



API



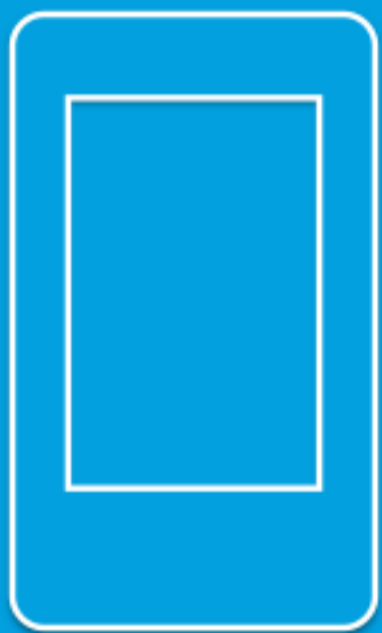
API



API

# Showoff

## API Architectures



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### Contributors

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# Showoff API Architectures

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# Showoff API Architectures

What is an API?

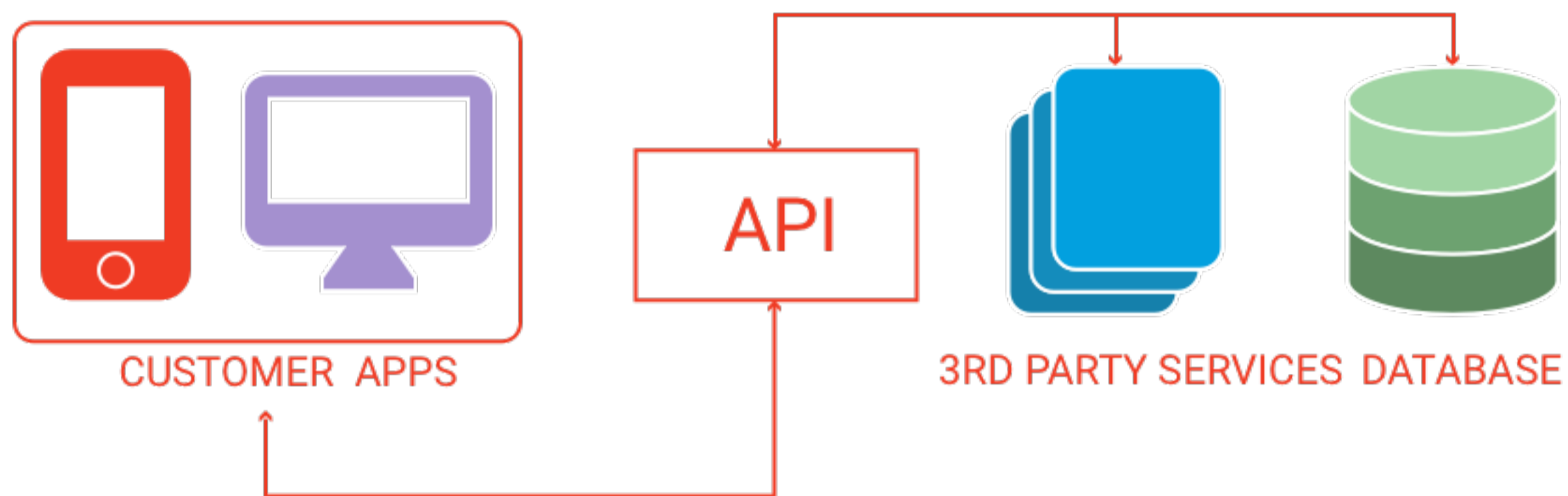


FIG 1. HIGH LEVEL API OVERVIEW

An API is an Application Programming Interface. It allows developers and clients to interact with functionality that has been designed to fulfil the requirements of our customers products. Simply put: an API is the backbone of any well designed application. Perhaps, a straightforward way of thinking of an API is as a producer and manipulator of data that is consumed by client applications, such as mobile applications and web applications.

In the context of how we develop our solutions at Showoff, our APIs are designed using RESTful techniques so that they are interoperable between client applications. This provides a standard way for defining and interacting with interfaces across the APIs that will be used by client applications.

**There are several benefits to using an API:** They abstract away the underlying software, so the developers of our applications need not be concerned with how the functionality of the application is developed.

They provide a common, straightforward way for developers to interact with that functionality. A result of this is that application development becomes much simpler, with the API doing the heavy lifting for the application. As such, the application developer generally only needs to be concerned with how the application is presented, how data is entered and how to send it to the API.

*An API is the backbone of any well designed application.*

By integrating these services and APIs with our customers APIs, this, generally, saves the need to integrate these services with the client applications, and again, provides a common, standardised means of interacting with these 3rd party services and APIs. This results in reduced development time for the client applications.

# Showoff API Architectures

What is an API? continued

For our clients, perhaps one of the main benefits of our API-centric approach is reduced development costs, as the main functionality for their product need only be developed once. Their mobile and web applications then make use of the API to present the client's product and interact with 3rd party services and APIs. This can also allow our clients to scale their product as their user base grows: some may opt to build an API and iOS application for their initial offering and then add Web and Android applications as their user base grows. This can offer further savings for their initial offerings, and allow them to stagger their development costs over a period of time. For our developers, our API-centric approach results in much more straightforward, less error-prone development.

