DATA CENTER OPTIMIZATION INITIATIVE AND YOU

2019 Edition

>> By Marc Cram, BSEE, CDCD

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INTRODUCTION

In April 2019 the GAO published a 98-page report titled "Additional Agency Actions Needed to meet OMB Goals". This white paper presents the most recent information available from the United States General Accounting Office (GAO) on the progress by the respective federal agencies towards compliance with the Data Center Optimization Initiative (DCOI).

PROGRESS ON DCOI

The April 11, 2019 GAO Report to Congressional Committees (GAO-19-241) was issued. In it, the GAO found the following:

The 24 agencies participating in the Office of Management and Budget's (OMB) Data Center Optimization Initiative (DCOI) reported mixed progress toward achieving OMB's goals for closing data centers and realizing the associated savings by September 2018. As of August 2018, 13 agencies reported that they had met, or had plans to meet, all of their OMB-assigned closure goals by the deadline. However, 11 agencies reported that they did not have plans to meet their goals. Further, 16 agencies reported that, as of August 2018, they had met, or planned to meet, their cost savings targets, for a total of $2.36 billion in cost savings for fiscal years 2016 through 2018. This is about $0.38 billion less than OMB's DCOI savings goal of $2.7 billion. This shortfall is the result of 5 agencies reporting less in planned cost savings and avoidances in their DCOI strategic plans, as compared to their savings targets established for them by OMB. Three agencies did not have a cost savings target and did not report any achieved savings.

In addition, the 24 agencies reported limited progress against OMB's five data center optimization targets for server utilization and automated monitoring, energy metering, power usage effectiveness, facility utilization, and virtualization. As of August 2018, the agencies reported that 3 had met three targets, 9 had met one target, and 10 met none of the targets. Two agencies did not have a basis to report on progress as they do not own any data centers. Further, as of August 2018, 20 agencies did not plan to meet all of OMB's fiscal year 2018 optimization goals. Specifically, only 2 agencies reported plans to meet all applicable targets; 6 reported that they did not plan to meet any of the targets.

DCOI

Server Technology initially reported on **"The DCOI and You"** in 2016. Subsequent to that time, the GAO issued progress reports[1] GAO-18-264 and GAO-19-241 on DCOI showing only partial progress by the US Federal Government agencies towards achieving the targeted goals of reducing the number of data centers, reducing energy consumption, and saving taxpayer money.

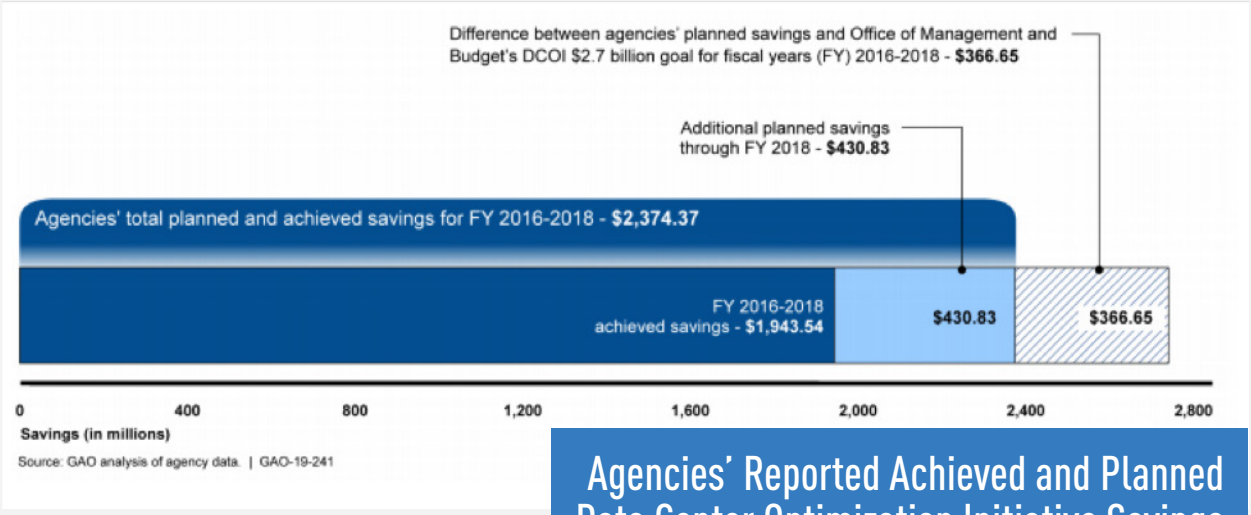
Data center closures – 7,221 of 12,166 data centers have been closed as reported in August 2018

Savings – about $2.36B saved during FY 2016 – 2018, about $0.38B under target

1 https://www.gao.gov/assets/700/698448.pdf - GAO Report to Congressional Committees for Data Center Optimization

Agency Cost Savings

With regard to agencies' progress in achieving cost savings, 22 agencies reported, as of August 2018, that they had achieved $1.94 billion in cost savings for fiscal years 2016 through 2018, while two agencies reported that they had not achieved any savings. The agencies are on track to fall short of target by about $0.37 billion than OMB's goal of $2.7 billion.



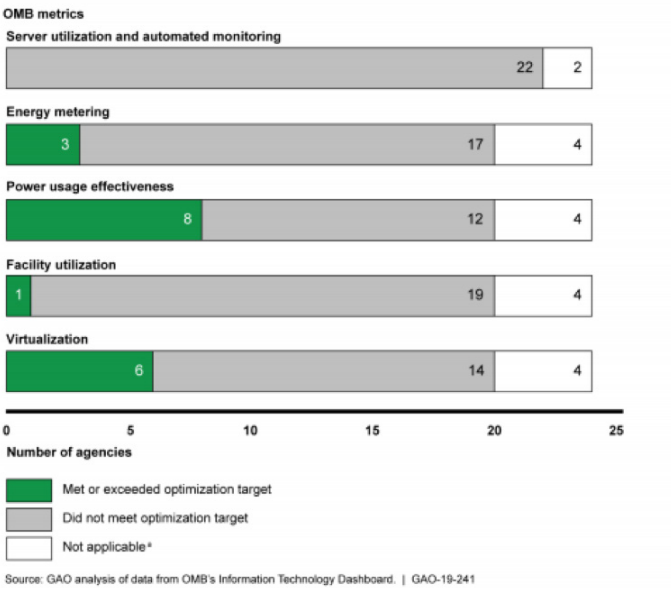
Agencies' Reported Achieved and Planned Data Center Optimization Initiative Savings against OMB's Goal for Fiscal Years (FY) 2016 through 2018, as of August 2018.

