

APIGEE

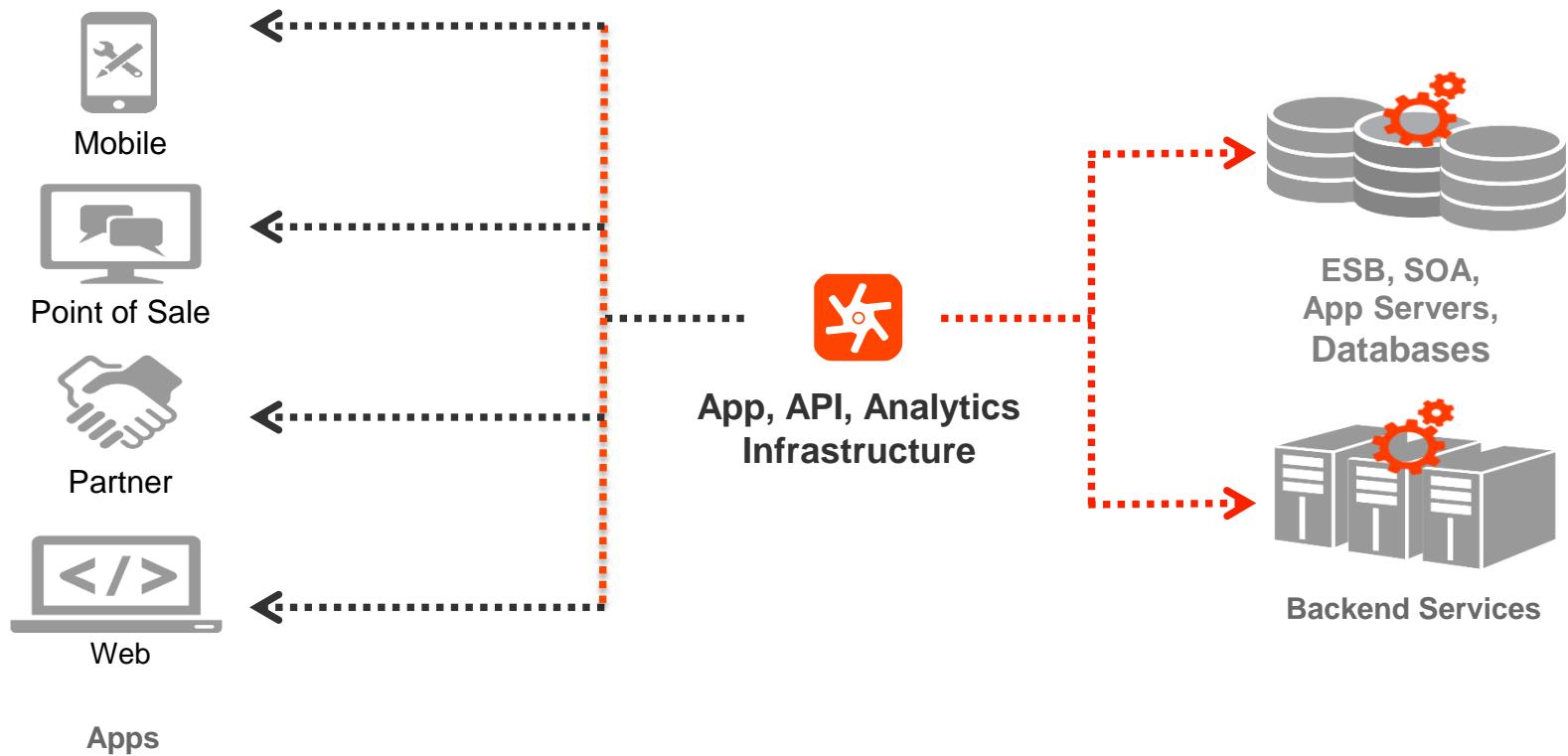


High performance. Delivered.

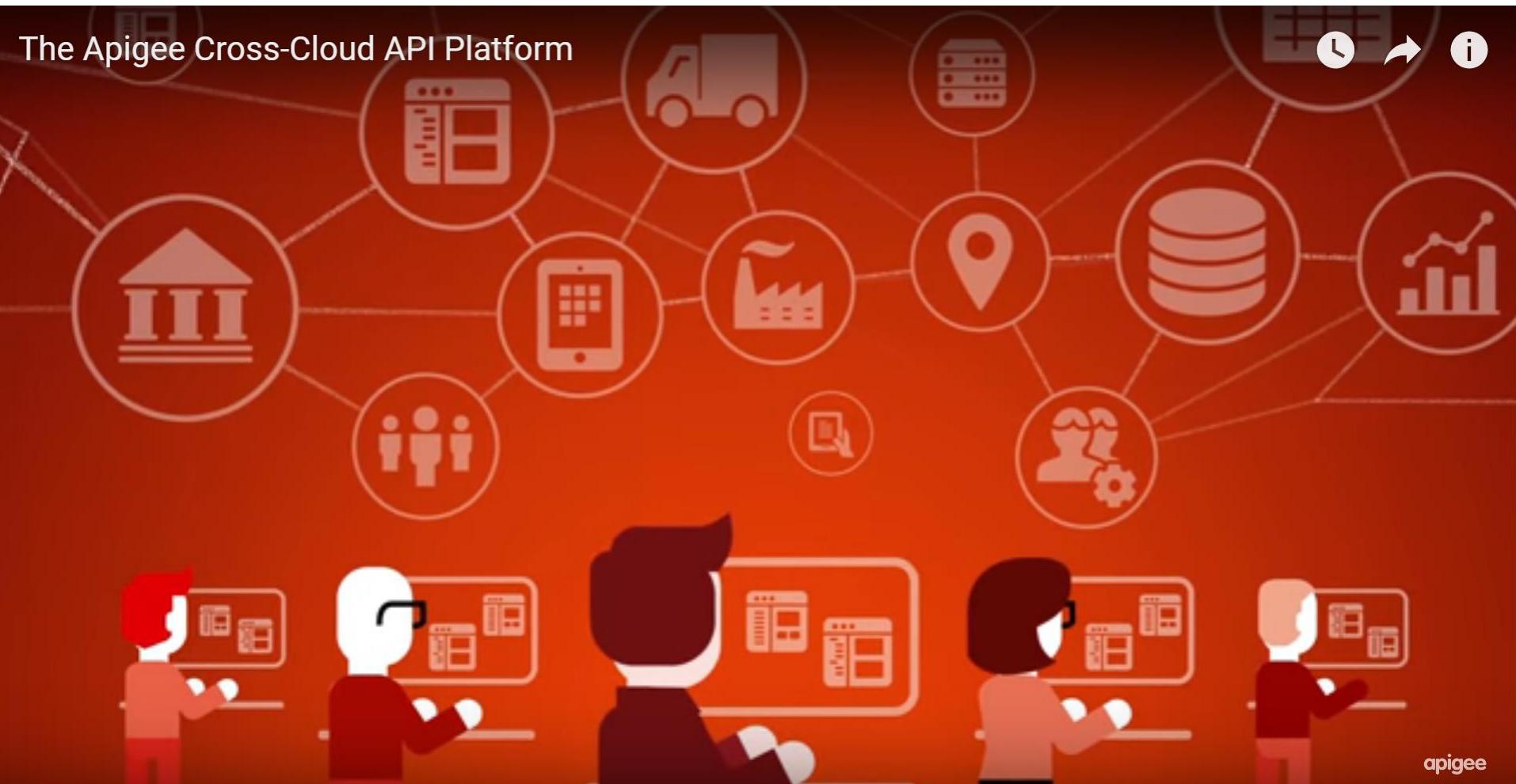
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consulting | technology | outsourcing

Digital Channels and Apigee Edge



Digital Channels and Apigee Edge



APIGEE Goals

- Concepts and Configuration
- API Proxies
- Build API Proxies
- Features of APIGEE Gateway
- Design of API Proxy
- User Developer Platform
- User Management
- Logging

APIGEE Goals

- Apigee Analytics
- **Web Services**

Creating an account

Step 1: Create an Apigee account

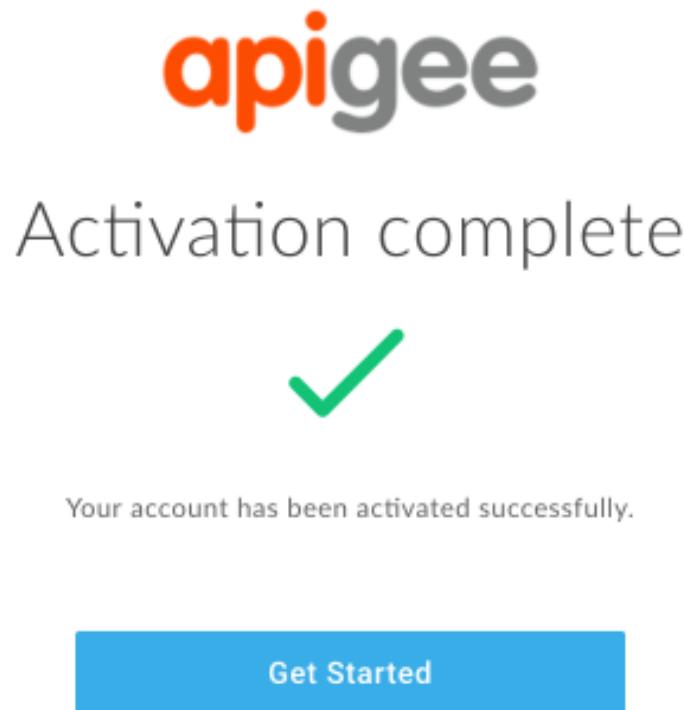
- To use Apigee Edge, you need an Apigee account.
- In this step, you'll create a free evaluation account.
- **To create your evaluation account and log in:**
- Go to https://login.apigee.com/sign_up.
- Enter your name, email address, and a password. Be sure to read and accept the terms of service.
- Click **Create account**.
- Apigee sends you an account confirmation.

Creating an account

- In the confirmation email, click the account verification link.
- You'll be sent to the login page: <https://login.apigee.com/login>
- Log in with the email and password that you used to sign up.
- Apigee activates your new account. This can take several minutes.

Creating an account

- After your account is activated, the following message displays:

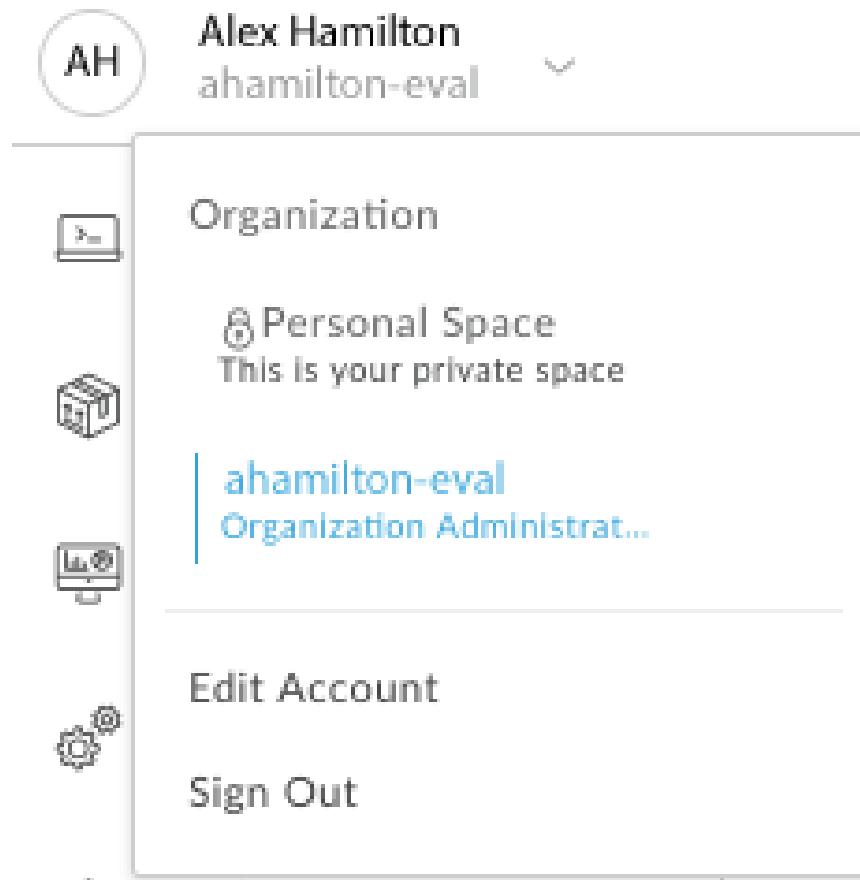


A word about organizations



- An *organization* is a container for your API proxies and the environments you deploy them to (either "test" or "prod"). You use the organization name in your calls to the API proxies.
- The name of the organization is autogenerated by Apigee based on your email address (minus the *@domain*). For evaluation accounts, it will end with "-eval".
- If necessary, Apigee adds a 5-digit random number to the organization name to ensure that it's unique. For example, if your email address is *ahamilton@example.com*, the organization name might be auto-generated as "ahamilton-eval" or "ahamilton-12345-eval".

A word about organizations



API Attacks

API Attacks That Made the News



“An Instagram Hack Hit Millions of Accounts, and Victims’ Phone Numbers are Now for Sale.”



“No Butts About It, Some Pinterest Users Have Been Hacked.”



“Three Million Moonpig Accounts Exposed by Flaw.”



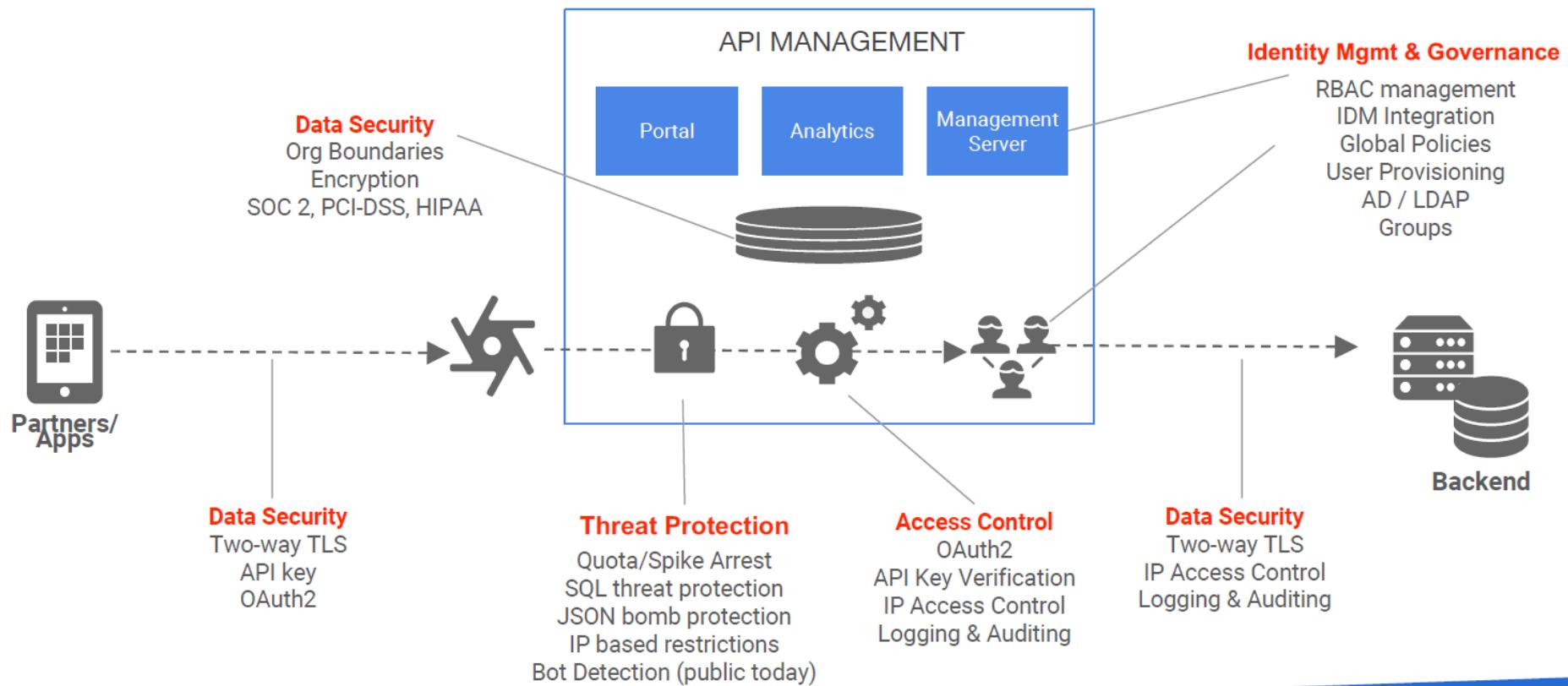
“Nissan Leaf Hackable Through Insecure APIs.”



“Thieves Stole Taxpayer Data from IRS ‘Get Transcript’ Service.”

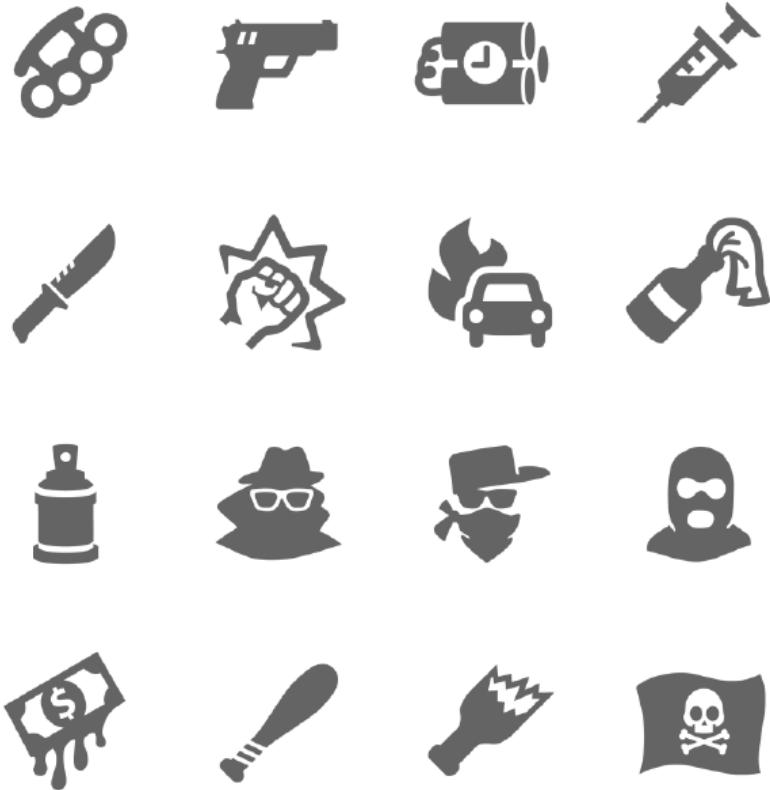
Layered Security

Layered Security and Governance



Signs of Attack

Signs of Attack on APIs



- Persistent attempts from same IP
- Unusual error rates
- Suspicious client requests
- Data crawling
- Key harvesting
- Activity bursts
- Geographical patterns
- Brute force attacks
- Bots probing for API security weakness
- Competitors scraping price data
- Credential stuffing
- Abuse of guest accounts
- Bot traffic skewing analytics and KPIs
- Using compromised API keys to access private APIs
- Dictionary-type attacks
- Man-in-the-Middle attacks

What is an API?



-
- An API is an interface that makes it easy for one application to 'consume' capabilities or data from another application.
 - By defining stable, simplified entry points to application logic and data, APIs enable developers to easily access and reuse application logic built by other developers.
 - In the case of 'Web APIs', that logic and data is exposed over the network.

What is an API?



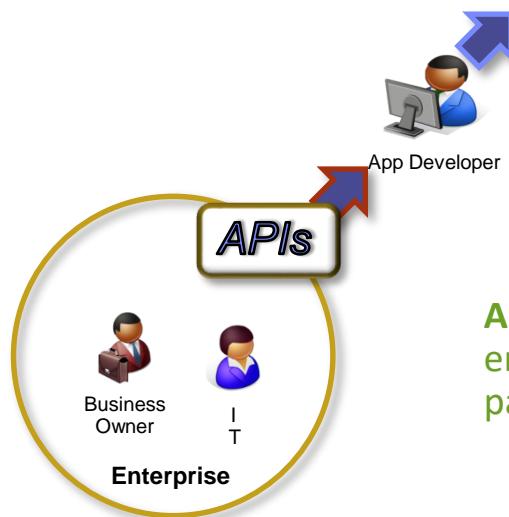
- Since applications that consume APIs are sensitive to changes, APIs also imply a 'contract'. The contract provides some level of assurance that, over time, the API will change in a predictable manner.
- Apigee Edge enables you to build APIs and if you have APIs already, expose them directly, while adding a management and visibility layer. If you have HTTP enabled services, such as SOA-based Web services, they can also be exposed as APIs via Apigee Edge.
- Edge also enables you to build APIs by implementing applications hosted on the API Services platform--with no backend service involved. You can build these applications in JavaScript, Java, and on Node.js.

API Management

API management is the process of

- creating and publishing APIs
- enforcing their usage policies
- controlling access
- nurturing the subscriber community
- collecting and analyzing usage statistics.

Apps, APIs and API Mgmt...

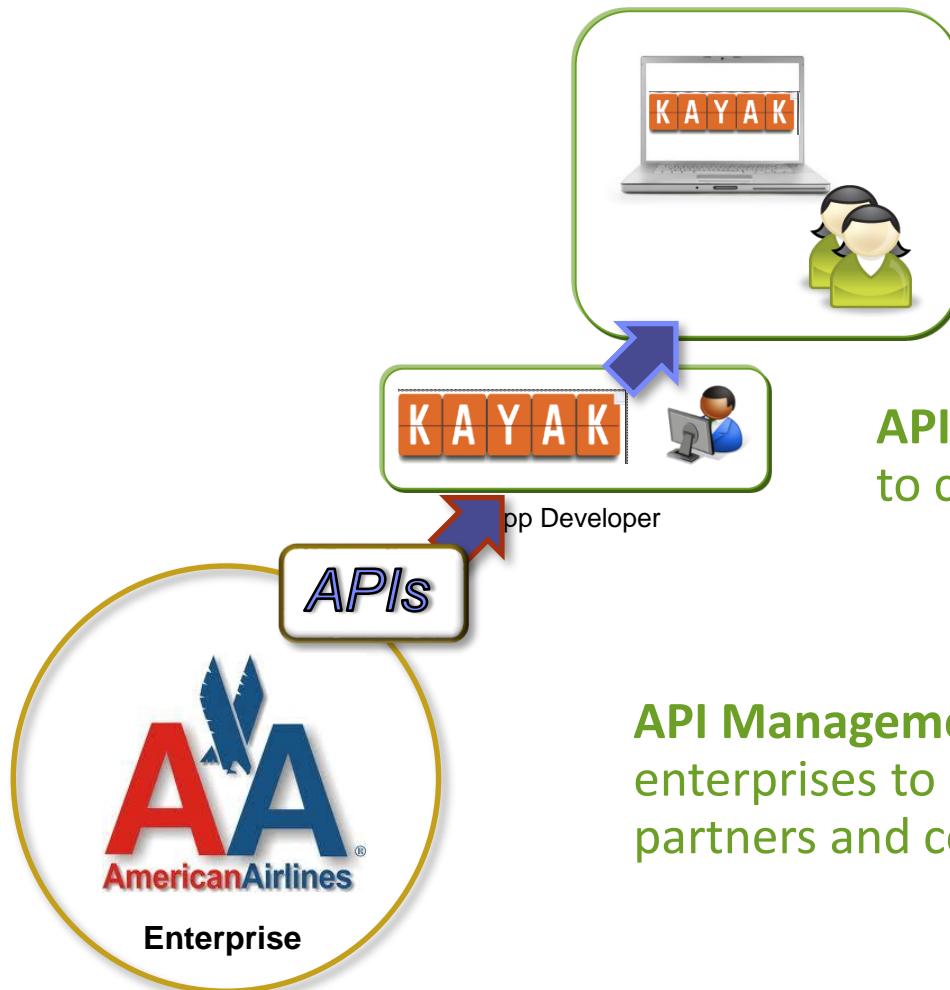


Apps = Customer facing systems of engagement (Ex: mobile app, web app, etc)

APIs = Exposes assets that developers use to create Apps

API Management = Capabilities needed by enterprises to extend APIs to developers, partners and communities.

Apps, APIs and API Mgmt...



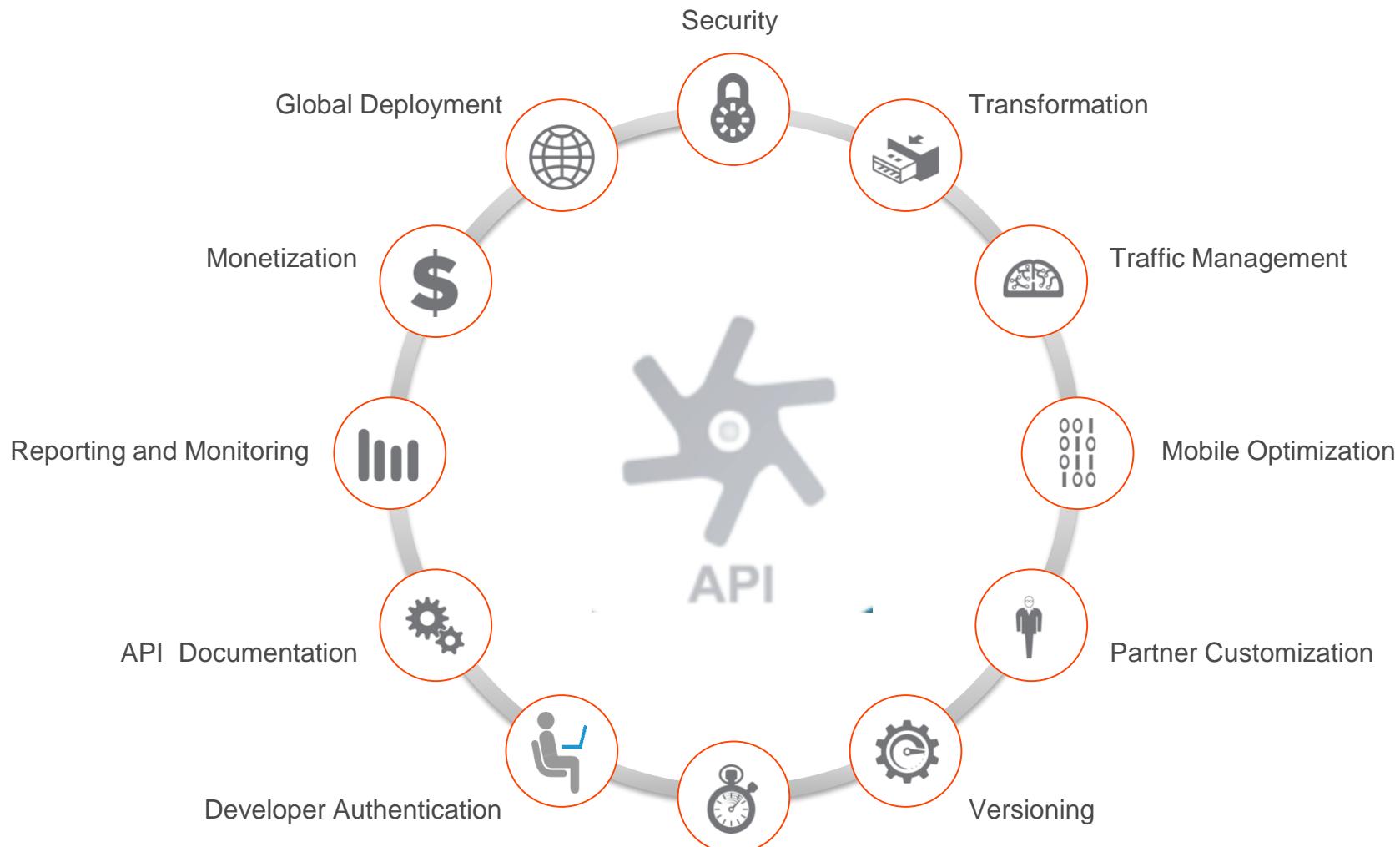
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Apps, APIs and API Mgmt...

apigee



Apps, APIs and API Mgmt...

Benefits

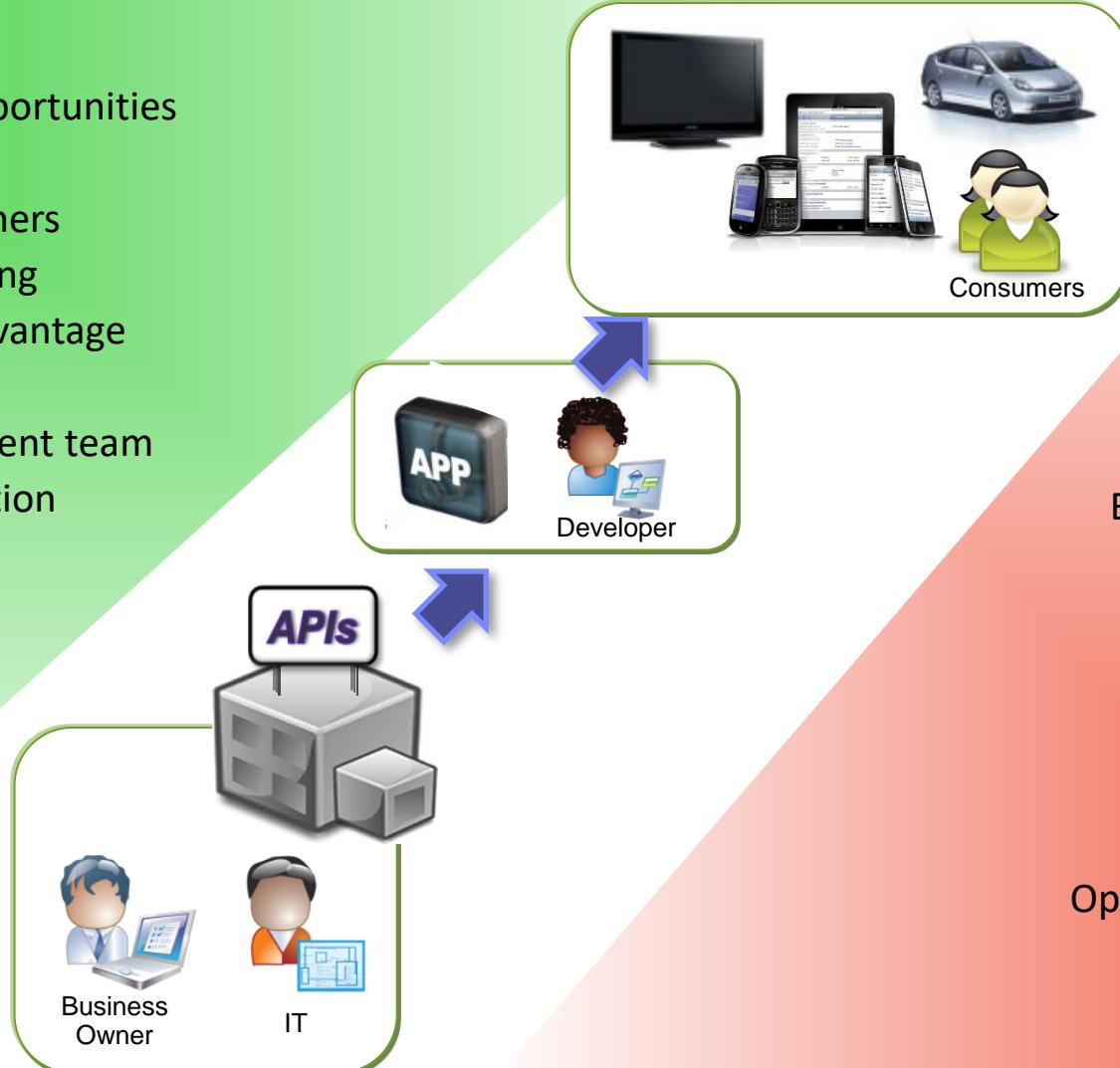
New business opportunities

- New markets
- Increase customers
- Enhance branding
- Competitive advantage

Extend development team

- Increase innovation
- Increase scale

Partner/supplier alignment



Challenges

Business strategy

Infrastructure

- Security
- Creation
- Scalability

Operational control

- Publish
- Analyze
- Monitor

Business use case

Financial Services: Leading Payments Processor

Business Challenge

- Create an “easy to do business with” environment for partners
- Establish a secure digital wallet for online purchases so personal financial data is not transmitted on the internet.
- Provide a 360° view of the end user for member banks

Solution

- Implement an API Management solution that provides:
 1. An easy to use developer portal
 2. Rapid assembly of new Restful APIs for online merchants
 3. Extensive real-time analytics

Result

- Improved relationships with members and partners
- Increased transaction volumes and revenue generation
- Gained real-time views of buying behavior and accelerated the timing of new, targeted offers to buyers



Types of APIs

- Coupon redemption
- Payment options
- Partner Loyalty Programs
- Account status

Example Apps

- Groupon: Daily Merchant coupons to help drive new customers
- PayPal: Account linkage to banks, credit and debit cards
- Tripit Point Tracker: aggregates points from various travel industry merchants.

Business use case

Insurance: Leading Property & Casualty Insurance Firm

Business Challenge

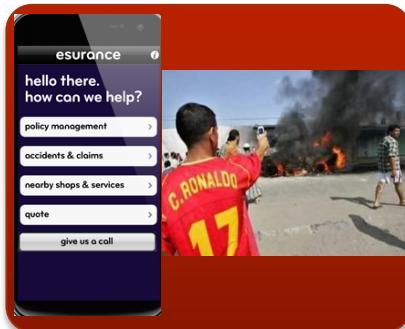
- Streamline claims processing for cost reduction.
- Improve customer satisfaction by speeding up claim resolution.
- Grow customer base.

Solution

- Implement an API Management solution that provides:
 1. Exposes customer policy information on mobile devices
 2. Enable claims adjustors to include images of claim to verify damage estimate.
 3. Include select repair partners to exchange data for fast resolution.

Result

- Eliminated paper based claims and reduced processing time by 3 days
- Customers had the option of having the claim check direct deposited to their banking account.
- Overall Customer Satisfaction rating improved significantly and then used as central marketing theme.



Types of APIs

- Customer policy coverage access
- Multimedia uploads to claim form
- Repair estimate data exchange with select partners
- Direct deposit banking approval

Example Apps

- Google Maps: for directions once on the ground
- Tripit: for aggregating travel information
- Pizza Hut: food ordering and payment processing

Business use case

Healthcare: Leading Healthcare Provider

Business Challenge

- Allow patients, physicians and medical **personnel** **secure multi-channel access to patient data** including:
 - Appointments
 - Insurance coverage
 - Prescription refills
 - Patient/physician email

Solution

- Implement an API Management solution that provides:
 - A secure/encrypted environment for maintaining and transmitting sensitive patient data
 - An easy to use developer portal
 - Rapid assembly of new APIs to access legacy applications without extensive app rewrite.

Result

- Released new REST enabled applications for mobile devices in **under 90 days**.
- Created **reusable APIs** for pretreatment authorization from **multiple insurance carriers**
- Provided patients a mobile app to **refill prescriptions via mobile devices**.



Types of APIs

- Appointment book access
- Insurance coverage requests**
- Pharmacy order entry**
- Secure messaging/email

Example Apps

- Merck Medicus: Patient handouts
- Greenway PrimeMOBILE: Electronic Health Record access
- BC/BS NC: HealthNAV, provides an urgent care finder
- WellDoc Diabetes Manager: connecting patient readings with physicians

Business use case

Energy & Utilities: Leading Electric Utility

Business Challenge

- Improve the efficiency of energy consumption across consumer, commercial and industrial customers.
- Increase utilization of self-service portal to reduce operational costs
- Reduce power outage time caused by extraordinary events.

Solution

- Implement an API Management solution that provides:
 1. A secure/encrypted environment for transmitting usage data to demand systems and models.
 2. An easy to use developer portal
 3. Extensive real-time analytics to better understand customer behavior and payment patterns

Result

- Launched multichannel app to monitor and control energy usage
- Increased use of self-service portal by 15% resulting in operational cost savings of 3%
- Improved response and power restoration time by mashing up location data of repair teams and outage failure point.



Types of APIs

- Energy consumption & management
- Service requests including new service, repair, and rate management
- Location services for mobile repair teams
- Inventory management for field repair depots and teams

Example Apps

- MobileIron SmartHome: remote control of home electrical devices
- Southern California Edison: customer support for service transfer.
- Scottish Power XDA repair centre.

Business use case

Automotive: Leading Automobile Manufacturer

Business Challenge

- Create additional **sticky services** for auto owners
- Expand **the ecosystem** for dealers and partners **including road service and hospitality brands.**
- Generate **higher dealer traffic volume**

Solution

- Implement an API Management solution that provides:
 1. A secure messaging environment between the auto manufacturer and the partners.
 2. An easy to use developer portal
 3. Extensive real-time analytics to better understand customer behavior and usage patterns

Result

- Launched new service utilizing sensor data from the car, GPS coordinates and roadside service stations to **minimize breakdowns** and locate nearby repair facilities.
- Generated multiple customer testimonials that **helped increase dealer traffic by 8%**



Types of APIs

- Location based services
- **Sensor data to warranty systems**
- **Alerts to dealers**
- Service record access

Example Apps

- Google Maps: GPS location mapping
- GM OnStar: vehicle diagnostics online monitoring while you drive
- BMW Connected Drive: intelligent emergency call for assistance

Business use case

Telecom: Leading Wireless Carrier

Business Challenge

- Establish a secure digital wallet for subscribers
- Create ecosystem for Near Field Communication (NFC) transactions including banks and merchants
- Leverage existing loyalty programs

Solution

- Implement an API Management solution that provides:
 1. An easy to use developer portal
 2. Rapid assembly of new Restful APIs for merchants to access transaction data
 3. Extensive real-time analytics to better understand customer behavior

Result

- Launched new service with “sticky” application generating more ARPU
- Gained a closer relationship with subscribers and merchants
- Provided real-time views of buying behavior and accelerated the timing of new, targeted offers to buyers via loyalty programs



Types of APIs

- Payment options (credit/debit)
- Partner Loyalty Programs
- Merchant specific promotions
- Access to payment account information

Example Apps

- Groupon: Daily Merchant coupons to help drive new customers
- PayPal: Account linkage to banks, credit and debit cards
- Tripit Point Tracker: aggregates points from various travel industry merchants.

Business use case

Media & Entertainment: Leading Movie Producer

Business Challenge

- Manage partner ecosystem leading up to major a movie release
- Control ticket distribution for selected premier venues
- Effectively manage IT infrastructure for cyclical demand loads

Solution

- Implement an API Management solution that provides:
 1. An easy to use and access developer portal for partners
 2. Traffic management to control demand for access to ticket outlets
 3. Scalable cloud based infrastructure to meet demand

Result

- Launched new developer portal for partners to add tie in promotions for new movie releases
- Smoothed message traffic and incorporated a tiered access program for high value customers
- Augmented an on premise implementation with on-demand cloud expansion as needed.



Types of APIs

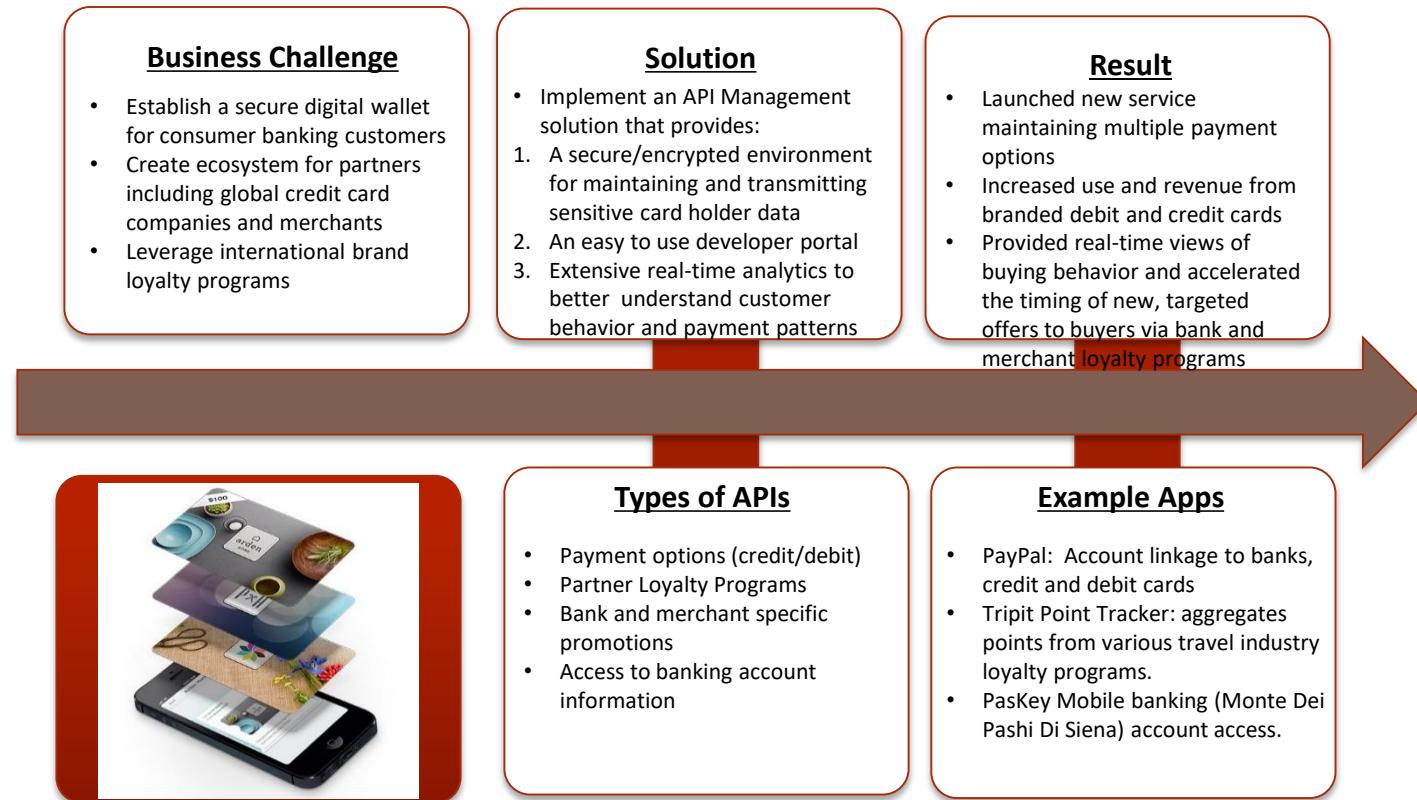
- Ticket purchase
- Product placement promotions
- Access to sound track recordings
- Tiered access (i.e. gold, silver, bronze etc.)

Example Apps

- Moviefone pre-release ticket ordering
- ComingSoon.net: movie trailers and latest news on stars
- Sony Pictures Brand Placement on YouTube, webpages etc.

Business use case

Banking: Leading Commercial Bank



Business use case

Aerospace & Defense: Supply Chain

Business Challenge

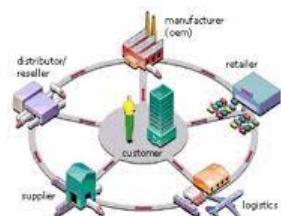
- Streamline procurement process when **on-boarding new trading partners**
- Minimize reliance on VANs (Value Added Networks) to reduce costs
- Maintain accurate **real-time** location and inventory usage data.

Solution

- Implement an API Management solution that provides:
 1. A secure/encrypted environment for maintaining and transmitting sensitive purchasing data
 2. An easy to use developer portal
 3. Extensive real-time analytics to better understand location and usage patterns

Result

- **Eliminated** need for sending and receiving purchase order and invoice **documents** for new vendors
- Provided catalog access and **"shopping cart"** order process
- Generated extensive **analytics tracking individual products** for location, shelf life and consumption statistics.



Types of APIs

- Payment options
- Catalog/inventory availability
- **RFID location based services**
- Shopping cart services
- **Tiered access**

Example Apps

- Amazon shopping cart
- IBM® Emptoris® for supplier on-boarding and qualification
- PINC Solutions Real Time Location Systems for GPS enabled RFID asset tracking

Business use case

Government: Business License Bureau

Business Challenge

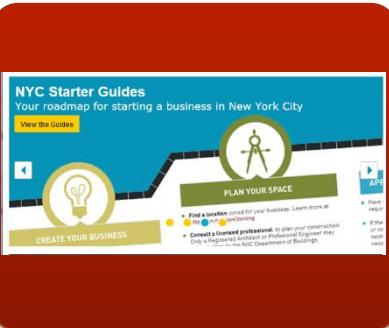
- Create a multi-channel business license application process
- Reduce the steps and shorten the time process the application
- Ensure license renewals are executed on time.

Solution

- Implement an API Management solution that provides:
 1. A secure/encrypted environment for maintaining and transmitting sensitive applicant data
 2. An easy to use developer portal for accessing legacy systems during the approval process
 3. Analytics for measuring usage

Result

- Launched new license application portal that automatically populated forms during the approval process
- Automated the insurance verification process required for license issuance
- Reduced the time to process by 15% and minimized applicant clerical data input by 45%



Types of APIs

- Access to variety of legacy systems including:
 - Building permits
 - Food and liquor licenses
 - Neighborhood variances
 - Fire inspections
- Property and casualty insurance verification

Example Apps

- Chicago Business Affairs: License application and zoning guide
- New York City Restoration Permits: post Hurricane Sandy rebuilding
- Slate.com link to TerraEarth observatory showing Moore, OK after EF5 tornado

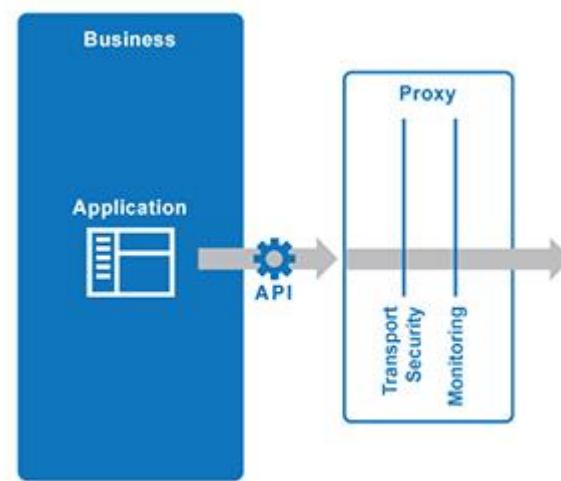
API Management Vendors

- 3scale
- Apigee
- Axway
- CA Technologies
- IBM
- Informatica
- Intel Services
- MuleSoft
- SOA Software
- Tibco Software
- Tyk Technologies
- WSO2

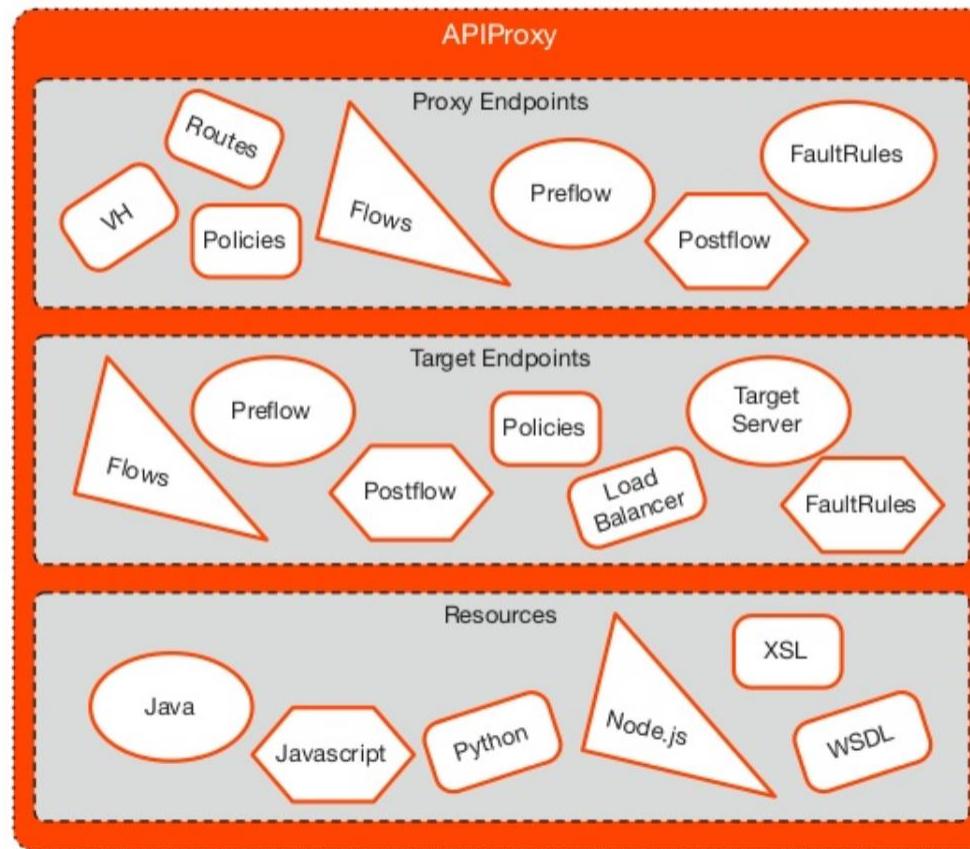
What is an API proxy?



- You expose APIs on Apigee Edge by implementing *API proxies*.
- API proxies decouple the app-facing API from your backend services, shielding those apps from backend code changes.
- As you make backend changes to your services, apps continue to call the same API without any interruption.



API Proxies



What is an API proxy?



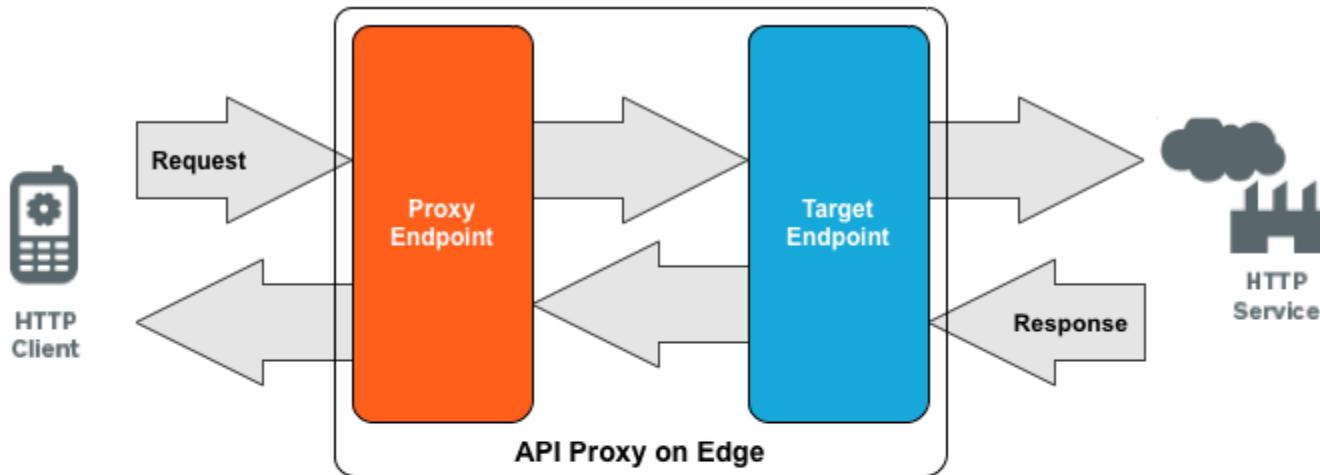
- In an API proxy configuration, there are two types of endpoints:
- **ProxyEndpoint**: Defines the way client apps consume your APIs.
- You configure the ProxyEndpoint to define the URL of your API proxy.
- The proxy endpoint also determines whether apps access the API proxy over HTTP or HTTPS.
- You usually attach *policies* to the ProxyEndpoint to enforce security, quota checks, and other types of access control and rate-limiting.

What is an API proxy?



- **TargetEndpoint:** Defines the way the API proxy interacts with your backend services.
- You configure the TargetEndpoint to forward requests to the proper backend service, including defining any security settings, HTTP or HTTPS protocol, and other connection information.
- You can attach *policies* to the TargetEndpoint to ensure that response messages are properly formatted for the app that made the initial request.

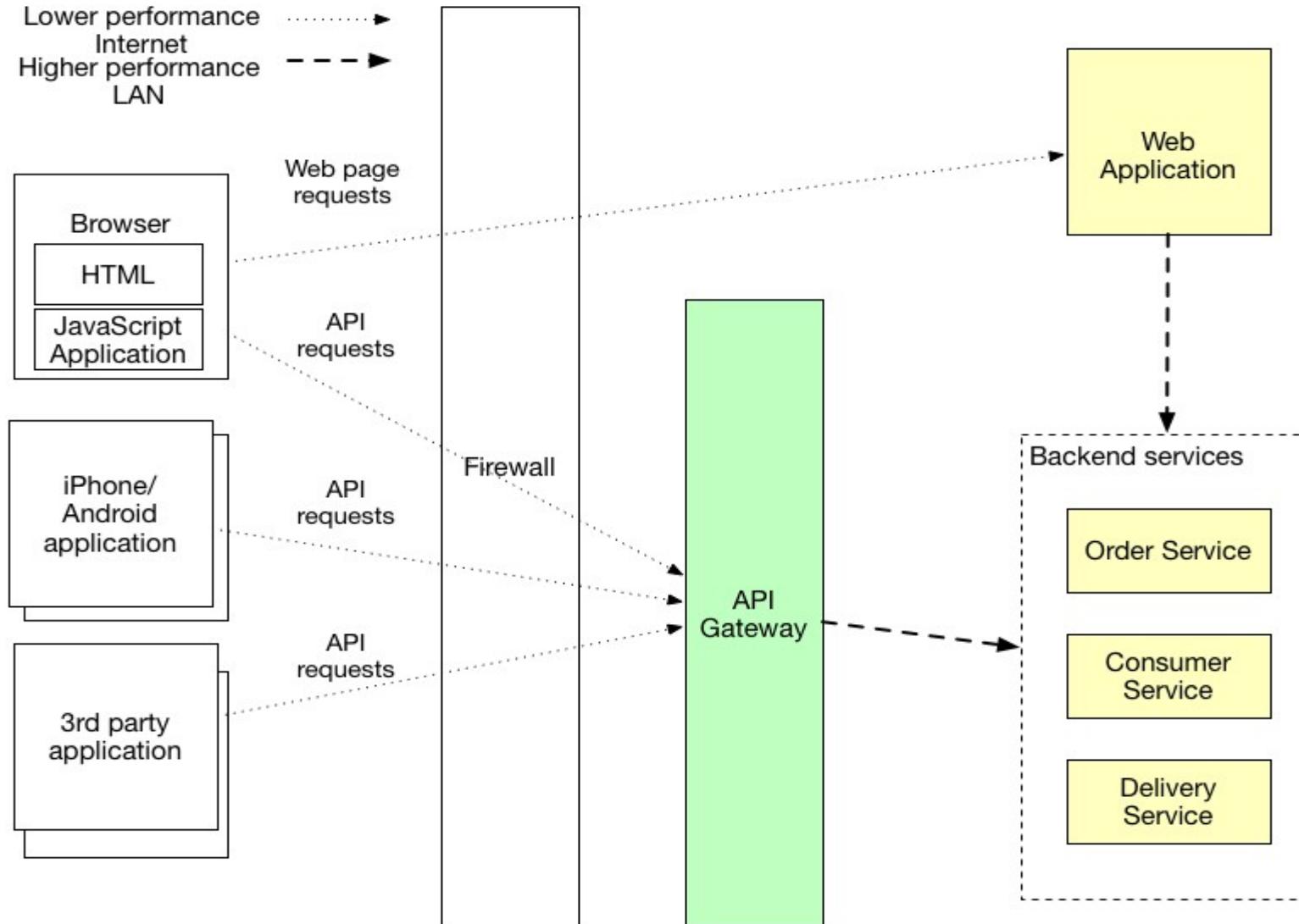
What is an API proxy?



```
<ProxyEndpoint name="default">
  <PreFlow/>
  <Flows/>
  <PostFlow/>
  <HTTPProxyConnection>
    <VirtualHost>default</VirtualHost>
    <BasePath>/v1/weather</BasePath>
  </HTTPProxyConnection>
  <RouteRule name="default">
    <TargetEndpoint>default</TargetEndpoint>
  </RouteRule>
</ProxyEndpoint>
```

```
<TargetEndpoint name="default">
  <PreFlow/>
  <Flows/>
  <PostFlow/>
  <HTTPTargetConnection>
    <URL>http://weather.yahooapis.com</URL>
  </HTTPTargetConnection>
</TargetEndpoint>
```

API Gateway

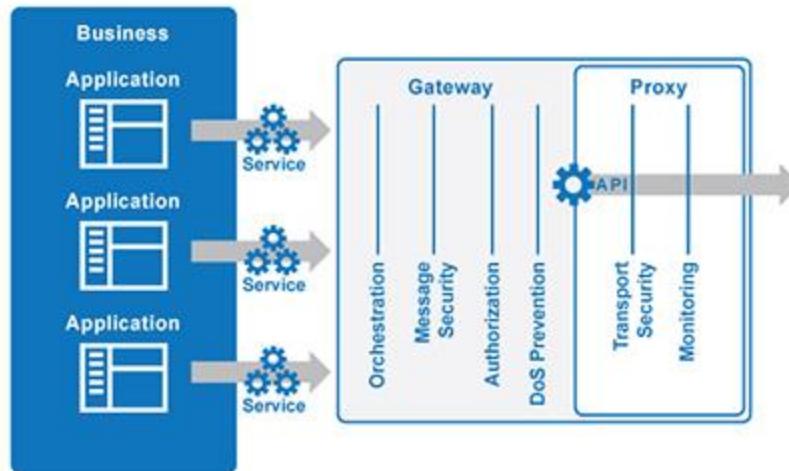


API Gateway

- An API gateway is a service which is the entry point into the application from the outside world.
- It's responsible for request routing, API composition, and other functions, such as authentication.
- The API gateway is responsible for request routing, API composition, and protocol translation.
- All API requests from external clients first go to the API gateway.
- The API gateway routes some requests to the appropriate service.

API Gateway

- The gateway handles other requests using the API Composition pattern and invoking multiple services and aggregating the results.
- It might also translate between client-friendly protocols such as HTTP and WebSockets and client-unfriendly protocols which are used by the services.

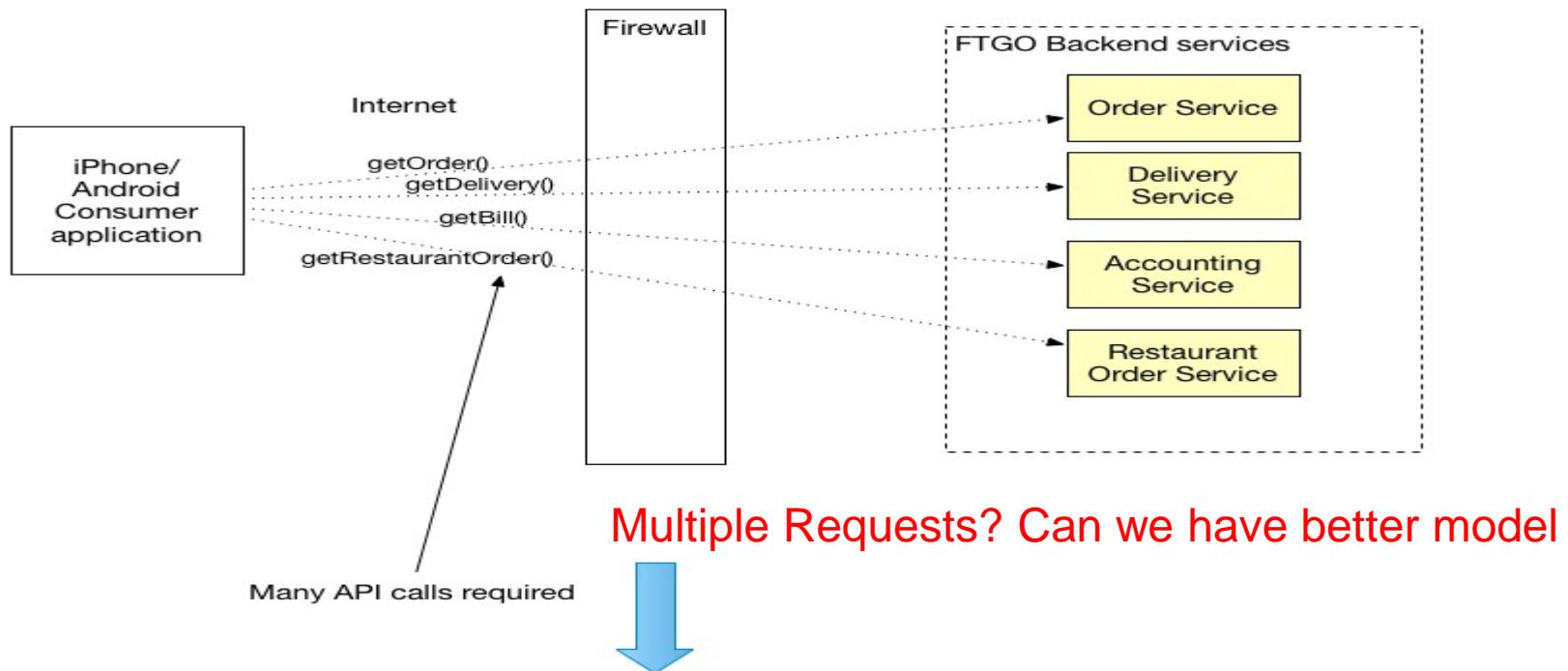


Request routing

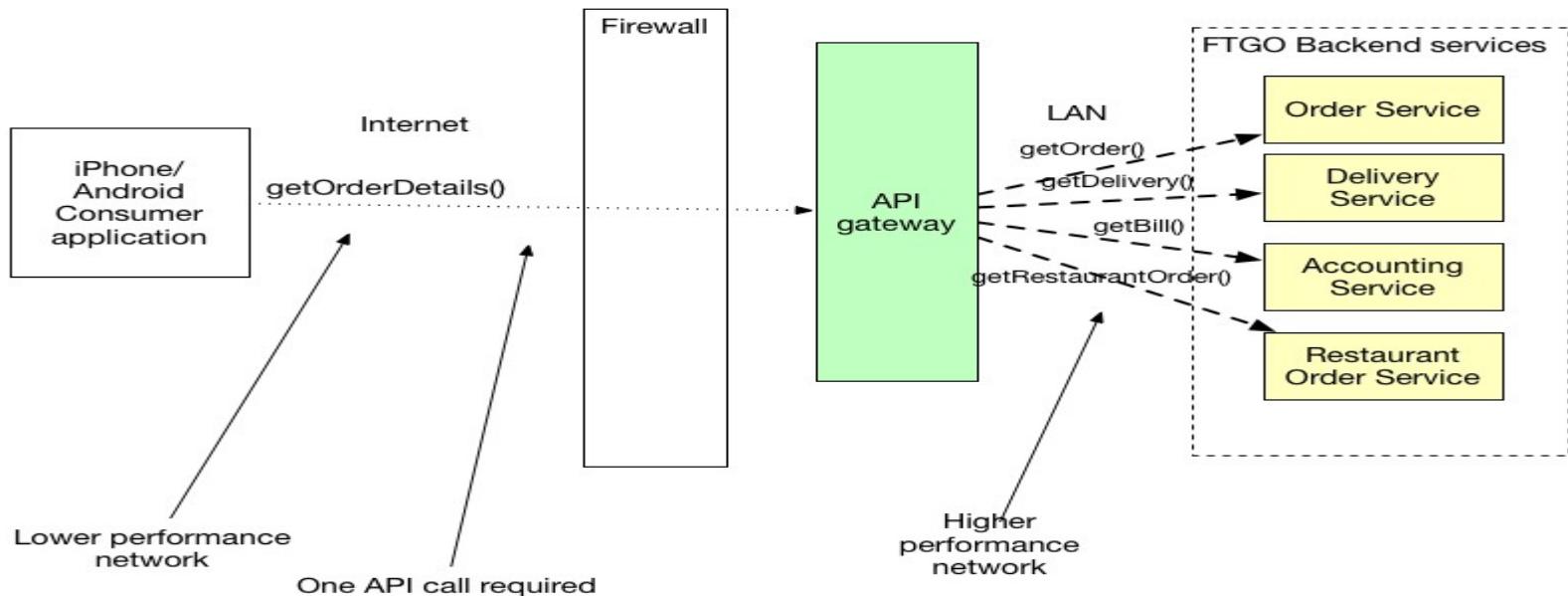
- One of the key functions of an API gateway is request routing.
- An API gateway implements some API operations by routing requests to the corresponding service.
- When it receives a request, the API gateway consults a routing map that specifies which service to route the request to.
- A routing map might, for example, map an HTTP method and path to the HTTP URL of a service.
- This function is identical to the reverse proxying features provided by web servers such as NGINX.

