Dissertation

# Server selection for latency-sensitive applications in mobile ad-hoc networks

Oliver Wellnitz

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**Abstract**

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# 1 Introduction

## 1.1 Wie klassifiziert man Netzwerktraffic?

Basic network characteristics: - Bandwidth - Bandwidth Jitter - Latency - Latency Jitter - Packet loss

The distributions of these network characteristics can also have a direct impact on the application. E.g. for video streaming applications the delay or loss of a packet belonging to an I-frame I-Frame can have a large impact on the perceived video qualtiy by the user. This is because the frame in question cannot be rendered to the user and following p- and b-frames by have used this I-frame as reference so they are also in trouble **TODO: REFRENCE, Verlust von I-Frames in streaming video,** Also, the loss of a TCP segment (ACK?) can have different influence on the throughput of an application.

* Show the difference between wireless networks and wired networks

| Network characteristic | Wired network | Wireless network |
|---|---|---|
| Bandwidth | High | Medium–Low |
| Bwdth jitter | Low | High |
| Latency | Low | Low |
| Latency jitter | Low (1/5) | Low (1/2–1) |
| Packet loss | Low | Low–High |

## 1.2 Problems of interactive, real-time applications

## 1.3 Problems of wireless networks

## 1.4 Problems of mobile ad-hoc networks

- Wegfindung in mobilen Ad-hoc Netzen * Es gibt einen Routing Overhead * Übersicht über die Protokolle, Klassifizierung * AODV ist ein gutes Protokoll, Warum?, Related work!

## 1.5  Related work - QoS

* Give a short introduction to QoS in wired networks * QoS in wireless networks (if any) * QoS in MANETs (if any) Tabelle mit Vergleich (CEDAR, etc.)

# 2 Applications

## 2.1 Introduction

## 2.2 Network requirements of applications

### 2.2.1 Multi-Player Games

**Games with directly controlled avatars**

**Games with indirectly controlled avatars**

**Round-based games**

### 2.2.2 Other kinds of applications

### 2.2.3 Application phases

**Setup**

**Running**

**Aftermath**

## 2.3 Scenarios

## 2.4 Evaluation criterias

## 2.5 Summary

# 3 Mobile Ad-hoc Networks

## 3.1 Introduction

## 3.2 Related work

General problems in ad-hoc networks

* High level problems (differences to the Internet - Mobility inside the network - Mobility outside the network (entering/leaving, switching on/off) * Problems of concurrent communication - Multiple Access / Collisions - Hidden/Exposed Terminal Problems * Problems of the wireless communication channel - Attenuation - Fading - Shadowing - Reflection, - Scattering - Diffraction * Others - Cooperation & Fairness

### 3.2.1 Routing protocols

Forwarding packets from source to sink can be a difficult task in a mobile ad-hoc network

According to [**?**], routing in MANETs can be divided into two major approaches: position-based routing and topology-based routing.

**TODO: Explain topology-based routing in general   TODO: Explain position-based routing in general**

Routing in MANETs can be divided into three different approaches: Proactive, reactive and hybrid routing. [**?**]

### 3.2.2 Quality of Service

## 3.3 Architectures

Communication architectures define how data is distributed between clients in the network. Basically, two major architectures exist: Client-Server and Peer-To-Peer.

### 3.3.1 Client-Server

### 3.3.2 Peer-to-Peer

- Unstrukturierte P2P-Systeme
- Hierarchische P2P-Systeme
- Strukturierte P2P-Systeme

Literatur: Ralf Steinmetz, Klaus Wehrle (Hrsg.): Peer-to-Peer Systems and Applications. Lecture Notes. In: Computer Science. Springer, Berlin 3485.2005 (Sept.). ISBN 3-540-29192-X Ralf Steinmetz, Klaus Wehrle: Peer-to-Peer-Networking & -Computing. Aktuelles Schlagwort. in:Informatik Spektrum. Springer, Heidelberg 27.2004,1, 51-54. ISSN 0170-6012 http://lsirpeople.epfl.ch/hauswirth/papers/DBS-P2P.pdf

### 3.3.3 Multi-Server Something

There are many other architectures for special purposes.

# 3.4 Zone Server Architecture

### 3.4.1 Synchronisation Mechanisms

## 3.5 Evaluation

## 3.6 Summary

# 4 The Server Selection Algorithm

# 5 Quality of Service

# 6 Evaluation

# 7  Conclusions