Advancing Education through the Community of Innovation

Higher Education Policy Conference

SHEEO 2023

Community
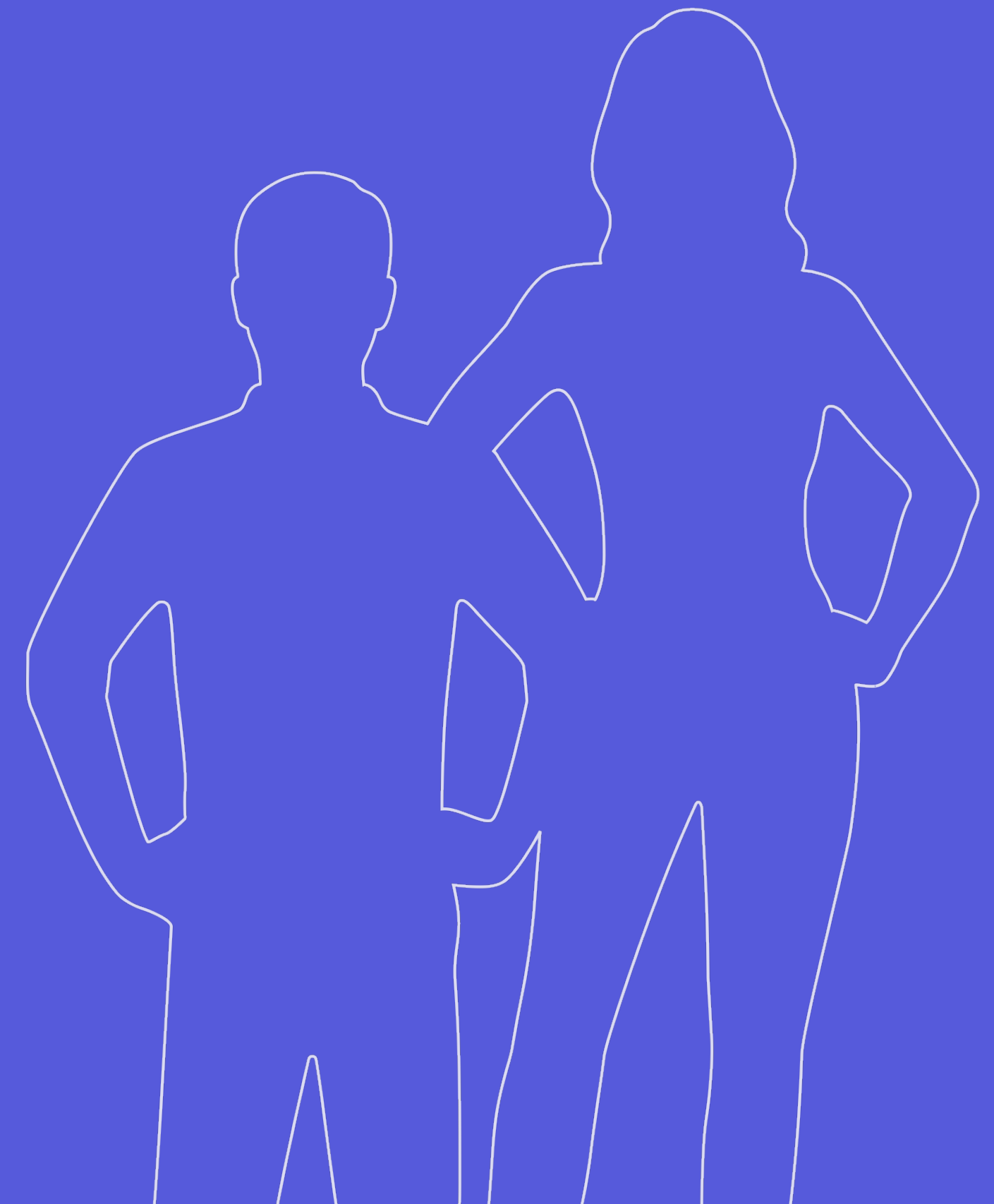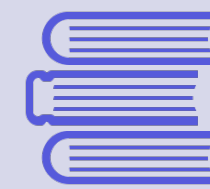of **Innovation**

Introductions

Community Stewards

Keith Farrugia
Sr. Project Manager

Pat Bush
President
Collaborative System and
Services

Participant Goals

Become familiar with the P-20W+ Community of Innovation including its mission and goals, as well as current and future projects.

Learn about current efforts to align data infrastructure, toolsets, and practices across postsecondary education, K-12, and the workforce.

Learn how to engage and connect their own work to the Community's work.

Community of Innovation

Community of Innovation Vision and Purpose

Develop reusable solutions and approaches to accelerate progress of state P-20W+ modernization efforts, align the market to enable innovation and scale, and share the experience to enable "fast followers."

Vision

Enable cost-effective, efficient, and accessible P-20W+ systems to derive actionable data insights to **reduce time to value, lower risk and cost** for P-20W+ modernization efforts.
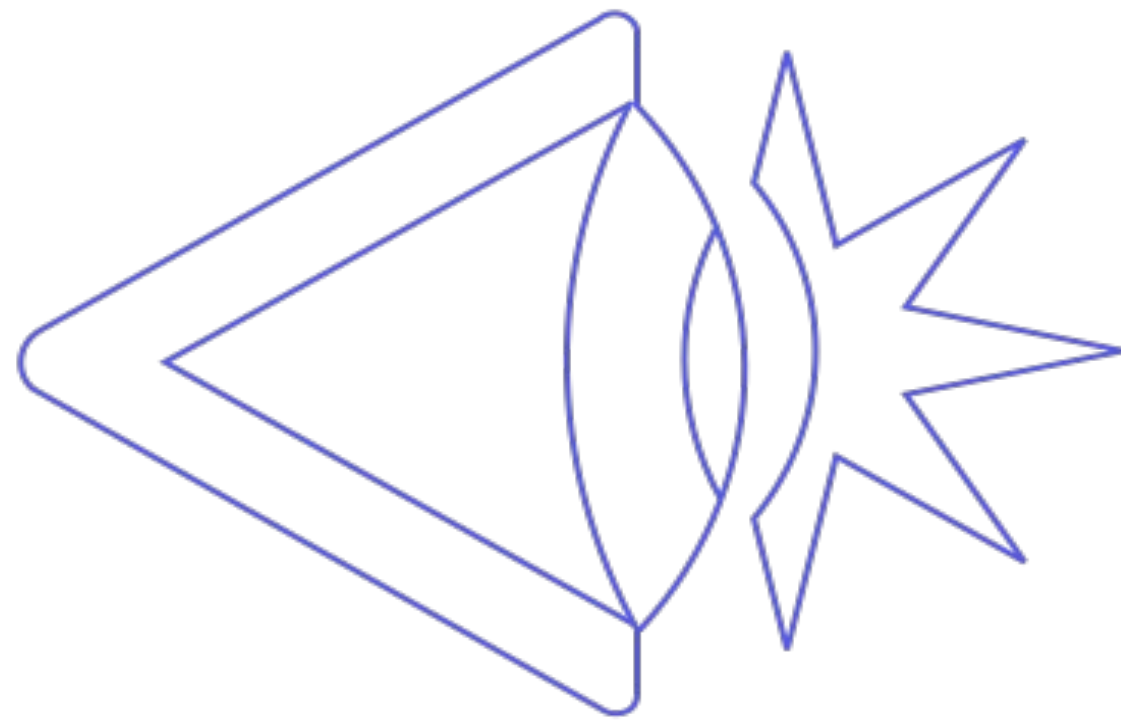
Mission

