

Summary

Seeking an architect or a principal leadership role in the area of network architecture, protocol and platform research, development, standardization. I have been in the data- and telecommunication industry all through my career and have a track record of accomplishing beyond the project goals. I have successfully collaborated with internal and external partners, arriving at the best possible approaches to a problem. Reporting into the OCTO, I have been part of several early-stage vision and initiatives, and have driven their strategy, planning and roadmaps while continuing to remain hands-on technical. As a technologist, I seek to understand limitations and complexities in networking and continuously explore ways to resolve them. I have a number of patents, my work is published in both academic and industry standard organizations.

Recent Experience

FUTUREWEI TECHNOLOGIES

2013-Present /Santa Clara, CA, USA

PRINCIPAL ENGINEER

Working with the office of the CTO, involved in the industry research on next-generation network technologies and protocols in service provider and large-scale network markets. Day to day work involves equal parts research, standardization and collaboration. It entails presenting, meeting partners and customers explaining new research directions, design and solution with technical details.

- **Technical Research:** Focus on in-network services and capabilities for emerging applications in industry automation, and advanced media ('holographic type' and high-precision communications). Analyse challenges in current networks and research new data plane and packet format mechanisms. Designing proof-of-concepts for research in transport and network layer. Earlier, a: developed a virtual routing architecture and protocol for auto-provisioning of tenant networks. b: An end to end 5G/B5G Network Slicing architecture and protocol for resource sharing in a multi-domain, multi-tenant network. c: Co-innovated preferred path routing for 5G and B5G backhaul.
- **Standards activities:** Founding member of FG-NET-2030. *Network 2030 initiative* at ITU, to develop formal road map and requirements for the next-gen network technologies. Familiar with IETF mechanisms and leading standardization of network slices in IETF.
- **Program and Project Management:** Both in the US and Europe on future network architecture topics, guiding students on New IP research.

CISCO SYSTEMS

2005-2013/Milpitas, USA

TECHNICAL LEADER

Led many projects on IOS-XR, IOS for edge service routers such as Openflow agent, policy based routing, Lawful intercept and platform bring up. I learnt a great deal about the scalability challenges and means to overcome them in a distributed operating system such as IOS-XR.

At Cisco, I have contributed to many aspects - bringing up new WAN, LAN line cards, and implementing metro Ethernet design. I mentored new hires, resolved customer issues and worked with platform-hardware and core operating system teams.

- **Policy services layer** Developed architecture to support flow-based infrastructure as well as network programmability (ONEP) for a distributed system. **Platform Stability:** Provided HA solution for lawful intercept as a part of L2L3 services team. Developed hybrid architecture endian aware message translation methods.
- **Edge router (7600) services:** developed platform-dependent slow-path forwarding module, added performance tweaks for QoS, selectively drop packets, prioritizing control packets, and bug fixes.
- **L2 functions:** Designed support for CFM 802.1ag standard over EoMPLS and different Metro Ethernet services. The services included CFM over VFI interfaces.

Skills

PROGRAMMING LANGUAGES *Experienced:* C | C++ *Familiar:* Java | Python | Bash
Network Architecture | Protocols | 5G Arch. | 5G-Backhaul | Edge
NETWORK TECHNOLOGIES computing | Network Slices | Service Provider and Data Center Net-
works
NETWORK PROTOCOLS *Developed:* STP | CFM | BFD | QoS | PBR | lawful-intercept *Flu-*
ency: BGP | IS-IS | Segment Routing | MPLS.
STANDARDS AND RESEARCH IETF | ITU-T | ETSI | ACM | IEEE involvement
NETWORK INFRASTRUCTURE IOS | IOS-XR | ASR9k | 7600 series

Earlier Experience

- Worked at a start up (Inkra Networks) as a board bring up and platform engineer for a management processor.
- Developed a control plane and data plane separation software, bring up WAN modules. Designing Network Programming Interface (NPI) for router platforms.
- Device Driver Engineer with BSP and board bring up. various drivers and modules for RTOS and telcom-exchange software.