All of our APIs use a standardised RESTful approach, and are well documented. This means that our mobile and web application developers can concentrate on building robust applications that offer our clients and their customers an awesome user experience, without worrying about the complexities and nuances of the problems and issues that are being solved.

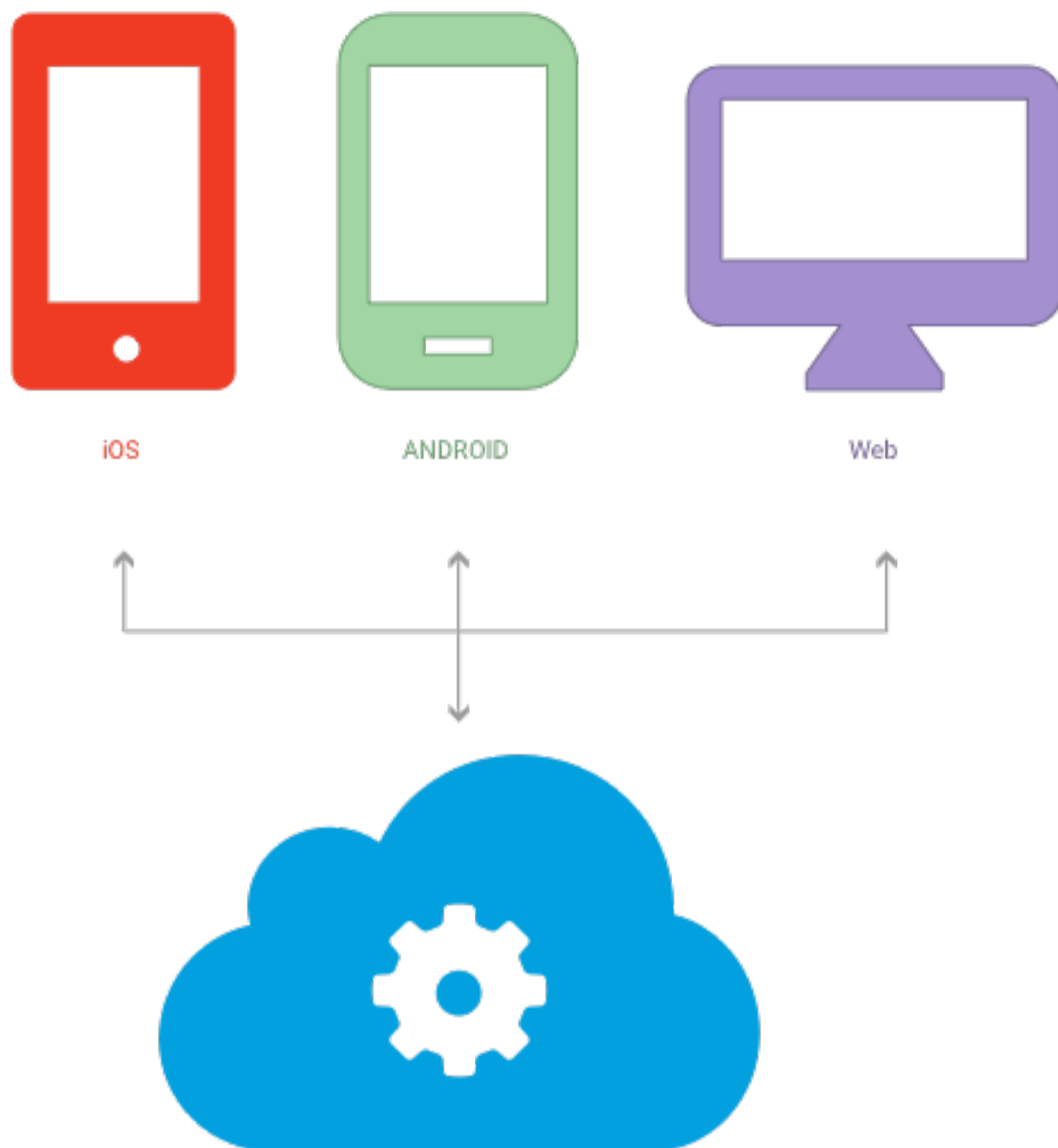
*For our clients, perhaps one of the main benefits of our API-centric approach is reduced development costs.*



Another key benefit to using an API-centric development approach is that, as the majority of the complexities and nuances of the problems and issues that are being solved are encapsulated into the API, if there are any issues with these, they will generally have a single point of failure: the API. This means that if there are any issues, then, generally, their resolution can be rapidly turned around without the need for issuing mobile and web application updates, which can take significant amounts of time to be approved for release.

# Showoff API Architectures

Where do we use APIs?



Generally, all solutions that are developed for the customers of Showoff will typically use an API-centric approach. There are several benefits to this, some of which have been described above.

