GoToConnect
Powered by Jive

THE VOICE CHOICE

True Cloud Solutions vs. Traditional On-Premise Systems

EXECUTIVE SUMMARY

Moving communications and collaboration tools to the cloud is predetermined and unavoidable for the modern business. Studies on businesses' cloud strategy have discovered:

- **80%** of all IT budgets will be committed to cloud solutions in 15 months.
- **73%** of companies are planning to move to a fully software-defined data center within the next two years.
- **42%** of all companies have moved their communications/collaboration to the cloud.
- Enterprises are planning to invest an average **$3.5M** on cloud apps, platforms and services.

Research consistently points out the benefits of moving from on-premise solutions to a cloud-based platform. Cost savings top the list of reasons, with the cloud eliminating the need for expensive on-site equipment and maintenance.[1] This is closely followed by reliability, thanks to redundant data centers, ease of use and faster deployments; improved security, and smoother upgrades.

Although this is a general description of the benefits of cloud solutions, it's important to consider that not all cloud solutions are the same. Therefore, the advantages business hope to receive from switching from an on-premise system to a cloud solution can vary greatly. This is based on how their vendor deploys their platform, and whether or not they're able to deploy a true cloud solution.

INTRODUCTION

For businesses looking to move their communications to the cloud, not choosing a true cloud solution exposes them to a host of problems, including low call quality (latency and jitter), higher reliability issues, additional costs, and potential security issues. These predicaments contribute to a diminished experience for the business, and especially the customers they seek to serve.

This is because cloud-washed solutions are simply hosted in virtualized data centers. On the other hand, true cloud solutions are hosted off-site and offer consistent, automated upgrades and follow a multi-tenant architecture. They also provide self-service, autoscaling, and usage-metering capabilities, all of which follow the definition provided by the National Institute of Standards and Technology.[2]

To that end, businesses must choose a communications solution with DNA rooted in the benefits of a true cloud solution. Those characteristics include:

- A unique physical and multi-tenant architecture that requires no on-premise equipment
- A wide distribution of active/active data centers
- Microservices
- Global States
- WebRTC

This whitepaper explores each of these requirements for a true cloud solution. It outlines the benefits of a true cloud solution over cloud-washed offerings in the market, and its superiority over on-premise systems. This will ultimately allow readers to cut through the market noise and correctly identify true cloud offerings available today.

THE DIFFERENT MODELS OF COMMUNICATION SERVICES

Vendors typically follow four common models of communication services. Each one is discussed comprehensively below to demonstrate functionality, benefits, and challenges:

- On-Premise Architecture
- Hub & Spoke Architecture
- Hosted Architecture
- True Cloud Architecture

ON-PREMISE ARCHITECTURE

On-premise architecture refers to a system of communication solutions that are installed and run on computers where the business is physically located.

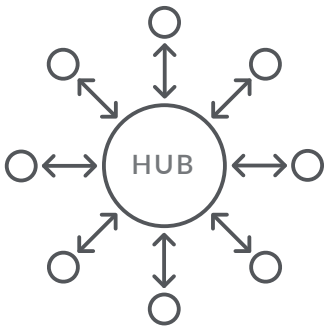
- **Higher cost:** The main disadvantage of on-premise based solutions is that it's expensive to deploy. This is due to equipment, physical space, and licenses needed prior to implementation.[3] Additional and ongoing expenses for employees, upgrades, and maintenance are also required to ensure optimum operations. The upfront cost for training alone can range from $2,333—$6,767 per administrator.[4]
- **Deployment and implementation challenges:** In terms of deployment and upgrade timeframes, it takes much longer with on-premise solutions.
- **Unreliable security and management:** Security and reliability is also a big challenge for businesses that opt for an on-premise based communication solution as most are ill-equipped for it. In most cases, they neither have the budget or employee competency to maintain the stringent security standards and upkeep required by the system.
- **General communication inefficiency:** Finally, because all communications have to travel back to the central server and then be routed to the desired recipient, this exposes businesses to more latency, jitter, and general quality of service (QoS) issues.

