Cloud Voting State of the Art

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Abstract

Cloud computing is a model for on-demand access to a shared pool of configurable resources. We intend to bring user owned devices that weren't designed for cloud operation in this shared resource pool. Once these devices can communicate with each other, they will enable more smart processing and services and can be part of a larger infrastructure (IaaS). Cloud help to connect to the devices (IaaS) around us so that we can access anything at any time and any place in a user friendly manner using customized portals and in built applications (SaaS).

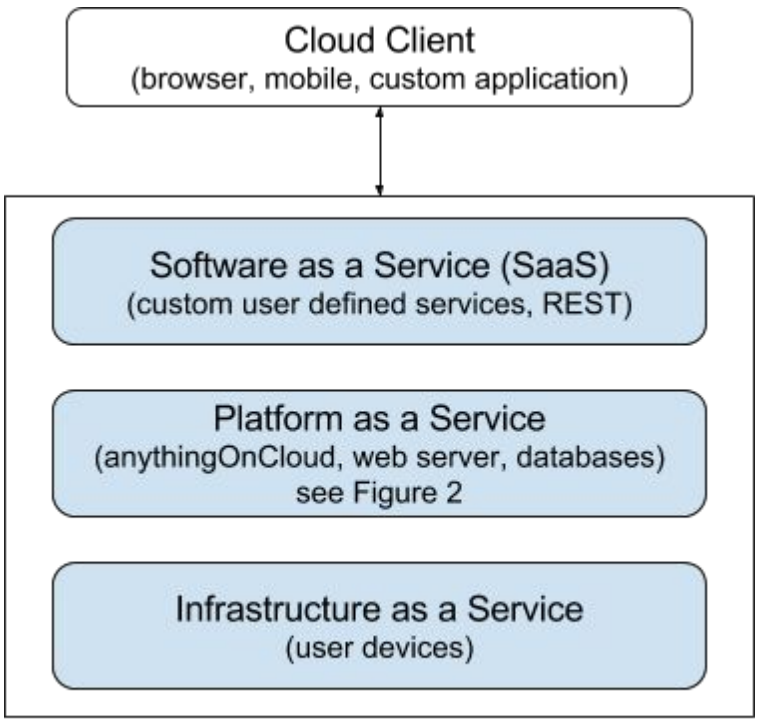

Figure 1

As a test application for the cloud model we will have a social choice voting implementation. Choosing the most preferred alternative when more than two choices are available (elections, popularity contests, even the menu for an event) is a complex issue if we want to choose fairly. Condorcet cycles can be present, or the straightforward anonymity, neutrality or strategyproofness conditions cannot be satisfied. Solutions like maximal lotteries or Kemeny's rule have been developed and will be implemented over the cloud system. Voting and determining the voting results will happen on different, loosely coupled cloud nodes - at the least one voting client node type and one node that centralizes and calculates results.

Keywords

Cloud computing, internet of things, iot, IaaS, SaaS, social choice

Introduction

This project is a use case for anythingOnCloud project. anythingOnCloud is a hardware agnostic infrastructure connects devices to the Web, allowing users to interact with devices and execute custom code on devices in real time by using RESTful APIs.

