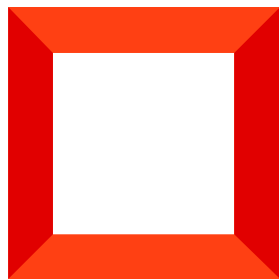
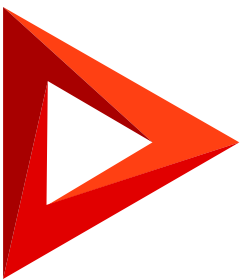


Microservices

Version 8.0



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Table of Contents

Mobile application	5
Mobile application basics	5
Schemas	6
Mobile application compatibility with Creatio products	7
Mobile application Installation options	8
Process modelling service	8
Studio Creatio, free edition basics	8
Studio Creatio, free edition operation schema	9
Studio Creatio, free edition compatibility with Creatio products	9
Studio Creatio, free edition deployment options	9
Global search service	9
Global Search Service basics	10
Global search service operation schema	10
Global search service scalability	12
Global search service compatibility with Creatio products	12
Global search service deployment options	12
Bulk duplicate search service	12
Bulk duplicate search basics	12
Bulk duplicate search service operation schema	13
Bulk duplicate search service scalability	14
Bulk duplicate search service compatibility with Creatio products	14
Bulk duplicate search service deployment options	15
Database enrichment service	15
Workflow	15
Compatibility with Creatio products	16
Deployment options	16
Machine learning service	16
Workflow	17
Scalability	18
Compatibility with Creatio products	18
Deployment options	18
Email Listener synchronization service	18
Workflow	19
Scalability	21
Compatibility with Creatio products	21
Installation options	21

Static content bundling service	21
Workflow	22
Compatibility with Creatio products	22
Installation options	22
Bulk email service	23
Bulk email service basics	23
Bulk email service compatibility with Creatio products	23
Bulk email service deployment options	24

Mobile application



Creatio's mobile applications are remote workplaces with instant access to customer data, calendar, mobile feed, etc. The mobile application is an auxiliary tool for accessing the primary Creatio application on mobile devices.

Mobile application basics

Using the Mobile Creatio provides the following advantages:

- Quick access to data and information exchange between the employee and the management.
- Enhanced interaction of the company's employees and departments.
- The timely arrival of vital information.
- Swift reaction to the arriving information.
- An increase in customer loyalty thanks to the swift reaction.
- An increase in field staff productivity.

Mobile Creatio offers the following opportunities to the users:

- Working with the data of the primary Creatio application on a mobile device.
- The information is accessible even without an established Internet connection (hybrid and offline modes).

Mobile Creatio is implemented using the hybrid approach. A hybrid application is a web application wrapped in a native container. Unlike native applications, hybrid applications have a single codebase for every platform.

To customize Mobile Creatio (for example, change the section list, a set of business fields, the business logic settings, etc), set up the mobile application in the primary Creatio application. Learn more about customizing the Creatio mobile application in the "[Mobile application setup](#)" block of articles. Setting up the list of sections available in the mobile application is covered in the "[Mobile application wizard](#)" block of articles.

One of the steps required to set up the mobile application is to choose the operation mode. A Creatio mobile application has the following operation modes available:

- **Hybrid mode.** The hybrid mode is designed for accessing the data when a stable connection to the Creatio server cannot be established. It is enabled automatically. This mode enables creating new records and working with schedules. Additionally, the most recent records (10 last records) are available for reading and editing when there is no Internet connection.
- **Online.** The online mode requires an Internet connection. In this mode, the user works directly with the server (the primary Creatio application). The configuration settings are auto-synced in real-time.
- **Offline.** The offline mode only requires an Internet connection for the initial imports and subsequent synchronizations. In this mode, the data are stored on the mobile device. To acquire the configuration changes and update the data, run a synchronization with the Creatio application server manually.

Learn more about the operation modes of Mobile Creatio in the "[Mobile application architecture](#)" article. The differences between the modes are covered in the "[Online/offline modes](#)" article.

The mobile application uses the DataService web service to synchronize with the Creatio server. Learn more about Creatio integration using DataService in the “[DataService](#)” article.

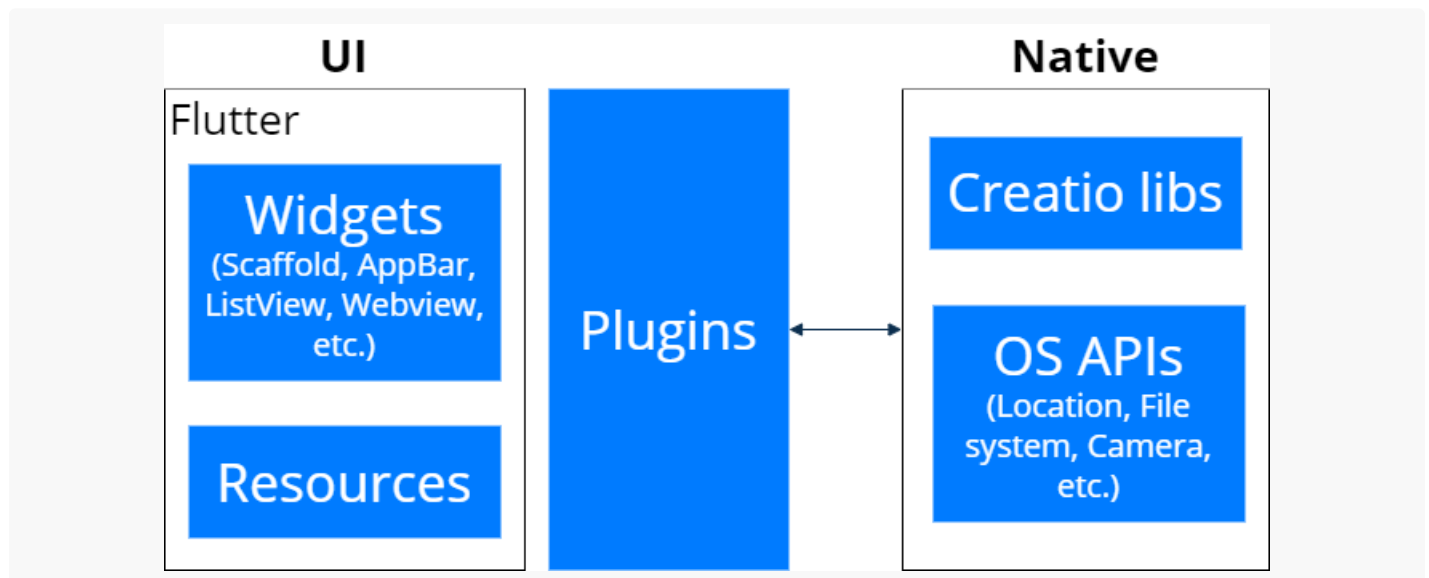
If conflicts occur during the synchronization, the details will be logged to the synchronization log, available in the hybrid and offline modes. Learn more about working with the synchronization log in the “[Online/offline modes](#)” article.

