



TELECOM INFRA PROJECT®

# Neutral Host Vertical Analysis Playbook

U.S. Hospitality Sector



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## Purpose and Audience

This white paper applies specific industry vertical context to the benefits of dedicated in-building neutral-host networks. It is intended for solution providers, equipment vendors, and system integrators who desire context for applying in-building networks to industry pain points. This paper answers the questions, what is the hospitality vertical and how does neutral host technology benefit this industry?

## Vertical Definition

**Hospitality as a segment can be broadly defined but this working group focuses on hotels and lodging as a use case.** It does not encompass other entertainment and leisure segments such as event planning, theme parks, transportation, or cruise lines.

Hotels and lodging often span multiple buildings and multiple floors. Common areas may include reception, foyers, meeting rooms, lobbies, rest rooms, corridors, lifts, garages. These spaces may typically cover single ground floor level spaces with potential mezzanine levels. Private spaces may include guest rooms on higher levels as well as offices and other rooms which staff occupy. Private public spaces may also be in buildings separate from common spaces. The priority for coverage by hospitality venue owners and managers amongst is typically the common areas, then private staff spaces and lastly private public spaces.

Within the hotels and lodging industry multiple groups of stakeholders influence technology decisions. Due to the multiple groups that have an interest in the success of each hotel, each invested group must be understood and addressed within the selling cycle.

**Brands:** The Brands are the big signs that you see on the outside of a hotel. They are the IHGs, Best Westerns, Wyndham's, Hiltons, and Marriotts of the world. They license the use of their name and playbook for running a hotel to an ownership group.

**Ownership Group:** The ownership group is the investor that puts up the money and owns the real estate. They're running a real estate business, but because hotels are cash-flowing entities, they're also making money on the day-today operations. Brands have a very intricate playbook for how hotels should be operated and usually, if not always,

require the owner/investor to hire a professional hotel management company to run that hotel on their behalf.

**Hotel Management Companies:** Hotel Management Companies are the operators. They hire the staff, run payroll, and ensure compliance with local, state, and national laws. They do everything required to operate the hotel according to the brand's playbook because the owners are focused on real estate investing.

**Key Property Personal:** These are the key personal that actually run the property day-to-day (typically under the Management Company). Depending on the size of the property, it normally includes the General Manager (GM), Assistance General Manager (AGM), IT Director, and Sales Director (though there can be many more).

