IRS Information Technology Modernization Business Plan

FY2019 Key Insights Report

February 2020

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1.0 PURPOSE

The Internal Revenue Service (IRS) is committed to providing America's taxpayers with top quality service by helping them understand and meet their tax responsibilities, and by applying the tax law with integrity and fairness to all. Investing in the modernization of the IRS's systems is critical to enabling a strong voluntary tax system, advancing the IRS's ongoing mission, and delivering a quality customer service.

The IRS Information Technology Modernization Business Plan (Plan), published in April 2019, describes a six-year modernization roadmap for achieving IRS enterprise modernization goals in two, three-year phases beginning in FY2019. The Plan includes a set of modernization initiatives estimated at approximately $2.3 billion to $2.7 billion over six years (including $310 million budgeted in FY2019), as well as a set of goals, multiple milestones, and levels of accountability. The Plan represents a surge towards modernizing the IRS; this investment over six years positions the IRS to continue its modernization journey and keep pace with changing technology. It is also guided by the IRS Strategic Plan FY2018-2022, which outlines enterprise resource decisions, programs, and operations to meet the taxpayer and tax community members' changing needs and expectations. The plan will continue to evolve as we factor in new appropriation levels and integrate the customer service, reorganization, IT strategic plan, and system development requirements in the Taxpayer First Act.

With a plan of this size and scope, communication of our progress, costs, and lessons learned is key to continued stakeholder buy-in and ensuring alignment of our performance against established goals and objectives. This document, the FY2019 Key Insights Report, builds on the IRS Plan and the IRS Strategic Plan FY2018-2022 by providing a comprehensive year-end summary of performance and budget updates related to the delivery of the Modernization Portfolio in FY2019. The report also provides initial performance measures and associated baselines developed to track progress for FY2019, while also highlighting Modernization Portfolio projections and commitments for FY2020.

As we conclude the first year of Phase 1, initial performance results and outcomes demonstrate that the IRS has made significant

> "We are continuing to deliver capabilities that put taxpayers first and enhance every perspective of the taxpayer experience.
>
> ***Charles P. Rettig***
> *Commissioner of Internal Revenue*

progress towards transforming the agency's technology and delivering a modernized taxpayer experience, highlighted in **Figure 2** within **Section 4.0** and described in the narrative accomplishments throughout **Sections 4.1-4.4**. These accomplishments were achieved despite the lapse in appropriations, which had direct and indirect effects on the Modernization Portfolio. Despite the five-week lapse and the implementation of the largest tax law changes in over 30 years as part of the Tax Cuts and Jobs Act (Public Law 115-97), the IRS started the filing season as planned and issued nine out of ten refunds within 21 days. More than 109 million refunds were issued in filing season 2019, totaling over $300 billion paid to taxpayers. IT systems maintained 100 percent uptime, which ensured that submission processing, fraud detection, and the ability for taxpayers to make online payments continued without interruption. The 2019 Filing Season was applauded as one of the most challenging and successful in 30 years.

Our priorities for FY2020 include delivering the technology needed to implement provisions of the Taxpayer First Act, Public Law 116-25, finalizing contracts associated with Enterprise Case Management (contract protests remain a potential challenge) and deploying an initial solution to the Tax Exempt and Government Entities (TE/GE) division by end of year; achieving the confidence milestones for Customer Account Data Engine (CADE) 2 Transition State 2 (TS2); proactively enhancing the IRS Cybersecurity protections and delivering new Online Account features to increase taxpayer payment functionality.

Our overall success will depend on several special legislative proposals and regulatory authorities that we believe are appropriate for an effort of this scope and importance:

- Engaging the Office of Personnel Management (OPM) to utilize direct hire authority for IT modernization positions, based on availability of funds. We have actively engaged the Office of Personnel Management to utilize direct hire authority for IT modernization positions to support the Tax Cuts and Jobs Act of 2017 (TCJA) and the Bipartisan Budget Act of 2018, which expired on December 31, 2019. Under this authority, we hired 426 GS-11 through GS-14 technical employees to support implementation of the legislative mandates. Currently, we are drafting a request to OPM for direct hire authority to support IT technical needs for the Taxpayer First Act, Public Law 116-25. However, to achieve overall success over the life of the Plan, we would require the flexibility to exercise on additional need for direct authority and/or broadening existing government-wide authorities, as needed;
- Leveraging the IRS streamlined critical pay authority (SCP) reauthorized by Congress as part of the Taxpayer First Act, Public Law 116-25 (Section 2103) through 2025 to fill critical technical positions. Job announcements for SCP positions have been issued. We expect SCP candidate to start onboarding in the third quarter of FY2020;
- Striving to provide consistency in regards to the availability of funding. The velocity at which the IRS delivers modernization is dependent on stable, predictable, and consistent funding.

Modernization Reporting Cadence

The Key Insights Report complements the regular communications delivered throughout the fiscal year to essential stakeholders and partners (e.g., Office of Management and Budget (OMB), Treasury, Government Accountability Office (GAO)). Some of these reporting cadences include:

- Monthly briefings on the Modernization Portfolio through the IRS Taxpayer First Act reporting to the Assistant Secretary of the Treasury for Management (ASM), including delivery accomplishments, cost, schedule, scope, and outcomes-based metrics;
- Quarterly investment reporting providing cost and schedule performance to Congress and GAO as mandated in Omnibus legislation;
- Annual budget requests and related documentation (e.g., the IRS Congressional Justification) with Plan implications.

We will continue to evolve this process in the future, building on our Key Insights described in **Section 2.0**.

1.1 FY2019 KEY INSIGHTS REPORT OVERVIEW

We are proud of the significant progress made and the strong foundation established to continue delivering on our modernization goals outlined in the Plan. To effectively communicate our accomplishments and develop the Key Insights Report, we collaborated across the IRS and with other stakeholders to aggregate modernization program data and program accomplishments, track and update delivery timelines, define and baseline performance measures, and describe the expected outcomes associated with our delivery of the Modernization Portfolio initiatives.

FY2019 Modernization Portfolio Review

In FY2019, we delivered 19 of 20[1] (95 percent) Modernization Portfolio milestones at $291.2 million of the revised $310 million (94 percent) budget in FY2019. The FY2019 budget was originally planned for $300 million and was revised to $310 million due to an approved $10 million increase in funding for Enterprise Case Management. The Modernization Portfolio Budget cost table (presented in **Table 1 & Table 4**) describes the planned annual budget and end of fiscal year actual spend for FY2019 by Pillar and across programs. Detailed cost information for each program, including variance differences, can be found in **Sections 4.1-4.4.**

[1] "Procure ECM solution" was not delivered as scheduled in FY2019 due to a contract protest filed with GAO; progress towards delivery will continue in FY2020.

TABLE 1: FY2019 Modernization Portfolio Budget

MODERNIZATION PILLAR	PROGRAMS	PLANNED ANNUAL BUDGET[2] *($ IN MILLIONS)*	REVISED ANNUAL BUDGET[3] *($ IN MILLIONS)*	END OF YEAR ACTUALS[4] *($ IN MILLIONS)*
Taxpayer Experience	WebApps[5]	25.00	24.70	24.10
	Taxpayer Digital Communications Outbound Notifications	5.00	5.40	5.40
	Live Assistance	5.00	5.00	5.00
Core Taxpayer Services & Enforcement	CADE2 TS2	85.00	85.00	80.90
	Enterprise Case Management (ECM)[6]	60.00	70.00	59.50
	Return Review Program (RRP)	35.00	35.00	34.70
Modernized IRS Operations	Robotics Process Automation (RPA)	5.00	5.00	5.10
	API Implementation	N/A	N/A	N/A
	Cloud Execution	5.00	5.00	5.40
	Next Generation Infrastructure	10.50	10.50	9.80
Cybersecurity & Data Protection	Vulnerability & Threat Management	19.50	23.10	21.40
	Identity & Access Management	20.00	20.20	19.00
	Security Operations & Management	25.00	21.20	21.00
	Subtotal:	**$300.00**	**$310.00**	**$291.20**
Core Infrastructure[7]		18.30	18.30	18.00
Architecture, Integration, and Management[7]		36.00	36.00	35.60
	Total:	**$354.30**	**$364.30**	**$344.80**

[2] Planned Annual Budget reflects figures as identified in the Plan published in April 2019.

[3] Revised Annual Budget reflects IRS adjustments based on FY2020 appropriations and prioritization decisions.

[4] End of Fiscal Year includes end-of-year adjustments.

[5] IRS realigned $350,000 from WebApps to Taxpayer Digital Communications Outbound Notifications on September 26, 2019 to support critical development work.

[6] IRS increased the budget for Enterprise Case Management from $60 million to $70 million on July 22, 2019.

[7] Core Infrastructure (Core) and Architecture, Integration, and Management (AIM) represent enterprise staffing and planning costs necessary to deliver the Plan. Core Infrastructure provides mission-critical services for designing, engineering, testing, and deploying standardized, consolidated, virtual, and secure modernized development and production environments. AIM provides engineering management capabilities essential to delivering complex IT functions, and supports IRS systems strategy, architecture, and engineering capabilities. These costs were not identified in the Plan because they are not attributable to specific initiatives, but they were reflected in the FY2020 President's Budget. For more information on Core and AIM, see page 71 of the FY2020 Congressional Justification (March 18, 2019).

The successful implementation of the FY2019 Modernization Portfolio has provided us with a strong foundation to continue accelerating our modernization progress in FY2020. For example, we have already delivered improvements to the customer experience through completion of all three planned Taxpayer Experience milestones, including: the release of the WebApps: ID Verify tool, the Live Assistance - Callback capability for taxpayers calling the IRS Toll-Free Balance Due application, and the Internal Application for IRS employees using the IRS IT Help Desk. In a supporting effort to the Modernization Portfolio, we have seen a reduction in our aged infrastructure from 45.5 percent at the end of FY2018 to 31 percent at the end of FY2019, resulting in an overall reduction of 14.5 percent for the first implementation year.

Key successes for the Modernization Portfolio in FY2019 included:

- Deploying the ID Verify Tool to protect more taxpayers from identity theft by giving them an option to confirm their identity with the IRS online;
- Deploying callback technology on the Toll-Free Balance Due phone line to give taxpayers a callback option as an alternative to waiting on the phone;
- Taking critical steps to award a contract for an Enterprise Case Management (ECM) system;
- Creation of new models and filters within the Return Review Program (RRP) to more effectively identify non-compliance in individual tax returns associated with withholding;
- Successful delivery of all three planned scenarios to testing for the CADE2 TS2 program: Simple Single Filing to Testing, Subsequent Payment with Filing for Extension, Internal Balancing & Control;
- Completion of all nine Modernized IRS Operations milestones including deployment of a critical vendor compliance check for a procurement process and development and validation of stack components; and
- Completion of both Cybersecurity & Data Protection milestones including a strategy to improve the number and quality of the IRS's audit trails through improved security audit analytics and compliance.

In delivering on our FY2019 capabilities, we encountered some challenges that impacted our ability to achieve additional progress. For example, contracting protests affected both cost and schedule performance. By identifying key dependencies and proactively planning to mitigate risks, we addressed these barriers and are incorporated lessons learned into FY2020 planning as listed in **Figure 1** within **Section 2.0**.

Key challenges to the Modernization Portfolio in FY2019 included:

- The CADE2 TS2 program had a delayed ramp up of contractor resources at the beginning of the fiscal year, which was further impacted by the lapse in appropriations and required subsequent replanning; and
- The ECM program experienced a contract protest, filed with GAO on August 9, 2019 (and later dismissed contingent on the IRS taking specific corrective actions), which impacted procurement activity and put delivery timelines for the ECM program at risk.

Additional detail and descriptions for FY2019 implementation timelines, outcomes, and accomplishments are described in **Section 4.0** and **Appendix A**.

FY2019 Insights – Building for the Future

We identified several important insights based on our experience delivering the FY2019 Modernization Portfolio capabilities that will drive our progress and delivery. We will use these lessons learned, as described in **Figure 1** within **Section 2.0** and outlined below, to inform modernization delivery planning and implementation for FY2020 and beyond:

- **One IRS Engagement:** Collaborating across the IRS to successfully achieve the Modernization Portfolio goals;
- **Effective Governance:** Establishing a process for obtaining regular input across the IRS to enable delivery, manage risk, and provide comprehensive reporting;
- **Strong Partnership with Oversight:** Frequently communicating with oversight groups (e.g., GAO, Congressional Staff) to reinforce the value of transparency and enhance our strategic planning;
- **Incremental Delivery Success:** Focusing on the successful delivery of incremental capabilities to increase efficiency and the likelihood of long-term success; and
- **Enterprise Dependency Planning:** Proactively planning for critical dependencies, such as budget, staffing, and procurement, that may impact the delivery of Modernization Portfolio milestones.

FY2020 Modernization Portfolio Commitments

In FY2020, we are excited to continue working towards our modernization goals by building on the capabilities delivered and initiated in FY2019. With passage of the FY2020 budget on December 20, 2019, the IRS replanned the FY2020 Modernization Portfolio to realign funding and revise delivery schedules. For FY2020, we received approved funding of $312.3 million for the Modernization Portfolio by allocating $180 million for the Business Systems Modernization appropriations account, $102.3 million in user fee balances, and $30 million in carryover balances. The FY2020 Modernization Portfolio Budget cost table (presented in **Table 2 & Table 11**) outlines the planned annual budget by Pillar and across programs.

TABLE 2: FY2020 Modernization Portfolio Budget

MODERNIZATION PILLAR	PROGRAMS	FY2020 APPROPRIATION ($ IN MILLIONS)	FY2020 ($ IN MILLIONS)	USER FEES ($ IN MILLIONS)	TOTAL AVAILABLE FUNDING ($ IN MILLIONS)
Taxpayer Experience	WebApps	10.0	5.0	10.0	25.0
	Taxpayer Digital Communications Outbound Notifications	0.5	0.0	2.5	3.0
	Live Assistance	0.2	0.0	0.0	0.2
Subtotal Taxpayer Experience:		**$10.7**	**$5.0**	**$12.5**	**$28.2**
Core Taxpayer Services & Enforcement	CADE2 TS2	60.0	20.0	20.0	100.0
	Enterprise Case Management (ECM)	58.0	0.0	8.2	66.2
	Return Review Program (RRP)	0.0	0.0	0.0	0.0
Subtotal Core Taxpayer Services & Enforcement:		**$118.0**	**$20.0**	**$28.2**	**$166.2**
Modernized IRS Operations	Robotics Process Automation (RPA)	1.0	0.0	0.0	1.0
	API Implementation	0.0	0.0	0.0	0.0
	Cloud Execution	0.5	0.0	2.0	2.5
	Next Generation Infrastructure	0.3	0.0	0.0	0.3
Subtotal Modernized IRS Operations:		**$1.8**	**$0.0**	**$2.0**	**$3.8**
Cybersecurity & Data Protection	Vulnerability & Threat Management	24.4	0.0	10.0	34.4
	Identity & Access Management	6.0	0.0	10.0	16.0
	Security Operations & Management	4.6	0.0	10.0	14.6
Subtotal Cybersecurity & Data Protection:		**$35.0**	**$0.0**	**$30.0**	**$65.0**
Core Infrastructure (Core)[8]		2.0	1.0	7.6	10.6
Architecture, Integration, and Management (AIM)[8]		3.0	1.5	22.0	26.5
Subtotal Core and AIM:		**$5.0**	**$2.5**	**$29.6**	**$37.1**
Management Reserve (MR)		9.5	2.5	0.0	12.0
Subtotal Pause / Shutdown of Projects and MR:		**$9.5**	**$2.5**	**$0.0**	**$12.0**
Total:		**$180.0**	**$30.0**	**$102.3**	**$312.3**

[8] Core Infrastructure (Core) and Architecture, Integration, and Management (AIM) represent enterprise staffing and planning costs necessary to deliver the Plan. Core Infrastructure provides mission-critical services for designing, engineering, testing, and deploying standardized, consolidated, virtual, and secure modernized development and production environments. AIM provides engineering management capabilities essential to delivering complex IT functions, and supports IRS systems strategy, architecture, and engineering capabilities. These costs were not identified in the Plan because they are not attributable to specific initiatives, but they were reflected in the FY2020 President's Budget. For more information on Core and AIM, see page 71 of the FY2020 Congressional Justification (March 18, 2019).

Our updated FY2020 Modernization Portfolio capabilities, based on replanning, are presented in **Table 3** below (and again in **Table 10**). It was determined during the rebalancing of the modernization portfolio that the Return Review Program (RRP) has been deployed to a modernized anomaly detection platform. As a result, RRP support is being transitioned to Operations & Maintenance (O&M) and subsequently funded by Operations Support. Additional detail and descriptions of FY2020 planned implementation timelines and commitments are described in **Section 6.0** and **Appendix B**, based on approved funding levels.

TABLE 3: FY2020 Modernization Capabilities Scheduled for Delivery

MODERNIZATION PILLAR	CAPABILITIES SCHEDULED FOR DELIVERY IN FY2020
Taxpayer Experience: Deliver a service experience comparable to private industry	**WebApps** • Taxpayer Payment API with Fiscal Service – View Payments Release 1 • Modernize Online Installment Agreements – View Status and Eligibility Release 1 **Live Assistance – Callback** • Customer Callback 2020 – Additional 4 taxpayer applications • Expanded toll-free capacity
Core Taxpayer Services & Enforcement: Streamline and integrate IT programs that enable top-quality service	**CADE 2 TS2** • Measurable progress toward converting code with a target of 31% (FY2020 Q1) focusing on developing multiple Scenario variations of the Address Change transaction • Measurable progress toward converting code with a target of 35% (FY2020 Q2) and with a focus on Scenarios for input transactions when an account is not present in the master file • Measurable progress toward converting code with a target of 38% (FY2020 Q3) and with a focus on scenario functionality yet to be planned iteratively • Measurable progress toward converting code of 43% (FY2020 Q4), specific focus on scenario functionality yet to be planned iteratively **Enterprise Case Management (ECM)** • Procure ECM solution • Deliver initial case management capabilities • Deliver sequencing strategy and Release Plan Structure to support the delivery of future ECM releases for FY21 and beyond
Modernized IRS Operations: Retire and decommission legacy systems in place of more sustainable infrastructure	**Robotic Process Automation (RPA)** • SB/SE Monitoring Offer in Compromise (MOIC) • IT Help Desk Self-Service (Natural language processing) • TE/GE Referrals Batch Process Identification **Application Programming Interface (API) Implementation** • Leverage security efforts with 3rd parties to develop API(s) **Cloud Execution** • Procure and deliver ECM Release 1 Cloud platform on Treasury Cloud • Deploy Cyber CDM Phase 2 on Treasury Cloud **Next Generation Infrastructure** • DevOps: CI/CD Onboard additional projects • DevOps/Standard Stack: Deploy 3 to 5 standard stack components via automation • DevOps/Standard Stack: Develop and deploy additional standard stack components • Converting Legacy Code / Reducing the Application Footprint: Strategy on Legacy Code Conversion

MODERNIZATION PILLAR	CAPABILITIES SCHEDULED FOR DELIVERY IN FY2020
Cybersecurity & Data Protection: Continue to protect taxpayer data and address emerging threats	**Vulnerability & Threat Management** • Complete IT Asset Management Use Case • Pilot Data at Rest Encryption (DARE) • Enhanced Security Testing (EST) and Process Automation • Expand DARE implementation • Enhanced Cyber User Behavior and Fraud Analytics IOC • Next Generation ESAT (Limited IOC) • Enhanced EST and Process Automation IOC **Identity & Access Management** • CDM Phase 1 FOC • CDM Phase 2 IOC • Convert 12 facilities for physical access compliance **Security Operations & Management** • Malware Email Sandboxing FOC • Endpoint Detection Response IOC • Continue network access restriction in Enforcement Mode implementation • IRS Cloud Access Security Broker (CASB) FOC • Malware Web Sandboxing FOC • Cyber Hyper Converged Infrastructure FOC for Real-Time Correlation Analysis • Endpoint Detection Response FOC • Begin network segmentation for High Value Assets (HVA)

FY2019 Key Insights Report Walkthrough

The FY2019 Key Insights Report begins with an overview of FY2019 insights and how we intend to build upon these lessons learned in the future (**Section 2.0**), followed by a description of how our Modernization Portfolio aligns to key legislation, particularly with regards to the Taxpayer First Act & 21st Century IDEA (**Sections 3.0-3.1**). We then provide a detailed review of FY2019 Modernization Portfolio performance by Pillar, describing overall status and outcomes, delivery accomplishments, and adjustments (**Sections 4.0-4.4**). **Section 5.0** outlines the initial performance measures that we have established to evaluate our success in FY2019. Subsequent sections provide a description of FY2020 Modernization Portfolio commitments (**Section 6.0**) and additional modernization efforts occurring at the IRS (**Section 7.0**).

