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EBOOK

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# VIRTUAL SPACES

The Future of Real-Time  
Interactions Online

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PubNub





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## INTRODUCTION

# What are Virtual Spaces?

Today, as we spend more time online and on apps, our lives have become highly virtual in many ways. Whether we're working or playing, we live and interact within online **Virtual Spaces**. A Virtual Space is a digital environment where people and devices, around the world, can seamlessly collaborate, socialize, and exchange information...as they happen. They're where real-time interactions and experiences happen online.

For something to be classified as a virtual space, it typically has the following 4 characteristics:

1. It's a digital environment
2. Multi-user – Involves 2 or more endpoints communicating with one another (people and/or devices)
3. Interactive – Data/communication (a message, a signal, visual status, or remote action etc.) is transmitted between endpoints
4. The interactivity (receipt and exchange of data/communication) occurs in real-time

You're already familiar with Virtual Spaces and the device you're reading this on has, at one time or another, been a part of a Virtual Space. In fact, if you've:

- » Participated in a real-time online fitness class...you were in a Virtual Space
- » Played video games with people from around the world...you were in a Virtual Space
- » Collaborated with co-workers on shared documents in real time...you were in a Virtual Space
- » Signed on to a video conference call...you were in a Virtual Space
- » Utilized a business' chat function on their website to receive technical support...you were in a Virtual Space
- » Logged on to a live concert online...you were in a Virtual Space
- » Voted for your favorite performer on a T.V. talent competition...you were in a Virtual Space
- » Turned on your home's lights or air conditioning either by voice or using an app...you were in a Virtual Space
- » Had a telehealth visit with a medical provider...you were in a Virtual Space

The modern conveniences we benefit from today...the technological upgrades that make our lives easier...all happen in and because of Virtual Spaces.

And this is just the beginning!



## >> Web3, the Metaverse... and Virtual Spaces

We're going to start the story of Virtual Spaces with two terms you've probably heard plenty about: Web3 and the Metaverse. Nowadays there's a lot of buzz about them, and both play a large role in the future of the internet, but what do they mean for your app? Despite them being sometimes used interchangeably, they're not the same thing. Let's take a look at the differences and how they relate to Virtual Spaces.

### WEB3

Web3, on the other hand, speaks less to the interoperability and connectedness of websites and is more about security, data privacy, and ownership, with a big push towards democratizing content creation. Simply put, the current Internet is highly centralized (dominated by companies that provide services in exchange for your personal data) but this is quickly changing. The focus of Web3 will be about who owns and controls the Internet of the future, and how to keep it all secure using advancements such as blockchain technology. This includes decentralized apps such as blockchain, cryptocurrencies, digital play-to-earn video games, NFTs, and other technology.

Many believe that this next phase will improve the current Internet because it will replace these centralized networks with a decentralized, open infrastructure where users and creators will have ownership over their own data, allowing them to uncover new types of monetization.

Web3 is in its nascent stage, and if we know anything about the internet and technology, it's that we can't predict with 100% certainty, where it's headed next.

### METaverse

So, what exactly is the Metaverse? While there are various hypothetical explanations circulating around of what the Internet will look like in the near future, we consider the metaverse to be the next phase of online experiences that will mimic certain "real life" aspects. In other words, the metaverse is a virtual world where people live, work, shop, and interact with others...all online and in real time.

Sound familiar?

In the metaverse, people use avatars to represent themselves, and live their lives through the lens of that digital embodiment. Everything that life entails—communicating with others, working, shopping, traveling, building relationships—takes place entirely online. A number of companies have begun to establish a presence in the metaverse. Namely, JP Morgan who became the first bank in the metaverse to open a virtual branch for their company's blockchain technology. This "lounge" is in Decentraland, a Metaverse platform where you can buy or sell lands/plots.

Unlike Web3, the metaverse already exists in a tangible form. For example, virtual reality (VR) is a simulated environment that makes users feel like they are fully immersed by using a headset that incorporates sight, sound, and in some instances touch.



As we move towards the future of the internet, the metaverse will expand beyond VR and include augmented reality (AR), enhanced online experiences that combines real world and computer-generated content.

## ...AND VIRTUAL SPACES

Everything we just talked about are mainly conceptual at this stage. Except Virtual Spaces, that is.

