Announcing the Final Examination of Prasun Dey for the degree of Doctor of Philosophy

Time & Location: October 31, 2019 at 9:00 AM in Research 1 103
Title: RETHINKING ROUTING AND PEERING IN THE ERA OF VERTICAL INTEGRATION OF NETWORK FUNCTIONS

Content providers typically control the digital content consumption services and are getting the most revenue by implementing an “all-you-can-eat” model via subscription or hyper-targeted advertisements. Revamping the existing Internet architecture and design, a vertical integration where a content provider and access ISP will act as unibody in a sugarcane form seems to be the recent trend. As this vertical integration trend is emerging in the ISP market, it is questionable if existing routing architecture will suffice in terms of sustainable economics, peering, and scalability. It is expected that the current routing will need careful modifications and smart innovations to ensure effective and reliable end-to-end packet delivery. This involves new feature developments for handling traffic with reduced latency to tackle routing scalability issues in a more secure way and to offer new services at cheaper costs. Considering the fact that prices of Dynamic Random Access Memory (DRAM) or Ternary Content-Addressable Memory (TCAM) in legacy routers are not necessarily decreasing at a desired pace, cloud computing can be a great solution to manage the increasing computation and memory complexity of routing functions in a centralized manner with optimized expenses. Focusing on the attributes associated with existing routing cost models and by exploring a hybrid approach to Software-Defined Networking (SDN), we also compare recent trends in cloud pricing (for both storage and service) to evaluate whether it would be economically beneficial to integrate cloud services with legacy routing for improved efficiency. In terms of peering, using the US as a case study, we show the overlaps between access ISPs and content providers to explore the viability of a future in terms of peering between the new emerging content-dominated sugarcane ISPs and the healthiness of Internet economics. To this end, we introduce meta-peering, a term that encompasses automation efforts related to peering from identifying a list of ISPs likely to peer, to injecting control-plane rules, to continuous monitoring and notifying any violation one of the many outcroppings of vertical integration procedure which could be offered to the ISPs as a standalone service.

Major: Computer Engineering

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Bachelor's of Computer Science & Engineering, BS, 2011, Bangladesh University of Engineering and Technology
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Approved for distribution by Murat Yuksel, Committee Chair, on October 15, 2019.

The public is welcome to attend.