

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Traceroute-like exploration of unknown networks: a statistical analysis ALAIN BARRAT, LUCA DALL'ASTA, IGNACIO ALVAREZ-HAMELIN, ALEXEI VAZQUEZ, ALESSANDRO VESPIGNANI, LPT, Universite Paris-Sud — Mapping the Internet generally consists in sampling the network from a limited set of sources by using **traceroute**-like probes. This methodology has been argued to introduce uncontrolled sampling biases that might produce statistical properties of the sampled graph which sharply differ from the original ones. Here we explore these biases and provide a statistical analysis of their origin. We derive a mean-field analytical approximation for the probability of edge and vertex detection that exploits the role of the number of sources and targets and allows us to relate the global topological properties of the underlying network with the statistical accuracy of the sampled graph. In particular we show that shortest path routed sampling allows a clear characterization of underlying graphs with scale-free topology. We complement the analytical discussion with a throughout numerical investigation of simulated mapping strategies in different network models.

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Date submitted: 13 Dec 2004

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