How to save Telecom Business as Service Industry Handling a Vital Essential Service, at Verge of Collapse, World over.

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Introduction: No one can stop advancement of Technology; and then Technology changes too quickly too. However, most Technology advancements disrupt the paths it goes through and grows. Same is truer in Information Communication Technology also. Advancement in ICT brought in convergence of Systems & Networks, mode of connectivity, the end links and User end devices and converged various forms of ICT based transactions that helped to provide Universal mode of Telecommunication that help humanity across the word.

INTERNET is the best thing happened in Communication technology in past few decades. IOT and IOE are the golden catch words that change the whole world. As it appears to millions out there, strangling of Net neutrality will be a horrendous mistake.

Nonetheless, the following facts and concerns call for serious consideration of all stake holders, the Telecom Business groups, Regulators and the Government, lest the World Telecom get disrupted beyond retrieval.

IOT cannot happen it by itself. The 'things' in the IOT need huge variety of the partner systems comprising Mechanical, Electrical, Electronic and Digital components, ICT and vide variety of applications involved in IOT implementation. Therefore, rather better to be known as IP-OE (IP on Everything.) This is one area having lot of opportunities for the start- up companies can concentrate on.

Nonetheless, INTERNET is a generalized term for INTRANET that works on protocols known as INTERNET Protocol that can belong to all sorts information transfer over INTRA-NET within a close area like any Factory or organization or between networks far apart both of **Public** like switched packet data network PSPDN under the realms of **Public** Switched Telephone Network **PSTN** or between **Private** switched packet data networks 'P'-SPDN that do not rather should not come under **PSTN.** A mix up of it as happening now over World Wide Web www can eventually kill the systems dealing PSTN unless clearly demarcated with exclusive CLOUD for PUBLIC and PRIVATE use.

1. **Demarcation of Telecommunication network based on the level of responsibility.** According to ITU(T) there is clear demarcation of areas of Service level, Service areas and Service responsibility. Telecommunication networks by definition are demarcated based on level of its ownership and operational responsibility at the 'User level' the 'Service provider level' and the Government level.

From the Technology and Business perspective, the differentiation between Mobile Networks and Fixed phone network is slowly vanishing making Voice, Data / Multimedia and INTERNET characteristics in Mobile systems similar to these in Fixed Networks. Differences are the end link, type of access, bandwidth type & it's limitations and User end devices.

2. Discrimination and Demarcation between 'Public' and 'Private' Telecommunication systems and Networks.

Fundamentally Internet area network (IAN) originally **came into being by chance** without much regulatory norms in the beginning but grown enormously as World Wide Web and occupy a higher hierarchy level above the LAN, WAN and INTRANET and provides access to infinitely innumerous Servers 'Neutrally', currently for both 'Private' and 'Public' Switched Packet Data Networks (PSPDN) facilitating its interworking as World Wide Web. However, the LAN, WAN and INTRANET functional wise in the realms of Integrated Services Digital Network (ISDN) protocol make it identical to Private Branch exchanges (PBXs) and Private Branch Digital Networks (PBDN) outside Public Switched Telecommunication Network (PSTN) with its ownership belong to its Users in the 'User Level' and get connected and inter-connected and come under PSTN only with registered subscription, either of one of the licensed TELCOs or ISPs and get included in PSPDN which is part of PSTN. Refer to ITU(T) codifications related to definition of PSTN.

Accordingly, Internet Area Networks (IAN) that are Packet Data Networks come under someone's individual ownership and responsibility shall become Neutral only when it is part of any Public Switched Packet Data Network (PSPDN) operational wise.

Therefore, any Packet Data Network (PDN) belonging to private domain shall become a registered subscriber confirming to regulatory rules and Technical, Tariff and Security parameters of a Public Switched Packet Data Network (PSPDN) and get inter-connected with other private data networks (PDNs) only through PSPDN world wide unless with privately owned or leased links and connectivity and works as INTRANET now known with fancy name CLOUDS.

2.1. Here one should have a layman idea of what is World Wide Web. It is basically a world wide imaginary CLOUD. The innumerous servers in packet Data Networks in PSPDN across the word get linked to the huge Servers of INTERNET EXPLORER Providers like Microsoft, Google, Rediff etc. These INTERNET EXPLORER servers are interconnected and switch any PDN accessing it within itself or to other EXPLOERS forming the World Wide Web (WWW).

INTERNET Users get access to Servers of these EXPLORER Companies or Organizations located in many parts of the world through regional INTERNET Service Providers (ISPs) with own or leased links, or through TELCOs which are then connected to ISPs or direct to INTERNET Explorer servers using own or leased links.

3. Basic fundamentals of Public Switched Telephone Networks. PSTN

At the outset, before looking into and analyzing the part of Over the top (OTT) players play in the area of conventional Telecommunication, there seems to be an urgent need to revisit the basic fundamentals of Telephony and also about the need to keep these principles in tact lest the whole world of Telephony and related businesses get disrupted beyond retrieval.

