



For a World Where All Data is Linked
Information Workbench

Linked Data at Your Fingertips





Linked Data in the Enterprise – A New Paradigm for Innovative Data Management

Semantic technologies make data machine-understandable by embedding them in a larger context of meaning and enriching them with metadata. Thus, data can be interpreted, researched, managed and reused. Logical inferences can be automatically drawn and relationships between information from different sources can be established. In this context, Linked Data standards play an important role. The term Linked Data refers to data represented in a unifying, machine-understandable data format that makes it possible to semantically interlink and connect heterogeneous resources at data level – regardless of the format, structure, author and data source. The so-called Linked Open Data (LOD) cloud e.g. provides interlinked Web data belonging to different areas and topics. These data exhibit a high degree of interoperability and ease of reuse. Combining Linked Open Data with company-internal data represented as Linked Enterprise Data paves the way for modern and innovative data management and allows for intelligent data aggregation, discovery, integration and (re-)distribution.

The combination of Linked Open Data and Linked Enterprise Data offers great potential for building innovative applications that integrate heterogeneous data from different sources in order to overcome the limitations of traditional data management systems.

Our Solution – The Information Workbench

The Information Workbench® from fluid Operations® is a highly customizable platform for Linked Data management and solution development. This includes support for the semantic integration of heterogeneous data sources going beyond the boundaries of individual data silos, collaborative knowledge acquisition and augmentation, semantic search, business intelligence and analytics, as well as data visualization and exploration. Designed as a self-service platform, the Information Workbench provides all the tools and features for building personal Linked Data applications in the

enterprise. Companies from various industries have already discovered the potential of Linked Data and have started to successfully implement solutions on top of the Information Workbench.

Information Workbench Application Areas

Healthcare & Life Sciences // Media Industry // Public Sector // Data Centers		
Integration	Collaboration	Business Intelligence & Analytics
Data Integration with Linked Data Standards	Collaborative Knowledge Management	Interactive Visual Exploration & Semantic Search
Integration of Enterprise, Web and Social Data Sources	Semantic Wiki based Authoring and Publishing	Predictive Analytics
Intelligent Metadata Management	Collaborative Operations Management	Customizable Charting and Reporting

Information Workbench Benefits

- Semantically integrate and interlink data scattered among different systems, to provide a unified view on previously isolated data silos.
- Cross the chasm between enterprise-internal and public data, thus making public knowledge available internally.
- Explore global Linked Open Data registries and integrate relevant data sets on-demand.
- Leverage semantic technologies for improved search, presentation, collaborative augmentation of data, collaborative authoring and publishing.
- Rapidly build innovative Linked Data applications addressing expressive information needs using Linked Data standards.
- Semantic Wiki supporting collaborative knowledge management and flexible user interface customization.

Information Workbench

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Key Features of the Information Workbench

Semantic Data Integration and Interlinking

The Information Workbench is an intelligent platform which allows for the integration, correlation and processing of data. It enables semantic access to and intelligent search across the whole integrated dataset, and supports users throughout the complete life cycle of interacting with data: from integration and creation, to maintenance, to use and reuse of data.

Information integration in the Information Workbench relies on so-called data providers. Data providers gather information from internal and external systems. The platform integrates the collected information in a central place and correlates them with information available on the Web, such as information from Social Networks, Linked Open Data Sources or other data markets from the Web. The platform comes with a selection of predefined provider types, while further customized providers can be easily integrated. Thanks to the integration and intelligent metadata management functionalities provided by the Information Workbench, enterprises are able to overcome the difficulties of managing data from different sources and systems, thus breaking down isolated data silos and providing a unified view on the data and their relationships. Company-internal data can be complemented with public data available in Social Networks or with data sources available in the LOD cloud.



The Information Workbench semantically integrates and interlinks data / information from every enterprise-internal and public data source.

Collaborative Knowledge Acquisition and Augmentation

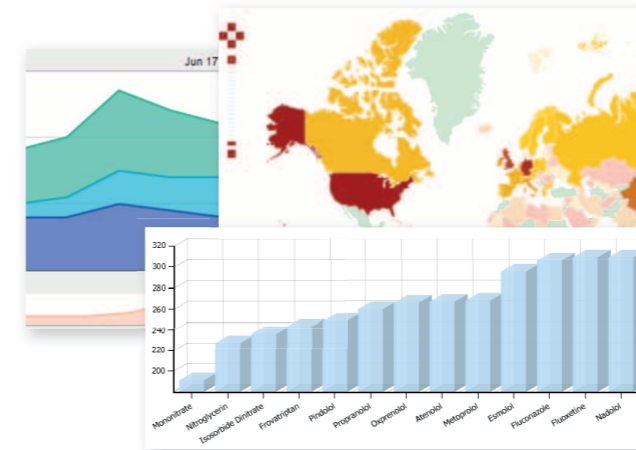
The Information Workbench enables efficient collaboration in large and virtual teams working at different locations and being involved in multiple processes. The full potential of linked information hidden behind different company-internal data sources or spread throughout the Web is realised with the Information Workbench.

The platform supports collaborative knowledge acquisition by using a Semantic Wiki which allows users to easily change, create and interlink information collaboratively, and enrich them with information from public Web sources. Semantic Wikis differ from traditional wikis in that they are linked to an underlying semantic database. They offer a special syntax which is used to write the unstructured data directly into the database. The Semantic Wiki of the Information Workbench provides a wiki page for each information object, including all its links and related metadata, and allows users to edit the page with free text or establish relationships between objects using semantic annotations. In addition, ontology-driven edit forms support the target-oriented knowledge acquisition process. Within this process, the system permanently tracks data provenance and user changes.

