CDC: Building a Response-Ready Public Health Data System

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Centers for Disease Control and Prevention (CDC)
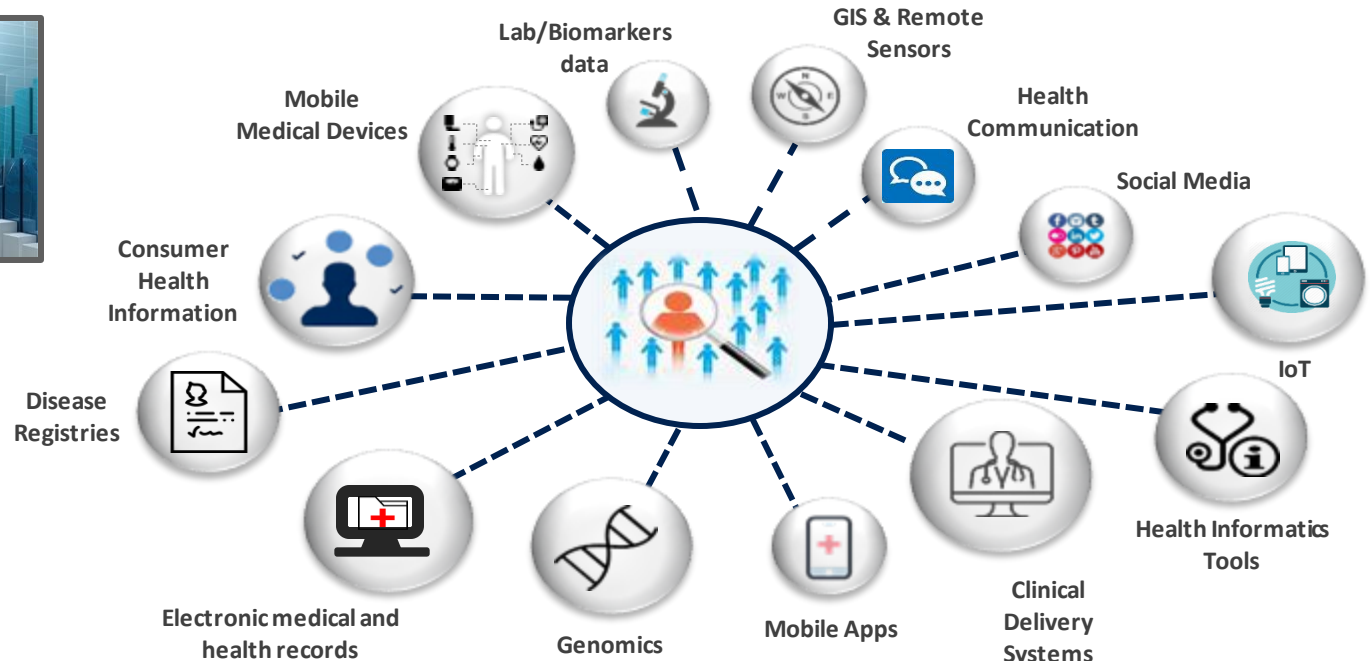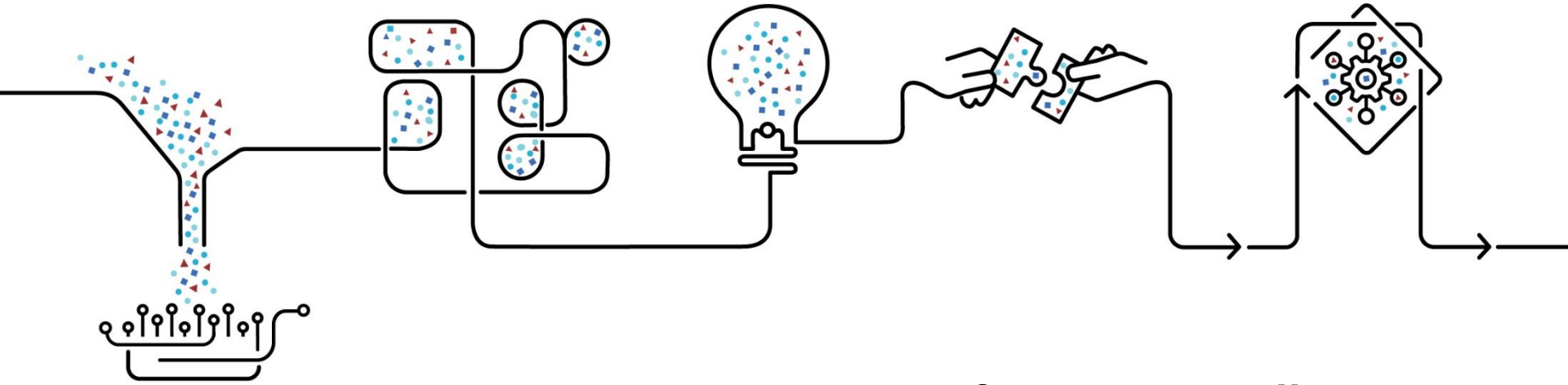
CDC Public Health Data Summit

