AI in Energy 2026

February 2026

Rob King

Data Governance as an Operational Enabler:

Driving automation, decision-making, safety,
and asset performance

Rob King

MS, ITILv3, PMP

C-Suite Executive

Transformational Change Agent

Strategic Advisor

3-Time CDO

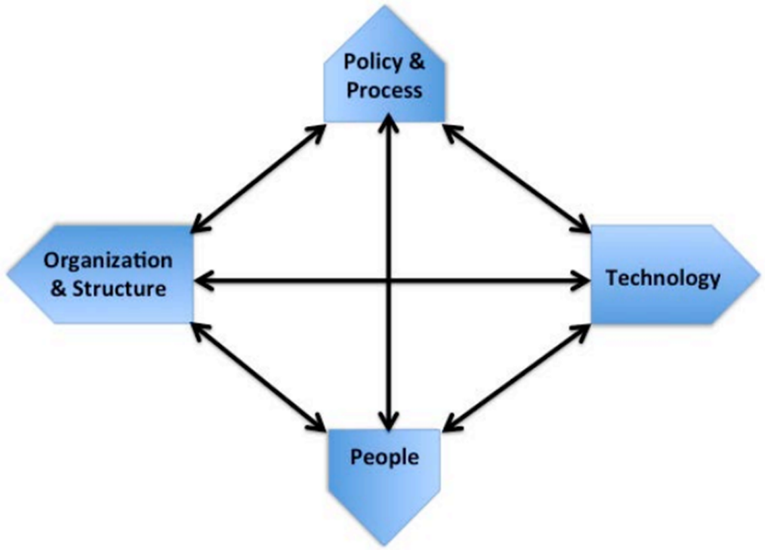
- Proven success driving enterprise-wide transformation
- Executive responsible for organizational AI, Advanced Analytics, and GIS
- Led data & AI frameworkds across dozens of federal agencies

Over last 10+ years, has led Enterprise Data, Advanced Analytics, and AI Transformations for organizations with Annual Portfolios Totaling

$100 Billion

Data / AI Governance = Organizational Change

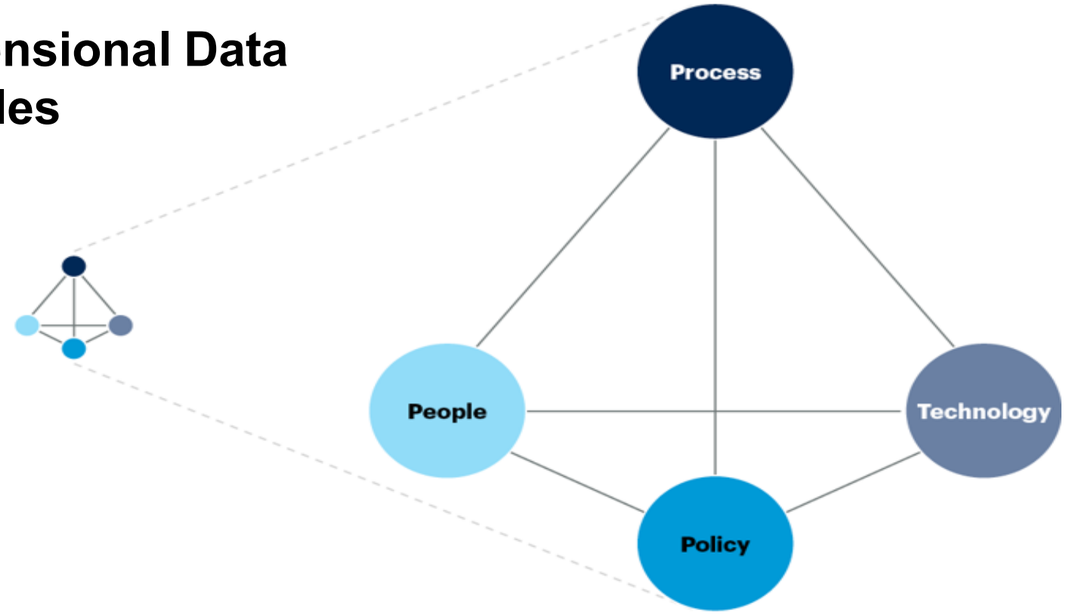
Data must be treated as a strategic asset and requires a multi-dimensional approach



Leavitt's Diamond: Change Framework

(published in 1965)

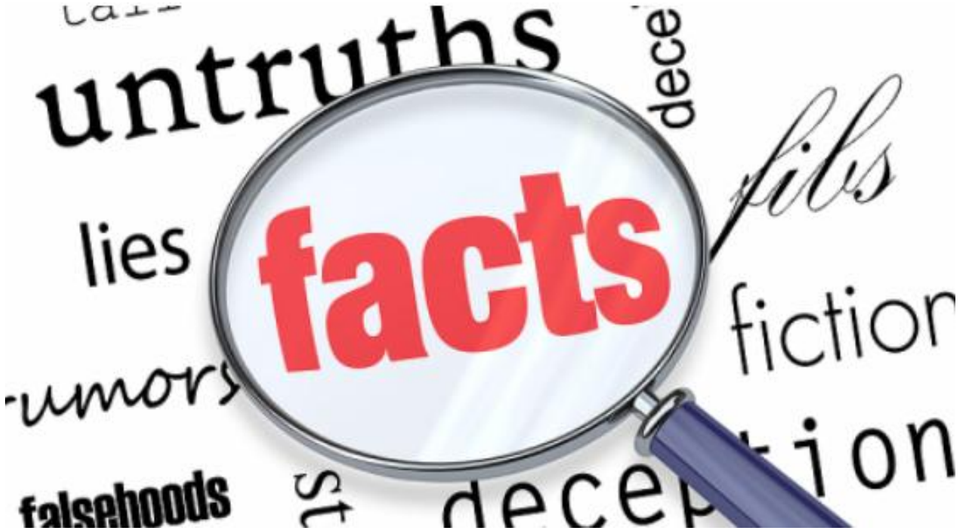
Multidimensional Data Deliverables



Gartner Tetrahedrom: How Technical Professionals Help With Effective Data and Analytics Strategies

(published in 2025)

Data Enablement **starts with Culture** and requires holistic organizational Change Management



Poor Data Quality has Consequential Organizational Impacts

Organizations Struggle with Governance

AI Era is Changing Everything

Consequences of Poor Data Quality

*In 2025 only **10% of organization are “completely ready” to** adopt AI.*
(Harvard Business Review)

acceldata

The Compounding Cost of Delay

The financial toll compounds as bad data travels through your systems:

- **20–30%** of enterprise revenue is lost due to data inefficiencies (Gartner)
- Data teams spend **50%** of their time on remediation (Ataccama)
- By the time a quality issue hits a boardroom dashboard, fixing it can cost **100x** more than catching it at ingestion (1×10×100 rule)

July 30, 2024

Gartner Predicts 30% of Generative AI Projects Will Be Abandoned After Proof of Concept By End of 2025

SYDNEY, July 30, 2024 — At least 30% of generative AI projects will be abandoned after proof of concept by the end of 2025, due to poor data quality, inadequate risk controls, escalating costs or unclear business value, according to Gartner, Inc.

Data Quality Across the Digital Landscape

ArcGIS Data Reviewer

Summer 2024

According to consulting firm Gartner, bad data costs organizations an average of $12.9 million per year. Other reports show similarly staggering figures. The McKinsey Global Institute, for example, found that poor-quality data can lead to a 20 percent decrease in productivity and a 30 percent increase in costs.