3.1. By definition, *Public* Switched Telephone Network (PSTN) that includes *Public* Switched Land Mobile Network (PLMN) as part of it and *Public* Switched Packet Data networks (PSPDN) by definition are obliged to give access and connectivity to and between the legally contracted subscribers of own or one of same or other PSTNs and PLMNs and PSPDN anywhere across the world.

Contrary to the above, access to innumerous numbers of Private Branch exchanges (PBXs) and Private Data

networks (PDN) with International Domain Names (IDNs) do not come under the obligation of licensed Telecommunication Service providers (TSPs) unless those become part of one or other PSTN or PLMN by becoming legally and rightfully its licensed Subscribers and function within stipulated rules of their connectivity, Traffic load parameters & operational limits and Tariff.

It means PSTN/PLMN TSPs are not obliged to provide direct connectivity and access to Private Data Networks, LAN ,WAN and INTRANET of Private Data Servers of sorts it it's Internet Area Network (IAN) and do not enjoy *Net Neutrality* unless it is originated through as legally subscripted user of any PLMN / PSPDN in PSTN.

Same is true with ISPs as per its demarcation based on responsibility of its operation as licensed Service provider and its subscriptions under user level and its access to Internet area network IAN according to statutes and policies of the concerned Governments.

It means any private Internet area networks IAN and its individual owner of servers however big, cannot be allowed to control or restrict the openness and neutrality of PSPDNs forming World Wide Web (WWW) and therefore, the need to upkeep the concept of Net neutrality in order. In other words demand for Net neutrality without consideration of what being said above do not influence negatively the need to adhere basic rules and regulation related connectivity and other fundamental rules of Telephony.

It does not mean that Broad Band services such as 3G, 4G LTE and other NGN as advanced features of old generation FAX and DATA products are not to be provided in licensed Telecommunication systems. Definitely - YES; but restricted to access within the System and then also within PSTN that includes PLMN.

It also leads to the question whether stand-alone Public or Private INTERNET Service providers (ISPs) can provide digital connectivity to its subscribers and enable them get connected private PDNs and also use basic Telephony related services such as voice calls through IAN, bye-passing Telecom switching systems? Bye passing TSPs, for their own customers according to License conditions - YES; If through the Telecommunications Systems and Network, emphatically NO, unless ISPs are part of TSPs.

To sum up, it leads us to the greater question. Does INTERNET and World Wide Web come under the realms of Public Switched Telecommunication Network (PSTN) ??.

INTERNET, Yes. World Wide Web that Inter-nets millions of PRIVATE servers – No; at least until the Licensed Telecommunication Companies across the World change over their Systems and Network and transport fully IP based and the Telecom Service Providers (TSPs) and Internet Service Providers (ISPs) become one entity, lest it trolls the death bells of current Telecom Service Providers. There is a limit the losses can be passed on to the Users. Either way it will negate growth of Telecom.

ITU-T, ETSI and INTERNET standards organizations need to revisit this, the earliest the better.

3.2. Impact of Over the Top (OTT) service providers on Telephony related business.

It is suicidal for licensed Telecom Service Providers (TSPs) to allow Over the top (OTT) service providers poach all sorts of Telephony related products and services and its revenue along with it using Telco's systems, Network and customer base. **Hence one of the issues is whether the OTT players legally are subscribers of a PLMN in PSTN or not? If yes, the issue is reduced to method of connectivity and commercial understanding between the**

TSPs and OTT players. But in the case of accessing OTTs via Internet, how this can be ensured is a question to ponder.

For many decades in erstwhile DOT days Governments neglected Telecom and it is the Public Telecom Service Providers by licensed Private Telecom business houses including currently autonomous BSNL after privatization made the Telecom in India what it is now. Privatization of Telecom by governments do not mean that it is outside the reams of the fundamental rules of PSTN. But then it is to be seen for how long Telecom Technology, Network, Switching and Transport continue in the present form as IP based ICT is the order of the future that will also make some of the present problems and squabbles like Net neutrality, vanish.

As Telecom contributes to nations growth and GDP, it is in nation's interest to frame people centric Telecom policies and not money centric. Fact of the day is access to ISPs and to INTERNET are no more monopoly of Telecom Service Providers (TSPs). Access to INTERNET is now available through to ISPs operated by Cable TV network any many other sources. In other countries, unified services are available by Ethernet Passive Optical Networks (EPONs) that take care Telephone, TV, and INTERNET in one go. Devices that can penetrate any TSP's network and ISPs are already there. A lasting solution therefore, are in Future systems and networks that will be fully IP based handling Telephone, TV, INTERNET all rolled in one and will take care of the current issues related Over the top (OTT) poaching the TELCOs Subscriber base, Systems and Networks and Revenue.

4.1. INTERNET also need to grow continuously without boundaries to meet the needs of the day of all from Rich to Poor across the country and its the ever growing demands in the Future.