Leverage deep experiences from states and expertise from solution providers to develop **capabilities, artifacts, and products** around **common P-20W+ use cases** to support modern P-20W+ data pipelines.
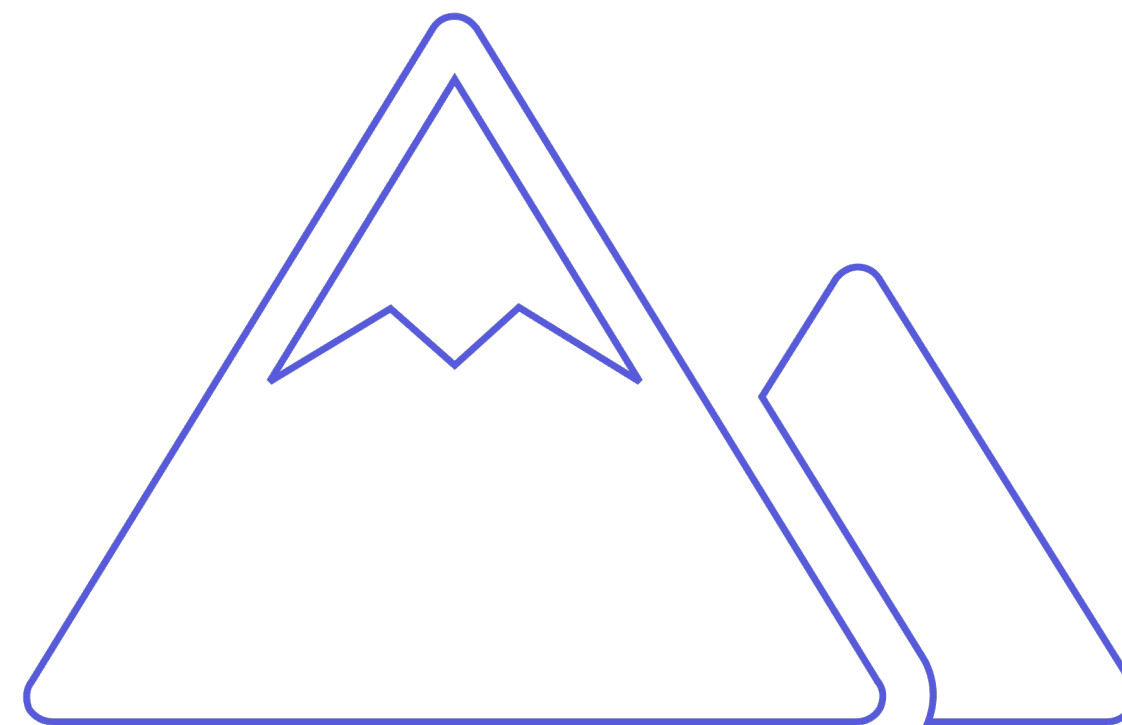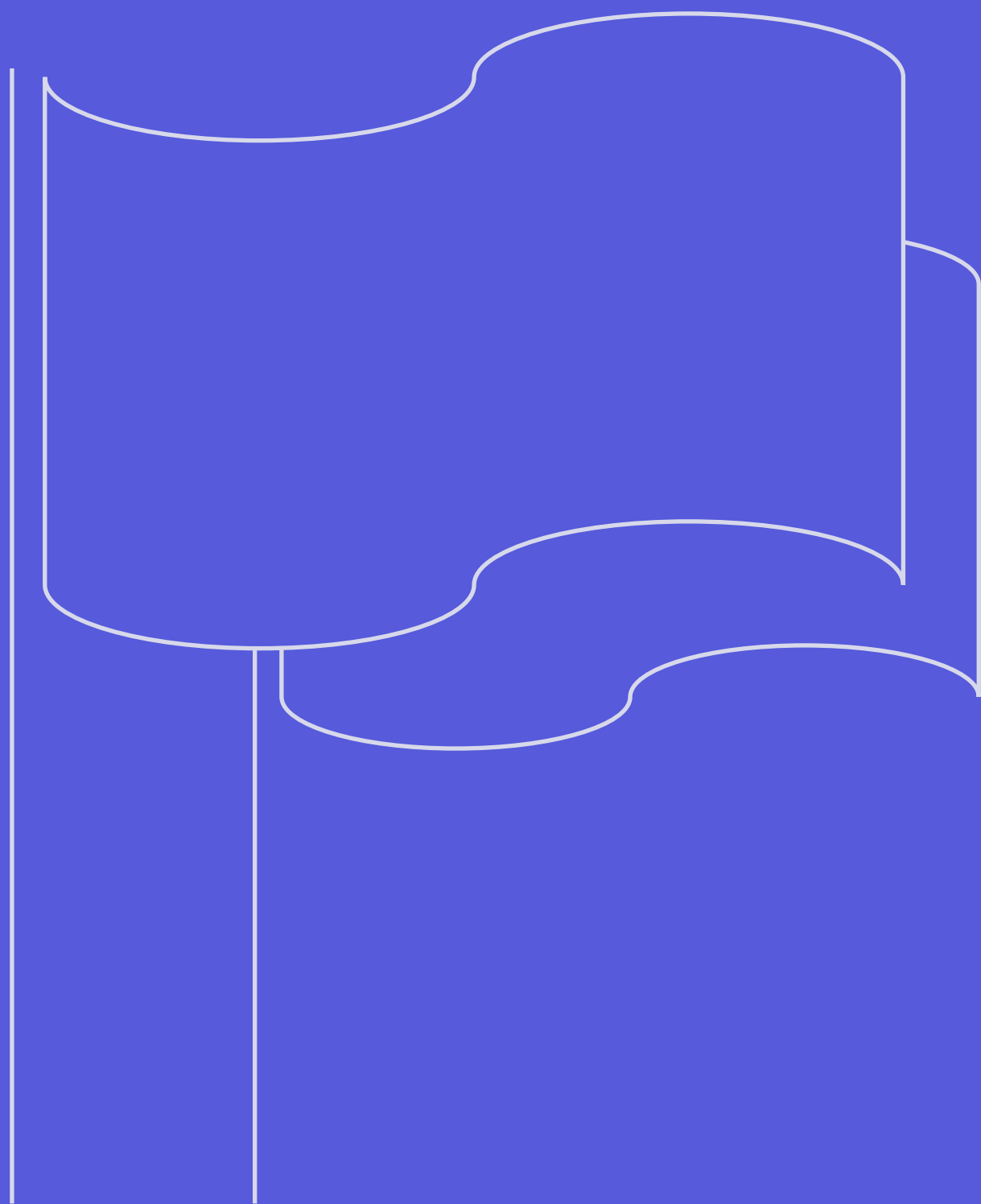
Outcomes

