



HTNG GUEST ROOM ENTERTAINMENT PRODUCT ORIENTATION AND SYSTEM CONSIDERATIONS

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About HTNG

Hospitality Technology Next Generation (HTNG) is a non-profit association with a mission to foster, through collaboration and partnership, the development of next-generation systems and solutions that will enable hoteliers and their technology vendors to do business globally in the 21st century. HTNG is recognized as the leading voice of the global hotel community, articulating the technology requirements of hotel companies of all sizes to the vendor community. HTNG facilitates the development of technology models for hospitality that will foster innovation, improve the guest experience, increase the effectiveness and efficiency of hotels, and create a healthy ecosystem of technology suppliers.

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1.0 Executive Summary

The hospitality industry has traditionally been a slow-mover in the adoption of new technology, especially when compared to the pace at which consumer technology has evolved. For years, video on demand revenue was a 'cash cow' for hotels and providers, so there was no incentive to develop the next-generation in-room product. Development centered around how to sell more VOD vs. any feature or functionality that might distract a user from parting ways with their dollars for content.

However, the evolution of the guestroom entertainment space has introduced some of the more exciting hotel technology in the last 20 years. New entertainment options, such as subscription and fee-based services, and consumers choosing to watch shows at their convenience using those services, combined with the lack of appeal of traditional in-room VOD, have accelerated the transformation of hotel guest room entertainment (GRE). This has provided the guest room with a comparable quality product to the guest's living room experience. Once paired with a guest's device, the expansion of content and functional opportunities multiplies significantly.

However, a guest room TV is more than just a means to provide entertainment and information to guests. The net-connected capabilities required to deliver modern entertainment elements allow GRE to serve as a central communication platform for the hotel room to external entities, both inside the hotel and in the cloud. What is created is an interactive computer, while the TV (monitor), remote control (keyboard/mouse), and the internet connection serve as the conduit to the outside.

Hotel technology decision-makers must have clear objectives when choosing a GRE platform. Is it solely an entertainment portal? Is it a compliment to a branded mobile application? Is it an improvement to the connectivity infrastructure for the guestrooms? This document is intended to illustrate the potential considerations in making those decisions.

A next-generation GRE platform decision should include hotel operations and IT and the sales and marketing team as organizations consider their overall digital strategy.

- Are you taking into consideration the value of the in-room elements?
- How will the TV 'connect' to the larger content and marketing platforms? Entertainment, as content and brand identity, is a consideration in and of itself.
- For larger organizations, have you leveraged the size, footprint, guest traffic, and other items to maximize the cost-benefit of providing targeted content to the demographic in your portfolio?

Additionally, given the portability of content today, brands must weigh the investment benefit of offering high-cost entertainment options.



The size of the hotel brand will be a factor when determining financial costs and opportunities with content and application providers. The hotel space is a valuable market that content providers and advertisers may compete for and can be used to the brand's advantage.

While the future of the GRE space is still evolving, a summary of considerations is outlined below. The following known tenants represent the current state of the GRE space as it pertains to hotels specifically and, more broadly, to travel. These points should be considered, along with this whitepaper designed to provide education and guidance vs. a specific solution.

SUMMARY OF CONSIDERATIONS



Consumer 'cord-cutting' continues to accelerate
OTT application memberships continue to increase
Almost all content is portable



Screen-technology is becoming easier to use and more commonplace
TVs are still the most recognizable technology in the hotel guest room
Digital screens are a powerful and inexpensive marketing/advertising tool, regardless of whether on a large screen or handheld

FIGURE 1: SUMMARY OF GRE CONSIDERATIONS



2.0 Document Information

Document Purpose & Scope

This document was created to help define the infrastructure, product, and vendor options to deliver a hospitality-specific Guest Room Entertainment Solution and is to be used as a guide when considering new GRE solutions. It is not meant to prescribe or dictate needs or requirements.

Additional reference information regarding the state of GRE solutions is presented in the [Appendix](#).

Relationship to Other Standards

The solutions in this document may leverage HTNG specifications such as HTNG PMS Integration. This document also references general industry-recognized standards and terminology for streaming, content, platforms, and integrations.

Audience

This document is intended for the following audiences:

- A technical brand/owner representative responsible for evaluating/implementing guest room entertainment solutions
- A General Manager
- Managed Service providers accountable for the creation, delivery, and management of the guest entertainment platform
- Content Providers responsible for delivery of programming to hospitality venues
- Providers of core hardware and software components for guest room entertainment solutions
- Hospitality advertising and marketing professionals

What is Not Covered

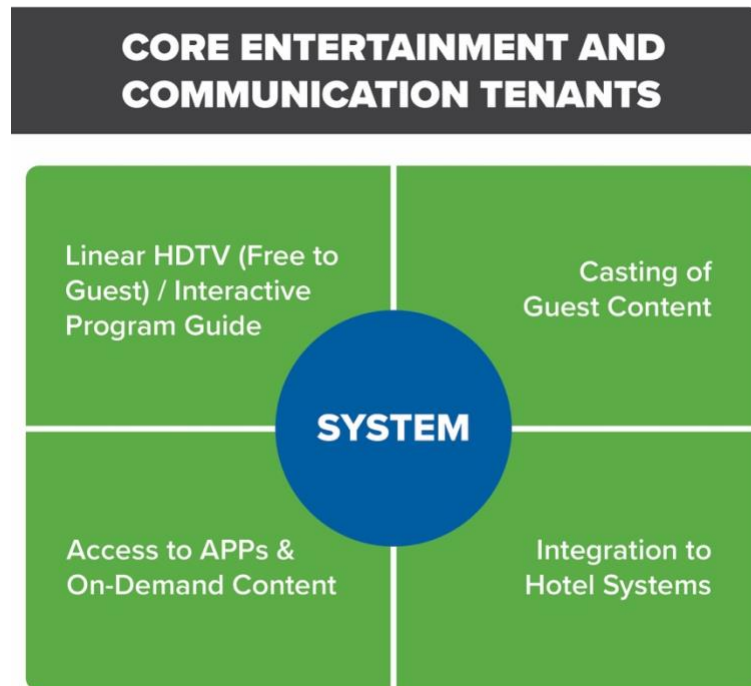
The following topics are not covered in this document:

- **Licensing:** Applications, software, content, etc. licensing is also out of scope and omitted.
- **Regional:** Specific regional information is not included and should be researched separately.
- **Regulatory:** Regulatory requirements are out of scope.
- **Cost:** Cost is not in scope.



3.0 GRE Overview

This HTNG paper articulates core technical and features tenants, which industry experts believe encapsulate the fundamental principles and considerations for an optimal guest GRE experience.



The four-core entertainment and communication tenants, implemented through a combination of software and hardware by a certified and qualified hotel systems integrator, should deliver a seamless, easy-to-use, next-generation GRE Platform. Each hotel should evaluate these four tenants and determine which meets their guest requirements and which specific approach.

Linear HDTV/Interactive Program Guide – Broadcast TV remains important for current events and live sports. This requires an interactive TV program guide to find and watch linear TV in its highest quality format, which today is HD & 4K in high-definition resolution (limited content at this time).

Casting of Guest Content – Guests will continue to bring more content on their own devices and seek to view their content on the guest room HDTV. An easy method to allow all types of devices (*i.e.*, *iOS*, *Android*, and *Windows*) to deliver that content wirelessly to the guest room HDTV is beneficial.

Access to APPs & On-Demand Content – Some solutions allow apps to be available directly on the TV or offer content delivered on-demand. The apps, such as Netflix, Hulu, Disney+, HBO Max, Paramount+, Showtime, and others, are typically pre-loaded. Some solutions provide the Google Play or Apple app store to guests on the hotel HDTV to access their preferred apps/content. In this instance, you must ensure guest credentials are removed on check-out automatically.

Integration to Hotel Systems – All hoteliers and brands have their preferences and requirements for specific integrations to hotel systems, particularly the PMS. A system may also connect with other hotel operational systems and have the ability to communicate with lighting, HVAC, point of sale, and hotel rewards programs.

A qualified professional with extensive technical and operational skills to design, deliver, and support a GRE Platform is essential for the overall solution. Hoteliers should carefully select their partners by checking deployment experience, references, certifications from brands and manufacturers, and operational coverage to support the hotel GRE Platform.



4.0 GRE Market Research – What do Guests Want?

With many entertainment choices available today and many ways to view them, it is often a daunting task to understand what guests want in a hotel room when it comes to in-room entertainment. However, extensive research has been gathered on TV viewing behavior at home and in the guest room, and it sheds light on areas of focus for hoteliers.

Despite many contradictory opinions, guests still prefer an actual TV in the guestroom. Both traditional, linear TV as well as streaming, over-the-top (OTT) applications are essential. The type of in-room entertainment offered can affect guest preference in a hotel, as concluded by a HUB Entertainment Study that surveyed 1,200 US hotel consumers and their 2019 viewing habits.

Some have started to assume that travellers, especially millennials, do not want a TV in the guest room with many guest-carried devices. However, 79% of travellers still consider an in-room TV set to be “essential” or “very important.” Many guests like to use their own devices in the guest room to play games and consume content, but there is a relatively low desire to connect personal devices to TVs, and 73% of guests still prefer to watch live TV on the guest-room TV. Additionally, according to a separate study, TV viewership in occupied hotel rooms has increased 49% since the start of the pandemic, leading to the fact that in-room TV is not a luxury but an essential aspect of the hotel guest room experience.

Today, hotels have many choices about what specific content they can provide to guests, and some consider only a few options. However, according to the HUB Study, in 2020, 64% had both streaming and linear content at home. While staying in hotels, 42% watch live television every time, while 30% watch streaming content during every stay. On the other hand, pay-per-view seems to be the least viewed, with only 14% choosing to pay-per-view every time they are in a hotel.

The HUB Study reported that some of the biggest complaints for travellers are lack of entertainment or uninteresting in-room entertainment. The study found that guest content preferences and comfort levels with technology are still wide-ranging. Even today, it is more beneficial for a hotel to offer a variety of entertainment content choices to meet various needs and preferences. This also means that in-room entertainment technology must be flexible enough to support these varied guest content viewing requirements.

Not simply a preference, travellers will now go out of their way to ensure in-room entertainment meets their standards. The HUB Study found that 61% of guests said they would pay more for access to local, live, and on-demand TV and music, and 59% said they would pay more to log in with access to streaming accounts. Therefore, a robust, in-room entertainment platform is no longer just something nice to have but a requirement to attract guests.

Refer to [Appendix](#) for additional Hub Research data.



5.0 Guest Room Entertainment (GRE) Platform Component Overview

This HTNG whitepaper will outline the critical components of a next-generation Guest Room Entertainment (GRE) platform.

There are three key hardware components:

1. The head-end technology
2. The distribution network technology
3. The guest room tech, which can be SMARTVs or Set-Top-Boxes (STBs) or Set-Back- Boxes (SBBs)

These technology components are linked together and managed by a software platform that can deliver the entertainment content selected by the hotelier. That software platform is modified to meet the specific hardware components by the hotel system integrator, who will operate the GRE system for hoteliers and provide specific feature and service customization as requested by the hotelier.

The list below outlines the key components. However, all components will be driven by the selection of entertainment content the hotelier seeks for their guest room and the system integrator's content licenses.

KEY COMPONENTS

- **ENTERTAINMENT CONTENT** - The GRE platform must support a host of inbound content sources discussed in the prior section: 1) linear TV such as satellite, cable, OTT (Over the Top), or OTA (over-the-air programming); 2) guest owned content such as app-based OTT streaming services such as Netflix, YouTube, HBOMax, Disney+, and others; 3) casting of guest owned OTT content services; 4) hotel provided OTT content such as Showtime or HBO; and 5) potential future sources of guest or hotel content.
- **HEAD-END TECHNOLOGY** - The GRE platform's head-end technology will align with the content sources selected by the hotel. Traditionally a dedicated linear content head-end is required to decrypt the encrypted HD and 4K linear television content and manage encryption and digital rights. Next-generation platforms may include cloud/hybrid solutions for delivering and managing OTT solutions to the GRE platform.
- **DISTRIBUTION NETWORK TECHNOLOGY** – The choice of GRE solutions is dependent on the available hotel infrastructure (i.e., the cable plant). Options include coax cable, CAT5/6 cabling, fiber distribution, and Wi-Fi. The property distribution network delivers the content from the head-end technology to the guest room technology.
- **SMARTV/STB/SBB** – Hotels have choices on how to display content on the guest room TV. The first is a commercial hospitality SMARTV, and the other is a commercial-grade Set-Back-Box(SBB) or Set-top-Box(STB), which connects to a TV providing the GRE experience.
- **SOFTWARE PLATFORM** – There are many software platforms available for GRE, which are designed to deliver and manage the entire GRE experience.
- **SYSTEMS INTEGRATOR** – The integrator's role is to make recommendations, remove the complexity of implementing a GRE solution, and provide ongoing support.
- This document will address items related to the major system components and associated discussion.



GRE Headend Technology Requirements

Headend technology has multiple meanings in a GRE environment, including:

1. Content Headend (provided by the satellite, cable, or OTA content provider)
 - a. Hardware designed to distribute live linear television content which takes input from a satellite, cable, or Over-The-Air (OTA) / Free-To-Air (FTA) feed within a specific property.
 - i. [Linear HDTV](#)
 - b. Headend technologies are available in several different hardware and cloud-based configurations, but IPTV headends are typically on-premises.
 - c. Each inbound 4K or HD linear television content solution from the content provider has specific headend requirements to ensure the security of the television content, commonly known as encryption rules or DRM (*Digital Rights Management*). In the United States, a GRE solution needs to support the linear encryption that the content provider requires. Suppose your content is provided by a cable or satellite provider in the United States. In that case, your content will be encrypted, and the hotel will need compatibility (i.e., decryption at the TV/STB). However, for OTA channels (ATSC, FTA, etc.) DRM may not be required. In EMEA, Free-to-Air (FTA) may still need a rebroadcasting license across all commercial businesses, including hotels, restaurants, offices, and hospitals.
 - d. The United States has the strictest 4K and HD linear TV encryption requirements. APAC and EMEA countries have different encryption requirements on HD linear television services because most are available via air broadcast channels. Sky is an exception and requires DRM protection for sports content. Generally, in these regions, only premium sports and movie channels require DRM outside the USA.
 - e. The three encryption solutions currently approved by all cable and satellite providers in the United States are Pro: Idiom, Verimatrix, and LYNK DRM. These solutions require the headend hardware of any GRE solution to convert the encryption used by the cable provider or satellite provider from their native encryption to one of these three hotel-certified encryptions. The decryption is done in the TV or an STB/SBB.
 - f. In recent years, additional software-based DRM standards have surfaced, supporting OTT delivery of linear/non-linear TV content to TVs or SBB's. These include Fairplay (Apple), Mediaroom (Microsoft), Widevine (Google), to name a few.
2. Platform Headend (provided by the GRE integrator)
 - a. Some headends have expanded to include technical mechanisms that facilitate all GRE Platform entertainment delivery and management, including guest content, such as OTT streaming and casting of content, and hotel information and apps. More recent trends have seen much of this functionality moved off-premises to a cloud-based headend solution. It is worth noting that, in general, IPTV head-ends (IPTV channel streamers) are still usually separate devices to the GRE management solution itself.