The Hidden Costs of Poor Data Governance

Exelegent
7,307 followers
July 16, 2025

In today’s data-driven economy, information is one of the most valuable assets a business can possess. Yet for many enterprise organizations, data remains a liability rather than an advantage.

Why? Because of one persistent issue: **poor data governance.**

The cost of poor data governance goes far beyond misfiled records or compliance gaps—it silently drains millions from company resources each year. In this article, we’ll explore how the absence of a robust governance framework leads to real financial, operational, and strategic damage—especially in companies with over 200 employees.

By 2028, 80% Of GenAI Business Apps Will Be Built On Existing Data Management Platforms

By Admin — ON JUL 19, 2025

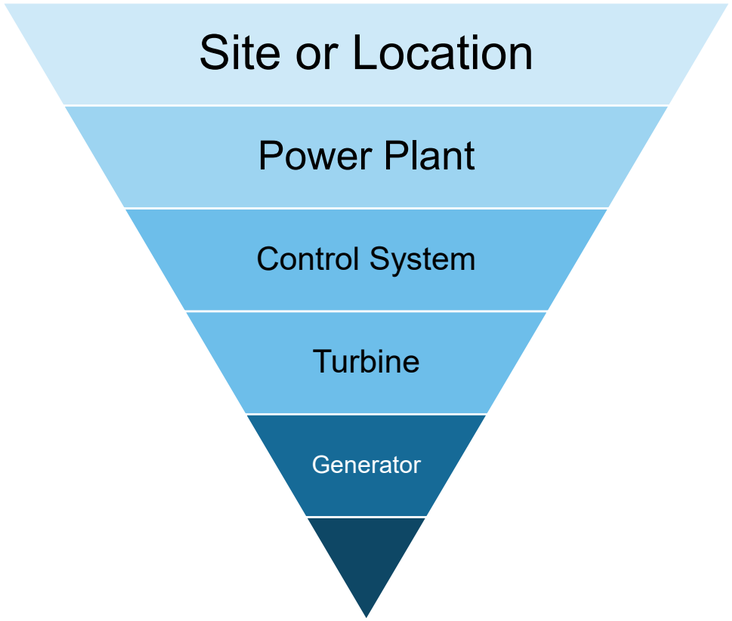
INTERNATIONAL NEWS

According to leading research firm Gartner Inc., by 2028, a staggering 80% of Generative AI (GenAI) business applications will be developed on existing data management platforms, dramatically cutting down delivery timelines and complexity by up to 50%.

Poor Data Quality has substantial direct, indirect, hidden, and morale costs

Consequences Poor Data Quality: in Energy Operations

Poor data quality can lead to downtime, margin loss, or safety exposure.



Issue	Outcome
Inconsistent asset hierarchies	• Process and system integration limitations • Unreliable analytics
Incomplete inspection records	• Audit and Regulatory exposure
Low data trust	• Inefficiencies • Workforce rejection of AI tools
Inaccurate maintenance collections and forecasts	• Unplanned downtime

As AI moves closer to the wellhead, compressor, refinery, or control room:

Data quality, Model accountability and Decision traceability become non-negotiable

Organizations Struggle with Governance

Organizations often:

- lack bandwidth and specialized expertise to manage governance infrastructure.
- struggle to plan and invest to deliver governance
- have weak accountability for governance processes and outcomes

Gartner Predicts 80% of D&A Governance Initiatives Will Fail by 2027, Due to a Lack of a Real or Manufactured Crisis

- perceive trade-off between “doing governance” and driving performance or innovation - some leaders view governance as limiting agility

Poor governance literacy results in policies existing in theory, but slow or failed to be adopted in practice

The AI Era: Transformative Generational Change

AI is already embedded in nearly all facets of our lives

- Gen AI and Agentic AI
  - transforming industries and organization delivery models
  - supercharging innovation and productivity
- Untapped opportunities for traditional AI adoption
- AI is no longer experimental
  - it's operational in government, industry, and academia

Decisions are increasingly AI informed, and is some cased AI enabled, in all sectors and in our personal lives

Governance = making AI deployable in mission-critical environments

Not Governance, but

- **Enablement of Business Value**
- **Enablement of Cost Avoidance**
- **Enablement of Cyber Risk Mitigation**

Not Governance, but:

- **Decision integrity**
- **Operational trust**
- **Scalability insurance**

A bad AI decision ≠ inconvenience, a bad AI decision can result in safety risk, production loss, environmental exposure, regulatory consequences.

The AI Era: *Data Bookends AI*

Scaling AI is predicated on governed AI-ready data – and AI built on fragmented ungoverned data equates to amplified risk.

For AI to provide meaningful sustained value, organizations must have a data strategy focused on high-quality, relevant data.

- **"*72% of the CDOs noted that managing data is one of the top challenges preventing them from scaling AI uses cases*." (McKinsey)**
- **"*Over 93% of CDOs agree data strategy is crucial for GenAI, however it requires high-quality, relevant data, specific to an organization's business and problems to unlock value.*" (Gartner)**
- ***"Most companies are not ready to deploy GenAI at scale because they lack a strong data infrastructure or the control needed."*** **(Accenture)**

Without governed data, AI is the epitome of the "garbage in, garbage out" principle.

Intersection of Data & AI

AI is not a technology – AI is a fundamental **shift in culture, responsibility, leadership and mission**

Data must be AI-ready - traditional data management, approaches, and applications are no longer viable to achieve success in the AI era.

Three primary principles of AI-Ready data:

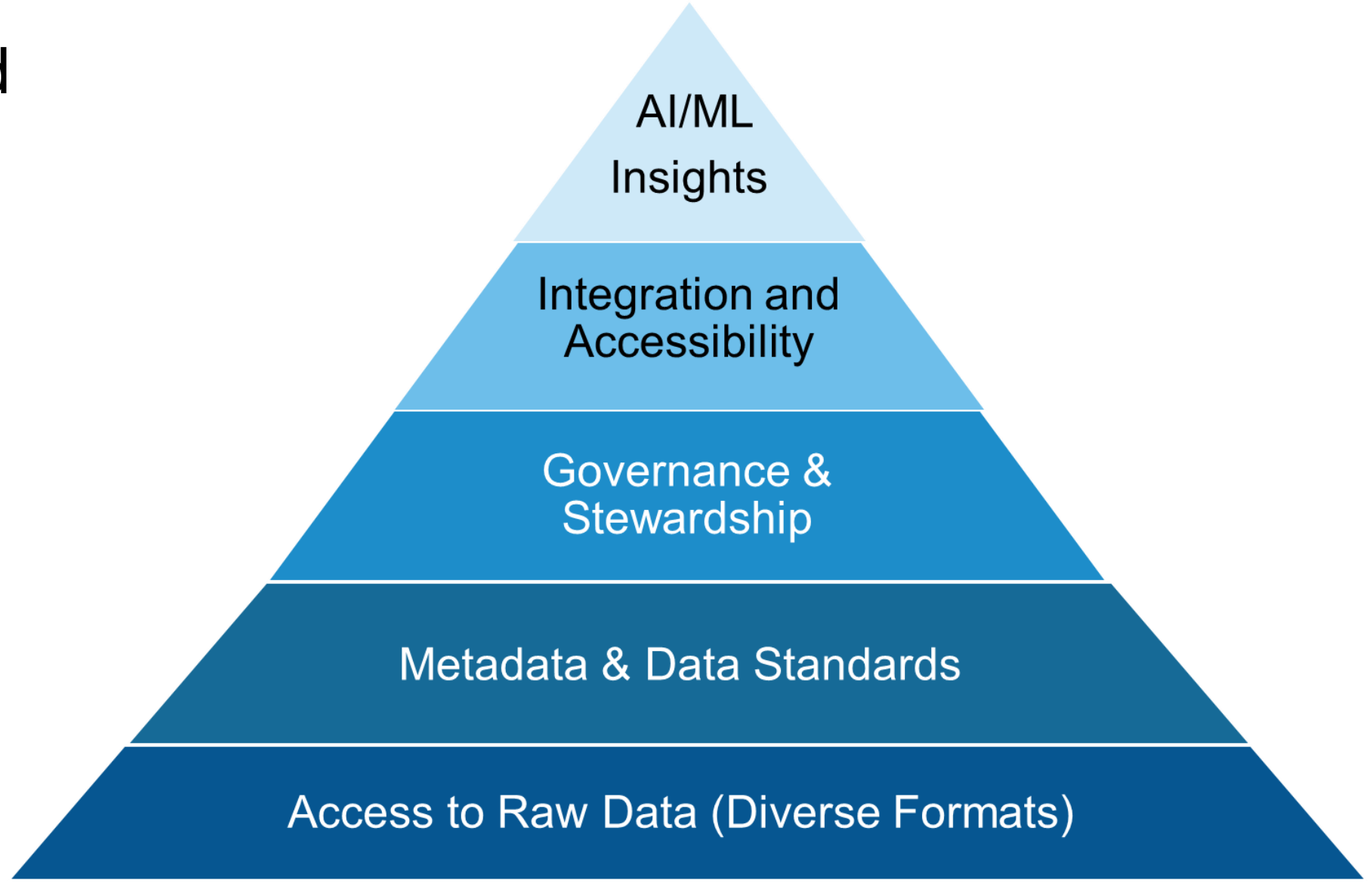
- Structured data needs to be “machine understandable” through a sematic layer.
- Unstructured data needs to be curated in Vector databases that serve AI solutions.
- Data needs to align to FAIR (Findable, Accessible, Interoperable, Reusable) principles

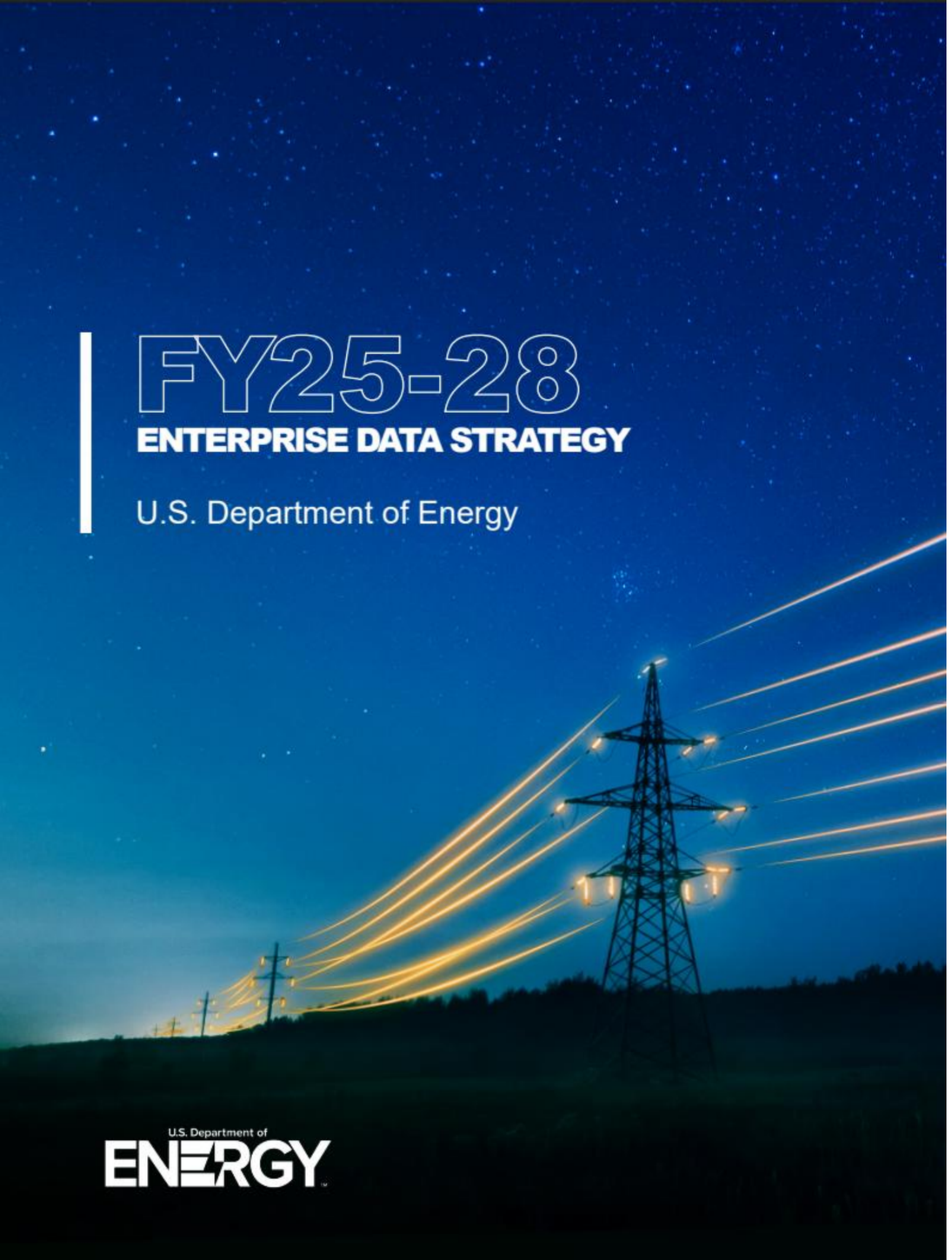
No governed data = No meaningful or responsible AI

Data must be *AI-ready*

Characteristics of AI-Ready Data

- Structured and Standardized
- Contextualized with Domain Knowledge
- Accessible and Secure
- Provenance-Tracked
- Validated and Curated
- Efficiently Managed