1 Accelerate progress of core states' modernization efforts.

2 Align the market around common language, methodologies, and technical approaches to enable innovation and scale for states.

3 Structure and document the modernization experience to inspire and enable other states to be "fast followers."

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Community Goals

Get Smart
Improved understanding among states and solution providers about common P-20W+ challenges and current efforts to address them.
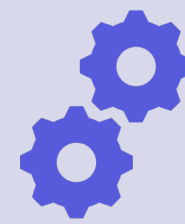
Drive Alignment
Improved alignment of modernization practices across states, solution providers, and data consumers through adoption of best practices.

Strengthen Capability
Improved capability through access to relevant and reusable playbooks and tools to advance current/future modernization efforts.
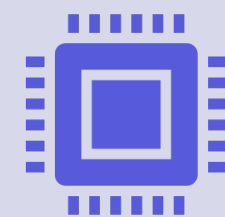
Develop Capability
Development of P-20W+ capabilities and shared solutions available for states to pilot/implement that support common P-20W+ use cases.

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How We Achieve Our Community Goals

Prioritize innovation and explore new solution frontiers, **that may inform new policy.**

Focus on generating "public good" products and tools in high-priority areas **for the core states.**

Take a product orientation and **focus on strengthening / developing capabilities,** across process, technology, and policy.

Elevate importance of communicating this work to influence other states, funders, and P-20W+ partners.

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Core Group Members

State
California

State
Indiana

State
New Mexico

State
Ohio

State
North Carolina

State
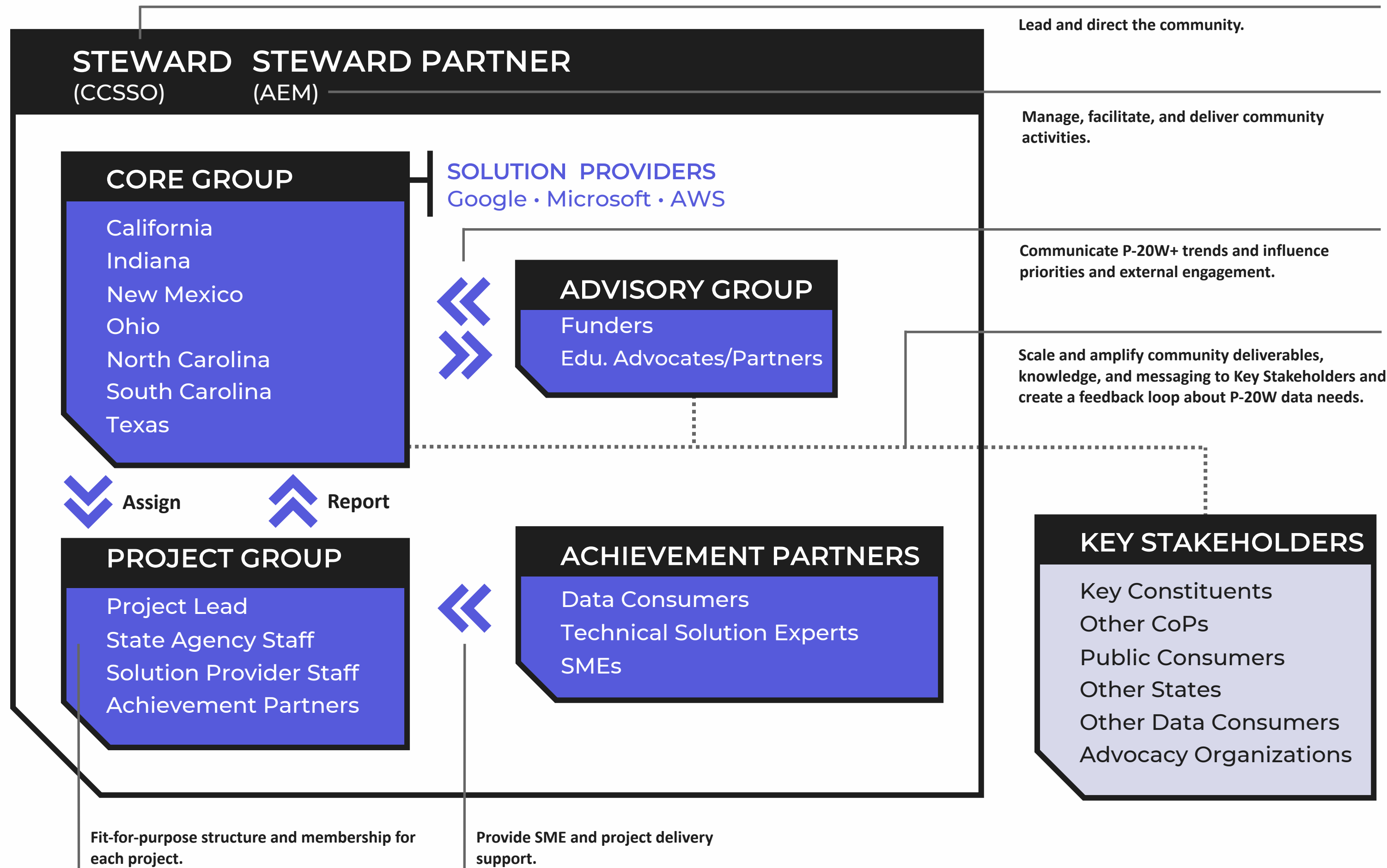South Carolina

State
Texas

Solution Providers
AWS

Solution Providers
Google

Solution Providers
Microsoft

Community Governance and Gathering Model

STEWARD (CCSSO)   **STEWARD PARTNER** (AEM)

Lead and direct the community.