API Composition

- An API gateway typically does more than reverse proxying.
- It might also implement some API operations using API composition.



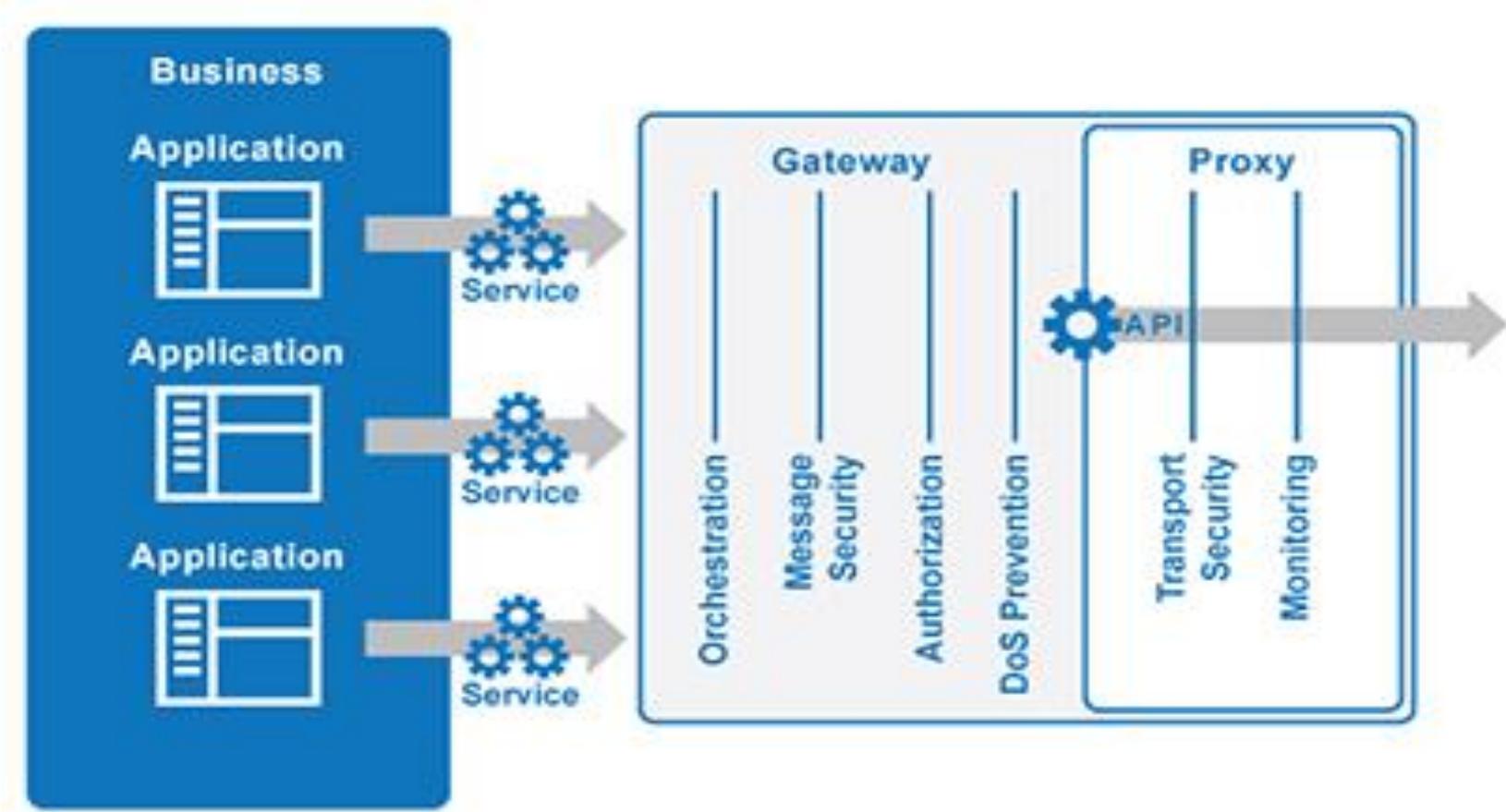
API Composition



Protocol translation

- An API gateway might also perform protocol translation.
- The API gateway might provide a RESTful API to external clients even though the application services use a mixture of protocols internally include REST and gRPC.
- When needed, the implementation of some API operations translate between the RESTful external API and the internal gRPC-based APIs.
-

API Proxy and Gateway



What is Apigee Edge?



- Apigee Edge is a platform for developing and managing API proxies.
- Think of a proxy as an abstraction layer that "fronts" for your backend service APIs and provides value-added features like security, rate limiting, quotas, analytics, and more.
- The primary consumers of Edge API proxies are app developers who want to use your backend services.

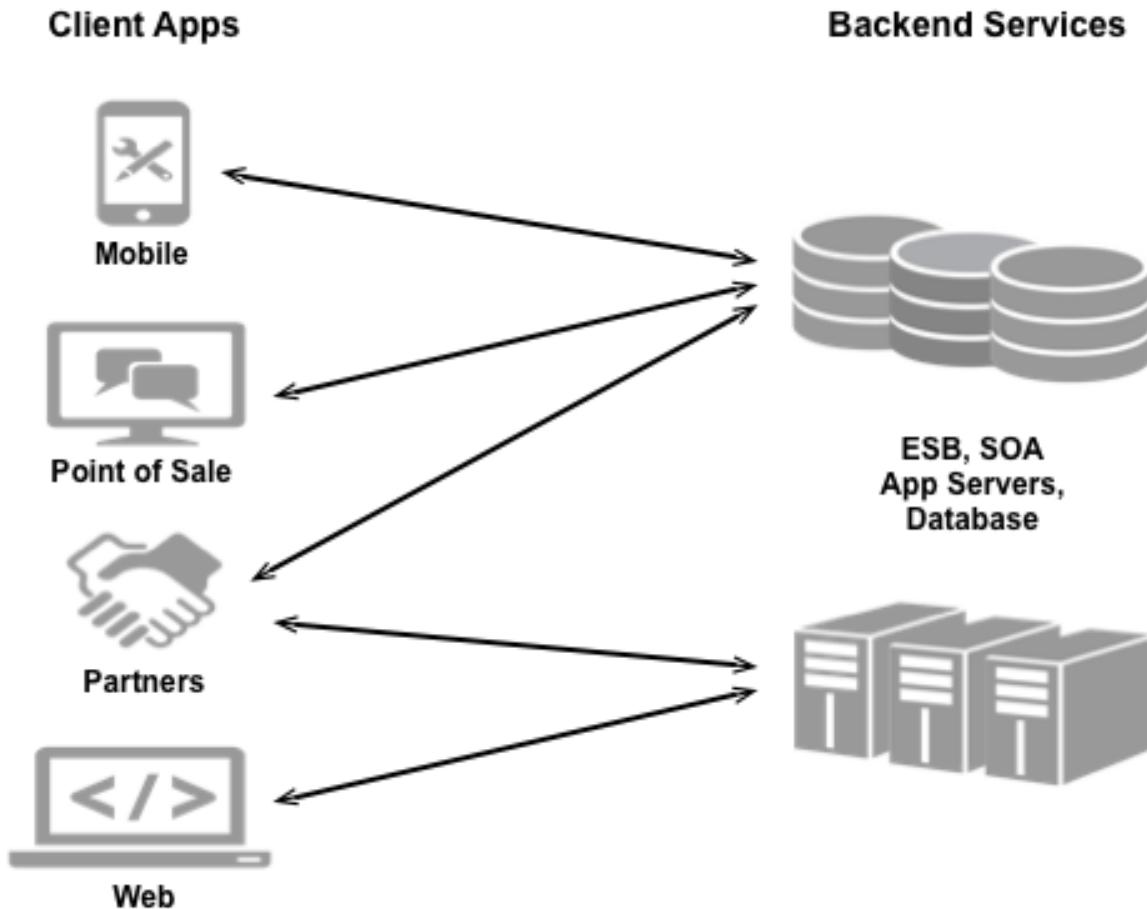
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- Companies today want to make their backend services available on the web so that these services can be consumed by apps running on mobile devices and desktops.
 - A company might want to expose services that provide product pricing and availability information, sales and ordering services, order tracking services, and any other services required by client apps.

-
- Companies often expose services as a set of HTTP endpoints. Client app developers then make HTTP requests to these endpoints.
 - Depending on the endpoint, the service might then return data, formatted as XML or JSON, back to the client app.

-
- The client apps that consume these services can be implemented as standalone apps for a mobile device or tablet, as HTML5 apps running in a browser, or as any other type of app that can make a request to an HTTP endpoint and consume any response data.
 - These apps might be developed and released by the same company that exposed the services, or by third-party app developers who make use of publicly available services.

Making your services available on the web

apigee



Making your services available on the web



- Because providers make their services available over the web, they must ensure that they have taken all necessary steps to secure and protect their services from unauthorized access. As a service provider, consider:
- **Security:** How will you control access to your services to prevent unauthorized access?
- **Compatibility:** Will your services work across different platforms and devices?
- **Measurability:** How can you monitor your services to make sure they are available?
- **Monetization:** How can you track and bill customers for access to your services?
- And many other considerations

-
- After a client app has been released that accesses any services, the service provider is then required to make sure that those services continue to work over time as they add, modify, or delete those services.
 - The service provider must also have a way to keep app developers aware of any changes to the services to ensure that client apps stay in sync with those services.

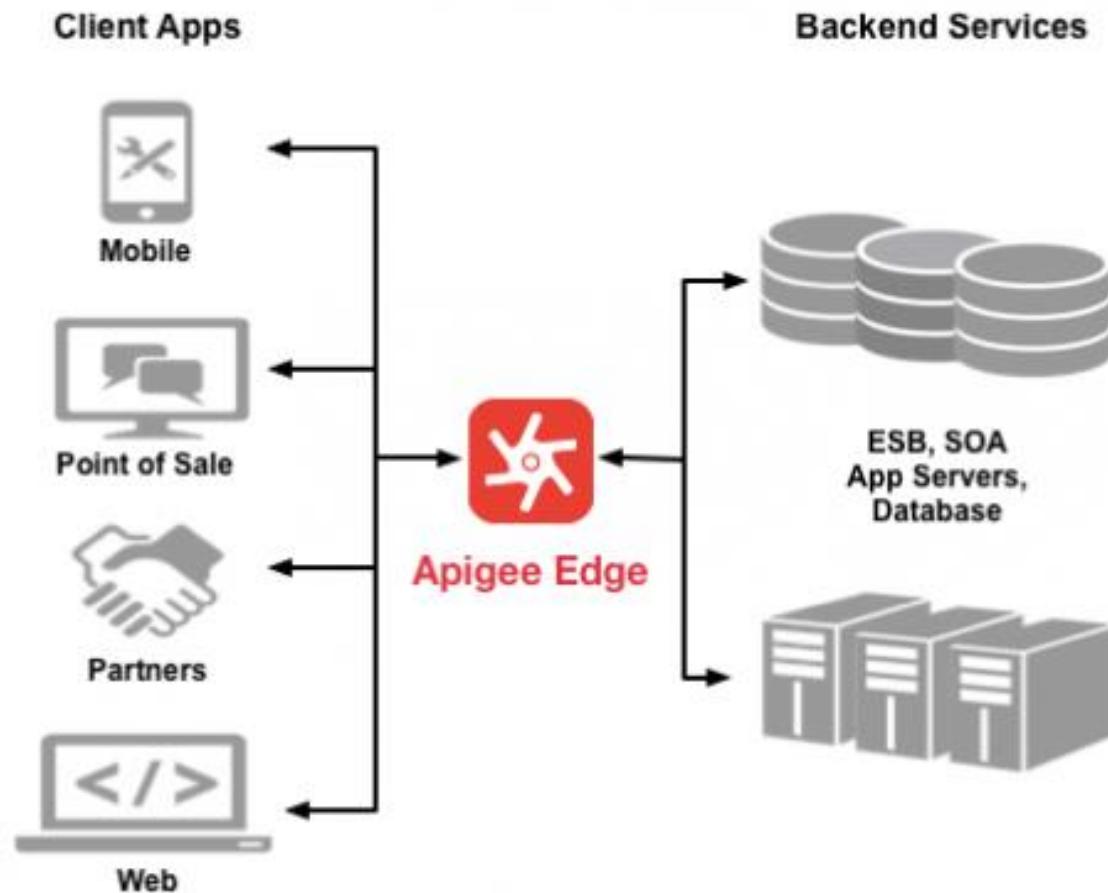
- Client app developers face challenges when trying to consume services from different providers.
- There are many technologies available today for use by a service provider to expose its services.
- The same client app might have to use one mechanism to consume a service from one provider, and a different mechanism to consume a service from a different provider.
- App developers can even face the situation where they have to use different mechanisms to consume services from the same provider.

Make services available through Apigee Edge



- Apigee Edge, which is built on Java, enables you to provide secure access to your services with a well-defined API that is consistent across all of your services, regardless of service implementation. A consistent API:
- Makes it easy for app developers to consume your services.
- Enables you to change the backend service implementation without affecting the public API.
- Enables you to take advantage of the analytics, monetization, developer portal, and other features built into Edge.

Make services available through Apigee Edge



Make services available through Apigee Edge



- Rather than having app developers consume your services directly, they access an API proxy created on Edge.
- The API proxy functions as a mapping of a publicly available HTTP endpoint to your backend service.
- By creating an API proxy you let Edge handle the security and authorization tasks required to protect your services, as well as to analyze, monitor, and monetize those services.
- Because app developers make HTTP requests to an API proxy, rather than directly to your services, developers do not need to know anything about the implementation of your services.
- All the developer needs to know is:
- The URL of the API proxy endpoint.
- Any query parameters, headers, or body parameters passed in a request.
- Any required authentication and authorization credentials.
- The format of the response, including the response data format, such as XML or JSON.

- The API proxy isolates the app developer from your backend service.
- Therefore you are free to change the service implementation as long as the public API remains consistent.
- For example, you can change a database implementation, move your services to a new host, or make any other changes to the service implementation.
- By maintaining a consistent frontend API, existing client apps will continue to work regardless of changes on the backend.

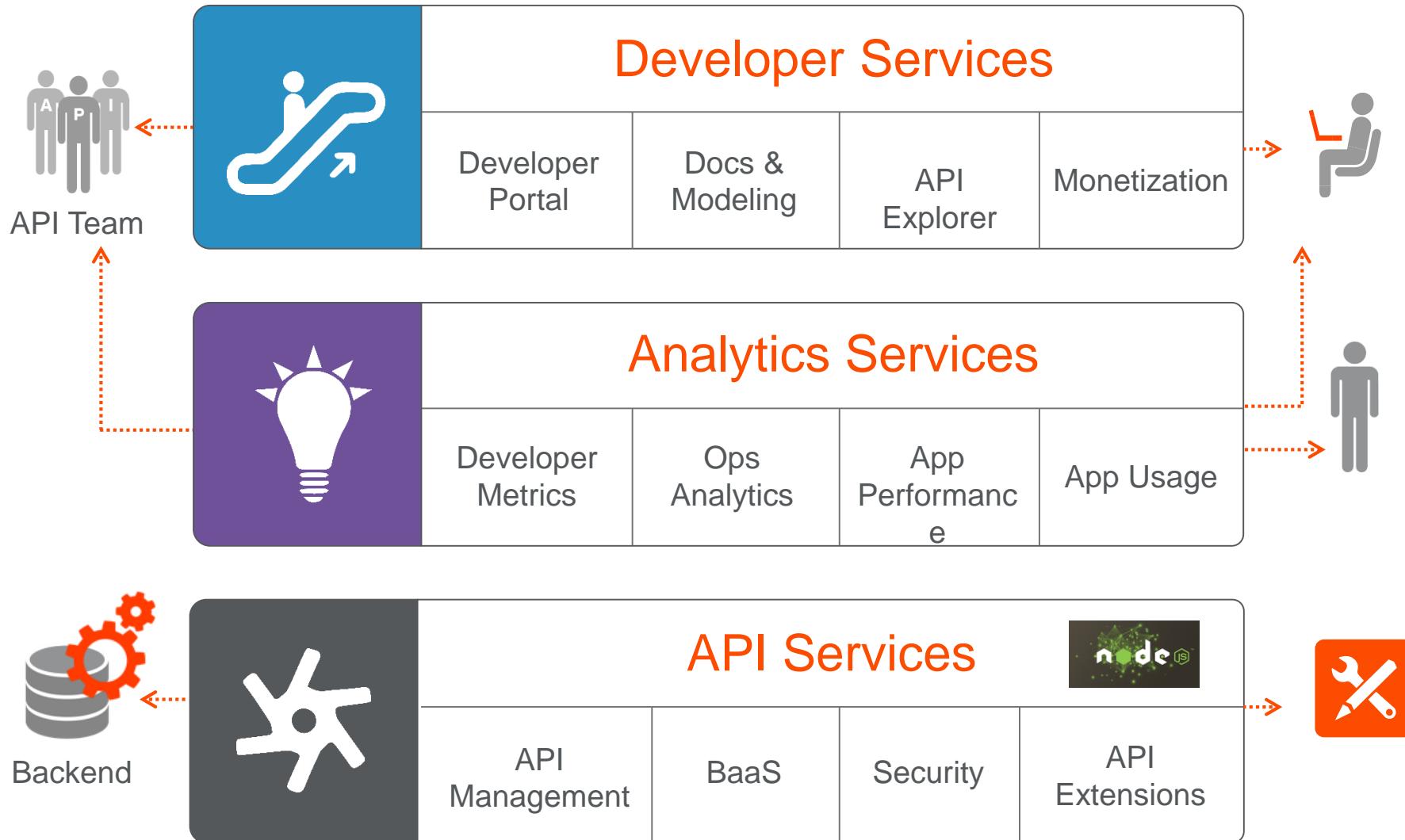
Make services available through Apigee Edge



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- You can use policies on the API proxy to add functionality to a service without having to make any changes to the backend service.
 - For example, you can add policies to your proxy to perform data transformations and filtering, add security, execute conditional logic or custom code, and to perform many other actions.
 - The important thing to remember is you implement policies on Edge, not on your backend server.

-
- Apigee Edge lets you easily and quickly build RESTful APIs that can be consumed by app developers.
 - You expose APIs on Edge by building API proxies that act as managed 'facades' for backend services.

Apigee Edge – Overview of Capabilities

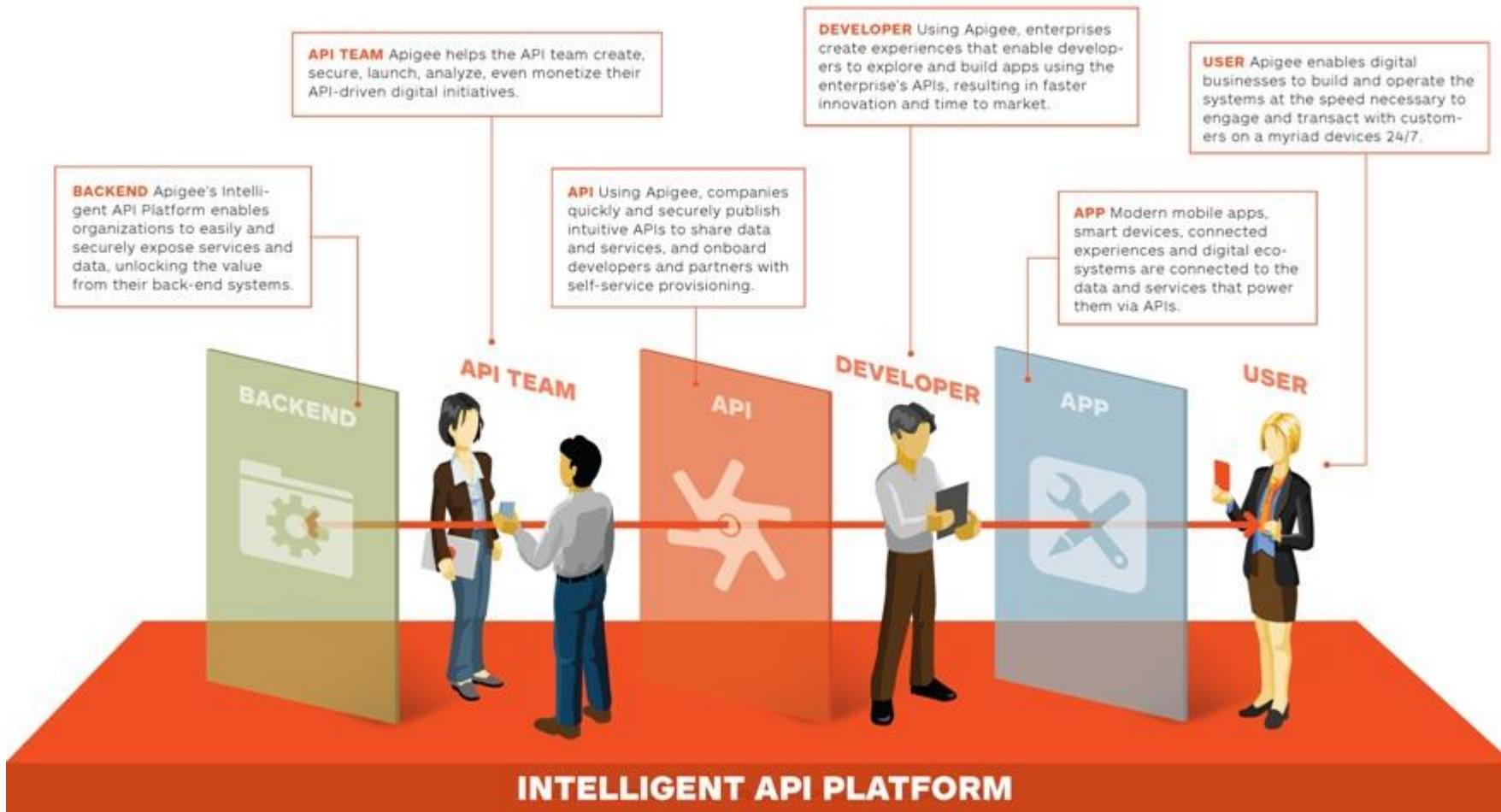


Apigee Edge – Overview of Capabilities



Apigee Intelligent API Platform Powers the Digital Value Chain

Enabling companies to accelerate the pace at which they share, innovate and adapt.



Components of Apigee Edge



- Apigee Edge consists of API runtime, monitoring and analytics, and developer services that together provide a comprehensive infrastructure for API creation, security, management, and operations.

Apigee Edge



-
- Apigee Edge API Services are all about creating and consuming APIs, whether you're building API proxies as a service provider or using APIs, SDKs, and other convenience services as an app developer.
 - On the API-building side, the API management server provides tools for adding and configuring your API proxies, setting up API products, and managing app developers and client apps.
 - It offloads many common management concerns from your backend services.
 - When you add an API proxy, you can apply policies to the API proxy for adding security, rate-limiting, mediation, caching, and so on.
 - You can also customize the behavior of your API proxy by applying custom scripts, making calls out to third-party APIs and services, and so on.

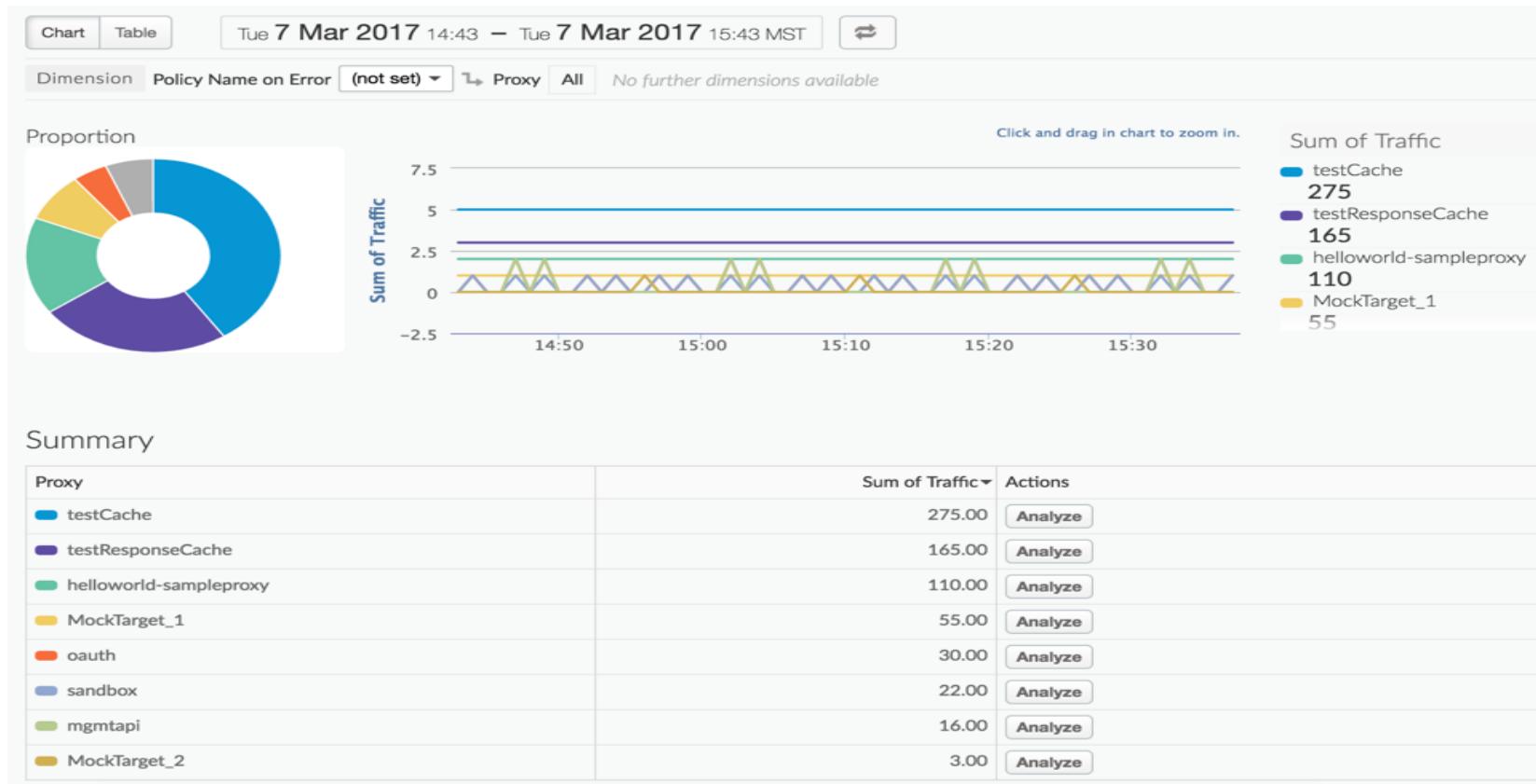
- On the API-consuming side, API Services powers mobile and Web apps by giving app developers access to a flexible data store and to key features such as social graphs, geolocation, user management, push notifications, performance monitoring, and more.
- These features, available with SDKs for iOS, Android, JavaScript, and others, let app developers focus on creating the rich features and user experience that truly differentiate a client app rather than burning time implementing core backend services and infrastructure.

-
- Apigee Edge Analytics Services provides powerful tools to see short- and long-term usage trends of your APIs.
 - You can segment your audience by top developers and apps, understand usage by API method to know where to invest, and create custom reports on business- or operational-level information.

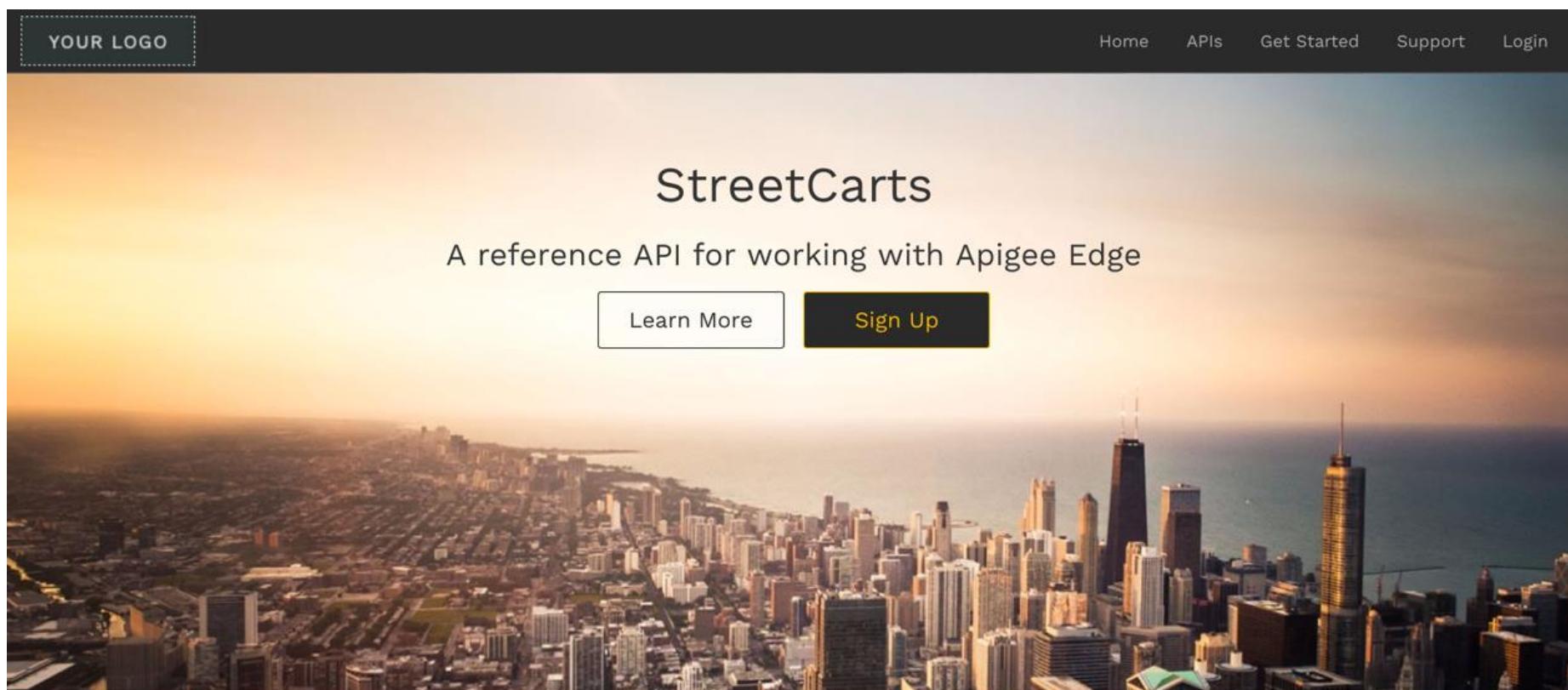
Edge monitoring & analytics



- The management UI lets you view multiple metrics and dimensions in a browser, as shown in the following figure:



- Apigee Edge Developer Services provide the tools to manage the community of app developers using your services.
- Developer Services offers the flexibility to work with internal and external developers and formalize these relationships with financial models.
- Developer Services provides the ability to onboard developers and create a developer portal for your publicly available API products.
- App developers connect to your portal to access API documentation, forums, and a blog.
- Every Edge customer can create their own developer portal, either in the cloud or on-premises with Apigee Edge for Private Cloud.



YOUR LOGO

Home APIs Get Started Support Login

StreetCarts

A reference API for working with Apigee Edge

[Learn More](#) [Sign Up](#)

Dive In

To understand how the StreetCarts API works and follow a tutorial to get your own instance running, see our [30 minute quick start guide](#).

News & Updates

We'll be rolling out an update to the orders APIs on Thursday, November 10 between 4 and 6pm GMT. ([read more](#))

Success Stories

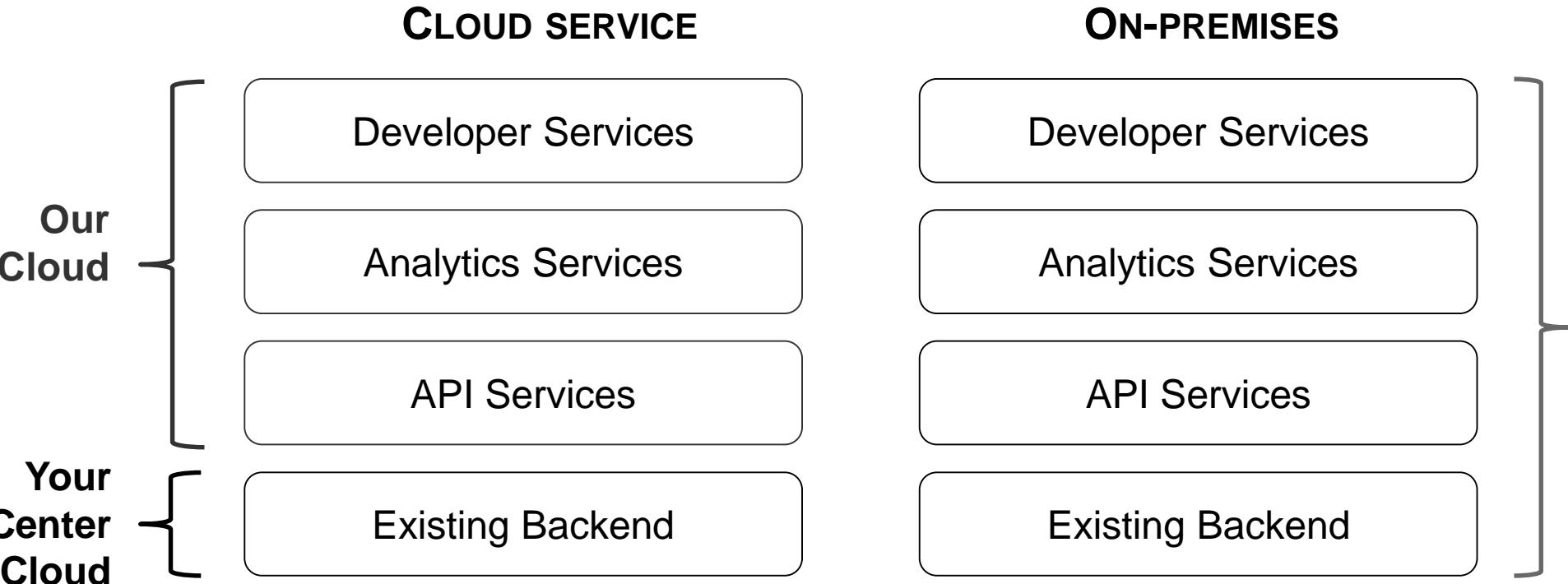
Congratulations to Steve Sharp, who launched an iOS version of the StreetCarts app! Within 72 hours Steve had already seen more than 7,500 unique users engaging with his app.

-
- Monetization capabilities provide the financial infrastructure and relationships to turn your Developer community into an actual channel for your digital assets.
 - With monetization, you can create a variety of rate plans that charge developers for the use of your API products or let you pay developers in revenue-sharing scenarios.
 - Plans include pre-paid plans, post-paid plans, fixed-fee plans, variable rate plans, "freemium" plans, plans tailored to specific developers, plans covering groups of developers, and more. In addition, monetization includes reporting and billing facilities.

- You can install Edge on-premises (Apigee Edge for Private Cloud) in your own environment to retain complete control of the environment and of the deployment taxonomies.
- Alternatively, you can use the cloud-hosted (SaaS) version where Apigee is responsible for maintaining the cloud environment for you, allowing you to concentrate on building your services and defining the API to those services.
- The functionality between the two versions is virtually identical.
- The difference is that the cloud supports both free and paid accounts, and that the hardware and software environment is managed by Apigee.

- With an on-premises installation, which requires a paid account, you are in complete control of Edge installation and deployment.
- To fully support an on-premises installation, Edge includes components such as the Apigee management server, an Apache Cassandra NoSQL database, an OpenLDAP server, a message Router, and a Message Processor.

Edge in the cloud vs. Edge on-premises



A word about organizations



- To call an API proxy, includes your organization name and the environment (either "test" or "prod") in the URL:
- [https://your_org_name-\[test|prod\].apigee.net/path/to/resource](https://your_org_name-[test|prod].apigee.net/path/to/resource)
- For example:
- <https://ahamilton-eval-test.apigee.net/getstarted>
- When you create a new account, your email is automatically added to the Organization Administrator role. That means you can do just about everything in your organization.

Step 2: Create an API proxy

- Now that you've created your Apigee account, you're ready to create a simple API proxy.
- **To create an API proxy:**
- Open the Edge Management UI in a browser and log in.
- Click **API Proxies** in the main window:

The new Apigee Edge experience

Same great platform, brand new user experience. Want to [learn more?](#)



Specs

Describe your services using the
OpenAPI Specification format



API Proxies

Route, transform, and secure your
traffic through the API gateway



API Products

Control how developers consume
your APIs



Portals

Publish APIs and reference docs,
and on-board developers



Learn More

Tutorials, tips, and documentation
for the new Edge experience



Community

Have questions? Get answers from
other Edge users and Apigeeeks

- Click the add + **Proxy** button in the upper right:
- Apigee walks you through the process of creating a new proxy. The first decision is the type of proxy:

- Reverse proxy (most common)
Route inbound requests to backend services.

 Use OpenAPI Optionally associate the proxy with an OpenAPI (Swagger) document

- SOAP service
Create a RESTful or pass-through proxy for a SOAP service.

- No Target
Create a simple API proxy that does not route to any backend target.

- Hosted Target (Beta)
Create a new app in Node.js and optionally add policies.

- Node.js App
Create a new app in JavaScript and optionally add policies.

- Proxy bundle
Import an existing proxy from a zip archive.

What Is OpenAPI?



- OpenAPI Specification (formerly Swagger Specification) is an API description format for REST APIs. An OpenAPI file allows you to describe your entire API, including:
- Available endpoints (/users) and operations on each endpoint (GET /users, POST /users)
- Operation parameters Input and output for each operation
- Authentication methods
- Contact information, license, terms of use and other information.
- API specifications can be written in YAML or JSON.

What Is Swagger?



- Swagger is a set of open-source tools built around the OpenAPI Specification that can help you design, build, document and consume REST APIs. The major Swagger tools include:
- Swagger Editor – browser-based editor where you can write OpenAPI specs.
- Swagger UI – renders OpenAPI specs as interactive API documentation.
- Swagger Codegen – generates server stubs and client libraries from an OpenAPI spec.

Why Use OpenAPI?



- The ability of APIs to describe their own structure is the root of all awesomeness in OpenAPI.
- Once written, an OpenAPI specification and Swagger tools can drive your API development further in various ways:
- Design-first users: use Swagger Codegen to generate a server stub for your API. The only thing left is to implement the server logic – and your API is ready to go live!
- Use Swagger Codegen to generate client libraries for your API in over 40 languages.
- Use Swagger UI to generate interactive API documentation that lets your users try out the API calls directly in the browser.
- Use the spec to connect API-related tools to your API. For example, import the spec to SoapUI to create automated tests for your API.

DEFINITION ▾ GET ▾ http://jsonplaceholder.typicode.com/users SEND

^ Request

Parameters Authentication & Headers Body

CLEAR REQUEST

query parameter

value

ADD NEW PARAMETER

^ Response

Status: 200 OK Time: 515 ms

PRETTY SHOW HEADERS DARK THEME

```
1 [ {  
2   "id": 1,  
3   "name": "Leanne Graham",  
4   "username": "Bret",  
5   "email": "Sincere@april.biz",  
6   "address": {  
7     "street": "Kulas Light",  
8     "suite": "Apt. 556",  
9     "city": "Gwenborough",  
10    "zipcode": "92998-3874",  
11    "geo": {  
12      "lat": -37.3150,  
13      "lng": 145.0650
```

History Collections

ADD TO COLLECTION DELETE

CREATE API DEFINITION

^ Pinned

No pinned items

^ History

<input type="checkbox"/>	24 Jan 2019 22:57	GET	http://jsonplaceholder.typicode.com/users	
<input checked="" type="checkbox"/>	24 Jan 2019 21:51	GET	https://jsonplaceholder.typicode.com/users	
<input type="checkbox"/>	26 Nov 2018 15:13	GET	https://restcountries.eu/rest/v2/all	
<input type="checkbox"/>	26 Nov 2018 03:14	GET	https://jsonplaceholder.typicode.com/users	
<input type="checkbox"/>	26 Nov 2018 03:06	GET	https://jsonplaceholder.typicode.com/users	
<input type="checkbox"/>	26 Nov 2018 02:47	GET	https://jsonplaceholder.typicode.com/users	
<input type="checkbox"/>	26 Nov 2018 02:42	GET	https://jsonplaceholder.typicode.com/users	
<input type="checkbox"/>	26 Nov 2018 02:38	GET	https://jsonplaceholder.typicode.com/users	
<input type="checkbox"/>	25 Nov 2018 22:59	GET	https://kycnewcf.cfapps.io/browser/index.html#/getall	
<input type="checkbox"/>	25 Nov 2018 22:58	GET	https://kycnewcf.cfapps.io/browser/index.html#/getall	



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PUBLIC | UNPUBLISHED

rps2018

PUBLIC | UNPUBLISHED

rps2018

PUBLIC | UNPUBLISHED

SHOWING 1-8 OF 8

Import OpenAPI From Inspector

Name Version

Visibility

Owner

CANCEL

IMPORT OPENAPI



swaggerusers

0.1

</> Design View



Export ▾



Search

Aa



SAVE



DEFAULT ▾

GET /users

```
+ 1 openapi: 3.0.1
+ 2 info:
+ 3   title: defaultTitle
+ 4   description: defaultDescription
+ 5   version: '0.1'
+ 6   servers:
+ 7     - url: 'https://jsonplaceholder.typicode.com'
+ 8   paths:
+ 9     /users:
+ 10    get:
+ 11      description: Auto generated using Swagger Inspector
+ 12      responses:
+ 13        '200':
+ 14          description: Auto generated using Swagger Inspector
+ 15      servers:
+ 16        - url: 'https://jsonplaceholder.typicode.com'
+ 17      servers:
+ 18        - url: 'https://jsonplaceholder.typicode.com'
```

defaultTitle

0.1 OAS3

defaultDescription

Servers

https://jsonplaceholder.typicode.com ▾

default

GET /users



Routing requests via SwaggerHub proxy | Use browser instead

Last Saved: 10:58:54 pm - Jan 24, 2019

✓ VALID ▾

Proxies - Apigee | List of publicly ava | IP2Geo Web Service | IP2Geo Web Service | ws.cdyne.com/ip2c | How to Parse a Qu | Inspector | Build, Collaborate | + | - | X

https://app.swaggerhub.com/apis/rps2018/swaggerusers/0.1

Apps Insert title here Empire New Tab How to use Assertion Browser Automation node.js - How can I fi Freelancer-dev-8104e Courses New Tab hi

SMARTBEAR SwaggerHub™ eswaribala

swaggerusers v 0.1 v </> Design View v

A Search Aa SAVE

DEFAULT ^ GET /users

```
1 openapi: 3.0.1
2 info:
3   title: defaultTitle
4   description: defaultDescription
5   version: '0.1'
6 servers:
7   - url: 'https://jsonplaceholder.typicode.com'
8 paths:
9   /users:
10  get:
11    description: Auto generated using Swagger Inspector
12    responses:
13      '200':
14        description: Auto generated using Swagger Inspector
15    servers:
16      - url: 'https://jsonplaceholder.typicode.com'
17    servers:
18      - url: 'https://jsonplaceholder.typicode.com'
```

defaultTitle
0.1 OAS3

defaultDescription
JSON Resolved
JSON Unresolved
YAML Resolved
YAML Unresolved

Servers
https://jsonplaceholder.ty

default
GET /users

Last Saved: 10:58:54 pm - Jan 24, 2019 ✓ VALID

Type here to search

Codegen Options

< Client SDK

< Server Stub

< Download API

Save As

This PC > Downloads >

Organize New folder

Name	Date modified	Type	Size
lib2.zip	24/01/2019 12:07	Compressed (zipped) Folder	10,755 KB
lib1.zip	24/01/2019 12:06	Compressed (zipped) Folder	21,882 KB
BankingApp.zip	24/01/2019 11:31	Compressed (zipped) Folder	52 KB
lib2	24/01/2019 12:07	File folder	
lib1	24/01/2019 12:06	File folder	
banking_lib	24/01/2019 12:04	File folder	

File name: openapi-client-generated.zip

Save as type: Compressed (zipped) Folder

Save Cancel

Don't worry, we've saved all the working code in your organization, and your team can easily get back to work by upgrading to a Team Plan.

{...} Swagger Team
SwaggerHub

Upgrade Now

Last Saved: 10:58:54 pm - Jan 24, 2019

✓ VALID

81048 Inspector Build, Collaborate + - Search Downloads

Courses New Tab Google hi

eswaribala Export

Codegen Options Client SDK Server Stub Download API

JSON Resolved JSON Unresolved YAML Resolved YAML Unresolved Placeholder.txt /users

Routing requests via SwaggerHub proxy | Use browser instead

23:00 ENG 24/01/2019 22

- Select **Reverse proxy (most common)**, and click **Next**.
- Apigee then displays the **Details** screen.
- Configure your proxy with the following settings:
 - Proxy Name: Enter "getstarted". If a proxy already exists with this name, choose a different name.
 - Proxy Base Path: Change this to "/getstarted".
 - The Proxy Base Path is part of the URL used to make requests to your API. Edge uses the URL to match and route incoming requests to the proper API proxy.

- Existing API: Enter "https://mocktarget.apigee.net". This defines the target URL that Apigee Edge invokes on a request to the API proxy.
- The mocktarget service is hosted at Apigee and returns simple data. It requires no API key or access token.
- (Optional) Description: Enter a description for your new API proxy, such as "Getting Started proxy".



Specify the proxy details.

Proxy Name *

getstarted

Valid characters are letters, numbers, dash (-), and underscore (_).

Proxy Base Path *

/getstarted

A path component that uniquely identifies this API proxy. The public-facing URL of this API proxy is comprised of your organization name, an environment where this API proxy is deployed, and this Proxy Base Path. Example URL <http://danger4242-eval-test.apigee.net/getstarted>

Existing API *

<https://mocktarget.apigee.com>

Defines the target URL invoked on behalf of this API proxy. Any URL that is accessible over the open Internet can be used. Example:
<https://api.usergrid.com>

Description

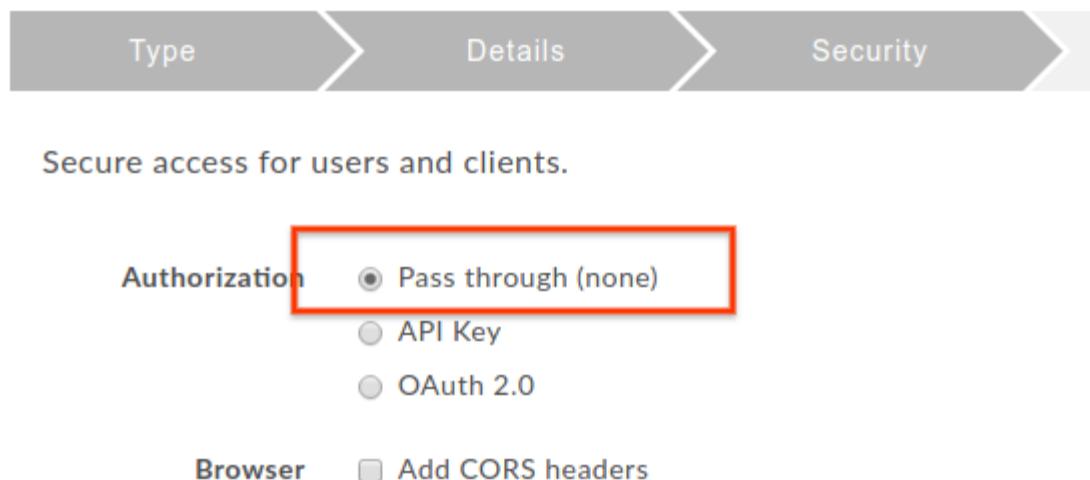
Getting Started proxy

Previous

Exit Without Saving

Next

- Click Next.
- On the Security screen, select Pass through (none) as the security option, and click Next:



- On the Virtual Hosts screen, accept the default selections and click Next.
- On the Build screen, make sure the test environment is selected next to Deploy Environments and click Build and Deploy:



You are ready to build and deploy your API proxy.

Deploy Environments prod test

Proxy Name tutorial

Proxy Type Reverse proxy

Virtual Hosts default, secure



 Generated proxy

 Uploaded proxy

 Deployed to test

View [getstarted](#) proxy in the editor .

- Click **View getstarted proxy** in the editor to display the Overview page for the API proxy:

The screenshot shows the Apigee API proxy overview page for a proxy named "getstarted".

Revision 1 Summary

Created: a minute ago, Updated: a minute ago.

Description: Getting Started proxy

Deployments

Environment	Revision	Status	URL
test	1	●	http://ahamilton-eval-test.apigee.net/getstarted [+]

Proxy Endpoints

Name	Base Path	Target Endpoints
▶ default	/getstarted	default

Target Endpoints

Name	Target	Used by Proxy Endpoints
▶ default	URL https://mocktarget.apigee.com	default

- Note that if you expand the [+], the UI lists both HTTP and HTTPS URLs for the test environment:

URL
http://ahamilton-eval-test.apigee.net/getstarted [-]
https://ahamilton-eval-test.apigee.net/getstarted

Step 3: Test your new proxy

- Now that you've created a new proxy, you're ready to test it.
- You can test your "getstarted" API using curl or a web browser.
- To test your new proxy:
 - In a terminal window, execute the following curl command:

```
curl https://org_name-test.apigee.net/getstarted
```

Where:

org_name is the organization name that Apigee assigned to you when you created your Apigee account.

-test is the environment. You deployed your new proxy to the "test" environment in Step 2: Create an API proxy.

/getstarted is the Proxy Base Path.

For example:

```
curl https://ahamilton-eval-test.apigee.net/getstarted
```

Alternatively, you can navigate to "https://org_name-test.apigee.net/getstarted" in a browser.

You should receive the following response:

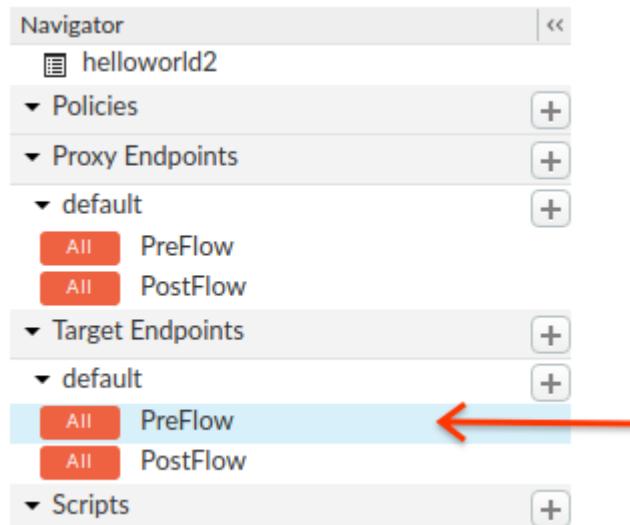
Hello, Guest!

- Step 4: Change your target endpoint
- Now that you've tested your new proxy, you're almost ready to add a policy to it. Before you do that, though, you should change your proxy's target endpoint to one that returns some data.
- Recall that in Step 2: Create an API proxy, you set the target endpoint (in the **Existing API** field) to "https://mocktarget.apigee.net". Well, that endpoint doesn't return any data, so now you'll change the endpoint to one that returns some XML.

- **To change your proxy's target endpoint:**
- Log in to the Edge Management UI and click API Proxies.
- Select your getstarted proxy from the list. If you don't see your proxy in the list, be sure that you selected the right organization, as described in A word about organizations.



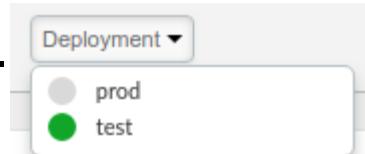
- This takes you to the API Proxy Editor. The Proxy Editor lets you see the structure of your API proxy and configure its flow.
- In the Navigator pane, select Target Endpoints > default:



APIGEE

- <TargetEndpoint name="default">
- <Description/>
- <FaultRules/>
- <PreFlow name="PreFlow">
- <Request/>
- <Response/>
- </PreFlow>
- <PostFlow name="PostFlow">
- <Request/>
- <Response/>
- </PostFlow>
- <Flows/>
- <HTTPTargetConnection>
- <Properties/>
- <URL><https://mocktarget.apigee.net></URL>
- </HTTPTargetConnection>
- </TargetEndpoint>

- Change the URL to "https://mocktarget.apigee.net/xml". (Append "/xml" to the existing URL.)
- The new URL returns a small block of XML in the body of the response.
- Your endpoint configuration should now look like the following:
 - ...
 - <HTTPTargetConnection>
 - <Properties/>
 - <URL>https://mocktarget.apigee.net/xml</URL>
 - </HTTPTargetConnection>
 - ...

- To save your changes to the proxy configuration, click the Save button.
- Edge saves your changes and automatically deploys them.

A screenshot of a 'Deployment' dropdown menu. It shows two options: 'prod' (gray circle) and 'test' (green circle). The 'test' option is selected.
- If there is an error, Edge will save your changes but not deploy the proxy. In this case:
 - Fix your proxy configuration. Edge may provide syntax guidance as a pop-up.
 - Manually deploy your changes to the test environment by clicking Deployment > test if Edge does not automatically deploy it.
 - You can check if your proxy was deployed successfully by selecting the Deployment drop-down above the Flow editor. A green button indicates that the proxy was deployed to that environment successfully:

- Test your changes by sending a request to your proxy, just like you did in Step 3: Test your new proxy. For example:
- curl https://org_name-test.apigee.net/getstarted
- For example:
- curl https://ahamilton-eval-test.apigee.net/getstarted | xmllint --format -
- This time, the mocktarget endpoint returns XML in the body of the response:

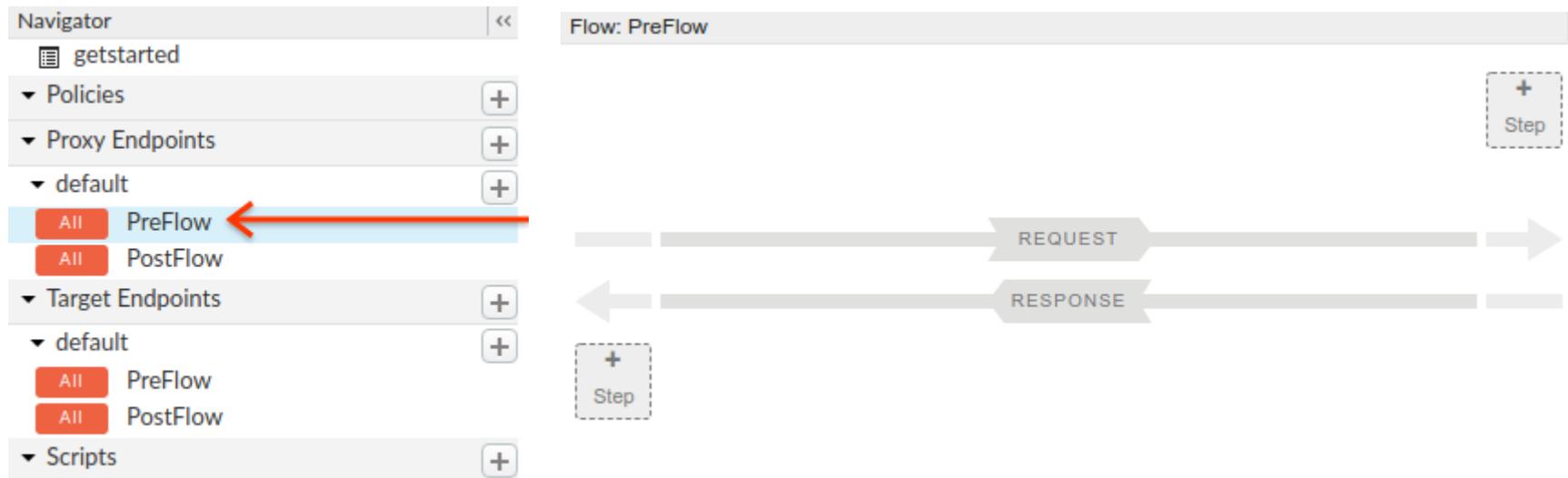
- <?xml version="1.0" encoding="UTF-8"?>
- <root>
- <city>San Jose</city>
- <firstName>John</firstName>
- <lastName>Doe</lastName>
- <state>CA</state>
- </root>

- Step 5: Add a policy
- Now that you've changed your target endpoint, you're ready to add a policy to your proxy.
- A policy is an Edge component that you can attach to different points in the message flow through your API proxies. Policies can transform message formats, enforce access control, call remote services, authorize users, examine message content for potential threats, and do much more.
- We are going to add the XMLtoJSON policy to your proxy. This policy converts the payload of an XML message to JSON. It also changes the response's Content-Type header.

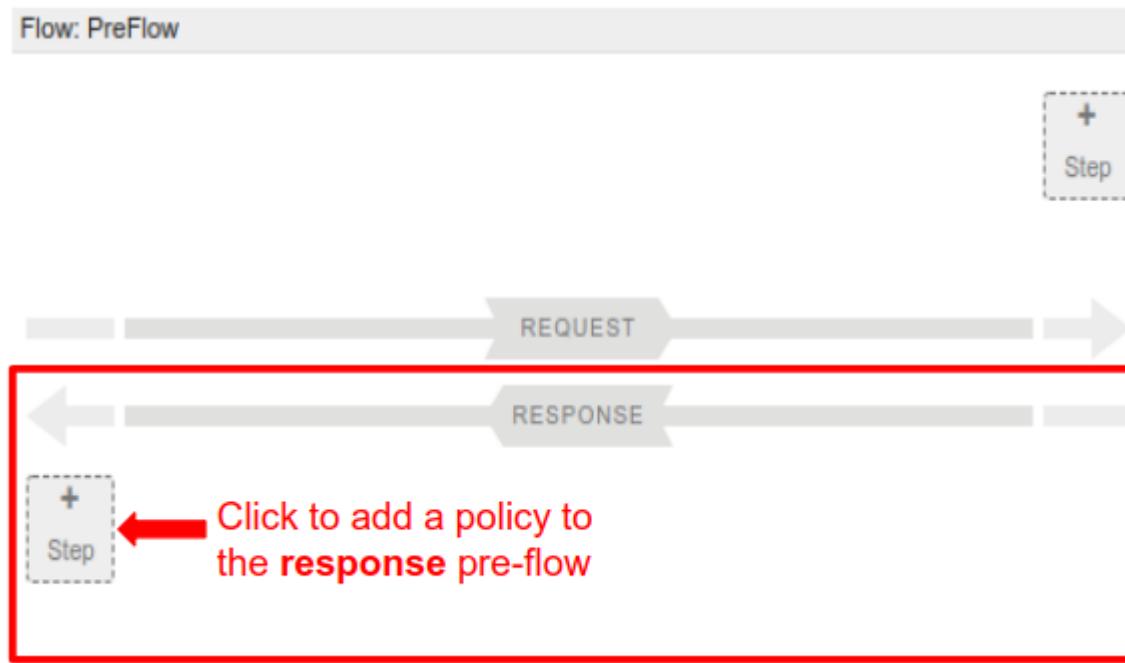
- To add the XML to JSON policy to your proxy:
- Open the Edge Management UI in a browser and log in.
- Click API Proxies in the main window and select a proxy. For this example, select the proxy that you created in Step 2: Create an API proxy.
- Click the Develop tab:



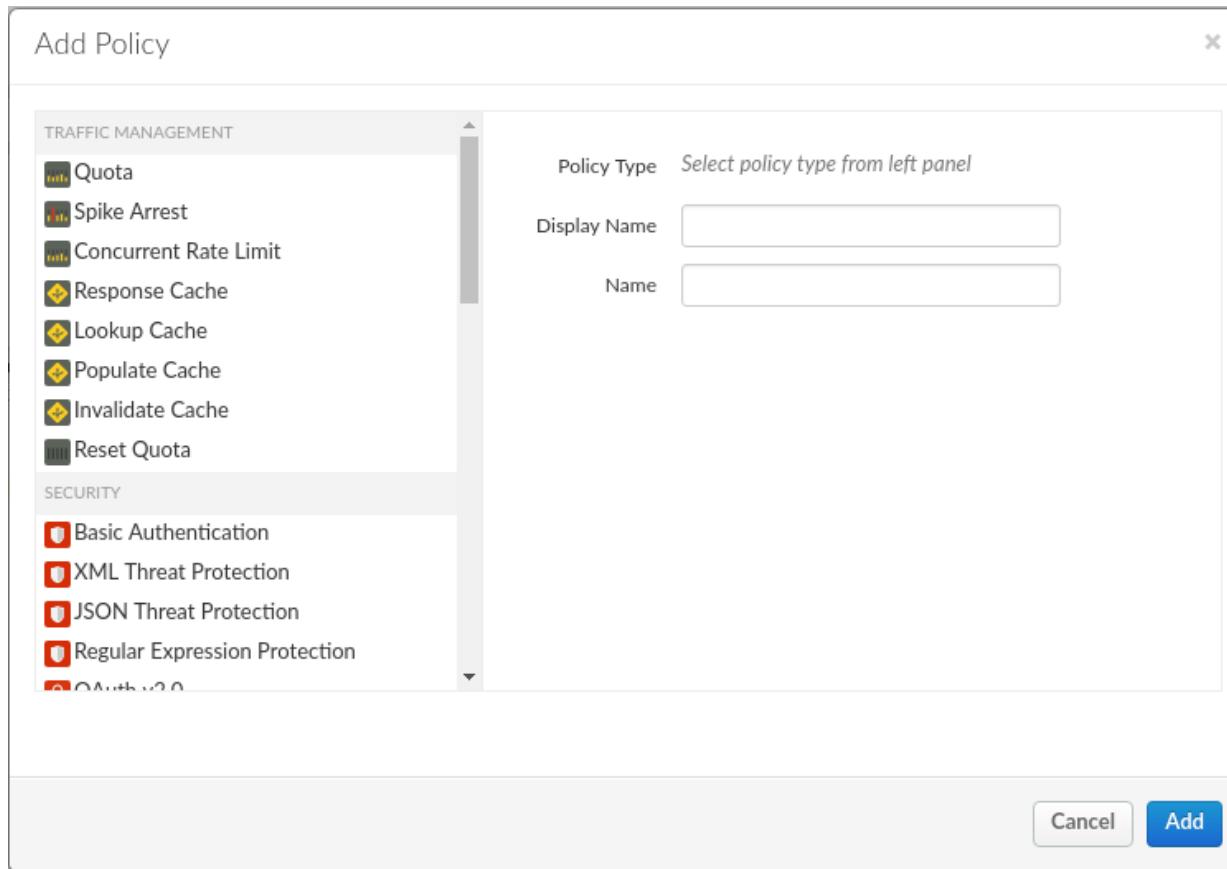
- In the Navigator pane, click Proxy Endpoints > default > PreFlow:



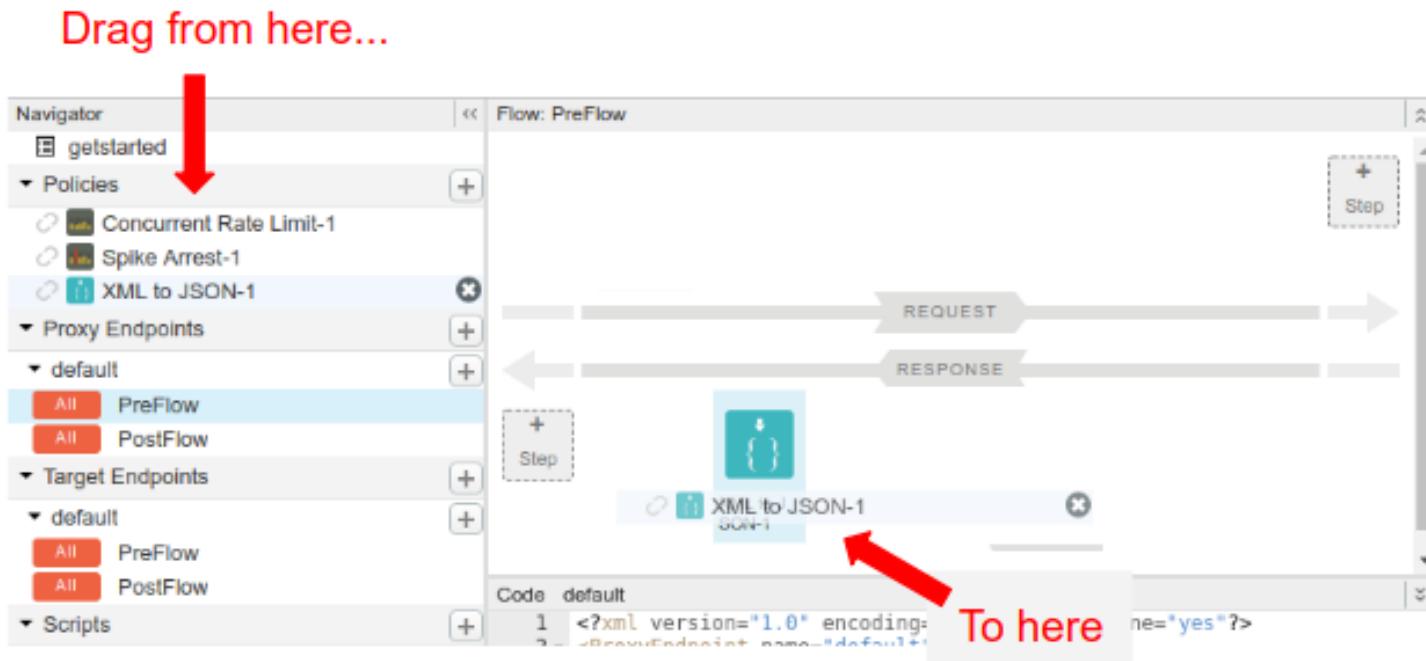
- To add a policy to your proxy, click the **+ Step** button in the response PreFlow (the bottom half of the Flow editor):



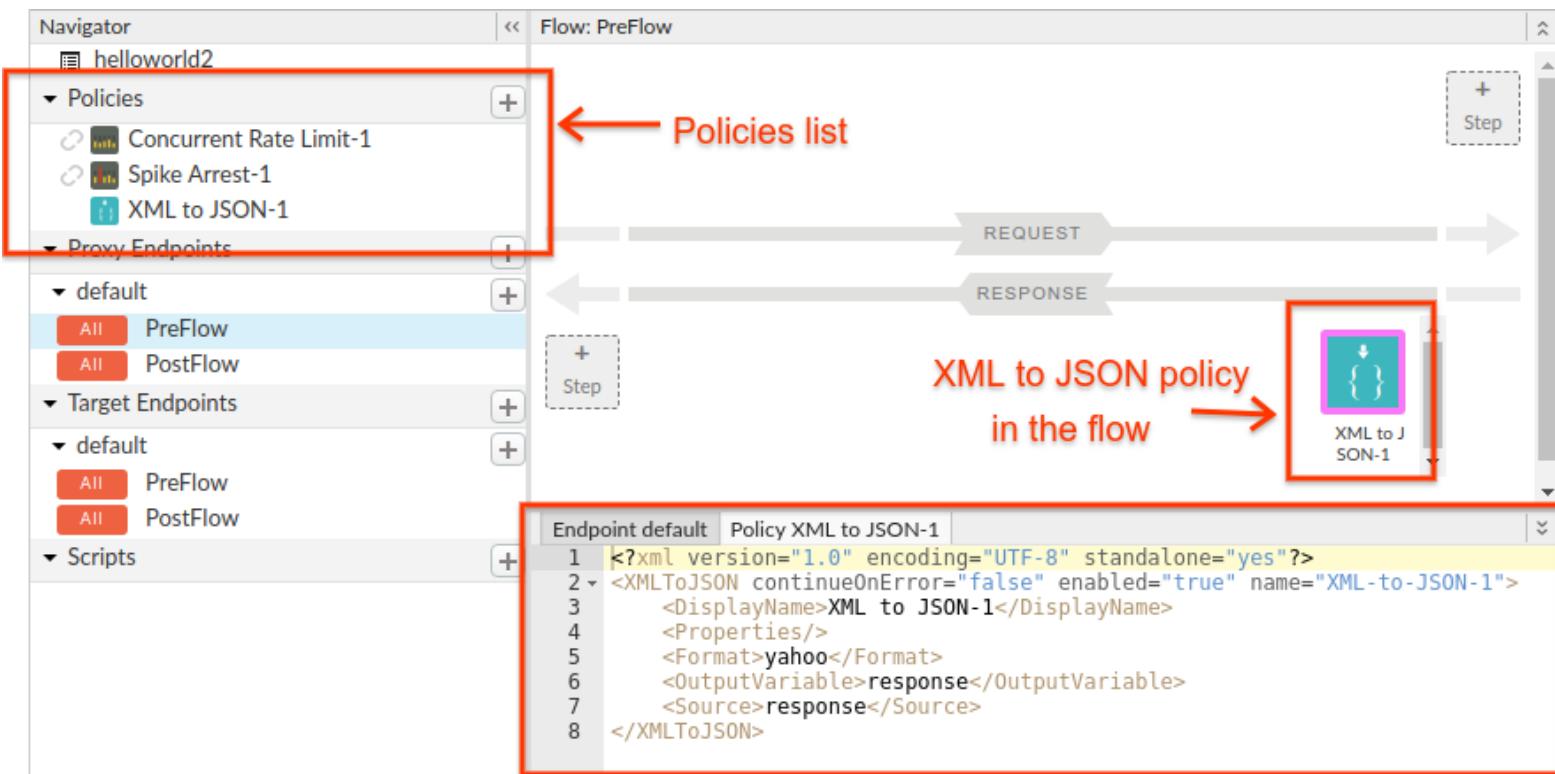
- Edge displays a categorized list of policies in the **Add** dialog box that you can add to your flow:



- Scroll down and select the **XML to JSON** policy in the Mediation category.



