New Directions With Data

Transforming government by modernizing data systems and processes

Introduction

Government leaders have long recognized the value of leveraging data to address some of their most pressing challenges. The COVID-19 pandemic reinforced data's strategic value in making decisions in a rapidly changing environment. It also exposed gaps in state and local governments' ability to access siloed information from disparate systems in real time.

Most state and local government agencies still use legacy IT systems and processes that struggle to move the large amounts of data needed for evidence-based policymaking, says Corinna Turbes, policy director of the Data Foundation, a nonpartisan research organization.

"They're looking for effective ways to leverage data in an evidence-based system, identifying skill gaps where they need to scale up their human capital and facing privacy concerns about what it means to have so much data," Turbes says. Advancements in technology and the post-pandemic impetus for modernization provide new opportunities to justify investments in data systems that can transform how governments operate. This paper explores the benefits of modernizing data systems and strategies to ensure government leaders maximize their investments in data to achieve their policy goals.

The Data Journey

Before the COVID-19 pandemic, many state and local governments focused their data consolidation efforts on improving transparency. This work follows a path blazed by the federal government, whose open data portal (data.gov) launched in 2009 with several dozen datasets and has since grown to more than 200,000. Today, at least 46 states have some form of an open data portal, according to the National Conference of State Legislatures (NCSL),[1] as do hundreds of local governments. The growth reflects a broader mindset shift that now sees government data "as a public asset that can be used to explore and discover patterns, correlations and insights to improve efficiency and solve problems," NCSL states.

Oregon Chief Data Officer (CDO) Kathryn Helms is more succinct. Open data, she says, represents "a firm commitment that data collected is for the benefit of the public."

The pandemic reinforced the strategic value of data sharing as governments relied on a range of information to coordinate public health activities, including COVID-19 testing and social distancing measures.

"There was frantic activity trying to get our hands on data to make decisions early on," says Carlos Rivero, who was CDO for the commonwealth of Virginia until November 2021. The state built on existing data-sharing frameworks — first created to address the opioid crisis — to develop COVID-19 dashboards and datasets.

The pandemic also highlighted the disparities in technology maturity at all levels of government.

"Governments are at multiple places in their journeys," says Franklin Williams, president of Tyler Technologies' Data & Insights Division. "Leading governments are using data in every aspect of their operations and viewing it as a strategic asset to drive outcomes for residents. On the other end of the spectrum, some are just starting."

The challenges facing communities — housing and food insecurity, economic development, public safety, and ongoing public health priorities — are growing more complex, requiring greater coordination among multiple departments and agencies. Too often, government leaders still struggle to access data from disparate sources in time to make relevant decisions.

"Governments have to tackle the most important problems facing society today," Williams says. "You can't face them in silos."

Strategies for Building Data Maturity

Moving forward requires governments to assess their current level of data maturity and develop strategies to advance the sharing and use of data across agencies and departments. Among the key steps:

Evaluate existing assets — Start by asking a fundamental question: *How important are various datasets to your organization?*

"Agencies should think about the types of data they collect and what might be of value to their constituents," says Oregon's Helms.

To expand cross-agency data collaborations, it's critical to work with data stewards and owners to understand how data is used and stored to ensure that different datasets are classified appropriately for security and privacy, says Rivero. "The goal is to ensure data assets are well documented and that we clearly understand how good they are for the activities we intend to use them," he says.

To expand cross-agency data collaborations, it's critical to work with data stewards and owners to understand how data is used and stored.

