

## CBP Improves Efficiency and Effectiveness through EA

*CBP/CUSTOMS USES EA TO IMPROVE SYSTEMS SUPPORT AT LOWER COST TO MORE THAN 20 AGENCIES WITH MISSIONS TIED TO INTERNATIONAL TRADE AND TRANSPORTATION*

### CBP PROFILE

#### Quick Facts

U.S. Customs and Border Protection (CBP) is the unified border control agency within the Department of Homeland Security (DHS). CBP was created by combining the inspectional workforces and broad border authorities of U.S. Customs, U.S. Border Patrol, U.S. Immigration, and The Animal and Plant Health Inspection Service.

Today, CBP employs more than 41,000 staff to manage, control and protect the Nation's borders, both at and between the official ports of entry.

"U.S. Customs and Border Protection has accomplished a lot to secure our borders, but there is much more we are doing. We understand that as America's frontline, the security of a nation rests on our shoulders. We have learned the lessons of 9/11 and are working day and night to make America safer and more secure." – CBP Commissioner Robert C. Bonner.

### THE SITUATION

Beginning in 1997, the U.S. Customs Service planned to invest well over \$1 billion to modernize its systems environment for certain core missions: facilitating international trade, enforcing laws governing the flow of goods and services across U.S. borders, and assessing and collecting about \$22 billion annually on imported merchandise. This effort was known as the Automated Commercial Environment (ACE).

In a study issued in February 1999, GAO found that Customs was not managing its modernization effort cost effectively. GAO found serious weaknesses involving architectural definition, investment management, and software development and acquisition. GAO recommended Congress withhold modernization funding for the new Automated Commercial Environment (ACE) until management weaknesses were resolved.

While Customs was preparing an appropriate strategy, the International Trade Data System (ITDS) office functions and support were transferred from Treasury to Customs. The events of September 11, 2001 brought increased emphasis on the Border Security support capability in ACE.

In the new strategy, the U.S. Customs Modernization Program Management Organization was established to develop an EA-driven system concept document for the ACE. Further, the Capital Planning and Investment Control (CPIC) process was instrumental in creating a governance structure providing greater diligence for developing business cases and full cost benefit analyses for the ACE program, as well as, other major initiatives.

The goals of developing the EA were to implement the EA/CPIC programs and governance processes to advance the CBP modernization program; better align CBP investments to CBP strategic goals; turn CBP into a more performance based organization; and lay the foundation to be one of the more mature EA programs in the federal government.

## THE SOLUTION

A strategic planning taskforce was created consisting of the Planning Group and the Technology and Architecture Group (TAG) to assess the IT systems and technology products in use in the Customs/CBP environment and assess the relationship between business objectives and IT support. The Planning Group was responsible for the CPIC while the TAG was responsible for developing an Enterprise Architecture. The CBP Chief Architect position was established to drive the EA effort.

A formal business case and full cost benefit analysis was created for the modernization initiative, the Automated Commercial Environment (ACE), using the Enterprise Architecture model. A clear EA Program and Model and Investment Management process were developed and validated by the GAO. All EA business case and Cost Benefit Analysis questions were addressed in the ACE business case and validated by the GAO. A metrics program was subsequently established to measure the benefits of implementing an Enterprise Architecture.

The EA influenced the planning, development, and implementation of the ACE solution. The EA Governance model facilitated better change management by enabling more responsive decision making processes. The EA became a part of the Enterprise Life Cycle Management Methodology, Systems Development Life Cycle, and CPIC processes through a series of touch points ensuring EA compliance at various stages of the life of an IT system.

Several tools were used in the development of the EA. Initially an EA repository was created in Microsoft Access. This has evolved into an EA portal. The EA environment makes use of the following tools: System Architect for modeling needs; Dimensions for documentation configuration management needs; and a Government Off-The-Shelf (GOTS) tool called WebRM, the Federal Enterprise Architecture (FEA) compliant CBP implementation of the FEA Reference Models.

The EA framework has evolved over time – initially it was the Treasury Information Systems Architecture Framework, then it became the

Treasury Enterprise Architecture Framework (TEAF), and now fully defines all artifacts contained in the CBP EA. In some cases, projects or particular technologies selected have been changed to ensure compliance with the FEA.

The CBP EA has been mapped into the FEA Reference Models. Reference Model details for new initiatives/investments at CBP are inserted into the WebRM tool and then compared to existing investments. The information is then analyzed to look for duplication and similar components aiding the development of a particular system better, faster, and cheaper.

