

POWERING THE INTELLIGENT UTILITY WITH AN ENTERPRISE ASSET DATA PLATFORM

Abstract

Utilities are increasingly challenged by aging infrastructure, renewable energy integration, climate resilience requirements, and growing data volumes from connected assets. This point of view outlines how an Enterprise Asset Data Platform can serve as the digital foundation for managing, governing, and deriving value from asset data across the utility landscape. It presents a strategic capability roadmap, target-state architecture, guiding principles, and digital canvas that enable the evolution from traditional asset management to intelligent, data-driven operations. By combining real-time data integration, advanced analytics, digital twins, AI, and robust governance, the platform enables predictive decision-making and enterprise-wide asset intelligence. The result is a scalable, secure, and future-ready ecosystem that improves asset reliability, operational efficiency, workforce productivity, regulatory compliance, and long-term business value.

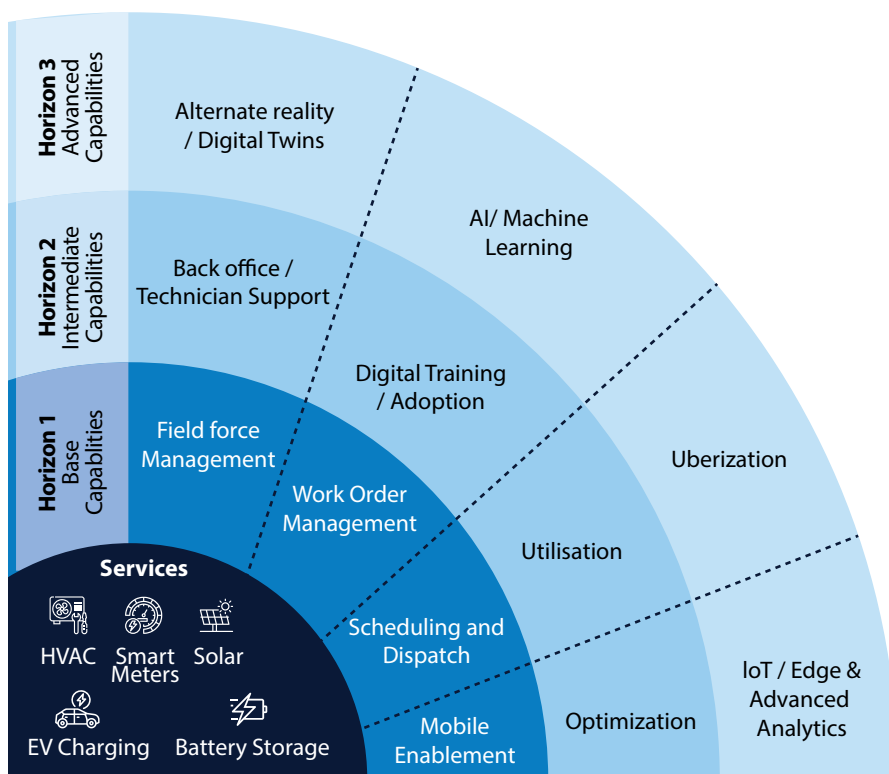
Overview

Utilities companies—whether in electricity, water, gas, or waste management—rely heavily on physical infrastructure and assets. An asset data platform acts as the centralized digital system to manage, integrate, and analyse data related to physical infrastructure assets of the Utilities such as transformers, substations, pipelines, meters, and grid components. This enables utilities to gain real-time visibility into asset location, condition, performance, and lifecycle status. As utilities increasingly adopt digital technologies and face challenges such as aging infrastructure, climate resilience, and renewable integration, asset data platforms become foundational to modern utility operations. They enable automation, support digital twin capabilities, and enhance customer service by improving reliability and responsiveness.

Need for an Asset Data Platform

A modern Utility Asset Management Platform can be developed through a phased capability roadmap that evolves from foundational asset operations to advanced, data-driven asset intelligence. The journey begins with core capabilities such as Asset Registry and Lifecycle Management, Work and Maintenance Management, Scheduling & Dispatch, Mobile Workforce

Enablement, and Asset Performance Monitoring, creating a single source of truth for managing utility assets across their lifecycle. Organizations can then strengthen operational efficiency through integrated field and back-office support, digital workflows, workforce enablement, and standardized maintenance processes, improving coordination, reliability, and scalability across asset operations.



