Cloud Print Services, 2021

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Executive summary

The ability of cloud-based services to deliver flexibility, on-demand scalability and reliability while controlling direct costs and administrative overheads has come into its own during the COVID-19 pandemic. IT teams have scrambled to support the shift to remote-working as businesses have battled to maintain employee productivity; cloud-based software and services have often played a central role in the tactical response to the crisis.

Now, as the long-term effects of the pandemic become evident, businesses are taking a more strategic view of the future workplace and the technology and services that will be required to support a hybrid workforce working across the office and from home. MPS providers must position themselves to support the accelerating digitisation journey and demonstrate how moving print infrastructure to the cloud delivers the visibility, security, functionality and cost control needed by highly distributed organisations.

This report highlights key market trends for cloud print services, covering offerings from both manufacturers and independent software vendors (ISVs). It draws on primary research conducted in January 2021 amongst 219 organisations using managed print services (MPS) across the US, the UK, France and Germany.

Key findings include:

- **The traditional on-premises print infrastructure is complex and characterised by cost inefficiencies.** Reliant on local print servers, conventional print management lacks flexibility and scalability. It is a complex environment encompassing driver installation, device configuration and compliance, device monitoring, reporting and management, server and queue management, firmware updates, and app deployment. Cloud-based print management overcomes these challenges by shifting print management to the cloud, typically without the need for local print servers.
- **Cloud adoption continues to accelerate.** Eight out of ten organisations now expect more than half of their IT infrastructure to be cloud based by the end of 2021. 43% expect *all* their IT infrastructure to be cloud based. In terms of the print infrastructure, 77% of organisations are already using a cloud service to manage at least some print jobs. 39% have already implemented some form of cloud print management platform.
- **Hybrid cloud provides the foundation for edge computing.** Many organisations are currently operating a hybrid cloud model as they juggle on-premise and cloud infrastructure. A drive to better control costs and avoid vendor lock-in may see organisations pursuing a multi-cloud strategy; selecting and connecting cloud services based on their performance, security and governance requirements. This approach also supports growing demand for edge computing, driven by the proliferation of internet-connected devices, including printers.
- **Zero trust security is an imperative in enabling the remote workforce**. Corporate network perimeters are disappearing due to the acceleration of cloud along with the rise in the number of remote workers accessing corporate resources via home and public networks. This potentially introduces threats from malware, ransomware, phishing attacks and more. A zero trust model is based on the philosophy that there is no implicit trust in the corporate network. The starting point is identity access management, and robust cloud print management should offer tightly integrated multi-factor authentication (MFA) to enable identity-based print security.
- **As cloud momentum grows, industry players are expanding their cloud print service and solutions offerings.** The transition to the cloud is a significant opportunity for vendors to initiate relationships that, once established, have potential to endure. Recognising this, print manufacturers and ISVs are bringing cloud-based options to the market to cater for the different public, private and hybrid cloud approaches being pursued by customers. In an environment where many businesses are shifting to a cloud-first approach and new businesses are born in the cloud, establishing and developing cloud-based print services to meet the broad spectrum of customer demand is essential to future relevance.

- **Provision of cloud print services is a primary supplier selection factor and incumbent suppliers should not be complacent.** More than two thirds of respondents expect to adopt cloud print management by 2025 and 45% say that offering cloud print services is a key factor influencing their choice of managed print service partner. Our research suggests that customers with fully outsourced MPS have not yet made the cloud transition; they are much more likely than those using hybrid MPS to be operating on-premise print. This is an important area of both opportunity and risk for incumbent suppliers: an opportunity to help customers make the switch, while also a risk that competitors will capitalise on inertia to offer attractive cloud-based alternatives.

Conclusion

The COVID-19 pandemic has created both appetite and opportunity for cloud MPS. Businesses that are planning for a cloud-first future should extend their ambition to the print infrastructure to ensure that remote and office workers have secure, flexible access to the print functionality they need to maintain productivity.

The print industry must position itself to offer valued strategic partnerships to customers as they navigate this accelerated and distributed digitisation journey. MPS providers with a large customer base still operating on-premise must act fast to help those customers that want to transition to a cloud environment to a solution that includes provision, security, monitoring and analytics for home-office devices.

A part of this will involve educating the customer on why a cloud-based print solution is in their best interests – availability, security, functionality and controlled costs should all be part of the messaging around this. At the same time, suppliers should diversify and partner to deliver adjacent services that support remote working productivity and collaboration that will allow customers to build momentum and ultimately effect a successful transition to the new cloud-first environment.

Please note this is a report excerpt. The full report is available by contacting Quocirca at www.quocirca.com

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End-user analysis

This report draws on Quocirca's MPS 2021 Study. Quocirca conducted a survey among senior IT managers with responsibility for decisions relating to managed print services. The research was conducted in the UK, France, Germany and the US, amongst 219 enterprises with 500 or more employees that already use a managed print service. For the purposes of this research, organisations with 500 to 999 employees are referred to as midmarket organisations and those with over 1,000 employees as large organisations. The survey was conducted online and fielded during January 2021.

Vendor analysis

To participate in this study, vendors were required to submit a written response to Quocirca's request for information on cloud services and solutions. This report covers only those vendors who agreed to participate in this survey.

Definitions

Cloud computing

Public cloud computing is the on-demand delivery of IT resources over the internet, generally with pay-as-you-go pricing. Instead of buying, owning and maintaining physical datacentres and computing hardware, technology services such as computing power, storage, networks and databases can be accessed on an as-needed basis from a cloud provider. The cloud can offer faster innovation, flexible resources and economies of scale. The public cloud enables a business to trade fixed capital expenses (such as datacentres and physical servers) for variable operational expenses, and only pay for IT as it is consumed. Elasticity enables a business to flexibly increase and decrease the amount of resources that are actually needed. In most cases, these can be scaled up or down to instantly grow or shrink capacity as business needs change.

The three main types of cloud computing include Infrastructure-as-a-Service, Platform-as-a-Service and Software-as-a-Service. Each type of cloud computing provides different levels of control, flexibility and management.

- **Infrastructure-as-a-Service (IaaS).** IaaS contains the basic building blocks for cloud IT. It typically provides access to networking features, computers (virtual or dedicated hardware) and data storage space. IaaS provides the highest level of flexibility and management control over IT resources.
- **Platform-as-a-Service (PaaS).** PaaS removes the need to manage the underlying infrastructure (usually hardware and operating systems). This allows IT to focus on the deployment and management of applications. This means that a business does not need to manage resource procurement, capacity planning, software maintenance, or patching.
- **Software-as-a-Service (SaaS).** SaaS is a method for delivering software applications or services over the internet, on demand and typically on a subscription basis. SaaS cloud providers host and manage the software application and underlying infrastructure and handle any maintenance, such as software upgrades and security patching.