HUB & SPOKE ARCHITECTURE

Hub and spoke architecture is often compared to a network of airports. It is operationally and financially prohibitive for smaller airports to offer direct flights to every airport around the world. Instead, they route passengers to larger airports (hubs), which can connect them to their destination. The lines drawn between smaller airports and hubs on a map resembles the hub and spoke of a wheel – hence the name.

In the context of communications, the rural airports represent businesses. When a business initiates communication, the data packet is sent from the business to a point of presence (PoP). A PoP can be thought of as a connecting flight to the larger hub. The server then routes the packet to the hub for final distribution.

- **Lack of standardization of business practices:** Applications are maintained at multiple locations. Therefore, it's hard to ensure consistency of service for end-users. Lack of standardization, especially if not managed well, can lead to each business running their own versions of an instance that are not aligned with another and create fragmented systems.
- **Higher IT infrastructure costs:** The hub-and-spoke model can lead to higher costs incurred due to hardware and software licensing. Additional costs may arise if a business opts to expand features and services simply because of the complex routing of the communication model.
- **Inefficient communication routing:** Communication must still be routed to a central location. This exposes the business to the same QoS and reliability issues of on-premise deployments.



HOSTED ARCHITECTURE

When businesses are presented a hosted communications platform, they assume that they are already getting a true cloud solution. This isn't always the case.

- **Cloud-washed application:** Basic hosted solutions simply move an on-premise solutions off-site[5] using a private, single tenant deployment. However, the business (not the communication vendor) is responsible for determining what sort of capacity they need. Businesses then run the risk of buying too much or too little equipment, resulting in wasted capital or being caught off guard when they inevitably hit maximum capacity.
- **Prone to quality issues:** Like on-premise and hub and spoke models, hosted communication solutions still have to be routed to a central location (it is simply moved to an off-site location), making it prone to the same QoS issues.
- **Inefficient process for upgrades:** Unlike true cloud communication solutions, vendors/businesses must upgrade their hosted systems individually. If the upgrade fails and an outage occurs, the business has no means to communicate. Businesses that choose the hosted route will, therefore, take more time to plan upgrades given the risk and resources involved. This translates to upgrades taking longer to implement.

TRUE CLOUD ARCHITECTURE

A true cloud communications tool offers a more cost-effective, scalable solution.

- **No on-site equipment:** The physical architecture of a true cloud communication solution requires absolutely no on-site equipment to run.
- **High-quality deployment and implementation:** True cloud architecture's physical architecture is designed in such a way that it allows the fastest data connection with the lowest chance for quality issues due to packet loss.
- **Reliable off-site management and maintenance:** All hardware to run the instance is done off-site, but is completely managed by the vendor.
- **Multi-tenancy ensures redundancy:** In addition, instead of being run on a private network, true cloud solutions leverage multi-tenancy and redundant data centers – which will be discussed in detail further into this paper – for faster upgrades, greater scalability, and higher reliability.

THE LOGICAL ARCHITECTURE REQUIRED TO MAXIMIZE A TRUE CLOUD COMMUNICATION SOLUTION

It's clear that shifting from on-premise solutions to a cloud-based system can certainly provide additional business benefits. However, there's a difference between a straightforward hosted solution and a true cloud architecture.

Leveraging on the potential of the cloud requires a closer look into how the solution is housed within it. Below are the different architectural models that vendors follow today.