The EA is made operational through close collaboration with the system architects and supports the current systems in the various Office of Information Technology program offices. The EA also integrates the IT lifecycle within CBP. The EA processes influence the development efforts of all projects by ensuring EA compliance at the critical milestone reviews. An Architecture Alignment and Assessment (AAA) is conducted at these reviews. The results/benefits of the AAA are:

- ❖ Adherence to System Development Life Cycle (SDLC) requirements is improved via the AAA's conducted at critical gate review stages described in further detail below.
- ❖ Decision making is improved by ensuring that no IT investment is approved without architecture alignment.
- ❖ Assessments are conducted throughout the lifecycle of the project at various critical gate reviews. On average, five potential problems are discovered at these various gate reviews. Discovering and correcting these problems early in the life cycle of the project leads to better projects for the customer and reduced costs in the long run.
- ❖ The assessment process helps to ensure that the EA is sufficient to guide the development of a project, and ensure that the project complies with the guiding EA.

Creating the EA has been a collaborative effort involving all CBP business units, and continues to develop among the various stakeholders. The TAG established Domain Owners, Subject Matter Experts, Business Information

Technology Representatives and Business Interface Representatives for the EA to solidify their involvement. EA business process mapping functions exemplify how the technology and business community within CBP worked together to develop a baseline and target architecture. The TAG interfaces with all Office of Information Technology and other CBP organizations to develop policies for appropriate and timely IT systems acquisition, management and operations.

Business leaders are more directly involved in the EA process, which has helped reinforce their role in EA management and the value of EA towards improving their business processes. As a result, the EA has been used to validate new IT initiatives, and business sponsors can show how their project complies with the EA and aligns to the agency strategic plan. This has helped to translate high level strategic plans into tactical projects.

As with any enterprise level initiative, many conflicts and challenges arose in the development of the EA. Initially, it required a major culture change within IT. For example, system developers now had to comply with the new processes, standards and controls. Eventually, everyone realized the benefits the disciplined processes provided in terms of time saved, reduced maintenance costs, and reduced support requirements.

Development of an EA was a major commitment for Customs/CBP. It took approximately 18 months from the time the Technology and Architecture Group (TAG) was established until the organization had a fully functioning EA, CPIC, and governance processes. The budget for EA development was approximately \$5 million for initial set up cost and approximately \$2 million annually to update, maintain, run and administer the EA processes and portal tools. However, without the development of an EA, significantly more money would have been spent in maintaining stovepipe systems throughout the organization and the lack of governance processes to ensure effective, responsible IT investments. In addition, the culture of change to improve the business processes would not have materialized.

## THE RESULTS

CBP has developed a methodology to measure both monetary benefits and cost avoidance. As a result of managing to an Enterprise Architecture, significant benefits were realized and documented. Examples of tangible benefits achieved through EA implementation include:

- ❖ The evaluation phase processes have led to demonstrated returns on investments in the millions of dollars as shown through post-implementation reviews conducted by the agency. The Evaluate Phase (Post Implementation Reviews) has led to a return on investment of approximately \$27 Million.
- ❖ The Technology Review Committee (TRC), Architecture Review Board (ARB), Information Technology Concept Document (ITCD), Needs Analysis Document (NAD), and Technology Insertion processes have saved approximately \$5 Million of investment dollars through the elimination of duplicative systems and redundant technology products.
- ❖ The Automated Commercial Environment (ACE) was able to move forward after CBP demonstrated it had a mature EA program, a sound program management approach, and a CPIC process. Benefits of a good CPIC process have included:
  - The Enterprise Architecture is intrinsically tied to the Investment Management Process (IMP) – the CBP implementation of CPIC – by ensuring that all projects requesting approval and/or funding are evaluated against the process requirements, strategic direction, and IT assets and standards that make up the CBP Enterprise Architecture.
  - CBP continues to implement, refine, and utilize the IMP to pre-select, select, control, and evaluate the CBP portfolio of projects in order to determine costs and benefits, reduce risk, achieve alignment with the business process needs, maximize returns on IT investments, and eliminate stove-piped data, technology, and systems.
  - The CPIC process has led the way for institutionalizing other agency processes throughout the organization which are now being used for all IT-related decisions, thus leading to measurable increases in CBP performance.