CORE GROUP

SOLUTION PROVIDERS
Google · Microsoft · AWS

Manage, facilitate, and deliver community activities.

California
Indiana
New Mexico
Ohio
North Carolina
South Carolina
Texas

ADVISORY GROUP

Funders
Edu. Advocates/Partners

Communicate P-20W+ trends and influence priorities and external engagement.

Scale and amplify community deliverables, knowledge, and messaging to Key Stakeholders and create a feedback loop about P-20W data needs.

Assign   Report

PROJECT GROUP

Project Lead
State Agency Staff
Solution Provider Staff
Achievement Partners

ACHIEVEMENT PARTNERS

Data Consumers
Technical Solution Experts
SMEs

KEY STAKEHOLDERS

Key Constituents
Other CoPs
Public Consumers
Other States
Other Data Consumers
Advocacy Organizations

Fit-for-purpose structure and membership for each project.

Provide SME and project delivery support.

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Scope

The Capability Model provides a business-centric approach to setting the scope, context, and requirements for the P-20W+ Reference Architecture. It serves as the foundation for all architecture recommendations developed by the COI team.

Intent and Usage

Designed to assist P-20W+ leaders and stakeholders responsible for shaping their organization's data strategy, the Capability Model serves as a guiding tool to assess, plan, and improve data management capabilities.

It facilitates the identification of gaps and establishes a common language for discussions and planning.

Key Points

- The Capability Model provides a holistic view of the key capabilities required for successful data management and utilization within the P-20W+ ecosystem. It is a flexible framework that can be adapted to the specific needs and context of each organization.

- By assessing and enhancing capabilities in areas such as data governance, data quality management, analytics, privacy and security, organizations can strengthen their foundation for policy, research, and analytics.

Community Centering

Don't duplicate effort.

Make, find, and share **easily usable products**.

Create tools that solve problems state organizations encounter during data and technical work.

Invent materials that **break down user silos**.

Support creation of **coherence in the innovation process**.

Guide others in finding and using tools to modernize.

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2023 Roadmap Objective: Coherence Building

1 Governed Wiki, Accelerator Map, Data Dictionary Optimization

2 Reference Architecture Blueprint

3 P-20W+ automatic data suppression solution

4 Prototype visualizations (December launch):

COMPLETE

COMPLETE

IN PROGRESS

DECEMBER LAUNCH

Governed Wiki invites participation, leverages community knowledge, provides gathering point.

Map provides scaffolding to deploy each part of the reference architecture and guides users through modernization supports stewarded in Resource Library.

Data Dictionary guides design and implementation of sustainable data dictionaries for longitudinal data systems.

Foundational exercise to define and scope P-20W+ Reference Architecture framework; this will guide the trajectory of all following projects.

Write logic to apply suppression algorithm based on the structure of 3-5 required tables. Post in Accelerator Map as first COI reference architectural product.

Build on previous project work and products, implement suppression code (logic) on dummy data in the 3-5 required tables, build visualizations in Power BI, post code to build the visuals in Accelerator Map as second COI reference architectural product.

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Reference Architecture

A "City Plan" for Your Data Landscape

Why do we need a Reference Architecture?

Reference Architecture provides a vision to the community—agencies, standards organizations, vendors, etc.—and ultimately supports timely analysis of data that results in evidence-based improvements.

Alignment between states > **Resource sharing – Reusable tech, knowledge sharing** > **Reduce implementation time and costs** > **Accelerate P-20W+ modernization efforts**

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What is the P-20W+ Reference Architecture?

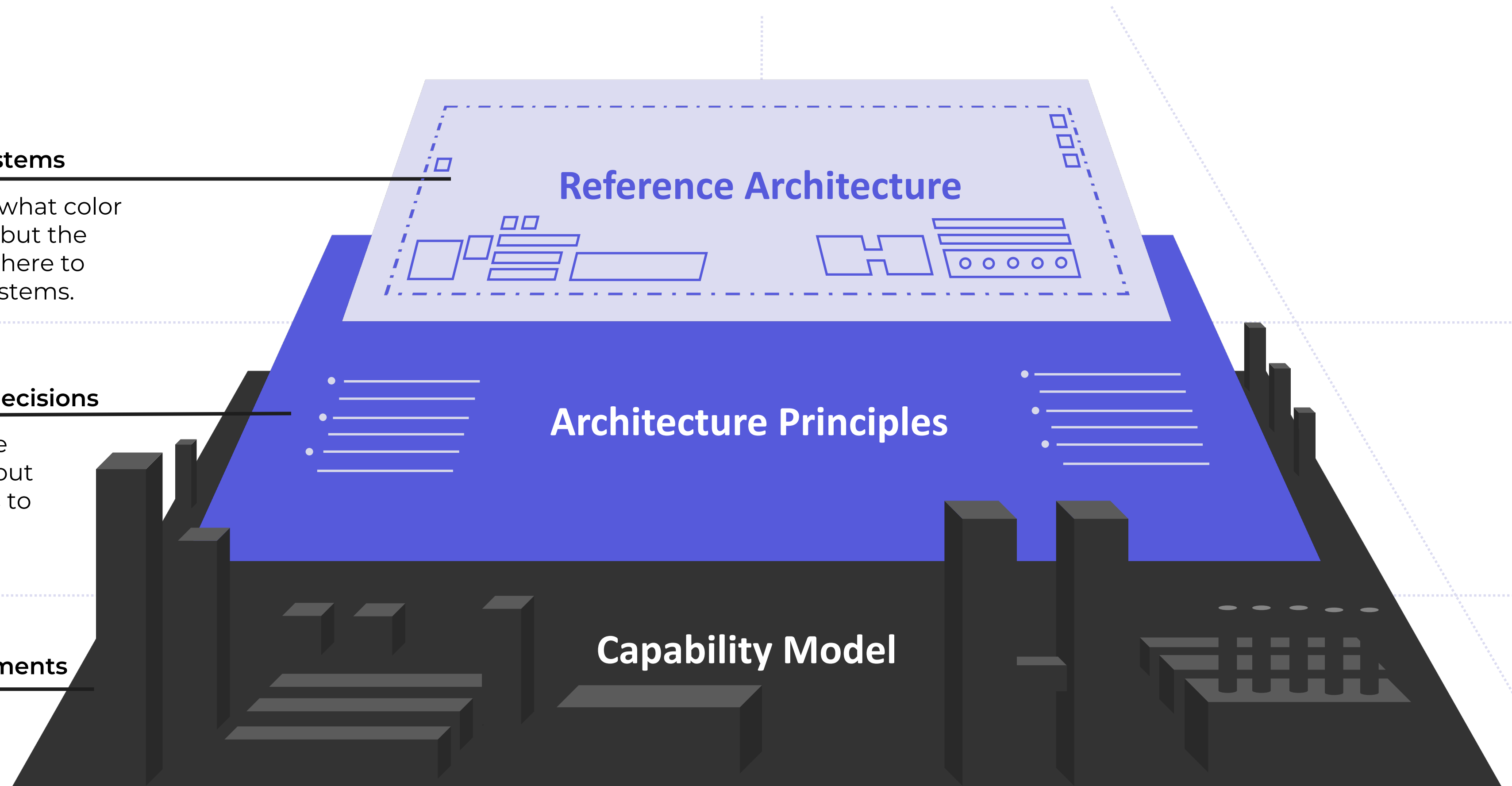**Blueprint for modern P-20W+ data systems**