These models underscore how multi-tenant architecture effectively supports the needs of today's modern workforce without compromising performance:

- Single-Tenant Architecture
- Shared Architecture
- True Cloud Multi-Tenant Architecture

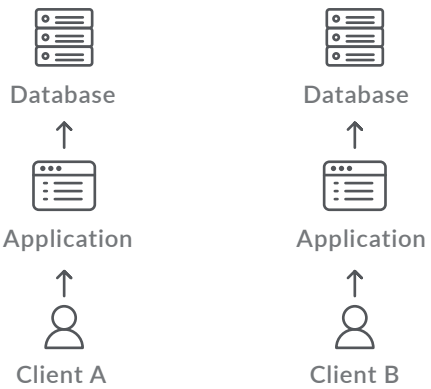
SINGLE-TENANT ARCHITECTURE

Single-tenant deployments are also known as private clouds given that a single business is the only customer on the instance.

Single-tenant architecture often uses a housing analogy. Single-tenant instances are like a standard, single-family house. Each home is built from the ground up and its homeowners are in control of the home after it is built. This means single-tenant architecture is highly-customizable and can be bolstered with additional security. However, these same features are responsible for making it more unreliable, difficult to scale, and expensive.[6]

Why? When each system is hyper-customized, it takes time to build out a new instance for each new customer. Deployments take even longer, and specialized equipment may be required to meet the customer's individual needs, which can be very expensive.

Thus, maintaining the system becomes more complex. Something as simple as upgrades may not work as expected due to a given instance's high level of customization. Similarly, if an update or upgrade doesn't work as intended, there is no backup instance ready to operate as a failover. Vendors must also keep track of the version every customer is on to troubleshoot, making it more tedious and time-consuming.



SHARED ARCHITECTURE

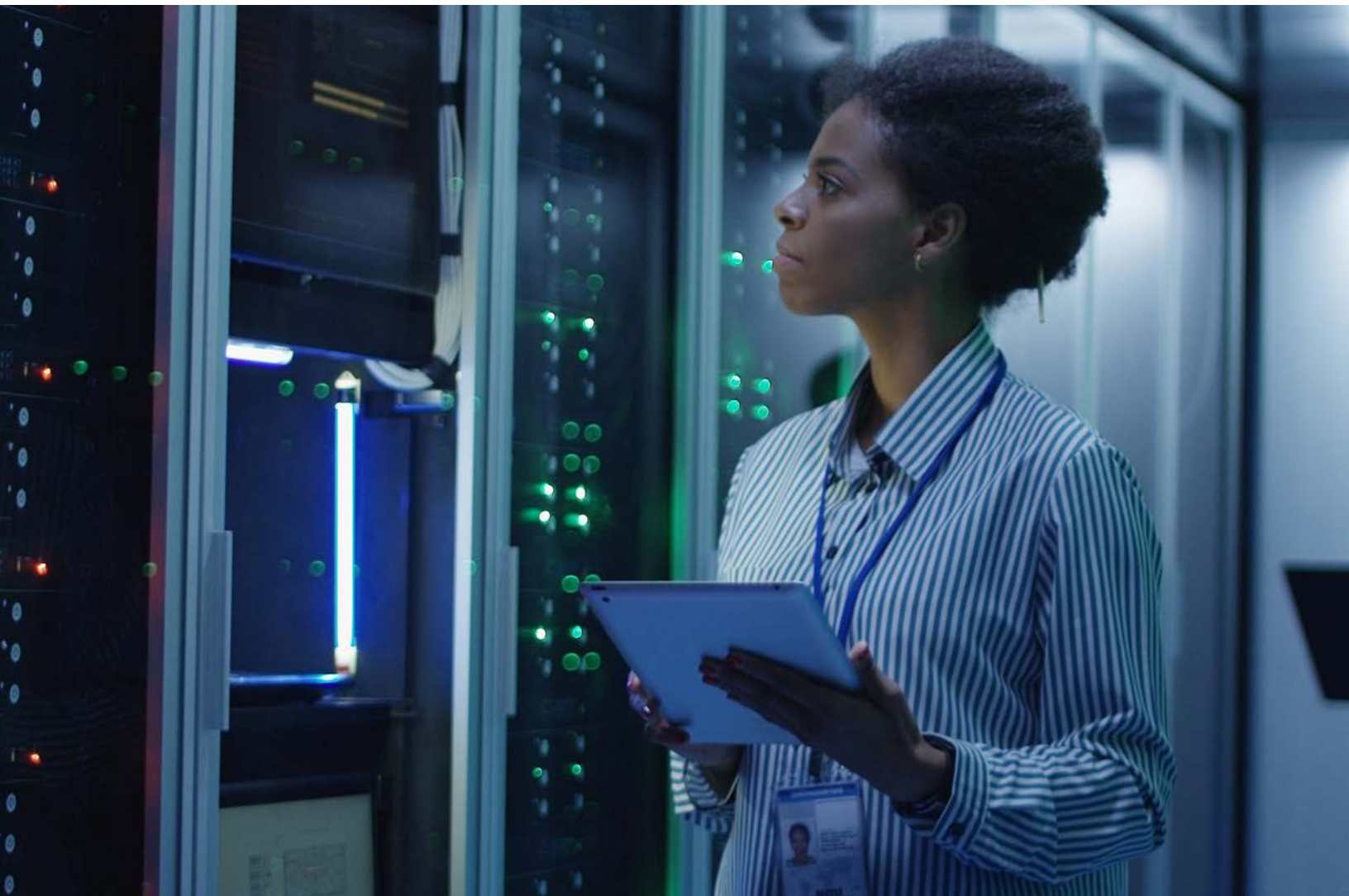
Shared architecture (aka multi-instance) means users' databases are separated physically, but are still connected logically. To use the housing example, it's as if each business is an owner of an apartment unit within a larger complex.

