

# RCPCH Digital Growth Charts API

## dGC Development Team

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# Outline

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[What is an API?](#)

[The problem of building Uber](#)

[The problem of building Digital Growth Charts](#)

How do our dGC programs work?

Where is our code?

API Business Models

References

# What is an API?

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API = Application Programming Interface, also known as a Web Service

It is a way for a computer program to 'talk' to another computer program

It uses a standard way of exchanging data called 'REST' hence sometimes called 'RESTful' APIs

# The problem of building Uber

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Uber is a popular taxi and ridesharing app.

To build Uber, you need:

- Mapping for the **whole world**
- An SMS text sending system (globally)
- A payment system (credit card system)

And you need **all of this** before you can launch and have your first customer!

# The problem of building Uber

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Luckily, Uber didn't need to build **any** of this infrastructure themselves

Because they are provided as Web Services, otherwise known as APIs

Uber could focus on building the 'special sauce' of the product, not the infrastructure

# The problem of building Uber

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Google Maps for their global mapping and geolocation information



Google Maps

# The problem of building Uber

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Twilio for SMS sending



# The problem of building Uber

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Braintree for processing credit card payments

**Braintree**  
A **PayPal** Service

# The problem of building Uber

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Without the use of APIs, Uber could not *possibly* have raised funding from venture capital backers to build their product



# Welcome to the API Library

The API Library has documentation, links and a smart search experience.

### Filter by

#### VISIBILITY

Public (286)

Private (2)

#### CATEGORY

Advertising (12)

Analytics (3)

Big data (16)

Blog & CMS (1)

Compute (6)

CRM (1)

Databases (4)

Developer stacks (2)

Developer tools (16)

Email (1)

Financial services (1)

Firestore (5)

### Maps

 <p><b>Maps SDK for Android</b> Google</p> <p>Maps for your native Android app.</p>	 <p><b>Maps SDK for iOS</b> Google</p> <p>Maps for your native iOS app.</p>	 <p><b>Maps JavaScript API</b> Google</p> <p>Maps for your website</p>	 <p><b>Places API</b> Google</p> <p>Get detailed information about 100 million places</p>
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### Machine learning

 <p><b>Dialogflow API</b> Google</p> <p>Builds conversational interfaces</p>	 <p><b>Cloud Vision API</b> Google</p> <p>Image Content Analysis</p>	 <p><b>Cloud Natural Language API</b> Google</p> <p>Provides natural language understanding technologies, such as sentiment analysis, entity...</p>	 <p><b>Cloud Speech-to-Text API</b> Google</p> <p>Speech recognition</p>
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# Public utilities and APIs

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APIs are the **public utility infrastructure** of the web, like the 'railroad tracks', 'National Grid', or 'water mains' that constitute physical infrastructure of countries

**Providers take something that was previously hard to do (or impossible), and make it easier**

# Public Utilities, APIs, and platforms

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Public utilities (and APIs) **enable innovation**:

- you can't build a train until there are tracks
- you can't sell fridges until there's reliable mains electricity
- You can't make satnav without GPS satellites
- you can't make mobile apps until there are smartphone platforms to put them on

# Public Utilities, APIs, and platforms

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What is special about **infrastructure** problems?

- **hard/expensive/complex** to build (...railways)
- requires **national** coordination (...motorways)
- only **governments or huge orgs** can do it (...GPS)
- once built, smaller orgs can **innovate** on (...apps)
- needs **standards** (...240V/50Hz, railway gauge)

# The problem of Digital Growth Charts

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The mathematics behind growth charts is complex  
To implement, you need:

- Technical programming skills
- Clinical paediatrics knowledge
- Health Informatics knowledge
- Statistical expertise

This makes growth charts expensive for EPR vendors to implement. **So they don't. And they won't.**

# The problem of Digital Growth Charts

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But we can break this deadlock by building a **web service** that EPR vendors can use to implement Digital Growth Charts

**“take something that was previously hard to do (or impossible), and make it easier”**

# RCPCH dGC API

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So we built a Growth Charts API Server

[digital-growth-charts-server](#)

# RCPCH dGC API

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**Show the thing**



Growth Charts API

[CONFLICT] GET GET Growth Cha... X

GET GET Growth Chart Referenc...

GET http://localhost:5000/api/v1/j...

