



7

Things You May Not Know About Element Unify

eBook

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Introduction

Industrial Transformation* (IX) is the proactive and coordinated approach to using digital technologies to create step change improvements in industrial operations to achieve business outcomes.

Pressure is increasing on IX leaders to pivot from proof-of-concepts to step change initiatives that deliver tangible value.

IX is driving adoption of a new, cloud-based stack integrating traditional automation, ERP, PLM, IIoT, and other systems to provide platform services for modern analytics like AI. A common data layer across IT, OT and ET data is the fundamental building block of the new IX stack to unlock data so people can create new sources of value.

This eBook covers 7 topics that are important to creating a common operations data layer, and why, now more than ever, users are adopting Element Unify as they make the IX pivot to value.

**LNS Research: [The IX Journey](#)*

Operations Data is Critical to Achieving Business Outcomes



Connected Worker



Resilient Supply Chain



Cost Optimization



Quality Management



Sustainability & Decarbonization



Agile, Digital Operations

1. Unify is an Open & Flexible Industrial DataOps Solution

Data Hub architecture yields maximum flexibility to meet Industrial DataOps requirements

The goal of Industrial Data Operations is to unify all internal and external operations data sources into enterprise-wide information.

Users want to access the operations information to create analytics and applications to create value for their organization. They'd like to avoid writing more code to utilize the information.

A Data Hub is a core enabler for Industrial Data Operations. Data Hubs de-silo data and tie it together across operations systems to provide users with a simpler, plug and play access.

Element Unify is an open, componentized and secure approach to designing the Data Hub. Unify's architectural design provides optionality and choice for users. This approach frees users from vendor, database or data model lock-in.

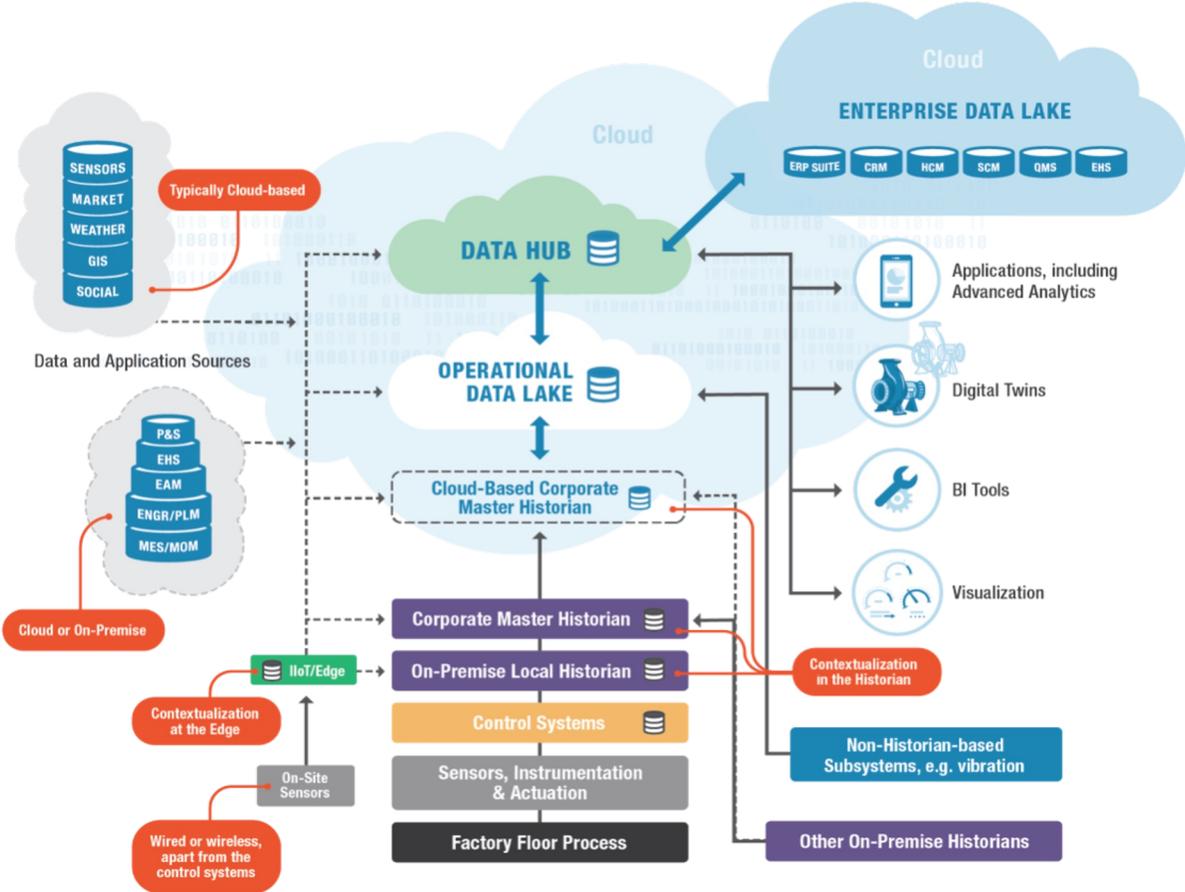
Unify provides core data hub functions for data processing, conditioning, synchronization, contextualization, persistence, access and governance.

