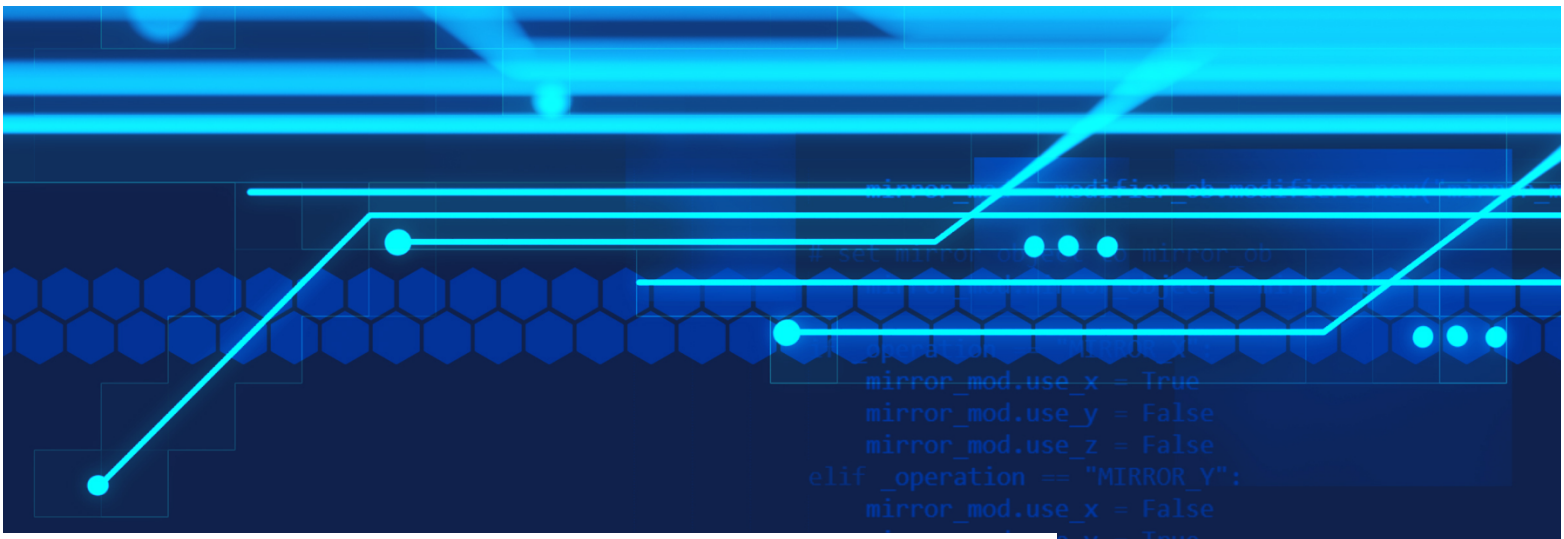
Insights from eSystems



Navigating the Maze of IT System Modernization in the Public Sector

Author: Sam Hua, Vice President, Software Engineering, eSystems

…by harmonizing the opposing forces of shrinking budgets, regulatory compliance, business demands, IT talent and limitations of legacy systems while leveraging principles of Agile, DevOps and modularity.

The Problem Today

Today's public sector faces many challenges on the technology front. Shrinking budgets and lack of IT talent, increasing regulatory compliance, rapid business changes, and the limitations of legacy systems all make it progressively difficult to maintain sustainability.

Shrinking budgets make it harder to hire and retain the right technical talent that government IT departments need, to adopt new technologies, or to get needed upgrades to equipment and software. Regulatory restrictions can complicate progress, since governments must secure citizens' and protected information. The large number of organizational and informational silos between agencies and divisions reduces visibility and discourages sharing and reuse.

There is also the need for government to modernize legacy systems to take full advantage of innovative technologies like the Internet of Things and machine learning. In *FCW* magazine[1], Mike Conger and Michael Preis pointed out that within the next 10 years, the government could save more than $110 billion by eliminating operations and maintenance of outdated systems. This shift would also lead to a more efficient government that offers its citizens better services, making it easier for citizens to engage and for workers to get their jobs done. Emerging technologies could help governments become more efficient.

