

Operationalizing Enterprise Architecture August 2023

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AGENDA

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- Understand Thy Culture
- Operationalizing EA
- Addressing stakeholder concerns
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- The value of analysis driven architecture approach
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BLUF

- Enterprise Architecture was discontinued approximately in 2008. Significant Enterprise Architecture debt is present, presenting a wicked problem scenario for the USCG. (no manageable architecture)
- The EA team and resources were cut to a team of 7 Enterprise Architects that were charged with producing EA governance for the Coast Guard.
- Coast Guard leadership continuously changes, bringing new perspectives on EA, or lack of understanding of EA.
- The Coast Guard culture is widely unaware of the purpose, value and impact of the EA discipline, and /or are unwilling or able to invest in EA.
- The EA discipline is no longer viable unless it can be digitized and ideally highly automated, possible only with modern toolsets / platforms to enable the intended outcomes of EA.
- The EA team is on a journey to modernize and operationalize EA for the necessary intended outcomes; requiring change management, evidence based analysis to inform decision making, providing evangelism and awareness along the way Significant progress has been made in the past three years ...





Opening Remarks (1) Understanding the problem space

The Wicked / Super Wicked Problem.

• A wicked problem is a problem that is difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize.

Strategies to tackle wicked problems.

Authoritative - seek to tame wicked problems by vesting the responsibility for solving the problems in the hands of a few people.

The reduction in the number of stakeholders reduces problem complexity, as many competing points of view are eliminated at the start.

The disadvantage is that authorities and experts charged with solving the problem may not have an appreciation of all the perspectives needed to tackle the problem





Opening Remarks (2)l understanding the problem space

- **Competitive-** attempt to solve wicked problems by pitting opposing points of view against each other, requiring parties that hold these views to come up with their preferred solutions.
 - The advantage of this approach is that different solutions can be weighed up against each other and the best one chosen.
 - The disadvantage is that this adversarial approach creates a confrontational environment in which knowledge sharing is discouraged.
 - Consequently, the parties involved may not have an incentive to come up with their best possible solution





Opening Remarks (3) understanding the problem space

✓ Collaborative - aim to engage all stakeholders in order to find the best possible solution for all stakeholders.

Typically these approaches involve meetings in which issues and ideas are discussed and a common, agreed approach is formulated.

A significant advantage of this approach is the creation of a strong information sharing environment.

The main problem is the risk that certain ideas, while integral to finding a possible solution, may be too controversial to accept by other involved parties.

Acknowledgement we are a federated organization and federated partners have various perspectives on problem space, a collaborative approach is invoked from the top down perspective. Efforts focused on this approach leverage an architecture analysis approach looking at capabilities supporting activity, aligned to strategy, and resources. (see Div2-metamodel)







Opening Remarks Summary (4)

Summary characterization of wicked problems.

- 1. The solution depends on how the problem is framed and vice versa (i.e., the problem definition depends on the solution)
- 2. Stakeholders have radically different world views and different frames for understanding the problem.
- 3. The constraints that the problem is subject to and the resources needed to solve it change over time.
- 4. The problem is never solved definitively.





Our EA Journey

<u>Before 2005 (Pre EA Hype):</u> CGEA Framework, Enterprise Roadmap, Enterprise Transition plan, Technical Reference Model/Enterprise Standards Profile, MITRE Center for Modernization

Between 2005 and 2010: Deepwater Architecture, TEAMS Standup, EA Practice Manual

WE ARE HERE.

Between 2010 and 2019: Policy, Compliance, CGEA Program Policy created., 2018 CG-6 OMR affect, TEAMS tech refresh market research, funding and acquisition efforts – to C5I-BEARS,

5

6

<u>2022 and beyond:</u> Mature the EA program for USCG; Continue value add agenda, Operationalize EA. Modernize EA.

Between 2019 to 2022: Adopt value add to organization paradigm, Executing on targeted EA Modernization Goals, invoked PM Rigor and Team Transformation, Revitalized the EAB, EAB Scheduled monthly, invoked portfolio management on programs, ALF, SELC, performing outreach to PM's and internal to CG-6.Standing up **BEARS (TEAMS tech refresh)** with Enterprise System Inventory (ESI).

