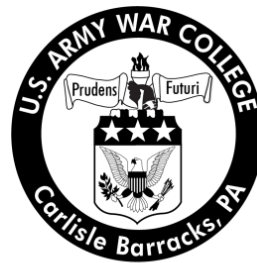


Strategy Research Project

Improving Army Information Technology Asset Visibility

by

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United States Army War College
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USAWC STRATEGY RESEARCH PROJECT

IMPROVING ARMY INFORMATION TECHNOLOGY ASSET VISIBILITY

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ABSTRACT

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Visibility of locally procured information technology (IT) assets must be centralized at the enterprise level. Only after Army leaders have precise enterprise visibility of the products and services that were locally procured can they accurately determine the total cost of ownership for each IT asset. The total cost of ownership includes the lifecycle costs of items such as computer hardware, software, and licenses as well as expenditures on contractor support personnel. With accurate and complete enterprise visibility of locally procured products and services and an accounting of the total cost of ownership of these assets, the Army can then, and only then, implement effective policy changes that measurably reduce IT overcapacity, redundancies, and wastefulness. Of the numerous automated systems used in IT lifecycle process, Wide Area Workflow (WAWF) may provide a centralized, mineable database for the timely and precise tracking, accountability, and reporting of the IT products and services that were procured throughout the Army enterprise.

IMPROVING ARMY INFORMATION TECHNOLOGY ASSET VISIBILITY

The Army lacks accurate and complete enterprise visibility of critical information technology (IT) assets. Although there are numerous automated systems being used to comply with federal, Department of Defense (DoD) and Army mandates, the Army remains incapable of accurately accounting for locally procured IT products and services and the amount of money it spends to sustain it all.

The crux of the problem is that management of IT assets in Tables of Distribution and Allowances (TDA)¹ units is decentralized. That is, local officials have the authority to make purchasing decisions on items such as smartphones, desktop and laptop computers, printers, office automation products, contracted services, and all sorts of other locally procured and sustained computer hardware and software. Generally, if local officials determine they have a need for something and the ability to pay for it, they are free to procure it provided the procurement conforms to the guidance under which they operate.²

A consequence of decentralized management of IT assets is the lack of an accurate and complete enterprise accounting of what products and services were locally procured. For example, Microsoft's SharePoint software is an online collaboration application that is procured, installed, and administered based on an organization's decision to obtain the capability for its local use. In December 2010 the Army Chief Information Officer (CIO) / G-6 estimated there were 900 SharePoint server licenses and tens-of-thousands of enterprise client licenses in use Army wide.³ Although it is not clear how officials in G-6 estimated these numbers, it is clear that the Army has great difficulty determining who procured what across the department. In March 2011 an All

Army Activities (ALARACT) message was released stating the need for an accurate enterprise inventory of the copies of SharePoint. The ALARACT instructed each Army organization that owned SharePoint to register their copy and self-report the total cost of ownership for it – which includes the cost of the product plus the costs of associated hardware, software, and services – in the Army’s automated systems repository.⁴

According to a DoD online IT product catalogue,⁵ one “SharePoint Internet Sites Enterprise” package is priced between \$27,197 and \$47,594, depending on options. If there are in fact 900 copies of SharePoint in the Army inventory, using the lowest priced package for illustration shows the department lacks accurate and complete visibility of more than \$24 million dollars worth of just one Microsoft product. Worse, this estimated \$24 million investment in SharePoint does not reflect the *total cost of ownership*. That is, to the \$24 million initial investment we must add the costs of directly related items such as the servers hosting the software; the databases linked to the product; other licenses and tools for software application developers; and, *especially*, the technical support personnel who install, configure, administer, and sustain the 900 applications.⁶

Without enterprise visibility of the things locally procured and sustained, Army leaders are incapable of effectively addressing IT asset overcapacity, redundancies, and waste.⁷ Fortunately, this problem can be fixed. This paper answers the research question: How can the Army more efficiently track and account for the unclassified information technology products and services that are locally procured and sustained in its Tables of Distribution and Allowances (TDA) organizations?

Terms, Scope, Purpose, Assumptions, and Research Methodology

Throughout this paper, the general terms of local IT officials, managers, approving authorities, and so on refer collectively to all the personnel involved in an

organization's IT procurement decision making, budget oversight, resource management, and IT acquisition processes.⁸ IT assets include everything that costs the Army money in terms of procuring information technology products and associated services for Army Tables of Distribution and Allowances (TDA) organizations. Expenditures to account for include those for contractors involved in the IT lifecycle; costs for vendor supplied products, including commercial off-the-shelf (COTS) hardware, software, licenses, databases, and tools; costs for IT items procured using government purchase cards; and the development and sustainment costs of locally developed boutique⁹ software applications, systems, and associated interfaces. Total cost of ownership is the accurate and complete sum of the lifecycle costs of a particular asset.¹⁰ Basically, if the Army pays a private sector company for it, the Army should be able to precisely account for it, down to the penny.

The scope of this research includes unclassified IT assets procured and sustained in TDA organizations via the Program Objective Memorandum (POM) process, the Military Interdepartmental Purchase Request (MIPR), government purchase / credit cards, and other means. IT assets procured for Modified Table of Organization and Equipment (MTOE) units and all classified units are outside the scope of this research. For visibility of manpower costs, only contracted labor costs were researched for this project. Tracking and accounting for military and federal civilian personnel manpower costs are outside the scope of this project.¹¹

The purpose of this research is not to comprehensively review each applicable law, regulation, policy, procedure, memorandum, and so on involved with managing IT assets; or to comprehensively review each automated system used throughout the TDA

IT asset lifecycle process; or to identify existing systems to subsume into others; or to or to recommend a process for determining Army enterprise IT requirements.

Rather, the purpose of this research is to recommend a new method for providing Army leaders (a) specific details on who procured what IT products and services from whom, when, and for how much, and (b) timely, readily available enterprise wide aggregation and reporting of this data. If implemented, this efficient and precise method will be the impetus for fundamentally changing Army IT asset management policy and procedures. This method may also become a successful model for other DoD departments and federal agencies to consider adopting, as they too are continuously seeking ways to improve how they manage their IT assets.

Four assumptions underpin this paper. First, numerous and comprehensive laws, regulations, policies, procedures, memorandums, and other official guidance apply to the management of Army IT assets. Second, IT management and procurement officials are required to use numerous large-scale automated systems throughout the lifecycle process. Third, no enterprise method currently exists to accurately and completely track and account for each cellular phone, desktop, laptop, printer, server, and database that was locally procured; and each COTS software product, such as SharePoint, that was bought, installed and sustained; and each boutique system in use across the department; and the personnel costs associated with sustaining IT assets. Fourth, it is institutionally desirable to accurately and completely capture and report the data the Army needs to more efficiently manage its information technology assets.

The research methodology for this project included a review of overarching laws, regulations, DoD Instructions, and other guidance applicable to Army IT management.

Additionally, interviews were conducted with a Resource Management (RM) official and IT decision makers from Carlisle Barracks, Pennsylvania and an Army IT decision maker and acquisition experts from the Assistant G-1 for Civilian Personnel in Alexandria, Virginia to learn of the processes and procedures they follow to manage their information technology assets. Lastly, accessible documentation on key automated IT management systems was reviewed to determine the high-level capabilities currently available in terms of providing visibility of locally procured IT products and services.