- Leave the default names, and click **Add**.
- Edge attaches the new policy to the PreFlow of the response:



Policy XML configuration

- Note that when you click Add, Edge does the following:
 - Adds the new policy under Policies in the Navigator pane.
 - Adds the XML to JSON policy in the Flow pane.
 - Displays the policy's configuration XML in the Code pane.
 - Click Save to save the current revision with your changes.
 - Now try it out! In a terminal window, execute the following curl command:

- curl https://org_name-test.apigee.net/getstarted
- Where:
- org_name is the organization name that Apigee assigned to you when you created your Apigee account.
- -test is the environment. You deployed your new proxy to the "test" environment in Step 2: Create an API proxy.
- /getstarted is the Proxy Base Path.

SOAP Proxy

- 1. <http://ws.cdyne.com/ip2geo/ip2geo.asmx?wsdl>
- 2. create post method instead of GET
- 3. <http://parameswaribala-eval-test.apigee.net/ip2geo/resolveip>
- 4. create post query with raw json message
- 5. {
 - "ipAddress":"209.85.128.0",
 - "licenseKey":0
- }

SOAP Proxy

PB Parameswari Bala parameswaribala-eval ▾

DEVELOP < API Proxies ip2geo Overview 1

Project Save Revision 1 Deployment OVERVIEW DEVELOP TRACE PERFORMANCE

Specs

API Proxies

Shared Flows

Offline Trace

API BaaS

SWITCH TO CLASSIC

Parameswari Bala parameswaribala-eval

Revision 1 Summary

Created: 17 minutes ago, Updated: 17 minutes ago.

Description: IP2Geo

Deployments

Environment	Revision	Status	URL
test	1	●	http://parameswaribala-eval-test.apigee.net/ip2geo [+]

Proxy Endpoints

Name	Base Path	Target Endpoints
default	/ip2geo	default
Endpoint Flow Name	Method	Path / Condition
PreFlow	ALL	n/a
OptionsPreFlight	COND	request.verb == "OPTIONS"
GetOAS	GET	/openapi.json
ResolveIP	POST	/resolveip
unknown-resource	ALL	none
PostFlow	ALL	n/a

Target Endpoints

SOAP Proxy

Builder Team Library

New Tab http://parameswariba × +

No Environment

POST http://parameswaribala-eval-test.apigee.net/ip2geo/resolveip Params Send Save

Authorization Headers (1) Body Pre-request Script Tests Cookies Code

Body (1)

form-data x-www-form-urlencoded raw binary JSON (application/json)

```

1 [
2   "ipAddress": "8.8.4.4",
3   "licenseKey": 0
4 ]
5

```

Body Cookies Headers (14) Tests Status: 200 OK Time: 734 ms Size: 809 B

Pretty Raw Preview JSON

```

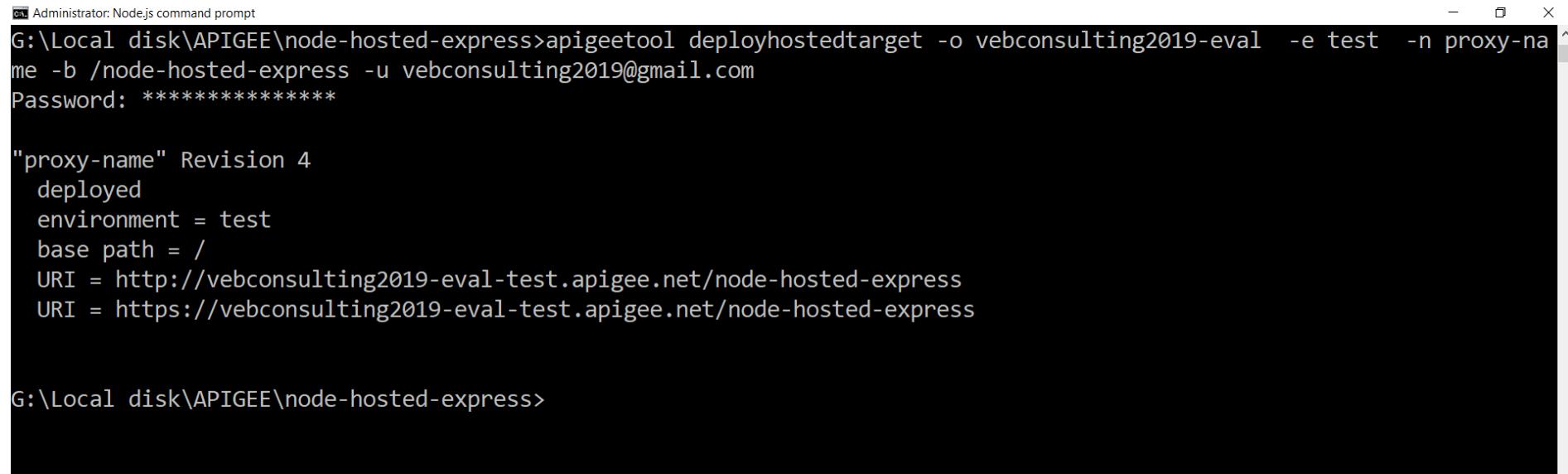
1 [
2   "ResolveIPResponse": {
3     "ResolveIPResult": {
4       "Country": "United States",
5       "Organization": "NULL",
6       "Latitude": 37.75101,
7       "Longitude": -97.822,
8       "AreaCode": 0,
9       "TimeZone": "NULL",
10      "HasDaylightSavings": false,
11      "Certainty": 90,
12      "RegionName": "NULL",
13      "CountryCode": "US"
14    }
15  }
16 ]

```

No Target

Nodejs as Hosted Target in latest

```
apigeetool deployhostedtarget -o vebconsulting2019-eval -e test -n proxy-name -b /node-hosted-express -u vebconsulting2019@gmail.com
```

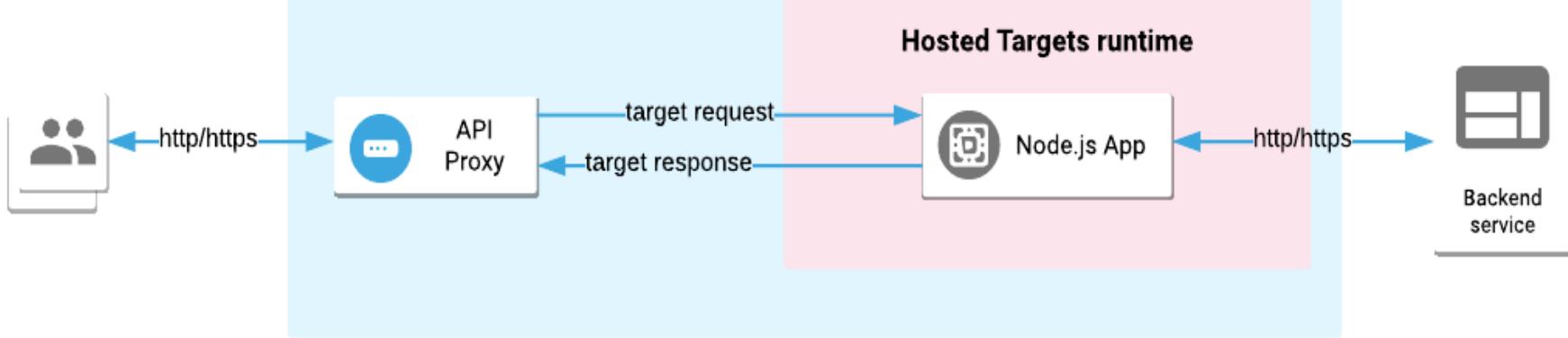


```
G:\Local disk\APIGEE\node-hosted-express>apigeetool deployhostedtarget -o vebconsulting2019-eval -e test -n proxy-name -b /node-hosted-express -u vebconsulting2019@gmail.com
Password: *****

"proxy-name" Revision 4
  deployed
  environment = test
  base path = /
  URI = http://vebconsulting2019-eval-test.apigee.net/node-hosted-express
  URI = https://vebconsulting2019-eval-test.apigee.net/node-hosted-express

G:\Local disk\APIGEE\node-hosted-express>
```

Apigee Edge organization:environment



Nodejs Retired in latest apigee
Following won't work in new version

Nodejs

```
apigeetool deploynodeapp -n myNodeApp -d . -m  
server.js -o myorg -e test -b /myNodeApp -u ntesla -p  
myPassword
```

Nodejs

```
Administrator: Node.js command prompt
environments      -e (required)
header           -H (optional)
help             -h (optional)
import-only      -i (optional)
insecure         -k (optional)
json             -j (optional)
main             -m (optional)
netrc            -N (optional)
organization     -o (required)
password         -p (optional)
preserve-policies -P (optional)
production       (optional)
resolve-modules   -R (optional)
token            -t (required)
upload-modules    -U (optional)
username          -u (optional)
verbose           -V (optional)
virtualhosts     -v (optional)
wait-after-import -W (optional)

F:\apigeenode>apigee tool deploynodeapp -n myNodeApp -d . -m server.js -o parameswaribala-eval -e test -b /myNodeApp -u parameswari.bala@rpsconsulting.in -p Vigneshbala@95!
"myNodeApp" Revision 1
  deployed
  environment = test
  base path = /
  URI = http://parameswaribala-eval-test.apigee.net/myNodeApp
  URI = https://parameswaribala-eval-test.apigee.net/myNodeApp

F:\apigeenode>
```

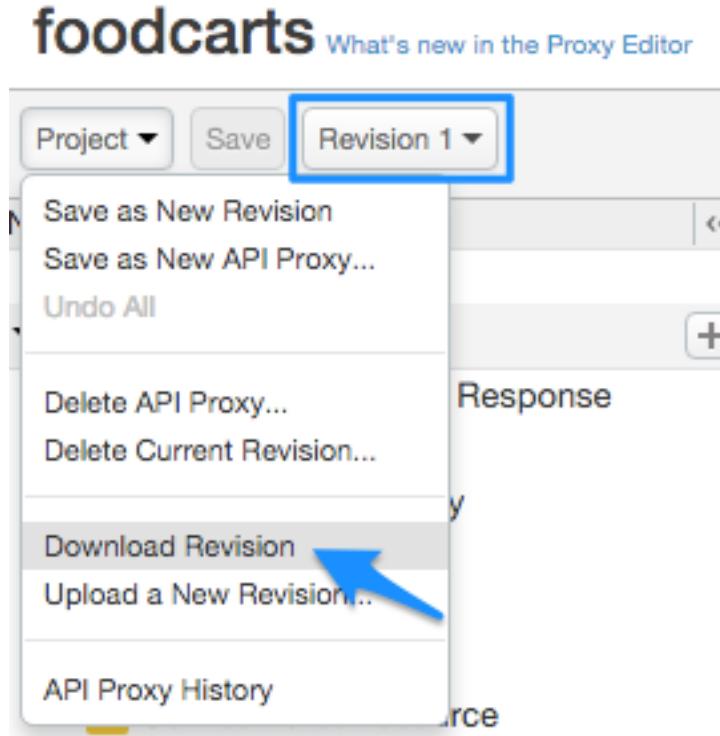


- Reasons to download an API proxy (as a zip file) from Edge:
- You want to add the API proxy to another organization.
- You want to unzip the API proxy to your local system.
This is useful for setting up file-based API proxy development in source control, or for just looking at the file-based version of the resources. The extracted .zip creates the required directory structure for API proxy deployment.

Download API proxies

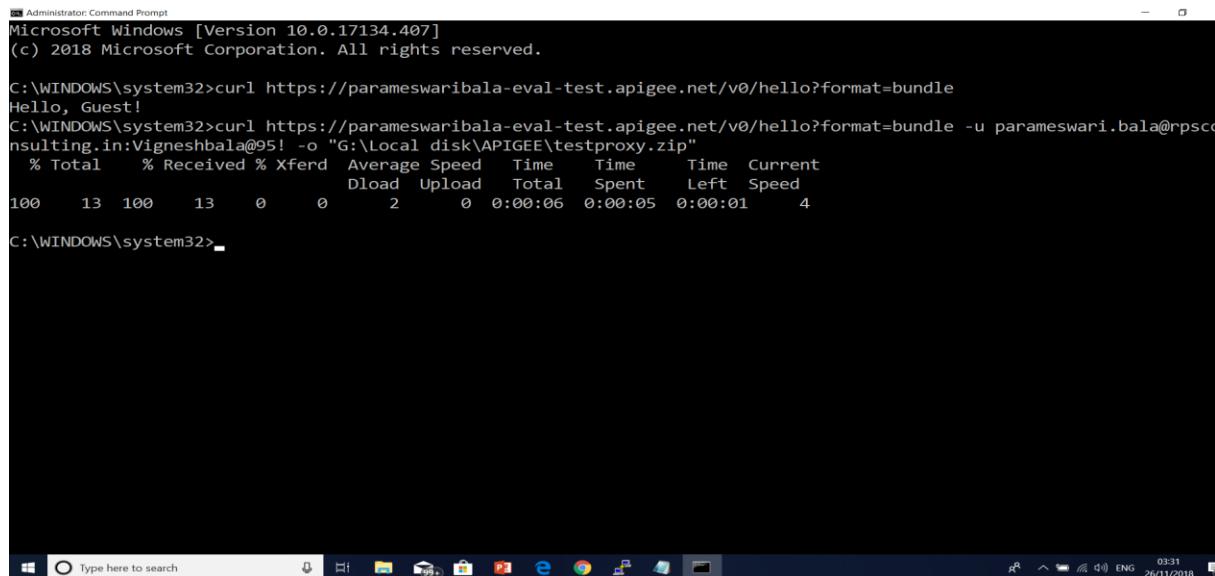


- Go to the API proxy editor Develop tab.
- Select the proxy revision you want to download.
- Select Project > Download Revision.
-



Export API Proxy

- curl https://parameswaribala-eval-test.apigee.net/v0/hello?format=bundle
- -U
parameswari.bala@rpsconsulting.in:Vigneshbala@95!
-o myProxy.zip



```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.17134.407]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>curl https://parameswaribala-eval-test.apigee.net/v0/hello?format=bundle
Hello, Guest!
C:\WINDOWS\system32>curl https://parameswaribala-eval-test.apigee.net/v0/hello?format=bundle -u parameswari.bala@rpsco
nsulting.in:Vigneshbala@95! -o "G:\Local disk\APIGEE\testproxy.zip"
  % Total    % Received % Xferd  Average Speed   Time   Time     Current
          Dload  Upload   Total Spent  Left  Speed
100      13  100      13     0      0       2      0  0:00:06  0:00:05  0:00:01    4
C:\WINDOWS\system32>
```

-
- Create an API proxy that requires an API key.
 - Add a developer and register an app.
 - Call your API with an API key.
 - It's important to protect your API from unauthorized access. One way to do that is with API keys (also called "public keys", "consumer keys" or "app keys").

- When an app makes a request to your API, the app must supply a valid key. At runtime, the Verify API Key policy checks that the supplied API key:
 - Is valid
 - Hasn't been revoked
 - Matches the API key for the API product that exposes the requested resources
 - If the key is valid, the request is allowed. If the key is invalid, the request results in an authorization failure.

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Specs

Describe your services using the
OpenAPI Specification format



API Proxies

Route, transform, and secure your
traffic through the API gateway



API Products

Control how developers consume
your APIs



Portals

Publish APIs and reference docs,
and on-board developers



Learn More

Tutorials, tips, and documentation
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Community

Have questions? Get answers from
other Edge users and Apigueeks

- Click + Proxy.



- In the Build a Proxy wizard, select Reverse proxy (most common), and click Next.
- Configure the proxy as follows:

Secure an API by requiring API keys



In this field	do this
Proxy Name	Enter: helloworld_apikey
Project Base Path	<p>Change to: /helloapikey The Project Base Path is part of the URL used to make requests to the API proxy. Note: For Apigee's recommendations on API versioning, see Versioning in the <i>Web API Design: The Missing Link</i> e-book.</p>
Existing API	<p>Enter: http://mocktarget.apigee.net This defines the target URL that Apigee Edge invokes on a request to the API proxy.</p>
Description	Enter: hello world protected by API key

- Click Next.
- On the Security page:

In this field	do this
Authorization	<ul style="list-style-type: none">•Select the following options:API Key•Publish API Product <p>These options are very handy. They'll automatically add two policies to your API proxy and create an API product needed for generating the API key.</p>

-
- On the Virtual Hosts page, click **Next**.
 - On the Build page, make sure the **test** deployment environment is selected, and click **Build and Deploy**.
 - On the Summary page, you see an acknowledgment that your new API proxy and an API product were created successfully, and that the API proxy was deployed to your test environment.
 - Click **View the helloworld_apikey proxy in the editor** to display the Overview page for the API proxy.

Secure an API by requiring API keys



- View the policies

The screenshot shows the Apigee Studio interface with the following details:

- Project:** helloworld_apikey
- Flow:** PreFlow
- Policies:** Remove Query Param apikey, Verify API Key
- Proxy Endpoints:** default (PreFlow selected)
- Target Endpoints:** default (PreFlow selected)
- Scripts:** Endpoint default (Policy Verify API Key) containing XML code:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<VerifyAPIKey async="false" continueOnError="false" enabled="true" name="verify-api-key">
  <DisplayName>Verify API Key</DisplayName>
  <APIKey ref="request.queryparam.apikey"/>
</VerifyAPIKey>
```

- Property Inspector:** PreFlow (name: PreFlow, Request Step: verify-api-key, Response Step: remove-query-param-apikey)

- Try to call the API
- Now try to call your API proxy:
- `http://{org-name}-test.apigee.net/helloapikey`
- replacing {org-name} with the name of your Edge organization.
- Without the Verify API Key policy, this call would give you the same response as the previous call. But in this case, you should get the following error response:
 - `{"fault":{"faultstring":"Failed to resolve API Key variable request.queryparam.apikey","detail":{"errorcode":"steps.oauth.v2.FailedToResolveAPIKey"}}}`

- About the API product
- An API product in Edge (among other nifty features) generates API keys for developers; or more accurately, for the apps developers register with Edge.
- If you're curious, you can view the API product that was automatically created when your API proxy was generated. Select **Publish > API Products > helloworld_apikey-Product** in the UI.
- Notice that the **Key Approval Type is Automatic**. That means developers get an API key automatically when they register an app, as opposed to you manually approving keys before they're given to developers.

- Add a developer and app to your organization
- Create a developer
- To create a developer:
- Select **Publish > Developers** in the menu.
- Click **+ Developer**.

In this field	enter
First Name	Keyser
Last Name	Soze
Username	keyser
Email	keyser@example.com

- Register an app
- To register a developer app:
- Select **Publish > Apps.**
- Click **+ App.**
- Enter the following in the New Developer App window:

In this field	do this
Name and Display Name	Enter: keyser_app
Developer	Select: Keyser Soze (keyser@example.com)
Callback URL and Notes	Leave blank

-
- Under **Products**, click **+ Product**.
 - Select **helloworld_apikey-Product**.
 - Click **Save**.

- Get the API key
- To get the API key:
 - On the Apps page (Publish > Apps), click **keyser_app**.
 - On the **keyser_app** page, click **Show** in the **Consumer Key** column. Notice that the key is associated with the "helloworld_apikey Product". Click **Hide** to hide the key.

Products

Product	Status	Consumer Key	
helloworld_apikey Product	Approved	0gIN6JhTz0GptggoGfX4X5NnYbaFwleG	 Hide

- Call the API with a key
- `http://{org-name}-test.apigee.net/helloapikey?apikey=apikey`

Products

Product	Status	Consumer Key	
helloworld_apikey Product	Approved	0gIN6JhTz0GptggoGfX4X5NnYbaFwleG	 Hide

- Best practice: Passing the key in the HTTP header
- Edit the API proxy. Select Develop > API Proxies > helloworld_apikey, and go to the Develop view.
- Select the Verify API Key policy, and modify the policy XML to tell the policy to look in the header rather than in the queryparam:
 - <APIKey ref="request.header.x-apikey"/>
- Save the API proxy to deploy the change.
- Make the following API call using cURL to pass the API key as a header called x-apikey. Don't forget to substitute your organization name.

```
curl -v -H "x-apikey: {api_key_goes_here}" http://{org-name}-test.apigee.net/helloapikey
```

Secure an API by requiring API keys



```
C:\Administrator: RabbitMQ Command Prompt (sbin dir)
C:\WINDOWS\system32>curl -v -H "x-apikey:m427t01fbeyWYy1f6IX1ZMDaiurGHqTV" https://parameswaribala-eval-test.apigee.net/fiservphotos
```

```
"thumbnailUrl": "https://via.placeholder.com/150/de1377"
},
{
  "albumId": 100,
  "id": 4993,
  "title": "est qui qui id fugit",
  "url": "https://via.placeholder.com/600/c96241",
  "thumbnailUrl": "https://via.placeholder.com/150/c96241"
},
{
  "albumId": 100,
  "id": 4994,
  "title": "in vel error quas officiis repellendus commodi",
  "url": "https://via.placeholder.com/600/6ffa50",
  "thumbnailUrl": "https://via.placeholder.com/150/6ffa50"
},
{
  "albumId": 100,
  "id": 4995,
  "title": "sequi sunt enim aut at",
  "url": "https://via.placeholder.com/600/51cc"
```

Secure an API by requiring API keys



Postman

File Edit View Collection History Help

Runner Import +

Builder Team Library

No Environment

Filter

History Collections

Today

GET https://parameswaribala-eval-test.apigee.net/basicauth

GET https://parameswaribala-eval-test.apigee.net/basicauth?apikey=MKwVfPhKxIE0KkhVk2ZrpSGJbdEnVsyz

GET http://parameswaribala-eval-prod.apigee.net/pivotal_poxy

GET http://parameswaribala-eval-prod.apigee.net/pivotal_poxy

November 24

POST http://localhost:6060/onBoarding/Suman

POST http://localhost:6060/onBoarding/Shyam

POST http://localhost:6060/onBoarding/Krishnan

POST http://localhost:6060/onBoarding/Krishnan

POST http://localhost:6060/onBoarding

POST http://localhost:6060/onBoarding

November 23

POST http://localhost:6060/onBoarding

POST http://localhost:7070/add

POST http://localhost:7070/add

GET https://parameswaribala-eval-test.apigee.net/basicauth

Headers (2)

Authorization

apikey MKwVfPhKxIE0KkhVk2ZrpSGJbdEnVsyz

Authorization Basic dXNlcjE6MTIz

key value

Body

Cookies

Headers (19)

Tests

Pretty Raw Preview JSON

```
1 > [{}]
2 > {
3   "id": 1,
4   "name": "Leanne Graham",
5   "username": "Bret",
6   "email": "Sincere@april.biz",
7   "address": {
8     "street": "Kulas Light",
9     "suite": "Apt. 556",
10    "city": "Gwenborough",
11    "zipcode": "92998-3874",
12    "geo": {
13      "lat": "-37.3159",
14      "lng": "81.1496"
15    }
16  },
17  "phone": "1-770-736-8031 x56442",
18  "website": "hildegard.org",
19  "company": {
20    "name": "Romaguera-Crona",
21    "catchPhrase": "Multi-layered client-server neural-net",
22    "bs": "harness real-time e-markets"
23  },
24  {
25    "id": 2,
26    "name": "Ervin Howell",
27    "username": "Antonette",
28    "email": "Shanna@melissa.tv",
29    "address": {
30      "street": "Victor Plains",
31      "suite": "Suite 879",
32      "city": "Wisokyburgh",
33      "zipcode": "90566-7771",
34      "geo": {
35        "lat": "-43.9509",
36        "lng": "-34.4618"
37      }
38    },
39    "phone": "010-692-6593 x09125",
40    "website": "anastasia.net",
41    "company": {}
```

R E W D 20:27 26/11/2018

Download and deploy a token-generating API proxy



- In this step, you'll create the API proxy that generates an OAuth access token from a consumer key and consumer secret sent in an API call.
- Apigee provides a sample API proxy that does this. You'll download and deploy the proxy now, then use it later in the tutorial. (You could build this API proxy easily yourself. This download and deploy step is for convenience and to show you how easy it is to share proxies that have already been created.)
- [Download the 'oauth' sample API proxy](#) ZIP file to any directory on your file system.
- <https://docs.apigee.com/api-platform/tutorials/secure-calls-your-api-through-oauth-20-client-credentials>
- Go to <https://enterprise.apigee.com> and log in. This is the Edge management UI.
- Click **APIs** in the top menu.

Download and deploy a token-generating API proxy



- Click the add (+) API Proxy button.
- In the Build a Proxy wizard, select Proxy bundle and click Next.
- Choose the oauth.zip file you downloaded, and click Next.
- Click Build.
- After the build completes, click the oauth link to view the new proxy in the API proxy editor.
- On the API Proxy editor Overview page, click the Deployment drop-down and select test. This is the test environment in your organization.

View the OAuth flow and policy



- Let's take a closer look at what the API proxy contains.
- In the API proxy editor, click the Develop tab. In the left Navigator pane, you'll see two policies. You'll also see two POST flows in the Proxy Endpoints section.
- Click AccessTokenClientCredential under Proxy Endpoints.

View the OAuth flow and policy



oauth What's new in the Proxy Editor OVERVIEW

Project Save Revision 1 Tools Deployment Help for Selected Flow

Navigator

- oauth
- Policies
 - GenerateAccessTokenClient
 - RefreshAccessToken
- Proxy Endpoints
 - default
 - POST RefreshAccessToken
 - POST AccessTokenClientCredential
- Target Endpoints
 - default
- Scripts

Flow: AccessTokenClientCredential

REQUEST →
← RESPONSE

Code default

```
<Flow name="AccessTokenClientCredential">
  <Description/>
  <Request>
    <Step>
      <Name>GenerateAccessTokenClient</Name>
    </Step>
  </Request>
  <Response/>
  <Condition>(proxy.pathsuffix MatchesPath "/accesstoken") and (request.verb = "POST")</Condition>
</Flow>
```

View the OAuth flow and policy



Now let's look at the policy the conditional flow will trigger. Click the GenerateAccessTokenClient policy icon in the flow diagram.

oauth What's new in the Proxy Editor

Project ▾ Save Revision 1 ▾ Tools ▾

Navigator | << Flow: AccessTokenClientCrede

Policies

- GenerateAccessTokenClient
- RefreshAccessToken

Proxy Endpoints

- POST RefreshAccessToken
- POST AccessTokenClientCredential

Target Endpoints

- default

Scripts

Flow: AccessTokenClientCrede

Code default

```
1  <?xml version="1.
2   <ProxyEndpoint nc
3     <Description>
4     <FaultRules/>
5     <Flows>
6       <Flow na
7         <Des<
8         <Reql
```

The screenshot shows the Apigee Proxy Editor interface for an 'oauth' project. The top navigation bar includes 'Project', 'Save', 'Revision 1', and 'Tools'. On the left, the 'Navigator' pane lists 'oauth' and 'Policies' (with 'GenerateAccessTokenClient' and 'RefreshAccessToken' listed). The main area shows 'Proxy Endpoints' with 'RefreshAccessToken' and 'AccessTokenClientCredential' (selected) listed under 'POST' methods. Below that is a 'Target Endpoints' section for 'default'. At the bottom is a 'Scripts' section. To the right, the 'Flow: AccessTokenClientCrede' is displayed with its XML code. A blue arrow points to the 'GenerateAccessTokenClient' policy icon in the 'Policies' list.

View the OAuth flow and policy



- <OAuthV2 name="GenerateAccessTokenClient">
 <!-- This policy generates an OAuth 2.0 access token using the
 client_credentials grant type -->
 <Operation>GenerateAccessToken</Operation>
 <!-- This is in milliseconds, so expire in an hour -->
 <ExpiresIn>3600000</ExpiresIn>
 <SupportedGrantTypes>
 <!-- This part is very important: most real OAuth 2.0 apps will want
 to use other
 grant types. In this case it is important to NOT include the
 "client_credentials"
 type because it allows a client to get access to a token with no
 user authentication -->
 <GrantType>client_credentials</GrantType>
 </SupportedGrantTypes>
 <GrantType>request.queryparam.grant_type</GrantType>
 <GenerateResponse/>
</OAuthV2>

Create the OAuth-protected API proxy



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Have questions? Get answers from
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- Click + Proxy.



- In the Build a Proxy wizard, select Reverse proxy (most common), and click Next.
- Configure the proxy as follows:

Create the OAuth-protected API proxy



In this field	do this
Proxy Name	Enter: helloworld_apikey
Project Base Path	<p>Change to: /helloapikey The Project Base Path is part of the URL used to make requests to the API proxy. Note: For Apigee's recommendations on API versioning, see Versioning in the <i>Web API Design: The Missing Link</i> e-book.</p>
Existing API	<p>Enter: http://mocktarget.apigee.net This defines the target URL that Apigee Edge invokes on a request to the API proxy.</p>
Description	Enter: hello world protected by API key

- Click Next.
- On the Security page:

In this field	do this
Authorization	<ul style="list-style-type: none">•Select:OAuth 2.0•Publish API Product <p>These options are very handy. They'll automatically add two policies to your API proxy and create an API product.</p>

- On the Virtual Hosts page, click **Next**.
- On the Build page, make sure the **test** environment is selected, and click **Build and Deploy**.
- On the Summary page, you see an acknowledgment that your new API proxy and an API product were created successfully, and that the API proxy was deployed to your test environment.
- Click **View the helloworld_oauth2 proxy in the editor** to display the Overview page for the API proxy.
Notice that this time the API proxy is automatically deployed. Click the Deployment drop-down to make sure there's a green deployment dot next to the "test" environment.

View the Policies

- In the API proxy editor, click the Develop tab. You'll see that two policies have been added to the request flow of the API proxy:
- Verify OAuth v2.0 Access Token – Checks the API call to make sure a valid OAuth token is present.
- Remove Header Authorization – An Assign Message policy that removes the access token after it's checked, so that it doesn't get passed to the target service. (If the target service needed the OAuth access token, you wouldn't use this policy).
- Click the Verify OAuth v2.0 Access Token icon in the flow view and look at the XML below it in the code pane.

View the Policies

helloworld_oauth2 What's new in the Proxy Editor

Project ▾ Save Revision 1 ▾ Tools ▾ Deployment ▾

Navigator

- helloworld_oauth2
- Policies
 - Remove Header Authorization
 - Verify OAuth v2.0 Access Token
- Proxy Endpoints
 - default
 - All PreFlow
 - All PostFlow
- Target Endpoints
 - default
 - All PreFlow
 - All PostFlow
- Scripts

Flow: PreFlow

The screenshot shows the Apigee Proxy Editor interface. On the left, the Navigator pane is open, displaying the project structure. In the center, the 'Flow: PreFlow' editor is shown. A blue arrow points to the 'Verify OAuth v2.0 Access Token' policy icon, which is highlighted with a pink border. Below the policy icons, there are REQUEST and RESPONSE arrows. At the bottom, a code editor window displays the XML configuration for the 'Verify OAuth v2.0 Access Token' policy, with the 'VerifyAccessToken' operation highlighted.

```
Endpoint default Policy Verify OAuth v2.0 Access Token
1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <OAuthV2 async="false" continueOnError="false" enabled="true">
3   <DisplayName>Verify OAuth v2.0 Access Token</DisplayName>
4   <Operation>VerifyAccessToken</Operation>
5 </OAuthV2>
```

- Add a developer and app to your organization
- Create a developer
- To create a developer:
- Select **Publish > Developers** in the menu.
- Click **+ Developer**.

In this field	enter
First Name	Keyser
Last Name	Soze
Username	keyser
Email	keyser@example.com

- Register an app
- To register a developer app:
- Select **Publish > Apps.**
- Click **+ App.**
- Enter the following in the New Developer App window:

In this field	do this
Name and Display Name	Enter: keyser_app
Developer	Select: Keyser Soze (keyser@example.com)
Callback URL and Notes	Leave blank

-
- Under **Products**, click **+ Product**.
 - Select **helloworld_apikey-Product**.
 - Click **Save**.

Create the OAuth-protected API proxy



- Get the consumer key and consumer secret
- Now you'll get the consumer key and consumer secret that will be exchanged for an OAuth access token.
- On the Developer Apps page (Publish > Developer Apps), click **nigel_app**.
- On the nigel_app page, click **Show** in the **Consumer Key** and **Consumer Secret** columns. Notice that the key/secret are associated with the "helloworld_oauth2 Product" that was automatically created earlier.

Products

Product	Status	Consumer Key	Consumer Secret
helloworld_oauth2 Product	Approved	xNnREu1DNGfiwzQZ5HUN8IAUwZSW1GZW	3Hx1GEqSNPfcOt9o



Select and copy the Consumer Key and Consumer Secret. **Paste them in a temporary text file.** You'll use them in a later step, where you call the API proxy that will exchange these credentials for an OAuth access token.

Secure an API with OAuth | Apic x parmeswaribala-eval - Apigee x https://jsonplaceholder.typicode.com x +

Paused

https://apigee.com/platform/parmeswaribala-eval/apps/5b07bc5d-d1dd-4b7c-af19-b0e8faf231bb

Apps Insert title here Empire New Tab How to use Assertion Browser Automation node.js - How can I fi Freelancer-dev-8104 Courses

Parameswari Bala
parmeswaribala-eval

PUBLISH

Developer Apps > userapp

Edit Delete

Developer App Details

Name	userapp
Display Name	userapp
Registered	Nov 26 2018 9:08 PM
Developer	Anoop Kumar (anoop@gmail.com)
App Status	Approved
Callback URL	
Notes	

Credentials

Issued	Expiry	Consumer Key	Consumer Secret	Status
Nov 26 2018 9:08 PM just now	Never	7gz7mzrTJ0MF3T22xkff1UA5UXYvwDzP	Hide	Vbg91OkqsCh4WJJn
		Product		Approved
		oauth2demo-Product		Approved

Custom Attributes

Name	Value

SWITCH TO CLASSIC

apigee



- Get an OAuth access token
- Now we get to the big payoff. You're about to use the Consumer Key and Consumer Secret you copied and pasted into a text file and exchange them for an OAuth access token. You're now going to make an API call to the API sample proxy you imported, oauth, which will generate an API access token.
- Using that key and secret, make the following cURL call (note that the protocol is https), substituting your Edge organization name, your consumer key, and your consumer secret where indicated (be sure to remove the curly braces):


```
curl -X POST -H "Content-Type: application/x-www-form-urlencoded" \
https://{{org-name}}-
test.apigee.net/oauth/client_credential/accesstoken?grant_type=client_
credentials \
-d "client_id={{consumer-key}}&client_secret={{consumer-secret}}"
```

Administrator: Command Prompt

```
C:\WINDOWS\system32>curl -X POST -H "Content-Type: application/x-www-form-urlencoded" http://parameswaribala-eval-test.apigee.net/oauth/client_credential/accesstoken?grant_type=client_credentials -d "client_id=7gz7mzrTJ0MF3T22xkff1UA5UXYvwDzP&client_secret=Vbg910kqsCh4NJJn"
{
  "refresh_token_expires_in" : "0",
  "api_product_list" : "[oauth2demo-Product]",
  "api_product_list_json" : [ "oauth2demo-Product" ],
  "organization_name" : "parameswaribala-eval",
  "developer.email" : "anoop@gmail.com",
  "token_type" : "BearerToken",
  "issued_at" : "1543247316506",
  "client_id" : "7gz7mzrTJ0MF3T22xkff1UA5UXYvwDzP",
  "access_token" : "gRhN22vNU93wwEs9A921lZMLd8WE",
  "application_name" : "5b07bc5d-d1dd-4b7c-af19-b0e8faf231bb",
  "scope" : "",
  "expires_in" : "3599",
  "refresh_count" : "0",
  "status" : "approved"
}
C:\WINDOWS\system32>
```

- Call the API with an access token (success!)
- Now that you have an access token, you can use it to call the API proxy. Make the following cURL call. Substitute your Edge organization name and the access token (remove the curly braces).

```
curl https://{{org-name}}-test.apigee.net/hellooauth2 -H "Authorization: Bearer {{access-token}}"
```

```
Administrator: Command Prompt
refresh_count" : "0",
"status" : "approved"
}
C:\WINDOWS\system32>curl https://parameswaribala-eval-test.apigee.net/oauth2demo -H "Authorization: Bearer gRhN22vNU93wwEs9A921lZMLd8WE"
[
{
  "id": 1,
  "name": "Leanne Graham",
  "username": "Bret",
  "email": "Sincere@april.biz",
  "address": {
    "street": "Kulas Light",
    "suite": "Apt. 556",
    "city": "Gwenborough",
    "zipcode": "92998-3874",
    "geo": {
      "lat": "-37.3159",
      "lng": "81.1496"
    }
  },
  "phone": "1-770-736-8031 x56442",
```

Authorization should be blank

The screenshot shows the Postman application interface. In the center, there is a request builder for a POST method to the URL https://parameswaribala-eval-test.apigee.net/oauth/client_credential/accesstoken?grant_type=client_credentials. The 'Authorization' tab is selected, showing 'No Auth' as the type. The 'Body' tab is also selected, showing a JSON response. On the left, a list of recent requests is visible, with the current request highlighted. The bottom of the screen shows the Windows taskbar with various pinned icons and the system tray.

```
{ "refresh_token_expires_in": "0", "api_product_list": "[oauth2demo-Product]", "api_product_list_json": "[ oauth2demo-Product ]", "organization_name": "parameswaribala-eval", "developer_email": "anoop@gmail.com", "token_type": "BearerToken", "issued_at": "1548225271479", "client_id": "7gz7mzrTJ0MF3T22xkf1UA5UXYvwDzP", "access_token": "FwZljt8pdJspugUJHxk9Nzc1bbE7", "application_name": "5b07bc5d-d1dd-4b7caf19-b0e8faf231bb", "scope": "", "expires_in": "3599", "refresh_count": "0", "status": "approved" }
```

Postman

File Edit View Collection History Help

Runner Import +

Builder Team Library

IN SYNC eswaribala

No Environment

Send Save

Filter

History Collections

Save to collection

Today

POST https://parameswaribala-eval-test.apigee.net/oauth/client_credential/accesstoken?grant_type=client_credentials

POST https://parameswaribala-eval-test.apigee.net/fiservphoton?apikey=m42701fbebWYy1f6XIZMDaiurGHqIV

GET https://parameswaribala-eval-test.apigee.net/v1/basicauthdemo?username=hello&password=test&apikey=M

Authorization Headers Body Pre-request Script Tests

Body

client_id
client_secret

7gz7mzrTJ0MF3T22xkff1UA5UXYvwDzP
Vbg91OkqsCh4WJjn

key

Status: 200 OK Time: 391 ms Size: 683 B

Pretty Raw Preview

```
{"refresh_token_expires_in": "0", "api_product_list": "[\"oauth2demo-Product\"]", "api_product_list_json": [ "oauth2demo-Product" ], "organization_name": "parameswaribala-eval", "developer_email": "anoop@gmail.com", "token_type": "BearerToken", "issued_at": "1548225271479", "client_id": "7gz7mzrTJ0MF3T22xkff1UA5UXYvwDzP", "access_token": "FwZ1jt8pdJspugUJHxk9Nzc1bbE7", "application_name": "5b07bc5d-d1dd-4b7caf19-b0e8faf231bb", "scope": "", "expires_in": "3599", "refresh_count": "0", "status": "approved" }
```

Type here to search

12:04 23/01/2019

API Tester

apigee

Click to add or remove steps Collapse / Expand

Request ▾ Step Name ▾

POST https://parameswaribala-eval-test.apigee.net/oauth/client_create

Post Data

1
&client_id=xUSmbpVAn5biDsfGvXVPQSAWLfHmgAuc
&client_secret=G23YGbbRM0PH6F5U

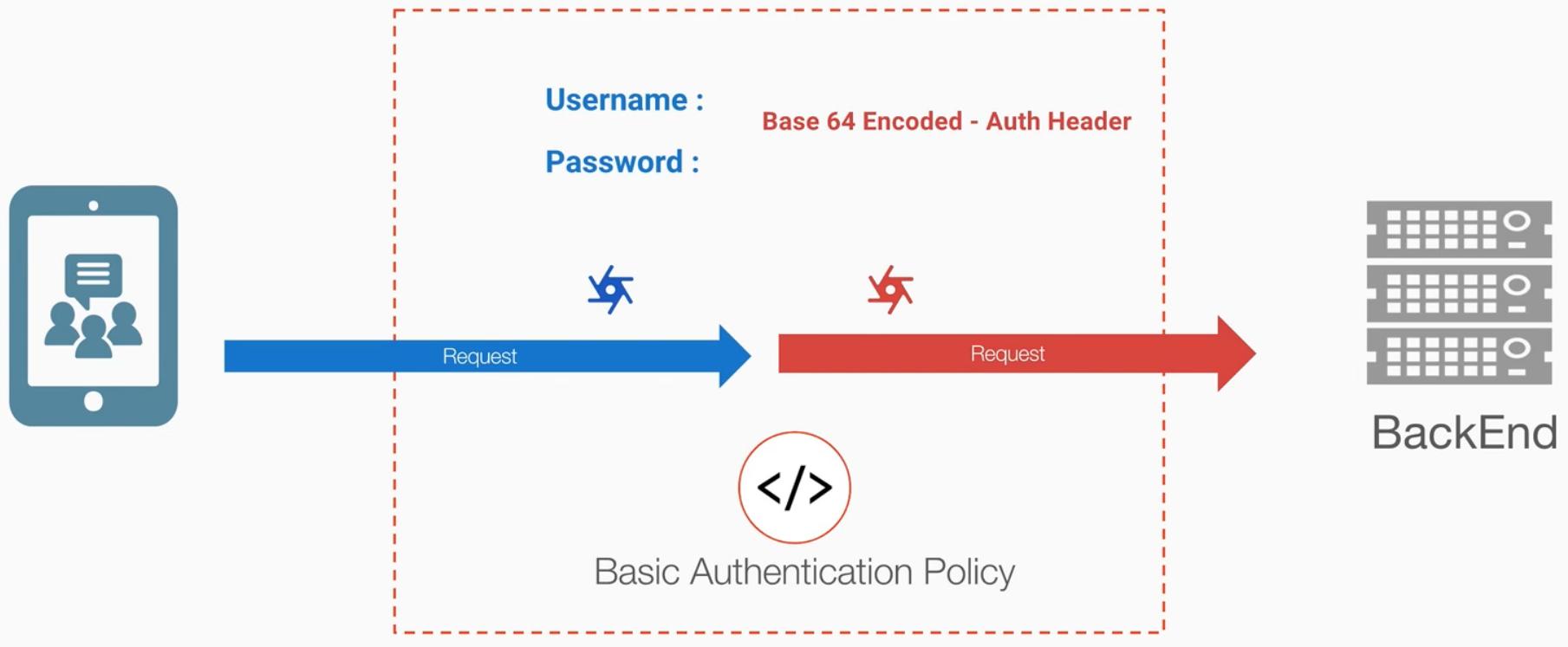
Headers
+ Add Request Header

+ Add Step



- Enables you to use lightweight Basic Authentication for last-mile security.
- The policy takes a username and password, Base64 encodes them, and writes the resulting value to a variable.
- The resulting value is in the form Basic Base64EncodedString.
- You typically write this value to an HTTP header, such as the Authorization header.
- The policy also lets you decode credentials stored in a Base64 encoded string into a username and password.

Apigee Edge



Basic Authentication policy



Screenshot of the Apigee Platform interface showing the configuration of a Basic Authentication policy.

The browser title bar shows "BasicAuthentication policy | Apigee" and "parameswaribala-eval - Apigee". The URL is "https://enterprise.apigee.com/platform/parameswaribala-eval/proxies/basicauthdemo/develop/1".

The Apigee navigation bar includes "Dashboard", "APIs", "Publish", "Analytics", "Admin", "Help", "Try New Edge", "Parameswari.bala@rp...", and "API Management".

The main workspace displays the "basicauthdemo" proxy editor. The left sidebar lists "Projects" (basicauthdemo), "Policies" (Add CORS, Basic Authentication-1), "Proxy Endpoints" (default, PreFlow, PostFlow), "Target Endpoints" (default, PreFlow, PostFlow), and "Scripts".

The central area shows the "Flow: PreFlow" diagram with a shield icon representing the "Basic Authentication-1" policy. A "REQUEST" message flows through the policy step. The "Property Inspector" panel on the right shows the policy details:

PreFlow	name	PreFlow
Request	Step	
Name	Basic-Authentication-1	
Response		

The code editor shows the XML configuration for the "Basic Authentication-1" policy:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<BasicAuthentication async="false" continueOnError="false" enabled="true" name="Basic-Authentication-1">
    <DisplayName>Basic Authentication-1</DisplayName>
    <Operation>Encode</Operation>
    <IgnoreUnresolvedVariables>false</IgnoreUnresolvedVariables>
    <User ref="request.queryparam.username"/>
    <Password ref="request.queryparam.password"/>
    <AssignTo createNew="false">request.header.Authorization</AssignTo>
</BasicAuthentication>
```

The bottom status bar indicates "Deployed to test".

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Basic Authentication Policy

Screenshot of a browser window showing a JSON configuration for a Basic Authentication policy.

The browser tabs include:

- OYO (@oyorooms) ×
- No.1 Tamil website ×
- parameswaribala-e ×
- https://parameswa ×
- https://parameswa ×
- Base64 Decode an ×
- BasicAuthenticatio ×
- httpbin.org/get ×
- + Paused

The JSON configuration is as follows:

```
{  
  "args": {  
    "password": "test",  
    "username": "hello"  
  },  
  "headers": {  
    "Accept": "text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8",  
    "Accept-Encoding": "gzip, deflate, br",  
    "Accept-Language": "en-IN,en-GB;q=0.9,en-US;q=0.8,en;q=0.7,ta;q=0.6",  
    "Authorization": "Basic aGVsbG86dGVzdA==",  
    "Connection": "close",  
    "Host": "httpbin.org",  
    "Upgrade-Insecure-Requests": "1",  
    "User-Agent": "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/70.0.3538.102 Safari/537.36"  
  },  
  "origin": "125.23.8.42, 104.198.35.174",  
  "url": "http://httpbin.org/get?username=hello&password=test"  
}
```

The browser taskbar shows various pinned icons and the system tray indicates the date and time as 04:04 on 27/11/2018.

Basic Authentication Policy

The screenshot shows the Apigee API Management interface. The top navigation bar includes links for apigee, Dashboard, APIs, Publish, Analytics, Admin, Help, Try New Edge, and API Management. The user is Parameswari bala@rp... with a notification icon. The organization is parameswaribala-eval.

The main page displays the 'basicauthdemo' API proxy. The 'OVERVIEW' tab is selected. The 'Send Requests' section shows a single transaction: a GET request to https://parameswaribala-eval-test.apigee.net/v1/basicauthdemo?username=hello&p... with a status of 200 and a duration of 90 ms. The 'Transaction Map' section shows a flow from a mobile device icon through various policy and gateway components to a final step. The 'Phase Details' section shows the request body and headers. The 'View Options' sidebar contains settings for Transaction Map and Phase Details.

Basic Authentication Request Details:

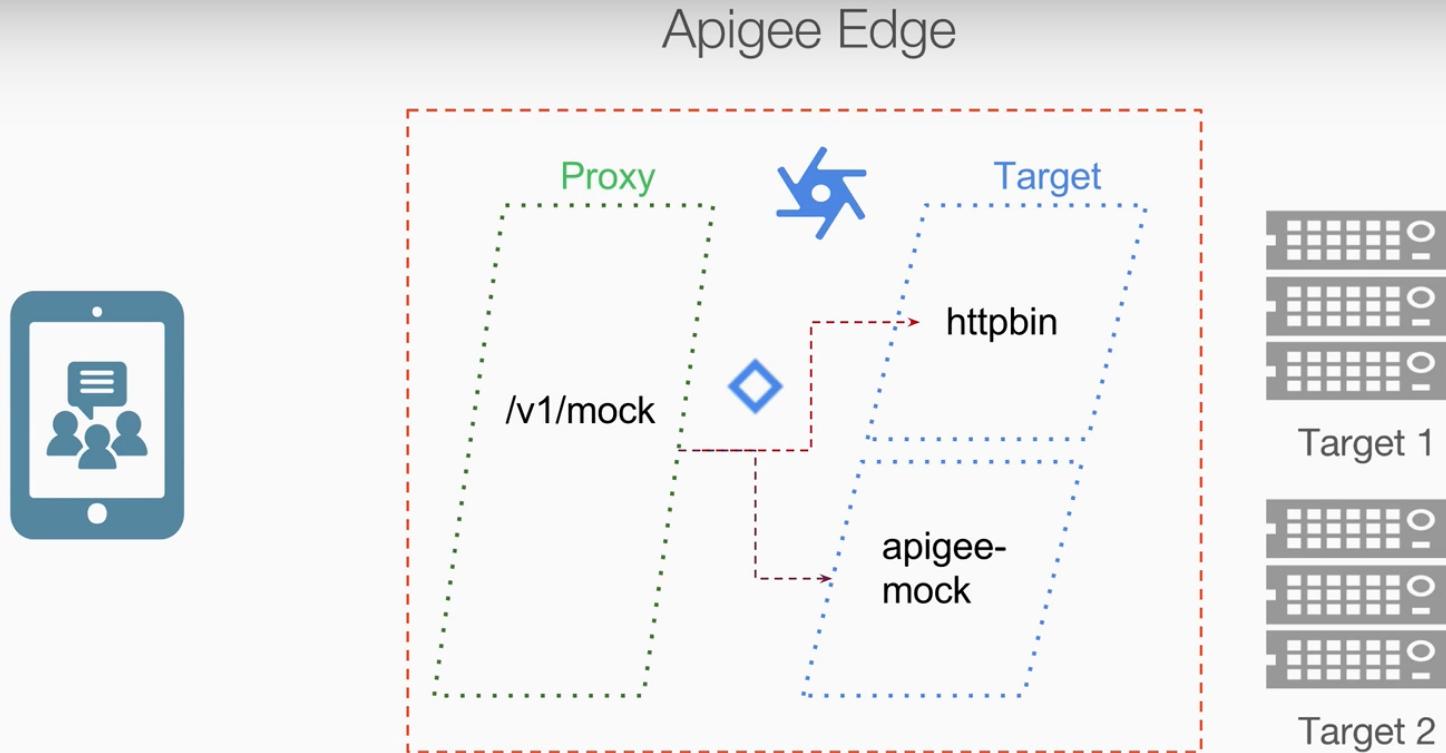
```
password : "secret",
"username": "hello"
},
"headers": {
"Accept": "text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8",
"Accept-Encoding": "gzip, deflate, br",
"Accept-Language": "en-IN,en-GB;q=0.9,en-US;q=0.8,en;q=0.7,tz;q=0.6",
"Authorization": "Basic aGVsbG86dGVzdA==",
"Cache-Control": "max-age=0",
"Connection": "close",
"Host": "httpbin.org"
```

Output from all Transactions

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04:07

Multiple Endpoints using Routes



MultipleRouting Rule

```
<RouteRule name="users">
<Condition>(request.queryparam.target =
"users")</Condition>
<TargetEndpoint>TargetEndpoint-1</TargetEndpoint>
</RouteRule>
```

Multiple Endpoints using Routes

Screenshot of the Apigee Edge platform showing a trace session for an API proxy named "multipleendpointproxy".

The trace session details:

- Deployment to Trace: Environment test, Revision 1
- Remaining Time: 09:20
- Send Requests: http://vебconsulting2019-eval-test.apigee.net/multipleendpointproxy?target=users
- Status: 200

The Transaction Map shows two transactions:

- Transaction 2: Status 200, Method GET, URI /multipleendpointproxy?target=users, Elapsed 241 ms.
- Transaction 1: Status 200, Method GET, URI /multipleendpointproxy?target=users, Elapsed 155 ms.

The Phase Details table includes the following information:

apiproxy.basename	/
apiproxy.name	multipleendpointproxy
apiproxy.qualifiedname	multipleendpointproxy_1
apiproxy.revision	1
environment.name	test
environment.orgname	vебconsulting2019-eval
environment.qualifiedname	vебconsulting2019-eval_test
organization.name	vебconsulting2019-eval
proxy.basename	/multipleendpointproxy
proxy.client.ip	13.231.9.53
proxy.name	default

View Options:

- Transaction Map:
 - Show Disabled Policies (none)
 - Show Skipped Phases (1)
 - Show All FlowInfos (11)
- Phase Details:
 - Automatically Compare Selected Phase
 - Show Variables
 - Show Properties

Output from all Transactions

System tray icons: Windows, Search, Task View, File Explorer, Chrome, Edge, Notepad, Mail, Battery, Signal, Volume, ENG, 08:08, 27/11/2019, 6

Multiple Endpoints using Routes

[multipletargetrouting](#) What's new in the Proxy Editor

Deployment to Trace Environment test, Revision 1 ▾ Stop Trace Session Remaining Time: 09:38 Download Trace Session

Transactions	Status	Method	URI	Elapsed	Filters
1 200	GET	/multipletargetrouti... target=photos		186 ms	

Send Requests

Method URL Status

GET http://parameswaribala-eval-test.apigee.net/multipletargetrouting?target=photos Send 200

Transaction Map

Phase Details

```

        url : "https://via.placeholder.com/600/92c052",
        "thumbnailUrl": "https://via.placeholder.com/150/92c052"
    },
    {
        "albumId": 1,
        "id": 2,
        "title": "reprehenderit est deserunt velit ipsam",
        "url": "https://via.placeholder.com/600/771796",
        "thumbnailUrl": "https://via.placeholder.com/150/771796"
    },
    {
        "albumId": 1,
        "id": 2,
        "title": "reprehenderit est deserunt velit ipsam",
        "url": "https://via.placeholder.com/600/771796",
        "thumbnailUrl": "https://via.placeholder.com/150/771796"
    }
  
```

View Options

Transaction Map

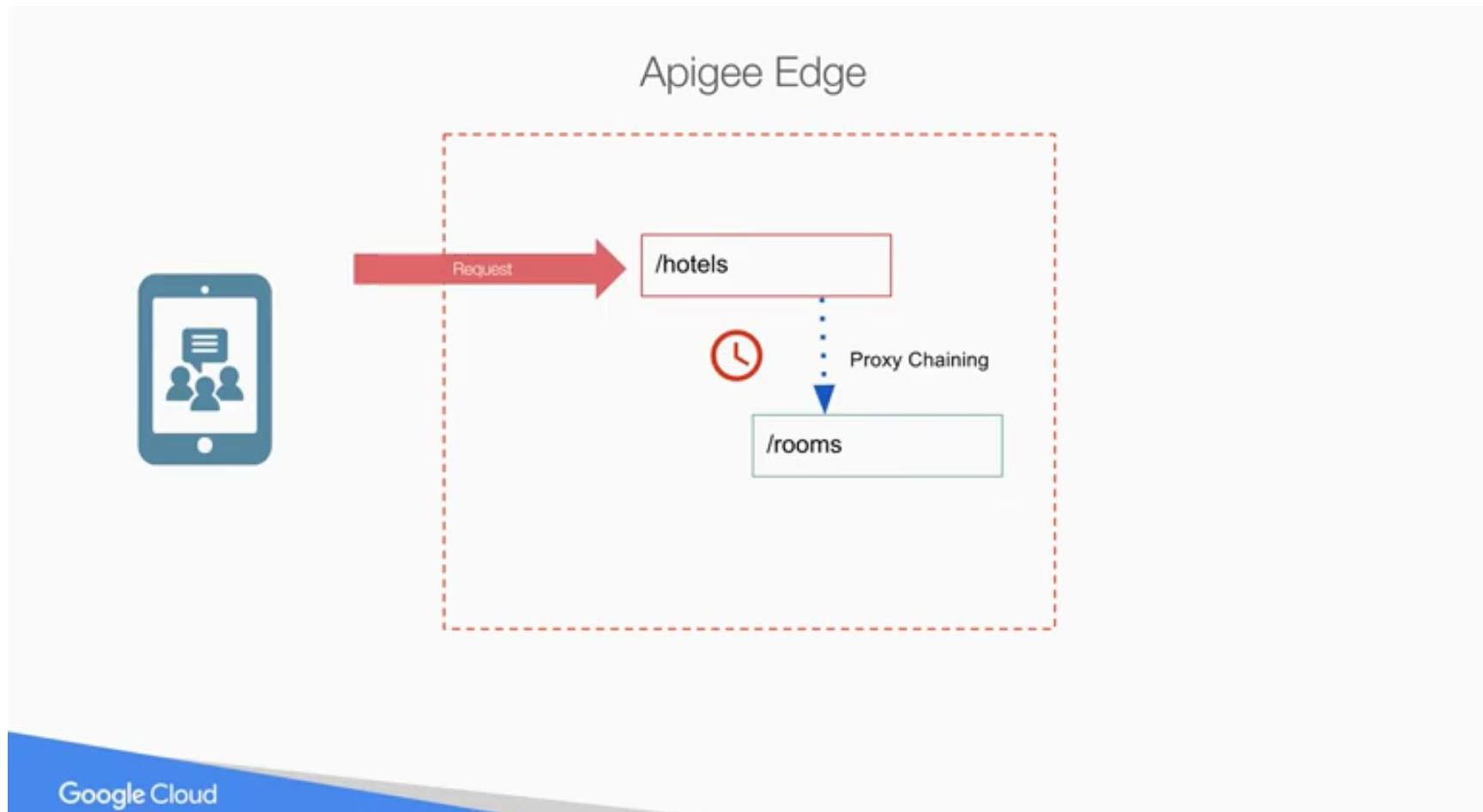
- Show Disabled Policies (none)
- Show Skipped Phases (2)
- Show All FlowInfos (11)

Phase Details

- Automatically Compare Selected Phase
- Show Variables
- Show Properties

Output from all Transactions

Proxy Chaining



External Proxy Chaining

Proxy 1 → Proxy 2

Parameeswari Bala
parameeswari-bala-eval

DEVELOP

Specs

API Proxies

Shared Flows

Offline Trace

API BaaS

SWITCH TO CLASSIC

apigee

API Proxies > proxy2 > Trace > 1

Deployment to Trace: Environment test, Revision 1 | Stop Trace Session | Remaining Time: 09:36 | Download Trace Session

OVERVIEW DEVELOP TRACE PERFORMANCE

Transactions

Index	Status	Method	URI	Elapsed
1	200	GET	/proxy2	2162 ms

Send Requests

Method: GET URL: http://parameeswari-bala-eval-test.apigee.net/proxy2 Status: 200

Transaction Map

Phase Details

Request Received from Client: GET /proxy2

Response Sent to Client: 200 OK

Request Headers

Accept	*
Accept-Encoding	gzip,deflate
Host	parameeswari-bala-eval-test.apigee.net
User-Agent	AHC/1.0
X-Forwarded-For	54.238.148.129

Response Headers

Access-Control-Allow-Credentials	true
Access-Control-Allow-Headers	origin,x-requested-with,accept,origin,
Access-Control-Allow-Methods	GET,PUT,POST,DELETE,GET,PUT,PO
Access-Control-Allow-Origin	*
Access-Control-Max-Age	3628800,3628800

Output from all Transactions

Internal Proxy Chaining

Proxy 1 → Proxy 2

API Proxies > proxy2 > Trace > 1

Deployment to Trace: Environment test, Revision 1 | Stop Trace Session | Remaining Time: 09:38 | Download Trace Session

Transactions: 1 200 | GET | /proxy2 | Elapsed: 227 ms

Method: GET | URL: http://parameswaribala-eval-test.apigee.net/proxy2 | Status: 200

Transaction Map: A sequence of nodes representing the flow from client to API. Nodes include a mobile phone icon, a pink circle, several grey circles, an 'AX' node, another pink circle, a teal square with a pencil icon, and a grey circle.

