Converged-Digital IP Network for Hotel

A New Perspective for Better Operation Efficiency and Business Agility

Alphamatic Whitepaper

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Section 1

Executive Summary

This paper presents the challenges faced by some of the hoteliers which have already implemented using the earlier network design and the workaround solutions to overcome these challenges with minimum investment cost.

Besides these, it also provides a new perspective on the converged-IP network concept which physically connect the Hotel Office Network (HOA) and Hotel Guest Network (HGA) which are isolated in the previous design because of security and performance issue. New technology such as VLAN, has enable networks which were segmented physically, are now able to connect together to achieve resources sharing and yet meeting the security and performance objectives.

On the High Speed Internet Access (HSIA), it is now a necessity in every hotel. Guest expectation has increased from just "wired internet access" to "reliable, high speed, wireless internet access by any mobile device in any vicinity of hotel premise". Meeting this expectation has posed a lot of challenges to existing and new hotel operators. This paper also highlights the new technology and the critical components required to make this setup a successful one.

Server Virtualization, a proven solution, deployed by many companies regardless of size and industry, has not been optimally leveraged by most of the hoteliers because of the discouragement from some major PMS application providers. This paper also share on how this technology could be fully maximized and how it can benefits the hotelier in lowering down the total cost of ownership for IT, improving business agility as well as system uptime.

Section 2

Introduction

With the continuous advancement of technology in addition to the endless demand from the guests, hoteliers are finding it challenging to meet the expectation of their clients.

Regardless of the hotel establishment and positioning, be it full service hotels, such as InterContinental, Starwood – Westin, Hilton, Marriott, and Hyatt hotels which contain upscale full-service facilities, or historic inns and boutique hotels which contain facilities of varying size in unique or intimate settings with full service accommodations, as well as small to medium-sized hotel establishments that offer a very limited amount of on-site amenities, are now exploring technology such as reliable and seamless wireless high-speed Internet access, IPTV, Digital TV etc. in order to differentiate and outclass their competitors of similar class.

Providing Internet access is good for the guest but not good enough; providing WIFI for internet access in the room is better for the guest but it is still not up to the expectation of most of the clients today. In fact, providing consistent and reliable WIFI high-speed Internet access in the room are now the bare minimum requirement for business travelers who put up a night in any size or class of hotel.

Besides Internet access, hotel guest wants more! They want comprehensive and up-to-date TV programme with HD quality picture, an option for video on demand (VOD) media, an ease of access to hotel information from a click of button from their TV etc.

This paper writes on the solutions available today and tomorrow for hotel operator to consider not only for those who are running the existing hotels but also for those who are setting up a new hotel.

It is always good to do things “right the first time”. New hotel has the liberty and freedom to consider the right solution with minimum investment. Existing hotels who have already deployed an obsolete design would have to consider some workaround solutions. For example, to provide IP TV solution, a good wired connection in every room is required. To revamp such as re-install network cabling to every guest can be a hassle and costly for these hotels.

Challenges

Major IT Challenges faced by hoteliers are listed but not limited to the followings:

i. Isolated Networks: Generally, there are two network segments in a hotel, one is for office and one is for guest. These two networks are separated because of security and performance issues. Because of the isolation, resources are not able to be shared and optimized.

ii. Non-managed Wireless LAN – Some of wireless solutions deployed are standalone and non-manageable. These solutions are only suitable for very small environment such as SOHO or home used.

iii. Intermittent Wireless Coverage – The cause of the intermitted wireless coverage could be due to insufficient number of Access Points (AP), improper installation of AP, non-managed wireless solution, unproven products used etc.

iv. Internet Bandwidth Issue – Inability to limit, control and monitor the right bandwidth used by guest has posed the greatest challenge to hotelier.

v. No WIFI access at guest room – wired to internet at guest room is no longer sufficient. Providing WIFI at lobby area only is no longer acceptable. The access to WIFI at anywhere and anytime within the premise is a MUST.

vi. Network limitation for IP-based solution – with the advancement of technology, more IP-based devices will emerge. It is a vision in which more devices, appliances and gadgets will be IP-based and it can be connected via wired or wireless connection. To ensure the network is ready for now and for future is very important in meeting the needs of business. 100Mbps wired connection is a past and 300Mbps wireless connection will be insufficient very soon. 1Gbps for wired connection is now a defacto standard, and very soon 1.3G wireless connection (AC type) will be a norm.

vii. Server proliferation- Distributed computing has resulted in server proliferation. This phenomenon has caused high consumption of power, cooling; largest datacenter footprint required; higher maintenance and support cost which bring up the total cost of ownership. Capacity testing and planning shown averagely only about 10% of the processing capacity used on each server.

viii. Physical Server limitation – Physical servers have many limitations such as slow in new server provisioning, high planned and unplanned downtime, longer recovery time when disaster strike etc.