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Awareness Training - Evangelize the operation EA model. Demonstrate value and impact. Inform decision-making. Manage and guide stakeholder expectations and perspectives. Show metrics.





Our approach ... Mature the EA / EAB Process.

Mature EA / EAB process to:

- Design focused leveraging ISO/IEC 25010:2011 (System and software quality models) connected to architecture data.
- Evidence based using repository and analysis tools.
- Architecture trade-Off Analysis Methodology (ATAM) ISO 42030 software, systems and Enterprise Architecture Evaluation Framework.



Realizing the value of the EA discipline is highly dependent upon a modern digital environment. Modern toolsets are key enablers.





Why Standards ? Creditabiliy is key...

O/IEC/IEEE 42030:2019(E)

Software, systems and enterprise-Architecture evaluation framework. USCG Goal: Mature the CGEA program for Value and Impact to USCG. We are adopting ISO standards to enable architecture evaluations that are used to:

a) validate that architectures address the concerns of stakeholders;

b) assess the quality of architectures with respect to their intended purpose;

c) assess the value of architectures to their stakeholders;

d) determine whether architecture entities address their intended purpose;

e) provide knowledge and information about architecture entities;

f) assess progress towards achieving architecture objectives;

g) clarify understanding of problem space and of stakeholder needs and expectations;

h) identify risks and opportunities associated with architectures; and

i) support decision making where architectures are involved.





Stakeholder and Change control Management. Understand Thy Culture ...

Key Points:

A stakeholder communication plan is vital. Top cover and campaign support in a military (or any) organization is crucial. **Directives are not the same as stakeholder feedback.**

A military service is structured accordingly to carry out the functions necessary to perform their mission. For the Coast Guard, Executive management is at the vice admiral level (VADM), Senior management is at the Flag officer (RADM), and Senior leadership and management is at the 06/CAPT and GS15 level. All other levels are the primary performers of workflow. (operations) The holistic leadership team demonstrate various perspectives on problem space for the eco system.

Architecture driven analysis is part of an approach to operationalize the EA discipline, resulting in evidence-based recommendations, to include but not limited to, aligning investment to strategy, identify trade space, cost avoidance and overall readiness posture of the organizational ecosystem





Operationalizing EA

What is operationalizing EA?

Operationalizing EA is the strategic approach of integrating EA discipline into the operations of the organizations eco-system. Demonstrating evidence based value add and impact, stakeholder and change control management are all vital to the intended outcome of this approach. The Coast Guard will mature the EA discipline to provide evidence-based data and information in support of decision-making.



Addressing Stakeholder Concerns



Architecture Descriptions (AD) provide the data and information to address stakeholder concerns for any given Entity of Interest (EOI). Once the AD is provided questions can be answered for a specific EOI or a portfolio of EOI's.





The analysis driven architecture approach

Bottom up. The Enterprise Architecture Board (EAB) is a governance board chaired by the CEA. Members of the EAB are 06/GS15 leadership.

Via the architecture analytics approach, findings and recommendations are presented to the EOI program manager the EAB and CIO.

Top Down. A use case for a EOI is structured by a sponsor. A program imitative is organized and executes on the use case requirements.



Once the manual process is stabilized, it may be automated. Must leverage a modern data management platform to realize realistic capacity towards improving readiness posture. Currently leverage ALFABET and O365.





The value and impact of analysis-driven architecture is quantifiable

- Improve understanding of capability and operational gaps.
- Identify points of integration and dependency within the larger USCG Ecosystem
 - Reduce the number of gaps in interoperability
 - Identify areas of possible reinvestment or overinvestment.
- Improved data traceability
 - Improved data stewardship
 - Understanding of the data needed (and its source(s)) to support decision making







Analysis-driven architecture simplified...



EA Analytics will inform decision making: ID operational and capability gaps, integration and dependency evidence, data traceability evidence., trade space and more. Are our strategic outcomes clearly crafted and communicated?

