



Product Overview

RapidPro is a platform that allows you to visually build scalable mobile-based applications from anywhere in the world.

RapidPro powers the connection between government leaders and the most important voices in their countries, while allowing organizations to connect those voices across borders and geographies.

RapidPro has been built by UNICEF with the collaboration of Nyaruka - a Rwandan software firm. It builds on UNICEF's 8 years of innovation experience in the most difficult operating environments and Nyaruka's TextIt application - a visual SMS application builder that has grown out of the [RapidSMS](#) community.

RapidPro's development has heavily been influenced by a set of [principles of innovation](#) endorsed by major multinational organizations. By the end of this year, RapidPro will be fully open sourced, enabling the developer and development community to contribute to a public technological good.

RapidPro is supported by the Global Innovation Centre in UNICEF, with partnerships from technology and development organizations.

RapidPro is made for international development:

- **Design for Your Context:** Visually build an appropriate mobile service through an easy-to-use interface
- **Reach those Who Matter:** Communicate beyond SMS with voice, social media, and more!
- **Scale with Ease:** Seamlessly integrate with mobile network operators, don't worry about hardware as your service grows
- **Publish & Analyze :** Collect and manage your data in a way that makes sense to you
- **Integrate & Interoperate:** Make your RapidPro application interact with external systems

RapidPro: the platform

Origins - RapidSMS

[RapidSMS](#) is an open-source SMS-based framework that manages data collection, complex workflows, and group coordination using basic mobile phones - and can present information on the internet as soon as it is received. So far RapidSMS has been customized and deployed with diverse functionality: remote health diagnostics, nutrition surveillance, supply chain tracking, registering children in public health campaigns, and community discussion. RapidSMS was initially designed to be customized for the challenges of governments, multilateral, international and non-government organizations, and development practitioners: working effectively in spite of geographical remoteness of constituents, limited infrastructure (roads, electricity), and slow data collection (due to paper-based records, slow courier systems, etc).

These programs all involve sending and receiving SMS from identified target groups (village health teams, headmasters, school teachers, youth leaders, the general public, etc), using free-to-the-user dedicated short code numbers, and aggregating data for further processing.

Nevertheless, until now, all these programs are implemented as separate software projects, based on a variety of open-source or even proprietary software packages – and investments on one project can therefore not easily be utilized to reduce additional investments on another similar SMS based system. As a response to these challenges and duplications in terms of investment in SMS based systems, UNICEF started to contribute to RapidSMS as the open-source basis to build on and to use as the core software for its SMS based applications. Although a number of the systems were already based on RapidSMS, most of them still needed software programming capacity in order to implement even the slightest modification as per the specific requirements of each program.

As a result all currently existing RapidSMS based systems have branched off from the initial core of the open-source RapidSMS platform, additional features and newly added software source code developed for one system is not easily and out-of-the-box available for other systems, and sometimes has to be added again – thus, increasing investment and software development costs for each new SMS based system deployed by UNICEF.

In order to overcome the above described challenges and reduce investment costs in the long run, the UNICEF Global Innovation Center developed [RapidPro](#). RapidPro has been built in collaboration between UNICEF and Nyaruka - a Rwandan software firm. It builds on UNICEF's 8 years of innovation experience in the most difficult operating environments and Nyaruka's [TextIt](#) application - a visual SMS application builder that has grown out of the RapidSMS community.

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Platform Overview

RapidPro is a highly capable platform built on TextIt that allows for the creation of sophisticated interactions using an intuitive user interface. It provides all the functionality required to implement 90% of interventions without any development by software engineers. Instead, it will be configurable for a wide set of use cases. It is designed for programmatic experts--not technologists--to be able to easily create mobile-based workflows to monitor programmes, track activities, or engage with beneficiaries.

As a globally-hosted, cloud-based platform, using RapidPro at scale is cheaper, easier, and faster than setting up server-based systems, hiring software programmers, and managing technical contractors. The UNICEF Global Innovation Centre and select vendors will ensure the smooth operations of the system and once RapidPro is open sourced, the software developer community will continuously add new features and functionality based on feedback and requests from users.

