DOD SUPPLY CHAIN
AND
THE FOURTH INDUSTRIAL REVOLUTION

govini

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AGENCIES INCLUDED

Air Force
Army
Defense Advanced Research Projects Agency
Defense Logistics Agency
Defense-Wide Agencies
General Services Administration
Missile Defense Agency
Navy
US Government Accountability Office

DOD SUPPLY CHAIN TECHNOLOGY TAXONOMY

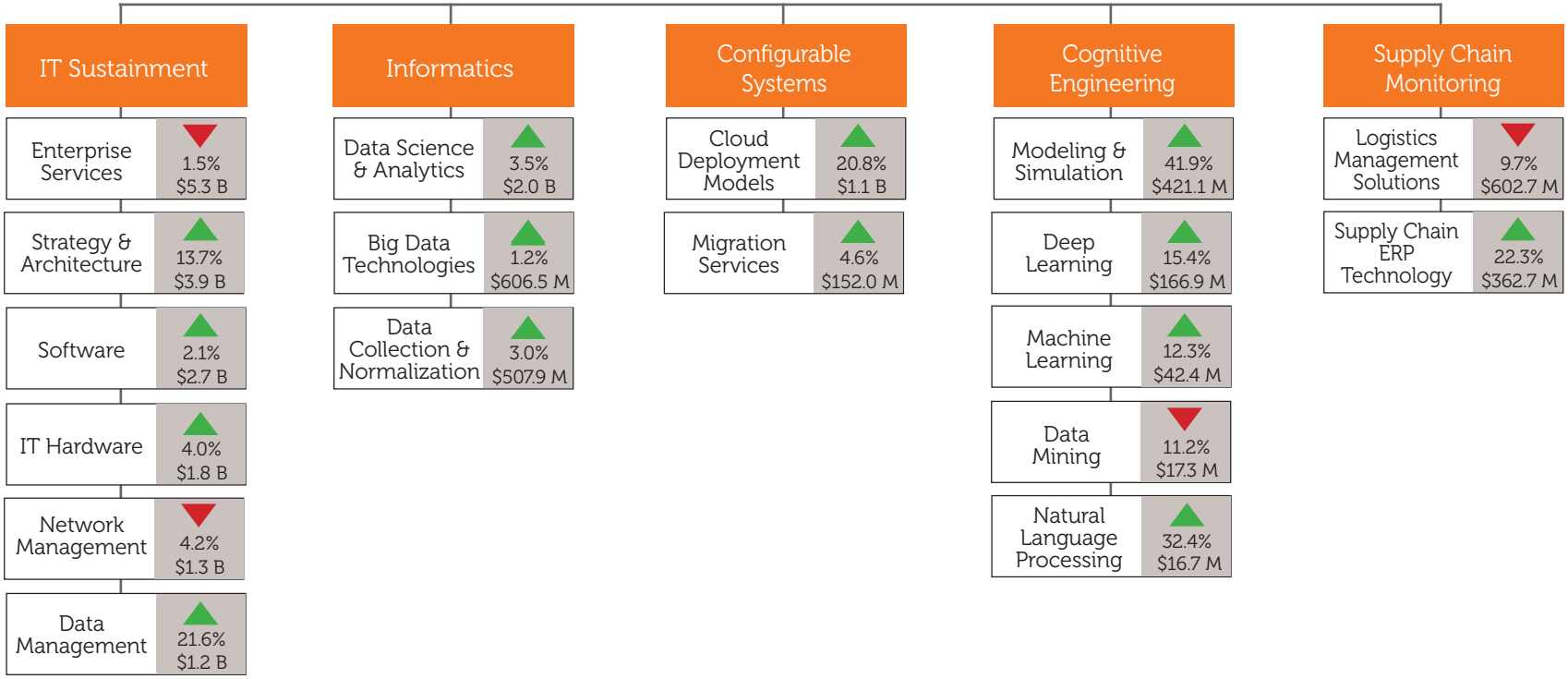


Exhibit 1: Govini's *DOD Supply Chain Technology Taxonomy* consists of five segments (orange boxes) that broadly define Department of Defense technological applications. Beneath these segments are 18 sub-segments (white boxes) that constitute the specific capabilities for these segments. This hierarchical organizational structure is designed to deliver insights ranging from high-level spending trends to more granular details on individual programs. FY17 spending and the corresponding three-year compound annual growth rate (CAGR) are noted for each sub-segment.

INTRODUCTION

The successful execution of national security missions is dependent on the US Department of Defense's (DOD) ability to manage and monitor its complex supply chain. The technologies deployed to manage the defense supply chain are transforming as DOD embraces capabilities that integrate the digital and physical realms. DOD is leveraging key Fourth Industrial Revolution technologies including Informatics, Configurable Systems, Cognitive Engineering, and Supply Chain Monitoring.

Govini's *DOD Supply Chain Technology Taxonomy* categorizes and measures how DOD is incorporating both IT sustainment efforts and emerging Fourth Industrial Revolution technologies into its portfolio, and how those investments shape its approach to monitoring and managing the defense supply chain.

This analytic report explores the market trends and landscape across the $23 billion annual DOD Supply Chain Technology marketplace. It includes a proprietary dataset of unclassified Federal prime contract obligations from FY14 through FY17 and is organized into a clear taxonomy. This taxonomized structure was determined by algorithmically examining multiple datasets, current and past DOD IT modernization priorities, the Modernizing Government Technology (MGT) Act, and Government Accountability Office studies on DOD supply chain risks.

Key Findings

- Federal contract obligations for DOD Supply Chain Technology totaled $79.2 billion from FY14 through FY17 and collectively grew at a 5.6 percent CAGR during that same time period.
- Technologies enabled by Artificial Intelligence (AI), the Internet of Things (IOT), and cloud capabilities are revolutionizing DOD's approach to monitoring and managing its supply chain.
- Supply Chain Monitoring capabilities live at the intersection of the digital, cognitive, and physical domains, and DOD's investments in emerging technologies will enable the department to generate real-time tracking and analysis of assets.
- DOD is rapidly incorporating software-based sensor-enabled Supply Chain Enterprise Resource Planning (ERP) Technology to monitor the defense supply chain at scale and moving away from traditional approaches to managing its supply chain.
- 73.1 percent of DOD Supply Chain Technology obligations were spent on sustaining enterprise systems and day-to-day IT operations, while the remaining 26.9 percent was used to procure key emerging technologies that have enabled these new approaches to supply chain monitoring.
- DOD is continuing to maintain its legacy IT systems and simultaneously develop new data-oriented systems.
- Defense-Wide Agencies and GSA contracted a significant portion of DOD's IT Sustainment contracts, but emerging technology investments are decentralized across the Military Services.
- DLA is the central agency for managing the defense supply chain and a notable portion of its IT portfolio, placing the agency in a unique position to influence how DOD uses new technologies to monitor and manage its supply chain.
- DOD used strategic contract vehicles for 44.9 percent of its IT obligations each year and will have challenges in increasing its strategic sourcing capabilities despite a mandate to do so.

AI, IOT, and Cloud Capabilities are Revolutionizing DOD's Approach to Supply Chain Monitoring

DOD Supply Chain Technology sub-segments that are enabled by emerging technologies are experiencing rapid growth. Sub-segments including Supply Chain ERP Technology, Modeling & Simulation, Natural Language Processing, and Cloud Deployment Models received a relatively small share of obligations in FY17 compared to other sub-segments, but growth was substantial. These sub-segments represent the tools used to link digital, physical, and cognitive processes together and they are changing the way DOD monitors its supply chain.

DOD is transitioning away from siloed Logistics Management Solutions and toward software-based sensor-enabled Supply Chain ERP Technology. These ERP solutions create connected systems that bring greater asset visibility and tracking capabilities to DOD. Investments in Supply Chain ERP Technology grew at a 22.3 percent CAGR in FY14 through FY17, the third highest growth rate across all sub-segments. Logistics Management Solutions represent more traditional management approaches to supply chain monitoring and experienced the second-largest decline across all DOD Supply Chain Technology sub-segments at a -9.7 percent CAGR over the period.

These diverging approaches to how DOD is monitoring and managing its supply chain reflect the way it is restructuring its technology portfolio. However, significant levels of spending continue to go toward sustaining legacy IT systems and maintaining architecture for traditional enterprise systems.

The three largest sub-segments were Enterprise Services, Strategy & Architecture, and Software with a combined $11.8 billion in FY17 obligations. These sub-segments account for large portions of spending but grew at lower rates than other Fourth Industrial Revolution technologies like Supply Chain ERP Technology, Modeling & Simulation, Natural Language Processing, and Cloud Deployment Models.