Key Performance Indicators:

- Field force Install capacity
- Field force efficiency
- Service reliability
- Demand fulfilment
- Learning and cross skilling
- Health and safety
- Supply chain efficiency
- Asset performance

Figure 1: Capabilities for an efficient Field Service Utility Organization

As the asset management platform matures, advanced capabilities such as Digital Twins, predictive maintenance, condition-based monitoring, and IoT-enabled asset intelligence enable utilities to transition from reactive to proactive asset management. Leveraging real-time telemetry, advanced analytics, and AI-driven insights, the platform continuously optimizes asset utilization, maintenance planning, network performance, and investment decisions. Applicable across domains such as electricity

distribution, water networks, smart metering, renewable energy assets, EV charging infrastructure, and battery storage systems, the platform drives measurable business outcomes including improved asset reliability and availability, reduced maintenance costs, enhanced workforce productivity, increased safety and compliance, optimized capital expenditure, improved service levels, and extended asset life, creating a resilient and future-ready utility asset ecosystem.

Technology View and Target Architecture

The high-level architecture has been formed by following seven guiding principles established by considering the Utilities’ typical current state.

These principles, listed in Figure 2 below, will enable the Utilities to advance towards and future state data architecture that is well aligned with their business objectives.

Guiding Principles	Technology Enablers	Business Objectives
Scalable Architecture. Deploy a scalable architecture which is easy-to-adopt for next-gen technologies	• Scalable cloud-based asset data environment • Enhanced Integration with existing systems • Distributed platform for Max Data Availability • AI-Enabled Technology • Cross-cloud interoperability • Comprehensive Data Protect	✓ Meet regulatory demands ✓ Flexibility to incorporate new technologies ✓ Smarter telemetry enabled business ✓ Reduced Technical debt ✓ Operational excellence ✓ Compliance with Industry standards
Integrated Data Foundation. Establish a standardize integrated data platform to implement fast-track ingest-to-consume Realtime/Near Realtime, Batch or IOT		
Institutionalize Data Governance. Implement a strong Data Governance model to govern data across the Enterprise and increase Information confidence		
Consumption driven Value. Propose consumption driven approach to generate insights into peripheral applications in terms of booking jobs, sending leakage data.		
Enable Exploration. Provide means to explore-and-exploit data to gain analytical insights and drive better business strategic decisions		
Robust Operating Model. To deliver incrementally and faster time-to-market solutions		
Security and Regulatory Compliance. Enable Security at defined access levels while adhering to regulatory & compliance specifications		

Figure 2: Seven Guiding Principles



These overarching principles drive the definition of the detailed functional capabilities for the future data architecture, listed in Table 1.

The Utilities' TARGET STATE CAPABILITIES	Scalable Architecture	• Able to grow in capacity and functionality to meet the Utilities' current and future business needs. • Cost effective data storage and computing power • Platform consistency - Availability & Performant • Easy to Adopt architecture for Cloud • Best of breed technologies to provide agility, speed, quality & TCO reduction
	Integrated Data Foundation	• Consolidated data platform catering to different data formats/latencies/volumes • Data logically segregated and modelled into zones to optimise consumption patterns • Complement existing data landscape while streamlining through the removal of redundant data. • Promote faster time to market from data ingestion to insight generation
	Institutionalize Data Governance	• Promote Data ownership to treat Data-as-an-Asset • Enhance processes for better Metadata Management • Operationalize and enforce policies and standards across Enterprise Data Assets • Build a stronger Technical Data Quality and Data Controls Framework for continuous and proactive data improvement
	Consumption driven value	• Single unified access layer to support multiple data consumption patterns – search, exploration, visualization, etc. • Capabilities to federate across new age and traditional data environments
	Enabled Exploration	• Provide data exploration and discovery capabilities to enable business users to perform hypothesis validation and finalization before analytical solutions/ products can be productionized
	Robust Operating Model	• End-to-end operating model from demand intake to outcome delivery • Integrated operating model across Data Management & Business • Revisit roles and responsibilities to align with the operating model • Strong governance leadership that is focused on business value
	Security & Regulatory Compliance	• Access to data of various levels of sensitivity should be controlled through a centralized mechanism in architecture. • Consistent with policies enforced by rest of the organization • Abide by Enterprise Security & Encryption standards • Adhere to Severn Trent's regulatory & compliance specifications

Table 1: Target State Capabilities

As a next step, a digital canvas which incorporates the components required to enable the functional capabilities listed above for the data platform.



Digital Canvas

The digital canvas represents a comprehensive enterprise data and analytics architecture that enables the seamless flow of data from source to business value. Diverse data sources such as smart meters, water and waste loggers, OT systems, and customer applications are ingested through batch, CDC, API/ event-based, and real-time streaming mechanisms into a unified data platform. The platform provides scalable storage, data integration, transformation, and publication capabilities through curated, consumption-ready, analytical, and experimental

data zones. Business users can access trusted data through semantic layers, data marketplaces, self-service analytics, and API-based services, enabling reporting, visualization, advanced analytics, AI/ML model development, and downstream business applications. Underpinning the entire ecosystem is a strong foundation of security, data governance, metadata and lineage management, data quality, lifecycle management, DataOps/ MLOps, and operational monitoring, ensuring that data is secure, governed, reliable, and capable of delivering business insights and innovation at scale.

