

Azure API Management



PLURALSIGHT

Products ▾

Courses ▾

View plans

Resources ▾

Microsoft Azure API Management Essentials



By Vishwas Lele

This course demonstrates how to use Microsoft Azure API Management to quickly and securely enable APIs for mobile development and for internal and external use.

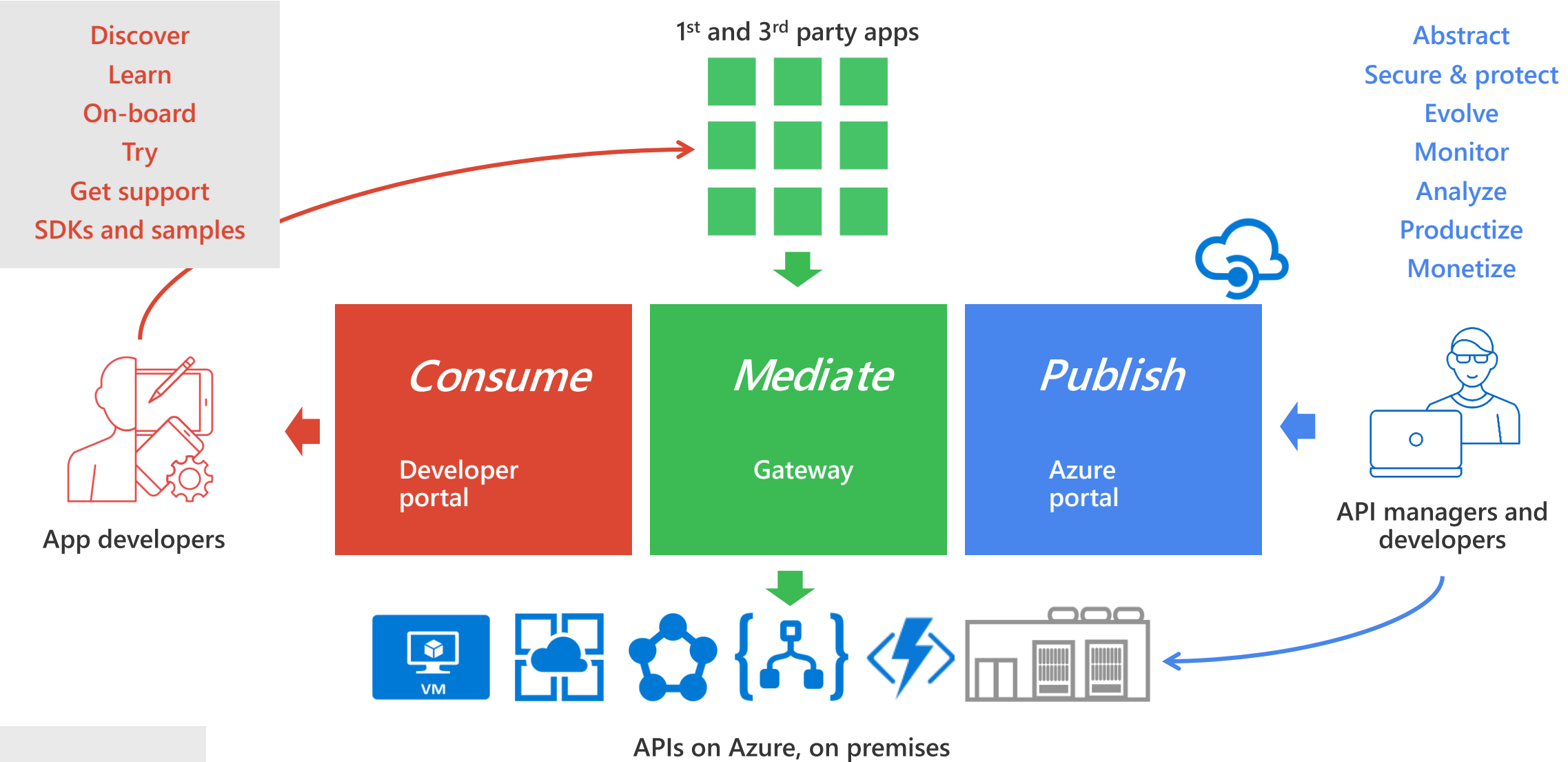
[START A FREE 10-DAY TRIAL](#)



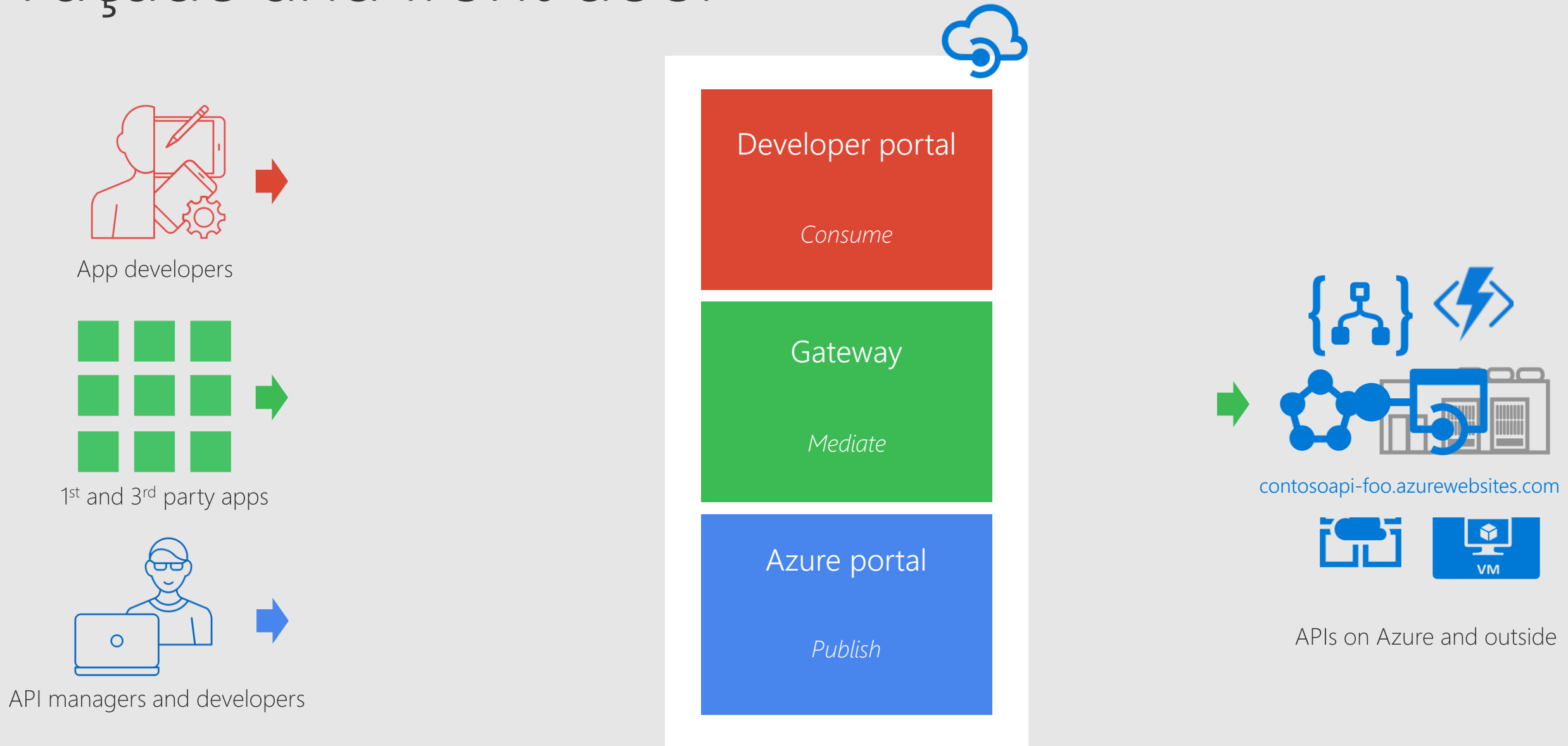
[PLAY COURSE OVERVIEW](#)

API Management

The hub for enterprise APIs



Façade and front door



What are policies?

- Pre/Post processing and validation of incoming requests
- Can be defined at multiple levels:
 - Operation
 - API
 - Product
- Each policy is defined as an XML document
 - Dynamic expressions are wrapped in @()
- Defined in Publisher Portal (or Azure Portal)

Policies

- Encapsulate common API management functions
 - Access control, Protection, Transformation, Caching, ...
- Chained together into a pipeline
- Mutate request context or change API behavior
- Set in the inbound and outbound directions
- Can be triggered on error
- Applied at a variety of scopes

Access restriction policies

- + Check HTTP header
- + Limit call rate per key
- + Limit call rate per subscription
- + Restrict caller IPs
- + Set usage quota per key
- + Set usage quota per subscription
- + Validate JWT

Advanced policies

- + Control flow
- + Forward request to backend service
- + Log to EventHub
- + Output trace information
- + Retry
- + Return response
- + Send one way request

Calculate effective policy

Policies - Example

- Limit to 5 calls / minute
- Maximum 100 calls / week

```
13 <policies>
14   <inbound>
15     <rate-limit renewal-period="60" calls="5" />
16     <quota renewal-period="604800" calls="100" />
17   <base />
18 </inbound>
19 <backend>
20   <base />
21 </backend>
22 <outbound>
23   <base />
24 </outbound>
25 <on-error>
26   <base />
27 </on-error>
28 </policies>
29 |
```