Now Internet is being used to access and acquire every form of information & knowledge, Personal and Business communication, Mass social media communications, various

applications for services, fast mushrooming e-commerce, Mobile banking and e-retail, as well as Small, Medium and large Enterprises, Communication and information exchange between various Private & Government establishments and People across the Country which is growing exponentially every day. Thanks to the software giants like Microsoft, Yahoo, Google, Rediff, Pinterest etc., for providing powerful Servers to facilitate access and interconnects for infinitely huge number of simultaneous Data conferences and Voice over IP over INTERNET over World Wide Web on near to or almost 'real time' basis.

Unless there are enough access pipes and bandwidths are made available between the end users and the millions of Servers in the mighty net, entire system will become slower and slower. Those who often complain of delays in getting connected and slow through put need to know that Internet work over a mesh of shared network of pure chance routing and throughput depends on availability of access paths with enough bandwidth in these pure chance alternate paths in every access points from the origination up to the destination. Any bottle neck in between anywhere will make the transport slow. A user contracted for 2 mbps data may not get same throughput when connected to a user having only 256 kbps connectivity. This is more true in case of real time applications and products. Here comes the need of strictly adhering the fundamentals of Telephony as described in the early part of this discussion paper.

5. Impact of transition from basic Voice and Data to Multimedia and IP based products.

The scope of ever growing Telecom business naturally face many disruptive junctures like in any other technology based businesses. Major shift of Voice based and other high speed Data and multi-media services over to INTERNET based usage will inevitably take away the business from Telecom Service providers to external digital, multimedia and various e-commerce and mobile banking service providers, and along with it goes out a

major chunk of their revenue. Please see what I wrote many years back: 'Impact of transition from Voice to Data & Multimedia'. http://wp.me/p1ZsI2-23

5.1. Major chunk of CAPEX of TELCO's Systems and Network and more importantly the REVENUE earned were from basic Voice and Data Services. Same is true with Non-telephony related Value-added services.

Fundamentally, Telephony related usage and Revenue in a given environment and Eco system, remain more or less constant. Non-telephony related value-added products and services such as Pay by phone and many other e-commerce related services using Telephone network and systems offer an excellent way to enhance Telephone usage and thereby enhanced revenue.

However, providing uncontrolled free access to external systems on circuit switched paths for long duration of real time applications, will cause congestion due to heavy traffic that will not only make the Telecom system to fail due to overload but also make other systems in the network to collapse due to congestion in the junction circuits. It will also clog the INTERNET.

5.2. With the advent of 3G/4G and new generation digital services, the transition from Voice call business to Direct and IP based Data and Multimedia already moved out substantial amount of business revenue from Telecom Industry to external service providers such as Banks, content providers, and other multimedia companies. Allowing external service providers to use the access through Telecom network and systems and Telecom SPs Customer base that are set up and run incurring huge amount of CAPEX / OPEX and heavy cost of License and Spectrum and are compelled to meet the need to expand it further in order to cater for these ever growing non-telephony related products and services. That is why I have been pointing out the folly of Government policies of Telecom such as delinking Spectrum from License and selling it by auction at high cost. In a developing country, Government policies on

Telecom shall be people centric not money centric. See my post "Who need Spectrum; How much, Where and When?

5.3. Revenue sharing is the way out. Telecom Industry will find it difficult to survive unless they ensure adequate share of revenue from these external Service providers and industries that by default use their customer base, systems and network. Telecom Industry therefore, has all the right to get adequate share of revenue from both Telephony related and non-telephony related value-added services and it is suicidal for them to remain mere onlookers while other industries hijack their revenue potentials.

6. How Net neutrality affect TELCOs?

As mentioned in Para 3. above, it is suicidal for TSPs to allow Over the top (OTT) service providers poach all sorts of Telephony related products and services and its revenue along with it using TELCO's systems, Network and customer base. It was already discussed whether OTT players are legally subscribers of a PSTN/PLMN or not, and if not why not.

6.1. Whether Net neutrality shall be applicable both ways?

Many are of the opinion that tariffing should be left to competition and the market place to decide. But how it can happen for a Zero-valued and 'Free basic' like products or service that are provided by some OTT players. Here is the importance to have relook at the term "Net Neutrality"

In normal Telephony environment, there is call charging based local call, national call or international call depends on the destination, time of the day and day of the year. Due to various reasons there can be different tariff for calls over different mode of connectivity, fixed mobile etc. Of course, with IP technology, it can

become cheaper, still unfair to ask for it at zero cost as the calls involve systems and networks of different stake holders. In fact revenue from long distance call contribute to provide cheaper local calls and other services at affordable cost to general mass.

Net neutrality vs Tariff neutrality!!

Looking closer one can easily discern that current controversy are based on User's concern more about Tariff neutrality than about Net neutrality.

Or is it better to make 'Tariff' also Net Neutral and leave it to the competition in the market place to decide?