A blueprint doesn't define features like what color to paint walls or what sink to purchase, but the Reference Architecture does indicate where to build things—like data lakes or other systems.

Foundation for making architectural decisions

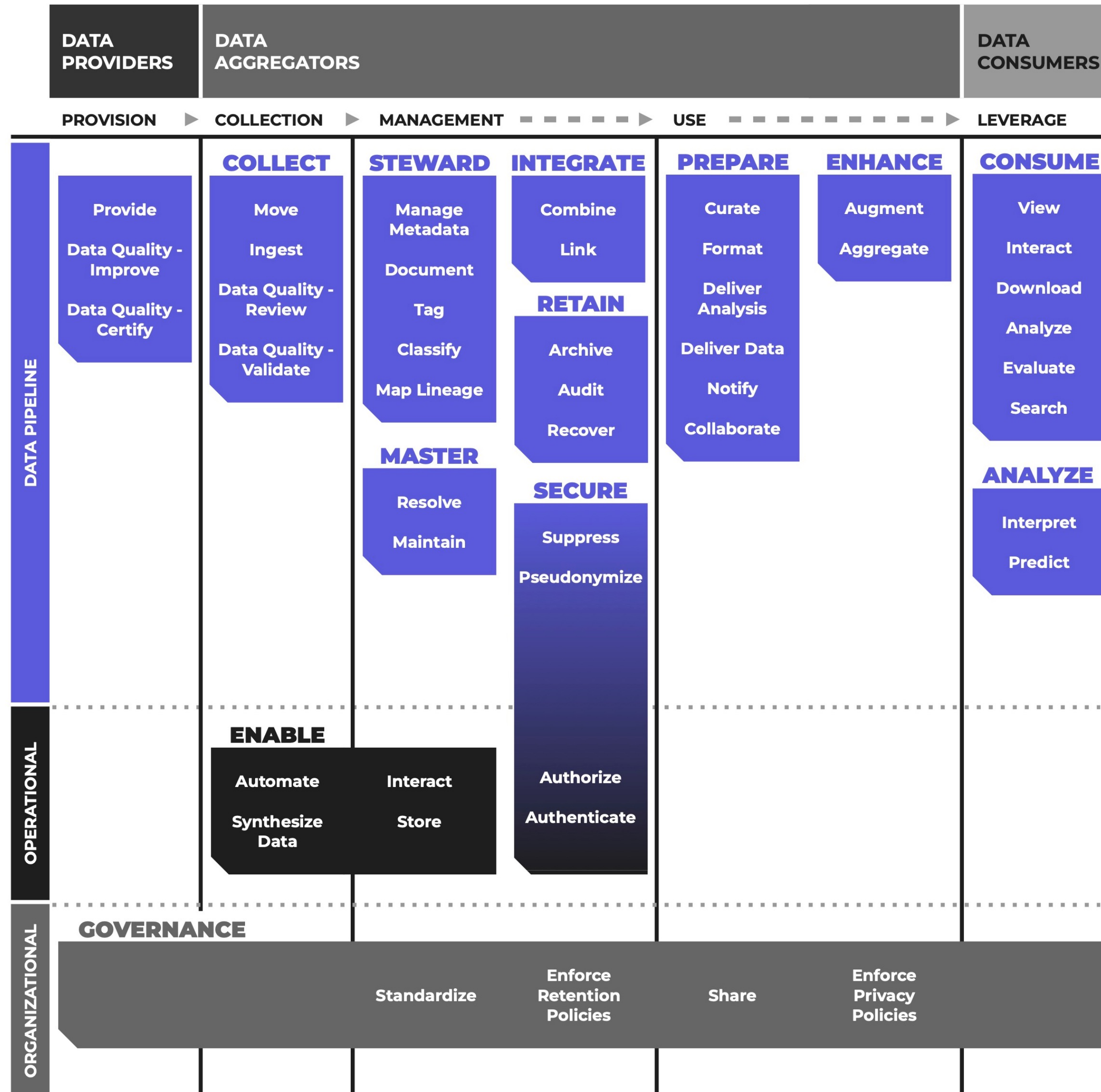The Architecture Principles function like building codes that guide choices without being prescriptive about commitments to software or vendors.

A plan setting scope, context, requirements

As in urban planning, the Capability Model ensures optimal placement of infrastructure to support a community's needs.