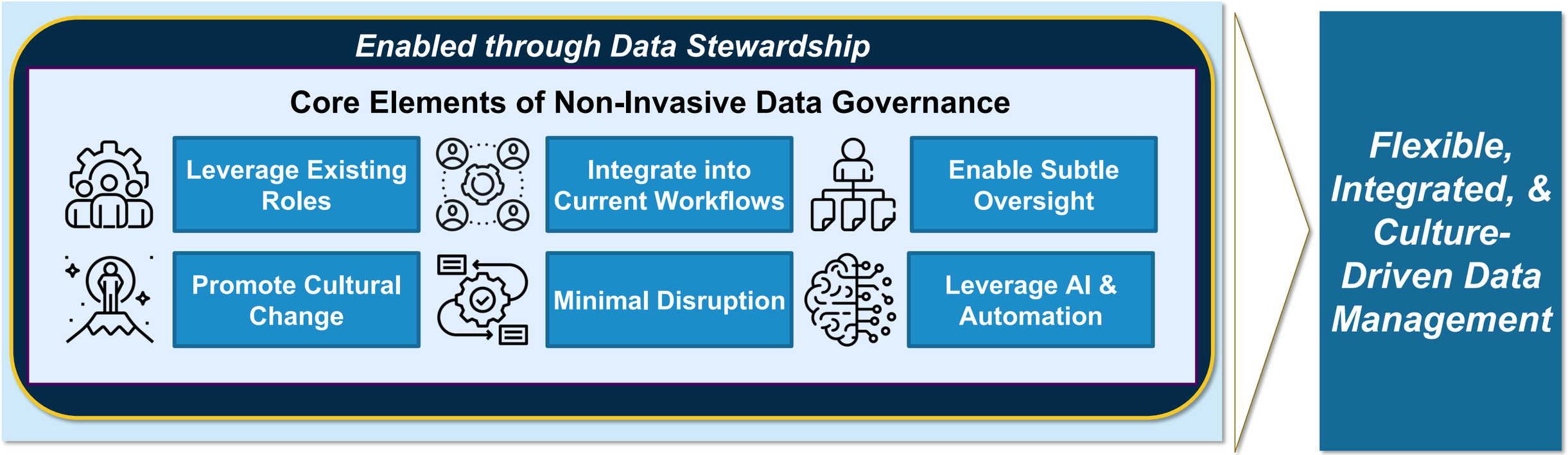


US Department of Energy Enterprise Data Strategy

Maximizing the value of data for AI
Scaling impact across energy, science & innovation, safety, security, and operations

Op Model: Non-Invasive Data Governance

Focuses on using & scaling existing processes & skills to embed data practices while minimizing undue burden - necessary to drive and deliver enterprise efficiencies and position data for incorporation into AI solutions.



*This approach encourages **working within the current operations, applying minimal disruption, embedding governance into day-to-day activities & driving towards automation**.*
The goal is to foster a culture of data accountability without creating additional layers of oversight.

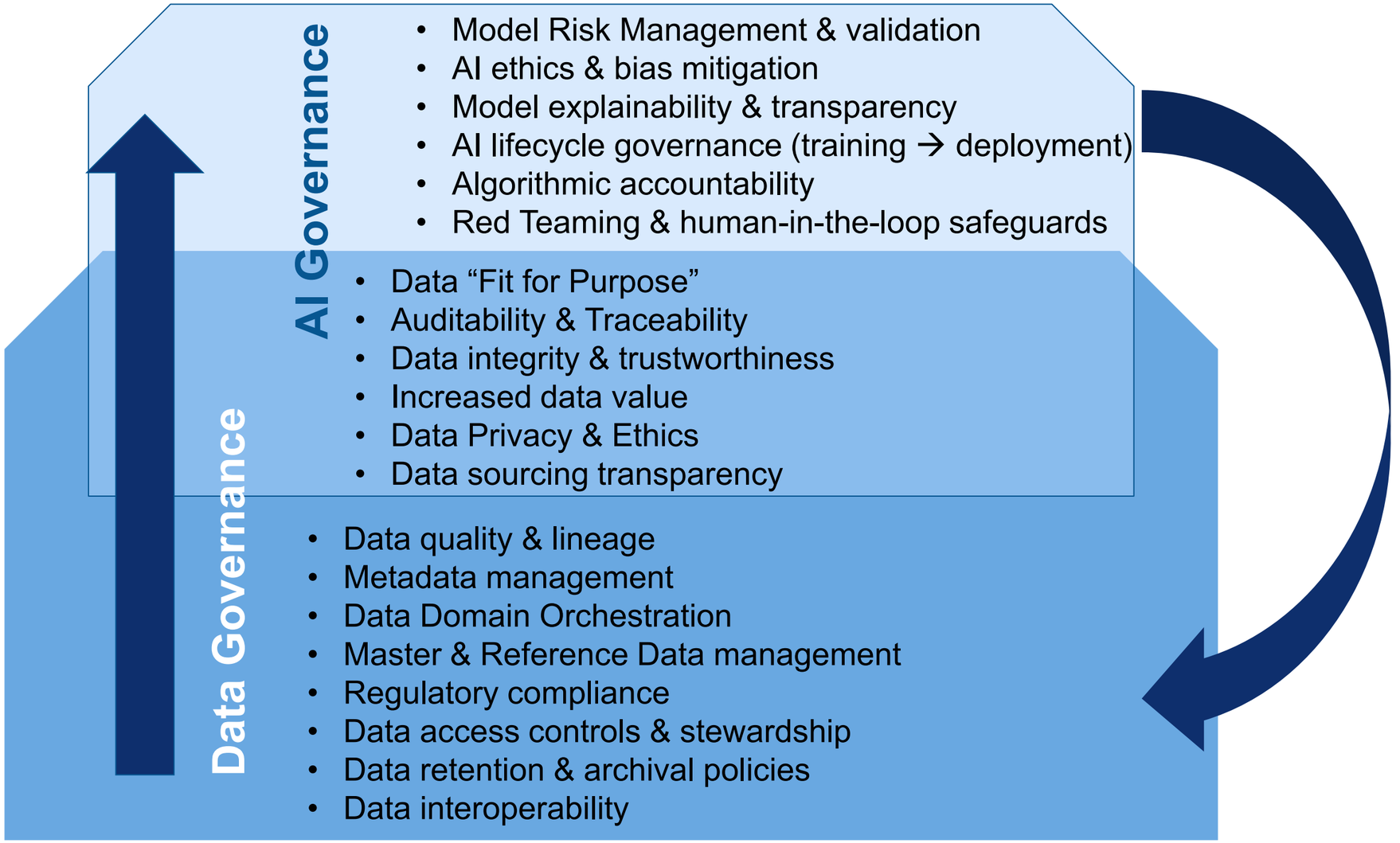
Tailoring DG to Different Mission Domains

Distinction of DG Goals: DOE's *Science & Research* vs. *Weapons* missions:

DG Goals	Science & Research (S&R) Mission	Nuclear Design & Manufacturing
Access Control	Tiered access (internal, public, restricted)	Clearance-based access (e.g., Confidential/Secret/Top Secret, RD/FRD categories)
AI Readiness	Focus on enabling reproducible science and accelerating science and discovery	Focus on validated, explainable AI for simulation, design, and manufacturing assurance
Compliance Standards	Open Science, Open Data, FAIR Principles	DOE Orders (e.g., 471.1B, 205.1C), NNSA-specific directives, DoD nuclear security standards
Data Sharing	Emphasis on open access where possible; OSTI submission, public repositories	No public release; distribution limited to cleared collaborators under DOE/NNSA classification (Note: cross lab/site data sharing is a key priority of NNSA's *Digital Transformation* efforts).
Incentives	Academic and peer recognition, external collaboration, science acceleration	Mission assurance, accelerate weapons production, risk avoidance, compliance, program certification
Metadata	FAIR-aligned and advanced science discipline-specific domains (e.g., chemistry, materials, physics)	Security-tagged metadata with classification markings, provenance tracking, chain-of-custody
Retention	Driven by scientific reuse, records management policies, and funding mandates	Driven by mission continuity and records management policies; retention can be decades to indefinite (weapons lifecycle ~50+ years)
Stewardship Model	Collateral-duty stewards may be feasible in research groups, but fulltime should be considered.	Full-time, cleared stewards should be required for compliance and security

Data & AI Enablement through Governance

Integrated Data / AI Governance



CDOs and CAIOs must be tightly partnered and have integrated and cohesive governance that has common priorities and use cases.

DG Practices to Enable AI-Ready Data

Data Governance Board:

- Key leaders from across organization and must be decision-oriented.
- Identify and tie key organizational priorities.
- Provide sponsorship, resources and accountability.

