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Internet map and simulation

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Many networking problems and solutions are distributed and
collaborative. To investigate them we need a realistic, detailed model
of the Internet and ideally a simulator that would work with that model
to simulate problems/solutions of interest at just the right level of
granularity. In my prior research I've worked on creating detailed models of Internet
routing, address space, traffic, communication patterns and vulnerability distribution
so I could evaluate worm and spoofing defenses. In all cases accurate
models made a world of difference, but getting them took months to years.
Such work is an overhead for researchers that do not focus on
Internet mapping/simulation - they can either lose time on it and pass
up research opportunities or they can adopt naive models and reach wrong results.

My future research
consists of two parts: an Internet map that can easily integrate data from multiple sources and export it and a distributed network simulator that can interact with the exported Internet model in a customizable manner, and whose level of simulation granularity and details can also be customized. I've done some preliminary work on hard questions, such as how to combine data of different granularity, how to infer missing data or fix incomplete data, how to achieve simulation at different levels of granularity, etc.

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