GRE PLATFORM HEADEND

The GRE Platform Headend is a server or cloud-based platform provided by the GRE Integrator which may consolidate the following functionality:

1. Linear inbound content
2. Electronic Programming Guide (EPG) Services
3. Pre-loaded content apps (such as OTT)
4. Hotel information (Compendium, F&B, etc.)

5. Hotel systems integration (PMS, POS, BMS, GRMS, etc.)

GUEST APP ACCESS

The ability for hotels to provide preferred entertainment apps for guest usage and the ability for guests, during their stay, to access, or download guest preferred apps is primarily driven by the GRE software platform that sits on the headend or cloud-based technology. app authentication is controlled by server technology and the TV Software platform. If a hotel seeks to adopt a GRE Platform with app access, that system's GRE Platform server technology should support authenticated and non-authenticated apps. You can learn more about these platforms in our [Appendix](#) or in [Section 11.0](#).

HOTEL SYSTEMS INTEGRATION

This is where interfaces to hotel systems take place, typically through an API or SNMP communication protocol. HTNG has been at the forefront of publishing "*industry standards*" for system interfaces that allow the personalization of GRE solutions. When selecting a system integrator and GRE platform, the hotelier needs to consider what hotel personalization they are seeking and what integration to hotel systems like PMS, POS, HVAC, lighting, Loyalty Program, and other data sources they are seeking to make their GRE platform unique to their hotel/brand and their guest's needs. Hoteliers should utilize certified interfaces to these hotel systems. Hoteliers may need additional licenses for this functionality.

6.0 Linear HDTV – Hotel Provided Content

According to HUB Entertainment Research conducted Q1 2021, the primary usage of the guest room television remains watching linear television channels. Over 89% of guests watch linear TV during their hotel stays. The demand for “*real-time*” information through news, business, and sports channels will exist for the foreseeable future. Today, while newly purchased hospitality TVs are 4K, 4K content is not generally available but will ramp up over time.

For linear content, there are many sources, and they vary regionally. Today, most hotels use a content provider such as a national cable or satellite vendor that has access to all forms of linear content for commercial use. Any content provider must have “*commercial license rights*” for linear television content. Many of the well-known linear streaming products such as SlingTV or YouTubeTV only have residential rights, and therefore their content cannot be licensed to hotels and legally displayed in guest rooms.

In the United States, content providers include Cable providers (*Comcast, Cox, and Spectrum*), satellite providers (*DIRECTV, DISH Network, SKY*), and Over-The-Air (OTA) providers (*Hughes, PBS, FreeSat/FreeView* (Europe) and local content providers). Today, and for the foreseeable future, these sources can provide hotels with legal commercial licenses necessary to show linear television. This content can be merged with off-air antennas which capture over-the-air broadcast local channels.

[Table 1](#) presents a summary of the benefits and challenges of utilizing specific Linear Content Providers.

Table 1: Linear Content Provider Summary

Linear Content Providers	Benefits	Challenges
Satellite Providers	<ul style="list-style-type: none"> • Satellite providers have national coverage • Extensive channel package options • Commercially licensed • High-Definition video 	<ul style="list-style-type: none"> • Require encryption support to the TV channels. • Not all content providers carry all channels • Channels can be in dispute and removed from line-ups without warning • Requires external building equipment (i.e., Satellite Dish) • Greater exposure to weather events
Cable Providers	<ul style="list-style-type: none"> • Cable providers avoid using satellite dishes on the roof • Extensive channel package options • Commercially licensed • High-Definition video 	<ul style="list-style-type: none"> • Require encryption support to the TV. • Not all content providers carry all channels • Channels can be in dispute and removed from line-ups without warning • Regional franchise model – no national coverage • Limited dedication to hospitality
Over-The-Air Providers	<ul style="list-style-type: none"> • FREE • Available by Law in most global regions • Good picture quality (less compression than some content providers) 	<ul style="list-style-type: none"> • Limited to just local channels in the US by law, (ABC, NBC, CBS, FOX, PBS) • Limited to line-of-sight and about 50 miles from broadcast towers • Channel availability may be limited to geography
OTT Content Providers	<ul style="list-style-type: none"> • Can support digital delivery of the signal • Simple to use, strong guest knowledge of interfaces 	<ul style="list-style-type: none"> • Not licensed for commercial use • Expensive when licensed for individual guest rooms • Limited channel options

ATSC 3.0 Standards

Today, ATSC 3.0 standards are being released for residential customers seeking a free signal in their local market. Currently, hospitality television manufacturers are not including ATSC 3.0 in their hospitality products.



7.0 Casting Solutions – Guest Provided Content

Today, guests demand a means to bring their own content when they travel and display it on guestroom television. Casting is a technology solution that allows hoteliers to provide guests with a simple and easy-to-use method of projecting content from their mobile device to the guest room television. There are two ways to solve casting: one is via hotel-provided technology, and the other is guest-provided (bring your device). In addition, multiple technologies provide this functionality, as well as different casting solutions that utilize proprietary platforms.

The overview below provides several of the most common casting technologies and the pros and cons of each. However, there are some general considerations for hoteliers when evaluating a casting solution which includes:

- Guest Room Wi-Fi Coverage – Most casting devices will utilize a Wi-Fi network, and a robust Wi-Fi signal is required for the guest room TV and the guest device(s). For optimal results, a Wi-Fi network with in-room access points will provide the best results.
- Property Internet Connection – Evaluate the current bandwidth to the property and size accordingly with the introduction of casting and additional streaming content.
- Guest Experience – Understand the steps required for a guest to use casting functions on the current platform in the guest room, such as:
 - Does this require a remote or menu navigation change to enable casting?
 - Will the guest have to scan a QR code for use within the guest room?
 - Does the guest have to change inputs to access casting features?
 - Will the guest automatically access the casting functionality in the guest room upon check-in via integration with the PMS (property management system)?
- Security – Has the vendor implemented methods to allow casting only to the HDTV within that guest's checked-in room and remove the visibility of other rooms' casting devices?
- Check-in /Check-Out – Understanding how the streaming system will be reset between guest stays is advisable. Is this a manual reset of the Chromecast functions, a time-based clear, or will this be automated via PMS integration?
- Be mindful of rapid technology changes concerning casting technology.

Further information on GRE Implementation Best Practices for casting solutions can be found in the [Appendix](#).

Chromecast

Today, nearly all major OTT video providers, from Netflix to HBO Max to Amazon, have developed a platform that supports Chromecast. Chromecast is uniquely supported by both iOS devices and Android devices, plus Microsoft.

These platforms allow guests to start a video on their mobile device and watch it on their guestroom television. Every Chromecast implementation works differently, and this is where the hospitality GRE integrator comes into play. More detail is provided in Section 9 – Network Technology Components, Guest Casting.

Apple AirPlay

AirPlay is a proprietary protocol that enables iOS or MAC OS devices to wirelessly share audio, video, images, and relative metadata. AirPlay 2 improved streaming performance, enabled voice controls and other control improvements and made it available to third-party TV manufacturers.

Functionally, AirPlay enables an Apple mobile device, an iPhone, iPad, or MAC to stream content to a larger screen through a receiving device, usually, an AppleTV device connected to the display.

MiraCast

Miracast allows users to wirelessly send content from their portable device to a larger screen enabled with MiraCast. The technology uses a Wi-Fi Direct connection between the two devices. The devices need to be near each other to allow Wi-Fi Direct streaming to work. MiraCast has been adopted by many consumer electronics manufacturers and can support HD pictures, encryption, and high-fidelity audio.

Android initially adopted this protocol for its devices but dropped it in 2015 in favor of its Chromecast.

Apple devices never support MiraCast, but some apps enabled the functionality.

Refer to appendix for detailed comparison on casting technologies.

Learn more about casting in our Appendix via [Table A10](#).

8.0 Streaming – Over-the-Top (OTT) Content

While casting is the physical action of presenting content from a device to the hotel TV, streaming is the physical method of delivering content directly from the provider to the TV.

OTT content can be delivered in three ways:

- Authenticated (hotel provided) Streaming Applications (app(s)) on the HDTV or SBB
- Non-authenticated apps on the HDTV that require guest login/app store
- Casting (see Casting Solutions Section above)

While the research supports a need for OTT in some form, it also suggests hotels need all three, which can be expensive and technologically complex for hoteliers. Hoteliers should understand the benefits and challenges of each of the methods of providing OTT. Then, watch guest usage, survey guests, and adapt according to actual guest demand.

Over the Top (OTT) / Streaming apps Options

There are several ways for guests to access content in a guest room:

1. Authenticated apps (*hotel provided content*)
 - a. This is a pre-installed feature on the GRE platform and offers the guest the quickest and simplest route to accessing premium (subscription video on demand – SVOD) content in their guest room. For authenticated apps (i.e., HBO, SHOWTIME), the brand/hotel enters into an Agreement for this content on behalf of the guest, and content is pre-authenticated for guest usage on a free to guest basis. There is no guest username or password required for use. Some OTT content apps may also make their content available in linear (*accessible to the guest*) format.
2. Non-Authenticated apps (*guest-provided content*).
 - a. In this scenario, guests access their content subscriptions (i.e., Netflix) on their device or the hotel HDTV and authenticate accordingly. The guest may need to enter their username and password into the app on the GRE platform HDTV screen. The GRE platform must not save this Personally Identifiable Information (PII), and viewing history and credentials must be automatically deleted upon guest checkout. A PMS integration with the GRE platform will accomplish this task. Hoteliers should verify that this is a capability of the GRE platform under consideration.
3. Casting (*guest provided content*)
 - a. Casting enables 2,000+ apps, and as apps are updated or new apps have casting capabilities, those changes are available immediately to guests without hotels having to secure licensing or update the firmware. Guests have the content that matters to them and can use the interface on their device that they are already familiar with. Guests must remember usernames or passwords or enter any personal information into the HDTV. Various casting solutions provided by many vendors are available today in over 300K guest rooms. Based upon tracking information, guests are watching ~7 hours of casted content per stay and, since the technology was first used in 2016, guests have cast over 1,800 unique apps. The most popular apps mirror large subscriber bases (Netflix, Amazon Prime, Disney+, YouTube). Still, many are less commonly known, perhaps specialty content or region-specific content, enabling guests to watch genuinely personalized content.



In addition, on some GRE platforms, apps can be pre-installed, and/or the guest can access an “app store” such as Google’s Play Store or Apple’s App Store and select their “favorite” app for use during their hotel stay. In addition, due to the nature of these open systems, new applications may be added in the future so that the GRE platform continues to support the latest apps.

Some GRE platforms also support non-entertainment functions like lighting controls, HVAC control, voice management, and other guest room functions.

Table 2: Comparison of Authenticated/Non-Authenticated Content*

Pre-Installed Apps	Guest Access	Distribution	Benefits	Comments
Showtime/ HBO Hotel App (Authenticated)	<ul style="list-style-type: none"> Instant Access No username/ password 	<ul style="list-style-type: none"> Authorized integrators only If there is a cost, it would be borne by the hotel, not the guest 	<ul style="list-style-type: none"> Instant Guest Access No linear subscription required 	<ul style="list-style-type: none"> Only comes bundled with some platforms Brand standards may apply
Netflix/Hulu/ Amazon Pre-Installed (Non-authenticated)	<ul style="list-style-type: none"> Requires username and password 	<ul style="list-style-type: none"> Authorized integrators only Certification required for Netflix 	<ul style="list-style-type: none"> No subscription cost for hotel (guest subscription) 	<ul style="list-style-type: none"> Requires guest login and auto-deletion of PII at checkout Check EULA (end-user license agreement)
Guest Downloaded Apps from App Store (Non-authenticated)	<ul style="list-style-type: none"> Requires username and password 	<ul style="list-style-type: none"> Integrated app stores, if available 	<ul style="list-style-type: none"> No subscription cost for hotel (guest subscription) 	<ul style="list-style-type: none"> Requires guest login and auto deletion of PII at checkout

**Note that not all Apps are represented, table references unique GRE examples*



Streaming Solutions Provider Options

There are numerous sources of content from which hotels and guests may have access at home. Demand for access to these services in guest rooms will continue to increase. Below is a summary of the categories of content providers. Hotels need to understand what options are available in their respective geographies and the types of content their guest demographic desires.

Subscription-based Video-on-Demand (SVOD) – Today, these providers typically charge consumers a fixed monthly fee for unlimited access to their licensed streaming content. SVOD is the largest global streaming market with all the well-knowing streaming company players, including Netflix, Amazon Prime, Hulu, Amazon Prime, Disney+, HBOMax, YouTubeTV, and many others.

Advertising-based Video-on-Demand (AVOD) – These providers do not charge a fee to view their licensed content but require consumers to view advertisements initially and while viewing content. The advertising revenue pays for the cost of the streaming video content. Major AVOD players include YouTube, Crackle, Pluto TV, Tubi TV, and Roku Channel. As an option, these providers may offer a premium rate to eliminate ads. While hotels have not widely adopted this, we expect to see more adoption in the future.

Transaction-based Video-on-Demand (TVOD) – These providers license or produce content for individual, single transaction fee use. Some providers offer this an optional service, while others only offer this model. An example would be renting a movie from Amazon for a single, 24 hours viewing. Users need to set up an account but do not have any monthly fees, and there are no advertisements in the video stream. Major TVOD players include Amazon, iTunes, Vudu, Google Play Store, and Sky Box Office. This is similar to what is commonly known as Pay-Per-View or (outside the US, referred to as Video/Movies on Demand) in hospitality.

It is universally understood that guest licensed content is a critical component of any next-generation GRE platform. In North America, residential adoption of some type of streaming OTT apps is over 60%. In Europe and Asia, adoption is lower but growing at a double-digit rate.

We've created a list of streaming providers, with more details about each one, in the Appendix under [Content Streaming Delivery Platforms](#).



9.0 Network Technology Components

Networking infrastructure within a property or venue is how the GRE platform is delivered. It connects the headend and associated inbound content sources to guest room components such as the TV, STB, SBB, and casting devices.

Hotel owners/operators should evaluate any impacts for upgrades or new networking components that may be required to operate a GRE solution with their chosen integration partner. Here are several critical topics for evaluation and discussion:

Property/ Venue Cabling Systems

The cable endpoint type and availability within the guest room will directly impact the available GRE solution and components that can be deployed. For example, if a guest room only has a COAX cable available at the HDTV, and no upgrade of property cable plant is being considered (CAT5/6 or Fiber), there will be a defined set of GRE solution options and providers that can work over COAX with the associated network and guest room hardware. Depending on the service provider or integrator chosen, additional headend and network equipment may also be required.

