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Smart Hotels //
In Room Technology

May 2020

Before COVID-19 hotels primary strategies were to create guest satisfaction, brand loyalty and revenue. In theory this won't change but hoteliers and hotel owners are going to have to deal with post COVID-19 tech-enabled guests who will most definitely have health related expectations.

When the world starts to open up again a hotel's cleanliness and sanitation will play a critical part of their recovery, so too will their guest facing technology.

If applied cleverly, guest facing technology, and how a hotel markets their offering, could play a large role in the decision making process of future bookers and guests at a hotel.

A hotel's guest-facing technology offering could become a very relevant focal point for their future guests' experience. Contactless options will most likely be very sought after.

Hotels wanting to introduce technology that supports a contactless environment will first need to review their tech stack and determine just how flexible it is to support this. Let's just consider the touch points a guest has when arriving and staying at a hotel.

- The Front Desk and Check-in process
- The Elevator Call button and floor selection button
- The Door Lock to the guest room
- Light Switches and Thermostat controls
- Telephone
- TV Remote Control

All these items could in theory be transitioned across to a contactless environment - but it will take some consideration.

You're probably thinking to yourself the easy solution would be to simply provide an app the guest can use on their phone / preferred device to do most of the above. When you boil it down to its basic element, you'd be right. However, it is what sits behind the app and all the technology to ensure that it works in a connected and seamless way. And this is where the Internet of Things related technology will play a part.

IOT

The definition of the Internet of things has evolved due to the convergence of multiple technologies, real-time analytics, machine learning, commodity sensors, and embedded systems. Traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and others all contribute to enabling the Internet of things. In the consumer market, IoT technology is most synonymous with products pertaining to the concept of the «smart building», covering devices and appliances (such as lighting fixtures, thermostats, security systems and cameras, and other appliances) that support one or more common ecosystems, and can be controlled via devices associated with that ecosystem, such as smartphones and smart speakers. This is also the case within a hotel environment.

THE CLOUD

We talk about "The cloud" and how it benefits a modern hotel's technology stack quite a lot in our content and this is why. While the cloud is not directly a part of IoT, it is an important component of many IoT workflows. Cloud computing refers to remote (off-site) servers either managed by the end user or by a third party provider to process, manage and store data whilst running business applications, instead of having them locally installed on property. This has various benefits, some of which includes cost, scalability, ease of maintenance and more. We talk about Cloud computing in more detail in the **PMS Editorial Video**.

Let's consider what might be the future expectations of the guests touch points as they arrive at the hotel, check-in and make their way up to the room.

ARRIVAL AND CHECK-IN

Guests most likely will expect keyless, contactless check-in and checkout with almost zero physical interactions and contact points. This means even having self service kiosks may not necessarily be the only answer. They'll likely need constant sanitizing before people may feel comfortable touching them without wondering how many before them have.

It is very likely that post COVID-19 travellers are going to want to simply check themselves in via their mobile device, walk into the hotel, enter the elevator themselves, select the floor they'd like to go to, find the room and use their mobile to enter their room, all without having to touch anything on the way. At time of check-out the same principle applies with the addition of automated payment solutions in place to avoid the need to hand over any cash or credit cards at the front desk.

WHAT MAKES A HOTEL ROOM A "SMART" ROOM?

Ok, we have touched on the arrival process and getting to the room and check-out. Now let's take a look at what can be done within the room itself to make it "smart" and offer as much as possible in room technology contactless solutions.

○ **Room Controls** - When using IoT technology in room lighting, heating, air conditioning and even curtains can be controlled from a centralised location, such as a smartphone or via such a device as Amazon Alexa.

○ **Voice-Controlled Technology** - Smart speakers can remove the need to touch in room technology devices. By connecting to the TV guests can control the device simply by using their voice. With voice directives guests can turn the television on or off from anywhere in the room and change the channel.

If the hotel network infrastructure supports and the connectivity is available, guests can use voice features to play personal music playlists through the in room smart speaker, or even order room service. This not only offers a contactless environment but also a more convenient experience.

○ **Personal Content** - Methods of consuming video, music and other services via the internet range from streaming, watching live feeds, listening to music and more. This is considered an expectation and is the new normal for the majority of guests, using their own mobile devices to access platforms such as Netflix, Amazon Prime, iTunes, etc. Therefore a smart hotel room can also offer a more personalised entertainment experience by allowing hotel guests to make use of their own accounts with these third-party online services either by directly through the in room TV or pushed from their own device onto the TV or in room speaker system. This together with reliable internet connectivity allows the guest to stream, view, listen and control devices in the hotel room with their mobile devices.

