White Paper

Understanding
Modern Hospitality
Telecommunications and Property
Management Systems

Abstract

The technological underpinnings of the telecommunications industry is rapidly moving from the legacy Time-Division-Multiplexed/Circuit-Switched (TDM/CS) environment to an open, standard, high-performance, totally programmable infrastructure provided by the Internet Protocol (IP). Heavily dependent on premises-based voice distribution technology, the hospitality industry is already experiencing the impact of this transition. IP-based premises systems such as Cisco Systems CallManager are now available to replace traditional TDM/CS PBX systems and thereby enable a whole new level of guest functionality, operational efficiencies and revenue-generation opportunities in hotels. This paper provides an in-depth review of two approaches for utilizing these new IP-based premises systems. One of these approaches, dubbed the hybrid hospitality system, utilizes the IP-based infrastructure of CallManager, but surrounds this infrastructure with an unfortunate array of legacy PBX-based adjuncts for such functions as voice mail, interactive voice response (eg, wake-up calls), and video entertainment. The second approach, referred to as the fully converged hospitality system, provides a totally IP-based hospitality solution which utilizes standards-based commodity processing platforms to provide the required functionality. This paper demonstrates that the fully converged system is superior to the hybrid system in such areas as scalability, flexibility, reliability, functionality, manageability, cost of ownership and maintainability.

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Introduction – The New Wave of Telecommunications

Enabled by Internet technology, much of the telecommunications industry is headed towards the total integration of data, voice and video on a single packet-based infrastructure. This integrated architecture makes the most efficient use of communication lines and premises-based equipment.

Cisco Systems, the world's leader in Internet communications equipment, now provides the most advanced platform supporting this integrated architecture. This platform replaces the traditional Private Branch Exchange (PBX) with less expensive and more flexible technology.

Figure 1 – Modern IP Display Phone

Called Cisco CallManager, this platform provides a seamless hardware and software infrastructure which is totally programmable to achieve unprecedented integrated value-added communications applications. Nevotek has developed a vertically integrated application called V/IP Suite which is tailored to the hotel hospitality industry. The architecture of V/IP Suite was defined at its inception to rigorously adhere to the open standards which are being developed as Internet technology is being applied to the various components of the worldwide telecommunications infrastructure.

It is this strict adherence to these new standards which sets Nevotek and V/IP Suite apart from the other vendors who utilize the Cisco CallManager platform in conjunction with an unfortunate array of legacy systems and interfaces.

In this paper, we refer to such a legacy-bound hospitality system as a Hybrid Property Management System (HPMS). Such systems do utilize Cisco CallManager voice functionality at a certain level, but do not break the bond with a variety of legacy systems and interfaces which typically are vendor specific and proprietary. As a result, HPMS systems have inherent limitations in important aspects such as scalability, flexibility, reliability, functionality, manageability, cost of ownership and maintainability.

The purpose of this white paper is to explain why these HPMS systems are presently on the market and their origins. In addition, the resulting limitations of such systems are explained in detail. Next, an overview of V/IP Suite is presented along with an explanation of why the previously-mentioned limitations are avoided through the use of open interfaces and forward-looking technology.

In this document, it is assumed that Cisco CallManager is integrated with Micros/Fidelio/Opera. However the general flow of the document as well as the conclusions are true also for other PMS systems. This document also assumes that the reader has a good understanding of Cisco AVVID and Cisco CallManager technology as well as an understanding of IP technology and voice switching technologies. The reader is referred to the Appendix for explanations of the acronyms used in the main body of this paper.

PBX/TDM Voice Networks

For decades, TDM-based PBX systems dominated premises-based telephone systems. Unfortunately, there was no standard architecture for traditional PBX systems. Therefore, almost all designs of both PBX hardware as well as PBX operating systems are proprietary. They are only compatible at the external electrical interface level. PBX systems are generally considered to be closed proprietary systems.

Choosing the right PBX system at the outset is very important because of the long term consequences. Once purchased, companies will need to continue to invest in the same product and brand for many years to come. To lock in a new customer, the initial purchase price of a new TDM-based PBX system is usually very attractive. But the operational and upgrade costs can be significant once the customer is locked into a proprietary environment.

