



Virtualizing Services In Pakistan

From Brick And Mortar To A Virtual Economy

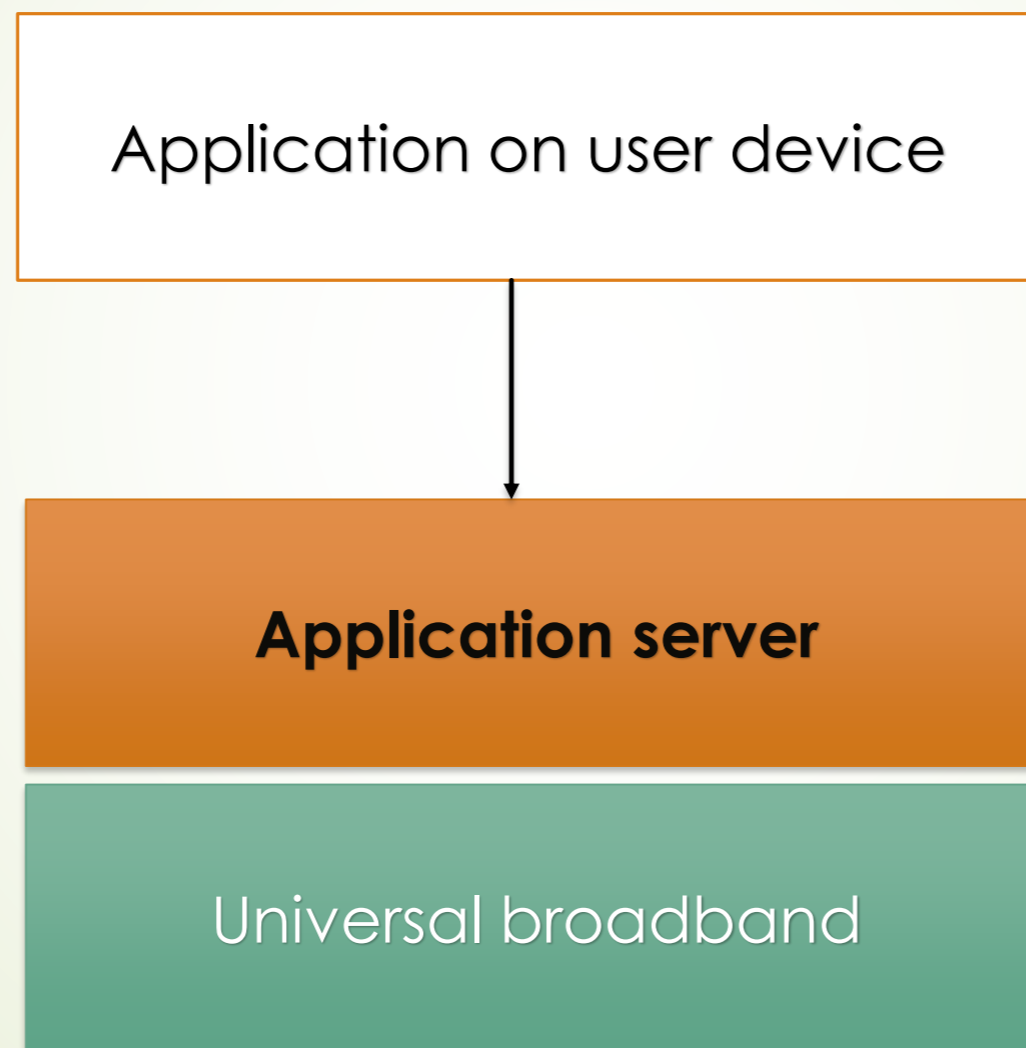
What Are Virtual Services?

- ▶ Virtual services are services offered over the internet:
 - Healthcare, education, financial, real estate
- ▶ For example:
 - Tele medicine: doctors can see patients 1000s of miles away
 - Universities: A virtual campus with infrastructure cost of \$100 - \$300 per student

Benefits Of Virtual Services

- ▶ Lack of human interaction reduces chances for human “error”
- ▶ Much more cost effective than brick and mortar
 - Govt can sell most real –estate allocated for public schools
 - Instead rely on virtual (online) schools
 - Not possible in all areas yet
- ▶ Telemedicine can allow rural areas access to doctors for minimal cost
- ▶ Virtual universities can easily scale
 - A virtual university supporting 100K students can be built for less than \$5M (Data center, web site, software, network)