Overarching Published Guidance for Managing Army IT Assets

The lack of enterprise visibility of locally procured and sustained IT assets is not just an Army problem: The problem is well known and acknowledged across the federal government. For example, to address the unrelenting proliferation of redundant capabilities and the lack of visibility of assets, specific corrective guidance from Congress, the Office of Management and Budget (OMB), DoD, and the Army was promulgated over the last 15 years that has resulted in some, though still not enough, improvement in IT asset management.

First, we have the Paperwork Reduction Act (PPA) of 1995, which built upon the requirements stated in the Paperwork Reduction Act of 1980.¹² Among its other mandates, the law requires agencies to integrate their IT management process with the organization's planning, financial management, human resources management, program, and budget decisions. The law further states that agencies shall assume responsibility for an accurate and complete accounting of IT asset expenditures, associated expenses, and results.

The Clinger-Cohen Act (CCA) of 1996¹³ is among the most often cited laws regarding federal IT management. This law requires each federal agency to designate a

Chief Information Officer (CIO) who is to provide for the selection, management, and evaluation of results of the organization's IT investments; ensure IT acquisitions are integrated with budget, financial, and program management decision making processes; apply minimum selection criteria when considering an investment; and identify IT investments for potential shared costs or benefits with other agencies. The law also specifies that before committing money to a new IT investment, the approving official must determine whether the government or private sector would better perform the proposed IT related function.¹⁴

Next we have U.S. Code Title 10, Section 2223.¹⁵ This law directs DoD officials to ensure IT systems are interoperable, prescribe IT standards for the department, eliminate duplicate IT systems within the department, and maintain an inventory of mission critical and mission essential automated systems and the interfaces between those systems.

Among other requirements, the Office of Management and Budget (OMB) Circular 130¹⁶ directs agencies to maintain and monitor portfolios of their information systems, prevent the development of redundant IT capabilities, and provide information regarding the agency's opportunities to share resources. Additionally, OMB Circular 130 states that each agency is to develop an enterprise architecture (EA) that is supported by a complete inventory of IT assets, which includes the associated funds, equipment, and personnel.

DoD also established policy to augment higher-level mandates regarding IT asset management. For example, Department of Defense Instruction (DoDI) 8115.01¹⁷ states IT investments are to be managed as portfolios. The DoDI defines a portfolio as a

grouping of information technology investments by capability to accomplish a specified mission outcome, goal, or objective. It specifies investments are those development and sustainment resources required to support IT initiatives funded by, for example, appropriations for operations and maintenance (O&M); procurement; and research, development, test, and evaluation (RDT&E). The DoDI requires that portfolios be used to identify redundancies in capabilities as well as capabilities opportunities and gaps.

DoDI 8115.02¹⁸ elaborates the department's portfolio management (PfM) process. It states there is a fundamental need to change how DoD manages IT assets. For example, the DoDI says historically IT assets have been acquired and managed as stand-alone systems, which results in duplicative capabilities and limits the ability of agencies to share information. The DoDI also directs the designated leads to establish an inventory of the investments within their mission areas.¹⁹

More specific guidance for managing Army IT assets is found in Army Regulation (AR) 25–1, Army Knowledge Management and Information Technology.²⁰ AR 25-1 directs Army agencies to use the Computer Hardware, Enterprise Software and Solutions (CHESS) system to procure commercial off-the-shelf (COTS) desktops, laptops, and software and all other IT assets that cost more than \$25,000. Although the regulation says that CHESS centralizes IT lifecycle management across the Army enterprise, it does not appear the CHESS was intended to be the authoritative source for tracking and accounting for locally procured assets. For instance, AR 25-1 goes on to state that local officials are responsible for maintaining an accurate, annually validated inventory of their IT equipment.

The regulation also directs computer hardware to be accounted for in accordance with supply regulations that address Army property book accountability. In terms of accounting for locally procured software, AR 25-1 states that although it is treated as a durable resource, software does not require accountability in a property book; rather, it is to be controlled by the organization's information management officer (IMO).

AR 25-1 directs Army agencies to use the Army Portfolio Management Solution (APMS) as the authoritative registry for their IT systems, capabilities, and investments; for their IT portfolio management activities; and to determine where redundancies and gaps in capabilities exist. Once registered, the owners of automated systems, such as SharePoint, are required to periodically certify their APMS information is accurate and complete.

Finally, related to AR 25-1 is Department of the Army Pamphlet 25-1-1 (DA PAM 25-1-1), Information Technology Support and Services.²¹ This DA PAM states the organization's Information Management Officer (IMO) is responsible for accounting for IT property. IMO responsibilities include the publication of procedural guidance for accountability controls such as the organization's property book and hand receipts. The DA PAM refers the reader to AR 710-2, *Supply Policy Below the National Level*, which states, for an example involving IT assets, that property book records shall be established and maintained for personal digital assistants (PDA), cellular phones, and pagers that cost more than \$1,000 each.²²

In response to the voluminous promulgated guidance for managing IT assets, and to provide officials and organizational decision makers relevant information from which they can base their investment decisions, numerous large-scale automated

systems have sprung up within DoD and the Army. The focus of this research is on the high-level capabilities of some of these major systems. The systems researched include those mentioned in select guidance and those that were discussed during the following interviews with IT management subject matter experts.

Interviews with Senior Army IT, Resource Management and Acquisition Personnel

Senior IT, Resource Management (RM), and acquisition officials from Carlisle Barracks, Pennsylvania and the Assistant G-1 for Civilian Personnel, in Alexandria, Virginia were interviewed to document how they manage IT assets. The focus of the interview questions was on the guidance and procedures they follow and the automated systems they use throughout the IT lifecycle process.

A senior Resource Management (RM) official from Carlisle Barracks, Pennsylvania was interviewed for his expertise with IT asset procurement.²³ For locally procured software such as SharePoint (Carlisle Barracks owns one of the estimated 900 copies in the Army) he said that the Chief Information Officer (CIO) has the discretionary authority to authorize such a purchase, provided funding is available.²⁴ The RM official went on to say the Carlisle Barracks CIO is also responsible for tracking and accounting for IT requirements, new and lifecycle replacement items, user licenses, and other related expenditures.

The major automated IT management systems the RM official is familiar with include the Contractor Manpower Reporting Application (CMRA), the General Fund Enterprise Business System (GFEBS), the Computer Hardware, Enterprise Software and Solutions System (CHESS), and Wide Area Workflow (WAWF). The high-level capabilities of each of these systems are detailed in the next section of this paper.

Regarding the use of GFEBS on Carlisle Barracks, the Resource Manager said the system is not useful for accounting for the specific details on the IT products procured through it. The official went on to note, however, that he established a work breakdown structure in the system that accounts for the total cost per U.S. Army War College student per year, which includes the money spent per student for tuition, books, academic trips taken during the school year, and so on.

In addition to the Resource Manager, three other senior officials from Carlisle Barracks were interviewed for their IT management experience and technical expertise with the Army IT lifecycle process.²⁵ They shared that they build IT capabilities based on local needs and planning factors and the availability of funding. Their funding flow is from the Training Program Evaluation Group (TPEG) to the U.S. Army War College Management Decision Package (MDEP). From the MDEP, the CIO gets a slice of the available funding. From this slice, the CIO develops a phased spending plan, which includes paying for IT service contracts, “must funds,”²⁶ lifecycle replacements, and new IT investments, such as SharePoint and BlackBerry smartphones.²⁷

In the performance of the CIO mission, the officials noted they regularly use GFEBS and Wide Area Workflow (WAWF). To track and account for receipt, issue, and turn-in of IT assets, the CIO uses the Property Book Unit Supply Enhanced (PBUSE) system. As with GFEBS and WAWF, the capabilities of PBUSE are described in the next section of this paper.

