



PERFORMANCE BASED

ENTERPRISE ARCHITECTURE PLANNING -

A WHITE PAPER

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ABSTRACT

Within the Enterprise Architecture (EA) activities of the Federal Government, one of the most difficult issues is the justification and quantification of major IT programs. EA plans cover the current processes, data systems and infrastructure, (the AS-IS), the future processes, data, systems and infrastructure (the TO-BE) and the roadmap transition plan from one to the other. Associated with EA is a real requirement to provide a Business Case Analysis (BCA) for major changes based upon quantifiable improvement in key mission/business measures in accordance with the organization/mission goals and objectives. In order to provide the steps in the transition plan, PROCESSES, DATA, SYSTEMS GAP analysis (difference between AS-IS inventory and TO-BE plan, including COTS as a TO-BE reference model) is being done in most EA plans. Now, a similar technique is being used with the business process activity models in a more proactive sense, applying volume, frequency and value parameters to simulate the AS-IS for validation and the TO-BE plan to view the future payoff. This paper shows some of those techniques/methods and addresses specific successes to demonstrate the validity of the approach to show return on IT investment.

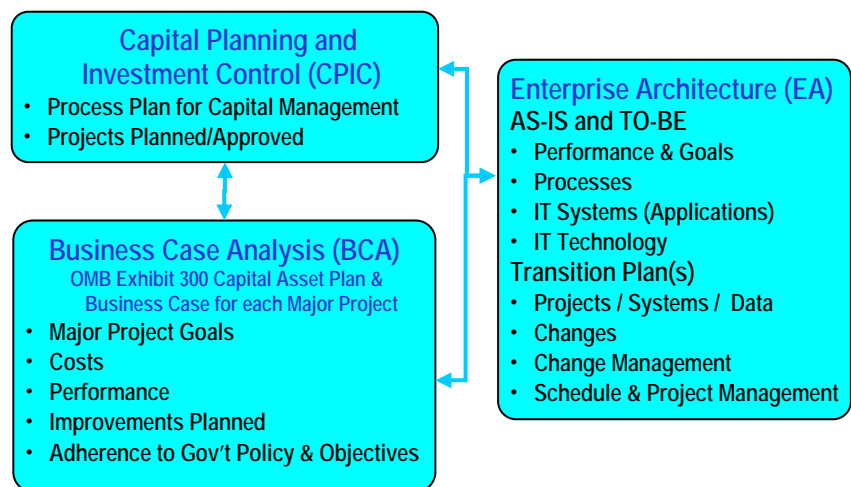
BACKGROUND

CACI was founded in 1962 as a simulation and modeling company. These early beginnings were soon followed by relationships with the Federal government, especially the Department of Defense involving various business functions and processes. The natural evolution of these two brought simulation and modeling to bear on DoD problems such as military logistics, repair, maintenance, supply and readiness. Over the past 15 years CACI developed numerous innovative approaches and technologies for business process improvement and redesign (BPI, BPR) including a formal methodology for the modernization of existing information systems called RENovate.

Over the last 10 years various Federal laws and administrative actions (GPRA, Clinger-Cohen, et al) have created performance- and budget-based controls for Information Technology (IT) programs. IT programs/investments are supported controlled by three management improvements (see Figure 1):

1. **Enterprise Architecture (EA)** – Documented goals and business systems flow to a technical foundation that has a current view, "As Is"; a future view, "To Be"; and a transition plan/approach structure. It is the basis for where an agency/service is and where it is going in business improvement / IT (see Figure 2).
2. **Capital Planning and Investment Control (CPIC)** process that delineates an approval procedure for IT investments, addressing the rationale and amount of dollars spent for IT and the management of the agency's IT portfolio. CPIC also keeps track of approved projects and assets.

Figure 1 - Federal IT Planning

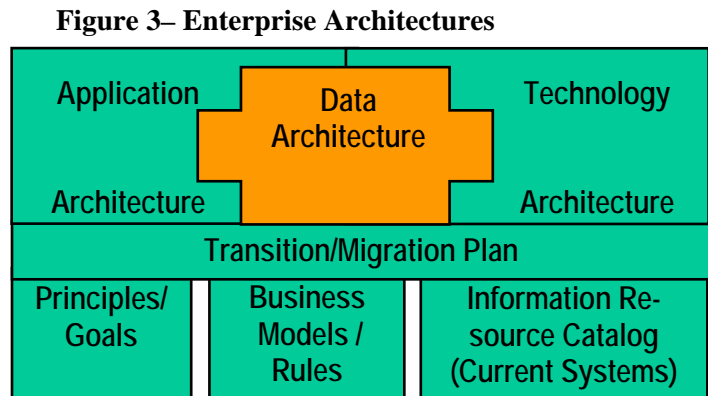


3. **Business Case Analysis (BCA)** for “major” programs and “e-gov” programs that justifies each IT program/investment under the CPIC process, documents its compliance to the agency’s EA and reports progress yearly (OMB Exhibit 300).

These plans are scored/approved by OMB using various checklists and scoring parameters as part of the budget approval process. High marks are given for modernizations that enhance the organization’s abilities to perform it’s mission, use of commercial-off-the-shelf software and for construction of “service components” reusable or re-used by other agencies, thus cutting the overall government IT development and maintenance costs for these common items.



Business Process Reengineering (BPR) and Enterprise Architecture (EA) Basics - BPR in the late 1980s and early 1990s focused on the modernization of legacy application systems including at CACI the construction of a very substantial business process re-engineering methodology and tool set. This approach, CACI’s RENovateSM preceded much of the EA direction that surfaced later in the 1990’s including the book, “Enterprise Architecture Planning,” by Dr. Spivak, the book that founded the approach or vice-versa. These and similar discussions in government led to the Clinger-Cohen Act of 1996 and subsequent OMB guidance on IT planning / budgeting via Circular A-130, A-11, A-76, *et al*, that direct Federal IT planning today. Figure 1 shows the high level relationships in Enterprise Architecture Planning.