Cloud computing models

There are four ways to deploy cloud services:

- **Public cloud:** Public clouds are owned and operated by third-party cloud service providers that deliver their computing resources, such as servers and storage, over the internet. All hardware and other supporting infrastructure are managed by the cloud provider. Examples of public cloud providers are AWS, Microsoft Azure, Google Cloud Platform, IBM Cloud, Rackspace and VMWare Cloud. The large public clouds such as Azure and AWS offer a mix of IaaS, PaaS and SaaS, although their biggest strengths tend to lie in the PaaS space.
- **Private cloud:** A private cloud refers to cloud computing resources used exclusively by a single business or organisation. A private cloud can be physically located in the company's on-site datacentre or within a

colocation facility operated by a third-party, where the business still owns and operates the computing and storage hardware, along with some aspects of networking hardware. Some companies also pay third-party service providers to host their private cloud. A private cloud is one in which the services and infrastructure are maintained on a private network.

- **Hybrid cloud:** Hybrid clouds combine public and private clouds, bound together by technology that allows data and applications to be shared between them. This gives a business greater flexibility and more deployment options, and helps optimise the existing infrastructure, security and compliance. The most common method of hybrid deployment is between the cloud and existing on-premise infrastructure to extend and grow an organisation's infrastructure into the cloud while connecting cloud resources to internal systems.

- **Multi-cloud:** A multi-cloud environment aims to eliminate the reliance on any single cloud provider or instance. A typical multi-cloud architecture utilises two or more public clouds as well as private clouds. Companies use multi-cloud environments to distribute computing resources and minimise the risk of downtime and data loss. They can also increase the computing power and storage available to a business.
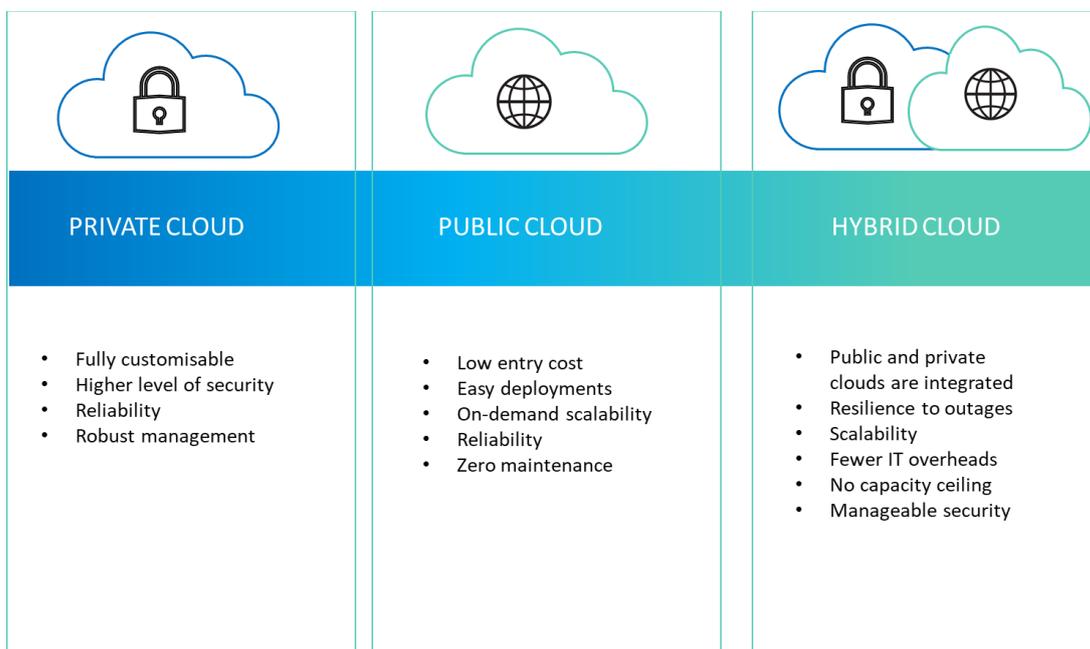
PRIVATE CLOUD	PUBLIC CLOUD	HYBRID CLOUD
• Fully customisable • Higher level of security • Reliability • Robust management	• Low entry cost • Easy deployments • On-demand scalability • Reliability • Zero maintenance	• Public and private clouds are integrated • Resilience to outages • Scalability • Fewer IT overheads • No capacity ceiling • Manageable security

Figure 1. Cloud models

Multi-tenant vs. single-tenant cloud

In a multi-tenant cloud environment, a public cloud provider runs a single instance of an application or service that is used by multiple different customers. However, it gives each customer a separate, secure space for storing data and projects. Each user can access only its own stored information, and the cloud provider's complex suite of permissions and security prevents other customers from accessing this content or the content or details of any processes that are ongoing at any one time. Since a multi-tenant cloud architecture means that the same servers are hosting multiple users, it's critical for public cloud customers to carefully understand the performance and security offerings of their cloud provider.

The alternative to multi-tenant cloud architecture is single-tenant cloud, where a server hosts only one customer, or tenant, who has sole access. In a single-tenant architecture, the customer has greater control over multiple capabilities, including data, performance, security and storage. However, resource flexibility can be hit, as the cloud instance will have been provisioned for the specific customer.

As an explanation of this, consider a single-tenant cloud. It is unlikely that the cloud owner will architect the cloud to offer the single user much in the way of resources overage – after all, this then means that space and power will have to be paid for to house resource that is not being used on a regular basis. If such an overage were allowed for, the customer would have to pay far more for the cloud usage than deemed necessary – again, because so many resources are being paid for that are hardly ever used. A trade-off is likely to be chosen: one where there is sufficient resource to meet most requirements, but one where a spike in usage is not going to be met by available resources, requiring the workload to be throttled – or resulting in the failure of the platform.

Now, consider a multi-tenanted cloud. This can be architected to provide sufficient resource headroom for multiple different workloads across multiple different customers. It is highly unlikely that each workload will have the same cyclical or occasional resource requirements. Therefore, a modest overage in resource availability is quite likely to meet the needs of all customers in the vast majority of circumstances.

Cloud print services and solutions

A cloud-based print management platform can be delivered as a part of or independently from a managed print service (MPS). It can be deployed as a private or hybrid model, where print servers are located in the cloud, completely eliminating the need for on-premise hardware (serverless printing) or hosted on-premise (private cloud). Serverless printing enables direct IP printing from workstations to network printers, which removes the complicated setup of having a dedicated print server for printing purposes.

