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Artificial Intelligence as a Service (AIaaS)

Version 1.0

February 2023

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Acronym List

AAS	Assisted Acquisition Services
AI	Artificial Intelligence
AIaaS	AI as a Service
AI RMF	AI Risk Management Framework
BIC	Best-In-Class
BYOD	Bring Your Own Device
CoE	Centers of Excellence
CDNS	Content Delivery Network Services
EIS	Enterprise Infrastructure Solutions
GWAC	Government Wide Acquisition Contract
IaaS	Infrastructure as a Service
IoT	Internet of Things
ITSM	IT Service Management
LAN	Local Area Network
NIST	National Institute of Standards and Technology
MSS	Managed Security Services
MTIPS	Managed Trusted Internet Protocol Services
MMS	Managed Mobility Services
MNS	Managed Network Services
MAS	Multiple Award Schedule
PaaS	Platform as a Service
SRE	Service-Related Equipment
SaaS	Software-as-a-Service
SD-WAN	Software Defined - Wide Area Network
SATCOM	Satellite Communications
TIC	Trusted Internet Connections
TTS	Technology and Transformation Services
WMS	Wireless Mobility Solutions

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1 Executive Summary

Many federal agencies are currently leveraging aspects of Artificial Intelligence (AI) to optimize their mission operations and most agencies are evaluating strategies for further integrating AI as part of on-going operations in the future. There are several federal bodies that have taken on the mission of providing AI guidance and support to facilitate AI within the federal government. Outside the government, there are many sources of information on AI implementation, lessons-learned and suggestions to assist agencies in planning, implementing and operating AI solutions.

No matter what path a federal agency decides to follow to incorporate AI capabilities, GSA has the Best-in-Class (BIC) offerings necessary to meet their AI requirements. The following summary lists GSA BIC offerings organized by category of AI service:

Table 1 GSA Best-In-Class AI Offerings

Category of AI Service	Summary of GSA Offerings
AI Consulting Services	● Government AI Consulting Services – Several government entities that can provide required expertise, including GSA's AI Center of Excellence ● Commercial AI Consulting Services – Vendors available through: o Multiple Award Schedules (MAS) o Government Wide Acquisition Contracts (GWACs) o Software Purchase Agreements (SmartBuy)
Cloud Services	● Enterprise Infrastructure Solutions (EIS) Cloud Services ● MAS Cloud Services
Connectivity	● EIS Connectivity Solutions ● Wireless Mobility Solutions (WMS) ● Satellite Communications (SATCOM) Products and Services
AI Tools and Sensors	● EIS ● MAS ● WMS
Acquisition Support	GSA's Office of Assisted Acquisition Services (AAS)

The selection of GSA BIC offerings will depend on the specifics of the agency AI requirements.

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2 Introduction

2.1 Purpose of this Paper

This white paper provides an overview of resources available through GSA to develop, obtain, or expand a federal agency's AI capabilities and describes how GSA BIC contracts can be used to provide resources across the entire AI landscape. This white paper also describes specific AI components and the specific vehicles through which federal agencies can acquire those capabilities.

2.2 Other References and Guides

This white paper describes the resources available to a federal agency to obtain the various facets of AI as a Service (AIaaS). It is assumed the reader is informed about what AI might be considered, the guidance within the federal government and leadership considerations and obstacles.

The following documents provide recent examples of federal and other recommendations and guidance on the topic of AI:

● **GSA AI White Paper:** An overview of AI. https://eis-public-pricer.eos.gsa.gov/ajax.php/whitepapers/download?type=file&file=GSA-Artificial_Intelligence.docx
● **National Institute of Standards and Technology (NIST) AI Risk Management Framework: Second Draft August 18, 2022**, intended for voluntary use to address risks in the design, development, use, and evaluation of AI products, services, and systems. https://www.nist.gov/system/files/documents/2022/08/18/AI_RMF_2nd_draft.pdf
● **NIST AI Risk Management Framework (AI RMF) Playbook.** The Playbook, based on the NIST AI RMF Second Draft, provides an action Framework users can use to implement the AI RMF by incorporating trustworthiness considerations in the design, development, use, and evaluation of AI systems. The draft Playbook includes example actions, references, and supplementary guidance for "Govern" and "Map" – two of the four proposed functions. Draft material for the "Measure" and "Manage" functions will be released later. https://pages.nist.gov/AIRMF/
● **GSA AI Guide for Government.** Published by the GSA IT Modernization AI Center of Excellence, this AI Guide for Government is intended to help government decision makers determine how AI will affect their agencies and how to invest in and build AI capabilities. https://coe.gsa.gov/coe/artificial-intelligence.html