Figure 1 illustrates the challenges that public sector IT organizations are facing. A shrinking budget implies that scarce resources must be conserved and utilized effectively. Doing more with less and *getting it right the first time* needs to be the rule, not the exception. Rapid business and regulatory changes increase system backlogs; coupled with the limitation of legacy systems, this hampers the ability to fulfill these needs in a timely fashion. The tug of war between these opposing forces, if not properly balanced, will not have a happy ending. The key is to find a systems integrator that has the experience and accolades to make the right decisions, with the time-tested solutions to prove it.

1. The Right Solution Architecture

With MITA 3.0, CMS is advocating that all new systems should adhere to this architectural paradigm. That sounds great from a 1,000 foot-high view. Most public IT infrastructures are not a clear playing field where this shift can magically happen with a snap of the fingers. They usually consist of intertwining tentacles of heterogeneous entrenched technologies and legacy architectures that are not easily adaptable to change. This is the manifestation of how state governments have operated for many decades - business needs, often inspired by politics, are the primary driver of the procurement, with IT taking more of a subservient back seat.

Unfortunately, this is no longer a sustainable model, with shrinking budgets and the demand for faster solutions to serve the business fueled by the expectations established by the age of the internet. IT needs to step up to take part in the decision-making process and drive the solution architecture. This is the insurance policy that will guarantee against the repeat of the "accidental architecture" of yesteryear. The last thing we all want is to realize that we still have the same brittle, inflexible architecture after having spent hundreds of millions of taxpayers' dollars in "modernizing" these systems.

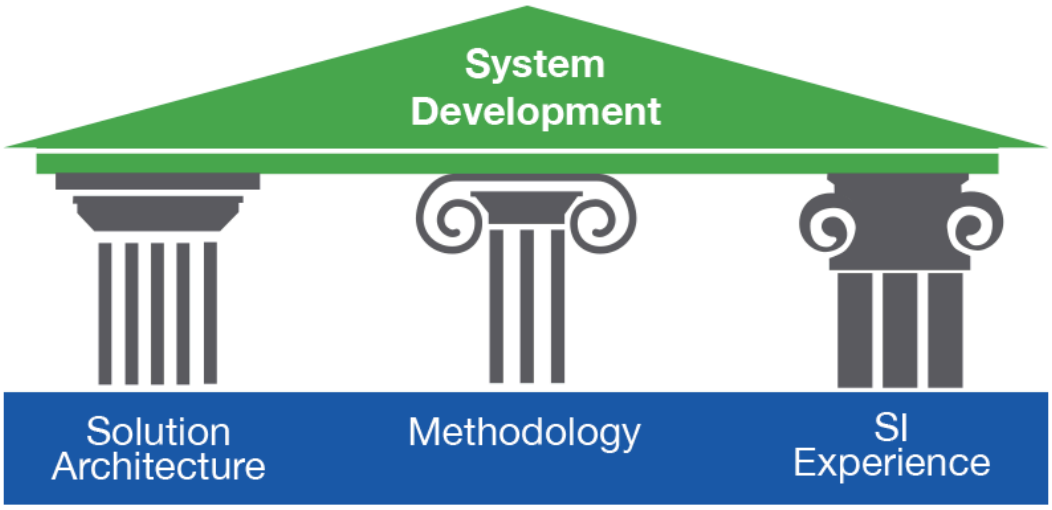


Figure 2 Foundational Pillars of Large-Scale Systems

"Architecture matters!" is a quote by Martin Fowler, the world-renowned author in software architecture, in his book *Patterns of Enterprise Application Architecture*[2]. Getting it right the first time should be our mission, not an option.

Solution architecture drives the logical and physical decomposition of the system. And there is no one size fits all. Done right, system modules will be more manageable and less dependable. They could be independently evolved, scaled and reused, as opposed to the rigid, complex large monoliths of the past.