Balanced against this is a growth in federal IT spending as shown below:

As of August 2018, most (22 of the 24) DCOI agencies continued to report limited progress in meeting OMB's fiscal year 2018 data center optimization targets identified on the IT Dashboard. The remaining 2 agencies—Education and HUD—reported that they did not have any agency-owned data centers in their inventory and, therefore, did not have a basis to measure and report optimization progress.

With regard to the data center optimization targets, agencies reported the greatest progress against two metrics: power usage effectiveness and virtualization metrics. Specifically, 8 agencies reported that they had met OMB's target for power usage effectiveness and 6 agencies reported that they had met the target for virtualization. However, for the energy metering, facility utilization, and server utilization and automated monitoring metrics, no more than 3 agencies reported meeting each.

The figure on the right summarizes the 24 agencies' progress in meeting each optimization target, as of August 2018.

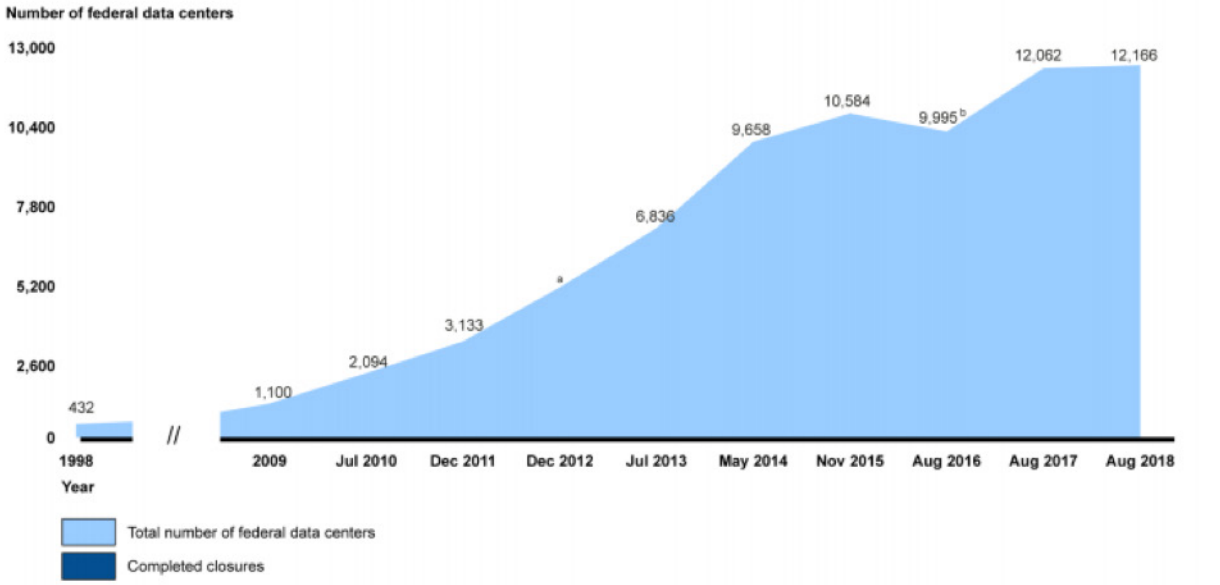


Source: GAO analysis of data from OMB's Information Technology Dashboard. | GAO-19-241

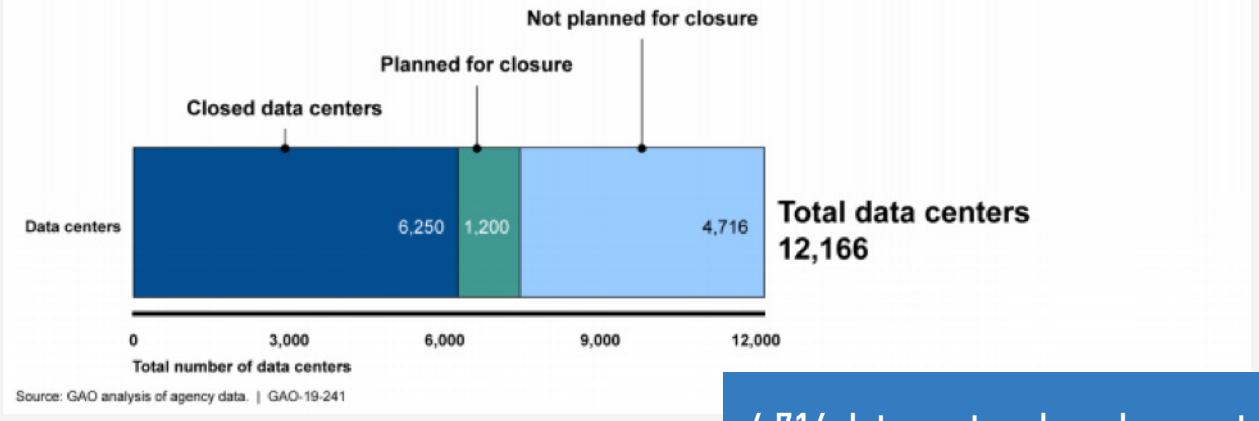
[a]Two agencies did not have any reported agency-owned data centers in their inventory and, therefore, did not have a basis to measure and report on their progress towards optimization. In addition, two other agencies did not own any tiered data centers and, therefore, did not have a basis to measure and report on four of the five metrics.

Progress on data center closure continues to move at a glacial pace, as the demand for more IT work is outpacing the ability to reduce or consolidate IT loads and migrate to cloud. The figure below depicts the situation quite well. Despite their best efforts, the total number of data centers increased!