Reference Architecture

Architecture Principles

Capability Model

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P-20W+ Capability Model

| DATA PROVIDERS | DATA AGGREGATORS | | | | | DATA CONSUMERS |

PROVISION ▶ COLLECTION ▶ MANAGEMENT ‑‑‑▶ USE ‑‑‑▶ LEVERAGE

DATA PIPELINE

- Provide
- Data Quality - Improve
- Data Quality - Certify

COLLECT
- Move
- Ingest
- Data Quality - Review
- Data Quality - Validate

STEWARD
- Manage Metadata
- Document
- Tag
- Classify
- Map Lineage

MASTER
- Resolve
- Maintain

INTEGRATE
- Combine
- Link

RETAIN
- Archive
- Audit
- Recover

SECURE
- Suppress
- Pseudonymize
- Authorize
- Authenticate

PREPARE
- Curate
- Format
- Deliver Analysis
- Deliver Data
- Notify
- Collaborate

ENHANCE
- Augment
- Aggregate

CONSUME
- View
- Interact
- Download
- Analyze
- Evaluate
- Search

ANALYZE
- Interpret
- Predict

OPERATIONAL

ENABLE
- Automate
- Interact
- Synthesize Data
- Store

ORGANIZATIONAL

GOVERNANCE
- Standardize
- Enforce Retention Policies
- Share
- Enforce Privacy Policies

Scope

The Capability Model provides a business-centric approach to setting the scope, context, and requirements for the P-20W+ Reference Architecture.

It serves as the foundation for all architecture recommendations developed by the COI team. The scope includes all major types of data workflows required by any P-20W+ organization.

Intent and Usage

Designed to assist P-20W+ leaders and stakeholders responsible for shaping their organization's data strategy, the Capability Model serves as a guiding tool to assess, plan, and improve data management capabilities.

It facilitates the identification of gaps, establishes a common language for discussions and planning, and supports the prioritization of investments in data-related initiatives.

Key Points

- The Capability Model provides a holistic view of the key capabilities required for successful data management and utilization within the P-20W+ ecosystem. It is a flexible framework that can be adapted to the specific needs and context of each organization.

- By assessing and enhancing capabilities in areas such as data governance, data quality management, analytics, privacy and security, organizations can strengthen their foundation for policy, research, and analytics.

- The P-20W+ Reference Architecture is a best practice template for delivering or enhancing the capabilities defined in the Capability Model.

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P-20W+ Capability Model
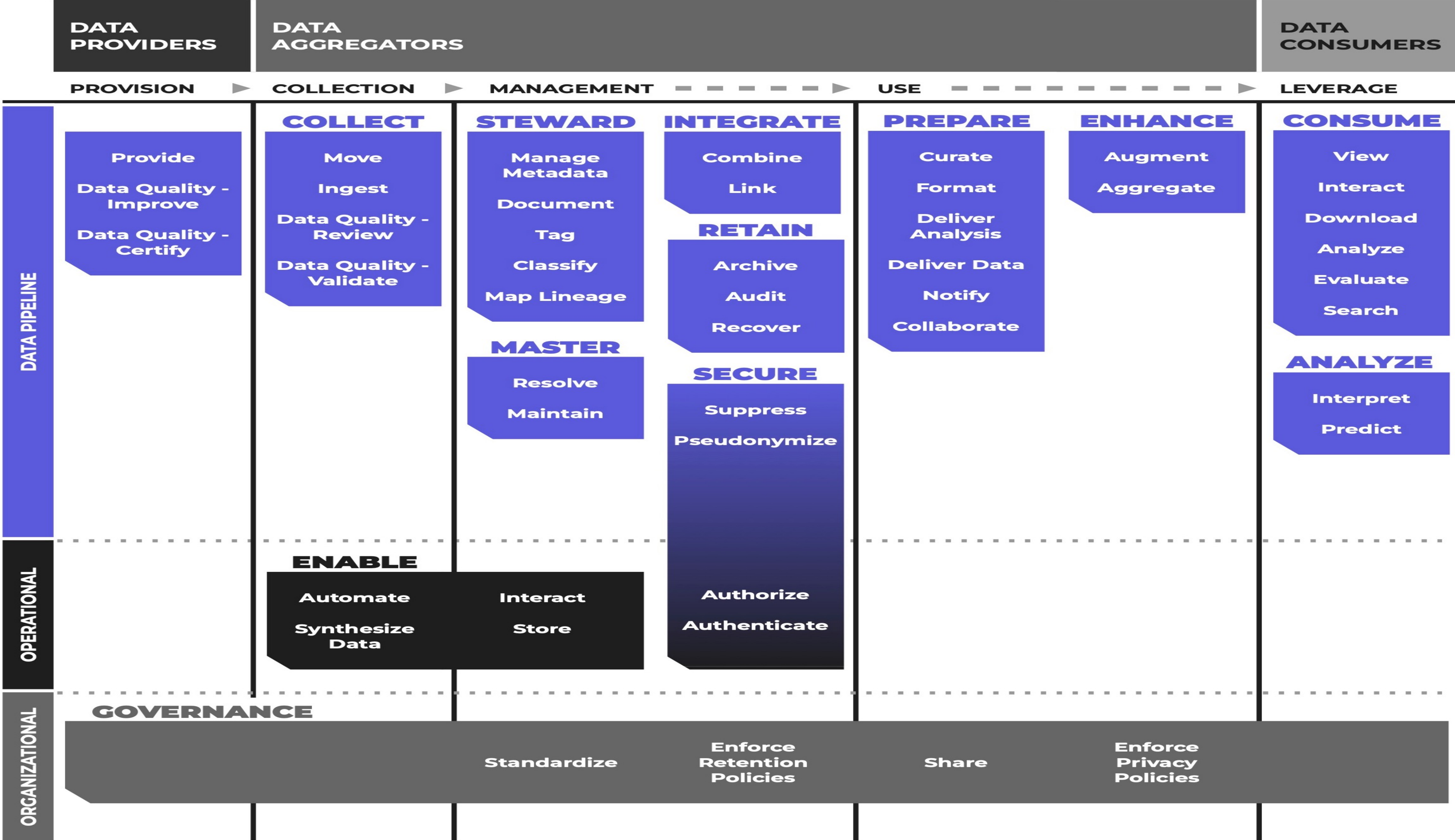
Architecture Principles