So, what is the right architectural paradigm that supports fast time-to-market that can also scale elastically to the demands of the business? The key is an architecture that promotes modularity and bounded context, allowing for small independent teams to have the ownership and focus to drive them forward. Coupled with the principles of DevOps, software capabilities can now be enhanced, tested and deployed independently and quickly to deliver value to the business.

2. The Right SDLC Methodology

The Waterfall process was invented many decades ago for managing large projects such as building planes, ships and buildings. These projects are expensive to change once the concrete is poured and the mold is casted, so getting it right is absolutely critical. That's the reason why major up-front analysis is required, and changes are discouraged once the ship has sailed. Trying to apply the same process to software is a flawed approach. Software is inherently flexible. Unlike "hardware", flexibility allows changes to be injected up to the time of release. Yet flexibility also increases the degree of uncertainty and the ability to predict the effectiveness of these changes. This is a double-edged sword according to Gary Gruver and Tommy Mouser in their book *Leading the Transformation by Applying Agile and DevOps Principles at Scale*[3].

So, in order to embrace these software characteristics and use them to our advantage, we need to employ a SDLC methodology that favors the unique flexibility of software while ensuring predictable outcomes. We are not talking about implementing Agile by the book. This is a common mistake we have seen in this industry. According to the State of Scrum report for 2017-2018[4], published by the Scrum Alliance, 78% of projects use a combination of Scrum and other hybrid approaches. Only 16% of projects use pure Scrum. Customers ask for "agile" but they actually mean "disciplined agile", which is a balanced approach between pure agile and waterfall from a release planning perspective, while heavily leveraging DevOps principles to achieve agility, predictability and stability. While frequent stable releases are desirable, customers also need comprehensive documentation along the SDLC processes, not simply because it is required by CMS, but to ensure the availability of accurate system knowledge over a transient workforce.