Virtual Spaces play an important role in both of these concepts:

1. For **Web3**, the platform that Virtual Spaces live on take center stage. When an app or website is built using highly customizable technologies that allow for change and expansion at any time, then adjusting for the interoperability or the ownership that Web3 embodies is less about starting from scratch, which saves a lot of time and money. In order to be ready for either of these futures of the internet, developers must retain control over the growth and direction of their applications, something that not all real-time communication solutions allow for.
  2. In **the metaverse**, Virtual Spaces are the individual opportunities for connectedness that arise in everyday life. Whether it's one of the example scenarios at the beginning of this book or something else entirely, Virtual Spaces make the metaverse...the metaverse.
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# Virtual Spaces & Apps

Every modern mobile or web app, regardless of industry or purpose, is a Virtual Space if it provides an online place where people can engage with each other just as authentically as they could face-to-face.

The existence of a Virtual Space (or Space) is not dependent on time or duration. In fact, a Space might be a long-running entity where members work together to achieve a quarterly business goal such as a virtual whiteboard. Or a Space might only exist for the duration of a sporting event, allowing fans to react as their team wins a crucial match.

And while time or duration doesn't make something a Virtual Space (or not), there are a few things that all successful Virtual Spaces have in common in addition to the 4 we mentioned at the start of this book:

- » They're scalable to allow for a growing user base
- » They're highly-customizable to meet both the changing needs of end users and the growth plans of creators
- » They contain features that encourage and facilitate interactions between users
- » They enable real-time engagement to mimic real life interactions
- » They're built with the appropriate attributes and features to enhance functionality and user experience.



To protect user experience and adoption and to ensure your app performs as it should, only incorporate relevant features and attributes.

Some examples of a Space and its appropriate attributes:

- » A Collaborative chat application will have different spaces within a larger work space where users can interact for one explicit purpose, for example, "ask-engineering", "ask-it", "ask-customer-support" etc
- » A 1:1 Chat space has attributes as a 1-on-1 chat facilitator, which mean the space will only have 2 members and show typing indicators to enhance user experience and engagement
- » A "Driver-passenger" space might be used in logistics or food delivery applications and includes geolocation data to track the interactions
- » A "Home" space for home automation contains the concept of device command and reporting to control the IoT devices
- » A "Game-Audience" space, where fans can encourage, support, and influence players of a multiplayer game tracks the progress of the game and allows for a replay of highlights



## >> Features that make Virtual Spaces as Engaging as Real-Life Experiences

When designing an app, there are specific features that can be utilized in order to create an enriching and engaging Virtual Space that creates loyal end users. These include:

### REAL-TIME, IN-APP CHAT AND MESSAGE REACTIONS

In-app chat generates a sense of community where users can form their own group chats, privately message one another, or broadcasters can directly engage with their audience while still remaining in-app. On top of that, there are additional features within in-app chat, such as message reactions like a thumb's up, smiley face, or emojis, that allow users to communicate their mood and how they're feeling to a message.

### PUSH NOTIFICATIONS AND ALERTS

Push notifications and alerts give apps a way to reach users wherever they are and draw them back to the app. They can be used to notify users when an event is starting, share personalized reminders, or provide real-time status updates on orders.

### USER AND DEVICE PRESENCE DETECTION

Presence is a feature that lets you track the online and offline status of users and devices in real time and create updates for changes. These updates include things like alerts for who's active in a chat or virtual waiting room, when players are online, location, whether a door is open or closed, and other sensor information.

### LEADERBOARDS, POLLING, AND QUIZZES

Interactive leaderboards, polls, surveys, and real-time quizzes add a deeper form of engagement by using gamification to entertain end users.

### ACCESS CONTROL

Access control gives you the ability to grant or revoke access to a channel. You can use it to ensure security for home automation devices, to monitor social apps, or to make a chat private.





## LIVE MAPS AND DISPATCH

Display live maps for visual tracking of fleet, drivers, riders, and deliveries to ensure scheduling and accurate asset counts, which helps keep business operations running smoothly.

## MULTI USER COLLABORATION

Synchronizing whiteboards and other content in real time such as quizzes, trivia, and breakout rooms to facilitate enhanced engagement among users and provide them more value in e-learning or digital collaboration experiences.