An Enterprise Architecture plan is quite straightforward in concept, containing;

- Definitions of the principles and goals of the enterprise, business area or major program and sets direction on such issues as the promotion of interoperability, open systems, public access, compliance with standards and policy guidance, end user satisfaction, and IT security.
- Documentation of the current and desired relationships among business and management processes and information technology. – *Business Process oriented*
- Descriptions of the "current architecture" and "target architecture" including the rules and standards and systems life cycle information to optimize and maintain the environment to be created and maintained by managing the IT portfolio.
- A strategy to support its current state and also act as the roadmap for transition to its target environment.
 - *Business Process Transition and System Transition Plans*
- A complete inventory of agency/service information resources, including personnel, equipment, and funds for information resources management and information technology.

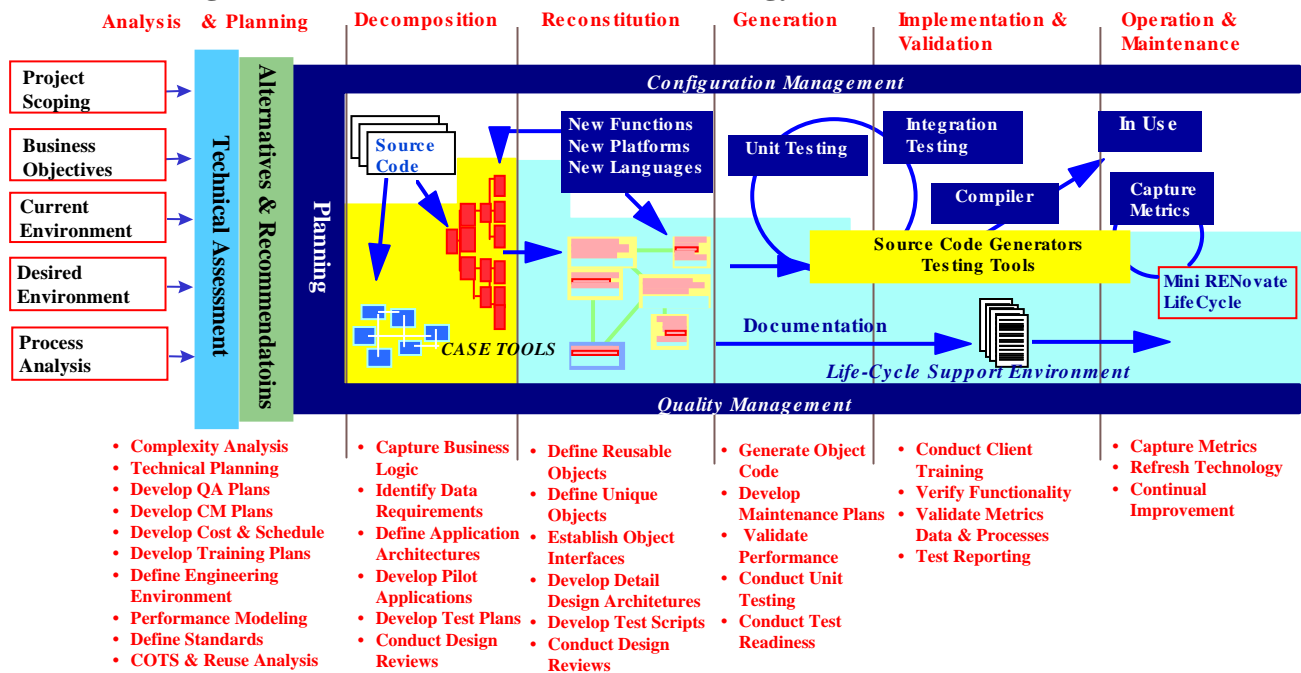
The effective gathering and maintenance of this critical planning, process, technical and directional information to keep it current as the agency or service proceeds with their plan is a considerable challenge and one worthy of the best tools and processes.

CACI's RENovateSM - CACI's RENovateSM Methodology shown in Figure 4 has been one of the hallmarks of CACI's EA/BPR services, especially in the DoD. CACI has been successfully using the business process-reengineering paradigm of

- AS-IS models (process, data, interface, technical)
- TO-BE models
- Transition Plans

for IT planning by using process modeling and other techniques for nearly 15 years. Thus, our EA practice, methods and tools are also founded on these successful implementation and lessons learned with minor adaptations to the Architecture Frameworks that have evolved within the government.

Figure 4 – CACI's RENovateSM Methodology –mature and effective BPR



It is not surprising that the goals of our RENovateSM process and the most effective Enterprise Architecture activities within government and industry are very similar in that they:

1. Represent the system in high-level documentation that when presented show a clear and useful understanding of each process/system/interface.
2. Utilize a high level of reusable specifications, data definitions, and algorithms in order to achieve productivity gains.
3. Improve the system quality: functionality, reliability and maintainability
4. Use sound engineering practices throughout in order to avoid maintenance problem relapses in the future. These practices must be measurable.
5. Pursue technical portability through independence from particular hardware and software environments and development tools where possible

6. Plan for adaptation of new technologies/practices. Continuous improvement to the process, to the business processes and systems must be achieved.
7. Plan in process, cost and technical changes that contribute to the agency/company competitive/productive position
8. Produce measured/managed results for quality at every level and phase of the process.

DoD Architecture Framework - Within the DoD, the DoD Architecture Framework (DoDAF) has become the standard for layout and presentation of business process and systems interaction for EA. The overall process includes the AS-IS, TO-BE and Transition plan constructs in the form of Views. They are used to frame a plan of action for both business processes improvement progress and the improvement, modernization or implementation of new systems in support of the goals/principles of the agency/service. Figure 5 shows the DoDAF views from high to low as required (mandatory items in yellow) for inclusion in major project work and in Enterprise Architecture documents/systems in particular. The AV views are the overview and summary. The OV views are the business and organizational process focused views. The SV views show the applications and their interactions and the TV views define the application environment, infrastructure and standards.