The problem with a shared architecture is that it suffers the same problems as a single tenant architecture. Specialty, non-commoditized hardware is often needed due to the degree of customization.

Similar to on-premise architecture, shared architecture faces licensing and customization challenges as well. In terms of licensing, vendors must first determine whether they need to purchase a permanent license or a subscription. From there, vendors can only make an educated guess as to how many users need access to the software.

Once purchased, they may see underutilization, which is a waste of money. Additionally, when it is time to upgrade, the vendor must decide once again how many licenses to purchase.

Furthermore, if each customer is on a customized instance and they continue to grow or expand, the vendor must find a way to house that instance. This may require migrating data to a new instance to continue supporting the business.



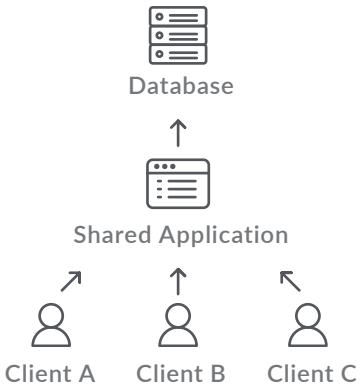
TRUE CLOUD MULTI-TENANT ARCHITECTURE

Following the housing analogy, a multi-tenant structure means all users live in the same building, where everyone gets the same apartment with access to the same amenities. While users may complain about a lack of customization and autonomy, the pros significantly outweigh the cons.[7]

For example, multi-tenancy is known for reliability. It is easy to replicate customer instances and allow for redundant instances to exist in a vendor's data center. In the case of outages, the vendor can therefore quickly push the customer to a duplicate instance.

To expound on this further, the major benefits of a true cloud multi-tenant application include:

- **Cost-savings:** Reducing service costs is a primary advantage due to the fact that no new resources are required for additional users. Operational costs are minimized since upgrades can easily be deployed for users and can be implemented in a single instance.
- **Easy management and deployment:** Multi-tenant systems are easier to deploy given that updates can effortlessly be pushed out since there's only one instance running. This makes the process straightforward and more efficient. Unlike other architectures, multi-tenancy means all businesses are given the most current version of the software.
- **Scalability:** Since the service delivered is standard across the board, scaling it is easier and faster. There's no need for the vendor to deploy services following a business' hyper-customized setup.
- **Efficiency:** With a reliable vendor, users can maximize the performance of all the features available as their provider is expected to deliver optimum speed and reliability at all times. In addition, should problems or troubleshooting issues arise, vendors are fully equipped to solve these issues expediently instead of businesses having to worry about addressing this themselves.