Policy expressions

```
<polices>
  <inbound>
    <base/>
    <set-variable name="bodySize" value="@context.Request.Headers["Content-Length"][0]"/>
    <choose>
      <when condition="@int.Parse(context.Variables.GetValueOrDefault<string>("bodySize")) < 256*1024)">
      </when>
      <otherwise>
        <rewrite-uri template="{{alternate-path-and-query}}"/>
        <set-backend-service base-url="{{alternate-host}}"/>
      </otherwise>
    </choose>
  </inbound>
  <outbound>
    <base/>
  </outbound>
</polices>
```

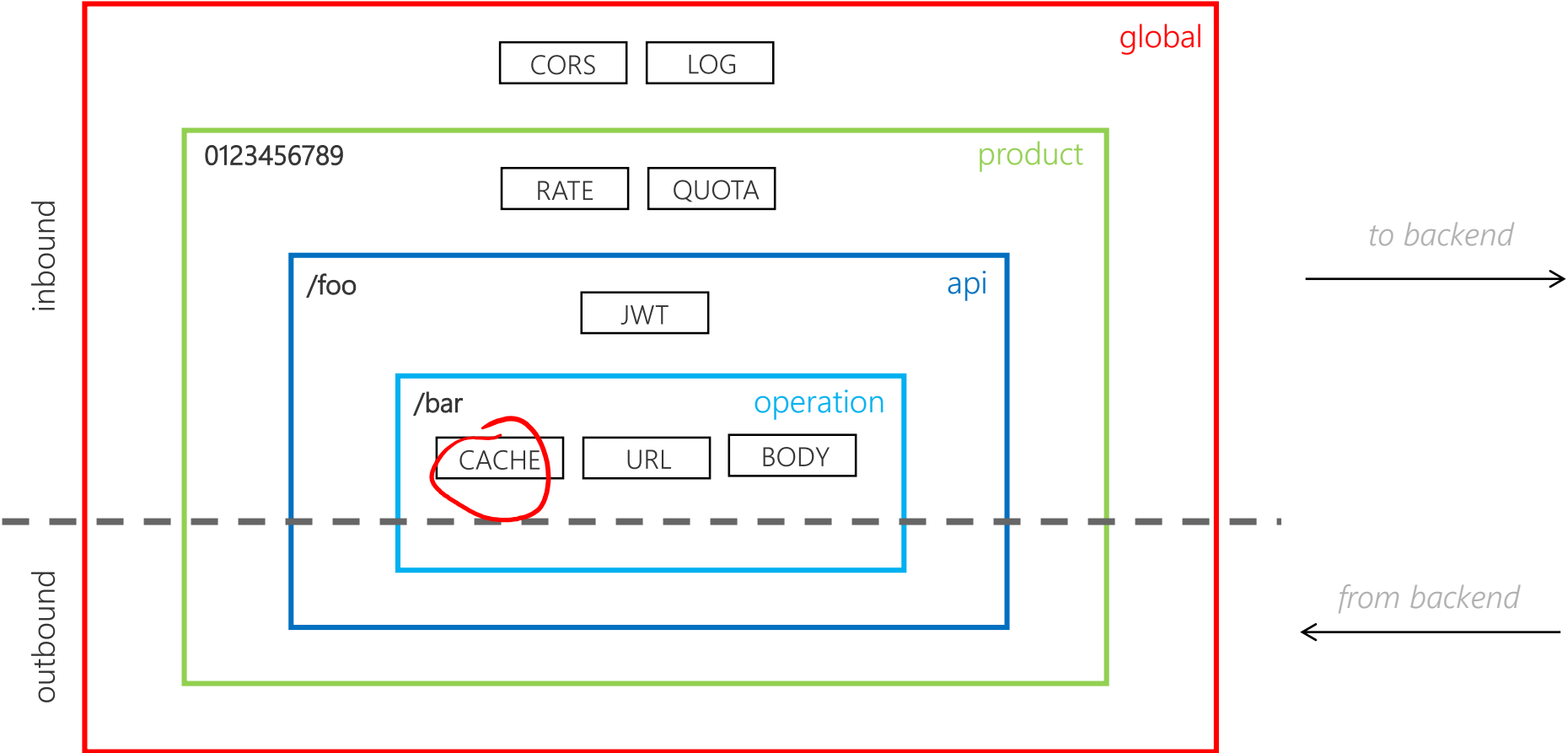


Policy scopes

GET /foo/bar HTTP/1.1
Host: api.constoso.com
Key: 0123456789

from caller
→

←
to caller



< < < Demo Steps > > >

- Create an API
- Test using the portal
- Subscribe
- API Catalog
- Dev Portal

Subscriptions

apiphany - Subscriptions

API Management service

Search (Ctrl+ /)

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

API Management

Quickstart

APIs

Products

Named values

Tags

Analytics

Users

Subscriptions

Groups

+ Add subscription

Columns

Refresh

Search

State

All

Pending approval

Scope

All

Service

All APIs

API: Conference Infoundefined

API: Event Brokerundefined

API: HTTP Binundefined

API: Inventory Managementundefined

API: Local Weather Forecastundefined

API: Numbers APIundefined

API: Order Managementundefined

API: Petstoreundefined

Product: Platinum

Product: Public

Product: Starter

Product: Trial

Type to search

DISPLAY NAME	PRIMARY KEY	SECONDARY KEY	SCOPE	OWNER	ALLOW TRACING
			Product: Starter	Administrator	✓
			Product: Platinum	Administrator	✓
			Product: Trial	Administrator	✓
Starter			Product: Starter	John Doe	
Built-in all-access subscription			Service		✓
			Product: Public	Administrator	✓
API Petstore subscription			API: Petstore		

Versioning is a highly debated subject

Version or not?

Semantic versioning?

What is a breaking change?

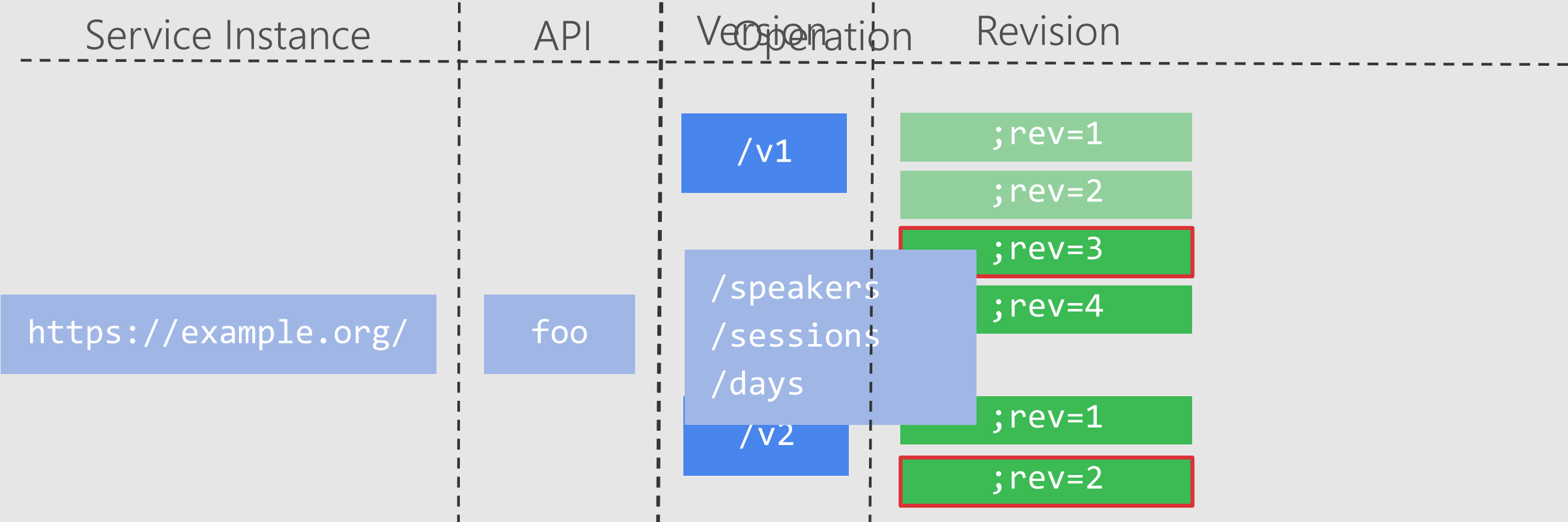
Where to place version information?

Path? Query? Header? Media type?

What format to use?

Number? Date? Name?