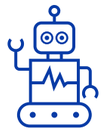
Require a **standardized Data Management Plan (DMP)** for every IT investment

Develop **Executive and Workforce Data and AI Literacy**

- Leaders must establish a data-driven culture and drive organization change
- Workforce must understand how to interact with data and utilize AI

Deploy, dedicate and incentive **Data Stewards to embed best practices**

Adopt FAIR principles (Findable, Accessible, Interoperable, Reusable) for Metadata Standards



Automate metadata capture and cataloging while maintaining “human in the loop” verification via Data Stewards.

DG Practices to Enable AI-Ready Data (cont'd)

Responsible AI:

- Invest in validation of data pipelines for "fit for purpose" contextualization for AI use cases,
- Maintain dataset provenance for all AI model training,
- Utilize and pilot mini-Rag AI systems and Vector databases with SME-curated and validated datasets

Develop mechanisms to **valuate and measure data and its ROI** through tracking dataset reuse, reproducibility, cost savings.

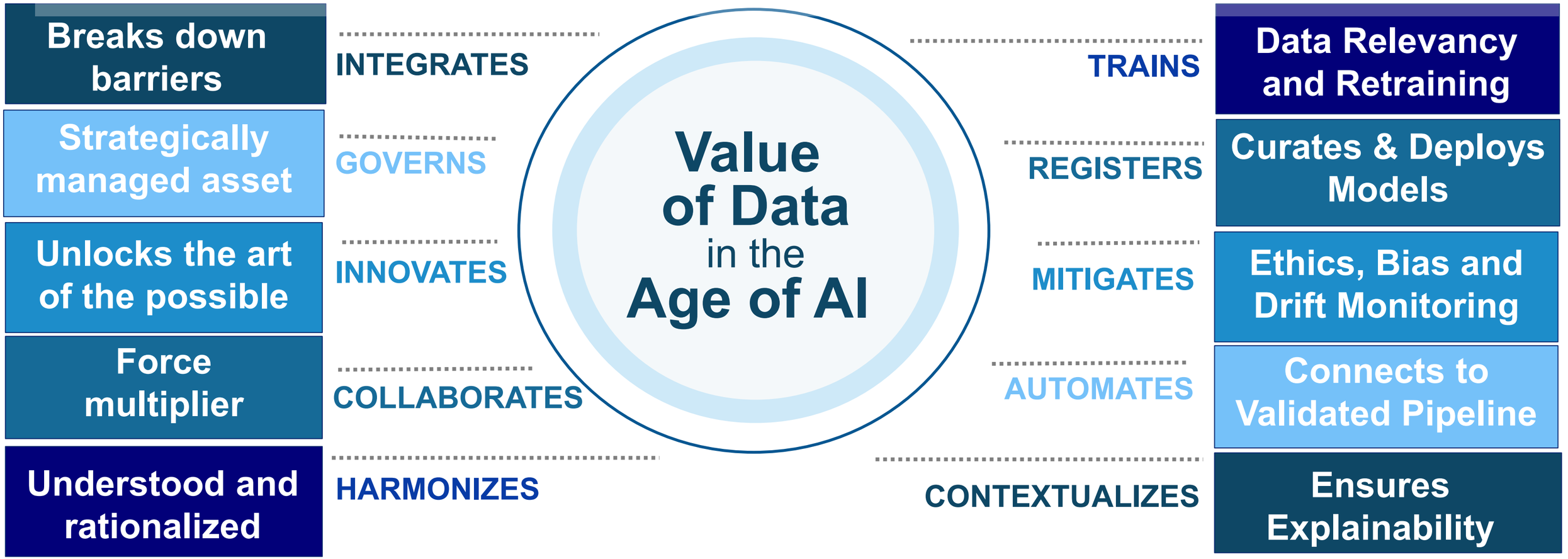
- Potential Industry's demand for datasets (potential monetization)

For data access and security, **establish a "need to know" data policy** for access controls and apply **tiered access controls – this is critical for the imminent wave of AI Agents**

To enable Infrastructure Governance, adopt compute-to-data plans to **minimize network bottlenecks**. **Use tiered storage and edge processing** to manage large datasets.

AI Ready Data: No Longer Optional - It is a Mandate

AI cannot be achieved without a multi-dimensional approach to AI Data Readiness!



Data needs the same dedicated focus that technology has enjoyed, if we truly want it to achieve its full potential. Now is the time to embrace the next generation in the data journey that must be focused on how to best manage our abundance of data and put it to work for the business.

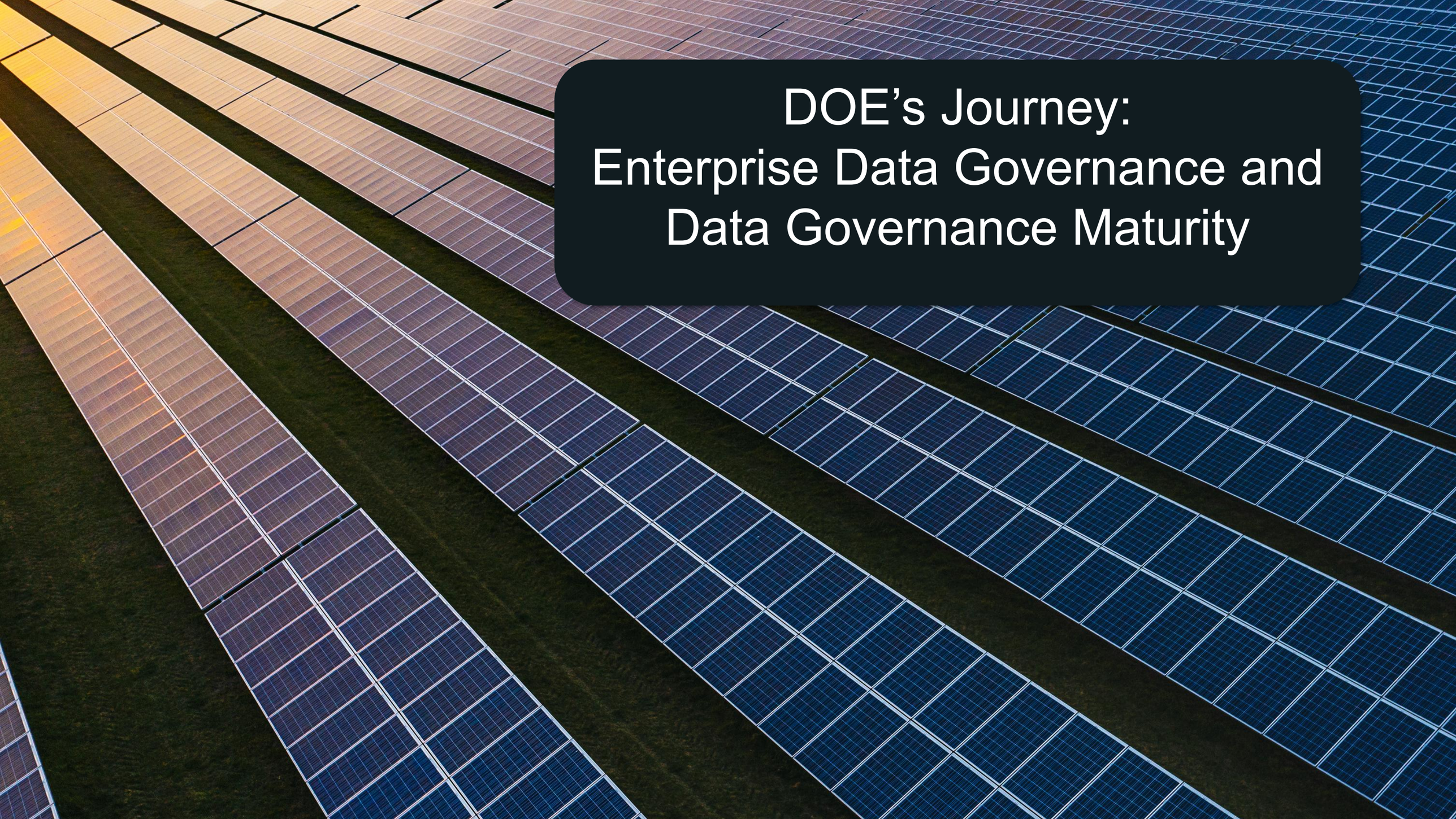
-- Cathryne Clay Doss, first appointed CDO at Capital One

Thank You!

