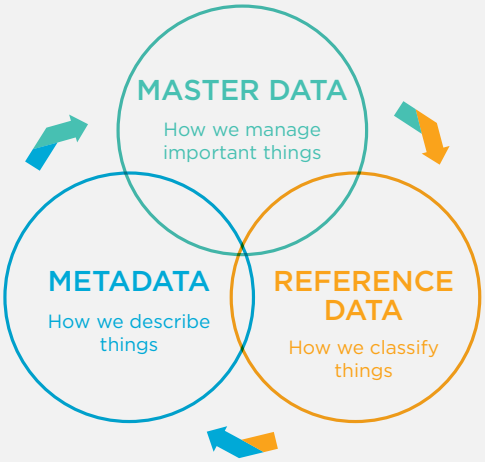
TIBCO EBX Software

A new way to manage, govern, and share your data assets

It's Time to Rethink the Way You Manage and Share Your Data Assets

Your business teams need to manage and share vast amounts of data assets—master data, reference data, conformed dimensions, hierarchies, and metadata. The dynamism and sophistication of your data means business teams can no longer rely on simple office automation tools or outdated data management tools to manage these assets. They need TIBCO EBX software.

EBX software makes it easier to manage your data assets. Custom applications and purpose-built master data management (MDM) solutions are hard to change while EBX software is flexible and agile. It uses a unique what-you-model-is-what-you-get design approach, with applications generated on the fly and fully configurable. This eliminates the need for long, costly, and endless development projects. And EBX software includes all the enterprise-class capabilities you need to create data-driven applications. Data stewardship, workflow, data quality, and data integration are built right in.



MASTER DATA PROVIDES **TRUTH**

Customers
Business Partners
Assets
Products
Suppliers
Locations
Bills of Material
Employees
Digital Assets

REFERENCE DATA PROVIDES **CONTEXT**

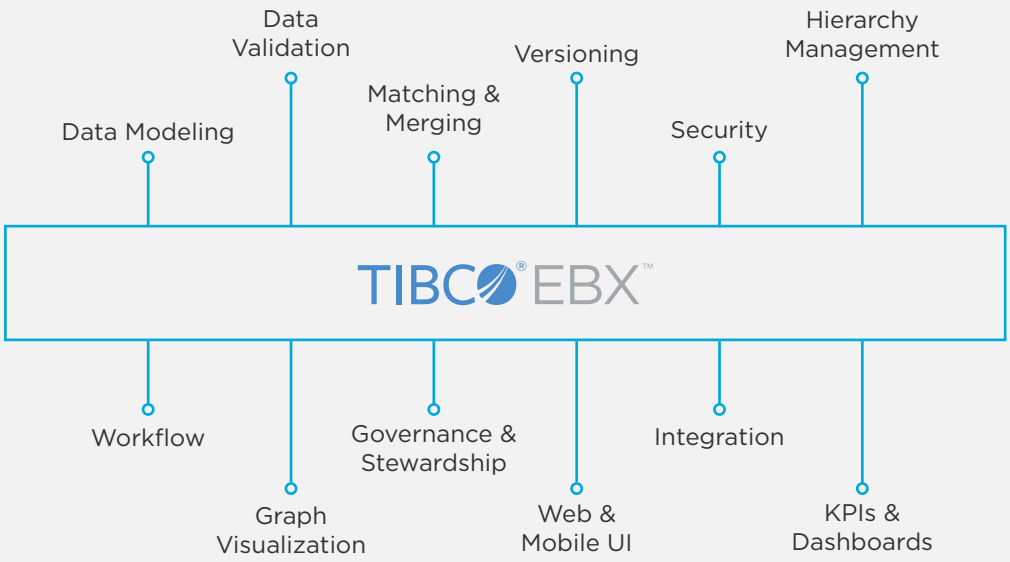
Industry Codes
Geographies
Org Chart
Currencies
Chart of Accounts
Cost Centers
Segments
Legal Entities
Standards

METADATA PROVIDES **MEANING**

Business Terms
Taxonomies
Systems
Critical Data Elements
Entitlements
Data Quality Rules
Data Governance Policies
Big Data Catalog
Reports

Configure Your Data Management Applications Your Way

With EBX software, you can use a model-driven approach to design data management applications, then configure only the features you need. Model-driven design simplifies change management. Updates require configuration changes, not coding.



Support All Enterprise Data-driven Use Cases

Business processes come in multiple flavors. Operational business processes knit together organizational activities to create value. Analytical processes evaluate the performance of operations. Governance processes control analytical and operational processes to ensure compliance with policies, regulations, and laws. Each process type has different aims, but one commonality: data assets power them all.

Operations

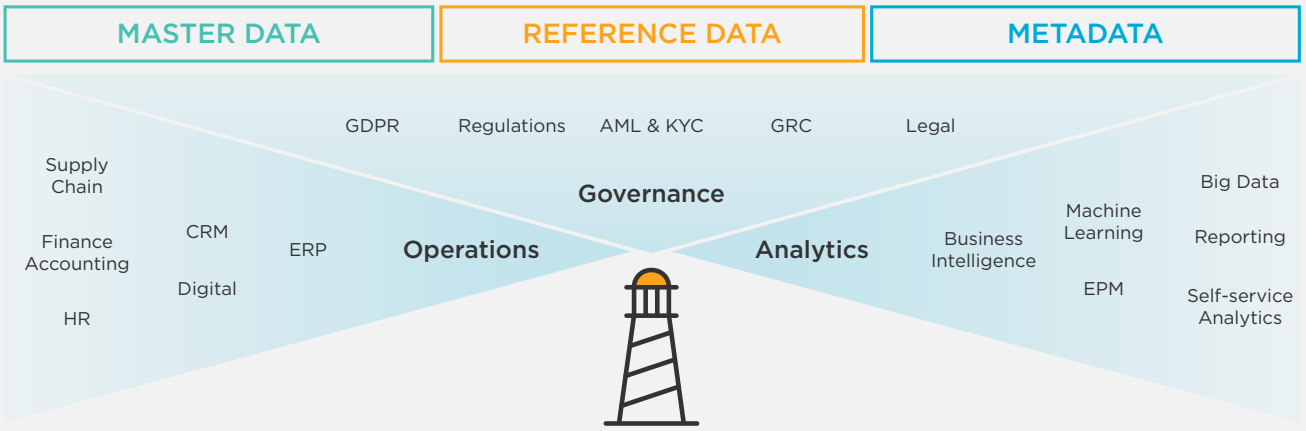
Business team and system collaboration depends on accurate data assets. Creating, governing, and distributing that operational data—customers, products, suppliers, reference data—is where EBX software comes in.

Governance

EBX software supports every facet of your governance program with a process-driven governance repository to capture all your critical data elements, business terms, policies, rules, and responsibilities.

Analytics

Accurate business intelligence (BI) and reporting requires enterprise-wide agreement on dimensions, attributes, and hierarchies. Business intelligence and big data teams govern their analytical reference data with EBX software.



Unified information governance & stewardship capabilities. One stop shop for all enterprise shared data assets.

Drive Adoption by Your User Community

Great for Business Users

EBX software delivers an intuitive, self-service experience to your business teams. Business users can view, search, author, edit, and approve changes in a workflow-driven, collaborative user interface (UI).

Great for Data Stewards

With EBX software, data stewards can easily discern the quality of their data and take action. They have access to sophisticated capabilities for governance, matching, profiling, cleansing, workflow monitoring, data quality analytics, and audit trails.

Great for Developers/Analysts

With EBX software, you can adapt your application on the fly without long and costly development projects. Project teams have full control over data models, workflow models, business rules, UI configuration, and data services.

Core Technologies

Semantic Data Store

EBX software Semantic Data Store combines the flexibility of NoSQL and graph databases with the safety and consistency of SQL databases. EBX software is deployed on an RDBMS (such as Oracle, Microsoft SQL Server, and PostgreSQL) but provides its own object-oriented persistence layer. EBX software Semantic Data Store relies on a rich data modeling language that goes beyond the limitations of traditional relational algebra to define complex objects and relationships. It features temporal data management for fine-grained version control and auditability, and spatial data management for adapting data values to contexts through inheritance.

Data-driven Application Metamodels

EBX software defines and operates a complete set of meta models to build data management applications. It combines semantic data models, business rules definition, workflow models, data quality rules, and key performance indicators (KPIs) plus UI configuration in a set of linked meta models. This ensures great flexibility for designing and maintaining applications.

Model-driven Engine

The EBX engine generates entire data management applications from the underlying models. When you publish a change in any model, whether that's to the data, workflow, business rule, or policy, the engine versions and validates the changes and generates the user and system interfaces immediately.

In-memory Engine

At runtime, the EBX in-memory engine delivers high performance for complex, interactive processes, such as on-screen maintenance of large hierarchies (million+ nodes), structured or fuzzy searching, inline match/merge, or real-time validation.

D3: Distributed Architecture

D3 supports federated deployment of EBX software. It ensures transactional synchronization between a master instance and slave instances. Use cases include: real time distribution clusters, geographical federation of data stores, and federated governance of global/regional/local data assets.

Solutions

Master Data Management

Every transaction in your organization is built on master data: products, customers, employees, suppliers, financial hierarchies, or reference data. Accurate and consistent master data streamlines your operational processes and increases the quality of your reporting and analyses. EBX software simplifies multi-domain master data management (MDM) by providing one way to manage, govern, and share all your master data.

- *It's actually multi domain.* EBX software lets you model any master data, including relationships between domains, without buying separate solutions.
- *Designed for the business,* not just your data stewards and developers, because mass adoption is critical for success.
- *Everything you need for MDM in one solution,* including workflow, data quality, role-specific applications, and more.

Reference Data Management

Reference data is a special subset of master data that's used for classification throughout your entire organization: postal codes, cost centers, financial hierarchies, or countries. Whether the data is externally mandated or internally authored, it's unambiguous and non-negotiable. EBX software is a single solution for managing and distributing your reference data. By centralizing control, you ensure that consistency and compliance are maintained.

- *More than code lists:* Reference data includes complex hierarchies, mappings, and more. EBX software supports all of these forms.
- *Version control:* EBX software can manage every version of reference data—past, present, and future—and connect them.
- *Diversity of distribution:* Your business teams and systems can access reference data in the way they want.

Product Master Data Management

When your product master data requirements go beyond a simple product catalog, you need a solution that can keep up. You may have complex product models that have multi-domain relationships with vendors, suppliers, or locations, or you may need to support regions, countries, or language adaptations. With EBX software, you only need one solution.