Figure 2: The Number of Reported Federal Data Centers from 1998 through August 2018



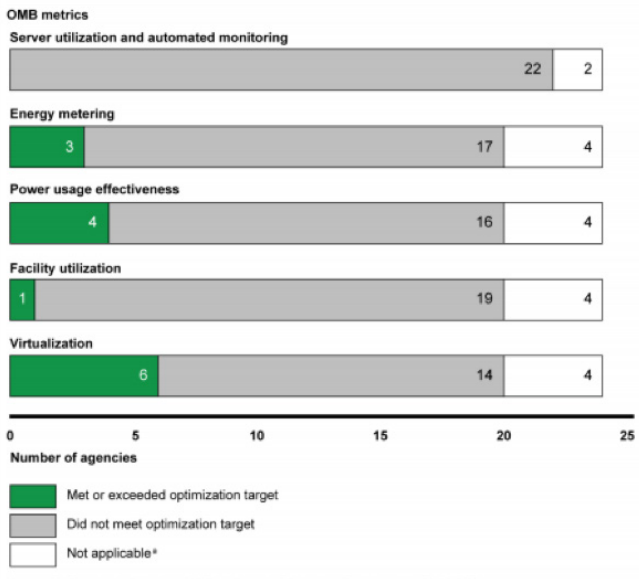
Source: GAO analysis of Office of Management and Budget and agency data. | GAO-19-241



4,716 data centers have been set aside as "not planned for closure"

Many of the reporting agencies have made little or no progress towards reaching the OMB targets. Shown in the adjacent figure is the summary of progress towards Server Utilization, Energy Metering, PUE, Facility Utilization, and Virtualization, with the latter having been the leading area of progress.

Figure 5: Agencies' Progress against Office of Management and Budget (OMB) Data Center Optimization Targets, as of August 2017



Source: GAO analysis of data from OMB's Information Technology Dashboard. | GAO-18-264

[a]Two agencies did not have any reported agency-owned data centers in their inventory and, therefore, did not have a basis to measure and report on optimization progress. In addition, two other agencies did not have any agency-owned tiered data centers and, therefore, did not have a basis to measure and report on four of the five metrics.

THE GAO / OMB RECOMMENDATIONS

In this report, the GAO made a total of 36 recommendations to 22 of the 24 agencies in the review, naming individual government roles and the specific actions to be taken. The Secretary of Defense was singled out with three action items, while many other agency leaders had two or only one. Details of the recommendations can be found on p. 42 of GAO-19-241, as seen in Appendix F.

The agencies provided responses to the recommendations. The GAO summarized the reactions of the agencies as follows:

"Of the 22 agencies to which we made recommendations, 11 agencies agreed with our recommendations; three agencies agreed with some portion, but not all of the recommendations; one agency disagreed with our recommendations; and seven agencies did not state whether they agreed or disagreed with the recommendations. In addition, OMB and two agencies to which we did not make recommendations stated that they had no comments. Further, multiple agencies provided technical comments, which we have incorporated, as appropriate."

Requirements of DCOI

Recall that DCOI requires the following:

- ☐ Virtualization
- ☐ Consolidation
- ☐ Migration to cloud
- ☐ Energy metering of all remaining data center inventory
- ☐ Power Usage Effectiveness (PUE) of 1.5 or lower
- ☐ Server Virtualization > 4:1
- ☐ Server Utilization >= 65%
- ☐ Facility Utilzation >= 80%

THE IMPACTS OF VIRTUALIZATION, CONSOLIDATION, AND MIGRATION

DCOI mandates that where possible, IT workloads are to be virtualized and then consolidated onto a minimum of servers. This causes server utilization to rise and power supply power consumption to rise commensurately, along with increasing the cooling requirements (or increasing the operating temperatures) of the racks that remain in use after eliminating those systems left over from the consolidation effort.

Migration of virtualized workloads to the cloud leads to closure of unneeded data centers. But not every workload is suitable for migration, whether for security or performance requirements. This leads to some of the agency data centers remaining in operation. For those data centers, the reporting requirements for operational metrics of DCOI become important.

REMOTE POWER MEASUREMENT AND MANAGEMENT

There is a broad ecosystem of physical hardware that is present in every datacenter. Servers, storage, networking, UPS, battery banks, cooling systems, distribution panels and the like are necessary in every data center.

Within each category of hardware, there are multiple products coming from multiple vendors, each having its own management tools and communications interfaces, some of which are proprietary in nature. The choice on server types and brands are too numerous to list here. Likewise, on the networking side, there are routers, top of row switches, fabrics, hubs, patch panels, and so on. Not every piece of gear is Ethernet enabled, so it does not make sense for all devices to be able to measure their own power consumption. And trying to find a single tool that interfaces to ILO, DRAC, and so forth while also supporting SNMP can be difficult.

Every piece of active electronics must be "plugged in" to a source of electricity. Inside the data center, the standard outlet types for compute, storage, and networking to plug into within an IT or networking rack are C13 and C19 outlets found on rack-level (cabinet) power distribution units (PDUs).

The easiest way to ensure that the agency can measure the power usage of its' IT infrastructure is to use intelligent PDUs having remote management capabilities. These power strips enable DCOI compliance by providing:

- Data collection of power consumption at the outlet, device, and cabinet
- Support for reporting, alarming, and smart load shedding capabilities
- Support for environmental sensors such as temperature, humidity, floor moisture, and so forth
- Facilitating capacity planning and rack consolidation, leading to data center consolidation
- Switching off unused or underutilized assets (zombie servers, storage, load balancers, etc.) resulting in lower IT power consumption and higher efficiencies

In North America, Legrand now offers two of the leading brands for intelligent PDUs capable of outlet-level and PDU-level power measurement by offering both Server Technology and Raritan to their customers. The PX family of Raritan PDUs offer a state-of-the-art display for ease of "at the rack" and remote data collection and operation, while the HDOT Cx Switched POPS family of Server Technology offers the data center a high degree of outlet level flexibility and reusability by combining C13 and C19 outlets into a single Cx outlet.

Beyond the PDU, Server Technology and Raritan offer a variety of inline power meters, transfer switches, and branch circuit monitoring capabilities to enable retrofit of older data centers and bring them up to meet DCOI requirements.

Both brands provide outstanding quality, reliability, and usefulness to the customer, and are available through a variety of channels, many of which are GSA IT Schedule 70.

Figure 1 - Server Technology HDOT Cx PDUs

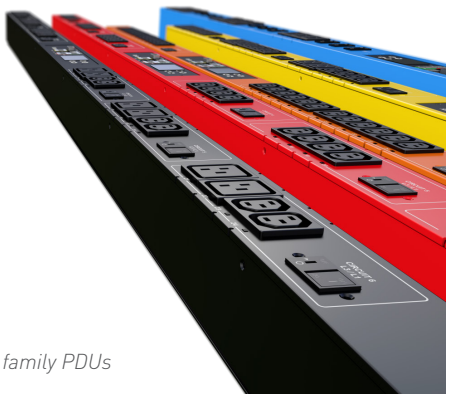


Figure 2 - Raritan PX3-5000 family PDUs

SENSORS

Both Raritan and Server Technology offer a range of sensors that interface to our intelligent power distribution products, enabling the data center to operate reliably over a variety of environments while minimizing the number of IP addresses required.