The Information Workbench also delivers capabilities which have been custom-developed to support semantic authoring and publishing workflows. This term describes the whole process for dynamic development and publication of semantically enriched content. This includes content research and content development, writing, several approval processes, publication and reuse of content. The platform supports automated authoring processes with automatically generated input forms and ontology-based auto-suggestion lists, as well as automated publishing processes from the first draft, to several review cycles, to automated publication.

Business Intelligence and Analytics

The Information Workbench provides advanced features for ad-hoc reporting and analytics across the border of isolated data silos. The platform provides advanced capabilities for navigation through large data sets, and allows users to trigger individually defined queries and to analyze the results. It allows for the easy export of information or search results into various formats. Users can continue to work with this data or share it with others. Individually created dashboards based on historical data visualize dynamically generated query results in various formats, such as bar and pie charts or timeline



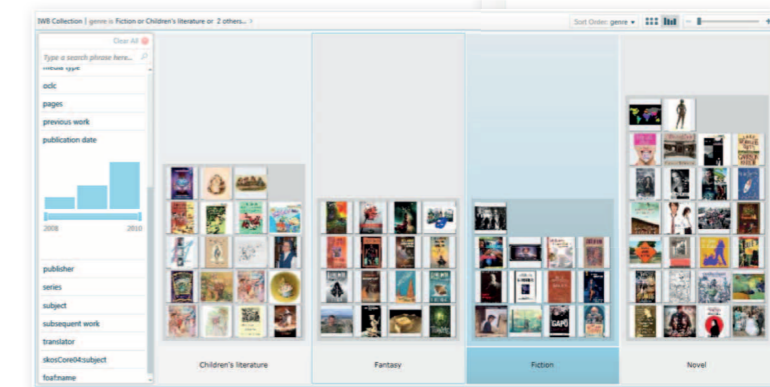
The Information Workbench offers a broad array of analytical capabilities.

diagrams. The results of an intelligent analysis across large amounts of data can be used for the prediction of critical business trends and for optimizing business strategies. Users only need the Information Workbench for integrated search, query and report generation. The platform offers a holistic view on previously isolated information and supports closing communication gaps between different teams and departments.

Visualization

The Information Workbench comes with a living user interface that is context-sensitive and dynamically configurable, flexible and customizable, extensible and widget-based.

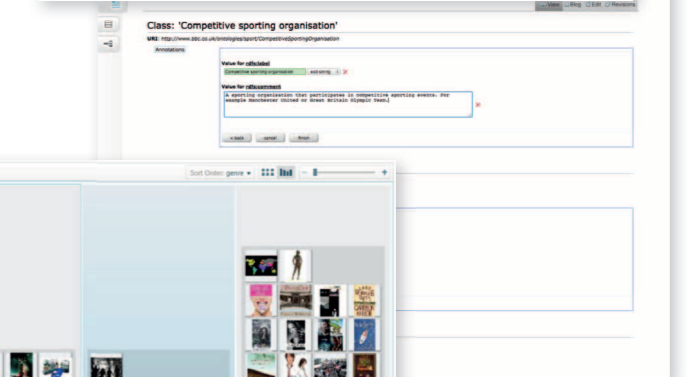
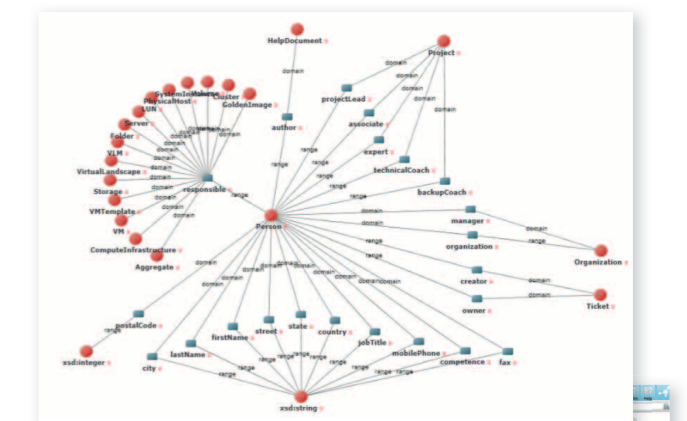
Widgets are components of the user interface that display information in different formats e.g. geo-mappings to display locations mentioned in the data, heatmaps, tag clouds, Twitter live feeds, etc.