- *It's more than a product catalog:* EBX software manages complex products and distribution.
- *Designed for use by everyone,* not just your product data experts.
- *It's actually multi domain:* EBX software lets you model any master data—including relationships between domains—without buying separate solutions.

Party Master Data Management

You do business with other parties as well as your customers. In the B2B world, relationships can get complex quickly when you're managing more parties—suppliers, vendors, distributors, wholesalers, or counterparties. Don't set up a multitude of party-specific solutions: use EBX software. It's a single solution for multiple parties.

- *Manage all your parties,* including customers, suppliers, and more in one solution.
- *Use hierarchy management* to visualize and maintain complex relationships.
- Profile, cleanse, validate, and match data *with built-in data quality* features.

Data Governance

Supporting your data governance program requires more than spreadsheets and simple documentation tools. EBX software supports every facet of your data governance program with a process-driven governance repository to capture all your critical data elements, business terms, policies, rules, and responsibilities. Data stewards, managers, users, and data owners can collaborate through workflow-driven, intuitive user interfaces.

- *Improve business ownership:* EBX software is designed for end users, data stewards, and business analysts.
- *Support for any business metadata:* EBX software can absorb all your artifacts, including critical data elements, policies, business rules, RACI matrices, and business terms.
- *More than documentation:* EBX software goes beyond metadata to let you directly map governance rules to runtime validation and workflow of your master and reference data.

Hierarchy Management

Hierarchies represent relationships between your data assets—chart of accounts, customer segments, product lines, and organizational structure. For every standard hierarchy your teams create dozens—if not hundreds—of alternate variations, each representing a unique business perspective. EBX software helps you simplify the creation, governance, and versioning of your standard and alternate hierarchies. All your hierarchies can be supported in one simple, easy-to-use tool.

- *Render any type of hierarchy* with support for ragged, balanced, unbalanced, and more.
- *Versioning and governance:* Maintain history and control access to your hierarchies.
- *Empower your business user*s with a self-service tool to create and manage their own hierarchies.

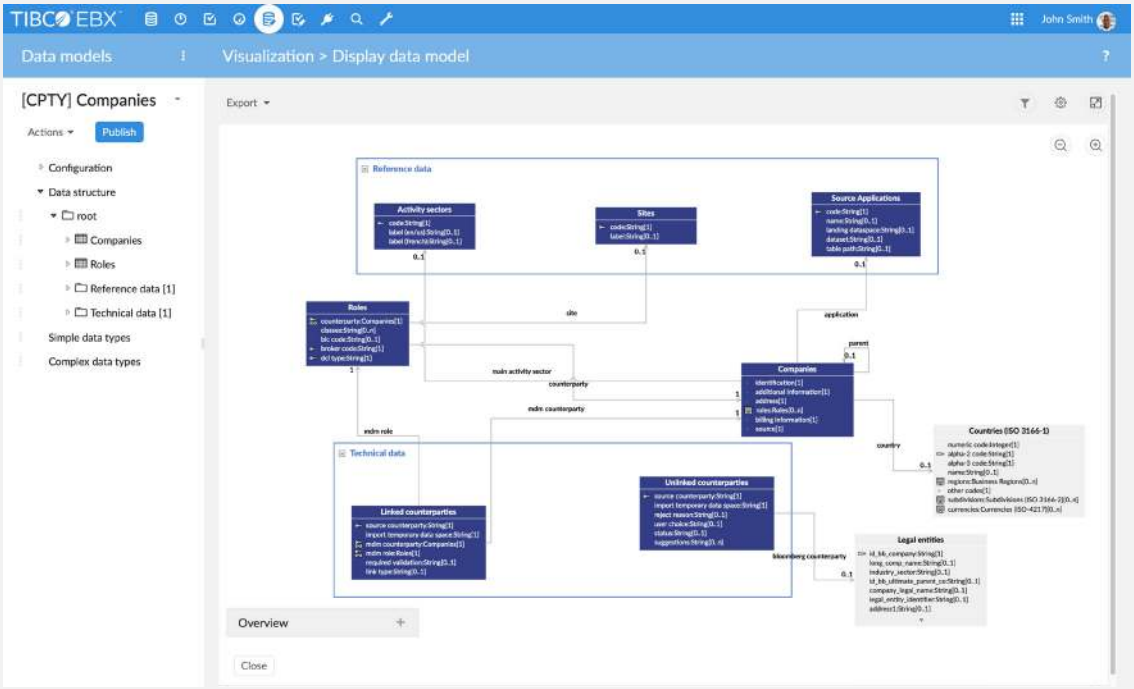
Feature Highlight: Data Modeling & Metadata

Model Any Domain And Its Relationships

EBX software includes built-in data modeling capabilities that are accessible through EBX software's browser-based user interface. We designed the EBX software data modeling tool to be easy to learn, easy to use, and simple to deploy, so that your business and IT teams could collaborate throughout the model definition process. Our belief is that greater collaboration among your teams will lead to more accurate master and reference data domain definitions.

Additionally, users of EBX software take a semantic approach when creating data models. Semantic modeling is especially effective when trying to express the complex, often multi-cardinal and conditional relationships between multiple domains of master and reference data. This is relevant for organizations that wish to maintain multiple interconnected domains of data within their data management platform, such as managing the identifiers, attributes, and connections between parties, things, and public and private forms of reference data.

One of the unique characteristics of EBX software is our "what you model is what you get" approach to interface creation. Upon publication of a model, EBX software generates all user and system interfaces without coding or database compilation. Business teams and end users can view their changes as they design the model. Generation eliminates code/compile steps, reducing errors and accelerating the development cycle.



Browser-based modeling
Collaborate between business and IT users

Mixed-model support
Design relation and objected-oriented data models

ID management
Define simple or composite keys, auto-generated IDs

Many-to-many links
Define complex cardinalities between objects

Inherited fields
Use inheritance values across any level of relationship

Computed fields
Auto-calculate values based on business rules

Cross-domain relationships
Define links between master data domains

Complex hierarchies
Support any type of hierarchies

Reusable types
Define reusable and documented data types

Multi-language
Use metadata in any language (UTF-8)

Model lifecycle management
Fully control data model versions

Publish on the fly
Publish model changes without any redeployment

XML schema
Use native support of the XML schema standard

Templates
Chose from data model templates provided by domain

Workflow
Manage data model changes with EBX software workflow

In addition, EBX software provides information governance features that allow you to manage the underlying metadata linked to your data. Based on the ISO/IEC 11179 registry standard, EBX software information governance dynamically links metadata definitions, ownership, and governance policies to your data.

Because information governance is based on EBX software, it works with existing features such as collaborative workflow for metadata onboarding and approval, version control for managing past, present, and future metadata, security for configuring fine-grained permissions, fuzzy search, data quality tools, and matching.

Metadata repository
Centrally manage all metadata

Business Glossary
Manage definitions and synonyms of business terms

Context-aware
Adapt definitions to business contexts and user profiles

Governance
Define ownerships and responsibilities for data

Visualization
Visualize relationships between metadata

Auto-alignment
Automatically align your metadata with your data

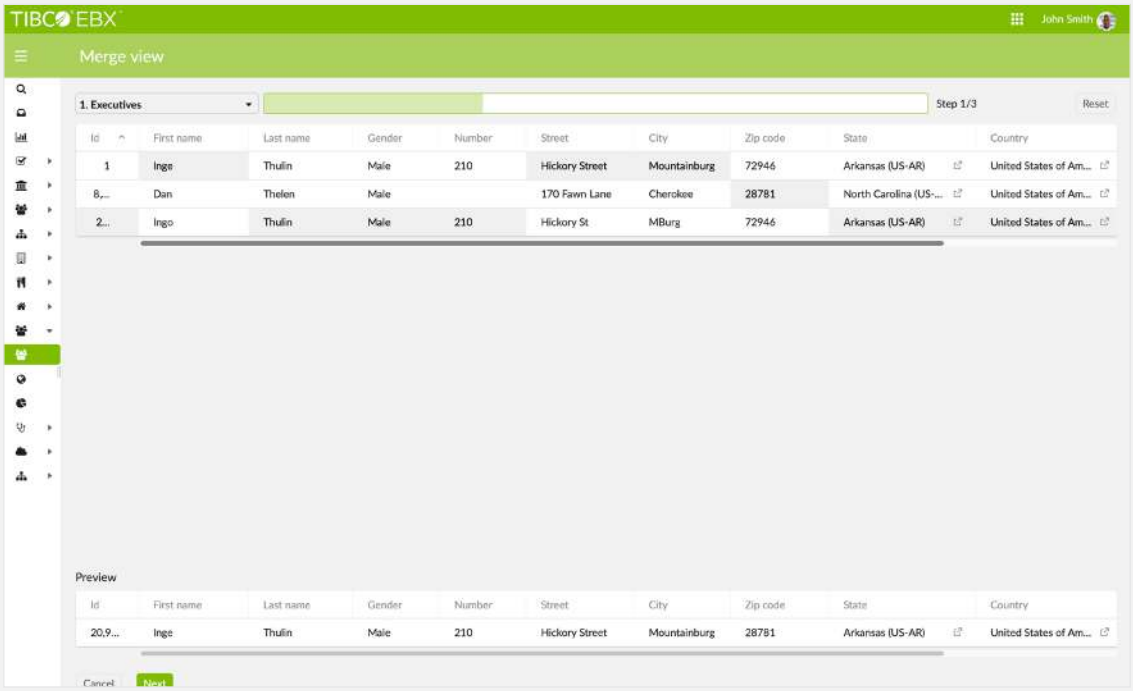
Feature Highlight: Embedded Data Quality

Maintain Quality With Validations And Matching

Many organizations begin data management projects to address their large quantity of low quality and inconsistent, data. Often, because the quality issue is so pressing, the project team focuses their efforts on “cleaning their lake” of bad data. Not much thought is given to what happens once that initial project is over.

What these organizations are missing is that one-time quality projects are ineffective if not paired with a sustaining process designed to maintain high levels of data quality. The reason is that master data, even the slowly changing dimensions sometimes found in reference data, is not static. Without tools to sustain quality, master data becomes increasingly inconsistent over time.

This is why EBX software comes bundled with a wide variety of tools to help your organization maintain data quality. Business rules, computations, and validations can be defined in the data model. As new information enters the platform, the EBX software validation engine enforces these rules and provides a real-time validation report that can be used for interactive resolution. Our multi-factor matching engine provides many different algorithms and techniques to find exact and fuzzy candidate matches that can be resolved using human (stewardship) or system/heuristic (survivorship) driven methods.