In addition, several proprietary peripherals supporting the telephone system were developed and sold over the decades, such as voice mail systems, Automatic Call Distribution systems (ACD) as well as Interactive Voice Response systems (IVR's). When applied to the hotel environment, such systems were and still are being used to provide basic hotel services such as voice mail, wakeup calls and accounting and billing information.
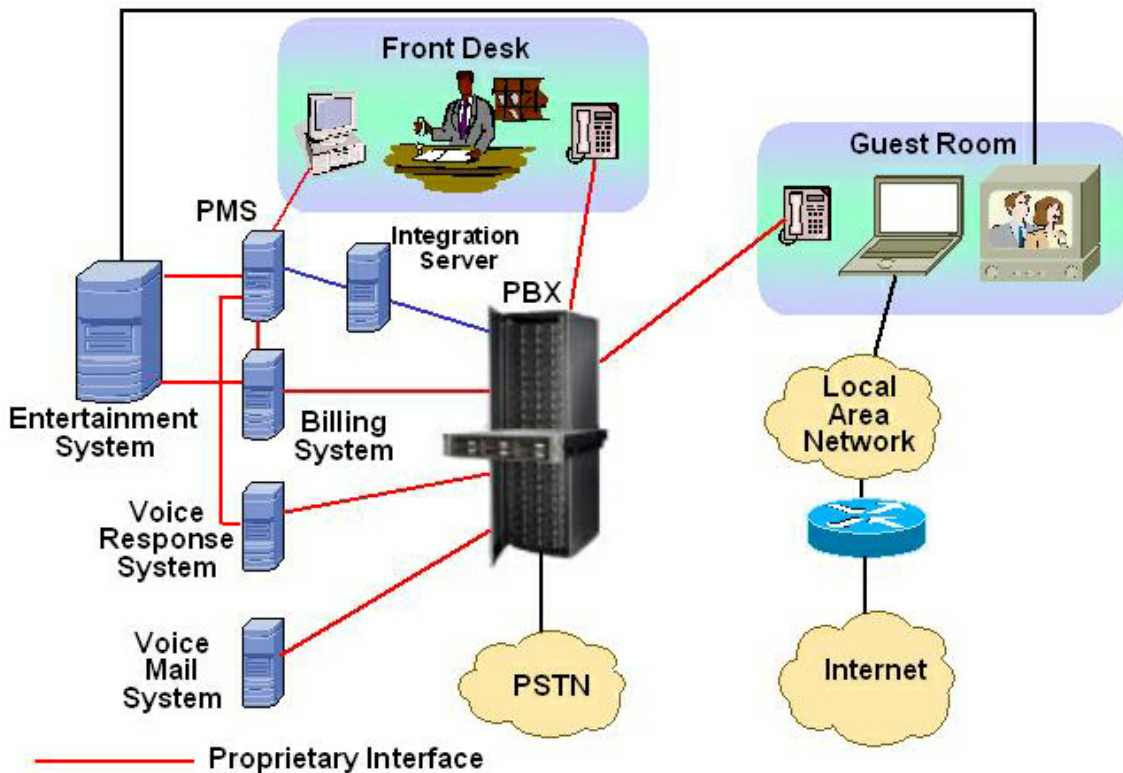
Figure 2 – Legacy TDM PBX-Based Hospitality System

Typically, TDM based PBX systems use proprietary hardware interfaces for computer-integrated applications that steer the PBX call control. Some designs utilize Computer Telephony Integration (CTI) hardware. Such hardware provides a buffer between these legacy interfaces and the modern Internet-based CTI environment. However, such "glue boxes" are expensive and usually defeat the purpose of providing a cost-effective modern hospitality environment.
For instance, voice message integration to a TDM PBX is typically implemented over a serial interface using the SMDI protocol.

Billing information is transmitted through an RS-232 serial port to a spooling device, which is then fed into an application to process the rating of the guest room telephone call costs. This tends to be a slow and error-prone process, sometimes resulting in calls that aren't registered or billed.

All value added functions like computer integration, voice messaging services, call mediation, rating and billing-like services are supplied by loosely coupled proprietary external devices. The main disadvantage here is the lack of an end-to-end, seamless, synchronized set of voice services.

IP Telephony Networks

The history of IP telephony is rather recent compared to traditional TDM-based telephony. In order to not repeat the errors of the past, the IP industry agreed on standard hardware systems and standard operating systems for all facets of the emerging network.

The transport medium is TCP/IP. Higher layer protocols for further services are also standardized. XML, SOAP, JTAPI, TAPI, SIP, MGCP are just a few examples of widely accepted standards today.

