Introducing Xapix:
Technical reference

www.xapix.io

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What is Xapix?

Xapix is a super fast, flexible, and user-friendly tool for data integration. As a "backend for connected vehicle services", it helps mobility companies access, use, and monetize their data easier than ever by enabling connections between new and existing systems. Xapix facilitates last mile data integration delivery at ease—and is your first mile of freedom across system integration challenges with partners.

What makes Xapix awesome

- **Flexible and highly customizable**
  Xapix is independent from programming languages, hosting problems, and iterates faster than competing approaches. Xapix flexibly supports REST, SOAP, and several SQL databases as inputs and enables on the fly configuration of REST or SOAP as an output—you or your partners decide. Xapix stands out when it comes to highly customized data integration use cases in historically grown data sources.

- **Easy maintenance of connectors**
  Reduce maintenance efforts to a minimum—and go easy on your IT pipeline. Xapix' output is fully customizable for developers. What's more, external users can be invited to customize their output.

- **Powerful data transformation/integration solution**
  At the core of Xapix is a powerful data transformation engine that lets you transform and integrate data faster than ever. Xapix is an orchestration layer that only adds around 100ms of latency. What's more, parts of the Xapix tooling are automated, for example the Swagger / Open API Spec and WSDL (SOAP) import and update features.

- **Data publishing, monetization and performance**
  Xapix allows for easy tracking of usage and performance of APIs so that you can start monetizing your API services. Internal and external users are granted access and their access to data can be securely managed. The software features end-to-end analytics and intelligence to ensure maximum uptime and performance.

Xapix key feature catalogue

Below you'll find a list of core features of the Xapix software tooling. The intuitive user interface as well as the variety of connectivity options (N-to-1 and 1-to-N), convenient API editing options, strong transformation capabilities, aggregation, analytics, and sandboxing features make Xapix the go-to tool for even complex data integration projects.

N-to-1 connectivity: Supported data sources

REST JSON, XML, etc	Get data from multiple sources and source it to one destination.
SOAP XML	
SQL databases (MySQL, MSSQL, PostgreSQL, etc)	Xapix also enables **Multi API Integration** so that you can build an "API for APIs" and hide internal complexity while increasing overall performance.
Files: CSV, JSON, XML, etc	
Planned extension: EDI & NoSQL databases (Redshift, Kafka, Redis, MongoDB, etc.)	Think of Xapix as your "a la carte" menu for data integrations, API combinations, and custom legacy data sources.

1-to-N connectivity: Supported output endpoint formats

REST JSON, XML, etc	Distribute data from a single data source and source it to different destinations.
	Give third parties like suppliers, vendors, and distribution partners as well as internal stakeholders easy access to legacy infrastructure.
SOAP XML	
	Xapix enables **self-maintained data integration**—without any need to change a legacy system.
+ Can be easily extended	