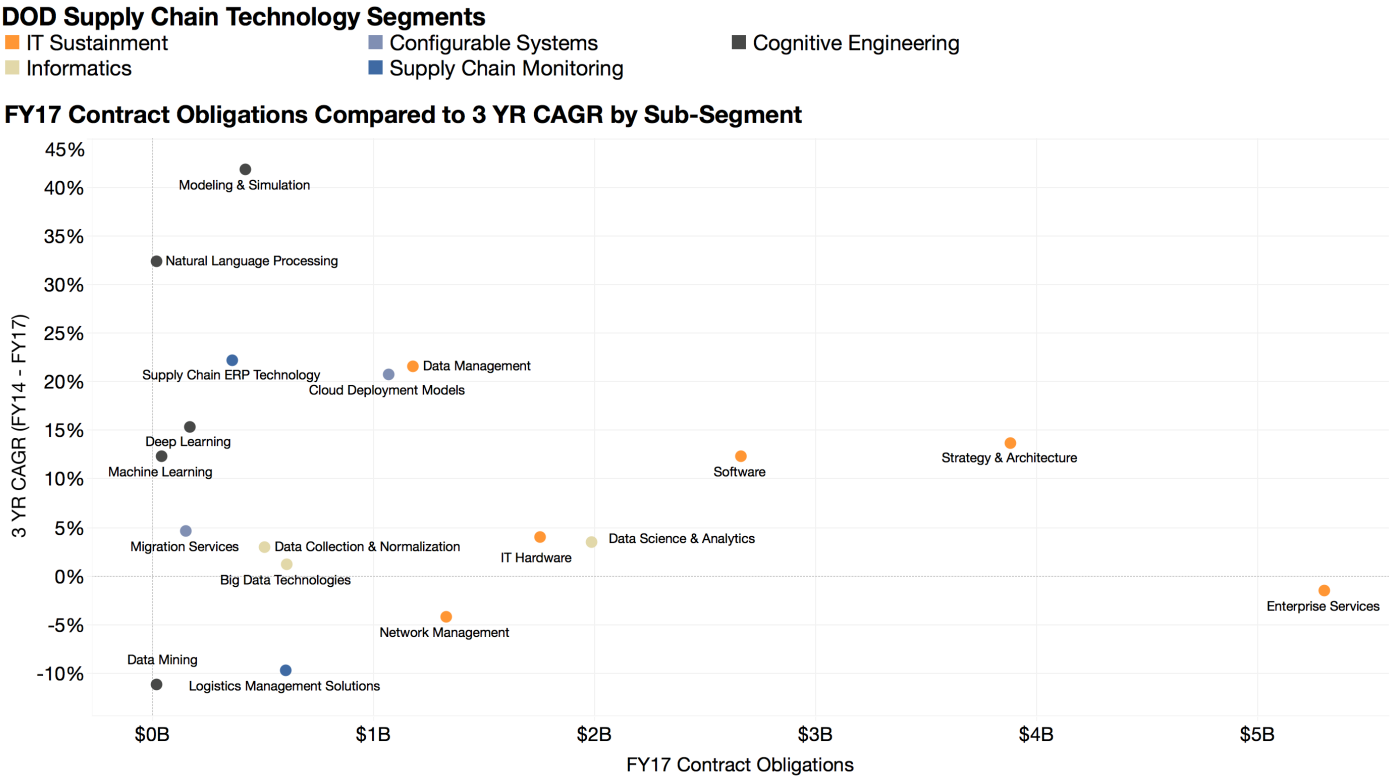


Exhibit 2: Modeling & Simulation was the fastest growing sub-segment at a 41.9 percent CAGR over the four-year period. IT Sustainment was the largest spending area, accounting for 73.0 percent of all DOD Supply Chain Technology contracts in FY17 but grew at lower rates than emerging technologies. The sub-segments Supply Chain ERP Technology, Natural Language Processing, and Cloud Deployment Models grew at a combined 23.6 percent CAGR.

The Vast Majority of Technology Spending is Going Toward IT Sustainment Efforts

Contract obligations for the overall DOD Supply Chain Technology market totaled $79.2 billion in FY14 through FY17 and grew at a 5.6 percent CAGR during that same period. While DOD is increasingly incorporating key Fourth Industrial Revolution technologies that enable more robust supply chain monitoring capabilities, the bulk of their technological investments are going toward IT Sustainment activities.

IT Sustainment obligations accounted for $57.8 billion in spending over the time period. The IT Sustainment segment encompasses DOD efforts to maintain their enterprises, networks, and IT hardware. These networks are critical for the day-to-day operations of the department and have received significantly higher levels of investment than Fourth Industrial Revolution technologies.

Leading DOD Supply Chain Technology capture was Perspecta (an entity composed of DXC, Vencore, and Keypoint). Several other large vendors, including Leidos, Northrop Grumman, General Dynamics (including CSRA), and others, had significant contract capture across the segments. Sizable portions of these organizations' capture came from IT Sustainment efforts, although in some cases, they are also leaders in emerging technology segments.

These companies' ability to work in the defense space in addition to their past performance has worked to their advantage in providing new solutions to the DOD. They should not be complacent, however, as the significant size of the DOD Supply Chain Technology segments and the relative fragmentation within the segments leaves ample opportunity for disruption and the entrance of new solutions providers.

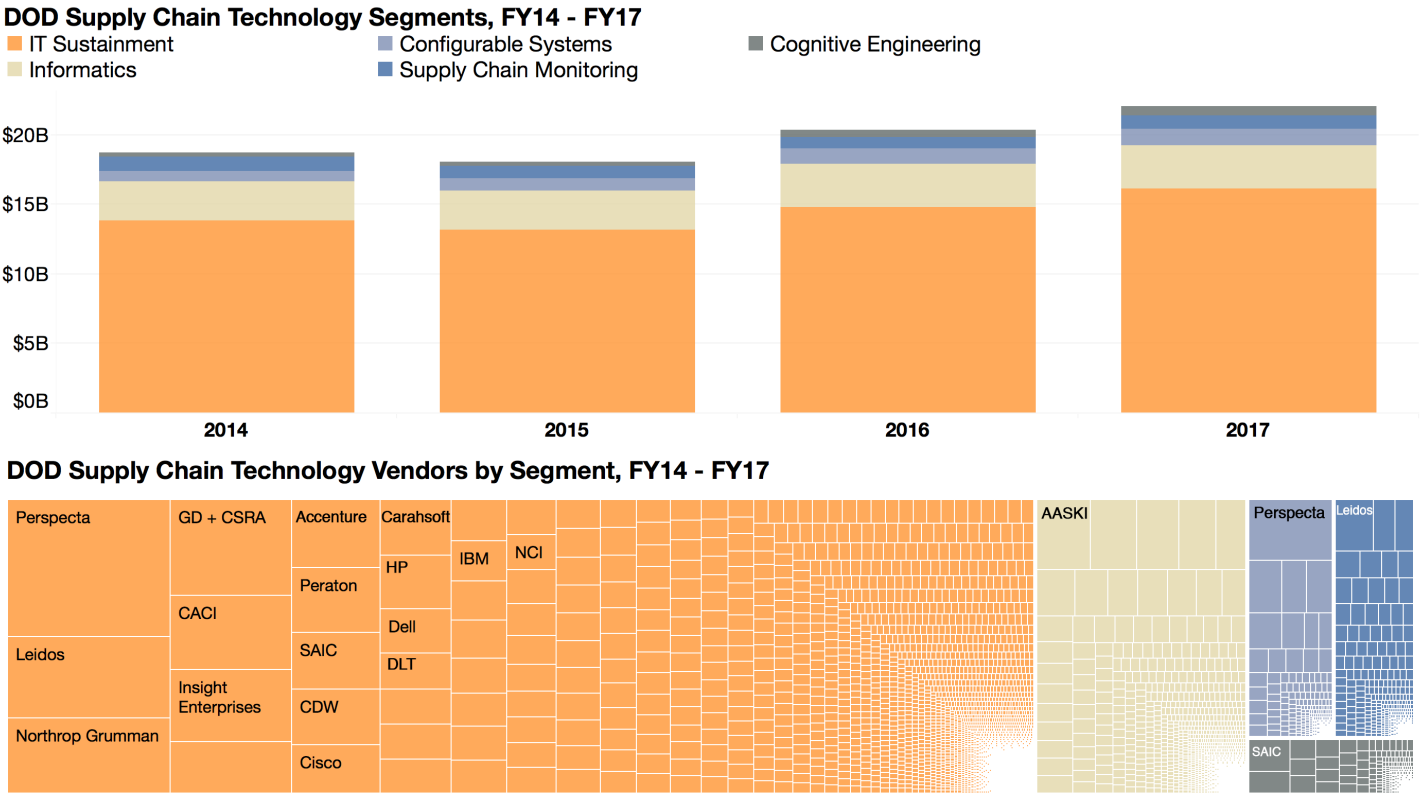


Exhibit 3: The overall DOD Supply Chain Technology market grew at a 5.6 percent CAGR in FY14 through FY17. IT Sustainment accounted for 73.8 percent of all DOD Supply Chain Technology obligations. The remaining 26.2 percent went toward key Fourth Industrial Revolution technologies, which were led by Informatics contracts.

The Procurement of Emerging Technologies is Decentralized across Military Services

Defense-Wide Agencies and the General Services Administration (GSA) are being increasingly used to procure DOD's IT Sustainment solutions. DOD's IT modernization priorities have laid out a clear goal to consolidate and standardize their enterprises and DOD has taken action by leveraging Defense Information Systems Agency (DISA), Defense Information Technology Contracting Organization (DITCO), and the GSA to procure commoditized department-wide IT products and services. Consolidating IT systems is still a work in progress. Defense-Wide Agencies and GSA were used to procure 44.6 percent of DOD's IT Sustainment contracts, while the rest was distributed across the branches. Furthermore, segments that leverage emerging technologies are decentralized across Military Services

Informatics, Configurable Systems, Supply Chain Monitoring, and Cognitive Engineering are procured at the Service level. Each DOD Service is procuring its own technology suites that are mission-relevant for that Service. For example, the Army was the lead agency for Cognitive Engineering capabilities due to its increased use of Modeling & Simulation packages for operations at Redstone Arsenal.

Each Service has its own contracting office that serves as the tip of the spear for procuring DOD's information technologies. These include DISA/DITCO, GSA Federal Acquisition Service (FAS), Space and Naval Warfare Systems Command (SPAWAR), Army Contracting Command (ACC), and Air Force Life Cycle Management Center (AFLCMC).

The seventh largest procurement center for DOD technological capabilities is the Defense Logistics Agency (DLA). DLA is poised to apply modernization priorities to supply chain management. Efforts are already underway to bring new technological approaches to DLA's logistics processes. These include warehouse modernization programs and integrating new supply chains into DLA's enterprise business system.