Additional network infrastructure, such as a DOCSIS solution, can be added to an existing COAX cable plant, which will create an IP-based network for a GRE solution over COAX. Properties may consider this an option to deliver IP-based content across an existing COAX cable plant without the need to re-cable a property to CAT5/6 or a Fiber-based solution. A cost-benefit analysis is always recommended. A property that has both COAX and CAT/Fiber cable endpoints for IP at the HDTV location within the guest room may want to use an IP based network over a COAX or DOCSIS solution as this offers greater flexibility for connecting GRE solution components and other guest room technologies into a single, converged managed network.

[Table 3](#) summarizes the various network delivery options for properties with the supported delivery features within a GRE solution.

Table 3: Network Delivery Options

Delivery/ Feature	GPON	Ethernet	SMATV Coax	DOCSIS	IP over Coax (G.hn & 802.3bt)	Wi-fi
Multicast IPTV	YES	YES	NO	YES	YES	NO†
HLS+/OTT	YES	YES	NO	YES	YES	YES
Digital (non-IP)	YES	NO	YES	YES	NO	NO
Casting	YES	YES	Requires Wi-Fi	YES	YES	YES
Power over the cable	See Comment **	YES	NO	YES	YES	N/A
TV services to guest own device	YES	YES	NO	YES	NO	YES
Limited capacity	NO	NO	YES*	YES*	YES*	NO
Recommended	MDU/ Large New Build. Distributed buildings/ external wiring required	Anywhere internal. Max 90m from switch.	No Ethernet/IPTV required. Coax TV delivery.	Coax in place. Ethernet required, can't re-cable.	Ethernet required. Can't re-cable	UDP/HLS streaming. Not multicast.

† Live TV services from IPTV head-end requires HLS transcoders on premise or OTT feeds over the internet (where available).

†† A wired connection is recommended for casting solutions, where an in-room wireless AP (access point) is not installed.

* Potential cost implication due to amplification requirements.

** Ability to provide power will depend upon location and type of cabling to ONT. Hybrid cable (copper & fiber) is an option.

Property Network Switching and Routing

Switching and routing components make up the GRE network's communication backbone. Therefore, there must be minimal throughput or capacity constraints for delivering guest room content. A loss of data (dropped IP packets) or slow content delivery to the guest room may result in HDTV screen pixelization or slow response times of on-screen guest content.

These types of issues can arise under the following conditions:

- The backbone of the network does not have consistent gigabit switching, with a mixed group of switches. The age and type of switching should be evaluated.
- Cascading switches connected to a gigabit backbone can oversubscribe an uplink.
- Lack of routing functions for multicast may require a software upgrade or the purchase of enhanced licenses needed for a new or upgraded GRE solution.

Investment in a property's switching and routing network should be considered as additional converged services are added to the backbone, the GRE solution, WI-FI, Guest Room TVs, IoT, etc., to ensure a stable level of service to the guest room.



Guest Room WI-FI Networks

Wi-Fi within properties is considered a must-have for guest data. It is equally essential for properties that will utilize a casting solution within the guest room. Both the guest device and often the casting device will require WI-FI access.

There are several considerations when using WI-FI networks with a GRE solution, namely.

- Suppose a property is using its WI-FI network for guest data. In that case, IoT and Back of House (BOH) applications, together with a casting solution, a site survey, and spectrum analysis, are recommended. This will identify any channel conflicts and potential coverage issues for the operation of the casting solution.
- The location of the WI-FI access point to the TV and the guest device can impact the quality of signal and performance of a casting solution. In-room WI-FI access points be used if a guest casting solution is deployed that utilizes a WI-FI signal.
- Careful consideration should be given before running the complete GRE solution over a Wi-Fi network.

Hotel Internet/Dedicated Bandwidth

The hotel Internet bandwidth should be sized to support an estimated number of guests streaming content. In addition, if the hotel is also providing IPTV via the Internet or dedicated circuit, this should also be considered in the sizing of the property bandwidth. Each hotel should seek out its brand standards for dedicated bandwidth per guest room. If a hotelier is seeking to adopt the Netflix app in their GRE platform, Netflix requires each guest room have a minimum of 3 Mbps connectivity.

Please see the [Appendix](#) for additional details on GRE Networking.

10.0 Guest Room Technology

The technology deployed in the guest room dramatically impacts the features and functionality of any GRE platform. This section contemplates the following Guest Room Technology:

- HDTVs
- Set-Top-Boxes (STB)/Set-Back-Boxes (SBB)
- Casting

Television Fundamentals

It is highly recommended to purchase a Commercial, Hospitality Grade TV. A residential grade HDTV in a hotel guest room will dramatically impair the functionality of a GRE solution. There are critical technological differences between residential and hotel/commercial grade TVs. Any hotelier must purchase a hotel/commercial grade TV for the reasons presented in Table 4.

Table 4: Hotel/Commercial Television Fundamentals

Functionality	Description
Warranty	A residential TV warranty in a hotel setting will void the warranty.
Guest Experience Functionality	Residential TVs may not be able to run the applications and perform the management needed for GRE platforms, including several operating features such as HDMI Port Blocking, Channel, Volume, Color, Hue, and Hotel/Brand Standard TV settings.
MPEG4 Decoding	Enables hoteliers to select cable or satellite and avoid any additional equipment for the TV in order to view HDTV channels.
Encryption	Content programmers require DRM (Digital Rights Management) for a commercial/in-room deployment, to prevent illegal sharing of content. DRM options include Pro:Idiom , Verimatrix, Samsung LYNK, etc., allowing licenses HD channels to be viewed in guest rooms.
Centralized Management	Today, all hotel grade HDTVs from the two dominant TV manufacturers, LG, and Samsung, support centralized management which eliminates the need to install and upgrade channels and settings in every guest room. The LG product is called the Pro:Centric Server and the Samsung product is called the REACH Server.
Duty Cycles	Consumer TVs are typically built to run four to eight hours a day while hospitality sets are designed to be used for 15 or 16 hours a day. There are even some TV panels that can run 24/7.

Keeping a single TV manufacturer in individual properties is highly recommended to allow hospitality integrators to manage firmware and software versioning better, thus improving the guest experience.



Type of Commercial HDTVs

The following matrix summarizes the differences between residential grade flat-panel televisions and the three types of commercial hospitality grade models. HTNG defines in greater detail these categories of HDTV as follows.

Residential HDTV – flat panels are sold to the residential market without a direct decode of commercial video signals (MPEG4) or commercial video encryption (Pro:Idiom/LYNK) without a cable or satellite box.

Hotel Lite HDTV – coax-based flat panels with commercial warranty include the ability to decode commercial video signals but not commercial encryption. This category also does not consistently have centralized management and is built specifically for management by a software platform set-back-box or set-top-box.

Hotel HDTVs – coax-based flat panels with commercial warranty, decode commercial video signals, and commercial encryption (Pro:Idiom/LYNK). This category consistently works with centralized management tools from LG and Samsung and can support management by a global software platform on a set-back-box or set-top-box.

SMARTV Hotel HDTVs – coax and IPTV-based flat panels with commercial warranty can decode commercial video signals and commercial encryption (Pro:Idiom/LYNK). This category is specifically designed to be the guest-facing software platform from LG and Samsung and can support management by a global software platform on a set-back-box or set-top-box. Refer to [Appendix](#) for additional information on TVs.

Guest Room Set-Back-Boxes (SBBs) / (STBs)

A guest room SBB is designed to provide a consistent, interactive guest experience without changing the guest room HDTV. SBB features below represent commercial-grade hardware, not residential-grade hardware (such as Roku or an Amazon Firestick).

The capabilities that should be contained in a commercial-grade SBB are provided in [Table 5](#).

Casting with Commercial Grade TVs and SBB

If a hotel utilizes a physical Chromecast device, the commercial-grade television, and the SBB must support an additional HDMI input for that Chromecast, plus a USB port to provide power to the Chromecast or available wall power outlet. In addition, the television and the SBB will need to support in software, the ability to potentially switch HDMI inputs to help cast if in a port not integrated with the SBB. The only exception is a certified Android TV SBB which has casting built into the software and does not require a separate Chromecast device.

For AirPlay (*except for TVs with Airplay 2 built-in*), similar requirements exist because AirPlay would be implemented by an Apple TV device plugged into an HDMI port on the television or an SBB. MiraCast is traditionally implemented into the hardware of a commercial-grade television or commercial-grade SBB. Thus, no additional HDMI inputs are needed.

Current Hotel Brand Guest Room Technology

This HTNG Workgroup does not endorse any manufacturer, vendor, or integrator of commercial-grade HDTV or interactive SBB products or solutions. HTNG has included the decisions made by several large brands on their choice of guest room technology.

Several major hotel brands are standardizing on SBBs to extend the life of the television panel itself and be able to more cost-effectively and regularly update the GRE solution. Marriott, Hilton, and InterContinental hotels are brands that have taken this approach.

Marriott GRE – Requirement for worldwide Marriott branded hotels to deploy an SBB which utilizes the LG WebOS/PCS software platform. The solution provides a branded guest interface, an interactive television guide, access to certain guest licensed content apps such as Netflix and Hulu, access to hotel licensed content through the Showtime app, and options to include an add-on residential Chromecast device for casting.

Hilton Connected Room – Requirement for worldwide Hilton branded hotels to deploy an SBB which utilizes the AOSP version of the Android TV software platform. The solution provides a branded guest interface, an interactive television guide, access to certain guest-licensed content apps, integration with the Hilton Rewards program, and future integration with IoT guest room features.

IHG Studio – Requirement for InterContinental branded hotels to deploy an SBB or a SMARTV that utilizes the LG WebOS/PCS software platform or the Samsung Tizen software platform. The solution provides:

- A branded guest interface.
- An interactive television guide.
- Access to certain guest-licensed content apps such as Netflix and Hulu.
- Options to include an add-on residential Chromecast device for casting.

Table 5: Set Back Boxes (SBB)

Functionality	Description
Centralized Control	SBBs can be centrally controlled by hotel integrators so that remote control of the entire hotel can be done through a central server and guest room visits are not needed for changes.
Version Management	SBBs can be all on the same version of the software and upgraded centrally using centralized version control tools. This is critical because SMARTVs do not maintain version control and older model SMARTVs do not always support the latest software versions.
Hardware	SBBs are available in a variety of SBBs forms and designs to meet the space and function requirements for hotels. Additional hardware/cables may be required.
Software Platforms	SBB delivers the software functionality and customization for the GRE solution and allows for a consistent guest experience regardless of the TV brand, model, etc. (reference Section 10.0 - Type of Commercial HDTVs).
Customizations	SBBs can have customized hardware to meet specific hotel needs such as additional HDMI ports for Chromecast or game consoles.
Access Control	SBBs can support extensive integrations such as communication with Property Management Systems, Point of Sales systems, and operational engagement systems. They also support a wide range of IoT functions and integrations.
Logistics Management	SBBs are installed behind either the guest room flat panel HDTV or in a credenza which provides physical security and protection from guest tampering or damage. In addition, the replacement cost of an SBB vs a flat panel HDTV is substantially less.



11.0 GRE Software Platforms

Guest room entertainment solutions start with foundational software. While each hotel or hotel group has different opinions on what type of entertainment and what connections are needed to meet their guests’ needs, this section outlines the services these seven platforms can deliver for GRE Platform.

1. LG WebOS/Pro centric
2. Samsung Orsay/Tizen/LYNK Cloud
3. AndroidTV/GoogleTV (two options: *Certified and Open Source*)
4. tvOS (Apple TV)
5. Catapult
6. Phillips
7. Roku
8. Amazon Fire
9. Residential Platforms

Several consumer platforms are available today, such as Roku and Amazon/Fire, which are not hospitality GRE-specific solutions.

The following tables illustrate the pros and cons of these seven global GRE platforms and their applicability to the hospitality ecosystem. Below are the four critical areas of functionality for hotels making a guest room entertainment decision as outlined in the Executive Summary. This section will answer how each of the global GRE software platforms meets the requirements or requires work from a hotel integrator to make it function in a hotel environment.

Key Technology Measurements:

<p>Linear HDTV – Does the platform natively support legally licensed, DRM protected and approved linear TV content in a commercial TV or commercial SBB today?</p>	<p>Guest Casting – Does the platform natively support casting today on a commercial TV or commercial SBB hardware?</p>
<p>Guest app Access – Does the platform natively provide access for a guest to access popular apps or apps of their preference?</p>	<p>Hotel Systems Integration – Does the platform natively have integrations with core hotel systems such as hotel lighting, HVAC, and/or guest room management systems (GRMS)? Does the platform integrate to any PMS, POS, loyalty, or other systems?</p>

Below is a matrix of each TV platform and its current ability to meet the technology measurements listed above.



PCS/WebOS

This TV software platform operates on LG commercial televisions and LG commercial set-back-boxes. This platform is probably the most widely deployed global core TV platform in the hotel marketplace.

<p>Linear HDTV – This platform contains Pro:Idiom encryption natively, which is approved for all linear TV content in North America and Canada. Note that some countries do not require encryption and/or DRM.</p>	<p>Guest Casting – This platform supports Miracast for Android devices and can support the integration of a residential Chromecast for casting but will require integration work by a systems integrator.</p>
<p>Guest app Access – This platform has a limited number of apps integrated into the commercial platform. Many of the apps require the system integrator to be directly licensed by the app owner, such as Netflix.</p>	<p>Hotel Systems Integration – This platform has some system integrator-developed apps/services that can integrate with hotel lighting, heating, and other systems. Integration to PMS or POS would require system integrator work and licenses but is commonly available.?</p>

REACH/Tizen

This TV platform operates on Samsung commercial televisions. This platform is widely deployed in the global hotel marketplace.

<p>Linear HDTV – This platform contains Pro:Idiom and Lynk DRM encryption natively, which is approved for all linear TV content in North America and Canada. Note that some countries do not require encryption and/or DRM.</p>	<p>Guest Casting – This platform supports Miracast for Android devices and can support the integration of a residential Chromecast for casting but will require integration work by a systems integrator.</p>
<p>Guest app Access – This platform has a limited number of apps integrated into the commercial platform. Many of the apps require the system integrator to be directly licensed by the app owner, such as Netflix.</p>	<p>Hotel Systems Integration – This platform has some system integrator-developed apps/services that can integrate with hotel lighting, heating, and other systems. Integration to PMS or POS would require system integrator work and licenses but is commonly available.</p>



AndroidTV/Google TV (Certified or AOSP)

Google TV (and its predecessor Android TV) has two TV software platforms: the first is a certified Google TV platform and the second is an Open-Source version (AOSP). Several vendors today support the Google TV-certified platform, and several others deploy an AOSP platform for guest room entertainment. The certified version will benefit from OS updates and improvements from Google, during the life of the device.

