

Cloud Computing

## Virtually There: Property Management Systems Expand Far Beyond Their Original Scope-and Head for the Clouds

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Jon Inge [jon@joning.com](mailto:jon@joning.com)

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Property management systems (PMSs) have been fundamental software in every hotel for decades; it's simply not possible to operate any property of more than a few rooms without one. Over the years PMSs have steadily improved by adding more depth and functionality in their original areas of tracking bookings, room availability, checkin, folio charges and checkout. Many vendors have also expanded their coverage into revenue management, sales and catering, spa/golf/activities and so on, within their own software and/or by interfacing to specialized systems from other vendors.

However, hotel complexity has grown to the point where a focus on property-based functions is no longer sufficient. What starts as a hotel project to find a new or replacement PMS frequently turns into a search for a system (or system set) with much broader capabilities. These usually include marketing, multiproperty reservations, distribution channel management and coverage of every aspect of the guest experience, both on and off property. In fact, it's probably high time to drop the old PMS name for these systems and adopt something more representative of what they actually do.

I'll discuss the main trends in this functional expansion below, but there's an equally significant change about to become mainstream in how these systems are provided to the properties - they're going up into the cloud.

Installing software applications at the property is becoming unmanageably complex. Despite very worthwhile gains in functionality, no PMS will ever cover everything a hotel needs; none offer telephone service, for example. As more guest and operating information needs to be captured and managed, many hotels and resorts need multiple other systems to complement the PMS.

However, the more applications are required, the greater the amount of computer room hardware needed to run them and the more complex the support requirements become.

This is unsustainable. Technical support for these multiple platforms and applications becomes even harder for individual properties to find (or afford), yet the need for greater reliability, audit ability, data storage and security only grows more critical. At the same time, the increased space, power and air conditioning needs of all this hardware run counter to the rise in energy costs and the strong movement toward more green operations.

The answer? Virtual servers and the cloud computing that they make possible.

### Virtualization

Server virtualization is not a new technology, but its adoption by the hospitality industry is relatively recent. The basic concept is that specialized control software allows the physical resources of a single computer server-memory, disk space and computing power-to be divided as needed between several different software applications, each perceived to be running on its own dedicated server. This has many benefits, starting with much more efficient hardware usage. Because most applications use only a fraction of a modern server's resources, servers frequently operate at less than 10 percent of their capacity. One server typically has ample power and storage to handle several applications in virtual servers very easily. Hotels that previously needed 10 to 12 racks of equipment can therefore now fit all their systems into just one or two, thus lowering space, power and air conditioning costs.

### Going Solo at Garibaldi House

It's not just the major chains who look to Web-based systems for their speed of implementation; small independents also need to get up to speed fast when switching systems.

One such is the 50-room Garibaldi House, at the north end of Tillamook Bay on Oregon's scenic Coast Highway. "We looked at signing with a couple of different brands when we bought the property last year," said Gene Tish, owner, "but in the end decided that we wanted to be independent. That meant that we had to replace the previous owner's franchise system almost immediately.

"At the same time I didn't want to take on the burden of installing and supporting an on-premise system, nor the up-front cost of buying one. We looked at three or four Web-based systems, picked one that fitted well with our operation (innRoad) and were up and running, fully operational, in three weeks.

"It's worked out very well for us. innRoad helped us set up GDS connectivity and a Website with Internet booking, and our largest booking segment is now through the Internet. The staff found it easy to learn, and any new hires are ready to go after spending an hour or so in interactive online training with the vendor. The monthly fee includes this training as well as software and support, all for the same cost as support alone with the franchise systems we looked at and without having to fund a replacement server every three to five years.

"Reliability has been excellent. We did lose the connection once when Internet service went down for 2 to 3 hours to this part of the Oregon coast, but we kept going with manual operations based on critical data we download regularly to a thumb drive. We also forwarded phone inquiries to another office that still had an Internet link, updated changes directly into the system and faxed anything urgent back to the property," said Tish.

Virtualization also permits on-the-fly reassignment of computing power and/or storage as needed if traffic loads on one application suddenly increase. Further, given the ability to configure backup copies on multiple machines, failure of one server has minimal impact on the operation, and some vendors report that their software actually runs more reliably in a virtual environment.

