

Agile EA for Dynamic Roadmaps

A case for the introduction of Agile values and principles into the design of federal government enterprise architectures.

Executive Summary

Enterprise architecture (EA) is under sustained pressure to guide and constrain investments, streamline systems, improve integration and compatibility, efficiently share resources, and reduce costs. Yet, EA often falls short of delivering unambiguously useful results and/or measurable operational value in meaningful timeframes.

EA's role in performance improvement necessitates that it keeps pace with and adapts to contemporary software development. Operational realities demand movement to more agile frames of mind for the process and product of EA.

To stay relevant and deliver value, EA roadmaps must be able to evolve and adapt quickly. The EA process and product must be flexible and responsive, or dynamic.

To affect dynamism, with roadmaps that maintain validity, higher agility approaches and techniques—typically associated with software development—can and should be introduced.

BRMi developed and uses the Agile EA approach to analyze EAs, design target architectures, and develop

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transition plans, or “roadmaps;” having adapted relevant values and principles of the *Manifesto for Agile Software Development*.

Agile EA results in greater buy-in and increased reliance on the quality of

analysis and guidance. By continuing to mature EA through BRMi's Agile EA, clients can more quickly meet or exceed their strategic goals and objectives, make the right investments, conduct better analyses, and address operational demands, including inspector general findings and CIO initiatives.

The Promise of Enterprise Architecture

EA's promise—birthed in the late 1980s—of cost avoidance, digital transformation, and sweeping redesigns of enterprises caught the attention of both the private and public sectors. The federal government spends many tens of billions of dollars annually on information technology (IT)¹, keeping the pressure on EA to guide and constrain investments, streamline systems, improve integration and compatibility, efficiently share resources, and reduce costs. Yet, EA often falls short of delivering unambiguously useful results and/or measurable operational value in meaningful timeframes.^{2 3 4} In addition to plain-to-see EA shortfalls, analysis of so-called big data sets has been an objective reality check.

Ideally, EA provides the “blueprints” for systematically and completely defining an organization's current, or “baseline,” and desired, or “target,”

Enterprise Architecture: Process & Product

Enterprise architecture (EA) is the plan for and design of a structure to align *and* synergize operational and technological resources, and the resultant structure meant to accomplish this. As such, EA is both a process and a product.

Good EA is not merely a compliance exercise. It supports, facilitates, provides, and optimizes (1) strategic outcomes, (2) organizational performance, (3) core missions, (4) core processes, (5) common approaches, (6) means of sharing (information and resources) and communication, and (7) cost-control measures.

operational/business and IT environments. It also helps implement new capabilities by improving information systems that optimize the agency's mission. EA is meant to facilitate performance improvement by creating a line-of-sight from strategic objectives through operational/business needs to IT capabilities. EA should help define an organization's future state to improve both cost effectiveness and mission delivery.

EA's role in performance improvement necessitates that it keeps pace with and adapts to contemporary software development. Software development continues to surely and steadily move *away* from sequential approaches—like the “waterfall” model—to iterative approaches—popularized via myriad “agile” models. Agile urges and aims

¹ ITDashboard.gov

² Jason Bloomberg, “[Is Enterprise Architecture Completely Broken?](#)” *Forbes* (July 11, 2014)

³ Government Accountability Office, [Opportunities to Reduce Potential Duplication in Government Programs, Save Tax Dollars, and Enhance Revenue](#), GAO-11-318SP (Washington, D.C.: March 1, 2011)

⁴ Stanley B. Gaver, [Why Doesn't the Federal Enterprise Architecture Work? An Examination Why the Federal Enterprise Architecture Program Has Not Delivered the Expected Results and What Can Be Done About It](#) (June 2010)

for the creation of smaller pieces of functionality (code) developed iteratively and delivered incrementally. This contrasts with the “big bang” approach of projects adhering to sequential methods, which are expected to deliver a singular, integrated, complete, working product *only at the end of software development*.

Similarly, much of “big EA” done today adopts a long, waterfall approach for completing EA artifacts. Operational and business realities demand movement to more agile frames of mind for the process and product of EA.

Maintaining Roadmap Validity

Waterfall EA’s Brittle Objects & Shelfware

Currently, the typical design of federal government enterprise architectures is slow and ponderous, “rolling up” from agencies through to headquarters in a sequential, “waterfall”-like manner. Agencies struggle because their *grand roadmaps are obsolete, or lose validity and relevance, by the time they are complete, approved, and released* due to changes in technology and other new conditions.