Education

PUNE UNIVERSITY 1994-1997
MASTERS IN COMPUTER SCIENCE APPLICATIONS (MCA)
DELHI UNIVERSITY 1991-1994
B.SC IN PHYSICS

External Positions

2020-21	NIPAA Workshop at ICNP IEEE New Internetworking Protocols, Architecture and Algorithms	General Chair
2018	The Ist New Internet Forum ETSI Track, SDN NFV Congress	Session Chair
2018-19	NEAT Workshop at ACM SIGCOMM Workshop on Networking for Emerging Applications and Technologies.	General Chair
2017	ETSI-NGP, E2E Network Slicing Architecture Next-generation Protocols group at ETSI.	Rapporteur

In case interested, please see attached reference to published work.

Speaking Engagements

- 2019 Holographic Type Communication Delivering the Promise of Future Media by 2030
[Speaker, ITU-T, Fifth Workshop on Network 2030, Geneva, Nov 2019](#)
A talk that details out network challenges and possible approaches to delivering holographic type media,
https://www.itu.int/en/ITU-T/Workshops-and-Seminars/2019101416/Documents/Kiran_Makhijani_v2.pdf
- 2019 Maturing E2E Network and Cloud Slicing: Where are the frontiers ? [Panelist, IEEE WCNC'19](#)
Dealing with diversity of standards, Resolve multi-domain, multi-operator aspects,
<https://wcnc2019.ieee-wcnc.org/panels#panel5>
- 2019 Future of slicing and ML - Cognitive high-precision slicing [Speaker, ITU-T SGLA at Telecom World'19](#)
As part of technical matters of growing strategic relevance to ITU standardization at SGLA,
<https://www.itu.int/en/ITU-T/studygroups/2017-2020/Pages/sgla.aspx>
- 2019 AWE Full Stack Computing Workshop, Santa Clara, CA [Speaker](#)
Holographic Type Communication: Delivering The Promise of Future Media in 2030,
<https://www.awexr.com/usa-2019/spatial-computing-workshop>
- 2018 ITU-T Study Group 13, Future Networks focus, Geneva [Speaker](#)
Future Networks: Challenges, Opportunities and Technologies
<https://www.itu.int/md/T17-SG13-180418-TD-GEN-0223>
- 2018 MPLS SDN NFV Congress, Paris [Speaker, ETSI, NGP ISG](#)
Next-Generation Protocol Updates: Status, Progress and Prospectus,
https://www.uppersideconferences.com/mps-sdn-nfv/2018/mpplswc2018_agenda_day_00_Tutorials_1.html
- 2018 IEEE Netsoft, Montreal [Tutorial](#)
Network Slicing Landscape: A holistic architectural approach, orchestration and management with applicability in mobile and fixed networks
<http://netsoft2018.ieee-netsoft.org/program/tutorials/>
- 2018 Deterministic Service Delivery through IP2020 - Next Generation Internet Architecture [Keynote](#)
<https://www.iaria.org/conferences2017/ProgramSENSORCOMM17.html>
- 2016 IEEE Hot Interconnects, Santa Clara [Keynote](#)
Cloudcasting - Perspectives on Virtual Routing for Cloud Centric Network Architectures <http://www.hoti.org/hoti24/keynotes/>

