

Yay 2.0: VoIP Reimagined

Business Voice Made Modern

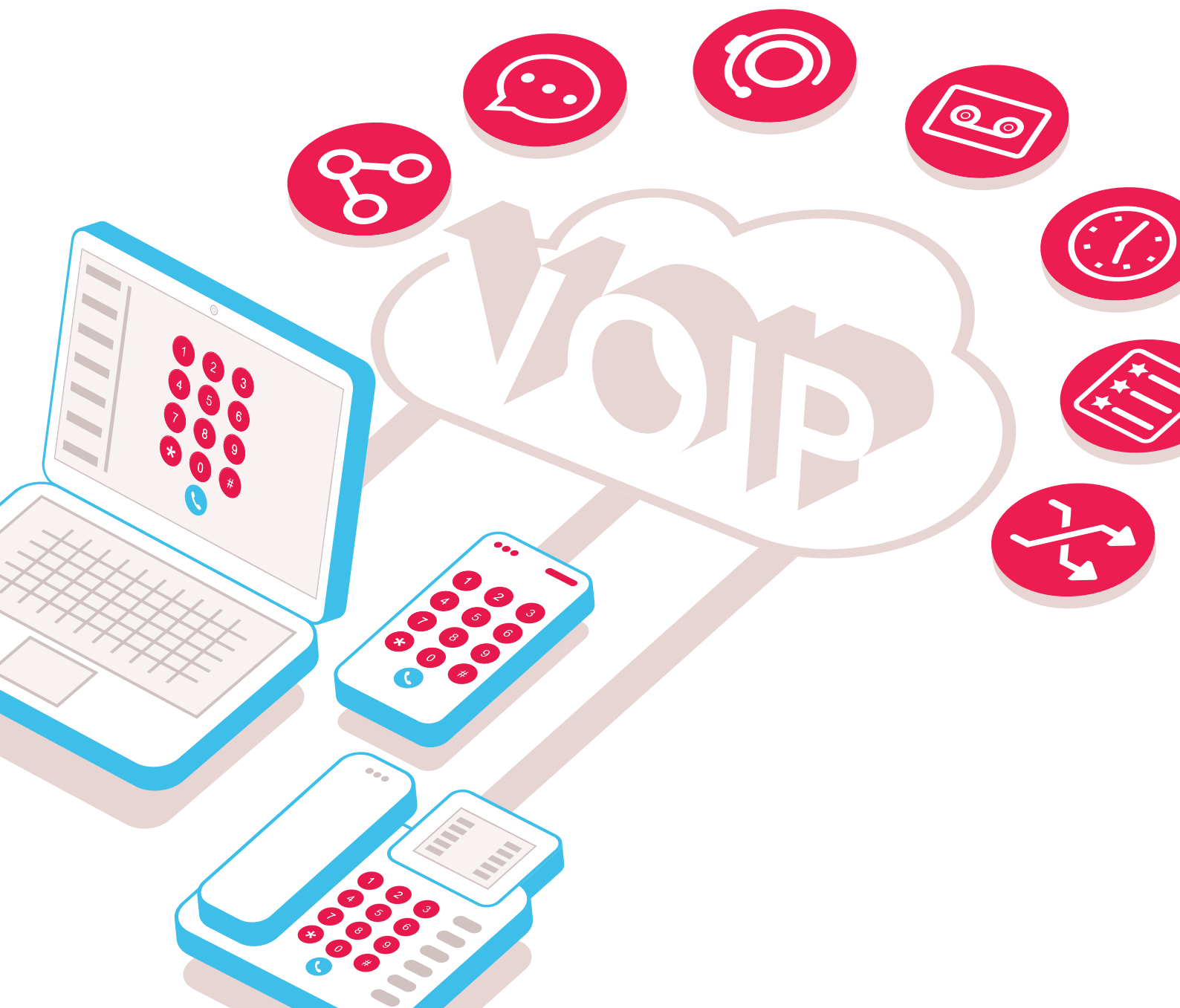


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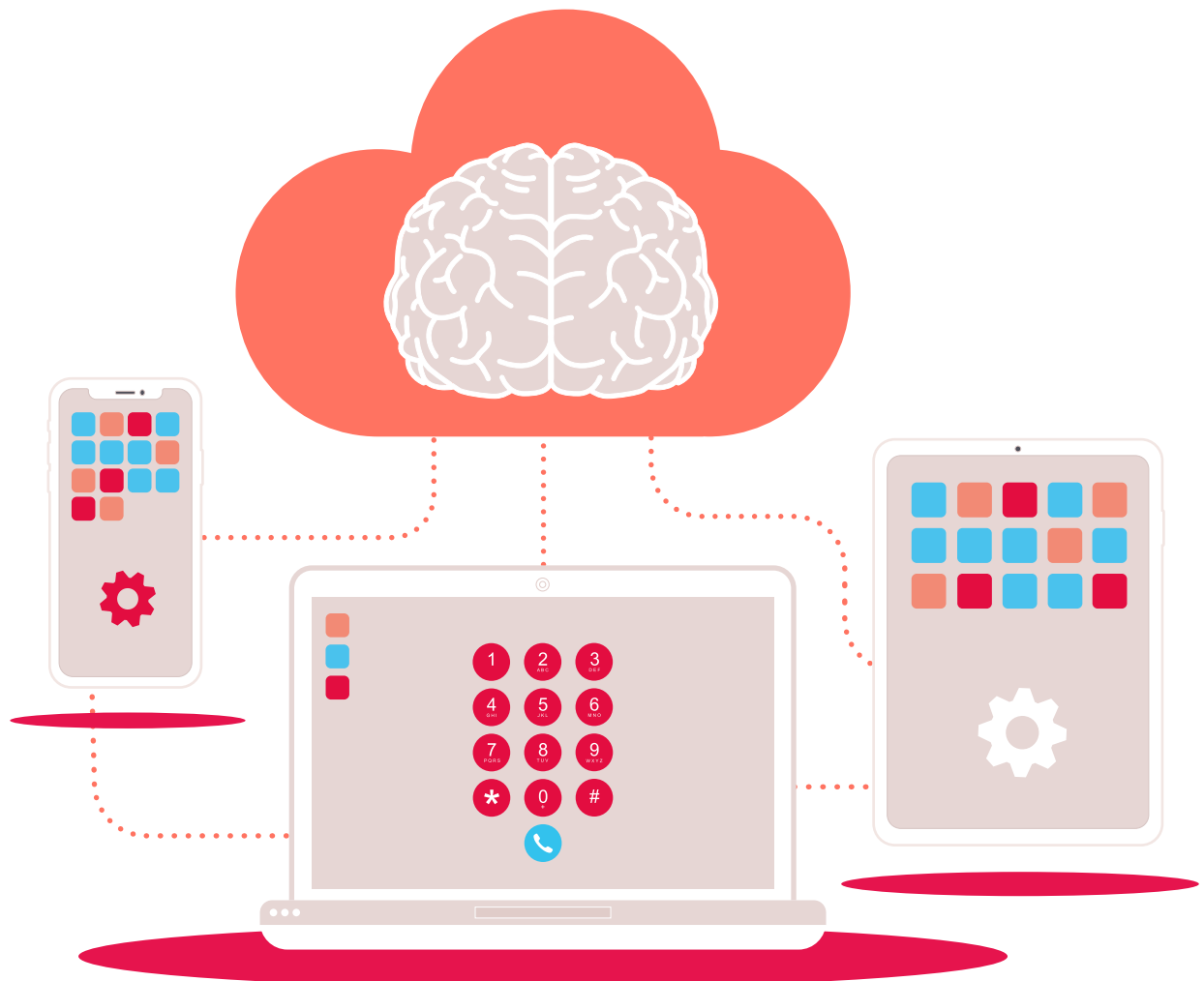
The Yay.com Ethos

At Yay.com we've long believed that innovation, driven by a close relationship with our customers, would be the driver of our success. In answer to the wash of derived solutions out there, we built our own. In direct opposition to each of the drawbacks wedged right into the foundations upon which competitor solutions are built, we aimed to build a platform from scratch that solves these challenges, offering customers a superior product.

Today, we are proud to present you with a new generation of the Yay.com platform.

In section I of this whitepaper, we will discuss the problems inherent in the four types of existing VoIP providers, the dated infrastructure on which they have been built and the business risks involved with using such solutions.

With the opposition defined, in section II we will outline the innovations our latest platform release introduces and make clear how our steps forward answer each of the problems outlined.