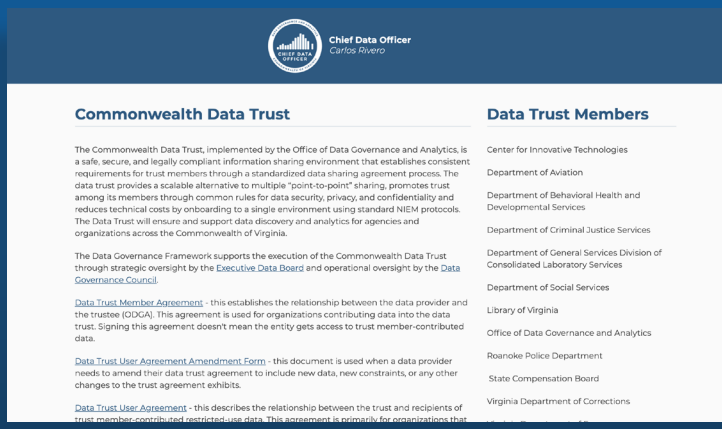
Assessing existing staff skillsets is another crucial element. Understand how many employees manage and analyze data, and whether they have both the technical and line-of-business skills to share insights across the organization.

"They have to be skilled in the domain in which they work, not just the broader IT competencies common in private companies," says Kyle Hall, director of product management for Tyler's Data & Insights Division.

Transparency and open data initiatives can help technology leaders identify promising use cases across agencies or departments.

In Virginia:

A Solid Foundation for Trust



Virginia's groundbreaking data-sharing alliance to address the opioid epidemic began in a rural corner of the state, where a local coalition had been coordinating efforts but struggled to share information among hospitals, social services agencies and law enforcement.

"We realized the issue wouldn't be resolved at the federal or state level. It needs to be addressed at the community level," says former Virginia CDO Carlos Rivero. It also needed to be addressed in ways that allowed data to be shared without compromising private information or being used to prosecute individuals.

The solution was to build a voluntary governance and legal framework in partnership with the state attorney general's office that enabled information sharing among the disparate agencies and organizations. The trust engendered by the framework brought aboard statewide partners, a process which later enabled the state to quickly stand up a COVID-19 dashboard which combined information about hospitalizations and ICU availability with testing results. This information was subsequently used by several cities and counties to analyze their own COVID testing and vaccination efforts.

"The foundational work done prior to the pandemic helped us respond to it," Rivero says.

Today, these efforts have coalesced into the Commonwealth Data Trust (https://www.cdo.virginia.gov/resources/commonwealth-data-trust/), a secure and legally compliant information-sharing environment built on the Tyler Technologies data platform running on the Amazon Web Services (AWS) Cloud. The Commonwealth Data Trust enables data sharing among more than a dozen state agencies and the Virginia Hospital and Healthcare Association. These efforts have identified new potential use cases for decision-making, including addressing food insecurity.

"The COVID response played a huge role in getting the word out about why it's so important to get the data where it needs to be in a well-governed way," Rivero says. "It's about the trust you engender to bring together the data assets."

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Identify use cases and desired outcomes — Work collaboratively with business owners to identify where decisions would have greater impact if they were enabled by real-time data and insights from multiple information sources.

"You don't need to manufacture a purpose," Helms says. "Think about your mission-critical applications, what's most important in day-to-day work, and what emergencies have looked like for you." For example, Oregon's housing and community services agency focused on data related to the unhoused, which is used to support a wide range of community partners and policy decisions.

Transparency and open data initiatives also represent an opportunity for technology leaders to identify promising use cases across agencies or departments. In New Jersey, for example, the state CDO's office researches open data available from state departments for potential use cases, says Poonam Soans, the state's CDO and director of application development. So far, these efforts have identified promising use cases based on datasets from more than 20 areas of government, including heavily accessed information about licensed childcare centers, vehicle inspection centers and cannabis dispensary locations.

> **"Sometimes agencies don't realize their data is an asset that can be used to inform decision-making."**
>
> Poonam Soans, Chief Data Officer, State of New Jersey

"Sometimes agencies don't realize their data is an asset that can be used to inform decision-making and is of great value to the general public," Soans says.

These efforts also can help identify internal champions within departments and agencies — ideally subject-matter experts who understand the context of their organization's data. Each agency contributing data to New Jersey's CARES Act dashboard, for example, has appointed a COVID-19 accountability officer who is responsible for the proper disbursement of pandemic relief funds by their agency, according to Soans.