3 Technical Elements of AI

3.1 Technical Fundamentals

The basic elements of an AI System are **data**, **AI tools/software** and **actionable results**, as shown in Figure 3-A Basic Technical Elements of an Implementation of Artificial Intelligence. In its basic form, data may come from a single, or multiple reliable data set(s) or sensor(s). The

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tool can be a piece of software running as an application, special purpose hardware or even embedded on a chip. The actionable result could be a report, another data set, execution of a process, or a signal to another device. A simple example of this is a video camera that reviews live video images, which provides the data set. The AI is the software embedded in the camera or an application that looks for a person or vehicle that enters the video frame. The actionable result could be to record that stream and/or alert someone.
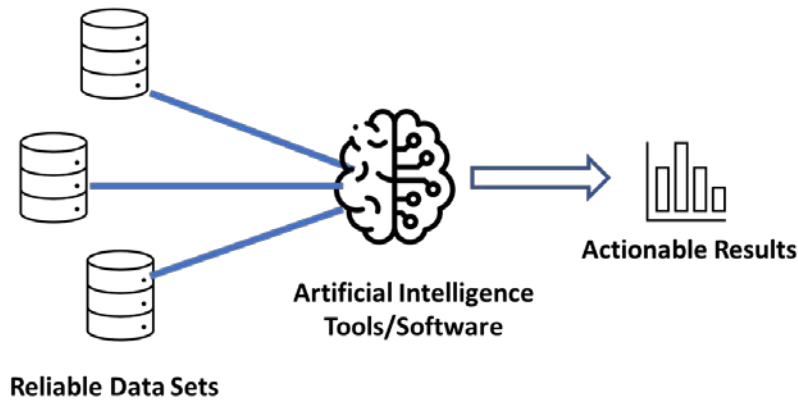

Figure 3-A Basic Technical Elements of an Implementation of Artificial Intelligence

3.2 Enterprise AI

Enterprise level implementations of AI to produce enterprise level results will not be this basic and will require multiple data sets across multiple systems. Sensors used in AI may feed data across the enterprise. This will drive an architecture where the data largely resides in a cloud environment where it can be managed, replicated, and accessed throughout the enterprise, such as that shown in Figure 3-B Robust Elements of an Enterprise Implementation of Artificial Intelligence.
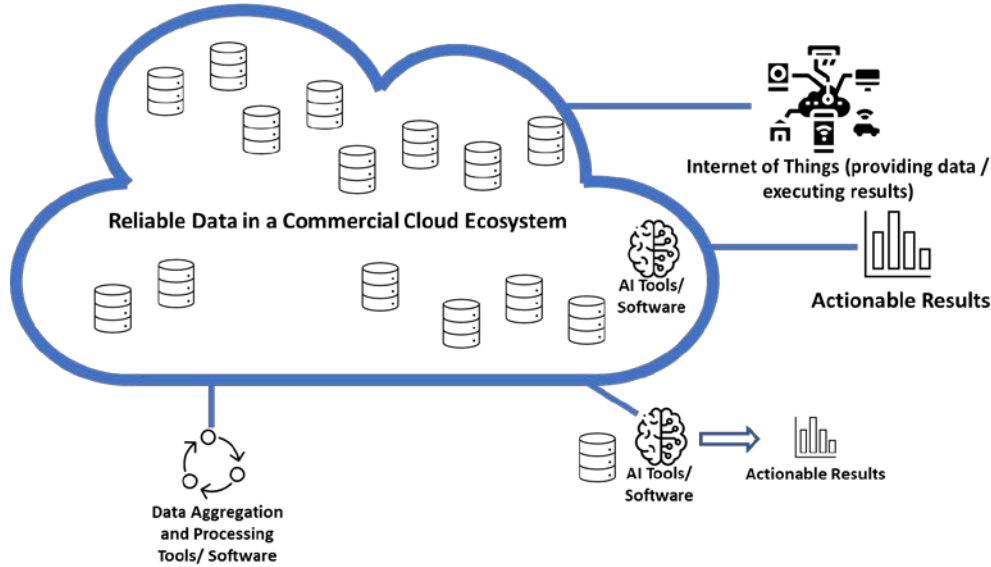
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Figure 3-B Robust Elements of an Enterprise Implementation of Artificial Intelligence

This type of architecture is especially effective if an organization needs to support future AI requirements that are not currently known or understood. With this architecture, the data sets in a cloud environment can be fed from multiple sources and accessed by different AI applications and the original systems that required the data.

