Financial Management for The Future:

How Government Can Evolve to Meet the Demands of a Digital World

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The Federal Financial Management community has made significant progress in improving the cost, quality, and performance of its systems. Initiatives directed and sponsored by Office of Management and Budget (OMB), General Services Administration (GSA), and the Treasury Department have provided the incentives and guidance necessary to build upon that progress. However, many agencies continue to face challenges meeting certain standards for accounting and reporting, and continue to use outdated financial systems that minimally support their financial performance and accountability. Moreover, some agencies still use legacy financial systems that feed their core Enterprise Resource Planning (ERP) system. Many of these systems are old, outdated, and costly to maintain. Additional efforts to improve financial systems through upgrades or replacement of legacy technology in an effective, efficient, and transparent manner will help agencies realize the full value of their investment in ERP systems.

In 2010, the IBM Center for The Business of Government published *What We Know Now: A Look into Lessons Learned Implementing Federal Financial Systems Projects.* That special report presented ten principles designed to provide insight into how to best deploy financial management systems, with a focus on optimizing resources and information. The principles were based upon lessons learned from multiple financial management system deployments throughout the public sector and remain relevant today:

- Engage stakeholders;
- Simplify processes;
- Plan acquisitions;
- Tighten scope;
- Commit resources;
- Manage proactively;
- Work together;
- Guide change;
- Conduct reviews; and
- Test thoroughly.

Since that publication, new opportunities and technologies have rapidly appeared. Cloud computing and shared services are becoming commonplace in the public sector. ERP vendors are beginning to encourage clients to move to the cloud by adding higher-end capabilities and announcing end-dates for on-premises systems support. In addition, new technologies and capabilities, including robotic process automation (RPA), blockchain, and artificial intelligence (AI), promise to enable significant gains in productivity. The automation of RPA, the trust and security enabled by blockchain, and the cost savings provided by shared services can all deliver significant business value.

We hope that this special report, *Financial Management for The Future: How Government Can Evolve to Meet the Demands of a Digital World,* will help government leaders and stakeholders capitalize on the promise of new technologies and business practices to increase the value of government financial systems.

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FINANCIAL MANAGEMENT FOR THE FUTURE: HOW GOVERNMENT CAN EVOLVE TO MEET THE DEMANDS OF A DIGITAL WORLD

This special report identifies and describes new opportunities that Chief Financial Officers (CFOs), Chief Information Officers (CIOs), and their colleagues and stakeholders can leverage to better position their agencies for:

- Shared services;
- Robotic process automation;
- Blockchain; and
- Artificial intelligence.

SHARED SERVICES

Federal shared services efforts have advanced for several decades. These efforts moved forward significantly with the release of OMB's March 2013 Memorandum M-13-08, *Improving Financial Systems through Shared Services,* and the designation of certain Federal agencies as approved shared service providers for Financial Management across the Federal government.

In October 2015, OMB and GSA announced the first government-wide operating model for shared services, including the establishment of the Shared Services Governance Board (SSGB) and the Unified Shared Services Management (USSM) office (now part of the GSA Office of Shared Solutions and Performance Improvement OSSPI). This model was intended to facilitate the delivery of high-quality shared services to improve performance and efficiency throughout the government, with the SSGB driving strategic direction and the USSM responsible for execution.

Ongoing initiatives and progress

OMB's May 2016 Memorandum M-16-11, *Improving Financial Systems through Shared Services,* institutionalized many ongoing initiatives and progress, including:

- Establishing the Federal Integrated Business Framework (FIBF), which serves as a model that enables the Federal government to better coordinate and document common business needs across agencies, and to focus on outcomes, data, processes, and performance. The FIBF is the essential first step towards standards that will drive economies of scale, simplify processes, and leverage the government's buying power. More information about FIBF initiatives may be found here: https://www.ussm.gov/fibf/.
- Introducing an investment review process for Financial Management (FM), Human Resources (HR), and acquisitions utilizing shared services.
- Collaborating with the Office of Federal Procurement Policy to

develop a governmentwide management and acquisition strategy for shared solutions.