Unify abstracts away operations data complexity using no-code data pipelines, a configurable template system and elastic graph technology to make it easier and faster for data consumers to build analytics and applications.

The architecture reduces code-first projects, makes structured data reusable for consumers and allows templates and pipelines to be recycled across similar projects, plants and processes.

Unify is cloud-native and runs on both AWS and Azure and is ISO 270001 certified.

Data Hub at the Center of Industrial DataOps



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2. Unify Enables Data Interoperability from Source to Consumption

No-code connectors for faster, more flexible deployments

Data engineers spend inordinate amounts of time writing one-off integration code to connect data sources to data-consuming analytics and applications.

This code-first approach increases integration debt and consumes increasing portions of IT budgets. It's estimated that maintenance costs can exceed build costs by 3-9X. This inefficiency also causes analytics to fall out of sync with ever-changing operations data.

Application vendors exacerbate this problem by bringing data connectivity and contextualization tools that only work within their product. Data lakes and warehouses also require writing and maintaining more one-off code to connect in source data.

Data Sources

- Time Series
- Enterprise Asset Management
- Engineering Design
- P&ID Diagrams
- Geospatial
- Edge Contextualization



Data Consumption

- Data Lake
- Data Warehouse
- Process Historian
- RDBMS/NoSQL
- Graph Database
- Cloud Storage
- BI & Analytics
- ML/AI
- Digital Twin
- Applications
- IIoT Platforms
- Governance

Unify's pre-built, no-code connectors automate bi-directional connectivity and data flows between data consumers and source systems. This reduces the time and cost of writing low-value code, freeing developers to focus on writing more valuable analytical and ML code.

Unify's growing library of connectors support OT systems like PI, IP.21 and consuming systems like AWS IoT TwinMaker, AWS Sitewise, Azure Digital

Twins, and storage systems including Amazon Redshift and Azure Data Lake.

Unify partners with edge contextualization leaders like Highbyte to bring richer solutions to users.

Unify's Connector Framework also enables users to easily build custom connectors.

3. Unify Structures Data for Easy User Self-Assembly

Instead of having to write code and queries to connect data together, wouldn't it be nice to easily assemble the subset of structured data representing plant operations for a specific use case like predictive maintenance, carbon accounting or root cause analysis?

Self-serve data must be structured to provide meaning that is independent of the data's context. For example, users analyzing pump failure want to know that for any pump, at any plant, sensor data will be available to analyze shaft vibration, external manifold vibration, voltage and amperage and

Templates build extensible relationships making use case configuration fast and easy

that other attributes like functional location, OEM specs and work orders are available in the structured data. Users want data without having to know anything about the context of things like historian tags that were configured years ago.

Unify's Templates structure data with reusable semantic models, standardizing the approach to representing anything—equipment, facilities, processes, people—as a model.

Templates store common attributes and global identifiers allowing data from multiple data sources

to be represented in a common structure for data self-assembly, abstracting away underlying complexity, allowing builders to simply address the data model for any given data entity.

Unify Templates are based on the Unify Type System which ties together relationships across metadata rather than the underlying raw data or storage systems. This makes every data model fully extensible to support new data sources, applications and analytics. Inheritance and composition relates templates to one another to produce greater meaning.

For example, a pump motor template can be referenced by a pump template, thus composing a pump and its motor into a well-defined compound structure.

Unify provides over 800 templates out of the box. Most users import or modify templates to align with organizational and/or industry standards like ISA-95, ISO 14224, IEC-CIM, CFIHOS, DEXPI and others.

