



Aura Ventures
Aim to Achieve

Aura Ventures

Convergence

Ver 2

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1. Executive Summary

With the ever increasing demand for connected homes and QoS not being compromised for the same, it is imperative for operators to consider options for increasing their penetration as well as maintaining QoS at the last meter.

The number of IP based applications in the telecom and the IT sector has grown tremendously. There is abundance of content available in sync with the demands of today's generation. There is a big market for these services with extremely high financial rewards.

Operators though are already finding it difficult to provide and manage such services with the physical network layer that is being provided in today's real estate industry.

There is therefore an immediate need to find a cost effective solution to the problems raised by conventional legacy networks, which are today being upgraded to deliver "fractured" next generation services, in a highly inefficient manner.

With wide acceptance of Passive Network Infrastructure Sharing in the Wire-less Domain, there is also a growing need to have players in the Converged Infrastructure Sharing domain to bring about Fixed - Mobile Convergence (FMC).

2. Real Estate and Technology

The identified telecom services in any real estate location are as under:-

- a. In Building Mobile Coverage (GSM, CDMA, UMTS)- ≤ 5 Operators
- b. Wi-Fi (WLAN)- 2 Operators
- c. TETRA- Not very prevalent
- d. VoIP and DECT Phones- 2 Operators
- e. ISP/Broadband on Fiber (FTTH)- 3-5 Operators
- f. Local Cable Operator (LCO) ≤ 2
- g. IP based Building Management Services (IP-BMS)- 5 Operators using different products

Real estate developers also need to install all necessary & statutory building and facility management infrastructures such Power Management, Fire Alarms, Heating, Ventilation and Air-Conditioning Control, Parking Management, Voice Communication, Video Surveillance, Resource Tracking, Access Control, Video Door control and Lighting Control.

One network infrastructure is required for each of the building/facility management services in addition to the individual network for each of the service and content provider, which is laid at the last meter!

Operators have to invest huge CapEx in installing this infrastructure and at the same time have to operate and maintain this system at their cost till perpetuity. A number of parallel infrastructures further result in a cluttered network, which is highly liable to frequent failures and breakdown. This further increases the operation, maintenance and administrative costs, thus raising the operator's OpEx significantly.

For telecom operators, there is a niche market segment to be captured in India today. The customers in this segment belong to the vibrant and tech-savvy young generation. These gadget-freak customers demand “Always Connected Premises” to access the ever increasing bandwidth hungry applications. Age-old copper infrastructure is not capable of providing these upcoming IP based services.

The bandwidth requirements are increasing by a factor of ten every five years and the way things are moving, this number can be expected only to increase manifold. In such an environment, it is advisable for operators to install an infrastructure which is capable of carrying all present and future services.

3. Need

With the changes in user needs, data based applications have taken over voice based applications (ARPU for operators is more and more dependent on data usage). These changes have occurred in all user segments and are equally influencing the technology needs to implement the required applications from an operators perspective. The core areas where such technologies will be needed are:-

a. Residential

The present day tech-savvy generation needs reliable and quality telecom and internet facilities with a very high QoS. Bandwidth requirements are growing steeply since contents such as IPTV, VOIP, VOD and MOD are available and the operators need to have infrastructure to deliver these services. The ability to provide

better coverage in buildings would also enable the operators to achieve a higher ARPU on a converged infrastructure.

b. Commercial Complexes/IT Parks

Commercial complexes such as Malls and IT parks are using facilities such as Broadband, Wi-Fi, Wi-Max, IP/Video telephony on a regular basis. The quality and scalability of services is very important in this segment as individual enterprises require high capacity dedicated bandwidth round the clock. Fiber is the only way through which the demands of this segment may be fulfilled.

c. Special Economic Zones (SEZs)

By the virtue of its area and a large number of individual enterprises, design and capacity planning need to be done very carefully, keeping in view the future technology requirements of the individual enterprises. Facilities such as High Speed Broadband, Video Conferencing and Wi-Fi are very important for this segment. Wi-Max may be required for securing reliable internet access at every point in the premises in the days to come. Quality, Reliability and Scalability of services are again very important issues for SEZs.

d. Hotels

Bandwidth requirements for entertainment, communication and building management services for hotels have grown phenomenally. Further, the hospitality sector by its definition and virtue of high competition has to maintain best facilities as well as update the same regularly. This is a niche market for service and content providers. The only apparent barrier in exploring this

segment is the physical infrastructure layer, which is not capable of delivering these services due to the high QoS needs.