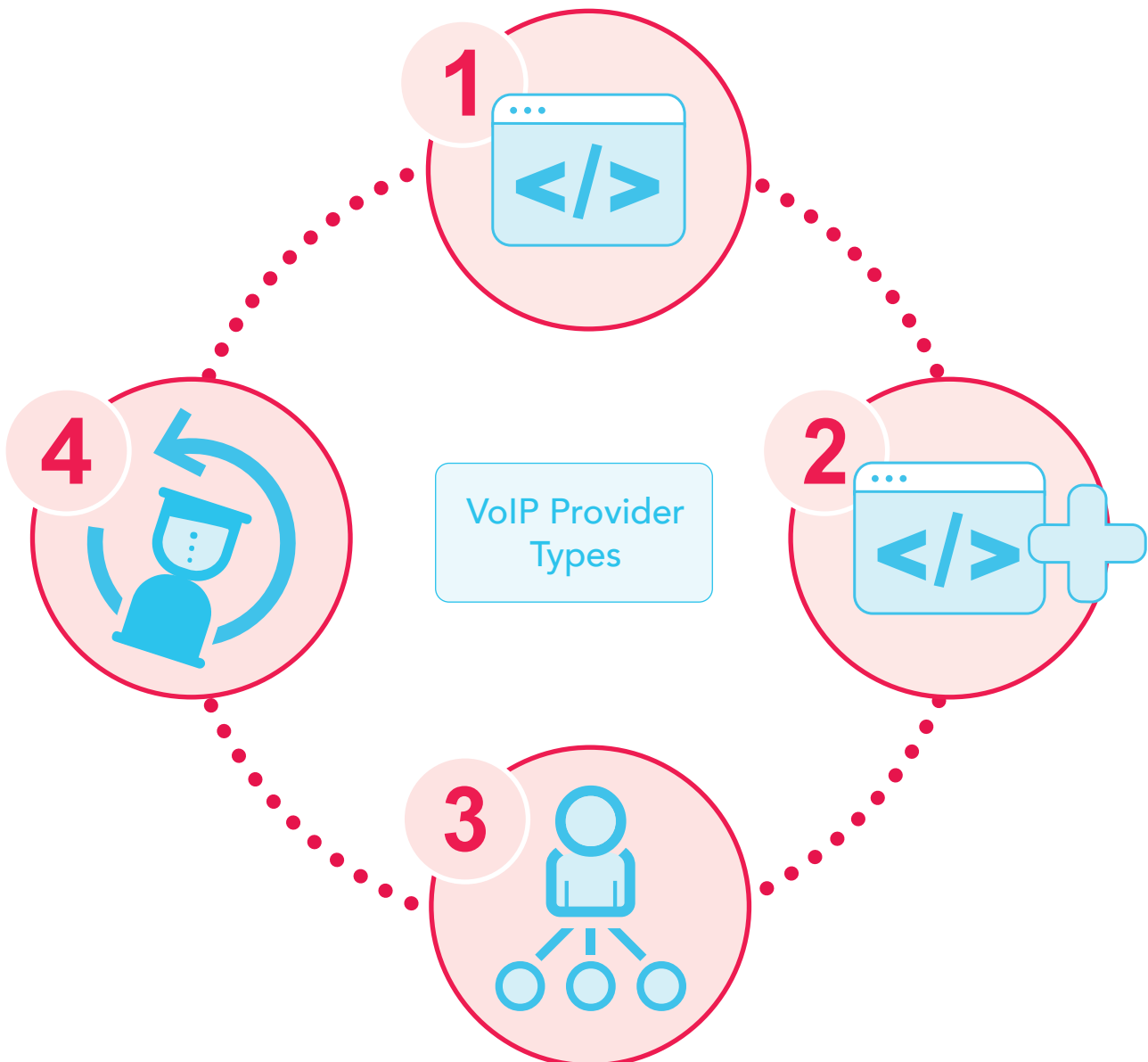


Existing VoIP 'Solutions' - and the Problems They Present for Businesses

Modern VoIP providers can be classified into one of four groups. Why so few? Because, despite the number of providers out there, most have either built their services on common architecture or are reselling solutions built by bigger providers. Combined, these practices have drastically reduced the pool of originality in the VoIP industry.

VoIP Provider Types

1. Open Source
2. Open Source Plus
3. Resellers
4. The Old Guard



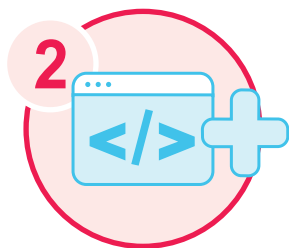


One: Open Source Solutions

The common architecture we're speaking of consists of free, open source codebases available for anyone to view, use and adapt. Most of the VoIP providers you've heard of are built on such open source software - software like Asterisk and Freeswitch.