To check if the custom functionality works as intended, use the instructions from the “[Mobile application debugging](#)” article.

Schemas

Mobile application architecture schemas

Mobile Creatio application architecture schemas



The Creatio mobile application utilizes the [Apache Cordova](#) framework for creating hybrid applications. The Cordova framework has the following advantages:

- Access to native device APIs for interacting with the database or peripheral devices (such as the camera or memory card).
- Native plug-ins for using the APIs of multiple mobile platforms (iOS, Android, Windows Phone, etc.). Additionally, developing custom plug-ins enables adding extra features and extending the API. The list of supported platforms and core plug-ins is available in the [Cordova documentation](#).

Mobile Creatio’s core provides a single interface that enables the interaction of the client parts of the mobile application. The JavaScript files that the core utilizes can be divided into basic and configuration scripts.

The basic scripts are part of the application package available in the application store. They include:

- MVC components (page layouts, controllers, models).
- Synchronization modules (data import and export, metadata import, file import, etc.).
- Client classes for web services.

- Client classes for accessing native plug-ins.

The application downloads the configuration files during the synchronization to the Creatio application server and then saves them to the local file system. The configuration files include the manifest of Mobile Creatio, as well as section schemas and settings.

A manifest is a configuration object with properties that describe the structure (objects and their connections) of the mobile application. The manifest properties of Mobile Creatio consist of the following groups:

- Application interface properties (setting up the application sections, the main menu, and custom images).
Learn more about the application interface properties in the “[Manifest. Application interface properties](#)” article.
- Data and business logic properties (the description of imported data and the custom business logic for processing such data in the mobile application).
Learn more about the data and business logic properties in the “[Manifest. Data and business logic properties](#)” article.
- Application synchronization properties (setting up synchronization parameters for data-syncing with the primary application).
Learn more about application synchronization properties in the “[Manifest. Application synchronization properties](#)” article.

Learn more about the architecture of Mobile Creatio in the “[Mobile application architecture](#)” article.

The [*Approvals*] section of Mobile Creatio uses [Flutter Framework](#).

Mobile application operation schema

The mobile Creatio application available in application stores is a set of modules required for synchronizing with Creatio servers. The working principles of Creatio Mobile:



Each product and each customer website may contain an independent collection of settings for Creatio Mobile, custom business logic, and custom visual interface. A Mobile Creatio user must first install the application and then synchronize it with the main application.

Mobile application compatibility with Creatio products

Mobile Creatio is part of the Creatio platform. The mobile application is available to the users of the primary Creatio application version 7.15 and up.

After the installation, the user specifies the connection parameter for a specific Creatio server. The application then downloads metadata (application structure, system data, etc.) and regular data. Such an architecture makes the mobile application compatible with all Creatio products.

Note. However, [portal](#) users cannot use the mobile application.

Mobile application Installation options

Creatio mobile application is available on:

- [App Store](#) – for iPhone and iPad running [iOS](#) version 8 and higher.
- [Google Play](#) – for mobile devices running [Android](#) version 4.4 and higher.

Process modelling service

 Beginner

Studio Creatio, free edition (Studio Creatio free) is a collaborative business process modeling tool. Business processes in Studio Creatio free correspond to the [BPMN 2.0](#) specification, which is easily understandable by all business users, from analysts to developers.

Studio Creatio, free edition basics

Studio Creatio free can help you with the following tasks:

- **Accelerate business process modeling.** Build process diagrams using simple visual tools and save them in the process library. A flexible structure, convenient navigation, and a single control environment will help to organize the business processes of the company swiftly and accounting for all requirements.
- **Standardize your business process management.** The multifunction process designer will ensure compliance with the BPMN 2.0 specification. This makes it possible to build processes that are understandable by customers, business analysts, developers, and end users. Meanwhile, `*.bpmn` support enables import and export to share business processes with other applications.
- **Arrange collaborative process modeling.** Involve your coworkers or outside experts, edit business processes along with them in real-time, and share links to the processes for remote viewing and commenting.
- **Facilitate documenting business processes.** Enter information and add all necessary explanations to the business process as you build the diagram. Creatio enables users to download the description of the process as a `*.pdf` file to have comprehensive documentation on the process for further use outside Studio Creatio free.

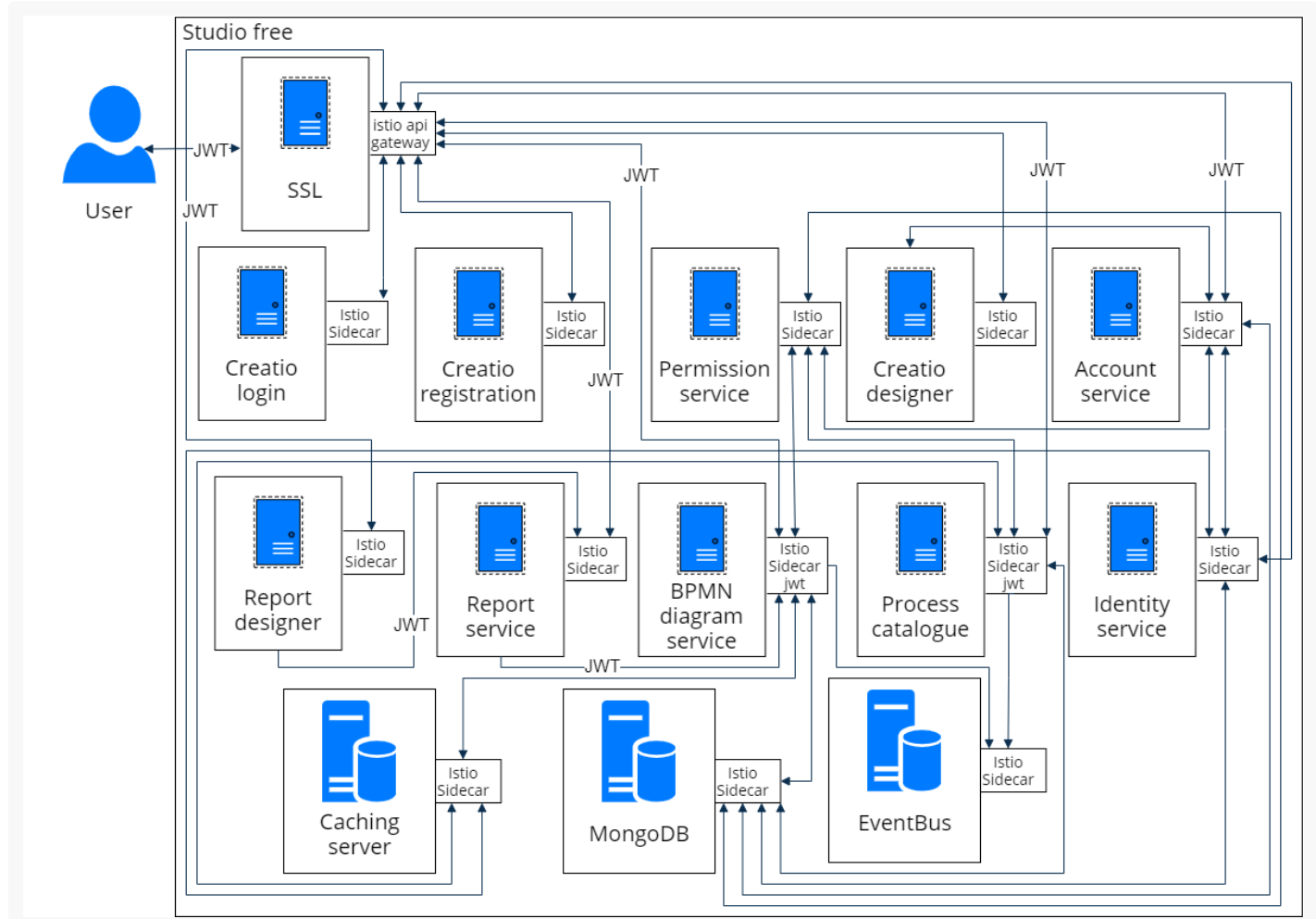
Studio Creatio free provides the following tools:

- **[Process designer](#).** The process designer with BPMN 2.0 support provides universal tools for designing business processes of any complexity using a visual designer.
- **[Process library](#).** All business processes of the company are stored in the process library, which enables you to add new business processes to your library by [creating](#) or [importing](#) them, organize business processes in

a hierarchical structure, and searching folders and processes.

Studio Creatio, free edition operation schema

The operation scheme of the Studio Creatio, free edition



Studio Creatio, free edition compatibility with Creatio products

Studio Creatio free is available as a separate product and can exchange data with all Creatio products utilizing business process export (`*.bpmn` , `*.svg` , and `*.png`) and import (`*.bpmn`).

Studio Creatio, free edition deployment options

Studio Creatio free is only available in Creatio's cloud, lacks an open API, and cannot be customized by customers.

Global search service

 Beginner

The Global Search Service is created for integration of the [ElasticSearch](#) engine with the Creatio.

Use the global search service to quickly search data in the main Creatio application by entering a search query in the search string. Creatio always searches in all sections (including custom sections).

Global Search Service basics

The search service implements recording and transport functions by doing the following:

- Subscribes clients by creating an index in ElasticSearch and saves the connection between the index and the application.
- Disconnects clients by removing their index in ElasticSearch.
- Participates in the indexing process by retrieving data from the application database (DB).

The Global Search Service has the following distinguishing features:

- The records are searched by their text and lookup fields as well as the [*Addresses*], [*Communication options*], and [*Banking details*] details.
- Files and links on the [*Attachments and notes*] tab of the record page can be found by their name or description.
- Search requests are processed taking into account common typos and morphology of different word forms in English (other languages are not currently supported). The search query is case-insensitive.
- The search results are ranked by relevance both in the actual results list and with any configured filters. For example, if the search is performed from a section, the records of this section are displayed at the beginning of the results list.
- If a user does not have permissions for a specific object column, such a column is not displayed on the page of global search results.

Use the following [system settings](#) to set up global search parameters:

- [*Global search default entity weight*] and [*Global search default primary column weight*] - to set up the rules for displaying search results.
- [*Display search results with partial match*] - to display search results taking morphology, typos, and fuzzy matches into account.
- [*Match threshold for displaying in search results (percent)*] - to manage the number of displayed search results with partial match and increase the chances of finding data for inaccurate search requests.

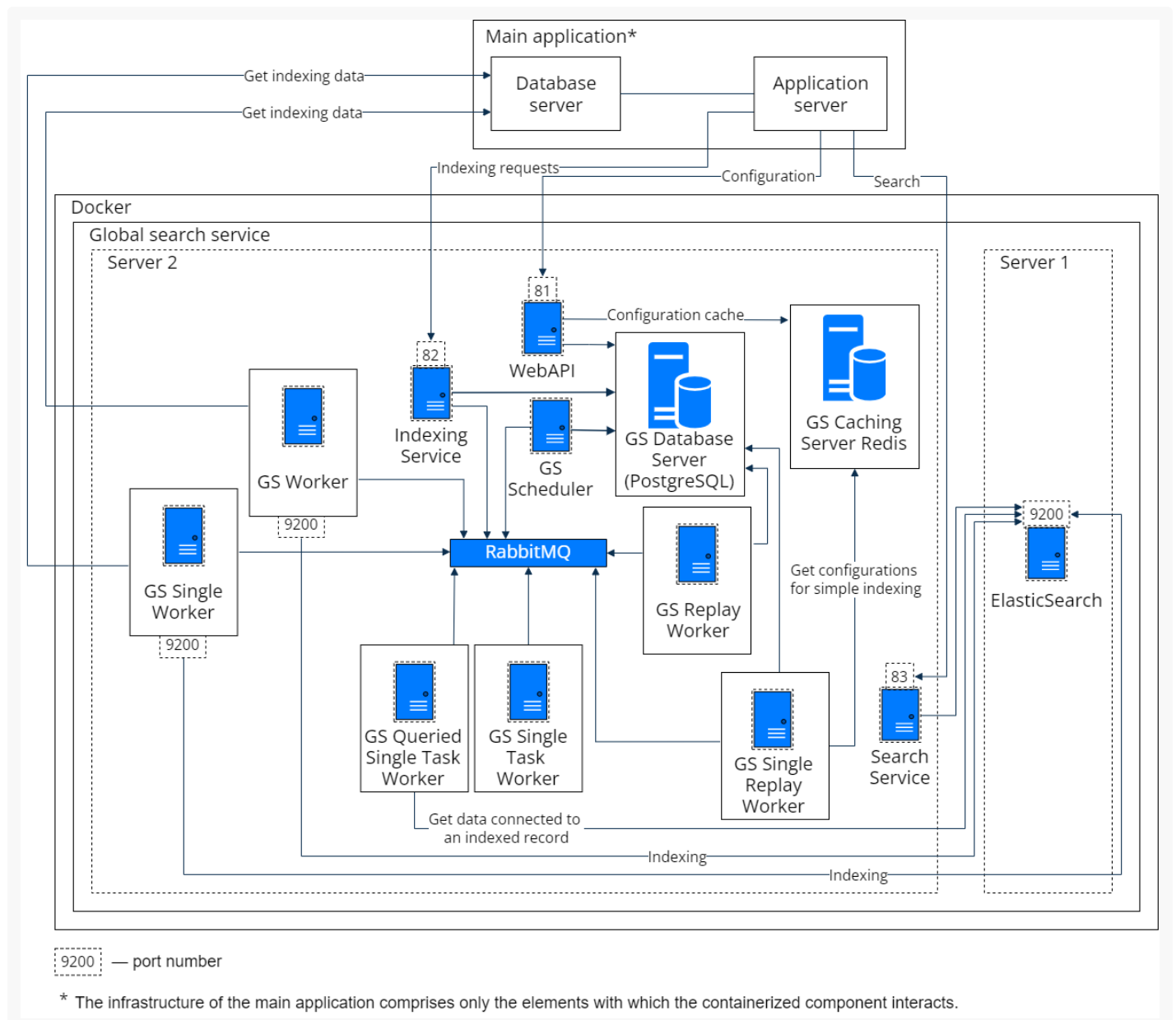
Global search service operation schema

Global search service consists of the following components:

- **RabbitMQ** - message broker.
- **ElasticSearch** - a search engine.
- **GS Database Server** - database for configuring the global search component.
- **GS Caching Server Redis** - database used for caching and speed.

- **WebAPI** – web service for global search component configuration.
- **Indexing Service** – web service for processing the queries for the targeted indexing of Creatio data.
- **GS Scheduler** – scheduler for indexing data from Creatio to ElasticSearch.
- **GS Worker** – component for indexing data from Creatio to ElasticSearch as per the GS Scheduler tasks.
- **GS Replay Worker** – component for processing indexing results (GS Worker operation results).
- **GS Single Worker** – component for targeted indexing of business process data in ElasticSearch upon a request from the business process.
- **GS Single Replay Worker** – component for handling exceptions when processing targeted indexing results (GS Single Worker operation results).
- **GS Single Task Worker** – component for scheduling tasks for GS Single Worker.
- **GS Queried Single Task Worker** – component for generating tasks for GS Single Worker.

The operation scheme of the global search service



Global search service scalability

Database clustering enables scaling of the global search service in large projects. Learn more about ElasticSearch clustering in the [official documentation](#).

Global search service compatibility with Creatio products

The global search service features several versions: 1.4, 1.5, 1.6, [1.7](#), and [2.0](#). Each version is compatible with all Creatio products of version 7.10 and up.

Global search service deployment options

You can deploy the global search service on-site and in the cloud.

On-site applications require a preliminary setup of the global search service. To set up the service, you need two servers (physical or virtual machines) that meet specific system requirements. More information about the system requirements for the servers is available in the “[Server-side system requirements](#)” article. Both servers must run under Linux with [Docker](#) installed. You can find the list of supported Linux distributions in the [Docker documentation](#).

We recommend that you install the most up-to-date version of the global search service.

Bulk duplicate search service



Bulk duplicate search is a third-party service for bulk deduplication of Creatio section records.

Duplicate records may appear in Creatio whenever users add new records to system sections. Finding and merging duplicates helps maintain the quality of your data in any Creatio section.

Bulk duplicate search basics

You need the [global search service](#) set up and configured using [ElasticSearch](#) to ensure the operation of the bulk duplicate search service.

Creatio implements the following duplicate search modes:

- **Bulk duplicate search** – check for duplicates is run for the entire database. Launched manually or automatically.
- **Duplicates search when saving a record** – checks for duplicates for a particular record. It is run automatically when a new record is added and saved in a section.

Additionally, you can manually merge any records in a section, even if they were not flagged as duplicates. This option is available for all system sections. By default, duplicate search is available in the [*Accounts*], [*Contacts*] and [*Leads*] sections. In Creatio, the duplicate search is executed with the help of pre-configured rules. Creatio also provides customization of out-of-the-box duplicate search rules for contacts, accounts, and leads. Create custom rules for any Creatio section, including custom sections.

The bulk duplicate search function is pre-enabled in Creatio applications deployed in the cloud. Creatio applications deployed on-site require the [global search service](#) set up and configured before the bulk duplicate search service

can be enabled.

[To connect bulk duplicate search to Creatio](#), take the following steps:

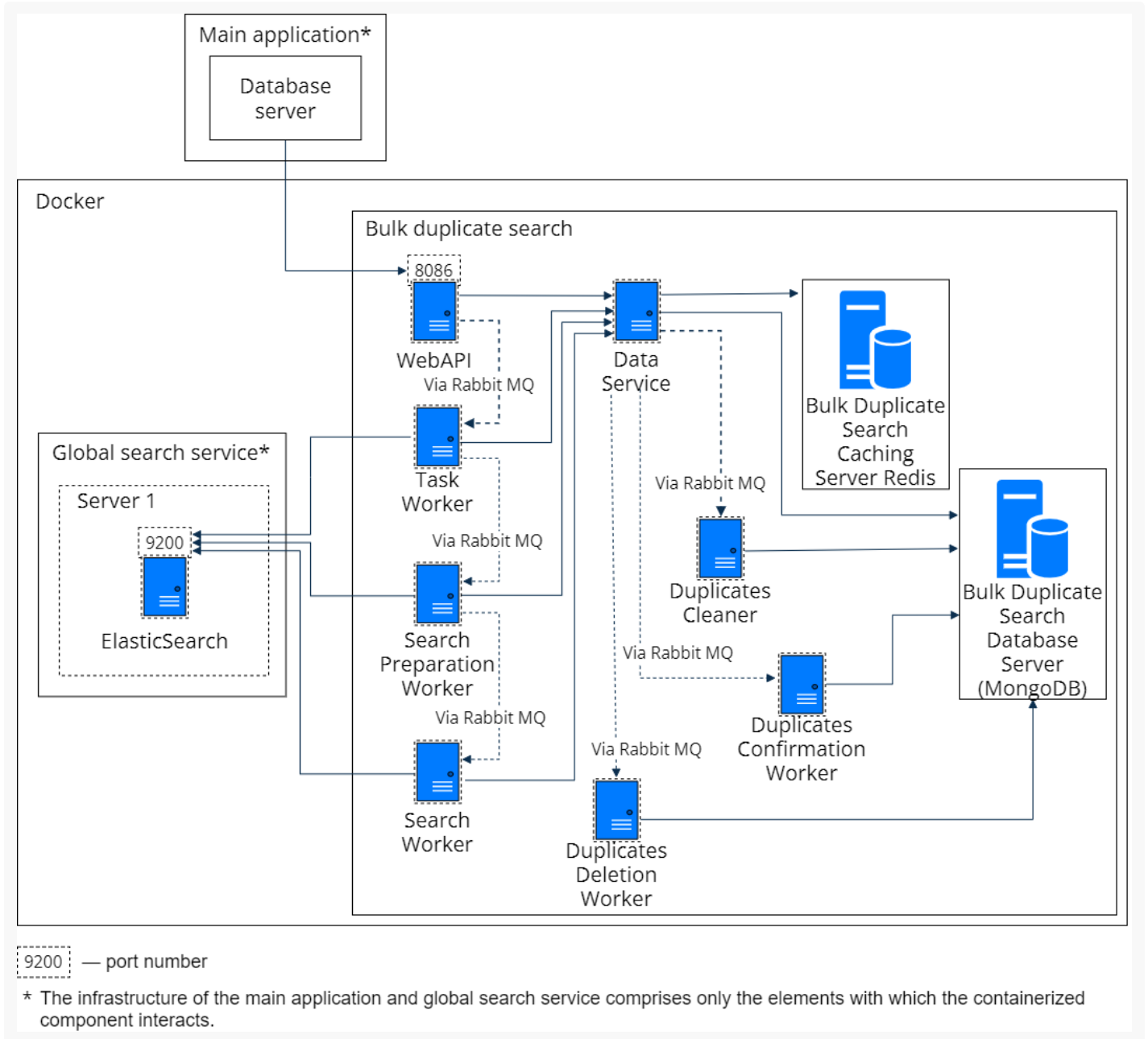
1. Set up the [*Deduplication service api address*] [system setting](#) value.
2. Set up the [*Duplicates search*] [operation permissions](#).
3. Run the SQL script to [enable the bulk duplicate search functionality in Creatio](#) (`BulkESDeduplication` , `ESDeduplication` , `Deduplication`).
4. Restart the Creatio application.