To illustrate how they use GFEBS, WAWF, and PBUSE in the course of their duties, the IT officials discussed the steps they followed during a recent purchase of computer hardware. First, a business case was submitted to the CIO for the

procurement of seven lifecycle servers. An internal check of the business case validated the need and the CIO approved the procurement. The Carlisle Barracks Business Manager then submitted a Requirements and Acquisition Document (RAD) to TRADOC G-6 and a Goal 1 Waiver Request²⁸ to Army G-6/CIO. In both cases they obtained authorization to proceed with the procurement.

Next, they submitted a Purchase Request in GFEBS that contained enough detail to identify each of the items to procure in the total package. These items included the seven servers, seven associated server software packages, and seven service support agreements. The Purchase Request was then routed in GFEBS to the Carlisle Barracks Resource Manager (RM). Once the RM confirmed funding was available for the procurement, the Purchase Request was routed to the supporting Contracting Office, where contracting specialists reviewed it and forwarded it to the selected vendor. The vendor then fulfilled the order and sent the items to Carlisle Barracks. Once the items arrived on post the delivery was accepted, confirmation of the acceptance was made in WAWF, and the new items were added to the IT inventory in PBUSE.

Acknowledging the lack of Army enterprise visibility of desktop software packages, one of the officials recommended that the Army account for end-user software like they did during the implementation of the Navy/Marine Corps Intranet (NMCI) – that is, inventory software products desktop by desktop. In the case of NMCI, the official said an accurate and complete manual inventory resulted in an action to decrease the number of approved products from some 1,100 to 143. The official also suggested that to efficiently and effectively manage its assets, the Army must maintain IT asset procurement information in a centralized database.

A third interview was conducted with a senior IT decision maker and two senior IT acquisition specialists from the Assistant G-1 for Civilian Personnel, or AG-1(CP).²⁹ They shared that AG-1(CP) has two regular funding sources for IT related expenditures; Operations and Maintenance – Army (OMA) and Other Procurement – Army (OPA). For IT asset procurement, all AG-1(CP) OMA spending is processed through GFEBS. As of the interview date, AG-1(CP) OPA spending was tracked through a legacy automated system, though the officials expected to soon process OPA spending through GFEBS.

As an example of how they use GFEBS in the organization, the officials discussed the steps they recently followed for the procurement of 250 lifecycle replacement desktop computers. First, a Purchase Request (PR) was initiated in GFEBS with a generic description of the requirement and a line of accounting. The PR was then routed to the Resource Manager, who certified funds were available to cover the request. Next, the GFEBS PR was routed to the servicing Contracting Office for review. From there the PR information was cross-referenced with the Army's Computer Hardware, Enterprise Software and Solutions (CHESS) system. Once a suitable desktop was found in CHESS, a contract was awarded to the selected vendor. This contract award obligated the funds and the vendor shipped the computers to AG-1(CP).

Upon delivery, the organization's Property Book Officer (PBO) verified receipt of the desktops. In this case, the desktop inventory data was not entered into the Property Book Unit Supply Enhanced (PBUSE) system since local procedures call for PBUSE to be used only for items with a unit value of more than \$5,000. An acquisition official also verified acceptance of the desktops as invoiced in Wide Area Workflow (WAWF), which

triggered the Defense Financial Accounting Service (DFAS) to send payment for the computers to the vendor.

For procurements using a government purchase card, designated officials are authorized to purchase IT assets, up to a unit price of \$25,000, from an existing government contract or General Services Agency (GSA) schedule. The officials mentioned that all of their government purchase card procurements are routed through GFEBS to the local Resource Manager, who approves the Purchase Requests and commits necessary funds. Although the aggregate dollar amount of each government purchase card procurement is accounted for in GFEBS, the officials noted the system does not provide specific product details on what was purchased.

To track and account for contractor labor, AG-1(CP) officials submit a Performance Work Statement (PWS) and other required documents to their servicing Contracting Office. Upon award of the contract, the winning contractor uses Wide Area Workflow (WAWF) to submit invoices to the government. AG-1(CP) officials then validate the contractor invoice in WAWF, which is an action that triggers the payment to the company. The contractor is further required to submit the man-hours charged to the contract using the Army's Contractor Manpower Reporting Application (CMRA).

An Overview of the Capabilities of Select Major Systems

Based on information gleaned from a review of published guidance and from what was learned during the interviews, a list of major automated systems was developed for further research. The research admittedly does not include all the systems used for managing Army IT assets. Rather, the systems reviewed include those that appear to have potential for improving enterprise visibility of locally procured products and services.

First, we have the Contractor Manpower Reporting Application (CMRA). To improve visibility of the work performed by contractors, starting on 7 January 2005 Francis J. Harvey, then Secretary of the Army, required all Army contractors to submit reporting information upon their contract award or modification.³⁰ The Secretary's memorandum requires contractors to use CMRA to enter specific tracking information associated with their services.

According to information found in the CMRA Version 3.6 Full User Guide³¹ and the CRMA Frequently Asked Questions (FAQ)³² each contractor is required to self-report information such as the associated contract number, the contractor's identifying information, the estimated direct labor hours (which includes hours for sub-contractors), the estimated direct labor dollars (including labor dollars for sub-contractors), the Federal Service Code (FSC) that reflects the services the contractor provided, the four digit code for the associated Management Decision Package (MDEP) and the total amount charged to the contract for the fiscal year. The documents also state that the reporting requirement applies to Military Interdepartmental Purchase Requests (MIPR); to all contracts except those associated with vertical construction, foreign military sales, utilities, and manufacturing; and to each separate delivery task or order for Delivery Order type contracts. The guidance also states there is no contract minimum dollar amount for this reporting requirement.

The CMRA is used to track and account for aggregate contractor costs, and, apparently, it would not be suitable for modification to enable it track and account for vendor supplied IT products such as COTS hardware, software, and the associated licenses or for tracking assets procured using government purchase cards. However, it

could serve as an input source for determining the total cost of IT asset ownership. For instance, accounting for the cost of a copy of SharePoint and the servers necessary to host it doesn't include what is often the largest expenditure in IT projects – the people involved. Using this example, it seems that with modification CMRA could track and account for the specific man-hours and dollars associated with installing, configuring, and administering an organization's SharePoint system.

The next system reviewed was the General Fund Enterprise Business System (GFEBS). In an article published in *The Journal of the American Society of Military Comptrollers*,³³ Kristyn Jones and Frank Distasio say work began on GFEBS in June 2005 to meet the mandates of the Chief Financial Officer Act of 1990. They describe GFEBS as an enterprise resource planning (ERP) solution that is capable of providing users real-time visibility of what is expected to be up to one million transactions per day, which are to be generated by some 70,000 end-users. Jones and Distasio note that the capabilities of GFEBS include full cost accounting, decision support, and providing users a wealth of analytic, comparative, and trend data.

