FDP: A Teaching and Demonstration Platform for Networking

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Requesting https://www.wikipedia.org from your browser can start a small storm of exchanges between your device and name servers, caches and ultimately the Wikipedia servers. Data networking involves simple ideas---such as modular decomposition and path redundancy---that produce interesting behavior through the, sometimes subtle, interaction with one another. Through this interaction, networking is able to achieve amazing feats of reliability, availability, and planetary scale. But it is difficult to connect the big ideas---such as reliability---with how they work across different implementations, topologies and in the face of different levels of network disfunction. Making that leap typically requires time spent with unforgiving tools such as 'tcpdump' across several experiments. This is not helped by the hearty alphabet soup that is the set of protocols that one has to learn to begin to understand how networking really works.

To help teachers and students navigate this process, we present FDP, a portable platform that enables end-to-end experimentation and zero-effort in browser interactive visualization, which we envision can benefit teaching and demonstration. FDP can show various network, including network faults and reconfigurations, using visual cues and quantitative graphing. Since we leverage the flexibility of software-defined networking (SDN), our tool can also be used for upper-level networks classes and also for research.

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