Dependencies

As we noted in the Plan, our overall success depends on special legislative proposals and regulatory authorities focused on addressing funding and staffing challenges that we believe are appropriate for an effort of this scope and importance. For example, we have actively engaged the Office of Personnel Management to utilize direct hire authority for IT modernization positions to support the Tax Cuts and Jobs Act of 2017 (TCJA) and the Bipartisan Budget Act of 2018, which expired on December 31, 2019. Under this authority, we hired 426 GS-11 through GS-14 technical employees to support implementation of the legislative mandates. Currently, we are drafting a request to OPM for direct hire authority to support IT techncial needs for the Taxpayer First Act, Public Law 116-25. However, to achieve overall success over the life of the Plan, we would require the flexibility to exercise on additional need for direct authority and/or

broadening existing government-wide authorities, as needed. As part of the Taxpayer First Act, Congress enacted streamlined critical pay authority for the IRS, which had previously expired in 2013. While the IRS increased hiring in FY2019, we are also leveraging the SCP as reauthorized with the Taxpayer First Act (currently set to expire in 2025) to prioritize additional hiring in support of our modernization goals. Adequate funding also remains a top concern for the Modernization Portfolio. Ensuring that funding is consistently available for multiple fiscal years is a critical factor in our ability to deliver on the projects as planned.

2.0 FY2019 INSIGHTS – BUILDING FOR THE FUTURE

From our experience delivering the FY2019 capabilities, we identified several important insights, as described in **Figure 1**, that informed modernization delivery planning and implementation for FY2020 and beyond. We will also use legislative changes to drive modernization and continue forward.

We will focus on delivering the Modernization initiatives and their underlying capabilities to meet business and customer demands with greater speed and effectiveness. We remain committed to maintaining a healthy technology organization founded on increased cross-functional collaboration and supporting stakeholders to achieve a set of shared commitments and IRS mission goals. We will continue to engage across the IRS to assess the broader environment (e.g., emerging technology, industry trends, new legislation) and tax ecosystem for potential implications related to the Modernization Portfolio.

Data drives our decision-making in day-to-day operations and is a key asset enabling us to track and assess our modernization progress. For example, in addition to insights gained through our Modernization Portfolio, we are also leveraging Technology Business Management (TBM), as highlighted in the President's Management Agenda and required by OMB for future implementation, to drive technology adoption through enhanced use of operational data and analytics. We have collaborated with Treasury to develop nine TBM-specific metrics to support delivery of Treasury Office of the Chief Information Officer (OCIO) metrics necessary to implement OMB guidance. Although TBM and its underlying capabilities are not included within Modernization Portfolio investments, TBM is already enabling new ways of looking at our IT cost data and providing data insights to ensure spend efficiency and alignment with the Modernization Portfolio.

We will continue to incorporate data-driven decision-making to enhance our approach and delivery in FY2020 and implement the lessons learned from our Modernization Portfolio efforts in FY2019, as described in **Figure 1**.

> "We're proud to celebrate the important work we are doing for the nation to support taxpayers and IRS employees. We delivered a number of improvements this year and that gives me great confidence. The IRS modernization efforts, along with provisions in the Taxpayer First Act, will improve the taxpayer experience and allow the IRS to offer the services our customers expect and deserve.
>
> ***Nancy Sieger***
> *Acting IRS Chief Information Officer*

FIGURE 1: FY2019 Key Insights

3.0 ALIGNMENT TO KEY LEGISLATION

This report reflects our commitment to comply with legislative requirements for reporting progress towards our modernization goals. As outlined in the Plan, we continue to adhere to and remain in compliance with:

- The CIO responsibilities of the recently enacted Taxpayer First Act, Public Law 116-25;
- The **Federal Information Technology Acquisition Reform Act** (FITARA); and
- Primary requirements of **Capital Planning and Investment Control** (CPIC), mandated by the Clinger-Cohen Act of 1996.

We also continue to work toward achieving enhanced information technology and customer experience performance metrics described in the **President's Management Agenda Cross Agency Priority Goals** (CAP), specifically:

- **CAP Goal 1:** Modernize IT to increase productivity and security
- **CAP Goal 4:** Improve customer experience with Federal Services

3.1 LEGISLATION ASSESSMENT: TAXPAYER FIRST ACT & 21ST CENTURY IDEA

We continue to emphasize the customer experience when engaging with IRS systems in accordance with the 21st Century Integrated Digital Experience Act (21st Century IDEA). For example, Taxpayer Digital Communications – Outbound Notifications (TDC-ON) is delivering an initial solution in FY2021 that provides certain notices to taxpayers digitally, in alignment with the 21st Century IDEA's focus on providing users with digital services. This initial solution allows the IRS to contact taxpayers in a manner similar to that of leading banks and other financial institutions through the use of push alerts and other consumer-friendly notifications.

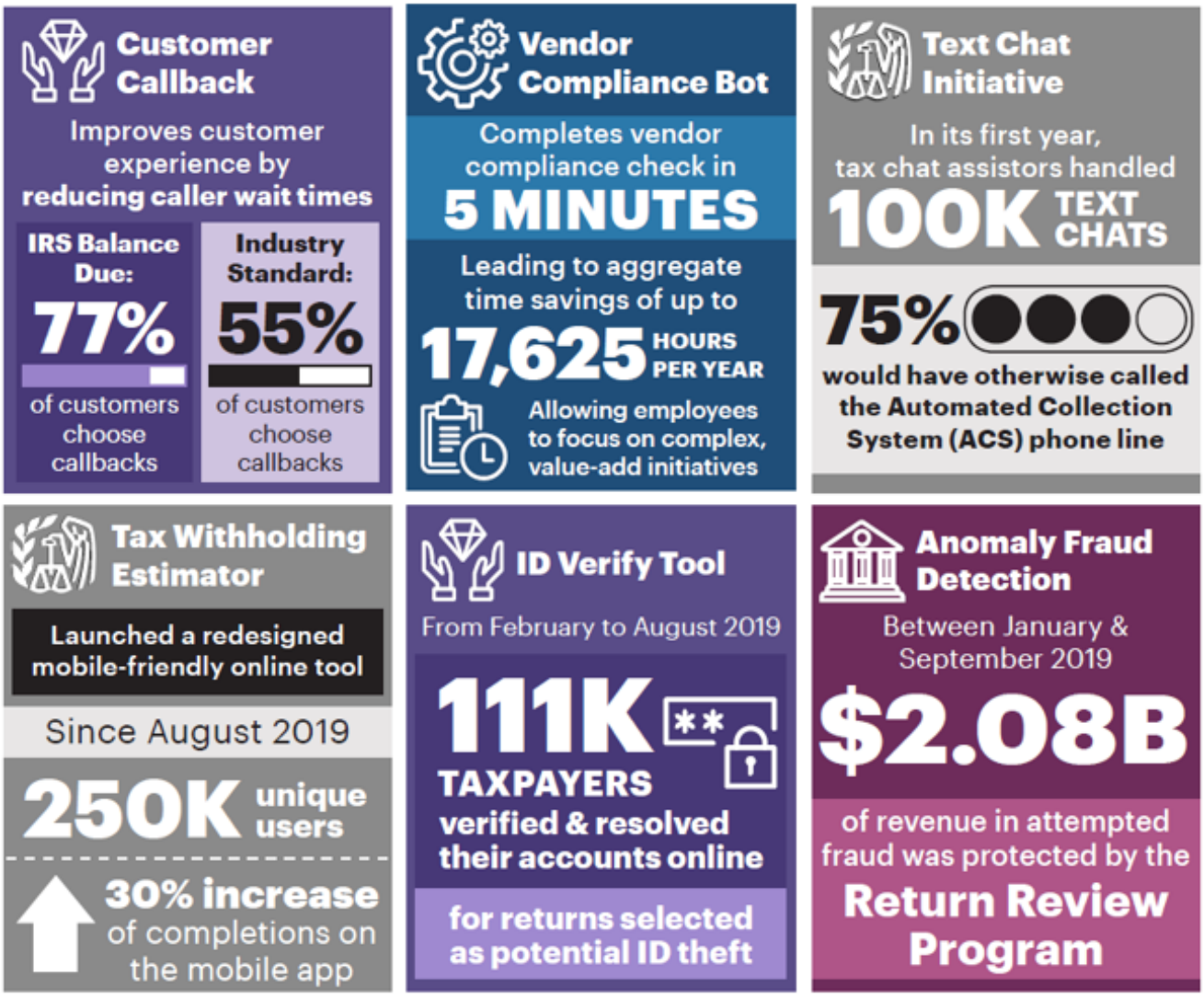
As we pursue modernization efforts into FY2020, we will continue to consider the opportunities present in the newly passed Taxpayer First Act, designed to improve taxpayer service and enforcement. The Modernization Portfolio supports the intent of the Taxpayer First Act and the 21st Century IDEA to improve customer experience through the programs and initiatives aligned to the Modernization Pillars: Taxpayer Experience, Core Taxpayer Services & Enforcement, Modernized IRS Operations, and Cybersecurity & Data Protection. As part of our FY2020 planning, we assessed the newly passed Taxpayer First Act and 21st Century IDEA to the Modernization Portfolio. We will continue to identify opportunities to align and comply with new legislation where applicable. For example, the Taxpayer First Act requires the IRS to implement a multi-year Strategic Plan for the organization's information technology needs. This report and its contents will serve as foundational material in support of that Strategic Plan.

4.0 FY2019 MODERNIZATION PORTFOLIO DETAILED REVIEW

Throughout the first year of our modernization journey, we have made significant progress towards achieving our goals. In FY2019, we delivered 19 of 20[9] capabilities originally scheduled in support of 11 Modernization Portfolio programs. We also made incremental progress on the 27 capabilities planned in support of 13 Modernization Portfolio programs that will continue into FY2020 and beyond (see **Section 6.0** for further detail on capabilities scheduled for delivery in FY2020).

To illustrate our FY2019 progress, the graphic below highlights our taxpayer impact over the last year, across each modernization Pillar and including additional modernization efforts at the IRS.

FIGURE 2: FY2019 Modernization Portfolio Taxpayer Impact



[9] "Procure ECM solution" was not delivered as scheduled in FY2019 due to a contract protest filed with GAO; progress towards delivery will continue in FY2020.

FY2019 Program Cost Information

The IRS originally budgeted $300 million for the Modernization Portfolio in FY2019 by allocating $201 million for the Business Systems Modernization appropriations account (including FY2019 appropriations and carryover balances) and $99 million in user fee balances. During FY2019, the IRS revised the total budget to $310 million due to an approved $10 million increase in funding for Enterprise Case Management. As of the close of the fiscal year, the FY2019 Modernization Portfolio milestones were delivered at $291.2 million (94 percent) of the revised annual budget.

The Modernization Portfolio Budget cost table (presented in **Table 1** & **Table 4**) describes the planned annual budget and end of fiscal year actual spend for FY2019 by Pillar and across programs. Detailed cost information for each program, including variance differences, can be found in **Sections 4.1-4.4.**

TABLE 4: FY2019 Modernization Portfolio Budget

MODERNIZATION PILLAR	PROGRAMS	PLANNED ANNUAL BUDGET[10] *($ IN MILLIONS)*	REVISED ANNUAL BUDGET[11] *($ IN MILLIONS)*	END OF YEAR ACTUALS[12] *($ IN MILLIONS)*
Taxpayer Experience	WebApps[13]	25.00	24.70	24.10
	Taxpayer Digital Communications Outbound Notifications	5.00	5.40	5.40
	Live Assistance	5.00	5.00	5.00
Core Taxpayer Services & Enforcement	CADE2 TS2	85.00	85.00	80.90
	Enterprise Case Management (ECM)[14]	60.00	70.00	59.50
	Return Review Program (RRP)	35.00	35.00	34.70
Modernized IRS Operations	Robotics Process Automation (RPA)	5.00	5.00	5.10
	API Implementation	N/A	N/A	N/A
	Cloud Execution	5.00	5.00	5.40
	Next Generation Infrastructure	10.50	10.50	9.80
Cybersecurity & Data Protection	Vulnerability & Threat Management	19.50	23.10	21.40
	Identity & Access Management	20.00	20.20	19.00
	Security Operations & Management	25.00	21.20	21.00
	Subtotal:	**$300.00**	**$310.00**	**$291.20**
Core Infrastructure[15]		18.30	18.30	18.00
Architecture, Integration, and Management[15]		36.00	36.00	35.60
	Total:	**$354.30**	**$364.30**	**$344.80**

[10] Planned Annual Budget reflects figures as identified in the Plan published in April 2019.

[11] Revised Annual Budget reflects IRS adjustments based on FY2020 appropriations and prioritization decisions.

[12] End of Fiscal Year includes end-of-year adjustments.

[13] IRS realigned $350,000 from WebApps to Taxpayer Digital Communications Outbound Notifications on September 26, 2019 to support critical development work.

[14] IRS increased the budget for Enterprise Case Management from $60 million to $70 million on July 22, 2019.

[15] Core Infrastructure (Core) and Architecture, Integration, and Management (AIM) represent enterprise staffing and planning costs necessary to deliver the Plan. Core Infrastructure provides mission-critical services for designing, engineering, testing, and deploying standardized, consolidated, virtual, and secure modernized development and production environments. AIM provides engineering management capabilities essential to delivering complex IT functions, and supports IRS systems strategy, architecture, and engineering capabilities. These costs were not identified in the Plan because they are not attributable to specific initiatives, but they were reflected in the FY2020 President's Budget. For more information on Core and AIM, see page 71 of the FY2020 Congressional Justification (March 18, 2019).

FY2019 Portfolio Adjustments

One of our key insights focuses on the need to plan for and demonstrate incremental success, which has resulted in adjustments to the Modernization Portfolio within FY2019. Those adjustments follow two categories: cost and program status. Adjustments have been made based on cost, procurement timing, technical dependencies, and related replanning efforts, as reported below. We initially included FY2020 assumptions below and throughout **Sections 4.1–4.4** as of the completion of FY2019 activities. Those assumptions are being reassessed as a result of the FY2020 replanning effort.

Cost Adjustments

- **WebApps:** Savings is a result of a lowered contract cost.
- **CADE2 TS2:** The projected underspend is primarily due to delayed ramp up of contractor resources at the beginning of the fiscal year, which was further impacted by the lapse in appropriations and subsequent replanning. The lapse in appropriations caused delays in adding planned technical resources to the CADE2 TS2 development teams, which negatively impacted the program's implementation velocity and timeline. Once full operations resumed after the lapse in appropriations, the CADE2 TS2 program successfully identified, onboarded, and trained over 60 additional technical resources and is demonstrating improved velocity going into FY2020.
- **Enterprise Case Management (ECM):**
  - IRS increased the ECM program budget by $10 million to accelerate the award of a contract for Integration Services for the solution in Q4 FY2019.
  - The projected underspend is due to a contract protest filed with GAO on August 9, 2019, which was dismissed on September 17, 2019, contingent on the IRS taking specific corrective actions.
  - The IRS awarded the ECM Solution Integration Support (ECMSIS) contract on September 30, 2019, which will become the primary vehicle to obtain ECM contractor resources and scope of all IT Service Delivery Partners. NOTE: This award was also protested and is pending as of the writing of this report.
- **Vulnerability and Threat Management and Security Operations and Management:** IRS was able to save $4 million of projected FY2019 spending due to efficient contract negotiation and program management practices. IRS will realign $4 million from the Security Operations and Management program to the FY2020 Vulnerability and Threat Management program in FY2020, contributing to a projected total annual budget of $80 million for the FY2020 Cybersecurity Modernization Portfolio budget.

Program Status Adjustments

- **Enterprise Case Management (ECM):**
  - ***Procure ECM Solution:*** A contract protest was filed with GAO on August 9, 2019 and dismissed on September 17, 2019, contingent on the IRS taking

specific corrective actions (that are procurement sensitive at this time). The IRS will make a new award determination after reassessing requirements and seeking revised or new proposals. As the product award moves to resolution, the IRS will continue to assess its ability to deliver initial case management capabilities in Q4 FY2020. There is a risk that the project will not deliver Release 1 in FY2020. However, the IRS has developed and implemented a mitigation plan for identified delivery risks. The team also continues to plan and sequence future releases and capabilities for FY2020 that are not procurement dependent.

    - ***Deliver initial case management capabilities:*** The continuing work associated with the contract protest filed with GAO for the ECM Product Vendor Selection prevents IRS from moving forward with issuing Task Order awards related to ECM, putting the delivery of initial case management capabilities at risk until the activities related to the protest are resolved.

- **Cloud Execution:**
    - ***Procure and deliver ECM Release 1 Cloud Platform on Treasury Cloud:*** The continuing work associated with the contract protest filed with GAO for the ECM Product Vendor Selection prevents IRS from moving forward with issuing Task Order awards related to ECM, putting the procurement of ECM release 1 on the Treasury Cloud at risk until the activities related to the protest are resolved.
- **Next Generation Infrastructure (NGI):**
    - ***DevOps: Pilot Solution for containerization:*** This capability is being removed due to FY2020 replanning.
- **Identity and Access Management**
    - ***Convert 12 facilities for physical access compliance:*** The planned completion for this capability was re-baselined from Q1 FY2020 to Q4 FY2020 to allow for the onboarding of a new vendor to complete upgrades to the Enterprise Physical Access Control System, addressing an exception that was originally reported in June 2019. This does not change the overall completion date for converting all facilities.

See **Sections 4.1-4.4** for additional information on FY2019 milestone achievement data, cost adjustments, and delivery timelines for modernization program capabilities within each Modernization Pillar.

4.1 MODERNIZATION PILLAR TAXPAYER EXPERIENCE

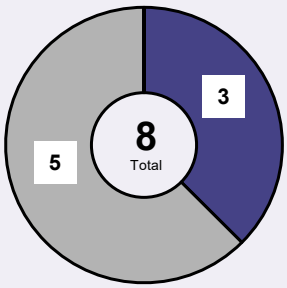
Taxpayers stand at the core of the IRS mission. We will place taxpayer needs at the front and center of every change driven in the Modernization Portfolio, including enhancing our multi-channel engagement model to improve taxpayer interactions with the IRS so taxpayers may elect their preferred or most efficient option.

We will focus on modernizing the taxpayer experience through the implementation of innovative technologies (e.g., mobile) and the enhancement of existing capabilities. This development will provide an environment that encourages multiple points of engagement through enhanced digital platforms and high levels of customer service interaction. By reducing taxpayer burden and achieving the objectives listed below, the IRS may drive an increase in voluntary compliance.

MODERNIZATION PILLAR	KEY OBJECTIVES	PHASE 1 PROGRAMS & INITIATIVES
Taxpayer Experience: Deliver a service experience comparable to private industry	• Help taxpayers resolve issues quickly and efficiently • Empower taxpayers with information about their account, obligations, and payment options • Make services available to customers when they need them • Protect taxpayer information and data	• WebApps (Web Applications) • Taxpayer Digital Communications Outbound Notifications (TDC—ON) • Live Assistance — Callback

4.1.1 | FY2019 Status & Outcomes – Taxpayer Experience

FIGURE 3: FY2019 Taxpayer Experience Pillar Status



COMPLETED	ON TRACK
• Taxpayer Protection Program - ID Verify Tool • Customer Callback Functionality (Interim) – Balance Due • Customer Callback Functionality (Interim) – IRS IT Help Desk	• Taxpayer Payment API with Fiscal Services • Modernize Online Installment Agreements • Taxpayer Digital Communications – Outbound Notifications • Expanded Toll-Free Capacity • Enterprise Callback Solution: Requirements & Design

Program Status Key: Capability Completed; On Track

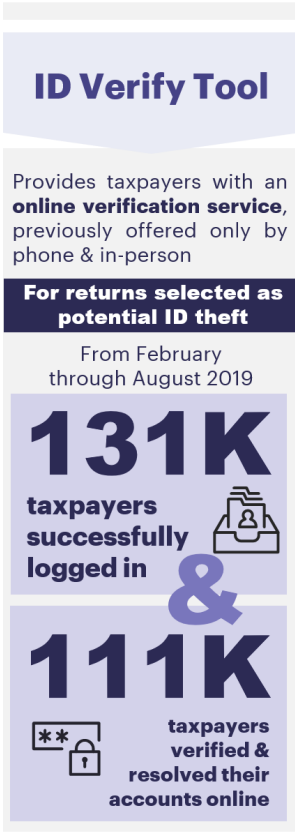
Key Accomplishments Delivered in FY2019:

We completed all three FY2019 Taxpayer Experience milestones as originally planned at $34.5 million of the $35 million in planned funding.