The RapidPro platform comprises of several components working in concert. This separation of core components guarantees that each component can continue to evolve at the appropriate pace without affecting the reliability of the system as a whole. The following components have already been developed and integrated or identified as development priorities for the RapidPro platform:

RapidPro

The core RapidPro service is a highly capable platform that allows for the creation of sophisticated interactions using an intuitive user interface. It will provide all the functionality required to implement 90% of interventions without any development by software engineers. Instead it will be configurable for a wide set of use cases. It shall also be flexible enough to further incorporate new and additional features (such as multi-channel or multi-language support, etc.) in future directly into the system to avoid the branching off of different use cases from the core service.

Vumi

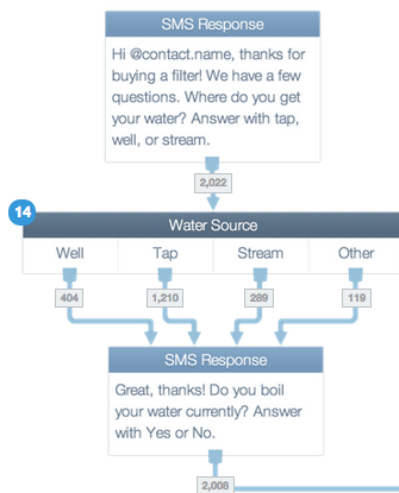
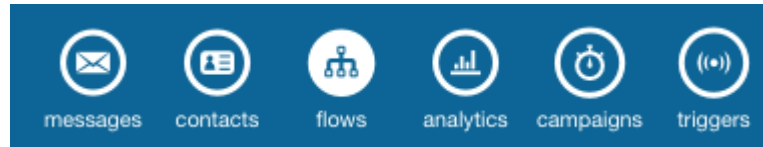
[Vumi](#) provides a highly scalable platform to interface with cellular carriers as well as other messaging platform's proprietary APIs. It will provide the channel for the delivery of messages sent and received by the platform.

RapidDash

The RapidDash service will provide a multi-tenant platform that integrates with RapidPro and provides flexible tools to build public facing web pages, reports and project descriptions. It will be used by most projects to create the web site describing the RapidPro project and to display reports gathered by that project. It will be configurable via a web interface.

Feature Overview

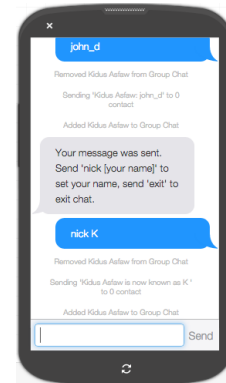
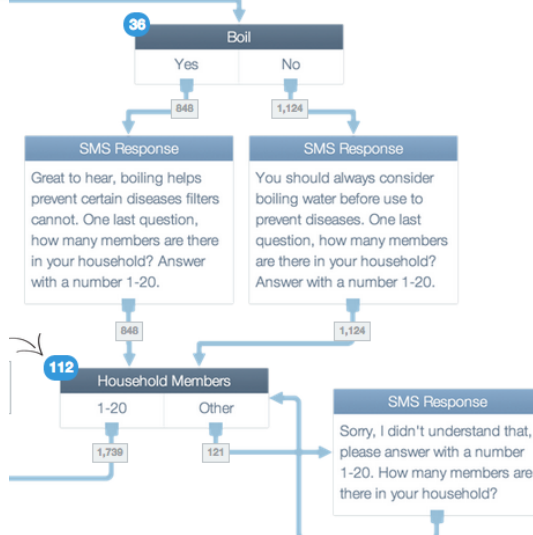
What RapidPro provides out-of-the-box is a workspace that allows you to build flows while setting triggers for executing them, manage user profiles and dynamically group them, analyze responses, and build campaigns that automate your engagement with users based on their responses. All of this can be done using a relay via an android app, or by testing your flows using a phone emulator.