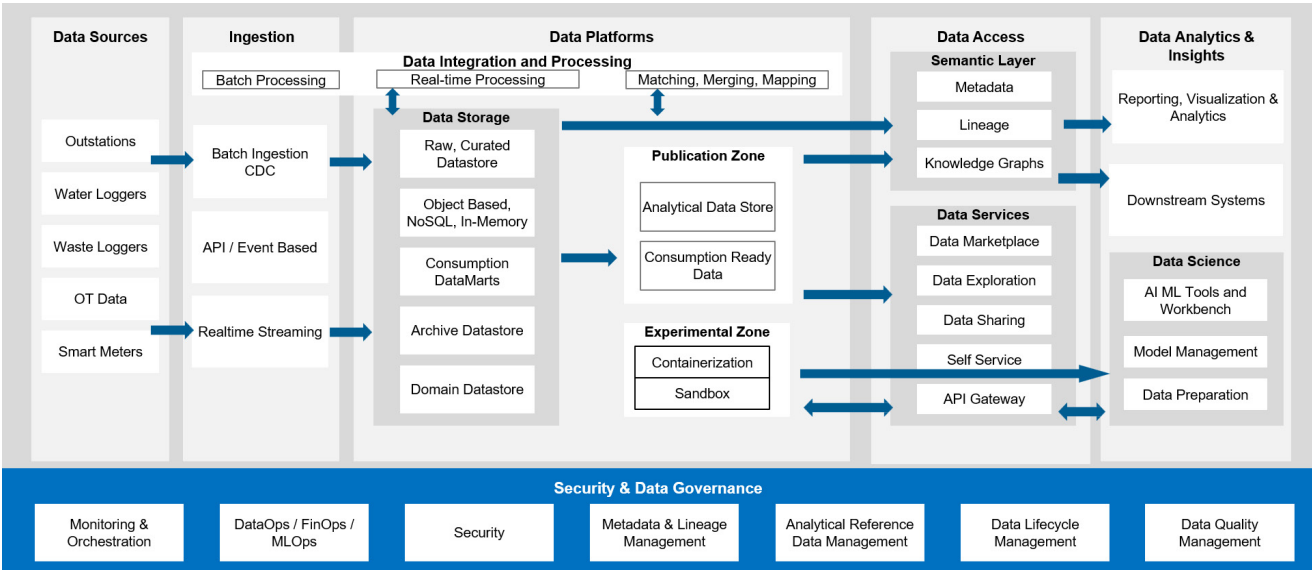


Figure 3: Architecture Defining Capabilities

Technical Capabilities

To activate the enabling components of the digital canvas, specific technical capabilities, need to be implemented. In Figure 4 below, the dark blue boxes refer to digital canvas components while the light blue boxes refer to the required technical capabilities.

Data Ingestion	Data Storage	Analytics & Insights	Data Access & Service	Security Monitoring	Data Governance
Structured Data Handling	Scalable Data Storage	Discovery	Self Service BI	Auto Scalability	Data Quality Management
Batch and Micro-Batch Data	Data Archival Management	Self service Analytics	User Onboarding	Workload Management	Metadata Management
Data Streaming (ex. video)	Metadata Management	Operationalization of Models	BI Catalog	Backup & Monitoring	Data Cataloguing
Unstructured Data Handling	Data Scrambling and Masking	Analytics Workbench - Predictive, ML & AI	Information Marketplace (Portal)	High Availability& Disaster Recovery	Data Security & privacy
Real Time Data Integration	Metadata Interface with External Data		Elastic Search	Multi Tenant Processing	Audit Control
On Premise & Cloud Integration	Operational Metadata		Decision Assistant	Elasticity	Data Masking
Data Profiling & Cleansing	Data Dictionary		Single Sign On	Failure Notification	Harmonization
IOT	Data Virtualization		Business Glossary	Monitoring Cloud Opex cost	Data Wrangling
Failure Notification	DWH maintenance			Monitoring Alerts/ notification	Data Profiling & Cleansing
	Data purge and destruction				Aggregation Framework

Figure 4: Technical Capabilities of the Data Canvas Core Components



The target-state data and analytics platform enable end-to-end data-driven decision making through integrated capabilities spanning data ingestion, storage, analytics, access, security, and governance. It supports diverse data sources and consumption patterns, provides scalable and cloud-ready data management,

empowers users with self-service analytics and AI-driven insights, and ensures trusted data through robust security, quality, metadata, and governance controls. Together, these capabilities create a scalable, secure, and business-focused data ecosystem that accelerates insight generation and value realization across the utility enterprise.



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