September 27, 2023

The Future is Now

By 2025, we enhance our **public health analytical capability** to maximize **public health impact**.

Data Modernization Initiative (DMI)

Build the right foundation

Provide the new information infrastructure and automated data sources for response-ready data sharing

Accelerate data into action

Create faster, more integrated data to provide a more real-time, 360-degree view of health and forecasts of health threats for greater disease prevention and response

Develop a state-of the-art workforce

Identify, recruit, and retain experts in Health IT, Data Science, and Cybersecurity to generate meaningful public health insights

Support + extend partnerships

Engage with state, tribal, local, and territorial partners to address policy challenges and create new strategic partnerships to amplify knowledge

Manage change + governance

Provide the necessary structure to support modernization and aid adoption of unified technology, data, and data products

Blueprint for Success: CDC's North Star Architecture

North Star architecture guides the decisions we make around the technologies and processes we'll use to achieve the Public Health Data Strategy milestones.

MEETING PRESSING PUBLIC HEALTH CHALLENGES…

…BY OFFERING…

1 Reduce burden and friction

Flexible, standardized, and replicable tools

2 Increase interoperability

Secure cloud environments

3 Remove siloes

End-to-end public health approaches

4 Get relevant data quickly

Range of support levels to our state, tribal, local, and territorial (STLT) partners

5 Be responsive

User-centric design and development

STLTs · HEALTH INFORMATION EXCHANGES · LABS · HEALTHCARE PROVIDERS · HOSPITALS · CDC · RESEARCH INSTITUTIONS · REGULATORY BODIES · UNIVERSITIES · PAYORS

Read more at https://www.cdc.gov/surveillance/data-modernization/technologies/north-star-architecture.html.
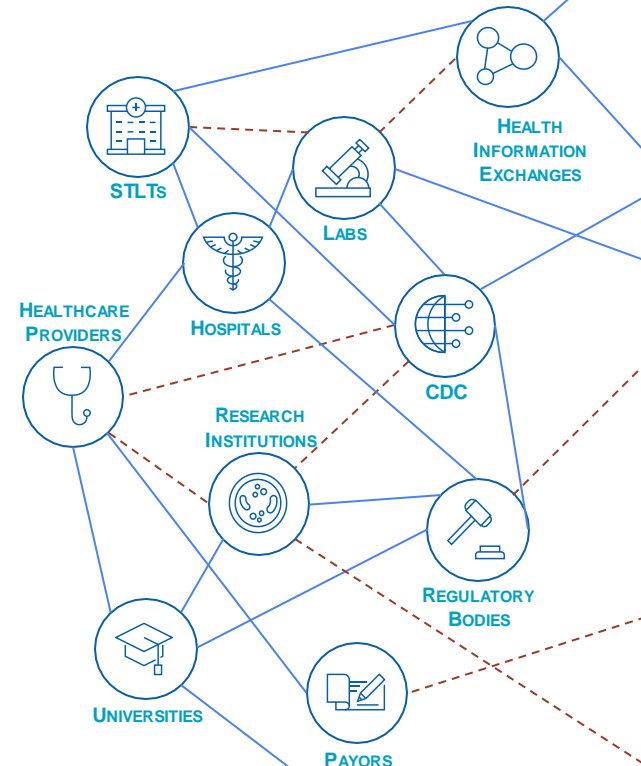
North Star Architecture Components and Partners