Flows

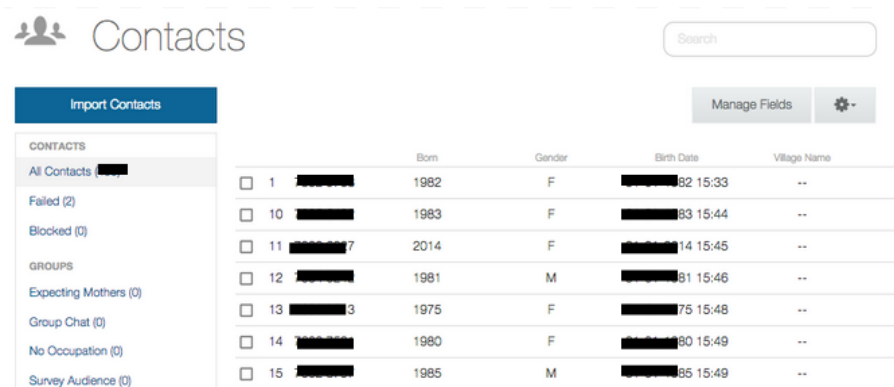
At the core of RapidPro lies the Flow Engine. This is the interface that allows users to visually build and modify the logic behind their application. Each interaction in RapidPro is defined by a step. By drawing arrows from one step to another, users have the ability to define how their application interacts with their end-users. At any point in the flow, actions can be triggered, such as sending an SMS, email or even calling an external API.

The flow builder also allows users to rapidly test their flow through a phone emulator that simulates the interaction the application would have with end-users. This is an essential feature for users who are still getting the hang of building applications for the first time.



Contacts

Users of RapidPro can easily customize and manage the information they collect from their end-users. By creating fields tailored to the applications use case, contacts can be directly imported via a spreadsheet or through a registration flow that dynamically populates the end-user's inputs into their contact profile.



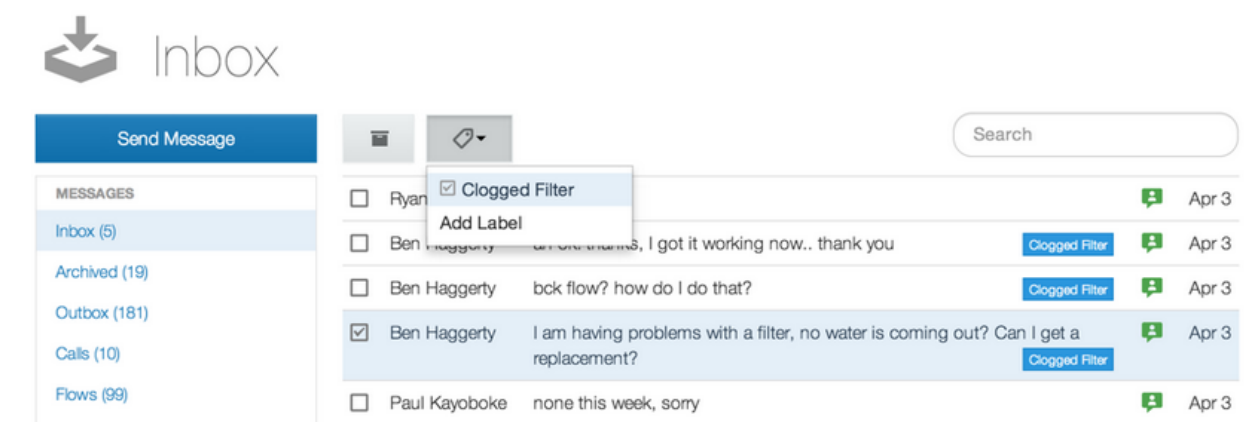
		Born	Gender	Birth Date	Village Name
<input type="checkbox"/>	1		F	82 15:33	--
<input type="checkbox"/>	10		F	83 15:44	--
<input type="checkbox"/>	11		F	14 15:45	--
<input type="checkbox"/>	12		M	81 15:46	--
<input type="checkbox"/>	13		F	75 15:48	--
<input type="checkbox"/>	14		F	80 15:49	--
<input type="checkbox"/>	15		M	85 15:49	--

By either dynamically using steps in flows or manually creating them, groups allows RapidPro users to manage their contacts based on specific indicators. This enables flows to target specific groups of people when necessary, and also gives way for in depth analysis to be taken on data that comes in from users of

similar background, preference, or inputs.

