THE NEED FOR SPEED
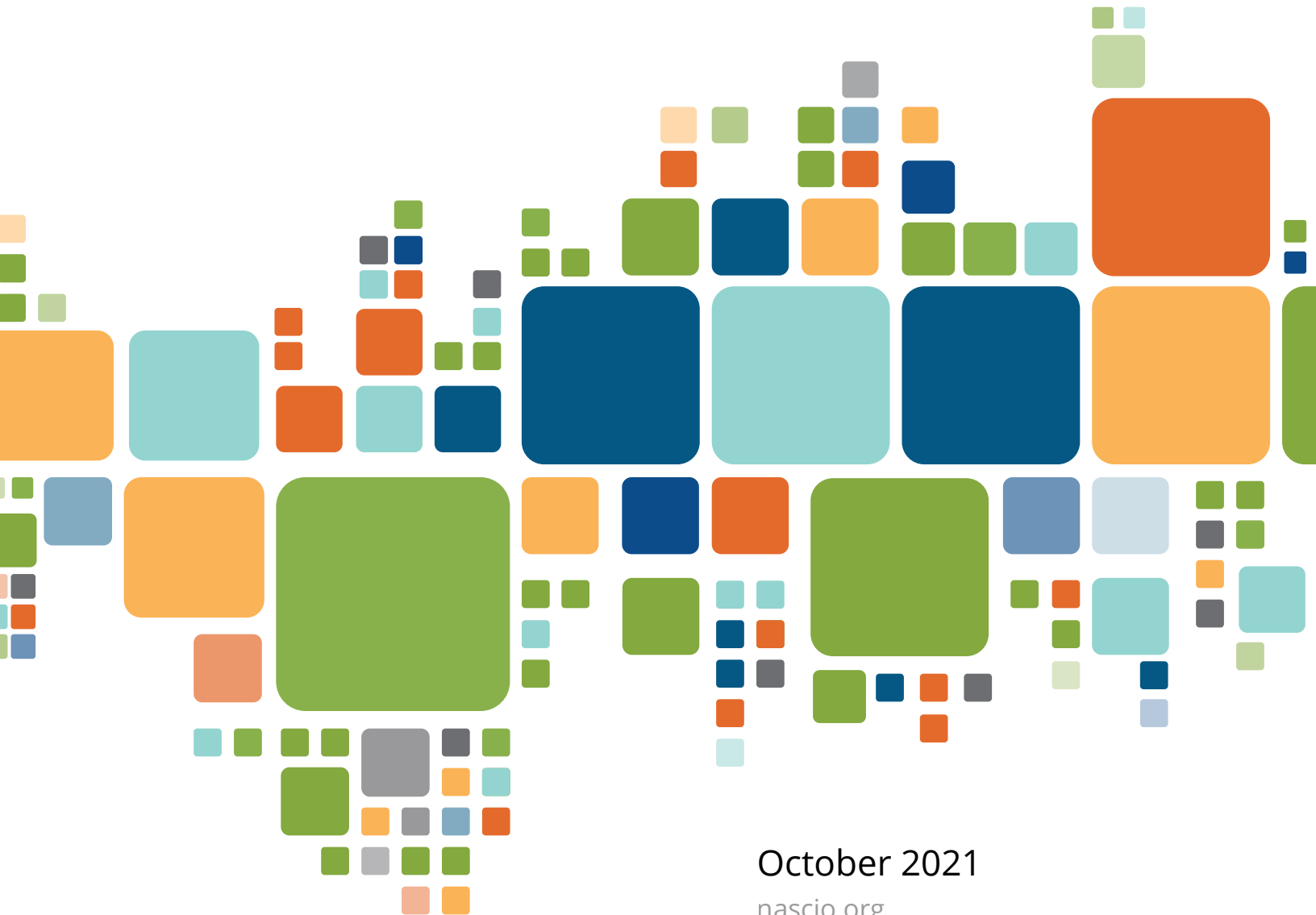
Why State CIOs are Turning
to Low-Code and No-Code
Software Development

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The idea of writing applications without programming experts isn't exactly new. In 1982, James Martin wrote the book "Application Development Without Programmers." Though much has changed in the last four decades, for many reasons this type of technology just wasn't ready for widespread adoption until recently. The COVID-19 pandemic brought with it many permanent changes to the way states provide technology, and for many, the pandemic also created the business case for low-code/no-code (LC/NC) application adoption due to how quickly the apps could be up and running.

Forbes explains the difference between low-code and no-code in terms of who is using these tools. They explain that no-code is used by "business users who can build functional but generally limited apps without having to write a line of code." These are often modular drag and drop interfaces. Those that use low-code are often "professional developers, streamlining and simplifying their work—delivering enterprise-class applications with little or no hand-coding."