4 Overview of GSA Solutions

GSA contracts provide all the elements needed to support an enterprise level AI implementation such as that described and shown in the previous section. This includes assisting agencies in developing a strategic AI plan and in long-term planning and implementation support. The services available through GSA to support an enterprise level AI implementation are described in the sections below. In each section below Figure 3-B (Robust Elements of an Enterprise Implementation of Artificial Intelligence) from the previous section is shown with the GSA services to be described shown in green in the figure.

4.1 AI Consulting Services

Unlocking the potential of AI for an organization is more than just plugging in a set of technologies. However, if an organization decides to proceed into an AI future, whether to pilot and evolve, or develop and implement an entire AI roadmap, outside expertise may be necessary to carry out the plan. GSA offers AI consulting in multiple areas, including:

Enterprise AI Strategy – Creating a long-term AI vision and roadmap that capitalizes on the current and future enterprise technology of the organization, trends in AI, and future organization mission requirements.

Governance and Enablers Assessment and Design – Whether implementing a comprehensive AI vision or moving through a series of pilots, an organization will require governance to adapt to the powers of AI. Support may be required to adapt organizations

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current processes and governance or to create new governance systems to control and enable a successful AI operation.

Use Case Discovery and Selection – Selection and prioritization of organizational use cases that will benefit from the application of AI is a critical step at the beginning of an organization's AI evolution. The ability to deliver a compelling return on investment based on the technology and mission operation, must be balanced with an assessment of the technical and governance risks inherent in any implementation. While critical in the initial AI efforts, use case prioritization will always be a part of the organization's AI operation.

Process Automation and Workflow – AI can often automate a human based process with much greater efficiency. Seldom can this be accomplished without other process and workflow considerations and alignment.

Lean Innovation Process Design – Automating a human based process with AI often requires evaluating approaches to improving the process itself. It is possible to add process components that would improve outcomes that may have been impossible in a human based implementation.

Identification and Implementation of AI Solutions – With a clear path of organizational use cases for AI, the organization will likely have a variety of AI solutions available. Selection of solutions, and implementation of these AI solutions requires a deliberate and disciplined approach.
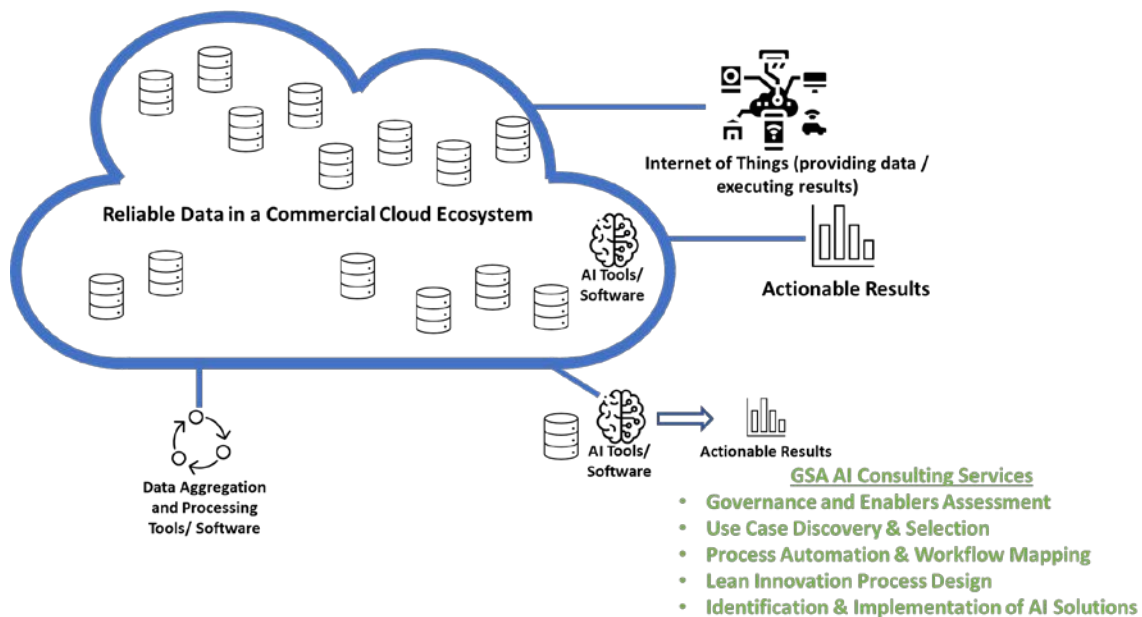