However, there are several criteria/factors that inform us that an application will require an API:

- Any application that has more than one distinct component requires an API
- Any application that uses dynamic data will require an API
- Any application that requires HIPAA level compliance on data
- Any application that interacts with 3rd party services will, require an API
- Any application that requires significant levels of scale will require an API

*Using an API-centric approach provides our customers with the most options for their products.*

As a company scales with its user base, perhaps the last of the points above becomes one of the most important. As a company grows, or in times of heightened media presence, the ability of an application to scale to demand is incredibly important.

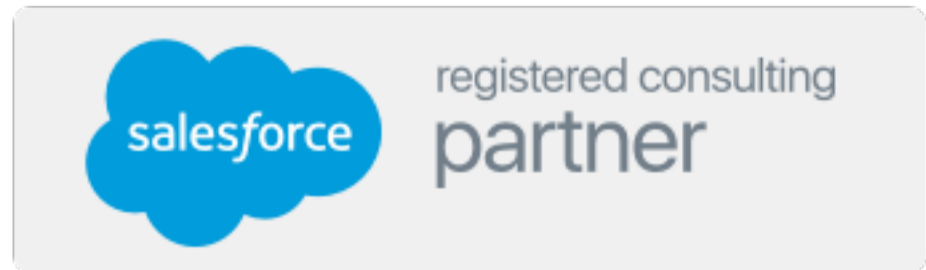
Users typically will become unhappy waiting for more than a couple of seconds for an application to respond, and using auto-scaling to decrease response times in periods of increased usage can keep our clients users happy.

Automatic scaling also allows for our clients to be assured that their applications will respond to demand, without having the overhead associated with a permanently deployed to-scale architecture that can respond to the same levels of scale.

Given the criteria above, and the benefits offered by using an API-centric approach, the majority of our applications are implemented using an API. These APIs allow Showoff to fulfill our customers requirements in the most reliable, robust and timely fashion, while also allowing for cost effective solutions to be built. Importantly, using an API-centric approach provides our customers with the most options and highest degree of choice for their product.

