

UNIVERSITY OF TARTU  
Institute of Computer Science  
Computer Science Curriculum

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**Data Consistency in Distributed Systems:**  
**Pipedrive Case Study**

**Master's Thesis (30 ECTS)**

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# **Data Consistency in Distributed Systems: Pipedrive Case Study**

## **Abstract:**

This work studies the two most common application architectures; monolithic and microservices. Choosing one or another architecture can be more helpful during a certain stage of business and application development. When the development team is small and business scope is low, monolith architecture is more suitable. And as a company grows, a monolithic architecture can become a bottleneck in the development process thus limiting the size and growth of a business. With the help of Pipedrive's journey from a monolithic to a microservice architecture, this work reflects how scaling an application can compromise data consistency and switching to microservices can easily lead to complex and redundant flows.

This thesis reflects what are the different consistency models that can provide consistency at the right level and how are they implemented in real-world applications such as Pipedrive.

**Keywords:** Monolith, microservices, distributed systems, consistency, scaling

**CERCS:** P170 Computer science, numerical analysis, systems, control

## **Andmete järjepidevus hajussüsteemides: Pipedrive näitel**

### **Lühikokkuvõte:**

Käesolev töö käsitleb kahte enamlevinumat tarkvara arhitektuuri: monoliitset ja mikroteenustel põhinevat. Ettevõtte ja rakenduse arengu erinevatel etappidel on kasulik kasutada kas üht või teist. Kui arendusmeeskond ja ettevõtte äriskoop on väikesed, on võimalik kiiremini liikuda monoliitse arhitektuuriga. Arendusmeeskonna kasvades võib monoliitsest arhitektuurist saada arenduse pudelikael ja see omakorda võib pärssida ettevõtte kasvu. Pipedrive teekond monoliitselt arhitektuurilt mikroteenustel põhinevale on näide sellest kuidas rakenduse skaleerimine liigsete mikroteenuste kasutusele võtmisega võib ohtu seada andmete järjepidevuse hajusas süsteemis ning tekitada tarbetult keerukaid protsesse. Käesolev töö võrdleb erinevaid järjepidevuse mudeleid ning kuidas neid rakendatakse Pipedrive laadses ettevõttes.

### **Võtmesõnad:**

Monoliit, mikroteenused, hajussüsteemid, järjepidevus, skaleerimine

**CERCS:** P170 Arvutiteadus, arvutusmeetodid, süsteemid, juhtimine

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