October 2021

INFORMATION TECHNOLOGY

Cost and Schedule Performance of Selected IRS Investments

A Century of Non-Partisan Fact-Based Work

GAO-22-104387

INFORMATION TECHNOLOGY

Cost and Schedule Performance of Selected IRS Investments

Why GAO Did This Study

IRS relies extensively on IT investments to annually collect more than $3.5 trillion in taxes, distribute more than $450 billion in refunds, and carry out its mission of providing service to America's taxpayers in meeting their tax obligations. For fiscal year 2020, the agency reported spending approximately $2.8 billion for these investments.

The Joint Explanatory Statement accompanying the Financial Services and General Government Appropriations Act, 2020 included a provision for GAO to annually review the status of IRS's IT investments. GAO's specific objectives were to (1) summarize IRS's reported performance for selected IT investments, including CADE 2; (2) identify IRS's reported progress in implementing its 2019 IT modernization plan; and (3) identify the IT-related actions IRS has taken to maximize telework and operate during the COVID-19 pandemic, and any impacts of those actions.

GAO obtained IRS's reported performance information for a nonprobability sample of five investments, and compared performance to agency targets. GAO also compared modernization activities that IRS reported completing to those identified in the agency's 2019 IT modernization plan. Further, GAO reviewed agency documentation to identify reported IT actions taken to continue to operate during the pandemic and reported associated impacts. GAO also interviewed cognizant IRS officials.

What GAO Found

The Internal Revenue Service (IRS) reported that the five investments GAO reviewed met most of the performance goals set by the agency for fiscal years 2019 and 2020. Specifically, IRS reported that most of the three investments in development were within 10 percent of performance goals, a variance the Office of Management and Budget considers not to be significant. An exception was the Customer Account Data Engine (CADE) 2, a program intended to modernize tax processing, that reportedly spent about 15 percent less than budgeted for 2020. For the two investments in operations and maintenance, IRS reported that for fiscal years 2019 and 2020 one investment met all five operational performance goals established by the agency, while the other met three of five goals in fiscal year 2019 and four of five in fiscal year 2020.

While CADE 2 had lower reported costs than expected for 2020 and was within 10 percent of schedule goals for 2019 and 2020, its longer term performance and outlook are troubling. IRS began developing CADE 2 in 2009 to replace its 60-year-old Individual Master File (IMF)—IRS's authoritative data source for individual tax account data. Since 2009, IRS has revised the program's cost, schedule, and scope goals on numerous occasions, including seven times between 2016 and 2019. Accordingly, a key major program milestone for replacing selected IMF functions, known as transition state 2, has slipped 9 years—from 2014 to 2023. Further, CADE 2 is now expected to replace core functions of IMF, rather than the entire system. The CADE 2 delays and IRS's continued use of IMF are troubling given, that IMF (1) is one of the oldest systems in the federal government; (2) has software written in an archaic language that IRS stated is no longer taught in school; and (3) is supported by a workforce with specialized skills that are increasingly harder to find. In June 2021, IRS reported that it planned to replace and fully retire IMF by 2030. Accordingly, IRS will continue to face IMF challenges for several more years.

For its agency-wide modernization plan, IRS reported completing most of its activities intended for fiscal years 2019 and 2020 within cost and on or ahead of schedule. The updated plan identified 59 activities for completion in fiscal years 2019 and 2020. IRS reported that, by the end of fiscal year 2020, it had completed 54 of the 59 activities early or on schedule and the remaining five activities 3 to 7 months later than initially planned. Regarding cost, IRS reported that it spent $9 million less than the $300 million planned for fiscal year 2019 and $19.9 million less than the $271 million planned for fiscal year 2020.

To respond to the pandemic, IRS took a number of information technology (IT)-related actions to maximize telework capabilities for its employees, including deploying IT equipment, such as laptops, and upgrading its network infrastructure bandwidth. For fiscal year 2020, IRS spent $104 million for these actions from emergency appropriations included in pandemic-related legislation. According to IRS officials, the long-term impact of sustaining an increased level of telework on the budget had not been determined. In contrast, IRS said the actions to maximize telework capabilities delayed plans for IT modernization and operations. For example, IRS reported that staffing resources initially allocated for CADE 2 had been reassigned to support COVID-19 responsibilities, resulting in a 7-month delay in the scheduled completion of key development activities.

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U.S. GOVERNMENT ACCOUNTABILITY OFFICE
A Century of Non-Partisan Fact-Based Work

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Washington, DC 20548

October 19, 2021

The Honorable Chris Van Hollen
Chairman
The Honorable Cindy Hyde-Smith
Ranking Member
Subcommittee on Financial Services and General Government
Committee on Appropriations
United States Senate

The Honorable Michael B. Quigley
Chairman
The Honorable Steve Womack
Ranking Member
Subcommittee on Financial Services and General Government
Committee on Appropriations
United States House of Representatives

The Internal Revenue Service (IRS) relies extensively on information technology (IT) systems to annually collect more than $3.5 trillion in taxes, distribute more than $450 billion in refunds, and carry out its mission of providing service to America's taxpayers in meeting their tax obligations. For fiscal year 2020, the agency reported spending approximately $2.8 billion for its IT investments.[1]

In April 2019, IRS issued a plan to guide its IT modernization efforts through fiscal year 2024.[2] This plan defined four major categories of work that IRS considered necessary to transform the agency's technology and deliver a modernized taxpayer experience in support of its mission: (1) taxpayer experience, (2) core taxpayer services and enforcement, (3) modernized IRS operations, and (4) cybersecurity and data protection.

Further, in response to the Coronavirus Disease 2019 (COVID-19) pandemic, starting in March 2020, IRS, like other federal agencies, took actions to ensure its employees' safety while continuing to meet its

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[1]This amount does not include the $104 million from COVID-19 related appropriations that IRS reported spending on IT-related actions it took to continue to operate during the pandemic. This spending is detailed later in this report.

[2]Internal Revenue Service, *IRS Integrated Modernization Plan Business Plan,* (Washington, D.C.: April 2019).

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mission. In March 2021, we issued our annual report on IRS's filing season performance. In the report, we identified steps the agency took to manage disruptions to the 2020 filing season due to COVID-19.[3]

The Joint Explanatory Statement accompanying the Financial Services and General Government Appropriations Act, 2020[4] includes a provision for us to annually review the status of IRS's IT investments. Our objectives for this review were to (1) summarize the agency's reported performance for selected IT investments, including the Customer Account Data Engine (CADE) 2; (2) determine IRS's progress in implementing its 2019 IT modernization plan; and (3) identify the IT-related actions the agency has taken to maximize telework during the COVID-19 pandemic, and the reported impacts of the actions on the agency's IT budget and plans.

For the first objective, we identified a nonprobability sample of five out of IRS's 133 IT investments. We selected the sample from among those investments that IRS identified as mission-critical and with the highest levels of funding for fiscal years 2019 and 2020. Specifically, we selected three investments in development—Enterprise Case Management (ECM), CADE 2, and Web Applications (WebApps)—and two investments in operations and maintenance—Individual Master File (IMF) and End User Systems and Services (EUSS).

For the investments in development, we compared planned cost, schedule, and scope data to actual cost, schedule, and scope data for fiscal years 2019 and 2020, using performance data from the Investment Performance Tool—IRS's system for tracking investment performance—and supporting documentation. The Office of Management and Budget's (OMB) and IRS's standards for reporting on investment performance consider variances within 10 percent of goals not to be significant.

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[3]GAO, *Tax Filing: Actions Needed to Address Processing Delays and Risks to the 2021 Filing Season*, GAO-21-251 (Washington, D.C.: Mar. 1, 2021). We also regularly issue government-wide reports on the federal response to COVID-19, including IRS's response. For the latest report, see GAO, *COVID-19: Continued Attention Needed to Enhance Federal Preparedness, Response, Service Delivery, and Program Integrity*, GAO-21-551 (Washington, D.C.: Jul. 19, 2021).

[4]Joint Explanatory Statement accompanying the Consolidated Appropriations Act, 2020, Pub. L. No. 116-93, 133 Stat. 2317 (Dec. 20, 2019). In communication with committee staff, we agreed to focus on the three objectives detailed in this report.

To assess the reliability of the Investment Performance Tool data for the selected investments in development, we, among other things, interviewed IRS IT organization officials responsible for overseeing the use of the tool to confirm our understanding of the data. We also reviewed the data to verify that it included all the projects supporting the investments for the 8 quarters in the scope of our review. We followed up with IT program officials to discuss detected anomalies. We determined that the data were sufficiently reliable for our purposes.

For the CADE 2 investment, we also reviewed prior GAO reports; IRS's quarterly IT reports to Congress on the agency's IT modernization progress; and relevant documents, including the modernization plan for IMF for which CADE 2 is a key component.

For the selected investments in operations and maintenance, we compared operational performance measures found in the agency's monthly investment performance reports to agency operational performance metrics for fiscal years 2019 and 2020. We also reviewed IRS's operational analyses—internal qualitative assessments of performance required by OMB—for the two selected investments to determine whether they addressed key factors specified in OMB's capital programming guidance. These factors included, for example, analyzing how well the investments contribute to achieving the organization's strategic goals and determining the extent to which the investments support customer processes, as designed. We rated each factor as addressed if the operational analysis fully addressed the factor; or partially addressed if the operational analysis addressed some, but not all, of the factor.

For the second objective, we compared IRS's reported actual costs and schedules for the IT modernization activities completed in fiscal years 2019 and 2020 to the planned costs and schedules for these activities. We also reviewed documentation, such as IRS's quarterly IT reports to Congress, and interviewed IT organization[5] officials, to understand variances between actual and planned performance.

In addition, we selected a nongeneralizable random sample of modernization activities to verify that they were completed. Specifically, we randomly selected one activity from each of the four modernization

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[5]IRS's IT organization is led by the Chief Information Officer and includes several subordinate offices.

categories outlined in the agency's plan for fiscal years 2019 and 2020. This resulted in our selection of eight of 59 activities. To verify completion of the selected activities, we reviewed supporting documentation and interviewed IRS IT organization officials.

To address the third objective, we obtained, analyzed, and summarized relevant documentation, including weekly impact summary reports prepared by associate chief information officers in IRS's Information Technology organization; IRS's COVID-19 spending plan; and the inventory of IT equipment and services that the agency purchased to transition its workforce to maximum telework. We also interviewed officials from IRS's Information Technology organization who are responsible for purchasing and deploying the equipment.

We also reviewed instructions for reporting information in the COVID-19 weekly impact summary reports. Further, we corroborated the accuracy of the information in the COVID-19 spending plan with IRS budget officials. We determined that the data were sufficiently reliable for purposes of summarizing what IRS reported. A detailed discussion of our objectives, scope, and methodology can be found in appendix I.