Public Health (PH) partners (non-exhaustive)

- Labs
- Providers and hospitals
- Other
  (e.g., testing sites, pharmacies, long-term care facilities, skilled nursing facilities, research institutions, medical examiners offices, payors, regulatory bodies)
- Health information exchanges

STLT and PH Environments

- Report Stream
- AIMS (journal)
- Other (e.g., State and Territorial Exchange of Vital Events (STEVE))

STLT Systems
(e.g., surveillance, immunization, vital stats, other registries)

STLT on-premises environment

STLT cloud environment

CDC-procured cloud environments

PRIVATE:

STLT workspaces

Analytics, visualization, and private storage

SHARED:

PH Digital Marketplace

Data assets, **modular tools and services**, and turn-key applications like **Modern NEDSS Base System (NBS)**

Shared Analytics Platform

STLT   CDC

Front door (incl. enterprise data exchange (DEX))

CDC

- Enterprise Data, Analytics, and Visualization
- Enterprise Data Catalog
- Other CDC systems

Data dissemination

Broader PH Ecosystem

- **Public**
  via CDC hosted websites
- **PH partners**
  via CDC hosted websites and Shared Analytics Platform
- **Federal agencies**
  via CDC hosted websites and Shared Analytics Platform
- **STLTs**
  via CDC-hosted websites and Shared Analytics Platform

CDC offered

Response Ready Data

(e.g., Clinical and Environmental Lab Results (CELR))

Current as of September 2023.

Piloting North Star Architecture for Data Exchange

These cases identify opportunities and gaps as we scale to many infectious and non-infectious diseases.

Pilots provide end-to-end proof of:

1 **Viral Hepatitis (infectious disease)**
Detects outbreaks of viral hepatitis across the United States

2 **Maternal and Newborn Health (non-infectious)**
SET-NET: Surveillance for Emerging Threats to Pregnant People and Babies Network
Improves maternal and newborn health

☑ **Public health impact**

☑ **Feasibility**

☑ **Scalability**

DEX Successes

- **Immunization (IZ) Gateway** quarterly data transfer to CDC from six states. Nearly 2 dozen more coming online shortly with DUAs.

- Surveillance for Emerging Threats to Pregnant People and Infants Network (SET-NET) **data transfer goes from weeks to days**.