## FUNCTIONS

Functions provide the flexibility to filter, re-route, aggregate, transform, and augment data. You can translate chat messages into other languages, screen messages for inappropriate content, or even inspect IoT data (like temperature) and trigger specific alerts based on “events” that are happening in your application.

## IoT DEVICE CONTROL AND MONITORING

Monitor and control smart home devices and systems in real time. Instantly flag anomalies and see online/offline state visualizations, making it easy to manage home automation, building management, and connected devices.

## REAL-TIME DASHBOARDS

Live displays present interactive data-driven experiences for gaming leaderboards, auctions, crypto, pricing, and more—and can be used alongside push notifications to update users of new items, pricing changes, highest bids, and more.

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# The Future of Virtual Spaces

Virtual-first communication is the future as more and more people spend time online. Virtual Spaces allow you to create experiences that are personal to an app's unique community and every user within it. They allow communities to form deeper connections by giving them a dedicated place to engage with one another regardless of barriers like location or language.

Virtual Spaces offer a wide range of opportunities for apps to attract business, convert users into loyal customers, and remain competitive—which will help you stay ahead of the curve.

Here are seven areas where Virtual Spaces will be making the biggest impact for businesses:

1. Virtual Community
2. Virtual Empathy
3. Virtual Commerce
4. Virtual Workplace
5. Virtual Learning
6. Virtual Fitness
7. Virtual Health

## 1 VIRTUAL COMMUNITY

Virtual Spaces offer a huge opportunity to foster community health, ensuring a safe and happy user experience. More than ever before, companies are turning to content moderation and profanity filtering to remove negative, unwanted behaviors from their app so that users of all ages feel free to share and engage as their authentic selves.

## 2 VIRTUAL EMPATHY

The ability to communicate empathy plays an important role in facilitating a space where users can form deeper personal relationships. For this reason, many apps have transitioned to Virtual Reality (VR) in recent years as a way to signal a new approach to virtual communication and mindfulness to retain their users. They use elements such as immersion and sensory feedback so the interactions around the user feel real. Research in the Journal Computers and Human Behavior found that when avatars have a visual expression of pain, it can create more awareness and emotional perception among virtual humans. And as the upcoming metaverse gains more traction, this trend will become more prevalent.

## 3 VIRTUAL COMMERCE

With e-commerce continuing to expand, businesses need to have an app engagement strategy to remain competitive. Therefore, a popular trend that has continued is incorporating a personalized consumer experience that provides relevant shopping content, such as promotional alerts and cart abandonment notifications to engage users throughout the customer journey and entice them to return.



Forrester research reported that shopping cart abandonment currently causes e-commerce brands \$18 Billion in yearly sales revenue, so more brands are turning to things like cart abandonment alerts to stop the bleeding.

#### 4 VIRTUAL WORKPLACE

Where is the virtual workplace going now? The future of work is moving towards a hybrid model, and what we're seeing from this is an increase in employee satisfaction and creativity. In fact, in a recent Pew Research study, 61% of respondents choose not to go to an office to work in 2022, an increase from 36% in 2020. This is why companies are investing in real-time collaboration capabilities to ensure that users get the most out of their experience.

#### 5 VIRTUAL LEARNING

E-learning has become a vital part of the global education system due to the explosive adoption of digital technologies. According to a report published by Allied Market Research, the global e-learning market size is projected to reach \$840.11 billion by 2030. For this reason, businesses are strengthening their position in the industry by providing real-time features such as multi user document editing, virtual whiteboards, and groups calendars, to effectively engage students and drive productivity in these virtual environments.

#### 6 VIRTUAL FITNESS

Virtual fitness skyrocketed during the pandemic and this trend is expected to continue. The "Online/Virtual Fitness Global Market Report 2022" by Research and Markets found that the global online/virtual fitness market is expected to reach \$79.87 billion in 2026 at a compound annual growth rate of 49.12%. But this also means that user expectations are increasing along with it. In fact, to keep up with the hybrid approach that many industries are moving towards, new methods of fitness such as gyms that are live streaming classes from their facility and virtual on-demand coaching sessions are becoming more common. This provides a more accessible fitness experience for consumers.