Section 3

Solution Overview

A converged-IP network is expected in Hotel regardless of their class and rating. 4-5 stars hotels need the converged-IP network for providing a complete full IP-based solutions to impress their sophisticated clients while other hotels require converged-IP network to deliver an efficient and cost-effective solution for front and back office.

Before this, Hotel Office Network (HON) and Hotel Guest Network (HGN) are always isolated because of the concerns on security, performance and management. However, this concern is now resolved and overcome by deploying the new technology such as VLAN. With proper VLAN segmentation and Layer-3 traffic switching, both network can co-exists together meeting the performance and security expectation. Converging these two networks also helps to lower down the Total cost of Ownership (TCO) with ease of management and cost effectiveness.

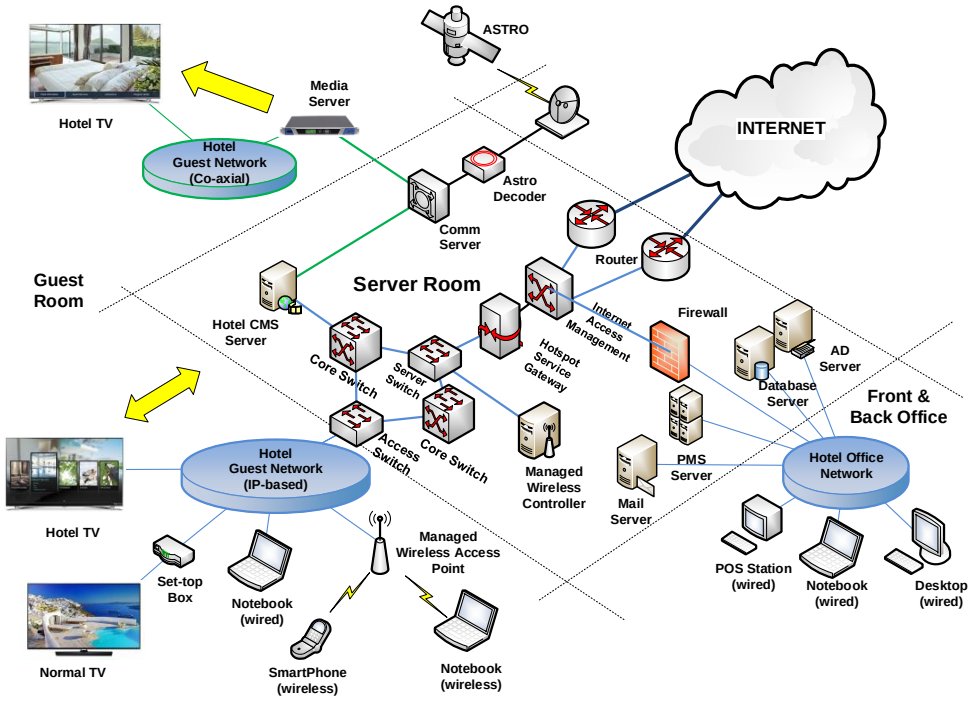


Figure 1: Converged-IP Network Architecture

Section 4

Hotel Office Network

Introduction

Basically Hotel Office Network(HON) provides connectivity for the front and back office operation and administration. The standard back end servers comprises of:

i. Active Directory (AD) servers
ii. File Server
iii. PMS servers
iv. POS servers
v. Data Backup server
vi. Antivirus Server
vii. Messaging Server

Besides the servers, it contains other critical network components as well:

i. Firewall with Intruder Prevention System (IPS)
ii. Messaging and Web Protection Gateway
iii. Internet Access Management (IAM) Appliance

Bigger and sizable hotels deployed the above network solution individually whereas smaller hotels use a centralized Unified Threat Management (UTM) which contains all the three (3) components in a single device. Right sizing of the UTM box will determine the success of the implementation.

