# Integrated Logistics System-Supply (ILS-S) Legacy Modernization

Business Case: Modernizing a legacy COBOL application in preparation for cloud migration

The Problem

54-year-old Air Force (AF) Standard Base Supply System (SBSS) (ILS-S backend) system provides critical supply support for logistics, training, and wartime missions, but O&M costs had become prohibitive.
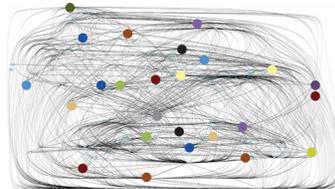
Millions of lines of complex COBOL code, insufficient technical documentation, and few remaining SMEs/Programmers. Prior attempts to modernize SBSS failed due to the massive size and complexity of the task.

The software needed to be upgraded in preparation for an AWS GovCloud migration, with no down-time, functionality/performance loss, and minimal mission risk.

The System

- Accountable data system for $55B in AF inventory, including classified, flight safety critical, and nuclear items.
- 18,000 users at 275 bases and forward operating locations around the world with 24/7 operations.
- COBOL-based SBSS system hosted on 8 Unisys mainframes with 1.3M Source Lines of Code (SLOC) in the core application that provides daily supply and equipment support for peacetime and wartime flying missions.
- Unisys DMS 2200 database with more than 3.5 million lines of COBOL code supporting approximately 500K transactions per day.

The Solution

COBOL **Phase 1** → JAVA **Phase 2** → JAVA **Phase 3** → AWS

Phase 1 (18 months): COBOL to Java Code Conversion and Rehost to x86/RHEL Platform
- Team ARRAY converted COBOL code from Unisys 2200 mainframes to Java code on a virtualized x86 RHEL platform with no loss of functionality or performance. The resulting converted Java code contained design remnants of COBOL. We further migrated the development and test environments to AWS. Phase 1 was completed 5-months early avoiding FY18 Unisys Mainframe DB costs of approximately $12M.

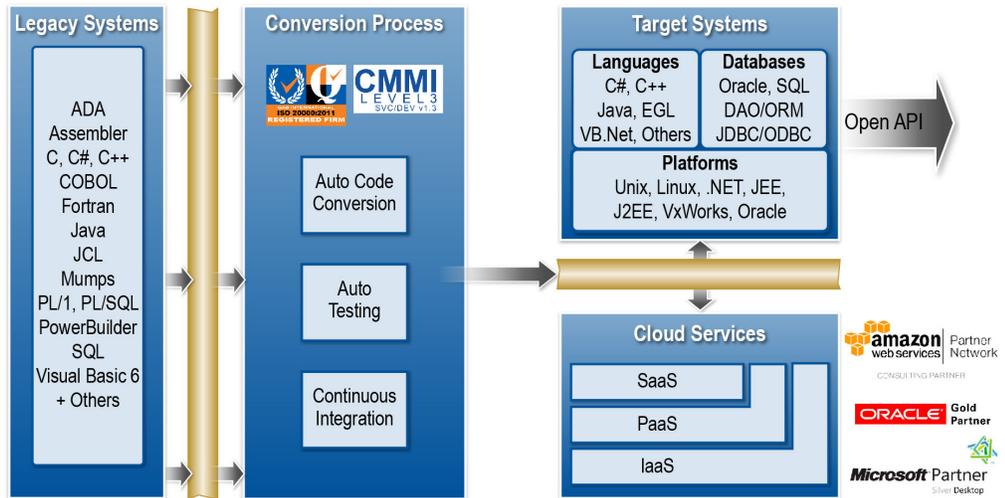**Phase 2 (12 months): Code Refactoring to Remove COBOL Design Overtones**
- Team ARRAY is currently refactoring the converted Java codebase to remove residual COBOL remnants, overtones, and design elements to improve maintainability.

