



Everything you need to know about cloud printing

The beginner's guide to being an expert at cloud printing

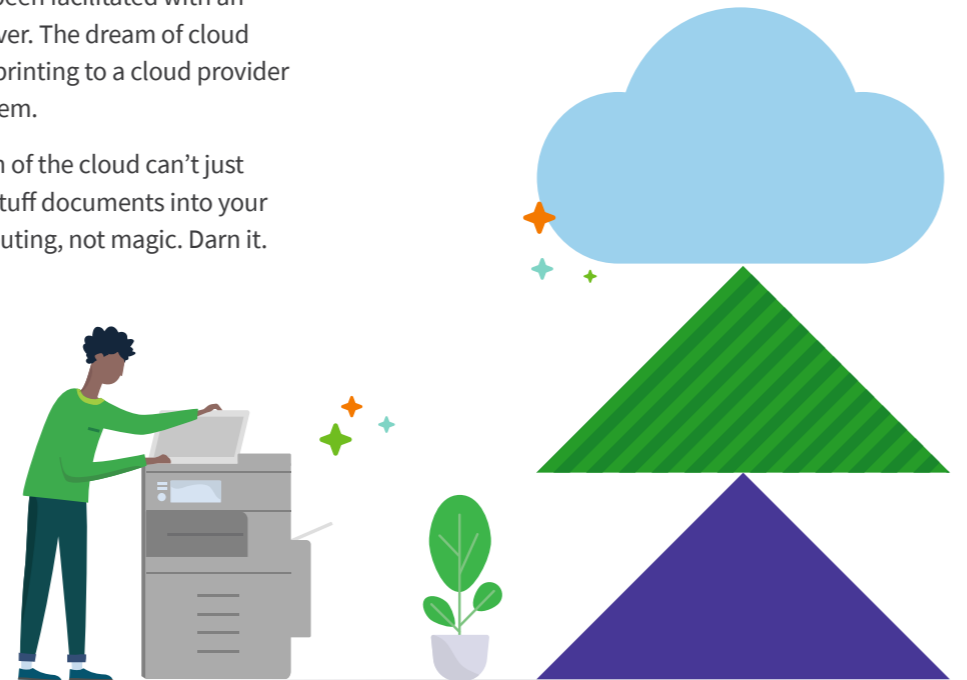
What is cloud printing all about anyway?

Cloud computing is nothing new. In fact, it's a staple of everyday life both inside and outside the workplace. Streaming music, movies, or TV? You're in the cloud. Backing up your photos on your phone? Cloud. Using online spreadsheets or word processing software? Oh, you better believe that's cloud. Streaming video games? Wave down at the ground below because you're in the cloud.

Like entertainment streaming and countless other software, platform, and infrastructure services, print management is another area of technology being enhanced by cloud computing. It's an obvious enough desire: eliminate onsite print servers and leverage the cloud for your print environment = cloud printing. But there's a bit more to it than that.

