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Memorandum

February 10, 2022

TO: Interested Persons

FROM: Jean Billingsley, Senior Research Analyst, 303-866-2357

SUBJECT: Technical Debt and Modernization

SUMMARY

This memorandum examines technical debt and modernization, along with legislation that aims to address legacy technical solutions that serve government organizations and their constituents.

OVERVIEW

Fixing existing technical solutions and replacing legacy systems may be expensive, and the change may be risky depending on the complexity. Yet, the challenges in supporting technical assets that have issues grow year-over-year, making them increasingly difficult to ignore. Due to multiple factors, an organization's technical solutions may become unwieldy to support due to tight budgets and limited resources. Moreover, nonfunctional requirements, such as security, compliance, or accessibility, may not be considered. Additionally, as technology becomes antiquated, the resources needed for ongoing support may be limited. For example, some organizations may find it difficult to support a technical product that is no longer supported by the vendor, or retain technical experts in an older technology.

Government organizations are also facing the need to modernize their technology. Legacy technology may not only be difficult to use and support but are also plagued with security vulnerabilities, and limited capabilities. These issues were noted in the 2017 [Report to the President on Federal IT Modernization](#) from the U.S. [Department of Homeland Security](#), which "focused on modernization efforts to improve security." Largely, these technical challenges compound if the issues are not addressed, increasing an organization's overall technical debt.

Technical Debt and Modernization

As far back as the early 1990's, "technical debt" was used to describe software that needed improvements in design or structure.¹ As the term technical debt became more popular, the meaning expanded to a broader range of technical assets. Now, the term may also describe deficiencies in any technical asset ranging from documentation, network infrastructure, hardware, and mobile devices.

Generally, technical debt is considered the gap between any existing technical asset and the ideal asset. Significant gaps could be a prevalent cybersecurity risk, or the absence of critical business functions. Subsequently, as quality goes up, technical debt goes down. Furthermore, technical debt may occur for various reasons. The pandemic, for instance, heightened the existing need to add or replace technology as organizations found an immediate need to support an expanded remote work force, improve broadband for remote learning and rural areas, and increase online government services.²

Modernization Legislation for Legacy Technology

Federal legislation. [The Modernizing Government Technology Act](#), which established the Technology Modernization Fund, was enacted as part of the [Fiscal Year 2018 National Defense Authorization Act](#) (Subtitle G Modernizing Government Technology). The act charges a board with reviewing and approving incremental funding for federal modernization projects, and requires quarterly project updates from the Office of Management and Budget.

In 2020, Congress passed the [Information Technology Modernization Centers of Excellence Program Act \(H.R.5901\)](#) to require the General Services Administration to facilitate the adoption of modern technology by executive agencies in order to improve cybersecurity. Federal departments are also addressing critical functionality. The U.S. [Department of Veterans Affairs Modernization](#) initiative includes improving its legacy technology. And to facilitate automated criminal record sealing and expungement, the [U.S. Fresh Start Act of 2021 \(US H 5651\)](#) establishes a grant program for states to modernize its justice data infrastructure.

State legislation. States are also taking a more holistic approach toward information technology (IT) modernization. Recent state legislation includes:

- **California** ([AB 1323/pending](#)) would require the Department of Technology to identify, assess, and prioritize state modernization projects, and work with legislative staff and the Legislative Analyst's Office to evaluate options, provide approvals, and establish oversight processes.
- **Hawaii** ([S.B. 1307 S.D.2/pending](#)) would establish an IT Modernization Program Management Office within the Office of Enterprise Technology Services to provide guidance and support to major IT projects.

¹"What is Technical Debt? Where does it come from?", Agile Alliance. Thierry Coq, Jean-Pierre Fayolle, Tom Grant, Dan Sturtevant, Ward Cunningham. < Introduction to the Technical Debt Concept | Agile Alliance >, accessed on February 2, 2022.

²"Pandemic Catalyzes Legislative Innovation". National Conference of State Legislators. Eric Peterson. August 23, 2021. < Pandemic Catalyzes Legislative Innovation (ncsl.org) >. Accessed on February 2, 2022.

- **Massachusetts** ([SD2645/pending](#)) would create an Innovation Fund, and establish a board, consisting of several government executives, citizens, and legislators, to provide loans to state agencies for modernization projects. Qualifications for the loan include replacing a legacy system, improving system security, or transitioning a legacy system to the cloud.
- **New Jersey** ([NJ A 2614/enacted](#)) would require each state agency to develop and submit a modernization plan each year, and then requires the Chief Technology Officer to evaluate the feasibility of using artificial intelligence, machine learning, and commercial cloud services. Modernization goals include narrowing the “growing gap between the digital demands of citizens and the methods by which the government provides digital services.” Project efforts would be focused on modernizing the government websites, including accessibility; expanding mobile device capabilities; and replacing paper processes to digital forms.
- **New York** ([NY A01330/pending](#)) would require the Chief Information Officer to study and report on methods to modernize data collection, retention, and dissemination practices in the state.
- **Texas** ([HB 4018/enacted](#)) relates to the legislative oversight and funding of state modernization IT projects, and creates the state’s Technology Improvement and Modernization Fund (fund). Each state agency using the fund’s appropriation must submit a plan to transition to a modern, integrated, secure, and effective technological environment. Texas outlines its modernization methodology, classification, and criteria in its October 30, 2020, report [Prioritized Cybersecurity and Legacy Systems Study Report to the Legislative Budget Board](#).
- **Virginia** ([VA H 1177/failed](#)) would have established the Virginia Digital Service working with an executive director appointed by the Chief Information Officer to recruit a team of experts to work with civil servants to modernize and improve digital services across the agencies.