GFEBS fielding documents published by the Assistant Secretary of the Army for Financial Management and Comptroller, or ASA(FM&C), were reviewed for more detailed technical information about the system. According to the Wave 8 Site Visit training slides on the GFBES Spending Chain process for the contracting scenario,³⁴ the high-level steps for the GFEBS end-to-end flow are: (a) create the purchase request in GFEBS, (b) route the request in GFEBS for approval and fund certification, (c) send the request to the servicing Contracting Office for further processing, and (d) create the purchase order in GFEBS. Next, the vendor's invoice for the products is submitted in

Wide Area Workflow (WAWF) and then this invoice is interfaced with GFEBS. Once the products are received by the requesting Army agency, a government official submits a transaction in WAWF and then this transaction is interfaced with GFEBS. The end-to-end high-level flow follows the same basic path described by the acquisition experts from the Assistant G-1 for Civilian Personnel, except in their process an additional step is performed to match the items in the GFEBS Purchase Request to the products available in the Computer Hardware, Enterprise Software and Solutions (CHESS) system.

Although the system apparently has the capability to account for the procurements processed through it, using GFEBS to establish and maintain enterprise visibility of locally procured IT products and services is not ideal since (a) it does not track and account for contractor man-hours, which is a critical component for calculating the total cost of ownership of each asset, (b) it is not an authoritative source for detailed vendor product information, which is necessary for precisely accounting for IT assets and (c) government purchase card procurements are not accounted for at a level of detail necessary for efficient oversight. Still, GFEBS may be a useful input source if a better authoritative source is not available.

Another source for tracking and accounting for the procurement of IT products could be the Computer Hardware, Enterprise Software and Solutions (CHESS) system. The Army Federal Acquisition Regulation Supplement (AFARS) states that officials procuring commercial IT assets, regardless of dollar value, must first use CHESS as their source for products.³⁵ Per Army G-6 guidance, these assets include printers,

scanners, routers, servers, video teleconference (VTC) equipment, laptops, desktops, and commercial off-the-shelf (COTS) software products.³⁶

There is a waiver process for procuring IT assets outside of CHES. For example, as stated in an online briefing package on the CHES website³⁷ an official can obtain a waiver to procure an IT product outside of CHES when the product is not available in CHES and when he or she finds a lower price on a non-CHES contract. AFARS policy further states that for procurement of an IT service, an official must consider “setting aside” contract requirements for small businesses. If there is no existing small business capability to meet the requirements, then the preferred vehicle for contracting IT services is CHES. Although CHES is preferred, the policy states that local officials are not required to submit a CHES waiver for procuring IT services outside of the system.

It appears that CHES is capable of tracking and accounting for IT assets – including hardware, software, and services – that are procured through it. This system, however, does not seem to be an ideal source for providing Army leaders enterprise visibility of what was procured by whom. First, data on contractor costs is not available in CHES and it appears that integrating this data from a system such as the Contractor Manpower Reporting Application (CMRA) would not be feasible. Second, even though it is a mandatory, initial source for purchasing computer hardware and software products officials could be granted waivers to procure products outside of the system. And third, officials can procure IT services outside of CHES without for a waiver. Compared to GFEBS, which is used to originate and route IT purchase requests, CHES seems less

capable in terms of providing visibility of each IT asset locally procured throughout the enterprise.

According to The Army Portfolio Management Solution (APMS) Fundamental Training Manual,³⁸ APMS was implemented in 2005 to meet the requirements of the Clinger-Cohen Act of 1996, DoD directives regarding portfolio management, and the Army's IT portfolio implementing guidance. The training manual states that APMS is the sole source for meeting IT Portfolio Management (IT PfM) requirements at the Army enterprise and lower levels. We also learn from the document that the purpose of IT PfM and APMS is to manage spending on IT investments by aligning these investments to the functional capability provided to the Army.

AR 25-1 specifies what IT investments are required to be registered in APMS.³⁹ Basically, if the IT asset costs more than \$25,000 per year to procure and/or maintain, or if it is required to undergo the certification and accreditation process per DoD Instruction, or if it was certified by the Defense Business Systems Management Committee (DBSMC), then it must be registered and the data on it maintained in APMS.

An Army G-6 information brief,⁴⁰ states that APMS serves as the vehicle for generating internal and external IT data calls (for example, APMS was used to collect information during the recent data call to determine how many copies of SharePoint are in the enterprise inventory and how much that capacity costs the Army). The G-6 briefing also notes that APMS provides the means to identify gaps and overlaps in systems capabilities – information that could be used retire stove-piped and redundant systems. APMS supports IT investment prioritization by Management Decision Package (MDEP) during the Program Objective Memorandum (POM) process as well as DoD

certification of major IT investments. And, we are made aware that for any IT investment that is not registered in APMS, its funding is potentially at risk.

Although APMS appears to capture useful information on major automated systems such as SharePoint, the system would not be a good candidate to serve as the Army's solution for establishing and maintaining enterprise visibility of locally procured IT products and services. APMS does not track and account for itemized vendor product data and costs, it does not track and account for itemized contracted IT services, and it does not track and account for assets procured using government purchase cards. Also, much of the data in APMS is self-reported, which may result in inaccurate or incomplete data. Compared to GFEBS and CHES, APMS offers the least potential for the accurate and complete tracking and accounting of procured IT assets.

During research on existing automated systems, information was uncovered on a system named the Army Request for Information Technology (ARFIT). According to draft implementation guidance,⁴¹ this new automated process is being designed to address formally identified deficiencies with the Army's enforcement of IT asset procurement procedures. The draft guidance states that in Phase I officials will use ARFIT to obtain approval for all IT asset procurements, regardless of dollar value. In later phases, ARFIT is to be integrated with GFEBS and APMS. In total, the draft document states that ARFIT will address the IT management problem areas uncovered by recent audits; reduce redundancies; and be the authoritative management tool, process, and database for officials to use to identify and procure Army IT assets.

Reviews of the draft workflow process⁴² and Required Information Appendix⁴³ show that although ARFIT may improve the governance process in terms of reviewing

and approving local purchase requests, it is not clear how the new system will improve enterprise visibility of the IT products and services procured. For example, instructional information found in the table in the Required Information Appendix does not indicate that specific product information, such as vendor model or software version number, is to be entered in ARFIT. It appears that ARFIT is not being designed to track and account for specific data on contractor billable hours. And it is not clear how this new automated process will add to or enhance the functionality already provided by many other automated systems, such as, for just a few examples, CMRA, GFEBS, CHESS, APMS, or the Property Book Unit Supply Enhanced (PBUSE) system.

The Property Book Unit Supply Enhanced (PBUSE) system, according to an overview provided by the Software Engineering Center (SEC) on Fort Lee, Virginia (SEC-Lee),⁴⁴ provides users, such as those in the Army Property Book Offices (PBO) and at the Unit Supply level with online, real-time property accountability capabilities. From the SEC-Lee overview we learn PBUSE is heavily used throughout the Army to track and account for those items requiring accurate and complete visibility at the local level. For example, the overview says PBUSE is being used by some 35,900 users who generate more than six million transactions per month to track and account for over 59,500,000 property book items worth about \$200 billion.⁴⁵

As we learned during the interviews with IT asset management experts from Carlisle Barracks and the Assistant G-1 for Civilian Personnel (AG-1(CP)), PBUSE is used by these two organizations to a limited extent to manage select IT assets. For example, in AG-1(CP), local procedures call for entering IT asset data into PBUSE only for items with a unit price of \$5,000 or more. In the absence of a better alternative, it

seems that PBUSE could be used to at least improve the visibility of tangible IT assets in the enterprise.⁴⁶ However, PBUSE would probably not be ideal for modification to enable it to track and account for contractor man-hour costs or for the costs of locally procured IT services, which are two critical components for determining the total cost of ownership of an IT asset.

