

Demo: Enabling Mobile Time-Dependent Pricing

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ABSTRACT

ISPs around the world have begun to offer new pricing plans for wireless data, such as usage-based pricing in the U.S., to mitigate recent growth in bandwidth demand. Time Dependent Pricing (TDP) represents a next step in this direction [1, 2]. With TDP, ISPs can shift traffic to off-peak periods, thus reducing their cost, while consumers save money by choosing the time of usage. TDP uses a feedback control loop between an ISP and its users to account for users' responses to offered prices in optimizing the future prices. We have implemented such a TDP system and are presently conducting a user trial at Princeton while planning larger trials with commercial ISPs. This demo will introduce the audience to our system's ISP- and user-side features. On the ISP side, we show the current network congestion, while on the user side, we show device UIs displaying the offered prices, the device usage history, and automated scheduling of applications to keep users within a specified budget.

Categories and Subject Descriptors

C.2.0 [Computer-Communications Networks]: General—Data Communications, Pricing; H.5.2 [Information Interfaces and Presentation]: User Interfaces—GUI, Screen Design

Keywords

Wireless pricing, Data plans, Economics

We will distribute iPads and iPhones to demo visitors, allowing real-time interaction with our GUI on these devices. We also show the network congestion condition from our trial. The prices shown on our devices are calculated by a pricing server located in our Princeton Edge Lab, which acts as the ISP within our trial. This server measures the aggregate traffic from all trial participants and updates its estimates of user response to prices, using these to compute the ISP's cost-minimizing prices for future time periods. For privacy reasons, the client-side UIs interact with the lab server only by exchanging price and usage information.

The client side consists of a UI installed on users' handheld devices, which serves two main purposes: self-education and automatic application scheduling. The education components allow users to view future prices, as well as the past



Figure 1: Screenshots of the iOS app.

prices and corresponding device usage (Figs. 1a and 1b). Users can also view the amount of bandwidth used by different apps, and in particular can see which apps use the most bandwidth (Fig. 1c). Finally, users can set their monthly budget on Fig. 1e's screen and turn on the "autopilot" mode, which automatically schedules applications. Users can specify delay tolerances for different applications, which are considered in the automated scheduling (Fig. 1d). Users can also manually schedule applications to future times (Fig. 1f) or to wait for WiFi access.

Acknowledgements

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1. REFERENCES

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- [2] JOE-WONG, C., HA, S., AND CHIANG, M. Time-Dependent Broadband Pricing: Feasibility and Benefits. *Proc. of ICDCS* (June 2011).