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HRG Assessment E-Government

The Federal Enterprise Architecture (FEA), Department of Homeland Security (DHS), and the newly established Terrorist Threat Integration Center (TTIC) all have in common a requirement for the integration and safe sharing of data regardless of hardware platform, operating system, or data format. The FEA, if properly and effectively implemented, will drive the integration of federal IT resources across agencies and departments of the federal government. The result will be the delivery of actionable information and alerts when and where needed to produce desired outcomes. This will become real-time E-Government in action.

Federal Enterprise Architecture (FEA)

“The FEA is a business-focused framework that provides OMB and Federal agencies with a way to monitor, analyze, and control Federal investments in information technology. The FEA will make possible horizontal (cross-Federal) and vertical (Federal, state, and local governments) collaboration and communication with respect to IT investments.” *Quoted from page 4 of the report – Implementing the President’s Management for E-Government / E-Government Strategy /April 2003. www.whitehouse.gov/omb/egov/downloads/2003egov_strat.pdf. The states are adopting the federal standards for FEA out of necessity.*

The Federal Enterprise Architecture (FEA) will initially be focused on Homeland Security, economic stimulus, social services, and back office operations. The FEA when fully developed will represent a comprehensive view of the federal government and the role of IT in government. The FEA should incorporate replicated decentralized and distributed databases in order to guard against any single point of failure in the event of a terrorist attack. Additionally, for enhanced ease of use by citizens the FEA should recommend where ever possible the use of Open Standard Web Services such as XML, and SOAP.

Given Sybase’s proven track record of providing highly effective solutions to the Federal government that work as advertised HRG feels confident in recommending that Sybase and its solutions be considered for key components of the new FEA as it will be implemented to support the DHS, TTIC, and the presidents other recent E-Government initiatives.

Department of Homeland Security

The U.S. Congress established the Department of Homeland Security giving it the mission to “prevent terrorist attacks within the United States; reduce the vulnerability of the United States to terrorism, and minimize the damage, and assist in the recovery, from terrorist attacks that do occur in the United States” (Sec. 2101(b)(1)). The department’s mission - to protect the U.S. borders, essential infrastructure, and effectively deal with emergencies - brings with it significant new requirements for systems integration and accelerated information sharing across the various departments and agencies comprising the federal government as well as new requirements to share information with state and local authorities. Additionally, this legislation establishes the respective roles of the private sector, state, and local authorities with regard to Homeland Security and the Department of Homeland Security.

One significant challenge to the effectiveness of the Department of Homeland Security is that key information required for the detection and prevention of terrorist attacks resides in the private sector. The new antiterrorism initiatives to be effective must rely on private sector constituents taking the necessary steps to deter attacks or ameliorate their consequences.

Terrorist Threat Integration Center

The Terrorist Threat Integration Center (TTIC) is tasked with the integration and analysis of all information collected by the CIA, Justice Department, Pentagon and Department of Homeland Security that is relevant to the identification and prevention of domestic and international terrorist acts.

The TTIC has in part been created to eliminate the obstacles to information sharing between the CIA, FBI, and other intelligence agencies. The center will also share information with state and local authorities as appropriate. Finally the Center will be able to set and assign intelligence collection requirements for the CIA, the Pentagon, the FBI, and through the Department of Homeland Security, state and local law enforcement. Key to the effectiveness of the TTIC will be the establishment of requirements for, and the maintenance of, shared national counter terrorism databases. One such database will contain up-to-date information on known and suspected terrorists.

Distributing terrorist threat related information to the public, private industry, and state and local government officials on time, and in a useful and actionable format is the responsibility of the Department of Homeland Security and the FBI.

Meeting The Challenge

The challenge for the federal government is to provide the right information, in the right format to the right person in the right place, and at the right time so that effective and appropriate action may be taken in a timely manner. One effective way to meet this challenge is to use event driven process automation and products from vendors like Sybase to provide the integration and interaction required to span such a wide range of data collection devices, data sources, databases, and information delivery platforms and formats.