The cloud print services and solutions ecosystem is diverse, covering vendors that deliver cloud MPS and cloud-based software and solutions. This is categorised as follows:

- **Printer/copier manufacturers –** Traditional OEMs such as Canon, HP, Kyocera, Konica Minolta, Lexmark, Ricoh, Sharp and Xerox.
- **Systems integrators/resellers –** These are a channel to market for some printer and copier vendors and may offer cloud print services and solutions as part of a wider MPS or cloud offering.
- **Independent software vendors (ISVs) –** These are companies that write and market software for facilitating tasks and processes. There is a thriving market for ISVs that focus on print management solutions, including EveryonePrint, MyQ, NT-ware, Papercut, Printix, PrinterLogic (Vasion), ThinPrint (Ezeep), Process Fusion, uniFLOW and Y Soft.
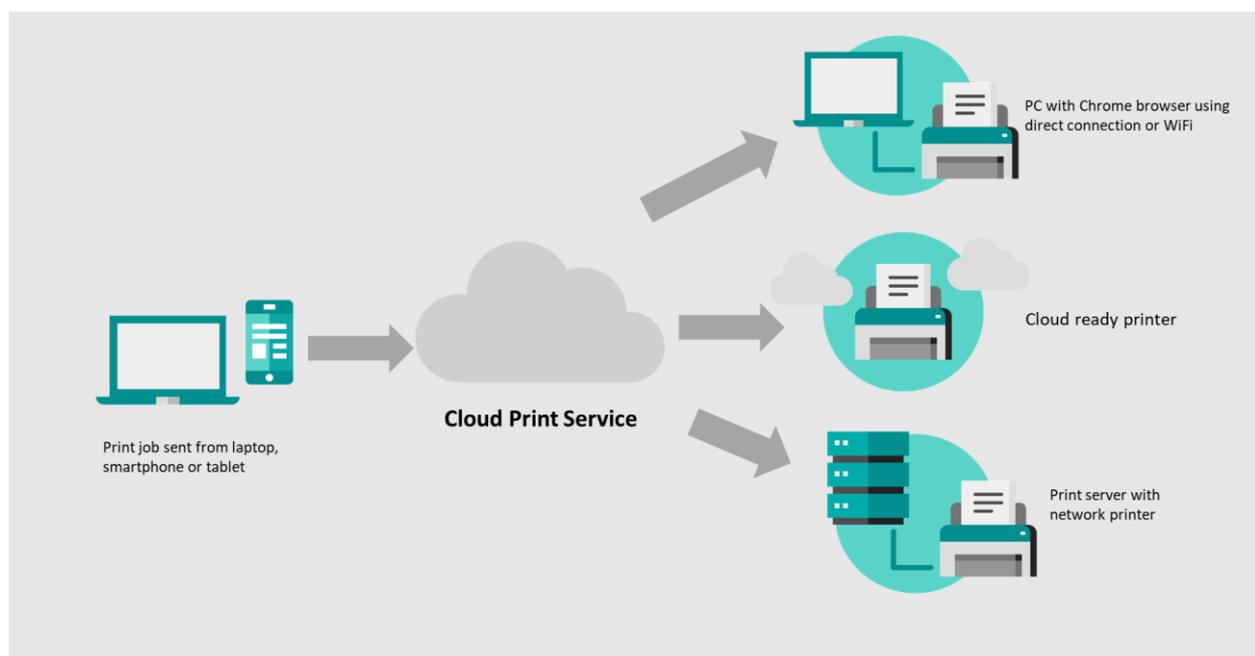

Figure 2. A cloud-based printing model

Introduction

A highly distributed, scalable and resilient cloud-based print infrastructure disrupts the traditional on-premise model. This report highlights key market trends and provides an overview of the competitive landscape which includes both manufacturers and independent software vendors (ISVs)

The pandemic has spurred cloud adoption
Even before the pandemic, the transition to cloud was underway. The pandemic accelerated the pace of digital transformation, redefining the way we work and collaborate and compressing the timeframe that organisations are migrating to the cloud. The mass exodus from the office left IT teams scrambling to keep their organisations up and running while dealing with new issues around information security and device suitability for those working from home (WFH).

Speed, agility and resiliency have never been more important, and the cloud has become the bedrock for every organisation. According to Quocirca's latest research, 82% of organisations expect more than half of their IT infrastructure to be cloud based by the end of 2021. 43% of organisations expect *all* their IT infrastructure to be cloud based by the end of 2021, rising to 52% in the US[1].

The pandemic pressed the reset button on traditional approaches that rely on legacy and on-premise infrastructure. The cloud has delivered on its promises of flexibility and on-demand scalability, enabling businesses to emerge stronger and more adaptable, and to plug gaps in their resilience measures. Those organisations that adapted best had already taken steps to modernise their IT environment and were able to rapidly scale resources to support a remote workforce.

As organisations ramp up their digitisation journeys and remote working becomes a permanent feature for many, cloud initiatives are set to accelerate in 2021. Recent Quocirca research amongst US and European businesses with over 250 employees revealed that on average 47% of employees are expected to work fully or predominantly from home when offices reopen[2]. Cloud spend will continue to increase, with 45% of organisations reporting it as a top investment priority over the coming year, rising to 50% in organisations with more than 1,000 employees.

Hybrid cloud provides the foundation for edge computing
The reality for many organisations is that they are operating a hybrid model for the cloud, as they look to maintain a mix of on-premise and cloud infrastructure. In order to increase scalability, reduce costs or avoid vendor lock-in, organisations may adopt a multi-cloud strategy – using multiple and often less connected cloud services. Cloud is not an either/or model and organisations' choice of approach has to be based on costs, performance, security, compliance, and governance requirements.

Meanwhile, edge computing - computing that is processed at or near the data source or "edge" of the network - is creating momentum for the distributed cloud. The growth of internet-connected devices (including printers) and the impact of ever faster network technology, such as 5G, is set to drive demand for edge computing solutions in 2021 and beyond.

Cloud in the zero trust security era
The rapid shift to the cloud has led to security gaps and increased vulnerabilities. As the remote work landscape proliferates to encompass more devices at the edge, network security is increasingly challenging. Remote workers are using laptops and printers with fewer controls in place connected to home networks, often with default security credentials, leaving them exposed to cyberattacks. The wider adoption of home printing is already impacting security confidence amongst IT decision makers. Quocirca's Print Security 2020 study revealed that just 21% are completely confident in the security of their print environment since the onset of the pandemic, compared to 33% pre-pandemic. Additionally, 32% indicated that employee-owned printers present a risk to their

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[1] [Quocirca MPS Landscape, 2021](#)
[2] [Quocirca Print Security Landscape, 2020](#)

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organisation. Organisations must protect cloud data from phishing attacks, malware, ransomware and a host of other vulnerabilities.

Traditional security approaches that focused on the perimeter of the network have become ineffective and must now accommodate an ever-changing, diverse set of users and devices, as well as much more prevalent threats targeting previously "trusted" parts of the network infrastructure. For larger organisations in particular, securing cloud-based remote employees will require a move to a zero trust security model resembling a SASE (Secure Access Service Edge) architecture.

Zero trust security ensures that the same controls applied to the corporate network also extend to the home or remote worker. This means organisations need visibility and security controls across the print infrastructure, to support a zero trust model. According to Quocirca's Print Security 2020 study, 34% of organisations have implemented a zero trust security architecture, with a further 37% planning to do so.

Cloud print management platforms are emerging that support zero trust principles. Ultimately, an effective cloud-based print management platform will significantly mitigate risk. A layered approach is necessary, one that encompasses multifactor authentication/identity access management, device security and remote monitoring and reporting tools that can track user behaviour, but also device anomalies such as DDoS attacks.