For all these reasons, virtual servers are rapidly finding their way into hotel computer rooms. Most software vendors are happy to approve them, having dropped their former insistence on a dedicated physical server for each application; after all, the software doesn't know that it's sharing. In some cases, though, licensing issues can be a challenge. Oracle's standard licensing is per server, for example, a difficult concept to pin down in a virtual world, and vendors of Oracle-based systems will have to negotiate a new approach if they're to offer their customers the cost savings that virtualization offers.

### The Cloud

Cloud computing takes virtual server tools one stage further, using them to allocate the resources of vast numbers of servers quickly and flexibly among many different companies' needs. These server farms are located in highly secure data centers managed either by third parties (public clouds) or by major companies themselves for their own use (private clouds). Clients access the software applications loaded on them via the Internet, or sometimes through private networks.

Economies of scale mean that cloud resources are less expensive than those at a single property, even virtualized. Further, the on-demand flexibility means that hoteliers no longer need to worry about buying and implementing more hardware resources as their businesses grow; they just call up the cloud vendor and ask for it to be allocated. Burst-management tools can even add resources automatically as traffic loads spike, with clients paying for only the actual resources used.

**Speed of Implementation.** This is a critical factor for international chains, one that's driving them to insist that vendors move their applications to the cloud. The explosive growth of emerging markets such as China and India requires any major chain to open (or acquire) new hotels there at a very rapid rate to gain market share. Given the often challenging infrastructure in these regions, there is simply no other way to equip

these properties quickly enough with the chain's standard systems than by configuring a new instance of each application in the cloud and providing the property with Internet access to it. Combine this with Web-based video training, and a new property can be brought online much more rapidly, in a matter of two weeks to three weeks instead of the several months it would take to acquire and implement multiple servers and system interfaces on property.

Another factor allowing faster implementations is service-fee or transaction-based pricing, which allows systems to be brought online without time-consuming and difficult capital expenditure approvals beforehand. Several vendors offer alternative pricing plans depending on a property's preferences.

One common approach is a flat fee per room per month for all software, interfaces and support, often with no minimum term so a property can switch vendors whenever it needs to. More specific transaction-based pricing is sometimes offered, such as a flat fee per occupied room night. This has the advantage of tying the property's costs directly to occupancy, and thus to room revenue, but few hotels seem to adopt this model. Perhaps the more complex accounting each month is a deterrent, and the predictability of a flat monthly fee is more appealing. Either way, the more traditional approach of a one-time up-front license fee plus a monthly hosting/support fee is always available.

**Flexibility.** Having resources available when you need them and not paying for them when you don't provides significant flexibility in handling peak loads, such as when a property launches a highly attractive marketing offer that generates a major spike in traffic. It also encourages trying out new systems or new operational approaches in a test environment, with a consistent base configuration that can be simply re-installed on a freshly created server at the start of each test.

Data storage is another factor, growing ever larger as properties keep more long-term data on their guests and operations to help with forecasting. Further, while hotels aren't often involved in lawsuits, draconian penalties are being imposed for failure to provide complete documentation under a legal discovery search (Morgan Stanley was fined \$1.4 billion in a 2006 court case for withholding information after it found some back-up tapes in a closet). As a result, many companies are wary of deleting any

data at all, calculating that the cost of storage offsets the difficulties of defining and managing a data retention policy that doesn't hamper the business. Storing all this data on cloud-based servers is cheaper than continually expanding on-site storage, though of course selection of a trusted, secure vendor for the cloud is even more important.

**Better Security.** As mentioned above, it's a challenge for any individual property to maintain the multiple applications, servers, networks and interfaces that property-based systems require. Apart from fixing problems as they arise, there's also the constant need to keep up with new security patches for the software, and the discipline both to back up each system every night and to test the backups to make sure they're usable. Off-loading all these tasks to third parties whose sole focus is to provide a secure, stable and up-to-date environment makes for a huge reduction in this effort.

Centralized support can also offer a higher level of expertise from more-qualified staff at lower cost, because their services are spread across multiple customers. That same factor drives the vendors to be proactive in providing the highest standards of system reliability and availability, knowing that any downtime will impact every one of their customers. Someone on property still needs to manage the relationship and make sure these things are done; more on this to follow.

PCI (Payment Card Industry) compliance is another significant factor, especially since hospitality has been identified as the most vulnerable and most commonly attacked industry for credit card fraud and identity theft. Hotels' credit card transaction volume typically puts them in the self-audit PCI certification category, and to be approved they have to use software applications certified to the Payment Application Data Security Standard (PA-DSS). While most vendors' systems now are PA-DSS certified, the self-assessment task drops dramatically (from 230+ questions down to 38) if those systems are hosted remotely at a PCI-certified site.