Important aspect to be kept in mind is that means and ways of revenue sharing shall be such that it will not unduly increase cost of service and burden end users. Government and TELCOs should know that success of Telecom Industry as in every other Industry thrives on its business volume and the volume comes from its availability and affordability to general mass of country's population. Cost of Super hyped handsets and other user end devises etc., and passing on the high cost on License and Spectrum to users will increase cost of usage and will push the common people out of the system and the Industry goes down the drain. Please see my blog: Make Telecom Systems, network, Phones, product and services for the common man. http://wp.me/p1ZsI2-9i http://wp.me/p1ZsI2-9i

7. Compromise solutions to upkeep Telcos Interest with Net neutrality.

Openness is the prime strength of INTERNET. Everyone agree that strangling Net Neutrality will be a horrendous mistake. Therefore, is the need to ensure Net neutrality according to principles of Telephony without hurting TELCOS while safe guarding end user's interest keeping the basic fundamentals of Telephony intact.

As mentioned above TELCOS are slowly losing their monopoly on Telecom service delivery. **Increasing data usage charges as being proposed by COAI is not a wise solution.**

As mentioned earlier, in every business, volume of user base brings in growth and volume can happen when the products and services are accessible and affordable to general mass. Increase of data charges will make it unaffordable to a large portion of subscribers and many would fall off. On the other side many more who currently use the communication service through TSP channels will move over to OTT based services causing further loss in revenue.

7.1. What can be the solutions?

To get over the current stalemate what is needed is a TSPs look for compromise solution by converting OTT like services to their advantage and continue to ensure Net neutrality without hurting Telcos and of course, also safe guarding interest of the end users.

In the present set up the end users can continue to enjoy Net Neutrality as far as TELCOs tow the line using compromising its interest and to compensate it Government need wake up and do away the policies of milking TELCOs with heavy cost on License and Spectrum. Please see my blog: **The Never Ending Telecom Muddle in India.** http://wp.me/p1ZsI2-gG

Such being the situation Governments had pushed the Telecom business into; the TELCOs would not dare to indulge in higher and higher investment needed for the high-tech data networks and access pipes to support other's e-business needs with no means of adequate return on their investment.

The Network Operators /ISPs therefore, need to find strategies and methods to get adequate share of the revenue collected by e-business units that use their customer base, their network and

resources. Many are of the opinion that market competition will take care of the issue; but how market competition can happen in zero cost service?

7.2. Fully IP based systems and TSPs & ISPs rolled into.

With further advance in technology and with <u>fully IP based systems</u> replacing current mode of telephone exchanges, it is possible to make "<u>TSPs and ISPs rolled into one</u>"; and extend its service area. This can happen only if the present form of licensing based on areas co-terminus to Telecom Circle is fully replaced with giving license on Pan India basis. If the Government is concerned about tariff neutrality between TSPs and OTT services the spectrum required by TSPs from time to time should be at free of cost and License cost recovered on revenue share basis.

7.3. Digital Connectivity for free INTERNET access everywhere is the key issue to be tackled. The easy way out is to start with providing in-house connectivity EPON providing with OF cable to every place. Provision of digital connectivity by taking OF cable along with Electric Power line connection to every building as currently being done by TV and ISP companies can be tried. Alternately Electricity service providers can themselves become ISPs and provide MODEMs to provide Internet services on these and remote reading digital Electric meters and make electric supply on pre-paid basis.

TSPs can tie up with Electricity department and provide Micro cells for Mobile telecom on every other electric pole for 3G/4G access and WiFI/WiMax connectivity on the roads everywhere. This and with changing over to fully IP based systems, TSP and ISP rolled in one and INTERNET connectivity provided from anywhere and everywhere will ensure Net neutrality and Tariff neutrality without the need of intermediaries like OTT players for this. Better to keep the proverbial Camel out of the tent. If at all it need be done for other reasons using as OTT players, it shall be like any other licensed Service provider connected to TELCOs/ISPs.

7.4. Need of Payment Gateways in PDN for apportioning and sharing of revenue.

It is to be reconciled that the e-business and e-services related to 2.5G, 3G /4G and Data services over INTERNET involve 'High Volume' of 'Low Value' payments on 24/7/365 basis and these cannot be done by direct payments or through banks or regular credit card companies that are mostly linked with bank accounts of the users. Also these payments can neither be handled by the Network operators/ISPs nor by the Service provider/e-business units as the value of each transaction is known only to the e-Business/Service provider who finally sells or provide the service.

This is the most critical issue and the high tech Telecom and IP related e-Business cannot take off and the Network Operators/ISPs cannot hold on to sustainable business plans until it is addressed and resolved.

Micro-payment Gateways in PDN is one such idea to get back part of the revenue generated from e-business based on data services. This need coordinated efforts by all stakeholders and the regulators.

8. Concept of Payment Brokers middle way systems.

To be in line with technology advancements, the network operators have no choice but to induct the new technology systems related to Telephony and non-Telephony value added systems in their networks and find means and ways to ensure sensibly viable business propositions. As mentioned earlier, the data related services gaining predominance, and the revenue potential moves from Network Operators/ISPs to external Service Providers and e-Business units, Network operators/ISPs have to look for methods to grab their share of revenue generated in the vast Packet data network PDN beyond the service area of the TSPs to survive. Here lies the emphasis of the Payment Broker systems, which can

manage the accounting of payments, apportioning of it and sharing the revenue generated between the stakeholders.