	SINGLE-TENANT ARCHITECTURE	SHARED ARCHITECTURE	TRUE CLOUD MULTI-TENANT ARCHITECTURE
INFRASTRUCTURE	Private	Separated physically but connected logically	Shared with common features
CUSTOMIZABILITY	High	High	Low
SCALABILITY	Complex due to hyper-customization	Complex due to hyper-customization	Simple and straightforward
COST	High due to hyper-customization	High due to hyper-customization	Low due to shared instances, with standard features for all users

MAXIMIZING TRUE CLOUD DATA CENTER DISTRIBUTION FOR COMMUNICATION RELIABILITY

Hinging off the previous section, it should be noted that the advantages of a true cloud, multi-tenant solution is maximized if the following key characteristics are inherently included in its deployment:

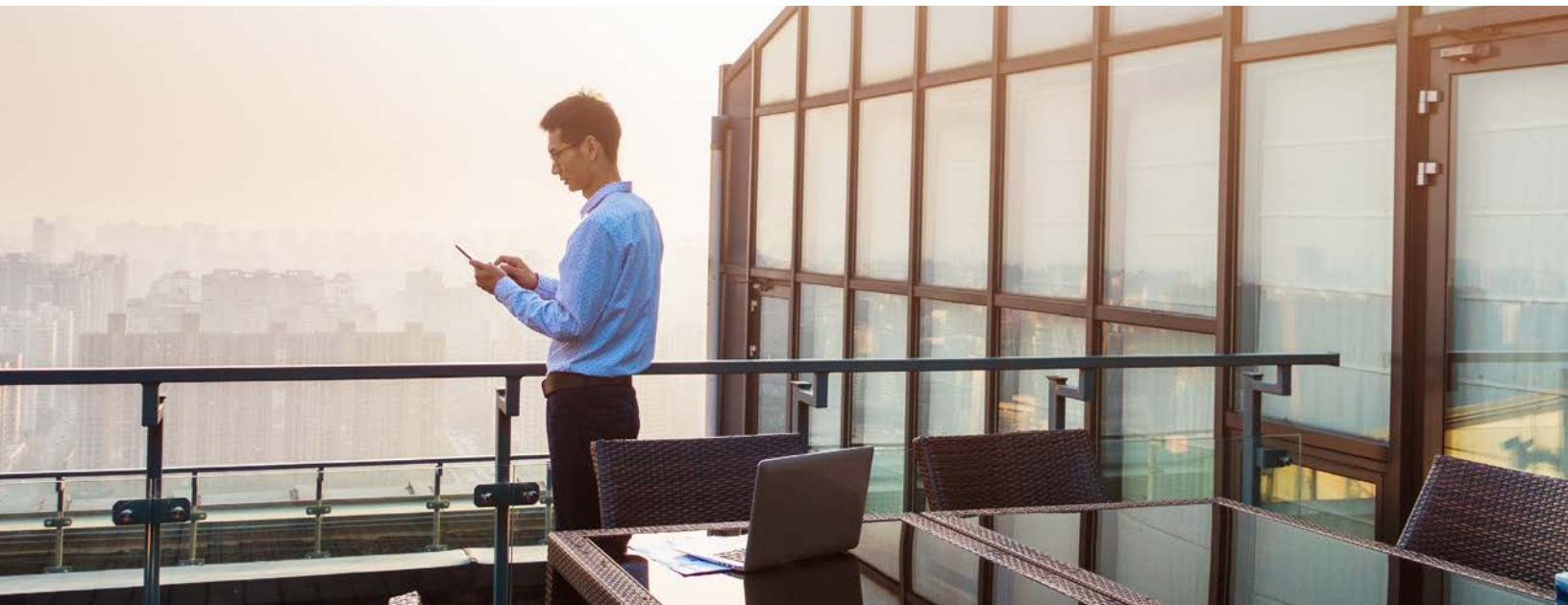
- Geographic Proximity
- Microservices
- Global States
- WebRTC

GEOGRAPHIC PROXIMITY

Typical, A/B setups usually deploy data centers on either side of a country. In the United States, for example, it can be as far as the East and West coast. This is mainly to ensure that at least one data center can run in the event of an outage. However, in such cases, all communications would still be routed to the primary data center before reaching its destination.

