

Designing an API Management Strategy for Microsoft Azure

RECOMMENDING A HOSTING STRUCTURE FOR API MANAGEMENT



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Overview



Why APIs?

What is Microsoft Azure API Management (APIM)?

Why APIM?

APIM components

- API Gateway
- Azure Portal
- Developer Portal

Scaling APIM

Automating APIM

Summary

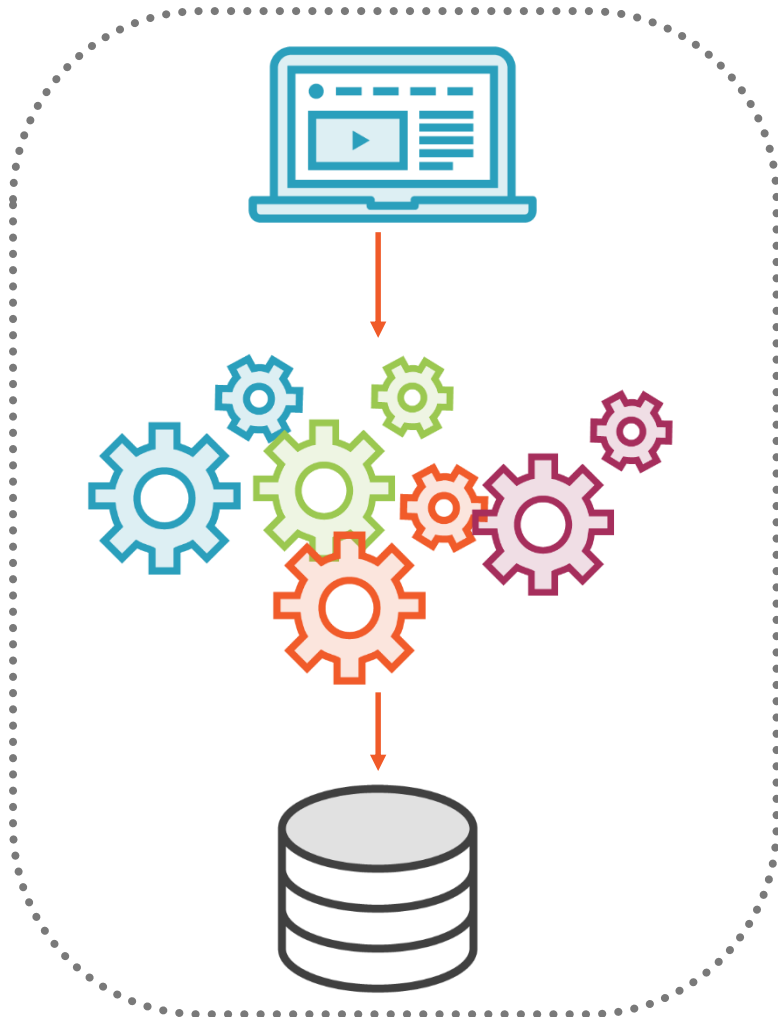


Introducing Azure API Management (APIM)



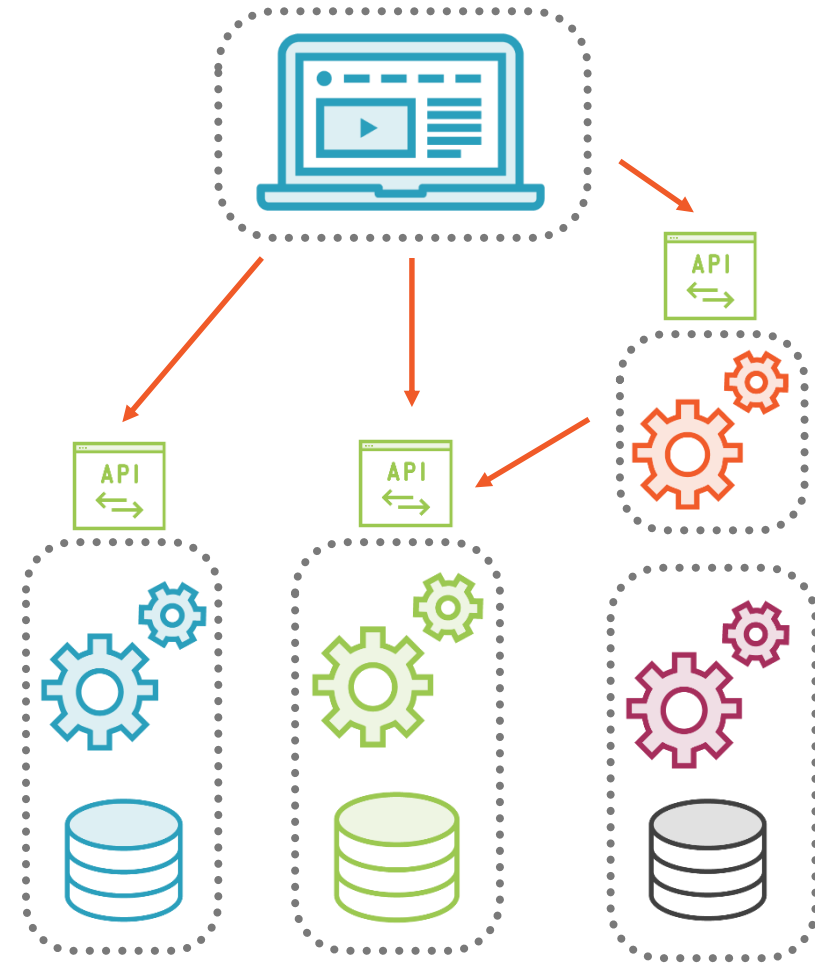
Why APIs?

