

On future-proofing networks

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Abstract

Modern networks face a constant barrage of new applications, devices, services, and use-cases. To ensure key properties such as end-to-end performance and flexibility continue to hold, operators often deploy intrinsic support in their networks (e.g., SDN to ensure flexibility), or add supplementary mechanisms (e.g., application accelerators and CDNs for performance).

But, are our networks “future-proof”? Can they be ‘guaranteed’ to offer good performance, robustness, security, and flexibility, in the face of unforeseen/disruptive applications and technology trends? In this talk, I will argue that the answer is no. More specifically, the systems that are in place in networks’ data and control planes to support key properties are either spot-fixes that are easily disrupted, or they may impose negative outcomes or undesirable side-effects, when the next killer app or disruptive trend comes to fore. We must therefore consider being “future-proof” as a first class design goal for such systems.

I will present my recent work on systems that make networks’ data and control planes future-proof with respect to performance and flexibility. I will highlight three key elements of the approach I have followed to designing such systems – picking a good invariant, designing the right abstraction, and iterating over implementations.