We conducted this performance audit from June 2020 to October 2021 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

The mission of IRS, a bureau within the Department of the Treasury, is to provide America's taxpayers top quality service by helping them understand and meet their tax responsibilities and enforce the law with integrity and fairness to all. In carrying out its mission, IRS annually collects more than $3.5 trillion in taxes from millions of individual taxpayers and numerous other types of taxpayers. It also manages the distribution of more than $450 billion in refunds.

In response to the COVID-19 pandemic, IRS, like many other agencies, had to take actions to ensure its employees' safety and health, while also ensuring the continuity of its mission-essential functions. In March 2020, Congress and the President enacted the Coronavirus Aid, Relief, and Economic Security (CARES) Act, which directed IRS to assist individuals, families, and households in alleviating the financial hardships they were

facing through the disbursement of economic impact payments.[6] In addition, the CARES Act provided the agency with the funding needed to take actions to continue to operate during the pandemic and perform its new responsibilities.

In March 2020, Congress and the President also enacted the Families First Coronavirus Response Act, which provided additional funding to IRS to continue to operate during the pandemic.[7] Further, in December 2020, Congress and the President enacted the Consolidated Appropriations Act, 2021, which authorized IRS to issue a second round of direct payments to individuals to help address financial stress due to the pandemic.[8] Finally, in March 2021, Congress and the President enacted the American Rescue Plan Act, which provided $1.5 billion to the agency to continue to develop "integrated, modernized, and secure systems."[9]

IRS Relies on IT to Carry Out Its Mission and Responsibilities

As previously mentioned, IT plays a critical role in enabling IRS to carry out its mission and responsibilities. According to the agency, it expended approximately $2.8 billion on IT investments during fiscal year 2020: $605 million for development, modernization, and enhancement, and $2.2 billion for operations and maintenance.

Included in these expenditures are the five investments selected for our review—all of which IRS describes as critical to the agency's mission.

Three of the five investments were primarily in the development phase during fiscal years 2019 and 2020:

- CADE 2, which IRS began developing in 2009, is intended to replace core functions of IMF—IRS's authoritative data source for individual tax account data—which accounts for a large portion of the tax processing activities. CADE 2 data are also expected to be made available for access by downstream systems, such as the Integrated Data Retrieval System, for online transaction processing by IRS

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[6]Pub. L. No. 116-136, § 2201(a), 134 Stat. 281,336–37 (codified at 26 U.S.C. § 6428) (March 27, 2020).

[7]Pub. L. No. 116-127, title III, 134 Stat. 178, 181 (March 18, 2020).

[8]Pub. L. No. 116-260, div. N, § 272(a), 134 Stat. 1182, 1965–1971 (2020), classified at 26 U.S.C. § 6428A. These payments are an advance refund for a tax year 2020 tax credit.

[9]American Rescue Plan Act of 2021, Pub. L. No. 117-2, Title IX, Subtitle G, § 9601, 135 Stat. 4, 144 (March 11, 2021).

customer service representatives. We provide more details on this investment later in the report.

- ECM, which IRS began developing in 2015, is intended to provide an enterprise solution for performing case management across the agency's business units. According to the agency, its current case management systems provide limited visibility into case management practices among programs, and cause process redundancies as well as multiple handoffs that can lead to, among other things, increased risks. ECM is expected to address these limitations.

  In June 2018, we reported that, after 18 months of working with a contractor, IRS had paused all development activities for the investment because the product that was being delivered did not meet the agency's needs.[10] Specifically, the contractor's solution was not sufficiently automated to be scalable across the agency.

  IRS subsequently established a new effort to acquire a product that would be aligned with its business needs. In April 2020, it acquired the product and began an incremental implementation.[11] The agency reported completing the first release of the implementation—the delivery of the case management solution to one business organization—in December 2020.

  IRS reported completing the second release—the delivery of the solution to one other business organization and the initiation of work with three additional business organizations—in May 2021. The agency expects the third release—the delivery of data services to allow users to access individual taxpayer data, and additional case management functionality to enable further business migration to ECM—to be completed in December 2021.

  IRS reported spending $66 million on the investment in fiscal year 2020. As of July 2021, the agency had spent $229 million on the lifecycle of this investment and had rebaselined it—meaning that it had revised cost, schedule, or scope goals— three times.

- WebApps, which the agency began developing in 2015, is intended to establish an online account for individual taxpayers that links the

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[10]GAO, *Information Technology, IRS Needs to Take Additional Actions to Address Significant Risks to Tax Processing*, GAO-18-298 (Washington, D.C.: June 28, 2018).

[11]IRS uses an agile approach to implement modernization activities.

taxpayer to various IRS services. For example, WebApps is intended to allow taxpayers to check their account balances and payment histories, and resolve a variety of tax issues using IRS's website or mobile application. The agency reported that it expects to complete the online installment agreements—which would allow users to create a short-term payment plan—in WebApps by September 2021. The agency reported spending $32 million on the investment in fiscal year 2020. As of December 2020, IRS had spent $181 million on the lifecycle of the investment.

The two other investments selected for our review were in the operations and maintenance phase during fiscal years 2019 and 2020:[12]

- EUSS, which IRS began operating in 2002, provides desktops, laptops, mobile devices, software, incident management services, and asset management services to end users in the agency. IRS reported spending $268 million on development and operations and maintenance for this investment in fiscal year 2020; it reported spending $2 billion on the lifecycle of the investment through September 2020.

- IMF, which began operating in 1970, is IRS's system for processing individual taxpayer account data. The agency uses this system to update accounts, assess taxes, and generate refunds, as required, during each tax filing period. Virtually all of IRS's information system applications and processes depend on output, directly or indirectly, from this data source; and IMF was used as a key system for determining eligibility for making the economic impact payments to individuals. IRS uses assembly language code[13] and Common

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[12]IRS allocated funding to both development and operations and maintenance activities for EUSS and for IMF in fiscal years 2019 and 2020. However, over 50 percent of the funding was allocated to operation and maintenance activities for both investments during this time period.

[13]Assembly language code is a low-level computer language initially used in the 1950s. Programs written in assembly language are conservative of machine resources and quite fast; however, they are much more difficult to write and maintain than other languages. Programs written in assembly language may only run on the type of computer for which they were originally developed.

Business Oriented Language (COBOL)[14]—languages that were developed in the late 1950s and early 1960s—to program this system, which it began developing in the late 1960s. The agency reported spending $14 million on operations and maintenance for IMF in fiscal year 2020 and a total of $189 million on the investment through August 2020.

To guide its future direction, in April 2019, IRS issued a plan for its IT modernization efforts through fiscal year 2024.[15] This plan defined four major categories[16] of work, which IRS considered necessary to transform the agency's technology and deliver a modernized taxpayer experience in support of its mission. The categories were taxpayer experience, core taxpayer services and enforcement, modernized IRS operations, and cybersecurity and data protection.

In addition, the plan defined two phases for completing the work: the first phase was scheduled to occur between fiscal years 2019 and 2021, and the second phase was scheduled to occur between fiscal years 2022 and 2024. The agency noted that successful implementation of the plan depended on obtaining certain hiring flexibilities and required multiyear funding at predictable levels.

IRS reports quarterly to the Congress and other stakeholders on its progress in implementing the modernization plan, as mandated in the Joint Explanatory Statement. These quarterly reports summarize accomplishments for the past quarter and identify plans, including associated costs and schedules for the upcoming quarter. Further, the agency issues a publicly available annual status report and, in February 2021, issued its second such report.

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[14]COBOL, which was introduced in 1959, became the first widely used, high-level programming language for business applications. The Gartner Group, a leading IT research and advisory company, has reported that organizations using COBOL should consider replacing the language, as procurement and operating costs are expected to steadily rise, and because there is a decrease in people available with the proper skill sets to support the language.

[15]Internal Revenue Service, *IRS Integrated Modernization Plan Business Plan,* (Washington, D.C.: April 2019).

[16]IRS refers to these major categories of work as pillars.

GAO Has Reported on Opportunities for IRS to Improve the Management of Its IT Investments

For several years, we have reported on the performance of IRS's IT investments and identified opportunities for improving the management of these investments. For example,

- In May 2016, we reported on legacy IT systems across the federal government. We noted that these systems were becoming increasingly obsolete and that many of them used outdated software languages and hardware parts that were unsupported by the vendor.[17] We stressed the need for agencies to move to more modern, maintainable languages, as appropriate and feasible. As part of that work, we highlighted the Department of the Treasury's use of assembly language code and COBOL to program its legacy systems.[18] We also reported that IMF was over 50 years old and that, although IRS was working to modernize it, the agency did not have a time frame for completing the modernization or replacement. Thus, we recommended that the Secretary of the Treasury direct the Chief Information Officer to identify and plan to modernize or replace IRS's legacy systems. In June 2021, IRS issued a high-level IMF retirement plan that included the scope of the work, the approach, dependencies and risks, and cost and timeline estimates.[19] According to the plan, IRS estimates that it will retire IMF in 2030.

- In June 2016, we reported that IRS had developed IT investment priorities which supported two types of activities—operations and maintenance and modernization.[20] We noted that the agency had not fully documented the process for allocating funding to its operations activities or developed a structured process for allocating funding to its modernization activities. We recommended that IRS develop and document these processes.

  In response to our recommendation, IRS documented its process for prioritizing its operations activities in March 2017. Further, in October 2020, the agency provided documentation of a process for prioritizing its modernization activities that it had developed and begun

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[17]GAO, *Information Technology: Federal Agencies Need to Address Aging Legacy Systems,* GAO-16-468 (Washington, D.C.: May 25, 2016).

[18]While COBOL was developed in the late 50s and early 60s, IRS has been regularly updating the version it uses. Nevertheless, according to IRS, modernizing its systems would assist with providing the instant data access and real-time updates to the systems that are needed to provide better across-the-board service in a cost-effective manner.

[19]IRS, *Information Technology, Individual Master File Modernization* (June 2021).

[20]GAO, *Information Technology: IRS Needs to Improve Its Processes for Prioritizing and Reporting Performance of Investments,* GAO-16-545 (Washington, D.C.: June 29, 2016).

implementing. According to IRS IT organization officials, this process for prioritizing modernization efforts is expected to be fully implemented for the fiscal year 2022 budget cycle, to coincide with the start of a new phase of modernization efforts.

