# Painless Healthcare

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## Abstract

The Consumer Health App allows users to connect a variety of different data sources to their Accolade health profile. This data is collated, stored in the cloud, and then visualized on our web application, giving the user instant access to all of their healthcare data such as their biometric and activity data in real time.

## Approach
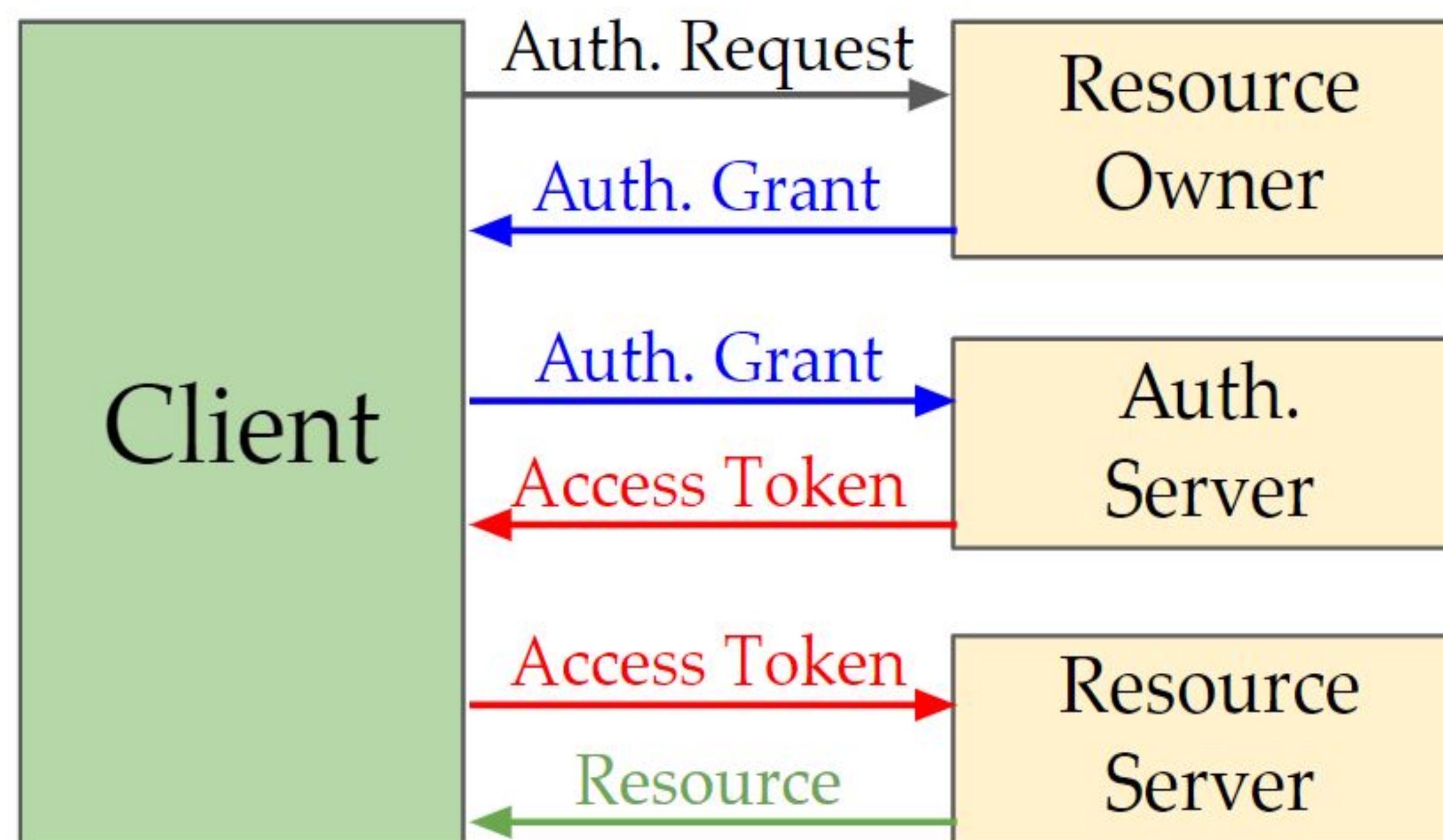


**Consumer Health Client:** From the front end, the user connects with third party data sources through an **OAuth** protocol flow (as seen above), in which the user is prompted to enter their login information.

**Cookies:** Once authenticated, an access token is returned for us to perform API requests. A refresh token is also returned and stored in a cookie for future polling.

**Lib Modules:** All pulled data point values are then parsed and formatted into FHIR compliant data structures via predefined mappings of data values and FHIR attributes.

**AWS Cloud Services:** The parsed data is then stored in DynamoDB and pushed to the **ACP Service**, which is Accolade's API for updating and accessing a patient's profile.