- Promoting increased accountability for shared service delivery by managing the new ProviderStat process, a data-driven and ongoing review process used to assess cost, quality, and performance metrics and ultimately drive agency budget development.
- Publishing an implementation playbook of best practices and lessons learned from across government.
- Aligning investment reviews to the Federal budget cycle.
- Fostering greater collaboration among Federal agencies to prepare a demand analysis for FM and HR, allowing shared service providers to plan for increased demand.
- Identifying requirements, assessment criteria, and a designation process for allowing new entrants into the supply marketplace.

To date, many agencies have successfully moved their financial systems to shared services providers. However, some implementations have faced challenges, and several agencies have even moved to other providers or brought their systems back in-house.

The push to shared services continues

Despite such challenges, the 2017 Executive Order on Cybersecurity (https://www.whitehouse.gov/presidential-actions/presidential-executive-order-strengthening-cybersecurity-federal-networks-critical-infrastructure) and the 2018 *Modernizing Government Technology Act* (Public Law No. 115-91, Subtitle G, Secs 1076-1078) both reiterated the push for Federal agencies to adopt the use of shared services. In December 2018, OMB refreshed its shared service strategy outlined in the most recent President's Management Agenda (https://www.whitehouse.gov/omb/management/pma). Along with the strategy update, agencies are now encouraged to become more involved in the development of standards in order to drive future shared services capabilities and solutions. Sharing quality services is identified as a cross-agency priority (CAP) goal, targeting those areas where multiple agencies must collaborate to effect change and report progress in a

manner the public can easily track. The sharing quality services CAP goal states, "The federal government will establish a strategic government-wide framework for improving the effectiveness and efficiency of administrative services by 2020, leading to continual improvements in performance and operational cost savings of 20 percent annually at scale—or an estimated $2 billion over the next 10 years."

On April 26, 2019, OMB issued a new directive ordering significant realignment in shared services, M-19-26 *Centralized Mission Support Capabilities for the Federal Government* (https://www.whitehouse.gov/wp-content/uploads/2019/04/M-19-16.pdf). The memo designated the following agencies as Quality Services Management Offices (QSMOs) to lead broad categories of shared services: GSA (HR), the Department of Health and Human Service (HHS) (Grants Management), the Department of Homeland Security (DHS) (Cybersecurity), and Treasury (FM). Each QSMO agency has a senior agency point of contact (SAPOC), drives standards, and develops a five-year plan. In the future, other agencies will not be permitted to pursue stand-alone modernizations in those areas without approval from the QSMO.

Federal agencies can accelerate progress by building on prior government efforts while also taking bold new steps. Bold steps include accelerating implementation of shared services within and across departments, where economies of scale can be leveraged to perform common financial management and IT activities. Moreover, Federal CIOs and CFOs where agencies or divisions share a common ERP system have an opportunity to re-shape their workforce assumptions; as shared services providers have demonstrated the ability to drive savings for the U.S. taxpayer, Federal workforces can focus more effort on mission support and analytic tasks. Also in the HR arena, the government's modernization progress in shared services has been built on decades of work to define governance structures and business needs and to establish a marketplace and rules of competition. Through these and similar efforts, agencies can transform the status quo of legacy IT systems that are expensive to maintain and nearly impossible to modernize.

A major challenge to accelerating the "as a service" model is change management. Several factors have contributed to antiquated agency financial systems—from project funding and scale, to having leadership aligned and willing to drive the charge. Yet the comfort of existing business processes and customization often limits agencies in modernizing their financial systems. This makes continuous stakeholder engagement critical to guiding the change. As agencies embrace the "as-a-service" model and/or consolidate routine or standard operations to a small number of organizations, savings can be redirected to core mission areas. Moreover, the path to an "as-a-service" model might include an agency moving its technology and people into a central services office, and planning for further modernizations and transformation. While this delivers proven efficiencies and savings, long-term benefits will emerge from establishing a future state financial services vision, and proactively leading people and managing solutions to achieve that vision. Another key consideration for successful change management is making sure the right resources are committed and the scope of the effort is well defined.

