



TECHORAMA

DEEP KNOWLEDGE IT CONFERENCE

May 22-24 | 2018

Antwerp, Belgium



Barry Luijbregts

www.azurebarry.com

@AzureBarry



BUILDING A GLOBALLY DISTRIBUTED APP WITH AZURE PaaS

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Find me on Pluralsight



- Introduction to Azure App Services
- Building a Global App with Azure PaaS
- Continuous Integration and Continuous Delivery: The Big Picture
- Cloud Design Patterns for Azure: Design and Implementation
- Cloud Design Patterns for Azure: Availability and Resilience
- Cloud Design Patterns for Azure: Data Management and Performance
- The .NET Ecosystem: The Big Picture
- Microsoft Azure for Developers: What to Use When?
- Microsoft Azure Cognitive Services: The Big Picture
- HTML, CSS and JavaScript: The Big Picture



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- HTML, CSS and JavaScript: The Big Picture



Don't
reinvent
the
wheel



the



The cloud takes care of the plumbing and “boring stuff”, so that you can build things that matter



Who uses Azure?



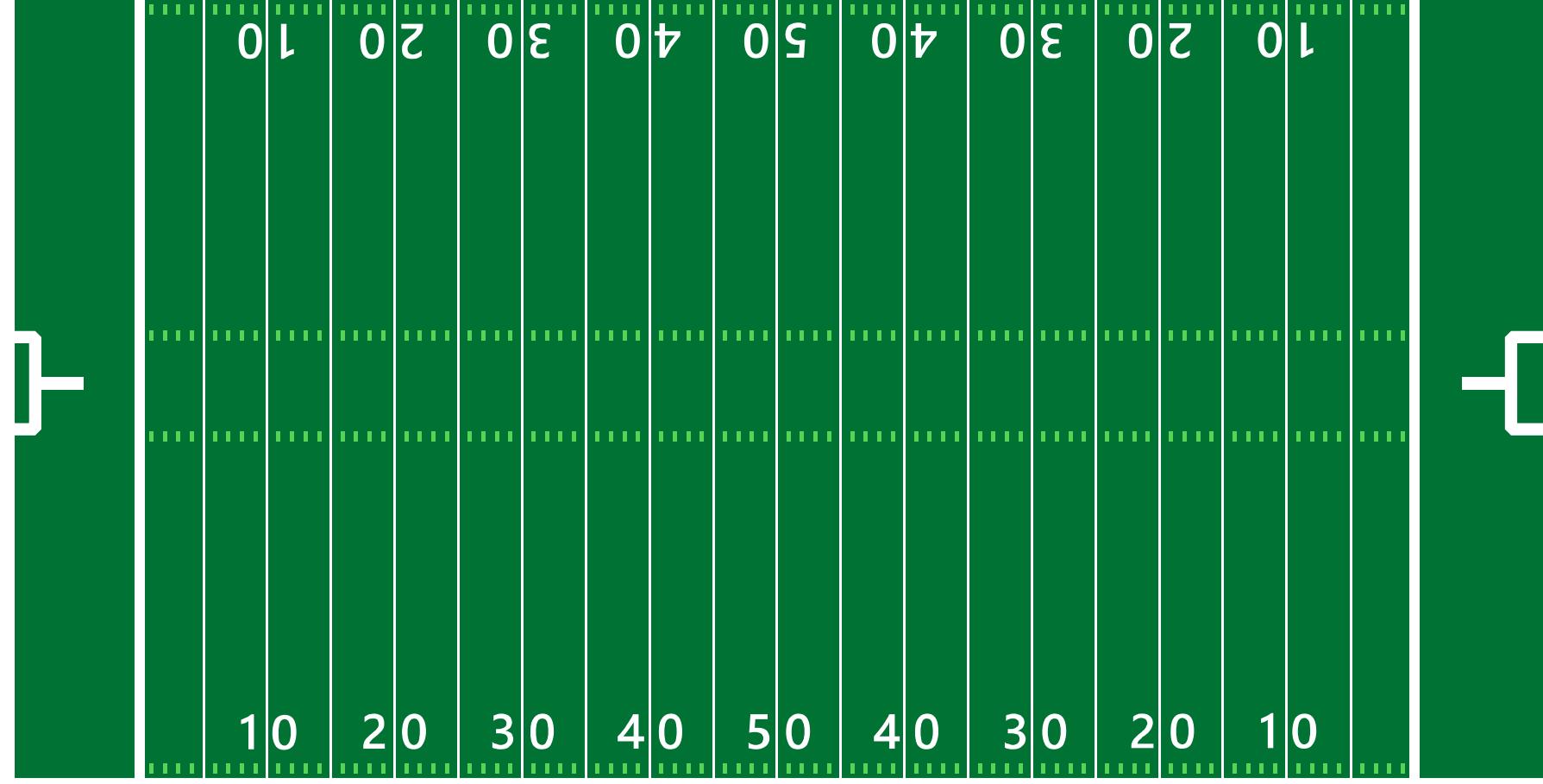


Who uses it in production?

Other clouds? (Google, AWS)

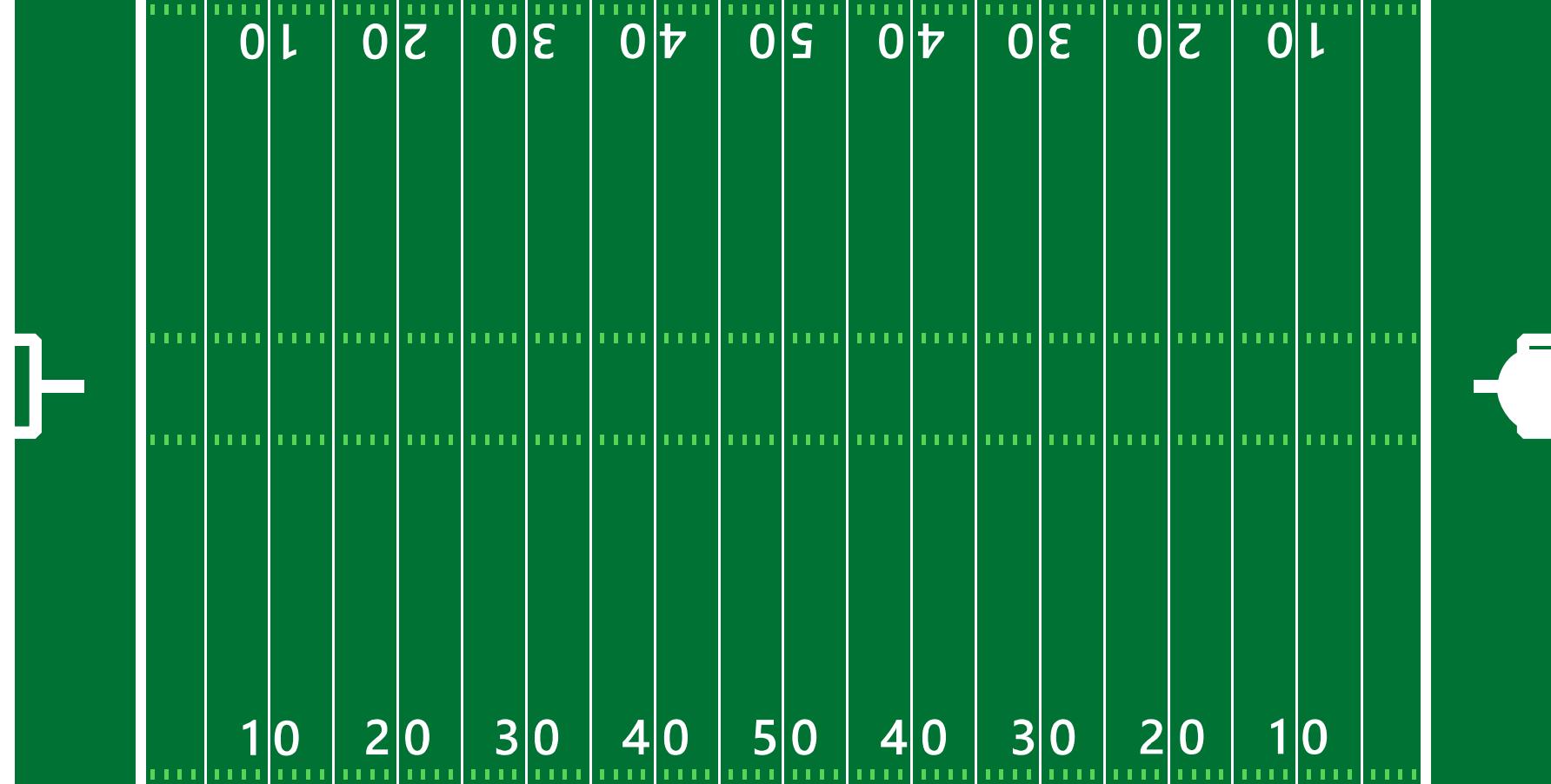






Hyper-scale Region Datacenter buildings
are about one football field in size





...large enough to hold two jumbo jets



Datacenter evolution

1989-2005 • 2007 • 2009 • 2012 • 2018

2.0+ PUE



Colocation

1.4 – 1.6 PUE



Density

1.2 – 1.5 PUE



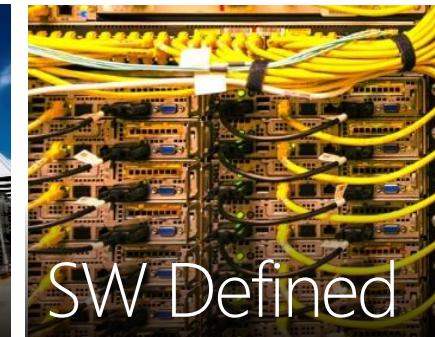
Containment

1.12 – 1.20 PUE



Modular

1.07 – 1.19 PUE



SW Defined

Server
Capacity
20 year Technology

Rack
Density & Deployment
Minimized Resource Impact

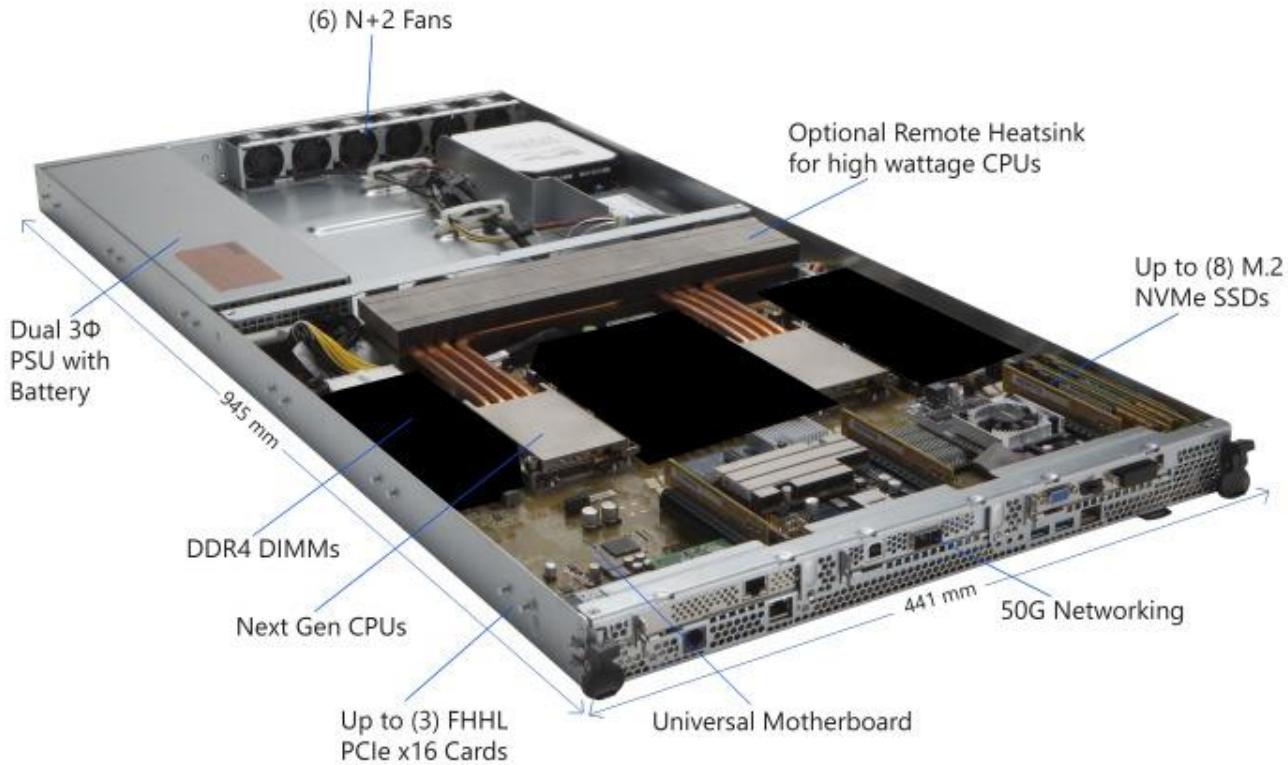
Containers, PODs
Scalability & Sustainability
Air & Water
Economization
Differentiated SLAs

ITPACs & Colocations
Reduced Carbon
Right-Sized
Faster Time-to-Market
Outside Air Cooled

Fully Integrated
Resilient Software
Common Infrastructure
Operational Simplicity
Flexible & Scalable



Open source hyper-scale cloud hardware



Project Olympus



Who houses your data

Under the sea?

Underwater datacenter



Project Natick: <http://natick.research.microsoft.com/>

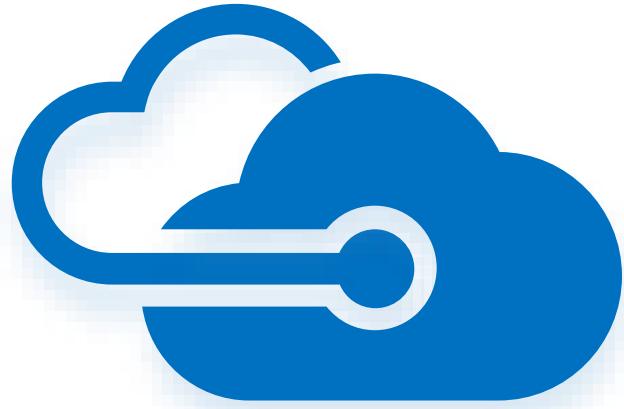


50 regions
worldwide

140 available in
140 countries



The Magic of the Cloud

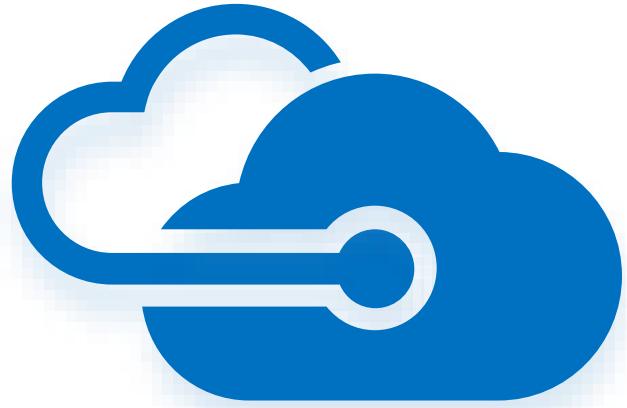


Microsoft Azure

- Ease of use
- Scalability
- Pay for what you use



The Magic of the Cloud



Microsoft Azure



IaaS



PaaS



SaaS

Infrastructure-as-a-Service
VM's, Storage, Networks

Platform-as-a-Service
Function Apps, SQL Azure,
CDN, Redis Cache, Logic Apps

Software-as-a-Service
Cognitive Services, IoT suite



The Magic of the Cloud



Microsoft Azure



IaaS



PaaS



SaaS

Infrastructure-as-a-Service
VM's, Storage, Networks

- Application platform
- Integration
- Business Process Management

Software-as-a-Service
Cognitive Services, IoT suite



Exploring Our Global Scenario



International Cookies



Cookie Store

order

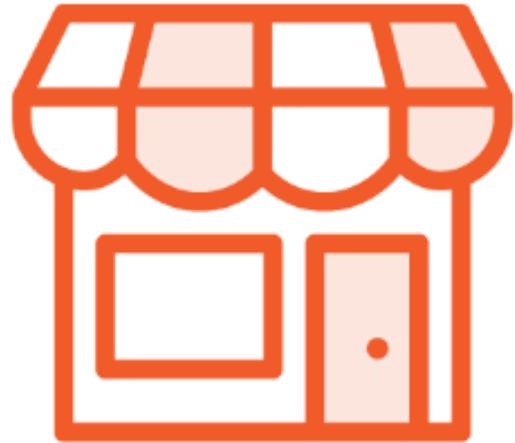


<https://www.internationalcookies.eu>



Internationalcookies





Cookie Store

Application goals

(Globally) Performant

(Globally) Available

Secure



Internationalcookies.eu



ASP.NET Core



Azure Web App



Azure Redis Cache



Azure CDN



Azure SQL



Azure Active Directory



Web Apps



What are Web Apps?

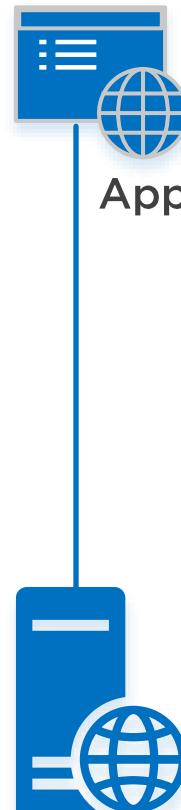
Traditional Webhosting

Hosting with Web Apps



What are Web Apps?