Phase Details:

- Request Received from Client: GET /proxy2
- Response Sent to Client: 200 OK

View Options:

- Transaction Map:
 - Show Disabled Policies (none)
 - Show Skipped Phases (1)
 - Show All FlowInfos (11)
- Phase Details:
 - Automatically Compare Selected Phase
 - Show Variables
 - Show Properties

Request Headers:

Accept	*/*
Accept-Encoding	gzip,deflate
Host	parameswaribala-eval-test.apigee.net
User-Agent	AHC/1.0
X-Forwarded-For	18.182.50.222

Response Headers:

Access-Control-Allow-Credentials	true
Access-Control-Allow-Headers	origin,x-requested-with,accept,origin,
Access-Control-Allow-Methods	GET,PUT,POST,DELETE,GET,PUT,PO
Access-Control-Allow-Origin	*
Access-Control-Max-Age	3628800,3628800

Output from all Transactions

JWT Tokens

Apigee - Generate JWT Policy



vebconsulting2019-eval - Ap | Rc REST Countries | Securing REST APIs - How to | How to store RSA keys for J | GenerateJWT policy | Apige | Failing to generate JWT using | +

apigee.com/platform/vebconsulting2019-eval/proxies/createjwttoken/overview/1

Apps Insert title here Empire New Tab How to use Assert... Browser Automatio... node.js - How can I... Freelancer-dev-810... Courses New Tab hi airtel Airtel 4G Hotspot ntF83 Paused

Parameswari Ettiyap... vebconsulting2019-...

Develop Specs API Proxies Shared Flows Offline Trace Publish Analyze Admin Help Feedback

API Proxies > createjwttoken > Overview > 1

OVERVIEW DEVELOP TRACE PERFORMANCE

Project Save Revision 1 Deployment

Revision 1 Summary
Created: an hour ago , Updated: 6 minutes ago .
No description for this proxy.

Deployments

Environment	Revision	Status	URL
test	1	●	http://vebconsulting2019-eval-test.apigee.net/createjwttoken [+]

Proxy Endpoints

Name	Base Path	Target Endpoints
default	/createjwttoken	none

Expand All Collapse All

Target Endpoints

No Target Endpoints for this proxy.

Waiting for segments.company-target.com...

Type here to search

01:59 25/11/2019

Generate .pem file for private key

- `openssl genrsa -des3 -out private-encrypted-rsa-des3.pem 2048`

Generate .pem file for private key

```
C:\Windows\System32\cmd.exe
2 Dir(s) 98,318,917,632 bytes free

G:\Local disk\APIGEE\keys>openssl genrsa -des3 -out private-encrypted-rsa-des3.pem 2048
Generating RSA private key, 2048 bit long modulus
.....+++++
.....+++++
unable to write 'random state'
e is 65537 (0x10001)
Enter pass phrase for private-encrypted-rsa-des3.pem:
Verifying - Enter pass phrase for private-encrypted-rsa-des3.pem:

G:\Local disk\APIGEE\keys>dir
Volume in drive G is New Volume
Volume Serial Number is 8E55-7759

Directory of G:\Local disk\APIGEE\keys

24/11/2019  11:34 PM    <DIR>          .
24/11/2019  11:34 PM    <DIR>          ..
24/11/2019  11:09 PM        1,834  keypair.pem
24/11/2019  11:34 PM        1,751  private-encrypted-rsa-des3.pem
```

Generate Public Key

```
2 Dir(s) 98,320,269,312 bytes free

G:\Local disk\APIGEE\keys>openssl rsa -in keypair.pem -outform PEM -pubout -out public.pem
Enter pass phrase for keypair.pem:
writing RSA key

G:\Local disk\APIGEE\keys>dir
Volume in drive G is New Volume
Volume Serial Number is 8E55-7759

Directory of G:\Local disk\APIGEE\keys

24/11/2019  11:13 PM    <DIR>          .
24/11/2019  11:13 PM    <DIR>          ..
24/11/2019  11:09 PM           1,834 keypair.pem
24/11/2019  11:13 PM            451 public.pem
                           2 File(s)        2,285 bytes
                           2 Dir(s)  98,318,917,632 bytes free

G:\Local disk\APIGEE\keys>
```

Administrator: Node.js command prompt

```
[2019-Nov-25 00:33:55] status: 201
[2019-Nov-25 00:33:55] ok. the key was loaded successfully.
```

```
G:\Local disk\APIGEE\keys\node\apigee-load-pem-to-kvm-master>node loadPemIntoKvm.js -u vebconsulting2019@gmail.com -p Vigneshbala@95! -v -o vebconsulting2019-eval -e test -m kvmsecret -F private-encrypted-rsa-des3.pem -N testkey
Apigee Edge PEM KVM-loader tool, version: 20180619-0825
Node.js v12.13.0
```

```
[2019-Nov-25 01:11:39] start
[2019-Nov-25 01:11:39] connect: {"orgname": "vebconsulting2019-eval", "user": "vebconsulting2019@gmail.com", "loginBaseUrl": "https://login.apigee.com", "mgmtServer": "https://api.enterprise.apigee.com", "urlBase": "https://api.enterprise.apigee.com/v1/o/vebconsulting2019-eval", "requestHeaders": {"accept": "application/json"}, "verbosity": true}
[2019-Nov-25 01:11:39] found stashed token.
[2019-Nov-25 01:11:39] valid and not expired
[2019-Nov-25 01:11:39] connected
[2019-Nov-25 01:11:39] GET https://api.enterprise.apigee.com/v1/o/vebconsulting2019-eval/e/test/keyvaluemaps
[2019-Nov-25 01:11:42] status: 200
[2019-Nov-25 01:11:42] Need to create the map
[2019-Nov-25 01:11:42] Create KVM kvmsecret
[2019-Nov-25 01:11:42] POST https://api.enterprise.apigee.com/v1/o/vebconsulting2019-eval/e/test/keyvaluemaps
[2019-Nov-25 01:11:44] status: 201
[2019-Nov-25 01:11:44] storing new key
[2019-Nov-25 01:11:44] GET https://api.enterprise.apigee.com/v1/o/vebconsulting2019-eval/
[2019-Nov-25 01:11:45] status: 200
[2019-Nov-25 01:11:45] GET https://api.enterprise.apigee.com/v1/o/vebconsulting2019-eval/e/test/keyvaluemaps/kvmsecret/entries/testkey
[2019-Nov-25 01:11:47] KVM entry create
```



Enter password as another key

Parameeswari Ettiyap... v
vebconsulting2019-...

Develop

Publish

Analyze

Admin

Audit Logs

Environments

Caches

Flow Hooks

Key Value Maps

References

Target Servers

TLS Keystores

Environments > Key value maps > test > kvmsecret

Delete

KEY	VALUE
privatekey-password	vighesh

-----BEGIN RSA PRIVATE KEY-----
Proc-Type: 4,ENCRYPTED
DEK-Info: DES-EDE3-CBC,CEF748B89A6FD4CC

testkey

```
6pAymKXcykDZp+2wVfyQNjs+nJZVwB+amD21t87CHp7l1Ltw8ikeZ1ysCXDyIL  
pkUjO/v+iQyjRuDI79Krf3P2KEEr9K4HfY++0Fmgw52MEPrmp32Tahe9GKyMVR  
z6ZyQCkNYUoW/ytJvynO40DQTZA24Zg9L++tx77fk3oEwrl8WtzYuHxa3aKGZJnB  
0Z1r-1CeAgiuV7oID1eNIVIw/25+h0Cn07rT2AhKmDdnCVc,2Cr0+L1IVh7D1
```

vebconsulting2019-eval - Ap x Rc REST Countries x | Securing REST APIs - How to x | How to store RSA keys for J... x | GenerateJWT policy | Apigee x | Failing to generate JWT using x +

apigee.com/platform/vebconsulting2019-eval/proxies/createjwttoken/develop/1

Apps Insert title here Empire New Tab How to use Assertio... Browser Automatio... node.js - How can I... Freelancer-dev-810... Courses New Tab Google hi airtel Airtel 4G Hotspot nt8F83

Parameswari Ettiyap... vebconsulting2019...

Develop

Specs

API Proxies

Shared Flows

Offline Trace

Publish

Analyze

Admin

Help

Feedback

API Proxies > createjwttoken > Develop > 1

OVERVIEW DEVELOP TRACE PERFORMANCE

Project Save Revision 1 Tools Deployment Help for Selected Flow

Navigator Search <>

Flow: PreFlow

REQUEST RESPONSE

+ Step

Property Inspector PreFlow

PreFlow name PreFlow

Request Response

Step Name Key-Value-Map-Operations-1

Step Name Generate-JWT-1

Step Name Assign-Message-1

Assign Message-1 Generate JWT-1 Key Value Map Operations-1

+ Step

All PreFlow All PostFlow

Code default

```
1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <ProxyEndpoint name="default">
3   <Description/>
4   <FaultRules/>
5   <Preflow name="PreFlow">
6     <Request/>
7     <Response>
8       <Step>
9         <Name>Key-Value-Map-Operations-1</Name>
10      </Step>
11      <Step>
12        <Name>Generate-JWT-1</Name>
```

Deployed to test

02:01 25/11/2019

Specs

API Proxies

- Shared Flows
- Offline Trace
- Publish
- Analyze
- Admin
- Help
- Feedback

Project ▾ Save Revision 1 ▾ Tools ▾ Deployment ▾ Help for Selected Key Value Map Operations Policy

Navigator Search Policies

Policy: Key Value Map Operations-1

Type: KeyValueMapOperations

Display Name: Key Value Map Operations-1

Name: Key-Value-Map-Operations-1

Attached to: Flow ALL PreFlow in default Proxy Endpoint

Code:

```

1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <KeyValueMapOperations async="false" continueOnError="false" enabled="true" name="Key-Value-Map-Operations-1" mapIdentifier="kvmsecret">
3   <DisplayName>Key Value Map Operations-1</DisplayName>
4   <Properties/>
5   <ExclusiveCache>false</ExclusiveCache>
6   <ExpiryTimeInSecs>300</ExpiryTimeInSecs>
7   <Get assignTo="private.privatekey">
8     <Key>
9       <Parameter>
10      testkey
11    </Parameter>
12  </Key>
13 </Get>
14 <Get assignTo="private.privatekey-password">
15   <Key>
16     <Parameter>privatekey-password</Parameter>
17   </Key>
18 </Get>
19 <Scope>environment</Scope>
20 </KeyValueMapOperations>

```

Property Inspector

KeyValueMapOperations	
async	false
continueOnError	false
enabled	true
mapIdentifier	kvmsecret
name	Key-Value-Map-Operations-1
DisplayName	Key Value Map Operations-1
Properties	
ExclusiveCache	false
ExpiryTimeInSecs	300
Get	
assignTo	private.privatekey
Key	
Parameter	
Get	
assignTo	private.privatekey-password
Key	
Parameter	privatekey-password
Scope	environment

API Proxies > createjwttoken > Develop > 1

OVERVIEW DEVELOP TRACE PERFORMANCE

Project Save Revision 1

Tools Deployment

Help for Selected 

Navigator

Search

createjwttoken

Policies

Assign Message-1

Generate JWT-1

KeyValue Map Opera...

Proxy Endpoints

default

All PreFlow

All PostFlow

Target Endpoints

Resources

Policy: Generate JWT-1

Type  GenerateJWT

Display Name Generate JWT-1

Name Generate-JWT-1

Code Generate JWT-1

```
1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <GenerateJWT async="false" continueOnError="false" enabled="true" name="Generate-JWT-1">
3   <DisplayName>Generate JWT-1</DisplayName>
4   <Algorithm>RS256</Algorithm>
5   <IgnoreUnresolvedVariables>false</IgnoreUnresolvedVariables>
6   <PrivateKey>
7     <Password ref="private.privatekey-password"/>
8     <Value ref="private.privatekey"/>
9     <Id>unique-identifier-for-privatekey-here</Id>
10    </PrivateKey>
11    <Subject>apigee-seattle-hatrack-montage</Subject>
12    <Issuer>urn://apigee-edge-JWT-policy-test</Issuer>
13    <Audience>urn://c60511c0-12a2-473c-80fd-42528eb65a6a</Audience>
14    <ExpiresIn>60m</ExpiresIn>
15    <Id/>
16    <OutputVariable>jwt-variable</OutputVariable>
17  </GenerateJWT>
```

Property Inspector Ge...

GenerateJWT

async false

continueOnError false

enabled true

name Gene...

DisplayName Gene...

Algorithm RS25...

IgnoreUnresolvedVariables false

PrivateKey

Password

ref privat...

Value

ref privat...

Id uniqu...

Subject apige...

Issuer urn://

Audience urn://

ExpiresIn 60m

Id

OutputVariable jwt-va...

Deployed to test

API Proxies > createjwttoken > Develop > 1

OVERVIEW DEVELOP TRACE PERFORMANCE

Project Save Revision 1 Tools Deployment Help for Selected Assign Message Policy

Navigator Search <>

Type AssignMessage

Display Name Assign Message-1

Name Assign-Message-1

Code

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<AssignMessage async="false" continueOnError="false" enabled="true" name="Assign-Message-1">
    <DisplayName>Assign Message-1</DisplayName>
    <Properties/>
    <Add>
        <Headers>
            <Header name="jwt-token">
                {jwt-variable}
            </Header>
        </Headers>
    </Add>
    <IgnoreUnresolvedVariables>true</IgnoreUnresolvedVariables>
    <AssignTo createNew="false" transport="http" type="response"/>
</AssignMessage>
```

Property Inspector As:

AssignMessage	
async	false
continueOnError	false
enabled	true
name	Assign-Message-1
DisplayName	Assign Message-1
Properties	
Add	
Headers	
Header	
name	jwt-token
IgnoreUnresolvedVariables	true
AssignTo	
createNew	false
transport	http
type	response

Deployed to test

vebconsulting2019-eval - Ap | Rc REST Countries | Securing REST APIs - How to | How to store RSA keys for J | GenerateJWT policy | Apigee | Failing to generate JWT using | +

apigee.com/platform/vebconsulting2019-eval/proxies/createjwttoken/trace/1

Apps Insert title here Empire New Tab How to use Assert... Browser Automatio... node.js - How can I... Freelancer-dev-810... Courses New Tab hi airtel Airtel 4G Hotspot nt8F83

API Proxies > **createjwttoken** > **Trace** > **1**

Deployment to Trace Environment test, Revision 1 | Stop Trace Session Remaining Time: 09:45 | Download Trace Session

Transactions

Status	Method	URI	Elapsed
1 200	GET	/createjwttoken	32 ms

Send Requests

Method URL Status

GET http://vebconsulting2019-eval-test.apigee.net/createjwttoken 200

Transaction Map

Phase Details

Accept	*	Accept	*
Accept-Encoding	gzip,deflate	Accept-Encoding	gzip,deflate
Host	vebconsulting2019-eval-test.apigee.net	Host	vebconsulting2019-eval-test.apigee.net
User-Agent	AHC/1.0	User-Agent	AHC/1.0
X-Apigee.Message-Timeout	57	X-Forwarded-For	52.197.191.136
X-Forwarded-For	52.197.191.136	X-Forwarded-Port	80
X-Forwarded-Port	80	X-Forwarded-Proto	http
X-Forwarded-Proto	http		

View Options

- Transaction Map
 - Show Disabled Policies (none)
 - Show Skipped Phases (1)
 - Show All FlowInfos (5)
- Phase Details
 - Automatically Compare Selected Phase
 - Show Variables
 - Show Properties

Output from all Transactions

Type here to search

02:04 25/11/2019

Alternative to KVM

JWT Tokens

apigee

apigee

Dashboard APIs Publish Analytics Admin Help Try New Edge Parameeswari.bala@rp... API Management

Dashboard / API Proxies / jwttokens / Develop / 1 Organization parameeswari.bala-eval

jwttokens What's new in the Proxy Editor

Project Save Revision 1 Tools Deployment Help for Selected Flow

Navigator jwttokens Policies Add CORS Assign Message-1 Assign Message-2 Generate JWT-1

Proxy Endpoints default Code default

```
1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <ProxyEndpoint name="default">
3   <Description/>
4   <FaultRules/>
5   <PreFlow name="PreFlow">
6     <Request/>
7     <Response>
8       <Step>
9         <Name>Assign-Message-1</Name>
10      </Step>
11      <Step>
12        <Name>Generate-JWT-1</Name>
13      </Step>
14      <Step>
15        <Name>Assign-Message-2</Name>
16      </Step>
17    </Response>
18  </PreFlow>
19  <PostFlow name="PostFlow">
20    <Request/>
21    <Response/>
22  </PostFlow>
```

Property Inspector PreFlow

PreFlow	name	PreFlow
	Request	
	Response	
Step	Name	Assign-Message-1
Step	Name	Generate-JWT-1
Step	Name	Assign-Message-2

JWT Tokens

Screenshot of the Apigee Platform interface showing the configuration of a JWT token generation policy.

The URL in the browser is <https://enterprise.apigee.com/platform/parameswaribala-eval/proxies/jwttokens/develop/1>.

The navigation bar shows the organization **parameswaribala-eval**.

The main view displays the **jwttokens** proxy editor. The **DEVELOP** tab is selected.

The **Navigator** pane on the left lists the proxy structure:

- Policies**:
 - Add CORS
 - Assign Message-1
 - Assign Message-2
 - Generate JWT-1
- Proxy Endpoints**:
 - default**:
 - PreFlow
 - PostFlow
- Target Endpoints**:
 - default**:
 - PreFlow
 - PostFlow
- Scripts**

The **Flow: PreFlow** pane shows a sequence of steps:

- Step (represented by a dashed box)
- RESPONSE (represented by a grey arrow pointing right)

Below the flow, the XML code for the **Assign Message-1** step is displayed:

```

<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<AssignMessage async="false" continueOnError="false" enabled="true" name="Assign-Message-1">
    <DisplayName>Assign Message-1</DisplayName>
    <Properties/>
    <AssignVariable>
        <Name>private.key</Name>
        <Value>Secret123</Value>
        <Ref/>
    </AssignVariable>
    <IgnoreUnresolvedVariables>true</IgnoreUnresolvedVariables>
    <AssignTo createNew="false" transport="http" type="request"/>
</AssignMessage>

```

The **Property Inspector** pane on the right shows the configuration for the **PreFlow** step:

Property	Value
name	PreFlow
Request	
Response	
Step	
Name	Assign-Message-1
Step	
Name	Generate-JWT-1
Step	
Name	Assign-Message-2

Deployed to test

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JWT Tokens

https://enterprise.apigee.com/platform/parameswaribala-eval/proxies/jwttokens/develop/1

Paused

Dashboard / API Proxies / jwttokens / Develop / 1 Organization parameswaribala-eval

jwttokens What's new in the Proxy Editor

Project Save Revision 1 Tools Deployment Help for Selected Flow Search

OVERVIEW DEVELOP TRACE PERFORMANCE

Navigator: jwttokens, Policies: Add CORS, Assign Message-1, Assign Message-2, Generate JWT-1, Proxy Endpoints: default, Target Endpoints: default, Scripts: Endpoint default, Policy Assign Message-2

Flow: PreFlow (RESPONSE)

Step

Assign Message-1, Generate JWT-1, Assign Message-2

```

1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <AssignMessage async="false" continueOnError="false" enabled="true" name="Assign-Message-2">
3   <DisplayName>Assign Message-2</DisplayName>
4   <Properties/>
5   <Add>
6     <Headers>
7       <Header name="jwt-token">{jwt-variable}</Header>
8     </Headers>
9   </Add>
10  <IgnoreUnresolvedVariables>true</IgnoreUnresolvedVariables>
11  <AssignTo createNew="false" transport="http" type="response"/>
12 </AssignMessage>

```

Property Inspector: PreFlow, Request, Response, Step, Name: Assign-Message-1, Step, Name: Generate-JWT-1, Step, Name: Assign-Message-2

Deployed to test

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JWT Tokens

Postman

File Edit View Collection History Help

Builder Team Library

No Environment

Filter

History Collections

POST https://parameswaribala-**eval-test.apigee.net/jwttokens**

Authorization Headers (2) Body Pre-request Script Tests

Body Cookies Headers (13) Tests

Status: 200 OK Time: 5543 ms Size: 1.31 KB

form-data x-www-form-urlencoded raw binary

username param 123

password value

key

Access-Control-Allow-Credentials → true

Access-Control-Allow-Headers → origin, x-requested-with, accept

Access-Control-Allow-Methods → GET, PUT, POST, DELETE

Access-Control-Allow-Origin → *

Access-Control-Allow-Origin → *

Access-Control-Max-Age → 3628800

Connection → keep-alive

Content-Length → 621

Content-Type → application/json

Date → Mon, 26 Nov 2018 23:48:12 GMT

Server → unicorn/19.9.0

Via → 1.1 vegur

jwt-token → eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzI1NiJ9eyJzdWliOiJzdWJqZWN0LXN1YmpIY3QiLCJhdWQiOlsiYXVkaWVuY2UxliwiYXVkaWVuY2UyIl0slmIzcyl6InVyb2xlL2FwaWdIZS1lZGdILUpXVC1wb2xpY3ktldGVzdCislmV4cCl6MTU0MzMwNDg5MiwiWF0ljoxNTQzMjC2MDkyLC

Type here to search

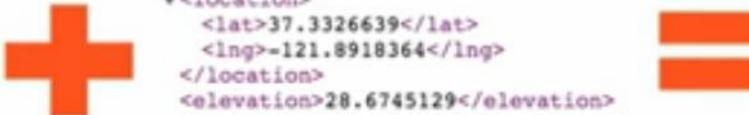
05:18 27/11/2018

Mashup

What are we trying to do?

- User has access to Address and wants Latitude, Longitude & Elevation details.
- Information is available in two different service
 - Geocoding service : Provides Latitude & Longitude by taking postcode and country as input
 - Elevation service : Provides Elevation details by taking latitude and longitude as input

So lets wrap both service to create a new unified service



```

{
  "results": [
    {
      "address_components": [
        {
          "long_name": "San Jose, CA 95113, USA",
          "short_name": "San Jose, CA"
        }
      ],
      "geolocation": {
        "bounds": {
          "northeast": {
            "lat": 37.3326639,
            "lng": -121.8918364
          },
          "southwest": {
            "lat": 37.3326639,
            "lng": -121.8918364
          }
        },
        "location_type": "APPROXIMATE",
        "viewport": {
          "northeast": {
            "lat": 37.3326639,
            "lng": -121.8918364
          },
          "southwest": {
            "lat": 37.3326639,
            "lng": -121.8918364
          }
        }
      },
      "place_id": "ChIJQewWkR0jAAKJSAB73L69E",
      "types": [
        "postal_code"
      ]
    }
  ],
  "status": "OK"
}

<?xml version="1.0" encoding="UTF-8"?>
<ElevationResponse>
  <status>OK</status>
  <result>
    <location>
      <lat>37.3326639</lat>
      <lng>-121.8918364</lng>
    </location>
    <elevation>28.6745129</elevation>
    <resolution>4.7719760</resolution>
  </result>
</ElevationResponse>

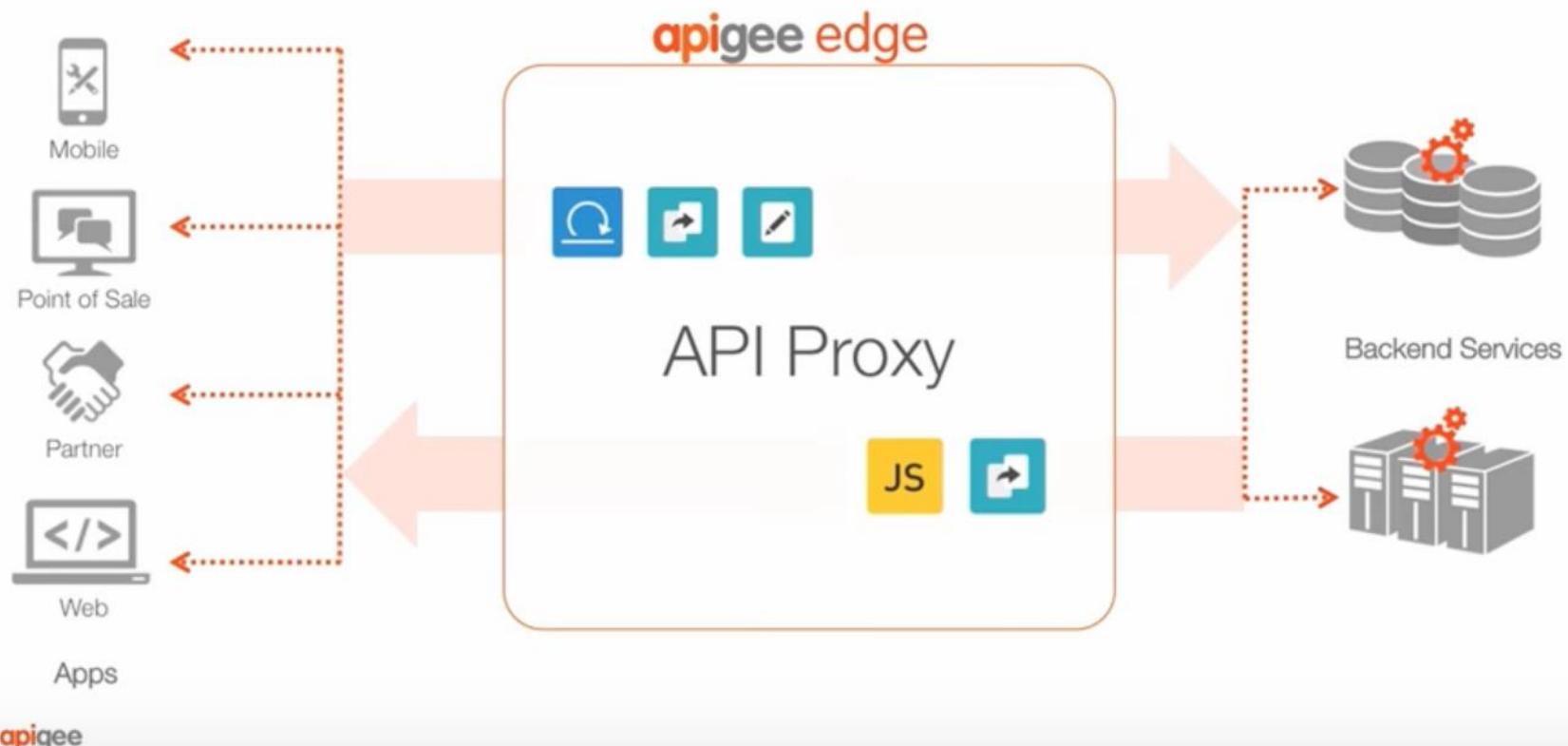
{
  "country": "us",
  "postalcode": "95113",
  "elevation": {
    "meters": 28.674513,
    "feet": 94.07648591451589
  },
  "location": {
    "latitude": 37.3326639,
    "longitude": -121.8918364
  }
}
  
```

upmyapp

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Mashup

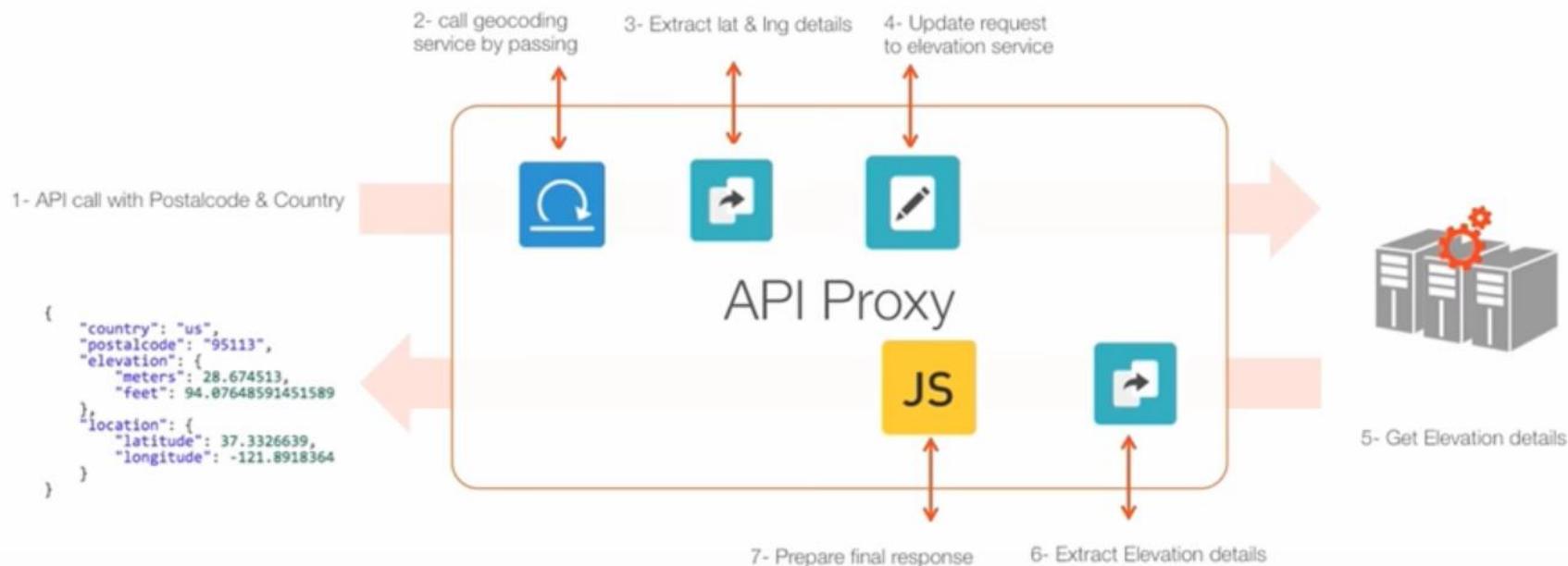
Apigee Edge - Pipeline & Facade Pattern



Mashup

Mash-up

- Mash-ups through pre-defined policies
 - Extract Variables, Service Callout, Assign Message and Javascript



Mashup

https://enterprise.apigee.com/platform/parameswaribala- eval/proxies/mashup/overview/11

Dashboard / API Proxies / mashup / Overview / 11 Organization parameswaribala- eval

mashup What's new in the Proxy Editor

Project Save Revision 11 Deployment

Revision 11 Summary

Created: 7 hours ago, Updated: 6 hours ago.

No description for this proxy.

Deployments

Environment	Revision	Status	URL
test	11	●	http://parameswaribala- eval-test.apigee.net/mashup [+]

Proxy Endpoints

Name	Base Path	Target Endpoints
default	/mashup	default

Target Endpoints

Name	Target	Used by Proxy Endpoints
default	https://maps.googleapis.com/maps/api/elevation/json?key=AlzaSyDnCmx6XW6zNRAlaXIqkN8dIYElsSDNLjI	default

Mashup

apigee

Screenshot of the Apigee API Management Platform showing the Proxy Editor for a 'mashup' proxy. The interface includes a top navigation bar with tabs like 'Dashboard', 'APIs', 'Publish', 'Analytics', 'Admin', 'Help', and 'API Management'. Below the navigation is a toolbar with icons for 'Insert title here', 'Empire', 'New Tab', 'How to use Assertion', 'Browser Automation', 'node.js - How can I f...', 'Freelancer-dev-8104...', 'Courses', and a 'Paused' status indicator.

The main workspace shows a 'mashup' flow named 'PreFlow'. The flow consists of three steps: 'Service Callout...', 'Extract V...', and 'Assign M...'. The 'REQUEST' path goes from the first step to the second, and the 'RESPONSE' path goes from the second to the third. To the right of the flow is a 'Property Inspector' pane displaying details for each step, such as 'name', 'Request', 'Step', 'Name', and 'Response'. At the bottom left, the code editor shows the XML configuration for the 'PreFlow' step, including the 'Service-Callout-1' callout. The bottom right corner indicates that the proxy has been deployed to a test environment.

Mashup

https://enterprise.apigee.com/platform/parameswaribala-eval/proxies/mashup/trace/11

Dashboard API Proxies mashup Trace / 11 Organization parameswaribala-eval

mashup What's new in the Proxy Editor

Deployment to Trace Environment test, Revision 11 | Stop Trace Session Remaining Time: 09:17 | Download Trace Session

Filters

Transactions			
Status	Method	URI	Elapsed
1 200	GET	/mashup?address=77379%2...	715 ms

Send Requests

Method URL Status

GET http://parameswaribala-eval-test.apigee.net/mashup?address=77379+US&sensor=true 200

Transaction Map

Phase Details

9766	<pre>"results" : [{ "elevation" : 39.6868057250 "location" : { "lat" : 30.0314279, "lng" : -95.5302337 }, "resolution" : 4.771975994110107 }]</pre>	<pre>"results" : [{ "elevation" : 39.68680572509766, "location" : { "lat" : 30.0314279, "lng" : -95.5302337 }, "resolution" : 4.771975994110107 }, "status" : "OK"]</pre>
10107		

View Options

- Transaction Map
- Show Disabled Policies (none)
- Show Skipped Phases (1)
- Show All FlowInfos (11)

Phase Details

- Automatically Compare Selected Phase
- Show Variables
- Show Properties

Output from all Transactions

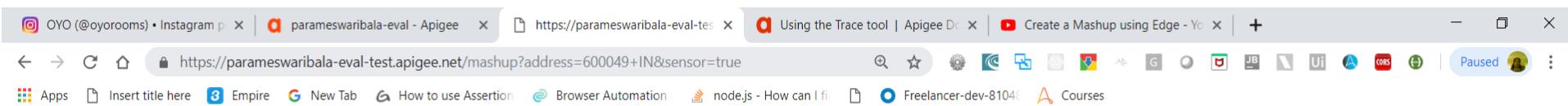
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Windows Taskbar

Type here to search

04:06 28/11/2018 203

Mashup



The screenshot shows a Microsoft Edge browser window with multiple tabs open. The active tab displays a JSON response from an API endpoint. The URL in the address bar is `https://parameswaribala-eval-test.apigee.net/mashup?address=600049+IN&sensor=true`. The JSON data is as follows:

```
{  
  "results" : [  
    {  
      "elevation" : 13.10373497009277,  
      "location" : {  
        "lat" : 13.1051726,  
        "lng" : 80.2046582  
      },  
      "resolution" : 610.8129272460938  
    }  
}
```

XML Threat Protection Custom Message

Filter

New Tab http://vебconsulting2 POST http://vебconsulting2019-eval-test.apigee.net/regexpressionproxy?name=31423

History Collections No Environment

POST Authorization Headers (1) Body Pre-request Script Tests Params Send Save Cookies Code

form-data x-www-form-urlencoded raw binary XML (application/xml)

```

1 <customer number='1'>
2 <name>Fred</name/>
3 <customer/>

```

POST http://vебconsulting2019-eval-test.apigee.net/regexpressionproxy?name=31423

POST http://vебconsulting2019-eval-test.apigee.net/regexpressionproxy?name=31423

POST http://vебconsulting2019-eval-test.apigee.net/regexpressionproxy?name=31423

POST http://vебconsulting2019-eval-test.apigee.net/regexpressionproxy

POST http://vебconsulting2019-eval-test.apigee.net/regexpressionproxy

Yesterday

GET http://vебconsulting2019-eval-test.apigee.net/fiserv-genjwt

GET http://vебconsulting2019-eval-test.apigee.net/messagelogs

POST http://vебconsulting2019-eval-test.apigee.net/messagelogs

POST http://vебconsulting2019-eval-test.apigee.net/messagelogs

POST https://prd-p-gb9mgshndnpl.cloud.splunk.com/services/collector

POST https://prd-p-gb9mgshndnpl.cloud.splunk.com/services/collector

POST https://prd-p-gb9mgshndnpl.cloud.splunk.com/services/collector

POST https://prd-p-gb9mgshndnpl.cloud.splunk.com/services/collector

POST http://vебconsulting2019-eval-test.apigee.net/regexpressionproxy?<Orders xmlns="http://tempuri.org/Orders.Xsd">

Status: 500 Internal Server Error Time: 953 ms Size: 232 B

Body Cookies Headers (4) Tests

Pretty Raw Preview JSON

```

1 {
2   "error_message": "XML Threat Occurred",
3   "error_code": "err-01"
4 }

```

XML Threat Protection Custom Message

Add Fault Rule in preflow

```
<FaultRules>
<FaultRule name="xmlfaultrule">
    <Step>
        <Name>Assign-Message-1</Name>
        </Step>
    <Condition>(fault.name Matches "ExecutionFailed")
    </Condition>
</FaultRule>
</FaultRules>
```

XML Threat Protection Custom Message

Add Fault Rule in preflow

```
<Set>  
<Payload contentType="application/json">  
{"error_message":"XML Threat Occurred","error_code":"err-  
01"}  
</Payload>  
</Set>
```

Add the Spike Arrest policy to your API



- In the editor for the new API proxy, click the Develop tab.
- (If you're not in the API proxy editor, select APIs > API Proxies > helloworld_policies in the management UI menu.)



- The API Proxy Editor lets you see the structure of your API proxy and configure its flow.
- The editor presents a visual representation of your proxy's request and response message flow as well as an editable display of the underlying XML that defines the proxy.
- In the left Navigator pane, click **PreFlow** under **Proxy Endpoints > default**.
- Click the top **+Step** button, corresponding to the Request PreFlow.
- This displays a categorized list of all the policies you can create.

Debugging

Trace is a tool for troubleshooting and monitoring API proxies running on Apigee Edge.

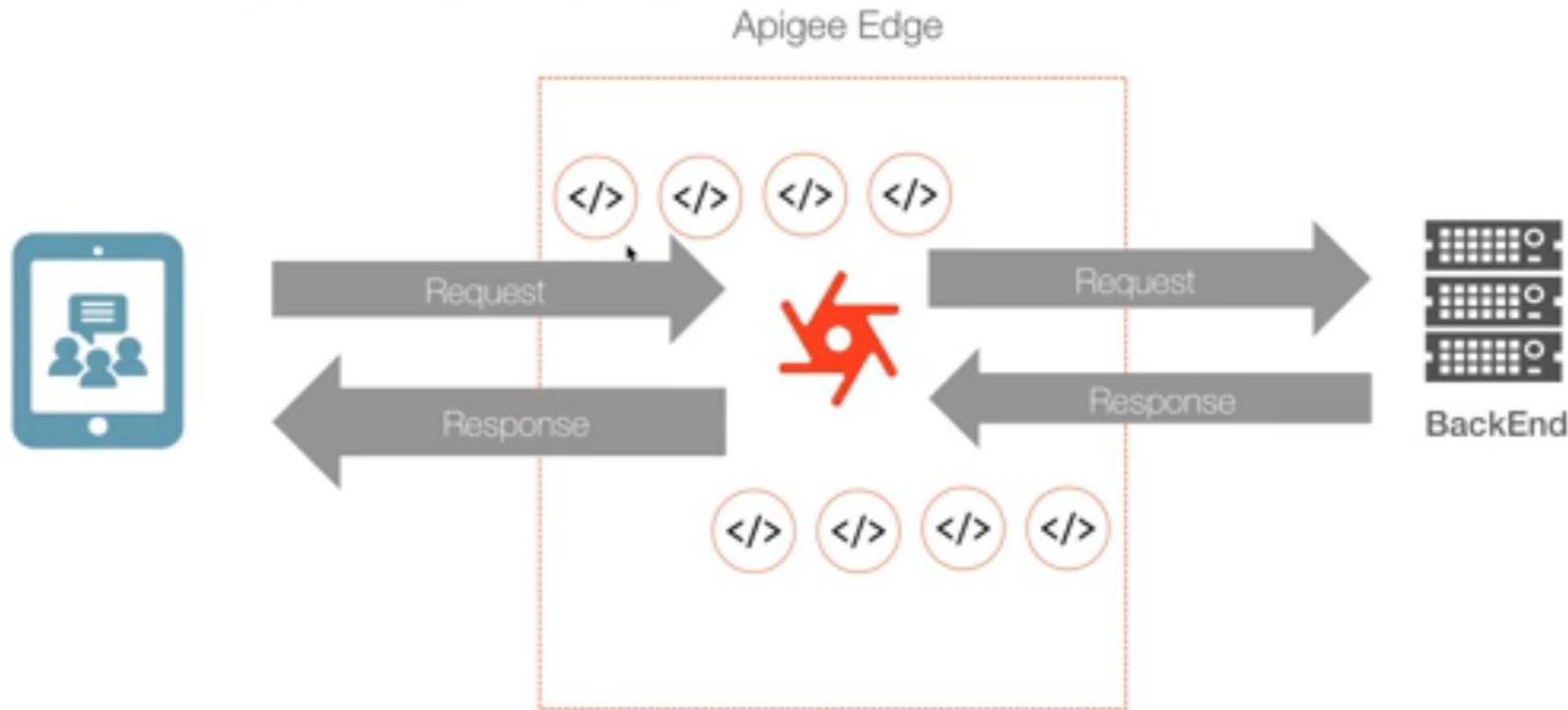
Trace lets you probe the details of each step through an API proxy flow.

Debugging

Apigee - 4MV4D - API Proxy - Trace Console

Watch later

API Proxy – Apigee Edge



How to use Trace



Trace is simple to use. You start a trace session, then make an API call to the Edge platform, and read the results.

Navigate to the Trace tool:

- In the New Edge UI: Select Develop > API Proxies in the left navigation bar.
- In the Edge Classic UI: Select APIs > API Proxies in the top navigation bar.

Select an API proxy from the API Proxies page.

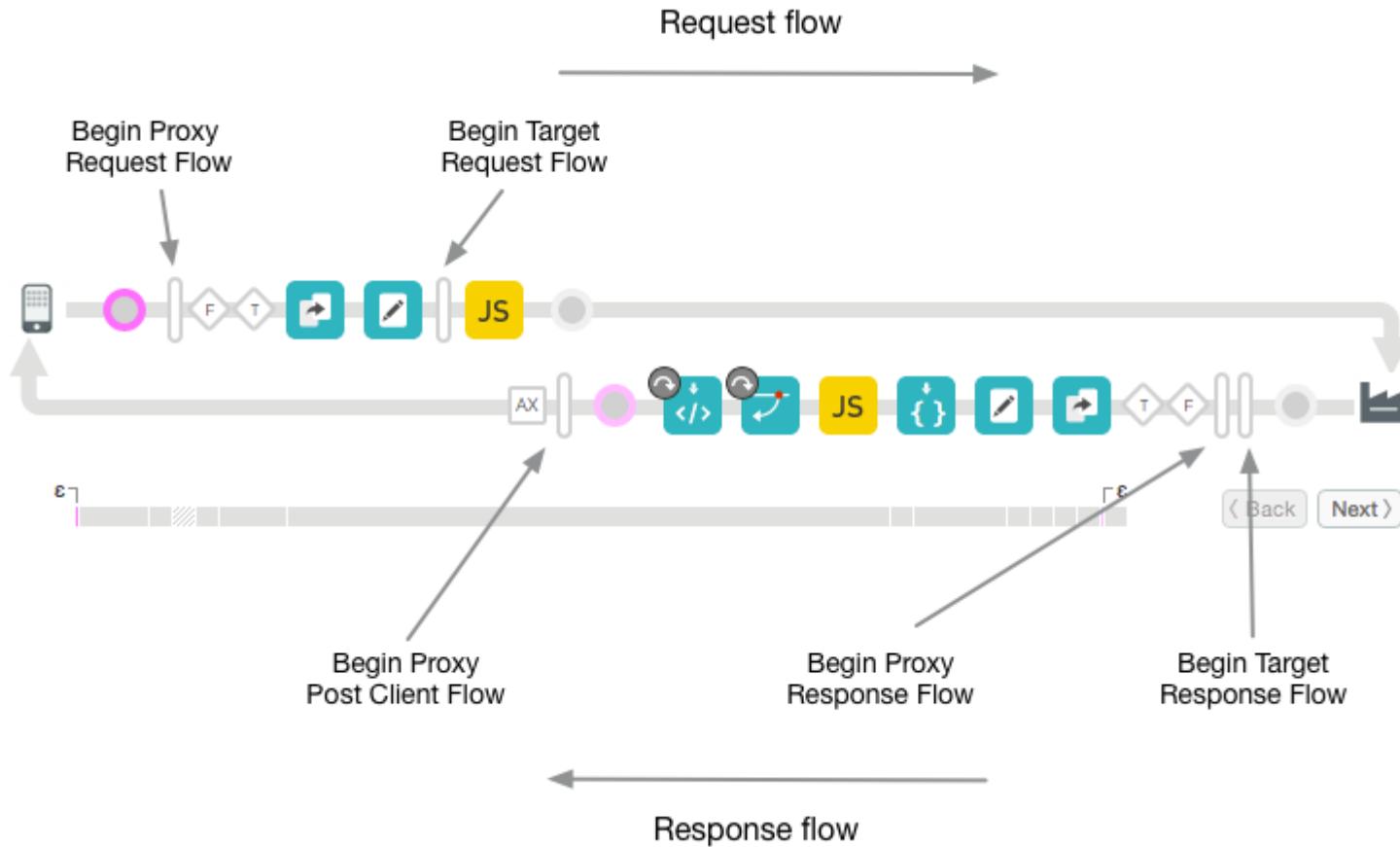
Be sure the API you wish to trace is deployed.

Click Trace to go to the Trace tool view.

Use the Deployment to Trace dropdown menu to select which deployment environment and proxy revision you wish to trace.

Click Start Trace Session. When the Trace session is active, the API proxy records details of each step in the processing pipeline. While the Trace session is running, messages and contextual data are captured from live traffic.

How to use Trace



Debugging

Json to xml

https://enterprise.apigee.com/platform/parameswaribala-eval/proxies/datamediation/trace/1

Dashboard / API Proxies / datamediation / Trace / 1

datamediation What's new in the Proxy Editor

Deployment to Trace Environment test, Revision 1 ▾ Stop Trace Session Remaining Time: 08:52 Download Trace Session

Transactions

Status	Method	URI	Elapsed
1 200	GET	/datamediation	114 ms

Send Requests

Method URL
GET http://parameswaribala-eval-test.apigee.net/datamediation

Transaction Map

Phase Details

Body

```
[{"id": 1, "name": "Leanne Graham", "username": "Bret", "email": "Sincere@april.biz", "address": {"street": "Kulas Light", "suite": "Apt. 556", "city": "Gwenborough", "zip": "92998-3874"}, "phone": "1-770-736-8031", "website": "hildegard.org", "company": "Romaguera-Crona", "catchPhrase": "Multi-layered client-server neural-net", "bs": "harness real-time web services"}
```

Output from all Transactions

```
<?xml version="1.0" encoding="UTF-8"?><Array><Item></id>1</id><name>Leanne Graham</name><username>Bret</username><email>Sincere@april.biz</email><address><street>Kulas Light</street><suite>Apt. 556</suite><city>Gwenborough</city><zipCode>92998-3874</zipCode><geo><lat>-37.3159</lat><lon>81.1496</lon></geo></address><phone>1-770-736-8031</phone><website>hildegard.org</website><company>Romaguera-Crona</company><catchPhrase>Multi-layered client-server neural-net</catchPhrase><bs>harness real-time web services</bs></Item></Array>
```

View Options

- Show Disabled Policies (none)
- Show Skipped Phases (1)
- Show All FlowInfos (11)

Phase Details

- Automatically Compare Selected Phase
- Show Variables
- Show Properties



Type here to search



04:28 ENG 28/11/2018

Debugging

Xml to json

Screenshot of the Apigee Trace tool interface showing a transaction trace for a GET request to /datamediation.

Header:

- Deployment to Trace: Environment test, Revision 1
- Remaining Time: 07:42
- Send Requests: Method: GET, URL: http://parameswaribala-eval-test.apigee.net/datamediation

Transactions Table:

Index	Status	Method	URI	Elapsed
1	200	GET	/datamediation	114 ms

Transaction Map: A visual representation of the API flow, showing requests entering from the left and responses exiting to the right. It includes nodes for XML processing (AX), JSON processing ({}), and other logic blocks.

Phase Details:

Body:

```
<?xml version="1.0" encoding="UTF-8"?><Array><Item><id>1</id><name>Leanne Graham</name><username>Bret</username><email>sincere@april.biz</email><address><street>Kulas Light</street><suite>Apt. 556</suite><city>Gwenborough</city><zipcode>92998-3874</zipcode><geo><lat>37.3159</lat><lng>81.1496</lng></geo></address><phone>1-770-736-8031<x56442</phone><website>hildegard.org</website><company>Romaguera-Crona</company><name>Leanne Graham</name><catchPhrase>Multi-layered client-server neural-net</catchPhrase>
```

Output from all Transactions:

```
{"Array": [{"Item": {"id": 1, "name": "Leanne Graham", "username": "Bret", "email": "Sincere@april.biz", "address": {"street": "Kulas Light", "suite": "Apt. 556", "city": "Gwenborough", "zipcode": "92998-3874", "geo": {"lat": -37.3159, "lng": 81.1496}}, "phone": "1-770-736-8031 x56442", "website": "hildegard.org", "company": {"name": "Romaguera-Crona", "catchPhrase": "Multi-layered client-server neural-net"}}, {"id": 2, "name": "Ervin Howell", "username": "Antonette", "email": "Shanna@melissa.tv", "address": {"street": "Kulas Light", "suite": "Apt. 556", "city": "Gwenborough", "zipcode": "92998-3874", "geo": {"lat": -37.3159, "lng": 81.1496}}, "phone": "1-770-736-8031 x56442", "website": "hildegard.org", "company": {"name": "Romaguera-Crona", "catchPhrase": "Multi-layered client-server neural-net"}]}
```

View Options:

- Show Disabled Policies (none)
- Show Skipped Phases (1)
- Show All FlowInfos (11)
- Automatically Compare Selected Phase
- Show Variables
- Show Properties

Debugging

Chrome File Edit View History Bookmarks People Window Help

apigee4mv4d - Apigee apigee4mv4d-test.apigee.net/ Sat 31 Dec 9 13 24 PM

Bookmarks Tips Personal Reactive Programming NodeJS

Anil Sagar apigee4mv4d API Proxies > tracedemo > Trace > 3

DEVELOP Build modern, scalable APIs for mobile apps and the web.

Specs

API Proxies

Deployment to Trace Environment test, Revision 3 Stop Trace Session Remaining Time: 09:21 Download Trace Session Node.js Logs

Send Requests Method URL GET http://apigee4mv4d-test.apigee.net/tracedemo/json Status 200 Or Send with the API Console

Transaction Map

Phase Details

JSON to XML-1	200 OK
XML to JSON-1	200 OK

Variables

apigee.metrics.policy.JSON-to-XML-1.timeTaken	= 412207
apigee.metrics.policy.XML-to-JSON-1.timeTaken	= 249120

View Options

- Transaction Map
 - Show Disabled Policies (none)
 - Show Skipped Phases (1)
 - Show All FlowInfos (13)
- Phase Details
 - Automatically Compare Selected Phase
 - Show Variables
 - Show Properties

Response Headers

Access-Control-Allow-Origin	*
Connection	keep-alive
Content-Length	68
Content-Type	text/xml;charset=UTF-8
Date	Sat, 31 Dec 2016 15:42:49 GMT

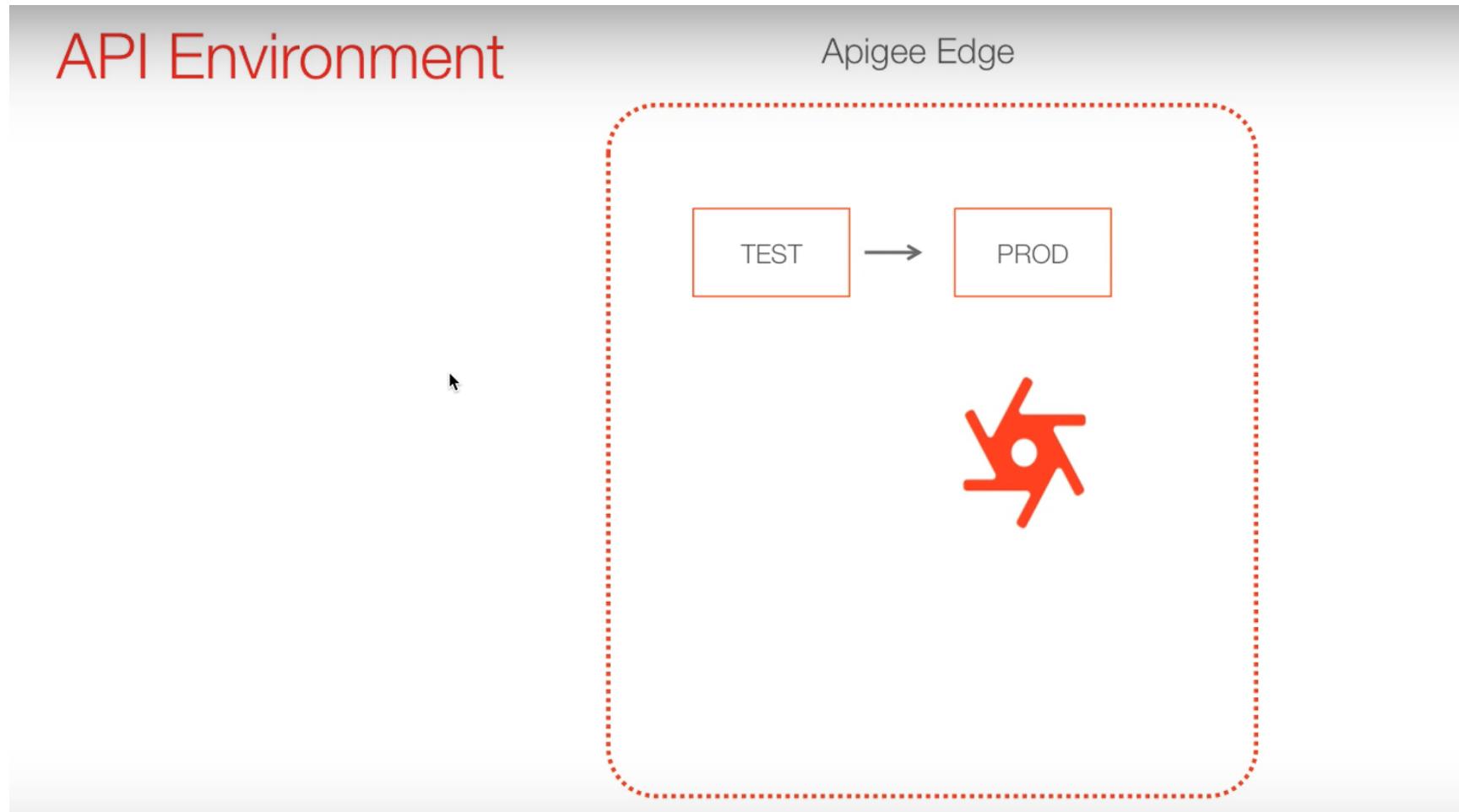
Output from all Transactions

OVERVIEW DEVELOP TRACE PERFORMANCE

SWITCH TO CLASSIC

apigee

Environment Configuration



Creating an Organization, Environment, and Virtual Host



Creating and editing caches

In the management UI, click the **APIs** menu, then click **Environment Configuration**.

Select the environment for which you want to configure caches, such as **test** or **prod**.

Go to the **Caches** tab.

Click **Edit**.

Under **Caches**, at the right side, click the **+Cache** button to add a new cache.

Creating an Organization, Environment, and Virtual Host

apigee

Environment Configuration test

Caches

Key Value Maps

Target Servers

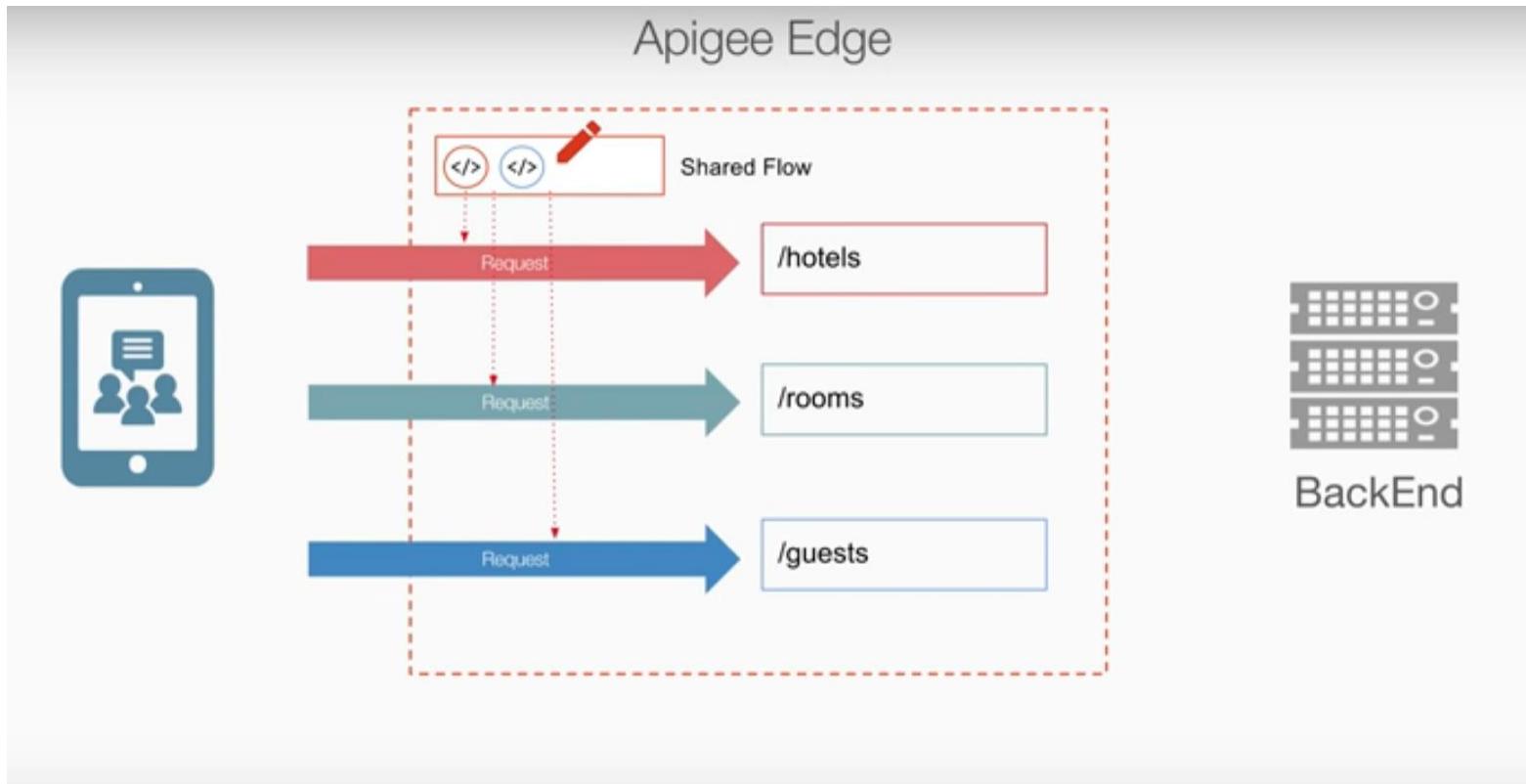
Virtual Hosts

Name	Description	Expiration Type	Expiration	Actions
oauth-token-cache	OAuth token cache	Timeout in Seconds	300	<button>X Delete</button>
paginationCache	Result pagination cache	Time of Day	00:00:00	<button>X Delete</button>
				<button>+ Cache</button>
				<button>Cancel</button> <button>Save</button>

Creating an Organization, Environment, and Virtual Host



- Shared Flows



Creating an Organization, Environment, and Virtual Host

Screenshot of a web browser showing the Apigee platform interface. The address bar displays the URL <https://enterprise.apigee.com/platform/parameswaribala-eval/sharedflows>. The page title is "Shared Flows".

The interface includes a navigation bar with links for apigee, Dashboard, APIs, Publish, Analytics, Admin, Help, Try New Edge, Parameeswari bala@rp..., API Management, and a user icon.

The main content area shows a table of Shared Flows:

Shared Flow	Environments	Modified	Action
Shared-Flow	test	21 minutes ago	Delete

At the bottom of the page, there is a footer note: "© 2018 Apigee Corp. All rights reserved. Version 181105".

The taskbar at the bottom of the screen shows various open applications, including Microsoft Word, Excel, and Edge, along with system icons for battery, signal, and volume.

Creating an Organization, Environment, and Virtual Host

- Shared Flows

The screenshot shows the Apigee Platform interface. The top navigation bar includes links for OYO (@oyorooms), Instagram, parameswaribala- eval - Apigee, Inbox (1,426) - parameswaribala, (205) Apigee Edge - 4MV4D, and a new tab indicator. Below the navigation is a toolbar with various icons for Apps, Insert title here, Empire, New Tab, How to use Assertion, Browser Automation, node.js - How can I fix it, Freelancer-dev-8104, Courses, and others.

The main content area displays the "SF-Demo-1" API Proxy Overview. The URL in the browser is https://enterprise.apigee.com/platform/parameswaribala- eval/proxies/SF-Demo-1/overview/1. A message box at the top right says "API Proxy Bundle download completed." The dashboard shows the following sections:

- Revision 1 Summary:** Created: a few seconds ago, Updated: a few seconds ago. No description for this proxy.
- Deployments:** A table showing one deployment entry for environment "test" (Revision 1, Status: green dot, URL: http://parameswaribala- eval-test.apigee.net/sf-demo-1). Buttons for "Save" and "Deployment" are visible.
- Proxy Endpoints:** A table for "default" endpoint with Base Path: /sf-demo-1 and Target Endpoints: default. Buttons for "Expand All" and "Collapse All" are present.
- Target Endpoints:** A table for "default" target with URL: http://mocktarget.apigee.net/json and Used by Proxy Endpoints: default. Buttons for "Expand All" and "Collapse All" are present.

At the bottom of the page, a footer note reads "© 2018 Apigee Corp. All rights reserved. Version 181105". The Windows taskbar at the bottom shows the search bar, pinned apps (File Explorer, OneDrive, Mail, Edge, Google Chrome, File Manager, Task View), system icons (Speaker, Network, Battery, Signal, Volume), and the date/time (05:11, 28/11/2018).

Creating an Organization, Environment, and Virtual Host

- Shared Flows

The screenshot shows the Apigee Platform interface. The top navigation bar includes links for OYO (@oyorooms), Instagram, parameswaribala- eval (active tab), Inbox (1,426), YouTube (205), and various browser extensions. The main header has tabs for apigee, Dashboard, APIs (selected), Publish, Analytics, Admin, Help, and API Management. The user is logged in as Parameswari bala@rp... with a notification bell icon.

The URL in the address bar is <https://enterprise.apigee.com/platform/parameswaribala- eval/proxies/SF-Demo-1/overview/1>. A message box at the top right says "API Proxy Bundle download completed."

The page title is "SF-Demo-1 What's new in the Proxy Editor". Below it, there are buttons for Project, Save, Revision 1, Deployment, and Overview, Develop, Trace, and Performance tabs.

Revision 1 Summary:
Created: a few seconds ago, Updated: a few seconds ago.
No description for this proxy.

Deployments:
A table showing one deployment entry:

Environment	Revision	Status	URL
test	1	Green circle	http://parameswaribala- eval-test.apigee.net/sf-demo-1 [+]

Proxy Endpoints:
A table showing one endpoint entry:

Name	Base Path	Target Endpoints
default	/sf-demo-1	default

Target Endpoints:
A table showing one target entry:

Name	Target	Used by Proxy Endpoints
default	http://mocktarget.apigee.net/json	default

At the bottom, a footer note says "© 2018 Apigee Corp. All rights reserved. Version 181105". The Windows taskbar shows the search bar, pinned apps (File Explorer, Edge, Google Chrome, Word, Excel, Powerpoint), system icons (Speaker, Battery, Network, Signal, Volume), and system status (ENG, 05:11, 28/11/2018, 222).

Creating an Organization, Environment, and Virtual Host

- Shared Flows

The screenshot shows the Apigee Platform interface for the SF-Demo-2 proxy. The top navigation bar includes tabs for Dashboard, APIs, Publish, Analytics, Admin, Help, and API Management. The current view is the Overview tab. The main content area displays the SF-Demo-2 proxy details, including its status as 'Revision 1' (Created: a few seconds ago, Updated: a few seconds ago) and a note that there is 'No description for this proxy'. Below this is the 'Deployments' section, which lists a single deployment to the 'test' environment at revision 1, pointing to the URL <http://parameswaribala-eval-test.apigee.net/sf-demo-2>. The 'Proxy Endpoints' section shows a single endpoint named 'default' with a base path of '/sf-demo-2' and a target endpoint of 'default'. The 'Target Endpoints' section shows a single target endpoint named 'default' with the URL <https://httpbin.org/get>. The bottom of the screen shows the Windows taskbar with various pinned icons and the system tray.

Dashboard / API Proxies / SF-Demo-2 / Overview / 1

Organization parameswaribala-eval

SF-Demo-2 What's new in the Proxy Editor

Project Save Revision 1 Deployment

OVERVIEW DEVELOP TRACE PERFORMANCE

Revision 1 Summary

Created: a few seconds ago, Updated: a few seconds ago.

No description for this proxy.

Deployments

Environment	Revision	Status	URL
test	1	Green	http://parameswaribala-eval-test.apigee.net/sf-demo-2 [+]

Proxy Endpoints

Name	Base Path	Target Endpoints
default	/sf-demo-2	default

Expand All Collapse All

Target Endpoints

Name	Target	Used by Proxy Endpoints
default	https://httpbin.org/get	default

Expand All Collapse All

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Creating an Organization, Environment, and Virtual Host



Screenshot of a web browser showing the Apigee platform interface. The URL in the address bar is <https://enterprise.apigee.com/platform/parameswaribala-eval/sharedflows-new>.

The page title is "Build a Shared Flow". Below the title is a progress bar with four steps: TYPE, DETAILS, BUILD, and SUMMARY. The first three steps are highlighted in blue, indicating they have been completed.

A summary section shows three green checkmarks:

- Generated shared flow
- Uploaded shared flow
- Deployed to test

Below this summary is a link: "View [Shared-Flow](#) shared in the editor".

At the bottom of the screen, the Windows taskbar is visible, showing various pinned icons and the system tray.

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05:18
28/11/2018

Creating an Organization, Environment, and Virtual Host



Screenshot of the Apigee Platform interface showing the creation of a Shared Flow Policy.

The browser address bar shows: <https://enterprise.apigee.com/platform/parameswaribala-eval/sharedflows/Shared-Flow/develop/1>

The page title is "Deploying Revision 1 to Environment test".

The navigation bar includes: apigee, Dashboard, APIs, Publish, Analytics, Admin, Help, Try New Edge, Parameswari.bala@rp..., API Management.

The main area shows the "Shared-Flow" configuration for "Quota-1".

Project: Shared-Flow
Revision: 1
Deployment: Deploying to test
Help for Selected: Quota Policy

Navigator:

- Shared-Flow
- Policies
 - Quota-1
- Shared Flows
- default
- Scripts

Policy: Quota-1

Type: Quota
Display Name: Quota-1
Name: Quota-1
Attached to: default Shared Flow

Shared Flow default Policy

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<Quota async="false" continueOnError="false" enabled="true" name="Quota-1">
  <DisplayName>Quota-1</DisplayName>
  <Properties/>
  <Allow count="2" countRef="request.header.allowed_quota"/>
  <Interval ref="request.header.quota_count">1</Interval>
  <Distributed>true</Distributed>
  <Synchronous>true</Synchronous>
  <TimeUnit ref="request.header.quota_timeout">minute</TimeUnit>
</Quota>
```

Property Inspector:

Quota	Quota-1
async	false
continueOnError	false
enabled	true
name	Quota-1
DisplayName	Quota-1
Properties	
Allow	
count	2
countRef	request.header.allowed_quota
Interval	1
ref	request.header.quota_count
Distributed	true
Synchronous	true
TimeUnit	minute
ref	request.header.quota_timeout

Status: Not deployed

Bottom status bar: © 2018 Apigee Corp. All rights reserved. Version 181105

System tray icons: Windows, Search, File Explorer, OneDrive, Microsoft Edge, Google Chrome, Task View, Word, Excel, Powerpoint, Mail, Calendar, System, Network, Battery, ENG, 05:22, 28/11/2018, 225

Creating an Organization, Environment, and Virtual Host



SF-Demo-2 What's new in the Proxy Editor

Project Save Revision 1

Navigator SF-Demo-2

Policies Add CORS

Proxy Endpoints default

- All PreFlow
- All PostFlow

Target Endpoints default

- All PreFlow
- All PostFlow

Scripts

Code default

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE proxy SYSTEM "http://apigee.com/api/proxy.xsd">
<proxy name="SF-Demo-2">
  <api name="SF-Demo-2" type="rest"/>
  <description>SF-Demo-2</description>
  <virtual-hosts>
    <virtual-host name="default">
      <route>
        <rule name="default">
          <target>https://www.google.com</target>
        </rule>
      </route>
    </virtual-host>
  </virtual-hosts>
  <timeout>30000</timeout>
  <cache-control>no-store</cache-control>
</proxy>
```

Add Step

Policy Instance New Existing

Policy Type Flow Callout

Display Name Flow Callout-1

Name Flow-Callout-1

Shared Flow Shared-Flow

Flow Callouts let you execute shared flows. [Learn more...](#)

Cancel Add

Organization parameswaribala-eval

OVERVIEW DEVELOP TRACE PERFORMANCE

Property Inspector PreFlow

PreFlow	name	PreFlow
	Request	
	Response	

Deployed to test

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Type here to search



05:26
28/11/2018

Creating an Organization, Environment, and Virtual Host



SF-Demo-2 What's new in the Proxy Editor

Project Save Revision 1

Navigator SF-Demo-2

Policies Add CORS

Proxy Endpoints default

- All PreFlow
- All PostFlow

Target Endpoints default

- All PreFlow
- All PostFlow

Scripts

Code default

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE proxy SYSTEM "http://apigee.com/api/proxy.xsd">
<proxy name="SF-Demo-2">
  <api name="SF-Demo-2" type="rest"/>
  <description>SF-Demo-2</description>
  <virtual-hosts>
    <virtual-host name="default" secure="false" />
    <virtual-host name="secure" secure="true" />
  </virtual-hosts>
  <route name="default">
    <target>https://www.google.com</target>
  </route>
</proxy>
```

Add Step

Policy Instance New Existing

Policy Type Flow Callout

Display Name Flow Callout-1

Name Flow-Callout-1

Shared Flow Shared-Flow

Flow Callouts let you execute shared flows. [Learn more...](#)

Cancel Add

Organization parameswaribala-eval

OVERVIEW DEVELOP TRACE PERFORMANCE

Property Inspector PreFlow

PreFlow	name	PreFlow
	Request	
	Response	

Deployed to test

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Type here to search



05:26
28/11/2018

Creating an Organization, Environment, and Virtual Host

A screenshot of a web browser window. The address bar shows the URL: https://parameswaribala-eval-test.apigee.net/sf-demo-2. The page content displays a JSON fault message:

```
{"fault": {"faultstring": "Rate limit quota violation. Quota limit exceeded. Identifier : _default", "detail": {"errorcode": "policies.ratelimit.QuotaViolation"}}}
```

The browser interface includes a tab bar with several open tabs, a toolbar with various icons, and a menu bar at the top.