Messages

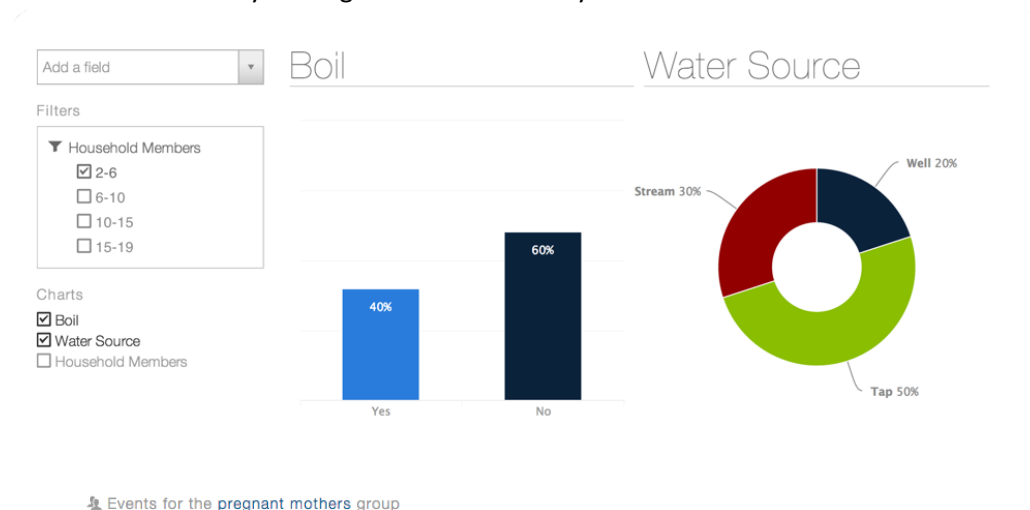
Just like email, messages from end-users can be filtered or labeled for further follow up. Messages can also be broadcasted to an end-user or a group of users, while even allowing for the customization of the message just like a mail merge. Messages can be sent out immediately, at a later time, or repetitively on a set schedule. This extends the use of a RapidPro application to providing human-to-human interaction during, between, or after a flow is completed. It also provides greater control for users to manage their communication with their end-users.



<input type="checkbox"/>	Ryan			Apr 3
<input type="checkbox"/>	Ben Haggerty	... on the phone, I got it working now.. thank you	Clogged Filter	Apr 3
<input type="checkbox"/>	Ben Haggerty	bck flow? how do I do that?	Clogged Filter	Apr 3
<input checked="" type="checkbox"/>	Ben Haggerty	I am having problems with a filter, no water is coming out? Can I get a replacement?	Clogged Filter	Apr 3
<input type="checkbox"/>	Paul Kayobo	none this week, sorry		Apr 3

Analytics

Every interaction with a flow creates a datapoint that is automatically associated with each user. RapidPro lets users easily get that data into Excel for further analysis, or the built-in real-time analytics for comparing datasets across populations. Since the RapidPro architecture provides versatility to interoperate with external systems (see Technical Architecture), data can also be pushed automatically to more robust analytics engines for richer analysis.



last menses

8 DAYS AFTER last menses	“Congratulations on your pregnancy at the health centre to ensure a healthy birth.”
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10 DAYS AFTER last menses	“Have you told someone you trust that they can support you?”
12 DAYS AFTER last menses	“Do you know your HIV status? Visit a health centre with your partner.”
15 DAYS AFTER last menses	“Do you sleep under a mosquito net? Babies born small or premature are more likely to die.”
17 DAYS AFTER last menses	“Stay healthy! Drink a lot of g-nuts. Eggs, meat or fish.”

Campaigns

An essential and effective tool in development has been scheduled reminders. Through campaigns, this functionality can be achieved by allowing users to easily schedule interactions with their end-users based on dates they have entered.