Ongoing shift to cloud print management
Cloud printing continues to gain momentum. The discontinuation of Google Cloud Print in January 2021, having been in beta for over 10 years, left many organisations using the Chrome operating system without an effective printing solution. Fortunately, there are many enterprise-grade third party print solutions that offer an alternative. While Google has retracted cloud printing support, Microsoft has in contrast invested heavily in this area with Universal Print. Launched in March 2021, Universal Print is a Microsoft 365 subscription-based service that runs completely on Azure. Quocirca expects Microsoft's commitment to cloud to drive further momentum in the cloud printing market.

According to Quocirca's MPS 2021 study, 39% of organisations have implemented some form of cloud print management platform, rising to 48% in organisations with more than 1,000 employees, 52% in the US and 51% in the financial services sector. To support the needs of remote workers printing to printers located in the office, 47% indicate that they have implemented remote job submission to office devices, rising to 58% in the US and 53% in the financial sector.

Overall, 67% say that they will increase their use of cloud print management by 2025, with a further 5% saying that they will move over to cloud-based printing completely. Notably, those using a hybrid MPS, rather than a fully outsourced MPS, are more likely to transition to cloud-based printing (80% and 63% respectively).

Shifting print management to the cloud

The print infrastructure is perhaps one of the last elements of IT to be moved to the cloud. However, it presents tremendous opportunities to lower the costs – both financial and environmental - and improve the efficiency of operating a traditional print infrastructure which uses on-premise print servers.

The complexity of traditional print management

Managing traditional and diverse print infrastructure is costly. Dedicated print servers can provide a range of benefits including centralised print management, automatic driver updates, high availability, control over a user's printer profile as well as integrated reporting. However, on-premise print servers are expensive to purchase and manage, and need to be continuously maintained by the IT department.

Print management tasks include the initial provisioning of the printers themselves, followed by the maintenance of print drivers and associated software. In a traditional mixed-fleet print infrastructure, there are typically multiple print queues for each brand of multi-function printer (MFP), along with multiple print drivers, requiring a patchwork of management and support. The impact of a print server going down can be disruptive and costly. However, high-availability redundancy is generally not in place.

In addition, traditional print management is not suited to working from home (WFH) models. The proliferation of home printers in response to broader remote working is creating the need for solutions that enable the remote submission of print jobs to office printers, as well as more comprehensive analytics on printing across the home and office environment. Alongside this are the security implications, particularly in organisations that are operating a broad and diverse range of printer devices across the hybrid work environment.

The hidden costs of print servers

Recent Quocirca research found that on average it costs £1,900 per server to provision, with annual running costs of £1,500.

This means that that each organisation has a capital outlay of close to £6,000 to provision its print servers, followed by £4,500 per annum in operating costs just to run print jobs on site.

These costs mount up for larger organisations operating thousands of printers.

Addressing print infrastructure complexity with cloud print management

A cloud-based print infrastructure is one where networked printers and MFPs are retained at the customer site, but print servers are hosted in the cloud and managed by a third-party provider. This consolidates print management tools into one platform, enabling configuration, users, printers and policies to be managed remotely. This eliminates the need for internal IT maintenance and individual driver installation. Cloud print management tools offer secure printing, remote job submission and mobile printing.

For instance, a global print queue can avoid the need for multiple print drivers and queue management. In addition, cloud-based print management can offer stronger access controls, security and compliance; with firmware updates, fleet management and reporting all handled by the provider.

Cloud print management can operate within a private hosted or hybrid model. Print jobs may be sent to the cloud, or retained locally. In smaller organisations that have very few workstations or printers, a serverless model may be a better approach. It can also appeal to enterprises that are consolidating servers, looking to reduce print costs and lower the IT administrative burden. For organisations with tighter security regulations that are not looking to completely eliminate their print servers, a hybrid solution deployed under a single management platform allows ease of use for administrators while still allowing for consolidation and cost savings.

Microsoft Universal Print – providing cloud printing to Microsoft 365 and Azure users

Universal Print is a cloud-based print solution that eliminates the need to maintain on-premise print servers, Active Directory or install printer drivers. Universal Print is a multi-tenant print solution hosted on the Microsoft Azure cloud platform. It is targeted at customers that are Microsoft 365 productivity suite users. It uses Azure Active Directory (AD) as its means of identifying and controlling printers – Azure AD is unable to discover printers connected via local print servers operating under Windows Server and local AD. Universal Print has been validated to work within the same Azure AD tenant.

Currently, print jobs are spooled and routed via Azure. Universal Print stores all print queues in Office data storage. This is the same secure cloud-based storage environment that stores customer's Microsoft 365 and OneDrive files.

Universal Print requires organisations to commit to Microsoft's 365 cloud platform (formerly Office 365), replacing the Windows Server print server functionality. They also have to be Windows 10 Enterprise or Education customers. (By the time this is published, it could be a few versions on – and so older versions may be working with UP)

For the best experience, a Universal Print-ready/compatible printer has Universal Print compatible firmware. Printer manufacturers are releasing new printers that are Universal Print-ready. These are listed on Microsoft's Universal Print web page. A Universal Print Connector is also available for printers that do not have updated firmware to provide a degree of Universal Print compatibility.

Universal Print does not currently support pull printing capabilities. Quocirca expects the functionality of Universal Print to improve rapidly.