GET GET Chart Data



localhost:5000-testing

## GET Growth Chart Calculations

Comments 0

GET

{{baseUrl}}/api/v1/json/calculations?birth\_date=2020-04-12&amp;observation\_date=2020-06-12&amp;height\_in\_metres=57.0&amp;weight\_in\_kg=6.0&amp;occipitofrontal\_circ\_in\_cm=40.0&amp;sex=male&amp;gestation\_weeks

Send

Params Auth Headers (6) Body Pre-req. Tests Settings

Cookies Code

Response

## Query Params

	KEY	VALUE	DESCRIPTION	...	Bulk Edit
<input checked="" type="checkbox"/>	birth_date	2020-04-12			X
<input checked="" type="checkbox"/>	observation_date	2020-06-12			
<input checked="" type="checkbox"/>	height_in_metres	57.0			
<input checked="" type="checkbox"/>	weight_in_kg	6.0			
<input checked="" type="checkbox"/>	occipitofrontal_circ_in_cm	40.0			
<input checked="" type="checkbox"/>	sex	male			
<input checked="" type="checkbox"/>	gestation_weeks	40			
<input checked="" type="checkbox"/>	gestation_days	0			
	Key	Value	Description		



Hit Send to get a response



Growth Charts API

[CONFLICT] GET GET Growth Cha... X

GET GET Growth Chart Referenc...

GET http://localhost:5000/api/v1/j...

GET GET Chart Data

+

...

localhost:5000-testing

## GET Growth Chart Calculations

Comments 0

Ex

GET

{{baseUrl}}/api/v1/json/calculations?birth\_date=2020-04-12&amp;observation\_date=2020-06-12&amp;height\_in\_metres=57.0&amp;weight\_in\_kg=6.0&amp;occipitofrontal\_circ\_in\_cm=40.0&amp;sex=male&amp;gestation\_weeks

Send

Params Auth Headers (6) Body Pre-req. Tests Settings

Cookies Code

Status: 200 OK Time: 80 ms Size: 5.57 KB

Save

## Query Params

KEY	VALUE	DESCRIPTION	...	Bulk Edit
<input checked="" type="checkbox"/>	birth_date	2020-04-12		
<input checked="" type="checkbox"/>	observation_date	2020-06-12		
<input checked="" type="checkbox"/>	height_in_metres	57.0		
<input checked="" type="checkbox"/>	weight_in_kg	6.0		
<input checked="" type="checkbox"/>	occipitofrontal_circ_in_cm	40.0		
<input checked="" type="checkbox"/>	sex	male		
<input checked="" type="checkbox"/>	gestation_weeks	40		
<input checked="" type="checkbox"/>	gestation_days	0		
	Key	Value	Description	

## Body Cookies Headers (4) Test Results

Pretty

Raw

Preview

Visualize

JSON

```

1  {
2
3
4    "birth_data": {
5      "birth_date": "Sun, 12 Apr 2020 00:00:00 GMT",
6      "estimated_date_delivery": null,
7      "estimated_date_delivery_string": null,
8      "gestation_days": 0,
9      "gestation_weeks": 40,
10     "sex": "male"
11   },
12   "child_observation_value": {
13     "measurement_type": "height",
14     "measurement_value": 57.0
15   },
16   "measurement_calculated_values": {
17     "centile": 23.60762714789094,
18     "clinician_comment": "On or below the 25th centile. Consider reviewing trend.",
19     "lay_comment": "Your child is in the lowest 1/4 of the population for length, sex and a",
20     "measurement_type": "height",
21     "sds": -0.7189811356363933
22   },
23   "measurement_dates": {
24     "chronological_calendar_age": "2 months",
25     "chronological_decimal_age": 0.16700889801505817,
26     "clinician_decimal_age_comment": "Born Term. No correction necessary.",
27     "corrected_calendar_age": null,
28     "corrected_decimal_age": 0.16700889801505817,
29     "corrected_gestational_age": {
30       "corrected_gestation_days": null,
31       "corrected_gestation_weeks": null
32     }
33   }
34 }

```

# RCPCH dGC Client

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So we built a Growth Charts Client

[digital-growth-charts-flask-client](#)

# RCPCH dGC Client

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**Show the thing**

# This is pioneering work

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No other Royal College I'm aware of has ventured into provision of web services.

Providing **Best Practice As A Service** is “Royal Colleges 3.0”... (1.0 paper documents, 2.0 PDF downloads)

This is the future of development and distribution of clinical professional standards

# Making the APIs Sustainable

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In order to be sustainable in the long term, the RCPCH needs to have a clear business model behind the API web service, to enable:

- further development and updates
- new API endpoints
- revenue generation for the College's investment
- growing the RCPCH's tech team
- wider dissemination of the **idea** of “Best Practice As A Service” to other Colleges and orgs

# References

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- [Uber's Tech Stack](#)
- [Digital Growth Charts Server](#) (the API)
- [Digital Growth Charts Demo Client](#) (just *one* of many possible user-facing applications that could exist)