Business Principles
　　Common Use Applications
　　Compliance with Law

Data Principles
　　Data is an Asset
　　Data is Shared
　　Data must be Accessible
　　Data Providers should use
　　Common Vocabulary and Data Definitions
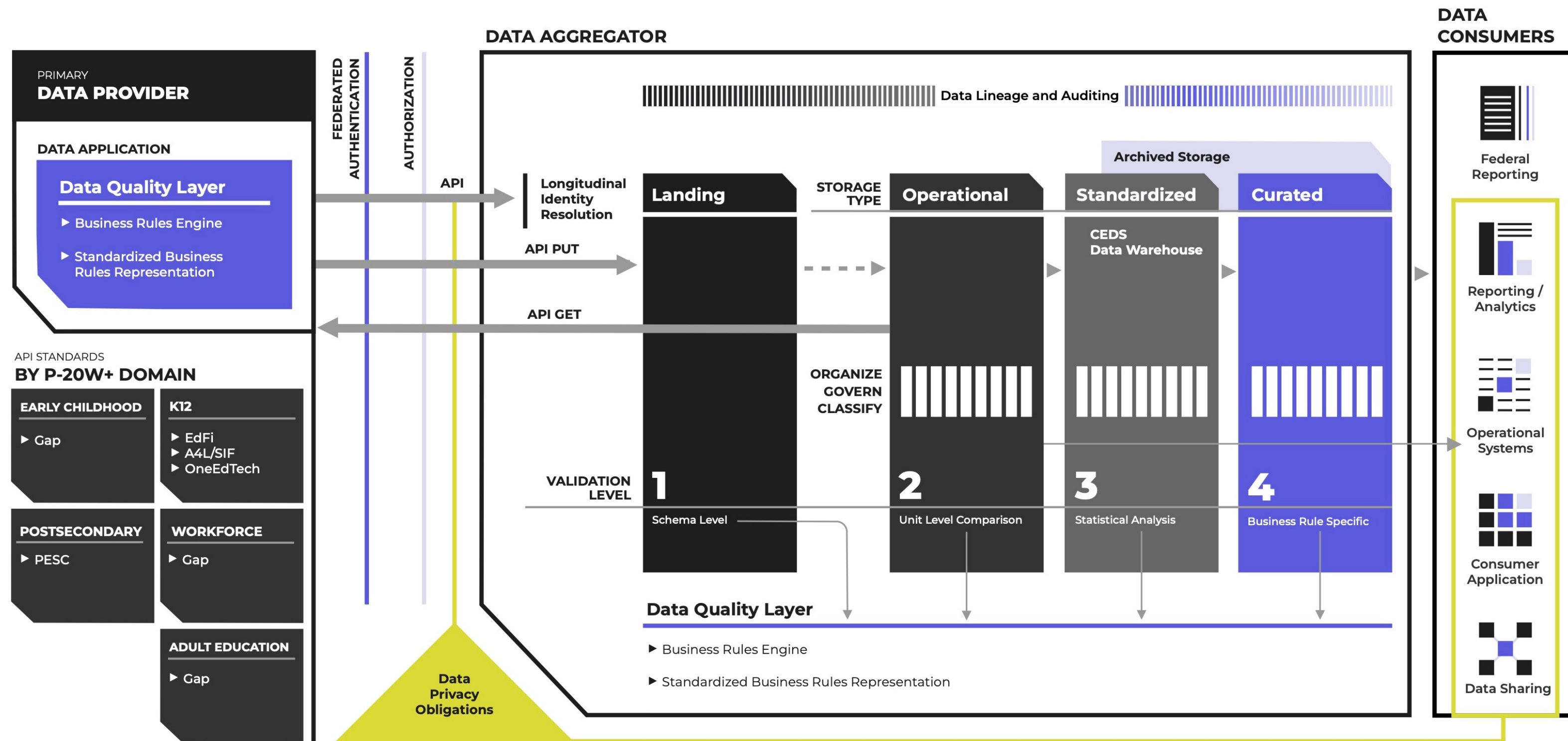　　Data Security is paramount

Application Principles
　　Technology Independence

Technology Principles
　　Control Technical Diversity
　　Interoperability

P-20W+ Reference Architecture Model

DATA AGGREGATOR

DATA CONSUMERS

PRIMARY
DATA PROVIDER

DATA APPLICATION

Data Quality Layer
▸ Business Rules Engine
▸ Standardized Business Rules Representation

FEDERATED AUTHENTICATION

AUTHORIZATION

API

API PUT

API GET

Longitudinal Identity Resolution

Data Lineage and Auditing

Archived Storage

Federal Reporting

Landing | STORAGE TYPE | **Operational** | **Standardized** | **Curated**

CEDS Data Warehouse

Reporting / Analytics

ORGANIZE GOVERN CLASSIFY

Operational Systems

VALIDATION LEVEL

1 Schema Level | **2** Unit Level Comparison | **3** Statistical Analysis | **4** Business Rule Specific

Consumer Application

Data Quality Layer
▸ Business Rules Engine
▸ Standardized Business Rules Representation

Data Sharing

API STANDARDS
BY P-20W+ DOMAIN

EARLY CHILDHOOD
▸ Gap

K12
▸ EdFi
▸ A4L/SIF
▸ OneEdTech

POSTSECONDARY
▸ PESC

WORKFORCE
▸ Gap

ADULT EDUCATION
▸ Gap

Data Privacy Obligations

Key Points

- This reference architecture provides a reusable, standardized, and comprehensive framework for designing, implementing, and managing longitudinal data collection and use platforms within the P-20W+ ecosystem. It does not prescribe specific technologies or implementations.

- The Reference Architecture advocates for the adoption of standardized APIs. By starting the work of data standardization at the point of data provision, organizations not only engage in data quality efforts as near to their source as possible, but the community takes a powerful step in unifying practices at the very beginning of the data lifecycle.

- This design, based on documented, open architecture principles, moves data quality feedback loops as close to the point of the data's origin as possible.

- This reference architecture accommodates multiple data storage approaches, from Relational Database Management Systems (RDBMS) to Data Lakes, but one important recommendation is the adoption of data standards.

Scope

This reference architecture (RA) and its framework are designed to help P-20W+ organizations migrate to modern data infrastructure throughout their data pipeline.

It provides a standardized blueprint that enables consistency, interoperability, and scalability across different systems and organizations.

Intent and Usage

Developed for P-20W+ leaders responsible for charting the course of their data and technical infrastructure, this RA can help guide design decisions and ensure alignment of technical solutions.

It promotes the use of industry-standard technologies, architectural patterns, and integration approaches to facilitate seamless data exchange, to ensure data quality and security, and support efficient data use.