Figure 5 – DoD Enterprise Architecture Framework (DoDAF) Views

<p>Overview Views</p> <ul style="list-style-type: none"> AV-1 Overview and Summary Information AV-2 Integrated Dictionary* AV-3 Capability Maturity Profile <p>Process/Information Views</p> <ul style="list-style-type: none"> OV-1 High Level Operational Concept Description* OV-2 Operation Node Connectivity Description* OV-3 Operational Information Exchange Matrix* OV-4 Organizational Relationship Chart OV-5 Activity Model* OV-6a Operational Rules Model OV-6b Operational State Transition Description OV-6c Operational Event/Trace Description OV-7 Logical Data Model <p>*Yellow means mandatory for DoDAF</p>	<p>System Views</p> <ul style="list-style-type: none"> SV-1 System Interface Description* SV-2 System Communications Description SV-3 System² Matrix SV-4 System Functionality Description* SV-5 Operational Activity to System Function Traceability Matrix SV-6 System Information Exchange Matrix SV-7 System Performance Parameters Matrix SV-8 System Evolution Description SV-9 System Technology Forecast SV-10a Systems Rules Model SV-10b System State Transition Description SV-10c System Event/Trace Description SV-11 Physical Data Model <p>Technical Views</p> <ul style="list-style-type: none"> TV-1 Technical Architecture Profile* TV-2 Standards Technology Forecast
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The above discussion is somewhat simplistic because Enterprise Architectures exist at different levels (see Figure 6). Clearly there is the enterprise-wide guidance and structure that is composed of the overall standards and the Enterprise-wide EA, (i.e. DoD or Air Force or USCG or DHS). For very large organizations these can be less than detailed enough to delineate and drive key programs. Thus, accompanying the enterprise-wide EA is and EA plan focused some major area . Within the DoD these are 1) Business Domain, 2) Warfighter Domain and 3) Intelligence Domain. Within the Business Domain there is the Business Enterprise Architecture (BEA) with Logistics, Administration, Human Resources, Accounting and Finance, Acquisition, Installations and Environment and Strategic Planning & Budgeting areas. These provide the enterprise-wide oversight. Within the BEA is guidance for each area as to what and how it functions. For example, AF logistics has the BEALog and the AF eLog21 initiative to implement it. There is an EA Plan at this level and then at the very major work area there is an operational EA plan to drive down to the implementation details.

For civilian agencies the Federal Enterprise Architecture (FEA) is the BEA counterpart, but the concept is the same.

Shared Data Systems - Another of the basic premises of EA is that shared systems (systems used by multiple agencies, services, and/or departments) are more cost effective than multiple separate systems or sub-systems doing essentially the same activity. Further, where common action and information interchange is required shared systems may be essential. Within DoD these are significant / valuable interoperability initiatives that provide the foundation for sharing systems and data management/platforms. They include:

- C4ISR Core Architectural Data Model (CADM)
- Defense Data Dictionary System (DDDS)
- COE Shared Data Environment (SHADE)
- Joint Technical Architecture (JTA)
- Joint Operational Architecture (JOA)
- Global Information Grid (GIG)
- Common Operating Environment (COE)

This investment by the DoD over the last 15 years is considerable and vital to sharing of information and cross-interfacing systems. Between civilian agencies there is more of a challenge since the goal of data sharing has not been institutionalized until recently and thus similar data is not represented in a consistent sharable way yet.

EA planning is succeeding in the civilian agencies, but they are using different EA frameworks than the DoD (FEAF, TEAF, other architecture frameworks). This is a challenge in that representation of processes, systems, etc. varies by agency/department, making communications among civilian agencies difficult. For USCG this is amplified by the need to interact with intelligence IT agencies (DoDAF format), the DoD services and agencies (DoDAF format with CADM/SHADE data) and DHS agencies (non-DoDAF EA formats, conventions and views). (ACI works in both the civilian EA and the DoD EA worlds and is assisting in this area).

Business Case Analysis – The BCA (OMB Exhibit 300) sets the tone for approval of major programs. It is scored in ten areas as shown in Figure 7 with 5 points maximum per area. A total of 40 or more is needed to gain funding acceptance (usually). The most important and difficult area to justify are the performance goals and alternative analysis areas. These are tied to the performance of the Agency/Department mission goals and crucial to both funding and to the more practical decisions on where to utilize funding to advance the agency or service.

Figure 6 EA Tiers

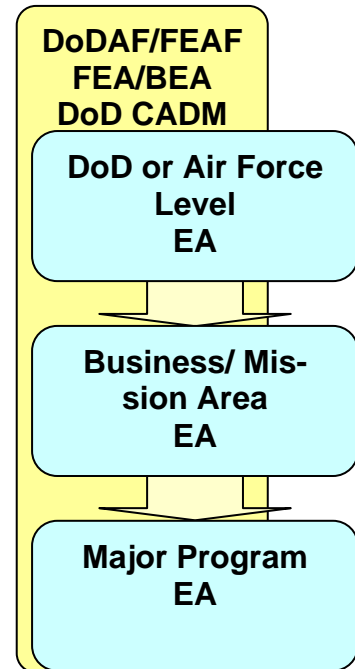


Figure 7 – OMB Exhibit 300 Business Case Scoring

Scoring Element	Score	Scoring Element	Score
Business Case (BC) Total			
President's Management Agenda (IA)		Risk Management (RM)	
Acquisition Strategy (AS)		Performance Goals (PG)	
Program Management (PM)		Security (SE)	
Enterprise Architecture (EA)		Performance Based Management System (PB)	
Alternatives Analysis (AA)		Life Cycle Costs Formulation (LC)	

CACI has worked with Federal Government agencies for years in the Business Case Analysis area through its Business Process Re-engineering lines of business. This has become a logical extension of CACI's RENovateSM methodology and the effective proceduralization of the Enterprise Architecture Planning process.

THE EA PERFORMANCE CHALLENGE

The Challenge: How to

- Utilize the EA methods/guidelines
- Evolve/improve the business processes of the service / agency
- Utilize the significant capabilities of COTS software, especially Enterprise Resource Planning (ERP) software
- Integrate these with evolving other systems
- Accomplish this without disrupting the continued quality operation of agency/service IT systems/ processes as transition occurs over time.

