FAKULTÄT FÜR !NFORMATIK
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Contract Definition and Governance for IoT

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Problem Statement

IoT contracts handle communication, access, and resource utilization rights to ensure inter-working of IoT devices and services.

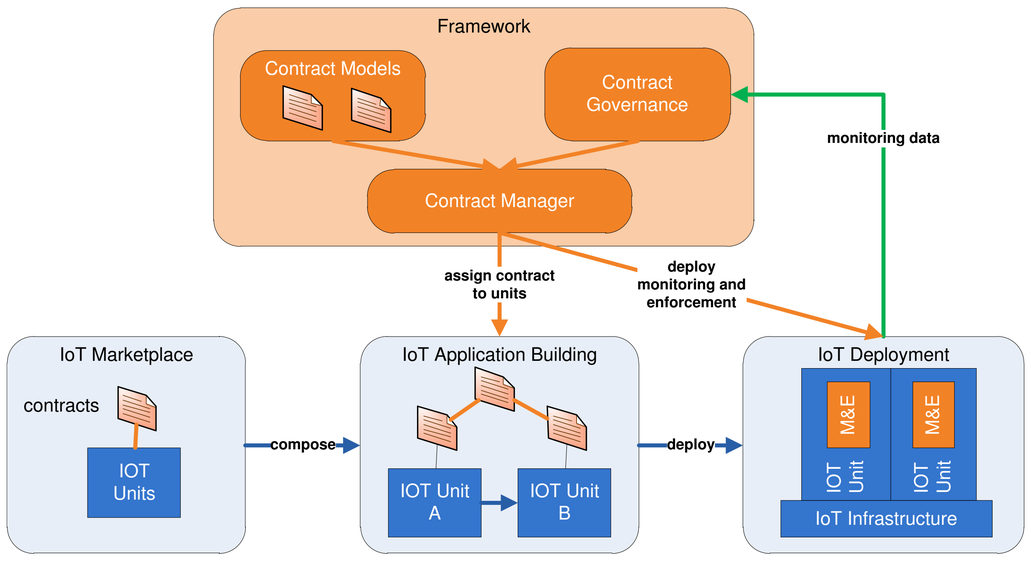
Research objective is to:

- Identify a flexible modeling approach for machine readable and executable contracts.
- Define monitoring functions to collect data for evaluation of contract terms.
- Provide means for enforcement of contract terms to identify contract violations and record them in a trusted manner.

Overview

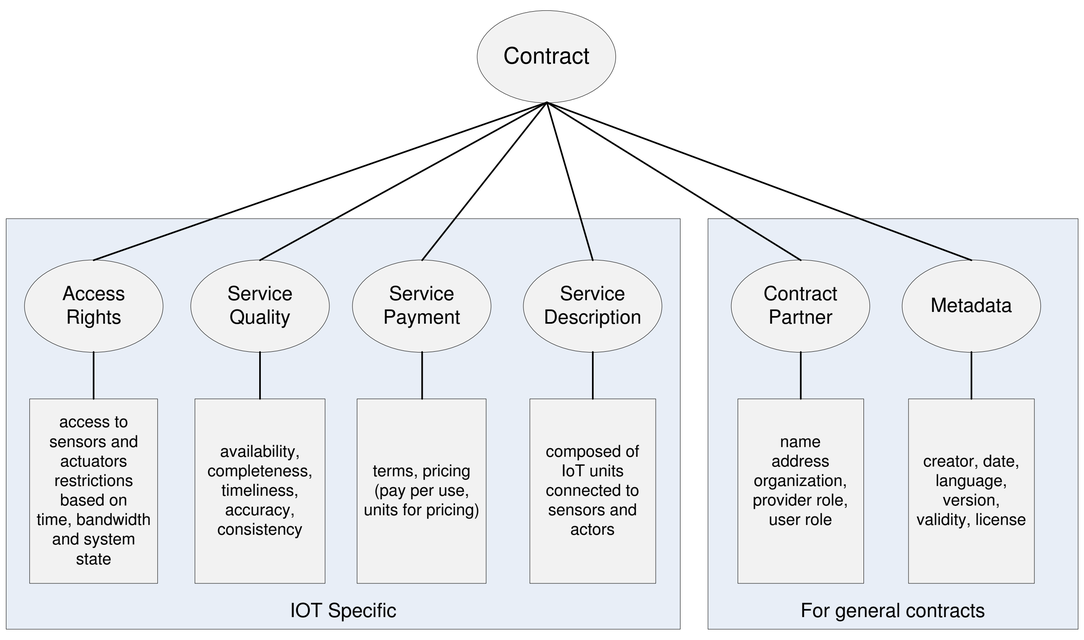
A prototype framework is developed that supports IoT contract definition, monitoring and enforcement.

- *Contract Manager* to build contracts from contract models and assign them to IoT units.
- *Contract Models* contain building blocks for creation of contracts.
- *Contract Governance* records contract violations identified by monitoring and enforcement and makes them available to contract parties.