Monolithic



Service Oriented / Microservices

Decompose



Why APIs?

APIs allow service-oriented design

Breaking down
applications to smaller
independent services

Easy integration

Each service exposes
APIs which are
consumed by other
services/clients

Easy maintenance

Deployments and bug
fixes can target each
individual service, not
the whole application



Any application can expose APIs,
regardless of whether they are
monolithic or service-oriented.

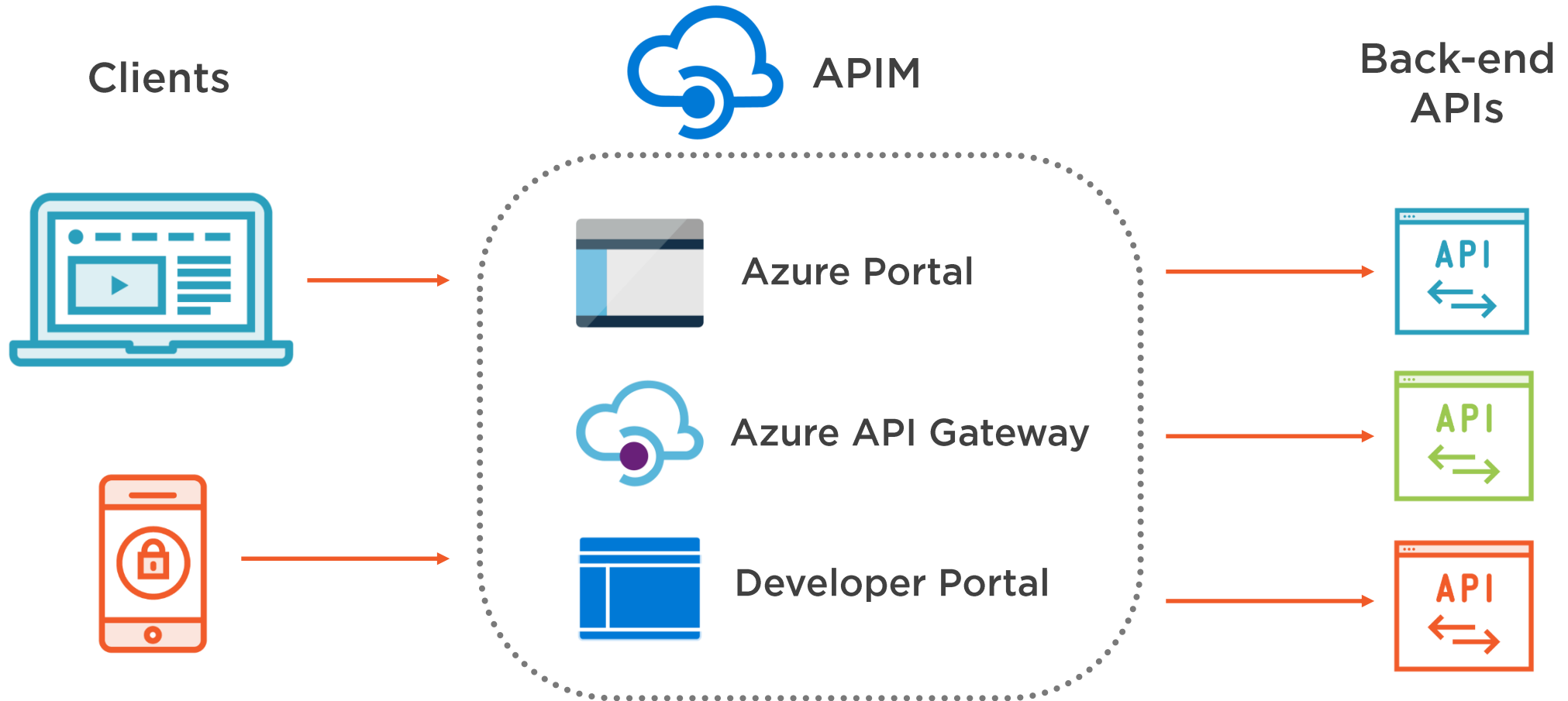


Azure API Management (APIM)

Azure API Management (APIM) helps organizations to publish existing back-end APIs for external consumers, partners, and internal developers.



What Is APIM?



Why APIM?

Easy API
consumption for
clients and internal
developers

Easy integration
with AAD for b2b
and b2c federated
authentication

Define quotas for
callers, throttling

Enable API
versioning and
revisioning

Usage report,
monitoring

Provides API
documentation,
mocking, IP filtering,
and response caching



APIM Components

API Gateway

The endpoint that accepts the API calls from clients

Azure Portal

The administrative interface where the API management is set up