How: CACI major Federal IT programs in BPR/EA have produced some “lessons learned”. They indicate that success involves looking beyond the EA views to find the key business activities with leverage and get into them deeper. What this means is that the required EA modeling of the AS-IS systems as indicated in the EA framework, including

- Process Models
- Function Models (system requirements in support of the business processes)
- Data Models (static and inter-organization and inter-system)
- Interface Models (inter-organization, inter-location and inter-system)

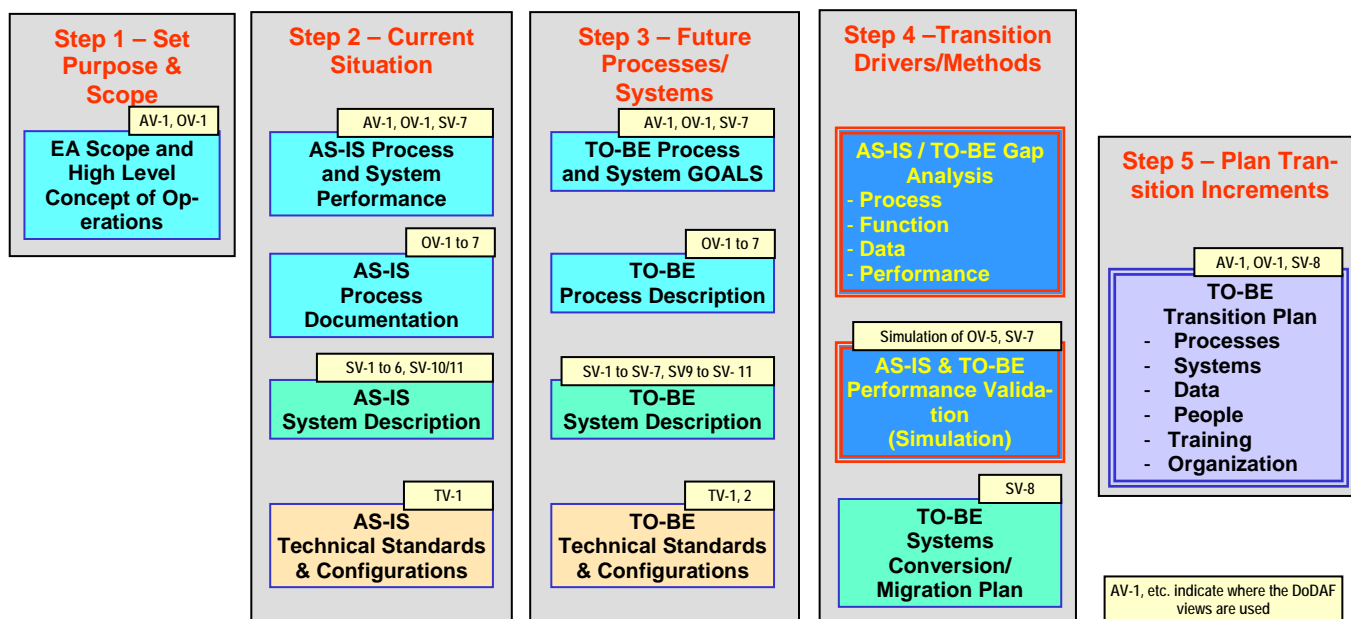
is vital but insufficient. They are the necessary foundation for planning. Sometimes just modeling these processes, data and interfaces finds fundamental flaws, but not usually (since the AS-IS is already in operation at some level proving the flow works at some level).

The shift to using COTS (ERP, *et al*) is not just a saving in IT staffing/maintenance but is really a complex shift in the underlying tools where a group of logical changes in business processes coupled with the COTS nearly standard capabilities may provide an overwhelming positive change in the organization and lower IT and organizational costs long term. Therefore, the EA of the AS-IS model and the TO-BE model must address both the desirable functions/processes and the available (COTS) and then focus on where the leverage really exists (See Figure 8). With the OMB and management pressure to move away from rehosting types of system modernization budget expenditures and toward modernizations with justifiable business improvements;

QUANTIFYING Change is Vital

Typical quantifications are staffing, throughput, response, turnaround, schedule, effectiveness and readiness.

Figure 8 – Major EA Development Steps



Planning and Modernizing with COTS systems: Our recommendation for most major initiatives is a simple one - *Focus on the Business*. This tagline is based on work that CACI has performed for the Navy and Air Force relative to planning for large-scale ERP systems. The AS-IS to TO-BE and AS-IS to COTS to TO-BE gap analysis, planning, and implementation all are important to the success of an ERP solution. But, focusing on the business processes and organization’s operational performance provide the critical leverage considered when moving to ERP and other COTS-based solutions.

Thus, it can be said that the technology is easy; it is the culture change, process improvement, and operational performance measurement that is difficult to get a grip on when trying to align to COTS packages, modernize processes/systems or address a new capability or approach.

Focus on the Business - Focus on business processes is the key to achieving transformation. Not only does this provide business improvements but it garners the buy-in of the staff almost from the beginning. To start, the legacy operational architectures must be captured and baselined at a high-level using state of the art business modeling and simulation products in order to quickly examine the processes efficiencies/inefficiencies and organization performance metrics.

This is not referring to the traditional IDEF-type monolithic static modeling activities that take years and millions of dollars and has proven too lethargic to be of much benefit in business analysis and reengineering. There are commercial products available today that support rapid high-level process mapping that can be used for quick dynamic simulations of processes to get business measurements that are critical to determining how to move forward with functional and information technology enablers to improve business processes.

The technical approach is to map and model the operational business processes and information use-points at a high-level to get an understanding of the "AS IS" situation. The current system business process documentation may vary from comprehensive to almost non-existent. CACI faces this continually and utilizes both a mature methodology (RENovate) to extract the business logic from existing systems through “decomposition” and “AS-IS” data and process documentation.

Then these AS-IS models are simulated and visualized to help communicate between the business analyst and systems analyst in preparation for migration to COTS. In addition, to the "AS IS" operational architecture baseline, the models provide a foundation for continual business process analysis and continual improvement for years to come. This should not be a one-shot deal.

CACI uses our proven product SIMPROCESS for these models. It's rich feature set (easily managed process definition/adjustment, activity based costing, analysis tools, graphical reporting of business metrics, and interfaces to systems modeling tools and optimization tools) and standards based for interchange with other software systems (UML, XMI, and XML based) provide the agency/service with a long-term simulation product (See Attachment A).