With these well-defined standard interfaces, it is possible to develop tightly integrated distributed systems capitalizing on the flexibility of IP. There is no longer a need for any transport other than IP. Well-accepted standard protocols over the IP layer provide all the flexibility and scalability required to develop fully-integrated systems with no limitations imposed by legacy systems.

In contrast to the TDM environment, the IP environment does not need proprietary hardware interfaces. All conceivable functionality can be achieved using standardized, programmable, flexible, and open interfaces. There is no need for serial SMDI links for voice mail integration. There is no need for RS232-based billing solutions. All these connections can be implemented over a single ethernet interface running an open higher-level protocol. This approach avoids all of the traditional compatibility, flexibility and scalability problems associated with the legacy systems. Enabled by numerous operational advantages, the major impact of this open systems environment on the business customer is economic. In addition to reductions in operational costs and total cost of ownership, the use of modern IP technology allows the creation of innovative services and an increased revenue stream for the hotel enterprise.

Hybrid Systems General Overview

Hybrid Property Management Systems (HPMSs) present a good news/bad news story. The good news is that they support modern IP-based voice systems like Cisco's CallManager. The bad news is that they take little advantage of the IP environment. They are generally composed of heterogeneous individual components that originally were designed as adjuncts to legacy TDM PBX switches to provide a basic set of value-added services. These systems tend to use proprietary analog and digital interfaces and higher-level protocols as defined by a legacy PBX system.

As portrayed in Figure 3, an HPMS for Cisco CallManager invariably utilizes legacy voice mail and accounting systems originally designed for TDM PBX switches. Vendors of such systems usually emphasize the utilization of the modern IP CallManager environment, but rarely highlight how the value-added voice and billing functionality is provided. Buying an HPMS is like buying the

fastest personal computer on the market and then using a dialup modem for
Internet access because no one figured out how to hook up a broadband Internet
connection. Those HPMSs that actually provide value-added services usually
have major limitations relating to scalability, flexibility, reliability, functionality,
manageability, cost-of-ownership, and maintainability. Although IP is used to a
certain extent, SMDI is still the main interface for voice mail integration and a
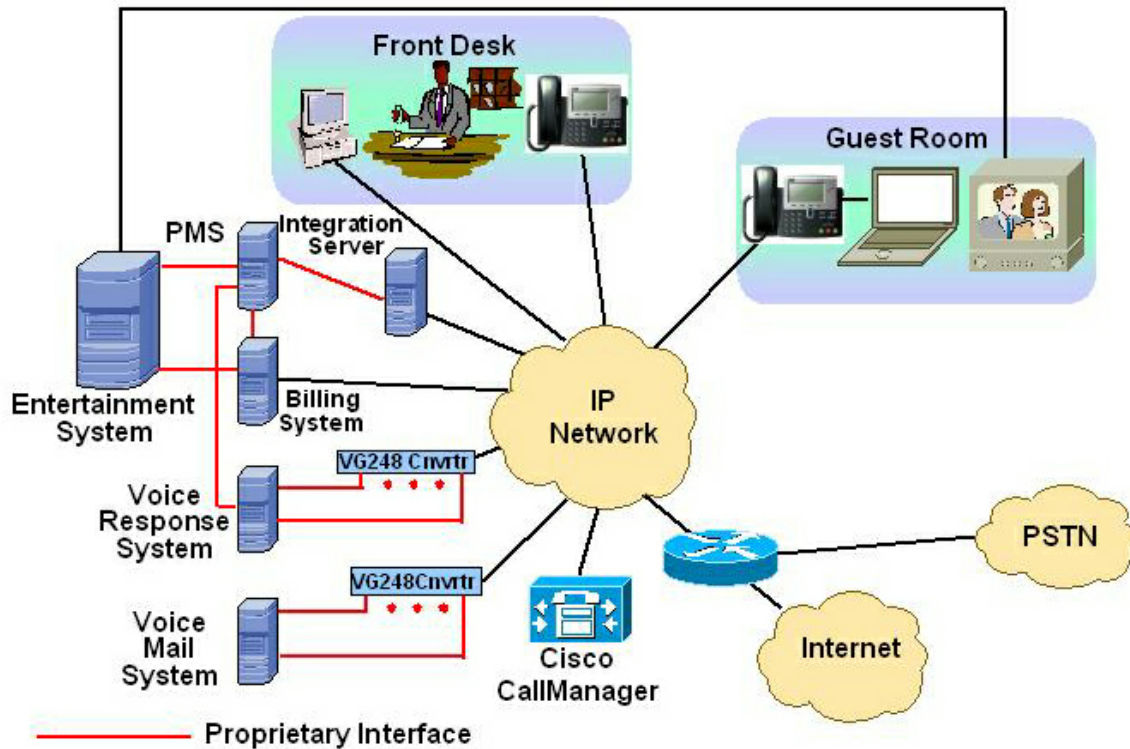serial link is still used for billing.