Cloud printing market trends

Quocirca's MPS 2021 study revealed that over three quarters (77%) of organisations are already using some form of cloud service to manage at least some of their print jobs (Figure 3), with 21% using cloud services to manage over 50% of the workload.
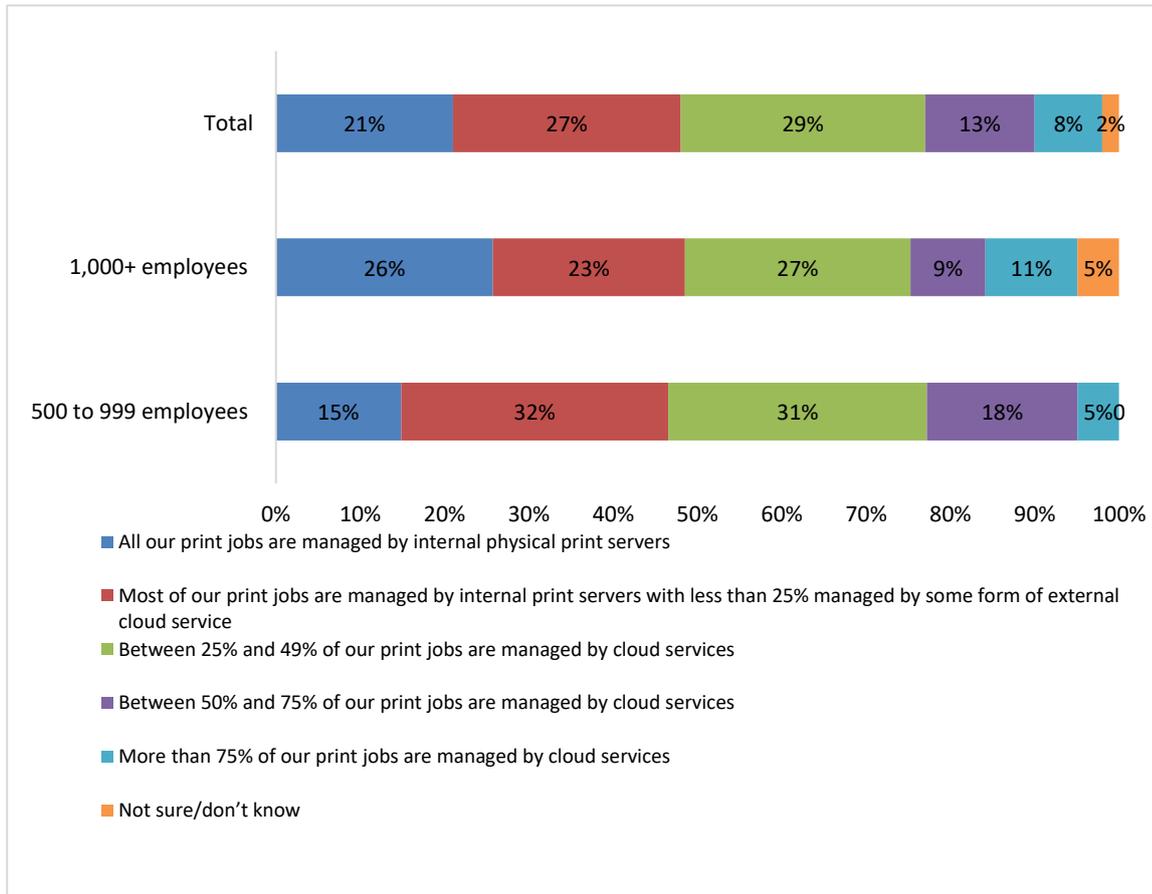

Figure 3. What is your current approach to managing print jobs across your organisation?

Notably, organisations using a fully outsourced MPS are more likely to be operating an on-premise print infrastructure – 41% report that all their print jobs are managed by on-premise print servers compared to just 8% of those using a hybrid approach to MPS.

Increasing cloud printing adoption

Overall, 39% report that they have implemented a cloud print management platform, with a further 37% planning to do so in the next 12 months. The percentage that has already deployed cloud print management rises to 52% amongst US organisations, while German organisations are least likely to have implemented a cloud printing platform. Larger organisations are most likely to have implemented cloud print management (48%) compared to 31% of smaller organisations. The financial sector is ahead in adoption, with 51% compared to 29% in the retail sector.
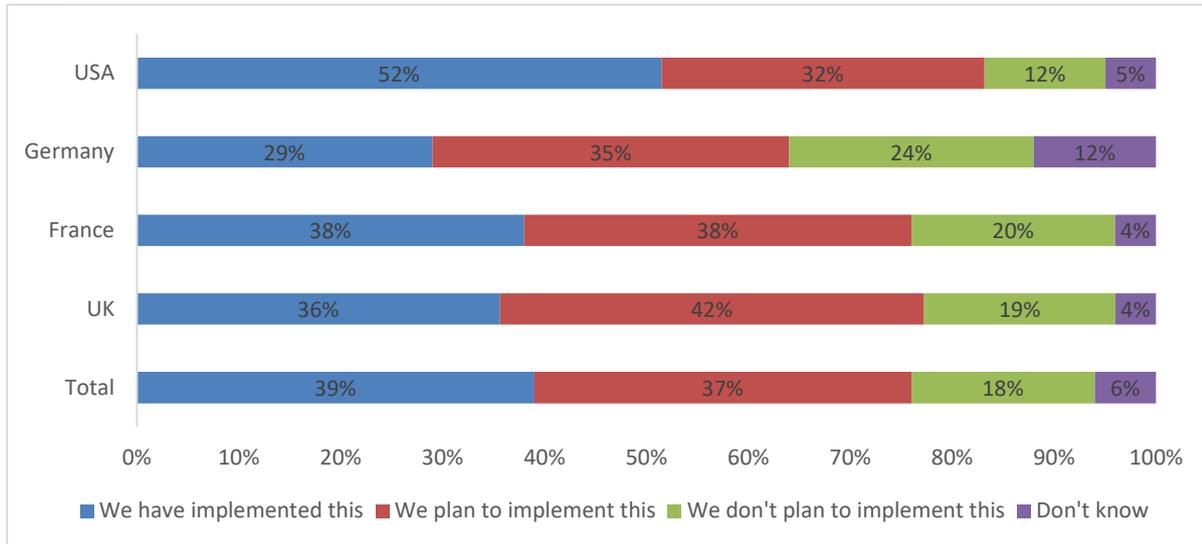

Figure 4. Has your organisation implemented a cloud print management platform? (e.g. serverless printing where print servers are hosted in the cloud)

Overall, 67% of organisations expect to increase their use of cloud print management, with a further 5% planning to move completely to cloud printing. This rises to 78% in the UK and 77% in the US. By vertical, professional services are most positive about an increase, with 83% reporting that their use of cloud print management will increase, compared to 68% in the industrial sector. Organisations using a hybrid model for MPS are more likely to expect to move to a cloud-based print service – 80% compared to 63% of those using a fully outsourced service.
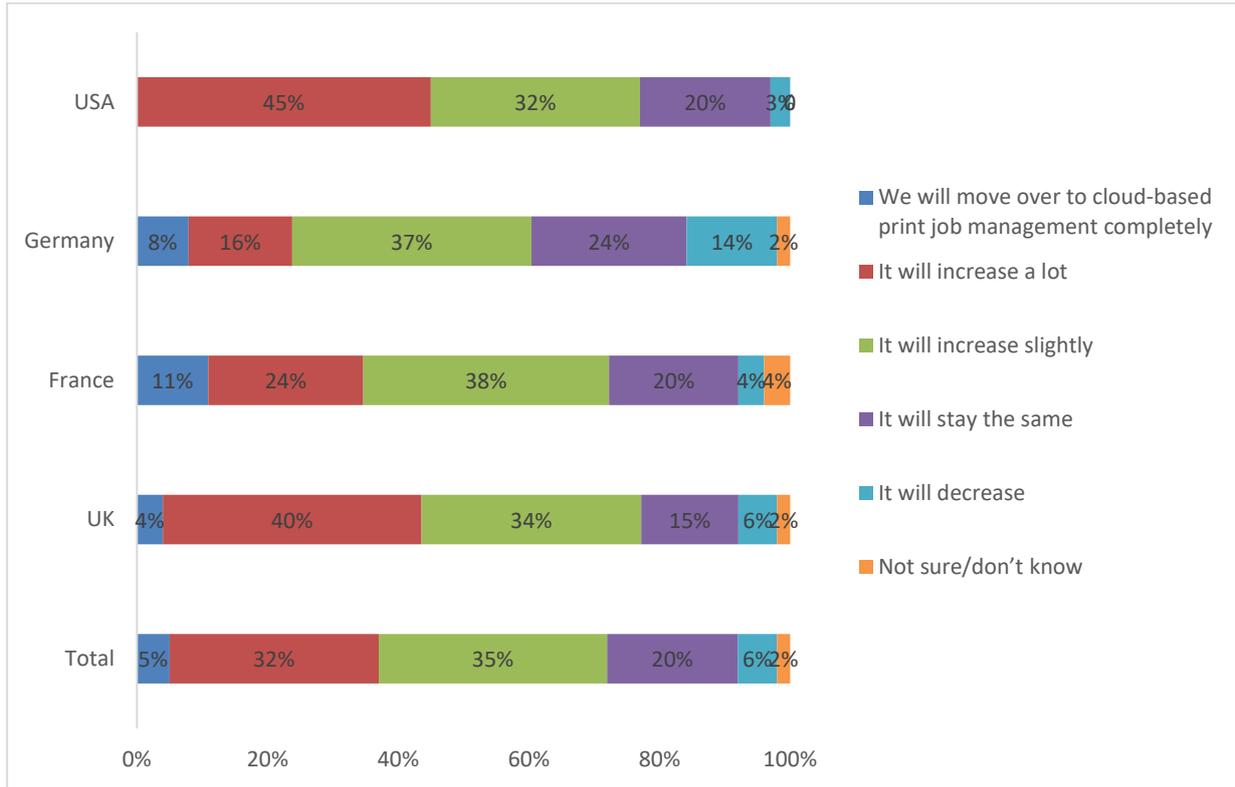
Figure 5. How do you see your usage of cloud-based print job management changing between now and 2025?