Inevitably, the number of interdependencies also equates to EA that is static (i.e., not tailorable). Effectively, it *cannot be meaningfully adjusted* to reflect changing conditions without tremendous, and potentially prohibitive, cost and effort. This results in so-called shelfware, whereby EA is a costly exercise that, despite

great and sincere efforts, yields little real-world value and few usable products.

Opportunity Within Change, Consolidation, and Reorganization

Organizations and environments are dynamic. Federal agencies are undergoing significant change that is intended to improve the customer experience and eliminate unnecessary service delivery costs. To support these priorities, mission areas have been redefined and overlapping functions performed at the agency level have been consolidated. The centralization of authority at the mission-area level will affect IT governance and operations, requiring mission-area chief information officers (CIOs) to

- Quickly inventory and assess their IT assets and processes,
- Identify redundancies, and
- Set targets for the agencies that reside within their mission areas.

The reorganization will also require mission-area CIOs to put together a strong plan for prioritizing how they spend IT-allocated dollars to support each agency under their purview. A renewed focus is also placed on data-driven decision-making across the department.

Some agencies face several “known unknowns,” which can either hinder or advance their ability to function in a strategic capacity. For example, the consolidation of common functions at the mission-area level have ripple effects on management structures

throughout a department's agencies and likely impact IT planning, budgeting, and execution. Agencies need to ascertain and share a deeper understanding of the impacts, effects, and potential that these changes will have within each agency, mission area, and the departmental management level. This understanding will enable agencies to move quickly to focus on quick wins.

Amidst the change, agencies have an opportunity to

- *Become fully data-driven organizations.* Agencies want to create and enhance the data structures and the tools necessary to make comprehensive data-driven decisions about customers, service delivery costs, or capital investments.
- *Tie IT spending to mission and operational, or "business," outcomes.* Agencies want to maximize their ability to demonstrate how investments in IT support accomplishment of strategic goals, executive decision-making, and better operational outcomes.⁵
- *Improve data availability and data quality* to enable quicker response to IT-related questions. Agencies must increase their collection and integration of authoritative data about their systems, applications, platforms, and products. They must also

convert more data into useful information to support technical and cost analysis, support cost forecasting, and for analyzing technical alternatives.

Results and Outcomes: Is Your Organization "Data Driven?"

Data driven typically means that insights, thoughts, decisions, activities, and investments are directed and/or influenced by demonstrable, quantifiable, real-world phenomena; in other words, evidence. The expected benefit of being data driven is a reduction in the risk of action(s) and an increase in efficiency as efforts can be focused to actual problems and results can be measured.

Data-driven organizations *avoid* acting, either solely or primarily, on feelings, hunches, and suppositions that may be taken as truth without evidence of their validity.

Truth via big data analytics informs EA with the vital signs of an enterprise and its environment.

To stay relevant and deliver value, EA roadmaps must be able to evolve and adapt quickly. The EA process and product must be flexible and responsive, or dynamic. To have more agility amidst changing technologies and circumstances, EA should occur iteratively, not sequentially.

Agile Enterprise Architecture

To affect an EA process and product that is flexible and responsive, with roadmaps that maintain validity, higher agility approaches and techniques—typically associated with software development—can and should be introduced. As agency

⁵ [Opportunities to Reduce Potential Duplication in Government Programs, Save Tax Dollars, and Enhance Revenue](#), GAO-11-318SP (Washington, D.C.: March 1, 2011)

operational/mission-area owners seek new way to quickly address their needs, BRMi's Agile EA offers *the higher agility approach* to EA that provides value in a similar fashion to agile software development. EA that truly embraces change and works directly with stakeholders to move organizations will more likely add real value to an enterprise.

Realize Immediate Value by *Being Agile*

Agencies realize almost immediate value on enterprise roadmap initiatives via Agile EA. Each priority area roadmap can be immediately used to inform investment decisions. Agencies can get started without having to wait for all priority areas to be analyzed.

Agile EA embodies, at its core, the view that collaboration, incremental development, early delivery, and the agility to respond to change typically lead to tangible results and broader success. It is *not* an overbearing, rigid, prescriptive methodology.