Figure 3 – Hybrid Property Management System

Hybrid systems find their roots in the traditional hotel PBX reseller or PMS
vendor world, and are regarded by those vendors as a way to migrate from the
legacy TDM world to the IP world while protecting their installed base.

Scalability of Hybrid System

Since an HPMS is comprised of individual sub-systems that communicate
through proprietary interfaces, most of which are slow serial connections, such a
system is constrained at inception to grow gracefully to a larger, more feature-
rich environment. Although the system interacts with Cisco CallManager, the
scalability is still dependent on the individual limitations of the constituent legacy
components: Dialogic analog conversion boards, digital voice mail systems,
serial cables, and an array of different management stations. It also means that
when new guest phones, staff phones or management stations are added,
additional hardware components may have to be installed along with additional

administration capability. Typically with such additions, the per-user cost of ownership of such systems increases, sometimes with shocking consequences at the breakage points.

Flexibility of Hybrid System

Because the HPMS is based on different vendor components with no common administration, it is very difficult to customize. As an example, suppose a new feature such as a pre-specified guest hometown radio station (derived from the Internet and billed to the guest) needs to be added to the list of telephone features. The cost and effort required to implement this feature across all of the involved systems in the HPMS would most assuredly be prohibitive.

Another example is localization of languages. The IP display phones allow several languages to be displayed on the screen of the guest's telephone. This capability presents an enormous opportunity to provide guest comfort in a multilingual environment. The guest data base in the PMS can easily hold information about a guest's origin and native language. The opportunity here is to tie the voice and display prompts to the guest in his or her native tongue. For example, the guest's native language can be used for wake up calls, voice mail prompts, alerts, broadcast messages and advertisements. This language synchronization is a virtual impossibility in an HPMS, rendering an HPMS solution unsatisfactory for most international deployments. For example, an HPMS system would not be appropriate in the Europe, Middle East and Africa (EMEA) region where there is a high density of many different languages and cultures requiring a flexible and extensible internationalization and localization architecture.

Reliability of Hybrid System

Complexity rarely improves reliability. The different components in an HPMS as well as the interconnecting interfaces are prone to failure. There is no redundancy between the different components since backup systems are prohibitively complex, with each component representing a potential point of failure with limited troubleshooting capability.

Functionality of Hybrid System

The attendant complexity of an HPMS is a roadblock to enhanced functionality. Usually, a large specialized programming and integration effort is required to achieve a core set of hospitality functionality in an HPMS. Once that functionality is achieved and stabilized, it rarely lends itself to major improvement and enhancements. Admittedly, some "tweaking" of the core functionality is generally possible by using IP meta-language techniques. However that functionality will be limited and will need re-programming each time a new function must be added or if an underlying component system is introduced or altered. Major

upgrades of functionality involving multiple components are virtually impossible as individual components are produced by different vendors, who do not synchronize their new version release dates unless forced to by dominant and powerful customers.

Manageability of Hybrid System

Another consequence of the HPMS is the fact that, since the system is composed of individual vendor components, there is no homogeneous management interface or platform. Usually, each component is accompanied with a different type of user interface and methodology of administration. This disparity in administration interfaces increases the training required to manage the different components effectively. An additional practical consequence is that it is difficult to customize and maintain an HPMS.

System management of a hybrid system has to take place locally and is therefore not suited for centralized or remote management.

Cost of Ownership of Hybrid System

It is difficult to predict the cost of ownership of a hybrid system since a full hybrid system has third party components with different pricing policies. The potential cost elements are:
- The PMS interface software and hardware
- The voice mail software and hardware
- The billing system software and hardware

It is reasonable to assume that cost of ownership in the context of the above will be significantly higher than a fully-integrated IP-based solution. However, it is predictable that expanding and evolving a hybrid system will be expensive because of the scalability, flexibility and functionality arguments expressed earlier.