The FBI has been working to expand information sharing with law enforcement, public health, and public safety officials at the state and local government levels. A new FBI data management system will share all the FBI’s terrorism-related information with the CIA, Department of Homeland Security, and other key agencies. The collection and dissemination of intelligence have been given the same priority by the FBI as it has previously applied to the collection of evidence for the prosecution of crimes. The FBI has also established a Counter Terrorism Watch center that operates 24 hours a day 365 days a year. This type of

information sharing requires the integration of a broad range of proprietary (read as legacy) as well as Unix (read as open) systems in order to facilitate the flow of information.

Integration - the keys to the kingdom

The applications that make up the new E-Government infrastructure will use information that is currently stored in databases owned and operated by various government departments and agencies whose legacy database record formats likely differ. “Loosely coupled” integration removes the requirement that all data to be useful must be stored in the same format. Real-time event driven process management and automation takes full advantage of the concept of “loosely coupled integration”. This type of integration allows dissimilar databases and systems to work together in near real-time thereby providing what could be described as a single virtual pool of raw information that can then be combined, filtered, monitored and disseminated across many departments and agencies of the U.S. federal government, as well as key state and local law enforcement, healthcare, private sector and others with “need to know”.

“Loosely coupled” integration based on event-driven process automation can span dissimilar data formats and systems. This type of integration, if properly implemented, has the potential to deliver on the promise of the real-time event-driven enterprise without requiring the replacement of current legacy computer systems, applications or databases. This is not a cost free solution but in Harvard Research Group’s opinion it is one of the most cost effective solutions to the federal government’s current data integration and information delivery challenge.

The delivery of the right information, at the right time, to the right place, and to the right person is essential for any real-time business process management solution that must span departments, divisions, agencies and enterprises. With respect to global multinational enterprises, government agencies, and other such entities across multiple time zones, the requirement for data synchronization through database or data mart replication becomes a critical requirement. One of the challenges to implementing an effective data replication solution on a global or near global scale is latency or lag time. An effective data replication solution will give the impression of a single large virtual database regardless of the geographic location of the observer. When viewed from the perspective of disaster recovery or survivability after 9/11 the need for database or data mart replication is a “must have”. This is especially true for the U.S. Federal government Department of Homeland Security and the newly established Terrorist Threat Integration Center. If either of these organizations were to rely on a centrally located (read as in Washington D.C) non-replicated database as the repository for critical information regarding terrorist activities targeted at key U.S. interests, the exposure would be unacceptable. Imagine the consequences if a terrorist attack destroyed that single data center – the result would be as if the U.S. and its interests were left virtually blind.

Real-time event driven process automation solutions, when properly implemented can deliver the following results:

- ✓ Reduced inventories
- ✓ Reduced cost
- ✓ Satisfied citizens
- ✓ Improved responsiveness
- ✓ Increased efficiency
- ✓ Better performance against Service Level Agreements
- ✓ Reduced frequency of errors.

The IT infrastructure required for the DHS to succeed in its mission must include technologies to collect, integrate and deliver event-driven information when and where it is needed whether that be to an application or an individual such as a civil defense authority, police or fire person, or other Federal, State, or local government authority or agency.

Event-driven process automation facilitates the integration of heterogeneous systems allowing those systems once integrated to change as the business or organization changes without the requirement for significant new investments in reintegration with new systems as they are brought on-line.

Event-driven process automation architected solutions make the task of integration easier. The source of an event doesn't require knowledge of how that event will be used or what the result will be or even have to know anything about the component taking the action or what the action is.

Integration Building Blocks

Operations or processes can be parsed into their component events, actions and reactions in a logical manner. Once events have been clearly identified, defined, and separated they will become the building blocks for new applications that can utilize systems and databases that previously could not talk to each other. Using such building blocks or objects, as they are sometimes referred to, it is now possible to rapidly build, improve, and modify an organization's IT infrastructure in a manner that allows it to keep pace with changing organizational requirements in a timely manner. Today there is a whole new crop of process automation tools that hold out the promise of ever increasing productivity through easy to use graphical tools, re-use of existing systems, and a simplified development cycle.

