

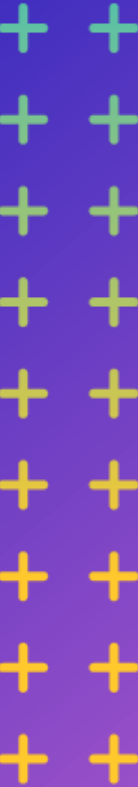
# Architecting Federal Public Health with the CDC Technical Reference Architecture (TRA)

Session 170 – March 12, 2026

Ryan M Harrison, PhD

Chief Enterprise Architect (Acting)

Centers for Disease Control and Prevention



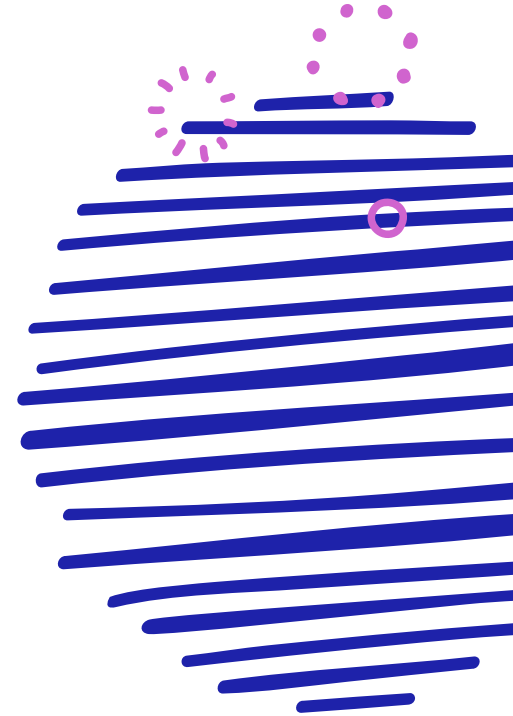
# Meet Our Speakers



**Ryan M Harrison, PhD**

Chief Enterprise Architect (Acting)

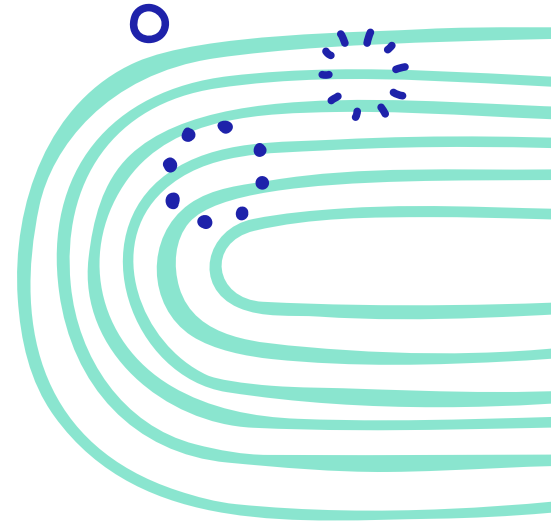
Centers for Disease Control and Prevention



# Conflict of Interest

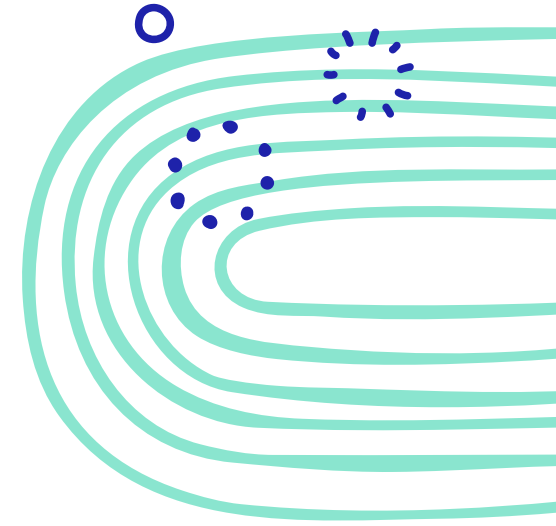
Ryan M Harrison, PhD

Has no real or apparent conflicts of interest to report.



# Agenda

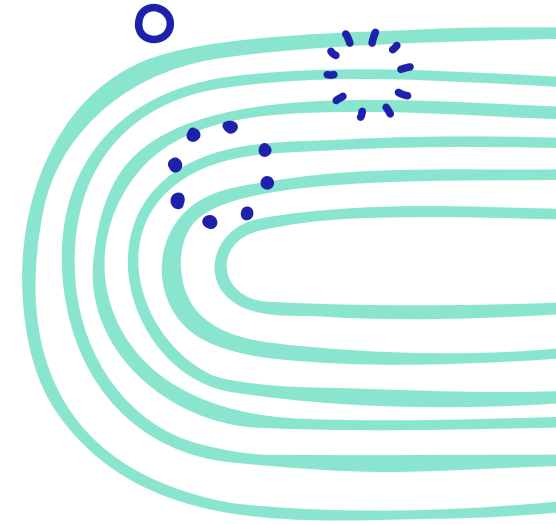
- What is Enterprise Architecture, with CDC examples
- Federal Enterprise Architecture
- Building the CDC Technical Reference Architecture (CDC TRA)
- Incorporating the CDC TRA into Governance
- Continuous Improvement



# Learning Objectives

After attending this session, participants will be able to:

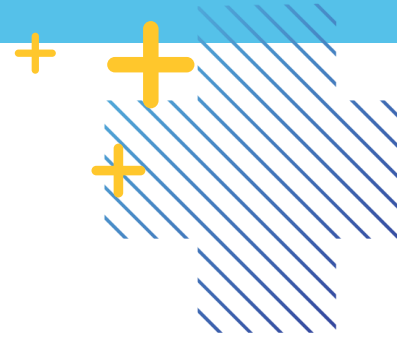
- Recognize how Enterprise Architecture advances digital transformation
- Recognize the Federal agencies take different approaches to codifying technical standards
- Evaluate your organization's enterprise architecture maturity



# What is Enterprise Architecture?



# What is Enterprise Architecture?



## The Open Group Architecture Framework (TOGAF)

EA is a strategic tool that presents an approach to identify and address gaps between aspirations and reality, whatever drives the gaps. It accelerates the ability of an Enterprise to achieve its stated objectives.

The Open Group. (2025). TOGAF Series Guide: A Practitioners' Approach to Developing Enterprise Architecture Following the TOGAF® ADM. Retrieved February 9, 2026, from <https://digital-portfolio.opengroup.org/togaf-series-guide-practitioners-approach/latest/01-doc/chap03.html>

## Federated Enterprise Architecture Certification (FEAC) [Zachman]

ENTERPRISE ARCHITECTURE is the total set of intersections between the Abstractions and the Perspectives that constitute the total set of descriptive representations relevant for describing an Enterprise.

Zachman, J. A. (2022). Architecture is architecture is architecture. Zachman International – FEAC Institute. Retrieved February 9, 2026, from <https://zachman-feac.com/resources/ea-articles-reference/153-architecture-is-architecture-is-architecture>

# What is Enterprise Architecture?

(4) "enterprise architecture"-

(A) means-

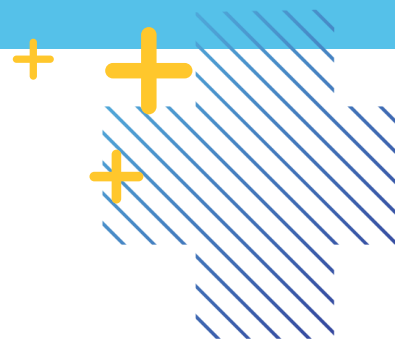
- (i) a strategic information asset base, which defines the mission;
- (ii) the information necessary to perform the mission;
- (iii) the technologies necessary to perform the mission; and
- (iv) the transitional processes for implementing new technologies in response to changing mission needs; and

(B) includes-

- (i) a baseline architecture;
- (ii) a target architecture; and
- (iii) a sequencing plan;

44 U.S.C. § 3601

# What is Enterprise Architecture?

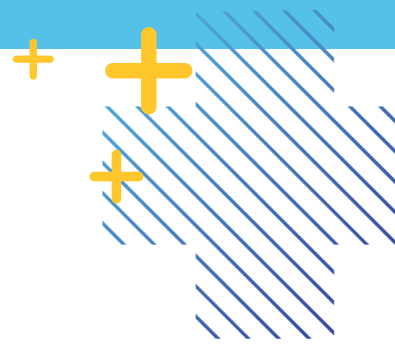


1. Make lists

2. Articulate state

3. Apply through governance

# What is Enterprise Architecture?



## 1. Make lists

- Preferred Solutions
- IT Systems
- Software
  - Repositories
  - Licenses
- Stakeholders

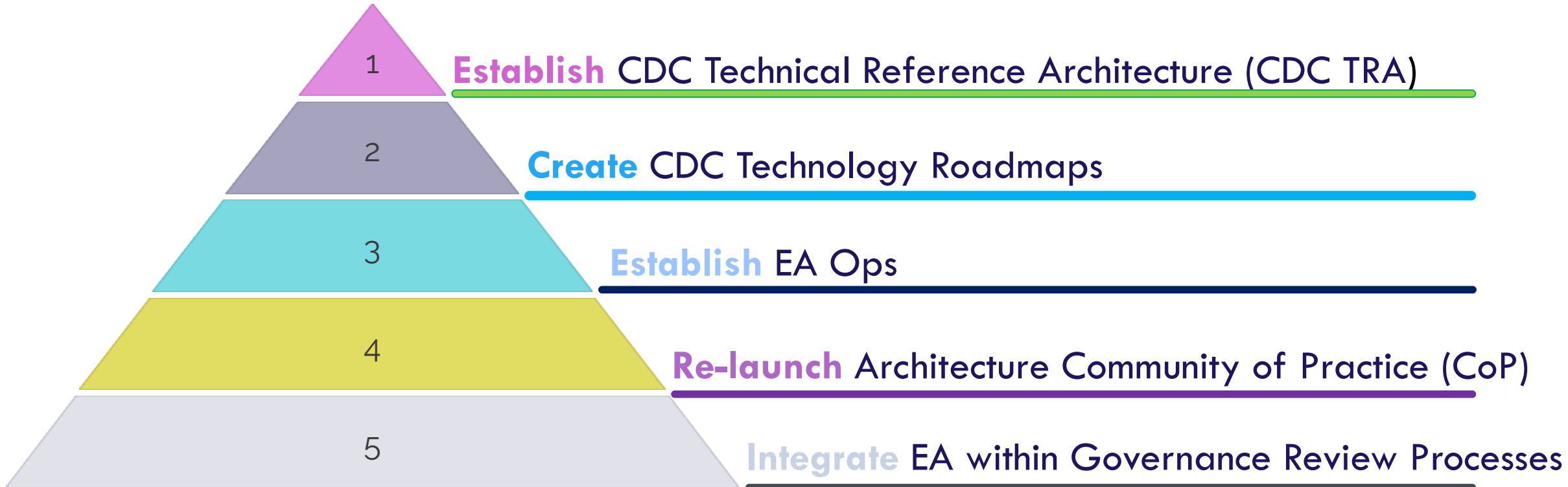
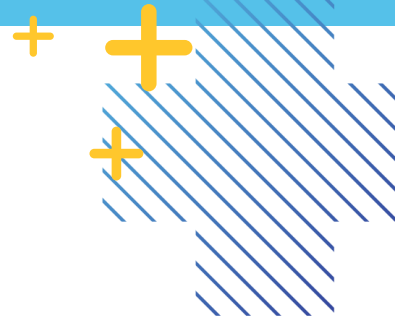
## 2. Articulate state

- Baseline, Target, Transition
- Architecture diagrams
- Architecture principles
- IT Standards

