Data Management Component for Virtual Factories Systems

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Data Management Component

Objectives

The vf-OS applications will consume and produce tremendous amounts of data

Objectives:

• Handle all vf-OS communication;
• Data storage capable of storing all vf-OS data;
• Harmonise vf-OS data;
• Analytic methods for enrichment, analysis and data interpretation.
Virtual Factory Data and Connect- Data Management Component (DMC)
**Data Infrastructure Middleware** relies on Message Oriented approach based on RabbitMQ using the AMQP protocol. Develop the message and publish/subscribe components.
Communication steps:
1) Producer sends one message to one exchange and to one or more queues (with routingKeys);
2) Broker redirects the message to designed exchange;
3) The queues that are linked to the routingKeys will receive the message;
4) Consumers that are listening to specific queue get the message.
Data Storage has to provide storing services for heterogeneous data from heterogeneous sources.

vf-OS usage:

- Relational data - relational data from vApps as well as other relational information of the vf-OS Platform itself;
- Time Series data - to allow storage and querying time series data. E.g: Sensor data;
- Document-Oriented data - to store, retrieve and manage document-oriented information, also known as semi-structured data;
- RDF data - to store and query subject-predicate-object triples to be used in the conceptualization taxonomy (Data Harmonization module).
Data Harmonisation has to provide taxonomy connections for vf-OS data, through the detection of non-linear and non-trivial patterns within the data.

**Design time:**
1. Receive vf-OS data
2. Data arrangement
3. Link the data concepts
4. Store data concept connection for future use

**Run:**
1. Use pre-stored data relations to link vApps’ data
Data Analytics has to provide analytical processing for sensor data.

Types of Data to be considered:
- Real-time data (alarms, critical actions);
- Historical Data (stored data for a certain period).

Types of algorithms to be used:
- Machine learning algorithms;
- Traditional data-mining algorithms (e.g. decision trees and rules, k-means, association rules).

In development
Conclusions

- The Data Management Component, to be develop during the vf-OS’ WP5, intends to manage data flows for vf-OS platforms.

**Main Goals**

- Scalability
- Adaptability

**Message Oriented Middleware**
- Data communication management

**Data Harmonisation and Data Analytics**
- Transforming and representing data

**Data Storage**
- Store vf-OS data
Questions?

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