Finally, data quality is not a separate component that exists outside the data management platform. EBX software data quality components are fully integrated into EBX software. This means you can incorporate quality checks into every part of the data management process and workflow that EBX software manages.

Data types validation Support standard or custom data types	**Validation controls** Control min/max values, patterns, list of values	**Business rules** Rules language and editor for complex validation controls
Validation API Develop additional controls with Java API	**External controls** Call external services for third-party validation	**Validation reports** View error reports with interactive correction
Matching on any object Add matching rules to any table or field in a model	**Multifactor matching** Configure matching policies on multiple fields	**Matching algorithms** Included library of matching algorithms
Real-time matching Perform matching at the point of entry	**Batch matching** Match large dataset in batch mode	**Match in UI** Perform matching inside data authoring UI in real time
Stewardship Review and merge duplicates with full stewardship user interface	**Merge record** Merge (or simulate) suspect records with pivot	**Survivorship** Enforce auto merge rules on duplicates
False negative protection Reduce false negatives with two-level matching	**State machine** Employ full state management of records (golden, suspects...)	**Trust framework** Determine best record/ fields based on trusted source configuration
Profiling Profile data with prebuilt procedures	**Cleansing** Cleanse data with pre-built procedures	**Crosswalk** Record matching and linking for registry creation

Feature Highlight: Data Authoring

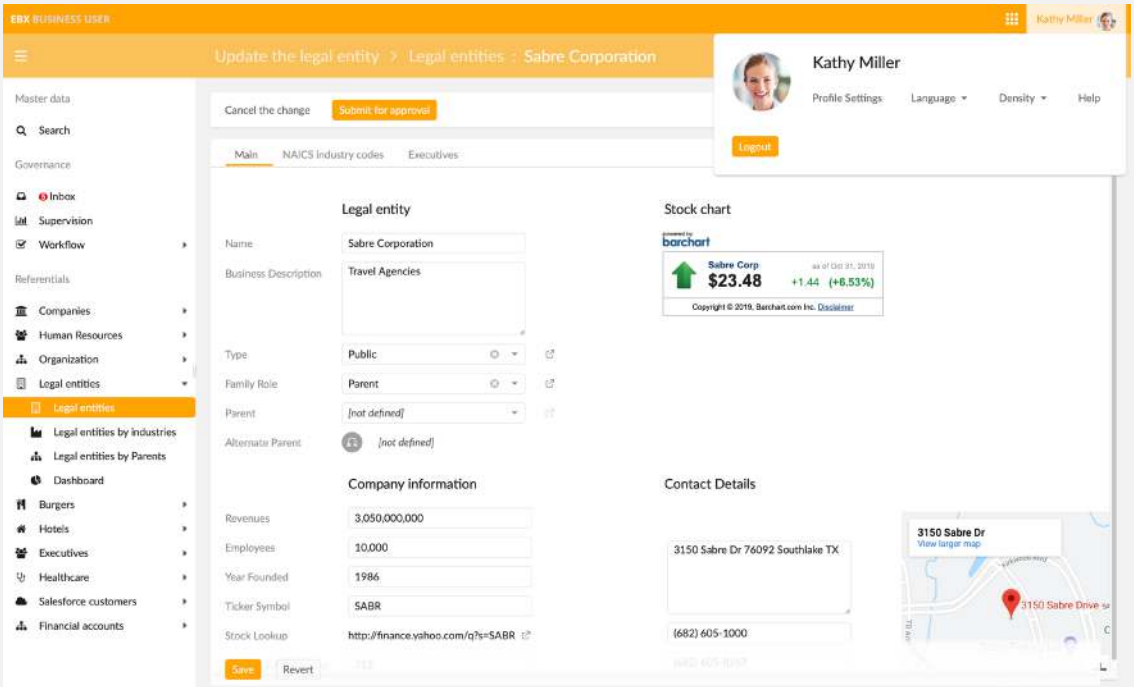
Provide Custom Authoring And Stewardship Interfaces

Users want more than a simple stewardship tool for authoring data. You need full control to view, update, and manipulate data. EBX software automatically generates the UI from data models and provides superior data management features that include: data maintenance (create, read, update, delete), grid view, and advanced search and views.

Using EBX software not only as a central store for data assets but as a true governance solution, our customers are able to deliver a rich user interface to their business users. The EBX software user interface has been designed to provide a clean, simple and easy-to-use front end.

While the EBX software data authoring user interface is dynamically generated from the data models, it is highly customizable to deliver the best user experience to a broad range of user profiles. This includes the ability to customize form layout, group data in tabs, and change the graphical styles of the application. In addition, the EBX software user interface can be integrated into third-party applications and portals using web components.

EBX software also provides advanced visualization features for exploring relationships between data. End users can visualize links between data objects and values and use relationship views for a specific record or dataset.



Auto-generated UI
Auto-generate user interface from the data model

Search
Search using simple, multi-criteria, or fuzzy logic

Mass update
Apply data updates on record selection or search

Perspectives
Configure data-drive applications by user role

Permalinks
Copy, paste, and email direct links to any data

Microsoft Excel export
Export Excel spreadsheets (xls, xlsx, csv)

Multi domain
Browse all data assets with one unique front end

Visualization
Visualize relationships between data

Tabs
Organize groups of fields in tabs

Views
Configure and share custom views with filters

Simple import/export
Import & export data in CSV, XML formats

Grid edit
Use spreadsheet-like editing of data in tables

Data browsing
View datasets, tables, and hierarchies

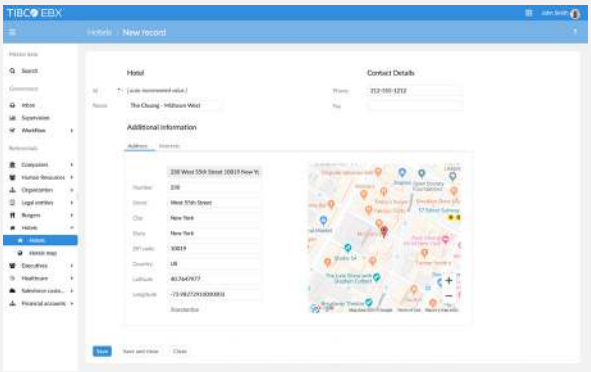
Web forms
Use auto-generated forms for data entry

Custom layout
Reconfigure auto-generated web forms layout

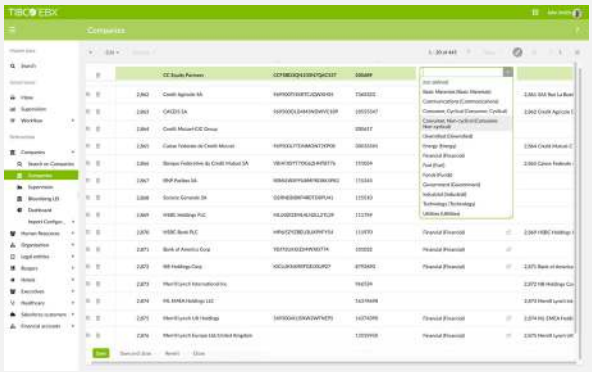
Web components
Integrate any part of UI in third-party portals or web apps

Microsoft Excel import
Import multi-sheet Excel documents with mapping

API
Develop custom UI services using EBX software Java API



Example of an integration with a mapping service to position data and standardize addresses



Example of “spreadsheet-like” editing of data using grid edit

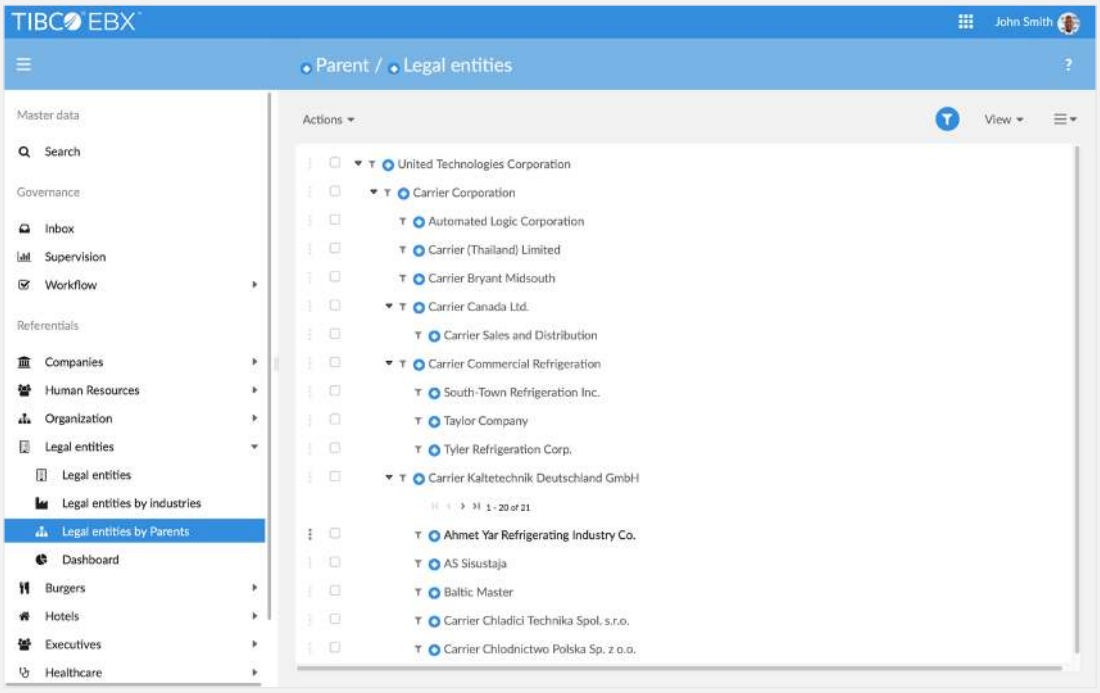
Feature Highlight: Hierarchy Management

Manage Standard And Alternate Hierarchies

Hierarchies are an ordered rendering of your data. Within EBX software, any relationship can be used to create a hierarchical view. Since relationships in EBX software can span a single domain, multiple domains, or multiple time periods, the software can render intra-domain, inter-domain, and inter-temporal hierarchies. Additionally, from a structural perspective, these hierarchies can be balanced, unbalanced, or ragged, and can span one-to-one, one-to-many, or many-to-many relationships.

Because EBX hierarchies are based on relationships, there's no difference when rendering either standard or alternate hierarchies. For example, a customer record could have connections to the company's legal parent, major country subdivision (ISO 3166-2), and revenue centers. With EBX software, these relationships can be turned into standard legal entity hierarchies, customers by geography, or even customers by revenue center.