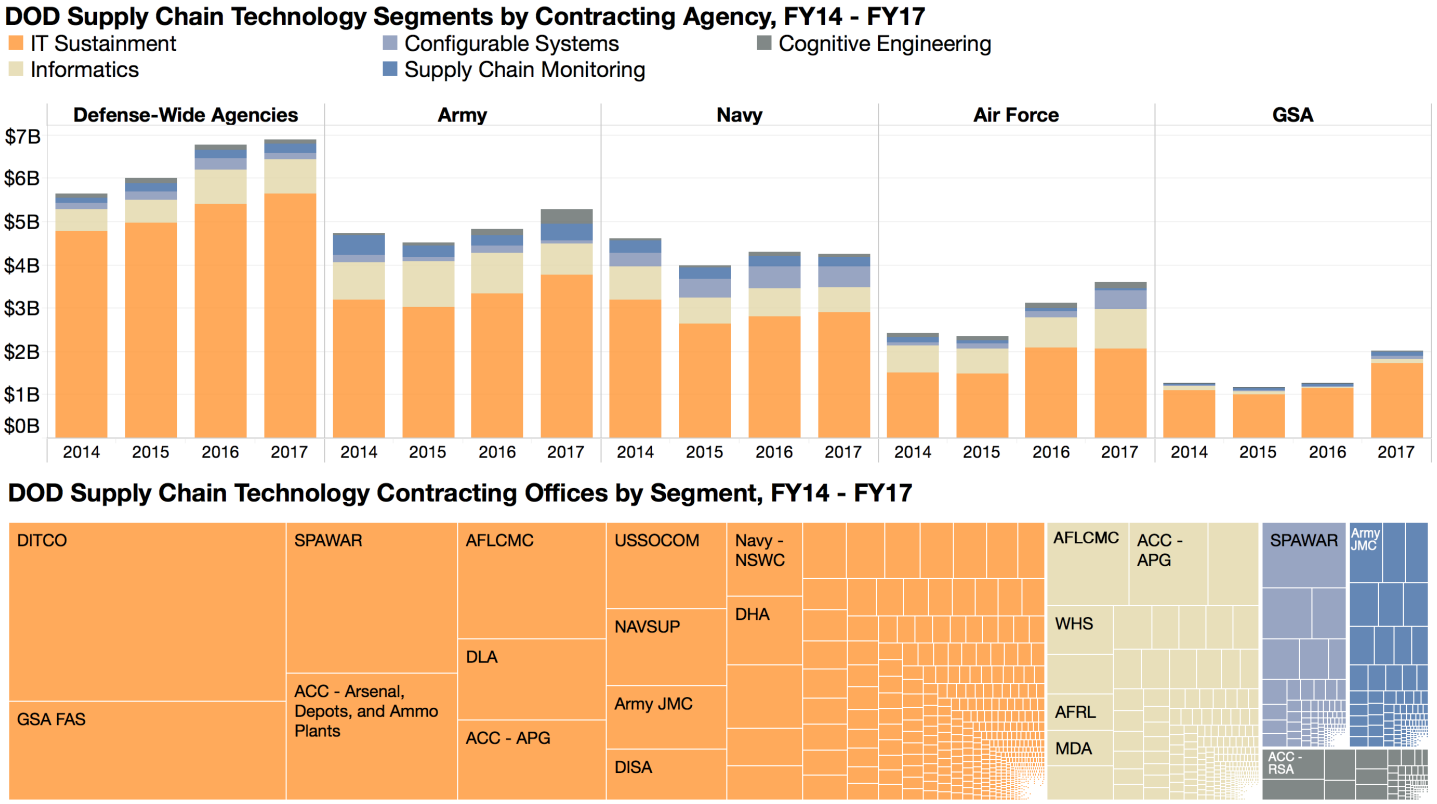


Exhibit 4: Led by DISA/DITCO and DLA, Defense-Wide Agencies were responsible for procuring 32.1 percent of all DOD Supply Chain Technology segments. GSA accounted for 8.7 percent of DOD IT Sustainment obligations but grew at a 16.6 percent CAGR within the segment.

DOD is Keeping Legacy Networks Intact While Designing More Data-Oriented Systems

IT Sustainment efforts were the largest spending area within the DOD Supply Chain Technology market. Contracts for IT Sustainment are focused on maintaining networks and connectivity across DOD. The way DOD is sustaining its intranets, enterprise systems, and networks is changing as the department focuses on designing architectures around data management and software deployment.

The largest IT Sustainment sub-segment, Enterprise Services, encompasses DOD's efforts to sustain legacy systems. Enterprise Services, IT Hardware and Network Management obligations collectively remained stable. In contrast, the Strategy & Architecture, Software, and Data Management sub-segments saw increases in spending over the period as DOD continued to develop and sustain its systems.

Large systems integrators are prevalent within the IT Sustainment segment. Perspecta led capture across the DOD IT Sustainment segment, followed by Leidos, Northrop Grumman, and the recently combined General Dynamics and CSRA (GD + CSRA). Other notable vendors include Insight and Carahsoft, who led the Software sub-segment. These value added resellers (VARs) of commercial off-the-shelf software are DOD's gateway to procuring software. Key products that VARs provided include Windows operating systems, Microsoft packages, Adobe suites, Red Hat, and SAP products.

DOD will continue to sustain and modernize fundamental IT infrastructure and use traditional IT technologies to do so. However, the segment is ripe for change as DOD moves to implement more cloud-based solutions.

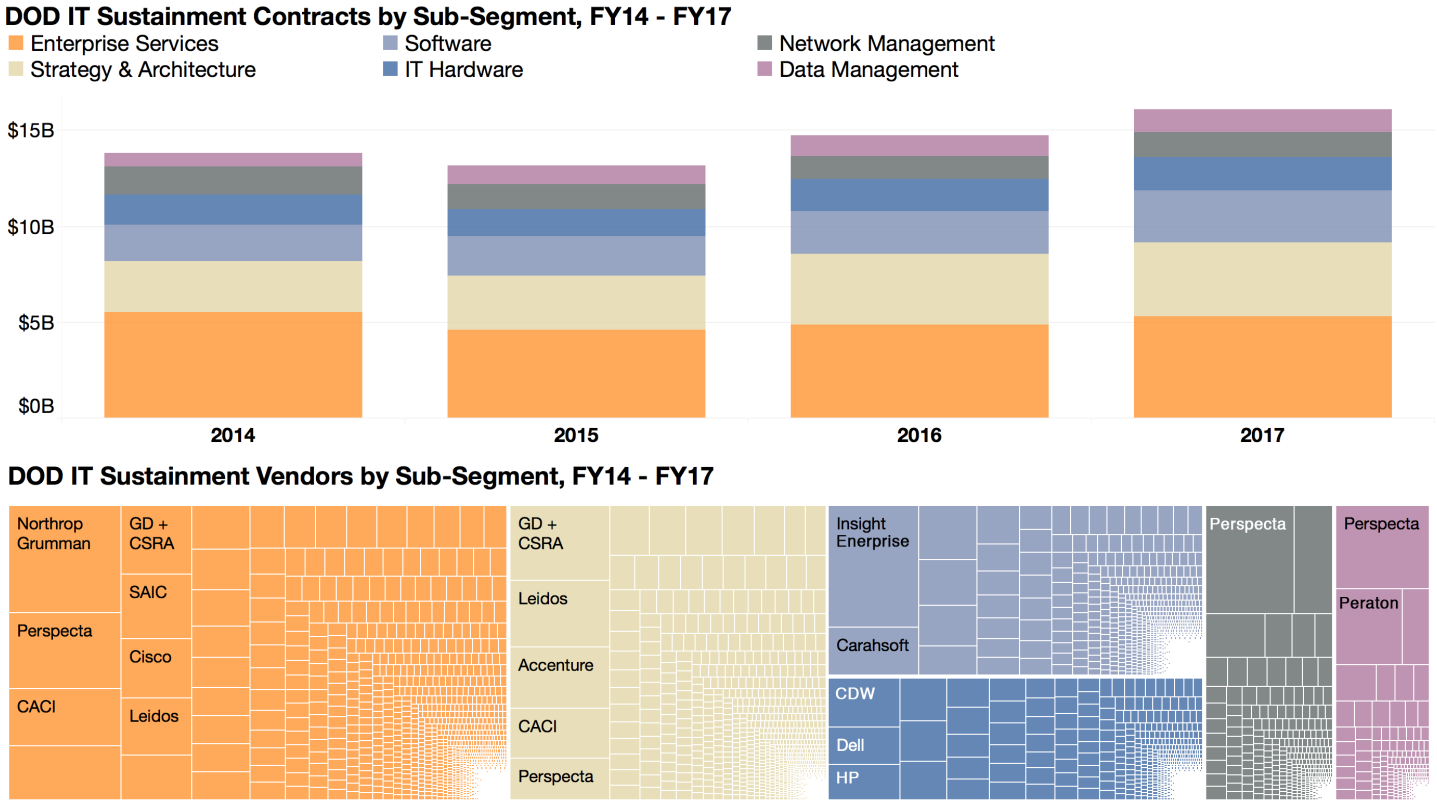


Exhibit 5: Enterprise Services was the largest sub-segment with contracts totaling $20.4 billion in FY14 through FY17. Data Management was the fastest growing IT Sustainment sub-segment at a 21.9 percent CAGR followed by Strategy & Architecture and Software.

Defense-Wide Agencies and GSA Are Increasingly Responsible for Maintaining DOD IT

DOD IT Sustainment contracts procured through Defense-Wide Agencies and GSA grew at a combined CAGR of 7.8 percent and accounted for a total of $25.8 billion over the four-year period. As the department looks to standardize its IT platforms, it is increasingly using agencies that have both broad access to commercial IT solutions and the ability to get those solutions into the hands of the Services.

Obligations for Enterprise Services, the largest IT Sustainment sub-segment, contracted through Defense-Wide Agencies declined over the period at a -5.1 percent CAGR while Strategy & Architecture contracts increased at a substantial 18.9 percent. Strategy & Architecture contracts procured through GSA rose significantly as well. The data also shows that DOD is increasingly reliant on GSA to procure its Enterprise Services contracts marking a transition in how DOD is sustaining its systems.

Leading Defense-Wide Agencies Strategy & Architecture procurement was DLA, which accounted for 9.8 percent of DOD the sub-segment's contracts. DLA Strategy & Architecture contracts are for managing and evolving the Defense Civilian Personnel Data System (DCPDS) and other troop support enterprise business systems (EBS).

Using these systems has notable implications for how DLA will continue to develop and leverage these types of architectures for not only personnel management, but also supply chain management.