- In June 2018, we reviewed the performance of selected IRS investments, the extent to which IRS had identified and taken steps to address the risks associated with three mission critical legacy systems—IMF, Integrated Data Retrieval System, and Mainframes and Servers Services and Support—and the agency's implementation of key IT workforce planning practices.[21] We reported, among other things, that these legacy systems were facing significant risks due to their reliance on legacy programming languages, outdated hardware, and a shortage of human resources with critical skills needed to maintain the systems. In addition, the agency had not fully implemented key risk management practices to effectively mitigate those risks.

  As a result of these and other findings in our report, we made 21 recommendations to IRS. The agency did not agree or disagree with the recommendations, but said it would provide a plan for addressing each recommendation. As of May 2021, IRS had updated its risk management process to include preparing, analyzing, and controlling risk. Further, the agency had implemented 18 recommendations, including updating its risk management plan for the Mainframe Servers and Support System to account for identifying risk, and had taken steps to address the others. A detailed summary on the status of IRS's efforts to address the recommendations is included in appendix II.

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[21]GAO, *Information Technology: IRS Needs to Take Additional Actions to Address Significant Risks to Tax Processing,* GAO-18-298 (Washington, D.C.: June 28, 2018).

IRS Reported That Selected Investments Met Most Performance Goals but Key Effort Had Significant Delays and Cost Increases

IRS reported that the five investments we reviewed had met most of the performance goals set by the agency and the performance reporting requirements established by OMB for fiscal years 2019 and 2020. Specifically, the agency reported that the three selected investments in development were mostly within 10 percent, of performance goals for fiscal years 2019 and 2020, a variance OMB and IRS consider not to be significant.[22] An exception was CADE 2 that reportedly spent about 15 percent less than budgeted for 2020. In addition, for the two investments in operations and maintenance, the agency performed operational analyses that addressed nearly all OMB requirements for fiscal years 2019 and 2020. Further, the agency reported that, in fiscal years 2019 and 2020, one of the investments met all five operational performance targets established by the agency; the other investment met three out of five targets in fiscal year 2019 and four out of six targets in fiscal year 2020.

While CADE 2 had lower expected costs for 2020 and was within schedule parameters for 2019 and 2020, IRS had changed its plans for the investment several times. This has led to a key schedule milestone for replacing selected IMF functions, known as transition state 2, being delayed 9 years—from 2014 to 2023. Overall, IRS now reports that CADE 2 development will not be completed until 2030. In addition, development costs to date are about four times higher than originally planned.

IRS Reported That Selected Investments in Development Were Mostly Within 10 Percent of Performance Goals

For the selected investments in development (ECM, CADE 2, and WebApps), IRS reported cost, schedule, and scope performance information on a quarterly basis for fiscal years 2019 and 2020.[23] According to the agency, with the exception of CADE 2, which experienced a significant budget underrun in fiscal year 2020, the three investments were within 10 percent of cost, schedule and scope goals for these years. Table 1 summarizes the performance of the ECM, CADE 2, and WebApps investments for fiscal years 2019 and 2020.

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[22]For purposes of this reporting, variances within 10 percent were considered not to be significant. Consistent with OMB guidance, IRS considers cost and schedule variances within this threshold not to be significant.

[23]While IRS uses earned value management type information from its Investment Performance Tool to track the performance of its investments in development, it does not consider the tool containing this information to be a formal earned value management system. As a result, we did not evaluate the extent to which the tool was compliant with the American National Standards Institute's guidelines for an Earned Value Management System.

Table 1: Reported Performance of Enterprise Case Management (ECM), Customer Account Data Engine 2 (CADE 2), and Web Applications (WebApps) Investments during Fiscal Year 2019 and 2020

Investment name	Fiscal year	Total budgeted cost of work performed (in millions)	Total actual cost of work performed (in millions)	Cost variance	Schedule variance[a]	Percent of planned scope delivered[a]
ECM	2019	$19.26	$19.26	0%	-1.8%	98%
	2020	$30.44	$30.44	0%	-2.2%	97.8%
CADE 2	2019	$51.87	$51.84	-0.1%	2.1%	102.1%
	2020	$82.26	$70.22	-14.6%	-0.1%	99.9%
WebApps	2019	$28.38	$26.48	-6.7%	0%	100.0%
	2020	$23.73	$21.81	-8.1%	0%	100.0%

Source: GAO analysis of Internal Revenue Service data. | GAO-22-104387

Note: For purposes of this reporting, variances within 10 percent were not considered significant. In addition, positive variances represent overruns and negative variances represent underruns.

[a]Based on the ratio of earned value to planned value at the investment level.

Regarding ECM, IRS reported that it was on budget, had a 1.8 percent schedule overrun, and delivered 98 percent of planned scope for fiscal year 2019. For fiscal year 2020, the agency reported results similar to those for fiscal year 2019. Specifically, IRS reported that ECM was on budget, had a 2.2 percent schedule overrun, and delivered 97.8 percent of planned scope.

For CADE 2, IRS reported that it spent about 0.1 percent less than budgeted for the amount of work performed (about $32,000 less), was 2.1 percent ahead of schedule, and delivered about 102 percent of planned scope in fiscal year 2019. For fiscal year 2020, the agency reported that CADE 2 was under budget by about 15 percent (about $12 million), was 0.1 percent behind schedule, and delivered 99.9 percent of the planned scope. CADE 2 program officials reported that the significant budget underrun in fiscal year 2020 was due to requiring fewer people than initially planned for the Individual Tax Processing Engine project.

In addition, in its fourth quarter fiscal year 2020 IT quarterly report to Congress, IRS reported that staffing resources were pulled from CADE 2 to support the 2020 filing season, COVID-19 responsibilities, and maintenance activities to ensure readiness for the 2021 tax filing season. The agency further reported that this reallocation of resources led to a slight underspend for the fourth quarter and is expected to result in a 7-month delay in the completion of Transition State 2 development activities—from September 2022 to April 2023.

However, while IRS reported the reallocation of resources and the resulting schedule impact in the fourth quarter fiscal year 2020 report to Congress, it did not include a history of baseline changes or other information that would provide a long-term view of CADE 2's performance.

We shared this observation with IRS, and, in response, the agency began including a history of program baseline changes in its quarterly reports, beginning with the second quarter fiscal year 2021 report. In July 2021, IRS IT officials stated they plan to continue to include this history in future reports. By including this transparency in its quarterly reports, IRS is providing greater assurance that Congress and stakeholders have more complete information to support their oversight of the agency's investments.

Regarding WebApps, the agency reported that it was under budget by about 7 percent (about $1.9 million) with no variances in schedule or planned scope in fiscal year 2019. WebApps program officials attributed the cost variance to spending less money than planned because their appropriation was delayed and lower than anticipated.

In fiscal year 2020, IRS reported similar results, with the WebApps investment spending about 8 percent (about $1.9 million) less than budgeted, and with no variances in schedule or scope. Similar to fiscal year 2020, WebApps program officials attributed the budget variance to having less to spend because the agency's appropriation was delayed and lower than anticipated. Nevertheless, in fiscal year 2020, IRS reported that it completed additional activities as part of this investment that related to COVID-19, including the development of a "Where's My Stimulus Check" application.

IRS Reported That the Selected Investments in Operations and Maintenance Met Most OMB Performance Requirements

OMB's fiscal year 2020 Capital Programming guidance states that agencies should conduct an operational analysis for each investment in operations and maintenance that addresses six factors.[24] These factors are (1) the extent to which the investment supports customer processes as designed; (2) how well the investment contributes to achieving the organization's strategic goals; (3) a comparison of current performance with a pre-established cost baseline; (4) alternative methods for achieving the same mission needs and strategic goals; (5) greater (i.e., increased)

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[24]Office of Management and Budget, *Capital Programming Guide V 3.1: Supplement to Office of Management and Budget Circular A-11, Planning, Budgeting, and Acquisition of Capital Assets* (Washington, D.C.: 2020).

utilization of technology or consolidation of investments to better meet organizational goals; and (6) annual performance of operational analyses.

Further, OMB's fiscal year 2020 Capital Planning guidance states that the ongoing performance of operational investments should be monitored to demonstrate that the investments are meeting the needs of the agency and delivering expected value, and/or that the modernized and replaced systems are consistent with the agency's enterprise architecture.[25] To achieve these goals, OMB requires agencies to define and publicly report on five operational performance metrics specific to each major IT investment, as well as planned and actual performance against these metrics. According to OMB, these metrics should address three broad areas: customer satisfaction, financial performance, and strategic and business results.

IRS conducted operational analyses for the two investments in operations and maintenance, EUSS and IMF, for fiscal years 2019 and 2020. The operational analyses for EUSS fully addressed all six OMB factors for fiscal years 2019 and 2020. For example, the operational analyses addressed the factors associated with

- utilizing technology or consolidation of the investment to better meet organizational goals. For example, the fiscal year 2019 operational analysis stated that IRS implemented a capability to deploy Windows and perform system upgrades remotely. In addition, the fiscal year 2020 operational analysis stated that IRS developed a robotics process automation tool to facilitate the interaction between service desk specialists and employees with account lockout issues—the most common issue requiring service desk assistance. According to the operational analysis, the tool reduced the amount of time it takes specialists to unlock accounts from 22 minutes to under 7 minutes.

- providing a comparison between planned and actual costs for both fiscal years 2019 and 2020 by addressing planned and actual costs in the operational analysis.

The operational analyses for IMF, in both fiscal years 2019 and 2020, fully addressed five of the six factors and partially addressed the one other factor. For example, the operational analyses addressed the factors associated with

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[25]Office of Management and Budget, *FY 2020 IT Budget – Capital Planning Guidance* (Washington, D.C.: June 2018).

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- supporting customer processes, as designed, by including performance goals related to customer satisfaction, specifically identifying a target goal of zero errors that cause the program to crash per month, and achieving the goal for fiscal years 2019 and 2020.

- researching alternative methods of achieving the same mission needs and strategic goals and aligning available resources with the investment annually.

The operational analyses partially addressed the factor associated with greater utilization of technology or consolidation of investments to better meet organizational goals. The analyses stated that IRS used new technology to implement processing improvements via a more robust testing approach in order to reduce coding defects.

However, while the analyses noted that IMF is being replaced with a more modern system, the analyses did not reflect IRS's modernization progress to date and the associated challenges—a shortcoming we identified in our review of the agency's 2016 operational analysis for IMF and reported on in June 2018.[26] We stressed that this omission was concerning given the risk exposure created by the agency's continued use of the legacy assembly language code. Consequently, we recommended that IRS ensure the operational analysis for IMF fully addresses greater utilization of technology or consolidation of investments to better meet organizational goals.