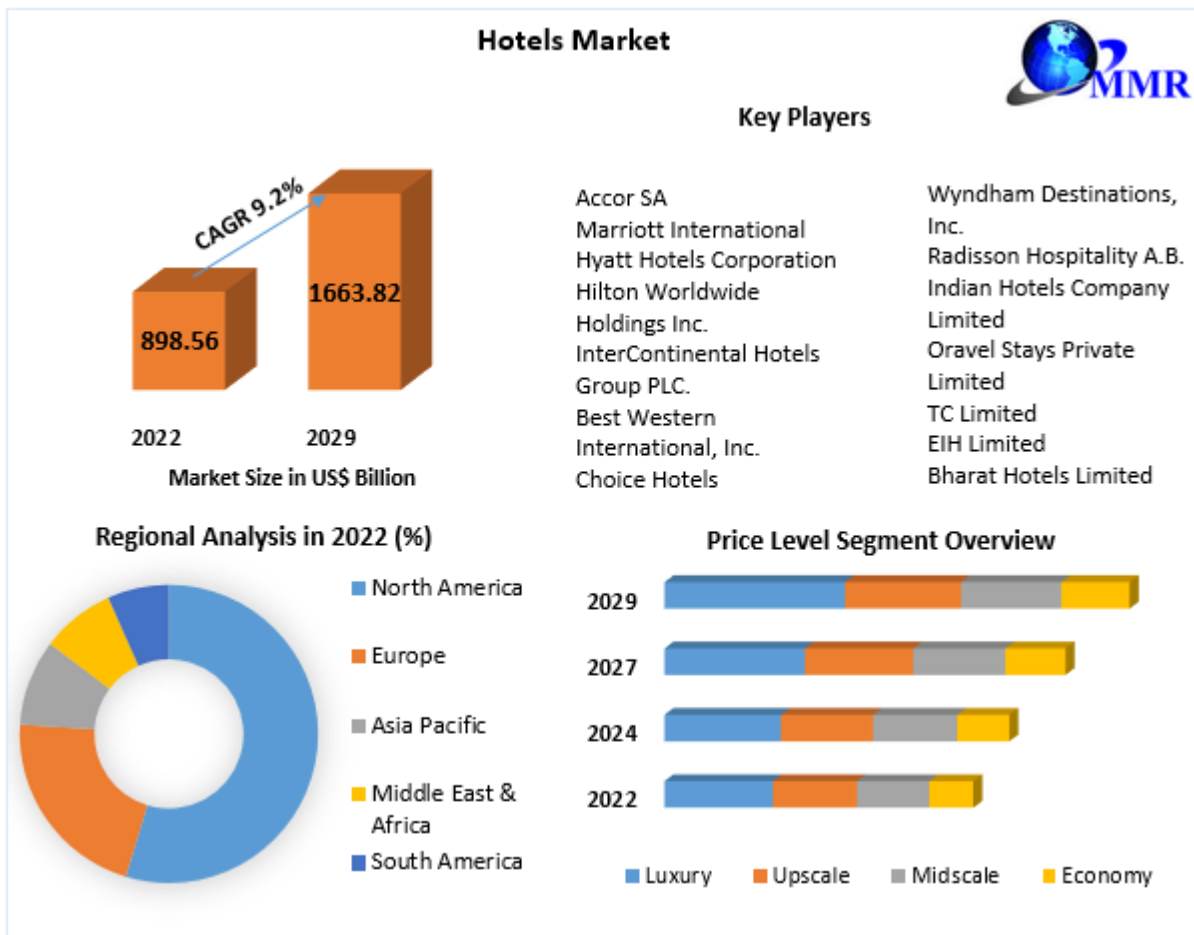
## US Hospitality Segment Total Addressable Market - 2024 - 2027

There are about 70,000 medium to large hotels, casinos, and resorts in the US among the top 20 brand portfolios. These comprise over 320 sub-brands. The properties are broken out into the following categories of building size:

- Total Addressable Market
  - Small Hotels (Under 50,000 square feet | 1 to 50 rooms):
    - Boutique hotels, bed and breakfasts, or independent lodgings
    - 25,000 to 30,000 properties
  - Medium Hotels (50,000 - 150,000 square feet | 51 to 200 rooms):
    - Mid-sized hotels often found in urban areas or popular tourist destinations.
    - 45,000 to 50,000 properties.
  - Large Hotels (150,000 - 300,000 square feet | 201 to 500 rooms):

- Larger, full-service hotels commonly found in city centers or near major attractions.
- 15,000 to 20,000 properties
- Extra-Large Hotels (Over 300,000 square feet | 501+ rooms):
  - Large-scale resorts, convention hotels, or properties located in major metropolitan areas.
  - 5,000 to 7,000 properties

World-wide, this is also a large industry segment. The global Hotels Market is valued at USD 898.56 Billion in 2022 and is projected to have a CAGR of 9.2%, reaching USD 1663.82 Billion by 2029 (Source: [https://www.maximizemarketresearch.com/market-report/hotels-market/47478/?trk=article-ssr-frontend-pulse\\_little-text-block](https://www.maximizemarketresearch.com/market-report/hotels-market/47478/?trk=article-ssr-frontend-pulse_little-text-block))



- Hotel Companies Aiming on Technological Innovations to Gain Competitive Advantage & Make Maximum Profit

- Guests are increasingly expecting more personalized options so that hotels may fit their specific needs
- The **global Smart Hospitality** market size is valued at USD 16,033.28 million in 2024 and is expected to expand at a CAGR of 26.76%, reaching USD 66,521.25 million by 2031. (source <https://www.linkedin.com/pulse/smart-hospitality-market-2031-emerging-trends-dynamics-dfu6e/>)
  - Integrating AI, IoT, ML technologies into the hospitality industry converts hotel buildings into smart hotels that help improve guest experience, driving the demand for smart hospitality management.
  - North America is the highest shareholder in the global market

In summary the hospitality segment is a broad category featuring many buildings of mid-to smaller size. The size of buildings and complex mix of players result in a price sensitive category with a complex selling cycle and reduced ability to amortize wireless infrastructure on a per-venue basis. These friction points have limited the adoption of in building solutions. However, as we look at the venue owner pain points, we will see the need for such solutions is rising.