CDC's Digital Gateway

A secure, modern platform for CDC's APIs that allows CDC programs, states, and other public health partners to quickly locate and access public health data in real time.
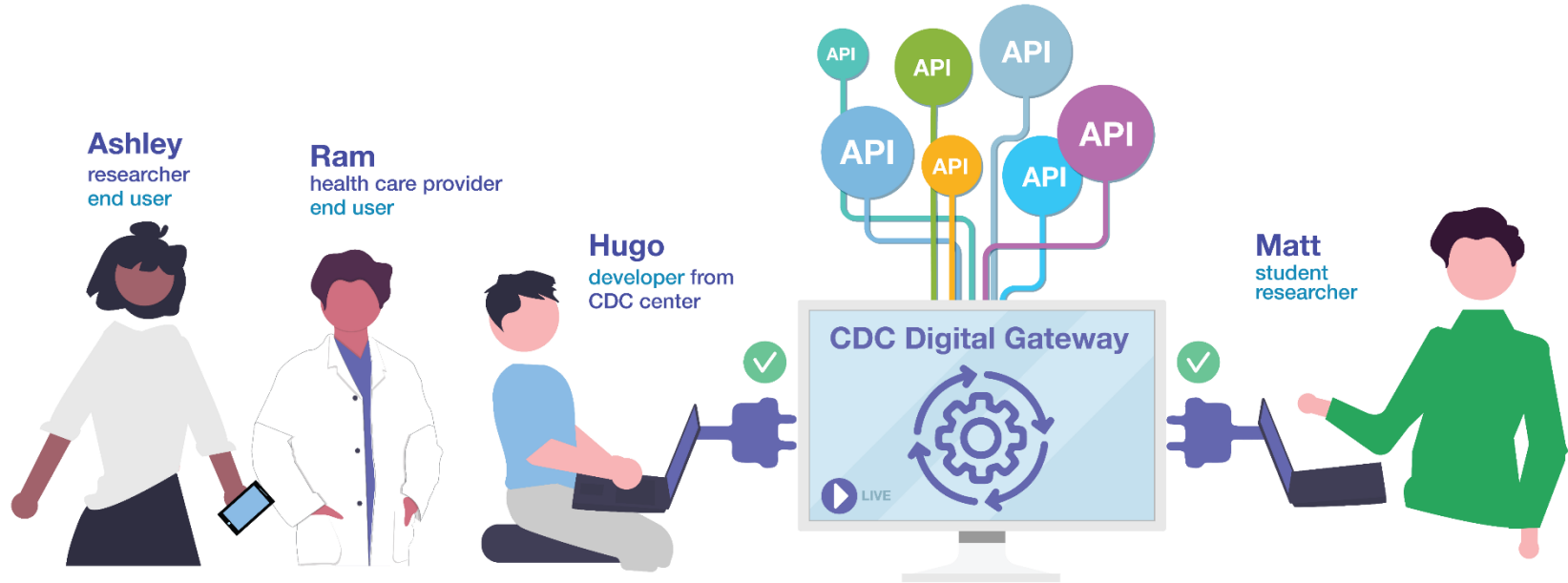
Workforce: Training Existing Staff Across the Agency

- Career Ready Program

- Data Academy

- Data Science Upskilling Program

- Diversity, Equity, Inclusion, Accessibility and Belonging (DEIAB)

Forums to Stay Updated on North Star Architecture Updates
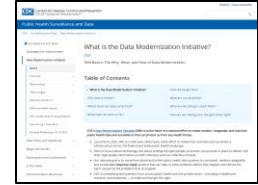
Focus of Forum	Forum of Engagement	Asks from This Group
Information sharing	**DMI related websites**	**Check the DMI related websites regularly** for updates on progress of the North Star Architecture.
		CDC websites: North Star Architecture DMI, and specific funding related webpages
	DMI webinars	**Attend DMI webinars** to be appraised of the latest updates.
	DMI consortium	Continue to **join and provide feedback** during the DMI consortium meetings.
Input gathering	**STLT focus groups**	Encourage STLT users with 'lived experience' **to volunteer to be a part of CDC's engagement panel via focus groups.** **Reach out to** dmibuildingblocks@cdc.gov.

Connecting technology, data, and people so we can move faster than disease…

- Keeping pace with the rapid evolution of technology and data

- Improving the effectiveness of our public health services

- Creating a safer future for all

Thank You!

Visit our websites

Office of the Chief Information Officer
www.cdc.gov/od/ocio

Data Modernization Initiative
www.cdc.gov/surveillance/data-modernization

CDC 24/7

PROTECTING AMERICA'S SAFETY, HEALTH, AND SECURITY

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348   www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Cloud-based technologies are the engine of a modernized, connected IT infrastructure.

CDC's Enterprise Cloud Services enable:

- Multi-cloud flexibility and sustainability

- Scale and resilience on demand

- Shared, easy access to data

- Increased data protections
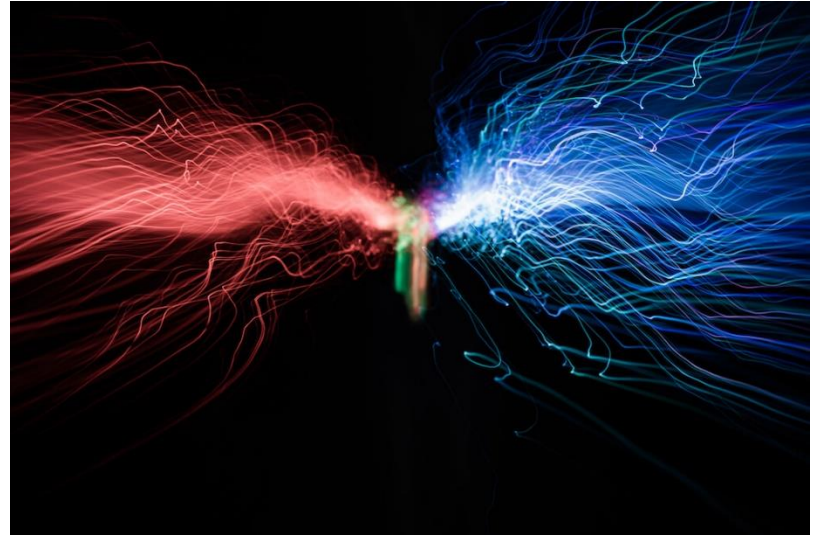
Dedicated Lab IT Support

CDC completed modernization pilots with four labs on Roybal campus

Secure lab network for specialized instruments; safer, more secure lab data transfer and storage

No code, low platforms = faster, easier development of response-ready applications and processes

- Increased efficiency, faster intervention, and greater agility

- Empowering non-technical teams = faster scalability

- Faster prototyping

- Better collaboration

- Greater flexibility to respond and adapt
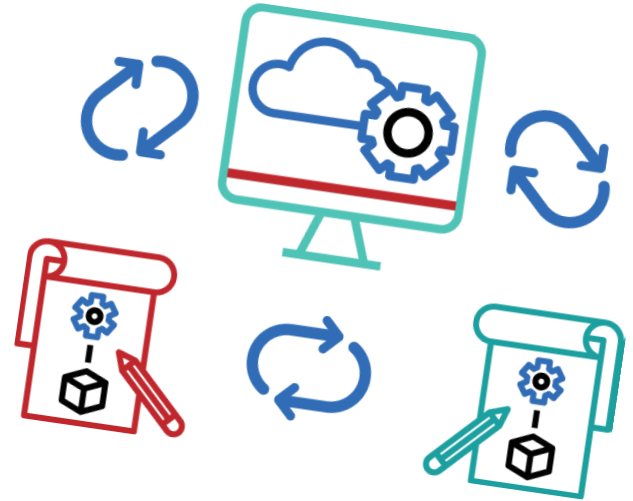
Modern architectures and cloud technologies enable collaboration to more effectively solve PH problems.

Local Public Health Labs and Hospitals

State, Territory, Local and Tribal Health Departments

National Public Health Agencies and Federal Partners

External Partner Authorization to enable seamless collaboration

⟷

Data Transport /Exchange Bi-directional movement of public health data by CDC and partners

⟷

Information Exchange, Shared Data Analytic and Enterprise Zones with modern data science tools for STLTs and partners

*Note: Above drawings were produced using AI.

Modernization Mindset

Helps CDC connect people with the information they need faster to make decisions.

IT and Data Modernization

- **Data Academy**

  - *Accomplishment*: In the last year, CDC's Data Academy saw an increase in enrollment and completion of all their offerings. Specifically, 1,170 learners participated in 15 live, instructor-led trainings; 217 unique learners from 25 CIOs took courses; 1,240 training hours were completed; and 1,160 courses were completed.