Relationship-building is key to cultivating trust and addressing cultural barriers to data sharing.

While it's important to identify specific use cases for data projects, organizations also should prepare to use data in unforeseen ways.

"There's no way you can anticipate all the needs," says Rivero. "Creating a framework that's flexible is extremely important. ... It takes community-think to address problems from multiple perspectives."

Address cultural barriers — Along with the traditional difficulties of technology change, data sharing poses its own cultural barriers. "People are hesitant to share data because there's a risk in putting it out there," says Myca Craven, vice president of product development for Tyler's Data & Insights Division.

Addressing these concerns largely involves relationship-building. Virginia, for example, first engaged partners in a regional effort to address the opioid epidemic which coalesced into a statewide data-sharing framework to address concerns about data privacy and appropriate use.

"It's about building trust, letting people know you're all on the same team, and how we as CDOs play a service role," Rivero says.

Building support for data sharing also involves clearly communicating its benefits to each participating agency. In New Jersey, Soans spoke to agencies about the process of publishing datasets on the state's open data site to demonstrate the platform and explain its value.

"My team creates rich visualizations and information dashboards on their dataset, which makes it a lot more interesting and useful," she says. "I present it as a win-win. It's a win for them because it makes their agency look good for putting out some really useful data, and we have more data available to citizens on one website. This approach really got us a lot of buy in with the different agencies and has helped pave the way forward."

Strengthen data governance — One key to building trust is ensuring data is secure and sensitive constituent information is only accessible to authorized users. While technology plays a role here, governance and policy are the most significant levers to ensure data is accessed and used appropriately.

"A big part of getting government data where it needs to be is creating governance structures that are flexible enough to meet needs going forward," Turbes says.

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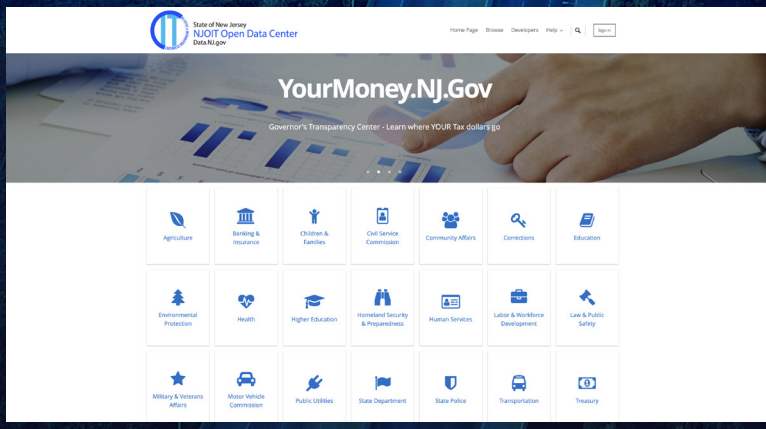
In New Jersey:

A Platform Approach to Open Data

New Jersey's first transparency site — which showed residents where their tax dollars were being spent — was developed in 2010. The application was developed in-house by nearly a dozen programmers. In 2015, the state migrated to an open data platform powered by Tyler Technologies data platform running on the AWS Cloud. The new platform prepared the state for larger-scale transparency efforts, including tracking the flow of federal relief funds — first in the wake of Hurricane Sandy and then the much larger coronavirus relief funding provided through the CARES Act in 2020.

Working on a 90-day deadline, New Jersey CDO Poonam Soans, state CTO Chris Rein and Dan Kelly, executive director of the Governor's Disaster Recovery Office, set up a process, identified participating agencies and worked with each one to appoint a COVID-19 accountability officer responsible for the disbursement and reporting of recovery funds. The resulting CARES Act disbursement site represents the largest dataset currently on the state's open data portal (data.nj.gov), covering more than $40 billion in expenditures.



The initiative was enabled by the data platform's extensibility and by an IT governance model developed during earlier efforts to coordinate data sharing among agencies that resulted in public information datasets on education, transportation, public employee pensions, health, environmental protection, agriculture and more.