IRS provided its fiscal year 2020 operational analysis for CADE 2, which addressed the agency's progress in modernizing components of IMF and associated challenges. However, given that this information was not included in the IMF operational analysis, the agency may not have had the critical information it needed to inform the decisions about IMF. We plan to continue monitoring the agency's efforts to update its operational analysis to include progress on modernizing IMF and the associated challenges.

Further, as mentioned earlier, OMB requires agencies to define and publicly report on five operational performance metrics specific to each major IT investment, as well as planned and actual performance against these metrics. The metrics are to focus on the three broad areas of customer satisfaction, financial performance, and strategic and business results.

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[26]GAO-18-298.

IRS defined operational performance metrics for EUSS and IMF, as required by OMB. For EUSS in both fiscal years 2019 and 2020, the metrics were:

- timeliness of service call resolution,

- percentage of IT interactions closed at the first level of support,

- percentage of properly configured workstations passing baseline security scans,

- amount of time it takes a customer service representative to complete a service call, and

- amount of time IRS employees wait before reaching telephone support.

For IMF, in fiscal year 2019, one of the metrics was interest paid on taxpayer refunds per million. However, in May 2019, IRS changed this metric to the amount of application changes made to address coding errors. The four other metrics that were used in both fiscal years 2019 and 2020 were:

- amount of errors causing the application to stop running,

- percent of scheduled system availability,

- amount of issues that cannot be resolved during a Service Desk call excluding outages, and

- percent of completed planned processing schedule to meet refund, notice, and online access deadlines.

The agency reported that the operational performance of EUSS improved from fiscal year 2019 to fiscal year 2020. Specifically, in fiscal year 2019, EUSS did not meet its performance target for percentage of properly configured workstations passing baseline security scans; however, in fiscal year 2020, EUSS met this performance target. For the other targets, EUSS met three of the five operational performance targets in fiscal year 2019 and met four of the five targets in fiscal year 2020. IMF met all of its operational performance targets for both fiscal years 2019 and 2020.[27]

Table 2 identifies the two investments' operational performance metrics, and whether or not each performance target was met during fiscal years

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[27]For fiscal year 2019, IRS had six operational performance metrics for IMF. It used one operational performance metric for part of the year and another metric for the rest of the year.

2019 and 2020. The table is followed by a discussion of the performance target shortfalls for these investments.

Table 2: End User Systems and Services (EUSS) and Individual Master File (IMF) Performance Metrics, Their Descriptions, and Whether Operational Performance Metrics Were Met for Fiscal Years 2019 and 2020[a]

Investment	Operational performance metric	Focus of metric	Whether performance target was met for fiscal year 2019	Whether performance target was met for fiscal year 2020
EUSS	Timeliness of service call resolution	Customer satisfaction	●	●
	Percentage of information technology interactions closed at the first level of support	Financial performance	●	●
	Percentage of properly configured workstations passing baseline security scans	Strategic and business results	○	●
	Amount of time it takes a customer service representative to complete a service call	Strategic and business results	●	●
	Amount of time IRS employees wait before reaching telephone support	Strategic and business results	○	○
IMF	Interest paid on taxpayer refunds per million	Customer satisfaction	●[b]	N/A
	Amount of application changes made to address coding errors	Strategic and business results	●[c]	●
	Amount of errors causing the application to stop running	Customer satisfaction	●	●
	Percent of scheduled system availability	Financial performance	●	●
	Amount of issues that cannot be resolved during a Service Desk call excluding outages	Strategic and business results	●	●
	Percent of completed planned processing schedule to meet refund, notice, and online access deadlines	Strategic and business results	●	●

Legend: ● performance target met; ○ performance target not met; N/A: not applicable because metric changed in 2019

Source: GAO analysis of IRS data. | GAO-22-104387

[a]The EUSS and IMF metrics are for IRS employees.

[b]IRS only used this metric for part of fiscal year 2019.

[c]IRS used this metric from May 2019 to September 2020.

The EUSS investment did not meet its target for the percentage of properly configured workstations passing baseline security scans for fiscal year 2019. The agency reported that this was due to switching from

Windows 7 to Windows 10 and a problem with IRS's compliance tool. Specifically, the agency said the compliance tool was not configured for Windows 10. According to User and Network Services officials, the issue was resolved when the agency configured its compliance tool to Windows 10.

In addition, in fiscal years 2019 and 2020, IRS did not meet the target for the amount of time its employees waited before reaching telephone support for EUSS. The agency reported that this was due to problems with its network and servers, ongoing software upgrades, a lack of resources due to attrition, and an increased number of teleworkers as a result of COVID-19.

User and Network Services officials said the agency's IT team consistently works on network, server, and software upgrade issues as they arise. In response to not meeting the target for EUSS telephone support, these officials stated that they had developed a process in which software releases were deployed to a pilot portion of workstations and then monitored to determine their impact before releasing new software to the rest of the agency's workstations.

We also asked IRS about actions the agency had taken to address the attrition of telephone support staff since this factor had contributed to the agency not meeting its target in prior years.[28] In response, the User and Network Services officials stated that IRS had received funding and authority to hire additional staff and additional contractor support in fiscal years 2019 and 2020; however, funding was not sufficient to get ahead of losses due to attrition, including retirements, and promotions to other parts of the agency. The officials added that they were continuing to elevate the understaffing issue to IRS's hiring authority while also pursuing options for assistance that do not require live telephone support. These options include encouraging users to use IT self-service options and an automated assistance function that the agency deployed in July 2019.[29]

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[28]In June 2018, we reported that IRS did not meet its target for the amount of time the agencies' employees wait to receive telephone support for 6 out of the 18 months we reviewed due to the attrition of telephone support staff and the agency's inability to hire additional support staff. See GAO-18-298.

[29]IRS's automated assistance is a chatbot that is designed to answer questions and help IRS employees resolve technical difficulties.

CADE 2 Development Has Taken Much Longer and Cost Significantly More Than Originally Planned

IRS began developing CADE 2 in 2009 to replace IMF. To limit risk and demonstrate incremental progress toward modernization, the agency planned to deliver the investment in three phases, called transition states. Table 3 shows the initial target completion dates and key characteristics for transition state 1, transition state 2, and the target state that we reported on in March 2011.[30]

Table 3: Initial Planned Completion Dates and Key Characteristics of the Customer Account Data Engine (CADE) 2 Transition States

Transition states and completion dates	Key characteristics of CADE 2 transition states
Transition state 1 January 2012	Dual systems – Individual Master File (IMF) and CADE 1. Daily batch processing of individual taxpayer returns provided by modifying IMF to run on a daily, rather than weekly, basis 2. Comprehensive database established for housing all individual taxpayer accounts and loaded with data from CADE and IMF 3. Database provides timelier updates of taxpayer information for use by IRS employees for compliance and customer service
Transition state 2 January 2014	Single system – CADE 1. Target technology (single processing system; IMF retired) 2. High priority downstream service and compliance applications modified to take advantage of the new database 3. Key financial material weaknesses and applications addressed
Target state TBD	Single system – CADE 1. Complete the transition of applications that use the target database so downstream systems fully leverage the database 2. Address all financial and security material weaknesses identified at the inception of the program 3. Eliminate transitional components that were required during the transition states

Source: GAO analysis of IRS data. | GAO-22-104387

IRS also initially reported preliminary estimated life cycle cost estimates for transition state 1 and transition state 2 of about $1.3 billion through 2024, including about $377 million for development and $922 million for operations and maintenance.

We previously reported that IRS completed all the work it had originally planned for transition state 1 in July 2014, 2 years later than originally

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[30]GAO, *Taxpayer Account Strategy: IRS Should Finish Defining Benefits and Improve Cost Estimates,* GAO-11-168 (Washington, D.C.: Mar. 24, 2011).

planned.[31] Through this phase, the agency modified the IMF processing cycle to allow for daily (rather than weekly) processing and posting of taxpayer returns. According to IRS, this enabled faster refunds to taxpayers, among other things. In addition, IRS established the database intended to serve as the authoritative source for all individual taxpayer data. IRS officials recently told us that they had used the CADE 2 database to meet their responsibilities for making advanced child tax credit payments to eligible taxpayers.

IRS has taken much longer than originally planned to develop transition state 2. It now expects that it will complete development activities in April 2023, 9 years later than originally planned. We previously reported that due to significant budget cuts and a shortage of skilled staff, the transition state's release plan was revised three times between 2016 and 2017.[32] In addition, in May 2019, IRS's Chief Information Officer stated that the agency recognized that the scope for CADE 2 was too broad and complex. As a result, IRS decided to de-scope several of CADE 2's projects to focus solely on modernizing parts of IMF—which accounts for a large portion of tax processing activities—rather than retire IMF.[33] As of July 2021, the agency was focused on re-engineering the core components of the IMF using a hybrid of Agile and waterfall software development approaches.

IRS initiated planning efforts for the target state in the second quarter of fiscal year 2021. As of July 2021, IRS estimated that it would complete it in 2030.[34]

Figure 1 shows the current and initial planned schedule for the three transition states.

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[31]GAO, *Information Technology: Management Needs to Address Reporting of IRS Investments' Cost, Schedule, and Scope Information,* GAO-15-297 (Washington, D.C.: Feb. 25, 2015). We reported that while IRS reported the completion of transition state 1 in November 2012, this transition state was completed "conditionally," meaning that the investment was approved to proceed to the next phase with outstanding issues remaining to be addressed. These outstanding issues were addressed by July 2014.

[32]GAO, *Information Technology: Key Attributes of Essential Federal Mission-Critical Acquisitions,* GAO-20-249SP (Washington, D.C.: Sept. 8, 2020).

[33]GAO-20-249SP.

[34]IRS, *Information Technology, Individual Master File Modernization* (June 2021).

Figure 1: Customer Account Data Engine 2 Current and Planned Transition State Schedules
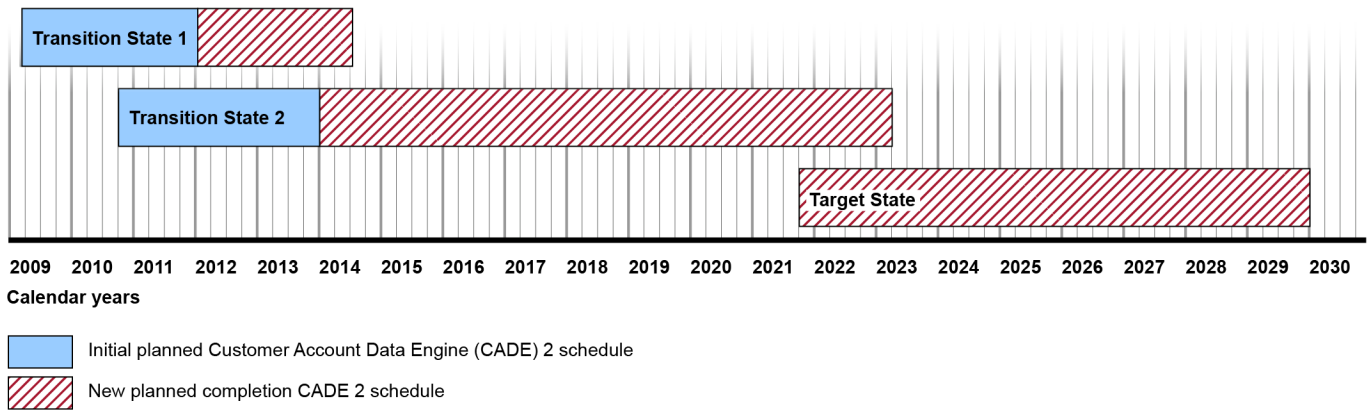
Source: GAO analysis of Internal Revenue Service data. | GAO-22-104387

Note: When IRS began developing CADE 2, its planned start and completion dates for the target state were "to be determined."