## 3. Apply through governance

- Local governance
- Enterprise governance

# Enterprise Architecture (EA) at CDC



# Authority for Enterprise Architecture



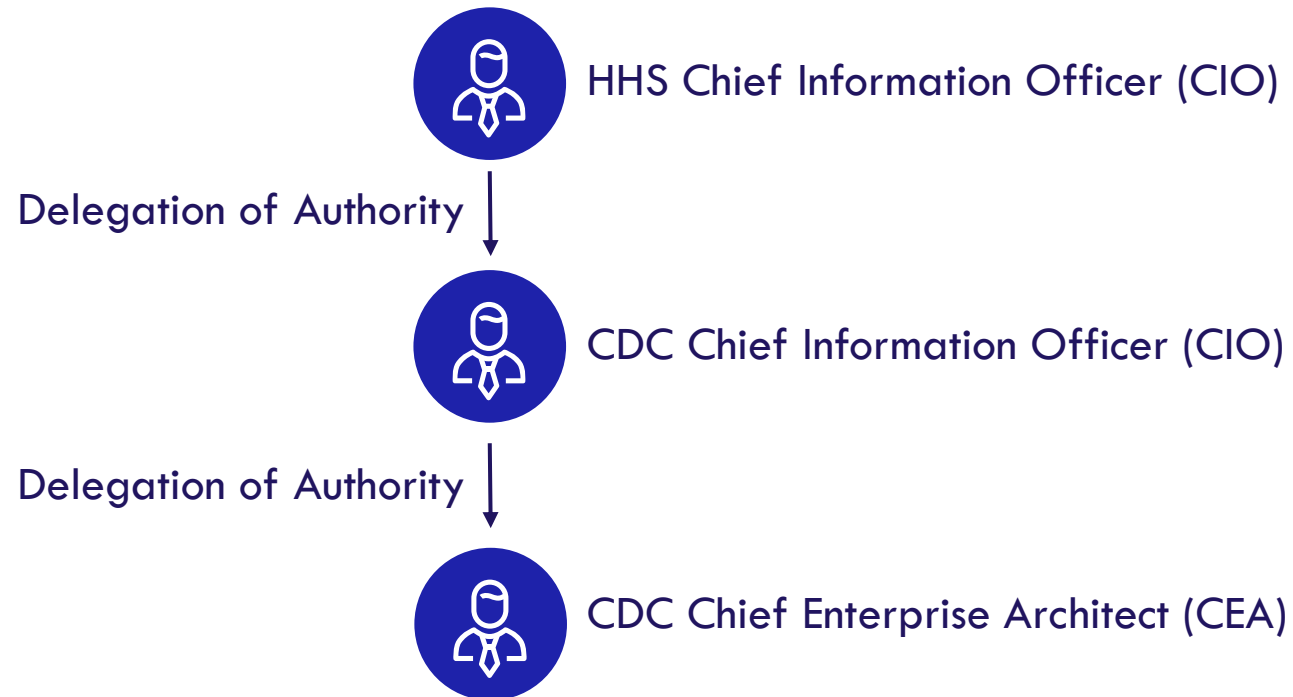
## Law (Statute)

- FITARA (Federal Information Technology Acquisition Reform Act)
- MEGABYTE Act (Making Electronic Government Accountable By Yielding Tangible Efficiencies Act of 2016)
- SHARE IT Act (Source code Harmonization And Reuse in Information Technology Act)

## Executive Order (EO)

## Policy

# Authority for Enterprise Architecture



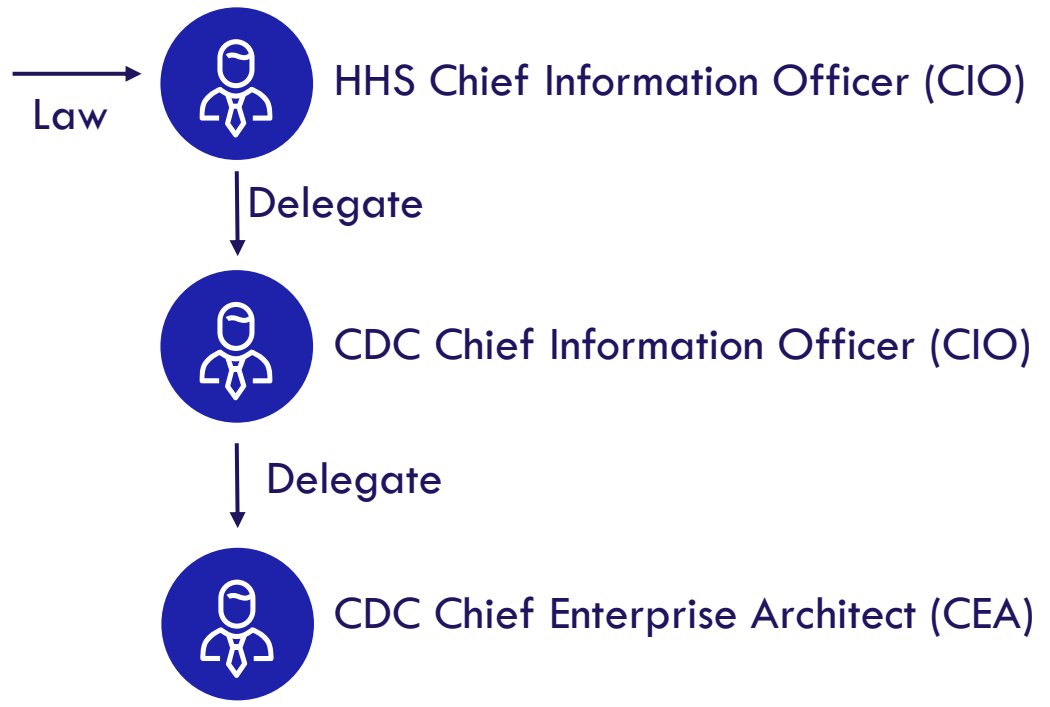
# Example: Share IT Act

## SHARE IT ACT

### SEC. 4. SOFTWARE REUSE.

(a) SHARING.—Not later than 210 days after the date of enactment of this Act, the head of each agency shall ensure that—

U.S. Congress. (2023–2024). SHARE IT Act, S. 3594, 118th Cong. (introduced 2024).  
Congress.gov. <https://www.congress.gov/bill/118th-congress/senate-bill/3594/text/is>



# Example: Share IT Act

Law: Share IT Act



CDC Chief Enterprise Architect (CEA)

## Policy

CDC SOURCE CODE MANAGEMENT POLICY

Sections: 1.	PURPOSE AND SCOPE
2.	BACKGROUND
3.	POLICY
4.	RESPONSIBILITIES
5.	REFERENCES
6.	ACRONYMS AND ABBREVIATIONS
8.	DEFINITIONS
Appendices: A.	APPROVED REPOSITORIES
B.	STANDARD LICENSE NOTICE
C.	SHAREABLE CODE REQUIREMENTS
D.	CUSTOM-DEVELOPED CODE

## Implementation

### Guidance

Share IT Act (CodeShare) > Implementation Guide

#### CDC Share IT Act Implementation Guide

This guide supports CDC's implementation of the SHARE IT Act (Public Law 118-187), which promotes transparency and software reuse by requiring agencies to publish metadata for custom-developed code, and share code with other agencies upon request.

#### Purpose of the SHARE IT Act

The SHARE IT Act is a federal law that says government agencies like CDC must be more transparent about the software we build using federal funds. It doesn't mean we have to release all our code publicly, but we do have to create a public list (like a catalog) that describes what custom-developed software we've created—similar to a library of software titles. This helps other agencies know what exists so we're not reinventing the wheel. If the code is sensitive or restricted, we can mark it as exempt, but we still need to explain why. CDC's policy supports this by using automation to scan our code repositories, generate the required descriptions (metadata), and publish them in a standard format (i.e., code.json file). This allows other agencies to discover our custom-developed software, and if appropriate, request access—even if the code isn't public.

The SHARE IT Act was established to:

- Improve discoverability and reuse of federally funded software
- Reduce duplicative investments in technology
- Foster innovation and collaboration across agencies

Purpose of the SHARE IT Act

Your Responsibilities Under the SHARE IT Act (next sheet)

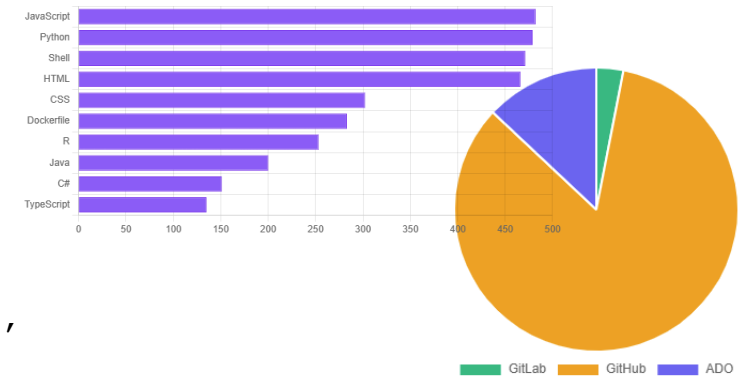
CDC Implementation Strategy: Facilitating Compliance Across All CDC Units

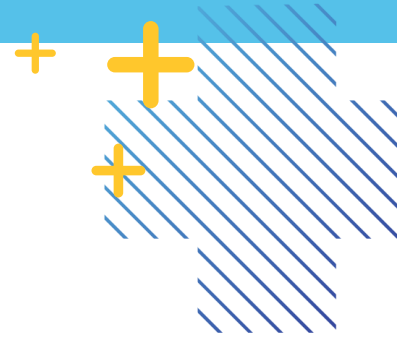
- Automated Metadata Generation
- Repository Requirements
- Public vs. Private Repositories Workflow
- Public Repositories
- Private Repositories
- Built-in Exemption Tagging
- README.md Override Optional Markers
- Developer Tip: Structuring Metadata in your README.md
- Conceptual Scenarios
- Scenario 1: A Public Repository
- Scenario 2: A Private Repository requiring code sharing exemption
- Scenario 3: Missing Metadata Prompts Follow-Up
- Scenario 4: A Private Repository with No Code-Sharing Exemption (Typical Case)
- Exemption Categories

[cdc.gov/code.json](https://cdc.gov/code.json)

```
{
  "agency": "CDC",
  "measurementType": {
    "method": "projects"
  },
  "projects": [
    {
      "name": "hl7-pet",
      "name": "data-exchange-fhir",
      "name": "prime-fhir-converter",
      ...
    }
  ]
}
```

### Dashboards





# Example: Cloud Tagging

## Cloud Business Office

### Data Management

Supports transparency, accountability, and better decision-making through centralized financial data and forecasting insights.

### Cloud Tagging

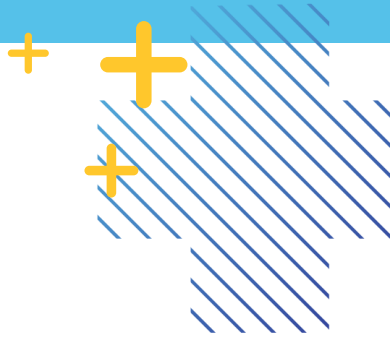
Improves data quality, cost reporting, and cloud accountability through consistent cloud resource tags.

### Cost Optimization

Delivers actionable insights that reduce waste, improve efficiency, and align cloud usage with strategic and financial goals.

### Adoption

Creates a CDC-wide environment that is cloud-aware, cost-conscious, and confident—regardless of technical background or readiness level.



Principles

# Example: Advancing AI Across Public Health

**Support  
Public Health  
to Accelerate  
AI Adoption**

**1**

**Strengthen  
Governance  
and Public  
Trust**

**2**

**Advance AI  
Capabilities  
Across CDC  
Enterprise  
Data  
Platforms**

**3**

**Empower an  
AI – Ready  
Workforce  
and Foster  
Innovation**

**4**

# Example: Advancing AI Across Public Health

Public CDC TRA

Home > CDC TRA > AI (GenAI)

## AI (GenAI)

This section includes information that is restricted for CDC internal use only.

Internal CDC TRA

Home > CDC TRA > AI (GenAI)

## Generative AI Tools at CDC

NOTE

Other specialized Generative AI tools authorized for CDC usage in either pilot or enterprise include: <Vendors Redacted>

### How to access approved Generative AI tools

#### CDC Chatbot

Use the following link to access CDC Chatbot: <redacted>. You must be logged in to the CDC network to access CDC Chatbot.

<Vendor Redacted>

How to access approved Generative AI tools

CDC Chatbot

<Vendor Redacted>

<Vendor Redacted>

CDC Guidance for unapproved Generative AI tools

<Redacted>

#### Market Research

Generative AI tools: Summary table

Generative AI tools: Detailed comparison table

Principles

Additional information

# Example: Advancing AI Across Public Health

Practical resources to safely and effectively leverage Generative AI and Deep Research in public health.