9. Security is also a major concern.

IOT and IOE are great, SIE (Security in everything) is equally if not more, important.

Volumes can be written on the hazards a fully open system can cause to various areas of security. One method to ensure security is to provide a two level access to Internet. This can be done by having Exclusive Govt. owned GSM Systems & Networks for administration and Crisis /Disaster management. Please see my blog in the link: http://wp.me/p1ZsI2-dh

Another way is to have an INTRANET layer as INDIA_CLOUD below World Wide Web for all such purposes.

Please see schematic by clicking the caption below:

Net Neutrality

Net neutrality without hurting Telcos and end users. http://wp.me/p1ZsI2-ES
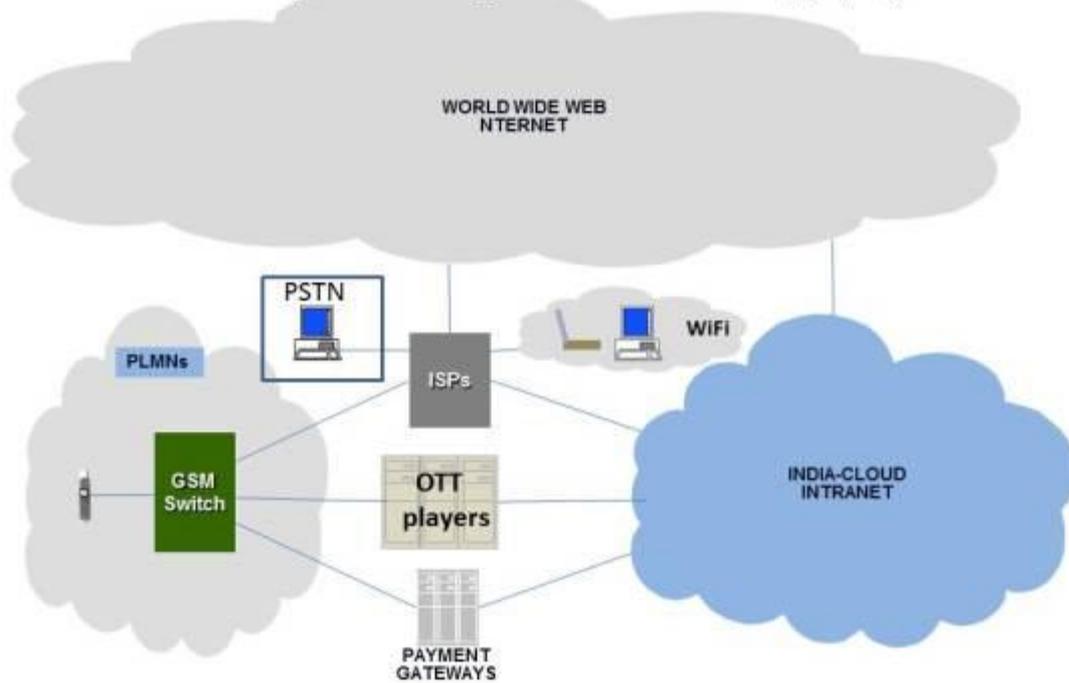
1. Licensed OTTs & ISPs shall function as subscribers of PLMN.
2. Payments Gateways appropriate revenue share between ISP's/OTTs & Telcos.
3. INDIA-CLOUD identifies and filters access to INTRANET & INTERNET services.

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10. INDIA CLOUD and Cloud computing.

Obviously, such payment broker system mentioned above cannot be managed by individual Network operators/ISPs as the Service Providers and e-business units are common platforms shared by customers of many different Networks/ ISPs. We are very much vociferous about Digitization and Digital India. Why not we have our own powerful servers and Explorers like Microsoft, Google etc., etc., set up and reside in India exclusively for India- Cloud as India Wide Web (IWW) below the World Wide Web (WWW) to start with and managed by Cloud Computing for obvious reasons now and later become the WWW confirming to all regulatory and business issues mentioned herein.

India-Cloud as proposed currently, need to be fully firewalled to ward off unlicensed service providers poaching products and services from existing licensed service providers or else, using their technology systems, Network and Spectrum.

This can be realized by routing out all non-telephony related data access to Internet direct through the ISPs and all Telephony related service requests (such as IP based call connecting) routed over circuit switched toll free access to licensed OTT players associating the payment Gateways for apportioning and sharing of revenue between the TELCOs and OTTs. As all non-Telephony related services will be routed out to Internet as happens now there shall be no complaints from the end users of Internet.