WebApps

ID Verify Tool

The updated WebApps: ID Verify Tool, released in Q1 FY2019, provides taxpayers with an online option for a service previously offered only through phone and in-person by visiting a Taxpayer Assistance Center (TAC). If a tax year 2018 individual return is selected as a potential identity theft return as part of the IRS's Taxpayer Protection Program (TPP), the taxpayer is sent a letter requesting additional identity verification and information before processing the return. The ID Verify Tool allows taxpayers to provide this additional information online rather than on the phone or in person. The first phase of the ID Verify tool became available in March 2018, allowing victims of identity theft who had not filed a return to resolve their account online. However, taxpayers who had filed a return still needed to call or travel to a TAC. The second phase, released in October 2018, provided the ability for taxpayers who had filed a return to provide additional information online to verify the authenticity of their return. For filing season 2019, the online tool was updated to accept 2018 tax return information and made available in February 2019. From February through August 29, 2019, over 131,000 taxpayers successfully logged in and more than 111,000 (85 percent) of the unique users were able to resolve their account online.



Source: FY2019 Modernization Portfolio Delivery

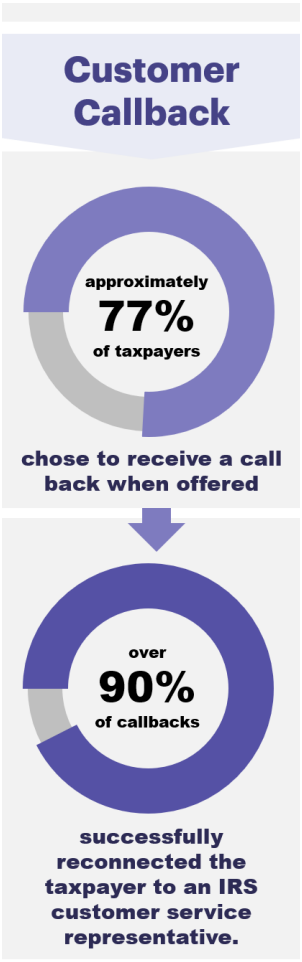
Live Assistance – Callback
External Application – Balance Due

Live Assistance: External Application – Balance Due was released in Q2 FY2019, providing a Callback capability on the IRS Toll-Free Balance Due application. Taxpayers now have a callback option when calling the toll-free line to discuss or pay a balance due rather than having to wait on the phone line for an IRS customer service representative to answer their call. When offered, approximately 77 percent of taxpayers chose to receive a call back and over 90 percent of callbacks successfully reconnected the taxpayer to an IRS customer service representative.

Live Assistance – Callback
Internal Application – IRS IT Help Desk

A similar capability used by employees calling the IRS's Enterprise Service Desk to resolve workplace equipment issues, the Live Assistance: Internal Application – IRS IT Help Desk, was completed in Q1 FY2019. This feature added a callback capability on the IRS internal service desk general help and password reset lines. This new feature saves staff time by providing a callback option for IRS employees calling the internal help desk for IT assistance with their workplace technology.

Figure 3 depicts a full list of FY2019 capabilities within the Taxpayer Experience Pillar by status (i.e., completed, on track, at risk). **Appendix A** provides the implementation timeline for these capabilities.



Source: FY2019 Modernization Portfolio Delivery

4.1.2 FY2019 Description of Cost Variance – Taxpayer Experience

The table below details the FY2019 cost data for the Taxpayer Experience Pillar and its corresponding modernization programs, including the planned annual budget and end of fiscal year actuals and cost variances for FY2019.

TABLE 5: Cost Variance - Taxpayer Experience

PROGRAMS	PLANNED ANNUAL BUDGET *($ IN MILLIONS)*	REVISED ANNUAL BUDGET *($ IN MILLIONS)*	END OF YEAR ACTUALS[16] *($ IN MILLIONS)*	COST VARIANCE *(%)**
WebApps[17]	25.00	24.70	24.10	2.2%
Taxpayer Digital Communications (Outbound Notifications)	5.00	5.40	5.40	-0.2%
Live Assistance	5.00	5.00	5.00	0.0%

**Actual variance may differ due to rounding. Variance within this range is recognized as normal for development. Positive cost variance represents underspend.*

Cost Variance of >10% or <-10% shown in red

FY2019 Cost Adjustments

WebApps: Savings is a result of a lowered contract cost.

[16] End of Fiscal Year includes end-of-year adjustments.

[17] IRS realigned $350,000 from WebApps to Taxpayer Digital Communications Outbound Notifications on September 26, 2019 to support critical development work.

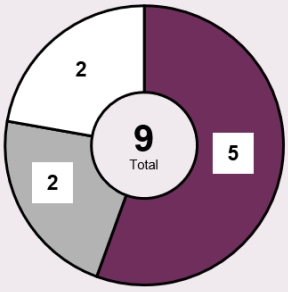
4.2 MODERNIZATION PILLAR CORE TAXPAYER SERVICES & ENFORCEMENT

Looking at the future needs of taxpayers and the IRS, we will assess and identify opportunities to modernize tax administration. We will modernize core tax systems to provide the quicker and easier tax filing experience that taxpayers expect, realizing these outcomes through data-driven operations and decision-making, real-time tax processing, and core tax administration systems integration. These systems will enhance the taxpayer experience when taxpayers engage with IRS personnel, such as during audits. With the newly passed Taxpayer First Act, we anticipate significant opportunities to expand on the capabilities aligned to Core Taxpayer Services & Enforcement.

MODERNIZATION PILLAR	KEY OBJECTIVES	PHASE 1 PROGRAMS & INITIATIVES
Core Taxpayer Services & Enforcement: Streamline and integrate IT programs that enable top-quality service	• Integrate tax processing systems to increase the cost effectiveness of operations • Enable real-time processing and increase transparency of returns status • Increase data usability and the use of data analytics to combat fraud	• Customer Account Data Engine (CADE) 2 Transition State 2 (TS2) • Enterprise Case Management (ECM) • Return Review Program (RRP)

4.2.1 | FY2019 Status & Outcomes – Core Taxpayer Services & Enforcement

FIGURE 4: FY2019 Core Taxpayer Services & Enforcement Pillar Status

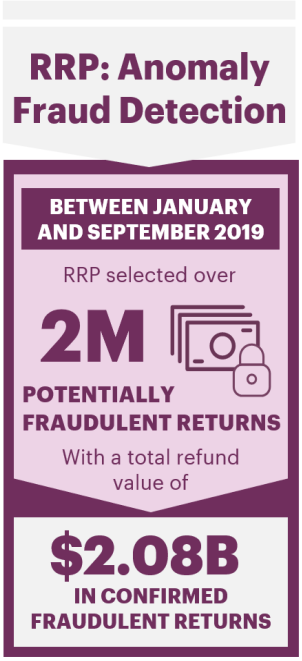


COMPLETED	ON TRACK	AT RISK
• Simple Single Filing to Testing • Subsequent Payment with Filing for Extension • Internal Balancing & Control • Develop Long-Term Strategy to Deliver ECM • Create New Models & Filters to Prevent Potential Fraud	• Develop a Reporting Solution That Allows for Access & Visualization of Data • Plan & Develop Fraud Detection Functionality & Enhance Automated Verification for Business Returns	• Procure ECM Solution • Deliver Initial Case Management Capabilities

Program Status Key: Capability Completed | On Track | At Risk

Key Accomplishments Delivered in FY2019:

We completed five of six originally planned FY2019 Core Taxpayer Services & Enforcement milestones at $175.10 million of the $180 million in planned funding, which was increased to $190 million as a result of an approved $10 million increase in funding for Enterprise Case Management.



Source: FY2019 Modernization Portfolio Delivery

Return Review Program (RRP)
Create new models and filters based on new schemes to prevent potential fraud

In Q4 FY2019, the IRS created new models and filters within RRP to more effectively identify non-compliance in individual tax returns. The newly implemented filter identifies cases with potentially overstated or incorrect income and withholding. Two populations are addressed: 1) cases with refundable credits (e.g. Earned Income Tax Credit and Additional Child Tax Credit), and 2) cases with wage/withholding issues, or false positive identity theft cases going through a second review for incorrect/false income reporting. These model and filter upgrades enhance the IRS's analytical capabilities, which ultimately improve fraud detection, increase the efficiency of unattended screening and return evaluation, and reduce the taxpayer burden by decreasing the number of refund delays. We also continue to make steady progress towards our goal of screening 60 total forms, return types, data sets, and schedules through RRP by the end of FY2024. In FY2019, two business forms were added, resulting in a total of 42 total forms, return types, data sets, and schedules that can currently be screened for anomaly detection through RRP. NOTE: Beginning in FY2020 RRP will not be reported through the IRS Information Technology Modernization Plan as it is being funded through the Operations Support portion of the IT budget and is no longer included in the Business Systems Modernization (BSM) funding stream. RRP progress will continue through Operations Support funding.

CADE2 TS2
Simple Single Filing to Testing
Subsequent Payment with Filing for Extension
Internal Balancing & Control

In FY2019, the IRS planned to deliver three scenarios to testing for the Customer Account Data Engine (CADE) 2 Transition State 2 (TS2) program: Simple Single Filing to Testing, Subsequent Payment with Filing for Extension, Internal Balancing & Control. Despite delays in onboarding planned technical resources to CADE2 TS2 development teams during the first half of the fiscal year, the IRS successfully

delivered these milestones, expanding the enterprise's ability to incrementally evaluate new code at the beginning of the development lifecycle, saving time, improving code quality, and reducing the risk of defects for future code conversions.

In addition, in FY2019, CADE 2 TS2 successfully converted 14 percent (21,000 Assembly Language Code (ALC) lines of code) of the in-scope legacy codebase for the Integrated Tax Processing Engine (ITPE) project. IRS also completed 20 percent of the total Technical Enablers, such as additional Java components, required to support performance and other aspects of the converted ALC code. CADE2 TS2 is currently trending in a positive direction, with no outstanding contract or contractor delays impacting our ability to achieve our FY2020 modernization goals.

Figure 4 depicts a full list of FY2019 capabilities within the Core Taxpayer Services & Enforcement Pillar by status (i.e., completed, on track, at risk). **Appendix A** provides the implementation timeline for these capabilities.

4.2.2 | FY2019 Description of Cost Variance – Core Taxpayer Services & Enforcement

The table below details the FY2019 cost data for the Core Taxpayer Services & Enforcement Pillar and its corresponding modernization programs, including the planned annual budget and end of fiscal year actuals and cost variances for FY2019.

TABLE 6: Cost Variance - Core Taxpayer Services & Enforcement

PROGRAMS	PLANNED ANNUAL BUDGET *($ IN MILLIONS)*	REVISED ANNUAL BUDGET *($ IN MILLIONS)*	END OF YEAR ACTUALS [18] *($ IN MILLIONS)*	COST VARIANCE *(%)**
CADE2 TS2	85.00	85.00	80.90	4.8%
Enterprise Case Management (ECM)[19]	60.00	70.00	59.50	15.0%
Return Review Program (RRP)	35.00	35.00	34.70	0.9%

**Actual variance may differ due to rounding. Variance within this range is recognized as normal for development. Positive cost variance represents underspend.*

Cost Variance of >10% or <-10% shown in red

FY2019 Cost Adjustments

CADE2 TS2: The projected underspend is primarily due to delayed ramp up of contractor resources at the beginning of the fiscal year, which was further impacted by the lapse in appropriations and subsequent replanning. The lapse in appropriations caused delays in adding planned technical resources to the CADE2 TS2 development teams, which impacted the program's implementation velocity and timeline. Once full operations resumed after the lapse in appropriations, the CADE2 TS2 program successfully identified, onboarded, and trained over 60 additional technical resources and is demonstrating improved velocity going into FY2020.

Enterprise Case Management (ECM):

- IRS increased the ECM program budget by $10 million to accelerate the award of a contract for Integration Services for the solution in Q4 FY2019.
- The projected underspend is due to a contract protest filed with GAO on August 9, 2019, which was dismissed on September 17, 2019, contingent on the IRS taking specific corrective actions.
- The IRS awarded the ECM Solution Integration Support (ECMSIS) contract on September 30, 2019, which will become the primary vehicle to obtain ECM contractor resources and scope of all IT Service Delivery Partners. NOTE: This procurement is under protest as of the writing of this document.

[18] End of Fiscal Year includes end-of-year adjustments.
[19] IRS increased the budget for Enterprise Case Management from $60 million to $70 million on July 22, 2019.

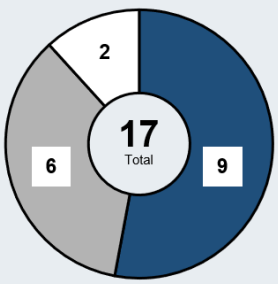
4.3 MODERNIZATION PILLAR MODERNIZED IRS OPERATIONS

Our focus in this Pillar is developing standardized, agile, solutions that leverage emerging technologies, while decommissioning and replacing legacy systems. A leaner, nimbler capability portfolio will power the IRS while keeping operational costs controlled. Our approach combines investments in new and emerging technologies while also taking advantage of expiring contracts to acquire technologies that will accelerate modernization efforts. By modernizing IRS operations, we will improve existing business processes. We project cost savings in Operations & Maintenance (O&M) due to reduced costs associated with supporting antiquated systems as we improve processes and implement contemporary systems.

MODERNIZATION PILLAR	KEY OBJECTIVES	PHASE 1 PROGRAMS & INITIATIVES
Modernized IRS Operations: Retire and decommission legacy systems in place of more sustainable infrastructure	• Reduce complexity of the technical environment • Leverage data to deliver secure, agile, and efficient applications and services • Strengthen organizational agility through automation and streamlining processes	• Application Programming Interface (API) Management • Cloud Execution • Next Generation Infrastructure • Robotics Process Automation (RPA)

4.3.1 | FY2019 Status & Outcomes – Modernized IRS Operations

FIGURE 5: FY2019 Modernized IRS Operations Pillar Status

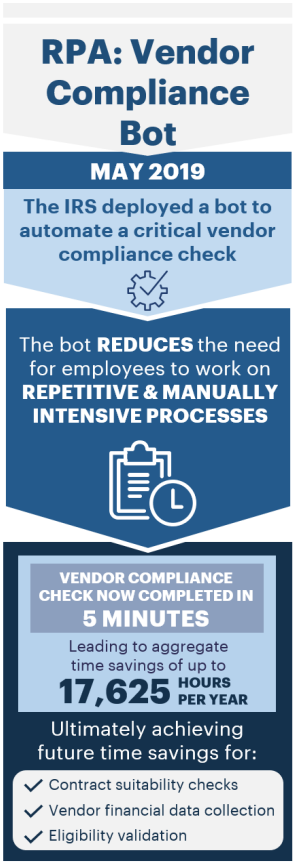


COMPLETED	ON TRACK	AT RISK
• Implement solution for Procurement processes • API Initial Operating Capability (IOC) • Establish Cloud Management Office and Cloud Governance • Complete RFI for the Enterprise Cloud Ecosystem • Build out sample Cloud Target-State Reference Model on the Treasury Cloud • DevOps: CI/CD Onboard (40) projects • DevOps/Standard Stack: Develop and validate 3 to 5 stack components • DevOps: Develop containerization solution architecture • DevOps: Centralized code repository (onboard 10 projects)	• SB/SE Monitoring Offer in Compromise (MOIC) • IT Help Desk Self-Service • Define External API Product Strategy, Operating Model • Leverage security efforts with 3rd parties to develop API(s) • Deploy Cyber CDM Phase 2 on Treasury Cloud • Converting Legacy Code / Reducing the Application Footprint: Define Strategy on legacy code conversion	• DevOps: Pilot solution for containerization • Procure and deliver ECM Release 1 Cloud platform on Treasury Cloud

Program Status Key: Capability Completed | On Track | At Risk

Key Accomplishments Delivered in FY2019:

We completed all nine FY2019 Modernized IRS Operations milestones as originally planned at $20.30 million of the $20.5 million in planned funding.



Source: FY2019 Modernization Portfolio Delivery

Robotic Process Automation (RPA)

Implement solution for procurement processes

The IRS deployed a bot to automate a critical vendor compliance check for a procurement process in Q3 FY2019. The bot reduces the time and resources needed to complete the compliance check, which is typically a highly manual and repetitive process that takes an employee about 2-4 hours to complete. The bot can complete the vendor compliance check in approximately 5 minutes, leading to an aggregate time savings of up to 17,625 hours/year (based on approximately 4,500 new contract awards per year, and 3 hours 55 minutes saved per contract award). This solution for procurement processes will ultimately lead to time savings in contract suitability checks, vendor financial data collection, eligibility validation, and processing time.

Next Generation Infrastructure (NGI)

DevOps/Standard Stack: Develop and validate 3 to 5 stack components

A technology stack is a set of software components within a platform that runs an application. Previously, the IRS has developed custom technology stacks to accommodate unique data storage and processing requirements, which often result in delays or complications during program upgrades. The IRS developed and validated 3 to 5 standard stack components in Q4 FY2019 to help provide a more stable environment that can accommodate rapid and frequent upgrades. Because minimal configuration is required after deployment, standard stacks help modernize the agency's technology footprint. The standard stack capability will also use a single configuration file that is standardized, identical, and Internal Revenue Manual (IRM) compliant for the provisioning of systems, reducing paperwork burden and inefficiencies for projects within the agency that are requesting standard stack components. Standard stack provides the agency with a repeatable process that is secure and requires minimal pre and post configuration information from the customer for faster delivery of standardized components being requested (from 14-28 days to 1-2 days).

Figure 5 depicts a full list of FY2019 capabilities within the Modernized IRS Operations Pillar by status (i.e., completed, on track, at risk). **Appendix A** provides the implementation timeline for these capabilities.

4.3.2 | FY2019 Description of Cost Variance – Modernized IRS Operations

The table below details the FY2019 cost data for the Modernized IRS Operations Pillar and its corresponding modernization programs, including the planned annual budget and end of fiscal year actuals and cost variances for FY2019.

TABLE 7: Cost Variance - Modernized IRS Operations

PROGRAMS	PLANNED ANNUAL BUDGET *($ IN MILLIONS)*	REVISED ANNUAL BUDGET *($ IN MILLIONS)*	END OF YEAR ACTUALS [20] *($ IN MILLIONS)*	COST VARIANCE *(%)**
Robotics Process Automation (RPA)	5.00	5.00	5.10	-2.0%
Application Programming Interface (API) Implementation	N/A	N/A	N/A	N/A
Cloud Execution	5.00	5.00	5.40	-7.9%
Next Generation Infrastructure	10.50	10.50	9.80	6.5%

**Actual variance may differ due to rounding. Variance within this range is recognized as normal for development. Positive cost variance represents underspend.*

Cost Variance of >10% or <-10% shown in red

[20] End of Fiscal Year includes end-of-year adjustments.