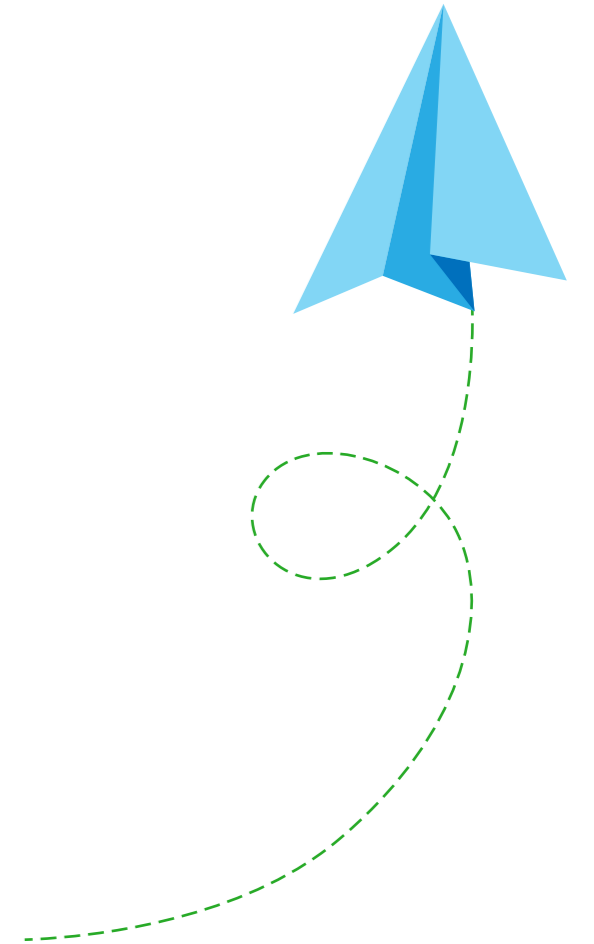
Picture this: you're sitting at your computer at work, right next to your printer. Traditionally, your printer and computer are connected by a wireless or wired network and your secure and quick printing has historically been facilitated with an on-premises (or on-prem) print server. The dream of cloud print management is to outsource printing to a cloud provider without having a print server on-prem.

But here's the catch... The long arm of the cloud can't just reach into your local network and stuff documents into your printers all by itself. It's cloud computing, not magic. Darn it.



Contents

What is cloud printing all about anyway?	2
So how does cloud printing actually work?	4
Learn more	5
Before we move on, we have to talk about “serverless printing” -----	6
So why would you want hardware onsite?-----	7
“But why would we move to the cloud?”	8
We're almost there! It's time to choose your own cloud adventure!	10
Private, hybrid hosted, and single tenant = PaperCut MF-----	11
Public, SaaS, and multitenant = PaperCut Hive/PaperCut Pocket-----	12
Bring the best from the Internet of Things: Edge Mesh-----	13
But... no matter what you choose, don't forget what's important	14
Our cloud print management four guiding principles:	15
Solution summary	16
But wait!	17
Before you go: -----	18
About PaperCut	20





So how does cloud printing actually work?

Your print jobs need some kind of software agent that can talk to your printers on one hand AND the cloud on the other to pull those jobs down. So why hasn't print management via a public cloud fully transitioned yet? Well, the printer/MFD/MFP/copier makes it a bit trickier because of the hardware.

To conquer this last bastion of the cloud, you need to solve two problems.

First, if you're sending your print jobs to a service up in the cloud, you're sending your documents over the internet - this can be slow and may be a security concern. So you have to think about your organization's security risk posture and what barriers you need in place to protect your intellectual property.

Secondly, your print job's delivered to the cloud service provider (which you may not know the actual physical location of) but getting the print job from the cloud back to the printer in a fast and secure way is tricky - especially if you have a complex print environment.

To connect the cloud to the printer, extra software or hardware needs to exist somewhere on your network to fetch the print job from the cloud. There are three options for what software/hardware combo you need.

► Software on the printer

Clouds can't talk to printers, but printers can talk to clouds with the right software. So, you can house the software directly on the printer, not a separate computer. A downside to this option is the software must be written individually for every printer brand under the sun. The double kicker is that only some brands will be able to handle the software, so it won't work for your regular printer around the office.

Other challenges to consider with this option are internet connection for the printer (another security attack surface to defend), and the computing power needed with your printer to run this kind of cloud software - software that often will only work with the printer manufacturer's cloud print platform. As of today, we know Canon printers and Uniflow Online work this way. Also, Microsoft has special agreements with some printer manufacturers to have their software embedded on the printer.

However, we've seen that in most cases, the hardware that makes up your onsite printers isn't a great substitute for computers. Certainly not the kind of computing you need to handle lots of print jobs or print queues, or large complex print jobs. We've seen [organizations that have more complex print environments](#) need a small box or device onsite (usually something like a computer that's

always on) that connects the printer to the software on the cloud directly. This piece of hardware does the heavy lifting of pulling the complex jobs and print traffic from the cloud that most printers can't do on their own.

