

# Transition of Legacy Systems to a Service Oriented Architecture and Cross-Domain Web Services

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## PROBLEM STATEMENT

The Navy's information infrastructure is largely based upon aging technologies that impair the ability to effectively and securely share information between applications. Information sharing today is largely accomplished through handshake agreements and periodic exchange of database exports. The cost of maintain obsolescent information infrastructures is significant both from a monetary and operational perspective. In many cases, the Navy maintains duplicative data collection, storage, and dissemination applications to satisfy different users rather than making use of single authoritative data store and service. The immediate financial impact is apparent as multiple infrastructures must be established and maintained. However, the secondary fiscal impact often greatly exceeds this as the duplicative data stores must be fed information which entails costly human-centric processes. Operationally, this approach leads to conflicting data stores which must usually be manually correlated and resolved to develop any semblance of an authoritative view of the environment the data stores are supposed to relate.

This problem is exacerbated in complex DoD/DHS environments where classification boundaries separate and divide data sources. In order to fully leverage an SOA in these environments, it is imperative that a web service guard be put in place that securely enables the bidirectional transfer of information between classification enclaves. <sup>1</sup>

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<sup>1</sup><http://www.acq.osd.mil/osbp/sbir/solicitations/sbir062/navy062.htm>

## **WHO CAN BENEFIT?**

Any organization that maintains a significant data infrastructure will benefit from this solution. This solution provides a mechanism to rapidly transition a legacy information infrastructure to an SOA with minimal impact to the existing infrastructure. The transition of shipboard systems to an SOA being accomplished within the Consolidated Afloat Networks and Enterprise Services (CANES) by PEO C4I and SPAWAR as well as the Network Centric Enterprise Services (NCES) effort by DISA are two of many opportunities within DoD to apply this methodology and tool to ease the transition. PEOs investigating an SOA transition as well as systems integrators aiding in such a transition can all benefit from this approach and tool.

## **BASELINE TECHNOLOGY**

Almost all current Navy web-enabled systems are built on a second generation web framework consisting of a database and a web application. Application logic, business rules, and presentation scripting are typically heavily intermixed which yields systems that are heavily stove-piped and difficult to maintain. These problems are well-known in the commercial sector and have been one of the drivers for the transition to SOA.

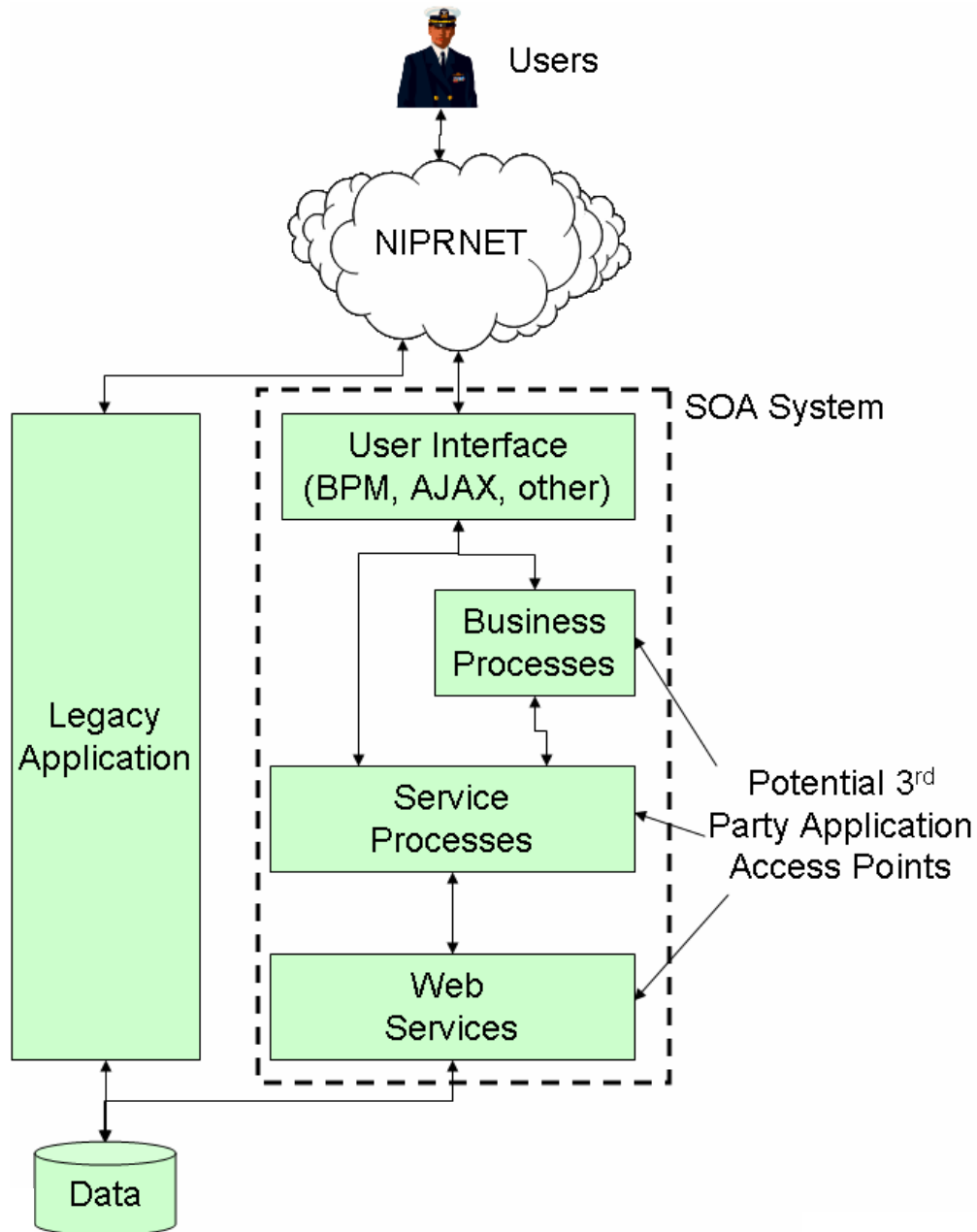
Cross-domain data transfer is accomplished most often by personnel physically moving information from one network to another. Specialty cross-domain devices are available and in use but are typically limited to very specific protocols and data types and are not effective at the interactivity required to make an SOA work. Typical cross-domain devices cost several hundred thousand dollars and are difficult to manage and maintain.