4.4 MODERNIZATION PILLAR CYBERSECURITY & DATA PROTECTION

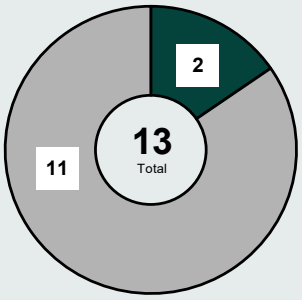
Protecting our systems and taxpayer information against cyber threats is a top priority for the IRS. The cyber landscape is constantly evolving, and we continue to experience increasingly sophisticated and frequent efforts by cybercriminals to steal taxpayer data (1.4 billion attacks annually, including denial-of-service attacks, unsuccessful intrusion attempts, probes or scans, and other unauthorized connectivity attempts), file fraudulent refunds, and infiltrate our systems. Due to the proliferation of sophisticated security threats and the sensitive taxpayer information contained within our systems, we must have an agency-wide, proactive approach to security. Continued investment in technology, tools, and processes is necessary to defend against expanding cyber threats and stay current with changing National Institute of Standards and Technology (NIST) guidelines.

For example, as part of our Network Security Enhancement initiative, our teams have deployed Network Segmentation to restrict IRS Local Area Network (LAN) access to users and devices based on pre-determined authorization levels. This effort enhances visibility across our networks and drives proactive mitigation of potential threats. As part of the initiatives within this Pillar, we will continue to enhance our real-time insights and defensive capabilities across the IRS enterprise to protect the organization and American taxpayer data from cyberattacks.

MODERNIZATION PILLAR	KEY OBJECTIVES	PHASE 1 PROGRAMS & INITIATIVES
Cybersecurity & Data Protection: Continue to protect taxpayer data and address emerging threats	• Establish trusted and streamlined access to information through identity and access management technologies • Proactively identify emerging threats and vulnerabilities through the use of real-time intelligence information and analytics • Protect taxpayer data and systems via end-to-end visibility and common platforms	• Identity & Access Management (IAM) • Security Operations & Management • Vulnerability & Threat Management

4.4.1 | FY2019 Status & Outcomes – Cybersecurity & Data Protection

FIGURE 6: FY2019 Cybersecurity & Data Protection Pillar Status



COMPLETED	ON TRACK
• Next Generation Enterprise Security Audit Trails (ESAT) Strategy • Cyber Cloud Strategy and Migration Plan	• Complete IT Asset Management Use Case • Pilot Data at Rest Encryption (DARE) • Enhanced Security Testing (EST) and Process Automation • Enhanced Cyber Use Behavior and Fraud Analytics IOC • Next Generation ESAT (Limited IOC) • CDM Phase 1 FOC • CDM Phase 2 IOC • Malware Email Sandboxing FOC • Endpoint Detection Response IOC • Continue network access restriction in Enforcement Mode implementation • Convert 12 facilities for physical access compliance

Program Status Key: Capability Completed | On Track

Key Accomplishments Delivered in FY2019:

We completed both FY2019 Cybersecurity & Data Protection milestones as originally planned at $61.40 million of the $64.5 million in planned funding.

Vulnerability and Threat Management

Next Generation Enterprise Security Audit Trails (ESAT) Strategy

Audit trails help establish accountability over users and their actions within information systems. Due to the sensitive nature of tax return data, the IRS is required by law to detect and monitor the unauthorized access and disclosure of taxpayer records. To improve the number and quality of the IRS's audit trails, we developed a strategy for use case and audit analysis process and data acquisition capabilities and provided enhancements to the technical infrastructure. In addition, there was alignment on the IRS process for changing capabilities to improve security audit analytics and compliance, while reducing technical and organizational complexity within the IRS.

Figure 6 depicts a full list of FY2019 capabilities within the Cybersecurity & Data Protection Pillar by status (i.e., completed, on track, at risk). **Appendix A** provides the implementation timeline for these capabilities.

4.4.2 | FY2019 Description of Cost Variance - Cybersecurity & Data Protection

The table below details the FY2019 cost data for the Cybersecurity & Data Protection Pillar and its corresponding modernization programs, including the planned annual budget and end of fiscal year actuals and cost variances for FY2019.

TABLE 8: Cost Variance - Cybersecurity & Data Protection

PROGRAMS	PLANNED ANNUAL BUDGET *($ IN MILLIONS)*	REVISED ANNUAL BUDGET *($ IN MILLIONS)*	END OF YEAR ACTUALS [21] *($ IN MILLIONS)*	COST VARIANCE *(%)**
Vulnerability & Threat Management	19.50	23.10	21.40	7.4%
Identity & Access Management	20.00	20.20	19.00	6.0%
Security Operations & Management	25.00	21.20	21.00	1.1%

**Actual variance may differ due to rounding. Variance within this range is recognized as normal for development. Positive cost variance represents underspend.*

Cost Variance of >10% or <-10% shown in red

FY2019 Cost Adjustments

Vulnerability and Threat Management and Security Operations and Management: IRS was able to save $4 million of projected FY2019 spending due to efficient contract negotiation and program management practices. IRS will realign $4 million from the Security Operations and Management program to the FY2020 Vulnerability and Threat Management program in FY2020, contributing to a projected total annual budget of $80 million for the FY2020 Cybersecurity Modernization Portfolio budget.

[21] End of Fiscal Year includes end-of-year adjustments.

5.0 MEASURING SUCCESS

We established performance objectives and outcomes aligned to Modernization Pillars as part of the Plan. Our progress towards those outcomes is being measured as part of our Modernization Portfolio management process and reported against a discrete set of performance measures. Our measures incorporate key hallmarks of modernization success, such as customer satisfaction, financial stewardship, internal business processes, and learning and growth through delivery.

Measures will be reported annually to include baselines, interim progress, and targets if established for the fiscal year. The measures in the table listed below (**Table 9**) describe the initial baselines established for FY2019 and targets to be achieved by FY2024, unless otherwise noted. These measures will continue to evolve as the Modernization Portfolio progresses and our performance management process matures.

The Modernization Portfolio is not inclusive of all activities conducted across the IRS, including customer interactions or IT activities. The measures currently aligned to the Modernization Portfolio include both enterprise outcome-focused measures and measures focused on assessing IT performance of project delivery for the modernization capabilities. We recognize that broader policy, process, and technology changes related to IRS modernization efforts and "Leverage Every Dollar" initiatives will also impact the taxpayer.

For the first annual Key Insights Report, efforts related to the Modernization Measures focused on:

- Defining the measures (including description, scope, format, formula);
- Establishing clear baselines;
- Identifying measure owners; and
- Determining interim goals where possible and 2024 targets to be achieved through the delivery of the Modernization Portfolio and related investments.

As part of future planning and activities focused on Modernization Portfolio measures, we will refine our performance management approach to include a systematic process for: establishing measures; defining goals, targets, and data collection procedures; and coordinating ownership for each measure. As part of this approach, we will modify, add, or remove measures as necessary to align with adjustments to Modernization Pillar goals, the overall strategic direction for the IRS, and legislative requirements.

Future work to improve digital services, in accordance with the 21st Century IDEA, may also impact capabilities and measures related to digital services. Any adjustments to

these measures, their definitions, calculations, or baselines and targets will be noted in future Key Insights Reports.

Using our enterprise dependency planning approach described in **Figure 1** within **Section 2.0**, we have identified dependencies and assumptions that may impact our ability to achieve the targets described in **Table 9**. These dependencies include:

- The success in procuring and updating applicable technology drivers for business measures, such as, *American Customer Satisfaction Index score* and *Number of Taxpayer Interaction Types that have a Digital Alternative;*
- No new legislative mandates that divert resources from the listed goals; and
- The capabilities stated in the Modernization Portfolio being delivered within the expected timeframes.

TABLE 9: Modernization Measures & Milestones

TAXPAYER EXPERIENCE				
Objective	**Measure**	**FY2019 Baseline***	**Interim Progress**	**FY2024 Target**
TRUST & CONFIDENCE Research indicates that an improved customer experience can lead to increased compliance, engagement, and trust.	**American Customer Satisfaction Index score**[22]	74 out of 100	Increase	Increase
DIGITAL ACCESS Increase use of digital self-help tools.	**Percent of interactions by taxpayers seeking services from the IRS that are completed through self-assistance**	79% (as of FY2017)	82% in FY2020	Increase
DIGITAL ACCESS Provide taxpayers with additional digital options for interacting with the IRS.	**Number of taxpayer interaction types that have a digital alternative**[23]	18	In progress	35

[22] IRS will continue to identify better ways to measure customer satisfaction, including analyzing the IRS wide customer satisfaction surveys.

[23] Based on a prioritized list of taxpayer interactions. This measure may be impacted by future work to improve digital services, in accordance with the 21st Century IDEA.

* FY2019 baselines are as of the beginning of FY2019, unless otherwise indicated.

Note: After completing an assessment of the Taxpayer First Act, we determined that the legislation has no impact on the Modernization Portfolio.

TAXPAYER EXPERIENCE (CONT.)				
Objective	**Measure**	**FY2019 Baseline***	**Interim Progress**	**FY2024 Target**
DIGITAL ACCESS Increase use of digital self-help tools through online accounts.	**Number of taxpayers with an active secure online profile**	6.51M	In progress	Increase 5% annually through FY2024
DIGITAL ACCESS Give taxpayers access to their IRS notices online.	**Percent of high-volume IRS notices available to be viewed by taxpayers digitally**[24]	0%	100% by the end of CY2020	In progress
HELPFUL REMINDERS Give taxpayers access to their IRS notices online.	**Percent of taxpayers opting in to receive the monthly installment agreement notice digitally**	0%	10% by FY2021	25%
PERSONALIZED SERVICE & CONTROL Offer customer callback where there is the highest demand for live assistance.	**Number of live assistance applications offering a callback option**	None	1 telephone application in FY2019; Additional telephone applications each fiscal year	61 applications (accounting for 95% of taxpayer demand)

[24] These notices account for an estimated 35% of notice volume. This measure may be impacted by future work to improve digital services, in accordance with the 21st Century IDEA.

* FY2019 baselines are as of the beginning of FY2019, unless otherwise indicated.

Note: After completing an assessment of the Taxpayer First Act, we determined that the legislation has no impact on the Modernization Portfolio.

CORE TAXPAYER SERVICES & ENFORCEMENT				
Objective	**Measure**	**FY2019 Baseline***	**Interim Progress**	**FY2024 Target**
FRAUD PREVENTION Reduce fraudulent tax refunds resulting from identity theft.	**Amount of unprotected identity theft tax refunds paid**	In progress	Additional 1% reduction	Additional 1% annually by CY2024
FUTURE COMPLIANCE Leverage compliance interactions to modify taxpayer behaviors and increase subsequent filing compliance.	**Non-filer recidivism rate**	48%	In progress	In progress
ANOMALY DETECTION Enhanced systemic identification of noncompliance and fraud will allow the IRS to expand taxpayer protection.	**Number of data sources (return types, schedules and datasets) screened for anomaly detection through Return Review Program**	40	Approximately 10 additional sources by FY2021	60
EASE & SIMPLICITY Increase taxpayer usage of online identity verification services.	**Percent of taxpayers using the ID Verify tool**	14%	Increase 5% in CY2020	Increase 50% by CY2024

* FY2019 baselines are as of the beginning of FY2019, unless otherwise indicated.

Note: After completing an assessment of the Taxpayer First Act, we determined that the legislation has no impact on the Modernization Portfolio.

MODERNIZED IRS OPERATIONS				
Objective	**Measure**	**FY2019 Baseline***	**Interim Progress**	**FY2024 Target**
COST CONTAINMENT According to the Government Accountability Office, federal spending on IT operations and maintenance has been steadily increasing. Until modernization progress is achieved we expect this to continue to grow.	**Stabilize the cost of operations and maintenance**[25]	84%	N/A	80%
RELIABILITY & SECURITY Upgrading and maintaining IRS infrastructure in line with industry standards provides greater security, reliability, and business value.	**Percent of aged infrastructure**	31.1%	30% by FY2021	25%
OPERATIONAL AGILITY With millions of lines of code written in legacy programming languages (ALC and COBOL), the IRS must provide taxpayers with current data and keep pace with changes to tax laws, technology and business processes.	**Reduction of selected legacy code (via multiple methods: Retire, Re-write, Replace and Refactor)**	0%	30% by FY2021	75%
SPEED & EFFICIENCY Automation tools can drastically reduce hours of manual labor and provide near-instant results. We introduced robotic process automation in 2019.	**Achieve efficiency gains on work processes where robotic process automation is applied**	0%	10% by FY2020	75%

[25] IRS will continue to identify ways to address cost savings.

* FY2019 baselines are as of the beginning of FY2019, unless otherwise indicated.

Note: After completing an assessment of the Taxpayer First Act, we determined that the legislation has no impact on the Modernization Portfolio.

CYBERSECURITY & DATA PROTECTION				
Objective	**Measure**	**FY2019 Baseline***	**Interim Progress**	**FY2024 Target**
HIGH SERVICE AVAILABILITY The IRS is striving to ensure systems are available when customers need them.	**Service availability of critical systems at the appropriate level of redundancy**	24%	40%	100%
CYBERSECURITY Enhancing cybersecurity protects taxpayer data and the nation's financial information from persistent and evolving threats.	**Percent of applications at the assessed level of risk or mitigated with compensating controls**[26]	100%	100%	100%

[26] IRS will continue to maintain 100 percent while implementing process improvements as they arise or are identified.
* FY2019 baselines are as of the beginning of FY2019, unless otherwise indicated.
Note: After completing an assessment of the Taxpayer First Act, we determined that the legislation has no impact on the Modernization Portfolio.

6.0 FY2020 MODERNIZATION PORTFOLIO COMMITMENTS

Looking ahead to FY2020, we are excited about the opportunity to continue advancing our modernization journey by building on the capabilities delivered and initiated in FY2019. With passage of the FY2020 budget on December 20, 2019, the IRS replanned the FY2020 Modernization Portfolio to realign funding and revise delivery schedules. In particular, we determined that Modernization funds will not be used to deliver Return Review Program (RRP) capabilities in FY2020. We will continue working towards our FY2020 goals, leading with the following objectives to enhance our overall approach and delivery:

- Implementing our insights learned in FY2019 to accelerate delivery of the Modernization Portfolio (see **Section 2.0** for a complete list of FY2019 insights);
- Monitoring and evaluating our success through established performance measures and targets;
- Enhancing our taxpayer service and enforcement measures;
- Maintaining transparency with Congressional liaisons and other external stakeholders;
- Supporting regular outreach and engagement across the IRS; and
- Continuing to identify and communicate value provided to the taxpayer through the delivery of the Modernization Portfolio's capabilities.

The Modernization Portfolio capabilities scheduled for delivery in FY2020 are detailed in **Table 3** and **Table 10** and the implementation timelines for these capabilities are provided in **Appendix B**. The FY2020 Modernization Portfolio budget by program can be found in **Table 2** and **Table 11**. The capabilities listed below were modified as a result of FY2020 replanning activities.

TABLE 10: FY2020 Modernization Capabilities Scheduled for Delivery

MODERNIZATION PILLAR	CAPABILITIES SCHEDULED FOR DELIVERY IN FY2020
Taxpayer Experience: Deliver a service experience comparable to private industry	**WebApps** • Taxpayer Payment API with Fiscal Service – View Payments Release 1 • Modernize Online Installment Agreements – View Status and Eligibility Release 1 **Live Assistance – Callback** • Customer Callback 2020 – Additional 4 taxpayer applications • Expanded toll-free capacity

MODERNIZATION PILLAR	CAPABILITIES SCHEDULED FOR DELIVERY IN FY2020
Core Taxpayer Services & Enforcement: Streamline and integrate IT programs that enable top-quality service	**CADE 2 TS2** • Measurable progress toward converting code with a target of 31% focusing on developing multiple Scenario variations of the Address Change transaction • Measurable progress toward converting code with a target of 35% and with a focus on Scenarios for input transactions when an account is not present in the master file • Measurable progress toward converting code with a target of 38% and with a focus on scenario functionality yet to be planned iteratively • Measurable progress toward converting code of 43%, specific focus on scenario functionality yet to be planned iteratively **Enterprise Case Management (ECM)** • Procure ECM solution • Deliver initial case management capabilities
Modernized IRS Operations: Retire and decommission legacy systems in place of more sustainable infrastructure	**Robotic Process Automation (RPA)** • SB/SE Monitoring Offer in Compromise (MOIC) • IT Help Desk Self-Service (Natural language processing) • TE/GE Referrals Batch Process Identification **Application Programming Interface (API) Implementation** • Leverage security efforts with 3rd parties to develop API(s) **Cloud Execution** • Procure and deliver ECM Release 1 Cloud platform on Treasury Cloud • Deploy Cyber CDM Phase 2 on Treasury Cloud **Next Generation Infrastructure** • DevOps: CI/CD Onboard additional projects • DevOps/Standard Stack: Deploy 3 to 5 standard stack components via automation • DevOps/Standard Stack: Develop and deploy additional standard stack components • Converting Legacy Code / Reducing the Application Footprint: Strategy on Legacy Code Conversion
Cybersecurity & Data Protection: Continue to protect taxpayer data and address emerging threats	**Vulnerability & Threat Management** • Complete IT Asset Management Use Case • Pilot Data at Rest Encryption (DARE) • Enhanced Security Testing (EST) and Process Automation • Expand DARE implementation • Enhanced Cyber User Behavior and Fraud Analytics IOC • Next Generation ESAT (Limited IOC) • Enhanced EST and Process Automation IOC **Identity & Access Management** • CDM Phase 1 FOC • CDM Phase 2 IOC • Convert 12 facilities for physical access compliance **Security Operations & Management** • Malware Email Sandboxing FOC • Endpoint Detection Response IOC • Continue network access restriction in Enforcement Mode implementation • IRS Cloud Access Security Broker (CASB) FOC • Malware Web Sandboxing FOC • Cyber Hyper Converged Infrastructure FOC for Real-Time Correlation Analysis • Endpoint Detection Response FOC • Begin network segmentation for High Value Assets (HVA)

FY2020 Program Cost Information

Our ability to deliver on the Modernization Portfolio planned for FY2020 is dependent on available funding. For FY2020, we received approved funding of $312.3 million for the Modernization Portfolio by allocating $180 million for the Business Systems Modernization appropriations account, $102.3 million in user fee balances, and $30 million in carryover balances.

TABLE 11: FY2020 Modernization Portfolio Budget

MODERNIZATION PILLAR	PROGRAMS	FY2020 APPROPRIATION ($ IN MILLIONS)	FY2020 ($ IN MILLIONS)	USER FEES ($ IN MILLIONS)	TOTAL AVAILABLE FUNDING ($ IN MILLIONS)
Taxpayer Experience	WebApps	10.0	5.0	10.0	25.0
	Taxpayer Digital Communications Outbound Notifications	0.5	0.0	2.5	3.0
	Live Assistance	0.2	0.0	0.0	0.2
	Subtotal Taxpayer Experience:	**$10.7**	**$5.0**	**$12.5**	**$28.2**
Core Taxpayer Services & Enforcement	CADE2 TS2	60.0	20.0	20.0	100.0
	Enterprise Case Management (ECM)	58.0	0.0	8.2	66.2
	Return Review Program (RRP)	0.0	0.0	0.0	0.0
	Subtotal Core Taxpayer Services & Enforcement:	**$118.0**	**$20.0**	**$28.2**	**$166.2**
Modernized IRS Operations	Robotics Process Automation (RPA)	1.0	0.0	0.0	1.0
	API Implementation	0.0	0.0	0.0	0.0
	Cloud Execution	0.5	0.0	2.0	2.5
	Next Generation Infrastructure	0.3	0.0	0.0	0.3
	Subtotal Modernized IRS Operations:	**$1.8**	**$0.0**	**$2.0**	**$3.8**
Cybersecurity & Data Protection	Vulnerability & Threat Management	24.4	0.0	10.0	34.4
	Identity & Access Management	6.0	0.0	10.0	16.0
	Security Operations & Management	4.6	0.0	10.0	14.6
	Subtotal Cybersecurity & Data Protection:	**$35.0**	**$0.0**	**$30.0**	**$65.0**
Core Infrastructure (Core)[27]		2.0	1.0	7.6	10.6
Architecture, Integration, and Management (AIM)[27]		3.0	1.5	22.0	26.5
	Subtotal Core and AIM:	**$5.0**	**$2.5**	**$29.6**	**$37.1**
Management Reserve (MR)		9.5	2.5	0.0	12.0
	Subtotal Pause / Shutdown of Projects and MR:	**$9.5**	**$2.5**	**$0.0**	**$12.0**
	Total:	**$180.0**	**$30.0**	**$102.3**	**$312.3**

[27] Core Infrastructure (Core) and Architecture, Integration, and Management (AIM) represent enterprise staffing and planning costs necessary to deliver the Plan. Core Infrastructure provides mission-critical services for designing, engineering, testing, and deploying standardized, consolidated, virtual, and secure modernized development and production environments. AIM provides engineering management capabilities essential to delivering complex IT functions, and supports IRS systems strategy, architecture, and engineering capabilities. These costs were not identified in the Plan because they are not attributable to specific initiatives, but they were reflected in the FY2020 President's Budget. For more information on Core and AIM, see page 71 of the FY2020 Congressional Justification (March 18, 2019).