## Considerations for Enabling Generative AI in Public Health

- ✓ Foundational steps for STLT GenAI adoption
- ✓ Real-world use cases from STLT agencies
- ✓ Responsible use principles aligned with NIST AI Risk Management Framework



## Considerations for Enabling Deep Research in Public Health

- ✓ Overview of agentic AI tools for multi-step research tasks
- ✓ Best practices for effective prompting
- ✓ Use case examples from CDC

## Informational Resources Available Now!

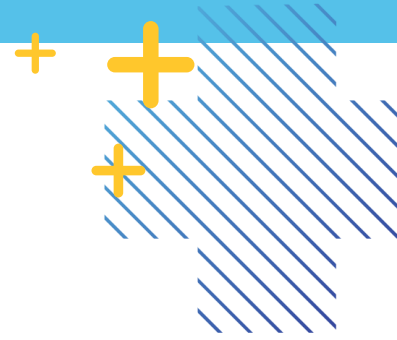
[cdc.gov/ai](https://cdc.gov/ai)



# Federal Enterprise Architecture (FEA)

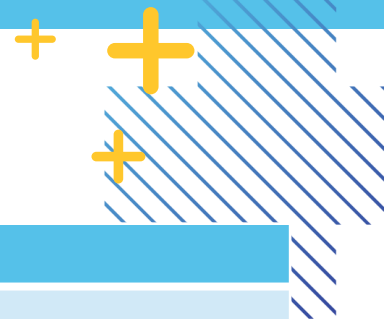


# A Brief History



Era	Time period	Key Events
<b>3<sup>rd</sup> Era: Clinger-Cohen</b> <b>1996 – Present</b>	2006	[Useable] Federal Enterprise Architecture Framework (FEAF)
	2003	DOD Architecture Framework (DODAF)
	1996	Clinger-Cohen Act
<b>2<sup>nd</sup> Era: Zachman</b> <b>1980s – 1990s</b>	1995	The Open Group Architecture Framework (TOGAF)
	1987	Zachman Framework
<b>1<sup>st</sup> Era: Business Systems Planning</b> <b>1960s – 1980s</b>	1982	<u>IBM publishes their internal planning approach</u>
	Mid-1960s	Corporate Models

# A Brief History

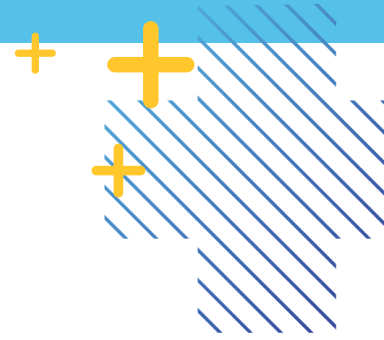
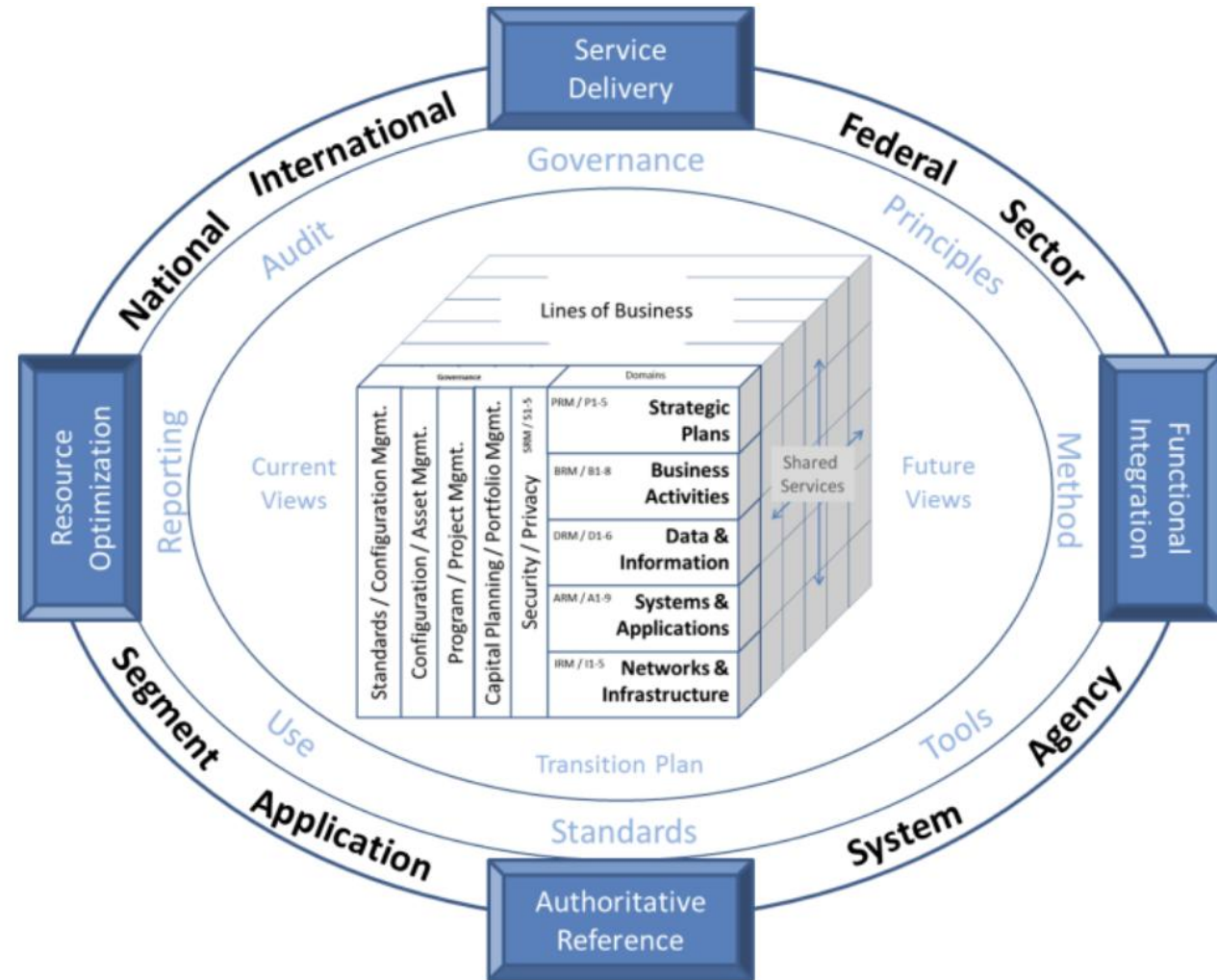


Era	Generation	Time period	Key Events
3 <sup>rd</sup> Era: Clinger-Cohen	4 <sup>th</sup> generation	2025 – Present	Delegated Chief Enterprise Architect (CEA) CDC Technical Reference Architecture (TRA) CDC Source Code Management (policy, code.json)
	2 <sup>nd</sup> interregnum	2020 – Present 2020 – 2024	Vacant Chief Technology Officer Vacant Chief Enterprise Architect
	3 <sup>rd</sup> generation MISO Center of Excellence in Architecture	2017 – 2019	CDC Enterprise Architecture Policy v3, drafted but never ratified.
	1 <sup>st</sup> interregnum	2015 – 2016	
	2 <sup>nd</sup> generation EA Community of Practice	2007 – 2014	CDC Enterprise Architecture Policy v2 [2013] CDC Enterprise Architecture Policy v1 [2007]
	1 <sup>st</sup> generation Pre-CDC EA policy	1996 – 2007	Clinger-Cohen Act OMB M-97-16

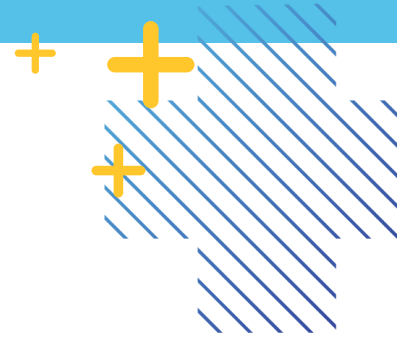
# Federal Enterprise Architecture

## Levels of Scope

- International
- National
- Federal
- Sector
- Agency
- Segment
- System
- Application



# Segment vs Sub-Architecture



## [Public Health] Segment

### “Line of Business”

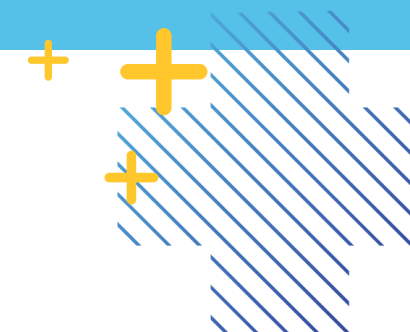
- Behavioral Health
- Case [Surveillance]
- Genomics
- Laboratory
- Vital Statistics
- ...

## Sub-architecture [Domain]

### Reference Model

- Performance
- Business
- Data
- Application
- Infrastructure
- Security

# Segment vs Sub-Architecture



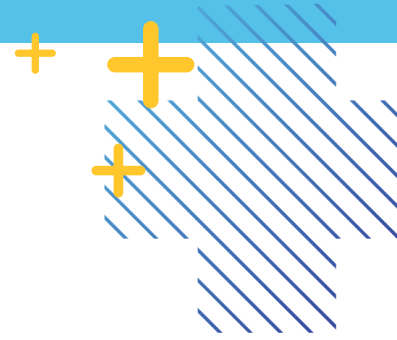
## [Public Health] Segment

### “Line of Business”

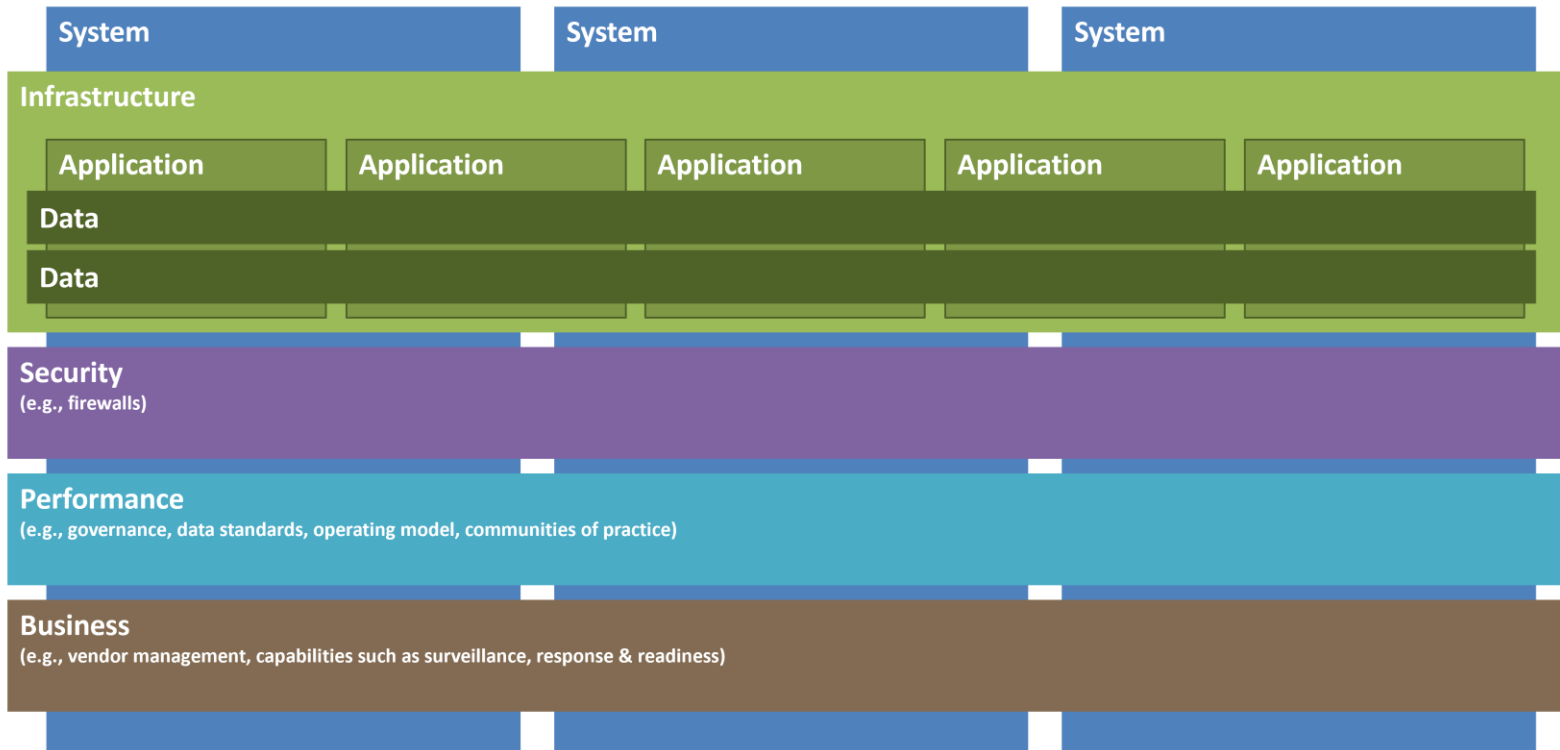
### Genomics

Definition	Genomic information used to help characterize high-priority pathogens
Mission	Monitor and analyze genomic trends to predict, manage, and prevent outbreaks of infectious diseases; understand how people are exposed to pathogens and how pathogens are geographically distributed; help trace the source and transmission of outbreaks; learn about pathogen evolution, such as the development of drug resistance
Example data types	Whole genome sequences
Example Systems	<ul style="list-style-type: none"><li>- PulseNet 2.0</li><li>- CaliciNet</li><li>- CryptoNet</li><li>- National Antimicrobial Resistance Monitoring System (NARMS)</li><li>- Strep Lab</li></ul>