Also, because we use relationships, these hierarchical views are dynamic, rather than saved. This means that as your underlying data and relationships change, the hierarchical views update immediately. For authorized users, the views can be used for management, such as moving portions of the hierarchy, reordering, or attaching or detaching nodes. And hierarchical views can be used during the data governance process in workflows.



Derived hierarchies
Render hierarchies on the fly based on relationships

Relational hierarchies
Use hierarchies based on links between objects

Recursive hierarchies
Use hierarchies based on parent/ child relationship

Explicit hierarchies
Use user-defined hierarchies on an existing dimension

Any hierarchy type
Use balanced, unbalanced, or ragged hierarchies

View and edit
View trees and move or edit nodes

Multi-parent support
Attach/detach nodes to/ from multiple parents

Wide & deep hierarchies
Use any number of levels and nodes

High performances
Enjoy high performance through Ajax technology for managing large hierarchies

Prune mode
Filter nodes that have at least one child

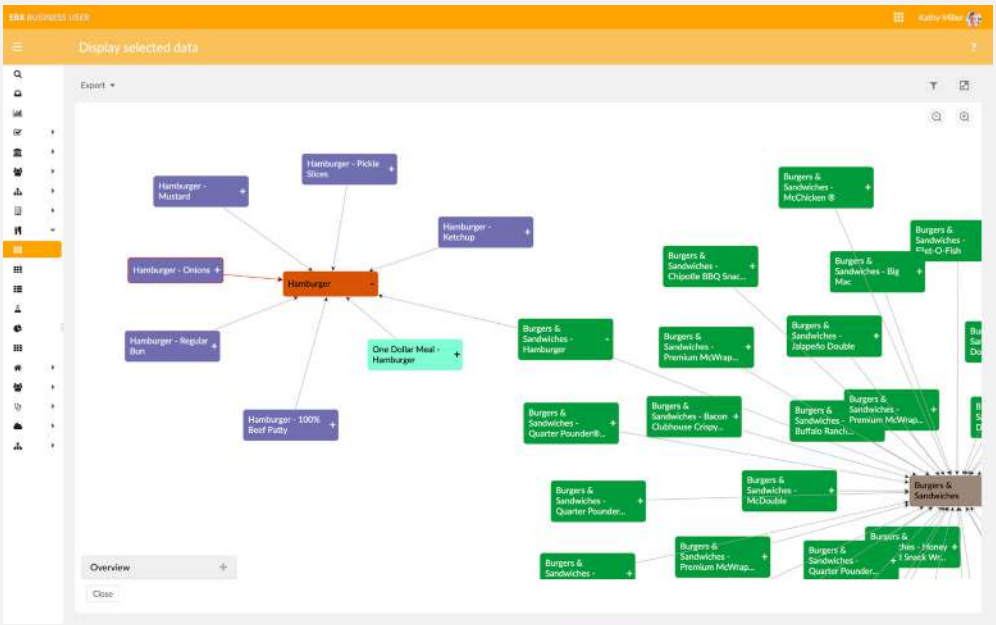
Filter
Define filtering criteria at any level of a hierarchy

Feature Highlight: Graph Visualization

Visualize Master Data And Relationships Using Graphs

Multi-domain implementations are characterized by their wide variety of relationships. Relationships can exist within a single table (recursive), within a data domain (intra-domain), and between domains (multi-domain). Relationships can be singular/one-to-many (1-n) or many-to-many (n-n). Effective management of these connections is facilitated by visualization tools that help users and stewards see how data connects.

EBX software provides many ways for users to investigate their connections. When viewing a record, users have tools such as previews and associations that can be used to step between records. Hierarchies create a tree-like view. Graph view enables you to see any data model as a graph, including objects, attributes, and complex relationships. There are a wide range of graphs offered, including classical views where each connection is treated as a unique node, data model, and encapsulation graphs to name a few. Graph view also includes tools to save configurations, assign icons, and manage/save/ export layouts. Finally, graphs can be constructed from any kind of relationship. This would include the various kinds of data lineage—horizontal, vertical, conceptual, and regulatory—that are common in data governance use cases.



Data Value
Classic "graph" view, each and every connection is a node

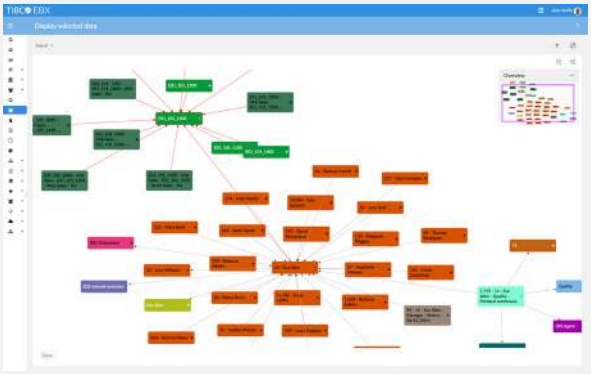
Data structure
Model-oriented view, the structure is used to organize relationships

Layered
Generation-oriented view, node layout is based on distance/hops from first node

Encapsulation
Classification-oriented view, domain, or data classification is used to encapsulate nodes

Data lineage
Primary graph types are used to sketch horizontal, vertical, conceptual, or regulatory data lineages

Auto/manual layout
Tools to automatically arrange nodes for improved readability



Example of a data structure graph. The orange node in the center is the point of origin.

Example of a layered (hierarchical) graph used to display an organization chart.

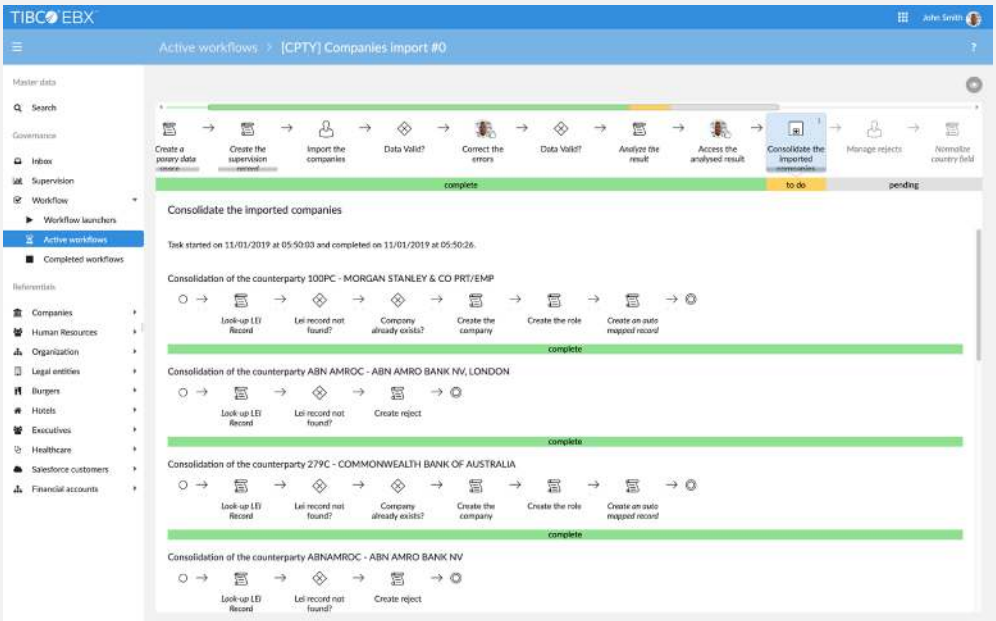
Feature Highlight: Collaborative Workflow

Enable Distributed Data Governance Across Teams

In every data management program, the data and workflow models outline the program's scope. Data models define what your organization will master, and workflows define how the responsible and accountable parties in your organization work together to ensure the accuracy and consistency of the data asset.

EBX software contains features that enable you to deliver a rich experience to the business teams involved with data management. With permission rules, fined-grained access rights can be defined for the roles and users that participate in workflows. Additionally, the workflow modeling tool defines not just the user interfaces, but also how these different roles, which can be inside or outside your organization, collaborate throughout the entire process of creating, updating, and deleting data. The workflow screens are designed to be intuitive and "intent-driven" to clearly specify the participant's tasks and activities with the aim of simplifying the adoption process. Finally, the EBX workflow engine drives the change management and approvals process, manages state, and issues notifications to all interested and involved parties.

In addition, EBX software contains support features to govern your workflows. These include a wide range of auditing tools that keep track of changes to data and workflow executions, i.e. the workflow history. Often, customers use the workflow history to measure and assess the performance of their data governance teams.



Because the actual process of governance may change, the modeling tool ships with components to maintain historical versions of your workflow processes. Also, auditing tools exist within EBX software that enable you to see who made what change when and roll back and "play back" step-by-step changes that were made to your data.

Workflow engine Rely on the fully integrated workflow engine	**Inbox** View and open tasks, sort, and search	**Workflow dashboard** Check each workflow status and history
Notifications Receive email notification on allocated or offered tasks	**Custom emails** Customize HTML emails for end users	**Deadlines & reminders** Configure deadlines on tasks and auto reminders
Workflow designer Model workflows with the browser-based tool	**User tasks** Configure task for end users (individual or group)	**Server tasks** Configure tasks executed on the server (scripts)
Conditions Define conditional rules between workflow tasks	**Parallel workflows** Launch parallel sub workflows	**Task library** Use prebuilt tasks (create record, version, access data…)
Priority management Define priorities for each workflow task	**Monitoring** View current and completed workflows	**Error management** View errors, relaunch/ reallocate/delete workflows

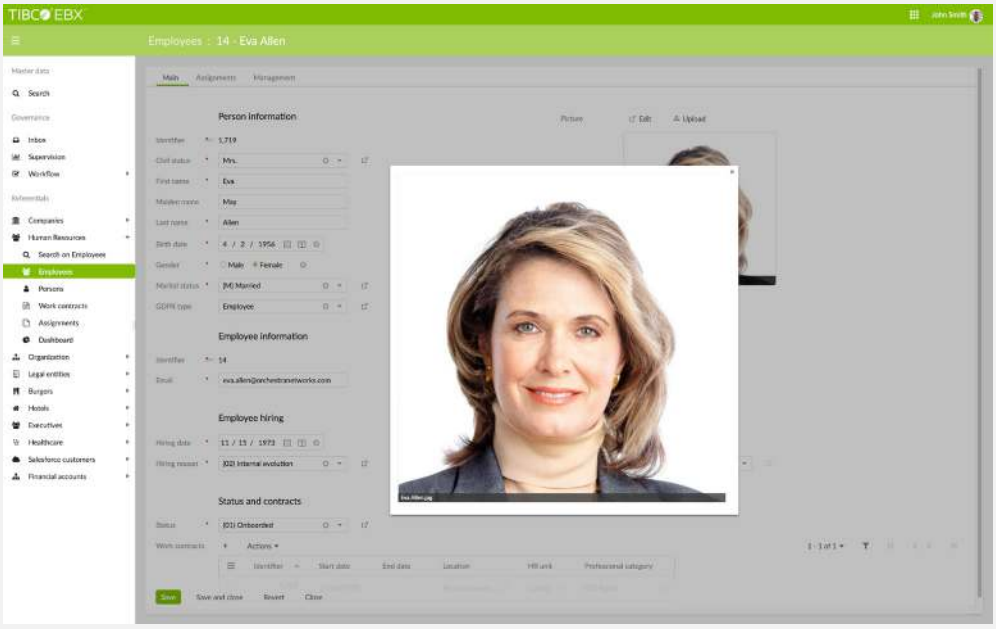
Feature Highlight: Digital Asset Management

Manage And Link Digital Assets To Your Data

Traditionally organizations have managed unstructured data and digital assets—images, documents, spreadsheets, etc.—separately from their master and reference data. However, how different is the official location photograph, company logo, or legal-approved terms and conditions from a product's name or text description? Aren't some of these digital assets, in reality, a form of unstructured master data?

