PART 1

PUBLIC SAFETY
+ THE FAR-REACHING IMPACT OF
THE CLOUD

WHY MOVING TO THE CLOUD IS SO IMPACTFUL
+ TIPS FOR BUY-IN AND SUCCESS

tyler technologies

Introduction

Many public safety agencies are wrestling with the decision to move mission-critical systems to the cloud. The shift from on-premises software to software as a service (SaaS) is significant, and it begs the question of whether the benefits outweigh the costs.

In this two-part series, real public safety agencies and Tyler Technologies leaders share their perspectives on why shifting to a SaaS model is one of the most impactful decisions an agency can make to protect against cyberattacks, reduce workload on staff, improve efficiency, and better serve their communities, plus tips for the transition.

Table of Contents

Tyler's Vision for Public Safety + The Cloud

By Andrew Hittle, Public Safety Division President, Tyler Technologies

When it comes to the cloud market today, one thing's for certain: Unleashing the power of the cloud has never been more urgent. We're feeling that urgency to move to the cloud in every aspect of our lives, whether in your professional life, personal life, family life, little league life, church life — the list goes on.

Cloud spend is expected to eclipse $1 trillion in 2024. From a reach standpoint, **more than 90% of all U.S. organizations — both private and public — are now using cloud services** with a very aggressive appetite to take on more.

This makes sense given the traditional drivers — the need for more modernization and moving off of legacy systems, the promise of improved organization agility. But, one of the biggest drivers is the absolute and immediate threat of cyberattacks and the protection of data. In fact, the increasing threat of cybersecurity is one of the leading factors in rapid cloud adoption. It's not just the volume and frequency of cyberattacks, but the velocity at which they can happen.

A few years back, it took hackers three to four weeks to gain access and cripple a system. Now, it can take four days or less. **It's not a question of if, but when a cyberattack will occur.**

While the appetite for cloud in the public safety market has been slower than other parts of the public sector, **we are now seeing aggressive growth in cloud adoption.** Gartner estimates more than 40% of justice and public safety organizations will have one or more mission-critical systems in the cloud by 2025. That is a very aggressive ascent because, in addition to the cyber attacks that are looming and threatening, we're seeing city and city and county CIOs establishing cloud-first strategies across the board. It's becoming a top-down strategy.

We're also seeing the next-generation leaders and decision-makers who grew up with cloud technologies expecting cloud capabilities in their place of work. And, the ability to find and retain the type of talent needed to manage the complexity of on-premises systems is getting tougher and tougher. For these reasons and more, we are seeing a shift to the cloud.

President Andrew Hittle

$1T

CLOUD SPEND IS EXPECTED TO BE MORE THAN **$1 TRILLION** IN 2024

90%

90% OF U.S. ORGANIZATIONS ARE USING CLOUD SERVICES

4 DAYS

IN 2019, IT TOOK HACKERS **4 WEEKS** TO CRIPPLE A SYSTEM; IN 2024, IT TAKES **LESS THAN 4 DAYS**

We see the cloud as the gateway to delivering a unique and differentiated experience in the public safety market.

— Andrew Hittle, Public Safety Division President

What Does Life in the Cloud Look Like?

When we think about the cloud at Tyler, it's not just a virtualized data center that promises cost efficiencies, agility, organizational advancement, and better security. Yes, those attributes are all proven and true, but we have a grander vision for our clients in the cloud. We see the cloud as the gateway to delivering a unique and differentiated experience in the public safety market.

We don't want the cloud journey to simply change the location of where our software is running. That would be minimizing the opportunity and missing the point. **Our vision enables a much-improved lifestyle for our clients.** Let me share a glimpse into what that looks like.

Radically Improved Upgrade Experience

With the cloud, we have the ability to radically improve the upgrade experience. This is a challenge we see with our on-premises clients today. There is an ever-changing puzzle of prerequisites for system upgrades — operating system updates, database updates, security patches. In the cloud, we can manage that complexity, take it off your shoulders, and put it in our managed cloud infrastructure, partnering with one of the best players in the world: Amazon Web Services (AWS).