## Overview

Accolade is a company that provides personalized health-and-benefits solution to improve the experience, outcomes and cost of healthcare for employers, health plans and their members. Many people have an abundance of healthcare data being collected from IoT (Internet of Things) devices like heart rate and blood sensors, as well as from doctor encounters. This data contains key insights into an individual's overall health that could be used for recommending doctors and predicting health issues. While this data is valuable many people either don't know it exists or don't put it to use. The consumer health app solves this problem by collecting healthcare data from a variety of data sources, making it available to the patient and Accolade; which designs machine learning algorithms aimed at finding solutions to some of healthcare's biggest questions.
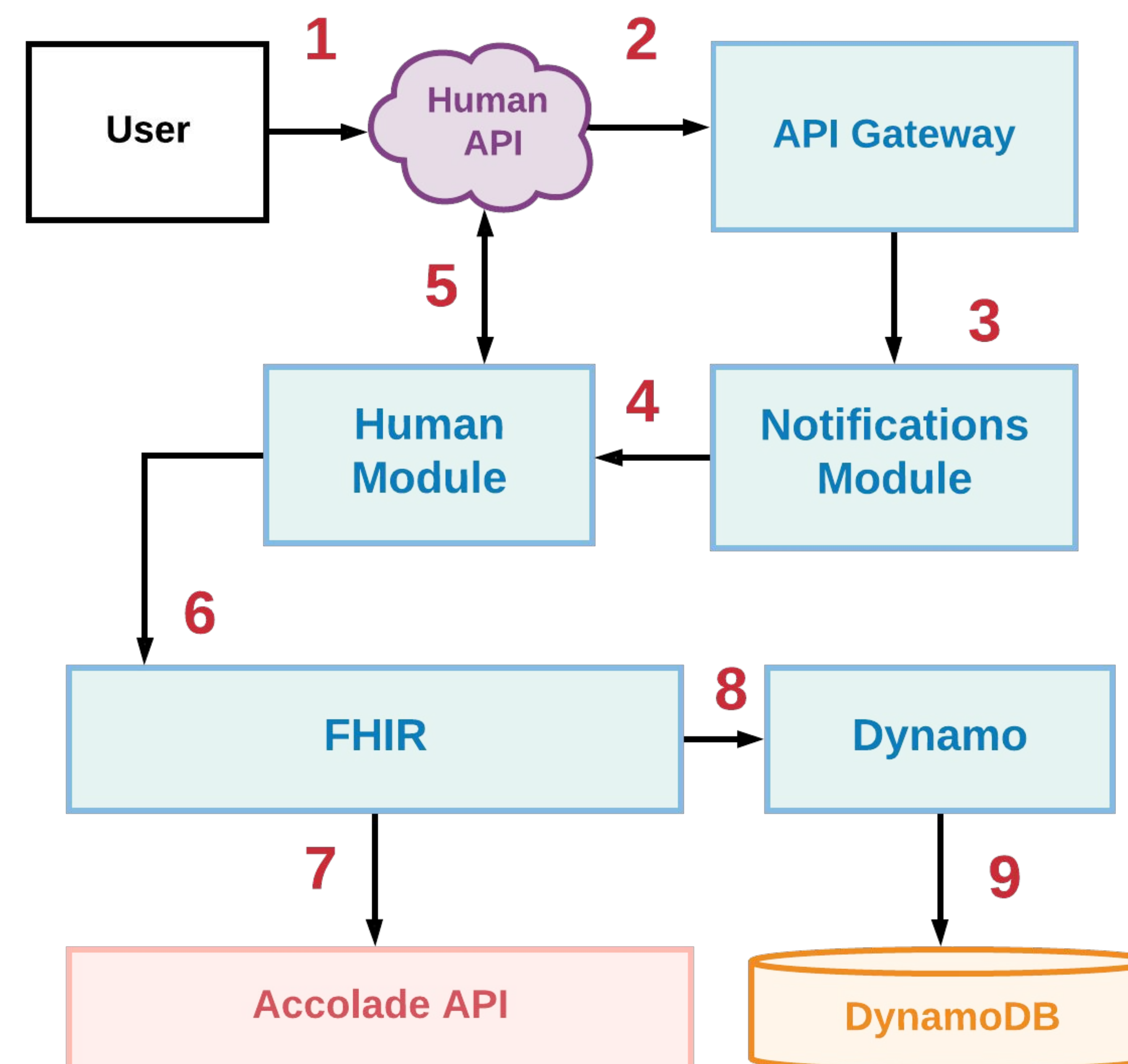


## Acknowledgments

## Methodology

Accolade's existing database utilizes the Fast Healthcare Interoperability Resources (**FHIR**) specification, which is an accepted industry standard data format for electronic health records. We created adapter classes for each data source which parsed and mapped the data to FHIR structures as seen below.

```
"blood_glucose": {
    "category": [ 🔲 ],
    "code": { 🔲 },
    "effectiveDateTime": "2014-01-23T22:48:19.858Z",
    "meta": { 🔲 },
    "performer": [ 🔲 ],
    "resourceType": "Observation",
    "status": "final",
    "subject": { 🔲 },
    "valueQuantity": {
        "code": "mg/dL",
        "system": "http://unitsofmeasure.org",
        "unit": "milligram per deciliter",
        "value": 90
    }
}
```

## Results

We integrated Google Fit and Human API endpoints with Consumer Health App so that they automatically poll, parse, and push the most up-to-date data. Furthermore, we were able to create a conclusive health data platform that provides the user an effortless and painless way to view their health data.

## Conclusion

In future implementations, we want to include more API integrations—pharmacies such as RiteAid, Walgreens, and CVS for medication data, and Teledoc for scheduling doctor appointments. We also want to implement a module that will generalize and streamline the flow for third party OAuth integration and data transduction.