The Operations of Telecom Networks and Data Centers Need a Paradigm Shift to Become Green, Reduce Global Warming and Optimize Total Cost of Operations (TCO)

Summary

There are approximately four billion mobile subscribers in the world being served through more than 4 million base stations. For this, the telecom networks and data centers remain powered up for 24 hours a day. With very low tele density in the emerging markets and ever increasing demand for more and better telecom services in the developed markets, in coming five to seven years, the world is likely to witness huge growth in telecom services and the subscribers. This would necessitate deployment and operation of more and more telecom and data center infrastructure. Combined together, telecom networks and data centers utilize around 4 % of total world energy consumption. Thus, the energy cost will mount further and so would be the carbon emission levels. There is an urgent need for a paradigm shift in the operations of telecom networks and data center servers in differentiated capacity configurations, one for peak hours and the other for lean hours load.

Analysis

The telecom networks utilization has a distinct pattern in a day. In the peak hours, the utilization is highest and in lean hours, it is the lowest. ***If from 11 pm to 7 am in a day, eight hours are taken as lean hours, the utilization of the networks is hardly between 3 % and 7 %.*** Therefore, for eight hours in a day, the network can function in a differentiated capacity configuration just enough to cater for 7 % of the traffic.

Thus, there can be a clear mandate from the wireless business head to the Chief Technology Officer (CTO) ***to program the operation of the network in Just Enough Capacity (JEC) configuration in lean hours only to bring it back to normal capacity configuration for rest of the day without any degradation in the values of the network Key Performance Indicators (KPIs) and Service Level Agreements (SLAs) committed to the customers.***

For example, GSM base station equipped up to 5, 5, 5 in normal capacity configuration can easily operate as 1, 1, 1 in JEC configuration in lean hours. Likewise, a CDMA base station equipped up to 4 carriers per sector in normal capacity configuration can operate in JEC configuration of 1 carrier per sector in lean hours. In fact, the entire wireless network comprising of Radio Access Network (RAN), back haul transport, core and trunks on Points Of Interconnection (POIs) can all be programmed to operate in JEC configuration in lean hours and normal capacity configuration for rest of the day.

The above innovation of operation of wireless network in ***JEC configuration in lean hours can be extended to wire line network, broad band network, entertainment network, any other systems or equipment which are dimensioned to meet the demand of services in peak***

hours.

Similarly, all servers hosted in data centers dimensioned to cater for peak hours load may not be needed in lean hours.***Thus, data centers can be operated in Just Needed Servers (JNS) mode in lean hours in which not needed servers are switched off only to be brought up for normal hours load.***

Telecom companies and other service providers who operate their networks in JEC configuration and data centers in JNS mode in lean hours can reap huge benefits in the saving of their operational expenditure.

JEC configuration of networks and JNS mode of operation of data centers have cascade effects in power saving. In lean hours, due to lesser consumption of DC power in the networks, there will be less generation of heat which would relieve the aircon and other cooling systems the burden of huge power consumption.

The service providers can save huge amount of money even up to 40 % of their power bills. The carbon emission levels would come down. The equipment life cycle would increase and spares inventory would also come down.

Equipment and server vendors would do well to equip their equipment and servers with the necessary features for these operational level measures which allow the operation of networks in JEC configuration and the operation of data centers in JNS mode.

The standards laying bodies like ITU-T, ETSI, 3GPP, 3GPP2 and various other forums can consider making such operation of networks and data center mandatory for all service providers in the world. These bodies can also modify standards and specifications of different types of RANs, transport networks, core networks equipment, servers etc to help the world convert the operation of all networks in JEC configuration and data centers in JNS mode say in next three years or so.

This has a similar analogy to the initiatives of countries that are stopping the analogue TV transmission and switching over to digital TV in a finite time period to optimally utilize the scarce resource of spectrum.

Finally,***telecom and technology regulatory bodies of the countries can include such technology operations measures like JEC configuration and JNS mode in the operators license conditions so that these really get implemented in an auto pilot mode.***
This would go a long way to make the world better place to live, as lesser and lesser hazardous radiations would be emitted.