→ # Open source vs. low-/no-code: Which should federal agencies invest in?
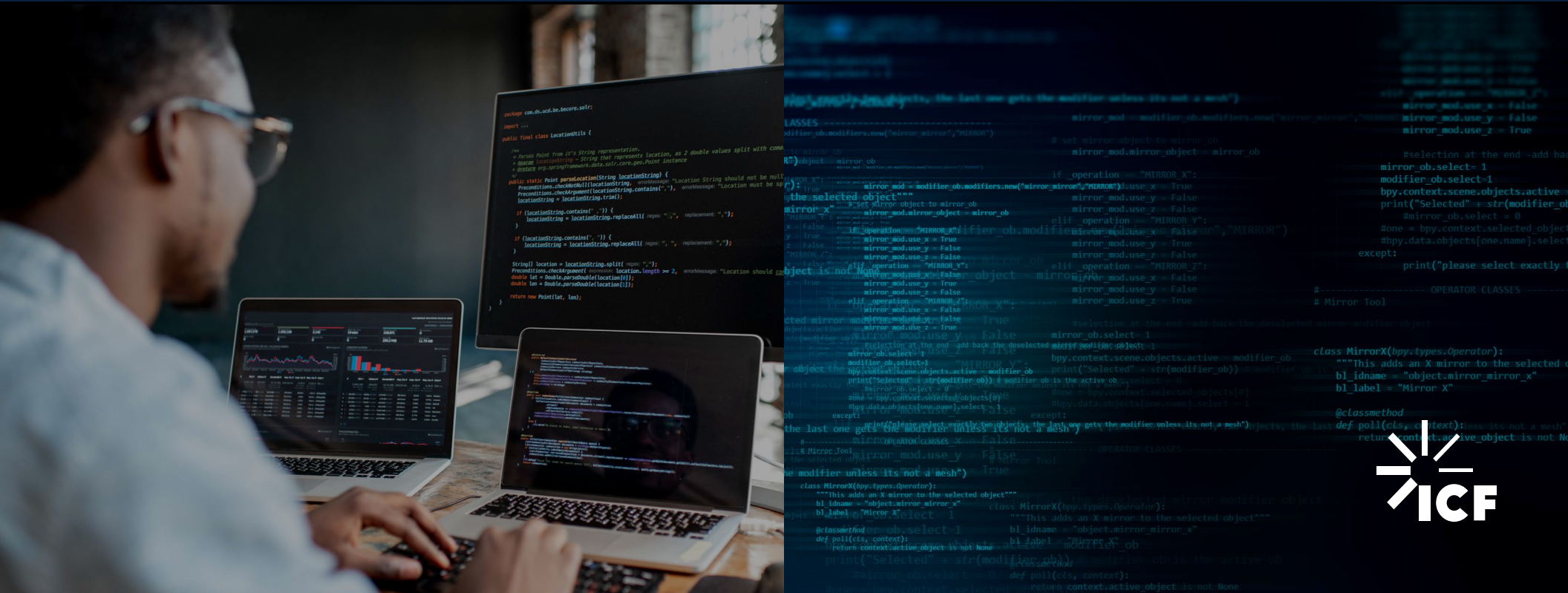
Introduction:
Open source or low-code/no-code?

An explosion of advanced tools and technologies has entered the market in recent years, offering new ways for federal agencies to accelerate IT modernization and deliver better, faster, smarter digital experiences to citizens and employees. As the federal sector looks to overhaul its IT infrastructure, two software options are vying for its attention. Open source code offers customization and encourages collaboration but requires more technical knowledge. Low-code or no-code tools offer a user-friendly, drag-and-drop interface, but can be limited in custom options. U.S. federal agencies are on the fence over the question of which software will better drive mission outcomes and help them achieve their goals.

In this eBook, we'll dive deeper into each option, exploring benefits and potential disadvantages to help you form a better idea of which solution to invest in and embrace.

What is open source code?

Open source code is written collaboratively and can be used or changed by anyone.

What do federal IT employees have to say?

A recent ICF survey asked 500 federal IT employees: "When considering your agency's digital transformation plans, which type of development would more effectively achieve your mission goals?"

54%
favored open source development, while

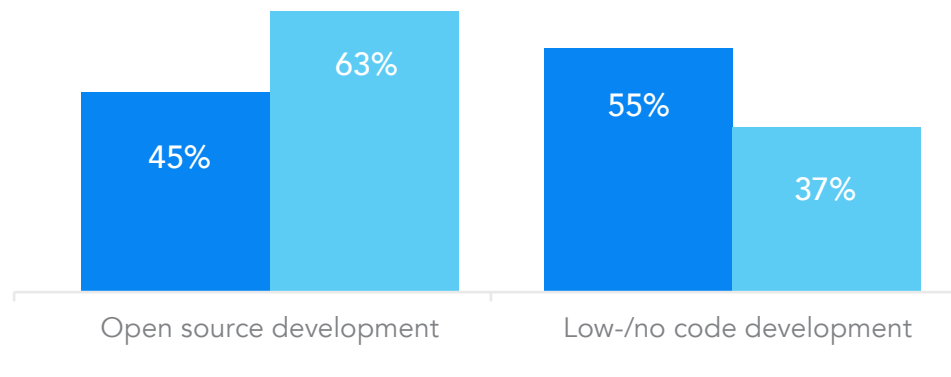# 46%
preferred low-code/no-code.