Bulk duplicate search service operation schema

Bulk duplicate search service consists of the following components:

- **RabbitMQ** - message broker. Bulk duplicate search service component.
- **ElasticSearch** - a search engine. Bulk duplicate search service component.
- **Redis** - repository used for caching and speed.
- **MongoDB** - document-oriented DBMS.
- **WebAPI** - web service for communicating in the main Creatio application.
- **Data Service** - internal service for communication with a MongoDB component.
- **Duplicates Search Worker** - duplicate search component.
- **Duplicates Deletion Worker** - targeted duplicate deletion component.
- **Duplicates Confirmation Worker** - component for grouping and filtering the detected duplicates based on their uniqueness.
- **Duplicates Cleaner** - component for clearing the duplicates.
- **Deduplication Task Worker** - component for setting the deduplication task.
- **Deduplication Preparation Worker** - component for preparing the deduplication process. This component generates queries for duplicate search according to the rules.

The operation scheme of the bulk duplicate search service



Bulk duplicate search service scalability

Database clustering enables scaling of the bulk duplicate search service in large projects. Learn more about ElasticSearch clustering in the [official documentation](#).

Bulk duplicate search service compatibility with Creatio products

The bulk duplicate search service features several versions: 1.0-1.5, 2.0. Each version is compatible with all Creatio products of version 7.14 and up.

Bulk duplicate search service deployment options

You can deploy the bulk duplicate search service on-site and in the cloud.

On-site applications require a [preliminary setup of the global search service](#). To set up the bulk duplicate search service, you need a server (a physical or virtual machine) that meets specific [system requirements](#). Both servers must run under Linux with [Docker](#) installed. You can find the list of supported Linux distributions in the [Docker documentation](#).

We recommend that you install the most up-to-date version of the bulk duplicate search service.

Database enrichment service



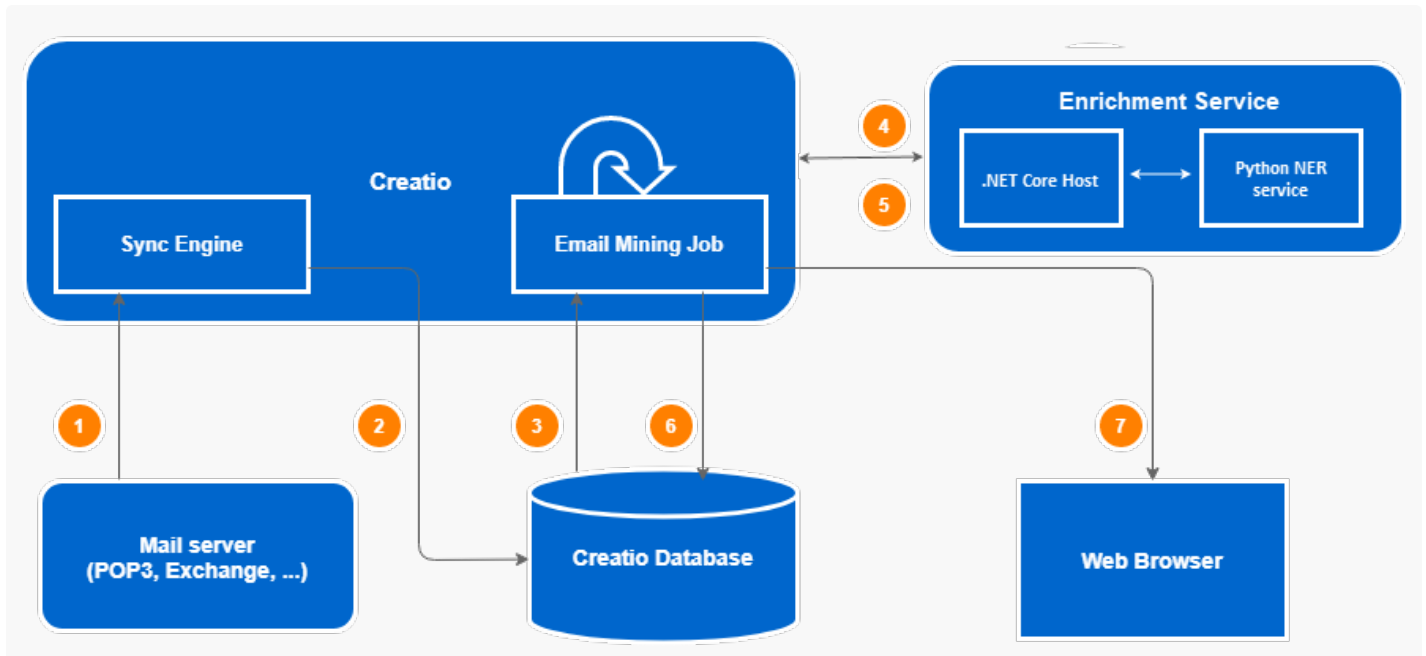
Beginner

Use the database enrichment service to search for the most up-to-date information on accounts and contacts, as well as their communication options, from emails and open Internet sources.