Net neutrality without hurting Telcos and end users. http://wp.me/p1ZsI2-ES
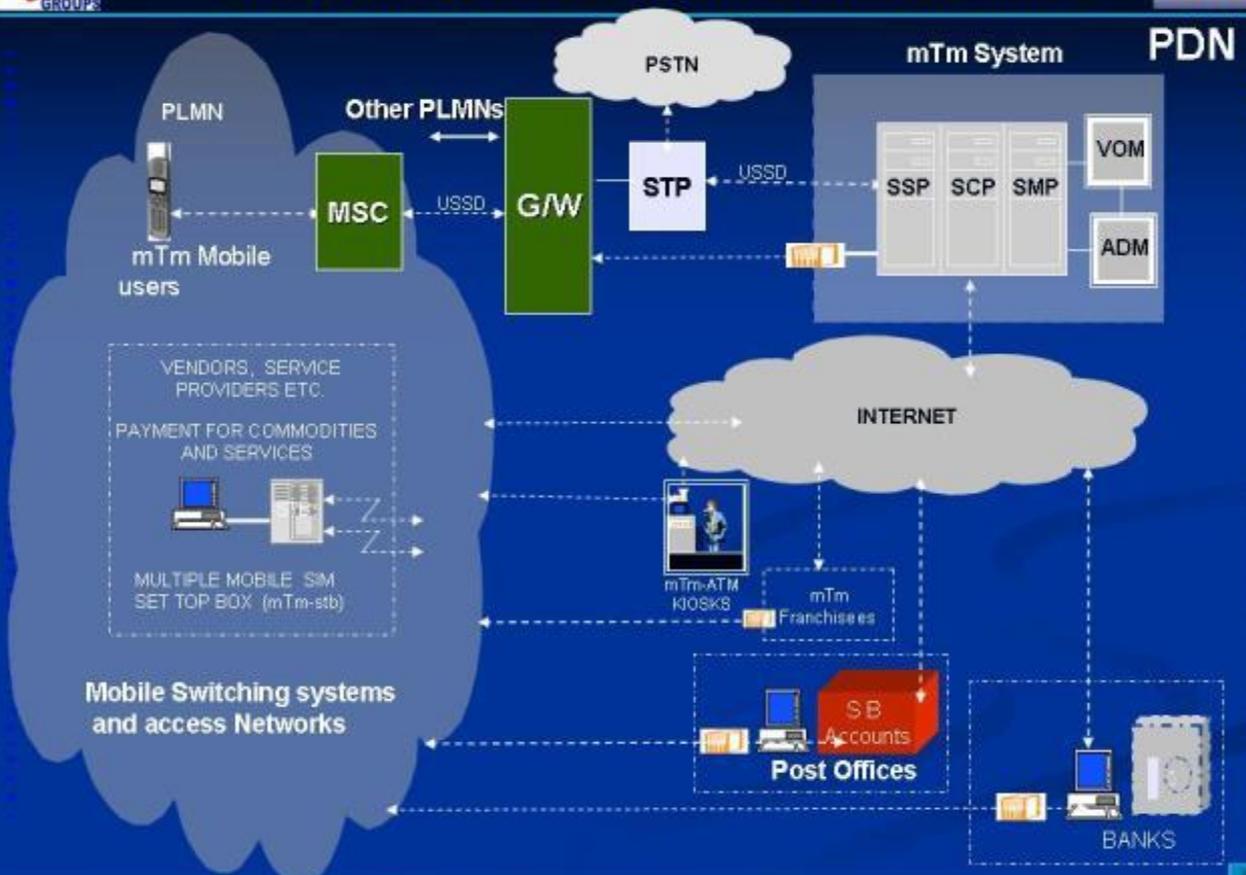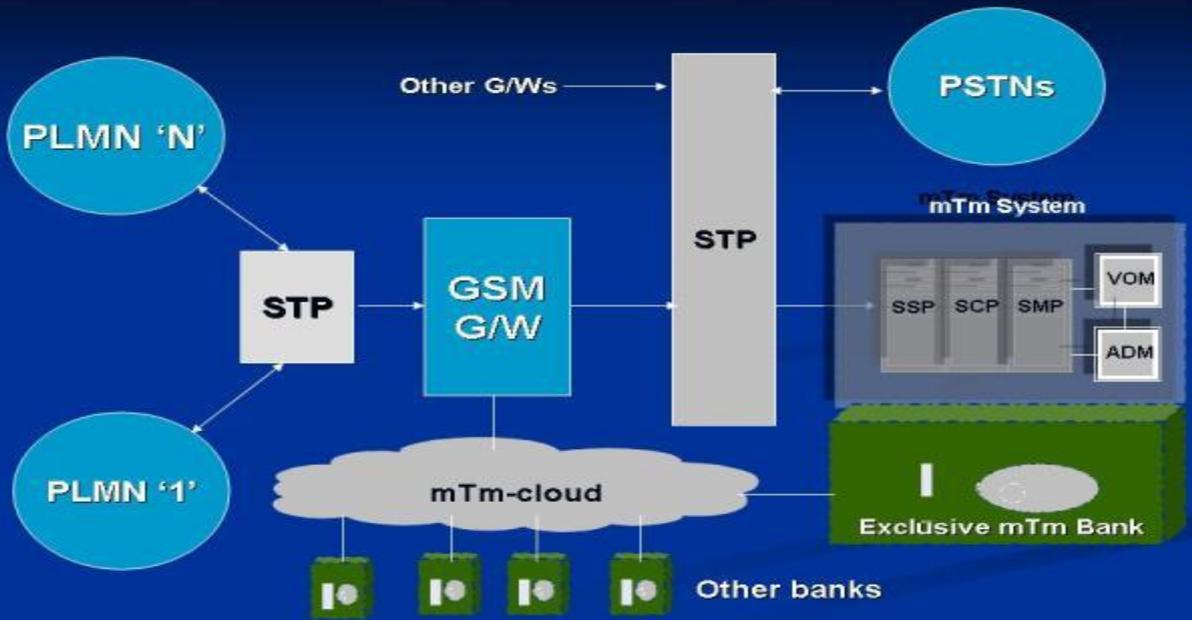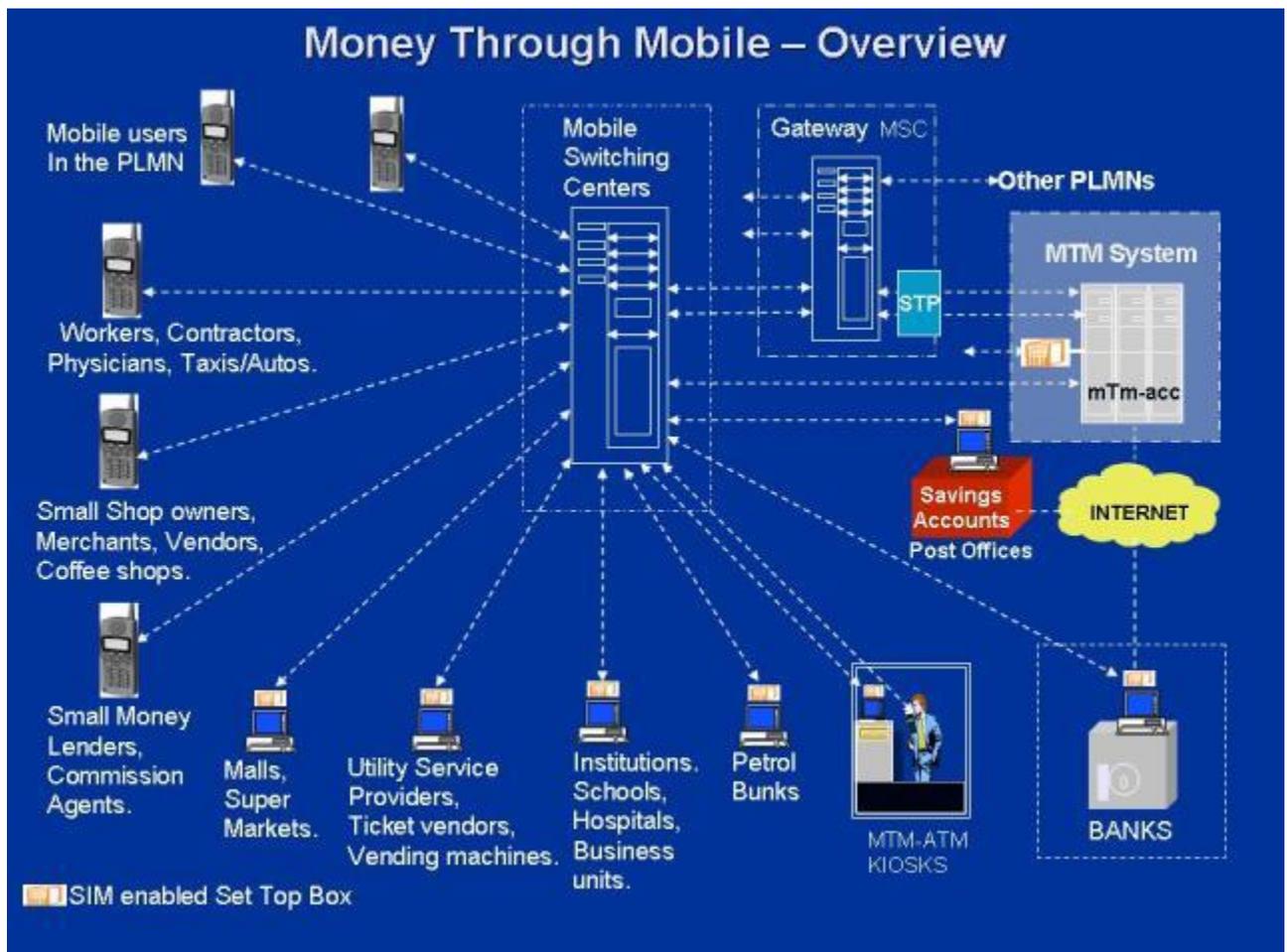Idea of exclusive OTT IP Switch to handle all access to and from universal OTT players.