## Shared Infrastructure Addressing Customer Need for Cellular

The guest and hospitality IT needs for cellular service have typically been regarded as low because most buildings have adequate macro coverage outdoor with critical indoor areas covered with WiFi, combining for a “good enough” threshold of connectivity. However, needs are quickly rising. As digital transformation and staffing challenges drive increasing adoption of mobile-first guest services and back of house automation, the need for cellular-like security, coverage, and availability is rapidly increasing. The broad introduction of WiFi has increased the dependency on ubiquitous wireless coverage while not solving for the use cases of seamless device sign on and recognition, voice calls, security, handover while mobile, and pervasive coverage.

At the same time as the customer need is expanding, the introduction of a shared infrastructure model is making public cellular coverage more affordable and resource efficient. Shared infrastructure is a strategic approach to resource utilization, allowing multiple parties to leverage the same physical and sometimes electronic assets. This approach drives efficiency, reduces costs, and promotes sustainability, making it an increasingly important concept in telecommunications. This approach helps lower the cost of serving key pain points for cellular coverage in hospitality buildings.



### Key Pain Points of Poor Cellular Coverage in Hospitality Buildings:

- Hotel guests have become far more sensitive to connectivity, particularly for business travel.
  - Comments and reviews about poor cellular coverage are becoming very common on travel review websites.
- Many jurisdictions around the country are incorporating new regulations that require a minimum level of indoor coverage for **first responders** (public safety).
  - The NFPA 72 "National Fire Alarm and Signaling Code" 99% cellular coverage in all critical areas of a building with a strong signal (minimum - 95 dBm).
  - Required by law for new building construction in most cities and for existing buildings in many jurisdictions
- WiFi is important, but not enough:
  - Cellular:
    - Is automatic and universal (no need for registration in the SSID)
    - Operates under licensed / controlled spectrum
    - Mobility is well-suited to voice calling. User sessions are maintained as they move between areas.
  - WiFi:
    - Can suffer from congestion due to the use of unlicensed spectrum
    - Voice calls, streaming video, and streaming audio user experiences can be disrupted or entirely lost by Wi-Fi session interruptions.
    - Higher vulnerability to cybersecurity attacks.
- As business travel is ramping up, there has been a massive boost in the requirement for mobile connectivity for remote work using cloud-based applications and messaging apps for communication.

### Need for A Private Network

Typically, only large, high-end resorts and complex facilities may have dedicated private network needs for its staff. Private 5G may not be as useful for the public attending such facilities due to the need for SIM provisioning. The technology options for a private network would be less restrictive than for a public network. A public network need is driven by deployment plans of a 5G core network as well as penetration of suitable 5G handsets. The former's need for private SIM provisioning suggests device ecosystem is less a concern as would be the core network. The business case and possibly the use case are more likely to drive the technology choice.

The ability to address private network, WiFi, and public wireless access is typically referred to as “Multi Access”. Multi-access refers to the ability to handle multiple types of access technologies (e.g., 4G, 5G, Wi-Fi) simultaneously at the edge. This ensures that users can seamlessly connect through various networks, depending on the availability and requirements of the application. These systems are essential for supporting multiple connections in wireless and wired networks, ensuring that users can communicate without interference or degradation in service quality. Venues should consider the ability to choose multi-access providers and technologies as a key selection criteria in addressing in building connectivity.