Campaigns can do more than just send messages, they can also start end-users down a flow, working them through a decision tree, collecting information or helping to provide feedback based on their inputs.

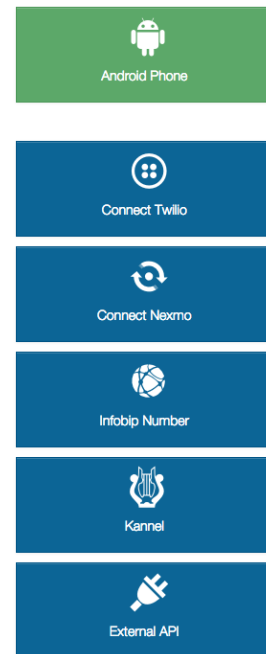
While the campaigns feature has specific use cases, it is a functionality that comes to great use to many development practitioners - especially in the health and education sectors.

Integration to MNOs

While SMS remains the core messaging channels for RapidPro, two methods currently exist to being connected to the mobile network operator (MNO) for sending and receiving SMS; either with a 3rd party aggregator company or via direct connections with each MNO.

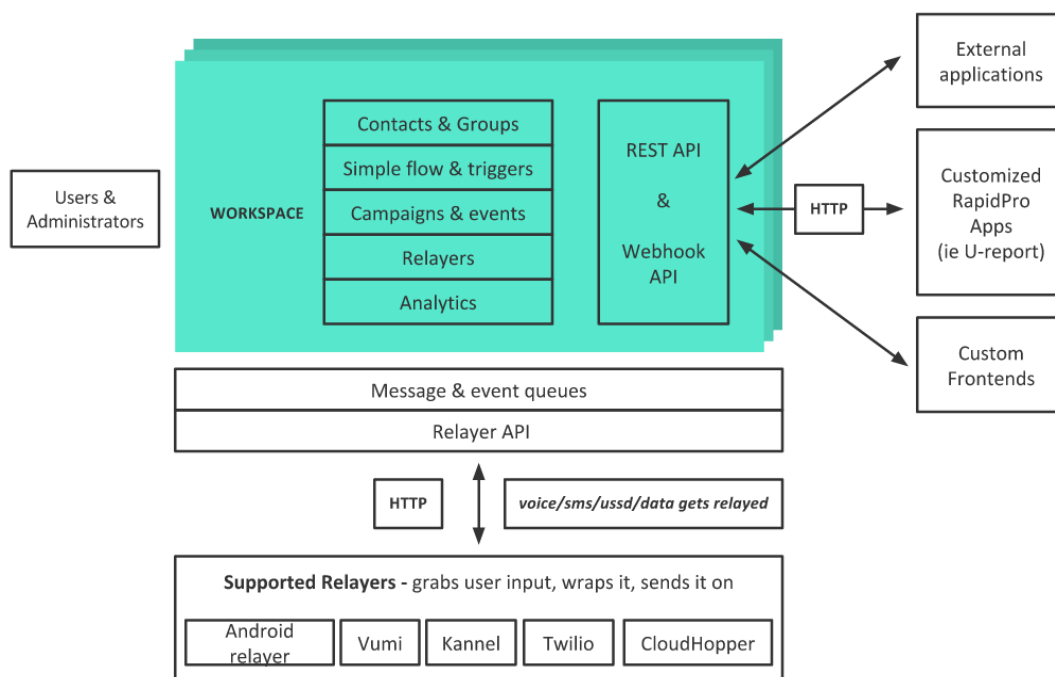
RapidPro can also send and receive messages from a SIM card in an Android phone -- this is only recommended for prototyping/testing or for cases where a small number of end-users exist. Connection to other cloud communication services - including Twilio, Nexmo, and Infobip - are available as long as users have prior service accounts with one of them.

Having these options, with the hopes to add HTTP messaging protocols in the near future, provide RapidPro users with the ability to seamlessly scale their application with very little engineering effort required to integrate an aggregator or MNO directly.