# Showoff API Architectures

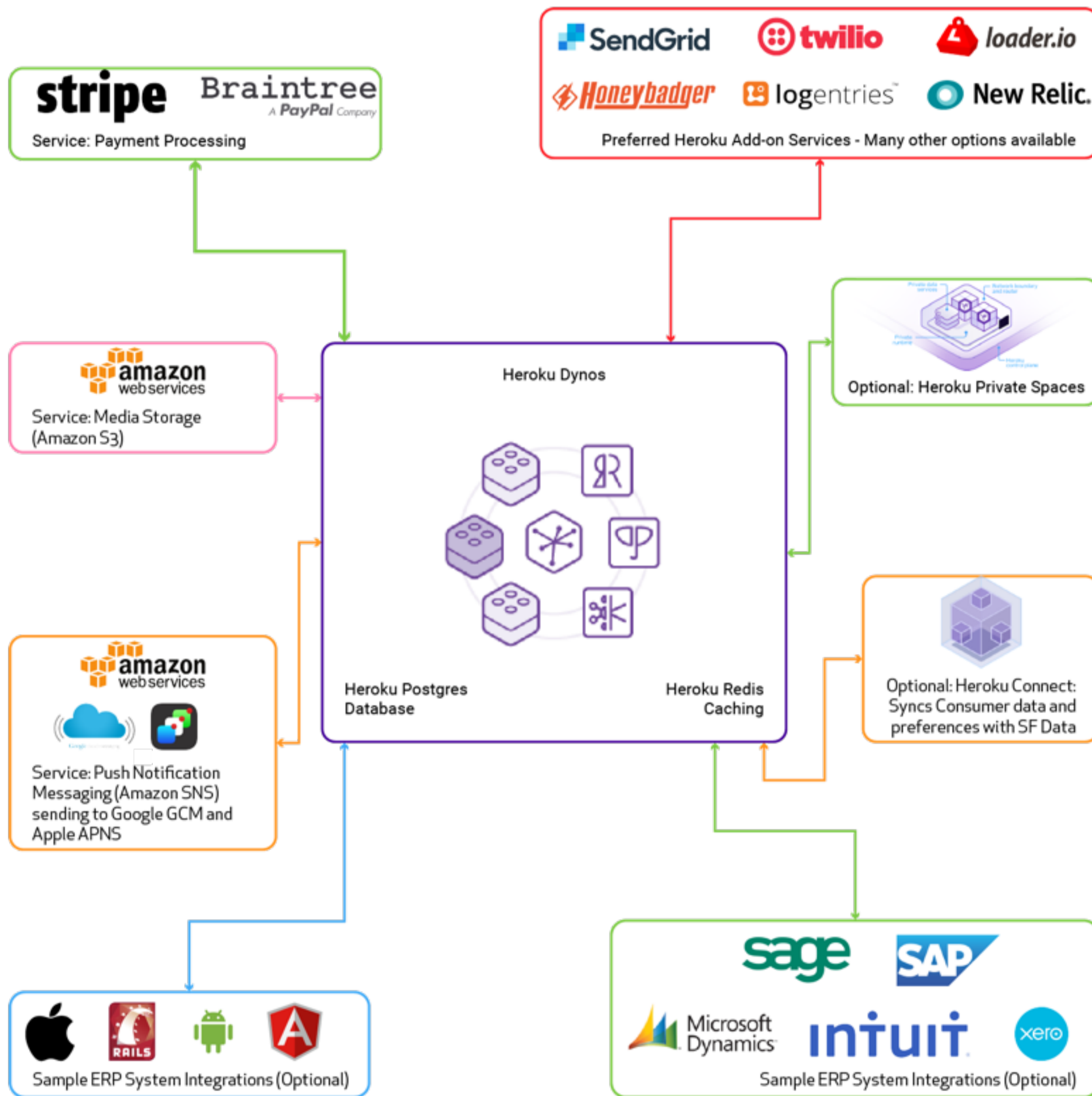
## Salesforce & Heroku



Showoff are a registered consulting partner of Salesforce

As cloud based, service oriented platform usage continues to grow and enterprises continue to see the benefit and problem solving capabilities it provides, Platform as a Service (PaaS) has emerged as a major component of this space. This infrastructure paradigm is purpose-built to allow us to develop best in class API solutions for our clients that scale to meet their users demand.

FIG 2. HEROKU & SALESFORCE



# Showoff API Architectures

## Salesforce & Heroku



Showoff are a registered consulting partner of Salesforce

Showoff became a registered consulting partner of Salesforce in 2017 and have been using the Salesforce Heroku platform since 2012 to deploy over 150 APIs and applications. At Showoff, we are firm believers in using best in class solutions to improve operational efficiency, improve reliability and handle the necessary level of scale that our customers require.

We believe in the Heroku technology stack as an ideal backbone to the API based solutions we build, due to a number of important features.

It offers high availability and high scalability of both dynos and databases. It offers an ever-growing suite of third party micro-service add-ons that can be used to aid development as well as support ongoing operations.

Ease of iteration and deployment are a key feature of Heroku and this is something that is vital to all of our customers. Heroku deployment practices encourage fast paced iterative development which complements the development practices and procedures that Showoff use day to day. One of the key development practices at Showoff is Convention over Configuration, and Heroku supports this by providing a standardised, conventional, deployment mechanism and environment for our Ruby on Rails API platforms.

*Heroku offers high availability and scalability of dynos and database and supports auto scaling to meet demand.*

Salesforce & Heroku also provide a service known as Private Spaces. For the customers that require this, it allows Showoff to build our customers APIs and Applications as normal and then isolate them inside a private network, solely accessible by our customers and their authorized partners. These private spaces offer features such as HIPAA compliance as well as region specific provisioning. These features are often key components of our customers data integrity processes and targeted deployment policies.

The APIs that Showoff deploy to Heroku Private spaces are run on private, dedicated hardware and are encapsulated as 'Dynos'. Each of these is a smart, containerized application that automatically receives language updates and security patches, offering our customers peace of mind.



# Showoff API Architectures

Salesforce & Heroku



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All Heroku applications are sandboxed inside a Dyno, which means that one application cannot interfere with another. Each Private Space Dyno exists inside our customers Private Space, providing further isolation from both other Private Spaces and Heroku's general pool of Dyno and third party services. This can prove beneficial to our customers compliance requirements and their application security practices and procedures.

Dynos that run inside Private Spaces can be deployed in specific regions which can help in providing fast, reliable services to our customers users in a specific region, by bringing the APIs 'closer' to those users. For any modern application, data security is a huge concern. As Heroku is backed by Amazon Web Services, it benefits from their best in class security offerings. All AWS data centers are ISO 27001 and FISMA certified, amongst other certifications.

General purpose databases on Heroku are essentially sandboxed too, which means that while they can be shared between applications, generally, they are given unique credentials which must be known by an application in order for that database to be accessed by the application. Within Private Spaces, each database is also Private, meaning that it can only be accessed by services existing inside the network boundary of that Private Space, and cannot be accessed by entities existing outside of that boundary.

This provides a significant benefit to our customers, eliminating a lot of their data security worries, and providing substantial peace of mind for our customers and their users.

*Heroku is backed by Amazon Web Services and benefits from their security offerings and IS27001 and FISMA certifications*