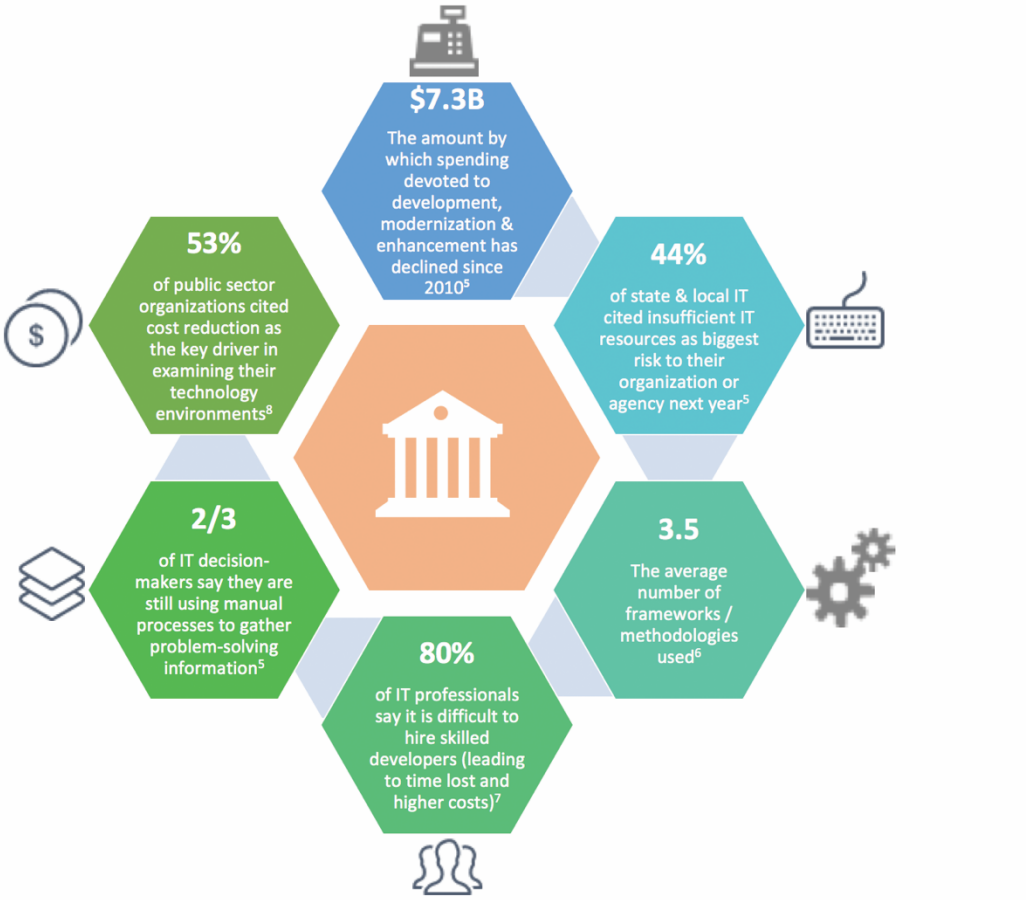


Figure 3 Key Data on Public Sector IT Challenges

3. The Right SI Experience

Modernizing enterprise applications is hard. What is the right approach and strategy? 37% of Scrum projects failed in 2018 according to the Scrum Alliance SoS report. Is it "rip-and-replace", or is it "strangle", an approach described by Martin Fowler[2]. "Rip & replace" can be very disruptive and is not often recommended. The "strangler" pattern, a more favorable approach, involves wrapping legacy systems behind proxies while new functionalities are introduced using new technologies incrementally. Over time, legacy functionalities are replaced or "strangled" until they exist no more. The choice of approach may appear trivial at a high level, but the devil is always in the details, and lack of accurate documentation and resources with the proper domain knowledge will impair the effort.

This entire journey is like running a marathon. It requires the ***right*** experience, the ***right*** discipline and persistence from a seasoned Systems Integrator that has navigated across these architectural, process and delivery waters successfully before. A famous entrepreneur from Silicon Valley once said: "Having the right vision is the easy part. Turning that vision into a viable product or solution is a journey that requires making thousands of ***right*** decisions".

Figure 4 Challenges Met with the Right Systems Integrator

Take Charge of Your IT Systems Modernization with eSystems

Along with state agencies, all businesses across industries are seeking to be more agile and productive when generating their software plans. To achieve these goals, organizations need to have a business partner with the flexibility to customize a plan that uses a hybrid of the best methodologies available, in proportions that are suited to that particular organization. This will help an organization to succeed by having the ability to quickly adjust to changing market, business, and regulation conditions.

About eSystems

Founded in 1999, eSystems' experience lies in helping Public Sector and private organizations better serve their stakeholders — members, citizens, providers, & employers — through developing business and technology solutions that are scalable and robust. eSystems is headquartered in Princeton, NJ, with offices in several U.S. states. eSystems is a technology and people-centric professional services firm with experience in systems integration, IT solutions, and application support services. We specialize in providing configurable and sustainable solutions for thriving organizations worldwide. Our employees, customers, and partners are the pillars of our success.

To learn more, visit www.esystems-inc.com or

email: marketing@esystems-inc.com

References

1. *FCW* Magazine, October 2, 2017: "Making Sense of the IT Modernization Challenge": Mike Conger & Michael Preis
2. *Patterns of Enterprise Application Architecture,* Fowler, Martin. Fowler: Pattern Enterprise Application Arch (Addison-Wesley Signature Series (Fowler)) . Pearson Education. Kindle Edition. Copyright © 2003 by Pearson Education, Inc.
3. *Leading the Transformation by Applying Agile and DevOps Principles at Scale*, IT Revolution. Kindle Edition. Copyright © 2015 Gary Gruver and Tommy Mouser ISBN 978-1-942788-02-7 All rights reserved. IT Revolution Portland, OR. info@itrevolution.net
4. "State of Scrum 2017 – 2018, Scaling and Agile Transformation", Scrum Alliance®
5. "5 Challenges to IT Modernization": DLT, Veritas: www.govloop.com, April 25, 2018
6. "State of Scrum 2017 – 2018, Scaling and Agile Transformation", Scrum Alliance®
7. "The State of Application Development 2018": Outsystems
8. "Enterprise Resource Planning Benchmark Survey": *Future-Proof Workforce Management in the Public Sector.* The Aberdeen Group, April 2014.