## **TECHNOLOGY DESCRIPTION**

The technology developed during the course of this SBIR is an amalgamation of two approaches. The first is a disciplined systematic method to SOA and web service development that yields components that are interoperable with the existing legacy system but provide a well-defined interface for use both internally by the re-architected application and by external customers. This transformation ensures the web services are truly cross-platform and have no “.NET-only or java-only” restrictions. A mapping layer is implemented that allows the legacy database naming scheme to remain in place and protect backwards compatibility but also allows conformance with modern web service element naming policies in place within DoN and DoD.

**Table 1: Features, Advantages, and Benefits**

Features	Advantages	Benefits
Well-defined external data and process interfaces	Greatly improved access to authoritative data sources	Better data reliability at a much lower cost and difficulty
Separation of data, business logic, and presentation	Improved code maintainability and re-usability	Lower long-term total cost of ownership of information systems
Smooth transition from legacy to SOA-enabled application	Ability to run both web services and legacy application simultaneously	Greatly eased transition period. Smoothly transition application/system to an SOA.



## CURRENT STATE OF DEVELOPMENT

The *legacy application transition* methodology has been tested on subsets of a legacy application and verified for correct operation. The application transition tool has been developed and has been demonstrated as a prototype to NAVSEA process stakeholders and users and is at TRL 6. Migration to the production environment (NDE) is in progress.

The *cross-domain technology* has been identified and observed in operation. Hardware has been procured to set up and test cross-domain functionality in a lab environment. This portion of the project is at TRL 3.

## ABOUT THE COMPANY

Avineon, Inc. is a CMMI Maturity Level 3 and ISO 9001:2000 registered Small Business with more than 16 years of federal prime contracting experience, successfully managing both large and small business subcontractors under multiple award agency contracts, government-wide acquisition contracts, BPAs, and other contracting vehicles. Avineon has deep experience and understanding in software development, systems engineering, Geographic Information Services (GIS), IT strategy, information security, Service Oriented Architecture (SOA), Business Process Management (BPM), knowledge management, and program management.

Avineon is a recognized industry leader with multiple awards from Washington Technology Fast 50, Virginia Innovation, Deloitte & Touche Fast 50, Harris Supplier Excellence Small Business Supplier of the Year, and most recently, Smart CEO Future 50. Avineon's dedication to disciplined systems engineering provides the foundation upon which complex projects are approached and has enabled Avineon to maintain a 100% customer satisfaction rating. Avineon, headquartered in Alexandria, VA, employs more than 1000 engineers, developers, GIS specialists, and configuration management specialists in the United States, India, and Europe and supports federal and local governments and commercial customers.