Virtual services require universal internet access

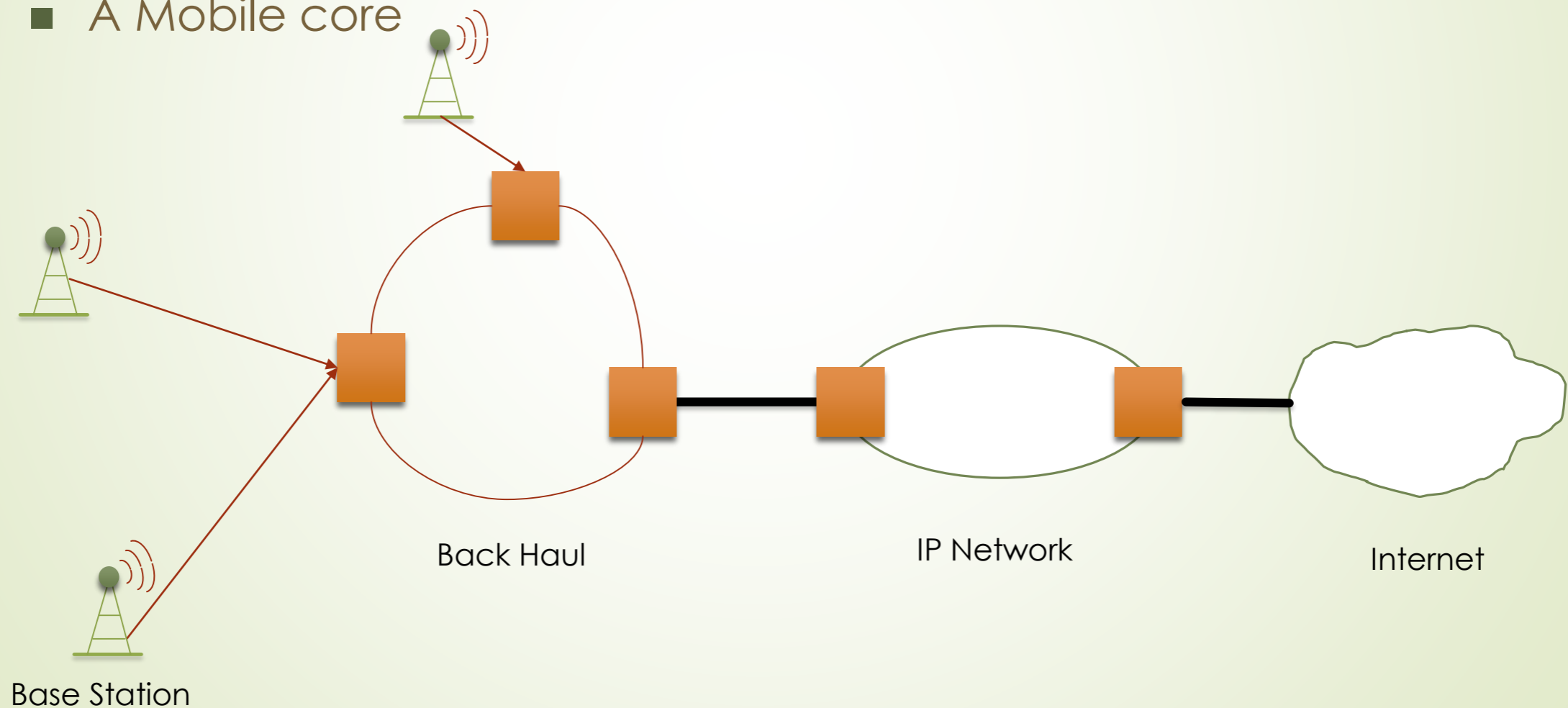


Universal Internet

- ▶ Last mile has to be wireless -5G or LTE?
- ▶ End users need 5G enabled tablets, laptops, or 5G-WiFi routers
- ▶ 5G base stations

5G Based Universal Internet

- ▶ 5G consists of:
 - A Radio access network
 - A Backhaul network
 - A Mobile core



Presentations

► Khalid Raza

- Khalid Raza is the CEO and founder of Graphiant, a Sequoia-funded startup. Khalid is widely regarded as a visionary in Internet routing protocols and large-scale network infrastructure. He was also the CTO and founder of Viptela, where he drove the vision and architecture of Viptela's technology solution and helped create the \$7 billion SD-WAN market. Following Viptela's acquisition by Cisco for \$610 million, Khalid took on the role of Distinguished Engineer, driving Cisco's innovations and market development.
- **Presentation:** Network options for Universal Internet ?
 - bandwidth per user
 - cost per user
 - total cost

Presentations (Continued)

► Dr. Suhail Chughtai FRCS

- Dr Chughtai is an Orthopaedic Surgeon & Medico. Legal Examiner, UK, being a Fellow of Royal College of Surgeons/Physicians, Glasgow, UK. He is also a Microsoft Certified Specialist & Tele-health Consultant for more than 15 years. His other roles are listed below:
 - Chairman: Medical City Online, London, UK
 - Director Telehealth: Association of Pakistani Physicians & Surgeons, UK
 - Faculty Lead Telehealth, Univ of Health Sciences Pak
 - International Ambassador: Patientory Association, USA
 - CEO: Citrus Health, Pakistan
 - Content Director: Citrus Health TV, Pakistan
 - Chairman: Pan Arab Telemedicine & AI Conference 2019, UAE
 - Telehealth Advisor: Adam Global Healthcare, UAE
 - Book Author: Telemedicine, a novel way to fight pandemic
 - Telehealth Articles Author in several Medical Journals
- Presentation: Building Telehealth service in Pakistan
 - requirements – bandwidth requirements, cost per patient etc

Presentations (Continued)

▶ Imran Qureshi

- Imran Qureshi spent 25 years at Cisco Systems focused on managing technology and sales enablement functions. He is currently the Chief Learning Officer at CyberMSI, a managed cybersecurity services company. Imran has a Masters degree in Computer Engineering,
- **Presentation:** What will it take to provide virtual education in Pakistan?
- bandwidth requirements, cost per user, other requirements

Presentations (Continued)

▶ Ahmed Shahid

- Ahmed has 25 years of experience. He is currently Sr. director of engineering at Marvell. He leads the Octeon baseband processor team. Prior to Marvell, he worked on multi-core MIPS processors. Ahmed started his career at Sun Microsystems, as a designer on the Ultra-SPARC processor core. He holds 15 patents in Computer Architecture/Design. Ahmed graduated with an MSEE from University of Rochester.
- **Presentation:** Building low cost 5G base stations and routers in Pakistan
 - What goes inside a base station
 - Engineering cost
 - Team size and skills needed
 - cost to build vs buy