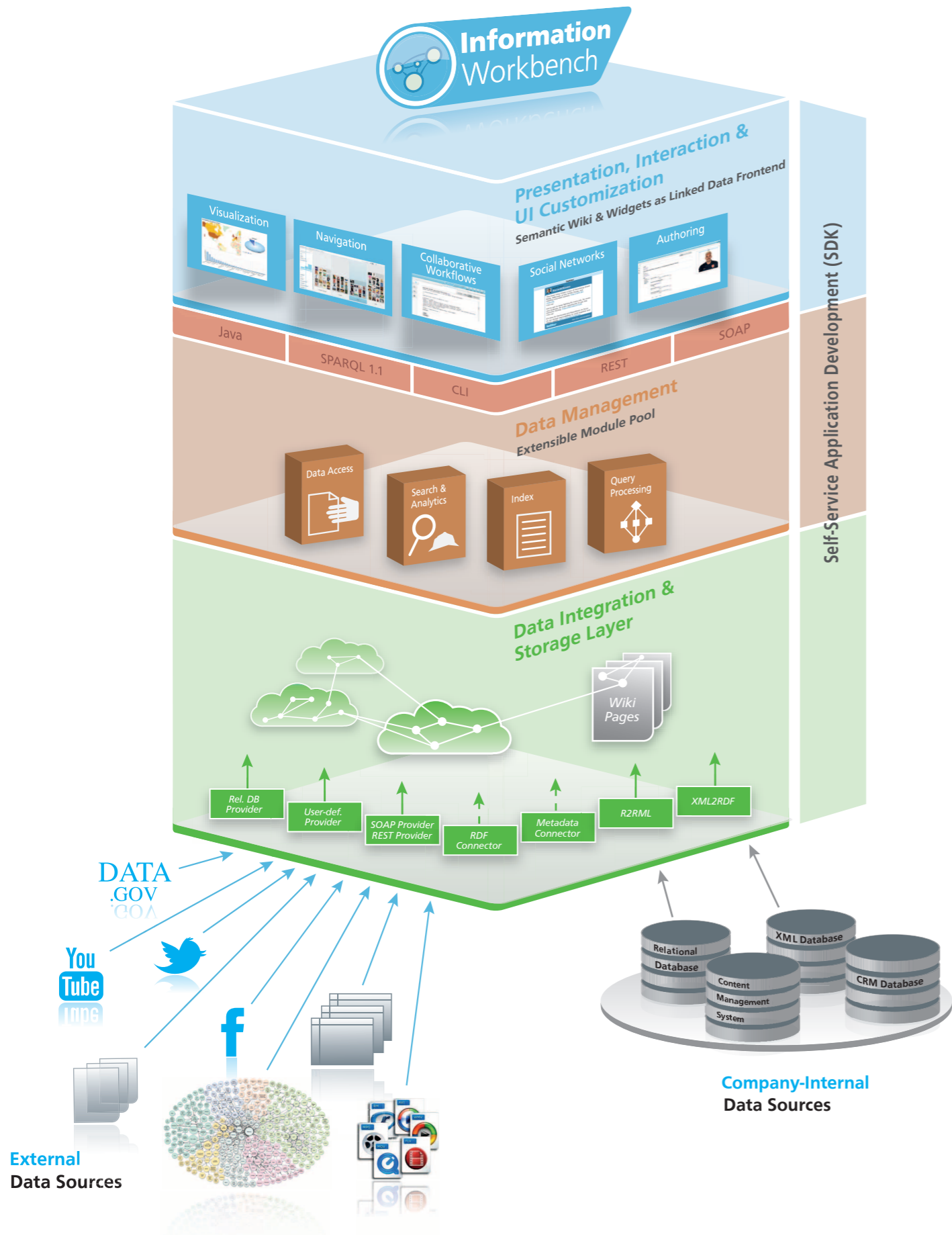
The Information Workbench provides different views on data.

The user utilizes an extensible pool of pre-defined widgets, which are dynamically selected based on the semantics of the data to be visualized.

In addition, the Information Workbench provides further interactive views on data. A customizable semantic wiki view provides a semantic view on interlinked information objects and their related metadata. The table view displays structured information in a tabular format and allows users to add or change information using ontology-based auto-suggestion lists. An interactive, customizable graph view displays information objects and their linked objects, information and data. Thus, previously unknown relationships can be discovered very quickly. The Pivot Viewer visualizes results and hits and provides interactive filtering, grouping and sorting capabilities for the visualized data. A preview of the selected information object contains all available information and metadata.



Information Workbench Architecture



Data Integration through Data Providers

Information integration in the Information Workbench relies on the concept of so-called data providers. A data provider is a module that gathers data from an internal or external data source, converts it into the RDF data format, and appends the converted data to the virtual repository. The providers are customizable and extensible, ultimately allowing users to integrate data from every accessible data source. Accounting for the dynamics of existing data sets, the provider concept also offers built-in mechanisms to synchronize information sources periodically.

The Information Workbench comes with a variety of predefined provider types supporting the fast integration of legacy data sources like

- relational databases or other tabular data such as CSV files,
- Web data accessible through the SOAP or REST protocol,
- internal systems such as LDAP or ERP,
- XML files and many more.

Complementary, Linked Open Data registries are used for automatic data discovery, allowing the user to visually explore and integrate Linked Open Data sources from the Web with little effort. In addition to automated data integration via data providers, the Information Workbench offers interfaces to Google Refine, where users can manually develop and refine sophisticated data mappings and easily import the created RDF data in the Information Workbench.

Advanced Search and Efficient Information Access

Conceptually, every resource in the Information Workbench repository may have associated structured data in the form of RDF triples and unstructured data in the form of its Wiki page, both of which are treated as first-class citizens. Accounting for the co-existence of structured and unstructured data, the system implements advanced search paradigms, like

- the combination of simple keyword-based and more complex graph pattern-based search, allowing for an integrated search in both the structured and unstructured repository content,
- faceted search, making it possible to refine search results along several dimensions,

- hybrid search methods allow to combine the search methods and
- Pivot based search enables filtering, grouping and sorting search results and hits of large amounts of data.

Semantic Wiki and Widgets as Linked Data Frontend

The living UI built on top of the Information Workbench is realized via semantic-aware widgets. The automated widget selection process is data-driven and follows a resource-centric paradigm: whenever the system is issued to display information related to a certain resource, the data associated to this resource is matched against the requirements of existing widget types and the system selects those widgets for visualization that fit the data under consideration. There exists a large collection of predefined widgets with varying functional focus, such as

- visualization widgets like charts and diagrams that can be used to display query results,
- navigation widgets, like a browsable graph of the underlying RDF data,
- collaborative workflow widgets, like Wiki edit pages or editable property-value lists,
- social networking widgets, e.g. to integrate associated Twitter or Facebook live feeds, or
- authoring widgets which allow for the automatic creation and publishing of interlinked information.