Figure 4-A Robust Elements of an Enterprise Implementation of Artificial Intelligence - AI Consulting Services

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4.1.1 Government AI Consulting Services

The GSA Centers of Excellence (CoE) initiative is part of GSA's Technology Transformation Services (TTS), https://www.gsa.gov/about-us/organization/federal-acquisition-service/technology-transformation-services. The CoE initiative accelerates IT modernization at federal agencies by leveraging private sector innovation and government services while centralizing best practices and expertise for holistic transformation. The GSA AI CoE, https://coe.gsa.gov/coe/artificial-intelligence.html, focuses on the AI needs of an organization, providing the necessary expertise from a government perspective.

18F is another government consulting resource provided through TTS to enable and empower government agencies to design, develop, buy, and deploy human-centered technological solutions faster and with reduced risk (https://www.gsa.gov/about-us/organization/federal-acquisition-service/technology-transformation-services/18f). The full range of TTS solutions, https://www.gsa.gov/about-us/organization/federal-acquisition-service/technology-transformation-services/tts-solutions, include a variety of government communities of practice that involve elements that are fundamental to an enterprise AI solution (such as Cloud, Data, and Digital Analytics).

4.1.2 Commercial AI Consulting Services

GSA's Information Technology Category offers commercial IT services that will meet the AI consulting service requirements of an organization, (https://www.gsa.gov/technology/technology-products-services/it-services). Depending on the specific AI services required, the best solution can be found in one or more of the following:

- **Multiple Award Schedules (MAS)** - MAS Information Technology features over 5,000 industry partners offering a wide variety of sustainable commercial IT products and services. https://www.gsa.gov/buy-through-us/purchasing-programs/gsa-multiple-award-schedule/gsa-schedule-offerings/mas-categories/information-technology-category
- **Government Wide Acquisition Contracts (GWACs)** - offer flexible access to customized IT solutions from a large, diverse pool of industry partners. https://www.gsa.gov/technology/technology-purchasing-programs/governmentwide-acquisition-contracts-gwacs
- **Software Purchase Agreements (SmartBUY)** - offer common commercial software and services at deep discounts. https://www.gsa.gov/technology/technology-purchasing-programs/smartbuy-blanket-purchase-agreements

Another GSA source for required AI expertise is the Enterprise Infrastructure Solutions (EIS) contract, https://www.gsa.gov/technology/technology-purchasing-programs/telecommunications-and-network-services/enterprise-infrastructure-solutions. The implementation of an AI solution is likely to require elements that can be provided by the EIS contract, such as connectivity, or cloud services. An agency can add Service-Related Labor (SRL) elements to support the AI use with EIS services beyond implementation.