Developer Portal

The web panel for the developers who intend to consume the APIs



API Gateway

Accepts calls from clients and directs to the back-end APIs

Verifies API keys, security tokens, certificates, and other credentials

Enforces usage quotas and call rate limits

Transforms API on the fly without code modifications using policies

Caches backend responses if set up

Logs API call details for analytics and monitoring purposes



Azure Portal

Define or import
back-end API
schema

Logical API
packaging into
products

Set up policies such
as quotas or
transformations on
the APIs

Get insights from
analytics

Manage API
access for users



Developer Portal

Developers can read API documentation

Try-out/test an API via the interactive console

Create an account and subscribe to the APIs by getting an API key

Access API call analytics on their own usage



APIM and Other Azure Resources

Managed Identities

External Cache



Managed Identities for Azure Services

**A service of
Azure Active Directory
(Azure AD)**

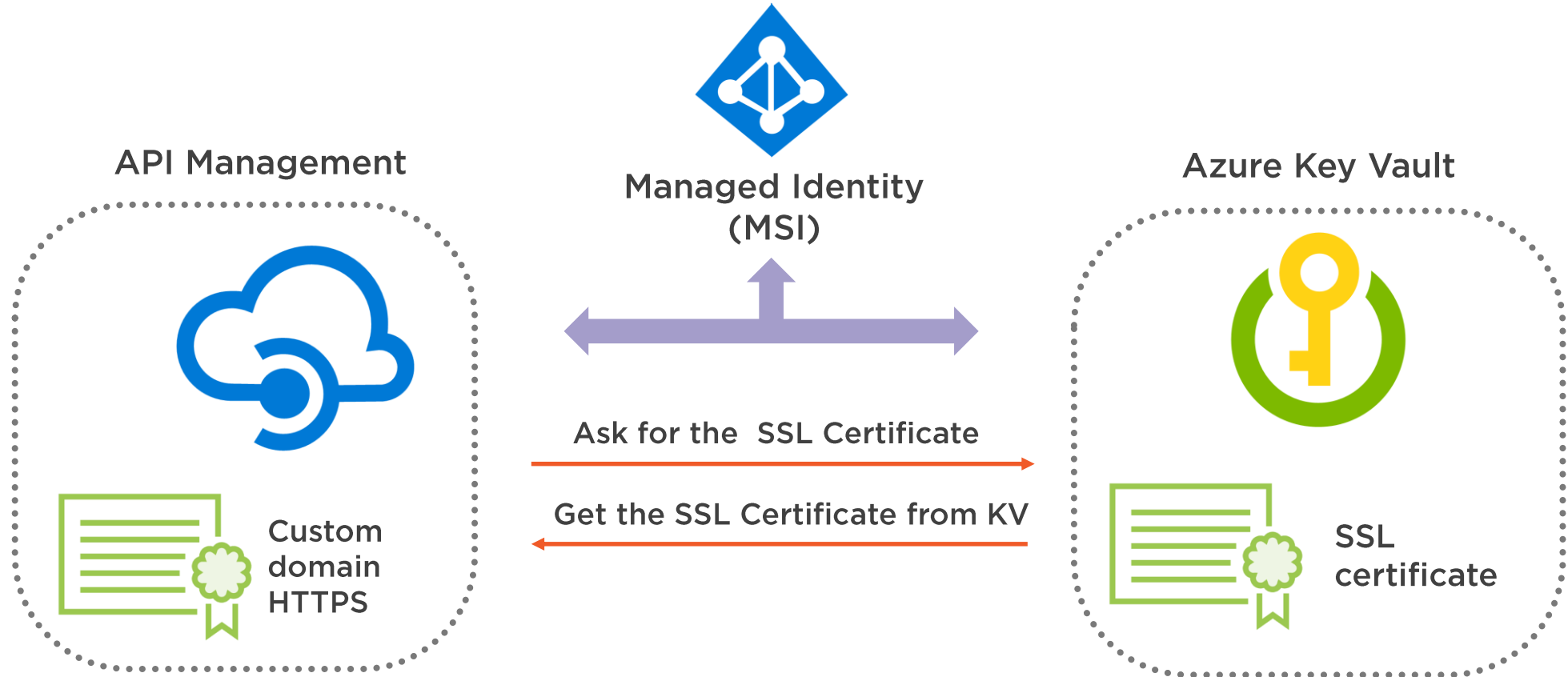
**Works with services that
support Azure AD
authentication**

