Information Resources Management Strategic Plan 2022

October 2022

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- **fosters payment and settlement system safety and efficiency** through services to the banking industry and U.S. government that facilitate U.S.-dollar transactions and payments; and

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Introduction

The *IRM Strategic Plan* describes how the Board develops long-term investment strategies and how it ties those strategies to annual operations planning, budgeting, and reporting activities. The Board recognizes the key roles that its information technology resources—and its data—play in meeting its responsibilities. This *IRM Strategic Plan* defines the Board's approach for identifying IRM activities that align with its strategic goals and annual plans, including how it

- conducts strategy development efforts that incorporate Boardwide input;
- uses those strategies to drive annual planning and budgeting;
- enforces high standards in enterprise architecture, privacy, information security, and other areas related to information resources management;
- governs and manages Board data in a manner that makes it easily available and fit for use by the Board and the public;
- develops the workforce needed to stay on the leading edge of information technology and data management trends; and
- reports publicly on the results of the Board's work.

These processes ensure that the Board's chief information officer (CIO) works in partnership with business stakeholders from across the Board to identify, prioritize, and fund technology and information management investments that align with the strategic direction of the Board.

For this plan period, the *IRM Strategic Plan* sets forth four IRM goals:

- Goal 1: Provide an Adaptive Computing Environment
- Goal 2: Provide an Engaging and Intuitive Work Environment
- Goal 3: Invest in a Diverse IT Workforce
- Goal 4: Enhance Cybersecurity and Risk Management Practices

In pursuit of these goals, the Board is continuously evaluating new technologies and enhancing its processes. This Plan provides examples of how emerging trends and tools are identified and assessed, which allows new technologies to be integrated into future iterations of strategy development and operational planning.

The *IRM Strategic Plan* will be updated annually to reflect incremental progress toward meeting the goals and objectives it describes, including changes in the Board's strategic priorities and new compliance or regulatory requirements. When a new Board *Strategic Plan* is published every four

years, this *IRM Strategic Plan* will be updated to align with the organization's new goals and objectives.

Finally, the *IRM Strategic Plan* incorporates the Board's first *Open Data Plan* as required under Open, Public, Electronic, and Necessary (OPEN) Government Data Act (OGDA).[1] The *Open Data Plan* lists the Board's planned actions in creating a publicly available data inventory, making data assets available in open format, leveraging technology, training, and setting procurement standards that will enable open data collection, management, and usage as well as collaboration with the public.

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[1] Title II of the Foundations for Evidence-Based Policymaking Act of 2018.

Board Strategy and Information Sharing

The Government Performance and Results Act of 1993 (GPRA), as amended by the GPRA Modernization Act of 2010, requires federal agencies to prepare a strategic plan covering a multiyear period.[2] Although the Board is not covered by GPRA, the Board follows the spirit of the act and, every four years, following a collaborative strategic planning process that includes senior leaders and key stakeholders, publishes a plan that identifies the Board's strategic goals and supporting objectives for the next four-year period.

The Board's current strategic plan covers the years 2020-23 and outlines the Board's priorities within five functional areas.[3] Relevant to the *IRM Strategic Plan*, Goal 5 of the Board's *Strategic Plan* states that the Board will seek to "Optimize operations and capabilities through efficient, effective, and sustainable stewardship and governance of resources." Under Goal 5, the Board's *Strategic Plan* identifies several objectives related to technology and information resources management. They include the following:

- ensure that the current and future workforce has the abilities, knowledge, and skills necessary to carry out the Board's mission

- design and implement a modern, safe, sustainable, and efficient workplace equipped with new tools and technology to better use resources

- optimize technologies to support effective and efficient operations within the Board and across the System

- explore new technologies and delivery mechanisms to expand capabilities and promote efficiencies and productivity improvements

- enhance cybersecurity and data privacy programs and maintain a secure technology environment that fosters collaboration, continuous improvement, and innovation

- improve data management and analytics capabilities to promote greater agility and efficiency in identifying and responding to business needs and in meeting federal requirements

- enhance capacity to leverage innovative data and technology approaches and trends, including big data, machine learning, and artificial intelligence to pilot new efforts and prepare for the future

The Board has developed this *IRM Strategic Plan* to align with Goal 5 of the Board's *Strategic Plan* and its associated objectives listed above.

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[2] GPRA Modernization Act of 2010, Pub. L. No. 111-352 (2011), https://www.congress.gov/111/plaws/publ352/PLAW-111publ352.pdf.

[3] *Strategic Plan 2020-23*.

Annual Planning and Reporting

Each year, the Board publishes an *Annual Performance Plan*, which provides greater detail regarding the specific initiatives the organization will undertake and allocate resources to, in order to accomplish the objectives in the Board *Strategic Plan*. The Board also publishes an *Annual Performance Report*, which summarizes the Board's progress toward achieving the objectives identified in the Board *Strategic Plan*. Both the *Annual Performance Plan* and the report are available on the Board's website.[4]

Freedom of Information Act

The Freedom of Information Act (FOIA), 5 U.S.C. § 552,[5] generally provides that any person has a right of access to federal agency records, unless the records (or any portion of the records) are protected from disclosure by one of FOIA's nine exemptions or by one of three special law enforcement record exclusions.

The Board maintains public and nonpublic records:

- **Public** records are available at the Board's conventional reading room and electronic reading room.[6] A FOIA request is not required to obtain these materials.

- A FOIA request must be submitted to obtain **nonpublic** records, according to the processes described on the Board's website.[7] Requests may be submitted in writing, via the electronic request form,[8] or via https://www.foia.gov/ (the government's central website for FOIA request submissions). Internally, the Board uses a cloud-based solution to track and manage both written and electronic requests.