○ **Amenities and faster guest services** - Using IoT devices within a smart hotel offers the ability to connect devices to other hotel services. These could range from Housekeeping to ordering extra towels, Maintenance to report an issue with the air conditioning, spa bookings or even concierge to get information about the local area.

By using either a voice-activated smart hub, or an app this can allow guests to interact on their devices directly with the hotel's departments and staff, all without having to touch a single item in the room.
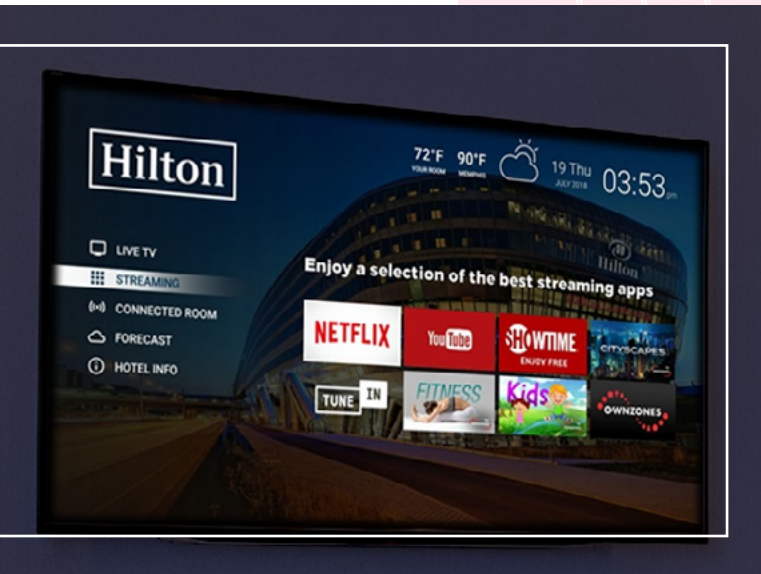
○ **Sustainability** - IoT technology also helps hotels save money on energy costs. For instance, it would be possible for a room to automatically detect the level of light in the room and then seamlessly reduce or increase the brightness of the lighting, The heating or cooling of a room could also be automatically adjusted. Rooms can determine when occupied or empty and automatically run lighting and air conditioning services on the bare minimum or completely shut them down.

Of course guests could override this and manually manage the controls of their room, either whilst in the room or from another location in the hotel. E.g. If they wanted to warm or cool the room for a short time before going back after spending time in the spa or bar, they could do so through the hotel app on their mobile phone.

THE NECESSARY INFRASTRUCTURE

The networking aspect of a hotel can be a very complicated and detailed topic. We could do an entire editorial just on cabling and network infrastructure, it's that involved. We'd be the first to admit that not all hotels are in a position to replace the entire network infrastructure within their building for varying reasons.

That said though, before a hotel can consider introducing any technologies that support IoT cloud based solutions and wireless communication

methods, having the right network and cabling back bone in place is an extremely important component in order to introduce a Smart Hotel environment. So it would be highly recommended that a hotel owner or management team consult with an industry network infrastructure consultant that understands the need for cabling based on the size and requirements of the hotel in question.

Most independently operated hotels and smaller regional brands today have some networking infrastructure throughout the property that is based on **TCP/IP** using **Ethernet**, **Fiber** or **DSL**. This typically supports the High Speed Internet Access (HSIA) network for the guest and locally installed applications (e.g. PMS) for operational purposes. Unless the hotel is using cloud based solutions which then means that these services are off property. Most global chains such as Marriott and Hilton are installing Structured Cabling solutions on a Converged Network environment. These are typically configured in such a way that there is a Guest Network that supports Wi-Fi and internet connectivity with it's own set of security protocols and a Back office network that is used for hotel staff for access to their applications and data with its own set of security protocols.

The other network solution available but is still yet to show its commercial value is Fibre to the room, also known as Passive Optical Networks (PON). A Passive Optical Network (PON) is a point-to-multipoint optical fiber network infrastructure using a passive (no power required) optical splitter to distribute data from a central location such as the Main Distribution Frame (MDF) in a hotel to guest rooms and other locations throughout the property. The optical splitter creates a shared network using a single fiber between a port in the MDF.

