Abstract:
In February of last year, the U.S. Federal Communications Commission voted to pass new net neutrality rules to regulate the Internet like a utility. Soon after, the European Commission reached the agreement on EU-wide net neutrality on June 30, 2015. The regulations ban Internet service providers from crafting deals to give preferential treatment, so called “Internet fast lanes,” to customers who could afford to pay more for the service. The proponents believe these rules will prevent larger conglomerates, like AT&T and Comcast, from controlling the flow of content online and therefore protect free expression and innovation on the Internet; while critics say it is a regulatory overreach and will make the Internet equitably slow and expensive for all of us. This controversy arises mainly because popularity of video streaming services has led to a surge in Internet traffic in recent years. Cisco forecasts that video will make up 84 percent of Internet traffic by 2018. The emerging Internet of Things (IoT) will add another significant percentage if they are not to be deployed responsibly. Unlike video streaming, mostly delivered on demand, many IoT applications rely on continuous data from Internet “things” to make real-time decisions. A recent study by the business consultancy firm Gartner anticipates 26 billion Internet-connected “things” by 2020. In this presentation, we discuss possible solutions for these important problems. More specifically, we examine traffic deduplication as a way to significantly reduce online video congestion. Although it may sound counterintuitive, creating temporary congestion is one effective solution to reducing congestion for video-on-demand services. To avoid non-stop streaming of IoT data, we consider ThingStore. Thing Providers may deploy “things” on Thing Servers, and advertise their smart services (thing operators for events detection) at ThingStore. Application developers can develop apps that query relevant thing operators using EQL (Event Query Language) much like the way traditional database applications are conveniently developed atop a standard database management system today. The advantage of this approach is twofold. First, EQL provides a unified abstraction to address the challenge associated with heterogeneity of devices; and second, decoupling of thing operators from the application logic allows pushing thing-specific computation closer to the live data source (e.g., pushing computer vision computation to the camera server) to avoid network traffic. The ThingStore architecture also enables applications to share Internet-connected “things” through EQL, an improvement over current intranet of things deployed in silos to support different IoT applications.

About the Speaker:
Dr. Kien A. Hua is a Pegasus Professor and Director of the Data Systems Lab at the University of Central Florida, U.S.A. He was the Associate Dean for Research of the College of Engineering and Computer Science at UCF. Prior to joining the university, he was a Lead Architect at IBM Mid-Hudson Laboratory, where he led a team of senior engineers to develop a highly parallel computer system, the precursor to the highly successful commercial parallel computer known as SP2. Currently, Dr. Hua is also serving as a domain expert on spaceport technology at NASA. Dr. Hua received his BS in Computer Science, and M.S. and Ph.D. in Electrical Engineering, all from the University of Illinois at Urbana Champaign, USA. His diverse expertise includes Internet of things, data analytics, image/video computing, network and wireless communications, medical imaging, mobile computing, sensor networks, spaceport technology, and intelligent transportation systems. He has published widely with 12 papers recognized as best/top papers at conferences and a journal. Many of his research have had significant impact. His Chaining technique started the peer-to-peer video streaming revolution. His Skyscraper Broadcasting, Patching, and Zigzag techniques have each been heavily cited in the literature, and have inspired many commercial systems in use today. Dr. Hua has served as a Conference Chair, an Associate Chair, and a Technical Program Committee Member of numerous international conferences, and on the editorial boards of several professional journals. Professor Hua is a Fellow of IEEE.

All are welcome!
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