



Army Software Transformation: Delivering Applications to the Warfighter

[H]ow we integrate information technology into our operations and structure its acquisition is among the most important determinants of our military power.

Deputy Secretary of Defense William J. Lynn III¹

Introduction

During nine years of conflict, facing agile and adaptable enemies, the U.S. Army has continued its transformation using lessons learned on the battlefield. Information technology—including that available to opponents—continues to advance rapidly, but the Army's technology applications are not keeping pace. To address this problem, the Army has developed a strategy to transform the way it acquires and implements computer software solutions.

Speeding up the Army's software acquisition process will require fundamental changes. With that in mind, the Army's senior leadership has launched Army Software Transformation,² an effort to radically decrease the time it takes to deliver relevant applications across the force. This will be accomplished using an enterprise approach that makes better use of the Army's limited resources and aligns all institutional assets to respond to dynamic operational requirements.

Success in this effort will require radical reformation of business models and processes,³ and the Army is looking to private industry for lessons learned and best practices that it can adopt. Innovative approaches such as those in use at Apple's App Store, agile development processes employed by corporations like eBay and platform standardization are key to increasing the pace of technology innovation. The evolution of smartphones in recent years illus-



trates the effect the Army is trying to achieve: each generation takes only months to develop and delivers more capabilities (both improved built-in functionality and increased access to inexpensive applications) for less money.

Limitations of the Current Environment

Today, the warfighter's information environment (e.g., e-mail address, phone number, network connectivity) changes when moving among home-station, training and deployment locations, interrupting work and degrading productivity. The Army's goal is for Soldiers to have a smartphone-like experience wherein applications, services and data are accessible globally without requiring end-user

¹ From remarks at the Defense Information Technology Acquisition Summit, Washington, D.C., 12 November 2009, <http://www.defense.gov/speeches/speech.aspx?speechid=1399>.

² For further information, see Lieutenant General Jeffrey A. Sorenson, Chief Information Officer/G-6, November 2009 presentation to the AUSA Institute of Land Warfare, http://www.army.mil/ciog6/briefings/Sorenson/09-11-12_AUSA_ILW_Breakfast.pdf.

³ For greater illustration of this point, see General Peter W. Chiarelli, Vice Chief of Staff, United States Army, Interview with National Defense, October 2009, http://www.nationaldefensemagazine.org/archive/2009/October/Pages/Army's_ViceChief'WeHavetoSpeedUpHowWeProcureThings'.aspx.



intervention or costly, inefficient and burdensome technical support to make these capabilities operational. To reach that goal, the Army will have to rethink its current systems-based development approach, adapting current acquisition models and processes that are ill-suited for rapidly developing and deploying applications.

The present command and control environment was built with systems that were established individually to deliver capability for a specific combat function: intelligence, maneuver, fire support, air defense, mobility and survivability, logistics or battle command. To support ongoing conflicts, combatant commanders have also procured technology solutions independently, installing and customizing them in theater. Consequently, deployed units plan and execute operations using multiple computer systems, servers, vehicle-based systems and hand-held and embedded systems.

While each of the official systems and unofficial solutions individually meets specific operational needs, work-around integration is typically required to enable cross-functional operational processes. These systems and solutions have limited reusability and no standard operating environment (different hardware, operating systems, databases and/or equipment) and are bolted onto vehicles or placed in tactical operations centers where space and power are limited. The result is inefficiencies, cumbersome work-arounds and complex knowledge management, with the warfighter often looking at multiple screens while engaged in conflict.

Currently all information technology (IT) development and management processes are based on a large-scale production model, as for a tank or aircraft. This model does not adapt well to the rapid pace of IT

innovation that has been a critical driver in accelerating the rate of change in the marketplace—and in the tactics and techniques employed by the Army’s opponents. Acquisition processes with long timelines limit the Army’s ability to continuously develop new applications that respond to emerging warfighter needs, creating barriers that prevent the Army from effectively harnessing rapidly advancing technology. Faced with enemies skilled at exploiting cheap communications devices and widely available commercial software, Soldiers are well aware that it takes too long for official institutional processes to deliver the technologies they need.

Army Software Transformation

Army Software Transformation is part of a larger effort to “transform LandWarNet to a centralized, more secure, operationalized and sustainable network capable of supporting an expeditionary Army in this era of persistent conflict.”⁴ The Global Network Enterprise Construct (GNEC) is the strategy to accomplish this goal. It focuses on providing the warfighter with universal access to the network and the ability to move from home station to deployment with consistent access to applications and data. During 2009, GNEC initiatives focused on providing a secure and centrally managed end-to-end network, from foxhole to rear station, which sets the conditions necessary to enable global access to applications and data.