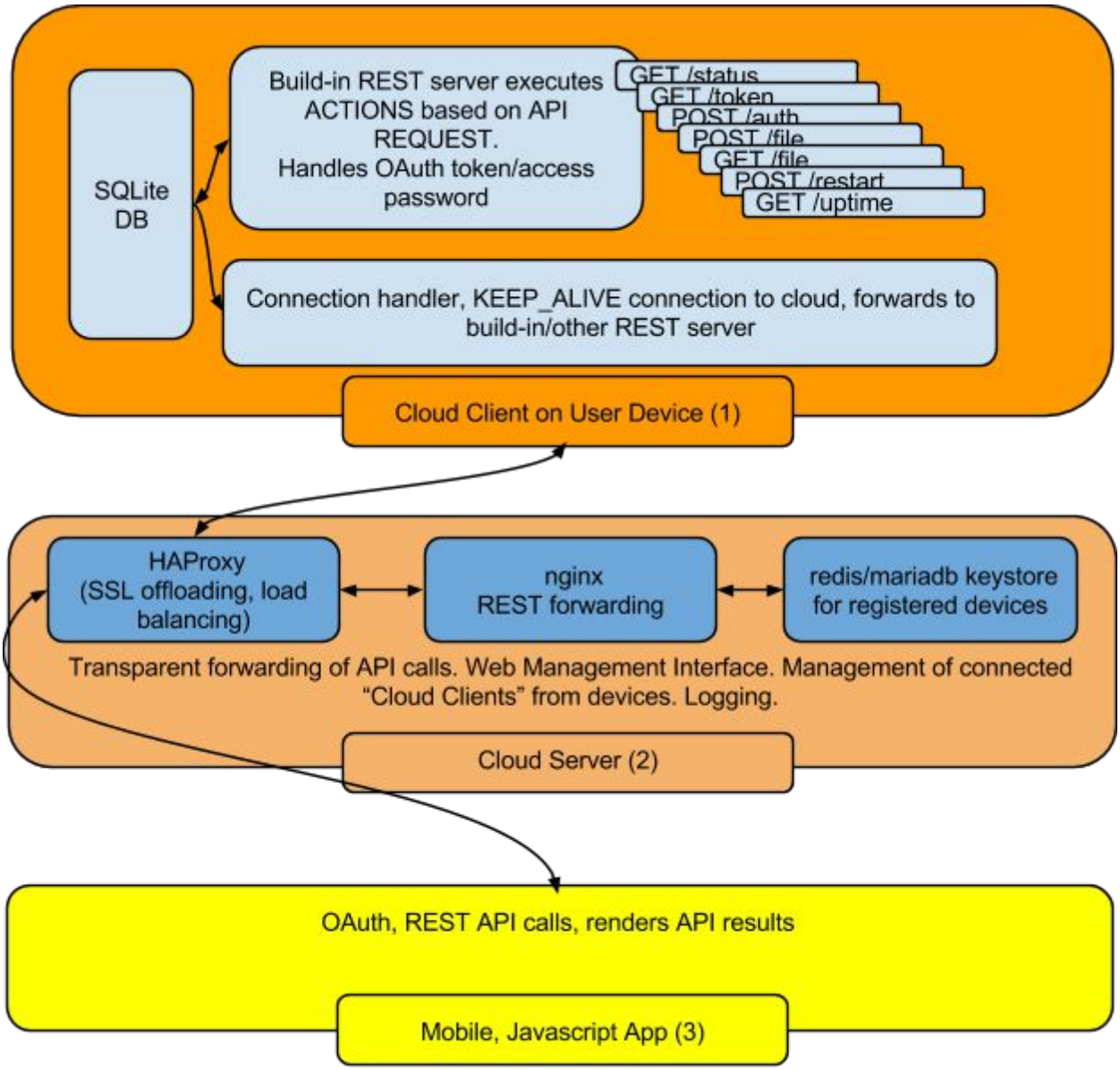

Figure 2
anythingOnCloud Arhitecture

Existing implementations - cloud

- **Google Cloud Platform** (https://cloud.google.com/solutions/iot/): Google Cloud Platform gives you the tools to scale connections, gather and make sense of data, and provide the reliable customer experiences that hardware devices require.

- **Oracle internet of things** (https://cloud.oracle.com/iot): Gain new data-driven insights and drive actions from IoT by connecting, analyzing and integrating device data into your business processes and applications, enabling your business to deliver innovative new services faster and with less risk.

- **Xively** (https://xively.com): simplifies the way companies securely and robustly connect their products and users, manage IoT data at scale, and engage more closely with their customers,users and partners.

Existing implementations - social choice

- A social choice theory introduction is publicly available at: http://www.sigecom.org/ec14/EC%202014%20Tutorial.pdf
- The only publicly available implementation of social choice algorithms is available at https://pnyx.dss.in.tum.de . It allows defining polls and obtaining results via standard plurality rules and also more advanced rules like Borda's, Fishburn's (maximal lottery) or Kemeny's (maximize pairwise agreement).

Related articles

- Fremantle, P. (2015)l - A reference architecture for the internet of things
- Neisse, R., Steri, G. , Baldini, G (2015) - Dynamic context-aware scalable and trust based IoT Security Privacy Framework
- Huss P., Wigertz N (2014) - Flexible Architecture for Internet of Things Utilizing an Local Manager

Resources and tools available

Cloud:

- HAProxy (http://www.haproxy.org/) - The Reliable, High Performance TCP/HTTP Load Balancer

- nginx (http://nginx.org/en/) - an HTTP and reverse proxy server, a mail proxy server, and a generic TCP proxy server

- sqlite (http://www.sqlite.org) - self-contained, serverless, zero-configuration, transactional SQL database engine

- mariaDB (https://mariadb.org/) - SQL database server

- redis (http://redis.io/) - in-memory data structure store, used as database, cache and message broker
- Python (https://www.python.org/) - a programming language that lets you work quickly and integrate systems more effectively.