



# A TOOLKIT FOR TRANSFORMATION

A composable approach makes modernization achievable and sustainable



**A**fter rapidly deploying solutions to respond to the COVID-19 pandemic, state and local governments now face a new charge. IT leaders must take stock of their technology portfolio to ensure it represents the right foundation for moving forward – even in the face of ongoing pressures to deliver solutions quickly and the ever-present reality of budgetary limitations.

Meeting this challenge requires a new way of thinking about modernization at scale, one which enables governments to tackle their biggest needs by starting small. “A lot of times in the public sector, we think about how we need to modernize large applications all at once,” says Michael Cerniglia, senior vice president of platform technology for Tyler Technologies. “But you can think small to do big things.”

This brief outlines a modern approach to application development and modernization; the toolsets that can enable modular, scalable and accessible solutions; and the importance of shifting mindsets to support new strategies that enable digital transformation.

## Beyond Band-Aids

At the onset of the pandemic, many governments deployed solutions in weeks or even days to address immediate needs. “The pandemic forced IT organizations to move faster,” says Cerniglia.

**Low code/no code environments let developers – or sometimes even non-technical business process owners – create and assemble packaged business capabilities and services using point-and-click interfaces.**

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“A lot of times in the public sector, it’s a multi-year effort, but you get a crisis like COVID, and you have to respond quickly.”

Now many organizations are reassessing these new solutions “and seeing gaps in security and compliance,” Cerniglia says. They are also finding these tools may be difficult to maintain or adapt to other needs.

As a result, IT organizations are shifting away from solutions “meant to be Band-Aids,” says Jeremy James, Tyler’s vice president of professional services. At the same time, their experiences during the pandemic have reaffirmed the importance of developing solutions fast to meet rapidly changing needs. Moving forward

the right way requires standard, scalable methodologies which let governments quickly develop safe and compliant solutions that can flexibly respond to crises, shifts in policies and priorities, and new use cases across multiple workflows or departments.

“It’s a good time for organizations to look back at what worked and what didn’t to deliver capability quickly,” Cerniglia says.

## A Platform Primer

New cloud-based platforms and modern toolsets enable government technology leaders to rethink application development using a methodology sometimes known as the “composable mindset.” Developers pick and choose different components – everything from small pieces of functionality such as user interfaces and workflow rules to fully built system modules such as client intake or investigations – and put them together to meet a business need.

“Instead of building from scratch, you’re taking pieces and putting them together like LEGO bricks to apply them to capabilities, which means you can rapidly build solutions,” Cerniglia says.

Doing so requires a software development platform with a toolset that supports this modular approach. These platforms are often developed in collaboration with cloud service providers such as Amazon Web Services (AWS) to provide the security, performance and scalability required for every application, Cerniglia says.

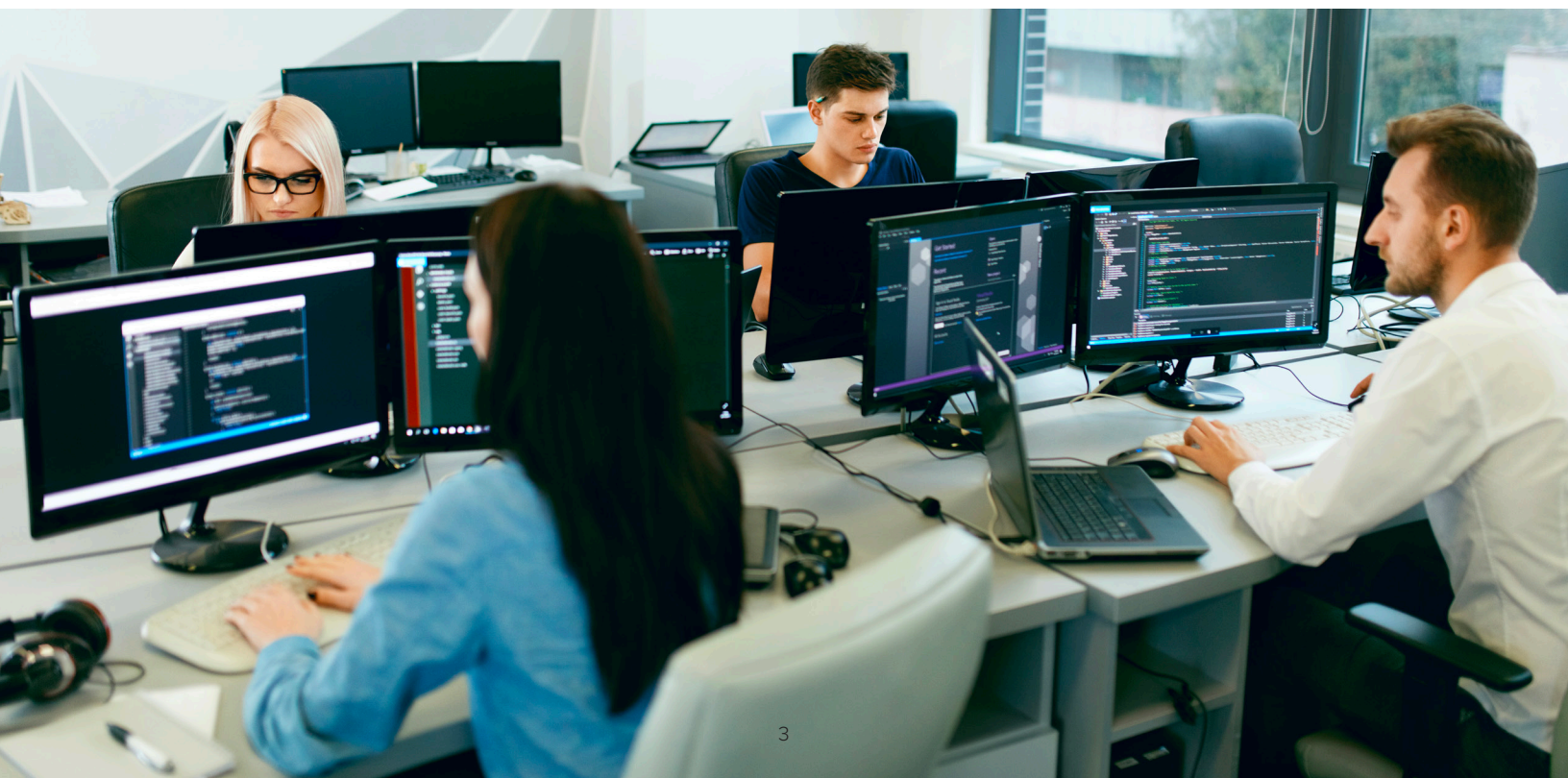
Modern cloud-based platforms that support composable application development include the following modular pieces and toolsets:

**⚙️ PACKAGED BUSINESS CAPABILITIES (PBCS):** Created by vendors or by government application development teams, these lightweight application building blocks bring together all the functionality required for a specific business capability. PBCs could include common government processes and functions such as intake systems, screening applications, case management capabilities and data-sharing tools.

The discreet pieces of functionality that make up PBCs – such as the forms, workflow tools, and application programming interfaces (APIs) needed to integrate with other systems and data stores – are most easily assembled using the toolsets and components available on modern development platforms. Development teams and architects also can reuse these components and even PBCs for multiple workflows, saving time that would otherwise be spent developing parallel solutions. For example, an intake PBC could be used for multiple social services programs across one or more departments.

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"The key to it all is modularity," says Cerniglia. "You're working with pieces to create something greater."

**⚙️ SERVICES AND SERVICE BUNDLES:** Application development platforms and the cloud providers that host them provide common services and functionality that can be used by PBCs and the larger applications that are created using the platform. For example, AWS provides pretrained machine learning services that let governments bypass the time-consuming process of building and training their own models. Some are discrete services, such as image recognition, optical character recognition or data analytics tools. Others provide an underlying foundation for the use and exchange of data in ways that can support government functions like responding to public records requests or managing and tracking sensitive data during investigations.

**In the public sector, it's important to select composable toolsets that are created specifically to address government functions, as well as an underlying cloud-based architecture that provides security and scale.**

**⚙️ A COMMON DATA FOUNDATION:** Modern platforms provide an opportunity to move away from siloed and disconnected data stores by providing built-in capabilities to securely aggregate information across the enterprise. This enables governments to analyze data across multiple departments or programs, offering the potential to transform business processes, according to Cerniglia. "It's that collection of data over time that allows you to get insights into your business."

## Strategies for Modernization

Composable toolsets and platforms support multiple modernization strategies. The three most common approaches include:

**⚙️ STANDALONE IMPLEMENTATION.** The flexibility of composable components lets governments identify specific manual or paper-based processes which have never been digitized and rapidly create nimble, flexible applications.

"When you look at the composable mindset, it's about the value you can get when you deploy quickly," says Cerniglia.

These newly digitized processes can also be combined to support multiple business processes and end-to-end services.



**Standalone Implementation**



## Legacy Modernization

⚙️ **LEGACY MODERNIZATION.** Large-scale “rip and replace” modernization projects have historically created substantial risks, including high up-front costs, significant disruption, the possibility that business needs will change during lengthy development cycles and financial constraints that could make it difficult to modify these monolithic systems in the future. By

contrast, a composable approach involves identifying the most critical areas of functionality to incrementally upgrade and replace — such as modern case management capabilities that employees can access from mobile devices or data-sharing capabilities that enable cross-agency collaboration.

“Even if you have a big legacy application, you can think about components,” says Cerniglia. “Split it up into PBCs and determine which ones can give you the most value. You don’t want to do the big bang unless that’s your only option.”