4.2 Cloud Services

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In the basic example of AI, only one or a few data sets provide the data that drives actionable results. This simplistic scenario may work for an organization's initial uses of AI. However, as an organization expands its use of AI to enhance its mission operations, it is likely to draw from larger, more disparate data sets. To properly support this AI function, and to conform with federal cloud first mandates, an organization will find the most practical and cost-effective means of storing and processing data will be in a robust cloud architecture. This may include multiple providers and will require a robust security architecture.
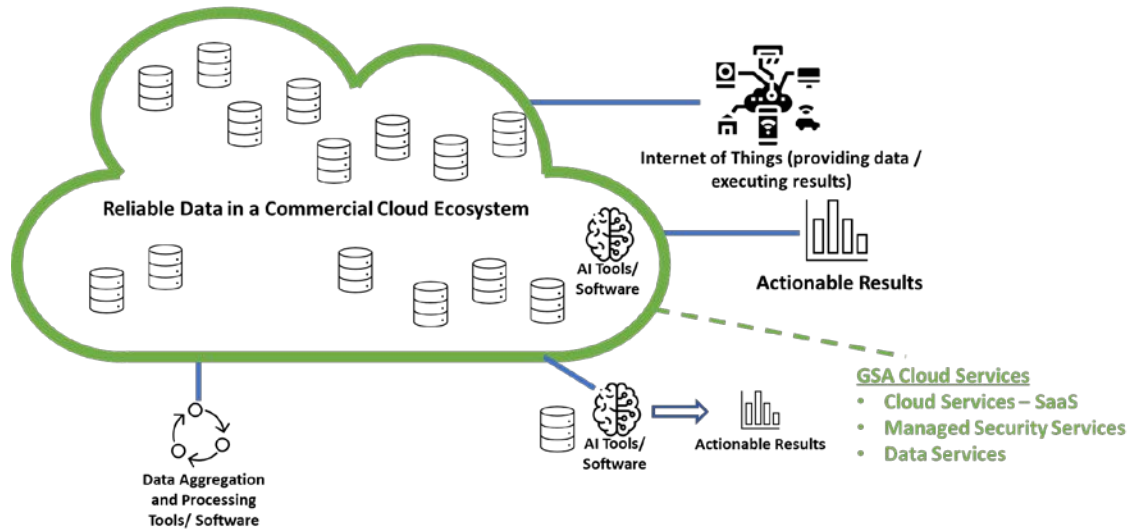

Figure 4-B Robust Elements of an Enterprise AI Implementation - GSA Cloud Services

The cloud services available through GSA will include: the purchase of cloud resources at the appropriate impact level, cloud strategy, cloud architecture, cloud migration, and cloud security.

4.2.1 EIS Cloud Services

There are four EIS Cloud Services Category offerings, https://eis-public-pricer.eos.gsa.gov/service-guides/:

Content Delivery Network Services (CDNS) - CDNS provides access to information for both agency end-users and the public. The CDNS provider incorporates equipment and algorithms to cache content on geographically dispersed servers on the internet to improve latency and optimize resources. The cached content is replicated from origin servers to other servers on the CDN. When a request is made from a particular location for specific content, the server that can most rapidly and efficiently provide the content.

Infrastructure as a Service (IaaS) – IaaS provides a secure, cloud-based IT environment with all the typical components such as computers, servers, network storage, etc. IaaS consists of two sub-services:

- **Private Cloud:** Provides a secure, segregated IT environment for an agency. It includes virtual machines, storage, server hosting, security components, storage backup, continuity of operation and disaster recovery services. The cloud platform provides the necessary network infrastructure such as Local Area Networks (LANs), load balancers and next-generation firewalls.

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- **Data Center Augmentation with Common IT Service Management (ITSM):** Enables augmentation of already virtualized Agency premises data center resources with dynamically expandable and contractible virtualized cloud-based resources that also includes a common IT management framework for Agency data center resources and cloud resources.

Platform as a Service (PaaS) - The EIS PaaS offering is a cloud-based service that provides a ready-made environment for the development, testing and deployment of applications. The service supplies all the IT components needed for application development including developer and testing tools, database systems, and a Big Data solution platform. Unlike IaaS, PaaS is not typically used to replace an agency's entire infrastructure, but as a platform for the development, testing and/or deployment of one or more applications using software tools supported by the cloud provider.

FedRAMP Authorized Software-as-a-Service (SaaS) Tools - SaaS gives an agency access to applications hosted in the cloud. The provider manages the security, availability, and performance of the applications as part of their service. Using SaaS allows an agency to reduce the time, expense, and risk associated with the installation and maintenance of software on agency computers. EIS SaaS meets all federally required security standards for cloud services.