To continue providing high-quality, timely, and efficient FOIA services, the Board is making investments in versatile and adaptable technology solutions that ensure compliance with relevant regulatory and statutory requirements. A multiyear effort is focused on modernizing the portfolio of systems used to respond to requests from external stakeholders, other federal agencies, Congress, and the public, as discussed later in this plan.

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[4] See https://www.federalreserve.gov/publications/gpra.htm.
[5] See https://www.justice.gov/oip/freedom-information-act-5-usc-552.
[6] See https://www.federalreserve.gov/foia/readingrooms.htm.
[7] See https://www.federalreserve.gov/foia/request.htm.
[8] See https://foia.federalreserve.gov/app/Home.aspx.

Public Feedback

The Board complies with applicable statutes and policies governing the disclosure or dissemination of information, including the Information Quality Act, the Privacy Act and E-Government Act of 2002, other laws, and Office of Management and Budget (OMB) guidance.

The Board's website describes how the organization reviews and substantiates the quality of its information before it is disseminated to the public.[9] It also outlines how affected persons may seek, and when appropriate, obtain correction of information that the Board disseminates.[10]

The public may submit comments on the Board's proposed regulations either through the website, by email, or in writing, as explained on the Board's website.[11] This process covers comments on Dodd-Frank Wall Street Reform and Consumer Protection Act proposals, rulemaking proposals, information collection proposals, and Economic Growth Regulatory Paperwork Reduction Act (EGRPRA) proposals.

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[9] See https://www.federalreserve.gov/iq_guidelines.htm.
[10] See https://www.federalreserve.gov/iq_correction.htm.
[11] See https://www.federalreserve.gov/apps/foia/proposedregs.aspx.

Plan Goals and Objectives

Working with senior leadership from across the Board and utilizing Goal 5's objectives as guide-posts, Board staff developed this *IRM Strategic Plan* to identify the Board's top technology and data management priorities.

The development process was informed by the Board's research and innovation activities, which are designed to encourage creative thinking across the organization. Fostering a culture of innovation has always been instrumental to the Board's success in identifying, evaluating, and implementing solutions that address some of its largest challenges. That same innovative mindset has also proven to be valuable in developing the technology and data management goals and objectives outlined in this IRM Plan.

The development process was also guided by many of the same principles being applied to the Board's enterprise architecture efforts. These efforts focus on defining future target state architectures, creating governance around enterprise-level tools, and ensuring consistency of use across the organization. Key to achieving success in those areas—as well as in meeting information resources management goals—are principles such as

- **Alignment:** Consider broader enterprise needs when making technology decisions supporting a specific business line.
- **Cloud:** Embrace the purposeful utilization of cloud services, technology, and processes to improve productivity and flexibility.
- **Data Lifecycle Management:** Consider a broad strategic and enterprise view of data and information to allow for sharing, easy access, integration, and analysis.
- **Strategic Partnership:** Collaborate with business partners to balance the desire for specific features and functions provided through custom development versus an off-the-shelf purchase, with cost, complexity, and support considerations.

The goals and objectives that follow in this IRM Plan are the outcome of this development process. Each broad goal includes more specific objectives that describe how the Board is providing an adaptive computing environment for its workforce; fostering an engaging and intuitive work environment; developing a diverse workforce by augmenting skills, building capacity, and advancing inclusive behaviors; and placing a strategic focus on security, risk management, and continuous monitoring.

Goal 1: Provide an Adaptive Computing Environment

To expand the analytical and computational tools available to staff and increase capacity for processing and storing data and other information, the Board is prioritizing a number of initiatives. This includes continuing to adopt cloud services that support business and operational capabilities in a secure and cost-effective manner. Investments are also being made to increase capacity for integrated access to diverse data sources, to provide for the secure sharing of data and computing resources with business partners, and to advance data capabilities and operational productivity through the practical application of artificial intelligence and other technologies.

Objective 1.1: Cloud Computing
Continue strategic adoption of cloud services and define a pathway for Board divisions to utilize cloud offerings in a secure, timely, and flexible manner

The on-demand, self-service, and easily expandable nature of cloud technology supports the Board's strategic focus on providing automation solutions that respond to stakeholder needs. The Board has developed a cloud strategy that outlines a holistic approach for the evaluation and deployment of both cloud and on-premises solutions as elements of the Board's information technology portfolio. The Board's cloud strategy is informed by the Federal Cloud Computing Strategy.[12] Activities are focused around thoughtfully using cloud resources to create opportunities for people to be more productive, processes to be more flexible, technology to be more strategic, and information to be accessed, integrated, and analyzed more effectively.

- **Establish cloud governance, develop centralized resources, and educate staff:** The Board has established a cross-divisional team of cloud subject matter experts who are tasked with developing cloud policies, procedures, and best practices as well as maintaining a central site to host those materials and other resources (e.g., a catalog of cloud technologies the Board has evaluated). The team ensures that cloud resources are shared with all relevant stakeholder groups and collaborates with technical training staff to identify and facilitate educational opportunities for Board employees.

  In-progress activities:

  – Work with internal strategy teams to update and revise the cloud strategy to align with applicable federal requirements

  – Maintain and enhance existing cloud governance

  – Facilitate trainings, workshops, and other educational activities to further develop employees' awareness of and expertise in cloud technologies

  – Expand the catalog that inventories all Board projects and systems currently hosted in the cloud to include the status of all cloud initiatives from proof-of-concept to production deployments

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[12] "Federal Cloud Computing Strategy," Office of Management and Budget, https://cloud.cio.gov.