The construction of effective automated event driven processes requires:

- ✓ Process design software that simplifies event driven application design
- ✓ Software tools to orchestrate process interaction through drag and drop graphical process mapping
- ✓ Interaction servers – to support information inflow and outflow through the use of web sites, mobile middleware and portals
- ✓ Integration that leverages re-use of existing events, applications, and objects.
- ✓ Monitoring tools to track and measure results in near real-time

Clear Objectives

Process automation projects that are successful start and finish with well-defined, agreed-upon objectives, methods and measures of success. Contributors in IT and agency staff, while working in different worlds, under different priorities must “buy in” and collaborate effectively. Clearly defined objectives and methods, supported by effective tools can help to build the required level of consensus or “buy in” which is critical to the success of any project involving groups of people. Graphically represented process models help all parties concerned to clearly understand the relationship between processes and their underlying events and to visualize the desired result.

Well-Integrated Tools Matter

Activity monitors provide a near real-time view of information, and can be used to aggregate key information in real-time. For example, by tracking the rate of occurrence of certain events – particular types of phone calls, money transfers or reports of other unusual behavior, and comparing these to historic rates, immediate alerts can be generated directly from within an activity monitor. This is accomplished by extracting and

aggregating information from the normal flow of events in real-time. This summarized view of event interactions and interdependencies also supports short-term trend analysis by allowing a view of retained data that can span a period of hours or days, and if needed, comparison to longer-term historical averages. One key requirement for any process monitor to be an effective part of an event-based integration strategy is that it must work closely and be well integrated with the process engine and its development tools. In this particular case, buying from a single vendor may be the best most logical choice. Clearly, when selecting process automation solutions, decisions should be biased toward tools that facilitate activity monitoring within the process design environment.

Effective Alert and Information Delivery

For process automation to be effective it must be capable of providing enriched, filtered event-based information to the right place at the right time, and in the right format. In the case where the DHS or FBI need to notify the State Police or a local fire department regarding a specific terrorist threat or event, it becomes critical that the alert and supporting information be delivered and useable for a variety of both fixed and mobile devices such as laptops, PDAs and mobile phones, etc. Once such an alert has been sent out, it is just as important that information comprising emergency procedures and recommend actions be available through the same mobile interface. An effective means of information dissemination that anticipates network disruptions is required to enable the human part of the equation to do its job effectively and efficiently. For mobile delivery, products and services available through Sybase's iAnywhere Solutions subsidiary are well worth consideration, having been developed specifically for mobile delivery through unreliable networks. Even though the preceding example invokes visions of 9/11 the same functionality is equally important in inventory control and in getting the right supplies to the right place at the right time. The practical applicability of these combined technologies are almost unlimited – from intelligence information dissemination, to clinical medical applications to securities exchange / trading floor applications.

As IT professionals and their management counterparts realize the cost and return on investment benefits to be had by implementing and maintaining real-time, event driven applications they are gaining favor. Of particular interest to budget conscious government managers and elected officials is the potential for reuse of legacy systems and the fact that event-driven process integration facilitates information sharing and effectiveness across agencies with only minimal new expense. Today, process automation tools are becoming available to make process automation practical, incremental, and measurable. Users of the new tools, when properly deployed, should expect measurable cost reductions, particularly in integration and reuse, quicker results, and reduced maintenance and improvement cycles.

Standards Based Web Services

Standards-based Web services can be leveraged to facilitate communication between diverse, independent applications via the Internet. Independent users and services can connect without prior knowledge of one another, to access information services, or initiate an automated process. In the case of the federal government one key goal is to allow citizens to access government services and information within three mouse clicks. This is just one example of how integrating the government's IT infrastructure by effectively implementing the FEA will have direct benefits for U.S. citizens. In order to serve the public effectively, IT must accommodate diversity. Open standards, and in particular, web services promise to enable a new level of simplicity and cost reduction. Use of web services throughout government will provide access to much needed government information and services through effective process automation beyond Washington D.C. to encompass all walks of life and communities. This will further reduce development costs, as global application and network interfaces are increasingly standardized.

Web services will continue to play an increasingly important role in process automation for the foreseeable future. They are particularly well suited to exposing and decoupling applications. Harvard Research Group expects that as Web services standards continue their evolution they will in the future become suitable for mission critical use.

The concept of an enterprise service bus leverages web services to create a future linking of independent systems and promotes re-use, thereby delivering significant development savings and improved ROI. Buyers must critically examine each vendor's offerings in view of their commitment to web services and services-oriented architecture as a means to facilitate the integration and re-use of legacy data and custom "in-house" developed applications.