Of course, a common architecture means that, below the hood, there's very little to differentiate the providers using these free platforms to power your calls. When it comes to the features on offer and the standard of service provided, too, these services will differ very little.

What's more, a shared codebase means that all of these platforms share the same shortcomings and limitations. Limitations inherent in even the best open source solutions hamstring providers, preventing them from offering a service with the kind of resilience a modern business needs.



Two: Open Source Plus

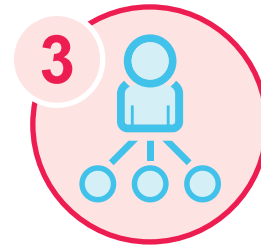
Of course, many VoIP providers are smart enough to know that, if they want an edge over their competitors, they have to differentiate their product. Those with the technical know-how will often upcycle the open source code, improving on it here and there where they're able.

“ ... common architecture means... there's very little to differentiate the providers using these free platforms ”

Whilst this sets these providers apart from others using open source solutions, maintaining their changes across multiple versions of a changing codebase (the open source code that makes up the bulk of their platform) begins to cause problems.

Added features are liable to break, requiring software engineers to rewrite the code in part or in full to get it working again. What's more, the inherent problems with the open source

solutions run deep enough that they cannot be avoided, meaning these providers are still stuck offering solutions that, at their root, suffer from foundational problems with stability and flexibility.



Three: Resellers

Of the few providers offering VoIP services not built using an open source codebase, two kinds remain. The first resells a third-party service, with consequences including limited product knowledge and poorer customer support. These are the household names in telecoms, who have rushed to find a viable 21st-century solution for businesses and have, in favour of innovating, struck deals with the market leaders.



Four: The Old Guard

Finally, we have those market leaders themselves. The few that have put in the work to differentiate themselves have risen to the top of the pile, but bring their own set of challenges to businesses.

Having grown so large, these providers have lost the agility needed to innovate at speed. Slowing in their ability to innovate and respond, these providers fail to provide a satisfactory experience for businesses, despite their large online presence and the strength of their name.

“ This internal bloat results in a poorer-than-necessary user experience, little ongoing innovation and steep learning curves for phone system administrators, as well as less-than-stellar customer support. ”

No matter which category your VoIP provider falls under, those looking for a phone system provider that listens, innovates at speed and provides a stable, viable solution have thus far been forced to compromise.

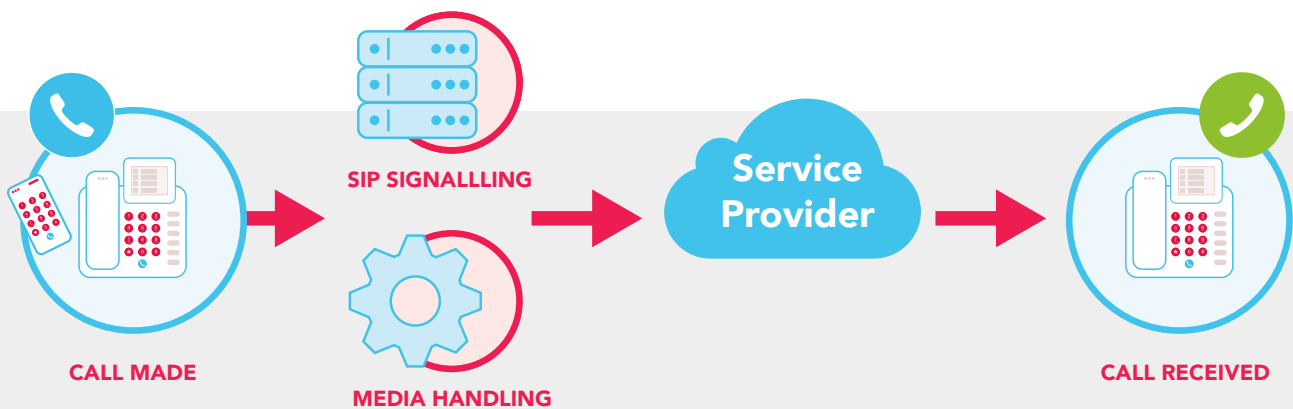
Shared Architecture, Shared Limitations: Anatomy of an Outdated Framework

Platforms Historically Comprised of Two Components

Until now, the industry standard for VoIP implementation has required two systems or components; one system for initiation and termination of the call and a second for the handling of voice data packets while the call is ongoing.