Server Virtualization

Server virtualization is a virtualization technique that involves partitioning a physical server into a number of small, virtual servers with the help of virtualization software. In server virtualization, each virtual host runs multiple virtual machines with various supported operating system instances at the same time. The two dominant virtualization software are from Vmware and Microsoft.

Hotel industry is one industry which have not fully leveraged on the server virtualization technology. This mainly because some of the PMS application providers do not recommend and endorse their application to be running on virtualization platform.

IMPORTANT NOTE: In our opinion, the main reason why the solution providers are not endorsing or recommending this great technology is to protect their interest by ensuring customers will continue to depend on them and renew their contract service continuously. Because of this, hotels are not be able to tap on the benefits of virtualization.

However, Hotelier can no longer avoid the adoption and deployment of this technology of the great benefits extended on business and financial perspective. The one who have deployed or going to deploy this technology will definitely have an edge against others who are not.

Benefits of Deployment of VMware Server Virtualization

- **Cost reduction:** Most businesses run heavily on expenditure and want to cut costs, if and where possible. With virtual servers, it is possible to cut cost on the infrastructure that hoteliers would need to install and maintain physical servers at the workplace. In other words, not only do hoteliers cut down on the initial capital investment that is required to buy and install the infrastructure, but also the added working cost that is necessary for maintaining it at top working quality.
- **Better utilization and increased productivity:** With physical servers, hoteliers utilize only 5 to 15 percent of the space in every server as opposed to a whopping 80 percent utilization of space with virtual servers. Therefore, there is no doubt that hoteliers utilize less space and increase overall productivity with virtualization, which definitely makes it a better option to look at.
- **Increased efficiency:** With virtual servers, hoteliers have fewer physical servers in the workplace, which makes it easy for hotelier' IT team to work while also increasing the operation efficiency. The extra advantage of decreased power consumption also adds to the reduction in overall cost that is required for running business. With fewer physical servers, hoteliers can utilize the space in a more effective way to ensure better business.
- **Server deployment is faster:** Another benefit of virtual server is the increased speed of deployment. As these servers are standardized, hoteliers can easily replicate them and ensure a faster and more efficient IT department to meet business needs.
- **Lesser downtime:** Lastly, hoteliers can now stop worrying about extended periods of downtime as virtual servers have more effective methods of backup and recovery, which makes them up and functioning within minutes.

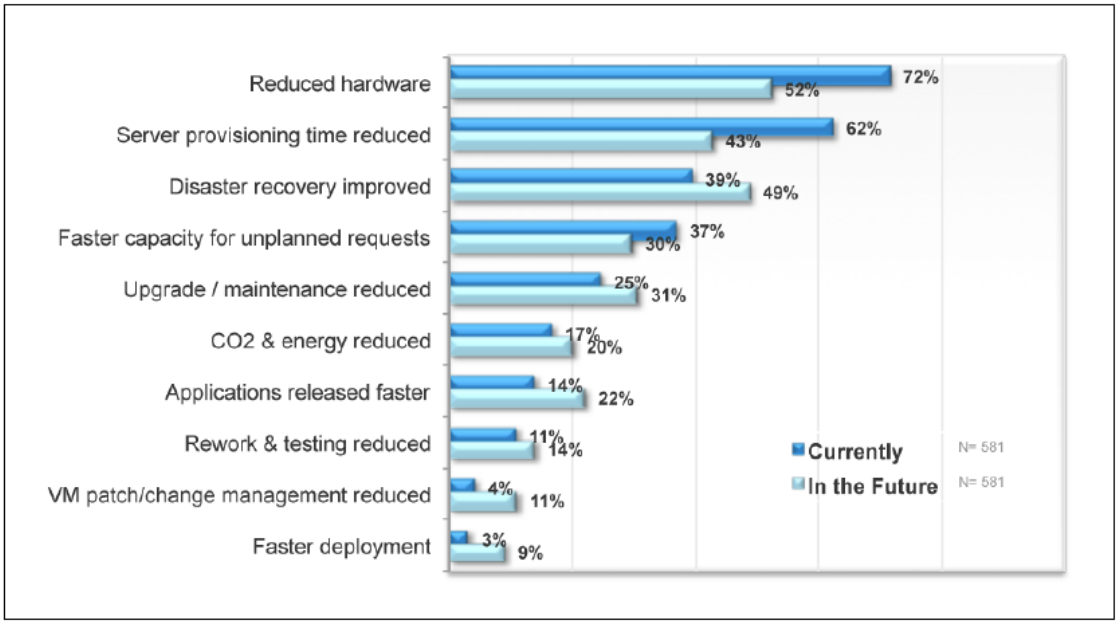


Figure 2: Primary Sources of ROI

Virtualization delivers both business and operational benefits. Figure 2 shows the primary sources of ROI both now and in the future.