# Showoff API Architectures

## API Architectures

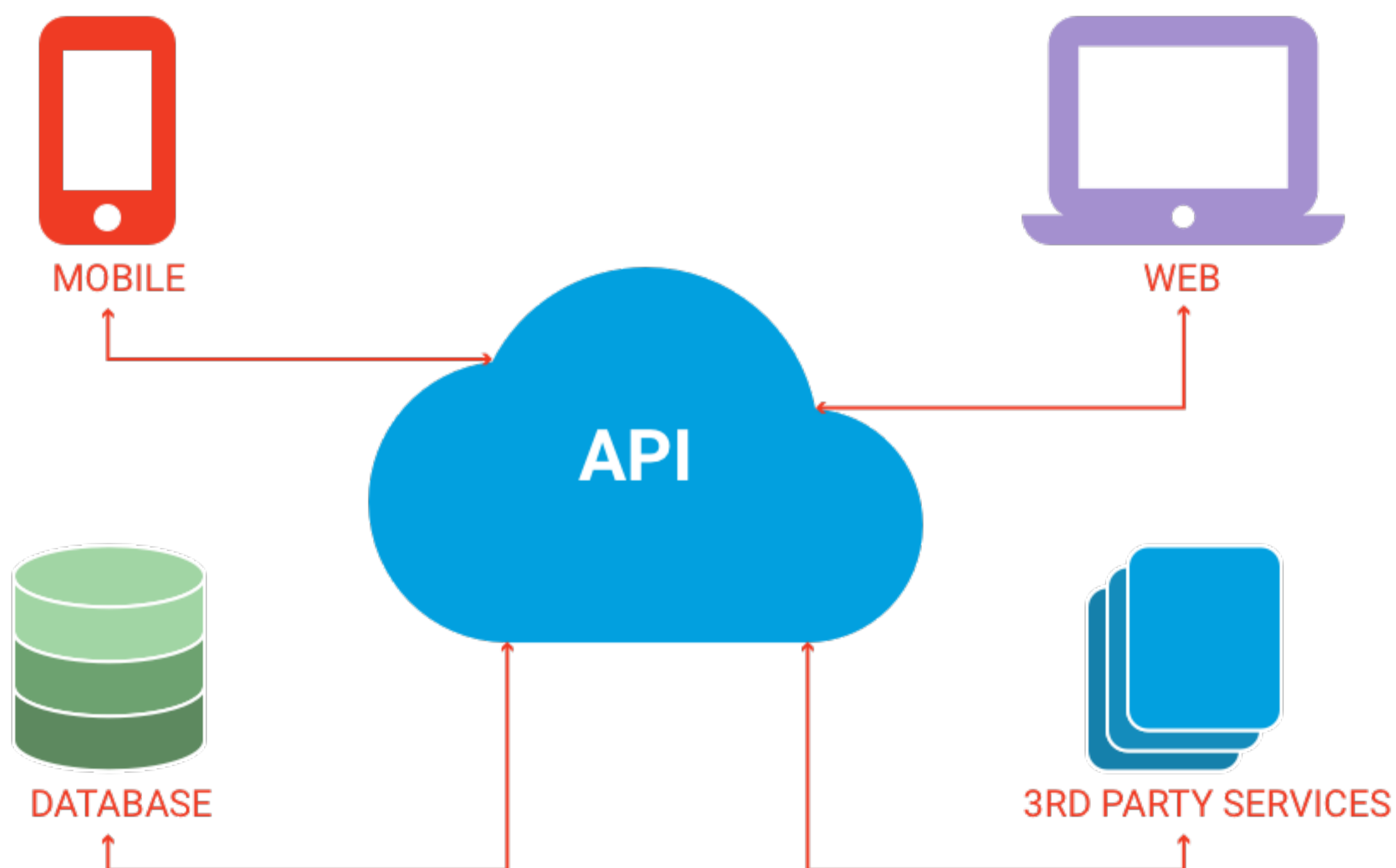
Software development of the past, whilst very productive, has often resulted in very monolithic applications. In a monolithic application, all services, controls, data flow and management procedures are very tightly coupled. This is fine for an application that changes very infrequently, but combining a monolithic architecture with frequent changes can often result in an architecture that becomes unmanageable and extremely cost prohibitive to maintain.

Simple changes in monolithic architectures will often take an unreasonable amount of time, and can change/detrimentally affect other parts of the architecture that would logically be exclusive. Obviously with change being so time intensive under a monolithic architecture, such solutions are not very cost effective.

At Showoff, we favour a more 'micro-service' driven architecture, in which there are a large number of loosely coupled components. The goal of an API is to ultimately produce a result that satisfies the requirements of a consumer or client. At a high level, it is better to think of an API and the data it provides as being the sum of all parts, rather than being concerned with what each individual part is.

Adopting such an approach allows Showoff to easily extend and modify our clients APIs, without impacting their whole ecosystem. For example, if a client initially wants to use a payment provider, and as their user base grows realises that another payment provider will offer them better value, then this is a relatively straightforward change, due to the loose coupling of our API architecture.

FIG 3. SIMPLE API ARCHITECTURE



# Showoff API Architectures

## API Architectures - continued

*Ruby on Rails allows Showoff to respond to our customers changing needs and requirements.*

Showoff, almost exclusively, develops APIs using Ruby on Rails. Ruby is a proven, well established language and Ruby on Rails is a well tested, efficient development framework. Together, both of these allow for rapid, iterative and agile development. This allows Showoff to respond to our customers changing needs and requirements as rapidly as required, while sticking to best in class development practices and procedures.