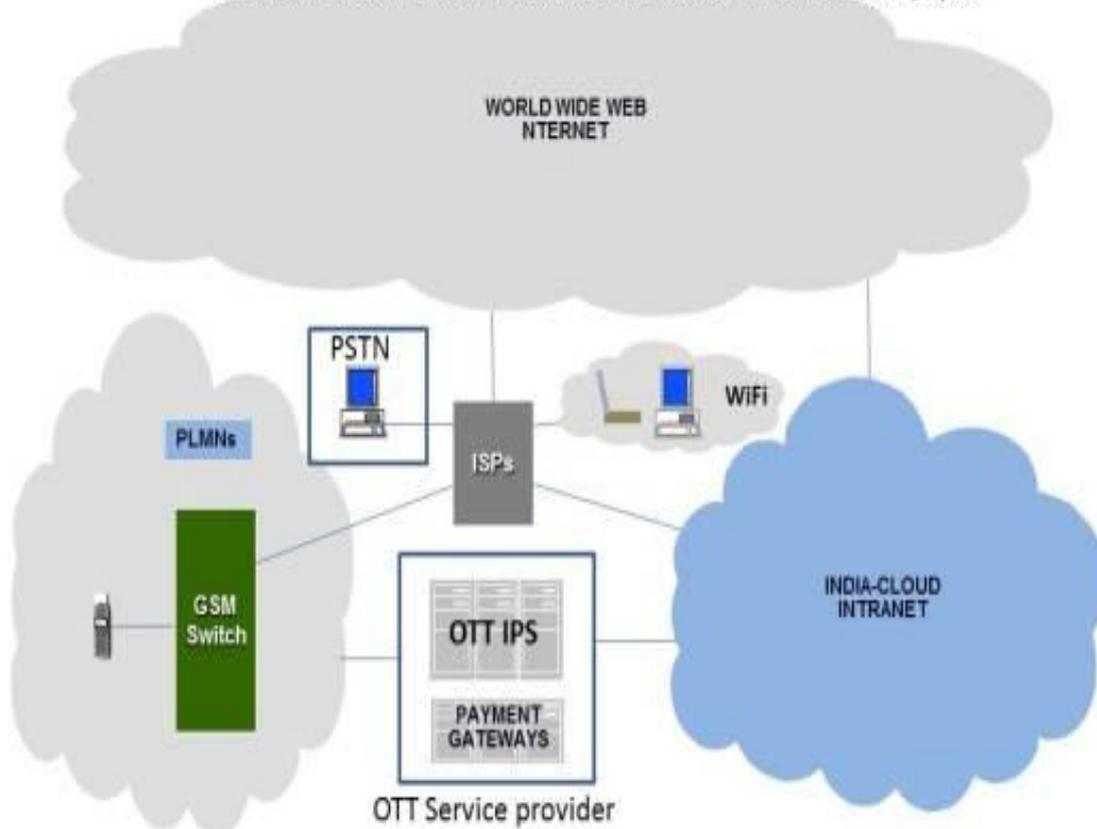
1. Exclusive Licensed OTT IPS IP Switch) that can access any and every PLMN.
2. Other licensed OTT players get access through OTT IPS via India Cloud.
3. INDIA-CLOUD identifies and filters access to INTRANET & INTERNET services.
4. Payment Gateway (PG) is associated with OTT IPS