Traditional Webhosting



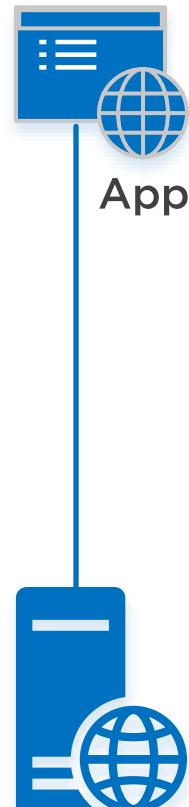
Server + OS + Webserver (IIS)

Hosting with Web Apps



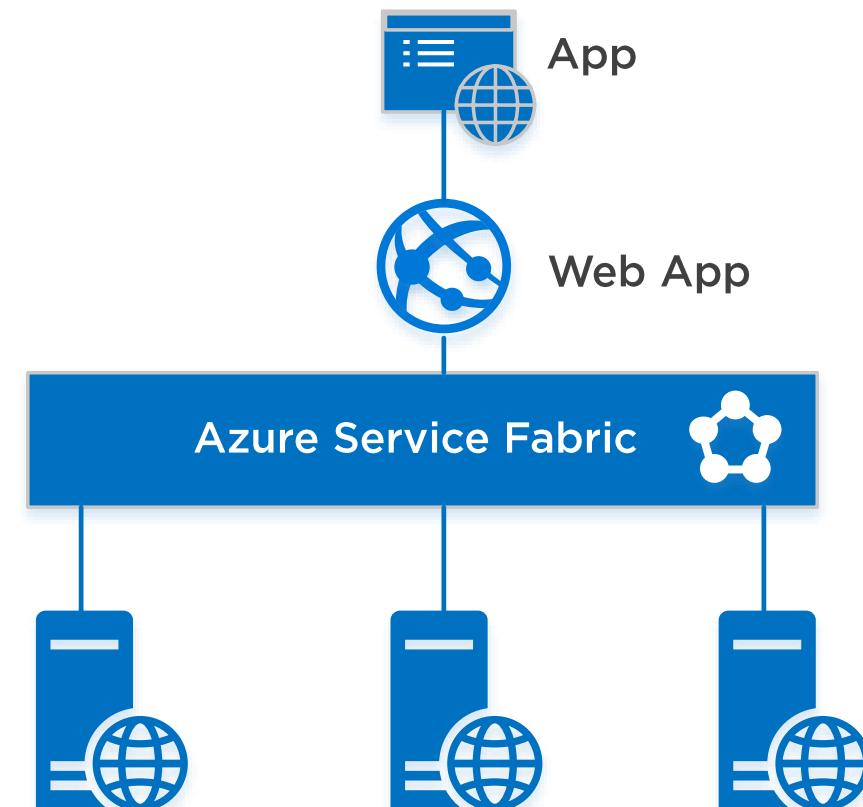
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Traditional Webhosting



Server + OS + Webserver (IIS)

Hosting with Web Apps

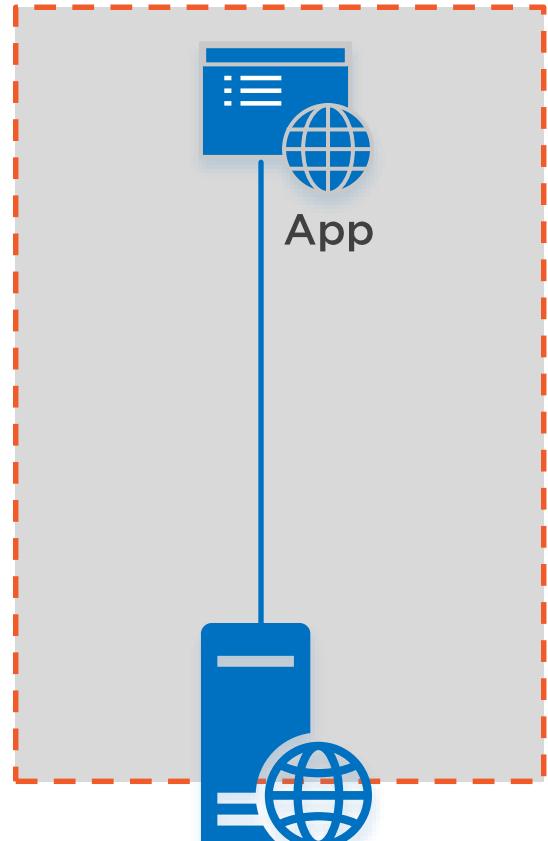


Server + Azure OS + Webserver (IIS)



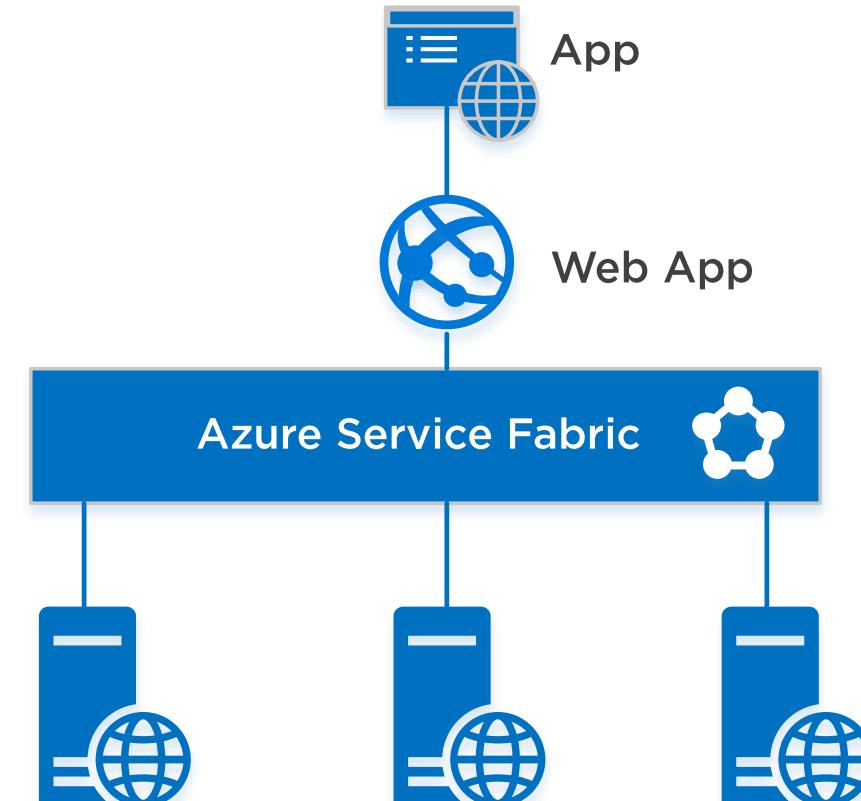
What are Web Apps?

Traditional Webhosting



Server + OS + Webserver (IIS)

Hosting with Web Apps

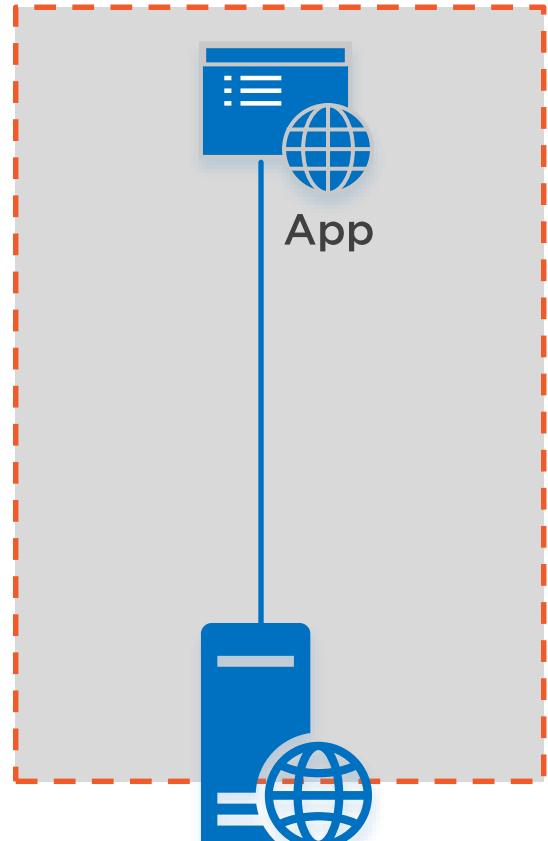


Server + Azure OS + Webserver (IIS)



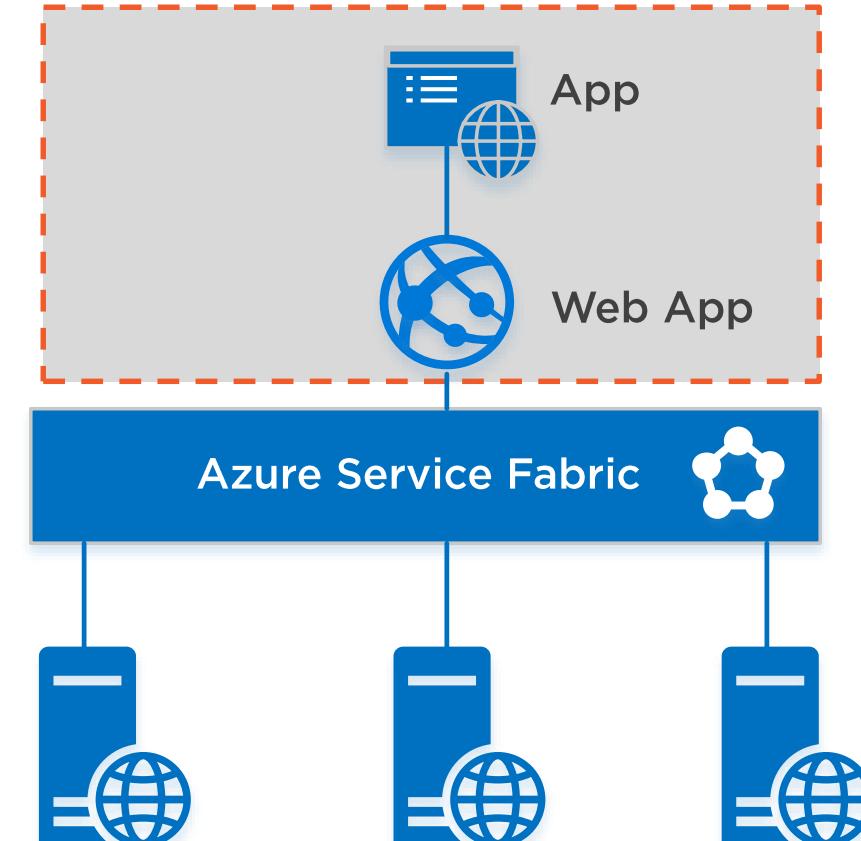
What are Web Apps?

Traditional Webhosting



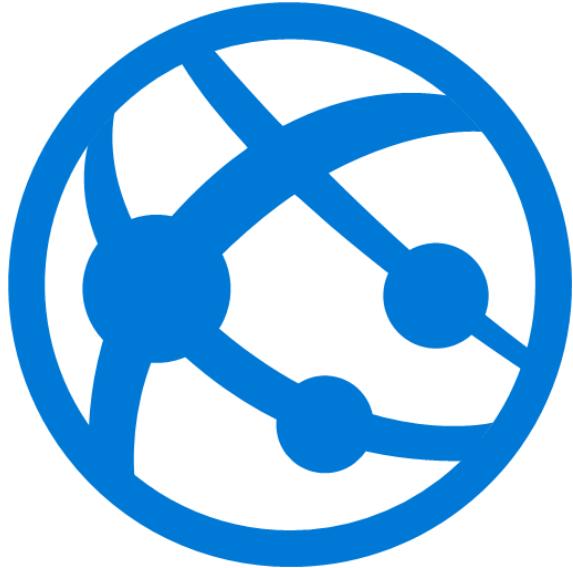
Server + OS + Webserver (IIS)

Hosting with Web Apps



Server + Azure OS + Webserver (IIS)





Azure Web App

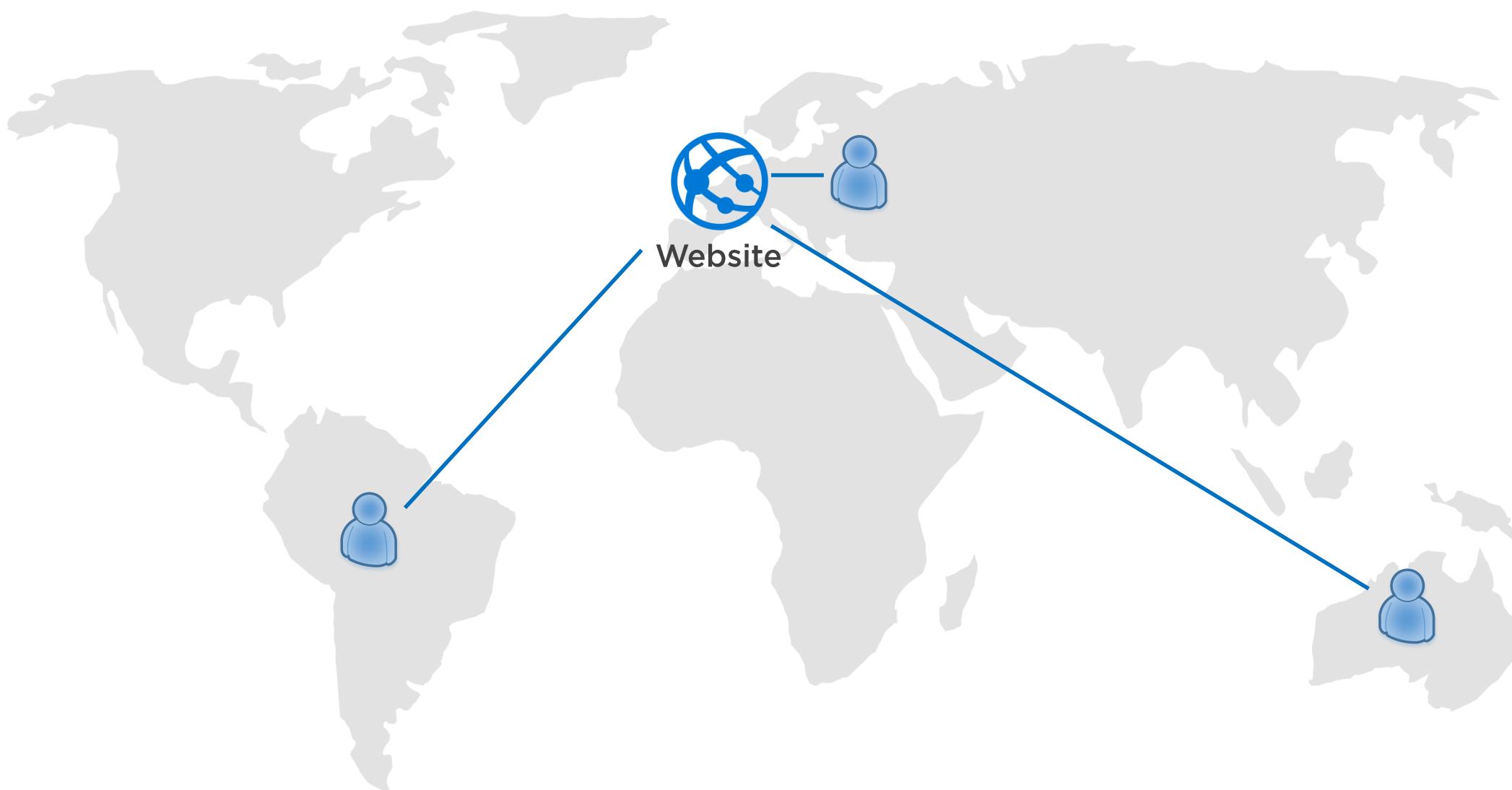
Host web applications
.NET, Node.js, Python, Java, PHP
SLA 99.95%
Custom domains
Continuous deployment
(Auto) scaling
Authentication / Authorization
Traffic Management
Access on-premises data