Maintainability of Hybrid System

A critical aspect of maintainability of any system is the availability of replacement components. In an HPMS, the system is dependent on different components from different companies, thereby posing potential problems regarding availability. It is highly unlikely that all components in an HPMS will have ubiquitous availability across a broad range of international locations and local language environments.

Platform providers like Cisco Systems go to great lengths to protect their customers through rigorous processes to insure compatibility with other vendor products. An HPMS makes such compatibility testing problematic. It is highly unlikely that any full-function HPMS will be compatibility certified to include the

billing, voice mail and IVR functions and thereby fit within the international support structure of a platform provider like Cisco. Potential buyers of an IP hospitality system are advised to check into such compatibility and support issues before they commit to a hybrid system as described above.

The Nevotek V/IP-Suite Solution General Overview

Not burdened by the demands of a legacy hospitality environment and enabled by the totally programmable flexibility of the Cisco CallManager platform, Nevotek has taken advantage of the opportunity to build a forward-looking hospitality application suite from the ground up. Called V/IP Suite, this product comprises a totally integrated, converged IP solution for the hospitality industry.

V/IP Suite was developed in close collaboration with the Cisco Systems CallManager experts. The system and end-user functionality was derived from hospitality RFPs and represents an amalgam of the hospitality requirements of major international hotel chains such as Marriott, Starwoods and Six-Continents.

V/IP Suite is fully based on Cisco AVVID and IP technology. V/IP Suite requires one single physical interface on the server it runs on, which of course is Ethernet running IP.

CTI ports are software-defined ports on the Cisco CallManager. V/IP Suite communicates to CallManager via the CTI ports. There is no need for any additional cabling (serial or otherwise) or Dialogic conversion hardware.
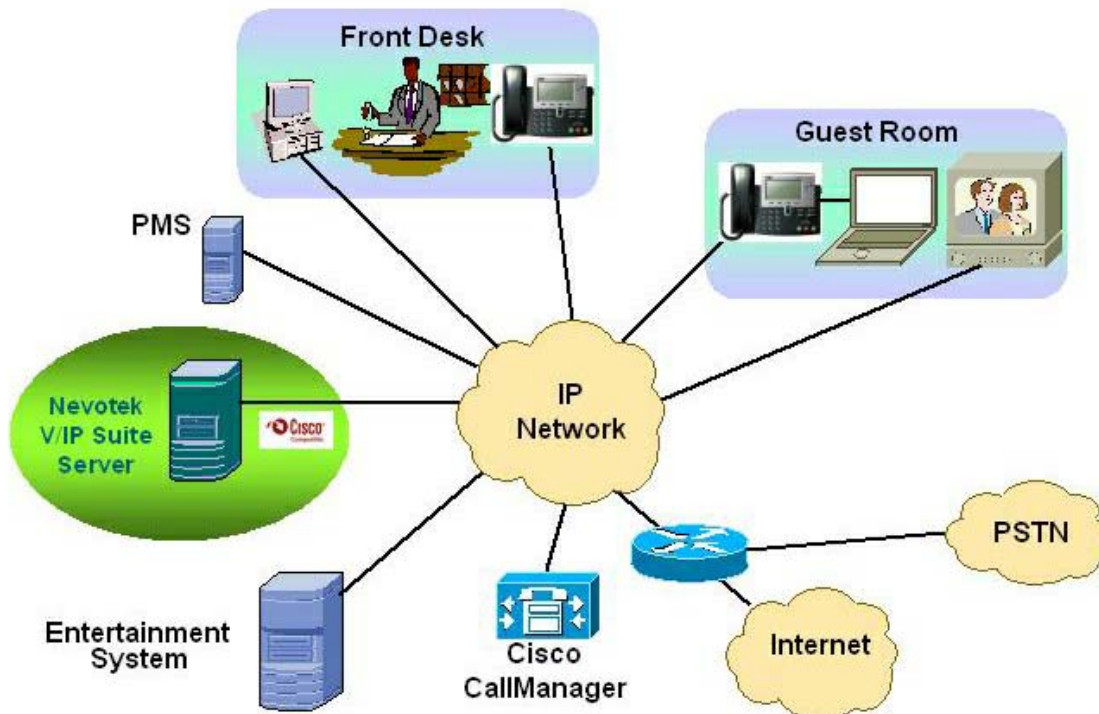

Figure 4 – V/IP Suite: The Fully Converged Hospitality Solution

We will now describe the advantages of this fully converged solution from the perspectives of scalability, flexibility, reliability, functionality, manageability, cost-of-ownership, and maintainability.