<p>Linear HDTV – Whilst neither platform natively supports linear TV encryption/DRM, several system integrators have built software solutions to allow a commercial TV or commercial SBB to provide linear TV channel playback.</p>	<p>Guest Casting – The certified Google TV platform natively has 4K Chromecast capability built-in. The AOSP platform does not, so it would require a system integrator to provide Chromecast functionality through a Chromecast dongle. See the Casting section for more information.</p>
<p>Guest app Access – The certified platform has the complete Google Play Store with over 10,000 available apps, for guest download and usage. The AOSP version does not have app store access and would require a system integrator to pre-install any required apps on the hardware platform.</p>	<p>Hotel Systems Integration – The certified platform has many apps that can be integrated by a system integrator to work with hotel systems. Integration to PMS or POS would also require system integrator work and licenses. The AOSP platform would be fully dependent on the systems integrator to write and integrate software systems, as there isn't a pre-existing Apps ecosystem.</p>

Apple TV 4k

Apple TV is a 4k HDR integrated software and hardware platform, offering access to the Apple App's ecosystem. Because the Apple TV uses tvOS, it benefits from regular feature updates and improvements from Apple, for the life of the device. Whilst Apple TV also natively supports Airplay content casting, Airplay 2 & Apple's TV+ App has now been implemented in several consumer TV hardware manufacturers too. Airplay 2 may also become available on commercial TVs soon.

<p>Linear HDTV – This software platform can support linear TV with encryption/DRM but requires specific custom software from specialist system integrators.</p>	<p>Guest Casting – Apple TV 4k has Airplay 2 integrated into the platform to support Apple's proprietary AirPlay casting technology for Apple devices. It does not support Chromecast or MiraCast casting.</p>
<p>Guest app Access – The Apple TV platform has access to the complete Apple tvOS app Store with over 13,000 available apps for guest use. Apps can be pre-installed and/or downloaded by guests. A system integrator would provide management and controls over the use of the apps.</p>	<p>Hotel Systems Integration – The platform has a variety of apps that can be integrated by a system integrator to work with hotel lighting, heating, and other systems. Integration to PMS, POS & other integrations are also available from specialist integrators.</p>



Catapult

This core TV platform operates on Catapult set-back-boxes. This platform is deployed globally in the hotel marketplace. Catapult SBB’s can also support Samsung REACH (see above).

<p>Linear HDTV – This platform contains Pro:Idiom encryption natively, which is approved for all linear TV content in North America and Canada. Note that some countries do not require encryption and/or DRM.</p>	<p>Guest Casting – This platform does not natively support casting but can support the integration of a residential Chromecast for casting which requires integrator work by a systems integrator</p>
<p>Guest app Access – This platform has a limited number of apps integrated into the commercial platform. Licensed native apps like Netflix and web apps are supported.</p>	<p>Hotel Systems Integration – This platform has native PMS support and has developed apps that can control an ecosystem of standards-based lighting, heating and other IoT solutions.</p>

Philips TV

Philips Professional Displays deliver a certified AndroidTV platform for the hospitality market. AndroidTV contains Google certified features such as Google Play Store, Embedded Chromecast, and multiple DRM including Widevine and V Secure. Hospitality access to mainstream apps such as Netflix, Disney, and Amazon Music is also associated with the OS. This product is widely available in EMEA and APAC, but just launched in North America in 2021.

<p>Linear HDTV – The PhilipsTV natively supports multiple linear TV DRM/encryption, including Pro:Idiom and vSecure.</p>	<p>Guest Casting – The Philips TV platform natively includes a software version of Google’s Chromecast functionality.</p>
<p>Guest app Access – This certified platform has the complete Google Play Store and over 10,000 available apps for guest download and usage. A system integrator would provide management and controls over the use of the apps.</p>	<p>Hotel Systems Integration – This certified platform has many apps that can be modified by a System Integrator to work with hotel lighting, heating, and other systems. Integration to PMS or POS would require substantial System Integrator work and licenses.</p>



Roku

Roku is available for consumers today as an integrated software and hardware platform (SBB) or as a software-only platform (integrated into a TV), which could (potentially) be integrated into a commercial TV or commercial SBB. No known Roku deployment exists in hotels to date, so caution is required.

<p>Linear HDTV – The combined hardware and software platform does not currently support linear TV encryption and would require the software to be integrated into a commercial TV or a commercial set-back-box.</p>	<p>Guest Casting – Roku platforms natively support Casting.</p>
<p>Guest app Access – Roku allows access to the complete Roku app Store with over 1,000 available apps. A system integrator would need to provide management and control over the use of the apps.</p>	<p>Hotel Systems Integration – The Roku platform has many apps that could be integrated by a system integrator to work with hotel lighting, heating, and other systems. Integration to PMS or POS would require System Integrator development and, potentially, licenses.</p>

FireStick/Amazon

Firestick/Amazon is a residential-based integrated software and hardware platform. No known Firestick/Amazon deployments exist in any global hotel to date, so caution is required.

<p>Linear HDTV – The combined hardware and software platform does not support linear TV encryption. The TV software platform also does not support linear TV encryption and would require the software to be integrated into a commercial TV or a commercial set-back-box.</p>	<p>Guest Casting – Firestick/Amazon platform does not natively support A System Integrator would have to add a Chrome Stick to enable guest casting.</p>
<p>Guest app Access – Firestick allows access to the complete Amazon Fire app Store with over 1,000 available apps. A system integrator would need to provide management and control over the use of the apps.</p>	<p>Hotel Systems Integration – The Amazon Fire platform has many apps that could be integrated by a system integrator to work with hotel lighting, heating, and other systems. Integration to PMS or POS would require substantial System Integrator work and licenses.</p>

Residential Platforms

These are TV platforms that operate various cable, terrestrial, and satellite solutions worldwide. This summary is not platform-specific but instead designed to provide a high-level overview of these types of TV platforms. These platforms have limited deployments in hotels globally, notably DirecTV Residential Experience, X1, and Sky In-Room in the UK.

Other international residential platforms, including Foxtel in Australia, TrueVision in Thailand, Singtel in Singapore, Evision in the UAE, and Canal Digital in the Nordics, will have a dedicated hotel solution. However, these specific hotel solutions are almost always more limited regarding content variety due to the increasingly complicated rights management issues.

Most residential TV manufacturers will invalidate warranty claims if their TVs are used in a commercial environment.

<p>Linear HDTV – All platforms will support their local linear TV encryption/DRM requirements.</p>	<p>Guest Casting – Some TV providers natively support Chromecast (e.g., Sony & Phillips), but there would generally be some significant integration to add a Chromecast dongle to the proprietary residential hardware.</p>
<p>Guest app Access – Most platforms support some apps but are limited and do not consider the commercial use of resetting user credentials on check-out.</p>	<p>Hotel Systems Integration – These platforms are proprietary and would require substantial system integrator work to control hotel lighting, heating, and other systems. Integration to PMS or POS would also require substantial System Integrator work and licenses.</p>

[Table 6](#) below presents a comparison of the features and options available for the various platforms. The table also provides a maturity key for the use of the product in hospitality.

Table 6: GRE Software Platform Comparison

Platform/ Features	LG Web OS	Samsung Tizen/ Orsay	Philips	Apple TV OS	Catapult	Certified Google TV	Opensource Android TV	Roku/ RokuTV	Amazon Firestick
Support for SMARTV or SBB	Both	Samsung TV	Philips TV	Apple TV SBB	Catapult SBB	Google SBB	Both	Roku SBB	Amazon SBB
Linear IPTV support (UHD/HD)	YES	YES	YES	YES	YES	YES	YES	NO	NO
Coax TV Support	YES	YES	YES	NO	YES	YES	YES	NO	NO
TV DRM Support	Pro:Idiom	Lynk DRM/ Pro:Idiom	Vsecure/ Pro:Idiom (USA models only)	Pro:Idiom M	Pro:Idiom	Pro:Idiom M	NO	NO	NO
Integrated Casting Compatibility	Smartshare (Android)	Miracast (Android), Airplay 2 (Apple)	Chromecast (Android/ Apple)	Apple Airplay 2	NO	Chromecast (Android/ Apple)	Android. Some have Airplay emulation (no DRM support)	NO	NO
Remote Management (update/ control)	YES	YES	YES	YES	YES	YES	YES	NO	NO
OTT Apps Available	LIMITED	LIMITED	LIMITED	NUMERO US	LIMITED	NUMEROUS	LIMITED	NUMEROUS	NUMEROUS
Existing Hotel Deployments (not POC)	YES	YES	YES	YES	YES	YES	YES	NO	NO
App Store Access for guests	NO	NO	YES -10,000+	YES - 13,000+	NO	YES -10,000+	NO	YES -1,000+	YES -1,000+



Table 6 (continued): Known Integrator Available Options

Known Integrator Available Options	LG Web OS	Samsung Tizen/ Orsay	Philips	AppleTV OS	Catapult	Certified Google TV	Opensource Android TV	Roku/ RokuTV	Amazon Firestick
Netflix Certified for use in Hospitality	Integrator Dependent	Integrator Dependent	YES	Integrator Dependent	YES	Integrator Dependent	Integrator Dependent	NO	NO
PMS Integration Supported	YES	YES	YES	YES	YES	YES	YES	NO	NO
GRMS/ Room control compatibility	YES	YES	YES	YES	YES	YES	YES	NO	NO
Hotel Services/ Information	YES	YES	YES	YES	YES	YES	YES	Potentially	Potentially
Wake on check-in	YES	YES	YES	NO	YES	YES ¹	YES	NO	NO
Solution Maturity (Jan 2021)									

	Dominant – 500k + TVs		Up & Coming 10k+ TVs		New, coming soon
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For additional technical insight into each of the core platforms please refer to [Appendix](#), which will include details on each of the following features/functionality, which decision-makers should consider when selecting an in-room entertainment solution.

¹ Please Check with Integrator



12.0 Selecting a GRE System Integrator

GRE platforms can be highly complex technology platforms that require specialized vendors to configure, implement, and support. When selecting a GRE system integrator, the hotelier should be asking a series of questions to determine the integrator's capabilities and expertise. The section below will review the skillsets required for a successful GRE implementation. Many brands have preferred or required GRE system integrators in their respective brand standards.

Depending on the hotelier's requirements for entertainment content, the following considerations should be considered in your discussion with system integrators.

- 1. Linear Television Content**
 - a. A system integrator should have a contractual agreement with one of the primary content providers to deliver broadcast channels (*satellite or cable*). This is referred to as Free to Guest (FTG).
- 2. Video on Demand Options (PPV and FTG)**
 - a. In the hotel marketplace, that is often first-run movies that can be licensed through a transactional (PPV) video-on-demand business model.
- 3. Hotel Subscription Video on Demand (SVOD)**
 - a. Licensed content apps such as Showtime, HBO Max, and CNN are licensed by the hotel brand/system integrator and made available for FREE guest usage on demand.
- 4. Hotel Licensed app/Guest Subscription**
 - a. Licensed content apps such as Netflix are currently licensed by the brand/system integrator and made available for guest usage of their personal subscriptions in the guest room.
- 5. Guest Licensed Content**
 - a. Content that the guest carries to the guest room or free content such as YouTube. The guest must have their subscription (Netflix or Disney+), and the hotel should confirm with their system integrator to ensure they are correctly licensed.

Note: As this paper is focused on Guest Room Entertainment, it does not cover Commercial Contracts for Public Spaces/Franchised Venues such as Bar/Restaurants/Outdoor Venues/Retail, etc. Hotels should consult their system integrator for options in these areas.

In summary, it is the hotels' responsibility to understand the EULA (End-User License Agreement) for each of the above content options for guest room entertainment. Another consideration would be OTA (Over the Air) / FTA (Free to Air) channels with rebroadcasting licensing.



Considerations when Selecting a GRE Integrator

Network Experience

GRE networks require networking expertise. IP networks are converged in many hotels, and the system integrator will be responsible for multiple services (*voice, video, and data*) over a single network. On-staff certified and licensed network engineers are a must, and system integrators should be able to present to any owner/operator a comprehensive network design and plan. Also critical is that system integrators will need to support legacy networks, such as coax, which is an entirely different skill set than IP networking.

Hardware Experience

The head-end and guest room hardware technology need to operate seamlessly for a GRE solution to deliver an excellent guest experience. System integrators will need technical staff that have experience in head-end servers and cloud-based technology. The system integrator will also need extensive commercial television experience. If that integrator delivers an SBB, engineering experience with low-level software drivers, middleware, and expertise with the respective global GRE software platform is a must.

Software Experience

Noted in the hardware experience section, software experience takes on several levels. For GRE platforms, the system integrator will need expertise and the licensing authority to address software issues reactively and proactively. The system integrator should deliver software deployment, maintenance, and scheduled upgrades to an owner/operator. Expertise is required in the global GRE software platform and other hardware areas and software management tools, including network gear configurations, software upgrades, network security, and several security patching and upgrades.

References

The owner/operator should seek from each system integrator a list of 3-4 reference accounts that have a similar product that the owner/operator is considering (i.e., similar size and infrastructure) to get comfortable with the skills set of the system integrator. An RFP or Vendor screener is the best way to seek an apples-to-apples comparison. Googling the integrator's past deployments that were press released and calling those customers is also a good source of information.

Regional Coverage

When selecting a system integrator, inquire about the regional support capabilities such as NOC, Call Center, etc., to support the 24/7 operation of the hotel in the desired region. Also, as a best practice, ensure an appropriate SLA (Service Level Agreement) for the level of service chosen.

HTNG does not endorse any individual system integrators, capabilities, or solutions. The list below includes the GRE system integrators who have contributed to this document.

GRE System Integrator Contributors

5thGenWireless	Mandarin Oriental Hotel Group
Accor	Melco Resorts & Entertainment
Allbridge	Minsait, An Indra Company
Aruba, a Hewlett Packard company	Montage International
AT&T	Nettify
Choice Hotels International	Nobu Hospitality
Cloud5 Communications	Nomadix
CNN	Omni Hotels & Resorts
Comcast Business	ProspX.ai LLC
CommScope - Ruckus Networks	PureHD
Corning	ROOMNET
DISH	Runtriz
Eleven	Sabre Hospitality Solutions
Four Seasons Hotels & Resorts	Sage Hospitality
GuestTek	Samsung
Highgate Hotels, Inc.	Sonesta International Hotels Corporation
Hoist Group	Sonifi
Hospitality Network, LLC	Spectrum Enterprise
Host Hotels & Resorts, Inc.	Tangerine Global
Hughes Systique Pvt. Ltd.	The Conceptual Group
IHG Hotels & Resorts	TUI InfoTec GmbH
Intel Corporation	Veridicum
JC Resorts	West Virginia University
Jireh-Tek	World Cinema, Inc.
LG Electronics USA, Inc.	Xenios Group

Appendix

Glossary of Terms

Castings – Casting is a technique that enables you to display content on a TV and control it via a mobile device. While the content is playing on the TV, the mobile device can usually be used for other things. Casting is not a mirroring experience.