These are, respectively, the SIP Signalling and Call Handling components. SIP stands for 'session initiation protocol' and governs the initiation and termination of each 'session', or call.

Open source SIP Signalling systems include OpenSIPS and Kamailio. Open source Call Handling solutions include Asterisk and FreeSWITCH. Even if you are unfamiliar with these names, they have facilitated the existence of many VoIP providers.



SIP Signalling and Call Handling Components

Limitations with Open Source SIP Proxy Solutions

Open source SIP Signalling solutions are not fault-tolerant enough.

When a call is initiated, that call relies on a server to be established. With almost any open source SIP Signalling component, even the best and most trusted, once that server establishes a call, that call is bound to that server. If the server goes down during the call, the user will not be able to end the call.

Second, since the provider doesn't own the code, any bugs or issues in a new version of the codebase are far more difficult to find, diagnose and fix. Any fixes already worked on can be undone with a new release and need to be reimplemented or even re-solved.

As an unfortunate side-effect of this frustrating cycle of fixing issues only to see them reintroduced with the next release, providers are de-incentivized and dissuaded from innovating.

Finally, reliance on the SIP protocol is a shortcoming in itself.

SIP isn't designed for large cloud environments. If something goes wrong, SIP 'messages' will begin to queue up, creating a backlog. 90% of any recovery challenge lies in clearing that backlog, which is often harder and more time consuming than fixing the original issue.

Altogether, as we found out ourselves, these shortcomings make it very difficult to scale with these open source signalling systems.

In summary, some of the consequences of issues with open source SIP Signalling components are:

- The inability to begin or end a call.
- A provider that is less able to scale and innovate.
- Issues with phone registrations.
- A high post-dial delay.

Limitations with Open Source Call Handling Solutions

Whilst the SIP Signalling component of a VoIP platform is not closely related to the features of the VoIP platform and, instead, has more to do with a platform's stability, the Call Handling, or "media", component has a lot to do with which features can be added and when.

If a provider has not written and does not own the Call Handling component of their platform, they will be restricted in terms of the features and functionality they can add to differentiate themselves from competitors. For the user, this means a wash of homogeneous services.

Plus, just as with the SIP Signalling component, new versions of the Call Handling component's open source code will contain bugs. This limits how much these providers can scale their service since it is time-consuming and expensive for a development team to find and fix bugs in code they haven't written.

In summary, some of the consequences of issues with open source Call Handling components are:

- A provider that is further dissuaded from innovating.
- A disconnect between the desires of the customer and the features offered by the provider.



The Business Risks of Using Flawed Solutions

Poor Return on Investment

By putting its faith in a phone system built on unstable foundations, a business runs numerous risks.

An outage on the provider's side means your phone lines going down and, as a result, lost customers and business opportunities. Accepting outages as even an uncommon occurrence impacts your business' profitability.

In short, a poor phone system will cost your business money, rather than saving or making it through a better caller experience and easier internal collaboration.

Accepting a Poorer Choice than Necessary

Businesses that choose VoIP providers whose solution is built on an open source codebase are settling for a provider that can offer them fewer features and features less relevant to the business.

“ “ **By putting its faith in a phone system built on unstable foundations, a business runs numerous risks.** ” ”

This is because, as discussed, one of the limitations a VoIP provider faces by not owning all of its call handling code is that it is restricted in its output of new features. Plus, new releases of the open source code can break any changes made by the provider, de-incentivising innovation.

As such, a provider offering a service built on open source components will be less innovative and will offer a less flexible phone system for its customers.