Longer-term activities:

– Streamline existing procedures for evaluating, selecting, implementing, and managing the use of cloud technologies in ways that minimize overhead

– Add dashboards (e.g., a cloud service provider uptime/downtime alert) to the cloud resource site

– Develop additional venues through which employees can grow their cloud skills, network with others who have similar objectives, and share information about using cloud technologies at the Board

- **Increase the Board's capacity to leverage cloud services:** The Board has established a team responsible for conducting the research, development, engineering, and maintenance activities needed to support the Board's cloud infrastructure, services, and security. It has also created project workstreams to research and evaluate cloud tools and deployment methodologies in cloud vendor environments. As part of this research, the group has identified and prioritized several goals for the upcoming years.

In-progress activities:

– Develop an enhanced network infrastructure model that will better support cloud enablement

– Provide cloud-native analytics tools to conduct sentiment analysis research

– Explore cloud solutions to provide data management solutions for enterprise data lifecycle management

– Research cloud-based data integration and extract/transform/load (ETL) tools to manage and perform data analytics

Longer-term activities:

– Identify additional, more complex use cases (e.g., web services, data management platforms, and data ingestion/ETL workflows); develop sample applications for those scenarios

– Develop reference architectures, configuration baselines, procedures, patterns, blueprints, and best practices for leveraging cloud services

– Embrace cloud automation through application deployment pipelines, containerized workloads, Infrastructure as Code, and Policy as Code

– Explore cloud-native analytics solutions to enable researchers to conduct modern research with emerging data patterns on complex problems

Objective 1.2: Big Data and Analytics
Support the Board's data lifecycle and data management needs by increasing capacity for and integrating access to diverse data sources

As the group responsible for setting the Board's data strategy and policy, the Office of the Chief Data Officer (OCDO) has identified several goals around the collection, management, and analysis

of data. To achieve these goals, OCDO has partnered with the Division of IT to identify and implement technologies that will improve data quality, increase employees' access to data, and streamline the onboarding of new data.

- **Explore opportunities for using open source tools to manage big data:** The Board has recognized the performance and cost-saving benefits of using open source frameworks to manage large data assets. A centralized Board staff team has been established to manage the growth of the Board's on-premises architecture and provide advisory services to teams considering use of the platform, including teams considering it for big data business cases.

  In-progress activities:

  – Expand the use of big data to additional Board business functions

  – Explore big data use in new business cases, including climate data analysis

  Longer-term activities:

  – Modernize the architecture and infrastructure of existing data processing and analytics platforms for future cloud integration

  – Determine whether to leverage open source capabilities in the cloud; if so, develop governance around their expanded use

- **Grow the capabilities of the Board's Big Data Platform (BDP):** The Division of IT and OCDO partnered to build the BDP, which provides staff with a platform-agnostic interface for accessing a vast array of the Board's managed data assets (including those purchased from external vendors). Built on the Hadoop platform, the BDP is enhancing data access and usage.

  In-progress activities:

  – Use the latest Hadoop features to improve system performance, security, and operational efficiency

  – Onboard additional vendor data assets, including timeseries and climate data used for economic research

  Longer-term activities:

  – Explore the migration of BDP to the cloud, to improve the platform's data science capabilities

  – Implement Board data governance policies in the automated data management processes on the BDP

- **Use big data technologies to identify market risks:** Being able to collect and analyze a high volume of data enables the Board to identify the relationships between financial market institutions (FMIs) and better understand potential risks associated with those connections. For example, the Board has developed a system to scrape FMI data and load that data into Hadoop on a scheduled basis. A web interface is used to analyze and reconcile the collected data as FMI relationships evolve.

In-progress activities:

– Use modern data integration and visualization technologies to analyze the high volume of data generated by data scraping activities; use that information to better understand FMI relationships and determine the systemic implications of market events

Longer-term activities:

– Expand the FMI data repository by scraping and extracting additional data as requested by Board business lines

– Develop additional data analysis, visualization, and reporting capabilities using Hadoop's advanced search and indexing features

Objective 1.3: Artificial Intelligence and Machine Learning

Advance data capabilities through the practical application of artificial intelligence and other enabling technologies and methodologies

In support of the Board's goals to accelerate the collection, analysis, and sharing of information, employees are assessing the search, mathematical optimization, and statistics and probability methods associated with Artificial Intelligence/Machine Learning (AI/ML). Work in this area is also focused on developing staff so that they have the skills needed to enable adoption of these new technologies, which aligns closely with the Board's long-term focus on meeting workforce needs in a rapidly changing environment.

- **Investigate the costs and benefits of AI/ML:** Because AI/ML differs from traditional application development, the Board is working to build expertise in the programming languages, techniques, methods, software frameworks, and libraries specific to AI/ML. The Board has established several workgroups that have already conducted proofs of concept, developed prototypes, and identified AI/ML capabilities that produce tangible benefits in the areas of code generation, natural language processing, and automated response. The workgroups have also begun to develop the staff skills and infrastructure needed to enable adoption of these new technologies.

  In-progress activities:

  – Identify training courses and other resources that developers, analysts, and managers can use to build skills in AI/ML programming languages, search and mathematical optimization techniques, statistics and probability methods, software frameworks, and libraries

  – Investigate opportunities for robotic process automation; develop software robot prototypes and evaluate their ability to emulate repetitive and routine human interactions with digital systems and software

  Longer-term activities:

  – Establish an AI/ML service framework; package functions and methodologies into an easy-to-use model that all teams can leverage

– Set best practices for the adoption and use of AI/ML models

– Create an AI/ML resource center that organizes software, algorithmic inventories, processes, governance, and best practices in a way that facilitates adoption of AI/ML technologies

– Continue to work with Board business lines to identify scenarios where AI/ML analysis and functionality could be applied

- **Explore use of AI/ML to support the data science needs of the Board:** The Board has actively been investigating how it might apply AI/ML technologies to respond with greater agility and efficiency to emerging data science needs. Most recently, work in this area has resulted in the launch of a new system built on the Hadoop big data platform. Using staff-defined terms (e.g., fair lending), it uses natural language processing, sentiment analysis, and deep learning to tag large volumes of documents submitted by the public. This tagging has improved the efficiency of the Board's public comment review process.