Workflow

The workflow for account/contact information enrichment with emails is as follows:

1. The [Synch Engine mechanism](#) performs the mail server synchronization. The mail server transfers the new emails to the Synch Engine (1).
2. The **Sync Engine** saves the transferred emails in the database as "Email" type activities (2).
3. The Creatio task scheduler occasionally runs the "Email Mining Job" process (3). The mining process extracts a batch of the most recently created unprocessed "Email" type activities. Then, the mining process extracts the message body and format (plaintext or HTML) from each activity.
4. The "Email Mining Job" process sends an HTTP request to the cloud Enrichment Service for each selected email (4).
5. The **Enrichment Service** performs the following operations (5):
 - Extracts a thread of separate messages (replies) from the email.
 - Extracts each message's signature.
 - Extracts the following entities from the signature: contact (full name), phones, email and web addresses, social networks, other communication options, physical addresses, and the organization name.
6. The "Email Mining Job" process parses the structure returned by the Enrichment Service and stores it raw in the Creatio database (6).
7. The "Email Mining Job" process sends a notification when the email data mining is complete. The notifications about the processed emails are sent to user communication panels via WebSocket.



Compatibility with Creatio products

The database enrichment service is compatible with all Creatio products of version 7.10 and later.

Deployment options

You can use the database enrichment service both on-site and in the cloud.

A **personal cloud service key** and Creatio cloud services **connection URL** are required to use the database enrichment service.

Use the following system settings to specify these values:

- [*Account enrichment service URL*] ([*Account enrichment service URL*]) — by default, this setting is populated for all Creatio applications.
- [*Text parsing cloud service*] ([*Text parsing cloud service*]) — specify the contact data enrichment service URL in this setting.
- [*Creatio cloud services API key*] ([*Creatio cloud services API key*]) — by default, this setting is populated for Creatio in the cloud. To set up the service on-site, request a personal key from Creatio support, then paste the key to this system setting. Learn more about setting up the database enrichment service on-site in the [Data enrichment service](#) article.

Machine learning service

 Beginner

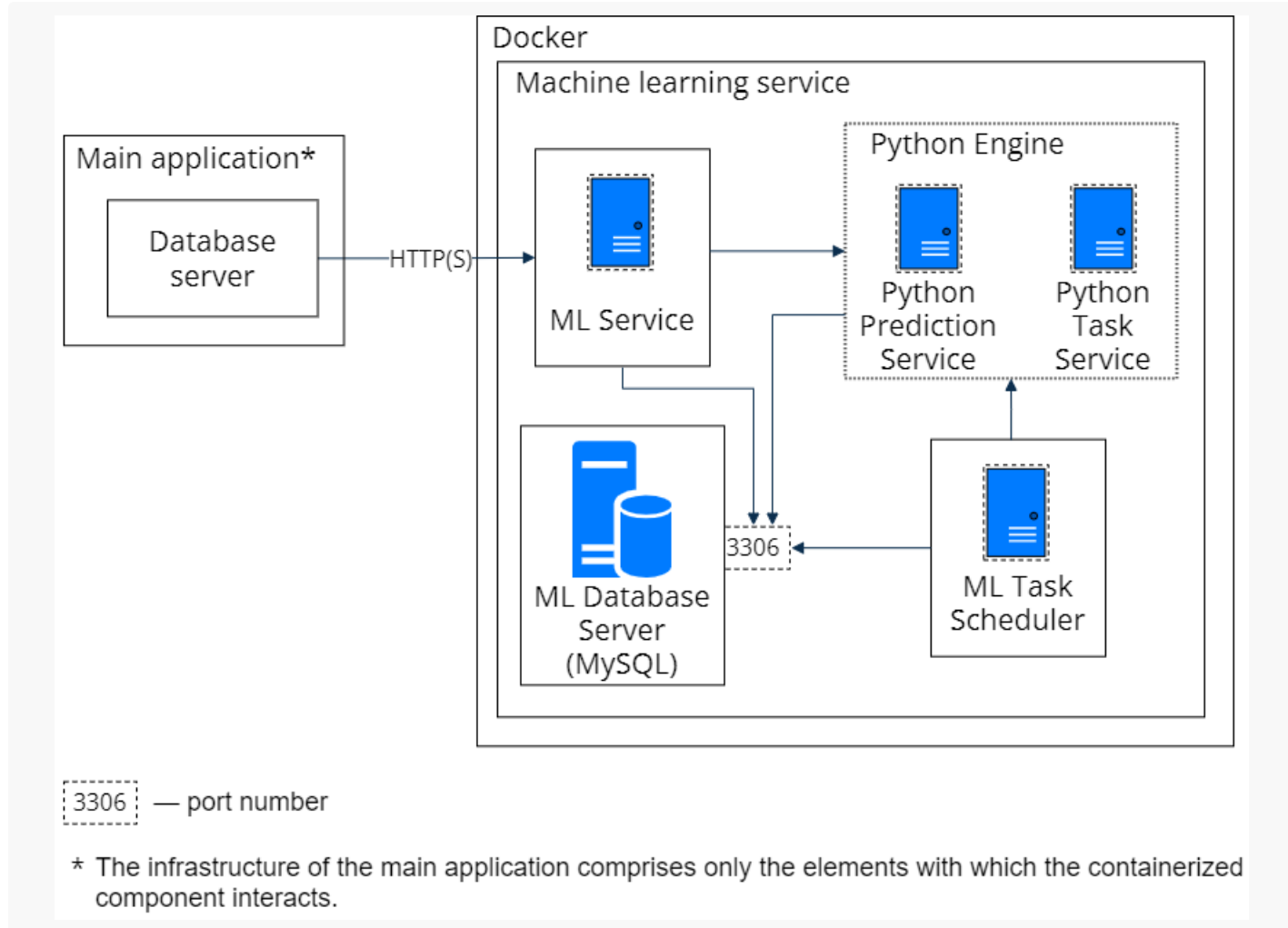
The machine learning (lookup value prediction) service uses statistical analysis methods to make predictions based on historical data.

Workflow

The machine learning service consists of the following **components**:

- **ML Service** — machine learning web service. The only component that can be accessed externally.
- **Python Engine** — machine learning engine, a service wrapper for open source machine learning libraries.
- **ML Task Scheduler** — task scheduler.
- **MySQL** — MySQL database.

The machine learning service workflow



The service creates a **prediction model** — an algorithm that makes predictions. This allows Creatio to make informed decisions based on historical data automatically.

The models have two main **workflow stages**:

- training
- prediction

Training

This stage “teaches” the ML model.

The **main training steps**:

1. The service establishes a data transfer and training session.
2. The service selects a training data batch sequentially.
3. The service requests to place a model in a training queue.
4. The ML Task Scheduler processes the queue.
5. The Python Engine trains the model and writes the parameters to the database.
6. Creatio occasionally queries the service to get the model status.
7. Once the model status is set to [*Done*], the model is ready for prediction.

Prediction

Creatio performs prediction tasks via cloud service calls that indicate the model `Id` and the data used for prediction.

The prediction result is a set of probability values stored in the `[MLPrediction]` table in Creatio.

If the `[MLPrediction]` table has predictions for a particular entity record, the edit page will automatically display the predicted values.

Scalability

[Docker](#) and [Kubernetes](#) make the machine learning service scalable.