With all these benefits of virtual servers, there is no doubt that this is the most appropriate and best solution for hoteliers' IT as well as business needs.

[Pleaser efer to https://www.vmware.com/files/pdf/cloud-journey/VMware-Business-Financial-Benefits-Virtualization-Whitepaper.pdf for the full details on the benefits of virtualization]

Figure 3 shows a typical server virtualization architecture which require only one (1) Physical Server (as AD server), three (3) as virtual hosts, one as backup server with tape backup drive attached to it. With this setup, hoteliers will most likely stay with similar hardware for next five years even when the business volume grows 2-3 folds. Each virtual host can run at least 5 virtual servers for standard specification e.g. single processor and 64 GB RAM and for higher specification e.g. dual processors and 128GB RAM, each virtual host can support 10-20 servers depending on the application and workloads.

Vmware – the leader in server virtualization technology
Veeam – the world#1 data backup and replication for virtual server
Trendmicro Deep Security- The best agentless software in virtual server protection

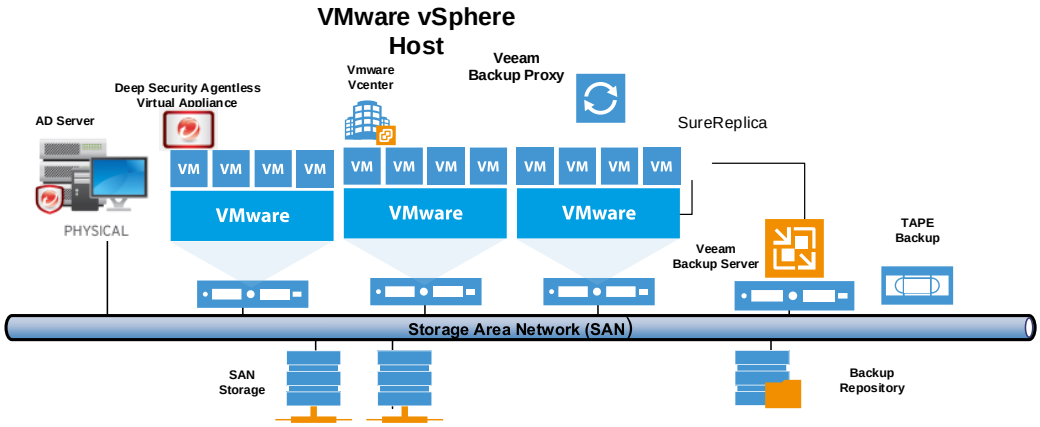


Figure 3: Typical Server Virtualization Architecture

Backup and Replication

Veeam, being the world #1 Backup and Replication solution for Server virtualization is the most suitable solution for Vmware or Microsoft virtual server environment.

Veeam delivers Availability for the Modern Data Center™ with solutions that enable the Always-On Business™. Veeam leverages the capabilities of the modern data center to lower recovery time and point objectives (RTPO™) to <15 minutes for all applications and data.

Veeam protects 6.5+ million VMs for more than 121,500 customers worldwide. Veeam is a not only providing fast and effective data backup solution but also built-in with data replication technology. This enable organization to implement very cost-effective offsite or Cloud DR solution. Figure 4 displays the architecture of Backup and replication using Veeam solution on virtualization environment.

Veeam's features for hypervisor solutions

High-Speed Recovery
Achieve low recovery time objectives (RTOs) of <15 minutes to recover the data you want, in the form you want it.

Data Loss Avoidance
Avoid data loss by enabling low recovery point objectives (RPOs) of <15 minutes and accelerating offsite data protection

Verified Protection
Reliably restore files, applications and virtual servers when needed while ensuring business resiliency with automated backup and DR testing.

Leveraged Data
Mitigate the risks of deploying and updating applications by testing changes in a production-like environment before rolling out changes in your data center.

Complete Visibility
Monitoring and alerting tools discover and alert you to issues in your IT environment before they have a significant impact.