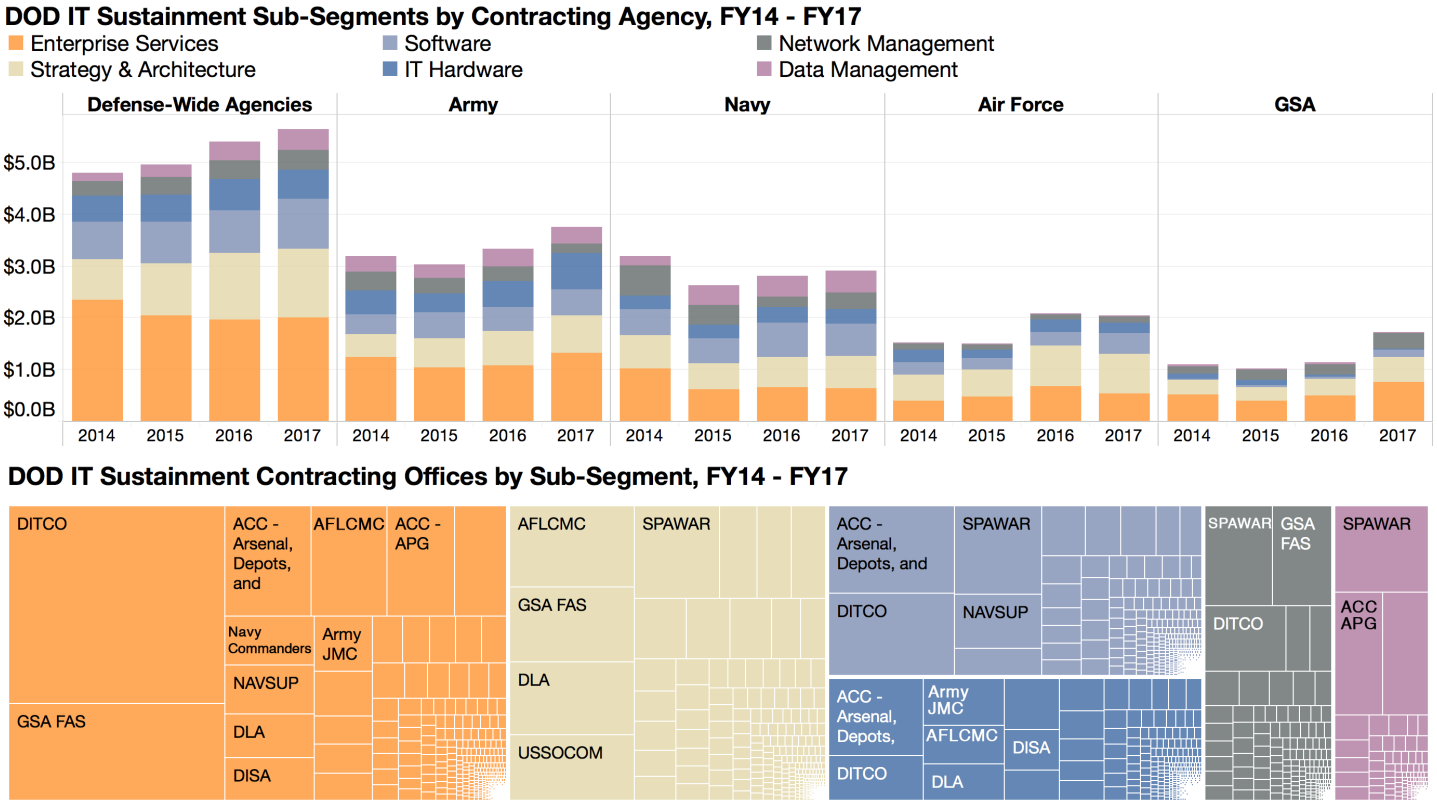


Exhibit 6: Defense-Wide Agencies obligated $20.8 billion in contracts spend for DOD IT Sustainment activities. Defense-Wide Agencies in conjunction with GSA grew at a combined 7.8 percent CAGR as the DOD moves to standardize and consolidate its enterprise. Uniquely positioned is DLA, who led spending and growth for Defense-Wide Strategy & Architecture.

Informatics is the Key to Connecting Data and Information to Humans

Defense spending on Informatics remained stable over the period with obligations averaging $2.9 billion annually since FY14. Informatics are solutions that leverage science and analytics to normalize, transform, and process data in a way that makes it accessible to humans. Employing Informatic capabilities is a critical component of how the DOD properly wields the massive amounts of data it needs to process. The three key technologies to do this are Data Science & Analytics, Big Data Technologies, and Data Collection & Normalization.

Data Science & Analytics was the largest sub-segment within the DOD Informatics segment. Capabilities like business analytics, visualization software, and intelligence exploitation underpin the types of solutions vendors are bringing to the DOD. These solutions work to integrate emerging technologies that use algorithms and artificial intelligence with mature datasets as part of DOD strategy.

Leading providers of Informatics capabilities include systems integrators working to turn intelligence data into exploitable information. Projects include BAE Systems' work on the Digital Electronic Warfare System (DEWS), Raytheon's flexdar processing systems, and General Atomics' MQ-1 and MQ-9 signals processing.

The Informatics segment will serve as the cornerstone to how DOD integrates the digital and physical realms, particularly as it pertains to needing humans in the loop. The department is increasingly dependent on data science techniques to disseminate its data, an approach needed to adequately manage their vast supply chain.

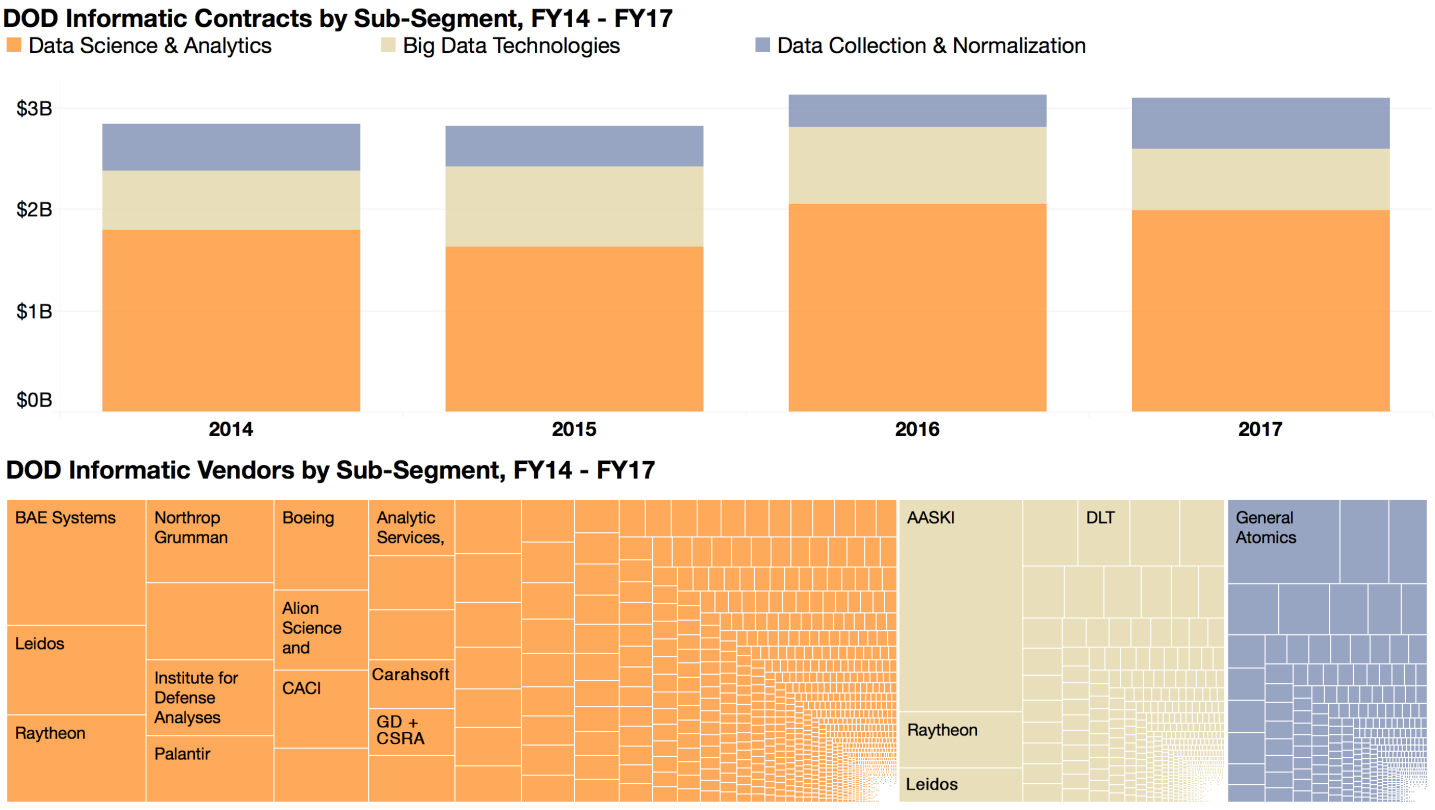


Exhibit 7: Data Science & Analytics was the largest sub-segment within the DOD Informatics segment, accounting for $5.5 billion in obligations over the period. The smaller Big Data Technologies and Data Collection & Normalization sub-segments accounted for $2.7 billion and $1.7 billion, respectively, over the same period.

Air Force Became the Lead Agency for Informatics Capabilities in FY17

Contracts for Informatics are dispersed across the Services with each defense agency procuring its own Informatics capabilities. An increased need to process and visualize large sets of business, financial, and intelligence data are driving Defense-Wide Agencies, and particularly the Air Force, to increase their Informatics investments.

Defense-Wide Agencies' contracts for Informatics grew at a 17.1 percent CAGR over the time frame, more than any other Service. Growth for Defense-Wide Agencies in the Informatics segment stems from increased investments in data storage capabilities as well as conducting analysis in support of the Joint Staff and Office of the Secretary of Defense (OSD).

Air Force saw similar growth for all sub-segments in its Informatics portfolio where AFLCMC was the top contracting office. Contracts for Air Force Informatics are tied to testing and analytics work performed for the Joint Program Executive Office for the Chemical and Biological Enterprise Fielding and Surveillance Directorate. Additionally, Air Force used Data Science & Analytics capabilities to perform intelligence exploitation work.

Transferring data from raw unstructured information into formats that are conducive for analysis and problem solving are critical to making defense data useful. All of the agencies will need to continue incorporating Informatic technologies into their data processes in order to connect human cognition with information.