Versions and revisions in API Management



There is no one-size-fit-all solution



Teams

Team structure
Organizational culture
Governance model



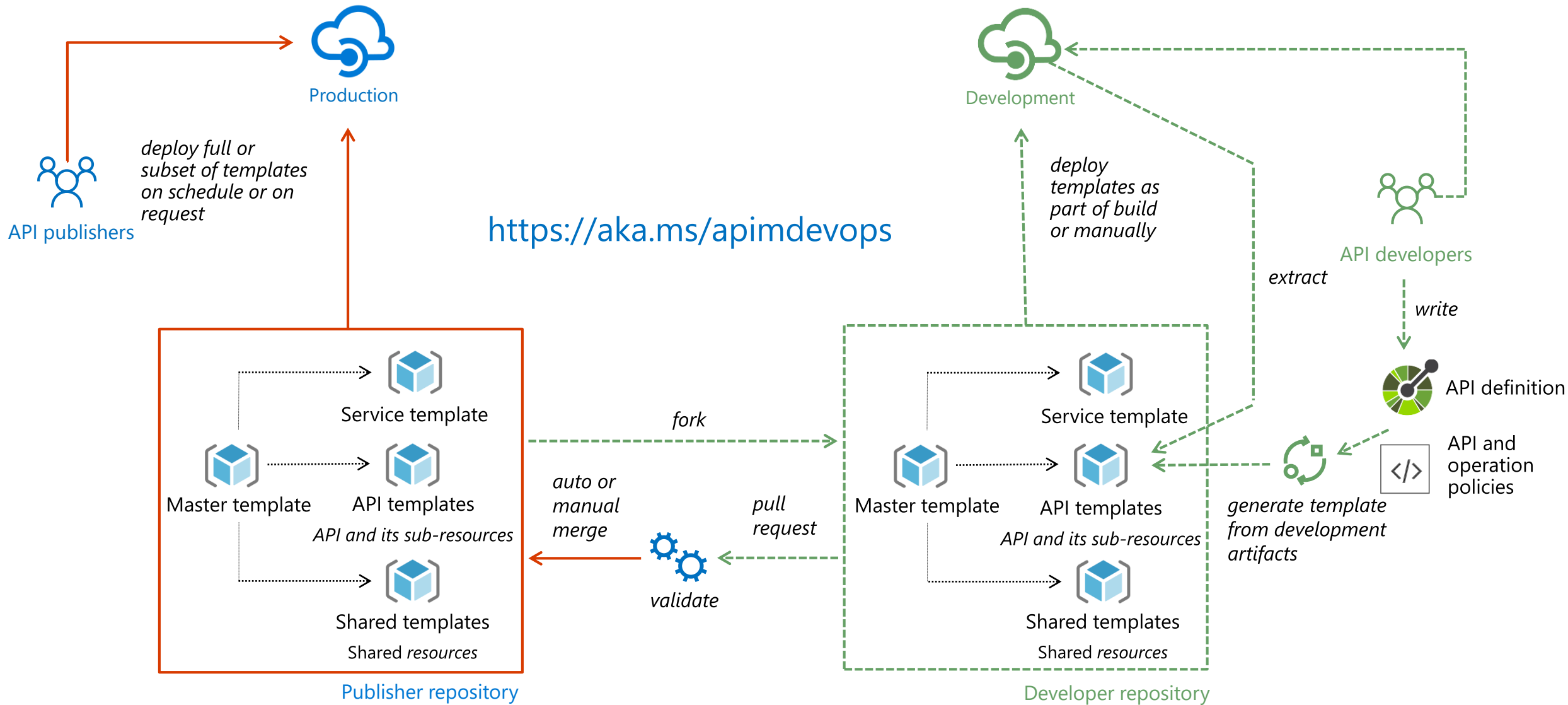
Tools

Azure Pipelines, Jenkins
Azure Repo, GitHub



Deployment Options

Portal
Management API
PowerShell
SDKs
Classic Git deployment
Resource Manager Templates



OPEN EDITORS

DEVOPSDEMO (WORKSPACE)

Inbox...

Desig...

Azure...

Azure...

API ...

SLT N...

temp...

Dock...

apim...

Camt...

Pause...

templates

conf-api

foodtrucks-api

contosoapim-dev-apiVersionSets.te...

contosoapim-dev-FoodTrucks-initia...

contosoapim-dev-FoodTrucks-subs...

contosoapim-dev-master.templ... 1

contosoapim-dev-parameters.json

petstore-api

contoso.apim.master.p...

contoso.apim.master.template.json 1

command.sh

demo.http

README.md

azure-api-management-devops-ex...

.vscode

example

src

APIM_ARMTemplate

apimtemplate

apimtemplate.test

10:29 PM

Sunday

Mute (m)

ContosoAPIM-DEV > templates > foodtrucks-api > {} contosoapim-dev-master.template.json > ...

```
1  {
2    "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json",
3    "contentVersion": "1.0.0.0",
4    "parameters": {
5      "ApimServiceName": {
6        "type": "string",
7        "metadata": {
8          "description": "Name of the API Management"
9        }
10     },
11    "LinkedTemplatesBaseUrl": {
12      "type": "string",
13      "metadata": {
14        "description": "Base URL of the repository"
15      }
16    },
17  },
18  "resources": [
19    {
20      "properties": {
21        "mode": "Incremental",
22        "templateLink": {
23          "url": "https://github.com/contoso/contoso-apim-devops-examples/blob/master/linkedTemplatesBaseUrl/contosoapim-dev-master.template.json"
24        }
25      }
26    }
27  ]
28 }
```

PROBLEMS 15

OUTPUT

DEBUG CONSOLE

TERMINAL

3: bash

Creating authorization server template

Creating API templates


Template ...

Press any key to exit process.

Miao-MacBook-Pro:apimtemplate miao\$

>> So now let's head over to

DevOps Resource Kit




Pull requests

Issues

Marketplace

Explore

 Azure

azure-api-management-devops-resource-kit

Unwatch

37

Unstar

130

Fork

53

<> Code

Issues 41

Pull requests 0

Projects 1

Wiki

Insights

Settings

Azure API Management DevOps Resource Kit

Edit

Manage topics

291 commits

4 branches

1 release

20 contributors

MIT

Branch: master


New pull request

Create new file

Upload files

Find File

Clone or download

 lucashuet93

Merge pull request #174 from Azure/lucashh-hotfix

Latest commit 945ebae a day ago

example

Merge pull request #145 from miaojiang/MVP

a month ago

src/APIM_ARMTemplate

fix validation null ref error

a day ago

.gitattributes

create solution file and include both projects

5 months ago

.gitignore

Revert "First Extractor MVP"

3 months ago

APIM-DevOps.png

Merged with master root folder

4 months ago

Azure-cli-example.md

Updated docs

3 months ago

FAQ.md

Merged with master root folder

4 months ago

LICENSE

Merged with master root folder

4 months ago

README.md

Merge branch 'lucashh-logger-extraction' into odaibert/products

a month ago

<https://aka.ms/apimdevops>

<<<Demo Steps>>>

- XML to REST
- Routing
- Transaction Management
- SOAP to REST

Routing

```
<choose>
  <when condition='@(context.Request.Url.Query.GetValueOrDefault("version") == "2020-03")'>
    <set-backend-service base-url="{{usual-host}}" />
  </when>
  <otherwise>
    <set-backend-service base-url="{{alternate-host}}" />
  </otherwise>
</choose>
```

```
<choose>
  <when condition="{{broadcast-is-true}}">
    <send-one-way-request mode="new">
      <set-url>https://broadcast.message.com/services</set-url>
      <set-method>POST</set-method>
      <set-body>@{
        return new JObject(
          new JProperty("messageId", "bJtrpFi1f01JMCcwLx8uZyAg"),
          new JProperty("message", "message details"))
        }.ToString();
      }</set-body>
    </send-one-way-request>
  </when>
</choose>
```

Encryption

```
<choose>
  <when condition="@context.Request.Certificate == null || !context.Request.Certificate.Verify()
    || context.Request.Certificate.Issuer != "trusted-issuer"
    || context.Request.Certificate.SubjectName.Name != "expected-subject-name")" >
    <return-response>
      <set-status code="403" reason="Invalid client certificate" />
    </return-response>
  </when>
</choose>
```

Importing a SOAP API

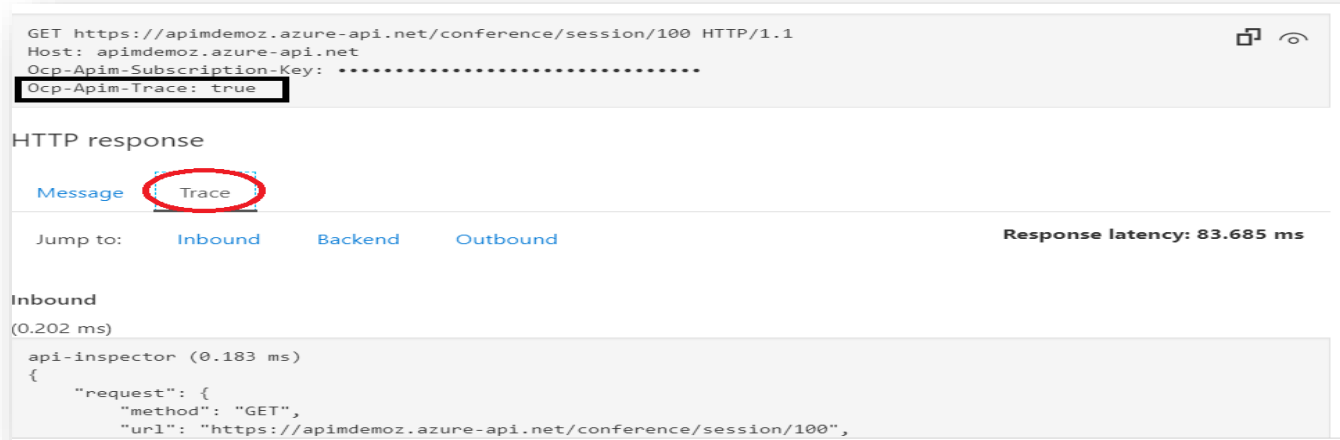
SOAP passthrough

- Gateway receives SOAP
- SOAP sent to service

SOAP to REST

- Gateway receives REST
- SOAP sent to service

Tracing and Error Handling



GET https://apimdemoz.azure-api.net/conference/session/100 HTTP/1.1
Host: apimdemoz.azure-api.net
Ocp-Apim-Subscription-Key:
Ocp-Apim-Trace: true