We can radically reduce the time it takes to upgrade. Instead of four, five, six hours, **we're pushing to complete upgrades in less than two minutes** to eliminate issues caused by downtime, especially in computer aided dispatch environments. And, we can drastically reduce the defects introduced in these upgrades and drastically reduce the time it takes to resolve those defects during the upgrade process.

With all these efficiencies, we have the ability to **upgrade clients much more frequently** — annually, quarterly, even monthly, depending on appetite — helping them stay up to date with the latest innovations and capabilities of their products.

Continuous Delivery of New Capabilities

Another core element of the differentiated client experience in the cloud is delivering smaller, more frequent, higher quality, incremental advancements to the product.

By doing this **continuous delivery of better quality software**, it provides a rocketing feedback loop from our clients on what's working and what's not. When our clients share their ideas and drivers and feedback on what needs changing in the software, this philosophy allows us to deliver on those needs much faster. That's a much better approach than elongated on-premises releases that take 12 to 18 months today.

Proactive Client Support Experience

Lastly, moving to the cloud allows us to introduce and deliver a proactive client support experience. The cloud gives us proactive visibility and insights into our clients' environments and usage that we have never had before. With that visibility, we can **proactively identify and resolve defects and performance issues** before a client ever experiences them. When we identify issues for one client, we can proactively resolve them for all of our clients. Tyler remains on the offense, on our toes, proactively removing those disruptions.

From an adoption standpoint, we can ensure the **latest and greatest features** and capabilities we have invested R&D dollars into are being adopted by our clients as soon as possible so they're getting the **highest return on investment**.

Ready When You Are

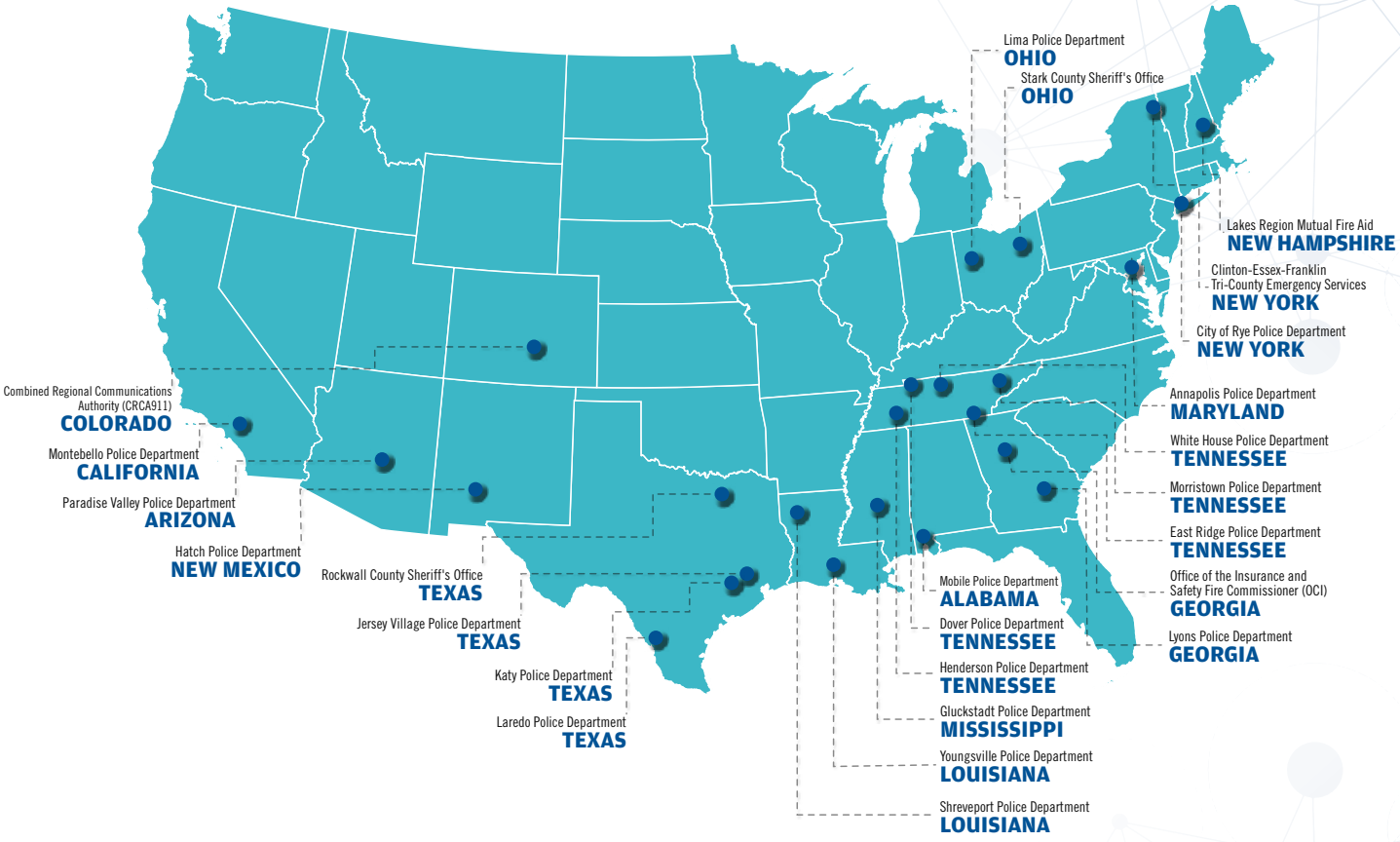
These are just a few elements of the **differentiated experience** our cloud clients will experience. We have built a tremendous on-premises business, and we'll continue to stand behind and support on-premises implementations. But, as we move forward, **the real catalyst for innovation is the cloud**.