Are the capabilities required to support our mission area (activity) identified and kept current? Do these capabilities align and support our intended strategic outcome?

Are business functions and process aligned to support capabilities?

Is the data architecture and data model in place to support business function and process and meet capability expectations, resulting in positive strategic outcome?

Is the application solution capturing data and producing information, aligned to the data architecture and data model, in support of business function and process that align to capabilities that support the intended strategic outcome?

Are the necessary infrastructure services in place and sustained to support the application, data model and architecture, business function and process, capabilities and intended strategic outcomes?





Does an EOI conform to baseline EA criteria?

Level		Interoperability	Data Use and Exchange	Security and Compliance	Technical Conformance	Trade Space
No Impact	1	System boundaries and interfaces are identified and defined.	Data quality dimensions are clearly addressed. Data requirements are clearly identified and documented to include source and sink systems.	System design clearly addresses required compliance standards	System design conforms with documented requirements documentation (e.g., ORD, etc.). Architecture is consistent with stated requirements.	System provides a unique solution not addressed by existing system or services. Fits within current existing support infrastructure

Are EOI boundaries and interfaces identified and defined?

Are data quality dimensions clearly addressed? Are data requirements clearly identified and documented?

Does EOI design clearly address required compliance standards?

EOI design conforms with documented requirements documentation (ORD, etc). EOI architecture is consistent with stated requirements.

EOI provides a unique solution not addressed by existing EOI or services. The EOI solution fits with existing support structure.





Is an EOI postured for success?







Accessing EOI's

Level		Interoperability	Data Use and Exchange	Security and Compliance	Technical Conformance	Trade Space
No Impact	1	System boundaries and interfaces are identified and defined.	Data quality dimensions are clearly addressed. Data requirements are clearly identified and documented to include source and sink systems.	System design clearly addresses required compliance standards	System design conforms with documented requirements documentation (e.g., ORD, etc.). Architecture is consistent with stated requirements.	System provides a unique solution not addressed by existing system or services. Fits within current existing support infrastructure
Marginal	2	System boundaries and interfaces are partially defined.	Data quality dimensions are incompletely addressed, but are in progress. Data requirements are partially identified as are source and sink systems.	Some compliance standards are not yet addressed, but have been identified for incorporation	System design conforms with majority documented requirements documentation (e.g., ORD, etc.). Architecture is consistent with stated requirements.	System provides a unique solution not addressed by existing system or systems. Presents potential new logistics and support requirements.
Significant	3	System boundaries are identified but interfaces are not yet defined	Some data quality dimensions are missing. Data requirements are partially identified as are source and sink systems.	Compliance standards (e.g., security, privacy, accessibility) are incompletely addressed. There is no clear mapping of non-functional requirements compliance to discrete aspects of the system architecture.	System design does not conform with or address specific operational requirements. Presents performance concerns.	System provides unique solution but has some potential overlap of functions and services with existing systems. Contains new system components presenting new logistics and support requirements driving Total Ownership Costs (TOC).
Critical	4	System boundaries and interfaces are only partially identified and incompletely defined	Some data quality dimensions are missing. Data requirements have not yet been identified nor have source and sink systems.	Compliance standards (e.g., security, privacy, accessibility, etc.) missing. There is no clear mapping of non-functional requirement compliance to discrete aspects of the system architecture.	System design does not conform with or address specific operational requirements. Presents major concerns in meeting operational performance requirements.	System provides unique solution but has some potential overlap of functions and services with existing systems. Uses some unique or proprietary system components presenting TOC risk
Unacceptable	5	System boundaries and interfaces are not identified nor defined.	Data quality dimensions are not addressed. Data Requirements have not been identified. Sink and Source systems have not been identified.	System does not address critical compliance requirements such as cyber security controls, Section 508, etc. No evidence of incorporation is evidenced in the architecture design.	System design (architecture) does not conform or appear to address stated requirements and operational gaps. Contains scope beyond stated objectives. Presents cross-enterprise and cross-sponsor concerns.	Similar system currently being supported with established logistics. Possible redundant system. Uses unique or proprietary system components presenting TOC risk.