**More Complete Range of Applications.** Some of the above benefits have been available from remotely hosted systems for years, but the scope for reducing on-property costs is limited if only a few applications can be outsourced. The real benefits accrue only when as many software applications as possible are hosted remotely. After all, if you just move your PMS and sales and

catering system to their vendors' data centers you still have other servers to maintain on property, typically for food and beverage POS, accounting and especially Microsoft Office®. There's also the interface question; if a couple of essential systems are remotely hosted and all the others are not, you have to deal with multiple interfaces to off-property locations, with all the security hassles that implies.

At this point, though, examples of pretty much every type of hospitality application are available from a remote data center, cloud-based or not.

To name just a few non-PMS examples, Micros offers its Symphony POS as a hosted option, Newmarket's Delphi and Daylight S&C systems are centralized, EzRMS' and IDEaS' revenue management applications are only available as hosted systems, M3, Data Plus and Aptech have offered remote accounting services for many years, and Internet-based telephone services are widespread. And now one of the biggest of them all, Microsoft, has released a basic version of its Office suite - free of charge, no less - in its own Azure cloud environment. While power users still need the full version for now, Microsoft is very clear on moving in this direction, which points the way to removing the last major need for a property-based server.

So what does moving all of your systems off-property buy you? Apart from the maintenance savings and greater system and data security, interfaces also become much simpler to implement and support. There's one link between the PMS and the revenue management system, one to S&C, one to the GDSs and Web booking sites, and so on, not one per system per property. Traditional remotely hosted approaches do outsource the support and security issues but can't provide the economy-of-scale savings nor the flexibility of clouds.

#### **Yes, but...**

All of the above makes what I believe is a compelling case for an unstoppable shift of hotel systems to the cloud, but that's not to say that there aren't challenges. Some are technical; cloud providers have different restrictions on what you can load on them (e.g. Amazon is pretty open but Google limits your choice of operating system and database), network speed is clearly critical both inside and outside the property, and interfaces with non-cloud applications do raise some technical and security issues.

Further, not all systems a property might select from a functionality viewpoint are yet available in a cloud-based form. Licensing can sometimes be a challenge, as mentioned above, and while capital expenditure is certainly massively reduced, operating costs (higher-speed networks, monthly hosting fees, etc.) need to be evaluated and monitored carefully. It costs the vendors a great deal to set up and manage a data center and they receive only monthly usage fees for systems running on it, not the significant up-front license fees they used to get.

Most hotels' operational concerns tend to fall into two main areas: data security and loss of the connection.

**Data Security.** Many properties are wary about the vulnerability of their critical data if it's held off-property. However, that data is very likely more secure in a dedicated data center, which will have more rigorously enforced physical access restrictions, software patch management, anti-virus and other malware protection and data backups. However, it's a legitimate concern that a hosting company may go out of business, or that for service or cost reasons a hotel may want to switch cloud providers and then might worry about retrieving its data.

Fears about service continuity can be mitigated by signing up with one of the major suppliers already offering cloud services, such as Microsoft, Google or Amazon, none of which is likely to go out of business any time soon. Changing providers is much more likely to be an issue as new cloud vendors come to market and offer more attractive bundles of services, support or pricing. The key is to make sure that whatever contract you sign permits you to download a copy of your database at any time you choose-it's your data, after all-so that even if the vendor fails or needs to be changed unexpectedly you still have a recent backup available. The larger hotel chains may find it more appropriate to set up and manage their own server cloud, but individual hotels and smaller groups certainly need to do their research to find a trusted provider.

**Connection Loss.** It is every hotel manager's nightmare for the system to go down when a line of guests is waiting to check in, and a back-hoe cutting through the communications cable to a remote system used to guarantee that happening. Given the high reliability and relative affordability of Internet access these days, one obvious solution is to have redundant connections

from different vendors (perhaps assigned primarily for administrative and guest Internet service) on opposite sides of the building. The Woodmark Hotel on Lake Washington, for example, uses bundled T1 land lines from XO Communications backed up by WiMax service beamed across the lake by PowerStream.

Alternatively, since many cloud-based systems are accessed via Web browsers it's also possible to use 3G (and soon 4G) high-speed cell phone connections to access them if the Internet or other main communications line goes down. The vendors will need to provide a smaller format set of screens for the most important functions, but it really is possible to manage the front desk from an iPhone or other smartphone.