Accounting for the self-service application development paradigm, developers can customize and extend the predefined set of widgets by writing their own scripts and Java code.



LINKED DATA ENTERPRISE CLOUDS

Information Workbench provides Linked Data as a Service

The fluidOps portfolio is driven by a rigorous Everything-as-a-Service philosophy, enabling the allocation of resources across the whole IT stack as a service. Going beyond the provisioning of infrastructure and applications as a service, the Information Workbench provides an architecture in which also data sources (e.g. from the Linked Open Data cloud) can be consumed as a service. This data as a service concept is realized by the virtualization of data sources, where remote sources can be connected ad hoc based on a federation approach, while the location and access of these sources is transparent to application developers and end users. The Data as a Service concept comes with a logical decoupling of data from applications. Thus, data sets can be used in the enterprise regardless of the application they are managed by or stored in. This makes data silos turn into data components, which can be flexibly combined and integrated on-demand into services and applications.

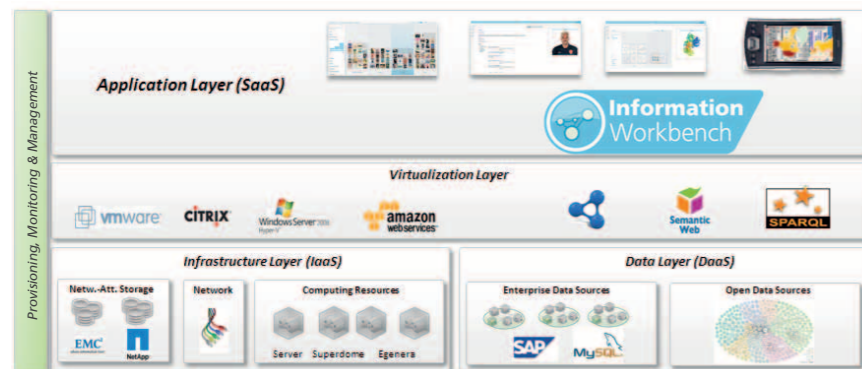
The Information Workbench Approach

The Information Workbench provides Data as a Service but goes far beyond. The platform provides e.g. advanced visualization and analytic capabilities which allow users to dynamically define charts and reports based on individual queries, to sort and filter data sets by different parameters, and to visualize results in various formats.

Data collections and visualizations can also be published, re-used and shared with others.

The Information Workbench facilitates the fast integration of literally every company-internal and external data source. These include legacy data sources such as relational databases or other tabular data, internal systems such as LDAP, ERP and many more, as well as Web data sources such as information available on Twitter, Facebook, Youtube, etc. In addition, the Information Workbench also allows for the integration of LOD data sources.

The value-add of using Linked Enterprise Data and Linked Open Data lies in the semantic integration and interlinking of data scattered among different data sources. The publishing, re-use and sharing of data is simplified by increasing openness and accessibility of data. Furthermore, linking to Linked Enterprise Data and especially to Linked Open Data enriches and contextualizes the integrated data set. The Information Workbench crosses the chasm between enterprise-internal and public data and extracts value from data. New Linked Data applications for extensive information needs in the enterprise can be quickly and easily created. And this without any programming skills – the Information Workbench provides all the necessary tools and features. It is designed as a self-service platform and it integrates and correlates information from enterprise internal data sources with public information available on the Web and allows for semantic access and intelligent search across the whole dataset and beyond the boundaries of individual data silos.



Consume data sources as a service with the Information Workbench.

Linked Data in a Federation – FedX

fluidOps has developed a practical framework for transparent access to multiple Linked Data sources through a federation – FedX. Users of the Information Workbench benefit from a seamless integration of this framework meaning that multiple RDF repositories (e.g. remote SPARQL endpoints) can be accessed as if the entire data resides in a single database.

SPARQL, a W3C standard, is the graph-based query language for RDF, which enables users to query, aggregate and edit RDF data. Federation extensions facilitate the simultaneous access to distributed data sources allowing integrated querying and correlation of data that is freely available on the Web. Data sources can thus be integrated as a service. Users of the Information Workbench gain the ability to correlate and enrich enterprise data with Web data on-demand and on-the-fly. The access to multiple data sources through a federation is transparent for the users, meaning that the FedX query engine evaluates SPARQL queries at relevant endpoints.

FedX allows to easily setup on-demand federations and to query these federations in a transparent and efficient way. The system does not need any preprocessed metadata such as statistics or indices, thus being suitable for on-demand query processing (including the modification of federation members, i.e. data sources, at runtime).

FedX offers the following features:

- Virtual integration of heterogeneous Linked Data sources
- Transparent access to data sources through a federation
- Efficient query processing in federated environments
- On-demand federation setup at run time
- Comprehensive CLI for federated query processing

FedX in use in the Information Workbench



Information Workbench changes the way in which you produce and consume content.

Linked Open Data Discovery: Data sources can be visually explored and discovered using a global data registry, e.g. CKAN.

Self-Service Federation Setup: A browser-based self-service UI can be employed to integrate discovered Linked Data. The federation can be configured on-demand at run time.

Query Definition: A query can be formulated ad-hoc or selected from a collection of predefined queries.

Query Execution & Result Presentation: The query is executed using FedX and evaluated at the configured federation members. Results are presented in widget-based UI components.