In-progress activities:

– Explore the use of cloud AI/ML technologies that have the potential to provide advanced data science and analytics capabilities to Board users

Longer-term activities:

– Adopt more AI/ML technologies to respond to emerging business needs

– Develop business partnerships and technical resources to identify use cases (e.g., climate research) suitable for advanced data science and analytics using either on-premises or cloud technologies

Goal 2: Provide an Engaging and Intuitive Work Environment

The Board has embarked on a multiyear effort to evaluate all facets of its physical and digital workspace, including but not limited to enhanced hybrid/telework tools, conference room technologies, and mobile computing and communication platforms. The overall goal is to create a smart, intuitive work environment where Board staff can collaborate with anyone at any time, in any place.

Objective 2.1: Modern Workspace
Create a modern workspace that makes it easier to create, share, preserve, and find information securely, while enabling staff to work from any location or Board device with a consistent user experience

Prior to the pandemic, the Board had begun to envision what its future workplace would look like. With the advent of long-term, widespread telework, the Board has expanded these assessment and planning activities to consider the needs of a hybrid workforce, one in which some employees work from the office while others telework.

Although a significant increase in telework has presented some challenges to the Board, it has also generated several unexpected benefits. Employees are reporting that online meeting plat-forms make them feel more equally represented in—and more engaged in—discussions with their colleagues. Building a future workspace that maintains such representation and engagement will be key to the Board's planning in this area.

- **Develop a roadmap for the hybrid workspace:** The Board has established a workgroup that will coordinate the information collection, staff engagement, and long-term planning needed to guide the evolution of the Board's workspace. In support of this, the Board has engaged a workspace adviser who is providing guidance on industry best practices and technologies that the Board could consider as part of its long-term roadmap.

  In-progress activities:

  – Continue to develop resources and implement new technologies that address the immediate communication and information sharing needs of staff, as more individuals begin to work on-site on a regular basis

  – Document the current state of the Board's workspace design and highlight areas for potential longer-term improvement

  – Engage with staff across the organization to identify pain points, both with their in-office and telework experiences

  – Develop a target end state for a communication and collaboration strategy that supports a hybrid workforce

  Longer-term activities:

  – Identify and implement technologies and practices that will move the Board toward the target end state

Objective 2.2: Collaboration Tools
Implement integrated electronic collaboration tools to increase conferencing capabilities and enhance conference room and collaborative spaces

The Board has widely deployed cloud-based platforms that support collaboration among staff. These tools have been highly effective throughout the pandemic, while Board employees have worked in a telework posture. As staff begin to transition back to working in the office, the preva-lence of hybrid meetings (those that include on-site and telework participants) will grow. As this transition continues, the Board will continue to investigate audio-visual hardware and conferencing platforms that support seamless meeting connections from any location or Board device.

- **Expand use of cloud-based collaboration platforms:** The Board has already adopted industry-leading cloud tools that support information sharing and collaboration among Board staff as well as with System staff. Staff can access these tools on their Board-issued phones and lap-tops, which is enabling them to work across devices from any location. These tools have been

integral during the pandemic, when the Board transitioned to a fully telework posture and employees' online communication and collaboration needs greatly increased.

In-progress activities:

– Add functionality and products to the existing suite of cloud technologies to further enhance and support a modern workspace

– Extend the Board's capabilities to support collaboration with additional federal agencies

– Encourage teams to continue moving their collaboration and communication activities from on-premises to cloud-based platforms

Longer-term activities:

– Investigate extending the Board's collaboration capabilities to include collaboration with research partners at academic institutions and other external organizations

- **Develop a unified communications infrastructure that supports a hybrid workforce:** The Board recently rolled out a one-touch solution for joining meetings from its conference rooms. In-room hardware, such as touch panels, has been overhauled to provide a more seamless meeting experience, with an emphasis on supporting hybrid meetings. Looking ahead, the Board is investigating both hardware and conferencing platforms that will support and expand communication among staff and our external partners.

In-progress activities:

– Continue to simplify the process for connecting to audio/video meetings from Board conference rooms

– Transition to audio-visual hardware that supports seamless meeting connections from any location or Board device

– Evaluate and adopt additional conferencing platforms, including cloud-based platforms

Longer-term activities:

– Evaluate new conference room features and telepresence technologies that would broaden the range of communication tools available to staff

Goal 3: Invest in a Diverse IT Workforce

The Board is committed to maintaining a highly skilled workforce that enable the Board to meet its missions. Staff within Board divisions responsible for workforce development, personnel management, and diversity, equity, and inclusion activities have formed an informal community of practice that promotes information sharing regarding such practices across the organization. Those division representatives work closely with the People, Strategy & Operations (human resources) team and the Office of Diversity & Inclusion (OD&I) to recruit, train, and support the overall professional development of Board staff.

Objective 3.1: IT Workforce Development

Provide opportunities for the IT workforce to develop the technical and business process skills necessary to thrive in an evolving computing environment

The 2020-23 Board *Strategic Plan* contains an objective focused on attracting, developing, and retaining "diverse talent with varied experience and perspectives to ensure the Board is able to meet workforce needs in a rapidly changing environment."[13] In alignment with that plan, the Division of IT is working to develop an IT workforce that can meet the evolving automation demands of Board business areas.