When your organization is ready to make the transition to the cloud, we'll be ready. We'll have the programs; we'll have the experience; we'll have the expertise; and we will ensure your journey to the cloud is a success.

> *When your organization is ready to make the transition to the cloud, we'll be ready. We'll have the programs; we'll have the experience; we'll have the expertise; and we will ensure your journey to the cloud is a success.*
>
> — Andrew Hittle, Public Safety Division President

Public Safety Agencies Are

Embracing the Cloud



800,000+
calls for service in the cloud in 2023

$450k average savings
over 5 years

75% reduced workload
for the average agency staff

50+ outages prevented
in 2023

44% of new clients are cloud
for the Enterprise Public Safety Suite

25+ live cloud suite clients
as of April 2024

25+ contracted cloud suite deals in progress
as of April 2024

1,200+ citation clients
in the cloud

Hosted by
Amazon Web Services (AWS)

Inside the Cloud: The Technical, Tactical Benefits of Public Safety Cloud Technology

By Adam Boyd, Manager of Public Safety Cloud Strategy, Tyler Technologies

Adam Boyd

In terms of doing more with fewer resources, the cloud has been a game changer for public safety agencies. I'm going to deep dive into the more technical benefits Tyler clients experience when they transition to the cloud.

To begin, I'd like to classify the benefits into three main categories: operational, security, and financial.

Operational Benefits

From an operational perspective, when a client's system is in the cloud, Tyler's Cloud Operations Team becomes responsible for the deployment, administration of the system software, and, really, the environment as a whole. This doesn't eliminate the need for an agency's in-house IT department, but it **frees them up from having to maintain the core public safety applications and server hardware**.

When the ball is in our court in terms of maintaining this software, **upgrades are faster and more consistent** because of the standardized deployments we use with our cloud solutions.

We utilize multiple backups, including full-system backups and SQL transaction logs, and a redundant infrastructure with multiple physical locations, including production, test, and disaster recovery environments. Data is always replicated to a separate area of the Amazon Web Services (AWS) GovCloud in a dedicated, encrypted S3 bucket. This enables us to **protect against worst-case scenarios** like natural disasters, data center failures, malware incidents, hacking incidents, etc.

