Azure App Service

Choosing Azure compute platforms

Application Architecture	VMs - Azure Virtual Machines	ACI - Azure Container Instances	Azure App Service (w-w/o containers)	AKS - Azure Kubernetes Services	Azure Functions	Azure Batch
Web apps (Monolithic)	✓	✓	✓	✓		
N-Tier apps (Services)	✓	✓	✓	✓	✓	
Cloud-Native (Microservices)		✓		✓ (Linux containers)	✓ (Event-driven)	
Batch/Jobs (Background tasks)	✓	✓	✓	✓	✓ (Background tasks)	✓ (Large-scale)

Legend

✓ Recommended

✓ Possible

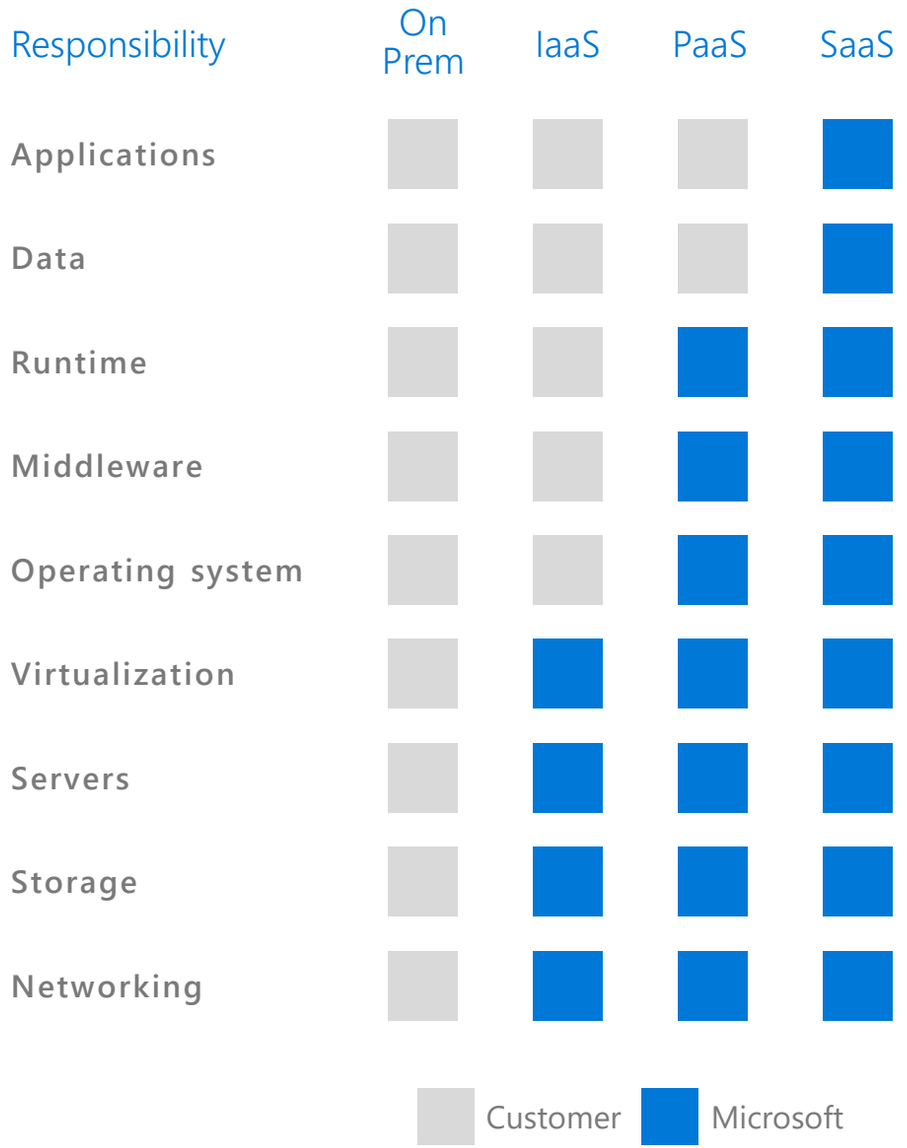
Balance of responsibility

Balance of control and responsibility depends on the category of the service

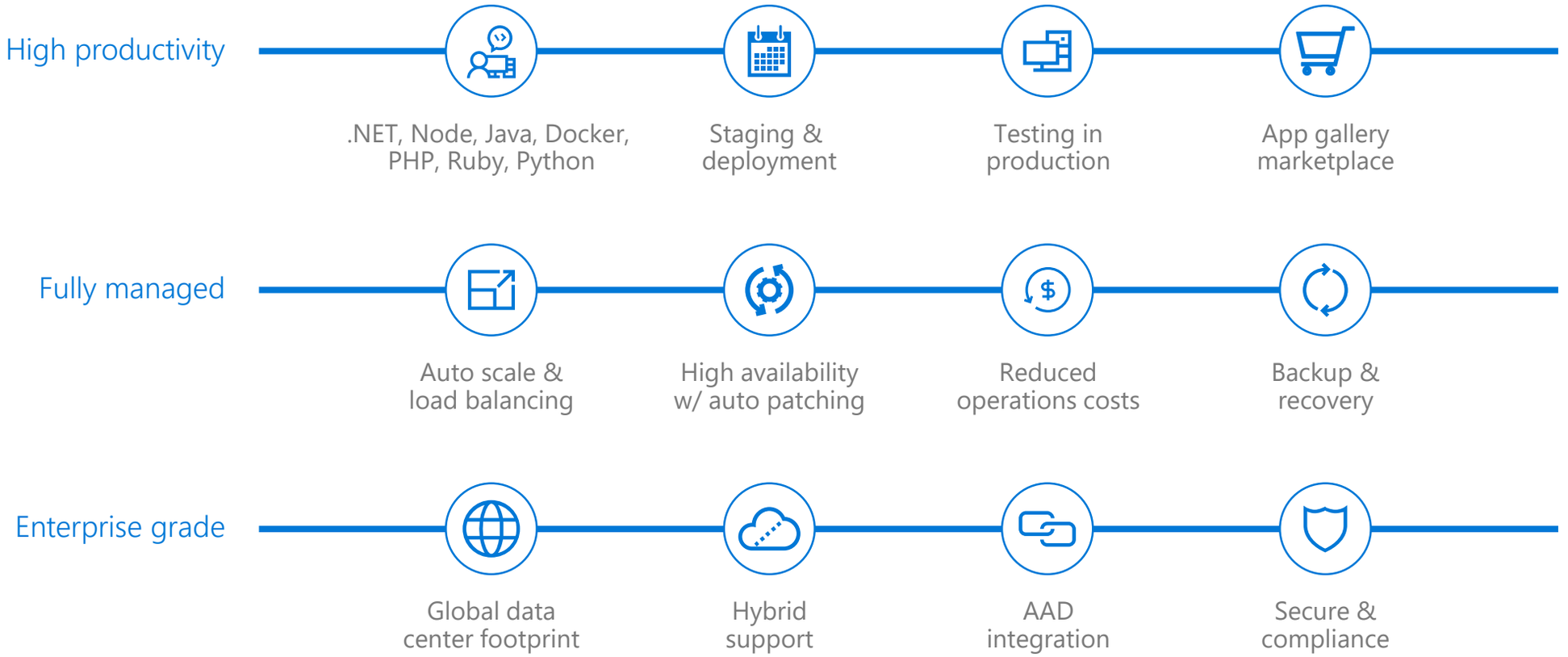
SaaS: Move-in ready
Use immediately with minimal configuration

PaaS: Some assembly required
Existing services are a starting point, with additional configuration for a custom fit

IaaS: Build from the ground up
Building blocks, create your own solution or apps from scratch



Azure App Service



550K active customers **1.7M** apps & sites hosted **>20B** requests per day

App Service features & capabilities

High productivity

- Remote debugging with Visual Studio
- Site staging slots
- Testing in production
- Continuous integration/deployment
- Git, Visual Studio, Docker Hub, and GitHub
- App and site diagnostics
- OS and framework patching
- Site extensions gallery
- NET, PHP, Python, Node, Ruby, Java
- Framework installer
- Browser-based editing
- Auto-healing
- Logging and auditing
- Admin-site
- Support site extension
- Remote debugging