Financial Management Line of Business establishes standards

The government has made significant progress in FM through the Financial Management Line of Business (FM LoB) by establishing standards in the following areas:

- Federal business lifecycles, service areas, functions, and activities, which serve as the basis for a common understanding of what services agencies need and what the solutions should offer.
- Business capabilities, which are the outcome-based business needs mapped to federal government authoritative references, forms, and data standards.
- Business use cases, which offer a set of agency "stories" that document the key activities, inputs, outputs, and other LoB intersections to describe how the government operates.

In addition, the FM LoB is continuing FM Federal Integrated Business Framework (FIBF) efforts in the following areas:

- Standard data elements, which identify the minimum data fields required to support the inputs and outputs noted in the use cases and capabilities.
- Performance metrics to define how the government measures successful delivery of outcomes based on timeliness, efficiency, and accuracy targets.

These standards and tools make action imperative in considering FM shared services. Agencies can leverage processes used to create the FIBF business requirements and functional areas, in order to assess the capabilities of providers to deliver services required by customer agencies ("what" is delivered), not on the software the provider offers (the "how"). This gives agencies the ability to define services needed, and offers providers flexibility to differentiate their offerings while complying with established standards. This standardized model of technology and business process support constitutes one of the most important factors for successful implementation of shared services, and will help the government accelerate its transformation.

Moreover, by emphasizing the "as a service" approach, agencies can buy dynamic cloud-based services and not static IT systems. Cloud strategies are a key consideration for agencies to consider when assessing not only the demands but also the opportunities of a digital world. A well-defined cloud strategy has proven to be more successful when jointly developed by all department leaders working, collaborating, and engaging together.

To assist with the process of moving to "as-a-service" solutions, agencies should consider utilizing not just FMLoB assets like templates or process models, but also staff who have successfully built out a LoB and demonstrated real progress (e.g., number of agencies migrated) over the long term.

ROBOTIC PROCESS AUTOMATION

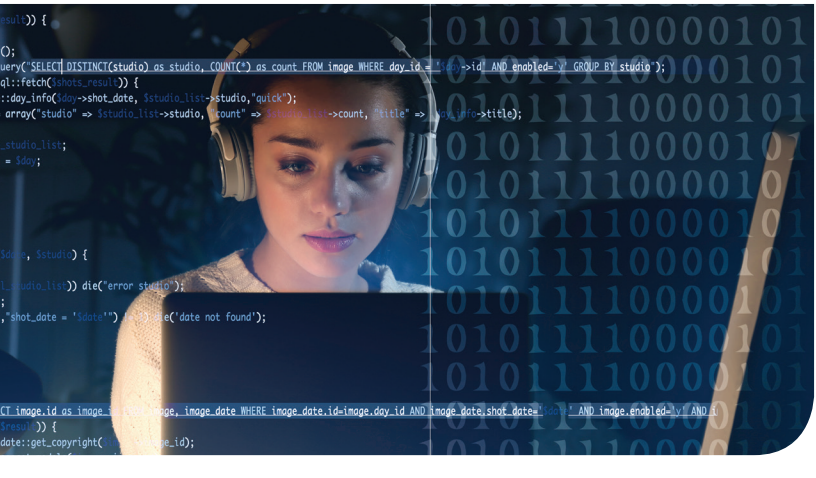
RPA is a popular topic among today's government agencies, and for good reason—the digital worker can deliver real business value via improved productivity, compliance, and accuracy, while reducing the cost of public service. In August 2018, OMB encouraged agencies to introduce new technologies, like RPA, to reduce repetitive administrative tasks in Memorandum M-18-23, *Shifting from Low-Value to High-Value Work* (https://www.whitehouse.gov/wp-content/uploads/2018/08/M-18-23.pdf).

RPA processes rules-based, structured data through a user interface of robotic software—supporting for instance, repetitive data entry functions and ERP downloads and uploads. While its benefits are real, RPA software generally executes steps for expected, default scenarios or process flows, and does not always handle exceptions, make decisions, and adapt.

RPA provides the foundation on which to build the digital employee. When integrated with cognitive capabilities like advanced analytics and artificial intelligence, advanced RPA implementations can enable intelligent automation with the potential to enhance digital workforce productivity. This intelligent automation evolves the digital workforce from a simple, process-driven team of task executers, to an orchestrated team capable of decision-making, evaluating, and self-healing to continuously improve.

