Network-Application Integration (NAI) Workshop Proposal

Motivation and rationale:

* See motivation in draft CFP

Workshop organizers:

* See CFP draft

Workshop format planned:

* Two keynotes:
  + One from academia (Ethan Katz-Bassett/Columbia, Bruce Maggs/Duke as candidates)
  + one from industry (Amin Vahdat/Google, Albert Greenberg/Microsoft, Greg Lavender/VMWare as candidates)
* One panel [keynote speakers, Ingmar Poese/Enric Pujol (BENOCS), organizers]
* 3 sessions of papers

Workshop tentative schedule:

* External schedule: see CFP
* Internal schedule: review assignment one week from deadline; PC meeting 3 days before notification; invitations of keynote and panel speakers will start as soon as we know whether the workshop will proceed.

Expected number of participants:

* 50

Expected number of submissions:

* 30

Workshop history:

* This will be the first instance (inaugural) workshop.

**Draft of Call for Papers**

Motivation: The Internet was designed and launched 50 years ago to satisfy yet unforeseen applications. The Internet's adaptation and scalability have been proved remarkably successful over the years. Today, more than 4 billion users (half of the global population) and 20 billion devices are online — the exponential growth of the connected people and devices are expected to continue over the next years.

However, the general-purpose and best-effort model of the Internet is challenged due to the ever-growing demand for more complex applications with stricter application-specific requirements. How can we deliver 4k videos to everybody (including the rest 4 billion people)? How can we ensure ultra low latency for applications such as self-driving cars and cloud gaming? How do we support high-bandwidth, low latency applications such as AR, VR, and holographic communications? How can we guarantee 100% service availability? How can we enable innovation at the edges for the next wave of 5G and IoT applications?

Network-Application Integration (NAI) can push the boundaries of what can be achieved. The maturing of NAI protocols such as the ALTO protocol, the recent report of large-scale, real implementation and realized benefits of NAI systems such as the Flow Director system, and the recent emergence of new, flexible networking mechanisms such as APN6, PANRG, P4, NPL, INT, and SmartNIC, all make NAI an exciting field for exploration by the core networking community.

In this workshop, we search for contributions on the design principles and real implementations of systems that enable network-application co-design. We will focus on realistic NAI designs, implementations and experiences, and explore both sides of NAI: application-aware networking (AAN) and network-aware application (NAA). Keynotes and a panel will be included to complement more traditional paper sessions, to set the research agenda, debate the issues, and share the most recent progress.

**Topics of interests**

* Network abstraction models
* Multi-domain network abstraction and coordination
* Network abstraction from network state
* Network exposure of information and control interfaces
* Data collection (e.g., measurement) for network abstraction
* Data processing techniques to generate network abstraction (e.g., low level, filtering)
* Validation of network abstractions (e.g., conforming to model)
* Privacy analysis of network information exposure
* Economical/game theoretical analysis of network information/service exposure
* Stability design and analysis of application-network (close-loop) control
* Optimality design and analysis of application-network (close-loop) control
* Control with multiple dimension constraints (privacy, policy, beyond networking)
* Co-design for specialized apps (e.g., video, ML, IoT)
* Wide-area data analytics
* Experience and deployment of application-network integration
* Application adaptation to network information/service models

**Workshop Program Committee/Organizers**:

* Richard Alimi (Google; verify)
* Ingmar Poese (BENOCS)
* Farni Boten (Sprint)
* Fabián E. Bustamante (Northwestern University; verify)
* Luis M. Contreras (Telefonica)
* Anja Feldmann (Max Planck Institute for Informatics) [co-chair]
* Kai Gao (Sichuan University)
* Oliver Holschke (Deutsche Telekom)
* Zhenbin Li (Huawei; verify)
* Borje Ohlman (Ericsson)
* Sabine Randriamasy (Bell Labs)
* Avi Silberschatz (Yale University)
* Georgios Smaragdakis (TU Berlin) [co-chair]
* Qiao Xiang (Yale University)
* Y. Richard Yang (Yale University) [co-chair]
* Ying Zhang (Facebook)
* Yunfei Zhang (Tencent)
* Mostafa Ammar (Georgia Tech; verify)
* // a few more names from academia, maybe: Rachit Agarwal (Cornell), Ethan Katz Bassett (Columbia), Christian Rothenberg?

**Submission Instructions**

Submissions must be original, unpublished work, and not under consideration at another conference or journal. Experience papers are welcome. Submitted papers must be at most six (6) pages long, including all figures, tables, references, and appendices in two-column 10pt ACM format. Papers must include authors names and affiliations for single-blind peer reviewing by the PC. Authors of accepted papers are expected to present their papers at the workshop. Please submit your paper via <https://nai20.hotcrp.com> (to be activated). We are getting in touch with JSAC to get a special issue for the work published in the workshop.

**Important Dates**

* Submission deadline: T (April 15, 2020 [push this as late as allowed])
* Acceptance deadline: T + 5 weeks (May 22, 2020)
* Camera ready: The same as SIGCOMM main conference
* Program ready: The same as SIGCOMM main conference
* Program: August 14 (not Aug. 10 due to IMC PC conflict)

Footnote references:

[1] Enric Pujol, Ingmar Poese, Johannes Zerwas, Georgios Smaragdakis, and Anja Feldmann. Steering hyper-giants’ traffic at scale. In CoNEXT ’19, ACM, pp. 82–95. DOI:https://doi.org/10.1145/3359989.3365430

[2] Zhenbin Li, Shuping Peng, Daniel Voyer, Chongfeng Xie, Peng Liu, Chang Liu, Kentaro Ebisawa, Yukito Ueno, Stefano Previdi, and James N Guichard. Problem statement and use cases of Application-aware IPv6 Networking (APN6). IETF Internet Draft (2019). https://tools.ietf.org/html/draft-li-apn6-problem-statement-usecases-01

[3] Amin Vahdat, David Clark, and Jennifer Rexford. A purpose-built global network: Google’s move to SDN. CACM 59, 3 (February 2016), 46–54. DOI:https://doi.org/10.1145/2814326

[4] Chi-Yao Hong, Subhasree Mandal, Mohammad Al-Fares, Min Zhu, Richard Alimi, Kondapa Naidu B., Chandan Bhagat, Sourabh Jain, Jay Kaimal, Shiyu Liang, Kirill Mendelev, Steve Padgett, Faro Rabe, Saikat Ray, Malveeka Tewari, Matt Tierney, Monika Zahn, Jonathan Zolla, Joon Ong, and Amin Vahdat. B4 and after: managing hierarchy, partitioning, and asymmetry for availability and scale in google’s software-defined WAN. In SIGCOMM ’18, ACM, pp. 74–87. DOI:<https://doi.org/10.1145/3230543.3230545>