► On a computer

A regular laptop can run the software to talk to the cloud. The issue here is if just one computer is running the software; if that computer is turned off or enters standby for whatever reason, you won't be printing anymore. So, there's a single point of failure if you have to depend on one computer providing that print server functionality.

► On a dedicated device

An admin desktop that's always on could house the software, and it wouldn't even need a lot of computing power, but this still means a single point of failure. The drawback here is this is somewhat of a hybrid approach and isn't that dissimilar to keeping a print server, so you're not leveraging the full functionality of engaging a cloud provider.

PaperCut takes a hybrid approach to the above three options, but more on that later.

Learn more

Read our blog: [What are the benefits of cloud print management?](#)

Before we move on, we have to talk about “serverless printing”

If you're technically minded, you know that “serverless printing” essentially means no onsite print server costs/management because you've outsourced the role of a print server to a cloud service provider.

Yes, cloud printing is possible without an onsite server handling all your print jobs. BUT, like we mentioned above, you still need something onsite to fetch your print job back from the cloud. We don't want to belabor this too much, but let's quickly dig into why and what this looks like.

In general, you have two types of cloud print jobs. The first type of print job we'll call “simple printing” - you just need metadata without any private info about the document, content or user. This is a lot like [direct printing](#) or [mobile device printing](#). You just want your users to hit print from a laptop or mobile device, choose a printer from a small list of predictable printers, and pick up their printout. This works well if the jobs don't need to be secure, you only have a small list of printers, your users aren't too mobile, and you don't need too much information on the types of print jobs traveling through your network.

The second type of print job we've been calling “complex” printing. It's when the whole file can go to the cloud, then be downloaded back to the printer. This is a must if you are in a different location than the office, like at home or in a cafe. You might fit into this bucket if you have mobile employees who need to print to remote offices, or you have too many printers on your network (some only the CFO can use, for example) or a large mixed fleet of printers, or you need to track certain departmental printing or client printing or you have specialty printers you need to keep an eye on - the list can go on, but we'll stop there.

At the time we write this, there are services out there that help with “simple printing” - they have printers communicating directly with the cloud to request and pull down jobs, as well as reporting back status. If you look deeper at the technical requirements, this requires firmware/software on the MFD to support this, but it does remove the need for servers or clients on-prem communicating with the printer.

So why doesn't this work for “complex” printing? One major reason is processing power. Most printers have limitations on processing power. So, the more devices, print drivers, print spoolers, print queues, and printers you have to manage, the more bandwidth you'll need for all the additional processes. You also need to consider things like bandwidth throughput, latency of the working link, upload and download costs, print load capacity, and redundancy of internet links.

Another reason this won't work for everyone is the variation between printer brands. Each brand would need its own software. This option will only support a small number of brands however, this may change over time.

So why would you want hardware onsite?

We previously mentioned one reason: printers have limited processing power. If you're an organization with, say, 10 printers or 100 users, you need a way to handle multiple print requests or print queues, or hundreds of print tasks with a little more oomph than a printer can provide, especially if you want the ability to track all those tasks and keep an eye on the rogue print-crazy employees. Most, if not all, current providers of a cloud print management solution require something onsite to help—maybe a little Raspberry Pi or similar hardware, or a piece of software installed on an always-on desktop.

You also have to consider [security](#). Sending a job from a simple printer to the cloud opens up otherwise secure documents to the risks of being “on the internet.” You need to trust that your cloud provider is handling your data carefully, and that all points the job travels through are correctly maintained for security. Again, because your printers have limited processing power, having extra hardware onsite will help ensure you have fail safes in place to help with encryption and authentication.



“But why would we move to the cloud?”