The best approach, though, is to keep a copy of enough critical data on property at all times so that operations can continue even if connection is lost completely. Long a feature of POS workstations, remote PMSs such as SoftHotel's PMX/Stay Manager and RSI's Roomkey PMS cache critical data on the workstations at the property. Updated frequently during the day, these files keep local copies of arrivals for the forthcoming week, current in-house guest lists, folio balances and other information. This allows the property to conduct normal business even with the complete loss of communications, including changes synchronized with the remote server upon reconnection. The cached data gradually becomes out of date after a couple of days, but the great majority of communications interruptions will be much shorter than that and will never be noticed by the property.

### A Word on Staffing

The above may imply that cloud systems allow you to transfer all your support worries to someone else and do without any IT staff on property, but that's not entirely true. You may have outsourced the provision and maintenance of the systems but you can't outsource responsibility for making sure they work properly. Although the need for traditional IT staff will be greatly diminished, someone at the hotel still needs to manage the vendor relationships, track all open issues to resolution and generally make sure that the vendor is meeting the up-time and response time standards specified in the contract's service level agreement (SLA).

### Functionality Trends

Major societal trends toward personalization and mobile access to data (not to mention the current

A CRM emphasis shows up in more traditional PMS functionality as:

**More accurate recognition of repeat guests** when they're booking future stays. This puts a premium on de-duping the guest profile database and a constant effort to maintain its accuracy through address validation services and other checks, all of which are finding their way into PMSs. Inaccurate personalization is worse than none at all.

**Pop-up alert messages for checkin staff** for welcome back greetings, anniversary congratulations, etc.

**Staff alerts** that a guest experienced challenges on a previous stay, describing what action was taken and providing advance notice to ensure a smoother return visit.

**Event-triggered alerts to managers**, e.g. to the GM when a VIP checks in, or to housekeeping when a guest arrives before his or her pre-assigned room or room type is ready.

**Integration between housekeeping and work order management** so that problems can be addressed as quickly as possible, before the guest notices and complains.

economic challenges) are driving every hotelier with more than a single property to look closely at centralized operations. They're doing this for the cost savings, to ensure consistency in guest preference data, and to provide fast access to operating reports, even from the browsers on their smartphones. As such, hotels looking for new systems now often focus first on reservations, CRM management and Web-based reporting, with traditional PMS functions being a necessary but secondary consideration.

Several reservations systems vendors now offer a PMS as an add-on module, and many PMS vendors offer multiproperty central reservations and CRM functions. Certainly a PMS without its own online booking engine for hotel Websites is rare indeed. The lines are blurring quickly, and hoteliers now care less about buying discrete systems in

traditional categories than about looking for vendors (or sets of vendor partners) who can meet their full range of operational requirements.

Almost as important, though, is that vendors are more willing to work as a team, with one acting as the overall coordinator both in presenting their combined bids and in handling first-line support calls after implementation. "One throat to choke" may be a little graphic, but it's meaningful to a resource-strapped hotelier.

To be as attractive as possible, therefore, PMS vendors both continue to add features to their own software and adopt Web services-based interface standards to make it easier to be a good partner with other vendors.

### CRM Focus

The highest priority for many hoteliers is more complete customer relationship management (CRM) functionality. This fundamentally requires the accurate consolidation of consistent guest data across all operational areas, whether managed by one system or several. The challenge in using several different systems is always both technical and philosophical; each system must mean the same thing by the same data element name.

A key factor in making this happen has been the rise of Web services-based interface standards, led by OpenTravel and HTNG, which ensure clarity in defining the data elements themselves and in how they're to be grouped and passed between systems. One of the most widely adopted HTNG interfaces is its Single Guest Itinerary (SGI), which links the PMS, spa/golf/activity management, reservations and POS systems to consolidate all of a guest's bookings and alert all systems if the room reservation is changed.

The point of CRM is to leverage all that information into effective marketing and guest recognition efforts. Some PMSs (such as Northwind's Maestro) now include e-mail marketing functions, and specialized CRM marketing vendors such as Cendyn, ZDirect and Digital Alchemy also integrate well with them. Beyond the usual intelligent e-mail confirmations, pre-arrival up-sell offers and post check-out thank you messages, more systems now integrate electronic GSSs that link a guest's satisfaction survey input back to her stay record for future reference. The best also tie the GSSs back to the specific departments and staff who interacted with her during the stay, and automatically

generate e-mail alerts to department heads if they contain key words such as "delighted" or "unsatisfactory."