**The new name for the service
formerly known as Managed
Service Identity (MSI)**

**Helps APIM to access
other Azure resources**



Managed Identities and APIM



Managed Identities and APIM



A Managed Identity allows API Management to easily and securely access Azure AD-protected resources, such as Azure Key Vault



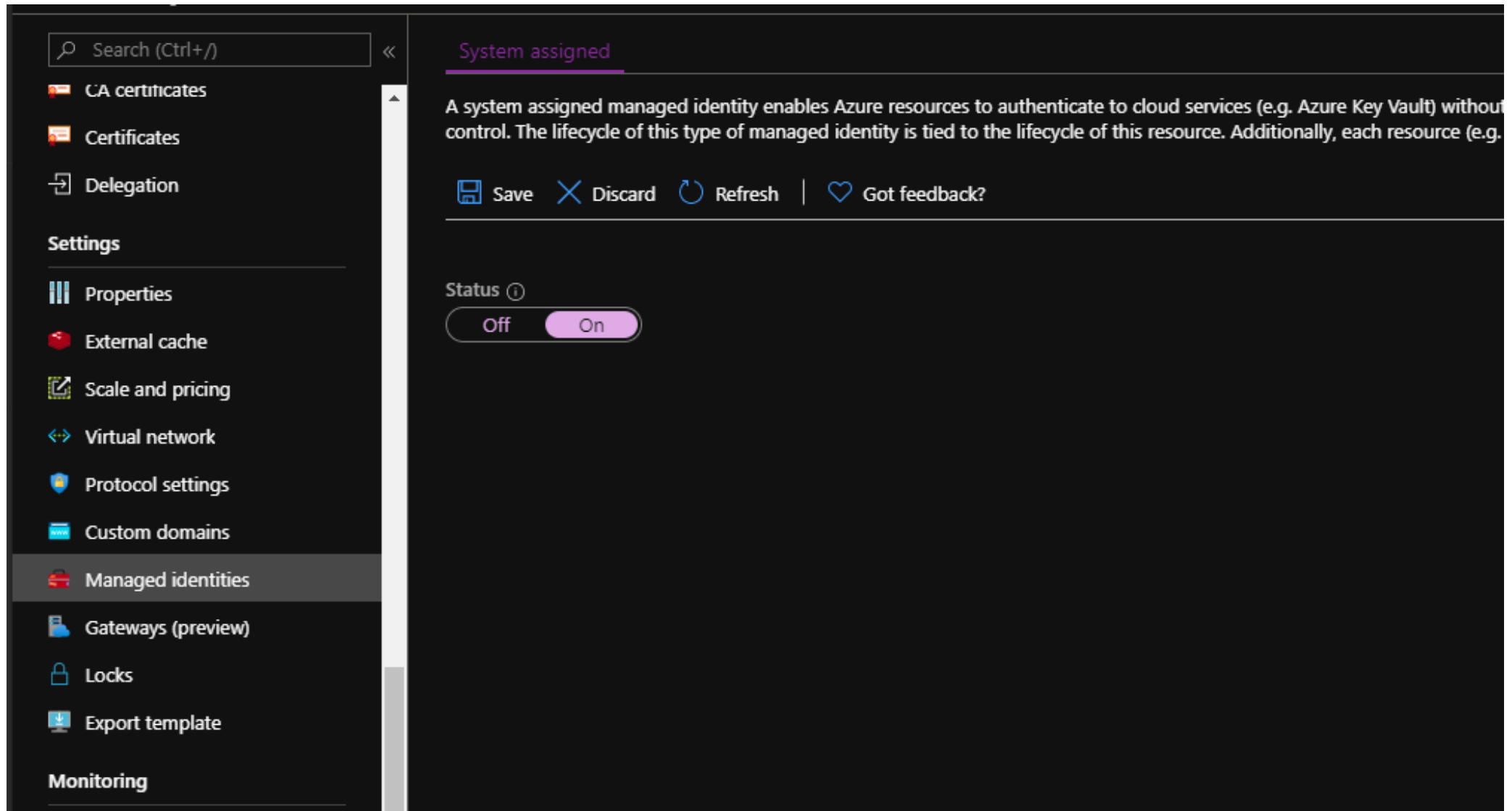
Currently, managed identities can be used to obtain certificates from Azure Key Vault for API Management custom domain names