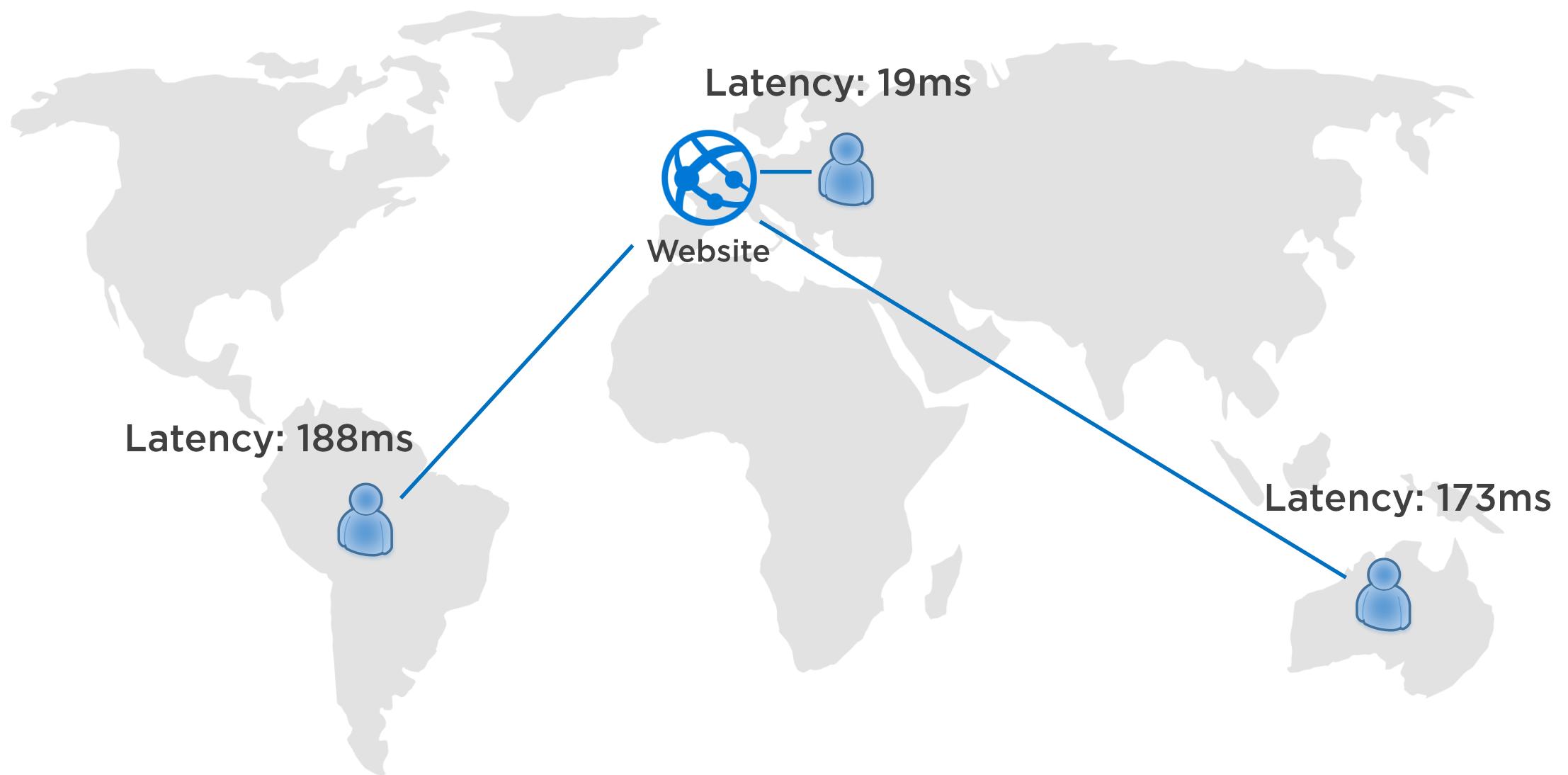
How to Deal With Global Usage



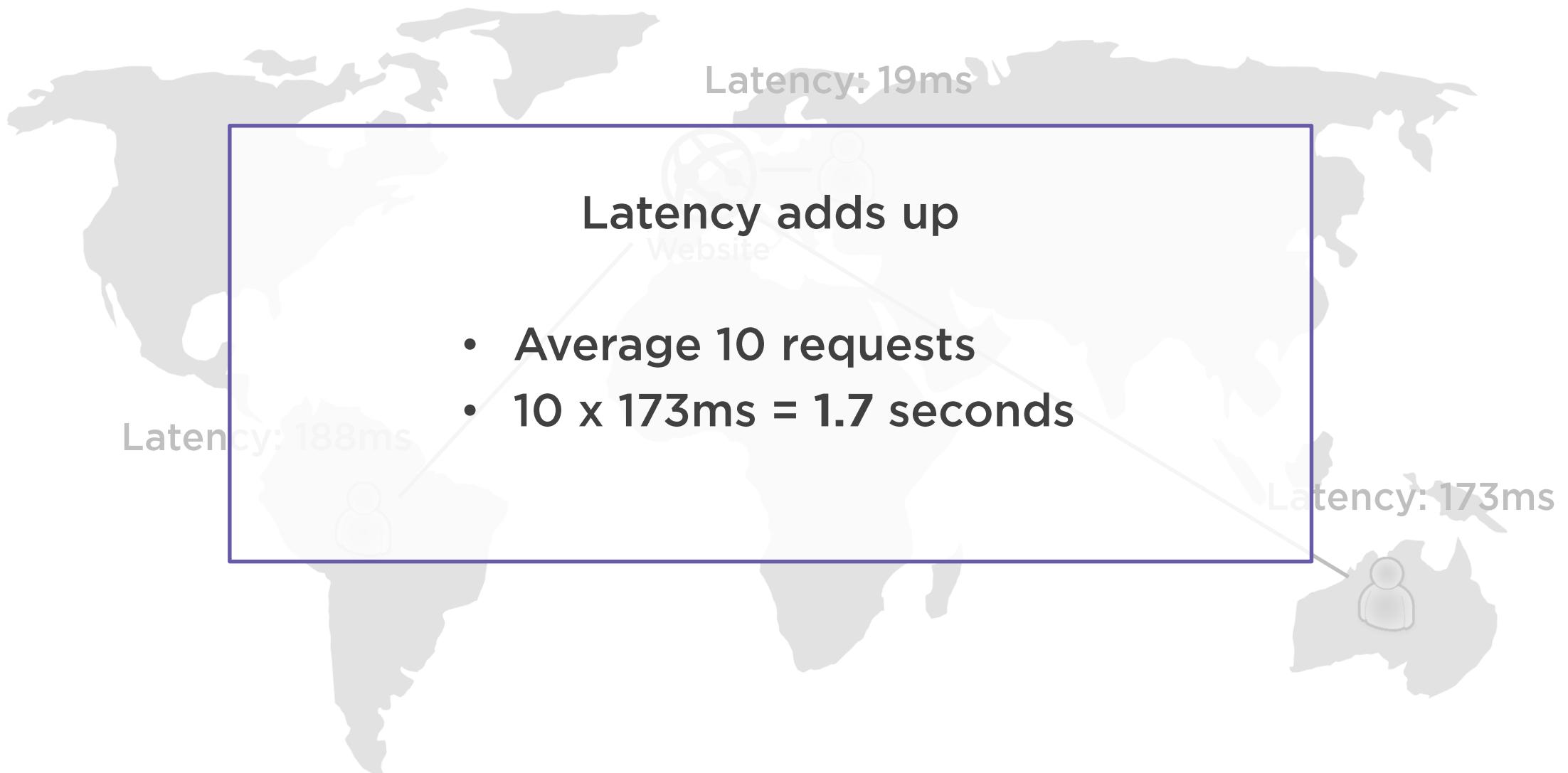
How to Deal With Global Usage



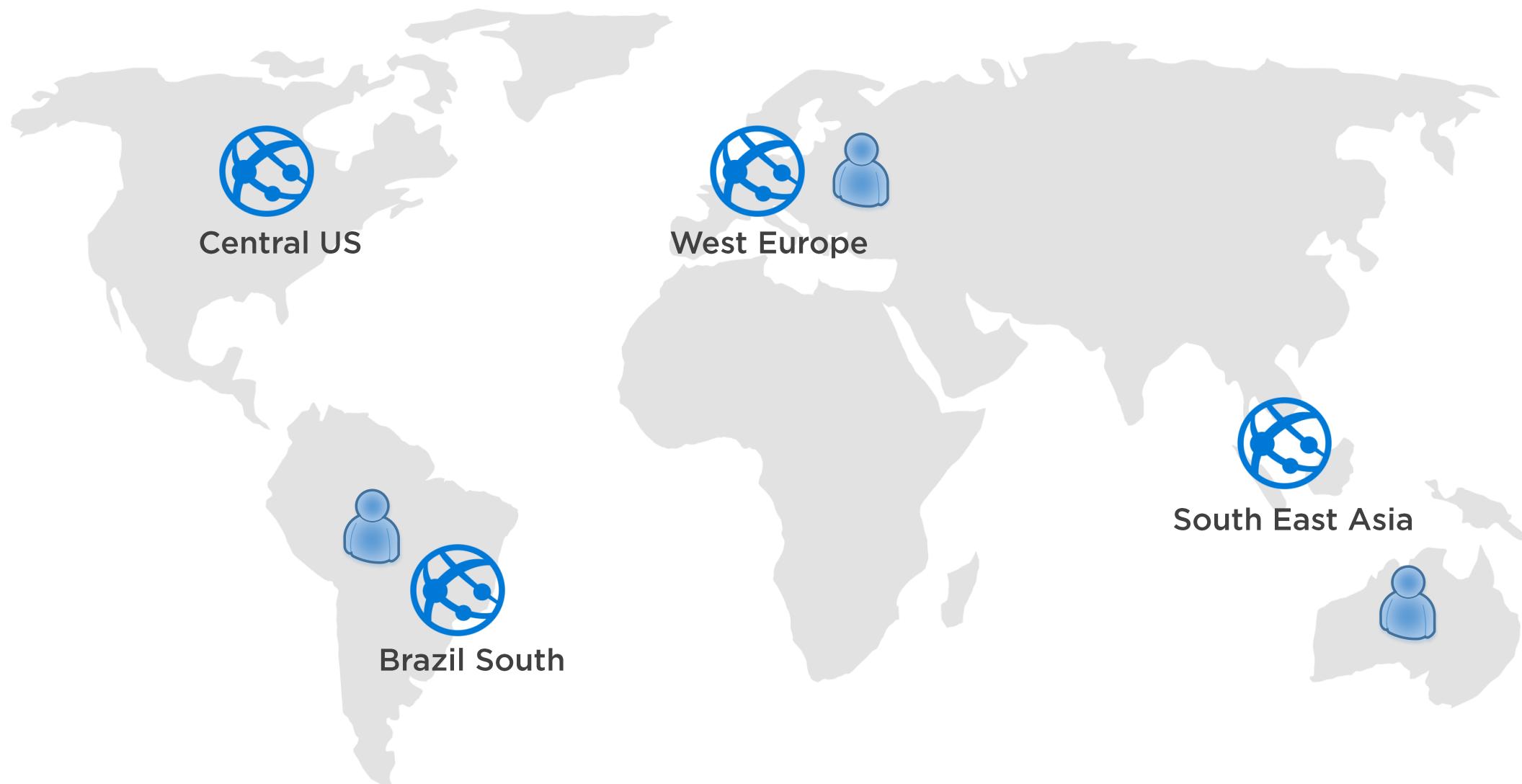
How to Deal With Global Usage



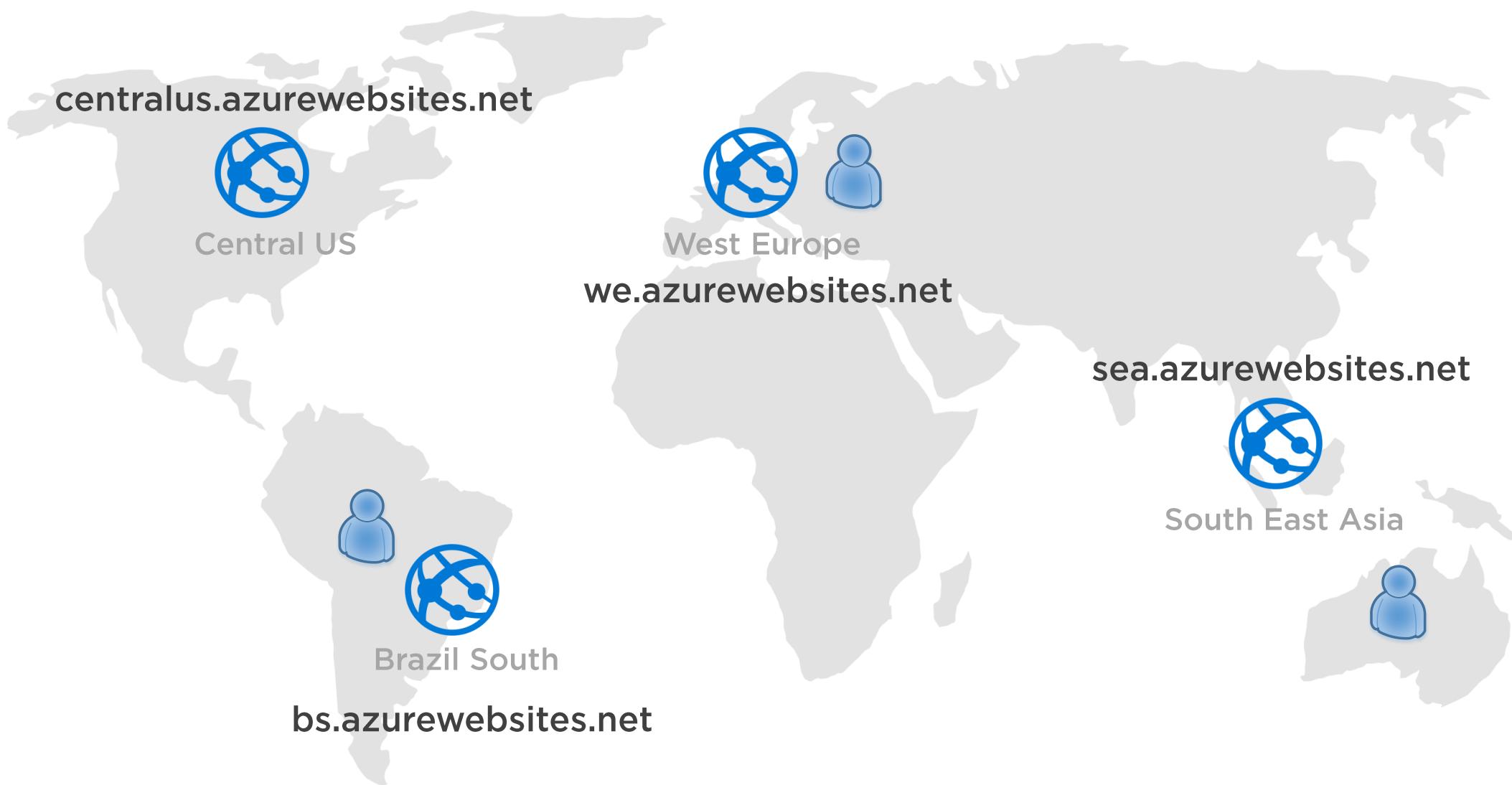
How to Deal With Global Usage



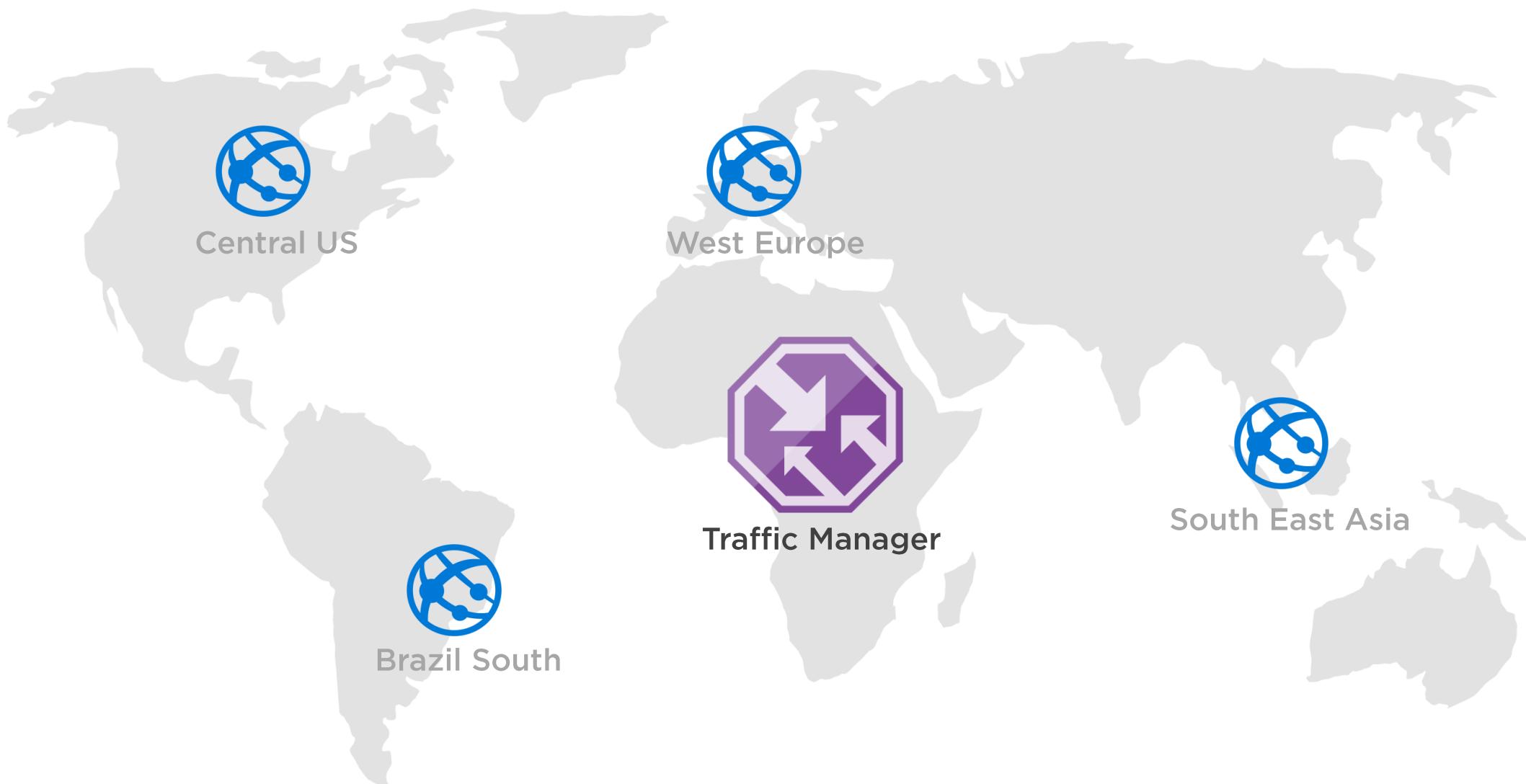
How to Deal With Global Usage



How to Deal With Global Usage



Traffic Manager



Traffic Manager



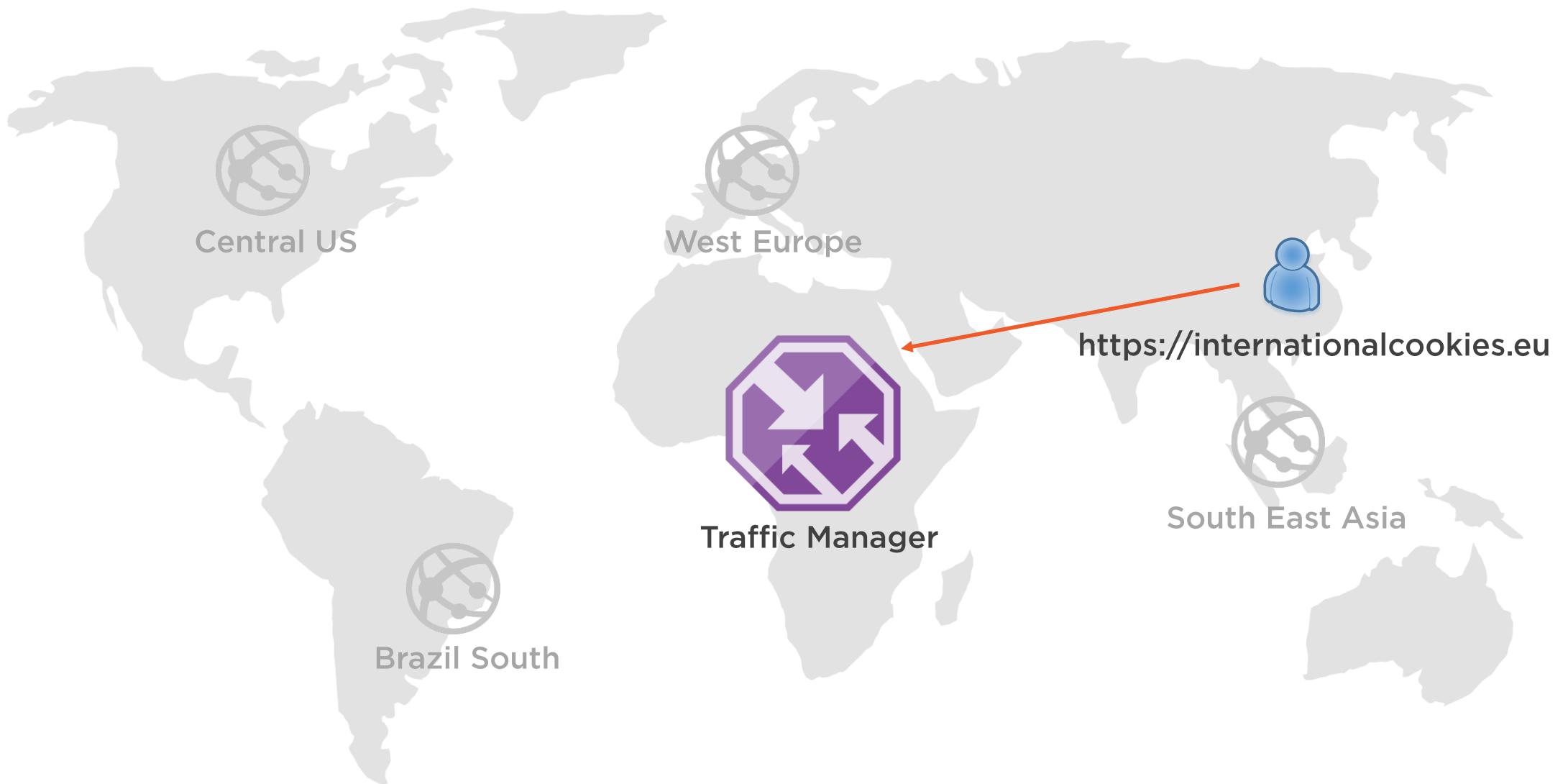
Traffic Manager