7.0 ADDITIONAL MODERNIZATION EFFORTS & UPDATES

With funding for business systems modernization comprising less than two percent of the overall IRS budget enacted in FY2020, the larger percentage of IT funding dedicated to operations support presents a key opportunity for additional savings and modernization opportunities. In allocating resources, the IRS strives to balance three competing and overarching priorities: basic tax administration, sustaining our IT systems, and modernizing our operations. We have adopted industry standards such as agile and DevOps for delivering technology programs at a faster, more efficient pace and we have contained costs in certain areas by using managed services. As tax laws change, we continue improving existing services like the Tax Withholding Estimator and building foundational technology solutions to enable more secure interactions with the IRS.

Some examples of how we continue to advance our modernization goals outside of the specific initiatives and capabilities in the Modernization Portfolio are included below.

Tax Withholding Estimator (TWE)

IRS launched the new Tax Withholding Estimator application on IRS.gov on August 6th, 2019. The Tax Withholding Estimator replaces the Withholding Calculator, which offered workers a convenient mobile-friendly online tool for checking their withholding. The new Tax Withholding Estimator offers workers, as well as retirees, self-employed individuals, and other taxpayers, a more user-friendly step-by-step tool for effectively tailoring the amount of income tax they have withheld from wages and pension payments.

The IRS engaged taxpayers and tax professionals to understand and incorporate their feedback and concerns as we developed the Tax Withholding Estimator. The tool offers a variety of other new user-friendly features including:

- The ability to more effectively target either a tax due amount close to zero or a refund amount at the time of filing;
- A new progress tracker to help users see how much more information they need to input;
- Enhanced tips and links to help the user quickly determine if they qualify for various tax credits and deductions;
- Self-employment tax for a user who has self-employment income in addition to wages or pensions; and
- Automatic calculation of the taxable portion of any Social Security benefits.

Since the new application became available, IRS has seen roughly 250,000 unique

users using the application and an increase of completion through the mobile application by 30 percent from the old Withholding Calculator. The application has received exceptional feedback from news and press reports.

eA3 (Authentication, Authorization and Access) Program

The eA3 (Authentication, Authorization and Access) Program addresses the challenge of identity theft and refund fraud and enables secure taxpayer interactions with IRS, including self-assistance and third party authorization. The eA3 Program consists of three projects: Secure Access eAuthentication (eAuth), Secure Access Digital Identity (SADI), and Authorization (Az) projects AzFramework and eSignature. Authorization is a direct enabler for the Taxpayer Experience Pillar (WebApps TaxPro), providing secure access to external-facing applications aligned to the Modernization Portfolio (e.g., WebApps Online Installment Agreements, TDC-ON, Tax Pro). A description of each of these projects is provided below:

- **eAuthentication (eAuth):** eAuth is a public facing application to identity proof, authenticate, and register individual identities. The application also provides credentials for electronic access to IRS systems, applications, and data repositories.
- **Secure Access Digital Identity (SADI) (next generation of eAuth):** The Secure Access Digital Identity (SADI) project will implement an identity proofing and authentication solution that serves to protect taxpayer data and complies with the new OMB Directives and National Institute of Standards and Technology (NIST) Special Publication 800-63-3 guidelines. SADI will leverage modern tools and technologies to strengthen user experience and security.
- **Az Framework:** Az Framework provides the capability for client applications to verify that: a specific user has access rights to another taxpayer's records, eServices' users (tax professionals) have signed the Terms of Consent, and external applications can access third and fourth party APIs.
- **eSignature:** eSignature is an enterprise common service that client applications can consume to record electronic signatures for IRS documents.

We rolled out numerous new services over the past several years, with many additional improvements on track to be delivered as part of the Taxpayer First Act. With the first year of the legislation behind us, we are focused on the work ahead:

- Continuing to expand taxpayer service options,
- Enabling the electronic filing of paper-based returns like the Form 1040X,
- Providing the technology needed to make online payments more seamless,
- Developing an initial solution for making certain notices available electronically,
- Expanding secure email and file sharing, and
- Ensuring our employees have access to the training and tools they need to better serve taxpayers
- In FY2020, we are focused not only on modernizing but we will continue to review and respond based on input from the taxpayers we serve.

8.0 CONCLUSION

We remain focused on fulfilling our important mission of providing America's taxpayers with top quality service by helping them understand and meet their tax responsibilities. Delivering on our Modernization Portfolio will strengthen our ability to continue executing that mission.

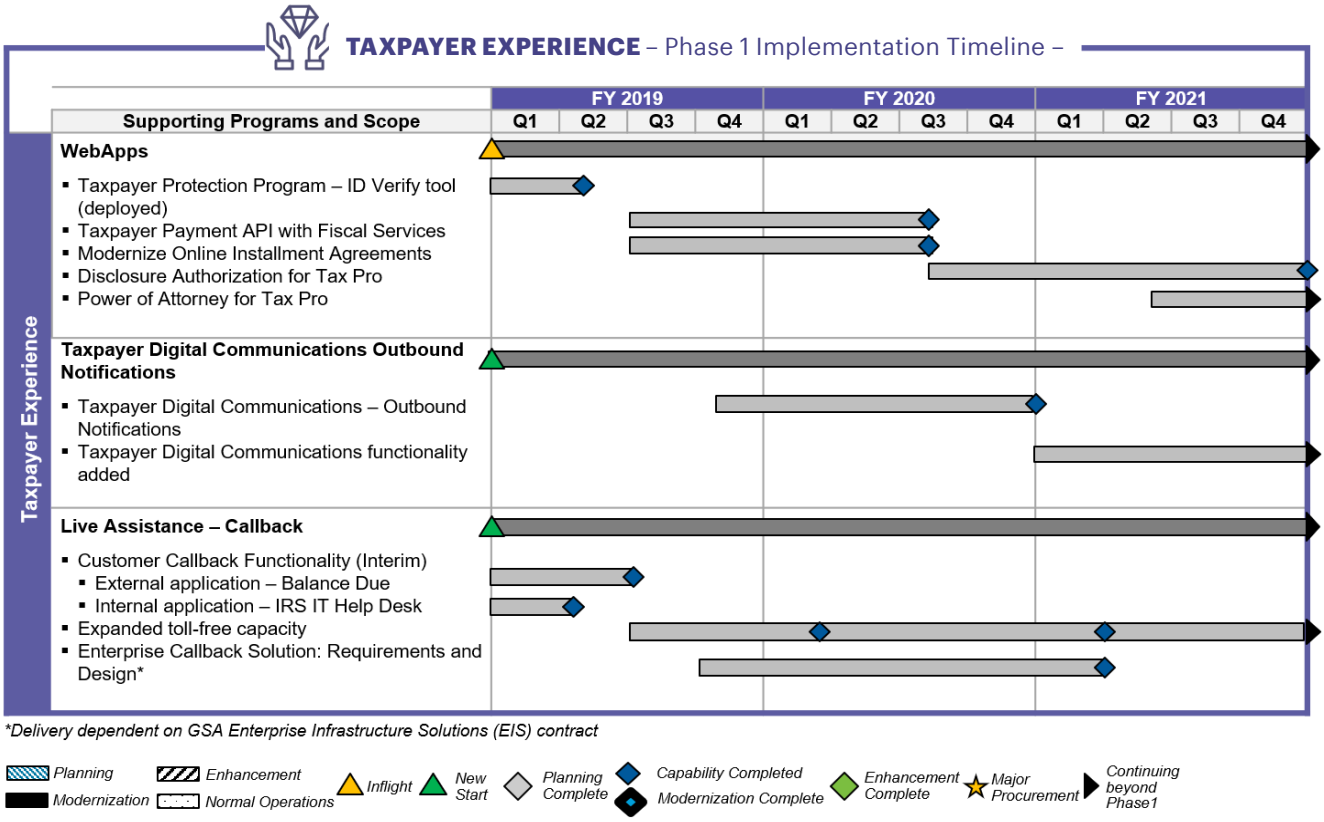
Throughout FY2019, we laid the foundation for future success and are in a strong position to continue making progress on our modernization journey. As we transition into FY2020 and beyond, we will continue to provide taxpayers with the services they need, while streamlining the processes that enable those services.

APPENDIX A - FY2019
IMPLEMENTATION TIMELINES

The following figures contain implementation timelines for FY2019 Modernization Portfolio capabilities along with the initial FY2020 plans. Implementation timelines for FY2019 were established as a baseline. Our FY2020 plans have been revised as shown in **Appendix B.**

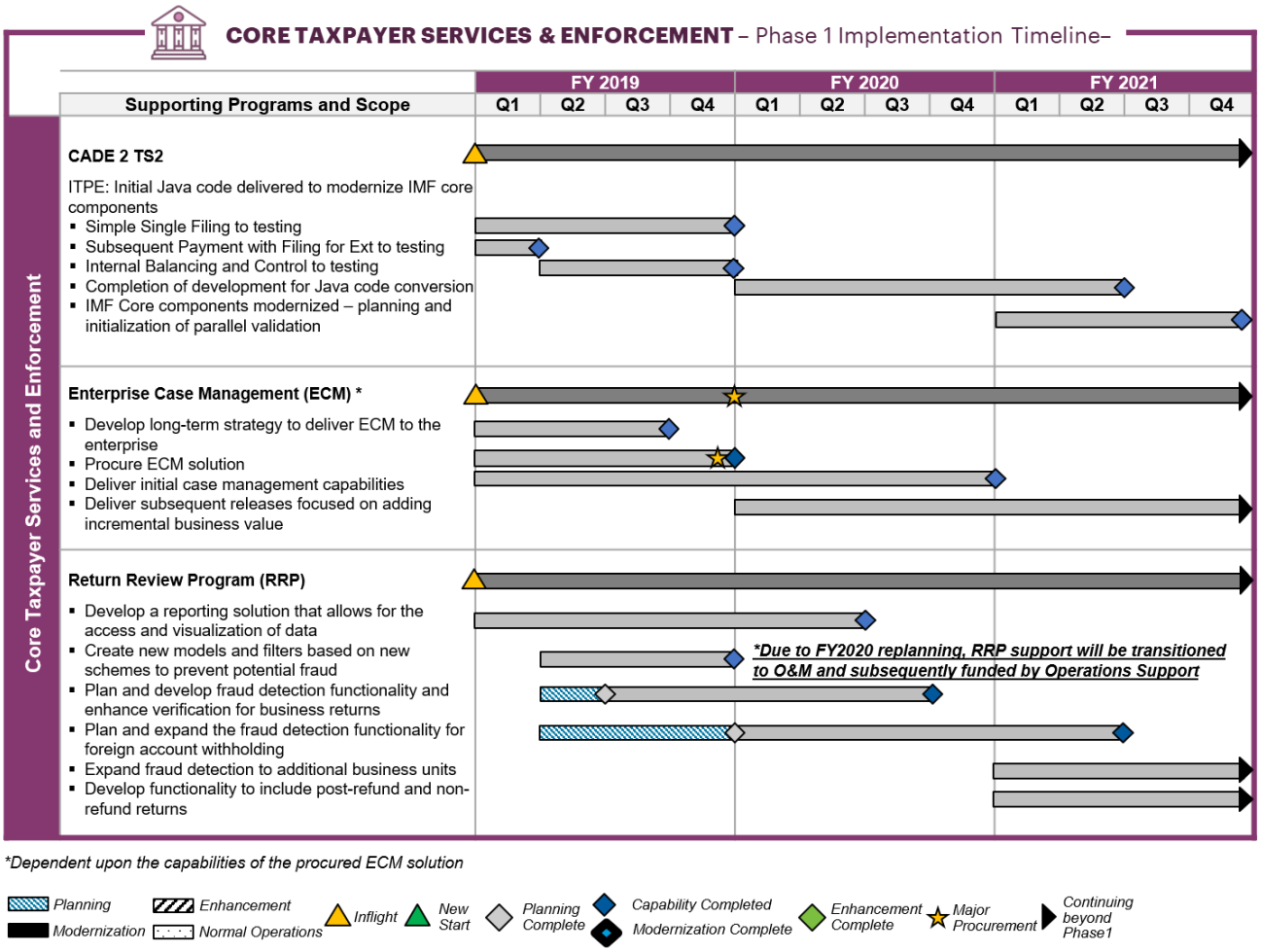
Implementation Phase 1 - FY2019 Taxpayer Experience

FIGURE 7: FY2019 Taxpayer Experience Implementation Timeline



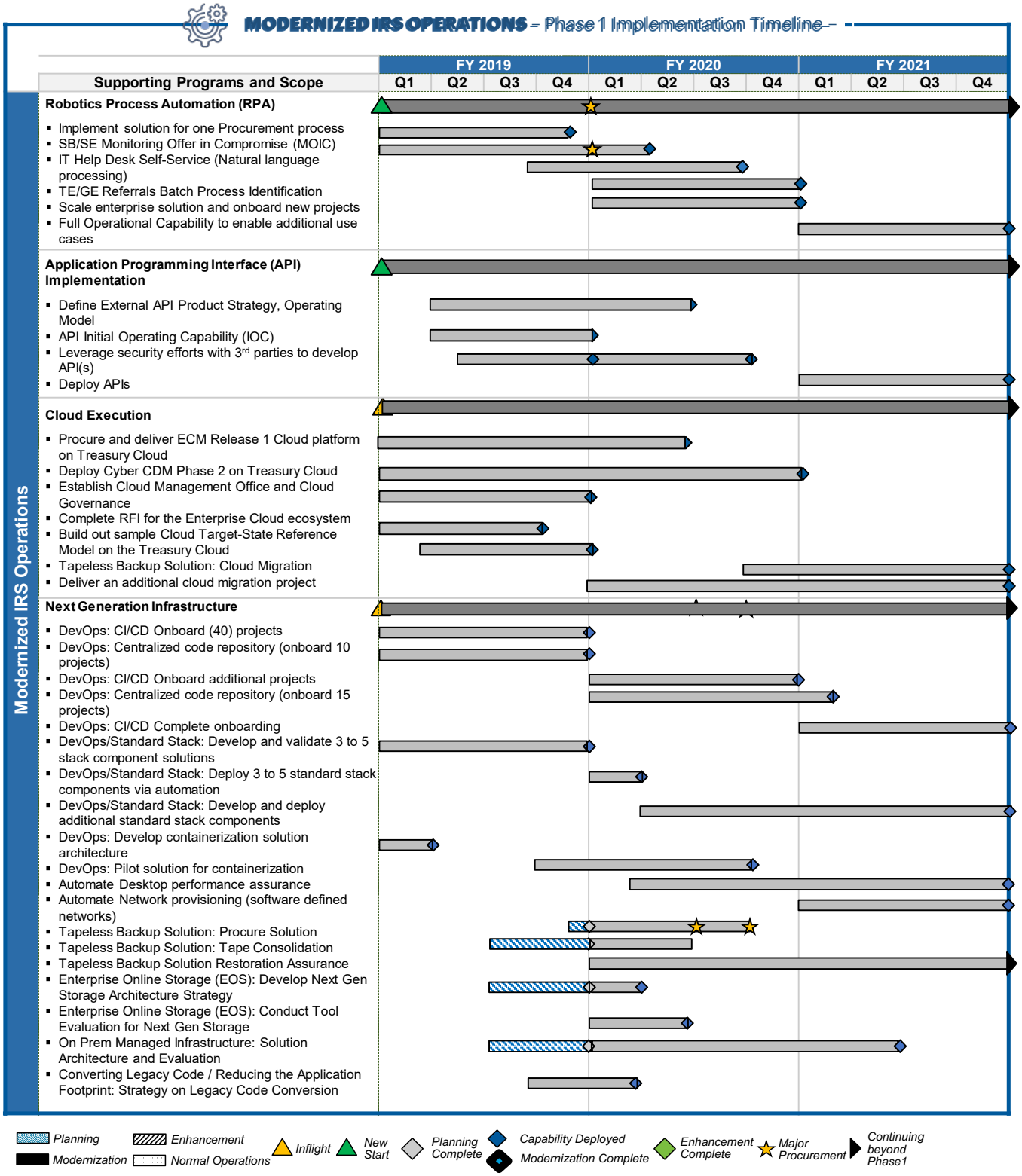
Implementation Phase 1 - FY2019 Core Taxpayer Services & Enforcement

FIGURE 8: FY2019 Core Taxpayer Services & Enforcement Implementation Timeline



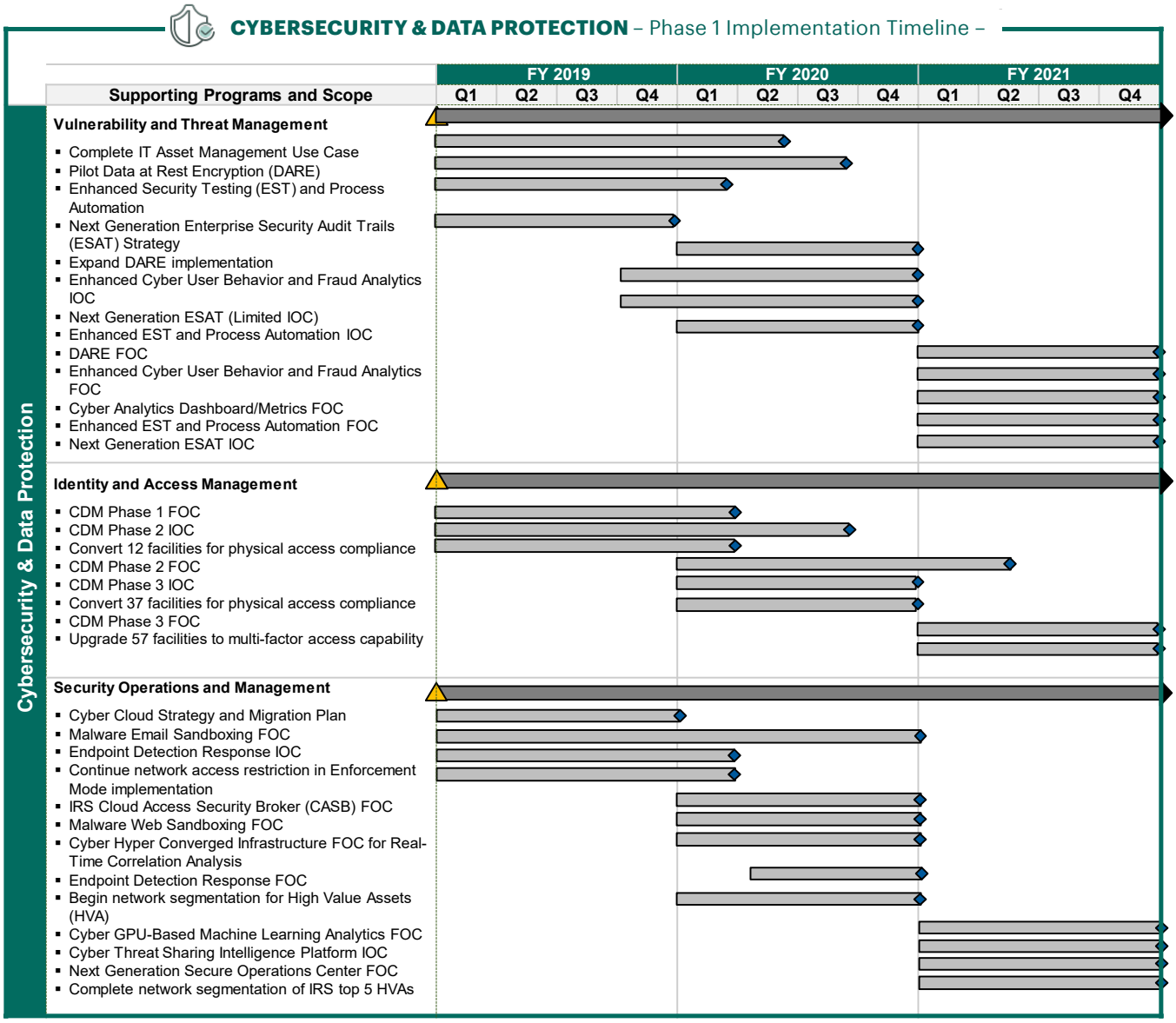
Implementation Phase 1 - FY2019 Modernized IRS Operations