The screenshot displays the Element Unify interface. On the left is a navigation sidebar with icons for Template Library, Dataset Catalog, Connectors, Asset Pipelines, Graphs, Model Coverage, Asset Explorer, Sensor Diagnostics, and Resources. The main area shows 'Asset Templates' with a grid of cards for 'Pump (Element)', 'Pump Base Demo', 'Pump KPI 2', 'Pump KPI1', 'Reciprocating Compressor (Element)', and 'Reciprocating Pump'. Each card lists 'Total Attributes', 'Important', and 'Last Updated By' information.

Overlaid on the right is a detailed view of the 'Pump (Element)' template. It includes a 'Description' field, a 'Standards Body' field, and a table of 41 attributes. The table has columns for 'Attribute Name', 'Attribute Type', 'Type', 'Data Type', and 'UoM'. The visible portion of the table includes:

	Attribute Name	Attribute Type	Type	Data Type	UoM
★	Age of Asset	Static	Double	Double	
★	Ambient Temp...	Continuous Va...	Double	Double	degC
★	Axial Bearing ...	Continuous Va...	Double	Double	Hz
				Double	degC
				Double	degC
				Double	Hz
				String	
				Double	A
				Double	psi
				Double	m3/s
				Double	psi
				Double	
				Double	
				Double	degC
				Double	
				Double	
				String	
				Double	degC
				Double	k/W
				Double	k/W
				String	
				Double	Hz
				String	
				Double	
				Double	
				Double	
				Int32	
				Double	m3/s
				Double	psi
				Double	psi
				Double	psi
				Double	psi
★	Suction Pressu...	Continuous Va...	Double	Double	
★	Suction Pressu...	Continuous Va...	Double	Double	psi
★	Suction Tempe...	Continuous Va...	Double	Double	degC
★	Suction Tempe...	Static	Double	Double	degC
★	Suction Tempe...	Static	Double	Double	degC
★	Voltage	Continuous Va...	Double	Double	V
★	Work Orders	Continuous Va...	Double	Double	

4. Unify's No-Code Data Pipelines are Purpose-Built for Industrial DataOps

Automates operations data modeling to produce structured data, fast

Investments in writing software code should focus on producing the highest value code possible, namely the business logic at the heart of applications and AI/ML algorithms. Writing code to transform data or deliver infrastructure is of much lower value and should be automated through reusable, no-code data pipelines.

No-code systems provide general functionality through graphical user interfaces and configuration to allow programmers and citizen developers to build apps without having to write and compile code.

For industrial organizations, a no-code approach allows subject matter experts critical to operations to collaborate and contribute to analytics projects with little or no need for coding skills.

Unify's no-code data pipelines integrate, contextualize and structure IT/OT data to eliminate writing one-off, custom code. Unify automates data contextualization

and structuring with over 23 transformations and hundreds of functions purpose-built for OT data to map tags, templates and attributes. Unify supports advanced joins, functions and fuzzy logic so subject matter experts can easily manage OT data complexity that cannot be addressed with techniques like AutoML.

Building no-code data pipelines in Unify integrates and automates the build-test-debug cycle so users don't suffer code-first context-switching between writing code and testing the outcome of the code.

Unify pipelines transform data into relationships stored in the Unify Graph to abstract away the complexity of operations data entities by upwards of 90%, making data easy to assemble for analytics.

Uniquely, Unify's no/low code pipelines both create the model derived from tag data and contextualize streaming data from sensors using the model.

The screenshot displays the Element Unify interface. On the left is a sidebar with navigation options: Template Library, Dataset Catalog, Connectors, Asset Pipelines, Graphs, Model Coverage, Asset Explorer, Sensor Diagnostics, and Resources. The main area shows a data pipeline graph with nodes for 'New Asset ID', 'New Attributes', 'Select Columns', 'Union', 'Select Columns', 'New Attributes', and 'Join the s...'. Below the graph is a table with 7 columns and 51 rows. Above the graph is an 'Advanced Join' configuration window. This window shows a table with 16 columns and 47 rows, and a dropdown menu for the 'Method' set to 'contains'. The table data is as follows:

name	description	engunits	pointsource	pointtype	srptid	totalcode	pointid
460C-51SPWR.pv	C8B14	KW	LKCH	Float32	0	0	4051
460C-21SPWR.pv	VBAC	KW	VNCE	Float32	0	0	3524
460C-41SPin.pv	VBAC	psi	VNCE	Float32	0	0	3875
460C-51SPi.pv	C8B14	m3/min	LKCH	Float32	0	0	4047
460C-715Current.pv	C8B14	a	LKCH	Float32	0	0	4414

5. Unify Creates Semantic Data Model for Operations

Superior graph technology creates “operations chart of accounts” to reduce data complexity

Industrial operations have no “chart of accounts” like the one tying together assets, liabilities, equity, revenue and expenses in an accounting system.