Creating an Organization, Environment, and Virtual Host

• Flow Hooks

The screenshot shows the Apigee Platform interface for creating a Shared Flow Hook. The top navigation bar includes tabs for 'apigee', 'Dashboard', 'APIs', 'Publish', 'Analytics', 'Admin', 'Help', and 'API Management'. The current view is under 'API Proxies / SharedFlowHookDemo / Develop / 1'. The main workspace displays a flow diagram titled 'PreFlow' with a single step named 'Spike Arrest-1'. Below the diagram is a code editor showing XML configuration for a Spike Arrest policy. The right side features a 'Property Inspector' panel for the selected 'Step' (Spike Arrest-1), which includes fields for 'name' (PreFlow), 'Request', 'Step', 'Name' (Spike-Arrest-1), and 'Response'. The bottom status bar indicates 'Deployed to test'.

SharedFlowHookDemo [What's new in the Proxy Editor](#)

OVERVIEW DEVELOP TRACE PERFORMANCE

Project [Save](#) Revision 1 Saving

Tools Deployment Help for Selected Flow

Navigator

- SharedFlowHookDemo
- Policies
 - Add CORS
 - Spike Arrest-1
- Proxy Endpoints
 - default
 - All PreFlow
 - All PostFlow
 - Target Endpoints
 - default
 - All PreFlow
 - All PostFlow
- Scripts

Flow: PreFlow

Spike Arrest-1

REQUEST

Endpoint default Policy Spike Arrest-1

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<SpikeArrest async="false" continueOnError="false" enabled="true" name="Spike-Arrest-1">
<DisplayName>Spike Arrest-1</DisplayName>
<Properties/>
<Identifier ref="request.header.some-header-name"/>
<MessageWeight ref="request.header.weight"/>
<Rate>2pmk</Rate>
</SpikeArrest>
```

Property Inspector PreFlow

PreFlow	<input type="text" value="PreFlow"/>
Request	
Step	
Name	Spike-Arrest-1
Response	

Deployed to test

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05:39 28/11/2018

Creating an Organization, Environment, and Virtual Host



Screenshot of the Apigee Platform interface showing the configuration of a Flow Hook in an environment.

The browser address bar shows the URL: <https://enterprise.apigee.com/platform/parameswaribala-eval/environments/test/flowhooks>.

The page title is "Environment Configuration test".

The "Flow Hooks" tab is selected in the navigation bar.

The "Shared Flow" dropdown for the "Pre-proxy Flow Hook" is set to "SharedFLowHookDemo".

The "Save" button is visible at the bottom right.

Page footer: © 2018 Apigee Corp. All rights reserved. Version 181105

Creating an Organization, Environment, and Virtual Host 

Event though we have not added any policy automatically comes from flow hook

Creating an Organization, Environment, and Virtual Host



Screenshot of the Apigee Platform interface showing a trace session for the FlowHookDemo proxy.

Header Bar:

- Apigee (selected)
- Dashboard
- APIs
- Publish
- Analytics
- Admin
- Help
- Try New Edge
- Parameswari.bala@rp...
- API Management

Breadcrumbs: Dashboard / API Proxies / FlowHookDemo / Trace / 1

Organization: parameswaribala-eval

Trace Session Details:

- Deployment to Trace: Environment test, Revision 1
- Remaining Time: 09:33
- Send Requests: Method GET URL http://parameswaribala-eval-test.apigee.net/flowhookdemo
- Status: 200

Transactions Table:

Index	Status	Method	URI	Elapsed
1	200	GET	/flowhookdemo	1375 ms

Transaction Map:

Phase Details:

- Request Received from Client: GET /flowhookdemo
- Response Sent to Client: 200 OK

Request Headers:

Accept	*
Accept-Encoding	gzip,deflate
Host	parameswaribala-eval-test.apigee.net
User-Agent	AHC/1.0
Forwarded For	12.112.122.140

Response Headers:

Access-Control-Allow-Credentials	true
Access-Control-Allow-Headers	origin,x-requested-with,accept
Access-Control-Allow-Methods	GET,PUT,POST,DELETE
Access-Control-Allow-Origin	*
Access-Control-Max-Age	3600000

View Options:

- Transaction Map
 - Show Disabled Policies (none)
 - Show Skipped Phases (1)
 - Show All FlowInfos (11)
- Phase Details
 - Automatically Compare Selected Phase
 - Show Variables
 - Show Properties

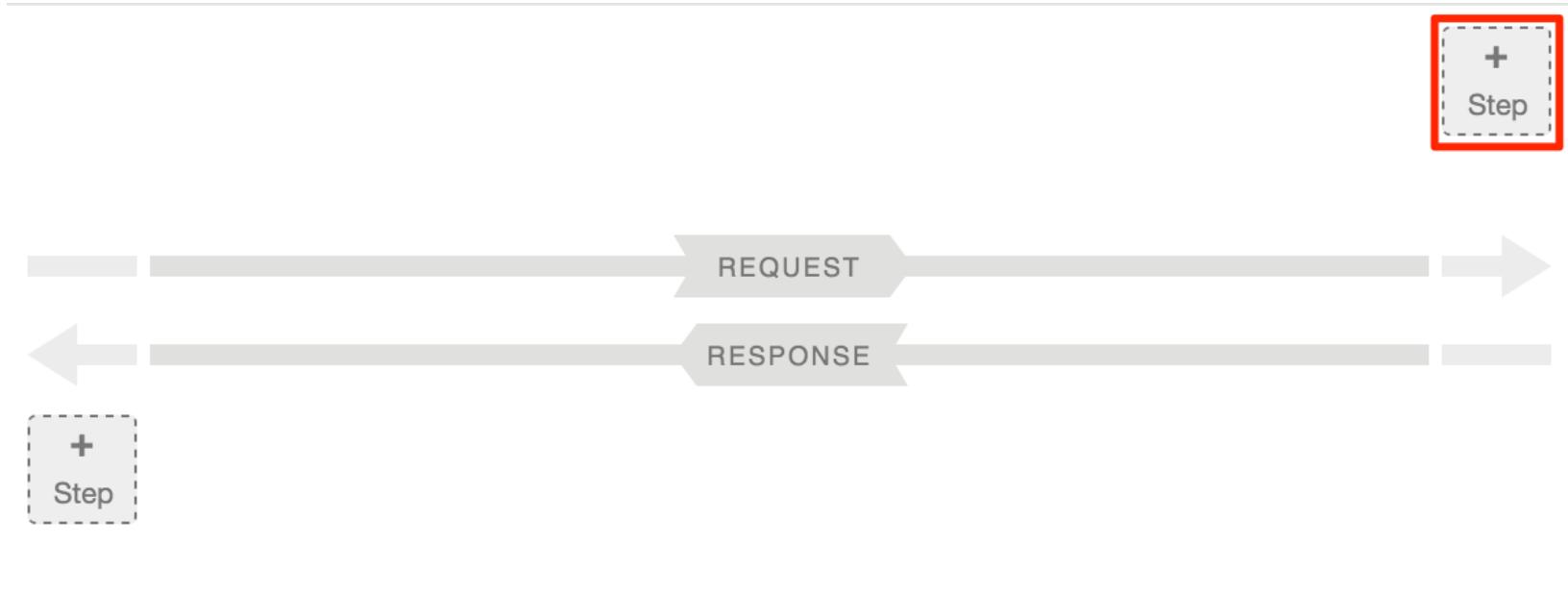
Bottom Navigation:

- Type here to search
- File
- PowerPoint
- Folder
- OneDrive
- 99+
- Google Play
- Chrome
- File Explorer
- Word
- Excel
- PowerPoint
- OneNote

System Status:

- 05:52
- 28/11/2018
- ENG

Add the Spike Arrest policy to your API



Add the Spike Arrest policy to your API



Add Step

Policy Instance New Existing

TRAFFIC MANAGEMENT	
<input type="checkbox"/> Quota	Policy Type <input type="radio"/> Spike Arrest
<input checked="" type="checkbox"/> Spike Arrest	Display Name <input type="text" value="Spike Arrest-1"/>
<input type="checkbox"/> Response Cache	Name <input type="text" value="Spike-Arrest-1"/>
<input type="checkbox"/> Lookup Cache	
<input type="checkbox"/> Populate Cache	
<input type="checkbox"/> Invalidate Cache	
<input type="checkbox"/> Reset Quota	
SECURITY	
<input type="checkbox"/> Basic Authentication	
<input type="checkbox"/> XML Threat Protection	
<input type="checkbox"/> JSON Threat Protection	
<input type="checkbox"/> Regular Expression Protection	
<input type="checkbox"/> OAuth v2.0	

Add the Spike Arrest policy to your API



helloworld_policies What's new in the Proxy Editor

OVERVIEW DEVELOP TRACE PERFORMANCE

Project Save Revision 1 Tools Deployment Help for Selected Flow Search

Navigator

- helloworld_policies
- Policies
 - Spike Arrest-1
- Proxy Endpoints
- default
 - All PreFlow
 - All PostFlow
- Target Endpoints
- default
 - All PreFlow
 - All PostFlow
- Scripts

Flow: PreFlow

The screenshot shows the Apigee Proxy Editor interface. On the left, the Navigator pane lists the project structure. In the center, the Flow: PreFlow editor shows a single policy step named "Spike Arrest-1". The flow diagram indicates REQUEST and RESPONSE paths. A modal window titled "Endpoint default Policy Spike Arrest-1" displays the XML configuration for the policy:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<SpikeArrest async="false" continueOnError="false" enabled="true" name="Spike-Arrest-1">
    <DisplayName>Spike Arrest-1</DisplayName>
    <Properties/>
    <Identifier ref="request.header.some-header-name"/>
    <MessageWeight ref="request.header.weight"/>
    <Rate>30ps</Rate>
</SpikeArrest>
```

On the right, the Property Inspector panel shows details for the "PreFlow" step, including its name, request, step name, and response.

Deployed to test

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Add the Spike Arrest policy to your API



helloworld_policies What's new in the Proxy Editor

OVERVIEW DEVELOP TRACE PERFORMANCE

Project Save Revision 1 Tools Deployment Help for Selected Spike Arrest Policy Search

Policies

- helloworld_policies
- Spike Arrest-1

Proxy Endpoints

default

- All PreFlow
- All PostFlow

Target Endpoints

default

- All PreFlow
- All PostFlow

Scripts

Policy: Spike Arrest-1

Type: SpikeArrest

Display Name: Spike Arrest-1

Name: Spike-Arrest-1

Attached to: Flow ALL PreFlow in default Proxy Endpoint

Property Inspector Spike Arrest-1

SpikeArrest	
async	false
continueOnError	false
enabled	true
name	Spike-Arrest-1
DisplayName	Spike Arrest-1
Properties	
Identifier	
ref	request.header.some-header-name
MessageWeight	
ref	request.header.weight
Rate	30ps

Code Spike Arrest-1

```
1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <SpikeArrest async="false" continueOnError="false" enabled="true" name="Spike-Arrest-1">
3   <DisplayName>Spike Arrest-1</DisplayName>
4   <Properties/>
5   <Identifier ref="request.header.some-header-name"/>
6   <MessageWeight ref="request.header.weight"/>
7   <Rate>30ps</Rate>
8 </SpikeArrest>
```

In the XML for the policy, change the value of the <Rate> element to 1pm (which translates into roughly 2 requests allowed every 60 seconds in the cloud).

-
- Execute the curl command (or refresh the browser window) two or three more times within one minute, and notice that you get the following message because you exceeded the rate limit of the policy:

```
• {  
•   "fault": {  
•     "faultstring": "Spike arrest violation. Allowed rate : 1pm",  
•     "detail": {  
•       "errorcode": "policies.ratelimit.SpikeArrestViolation"}  
•     }  
•   }  
• }
```
 - If you try making more calls within a minute, you should continue to get the fault message.

- Edit your policy to set the <Rate> limit to 15pm (which translates into roughly 2 calls allowed every 4 seconds in the cloud), and then save the API proxy.
- Run the curl command or refresh the browser repeatedly (cURL is faster).
- Notice that if you make one or two calls within 4-second intervals, your calls succeed.
- If you make the calls quickly, more than two in within 4 seconds, you should get the fault. But after each 4-second interval you can continue making calls, as opposed to being blocked out for an entire minute (with the 1pm setting).

Populate Cache Policy

- Write arbitrary data, not necessarily response content, to the cache.
- You can use composite keys for the cache, so that you could cache user information, client information etc., so on.
- Each cache item can be tagged with an individual Time-to-Live, so data can be available for 10 seconds or 10 hours or 10 days, etc. PopulateCache.

Response Cache policy

- Caches data from a backend resource, reducing the number of requests to the resource.
- As apps make requests to the same URI, you can use this policy to return cached responses instead of forwarding those requests to the backend server.
- The ResponseCache policy can improve your API's performance through reduced latency and network traffic.

Response Cache policy

- By using ResponseCache to return cached responses between refreshes, you can decrease the number of requests reaching the backend.
- This also reduces the number of network hops.

LookupCache policy

- Retrieve values that have been cached with the PopulateCache policy. LookupCache.

Invalidate cache policy

- Purges values that have been cached by PopulateCache. Invalidate Cache policy.

Conditional Flow

- Business Team Requirements :
- API Response of GET Individual Employee details should be of XML format instead of JSON.
- API Response of other endpoints like get all employee details, create employee, update employee, delete employee should be JSON as it is sent by the target server.

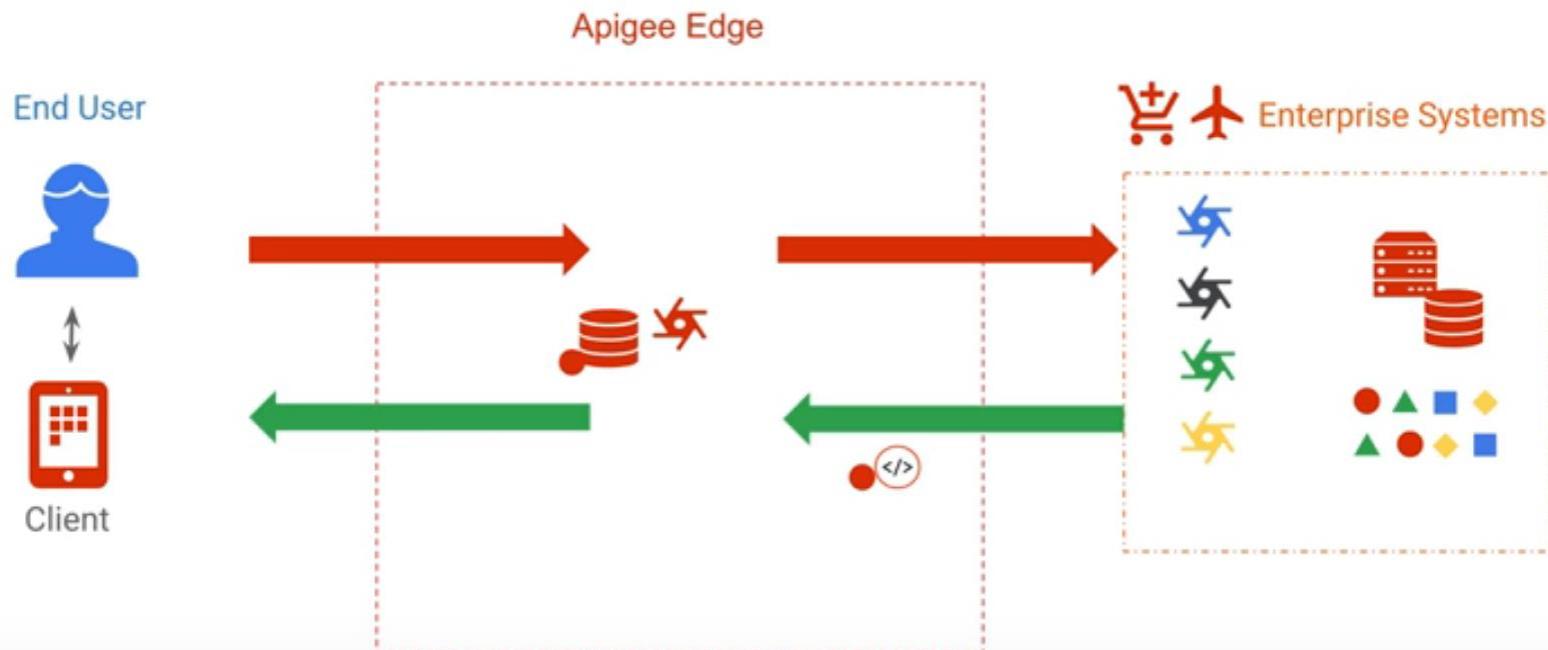
Caching

API Caching - Apigee Edge



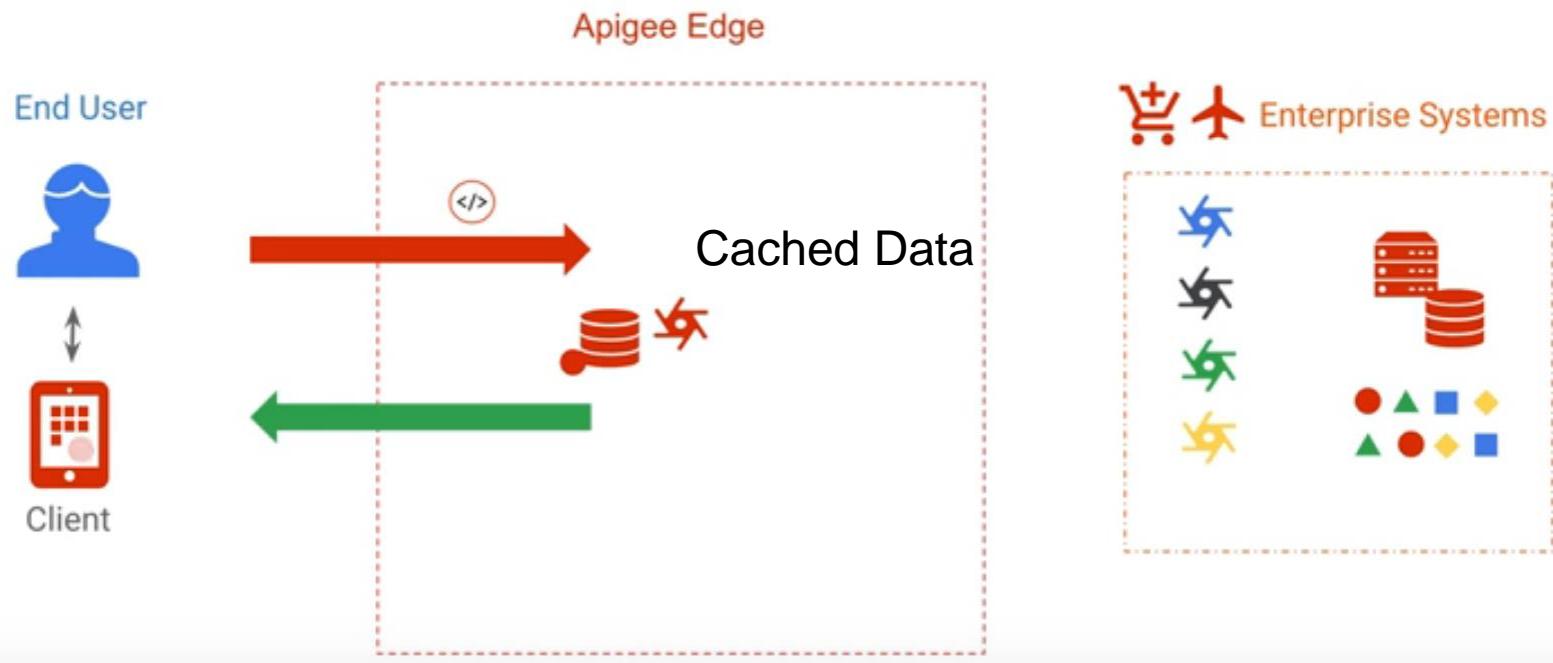
Caching

API Caching - Apigee Edge



Caching

API Caching - Apigee Edge



Cache Parameters

- <PopulateCache name="token-cache">
- <!-- The cache to write to. -->
- <CacheResource>mycache</CacheResource>
- <!-- The source of the data, a variable containing the value. -->
- <Source>twitter-translate.apiAccessToken</Source>
- <!-- An enumeration representing a prefix for namespace scope. -->
- <Scope>Exclusive</Scope>
- <!-- A unique pointer (a flow variable value) to the data. Use this later to retrieve it. -->
- <CacheKey>
- <KeyFragment>apiAccessToken</KeyFragment>
- <KeyFragment ref="request.queryparam.client_id"></KeyFragment>
- </CacheKey>
- <!-- Entries placed into the cache with this policy will expire after 600 seconds. -->
- <ExpirySettings>
- <TimeoutInSec>600</TimeoutInSec>
- </ExpirySettings>
- </PopulateCache>

Caching

OYO (@oyorooms) • Instagram p x | parameswaribala-eval - Apigee x | https://parameswaribala-eval-test.apigee.net/googlebooksdemo x | Inbox (1,426) - parameswaribala x | (205) Apigee - 4MV4D - Garden x | +

Apps Insert title here Empire New Tab How to use Assertion Browser Automation node.js - How can I fi Freelancer-dev-81048 Courses

```
{
  "kind": "books#volumes",
  "totalItems": 988,
  "items": [
    {
      "kind": "books#volume",
      "id": "ZH6bpbcrlvYC",
      "etag": "hvLE67ycAKo",
      "selfLink": "https://www.googleapis.com/books/v1/volumes/ZH6bpbcrlvYC",
      "volumeInfo": {
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        "subtitle": "Building Javascript Based Scalable Software",
        "authors": [
          "Pedro Teixeira"
        ],
        "publisher": "John Wiley & Sons",
        "publishedDate": "2012-10-01",
        "description": "Learn to build fast and scalable software in JavaScript with Node.js. Node.js is a powerful and popular new framework for writing scalable network programs using JavaScript. This no-nonsense book begins with an overview of Node.js and then quickly dives into the code, core concepts, and APIs. In-depth coverage covers the essentials to cover debugging, unit testing, and flow control so that you can start building and testing your own modules right away. Covers node and asynchronous programming main concepts Addresses the basics: modules, buffers, events, and timers Explores streams, file systems, networking, and automated unit testing Goes beyond the basics, and shares techniques and tools for debugging, unit testing, and flow control If you already know JavaScript and are curious about the power of Node.js, then this is the ideal book for you.",
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}
```

Type here to search

06:10 28/11/2018

Caching

apigee

The screenshot shows the Apigee API Management interface for a trace session. The top navigation bar includes links for Instagram, parameswaribala-apigee, Inbox, YouTube, and various browser extensions. The main header has tabs for apigee, Dashboard, APIs, Publish, Analytics, Admin, Help, Try New Edge, and API Management. The current view is under the API Management tab.

The page title is "googlebooksdemo What's new in the Proxy Editor". It displays a trace session for a "googlebooksdemo" proxy. The session details show a single transaction: Status 200, Method GET, URI /googlebooksdemo, and Elapsed time 304 ms. A red arrow points from the status bar at the bottom of the image to this transaction row.

The "Send Requests" section shows a GET request to http://parameswaribala-eval-test.apigee.net/googlebooksdemo. The "Transaction Map" shows a flow from a client device icon to a central node, then to an external service (AX) node, and finally back to a client device icon. The "Phase Details" section shows two phases: "Request Received from Client" (GET /googlebooksdemo) and "Response Sent to Client" (200 OK). The "Request Headers" and "Response Headers" tables provide detailed information about the request and response.

The "View Options" sidebar on the left includes settings for Transaction Map (Show Disabled Policies, Show Skipped Phases, Show All FlowInfos), Phase Details (Automatically Compare Selected Phase, Show Variables, Show Properties), and a search bar.

The bottom status bar shows system icons for battery, signal, and volume, along with the date and time (06:13, 28/11/2018).

Caching

https://enterprise.apigee.com/platform/parameswaribala-eval/proxies/googlebooksdemo/trace/1

Dashboard APIs Publish Analytics Admin Help Try New Edge Parameswari.bala@rp... API Management

googlebooksdemo What's new in the Proxy Editor

Deployment to Trace Environment test, Revision 1 ▾ Stop Trace Session Remaining Time: 09:43 Download Trace Session

Transactions Status Method URI Elapsed

1	200	GET	/googlebooksdemo	56 ms
---	-----	-----	------------------	-------

Send Requests

Method URL

GET http://parameswaribala-eval-test.apigee.net/googlebooksdemo

Transaction Map

Phase Details

- Request Received from Client **GET /googlebooksdemo**
- Response Sent to Client **200 OK**

Request Headers

Accept	*
Accept-Encoding	gzip,deflate
Host	parameswaribala-eval-test.apigee.net
User-Agent	AHC/1.0
Forwarded For	12.111.26.229

Response Headers

Access-Control-Allow-Headers	origin,x-requested-with,accept
Access-Control-Allow-Methods	GET,PUT,POST,DELETE
Access-Control-Allow-Origin	*
Access-Control-Max-Age	3628800
Cache-Control	private max-age=0 must-revalidate no-transform
Output from all Transactions	

View Options

Transaction Map

- Show Disabled Policies (none)
- Show Skipped Phases (1)
- Show All FlowInfos (4)

Phase Details

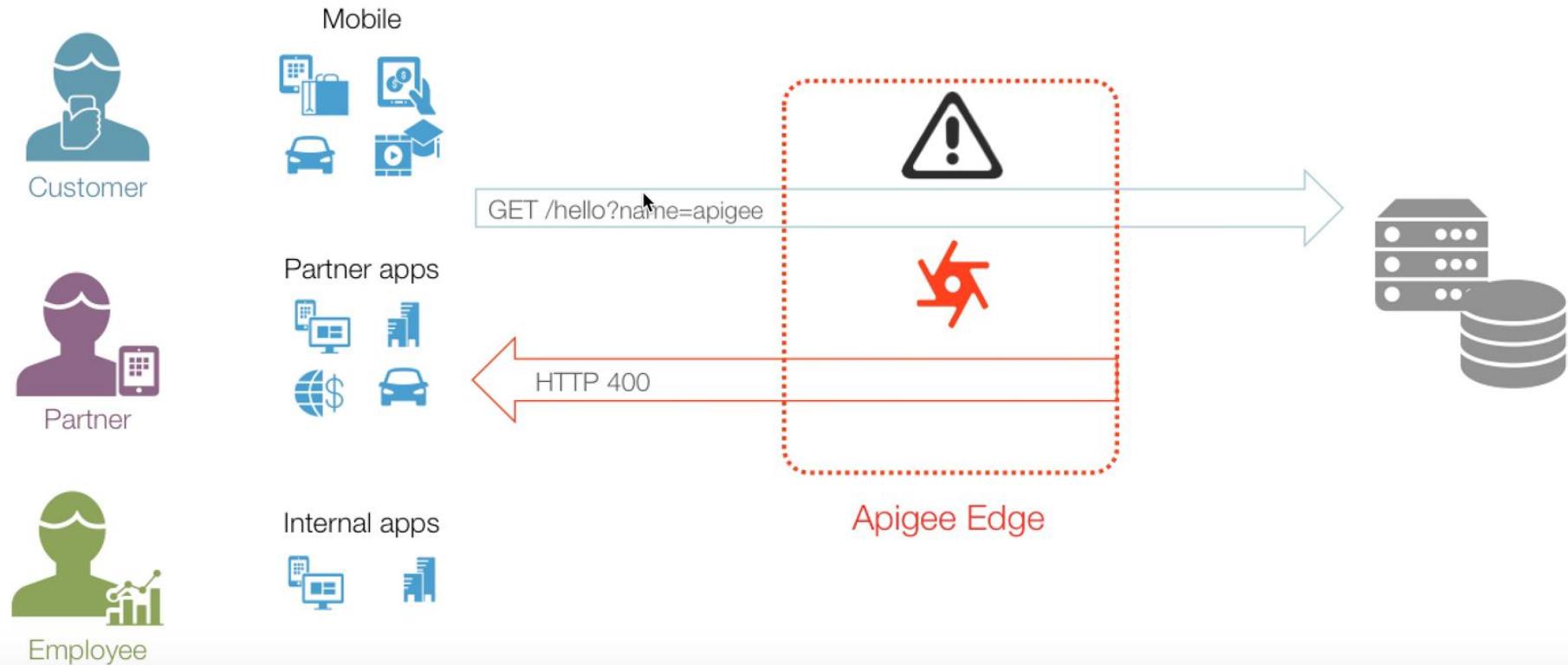
- Automatically Compare Selected Phase
- Show Variables
- Show Properties

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Raise Fault

Raise fault at proxy layer

Problem Statement



SAML Authentication

SAML Settings Edit

GENERAL

Single Sign On URL	https://dxhglopzvipwope-s5piws67lth8ith2.accounts.apigee.io/saml/SSO/alias/dxhglopzvipwope-s5piws67lth8ith2.apigee-saml-login
Recipient URL	https://dxhglopzvipwope-s5piws67lth8ith2.accounts.apigee.io/saml/SSO/alias/dxhglopzvipwope-s5piws67lth8ith2.apigee-saml-login
Destination URL	https://dxhglopzvipwope-s5piws67lth8ith2.accounts.apigee.io/saml/SSO/alias/dxhglopzvipwope-s5piws67lth8ith2.apigee-saml-login
Audience Restriction	dxhglopzvipwope-s5piws67lth8ith2.apigee-saml-login
Default Relay State	Tamilnadu
Name ID Format	Transient
Response	Signed
Assertion Signature	Signed
Signature Algorithm	RSA_SHA256
Digest Algorithm	SHA256

SAML Authentication

SIGN ON METHODS

The sign-on method determines how a user signs into and manages their credentials for an application. Some sign-on methods require additional configuration in the 3rd party application.

Application username is determined by the user profile mapping. [Configure profile mapping](#)

SAML 2.0

Default Relay State Tamilnadu

 SAML 2.0 is not configured until you complete the setup instructions.
[View Setup Instructions](#)

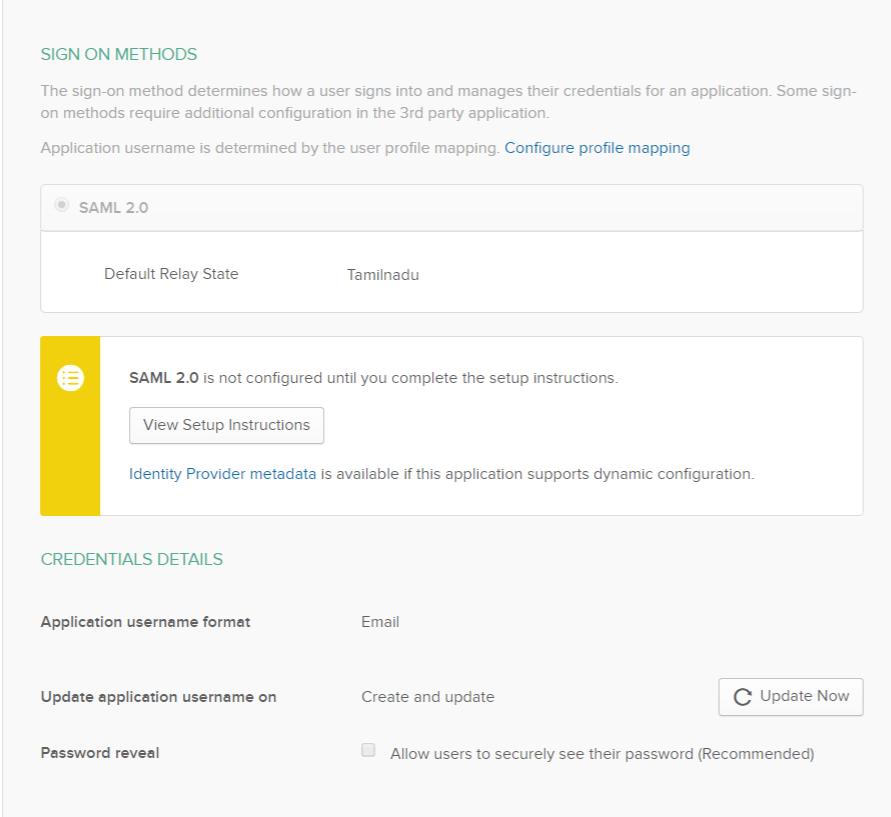
[Identity Provider metadata](#) is available if this application supports dynamic configuration.

CREDENTIALS DETAILS

Application username format Email

Update application username on Create and update [C Update Now](#)

Password reveal Allow users to securely see their password (Recommended)



experience by not requiring the user to know their credentials. Users cannot edit their credentials when SAML 2.0 is configured for this application. Additional configuration in the 3rd party application may be required to complete the integration with Okta.

Application Username

Choose a format to use as the default username value when assigning the application to users.

If you select None you will be prompted to enter the username manually when assigning an application with password or profile push provisioning features.

SAML Authentication

Developer Programs > Configuration > SAML Identity Provider

Provider Configuration

Enabled

SAML Settings

Configure SAML settings. [Learn more](#)

Sign-in URL	https://rpsconsulting.okta.com/app/rpsconsulting_testapp_1/exk21173wbvaedjHw357/sso/saml
Sign-out URL	https://rpsconsulting.okta.com/app/rpsconsulting_testapp_1/exk21173wbvaedjHw357/sso/saml
IDP entity ID	http://www.okta.com/exk21173wbvaedjHw357
SP metadata URL	https://dxhglopzvipwope-s5piws67lth8ith2.accounts.apigee.io/saml/metadata/alias/dxhglopzvipwope-s5piws67lth8ith2.apigee-saml-login

Identity providers

Provider Type: SAML

Connected portal

Portal Name: testportal

Certificate

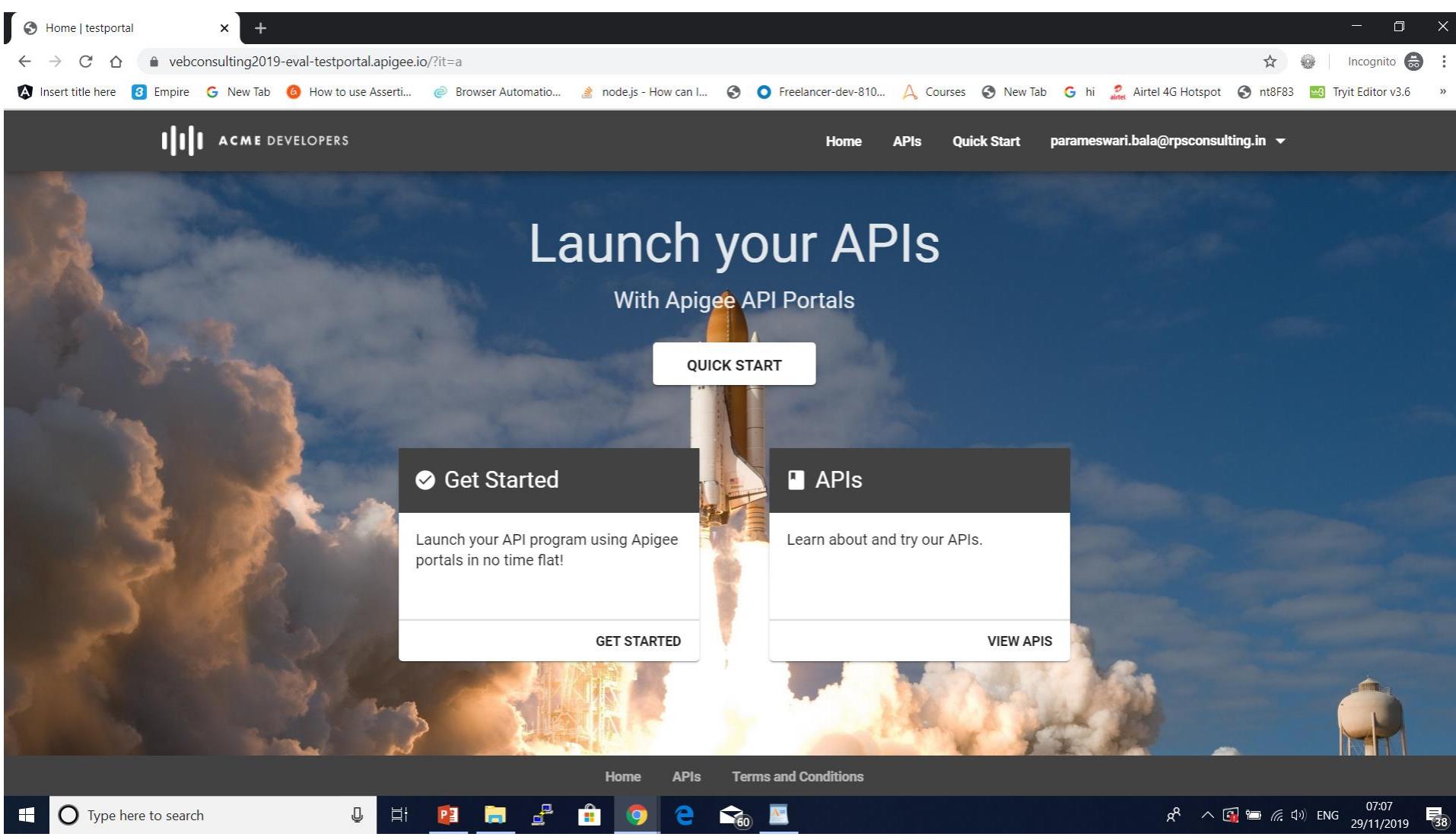
Upload a new certificate. [Learn more](#)

Common name	rpsconsulting
Issued by	rpsconsulting
Fingerprint	SHA1: 8A C5 19 5C 87 F7 53 E6 B1 07 A2 95 A9 8A 2C C9 02 5F 76 97

Test SAML Authentication

- Open new incognito window (option in chrome) and sign in

Test SAML Authentication



Home | testportal x + Incognito ...

vebconsulting2019-eval-testportal.apigee.io/?it=a

Insert title here Empire New Tab How to use Asserti... Browser Automatio... node.js - How can I... Freelancer-dev-810... Courses New Tab hi Airtel 4G Hotspot nt8F83 TryIt Editor v3.6

ACME DEVELOPERS

Home APIs Quick Start parameswari.bala@rpsconsulting.in ▾

Launch your APIs

With Apigee API Portals

QUICK START

Get Started

Launch your API program using Apigee portals in no time flat!

GET STARTED

APIs

Learn about and try our APIs.

VIEW APIS

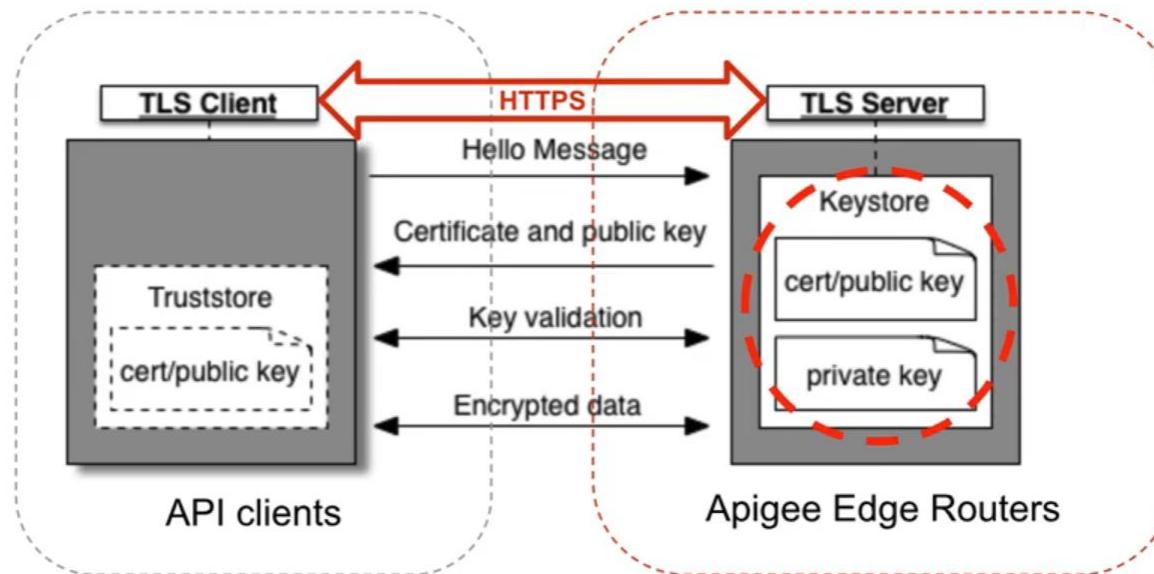
Home APIs Terms and Conditions

Type here to search

07:07 29/11/2019 ENG 38

TLS Certificate

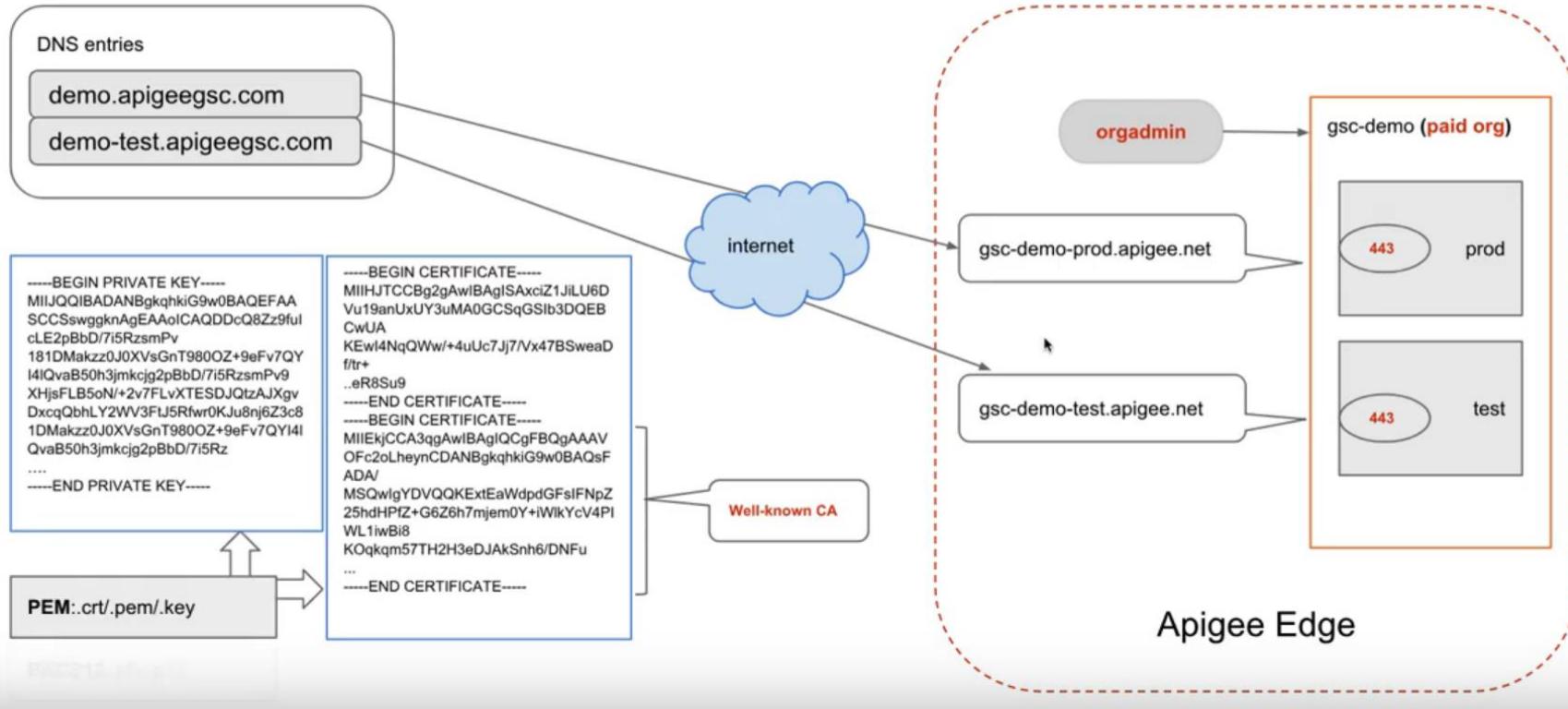
One-way TLS configuration



TLS Certificate

Edge Virtual Hosts Module - One-way TLS

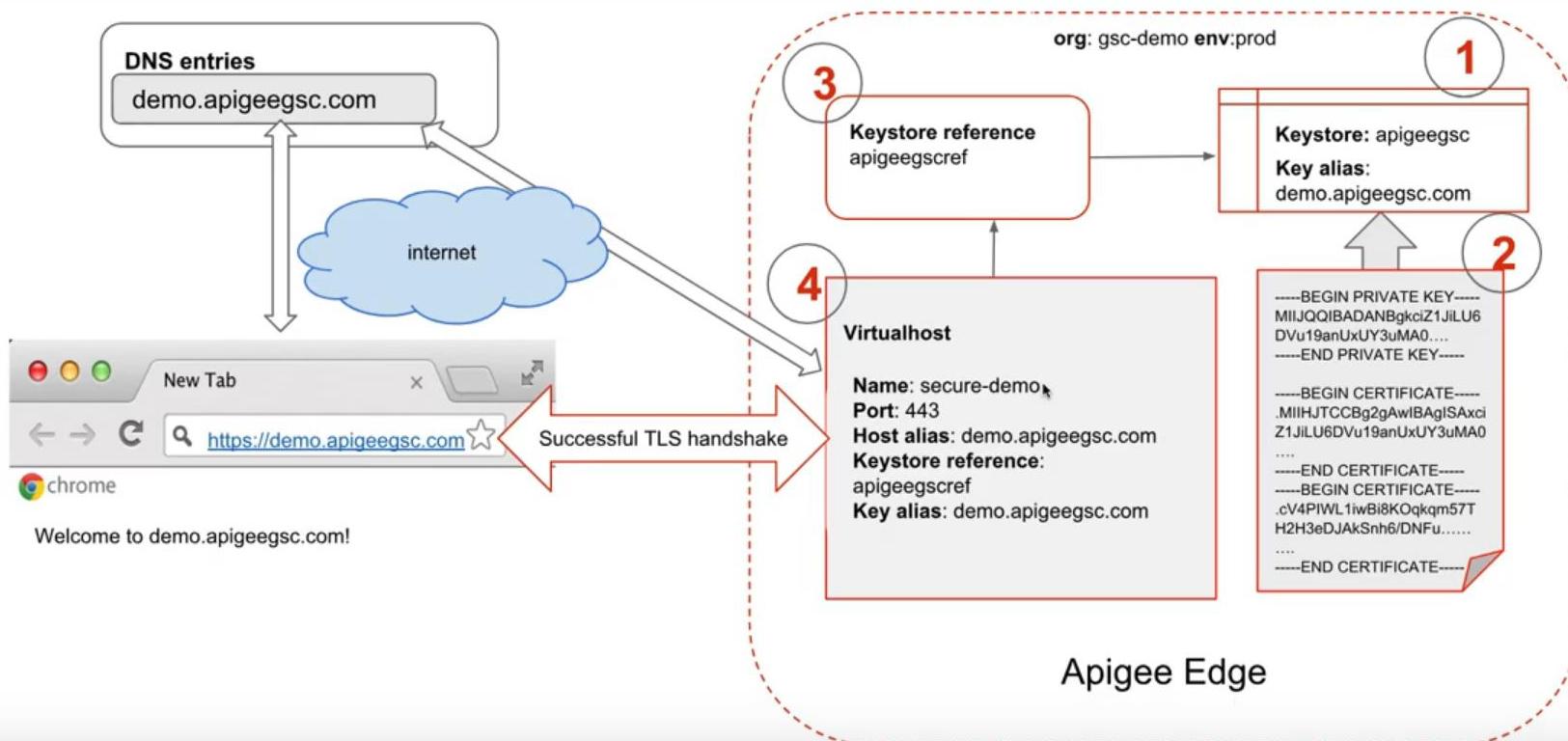
One-Way TLS Requirements



TLS Certificate

Edge Virtual Hosts Module - One-way TLS

Steps



TLS Certificate

Edge Virtual Hosts Module - One-way TLS



Demo

One-Way TLS configuration on Apigee Edge through the Edge UI

demo.apigeegsc.com → **gsc-demo-prod.apigee.net**

TLS Certificate

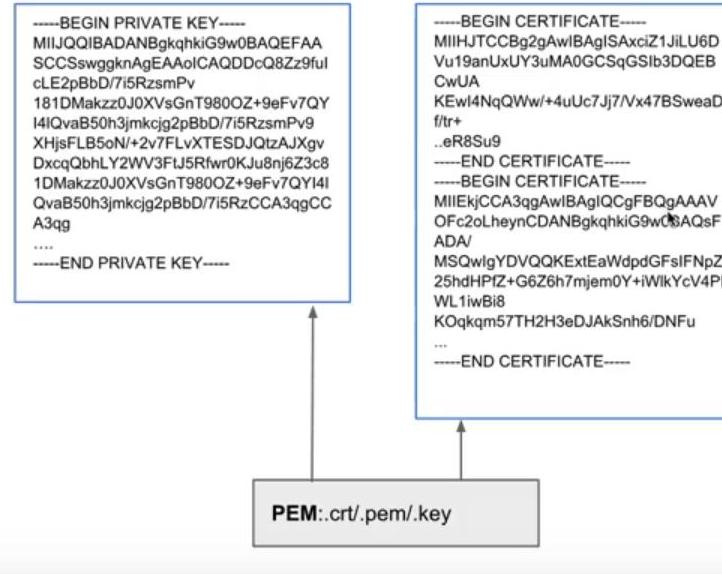
Edge Virtual Hosts Module - One-way TLS

Demo



One-Way TLS configuration on Apigee Edge through the Edge UI

demo.apigeeegsc.com → gsc-demo-prod.apigee.net



keystore

TLS Certificate

```
openssl req -new -newkey rsa:4096 -x509 -sha256 -days 365 -nodes -out  
MyCertificate.crt -keyout MyKey.key
```

```
Administrator: RabbitMQ Command Prompt (sbin dir)
```

```
G:\Local disk\APIGEE\tlskey>openssl req -new -newkey rsa:4096 -x509 -sha256 -days 365 -nodes -out MyCertificate.crt -k  
eyout MyKey.key  
Generating a RSA private key  
.....  
.....+++++  
writing new private key to 'MyKey.key'  
-----  
You are about to be asked to enter information that will be incorporated  
into your certificate request.  
What you are about to enter is what is called a Distinguished Name or a DN.  
There are quite a few fields but you can leave some blank  
For some fields there will be a default value,  
If you enter '.', the field will be left blank.  
-----  
Country Name (2 letter code) [AU]:IN  
State or Province Name (full name) [Some-State]:TAMILNADU  
Locality Name (eg, city) []:CHENNAI  
Organization Name (eg, company) [Internet Widgits Pty Ltd]:RPS  
Organizational Unit Name (eg, section) []:RPS CONSULTING  
Common Name (e.g. server FQDN or YOUR name) []:PARAMESWARI  
Email Address []:parameswaribala@gmail.com  
  
G:\Local disk\APIGEE\tlskey>dir  
Volume in drive G is New Volume  
Volume Serial Number is 8E55-7759
```

TLS Certificate

Screenshot of the Apigee Edge interface showing a TLS certificate configuration.

The browser tabs are:

- Troubleshooting guide | Okta
- Edge Virtual Hosts Module - One
- Create a Self-Signed TLS Certificate
- Welcome | Apigee Edge

The Apigee sidebar shows the current environment and various management options:

- Parameswari Ettiyap... vebconsulting2019-...
- Develop
- Publish
- Analyze
- Admin
- Audit Logs
- Environments
 - Caches
 - Flow Hooks
 - Key Value Maps
 - References
 - Target Servers
- TLS Keystores** (highlighted)
- Extensions
- Privacy & Security
- Roles

The main content area displays the details of a TLS keystore entry for `demo.apigeegsc.com`:

demo.apigeegsc.com

Certificate Type	Certificate and Key	Signature algorithm	SHA256withRSA
Validity	Nov 29, 2019 to Nov 28, 2020	Public key	RSA Public Key, 4096 bits
Serial number	00:c2:2e:b2:8b:d4:a7:25:dc	Basic constraints	CA:TRUE

Subject

Common Name	PARAMESWARI
Alternative names	N/A
Organization unit	RPS CONSULTING
Organization	RPS
Locality	CHENNAI, TAMILNADU, India (IN)

Issuer

Common Name	PARAMESWARI
Organization unit	RPS CONSULTING
Organization	RPS
Serial number	N/A
Locality	CHENNAI, TAMILNADU, India (IN)

Windows taskbar at the bottom:

- Type here to search
- Icons for File Explorer, Microsoft Word, Microsoft Excel, Microsoft Powerpoint, Microsoft OneDrive, Microsoft Edge, Google Chrome, Mail, Task View, and File Explorer
- System tray icons for battery, signal strength, volume, and system status
- System information: 07:40, 29/11/2019, 264

TLS Certificate

Screenshot of the Apigee Edge interface showing the 'References' dialog box.

The dialog box is titled "Edit Reference". It contains the following fields:

- Name: apigeegsreference
- Reference: apigeegsc

At the bottom right of the dialog box are two buttons: "Cancel" and "Update Reference".

The background shows the Apigee Edge environment list, with "prod" selected. The list includes:

- NAME: apigeegsreference
- NAME: apigeegsc
- NAME: freetrialref

The "References" tab is highlighted in the sidebar.

System tray icons are visible at the bottom right, including signal strength, battery level, and system status.

TLS Certificate

Edge Virtual Hosts Module - One-way TLS

The screenshot shows the Apigee Edge interface. On the left, the navigation sidebar includes options like AG, ADMIN, Users, Roles, Virtual Hosts (which is selected), Environments, Audit Logs, and Privacy & Security. The main content area displays the "Virtual Hosts" table with two entries: "default" (port 80, alias gsc-demo-prod.apigee.net) and "secure" (port 443, alias gsc-demo-prod.apigee.net). A modal window titled "Create Virtual Host" is open on the right, showing fields for "Port" (443), "Host Aliases" (demo.apigee.com), and "TLS Information". The TLS section includes settings for "TLS/SSL" (Enabled), "Keystore" (ref://apigee.com), "Keystore Alias" (demo.apigee.com), "Client Authorization" (Disabled), "Trust Store" (None), and "Ignore Validation Errors" (False). At the bottom of the modal, there's a "Properties" section with a note to "Add properties to further configure your virtual host".