Across the Army today we see that data on a locally procured IT product such as SharePoint and its associated servers and licenses could, to some extent, simultaneously be found in all sorts of systems, such as GFEBS, CHESS, APMS, PBUSE, and apparently soon in ARFIT. And in terms of personnel costs, the contractor man-hours expended to install, configure, and administer SharePoint are being aggregated with other billable hours in CMRA. To add to this mix of six large-scale, enterprise systems, we will see next that vendor data on IT products such as SharePoint could be found in Wide Area Workflow (WAWF) too!⁴⁷

Given the capabilities of the seven systems reviewed, the best solution for precisely determining who procured what IT assets when and for how much and for also accurately calculating the contractor manpower costs for sustaining these assets could be WAWF. From a Defense Finance and Accounting Service (DFAS) overview on WAWF⁴⁸ we learn that an automated contractor payment processing system was mandated by Section 1008 of the National Defense Authorization Act (NDAA) of 2001.⁴⁹ Adding to the NDAA of 2001, the Defense Federal Acquisition Regulation Supplement (DFARS) Subpart 232.70⁵⁰ requires contractors to electronically submit their invoices and the designated government officials to electronically process these invoices via WAWF. Contractors are not, however, currently required to submit invoices via WAWF

for assets procured with a government purchase card, or for purchases made via classified contracts, or for contracts awarded to foreign vendors who perform work outside of the United States.

As depicted in a DFAS overview,⁵¹ the receipt and acceptance process begins with the vendor submitting an invoice and/or receiving report to responsible government officials via WAWF. If the designated government officials receive, inspect, and accept delivery of the product(s) as indicated on the vendor's invoice, then WAWF sends a notice to a DFAS payment office to further process the transaction. With a positive response from the DFAS payment office, WAWF then transmits a payment action to a DoD pay system. The DoD pay system then processes the payment to the vendor based on the invoice, receiving report, and contract. If all payment processing is successful, the DoD pay system submits an electronic fund transfer (EFT) for the invoice amount to the vendor's bank.

What makes WAWF especially relevant for potentially tracking and accounting for locally procured IT assets is that vendors already must use it to submit invoices with line item information about their products and services. When selling the government products, vendors must enter specific data such as item number, stock number (e.g., National Stock Number or the vendor's part number), quantity shipped, unit of measure, unit price, and description for the contract line item number (CLIN). For IT services, contractors must submit invoices that include data for the billable hours (e.g., a unit of measure in hours or weeks), and the unit price.⁵²

Referring again to SharePoint as an example, a Purchase Request for the software and the necessary servers and licenses is routed through the existing

automated systems and then sent to the selected vendors. The vendors ship their products to the Army customer and submit invoices detailing their sales in WAWF. A designated government official accepts receipt of the products in WAWF, which triggers a DoD pay system to send payments to the vendors.

Meanwhile, an onsite contractor installs, configures, and administers the new servers and installs, configures, and administers the new SharePoint system and then submits a service invoice for the specific billable hours in WAWF.⁵³ A government official accepts the service invoice and then sends the transaction on its way through the remaining steps.

In these two directly related example transactions accurate and complete costs for procuring and sustaining the SharePoint software and necessary servers are captured in one authoritative database. In this case, enough data would be available for calculating a reasonably good total cost of ownership for the organization's SharePoint system.

There are four key arguments supporting WAWF as a suitable source for accurately and completely determining who procured what IT assets and services when and for how much. First, today, as promulgated, vendors must use WAWF to submit invoices to the Army before they are paid. Second, government officials, in turn, must use the system to validate they received exactly what is reflected on the vendors' invoices. Third, with sufficiently detailed vendor product and contracted service information stored in WAWF, it would be relatively straightforward to mine information from the database to establish and maintain enterprise visibility of the products and services being procured. And fourth, this method could be implemented without

requiring anyone to do more than they are already required to do during the IT asset lifecycle process.

Alternative Views to Address

For many inside the IT community, as well as for some outside of it, the idea of tracking and accounting for each IT asset procured, including each contractor's billable hour, will be seen as placing too much emphasis on bureaucratic efficiency at the expense of operational effectiveness. For instance, they may cite DA PAM 25-1-1 guidance on micropurchases, which goes so far to say that it is not worth the time and effort to keep track of IT purchases that cost under \$2,500.⁵⁴ Some may argue that the automated systems being used today are good enough for the management of IT assets. And a point could be made that WAWF, or a similar centralized system, is not designed to account for the disposal, turn-in, transfer, loss, or theft of IT assets and therefore it is not a good candidate for an automated IT asset inventory system.

These are good points to be considered by the Army's senior leaders if they feel the IT asset management process should be improved, and, if so, how. A vendor-fed automated system such as WAWF will accurately and completely capture each IT asset procurement without adversely impacting organizational effectiveness. The requirement for detailing each vendor-to-government transaction will continue to be met by the vendor / contractor via the required invoice. The government officials involved in the process will continue to take the same actions that they are taking now in the performance of their duties. In terms of the effectiveness of existing guidance and the consequent automated systems for tracking and accounting for IT assets, the fact that the Army has to resort to a data call to determine the location and total cost of

ownership of its 900 or so copies of SharePoint, for just one familiar example, is telling enough.

And finally, while acknowledging that WAWF is not and should not become an automated inventory system, what it could become is a system for precisely determining the totality of the IT products and services locally procured over time. And, it seems feasible that WAWF product data could be sent to a system such as PBUSE to initially populate the latter with inventory information. In time, WAWF could be the authoritative source for capturing and reporting all invoice information (for both products and contracted services) and for initially populating a system such as PBUSE with data on products requiring local inventory management.

Conclusion and Recommendation

There are numerous and comprehensive laws, policies, regulations, and procedures applicable to managing Army IT assets. To comply with this guidance, management and acquisition officials, resource managers, and government contractors use many different automated systems in the asset lifecycle process. Collectively, the voluminous official guidance plus the consequent automated functionality amounts to an e-bureaucracy⁵⁵ that is incapable of providing Army leaders timely, accurate, and complete enterprise visibility of locally procured IT assets.

Fortunately, centralizing visibility of who procured what products and services when and for how much is achievable without adding bureaucratic red-tape to an already unwieldy mix of official guidance and supporting automation. By capturing *all* vendor and contractor invoice information in *one* database, the department will have an authoritative repository of timely, accurate, and complete information on the products and contracted services that are locally procured. Only after this level of enterprise

visibility is achieved can the Army implement policy changes to measurably improve efficiency in information technology asset management.

More research of WAWF capabilities is needed to verify whether or not the system is capable of providing raw data for all vendor product invoices, including those generated for procurements made via government purchase cards, and detailed invoices for contracted services. If WAWF cannot become a fully capable source for these invoices, then the Army should begin to capture available vendor information from existing reliable sources and then aggregate the data in a separate data warehouse.

Necessary modifications should then be made to WAWF and/or other automated systems to capture procurements made via government purchase cards and detailed invoices for contracted services.⁵⁶ With all vendor product and contracted services information aggregated, the Army can then finally determine a starting baseline inventory of each capability; determine where are the opportunities for reducing IT overcapacity and redundancy and eliminating excesses; and adjust its policies, regulations, procedures, and, especially, local IT budgets accordingly. Lastly, subsequent research should be conducted to determine if WAWF data could be used to initially populate an inventory system, such as PBUSE, with IT asset product information.