With the emergence of cloud services as a cost-effective alternative to on-prem hardware in the print management space, more and more businesses are transitioning to cloud-based print management solutions.



According to the Quocirca Global Print 2025 Report, 73% of organizations expect to transition to cloud print management in the next five years. Cloud services can potentially enhance security, scalability, and mobility. Print management is undoubtedly a slice of that pie.

Cloud opens the door for a flexible, resilient, and reliable alternative to traditional data center services:

- ▶ Room to add on and scale-up
- ▶ Reduced print spend
- ▶ Increased ROI
- ▶ Less IT team burden

However, it's crucial to remember the “benefit/tradeoff, two steps forward, one step back” approach when it comes to cloud print management. Through this transition, we need to be making business decisions with full knowledge of the trade-offs.

The 3 benefits and trade-offs of cloud printing

Print management in the cloud has its benefits, but it also has its drawbacks. It would be wrong to talk about cloud as a “perfect answer.” The magic is being able to talk about the trade-offs.

Simplicity vs control

Cloud computing allows us to simplify how we use technology. If it suits your print environment, you don't need to bother with the behind-the-scenes maintenance of print servers. Fewer moving parts is simpler. The trade-off is you may have less control.

For some people, not seeing under the hood of their car is their preference. They don't need to see the pistons firing and gears grinding. For others, seeing under the hood is a crucial functionality. Can your print environment benefit from simplicity, or do you need to pop the hood?

Cost flexibility and elasticity vs predictability

Not only does cloud-based printing reduce your infrastructure but also the hardware maintenance is handled for you. There's no doubt that self-hosting is generally cheaper when you have the expertise on-site. But what if there's a cost to acquire that expertise? Different businesses with different levels of expertise will benefit from different approaches.

Cloud-based print management is rapidly deployed, so it lessens the burden of implementation and administration. It also has the benefit of auto-scaling, depending on your requirements or usage. In a self-hosted world, you

often need to commit to a server that speaks to your requirements. If you grow, you need to buy a new one. In the cloud it auto-scales, so it's a flexible system.

So, the two steps forward here are all that flexibility and elasticity. The step back? In your on-prem/self-hosted world, it's very predictable. So, the trade-off here is it's out of your control. That can be a benefit, or a drawback, depending on your print environment.

Security and compliance vs simplicity

With on-prem or self-hosted print management, the data and infrastructure is managed by you. You're in control. You know where the data is and have complete access. Your hands are on the wheel. This is one area where the cloud is net neutral or a loss in security and compliance. You're trading off for some of the above benefits in simplicity and flexibility. That's not to say the cloud is less secure, by the way - just that the data is not under your roof.

The benefit of self-hosted print management is you're in the driver's seat the entire time. The benefits of cloud-based print management are that third parties are handling elements like software updates and security fixes. Security and compliance is managed by the provider rather than yourself, which can be a major consideration before shifting to print management in the cloud. Again, that is not to say the cloud is less secure. Most cloud print services use platforms such as AWS or Microsoft Azure, so you can rest easy knowing security and resilience is top of mind.



We're almost there! It's time to choose your own cloud adventure!

Just like each operating system is a different shape, and each printer model and make is different, clouds come in different forms too.

An important part of PaperCut's approach to print management is 'customer first'. We work hard to ensure our customers have a choice: choice of operating system, choice of printer brand, and of course, the choice of cloud type.

Private, hybrid hosted, and single tenant = PaperCut MF

At a glance:

- ▶ Modular
- ▶ Secure
- ▶ Scalable
- ▶ Hybrid and private hosted cloud compatible
- ▶ Built using Web Services
- ▶ [Mobility Print](#) and [Print Deploy](#) work in the cloud
- ▶ Google Cloud Directory and Azure AD user sync built-in
- ▶ Deploy on Azure, Amazon AWS, Google GCP or similar

PaperCut MF is modular in nature and can be [architected for private and hybrid cloud-hosted print management](#), including calibration for your desired cloud advantages. You can customize print jobs to stay local on your network. You can even design your set-up for [high availability](#) and redundancy.

