Spectrum and Infrastructure Virtualization for Next Next-Gen Cellular Networks

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Abstract: With the 260%/year growth of mobile traffic in recent years, cellular operators world-wide have begun deploying new wideband access technologies (such as 4G LTE) along with small cells. Each operator must also increase the amount of spectrum used in its network to keep pace with the traffic. By some estimates, a total of 1.2 - 1.7 GHz is needed to deal with the expected traffic load. However, finding new spectrum, a scarce resource, will be difficult. The cost of infrastructure deployment and operations are additional serious issues.

When a resource is expensive and/or scarce, the most common solution is the concept of dynamic sharing among multiple interested entities. We believe that advances in key areas (such as RF processing in software, virtualization technologies, wideband digital radios and near real-time network monitoring) will enable sharing of spectrum and infrastructure virtualization, in a way similar to the virtualization and cloud revolutions in the computing industry. This talk will highlight current Bell Labs programs that will enable dynamic sharing. It will also briefly touch on the regulatory steps necessary to ensure a smooth evolution.

Biography: Krishan Sabnani is currently Vice President of Networking Research at Bell Labs. He manages all networking research in Bell Labs, comprising nine departments in six countries: USA, France, Germany, Ireland, India, and Belgium. Krishan has conceived and launched

numerous systems projects in the areas of internetworking and wireless networking. His successful transfers of research ideas to products in Alcatel-Lucent and (previously) AT&T business units have had a major positive impact on the business. Krishan has also conducted extensive personal research in data and wireless networking. His contributions have played a major role in modern mobile networks, and his recent breakthrough re-engineering of routers has launched a revolution in network designs.

Krishan received the 2005 IEEE Eric E. Sumner Award and the 2005 IEEE W. Wallace McDowell Award. He is a Bell Labs Fellow and a Fellow of the Institute of Electrical and Electronic Engineers (IEEE) and the Association of Computing Machinery (ACM). He received the Leonard G. Abraham Prize Paper Award from the IEEE Communications Society in 1991 and the 2005 Distinguished Alumni Award from the Indian Institute of Technology, New Delhi, India. He also won the Thomas Alva Patent Award from the R&D Council of New Jersey in 2005, 2009, and 2010. He holds 40 patents and has published more than 70 papers.

Krishan received his B. Tech. in electrical engineering from IIT Delhi in 1975, and a Ph.D. in electrical engineering from Columbia University, New York, in 1981. He joined Bell Labs in 1981.

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