Phase 3 (3 months): Full System Migration to AWS
- After Phase 2 is completed, we will migrate all remaining environments to AWS including production.
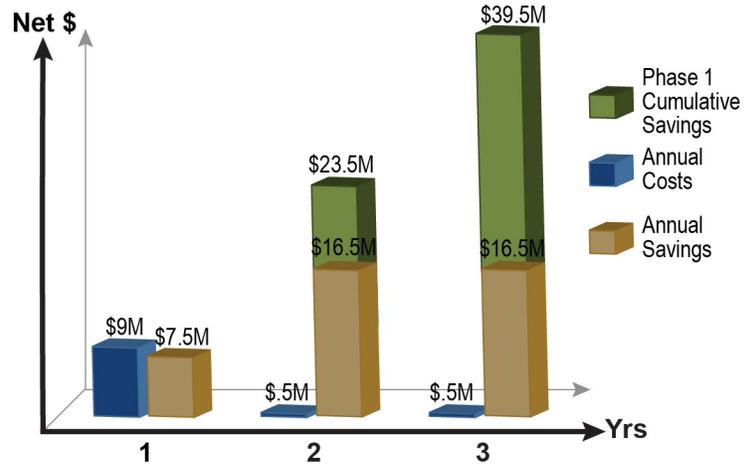
Portability

- Repeatable processes using Agile development, automated CM and testing tools; grounded in CMMI/ISO standards.
- Ability to exactly mirror current business processes and interfaces in Phase 1.
- Can be performed "from any code" base or environment "to any code" base or environment.
- Escaping legacy application challenges (e.g., resource availability, outdated technologies, exponential hosting costs) and a viable path to the cloud can be tackled under a single (but incremental) work scope.
- Breaking efforts into chunks (e.g., modernize, migrate, etc.) keeps risk low and ensures mission success.
- Modernizing legacy apps can enable a new set of sustainment opportunities (e.g., cross-trained labor pool, COTS/OSS tooling, cloud hosting, etc.)
- No limits to type or number of connected platforms or applications.

Legacy Systems

ADA
Assembler
C, C#, C++
COBOL
Fortran
Java
JCL
Mumps
PL/1, PL/SQL
PowerBuilder
SQL
Visual Basic 6
+ Others

Conversion Process

CMMI LEVEL 3 SVC/DEV v1.3

ISO 20000:2011 REGISTERED FIRM

Auto Code Conversion

Auto Testing

Continuous Integration

Target Systems

Languages	Databases
C#, C++	Oracle, SQL
Java, EGL	DAO/ORM
VB.Net, Others	JDBC/ODBC

Platforms
Unix, Linux, .NET, JEE, J2EE, VxWorks, Oracle

Open API

Cloud Services

SaaS
PaaS
IaaS

amazon web services Partner Network
CONSULTING PARTNER

ORACLE Gold Partner

Microsoft Partner
Silver Desktop

The Results

- Achieved a .015% per SLOC error rate that included remediating 800 AF HP Quality Center Problem Reports (PRs) for the 4.8M lines of code;
- Government performance testing found that the modernized SBSS solution delivered more than 500% of the production peak load in an environment 1/2 the size of production.
- The new capability could support 938 concurrent users or 8.7 times the normal expected production load while providing sub 5 second response times.
- Customer indicated, *This approach took advantage of Agile processes without having to slip the IMS for this project or create conflict with internal government processes that aligns with the PEO BES BPD systems engineering processes. All weekly Government SBSS migrations were met early or on time thereby ensuring all 275 SBSS sites were migrated 5 months ahead of schedule (Sep 2017 vs. Feb 2018).*
- Total projected cost savings over a 3-year period is $39.5M based on Phase 1 alone.

Net $

	Yr 1	Yr 2	Yr 3
Phase 1 Cumulative Savings	$9M	$23.5M	$39.5M
Annual Costs		$.5M	$.5M
Annual Savings	$7.5M	$16.5M	$16.5M

Yrs

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