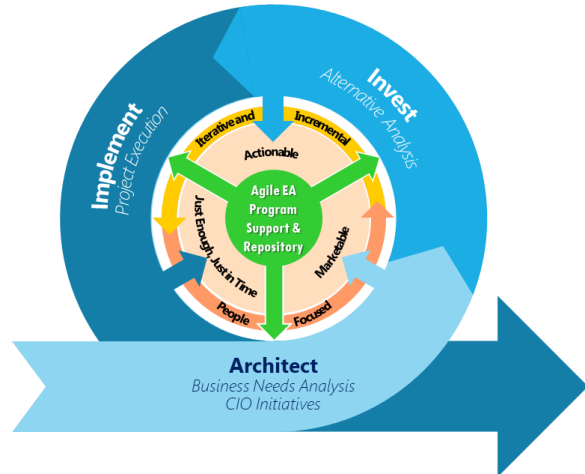
BRMi developed and uses the Agile EA approach to analyze EAs, design target architectures, and develop transition plans, or “roadmaps.” Recognizing that not everything “Agile” translates into the work that enterprise architects do, BRMi has adapted relevant values and principles⁶ of the *Manifesto for Agile Software Development* to EA methods and practices.

Agile EA Values and Principles

Agile EA iteratively addresses specific, client-designated priorities in a number (no less than three) of “sprints” (see Figure 1) that reflect Agile-based values and principles. Each sprint—current state, target

state, and roadmap—takes 4 to 6 weeks to complete. In turn, each priority takes 3 to 4 months to complete.

Figure 1: Agile EA Sprints Support the Architect-Invest-Implement Lifecycle



The core of the sprint lies with EA program support, which ideally is supported by an EA tool and repository. EA program support with such a tool can employ Agile EA methods to support all EA work including creation, maintenance, and updates of EA reference models, domain architectures, related taxonomies, standards, and architectures stored in the repository.

The Sprint in Agile EA

Inspired by Agile-based software development, a “sprint” is an iterative cycle of work confined to a brief, regular schedule. The sum of the incremental successes—moving from the higher to lower priorities—form a complete architecture.

Agile EA can inform all activities conducted during the life cycle, particularly in the Architect and Invest phases (of an Architect-Invest-Implement lifecycle), by quickly

⁶ Agile Alliance, [What Is Agile Software Development?](#)

providing the EA artifacts that guide analysis and investment activities. For the Implement phase, BRMi can support agency EA personnel assigned to execution integrated-project-teams. Once each project activity is complete, its artifacts can be updated in the repository with the latest models and information. The cycle repeats and continually matures EA by providing an ongoing feedback cycle between EA and the operation/business.

Actionable

Agile EA effects actionable architecture in that it

- Is clearly defined;
- Has tangible and measurable results;
- Directly supports a subsequent effort;
- Accurately, proportionately (i.e., just enough, just in time), and iteratively documents the state of the operation/business; and/or
- Otherwise directly supports stated operational/business objectives.

Actionable deliverables come through collaboration with a client's EA staff and project sponsors. Client satisfaction increases because the value of each architecture (iteration) is more apparent.

People-Focused

Agile EA focuses on people, collaboration, and engagement with impacted stakeholders, early and often, to explicitly address architectural pain points. Successful

architectures are those that fuse the work of architects and stakeholders; neither should work in isolation from the other. Agile EA defines that which is needed and obtains concurrence, or "buy-in," wherein stakeholder requirements and concerns are directly addressed. This involves:

- Face-to-face conversations on a continuous basis; communicating with stakeholders as often as necessary to define actionable architectures and obtain the information needed to complete analysis tasks.
- Artifacts available to project stakeholders as they are created and revised; project sponsors can review and offer feedback during the analysis.
- Formal meetings with stakeholders to obtain final feedback, validation, and sign-off as artifacts near completion.

Iterative and Incremental

Agile EA dissects work into smaller, more manageable blocks/increments to produce more accessible and easily revised artifacts and data in iterations. It seeks to implement and/or support (e.g., governance, maintaining artifacts) a centralized EA tool or repository. The repository is set up such that it is *the* authoritative, readily available source for all relevant EA artifacts and data. Once created, the artifacts need only be updated or expanded in the future rather than rebuilt or started anew. Building architectures out of something (i.e., iterating and

incrementally improving) hastens full implementation of Agile EA. A repository lets an EA team

- More closely collaborate and engage.
- Be future ready.
- Use the information found therein as the foundation for the architectural analysis effort.
- Prepare all architectural artifacts in machine-readable format as required for inclusion in the repository.
- Update the relevant artifacts as needed to meet EA objectives and socialize drafts to obtain sign-off.
- Update the repository with the final updated version of the relevant artifacts once each receives client sign-off.

The repository can be continually and consistently updated to provide the most accurate and relevant architectural data. Agile EA calls for collaboration with client EA personnel to advertise the existence and promote the use of the repository consistently across all EA efforts.