- **Ensure that the IT workforce has the abilities, knowledge, and skills necessary to carry out the Board's mission:** The Board is dedicated to developing both the business acumen and technical skills of its IT staff, so that the IT community remains at the forefront of technological change. To that end, the Board's Office of Development and Learning partners with employee development and personnel management specialists embedded in each division to provide the Board's IT workforce with a broad range of both internally developed and publicly available professional development resources. The Board offers rotational opportunities that enable staff to experience other IT roles and encourages its IT professionals to attend conferences and pursue professional certifications that support their professional growth.

The Board is undertaking an "Enterprise IT Workforce Modernization" effort, which will update IT position descriptions to tie them more closely to the Board's evolving technology needs. It will also more closely align Board position descriptions with industry trends and better equip the organization to attract and retain staff in a competitive job market.

Within the Division of IT, the Board has created a work unit dedicated to leading the division's transition to using Agile development methodologies. These iterative application development practices will enable the Board to deliver technology solutions in a faster, more responsive manner. The team is working with technology professionals in other divisions to identify training resources that can be used across the organization.

In-progress activities:

– Revise the first set of position descriptions that were prioritized as part of the Enterprise IT Workforce Modernization effort

– Require training sessions that upskill the IT workforce in support of the Agile transformation

Longer-term activities:

– Complete the modernization of all remaining IT job families, and identify capability gaps as part of the Enterprise IT Workforce Modernization effort

– Facilitate focused coaching engagements that develop the Agile skills of service delivery and leadership teams

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[13] *Strategic Plan 2020-23*.

Objective 3.2: Diversity, Equity, and Inclusion

Collaborate with functions across the Board to explore the factors that influence diversity, equity, and inclusion (DEI), and evaluate external outreach opportunities to promote increased participation in STEM-related disciplines

The Board published a *Diversity and Inclusion Strategic Plan* that frames its DEI activities as responsibilities shared by all Board employees.[14] It describes how the Board develops and implements activities and training for staff to encourage growth and better understanding of DEI issues. It also describes outreach and recruitment programs aimed at drawing a diverse range of technology and STEM professionals to the Board.

Across the organization, the Board actively seeks and deploys technology solutions that provide virtual learning opportunities, so that staff can better understand the importance of DEI in the workplace, can learn about and develop more inclusive behaviors, and can enhance their communication skills. Other technology solutions focus on ensuring all Board staff have the ability to readily access and utilize the Board's information resources.

- **Enhance the Board's recruiting program to draw applicants from diverse professional backgrounds:** Recruiting and retaining a highly motivated, well-trained, and diverse workforce is necessary to achieve the Board's missions and goals. The Board's recruiting efforts are sustained by strong professional relationships with an array of colleges and universities, professional organizations, and associations.

  The Board has broadened its IT professional candidate pools by improving engagement with Historically Black Colleges and Universities (HBCUs), the Hispanic Association of Colleges and Universities (HACU), the INROAD program (which creates pathways to careers for ethnically diverse high school and college students), and a number of STEM-focused organizations. Recent activities have included HBCU outreach events that aimed to raise awareness of IT professional opportunities at the Board. The Board has seven Employee Advisory Committees that continually identify and recommend programs and opportunities that improve the Board's recruitment and development of technology professionals.

  In-progress activities:

  – Broaden the Board's recruitment approach to bring a more diverse range of perspectives and expertise into the IT workforce

  – Identify and develop strategies to partner with external groups that advocate for STEM disciplines (e.g., professional organizations and organizations representing high school-aged children)

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[14] Board of Governors of the Federal Reserve System, *Diversity and Inclusion Strategic Plan 2016-19* (Washington: Board of Governors, December 2016), https://www.federalreserve.gov/publications/diversity-inclusion-plan.htm.

Longer-term activities:

– Develop additional programs that engage prospective students and aim to increase the diversity of future IT and STEM professional candidate pools

- **Foster DEI initiatives:** The Board publishes resources, plans events, and supports employee resource groups aimed at fostering DEI in the workplace. It also reinforces its commitment to diversity and inclusion through a variety of communication channels and educational outreach efforts aimed at both internal and external audiences.

In-progress activities:

– Establish an annual schedule of DEI-focused events and programs

– Continually identify and offer annual DEI training to Board staff, in the areas of unconscious bias, leading with conscious inclusion, and allyship

– Increase workforce participation in employee resource groups

Longer-term activities:

– Identify initiatives that will focus on inclusion and employee engagement

Goal 4: Enhance Cybersecurity and Risk Management Practices

The Board has implemented a comprehensive, agencywide information security program to protect the data and information systems used to support its mission. Overseen by the Board's Information Security Officer (ISO), the program complies with federal information security requirements as established by the Federal Information Security Modernization Act (FISMA) as well as with National Institute of Standards and Technology (NIST) standards and guidance issued in accordance with FISMA. More information is available in the Board's Cybersecurity and Financial System Resilience Report.[15]

The Board's privacy program is overseen by the Senior Agency Official for Privacy (SAOP), who, among other activities, monitors federal laws, regulations, and policies for changes that impact the Board's privacy program. As needed, the SAOP ensures that the Board's practices are adjusted to reflect new laws and regulations as well as emerging business needs.

As described below, the Board continually enhances both programs. Changes to its information security tools and controls (Cybersecurity Architecture) as well as its governance, processes, and training (Cyber, Risk, and Privacy Programs) are aimed at reducing the overall risk of cybersecurity incidents, mitigating the impact of incidents, and improving the Board's ability to respond to incidents when they do occur.

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[15] Board of Governors of the Federal Reserve System, *Cybersecurity and Financial System Resilience Report* (Washington: Board of Governors, September 2021), https://www.federalreserve.gov/publications/cybersecurity-and-financial-system-resilience-report.htm.