As with links to other management sub-systems, PMSs that do not include all of this CRM functionality often acquire it through vendor partnerships. For example, MTech and GuestWare both offer good work order and guest experience integration with PMSs, and LibraOnDemand can supplement-or replace-a PMS's own CRM database.

### Rate/Revenue Management.

One PMS area that's always been of critical importance is rate management, the ability to open and close rates based on pre-defined occupancy triggers and to set length-of-stay restrictions flexibly and quickly. At a higher level, full revenue management systems (RMS) also look at revenue and occupancy goals, compare historical to current booking pace, and then make pro-active recommendations on changes. This highly specialized function is still most often acquired from a separate vendor such as IDEaS or EzRMS (though Micros offers a full RMS module as part of its Opera suite), and many PMSs now integrate these RMS inputs into their own rate management functionality.

The rate/revenue management aspect that's grown most in importance, though, is distribution channel management, which helps hotels post the right rate at the right time to the right market segment on the distribution channels where that segment usually books. More PMSs now include direct connections with Expedia.com, hotels.com and other Internet booking engines, or provide tight integration with third-party systems (EzYield, RateTiger, SynXis, etc.) that manage this distribution function for them.

On a more day-to-day level, there's a trend toward simplifying the rate creation process itself by deriving most rates from a single base rate instead of having to enter dollar values for each occupancy level for each rate. Creating a new weekend rate of base-minus 12 percent and defining its applicable date/day of week range and market segments is quicker, less error prone and allows rate management changes to ripple through the whole system automatically. Some multiproperty PMSs also define their standard rates centrally for each hotel to use as appropriate, saving more configuration effort and improving consistency.

### Reporting.

The reporting flexibility built into a PMS has become a significant selection feature. Hotels need to stay very much on top of emerging trends in their data, and so pre-defined libraries of reports must be supplemented by ad-hoc report generators that are easily understandable by line managers. For more extensive analysis, especially for larger operations, a full business intelligence (BI) tool is often required.

Since third-party BI applications (such as Datavision, Aptech and ProfitSword) are well equipped to extract and analyze data from many different PMSs, it's not so important for a PMS vendor to develop its own. Some do, though, such as Micros and Infor/SoftBrands; others have partnerships with specific vendors, such as Northwind, which re-sells QlikView. These arrangements often provide a very cost-effective solution for smaller hotel operations.

### Ease of Use.

One of the side benefits of our current fascination with smartphones has been a greater awareness of the benefits of a clean, intuitive user interface. This was often a challenge with older PMS screen designs, especially given the traditionally high rate of staff turnover and the need to bring new hires up to speed as quickly as possible. Newer systems are catching up fast with more subtle and visually appealing approaches, but many older systems still need a lot of improvement.

### Training and Support.

Another area where PMS vendors have an opportunity to stand out is in technical support and user training. More now allow hotels to enter and track trouble tickets online, or provide a FAQ database for user research. Online training courses are also becoming more common (RSI, Northwind and Micros are examples), and are very much appreciated by hotels as a way to bring new staff up to at least base level competence and to refresh existing staff knowledge.

Vendors also find them useful in reducing their onsite training effort, by requiring hotels to have their staff complete a certain level of online courses before the vendor's staff arrives on property. This requires the courses to be tracked and managed, of course, rather than just being a collection of videos or multiple choice questions, but again this is quite common.

### Summary

Traditional PMS functionality is still the essential core at every property. By tracking and managing all aspects of guests' stays, it's both a source and collection point for the crucial activity and preference information that forms the basis of all future relationships with them, on and off site.

But hotels now need a wider function set than what a traditional PMS provides. In response, the systems' capabilities have evolved in both on-property and above-property areas, inherently and through Web services-based interfaces to other systems, and they probably deserve a new acronym. These same Web services make it easier for new vendors to develop fresh approaches and link them quickly and effectively into established systems, providing hoteliers with richer and more varied options. This will remain a fascinating development laboratory for years.

At the same time, the move to cloud-based architecture makes all of these combinations simpler to create, implement and support. The arguments for going "up" are already highly compelling, and I'll be astonished if all hotel systems aren't provided this way in a couple of years.

*Jon Inge is an independent consultant specializing in technology at the property level. He can be reached at [jon@joning.com](mailto:jon@joning.com) or by phone at (206) 546-0966.*

*Be sure to check out Jon's new picture on the Contributor's page (page 8).*