Enterprises

Quality and reliability of services are extremely important for extending technology services to the hospitals and other such enterprises. Same is true for other enterprises and public places such as airports and hi-tech stadiums.

Interpretation

From the above it is apparantly clear that there is a huge market for the hi capacity needs at various locations.

Bottlenecks

Though there exists a huge opportunity for leveraging are certain questions to be asked:-

- a. Who is responsible for deciding the technical specifications/ requirements of a particular real estate project, keeping in view the operator's present and future requirements?
- b. Who owns the responsibility of providing quality services to the end-users after the building is handed over to the users - the realtor, the operator or the end user?
- c. What will happen if the required bandwidth exceeds the available bandwidth in a short span say two years? Is there a provision for additional bandwidth?
- d. Do all operators have an equal access to the real estate location under question?

- e. Are the operators making the most of the available revenue in the real estate segment?
- f. Are the operators providing their services in the most cost-efficient way?

Unfortunately, the answers to above questions present a pessimistic picture to operators. Technology is evolving manifold and barring a few, the realtors do not have the best people to understand the technology needs and formulate a solution. Currently, almost all realtors are installing copper infrastructures at their premises which in the long term is a wasted effort.

It is not intelligent to waste critical resources such as copper etc in providing parallel networks (average 20 in a complex). The main issues which an operator faces due to poor infrastructure are:

- a. Copper based band limited infrastructure
- b. Poor quality of content at last meter
- c. Poor customer experience

The end user dis-satisfaction further translates into loss of revenues and churn for the operator. When operators are not able to maintain the QoS for the traditional services, there is no question of providing new and upcoming services, resulting in further loss of revenue.

The current competitive landscape at the last meter is also not very good. Some operators secure the right of first entry which is monopolistic, resulting in an unequal distribution of market share depending on the first entry. This is not a healthy situation both for large and small operators. Understandably,

small operators loose a lot because of the monopolistic rights acquired by the incumbent (large) operators.

3.2 Role of Neutral Operator/ Anchor Operator

From the above enumerated facts it is apparent that there has to be a fiber based infrastructure which is future-proof, which is neutral, and can support wireless, wireline and media. The best capability of the fiber platform is its bandwidth and scalability. All the Building Management Services need to be integrated on this fiber platform. Thus there will be only one network that is very simple to operate and maintain and is scalable for future. It also is efficient and a better lifecycle.

Converged wire-less and In Building coverage will ensure reliable mobile and wi-fi coverage within the entire premises. The ability to provide better coverage in buildings would also enable the operators to achieve a better 3G and LTE coverage. It is imperative that a Neutral Access Network platform is an automatic solution to the questions raised above and is therefore the way forward. The responsibilities are as under:-

1. Installation
2. Activation and maintaining the shared access network.
3. Act as a technology partner for the operator and will help in installing and maintaining the system.
4. Responsible for abridging the existing gap between the operator, the realtor and the end user.
5. Provide software interface to the hardware installed and provide excellent customer service facilities to the end users using Interactive Voice Response System (IVRS) and Website.

6. Responsible for complying with the directives of the regulatory authorities as applicable to different service and content providers. It will also be responsible for providing technologically compatible systems to them.

3.3 Applications

Various applications which can be undertaken are:-

Fiber to Home/Office (FTTH/X) - This will cater to the wire-line needs and will provide sufficient bandwidth for provision of necessary facilities in the building complex. Passive FTTH/x infrastructure includes fiber laid in the premises while active infrastructure comprises of GPON, Routers, IPBX and Servers.

Various applications which can be hosted are :-

- a. Broadband at 30 Mbps (Can be scaled upto 1 Gbps – Bandwidth on Demand)
- b. Wi-Fi
- c. Cable TV/IPTV/DTH
- d. Video Conferencing
- e. IP Telephony
- f. Videos and Video on Demand
- g. Movies and Movies on Demand
- h. Games and Gaming on Demand
- i. Intercoms/Video Intercoms

For Wireless Technology

Common Shared Wire-less and In Building coverage (IBS): It enables the wireless coverage for various technologies i.e.