Contact Information

Rob King
Your Friendly Neighborhood CDO
3x CDO, Prior Vice Chair of Federal CDO Council
Data and AI Enablement Expert
Organizational Transformation Agent

C: 571-331-0676 | rob@opspark.ai | LinkedIn | http://opspark.ai/



DOE's Journey: Enterprise Data Governance and Data Governance Maturity

Key Enablers to Mission Success

Clear **strategy** and **executive sponsorship**

Strong **Data & AI Governance**

Modern **infrastructure**

Interoperability & **standards**

Share first with controls

Capacity building – data scientists, analytics, stewards

Demonstrating **quick wins** and **iterative value**

Security Controls & **Compliance**

Technology is NOT a silver bullet

Dept. of Energy - Enterprise Data Strategy (EDS)

	GOALS	OBJECTIVES			
1	**Establish & scale federated data governance & stewardship**	Common **Data Governance Structures**	Standard **Data Management & Quality** Requirements	Department-wide **Security Controls**	Enterprise & Domain-specific **Stewardship**
2	**Build & maintain data architecture & infrastructure platform foundations**	Shared **Data Reference Architectures, Services & Solutions**	**API-First** Approach	Processes for Onboarding & Deploying **Emerging Capabilities**	**Identity & Access Management** Solutions
3	**Strengthen capabilities that improve discoverability, usability, quality & trustworthiness of our data**	Enterprise **Data Catalog & Inventory**	**Metadata Standards**		**Data Sharing** Best Practices
4	**Foster & sustain our Next Generation data & analytics workforce**	Development **Pathways to Mature** Workforce	Standard **Practitioner Roles & Responsibilities**	Department-wide **Communities of Practice**	Institutional **Knowledge Management**
5	**Ensure the trusted & scalable use of data for AI**	Practices, Integration Points, & Tools for Discoverability for **AI Governance**	**Streamlined Data Management & Governance** Practices		**Transparent Practices** in End-to-End Data & AI Lifecycles

DOE's FY25-28 publicly available Enterprise Data Strategy can be found publicly here on Energy.gov.

Roadmap to DOE's EDS: Oct. 2023 – Jan. 2025

52 Participating DEs, Programs, Labs, Sites, Plants & PMAs*

BPA ◆ ANL ◆ ASCR ◆ CET ◆ CF-1 ◆ CF-10 ◆ CF-40 ◆ CR ◆ EA ◆ EIA ◆ EJE ◆ EM ◆ FECM ◆ GC ◆ HC ◆ IM-1 ◆ IM-10 ◆ IM-20 ◆ IM-30 ◆ IM-40 ◆ IM-50 ◆ IM-60 ◆ IN ◆ INL ◆ **KCNSC** ◆ **LANL** ◆ LBL ◆ **LLNL** ◆ LM ◆ MA ◆ MESC ◆ **NA-144** ◆ **NA-193** ◆ **NA-20** ◆ **NA-IM** ◆ **NA-90** ◆ NETL ◆ **NNSS** ◆ NREL ◆ OCED ◆ OE ◆ ORNL ◆ OSTI ◆ PA ◆ PNNL ◆ **Project Alexandria** ◆ **PRIDE** ◆ SC ◆ **Sandia** ◆ SLAC ◆ SRNL ◆ WAPA

Strategy Interviews
12 formal interviews, 6 informal

Self-Assessed Capture Forms
~80 forms distributed & 18 submitted

Systems Research
9 system-level discussions or detailed research

Discovery Synthesis & Validation
1 Month review period with DGB & OCIO

Compliance Drivers
~27 statutes & other related legislation reviewed

Visioning Workshop
~40 data practitioners across 30 DEs

Market Research
13 Federal Agency data strategies reviewed

Draft Goals & Objectives Office Hours
~60 representatives across 25+ DEs

Leadership Review of EDS
DGB, Cyber & IT/OT, & S2 Approvals
~60 representatives across 50+ DEs

DOE EDS
Formalize in Jan. '25

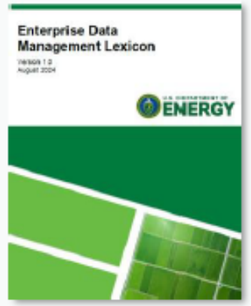
Key Milestones:

- Established DGB in Oct. '23
- EDS discovery process started in Dec. 2023
- DGB Approved EDS in Aug. '24

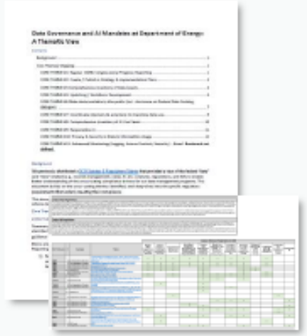
Multi-year Implementation Plan ***Developed Collectively***

The Journey is more Important that the Destination

Products to Accelerate Data Literacy & Adoption



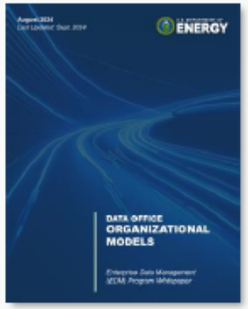
Enterprise Data Management Lexicon



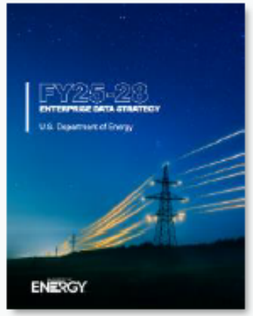
Compliance Statutes & Regulations Documents

Responses to IG Memos, Audits, & OMB Requests

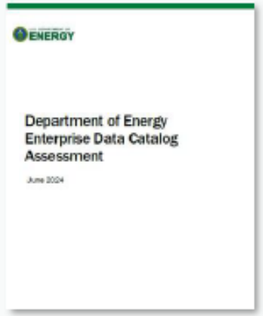
Knowledge Sharing & Collaboration Platforms



D&A Resourcing Whitepaper

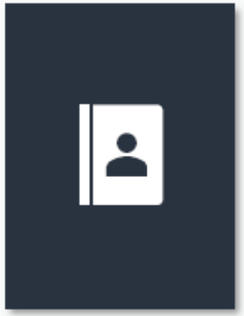


FY25-28 Enterprise Data Strategy



Data Catalog AoA & Roadmap

Data Stewardship Playbook



Position Description
Inventory

Through DGB-sponsorship and direction, your data community should partner to establish tailorable products with agile processes.