Regarding costs, IRS reported that it had spent $1.47 billion on the development for CADE 2 through September 2020, nearly four times the amount it had estimated it would spend to develop transition states 1 and 2. In addition, the agency reported that it had spent approximately $72 million for operations and maintenance though September 2020.

We reported that overall IRS had revised or rebaselined its cost, schedule, and scope goals on numerous occasions, including seven times between 2016 and 2019.[35]

The CADE 2 delays and IRS's continued use of IMF are troubling given that IMF (1) is one of the oldest systems in the federal government, (2) has software written in an archaic language that IRS stated is no longer taught in school, and (3) is supported by a workforce with specialized skills that are increasingly harder to find. In addition, IRS has reported that a more modern system would provide the foundation for real time

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[35]We have previously reported that agencies may modify a project's cost, schedule, or performance goals (i.e., baseline) to reflect changing development circumstances. We have also reported that these changes—called a rebaselining—can be done for valid reasons, but can also be used to mask cost overruns and schedule delays. See GAO, *Information Technology: Agencies Need to Establish Comprehensive Policies to Address Changes to Projects' Cost, Schedule, and Performance Goals,* GAO-08-925 (Washington, D.C.: July 31, 2008).

digital taxpayer interactions, agile responses to legislative changes, and rapid access to data for enhanced customer service, compliance, and fraud detection services.

As mentioned earlier in this report, in May 2016,[36] we reported on legacy IT systems across the federal government, including IMF. As part of that work, we highlighted the Department of the Treasury's use of assembly language code and COBOL to program its legacy systems.[37] We also reported that IMF was over 50 years old and that, although IRS was working to modernize it, the agency did not have a time frame for completing the modernization or replacement. Thus, we recommended that the Secretary of the Treasury direct the Chief Information Officer to identify and plan to modernize or replace IRS's legacy systems such as IMF.

In June 2021, IRS reported that it planned to replace and fully retire IMF by 2030 through a combination of CADE 2 and other modern components. Specifically, the agency issued a high-level IMF retirement plan that included the scope of the work; the approach, dependencies, and risks; and cost and timeline estimates.[38] In addition, IRS IT officials, including the Chief Information Officer, recently reported that they plan to use part of the $1.4 billion appropriated for their IT budget through the American Rescue Plan Act to accelerate several programs, including CADE 2 and IMF retirement plans. They added that they were in the process of developing more detailed plans associated with the replacement and retirement of IMF.

While IRS now has a high-level plan for retiring IMF, a 2030 milestone for full replacement means that for many years it will still have to contend with the numerous challenges associated with the system's age and reliance on an old programming language. Further, given the past significant delays and other challenges in developing CADE 2 and the substantial work ahead, consistent high-level management attention is warranted.

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[36]GAO-16-468.

[37]While COBOL was developed in the late 50s and early 60s, IRS has been regularly updating the version it uses. Nevertheless, according to IRS, modernizing its systems would assist with providing the instant data access and real-time updates to the systems that are needed to provide better across-the-board service in a cost-effective manner.

[38]IRS, *Information Technology, Individual Master File Modernization* (June 2021).

IRS Reported Completing Most of Its 2019 IT Modernization Plan Activities within Schedule and Cost Estimates

In the *IRS Integrated Business Modernization Plan*, referred to as the IT modernization plan that IRS issued in April 2019, the agency identified 65 activities supporting 13 programs and initiatives and four categories of work that it planned to complete in fiscal years 2019 and 2020. These activities included developing online installment agreements to allow taxpayers to view the status of their payment plans within their IRS online accounts. The activities also included completing a major acquisition for the technical solution to enable the agency to consolidate its many case management systems. IRS estimated that completing these activities would cost approximately $300 million and $271 million, respectively, for fiscal years 2019 and 2020.

IRS subsequently made changes to its modernization plan, which it noted in its fiscal years 2019 and 2020 quarterly reports to Congress. Specifically, the agency added eight planned activities, including providing a callback option to taxpayers calling the toll-free assistance line by the second quarter of fiscal year 2020, developing a 3-year plan for moving applications to the cloud by the fourth quarter of fiscal year 2020, and achieving several milestones for converting code to a modern programming language as part of the CADE 2 Individual Tax Processing Engine project. According to the agency's annual fiscal year 2020 Key Insights report,[39] the activities were added mostly due to technology advances and evolving customer expectations and needs.

In addition, IRS removed four activities and paused 10 other activities, resulting in an updated list of 59 activities planned for completion in fiscal years 2019 and 2020. For example, IRS eliminated the modernization activities it had planned for fiscal year 2020 for the Return Review Program.[40]

Further, the agency paused seven out of 12 of the activities associated with the Next Generation Infrastructure modernization initiatives that it had planned for the same year. According to the agency's IT officials, including the Chief Information Officer, and as noted in the agency's quarterly reports to Congress, IRS removed or paused these activities due to funding constraints. In April 2021, the officials stated that the

[39]IRS's 2020 Key Insights report, issued in February 2021, provides a status of modernization activities completed in fiscal year 2020 and those planned for fiscal year 2021.

[40]IRS IT officials told us that they subsequently decided to use operations and maintenance funding for these Return Review Program activities.

agency's decision to resume the activities in fiscal year 2021 would depend on whether it received additional funding.

Table 4 provides a breakdown of the number of initial and revised planned modernization activities by category and program/initiative.

Table 4: The Internal Revenue Service's (IRS) Planned and Revised Modernization Activities by Program/Initiative and Work Category for Fiscal Years 2019 and 2020

Work category	Program/initiative	Number of planned activities in modernization plan	Revised number of planned activities
1. Taxpayer experience	WebApps	3	4
	Taxpayer Digital Communications Outbound Notifications	1	0
	Live Assistance	3	4
2. Core taxpayer services and enforcement	Customer Account Data Engine 2 transition state 2	3	7
	Enterprise Case Management	3	3
	Return Review Program	4	1
3. Modernized IRS operations	Robotics Process Automation	4	4
	API Implementation	3	2
	Cloud Execution	5	5
	Next Generation Infrastructure	16	9
4. Cybersecurity and data protection	Vulnerability and Threat Management	8	8
	Identity and Access Management	3	3
	Security Operations and Management	9	9
		65	**59**

Source: GAO analysis of IRS's Integrated Modernization Business Plan and progress reports. | GAO-22-104387

IRS reported that, by the end of fiscal year 2020, it had completed most of the 59 IT modernization activities associated with its revised plans for fiscal years 2019 and 2020 early or on schedule and within cost. Specifically, the agency reported that it had completed 54 of 59 activities early or on schedule.

Of eight modernization activities that we selected for review (from IRS's revised list of 59 activities), we verified that the agency had completed all of them.[41] Table 5 lists these eight activities and the programs or initiatives they support.

Table 5: Activities That the Internal Revenue Service (IRS) Completed in Fiscal Years 2019 and 2020 That GAO Verified

Program or initiative	Activity
Live Assistance Customer Callback	Added four additional taxpayer applications
	Expanded toll-free capacity
Customer Account Data Engine 2	Deployed modern code for the internal balancing and control component for Individual Master File testing
Enterprise Case Management (ECM)	Delivered sequencing strategy and release plan to support the delivery of future ECM releases for fiscal year 2021 and beyond
Next Generation Infrastructure	Deployed continuous integration/continuous delivery to software upgrades and code changes rapidly and reliably
	Deployed additional standard stack components[a]
Security Operations and Management	Deployed cyber architecture and cyber cloud strategy, and migration plan
Vulnerability and Threat Management	Enhanced security testing and process automation to fully integrate security in system deliver as early as possible

Source: GAO analysis of IRS's modernization activities. | GAO-22-104387

[a]A technology stack is a set of software components that compose a platform for running an application.

Regarding the activities completed late, IRS reported that it completed the remaining five of 59 activities 3 to 7 months later than initially planned. Table 6 provides the planned and actual completion dates for the activities that the agency completed late.

[41]For our sample, we selected one activity from each of the four categories of work for both fiscal years 2019 and 2020, resulting in eight activities.

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Table 6: The Internal Revenue Service's (IRS) Planned Modernization Activities for Fiscal Years 2019 and 2020 That Were Completed Late

Activity	Initiative	Planned completion date	Actual completion date	Number of months late
Procure Enterprise Case Management (ECM) solution	ECM	September 2019	April 2020	7
Deploy initial network monitoring – Continuous Diagnostics and Mitigation Phase 1	Identity and Access Management	December 2019	April 2020	4
View scheduled and pending payments	WebApps	June 2020	September 2020	3
Procure and deliver cloud computing services required to deploy ECM	Cloud Execution	June 2020	September 2020	3
Measurable progress toward converting code with a target of 31 percent	Customer Account Data Engine 2 transition state 2	December 2019	March 2020	3

Source: GAO analysis of IRS's Integrated Modernization Business Plan and progress reports. | GAO-22-104387

According to IRS's quarterly IT reports to Congress, the late completion of the majority of these activities was primarily due to delays in the agency obtaining the necessary funding. For the Procure Enterprise Case Management Solution capability, the agency reported that the delay was due to taking corrective action in response to a vendor's bid protest of IRS's contract award determination at the end of fiscal year 2019.

Regarding the cost to complete the 59 modernization activities, IRS reported that, for fiscal years 2019 and 2020, respectively, it had spent less than the $300 million and the $271 million that it projected to spend in its modernization plan. Specifically, for fiscal year 2019, the agency reported that it spent $291 million on modernization, or $9 million less than the $300 million it had planned. For fiscal year 2020, the agency reported that it spent $251.3 million on modernization, or $19.9 million less than its planned budget of $271.2 million. According to the agency, this was due to IRS receiving less funding than requested, the lapse in appropriations in fiscal year 2019, and the late passage of the fiscal year 2020 budget.