HTTP response

Message **Trace**

Jump to: [Inbound](#) [Backend](#) [Outbound](#) **Response latency: 83.685 ms**

Inbound
(0.202 ms)

```
api-inspector (0.183 ms)
{
  "request": {
    "method": "GET",
    "url": "https://apimdemoz.azure-api.net/conference/session/100",
```

```
<on-error>
  <!-- statements to be applied if there is an error
        condition go here -->
</on-error>
</policies>
```

me > apiphany-apim-ai - Application map

apiphany-apim-ai - Application map

Application Insights - Last 24 hours - apiphany-apim-ai

Search (Ctrl+/) <<

Time range = Last 24 hours

Feedback ▾

Learn more

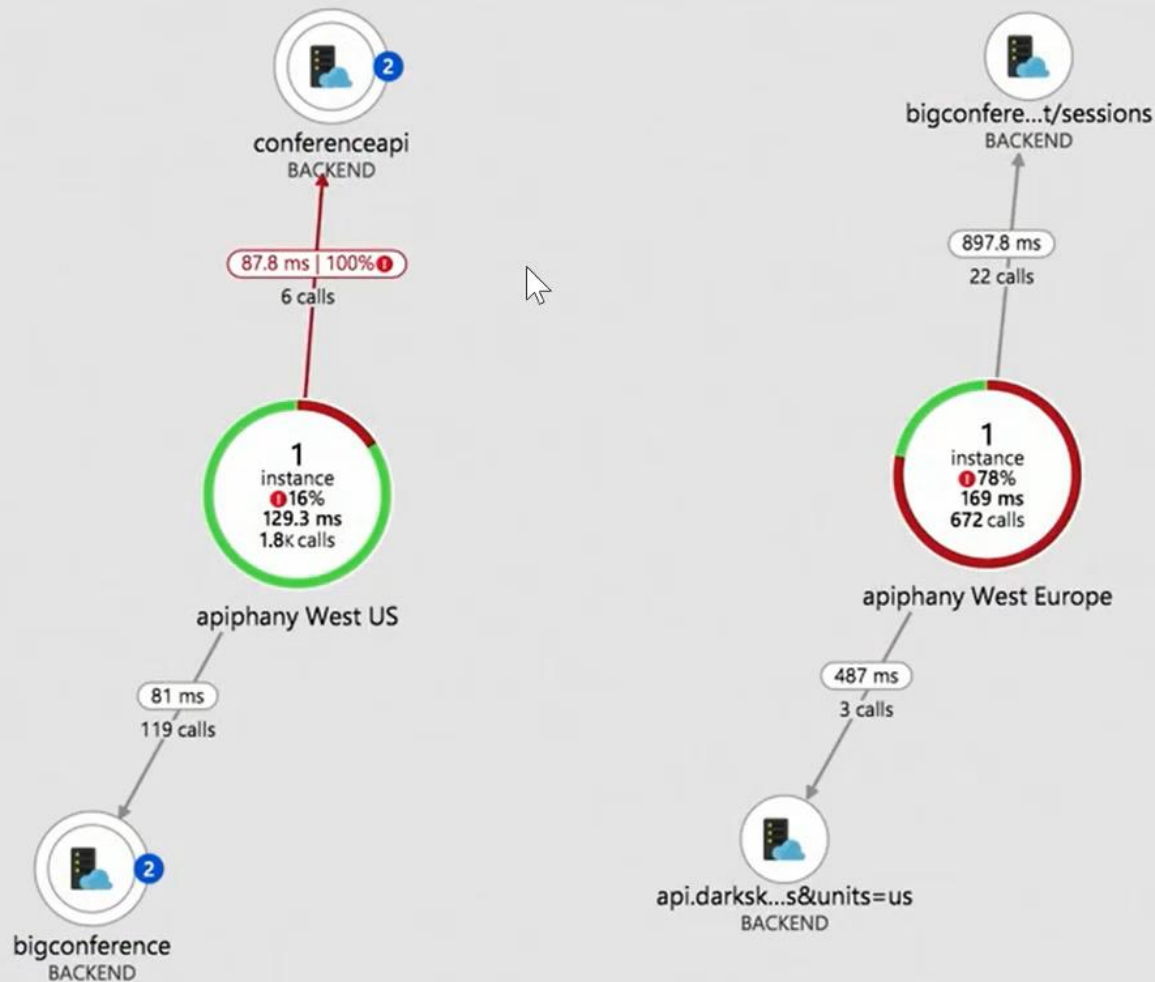
Refresh

Update map components

- Overview
- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems

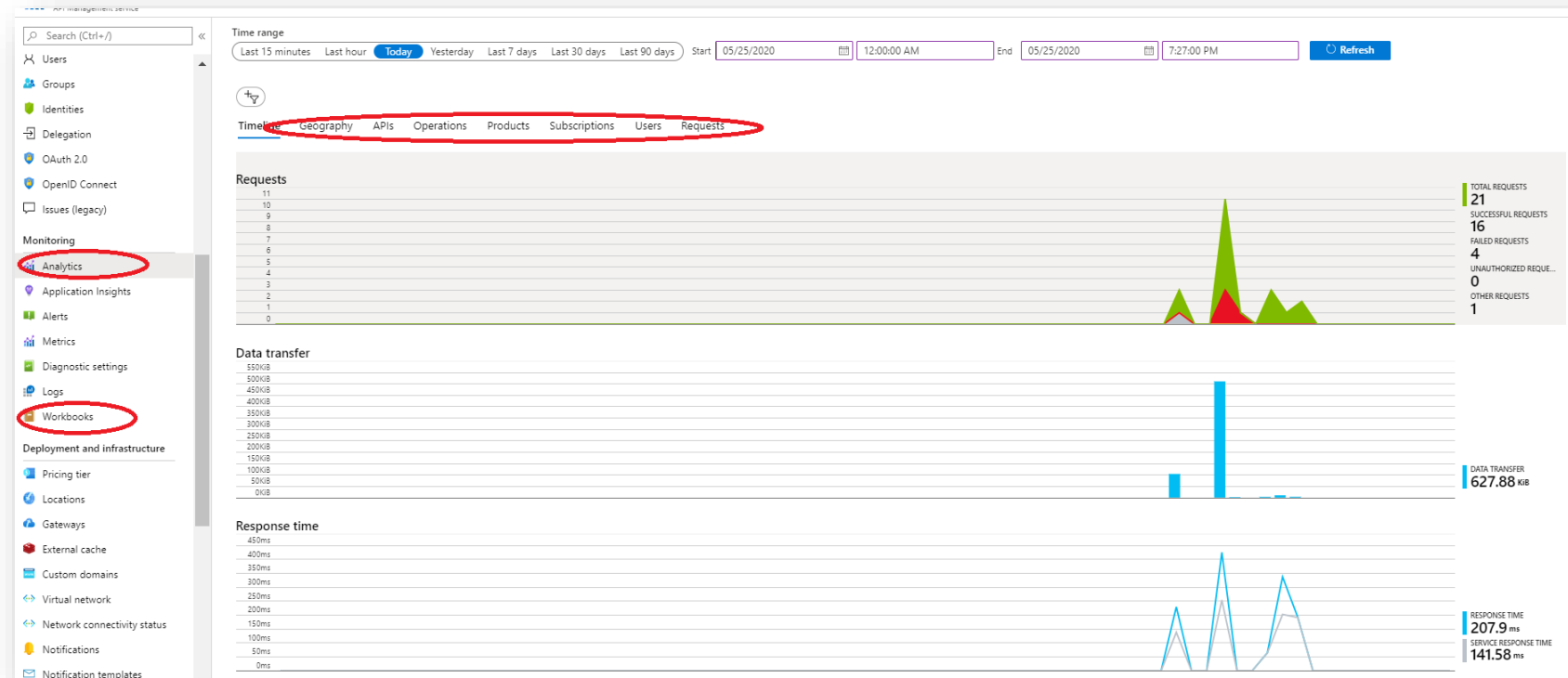
INVESTIGATE

- Application map
- Smart Detection
- Live Metrics Stream
- Metrics Explorer
- Metrics (preview)
- Search
- Availability
- Failures
- Performance
- Servers
- Browser