The Satisfaction of Your Customers and Staff

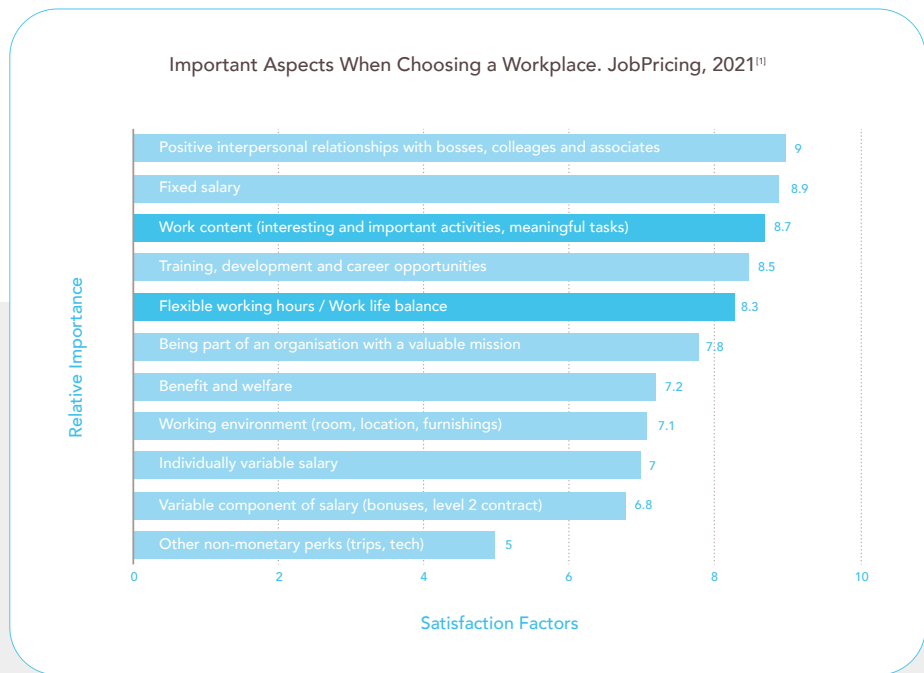
Staff and customer satisfaction are both integral to the success of any business.

When your customers are happy they bolster your business' reputation through word of mouth and, when your staff are happy, they work harder to achieve for your business.

When it comes to the needs of a modern staff, COVID-19 accelerated an ongoing shift in the way people want to work. In their Salary Satisfaction Report 2021^[1], JobPricing ranked 11 factors relating to job satisfaction according to the feedback of surveyed workers. They found that flexible working hours and work-life balance came in less than half a point behind the actual content of the job itself.

Both work-life balance and flexible working hours necessitate solutions that enable your staff to work from anywhere and at any time. A robust VoIP platform is one such solution.

A VoIP platform built on open source code has limitations already discussed



pertaining to fault tolerance and these factors are magnified when workers try to make calls while on the move.

Without a stable, resilient and feature-rich phone system, the satisfaction of both your customers and staff is at stake, threatening business success.

Modern Crime Happens Online

84% of people surveyed in the UK in 2019^[2] agreed that the risk of becoming a victim of cybercrime was increasing. With DDOS attacks on UK VoIP Providers making industry news in 2021^[3], leaving customers with inoperable phone systems for more than a week in some cases, it has never been more important to avoid a phone system built on an unreliable foundation, which is no vote of confidence in favour of providers built on open source frameworks.



Section II

In Search of a Better Solution

In the previous section we revealed the problems with most existing VoIP solutions to be:

- Poor resilience in the face of internal failures or cyber-attacks.
- Failure to provide a satisfactory experience for the modern customer and staff.
- Dissuades provider innovation, causing homogeneity between services and a departure from the needs of the customer(s).
- A poor return on investment.

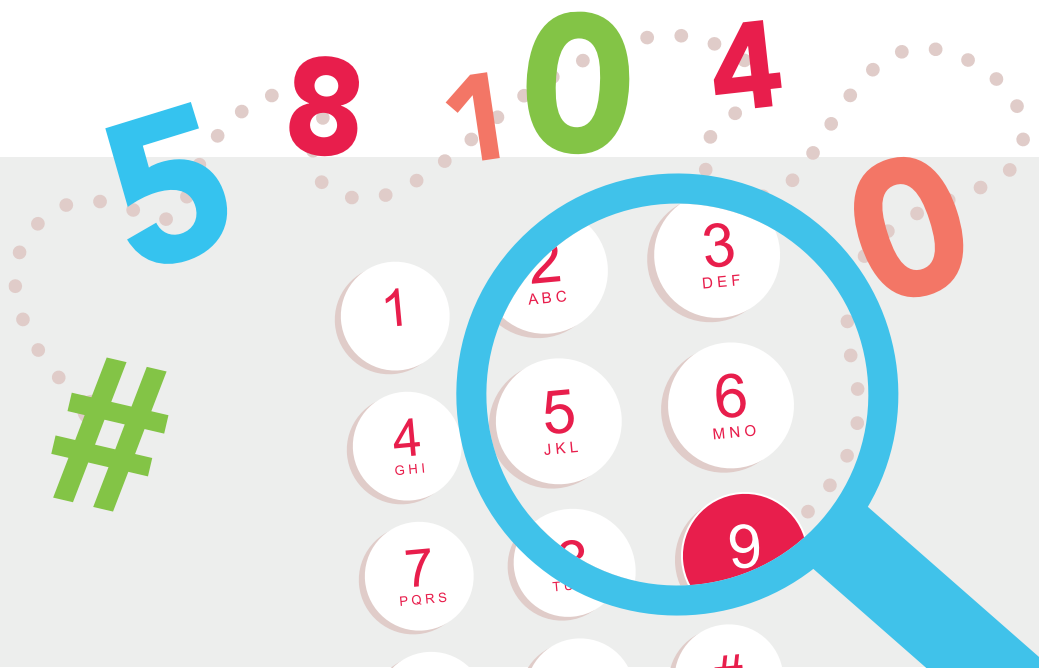
These issues are a result of either (i) the decision to build a VoIP platform on an open source code base that limits ingenuity, or (ii) the reselling of an established but stagnant service, unable to provide the level of service businesses deserve.