Intuitive graphical user interface

Drag & drop mappings	Easy, quick to learn, and simple to apply for your developers.
Shortcut navigation	Onboard data sources, reshape data interfaces as desired, publish and manage access in comprehensible workflows.
Project management and tracking	Manage user roles and permissions, collaborate and trace back changes.
Imports of standard schemata (Swagger/OpenAPI, WSDL)	Speeding up workflows significantly by prepopulating integration adapters: - Importing data sources, then map manually - Import full 1:1 setups, then adjust manually
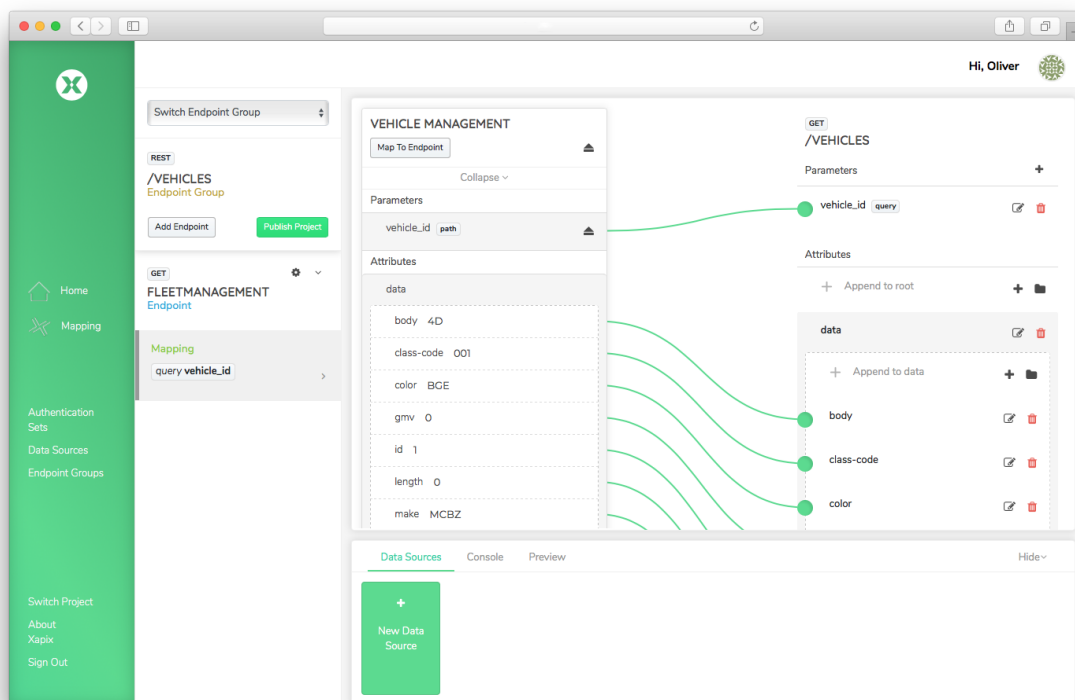
Out-of-the-box API editing options
- **Filtering:** Source only selected data based on various filtering conditions
- **Sorting:** Sort data by attributes specified
- **Pagination:** Paginate large result sets with various strategies
- **Sparse fields:** Limit returned attributes to the minimum necessary

Transformation

Type conversions	Cast types as needed between number formats, strings, and others.
Text interpolation	Use placeholders to easily chain returned text values and apply string operations as well as transformations.
Math calculations	Apply simple to complex mathematical functions on returned numerical values.
Return value combinations	Pull multiple values from data sources, output endpoint attributes, and parameters (can also be done individually). Combine them and apply further transformations as needed.
Conditionals	Have a conditional expression decide what part of your formula to execute on a return value.
Dictionaries	Define a dictionary of possible return values and for each enter a fixed value to replace it with.
Date conversions	Enter how a date/time return value's format can be converted to UTC. Have all the different date and time formats in use ready for comparison and available for time series queries.
Geospatial conversions	Enter how geospatial data (like latitude and longitude) can be converted to geopoint format and have all the different geo data in use available for geospatial queries.

Aggregation & combination

Dependent	Access a data source and use its result values as parameters for a following dependent request to a different data source.
Data governance	Specify a data governance formula or send a request to an authority data source. Result sets will be selected and filtered based on the return.
Record merge	Access two or more data sources in parallel

	and merge result values into matching single records.
Record set union	Access two or more data sources in parallel and unify their record sets.
Record set cartesian product	Access two or more data sources in parallel and build a cartesian product on their record sets.

Analytics
Monitor the performance, easily detect pain areas, and monitor API endpoint usage—a first step to effective data monetization.

Configurability
Capability to allow dynamic manipulations

Sandbox environment
Set up static or mock data in minutes using Xapix, so developers can set up a sandbox environment for their projects in no time.