Objective 4.1: Cybersecurity Architecture

Reengineer the Board's cybersecurity tools and controls to establish a zero-trust architecture (ZTA), as well as to strengthen enterprise identity and access management capabilities

The Board's approach to cybersecurity focuses on remaining vigilant about its cybersecurity posture, investing in risk mitigation initiatives and programs, protecting systems and data, and continuously monitoring and assessing cybersecurity risks to its operations. The Board uses a comprehensive "defense in depth" approach, whereby multiple layers of security controls are implemented across the enterprise to protect non-public information against advanced persistent threats, malware, insider risks, distributed denial of services (DDoS) attacks, and other risks. The Board continues to plan cybersecurity initiatives that will enhance the Board's identity and access management capabilities, improve its ability to respond to evolving cybersecurity threats with agility, decisiveness, and speed, and enable the continuous monitoring of critical assets.

- **Implement a zero-trust architecture (ZTA) and supporting controls:** Executive Order 14028[16] outlined a new vision for agency information security models, a vision that was further defined in M-22-09.[17] That memo defined a ZTA paradigm shift for agencies, one that will require the Board to move away from a traditional focus on the network perimeter and instead toward users, assets, and data. The Board views ZTA as an opportunity to transform not only the information security program but also the Board's approaches to infrastructure management, application development, and data management.

  In line with this emerging guidance, the Board has conducted a ZTA maturity assessment, developed a high-level ZTA implementation plan, and begun to develop a target-state ZTA design. M-22-09 and related guidance is being consulted as the Board plans a ZTA pilot, discusses how to enhance its monitoring and incident response capabilities, and looks at strengthening continuous diagnostics and mitigation (CDM) practices.

  In-progress activities:

  – Develop a target-state ZTA design and pilot it with at least one Board application

  – Ensure that the Board's logging, log retention, and log management capabilities meet EL1 requirements defined in M-21-31[18]

  – Establish standards for encrypting Board data stored in the commercial cloud and monitoring access to that data

  – Partner with the Department of Homeland Security (DHS) to implement DHS existing CDM tools and capabilities at the Board

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[16] Improving the Nation's Cybersecurity," 86 Fed. Reg. 26,633 (May 12, 2021), https://www.govinfo.gov/content/pkg/FR-2021-05-17/pdf/2021-10460.pdf.

[17] See M-22-09, "Moving the U.S. Government Toward Zero Trust Cybersecurity Principles," at https://www.whitehouse.gov/wp-content/uploads/2022/01/M-22-09.pdf.

[18] See M-21-31, "Improving the Federal Government's Investigative and Remediation Capabilities Related to Cybersecurity Incidents," at https://www.whitehouse.gov/wp-content/uploads/2021/08/M-21-31-Improving-the-Federal-Governments-Investigative-and-Remediation-Capabilities-Related-to-Cybersecurity-Incidents.pdf.

Longer-term activities:

– Refine the ZTA approach based on the pilot's outcome; plan a broader rollout of the
new model

– Enhance the Board's logging capabilities to support information sharing with CISA; meet
M-21-31 EL2 and EL3 requirements per timelines in that memo

– Evaluate cloud encryption and access standards versus the capabilities of new vendors;
refine approach as more Board data moves to the cloud

– Work with DHS to implement DHS emerging CDM tools and capabilities at the Board

- **Strengthen identity, credential, and access management (ICAM) capabilities:** The Board has
established an ICAM program, with oversight for the policies and technologies that ensure that
Board information and resources are only accessed by the appropriate individuals for the pur-
pose of conducting Board business. A framework of ICAM policies built into the Board's tech-
nology infrastructure enables staff to securely share information across the organization as well
as with external partners. Current areas of focus include strengthening access control via a cen-
tralized permissions management application, modernizing the Board's multifactor authentica-
tion (MFA) model, and investigating longer-term enhancements to the privileged access manage-
ment (PAM) solution.

In-progress activities:

– Implement a centralized permissions management solution

– Design and pilot the Board's long-term MFA approach

– Conduct research for—and plan the modernization of—the Board's PAM solution

Longer-term activities:

– Enhance the centralized permissions management solution to support additional types of
access requests; expand its scope to support revalidating existing permissions

– Refine the MFA approach based on the pilot's outcome; plan a broader rollout of the
new model

– Modernize the Board's PAM solution to support a hybrid on-premises/cloud computing
environment

Objective 4.2: Cyber, Risk, and Privacy Programs

*Reengineer the Board's cyber, risk, and privacy programs to incorporate new standards,
processes, and tools that enable the agility the business requires, while protecting Board
information and assets based on risk*

The Board's cyber, risk, and privacy program leadership continually evaluates the Board's programs
in light of new federal guidance as well as emerging cybersecurity threats. Program enhancements
are identified, piloted, and implemented on a rolling basis. In recent years, greater attention has

been placed on how the Board can more closely align its security and privacy controls with various business areas' risk tolerances.

- **Evolve the cyber risk governance program to better align business risk tolerance with program activities:** The Board promotes effective cybersecurity risk management through active oversight, collaboration, and coordination across Board functions and Board stakeholders. Within the IT Division, the CISO/SAOP has oversight for identifying emerging cyber and privacy threats and coordinating the Board's responses to any incidents. At a Boardwide level, the Office of the Chief Operating Officer (COO) helps coordinate information flow and provides mechanisms for the efficient and timely exchange of critical risk information across business, IT, and information security functions.

  Executive Order 14028[19] put a spotlight on the cybersecurity risks posed by the software supply chain, and the Board has already taken steps toward identifying and assessing the security posture of "critical software," as defined by NIST.[20] Understanding and managing the risks associated with critical software will continue to remain an important focus.