In accounting, the chart of accounts is a semantic data model across core domains that facilitates booking every transaction to two separate accounts (double entry bookkeeping), enabling error detection and prevention, adherence to standards like GAAP and is essential to operate the business and integrate to many other systems.

Industrial app builders don’t have an equivalent chart of accounts that unites all operations data together into well-known domains that are linked together through a semantic data model.

Instead, they face great complexity trying to work with various data types, data interconnections, and the processes managing the data and are forced to write code when trying to create a singular view of operations and equipment.

Unify builds a semantic model tying together assets, processes and associated engineering, time series, maintenance, quality data sources. This creates an “operations chart of accounts” to guide connectivity between systems and data views from the COO to front line worker.

Unify Graph is built on a powerful, in-memory graph database that stores the relationships and template associations built with Unify’s no-code pipelines for flexible, rapid retrieval. Users easily configure any multi-system data variables into the data model required for a target use cases.

Users connect the Unify Graph model with raw time series data streaming into Unify from the PI System and other data sources and guide the data where it needs to go for consumption. This speeds up how quickly data is available to use.

Unify is the only many-to-many semantic graph supporting an open systems approach available today for Industrial DataOps.

Operations Data Sources

Engineering

- Function
- Design

Transactional

- Work Orders
- Quality/Lab

Time Series

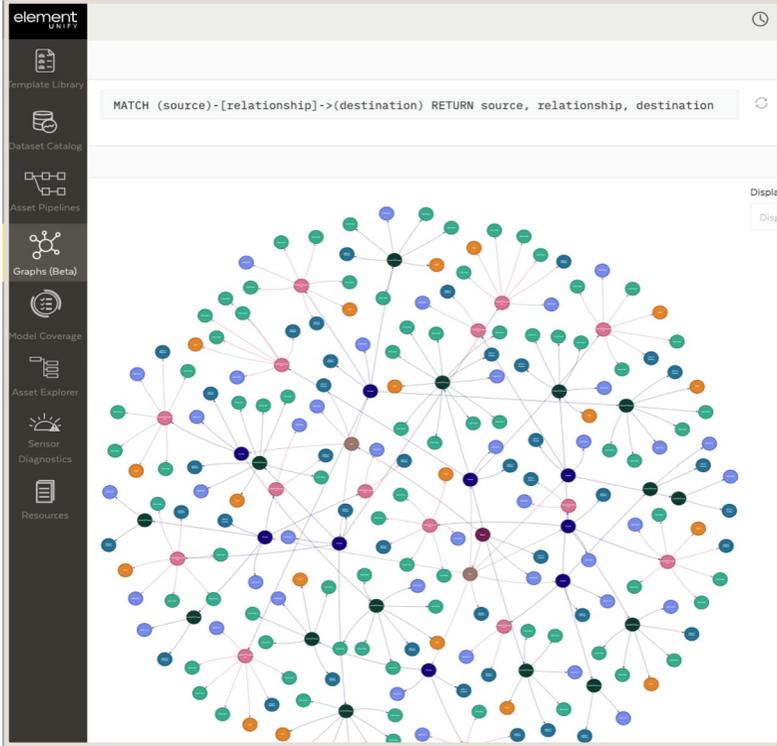
- Streaming
- UoMs

Visual/Spatial

- P&ID
- Point Cloud

Derived

- Efficiency
- Anomalies



Unify Graph stores a semantic model containing relationships between assets and their associated engineering, process, and transactional data

6. Unify Addresses OT-Specific Data Challenges

Supports OT-native challenges like integrating engineering, maintenance and operations data

Operations professionals have long struggled to connect, model and consume operations data owing to the challenges of managing different data formats, shapes, inconsistent data labeling, paper and pdf-based data and disparate storage systems.

Extracting context from Piping and Instrumentation Diagrams (P&IDs) to map industrial sensors is manual and time-consuming, often introducing transcription errors. Once diagrams are manually transcribed, they are not readily available for use, causing data validation delays and a high error mapping rates.