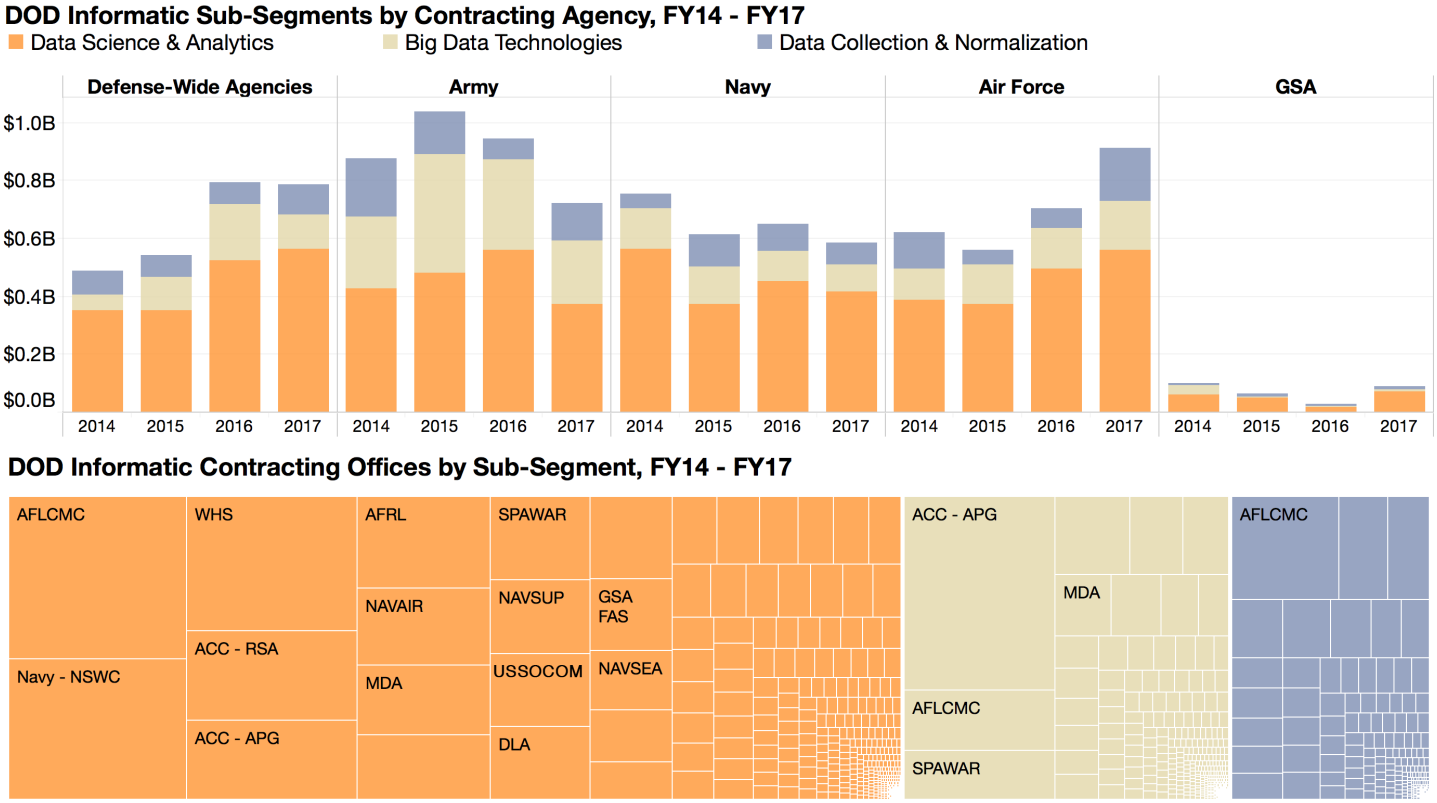


Exhibit 8: AFLCMC was the lead contracting office for Informatics technologies obligating $1.4 billion over the four-year period. Air Force experienced notable growth in its Informatics spending and grew at a 10.7 percent CAGR in FY14 through FY17. Defense-Wide Agencies grew the most over the period at a 17.1 percent CAGR.

DOD is Speeding Up Its Incorporation of Configurable Systems

Configurable Systems represent capabilities and data solutions enabled by cloud technologies. There has been significant growth in the segment as DOD works to catch up with the commercial sector in its use of cloud technologies. This is an important step in shifting away from legacy systems and creating stronger data capabilities, particularly for the supply chain.

Growth and spending in the Configurable Systems segment was driven by contracts for Cloud Deployment Models. These models provide hosted infrastructure and applications in either on-premise or remote environments that users can access. Migration Services have also gained pace within DOD's efforts to implement cloud technologies. The sub-segment accounted for a lower amount of spending than Cloud Deployment Models, but growth is promising. Transitioning away from legacy systems to cloud architectures is a core component of DOD's IT modernization strategy.

Traditional systems integrators are the leading vendors for DOD Configurable Systems contracts. The familiarity these vendors have with the missions, systems, and equipment used across the department have given them an advantage in understanding which systems need to be consolidated. The vendor landscape is transforming as merger and acquisition activity among large technology firms increases

Initiatives like the Modernizing Government Technology Act, which gives financial assistance to agencies for their modernization efforts, incentivize departments to work toward cloud adoption models. More incentives and strategies like this will need to be implemented if DOD is to adequately embrace cloud technologies.

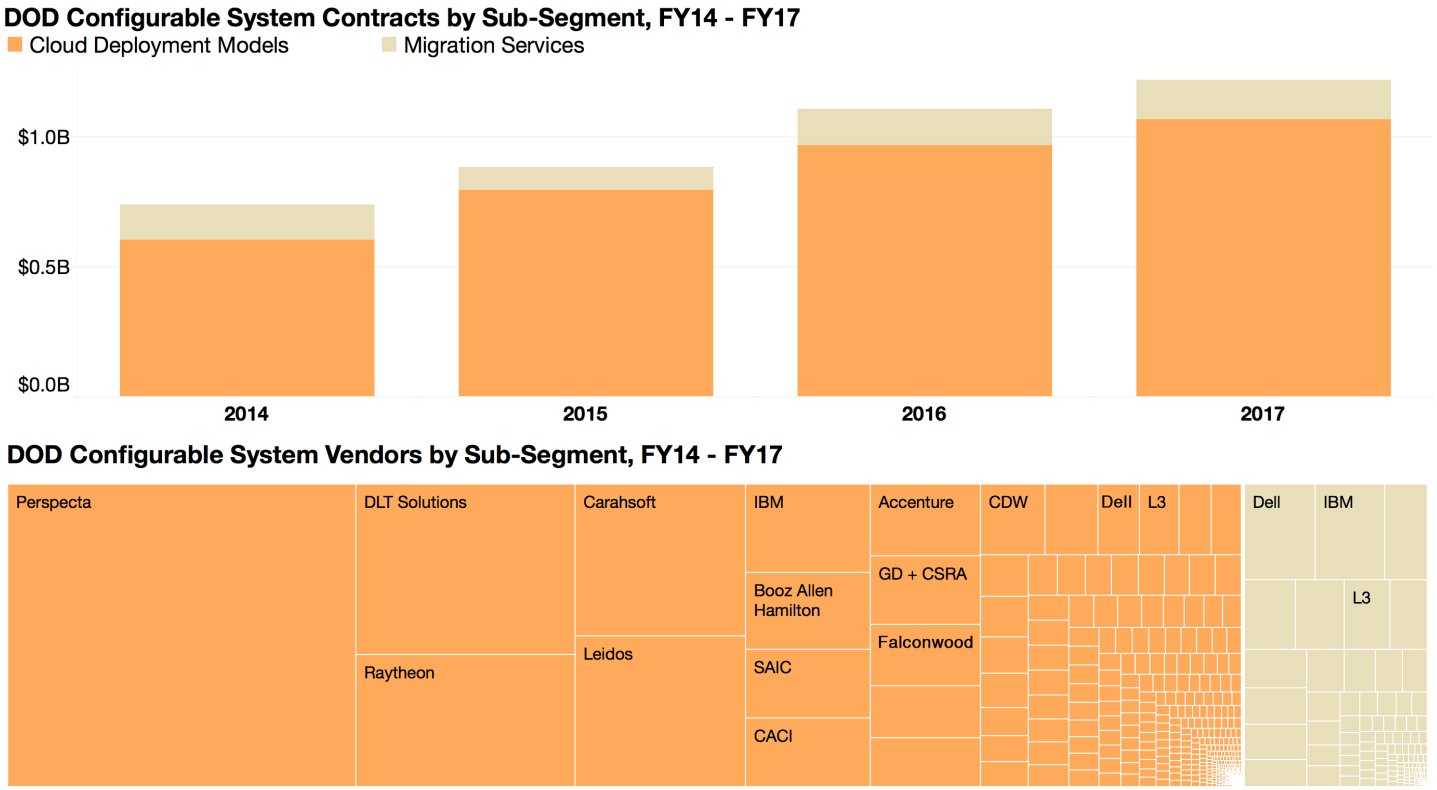


Exhibit 9: The Configurable Systems segment grew at a 18.2 percent CAGR in FY14 through FY17. Growth was driven by investments in Cloud Deployment Models, which grew at a 20.8 percent CAGR and accounted for $3.4 billion in total spending over the time frame.

Air Force and GSA are Quickly Incorporating DOD Configurable Systems

Recent growth in Configurable Systems is due in large part to the Air Force's recent investments in cloud technologies. Navy has historically procured the majority of Cloud Deployment Model contracts but FY17 saw the Air Force nearly surpass them.

The Air Force has made significant progress toward implementing cloud capabilities with FY17 obligations reaching $439 million. GSA has also had an increasing role in how the DOD is procuring its cloud technologies. As of FY17, GSA accounted for 38.0 percent of DOD's Migration Services contracts where it had procured almost none in the years prior.

As the spearhead for Navy's IT procurement, SPAWAR led contract obligations for Configurable Systems over the four-year period. AFLCMC is driving the Air Force's Configurable Systems procurement. Programs driving Air Force's investments include the virtualized data centers at CENTCOM and implementing cloud solutions for the Common Intelligence Collection System (CICS).

The continued use of GSA for Migration Services and the trend in the Air Force's increased investments in Cloud Deployment Models are promising indicators that the department is taking steps to incorporate next generation IT solutions. The MGT Act also creates a $500 million central fund over two years that agencies can borrow against to update or transition away from legacy systems.