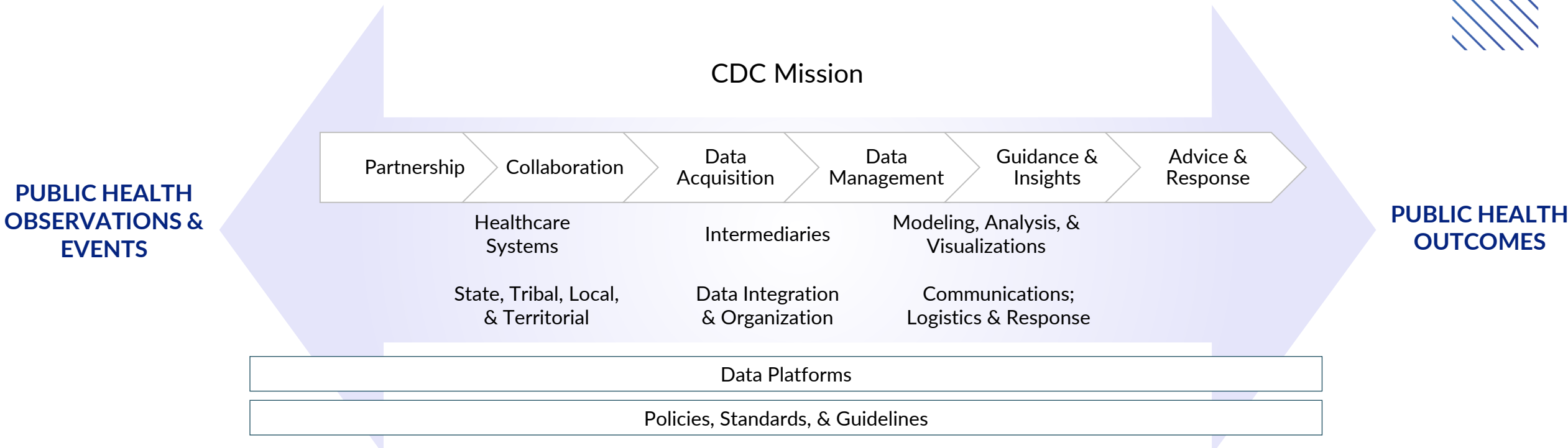
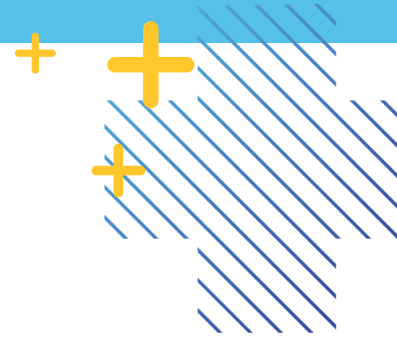
# Segment vs Sub-Architecture



## Sub-architecture [Domain] Reference Model



# Business Architecture



Aligning core capabilities



Promoting adaptive, shared enterprise solutions

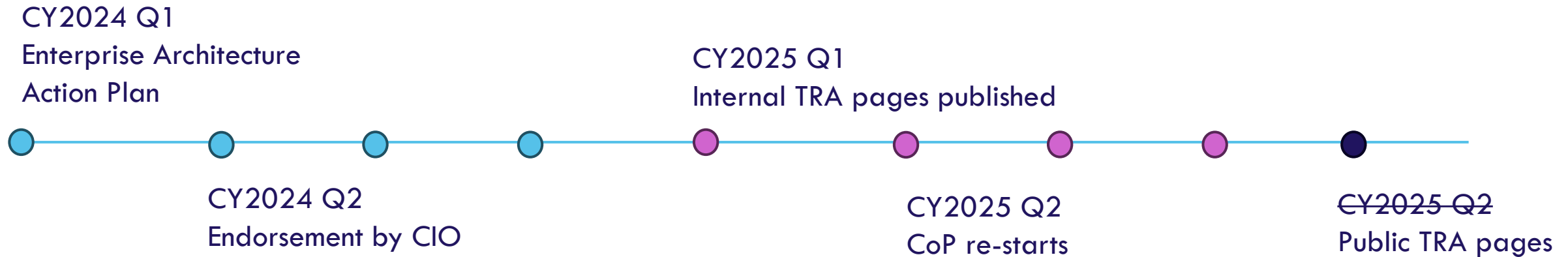
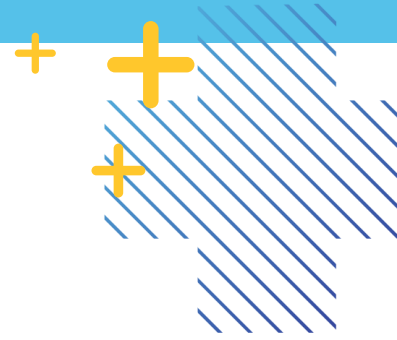


Utilizing robust data platforms

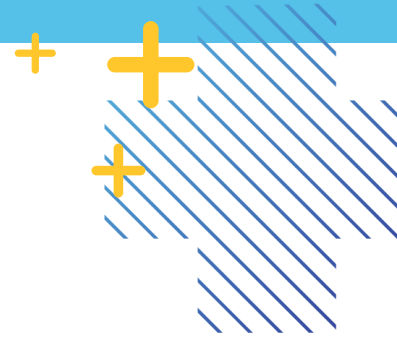
# Building the CDC Technical Reference Architecture (TRA)



# Timeline



# Authority



## HHS Policy for Enterprise Architecture (EA)

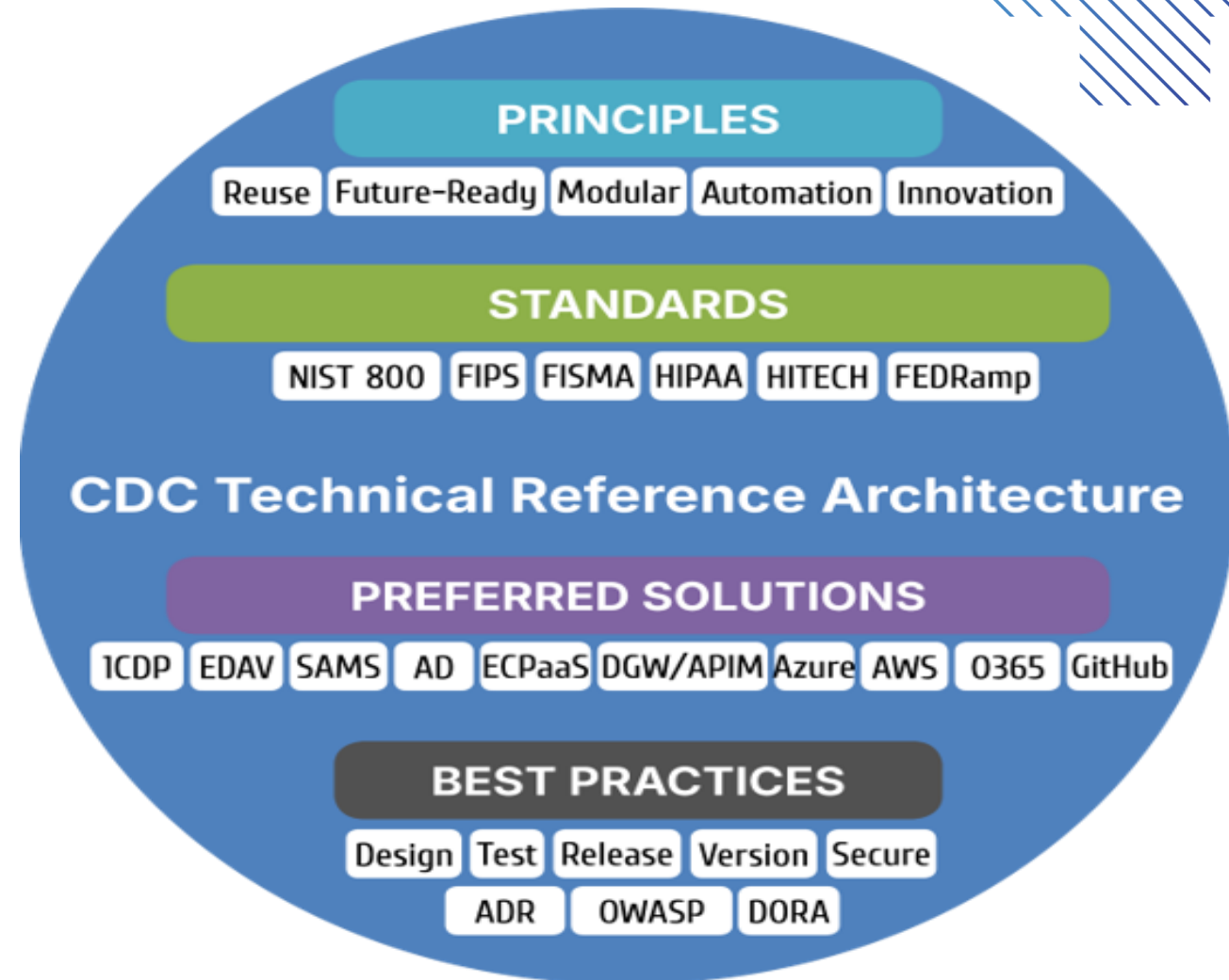
### 7.10 Operating Division (OpDiv) Chief Enterprise Architect (CEA)

- a. Develop and disseminate the OpDiv's EA strategies, policies, standards, and governance requirements that are no less restrictive than those within this *policy* and the HHS EA Framework;
- d. Adapt the HHS EA Framework to produce an OpDiv-specific enterprise architecture vision, standards, and review process to meet the requirements of their OpDiv;

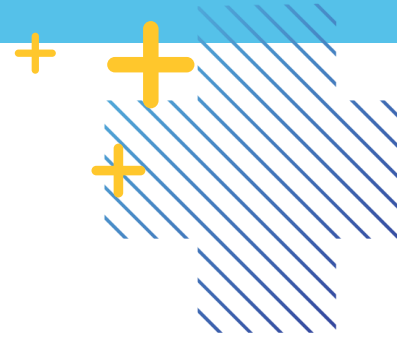
U.S. Department of Health & Human Services, Office of the Chief Information Officer. (2024, October). *HHS policy for enterprise architecture (EA)*. HHS.gov. <https://www.hhs.gov/web/governance/digital-strategy/it-policy-archive/hhs-policy-for-enterprise-architecture.html#7.10>

# What is the CDC TRA?

- Guides the development of the CDC technology ecosystem.
- Defines standards that operationalize guiding principles.
- Prescribes preferred solutions that implement Federal, HHS and CDC standards.
- Supports systems and applications implementation with best practices and checklists that distill industry and CDC best practices.



# What is the CDC TRA?



## Baseline in Dec 2024

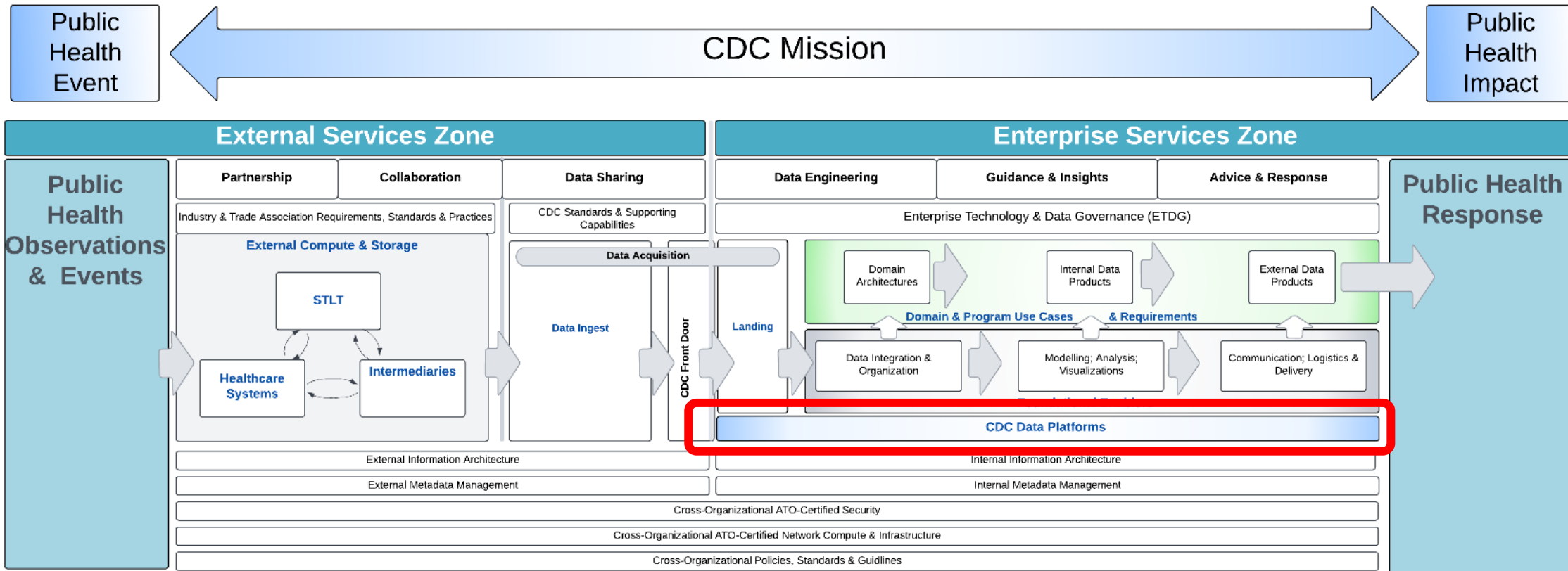
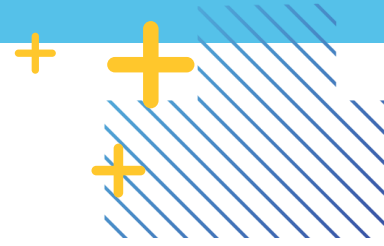
- May use: List of IT Systems
- Should use: Not codified
- Gap: What **should** an architect, developer, or system designer use?