Just Enough, Just in Time

Agile EA reduces complexity and produces only the artifacts necessary—“just enough, just in time”—to support a roadmap at the appropriate level of detail; nothing more, nothing less. It

- Is data driven;
- Focuses on solving problems and on the simplest and most

direct means of providing relevant architectures;

- Calls for the creation of quick prototypes and/or basic documents, often as the result of a few days or weeks of intense work in conjunction with stakeholders; and
- Addresses stakeholders’ fundamental, urgent needs while still being open for continuous improvement (i.e., iteration) to refine the architectures to their final state.

Agile EA casts aside onerous documentation and months- or years-long quests for “perfect” architectures. *Where necessary*, requirements are gathered, managed, and prioritized along the way so that they can be incorporated into subsequent iterations of the architecture; but, the focus remains on producing quick and accurate iterations to meet current needs. Once an iteration is completed and approved by stakeholders, work can continue iteratively improving the artifact to further address stakeholder needs.

Marketable

The most effective enterprise architectures have enthusiastic agreement, or “buy-in,” at all levels of an organization. Buy-in comes through an understanding of and appreciation for EA; its analyses, the artifacts it maintains, the value it can provide to new and ongoing IT initiatives, etc. Stakeholders will tend seek out EA support to address their pain points in thoughtful and innovative ways.

Agile EA values partnership with the client's EA staff to formulate the appropriate marketing strategy to promote EA's everyday value. While the marketing strategy varies according to the subject matter, Agile EA poses five questions:

1. Who is the target audience for the architecture?
2. What is the value of the architecture the EA team has completed?
3. What are the metrics necessary to prove value most clearly?
4. What can the architecture enable next?
5. What is the implementation plan for marketing the architecture, including the "sound bites" best suited to easily communicating its purpose?

Working with the client to definitively answer these five questions is an important step toward an end-to-end EA marketing plan, which may include but is not limited to: creation of executive or stakeholder briefings, leading face-to-face meetings and communications, developing educational training materials, writing promotional pieces for the client's intranet, and regular outreach.

Prioritized Roadmaps

An Agile EA team works under the guidance of a senior enterprise architect and, as discussed earlier, uses a shared repository for all artifacts to maximize reuse and collaboration. Figure 2 and Figure 3 show that roadmaps are prioritized

and iteratively expand. Starting with the highest priority, each subsequent roadmap builds on prior initiative(s) to form the enterprise roadmap. Agile EA provides value early and often, or continuous value to completion.

Figure 2: Sample of Prioritizing Recommendations

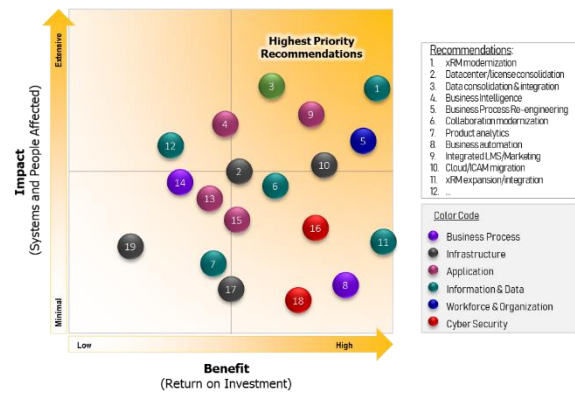


Figure 3: Sample of Prioritizing for Roadmaps



Baseline Architecture: Current State

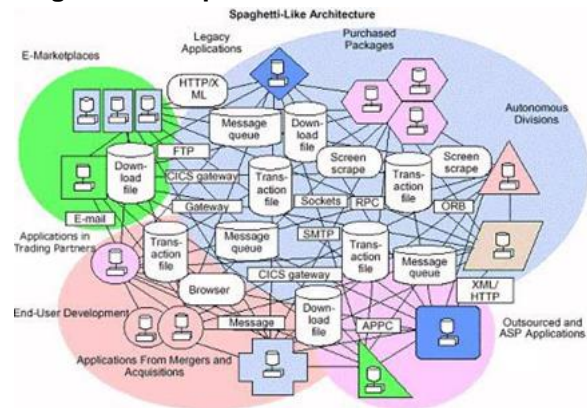
The baseline architecture identifies performance gaps, resource constraints and desired capabilities. It evaluates the current state of the enterprise with forethought to the target state. A full understanding of the current state and its deficiencies provides traceability (i.e., artifacts) to fully justify investing in any recommendation or proposed capability; ultimately, incorporated into a target architecture and roadmap.

The current state sprint for each roadmap (iteration) aims to understand the people, processes, and technologies *supporting the selected function*. This happens by researching relevant documentation and interviewing essential stakeholders.