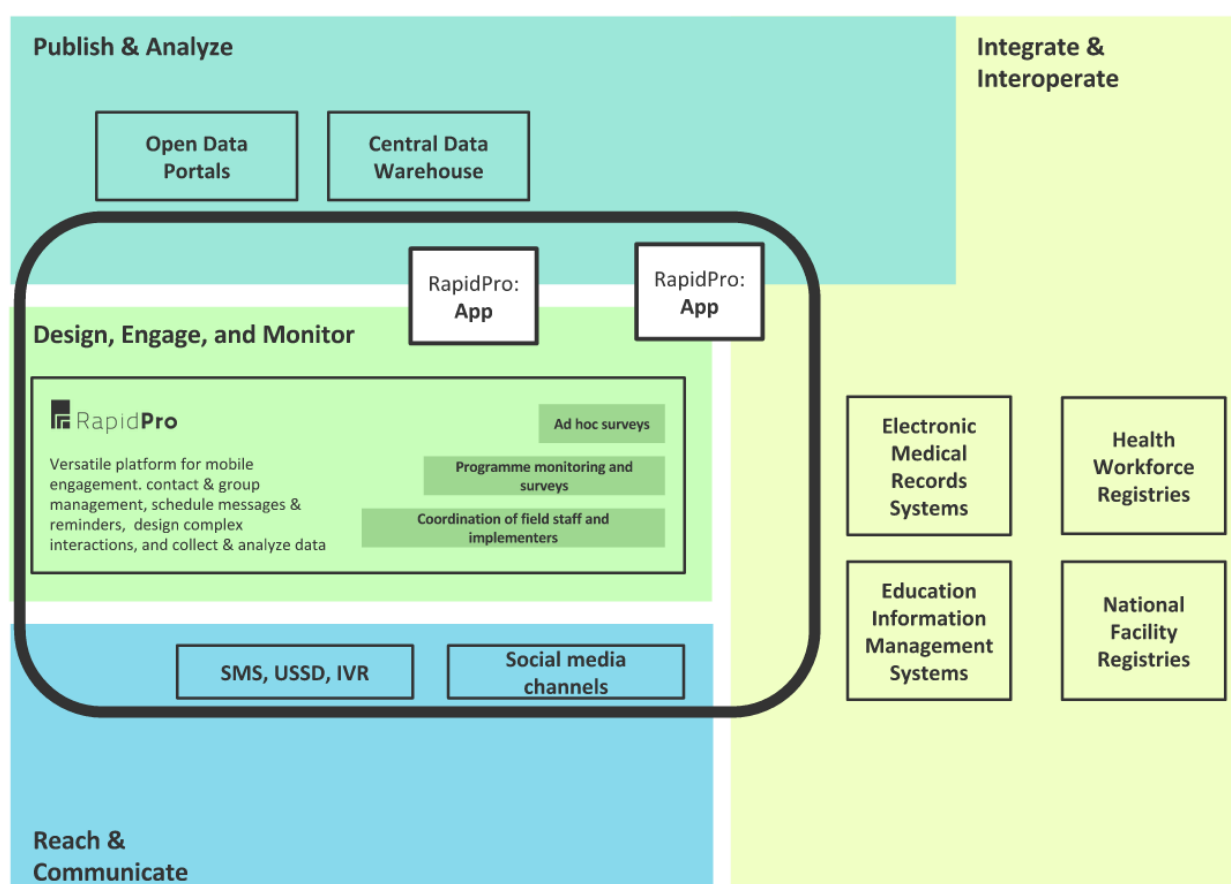
Architecture & Technical Ecosystem

RapidPro is designed for an increasingly complex world of databases, software services, and analytics. It is a cloud-hosted, scalable platform designed for integration and interoperability.



While the RapidPro workspace remains a versatile platform for mobile engagement, contact and group management, complex interaction design, and data collection and analysis, the platform is also designed to externally **reach & communicate**, **publish & analyze**, and **integrate & interoperate**.