Generally at the core of our APIs are the following components:

- A Ruby on Rails API - This will use OAuth2 as the authentication service for all API users.
- At least one Postgres database for persisting application data.
- A fast caching service like Redis or Memcached to cache the results of complicated operations and/ or commonly accessed data.
- Error and exception tracking services such as Honeybadger to track code level exceptions.

The above provides a solid foundation for a robust Ruby on Rails API. In addition to the above, depending on a customer's needs, our APIs will typically also use the following 3rd party services/APIs:

- A payments provider: Showoff typically recommends Stripe due to its ease of use and low overheads.
- A data storage service: Showoff typically recommends Amazon AWS S3 due to its ease of use and low operational cost.
- A content delivery network: Showoff typically recommends Amazon AWS CloudFront due to its low response times and wide distribution.

- A mobile push notification service: Showoff typically recommends Amazon SNS due to its low operational cost and high reliability.
- A text messaging service: Showoff typically recommends Twilio due to its low operational cost.
- An on demand email service: Showoff typically recommends Sendgrid due to its ease of use and low cost.
- A marketing email service: Showoff typically recommends Mailchimp due to its ease of use and high level of functionality.
- A CRM system: Showoff typically recommends Salesforce due to its ease of use and high level of functionality.

As each of these components is a loosely coupled service itself, changing one for another of its competitors is relatively straightforward and typically does not impact another part of the API. This results in rapid turnaround of changes and lower costs to our customers.

# Showoff API Architectures

API Architectures - continued

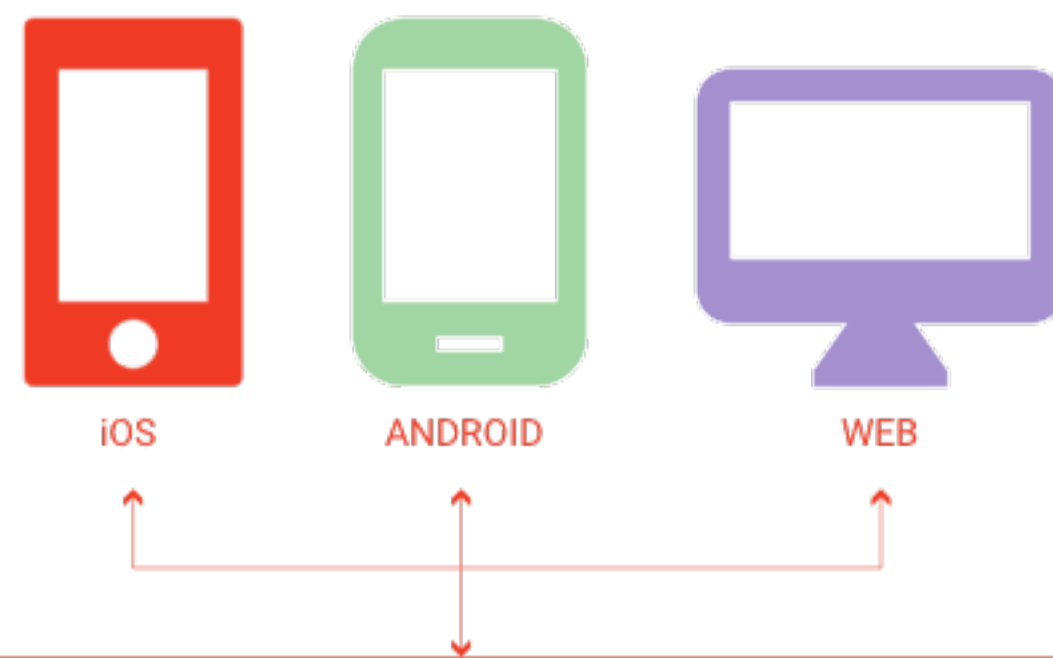
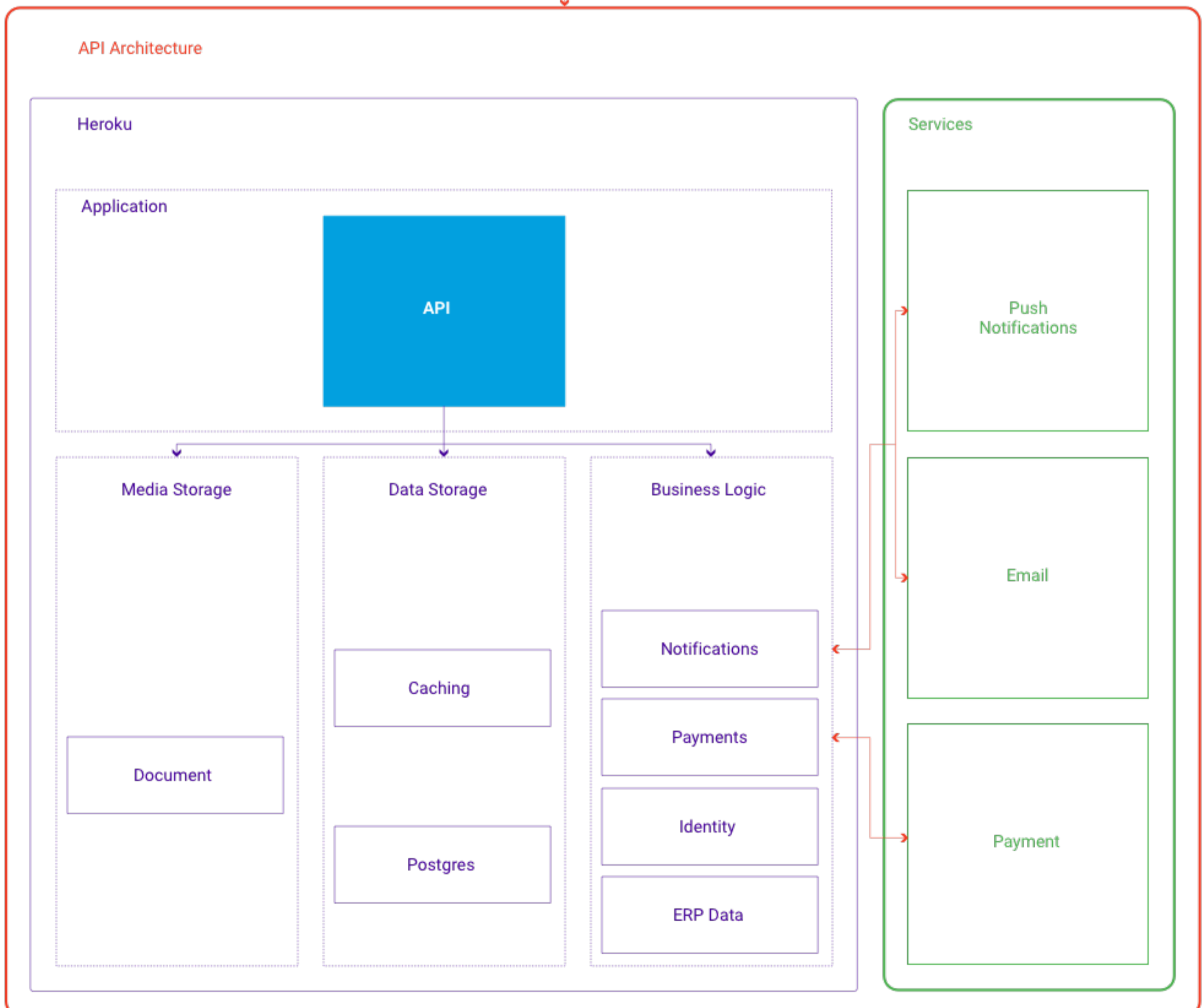