Environmental sensors enable data center managers to:

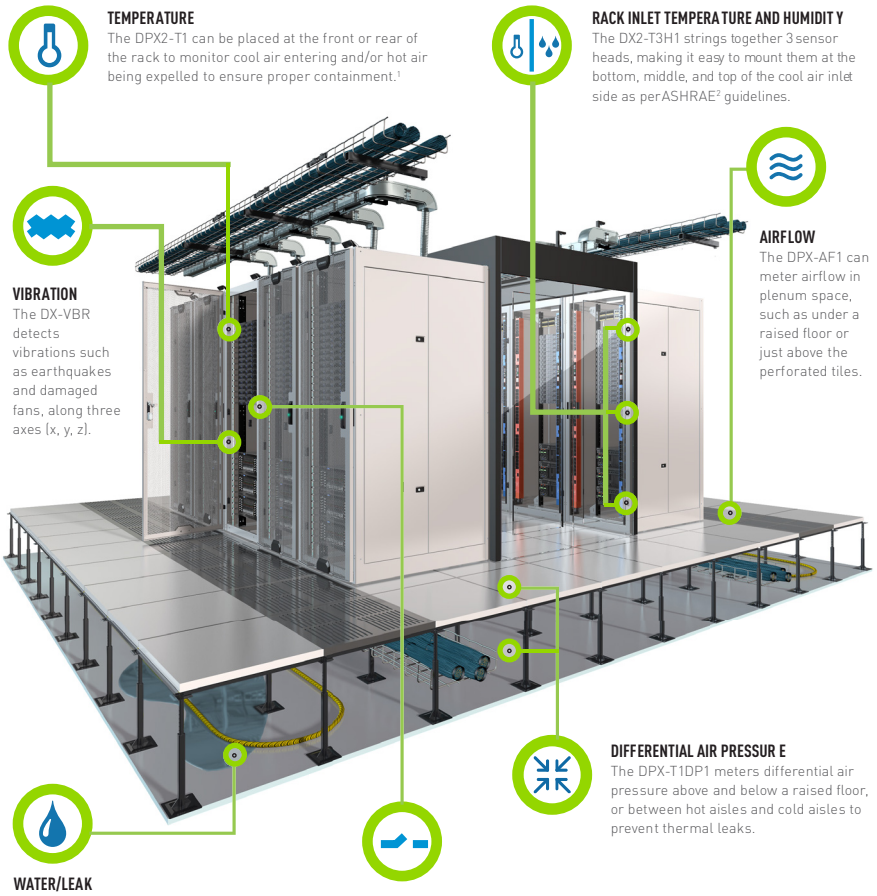
- Ensure uptime by monitoring racks for potential hot spots
- Save on cooling by confidently raising data center temperatures, maximizing PUE
- Maintain cabinet security with contact closure sensors
- Improve data center availability by receiving environment alerts
- Make strategic decisions on cooling design and containment
- Set thresholds and alerts to monitor onsite or remote facilities

We offer sensors for:

- Temperature
- Humidity
- Temperature + Humidity
- Airflow
- Air pressure differential
- Leak detection
- Vibration
- Dry contact closure

In addition, we can work with a number of USB cameras and various smoke detectors to provide additional functionality for the data center operator.

SENSORS IN YOUR DATA CENTER



[1] Additional temperature and humidity sensor options are available.

[2] The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) recommends measuring the cool air entering IT equipment near the bottom, in the middle and near the top of each IT rack.

REMOTE ACCESS AND CONTROL

As a part of the server consolidation process, the agency CIO should consider the ability to remotely access systems through a secure, redundant pathway. This becomes important for delivering on the DCOI requirement for achieving maximum system uptime and ensuring user/taxpayer satisfaction. Taking the time to evaluate the needs of the data center and the suitability of KVM-over-IP or Serial Console products with centralized management for "out-of-band" access can result in dramatic improvements for the uptime and responsiveness of the connected systems. With high performance, reliable, secure KVM-over-IP and serial switches from Raritan, the agency can leverage on Raritan's 30+ years of experience in the field. Our products support AES, FIPS140-2 encryption, Common Access Card (CAC) authentication, PIV, FIPS 201, HSPD-12 and IPv6 networking.

The Dominion KX III family of KVM-over-IP switches can provide the agency with military grade, java-free interfaces for video, PS/2, USB and serial ports of the oldest to newest servers on the market. The Dominion SX II family of console servers supports secure access of serial devices such as LAN switches, routers and Linux/Unix servers. With dual power supplies and gigabit ethernet ports supporting automatic failover, Dominion switches are the most reliable and secure in the industry.

Optional CommandCenter management supports consolidated access of equipment connected to the Dominion KX III, SX II and other physical and virtual devices, together with remote power control of devices connected to Raritan and Server Technology PDU's.

MODERNIZING GOVERNMENT TECHNOLOGY ACT

Memorandum M-18-12 [2], the Modernizing Government Technology Act from Mick Mulvaney, Director of OMB, was released during the Trump Administration as an aid in improving Federal technology by providing financial resources and technical expertise to agencies. The act allows agencies to invest in modern technology solutions with the aim of improving service delivery to the public, secure sensitive systems and data, and save taxpayer dollars by making $500M available to agencies in the form of the Technology Modernization Fund (TMF). Up to $250M is available per fiscal year for FY 2018 and FY 2019.

A copy of M-18-12 is found in Appendix B of this document.

Every agency should try to take advantage of the MGT Act while monies are available. Working with a representative from Legrand and our partners to select power, access, and control solutions suited to data centers striving to meet the goals and intents of DCOI just makes good sense. See why more data centers globally choose Legrand's Raritan and Server Technology brands for their power, access, and control needs.

2. https://www.whitehouse.gov/wp-content/uploads/2017/11/M-18-12.pdf - Implementation of the Modernizing Government Technology Act

CONCLUSION

DCOI is an evolution in governmental thinking from the initial FDCCI. It raises the bar with respect to the efforts to be taken by the respective agencies to control the proliferation of datacenters and computational infrastructure required to provide the services that the other branches of government, industry, and the public expect of them. Complying with DCOI does not have to be a stress point for the CIO of the agency, but instead can be part of the discipline of running an environmentally responsible, well-managed organization and its IT assets.