4.2.2 MAS Cloud Services

Cloud and IT Professional Services are available under MAS (https://www.gsa.gov/technology/technology-purchasing-programs/mas-information-technology/sins-and-solutions-we-offer/cloud-computing-and-cloud-related-it-professional-services) with the following cloud services offerings:

- **Infrastructure as a Service (IaaS)** https://www.gsa.gov/technology/technology-purchasing-programs/mas-information-technology/sins-and-solutions-we-offer/cloud-computing-and-cloud-related-it-professional-services#Infrastructure%20as%20a%20Service%2
- **Platform as a Service (PaaS)** https://www.gsa.gov/technology/technology-purchasing-programs/mas-information-technology/sins-and-solutions-we-offer/cloud-computing-and-cloud-related-it-professional-services#Platform%20as%20a%20Service%20(PaaS)
- **Software as a Service (SaaS)** https://www.gsa.gov/technology/technology-purchasing-programs/mas-information-technology/sins-and-solutions-we-offer/cloud-computing-and-cloud-related-it-professional-services#Software%20as%20a%20Service%20(SaaS)
- **Cloud related IT professional services** that support the adoption, analysis, development, governance, migration, operations and maintenance, optimization, and other cloud related activities.

4.3 Connectivity Services

To support a robust enterprise AI environment, connectivity (between cloud environments, agency locations, data generating devices and systems) will be required. The EIS contract can meet most connectivity requirements and can provide efficient outsourced management options. For some specialized location or requirements, an agency may require the capabilities of GSA's Mobility or Satellite BIC contracts.
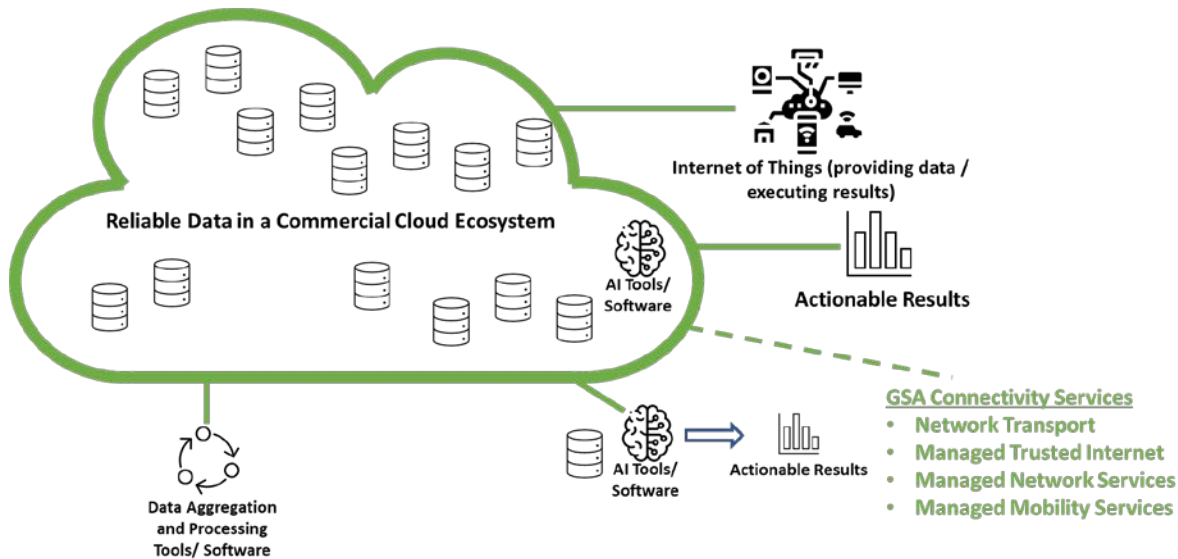
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Figure 4-C Robust Elements of an Enterprise Implementation of Artificial Intelligence - Connectivity Services

4.3.1 EIS Connectivity Services

Agencies are already migrating legacy telecommunications connectivity services to EIS. EIS offers a wide range of capabilities (https://eis-public-pricer.eos.gsa.gov/service-guides/) that can support enterprise AI implementation particularly in managed security functionality. These capabilities include:

Managed Security Services (MSS) – The EIS MMS is a comprehensive offering that protects an agency's IT assets (network, hardware devices, software, and information) from malicious attacks. MSS includes capabilities such as authentication, anti-virus, anti-malware/spyware, intrusion detection, and security event management, and other infrastructure security functions. MSS comprises the following sub-services: Trusted Internet Connections (TIC) Service, Managed Prevention Service, Vulnerability Scanning Service, and the Incident Response Service.

