

DATASHEET FOR CITYSYNERGY INTEGRATE

PRODUCT OVERVIEW

CitySynergy does not disrupt the City or Smart Place ecosystem of sub-systems and service providers. It integrates them, ensuring data segregation between the different operators.

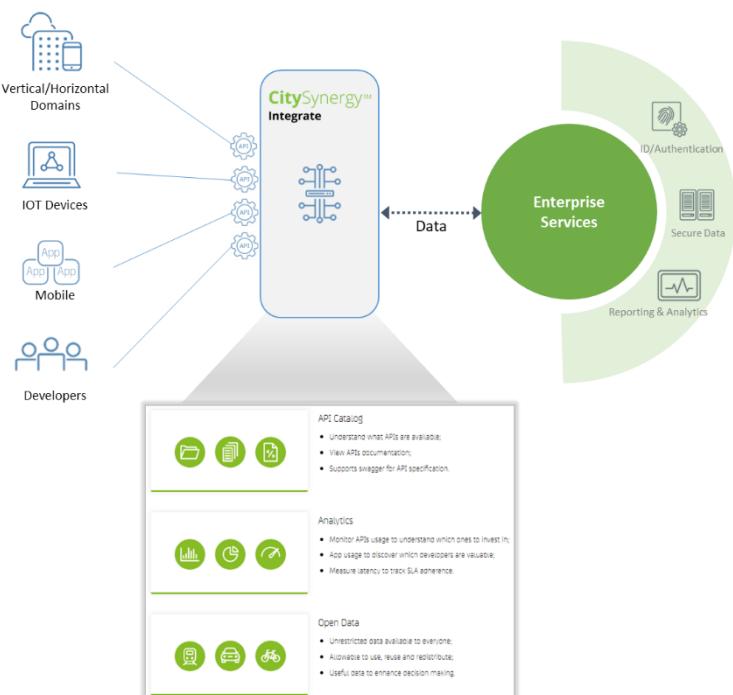
KEY CAPABILITIES

- Entity Federation
- API Library
- API Developer Portal
- Integration Hub

This integration layer intends to ensure the **fast incorporation of APIs** and web services, which should ensure connection with the vertical and horizontal management domains, IoT devices and other applications of the city with CitySynergy. These are built using a **micro services architecture**, increasing the **scalability** and **flexibility** of the solution.

Additionally, **CitySynergy Integrate** uses an **IoT message broker** to integrate Internet of Things.

This increases and **accelerates the integration between systems**, fosters the innovation of the several parts of an ecosystem, the data flow access, control and compliance, with a **secure and centralized access** to it.



ENTITY FEDERATION

Provide the ability to establish a trusted relationship between the CitySynergy and an internal or external LDAP, enabling the contact data federation.

LDAPs Integration

KEY BENEFITS

- Single Sign On
 - User data Aggregation
 - Central entity federation manager
- The solution provides **APIs to receive and retrieve contacts** data from/to a local or remote LDAP. These contacts represents users like **citizens, tourists, employees, residents, visitors**, etc.
- The solution provides the ability to relate the **actions/logs** with the **same contact ID**.

This provides a **Single Sign On (SSO) integration** and **federation** of the data for the vertical and horizontal domain managers.

API Library

APIs that ensures the integration between the CitySynergy modules and the vertical and horizontal domains of the city or smart place.

KEY BENEFITS

APIs

- **Interoperability** between vertical and horizontal domains and the operation center
 - **Simplify** data exchange
 - **Centralized** operational data
 - **Message Broker** subscription
 - **Legacy webservices**
- CitySynergy Integrate has a bundle of versioned **Restful API's** that use:
- **JSON** or **XML** message structure,
 - HTTP appropriated verbs: **GET, POST, PUT, DELETE,**
 - **URIs** to identify data as resource.
- Internal and external APIs are built in a micro service architecture and are resistant to common attacks (buffer overflows and SQL injections).
- CitySynergy Integrate performs the communication between CitySynergy modules.
- Some of the APIs needs an **access key**, this key have an **expiration date** and is used to make API calls. CitySynergy Protect that performs the authentication and authorization gives the key.
- CitySynergy ensures a minimum of 32k/day API calls and a 160Mb/day data transfer.

The available APIs allows to receive and retrieve information about the following data:

- **Authentication**

- o The CitySynergy Protect performs the authentication.

The available API is:

- . Authenticate

- **Contacts**

- o Refers to the city or smart place users like citizens, tourists, employees and visitors.

The available API is:

- . Contacts

- **Digital Twin and Inventory**

- o Information about all the services and its items, including the relation between them and with contacts.