NAME	PORT	ALIAS
default	80	gsc-demo-prod.apigee.net
secure	443	gsc-demo-prod.apigee.net

Create Virtual Host

Port: 443

Host Aliases *: demo.apigee.com

Add an alias: Press "Enter" to add an alias

TLS Information

Configure the following security attributes

TLS/SSL: Enabled

Keystore*: ref://apigee.com

Keystore Alias*: demo.apigee.com

Client Authorization: Disabled

Trust Store: (None)

Ignore Validation Errors: True (radio button selected)

Properties

Add properties to further configure your virtual host

TLS Certificate

Edge Virtual Hosts Module - One-way TLS

Virtual Hosts

Environment prod All 1 - 3 of 3

NAME*	PORT	ALIAS
default	80	gsc-demo-prod.apigee.net
secure	443	gsc-demo-prod.apigee.net
secure-demo	443	demo.apigee.gsc.com

AG apigee gsc gsc-demo

ADMIN

Users

Roles

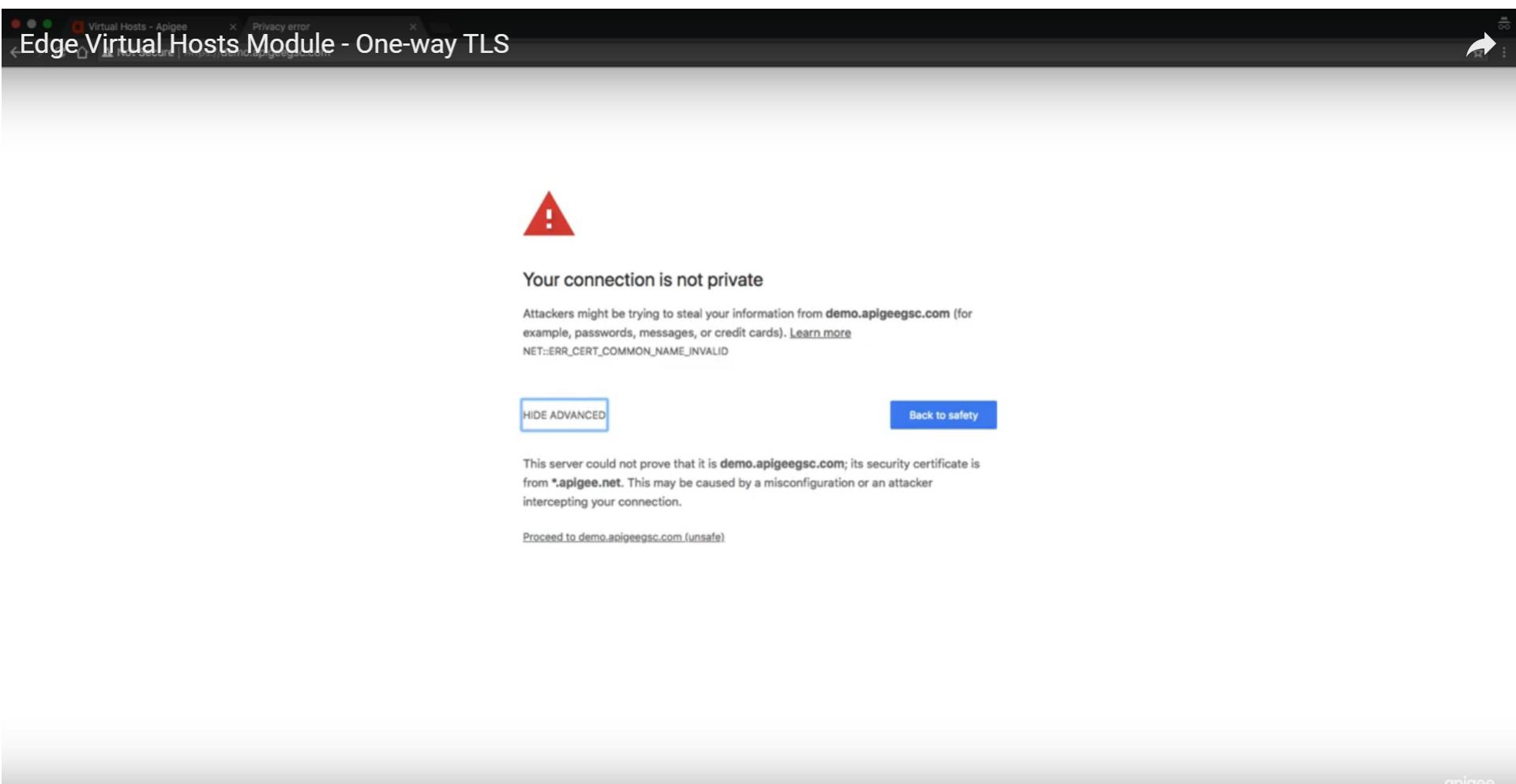
Virtual Hosts

Environments

Audit Logs

Privacy & Security

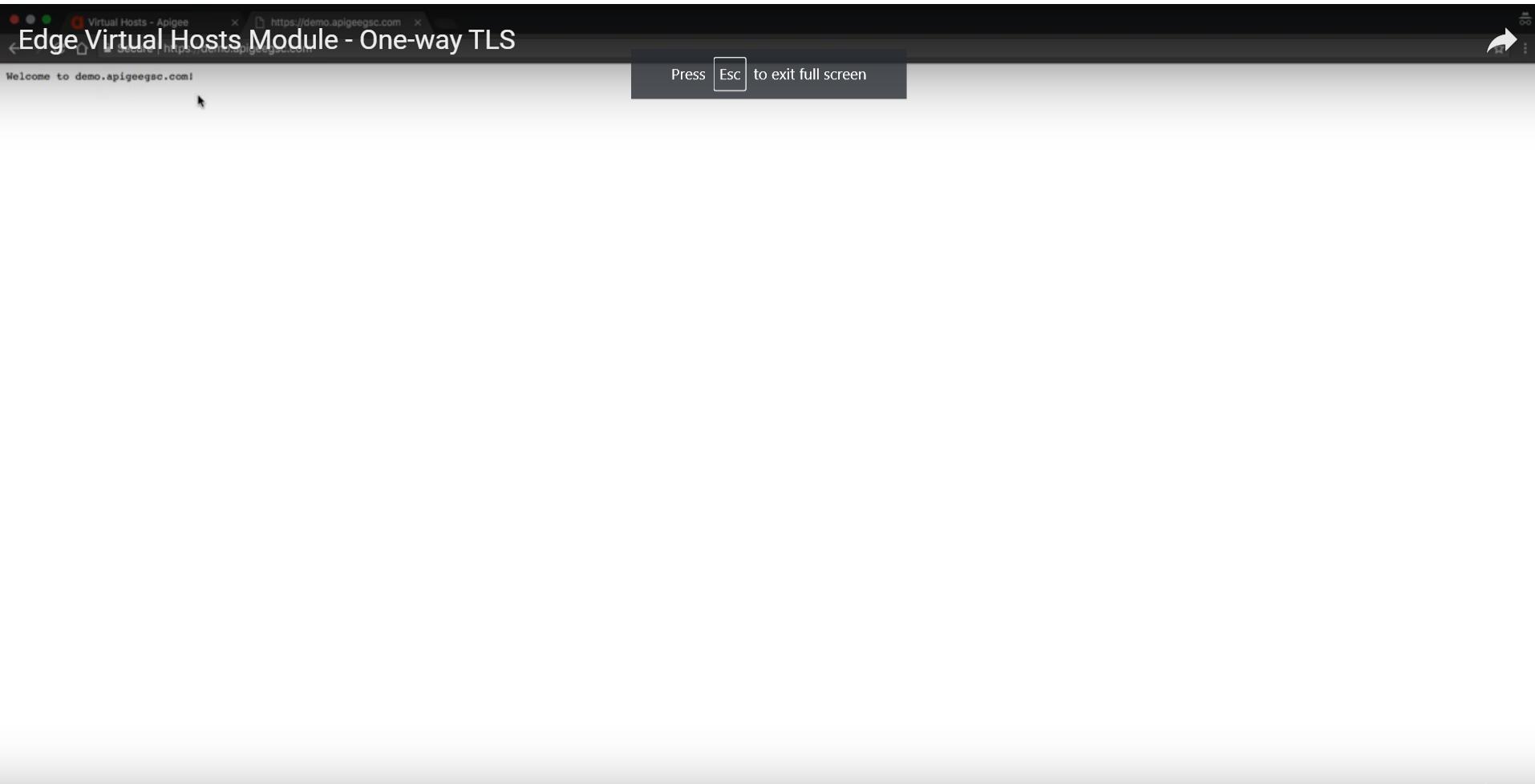
TLS Certificate



The screenshot shows a browser window with the following details:

- Title Bar:** Edge Virtual Hosts Module - One-way TLS
- Address Bar:** demo.apigee.com
- Content Area:**
 - A large red warning icon with an exclamation mark.
 - Your connection is not private**
 - Text explaining the risk: "Attackers might be trying to steal your information from **demo.apigee.com** (for example, passwords, messages, or credit cards). [Learn more](#)"
 - Code: NET::ERR_CERT_COMMON_NAME_INVALID
 - Buttons: "HIDE ADVANCED" (highlighted with a blue border) and "Back to safety"
 - Text below the buttons: "This server could not prove that it is **demo.apigee.com**; its security certificate is from ***.apigee.net**. This may be caused by a misconfiguration or an attacker intercepting your connection."
 - Link at the bottom: "[Proceed to demo.apigee.com \(unsafe\)](#)"

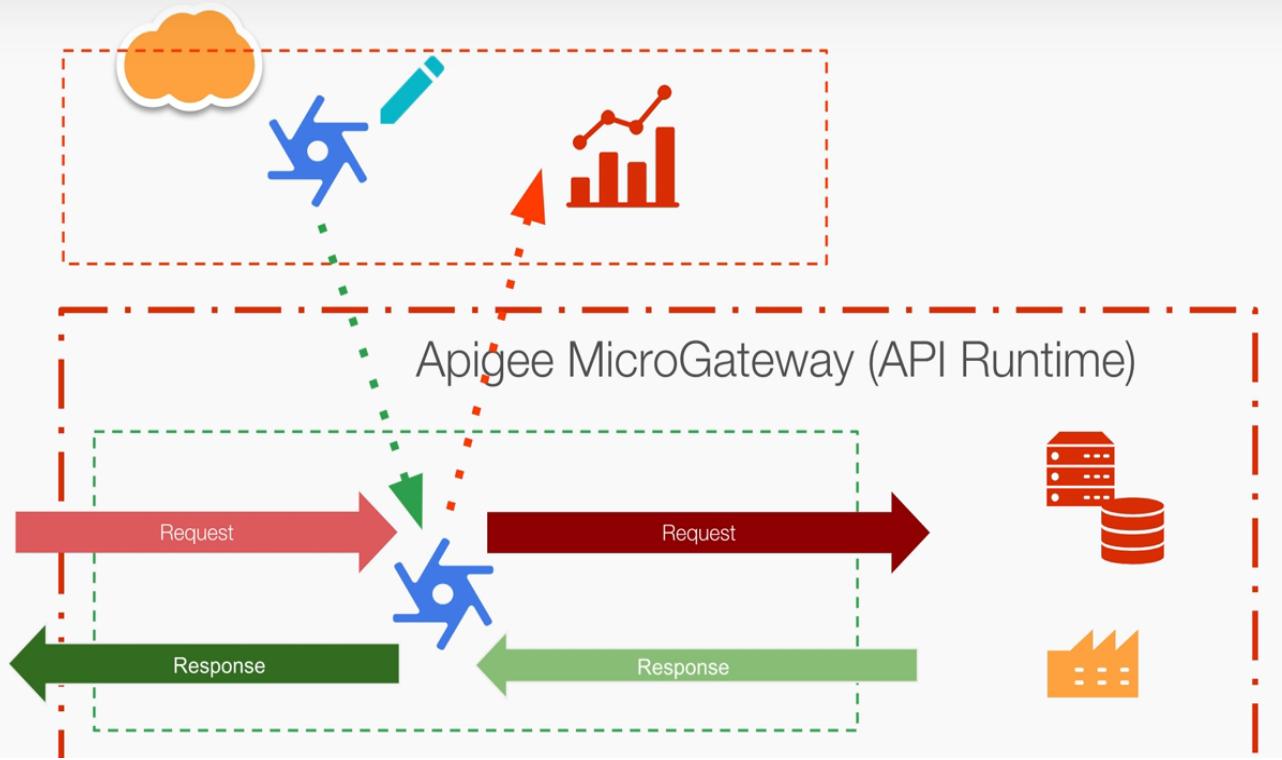
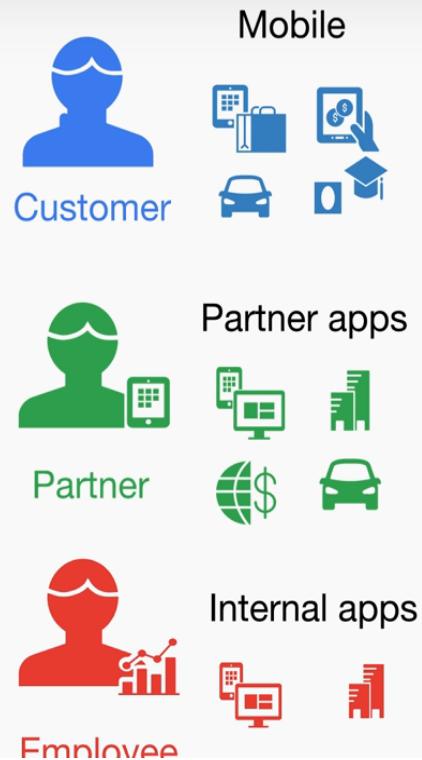
TLS Certificate



Edge Microgateway

- Apigee Edge Microgateway is a secure, HTTP-based message processor for APIs.
- Its main job is to process requests and responses to and from backend services securely while asynchronously pushing valuable API execution data to Apigee Edge where it is consumed by the Edge Analytics system.

Apigee Edge Cloud (Management Plane)



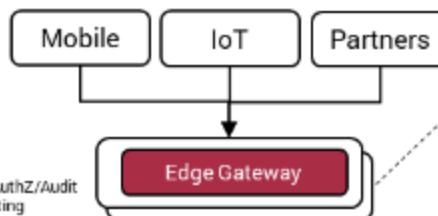
Centralized governance



Coupled with Modernized elastic runtimes

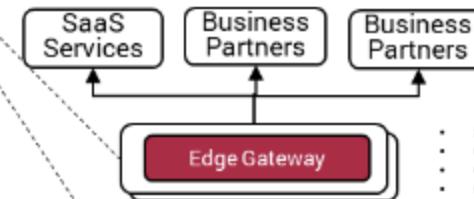
1. Consumer edge

- Generate revenue
- New protocols
- Server side AuthN/AuthZ/Audit
- Quota and Rate limiting
- Server Secured transport layer
- Threat detection



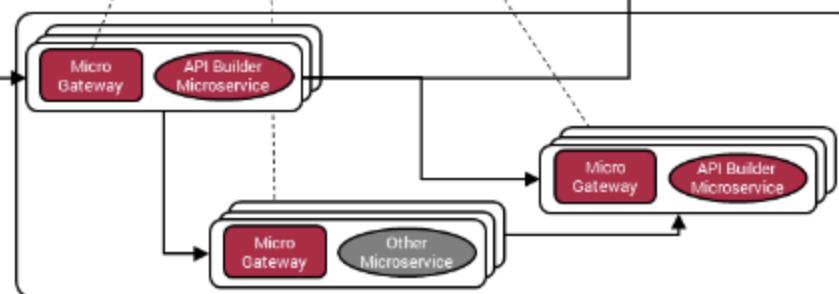
2. Provider edge

- Share revenue/control costs
- Client side AuthN/AuthZ/Audit
- Quota and Rate limiting
- Client Secured transport layer

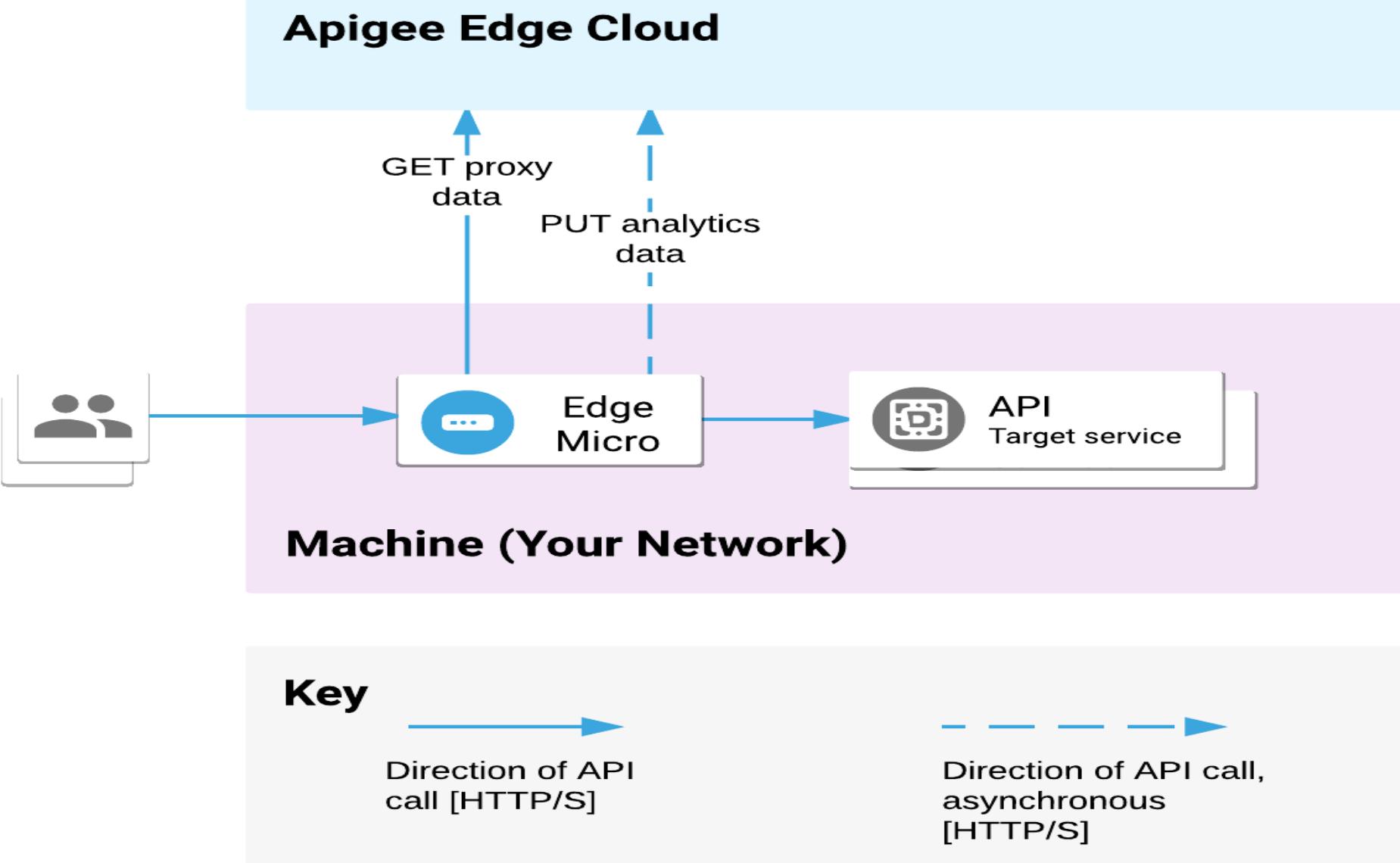


3. Internal Micro-Services

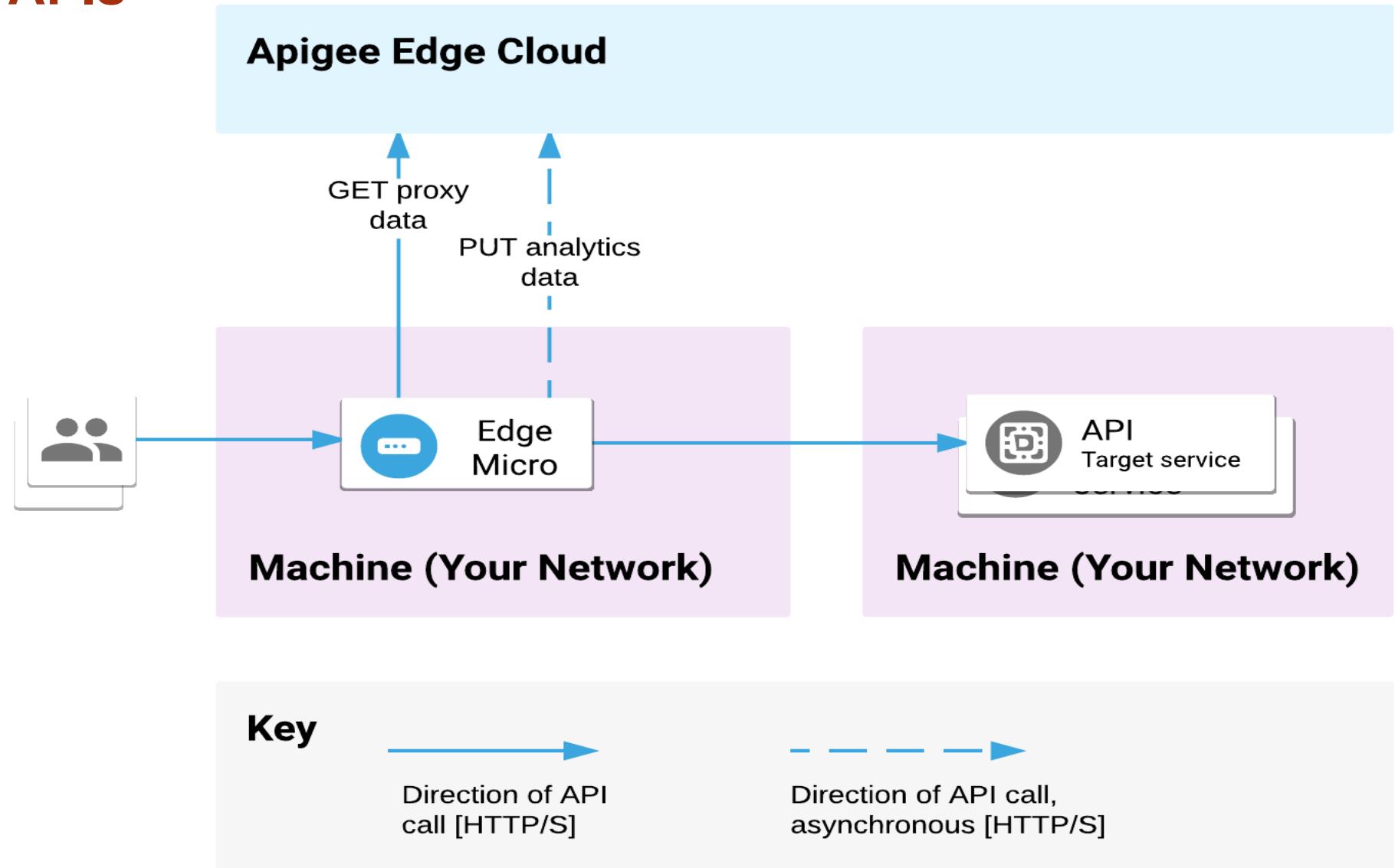
- Distributed service mesh:
- Dynamic discovery & routing
 - Traffic Control
 - Circuit Breaker
 - Auditing
 - Token Validation
 - Rate limiting, Quota, Schema validation?



The most simple deployment of Edge Microgateway



Edge Microgateway separated from backend target APIs



Installing Edge Microgateway if you have an internet connection



- `npm install edgemicro -g`
- Specific Version
- `npm install edgemicro@2.5.7 -g`
- Check the version number. For example, if you installed version 2.5.7:
- `edgemicro --version`

Docker support



-
- docker pull gcr.io/apigee-microgateway/edgemicro:latest

- Initialize Edge Microgateway (you only need to do this step one time):
 - `edgemicro init`
 - A config file called `default.yaml` file was placed in your home directory in a subdirectory called `.edgemicro`. Check now to be sure this file exists:
 - `ls ~/.edgemicro`
 - `default.yaml`

- All CLI commands have a help function. Print help for the edgemicro configure command:
- `edgemicro configure -h`
- Execute the following command to configure Edge Microgateway:
- `edgemicro configure -o [org] -e [env] -u [username]`
- `edgemicro-auth` proxy automatically created

-
- Open ssl error
 - To rectify
 - In System env set
 - `OPENSSL_CONF="openssl.cnf absolute path"`

```
G:\Local disk\APIGEE\microgateway>edgemicro init
2019-11-25T16:11:30.922Z [17344] [microgateway edgemicro] current nodejs version is v12.13.0
2019-11-25T16:11:30.926Z [17344] [microgateway edgemicro] current edgemicro version is 3.0.10
2019-11-25T16:11:34.074Z [17344] [microgateway cmd] config initialized to C:\Users\Balasubramaniam\.edgemicro\default.yaml
```

```
: \Local disk\APIGEE\microgateway>edgemicro configure -h
2019-11-25T16:11:51.701Z [1252] [microgateway edgemicro] current nodejs version is v12.13.0
2019-11-25T16:11:51.703Z [1252] [microgateway edgemicro] current edgemicro version is 3.0.10
Usage: configure [options]
```

utomated, one-time configuration with Edge Cloud

ions:

-o, --org <org>	the organization
-e, --env <env>	the environment
-v, --virtualHosts <virtualHosts>	override virtualHosts (default: "default,secure")
-u, --username <user>	username of the organization admin
-p, --password <password>	password of the organization admin
-t, --token <token>	OAuth token to use with management API
-r, --url <url>	organization's custom API URL (https://api.example.com)
-d, --debug	execute with debug output
-c, --configDir <configDir>	Set the directory where configs are written.
-x, --proxyName <proxyName>	Set the custom proxy name for edgemicro-auth
k --key <key>	Path to private key to be used by Apigee Edge
-s --cert <cert>	Path to certificate to be used by Apigee Edge

G:\Local disk\APIGEE\microgateway>edgemicro configure -o vebconsulting2019-eval -e test -u vebconsulting2019@gmail.com

2019-11-25T16:13:34.555Z [10072] [microgateway edgemicro] current nodejs version is v12.13.0

2019-11-25T16:13:34.558Z [10072] [microgateway edgemicro] current edgemicro version is 3.0.10

password:

2019-11-25T16:13:42.332Z [10072] [microgateway-config io] file doesn't exist, setting up

2019-11-25T16:13:46.643Z [10072] [microgateway deploy auth] Give me a minute or two... this can take a while...

2019-11-25T16:14:41.519Z [10072] [microgateway deploy auth] App edgemicro-auth deployed.

2019-11-25T16:14:41.796Z [10072] [microgateway configure] checking org for existing KVM

2019-11-25T16:14:43.000Z [10072] [microgateway configure] error checking for cert. Installing new cert.

2019-11-25T16:14:44.659Z [10072] [microgateway cert lib] creating KVM

2019-11-25T16:14:44.660Z [10072] [microgateway cert lib] adding private_key

2019-11-25T16:14:44.660Z [10072] [microgateway cert lib] adding public_key

2019-11-25T16:14:48.521Z [10072] [microgateway cert lib] configuring host edgemicroservices.apigee.net for region us-central1

2019-11-25T16:14:48.523Z [10072] [microgateway configure]

2019-11-25T16:14:48.524Z [10072] [microgateway configure] saving configuration information to: C:\Users\Balasubramaniam\.edgemicro\vebconsulting2019-eval-test-config.yaml

2019-11-25T16:14:48.527Z [10072] [microgateway configure]

2019-11-25T16:14:48.528Z [10072] [microgateway configure] vault info:

-----BEGIN CERTIFICATE-----

MIIcpDCCAYwCCQCdKJzjA6BZwzANBgkqhkiG9w0BAQsFADAUMRIwEAYDVQQDDA1s
b2NhbGhvc3QwHhcNMTkxMTI1MTYxNDQ0WhcNMTkxMTI2MTYxNDQ0WjAUMRIwEAYD
VQQDDA1sb2NhbGhvc3QwggeIMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQCs
QvYLTOB/6zA1KBzQfw8VONyAoALqagKrCVmhIAv3yj5PTQDEL61W4B21Z1LntMjF
Row/76FObd8FeRMtwUl/NdeIsPlSOuDyxOSz37fecX1fsf+b+ojhEKrAW161it7Q

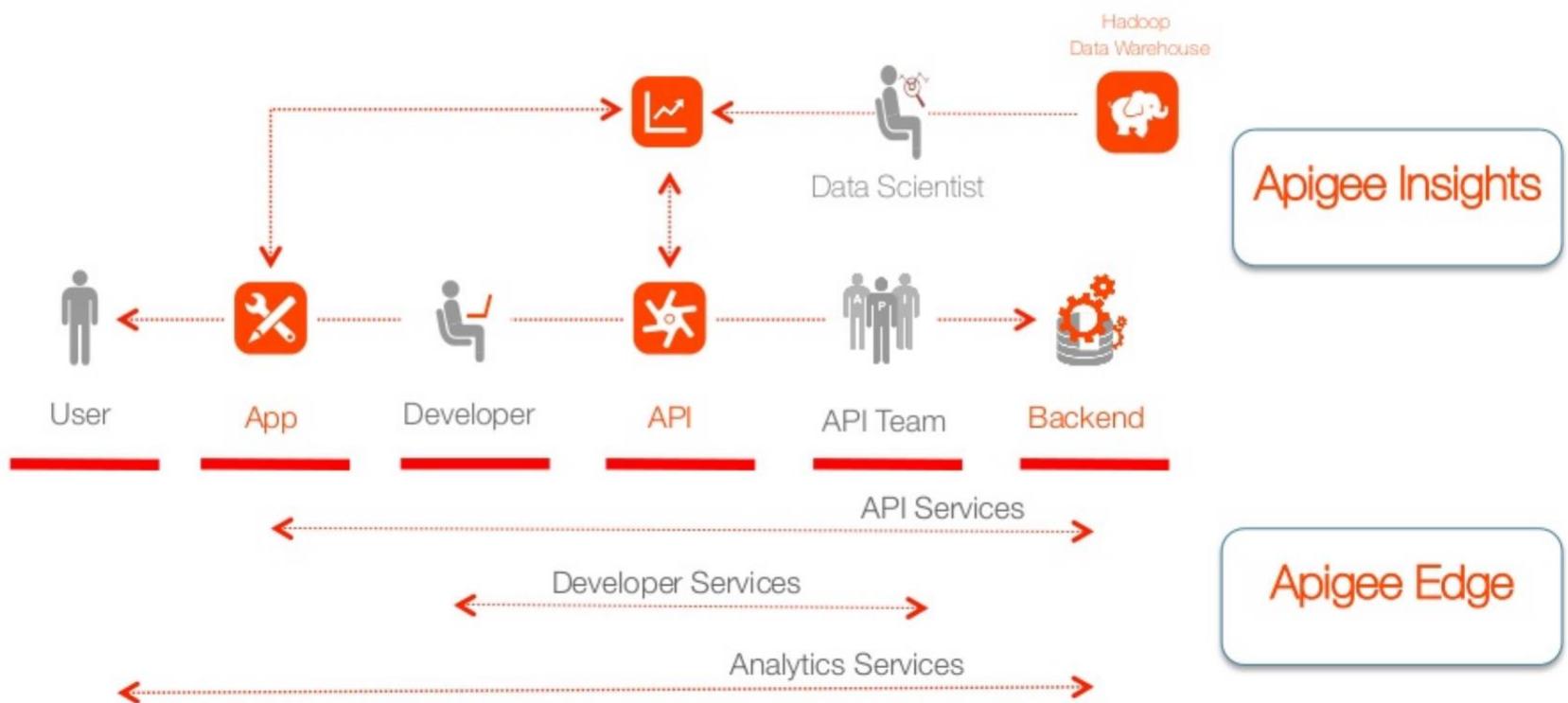
```
Administrator: Node.js command prompt
/xE2+Z1dAE205mB8BrRCZPcsQf2xLq37I80V/2bFS+9G9KcxP2K/okRDyaRQ4iwB
KGWaZSjpz5j4EEEnNZFaw9oTQbvFmIlhs/z96Zp67pgb1nND7r9p1JvKXtw5dAFjj
uUl1vPdJCKiZCo/RPCqhv+DDxHTeBCRAtXT0/mH4Kl0cvDn7BsxQtwfft1cwFJc40
+577DAuFYwP6CH/FwnehAgMBAEwDQYJKoZIhvcNAQELBQADggEBAAFBpJY5/etw
CmmjJaXspMR7vOgLcyk143s18skSaFjsJ0iMdG01OCqmU7MuNmGvNwnKKVJRK1BK
ygUx1DdtAaQpJL3oP0VqrURQAYiCKmUlOMBPcpVsS9k9b6q7Wb4Qv8RDTkSJSYG7
j/71qN7bdLXd3tt9ZFownsasZ9LGCLCFJnYiVgwmtNQdGXL64C5I8ygY1qH7TJRH
kBjhVmpNSw1Jw0lnWxta/e1qrDHhdxmPOoHx03x4Q9b8wu6vn6P0vsUSsrIr2TK
afcGQaPmuYMGhhqsM6G4umsG7YnNVjy41cMFhPcnkR9c9ive7XSprKVyphT8+pzk
QwK+Ou1EAUY=
-----END CERTIFICATE-----
2019-11-25T16:14:48.528Z [10072] [microgateway configure]
2019-11-25T16:14:48.529Z [10072] [microgateway configure] The following credentials are required to start edge micro
2019-11-25T16:14:48.530Z [10072] [microgateway configure] key: 090f83d826c5efded15a9a2b26bec8f5e46d4267714e0b7ed6aad
daf56fca095
2019-11-25T16:14:48.530Z [10072] [microgateway configure] secret: 8545b2f73a79c8e90ef6cdc880a1cd5eefcf1b31ce7dabb37
57eaf2883f7f21
2019-11-25T16:14:48.530Z [10072] [microgateway configure]
2019-11-25T16:14:48.539Z [10072] [microgateway configure] edgemicro configuration complete!

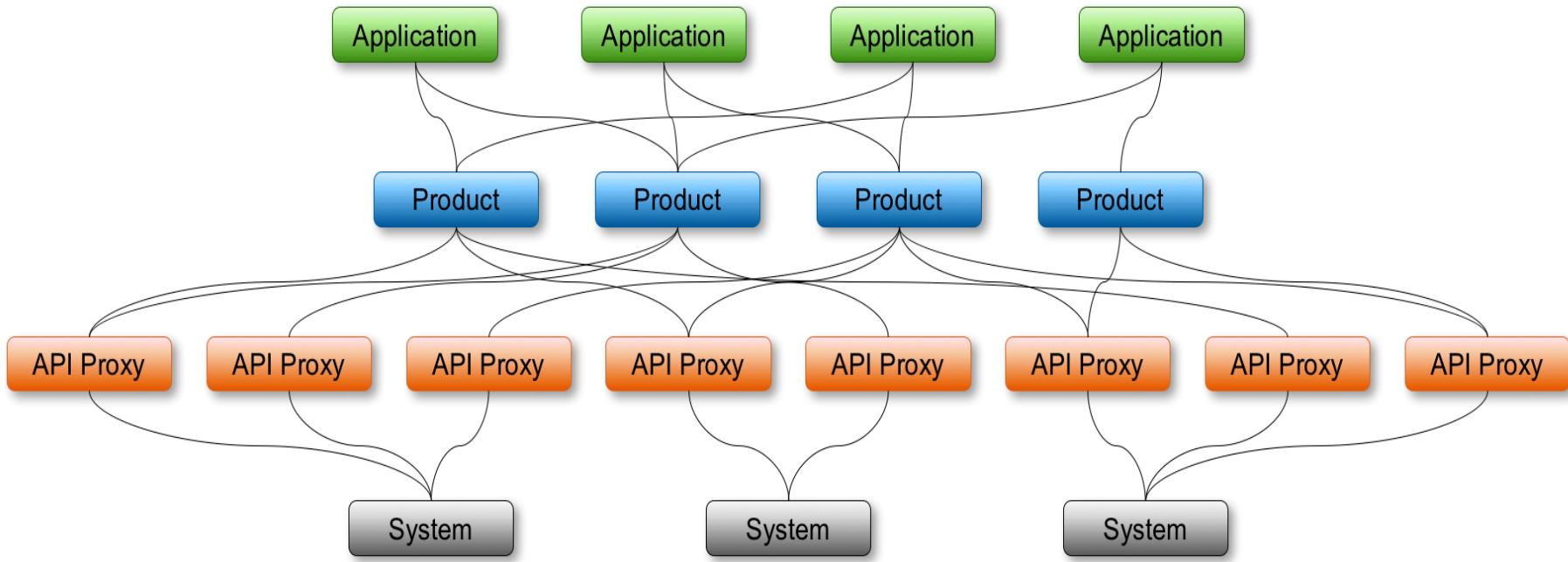
G:\Local disk\APIGEE\microgateway>
```

Create an Edge Microgateway-aware API **apigee** proxy on Edge

- Create Reverse proxy with proxyname starts with **edgemicro**
 - Proxy Name: **edgemicro_hello**
 - Proxy Base Path: /hello
 - Existing API: <http://mocktarget.apigee.net/>
- Create a product
- Name: EdgeMicroTestProduct
 - Display Name: EdgeMicroTestProduct
 - Environment: test and prod
 - Access: Public
 - Key Approval Type: Automatic
 - Resources, click **+API Proxy**, select edge auth and **edgemicrohello**
- Create a test developer
- Create a developer app
- Show Consumer Key and Consumer Secret.

Digital Value Chain





Create an Edge Microgateway-aware API proxy on Edge

- Name: EdgeMicroTestApp
- Display Name: EdgeMicroTestApp
- Developer: If you created a test developer, select it. Or, you can use any existing developer for the purpose of this tutorial.
- Credentials:
- Select Expiration: Never.
- Click + Product and select EdgeMicroTestProduct (the product you just created)

apigee node.js hosted target | Apps - Apigee | Setting up and configuring E | (42) Apigee Edge - 4MV4D | Inbox (2,328) - parameswarit | https://jsonplaceholder.typico... | +

apigee.com/organizations/vebconsulting2019-eval/apps/details/e1524525-649e-4e24-a70d-335131f522a0

Apps Insert title here Empire New Tab How to use Assertio... Browser Automatio... node.js - How can I... Freelancer-dev-810... Courses New Tab Ghi airtel Airtel 4G Hotspot nt8F83

Parameswari Ettiap... vebconsulting2019-...

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Apps > EdgeMicroTestApp

Edit **Delete**

App Details

Name	EdgeMicroTestApp	App status	Approved
Display Name	EdgeMicroTestApp	Callback URL	
Registered	Nov 25 2019 4:35:51 PM (UTC)	Notes	
Developer	Parameswari Bala (Parameswaribala@gmail.com)		

Credentials

Status	Approved	Product	Status
Key	Hide JM99ANOBL1iA0EFLClwSc1sAasJ2snwC	EdgeMicroTestProduct	Approved
Secret	Hide 5h7qnspscZQXmKW		
Issued	Nov 25 2019 4:35:51 PM (UTC)		
Expiry	Never		

Custom Attributes

Key-value pairs used to store and retrieve values at runtime to control API proxy execution and customize analytics reports.

Name	Value

Type here to search

Operate Edge Microgateway

- Start Edge Microgateway
- Earlier Edge configure returned key as
 - key:
090f83d826c5efded15a9a2b26bec8f5e46d4267714e0
b7ed6aaddaf56fca095
- secret:
8545b2f73a79c8e90ef6cdc880a1cd5eefcf1b31ce7da
bb3757eaf2883f7f21

Operate Edge Microgateway

- Print help information for the edgemicro start command.
- edgemicro start –h
- To start Edge Microgateway, execute the following command:
- edgemicro start -o [org] -e [env] -k [key] -s [secret]
- edgemicro start -o vebconsulting2019-eval -e test -k 090f83d826c5efded15a9a2b26bec8f5e46d4267714e0b7ed6aaddaf56fca095 -s 8545b2f73a79c8e90ef6cdc880a1cd5eefcf1b31ce7da bb3757eaf2883f7f21

Administrator: Node.js command prompt - edgemicro start -o vebconsulting2019-eval -e test -k 090f83d826c5efded15a9a2b26bec8f5e46d4267714e0b7ed6aaddaf56fca095 -s 8545b2f73a79c8e90ef6cdc880a1cd5eefcf1b31ce7dabb3757eaf2883f7f21
^CTerminate batch job (Y/N)? y

```
G:\Local disk\APIGEE\microgateway>edgemicro start -o vebconsulting2019-eval -e test -k 090f83d826c5efded15a9a2b26bec8f5e46d4267714e0b7ed6aaddaf56fca095 -s 8545b2f73a79c8e90ef6cdc880a1cd5eefcf1b31ce7dabb3757eaf2883f7f21
2019-11-25T16:40:45.354Z [7300] [microgateway edgemicro] current nodejs version is v12.13.0
2019-11-25T16:40:45.356Z [7300] [microgateway edgemicro] current edgemicro version is 3.0.10
2019-11-25T16:40:47.507Z [7300] [microgateway-config network] config download from https://edgemicroservices.apigee.net/edgemicro/bootstrap/organization/vebconsulting2019-eval/environment/test returned
2019-11-25T16:40:50.233Z [7300] [microgateway-config network] jwt_public_key download from https://vebconsulting2019-eval-test.apigee.net/edgemicro-auth/publicKey returned
2019-11-25T16:40:51.026Z [7300] [microgateway-config network] products download from https://vebconsulting2019-eval-test.apigee.net/edgemicro-auth/products returned
2019-11-25T16:40:51.121Z [7300] [microgateway gateway] PROCESS PID : 7300
```



Operate Edge Microgateway

- edgemicro status

```
C:\Windows\System32>g:
```

```
G:\Local disk\APIGEE\microgateway>edgemicro status
2019-11-25T16:43:36.287Z [15744] [microgateway edgemicro] current nodejs version is v12.13.0
2019-11-25T16:43:36.290Z [15744] [microgateway edgemicro] current edgemicro version is 3.0.10
2019-11-25T16:43:37.684Z [15744] [microgateway gateway] edgemicro is running with 8 workers
```

```
G:\Local disk\APIGEE\microgateway>
```

Test Edge Microgateway

- curl -i http://localhost:8000/edgemicro_albums_proxy/

```
G:\Local disk\APIGEE\microgateway>curl -i http://localhost:8000/edgemicro_albums_proxy/
HTTP/1.1 401 Unauthorized
content-type: application/json
Date: Mon, 25 Nov 2019 16:48:44 GMT
Connection: keep-alive
Content-Length: 84

{"error":"missing_authorization","error_description":"Missing Authorization header"}
G:\Local disk\APIGEE\microgateway>
```

Securing the API with an API key

- Open the file `$HOME/.edgemicro/org-env-config.yaml`.
- Set
 - `oauth:`
 - `allowNoAuthorization: false`
 - `allowInvalidAuthorization: false`

```
edgemicro reload -o vebconsulting2019-eval -e test -k  
090f83d826c5efded15a9a2b26bec8f5e46d4267714e0b7ed6aaddaf56fca095 -s  
8545b2f73a79c8e90ef6cdc880a1cd5eefcf1b31ce7dabb3757eaf2883f7f21
```

```
[{"error": "missing_authorization", "error_description": "Missing Authorization header"}]  
G:\Local disk\APIGEE\microgateway>edgemicro reload -o vebconsulting2019-eval -e test -k 090f83d826c5efded15a9a2b26bec8f5e46d4267714e0b7ed6aaddaf56fca095 -s 8545b2f73a79c8e90ef6cdc880a1cd5eefcf1b31ce7dabb3757eaf2883f7f21  
2019-11-25T16:57:08.314Z [16040] [microgateway edgemicro] current nodejs version is v12.13.0  
2019-11-25T16:57:08.317Z [16040] [microgateway edgemicro] current edgemicro version is 3.0.10  
2019-11-25T16:57:10.411Z [16040] [microgateway-config network] config download from https://edgemicroservices.apigee.net/edgemicro/bootstrap/organization/vebconsulting2019-eval/environment/test returned  
2019-11-25T16:57:11.303Z [16040] [microgateway-config network] products download from https://vebconsulting2019-eval-test.apigee.net/edgemicro-auth/products returned  
2019-11-25T16:57:13.385Z [16040] [microgateway-config network] jwt_public_key download from https://vebconsulting2019-eval-test.apigee.net/edgemicro-auth/publicKey returned  
2019-11-25T16:57:13.555Z [16040] [microgateway gateway] Reload Completed Successfully  
  
G:\Local disk\APIGEE\microgateway>
```

```
curl -i http://localhost:8000/edgemicro_albums_proxy -H "x-api-key:  
JM99ANOBL1iA0EFLClwSc1sAasJ2snwC"
```

http://localhost:8000/edgemicro_albums_proxy?x-api-key=JM99ANOBL1iA0EFLClwSc1sAasJ2snwC

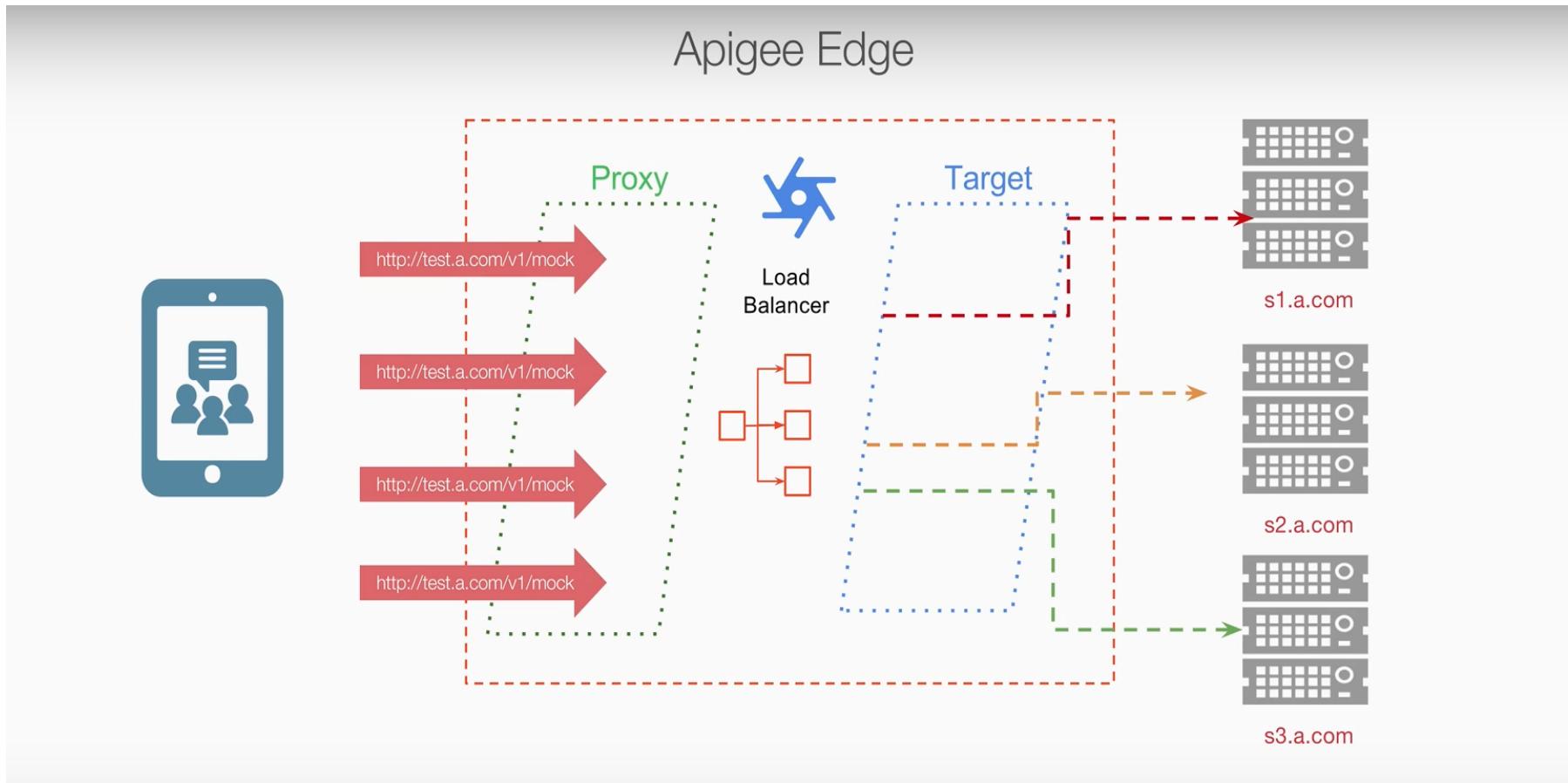
Postman

APIGEE LOAD BALANCER

- Apigee Edge enhances the availability of API by providing built-in support for load balancing and failover across multiple backend server instances.
- TargetServer configurations decouple concrete endpoint URLs from TargetEndpoint configurations.
- Each TargetServer is referenced by name in a TargetEndpoint HTTPConnection.
- Instead of defining a concrete URL in the configuration, you can configure one or more named TargetServers in TargetEndpoint.

APIGEE EDGE LOAD BALANCER

ROUND ROBIN ALGORITHM



APIGEE TARGET SERVER LB

- Create reverse proxy with pass through using restcountries api
- Create Target servers in admin environments
- Connect Proxy Target end point to
 - <LoadBalancer>
 - <Server name="lb-server1"/>
 - <Server name="lb-server2"/>
 - </LoadBalancer>
 - <Path>/</Path>

APIGEE TARGET SERVER LB

- <LoadBalancer>
- <Algorithm>RoundRobin</Algorithm>
- <Server name="lb1-targetserver"/>
- <Server name="lb2-targetserver"/>
- <MaxFailures>5</MaxFailures>
- <ServerUnhealthyResponse>
- <ResponseCode>500</ResponseCode>
- <ResponseCode>502</ResponseCode>
- <ResponseCode>503</ResponseCode>
- </ServerUnhealthyResponse>
- </LoadBalancer>
- <Path>/</Path>

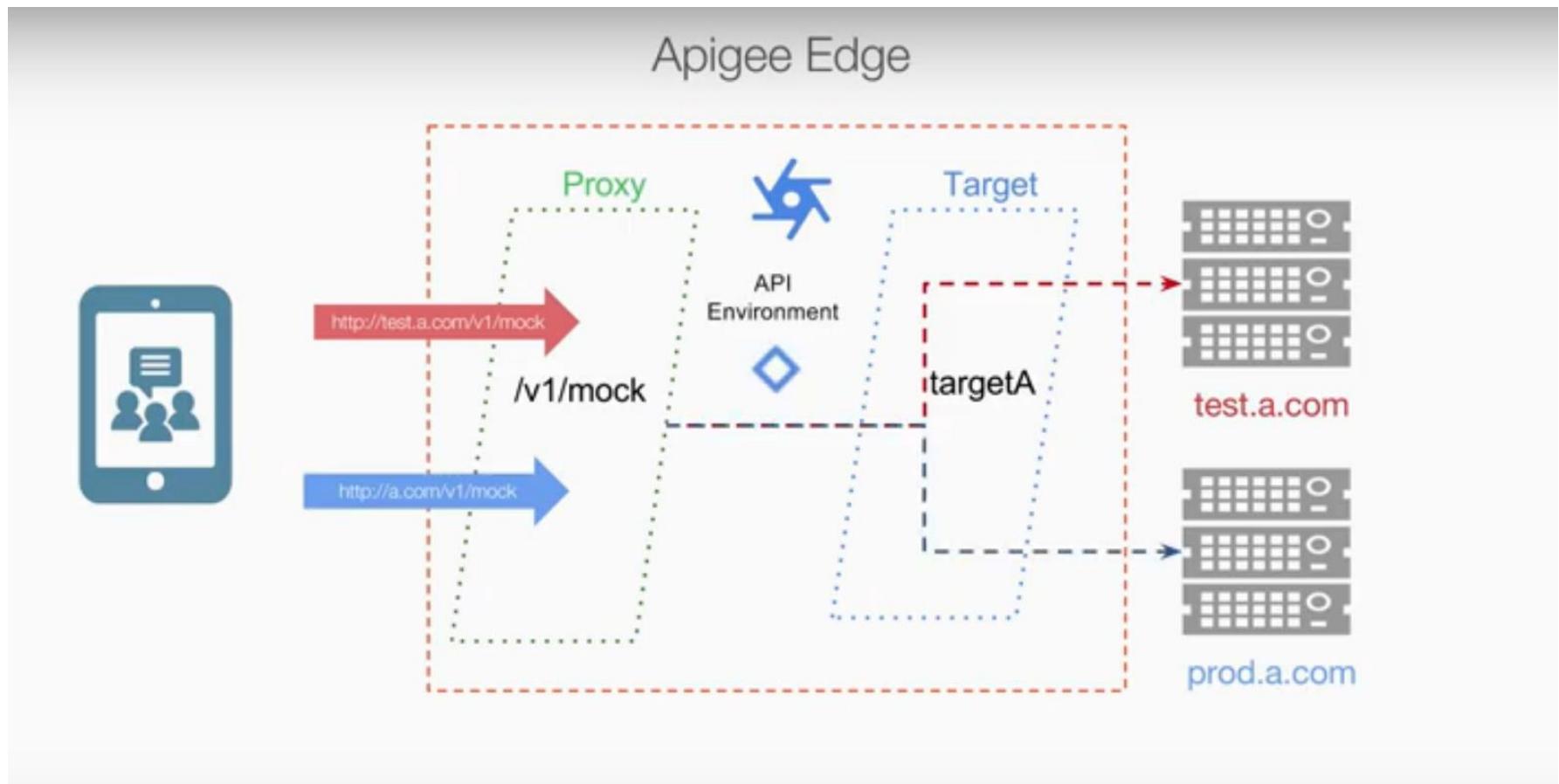
APIGEE TARGET SERVER LB

- <HealthMonitor>
- <IsEnabled>true</IsEnabled>
- <IntervalInSec>5</IntervalInSec>
- <TCPMonitor>
- <ConnectTimeoutInSec>10</ConnectTimeoutInSec>
- <Port>80</Port>
- </TCPMonitor>
- <HTTPMonitor>
- <Request>

APIGEE TARGET SERVER LB

- <ConnectTimeoutInSec>10</ConnectTimeoutInSec>
- <SocketReadTimeoutInSec> 30</SocketReadTimeoutInSec>
- <Port>80</Port>
- <Verb>GET</Verb>
- <Path>/healthcheck</Path>
- <Header name="Authorization">Basic 12e98yfw87etf</Header>
- </Request>
- <SuccessResponse>
- <ResponseCode>200</ResponseCode>
- <Header name="ImOK">YourOK</Header>
- </SuccessResponse>
- </HTTPMonitor>
- </HealthMonitor>
-

API routing based on environment using target servers

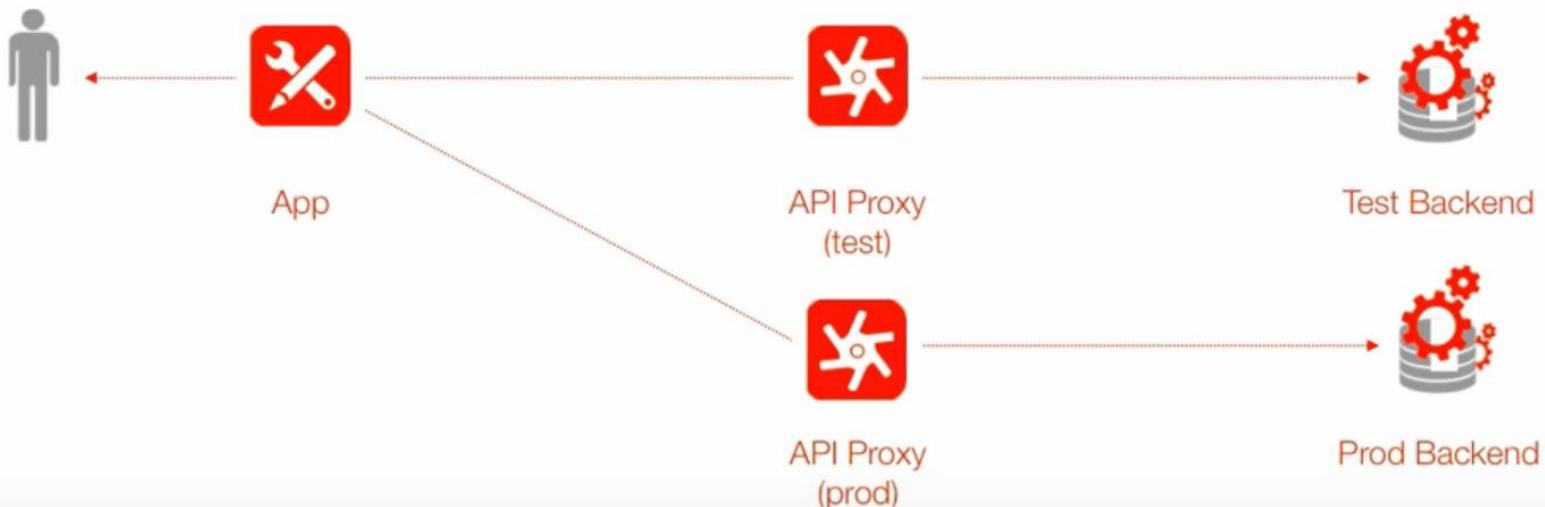


API routing based on environment using target servers



- Create Proxy in prod and test environment
- Create Target Server in prod and test environment
 - Target a --→ httpbin.org --→prod
 - Target a---→restcountries.eu--→test
- Modify Target endpoint URL with<LoadBalancer>
 - <LoadBalancer>
 - <Server name="targeta"/>
 - </LoadBalancer>
 - <Path>/</Path>

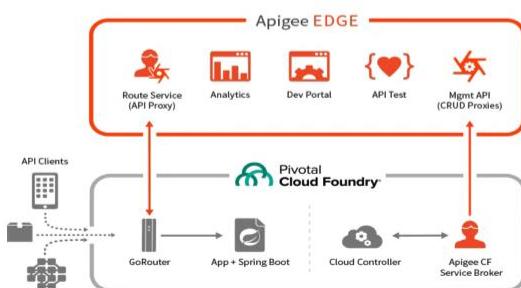
Environments and TargetServers



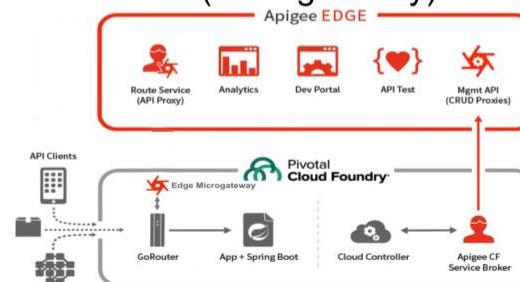
Apigee Service Broker

Route Services

Apigee Edge Enterprise (org)

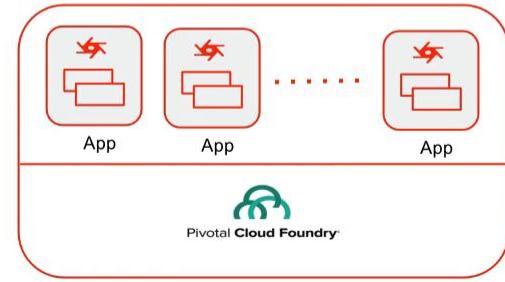


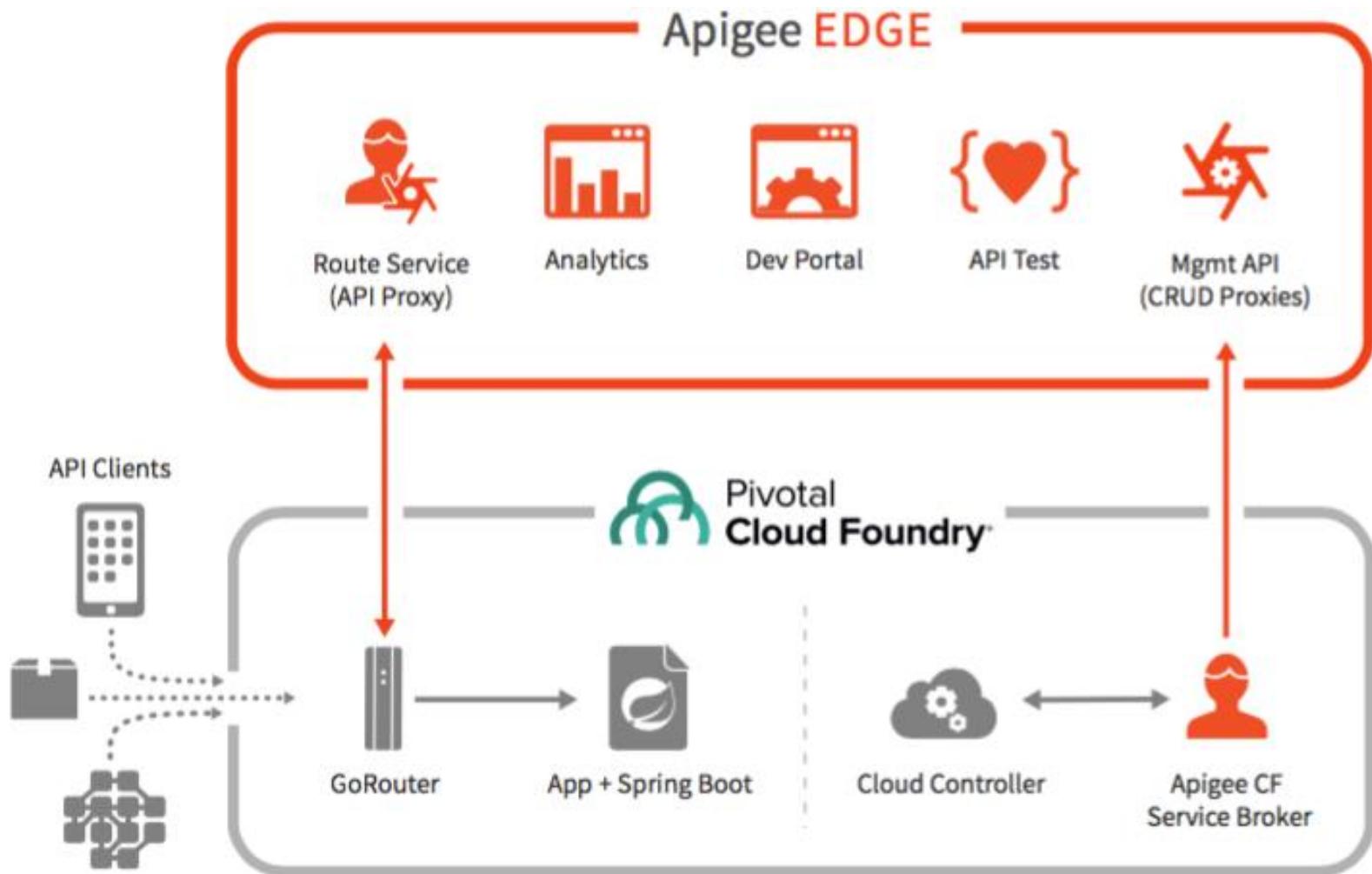
Apigee Edge Microgateway (microgateway)



CF Decorator Buildpack

Apigee Edge Microgateway (co-resident)





PCF and APIGEE

- 1. cf –h
- 2. cf login -a https://donotuseapi.run.pivotal.io
- 3. cf marketplace
- 3a. git clone <https://github.com/apigee/cloud-foundry-apigee.git>
- 3b. cd cloud-foundry-apigee/apigee-cf-service-broker
- 3c. cf push

PCF and APIGEE

```
cf set-env apigee-cf-service-broker SECURITY_USER_NAME  
<pick a username>
```

```
cf set-env apigee-cf-service-broker  
SECURITY_USER_PASSWORD <pick a password>
```

```
cf restage apigee-cf-service-broker
```

```
cf create-service-broker apigee-edge eswaribala vigneshbala  
https://apigee-cf-service-broker.cfapps.io/ --space-scoped
```

```
cf enable-service-access apigee-edge --> skip this command
```

```
cf marketplace
```

```
cf marketplace -s apigee-edge->(market place name)
```

Administrator: RabbitMQ Command Prompt (sbin dir)
Server error, status code: 400, error code: 260001, message: Service Plan Visibility is invalid: service_plan is from a private broker

G:\Local disk\APIGEE\cloud-foundry-apigee\apigee-cf-service-broker>cf marketplace
Getting services from marketplace in org rpsboamumbai2019 / space development as vebconsulting2019@gmail.com...
OK

	service	plans
		description
Greenplum		Free Greenplum for Pivotal Cloud Foundry
apigee-edge		org, microgateway, microgateway-coresident Apigee Edge API Platform
app-autoscaler		standard Scales bound applications in response to load
blazemeter		free-tier, basic1kmr*, pro5kmr* Performance Testing Platform
cedexisopenmix		opx_global*, openmix-gslb-with-fusion-feeds* Openmix Global Cloud and Data Center Load Balancer
cleardb		spark, boost*, amp*, shock* Highly available MySQL for your Apps.
cloudamqp		lemur, tiger*, bunny*, rabbit*, panda* Managed HA RabbitMQ servers in the cloud
elephantsql		turtle, panda*, hippo*, elephant* PostgreSQL as a Service
gluon		free, indie*, business*, enterprise* Mobile Synchronization and Cloud Integration



PCF and APIGEE

4. cf create-service apigee-edge org apigee-service -c
"{"org": "vебconsulting2019-eval", "env": "test"}"

Refer apigee cloud foundry service broker manifest.yml file

5. cf service apigee-service

P Pivotal | P Download Apigee Edge | P Services - Space: devel | P cloud-foundry-apigee/ | P Getting Started with th | P Services - Space: devel | P Proxifying a Cloud Foundry | +

console.run.pivotal.io/organizations/8455f8ed-b792-4781-9805-4c26ca11e9fd/spaces/8f72968c-5354-4da... | Apps Insert title here Empire New Tab How to use Assertions Browser Automation node.js - How can I... Freelancer-dev-810... Courses New Tab hi airtel Airtel 4G Hotspot nt8F83

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Space <<

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vебconsulting2019@gmail.com

Home > rpsboamumbai2019

SPACE RUNNING STOPPED CRASHED

development • 2 0 ▾ 0

Services ADD A SERVICE

Service	Name	Bound Apps	Plan	Last Operation
apigee	Apigee Edge API Plat... org	0	free - Apigee Edge for Route Se...	create succeeded
ClearDB MySQL Datab...	daimlerblogdb	1	free - Spark DB	create succeeded

Pivotal

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PCF and APIGEE

- curl https://login.apigee.com/resources/scripts/sso-cli/ssocli-bundle.zip -o "ssocli-bundle.zip"
- tar xvf ssocli-bundle.zip
- Create a .sso-cli directory in your user directory
- \$ mkdir ~/.sso-cli
- Run ./get_token from linux shell (use gitbash)
- You may be prompted for your Apigee Edge username and password, and an MFA token.