The Army’s Network Service Center (NSC) performed the first operational validation of the GNEC as part of Exercise Austere Challenge 2009, successfully demonstrating the global access it offers.⁵ The Army’s computing facilities, called Area Processing Centers (APCs), hosted brigade-level battle command applications that were used from home station to the front lines, resulting in enhanced continuity of operations for an expeditionary deployment.

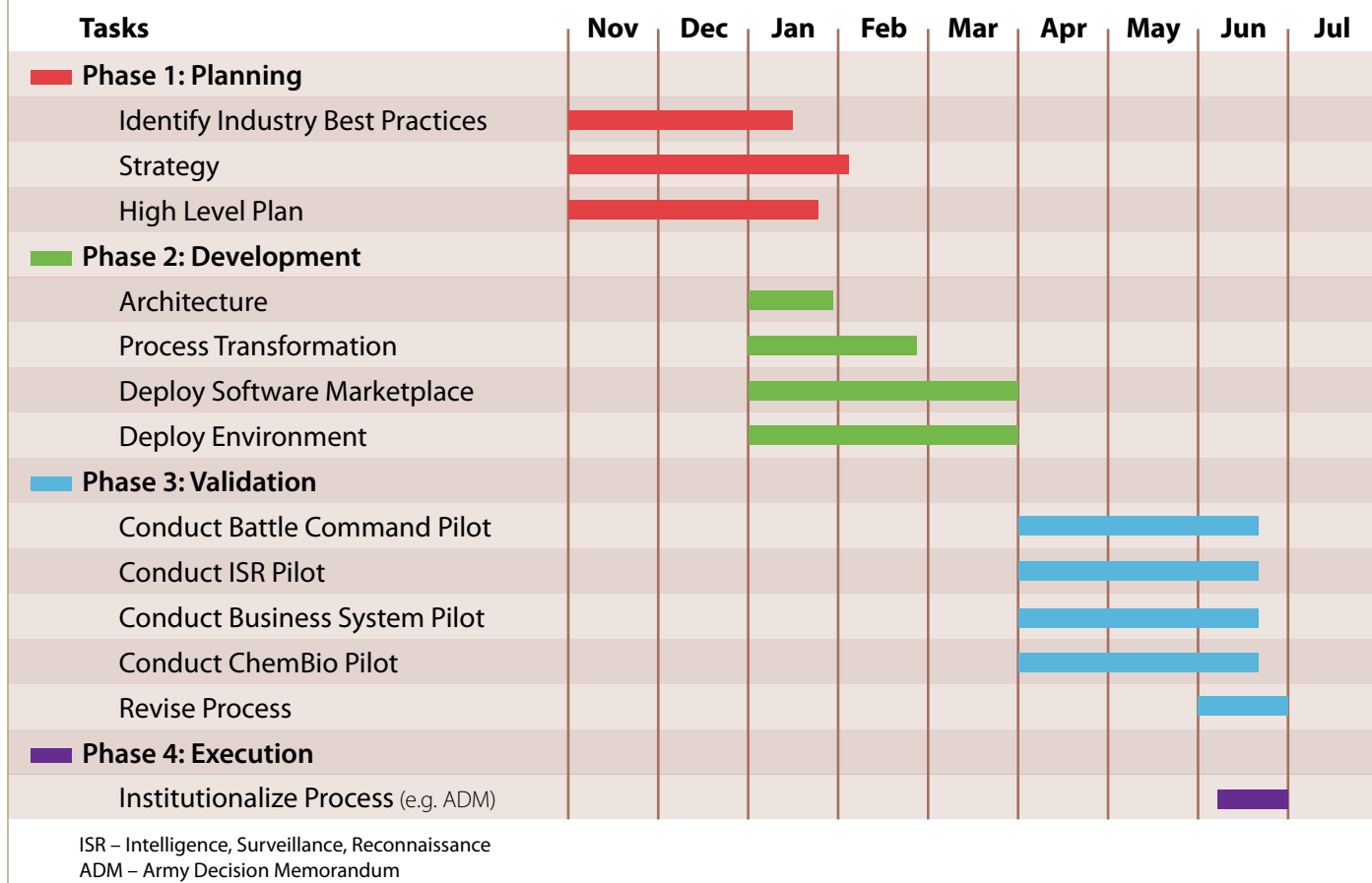
With GNEC as the foundation, Army Software Transformation will close the remaining gaps. Specifically, the Army intends to:

- standardize end-user environments and software development toolkits;
- establish streamlined enterprise software processes; and
- create an Army Application Marketplace.