APMS – Army Portfolio Management Solution	We learn from the 2007 Army Posture Statement ⁵⁷ that “The Army has implemented the Army Portfolio Management Solution (APMS) to facilitate collection and analysis of information necessary to prioritize the thousands of IT investments within its portfolio. IT investments are grouped according to the mission capabilities they support: Warfighter, Business and Enterprise Information Environment Mission Areas, each of which is led by a three- or four-star level general officer or senior executive.”
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ARFIT – Army Request for Information Technology	Draft implementation guidance ⁵⁸ explains that the “Army Request for Information Technology (ARFIT) is the Army’s new governance process and application to obtain approval to procure IT. ARFIT is a multilevel management process and application that integrates all requirements for IT procurement into one process implemented uniformly across the Army enterprise. ARFIT is a rules-based application that allows HQDA to manage the procurement of IT by exception. While all IT procurements must go through the ARFIT process, only those that meet the exception criteria defined in this document will be routed to the DA staff for review and approval.”
CHESS – Computer Hardware, Enterprise Software and Solutions	As stated in Army Regulation 25-1, ⁵⁹ “The CHES Office is the primary source for establishing commercial IT contracts for hardware, software, and services. The use of CHES contract offerings makes purchasing more efficient through volume buying, thereby simplifying and centralizing IT lifecycle management throughout the Army enterprise. Organizations will use the CHES, to the maximum extent possible, to purchase COTS software, desktops, and notebook computers regardless of dollar value and for all other IT purchases greater than \$25K. If a requirement cannot be satisfied based on these criteria against a CHES contract, a waiver may be granted.”
CMRA – Contractor Manpower Reporting Application	The CMRA User’s Guide says that “The CMRA is an online database that automates the Army’s contract management and reporting process for contract management personnel by allowing users to enter their contract information, track contract data, and view reports based on contract data in the application.” The guide further states that “It enables the Army to: Fully understand the total Army workforce; Provide better oversight of the workforce; Ensure Army receives full value from contractor workforce; Better account for total Army workforce.” ⁶⁰
COTS – Commercial Off-the-Shelf	COTS products are commercially available to the general public. These products are typically procured with the intent of using them “as is” – that is, without modifying / customizing the product to any extent.
e-Bureaucracy	The author’s definition: An e-bureaucracy results from government officials mandating compliance with laws, policies, regulations, and procedures exclusively through the use of special purpose automated systems. These automated systems are often boutique, non-integrated, and non-standardized online applications that are usually contractor designed, built, and sustained as directed by those government organizations that have the funding and authority to impose such functionality on their clientele.

GFEBS – General Fund Enterprise Business System	Per the GFEBS homepage, ⁶¹ “The General Fund Enterprise Business System – or GFEBS – (a project office of the US Army’s PEO EIS) is the Army’s new web-enabled financial, asset and accounting management system that standardizes, streamlines and shares critical data across the Active Army, the Army National Guard and the Army Reserve....The primary goal of GFEBS is to capture transactions and provide reliable data to better enable Army leadership to make decisions in support of the Warfighting capability.”
PBUSE – Property Book Unit Supply Enhanced	As stated in the PBUSE User’s Guide, ⁶² “ PBUSE provides a responsive and efficient means to maintain accountable records for the Army’s inventory of property in the hands of Tables(s) of Organization and Equipment (TOE) and/or Table of Distribution and Allowances (TDA) units, National Guard and Reserve Units, and Installations.”
TDA – Tables of Distribution and Allowances	According to the U.S. Army Center of Military History, “TDA units are organized to perform specific missions for which there are no appropriate TOEs [Table of Organization and Equipment units]....Unlike TOE units, TDA organizations are considered non-deployable, even when organized overseas, as their missions are normally tied to a geographic location. The personnel of TDA organizations can be military, civilian, or a combination of both.” ⁶³
WAWF – Wide Area Workflow	The WAWF homepage ⁶⁴ says that “Wide Area Workflow (WAWF) is a secure Web-based system for electronic invoicing, receipt and acceptance....WAWF creates a virtual folder to combine the three documents required to pay a Vendor - the Contract, the Invoice, and the Receiving Report. The WAWF application enables electronic form submission of Invoices, government inspection, and acceptance documents in order to support DoD’s goal of moving to a paperless acquisition process.”

Table 1. List of Acronyms and Terms

Endnotes

¹ See Table 1. List of Acronyms and Terms for more information regarding the acronyms and terms used throughout this paper.

² Guidance under which they operate, for example, includes Army Regulation 25-1, Army Knowledge Management and Information Technology and Department of the Army Pamphlet 25-1-1, Information Technology Support and Services. For this research, it is assumed that the personnel involved, such as the Chief Information Officer (CIO), Information Management Officer (IMO), the Resource Manager (RM), Property Book Officer (PBO), and IT acquisition

personnel are meeting the requirements and intent of all applicable laws, regulations, policies, procedures, memoranda, and so on throughout the IT lifecycle.

³ U.S. Department of the Army, Army Chief Information Officer/G-6, "Enterprise Network Update December 2010: Enterprise SharePoint," Washington, DC: U.S. Department of the Army, December 2010.

⁴ U.S. Department of the Army, "Current Use of SharePoint by Army Commands ALARACT," March 16, 2011, [ALARACT_082_2011_USE_OF_SHAREPOINT_BY_ARMY_COMMANDS_ALARACT](#) (accessed December 23, 2011).

⁵ U.S. Department of Defense, Enterprise Software Initiative, "Attachment A – Product and Price List in Excel Format," TAB CLINS 0001-S008 Single Products, <http://www.esi.mil/contentview.aspx?id=176&type=2> (accessed October 29, 2011).

⁶ Although the example of SharePoint is used throughout this paper, the lack of visibility of locally procured IT products and services is a problem for other similar assets such as commercial grade databases (examples include Oracle and Microsoft's SQL Server), websites (of all sizes), automated workflow products, software developer suites and toolkits, commercial statistical reporting packages, and so on. In terms of not knowing what was procured and is being sustained enterprise wide, the worst problem of all is probably with the locally developed automated software applications. Locally developed applications are often redundant, shortsighted, extremely costly to build and maintain, and especially difficult to track, account for, and control at the enterprise level.

⁷ The problem of overcapacity is currently being addressed to some extent – for example, with the federally mandated data center consolidation effort and email service migration from local providers to a single DoD provider. The problem of redundant capabilities, especially those resulting from locally sustained automated systems (both commercial off-the-shelf, or COTS, and locally developed), is widely known, readily acknowledged, and is being governed to some extent. The totality of waste throughout the department cannot be measured until the Army achieves precise visibility of its IT assets.

⁸ For brevity at the risk of over simplifying who does what when in the IT asset lifecycle, the terms IT officials, managers, approving authorities, decision makers and so on include local personnel who are delegated specific authority to make IT purchase decisions and/or to obligate government funds for IT products and services. The personnel involved could include, for example, the locally designated Chief Information Officer (CIO), Information Management Officer (IMO), Resource Manager (RM), contracting personnel (such as the Contracting Officer, Contract Specialist, and Contracting Officer's Representative), IT acquisition personnel, others who are authorized to procure IT assets with a government purchase card, and senior leaders involved in the organization's IT governance process (e.g., the Chair and voting members of the local Configuration Control Board, or CCB), among others. A key point to keep in mind throughout this paper is that no one person in an organization has absolute authority to procure high dollar value IT assets singlehandedly and without coordination and concurrence from other officials.