EBX software has always provided a method to store links (URLs) for separately managed digital assets to master data. What's new with this digital asset management capability is that EBX software is storing, versioning, and associating your digital asset with its master and reference data. Managing both

kinds of assets together helps consumers of both, improving findability and providing more context. For example, in regulatory scenarios master and reference data about critical data elements is enriched with the official governance policy in PDF form. In operational scenarios, keeping the official product assets in combination with its official images can support downstream consumers in sales and marketing.



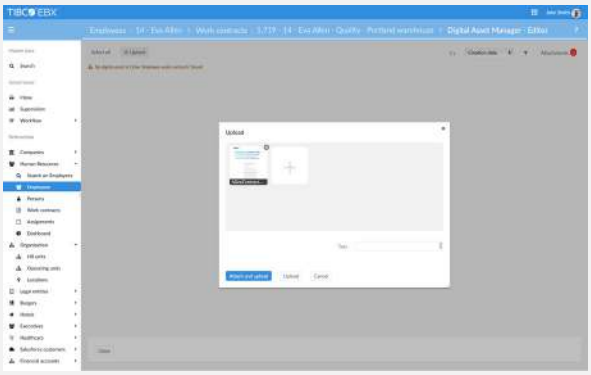
Library of digital assets
Create and manage libraries of digital assets

Edit metadata
Edit all metadata associated with your digital assets

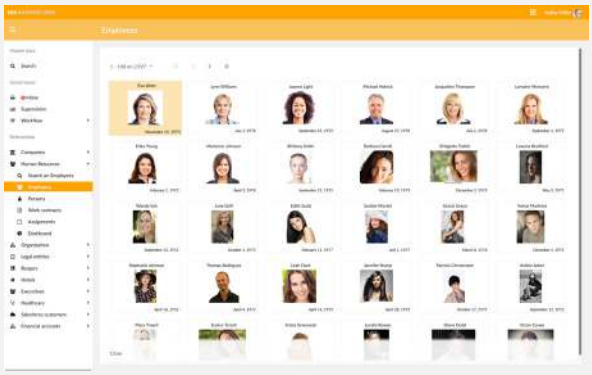
Version control
Manage multiple versions of your digital assets

Upload assets
Upload (or mass-upload) documents and media

View digital assets
View digital assets in the user interface



Example of a PDF contract upload associated to an employee record



Example of a mosaic view of data records using employee pictures

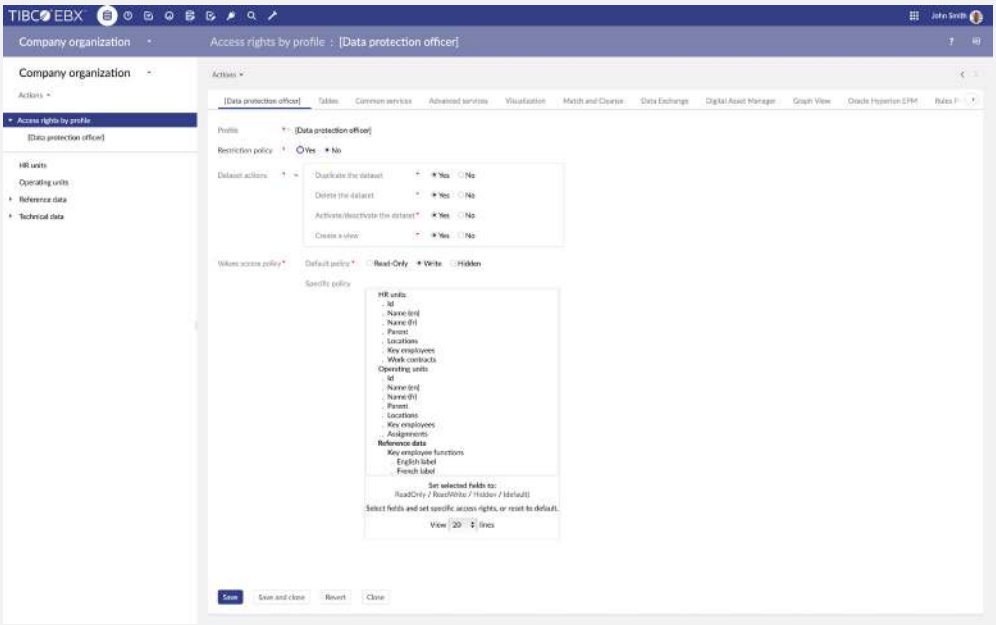
Feature Highlight: Version Control

Manage And Connect Past, Present And Future Editions

Data management should not only define the current state of your data but also the present, past, and future versions, accurately showing all transactions that have occurred. The EBX version control engine allows you to concurrently manage all four major version types including: as-of (historical), current/production, effective dated (future-approved), and proposed (future not approved or hypothetical). Version controls may be applied both across the EBX platform and at the specific record level, allowing you to perform an "as of" analysis of data. EBX software also generates a detailed audit trail of all transactions. This real-time log of history provides business activity monitoring with customizable queries and filters.

Versioning within EBX software is at the container level. This is different from other solutions that combine historical, current, and future data into the same database or data table.

Versioning at the container level means that an historical version (as-of content) is isolated from future data (effective dated). However, this isolation does not preclude connections. It is possible to map time versions of data to each other so that you can understand how (and why) a hierarchy evolved, not just recognize that a hierarchy has changed.



Finally, container level versioning in conjunction with EBX software's fine-grained security model means that you can use EBX software to model confidential changes to data—organization changes, mergers and acquisitions, restructuring, etc.—without exposing these future changes to unauthorized users and risking a breach of confidentiality.

Future versions
Manage future version of data using "data spaces"

Past versions
Keep track of past "as of" versions

Sandbox/playground
Create ad-hoc versions for testing out new ideas

Staging
Manage staging versions for data import

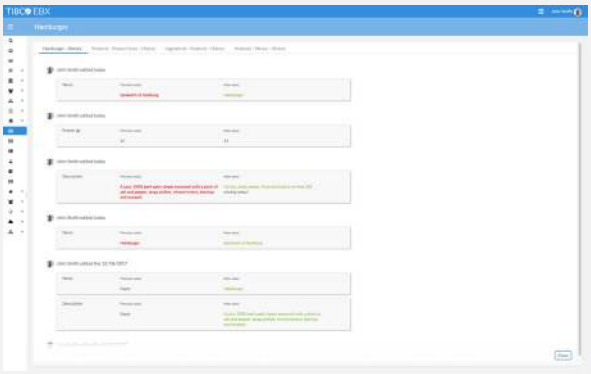
Record-level history
Keep track of all updates at dataset and record levels

Roll back
Roll back data values at any point of time, at record level

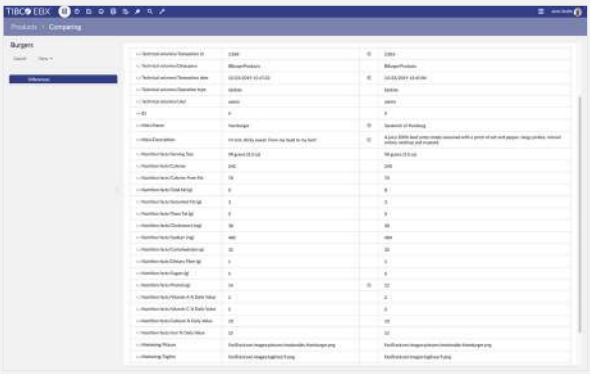
View & search history
View and search full history at dataset, table, and field levels

Native SQL access
Query the full history in native SQL

Compare & merge
Use three-way compare & merge with conflict detection



Example of a custom history screen to show a timeline of changes



Example of a side-by-side comparison between two versions

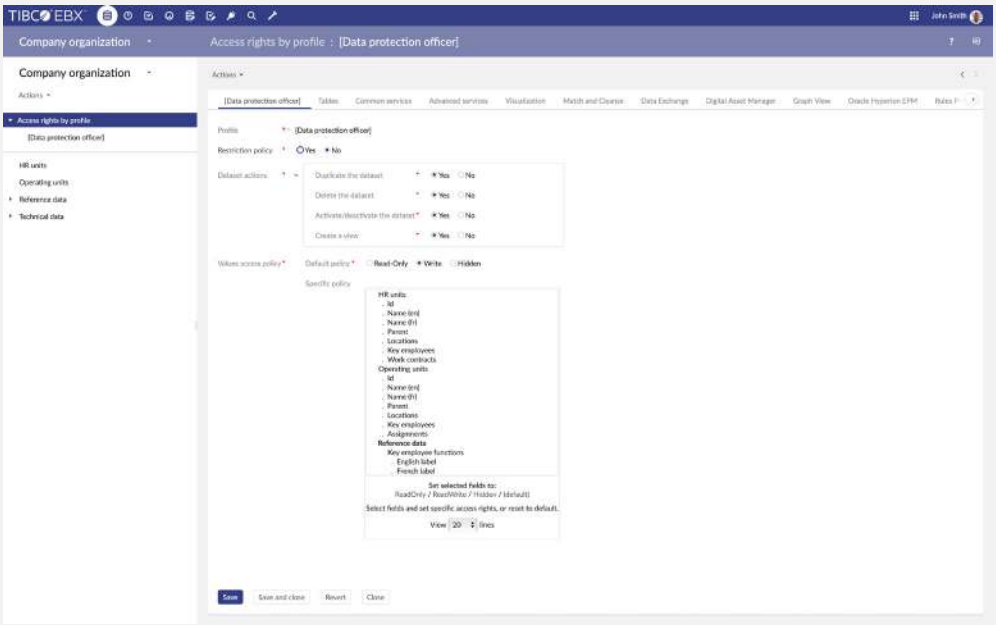
Feature Highlight: Security & Permissions

Enforce And Secure Fine-grained Access

In data management, internal controls are often established using well-defined role participation rules, such as RACI. This is why you often see responsibility (operations steps) separated from accountability (approval steps) in EBX workflows.