FIGURE 9: FY2019 Modernized IRS Operations Implementation Timeline



Implementation Phase 1 - FY2019 Cybersecurity & Data Protection

FIGURE 10: FY2019 Cybersecurity & Data Protection Implementation Timeline



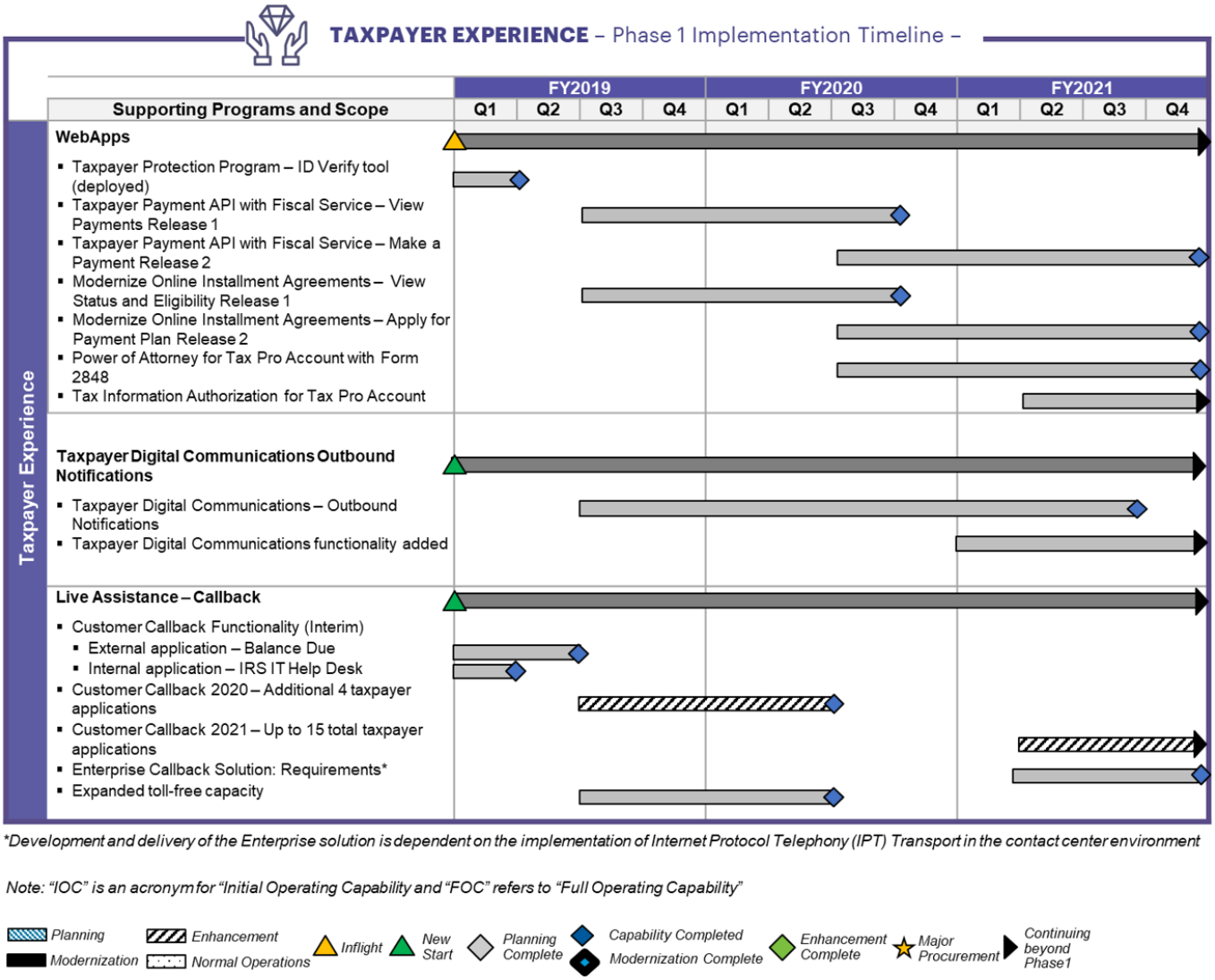
** Note: "IOC" is an acronym for "Initial Operating Capability and "FOC" refers to "Full Operating Capability"*

APPENDIX B - FY2020
IMPLEMENTATION TIMELINES

The following figures contain implementation timelines for FY2020 Modernization Portfolio capabilities. Implementation timelines for FY2020 are established as a baseline and revisions will be incorporated in future timelines and fiscal year planning. Delivery timelines are dependent upon budget, available resources, and further analysis of legislative impacts (e.g. 21st Century IDEA). The timelines provided below are based on the approved funding of $312.3 million for the Modernization Portfolio, with $180 million allocated for the Business Systems Modernization appropriations account, $102.3 million in user fee balances, and $30 million in carryover balances.

Implementation Phase 1 - FY2020 Taxpayer Experience

FIGURE 11: FY2020 Taxpayer Experience Implementation Timeline

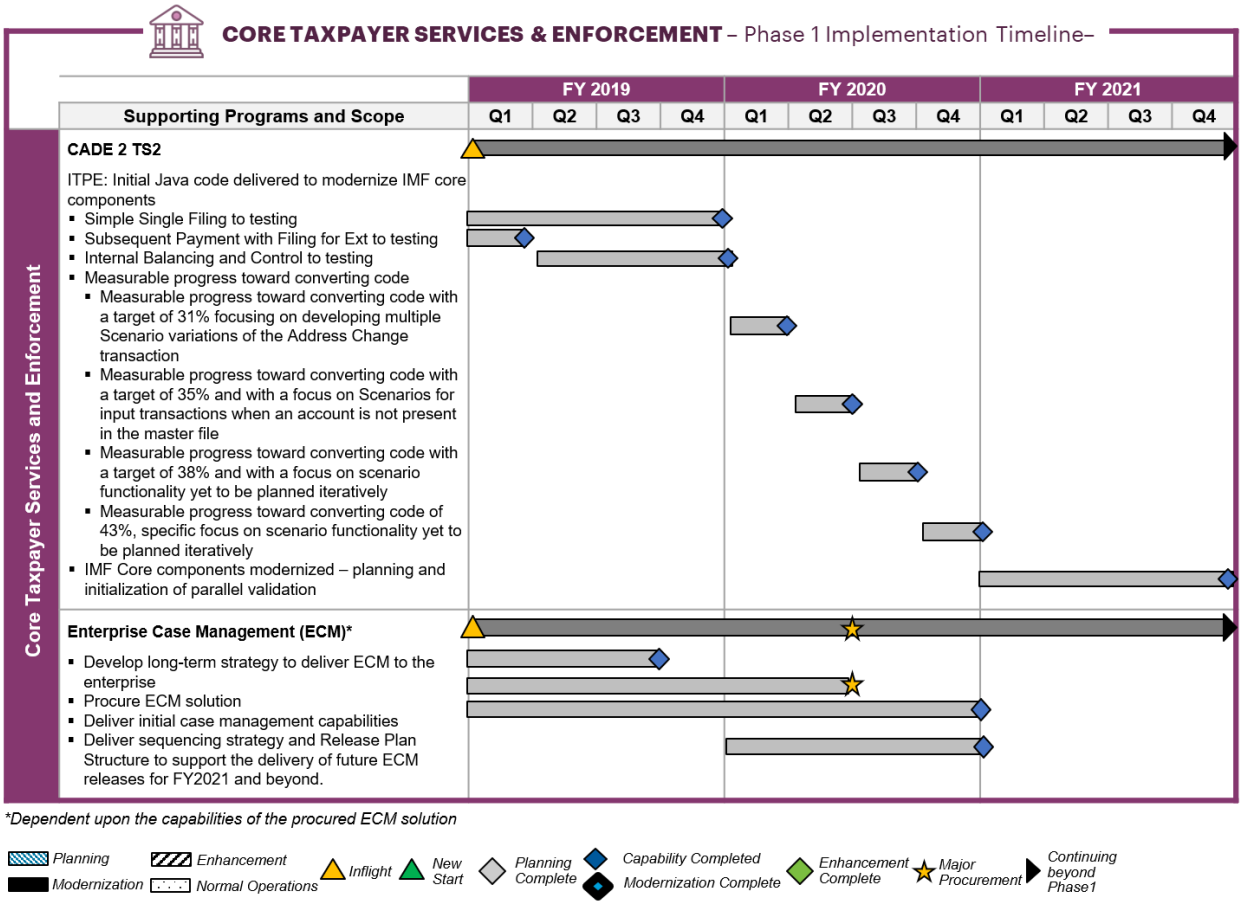


*Development and delivery of the Enterprise solution is dependent on the implementation of Internet Protocol Telephony (IPT) Transport in the contact center environment

Note: "IOC" is an acronym for "Initial Operating Capability and "FOC" refers to "Full Operating Capability"

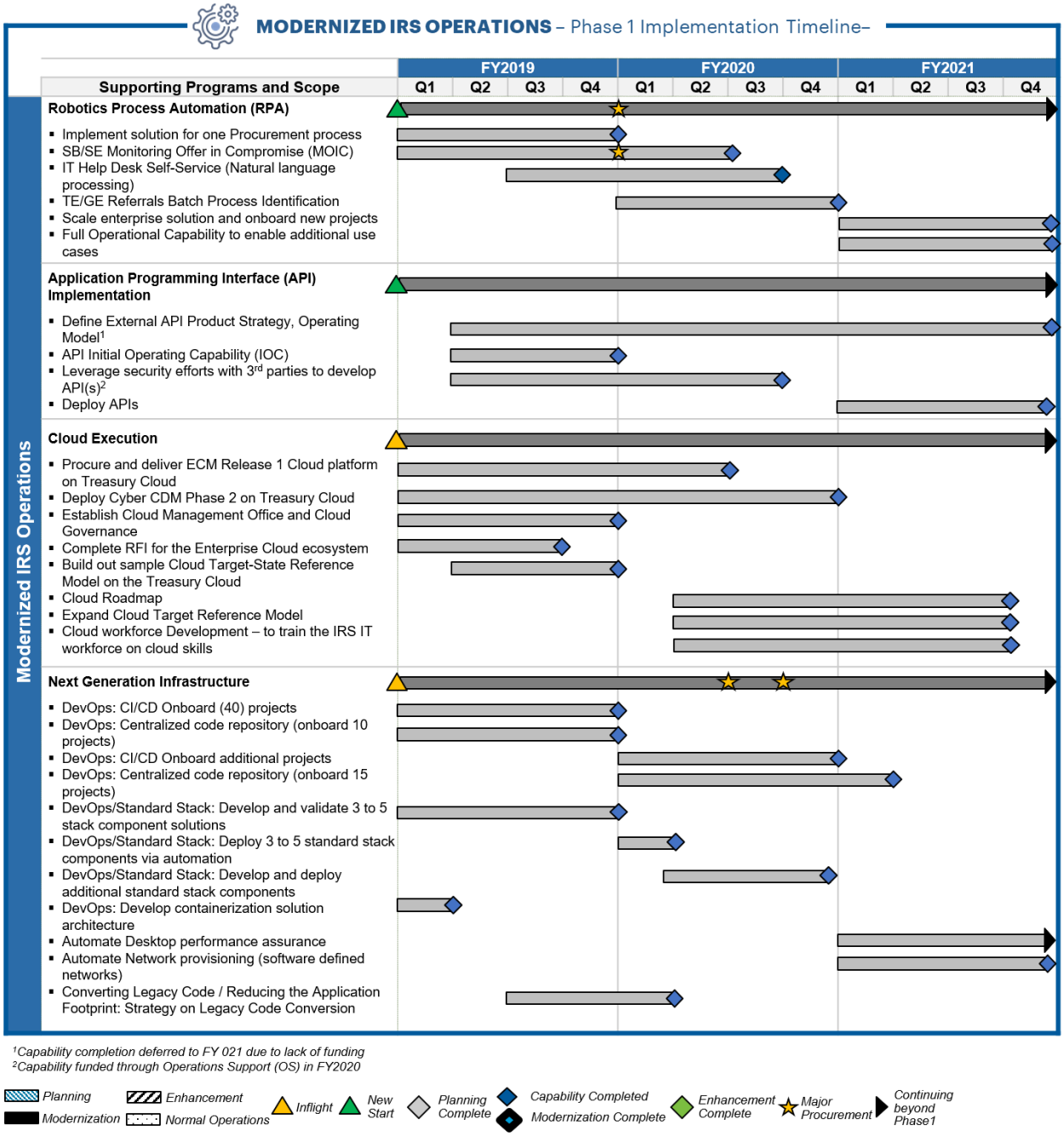
Implementation Phase 1 - FY2020 Core Taxpayer Services & Enforcement

FIGURE 12: FY2020 Core Taxpayer Services & Enforcement Implementation Timeline



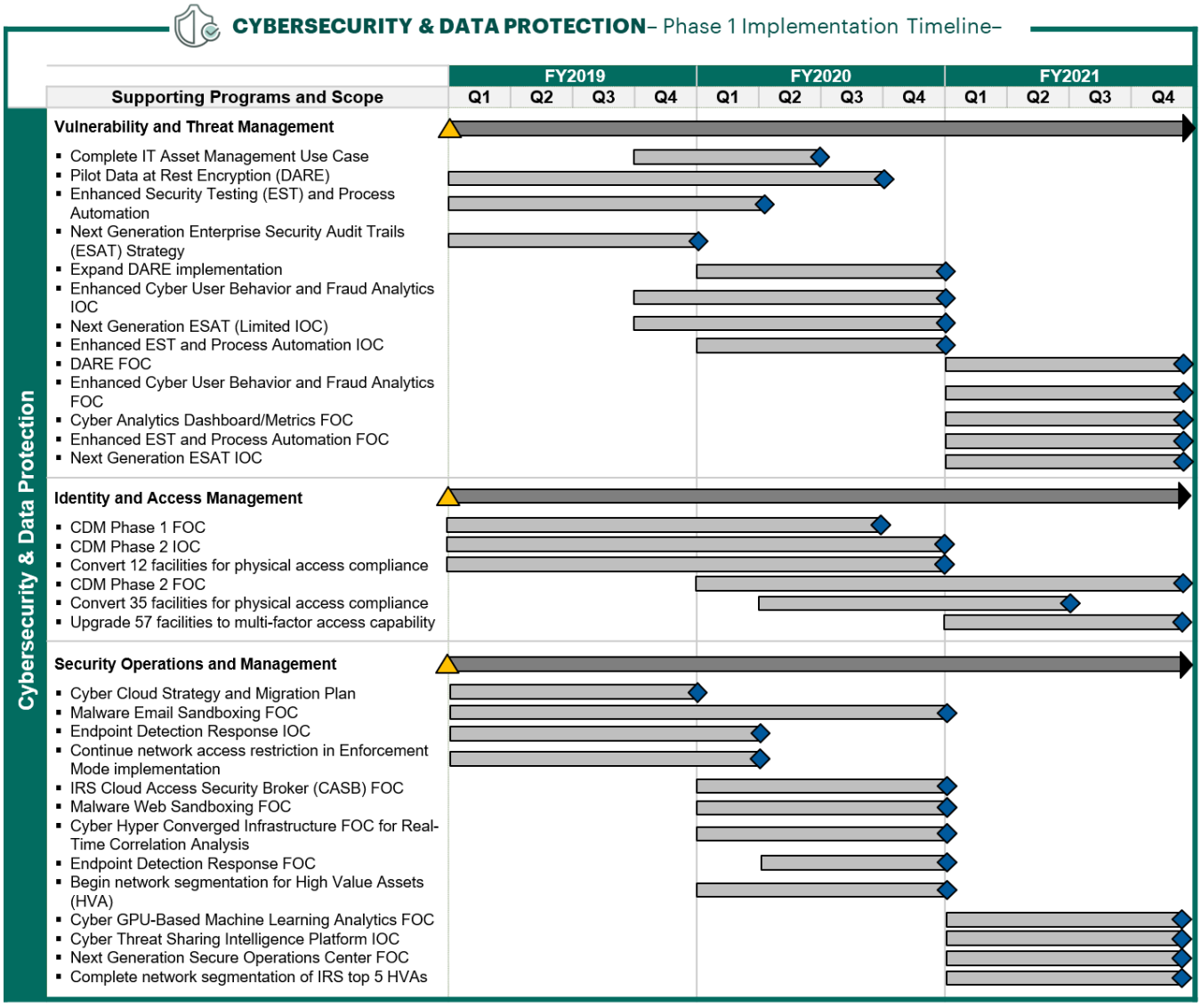
Implementation Phase 1 - FY2020 Modernized IRS Operations

FIGURE 13: FY2020 Modernized IRS Operations Implementation Timeline



Implementation Phase 1 - FY2020 Cybersecurity & Data Protection

FIGURE 14: FY2020 Cybersecurity & Data Protection Implementation Timeline



APPENDIX C - FY2019
CAPABILITY DESCRIPTIONS

Modernization Pillar: Taxpayer Experience

The IRS is continuing to enhance its technology-based services while helping taxpayers understand the wide range of options for interacting with the IRS to answer questions and resolve tax issues. Modernization will provide real benefits, both short-term and long-term, for taxpayers, tax professionals, and the tax community, while allowing IRS employees to be more efficient and effective. To achieve the Pillar's objectives, we identified target capabilities for each initiative over the next six years (FY2019-FY2024), subject to available resources.

TABLE 12: Taxpayer Experience Capability Descriptions

TAXPAYER EXPERIENCE	
Capability	**Capability Description**
Web Applications (WebApps)	Today, individual taxpayers can check their account balance, payment history and resolve a variety of tax issues using the IRS website or IRS2Go mobile app. These capabilities allow the IRS to maintain, improve and expand on the broad range of digital services offered today and enhance the number and types of transactions the taxpayer and their representatives can complete securely using their personal IRS Online Account. The WebApps capability delivers new digital options for self-service and secure information exchanges that ultimately help ensure a higher-quality customer experience in line with government-wide efforts to deliver what the public expects and deserves from a 21st century government.
– Taxpayer Protection Program — ID Verify tool	Today, when the IRS receives a federal income tax return that appears suspicious, the IRS must verify the person's identity to process the return accurately. Until that process is complete, the IRS "locks" the individual taxpayer's account and holds any refund until the IRS can get more information. Historically, an individual taxpayer would be required to call the IRS or travel to a Taxpayer Assistance Center. The ID Verify tool allows the individual taxpayer to provide the requested information online, without the need to call or travel to an IRS office, and in turn, this helps prevent an identity thief from getting a refund using the legitimate individual taxpayer's account.
– Taxpayer Payment API with Fiscal Services	Today, individual taxpayers who visit the IRS website to make a payment must be redirected to a separate website maintained by the U.S. Bureau of Fiscal Service. This capability will make online payments a more seamless process for individual taxpayers by allowing them to check their account balance and payments through a single online session with the IRS. As observed in the private sector, when online transactions are interrupted or disjointed for any reason, the likelihood of completing the transaction declines. The taxpayer payment API with Fiscal Service directly supports the IRS mission of collecting revenue and increasing voluntary compliance. Overall, improving the online experience is intended to provide a strong incentive to use digital services, thereby increasing the availability of IRS employees to help others in local offices and on the phone.
– Modernize Online Installment Agreements	Today, taxpayers, their representatives, and businesses eligible for a payment plan must use a paper-based process to view their existing installment agreements or determine if they are eligible for any of the various payment plan options. This application would improve the online experience of establishing installment agreements and determining eligibility by adding functionality to the IRS Online Account.