The platform approach to open data has been key to simplifying and encouraging participation in these activities.

"It's the key to it all," says Soans, who also serves as the state's director of application development. "People were apprehensive about how much work it will involve. They saw that the ask is not that big on this low code platform."

Oregon is in the process of rolling out its first statewide data governance policy, which includes the expectations that each state agency will create a governing board, update data inventories and identify data stewards.

Effective data governance is another area that relies heavily on relationship-building.

"Governance is about getting the right people engaged in the right conversations to make the right decisions," Rivero says. Virginia's Commonwealth Data Trust, which enables information sharing across more than a dozen state agencies and non-governmental organizations, relied on initial partnerships to develop a consistent data-sharing agreement and disclosure regulations that have engendered the trust required for additional partners to join.

Focus on equity — Even as equity has taken center stage in government decision-making, it's often left out of data system planning because data itself is considered objective. That's a mistake.

"In reality, data collection is a socio-political act," Helms says. "There needs to be transparency about how data is used, how it's collected, and who is and isn't in the dataset."

Failing to consider these issues within dataset or data-analytics algorithms can create problems that are difficult to address retroactively.

Ensure data quality — Data-driven decisions are only as good as the quality of the information they draw from. Ensuring data quality begins with understanding appropriate uses for existing datasets within an agency or department, considering factors such as consistency, formatting and timeliness of the information. When working with data from multiple agencies, make sure common data types are standardized. New Jersey, for example, developed a uniform set of terms for its CARES funding dashboard.

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Technology leaders and CDOs also must design systems and policies that address the entire data life cycle — from creation and capture; to storage, processing and sharing; and finally, retention or deletion.

"The COVID response played a huge role in getting the word out about why it's so important to get the data where it needs to be in a well-governed way."

Carlos Rivero, former Chief Data Officer, Commonwealth of Virginia

"When projects fail, it's because they don't have the connective tissue," Williams says.

Provide support — Different departments and agencies have varying capacity for data initiatives. In Oregon executive branch agencies, for example, technology teams range in size from large and sophisticated organizations to just a handful of people. In response, the CDO's office developed a manual that details the best way to structure data, including a data dictionary defining standard metadata fields.

"Providing additional support helped us go from informal ad-hoc to standards," Helms says.

In New Jersey, agency staff participating in data sharing projects receive a simple one-page summary to get started, followed by more detailed materials that spell out data standards clearly and succinctly.

"Documentation is key to good future outcomes," Soans says. "People hear the phrase 'column level metadata' and get nervous, when all it means is that each column of data has to be defined. The same goes for asset level metadata — it's a description of the asset or dataset."

Evaluate technology needs — Committing to data-driven decision-making often requires new solutions to aggregate and catalog information from multiple sources, and a range of new options have emerged to support these efforts.

Rivero says technology systems should address two key constraints when working with multiple data partners — different methodologies for storing and collecting data on the input side and different ways to aggregate and share data on the output side.

"It boils down to being flexible and having centralized capabilities where your team only has to manage one platform to move all those datasets around," he says. "We're using cloud-based solutions that provide APIs to manage both ends of these processes so our team can remain small."

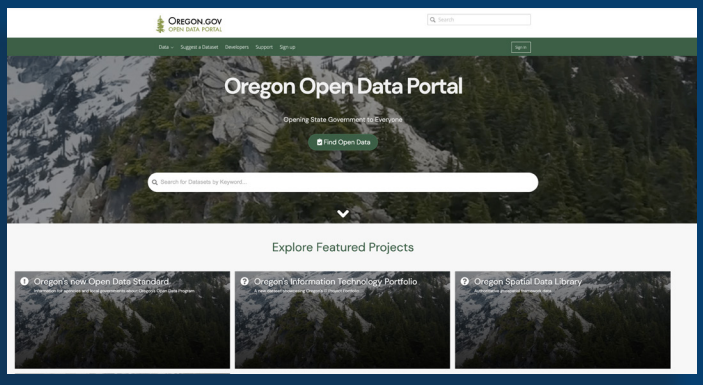
It's also important to provide dashboards, data visualizations and low/no-code tools for data analysis that let subject-matter experts, policymakers, and the public access and understand data. "Most of the value for government comes when you get that high-quality