In addition to the models' benefit in understanding how the business performs and integrates with other business processes, is the ability to measure effectiveness (such as activity based costing, resource utilization, throughput, delays, timing, etc.) of business areas. These business metrics are used as QUANTIFIED benchmarks against targeted COTS products or against other modernizations, process changes or new capabilities. For example, the "AS IS" model represents the legacy process while an ERP-implied process (assuming the out-of-box ERP product implies a set of system transactions that in turn dictate how many of the processes must align to those transactions) is a "What-If" model that represents another benchmark (a possible TO-BE). The simulations and resulting metrics (speed, bottlenecks, costs, response, turnaround, throughput by organization, location or other factor) can then be used as an important tool in comparing and determining how and if work flow/processes/sequences can be changed to match the COTS product or can be improved by adjustment to the flow or whether customization is imminent.

Traditional static process modeling tools and methodologies will not support this type of rapid functional process analysis. The dynamic simulations available with SIMPROCESS are a crucial technology that is the catalyst in making this technique work. This has become increasingly clear in work for the US Navy and Air Force where SIMPROCESS is a central modeling tool that interfaces effectively with the other tools (EA, systems and development) used.

The following paragraphs provide some areas of focus on how the process and performance gap-analysis fits into a total planning and implementation process.

AREAS OF FOCUS

Most of CACI's success with DoD customers has been in providing high value-added services in the identification, quantification and justification of business process improvements (either through process change or use of more comprehensive/helpful IT systems – COTS or custom). CACI has successfully constructed numerous of the systems in this class giving credence to the approach, the tools and benefits discussed here. Even as a technology company, the most success for CACI customers has come by applying a team concept to fully capture the business processes, current and planned, and translating them effectively into plans and later systems.

It is also important to note that the business areas to focus on are in many cases already known to the agency/service at least in a somewhat subjective way. **Almost always, the leverage/benefit follows the volume (and value) of the work.** For example, as CACI worked with a State motor vehicle department customer, the simpler driver's license renewals and car registration renewals dwarfed all other activities (even though their were over 100 primary activities/ business transactions in every office). The search for volume, for improved performance on these high volume/common tasks and the understanding of

what is new compared to what is desired provide the framework for the focus of successful EA projects and transitions.

One is really looking at questions such as:

- What key business process is consuming a lot of the service/agency's resources/time?
- What key business processes need to change/expand to serve the agency?
- What business processes served by this service/agency systems could serve other services/agencies effectively, and how would those systems perform/look should that volume attrite to this agency?

These all retain focus on the business area activities. From questions like this there are sets of candidate business processes that need to be scrutinized further. Building the "AS-IS" models starts the process. Projecting one or more "TO-BE" models provides another perspective, the future perspective and then various methods are used for gap analysis between the two.

Operational Architectures - As shown in Figure 5, the DoDAF gives the framework for a number of views of the business/systems. These views need to be represented in a number of ways in a consistent format documenting the business architecture. The need for a consistent format is so that the "AS-IS" version can be compared to the "TO-BE" proposals. Apples can be better compared to Apples and the differences noted – that is GAP ANALYSIS. Gap analysis is done on all the major areas: performance/goals, functions/features, processes, data, nodes/locations/organizations and information/data interchanges. The DoDAF views are really helpful as the anchor for the gap analysis (OV-5 Activity Model for process, OV-6a/b Operation Rules/State Transitions Descriptions for function, and OV-7 Logical Data Model for data).

Since the EA cascades or links from Goals to Process to Systems to Technology, consistent representation is vital at each level and between levels so that effective comparisons are made (gap analysis) and updates and evolution of the EA can be accomplished. Various standards are important here, most notably UML (Unified Modeling Language for process models) and XML (Extensible Markup Language for data models). These and other standards and conventions are critical to interaction between best of breed tools in this arena. The DoDAF framework is a good one but needs to be augmented with business performance metrics. This means that performance related data (volume, timings, etc.) needed for input to the performance/ simulation side of the model and the results expected/planned/projected from the processing (turnaround, response, throughput,) is critical to the business process performance.

CACI brings this performance-focused planning, measuring and justification to an EA team. As such the traditional AS-IS to TO-BE gap analyses, can be subject to a performance analysis as well with the overall benefit of quantified results usable both in planning and justifying the project.