TAXPAYER EXPERIENCE	
Capability	**Capability Description**
– Disclosure Authorization for Tax Pro	Taxpayer information is subject to protection from unauthorized disclosure under Section 6103 of the Internal Revenue Code. Today, tax attorneys and other third parties representing their clients must rely on a paper-based system to sign and submit the appropriate disclosure release forms. By providing the option to submit these forms online, the IRS will help decrease paperwork, administrative burden, and provide more timely resolution of taxpayer issues. Disclosure Authorization for Tax Pro provides for the incremental deployment of new features that modernize certain paper-based processes to help third parties resolve issues with the IRS on behalf of their clients.
– Power of Attorney for Tax Pro	*IRS Form 2848 (Power of Attorney)* is used to authorize an individual to represent taxpayers before the IRS and enables tax professionals to represent their clients and resolve tax matters. Because the form cannot be submitted digitally, there are delays in processing times which can result in taxpayers not receiving the benefit of timely representation in critical matters, such as levy actions. This application will provide the ability to submit and file Power of Attorney documentation using a secure online method.
Taxpayer Digital Communications - Outbound Notifications (TDC-ON)	Today, the IRS mails more than 200 million letters and notices a year as required by law, such as when the IRS must issue a notice of deficiency before assessing additional taxes. The IRS also issues courtesy notices, such as when a person first registers for their IRS Online Account to make them aware of our privacy and security safeguards.
– Taxpayer Digital Communications — Outbound Notifications	The initial solution for limited use would make certain notices available via PDF, as well as the monthly payment reminder sent to those with installment agreements (CP521). This allows taxpayers who opt-in to navigate directly to IRS online payment tools and in effect, increases the likelihood the taxpayer acts.
– Taxpayer Digital Communications functionality added	This effort will allow the IRS to move away from paper-based notifications and contact taxpayers in a manner similar to how leading banks and other financial institutions push alerts and other consumer-friendly notifications. Rather than receive a paper notice by mail, this added functionality will allow taxpayers who opt-in to receive certain types of electronic notifications from the IRS through a secure messaging platform.
Live Assistance — Callback	The IRS has a large customer base and offers a variety of toll-free numbers. With millions of phone calls received each year, and heavy traffic during the filing season, wait times have long been a source of frustration for taxpayers. Customer callback is an established industry technology that allows a person to hold their place in queue without remaining "on hold" on the phone. This capability adds the callback option to certain IRS phone lines. This will provide taxpayers with the option to have the next available customer service representative call them back, resulting in no "on hold" wait time, and helping to resolve cases faster.
– Customer Callback Functionality (Interim): External application — Balance Due	This feature provides a callback option for taxpayers calling the toll-free line to discuss or pay a balance due.
– Customer Callback Functionality (Interim): Internal application — IRS IT Help Desk	This feature provides a callback option for IRS employees calling the internal help desk for IT assistance with their workplace technology, helping save staff time.

TAXPAYER EXPERIENCE	
Capability	**Capability Description**
– Expanded toll-free capacity	The IRS will expand the callback option to additional taxpayer-facing toll-free product lines. The IRS will also upgrade the network infrastructure to support new capabilities such as text and video chat.
– Enterprise Call Back Solution: Requirements and Design	The IRS maintains one of the world's largest call center environments and has made significant progress modernizing its infrastructure in recent years. The IRS recently upgraded the legacy technology for how millions of calls are managed and routed within the IRS network, and now the IRS must determine what a new, more robust infrastructure would require. The IRS will develop the enterprise solution requirements for a callback solution that meets the needs of taxpayers, delivering business value.

Modernization Pillar: Core Taxpayer Services & Enforcement

The IRS will continue to evolve core tax systems to provide quicker and easier tax filing services that taxpayers expect, realizing these outcomes through data-driven operations and decision-making, real-time tax processing, and core tax administration systems integration. Our goal is to enhance systemic identification of noncompliance and fraud, while also decreasing false positives, the rate at which an IRS system selects a legitimate return for compliance review and delays the refund. This will ultimately reduce the burden taxpayers face when their legitimate refunds are delayed. Longer term, these efforts will contribute to the IRS's ability to increase taxes collected as a percent of taxes owed, thereby increasing efficiency of audits and voluntary compliance as taxpayers find it easier to make self-corrections. To achieve the Pillar's objectives, we identified target capabilities for each initiative over the next six years (FY2019-FY2024), subject to available resources.

TABLE 13: Core Taxpayer Services & Enforcement Capability Descriptions

CORE TAXPAYER SERVICES & ENFORCEMENT	
Capability	**Capability Description**
CADE 2 TS2 • ITPE: Initial Java code delivered to modernize IMF core components	Completion of the "Customer Account Data Engine" (CADE) Transition State 2 (TS2) will help modernize the technology environment that enables the IRS to process more than 150 million individual tax returns each year. The Individual Tax Processing Engine (ITPE) project is a key component of TS2 and will require converting approximately 200,000 lines of legacy assembly language code to modern software language. This code conversion is a major milestone towards retiring core components of the Individual Master File (IMF). The IRS will migrate the core functions of posting, settlement, and analysis to a standard and modernized programming language, effectively replacing non-standard and legacy components.
– Simple Single Filing to testing	Successful start and completion of the development and delivery of the new Java code deployed for the Simple Single Filing component of the IMF to testing.
– Subsequent Payment with Filing for Ext to testing	The IRS is using a scenario-based approach to test, deliver and validate programming code. "Subsequent Payment with Filing for Extension" is one of several scenarios planned. By converting and updating the legacy code with each test scenario, the IRS is able to incrementally evaluate new code at the beginning of the development lifecycle, which ultimately saves time, improves the code quality and reduces the risk of defects.
– Internal Balancing and Control to testing	Successful start and completion of the development and delivery of the new Java code deployed for the Internal Balancing and Control component of the IMF to testing.
– Completion of Java code conversion	Although the IT infrastructure will continue to rely on legacy code to a certain extent, completing the Java code conversion will significantly modernize and integrate the core code structure.
– IMF Core components modernized – planning and initialization of parallel validation	After completing the scenario-based code conversions, the IRS must conduct a validation of the code in parallel with the legacy IMF core components. This allows the IRS to verify and validate that the code conversions were successful by running the same transactions in parallel and identifying any discrepancies arising from modernized code.

CORE TAXPAYER SERVICES & ENFORCEMENT	
Capability	**Capability Description**
CADE 2 Target State	CADE 2 will provide state-of-the-art individual taxpayer account processing and data-centric technologies for maintaining and balancing individual taxpayer account data. Although completion of the CADE 2 Target State will allow the IRS to retire the most complex portion of the Individual Master File (IMF), efforts to fully retire the IMF are beyond the scope of CADE 2.
Enterprise Case Management (ECM)	The IRS routinely interacts with individual taxpayers, small and large businesses, tax-exempt organizations, and a wide spectrum of intermediaries. The current case management environment, comprised of multiple systems that often do not communicate with each other, causes the IRS to treat each selected interaction as a separate case. This significantly limits the effectiveness and efficiency of each case interaction. In the tax community, this adds frustration and prolongs case resolution. Transitioning to an enterprise case management system with standard business processes is a complex undertaking. The benefits include allowing authorized IRS employees to see a taxpayer's entire range of issues, relevant case data and communications with a taxpayer to more quickly resolve cases. Although the ECM solution may provide multiple benefits, a separate investment may be required to modernize the enterprise case selection (ECS) processes.
– Develop long-term strategy to deliver ECM to the enterprise	The IRS must deliver new case management capabilities within a multi-year time frame. A well-informed strategy will help increase the likelihood of a timely delivery within the planned cost, schedule and scope of the program.
– Procure ECM solution	The IRS plans to procure a suite of commercially available products for a case management solution based on the vendor's proven ability to meet the necessary business requirements at the scale and velocity required.
– Deliver initial case management capabilities	As a first use case, ECM Release 1 will provide the foundational components of a new case management solution that can be used by a limited number of staff in the customer service organization within Tax Exempt and Government Entities (TE/GE). The use case allows the IRS to document specific test conditions and validate if the proposed solution can be scaled up to meet more expansive and diverse requirements.
– Deliver sequencing strategy and Release Plan Structure to support the delivery of future ECM releases for FY21 and beyond.	The IRS will plan and deliver a full range of case management functionality to all IRS business units.
Return Review Program (RRP)	In late 2016 after the IRS retired the core functionality of the Electronic Fraud Detection System (EFDS), RRP became the primary system used for pre-refund anomaly and fraud detection for individual tax returns claiming refunds, including all identity theft and fraud detection components. RRP uses leading-edge, machine learning technologies to detect, resolve, and prevent criminal and civil tax refund fraud and non-compliance. The IRS will expand the use of RRP to other return types, to further improve the agency's ability to pursue significant areas of tax noncompliance.
– Develop a reporting solution that allows for the access and visualization of data	The IRS will implement a solution that will provide the benefits of the legacy reporting tool as well as additional functionality via a new, state-of-the-art solution.

CORE TAXPAYER SERVICES & ENFORCEMENT	
Capability	**Capability Description**
– Create new models and filters based on new schemes to prevent potential fraud	The IRS must create new models and filters to prevent potential fraud and stay ahead of emerging schemes. This capability will allow the IRS to upgrade its models and filters to more effectively identify non-compliance in individual tax returns.
– Plan and develop fraud detection functionality and enhance automated verification for business returns	The IRS will expand use of automated anomaly detection for identifying non-compliance among business returns. Beginning with *Form 1041 (Income Tax Return for Estates and Trusts)* and *Form 1120 (Corporate Income Tax Return)*, this functionality will allow the IRS to develop models and filters that IRS business units can use more effectively to detect significant areas of noncompliance.
– Plan and expand the fraud detection functionality for foreign account withholding	Today, withholding agents are required to report to the IRS certain income paid in foreign countries using *Form 1042-S, Foreign Person's U.S. Source Income Subject to Withholding*. The IRS will explore using RRP to detect noncompliance related to *Form 1042-S*.
– Expand fraud detection to additional business units	Federal tax revenue must be protected from the risk of increasing global fraud sophistication by expanding and maximizing real-time anomaly and fraud detection at filing. The IRS will further expand fraud detection efforts and enhance its modernized fraud detection platform over time as needed.
– Develop functionality to include post-refund and non-refund returns	Today, the RRP program focuses primarily on individual tax returns claiming a refund rather than all returns. The planned new functionality would use RRP to analyze more types of returns for potential noncompliance, including non-refund returns as recommended by the Government Accountability Office.
Real-Time Tax Processing (RTTP)	The IRS will redesign and modernize the current batch processing of tax return information by replacing today's functionality with independent and near real-time processing. This will be a new capability that envisions providing taxpayers with the ability to correct their tax filing information online and update their tax records in near real-time.
Information Returns Systems Processing	The IRS will provide a consistent solution for the acceptance, validation, perfection, management and use of information return data. This will be a new capability that enables improvements to document-matching and providing taxpayers with visibility and access to third-party data before filing.

Modernization Pillar: Modernized IRS Operations

A key part of the IRS modernization effort centers on improvements to the underlying infrastructure and architecture, paving the way for improvements for taxpayers and the tax community. The combination of these initiatives is focused on reducing the complexity of the agency's technical environment, maintaining a secure infrastructure, and adopting leading industry practices together with emerging technologies like cloud and robotics process automation that deliver new and sustained efficiencies. To achieve the Pillar's objectives, we identified target capabilities for each initiative over the next six years (FY2019-FY2024), subject to available resources.

TABLE 14: Modernized IRS Operations Capability Descriptions

MODERNIZED IRS OPERATIONS	
Capability	**Capability Description**
Robotics Process Automation (RPA)	IRS business units are highly motivated to find operational efficiencies that can improve services and automate workflow for a wide range of taxpayers to significantly relieve administrative burden. This effort will include a series of initial limited use projects and activities that lay the foundation for change by providing additional functionality and efficiency gain.
– Implement solution for one Procurement process	Certain activities are repetitive and well defined, making them good candidates for automation. The solution will include the following capabilities and benefits: • time savings for IRS contracting officials in fulfilling the requirement to conduct suitability checks before a contract may be awarded; • data collection from variety of sources to determine if a company has financial resources and capabilities to perform proposed work, • eligibility validation to receive an award under applicable laws and regulations; and, • significant reductions in processing time (e.g., from a duration of hours to under 2 minutes).
– SB/SE Monitoring Offer in Compromise (MOIC)	The IRS is authorized to enter into an offer-in-compromise (OIC) agreement with an individual taxpayer or business to settle a tax debt at a lower amount than what they actually owe. When an individual taxpayer, business, or their representative establishes an agreement, the IRS is required to monitor a taxpayer's filing and payment compliance for five years after an offer has been accepted. The IRS will implement RPA for MOIC to automate what is currently a manual process, saving significant staff time and reducing the risk of human error.
– IT Help Desk Self-Service (Natural language processing)	The IRS will deploy a "chatbot" to provide additional self-service opportunities for employees who may experience technical difficulties as upgrades are deployed to additional desktops and employee workstations. The "chatbot" will prioritize each employee's search results when using the online IT Help Desk and deliver personalized search results based on their browsing history, increasing the likelihood the employee quickly finds the information they need.

MODERNIZED IRS OPERATIONS	
Capability	**Capability Description**
– TE/GE Referrals Batch Process Identification	The capability will: • scan incoming referrals data; • scan for duplicates and referrals with similar issues; • create PDF batch files; and, • create email with descriptive text and attach batch file. Although the capability will not be involved in classification or case selection processes, it will help by batching similar work to promote efficiency.
– Scale enterprise solution and onboard new projects	Before full-scale implementation, the IRS must ensure it has the proper back-end infrastructure and operating model to grow usage and scale up robotics process automation. Implementing an initial solution for limited use will allow the IRS to onboard new projects using a new enterprise solution to be expanded upon with subsequent capabilities.
– Full Operational Capability to enable additional use cases	The IRS will consistently employ and maintain an RPA capability, providing a platform that allows more IRS business functions to consider adopting robotics. Improvements in taxpayer service may include reduced processing time and errors, allowing employees to focus on other areas where human intervention is indispensable.
Application Programming Interface (API) Implementation	Application Programming Interfaces (APIs) allow data to be exchanged through services via standard, reusable services and common programming code. This allows software developers to design applications that interact with one another and expose back end data, systems, and command code. This coordinated effort will deliver the framework for deploying new secure APIs that support IRS business operations and stakeholders who rely on IRS data for authorized purposes. By providing authorized third parties easier access and a streamlined data exchange with the IRS, they are in better position to serve their clients and help to ensure the most efficient use of common services.
– Define External API Product Strategy, Operating Model	The IRS is authorized to share taxpayer data with organizations that use it for specific authorized purposes, such as banks using IRS data to verify a customer's eligibility for a loan. The IRS has rolled out new, stronger data protection requirements to these third parties seeking IRS data. The IRS will define an external API product strategy and operating model to deploy APIs that securely interact with the tax community and by extension their clients.
– API Initial Operating Capability (IOC)	The IRS will develop the ability to securely interact with the tax community by implementing a minimally functional form of the API capability.
– Leverage security efforts with 3rd parties to develop API(s)	The IRS works closely with authorized third parties to ensure the protection of taxpayer data. Developing an API will leverage ongoing security efforts with third parties to: • access applications without being blocked; • provide a more secure channel than the method used today; and, • allow applications to be protected behind advanced cybersecurity protection tools.
– Deploy APIs	Based on the strategy, operating model, and initial limited uses, the IRS will deploy additional APIs as needed that enhance IRS business operations or improve the experience of accessing IRS data for authorized purposes.

MODERNIZED IRS OPERATIONS	
Capability	**Capability Description**
Cloud Execution	The IRS has several projects using various cloud services and is now focused on leveraging cloud technologies to provide value and improved service to taxpayers. The IRS has adopted a cloud strategy, which aligns to the Federal strategy, and will migrate various workloads to the cloud as appropriate. The IRS can securely host tax applications in the cloud, even for major efforts like Enterprise Case Management; this set of capabilities will be critical to stabilizing the cost of operations and maintenance and further enhancing the agency's security posture.
– Procure and deliver ECM Release 1 Cloud platform on Treasury Cloud	The IRS will leverage the Treasury cloud to provide the infrastructure for its first major release under the Enterprise Case Management program. This first deployment in the Treasury cloud will modernize a limited type of case management work currently conducted by the TE/GE Customer Support division (ECM Release 1 – TE/GE Exempt Organizations Customer Support).
– Deploy Cyber CDM Phase 2 on Treasury Cloud	The next deployment in the Treasury cloud will be to provide the infrastructure for CDM Phase 2 identity management software.
– Establish Cloud Management Office and Cloud Governance	The IRS must ensure coordination and maximize the intended outcomes of modernizing IRS operations by moving appropriate workloads to the cloud. The IRS is laying the foundation for cloud migrations in line with best practices. This milestone will establish a strong management office and formal governance to coordinate, manage and govern cloud adoption.
– Complete RFI for the Enterprise Cloud ecosystem	The IRS routinely uses the process of issuing a Request for Information (RFI) to learn about industry capabilities and how they can help modernize the IRS environment.
– Build out sample Cloud Target State Model on the Treasury Cloud	The IRS can more rapidly leverage the benefits of the Treasury cloud with a framework to onboard applications. The IRS will build out a sample Cloud Target State Model on the Treasury cloud to provide the necessary foundation for migrating more workloads to the cloud.
– Tapeless Backup Solution: Cloud Migration	The IRS will leverage cloud services to provide the infrastructure needed for a tapeless back-up storage solution.
– Deliver an additional cloud migration project	The IRS will migrate an additional application to cloud technology.
– Cloud Roadmap	Develop a three-year Cloud Roadmap that shows the key steps from IRS's current state to future state.
– Expand Cloud Target Reference Model	Develop Proof of Concepts (POCs) within the cloud to verify portions of the IRS Cloud Target State Architecture. Produce a Hybrid Cloud Reference Architecture to support the IRS's hybrid computing methods. Identify and document multiple architectural views for a hybrid computing construct between on-premise and an off-premise Cloud Service Provider.
– Cloud Workforce Development – to train the IRS IT workforce on cloud skills	Prepare and deliver a cloud organizational readiness and training plan. Host and train IT workforce on cloud skills.
Next Generation Infrastructure	Next Generation Infrastructure provides a more efficient, scalable and flexible architecture by implementing advanced IT infrastructure tools and technologies for compute, network and storage activities. The combination of these capabilities will help further automate and modernize the technology infrastructure and convert legacy code to modern programming languages.

MODERNIZED IRS OPERATIONS	
Capability	**Capability Description**
– Continuous Integration / Continuous Delivery (CI/CD) • DevOps: CI/CD Onboard (40) projects • DevOps: CI/CD Onboard additional projects • DevOps: CI/CD Complete Onboarding	Continuous integration / continuous delivery (CI/CD) is a leading industry practice that uses automated testing to deploy software upgrades and code changes more rapidly and reliably. The IRS will automate the integration and security testing for 40 projects, followed by a subsequent release of additional projects.
– Centralized Code Repository • DevOps: Centralized code repository (onboard 10 projects) • DevOps: Centralized code repository (onboard 15 projects)	The ability to stage changes prior to deployment allows an organization to speed software delivery. This is achieved in part by establishing and using a centralized code repository that multiple teams can use to more rapidly deploy changes in a predictable and reliable manner. The IRS will migrate projects to a centralized code repository incrementally - an initial 10 projects to the centralized code repository, followed by an additional 15 projects.
– Standard Stack • DevOps/Standard Stack: Develop and validate 3 to 5 stack components • DevOps/Standard Stack: Deploy 3 to 5 standard stack components via automation • DevOps/Standard Stack: Develop and deploy additional standard stack components	A technology stack is a set of software components that compose a platform for running an application. Over time, the IRS has developed custom technology stacks to accommodate the unique data storage and processing requirements of new tax laws and other administrative requirements. Rather than keep building custom environments, standard stacks provide a more stable environment that can accommodate rapid and frequent upgrades. Because minimal configuration is required after deployment, standard stacks will help modernize the agency's technology footprint. When completely implemented, all, or nearly all, of the servers in the IRS ecosystem will be configured as one of the standard stack configurations. The IRS will develop and deploy standard stacks in waves, delivering at least three to five stack components in the short term followed by additional standard stack components that further enable standardization of the infrastructure and skills needed to maintain them.
– Containerization Architecture and Pilot • DevOps: Develop containerization solution architecture • DevOps: Pilot solution for containerization	Containers are widely used by modernized organizations to increase the speed and reliability of deploying programming changes. The IRS will develop the solution architecture to use the minimum compute, memory and storage resources required to run an application and provision application environments rapidly without the need to build individual servers. The IRS will also implement an initial limited use case for the solution.
– Automate Desktop performance assurance	Automating desktop performance assurance will provide insights into the computing performance of desktops / workstations and more quickly resolve issues that might otherwise disrupt taxpayer service operations.
– Automate Network provisioning (software defined networks)	The IRS is required to provision networks on a regular basis to support IRS business operations. By automating the provisioning of software defined networks, the IRS can further modernize its technology operations.
– Tapeless Backup Solution: Procure Solution	The IRS will complete the acquisition package for implementation of a new and modernized tapeless backup solution.