Agile EA does follow The Common Approach to Federal Enterprise Architecture⁷ to document the architecture along six domains, or “views,” as follows:

1. *Strategy* identifies strategic goals and objectives that must be represented in the architecture and identifies key performance metrics the client either relies upon today or would like to rely on for decision-making in the future.
2. *Business* leverages existing architecture artifacts that identify current state and target state capabilities and processes, including existing process and capability gaps the roadmap must address.
3. *Data* considers important data relationships at a high level, with an eye towards the entities and relationships most relevant to enabling the metrics desired in the strategy domain.
4. *Application* assesses systems that exist today and looks forward to the way the client wants them to evolve. The application target state architecture and roadmap reflect movement towards the

Figure 4: Sample of a Baseline Architecture



applications selected leveraging all completed application rationalization efforts.

5. *Infrastructure* evaluates changes the client wishes to make to their infrastructure assets, such as moving to a “cloud first” IT deployment model. This level of analysis identifies opportunities to move to the target infrastructure.
6. *Security* documents the relevant standards so that all subsequent architectures and initiatives properly capture security controls as requirements for implementation.

The output of these analyses is a series of diagrams, models, and other artifacts that provide a multi-dimensional architectural view. Agile EA reuses all existing artifacts and creates others as needed.

Target State Analysis

The baseline (current state) is followed by the target state analysis. In each target state sprint, the Agile EA team

⁷ Office of Management and Budget, [The Common Approach to Federal Enterprise Architecture](#) (Washington, D.C.: May 2, 2012)

artifacts) enables clients to do more with less and in less time. Well-constructed agency-wide target architectures and enterprise roadmaps accelerate implementation of operational efficiencies by enabling a focus on priorities while keeping a broader perspective. Agile EA's iterative process for creating a target architecture and roadmap empowers CIOs to quickly deliver value. With leadership commitment, BRMi can help clients achieve this by making use of in-flight initiatives.

Speed Ideas into Action

"[Agile EA] brought a new strategic vision and approach translating the speed of ideas into action in a matter of days vs. months. [Agile EA] coupled with the professionals from BRMi on this team generated remarkable returns in our project quickly and those returns are directly attributed to the EA team."

Office of Security and Integrity

BRMi swiftly implemented a target architecture and transition sequencing plan in 8 months at an agency within a recently formed U.S. Department. We identified opportunities for mission delivery improvements, automation, and consolidation, as well as new capability needs. Agile EA matured the nascent organization, as measured in the Office of Management and Budget's (OMB) EA Assessment Framework, from a Level 0 to Level 3 score.

Mature Mission Views

At a large federal law enforcement agency, BRMi focused aligning the target architecture and roadmap to

OMB *Performance* and *Business* Reference Models, driving subsequent application rationalization. This multi-year effort delivered a mature mission view, including the definition of business functions and processes to drive modernization. Given the business focus, this effort was successful in large part due to strong outreach and business-friendly terminology and artifacts. This target architecture is now being used to support their cloud migration efforts.

Drive Better Conversations

"As a small agency, this [EA analysis] starts to drive a better conversation at the Department as a whole. Everyone should have this. We want to push along the conceptual discussion about how the Department's OCIO and enterprise services relate to the functions of individual bureaus."

Chief Financial Officer

BRMi presented a U.S. Department's Chief Financial Officer and Acting Assistant Secretary for an administrative component with a bold vision and 5-year roadmap for revitalizing their IT functions. We led a full analysis of the current state and the gaps to desired future capabilities. In just 4 months, Agile EA yielded roadmap initiatives with data visualizations to emphasize the evidence for key findings and recommendations.

Get Buy-In

At a federally chartered corporation, BRMi applied Agile EA to pension plan management and financial operations and many IT areas,

including security/risk management and infrastructure, in a “bottoms-up” approach to the target architecture and roadmap. Agile EA’s marketing helped overcome organizational resistance to change. They have used the “blueprints” to respond to inspector general and Government Accountability Office audits, develop business cases, and modernize several of the areas.

Profile Environments Accurately

At an association of bankers and financial institutions, BRMi analyzed the operating environment—interviewing dozens of individuals—and developed an organization-wide target architecture and 5-year roadmap defining 38 sub-projects. Roadmap initiatives were quickly implemented, including a migration of six core business applications to a cloud hosting environment and the development of an integrated data environment.

Let’s talk more about realizing immediate and long-lasting value in your enterprise architecture through Agile EA.

Ask us about scheduling an introductory meeting!



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