Azure Traffic Manager

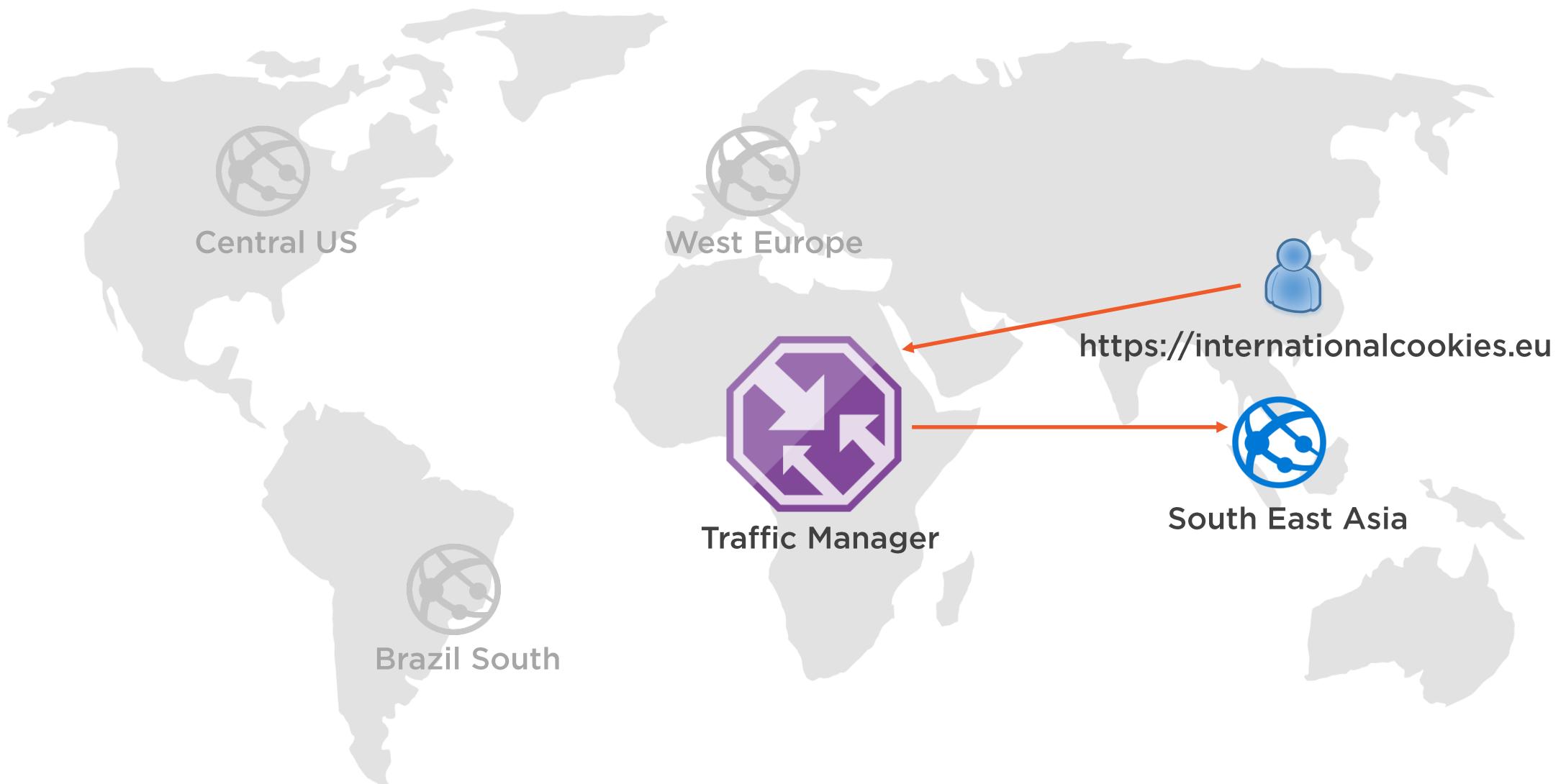
- Not bound to a region
- Pings endpoints every 30 seconds
- Routes on:
 - Availability
 - Geographic performance
 - Geographic location
 - Priority / weight



Traffic Manager

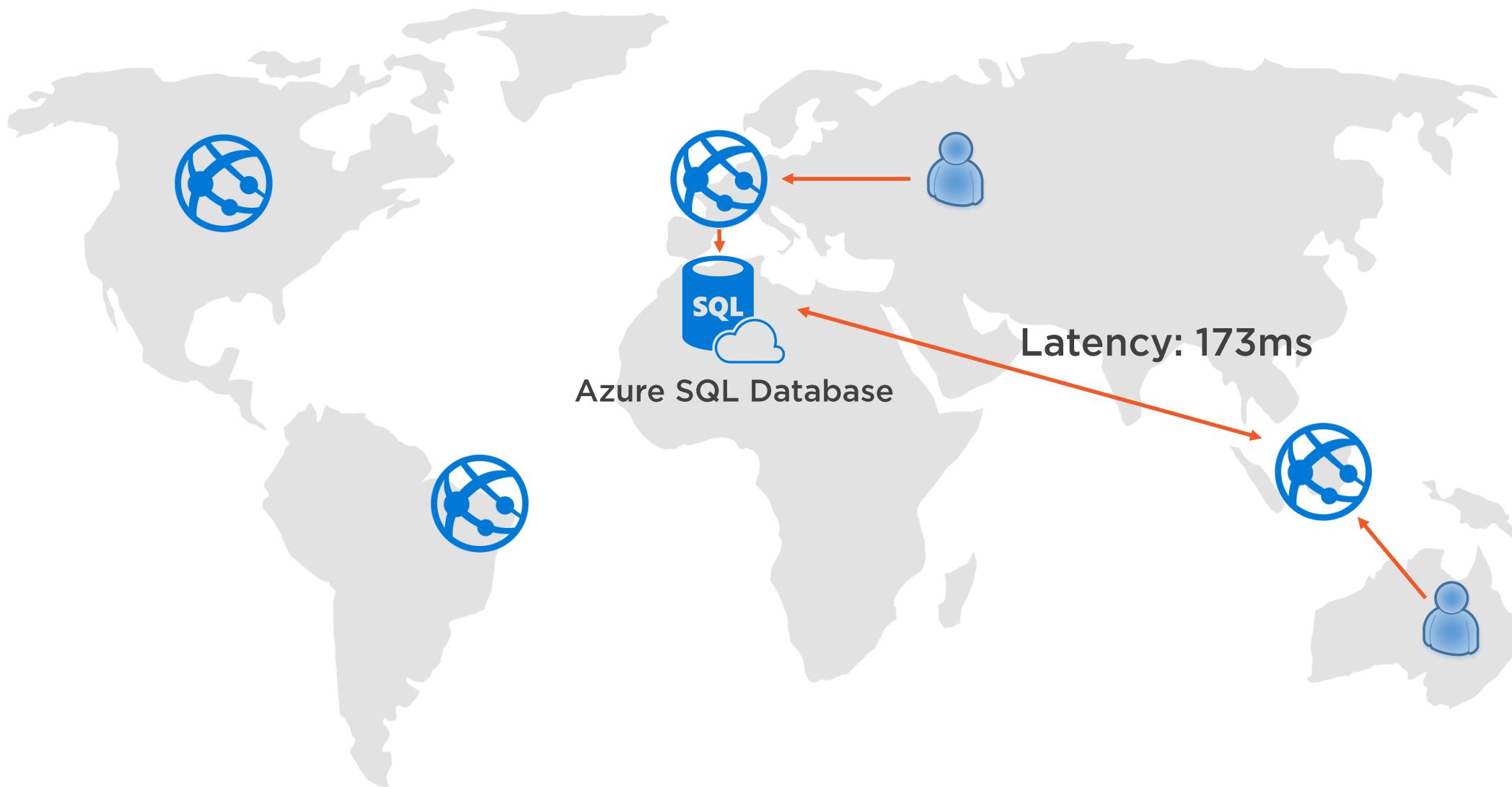


Traffic Manager





Data in the Application





About Azure SQL Server

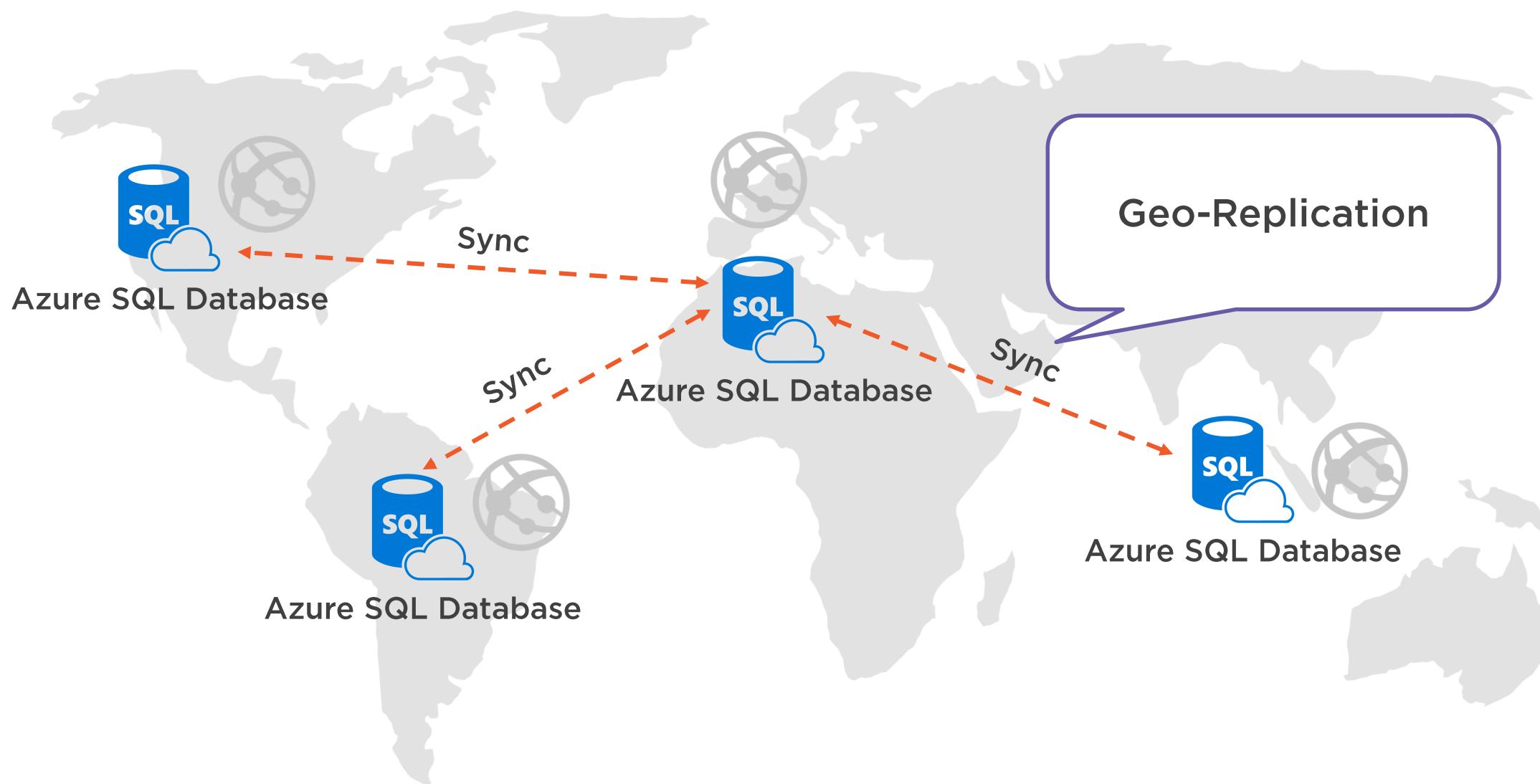
Database-as-a-Service
(mostly) relational datastore
Highly available (99.99%)

Lot's of features:

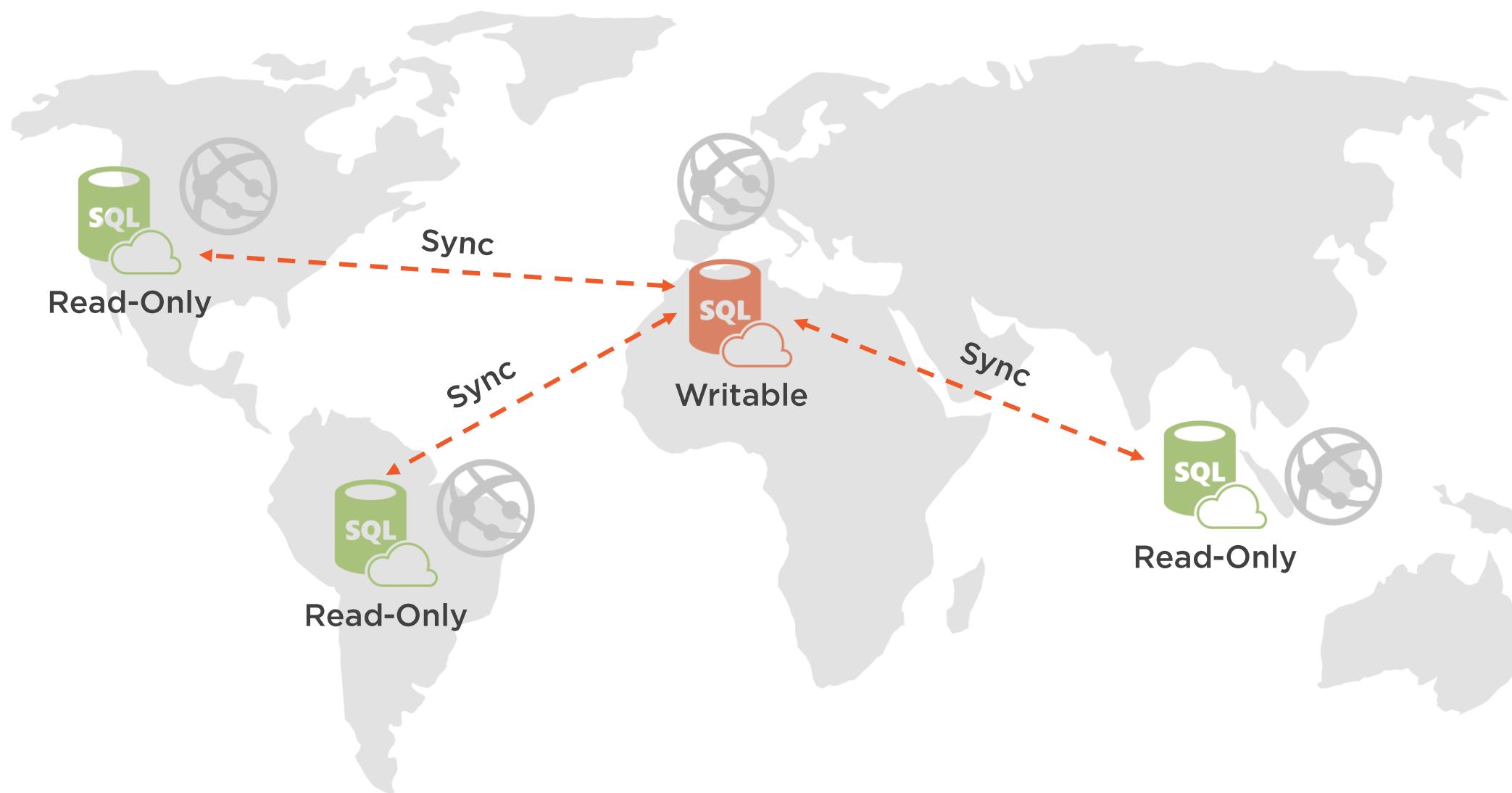
- Auditing
- Geo-replication
- Transparent Data Encryption (TDE)
- Dynamic Data Masking
- Performance recommendation