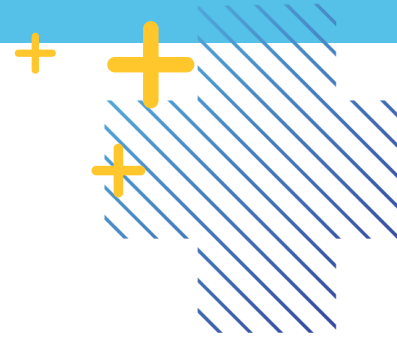
## Baseline in Dec 2025

Codified as Preferred Solutions by

- Sub-architecture
  - Data
  - Applications
  - Security
- Public Health Segment
  - Genomics
  - Laboratory

# Example: Data Platforms



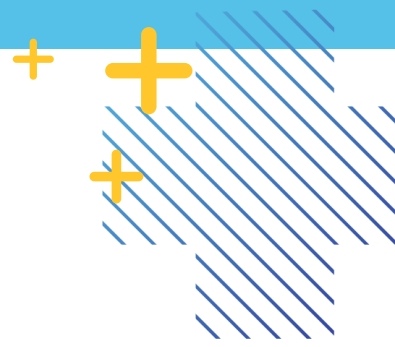


# Existing Platforms

Many different systems with “platform” in name

System ID	System Name $\ni$ “Platform”	System Acronym
1	National Center A Data Platform	
2	Vendor A Data Platform	
3	CDC Vendor B Security Platform	
4	Disease A Surveillance Cloud-based Computing Platform	
5	Disease B Analysis Platform	
...		
N		

# Define a “Platform”

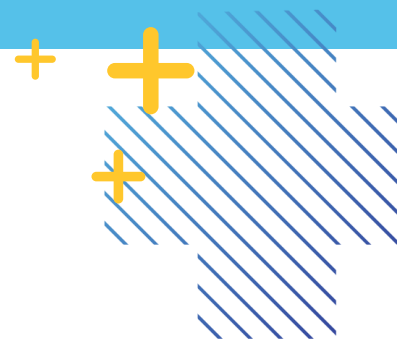


A **Platform** refers to any system whose primary purpose is to host other systems or applications, providing services that support the build, deployment, and operation of those systems or applications.

Within CDC, platforms can be categorized into two categories: *functional* and *data platforms*.

**Functional platform** is to support operations activities related to the mission functions of CDC.

**Data Platform** is to drive analytics and insights for decision-making by supporting core functions required to manage data across the data lifecycle.



# Attributes of a Data Platform

**Data Ingestion:** Best practices for data integration

**Data Storage:** Best storage principles

**Data Processing:** Tools and technologies for data transformation

**Data Product Dissemination:** Data distribution

**Data Governance:** Ensuring data quality and compliance

# Codify Preferred Solutions

## Preferred Data Platforms

### Sub-Architecture: Data



One CDC Data Platform  
(1CDP)



Enterprise Data Analytics &  
Visualization (EDAV) Platform

### Segment: Genomics



Advanced Molecular  
Detection (AMD) Platform

# Detail by Persona



As **Management**, are we doing the “right” things, and are we doing them right?



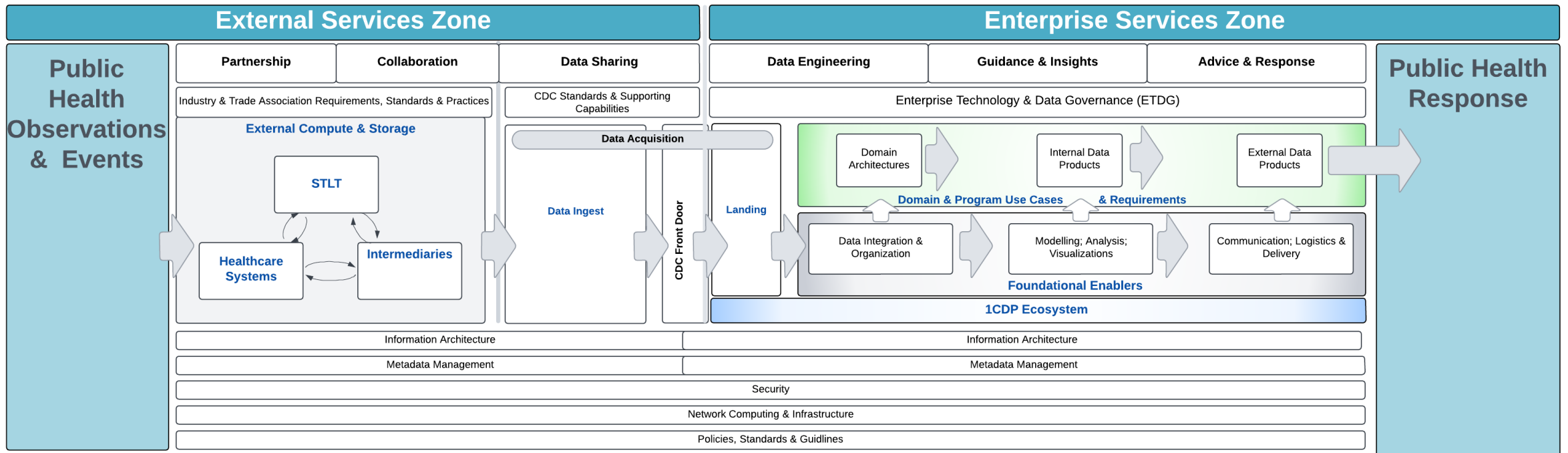
As a **Scientist**, how do I build the pipeline? Am I getting the right data in the right format at the right time?



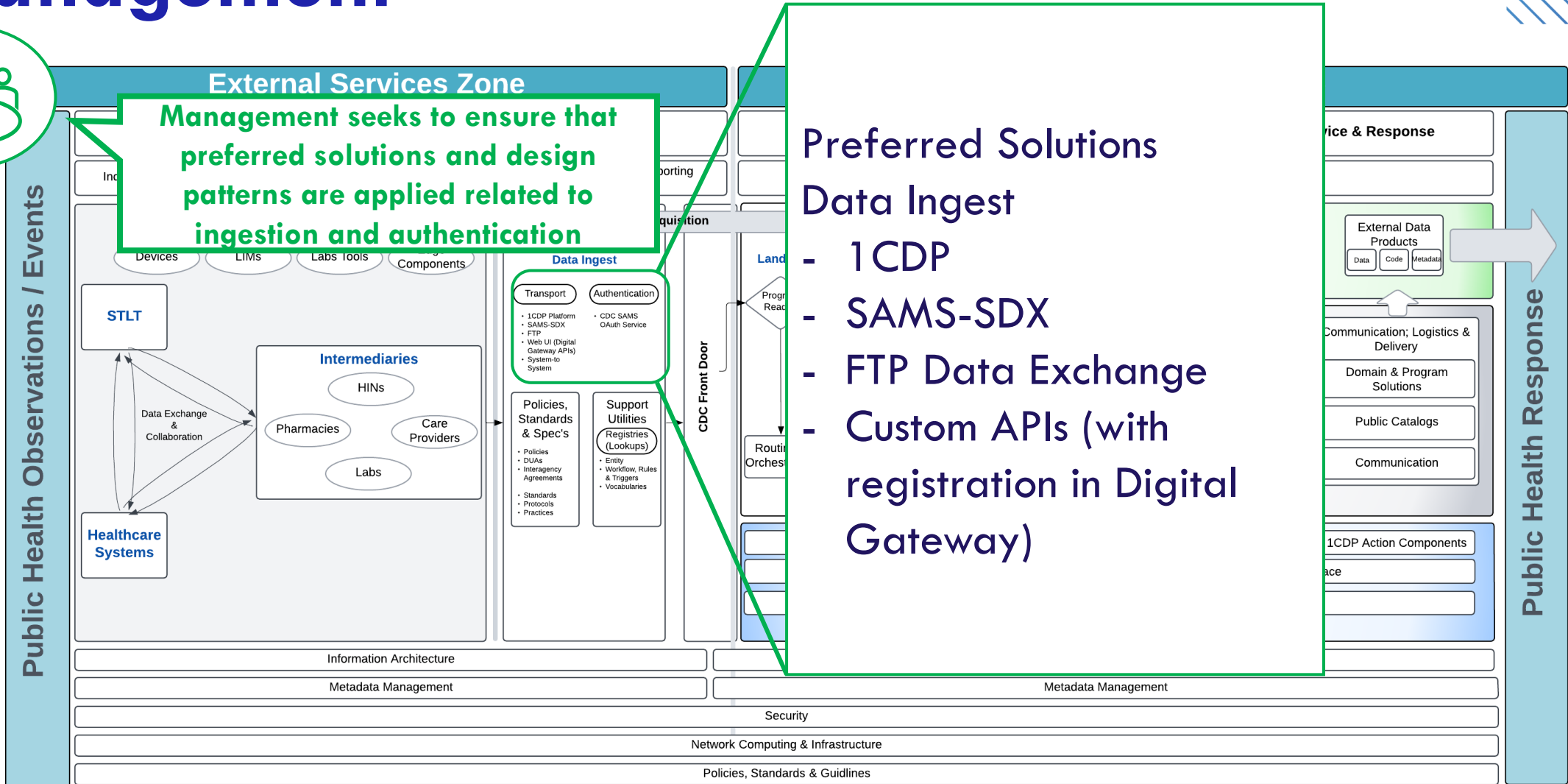
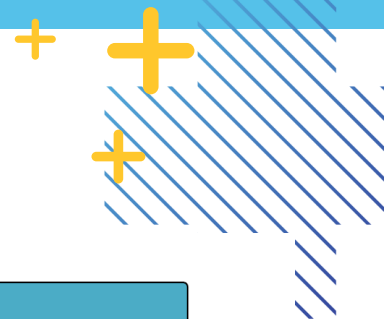
As a **Solution Architect**, does the TRA identify major components AND provide direction to support my IT system?



As **Operations**, are we adhering to pre-approved design patterns that ensure an efficient, managed and controlled foundation?