Examples of RPA in action

- **Reducing backlogs in the validation and reconciliation process.** A defense agency identified and removed manual backlogs in the validation and reconciliation process for its annual cost analysis update. With an eye on discovery, transparency, and improvement, the agency determined that 80 percent of the process steps could be automated. An RPA prototype was developed to reconcile and validate data to improve cleanliness, reduce complexity and manual review time, and increase audit readiness through the creation of audit files and data governance. This



automation can be developed in less than a week, reconciles and validates 12 of 20 data provider files, follows 40 different business rules, supports multiple data formats, and completes a previous 30-60 minute manual process in less than one minute. The automation represents the first step for users interacting with the data in an SAP analytics system, and is expected to expand into additional functional and mission-oriented ERP actions.

- **Automating manual testing process.** Another defense agency implemented a pilot program to automate manual testing process. Digital assistants were created to work alongside humans in end-to-end ERP and business intelligence testing and data validation. The digital assistants reduce individual test cycle times from 30-60 minutes to 2-3 minutes, while increasing test coverage, test quality, and positioning humans to perform critical job functions such as defect resolution, active debugging, and more advanced testing. The solution combines RPA with traditional automation to execute test cases, including data entry and collection, analysis and reporting, and error identification for each case, laying the foundation for future ERP automation.

How to get started?

Processes best suited for RPA are high-volume, repetitive tasks that may involve multiple legacy systems and manual processes. They may also require a large number of staff, and have to address inaccuracies due to the rekeying of data. For example:

- Extracting data from a source system or document and keying the data into a spreadsheet or second system;
- Cumbersome processes requiring data capture from multiple sources (e.g., reconciliations and comparisons of financial data);
- Matching data between two systems; and
- Repetitive clerical processes (e.g., invoice matching or report generation and distribution).

Implementing an RPA solution effectively necessitates a focus on several key considerations:

- Begin with well-defined and fairly simple use cases;
- Build upon early success and advance toward intelligent automation and systems cognitive;
- Where the RPA platform and software bot provides the "hands" to increase productivity of a digital workforce, as described below a well-placed cognitive tool supplements the workforce's "brain"; and
- Features might include natural language processing and machine learning systems that train bots as they encounter new situations, and data analytics to diagnose issues and make recommendations.

BLOCKCHAIN

As agencies continue to rely upon a combination of ERP solutions and legacy financial systems, they often encounter heavy customization to account for nuanced business processes and offer non-standard (often proprietary) data distributions or transactions. End-to-end financial transactions involve a multitude of department and enterprise level systems and multiple organizations. This complex business application ecosystem can lead to data silos, data duplication, mismatched data, "vendor lock," or incomplete transaction data. Similarly, an inability of organizations to record all financial transactions and supporting documentation—and to provide comprehensive traceability of transactions through planning, budgeting, and execution—can hamper efforts towards achieving a clean audit. The advent of blockchain technology has helped commercial firms in the financial and other sectors address such challenges, and can reap similar benefits for government agencies.

What is blockchain?

Blockchain is a capability that allows for a centralized ledger that can track financial transactions end to end, enabling the level of traceability that agencies have long sought to achieve a clean audit opinion.

Blockchain offers:

Removal of data silos via a shared ledger—Blockchain provides a central ledger that can sit in between existing systems to allow for a single view into enterprise financial data, and the sharing of that data to inform important decisions. Assets can be tracked easily and the shared ledger becomes a single source of truth for financial transactions.

Secure data—Blockchain supports data encryption and permission settings for participants, to ensure appropriate visibility and that transactions are secure, authenticated, and verifiable.