Taking positive steps towards systems consolidation, power measurement and management, and outsourcing various platforms and services all give the agency CIO plenty of options and tools for meeting the needs for environmental sustainability required by DCOI while also giving the CIO a chance for improving employee productivity, achieving higher efficiency, and delivering improved services.

Using remotely managed intelligent power strips (PDUs) for powering an agency's IT infrastructure can help the CIO achieve the PUE goals necessary to comply with the Data Center Optimization Initiative. In addition, the use of KVM-over-IP switches can help in the consolidation process by allowing remote access to systems through a secure, redundant pathway. By utilizing of intelligent PDUs, KVM-over-IP switches, and sensors can further improve PUE while ensuring maximum uptime and quality of user experience.

WHY SERVER TECHNOLOGY

Server Technology's power strategy experts are trusted to provide rack PDU solutions for demanding data centers worldwide ranging from small technology startups to Fortune 100 powerhouses. Because power is all we do, you will find us in the best cloud and colocation providers, forward thinking labs and telecommunications operations. Server Technology customers consistently rank us as providing the highest quality PDUs, the best customer support, and most valuable innovation. Let us show you – we have over 12,000 PDU configurations to fit every need, and over 80% of our PDUs are shipped within 10 days.

Only with Server Technology will customers Stay Powered, Be Supported, and Get Ahead.

Interested in learning more about how Server Technology can help you manage and distribute power in your application?

Visit us online at www.servertech.com

WHY RARITAN

Raritan, a brand of Legrand, is a global leader in intelligent rack PDUs, KVM switches, and other data center infrastructure monitoring and management solutions. Raritan's innovations improve the reliability, efficiency, and intelligence of data centers and server rooms around the globe — including those of the top Fortune 500 companies, such as Cisco, Dell, Google, HP, IBM, Intel, and Microsoft.

To learn more, visit Raritan.com

WHY LEGRAND

At Legrand, we build sustainability into everything we do. We are committed to developing solutions that enable high performance buildings (such as data centers), reducing the environmental impact of our own operations and transforming how people live and work -- more safely, more comfortably, more efficiently. We were ranked 51st among the Global 100 World's Most Sustainable Corporations in 2018. In addition, Legrand North and Central America was recognized by the Department of Energy (DOE) in 2018 for achieving a 20.3 percent reduction in energy intensity. We are committed to optimizing the way we manage energy, water and waste because these practices are good for the environment and good for business.

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https://www.whitehouse.gov/wp-content/uploads/2017/11/M-18-12.pdf - Implementation of the Modernizing Government Technology Act

https://cdn10.servertech.com/assets/documents/documents/591/original/WP_Datacenter_Optimization_Initiative_Rev_1-0.pdf - "The Data Center Optimization Initiative and You"

APPENDICES

- Appendix A - GAO 18-264
- Appendix B - M-18-12
- Appendix C - Closures by Agency
- Appendix D – Agencies, and Agency Strategic Plan Locations
- Appendix E – The Federal CIO Dashboards
- Appendix F – GAO 19-241

APPENDIX A - GAO 16-264

GAO 18-264 is too long to be included in its entirety herein.

A copy of the report may be downloaded directly from the GAO

https://www.gao.gov/assets/700/691959.pdf

APPENDIX B - M-18-12

M-18-12

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: Mick Mulvaney, Director

SUBJECT: Implementation of the Modernizing Government Technology Act

The Modernizing Government Technology (MGT) Act is a key component of this Administration's continued efforts to improve Federal technology by providing financial resources and technical expertise to agencies. The MGT Act will allow agencies to invest in modem technology solutions to improve service delivery to the public, secure sensitive systems and data, and save taxpayer dollars. This memorandum sets forth Administration objectives and necessary actions agencies should take in order to implement the MGT Act.

Background

The MGT Act was enacted as part of the Fiscal Year 2018 National Defense Authorization Act (NDAA) on December 12, 2017. 1 The MGT Act has two primary provisions that address agency information technology (IT) modernization needs:

1. The establishment of a centralized Technology Modernization Fund (TMF) and Technology Modernization Board (Board); 2 and

2. The authorization for all CFO Act agencies3 to establish IT Working Capital Funds4 (WCFs).

This memorandum provides guidance to all agencies regarding the necessary planning for upcoming TMF activities, including the initial process for submitting project proposals to the Board, additional guidance to ·CFO Act agencies5 regarding the administration and funding of IT WCFs, and where to find additional information on topics such as disbursement and repayment process for the TMF funds.

1 Pub. L. No. 115-91, National Defense Authorization Act for Fiscal Year 2018, Title X, Subtitle G (§§ 1076 through 1078).

2 Ibid. § l 078(b)(I). 3 31 U.S.C. §90l(b). 4 Pub. L. No. 115-91 , Title X, Subtitle G, §l077{b)(I). 5 31 U.S.C. § 901(b).

A. Guidance to Agencies on the Technology Modernization Fund and Technology Modernization Board

Section A of this guidance is applicable to all agencies (as defined in 5 U.S.C. §551(1)).

Section 1 – The Technology Modernization Fund (TMF)

The TMF provides a new funding model for Federal technology modernization projects. Agencies may submit project proposals for technology modernization projects to the Technology Modernization Board (Board), described in greater detail below in Section 2. The Board will consider project proposals based on financial, technical, and operational criteria. Approved projects will receive funds in an incremental manner, tied to specific project milestones and objectives, and will be regularly monitored by the Board for success.

The MGT Act authorizes up to $250,000,000 in appropriations for the TMF for each of fiscal years 2018 and 2019. Appropriations for fiscal year 2018 are currently pending. The Board will evaluate and recommend for funding the proposals that show the strongest case for delivering on agency mission objectives and a strong likelihood of success. Agencies must reimburse TMF for any transfer of TMF funds in accordance with the terms of a written agreement.6 The written agreement will document the purpose for which the funds will be used and the terms of repayment, which may not exceed 5 years unless approved by OMB.

Successful projects will demonstrate a strong execution strategy, technical approach, and have a strong team with a demonstrated history of successful modernization efforts. Agencies should, to the extent practicable, consider the adoption of commercial technology solutions in their proposals and provide a strong technical approach and acquisition strategy to implement those solutions. Furthermore, agencies are encouraged to submit proposals for common platforms and shared solutions or other modernization projects that will serve multiple components within a single agency or multiple agencies. OMB anticipates that the TMF will be a testbed for projects and procedures that agencies can operationalize through their IT planning processes and in their execution of their existing appropriations.