- **reach & communicate:** integrate with local SMS aggregators, mobile network operators or communicate via social media to reach field staff, implementers, community health workers, and young people
- **publish & analyze:** publish aggregated data to open data platforms, global data repositories, or local datastores
- **integrate & interoperate:** RapidPro's extensive APIs allow for integration with a broad ecosystem of external systems and web services - so critical data is stored in global data repositories, purpose-built systems, proprietary platforms, or in any local database



RapidPro is cloud-based to meet the spikes of usage for applications at scale and to centralize the deployment of new feature rollouts in a secure and high performance environment. Both the platform and applications can be locally hosted, but this would require the purchase of dedicated server hardware, redundant power & network connections, and a systems administrator. Local installations can also access external systems and web services as long as internet connections are available.

RapidPro provides a simple REST API to interact with external applications using the JSON format.

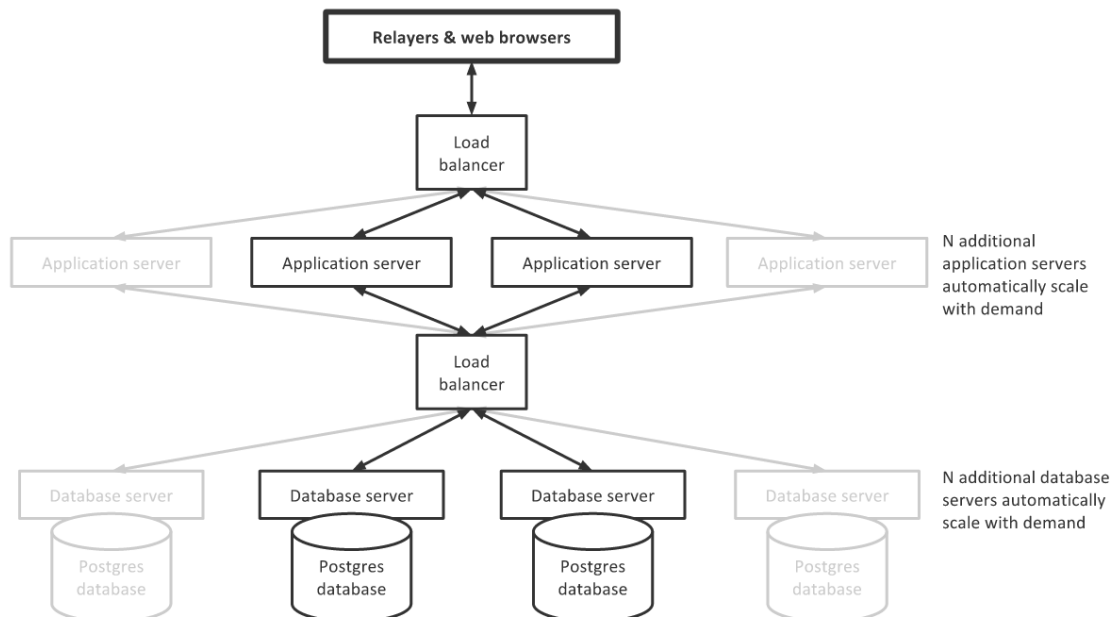
External applications and webservice can use the API to:

- list or modify contacts
- list, create, and send messages
- list incoming, outgoing and missed calls
- list active user interactions
- list or start user interactions with contacts or groups
- list, modify, or schedule events
- list and access user submitted data

RapidPro's **Webhooks** allow external applications to be notified when new messages are received, sent or delivered. Also, during any step of a user interaction, additional webhooks can access external applications to:

- retrieve information about a person from another database
- trigger an action in another application
- lookup, update, or store user-submitted data in another database

RapidPro's API documentation can be found at: <https://rapidpro.io/api/v1>



RapidPro's Technology Stack

Database	Postgres
Backend	Python and Django application Java queue
Frontend	Angular.js and jsPlumb

References

1. RapidPro website: www.rapidpro.io
2. About UNICEF & RapidPro: <http://unicef.rapidpro.io>
3. RapidSMS resources: www.rapidsms.org
4. RapidPro API: <https://rapidpro.io/api/v1>
5. RapidPro Knowledge Base: <http://docs.rapidpro.io>