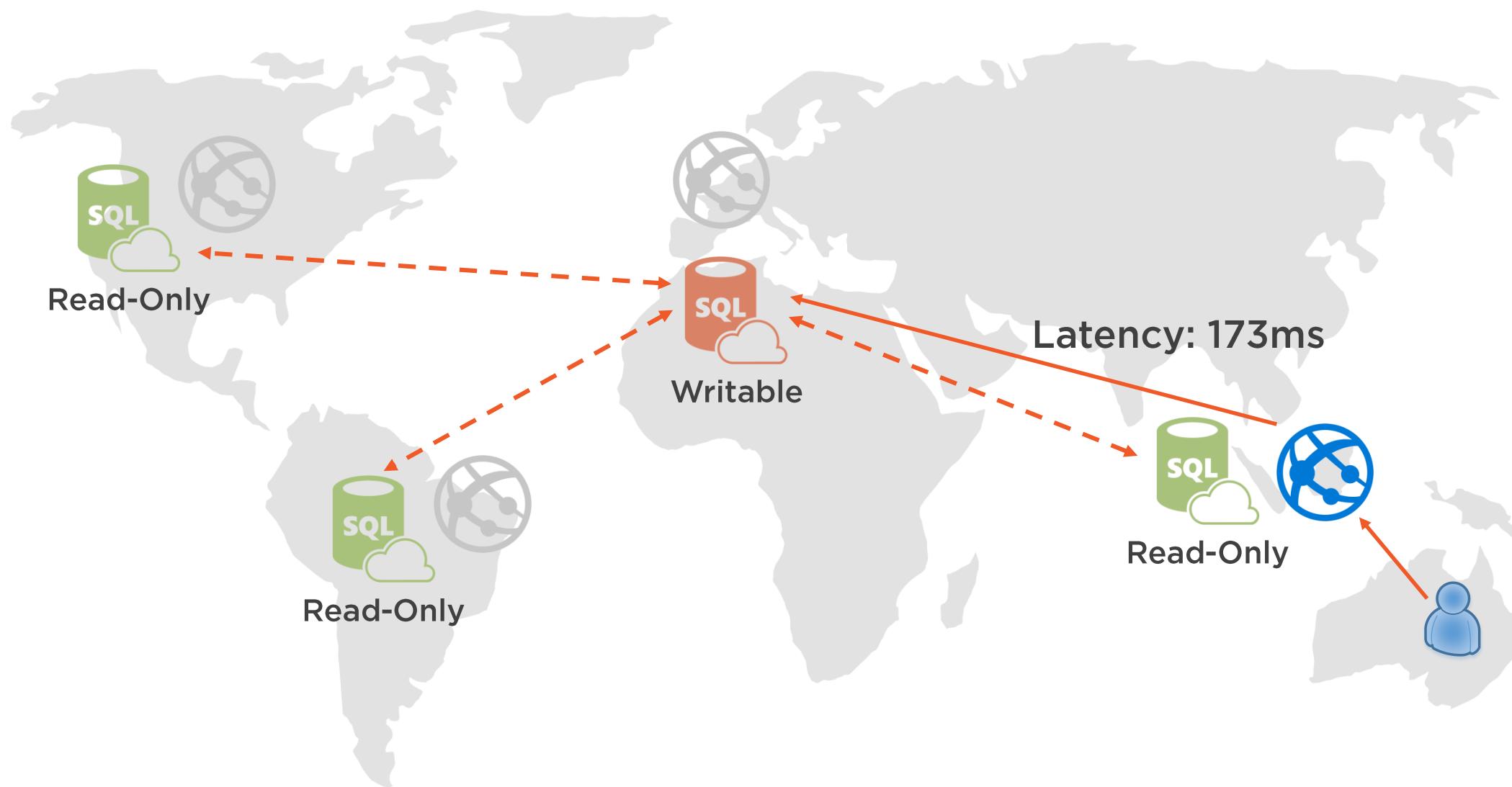
Data in the Application: Option 1



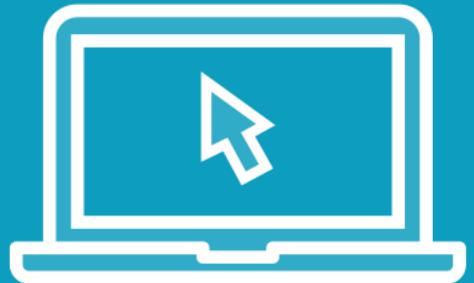
Data in the Application: Option 1



Data in the Application: Option 1



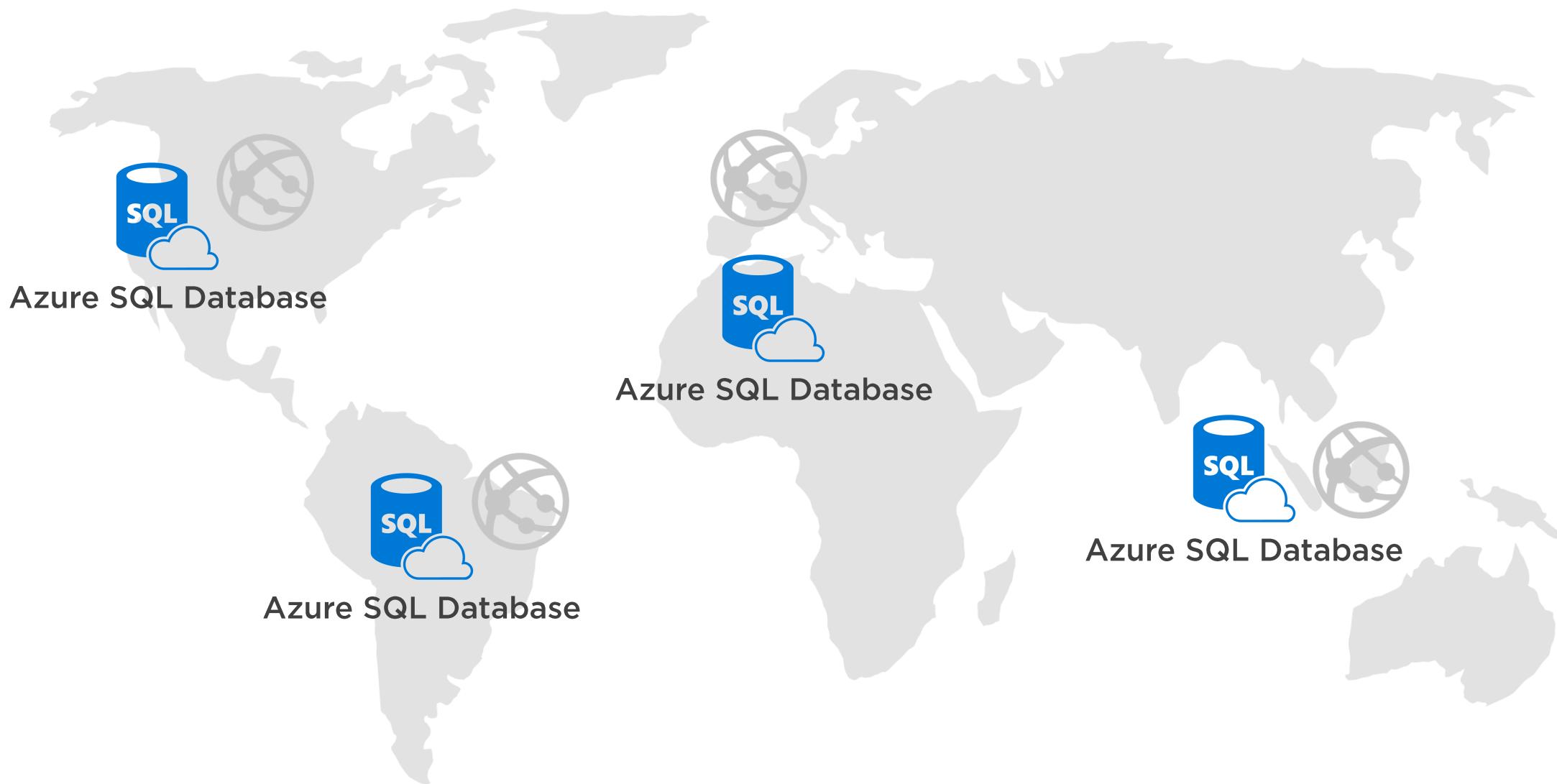
Demo



Geo-replication in Azure



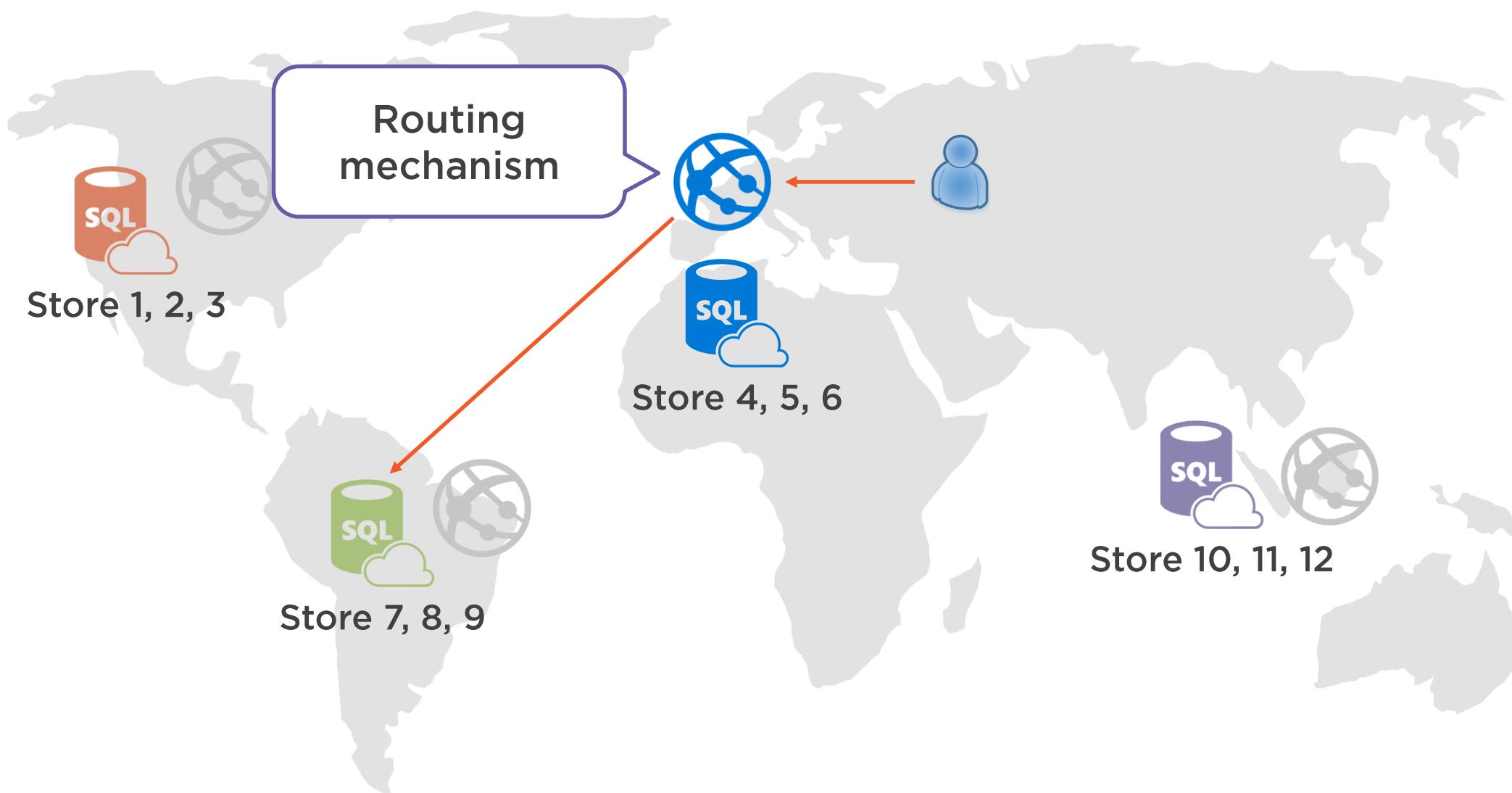
Data in the Application: Option 2

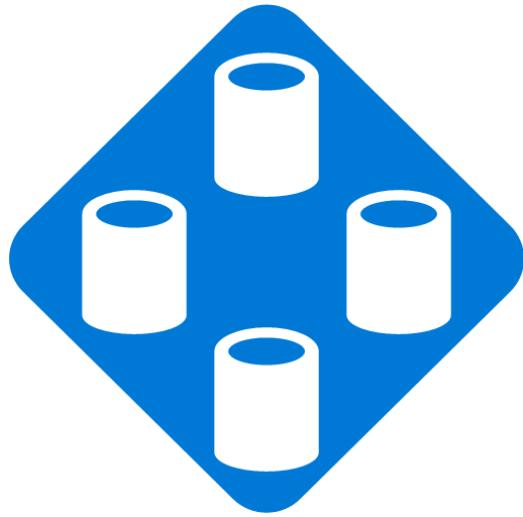


Data in the Application: Option 2



Data in the Application: Option 2



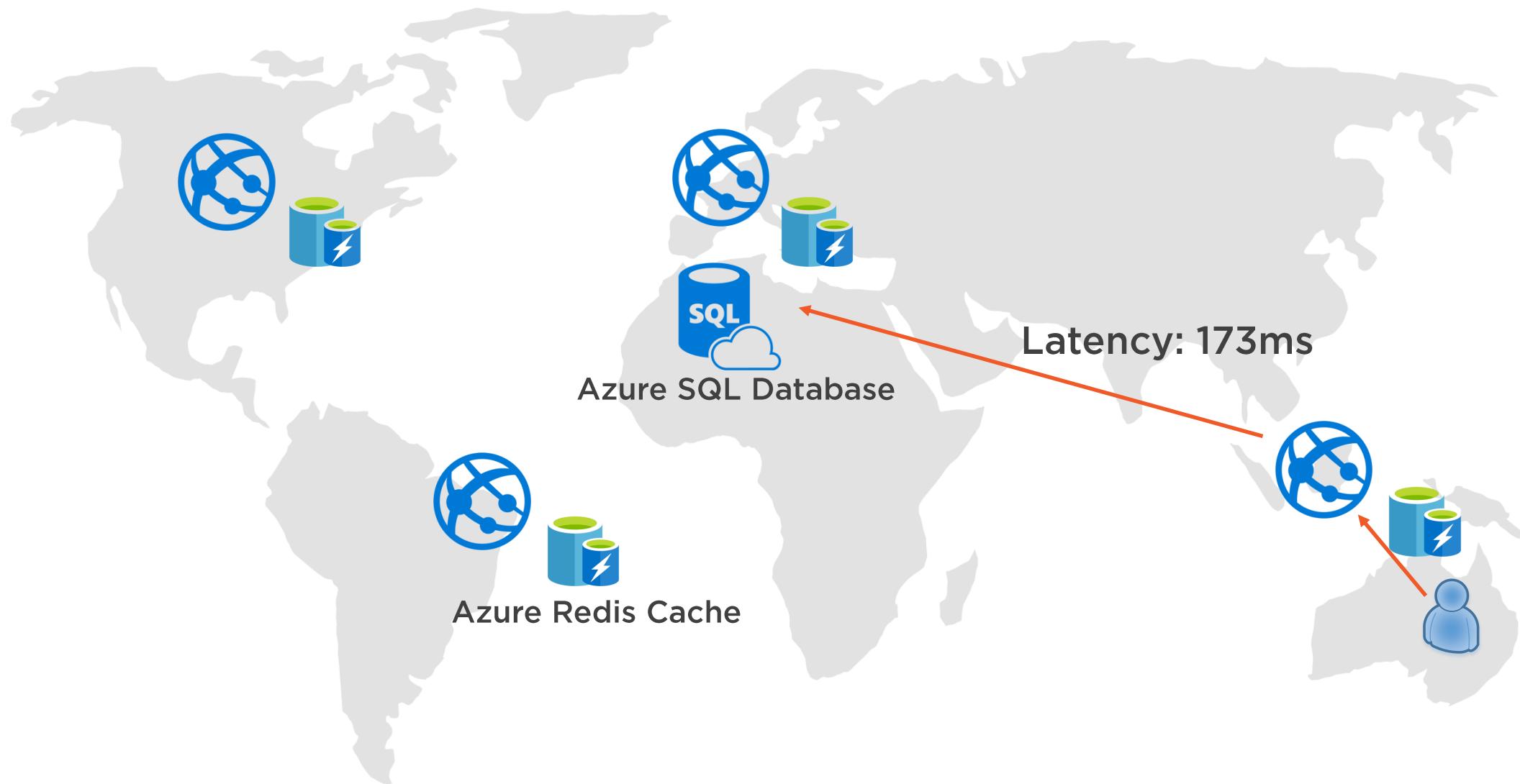


SQL Server Elastic Database Client Tools

- NuGet Package
- Shard Map Management
- Routing based on shard key
- Multi-shard querying



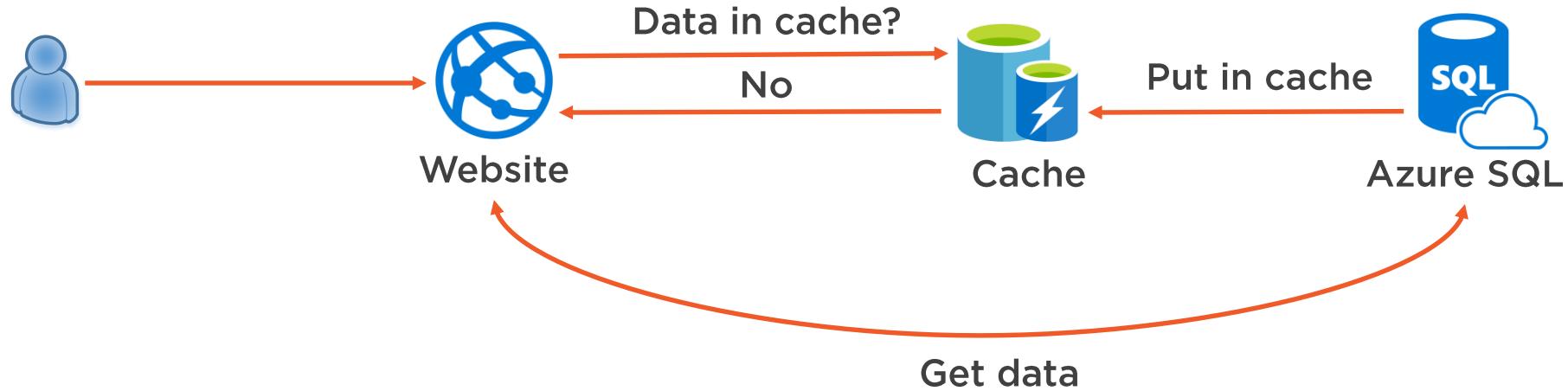
Data in the Application: Option 3



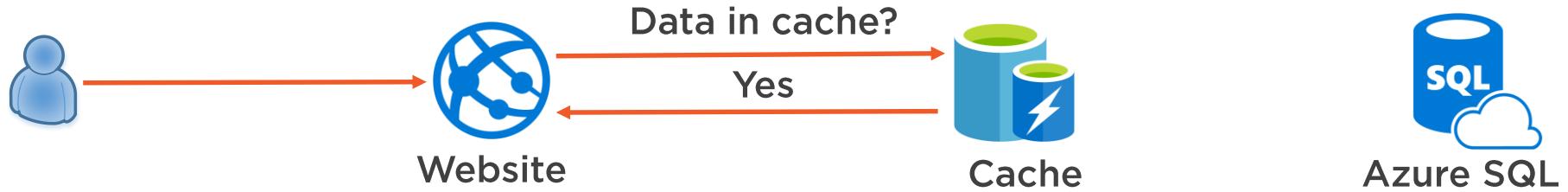
A Word About Caching



A Word About Caching



A Word About Caching



Data in the Application

	Reading	Writing	Control location of data	Additional
1: Geo-Replication				
2: Spread out data (sharding)				
3: Central writable				



Data in the Application

	Reading	Writing	Control location of data	Additional
1: Geo-Replication	Fast	Slow	No	
2: Spread out data (sharding)				
3: Central writable				



Data in the Application

	Reading	Writing	Control location of data	Additional
1: Geo-Replication	Fast	Slow	No	
2: Spread out data (sharding)	Fast	(Mostly) Fast	Yes	Routing mechanism
3: Central writable				



Data in the Application

	Reading	Writing	Control location of data	Additional
1: Geo-Replication	Fast	Slow	No	
2: Spread out data (sharding)	Fast	(Mostly) Fast	Yes	Routing mechanism
3: Central writable	Fast	Slow	Partial	

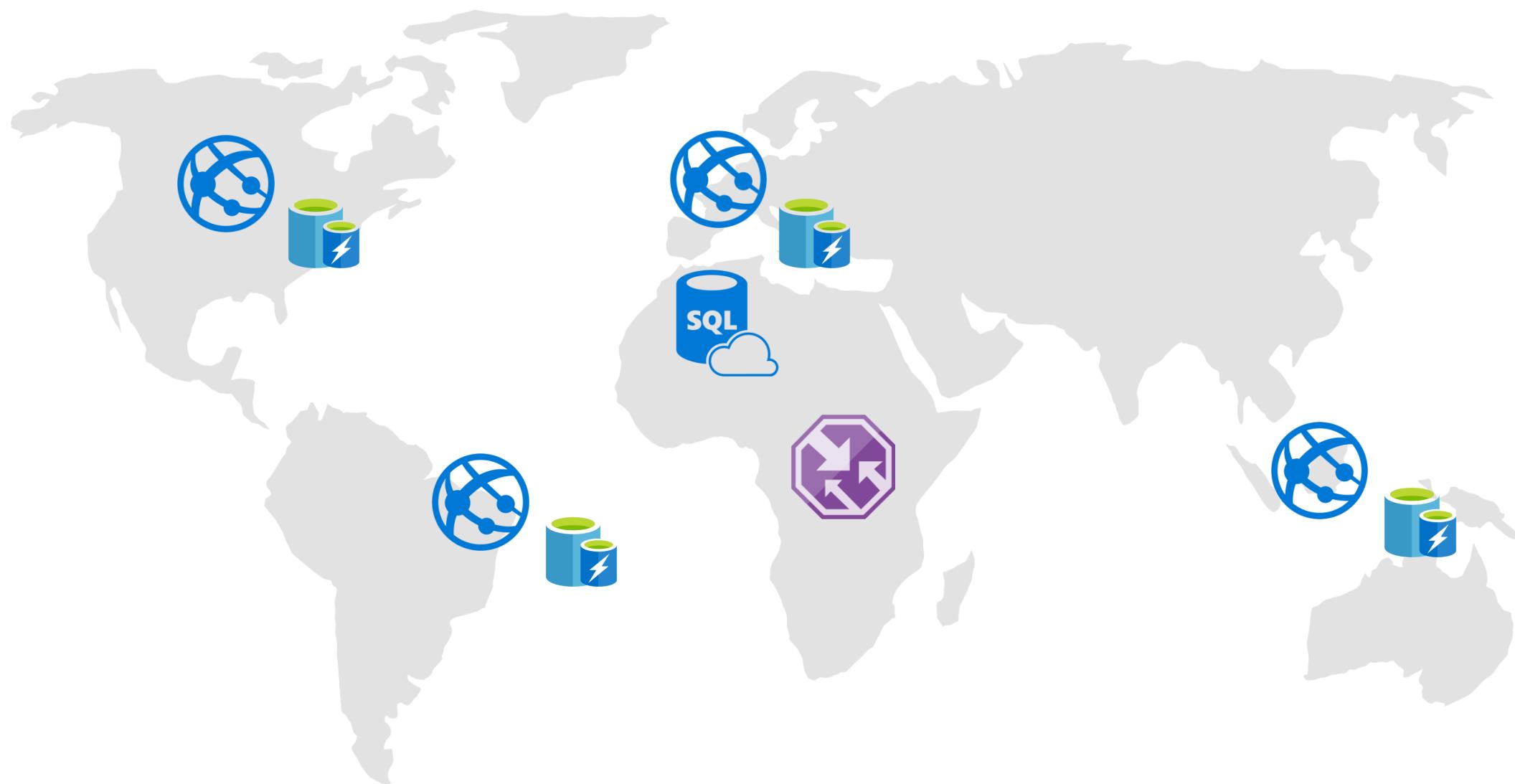


Data in the Application

	Reading	Writing	Control location of data	Additional
1: Geo-Replication	Fast	Slow	No	
2: Spread out data (sharding)	Fast	(Mostly) Fast	Yes	Routing mechanism
3: Central writable	Fast	Slow	Partial	



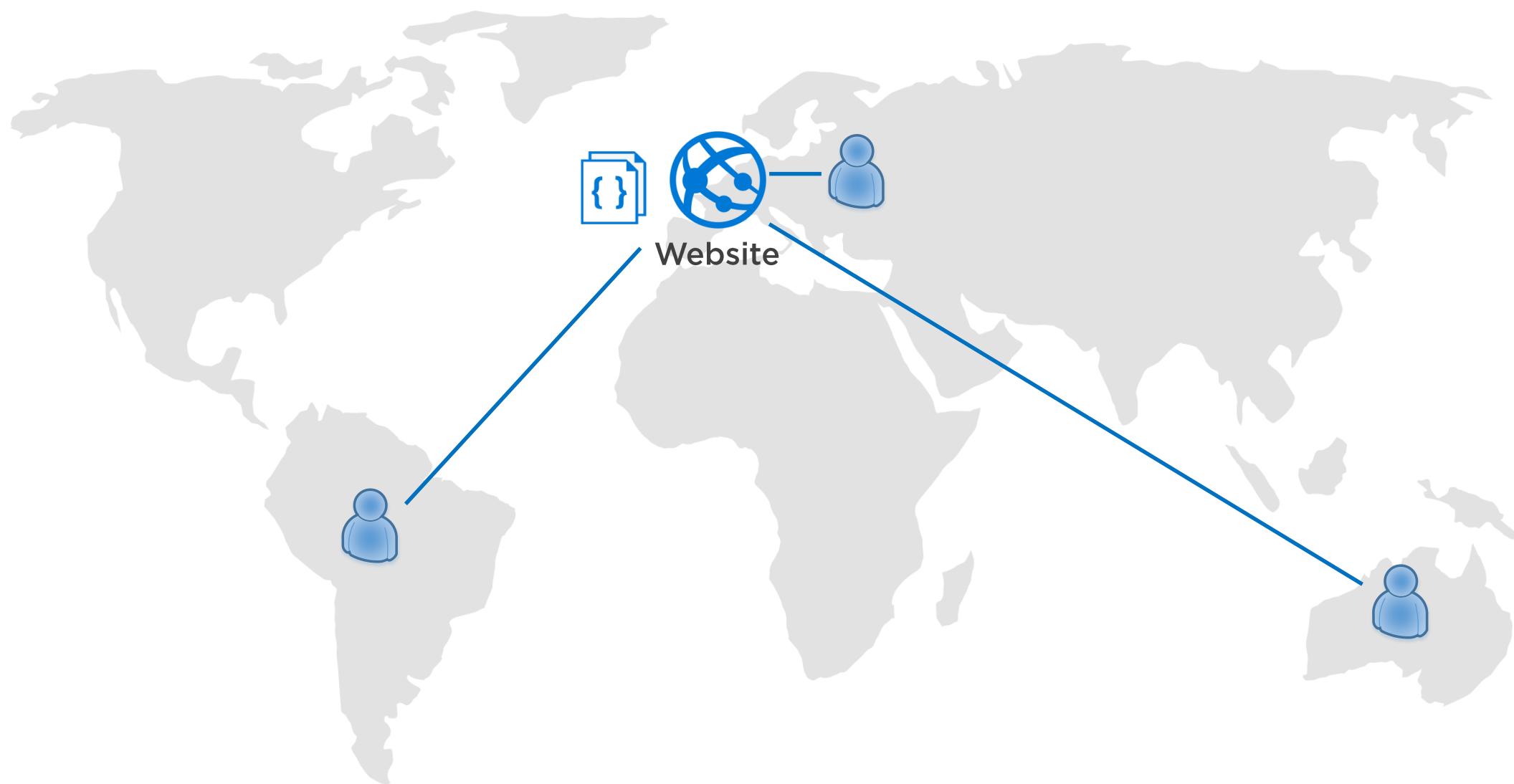
Geographically Distributed Application



Implement CDN to Speed up Our Website



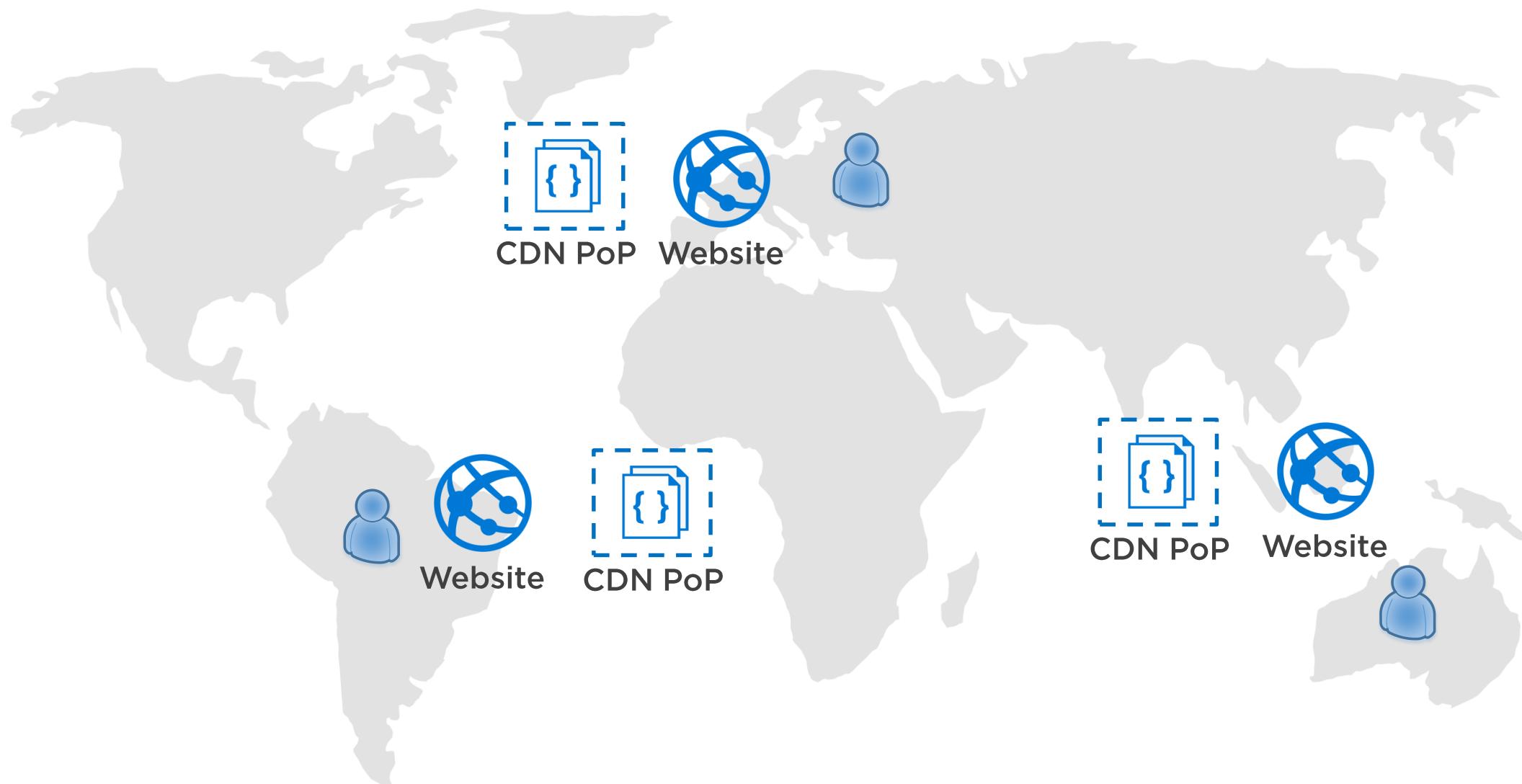
What is CDN?



