of the pre-processing definition files 24, 26, 28 correlate with the messages 22. The message pre-processing module 30 receives the messages 22 by means of communication with the message acquisition module 32. In the event where the messages 22 correlate with one of the pre-processing definition files 24, 26, 28, the messages 22 will be pre-processed accordingly based on the one of the pre-processing definition files 24, 26, 28 in a step 118. In the event where the messages 22 do not correlate with one of the pre-processing definition files 24, 26, 28, the messages 22 will not be pre-processed.

The system 20 enables a plant control system 40 to integrate the external systems 34, 36, 38 into the plant control system 40 as shown in Fig. 3. The plant control system 40 manages and controls plant assets, such as field devices that are arranged in a plant (not shown). The messages 22 acquired and pre-processed by the system 20 provide external diagnoses, which are integrated into the plant control system 40. With the external diagnoses, the plant control system 40 is able to provide overall, detailed and comprehensive diagnostic information for plant assets by showing the integrated external diagnoses to users with a single window (not shown).

With the system 20, for each addition or change in the external systems, the only modification required is to add or change the pre-processing definition files. There is no need to modify the message pre-processing module 30 by hard coding the pre-processing logic therein. As such, there is no need for re-compilation of the message pre-processing module 30, and there is minimal downtime and less human resources required for any modification required.

In the foregoing manner, a system and a method for integrating external systems into a plant control system for pre-processing messages generated from the external systems to provide external diagnosis are described according to one embodiment of

the invention for addressing the foregoing disadvantage. Although only one embodiment of the invention is disclosed, the invention is not to be limited to specific forms or arrangements of parts so described and it will be apparent to one skilled in the art in view of this disclosure that numerous changes and/or modification can be made without departing from the scope and spirit of the invention.

Claims

1. A system for pre-processing messages from an external system comprising:

at least one pre-processing definition file defining a pre-processing logic specific to the external system;

a message pre-processing module for retrieving the at least one pre-processing definition file; and

a message acquisition module for acquiring at least one message from the external system, the message acquisition module connected to the message pre-processing module,

wherein the message acquisition module communicates with the message pre-processing module for pre-processing the acquired at least one message by correlating the acquired at least one message to the retrieved at least one pre-processing definition file specific to the external system.

2. The system for pre-processing messages as in claim 1, wherein the at least one pre-processing definition file is in a form of a text-based language.

3. The system for pre-processing messages as in claim 2, wherein the text-based language is one of extensible markup language and comma separated value language.

4. The system for pre-processing messages as in claim 1, wherein the external system is a server.

5. The system for pre-processing messages as in claim 4, wherein the server is an open connectivity via open standards ("OPC") server.

6. The system for pre-processing messages as in claim 5, wherein the OPC server provides a specification for managing current messages.

7. The system for pre-processing messages as in claim 5, wherein the OPC server provides a specification for accessing historical messages.

8. A system for pre-processing messages from at least two external systems comprising:

first and second pre-processing definition files defining first and second pre-processing logics specific to first and second external systems;

a message pre-processing module for retrieving the first and second pre-processing definition files; and

a message acquisition module for acquiring first and second messages from the first and second external systems, the message acquisition module connected to the message pre-processing module,

wherein the message acquisition module communicates with the message pre-processing module for pre-processing the acquired first and second messages by correlating the acquired first message to the retrieved first pre-processing definition file specific to the first external system and correlating the acquired second message to the retrieved second pre-processing definition file specific to the second external system.

9. A system for pre-processing messages from an external system integrated into a plant control system comprising:

at least one pre-processing definition file defining a pre-processing logic specific to the external system;

a message pre-processing module for retrieving the at least one pre-processing definition file; and

a message acquisition module for acquiring at least one message from the external system, the message acquisition module connected to the message pre-processing module,

wherein the message acquisition module communicates with the message pre-processing module for pre-processing the acquired at least one message by correlating the acquired at least one message to the retrieved at least one pre-processing definition file specific to the external system.

10. A method for pre-processing messages comprising the steps of:

retrieving at least one pre-processing definition file, the at least one pre-processing definition file defining a pre-processing logic specific to an external system; and

acquiring at least one message from the external system,

wherein the acquired at least one message is being pre-processed by correlating the acquired at least one message to the retrieved at least one pre-processing definition file specific to the external system.

11. A method for pre-processing messages comprising the steps of:

retrieving at least one pre-processing definition file by means of a message pre-processing module, the at least one pre-processing definition file defining a pre-processing logic specific to an external system; and

acquiring at least one message from the external system by means of a message acquisition module, the message acquisition module connected to the message pre-processing module,

wherein the message acquisition module communicates with the message pre-processing module for pre-processing the acquired at least one message by correlating the acquired at least one message to the retrieved at least one pre-processing definition file specific to the external system.

12. The method for pre-processing messages as in claim 11, wherein the at least one pre-processing definition file is in a form of a text-based language.

13. The method for pre-processing messages as in claim 12, wherein the text-based language is one of an extensible markup language and a comma separated value language.

14. The method for pre-processing messages as in claim 11, wherein the external system is a server.

15. The method for pre-processing messages as in claim 14, wherein the server is an open connectivity via open standards ("OPC") server.

16. The method for pre-processing messages as in claim 15, wherein the OPC server provides a specification for managing current messages.

17. The method for pre-processing messages as in claim 15, wherein the OPC server provides a specification for accessing historical messages.