Compatibility with Creatio products

The machine learning service for Creatio **on-site** is compatible with all Creatio products of version 7.10 and later.

The machine learning service for Creatio **cloud** is compatible with all Creatio products of version 7.13.3 and later.

To set up the service in earlier Creatio versions, use the corresponding version's docker image available on [Docker Hub](#).

Deployment options

Predictive data analysis in Creatio **on-site** requires preliminary setup.

To set up the service, use a physical or a virtual server running a Linux distribution or Windows. Install the service components with Docker.

We recommend using a Linux server for the production environment. Use a Windows server only for the development environment.

Contact Creatio support to receive Windows-compatible Docker containers.

Learn more on deploying the machine learning service in the [Machine learning service](#) article.

Email Listener synchronization service



Note. The former Exchange Listener synchronization service is named “Email Listener synchronization service” since Creatio 8 Atlas to capture its essence better.

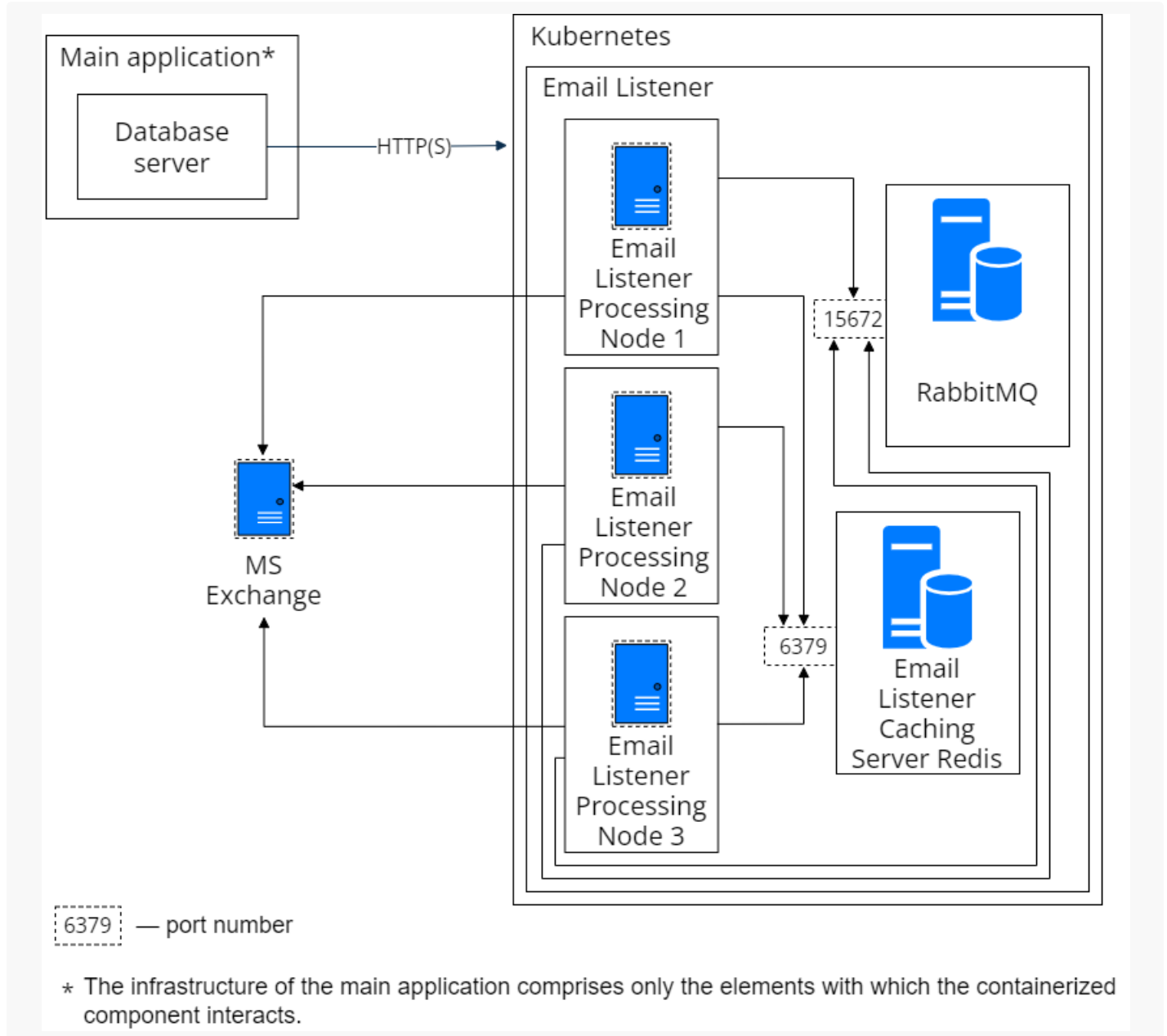
The **purpose** of the Email Listener synchronization service is to synchronize Creatio with MS Exchange and IMAP/SMTP mail services using a subscription mechanism. This is the only method of working with mail services. Working with mail services without the microservice is not supported.

Workflow

The **components** of the Email Listener synchronization service are as follows:

- Email Listener primary module.
- NoSQL Redis DBMS.
- Email Listener secondary module.
- RabbitMQ.

The workflow of the Email Listener synchronization service is available in the figure below.



Email Listener module

The **purpose** of the Email Listener module is to use the mailbox credentials and create a subscription to “new message” events. The open subscription remains in the component memory to ensure fast response time when new emails arrive. When a corresponding event is received, the email instance loads.

NoSQL Redis DBMS

The **purpose** of Redis NoSQL DBMS is to enable creating a scalable and fault-tolerant system of processing nodes. The Redis repository holds information about the served mailboxes. This enables any container to process Creatio queries for adding a new subscription or check the status of a specific subscription regardless of the subscription node.

Requirements to Redis:

- Authorized access of the Email Listener service to Redis.
- A separate database available for the Email Listener service operation.

Email Listener module

The **purpose** of the Email Listener module is maintain scalability and fault-tolerance of the Email Listener primary module. The secondary module downloads emails from the mail server and delivers them in the Creatio application. This smoothes out processing peak mail flows for high-load services due to the API components not participating in downloading. They are less busy and thus available for subscription and sending emails instead. The original service component. Replaced with the primary module when unavailable.

RabbitMQ

The **purpose** of RabbitMQ is to maintain scalability and fault-tolerance of the service. The message broker distributes tasks between the components in high-load environments. The original service component.

Scalability

By default, separate nodes of the `statefulSet` type process requests based on 1 handler instance per 50 active mailboxes. The number of replicas depends on the `replicaCount` parameter. You can increase the number of processors by specifying the needed value. You can configure automatic scaling depending on the number of active subscriptions.

Compatibility with Creatio products

The Email Listener synchronization service version 1.0 (MS Exchange support) is compatible with all Creatio products of version 7.15.2 and later.