According to Microsoft, more scenarios will be supported soon



Managed Identities and APIM



The screenshot shows the 'Managed identities' settings page in the Azure Portal. The left-hand navigation pane includes a search bar and categories like 'Settings' and 'Monitoring'. Under 'Settings', 'Managed identities' is selected. The main content area is titled 'System assigned' and contains a descriptive paragraph about system-assigned managed identities. Below the text are buttons for 'Save', 'Discard', 'Refresh', and 'Got feedback?'. A 'Status' section features a toggle switch currently set to 'On'.

Search (Ctrl+/) <<

- CA certificates
- Certificates
- Delegation

Settings

- Properties
- External cache
- Scale and pricing
- Virtual network
- Protocol settings
- Custom domains
- Managed identities**
- Gateways (preview)
- Locks
- Export template

Monitoring

System assigned

A system assigned managed identity enables Azure resources to authenticate to cloud services (e.g. Azure Key Vault) without control. The lifecycle of this type of managed identity is tied to the lifecycle of this resource. Additionally, each resource (e.g.

Save Discard Refresh | Got feedback?

Status ⓘ

Off On



Securing Applications in Microsoft Azure

by Reza Salehi

This hands-on course covers powerful Azure security services including MSI, WAF, NSGs, ASGs, and App Service Environments. These services enable you to easily protect your IaaS and PaaS applications from today's sophisticated attacks.



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Related Courses

This course is part of:  Securing Data and Applications in Microsoft Azure Path

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Course Overview



1m 22s



Configuring TLS/SSL Certificates



27m 13s



Configuring Managed Service Identities (MSI) for Microsoft Azure Resources



32m 30s



Configuring Network Security Groups & Application Security Groups to Secure Virtual Machines



42m 53s



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
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Response Caching and APIM



API Management operations can use response caching



Response caching reduces latency, bandwidth and resource consumption



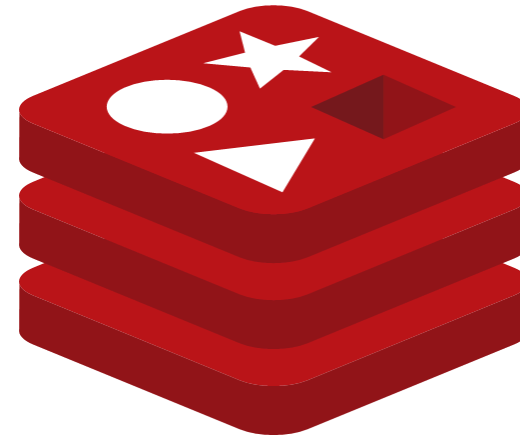
Should only be used to load data which does not change frequently