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Typical example may be seen in what I had been propagating for long:

"Money through Mobile" (mTm), a system that supports all sorts of money transactions and e-commerce by phone users transparent to Banks and banking systems setup and owned by a consortium of service providers is an option for telecom service providers to look into. Please see article on Universal Money Management by phone. http://wp.me/p1ZsI2-4g

Exclusively banked Universal mTm System

Money Through Mobile – Overview of Network Elements

Money Through Mobile – Overview

Conclusion. Coming back to the Net neutrality issue, please see my reply to TRAIs consultancy paper on the Pandora's Box on Regulatory Framework for Over-the-top (OTT) with some short term work around ideas till entire systems comprise of IP based switching and transport, end to end.

My response to the questions in TRAI consultancy paper on Regulatory Framework for Over-the-top (OTT) services is in the link http://wp.me/p1ZsI2-G5 or click on the caption to open the PDF file. Reply to CP on TRAI_OTT (Q&A) (5)

Knowing fully well that the ideas and opinions in my answers being against general view of many millions on this; it is most likely to end up a wasted effort by TRAI, I did not spend more time on it to fully refine it. Of course, like everyone, I would also like to have everything free, but that doesn't change facts. Fact is that I had tested out most of these OTT applications a decade back (Money through Mobile mTm for instance) but did not to push it forward exactly for these reasons.

As mentioned earlier, the final solution is in changing over to IP based systems, network and transport, the earlier it happens the better for all, the TSPs as well as for the consumers.

Please see my Counter comments on TRAI CP on Regulatory Framework for Over-the-top (OTT) services. http://wp.me/p1ZsI2-GA

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