“**... Code should be written with security and resilience at the forefront, whilst paving the way for innovation...**”

If businesses are to distance themselves from these problems, they need to choose a stable, resilient service that's cost-effective and feature-rich without a steep learning curve.

This means a solution built on proprietary code that goes steps further than the open source equivalents. This code should be written with security and resilience at the forefront, whilst paving the way for innovation and the introduction of new features that put the users first.

All of this should be wrapped up in a commercial product that is cost-effective and competitive, supported by a team boasting expert product knowledge with a proven track record for customer satisfaction.



Introducing Yay.com's 4th Generation Platform

The newest generation of the Yay.com Voice platform constitutes a complete reimagining of our core architecture, making for efficient data transport, memory handling and resilience, with an emphasis on true distribution.

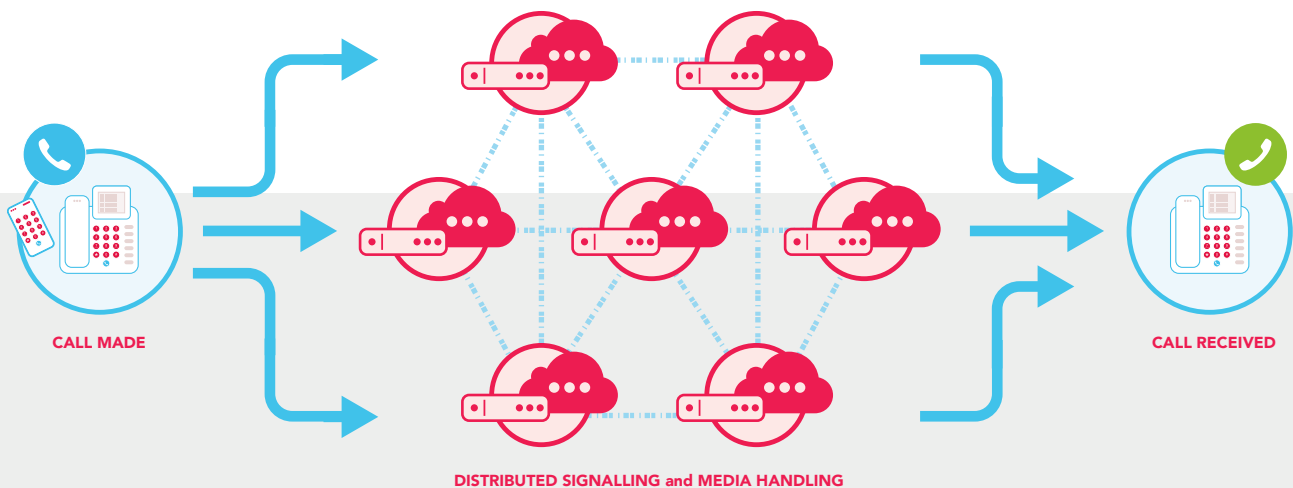
Here's how our latest platform keeps your communications rock solid.

Reinforcing Resilience Through True Distribution

Our platform has been built from the ground up since its first iteration to reimagine communications stability. Now, we've gone a step further. We've removed the internal SIP component relied on by traditional platforms from our own, freeing our customers from all of its limitations in a single stroke.

This means no backlog of SIP 'messages' in the event of any failure. In turn, this means we can isolate and fix any root cause in record time.

Plus, since our platform is now distributed down to the level of the individual data packets themselves, callers using our service will experience ongoing, uninterrupted calls even in the rare event of multi-server failure.



A distributed platform ensures uninterrupted communication

This is in stark contrast to what is possible with most voice platforms, which lock an established call to a single server, meaning the call terminates even if only that server fails.