- Wi-Fi provides sufficient wireless connectivity for small or medium-sized venues where users are primarily stationary, whereas Private 5G and Neutral Host networks provide robust, high-capacity, highly secure, interference-free connectivity for larger venues and properties, with seamless handoff as users move from one area to another and without inconsistent service levels due to interference and congestion.
- Use Cases
  - **Employee communications:** Secure push-to talk staff communications within and between managed properties
  - **Telephony functionality:** similar to a Premise-based system (i.e. PBX) Guest and staff can use voice communications with PBX functionality
  - **Guest on premise communication:** guest voice and data communications where guest’s devices auto authenticate on arrival, independent of MNO services
    - Enhanced guest experiences:
    - Immersive virtual reality tours
    - Smart room automation
  - **Location-Based Services (LBS):** (e.g., wayfinding assistance, targeted promotions, and proximity-based notifications)
  - **POS with mobile support:** Secure wireless data support for mobile and nomadic POS terminal
  - **Operational Automation:** Task orders, cleaning cart location and optimization, confirmation of room availability, robotic-based cleaning and delivery, etc.
  - **Security/Safety:** CCTV surveillance cameras in parking areas or other places where wires don’t reach, mobile video monitoring, etc.



- **Building Management:** Monitoring and controlling thermostats, lighting, elevators, power systems.

## Neutral Host or Private Network? A Shared Infrastructure Model

Neutral Host and Private Networks can be complimentary technologies or separate choices. The critical element to venue owners is to consider whether there are multiple use cases or participants on the network which can create a more cost-effective approach through sharing infrastructure. Infrastructure sharing is a strategic approach that allows multiple operators or business units to utilize the same physical infrastructure to deliver their services. By sharing network assets, radios, power, and space the network participants can reduce costs, increase efficiency, and minimize environmental impact while maintaining or improving network coverage and capacity.

Typically, the key factors that impact the decision-making of whether to focus on neutral host or a single private network are:

- Size of the hotel
- Ownership structure
- Guest demographics
- Budget considerations.
- Generally, Neutral Host architectures deliver the most economic benefit when venues are large enough to amortize the equipment cost.
- **Private Networks:**
  - Provide greater control over network management, security, and customization to meet specific guest needs.
  - Preferred by luxury hotels and resorts aiming to provide a premium guest experience with reliable and secure connectivity.
  - Larger hotels require cellular coverage supporting public safety use cases to ensure reliable communication during emergencies.
  - Private network are 100% funded by a single entity within the hotel
- **Neutral Host Networks:**
  - Commonly deployed in smaller hotels, boutique hotels, or properties where there is an insufficient business case for a standalone network
  - May enable cost and revenue sharing with MNOs
- Private Network + Neutral Host as a viable option to implement private use cases while meeting public safety demands and sharing costs / revenue.



## High Level Radio Solution Components

The smaller building sizes and limited IT infrastructure require simple, single input/single outpost DAS or small cell systems. Solution providers and venue owners should measure the ability of technologies to solve challenges across four main domains: The wireless network propagation characteristics, coverage, capacity, and deployment cost.

Architecture	RF Characteristics	Coverage	Capacity	Costs and deployment complexity
<b>Passive DAS</b>	<ul style="list-style-type: none"> <li>Vulnerable to PIM</li> <li>High signal degradation due to coaxial cable</li> </ul>			<ul style="list-style-type: none"> <li>Can reuse existing coaxial cable</li> <li>Slow to medium deployment                             <ul style="list-style-type: none"> <li>(weeks or months)</li> </ul> </li> <li>Mostly proprietary solutions (limited interoperability)</li> </ul>
<b>Hybrid DAS</b>	<ul style="list-style-type: none"> <li>Multiple carriers support</li> <li>Multiband support limited by POI capabilities</li> </ul>	<ul style="list-style-type: none"> <li>Scalable with the number of antennas</li> <li>May require from amplifiers to improve coverage</li> <li>May required additional cable (coaxial or fiber) to expand coverage</li> </ul>	<ul style="list-style-type: none"> <li>Capacity of the donor cells is shared among all the antennas</li> </ul>	<ul style="list-style-type: none"> <li>RUs can be located on equipment rooms of different buildings</li> <li>Slow to medium deployment                             <ul style="list-style-type: none"> <li>(weeks or months)</li> </ul> </li> </ul>
<b>Active DAS</b>	<ul style="list-style-type: none"> <li>Multiband support limited by POI capabilities</li> <li>Multiple carriers support</li> <li>Multiband support limited by POI capabilities</li> </ul>			<ul style="list-style-type: none"> <li>Enables large separation between BTS and RUs</li> <li>Signal can be routed to specific locations</li> <li>Slow to medium deployment                             <ul style="list-style-type: none"> <li>(weeks or months)</li> </ul> </li> <li>Mostly proprietary solutions (limited interoperability)</li> </ul>
<b>Small Cells</b>	<ul style="list-style-type: none"> <li>Multiband support limited by SC capabilities</li> </ul>	<ul style="list-style-type: none"> <li>Scalable with the number of Small Cells</li> </ul>		<ul style="list-style-type: none"> <li>Costs scale with the number of required SCs</li> <li>Fast deployment                             <ul style="list-style-type: none"> <li>(days)</li> </ul> </li> </ul>
<b>Small Cells + DAS</b>	<ul style="list-style-type: none"> <li>Multiband support limited by POI, RU and DC capabilities</li> <li>Multiple carriers support</li> </ul>	<ul style="list-style-type: none"> <li>Coverage can be expanded by adding of antennas and coaxial distribution</li> </ul>	<ul style="list-style-type: none"> <li>Capacity can be expanded by adding SCs</li> </ul>	<ul style="list-style-type: none"> <li>Plug &amp; play deployment</li> <li>Can reuse existing ethernet backhaul</li> </ul>