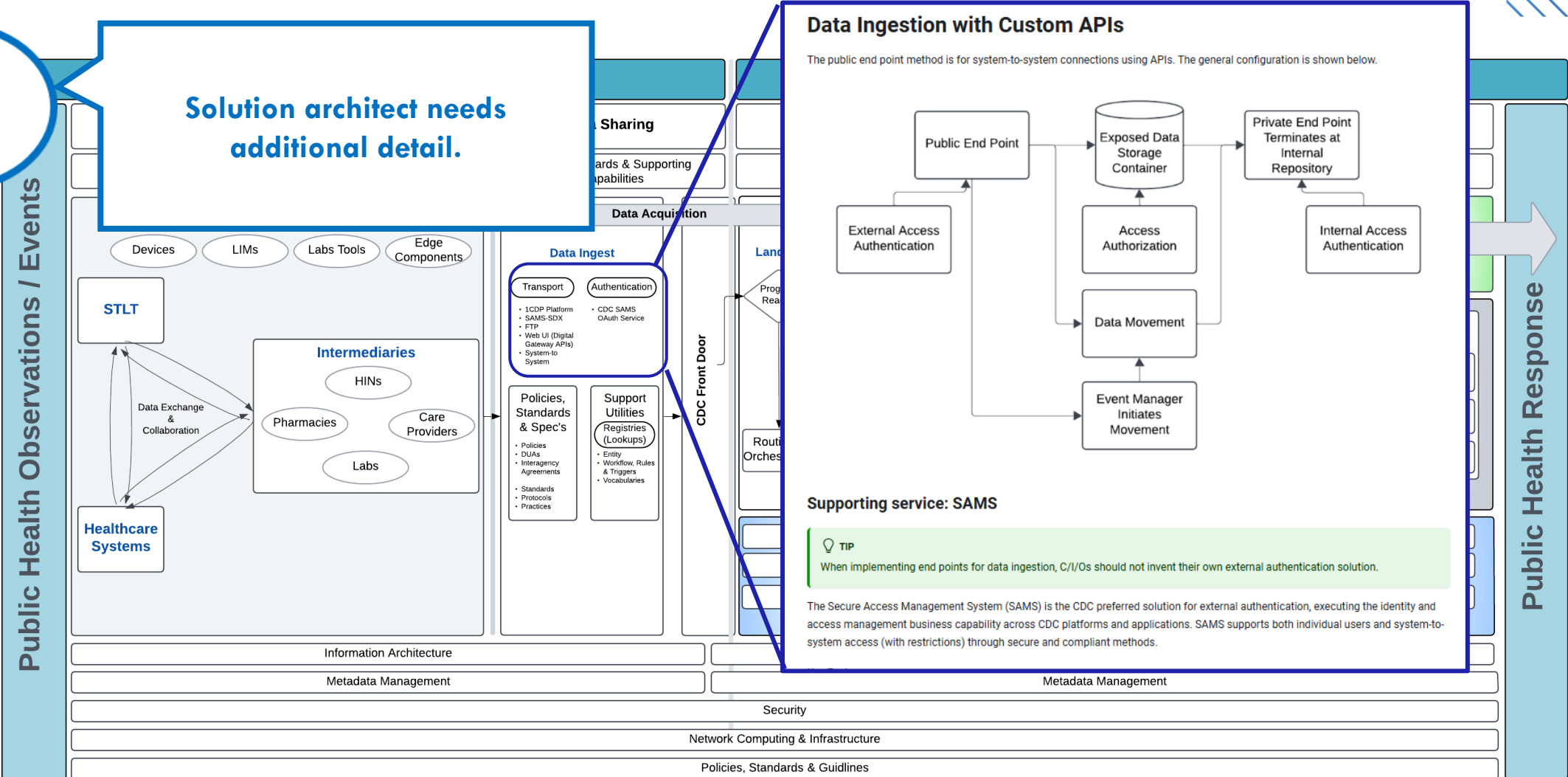
# Management



# Solution Architect



**Solution architect needs additional detail.**

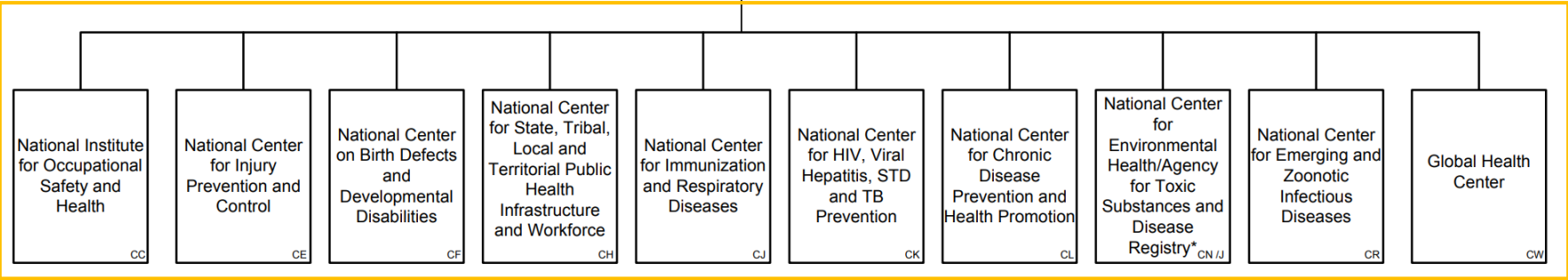
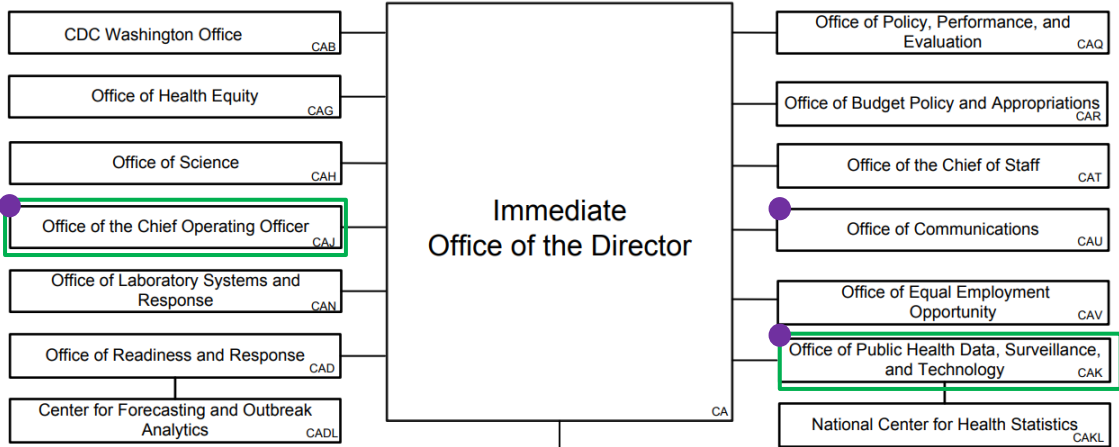
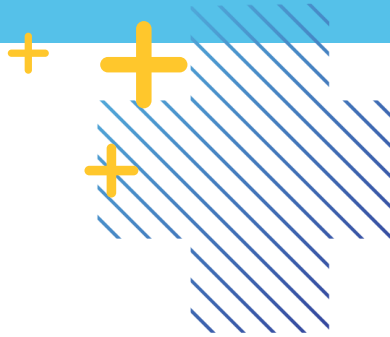


# Governance



# CDC Organization

## DEPARTMENT OF HEALTH AND HUMAN SERVICES CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC)

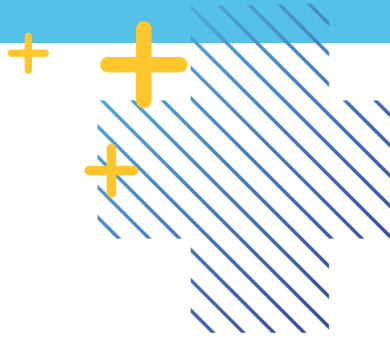


- Enterprise Governance
- Enterprise technology providers
- Local Governance

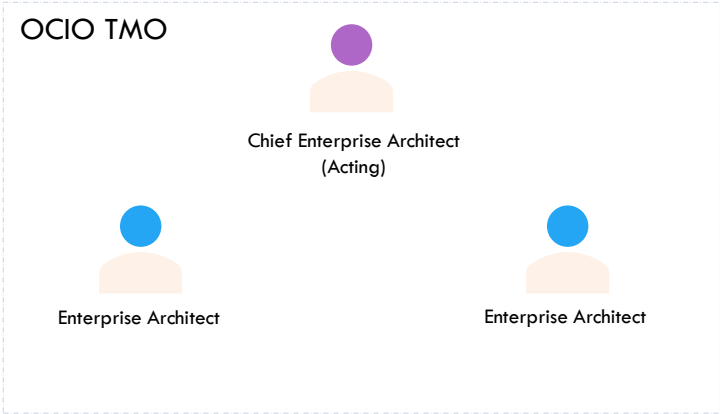
\*ATSDR (J) is an OPDIV within DHHS but is managed by a common director's office.

Approved 9/13/2024

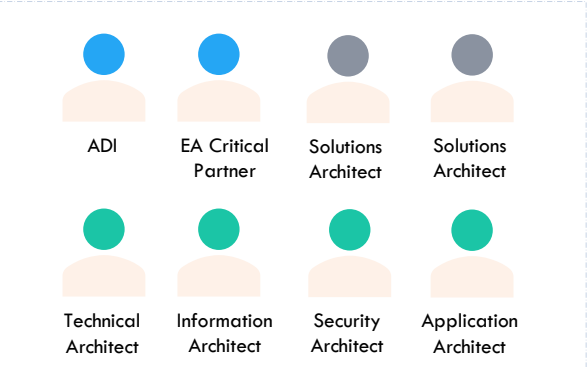
# CDC Organization



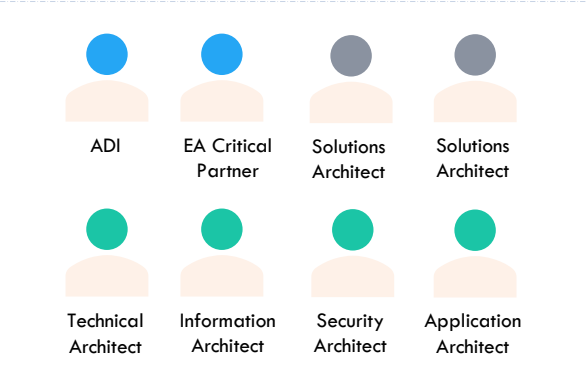
## Enterprise Architecture Team



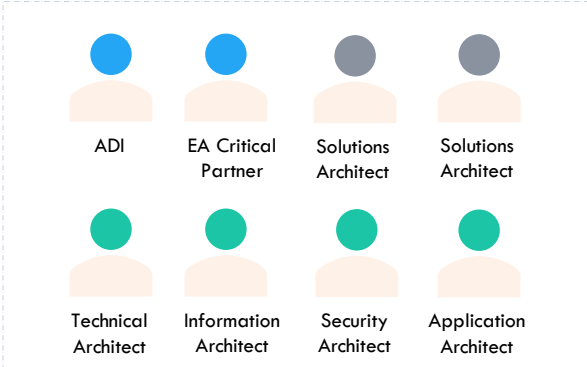
### National Center



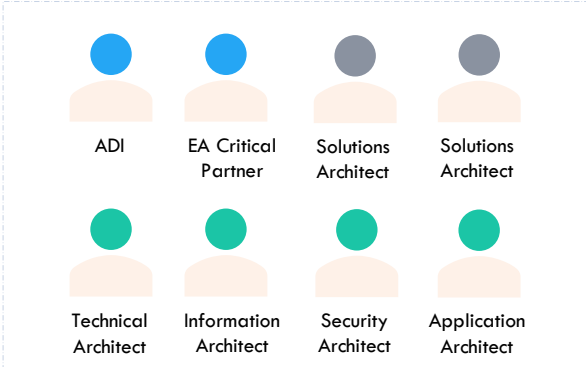
### National Center



### National Center

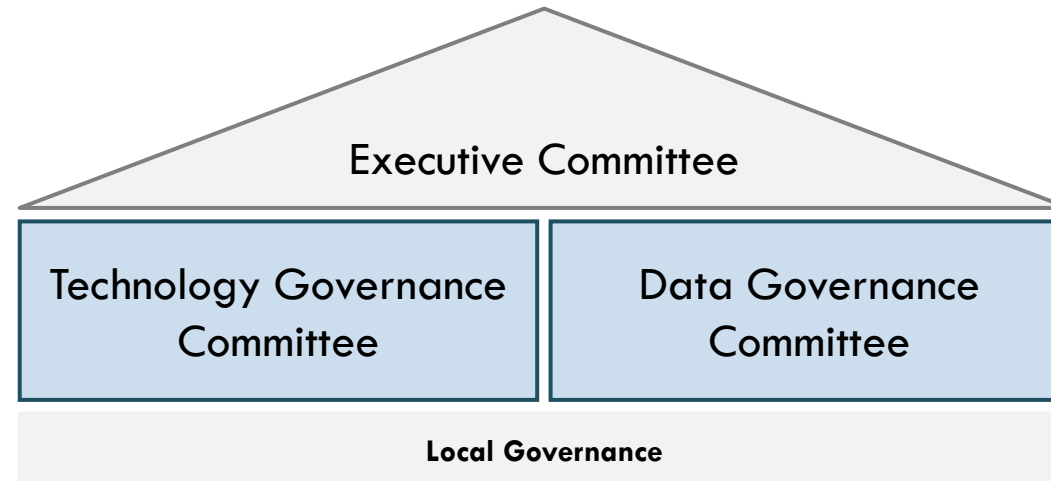
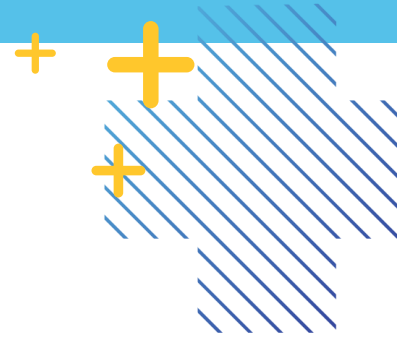


### National Center

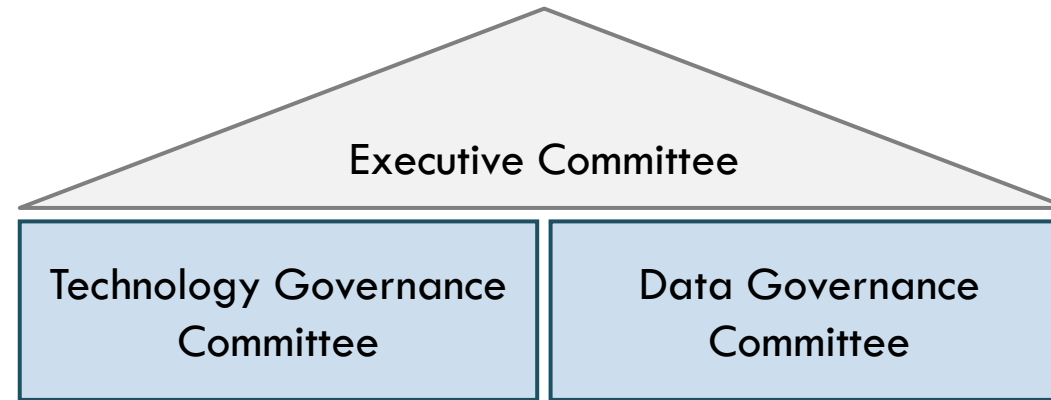
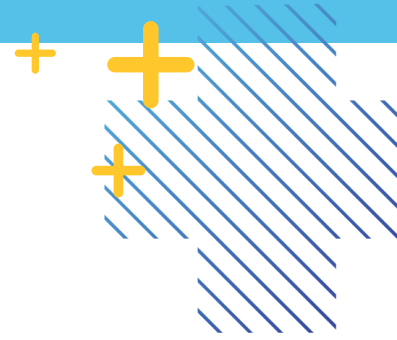