DMR – Digital Rights Management, often referred to as the method of encryption used to protect digital content.

Electronic Programming Guide (EPG) Services – Electronic programming guides (EPGs) and interactive programming guides (IPGs) are menu-based systems that provide users of television with continuously updated menus that display scheduling information for current and upcoming broadcast programming (most commonly, TV listings).

Hotel Systems Integration – This is the ability for the TV headend to interface with various hotel systems. This may include the Property Management System (PMS), Point of Sales (POS), Building Management Systems (BMS), and Guest Room Management Systems (GPMS).

Hotel Information – The ability to interface with hotel systems that display information regarding the services offered at the hotel. This may include Spa, Golf, Restaurants, etc.

IPTV – This is the term used when TV content is delivered over the network in digital form. It stands for Internet Protocol TV. IPTV in hotels is usually delivered in Multicast form.

LYNK DRM – Developed by Samsung, this software-based encryption is used exclusively by Samsung in their hospitality commercial-grade HDTVs.

Mirroring – This is where the content of your mobile, tablet, or laptop is also shown on the TV screen. The TV mirrors what's on the device at that time.

Multicast – This refers to a single channel sent across a network to many users at the same time. It allows scalability of TV channel delivery in a network, as multiple users can watch the same stream (TV channel) simultaneously.

OTT (Over the Top) – The term itself stands for “*over-the-top*,” which implies that a content provider goes *over the top* of existing internet services. Netflix, Hulu, YouTube, Disney, etc., are all examples of OTT content delivery providers.

Pro:Centric – LG encryption technology that is used in hospitality to protect digital content that is delivered to LG televisions.

Pro:Idiom – The encryption technology used in hospitality to protect digital content delivered to the guest room TVs. Developed by and currently owned and licensed by Zenith/LG to various TV manufacturers and SBB makers. There are two Pro:Idiom solutions. The first and most common is a hardware chip solution purchased inside commercial-grade HDTVs or commercial-grade SBBs. The second growing solution is Pro:Idiom Mobile, a software-based solution for the Pro:Idiom encryption standard, allowing specialist (licensed) developers to deliver Pro:Idiom encrypted content via their SBBs to the TV.

Pre-loaded content apps (such as OTT) – This pertains to having pre-loaded apps available to the guest on the TV (Via the STB or SBB) to allow the guest to utilize the streaming service without using an application on their device.



STB and SBB – A set-top box (STB), also colloquially known as a television decoder, is an information appliance device that generally contains a TV-tuner input and displays output to a television set and an external source of signal, turning the source signal into content in a form that can then be displayed on the television screen or other display device. The set-back box (SBB) performs the same function but is generally behind the TV.

Verimatrix – A software-based solution used primarily by commercial-grade SBBs. It provides approved UHD/HD linear television encryption and the option to provide encryption simultaneously for video-on-demand services.

Zigbee – IEEE 802.15.4 is based on a suite of high-level communication protocols used to create wireless connectivity between in-room devices.

Z-Wave – Wireless communications protocol used for home automation.

GRE Platform Option Definitions

Contained in this section is a list of the definitions relating to the GRE Platform.

Commercial Functionality – A comprehensive set of tools that centrally manages the software in a commercial/hotel environment. Features include centralized distribution and versioning management of the platform software.

Application Support – The ability to support individual applications on the software platform that would allow for customized features and services to be added straightforwardly, including the unique configurations of individual hotels. This includes support for IoT.

Application Certification – In an ideal world, the management of such applications would come from a centralized “store,” which would allow individual application developers to maintain and update versions of the respective applications. This would limit the burden on the particular hospitality integrators and hotel chains to support various integrations.

Security – Not just a secure software platform on the hardware of the guest room solution, but security relative to streaming and linear TV encryption services included and certified in the software platform. This simplifies the deployment of entertainment content for the hospitality marketplace.

Hardware Support – The ability to support multiple hardware platforms that are commonplace in the hospitality marketplace. This includes various TV hardware solutions, and a variety of Set-Back-Boxes (SBBs) integrated into various TV models. This also can incorporate different communication tools such as Bluetooth, Zigbee, Z-Wave, RF, etc.

Global Functionality – The capabilities to support all international languages and international display hardware, not just a regional supported functionality such as ATSC and the Americas.

Content – This is a broad-based feature/category because content and access come in many forms. Fundamentally the platform should support both residential licensing of content, which is the ability for the guest to utilize their licensed content, log in through a supported app (in various forms) and access their content on the guest room television. Content also means pre-certified content on the software platform, licensed commercially for use by an integrator. The respective commercial content app can be used or licensed directly from the software platform provider because that platform has licensed content.

Customization – This is the ability for integrators to modify the platform to meet and deliver hospitality-specific features and functions. This includes the creation of a brand-specific or hotel-specific user interface. The ability to integrate the platform with hotel-specific systems such as Property Management Systems (PMS) and Point of Sale (POS) systems allows hotels to offer system personalization and transactions via the TV. Customization also supports integrating specific hotel systems and IoT functions like managing HVAC, lighting, and guest room curtains. The ability to provide room occupancy sensors, voice integration, and other brand-specific customization allows for a differentiation of services.



Research Materials

Here, you'll find reference material related to GRE. Much of this material was used to produce the content in the body of this document.

Table A1 presents a summary of the current guest-owned devices used to display entertainment content in the guest room. It reveals that the smartphone and tablet remain the choice of guest devices for entertainment viewing.

Table A1: Guest Device used to Display Content²

Device	Percentage of Use
Smartphone	96%
Laptop	89%
Tablet	92%
Media Player	74%

Table A2 summarizes the type of content viewed on guest room televisions. This highlights that linear/live television still dominates screen time, but there is a rapidly rising growth of streaming content viewed on guest room televisions.

Table A2: Source of Content on TV

Source	Percentage of Choice
Live TV	89%
Streaming TV	70%
Premium Cable	74%
Free VOD	68%

² Data provided by 2020 Guest Media Study by Hub Entertainment Research.



Table A3 summarizes what device is used to display the various sources of content.

Table A3: Device Used to Display Content

Content	Uses in room TV	Uses Guest Device
Live TV	73%	39%
Streaming TV	54%	65%
Premium Cable	67%	48%
Free VOD	63%	53%

Table A4 presents the primary guest concerns and complaints regarding the use of GRE Platforms.

Table A4: Guest Comments

Guest Comment
"Nothing to watch on TV."
"In-room entertainment is not interesting, therefore guest used their own devices to view content."
"No access to guest preferred provider or service that the guest had access to at home."
"Too difficult to log into streaming content."
"In-room TV did not support casting."
"No HDMI or USB available in the room for connection of the guest device."

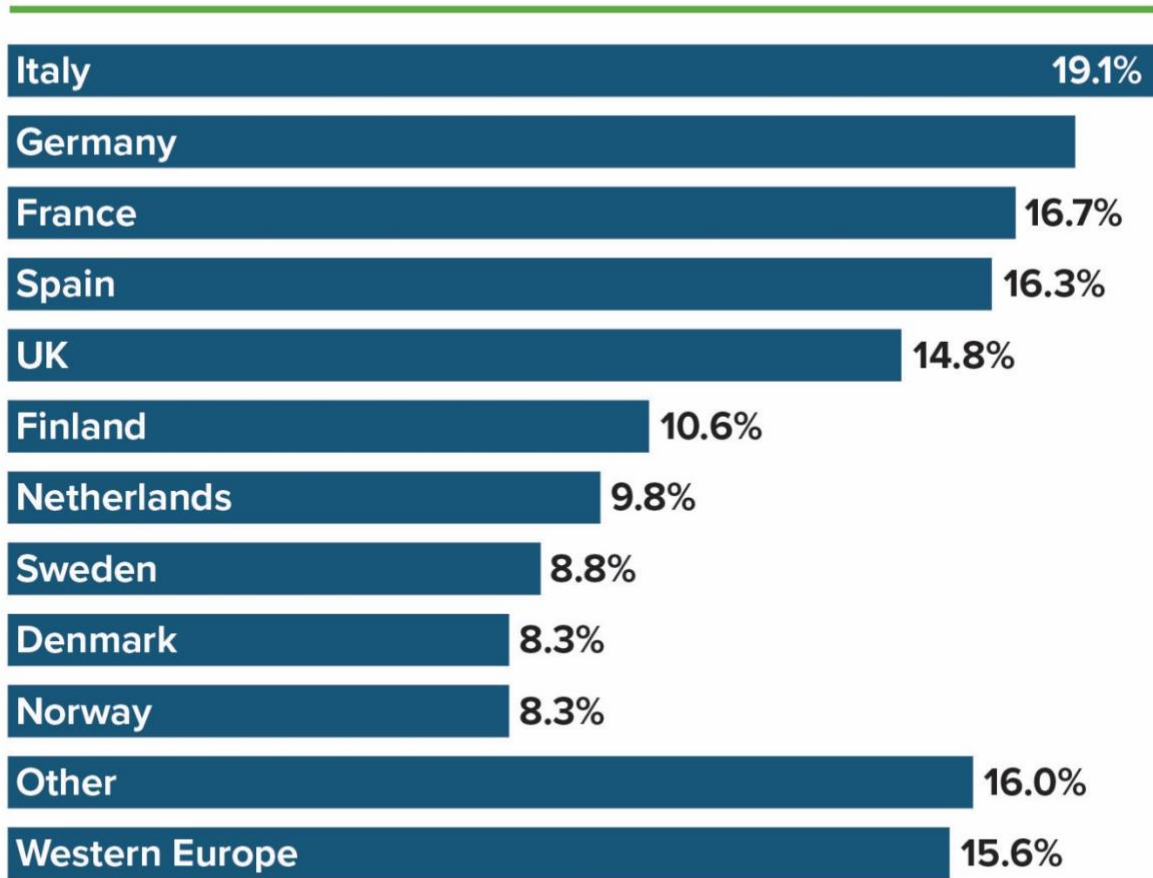


Streaming Reference Information

Contained in the following figures is reference information regarding the OTT subscriptions in various countries.

Subscription OTT Video Service User Growth in Western Europe, by Country, 2020

% change vs. prior year



Note: individuals of any age who watch video via any app or website at least once per month that provides paid subscription access to streaming video content over the internet and bypasses traditional distribution; examples include Amazon Prime Video, HBO Now, Hulu, Netflix, Sling TV, and YouTube Premium; OTT video services are not necessarily exclusive; includes overlap between video services.

Source; eMarketer, Sept 2020

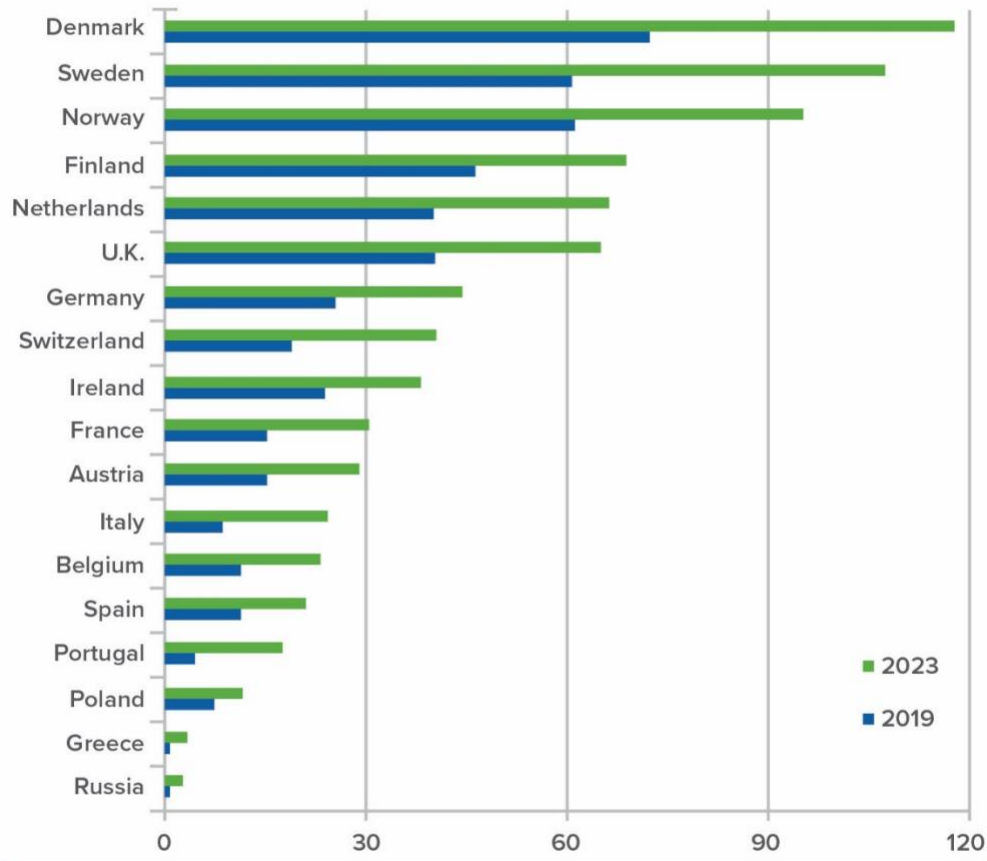
258601

www.eMarketer.com

FIGURE A1: OTT SUBSCRIPTIONS BY COUNTRY



European online video subscriptions as percent of population 16-64, 2018-2023 (%)



Data compiled Feb. 2019
Sources: Industry data, Kagan estimates
Kagan, a media research group within the TMT offering of S&P Global Market Intelligence
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FIGURE A2: EUROPEAN SUBSCRIPTIONS

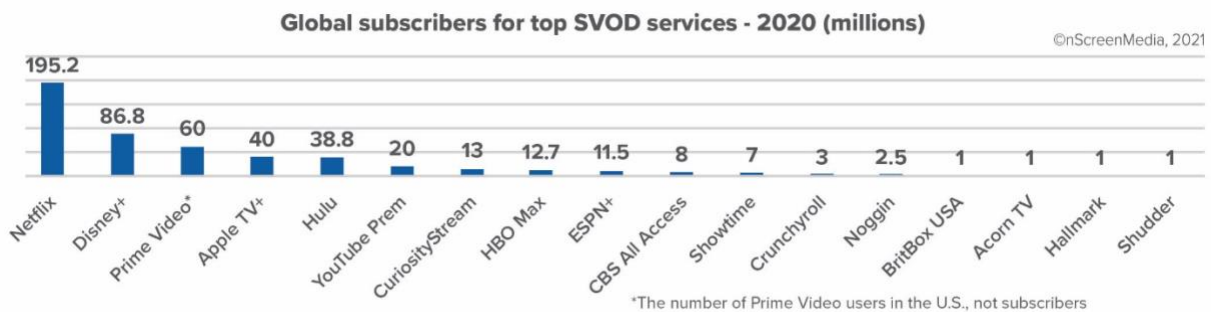


FIGURE A3: GLOBAL SUBSCRIPTIONS OF SVOD



Breaking the numbers down by country (as shown in Tables A6 thru A8), we see the following:

Across Europe, Netflix is the most popular Streaming Video on Demand (SVOD) service. Netflix is followed by Amazon Prime, but Europe remains fragmented with local services gaining traction.

