

Keynote for ITNAC 2022 – David Cheriton

Computer Network Automation

Abstract:

Computer networks are conceptually very simple. Cables connect switches and routers and packets are forwarded over this links to reach their destination. However, the reality is far more complicated. The dynamic behavior of network traffic can be complicated and produced “grey’ failures from congestion and convoying. Moreover, the control mechanisms such as access control filters, rate policers virtual networks, overlays, policy based routing, EVPN, routing protocols, etc add additional complexity. This complexity is colliding with human limitations to manage networks with the reliability and agility required by modern organizations. The consequences of misconfiguration and failures can be severe. Operator error is the primary source of network failure and personnel costs are the dominant overhead of running a computer network. The solution is automation of network management, assuming it can be done right.

This talk discusses a wholistic approach to automated network management taking an ”operating system” perspective. The network automation configures, monitors and identifies faults in the network, reducing the burden on the network operator. The challenge is making the system highly scalable, fault-tolerant and extensible to meet new network requirements and support new network features.

Bio:



David R. Cheriton is Chief Data Center Scientist at Juniper networks. Previously, he was founder and CEO of Apstra, a network automation company acquired by Juniper in 2021.

He is Professor Emeritus of Computer Science at Stanford University where he taught for 37 years. He has a number of publications in significant research journals and conferences, including SIGCOMM, from which he received a Lifetime Achievement award in 2003.

His research has made contributions to the design of distributed systems, network protocols and software design.

Besides academic work, he was a co-founder of several startup companies in Silicon Valley, including Arista Networks and an early angel investor in others, including Google and VMware.