**ADI** : Associate Director of Informatics | **EA CP** : [EPLC] Enterprise Architecture Critical Partner | **OCIO TMO** : OCIO Technology Modernization Office

# Enterprise Technology & Data Governance



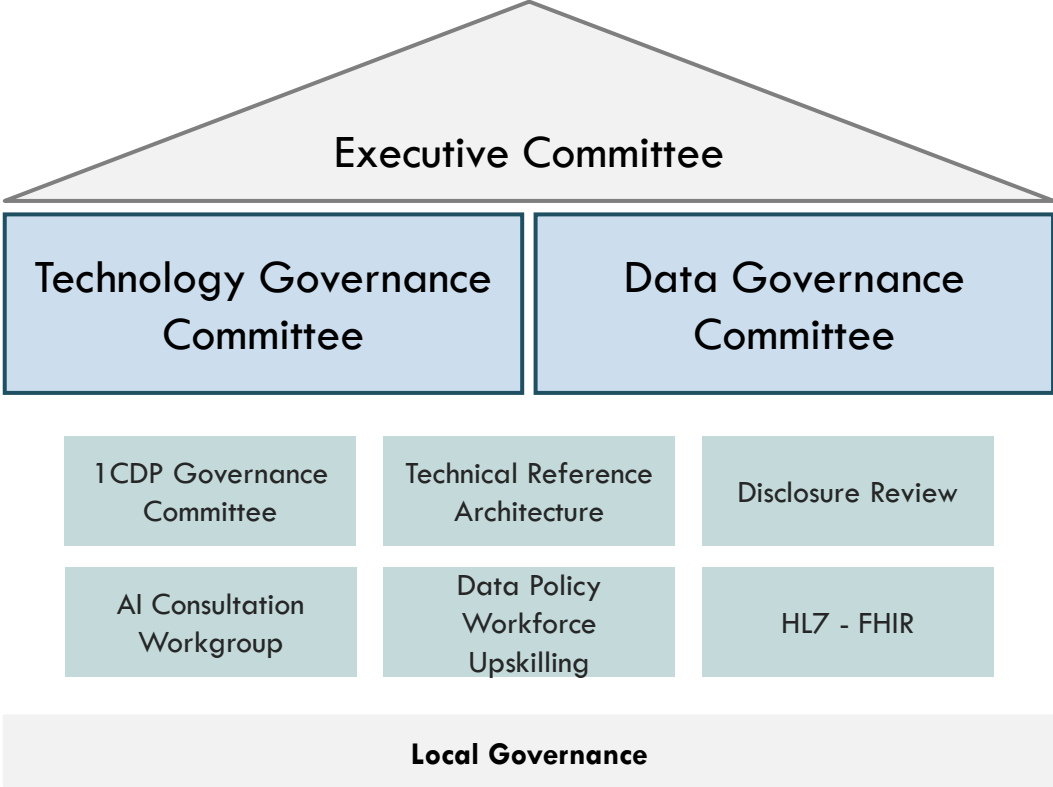
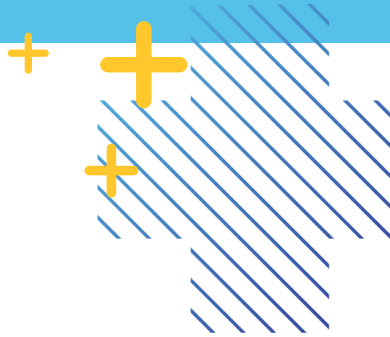
# Enterprise Technology & Data Governance



CDC Technical Reference  
Architecture (TRA)

Local Governance

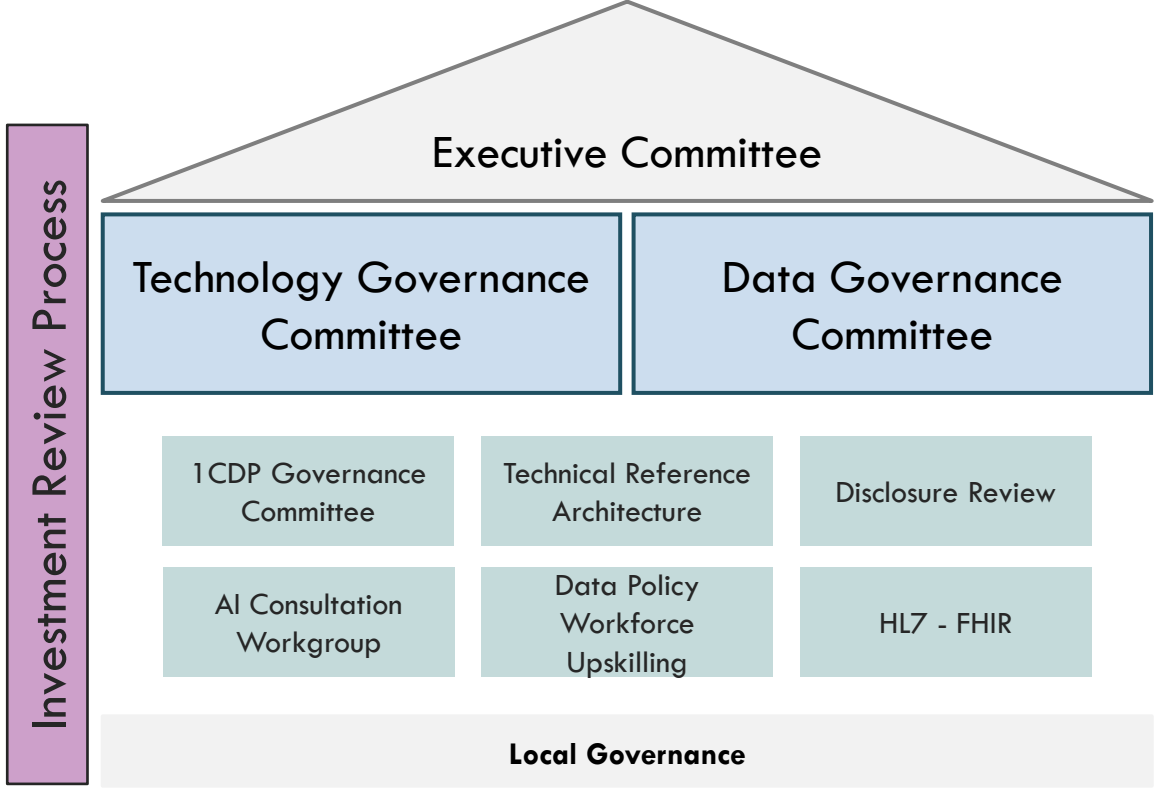
# Enterprise Technology & Data Governance



# Enterprise Technology & Data Governance

Exception

Guidance

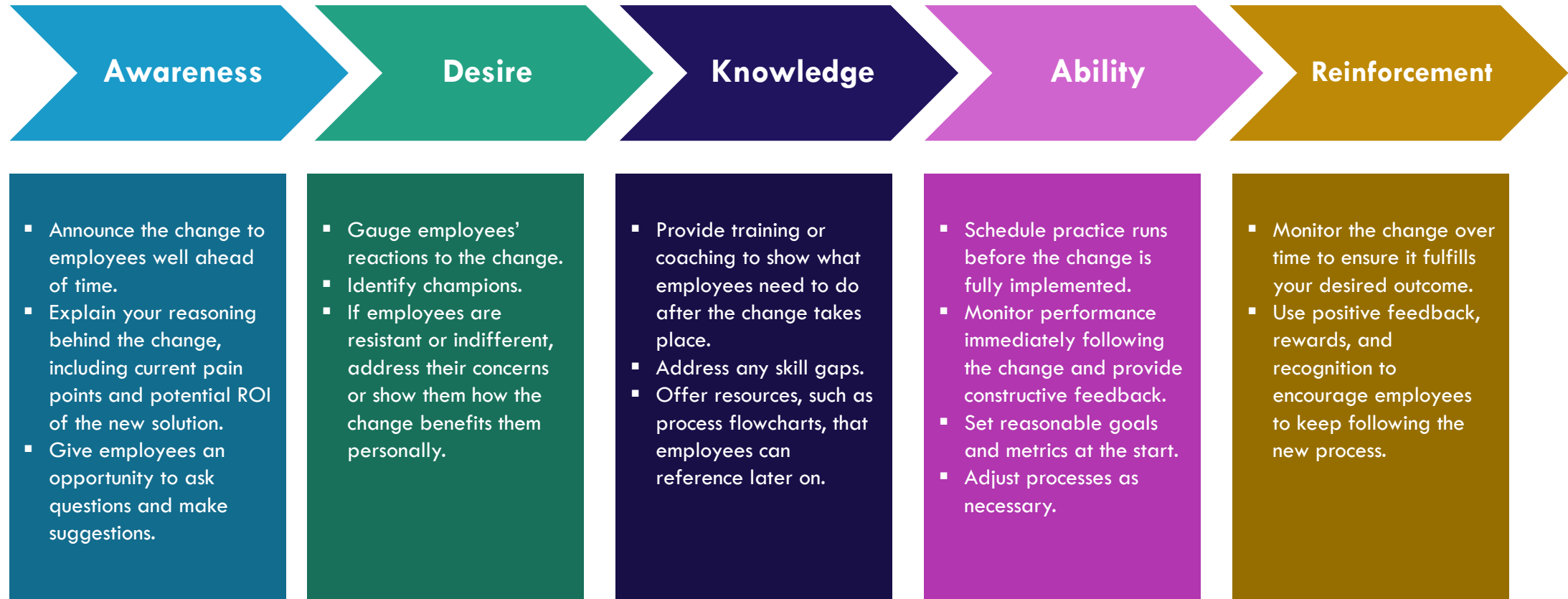


← Guidance informs criteria for escalation and investment review →

# Continuous Improvement

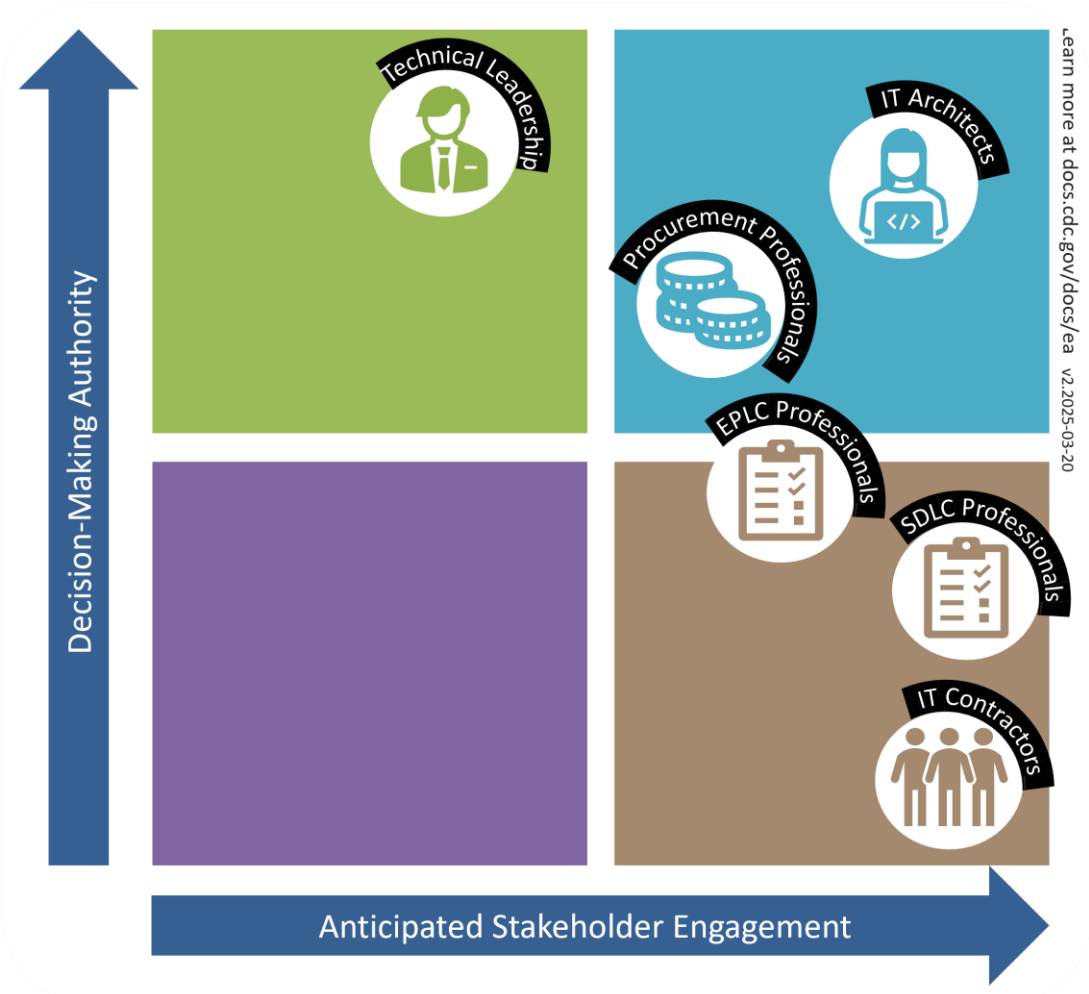


# ADKAR Change Management Model



Hiatt, J. (2006). ADKAR: a model for change in business, government, and our community. Prosci.