Response Caching and APIM



Built-in Cache

Comes with your APIM tier



























External Redis Cache

Both Azure-hosted and external
Redis instances



























APIM Built-in Cache

| DEVELOPER | | BASIC | | STANDARD | | PREMIUM | |
|---|-------------------------|---|-------------------------------|---|---------------------------------|---|-------------------------------|
| No | SLA | 99.9 | SLA, % | 99.9 | SLA, % | 99.95* | SLA, % |
|  | AAD integration |  | No AAD integration |  | AAD integration |  | AAD integration |
|  | Virtual network |  | No virtual network |  | No virtual network |  | Virtual network |
|  | Single region only |  | Single region only |  | Single region only |  | Multi-region support |
|  | No scaling |  | Up to 2 scale units |  | Up to 4 scale units |  | Unlimited scale units* |
|  | 10 MB cache |  | 50 MB cache / unit |  | 1 GB cache / unit |  | 5 GB cache / unit |
|  | 500 max rps (estimated) |  | 1K max rps / unit (estimated) |  | 2.5K max rps / unit (estimated) |  | 4K max rps / unit (estimated) |
| 58.56 CAD/MONTH (ESTIMATED) | | 179.43 CAD/MONTH (ESTIMATED) | | 837.26 CAD/MONTH (ESTIMATED) | | 3,407.96 CAD/MONTH (ESTIMATED) | |



APIM Built-in Cache

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Internal cache is not available in the APIM Consumption tier.



APIM and Redis Cache



Avoid losing cached responses due to API Management updates



Have fine-tuned control over Redis cache configuration



Cache much more data comparing to API Management built-in caching



Use caching with the Consumption tier of API Management



APIM and Redis Cache

apim-update01 - External cache
API Management service

repository

Management API

Security

Identities

OAuth 2.0

OpenID Connect

CA certificates

Certificates

Delegation

Settings

Properties

External cache

Scale and pricing

Virtual network

Protocol settings

+ Add

↺ Refresh

Used from

No results

External cache
API Management service

Save

Cache instance

Cache instance location

Use from *

Description

Connection string (StackExchange.Redis) *



Demo



Explore a sample JSON API

Create a new APIM instance

Examine the Azure Portal for the APIM:

- Import a sample API
- Configure call limits
- Create a product
- Configure mocking

Examine the developer portal for the APIM

- Read the API documentation
- Subscribe to the API

Call the APIs in the APIM



Azure API Management (APIM) in Scale



Upgrade and Scale an Azure APIM Instance

Change the service tier

























Upgrade service tier for better performance
(Developer, Basic, Standard, Premium)

Add or remove performance units in one tier

Developer tier does NOT support changing units



Change APIM Service Tier

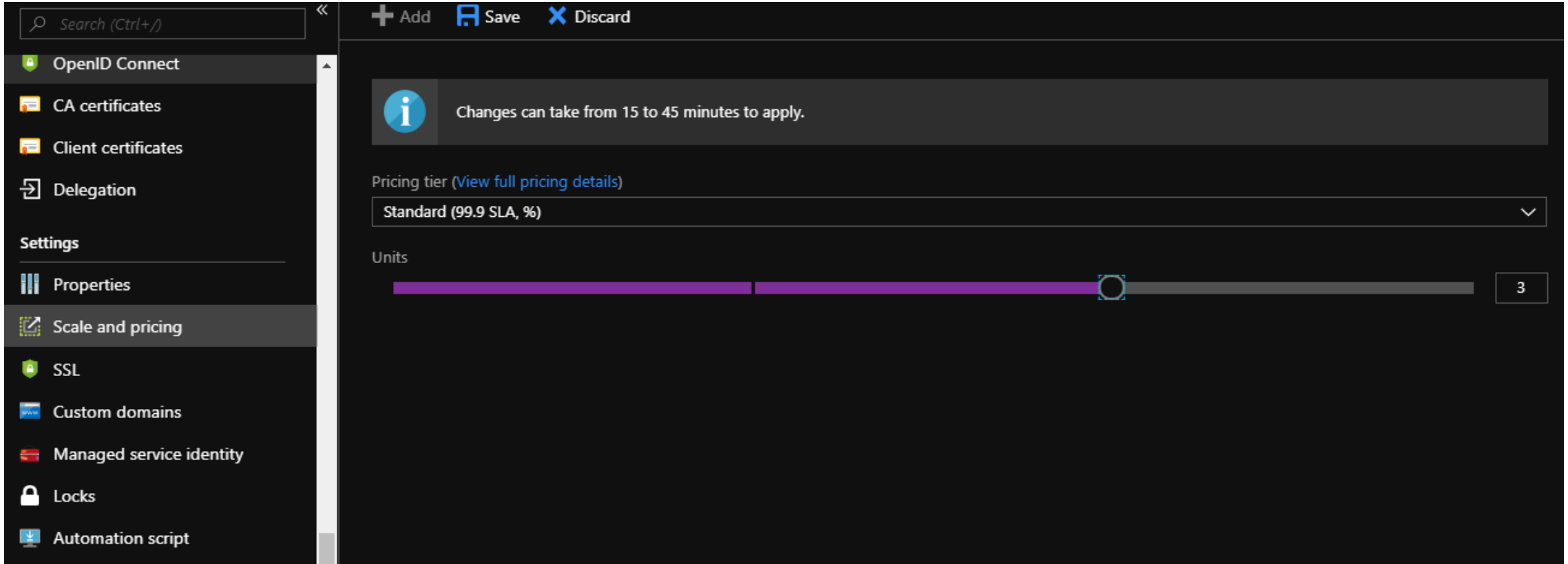
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A unit is composed of dedicated Azure resources and has a certain load-bearing capacity expressed as a number of API calls per month.