This suggests that MPS providers have yet to migrate their customers away from the traditional on-premise print infrastructure, while those using a hybrid model may be more likely to be using third party cloud-based print platforms.

Overall, 45% of respondents state that they are more likely to select an MPS provider that offers cloud-based print services. This was in second place after workplace services, showing that it is seen as a high priority when selecting an MPS provider.
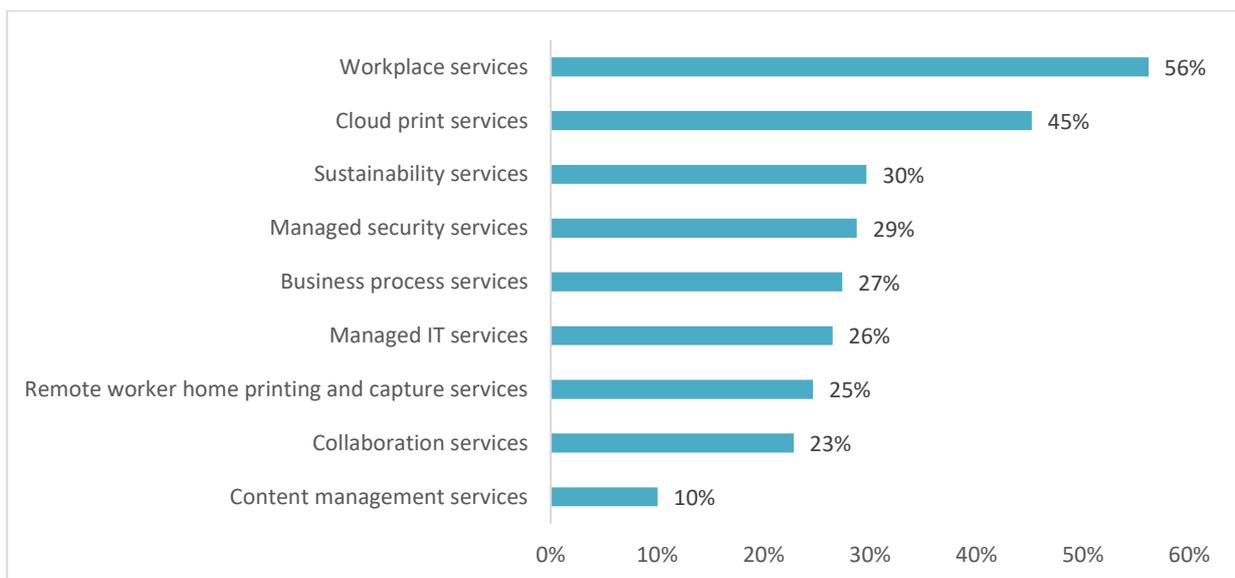

Figure 6. What additional services would be more likely to make you select an MPS provider?

Buyer recommendations

The cloud print services market is still evolving, with many different approaches in the market. Some print manufacturers offer a fully managed cloud print service, while independent software vendors (ISVs) are a good solution for organisations operating a mixed fleet environment, or where organisations are not using a fully outsourced MPS.

Quocirca recommends that buyers evaluate how cloud print service providers can support their specific cloud journey. A portfolio that offers private, public and hybrid models will enable organisations to transition as their on-premise and cloud needs adapt. For those already on their cloud journey, choosing a provider that will be able to keep pace with the organisation's pace will be crucial.

- **Serverless or hybrid.** In smaller organisations that have very few workstations or printers, a serverless model may be a better approach to saving money on print server costs and overheads, or at least creating a more predictable cost base for ongoing print related issues. It can also appeal to enterprises that are consolidating servers, looking to control print costs and lower the IT administrative burden. For organisations not looking to completely eliminate their print servers, or who may have security concerns, a hybrid solution deployed under a single management platform allows ease of use for administrators while still allowing for consolidation and cost savings may be the better choice.

- **Multi-tenant platform.** Single tenant-hosted solutions are more expensive and provide better overall control and nominal security capabilities, they can also create availability risks due to manual maintenance and update processes. Multi-tenant solutions are generally highly configurable and also include solid security managed by the service provider. Multi-tenancy also keeps costs down as the platform is constantly evolving to support a multitude of individual tenants. The cloud platform should deliver continuous updates and feature releases to all customers along with defined uptime SLAs. Customers must be kept informed of what changes are going to be introduced and when to allow for education of users.

- **VPN requirements**. Some cloud printing solutions are hosted on a cloud server, but still require a VPN tunnel into the network, limiting accessibility. Using a VPN service to enable users to connect to the print platform adds significant overheads in terms of performance of the connection, cost of the VPN, installation and management on desktops and mobiles. It can also create an unnecessary security weakness as the VPN provides access to the whole on-premise network should it be compromised in any way.

- **Document security**. The print platform should allow either compression of print jobs, or local handling of at least some part of the job, rather than sending all the data and metadata around print jobs to the cloud to be spooled. A cloud-based platform can keep print jobs on the local network behind the firewall. Preferably, any data that is sent between the client and the cloud should be encrypted to prevent the stream being captured via a man-in-the-middle attack.