Improving the User Experience and Customer Care

Providing the best customer care in the industry has always been at the heart of what we do and we're proud of being rated 5 stars by almost 2000 customers across a number of review platforms.

Our latest platform makes it even easier for us to offer our customers the best user experience and customer care in telecommunications.

Firstly, since our platform was built in-house, there is no part of our code that we do not understand. Compared to the level of product knowledge on offer from

companies reselling the services of other providers, the members of our team are light years ahead. They receive the very best training, working hand-in-hand with the very engineers that monitor, maintain and develop our platform.

This gives us unprecedented access to, and control over, our platform's inner workings, meaning we can give you the answers and the detail you need for unwavering confidence in your business phone system.

Championing Innovation

Unwilling to settle for established solutions or paradigms, our software engineers did more than rebuild a platform; they redefined best practices for voice platforms. We saw a better way, so we built it.

“**... secure, blazingly fast and ideal for high volume concurrency**”

For years, our VoIP apps have employed the Opus codec and WebRTC for the highest quality and most stable calls possible while on the move, something entirely impossible with SIP-based softphone apps. Even in 2022, very few other VoIP providers have caught up with implementations like these that our customers have been benefitting from for years.

Now, our latest platform architecture is designed to be fast, stable and efficient, empowering us to innovate where others can't. This penetrates right down to the language our code base is written in: Rust. Chosen for being secure, blazingly fast and ideal for high volume concurrency, Rust is the language of choice for services including Firefox, Cloudflare and Dropbox.

Smart and Scalable

In addition to the code base itself being built from the ground up with speed, memory management and resilience in mind, our database architecture is super smart too.

A MySQL cluster acts as the main workhorse, but we sit a KeyDB cluster on top of that for fast memory access to key data, using CockroachDB for fast access to voluminous data like your call history logs.



These systems work in harmony to manage and fetch huge amounts of data at lightning speeds, always with a view to offering our customers the very best service.

What's more, our platform scales with the needs of Yay.com and its customers by leveraging cutting edge, cloud-hosted technology. We bring servers online or offline as needed to maximise platform performance and efficiency in dynamic response to user demand. As a result, we can scale like no one else, capable of adding hundreds of thousands of users in as many fractions of a second.

Providing Excellent Return on Investment and Peace of Mind

Most cloud phone system providers charge too much and offer too little.

Your phone system does more than just facilitate calls between colleagues and clients; your phone system is the lifeline between you and your customers and the backbone of your acquisition efforts.

Moreover, the platform your phone system is built on houses data - data for you to leverage to your advantage, or bad actors to leverage to theirs.

Our latest platform is more resilient than ever before, distributing and managing data streams dynamically, via our integrated call handling and initiation systems, in a way that redefines industry standards.

It's innovative, offering server tunnelling to power best-in-class audio quality even on calls across continents, as cutting-edge memory management allocates resources for powerful performance.

But most of all, ours is a platform that's feature-rich, scalable and supported - supported by a team of people working their hardest to make sure you feel informed, in control and welcome on our platform.

For these reasons, Yay.com represents the most cost-effective enterprise phone system on the market today. Email us at enquiries@yay.com or call us on 0330 100 6000 for more information.



References

[1] JobPricing, "Most important aspects considered by Italians when choosing a workplace in 2021", *Salary Satisfaction Report, (2021): 23*, <https://www.jobpricing.it/blog/project/salary-satisfaction/>.

[2] European Commission, "Europeans' Attitudes Towards Cyber Security (Cybercrime)", *Europa.eu, 2020*, <https://europa.eu/eurobarometer/surveys/detail/2249>.

[3] Jackson, Mark, "VoIP Provider Voipfone UK Knocked Out by DDoS Attack AGAIN UPDATE", *ispreview.co.uk, 26th October 2021*, <https://www.ispreview.co.uk/index.php/2021/10/voip-provider-voipfone-uk-knocked-out-by-ddos-attack-again.html>.

About Yay.com

Managing 18 million calls a month and growing, Yay.com is a leading unified communications provider using data to provide fast HD quality voice, video and chat communications to wherever you are in the world. A powerful and intuitive dashboard gives real-time control to the customer and, with over 1 million phone numbers available for major cities worldwide, you can have a 'local' business presence anywhere in the world - today. Renowned for its excellent customer service, ever-expanding feature set and fast, reliable platform, Yay.com is the go-to choice in modern business communications for enterprises of all sizes.



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