Scenario: Tainting the food supply

The following is a scenario that illustrates the critical role of Information Technology in protecting the United States and its citizens from terrorist attacks on the food supply. This scenario involves a terrorist organization tampering with the US food supply.

Our scenario begins with an unexplained serious outbreak of food-borne illness almost simultaneously in Chicago, and Seattle. When examining reported symptoms around the country for patterns, the USDA as the responsible agency would leverage the resources of the Terrorist Threat Integration Center (TTIC). With the help of the collection and analysis capabilities of the TTIC, the apparently unexplainable problem with the U.S. meat supply is linked to a terrorist event. Using TTIC analysis, USDA is able to rapidly identify symptoms that would not normally be symptomatic of an illness that would come from the meat and make a determination that the meat did not come out of the processing plant that way. Broad access to event information (in this example, meat testing results and illness reports from the affected areas) enables USDA to quickly make the determination that somebody has very likely tainted the meat supply between the plant and the stores where it was bought, perhaps tainting in several places at the same time in order to achieve broader results. With information available quickly, it would then be possible to more rapidly remove all of the tainted meat from the stores (based on lot number tracking) and through the Department of Homeland Security issue an immediate recall announcement over radio, TV and print media as appropriate.

The integration challenge presented by this scenario is one of data collection, aggregation, filtering, analysis, and information dissemination through appropriate channels to the right audience in a timely manner.

In order to recognize the event as a terrorist act pertinent data must be collected and transmitted to the Terrorist Threat Integration Center in real-time or nearly real-time from multiple sources (via phone, mobile devices, and other means) which can include: meat inspectors, meat packers, transportation companies, supermarket chain shipment receipts, health professional inputs, hospital records, EMS records – the list can be quite extensive. The data then needs to be analyzed and the results of that analysis mapped geographically in order to localize the source of introduction of the toxin into the food supply. Once this analysis has been completed the Department of Homeland Defense and FBI would be involved as the channel through which alerts would be sent to multiple places including the CDC and states in order to get the tainted meat out of the stores in as short a time as possible without alarming the general public. Additionally, in this scenario there would be a requirement for a broadcast recall of all meat of a certain type bought in specific stores within a given time frame in order to limit illness and death from the consumption of tainted meat.

In the preceding case a product such as Sybase integration products, including Integration Orchestrator and BizTracker, can be applied to the critical information collection, filtering, and distribution tasks Sybase integration products facilitate the collection of health data from CDC, state health departments, local health departments, individual hospitals, doctors, and potentially citizens. The sources are all over and they are all different types. The information once available, can be delivered to agency staff, and/or delivered to analytic information repositories, such as those possible with Sybase Adaptive Server IQ. Once the threat has been analyzed and localized they could use products from Sybase's iAnywhere Solutions subsidiary to push messages and event details out to all appropriate parties who need to take informed action.

In order to effectively use technology to track events and preempt terrorist attack we need to implement an architecture (FEA) which will insure the aggregation and integration of dissimilar data sources and formats across federal, state, and local agencies. Without this level of integration a successful outcome to a scenario such as the one described above could not be achieved in a timely manner.

Consider This

Today Sybase can deliver a complete solution set comprised of data management, process integration, automation, and event monitoring, coupled with multi-channel delivery and device management capabilities for a variety of web and wireless applications.

Event-driven applications can, if properly planned and implemented, greatly reduce costs and achieve information integration, safely and rapidly. Process visualization tools are a requirement in order to most efficiently modify processes thereby driving down long-term development and maintenance costs. Today 70% to 80% of IT budgets are spent on continuing support and maintenance, in the federal government real and effective cost reduction is a requirement that can be at least partially satisfied through the judicious implementation of event-driven process automation.

The federal governments information systems have historically appeared as fragmented and stove-piped, with government agency or departmental classified and declassified data locked into proprietary systems and applications that either were not allowed to intercommunicate or were incapable of such. "Unwiring" the federal government means un-tethering previously proprietary or classified federal government information and events from the various underlying databases and applications. Additionally as we look out over the next decade there will be an increased requirement for bi directional wireless communication with the federal government from an increasingly mobile community of U.S. Citizens.