Security is the biggest advantage of private and hybrid cloud environments. PaperCut MF caters to this as well. You can deploy it in your secured cloud environment of choice and have full control over everything from encryption certificates, authentication policies, and where your data is located.

Another part of the demand for cloud is meeting the rise of the mobile worker, and PaperCut MF is feature-rich to cater to easy BYOD printing with [Mobility Print](#) and [Print Deploy](#) - all easily accessible via a web browser. The hybrid cloud approach and built-in integrations means you can leverage cloud directory services like Google Workspace and Azure AD, or scan to OneDrive or Dropbox. You can even enable [OCR](#) (image to text) with a PaperCut MF checkbox.



Video: [Solve your print queue problems with PaperCut Print Deploy](#)

Public, SaaS, and multitenant = PaperCut Hive/PaperCut Pocket

At a glance:

- ▶ Cloud-native hosted SaaS print management
- ▶ Multitenant - serverless application
- ▶ [Edge Mesh](#) - innovative print management approach
- ▶ Self-healing - no single point of failure
- ▶ Print jobs can stay local
- ▶ Zero-trust network - highly secure job encryption
- ▶ Continuous deployment auto-updating with the latest features

[PaperCut Hive](#) and [PaperCut Pocket](#) are our “built for cloud” platforms that borrow the best parts of IoT (Internet of Things). One of the core concepts at the forefront of IoT design is security, which we’ve brought into this cloud-native platform as a design principle right from the first line of code.

As multi-tenant public SaaS solutions, PaperCut Hive and PaperCut Pocket are also designed with scalability and efficiency at the forefront of development. The platform is designed with a microservices architecture and modern continuous deployment development practices. The benefits of this are new features become available quickly without needing to perform upgrades and the cost savings at hosting at scale are passed through to organizations.

PaperCut Pocket is for small businesses looking at a DIY solution for cloud print management. PaperCut Hive is for scaling, distributed, and enterprise organizations looking for an embedded MFD/MFP software.



Video: [PaperCut Pocket - it's print management in the cloud](#)



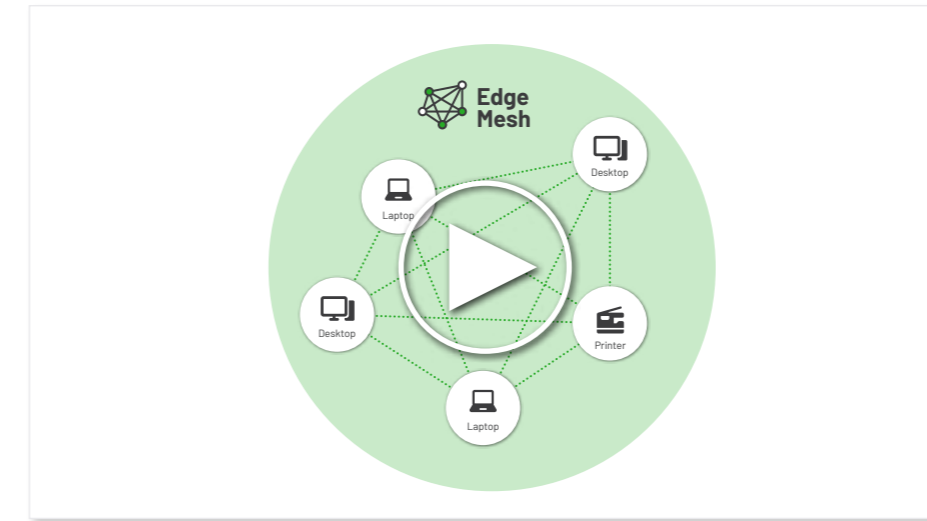
Bring the best from the Internet of Things: Edge Mesh

There are loads of exciting things to discover with our built-for-cloud solutions. One of them is the way it was influenced by the world of IoT to overcome the difficulties of marrying hardware and the internet. Remember we talked about the three methods of connecting the cloud to printers earlier? This is how we solved the challenge.

