

Fog Computing (SS 2019)

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Reading Assignment

Together with your group members, do the following tasks for your assigned paper.

- I. Read the paper carefully.
- II. Answer the corresponding question (see below).
- III. Prepare a presentation (10min) in which you answer the question and introduce the paper's key concepts. You should also name other related work.

Besides these three tasks for your assigned paper (No. n), we will assign two additional papers to your group ($n+1$ and $n+2$). For these, you shall prepare some questions that you will ask after the corresponding papers have been presented. You will be responsible for a short discussion with the respective other two groups.

Questions

1. Can the approach described in "Enhancing Edge Computing with Database Replication" be used in Fog Computing? Why is that the case?
2. Can the approach described in "Megastore: Providing scalable, highly available storage for interactive services" be used in Fog Computing? Why is that the case?
3. Can the approach described in "A Horizontally Scalable and Reliable Architecture for Location-based Publish-Subscribe" be used in Fog Computing? Why is that the case?
4. How can fog applications with mobile clients (e.g., vehicles) be tested with tools such as MockFog ("MockFog: Emulating Fog Computing Infrastructure in the Cloud"), what changes are necessary?
5. Does it make sense to use systems such as "The Chubby lock service for loosely-coupled distributed systems" in Fog Computing? Where and how would you deploy it? Would you recommend to make any changes?
6. Which of the two approaches described in "An Object Store Service for a Fog/Edge Computing Infrastructure based on IPFS and Scale-out NAS" and the Global Data Plane described in "The Cloud is Not Enough: Saving IoT from the Cloud" is better suited for Fog Computing? Why?

7. How would you classify and rate the paper "FogStore: Toward a Distributed Data Store for Fog Computing" considering "An Object Store Service for a Fog/Edge Computing Infrastructure based on IPFS and Scale-out NAS" and "The Cloud is Not Enough: Saving IoT from the Cloud" which you know from the lectures?
8. Is the approach described in "The Stratosphere platform for big data analytics" ready for use in Fog Computing? Where would you deploy which parts of the system in an IoT use case?
9. Is Bifrost ("Bifrost – Supporting Continuous Deployment with Automated Enactment of Multi-Phase Live Testing Strategies") capable of handling rollouts in Fog Computing environments? How should it be deployed and/or what changes are necessary?
10. Can Intel SGX technology help to mitigate Fog security risks? How would the setup and operation of an enclave in the Fog look like? What are the use cases? The paper "Secure Cloud Micro Services using Intel SGX" shows an example application of SGX.
11. The paper "The Serverless Trilemma" presents (among others) the architecture and design of the open source FaaS platform OpenWhisk. Present the architecture, data, and control flows. Which changes are necessary to coordinate function compositions that span multiple clusters (e.g., one near the Edge and one in the Cloud)?
12. Google's Dapper is a system designed for tracing in microservice architectures. Considering the changes in Fog architectures and deployments as covered in the lectures, which changes are necessary to adapt Dapper for a Fog world?