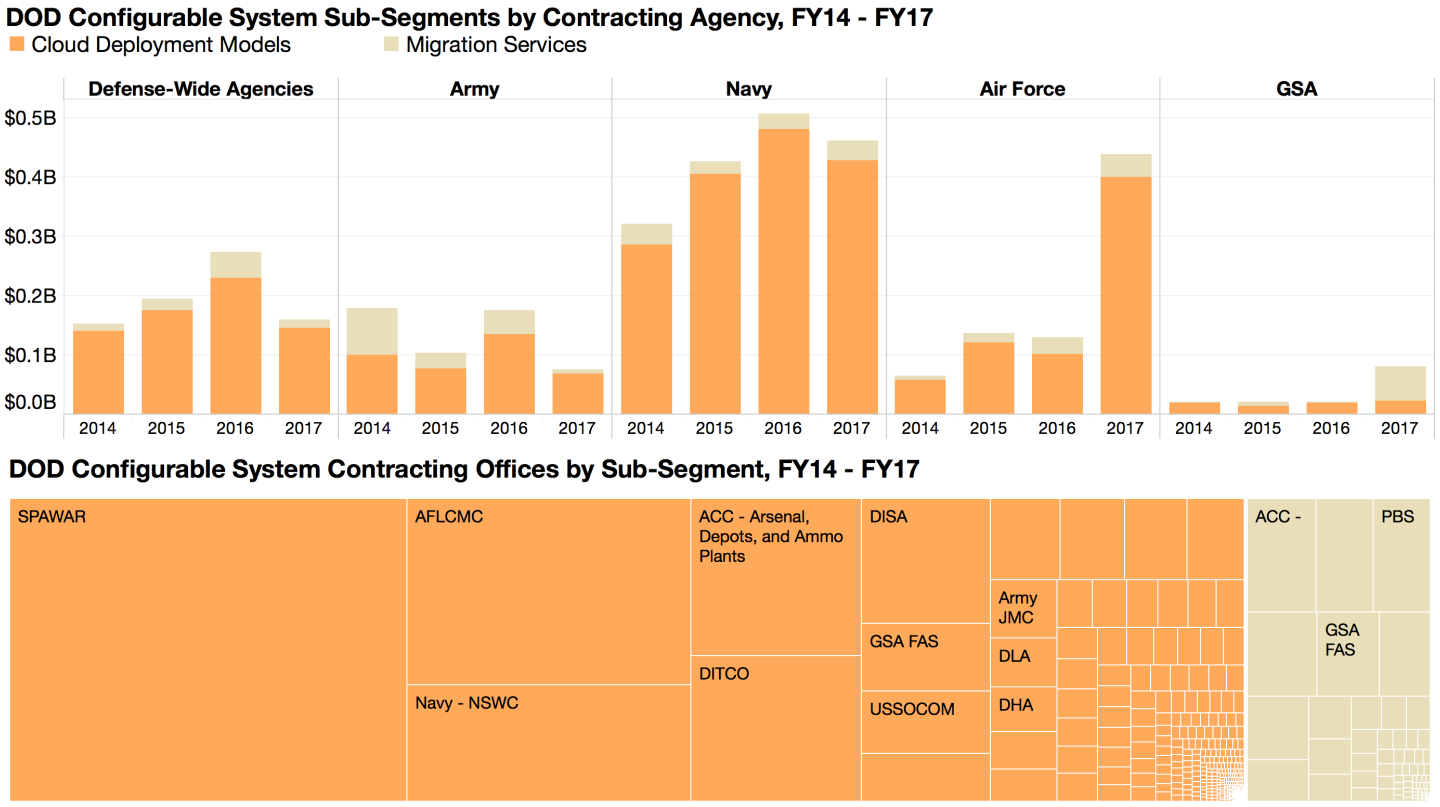


Exhibit 10: Navy accounted for 43.5 percent of all cloud spending for DOD over the four-year period. Air Force saw the most significant growth at a notable 91.3 percent CAGR in FY14 through FY17. GSA also grew significantly at a 57.3 percent CAGR over the same period.

Cognitive Engineering Technologies Shift the Cognitive Load from Humans to Machines

Cognitive Engineering is the bedrock for how physical and cognitive information is connected to the digital world. Cognitive Engineering is an approach that applies AI, machine learning, and data science to create autonomous processes for analyzing data. As a key enabler of the Fourth Industrial Revolution, Cognitive Engineering is crucial in how DOD enables real-time information processing, a capability that has ample applications in monitoring the supply chain.

The Cognitive Engineering segment grew significantly and obligations totaled $1.8 billion over the time frame. Growth was bolstered by the Modeling & Simulation sub-segment, which grew at a 41.9 percent CAGR. The Natural Language Processing sub-segment, which leverages AI to more quickly derive information from vast sets of human language data, also experienced strong growth over the period. The increased spend on Cognitive Engineering capabilities exemplifies DOD's intent on implementing emerging technologies.

Familiar systems integrators provided technologies for DOD's Cognitive Engineering needs including SAIC, Northrop Grumman, Torch Technologies, and others. These vendors are performing the majority of their work within the Modeling & Simulation sub-segment. These contracts are centered around using AI and algorithms to test and simulate weapon and platform lethality, resiliency, or safety.

Other sub-segments, including Machine Learning and Deep Learning, experienced significant growth as well and saw non-traditional defense contractors leading capture over the period. All of these technologies work to shift the cognitive load away from humans to machine-based solutions.

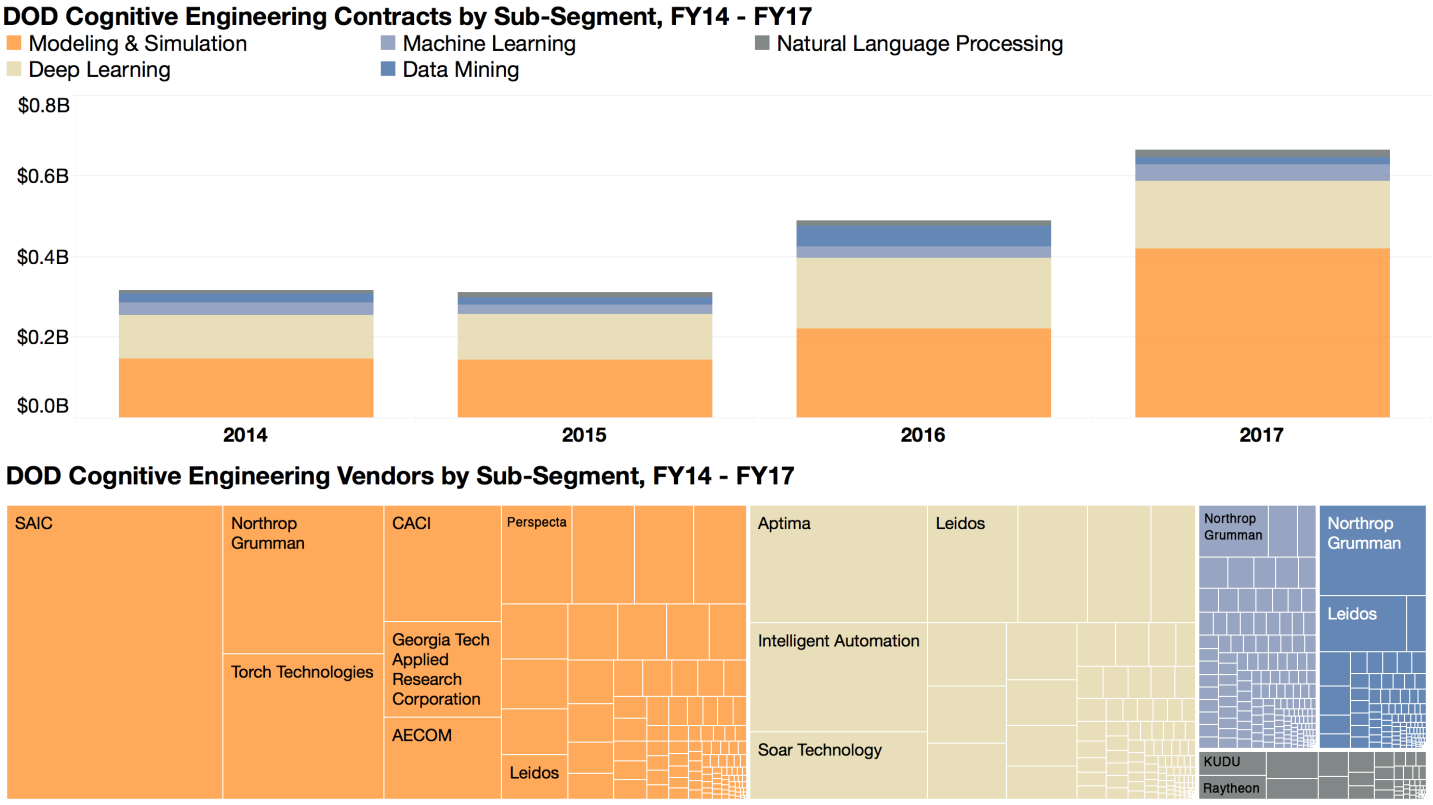


Exhibit 11: The Cognitive Engineering segment grew the fastest of all five DOD Supply Chain Technology segments at a 27.9 percent CAGR. Modeling & Simulation was the largest and fastest-growing sub-segment at a 41.9 percent CAGR, followed by the Deep Learning sub-segment.

Army Modeling & Simulation Activity is Driving the Cognitive Engineering Segment

The Army is procuring most of DOD's investments in Cognitive Engineering capabilities. Spending on Cognitive Engineering for the Army totaled $343 million in the most recent year where it accounted for over half of all segment spending. The recent boost in Army contracts is tied to work being performed by SAIC for force protection modeling and simulation at the Soldier Protection Lab in Redstone Arsenal.

The Air Force also saw an increase in obligations for Cognitive Engineering capabilities. Contracts for Deep Learning were the focal point of the Air Force's Cognitive Engineering developments. Key programs include the sensor-based multimodal automated reasoning technology for infrastructure assessments, the fully automated cyber reasoning system, and cognitive electronic warfare developments.

Several contracting offices have served as key gateways to accessing vendors who can develop these experimental and transformative technologies. The Army has relied on its contracting command at Redstone Arsenal to procure most of its Cognitive Engineering services while Air Force Research Lab (AFRL) leads Air Force activity. For Defense-Wide Agencies, the Missile Defense Agency (MDA) and the Defense Advanced Research Projects Agency (DARPA) emerged as the top contracting offices for Cognitive Engineering capabilities.

AFRL was the top contracting office for Cognitive Engineering capabilities at the more experimental end of the spectrum. Deep Learning, Machine Learning, and Natural Language Processing, all of which are fast-growing sub-segments, are being heavily procured through AFRL.