⁹ In this paper, boutique software is a term for locally developed and sustained, narrowly focused, especially hard to track and account for, and often non-integrated / non-interoperable automated systems and applications.

¹⁰ Total cost of ownership is admittedly an extremely difficult dollar amount to determine. For this research, it includes readily available direct and indirect costs incurred throughout the asset's lifecycle, such as the costs to procure the IT asset and install, configure, administer, sustain, upgrade, and decommission it.

¹¹ The costs for military and civilian personnel must eventually be included in the calculations for the total cost of ownership of IT assets. It is relatively easy to obtain these manpower costs – the first step for the Army, though, is to accurately and completely track and account for the costs of its contractor personnel.

¹² *Paperwork Reduction Act of 1995*, Public Law 104-13, 104th Cong., (May 22, 1995). Online at <http://www.archives.gov/federal-register/laws/paperwork-reduction/>, see especially § 3506 Federal agency responsibilities (accessed 25 October 2011).

¹³ The Information Technology Management Reform Act of 1996 (ITMRA) was subsequently designated the Clinger-Cohen Act of 1996.

¹⁴ *National Defense Authorization Act (NDAA) of 1996*, Public Law 104-106, 104th Cong. (February 10, 1996). ITMRA, later renamed The Clinger-Cohen Act of 1996, was part of the NDAA of 1996. See especially 40 USC, Chapter 113, Section 11312 online at http://uscode.house.gov/download/title_40.shtml (accessed October 25, 2011).

¹⁵ Title 10 - Armed Forces, Subtitle A - General Military Law, Part IV - Service, Supply, and Procurement, Chapter 131, Sec. 2223, (October 1, 1998), [http://uscode.house.gov/uscode-cgi/fastweb.exe?getdoc+uscview+t09t12+1374+0++\(\)%20%20A](http://uscode.house.gov/uscode-cgi/fastweb.exe?getdoc+uscview+t09t12+1374+0++()%20%20A) (accessed October, 26 2011).

¹⁶ U.S. Office of Management and Budget, "OMB Circular No. A-130: Management of Federal Information Resources," as amended, http://www.whitehouse.gov/omb/circulars_a130_a130trans4#8 (accessed October 29, 2011).

¹⁷ U.S. Department of Defense, "Department of Defense Directive 8115.01," October 10, 2005, <http://www.dtic.mil/whs/directives/corres/pdf/811501p.pdf> (accessed October 5, 2011).

¹⁸ U.S. Department of Defense, "Department of Defense Directive 8115.02," October 30, 2006 <http://www.dtic.mil/whs/directives/corres/pdf/811502p.pdf> (accessed October 5, 2011).

¹⁹ Ibid. The DoDI states the four mission areas are: The Warfighting Mission Area (WMA), the Business Mission Area (BMA), DoD's portion of the Intelligence Mission Area (DIMA), and the Enterprise Information Environment (EIE) Mission Area (EIEMA).

²⁰ U.S. Department of the Army, "Army Knowledge Management and Information Technology, Department of the Army Regulation 25-1," December 4 2008, http://www.apd.army.mil/pdf/r25_1.pdf (accessed December 2, 2011).

²¹ U.S. Department of the Army, "Information Technology Support and Services, Department of the Army Pamphlet 25-1," October 25, 2006, http://www.apd.army.mil/pdf/p25_1_1.pdf (accessed December 2, 2011).

²² U.S. Department of the Army, "Supply Policy Below the National Level, Department of the Army Regulation 710-2," March 28, 2008, http://www.apd.army.mil/pdf/r710_2.pdf , 22 (accessed December 4, 2011).

²³ Interview with confidential source, October 27, 2011.

²⁴ In addition to the availability of funds, a senior member of the Carlisle Barracks Office of the CIO, whose interview follows this one, elaborates governance related requirements for procuring a product such as SharePoint.

²⁵ Interview with three confidential sources, October 31 2011.

²⁶ Ibid., "Must Fund" is a term commonly used for the products and services the government is contractually obligated to pay for.

²⁷ Ibid., The demand for BlackBerrys on Carlisle Barracks recently increased from about 40 to over 100, at a sustainment cost of around \$1,000 per year for each device.

²⁸ Under current Army guidance, a Goal 1 Waiver request is required to be submitted for approval if the IT asset cost more than \$25,000 and it is being paid for from the Operations and Maintenance (O&M) account.

²⁹ Interview with three confidential sources, November 7, 2011.

³⁰ U.S. Secretary of the Army Francis J. Harvey, "Accounting for Contract Services," memorandum for Principal Officials of Headquarters, Department of the Army, Washington DC, January 7, 2005, https://cmra.army.mil/Help/Secretary_of_the_Army_Memo_army_policy.pdf (accessed November 27, 2011).

³¹ U.S. Department of the Army, "Contractor Manpower Reporting Application, Full User Guide Version 3.6," https://cmra.army.mil/Help/Full_User_Guide.pdf (accessed November 12, 2011).

³² U.S. Department of the Army, "Contractor Manpower Reporting Application, Frequently Asked Questions Version 3.7," linked from *The Contractor Manpower Application Home Page* at "View User Manuals, Frequently Asked Questions (FAQ) and Glossary," <https://cmra.army.mil/Login.aspx> (accessed November 12, 2011).

³³ Kristyn E. Jones, Frank A. Distasio, "Army Moving to Compliance with the Chief Financial Officers Act," *The Journal of the American Society of Military Comptrollers*, (Spring 2011): 8-10.

³⁴ Assistant Secretary of the Army for Financial Management & Comptroller, "General Fund Enterprise Business System (GFEBS) Wave 8 Site Visit Spending Chain Business Process Workshop," October 26, 2010. <https://www.us.army.mil/suite/doc/30724590> (accessed October 22, 2011).

³⁵ U.S. Department of the Army, "Army Federal Acquisition Regulation Supplement: AFARS Revision #25," April 1, 2010, 150, https://www.alt.army.mil/portal/page/portal/oasaalt/documents/AFARS%20Revision%20No%2025%20FINAL_040110.pdf (accessed December 8, 2011).

³⁶ Acting Assistant Secretary of the Army(Acquisition, Logistics, and Technology) Dean G. Popp, and Chief Information Officer/G-6 LTG Jeffrey A. Sorenson, "Use of Computer Hardware, Enterprise Software and Solutions (CHESS) as the Primary Source for Procuring Commercial Information Technology (IT) Hardware and Software," memorandum for Principal Officials of Headquarters, Department of the Army, Washington, DC, May 4, 2009, <http://ciog6.army.mil/LinkClick.aspx?fileticket=FwYmnYpcJdl%3D&tabid=64> (accessed November 12, 2011).

³⁷ Brendan Burke, "Army Computer Hardware, Enterprise Software and Solutions (CHESS) Overview: Information Exchange Forum Session: #1," https://ascp.army.mil/ascp/commerce/downloads/LWN/LWN11_CHESS_CHESS%20101_v5-2011-08-23.pdf, 8, (accessed November 1, 2011).