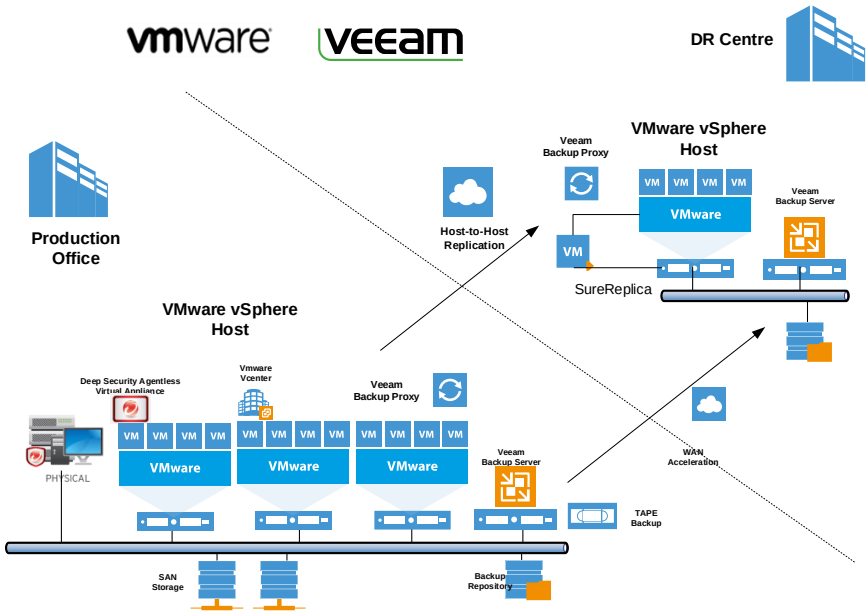


Figure 4: Data Backup and Replication Architecture

Section 5

Hotel Guest Network

The Network Switches

Traditionally, the Guest Network is always isolated from the Office Network for security reason. However, as network technology getting more advance, it is possible to physically connect these two networks together but virtually it can be isolated for better security and performance purpose. By connecting these two networks together, it enables some devices to be shared and used for the protection, control and monitoring of the users in these two networks. This help to lower down the initial investment cost and also the total cost of ownership (TCO)

A good high performance layer-3 core switches is to be deployed in other to enable VLAN segment can be created for these two networks in order to segregate these two networks for best performance, cost effectiveness as well as proper security protection.

The Wireless LAN

Many 5-stars rating hotels have suffered on the obsolete deployment of Access Point at corridor because of the intermittent strength coverage provided as the high quality of material used on the door and wall has blocked majority of the signal.
The latest deployment for 5-stars are going for wall-switch Access Point which is deployed in the guest room. If budget is a concern, Wall-switch AP can be deployed in adjacent room. This deployment is easy to deployed for those with existing network points in the room and the new setup.
Wall-switch AP deployment also prepare hoteliers who wish to deploy IP TV solution immediately or in the future.

A stable, reliable and easily manageable Wireless LAN implementation must possess at least the following:

i. Managed Wireless – Must have a centralized managed wireless controller which can manage, control, monitor all the AP with ease from single console. Managed wireless also allows users to seamlessly shift the connection one AP to another without disruption
ii. Dual-radio support- Those it is not a must, but it is encouraged to have dual radio support e.g. 2.4Ghz and 5Ghz.
iii. Support at least type a/b/g/n

iv. Support type AC - Type AC support throughput up to 1.3Gbps. Though, it is new but it will be very soon became a minimum requirement. Some 5-stars hotel has already deployed this technology to assure their customers of their readiness in new technology deployment

Managed wireless solution should always be considered on every deployment on any class of hotel because of the following benefits:

- Reliable and durable: Dramatically reduce connection problems and drop outs
- Ease of Management: Easy to troubleshoot and identify problem
- Seamless connection: Users can roam and seamlessly maintain their connection as they switch to the nearest AP
- Dual-band support: offers simultaneous connection for new "n" standard devices and older "g" devices
- Scalable: Easily add additional AP's to your wireless network as demands increase
- Centralized controller: Intelligent hardware manages and balances your entire wireless infrastructure

The Service Gateway

Service gateway is another important components in the deployment of High-speed Internet Access (HSIA) for the guest. It has many features needed to manage, monitor and control the guest access. To name a few but not limited to the following provided by most of the Service Gateway:

- Provide customized welcome page design with guest self-service portal and information portal – enhance hotel's brand image.
- Comes with built in NOC to monitor all network equipment and alert support proactively if there are any equipment breakdown.
- Built-in intelligent bandwidth management to manage P2P services and prioritize selected services – supports VOIP.
- Enable guest to connect their own notebook, smart phone and tablet to the hotel's internet services at the same time and account for the services.
- Guest using mobile devices do not have to do multiple logins. The system can be configured to allow mobile phones to login just one-time and connection will remain till guest check-out.
- Support access to all types of VPNs (corporate guests) and offer professional business centre internet services.
- Integrates with various hotel front office system to auto provide internet services when guest check-in, auto post internet services charges (if any) to folio and auto close account when guest check-out.
- Supports multiple authentication types, including self-provisioning with credit card, or direct property management folio integration.
- Per device or per group, bandwidth capping allows for control on a granular level for the operator to sell in tiered levels to groups.

- Pre- and post-authentication redirection of Web browser requests allows the operator to manage what the customer sees, such as advertising messaging or a branded webpage to facilitate added awareness and revenue.

Some International Chain hotel has identified one provider to manage the entire Chain hotel worldwide. Though it guaranteed a minimum quality and standardize the solutions and processes, however it can be very dangerous as it could cause a high cost of deployment because it lacks the transparency in competition.

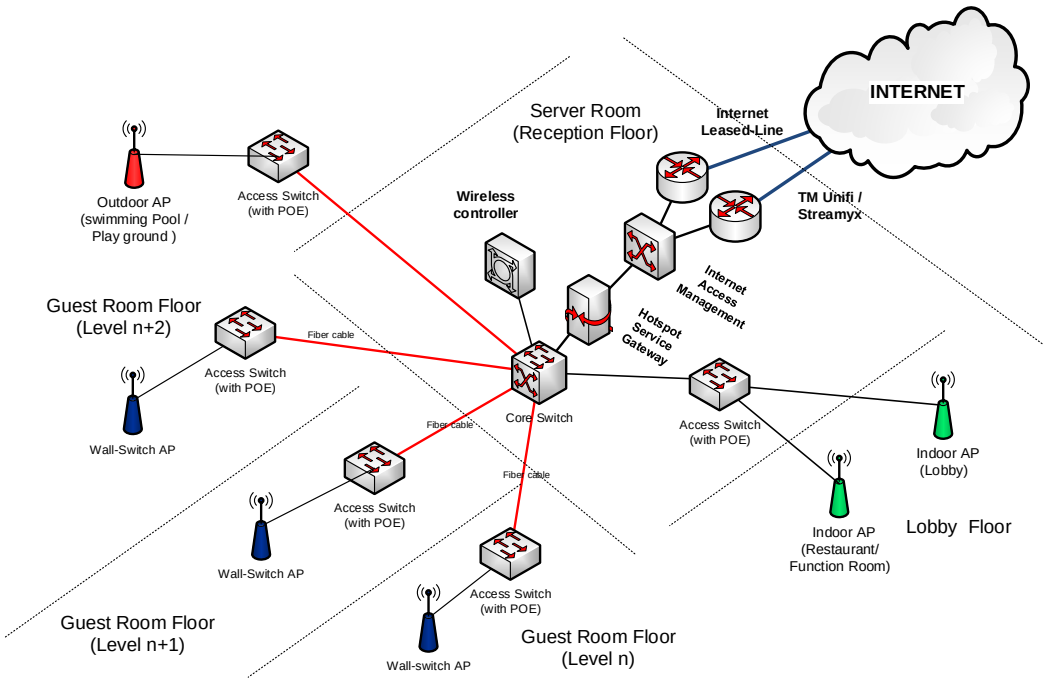


Figure 4: High-Speed Internet Access (HSIA) Architecture

Section 6

IP TV

Based on Wikipedia definition: Internet Protocol television (IPTV) is a system through which television services are delivered using the Internet protocol suite over a packet-switched network such as a LAN or the Internet, instead of being delivered through traditional terrestrial, satellite signal, and cable television formats. Unlike downloaded media, IPTV offers the ability to stream the media in smaller batches, directly from the source. As a result, a client media player can begin playing the data (such as a movie) before the entire file has been transmitted. This is known as streaming media.

