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Studying properties of special class of routing algorithms

Title of the dissertation	Scalability and Resiliency of Static Routing

Contents of the dissertation

For every computer network to function, network devices have to decide where to send data packets. This is not a trivial problem especially for large-scale networks such as the Internet. To solve that problem there are many different algorithms that build routes for each packet – routing algorithms. Despite a huge body of research on this topic, some questions are not yet addressed. This dissertation is aiming to investigate important properties of the simplest class of routing algorithms, namely static routing. We study how well static routing algorithms work on large networks, and how good can they tolerate network failures. For the former, we present a static routing algorithm, which can deliver data to several receivers at the same time in Internet-scale networks. There are no such algorithms yet deployed in the Internet. For the latter, we present a systematic theoretical study and propose several unexpectedly tolerant to network disruptions static routing algorithms.

This dissertation lays the groundwork for further theoretical research of static routing properties. Additionally, we present several highly practical routing algorithms. Some of them are better than existing algorithms and can yield significant benefits in several scenarios.

Field of the dissertation	Computer Science, Telecommunications Software
Doctoral candidate	Ilya Nikolaevskiy, M. Sc Born in Petrozavodsk, Russia 1988
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Opponent	Professor Yevgeni Koucheryavy, Tampere University of Technology, Finland
Custos	Professor Antti Ylä-Jääski, Aalto University School of Science, Department of Computer Science
Doctoral candidate's contact information	Ilya Nikolaevskiy, Department or Computer Science, ilya.nikolaevskiy@aalto.fi, +358505758927