MODERNIZED IRS OPERATIONS	
Capability	**Capability Description**
– Tapeless Backup Solution: Tape Consolidation	The solution will implement a modernized infrastructure to consolidate and provide faster recovery of information from existing tape libraries, which will be phased out.
– Tapeless Backup Solution Restoration Assurance	The IRS will develop and implement a new "as a service" model for restoration assurances, which facilitates more rapid recovery of data. This includes analysis of data and identifying the optimal solution for converting legacy stored tapes to modern storage options.
– Enterprise Online Storage • Enterprise Online Storage (EOS): Develop Next Gen Storage Architecture Strategy • Enterprise Online Storage (EOS): Conduct Tool Evaluation for Next Gen Storage	Managed storage services offer new opportunities to stabilize the cost of operations and maintenance of systems that support the massive data storage needs of the IRS while leveraging the best technology available today. The IRS will develop its strategy, evaluate the technologies that best meet the Federal government requirements, and implement a solution.
– On Premises Managed Infrastructure: Solution Architecture and Evaluation	Stabilizing the rising costs of operations and maintenance depends in part on transitioning the IT infrastructure from on-the-IRS-premises (on-prem) to managed services that leverage cloud technology.
– Converting Legacy Code / Reducing the Application Footprint: Strategy on Legacy Code Conversion	Several IRS systems rely on legacy programming languages to hard-code the system rules and processing engines that power tax computations and other mission-critical functions. Although this legacy code is highly stable, making updates can be difficult under intense time pressures. For example, efforts late in year to renew expired tax credits (also known as extenders) can increase the risk of delaying the start of the annual tax filing season. With a diminishing number of technology professionals who know legacy programming code such as Common Business Oriented Language (COBOL) and Assembly Language Code (ALC), the IRS will refine and deliver a strategy to transition to programming languages that are easier to maintain and provide greater business value.
Data Digitization	The IRS has achieved significant operational efficiencies by digitizing paper processes and increasing access to electronic data to support advanced analytics. This effort will implement new technology to scan and store incoming paper forms and correspondence in an electronic format, as well as modify the paper processing pipeline and retire additional legacy systems.
Universal Data Hub / Analytics Tools / Platform	A modernized infrastructure that provides universal data access under a unified technology platform is key to delivering on the IRS Strategic Goal of using facts and data to inform decision-making and provide more robust access to data. This approach will allow the IRS to automate and advance data analytics rather than rely on the current process of using disparate and segregated data sources that may be prone to time lags or human error.

Modernization Pillar: Cybersecurity & Data Protection

Protecting our systems and taxpayer information against cyber threats is a top priority for the IRS. The cyber landscape is constantly evolving, and we continue to experience increasingly sophisticated and frequent efforts by cybercriminals to steal taxpayer data (1.4 billion attacks annually, including denial-of-service attacks, unsuccessful intrusion attempts, probes or scans, and other unauthorized connectivity attempts), file fraudulent refunds, and infiltrate our systems. To that end, we have used funding provided by Congress to increase our monitoring, detection, and analytical capabilities to identify suspicious activity within our systems. These improvements have helped us slow down identity thieves, but we still need to do more. To achieve the Pillar's objectives, we identified target capabilities for each initiative over the next six years (FY2019-FY2024), subject to available resources.

TABLE 15: Cybersecurity & Data Protection Capability Descriptions

CYBERSECURITY & DATA PROTECTION	
Capability	**Capability Description**
Vulnerability and Threat Management	The IRS must focus on preventing unauthorized access to tax accounts and unauthorized disclosure of taxpayer data. These capabilities provide full visibility into servers and endpoints for monitoring and analyzing data to identify managed threats.
– Complete IT Asset Management Use Case	Strong asset management helps ensure that IT services continue to support the IRS's business operations and provide services to taxpayers efficiently. The IRS operating environment consists of 12 mainframe systems, more than 14,000 servers, over 67,000 laptops and desktops, and thousands of other network and mobile devices. This use case will baseline authoritative data and lay the foundation for building a holistic view of all IT assets.
– Data at Rest Encryption (DARE) • Pilot Data at Rest Encryption (DARE) • Expand DARE implementation • DARE FOC	Data encryption is the process of making data unreadable by other humans or computers for the purpose of preventing others from gaining access to its content. This effort will help eliminate or reduce critical security vulnerabilities. The IRS will identify enterprise encryption solutions and then test and deploy those solutions in waves on critical systems and high value assets.
– Enhanced Security Testing (EST) and Process Automation • Enhanced Security Testing (EST) and Process Automation IOC • Enhanced Security Testing (EST) and Process Automation FOC	Enhanced security testing and process automation helps to embed and fully integrate security into system delivery as early as possible. The IRS will implement initial limited use cases and will subsequently launch a full solution.

CYBERSECURITY & DATA PROTECTION	
Capability	**Capability Description**
– Next Generation Enterprise Security Audit Trails (ESAT) • Next Generation Enterprise Security Audit Trails (ESAT) Strategy • Next Generation ESAT (Limited IOC) • Next Generation ESAT (IOC)	Audit trails help establish accountability over users and their actions within information systems. Due to the sensitive nature of tax return data, the IRS is required by law to detect and monitor the unauthorized access and disclosure of taxpayer records. The Treasury Inspector General for Tax Administration (TIGTA) has found the IRS needs to improve the number and quality of its audit trails and that the IRS continues to make progress. These enhancements, to be delivered in three phases, will help to further improve analytics and compliance. Activities include developing the strategy and data acquisition capabilities, enhancing the technical infrastructure, and updating processes.
– Enhanced Cyber User Behavior and Fraud Analytics • Enhanced Cyber User Behavior and Fraud Analytics (IOC) • Enhanced Cyber User Behavior and Fraud Analytics (FOC)	Advanced analytics is key to staying ahead of cyber criminals. Enhanced Cyber User Behavior and Fraud Analytics, implemented in phases, will provide an automated dashboard and reporting mechanism and incorporate highly sophisticated user behavior analytics. The IRS will combine several dozen indicators with machine-learning and analyst know-how to create an integrated model for flagging high-risk entities and activities. The fully implemented solution will be capable of ingesting new external information such as threat intelligence from other federal agency partners.
– Cyber Analytics Dashboard/Metrics FOC	Automated and sophisticated reporting tools allow the IRS to aggregate collected data from a diverse set of security tools, analyze and query the data, and provide overall situational awareness. Establishing a dashboard that helps identify cybersecurity risks will support the detection and awareness of asset-based security risks.
Identity and Access Management	Identity and Access Management (IAM) refers to the processes, technologies and policies for managing users' digital identities and controlling their use to access enterprise resources. The combination of these capabilities will help to further prevent malicious and unintended access and disclosure of taxpayer and other sensitive data.
– Continuous Diagnostics and Mitigation (CDM) • CDM Phase 1 FOC • CDM Phase 2 IOC & FOC • CDM Phase 3 IOC & FOC	CDM Phase 1 helps address the question of "What is on the network?" Phase 1 is primarily focused on installing new sensors that allow the IRS to more systemically identify and detect the presence and activity of authorized hardware and software assets on the network. Data from these new sensor tools will be aggregated and used to meet the requirements of the U.S. Department of Homeland Security (DHS) as part of the Treasury Dashboard. CDM Phase 2 helps address the question of "Who is on the network?" Phase 2 is primarily focused on the automated provisioning and deprovisioning of devices on the network. Activities include the installation and configuration of the tools and training key stakeholders, such as Criminal Investigation, on how to use those tools. CDM Phase 3 helps address the question of "What is happening on the network?" Phase 3 allows the IRS to block or quarantine unauthorized devices from network connectivity. These enhancements, delivered in three phases, will improve our ability to detect and mitigate the presence of unauthorized hardware and software in IRS's systems. The IRS will implement solutions for initial limited use cases and will subsequently launch a full solution.

CYBERSECURITY & DATA PROTECTION	
Capability	**Capability Description**
– Physical Access Controls • Convert 12 facilities for physical access compliance • Convert 37 facilities for physical access compliance • Upgrade 57 facilities to multi-factor access capability	The Homeland Security Presidential Directive-12 (HSPD-12), along with other security standards, requires the IRS to upgrade certain equipment at IRS facilities. These efforts, delivered in three phases, will upgrade multiple IRS facilities to comply with the new, more robust security standards. The plan includes upgrading 12 IRS facilities beginning in FY 2019, 37 more beginning in FY 2020 and the last tranche of 57 facilities beginning in FY 2021.
Security Operations and Management	Security operations and management includes those activities needed to secure taxpayer data and the systems that handle or store that data through full visibility of hardware and software on the network, as well as enhance incident response and detection of internal threats to data and systems.
– Cyber Architecture and Cloud Migration • Cyber Cloud Strategy and Migration Plan • IRS Cloud Access Security Broker (CASB) FOC	The IRS must deploy systems and protect Federal tax information with reasonable assurance that the systems meet applicable Federal security guidelines. In this series of capabilities, the IRS will develop the security engineering and architecture, the cyber cloud strategy and migration plan, and a new tool (CASB) to identify any potential unauthorized activity in the cloud environments. The combination of these capabilities will allow the IRS to ensure strong cybersecurity in the cloud and continued protection of data.
– Malware Sandboxing (Email and Web) • Malware Email Sandboxing FOC • Malware Web Sandboxing FOC	Strong controls and tools help prevent and identify cybersecurity vulnerabilities. This capability focuses on malware that may be present in email or on the web. The IRS will be able to query and identify potential vulnerabilities by using tactics, such as looking for pre-defined signatures and behaviors.
– Intrusion Detection System - Endpoint Detection and Response • Endpoint Detection Response IOC • Endpoint Detection Response FOC	The IRS must have the ability to replay and analyze inbound and outbound network traffic across the IRS network. The IRS will implement initial limited use cases to conduct functional and performance testing on selected servers and workstations. Subsequent capabilities will expand to all servers and workstations, allowing the IRS to better detect and mitigate threats and ultimately, limit the severity of any security incidents.
– Network Access Restriction and Protection of High Value Assets • Continue network access restriction in Enforcement Mode implementation • Begin network segmentation for High Value Assets (HVA) • Complete network segmentation of IRS top 5 HVAs	The IRS must ensure that it is properly monitoring and maintaining controls on its network in a secure manner. Although the IRS can monitor activity on its network, its ability to enforce restrictions, intervene, and stop activity as quickly as possible is limited. Network Access Restriction and Protection of High Value Assets will allow the IRS to further automate and restrict network access to approved users and devices only. High Value Assets include systems that contain the agency's most valuable data assets and are critical to essential tax administration functions such as processing taxes and refunds. These capabilities will further restrict network access to only approved users and devices and block network access for unauthorized users. Network segmentation allows the IRS to restrict access to approved devices and services, and to segment key systems in ways that limit exposure.

CYBERSECURITY & DATA PROTECTION	
Capability	**Capability Description**
– Cyber Hyper Converged Infrastructure FOC for Real-Time Correlation Analysis	Monitoring the evolving threat landscape requires significant computing power and advanced tools. A cyber hyper converged infrastructure for real-time correlation analysis will allow the IRS to converge its legacy cybersecurity infrastructure into easy-to-deploy building blocks that reduce costs while increasing the capacity and processing power needed.
– Cyber GPU-Based Machine Learning Analytics FOC	Machine learning and other advances in analytics have significantly improved the IRS's ability to protect taxpayer data. The IRS will create a new test environment for better log handling and alerting using graphics processing units (GPUs) that improve computational processing for correlation analysis. This effort will ultimately enhance the agency's threat intelligence platform.
– Cyber Threat Sharing Intelligence Platform IOC	The IRS must ensure it has a platform to curate, correlate, contextualize and disseminate threat intelligence information as cybersecurity threats continue to evolve. The cyber threat sharing intelligence platform will deliver a new platform that allows the IRS to share organized, analyzed and refined information about potential or current cyber-related attacks. The IRS will implement solutions for initial limited uses.
– Next Generation Secure Operations Center FOC	Continued investment in technology, tools and processes is needed to defend against expanding cyber threats. The Next Generation Secure Operations Center will further modernize the mission, functions, and supporting roles necessary for 24x7 data protection.

TABLE 16: Technical Terms

Technical Term	Description
Anything "as a Service" (XaaS)	Describes a broad category of services related to cloud computing and remote access. With cloud computing technologies, services are available over the web or similar networks.
Application Programming Interfaces	A set of protocols, routines, functions and/or commands that programmers use to develop software or facilitate interaction between distinct systems.
Assembly Language Code (ALC)	A low-level computer language specific to a computer architecture. By comparison, many high-level programming languages can be used on multiple architectures but require interpreting or compiling before the instructions reach the processor.
Authoritative Data	A data source that is the primary source of information and considered to bethe most accurate and vetted according to official rules and policy.
Back End Infrastructure	The resources of a network that allow for the connectivity, communication, operations, and management of an enterprise network in response to front-end system requests and operations.
Batch Processing	A form of data processing in which transactions are processed in a group and normally on a set schedule or at the end-of-cycle.
Centralized Code Repository	A central location where data and files from multiple databases and applications are stored and managed.
Chatbot	An artificial intelligence program that is often used in customer service or marketing systems to simulate interactive human conversation by using key pre-calculated user phrases and auditory or text-based signals.
Cloud Access Security Broker (CASB)	A software tool or service that enforces an organization's security policies beyond their infrastructure by acting as a gatekeeper between the organization's on-premise infrastructure and a cloud provider's infrastructure.
Command Code	The language that programmers create and use to tell a computer what algorithms and programs to perform.
Containerization	A virtualization technology that contains an application's entire platform and dependencies in one environment, allowing the software to run reliably from one computing environment to another.
Continuous Integration / Continuous Development (CI/CD)	A leading industry practice that uses automated testing to deploy software upgrades and code changes more rapidly and reliably.
Data at Rest	Data that is not in use or traveling to system endpoints, such as mobile devices or workstations.
Data Digitization	The process of changing paper-based information and processes to a digital form and digital data.
Data Encryption	The process of encoding data into another form at either the database or data field level, so that an unauthorized party cannot decipher it.
Deployment	A variety of activities that support the implementation and rollout of new applications or infrastructures including installation or interoperability testing.
Endpoint(s)	A device or node in a distributed computer system that accepts communications back and forth across the network (e.g. desktop computers, laptops, portable devices, or specialized hardware installations).
Enterprise Infrastructure Solutions (EIS)	A GSA contract vehicle at the forefront of delivering affordable access to global telecom and information technology infrastructure solutions for federal agencies.

Technical Term	Description
Enterprise Security Audit Trail (ESAT)	A set of records that collectively provide documentary evidence of processing used to aid in tracing from original transactions forward to related records and reports, and/or backwards from records and reports to their component source transactions.
Full Operating Capability (FOC)	FOC is attained when organizations scheduled to receive a system have received it and have the ability to employ and maintain it. The specifics for any particular system FOC are defined in that system's Capability Development Document and Capability Production Document.
Graphical Processing Unit (GPU)	A single-chip processor primarily used to manage and boost the performance of video and graphics.
Hardware	The physical components of a computer including the keyboard, monitor, disk drive, and internal chips.
High Value Assets	The collection of assets, Federal information systems, information, and data for which an unauthorized access, use, disclosure, disruption, modification, or destruction could cause a significant impact to the United States' national security interests, foreign relations, economy, or to the public confidence, civil liberties, or public health and safety of the American people.
Hyper Converged Infrastructure	An IT framework that combines storage, computing and networking into a single system to reduce data center complexity and increase scalability.
Identity and Access Management (IAM)	A framework of policies and technologies that ensures the right people have the appropriate access to technology (and physical) resources.
Initial Operating Capability (IOC)	In general, IOC is attained when some parts of an organization scheduled to receive a system have received it and have the ability to employ and maintain it. The specifics for any particular system IOC are defined in that system's Capability Development Document and Capability Production Document.
IT Asset Management (ITAM)	Provides an accurate account of technology asset lifecycle costs and risks to maximize the business value of technology strategy, architecture, funding, contractual and sourcing decisions.
Machine Learning (ML)	A technology that consists of advanced machine learning algorithms composed of many technologies (such as deep learning, neural networks and natural-language processing), used in unsupervised and supervised learning, that operate guided by lessons from existing information.
Malware	A software program(s) designed to damage or do other unwanted actions on a computer (e.g., viruses, worms, trojan horses, and spyware).
Managed Storage Service(s)	The process of offloading an organization's data storage requirements to a third-party managed service provider (e.g., cloud storage).
Migration	The process of transporting data between computers, storage devices or formats. It is a key consideration for any system implementation, upgrade or consolidation. During data migration, software programs or scripts are used to map system data for automated migration.
Natural Language Processing (NLP)	A technology that involves the ability to turn text or audio speech into encoded, structured information, based on an appropriate ontology (e.g., a chatbot uses natural language processing to ask questions, understand answers, and identify all the relevant information in the conversation to automate the customer assistance process).
Network Access Restriction / Control	A process that adds policies to the network for controlling access by devices and users. Policies may be based on device and/or user authentication and the status of endpoint configuration.
Network Segmentation	A process that physically or virtually separates a computer network into smaller network segments, limiting communication through a network, thereby reducing available options for cyber-attacks throughout the network.

Technical Term	Description
Next Generation	A term used to describe a product that has been developed using the latest technology, usually with the intention of replacing an existing product.
On-Premises (on-prem)	On-premises consists of the software and technology that is located within the physical confines of an enterprise, typically within the data center, as opposed to running remotely on hosted servers or in the cloud.
Performance Assurance	Leveraging system monitoring tools to gather relevant data points in order to ensure and monitor system performance as well as trigger alerts to stakeholders whenever a degradation of service occurs.
Pilot Program	A small-scale version of a larger project aimed at testing a capability or solution in the agency's environment, using internal records and staff, before full implementation occurs.
Platform	A product that serves or enables other products or services. Platforms (in the context of digital business) exist at many levels. They range from high-level platforms that enable a platform business model to low-level platforms that provide a collection of business and/or technology capabilities that other products or services consume to deliver their own business capabilities.
Robotics Process Automation (RPA)	A technology that enhances business process execution, speed, and accuracy through smart software designed to perform high-volume, repeatable tasks.
Sandboxing	A computer security term referring to when a program is set aside from other programs in a separate environment so that if errors or security issues occur, those issues will not spread to other areas on the computer. Programs are enabled in their own sequestered area, where they can be worked on without posing any threat to other programs.
Secure Operations Center (SOC)	A team and facility dedicated to preventing, detecting, assessing and responding to cybersecurity threats and incidents, and to fulfill and assess regulatory compliance.
Servers	A computer or program that is dedicated to managing access to a centralized resource or service in a network (e.g. web servers, mail servers, and file servers).
Software	Any program that performs a specific function (e.g., word processing, spreadsheet calculations, e-mail).
Software Language	A computer language engineered to create a standard form of commands. These commands can be interpreted into a code understood by a machine. Programs are created through programming languages to control the behavior and output of a machine through accurate algorithms.
Solution	An implementation of people, processes, information and technologies in a distinct system to support a set of business or technical capabilities that solve one or more business problems.
Solution Architecture	The process of designing enterprise solutions, applications, and processes that integrate with each other to address specific needs and requirements.
Tapeless Back-up Storage	The process of replacing the tape-based data storage infrastructure to a disk/cloud-based solution.
Use Case(s)	A use case describes how an end-user wants to use a system. It represents the list of tasks that actors can perform and is directly related to the requirements of the business process.

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