Scalability of Fully Converged System

The Nevotek V/IP Suite scales with Cisco CallManager. As the system is fully IP based, adding new guest rooms or back office extensions or management consoles does not require hardware upgrades. Increasing the number of users simply means increasing the number of software ports (CTI). Therefore, scalability is just a matter of modifying software parameters and assigning additional processing resources to the application.

There is also another benefit of this software-configurable scalability which we will demonstrate by example. In an HPMS, the addition of more hotel rooms will require the physical expansion of the voice mail and wakeup systems. This means purchasing and installing more equipment for hotel upgrades. However, with V/IP Suite, these functions are handled in software and only constrained by the capacity of the server. Keep in mind that servers have become powerful commodity resources that run standardized operating systems. To add more rooms using V/IP Suite, it is only necessary to administer the software system to apply more server resources to voice mail and wakeup functions. Not only is this approach flexible and convenient, it is very cost effective for obvious reasons. Note that there is no dependency on the number of physical system ports (i.e., telephones) with V/IP Suite.

Staying with the voice mail example, a hybrid system requires a dedicated voice mail processor connected via serial interfaces and analog voice lines. In most popular voice mail systems, the number of ports available is typically around 20. Although these systems can utilize more ports according to their specification, the total maximum number of ports for such a system is typically not more than 64. As voice mail ports are software defined in the V/IP Suite solution, there is no need for analog voice mail conversion and the dedicated voice mail processor. The hardware savings from this alone can be easily in excess of $10,000 in a typical medium size hotel installation.

In addition to making best use of the resources in the V/IP Suite, this homogenous solution technology also optimally utilizes the Cisco CallManager resources. In a hybrid system, dedicated resources on the Cisco CallManager are required for each component of the system. Even though CallManager is software based like V/IP Suite, it is usually not possible to share these CallManager resources between the dedicated components like voice mail and wakeup since CallManager must be configured to dedicate fixed resources to these sub-systems. Nevotek's V/IP Suite, thanks to its all-IP Cisco-compatible design, makes optimal use of the Cisco CallManager resources.

Another scalability feature embedded in the design of the Nevotek V/IP Suite is the built-in internal SQL database, recognized worldwide as a premier database system. Most hybrid systems employ less powerful database systems. All critical V/IP Suite information is stored in the SQL database which allows for almost limitless expansion of the hospitality operation information base.

Flexibility of Fully Converged System

Nevotek V/IP Suite is a single modular platform. This means that functionality can be added or omitted depending on the hotel's requirements. Also, that functionality is contained within a single server running multiple software modules serving a common IP protocol. Moves, adds, upgrades and changes on the IP network are transparently supported throughout the system and a maximum amount of rearrangement and change flexibility can be achieved.

Nevotek's V/IP Suite requires no additional training for the front desk staff. They continue working with the PMS they are already familiar with, typically Fidelio. All communications between the PMS, Nevotek V/IP Suite and the Cisco CallManager are performed transparently and front desk people are not involved. The operational convenience is striking. In a hybrid system, the front desk people who receive a wakeup call schedule request must enter the request into the associated IVR system, usually through a unique proprietary interface. With V/IP Suite, the wakeup call can be scheduled directly with the Fidelio PMS which is then transferred seamlessly and transparently to V/IP Suite which executes the call, in the guest's native language! Also, taking advantage of the power of the IP telephones, the guest can schedule the wakeup call himself, using easy to understand prompts, again in his native language.

From the outset, the designers of V/IP Suite recognized the importance of local language capabilities in the international hospitality market. As a result, local languages can be transparently added in a matter of days. It is just a matter of re-recording the voice prompts and displaying the appropriate languages as all V/IP Suite functional modules support localized languages.

Reliability of Fully Converged System

V/IP Suite takes full advantage of the clustering capabilities of Cisco CallManager. In a configuration with a redundant CallManager processor, V/IP Suite will detect a failure in the primary CallManager and automatically switch to the backup CallManager. Similarly, if the primary V/IP Suite fails within a cluster, that failure is detected by the backup V/IP Suite which immediately takes control of the V/IP Suite functions.

