EU RGPD, IoT, Privacy and DEBS: Integrating Usage Control in a distributed event-based system

Context and problematic

- By 2020, the number of connected devices will exceed 25 billion.
- The main challenge for IoT is and will remain data security issues.
- GDPR requires the users consent for a well-motivated purpose to process their data.
- DEBS can manage the high amount of data generated by IoT devices but still not adapted to GDPR requirements.

Objectives

- Integrate a usage control system in the muDEBS middleware tailored for the IoT and developed at Télécom SudParis.

Approach

- Publisher: the sender/producer of the messages.
- Subscriber: the receiver/consumer of the messages.
- DHT: the Distributed Hash Table that stores the information for usage control system.
- Broker: the router of the messages.
- Access Broker: the broker that is directly connected to a publisher/subscriber.
- Usage Control: the system that decides about permission grant or denial for message processing.

Solution

- Usage of Apache Cassandra to implement the DHT.
- Usage Control System integration by altering the following system functionalities:
  - Advertise: before publishing, the producer indicates the data it is willing to send and its privacy requirements.
  - Publish: when the publisher sends a message, the brokers determine the subscribers interested in this message by using the Usage Control System.
  - Subscribe: the consumer should subscribe to receive a message. It specifies the data it is willing to accept and its ABAC information, used by PDP to decide about its permissions.

Technologies

Java
muDEBS
WSO2
Balana
cassandra
git

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