With the monthly recurring maintenance windows we use to apply Microsoft Windows updates, our customers are seeing just a **small blip of downtime** — an average of 90 seconds to complete the Windows update process compared to one to three hours of downtime for a Windows patching on an on-premises environment.

We also handle operating system and Microsoft SQL Server currency updates to the next major release in accordance with CJIS standards. In short, our clients who migrate to the cloud essentially **never have to go through another server migration process**.

Lastly, our team conducts **24/7 environment monitoring** of the server. This is inclusive of the operating system, all of the application services, and the resources, utilizing an industry-standard tool that gives us visibility into the environment. In 2023, we had 245 alerts, and of those, 17 were marked critical or high and would have eventually led to a system outage or severe impact on performance. Fortunately, our Cloud Operations Team was alerted to these issues and able to **remediate the problems before they impacted our clients**.

90
SECONDS

MICROSOFT WINDOWS UPDATES CAN BE COMPLETED IN **90 SECONDS IN THE CLOUD** VERSUS **1-3 HOURS ON-PREMISES**

17
ISSUES

17 HIGH/CRITICAL-LEVEL SYSTEM **ISSUES PROACTIVELY RESOLVED** IN 2023

PROTECTIONS ARE COMPLIANT WITH:

- Criminal Justice Information Services (CJIS)
- Federal Risk and Authorization Management Program (FedRAMP) *(AWS GovCloud Datacenters)*
- Certain National Institute of Standards and Technology (NIST) 800-53 guidelines
- Federal Information Processing Standards (FIPS)
  - FIPS 140-2 for data in transit
  - FIPS 197 for data at rest

I spoke with an agency that was on the fence about moving to the cloud — one of their concerns being unplanned downtime. When they conducted an internal study to determine the root cause of their outages, they found an environment issue in a server that wasn't properly maintained or monitored because their IT staff didn't have the bandwidth. These types of challenges are non-issues when an agency's core applications are in the cloud because our Cloud Operations Team is **hyper-focused on keeping these systems running properly**.

Security Benefits

Moving on to security benefits, our goal is **top-tier security and CJIS compliance**. We deploy in the AWS GovCloud. This is where all of the infrastructure and the network backbone resides, and it's built on industry-leading standards. We follow a shared responsibility model where AWS is responsible for the security of the cloud, and Tyler is responsible for security in the cloud, so **physical security of the infrastructure is second to none**.

The AWS GovCloud is a group of FedRAMP-compliant data centers that have addressed the security controls based on the NIST 800-53, as well as CJIS, FIPS, and several other compliance standards and requirements. By design, the actual data center locations are strictly confidential to maintain the security and privacy of customer data. Access to the physical data centers is limited to approved AWS employees. **The GovCloud meets the rigorous security needs of the Department of Homeland Security**, and, of course, our public safety clients get to experience that same caliber of security for their data.

All data at rest and in transit is encrypted to meet CJIS policy requirements. FIPS 140-2 for all the data in transit, and FIPS 197 for all data at rest. This also includes using dedicated, Tyler-managed encryption keys.

We take our deployments one step further by using the AWS Nitro System family of EC2 instances. That means there's a dedicated security chip that meets the FIPS 140-2 requirements, preventing even the AWS employees who have physical access to the infrastructure from accessing the data running on the virtual machines.

On top of that, we utilize client-specific controls that ensure CJIS compliance for our applications, like authentication and password policies via the Tyler Enterprise Security Server. Tyler and AWS operate under the **principle of least privilege**, meaning each user, service, or application only has the required permissions to function and nothing more.

Our cloud solutions include antivirus with intrusion detection and intrusion prevention technologies, which **monitor for denial of service attacks** and other errant activity. As an example of what that looks like, we had an end user who had just reset their password and repeatedly tried logging into the system. It was flagged as a potential intrusion, but as it turns out, they had just forgotten their new password and ultimately had to reset it again before they could gain access to the system.