  - *Impact:* Data academy trains CDC staff to use new technologies and analytical tools to respond to public health challenges faster and smarter.
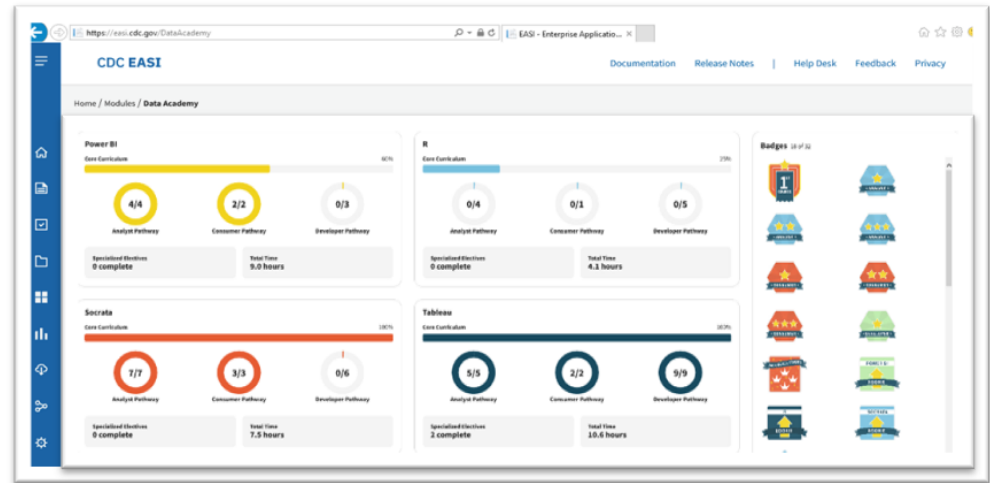
Mpox and Ebola Forecasting

INFORM: Generate practical decision support PRODUCTS

Produce qualitative and situational **assessments on outbreak implications**

Communicate and translate modeling and analytics results to policymakers, partners, and other audiences

Technical Reports

Risk Assessments

MPOX TECHNICAL REPORT

Due to the trajectory of the mpox outbreak, the mpox technical reports will be produced and not on a regular cadence.

These are technical reports intended for scientific audiences. Additional information, includi... general public, are available on CDC's mpox site.

November 18, 2022
Supplementary Analysis
This addition to Technical Report 4, is intended to provide updated national reproduction number estimates and to report newly created sub-national reproduction number estimates.

[Read the Analysis]

October 27, 2022
Technical Report 4
The Multi-National Mpox Outbreak Report provides updates regarding CDC's ongoing response to the mpox outbreak and includes preliminary results of new analyses that can improve understanding of the outbreak and inform further scientific inquiry.

[Read the Report]

MPOX RISK ASSESSMENTS

CDC risk assessments are intended to inform clinical, scientific, public health, and general public audiences in their planning and decision-making. Additional information is available on CDC's mpox site.

May 17, 2023
Renewed Mpox Outbreaks Likely
A recent uptick in mpox cases in Chicago underscores the risk of renewed mpox outbreaks, which we judge is substantial across the United States.
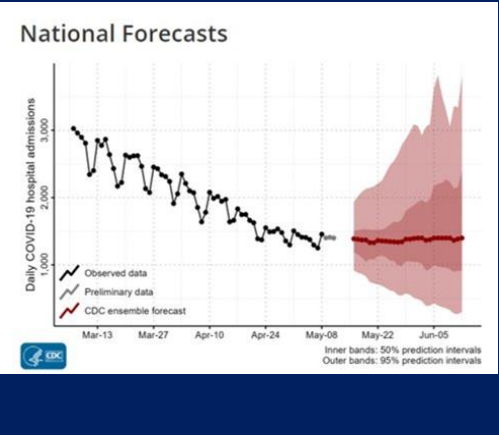
[Read the Analysis]

April 4, 2023
Mpox Resurgence and Vaccines
Most jurisdictions in the United States may be at risk of resurgent mpox outbreaks without continued efforts to vaccinate people at risk.

[Read the Analysis]

Forecasting

National Forecasts

Daily COVID-19 hospital admissions

- Observed data
- Preliminary data
- CDC ensemble forecast

Mar-13 Mar-27 Apr-10 Apr-24 May-08 May-22 Jun-05

Inner bands: 50% prediction intervals
Outer bands: 95% prediction intervals

Data management platforms such as the Enterprise Data Catalog (EDC) give CDC researchers better ways to determine which data sources are needed to drive insights and decisions

- **A one-stop shop** to find references for metadata cataloged by participating centers and programs

- **Helps users determine which data sources are appropriate** for their specific project needs

- **All critical data assets become discoverable and accessible**, with no data left behind