Many like the financial crisis that precipitated a new world order, a quiet revolution of some sorts is happening in the telecom industry worldwide. The bankruptcy of stalwarts such as Nortel and the impregnation of Google and Apple into the mobile phone space at an amazing alacrity are changing the world order once dominated by the likes of biggies such as AT&T. What are these changes and what can we expect in the future? We explore in this article, the emerging technologies, market evolution, business models and regulatory interventions and indicate possible research directions in the area of data communications and networking in the coming days.

We begin with the Web as it has now become part and parcel of all businesses. Everything else depends on how good your web utilization is.

**WEB**

When Tim Berners-Lee, then a graduate of Oxford University, invented the World Wide Web at CERN circa 1990 as an internet-based hypermedia initiative for global information sharing, little did he think that after 20 years it would become such a hyper-phenomenon. In its early days, Web was a read only traffic was always one way, from web to readers. There was no possibility of adding new content or modifying the content. Eric Schmidt, CEO of Google, now defines Web as a set of “applications that are pieced together - with the characteristics that the apps are relatively small, the data is in the cloud, the apps can run on any device (PC or mobile), the apps are very fast and very customizable, and are distributed virally (social networks, email, etc.)”. Evidently, WWW has travelled a long way from what it started with. It has come of age by breaking the digital divide and making the information available for everyone out there looking for it. The move from information to interaction has changed the web from read-only to and read-n-write. From a developer’s perspective the web moved from html based web to more sophisticated Ajax platform.

Since the web now is more about the users content, it makes all the more about users prefer-
ences, user likes and user dislikes. As far as the ownership over the resources was concerned, the individual has gained in terms of democracy as he has every right to express freely on the web. The flow of information changed drastically with the emergence of social networks. You are connected with friends, acquaintances and relatives through the virtual communities and are constantly fed with what they want to share. The scalability of the mobile platform from phone devices to communication devices for both data and voice was critical on the diffusion of the web services and applications.

The emergence of Internet-based social media has made it possible for one person to communicate with hundreds or even thousands of other people in the network. Social media encompasses a wide range of online, word-of-mouth forums including blogs, discussion boards and chat rooms, consumer-to-consumer e-mail, consumer product or service ratings websites and forums, Internet discussion boards and forums, moblogs (sites containing digital audio, images, movies, or photographs), and social networking websites, to name a few (Mangold & Faulds, 2009). An important disruption we have been seeing is that the high-speed access networks and Smartphones enable users to access and use these social media through mobile phones, any time any where. These many-to-many group forming transactional communication networks and the associated exponential value generation in such networks was characterized way back in 2001 by Reed (Reed, 2001). The analysis of communication patterns in such social media and peer-to-peer networks will throw a light on their impact on network capacity, topology and routing.

NETWORKS

Ever since mobile wireless networks have taken the centre stage, wired networks have gone into the background just as they have been pushed to the core by the wireless access. It all began with voice in the wireless domain, but now data as usual is surging ahead as the killer service. In a recent research study, it has been pointed out that mobile data traffic will grow at a Compound Annual Growth Rate of 92 percent from 2010 to 2015, reaching 6.3 Exabytes per month by 2015. The study also points out “The mobile-only Internet” population will grow 56-fold from 14 million at the end of 2010 to 788 million by the end of 2015 (Cisco, 2010). These trends clearly indicate the possible exponential growth in the use of mobile devices to access Internet and bandwidth intensive application. Though technologies such as Long Term Evolution (LTE), LTE-Advanced, WiMAX, mobile WiMAX (IEEE 802.16e) are gaining ground in different geographical areas and being actively adopted by the mobile operators worldwide to provide enhanced user experience, spectrum crunch is evident. In tune with these trends, we see two active research areas in networking. One is Cognitive Radio (CR) that enables flexible and dynamic spectrum usage with cognitive capabilities for opportunistically seizing vacant Radio Frequency spectrum blocks in both licensed and unlicensed bands (Chapin & Lehr, 2007). In a major breakthrough to the proponents of CR technologies, IEEE released 802.22 standards earlier this year that defines the unlicensed use of frequencies between TV channels in the Very High Frequencies (VHF) and Ultra High Frequency (UHF) bands. However, there are still evolving research problems on interference management, frequency allocation algorithms and power management that need to be addressed. Wireless technology is also in the midst of an important stage in its technical commercial evolution from radios with behavior fixed in hardware to radios with behavior determined by software. The flexibility demanded by the radio systems can potentially be embedded best in software rather than hardware and hence the development of Software Defined Radios (SDR) (Partridge, 2011). Though the SDRs on their own could not stand on its own commercially, the CR combined with SDRs to provide flexible spectrum management provides an enlarged space for wireless researchers. Research is also needed in ways to allow software radios to use the spectrum appropriately.
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