The Email Listener synchronization service version 2.0 (IMAP/SMTP support) is compatible with all Creatio products of version 7.16 and later.

Installation options

We recommend using the Kubernetes orchestrator and Helm package manager to deploy the service and ensure the operation of the application in the **production environment**. Learn more about deploying the synchronization service via Kubernetes a separate article: [Deploy the synchronization service via Kubernetes](#).

You can also use Docker to speed up the deployment in the development environment. Learn more about deploying the synchronization service via Docker in a separate article: [Deploy the synchronization service via Kubernetes](#).

An in-memory repository is sufficient to deploy the service.

Static content bundling service



The **purpose** of the static content bundling service is to reduce the page loading time. **Static content** includes

*.js-files and *.css-files that are located in the Creatio [file system](#) and are required to display the Creatio UI in the browser. Learn more about static content in a separate article: [Packages file content](#).

Ways to optimize the page loading time:

- **Minification.** Reduces the size of *.css, *.js, and *.html files. This implies removal of commented out code as well as superfluous line breaks, leading and trailing spaces. This reduces the size of the original file by 10-20%.
- **Bundling** i. e., generation of bundle files. Optimizes the performance by combining the static files of the same type into a single bundle file. Reduces the number of requests.

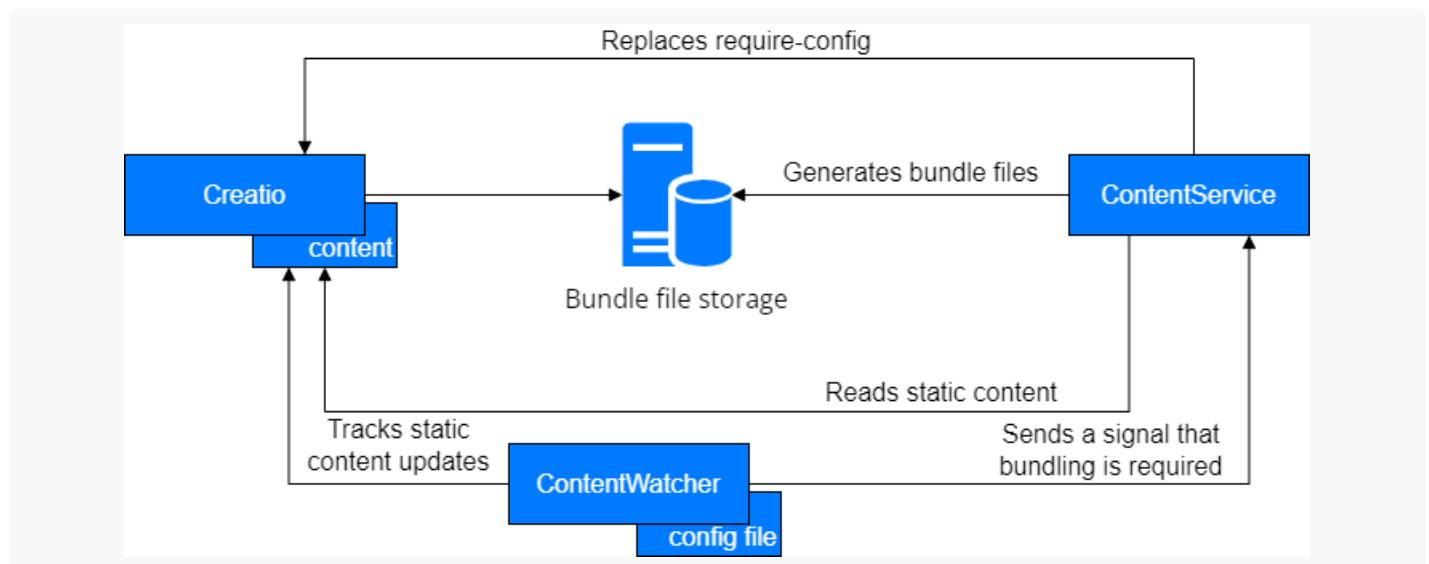
Most web applications are delivered with minified and bundled files. Since the Creatio configuration and static content can change during the life cycle, the service runs minification and bundling automatically when necessary.

Workflow

- `ContentService`. The service that minifies and bundles Creatio files. Deployed independently of Creatio. `ContentService` can be paired with `ContentWatcher` or work independently. Learn more in a separate article: [Static content bundling service](#).
- `ContentWatcher`. A utility that interacts with Creatio files and `ContentService` to ensure timely minification and bundling. Learn more in a separate article: [Static content bundling service](#).

To improve performance, the application is configured to generate minified bundle files by default.

View the static content bundling workflow in the figure below.



Compatibility with Creatio products

The static content bundling service is compatible with all Creatio products of version 7.11 and later.

Installation options

You can use the static content bundling service both on-site and in the cloud.

Use a Docker container to deploy the bundling service **on-site**. Docker documentation is available on the official [Docker website](#). To the static content bundling service, follow the instructions in a separate article: [Static content bundling service](#).

Creato **cloud** has the bundling service configured out-of-the-box.

Bulk email service



Beginner

The bulk email service is designed for integrating Creatio with bulk email providers. Bulk emails are one of the most effective marketing tools for promoting products and services.

Bulk email service basics

In Creatio, emails are managed in the [*Email*] section, which you can use to:

- Set up email templates.
- Segment email recipients.
- Access delivery analytics.
- Access individual bulk-email feedback.

The following marketing email functions are available in Creatio:

- **Bulk emails**. Sent once to a set number of recipients. Bulk emails enable you to actively engage your customers.
- **Trigger emails**. Trigger emails are sent automatically to each recipient who triggers them (e.g., submits a web form, clicks a link, etc.).

Access to the marketing email functionality is [licensed](#) separately.

Set up your email service integration with Creatio for using the bulk email service. All cloud email service settings for bulk emails are consolidated on the bulk email setup page in the [*Email*] section. Learn more about working with the [*Email*] section in the [section](#).

[Email domain verification](#) is required before using the email functionality. Two mail services are available for sending bulk emails from Creatio: [UniOne](#) and [Elastic Email](#). By default, Creatio is integrated with UniOne. Contact Creatio support to send emails via Elastic Email.

[Set up the bulk email contents](#) that the recipients will see (the email template) before sending bulk emails. There are two types of marketing email templates in Creatio: templates that display the same content for all recipients (static content), and templates, whose content differs for different target audiences (dynamic content). Email templates are created via a no-code visual drag&drop editor called "**Content Designer**".

You can use [email analysis](#) to see the email results and evaluate their effectiveness. The [*Email*] section analytics provides detailed statistics both for individual marketing emails and for aggregated metrics.

Bulk email service compatibility with Creatio products

The bulk email service function is available in Marketing Creatio.

Bulk email service deployment options

You can deploy the bulk email service on-site and in the cloud. Learn more about setting up bulk emails in the [article](#).