  In-progress activities:

  – Refocus the cyber risk governance program so that it incorporates input from business units, on the areas in which they perceive their highest areas of risk to be

  – Evaluate whether all "critical software" identified during 2021 meets applicable security measures

  Longer-term activities:

  – Continue to evolve the cyber risk governance program to support business needs and address emerging cybersecurity risks

  – Monitor guidance on "critical software" and expand Board activities to cover additional categories, as those are added by NIST

  – Monitor potential amendments to the Federal Acquisition Regulation and incorporate similar changes as appropriate into the Board's contract language

- **Implement new tools and training in support of the information security and privacy assurance programs:** The Board administers mature information security and privacy training programs. The Board evaluates and enhances these training programs annually to incorporate the latest information about policies, procedures, and risk management practices.

  Training program metrics—as well as metrics on risk management, inventory management, and privacy program activities—are compiled and displayed in the Information Security and Privacy

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[19] 86 Fed. Reg. 26,633 (May 12, 2021).

[20] "Critical Software – Definition & Explanatory Material," National Institute of Standards and Technology, last modified July 9, 2021, https://www.nist.gov/itl/executive-order-improving-nations-cybersecurity/critical-software-definition-explanatory.

team's dashboard. The dashboard provides Board leadership with insight into key information security and privacy program activities.

In-progress activities:

– Continue to implement enhanced information security and risk management training programs

– Review the National Initiative for Cyber Education (NICE) framework versus Board IT job descriptions; identify potential opportunities to enhance the Board's cybersecurity training requirements to align with NICE recommendations

– Transition to a continuous authorization program, which will allow business owners and security personnel to have an automated, ongoing method to monitor system security

– Enhance the information security and privacy dashboard to include additional metrics that support the annual FISMA review process and other internal processes

Longer-term activities:

– Develop a Security & Privacy Champions initiative, which will educate product owners and developers and enable them to incorporate security and privacy standards into requirements for new efforts

- **Continually enhance the privacy program to ensure the integrity and security of the personally identifiable information collected by or on behalf of the Board:** The Board's SAOP has responsibility for developing, implementing, and maintaining an agencywide privacy program that ensures compliance with applicable privacy requirements. Program staff collaborate with Board Legal Division staff to ensure that Privacy Impact Assessments (PIAs) and System of Records Notices (SORNs) are created and published on the Board's website, in accordance with the Privacy Act[21] and the E-Government Act of 2002.

In-progress activities:

– Ensure policies, standards, and processes are adaptive to changing laws, guidance, and best practices (e.g., NIST SP 800-53 Rev. 5)

– Evaluate privacy standards and processes to identity opportunities for improvement

– Evaluate the staffing structure of the privacy program to identify opportunities for improvement

– Provide guidance and counsel to stakeholders in connection with the Board's multiple IT modernization projects

Longer-term activities:

– Update privacy program standards and processes to make the program more efficient and effective

– Restructure the privacy program staffing to better support the Board's privacy requirements

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[21] Privacy Act of 1974, 5 U.S.C. § 552a.

Open Data Plan

The Board believes that adopting robust open data practices as well as collaborating with the public on the use of the agency's data will promote transparency and understanding of the Board's mission and activities.[22] Accordingly, the Board is working proactively and collaboratively to advance open data objectives, including those codified in OGDA.[23] The Board's chief data officer (CDO), who heads the Board's Office of the Chief Data Officer (OCDO), is formally charged with implementing OGDA's requirements and provides an annual report to Congress on the compliance of the agency. The CDO works with the Board Data Council, which consists of senior leaders across the Board accountable for data, to advance open data practices at every level of the Board.

Under OGDA, the Board is required to include an open data plan as part of its *IRM Strategic Plan*. This *Open Data Plan* addresses the Board's work to implement OGDA's open data requirements including collaboration with the public on the use of Board data.

In accordance with OGDA's requirements, the Board's *Open Data Plan* describes agency efforts in the following areas:

- Data Collection Mechanisms
- Collaboration with the Public
- Data Asset Usage Evaluation
- Open Government Data Asset Quality Evaluation and Improvement
- Open Data Enablers: Technology, Training, and Procurement Standards
- Priority Data Assets, Data Inventory, and Federal Data Catalogue

NOTE: The areas appear in the order they are listed in the statute.

Included in the *Open Data Plan* are steps the Board intends to take over the next 12 months to implement new programs and enhance existing programs to align with OGDA's requirements as well as the Board's strategic objective to "[a]ccelerate the ability to obtain, integrate, analyze, and share data and information throughout the organization."[24]

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[22] As set forth in Office of Management and Budget Circular No. 130, *Managing Information as a Strategic Resource*, "'Open data' means publicly available data that are made available consistent with relevant privacy, confidentiality, security, and other valid access, use, and dissemination restrictions, and are structured in a way that enables the data to be fully discoverable and usable by end users. Generally, open data are consistent with principles, explained in OMB guidance, of such data being public, accessible, machine-readable, described, reusable, complete, timely, and managed post-release."

[23] Pub. L. No. 115-435 (2019).

[24] *Strategic Plan 2020-23*.

Data Collection Mechanisms

In accordance with OGDA, the Board's data collection mechanisms generally are available in an open format. In particular, the Board collects data from supervised financial institutions in an open format as set forth in the Board's reporting instructions.

Over the next 12 months, the Board plans to enhance data collection processes by

- establishing data guidelines that support an open format as the default format for Board data collections; and
- beginning a review to determine which data collections are not in an open format and establishing reasonable goals for transforming such data collections to an open format.