- **Identity access management and multi factor authentication.** Evaluate the functionality for pull printing that enables print jobs to be released to authenticated users, regardless of location. Cloud printing enables users to release print jobs from any networked printer or MFP. Consider a cloud printing platform that enables users to authenticate at any device using either smart card release, other forms of near field communication/Bluetooth, biometrics, or through PIN printing. Identity management is becoming a much stronger focus. Quocirca advises that those in the print environment do not aim to provide their own solution in this area, due to the mature nature of existing solutions in the identity management space. Instead, the channel should look to integrating into systems that are already strong in the enterprise environment, such as Okta and Ping Identity. At a bare minimum, multi-factor authentication (MFA) systems should be implemented, preferably using mobile device-based apps

- **Native driver support**. While a universal print driver (UPD) can offer simplicity, buyers should consider solutions that offer native driver support which can use the full functionality of the MFP. If this is not possible, look for UPDs that offer the best support for the functionalities most used by your users, such as double-sided printing, collation, best-fit, colour/black and white and so on.

- **Reporting and analytics**. Traditional print management solutions offer extensive reporting on printer utilisation, device performance, consumables usage (toner, paper) as well as service information. In a serverless environment this reporting may be limited. Some cloud printing platforms (particularly those based on serverless/direct IP printing) do not offer extensive reporting capabilities. Quocirca expects this to change, however, as such platforms mature and more data is drawn from print devices to be analysed and reported on in the cloud platform. There will be an increasing demand for home printers to be capable of being seen as part of an organisation's overall IoT environment. This will either require print devices that can participate directly in such a manner but that also remain affordable for organisations to offer them to employees working from home, or for the provision of on-premise home IoT 'hubs' that can act as a means of collecting and dealing with such data needs as edge devices. However, it may be possible to do this through the use of PC-based software – it will be up to the print OEMs and channel to furnish such software as part of their offerings.

Supplier recommendations

With cloud usage increasing, the channel has had to move to a position of at least supporting cloud within its customer base. Many in other parts of the IT channel have fully embraced cloud, providing solutions that are dependent on the customer taking a cloud subscription. However, a full shift toward a cloud-only model is not advisable: while it can play well for those whose customer base is predominantly small and medium sized organisations, or where they are 'born in the cloud' companies, it must be remembered that not all organisations are moving to the cloud at the same speed. There are still needs for on-premise and hybrid solutions that will enable customers to move to cloud at their own speed. A mixed capability of an equally-functional cloud and on-premise solution will allow customers to move along the cloud journey at their own pace – with the channel's help.

Indeed, there are still many within the channel who are not well-prepared to move to cloud. The move from up-front capital and licensing fees plus ongoing maintenance to subscriptions has not been easy, with some parts of the channel preferring to stick with what they know rather than grasp the nettle of such a move. Others have struggled to define what type of cloud model best suits them, with some early movers deciding to go for a dedicated cloud, finding that this then means that they incur heavy ongoing management costs that are difficult to pass on to the customer.

Print manufacturers have a critical role to play in helping the channel overcome these challenges. Any supplier of cloud-based print services and solutions should consider the following:

- **Educate the customer.** Many organisations are now beyond just testing the water when it comes to cloud. However, the areas where cloud is being used tend to be larger enterprise application solutions, such as enterprise resources planning (ERP), customer relationship management (CRM), human resources (HR) and workplace services, such as managed desktops and Microsoft 365. The print environment is one of the last elements of the IT infrastructure to move to the cloud. This is likely to remain the case unless customers are made aware of how important it is to move print management to the cloud – using arguments around availability, more manageable costs, better updating of available functionality and so on. While many businesses may be familiar with the benefits of a managed print service, the market for cloud print services and solutions is broad and diverse. The growing acceptance of the cloud – be it IaaS, SaaS or PaaS – will enable providers to build propositions that can support existing cloud strategies.

- **Address the multi-cloud needs of businesses.** Although the ultimate goal around cloud usage may be a hybrid or single cloud model, the current reality for the majority of enterprises today is a multi-cloud model. Those selling cloud-based print management solutions must recognise that each variant of the cloud offers its own advantages, and each has its own obstacles to adoption. Any cloud print infrastructure proposition must address the varying needs of businesses as their cloud journey progresses.

- **Shift from a traditional to a consultative mindset.** Providing guidance on how to leverage different types of cloud services and technology is critical. Moving from where a customer is currently to where they need to be in the future will require a lot more discussion and planning. The future for the channel is no longer a 'sell it and forget' model, depending on the customer to automatically renew maintenance on a yearly basis, but to work with the customer to uncover extra areas where more value add can be built in over time – and so extra revenue accrues to the provider. This requires a shift in mindset from selling products to offering cloud-based services, and the subscription model that comes with it. Many channel partners in particular will find this transition shaky and will require support from their vendor partners.

- **Enhance trusted partner status to deliver differentiated value services**. Given the varying needs of customers, cloud print service providers have a significant opportunity in providing other value-added services and solutions to support a customer's digital transformation journey. Areas such as workplace services, particularly in the areas of collaboration, videoconferencing, managed desktops and workflow, can be low hanging fruit where good margins can be made. Other areas, such as managed security and other larger IT services are also possible. Service providers can generate greater profitability by offering additional managed services that can deepen customer engagement. Managed services can also increase the share of business that comes from recurring revenue, giving healthier margins and revenue growth over time. Such services do not need to be home-grown by the channel partner: the beauty of the cloud is that it allows cloud-based service providers to share and consume each other's functionality in a reasonably easy manner.

Future outlook

In normal times, the print industry has had to move fast to maintain its position in the market, against changes in customer needs as well as improvements from competitors. However, the last 12 months have changed things in a fundamental way: the COVID-19 pandemic has resulted in a complete change to the way many employees work and in how information needs to be managed while being handled by those along the workflow chain.

Print management solutions focused on just managing workflows and print devices that are on an organisation's network are no longer fit for purpose. Working from home (WFH) and the consequent use of less-controlled clients and print devices connected to the corporate network by insecure public networks means that organisations need a different approach to how they manage their print environment.

Cloud was already going to be the future, but the pandemic has accelerated the need for the print market to come up with cloud-based solutions that have enhanced and advanced functionality that meets the customer's needs.

Generation 1 cloud-based print management, including provisioning, update and print job management functions, must now move to including better data aggregation, analysis and reporting, as well as enhanced capabilities through the use of greater functionality in universal print drivers (UPDs) along with more controls on routing and print job optimisation through the preferred routing of certain print jobs to the best print device. Security must also be a high focus area: not only when it comes to users freeing up print jobs at their print device of choice, but also in managing the flows of information across important network junctions (through the use of technologies such as data leak prevention (DLP) and digital rights management (DRM)), but also for data on the move (protecting via the use of virtual private networks (VPNs) or encryption) and data at rest (encryption of print device hard disk/solid state drives, secure deletion of print jobs after use).

The increasing availability of machine learning (ML) and artificial intelligence (AI) systems can help the print market in aggregating data from data-rich print devices, analysing it and then using it to aid the customer in many different areas. From simple consumables status and reordering through advanced predictive fault detection to helping customers identify wastage and poor information management, data analysis and reporting will become a major area for the print market to focus on.