The available APIs are:

Environment Climate

- . Climate City Planning
- . Climate Emergency Planning
- . Weather Service

Environment Pollution

- . Air Pollution Control
- . Light Pollution Control
- . Noise Pollution Control
- . Radioactive Pollution Control
- . Soil Pollution Control
- . Water Pollution Control

Environment Public Health

- . Animal Pest Control
- . Animal Shelters
- . Botanical Pest Control
- . Food Safety
- . Hygiene

Living Communication

- . Cellular Communication
- . Wi-Fi

Mobility Parking

- . Bike Parking
- . Off Street Parking

Resources

ContactRelations

Environment Energy

- . District Heating
- . Electric Vehicle Charging
- . Energy Production
- . Industrial Energy
- . Public Building Energy
- . Residential Energy

Environment Solid Waste

- . Bulky Waste Collection
- . Domestic Waste Collection
- . Garden Waste Collection
- . Hazardous Waste Collection
- . Industrial Waste Collection
- . Recycled Waste Collection
- . Street Cleaning

Living Illumination

- . Street Lighting

Mobility Traffic

- . Traffic Light
- . Traffic Service

Mobility Transportation

- . Bus Service
- . Bike Sharing

Cirelations

- **Locations**

- A location is a place where assets, companies, contacts, and legal documents are placed or situated.

A road axis is the directions that the referred street can have between two crossing streets. It is important to define routes. At this moment, only SIG integration can create a road axis.

A Spot location is the place where a door or parking spot is located. A spot location is always associated to a location. At this moment, only SIG integration can create a spot location.

The available APIs are:

- . Locations
- . RoadAxis
- . Spots

- **Situations**

- Represents Incidents or requests related with a city service. E.g.:
A request information about a bus service or a bus service that is not running.

Incident is an unplanned interruption to an IT service or reduction in the quality of an IT service. Failure of a configuration item that has not yet impacted service is also an incident, for example failure of one disk from a mirror set;

Request is used as a generic description for many varying types of demands that are placed upon the Operations Center by the users.

The available APIs are:

- . Situations
- . Incidents
- . Requests

- **Changes**

- Represents the addition, modification or removal of any authorized, planned, or supported service or service component that could have an effect on a service.

The available API is:

- . Changes

- **Tasks**

- Refers to a piece of work to be done or undertaken, it includes resolving service failures, fixing problems, as well as carrying out routine operational tasks.

E.g.: Replace of an equipment.

The available API is:

- . Tasks

- **Alerts**

- Alerts are situations that represents **FIWARE** alerts based on the defined data model. CitySynergy Integrate does the transformation between the FIWARE Alert data model and CitySynergy situations data model, this guarantees the alignment between data models, **enabling data portability**.

The available API is:

- . Alarms

- **IoT Metrics**

- This API allows receiving data about metrics, e.g. temperature. APIs with a defined but **flexible structure** that enables the IoT domain manager to **communicate** the **metrics data**. All the data transformation and correlation with the Digital Twin of the city is transparent. This data **enrich the city data** and allows to detect problems before they happen, improving the **quality of the services** to the city users.

The available API is:

- . Metrics

- **KPIs**

- List of KPIs such values are available. The exchange of reporting and analytical data is simplified once all the data is produced in a centralized system with the same premises and calculations. This data enhance the decision-making.

There are operational and business KPIs.

The available API are:

- | | |
|---------------------------------------|--------------------------------|
| . Drinking Bottles and Cans Collected | . Students in Public Education |
|---------------------------------------|--------------------------------|

- . Waste Collected in Coastal Areas
- . Trees Planted
- . Environmental Awareness Actions
- . Domestic Waste Recycled
- . Population Using Public Transports
- . Electric Buses
- . Bus Routes Extension
- . Sharing Bicycles

- . Bicycle Lanes Extension
- . Avg. Waiting Time for Primary Health Care
- . Doctors per 1000 Citizens
- . Emergency Patients

- . Students in Private Education
- . Recovered Schools
- . Universities

- . Number of Ludic Libraries
- . Citizens with University Degrees
- . University Vacancies
- . Monitored Services
- . Top 5 City Services > resolved tickets
- . Situations Volume analysis
- . Availability

- . SLA Analysis
- . City Benchmark

Additionally, CitySynergy uses an **IoT message broker** to integrate Internet of Things, this feature provides the ability to access in real time to open or shared data. CitySynergy message broker provides interest driven delivery based on what topics applications subscribe to.

All messages published to a topic are received by all subscribers on the topic. It implements MOM (Message Oriented Middleware) architecture to interact with publish/subscribe message model, being capable of supporting MQTT (Message Queuing Telemetry Transport) or AMQP (Advanced Message Queuing Protocol) protocols.

Data can be ingested in multiple formats, such as JSON and XML.

- **GDPR Metrics**

- o Related to users personal data **requests** there is a list of APIs that retrieve the number of requests related with: **erasure**, **access personal data**, etc.

The available APIs are:

- . Erasure
- . Access Personal Data

API Developer Portal

API Developer Portal allows to control how APIs are published, enables consumers to discover what services are available, and helps operations teams monitor API performance. API Portal simplifies API discovery for citizens and developers and provides them with access to enterprise data to build apps fast. Relationships with developers, partners, and third parties are easily managed and analytics provide valuable operational data.