MINGW64:g/Local disk/APIGEE/cloud-foundry-apigee/apigee-cf-service-broker

```
BalaSubramaniam@DESKTOP-55AGI0I MINGW64 /g/Local disk/APIGEE/cloud-foundry-apigee/apigee-cf-service-broker (master)
$ ./get_token
mkdir: missing operand
Try 'mkdir --help' for more information.
#####
# You have outdated version, Please refer the documentation to update to the latest version #####
Enter username:
vебconsulting2019@gmail.com
Enter the password for user 'vебconsulting2019@gmail.com'
Enter the six-digit code if 'vебconsulting2019@gmail.com' is MFA enabled or press ENTER:

eyJhbGciOiJSUzI1NiJ9.eyJqdGkiOiI3YzYxYWI3OC11NTNmLTRjMjYtOWJ1Yi1kMmI4ZTU3N2NiNzAiLCJzdWIiOiIwZmI5NjVjMy02NDU4LTQwOGMtODQxOC11MDdhNzI2OGIyMDEiLCJzY29wZSI6wyJzY21tLmVtYwlscy5yZWfkIiwic2NpbS5tZSIsIm9wZW5pZCIsInBhc3N3b3JkLnnyaXRlIiwiYXBwcm92YwxzLm11Iiwiic2NpbS5pZHMcumVhZCIsIm9hdXR0LmFwCHJvdmFscyJdLCJjbG11bnRfaWQioij1ZGd1Y2xpIiwiY2lkIjoizWRnZWNSaSIsImF6ccI6ImVkJ2VjbGk1LCJncmFudF90exB1IjoicGFzc3dvcmQiLCJ1c2Vyx2lkIjoimGziOTY1YzMtNjq1OC00MDhjLTg0MTgtZTA3YTcyNjhimjAxIiwib3JpZ2luIjoidXN1cmdyaWQiLCJ1c2Vyx25hbwuioij2ZWjjb25zdWx0aw5nMjAxOUbNbWFpbC5jb20iLCJ1bwFpbC16i1z1YmNvbnN1bHRpbmcyMDE5QGdtYWlsLmNvbsSIsImF1dGhfdG1tZSI6MTU3NDg3NTE1MiwiYwwiOjAsInJ1d19zawcioii1NmVmYjgxMCIsIm1hdCI6MTU3NDg3NTE1MiwiZXhwIjoxNTc0OTE4MzUyLCJpc3MiOijodHRwczovL2xvZ2luLmFwaWd1ZS5jb20iLCJ6awQioij1YWEiLCJhdWQio1siZWRnZWNSaSIsInNjawa0uZW1hawxzIiwiic2NpbSIsIm9wZW5pZCIsInBhc3N3b3JkIiwiYXBwcm92YwxzIiwiic2NpbS5pZHMiLCJ
```

PCF and APIGEE

- cf bind-route-service cfapps.io apigee-service --
hostname daimlerblogapp2019-cf -c
'{"org":"vebconsulting2019-eval","env":"test",
- "bearer": "\$(cat ./valid_token.dat)",
- "action":"proxy bind",
- "protocol":"https"}'

PCF and APIGEE as per screenshot

- cf bind-route-service cfapps.io apigee-service --
hostname daimlerblogapp2019-cf -c
'{"org":"vebconsulting2019-eval","env":"test",
- "bearer": "\$(cat
C:/Users/Balasubramaniam/valid_token.dat)"",
- "action":"proxy bind",
- "protocol":"https"}'

```
MINGW64:g/Local disk/APIGEE/PCFAPIGEE/ssocli-bundle
```

```
cat: './valid_token.dat': No such file or directory  
FAILED  
Service instance org not found
```

```
Balasubramaniam@DESKTOP-55AGI0I MINGW64 /g/Local disk/APIGEE/PCFAPIGEE/ssocli-bundle  
$
```

```
Balasubramaniam@DESKTOP-55AGI0I MINGW64 /g/Local disk/APIGEE/PCFAPIGEE/ssocli-bundle  
$ cf bind-route-service cfapps.io apigee-service --hostname daimlerblogapp2019-cf -c '{"org":"veb  
consulting2019-eval","env":"test",  
"bearer":'$(cat C:/Users/Balasubramaniam/valid_token.dat)',  
"action":"proxy bind",  
"protocol":"https"}'  
Binding route daimlerblogapp2019-cf.cfapps.io to service instance apigee-service in org rpsboamumba  
i2019 / space development as vebconsulting2019@gmail.com...  
FAILED  
json: error calling MarshalJSON for type *json.RawMessage: invalid character '\u00e1' looking for beginn  
ing of value
```

```
Balasubramaniam@DESKTOP-55AGI0I MINGW64 /g/Local disk/APIGEE/PCFAPIGEE/ssocli-bundle  
$ cf bind-route-service cfapps.io apigee-service --hostname daimlerblogapp2019-cf -c '{"org":"veb  
consulting2019-eval","env":"test",  
"bearer":'$(cat C:/Users/Balasubramaniam/valid_token.dat)',  
"action":"proxy bind",  
"protocol":"https"}'  
Binding route daimlerblogapp2019-cf.cfapps.io to service instance apigee-service in org rpsboamumba  
i2019 / space development as vebconsulting2019@gmail.com...  
OK
```

```
Balasubramaniam@DESKTOP-55AGI0I MINGW64 /g/Local disk/APIGEE/PCFAPIGEE/ssocli-bundle  
$
```



preflow and po x Proxies - Apigee x P Pivotal Platform x P Pivotal x P Apps - Space: c x Managing Serv x cloud-foundry- x mfa - Apigee C x Apigee Edge in x +

apigee.com/organizations/vbconsulting2019-eval/proxies

Apps Insert title here Empire New Tab How to use Assert... Browser Automatio... node.js - How can I... Freelancer-dev-810... Courses New Tab Ghi airtel Airtel 4G Hotspot nt8F83

Parameswari Ettiap... vbconsulting2019-eval

Develop Specs API Proxies Shared Flows Offline Trace Publish Analyze Admin Help Feedback

Proxies

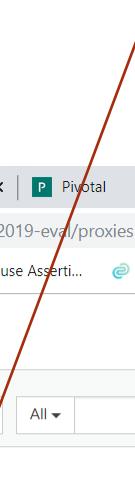
Environment test All 1 - 23 of 23 < >

NAME	STATUS	TRAFFIC (24H)	AUTHOR	MODIFIED
cf-daimlerblogapp2019-cf.cfapps.io	●	0	vbconsulting2019@gmail.com	2 minutes ago
countryproxy2019	●	12	vbconsulting2019@gmail.com	2 hours ago
userproxy	●	55	vbconsulting2019@gmail.com	
photo-proxy	●	11	vbconsulting2019@gmail.com	3 hours ago
JWTVerifyToken_rev4_2019_01_27	●	0	vbconsulting2019@gmail.com	a day ago
messagelogs	●	0	vbconsulting2019@gmail.com	a day ago
regexpressionproxy	●	0	vbconsulting2019@gmail.com	a day ago
multipleendpointproxy	●	0	vbconsulting2019@gmail.com	a day ago
route-target-server-proxy	●	0	vbconsulting2019@gmail.com	2 days ago
lb-proxy	●	0	vbconsulting2019@gmail.com	2 days ago

https://apigee.com/platform/vbconsulting2019-eval/proxies/userproxy/overview/2

Type here to search

R ENG 20:04 28/11/2019 25



PCF and APIGEE

- Test the Binding
- Curl `http://vebconsulting2019-eval-test.apigee.net/daimlerblogapp2019-cf.cfapps.io`



Pivotal
Web Services

Search apps, services, spaces, & orgs

press /

vебconsulting2019@gmail.com

Service <<

Overview

Plan

Settings

Marketplace

Home > rpsboamumbai2019 > development

 apigee-service

SERVICE: Apigee Edge API Platform PLAN: Apigee Edge for Route Services

Docs  Support  Manage 

Bound Apps

BIND APP

No Apps have been bound to this Service.

Bound Routes

BIND ROUTE

<https://daimlerblogapp2019-cf.cfapps.io> 

x

Service Key Credentials

CREATE SERVICE KEY

No Service Keys are associated with this Service.

APIGEE LOGGLY

- <ServiceCallout async="false" continueOnError="false" enabled="true" name="Service-Callout-1"> <DisplayName>Service Callout-1</DisplayName> <Properties/>
- <Request variable="myRequest">
- <Set>
- <Headers>
- <Header name="content-type">text/plain</Header>
- </Headers>
- <Payload> {response.content} </Payload>
- </Set>
- </Request>
- <Response>calloutResponse</Response>
- <HTTPTargetConnection> <Properties/> <URL>http://logs-01.loggly.com/inputs/b63c44f9-a355-41e9-a5cc-0fab27fe1a8a/tag/http</URL> </HTTPTargetConnection>
- </ServiceCallout>

APIGEE LOGGLY

- <MessageLogging async="false" continueOnError="false" enabled="true" name="Message-Logging-1">
 <DisplayName>Message Logging-1</DisplayName>
 <Syslog>
- <Message>[b63c44f9-a355-41e9-a5cc-0fab27fe1a8a@41058
tag="{organization.name}.{apiproxy.name}.{environment.name}"]Response received from JWT Verification Header
{request.header.jwt-token}</Message>
- <Host>logs-01.loggly.com</Host>
- <Port>514</Port>
- <Protocol>TCP</Protocol>
 <FormatMessage>true</FormatMessage>
 </Syslog></MessageLogging>

Loggly

SolarWinds Loggly

Search Charts Dashboard Alerts Derived Fields Source Setup Live Tail Metrics/APM Feedback Upgrade to a paid plan Parameswari Help

*Default + New All Sources Search logs -1d now Nov 26, 12:17 AM - Nov 27, 12:17 AM (1 day) Search

Field Explorer

Syslog

id	
Field Actions	
0 values	0 events

No values in syslog.sd.id match this query term

Event Timeline Chart

10,768 events

Nov 26, 12:17 AM - Nov 27, 12:17 AM (1 day)

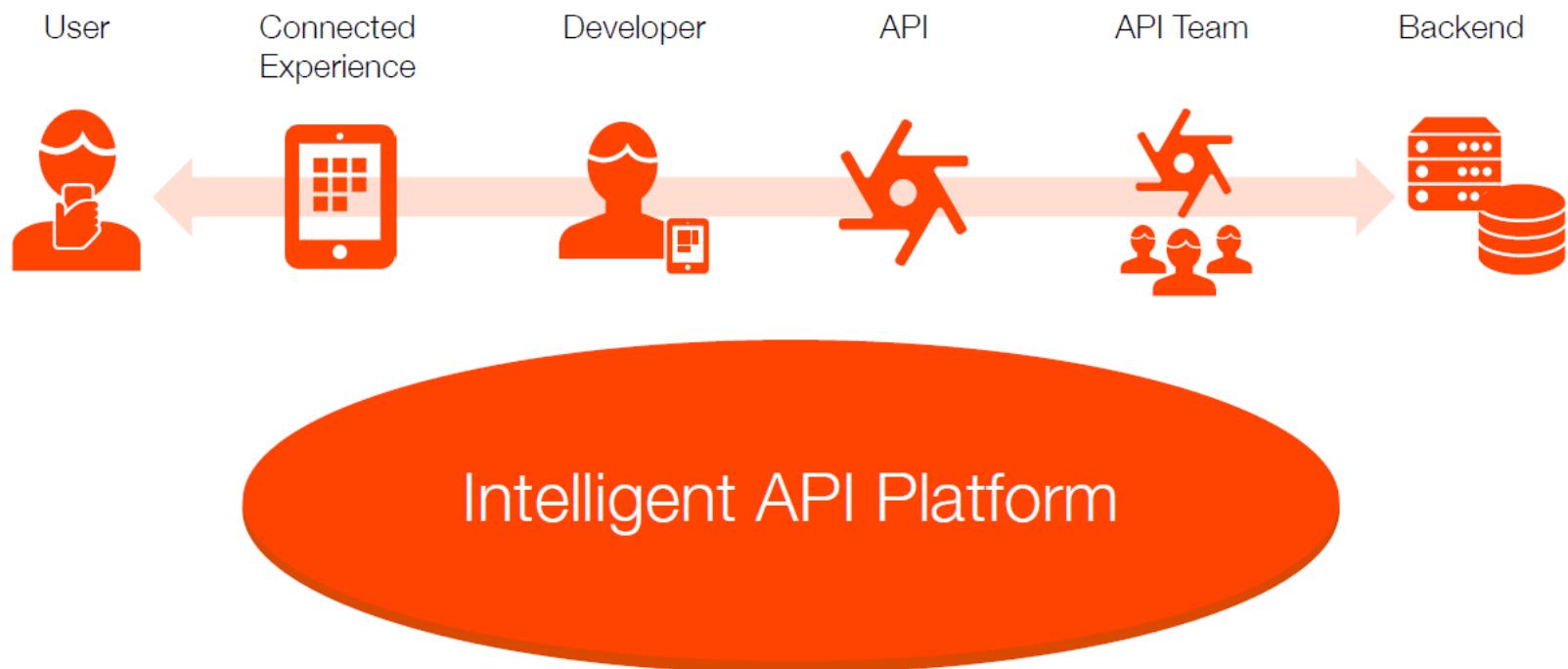
Event View Sort: Descending Expand Events More Options Expanded view

2019-11-27 00:17:17.596 Response received from JWT Verification Header
eyJraiwQj0iJ1bmIxwdUtaWRlbnRpZmlc1mb3ItchJ3pdmF0ZWt1eS1oZXJ1IiwidH1wIjoiSldUIiwiYwxnIjoiU1MyNTYifQ.eyJzdWIiOiJhcGlnZlWUtc2VhdHRSzS1oYX
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vbGljeS10ZXN0IiwiZXhwIjoxNTc0Nzk3NjM3LCJpYXQiOjE1NzQ3OTQwMzcsImp0aSI6IjA4ZTBhMjIILThkZjktNGYxOS04OGU1LwQyMmR1MTY5ZTA1YyJ9.tPR8eFpjOKK
amnIfippDA-
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WJU291Nuy/wiqFK4Wi09MwL-dS1LiV4dcPM73G_RqF6X4-7MuP7DUG0dfDDMuapIC1CjF5sh9f8cwlH2yG8Hzt4ScrCh40cz1DVQS5_0dGk-
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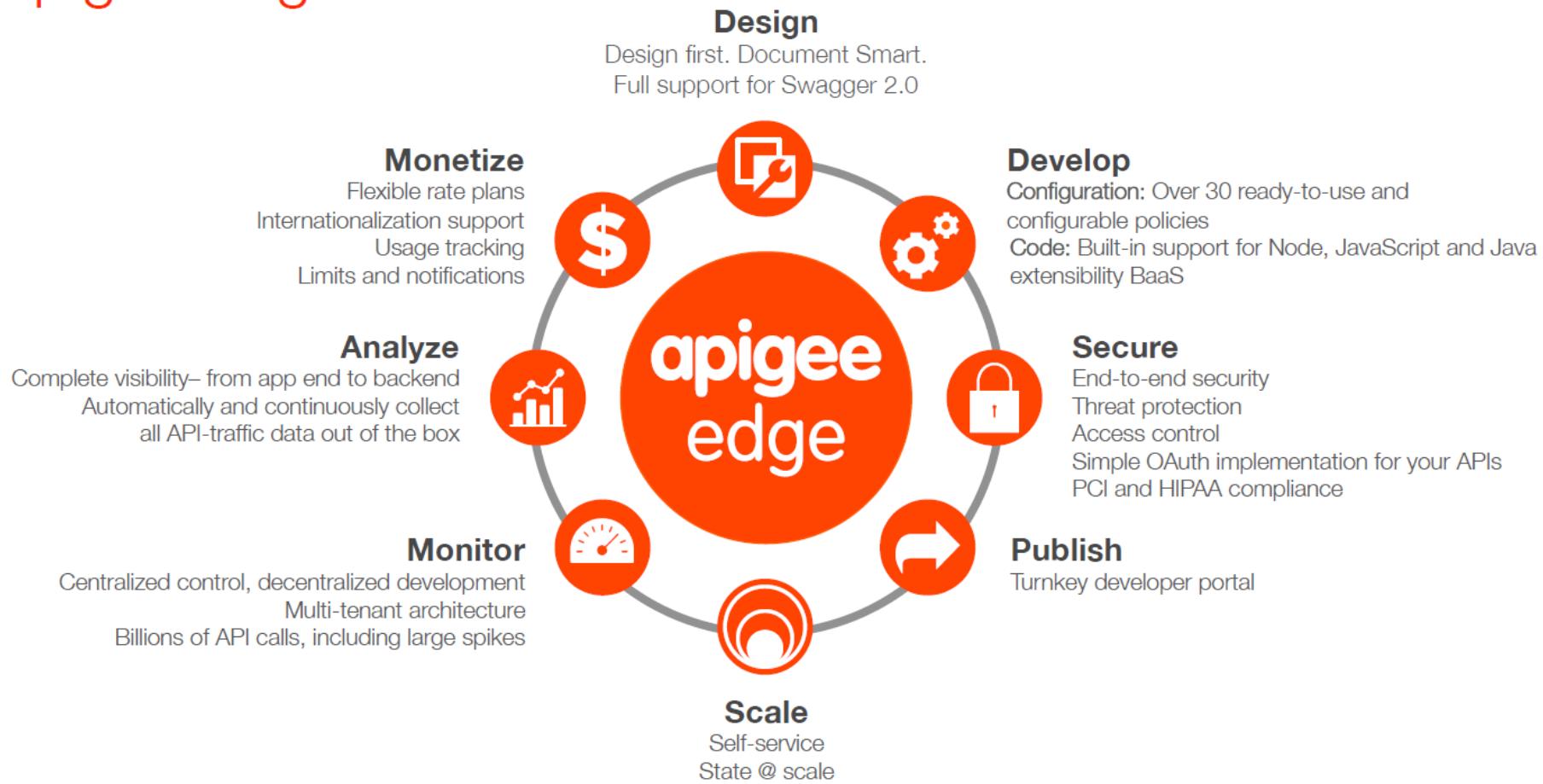
2019-11-27 00:14:58.953 Response received from JWT Verification Header
eyJraiwQj0iJ1bmIxwdUtaWRlbnRpZmlc1mb3ItchJ3pdmF0ZWt1eS1oZXJ1IiwidH1wIjoiSldUIiwiYwxnIjoiU1MyNTYifQ.eyJzdWIiOiJhcGlnZlWUtc2VhdHRSzS1oYX
RyYWNrLW1vbvnRhZ2UiLCJhdWQiOj1cm46XC9cL2M2MDUXMWmLTyYT1tDczYy04MGZkLTQyNTI4ZW12NWE2YSIsImlzcyI6InVybjpcL1wvYXBpZ2V1LWVkZ2Uts1dULXB
vbGljeS10ZXN0IiwiZXhwIjoxNTc0Nzk3NDk4LCJpYXQiOjE1NzQ3OTM4OTgsImp0aSI6IjA3NjA2Y7T4LwUzzDYtNDyQOC1hNDyLWM4YzA0MjM0ZTUzziJ9.oh1FVDSUOp0
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2019-11-26 22:45:50.872 [{"name": "Afghanistan", "topLevelDomain": ".af", "alpha2Code": "AF", "alpha3Code": "AFG", "callingCodes": ["93"], "capital": "Kabul", "altSpellings": ["Af", "Afghanistan"], "region": "Asia", "subregion": "Southern"}]

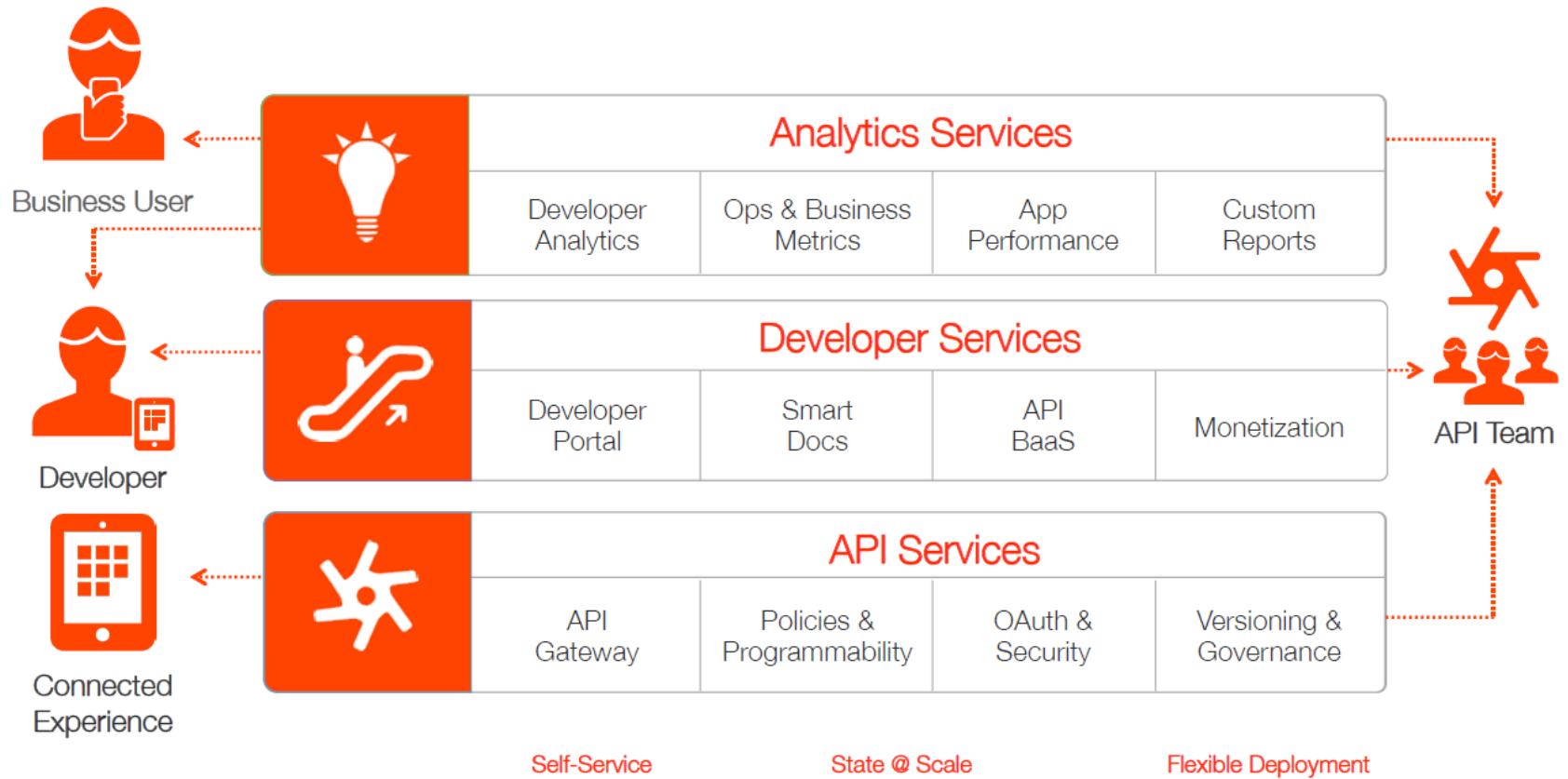
Intelligent API platform enables the digital value chain



Apigee Edge



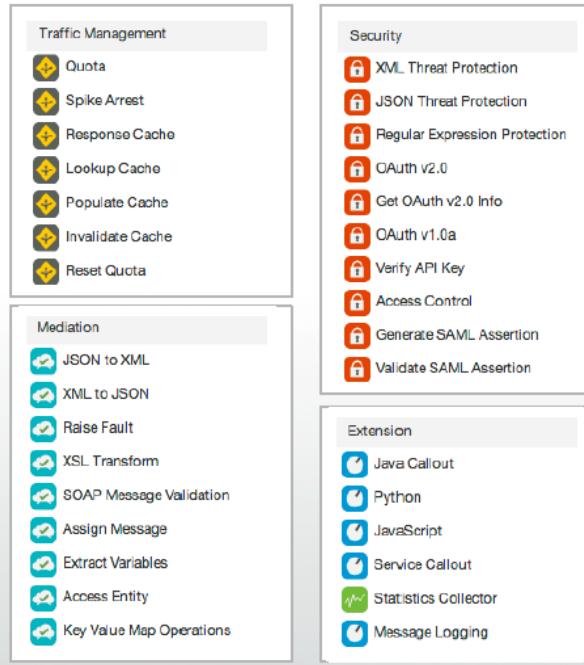
Apigee Edge – API management



Apigee Edge policies – Build APIs faster

Manage interactions with API consumers and optimize performance

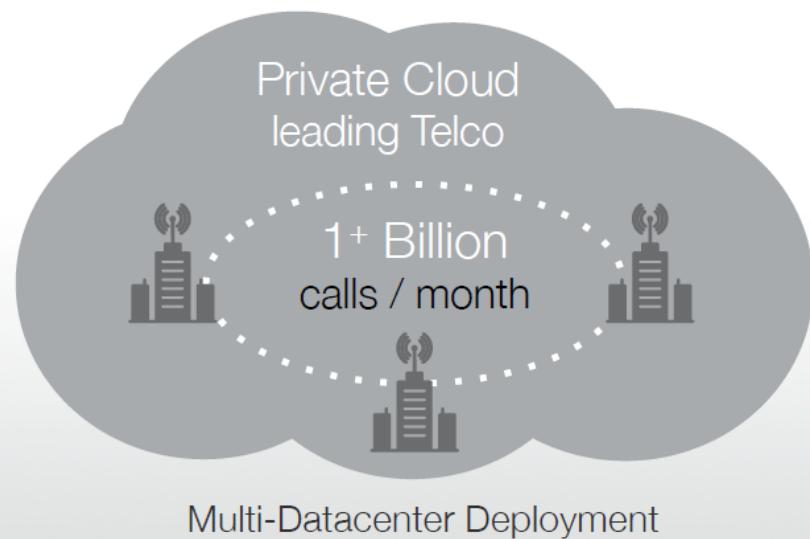
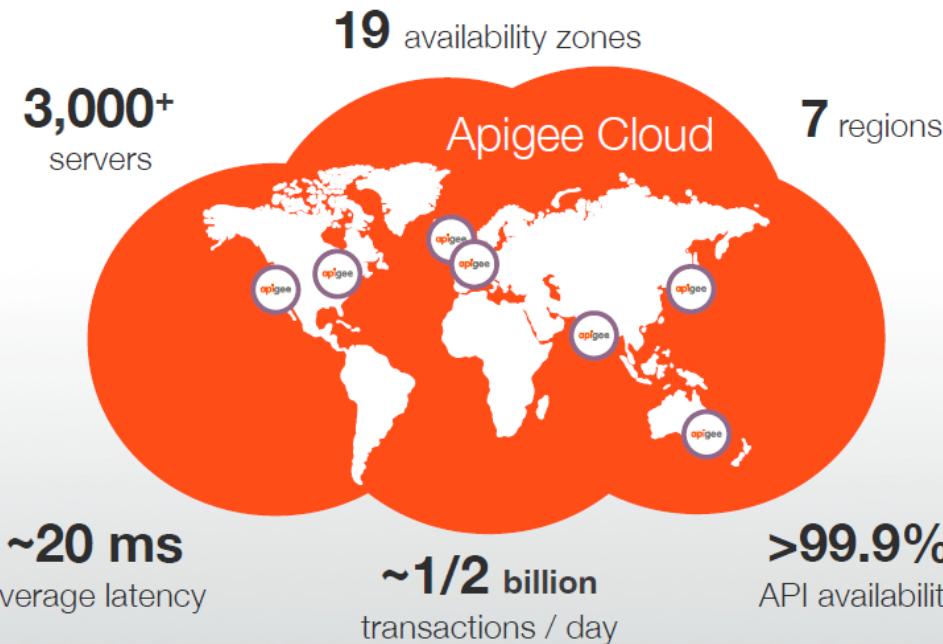
Transform, translate and reformat data for easy consumption



Secure APIs and protect back-end systems from attack

Extend with programming when you need it

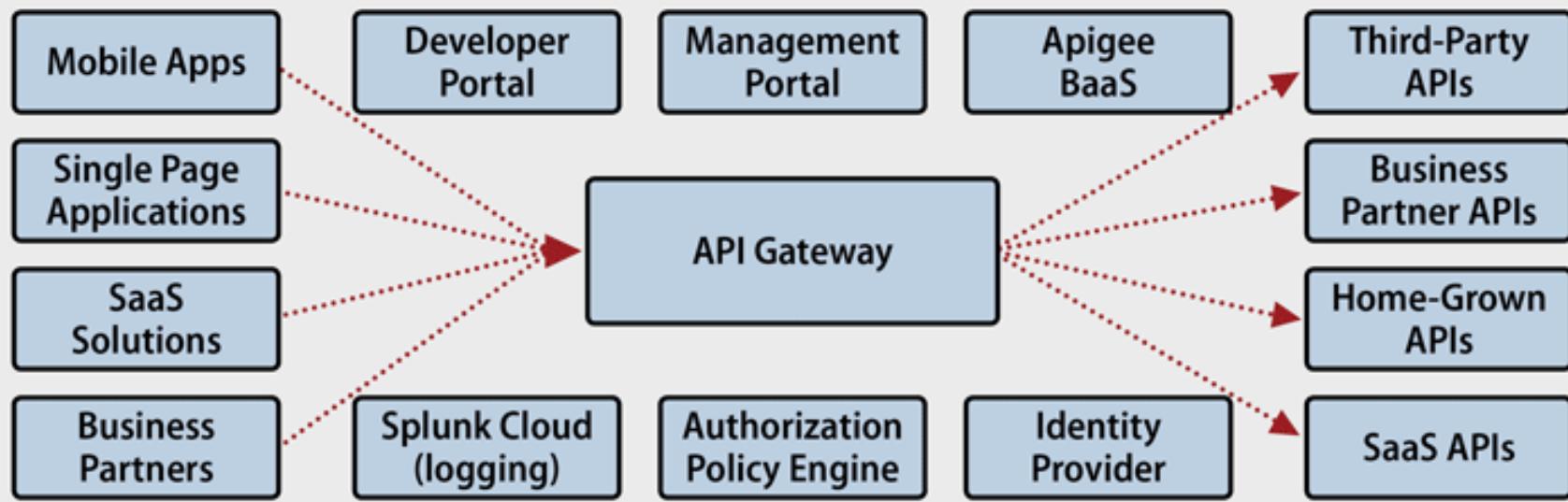
Flexible deployment options



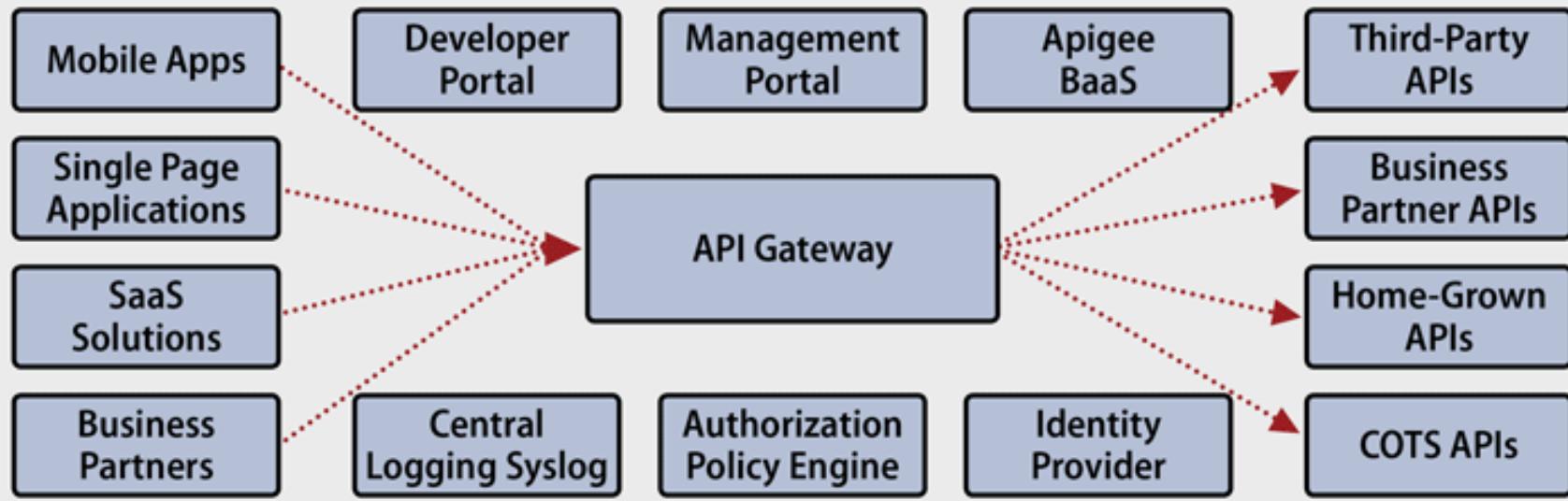
Public Cloud = Private Cloud

API Management Solution Architecture

Cloud Hosted API Management Platform Architecture



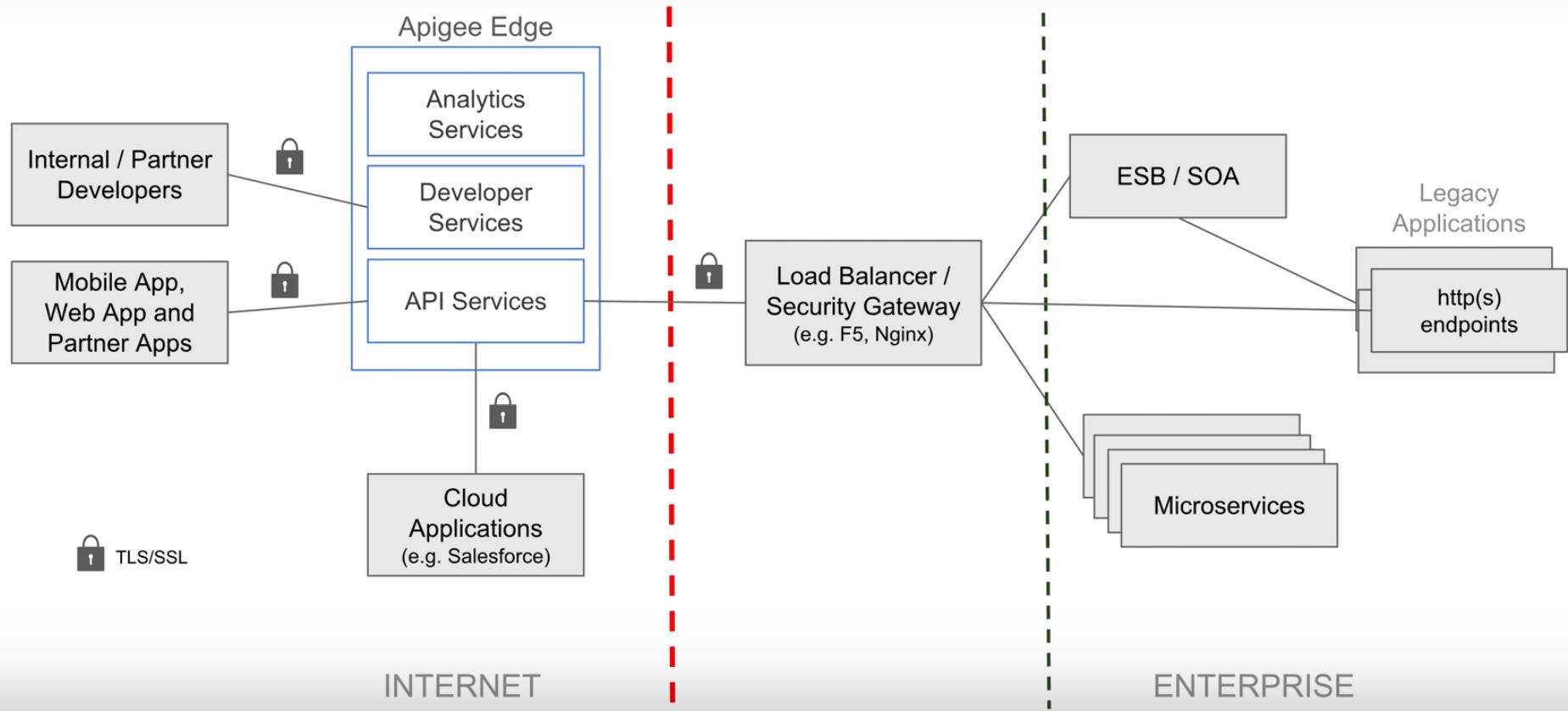
On Premise API Management Platform Architecture



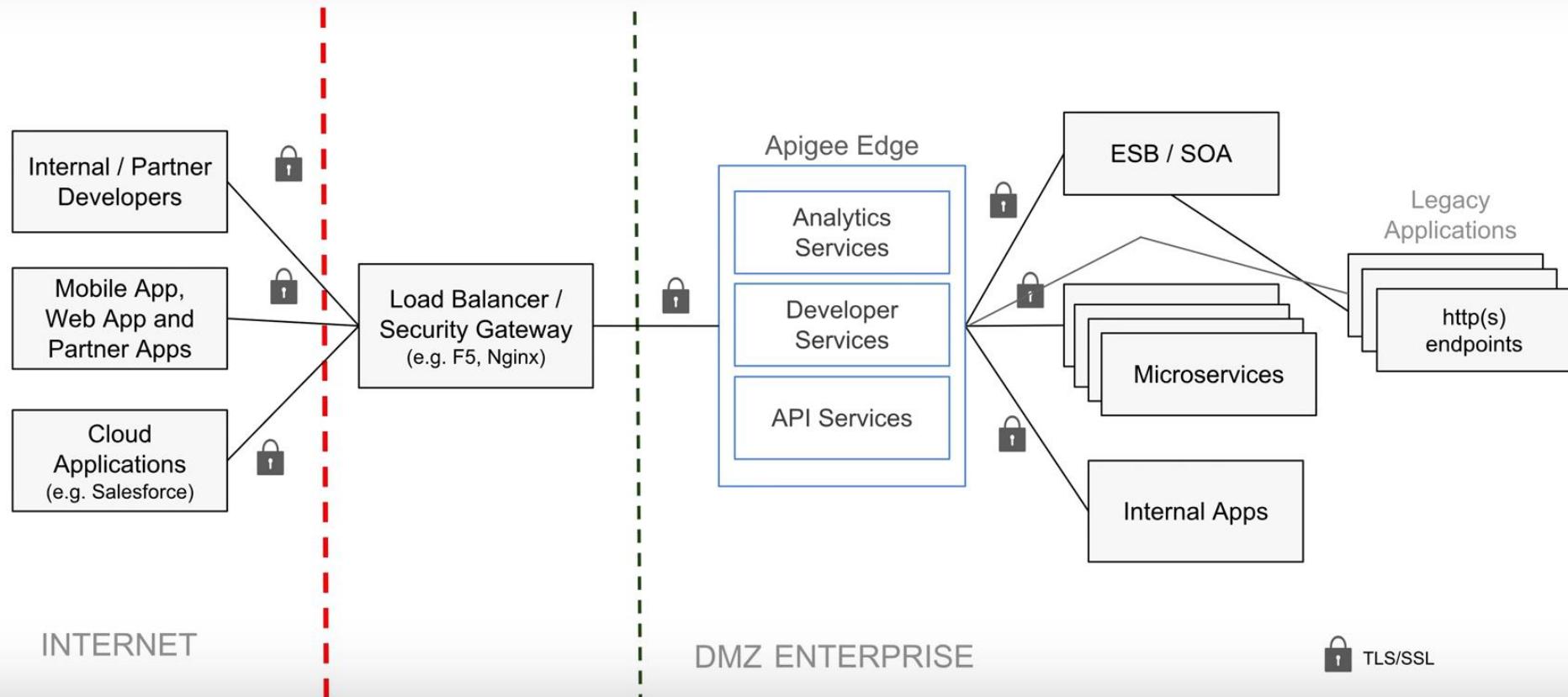
Cloud Native Deployment Strategy



Apigee Edge Cloud



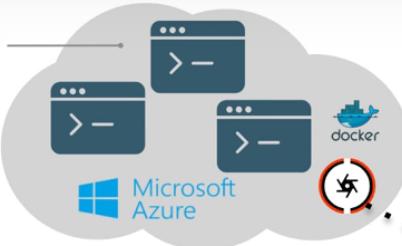
Apigee Edge OnPremises



Apigee Edge Multi-Cloud

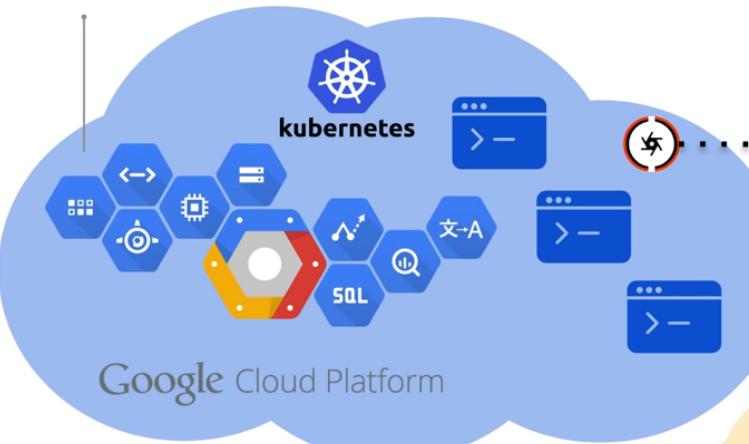
Apigee on Azure Cloud

Easily deploy Apigee API management as a Azure Service



GCP K8S Integration

Add Apigee API management to any service running on K8S



Google Cloud Platform



Apigee Distributed Run-Time

AWS Lambda Integration

Easily create an API for a AWS Lambda target from Apigee



apigee

MANAGEMENT SERVICES

ANALYTICS

SECURITY

API DEVELOPMENT

DEVELOPER MGMT

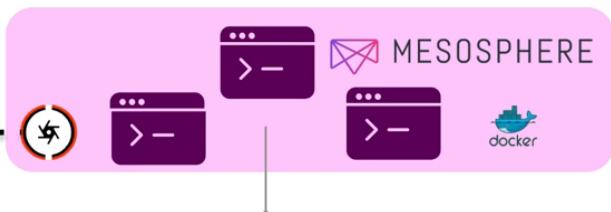
Native CF Integration

Add Apigee API management as a CF Route service



PaaS Agnostic

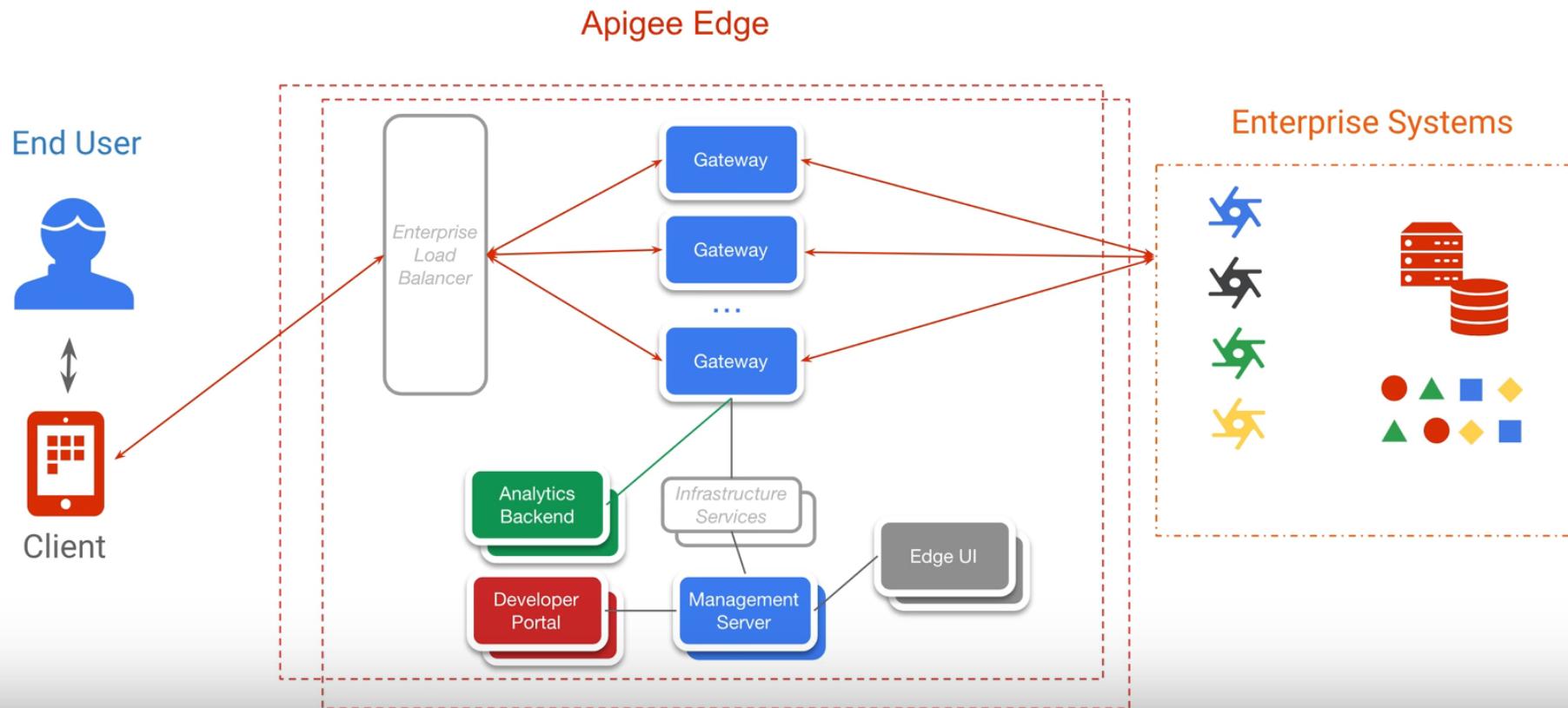
Add Apigee API management to any container or service



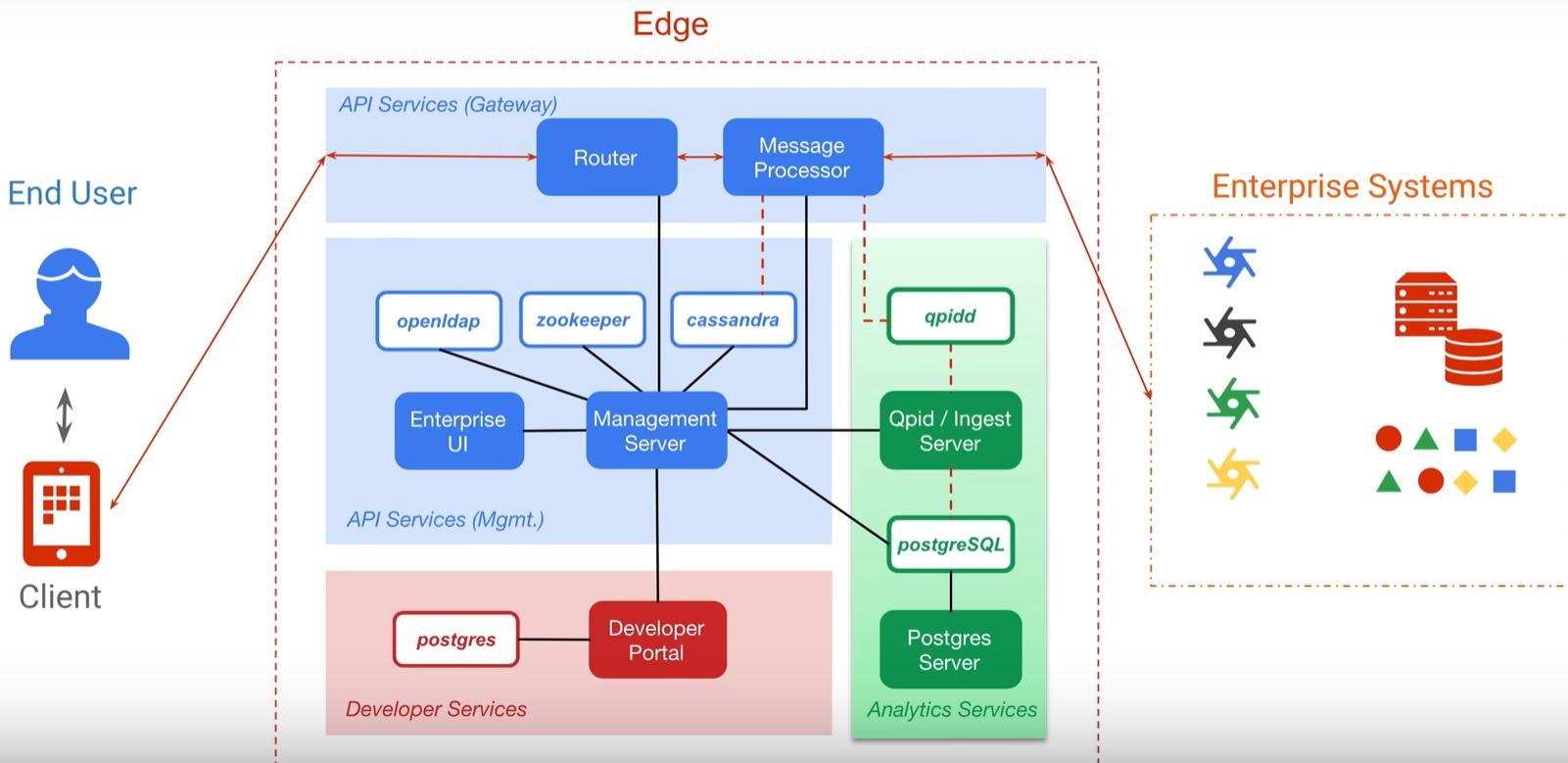
Cloud Foundry



Apigee Edge Distributed & Scalable Architecture



Apigee Edge Components

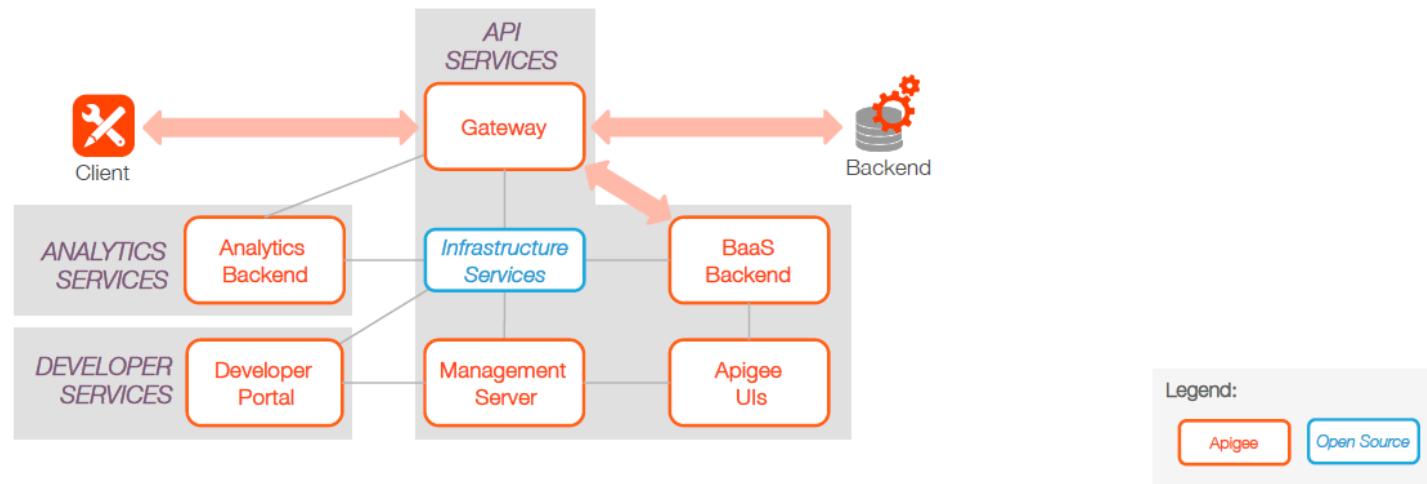


Apigee Edge architecture – High level

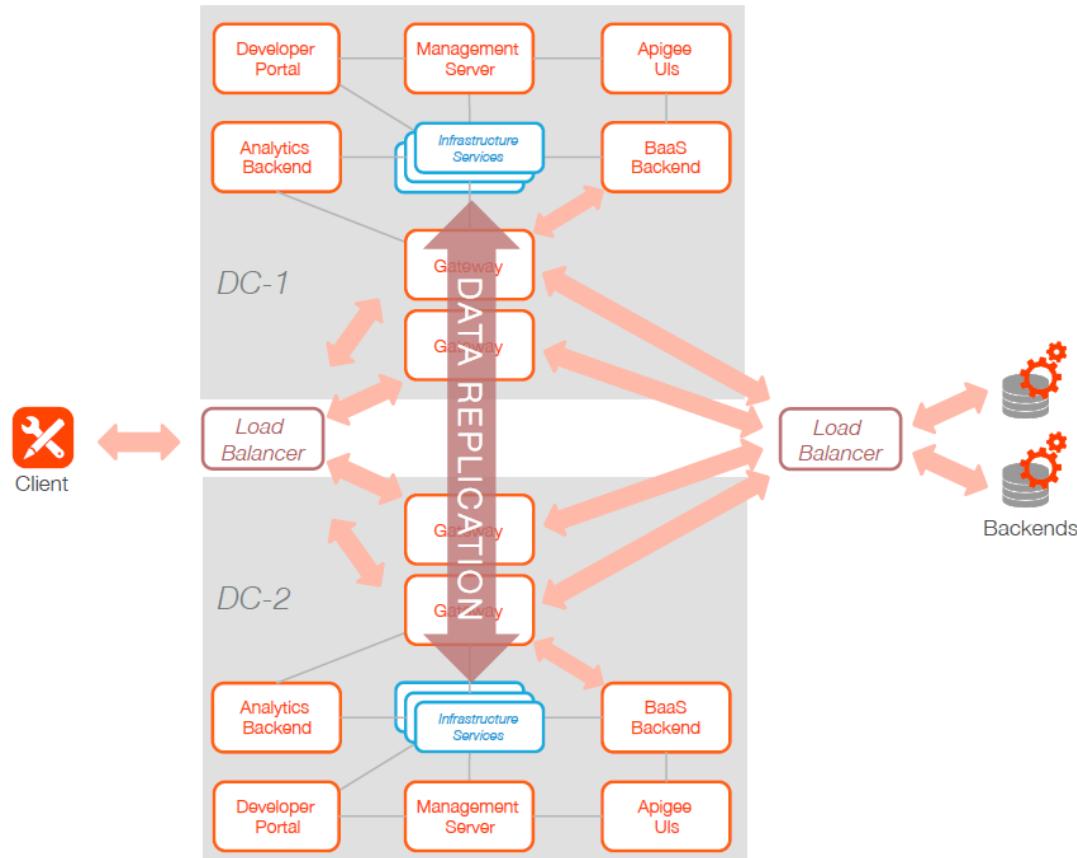
Apigee Edge is comprised of several stateless components that use infrastructure services to persist data

- Gateway: Routing and processing API calls
- Apigee UIs: Enterprise UI, Developer Portal
- Infrastructure Services: Persistence and queuing of run time data
- Management Server: Provider of REST APIs for all configuration tasks

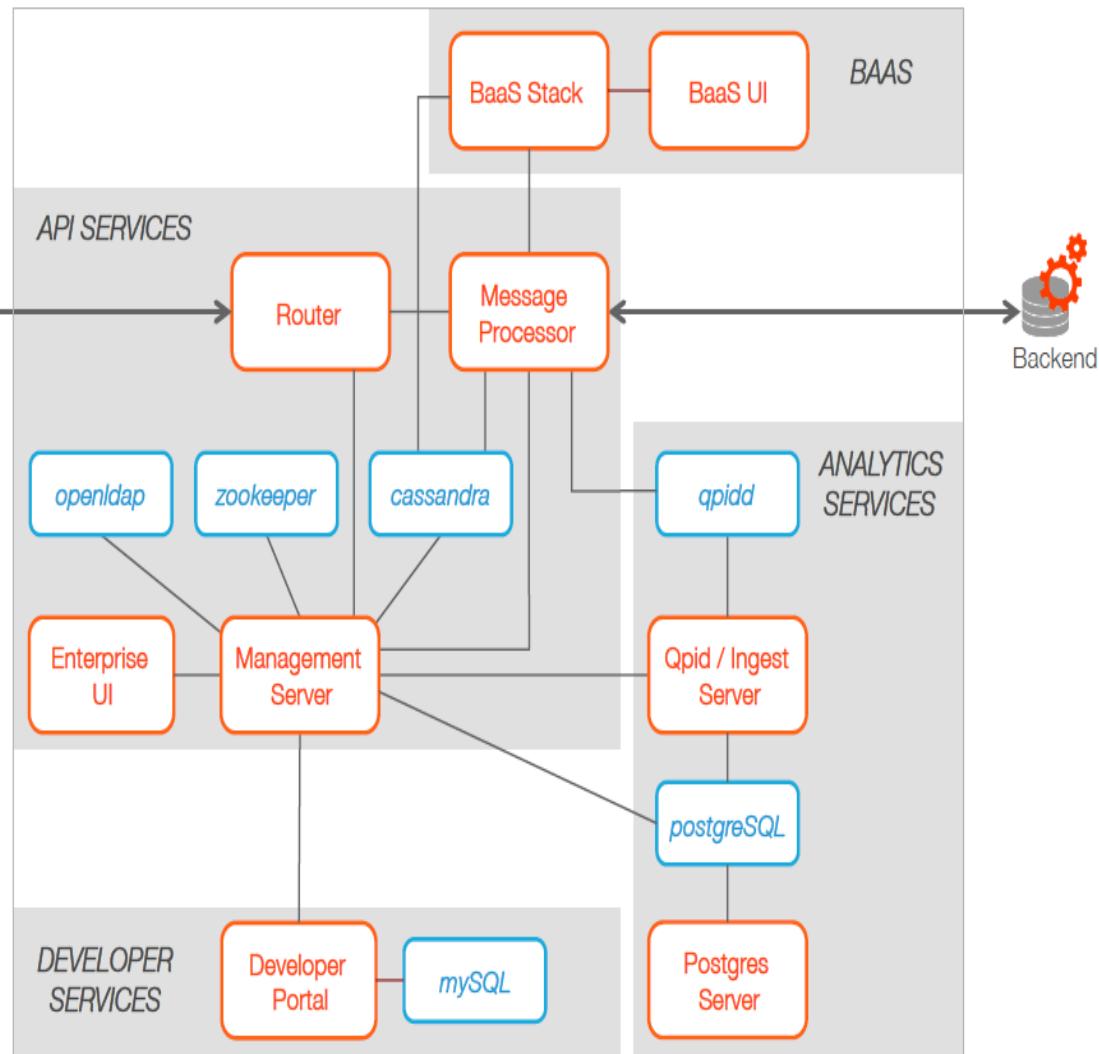
Note: Monetization is part of Developer Services and leverages Gateway, Analytics Services and Management Server



Apigee Edge architecture – High level



Apigee Edge architecture – Component view

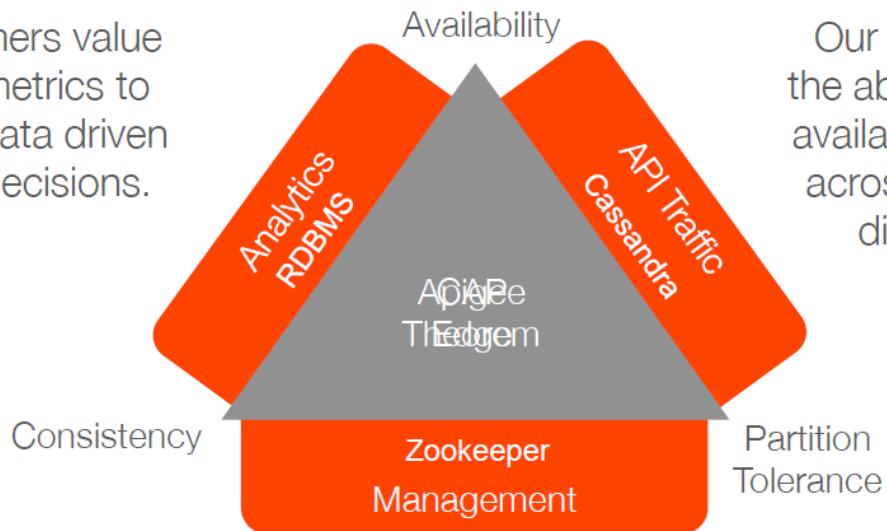


- **Router** handles all incoming API traffic and dispatches it. The Router terminates the HTTP request, handles the SSL traffic, and uses the virtual host name, port, and URI to steer requests to the appropriate node.
- **Message Processor** handles API traffic for a specific organization and environment and which executes all policies.
- Apache **Cassandra** stores application configurations, distributed quota counters, API keys, and OAuth tokens for applications running on the gateway.
- Apache **ZooKeeper** contains configuration data about all the services of the zone and which notifies the different servers of configuration changes.
- **OpenLDAP** contains organization user and roles.
- Management Server offers an API that is used by the Central Services server to communicate with the servers in each on-premises installation.
- **QPID Server** manages queuing system for analytics data.
- **Postgres Server** manages analytics database.



Apigee Edge architecture – Technology Stack

Our customers value accurate metrics to help drive data driven business decisions.



Our customers value the ability to have highly available API expanded across geographically dispersed sites.

Our customers value the ability to centralized management of distributed components.

In theoretical computer science, the CAP theorem, also known as Brewer's theorem, states that it is impossible for a distributed computer system to simultaneously provide all three of the following guarantees:

- Consistency - all nodes see the same data at the same time.
- Availability - a guarantee that every request receives a response about whether it succeeded or failed.
- Partition tolerance - the system continues to operate despite arbitrary message loss or failure of part of the system.

Apache Cassandra

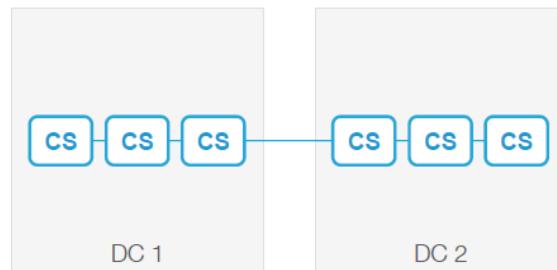
“Apache Cassandra is an open source distributed database management system. It is an Apache Software Foundation top-level project designed to handle very large amounts of data spread out across many commodity servers while providing a highly available service with no single point of failure.” -- Wikipedia

Cassandra characteristics:

- All nodes are equal. Not master/slave or primary/secondary.
- An application can read/write data from any node.
- Data replication. Apigee Edge uses replication factor 3.
- Consistency managed by application. Apigee Edge uses one and local quorum.

Cassandra is used by Apigee for a variety of purposes, including:

- Storage of developer, application and API Product data
- Storage of access and refresh tokens
- Storage of key-value map data
- Audit logs
- Custom analytics report models

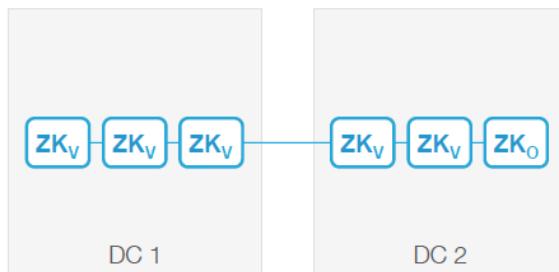


Apache Zookeeper

“Apache ZooKeeper is a software project of the Apache Software Foundation, providing an open source distributed configuration service, synchronization service, and naming registry for large distributed systems.”

– Wikipedia

Zookeeper is used by Apigee as a distributed configuration registry, tracking component location, configuration and status data. With some exceptions, it is NOT required to process API requests.