## Architecture Choices in Solution Ecosystem

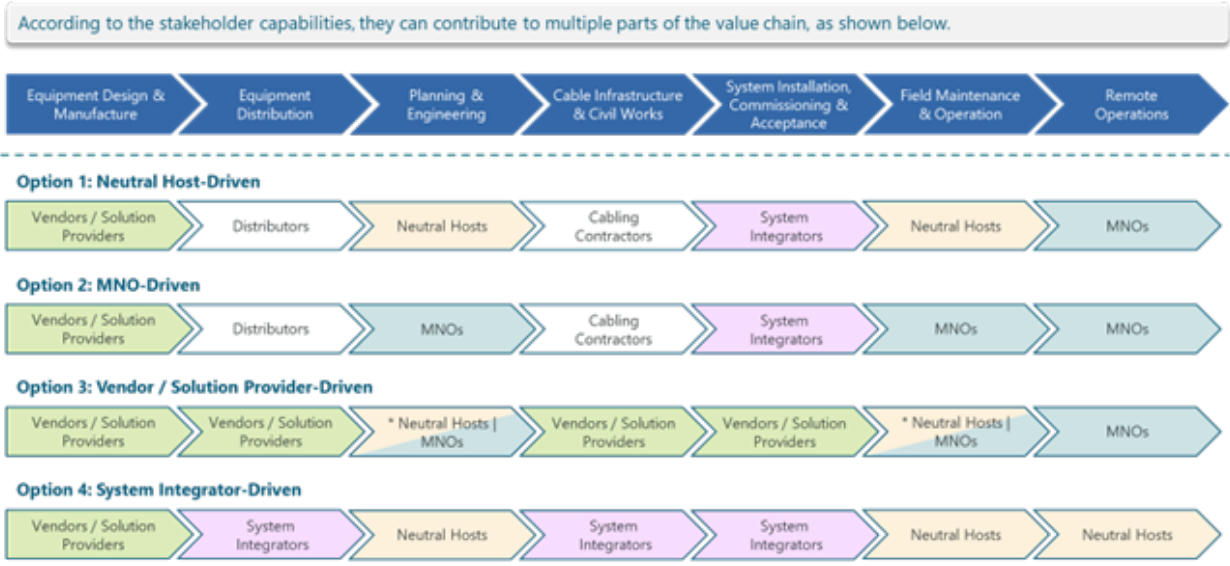
In order to choose the best solution or set of solutions to provide a seamless guest and worker experience inside buildings, hospitality decision makers have a range of technologies to consider across a key set of architectural components.

- **Passive Distributed Antenna System (Passive DAS)** is a type of wireless solution that enhances cellular coverage by using a network of passive components such as coaxial cables, splitters, couplers, and antennas to distribute RF signals from a central source throughout a building or facility. Passive DAS relies solely on the signal strength received from the nearest outdoor macro cell or base station and distributes this signal passively through the building.