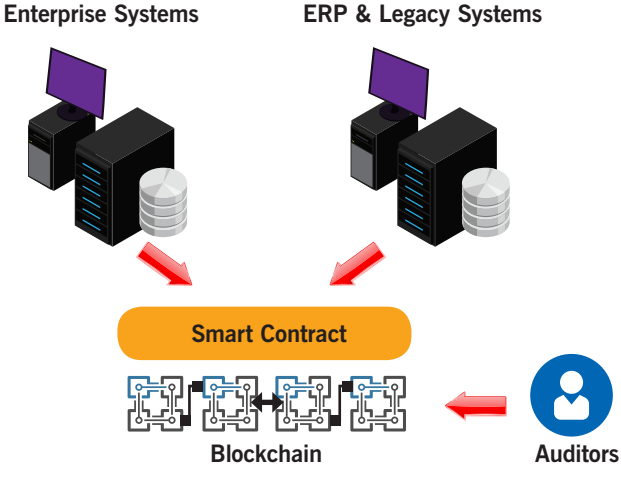
Provenance of assets—Blockchain offers complete provenance details of each recorded asset to track what happened and when. All assets are secured to the blockchain ledger.

Immutability—Nobody can change written data on the blockchain, not even a system administrator. This leads to trust in transactions and avoidance of fraud and abuse.

How can blockchain reduce complexities and create integrity and traceability into the CFO's financial management process? Though blockchain has the ability to maintain its own set of business logic and business rules as part of a "smart contract," the most appropriate

implementation may be to leverage blockchain capability as a "shadow chain." The shadow chain can sit over the top of existing systems and record transactions during each step in the financial process, according to the business rules defined in the blockchain smart contract; this creates an immutable record that can be reviewed through permissioned access. Such an implementation will take advantage of the investment already made to build out the complex logic of the FM process, and eliminate the need for governing bodies to further standardize data across the myriad of organizations, systems, and transactions involved—focusing instead on the rules that define what data each player provides at each step in the process for ledger recording.

The blockchain can connect with existing ERPs and legacy systems through use of APIs (Application Programming Interfaces), and these systems can pass records to be stored in the chain.



With each piece of the end-to-end transaction stored in the blockchain, each organization can view each piece through secure access—a level of visibility not currently available. Agencies can leverage smart contracts that execute on the shared ledger based on a set of agreed upon business rules to drive consistency across the

network; the same rules apply for everyone using data on the shadow chain. Further, auditors have a place to view each transaction and a way to document traceability. Finally, the value of blockchain can provide a trusted, more accurate, more actionable data set to feed AI, RPA, analytics, and other emerging technologies, value greater than than of a blockchain itself.

Use cases

Opportunities for blockchain in the Federal government are gaining traction. One agency is using blockchain to transmit and store data collected along borders and from airports and ports, while another is exploring how blockchain can be used to exchange medical information more securely and efficiently.

How to get started?

These resources can help agencies get started:

- ACT-IAC Blockchain Primer: Enabling Blockchain Innovation in the U.S. Federal Government: https://www.actiac.org/act-iac-white-paper-enabling-blockchain-innovation-us-federal-government
- ACT-IAC Blockchain Playbook: https://blockchain-working-group.github.io/blockchain-playbook/intro
- The Impact of Blockchain for Government: Insights on Identity, Payments, and Supply Chain: http://www.businessofgovernment.org/report/impact-blockchain-government-insights-identity-payments-and-supply-chain#overlay-context=blog/how-can-blockchain-technology-help-government-drive-economic-activity-1
- Blockchain best practices guide *The Founder's Handbook, Your Guide to Getting Started with Blockchain Edition 2.0* discusses how to identify the business problem, build your ecosystem, business model design, governance, and legal considerations. https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=28014128USEN.

Key considerations

To determine whether a use case is a good fit for blockchain, ask these questions:

- Is a business network involved?
- Is consensus used to validate transactions?
- Is an audit trail, or provenance, required?

- Must the record of transactions be immutable, or tamper proof?
- Should dispute resolution be final?

If the answer is yes to the first question and to at least one other, then the case would benefit from blockchain technology.

ARTIFICIAL INTELLIGENCE

Cognitive capabilities involving AI will come to the Federal ERP marketplace, but likely at a slower pace than in the commercial market. The information security requirements and process required for implementation by federal agencies, particularly in the defense and intelligence space, will mean that adoption of widespread usage must be accompanied by a careful focus on compliance. For example, agencies must follow the Federal Risk and Authorization Management Program (FedRAMP) which enables secure cloud computing for the federal government. In addition to FedRAMP authorizations, U.S. Department of Defense (DoD) cloud solutions must achieve a provisional authorization from the Defense Information Systems Agency at impact level 5 (controlled, unclassified information) or 6 (for classified information), as defined in DoD's Cloud Computing Security Requirements Guide (SRG), Version 1, Release 3 (March 6, 2017).