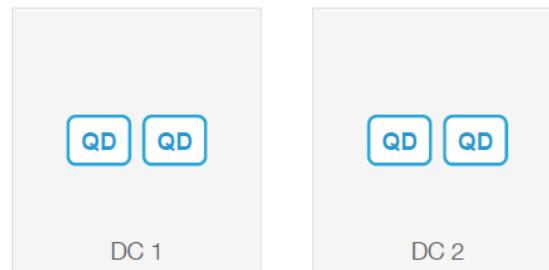
- **Leader:** The node that controls coordination of writes across distributed Zookeeper nodes
- **Voters:** Nodes that can vote on change proposal made by the Leader
- **Observers:** Do not vote on change proposals and must forward all writes to the Leader

Apache Qpid

“Apache Qpid, an open-source (Apache 2.0 licensed) messaging system, implements the Advanced Message Queuing Protocol. It provides transaction management, queuing, distribution, security, management, clustering, federation and heterogeneous multi-platform support.”

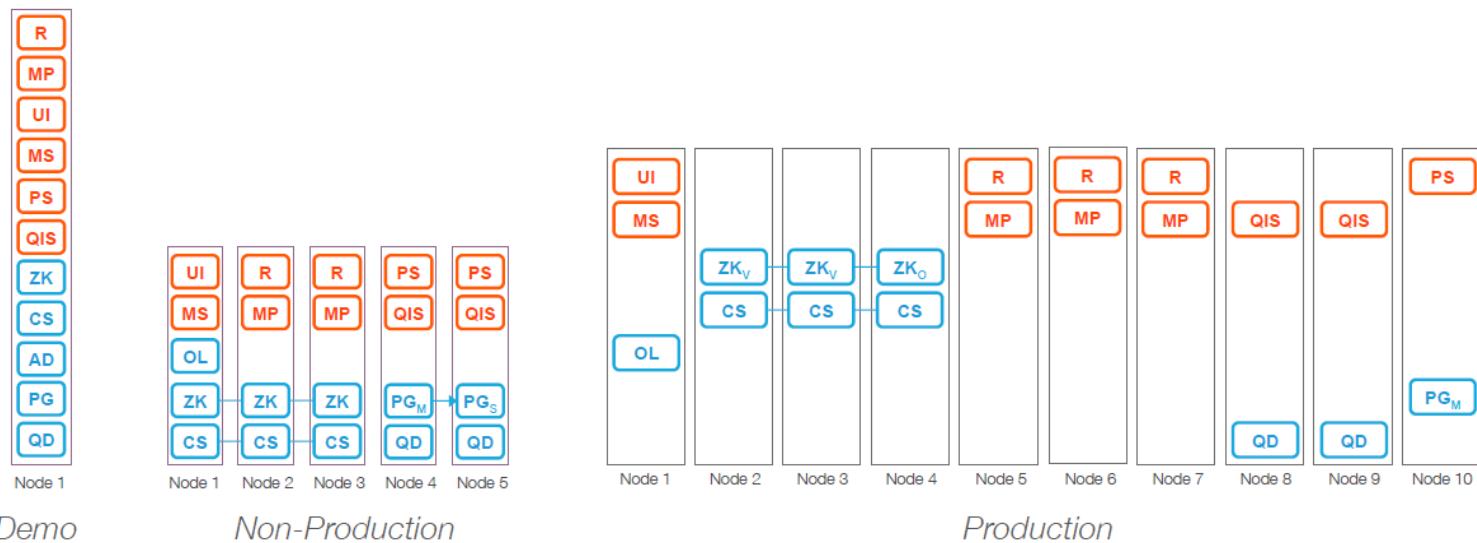
– Wikipedia

Qpid is used by Apigee Edge as messaging system for analytics and monetization data.



Apigee Edge architecture – Deployment options

- Apigee Edge architecture offers great flexibility when it comes to deployment options.
- Edge can be deployed from a single VM to a multi-datacenter active/active configuration.
- Edge has been designed from the ground up to be a true cloud scale solution, capable of running on both virtualized (including AWS) and physical hardware.



Topology selection – Key considerations

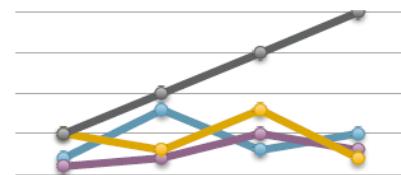
1. Know your business



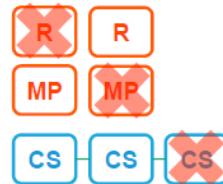
4. Know your API proxies

Traffic Management	Security
Quota	XML Threat Protection
Spike Arrest	JSON Threat Protection
Response Cache	Regular Expression Protection
Lookup Cache	OAuth v2.0
Populate Cache	Get OAuth v2.0 Info
Invalidate Cache	OAuth v1.0a
Reset Quota	Verify API Key
Mediation	Access Control
JSON to XML	Generate SAML Assertion
XML to JSON	Validate SAML Assertion
Raise Fault	
XSL Transform	
SOAP Message Validation	
Assign Message	
Extract Variables	
Access Entity	
Key Value Map Operations	
Extension	
Java Callout	
Python	
JavaScript	
Service Callout	
Statistics Collector	
Message Logging	

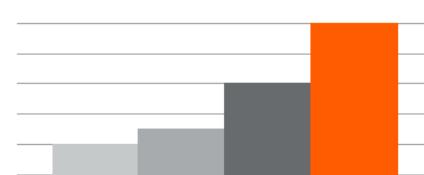
2. Understand traffic patterns



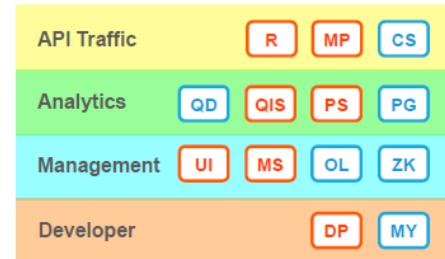
5. Remember everything fails



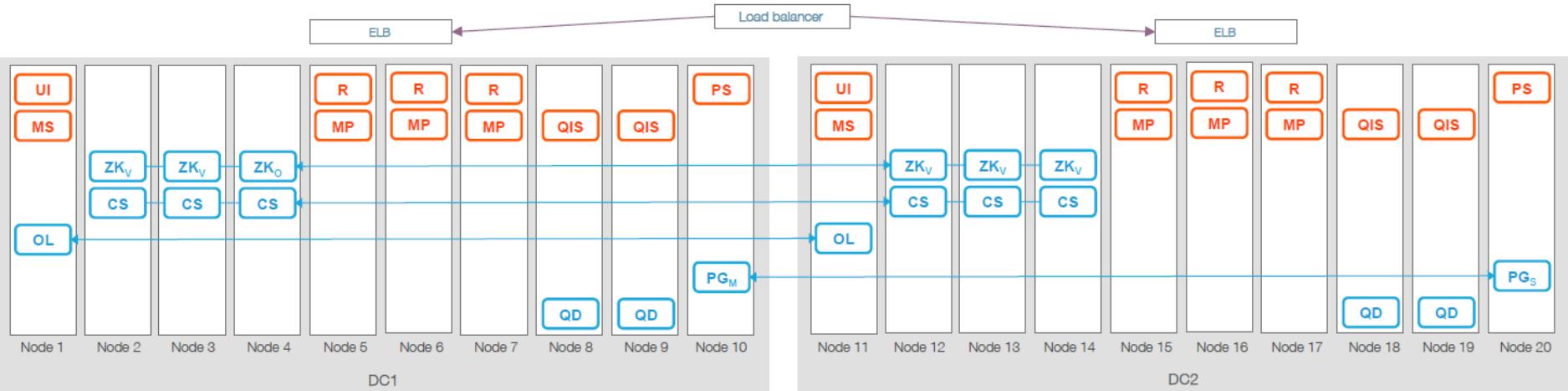
3. Plan for growth (2X, 5X, 10X?)



6. API Traffic, Analytics and Management, Developer Service components can and should scale independently.



Apigee Edge architecture – Architecture characteristics

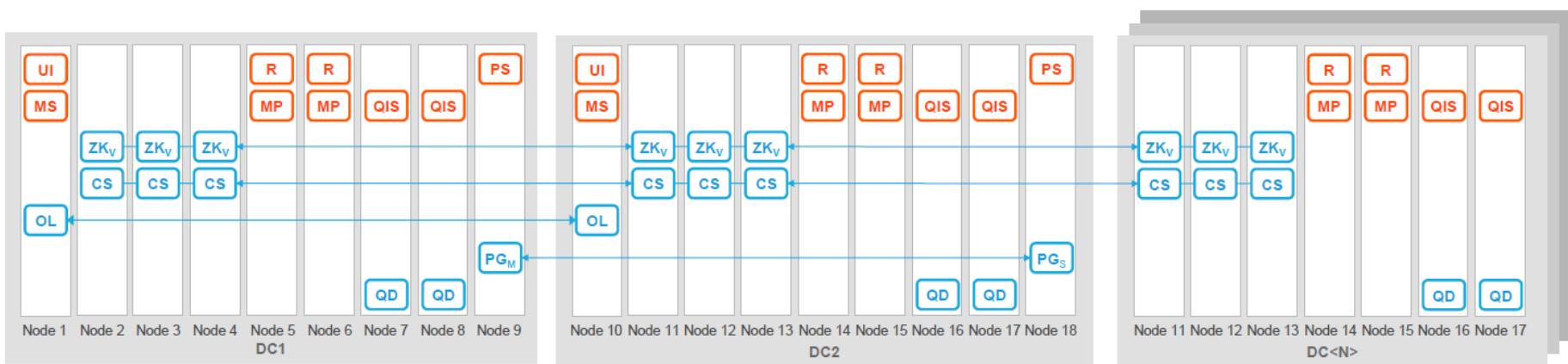


- Horizontally scalable. Components can be installed and configured to run from a single node (all in one setup) all the way to a multi DC centers, active/active, globally distributed setup.
- Ability to stack components.
- Distributed data replicated using eventual consistency.
- Asynchronous analytics data capture and processing.
- Centralized configuration for distributed components.
- Multitenant by design.
- Management via APIs and UI console.

Legend:	R Router	MS Management Server	DP Developer Portal	MY MySQL	OL Openldap	Server/Virtual Machine
	MP Message Processor	PS Postgres Server	BA BaaS Server	ZK Zookeeper	PG PostgreSQL	POD
	UI Enterprise UI	QIS Qpid/Ingest Server		CS Cassandra	QD Apache Qpid	

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Apigee Edge architecture – Horizontal scalability



- Planet footprint is driven by customer requirements, transaction volumes, availability and reliability among others drive component stacking and number of nodes.
- R, MP and CS are critical components to handle live API traffic.
- Management and analytics components are not required on every DC.
- For high availability, ZK and QD should be available in all DCs.
- Analytics data replication via Master/Slave or Publish/Subscribe.

Legend:	[R]	Router	[MS]	Management Server	[DP]	Developer Portal	[MY]	MySQL	[OL]	Openldap	[POD]
	[MP]	Message Processor	[PS]	Postgres Server	[BA]	BaaS Server	[ZK]	Zookeeper	[PG]	PostgreSQL	
	[UI]	Enterprise UI	[QIS]	Qpid/Ingest Server	[CS]	Cassandra	[QD]	Apache Qpid			

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Apigee Edge architecture – Scaling by capability

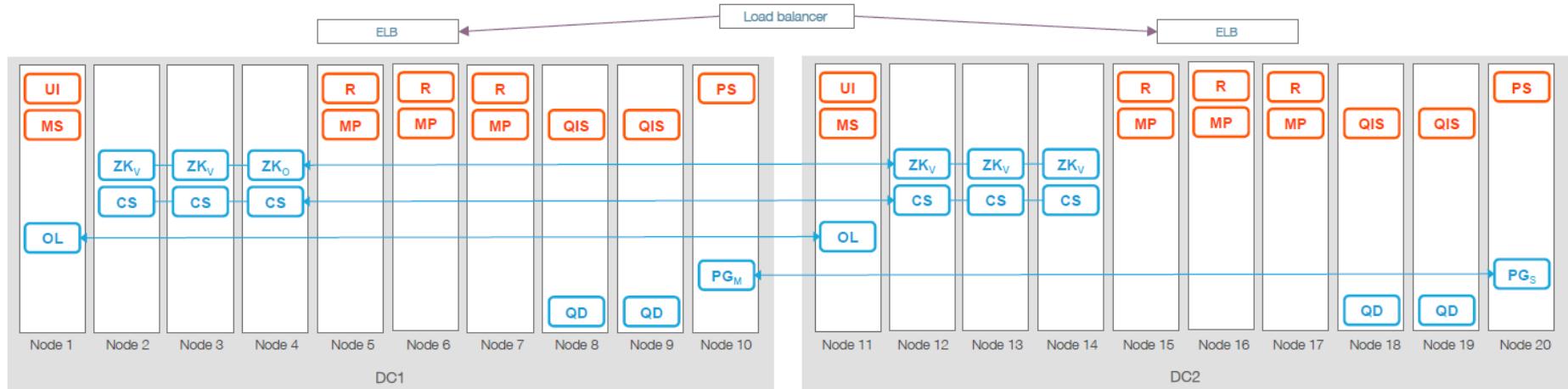


- Given the responsibility and capabilities offered by each component, scalability requirements and how they are implemented may vary.
- In most scenarios, scaling to accommodate higher number of TPS or API calls may impact only components serving live API traffic.
- Analytics and management components may grow in number mostly driven by demanding high availability requirements for those capabilities provided by analytics and management components.

Legend:	R Router	MS Management Server	DP Developer Portal	MY MySQL	OL Openldap	PG PostgreSQL	CS Server/Virtual Machine
	MP Message Processor	PS Postgres Server	BA BaaS Server	ZK Zookeeper	PG_M PostgreSQL	QD Apache Qpid	QI POD
	UI Enterprise UI	QIS Qpid/Ingest Server		CS Cassandra			

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Apigee Edge architecture – Multitenant by design



Legend:	R Router	MS Management Server	DP Developer Portal	MY MySQL	OL Openldap	Server/Virtual Machine
	MP Message Processor	PS Postgres Server	BA BaaS Server	ZK Zookeeper	PG PostgreSQL	POD
	UI Enterprise UI	QIS Qpid/Ingest Server		CS Cassandra	QD Apache Qpid	

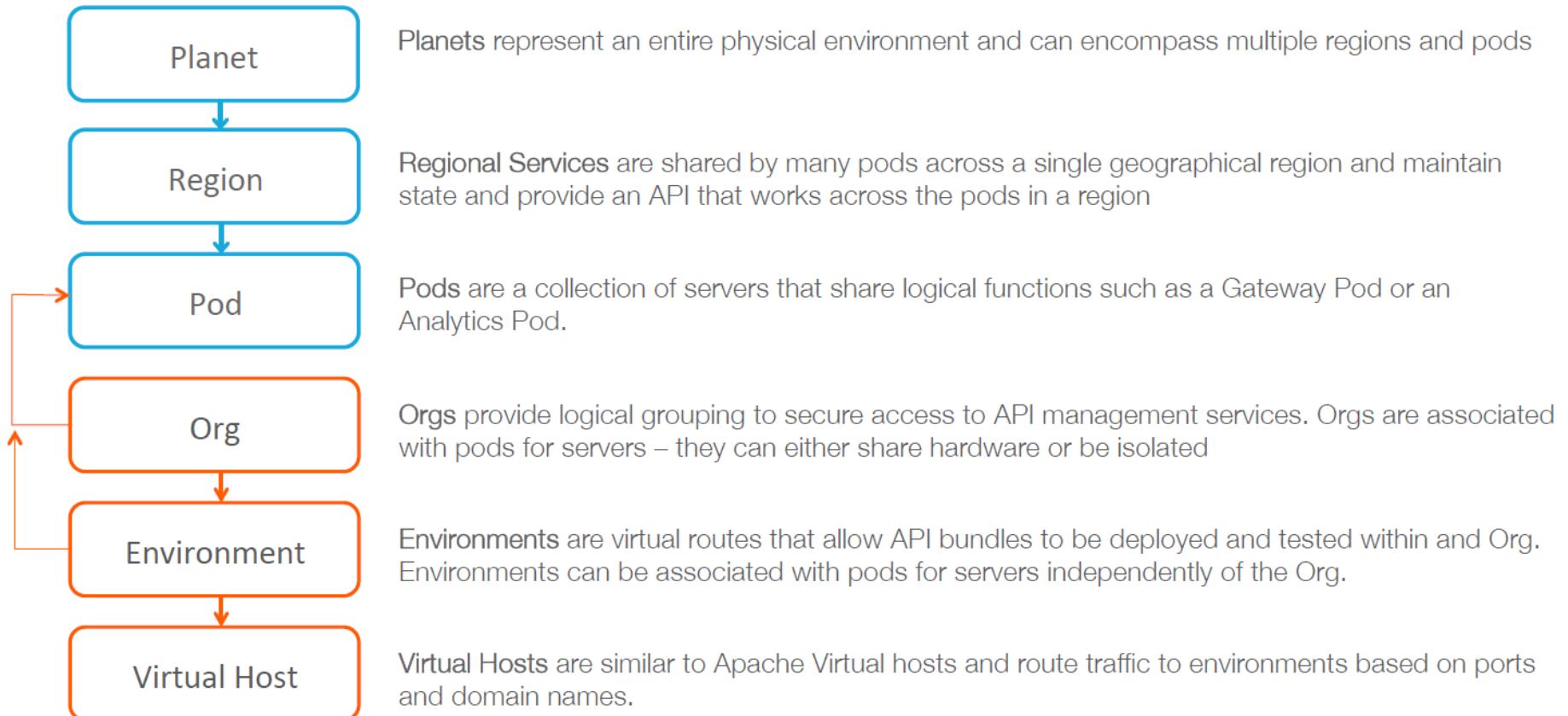
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Multitenancy

“Multitenancy is a reference to the mode of operation of software where multiple independent instances of one or multiple applications operate in a shared environment. The instances (tenants) are logically isolated, but physically integrated. The degree of logical isolation must be complete, but the degree of physical integration will vary. The more physical integration, the harder it is to preserve the logical isolation. The tenants (application instances) can be representations of organizations that obtained access to the multitenant application (this is the scenario of an ISV offering services of an application to multiple customer organizations). The tenants may also be multiple applications competing for shared underlying resources (this is the scenario of a private or public cloud where multiple applications are offered in a common cloud environment).” - Gartner

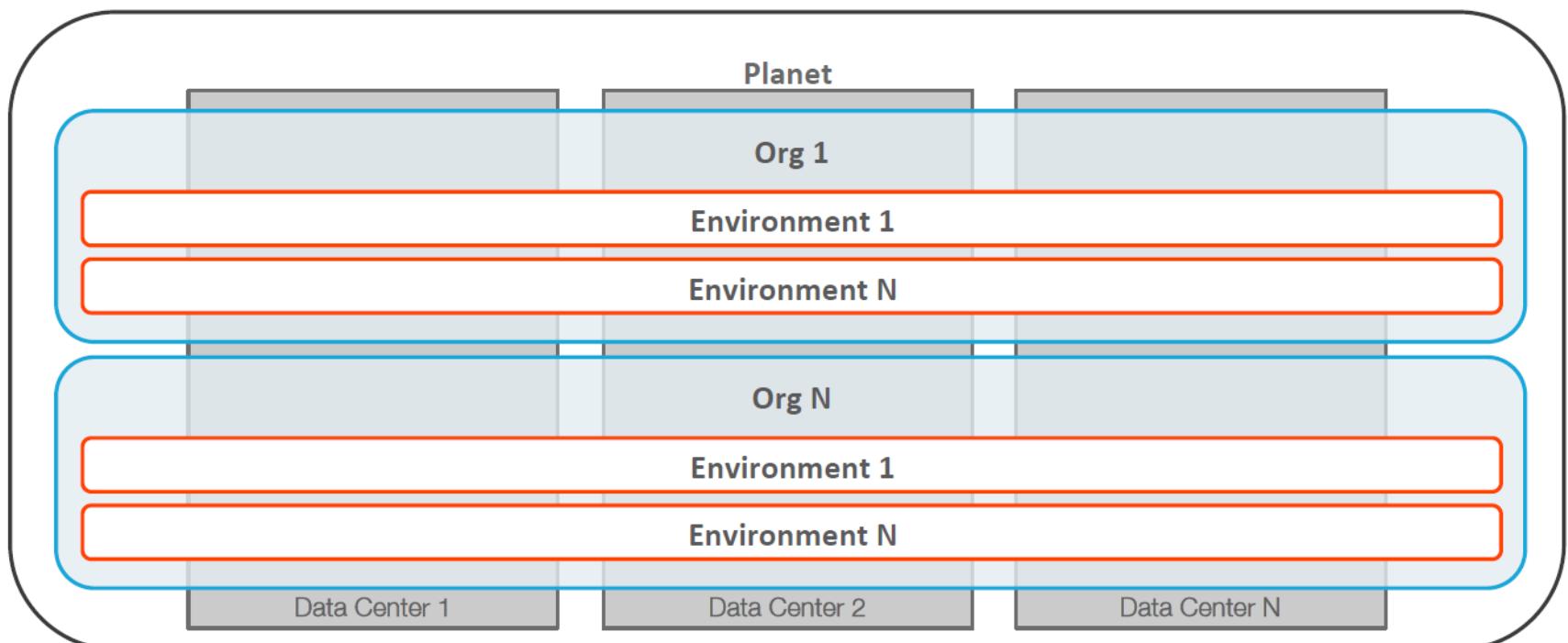
Multitenancy = Software capabilities to support shared infrastructure while providing tenants with data and processing partitioning.

Apigee Edge Architecture – Multitenancy

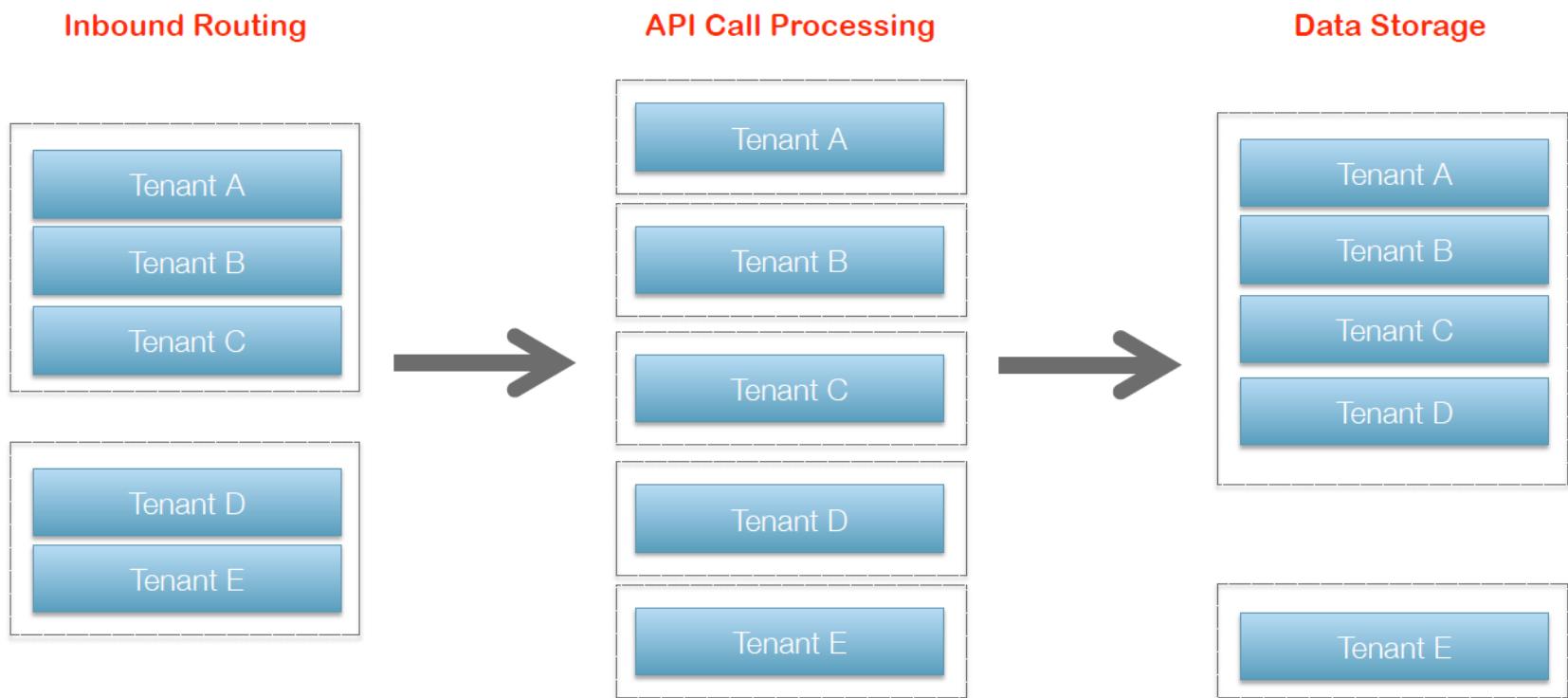


Apigee Edge Architecture – Multitenancy

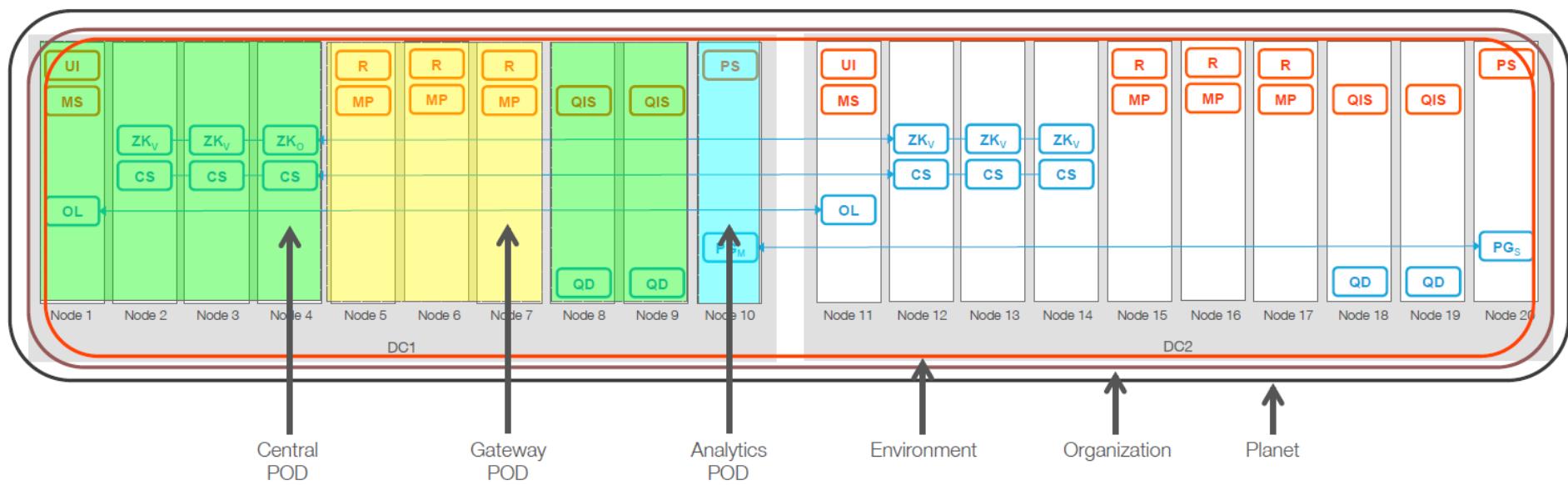
- A Planet can expand multiple DCs. Organization and Environment can expand across the planet.
- Data partitioning by Organization and Environment. Processing partitioning by Org+Env can be configured.



Apigee Edge Architecture – Physical partitioning

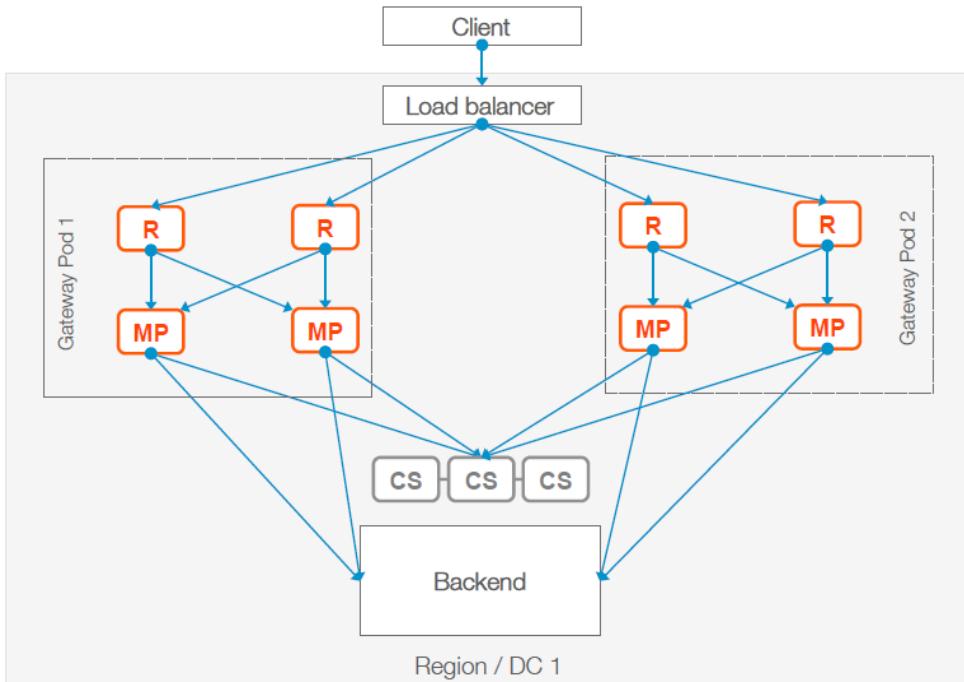


Apigee Edge Architecture – Organizational structure



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Apigee Edge Architecture – API traffic data flow



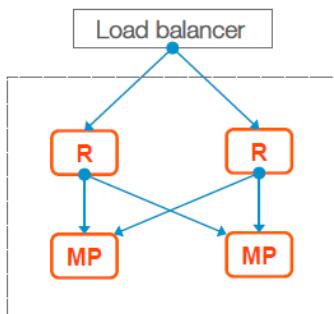
- Routers send requests to Message Processors in their Gateway pod.
- If there are two or more gateway pods in a region, then routers will ignore message processors in the other gateway pods.
- Message Processors respect the region as their scope.
- For two data center the same rules apply as for one datacenter.
- All Apigee components are configured to only use the Cassandra nodes in their region / data center.

Legend:	R Router	MS Management Server	DP Developer Portal	MY MySQL	OL Openldap	PS Server/Virtual Machine	● → API call flow
	MP Message Processor	PS Postgres Server	BA BaaS Server	ZK Zookeeper	PG PostgreSQL	CS Cassandra	● → Analytics flow
	UI Enterprise UI	QIS Qpid/Ingest Server		CS Cassandra	QD Apache Qpid		
						POD	©2015 Apigee. All Rights Reserved.

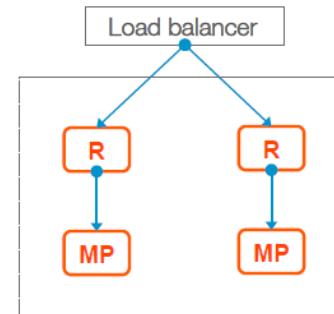
Apigee Edge Architecture – API traffic data flow

R+MP Configuration options

Tenant Aware Routing



Server Affinity



- Rs direct traffic to appropriate MPs, load balancing between them.
- Default behavior.
- Health check heartbeat allows R to automatically take MP out of/into rotation if unresponsiveness is detected.

- R can also be configured to connect to a dedicated MP. Using server affinity, all traffic handled by a R is exclusively sent to its corresponding MP.
- This configuration option offers customer the ability to isolate R/MP for dedicated use cases without impacting API traffic flowing across other R/MP within the same pod.

Legend:
R Router
MP Message Processor
UI Enterprise UI

MS Management Server
PS Postgres Server
QIS Qpid/Ingest Server

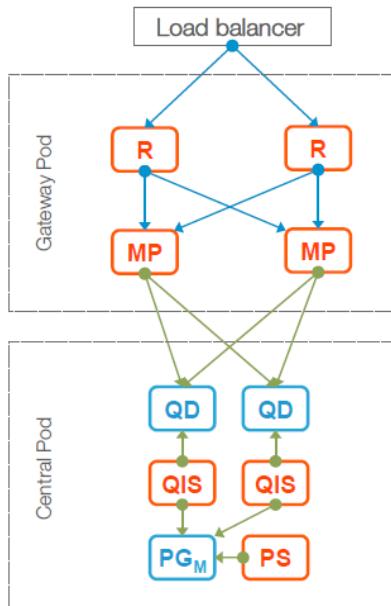
DP Developer Portal
BA BaaS Server

MY MySQL
ZK Zookeeper
CS Cassandra

OL Openldap
PG PostgreSQL
QD Apache Qpid

Server/Virtual Machine
POD
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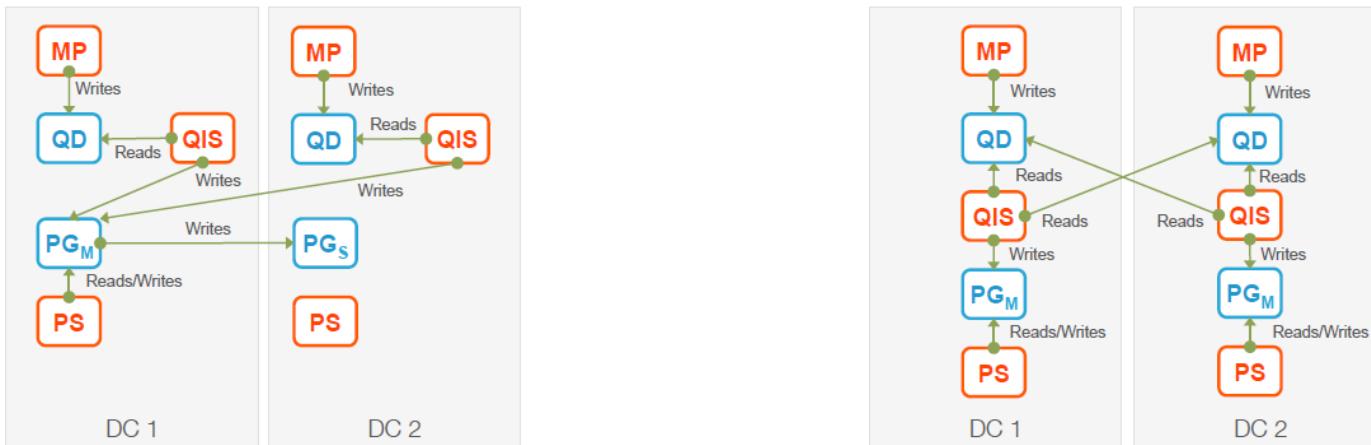
Apigee Edge Architecture – Analytics data flow



- Ingest services in Qpid Ingest Server will collect Analytics data from all queues and store in PostgreSQL.
- Postgres Server aggregates analytics data asynchronously.
- Message Processors respect the region as their scope and will offload analytics data to all Apache Qpid queues in their region / data center.

Legend:		MS		DP		MY		OL		Server/Virtual Machine		● → API call flow
R	Router	MS	Management Server	DP	Developer Portal	MY	MySQL	OL	Openldap	POD	POD	● → Analytics flow
MP	Message Processor	PS	Postgres Server	BA	BaaS Server	ZK	Zookeeper	PG	PostgreSQL			©2015 Apigee. All Rights Reserved.
UI	Enterprise UI	QIS	Qpid/Ingest Server			CS	Cassandra	QD	Apache Qpid			

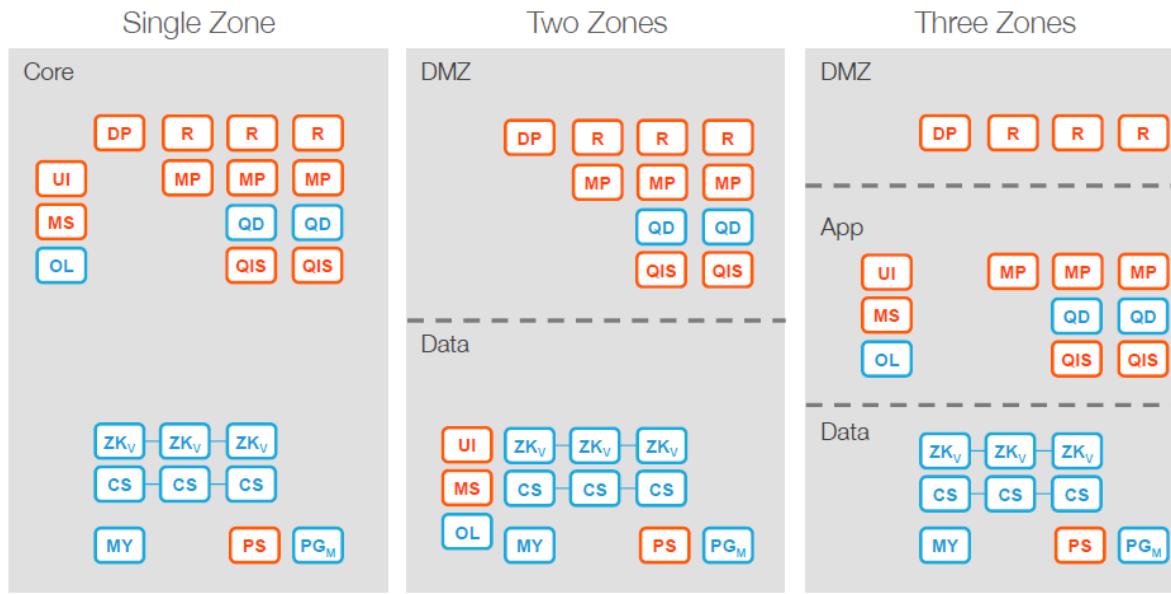
Apigee Edge Architecture – Analytics data flow



- Analytics data is partitioned per Environment.
- Analytics data size generated by MPs per transaction is about 1kb.
- PostgreSQL contains Raw Data Tables and Aggregated Data Tables. Raw Data Tables grow as analytics data is collected. Appropriate data retention policy and purge processes are required.
- Custom reports allow customers to define user-defined queries which run against raw data.



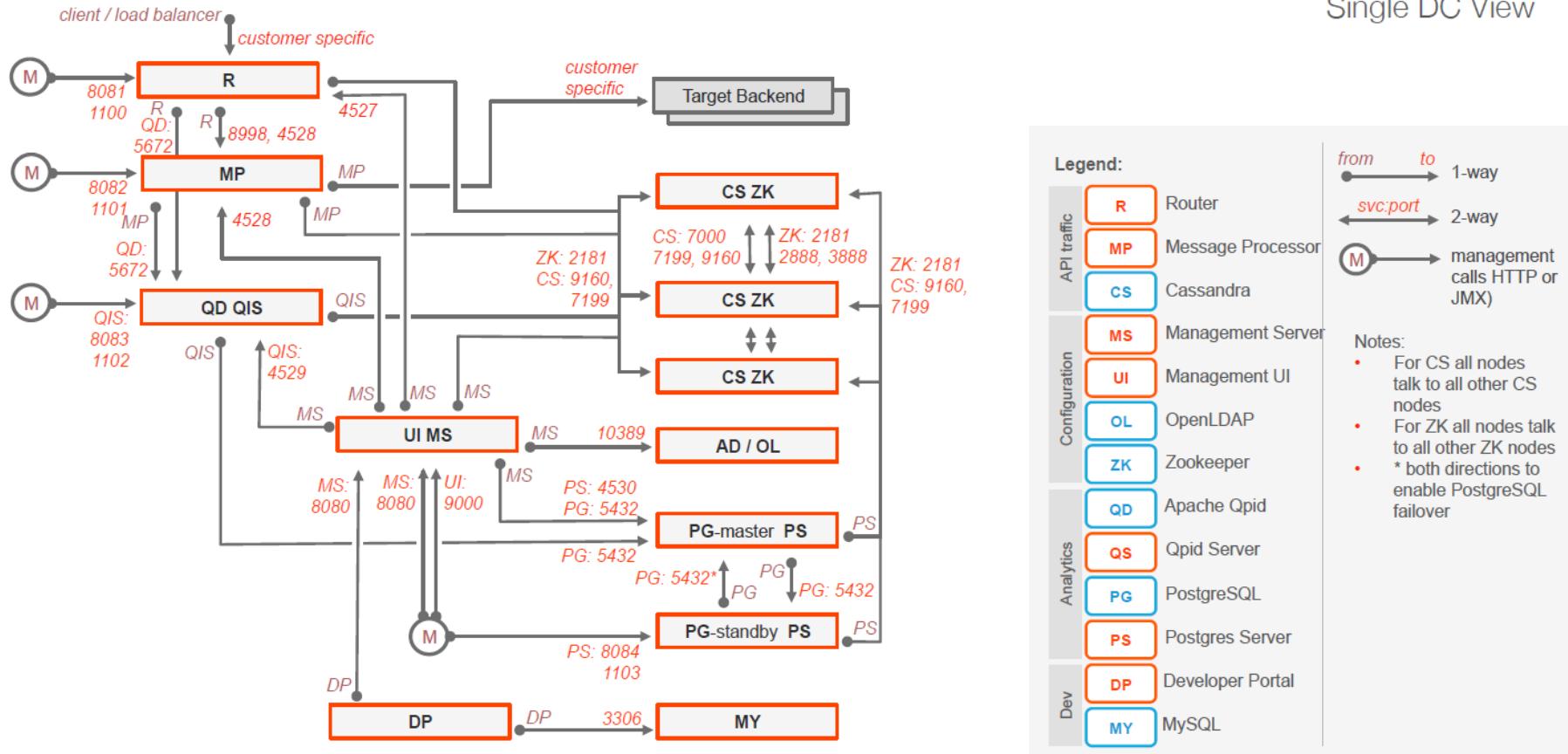
Apigee Edge Architecture – Network Zoning



- Edge architecture does not impose network zone requirements. Network zoning will be driven by customer operation and security requirements.
- Firewalls and security appliances between zones should accommodate the connectivity and traffic characteristics of Apigee components without adding latency overhead.
- Keep API traffic as direct as possible. Keep MP dependencies close.
- Pay attention to cross-zone connections.

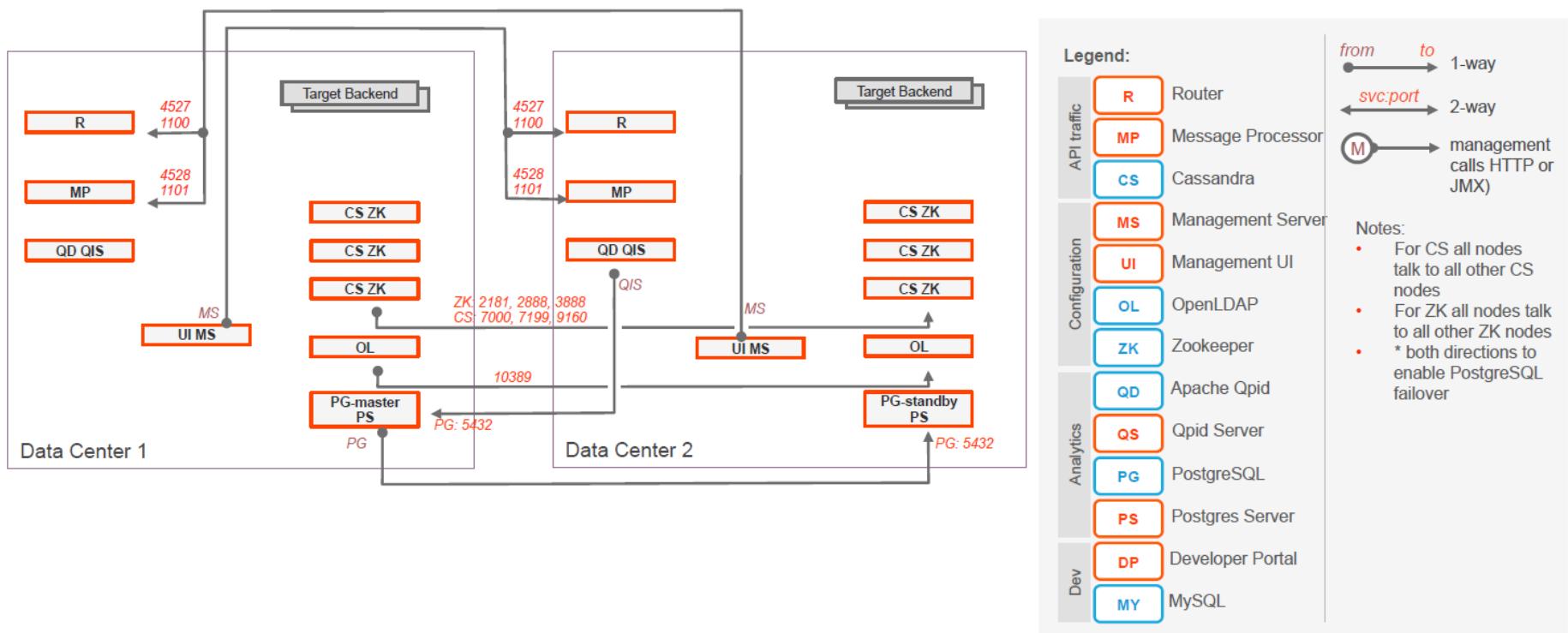
Legend:	R Router	MS Management Server	DP Developer Portal	MY MySQL	OL Openldap	Server/Virtual Machine	—> API call flow
	MP Message Processor	PS Postgres Server	BA BaaS Server	ZK Zookeeper	PG PostgreSQL	POD	—> Analytics flow
	UI Enterprise UI	QIS Qpid/Ingest Server		CS Cassandra	QD Apache Qpid		©2015 Apigee. All Rights Reserved.

Apigee Edge Architecture – Components Connectivity



Apigee Edge Architecture – Components Connectivity

Multi DC View



System Requirements – Hardware Specification



- Cassandra
 - Local storage with SSD or fast HDD supporting 2000 IOPS
- PostgreSQL
 - Local storage with SSD or fast HDD supporting 1000 – 8000 IOPS
 - CPU, Memory and Size the storage according to the data retention requirements. Implement archive / purge process and keep less data for best performance.
 - Operations Guide provides formula to estimate storage needs.

Type	Components	CPU	Memory	Disk
A	UI, MS	2 core	4 GB	60 GB
B	OL	2 core	4 GB	60 GB
C	ZK, CS	8 core	16 GB	250 GB local storage with SSD or fast HDD supporting 2000 IOPS
D	R, MP	4/8 core	8/16 GB	100 GB
E	R	4 core	8 GB	60 GB
F	MP	8 core	16 GB	100 GB
G	QIS, QD	8 core	16 GB	500 GB local storage with SSD or fast HDD supporting 1000 IOPS
H	PS, PG	8 core	16 GB	500 GB to1 TB local storage with SSD or fast HDD supporting 4000-8000 IOPS

Legend:

[R] Router	[MS] Management Server	[DP] Developer Portal	[MY] MySQL	[OL] Openldap	[SV] Server/Virtual Machine
[MP] Message Processor	[PS] Postgres Server	[BA] BaaS Server	[ZK] Zookeeper	[PG] PostgreSQL	[POD] POD
[UI] Enterprise UI	[QIS] Qpid/Ingest Server	[CS] Cassandra	[QD] Apache Qpid		

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System Requirements – Software Dependencies

Operating System

- Red Hat Enterprise Linux (64-bit):
 - 6.3, 6.4, 6.5, 6.6, 7.0
- CentOS (64-bit):
 - 6.3, 6.4, 6.5, 6.6, 7.0
- Oracle Linux (64-bit):
 - 6.5

JDK

- Oracle JDK 1.7
- OpenJDK 7

SSL/TLS

- 1.0
- 1.2

Other software

- Cassandra 2.0.15
- Zookeeper 3.4.5
- QPID 0.14
- PostgreSQL 9.3
- Play (UI) 2.3.4
- OpenLDAP 2.4

Private Cloud Installer – Software Dependencies

- awk
- basename
- bash
- chkconfig
- curl
- date
- dirname
- echo
- expr
- grep
- hostname
- id
- ls
- perl
- pgrep (from procps)
- ps
- pwd
- python
- rpm
- rpm2cpio
- sed
- sudo
- tar
- tr
- uname
- unzip
- useradd
- wc
- yum

Complete list of prerequisites can be found in Apigee Edge Install and Configuration Guide, Page 19.

In addition to the tools above, some nodes require the installation of additional software components such as:

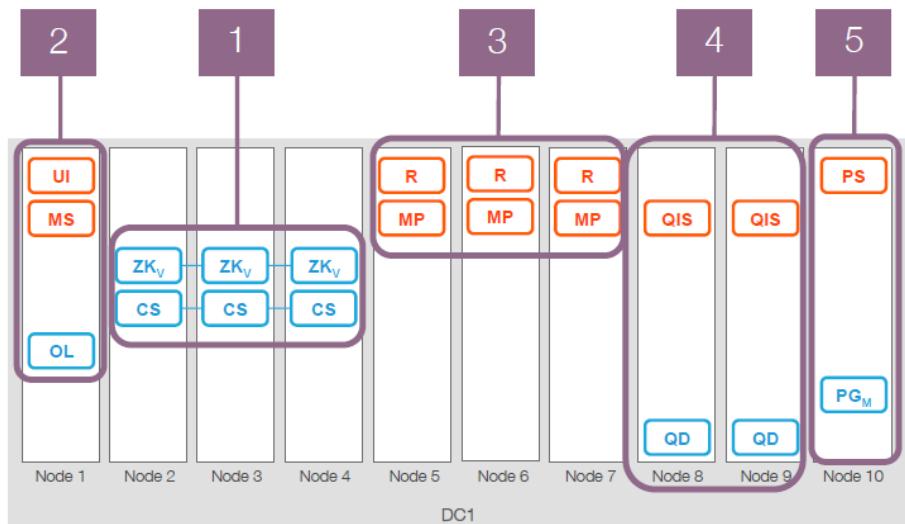
- ntp (all nodes)
- rsync (PostgreSQL nodes)
- openldap-clients openldap-servers (Management Server node)

Apigee Edge Installation Process

1. Install data store hosts
2. Install management hosts
 - Install LDAP first if using standalone LDAP hosts
3. Install router, message processor
4. Qpid hosts
5. PostgreSQL hosts
6. Configure PostgreSQL replication, if needed
7. Create organization(s) and environment(s)

If applicable, install:

7. Developer portal
8. Install monetization
9. App services (BaaS)



Legend:	R Router	MS Management Server	DP Developer Portal	MY MySQL	OL Openldap	Server/Virtual Machine
	MP Message Processor	PS Postgres Server	BA BaaS Server	ZK Zookeeper	PG PostgreSQL	POD
	UI Enterprise UI	QIS Qpid/Ingest Server		CS Cassandra	QD Apache Qpid	

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Private Cloud – Software Install

Apigee Private Cloud (apigee-edge-4.15.07.00.zip) has everything required to install and configure Apigee Edge and BaaS components except for the Developer Portal. The Developer Portal is distributed using a different package (DeveloperServices-4.15.07.00.tar).

Apigee Edge installation steps:

1. Acquire a license key and copy it to all nodes.
2. Download the Apigee Private Cloud from <ftp.apigee.com> and copy it to all nodes.
3. Installation downloads and installs required system software via Yum. It requires Internet connection or local repository.
4. Unzip apigee-edge-4.<YY>.<MM>.<V>.zip
5. Run the primary installation script:

```
/<unzip-location>/apigee-edge-4.<YY>.<MM>.<V>/apigee-install.sh -j /usr/java/default  
-r <inst-root> -d <data-root>
```

Private Cloud – Software Setup

1. Once Apigee binaries are installed, run:

```
/<inst-root>/apigee4/share/installer/apigee-setup.sh
```

2. Setup script requires a profile type and information about the system, provided interactively or via response file (silent install).
3. Create an organization, environment(s) and organization administrator, run:

```
/<inst-root>/apigee4/bin/setup-org.sh
```

Private Cloud – Silent Install

- Silent install provides a way for specifying, in advance, all necessary values used by apigee-setup.sh
- Silent install provides a way for specifying, in advance, all necessary values used by apigee-setup.sh

```
/<inst-root>/apigee4/share/installer/  
apigee-setup.sh -p ds -f <response-  
file-name>
```

- The response files contain a number of variables definitions to be used by apigee-setup.sh. A response file per DC/Region will be needed since some values are unique per DC/Region.

Single machine setups:

- aio = All In One (Gateway and Analytics Standalone)

Cluster node setup for ZooKeeper and Cassandra (min 3 nodes):

- ds = Datastore Cluster Node

LDAP setup for OpenLDAP:

- ld = LDAP Node

Separate components setup:

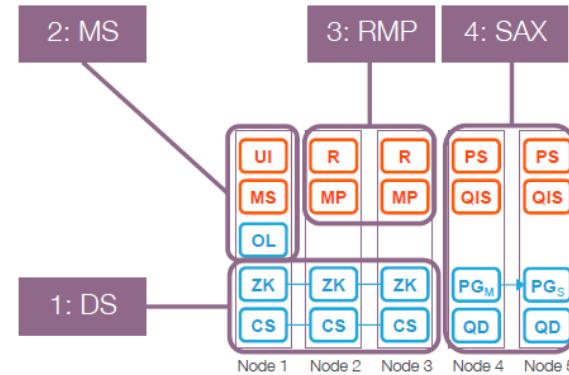
- ld = LDAP Node
- ms = Gateway Management Server
- r = Gateway Router
- mp = Gateway Message Processor
- rmp = Gateway Router and Message Processor
- qs = Analytics Qpid Server
- ps = Analytics Postgres Server
- mo = Monetization Server

Note: The list above doesn't show all the available options. Refers to Apigee Edge Install and Configuration Guide, section Basic Host Installation, page 35 for details.

Apigee Edge Install Lab – Installation and Setup

Install Steps

- A. Unzip apigee-edge-4.15.07.00.zip
- B. `./apigee-install.sh -j /usr/java/default -r /opt -d /opt`



Setup Steps

1. `/opt/apigee4/share/installer/apigee-setup.sh -p ds -f /root/opdk/response.txt`
2. `/opt/apigee4/share/installer/apigee-setup.sh -p ms -f /root/opdk/response.txt`
3. `/opt/apigee4/share/installer/apigee-setup.sh -p rmp -f /root/opdk/response.txt`
4. `/opt/apigee4/share/installer/apigee-setup.sh -p sax -f /root/opdk/response.txt`

Apigee Edge Install Lab – Installation and Setup

Setup Master-Standby Replication for PostgreSQL

- Apigee Edge Install and Configuration Guide, Page 59

Onboarding

- Apigee Edge Install and Configuration Guide, Page 47
- `/opt/apigee4/bin/setup-org.sh`

Access Apigee Edge

- `http://<management-server-public-ip>:9000`

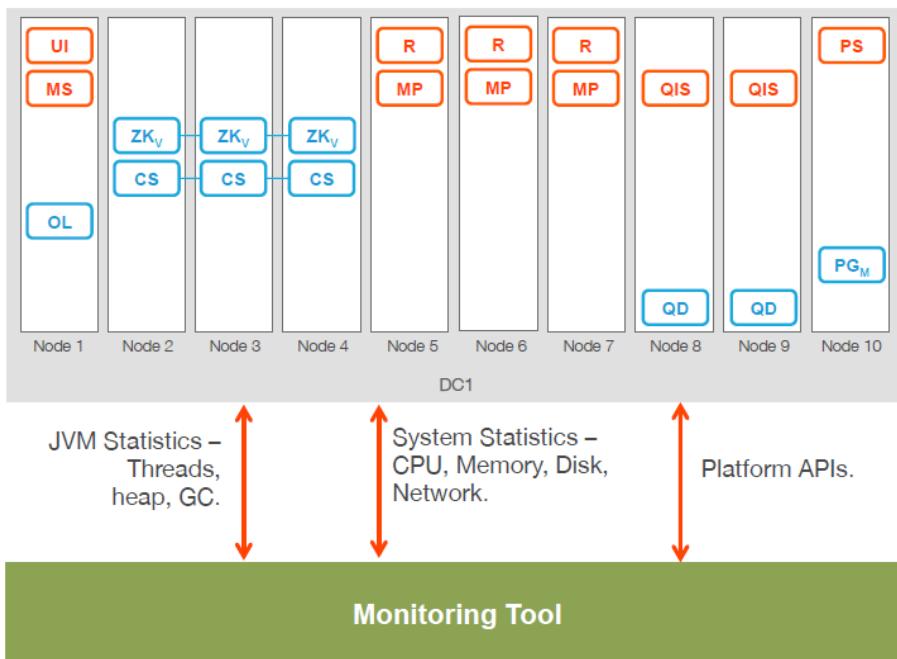


Platform Operations - Walkthrough

- Directory Structure
 - /<inst-root>/apigee4
- Start / Stop / Status
 - /<inst-root>/apigee4/bin/all-start.sh
 - /<inst-root>/apigee4/bin/all-status.sh
 - /<inst-root>/apigee4/bin/all-stop.sh
- Logs file
 - /<inst-root>/apigee4/var/log
- Management UI
 - <http://<management-server-host>:9000>
- Management API
 - <http://apigee.com/docs/management/apis>
 - <http://<management-server-host>:8080>



Platform Operations – Component Level Monitoring



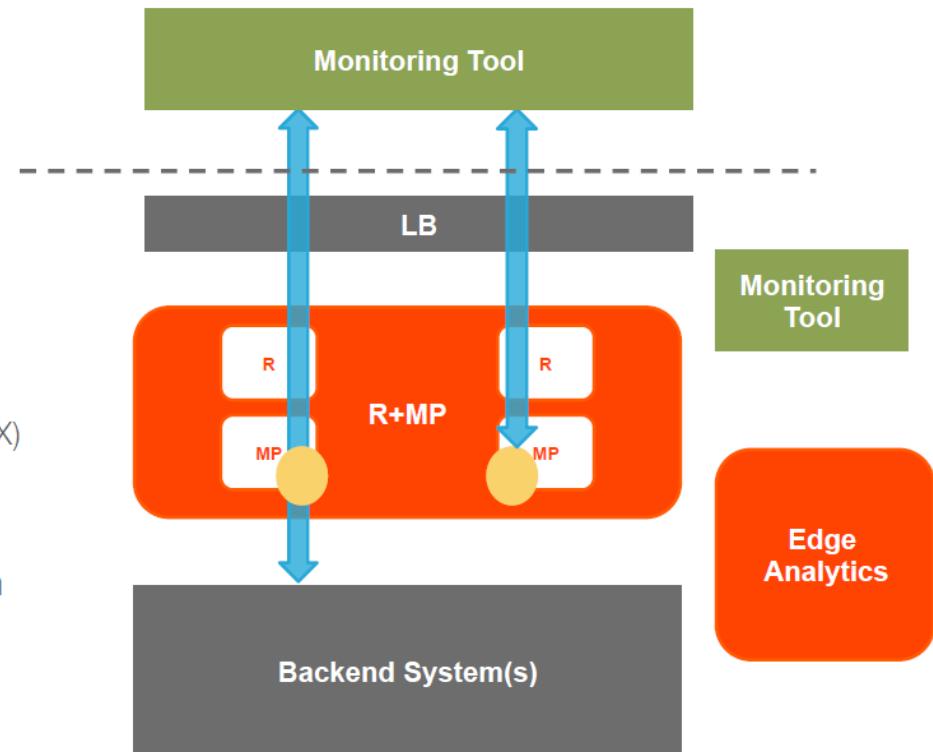
- System-Level Checks
 - CPU, Memory, Disk, Load, Network
- Process/Application Checks
 - Thread statistics, Memory utilization
- Components monitoring
 - JMX
 - Metrics
 - Management API (<http://<host>:<port>/v1/servers/self/up>)
 - Router health check of the Message Processor
 - Log monitoring
 - HeartBeat
 - Mark down/mark up events
 - Logging Policy

Legend:	R Router	MS Management Server	DP Developer Portal	MY MySQL	OL Openldap	SV Server/Virtual Machine
	MP Message Processor	PS Postgres Server	BA BaaS Server	ZK Zookeeper	PG PostgreSQL	POD POD
	UI Enterprise UI	QIS Qpid/Ingest Server		CS Cassandra	QD Apache Qpid	

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Platform Operations – APIs Monitoring

- API-Level Checks
 - API calls 20X responses
 - API call error within Apigee
 - API call error on backend
 - JMX
 - Metrics
- Message Flow Checks
 - Number of active clients
 - Number of responses (10X, 20X, 30X, 40X and 50X)
 - Connect failures
- API Health - <https://pages.apigee.com/api-health>



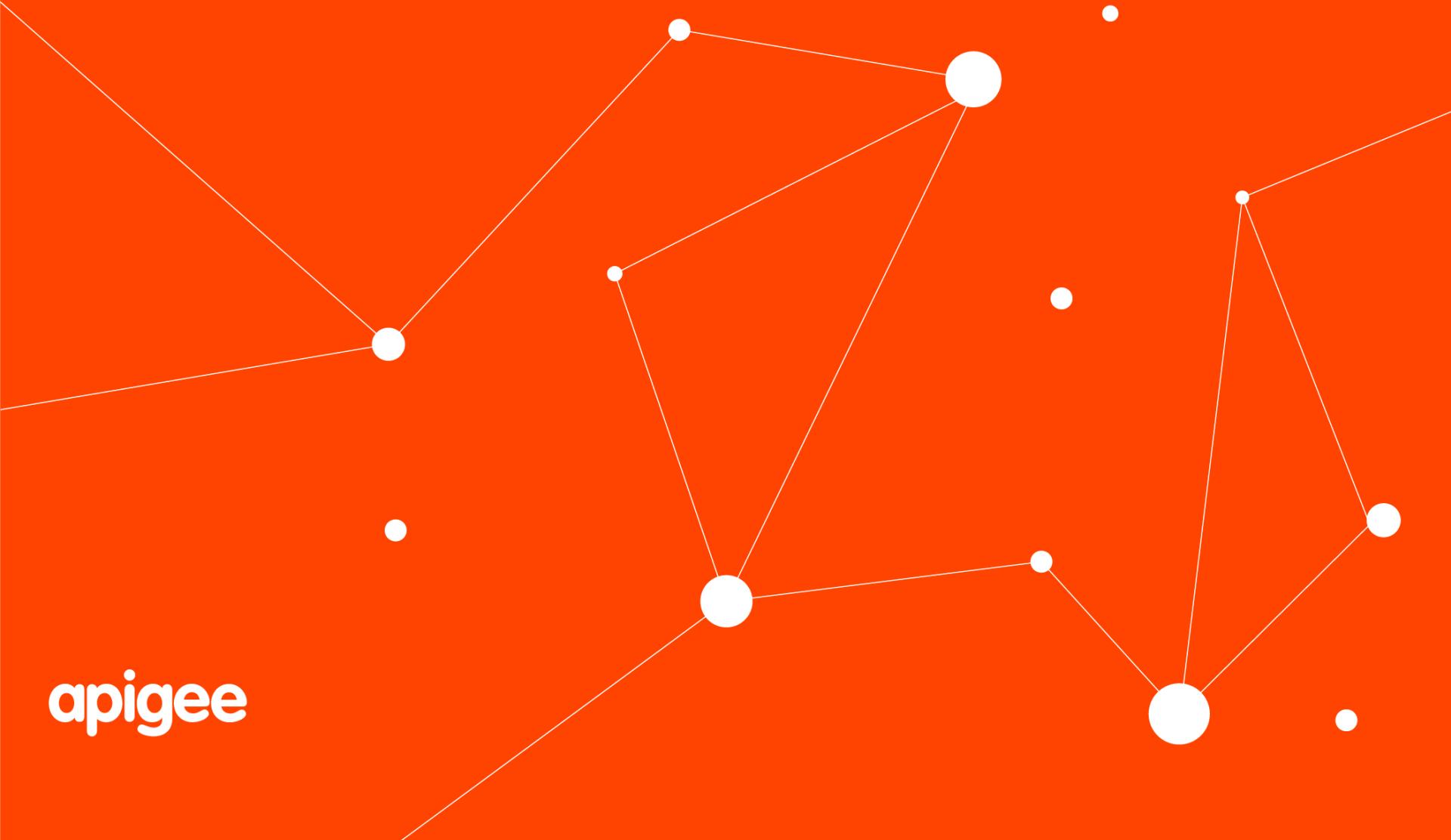
Legend:	R Router	MS Management Server	DP Developer Portal	MY MySQL	OL Openldap	PS Server/Virtual Machine
	MP Message Processor	BA Postgres Server	BAA BaaS Server	ZK Zookeeper	PG PostgreSQL	CS POD
	UI Enterprise UI	QIS Qpid/Ingest Server		QD Cassandra		

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Questions



Thank you



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