Recall that a key component of V/IP Suite is the SQL database. This premier data base system has a rich set of features relating to reliability and data

protection. In addition to automated reliability operations like scheduled backups, V/IP Suite takes advantage of SQL's buffering capability by locking and protecting all operational information in the event of a link disconnection. For example, if the hotel PMS suffers a failure, it is possible to maintain normal hotel operations. Incoming guests can be manually registered in V/IP Suite and that information will remain protected. Once the PMS is back on-line, V/IP Suite automatically synchronizes the buffered information with the PMS.

Cisco CallManager provides a number of redundancy options with their line of MCS and ICS servers. Systems using these servers can support a wide range of line sizes and distributed configurations. V/IP Suite takes full advantage of these redundancy options across the full range of available configurations.

Functionality of Fully Converged System

The most important system attribute that distinguishes V/IP Suite from legacy and hybrid hospitality systems is functionality. Since the combination of the PMS, Cisco CallManager and V/IP Suite comprises a programmable environment based on well-known interface and programming standards, the extent of the possible system functionality is practically limitless. Moreover, the services that can be achieved are independent of third-party components. All involved functional modules have been designed from the ground up for smooth integrated operation and high performance.

With V/IP Suite, all communications between the PMS and CallManager occur using the IP protocol and allow all system and operational information to be shared in real time among the system components. For example, as soon as there is an event that occurs in the PMS, V/IP Suite triggers an immediate response in real time. This is contrasted with the typical hybrid system which uses shared database tables that are polled at regular intervals to update the various system components. This creates an inherent delay in the intra-system communications, resulting in pent up interactions whose final execution resembles batch processing as opposed to real-time processing.

Manageability of Fully Converged System

Like Cisco CallManager, V/IP Suite was constructed to perform system administration and maintenance functions using a single Internet browser-based interface. In addition to being a familiar environment for most people to use and navigate, this administration interface enables these systems to be monitored and administered both locally and remotely.

Guest services, service modifications, moves, additions and changes for the billing modules, voice mail, PMS integration, and guest and hotel staff services are all managed and administered through this single browser-based interface. There is no longer any need for the system administrator to be locked to a single

administration console at a fixed location. The system administrator can literally be anywhere.

The days of proprietary GUI management interfaces as found in legacy and hybrid hospitality systems are over. Moreover, the mechanisms and procedures used for V/IP Suite management were designed to closely resemble those used by the Cisco CallManager. Not only is the technology of V/IP Suite administration aligned with CallManager, the very "look and feel" of the management screens is familiar across both systems.   This integrated administration approach offers flexibility in personnel assignments and reduced time in training the system administrators.

Another important aspect of the V/IP Suite system management is the fact that it is layered. For example, the various CTI ports in the system can be monitored at a very basic level by a novice or at a very sophisticated level by an expert administrator. Also, multilevel administration features and reports allow interfaces and reports appropriate for different management levels.

Cost of Ownership of Fully Converged System

The following attributes of the integrated fully converged hospitality system all contribute to significant cost-of-ownership advantages over the lifetime of the system:
- Open protocols and interfaces
- Commodity processors
- Software-based (not hardware-based) functionality
- Smooth scalability
- Common standardized distribution infrastructure
- Avoidance of third-party components
- Remote administration
- Simplified maintainability
- Improved reliability
- More efficient hotel operations

Another aspect of economic impact needs to examined. The popularity of cell phones has diminished the revenue opportunities from telephone services in the hospitality industry. With a modern hospitality system, it is possible to reverse this trend with value-added guest services and innovative use of display telephones. In addition to high-speed Internet access, the following are all new revenue opportunities:
- Innovative messaging services (e.g., email from your telephone)
- Innovative information services (hometown radio and weather)
- Advertising revenue
- Cross selling of outside guest services like transportation

Maintainability of Fully Converged System

As stated earlier, a critical aspect of maintainability of any system is the availability of replacement components. With the integrated fully converged solution of V/IP Suite and Cisco CallManager, all components are standardized and available on a worldwide basis. There is no risk of a critical component being unavailable due to a shortage or a third party going out of business.

In addition, the Nevotek V/IP Suite is fully tested and certified by Cisco Systems. Therefore, the entire hospitality system enjoys 24/7 worldwide Cisco support, including PMS integration, billing and accounting, voice mail, staff services and guest services. The Cisco compatibility logo was hard won by Nevotek and insures the end-to-end quality differentiation of a Cisco Partner solution.