In October 2018, OMB released the Federal Data Strategy (https://www.performance.gov/CAP/CAP_goal_2.html) that serves as a foundation for how agencies can use AI, which has since been supplemented by an AI Executive Order (https://www.whitehouse.gov/presidential-actions/executive-order-maintaining-american-leadership-artificial-intelligence). The Strategy identifies practices, principles, and action steps designed to inform agency actions on an on-going basis, and the EO lays out a roadmap for agency implementation and standards development.

Example of AI in action

The U.S. Transportation Security Administration's Office of Acquisition Program Management experimented with a proof of concept of a Cognitive Object Detection Assistant (CODA). CODA demonstrated

early machine learning successes for X-ray baggage screening in the checkpoint environment, and the ability to improve threat object detection in comparison to traditional detection methods. CODA helped to augment the X-ray image for the operator by highlighting threats and prohibited items, identifying threat type, and providing a confidence score. CODA technology demonstrated a 99 percent detection rate for handguns.

Adoption of advanced capabilities will likely continue to occur first on the edges for the Federal financial ERP systems, where natural language processing may be implemented for help desk support (and blockchain use cases for asset management and supply chain). AI-enabled chat-bots have been successfully deployed on numerous ERP implementations to drive customer satisfaction, (e.g., by immediate response to common questions) and reduce costs (e.g., off-shift support can be provided exclusively through AI).

An application of AI in ERP can help agencies understand large amounts of historical, unstructured information, in order to identify patterns and improve performance. For example, a large civilian Federal agency is looking to improve its acquisition processes and redundancies in departmentwide contracting by putting emerging technologies behind data on the $24 billion it spends on goods and services each year through its "Buy Smarter" initiative. This agency recently analyzed $23 billion in prior year purchase records from its procurement system. AI machine learning algorithms enabled more discrete category management and the identification of about $2 billion a year in potential cost avoidance from consolidated purchases, reduction of vendors, reduction of models purchased, and similar steps. This analysis was not natively available in the procurement systems and too time consuming to be done manually.

How to get started?

These resources can help agencies get started:

- Federal Data Strategy: Leveraging Data as a Strategic Asset, https://strategy.data.gov/
- Delivering Artificial Intelligence in Government: Challenges and Opportunities, http://www.businessofgovernment.org/sites/default/files/Delivering%20Artificial%20Intelligence%20in%20Government.pdf
- How Artificial Intelligence Can Transform Agencies, https://www.nextgov.com/ideas/2019/01/how-artificial-intelligence-can-transform-government/154462/

CONCLUSION

Additional efforts are required to improve agency ERPs through upgrades, replacement of legacy financial systems, cloud strategies, and the adoption of cognitive technologies. The goal to operate an effective, efficient, and transparent CFO organization is ever changing as technology advances faster than most agencies can adapt, although many of the concepts discussed in the Center's 2010 paper remain relevant and apply to areas discussed in this special report. While most Federal ERPs have been relegated to the back office and CFO functions, the future of ERPs enabled with cognitive technologies will allow migration to mission-oriented functions—adding value to the ERP investment. A key to success will involve agency understanding of how to plan for and acquire new technologies and services. The following steps can help agencies move forward.

Recommended Next Steps

- Learn more about innovative solutions to help agencies become more efficient and transparent in Federal Financial Management by visiting the Bureau of the Fiscal Service's Office of Financial Innovation & Transformation (FIT) at https://www.fiscal.treasury.gov/fit.
- Attend training on these emerging technologies, such as free topic offerings at Massive Open Online Courses at www.MOOC.org.
- Identify pain points in business processes, and consider a use case for one or more of these emerging technologies.
- Pilot the use of an emerging technology for a business process pain point, and share the results of a pilot experience through FIT FM Innovation Program for information sharing purposes and lessons learned.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