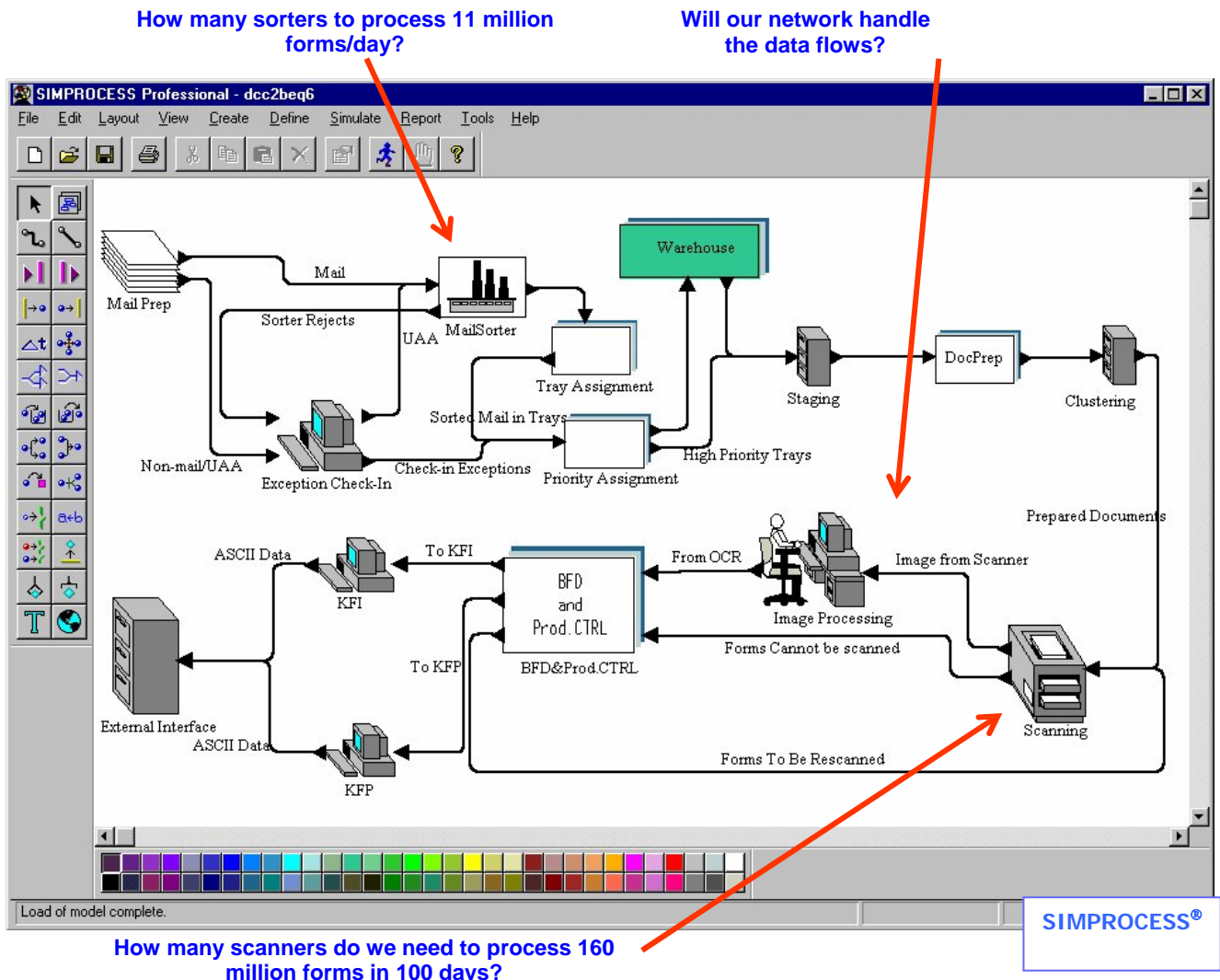
GAP ANALYSIS

Approaches to Gap Analysis - Traditionally, gap analysis for has focused on function, feature, and data matching. We add business process and operational **performance** gap analysis as well. After all, the COTS ERP vendors are selling "industry best practices" so the agency/services needs to measure the performance of those COTS-implied processes to be sure they support the mission performance. COTS packages can certainly be mapped from a pure data and IT perspective, but it is the operational performance that is most critical to an organization. None-the-less the basic gap analysis must be accomplished as the foundation.

Process Gap Analysis - Business process models are developed to address a particular organization's work including resources, workflows, decision points, business entities, organizational roles, cycle time, activity based cost metrics, and key points where the information system is needed to support the business process. Then the agency can not only analyze and synchronize transformation and reengineering efforts across its components but can also plug and play with higher-level business process models.

The process models fulfill the DoDAF OV-5 and OV6a&b view content and lay the foundation for business performance analysis through the simulation tools. The stakeholders are able to visually understand the process flows, control flow, process sequence, process dependencies and inputs/outputs by viewing the process flow diagrams (See Figure 9). The simulation of the process models provide an additional dimension of analysis between the "AS IS" and "TO BE" models resulting in a measurement of improvement from the legacy processes to the industry best practices processes implemented through the COTS ERP. These measurements focus more on the business performance and less on system performance, although there can be a direct relationship in some instances.

Figure 9 – 2000 Census Process/System Simulation



Data Gap Analysis - The data gap analysis (See Figure 10) is done by extracting the legacy data definitions and associated business rules from the existing systems and modeling it in a DoDAF OV-7 Logical Data Model view. The OV-7 logical data model is then used as the “AS IS” baseline and compared to the “TO BE” COTS ERP data model to determine the gaps in data. The OV-7 is developed in parallel to the development of the OV-5 and OV-6 process models so that a better understanding of how the data is used in the business processes is gained. This understanding is needed when mapping and reconciling and mapping the “AS-IS” data to the “TO BE” data since semantic differences can often camouflage data mappings.

The data mappings are then used to determine the gaps by comparing the differences between the “AS IS” and “TO BE” models. The differences are used to formulate translation and/or conversion plans to remove as many differences as possible when moving to COTS ERP. It is important to remove as many differences as possible since this can cause or lead to unnecessary customization of the COTS product.

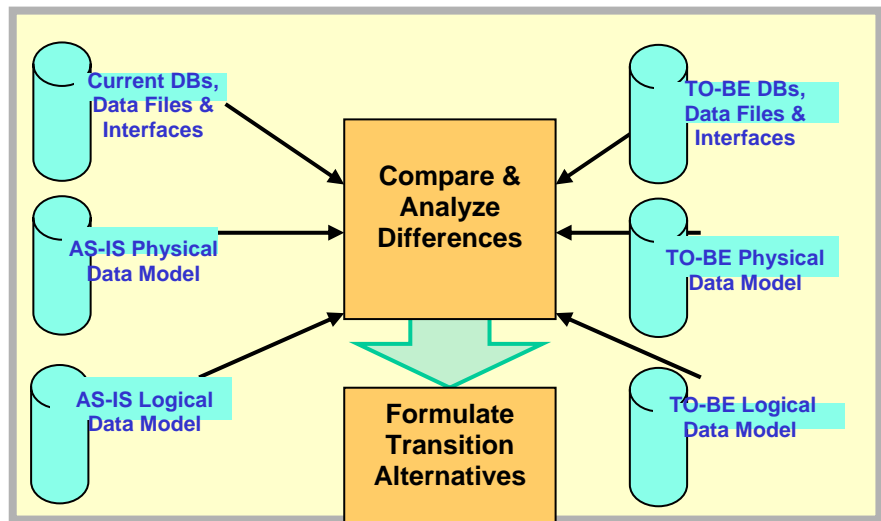
Function/Feature Gap Analysis

- The function gap analysis is done by defining the basis functional requirements the system to support the users work. The function requirements are best done in conjunction with the business process models and link directly from the process diagrams to a formal requirements methodology such as UML Use Cases (process flow scenarios). At a minimum, the function requirements can be declared in traditional requirement statements (aka shall statements in a Software Requirement Specification), however some of the overall business context is lost as opposed to the integrated process models and Use Case models.