Information Workbench for Media Management

The digital age significantly changed the behavior of companies (regardless of their industry) and consumers when dealing with, obtaining and managing information. Both enterprises and individuals continue to invest more time in the Social Web and are faced with ever increasing amounts of information and content.

Particularly affected by this change is the publishing and media industry. A major challenge consists of developing innovative product and service offerings while at the same time reducing the costs incurred for content creation. In this context the enrichment and reuse of existing content is very important. Many publishing and media companies have already discovered the potential of Linked Data and semantic technologies and have started to implement strategies for publishing dynamic and semantically enriched content. One of them is the largest British broadcaster who has decided for the Information Workbench to support its dynamic semantic publishing strategy (DSP).

The DSP approach uses Linked Data technology to automate the aggregation and publishing of interrelated content objects according to an ontological domain-modeled information architecture, providing a greatly improved user experience and high levels of user engagement. The use of semantic data formats increases the reuse and recycling of existing content, enables automatic content correlation and interlinking with further relevant topics, and supports the creation of new advertising services as well as search engine optimization through improved metadata annotations of published content.

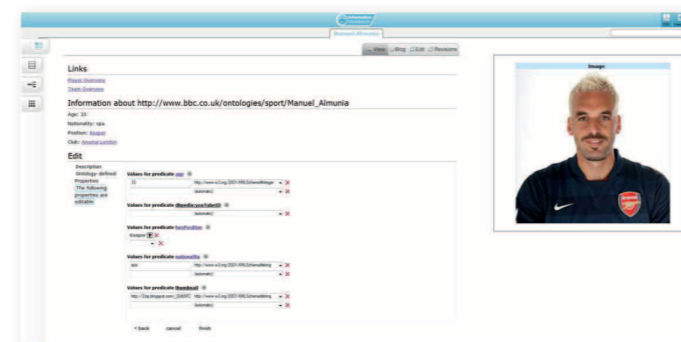
Our Solution for Content Producers

The Information Workbench supports editorial processes for semantic data – from authoring and curation to publishing of ontology and instance data following an editorial workflow. Approved content is available for automatic publication on websites. The platform seamlessly integrates into already existing editorial processes and automates the creation and delivery of semantically enriched content.

Information Workbench Benefits for Content Producers

Dynamic Semantic Authoring: Content producers such as editors, writers, media managers, webmasters, journalists and all individuals who need to do research, create and write content, go through approval processes and publish and reuse dynamically generated content are supported by the Information Workbench. The Information Workbench supports content producers to:

- create and maintain content using automatically generated data entry forms which are based on the underlying semantics,
- easily establish relationships between objects,
- correlate content automatically and
- interlink information with further relevant topics.



Authoring made easy with the Information Workbench.

Dynamic Semantic Publishing: The Information Workbench supports the full automation of data publishing processes from the first draft, to several review cycles, to automated publication. The solution allows content producers to realize real data driven journalism by:

- creating and publishing interlinked content automatically as fully dynamic websites,
- re-packaging and re-using content individually and publishing it automatically at any time,
- making visible spontaneous content changes immediately,

- delivering websites which automatically provide personalized and event-driven information, enriched with information e.g. deriving from social networks or with geographic data.

Interlink and Integrate Data Sources: Access integrated and interlinked content in a central place. Content can derive from any internal source, from the Web and from different authors. Special content such as articles can e.g. be quickly and automatically interlinked and enriched with background information deriving from other data sources, with content from the social Web, with archive information and with own comments, and then made available to end users.

Enrich Content with Metadata: Create and collaboratively edit new content, add or edit metadata, create links between content or add free text documentation.

Our Solution for Content Consumers

The Information Workbench supports content consumers in acquiring, storing, correlating, consuming, re-using, sharing and monitoring large amounts of data, regardless of the data source. Data can derive from social networks and blogs as well as from data or online stores offering music files, videos, eBooks etc. Data can easily be integrated and enriched with information deriving from Twitter or Facebook or other public available data sources. The platform offers a unified view on the integrated dataset and allows for easy search, navigation, visualization and analysis of large amounts of information from disparate data sources.

Information Workbench Benefits for Content Consumers

Acquire and Consume large content volumes: With the Information Workbench content consumers easily integrate, store, consume and share large databases such as complete music and video archives or digital libraries. The solution enables content consumers to:

- enrich media with information deriving e.g. from DBpedia, Flickr, Last.fm, Youtube etc.,
- discover interrelations between files,

- browse through the media by using semantic search functionalities. When for example searching the database for a specific song, the results page will include a link to other songs of the artist, the corresponding music video, a cover picture alongside common information such as title, artist, album etc.

Handle large content volumes: The Information Workbench enables content consumers to:

- easily navigate through large and rapidly changing databases,
- always find exactly what they are searching for,
- trigger individually defined queries and create dashboards of dynamically generated query results in various formats,
- visualize large databases using different views on data,
- recognize patterns and make transparent complex networks of relationships between data and their associated details and meta-information.



The Information Workbench easily taps large media databases and links it with publicly available data sources.

Interact with large volumes of content: With the Information Workbench content consumers can change, create and interlink large volumes of content, create or edit links between data and enrich them with information from public Web sources. They can also add, edit or delete free text annotations or choose and add automatically generated information.

Information Workbench for Semantic Master Data Management

In many enterprises, data is scattered across different silos, with each department managing its own information, often unaware of how it affects the rest of the organization. Typically, a single application makes use of a single data source. Data silos include:

- company related data originating from different enterprise applications such as ERP systems,
- customer related information such as projects, SLAs, information from CRM systems etc., and
- infrastructure related information/assets such as hardware, software, etc.