PaperCut looked at the best practices from IoT and adapted them for cloud-managed print management – specifically the concepts of Edge computing and self-healing Mesh.

The magic is mixing the two together to bring the benefits of on-prem and cloud melded as one. This creates an ‘and-and’ environment rather than an ‘and-or’ tradeoff. At a basic level, [PaperCut Edge Mesh](#) means all your print traffic stays on your local on-prem network where technically possible. No going up to the cloud and back again. It also means there’s no single point of failure.

PaperCut Edge Mesh ensures your printing is secure, reliable, and offers a speedy and simple user experience. Thanks to the cloud SaaS model, features and updates for security are automatically deployed. You’ll have the most current, highest-functioning version of the software at all times.



Video: [PaperCut Edge Mesh explanation - Serverless Print Management in the Cloud](#)

A little more on what the Edge Mesh really is

Do you remember earlier when we were talking about how clouds can’t really talk to printers without the help of some software onsite? We mentioned that you can put that software on a printer, computer, or some other dedicated device and talked about both the benefits and pitfalls of those three options.

That’s where the Edge Mesh comes in. We take all the benefits you get with an onsite print server (offline functionality, near-zero latency, high security, documents stay local, direct management) BUT take away the printer server and offer the benefits of public cloud printing (scalability, high availability, cost effective, easy administration, off-premise print submission).

And again, like all of the solutions currently on the market, the Edge Mesh works by having our smart software living on your computers or clients you already have onsite. You can dive into the details of how this all works by [visiting our article here](#), but to explain as simply as we can: we take the current clients you have on-site and use them to handle the communication and computing your retired server used to do.

But... no matter what you choose, don't forget what's important

It doesn't matter which cloud solution you go for. From single tenant private and hybrid hosted PaperCut MF to multi-tenant SaaS public PaperCut Hive and PaperCut Pocket, our approach to cloud print management is driven by four guiding principles.



Our cloud print management four guiding principles:



Security

Protecting sensitive information is present in everything we do, from the first line of code through to ongoing service and support.



Simplicity

Yes, it is actually possible to solve some amazing technical problems without compromising on a joyful print experience.



Flexibility

We are customer first and aim to offer you choice: any printer, any hosting environment, any platform, any OS, any device.



Performance

Our flagship print management solution is brewed with 25+ years of industry experience and is a fully powered private and hybrid cloud solution. PaperCut Edge Mesh print jobs never get sent via the cloud so printing speed matches existing on-prem performance.

Solution summary

From simple, joyful print experience, to a fast and flexible cloud print solution, to advanced print security - PaperCut offers a full suite of cloud print management solutions to fit your needs.

PaperCut™ MF

- ▶ Hybrid and private cloud compatible
- ▶ Mobility Print and Print Deploy work in the cloud
- ▶ Google Cloud Directory and Azure AD user sync built-in
- ▶ Deploy on Azure, Amazon AWS, Google GCP or similar

FIND OUT MORE

PaperCut™ Pocket

- ▶ Set it up yourself
- ▶ Multitenant - serverless application
- ▶ Zero-trust network, highly secure job encryption
- ▶ Self-healing - no single point of failure

FIND OUT MORE

PaperCut™ Hive

- ▶ Built for scaling, distributed, and enterprise organizations
- ▶ Embedded experience at the printer
- ▶ Multitenant, zero-trust, and self-healing just like Pocket
- ▶ Continuous deployment auto-updating with the latest features

FIND OUT MORE



But wait!

We have more goodies for you before you leave.