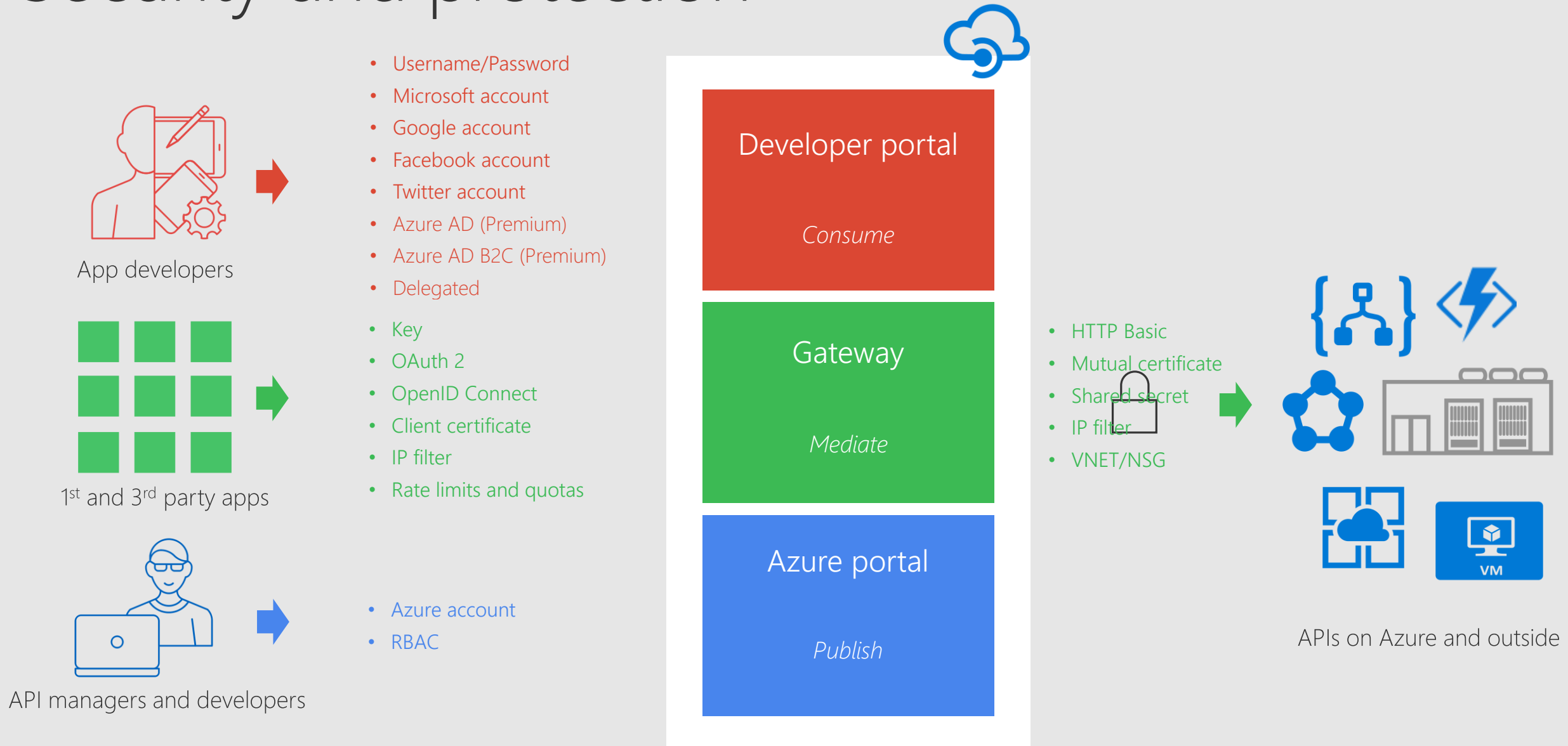
Analytics

- Built in dashboard in Azure Portal.



- Create custom workbooks

Security and protection



Observability

Design

Settings

Diagnostics Logs

Application Insights

Azure Monitor

Enable

☒

Sampling (%)

100

Always log errors

☒

Additional settings

☒ Frontend Request Headers

Accept-Language

First bytes of Body (max 1024)

0

☐ Frontend Response

☐ Backend Request

☐ Backend Response

[← Basic Options](#)

Save

Discard

Design

Settings

Diagnostics Logs

Application Insights

Azure Monitor

Enable

☒

Destination

applicationinsights

Manage

Sampling (%)

10

For high traffic APIs, please read this [documentation](#) to understand performance implications and log sampling.

Always log errors

☐

Additional settings

☒ Frontend Request Headers

Accept-Language

First bytes of Body (max 1024)

0

☐ Frontend Response

☐ Backend Request


☐ Backend Response


[← Basic Options](#)


Save


Discard


Protocol settings


 Properties


 External cache (preview)


 Scale and pricing


 Virtual network

 Protocol settings


 Custom domains


 Managed identities


 Locks


 Export template


Monitoring


 Application Insights

 Alerts

 Metrics

 Diagnostic settings

 Logs

 Workbooks

Ciphers

Triple DES (3DES)

On

Off

Client-side protocols

HTTP/1.x

On

Off

HTTP/2

On

Off

Client-side transport security

TLS 1.2

On

Off

TLS 1.1 (HTTP/1.x only)

On

Off

TLS 1.0 (HTTP/1.x only)

On

Off

SSL 3.0 (HTTP/1.x only)

On

Off

Backend-side transport security

TLS 1.2

On

Off

TLS 1.1

On

Off

TLS 1.0

On

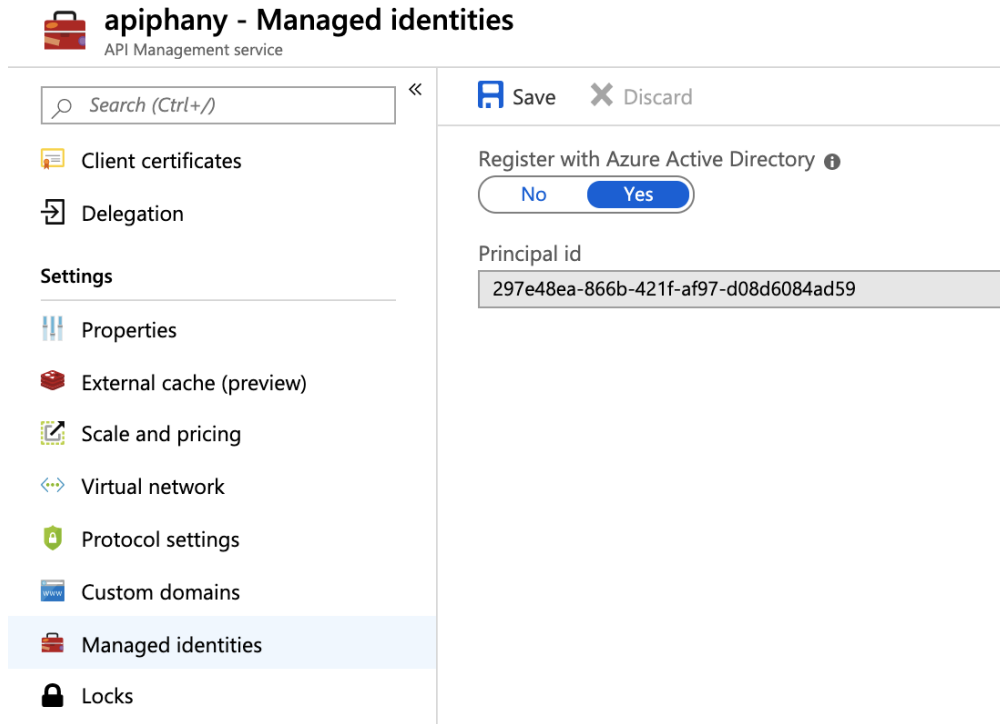
Off

SSL 3.0

On

Off

Managed identity



Turn on managed identity

```
<authentication-managed-identity ·  
··· resource={{resource-url}} ·  
··· output-token-variable-name="token"  
··· ignore-error="false" />
```

Use the policy to add access token

JWE

```
<validate-jwt header-name="Authorization" require-scheme="Bearer" output-token-variable-name="jwt">
  ....<issuer-signing-keys>
  ....|....<key>{{jwt-signing-key}}</key>
  ....</issuer-signing-keys>
  ....<decryption-keys>
  ....|....<key>{{jwt-encryption-key}}</key>
  ....</decryption-keys>
  ....<audiences>
  ....|....<audience>@(context.Request.OriginalUrl.Host)</audience>
  ....</audiences>
  ....<issuers>
  ....|....<issuer>contoso.com</issuer>
  ....</issuers>
</validate-jwt>

<choose>
  ....<when condition="@ (context.Request.Method == "POST" &&
  ....|....|....|....|....|....!((Jwt)context.Variables["jwt"]).Claims["group"].Contains("contributor"))">
  ....|....<return-response>
  ....|....|....<set-status code="403" reason="Forbidden" />
  ....|....</return-response>
  ....</when>
```

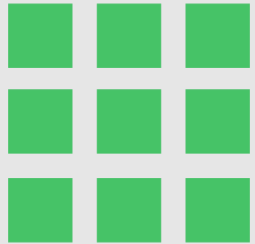
JWE

```
<validate-jwt header-name="Authorization" require-scheme="Bearer">
  ....<issuer-signing-keys>
  ....|....<key>{{jwt-signing-key}}</key>
  ....</issuer-signing-keys>
  ....<decryption-keys>
  ....|....<key>{{jwt-encryption-key}}</key>
  ....</decryption-keys>
  ....<audiences>
  ....|....<audience>@(context.Request.OriginalUrl.Host)</audience>
  ....</audiences>
  ....<issuers>
  ....|....<issuer>contoso.com</issuer>
  ....</issuers>
</validate-jwt>
```