Add or Remove Performance Units in One Tier



The screenshot shows the 'Scale and pricing' configuration page in the Azure portal. On the left is a navigation pane with a search bar and a list of settings: OpenID Connect, CA certificates, Client certificates, Delegation, Settings (expanded), Properties, Scale and pricing (selected), SSL, Custom domains, Managed service identity, Locks, and Automation script. The main content area has a top bar with '+ Add', 'Save', and 'Discard' buttons. Below this is an information banner stating 'Changes can take from 15 to 45 minutes to apply.' The 'Pricing tier' is set to 'Standard (99.9 SLA, %)' with a link to 'View full pricing details'. The 'Units' section features a horizontal slider with a purple bar and a blue square handle, and a numeric input box on the right showing the value '3'.

Search (Ctrl+/)

+ Add Save Discard

Changes can take from 15 to 45 minutes to apply.

Pricing tier ([View full pricing details](#))

Standard (99.9 SLA, %) ▾

Units

3



The upgrade or scale process can take from 15 to 45 minutes to apply. You will get a notification when it is done.



When to Scale an APIM Instance?

Auto-scale

Auto-scale can be enabled for Standard and Premium tiers

Use “capacity”

Capacity is the most important metric for making informed decisions whether to scale an API Management instance



Auto Scaling an APIM Instance

Auto-scale can be enabled only for Standard and Premium tiers

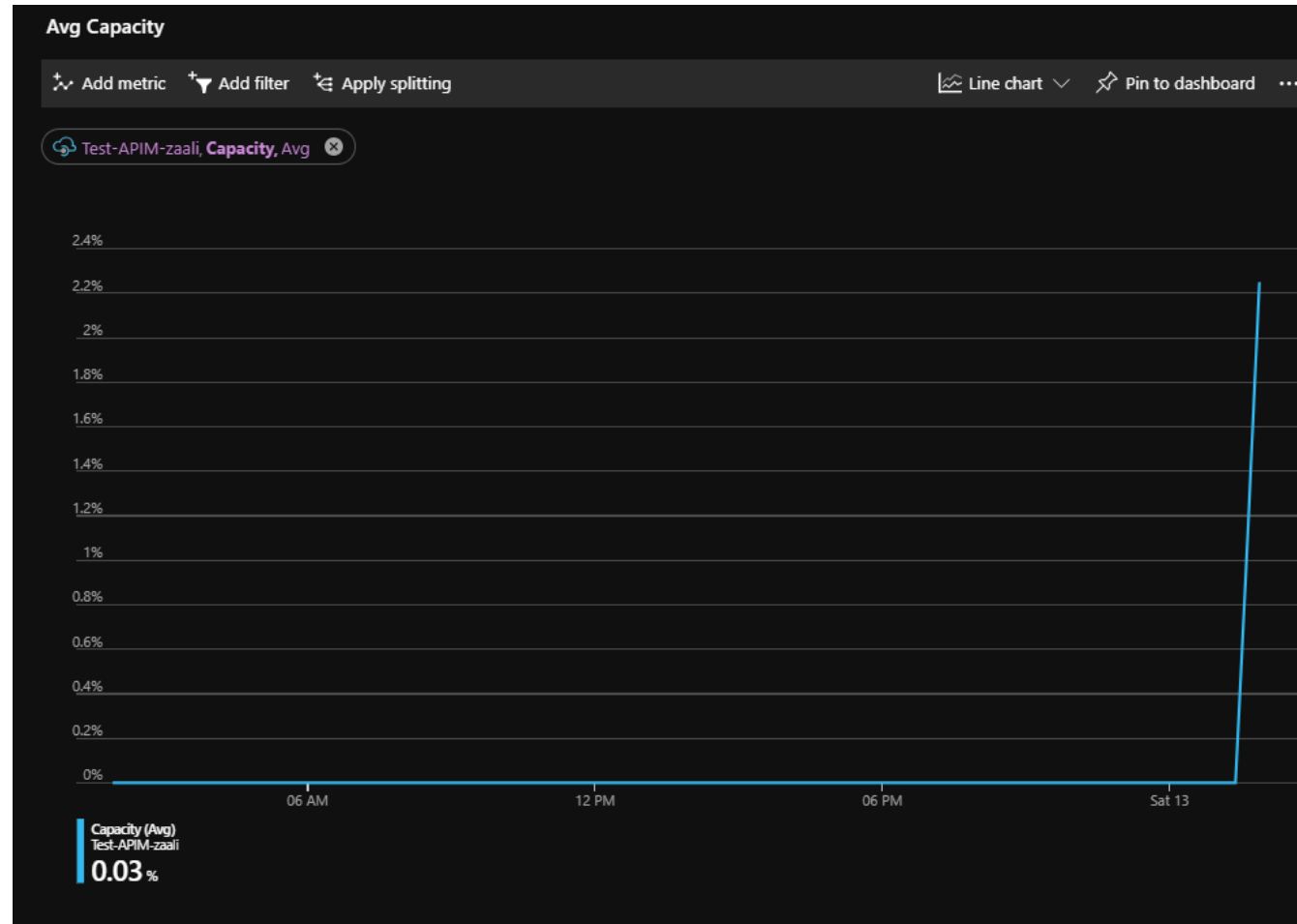
Pricing tiers specify the maximum number of units