## System Enhancement

⚙️ **SYSTEM ENHANCEMENT.** Along with upgrading and replacing processes within larger legacy systems, PBCs can enhance existing systems by adding new functionality. For example, they can be used to add online constituent self-service modules to legacy systems that lack these capabilities.

### Start with the Business Problem

When building applications with a composable toolset, it’s important to start with the business problem — and the data needed to address it. “You can fix applications, user interfaces and business logic, but it’s hard to fix data,” Cerniglia says.

Begin by determining what data the application or project will need, where that data will come from, what data model is needed to analyze it, and what privacy and security rules apply to it.

Next, ensure the platform and vendor provide the right functionality for your business needs — either with vendor-developed PBCs or the capability for your organization to build them itself. That’s why in the public sector, it’s important to select a platform that has toolsets created specifically to address government functions, as well as an underlying cloud-based architecture that provides security and scale.

“If you have the right platform, you’re picking the components and filling in the gaps,” Cerniglia says.

Low-code and no-code environments let developers — or in some cases, non-technical business process owners — do much of the development and assembly of PBCs and services through point-and-click interfaces. More complex workflows and business logic can often be developed using low-code methodologies, while APIs — typically written in programming languages like Java but provided as pre-built interfaces which can be added to solutions — address the more complex tasks of integrating with existing legacy systems or data stores. Developers still write code of their own, but primarily to address the remaining gaps.

“Developers appreciate not building the repetitive pieces, but at the same time they don’t want a point-and-click interface to get in the way if you have a hard problem to solve,” Cerniglia says. “What really helps accelerate development is when you have a wide selection of toolsets available.”

It’s also important to ensure the underlying platform can support newly created applications, which may consist of multiple PBCs and services.

“Technologies that allow you to take a modular approach are powerful, however with each piece you add, you also increase complexity,” Cerniglia says. “You need a clean and composable architecture to use it across the enterprise.”

Cloud-based platforms, like those hosted on AWS, also can scale up and down to meet needs, meaning they can accommodate applications created to serve one team or thousands of users. Their underlying architecture also addresses the need to secure



data across all applications and use cases by providing encryption, audit logs for accessing data and granular rule-based access permissions for specific data sets.

## Supporting Agile Development

A composable approach to application development also enables governments to quickly create prototypes to determine the viability of a solution before committing to full-scale development. "You can model and drive it a little bit and see if you want to make the investment," says Cerniglia. "It helps you envision what would be possible."

That thinking supports agile development methodologies, but with an important distinction. "In our industry, agile is really popular, but people don't always understand what it means," Cerniglia says. "It's not just sprinting every two weeks. It's thinking in smaller pieces to do something greater."

Composable toolsets also enable another kind of agility: repurposing solutions for different departments or use cases.

"Being able to build once and deploy to multiple agencies with the same business need has a lot of value," James says. "The composable enterprise mindset involves getting the full value of an application by leveraging it across the entire organization's needs."

## Shifting the Mindset

The mindset around application development shifts once governments adopt composable toolsets. But successfully navigating that change requires technology leaders to address institutional concerns and demonstrate benefits.

The biggest challenge, says Cerniglia, is demonstrating that new, more standardized platforms can fully address complex government functions currently handled by legacy systems. Developing small proofs of concept represents one strategy to dispelling skepticism, he says.

And then there's what Cerniglia calls "the forgotten stakeholder" — the veteran developers and engineers whose careers may have centered around the complex coding required to build and maintain existing systems.



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# Agility in Action

One constant in government is change — sometimes expected, sometimes not. A composable approach to building and maintaining applications can help governments address both.

For example, a state Medicare system faced the need to routinely update reporting requirements that change annually. Using a composable toolset allowed developers to update just the components of the application that deal with reporting "without impacting the other parts of the system," says Jeremy James, vice president of professional services for Tyler Technologies.

Then there are the one-time changes that come with little warning — such as changes in policy around COVID vaccinations. Facing an executive order requiring all employees to be vaccinated by late November, one federal agency used composable toolsets to develop an application that drew data from existing HR systems to validate attestations for 65,000 employees. The project went from conception to full-scale launch in just 11 days, while ensuring that sensitive data remained secure in existing systems, according to James.

"Replacing custom coding can be intimidating because existing staff worry they're being replaced," he says. Organizations can address this fear by emphasizing that composable platforms will help developers respond to rapidly changing needs and business requirements.

"These are good tools to leverage their strengths to build things quickly," he says. "Additionally, the goal is to provide developers and engineers with more bandwidth to address those larger projects that often sit on the backburner. Composable applications present opportunities for more streamlined workflows, allowing technology teams to do even more."

Ultimately, adopting a composable mindset can address one of the biggest challenges in government — overcoming inertia.

"A lot of times we get stuck trying to come up with a grand plan," Cerniglia says. "We can go big by starting small."

*This piece was written and produced by the Center for Digital Government Content Studio, with information and input from Tyler Technologies.*