³⁸ U.S. Department of the Army, "Army Portfolio Management Solution (APMS) Fundamentals Training Manual Release 1", January 4, 2011, <https://www.us.army.mil/suite/doc/26317786> (accessed November 25, 2011).

³⁹ U.S. Department of the Army, "Army Knowledge Management and Information Technology, Department of the Army Regulation 25-1," December 4 2008, http://www.apd.army.mil/pdf/files/r25_1.pdf, 23, (accessed December 2, 2011).

⁴⁰ U.S. Department of the Army, Chief Information Officer / G-6, "Army IT Portfolio Management and the Army Portfolio Management Solution (APMS)" briefing slides, Washington, DC, n.d.

⁴¹ U.S. Department of the Army Chief Information Officer/G-6 (CIO/G6), "Army Request for Information Technology Implementation Guidance: DRAFT," March 9, 2011, <https://www.us.army.mil/suite/doc/27703486> (accessed November 29, 2011).

⁴² Ibid.,11.

⁴³ Ibid.,14-17.

⁴⁴ U.S. Department of the Army, Software Engineering Center - Lee, "PBUSE Overview" briefing slides, Fort Lee, VA, November 10, 2010.

⁴⁵ Ibid., 3.

⁴⁶ A discussion on the Army policies and regulations that identify the particular assets that are "accountable," and therefore are to be tracked in an inventory management system such as PBUSE, is outside the scope of this research. On a related note, the author's many years of experience with automation supporting inventory management of Class V (ammunition) and IX (repair parts) assets demonstrates the Army can do significantly better with the management of its IT assets compared to the level of detail that other assets are managed to (e.g., by national stock number, or NSN).

⁴⁷ As a reminder, there are more than these automated systems being used throughout the IT lifecycle process. While acknowledging this is not a comprehensive list of all relevant systems, the seven automated systems reviewed for this research are useful for illustrating how

much automation has proliferated in the Army to no avail in terms of providing leaders accurate and complete enterprise visibility of locally procured products and services.

⁴⁸ Defense Finance and Accounting Service, "Wide Area Work Flow Overview," <https://www.us.army.mil/suite/doc/22305481>, (accessed November 12, 2011).

⁴⁹ *National Defense Authorization for Fiscal Year 2001*, Public Law 106-398, 106th Cong. (October 30, 2000). Specifically, § 2227. Electronic submission and processing of claims for contract payments states "(a) SUBMISSION OF CLAIMS.—The Secretary of Defense shall require that any claim for payment under a Department of Defense contract shall be submitted to the Department of Defense in electronic form." <http://www.dod.gov/dodgc/olc/docs/2001NDAA.pdf> (accessed December 12, 2011).

⁵⁰ U.S. Department of Defense, "Defense Federal Acquisition Regulation Supplement: Subpart 232.70—Electronic Submission and Processing of Payment Requests and Receiving Reports," Revised March 3, 2008, http://www.acq.osd.mil/dpap/dars/dfars/html/current/232_70.htm. Section 232.7003, Procedures, states "(a) The accepted electronic form for submission of payment requests and receiving reports is Wide Area WorkFlow," (accessed December 12, 2011).

⁵¹ Defense Finance and Accounting Service, "Wide Area Work Flow Overview," <https://www.us.army.mil/suite/doc/22305481>, 13, (accessed November 12, 2011).

⁵² U.S. Department of Defense, Washington Headquarters Service (WHS), "Wide Area Workflow (WAWF) Vendor Guide Ver. 3.0.8," July 2005, <http://www.whs.mil/APO/documents/VendorGuide-WHS.pdf>, 8-12, (accessed November 12, 2011). More research is required to determine the level of detail of the IT service invoices submitted by contractors. Until then, it is assumed that invoices submitted by contractors is, or could be, detailed enough for the purpose of precisely calculating the total cost of ownership of each IT asset.

⁵³ In this simplified example transaction, the invoice for the hours billed regarding server and SharePoint installation and administration is only illustrative – it is not meant to reflect how contracted IT services are currently billed in WAWF, or in any other automated system.

⁵⁴ U.S. Department of the Army, "Information Technology Support and Services, Department of the Army Pamphlet 25-1," 92, October 25, 2006, http://www.apd.army.mil/pdf/files/p25_1_1.pdf (accessed December 2, 2011). The author wholeheartedly disagrees with this guidance. Granting anyone unrestrained and unconstrained authority to make discretionary IT purchases – as small as these micropurchases seem relative to the Army's budget – greatly adds to the Army's overcapacity and redundancy problems. For example, in one organization the author served in, his software librarian reported the organization had 107 unique desktop software products in the inventory. Many of these products were procured via the micropurchase / government purchase card process. Leaders at the *enterprise level* should be aware of what is in the *enterprise inventory* and ensure that local IT asset procurements such as these 107 desktop products are justified given an organization's mission.

⁵⁵ The author's definition: An e-bureaucracy results from government officials mandating compliance with laws, policies, regulations, and procedures exclusively through the use of

special purpose automated systems. These automated systems are often boutique, non-integrated, and non-standardized online applications that are usually contractor designed, built, and sustained as directed by those government organizations that have the funding and authority to impose such functionality on their clientele.

⁵⁶ With accurate and complete vendor / contractor costs captured in WAWF, or in a separate data warehouse, the Army would still need to capture associated military and civilian personnel costs for calculating the total cost of ownership for IT assets. While breaking down the military and civilian personnel costs per asset is a subject for follow-on research, exact salary and wage data for each military service member and civilian employee is available in a number of existing personnel systems. This information could be used to calculate the rough order of magnitude of military and civilian personnel costs for an agency's IT operations. These rough personnel costs could then be added to the more precisely calculated vendor / contractor costs.

⁵⁷ *2007 Army Posture Statement – Information Technology Portfolio Management*, <http://www.army.mil/aps/07/infopapers/78.html> (accessed February 11, 2012).

⁵⁸ U.S. Department of the Army Chief Information Officer/G-6 (CIO/G6), "Army Request for Information Technology Implementation Guidance: DRAFT," March 9, 2011, <https://www.us.army.mil/suite/doc/27703486>, 2, (accessed November 29, 2011).

⁵⁹ U.S. Department of the Army, "Army Knowledge Management and Information Technology, Department of the Army Regulation 25-1," December 4 2008, http://www.apd.army.mil/pdf/r25_1.pdf, 35-36, (accessed December 2, 2011).

⁶⁰ U.S. Department of the Army, "Contractor Manpower Reporting Application, Full User Guide Version 3.6," https://cmra.army.mil/Help/Full_User_Guide.pdf, 3, (accessed November 12, 2011).

⁶¹ *The General Fund Enterprise Business System Home Page*, <http://www.gfebs.army.mil/> (accessed February 12, 2012).

⁶² U.S. Department of the Army, Software Engineering Center – Lee, "AIS Manual PBUSE EUM," linked from the PBUSE Home Page at Section 2 System Summary, 2-1, https://pbuse.lee.army.mil/gcss/help/eum/pdf/Section_2.pdf (accessed 14 February 2012).

⁶³ U.S. Department of the Army, Center of Military History, "History of Tables of Distribution and Allowances (TDA) Units," <http://www.history.army.mil/html/forcestruc/tda-ip.html> (accessed February 7, 2012).

⁶⁴ *The Wide Area Workflow Homepage*, <https://wawf.eb.mil/xhtml/unauth/web/homepage/FunctionalInfo.xhtml> (accessed February 15, 2012).