At right you'll find a helpful list of questions to check whether a cloud print management solution is right for you. If you answer yes to the majority of questions, the cloud is the right solution for you.

Before you go:

- Does your server have any functional limitations?
- Is your server constantly crashing or locking up?
- Are you wanting to not worry about constant patching and maintenance?
- Do your users demand paperless data and document access wherever they are?
- Do the lease terms of your current hardware (printers and servers) and software agreement still fit?
- Is your hardware fleet approaching EOL?
- Are you prepared for the security implications of a cloud print migration?
- Is your team more cloud literate?
- Are the majority of your current services in the cloud?

- Do you have an IT team to help with the implementation of any printing architecture?
- Is cloud printing or cloud print management cost-effective to implement now or later?
- Double check the printer brands the product you are considering works with
- Can your selected print management provider deliver you a solution hosted in your region for data sovereignty purposes, if required?
- How important is security and privacy for you?
 - If security is your top criteria and you don't need people to print from remote locations to the office printer, then you need a technology that keeps your documents on side. You don't want big documents content to go to the cloud and come back to the print from privacy and security considerations but also speed. Long documents might take more than 5 minutes to get printed.
 - If you are in the next level, very high security concerns because you work with super sensitive data, you might consider having a physical server, completely inside your office network or a private cloud one (AWS, Etc) so that you are still under control.
- How important is control and responsibility?
 - With fully cloud solutions your responsibility is lower - no maintenance, no updates (it is all automatically taken care of for you), no single point of failure.
 - With private cloud servers in Amazon, Google etc, it is a mid level of responsibility. You don't have to take care of updates, security, maintenance but you still have 2 vendors to deal with: the print management software and the cloud hosting provider.
 - Total control and having all the responsibility is with on prem server.



You'll also find this helpful table that breaks down all your cloud print management options - because who doesn't love a simple table, right?

FEATURE	PaperCut MobilityPrint	PaperCut Views	PaperCut MF	PaperCut Pocket	PaperCut Hive
Cloud printing (remote off-network printing)	✓	✗	✓ <small>When mobility print enabled</small>	✓	✓
Private cloud hosted software	✓	✓	✓	✗	✗
Public cloud hosted software	✗	✗	✗	✓	✓
Embedded printer apps	✗	✗	✓	✗	✓
Enable printing from any device to any printer / MFD brand	✓	✗	✓	✓	✓
Track and manage printing	✗	✓ <small>Limited functionality, basic tracking only</small>	✓	✓	✓
Track and manage printing, copying, scanning and faxing	✗	✗	✓	✗	✓
Secure print release at the printer / copier	✗	✗	✓ <small>Via mobile device and/or embedded app</small>	✓ <small>Via the mobile device app</small>	✓ <small>Via mobile device and/or embedded app</small>

About PaperCut

PaperCut is a leading provider of print management software that's helping hundreds of millions of people around the globe to minimize waste while having a secure and easy printing experience.

In 1998, two developers founded what is now PaperCut and they still own and run it today.

For over 25 years, PaperCut has helped reduce paper and save trees by eliminating forgotten or redundant print jobs. Our solutions are used in many industries including education, healthcare, legal, government, small business and large enterprise.



PaperCut empowers you to **make printing easy** for your end users.

BYOD printing's a breeze with PaperCut. Plus, we make printing easier for you by auto-deploying print queues. And that's just the beginning. We've got truckloads more on offer, from third-party integrations to easy tap-and-release Find-Me printing.

It doesn't matter what size your organization is, what printers you use, or what operating system your users prefer – PaperCut is for you. We take a cross-platform, vendor-neutral approach to technology to deliver a print management solution that just works.

At PaperCut we don't measure our success by profits and business metrics. Our success is the Forest Positive impact we've made on the planet, thanks to over 100 million users at over 70,000 organizations around the world who have saved billions of pages.





PaperCut[™]

If you want to give PaperCut a spin, visit our [products overview](#) page on our website.

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