To address this, A/B solutions may use points of presence (PoPs) placed close to a customer to mitigate the risk of low QoS. However, PoPs simply relay the information back to the central data center with marginal improvements on data transfer speeds. Compared to a full-fledged data center, PoPs are a poor substitute.

True cloud communication solutions with multiple redundant data centers have the benefit of proximity to leverage on. Placing data centers close to customers helps increase quality by reducing latency and jitter that's typically associated with data traveling long distances.



MICROSERVICES

The benefits of placing communications services close to the customer is further improved with microservices – the process of breaking up services and decoupling it from the rest of the program. In the context of communications, here are some key examples:

- Call registration
- Selective forwarding
- Encryption
- Stream recording
- Call control
- Presence monitoring

The use of microservices combined with the benefits of geographic proximity means a cloud communication solution becomes more scalable, reliable, and extensive. These benefits are further explored in the three points below:

Microservices are more reliable and scalable: According to research[8], "Microservice architectures can be an enabler for scalable, agile, and reliable software systems."

The idea is to split your application into a set of smaller but interconnected services that make adoption easier, faster to develop, and easier to maintain. For example, with microservices placed in data centers near the customer, specific functions can be processed quickly and allow for real-time load balancing. This helps minimize issues with latency and jitter.

In addition, since microservices are decoupled from the core of the system, an issue resulting from a specific microservice will not bring the entire system down.

Microservices need to be able to talk to other microservices and the rest of the solution at large. By their nature, they must be able to integrate with other system components. This makes it very easy to build integrations with other microservices.

GLOBAL STATES

In a true distributed, cloud architecture, various application states must be easily accessible across all network nodes in real-time. This is similar to core Internet routing algorithms like BGP (Border Gateway Protocol). In communication sense, these states determine which phones to ring with any given call and are constantly in flux. For scalable communications, the solution needs to know the current state of a user and make a suitable decision.

These various user states include:

- Online vs Offline
- On Call vs Off Call
- DND
- Custom States ("AFK", "At Lunch")

WebRTC

By definition, SIP (Session Initiation Protocol) is a protocol used to signal to a recipient that a caller wants to speak to them. SIP relies on an intermediary device to make the call whether a SIP-enabled desk phone or a local application that is downloaded onto a computer/device. The limitation of SIP is that the user is tied to the intermediary device. That means a user can't just log into a browser and start communicating. This is why vendors must use WebRTC rather than just SIP to be a true cloud communications solution.

With WebRTC, users no longer need to download anything or have a desk phone next to them. The technology enables the easy transmission of data over the Internet using a web browser. All users have to do is open their browser, access the application in the browser, and start making/receiving calls. No need to download or install software and no phones required.

The combination of all these characteristics ensures easy implementation and deployment of a true cloud solution that businesses need today. With the right technology backing your communication solution, businesses gain:

- **Easy mobility for employees:** The platform provides an easy and reliable way for geographically separated employees to stay connected and enjoy real-time coordination for maximum productivity.
- **Better collaboration between teams:** Backed by a true cloud solution, powerful communication features can be applied and adapted to empower the modern workforce's evolving needs.
- **Support for modern workplace trends:** Between the rise of remote working[9] and increasing BYOD movement[10], companies need to focus on adopting new technologies that sustain productivity and keep up with changing workplace habits and trends.