More on Sybase

Sybase provides products suitable for creation of systems that adhere to the Federal Enterprise Architecture. Sybase provides 3 groups of products:

1. Integration and monitoring for real-time, event-driven information analysis and delivery
2. Web and mobile information delivery products, and,
3. Mature, reliable information integration solutions

Sybase Integration Solutions:

Sybase's *Integration Orchestrator* combines traditional Enterprise Application Integration, or EAI with event-driven process automation to facilitate the creation of event-driven automated processes. Integration

Orchestrator delivers on the promise of cost-effective re-use and extension of applications that have taken years to build.

Integration Orchestrator in combination with Sybase's *BizTracker* business activity monitor delivers real and effective process automation capabilities.

Integration Orchestrator provides graphical process visualization tools that facilitate and make more comprehensible the design of automated processes. Integration Orchestrator and BizTracker tools are best used in combination to build process models, enrich the models, and then generate the event driven process software. Process modification can be done by rearranging icons in the enriched model. Sybase's *PowerDesigner*, used during process modeling, adds enhanced modeling capabilities; the results can then be exported to Integration Orchestrator for process development.

There is good synergy between the process engine (Integration Orchestrator) and business activity monitor (BizTracker). Both utilize the same visual tools and development process, wherein Integration Orchestrator makes it easy to define processes, including what to monitor, implemented through drag, and drop functionality. BizTracker provides a means to assimilate information from the monitored systems, and in turn can trigger additional automated processes to streamline the resolution of exception conditions.

Sybase's data replication solution *Replication Server* detects events as they occur within databases, such as simple updates and deletes, and then replicates those events between databases and other applications. Replication Server, when deployed with *RepConnector* can detect and filter events, and initiate automated processes built using Integration Orchestrator when events of interest occur.

Sybase also provides the *Real Time Services Package* providing a real-time event and information delivery solution directly within Sybase Adaptive Server Enterprise (ASE) 12.51 database. This package provides Java Messaging Service (JMS)-compliant enterprise messaging services that push events directly from the database as real-time changes occur. This reduces process latency: events are captured in near real-time, filtered, and transmitted as they occur, without changing the original application that updated the database, regardless of which vendor supplied the database. This combination of Sybase offerings effectively moves event handling into the database delivering significantly improved performance and greatly reduced cost to event-enable existing applications and their data stores.

Information Delivery Solutions

Sybase provides the following information delivery capabilities:

EAServer is an application server that can be used to host a variety of web- and standards-based applications.

Enterprise Portal provides users with a personalized, integrated and organized view of applications and information. Enterprise Portal serves as the platform for the development and customization of information dashboards.

mBusiness Server, provided by the Sybase subsidiary *iAnywhere*, offers "always available" information delivery. That is the delivery of multiple forms of information to mobile devices, independent of the current state of wireless network. Such a delivery solution is critical the alert and information delivery requirements of the DHS and TTIC as well as other agencies and departments of the federal government.

Information Integration Solutions

Sybase's ASE 12.5.1 database goes a long way toward enabling some of the basic functionality required if we are ever to fully realize the potential promised in the recent spate of "Grand Vision" statements from the likes of IBM, HP, Sun and others. By delivering self-management functionality at this point in time Sybase is demonstrating a real regard for their customers technical challenges and business requirements.

The real benefit to be had from using a well-integrated solution from Sybase can be seen in the result produced through their effective implementation. Those results are:

- ✓ Improved effectiveness - being able to process more transactions during peak hours and then quickly return to processing normal workloads.
- ✓ More work of higher value can be done with the same staff and less human error.
- ✓ Data can now be used across federal agencies and departments that previously did not talk to each other.
- ✓ Information can now be collected real-time through a variety of sources, quickly integrated and analyzed, and the through process automation alerts and supporting information can automatically be distributed in order to most effectively counter almost any terrorist attack.

In conclusion:

Given Sybase's proven track record of providing highly effective solutions to the Federal government, and in particular constituent agencies now part of DHS, HRG feels confident in recommending that Sybase and its solutions be considered for key components of the new FEA as it will be implemented to support the DHS, TTIC, and the presidents other recent E-Government initiatives.

Harvard Research Group is an information technology market research and consulting company. The company provides highly focused market research and consulting services to vendors and users of computer hardware, software, and services. For more information please contact Harvard Research Group:

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