VNETs and Hybrid



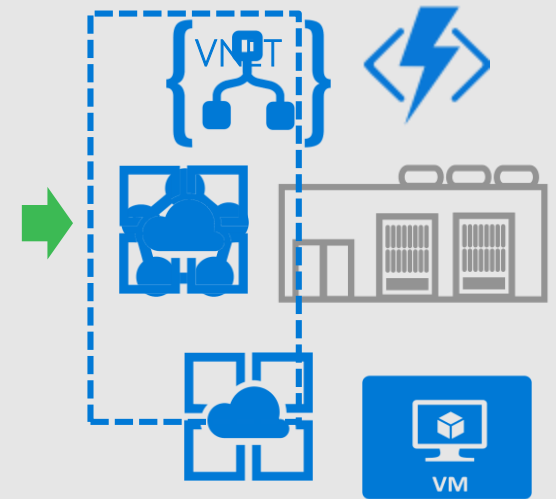
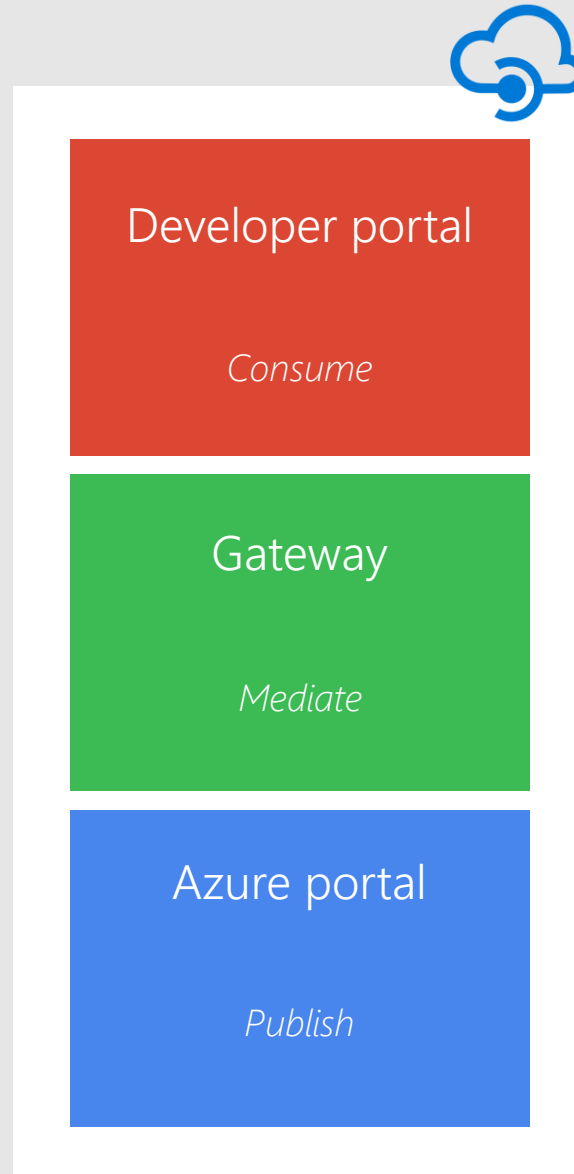
App developers



1st and 3rd party apps

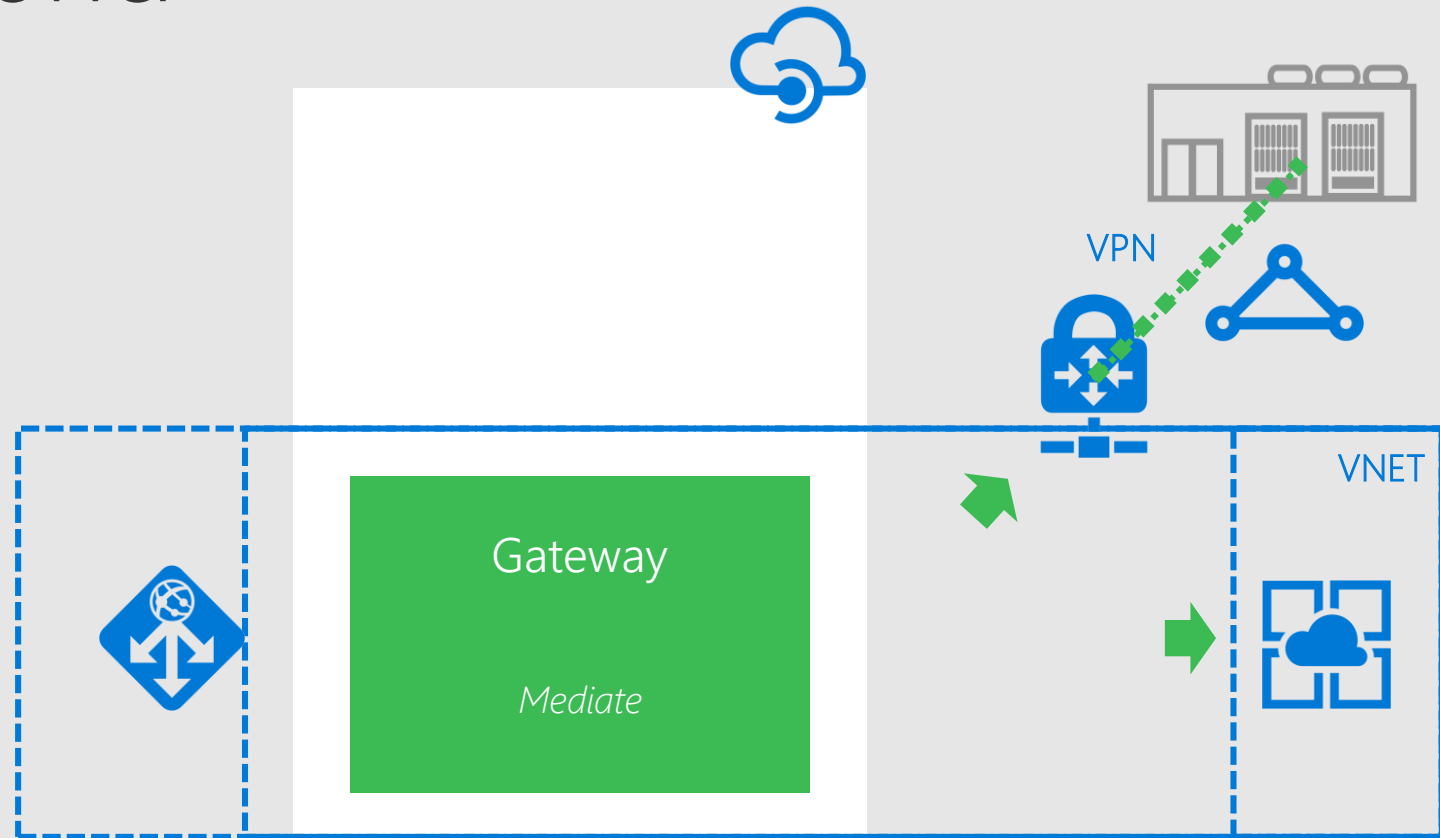
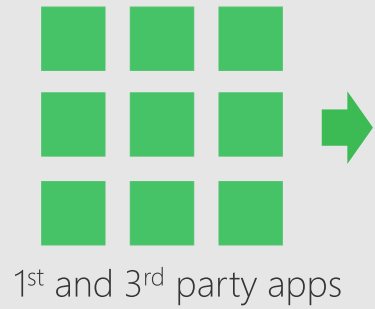