ADVANTAGES OF A PASSIVE OPTICAL NETWORK

Lower TCO (Total Cost of Ownership)

Green IT (Saves Power & Space/ Reduces Carbon Footprint)

High Availability and Security

Future-Proof Infrastructure

This "PON" solution is still to show its functional and commercial value, an example of why is due to the fact that most chain branded hotels will not install it due to the fact that every guest room still requires a Optical Network Terminal (ONT) that connects all of the in-room wiring for telephones, TVs, HSIA, and any other devices. For back-up and emergency purposes the chain brands require each ONT to have a dedicated Uninterrupted Power Supply (UPS) in the closet or the AC circuit to be on a UPS. This is a factor that adds a lot of extra cost that even the global chains baulk at and hence continue to install a structured cabling network over Ethernet.

The benefit of such a PON network topology is that it should in theory save money on cabling vs. the traditional Copper Ethernet CAT 6 cabling environment, given it reduces the amount of cabling required to support the entire building. Yet for one reason or another, these cost savings have not been proven or validated and the vendors that supply them are themselves struggling at times to manage their own contractors and resources during the installation phase and ongoing service and maintenance. Just goes to show that even the biggest branded hotels and chains are struggling to find the "Goldilocks" zone of is being cost effective and business enhancing.

Fibre Cable vs. Copper Ethernet Cable. (Source - HTNG)

This chart gives a very high level comparison of the difference between Fibre and Copper Ethernet cable.

Riser Rated Cable	Fiber Optic Cable	Tier 1 Vendor Category 6a UTP
10G Distance	○ 40 km	○ 100 m
Cable OD	○ 2.9 mm	○ 7.5 mm
Weight	○ 4 lb / 1000 ft	○ 39 lb / 1000 ft
Minimum Bend Radius	○ 5 mm	○ 30 mm
Tensile Strength (Installation)	○ 48 lbf	○ 25 lbf

Relative Cable Diameter Comparison	Relative Bend Radius Comparison



Fiber 2.9 mm — 7.5mm

Fiber 5 mm — 30mm

With a PON solution hotels can integrate the entire Guest Room services onto a single optical fibre infrastructure that would include the following in room requirements.
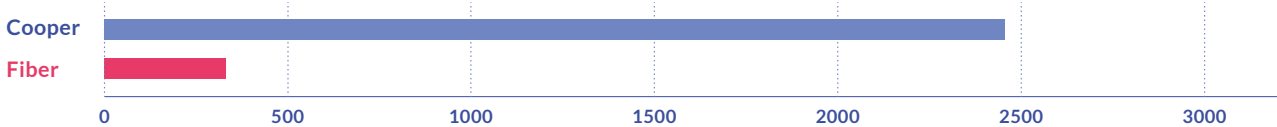
- High Speed Internet Access
- Voice Services
- Analog Telephones
- VoIP (w/ PoE) Telephones
- Automatic Mini Bar
- Building Automation Systems

- Video Services
- IP Video (IPTV)
- WiFi Access Point
- Security Cameras and Systems
- Sensors and Monitoring

215 Room Hotel Cable Comparison (Source - HTNG)

Mains Distribution Unit Space Requirements (RU)
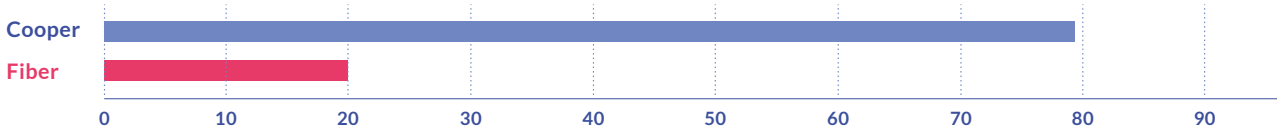
Total Cable Weight (Pounds)

Power Requirements (Watts)

Annual Maintenance ($)

Not everything listed in this article might be practical or feasible for every hotel. If you're a hotel owner or operator and interested in expanding your guest facing technology and smart hotel solutions to offer a more contactless guest experience then thorough research and investigation into the solutions that best fit your existing technology stack should be carried out.

Also, talk with your technology providers about what might be the best solutions for your hotel. Like any major business decision, reducing risk and maximizing returns should be top of mind.

Marriott International IoT Guestroom

This behind-the-scenes video shows The IoT Guestroom Lab – powered by Marriott's Innovation Lab at the company's corporate headquarters. It shows how they explore concepts that have the potential to elevate the guest experience, create more efficient hotel room design and construction.