AI will also help in optimising the delivery of firmware and software updates to print devices, while also enabling new functionalities to be more easily added through both embedded apps and in-cloud apps that can capture certain types of information workflow and work upon them to, for example, meet business security policies and service levels.

Ultimately a cloud print infrastructure is cost-efficient, can increase business performance and support an organisation's broader digital future. MPS providers must look to build their relevance as businesses continue their digital transformation journeys, and it will be those that can deliver transformational cloud services and solutions that track and enhance their customers' cloud journeys that are most likely to succeed.

ISV profile: Printix

Quocirca opinion

The Printix cloud-based print management solution helps businesses of any size eliminate complicated and costly print IT infrastructure. As a cloud-first print management vendor in the market, the Printix native cloud platform offers advantages over print management products which originated as on-premise platforms. It offers deep integration with Microsoft Azure and as such specifically targets Microsoft Cloud Solution Providers (CSPs) to deploy its platform. It has seen success with public sector organisations as well as education, health care, manufacturing, and finance segments.

Its primary focus on the Microsoft channel sets it apart from its competitors and opens up new opportunities to engage with partners who are focused on the broader IT infrastructure. Printix also partners closely with Google to optimise printing on Chromebooks. With the retirement of Google Cloud Print, Printix can help with a cloud print management service for Chromebooks in enterprise and education environments. As Microsoft Azure continues to gain ground in the cloud market, Printix is well positioned to support the serverless printing requirements of businesses that are aligned with the Azure platform.

Native cloud print management

Printix's native cloud print management service and true SaaS product and business model creates a virtual blueprint of the customer's on-premise print infrastructure, managed in the Printix Cloud service. It supports single sign-on with both Google Workspace and Microsoft Endpoint Manager and can be deployed with Microsoft Intune. The scalable-by-design serverless platform provides organisations with modern printing, with secure and mobile printing functionality.

Printix's cloud print management solution is a multi-tenant service designed and structured to provide customers with a complete cloud managed print infrastructure and secure printing environment. Customers can choose to migrate to a hybrid or full cloud environment, to benefit from the ability to rationalise infrastructure and automate time-intensive tasks such as managing print queues and drivers based upon locations and group policies. The SaaS-based solution runs with Printix Client software installed on users' computers (Windows and Mac).

Strong security credentials and zero trust support

Security is a key focus. Documents are encrypted (AES with a key length of 256 bits) and stored locally until they expire and/or get deleted. They do not leave the customer's network unless using print via the cloud is enabled (i.e. pending documents are stored in the customer's own secure cloud storage), and document names can only be seen by the owner of the document. Printix supports zero trust networks. Printing can now work if there is no physical computer with Printix Client online on the printer network or if printers and computers are kept on separate networks (Zero trust).

Integration with Universal Print by Microsoft
Microsoft Graph API integration connects Printix and Universal Print to a single managed cloud service with extended features, security, management, and reporting. As an advanced option, Printix provides customers with direct print via Printix Client, so Universal Print can be used on existing printers without using the Universal Print connector on a local machine and without an expensive server. This also keeps print local to minimize traffic and prevent conversion in the cloud.

Cloud solutions portfolio

Printix runs its server infrastructure on a Microsoft Azure public cloud. Print vendor-agnostic and scalable by design, the platform can handle any number of users and printers. The technology can handle multiple sites and separate networks. Print processing is done locally on the computer or via the customer's own cloud storage, so no additional network traffic is needed to transfer print data to a print server.

Key features include:

- **Print driver store.** Print drivers are automatically uploaded and placed in the Printix driver store.
- **Printix for Chromebook.** Users can print to Printix managed printers from Chromebooks and computers with Google Chrome.
- **Printix Administrator.** A web-based interface used to configure Printix and manage printers, print queues, and print drivers.
- **Printix App.** The native app runs on Android and iOS/iPad OS devices and as a web app in a web browser. End-users can easily release, print and delete confidential documents safely with print release from a phone.
- **Printix Redirector.** Used to enable printing to a print queue on a Windows computer, and enable third-party follow/pull print queues from PaperCut, SafeCom, Equitrac, PrinterLogic and similar third-party pull-printing solutions. Users can continue using existing card readers to sign in and release documents from the enabled printers' touchscreen control panel.
- **Easy printer identification.** End-users can scan any printer's QR code or NFC tag.
- **Google Workspace integration.** Facilitates automatic registration of users the first time they sign in to Printix with their Google Workspace work or school account.
- **Cloud Print API.** For use by applications that wish to push print jobs in printer native or PDF format into a Printix print queue.
- **Microsoft Azure AD integration.** Facilitates automatic registration of users the first time they sign in to Printix with their Microsoft work or school account.
- **Printix Anywhere.** The Printix Anywhere print queue allows users to roam between printers and collect the document at any printer they choose.
- **Printix Go.** Secure printer access with card-based authentication and release of documents at the printer using proximity cards with optional pin code.
- **USB printing.** Printix Redirector enables printing to a locally attached USB printer.
- **Reprint.** Users can reprint documents that were deleted or printed within the previous 12 hours, without re-submitting them.
- **Data security.** The standard setting in Printix sends print jobs unencrypted from the Printix client to the printer. This follows the industry standard for network printing with print servers – TCP/IP and IPP printing – which addresses modern printing requirements including security, job status and printer feature capability.
- **Secure print.** It's possible to set a minimum secure print level for all users, or a higher secure print level for selected users via group membership. Controls can also be put in place to ensure users are physically present at the printer to release documents, and require users to identify the printer by scanning the printer's QR code, NFC tag or Beacon (level 1).
- **Windows Virtual Desktop (WVD).** Printix helps users get the most out of Windows Virtual Desktop through SSO, silent configuration, updates and continuous monitoring of the print environment.
- **Citrix and RDS.** Printix printing is also possible if you use Citrix or Remote Desktop Services (RDS).
- **Analytics and reports.** Easy to set up analytics facilitates interaction with the Printix Power BI report to get insights.
- **Cloud storage.** Documents printed via the cloud, or as mobile print from Android and iOS phones and tablets, can be routed to the cloud and securely stored (Azure Blob Storage and Google Cloud Storage).

Pricing and availability
Printix offers a free one-month trial with all features included, and either monthly or annual subscriptions. Volume discounts (per user) are also available. Billing is based on active usage during a billing period. When a user is

registered as active in any given month, Printix counts this as use of service. An active user is any user that signed into Printix at least once during the monthly billing cycle.

About Quocirca

Quocirca is a primary research and analysis company specialising in the business impact of information technology and communications (ITC). With worldwide, native language reach, Quocirca provides in-depth insights into the views of buyers and influencers in large, mid-sized and small organisations. Its analyst team is made up of real-world practitioners with first-hand experience of ITC delivery who continuously research and track the industry and its real usage in the markets.

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