API managers and developers



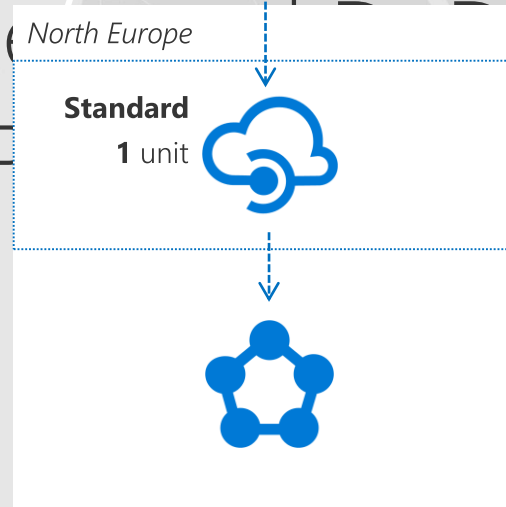
APIs on Azure and outside

VNETs and Hybrid

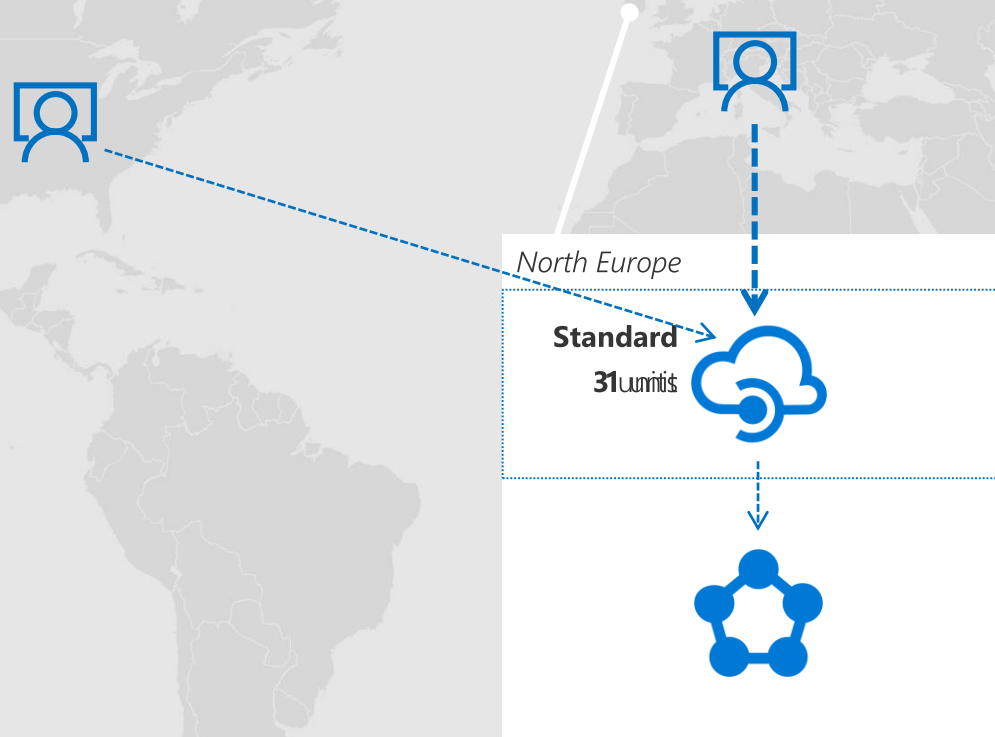


Multi-region and scaling

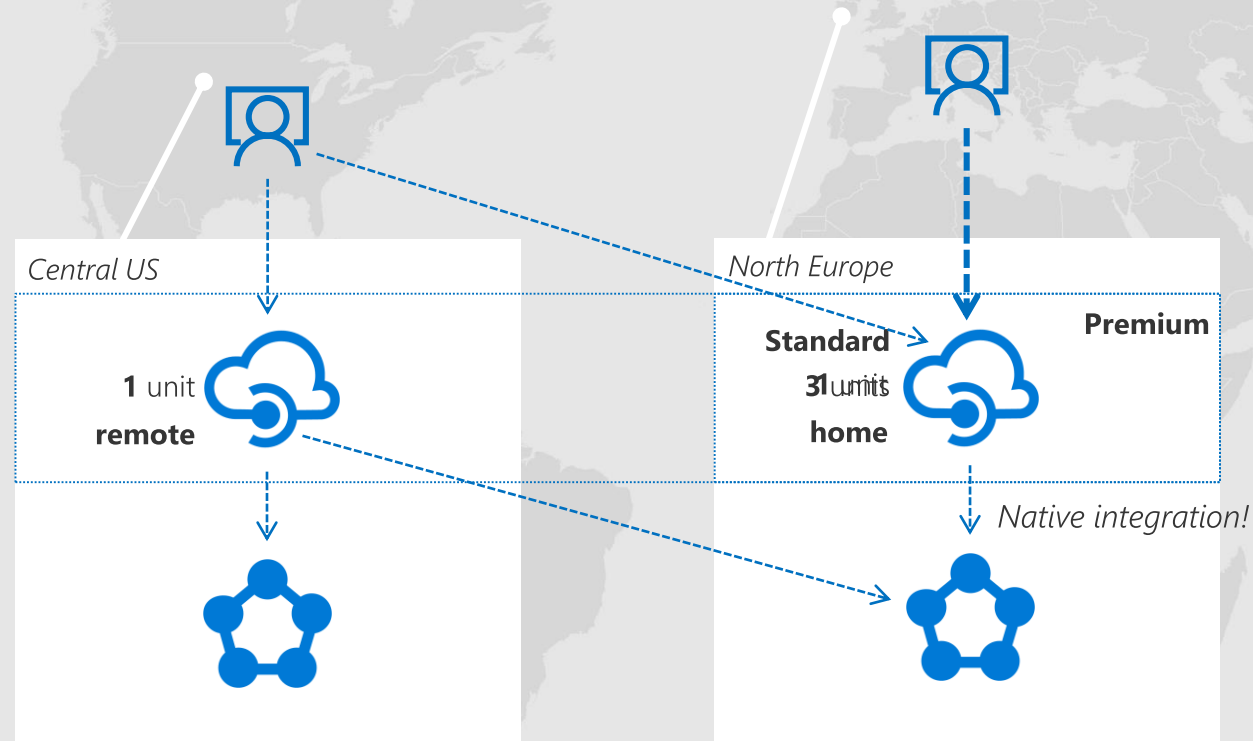
27 public regions in Americas, Europe, Asia and Australia
6 US government regions (preview)



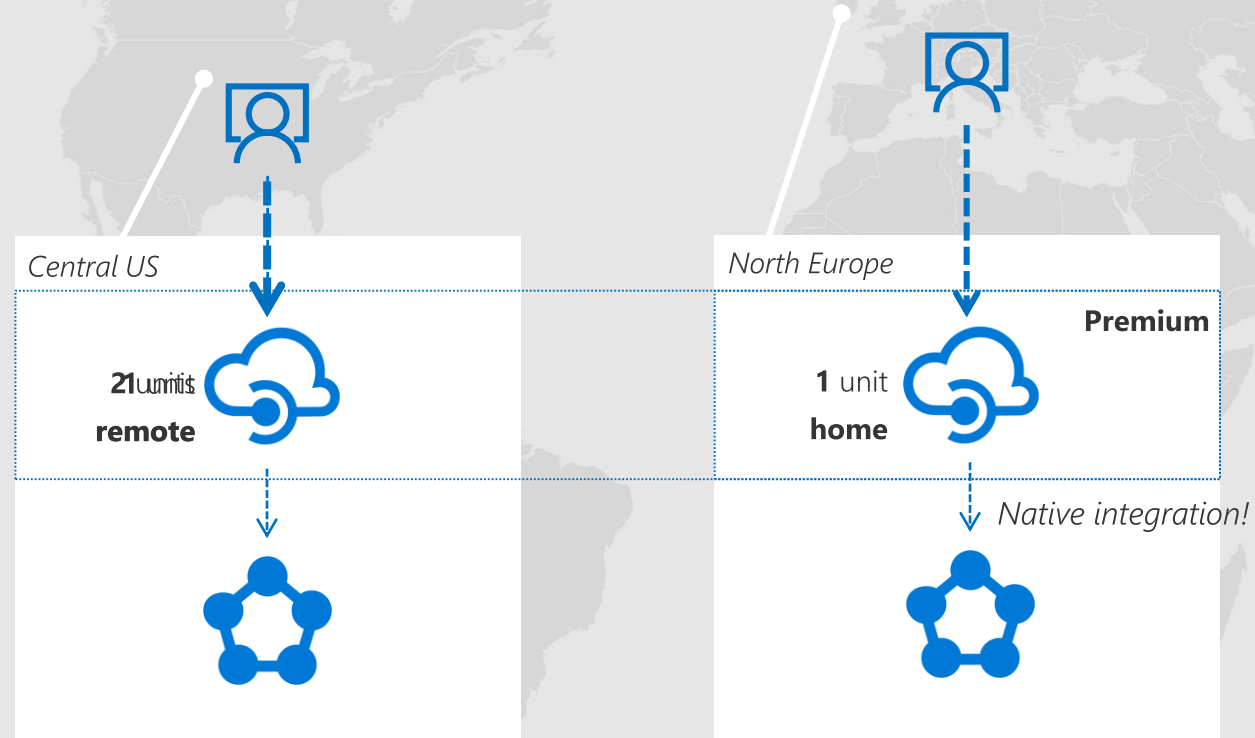
Multi-region and scaling



Multi-region and scaling



Multi-region and scaling



Self-hosted API Management gateway



Can be hosted on premises or in any cloud

Packaged as a Docker container image (Linux only)
Functionally equivalent to the managed gateway



Federated with an API Management service instance

Gateway pulls down configuration and pushes up telemetry
Gateway needs only an outgoing connection to Azure



Kubernetes is the recommended hosting environment

Simplifies deployment, scaling, updates, availability
Other container orchestrators will work too

Preview is coming in the late summer or early fall!

API Management

Import Azure Functions

API Management service

Don't see an Azure Function? Azure API Management requires Azure Functions to use the HTTP trigger and Function or Anonymous authorization level setting.

★ Function App

serverless-pets

Search to filter items...

☒

NAME

☒

Order

☒

Products

HTTP METHODS

GET, POST

GET

URL TEMPLATE

Order

Products

Select

Functions

Home > serverless-pets > serverless-pets - API Management

serverless-pets - API Management

App Service

Search (Ctrl+J)

Go to API Management

Unlink API Management

Change App Service plan

Development Tools

Clone App

Console

Advanced Tools

App Service Editor (Preview)

Performance test

Resource explorer

Extensions

API

API Management

API definition

CORS

Monitoring

Metrics

API Management

Expose your HTTP trigger Functions through Azure API Management - manage, protect, secure, and publish the APIs.

★ API Management

Search

Create new

★ API
































Search

☒ Import Functions

☐ Enable Application Insights

Link API

Consumption tier

DEVELOPER	BASIC	STANDARD
No SLA	99.9 SLA, %	99.9 SLA, %
 AAD integration	 No AAD integration	 AAD integration
 Virtual network	 No virtual network	 No virtual network
 Single region only	 Single region only	 Single region only
 No scaling	 2 Max scale units	 4 Max scale units
 10 MB Cache	 50 MB Cache / unit	 1 GB Cache / unit
 500 Max RPS (estimated)	 1,000 Max RPS / unit (estimated)	 2,500 Max RPS / unit (estimated)
48.17 USD/MONTH (ESTIMATED)	147.57 USD/MONTH (ESTIMATED)	688.59 USD/MONTH (ESTIMATED)
PREMIUM	CONSUMPTION	
99.95* SLA, %	99.9 SLA, %	
 AAD integration	 No AAD integration	
 Virtual network	 No virtual network	
 Multi-region support	 Single region only	
 Unlimited* Max scale units	 Automatic scaling	
 5 GB Cache / unit	 External only Cache	
 4,000 Max RPS / unit (estimated)	 N/A Max RPS (estimated)	
	 1 M Free calls / Azure subscrip...	
2,802.83 USD/MONTH (ESTIMATED)	0.0175 USD/10,000 CALLS	

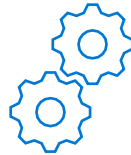
Select

Consumption tier



Generally available

North Central US, West US, West Europe, North Europe, Southeast Asia, and Australia East. Additional regions coming soon.



Serverless API Management

On-demand activation, auto-scale out and back to zero, consumption-based micro billing



Façade for serverless endpoints and container-based microservices

Functions, Logic Apps, Kubernetes, Service Bus, Event Hubs, Storage, etc.