Scaling process will take at least 20 minutes

A service with multi-regional deployments, only units in the Primary location can be scaled



Use Capacity to Determine When to Scale



Use Capacity to Determine When to Scale

Look at a long-term trend and average

Ignore sudden spikes that are most likely not related to increase in load

Upgrade your instance when average capacity exceeds 60%-70% for a longer period (e.g. 30 minutes)



APIM and Multiple Region Deployment



A single APIM deployment can be distributed among multiple regions



API consumers around the globe will experience less latency, also provides failover in case of primary region outage



Only the API gateway component is deployed to all regions



Only available in the Premium tier of APIM



APIM and Multiple Region Deployment

The screenshot displays the 'Scale and pricing' configuration page for an API Management instance. The left sidebar contains navigation links for various settings, with 'Scale and pricing' currently selected. The main content area includes a search bar, action buttons (Add, Save, Discard), and two informational messages. The 'Pricing tier' is set to 'Premium (99.95* SLA, %)'. Below this, a table lists the current deployment locations. On the right, a sidebar allows selecting the 'Location' (Australia East) and setting the 'Units' (1).

apim-update01 - Scale and pricing
API Management service

Search (Ctrl+ /)

+ Add Save X Discard

Refer to [capacity metric](#) to make a decision whether to scale your API Management instance to accommodate more load. Changes can be made in the [Scale and pricing](#) settings.

Changing API Management service tier will cause public VIP to change.

Pricing tier ([View full pricing details](#))

Premium (99.95* SLA, %)

Locations

| Location | Capacity |
|--------------------------|----------|
| Canada Central (Primary) | 1 unit |

Location *
Australia East

Units
1

Settings

- Certificates
- Delegation
- Properties
- External cache
- Scale and pricing**
- Virtual network
- Protocol settings
- Custom domains
- Managed identities
- Gateways (preview)
- Locks
- Export template

Monitoring

- Application Insights



Demo



Upgrade the APIM tier to Standard

Change the units

Configure auto-scale

- Scale up
- Scale down

Examine the capacity report

Downgrade the instance to Developer



Demo



APIM and Multiple Region Deployment



Notes About Azure Automation and APIM



Automating APIM Tasks



You can write PowerShell scripts to perform many of your API Management tasks



The scripts can be run manually or by Azure Automation workflows



You can pair these cmdlets in Azure Automation with the cmdlets for other Azure services, to automate complex tasks across Azure services



Demo



Backup the API Management service
using Azure PowerShell

Restore the API Management Service
from the backup



Summary



APIs and modern software architecture

Introduced Microsoft Azure API
Management (APIM)

How can APIM help?

APIM components

- API Gateway
- Azure Portal
- Developer Portal

Scaling APIM

Automating APIM