Disparate Missions = Different DG Needs

Primary missions in DOE:

- Applied science and research (e.g., NREL, ORNL, ANL)
- Nuclear weapons design and production (e.g., LANL, LLNL, KCNSC, Y-12)
- (Note: There are other key DOE missions, such Environmental Management & Clean-up)

DG practices should be generally similar irrespective of mission - stewardship, metadata, lifecycle, infrastructure governance - but the emphasis shifts:

- Research labs: openness, collaboration, reproducibility, external impacts and partners.
- NNSA labs/sites: security, traceability, validation, mission assurance, design and manufacturing.

Common DG drivers include:

- **Data elevated** to the same priority level as publications, products, and/or S&R research.
- **Metadata standards and FAIR principles** drive findability, reuse, and reproducibility.
- **Embedding data stewards** within domains to bridge and integrate SME expertise and governance.
- Compute-to-data plans to **manage massive HPC outputs and reducing network bottlenecks**.
- Domains experts and **stewards are empowered to validate** data pipelines and AI/ML results for accurate and responsible outcomes.
- ROI measurements and demonstration **to quantify value** in savings in time, resources, accuracy, and mission capabilities delivered from enhanced data governance.

How Data & AI Governance should be Approached

Integrated Data / AI Governance

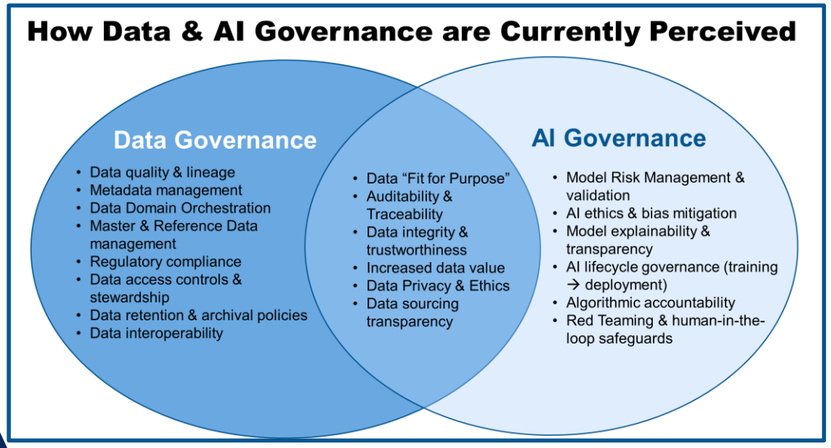
AI Governance

- Model Risk Management & validation
- AI ethics & bias mitigation
- Model explainability & transparency
- AI lifecycle governance (training → deployment)
- Algorithmic accountability
- Red Teaming & human-in-the-loop safeguards

- Data "Fit for Purpose"
- Auditability & Traceability
- Data integrity & trustworthiness
- Increased data value
- Data Privacy & Ethics
- Data sourcing transparency

Data Governance

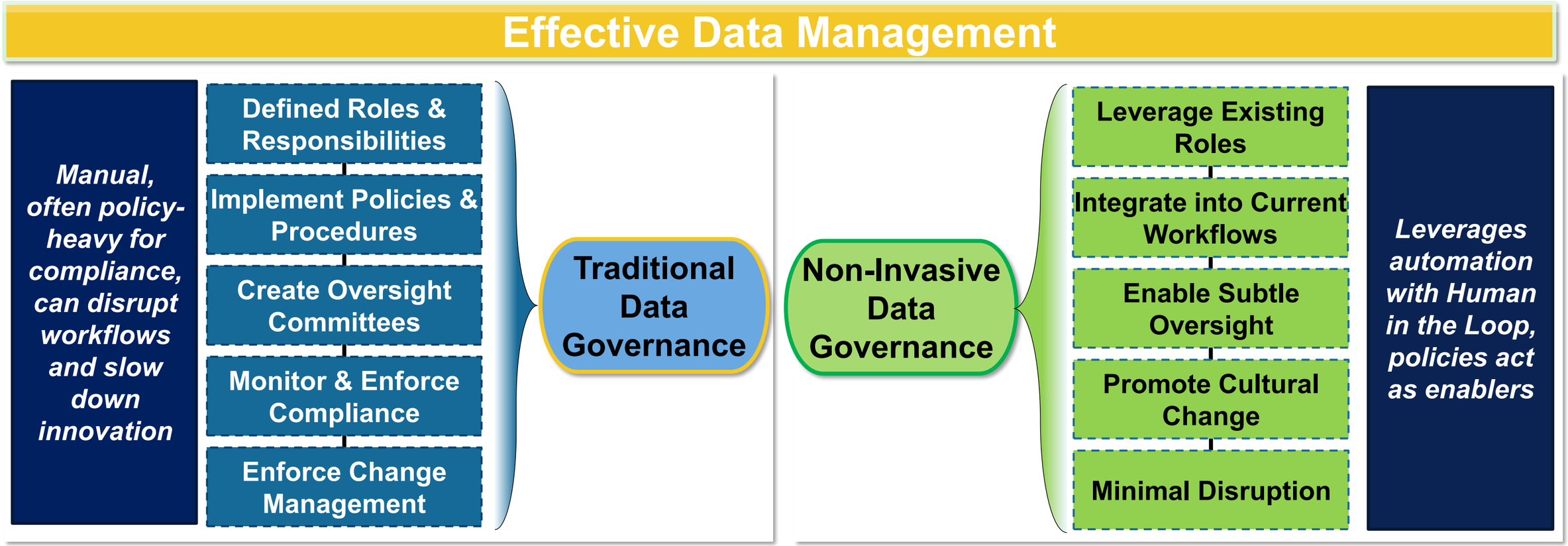
- Data quality & lineage
- Metadata management
- Data Domain Orchestration
- Master & Reference Data management
- Regulatory compliance
- Data access controls & stewardship
- Data retention & archival policies
- Data interoperability



CDOs and CAIOs must be tightly partnered and have integrated and cohesive governance that has common priorities and use cases.