⁴ General George W. Casey, Jr., Army Chief of Staff, Memorandum, subj: LandWarNet – Global Network Enterprise Construct Strategy Implementation, 2 March 2009.

⁵ Colonel John Hildebrand, Assistant Chief of Staff/G-3, NETCOM/9th Signal Command, GNEC and NETCOM 2009 Lessons Learned Briefing, presented 21 September 2009 at AFCEA Industry Days, Augusta, Ga.

Army Software Transformation Plan



Private industry has demonstrated that applications can be developed with and delivered on commoditized and inexpensive systems, often within weeks. This model can also work for the Army, with hardware and the operating environment—vehicle-based, hand-held device, server, laptop or desktop—becoming commodities. **The Army intends to define the end-user environment and take advantage of commercial software, often without modification, to achieve a balance between innovation and standardization.** This will allow software developers to focus on producing high-quality applications quickly and cheaply, and it should reduce the complexities of configuration, support and training associated with the end-user environment. The Army will also shift from procuring systems with dedicated hardware to buying applications that can be downloaded for use wherever they are needed.

Several acquisition programs, including the Army Battle Command System (ABCS), Distributed Common Ground Systems-Army (DCGS-A) and Force XXI Battle Command Brigade and Below (FBCB2) have already begun to transition from cumbersome system-of-systems

approaches to a common software framework and software development toolkit to produce new releases. Their initial experiences show success in reducing delivery time to the field and generating cost savings. For example, the materiel developer for the Tactical Airspace Integration System (TAIS) program (a part of ABCS), reports that use of the Command Post of the Future (CPOF) frame-





work (based on CoMotion technology) and NASA's Dynamic Airspace Collaboration Tool resulted in:

- development of a prototype capability to display TAIS air tracks on CPOF in just four weeks;
- a 65 percent reduction in computer hardware procurement costs by moving from expensive Unix laptops to Windows platforms;
- elimination of software license fees for the Windows product, compared to more than \$20,000 per license for Unix TAIS software, through developing innovative business strategies with the software developer;
- continuous capability enhancements, delivered quarterly; and
- substantial cost savings and cost avoidance by reusing CPOF technology during the program's migration to Windows. A value engineering study concluded that cost savings totaled \$3.86 million in Fiscal Year 2009 alone.

The Army also is moving to agile, continuous processes for application development, a style that has proven quite successful for the private sector. This approach entails constant response to change, continuous customer collaboration and frequent delivery of working software. Using social networking tools, the success of an application—and ultimately the organization—is now measured by transparent customer ratings and feedback. This customer-centric

approach relies on preapproved software development toolkits and automates submission, testing, certification and distribution of applications. As a result, developers work more quickly and efficiently.

The Army Application Marketplace will be the mechanism for transforming the way software development is managed. It will establish the infrastructure and the operations to support standardization of computing environments and streamlining of enterprise application processes. The marketplace will provide a central online location for advertising, locating and distributing (downloading) applications and services, and for tracking the Army office responsible for each application, as well as its developer, cost, version, usage, performance and user feedback. It will bring developers and end-users together to collaborate on innovative solutions to Army problems. The Army Application Marketplace will also make it easier for additional vendors to participate in developing software solutions, leveling the playing field and increasing competition.

The Way Ahead

The Army has a plan to revolutionize information technology acquisition and transform software-development technical and business processes enterprise-wide. This collaborative effort will bring together stakeholders from across the Army IT community to identify standard end-user environments and related software development toolkits. Pilot programs will validate and improve these new processes, environments and toolkits. Once approved by senior Army leadership, an Acquisition Decision Memorandum will direct program executive officers and program managers to implement these processes as well as the standardized end-user environments and associated toolkits.

Faced with enemies skilled at exploiting cheap, commercially available communications devices and off-the-shelf electronics, the Army must immediately transform its approach to delivering applications to remain the world's preeminent landpower and stay relevant to the challenges posed by the complex global security environment. Resources and institutional support are essential to the success of this effort.

A combat multiplier: the U.S. Army is transforming the way it acquires and implements computer software solutions.