GSM, CDMA, W-CDMA and Non-cellular standards such as Wire-less, WLAN/Wi-Fi.

Advantages of a Shared Wireless System are:-

- a. Single antenna for CDMA, GSM, UMTS, LTE and Wi-Fi etc.
- b. Excellent mobile connectivity on all floors of building complexes, including basements. Assured standard QoS for all sharing operators
- c. Increased revenues for the operators due to higher number of matured calls and longer duration of calls
- d. Increased revenues for ISPs as a result of better and enhanced Wi-Fi coverage
- e. IBS can cater to the high speed data networks
- f. IBS off loads the macro network traffic at a specific site
- g. More and mobile operators are now using the leased lines for reaching prime business sites instead of Macro Outdoor Sites
- h. IBS attracts additional mobile subscribers due to enhanced network quality and accessibility to mobile internet applications and other services that require high data-rates and capacity
- i. Internet Browsing through Wi-Fi on the laptop in the entire area

4. **Conclusion**

With the concept of a converged infrastructure operators will no more have to invest heavily in CapEx and associated OpEx and at the same time be able to enjoy enhanced revenues by

the virtue of better QoS and content delivery capability at the last meter.

It is pretty evident that as of now the industry is only focussing on wireless growth however there is an opportunity leverage converged infrastructure and enable operators deliver state of the art content at the last meter on both fixed and mobile networks.

Glossary

- CDMA: Code Division Multiple Access
- BMS: Building Management Services
- DECT: Digitally Enhanced Cordless Telecommunications
- FTTH/X: Fiber to home/office/enterprise
- GSM: Global System for Mobile communications
- IBS: In-Building Solutions
- IP: Internet Protocol
- IPTV: Internet Protocol Television
- LTE: Long Term Evolution
- MOD: Music on Demand
- NANO: Neutral Access Network Operator
- QoS: Quality of Service
- TETRA: Terrestrial Trunked Radio
- 3G (Third Generation): Radio Technology or wire-less networks, telephones and other devices. Narrowband digital radio is the second generation of technology.
- UMTS: Universal Mobile Telecommunications System
- VOIP: Voice Over Internet Protocol



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- W-CDMA: Wideband Code Division Multiple Access
- WLAN: Wire-less Local Area Network

Appendix A

Common Shared In-Building and Outdoor Solution

Defined coverage! Defined capacity!
Futuristic Needs: Win Win for All

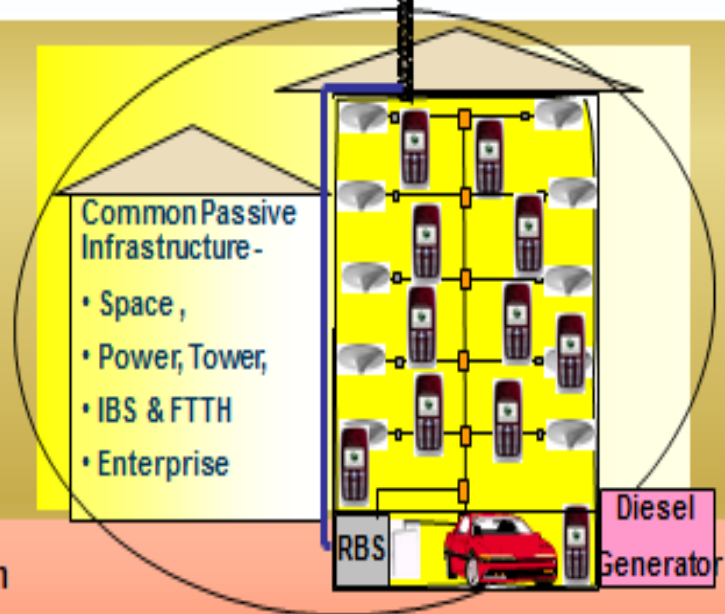
Solution for

- Enterprise Solutions
- Hosted Solution
- Managed Services

Common Passive Infrastructure-

- Space ,
- Power, Tower,
- IBS & FTTH
- Enterprise

Common Antenna
& Feeder/ IP Network



Customer- Win Win Situation

Realtor- Win Win Situation

Service Provide- Win Win Situation



The Last Meter Converged Network

