Fog Computing – Paper Review

1. An Object Store Service for a Fog/Edge Computing Infrastructure based on IPFS and Scale-out NAS
2. The Cloud is Not Enough: Saving IoT from the Cloud

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Background

This Presentation aim to justified the following challenge: which of the two approaches described in

1. An Object Store Service for a Fog/Edge Computing Infrastructure based on IPFS and Scale-out NAS (Paper 06a)
2. The Global Data Plane described in “The Cloud is Not Enough: Saving IoT from the Cloud“(Paper 06b)

- is better suited for Fog Computing?
- and rationale why the selected approach is better?

Paper 6a Key Concept

Identify Fog Computing

1 Deploy dedicated servers in micro/nano datacenters geographically spread at the Edge of the network, that is, close to the end-users.

Fog Object Store Service

2

1. Data locality (enabling low access time)
2. Network containment between sites
3. Support for users mobility;
4. Possibility to access data in case of service/network partitioning;
5. Scalability with a large number of sites, users and objects stored.

Empirical Analysis

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1. Reliable Autonomic Distributed Object Store (RADOS), Cassandra, Inter Planetary File System (IPFS)
2. Provide software abstractions that enable the definition of areas that can be mapped to geographical sites, and thus may be adapted to a Fog Context

Drive IPFS Solution

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1. IPFS can be seen as an object store service built on top of the BitTorrent protocol and the Kademlia DHT.
2. IPFS supports the mobility of data in a native fashion (one of Fog Object Store Service Properties).

Risk, Issue & Challenge

5 The main issue of using a DHT for the metadata management in IPFS is that each time a user wants to access an object, it involves the DHT to locate the object if it is not available on the requested node.

Release Solution

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1. Deploying on each site a local Scale-out Network Attached Storage system (NAS)
2. Allows nodes to access any object stored locally on the site without using the global DHT

Paper 6b Key Concept

Identify Motivation

1

1. Introduce distributed platform, called the Global Data Plane (GDP).
2. Disadvantages and argue that fundamental properties of the IoT prevent the current approach from scaling.
3. Focused on the transport, replication, preservation, and integrity of streams of data for locality and QoS.

Purpose Product

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1. We call the resulting infrastructure the Global Data Plane (GDP).
2. Offers Common Access APIs (CAAPIs)

Product Development

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1. Proposed Global Data Plane (GDP) focused around the distribution, preservation, and protection of information
2. Single-writer time-series logs, Location-independent Routing, Pub/Sub and multicast tree

Challenge, Risk & Control

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1. Review the state of the art in the distributed application space for IoT.

Summary

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1. Accelerate adoption with tools and services.
2. GDP is not yet bullet-proof and our initial implementation has not withstood the test of widescale deployment.

Future Work

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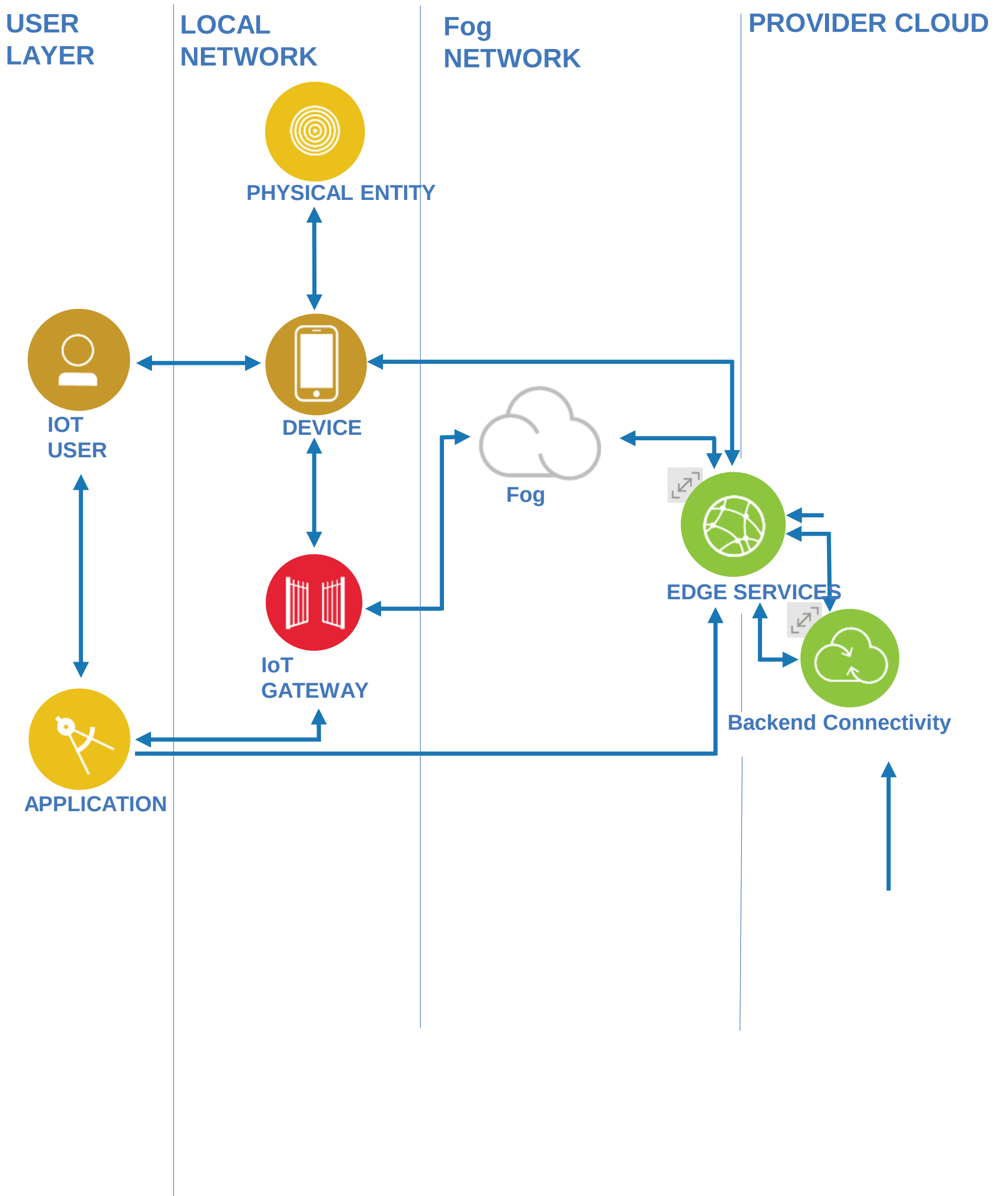
1. Decentralized data storage and delivery platform is apparently absent
2. EdgeComputing from Akamai, Intel’s Intelligent Edge, and Microsoft’s Cloudlet
3. –

Paper 6a - Architecture Approach



Paper 6b - Architecture Approach

Evaluation – Solution Justification

- IPFS with Scale out NAS is better suited for Fog Computing

Proof of Concept

Small demo using IoT use case with main component:

1. Node JS.
2. Zero MQ
3. In Memory DB (or MongoDB)