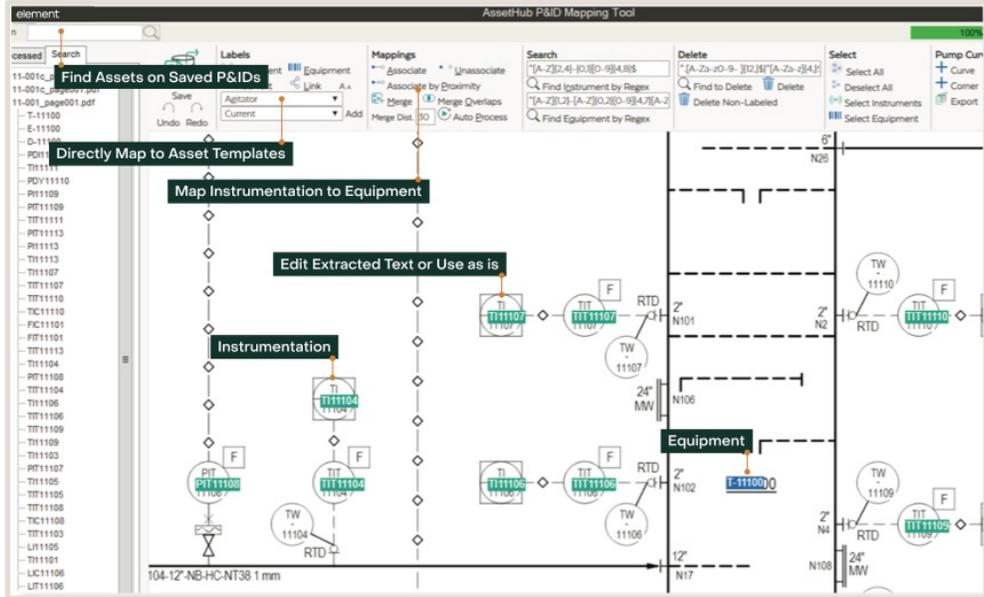
Data governance is essential for organizations using time series data from systems like PI to improve operations. A lack of software tools and overreliance on spreadsheet data modeling, siloed data and poor data labeling lead to errors, drain personnel time and don't scale.

Unify provides a series of Clients that are purpose-built to solve hard OT and ET data challenges.

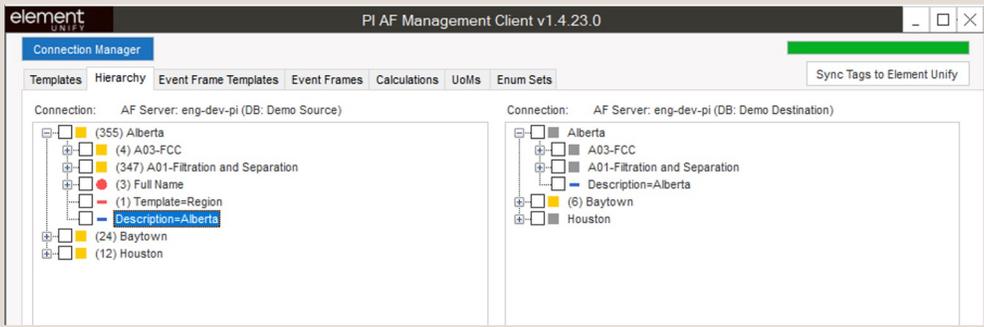
The Unify P&ID Client provides a fast, streamlined way to extract information from P&IDs in bulk. Users associate text to instrumentation and equipment, making the data available in Unify to transform and contextualize to create a more comprehensive view of assets and equipment, and compacting project timelines from months to weeks.

The AF Management Client is for PI System users to deploy in conjunction with Unify to enable consistency and data governance for PI Asset Framework models. It keeps AF models evergreen, ensuring analytics and other data consuming use cases are kept up to date. Use the AF Management Client to import existing hierarchical relationships from PI Asset Frameworks.

Unify P&ID Client



Unify AF Management Client



7. Unify Manages Data as a Product

Manages multiple streaming, batch and asynchronous use cases by using the same data to facilitate and standardize connectivity to numerous applications

Industrial organizations building new apps and analytics typically start with a single use case with 2-3 data sets but only use the data for that use case. This impedes the ability to scale up the use case plant wide, add new data sets to enrichen the use case or to re-use the data.

Managing “data as a product” is being adopted by industrial organizations who view their data as a true asset.

Applying product thinking to data makes it more easily discoverable, understandable, explorable, trustworthy and able to support multiple use cases with data relevant to the user’s domain.