As one NASCIO member company explained to us, "Low-code is going to get you 70-80 percent of the way there, and you'll need to code the last 20 percent." They further explained that no-code platforms are usually visual without needing to do any coding at all.

The use of LC/NC software development platforms also fits in well with the growing CIO as a Broker model where states are turning more to vendor partners to provide the technology needs of the state instead of doing everything in-house. This is driven in large part by state workforce challenges and the desire to move out of maintaining legacy systems.

We've seen in our own surveys that LC/NC as an emerging technology is rapidly gaining traction for state CIOs. In NASCIO's 2020 State CIO Survey, we asked CIOs what emerging technology they think would be most impactful in the next 3-5 years. We added LC/NC as an option for the first time that year and it came in as the second choice at 33% with the first choice being artificial intelligence (AI) (which included robotic process automation (RPA) and chatbots in 2020) at 61%. Data from the 2021 state CIO survey shows LC/NC tied with AI and RPA combined (AI and RPA were not combined in the latest 2021 survey).

2020
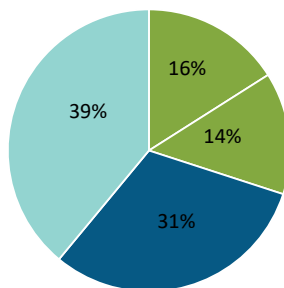
What emerging IT area will be the most impactful in the next 3-5 years? (choose one)
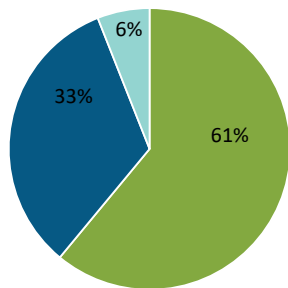
- 61% / 33% / 6%
- ■ AI (machine learning, RPA, chatbots)
- ■ Low-code application development
- ■ Other

2021

What emerging IT area will be the most impactful in the next 3-5 years? (choose one)

- 16% / 14% / 31% / 39%
- ■ AI and machine learning
- ■ Robotic process automation
- ■ Low-code/no-code
- ■ Other

Responding to COVID-19: Speed and Agility

In our conversations with state chief information officers (CIOs), other technology leaders and low-code/no-code companies we heard repeatedly about the effect the pandemic has had on the adoption of LC/NC technology. Just as we all started using collaboration tools such as Teams and Zoom in our daily routines, this technology became a necessity as well. As we all know by now, the pandemic came on fast, and suddenly states were faced with unprecedented challenges that needed to be dealt with urgently. Examples included surging unemployment insurance applications, the need for testing appointments, rental assistance portals, social assistance programs, food assistance programs, vaccine appointment portals, inmate COVID-19 management systems and, more recently, solutions to manage bringing employees back to the office.

States saw vendor partners offering LC/NC solutions to these challenges and because they didn't require traditional programming, they could be ready in hours or days. One major service integrator we talked with was able to get a drive-up COVID testing portal ready for a major city in less than two days with nothing more than a diagram to guide them.

For many of the states we talked with, they may have dabbled in LC/NC in the past, but during the pandemic these solutions became mainstream at an enterprise information technology (IT) level. On the private sector side, vendors offering LC/NC solutions also saw a huge increase in usage by states due to COVID-19.

The Benefits

We heard repeatedly from states that the largest benefit of LC/NC is the **reduction in time from concept to implementation**. As mentioned above, this was particularly important during an ongoing crisis such as the pandemic. As one state CIO put it, "Being able to stand things up for traditional development would take us 18 months. The average time during the pandemic was 11 days."

Another benefit is that LC/NC addresses **workforce challenges**. As states struggle to find qualified developers either from lack of available skilled workforce or inability to compete with private sector salaries, using low-code or no-code application development means that they don't have to hire as many people. As one state IT professional put it, "We are doing more with less and getting more of our projects done with the same number of people. In state government it's hard to get new positions, but we can make our current positions more productive."

The workforce benefits to LC/NC are particularly important to state government. One software company told us that from their perspective, governments are utilizing this technology even more than the private sector because of state government workforce issues. When asked about business drivers for using LC/NC a state CIO told us, "We have a hard time finding the right skillsets in (our state) to do traditional development. We have a history of big bang project failures like health exchanges when we try to go on our own. We wanted to be more agile and nimble getting things done."