What is low-code/no-code?

Low-code and no-code capabilities make it easy for developers of any skill level to build and deploy business applications using visual design tools and a drag-and-drop interface.

Cracking the code?

Federal employees split between open-source and low-/no-code solutions*

■ GS-9/GS-10
■ GS-11+

*Asked among 500 federal employees, employed full time, working in technology or IT-focused roles

	Open source development	Low-/no code development
GS-9/GS-10	45%	55%
GS-11+	63%	37%

But 95% admit low-/no code solutions are more important now than before.

Currently, federal IT employees are fairly split on which development type would better support their goals. The right choice can depend on available resources and talent, but still, "95% of federal employees surveyed admit low-/no-code solutions are more important now than ever before," according to the same ICF study.

Regardless of solution—each with benefits and pitfalls—it's clear that everyone needs one.

Low-code/no-code demand expected to grow in federal sector

Low-code/no-code, drag-and-drop software that enables citizens and office workers to easily take on coding functions, is currently a big trend in agencies. Its simplicity is gaining traction over open source software, an often community-supported method of coding that an agency can tweak to meet its needs, which is inexpensive, and often free.

Software programmers are in short supply in the government sector as the latter cannot compete with Silicon Valley's salaries, according to a report summary from Market Research Media.

Combined with an aging IT workforce and a need to speed up implementation, that shortage is creating demand for citizen developers in U.S. agencies who can quickly build IT applications with low-code/no-code and integrate them with federal government application programming interfaces (APIs), the report says.

Low-code/no-code works well for repetitious tasks, which don't need a high degree of customization or high performance, according to John B. Owens, former CIO at the U.S. Patent and Trademark Office, writing in GCN.

Owens points to the processing of standard forms, for example, which is an act of "data collection, secure storage, and workflow

Bringing low-code efficiencies to the Surface Transportation Board

The Surface Transportation Board (STB)—an independent federal agency that provides oversight and economic regulation governance for various modes of transportation, with a primary focus on freight rail transportation—needed a ground-up rebuild of its existing suite of legacy applications as part of larger systems modernization initiatives.

Challenge

To improve system productivity and quality of life, the STB sought a partner that could implement a modern cloud-based solution in support of its mission—efficiently and economically. This extensive legacy modernization project required our team to work through many technical challenges and requirements, including:

- A large-scale legacy data migration for hundreds of thousands of system records and hundreds of gigabytes of documents and files.
- A simultaneous overhaul of the existing STB website to facilitate the electronic filing of new documents and public searches.
- A scalable platform architecture capable of adding additional workflows as the system evolves.
- A secure framework that allows all personnel access to the new case management system.

Solution

Applying our expertise in the Appian ecosystem, we modernized the case management system for the STB. We scoped, designed, and implemented a hybrid solution that leveraged the Appian platform and planned incremental releases.

The system:

- Brings secure, scalable, cost-effective features to support STB operations.
- Enables the STB to better track filings, correspondence, documents, and workflow assignments.
- Captures the needs and wants of all STB organizational units, ensuring a unified platform.
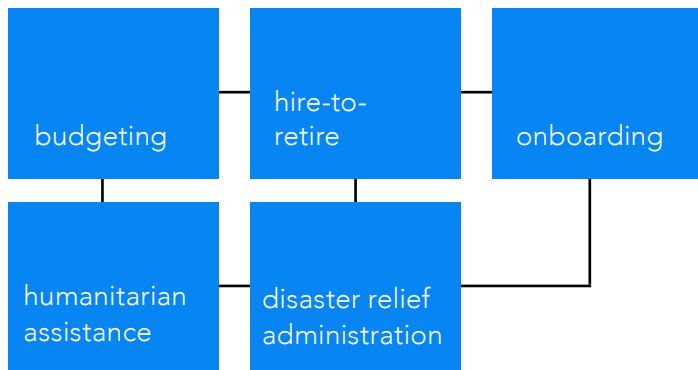
Results

As of March 2021, our team has delivered four product releases and migrated over 420,000 records to the new system. The STB's dynamic case management system receives and processes over 100,000 website search requests per month and upwards of 150 electronic document submissions per month.