Table A5: European OTT Video Service Provider Breakdown.³

EMEA	First Place	Market Share	Second Place	Market Share	Third Place	Market Share
UK	Netflix	61%	Amazon Prime	25%	NowTV (Sky)	11%
Germany	Amazon Prime	40%	Netflix	28%	Maxdome	5%
Nordics	Netflix	49%	ViaPlay	22%	HBO Nordics	14%
Italy	Netflix	73%	TimVision	15%	Amazon Prime	11%
Spain	Netflix	74%	Amazon Prime	9%	Hulu	9%
France	Netflix	57%	Orange	18%	Amazon Prime	17%
Netherlands	Netflix	70%	Videoland	17%	NPO	7%
Poland	Netflix	26%	Cyfrowy Polsat Go	19%	HBO Go	18%
Middle East	Netflix	35%	StarzPlay	29%	Amazon Prime	10%

³ Information in tables A5, A6 and A7 was provided by one or more of the following sources: eMarketer, Statista, BroadbandTVnews.com, Dgitaltveurope.com and Parrot Analytics



In Asia Pacific (APAC), a different story emerges mainly due to China and India the two most populated countries in the world where Netflix plays no (Netflix is blocked in China) or a much smaller role in favour of local players.

Table A6: APAC OTT Video Service Provider Breakdown.

APAC	First Place	Market Share	Second Place	Market Share	Third Place	Market Share
China	iQiyi	40%	Tencent Video	35%	Youku	23%
Japan	Amazon Prime	14%	TVer	11%	Netflix	8%
India	Alt Balaji	24%	Eros Now	22%	JioTV	18%
South Korea	Netflix	50%	Poog	13%	TVing	12%
Australia	Netflix	57%	Foxtel Now	25%	Stan	19%

In Latin America (LATAM), OTT consumption is still growing with Netflix winning across the continent.

Table A7: LATAM OTT Video Service Provider Breakdown.

LATAM	First Place	Market Share	Second Place	Market Share	Third Place	Market Share
Brazil	Netflix	63%	HBO	13%	Globo Play	11%
Mexico	Netflix	50%	Claro Video	28%	Amazon Prime	19%

Content Availability

First-Run Movie content window was created by Hollywood for the airline and hotel industry. The window allowed Hollywood to create a premium price for a premium window, effectively charging the price of a movie ticket for a guest to see a first-run movie in a hotel room. At that time, the content distribution window was what is shown in Table A8.

Table A8: Content Distribution

Event	Time Frame
US Theatrical Release	0-90 Days
International Theatrical Release	30-180 Days
Hotel/Airline Window	90-180 Days
VHS/Betamax	>180 Days
Premium Cable Channels (HBO)	365-730 Days
Broadcast TV & Cable Channels	>730 Days



Currently, a vast majority of the content consumed by guests were first-run movies. Hotel integrators test other content licensing like exercise videos, documentaries, and other short-format video content, but found the dominant consumption was premium movies which accounted for nearly 6-8% of occupied rooms at its peak and depending on hotel class.

Using the premium movie distribution channels as an example compared to the 1990s, the following is a high-level summary of the distribution matrix today. The key thing to observe is that in the 1990s, rarely did content gets released in a specific area simultaneously on multiple platforms.

Table A9: Movie Distribution

Event	Time Frame
US Theatrical Release	0-60/90 Days
International Theatrical Release	0-90/180 Days
Hotel/Airline Window	60-120 Days
Streaming on Source Platform	>0 Days
Streaming on 3 rd Party Platforms	>120 Days
DVD/Digital Sales	>90 Days
Premium Cable Channels (HBO)	>180 Days
Broadcast TV & Cable Channels	>365 Days

Today, windows are much smaller because digital access platforms allow for wider and more immediate access to Hollywood content.

Content Streaming Delivery Platforms

This section provides additional information on the various content streaming platforms. We have included some best practice guidelines for the introduction of casting to a hotel at the end of this section.

The matrix below summarizes the pros and cons of each technology and the challenges with the deployment of such technology in a hotel environment.



Table A10: Chromecast Benefits and Deployment Challenges

GOOGLE CHROMECAST	
Benefits	Deployment Challenges
<ul style="list-style-type: none"> ● Near universal compatibility with content apps (2,000+ apps) ● Cost-effective device ● Mobile device operating system compatibility agnostic (supports both iOS and Android and Windows) ● Strong consumer familiarity ● Mobile device integration potential with voice (“Hey Google”) ● Supports new apps as soon as they are launched with no updates required by the hotel or System Integrator ● Guests do not have to log into the TV – they use the apps already on their mobile device. This prevents the hotel from being liable for protecting consumer data ● Generic usage statistics (such as all forms of time casting and apps cast) are available to inform guest behavior ● Multitasking capability (guests can cast encrypted content and use their mobile device for other things) ● Multi-device support (guests can connect multiple mobile devices at one time and cast to all TVs in the room via a single connection) ● Available in software form in GoogleTV set-top-boxes ● Can be integrated into hotel networks through Dynamic VLANs 	<ul style="list-style-type: none"> ● Chromecast is a consumer product that has limited commercial product protection (lack of coordination with Google on software updates) as to where AndroidTV software Chromecast has commercial protections ● Network management leveraging proxy/middleware can be challenging ● On property provisioning by hotel staff can be cumbersome ● Lack of 'locked' mode/device settings but can be blocked by the vendor to prevent resetting the device. ● Brands not able access to some usage data ● No control over data being transmitted to Google



Table A11: Airplay Benefits and Deployment Challenges

APPLE AIRPLAY	
Benefits	Deployment Challenges
<ul style="list-style-type: none"> • Allows casting of proprietary Apple content (iTunes) • High level of product familiarity by Apple/iOS device users • Better transparency with software changes, Apple provides iOS and TV developer betas to give developers access to new software features • Mobile device integration opportunity with voice (Hey Siri) • Apple does not track usage statistics • Not dependent on hotel guest connection to hotel Wi-Fi 	<ul style="list-style-type: none"> • Limited commercial product protection (lack of coordination with Apple software updates) • Does not support Netflix - Netflix dropped support for it on purpose • Bandwidth consumption doubles in certain circumstances (AP2 is better) • Mobile Device Management software is needed to effectively control these devices remotely (like JAMF) and that adds additional cost • Network management leveraging proxy/middleware can be challenging, • Lack of roadmap transparency • Very high-quality control standards (not hospitality compatible) • Limited multitasking - a user cannot watch a different video or video source on their iOS device and the Airplay receiver. With Chromecast, you could watch Hulu via casting and YouTube on your iPad. With Airplay, once you launch a different video source, that source takes over the Airplay session. • Not compatible with Android devices • Content limited to proprietary Apple content • Apple does not track usage statistics for hotels to understand usage



Table A12: Miracast Benefits and Deployment Challenges

MIRACAST	
Benefits	Deployment Challenges
<ul style="list-style-type: none"> • Best designed for laptop content/demonstrations • Available in many consumer TVs, but less so in commercial-grade TVs 	<ul style="list-style-type: none"> • No support for IOS devices • No support for multitasking • No DRM supported • Requires Wi-Fi Direct from Mobile Device • Inconsistent implementation by TV manufacturers

Casting considerations and best practices

Casting adds several network requirements beyond HD linear television services that must be considered by owners/operators when making GRE platform decisions.

The success of any casting solution is in the simplicity of pairing a guest device to the casting device in the room and, of course, the reliability of the device onboarding platform. It will involve the co-operation of the hotel’s Wi-Fi provider to work alongside your IPTV and casting provider in the cast of Chromecast or Apple Airplay.

There are two primary methods for managing Chromecast and Apply Airplay in a hotel’s network. The hotel’s systems integrator can advise the hotel on the specific network requirements but must include one of the following solutions to manage to cast securely.

1. Proxy Server/mDNS

- a. A proxy/mDNS server is typically required to direct guests’ mobile/laptop traffic to the appropriate casting receiving device in the guest’s room (Chromecast dongle/Android STB or AppleTV). This proxy server is the critical component in the process of onboarding devices, but also in blocking unwanted administrative control communication with the room device. Most casting solution providers use a proxy or mDNS server.

2. PAN (Personal Area Networks)

- a. Casting can also be achieved using a PAN (*Personal Area Network*), where the in-room device and the guest’s own devices share the same VLAN (Dynamic). For those using PAN, ensure that Chromecast management traffic is blocked at the network layer and the guest room technology is registered correctly, or guests could be placed into the wrong room PANs.

For multiple reasons (security, management, etc.), no casting solution should not be deployed in an unmanaged environment within a hotel property. Without a managed casting solution, guests may share their content to the wrong room and alter settings (including changing images shown on the TV) when casting is active.



When using a consumer device like the Chromecast dongle or AppleTV, it may be adversely affected by software updates from the manufacturer, requiring the hotel solution partner to intervene and provide remedial assistance. Some casting solutions need the guest to download an app first, which should be carefully considered when selecting a platform.

Chromecast dongle v2/v3 appears to be going end of life, so the property should maybe consider not deploying this version of Chromecast and utilizing Chromecast Ultra, the latest model.

To provide a guest with minimum issues in utilizing casting with Chromecast, the property should deploy the Chromecast using the following best practices:

- Disable Guest mode on the Chromecasts.
- Choose a proven casting solution provider.
- If possible, deploy Ethernet as the network interface to the casting device.
- If an Ethernet network interface is not possible, the Wi-Fi coverage where the Chromecast is installed should have a signal strength of at least -65 dBm.
 - In the case of Wi-Fi, utilize the same SSID to initiate the streaming used for regular guest access. That is not to say that the Chromecast can be connected to a different SSID.
- Ensure that the onboarding process is as simple as possible (using one of the abovementioned methods).and present the guest with clear instructions on the TV,
- Attach Chromecast to the TV with a security bracket that would prevent re-configuration or theft.

GRE Platforms – The Details

AndroidTV – The largest residential interactive TV platform installed in over 130m homes. It is the standard software in the SMARTVs from Sony, Hisense, Sharp, Philips, and others. Many streaming residential set-top boxes also utilize the software, including Nvidia, AirTV, and Xiaomi. AndroidTV comes in two forms. One is a Google Certified Platform which provides access to the Google Play Store and its collection of apps, plus Chromecast built-in to its software. The second option is called Android Open-Source Platform (AOSP). This is a non-certified Google platform. It has more flexibility and is lower cost to develop but does not provide Chrome casting or access to the Google Play Store.

Table A13: Android (Certified AndroidTV and Android AOSP) Features

Feature	Description
Commercial Functionality	AOSP has existed as an entertainment platform in hotels going back to 2002. AOSP provides commercial entertainment and management functionality for integrators to use and deploy securely in a hotel setting. However, it requires substantial customization by the hotel integrator company to deploy the features below, such as app support, PMS integration, app certification, security, hardware support, and Global Functionality. Certified AndroidTV, at its core, has many of the commercial functionalities built-in, allowing for quick and secure deployment of a hotel entertainment solution.
Application Support	Certified AndroidTV’s core is the comprehensive support of applications developed by both Google and third-party developers. While AOSP also supports applications, it requires integrators to secure licenses from each application provider and requires the integrator to undertake the application integration to the AOSP platform. Certified Android platform provides Google licenses for all apps. It allows the hotel integrator to configure pre-loaded apps for guest usage and uniquely will enable guests to download apps for their use during their stay independently.
Application Certification	AndroidTV’s Google Play Store, available only in the Certified AndroidTV platform, contains over 3,000 applications today. Google manages all certifications for the applications in the Google Play Store. Each AOSP integrator is responsible for app certification and licensing on their platform.
Security	Both AOSP and Certified AndroidTV provide a complete suite of commercial software security and support a wide range of video streaming encryptions and network security protocols. Neither AOSP nor Certified AndroidTV natively supports any linear TV DRM/encryption. These deployments would be the responsibility of the hotel integrator and require software development.
Hardware Support	Certified AndroidTV supports a limited number of TV manufacturers (see above). Currently, none contain hospitality functionality and commercial controls. Both AOSP and Certified AndroidTV support a wide range of commercial-grade SBBs which hotel integrators can deploy. Certified AndroidTV supports the most popular communication plug-ins such as Bluetooth and RF functionality. AOSP requires the hotel integrator to deploy additional plug-in communication features. Android in both forms has many different hardware platforms and supports key hardware integrations such as HDMI CEC, many video and communication protocols.
Global Functionality	AndroidTV has complete global support today in both languages and international features.
Content	Certified AndroidTV platform allows access to Google’s content library, one of the largest content libraries in the world, via Google Music, Google Movies, and Google TV. This content allows guests to use their accounts or create a Google account. It cannot be licensed to the hotel for guest use. In addition, the AndroidTV app certification process permits hoteliers and integrators to add their custom app. AOSP also allows hoteliers and integrators to add their apps to the platform.
Customization	AndroidTV in both forms provides extraordinary flexibility for customization, including the extensive ability for hotel integrators to create a branded guest user interface. APIs exist to provide customizations to allow PMS, POS, and IoT integrations. The certified AndroidTV platform also has pre-built integrations with several HVAC, lighting, and curtain apps on the Google Play Store. AOSP would require integrators to undertake customization to make those apps work. The key to AndroidTV’s certified platform is that it provides access and customization to Google Assistant, Google’s comprehensive voice solution, and voice integrations with over 1,000 apps on the Google Play Store, subject to availability by the solution provider. The AndroidTV certified version does not allow customization to the Google Play Store interface and requires YouTube on all deployments.



tvOS – Apple TV – Apple has a large, global residential deployment base, with over 60m devices being sold globally. It runs on reliable and high-performance Apple proprietary hardware and has extensive application support via the tvOS App Store. It also supports 4k HDR and Dolby Atmos out of the box. tvOS is an extension of iOS, making it relatively easy to build Apps. The tvOS App stores allow access to over 13,000 streaming, games, and other Apps. Regular updates from Apple keep the interface fresh and relevant to users.