API Catalog

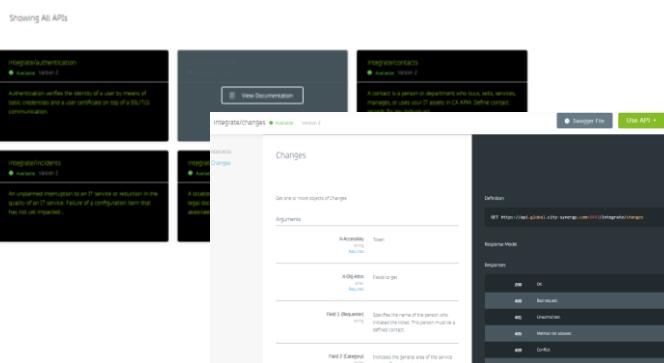
API Catalog is a part of API Portal that provides the ability to:

- Understand what **APIs are available**;
- View APIs **documentation**;
- Supports swagger for **API specification**.

KEY BENEFITS

- Single point of APIs Documentation

The API Catalog reflects the API Library.



API Interactive Explorer

The solution allows:

KEY BENEFITS

- API Plans
- Open and Shared Data

- APIs management (private and public)
- Access management
- Data management

Providing a data control.

To control how APIs can be consumed the product enables the creation of API Plans. An API Plan comprises **rate limit** and/or **quota information**, along with the public or private APIs that these controls apply to.

Citizens, developers or vertical domains can consume the APIs that provide **open** and shared data.

The product has the ability to export the available open data into XML or JSON formats.

API Developer Portal Documentation & SDKs

KEY BENEFITS

- Apply for API Access
- Authorization to use API
- Faster development

The API Portal allows the developers to:

- **Discover** what **APIs** are **available** and to **apply for access**
- Receive **authorization** to use APIs and get **API keys**
- Get started on **development faster** with tools including an API catalog, sample applications, API Explorer, and code generation.

API Access Analytics for Domains

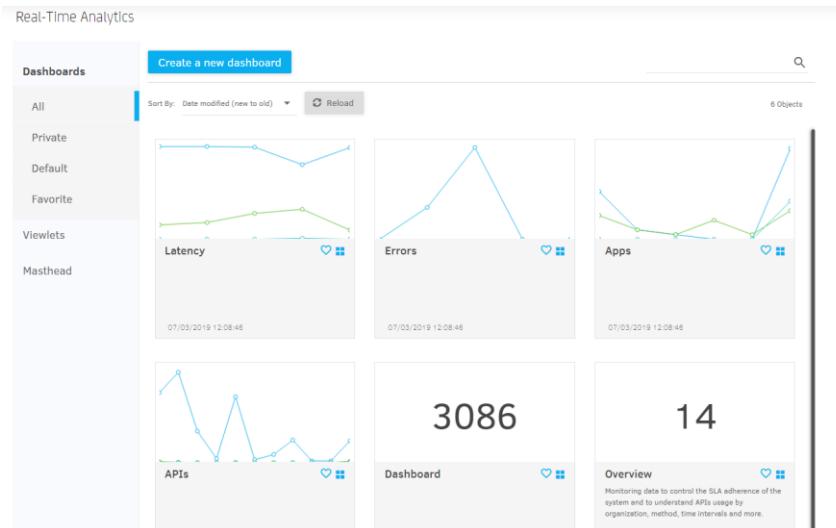
The product displays metrics about:

- **APIs usage**, to understand which ones to invest in;
- App usage, to discover which **developers** are **valuable**;

APIs calls **latency** to track SLA adherence, in order to **identify and optimize** possible failures, increasing the **quality** and **efficiency** of the system.

KEY BENEFITS

- Monitor API usage
- Increase API efficiency



Integration Hub

CitySynergy's Integration Hub will enable inbound and outbound integration with external systems, providing an automatic mechanism to fetch and/or send information between systems.

Integration Hub

Integration Hub allows an easy and smooth data bi-directional integration with external data sources. Reusable workflows allow either the collection of data from clients APIs, or the streaming of data to their systems, such as metrics and alerts, providing an intrinsic data federation on our system. This module maps and transforms the data to be stored in CitySynergy and provides reusable workflows to process the data.

The Integration Hub retrieves information through one of the following processes:

- Efficient data integration
- Management of new integration points



SUPPORTED STANDARDS

XML, JSON, SOAP, REST, PCI-OSS, AJAX, XPath, XSLT, WSOL, XML Schema, LDAP, RADIUS, SAML, XACML, OAuth 1.0a/2.0, PKCS, Kerberos, X.509 Certificates, FIPS 140-2, XML Signature, XML Encryption, SSL/TLS, SNMP, SMTP, POP3, IMAP4, HTTP(S), JMS, MQ Series, Tibco EMS, Raw TCP, FTP(S), WS-Security, WSTrust, WS-Federation, WS-SecureExchange, WSIL, WS-1, WS-Addressing, WS-Policy, SSecureConversation, WS-MetadataExchange, WS-SecurityPolicy, WS Policy Attachment, WS-1 BSP, UDOI, WSRR, MTOM, IPv6, WCF, MQTT, RabbitMQ, Kafka, JMS, Websockets.

ADDITIONAL INFORMATION

More information can be found at:

<https://www.deloitte.com/citysynergy>

RELATED PRODUCTS

CitySynergy Integrate establishes de communication between the following products:

- CitySynergy Command,
- CitySynergy Insights,
- CitySynergy Intelligence.

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