The Downsides

Cost is a big factor for states considering LC/NC solutions. Many companies' have a pricing structure based on a "per-user" model (though some have started to offer other pricing models). If an application is going to have tens of thousands of users, it won't make sense for a state to use a solution with that pricing structure because it will simply be too expensive. States should avoid using LC/NC for applications that are low value and high touch if the pricing is based on users. An example of a low value and high touch application would be a company that has hundreds of thousands of employees that use an application to enter their time off. Licensing every employee to use the app would be extremely cost-prohibitive for the value.

Another issue we heard more than once is that the **licensing can be complicated**. You need to thoroughly understand the application up front, what you are building and how you are using it. You want to make sure you are not over licensed or under licensed based on your needs.

A specific skillset is needed to manage LC/NC work. Even though it's easier than building apps from scratch, it's not a job for just anyone. As an example, the state of Nebraska has an entire team dedicated to low-code work in the enterprise IT office. Another state IT leader told us, "We haven't tried to hire people but based on what I'm seeing, if we are going to bring some of these solutions in-house, it's going to be tough."

Some states mentioned that **low-code applications can be hard to debug.** While there are tools for testing and debugging apps built on low-code platforms, they are limited. In addition, because much of the code is hidden, debugging can take up a lot of time and reduce the value of a low-code application's time savings.

Shadow IT is another concern for state IT leaders when it comes to LC/NC. It's easy enough for agencies to purchase these types of solutions without any sort of enterprise architecture or governance in place. The cost of these solutions may be below the approval threshold for CIO review. Once that happens, the enterprise IT office has no control. As one state IT professional told us, "(T)he approach to LC/NC [especially for no-code], is to allow citizen development and to provide tools to business users who may not fully understand [or even appreciate] application lifecycle management or common approaches to system development lifecycles. The need for governance to help keep folks on a 'happy path' is paramount. It doesn't mean you need to put up roadblocks or slow folks down, but the scope of the problems that these tools should be used to address, without the need for formal development practices, needs to be clearly and frequently communicated."

Strategies for Success

These recommendations came out of hours of conversations we had with both state IT leaders and NASCIO corporate members who have experience with LC/NC.

1. **Don't forget governance.** This is the foundation of how the state of Nebraska handles low-code software in their state. They have an entire team they have trained since they were community college interns, and they handle any low-code needs that the agencies may have. Nebraska state CIO Ed Toner explained, "If you don't put governance in place around it, you could have 30-40 front ends, we want one. Because it is so easy, people could start to build their own, and you don't want sprawl. We control all the IT and cloud contracts, and we have all the developers. The rule from the start is, if you want something we are going to build it for you. The right way."

Creating a strong governance around LC/NC, and owning the process also ensures that you end up dealing with less shadow IT and don't have problems figuring out how to debug applications. Ideally as a state you would have an easy way for agencies to ask for something and a low-code team to build it for them.

2. **Make sure you aren't giving away your intellectual property or data in the contract.** Before signing a contract ensure that you would be able to get back your intellectual property if you had to switch to a different vendor. Alternatively, you might agree to save the data in another location as a backup.

3. **Get a grasp on licensing**. As mentioned above, licensing is complex. Know what you need before you sign a contract because finding the best-fit solution, despite the upfront costs, can save a lot of money and time. Understand you may be able to add more applications onto a single license—making the upfront costs more valuable over time. Consider hiring a consultant to walk you through the options and pricing margins of different vendors.

   As you get more licenses at an enterprise level, it will replace some other costs. Consider starting with bigger agencies that have bigger budgets such as health and human services or transportation before adopting low-code enterprise-wide.

4. **Avoid making changes to low-code applications.** Don't live "outside the box" because if you have to program on top of it, it is no longer considered low-code. This is also an important part of your training for users.

5. **Find or train staff with the right skillset.** Having the right staff on board to manage the programming that *is* involved in low-code software development will be helpful in making things run more smoothly. Train your users so that the applications can be maintained over time. No states we talked with mentioned that they were outsourcing contractors to help with LC/NC specifically.

Temporary Tool or the Future of Programming?

The consensus of those we interviewed was that LC/NC is taking off. Now that states have tried it out on a very large scale to respond to the pandemic, they will be finding other ways to utilize LC/NC software development. Due to workforce shortages and the desire to reduce technical debt created by custom applications, LC/NC really fills a need.

However, that doesn't mean LC/NC will replace traditional programming completely. There will always be a place for more customization and traditional development. As one state IT professional put it, "States that choose to focus on a single platform and invest heavily into enablement across their organization may find that they are able to solve the majority of problems with that (low-code) approach, but I think there will likely always be workloads that are more effort or cost to migrate than the benefits of having them consolidated into a single solution."

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