To support these types of governance approaches, EBX software provides components for security and permissions. From a security perspective, the directory defines who your participants are. These users (and their roles and groups) are defined either in the EBX directory or within your enterprise directory, such as Active Directory or LDAP. Given that EBX software uses a web application architecture, it supports single sign-on technology to streamline the authentication process for your users.

Permissions place limits on a specific role, user, or group's ability to access data and EBX features. For example, what data can a group create, read, update, or delete? Or which workflows does a specific individual have visibility into? And of course, what roles are accountable for approving these data changes? Often, our customers specify these permissions by role, not users, so that an individual can be responsible for updating some data domains, have approval over others, and be informed of changes in a third.



These permissions can be applied at every level from large grain (the EBX software environment and domains) to fine grained (fields or tables) and everything in between.

Roles and users
Define user groups and combine roles for users

Permissions on domains
Configure access rights for each data domain

Permissions on datasets
Configure access rights for each dataset

Field-level security
Configure access rights down to the field level

Permission rules
Add specific filters at record level based on rules

Enterprise directory
Integrate with third-party directories (LDAP, AD)

Single sign-on
Integrate with third-party SSO systems

HTTPS/SSL
Employ SSL encryption of user interface and services

Web service security
Support for HTTP authentication and WSSE

Feature Highlight: Integration & Distribution

Share Data Assets With Systems And People

EBX software has features to integrate data with IT systems and distribute data to business teams. While all data management vendors provide some methods for integrating data with other enterprise applications, very few focus on distribution to business teams. At TIBCO, we have found that providing methods for your

business teams to consume data helps ensure consistent use throughout your organization and reduces reconciliation issues. Making those distribution methods easy to use improves both the profile and perceived value of the MDM program.

On the systems integration side, EBX software supports a wide range of platforms and techniques starting with direct API calls and extending to both data integration and middleware. In addition, EBX software supports calls to external data quality, business process management, and business rules management systems.

ETL (DATA INTEGRATION)	ESB (MIDDLEWARE)	OTHER (DQ, BPM, BRMS)
• Informatica Powercenter	• WebMethods ESB	• Informatica Data Quality
• IBM Datastage	• Oracle OSB	• IBM Quality Stage
• Oracle ODI	• IBM ESB, MQ	• TIBCO Cloud Integration/ BusinessWorks
• Talend ETL	• MuleSoft	• WebMethods BPM
• Microsoft SSI	• Aurea (Progress) Sonic ESB	• IBM JRules
• TIBCO Data Virtualization	• Microsoft BizTalk	

Examples of integration platforms supported by EBX software

Because all EBX software system interfaces are generated from your models, your development teams expend no effort developing system interfaces. More importantly, generation eliminates the interface maintenance that leads to lower TCO.

From a distribution point of view, EBX software provides multiple mechanisms to distribute data to business teams. Much of our support stems from EBX software's web-application architecture. Given that access to EBX software happens through a browser, anywhere you can put a browser you can put EBX software.

For authorized users this means access to the same user interface through browsers on their desktops, laptops, and mobile devices. With single sign on enabled, you can embed any EBX software screen in enterprise applications and in portals, including screens for data lookup, data editing, workflow, and matching and data quality. In fact, we have had several customers embed their customer lookup screens in applications like Siebel or SAP, and organizational and product and legal hierarchies in portals like Microsoft Sharepoint. By embedding read-only EBX software hierarchical views (instead of creating and updating spreadsheets or PDFs) in their portals or SharePoint sites, customers ensure that their interested parties will always receive the most up-to-date information.

SOAP data services
Employ auto-generated web services (SOAP/WSDL)

REST data services
Employ auto-generated web services (RESTful/JSON)

File import/export
Import or export files in CSV, XML formats

Mapping
Map between source systems and data model

Transformation
Include complex transformation rules for file import

Microsoft Excel
Import or export multi-sheet Excel spreadsheets

RDMBS connector
Import and export data from/to any RDMBS in SQL

JMS
Publish/subscribe to/from JMS queues

Native SQL access
Query your data assets in native SQL language

API
Use the Java API to integrate additional services

EBX software also includes a unique federated distribution feature called D3 (Distributed Data Delivery):

Master/slave sync
Synchronize a master instance with many slaves

Transactional
Use two-phase commit on sync between instances

Encryption API
Encrypt data at synchronization time

Clustering
Expose a cluster for real-time data access

Hot deployment
Add slave instances on the fly in a D3 cluster

Geographical federation
Distribute instances across regions

Feature Highlight: Performance Measurement

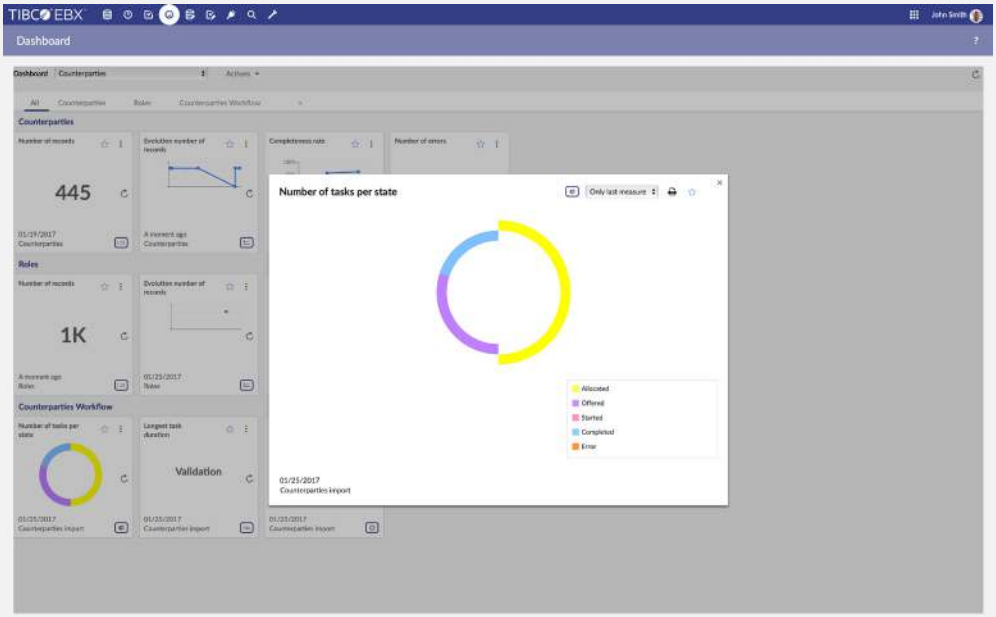
Track Data Quality Improvement

For most of our customers, data management is a process of continuous improvement. This is why many of them have requested features that measure quality and support benchmarking and root cause analysis. Analysts have said that, without measuring the quality of data and its effects on business performance before and after a data management initiative, there is no objective basis for reporting improvements.

EBX Insight reporting helps customers measure the change in quality and process performance over time. This data includes important information for determining how and where to make improvements. Insight reporting works hand in hand with the other kinds of reporting that EBX software provides. While Insight shows the performance of your data management program, EBX software history and audit trails help you comply with internal controls and regulations, such as Sarbanes Oxley,

21 CFR part 11, ISO 9001, GDPR, and CCPC by providing a complete breakdown of who changed what and when. Also, EBX software has multiple methods for distributing your data assets and its hierarchies through native SQL access, file export, or intranet sites/portals.

Indicators provide performance information for a point in time, over an entire time series, and their rates of change. Below are a few examples of how indicators can be used.



EXAMPLE INDICATOR	DATA DOMAIN	POINT-IN-TIME	TIME SERIES/RATE OF CHANGE	ALERTS
Data records	Customer	How many customers do we have?	How many new customers are we adding each month?	Alert me when we reach one million customers
Workflow execution time	Supplier	What is today's average for onboarding a new supplier?	How has our average onboarding time dropped?	Alert me if a supplier onboarding workflow takes more than three days
Workflow monitoring	Finance	What's the number of new GL account requests our finance team handles per day?	How much seasonality do we have in new GL account requests?	Alert me if we have more than 20 GL requests open
Data quality	HR	How many potential duplicate employee records do I have?	Has the number of employee record validation failures dropped over time?	Alert me if we have more than 30 duplicates detected during a day

EXAMPLE INDICATOR	DATA DOMAIN	POINT-IN-TIME	TIME SERIES/RATE OF CHANGE	ALERTS
Data completeness	Material/ Product	How complete are our material records?	How quickly did completeness improve for our material records?	Alert me if a product has less than 25 percent of its attributes completed
Data freshness	Reference Data	When were postal codes updated?	How frequently do we update our postal code data?	Alert me if postal codes have not been updated for more than one month
User activity	MDM Admin.	Who are our most active users?	How much have users increased their use of EBX software?	Alert me if a group or user is not active during a week
Data values	HR	What is the distribution of salaries for our employees?	How much has the average salary of our VPs changed over time?	Alert me if an employee's salary changes by more than 30 percent.