For these challenges we propose Semantic Master Data Management which seamlessly integrates and provides a unified view on all these data and offers significant opportunities. It allows users to explore relationships between data, document and annotate them

in a central place, and analyze key performance indicators, preferably on-demand and ad-hoc. This enables flexible and scenario-based insights into upcoming developments and proactive planning on a long-term basis. Our Semantic Master Management Platform is the key to master all the technical challenges to bring together heterogeneous data sources:

- Various data formats (XML data, relational databases, spreadsheets, etc.)
- The variety of mechanisms for accessing different data types which requires a large set of different APIs
- Data from various domains
- Data sources which are partly overlapping, partly complementary
- Redundancy
- Different IDs for the same resources which are used across data formats

Our Solution

With the Information Workbench, fluidOps delivers a tool for Semantic Master Data Management. The semantic data model leads to an integrated, resource-centric view on the entire data set, making vital relationships between resources explicit. In combination with cutting-edge technology for search, collaboration and exploration, the solution clears the way for intelligent information management and master data management. Our Semantic Master Data Management solution follows a two-step approach:

Phase 1 – Integration: As shown in the diagram, the Information Workbench integrates all data into a unifying repository using data providers. Data providers lift existing data sources to RDF format and integrate the RDF data into the central repository. In the first phase all data are also aligned using a global ontology which allows for a format- and tool-independent view on the data. This ultimately provides a unified and integrated view on all data in form of a graph in which all objects are linked with each other.

Phase 2 – Logical Mapping: In the second phase entities originating from different sources are brought together. A logical view is generated in which data items are logically mapped. Equal data are identified across different data sources and aligned. The logical mapping layer derives IDs spanning different data sources.

Benefits of Semantic Master Data Management with the Information Workbench

Seamless integration creates transparency: The end-to-end integration of different data sources provides an integrated and holistic view of previously isolated information.

Improve the quality of your data: Avoid wrong management decisions and misleading information by aligning data from different data sources. Clean data sources using automatically generated comparison lists.

Reuse data: Open APIs for data access provide export functionality and interfaces for reuse of the integrated dataset.

Discover redundancies and inconsistencies: Merge different data sources in a central place, detect errors quickly before they lead to wrong decisions and take preventive measures.

Ad-hoc analysis: Use interactive visualizations in which all objects are interconnected for innovative ad-hoc analysis and reporting across the border of departments.

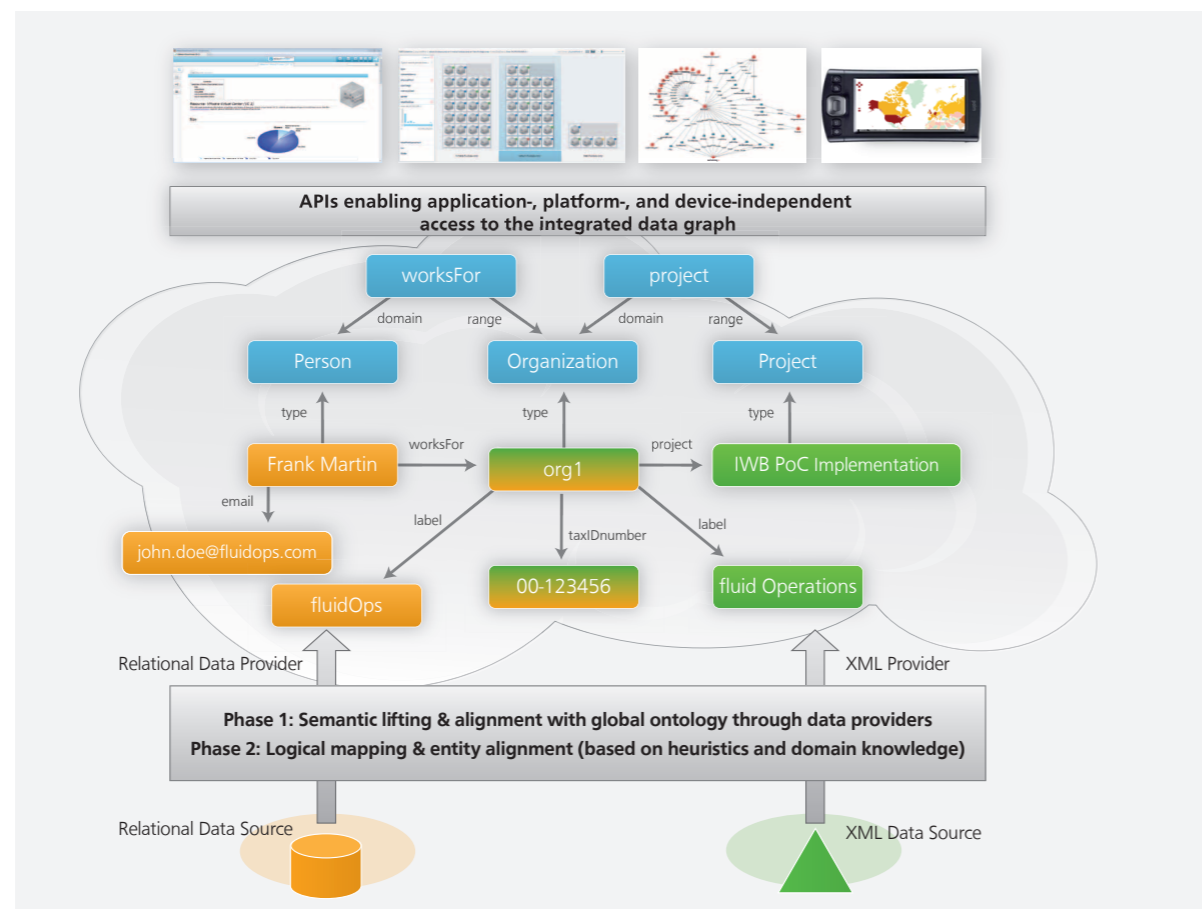
Optimize processes: One central tool for integrated search, query and report generation closes communication gaps between teams and departments and realizes enormous time savings.

