

Implementation Aspects of Agent Substitution Mechanism in RedSib

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Abstract

Internet of Things (IoT) [1] solutions consist in services operating on the data originated from multiple devices interconnected with each other. Limited power supply and unstable wireless communication channels make reliability a key factor for such solutions, because a device may lose connection during its operation and compromise dependant elements.

Dataflow network [2] is a relevant computational model for IoT solutions. In [3] we proposed an approach for implementation of dataflow networks on top of Smart-M3 platform – open-source platform for smart space applications development [4].

To improve sustainability of solutions based on dataflow networks we developed a mechanism that allows to temporarily replace the disconnected agent by substitute one till the moment when the original agent reconnects to the network. At the moment, we integrated the mechanism into the RedSib implementation [5] of Smart-M3 Semantic Information Broker.

During development we have made several implementations decisions. The first decision was using of the existing triple-based exchange to support new operation types, such as dataflow network agent registration, substitution and disconnection (an alternative was to extend the Smart Space Access Protocol). The second decision was to support the dataflow network in actual state by processing dataflow network events for all agents inside one subscription handler instead of the handler-per-agent strategy.

Index Terms: Substitution mechanism, Robust dataflow network, RedSib, Smart-M3.

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