CONCLUSION

Cloud technology has truly changed and revolutionized communication in the modern workplace. The benefits of a cloud-based communication solution highlights the limited capabilities of on-premise solutions. However, if the cloud solution does not leverage the benefits of multi-tenant architecture, businesses cannot fully maximize the real promise of the cloud.

This is why users need to select a true cloud vendor to achieve its maximum results. To that end, a true cloud solution must have all the following characteristics working together:

- A unique physical and multi-tenant architecture that requires no on-premise equipment
- A wide distribution of active/active data centers
- Microservices
- Global States
- WebRTC

Anything less would expose a business to unneeded risk, wasted money, poor scalability, reduced extensibility for the future, and the common challenges that on-premise systems suffer from.

ABOUT GOTOCONNECT

GoToConnect leads the hosted business phone industry in customer support and reliability. With over 100 all-inclusive features across voice, video, and messaging, and eleven datacenters distributed worldwide providing redundant service, GoToConnect sets the pace for the Hosted VoIP and Unified Communications industry.

Easily communicate internally and externally via your web browser, a downloadable desktop app, a desk phone or your mobile device. GoToConnect keeps everyone in your business connected – wherever they might be.

GoToConnect
Powered by Jive

Get a Quote

Talk to a specialist today

Call us at 1-800-514-1317 or visit **GoTo.com/Connect**

01.03.2020/LMI1045

REFERENCES

1. Vithayathil, J (2017). Will Cloud Computing make the Information Technology (IT) Department Obsolete? Retrieved from: https://www.researchgate.net/publication/317503796_Will_Cloud_Computing_make_the_Information_Technology_IT_Department_Obsolete, par 1, page 7
2. https://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-145.pdf
3. Wang, R. (2006) Retrieved from: Comparing The ROI Of SaaS Versus On-Premise Using Forrester's TEI™ Approach http://www.truecloud.com/c.830372/site/ForresterROI.pdf
4. Aberdeen Group (2012), Total Cost of Ownership Benchmarking Study for Unified Communications, https://lanairgroup.com/pdf/Aberdeen_TCO.pdf, page 17, table 7
5. https://www.cio.com/article/3201193/7-reasons-to-switch-to-microservices-and-5-reasons-you-might-not-succeed.html
6. https://www.huffingtonpost.com/ian-khan/the-3-hidden-but-real-dis_b_8743080.html
7. Hossain, A. (2015). Cloud Computing: A Multi-tenant Case Study. Retrieved from: https://www.researchgate.net/publication/283261993_Cloud_Computing_A_Multi-tenant_Case_Study, page 2.
8. Hasselbring, W, Steinacker G. (2017), Microservice Architectures for Scalability, Agility and Reliability in E-Commerce. Retrieved from: https://www.academia.edu/34509938/Microservice_Architectures_for_Scalability_Agility_and_Reliability_in_E-Commerce, page 1.
9. https://www.businessnewsdaily.com/8156-future-of-remote-work.html
10. https://www.insight.com/en_US/learn/content/2017/01182017-byod-statistics-provide-snapshot-of-future.html
11. https://www.forbes.com/sites/louiscolumbus/2017/04/23/2017-state-of-cloud-adoption-and-security/#1c7eff301848
12. https://www.forbes.com/sites/louiscolumbus/2017/04/23/2017-state-of-cloud-adoption-and-security/
13. https://www.dimensiondata.com/microsites/-/media/95C5923C59FD4437B870929D3396F891.ashx
14. https://www.forbes.com/sites/louiscolumbus/2018/08/30/state-of-enterprise-cloud-computing-2018/#43cdbceb265e
15. https://www.cio.com/article/3124534/cloud-washing-gives-way-to-true-cloud-services.html
16. Kurth, W. (2017). Evaluating the Operational, Performance, and Extensibility Characteristics of SOA, ESB, and Microservices Architectures. Retrieved from: https://pdfs.semanticscholar.org/951d/bb294768264411647315e3aa8c4747cd4e03.pdf page 6