Where legally permissible, TMF funding may be used to accelerate modernization efforts that are ongoing. The TMF is not intended to duplicate funding provided through existing appropriations, including any agency funding of IT modernization projects through established IT WCFs. Consistent with the MGT Act, agencies may not submit any requests to the TMF, or utilize funding transferred into an agency WCF, to fund any project that has been expressly denied or restricted by Congress.

6 For more information on the funds disbursement and repayment process, please visit policy.cio.gov.

Section 2 – The Technology Modernization Board

The Board will evaluate proposals and make recommendations for project funding to the GSA Administrator. The Board's responsibilities will include, but are not limited to, the following:

- evaluating proposals submitted for TMF funding;
- establishing evaluation criteria;
- identifying opportunities to improve or replace legacy information technology systems;
- providing funding recommendations to the GSA Administrator; and,
- monitoring the progress and performance of approved modernization projects.

Pursuant to the MGT Act, the Board will be established on March 12, 2018, and will consist of seven members:

- The Administrator of the Office of E-Government (Federal CIO), who shall serve as the Chair;
- A senior official from GSA with technical expertise in information technology development;
- A member of the Department of Homeland Security's (DHS) National Protection and Programs Directorate (NPPD); and
- Four employees of the Federal Government primarily having technical expertise in information technology development, financial management, cybersecurity and privacy, and acquisition, appointed by the Director of OMB.

The Board will distribute information and communications regarding the TMF, including updates to the submission and evaluation process, a charter governing Board operation, evaluation criteria for project proposals, and any other relevant information to policy.cio.gov.

Section 3 –Initial Project Proposal Submissions Process

All agencies are encouraged to begin submitting Initial Project Proposals to ofcio@omb.eop.gov using the template provided in Appendix A starting February 27, 2018. Appendix B provides some areas of consideration that are intended to aid agencies in an initial submission. Agencies may submit as many Initial Project Proposals as they wish. However, the submission of Initial Project Proposals does not guarantee funding from the TMF, and selection of projects for funding by the GSA Administrator does not require agencies to accept funds for projects. Initial Project Proposals will continue to be collected at the address above until the Board issues further instructions for project submission. For updates, downloadable Initial Project Proposal templates, and additional information, please visit policy.cio.gov.

Section 4 –Additional MGT Act Implementation Information

Additional information on agency considerations for project proposals, the process and mechanics of TMF funds disbursement and repayment, and other matters relevant to the implementation of the MGT Act is available at policy.cio.gov. If necessary, OMB may provide additional supplemental guidance on the areas described above or other relevant matters that may arise out of initial MGT Act implementation. Questions regarding this memorandum should be directed to ofcio@omb.eop.gov.

B. Guidance to CFO Act Agencies on IT Working Capital Funds

Section B of this guidance is applicable to all CFO Act agencies (as defined in 31 U.S.C. §901 (b)).

Under the MGT Act, all CFO Act agencies are authorized to establish an IT Working Capital Fund (WCF).7 IT WCFs may only be used: (A) to improve, retire, or replace existing information technology systems to enhance cybersecurity of existing systems and to improve efficiency and effectiveness of the life of a given workload; (B) to transition legacy information technology systems to commercial cloud computing and other innovative commercial platforms and technologies, including those serving more than one covered agency with common requirements; (C) to assist and support covered agency efforts to provide adequate, risk-based, and cost-effective information technology capabilities that address evolving threats to information security; (D) to reimburse funds transferred to the agency from the Technology

Modernization Fund; and, (E) for a program, project, or activity or to increase funds for any program, project, or activity that has not been denied or restricted by Congress.

By March 26, 2018, all CFO Act agencies should notify their OMB Resource Management Office (RMO) and the OFCIO Desk Officer if the agency intends to establish an IT WCF in FY 2018 and initiate the process of creating a new Treasury account for the WCF. If an agency determines it will establish an IT WCF after February 27, 2018, the agency should notify their OMB RMO and the OFCIO Desk Officer at least 30 days prior to establishment.

If an agency establishes an IT WCF under the MGT Act, OMB will oversee the fund and the IT investments it supports consistent with OMB's management and budget development role. In the fiscal quarter after an agency establishes an IT WCF, and every quarter thereafter, the agency will report to OMB on all IT investments funded out of the IT WCF. Pursuant to the MGT Act, each agency shall submit to OMB:

a) All planned transfers and reprogramming actions for the upcoming quarter, including a brief narrative justification;

b) Updates to the IT Dashboard, reflecting changes to all investments or projects funded from the IT WCF in the prior quarter and planned for funding in the upcoming quarters (including all necessary updates to IT Portfolio/Business Cases/Standard Reports); and

c) A summary by fiscal year of actual obligations, expenditures, and unused balances.

OMB will align IT WCF reporting to pre-existing reporting processes (such as the OFCIO integrated data collection (IDC) process, Agency Strategic reviews, PortfolioStats, and TechStats). Agencies that establish WCFs should consider, to the extent applicable, the criteria and guidance the TMF Board formally approves for TMF projects.

Agencies are reminded that, pursuant to the MGT Act, all transfers and reprogramming of funds to the WCFs are subject to any applicable appropriations law restrictions. The MGT Act does not confer transfer authority. Therefore, agencies may transfer funds to WCFs only if they have other authority that authorizes the transfer of such funds. Agencies are encouraged to review their existing agency-specific authorities to identify accounts with applicable transfer authority. In concert with the decision to establish a WCF, agencies should identify accounts with applicable transfer authority and submit the account names to their OMB RMO and OFCIO desk officer.

7 Pub. L. No. 115-91, Title X, Subtitle G, §1077(b)(1).

APPENDIX C - CLOSURES BY AGENCY

Table 1: Number of Reported Tiered and Non-tiered Federal Agency Data Centers with Completed and Planned Closures through Fiscal Year 2018, as of August 2018

	Tiered				Non-tiered			
Agency	Total data centers	Closed through August 2018	Additional planned closures through fiscal year 2018	Percent of closed and planned closures/total	Total data centers	Closed through August 2018	Additional planned closures through fiscal year 2018	Percent of closed and planned closures/ total
Department of Agriculture	35	23	6	83	2,237	2,230	3	100[a]
Department of Commerce	256	32	1	13	122	74	1	61
Department of Defense	934	202	74	30	2,680	826	742	59
Department of Education	0	0	0	0	2	2	0	100
Department of Energy	110	23	0	21	204	71	9	39
Department of Health and Human Services	93	28	4	34	299	80	2	27
Department of Homeland Security	38	15	0	39	237	35	0	15
Department of Housing and Urban Development	4	2	0	50	63	19	44	100
Department of the Interior	93	28	0	30	328	162	0	49
Department of Justice	41	24	4	68	69	60	3	91

[47]The Social Security Administration did not report any non-tiered data centers and therefore did not have a target for non-tiered closures.