Deployment options: On-Premise, Private Cloud, Public Cloud
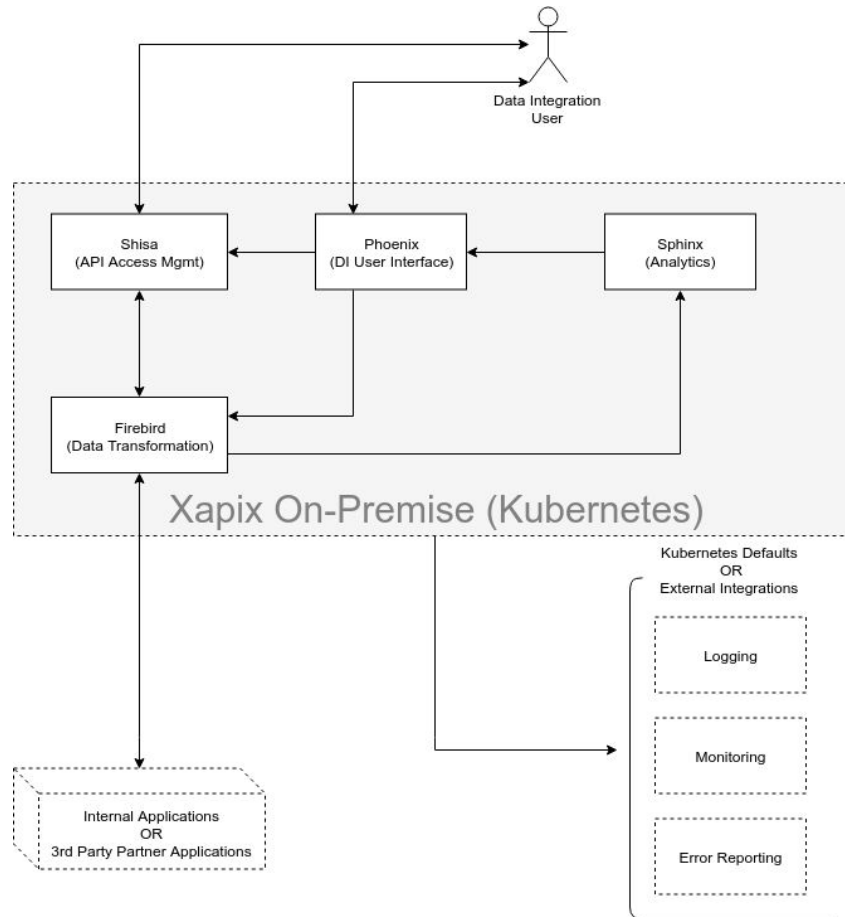
Introduction to deployment options

We support a variety of deployment options, including full on-premise deployments, hybrid on-premise/cloud setups as well as cloud-only setups.

Xapix also supports a range of cloud solutions:

- **Firebird**, the data transformation engine and API gateway we recommend to host on-prem, usually together with Shisa, our API management component.
    - Firebird operates in a standalone fashion and will continue to serve your API even if it temporarily can't communicate with other components
    - Running Firebird on-prem also gives you complete control, minimum latency and custom scalability.
    - You can take full advantage over the fine-grained access control features of your cloud provider.
- For **easier (test) setups**, you can choose to use our cloud versions of the visual GUI and the analytics components, as those are not critical for operations.
- To keep complete control over your data, we recommend to install the **analytics component on-premise** for production installs.

Our system is designed to give you full control over all mission-critical components in a production setup, ensuring that you can comply to any data protection laws applicable to you.

Xapix is proud to support Kubernetes so that users can take full advantage of this industry standard for container orchestration. All Xapix components are delivered as modern Docker containers and can easily be deployed to any Kubernetes cluster. In addition to that, Xapix integrates seamlessly into Prometheus, the standard monitoring and alerting infrastructure for Kubernetes.

Besides the deployment options, we offer three different product lines through which the deployment can be adjusted to various requirements:

Scenario 1, FULL: (Private) Cloud or On-Premise
Full transformation and configuration
Recommended for server / cloud deployments

Scenario 2, LIGHTWEIGHT: Embedded
Only data transformation engine installed
Ideal for embedded systems / data transformation on devices

Scenario 3, DYNAMIC: Custom packaging
Data processing installed, active real-time link to external system possible
Ideal for specialised client installations

Overview: Deployment options for the private cloud (incl. on-prem) version

Version	Data Integration Engine		Visual GUI		Preloaded config	Logging and Analytics	Project JSON and Dynamic Link	
	Host Side	Partner Side	Host Side	Partner Side			Host Side	Partner Side
Full	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lightweight	Yes	No	No	No	No	Yes	No	No
Dynamic	Yes	No	Yes	Yes	No	Yes	Yes	Yes

What makes Xapix stand out

Competitive differentiators

Custom use cases	Speedy UI workflows	Broad UI user base
Easily and flexibly integrate highly custom legacy data sources as opposed to mingling together predefined adapters out of a large enterprise service bus' library.	Create and maintain custom data integrations with an intuitive, specialized, and lightweight tool as opposed to study and roll out a large ESB software suite.	Anyone using Excel can also use Xapix! Keep your data integrations in the team as opposed to pull in and depend on external coders, consultants or contractors.
Value add: **More flexibility for your team and better solutions**	Value add: **More speed—complete projects in just a few days**	Value add: **More control and security**

Companies prefer to be in full **control** of their data for obvious reasons like security, but also because less dependence on IT providers means easier, cheaper, and faster updates. Xapix processes and moves data but doesn't take control over data.