What is CDN?



What is CDN?



What is CDN?

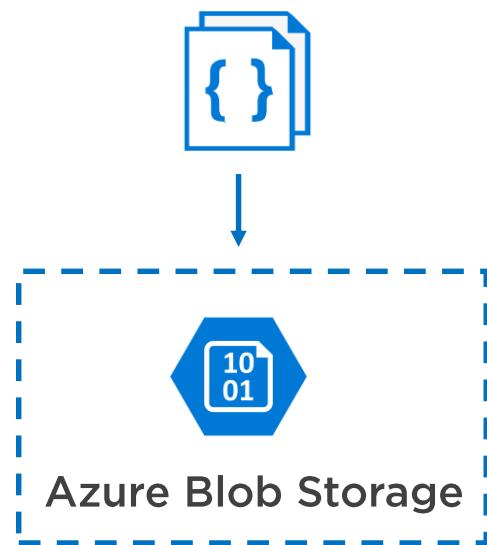


Azure CDN
Profile

Verizon

Akamai

Microsoft



Website

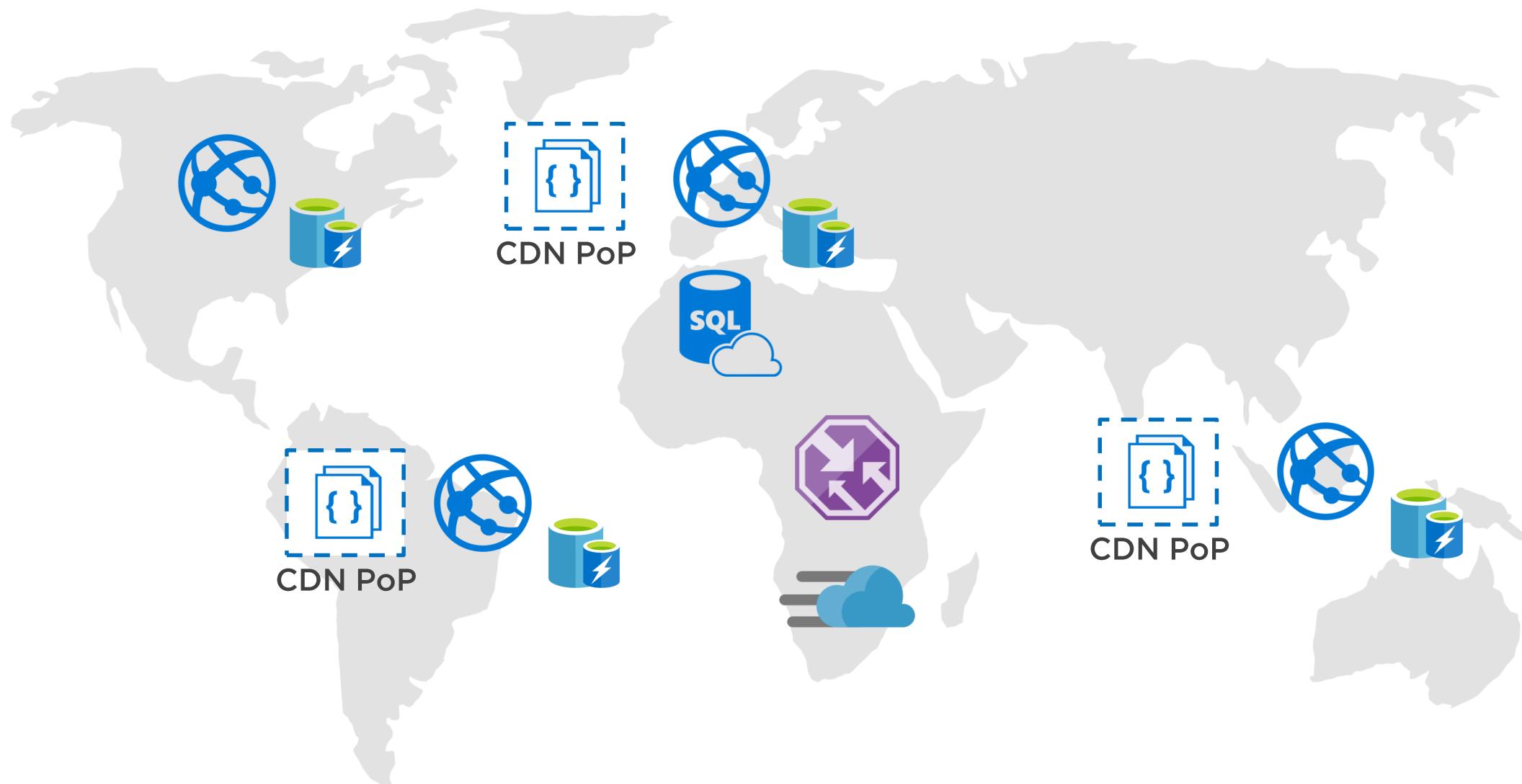
<http://intcookie.azureedge.net/cookie.jpg>



Points of Presence (POP)



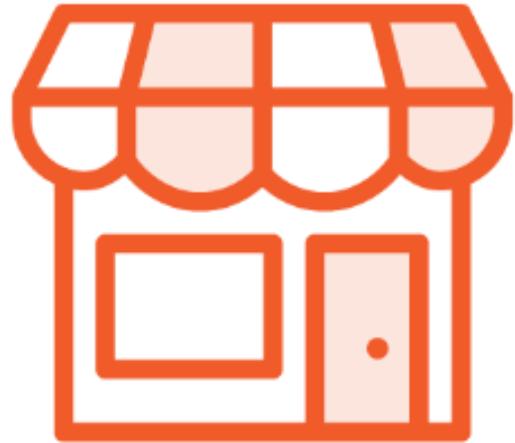
Geographically Distributed Application



Performance & Availability

- **Performance**
 - Website is close to the users
 - Data is close to the users
 - Writing data is slow but acceptable
- **Availability**
 - CDN and Cache aren't critical
 - Web App is resilient (99.95%)
 - Azure SQL is resilient (99.99%)
 - Traffic Manager load-balances
 - Endpoint health





Cookie Store

(Globally) Performant
(Globally) Available
Secure



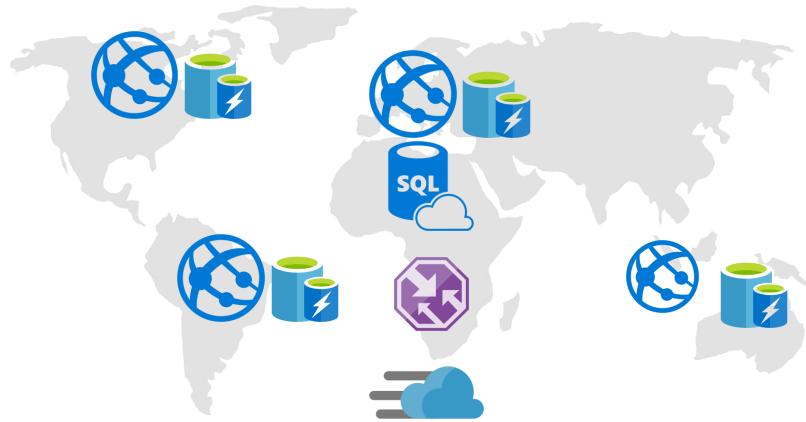
How Do You Deal With Deployment?



Our Environment



DTAP Environments



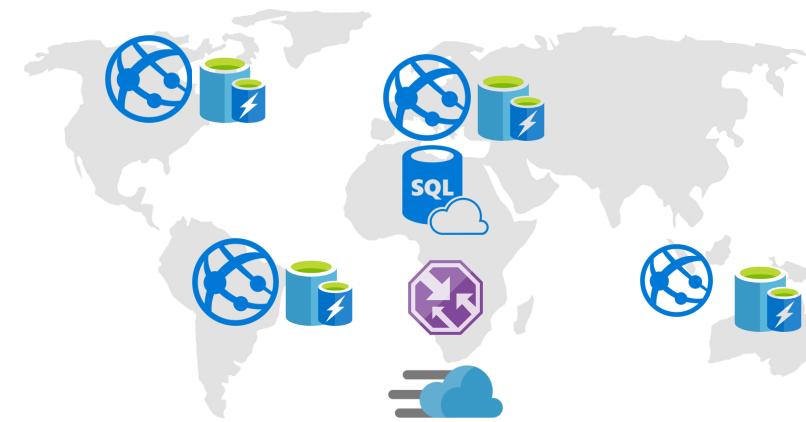
Development



Acceptance



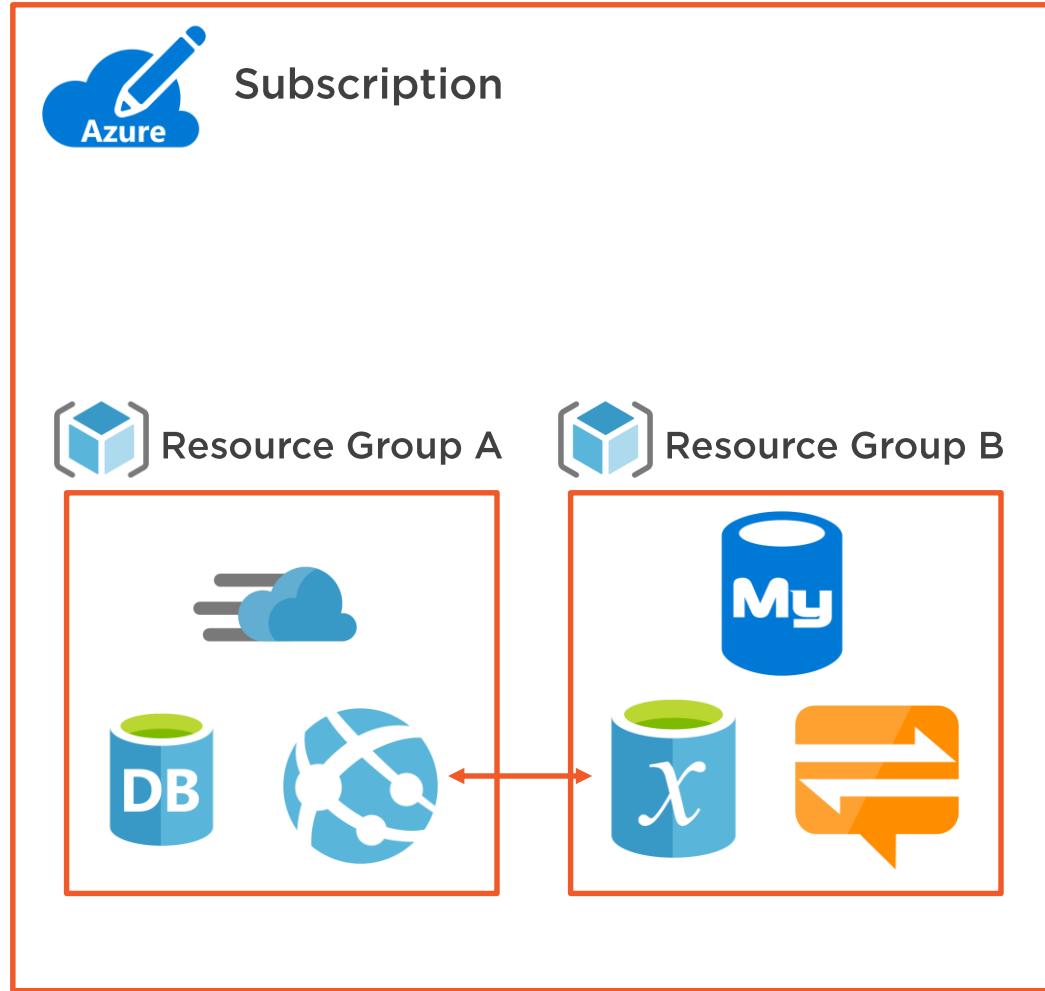
Test



Production



Manage Resources

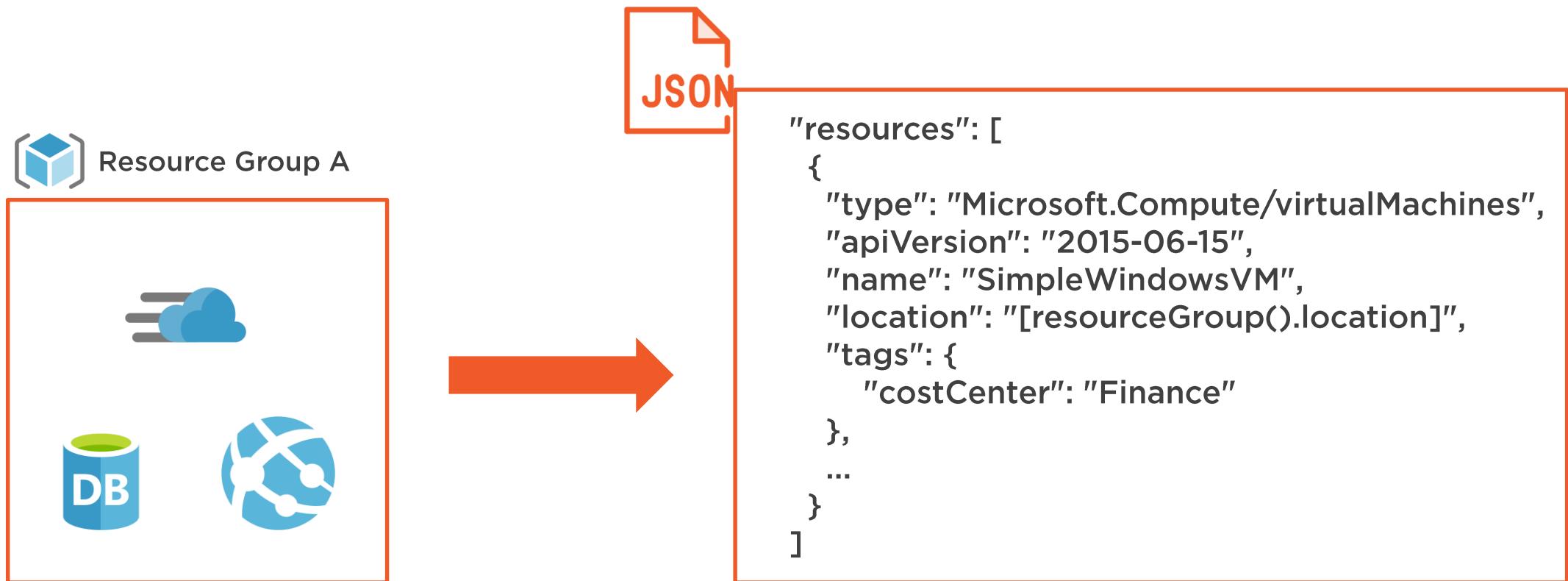


Azure Resource Group

- **Not bound by region**
- **Logical Group**
 - Security
 - Billing



Azure Resource Manager Templates



What to Deploy?