In Oregon:

Maturing Open Data Initiatives

Since passing an open data law in 2017, Oregon agencies have mapped data on natural disasters and COVID-19 so constituents can see the local impact of these events. Users have generated more than 2 million page views on the state's open data portal (data.oregon.gov) built on the Tyler Technologies data platform running on the AWS Cloud. Kathryn Helms, who became the state's first chief data officer in 2019, is now taking steps to move Oregon's open data strategy beyond the "forming, storming and norming phase," she says.

Organic data projects which began by linking specific datasets to geographic information systems (GIS) are now supported by technical standards, a data dictionary and an emerging governance standard. A key, Helms says, is giving agencies the time and support they need to meet these emerging standards as they develop their own open-data plans.



"The way agencies show compliance is showing due diligence building toward that aspiration," she says.

Every two years, Oregon agencies will conduct a maturity assessment and refine their open data plans. These processes, in turn, will generate more opportunities to share data with the public and across agencies, according to Helms.

"Open data is a byproduct of doing data governance well in the first place," she says. "Data is now embedded into some of the foundational conversations legislators have and the information that citizens want."

Design systems and policies that address the entire data lifecycle — from creation and capture, to retention or deletion.

data into the hands of subject-matter experts and policymakers," says Hall.

Changing Culture One Step at a Time

Technology leaders point to multiple drivers for investments in data maturity — everything from ending duplicate data collection and improving operations to ensuring transparency, enabling better services and addressing emerging problems before they reach a crisis point. Efforts to restart local economies during the pandemic also have demonstrated the benefits of comprehensive data to target support where it's needed most.

"As governments go on a journey to better understand their data, they uncover a lot of the ROI along the way," says Williams, president of Tyler Technologies' Data & Insights Division.

More important, however, may be the shift in mindsets about the value of data itself. "The change that's starting to come is that agencies are thinking about data as an asset equivalent to a building or a road," says Hall.

For state and local government leaders looking to begin the journey to data maturity, one strategy may be to start small.

For state and local government leaders looking to begin the journey to data maturity, one strategy may be to start small. Turbes points to the approach initially undertaken by federal government agencies, each of which crafted an annual learning agenda focusing on a key research question they wanted to answer.

In New Jersey, Soans focuses on developing one use case/dataset within an agency, and then she encourages the accountability officer to find others after showing the impact of making data accessible on the state's data platform, which simplifies analysis and reduces time-to-insight from years to months or weeks. In similar fashion, Virginia's open data portal and the public requests for additional data it generates serve "as a conversation starter for us to get agencies on board," Rivero says.

These efforts tend to snowball, officials say, creating a data culture within agencies that drives innovation and pushes data initiatives forward.

"Every week," Soans says, "we think of new ways to incorporate data."

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

Data Solutions, Defined

Data warehouses are systems that collect structured data from siloed databases or records. They typically have the same rigid structures as the traditional databases they draw from, which makes them difficult to modify or reformat to meet changing needs or use cases.

Data lakes store large volumes of unstructured data from multiple sources in their original form. Data lakes enable organizations to store information at low cost, but the unstructured data within them must be transformed to be used for insights and analytics, introducing the potential for errors.

Data platforms streamline the process of storing, transforming and sharing data to provide a single environment flexible enough to enable analysis for a wide range of use cases. Solutions purpose-built for government include data access controls required to comply with privacy requirements and the sharing of contextualized data with the public.

To learn more, visit www.tylertech.com/resources/blog-articles/3-data-storage-technologies-explained.

1. https://www.ncsl.org/research/telecommunications-and-information-technology/state-open-data-laws-and-policies.aspx

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