Analysis-driven architecture transparency

the dashboard needs at least:

- indicators giving insight into:
- the enterprise's current state,
- the enterprise's current performance,
- the enterprise's future (expected) performance,
- the selected direction and progress of its transformation processes,
- controls allowing the transformation processes to be influenced:
- the desired state of the enterprise,

Enterprise transformation

Execution

- plateaux of intermediary stages,
- overall regulations.



transforms

Modernizing and operationalizing the EA/EAB process leveraging standards and the architecture data-driven approach is a transformational enabler. The use of a digital platform to visualize key transformational metrics is critical to maturing and transforming the organizational eco system.





The organizational eco system

Architecture driven analysis can inform key decision points with evidence backed data and information.

This approach can enhance readiness posture in all areas by informing decision making.

The value add and impact is maturing an approach to enhance or make better a "wicked" problem space.



The organization eco system wicked problem space: How can we achieve our strategic intent?





FEEDBACK / QUESTIONS ?



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What is an Enterprise?

1. What is an enterprise?

An enterprise is any type of human endeavor. It is being enterprising. In any enterprise there are always people collaborating for a purpose supported by a platform. *Management pieces* like the organization structure, capabilities and skills or strategies and plans. *Operational pieces* like activities and processes, products, transactions or services and supporting, pieces like software, applications, databases, hardware, platforms and communication networks. <u>all these pieces is the architecture of the enterprise.</u> Therefore, *every enterprise has an enterprise architecture*. It is important to remember here that an enterprise is not always a company. It can be part of a company. It can be a non-commercial endeavor or temporary project. It is any human undertaking.





How do you architect an Enterprise?

2. How do you architect an Enterprise? There is a process of architecting which applies the **discipline of** enterprise architecture and produce these outputs that describe the architecture enterprise. The process of architecting involves taking stock of the relevant components or building blocks that make up an enterprise this is much more than simply information technology. For example this might include Communications networks, computers and laptops, databases, media stores, buildings and locations, products and events, services, applications, data processes, capabilities, strategies and organization Structures. An architect then needs to examine how these components enable or constrain the enterprise. Architects then work out the alternatives and options for moving from the current state to the future target state. They create frameworks to manage the architecture, detailed descriptions of the architecture in its components and roadmaps to show the best ways to change and improve the architecture. They assess the constraints and opportunities, costs, benefits, risks and value in each option to help decision-makers select the best alternative. So architecting an Enterprise is a process. It requires experienced and skilled Enterprise Architects applying a professional discipline called Enterprise Architecture and it produces descriptions of the architecture of an enterprise in its current and future States that guide changes to the architecture.





What makes Enterprise Architecture so special or unique?

3. What makes Enterprise Architecture so special or unique? Enterprise architecture is one of the few disciplines that examines the management and evolution of an enterprise holistically, the whole unit, but what really makes Enterprise Architecture so special is that it does this by applying a unique combination of specialist techniques, such as architecture frameworks, fundamental factors and principles, separation of concerns. The main analysis patterns and building Blocks.





Do we need Enterprise Architects?

4. Do we need enterprise architects? No.

There are many enterprises that come into existence without the intervention of an Enterprise Architect. There is a strong belief however that there are many situations when it's better to architect an enterprise than to leave the creation and evolution of its architecture to chance. The belief goes that it is better to have <u>an architecture that is integrated</u>, <u>coherent and proactively designed than one that is</u> <u>random</u>, <u>ad hoc and inconsistent</u>. Remember the enterprise will always have an architecture. It is not optional. We do have a choice on whether we manage its evolution or not and how well we manage it. We can leave a garden so that it is overtaken by weeds. We can do the gardening ourselves or we can employ a professional gardener. We can make a sandwich, create a meal by following a tried and trusted recipe, or go to eat in top restaurant. Plants will grow with or without our intervention. People need to eat is not an option, <u>and in the same way every enterprise has an architecture whether we</u> <u>choose to manage it or not</u>.