Summary

The following matrix summarizes the results of the discussion in the previous two sections:

Attribute	Hybrid System	Fully Converged System
Scalability	Limited by the awkward combination of legacy components.	Software-based applications. Scalability provided by processing power of commodity servers.
Flexibility	Customization is difficult. Multilingual applications are all but impossible.	Homogeneous platform of programmable modules. Innovation is encouraged without bound.
Reliability	Complexity, multiple interfaces and lack of redundancy are all problems.	Infrastructure simplicity is a plus. Redundancy for all functions are integrated with platform.
Functionality	Tweaking of existing applications is possible. Major upgrades are very difficult.	IP and XML flexible. Database sharing allows fast, seamless integrated applications.
Manageability	No single, consistent, integrated management interface, requiring multiple management consoles.	Single browser-based user interface. Remote management capabilility is built in.
Cost Of Ownership	No standards, poor integration and limited flexibility forecast expensive long term ownership.	All of the above attributes point to a long-term evolvable cost-effective investment.
Maintainability	Failed component replacement is an issue. Platform certification is piecemeal at best.	Replacement of components and total certification with the platform vendor are assured.

Figure 5 – Comparison of Hybrid Systems And Fully Converged Systems

The Future

Not being constrained by a TDM installed base or a legacy hybrid environment, the integrated, fully converged system based on V/IP Suite and Cisco CallManager clearly represents the future direction of the hospitality industry. Impressive functionality that was never before possible already exists, like true multilingual support, integrated messaging and guest information derived from Internet feeds. This functionality will only grow with time. Integration of hotel entertainment systems into the IP infrastructure will offer a whole new platform for multimedia functionality that will allow a host of new innovative entertainment and information services. In short, the fully converged system is the future of hospitality systems and is available today.

Appendix

Definitions

API: Application Programming Interface.

AVVID: Cisco Systems Architecture for Voice Video and Integrated Data. The foundation of all Cisco Systems IP solutions on converged infrastructures. AVVID assumes that voice, video and data are treated as applications on IP.

Cisco CallManager: An IP-based telephone call switching platform for voice . video and data from Cisco Systems.

CTI port: Computer Telephony Integration port; the software interface through which tightly-integrated computer and telephone systems interact.

FXS-FXO: "Foreign Exchange Station" – "Foreign Exchange Office" FXS-FXO provides analog local telephone service from an exchange to a local telephone.

GUI: Graphical User Interface.

Hybrid PMS Integration Systems for CallManager (HPMS): Systems that are fundamentally based on legacy (TDM PBX) oriented components, that have an interface to CallManager, and thereby represent a hybrid system using both Internet IP and legacy TDM technologies.

Integrated Fully Converged Hospitality Systems for CallManager: Hospitality systems that are based totally on IP and fully comply with Cisco AVVID.

ICS: Cisco's Integrated Communications System.

LCD: Liquid Crystal Display.

MCS: Cisco's Media Convergence System.

MWI: "Message Waiting Indicator". The red message lamp on telephone handsets.

PBX systems: Private Branch Exchange systems or telephone exchange systems. Legacy PBX systems are implemented with TDM-based circuit-switching technology.

Property Management System: The system that manages the hotel facilities and registers hotel services revenue. The PMS system interacts and collects

information from other hotel assets such as POS terminals, PBX systems, and minibars.

SMDI: "Simplified Message Desk Interface". SMDI is usually a serial data line from the exchange (PBX) to the voice message mailbox.

TDM: "Time Division Multiplex"; a technique for transmitting a number of separate data and voice signals simultaneously over one communications medium by assigning predetermined time slots to each signal type.

VG248: Cisco Voice Gateway for connecting analog devices to the IP network.

Cisco AVVID Partner Development Program

A partner development program which supports and certifies applications developed for Cisco CallManager. The AVVID Partner Development program encourages partner developers to create applications specifically for Cisco AVVID platforms. Nevotek is one such partner. The program also defines a rigorous testing for reliability, failure recovery and performance stress testing. Only applications which pass this comprehensive testing are certified applications which receive the full arsenal of Cisco technical assistance support services. Fully AVVID-certified applications can be recognized by the Cisco compatible logo as shown.

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