Indicators library
Monitor data and workflows with pre-built indicators

Flexible configuration
Set computation frequency, lookback period, boundary conditions, and thresholds

Dashboard
Set, visualize, and analyze KPIs with rich and interactive graphs

Alerts
Send real-time notifications and kick off workflows

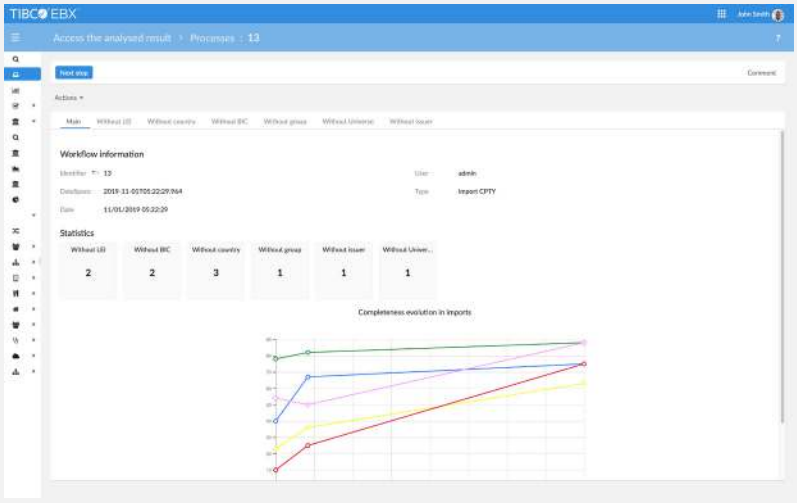
Native SQL access
Query indicator results in SQL

API
Create your own indicators

File export
Export data in CSV, XML, and Excel

Security & permissions
Enforce and secure fine-grained access

Email
Share reports and scorecards by email



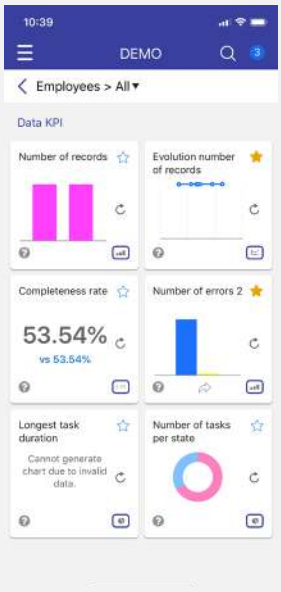
Feature Highlight: EBX GO Software, Mobile MDM

Enterprise Data Management In Your Pocket

Every successful data management program requires user adoption. When everyone has access to easy-to-use, intuitive data management capabilities, they can actively contribute to improving the quality of data assets. Whether it's searching, correcting, or enriching data assets—or even participating in workflows—managing data has to be as easy as sending an email or a social update.

EBX GO software extends enterprise data management capabilities to your mobile device. A native mobile client means your team can participate from anywhere using whatever device is available. For globally distributed stewardship teams, this removes latency and shortens approvals. For field teams, including sales, EBX GO software simplifies access to master and reference data, such as territories, product, financial hierarchies, and even business glossaries. These teams will always have the information they need at their fingertips to do their jobs.

EBX GO software is a native experience on iOS and Android devices and has all the EBX software features you love, including workflow, hierarchies, search, and more. To use it, simply download it from the App Store, point to your EBX software server, and you're ready to go.



Native iOS/Android app
Get it on the App Store or by side loading

Access any data
Create menus to access any data domain managed in EBX software

Browse and view data
Browse datasets and hierarchies with custom views and sort criteria

Search
Search on exact criteria or "Google-like" fuzzy queries

Workflow on the go
Manage your workflow inbox with native notifications

Approvals
Approve changes in workflows with full history and comments from your phone

Digital Assets
Export data in CSV, XML, and Excel

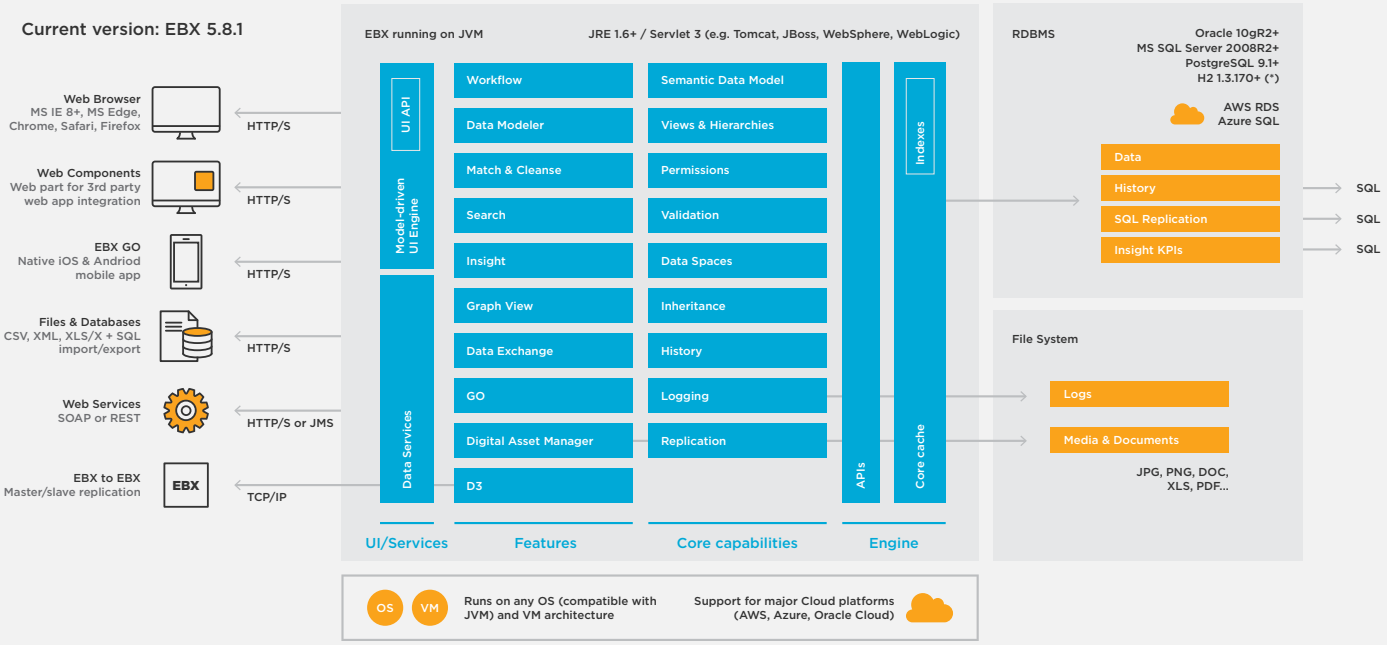
Favorites
Enforce and secure fine-grained access

Why a native app?

The EBX software web UI has always been accessible to anything with a browser. In fact, for quite a few of our customers, accessing EBX software through a tablet or iPad was the default way to get MDM on the go. However, in our conversations with these customers, our team learned that responsive web UIs, while sufficient for larger devices and computers, can be frustrating to use on smaller form factor devices like phones. Moreover, when we discussed why mobile MDM was needed, especially in field service use cases, customers expressed a need for the many built-in services smartphones provide (geolocation, access to the camera, simplified sharing, etc). It was for these reasons we decided to go native.

> **Learn more at https://www.tibco.com/products/tibco-ebx-software**

Product Architecture



Supported environments

Server

- Java Runtime Environment JRE 1.6+
- Any Java application server that complies with the Servlet 3.0+

Database

- Oracle Database 10gR2+
- PostgreSQL 9.1+
- Microsoft SQL Server 2008R2 +
- H2 v1.3.170+

Cloud IaaS/PaaS

- Microsoft Azure with Azure SQL Database
- Amazon EC2 with Relational Database Service
- Oracle Cloud with Oracle Database Cloud Service

Web browsers

- Microsoft Internet Explorer 8, 9, 10, 11
- Microsoft Edge
- Mozilla Firefox ESR 38
- Google Chrome
- Apple Safari

Mobile Device Support (EBX software GO)

- iOS 9.0 and above
- Android 4.1 and above

Integration

Integration is a key capability. It's how the systems and people in your organization will access clean and consistent master data. With EBX software, organizations can choose from server-side and client-side methods of integration. These approaches aren't mutually exclusive. In fact, many of our customers use several techniques simultaneously, applying the approach that best fits their use case and data domain.

In most cases, EBX software server-side integrations are "headless," or system-focused. The goal is to automate the flow of data to and from the MDM. In contrast, EBX software client-side integrations are user-focused. The goal is to provision master data when and where it's needed.

While a lot of teams hone in on systems integration. We think it's important to recognize the important role client-side integrations can play in your enterprise MDM program. After all, MDM, at its heart, is a change management challenge. Success is driven by user adoption. And since some users might balk at coming to the MDM, client-side integration gives you the opportunity to bring the value of MDM to them. Embedded EBX software screens in enterprise applications and/or in portals allows users to perform lookups, initiate change requests or issue management workflows all from the comfort of an application they know.

In our customer base, we have several customers who embed their customer lookup screens in applications, ranging from CRM to Digital Asset Management to ERP. And customers routinely embed EBX software-managed hierarchies through portals, such as Microsoft SharePoint, to distribute customer, organizational, product, or legal hierarchies to interested parties. By embedding read-only EBX software hierarchical views (instead of creating and updating spreadsheets or PDFs), our customers ensure that their constituents always receive the most up-to-date information on screen or via downloads into Excel, text, or XML files.

In the table below, we quickly describe the server-side and client-side integration approaches. Real-time (and on-demand) cadences involve the API, web services, and SQL. While files are generally used in batch.

STANDARD ENTERPRISE INTEGRATION PATTERN	EBX SOFTWARE FEATURE THAT PROVIDES SUPPORT
Messaging and other real-time patterns SOAP/WSDL and RESTful (JSON)	Model-generated data services support: web services, ESB (Microsoft BizTalk, TIBCO ESB, Software AG webMethods, IBM WebSphere ESB, Progress DataXtend & Sonic ESB, Talend ESB), and ETL (Informatica PowerCenter, IBM DataStage, Microsoft SSIS, Oracle Data Integrator, IBM WebSphere ESB, Talend ETL). These data services also support calls from BPMS such as: Oracle BPM, IBM Lombardi, and TIBCO, allowing you to integrate data stewardship and governance workflows into your business processes.
Database pattern/SQL	EBX software SQL Replication enables both direct database calls (native SQL support), replication, and synchronization (eg. ETL) strategies. EBX software can also import data from tables in the RDBMS you specify.
File transfer	EBX software Data Exchange supports file-based integration through text, XML, and XLS.
Remote procedure invocation patterns	EBX software Java API supports function calls from Java or .NET (via bridges) applications.
Client integration	EBX software web components allow users to integrate its screens into their applications. This pattern can be used for read-only access, for example, distributing business glossaries and hierarchies via portals, such as SharePoint or through screens within the enterprise application. This pattern could also be used to support workflows that begin in the enterprise application but complete inside EBX software.

What Makes EBX Software Unique?