Curated set of features and usage limits

E.g. no developer portal or built in cache

VS Code extension

Resource explorer

- List, create, delete APIM instances

- List, create, delete sub-resources

 - APIs, operations, products, named values, loggers

Policy editing

- XML and C# syntax check

- IntelliSense (code completion, hover for parameter description)

- Policy snippets for common scenarios

Remote and local testing

Integrated with automation tools

[Please reach out to me if you want to provide feedback or see additional scenarios](#)

Bring your own cache

External cache

API Management service

Save

Cache instance

Custom

West US

apiphany

serverless-pets

West US

Description

apiphany.redis.cache.windows.net

* Connection string (StackExchange.Redis)

apiphany.redis.cache.windows.net:6380,password=[REDACTED],ssl=True,abortConnect=False

Bring your own cache

```
<cache-lookup caching-type="prefer-external" vary-by-developer="true" vary-by-developer-groups="true" down:  
...<vary-by-header>header n external  
...<vary-by-query-parameter>internal  
</cache-lookup> prefer-external
```

```
<cache-lookup-value caching-type="prefer-external" key="" default-value="" variable-name="" />  
external  
internal  
prefer-external
```

Transformation and Routing

- Transformation through policies
 - XML to JSON and vice-versa.

```
<json-to-xml apply="always | content-type-json" consider-accept-header="true | false" parse-date="true | false"/>  
<xml-to-json kind="javascript-friendly | direct" apply="always | content-type-xml" consider-accept-header="true |
```

- SOAP to REST
 - Supports SOAP to REST during the API Import itself. Custom transformation policies could be written as well.

Create from WSDL

[Basic](#) | Full

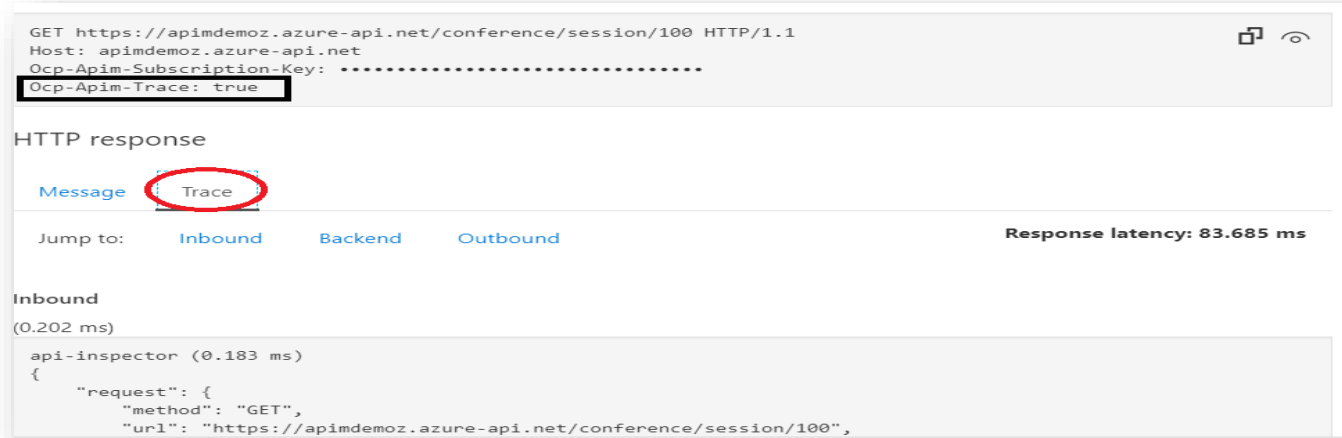
* WSDL specification or
(maximum size 4 MiB)

Import method ☒ SOAP pass-through ☐ SOAP to REST

- Basic Routing during API/Operation definitions, Advanced and conditional routing through policies.

Tracing and Error Handling

- Tracing
 - Inspect request processing across different stages (Inbound, Backend & Outbound)



- Error Handling
 - Processing immediately jumps to the on-error policy section
 - Can configure custom behavior or creating a new response to return to the caller.
 - Rich set of Error objects populated with details about the error such as source, reason, message and scope etc

```
<on-error>
  <!-- statements to be applied if there is an error
        condition go here -->
</on-error>
</policies>
```

Logging and Monitoring

- Configuration
 - Integration with Application Insights and Azure Monitors.
 - Can be setup at API level or the Operation level
 - API Gateway specific metrics
 - Can be archived to Log Analytics, Azure storage or Event Hub.
- Logs Types
 - API Metrics
 - Gateway Requests, Capacity, Events, Network status etc.
 - Resource Logs
 - Provide rich information about API requests and errors.
 - Batched hourly, logs every API requests.
 - Activity Logs
 - Audit log or Operational log
 - Get insight of all operations performed out such as modifying API, adding/removing users etc.
- Alerts
 - receive alerts based on metrics and activity logs.
 - Notify or take actions using Action groups.

Caching Policies

Caching policies

- + Get from cache
- + Get value from cache
- + Remove value from cache
- + Store to cache
- + Store value in cache

- Cache full responses:
 - Store to cache / Get from cache
- Cache partial values
 - Store value in cache / Get value from cache

Access restriction Policies

- Check HTTP header:
 - Validate request contains header with value
- Call rates:
 - Per subscription or per key
- Quota
 - Per subscription
- Restrict caller Ips
 - Restricts where api can be called from
- Validate JWT
 - Validate JWT tokens before calling API

Access restriction policies

- + Check HTTP header
- + Limit call rate per key
- + Limit call rate per subscription
- + Restrict caller IPs
- + Set usage quota per key
- + Set usage quota per subscription
- + Validate JWT

Authentication Policies

- Secure connection between API gateway and API
 - Basic authentication
 - TLS Mutual Authentication
- Use Named Values to avoid hardcoding sensitive values in policy

Authentication policies

+ [Authenticate with Basic](#)

+ [Authenticate with client certificate](#)

TAGS	NAME	VALUE
	Orders-API-Password
	Orders-API-Username	myuser

```
<backend>
  <authentication-basic username="{{Orders-API-Username}}" password="{{Orders-API-Password}}" />
  <base />
</backend>
```

Advanced Policies

Advanced policies

- + Control flow
- + Forward request to backend service
- + Log to EventHub
- + Output trace information
- + Retry
- + Return response
- + Send one way request
- + Send request
- + Set context variable
- + Wait for...

- Control Flow == When/Case *
- Forward Request == send request to backend
- Retry == implement retry policy
- Return an HTTP response

Others can be used to implement fan-out, logging / audit and other patterns

* Combined with Set-Backend-Url can be used for Dynamic routing

Transformation Policies

- Content Conversion
 - XML <-> JSON
- Modifying request or responses
 - Masking, replace strings
- Rewriting URLs
 - Pretty URLs exposed and converted internally
- Change backend URL
- Change request / response
- Apply XSLT

Transformation policies

- + Convert JSON to XML
- + Convert XML to JSON
- + Find and replace string in body
- + Mask URLs in content
- + Rewrite URL
- + Set backend service
- + Set body
- + Set HTTP header
- + Set query string parameter
- + Set request method
- + Set status code
- + Transform XML using an XSLT

Other Policies

Other policies

- + Limit request processing concurrency level
- + Mock Response
- + Set http proxy for backend request

- Concurrency
- Mocking service responses (during dev)
- Proxy URL
- CORS policies

Cross domain policiess

- + Allow cross domain calls
- + CORS
- + JSONP

Effective Policy

- Combination of Product / Api / Operation policies
- Keep it simple
- Some policies only make sense in certain scopes
 - Example: Subscription quotas only make sense at the Product level

Effective Policy


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Properties

- Key / Value Store
- Provides reusable values across policies
- Values can be secret (not displayed in UI)
- Used with “{{propertyName}}” in policies

 ADD PROPERTY

Search property 

Filter by tags 

TAGS	NAME	VALUE	
	Orders-API-Password 	 EDIT  DELETE
	Orders-API-Username	myuser	 EDIT  DELETE

Policy Expressions

- C# 6.0 expressions embedded in the XML policy
- Has implicit context variable
- Can use a subset of .NET Framework Types

@(expression)

Single statement
Expression

@{expression}

Multi-statement
Expression

Policy expressions

```
<polices>
  <inbound>
    <base/>
    <set-variable name="bodySize" value="@context.Request.Headers["Content-Length"][0]"/>
    <choose>
      <when condition="@int.Parse(context.Variables.GetValueOrDefault<string>("bodySize")) < 256*1024)">
      </when>
      <otherwise>
        <rewrite-uri template="{{alternate-path-and-query}}"/>
        <set-backend-service base-url="{{alternate-host}}"/>
      </otherwise>
    </choose>
  </inbound>
  <outbound>
    <base/>
  </outbound>
</polices>
```



Policy Expressions - Samples

```
@(true)
```

```
@((1+1).ToString())
```

```
@("Hi There".Length)
```

```
@(Regex.Match(context.Response.Headers.GetValueOrDefault("Cache-Control", ""), @"max-age=(?<maxAge>\d+)").Groups["maxAge"]?.Value)
```

```
@(context.Variables.ContainsKey("maxAge") ?  
int.Parse((string)context.Variables["maxAge"]) : 3600)
```

Policy Expressions - Samples

```
@{
    string value;
    if (context.Request.Headers.TryGetValue("Authorization", out value))
    {
        return Encoding.UTF8.GetString(Convert.FromBase64String(value));
    }
    else
    {
        return null;
    }
}
```

Policy Expressions - Samples

```
@(true)
```

```
@((1+1).ToString())
```

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@("Hi There".Length)
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