IPTV services may be classified into the following main groups:

i. Live television, with or without interactivity related to the current TV show;
ii. Interactive menu to request for room service, access to information on hotel facilities
iii. Surfing the Internet from the TV
iv. Video on demand (VOD): browse a catalog of videos, not related to TV programming.
v. Time-shifted television: catch-up TV (replays a TV show that was broadcast hours or days ago), start-over TV (replays the current TV show from its beginning);

Generally, IP TV deployment in Hospitality industry are to achieve mainly on the first three items. VOD used to be popular but has reduced its popularity due to the streaming media is now easily accessible from Internet.

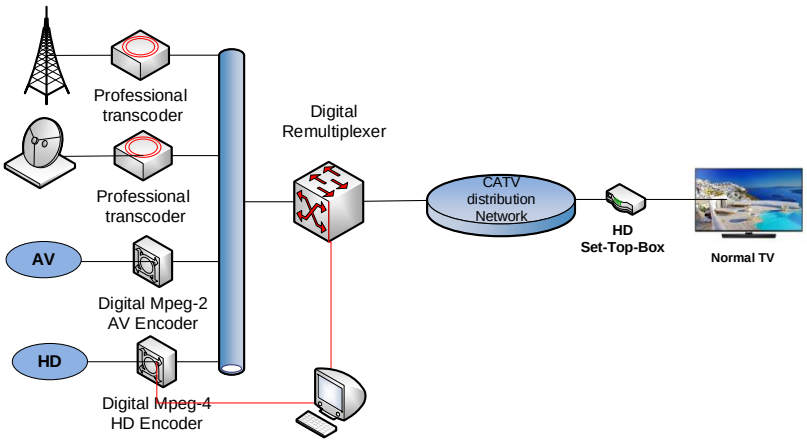
Most of the IP TV solutions are deployed with Set-top-box (STB). However Samsung has revolutionized the solution by integrating the STB in their TV. With this design, no external STB is required. It is “cleaner” with minimum wiring connection and easy to manage with one single device.

Section 7

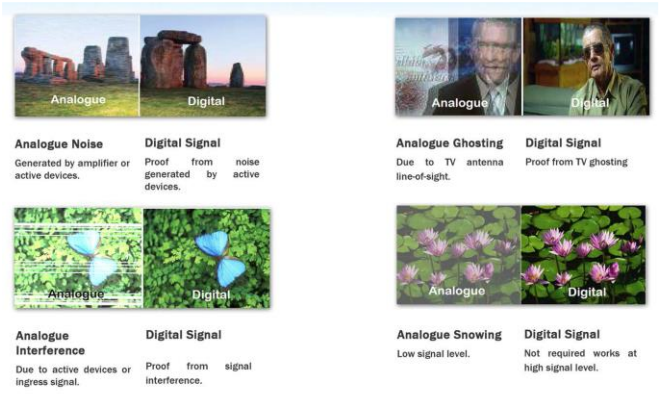
Digital TV Solution

Most of the hotel today are using "coaxial" cables to transmit the TV or paid TV programme to the TV in the guest room. Because of the nature of the technology, the analogue signal transmitted via the coaxial cable is very susceptible to noise and interference. This make the picture quality very unacceptable to the guest.

In order to overcome this, it is to use a Digital TV headend solution to covert the incoming signal to digital signal before broadcasting through the coaxial cable. The digital signal is then converted back to analogue signal by the Set-to-box before showing on the TV.



When the DTV broadcasts the digital video signals, it maintains higher picture quality than analogue signals because the picture information is already digitized. The digitized signal is free from snowing picture, ghosting, noise or interference and saving transmission bandwidth with MPEG-2 video compression technique.



Section 8

Conclusions

i. New hotel should consider to have a network point in every guest room to support for wireless AP installation or/and IP-based TV for immediate or future needs

ii. Luxury hotel should consider to use wall-switch AP installed in every guest room (or at least the adjacent room) to achieve the highest quality of signal coverage

iii. Managed wireless solution must be considered because of the reliability, scalability and manageability benefits provided.

iv. A right Internet Access Management (IAM) solution will help to control, monitor and manage the Internet bandwidth optimally

v. IP TV – a solution should be considered by full serviced hotels to differentiate from others.

vi. DTV – can be a cost effective solution for existing hotel for improving the picture / video quality of all the TV / in-house video programme

vii. Server Virtualization technology can no longer be ignored by hoteliers in order to improve system uptown, reduce cost of support, energy and the footprint of data center.

viii. Converged IP network for both Hotel Office Network (HON) and Hotel Guest Network (HGN) is now possible with newer technology in order to achieve critical resources sharing and optimization.

Section 9

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