Managed Trusted Internet Protocol Services (MTIPS) – MTIPS, based on TIC 2.2, provides security for all external connections to public Internet, Extranet, and Cloud Service Providers. As agencies look to implement the Cybersecurity and Infrastructure Security Agency TIC 3.0 guidance, MTIPS may be complemented with additional EIS services to achieve the updated security capabilities of a TIC 3.0 Traditional TIC solution.

Managed Mobility Services (MMS) – The EIS MMS supports mobile computing by allowing government workers to use agency-owned and personal mobile devices such as smartphones and tablets (i.e., Bring Your Own Device - BYOD) to access agency networks, data, and applications in accordance with the agency's IT security policy. This, and MMS's central administrative interface, can help ease an agency's transition to a more complex mobile and communications environment where an increasing number of mobile devices are used by agency personnel. This is especially important as BYOD initiatives and advanced wireless computing become the focus of many agencies.

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Managed Network Services (MNS) – The EIS MNS enables an agency to outsource a portion or all of its network planning, design, implementation, maintenance, operations, and customer service as a strategic move to improve IT services and lower costs.

Software Defined - Wide Area Network (SD-WAN) Services – SD-WAN services provide significant benefits by giving agencies central security management and visibility, the ability to segment networks where security policies can be tailored per application and data type, and identity-based user access.

4.3.2 Wireless Mobility Solutions (WMS)

GSA offers broad portfolio of BIC wireless mobility solutions through the WMS Special Item Number (SIN) 517312 category of MAS offerings that include the top wireless providers in the nation. https://www.gsa.gov/technology/technology-purchasing-programs/telecommunications-and-network-services/wireless-mobility-solutions-wms

4.3.3 Satellite Communications (SATCOM) Products and Services

GSA offers BIC SATCOM (https://www.gsa.gov/technology/technology-purchasing-programs/telecommunications-and-network-services/satellite-communications-satcom-products-and-services) contracts through:
- Complex Commercial SATCOM Solutions (CS3)
- Commercial Satellite Communications Solutions on MAS

4.4 Component Tools and Sensors

To achieve an agency AI strategic vision, discrete products that operate on the network (Internet of Things), processing software products or AI software packages may be required. They can be obtained through the EIS contract or MAS.
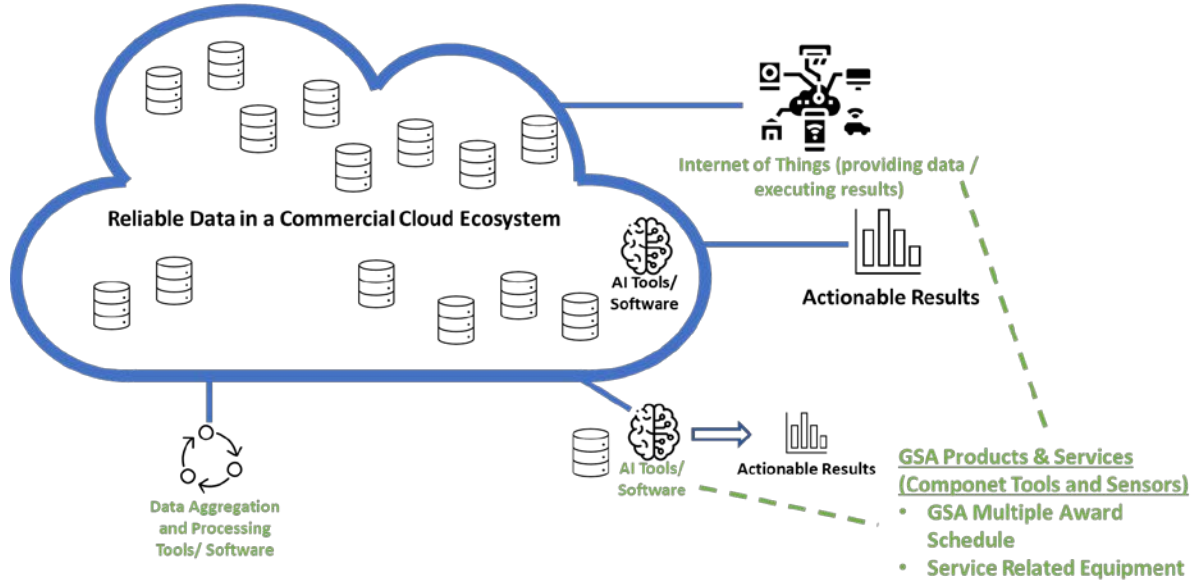
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Figure 4-D Robust Elements of an Enterprise Implementation of Artificial Intelligence - Component Tools and Sensors