ASP.NET Core



Database schema



ARM templates



GitHub





Visual Studio Team Services

TFS in the cloud

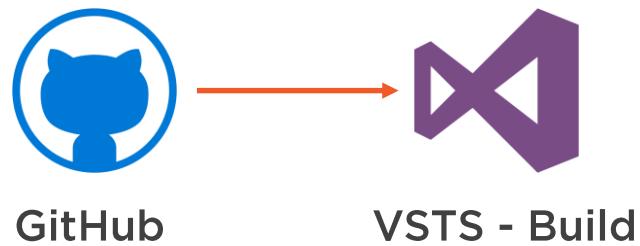
ALM-as-a-Service

Application Lifecycle Management

- Source control
- Work
- Build
- Release



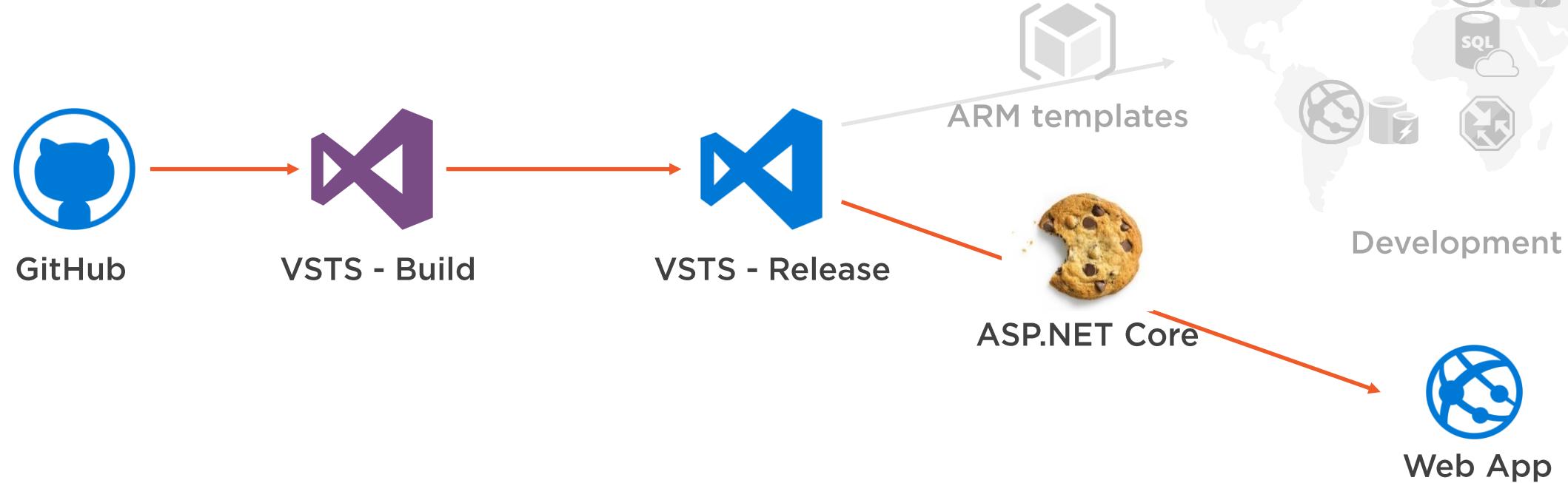
How to Deploy?



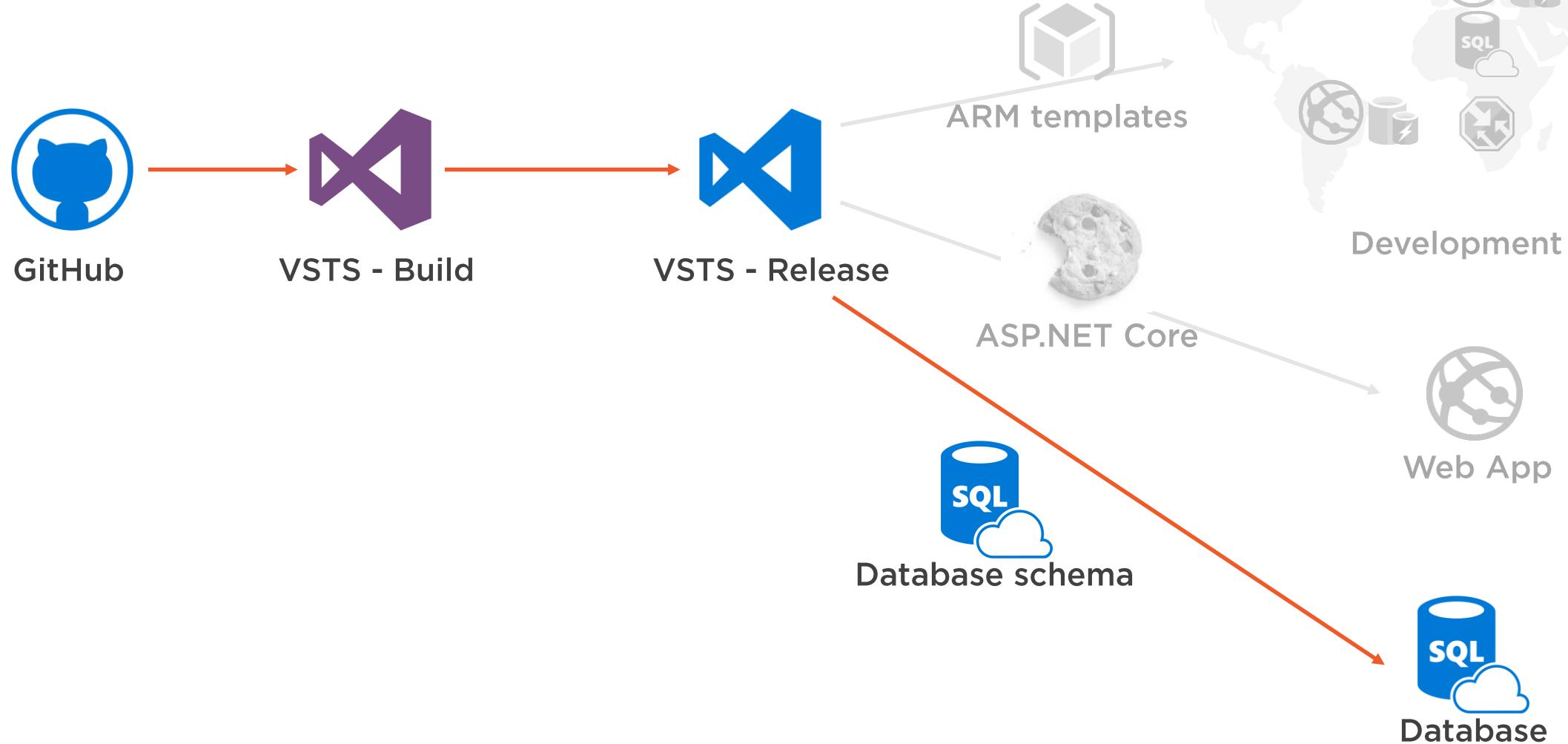
How to Deploy?



How to Deploy?



How to Deploy?



Demo



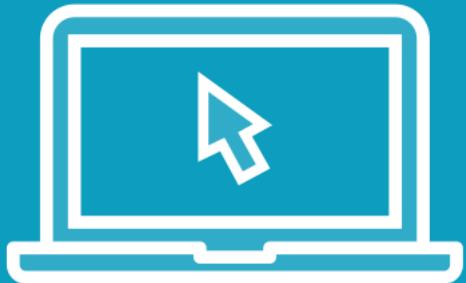
<https://github.com/bmaluijb/AzurePaaSDemo>



Visual Studio 2017



Demo



Geographically Distributed Application

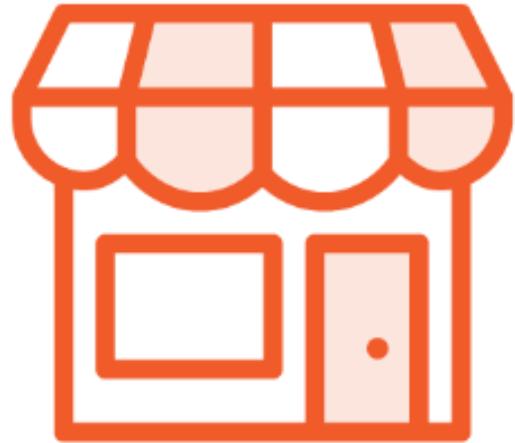
- Web Apps
- Traffic Manager
- Azure SQL and Azure Redis Cache

Resource Groups

Azure Resource Manager (ARM) Templates

Visual Studio Team Services





Cookie Store

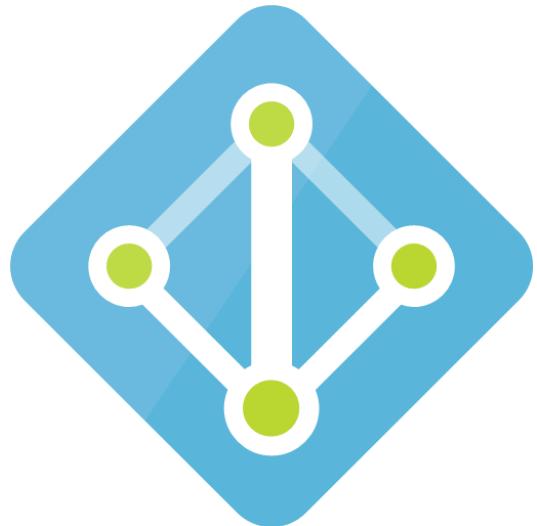
(Globally) Performant
(Globally) Available
Secure



Authentication with AAD



About Azure Active Directory



Azure Active Directory

Identity-as-a-Service

Serves as an Identity provider

Integrates with on-premises IDP

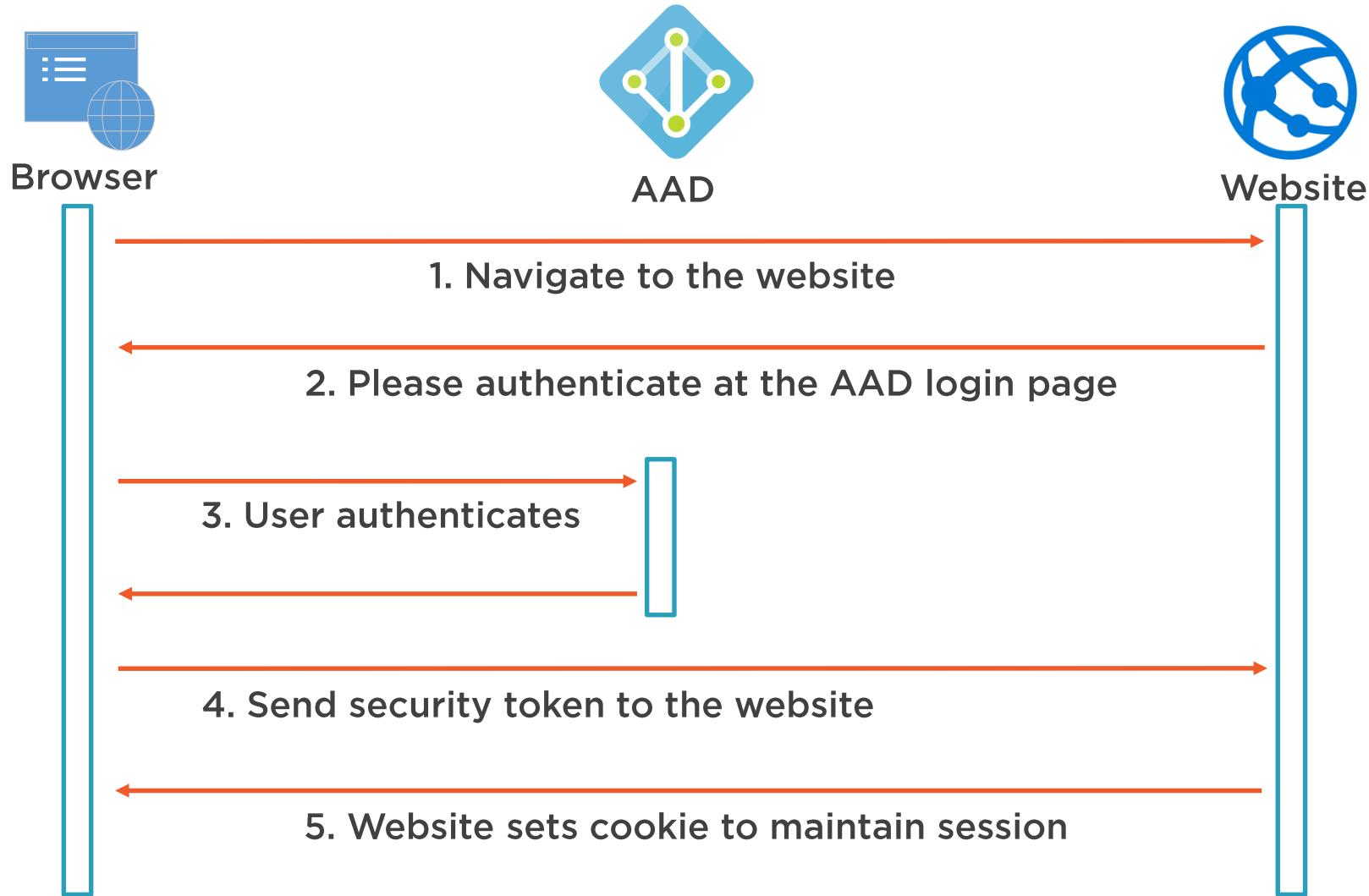
Protect cloud and on-premises applications

Multi-factor authentication

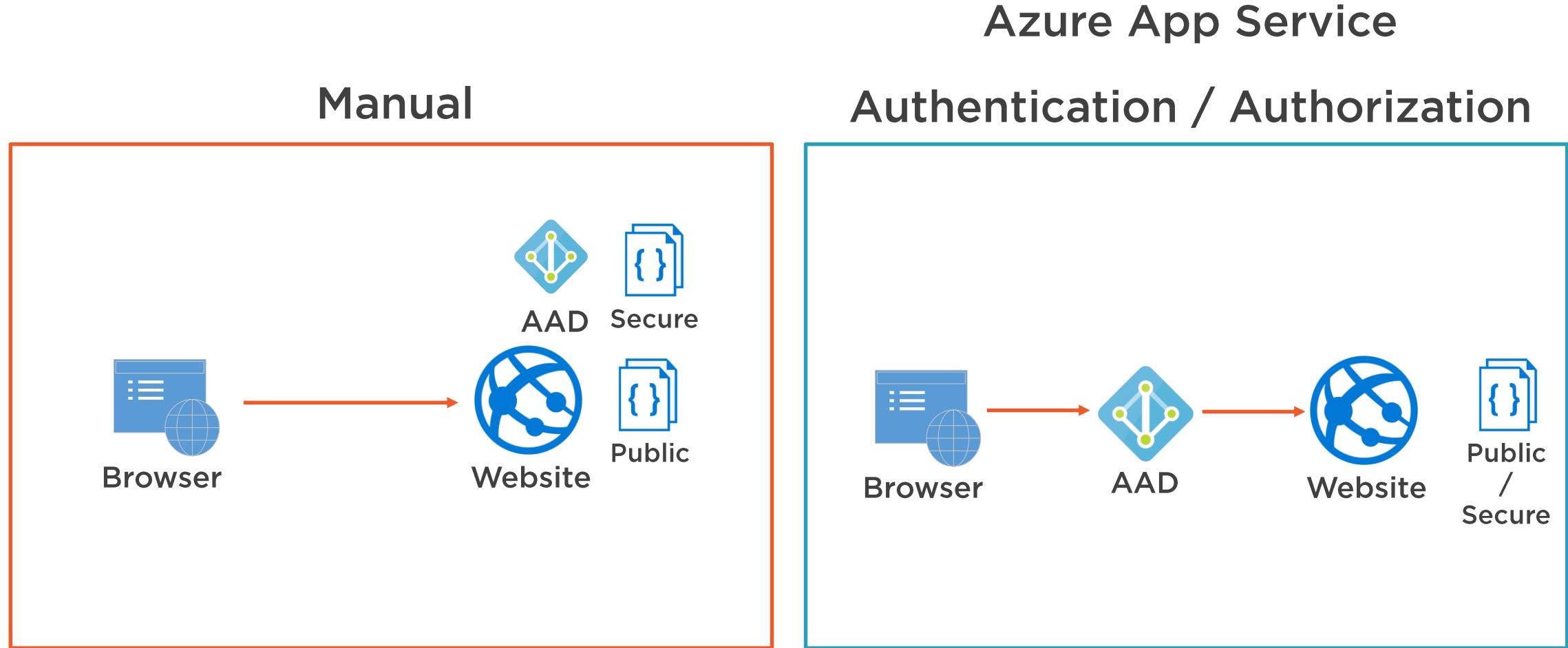
Advanced threat detection



Azure Active Directory



AAD Options for App Services



AAD Options for App Services

Azure App Service

Manual

Authentication / Authorization

Control over security

Advanced setup

Application needs change

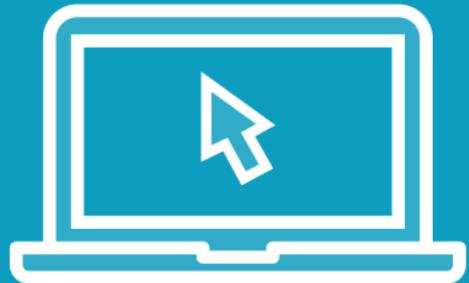
Whole app is secure

Easy setup

Application is unchanged

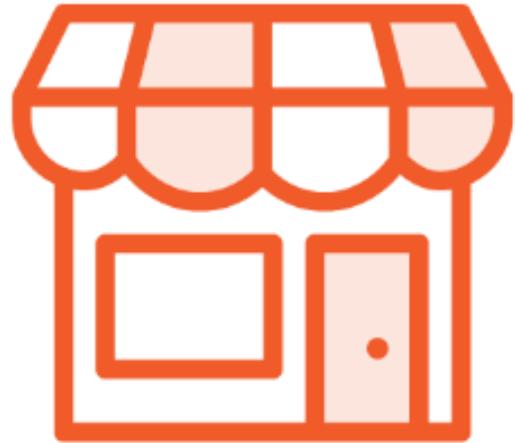


Demo



App Service Authentication
All-app authentication





Cookie Store

(Globally) Performant
(Globally) Available
Secure



Internationalcookies.eu



Azure Resource Manager



ASP.NET Core



VSTS



Azure Web App



Azure Traffic Manager



Azure Redis Cache



Azure SQL



Azure Active Directory



Azure CDN



Internationalcookies.eu



Azure Resource Manager



ASP.NET Core



VSTS



Azure Web App



Azure Traffic Manager



Azure Redis Cache



Azure SQL



Azure Active Directory



Azure CDN







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