Looking to the future, as of April 2021, IRS had 31 modernization activities planned for completion through the remainder of fiscal year 2021. These included several activities supporting the WebApps, CADE 2, ECM, and cloud execution initiatives. According to the IT modernization officials, the activities associated with the Next Generation Infrastructure program that the agency paused, as well as the Robotics Process Automation and the Live Assistance programs were removed altogether

from the modernization plan, as part of the replanning undertaken to align with the appropriation received. However, in June 2021, the IT modernization officials added that they planned to use part of the $1.4 billion that was appropriated for IT through the American Rescue Plan Act to accelerate several programs. The officials stated that they had developed high-level plans to use the funds and were working on developing more detailed plans.

IRS Took Actions to Maintain Operations during the COVID-19 Pandemic

IRS took several IT-related actions to maximize telework capabilities for its employees and continue to operate during the COVID-19 pandemic. These actions included procuring IT equipment to continue to support agency operations and upgrading its infrastructure bandwidth. According to the responsible officials in the agency's IT organization, the actions taken were not funded from IRS's IT budget for fiscal year 2020; however, the actions contributed to delays in the agency's plans for IT modernization and operations.[42]

IRS Procured Equipment and Upgraded Its IT Infrastructure to Maintain Operations

To maximize telework and operate during the COVID-19 pandemic, IRS accelerated its plans to procure IT equipment and upgraded its IT infrastructure. The agency estimated that, of the $104 million it received from the CARES Act and Families First Coronavirus Response Act,[43] it spent approximately $53 million to cover the costs associated with procuring the equipment and making the infrastructure upgrades needed to transition the agency to maximum telework. Of the $53 million, the agency estimated that it spent approximately $23 million on procuring IT equipment and approximately $30 million on upgrading its infrastructure.

Procuring IT equipment. IRS took steps to accelerate the procurement and distribution of necessary equipment, such as laptops and headsets, to transition employees to maximum telework and continue to operate during the pandemic. Prior to the pandemic, the agency had developed a

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[42]In March 2021, we issued a report on IRS's performance during the 2020 filing season which described changes IRS made to its operations and services due to the pandemic. See GAO, *Tax Filing: Actions Needed to Address Processing Delays and Risks to the 2021 Filing Season*, GAO-21-251 (Washington, D.C.: Mar. 1, 2021). We also regularly issue government-wide reports on the federal response to COVID-19, including IRS's response. For the latest report, see GAO, *COVID-19: Continued Attention Needed to Enhance Federal Preparedness, Response, Service Delivery, and Program Integrity* GAO-21-551 (Washington, D.C.: Jul. 19, 2021). Our government-wide reports issued quarterly and are available on our website at https://www.gao.gov/coronavirus.

[43]IRS received $89 million in funding from the CARES Act and $15 million from the Families First Coronavirus Response Act to continue to operate during the pandemic.

3-year plan to replace its desktop computers with laptops in order to support business operations and prepare its employees to work in a telework environment. IRS's Enterprise Customer Service Representative Telework Phased Implementation Plan stated that the agency had expected to replace over 16,000 of its existing desktops with a new inventory of laptops by February 2021.[44]

In response to the pandemic, the agency accelerated its plans and redirected its new laptop inventory intended for general replacements to employees who were not originally set up for telework. These employees included the agency's customer service representatives.[45] User and Network Services officials stated that these employees were mission critical personnel who needed to immediately begin teleworking in order to continue providing services to taxpayers.

By redirecting its inventory, the User and Network Services officials said IRS was able to distribute laptops to about 14,000 of the agency's customer service representatives between March 2020 and May 2020. Table 7 provides details on the approximately $23 million that IRS spent in fiscal year 2020 on procuring IT equipment that was used to maximize telework and operate during the COVID-19 pandemic.

Table 7: Information Technology Equipment and Costs That the Internal Revenue Service Spent to Operate during the COVID-19 Pandemic in Fiscal Year 2020

Dollars in thousands

	Cost
Headsets and adapters	962
Shoulder/rolling bags	898
Monitors	2,300
Printers	1,614
Laptop bundles	17,249
Shipping and delivery	250
Total	**$23,273**

Source: Internal Revenue Service reported data. | GAO-22-104387

[44]IRS, *Information Technology, Contact Center Support Division, Enterprise Customer Service Representative Telework Phased Implementation Plan*, (Sept. 5, 2019).

[45]Customer service representatives provide administrative and technical assistance to individual taxpayers and businesses primarily over the phone.

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Upgrading IT infrastructure. In addition to equipment, in order to work remotely, employees needed to be able to access IRS's network from their approved telework locations and request access through the agency's Enterprise Remote Access Program. Due to the pandemic, User and Network Services officials expected the number of employees accessing the network to increase significantly, as the majority of the workforce was given telework flexibilities.

To support the significant increase in employees connecting and accessing its systems remotely, the agency added additional capacity to its Common Communications Gateway infrastructure and purchased additional Enterprise Remote Access Program provisioning licenses. In doing so, IRS upgraded the bandwidth capacity of its network infrastructure from 2 gigabytes[46] to 10 gigabytes in two planned phases. In the first phase, the agency increased the bandwidth from 2 gigabytes to 4 gigabytes. In the second phase, it increased the bandwidth to 10 gigabytes.

According to User and Network Services officials, they gradually increased the infrastructure bandwidth over time as a means to avoid overloading the network, as well as to monitor the performance of the upgrade. In addition to increasing bandwidth, the officials stated that they made the decision to build the network infrastructure across three site locations to ensure the continuation of essential services in the event of an emergency or disruption.

IRS also increased its toll-free call service by adding callback lines and additional functionality for taxpayers needing to obtain tax information related to economic impact payment checks or the status of their filing requirements. Additionally, to ensure business continuity, the agency coupled its IT field support technicians with its service desk operations to provide technical assistance and support to employees who were new to the telework environment.

Table 8 provides further information on the approximately $30 million IRS spent on upgrading its infrastructure for COVID-19 between March and May 2020.

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[46]A gigabyte is a measurement of data storage capacity that represents the total volume of data sent and/or received by the end user over a period of time.

Table 8: Infrastructure Upgrades and Costs That Internal Revenue Service Incurred during COVID-19 between March and May 2020

Dollars in thousands

	Cost
Network/remote access	13,583
Video/audio conferencing and webcast services	10,989
Contract recording centralization	2,600
Infrastructure/telecommunication	2,939
Total	**$30,111**

Source: Internal Revenue Service reported data. | GAO-22-104387

IRS Reported That Actions Taken Delayed Modernization Plans

According to IRS, as of April 2021, the transition to maximum telework had not impacted the agency's IT budget for fiscal year 2020. Officials in the agency's IT organization stated that the actions IRS took to transition to maximum telework in fiscal year 2020 were all funded by appropriations from the Families First Coronavirus Response Act and the CARES Act. However, the officials added that the agency had not yet determined the long-term impact of sustaining an increased level of telework on the IT budget.

On the other hand, the IT organization reported that the transition to maximum telework had impacted the agency's plans for IT operations and modernization activities. Specifically, between May and July 2020, the Chief Information Officer established a mechanism for the deputy and associate chief information officers to report impacts on ongoing and planned work due to the COVID-19 pandemic on a weekly basis.[47] The weekly reports identified issues, such as delays and risks to programs and initiatives, and their effects on the agency's IT programs and initiatives for the fiscal year 2021 filing season and nonfiling season activities. Among the issues identified in the reports were a delayed infrastructure refresh due to hardware supply chain back orders and delays of procurement activities because staff were reassigned to accelerate the move to maximum telework.

In addition, as mentioned earlier in this report, in its quarterly status IT investment reports to Congress, IRS reported that resources initially allocated to the CADE 2 modernization program for the fourth quarter of

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[47]The documented weekly impact reports were discontinued after July 2020, though Associate Chief Information Officers and Deputies were instructed to report issues in their meetings with the Chief Information Officer.

fiscal year 2020 had been reassigned to support COVID-19 responsibilities. This resulted in a 7-month schedule delay in the completion of development activities for CADE 2's transition state 2, which, as previously mentioned, has been delayed several times since IRS initiated the program in 2009.

Agency Comments and Our Evaluation

IRS provided comments on a draft of this report. In its comments, which are reproduced in appendix III, IRS offered its views on IMF, CADE 2, and the agency's progress in implementing the 2019 modernization plan. IRS also discussed actions it took to maximize telework capabilities and provide the agency's workforce with the equipment needed to telework at the onset of the COVID-19 pandemic. Further, the agency commented on its progress in implementing our 2018 recommendations related to selected IT investments.

Regarding IMF, IRS called it one of the most critical systems in the federal government and stated that, despite the system's limitations, IMF continues to perform and enable the agency to implement statutory mandates. However, as we note in our report, IRS has acknowledged that a more modern system would provide the foundation for real-time digital taxpayer interactions; agile responses to legislative changes; and rapid access to data for enhanced customer service and compliance, among other things.

IRS also noted that IMF's modernization plan involves systems and functions beyond CADE 2, and that the plan positions the agency to incrementally deliver benefits for the next 10 years. Nevertheless, as we state in this report, a 2030 milestone for the full retirement of IMF means that, for many years, the agency will have to contend with the numerous challenges associated with this system's age and reliance on an old programming language.

Commenting on CADE 2, IRS stated that the program had made good progress in modernizing some of the most complicated portions of IMF and remained within acceptable schedule parameters for fiscal years 2019 and 2020. As we discuss in our report, despite this progress, CADE 2's delays and continued use of IMF are troubling. The agency has previously reported that IMF: (1) is one of the oldest systems in the federal government, (2) has software written in an archaic language that is no longer taught in school; and (3) is supported by a workforce with specialized skills that are increasingly harder to find.

Further, since 2009, IRS has revised the CADE 2 program's cost, schedule, and scope goals on numerous occasions, including seven times between 2016 and 2019. Accordingly, a key major program milestone for replacing selected IMF functions, known as transition state 2, has slipped 9 years—from 2014 to 2023. In addition, CADE 2 is now expected to only replace core functions of IMF, rather than the entire system, as was originally planned. While we acknowledge IRS' progress on CADE 2 in the years we reviewed, given the past significant delays and other challenges in developing CADE 2, as well as the substantial work ahead, consistent high-level management attention is warranted.

IRS also highlighted several modernization activities it had completed in fiscal years 2019 and 2020. These activities included expanding the availability of the customer callback feature, digital services for taxpayers, and activities to reduce cybersecurity vulnerabilities and manage potential threats.