Collaboration with the Public

The Board conducts outreach and engagement activities to the public and industry in connection with its publicly available data publications. Industry outreach initiatives include communications with trade groups, financial institutions, and third-party consultants and vendors. The public is invited to submit questions and comments concerning data on the Board's website. Additionally, as part of the OCDO's recent efforts to make the Board's Micro Data Reference Manual (MDRM) machine-readable for public data users, the OCDO invited a group of public data users to participate in design and usability testing. These users had previously contacted the Board with questions and concerns regarding the accessibility and usability of the MDRMs. The collaboration resulted in the provision of the MDRMs in an open format.

Over the next 12 months, the Board plans to

- develop a public engagement plan to understand how the public interacts with, utilizes, and values the data assets the Board makes available to the public; and
- update and enhance the Board's online Data Download Program (DDP). The goal of this effort is to provide the public with data and services that are useful, accessible, and modern, while adhering to the Board's legal and regulatory requirements and supporting the implementation of the Board Data Strategy. The project includes a public engagement workstream to learn how the public seeks to use and interact with the Board's data by collaborating with the Federal Reserve Bank of St. Louis's Federal Reserve Economic Data (FRED) team to survey the public's needs regarding data access and analysis capabilities with respect to the Board's statistical releases. The survey results will inform next steps in enhancing DDP capabilities.

Data Asset Usage Evaluation

Currently, the Board's evaluation of public data asset usage includes monitoring and tracking activities on the Board's website, including pageviews, unique pageviews, and downloads.

The Board's Open Data Point of Contact (POC) will serve as a dedicated point of contact within the Board to assist users and respond to quality issues, usability issues, recommendations for improvements, and complaints about adherence to open data requirements.

Over the next 12 months, the POC will work collaboratively with Board staff and the public to

- develop a plan for data asset usage evaluation, including expanding monitoring and tracking usage information and making the usage information available for analysis; and

- leverage the DDP user feedback survey results to ensure user needs are met and to identify areas for improvement.

Open Government Data Asset Evaluation and Improvement

The Board ensures the timeliness, completeness, consistency, accuracy, usefulness, and availability of open Government Data Assets principally through the Statistics Data Quality Program (DQP).[25] Under the DQP, data quality controls are implemented at the pre-submission, submission, and post-submission phases of the Board's data collections. The Board also solicits input from the public on the timeliness, completeness, and other dimensions of data quality for data collections through the Paperwork Reduction Act (PRA) compliance processes.[26]

Over the next 12 months, the Board plans to

- review and update the DQP annually to foster adherence to best practices and confirm that defined data quality processes are meeting the Board's objectives;

- review and validate metadata in the Board's comprehensive data inventory to ensure quality, consistency, and conformance to standards for publishing open government data assets;

- develop a cloud-based analytical hub to facilitate collaboration and create data pipelines that supply quality data assets and facilitate downstream analytical uses of the data; and

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[25] OGDA defines an "open government data asset" as "a public data asset that is (A) machine-readable; (B) available (or could be made available) in an open format; (C) not encumbered by restrictions, other than intellectual property rights, including under titles 17 and 35, that would impede the use or reuse of such asset; and (D) based on an underlying open standard that is maintained by a standards organization." *See* 44 U.S.C. § 3502(20).

[26] The Board, under delegated authority granted by OMB, conducts a rigorous review process (also known as the "clearance process") of proposed information collections subject to the PRA. The Board uses the PRA clearance process to promote improved quality and practical utility of information collected while seeking to minimize the overall response burden.

- establish workgroups to explore new approaches to using and managing big data and non-traditional data, including unstructured text data, streaming information, 3–D geospatial data, and video data.

Open Data Enablers: Technology, Training, and Procurement Standards

The Board recognizes that the acquisition of technology, provision of training for employees, and implementation of procurement standards will help the Board meet the goals of the *Open Data Plan*.

The Board's Procurement Office has been instrumental in sourcing both professional services talent and information technology products in support of open data objectives. Most recently, the Procurement Office utilized a basic ordering agreement (BOA) to retain consulting services on the metadata plan and roadmap and the technology to support the development of the Board's comprehensive data inventory in compliance with OGDA.

The Board also offers various relevant training opportunities for staff on topics, such as data science, data management, and data analytics. In addition to the training and upskilling for current staff, the Board continually seeks to recruit new staff with advanced skills to support the Board's open data objectives as well as to fill specific skills gaps related to open data.[27]

Over the next 12 months, the Board plans to

- continue to retain professional services to assist with OGDA implementation;
- further revise and develop the Board's Information Management BOA to facilitate focused identification of consulting firms and vendors with specific expertise in OGDA and open data plan implementation; and
- increase investments in training and upskilling to continuously enhance open data capabilities to carry out the Board's missions.

Priority Data Assets, Comprehensive Data Inventory, and Federal Data Catalogue

The goal of the Comprehensive Data Inventory (CDI) is to create an inventory of Board data assets, as required by OGDA. The Board is taking an iterative approach and will initially publish the data assets that are currently available to the public on the Board's website.

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[27] Examples of such skills relevant to open data include metadata management, enterprise information architecture, data modeling, data governance, data management, records management, FISMA compliance, descriptive data analysis, predictive data analytics, machine learning, transparent AI, and other data science skills.

The Board has prioritized an initial set of data assets to include in the CDI and publish in the Federal Data Catalogue. As the Board provides more data to the public, identifying the criteria that establishes the release order of the data assets is an important consideration. Data related to monetary policy are exempt from the OGDA requirements.

Over the next 12 months, the Board plans to

- establish a work group to develop a process for prioritizing data assets for disclosure in the Federal Data Catalogue in collaboration with the public;

- generate the inaugural CDI for disclosure to the public;

- establish a periodic review of the CDI to identify new data assets that meet the criteria for public disclosure in the Federal Data Catalogue; and

- adopt the metadata schema required by the Federal Data Catalogue to facilitate publication of the Board's data in the catalogue.