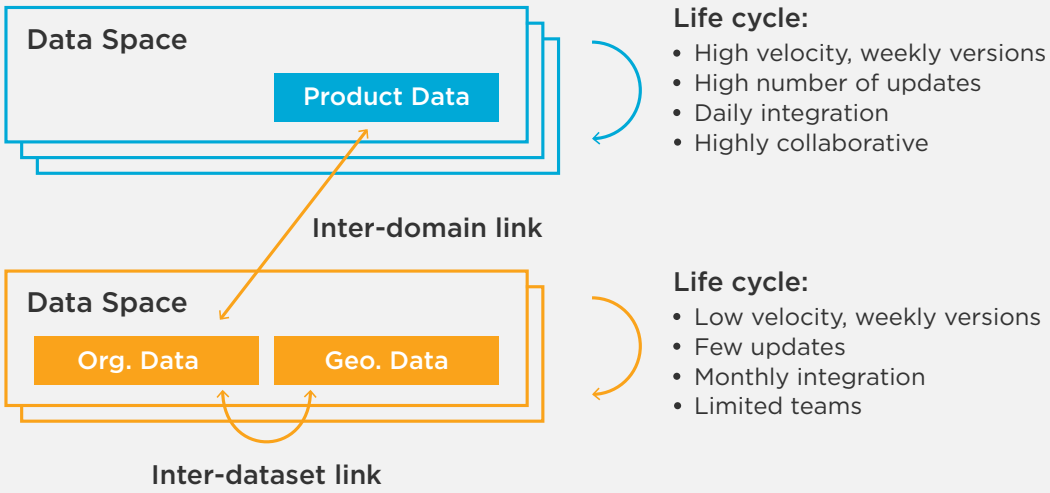
Cross-domain Relationship Management

For your enterprise data management program, you need to manage not only multiple data domains but also strong relationships between domains. Without a true multidomain data management solution, you could face the following key issues:

- Some solutions claim to be multidomain but don't provide the ability to isolate each domain (with different life cycle, security policies, and governance constraints) while maintaining links. The risk here is to rely on a monolithic solution that cannot adapt to each new business requirement.
- Some solutions rely on multiple products (customers, products, etc.). Here the risk is even more important because data assets are managed in silos without any link between the various data hubs.

To achieve cross-domain relationship management, EBX software provides a unique capability called “data spaces”. In a central EBX software instance, a data space is an isolated area that contains datasets. A data space can be considered a vertual area that has its own life cycle (versions, permissions, and users).

Thanks to data spaces, you can isolate your various data domains, for instance Products, Charts of Account, Customers, Countries, Trading Partners, Vendors, and reference tables. While data spaces are isolated, EBX software provides the unique capability to define relationships between data spaces.



For instance, a legal entity in the Organization data spaces can refer to a country in the Reference Tables data spaces. EBX software will automatically enforce integrity controls on this relationship. In addition, data spaces allow you to work on multiple parallel versions of data. For instance, the Organization master can contain the current organization hierarchy and future versions. EBX software allows you to compare and merge versions together.

Model-driven Data Management

In any data management program, you have to deal with complex and different data structures (simple and complex hierarchies, tables, various cardinalities, and more). The wide variety of data objects requires different data modeling capabilities.

EBX software relies on "semantic" data modeling capabilities, which allows you to design rich data models. A data model in EBX software can mix various concepts such as hierarchical relationships, object-oriented entities, and traditional relational models. This means that you will be able to model all your master domains and benefit from the unique "model-driven" capabilities of EBX software. As the model is semantic, the software dynamically generates the user interface and the service layer without the need for coding screens or interfaces.

In addition, EBX software allows you to enrich a data model with documentation for end users (all languages are supported) and business rules for enforcing complex validation controls and data quality checks. EBX software also supports a full versioning of metadata. This means it is possible to work on multiple versions of a model, keep track of previous versions, compare changes, and even publish multiple versions of different datasets.

Multi-domain and Cross-functional Data Governance

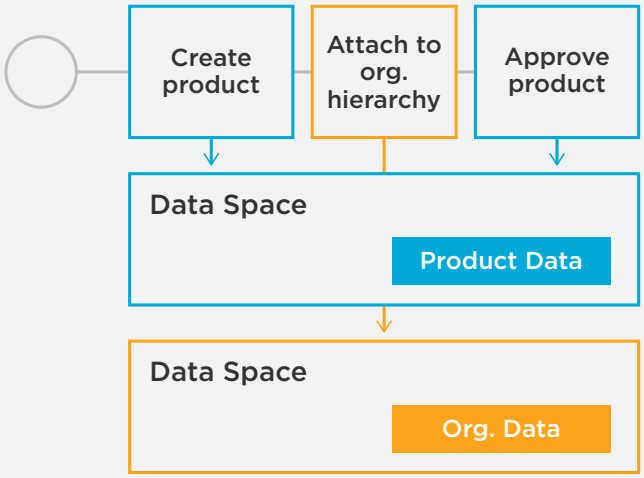
One of the main strengths of EBX software is the user experience. The solution provides business and IT users with a 100 percent web-based user interface that provides access to all the data governance features, including data modeling, business rule definition, workflow, security, history, version-control, and service configuration.

This means that you can deliver the data management user interface to a wide range of business users (even integrated in a portal) with minimal or no training. At TIBCO, we think that the user experience is the most important success criteria for any data management initiative.

Beyond the ease of use, EBX software also provides a workflow capability for a true data governance strategy across multiple data domains and business functions.

While most data management software requires a third-party solution for workflow, EBX software provides an embedded data management workflow engine. The main benefit is the ability to dynamically "map" a process to the underlying data model, security policy, and user interface. When the data structure or any business rules change the workflow will automatically adapt.

In addition, EBX software's workflow lets you configure "cross-domain" processes. For instance, a workflow can span between reference tables, organization and business partners by mapping its various tasks to different data domains. (Data spaces enable multi-domain MDM with relationships between domains.)

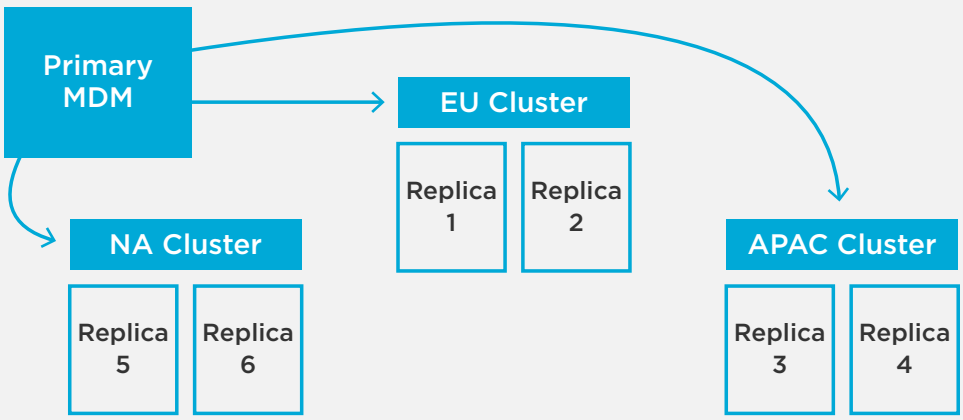


One data workflow spans two master data domains

Two master data domains isolated in data spaces with different lifecycles, integration patterns, and user groups

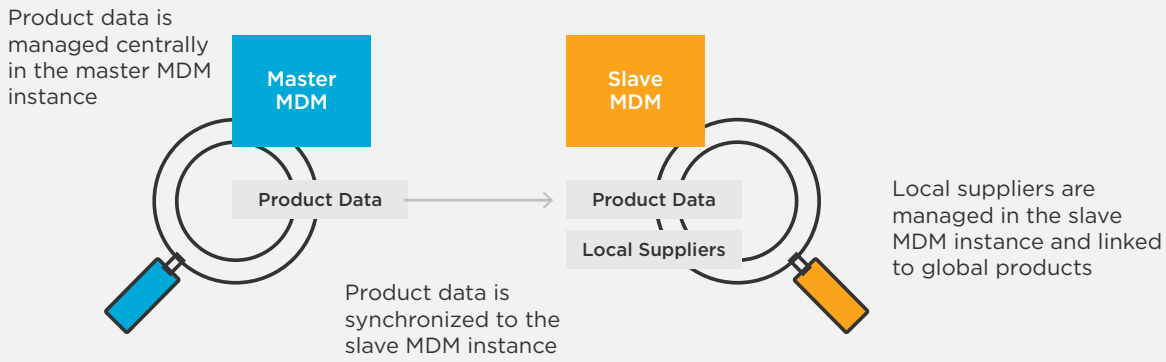
Scalability and Wide Data Distribution

By definition, a multi-domain data management platform needs to scale and cover all business functions, regions, and IT systems across the enterprise. In a complex and distributed organization, relying on one single "hub" can be risky. Most solutions propose only a central hub architecture without any way to distribute and scale.



EBX software includes a unique capability called D3 (Distributed Data Delivery). Rather than relying on a single MDM instance, D3 lets you deploy the MDM in a distributed architecture. An EBX software instance dedicated to data governance can then be synchronized with other EBX software instances for data access (support for clustering in a real-time SOA) or geographical distribution.

D3 can also be used to synchronize different MDM instances that need to share common reference data.



Multi-language Data Management Platform

For large and international organizations, it is critical to rely on true multi-language solutions. This means the ability to localize both metadata and data in any language. EBX software provides advanced localization features, including:

- The product user interface is available in five languages: English, French, German, Spanish, and Portuguese
- Data models (metadata), including entities, fields, labels, descriptions, and error messages attached to business rules can be localized in any language (UTF-8 support). Based on user preferences, EBX software will automatically present data models in the preferred language.
- Data content can be localized using unique inheritance features. For any dataset, the values of any field can be adapted to a specific language, without any data duplication. For instance, the product labels in a product dataset, by default in the English language, can be localized in multiple languages. EBX software allows you to overwrite only values that need to be localized and maintain automatic inheritance for the others. In the user interface or the service layer, it is possible to perform CRUD operations at the global level or at any sublevel dedicated to specific languages.

Standards-based Integration

Our EBX software has been built on top of industry standards in order to provide a clear decoupling between MDM and any third-party middleware solutions. Our experience shows that this decoupling is critical since our customers can use various middleware technologies (or change it over time), depending on data domains, architectural constraints, or integration patterns.

To achieve this, EBX software provides a data services layer that exposes data operations and content as standard SOAP/WSDL or RESTful web services. This data services layer allows you to connect the MDM to any source or target systems in real time (or batch via file import/export). It also provides data lineage capabilities for configuring exact relationships between systems at the field level.

We Help Organizations Manage Their Most Important Data

TIBCO EBX software helps organizations manage their most important data, whatever that may be. We provide a software solution that lets users manage, govern, and share any and all data assets, including master data, reference data, and metadata, because we know that effective data management often requires more than a single point solution.

> **Learn more about TIBCO EBX software at https://www.tibco.com/products/tibco-ebx-software**

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