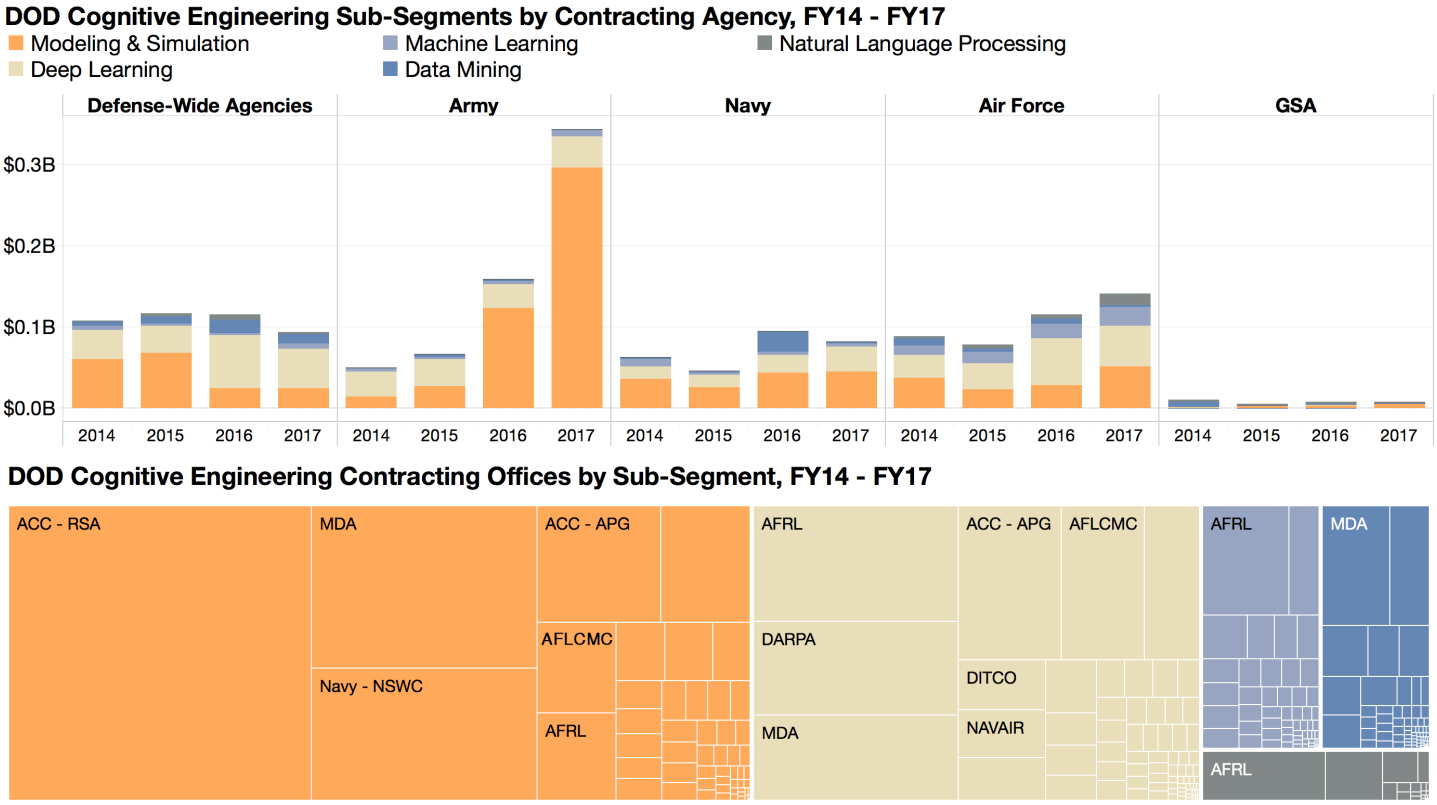


Exhibit 12: The Army's increased investments in Modeling & Simulation contracts saw the Service grow at a 90.9 percent CAGR from FY14 through FY17. In addition, the Air Force's Cognitive Engineering portfolio rose by 16.6 percent over the same period.

The Fourth Industrial Revolution is Transforming the Way DOD Monitors its Supply Chain

DOD's investments in IT Sustainment and emerging technologies all have applications for how it is monitoring and managing its supply chain. DOD is incorporating elements of the Fourth Industrial Revolution, IOT, and resilient IT infrastructure to create better logistics data and gain improved asset visibility.

FY17 marked a transition away from traditional Logistics Management Solutions to a more analytically capable enterprise software approach. In FY14 Logistics Management Solutions accounted for 80.5 percent of the Supply Chain Monitoring segment. That figure dropped to 62.4 percent in FY17. Emerging technologies have helped DOD move forward on how it takes data-centric software approaches to mitigating risks to the supply chain.

DOD has historically relied on systems integrators to apply ad hoc logistics management solutions to various supply chains and programs, but the data shows that relationship is changing. Total Supply Chain Monitoring spending decreased over the FY14 through FY16 period due to the expiration of logistics management contracts to Boeing, Northrop Grumman, and Raytheon. Upon the expiration of these contracts, these vendors largely exited the market and DOD transitioned toward using Supply Chain ERP Technologies, which caused the FY17 rebound in spending.

Advancing sensor, radio frequency identification, cloud, and Informatics capabilities across the department is allowing DOD to take new approaches to how it monitors its supply chain. Since formation of the Strategy for Improving DOD Asset Visibility in FY14, the department has made progress in creating data-driven joint solutions to Supply Chain Monitoring.

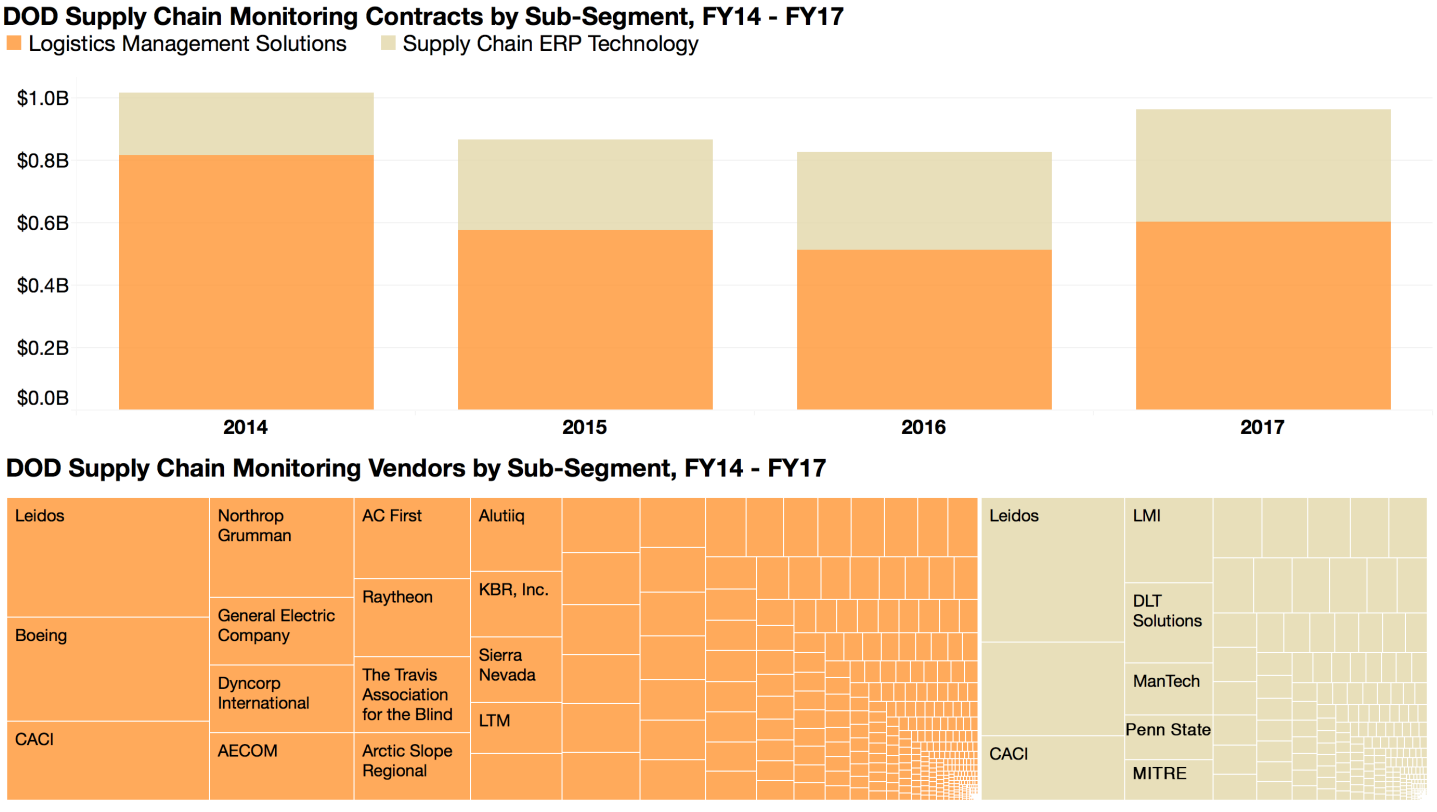


Exhibit 13: The Supply Chain Monitoring segment declined by 18.6% from FY14 to FY16 as several large systems integrators exited the market. Supply Chain ERP Technology grew at a 22.3 percent CAGR in FY14 through FY17.

Army has the Greatest Demand for Supply Chain Monitoring Solutions

DOD Supply Chain Monitoring capabilities are being driven by increased Army and GSA investments in ERP and analytics technologies. The Army accounted for 36.4 percent of all DOD Supply Chain Monitoring contracts. The Army's obligations for Supply Chain Monitoring solutions are attributed to large amounts of spending on traditional primes for logistics management projects in FY14 and a spike in FY17 spending on both Logistics Management Solutions and Supply Chain ERP Technology.

The growth in Army spending for ERP technologies outpaces its spending for traditional logistics management solutions. Army's ERP investments were largely the result of the Logistics Modernization Program, which resulted in the Army developing streamlined enterprise solutions to manage its supply chain as well as leveraging commercial logistics software products like SAP.

Dovetailing the Army's transition toward modernized supply chain technologies, GSA has been increasingly used to contract logistics software for DOD. Supply Chain ERP Technology contracted through GSA grew at a 63.4 percent CAGR over the four-year period reflecting DOD's push to access more commercially available solutions.

A key contracting authority for DOD Supply Chain Monitoring technologies is DLA, which is uniquely positioned in the segment. As DOD continues to expand its data-driven approaches to business processes, DLA is exploring and implementing ways it can modernize its logistics management processes and will be an important force in how emerging technologies are deployed to manage and monitor the defense supply chain.