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P-20W+ Reference Architecture Model
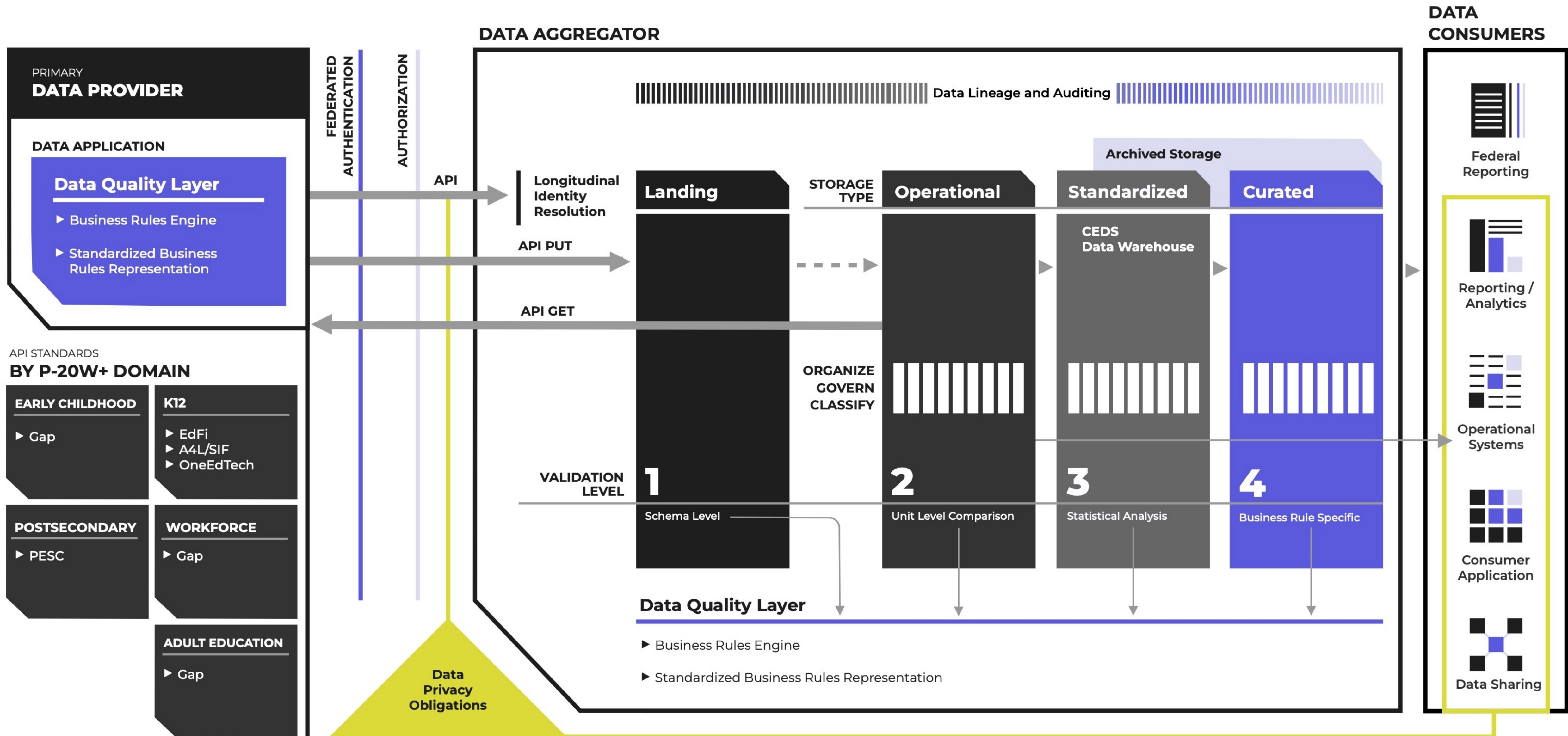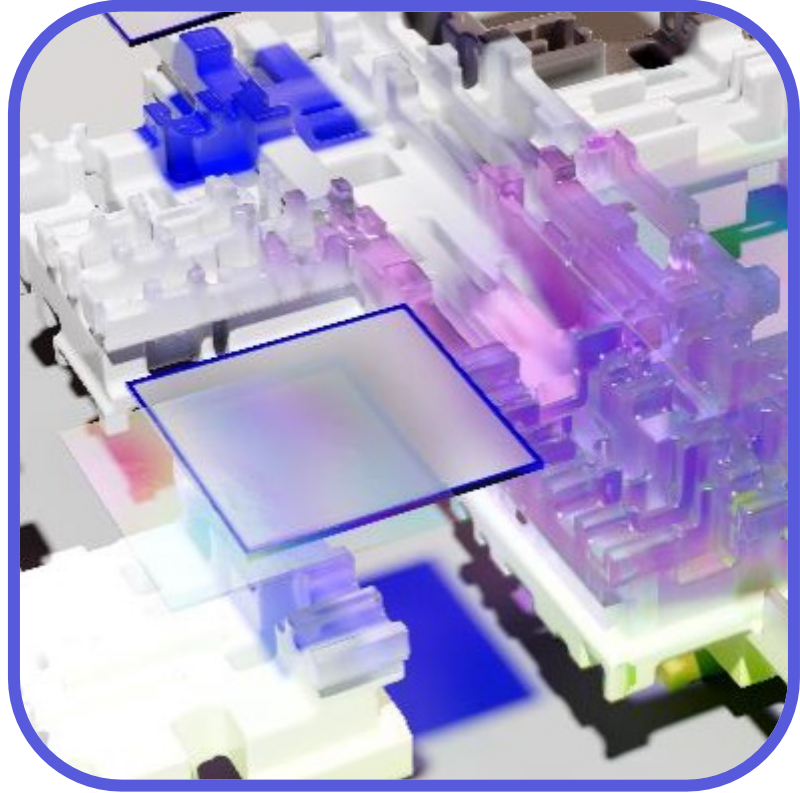
More to Come…

Phase II

COI Modernization Map

Provide concrete reference materials for each part of the reference architecture to support implementation.

30-Minute Interactive Webinar Series

COMING THIS FALL

1. **With a Capability Model, You Can:** Introduction to the COI Capability Model

2. **How Architecture Principles Enable Infrastructure:** Exploring the P-20W+ Reference Architecture Principles

3. **A Blueprint for the Future:** How the P-20W+ Reference Architecture Can Help You Achieve Scale

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Questions

Thank you!

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