Tight Integration of IT and Data Center Resources

With the eCloudManager® Intelligence Edition, fluidOps has developed an out-of-the-box solution for the special requirements encountered in the data center domain such as:

- access infrastructure data automatically delivered by data providers,
- automate data center processes such as root cause analysis and error handling, technical documentation and responsibility management, performance monitoring and capacity planning, resource management, IT Service Management, reporting, technical support management, billing procedures, and many more,
- manage data center resources and business-level information in a unified way without system boundaries,
- improve internal knowledge management processes and workflows driven by latest semantic technology,
- create user-defined dashboards and reports, e.g. to analyze KPIs, monitor cost and utilization of data center resources, and identify risks, problems, and optimization opportunities.

The eCloudManager Intelligence Edition is based on the Information Workbench which offers a full set of capabilities for a Semantic Master Data Management. In the data center domain the solution supports daily data management tasks and helps organizations identify data center risks, problems and optimization opportunities. The eCloudManager Intelligence Edition integrates business-level resources, such as customer and projects catalogs, with data center resources across the whole IT stack – from the hardware to the application layer – in a central place. A major international provider of information and communication technology is already using the eCloudManager Intelligence Edition from fluidOps for Semantic Master Data Management.



An organization (in this case fluidOps) is represented by two different IDs in two different data sources. In a first step, the Information Workbench aligns this information using a global ontology. An ontology (represented in blue) describes concepts and their context. In a second step, the Information Workbench matches the two identical tax ID numbers from the two datasets and establishes that the two different company IDs refer to the same organization. The two organizations are merged. The resulting data graph aggregates the information about the two initial organizations while storing the details about data provenance.

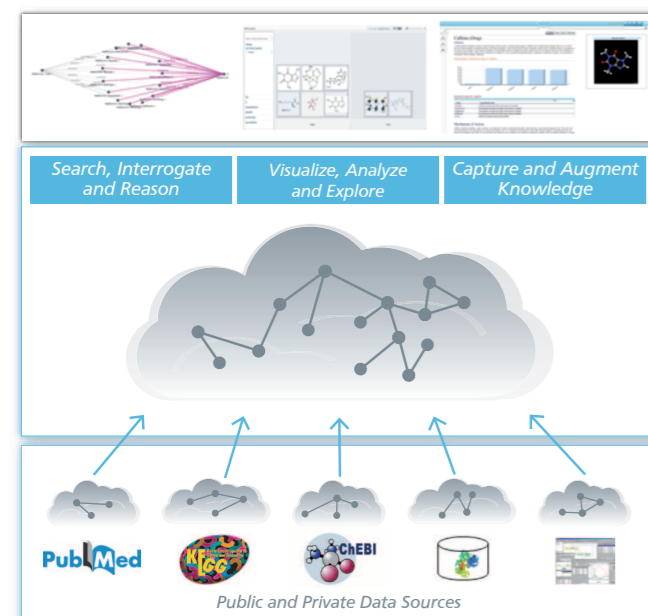


Information Workbench for the Healthcare Industry and Life Sciences

The invention of a new drug therapy is a high-risk, knowledge-intensive process and typically involves many people from different organizations. Scientists engaged in Healthcare and Life Sciences research are faced with large amounts of distributed data and open Web databases rarely following a common pattern. Information needs can only be answered by combining, mining, and correlating massive amounts of highly technical structured and unstructured content from several sources. One of our customers from this sector is a German-based global pharmaceutical and chemical company.

Our Solution

The Information Workbench processes bio-medical and chemical data and connects information from different sources. Users can search across large volumes of bio-medical literature and databases, and extract and link relevant information. This enables a unified view across data silos and allows scientists to use data in an integrated way. Integrating existing specialized tools for generating knowledge networks (such as CellDesigner), the Information Workbench enables semantically enriched, distributed, bio-medical knowledge acquisition, sharing, and reuse.



The Information Workbench processes bio-chemical and chemical data and connects information from different sources.

Information Workbench Benefits

Single View Across Disparate Data Resources

The Information Workbench allows pharmaceutical companies to semantically integrate and interlink their private bio-medical databases with public databases such as KEGG, Drugbank, ChEBI, and PubMed, thus providing a unified view on isolated data silos and enabling the company to cross the chasm between enterprise-internal and public data. Unstructured sources such as scientific literature (e.g. PubMed articles) and sophisticated data mappings created using Google Refine can also be integrated.

Derive New and Prior Knowledge

Researchers and scientists can collaboratively acquire new and complement existing knowledge, by being able to collect, correlate and document structured and unstructured information in a central place. They can e.g. share the results of their latest experiments regarding the side effects of a newly developed drug. The viewer is able to read the published results, compare them with other results, as well as augment the information by adding new content or comments.

Identify New Drug Targets and Pharmaceutical Interactions

The Information Workbench provides advanced search functionalities which allow for the querying of structured and unstructured content available in disparate data sources through a unified interface. Users are able to find paths or discover previously unknown relationships between compounds and reactions across multiple sources.

