Fog and Cloud Computing Optimization in Mobile IoT Environments

José Carlos Ribeiro Vieira
josecarlosvieira@tecnico.ulisboa.pt

Instituto Superior Técnico, Universidade de Lisboa
Advisors: Prof. António Manuel Raminhos Cordeiro Grilo
Prof. João Coelho Garcia

Abstract. We introduce a xxxxx

Keywords: Cloud computing, fog computing, mobility, optimization, genetic algorithm, quality of service, quality of experience, cost, energy, bandwidth

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1 Introduction

1.1 Context

Cloud computing became popular at the beginning of the twenty-first century. The *National Institute of Standards and Technology* (NIST) defines cloud computing as a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction [1]. Cloud computing has been instrumental in expanding the reach and capabilities of computing, storage, and networking infrastructure to the applications. In this model, clients outsource the allocation and management of resources (hardware or software) that they rely upon to external entities known as clouds. Clouds provide consumers online accesses to computing services and centralized data storage, running on data centers where large groups of servers, disks, and routers are networked. Since the demand for cloud resources change over time, setting a fixed amount of resources results in either over-provisioning or under-provisioning, so *cloud service providers* (CSPs) afford dynamic resources for a scalable workload, applying a pay-as-you-go cost model where clients only pay for the amount of resources they actually use.

Although cloud computing has bring forth many advantages, the time required to access cloud-based services may not be suitable for some applications with ultra-low latency requirements. Also, the rapid growth in the number of connected IoT devices has brought new needs, such as greater demand for high-bandwidth, geographically-dispersed, low-latency, and privacy-sensitive data processing. These demands require cloud resources to be closer to end-devices, making plenty of paradigms such as *Fog Computing* (FC) to emerge.

Fog computing is a new computing architecture that aims to enable computing, storage, networking, and data management not only in the cloud, but also along the IoT-to-Cloud path as data traverses to the cloud (preferably close to the IoT devices). Although fog computing is intended to provide strong support for the Internet of Things, it does not replace the needs of cloud-based services. In fact, fog and cloud complement each other; one cannot replace the need of the other. By coupling cloud and fog computing, the services can be optimized even further, allowing enhanced capabilities for data aggregation, processing, and storage. Fog nodes can be placed close to IoT source nodes, due to low hardware footprint and low power consumption (e.g., small servers, routers, switches, gateways, set-top boxes, access points), allowing latency to be much smaller compared to traditional cloud computing. Also, the decentralized nature of fog computing allows devices to either serve as fog nodes themselves or use fog resources as a client ?????. Moreover, Internet connectivity is not essential for the fog-based services to work, what means that services can work independently and send necessary updates to the cloud whenever the connection is available [2].

1.2 The problem

Despite the benefits of using fog computing, the current model suffer from several problems. [**?**]

1.3 Alternatives

[Alternatives]

1.4 Our approach

To address the aforementioned problems, the present document proposes ...

1.5 Contributions

[Contributions]
The remainder of the document is structured as follows. Section **??** xxx. Section 2 xxx. Section 3 describes xxxx. Section 4 defines the xxx. Finally, Section 5 presents xxxx and Section 6 xxxx.

2 Related Work

In this section we will give some contextual information about concepts and techniques that are relevant to our work.

2.1 xxxx

2.2 xxxx

2.3 xxxx

2.4 xxxx

3 Architecture

xxxxx
xxxx

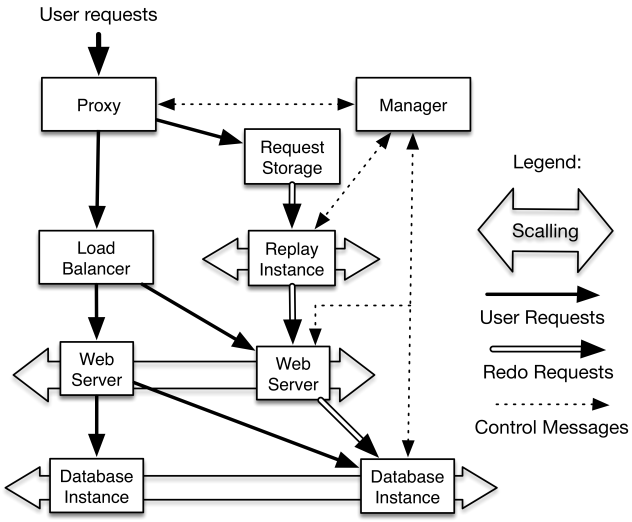

Fig. 1: Overview of the proposed service

4 Evaluation

The evaluation of the proposed architecture will be done xxxx

5 Schedule of Future Work

Future work is scheduled as follows:

- xxxx
- xxxx

6 Conclusion

xxxxx

References

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