Combination of Liquid Software with IoT Framework

Casper Vranken

Master of Electronics and ICT Engineering Technology

27 BILLION

IoT devices are currently connected and operating, and this number is growing every day [1].

The power of these devices will rise and applications will be runnable.

IoT framework by TUT can mass-deploy and manage thousands of applications on devices.

3.7 DEVICES

is the number of devices connected to the internet that the average person has [1].

Liquid software states that data and applications should move freely between devices.

There are four use cases: forking, migrating, cloning and forwarding.

IoT Framework

Liquid Software

USE CASES

- Forking is copying an app and its state and using it on a target device.
- Migrating is forking but deleting the app from the source device.
- Cloning is forking an app and synchronizing the state afterwards.

TECHNOLOGIES

- ArangoDB
- Node.js

Method

Results

Migration and forking is implemented using P2P. Cloning is implemented using P2P and master-slave.

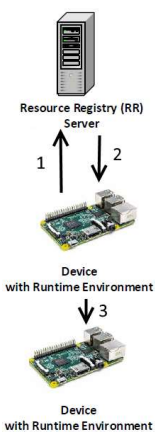Synchronization collisions solved by using timestamps.

Amount of target devices for liquid transfer does not affect time to transfer.

Presence of resource folder does greatly affect transfer speeds.

Resource Registry (RR) Server

1   2

Device with Runtime Environment

3

Device with Runtime Environment

Cloning an application P2P.

Development Platform supported by a browser-based IDE

Resource Registry (RR) Server

1   2   3   3

Device with Runtime Environment

Device with Runtime Environment

Migrating or forking an application.

GOAL

- Migrate applications across devices
  - Synchronize applications across devices
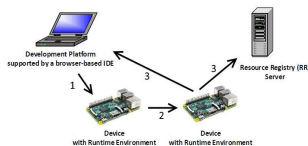- No or little extra work for the IoT developer

CONCLUSION

- Migration, forking and cloning was implemented in various ways
- Results show that it happens fast
- Synchronization communication works as expected

[1] Statista. (2017) Internet of things (iot) connected devices installed base worldwide from 2015 to 2025 (in billions). [Online]. Available: https://www.statista.com/statistics/471264/iot-number-of-connected-devicesworldwide/

Supervisors / Cosupervisors: Prof. Dr. K. Systä
Prof. Dr. K. Aerts