Table A14: Apple TV

Feature	Description
Commercial Functionality	There are over 60 million Apple TVs in homes, schools, and businesses around the globe, excluding mainland China. UI Navigation is familiar thanks to its similarity to iOS. tvOS (Apple TV’s Operating System) now supports enterprise MDM (Mobile Device Management) services using the same iOS and MAC OS frameworks, allowing complete remote management of the device. tvOS gets free of charge updates and new features in line with iOS releases throughout the year. Specialist hotel integrators are necessary when using this platform in hotels.
Application Support	tvOS allows any developer familiar with writing apps for iOS to do the same on Apple TV, using Xcode 11 (supports SWIFT, tvML, tvUIKit, etc.). apps are delivered via the app store or through Apple’s Enterprise program – app Store Connect, which uses Apple’s APNS & MDM frameworks.
Application Certification	There are currently over 13,000 apps on the Apple TV (tvOS) app store. Publicly available app store applications require submission and approval by Apple’s app store team. Enterprise apps (private) do not usually require approval by Apple.
Security	Apple is renowned for its security and privacy protection for its systems and users. System security encompasses the boot-up process, software updates, and the ongoing operation of the OS. Apple devices have encryption features to safeguard user data and enable remote wipes in the case of device theft or loss. Apple provides layers of protection to ensure that apps are free of known malware and have not been tampered with. Additional protection enforces that access from apps to user data is carefully mediated.
Hardware Support	tvOS currently only runs on Apple TV hardware. tvOS is supported on Apple TV HD and Apple TV 4k. Apple TV supports key hardware integrations such as HDMI CEC, most video, and communication protocols.
Global Functionality	Globally available from any Apple reseller, except mainland China. Support is also available globally from Apple or its vast partner network. Content is subject to individual providers’ regional variations, as are all other legal platforms.
Content	Apple TV supports all primary content streaming providers via the app Store, plus its own content service called tv+. It also supports casting for Apple users using the Airplay 2 standard. Multicast and/or Pro: Idiom equipped live IPTV content can only be provided through software via specialist integrators, as it is not currently supported natively by Apple’s media player.
Customization	Apple TV in both forms provides some flexibility for customization. Apple TV provides the ability for hospitality integrators to create a branded guest user interface. Enterprise Apps can be built to deliver virtually any form of application, branding, integration, or other valuable purposes. Integrators are responsible for providing customizations to allow PMS, POS, and IoT integrations. Apple TV also requires integrators to customize to make integrations to HVAC and lighting solutions, except where HomeKit is deployed.



Roku – Originally a residential streaming hardware solution, Roku has transitioned into a large software platform for interactive TV services. Today, Roku software is in the following residential SMARTVs, Walmart's ATVIO, Element, Hisense, Hitachi, InFocus, JVC, Magnavox, Philips, Polaroid, RCA, Sanyo, TCL, and Westinghouse. Currently, Roku does not have any deployments in hotels but is considering the hospitality marketplace.

Table A15: Roku Features

Feature	Description
Commercial Functionality	None currently, but Roku is actively researching this space. At this time, there are no known commercial partners with any platforms deployed.
Application Support	Roku’s software platform has a growing number of apps and a growing app developer group. It is significantly smaller, however, than Apple TV and AndroidTV.
Application Certification	Roku has a certification process and utilizes an application management platform called Roku Channel Store. The Roku Channel Store provides software integrators a place to access certified applications for the Roku platform.
Security	Roku’s extensive TV software and streaming functionality allow its platform to support the most significant encryptions (except Pro:Idiom) and nearly all popular streaming encryptions.
Hardware Support	Roku was initially a proprietary platform, and they still sell Roku branded hardware. However, Roku software is now in a host of white-labelled hardware platforms. Roku has many different hardware platforms and supports key hardware integrations such as HDMI CEC, most video protocols, and communication protocols.
Global Functionality	Roku’s software supports global functionality both for encryption, video formats, and international languages.
Content	Roku does not own any specific content that it can deliver to its platform. Still, through its certified app program, Roku is supported by nearly all the major streaming apps but requires guests to use their residential licenses to access the content.
Customization	Roku does not have any known ability to provide customization for hospitality guest room use. No known APIs exist to provide customizations to allow PMS, POS, and IoT integrations nor do any HVAC, lighting, and curtain integrations exist. ROKU would require integrators to undertake customization to make those apps work.



Firestick/Amazon – Firestick from Amazon is a residential hardware and software solution. It does not currently have a commercial version. However, it does provide some management tools. The critical aspect of Amazon’s Firestick is its support for Amazon’s voice controls, Alexa.

Table A16: Amazon Firestick Features

Feature	Description
Commercial Functionality	Currently, Firestick is a residential application with limited centralized control and no ability to manage versioning nor groups of hardware. At this time, there are no known commercial partners with any platforms deployed.
Application Support	Firestick does support a wide range of applications. The availability of apps is far less than AndroidTV or iOS/Apple TV, and even less than Roku, but it is growing.
Application Certification	Amazon Appstore provides a centralized certification of apps for the Firestick and enables some management of versioning.
Security	Firestick’s extensive presence in the TV software area and the streaming functionality allow its platform to support most significant encryptions (except Pro:Idiom) and nearly all popular streaming encryptions.
Hardware Support	Amazon currently controls its hardware and does not allow third-party commercial customization developments. Firestick does support key hardware integrations such as HDMI CEC, most video protocols, and communication protocols.
Global Functionality	Firestick software supports global functionality both for encryption, video formats, and international languages.
Content	Amazon owns one of the largest content libraries in the world. It is for residential use, and it is unclear if Amazon’s licensed content could be utilized in a commercial license form. Amazon also produces a significant amount of its content. It is anticipated that Amazon could provide that content in a direct, commercial content license to its software platform.
Customization	Amazon Firestick does not have a known ability to provide customization for hospitality guest room use. No known APIs exist to provide customizations to allow PMS, POS, and IoT integrations, nor do any HVAC, lighting, and curtain integrations exist. Firestick would require specialist integrators to undertake customization to make those apps work.



WebOS/PCS – LG’s interactive entertainment software platform for its residential SMARTV’s is deployed in over 100m homes worldwide. The LG Commercial team has modified this platform for hospitality use, known as Pro:Centric server. It has also built integrated APIs to provide commercial controls and management of the WebOS software. The commercial platform in this section will be referred to as WebOS/PCS. Multiple integrators have developed interactive TV platforms for LG commercial TVs, including links to crucial hotel systems such as PMS.

WebOS/PCS is the commercial platform used by Marriott globally for its Guest Room Entertainment (GRE) branded platform. InterContinental Hotels also utilize it as one of its certified IHG Studio platforms.

Table A17: LG WEBOS Features

Feature	Description
Commercial Functionality	LG’s WebOS/PCS is the largest deployed commercial interactive software platform globally, with over 1,000,000 guest rooms supported today worldwide. Many integrators support this platform.
Application Support	LG’s residential content store is not available on the commercial platform. The LG Commercial team independently licenses and integrates apps for use in a commercial setting. At this time, LG Commercial has modified approximately 15 apps for commercial use, including Netflix, Hulu, HBO Now, Showtime, Crackle, YouTube, and Pandora. These apps are accessible to the hotel integrator through the commercial integration of its platform, but only in an initial configuration setup. Guests cannot independently access the Content Store and download individual applications of their preference during their guest stay.
Application Certification	LG Commercial owns all licensing and certification responsibilities. LG Commercial passes its commercial licenses to hotel integrators for guests, and LG Commercial takes all responsibility for app versioning upgrades for the hotel integrators.
Security	LG’s WebOS/PCS software is unique as it allows for support for the core hospitality linear TV encryption Pro:Idiom, unlike AndroidTV, Amazon, and Roku. In addition, WebOS-PCS has the backing of most major streaming DRM and the various apps in its commercial store.
Hardware Support	LG’s WebOS/PCS is an LG-only hardware platform. It is deployed in all LG current commercial HDTVs and is available in an SBB platform in various models. The platform supports key hardware integrations such as HDMI CEC, most video protocols, and communication protocols.
Global Functionality	LG’s WebOS/PCS platform is a worldwide platform supporting multiple languages and is deployed globally by hotels.
Content	LG/WebOS does not own any specific content that it can deliver to its platform but enables access to content through the critical content-centric streaming apps that it supports on its commercial store. Nearly all the major streaming apps support LG/WebOS, but some are not licensed in commercial platform versions. WebOS/PCS apps are unique. In some cases (such as Showtime), they are commercially licensed and allow the hotel to license content via the app for guest usage without a residential guest user account. Instead, a commercial subscription is made available to the hotel.
Customization	WebOS/PCS provides flexibility for user interface customization and is deployed by many brands today. WebOS/PCS does not offer pre-built customization apps but offers tools to hotel integrators to allow PMS, POS, and IoT integrations, as well as HVAC, lighting, and curtain controls. The LG WebOS/PCS platform does not have any voice integration tools, but many integrators today have deployed IoT integration on the platform.



Tizen/Orsay – Orsay was Samsung’s legacy OS for its SMARTV’s, which Tizen has now replaced. Samsung’s SMARTV software platform Tizen was built initially for its residential TV models worldwide. It was ported over to support Samsung’s commercial SMARTVs and has often been referred to as HBrowser, due to its similarity to HTML. Tizen utilizes a proprietary Samsung store to download applications called SmartHub. This software platform only functions on Samsung HDTVs. Tizen is usually managed by a centralized server called REACH, which provides commercial controls of the Tizen platform software. However, multiple integrators have developed their interactive TV platforms for Samsung commercial TVs running Tizen or Orsay, including links to crucial hotel systems like PMS. InterContinental Hotels utilize Tizen as one of its certified IHG Studio platforms.

Table A18: Samsung Tizen Features

Feature	Description
Commercial Functionality	Samsung modified its software platform to deploy commercial TV models in 2016 and has hundreds of thousands of commercially deployed HDTVs in the hotel marketplace. Many integrators support this platform.
Application Support	Like LG, Samsung has developed commercially modified apps for use on its Tizen platform, controlled by its centralized REACH servers. Samsung’s Tizen supports the deployment of applications by integrators in the initial configuration through SmartHub. It does not allow guests to individually download preferred applications for their use during their hotel stay. The portfolio of applications is substantially less than AndroidTV, Apple TV, and Roku but has a collection of core apps that allow users to access Netflix, Hulu, HBO Max, Disney+, etc. Much like LG, these Apps usually require commercial license agreements to be held by the integrator.
Application Certification	Samsung owns the certification responsibility for apps on its Tizen platform. The certification process is similar to WebOS/PCS because, like LG, Samsung is responsible for integrating and certifying all new commercial apps on the Tizen platform.
Security	Tizen’s TV software is unique as it allows for support for many linear TV encryptions, unlike AndroidTV, Amazon, and Roku. This is because the software is a TV-first software platform, streaming second. Today, Tizen supports Verimatrix, LYNK, and Pro:Idiom for linear TV encryption. In addition, Tizen has support for most major streaming DRM methods as well.
Hardware Support	Tizen is limited to only Samsung HDTV hardware. At this time, Samsung does not make a set-top box that would be deployed on alternative displays through an HDMI connection. It is understood that Samsung has been working with Catapult to develop an SBB that works with Tizen. The platform supports key hardware integrations such as HDMI CEC, most video protocols, and communication protocols.
Global Functionality	Tizen is a global platform and supports worldwide languages, as well as worldwide TV and streaming formats.
Content	Tizen/Samsung does not own any specific content that it can deliver to its platform. Still, Tizen supports most major streaming apps and content providers through its certified app program, but some are not licensed in commercial versions of the platform. Currently, Tizen requires guests to use their residential licenses to access the content. Still, Showtime and HBO are believed to be working with Samsung to deploy its commercial apps on the Tizen platform, where a hotel would hold a commercial subscription.
Customization	Tizen provides flexibility for user interface customization and even offers a group of templates for hotel integrators. Tizen does not provide pre-built customization apps but provides tools for hotel integrators to allow PMS, POS, and IoT integrations, as well as HVAC, lighting, and curtain controls. Tizen platform does not have any voice integration tools, but many integrators today have deployed IoT integration on the platform.



Android TV from Phillips - Philips Professional Displays Mediasuite Range of Professional TVs use the commercial version of Android TV, which is an unrestrictive platform. Android is one of the largest open-source Operating Systems (OS) globally, allowing access to a massive pool of supporting developers should specific applications need to be created. The Philips product already comes with access to the Google PlayStore with over 10,000 apps, many of which are specifically written for the TV. The Philips platform strictly follows Google processes and workflows, meaning high-quality support and the latest features supported by the OS. Philips displays can be managed by their own proprietary 'CMND' Software or API/SDKs provided to partners who want to build their own internal or external applications. Having Chromecast on-board negates the need for an external dongle, cables and offers reduced complexity.

Table A19: Philips Features

Feature	Description
Commercial Functionality	Android TV is Google’s platform for SMARTVs and streaming devices. It brings the innovation of Google through an easy, helpful entertainment experience. Making it easier for people to watch, play, and do everything they love on their TV. Android is recognized as one of the largest open-source platforms for application development.
Application Support	Philips Android TV is a Google-certified platform, providing unlimited access to the Google PlayStore, where more than 10,000 apps are freely available for download. A hotel integrator has complete freedom to choose from these apps and decide which ones are permanently installed on the TV. Guests can also install independently individual apps of their personal preference from the Google Play Store. The guest-installed apps will be uninstalled after reinitialization (i.e., checkout).
Application Certification	Applications are used under the Terms and Conditions as defined by the Google Play Store. Application updates are automatically deployed unobtrusively through Google Play Store or Philips’ proprietary AppControl server.
Security	Philips Android TV follows the Google Android TV requirement for regular security patches and OS updates for up to 3 years after the first introduction. Android TV supports most major streaming encryptions, e.g., Widevine, MS PlayReady, Pro:Idiom (region dependent), Clplus (region dependent), and the Philips owned VSecure. Philips Android TV is security-reviewed and approved by the most demanding streaming services like Amazon, Disney, and Netflix. Being a global product range, Philips Android TV is also fully GDPR compliant.
Hardware Support	Philips Android TV supports key hardware integrations such as HDMI CEC, HDMI ARC, most video protocols, several USB devices classes, and communication protocols over IP or serial port for integration with SBBs.
Global Functionality	Philips Android TV platform is available in NAFTA, EMEA, CIS, and APAC regions and supports over 50 languages
Content	Philips Android TV does not own any specific content but enables content through the critical content-centric streaming apps available via Google Play Store. Some are preinstalled (e.g., YouTube, YouTube Music, Netflix). Additional content for Philips Android TV can be commercially licensed through a partner network, allowing the guest to potentially watch on-demand or linear content without a residential guest user account.
Customization	Philips Android TV provides total flexibility for complete user interface customization and is deployed by many brands today. Philips Android TV also allows for partial customization/branding of the default user interface straightforwardly. Philips provides tools to hotel integrators to allow PMS, POS, and digital compendium integrations.