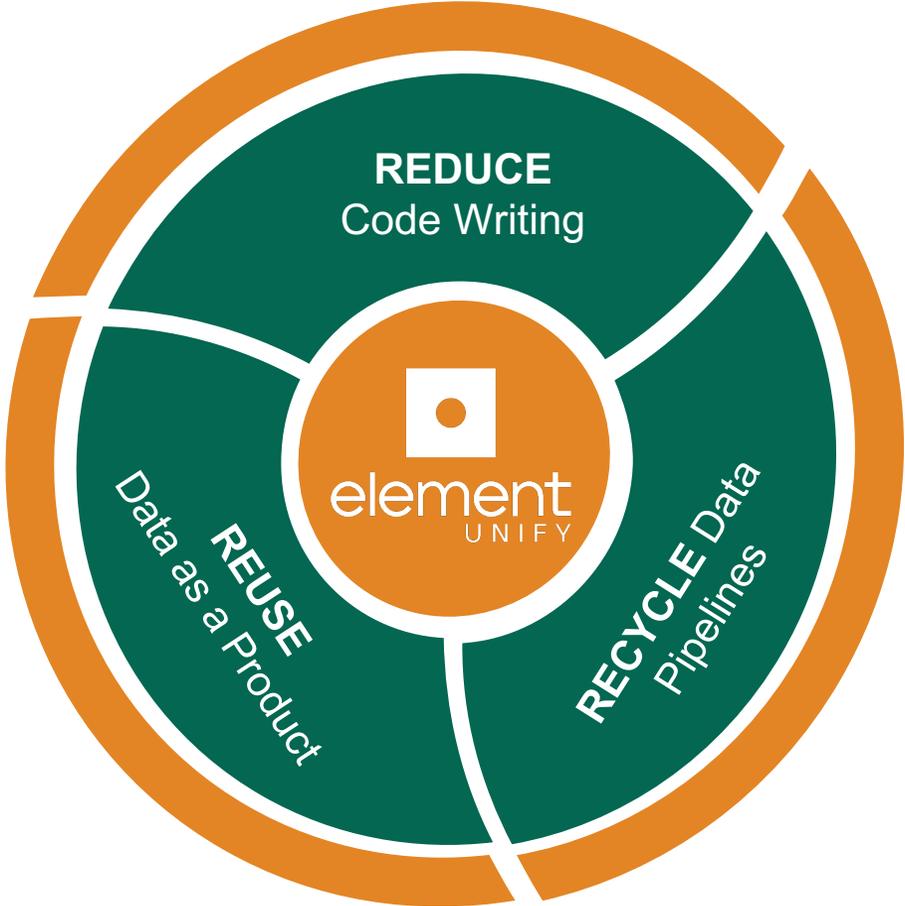
Managing data as a product overcomes the inherent challenges organizing IT-OT-ET by making it easy to access data in a format that provides meaning to users that can be extended by adding new data, and that is easy to maintain as data volume grows.

Unify manages data as a product, reducing the effort to build analytical and BI projects by bringing data together in one place for use, and re-use, based on what's relevant to the user to support multiple use cases.

Unify brings streaming, batch and asynchronous data together to standardize numerous use cases like remote monitoring, digital twins for predictive maintenance, OEE, carbon accounting, APM, batch analysis, energy management and many more.

Unify also feeds analytics faster, reducing the cost and time to generate insights. SMEs at the plant and colleagues operating out of a CoE can access the data they need to collaborate from anywhere. This dynamic, in turn, enables rapid and accurate insights, derived from high quality data, to create safer, efficient, and more profitable operations.

Managing data as a product makes data reusable and eliminates writing one-off integration code



Conclusion

A data foundation
freeing people to
achieve their potential
to add business value

This eBook isn't designed as a comprehensive guide to compare Element Unify with other products. It offers insight into how to overcome some of the bigger operations data challenges in IX initiatives.

Element's customers rely on Unify to create a common data layer across IT, OT and ET data to create a common data foundation that unlocks data so people can create new sources of value.

If you're facing similar challenges bringing IT and OT teams together through unified operations data think of Unify as an enabler worth considering.



About Element

People are the foundation of industrial organizations and must be empowered with useful operations data to produce business value

Company: Element is a leading software provider in operations data management. Element Unify empowers people with access to operations data to make faster decisions that deliver business impact. Element's customers represent over \$750 billion in revenue, \$500 billion in fixed assets and 450,000 employees.

Mission: Empower people with operations data to achieve more.

Vision: To unlock the full potential of operations data.

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