# Personas and Engagement Mapping

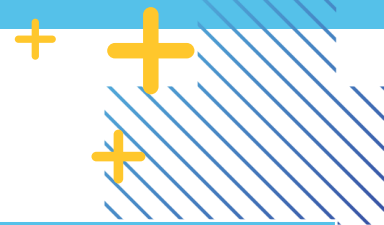


Persona Type	Interviewed
EPLC / SDLC Professionals	6
IT Contractor	2
IT Architect	1
<b>Grand Total</b>	<b>9</b>

To inform our EA approach, we interviewed a range of stakeholder types, including contractors, architects and process leads, to understand their roles, how familiar they are with EA and how EA affects their daily work at the agency.



# Personas Pain Points



Pain Point	EA Charter Goal	Objective	Quote
<b>Leadership &amp; Communication Gaps</b>	Ensure that the IT landscape is strategically aligned with, and capable of supporting, current and future business needs.	Ensure programs are aware of agency's future strategy and incorporating in their roadmap	"You're not getting any communication and then all of a sudden you're out of compliance and someone's pinging you" - SDLC Professional (Project Manager)
<b>Lack of Visibility &amp; Alignment</b>	Foster an environment where business and mission areas can collaborate and communicate on common IT projects and outcomes.	Ensure cross program communication and collaboration	"I feel like it's communication is where it's lacking, so it's like, 'oh, we're going to roll out this or you know, we're going to roll out 1 CDP, or we're going to roll out this new security process' but like the tactical how do you do that? Or what are the next steps?" - SDLC Professional (Project Manager)
<b>Inconsistent Processes</b>	Promote the use of common IT solution patterns, standards, best practices, and the adoption of enterprise-wide IT services.	Expand common IT patterns, standards, and best practices usage across programs	"So the issue with having consistency is you have some people who are allowed to come to work and just make their own workflow." - SDLC Professional (Security Steward)
	Identify IT redundancies and streamline processes to enhance overall efficiency, including IT system and software license rationalization.	Decrease redundancy of IT tools, services, and processes	
	Improve decision making by ensuring that decisions are not made in isolation or solely based on project-specific needs but instead reflect broader enterprise priorities, thus avoiding costly one-off solutions and promoting more sustainable, integrated investments.	Decrease costly one-off solutions across agency	
<b>Compliance &amp; Security Concerns</b>	Promote the use of common IT solution patterns, standards, best practices, and the adoption of enterprise-wide IT services.	Expand common IT patterns, standards, and best practices usage across programs	"What would make my job easier is if there's more of a compliance mechanism to say, 'hey, you must follow this,' a lot of times we don't necessarily have that guidance" - IT Architect

# Surveys

## Strong Organizational Consensus

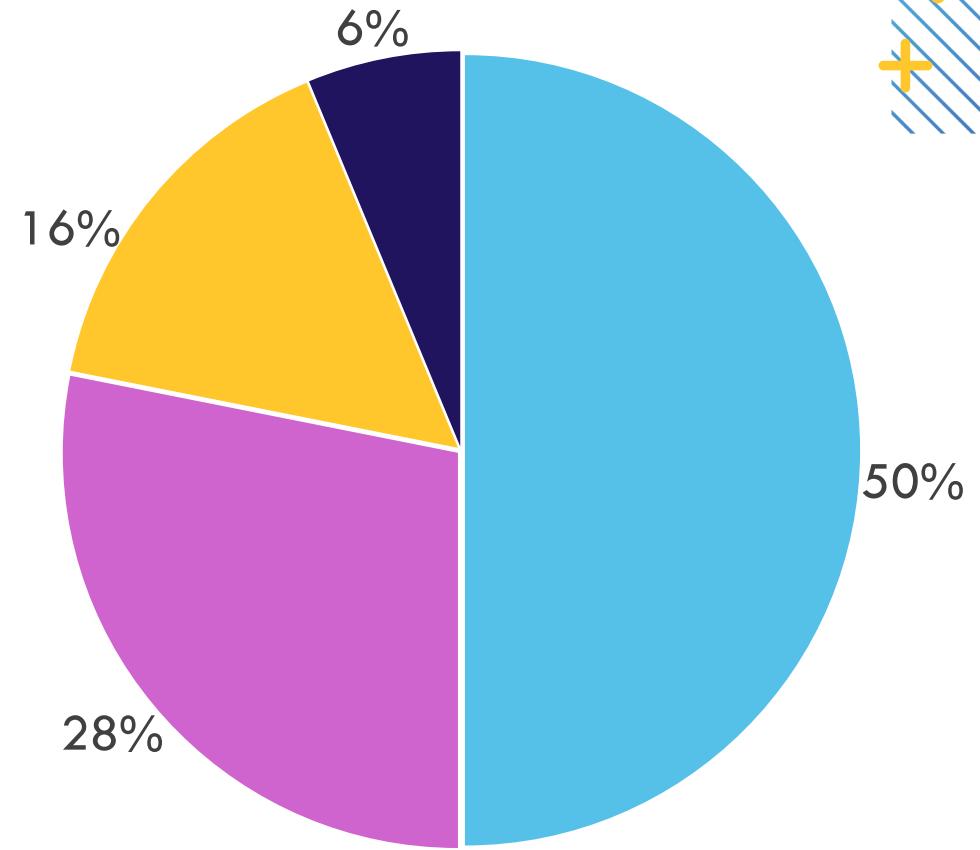
78% of respondents rate EA as very to extremely important, demonstrating clear organizational alignment for implementation

## Mission-Critical Priority

Half of all respondents view EA as "critical for our success," indicating current CDC capabilities are significantly constrained without it

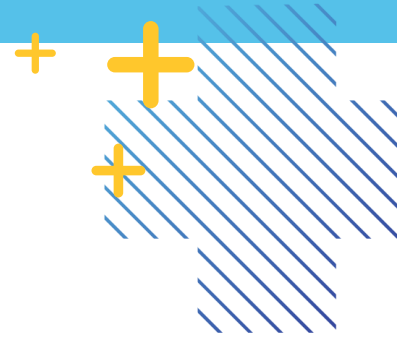
## Minimal Resistance

Only 6% see EA as slightly important, showing widespread recognition of its strategic value across the organization



- Extremely important - It's critical for our success
- Very important - It would provide significant benefits
- Moderately important - It would help but isn't urgent
- Slightly important - It might provide some benefits

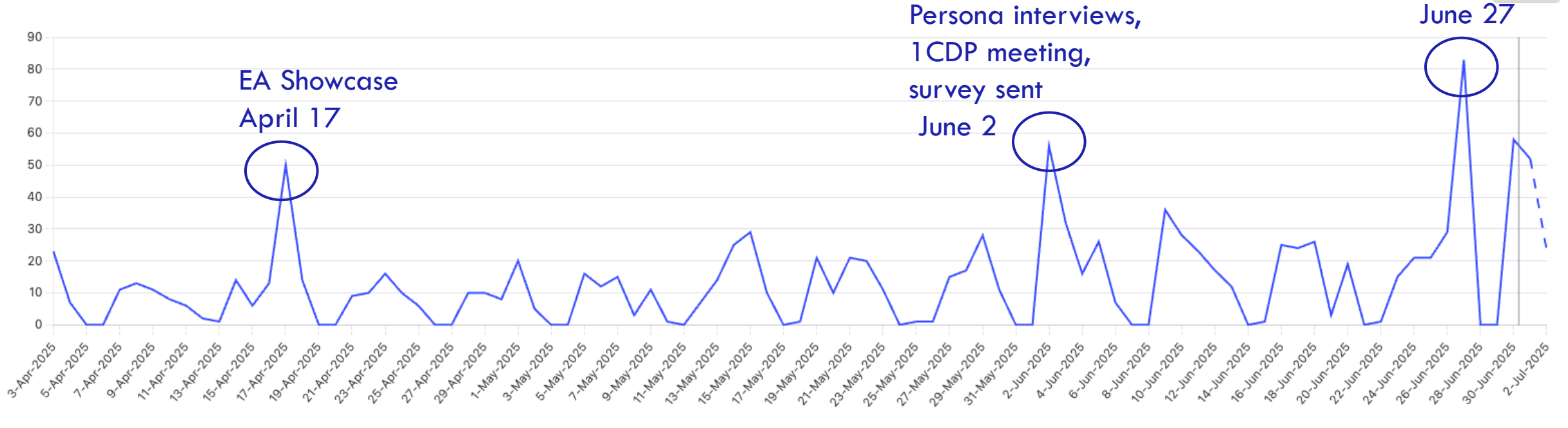
# Usage tracking (CY2025 Q2)



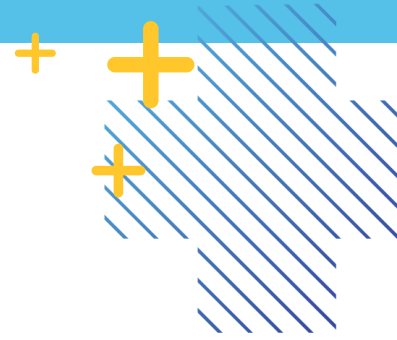
Unique visitors

Visitors Views Sessions

Group by Day

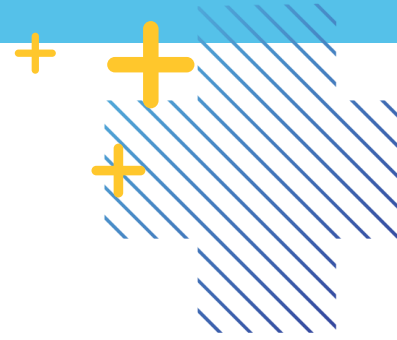


# Usage tracking (CY2025 Q3)



Paths ⓘ

PATH	VISITORS	VIEWS
/docs/ea/codeshare/implementation-guide	241	1,147
/docs/ea	181	1,258
/docs/ea/tra/preferred-solutions	142	588
/docs/ea/tra/	132	502
/docs/ea/codeshare/	77	251
/docs/ea/tra/data/	70	310
/docs/ea/codeshare/faq-custom-code	69	264
/docs/ea/tr/roadmaps	66	170
/docs/ea/tra/guiding-principles	59	156
/docs/ea/tra/cloud/cloud	56	192



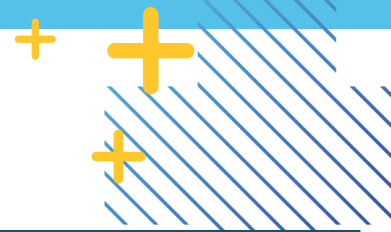
# Outcome Measures

Measure	July 2025
<b>Awareness</b> (Stakeholders being very familiar with Enterprise Architecture)	28%
<b>Desire</b> (Stakeholders view EA as important to strengthening CDC's technology capabilities)	50%
<b>Knowledge</b> (7-day trailing average of unique visitors to TRA)	28
<b>Ability</b> (EA standards and principles application)	0%
<b>Reinforcement</b> (Average weekly TRA user retention)	16.2%

# Takeaways



# Acknowledgements



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and Architecture Lead

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**Ed Brailovsky**



**Jonathan Adams**



**Nihar Dave**



**Dorris Wong**

# Q&A

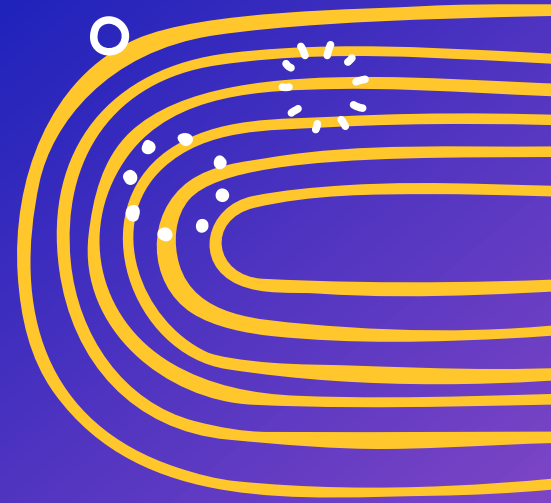
Feel free to ask questions!

## Contact Information

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## Session Feedback

Please take a moment to complete the session evaluation.



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