The role of reconfigurable, policy-based middleware in supporting the Internet of Things

Jatinder Singh
Computer Laboratory
University of Cambridge

ABSTRACT

Information sharing underpins the Internet of Things (IoT). The broad vision is to have *'things'* (system components) *interact* (exchange information), when and where appropriate, to meet user goals. Interactions require management, not only because orchestrating 'things' realises functionality, but also because data may be personal or sensitive, actuating commands can impact the physical environment, and 'things' will have different owners and managers.

Currently, 'things' tend to be completely open with limited control mechanisms and/or operate within a particular application or technological silo [2]. The wider IoT vision requires a management regime that operates outside of a 'thing's' application logic, capable of operating across 'things'.

We argue that middleware facilitating dynamic, context-aware policy-based control is crucial in realising this vision.

Middleware, by managing the communication specifics, is an appropriate place for mediating interactions. By providing reconfiguration capabilities [1], and assuming some degree of openness and standardisation, it means that policy (however specified) external to the 'things', can: a) directly initiate, cease or manage an interaction, and b) define the circumstances allowing a possible interaction, e.g. by changing privileges or service visibility.

The approach allows user/application-level concerns to drive the IoT. 'Things' can be re/used, when and where appropriate, perhaps in ways not envisaged by system designers. This enables new functional possibilities, facilitating personalisation and customisation. Policy is abstracted and can operate across 'things', rather than being fragmented within different systems with various control capabilities. This abstraction also simplifies application development and deployment, as the operating and customisation aspects are effectively delegated.

BODY

IoT requires middleware enabling the interactions of 'things' to be dynamically managed and regulated according to user/application policy.

REFERENCES

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Volume 3 of Tiny Transactions on Computer Science