Simplified and Innovative Visualization and Analysis for Better Results

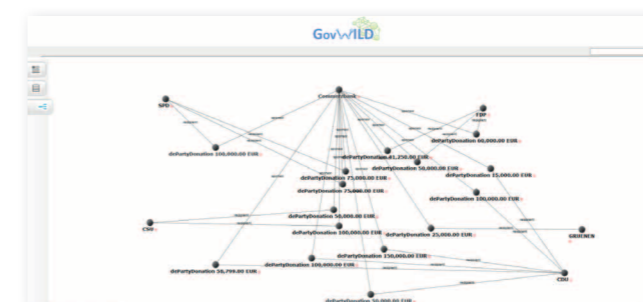
The Information Workbench delivers advanced visualization and exploration features, which enable users to graphically visualize complex knowledge networks, create customized reports, charts, dashboards, etc., to allow for easier content analysis. Researchers and scientists can e.g. define charts displaying all the drugs for a certain disease based on the level of popularity. With the PivotViewer experimental studies and adverse effects of drugs by their likeliness of occurrence can for example be analyzed and visualized.

Information Workbench for Open Government Data Initiatives

In the past years, Open Public Data initiatives such as data.gov, data.gov.uk, publicdata.eu, or open data initiatives of international organizations such as data.worldbank.org have played an increasingly important role worldwide. The goal of these initiatives is to make government data publicly available and to interlink these data in order to make them more transparent for the public.

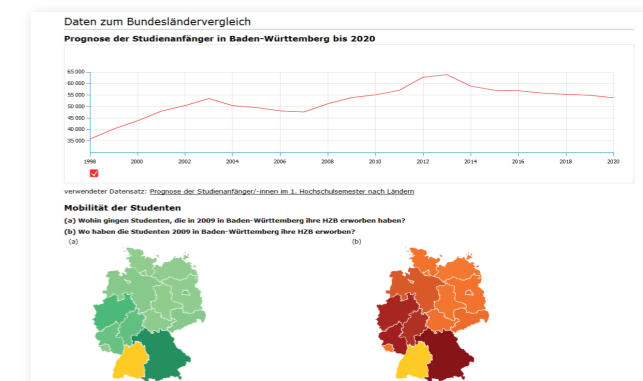
A major challenge is to make this information easily accessible and transparent, so that users can actively reuse it. This is the basis for informed decision making and the creation of new and innovative business models, products and services. With the goal of making government data transparent, usable and freely available for the public, fluid Operations collaborates with the Hasso-Plattner-Institut (HPI), the academic Center of Excellence in IT Systems Engineering, in two research projects:

As part of the **GovWILD (Government Web Data Integration for Linked Data)** project, the Information Workbench integrates large amounts of freely available data about politicians and companies in the U.S. and Germany, links them in one central place with freely available data stored in different data sources, and provides end-users with a frontend which enables them to navigate through the integrated dataset, to discover previously unknown relationships and to make information transparent.



Flow of funds of the German Commerzbank to German political parties.

The Information Workbench is also used as a self-service Portal in the **„Bundesst@ts“ App** (“German Federal States” App). This app interlinks open government data from different data sources related to educational policy in the German Federal States. Using the Information Workbench the user can compare information and statistics and individuals who plan to start their studies can get information about the study conditions in the different federal states in Germany.



Analysis of linked data sets from the German educational policy.

Our Solution

The Information Workbench is a generic and domain-independent platform which can be used for developing Open Data ecosystems. The platform enables to build large data catalogs and to migrate data into a unifying repository which contains open government data from different sources, from the LOD cloud and other external or private data sources. The platform makes interlinked and enriched open government data easily accessible and transparent by allowing for semantic processing of information, collaborative annotation, visualization, exploration and analysis.

Information Workbench Benefits

Data integration: The seamless integration of large amounts of open government data from different data sources enables the user to access data catalogs on-demand.

Enable transparency: The analysis of the entire integrated data catalogs provides transparency. Transparency enhances the quality of decisions and reduces the effort needed for the collection and analysis of relevant information and relationships between data. This data transparency helps companies to e.g. reach well-informed decisions when planning where to set up new offices.

Tell stories with data: Gain deep insights into complex relationships and let data tell new stories by combining e.g. feely available regional economic data with information about kindergartens, schools, doctors in the area, noise pollution, crime rates, age structure and land use.

flexibility comes first



Curious? To find out more about the Information Workbench® and to view an interactive demo, please visit our website: <http://www.fluidops.com/information-workbench>

The Information Workbench is available in two editions. The Community Edition provides advanced integration, collaboration, exploration, and visualization capabilities. The Enterprise Edition delivers the full set of functionalities including enterprise features and enterprise support.

About fluid Operations

fluid Operations® (fluidOps) is a young, innovative software company headquartered in Walldorf, Germany. Its focus lies on the research and development of novel technologies for intelligent cloud and data management in the enterprise. With the Information Workbench®, fluidOps delivers a highly customizable platform for Linked Data management and solution development. This includes support for the semantic integration of heterogeneous data sources across the borders of individual domains, collaborative knowledge acquisition and augmentation, semantic search, business intelligence and analytics, as well as data visualization and exploration. fluidOps' Conference Explorer won the Linked Data-a-Thon at the 2011 International Semantic Web Conference and placed second in the WWW 2012 Metadata Challenge. Gartner Analysts named fluidOps, „Cool Vendor in the SAP Ecosystem“ in 2010. For more information about fluidOps and its products and solutions please visit www.fluidops.com.

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