#### 7 VIRTUAL HEALTH

Advancements in telehealth began with the pandemic, however, these trends have paved the way for the future landscape of the healthcare industry. In a research survey conducted by the American Medical Association (AMA), they found that about 9 in 10 physicians now believe digital health tools are an advantage for patient care. Benefits like increased work efficiency and improved patient care have been key drivers for more physicians adopting digital tools.



## >> Conclusion

As we said before, there's no way to predict anything with certainty when it comes to the internet but there is one thing that we do know...Virtual Spaces are a reality now and they will only grow in use and sophistication as these other "future internets" come into fruition.

App creators who build with the idea of product growth, versatility, and scalability in mind will be the ones who succeed. They'll be the ones who lead the way when the doors of Web3 or the metaverse open and present us with these new and exciting worlds to explore.

## >> How PubNub Powers Virtual Spaces for Apps

At PubNub, we've created a Virtual Spaces Platform to help businesses build modern, highly engaging digital environments so they can better attract and create loyal end users. With the ability to support multiple use cases such as in-app chat, location tracking, IoT, and more, users and devices can connect and collaborate with each other in real time. With PubNub's Virtual Spaces Platform every virtual interaction is fast, secure, and reliable, and every implementation is flexible and easily scaled.

### BENEFITS OF PUBNUB'S VIRTUAL SPACES PLATFORM

Virtual Spaces offer a collection of capabilities that can be added to apps to improve user experience, stickiness, and loyalty. PubNub already powers thousands of the world's leading Virtual Spaces that you already know, use, and trust.

With our Virtual Spaces Platform, you will:

- » Improve and modernize user engagement with features that facilitate in-app, real-time connections
- » Drive community through live, full-featured chat, live polls, interactive whiteboards, and many other synchronous real-time experiences
- » Increase time spent in-app and retention through features like real-time alerts, gamification, and rewards
- » Create more opportunities for partnerships and monetization
- » Launch quickly on a platform designed for security and global scale
- » Analyze real-time user experience data to drive business decisions
- » Shape online communities in infinite ways with features like language translation, content moderation, giving you the flexibility to create any unique in-app experience
- » Focus on innovation not infrastructure, using the Virtual Space Platform to accelerate your product roadmap, and stay ahead of the competition

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*To learn more about how PubNub can help you build engaging in-app experiences to attract and retain users for the long-term, request a demo today.*



# Virtual Spaces Platform Fundamentals Checklist

The right Virtual Space Platform will enable businesses to build modern, highly engaging digital environments so they can better attract and create loyal end users.

When you're looking for a solution for real-time communications, there are a number of factors we recommend you keep in mind to ensure you're partnering with the right provider who can support your build both now and in the future.

- ☐ **Offers unlimited vertical *and* horizontal scalability** to handle any number of concurrent users from anywhere and any activity spikes...without financial penalties.
- ☐ **Enables teams to build the real-time experiences** users are demanding, and leaves the door open for adding additional features and functionality in the future.
- ☐ **Improves and modernizes user engagement** with features that facilitate in-app, real-time connections.
- ☐ **Operates in real-time without latency issues**, and high uptime, capturing the energy and excitement of in-person interactions online.
- ☐ **Delivers real-time updates** for all users, everywhere, via push notifications and in-app alerts.
- ☐ **Runs on its own rock-solid architecture** via worldwide data centers with 99.999% SLA, freeing you from reliability worries.
- ☐ **Supports customers from multiple time zones** so you can get help when you need it, unlike with some single-location customer support teams.
- ☐ **Streams and aggregates data** via live dashboards so you can gain real-time visibility and mine in-depth insights to inform business decisions.
- ☐ **Gets you up and running fast** and acts like a trusted extension of your ops team, who is with you from design through testing, launch, and beyond.
- ☐ **Increases time spent in-app and retention** through features like real-time alerts, gamification, and rewards.
- ☐ **Protects your organization's reputation and bottom line** with enterprise-grade security and regulatory compliance with regulations such as GDPR, SOC 2, HIPAA, ISO 27001, CCPA, etc.

For more information about how PubNub can help you build interactive, engaging Virtual Spaces that improve user experience and increase loyalty, [sign up for a free trial](#) today.