4.4.1 Components Tools and Sensors through EIS

When required AI items are a component of an infrastructure obtained through EIS, they can be included in the fair opportunity as Service-Related Equipment (SRE). The EIS SRE document is a comprehensive list of equipment required for agencies to successfully deploy an EIS service in their network environment. EIS network services include all service-related labor necessary to implement the services; however, when developing the requirements of a task order procuring one or more network services, an agency may consider including additional labor to support the EIS services.

4.4.2 Components Tools and Sensors through MAS

GSA MAS makes the latest products commercially available at BIC pricing. An enterprise AI architecture may draw data from devices and sensors on the network as well as systems data driven by enterprise software. Since much of the modern software driven hardware and systems are inherently internet capable (such as heating & cooling systems, refrigeration, security devices, etc.), they will not be categorized as Internet of Things (IoT) but will still be available under a MAS using the category of their primary purpose. Software also will not generally be listed as "AI Software" but may be available under other categories and descriptions such as event management or data analysis. No matter how it is listed, the capabilities an organization requires for its enterprise AI implementation will most likely be available under MAS.

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4.4.3 Mobility

IoT & Other/Mobile Services cover vendors who offer other services not commonly used across agency enterprises due to unique usage, features, niche application, or legacy technology requirements. https://www.gsa.gov/technology/technology-purchasing-programs/telecommunications-and-network-services/wireless-mobility-solutions-wms#InternetofThings

4.5 Acquisition Assistance

GSA offers several paths to meet an agency's AI requirements. From an AI operations or implementation perspective there may be different advantages and risks depending on the path. GSA acquisition professionals are available to navigate these considerations and ensure a successful acquisition. https://aas.gsa.gov/

The offerings in AI are so new and the pace of technology developments is so incredibly fast. GSA can assist an agency with its market research of available options through its Market Research as a Service (MRAS). https://buy.gsa.gov/mras. MRAS delivers meaningful market data to Federal, State, and Local agencies for free.

5 Frequently Asked Questions

Is there a single "best" BIC vehicle for AI requirements?

No. The "best" GSA BIC vehicle for an agency will depend on the agency's specific AI objectives and requirements. It may be that a combination of GSA BIC vehicles will most effectively meet an agency's AI needs.

Is AIaaS a priced option on GSA BIC vehicles?

No. A complete AIaaS solution required to meet any agency's need will be very specific to that agency's AI requirements. It would be difficult to craft an AIaaS solution that would be universally applicable to the majority of agencies. However, if an agency wanted to obtain an AI solution that was adaptable, flexible, and expandable on demand, such a solution could be crafted out of the GSA BIC offerings. GSA BIC vehicles contain a range of "as-a-service" offerings that could be combined to meet an agency's AIaaS requirements.

Does GSA offer the latest in AI technologies and solutions?

Yes. GSA BIC offerings include the latest AI software, consulting capabilities with the latest AI experience and data, sensor and cloud capabilities that are state of the art.

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6 GSA is Here to Help

If you would like more information on the topics covered in this paper, please reach out to your designated GSA representative at https://gsa.gov/nspsupport or call 855-482-4348 to get in touch. GSA has multiple offerings for products, services, and solutions to support your planning, implementation, and continued support of the components of your AI. Thank you for reading!

7 Conclusions

All the possible requirements for an organization's AI strategy can be met through GSA BIC contract vehicles. The categories of AI solution requirements include AI Consulting Services; Cloud Services; Connectivity Services; AI Components, Tools, and Sensors (including Internet-of-Things); and Acquisition Support.

The optimum selection of GSA BIC vehicles to meet an organization's AI requirements will depend on that organization's approach to implementing AI. The approach, combined with the state of the organization's enterprise technology and overall objectives will dictate AI requirements that will guide the path through the GSA BIC options.

8 Contributors
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