- **Active Distributed Antenna System (Active DAS)** is an advanced in-building wireless solution designed to improve cellular coverage and capacity by using a network of fiber optic cables, remote radio units, and antennas. Active DAS actively amplifies and distributes signals, allowing it to cover large and complex buildings with multiple floors, dense walls, and significant interference.
- **MORAN** (Multi-Operator Radio Access Network) is an effective network-sharing model that enables multiple mobile network operators to share the RAN infrastructure while maintaining separate spectrum allocations and core networks. This approach provides cost savings, improves coverage, and accelerates the deployment of new technologies, all while allowing operators to maintain their independence and service differentiation. However, it requires careful management and coordination to address challenges such as interference and regulatory compliance.
- **MOCN** (Multi-Operator Core Network) is a highly efficient network-sharing model that allows multiple mobile network operators to share both the radio access network and the spectrum while maintaining separate core networks. This model offers significant cost savings, improved spectrum utilization, and faster deployment of services, making it particularly valuable in areas with limited resources or high deployment costs. However, successful implementation requires careful coordination, regulatory compliance, and robust management of shared resources to ensure high-quality service for all participating operators.
- **Core network sharing** is a sharing model where along with either MORAN or MOCN the core resources (like HSS, IGW, MME) are also shared amongst multiple MNO. This provides further cost savings over and above the MOCN.



## Value Chain Variants



\* Neutral Hosts and MNOs can share functions

### Commercial Model

In building coverage is experiencing dramatic changes in the commercial models of solutions. Within hospitality, coverage solutions have historically been split into a small tier of large, high visibility venues which are served and funded by Mobile Network Operators and then the majority of medium to small venues which self-fund coverage solutions (typically provided by solution integrators or third party operators) in what is typically referred to as “venue pays” or “enterprise pays”.

Therefore, in the traditional model, mobile network operators owned and managed all the mobile network infrastructure – even the in-building components, like radios and baseband systems.

However, with the industry evolving, now hotels can directly network services from third party providers or could even acquire signal sources directly from Mobile Network Operators. This change requires hotels to consider new distribution solutions as well as new commercial models.



The in-building solution market is increasingly bifurcating into two basic models:

**MNO-Led:** The Mobile Network Operator owns and manages both the signal source and the infrastructure used for distribution. They handle the operation of the system and any interactions with additional network providers. This also implies the Operator is paying the venue a fee under the premise that facility is providing “site access” in the form of taking care of the permissions, physical space, and location access so that the Operator can ensure high capacity coverage to guests and visitors.

Because Operators are facing budget constraints to provide in-building connectivity for this segment, sharing RAN infrastructure is a major paradigm shift for operators who seek the lowered cost and quicker service enablement. It has provoked the adoption of a different commercial model, where the venue is primary tenant and direct customer. This is what is referred to as Venue Pays.

**Venue Pays:** In this model the hotel (or enterprise) owns and operates the infrastructure. The hotel can purchase or lease the signal source from the MNO and connect it to the hotel's infrastructure. However most often this model means the hotel is hiring a System Integrator (SI) or third party operator to handle the design, installation, and management of the network system. Otherwise the hotel IT team must gain the skills and tools to work directly with Mobile Operators on cellular networks. In a Venue Pays model, building owners and enterprises are best served by neutral-host networks but telecom/wireless is complex and not a core competency for the enterprise. For hotel owners this has meant IT buyers must allocate budgets which cover WiFi and fixed systems in addition to dedicated cellular in-building.

The hotel can use this setup either through a capital expenditure (buying the system) or operational expenditure (paying for its use).

This shift to venue pays for the delivery of cellular coverage (from the signal sources through to the distribution systems) allows for greater flexibility and potential cost savings. The sharing of basebands, signal distribution networks, radios, and spectrum offers the most economically efficient solution and can save on energy consumption, air-conditioning, and real-estate footprint. The actual operational cost varies by technology but the more hardware sharing that can occur the lower the anticipated operation cost.



These inherent efficiencies are creating increased interest for neutral host networks as a solution of choice for solving the rising need for seamless wireless connectivity in hotels and entertainment venues.

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