We utilize a **defense in depth strategy** consisting of multiple layers, including the Tyler VPNs used to create the secure tunnel from our clients' on-premises network into the AWS GovCloud, the previously mentioned encryption, network access control lists, IP whitelisting, IP blacklisting, security groups, virtual firewalls — the list goes on and on. Ultimately, we create a **dedicated, isolated environment** for every one of our clients.

Financial Benefits

Lastly, the cloud brings substantial financial benefits. Our cloud clients have the ability to accurately forecast expenses because of the **predictable, annually recurring SaaS fee**. It also **eliminates the need for large capital expenses** — namely, hardware — and some of the pain points that come along with those purchases. There's guesswork that comes with investing in servers and infrastructure that need to last four or five years. You don't want to under-purchase, because you may end up in a place where you're having to find additional funding for more hardware. At the same time, over-purchasing could result in thousands of dollars worth of idle resources. It really is a tricky balance.

On top of that, once that equipment finally gets priced out, configured, and shipped, someone needs to install, rack, stack, wire, secure, and maintain the infrastructure.

After migrating into the cloud, **all of that becomes Tyler's responsibility**. You don't have to worry about staying compliant with Microsoft's ever-changing licensing policies since the system software is included. **Moving to the cloud is the last server migration our clients ever have to deal with** — no more provisioning new hardware, new virtual machines, and the latest server and SQL operating system for Tyler to then conduct a server migration process.

Tyler's Cloud Operations Team covers system administrator-type activities upon our deployment, including Windows updates, SQL updates, application optimization, software updates, and 24/7 support. This gives agencies the opportunity to **reallocate in-house IT support** and even **utilize third-party IT support** to focus on other tasks and initiatives.

> *Moving to the cloud is the last server migration our clients ever have to deal with.*
>
> — Adam Boyd, Manager of Public Safety Cloud Strategy

As far as cost savings go, some of these figures are certainly cut and dry. However, it is somewhat of a challenging task to compare all of the components of on-premises versus some of the **intangible cost savings** of a cloud-hosted solution. We've covered some of the obvious items — the cost of infrastructure, supporting, running, and maintaining it, as well as system software, disaster recovery, and existing software maintenance. However, every agency is different, every situation is different. I would encourage any agency considering the cloud to **conduct their own comparison of costs**, whether it be over three years, five years, or even a 10-year period. One of our current cloud clients was able to save thousands of dollars by eliminating some leased fiber links that exist between their buildings. That's a perfect example of some of the cost savings that can only come from digging deeper into an agency's unique situation through a cost comparison.

This just skimmed the surface of the immense value SaaS provides for our clients. I hope I shed some light on why I truly believe in Tyler's vision for "the cloud."

Benefits of SaaS for Public Safety Agencies

Next Steps

Keep Reading

Public Safety + The Far-Reaching Impact of the Cloud: Part 2

The Cloud Experience: Real Public Safety Agencies Share Their Journey to the Cloud

Law enforcement, dispatch, and city leaders share what drove their agencies to migrate to SaaS, the inner workings of that process, and advice for agencies in their shoes.

Read Now

Let's Talk

Ready to talk about what the cloud can do for your agency? Reach out to us.

833.895.3783

PublicSafetyInfo@tylertech.com

tylertech.com/publicsafety

ABOUT TYLER TECHNOLOGIES, INC.

Tyler Technologies (NYSE: TYL) is a leading provider of integrated software and technology services for the public sector. Tyler's end-to-end solutions empower local, state, and federal government entities to operate efficiently and transparently with residents and each other. By connecting data and processes across disparate systems, Tyler's solutions transform how clients turn actionable insights into opportunities and solutions for their communities. Tyler has more than 44,000 successful installations across 13,000 locations, with clients in all 50 states, Canada, the Caribbean, Australia, and other international locations. Tyler has been recognized numerous times for growth and innovation, including on Government Technology's GovTech 100 list. More information about Tyler Technologies, an S&P 500 company headquartered in Plano, Texas, can be found at **tylertech.com**.

PS-EPSCL-TL-35630-0624

Empowering people who serve the public®

tyler technologies