Defining Governance Frameworks

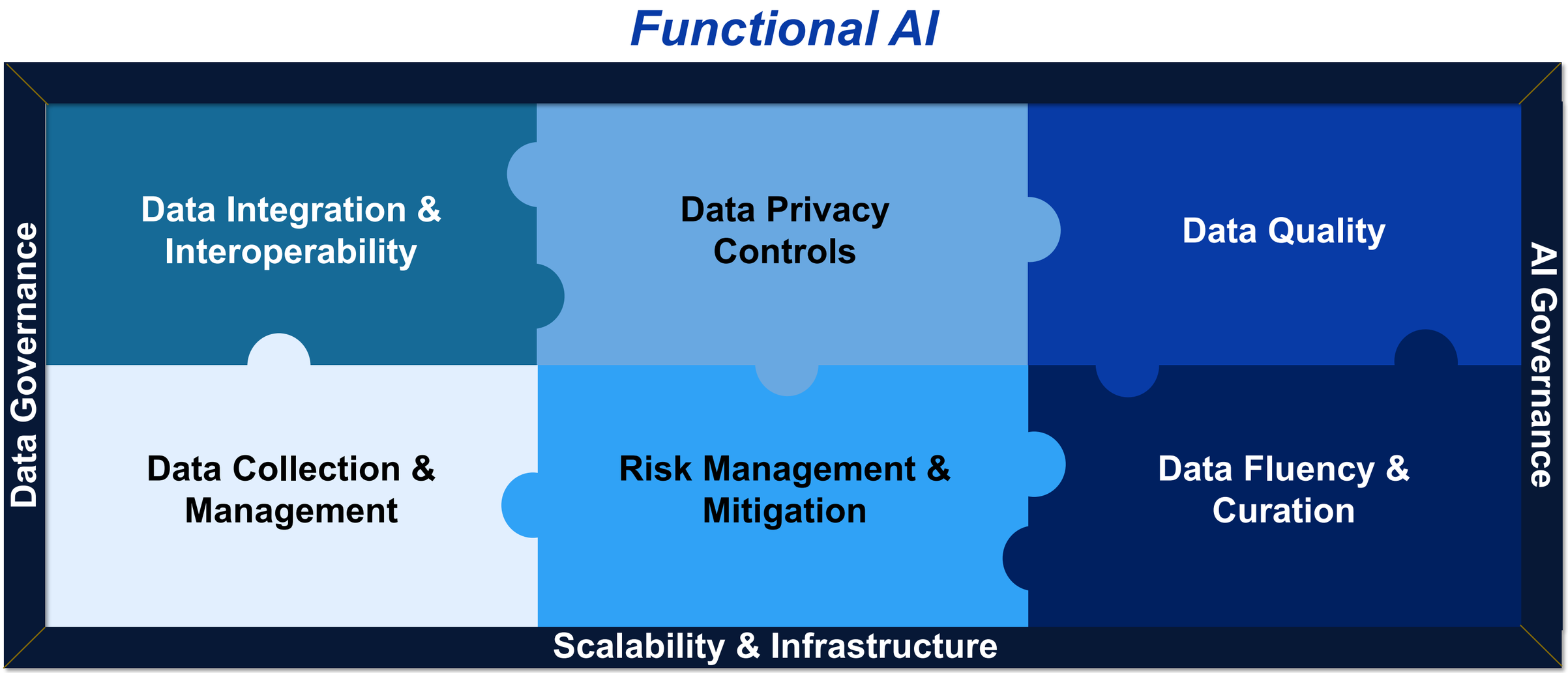
Traditional data governance & non-invasive data governance models share common goals but differ in implementation. Non-invasive data governance offers a more flexible, federated framework for governance enabled through automation with human-in-the-loop. The traditional model is no longer viable in the era of AI.



Ensuring data is consistently Findable, Accessible, Interoperable, and Reusable (FAIR), while aligned with mission areas, fostering acceleration against organizational priorities.

Data Building Blocks for Functional AI

Building trusted & scalable AI requires having underlying data foundations in place. Any piece missing from the foundations introduces risks and liability – including financial, privacy, & more.



The New Mandate

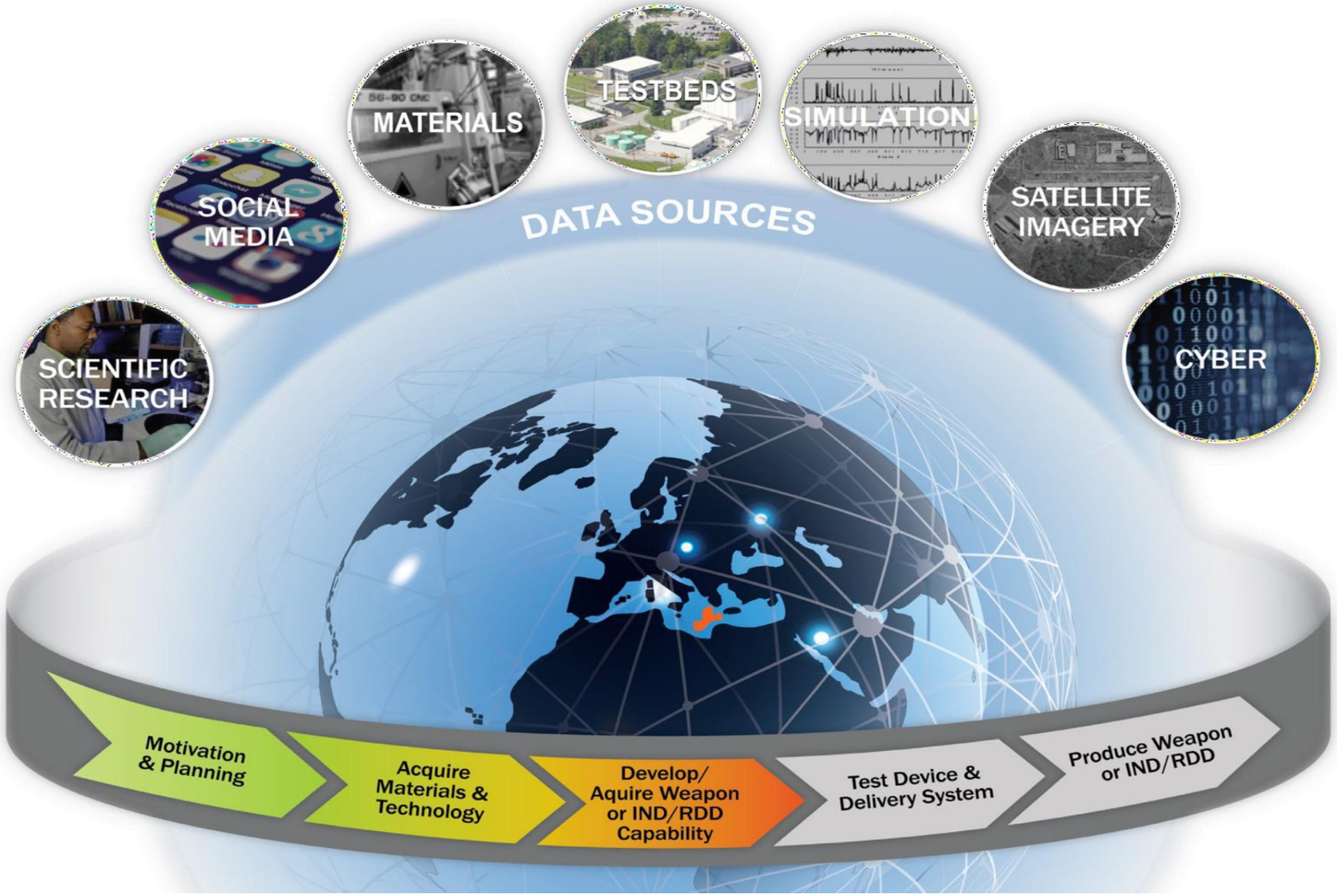
Old operating model towards data management and governance is no longer viable

- **AI** introduces **new dynamics:**
  - Machines making decisions
  - Agents executing processes
  - Approximating human intention
  - **Data = both fuel and liability**

- AI **enablement, ethics,** and **enterprise risk management** are imperative.

Data Governance (DG) and Data Stewardship (DS) must rapidly evolve to meet this new mandate

Harnessing Data Enablement: Nuclear Security Enterprise



Note: This specific model applies to the National Nuclear Security Administration's Non-nuclear Proliferation function

Governance:
- policy,
- access,
- classification,
- traceability,
- standardization.

Management:
- infrastructure,
- pipelines,
- interoperability,
- lifecycle policies,
- repositories.

Products:
- data standards,
- ontologies,
- integration flows,
- workflows

Target:
AI-ready data that is discoverable, interoperable, and secure.

Harnessing Data Science for Nuclear Security Enterprise



By aligning data science with strong DG practices, DOE's nuclear-focused components are striving towards achieving:

Enhanced security
decision-making through real-time data-driven insights

The ability to monitor and detect
foreign nuclear weapon development activities

Improved risk characterization
to better support nuclear security

Leveraging strong governance practices with AI and advanced analytics enhances nuclear security decision-making