IRS further noted the IT-related actions it took to provide the equipment and infrastructure upgrades needed to transition the agency to maximum telework at the onset of the COVID-19 pandemic. These are consistent with the actions we identified in our report.

Finally, IRS stated that it had addressed 17 of 21 recommendations included in our 2018 report on selected agency investments. At the end of our review, IRS also provided evidence of actions it had taken to address two of the remaining four recommendations. We reviewed the evidence and determined that the agency had implemented one of the recommendations, bringing the total number of implemented recommendations to 18 of the 21. We adjusted our summary of actions taken in appendix II of this report accordingly.

We are sending copies of this report to interested congressional committees, the Commissioner of IRS, and other interested parties. In addition, this report will be available at no charge on the GAO website at http://www.gao.gov.

Should you or your staffs have any questions on information discussed in this report, please contact me at (214) 777-5719 or hinchmand@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix IV.

David B. Hinchman
Director, Information Technology and Cybersecurity

Appendix I: Objectives, Scope, and Methodology

Our objectives were to (1) summarize the Internal Revenue Service's (IRS) reported performance for selected information technology (IT) investments, including the Customer Account Data Engine (CADE) 2; (2) determine IRS's progress in implementing its 2019 IT modernization plan; and (3) identify the actions IRS has taken to maximize telework during the COVID-19 pandemic, and the reported impacts of the actions on the agency's IT budget and plans.

To select investments for our first objective, we identified a nonprobability sample of five investments out of 133 based on the following factors: (1) investments that IRS rated as being mission critical; and (2) investments with the highest levels of funding for fiscal years 2019, 2020, and 2021, as reported on the Federal IT Dashboard.[1] We selected five investments in different life cycle phases—three investments in the development phase and two investments in the operations and maintenance phase. The investments that were primarily in development were CADE 2, Enterprise Case Management (ECM), and Web Applications. The investments primarily in the operations and maintenance phase were the End User Systems and Services and Individual Master File (IMF).

For the investments in development, we compiled and analyzed quarterly reports from the Investment Performance Tool—IRS's internal system for tracking investment performance—showing planned versus actual cost, schedule, and scope for work the agency was performing on these investments during fiscal years 2019 and 2020. We also interviewed IRS IT program officials to understand variances between planned and actual performance.

To assess the reliability of the performance data for the investments in development, we confirmed our understanding of the processes used to generate the data by reviewing the processes defined in IRS's August 2020 Investment Performance Tool User Guide and confirmed their use with project management officials. We also reviewed the data to verify that it included all the projects supporting the investments for the eight quarters in the scope of our review. Further, we followed up with these officials to discuss detected anomalies we found in the performance data. Finally, IRS's Integrated Financial System is the source of the financial data in the Investment Performance Tool, and our prior audits of the agency's internal controls over financial reporting found that there were

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[1]The Federal IT Dashboard is a public website deployed by the Office of Management and Budget with information on the performance of federal agencies' IT investments.

no internal control issues that would prevent us from relying on the data in the system. We determined these data were sufficiently reliable for purposes of summarizing what IRS reported.

For the CADE 2 program, we also reviewed prior GAO reports, IRS's quarterly IT reports to Congress on the agency's IT modernization progress, and relevant documents, including the modernization plan for IMF for which CADE 2 is a key component. From this documentation, we determined any revisions to these plans, and the functionality delivered.

For the investments in operations and maintenance, to determine if the operational performance metrics were met for fiscal years 2019 and 2020, we compared the average of the actual monthly operational performance measures found in the agency's monthly investment performance reports for each year to the performance target for the year. Further, we determined the extent to which an operational analysis was performed in accordance with relevant Office of Management and Budget (OMB) guidance.[2] To do so, we obtained operational analyses for fiscal years 2019 and 2020 and compared the analyses to requirements specified in OMB's fiscal year 2020 capital programming guidance. We rated each requirement as addressed if the operational analysis fully addressed the requirement; or partially addressed if the operational analysis addressed some, but not all, of the requirement.

For the second objective, we compared the activities IRS reported that it completed for fiscal years 2019 and 2020 in quarterly IT summary reports to Congress and an annual status report to the Department of the Treasury, along with their associated schedule and costs, to the activities identified in the 2019 modernization plan. For additional cost analysis, we compared actual costs and schedules for the IT modernization activities completed in fiscal years 2019 and 2020 to the planned costs and schedules for these activities found in the agency's quarterly IT summary reports to Congress and an annual status report. We also reviewed documentation and interviewed IRS IT organization officials to understand variances between planned and actual performance.

To supplement our analysis of the agency's reported data, we verified the completion of a nongeneralizable random sample of modernization activities. To do so, we randomly selected one activity from each of the

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[2]Office of Management and Budget, *Capital Programming Guide V 3.1: Supplement to Circular A-11, Planning, Budgeting, and Acquisition of Capital Assets* (Washington, D.C.: December 2020).

four modernization categories outlined in the agency's plan for fiscal years 2019 and 2020. This resulted in our selection of eight of 59 activities. We confirmed that the eight selected activities were completed by reviewing supporting documentation and interviewing IRS IT program officials. The activities we selected were:

- Live Assistance Customer Callback: four additional taxpayer applications.

- Live Assistance Customer Callback: expanded toll-free capacity.

- CADE 2: deployed modern code for the internal balancing and control component for IMF testing.

- ECM: delivered sequencing strategy and release plan to support the delivery of future ECM releases for fiscal year 2021 and beyond

- Next Generation Infrastructure: deployed continuous integration/continuous delivery to software upgrades and code changes rapidly and reliably.

- Next Generation Infrastructure: deployed additional standard stack components.[3]

- Security Operations and Management: deployed cyber architecture and cyber cloud strategy, and migration plan.

- Vulnerability and Threat Management: Enhanced security testing and process automation to fully integrate security in system delivery as early as possible.

For these eight activities, we reviewed project documentation that IRS provided, including a solutions concept of operations document for the live assistance customer callback feature, systems testing documents, a Cybersecurity Modernization Plan status report, and various other status reports.

For the third objective, we obtained, analyzed, and summarized relevant documentation, including weekly impact summary reports, a COVID-19 spending plan, and an inventory of IT equipment and services the agency reported that it purchased to transition its workforce to maximum telework. We supplemented our document reviews with interviews of

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[3]A technology stack is a set of software components that compose a platform for running an application.

cognizant IRS officials from the IT organization's User and Network Services group.

We also reviewed instructions for Associate Chief Information Officers reporting information in the COVID-19 weekly impact summary reports. We corroborated the accuracy of the information in the COVID-19 spending plan with IRS budget officials. We determined that the data were sufficiently reliable for purposes of summarizing what IRS reported.

As part of our work, we also determined the status of actions taken to address each of 21 prior recommendations we made in our 2018 review of IRS's IT investments to improve operational analyses and fully implement risk management practices for selected investments, and implement IT workforce planning practices. To do so, we asked relevant agency IT organization officials about actions taken or planned to address each recommendation, and obtained and analyzed evidence to substantiate their claims. We assessed a recommendation as being fully addressed if IRS provided evidence that it completely addressed all elements of our recommendation; partially addressed if IRS provided evidence that it addressed some, but not all, of our recommendation; and not addressed if IRS did not provide any evidence that it addressed our recommendation.

We conducted this performance audit from June 2020 to October 2021 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Status of IRS's Efforts to Implement 2018 GAO Recommendations on Selected IT Investments

In June 2018, we reported on the performance of selected IRS IT investments; the risks that selected legacy investments faced; and the need for the agency to implement key IT workforce planning practices.[1] We made 21 recommendations in that report and, as of September 2021, IRS has fully implemented 18 of these recommendations. Table 9 summarizes our assessment of IRS's efforts to implement the recommendations included in the report.

Table 9: Status of the Internal Revenue Service's (IRS) Efforts to Implement Recommendations on Operational Analyses and Risk Management, as of September 2021

Recommendation	Status	Summary
1. The Commissioner of the IRS should ensure the operational analysis for Individual Master File (IMF) fully addresses greater utilization of technology or consolidation of investments to better meet organizational goals.	◐	IRS provided its fiscal year 2019 and 2020 operational analyses; however, it did not reflect the agency's progress in modernizing IMF and associated challenges. Instead, IRS provided its Customer Account Data Engine 2 fiscal year 2020 operational analysis which addressed IMF's progress in modernization and associated challenges. However, given that the information on modernization and challenges was not in the IMF operational analyses, decision makers may not have the critical information they need to inform their decisions about IMF.
2. The Commissioner of the IRS should ensure the operational analysis for the Integrated Data Retrieval System (IDRS) addresses the extent to which the investments support customer processes as designed, and how well the investments are delivering the goods or services they were designed to deliver.	●	In June 2020, IRS provided its fiscal year 2019 operational analysis which addressed the extent to which investments support customer processes as designed and how well the investment was delivering the goods or services it was designed to deliver.
3. The Commissioner of the IRS should ensure the operational analysis for the Telecommunications Systems and Support (TSS) addresses the extent to which the investments support customer processes as designed, and how well the investments are delivering the goods or services they were designed to deliver.	◐	IRS provided its fiscal year 2020 operational analysis that addressed how the investment supports services such as video conferencing, enterprise voice, and fax services. However, the information was not included as part of the specific metric. We will therefore continue to monitor the operational analysis on how the investment supports services.
4. The Commissioner of the IRS should ensure the operational analysis for TSS includes a comparison of current performance with a pre-established cost baseline.	●	In February 2021, IRS provided its fiscal year 2020 operational analysis report which demonstrated that IRS had compared current performance with a pre-established cost baseline, and accounted for user fees and multi-year costs.
5. The Commissioner of the IRS should ensure the operational analysis for End User Systems and Services includes a comparison of current performance with a pre-established cost baseline.	●	In December 2020, IRS provided its fiscal year 2020 operational analysis, which addressed the comparison of current performance with a pre-established cost baseline.

[1]GAO, *Information Technology: IRS Needs to Take Additional Actions to Address Significant Risks to Tax Processing*, GAO-18-298 (Washington, D.C.: June 28, 2018).