APPENDIX C - CLOSURES BY AGENCY

Continued

	Tiered				Non-tiered			
Agency	Total data centers	Closed through August 2018	Additional planned closures through fiscal year 2018	Percent of closed and planned closures/total	Total data centers	Closed through August 2018	Additional planned closures through fiscal year 2018	Percent of closed and planned closures/ total
Department of Labor	10	2	3	50	76	46	4	66
Department of State	53	10	1	21	395	37	4	10
Department of Transportation	223	12	0	5	233	162	1	70
Department of the Treasury	61	26	2	46	2,404	1,693	35	72
Department of Veterans Affairs[b]	288	41	11	18	128	54	18	56
Environmental Protection Agency	5	1	0	20	78	42	4	59
General Services Administration	42	36	0	86	93	82	0	88
National Aeronautics and Space Administration	55	33	2	64	4	4	0	100
National Science Foundation	1	0	0	0[c]	1	1	0	100
Nuclear Regulatory Commission	5	3	0	60	14	9	0	64
Office of Personnel Management	7	3	1	57	2	1	1	100
Small Business Administration	9	0	3	33	43	10	26	84
Social Security Administration	3	1	0	33	0	0	0	0
U.S. Agency for International Development	2	2	0	100	86	3	0	3
Total	**2,368**	**547**	**112**	**28**	**9,798**	**5,703**	**897**	**67%**

Source: GAO analysis of agency data. | GAO-19-241

[a]The Department of Agriculture plans to close 99.8 percent of its non-tiered data centers.

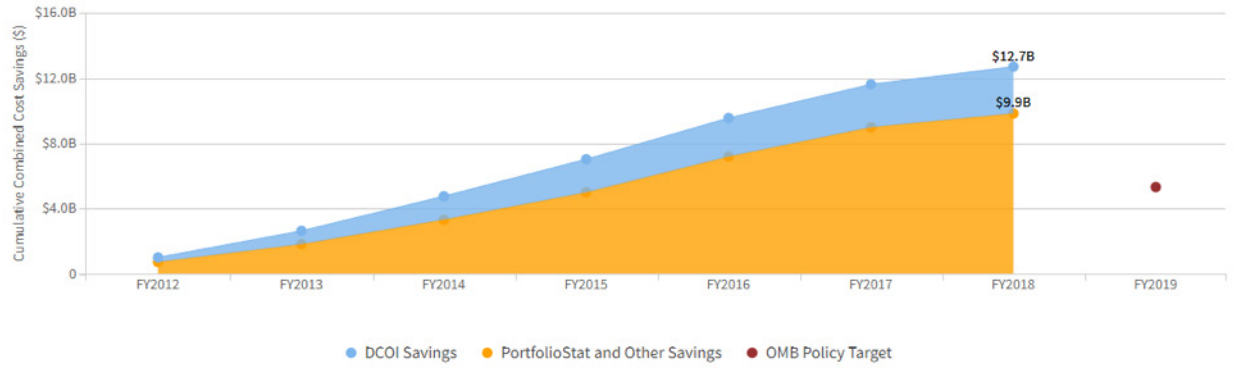
[b]Department of Veterans Affairs, Office of Inspector General, *Lost Opportunities for Efficiencies and Savings During Data Center Consolidation*, 16-04396-44 (Washington, D.C.: Jan. 30, 2019). In January 2019, after VA provided comments on a draft of this report, the VA Office of the Inspector General released a report that concluded VA had not reported a projected 860 facilities as data centers, due to incorrect internal agency guidance on what should be classified as a data center. The department agreed with the report's associated recommendations to develop additional guidance on determining what facilities are subject to DCOI and to establish a process for conducting a VA-wide inventory of data centers. The VA Office of the Inspector General reports the status of these recommendations as closed, based on actions taken by the department.

APPENDIX D - AGENCIES, AND AGENCY STRATEGIC PLAN LOCATIONS

- Department of Agriculture
- Department of Commerce
- Department of Defense
- Department of Education
- Department of Energy
- Department of Health and Human Services
- Department of Homeland Security
- Department of Housing and Urban Development
- Department of Justice
- Department of Labor
- Department of State
- Department of the Interior
- Department of the Treasury
- Department of Transportation
- Department of Veterans Affairs
- Environmental Protection Agency
- General Services Administration
- National Archives and Records Administration
- National Aeronautics and Space Administration
- National Science Foundation
- Nuclear Regulatory Commission
- Office of Personnel Management
- Small Business Administration
- Social Security Administration
- U.S. Army Corps of Engineers
- USAID

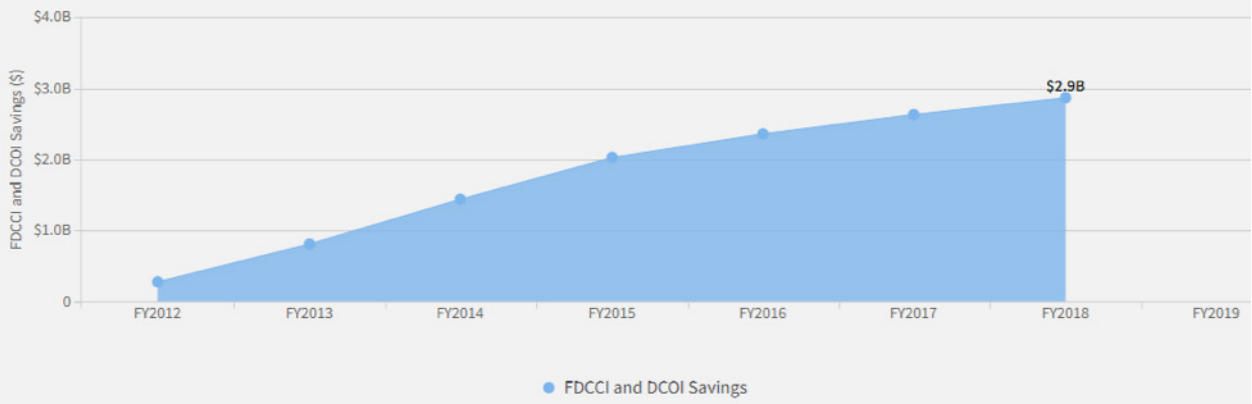
APPENDIX E - FEDERAL CIO DASHBOARDS

https://www.itdashboard.gov/drupal/cost-savings



Warning

There is incomplete, improperly formatted, or missing data for the following agencies: Commerce, HUD, NSF