Publications

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- 2020 Enhancing End-to-End Transport with Packet Trimming A, Albalawi;H. Yousefi;C. Westphal;K. Makhijani;J.J. Garcia-Luna-Aceves
2020 IEEE Global Communications Conference
- 2020 Network 2030 - Gap Analysis of Network 2030 New Services, Capabilities and Use cases" Lead Author, Editor
FG-NET-2030 https://www.itu.int/en/ITU-T/focusgroups/net2030/Documents/Deliverable_NET2030.pdf
- 2020 Qualitative Communication Via Network Coding and New IP : Invited Paper Lijun Dong;Kiran Makhijani;Richard Li
2020 IEEE 21st International Conference on High Performance Switching and Routing (HPSR)
- 2020 New IP: A Data Packet Framework to Evolve the Internet : Invited Paper Richard Li;Kiran Makhijani;Lijun Dong
2020 IEEE 21st International Conference on High Performance Switching and Routing (HPSR)
- 2019 New Services and Capabilities for Network 2030: Description, Technical Gap and Performance Target Analysis Co-author
FG-NET-2030 https://www.itu.int/en/ITU-T/focusgroups/net2030/Documents/Deliverable_NET2030.pdf
- 2019 Improving Performance and Scalability of Next Generation Cellular Networks Ali Mohammadkhan;K. K. Ramakrishnan;Uma Chunduri;Kiran Makhijani
IEEE Internet Computing
- 2019 Extended Abstract: Coordinated Communications for Next-Generation Networks Kiran Makhijani, Hamed Yousefi, KK Ramakrishnan, and Richard Li
IEEE ICNP <https://doi.org/10.1145/3341558.3342201>
- 2019 A Framework for Qualitative Communications using Big Packet Protocol Kiran Makhijani, Richard Li, Hamed Yousefi, Cedric Westphal, Lijun Dong, Tim Wauters, and Filip De Turck.
ACM SIGCOMM NEAT'19 <https://doi.org/10.1145/3341558.3342201>
- 2019 Using Big Packet Protocol Framework to Support Low Latency based Large Scale Networks Kiran Makhijani, Renwei Li, and Hesham El Boukary
https://www.thinkmind.org/index.php?view=article&articleid=icns_2019_1_20_100301
- 2018 A New Framework and Protocol for Future Networking Applications Richard Li, Alexander Clemm, Uma Chunduri, Lijun Dong, Kiran Makhijani
ACM SIGCOMM NEAT <http://conferences.sigcomm.org/sigcomm/2018/workshop-neat.html>

- 2018 Survey of Internet Protocol and Architectures in the Context of Emerging Technologies [Kiran Makhijani, Richard Li, Alex Clemm, Uma Chunduri, Lin Han, Yingzhen Qu](#)
https://www.thinkmind.org/index.php?view=article&articleid=ctrq_2018_1_30_65022
- 2018 Robustness of IoT Application Protocols to Network Impairments [E. Liri, P. K. Singh, A. B. Rabiah, K. Kar, K. Makhijani and K. K. Ramakrishnan](#), 2018 IEEE International Symposium on Local and Metropolitan Area Networks (LANMAN), Washington, DC, 2018, pp. 97-103
doi: 10.1109/LANMAN.2018.8475048.
- 2017 Network 2030 – A Blueprint of Technology, Applications and Market Drivers Towards the Year 2030 and Beyond [Lead Author, Editor](#)
https://www.itu.int/en/ITU-T/focusgroups/net2030/Documents/White_Paper.pdf
- 2017 Next Generation Protocols – Market Drivers and Key Scenarios [Lead Author](#)
https://www.etsi.org/images/files/ETSIWhitePapers/etsi_wp17_Next_Generation_Protocols_v01.pdf
- 2017 GS NGP 001 Next Generation Protocol (NGP); Scenario Definitions [Contributor](#)
http://www.etsi.org/deliver/etsi_gs/NGP/001_099/001/01.02.01_60/gs_NGP001v010201p.pdf
- 2016 A Scalable and Dynamic Distribution of Tenant Networks across Multiple Provider Domains using Cloudcasting [Kiran Makhijani, Renwei Li, Lin Han](#)
https://www.iariajournals.org/networks_and_services/tocv9n34.html
- 2016 Efficient Service Auto-Discovery for Next Generation Network Slicing Architecture [Salvatore Talarico; Kiran Makhijani; Padma Esnault](#)
<https://ieeexplore.ieee.org/document/7919471/>