Recommendation	Status	Summary
6. The Commissioner of the IRS should ensure the operational analysis for the Mainframes and Servers Services and Support addresses alternative methods of achieving the same mission needs and strategic goals.	●	In August 2019, IRS provided its fiscal year 2018 operational analysis that addressed alternative methods of achieving the same mission needs and strategic goals.
7. The Commissioner of the IRS should fully implement the risk management key practice associated with preparing for risk management for the IMF investment.	●	In December 2019, IRS provided its updated IT Risk Management Program plan which addressed key practices associated with preparing for risk management for the IMF investment.
8. The Commissioner of the IRS should fully implement the risk management key practice associated with analyzing risk for the IMF investment.	●	In December 2019, IRS provided updated policy documentation that addressed its risk management policy associated with analyzing risk. In addition, in May 2021, IRS provided evidence that it analyzes risk for the IMF investment. Specifically, the agency provided examples of the risk statement and analysis that are included in its Item Tracking Reporting and Control tool.
9. The Commissioner of the IRS should fully implement the risk management key practice for prioritizing risk for the IMF investment.	●	In December 2019, IRS provided its risk profile which addressed key practices associated with prioritizing risk for the IMF investment. Specifically, IRS provided, among other things, risk registry reports. These reports identified IRS's implementation of the risk management practice for prioritizing risk for IMF.
10. The Commissioner of the IRS should fully implement the risk management key practice associated with mitigating risk for the IMF investment.	●	In December 2019, IRS provided updated policy documentation that addressed the agency's risk management policy associated with mitigating risk. Further, in May 2021, IRS provided its risk review registry that identified risk for IMF and alternative courses of action to take (mitigation plans) if risks statements are impacted.
11. The Commissioner of the IRS should fully implement the risk management key practice associated with monitoring, reporting, and controlling risk for the IMF investment.	●	In December 2019, IRS provided updated policy documentation that addressed the agency's risk management policy associated with monitoring, reporting, and controlling risk. In addition, in February 2021, IRS provided, among other things, governance board meeting minutes and its annual operational analyses review of risk management to demonstrate that it has implemented its policy for risk management.
12. The Commissioner of the IRS should fully implement the risk management key practice associated with preparing for risk management for the IDRS investment.	●	In December 2019, IRS provided its updated IT Risk Management Program plan, which addressed key practices associated with preparing for risk management for the IDRS investment. In addition, in February 2021, IRS provided its Risk Issue and Action Item Management Process transmittal, which described the risk management requirements for all IRS IT investments, including IDRS.

Recommendation	Status	Summary
13. The Commissioner of the IRS should fully implement the risk management key practice associated with analyzing risk for the IDRS investment.	●	In December 2019, IRS provided its updated IT Risk Management plan that addressed the agency's risk management policy associated with analyzing risk for the IDRS investment. IRS also provided a risk register for IDRS showing that it analyzed both inherent and residual risks for the investment.
14. The Commissioner of the IRS should fully implement the risk management key practice associated with mitigating risk for the IDRS investment.	●	In December 2019, IRS provided its Risk and Issue Management plan which identified the key practices associated with mitigating risk. Further, in May 2021, IRS provided its risk review registry that identified risk for IDRS and alternative courses of action to take (mitigation plans) if risks statements are impacted.
15. The Commissioner of the IRS should fully implement the risk management key practice associated with monitoring, reporting, and controlling risk for the IDRS investment.	●	IRS provided its Risk Management Program plan which identified the key practices associated with monitoring, reporting, and controlling risk. In addition, in February 2021, IRS provided, among other things, governance board meeting minutes and annual operational analysis reviews of risk management to identify that it has implemented its policy for risk management.
16. The Commissioner of the IRS should fully implement the risk management key practice associated with preparing for risk management for the Mainframes and Servers Services and Support (MSSS) investment.	●	In February 2021, IRS provided its updated IT Risk Management Program plan which addressed key practices associated with preparing for risk management for the MSSS investment.
17. The Commissioner of the IRS should fully implement the risk management key practice associated with identifying risk for the MSSS investment.	●	In January 2020, IRS provided an updated MSSS risk log which identified risks for the investment, including human resource risks and staff shortages.
18. The Commissioner of the IRS should fully implement the risk management key practice associated with analyzing risk for the MSSS investment.	●	In December 2019, IRS provided updated policy documentation that addressed the agency's risk management policy associated with analyzing risk. In addition, in May 2021, IRS provided evidence that it analyzes residual risk for the IMF investment. Specifically, the agency provided examples of the risk statement and analysis that are included in its Item Tracking Reporting and Control tool.
19. The Commissioner of the IRS should fully implement the risk management key practice associated with mitigating risk for the MSSS investment.	●	In December 2019, IRS provided updated policy documentation that addresses the agency's risk management policy associated with mitigating risk. In addition, in January 2020, the agency began identifying a period of performance for its risks by providing Risk Reports which identified that each risk has a "submit date", a "probable impact date", and a "projected completion date".

Recommendation	Status	Summary
20. The Commissioner of the IRS should fully implement the risk management key practice associated with monitoring, reporting, and controlling risk for the MSSS investment.	●	In December 2019, IRS provided updated policy documentation that addresses the agency's risk management policy associated with monitoring, reporting, and controlling risk. In addition, in February 2021, IRS provided among other things, governance board meeting minutes and its annual operational analyses review of risk management to identify that it has implemented its policy for risk management.
21. The Commissioner of the IRS should fully implement IT workforce planning practices, including the following actions: (1) setting the strategic direction for workforce planning; (2) analyzing the workforce to identify skill gaps; (3) developing strategies and implementing activities to address skill gaps; and (4) monitoring and reporting on progress in addressing skill gaps.	◑	In March 2021, IRS provided its draft IT Workforce Strategy, which identifies objectives that the agency plans to achieve, such as, a diverse, flexible and engaged workforce. IRS also developed an implementation plan to operationalize the IT Workforce Strategy, which described key efforts supporting each objective, along with benefits and measurable outcomes. However, IRS did not provide a date for when it plans to finalize the strategy. In addition, IRS did not provide evidence that it had implemented the key efforts identified in the implementation plan.

Legend: ● – recommendation fully implemented, ◑ – recommendation partially implemented, ○ – recommendation not implemented.

Note: Recommendations from GAO-18-298.

Appendix III: Comments from the Department of the Treasury Internal Revenue Service

DEPARTMENT OF THE TREASURY
INTERNAL REVENUE SERVICE
WASHINGTON, DC 20224

DEPUTY COMMISSIONER

September 16, 2021

David B. Hinchman
Director, Information Technology and
  Cybersecurity
U.S. Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Hinchman:

We reviewed the U.S. Government Accountability Office (GAO) draft report entitled Information Technology: Cost and Schedule Performance of Selected IRS Investments (GAO-22-104387) and appreciate the opportunity to provide comments. We remain committed to investing in and delivering on modernization plans that improve how the IRS interacts with taxpayers and the tax community while continuing to strengthen cybersecurity protections and information technology systems.

The IRS contends with multiple priorities including annual tax law changes, emergency legislative mandates, and evolving security and fraud threats. As we deliver on these needs, we also continue to prioritize the operational health of our technology environment and the modernization of critical systems such as the Individual Master File (IMF). The IMF is one of the most critical systems in federal government, as it provides data to support IRS customer service, compliance, custodial accounting and fraud detection. Despite its limitations, the system continues to perform and enable the IRS to implement legislative mandates such as quickly facilitating the distribution of Economic Impact Payments and Advanced Child Tax Credit payments.

The Customer Account Data Engine 2 (CADE 2) program has made good progress modernizing some of the most complicated portions of the IMF, and as noted by GAO, remained within acceptable schedule parameters for 2019 and 2020. We completed the CADE 2 Target State Plan, in addition to an independent verification and validation, and assessments of the program by the Treasury Inspector General for Tax Administration have noted that we are effectively monitoring the progress of the Individual Tax Processing Engine project, which is a key component of CADE 2. Although CADE 2 is foundational to modernizing the IMF, we must also replace systems and functions not included in the CADE 2 program. The IMF modernization plan, which has been independently assessed, positions the IRS to incrementally deliver benefits each year for the next 10 years. With the American Rescue Plan providing modernization funding,

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we are accelerating these efforts, but continued progress will depend on available funding.

More broadly, the IRS continues to successfully deliver on the IRS Integrated Modernization Business Plan. In FY 2019 and FY 2020, we remained within cost and schedule parameters, ultimately delivering a total of 60 new capabilities that included expanding the availability of the customer callback feature, which allows callers to choose to receive a return call from us rather than stay on hold. We also expanded digital services for taxpayers and continued to innovate our online assistance. For example, we enhanced Taxpayer Digital Communications, which includes secure messaging, a text chat function, and outbound notifications, and added several new features to IRS Online Account. We appreciate that for the eight modernization capabilities reviewed as part of this report, GAO verified that all capabilities were completed.

Cybersecurity also remains a top priority area for allocating IRS technology funding. The IRS observes and mitigates more than 2.5 million unauthorized access attempts per day, including denial-of-service attacks, unsuccessful intrusion attempts, probes or scans, and other unauthorized connectivity attempts. As part of the overall modernization plan, we have successfully delivered several additional capabilities to reduce vulnerabilities and manage potential threats with a focus on areas such as data encryption, asset management, security testing and process automation, and fraud analytics.

At the onset of the COVID-19 pandemic, we quickly mobilized to maximize telework capabilities and equip the IRS workforce with the equipment needed to telework. For example, we successfully upgraded the bandwidth capacity of our network infrastructure from 2 gigabytes to 10 gigabytes, which enabled a record number of nearly 60,000 IRS employees to securely connect to the IRS network remotely. We also equipped IRS customer service representatives with laptops and peripheral equipment bundles in preparation for telework and took unprecedented steps to ship laptops directly to employees' home addresses. By the end of FY 2020, more than 15,000 laptops and peripheral equipment bundles were provisioned across 28 sites around the country, and more than 2,000 employees received equipment at home. These actions helped ensure the continuity of mission critical activities.

In collaboration with GAO, we have addressed 17 of the 21 recommendations from the prior report entitled Information Technology: IRS Needs to Address Significant Risks to Tax Processing (GAO-18-298). Of the remaining four recommendations, two are currently under review and two will be addressed during the FY 2021 Operational Analysis Evaluation, which is scheduled for completion by the end of CY 2021. We look forward to working with GAO to fully address these remaining recommendations.

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If you have any questions, please contact me, or a member of your staff may contact
Nancy A. Sieger, Chief Information Officer, at 202-317-5000.

Sincerely,

Jeffrey J.
Tribiano

Digitally signed by
Jeffrey J. Tribiano
Date: 2021.09.16
07:26:09 -04'00'

Jeffrey J. Tribiano
Deputy Commissioner for
  Operations Support

Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact	David B. Hinchman, (214) 777-5719, or hinchmand@gao.gov
Staff Acknowledgments	In addition to the individual named above, the following staff made key contributions to this report: Sabine Paul (Assistant Director), Lori Martinez (Analyst in Charge), Sher'rie Bacon, Roger Bracy, Rebecca Eyler, Michele Fejfar, and William Hutchinson.