- Using the IMP in conjunction with the EA has helped CBP to maintain the current architecture and to build the "to be" architecture and modernization blueprint for CBP.
- Since the institution of the IMP disciplined processes, CBP has been able to better articulate the benefits of their projects and gain the necessary approvals and funding. In CBP's case they have achieved near 100% funding for all major OMB Exhibit 300 investments.
- ❖ All GAO management weaknesses previously identified as a condition for allowing the ACE modernization program to proceed were resolved to GAO's satisfaction. To date, this has resulted in over \$1 billion dollars of investment funds to support the development of ACE.
- ❖ New processes have identified and resolved over 500 action items and led to over 350 decisions resulting in business process or IT improvement. Tangible benefits of the Technology Review Committee (TRC) and Architecture Review Board (ARB) processes, decisions, and actions include:
  - Reduced IT infrastructure complexity.
  - Minimized IT duplication.
  - Reduced system redundancy.
  - Increased standardization.
  - Better justification for IT spending.
  - Improved understanding of IT projects.
  - Increased efficiency in solving IT issues.
  - Better responsiveness to customer IT needs.
- ❖ The Automated Commercial Environment (ACE) will be replacing the legacy system called the Automated Commercial System (ACS). This program will totally revamp the entire trade management system and supporting infrastructure throughout the country. To date, approximately 110 subsystems of ACS have been retired with many more due to be replaced over the course of the next three years.
- ❖ Over 15 new system acquisition, management and operational IT policies have been developed and implemented, providing the enforcement and compliance piece to the EA program.
- ❖ The addition of the pre-select process to the Investment Management Process has led to faster and better first time development of solutions for the customer. The customer submits a Needs Analysis Document (NAD).

The review time of the NAD has been reduced to two weeks, which has helped the Office of Information Technology (OIT) to meet and exceed customer expectations.

Other significant benefits to CBP, although not as well quantified, include:

- ❖ Enforcement Systems Branch (ESB) requested a reporting tool and the EA Branch was able to identify several tools in the Enterprise. Though none of the existing tools were sufficient, ESB was able to make an informed decision about their alternatives and verify their need for a new technology.
- ❖ Systems Engineering Branch (SEB) identified a need for a portal-based application initiative. After consulting with the EA Branch, they were able to identify a Web Application Server and back-end Database Management System which were already approved for Enterprise use, as well as a development tool which was approved for limited use and could be expanded for their initiative. This allowed CBP to leverage previous investments and thus save money.
- ❖ A CBP-wide workstation configuration standard was developed and adopted.
- ❖ Modernization of legacy systems has improved integration with other law enforcement organizations.
- ❖ The CBP EA will align more easily with other e-Gov initiatives.
- ❖ Duplicate development and stovepipe systems continue to be reduced.
- ❖ Better investments have been submitted to the Investment Review Board (IRB).
- ❖ Each successive legacy architectural product has been completed with less effort.
- ❖ Modernization of CBP systems has been further refined.

The Enterprise Architecture Branch regularly assists writers of the business case (OMB Exhibit 300) with the 17 EA questions included in the business case. Stated one Program official, "It would be very difficult to get the funding we require for our investments without all the work done on the EA ..." The result is CBP business cases receive very high scores, particularly on the EA portion, and receive the funding required.

## THE CONCLUSION

On May 18, 1999, GAO released a memorandum to Congressman Phillip M. Crane which stated, "On the basis of a Customs-provided architecture briefing and demonstration, although some limited work remains, Customs appears to have satisfied our recommendations to (1) complete the architecture and (2) institute a process for ensuring that projects like the Automated Commercial Environment (ACE) comply with the architecture.

A July 1999, GAO report titled "Major Management Challenges and Program Risks" states, "Our work on Customs Systems Architecture resulted in recommendations for Customs to complete and enforce an enterprise systems architecture. Customs agreed with those recommendations and has acted to fully address them and we have, therefore, closed the two architecture related recommendations."

Additional documentation is continuing to be gathered to support the EA. In the meantime, a brief summary of some of the milestones of the CBP EA program include:

- ❖ 1998: The Customs/CBP EA revolution began.
- ❖ 1999: The EA Blueprint document was published.
- ❖ 2000: The Treasury Enterprise Architecture Framework was published with Customs as the champion for the project.
- ❖ 2001: Customs was declared a role model agency for EA by the GAO.
- ❖ 2001: The Modernization effort was allowed to proceed.
- ❖ 2002: CBP was the only agency rated 5 in GAO's EA Maturity Model.

These milestones enabled the following accomplishments to be achieved:

- ❖ The EA was integrated with CPIC, SDLC, and ELCM processes.
- ❖ Active governance boards oversee the EA program.
- ❖ The EA program includes metrics that show benefits.
- ❖ The EA program provides an evaluation capability by conducting Architecture Alignment and Assessments.
- ❖ Customs/CBP was asked to develop several CIO Council documents including the

"Architecture Alignment and Assessment Guide (2000)" and the "Practical Guide to Federal Enterprise Architecture (2001)".

- ❖ Over 75 agencies have been briefed on the EA program as a government best practice.
- ❖ Other agencies are adopting many of the CBP EA and CPIC processes.