The modernized Appian-based case management system for the STB provides key agency stakeholders and users a unified user experience, enabling users from multiple organizational units to leverage a single platform, thereby increasing efficiencies.

with routing, notification, and basic data analytics: a highly repetitive set of well-known and well-defined user interactions."

Secure business process automation: Low-code/no-code

In a blog post from earlier this year, Catalytic, a no-code workflow automation platform, contends that no-code solutions in the public sector can automate such processes as—but not limited to:

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budgeting    hire-to-retire    onboarding

humanitarian    disaster relief
assistance      administration
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Low-code/no-code solutions are generic. They solve the most common business problems for not just government, but across a spectrum of industries. In that sense, they are user-friendly, agile, and ideal for standardized processes (read more about how low-/no-code platforms help agencies achieve speed-to-mission).

These platforms are also attractive as they come with built-in security clearances. That allows the software to easily establish itself on the government's fedRAMP list, the list of cloud software from which federal agencies have authority to purchase.

However, while low-code/no-code can handle 80% of the lifting where a good deal of customization of data is required, that last 20% could take a long time to establish.

The more complex the business logic, and the domain—the requirements, terminology, and functionality of your software program—the less effective low-code/no-code programs become due to their largely generic nature.

Flexible, reliable, and customizable: Open source

As evidenced by Code.gov and other open source software sharing platforms, the federal government is embracing open source development to lower code spend while improving code quality across agencies.

Across the pond, the Central Digital and Data Office of the U.K. Government also advocates for open source development. They provide a handy checklist of things to consider when deciding on open source or proprietary software.

| Does the solution do what you need it to? |

| Does it meet the needs of your end users? |

| What are the solution's initial and ongoing costs? |

| If the solution is open source, how widely is the code already adopted, and how mature is it? |

"Low-code/no-code platforms allow agencies to strike the perfect balance between compliance and agility—delivering wins for CIOs, mission leaders, citizens, and employees."

—Kyle Tuberson, Chief Technology Officer, Public Sector, ICF

Helpful .gov resources

Explore these federal government links and resources to learn more about low-code/no-code and open source solutions:

The Data Briefing: Serving Citizen Developers Inside and Outside of the Federal Government (Digital.gov)

Guide to Robotic Process Automation (Digital.gov)

Sharing America's Code (Code.gov)

Open Source Community (Digital.gov)

Memorandum for the Heads of Departments and Agencies (whitehouse.gov)

The Rise of No/Low Code Software Development—No Experience Needed? (NLM; NIH)

Open source can keep IT budgets under control

The open source software company, eXo, who, in 2003, enlisted the U.S. Department of Defense as their first customer, says open source comes with many advantages, particularly helping keep IT budgets under control.

Open source software has a total cost of ownership that is generally lower than proprietary software. It is free of licensing costs—offering agencies access to code and the ability to implement solutions. The cost associated with open source code is in services to support and customize the software. So while not completely free of charge, it is far less expensive than proprietary software. "Using it therefore helps public bodies better contain their IT expenditures," says Patrice Lamarque, eXo's Product Officer.

Lamarque also cites open source's "robustness and reliability," adding that, with open source software, governments "can easily monitor their computer systems' functionality, correct the code when necessary, and even improve it as needed."

Historically, open source code was preferable to minimize cost and allow pressure testing by a high volume of users as there is a wider pool of software developers exposed to open source than to proprietary tools. That said, in a world where low-code makes lower-level programming less important, this benefit may also lose its luster.

The risks of open source software

As with low-code/no-code, open source has its drawbacks. The individuals and companies providing open source software could stop supporting it without warning.

In one instance, a software repackager became involved in a dispute with an open source company it was using, and the latter changed its license, a complication that most parties would be keen to avoid.

In a similar fashion, arguments can arise over intellectual property, which could lead to agencies using open source suddenly finding themselves on the hook for millions of dollars' worth of licenses.

Finally, while open source advocates maintain the software is secure, hackers have nonetheless discovered ways to gain access to its code, then wait, and deploy damaging malware or trojan horses hidden within open software's complicated ecosystem.

"The real art to intelligent automation lies in the orchestration—the ability to architect a solution that combines Platform-as-a-Service (PaaS), open source technologies, and best-of-breed capabilities to solve the unique mission objectives and concerns that agencies face."

—Kyle Tuberson, ICF

Conclusion: No single solution is the best

Ultimately, no single solution is going to serve an agency across the board.

Low-code/no-code does many things well but falls short where customization is needed. Open source is flexible—and boasts a considerable amount of collective power and knowledge—but has its own set of pitfalls.

Deferring back to John B. Owens, he notes that low-code/no-code, open source, and even commercial-off-the-shelf solutions all have their place. His recommendation? That agencies "engage experts to help them assess their agency's needs and select the right solution that balances cost, features, time, and performance."

So, even if a one-size-fits-all solution may never arise, with the right expertise and insight the perfect solution need not be out of reach.

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