FIG 4. HEROKU & SALESFORCE



# Showoff API Architectures

## Open API Architectures

*Opening an API to the public and selected strategic partners can result in innovation across our clients products.*

As our customers companies and their applications and services grow, they often reach a point where they will want to integrate with other companies, services or the public by opening up the access to their APIs. A simple way to think of the difference between an open and closed API is that in a closed API, only the customer's client applications may interact with the API, and in an open API, both the customer's client applications and external client applications may interact with some or all features of the API.

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*There are generally two situations in which our customers will consider opening their APIs. On the one hand, as they experience growth, they may want to interact with other companies and services, or other companies and services may want to interact with them as part of a strategic partnership. On the other hand a customer may want to allow the public to interact with their services and productions.*

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By utilising a micro-service focused, API-centric architecture for our customers, this makes opening up their APIs to external parties much more straightforward; often, much of the functionality required by the external parties is already defined as part of the existing API.

Once any necessary extensions are developed for and applied to the API, such as allowing developers to create their own OAuth applications to allow them to interact with the API, our customers can then publish the details of their APIs to their strategic partners and/or the public if desired.

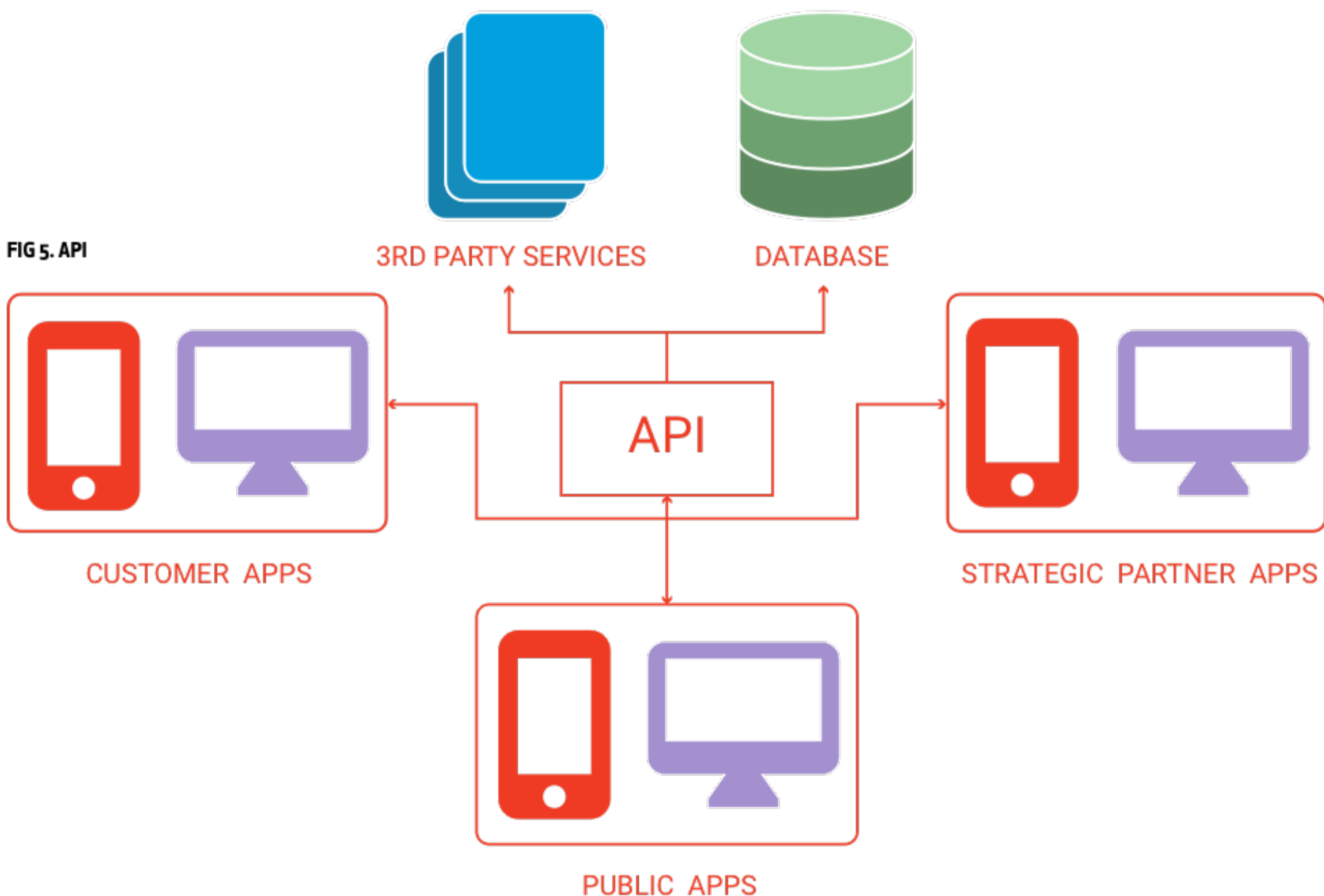
In the case of strategic partnerships, opening up an API in such a way can often allow for bi-directional sharing of data and functionality between both parties, as well as allowing for both of the partners to extend their offerings. Often, due to the strategic partnership and the interaction between both parties, this can allow for a completely new type of functionality to be defined by our customer in their APIs as well as those of their strategic partners.

Our customers may decide to only open a limited feature set of their APIs to their strategic partners or to open their whole API. Usually this is dependent on the scope of the strategic partnership, but a customer may also decide to open their whole API to allow for any future strategic partnerships that may arise.

# Showoff API Architectures

## Open API Architectures - continued

In the case of a publically open API, our customers will generally allow the public to access their APIs once they have registered an OAuth application against the API. There are many reasons a customer may want to open their API to the public: user demand, potential user acquisition, encouraging competition and/or for data acquisition purposes, amongst others. One potential worry when allowing the public to access an API is that of increased demand and whether or not the system will scale to meet demand. As the APIs that Showoff build for our customers are capable of automatic metric based scaling, this is not generally an issue that needs to concern our customers.



# Showoff API Architectures

## Closing Statement

**To conclude, using an API-centric architecture for our customers platforms, services and applications allows Showoff to offer bespoke platforms that offer a best in class experience, with reduced cost and enhanced iterative potential. A well defined API should support a RESTful mapping to resources, that is clearly defined and well documented. It should also offer a consistent interface to its users, the developers of client applications.**

At the same time, APIs should, generally, be micro-service oriented, rather than monolithic in nature, allowing for extensibility as well as value to our customers. Equally important is the platform that the API is deployed upon; such a platform should be capable of scale, and should ideally support automatic scaling to offer customers reduced operational overheads. The isolation of deployment environments and data storage services is also important to aid in data protection, integrity and compliance services, if required. Due to our experience with the platform, and the benefits it offers our customers, Showoff recommends Salesforce Heroku as an API deployment environment.

Ultimately, a good API will be the backbone of any modern application and will serve as the warden of all events throughout a platform. It is probably the most important piece of a complete solution as it provides and manipulates the data consumed and presented by all client applications. It should be reliable, stable, robust and responsive. Without each of these traits, an API will not withstand the pressures applied by modern applications. At Showoff, we pride ourselves on being the market leader in offering affordable, scalable, extensible, responsive and cost effective APIs to enable our clients to build the perfect product.

**An API is the backbone of any well designed application, and should be interoperable between client applications.  
For our customers, the result of this is reduced development time, cost and time between iterations.**

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