Type of Hospitality Televisions

- **Android TV** – [LINK](#)
 - Sony – [LINK](#)
 - A9S 4K HDR OLED with Smart Android TV (2020) – [LINK](#)
 - X950H 4K HDR Full Array LED with Smart Android TV (2020) – [LINK](#)
 - X800H 4K HDR LED with Smart Android TV (2020) – [LINK](#)
 - X750H 4K HDR LED with Smart Android TV (2020) – [LINK](#)
 - Skyworth – [LINK](#)
 - XC9300 Series OLED 4K Android TV – [LINK](#)
 - XC9000 Series OLED 4K Android TV – [LINK](#)
 - UC7500 Series 4K Android TV – [LINK](#)
 - TC6200 Series Android TV – [LINK](#)
 - HiSense – [LINK](#)
 - 50" 4K ULED™ Hisense Android Smart TV (2021) U6G SERIES – [LINK](#)
 - 50" H8 QUANTUM SERIES HISENSE ANDROID TV – [LINK](#)
 - 43" 4K UHD HISENSE ANDROID SMART TV (2021) – [LINK](#)
 - FULL HD HISENSE ANDROID SMART TV (2020) – [LINK](#)
- **Apple TV** – [LINK](#)
 - Apple TV 4K – [LINK](#)
 - Apple TV HD – [LINK](#)
- **Roku** – [LINK](#)
 - Roku Streambar – [LINK](#)
 - Roku Ultra – [LINK](#)
 - Roku Streaming Stick 4K Plus – [LINK](#)
- **Amazon Fire TV** – [LINK](#)
 - Amazon Fire TV 43" Omni Series 4K UHD Smart TV, hands-free with Alexa – [LINK](#)
 - Amazon Fire TV 43" 4-Series 4K UHD Smart TV – [LINK](#)
 - Fire TV Cube, Hands-free streaming device with Alexa, 4K Ultra HD – [LINK](#)
 - Fire TV Stick with Alexa Voice Remote (includes TV controls), HD streaming device – [LINK](#)
- **LG** – [LINK](#)
 - 43" US670H Series UHD 4K Pro:Centric Smart Hospitality TV with Pro:Centric Direct, webOS 5.0, Embedded b-LAN™, Smart Share, Screen Share, Pro:Idiom®, SoftAP & Voice Recognition – [LINK](#)
 - 40" LT340H Series TV for Hospitality & Senior Living with standard features including Multi IR, Speaker Out and USB Picture Viewer – [LINK](#)
 - 49" UT567H Series Pro:Centric® Enhanced 4K UHD Hospitality TV with NanoCell Display, EzManager, and Pro:Idiom – [LINK](#)
 - 40" LT570H Series HD TV for Hospitality & Healthcare with Pro:Centric™, Pro:Idiom™, B-LAN EZ-Manger & USB Cloning – [LINK](#)
- **Samsung** – [LINK](#)
 - 690U Series 50" – [LINK](#)
 - 710 Series 55" – [LINK](#)
 - RU750 Series 50" – [LINK](#)
- **Philips** – [LINK](#)
 - Professional TV – [LINK](#)



SET BACK BOX (SBB) FUNCTIONALITY

Over the past 10 years, hotel integrators have been expanding their use of SBBs vs SMARTVs for several key reasons.

Table A20: SBB Functionality

Functionality	Description
Centralized Control	SBBs can be centrally controlled by hotel integrators so that remote control of the entire hotel can be done through a central server, and guest room visits are not needed for changes.
Version Management	SBBs can be all on the same software version and upgraded centrally using centralized version control tools. This is critical because SMARTVs do not maintain version control, and older models do not always support the latest software versions.
Software Platforms	SBBs can come in various SBBs forms and designs to meet the space and function requirements for hotels.
Customization	SBBs can have customized hardware to meet specific hotel needs, such as additional HDMI ports for Chrome sticks or game consoles.
Access Control	SBBs can support extensive integrations such as communication with Property Management Systems, Point of Sales systems, and operational engagement systems. They also support a wide range of IoT functions and integrations.
Logistics Management	SBBs are behind either the guest room flat panel HDTV or a credenza that provides physical security and protection from guest tampering or damage. In addition, the replacement cost of an SBB vs. a flat panel HDTV is substantially less.

Note for hoteliers: SBBs are commercial-grade products, not a residential grade. For example, Apple TV, Roku, or Amazon Firestick are, by nature, residential products and are STBs, not SBBs. Some hotel integrators have been able to customize Apple TVs to act more like SBBs.



GRE Implementation – Best Practices

Linear HDTV

Both legacy coax and IP-based networks support all forms of HD linear television services and require encryptions. This HTNG workgroup recommends that any coax network be upgraded to a 1 GHz platform, requiring upgrades to splitters or taps and 860 MHz bi-directional amplifiers. These upgrades would allow for linear broadcast TV, up to 125 channels over the coax network. The bi-directional amplifiers would also allow for the utilization of DOCSIS (*Data Over Cable Service Interface Specifications*) technology. DOCSIS (See alternative G.hn coax-based solution in table 8)would enable the creation of an IP network over the legacy coax infrastructure. This is often a much lower cost solution than rewiring a hotel with CAT6 or fiber. Several delivery options are presented later in this section.

For an IP-based network to support either IPTV or OTT streaming, the hotel network needs to be designed and configured to support these applications. Specifically, the network must be configured to support the following functionality:

- A minimum bandwidth per connected device of 0.5 to 2.5 Mbps. To provide optimal performance, the bandwidth per connected device should be at least 4 Mbps.
- The switches or PON edge devices need to satisfy the following features:
 - Port Isolation
 - IP Multicast routing
 - IP Multicast filtering
 - IGMP snooping
 - Bandwidth management
 - Ability to support video streams of 4-20 Mbps
- In the case of a GPON deployment, single mode fiber needs to be installed to support the connections between the OLT and Optical Splitters and the fiber between the splitters and the ONTs.
- Isolated VLANs that are not used by any other applications in the hotel.
- Isolated VLANs should also be configured to not traverse the property guest gateway but go directly to the Internet or IPTV head-end equipment.
- If the VLANs are directly connected to the Internet, Access Control Lists need to configure on the outbound switches or routers to prevent any unsolicited inbound traffic from entering the VLANs.
- The VLANs must traverse managed switches that support SNMP and ACLs. No hubs or non-managed switches should be used to support the IPTV or OTT traffic.
- Although not a requirement, is it recommended that the OTT streaming not traverse the property Wi-Fi network.

In all cases, encryption passes seamlessly through all network mediums. Thus, encryptions are not a limiting factor in network decisions.

Figure A1 presents a diagram of a COAX option for IPTV delivery.

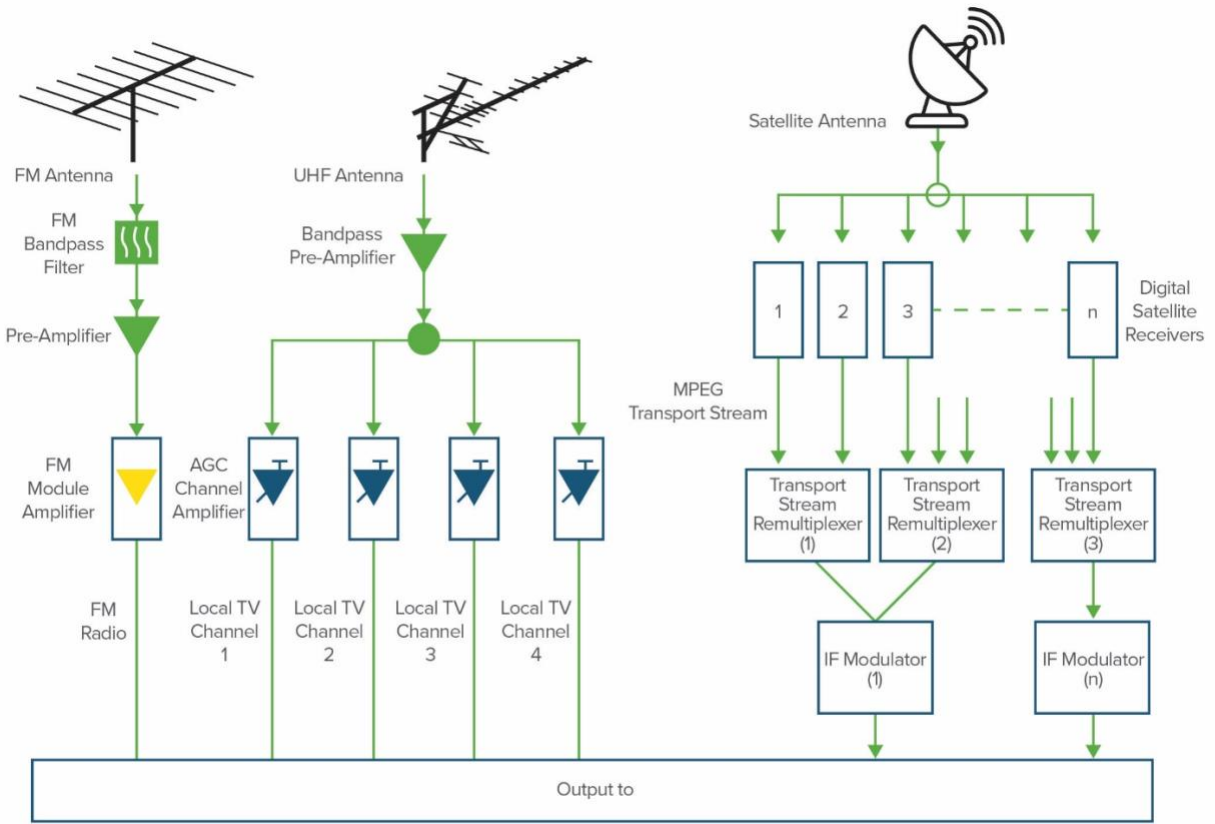


FIGURE A1: COAX DELIVERY SYSTEM

Figure A2 presents a diagram of an all-IP option for IPTV delivery.

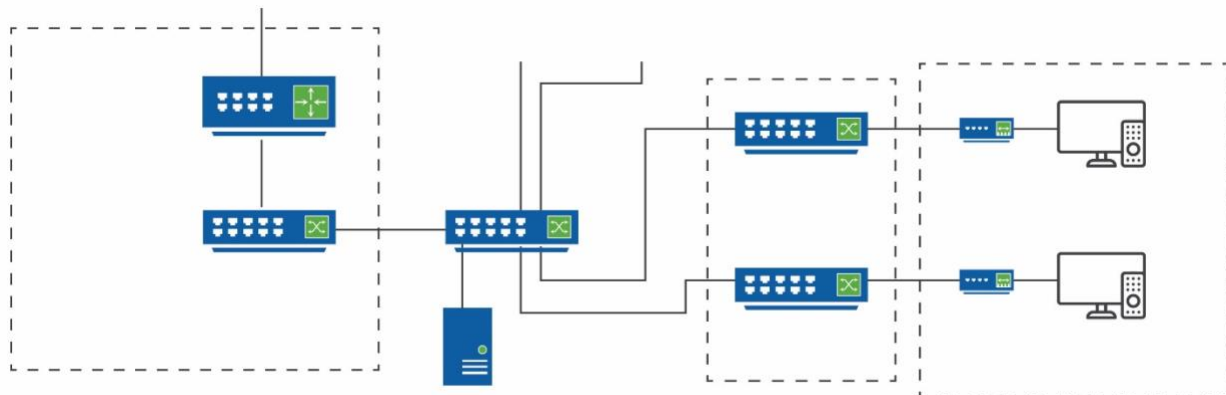


FIGURE A2: ALL IP IPTV DELIVERY SYSTEM

Figure A3 presents a diagram of a DOCSIS option for IPTV delivery.

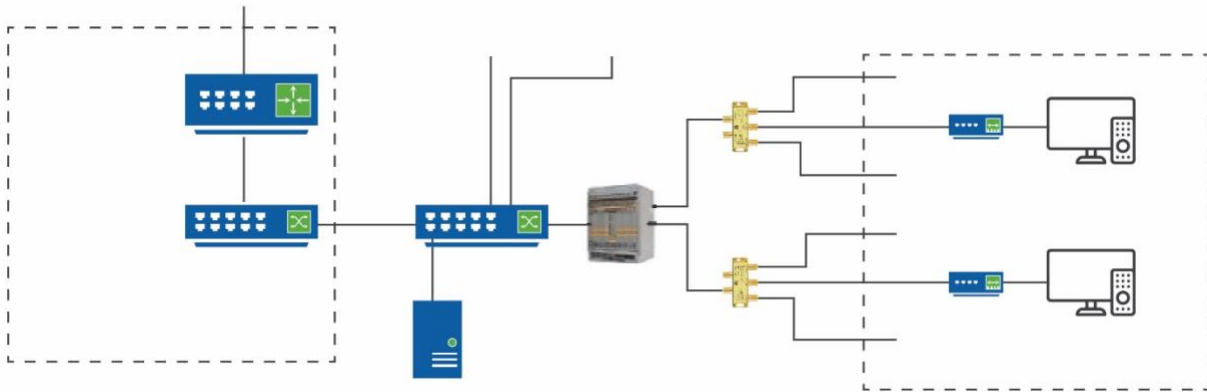


FIGURE A3: DOCSIS IPTV DELIVERY SYSTEM

Figure A4 presents the GPON delivery system.

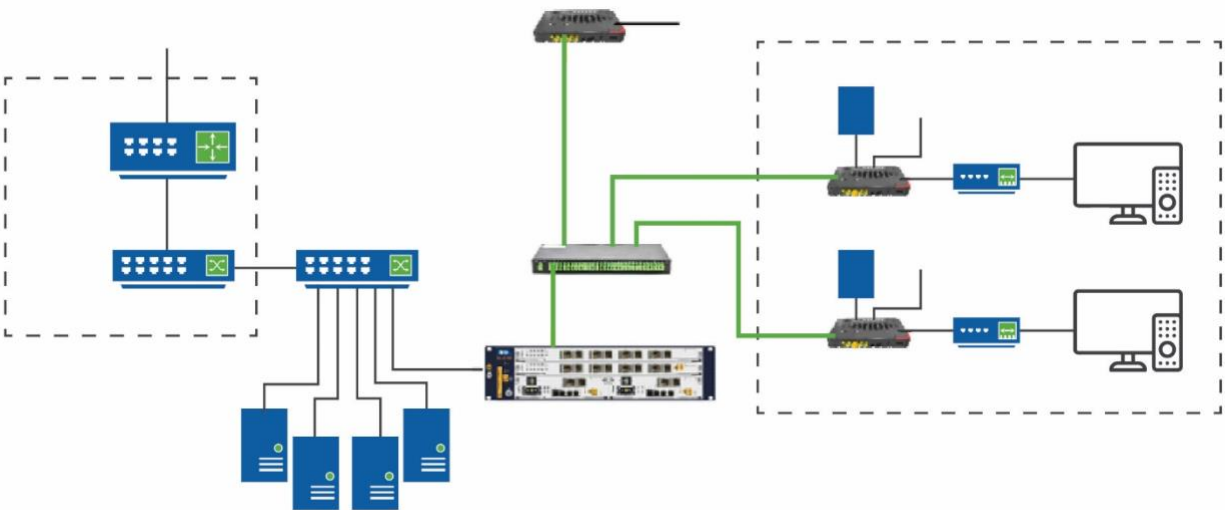


FIGURE A4: GPON DELIVERY SYSTEM

HTNG Reference Documents

Please visit this link for a list of reference documents: [AHLA - HTNG Technical Specifications](#)