In many situations, the functional requirements can be extracted from the legacy systems using a methodology like CACI’s RENovate. When the legacy systems are used as a starting point to mine the requirements, a strong discipline must be put in place with rigorous checks to make sure the functional requirements do not get into software or design requirements. The requirements must focus on “what” the system functions should be and not “how” to do them. If you get into the definition of “how” functions are to be carried out, this can be counter-productive to COTS gap analysis and lead to unnecessary customization of the COTS. The integration of the Use Cases with the process model activities helps to keep a business perspective on what the system needs to do to support the business work steps and helps to alleviate the problem of specifying “how” in the functional requirements.

By aligning the functional requirements (preferably Use Cases) with the process model activities, the gap analysis for the functions can be done in conjunction with the process gap analysis is a more comfortable means of determining why, where, when, and how functional requirements support the specific business steps. If the COTS-implied industry best practices can eliminate business steps in the “TO BE” process models, then gaps in the functional requirements can be eliminated as well. This approach can avoid unnecessary demands for functional “clones” of legacy system functions when adopting COTS.

Figure 10 Data Gap Analysis



(The modifications to COTS to accomplish this cloning is one of the major reason for COTS long term failure in Federal IT – it is to be avoided)

The feature gap analysis defines the bells and whistles needed in the COTS/ applications/ system to support the business process. For example, features like automated workflow, web services, and etc. that tie directly back to improving the business performance will be indicated in the business process model. This will help eliminate the demand for COTS features that are not truly adding value to the business process. Likewise, it helps the agency to measure the benefit of features that are all too often used in marketing and sales pitches by ERP vendors to sell their product.

Business Models and Measurements - When modeling business processes there are three basic constructs that the business performance metrics are centered around. They are:

- Entities – the things that business works on in performing its mission. An example would be an aircraft for an aircraft maintenance organization. Entities are also used to define the related objects of work such as paperwork, customer requests, etc.
- Resources – the people, facilities, consumables, and equipment that are used to perform the work on entities.
- Activities – the work steps (a set of activities define a process workflow) where discrete events of work are done on the entities. Activities typically utilize or require resources to perform the work.

The following are a minimum of the business performance metrics that should be considered where comparing the “AS IS” and “TO BE” process models:

- Entity Cycle time – the total duration that a business takes to perform the work on an entity
- Resource Utilization – the amount that resources are utilized to do the work in a process
- Entity Cost – the cost for doing work on the entities, usually expressed in average cost per entity.
- Activity Cycle Time – the amount of time it takes to do work by activity.
- Activity Based Cost – the cost of doing work by activity. This is a very important metric since it can reveal where the real cost of doing business is.
- Throughput – the total capacity of an activity, sub-process, or entire process measured in the number of entities through the business.
- Delays – process delay times/bottlenecks where entities slow down or back up waiting to be worked.

Many variations of the above metrics can be produced via SIMPROCESS to provide a rich set of business measurements when comparing the “AS IS” business processes to the “TO BE” processes. These metrics are much more important when considering COTS than how many of the data elements map or how many bells and whistles the COTS software product implements.

These metrics provide both a quantitative (times, cost, etc.) and qualitative (response time to customer’s needs) view of the business when doing gap analysis.

Performance Based Modeling: Simulation - Clearly, the easier analyses involve the features, functions and data. Determination of what processes should be in the “TO-BE” plan is the really difficult part of EA planning. There are multiple sources of “TO-BE” processes including, for example:

- Need to improve a poorly performing process
- New legislation/rules that require old processes to be replaced
- Opportunity to move from current practice to best industry practice (many times this is part of the attractiveness of COTS solutions such as ERP software)
- Requirement to change the mode of service (web, on-line voice, integration with other services)

Experience tells us that there is no pat answer here and further that betting on improving the wrong supposedly key processes can be devastating to the project or organization. Underwhelming one or more key processes is probably the definition of why major IT modernizations fail. Some key lessons learned in EA help to determine which key “TO-BE” processes areas to emphasize:

- Look at where the high volume of transactions are, especially those done at a lot of locations.
- Look at where the high risk/value transactions are
- Look at difficult transactions when done incorrectly cause for a lot of rework/ recheck, especially those difficult transactions / activities done at a high number of locations

The traditional steps to formulating the “TO-BE” are:

- Document the “AS-IS” business processes, especially the high volume, high risk, high value activities (business processes and key information exchanges)
- Determine what the current performance parameters are for these key business flows
- Speculate what changes in process might improve performance and/or functionality (or in terms of COTS software like an ERP, map the process to a variant of the COTS process)
- Propose those changes as the “TO-BE” and validate it through reviews with agency leaders

Through SIMULATION these steps can be changed (see Figure 11) to:

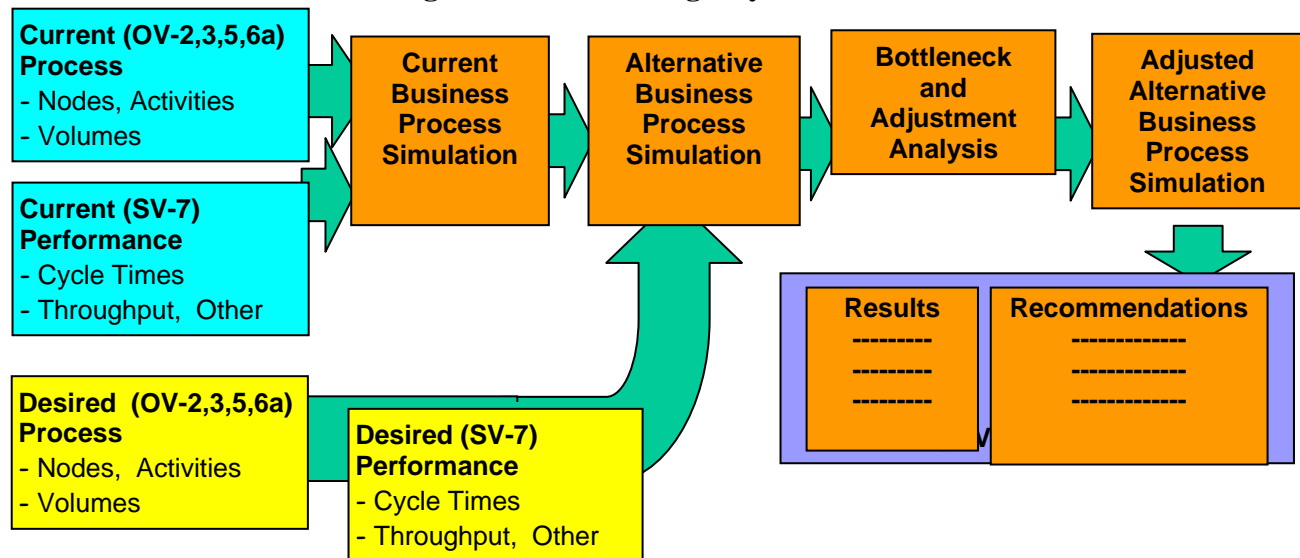
- Document the “AS-IS”, especially the high volume, high risk, high value activities (business processes and key information exchanges)
- Determine what the current performance parameters are for these
- VALIDATE the key process “AS-IS” performance through SIMULATION of the process model
 - Learn from this operating model where bottlenecks are and where adjustments can be effective in improving performance of the current flow (first of key adjustments through simulation)
- Speculate what OTHER changes in process might improve performance and/or functionality
- Propose those changes as the “TO-BE” and validate it through SIMULATION
 - Review the results and discuss, tuning the simulated model and rerun for effect
- Analyze the results (using SIMPROCESS activity based costing if you like) and provide the quantitative results as part of project funding justification and implementation performance objectives

The underlying story is that during the EA activities is not only possible but crucial to take the process models constructed ADD the performance information (See Figure 11) and

TRY THE PROCESS BEFORE YOU BUY/BUILD IT

By planning to make this approach central to the critical processes and by using the various standards to interchange planning data (UML, XML, etc.) with the other EA tools, the SIMPROCESS power can be integrated into the agency/service’s EA oversight and lower the overall risk to major transition of business processes and their underlying information systems.

Figure 11 - Simulating Key Processes



Change Management - Change management starts with the decision-makers and stakeholders understanding the targeted environment. People do not change their way of doing business easily. The biggest roadblock is the stakeholder not understanding what they are changing to and how it will impact them. This ties back to understanding and quantifying the "AS IS" processes against the "TO-BE" processes and communicating the differences and improvement to the stakeholders at all levels, not just the decision-makers. It is our opinion that even though organization and process change has been successful in industry, it has not been easy and the magnitude of a Military organization with its various components is much more complex than in a private company.

Our suggestion to use dynamic simulation models that support visualization of people's roles in the business process and workflow is crucial in getting the stakeholders to understand their new role and how it fits into the big picture. This is not a "silver bullet" but it is certainly very helpful in the process of change management.

Risk Mitigation - The Focus on the Business approach is at the heart of risk avoidance. The processes and effectiveness of an organization must be understood and quantified for the operational architectures or the agency/service runs the risk of damaging the missions of its organizations. The modeling approaches we have described here provide the engineering discipline to examine, measure, prototype, and review changes before technology is inserted (including COTS-implied processes). This will help the decision-makers to understand the potential improvement of certain changes in technology as well as understand the risk of a change to one part of the business affecting another part of the business downstream. The use of the simulation models helps to find the "domino effect" of changing one area that potentially damages another area. This phenomenon is extremely difficult to uncover using traditional static process mapping technologies and methods (such as IDEF). The bottom line is that changes and transformation must be driven by the business and not driven by technology.

SUMMARY

CACI and the CACI products are firmly involved with DoDAF and civilian agency EA activities and have been for the last 15 years in all the various evolution of business process engineering/systems modernization including:

- DoD Application integration within the DoD and between the DoD and other government agencies/industry
- Provide significant and proven performance based tools and skills to the DoDAF EA environment
- Utilize data, process, feature, performance models built on the best of industry and DoD standards
- Have and continue to perform effectively at the enterprise level as well as effectively at the mission levels of DoD or civilian Department
- Utilized the DoD standard processes (i.e. DoD Data Dictionary) and various data exchange initiatives to effectively build, maintain and enhance data collaboration using various techniques from information sharing to translation
- Have integrated activity based costing and performance based transition justification into the forefront of EA.

CACI SIMPROCESS software and RENovate methodology coupled with CACI services available on a number of proven contract vehicles provides very significant value to Federal IT organizations. CACI services and these key products have proven to be effective within the current DoD EA environment and can/have worked effectively with other vendors' tools to the benefit of the DoD customer. We look forward to have having the opportunity to accomplish that for your agency / department also.

For more information see the attachments and brochures included and/or contact:

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Attachment A – SIMPROCESS and RENovateSM Descriptions

SIMPROCESS Modeling and Simulation - SIMPROCESS is a modeling and simulation language/interactive system used simulating and evaluating various forms of models and flows. Within the business process reengineering community, SIMPROCESS has been used with considerable success at providing performance based and cost based insight into current processes and IT systems with a special emphasis on the capability to QUANTIFY both performance and COST in a

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approach. With industry standard interfaces and representations (UML, XML, etc.) SIMPROCESS is a viable tool that complements and completes the business process planning tools and is an active companion to the best CASE tool sets such as IBM's Rational tools. CACI has the software, training and guidance as to how to use SIMPROCESSTM in you EA activities. Additionally, our staff stands ready to be your simulation arm for the agency/service EA activities.

RENovateSM Business Process Methodology - Because CACI is an IT services firm first; we have developed sophisticated and proven methods and practices in the modernization of IT systems. Our RENovateSM methodology is used when modernizing or converting existing systems to new COTS systems (i.e. ERP). It is very successful in the decomposition of legacy systems extracting the business rules, processing logic, data structures and use from systems, which are most always under-documented and no longer supported by the original authors. Since the agency/service in its EA activities are faced with the modernization and combination of existing systems, CACI's RENovateSM methodology using many of the best tools in industry in a successful pattern is also available for agency/service use. CACI can provide RENovateSM as a service or a product including its full documentation.