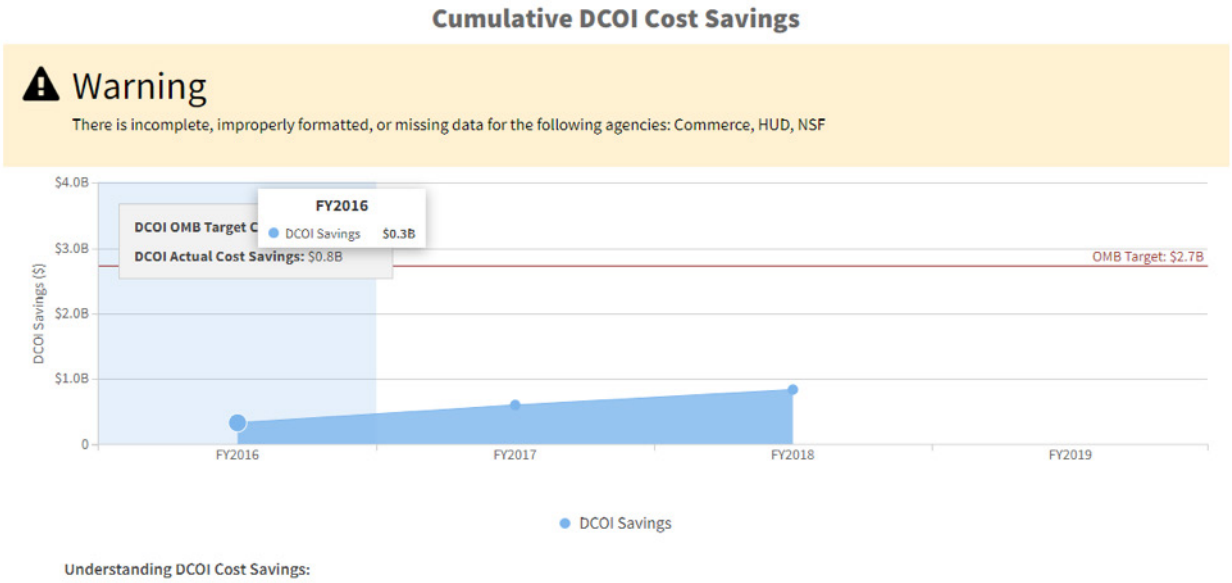


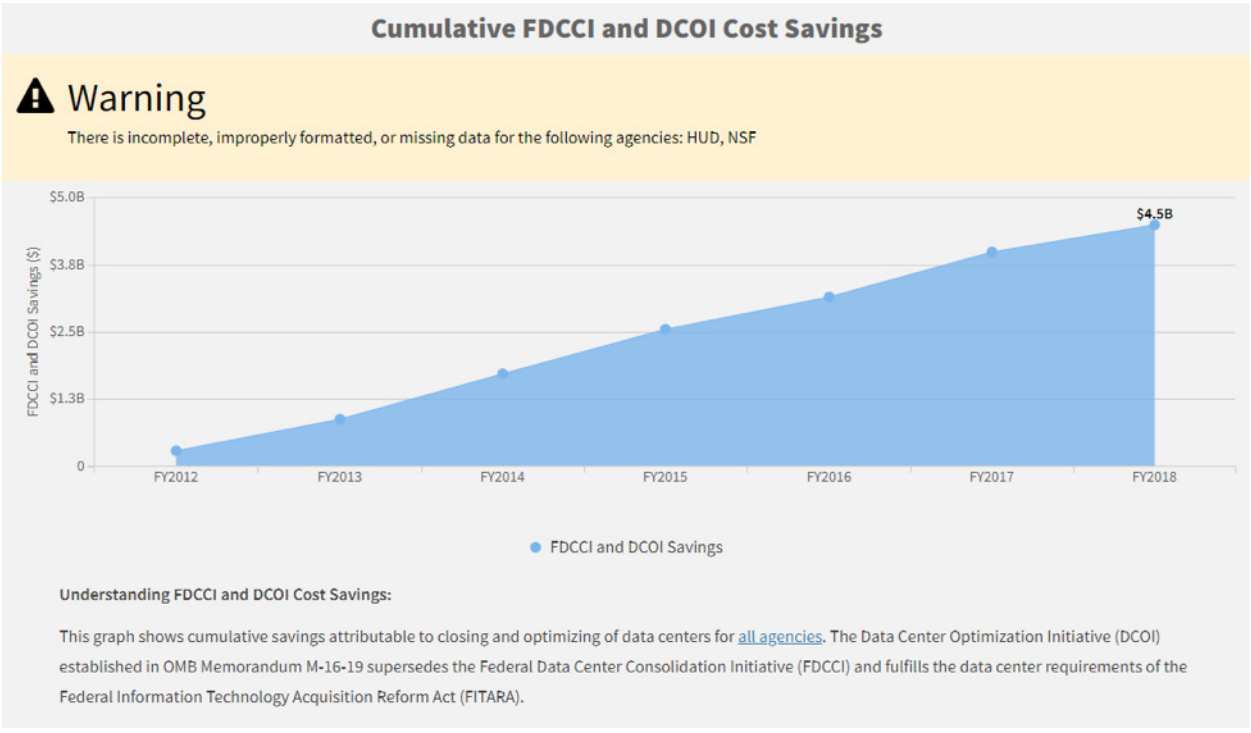
Understanding FDCCI and DCOI Cost Savings:

This graph shows cumulative savings attributable to closing and optimizing of data centers for all agencies. The Data Center Optimization Initiative (DCOI) established in OMB Memorandum M-16-19 supersedes the Federal Data Center Consolidation Initiative (FDCCI) and fulfills the data center requirements of the Federal Information Technology Acquisition Reform Act (FITARA).

APPENDIX E - FEDERAL CIO DASHBOARDS

https://www.itdashboard.gov/drupal/cost-savings





APPENDIX F - GAO 19-241

GAO 19-241 is too long to be included in its entirety herein.

A copy of the report may be downloaded directly from the GAO

https://www.gao.gov/assets/700/691959.pdf