Instead of having thousands of connectors, Xapix is the connector that fits - data exchange can be **customized** by format and technology yet being automated. This results in high **flexibility** for users as it enables a range of internal and external use cases across industry verticals - and it builds upon existing IT systems.

Where Xapix is exceptionally strong: Standout use cases

Multi service integration layer	In order to make infotainment services available for customers across the globe, OEMs have to integrate an ever-increasing number of APIs. Xapix offers an orchestration layer to normalize, integrate, and transform data which is targeted at partnering. Middleware- and API management solutions fall short here, because they do not scale as easily; what's more, they are also higher-maintenance than Xapix.
Flexible data transformation layer	Setting up integrations, either internally or externally, leads to high complexity with regards to supporting different technologies, maintaining the data service, and feeding into a backend across different partners. Xapix offers a flexible API integration layer that can leverage integration adapters for certain services to ease that integration.

Flexible partnering data sharing layer	Using traditional means, offering custom data integrations (or data streams) for customers (across borders of SOAP/REST) is lengthy and expensive. Often, the customers' requirements for integrations cannot be met, because other solutions often only provide a library of predefined adapters. Xapix offers flexible connectors that allow sharing the data in the envisioned format, which are also easy to create and maintain.
On-vehicle data integration	The connected car creates a gigantic amount of data. The goal is to create a dynamic, onboard data filtering that minimizes traffic over the vehicle-cloud-network. Xapix offers a robust on-board solution that can learn on-the-go and features dynamic filtering, so that only the data that is needed will be sent to the server—in the correct format. Current solutions in place with OEMs are not responsive enough to meet these requirements. *This use case is currently being explored in the Xapix lab.*

What makes Xapix different from API management solutions?

What makes Xapix different from traditional API management tools are its **strong transformation capabilities**, the chaining functionality to hide internal complexity, and the adapter logic to reduce maintenance, making the tool perform better. That also means that Xapix is not only a data integration tool:

- **Data normalization on Xapix** allows unique data operations—the API providers gets rewarded with better user experience for developers.
- **Data transformation for better APIs**: Instead of simple xml to JSON transformations, Xapix allows for a complete restructuring of the response. Hence, both clean RESTful services can be created from nested SOAP structures—and also new RESTful services can be transformed back into SOAP xml with heavy nesting.

Existing API management solutions generally function as a gateway and thereby ensure the secure access to services through user management and analytics features. Additionally, microservices support the automation of integrations. One key element they fall short of is **addressing API quality for easier consumption**. The Xapix toolset is focused on this aspect to bridge technology gaps between API consumers and providers, and through features to combine or normalize services, hide their internal complexity:

- **Combination for easier data access:** Two or more services or data from databases can be combined into a single response to the user. While the combination of data is facilitated in the background, the API consumer interacts with one optimized API service

- **Chaining to hide complexity:** Two or more services which rely on each other, can be combined. Individual requests are triggered along a chain across multiple internal services or systems, exposing only the results at the end of that chain to the external user as a single API endpoint
- **Adapter Logic for reduced maintenance and improved performance:** Significantly reduced maintenance efforts as a set of users are connecting to your services through adapters. This gives the API provider insight into specific usage patterns of endpoints which gives critical insight for performance improvements (e.g. to set up an inbuilt cache) or change considerations for changing APIs + communication those changes
- **Partner customization at scale:** The partners and customers of our users can get access to a secure space where they define the data in a data format and technology (e.g. SOAP/REST) that fits best - making connections as easy as a snap.

Engineering FAQs

How secure are solutions provided by Xapix?
Xapix provides secure and flexible ways to authenticate requests. By default JWT based API authentication is already set up but can easily be replaced and adapt to individual use case specific requirements.

What are Xapix' performance specs?
Our high performance transformation engine only adds a few milliseconds to each request and is capable of handling requests in parallel.

What support options does Xapix provide?
Xapix provides three levels of support for the software.
- **Level 1: Technical assistance**
  Email/Phone/Slack support for problem reporting
- **Level 2: Product support**
  Identifying workarounds for technical problems
- **Level 3: Product engineering**
  Patches and fixes to improve functionality and performance

Questions? Reach out to us!

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