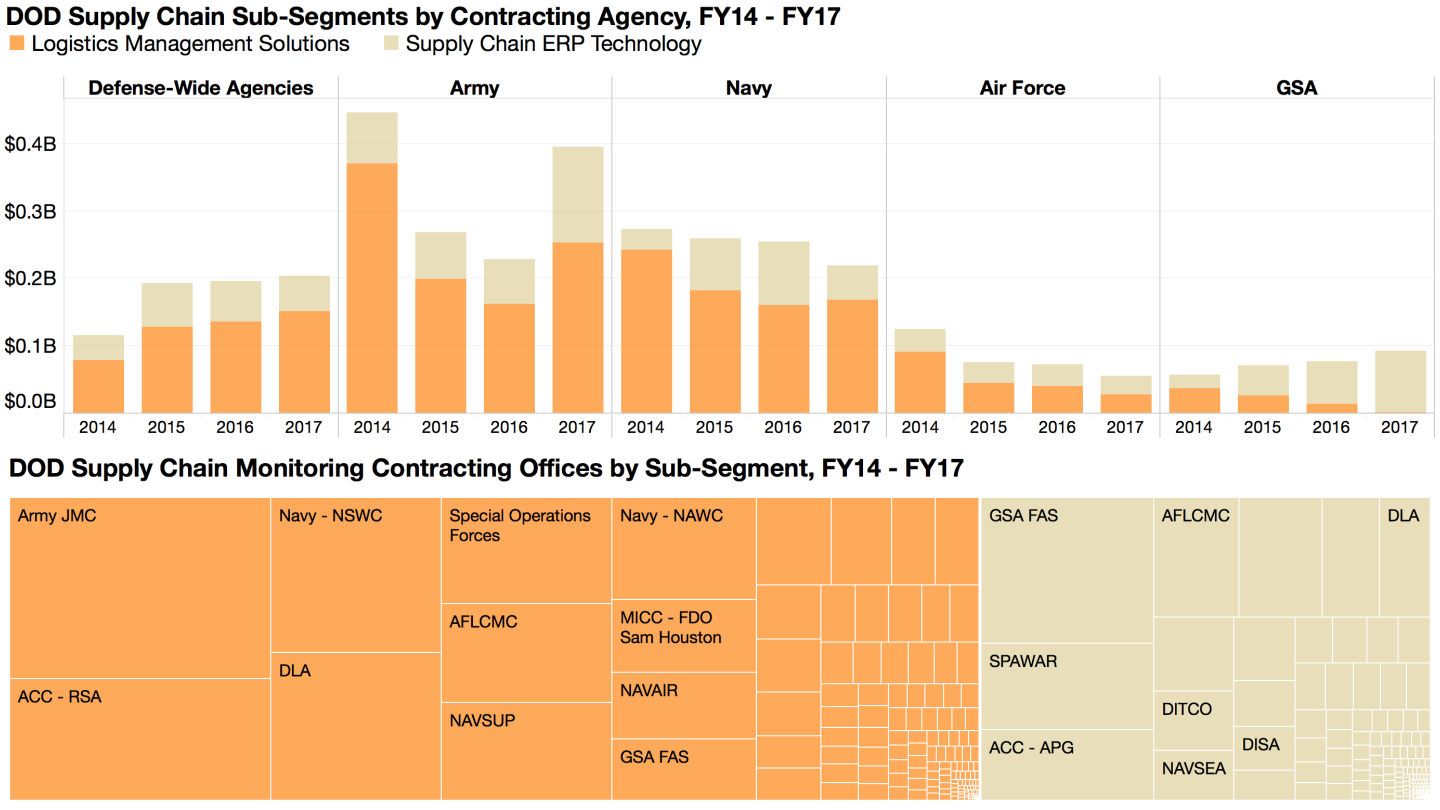


Exhibit 14: The Army accounted for 36.4 percent of Supply Chain Monitoring contracts in FY14 through FY17. Supply Chain Monitoring contracts procured through GSA increased at a 17.2 percent CAGR over the same period.

Strategic Sourcing Capabilities will be Difficult to Improve Upon

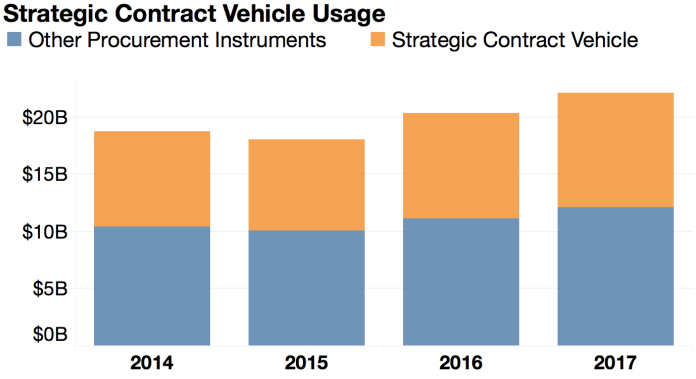
DOD seeks to better leverage strategic sourcing for IT commodities in addition to modernizing, consolidating, and standardizing its IT and technological capabilities. Strategic contract vehicles are the most immediate and substantial way to strategically source DOD technology. Strategic contract vehicles in this analysis are defined as any Federal multi-award indefinite delivery vehicle.

The cumulative value of contracts that were awarded using strategic contract vehicles remained consistent over the time period, averaging 44.8 percent annually, a relatively high percentage. DOD will face challenges in increasing its use of strategic sourcing mechanisms since it already leverages a significant portion of its technology with strategic contract vehicles.

A significant number of contracts that were procured using a strategic contract vehicle belong in the IT Sustainment segment. These are more mature technologies whose hardware and software components are highly commoditized. Over half of the Enterprise Services segment's contracts, for example, were procured using strategic contract vehicles.

In emerging markets like Cognitive Engineering, experimental technologies are procured using small or one-off contracts and are not commoditized. If the department continues to look for ways to create enterprise approaches to procuring its technology, it will need to ensure that it has efficient means of procuring small, fast-growing technologies as they scale.

Strategic Contract Vehicle Usage



Top 10 Strategic Contract Vehicles

Schedule 70	$6,872M
Alliant	$4,533M
SeaPort - e	$3,252M
SEWP V	$2,466M
DISA ENCORE II	$2,584M
Alliant SB	$1,738M
8(a) STARS II	$1,504M
Army ADMC-2	$1,283M
USSOCOM SITEC	$1,166M
SEWP IV SB	$1,047M

Strategic Contract Vehicle Usage by Sub-Segment, FY14 - FY17

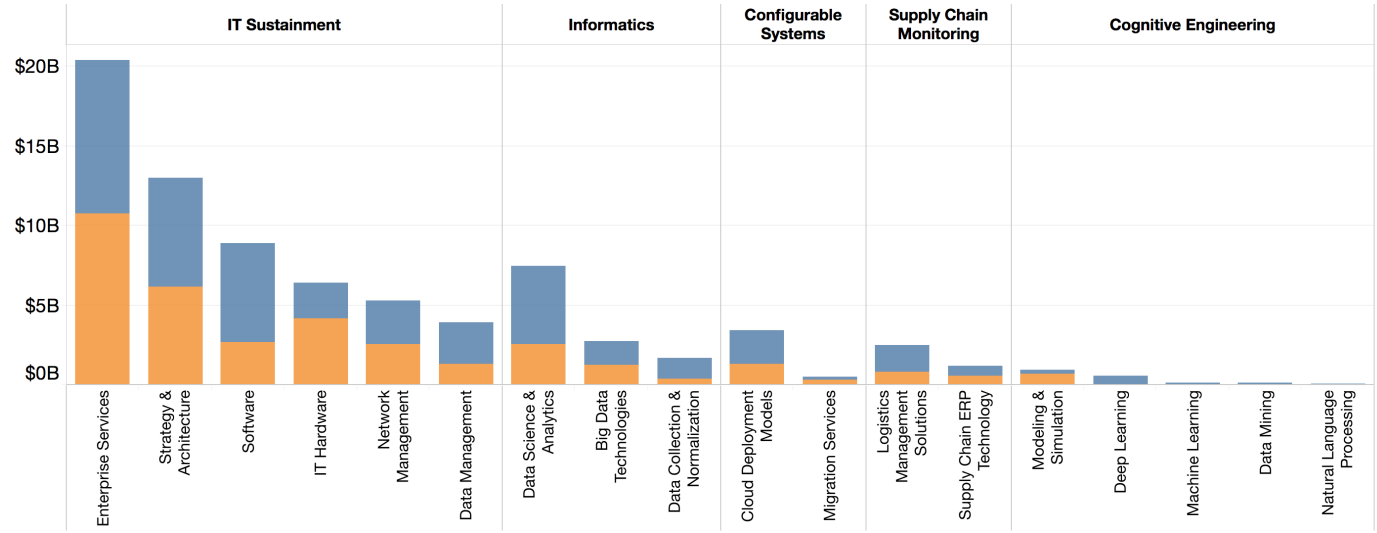


Exhibit 15: Strategic contract vehicle usage for DOD Supply Chain Technology remained stable, accounting for 44.8 percent of annual spending on average. GSA IT Schedule 70 was the preferred strategic contract vehicle for procuring commoditized IT products accounting for $6.9 billion in obligations in FY14 through FY17.

Conclusion

The new technologies that will drive DOD's analytical capabilities are enabled by AI, IOT, cloud technology, and key Fourth Industrial Revolution capabilities. These technologies are needed to facilitate critical transitions of information between the digital, cognitive, and physical realms, which are integrating at a harrowing pace. At the center of these entangled spheres lies the supply chain.

Asset visibility is of growing importance as DOD works to more rapidly place mission-critical parts in the hands of warfighters. Mitigating risks and preventing disruption to the defense supply chain is also of heightened concern. To generate real-time tracking and analysis of DOD assets, elements of all DOD Supply Chain Technology will have applications in the department's approach to monitoring its supply chain.

Configurable Systems will improve resiliency and access to information across the enterprise. Incorporating Informatics into DOD processes will expedite the department's ability to transfer information from the digital world to humans for analysis. Cognitive Engineering augments or replaces human analytical capabilities with AI-driven machine technology. The growing use of sensor-enabled asset tracking is creating massive sets of supply chain data and DOD will need to incorporate all of these technologies in order to protect its supply chain.

The Army has a strong need for these capabilities and has already taken efforts to implement enterprise software-based solutions. Through the Logistics Modernization Program, the Army has increasingly leveraged Supply Chain ERP Solutions to monitor its logistics. DLA, as the central agency for managing the defense supply chain and a significant portion of its IT portfolio, is uniquely positioned to influence how DOD is using technology to monitor its supply chain.

IT modernization strategies across the Federal government are providing incentives for agencies looking to procure new technology solutions. The Modernizing Government Technology Act is a prime example of these incentives. The MGT Act gives agencies access to financial resources to procure innovative commercial technologies. DOD is also looking to better leverage strategic sourcing options. The department has already procured a significant portion of its technologies using strategic contract vehicles, but will need to ensure that it can maintain those efficiencies as emerging technologies become ubiquitous. More incentives and structures are needed if DOD is to catch up with the private sector's adoption of these technologies.

The scale of the challenge at hand and the solutions needed to create a robust data-driven solution to supply chain monitoring have put DOD at the forefront of significant technological change.

Govini is a big data and analytics firm committed to transforming the business of government through data science. Govini's insights and analyses are utilized by Federal Agencies, Federal Contractors, Private Equity Firms and Hedge Funds to guide their strategies and uncover opportunities. Govini was founded in 2011 and has offices in Arlington, Virginia and San Francisco, California.