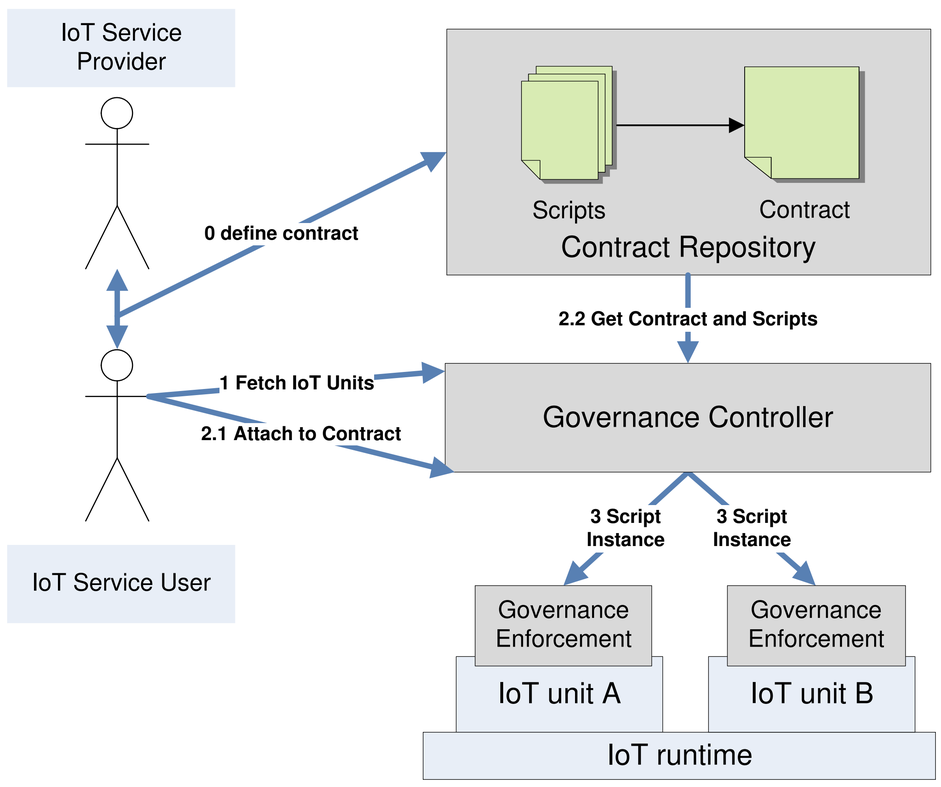
Contract Model

IoT specific contract terms covered in the contract model include access rights, service quality and service payment. General terms include contract partners and meta-data.



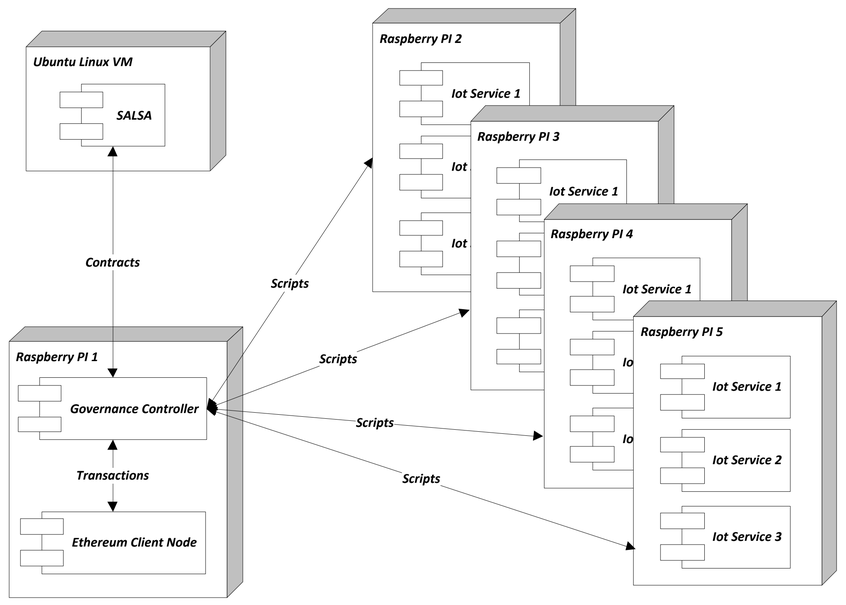
Contract Governance

- Step 0: Contract is defined and created.
- Step 1: Service user checks list of available IoT units.
- Step 2.1: Service user attaches contract to an IoT unit.
- Step 2.2: Governance controller builds the enforcement logics.
- Step 3: IoT unit fetches and executes the enforcement logics.

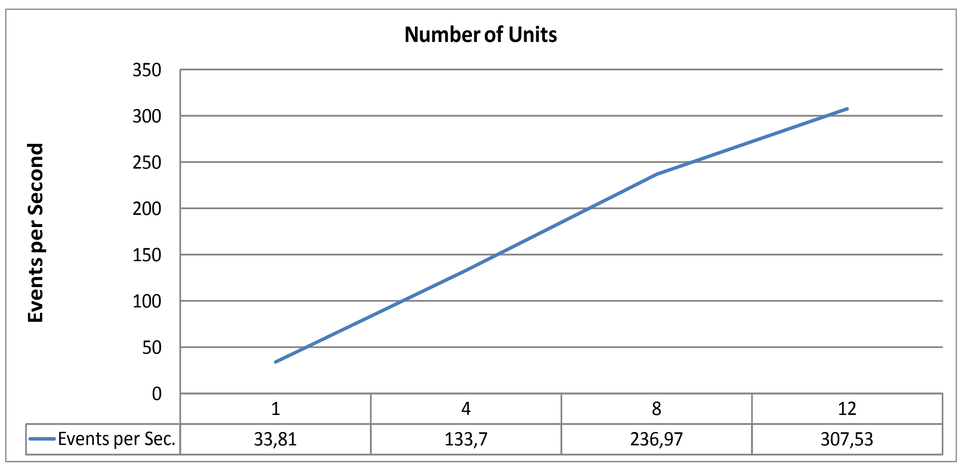


Experiments

Evaluation of prototype with a set of simulated IoT units running on Raspberry PIs. Data taken from managing the heating, ventilation and air conditioning for mobile radio transceiver stations.



Performance Evaluation: Scaling over Number of IoT Units



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