Fully managed

- Automated deployment
- AutoScale
- Built-in load balancing
- WW datacenter coverage
- End point monitoring and alerts
- App gallery
- DR site support
- WildCard support
- Dedicated IP address
- HTTP compression
- CDN support for websites
- Premium WordPress
- App Services Environments

Enterprise grade

- Hybrid connections/VPN support
- Scheduled backup
- Azure Active Directory Integration
- Site resiliency, HA, and DR
- Web jobs
- Role base access control
- Audit/compliance
- Enterprise migration
- Client certs
- Cache
- IP restrictions/SSL
- Web sockets
- SQL, MySQL, DocDB, and Mongo
- Sticky sessions
- Authorization/authentication
- MSI

Fully managed

App Service takes care of the plumping so you can focus on business logic

Auto-scale & load balancing

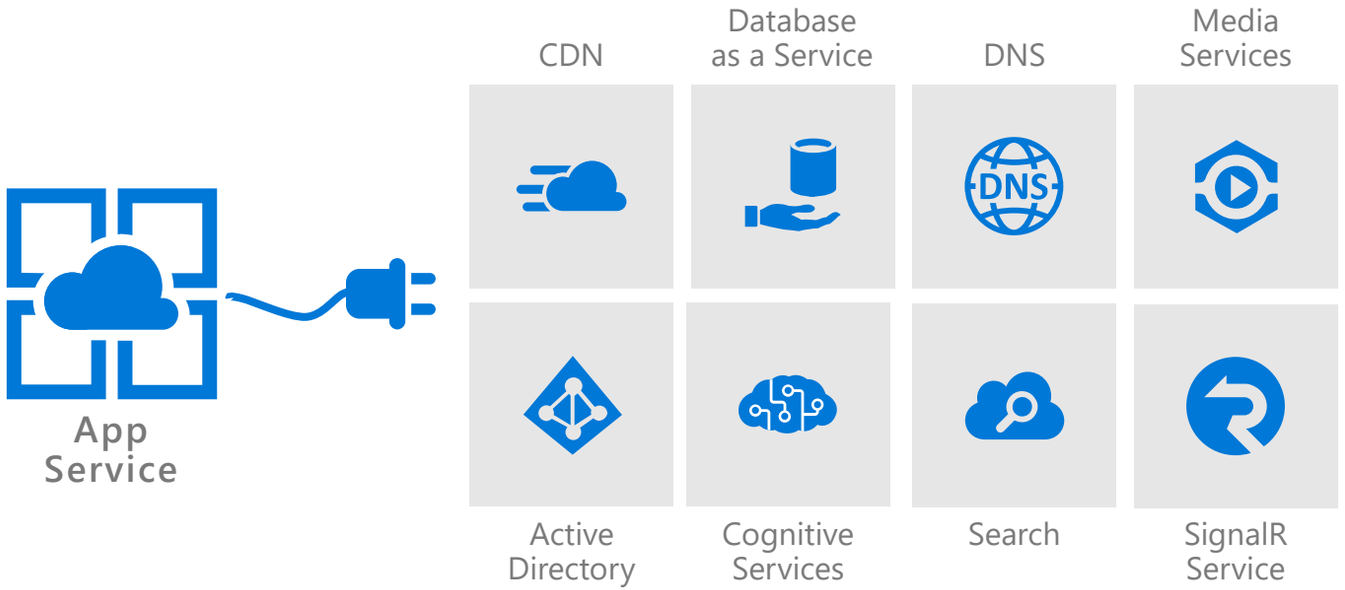
High availability with auto patching

Reduced operations costs

Backup & recovery

Fully managed

Easily connect to other managed services to meet specific web app needs



Enterprise grade

Get the control you want with a variety of hosting options

Azure App Service (multi-tenant)

Get your Web, API, or Mobile App created in seconds in the cloud. We provide the plumbing, you provide the application code or container(s).

App Service Environment

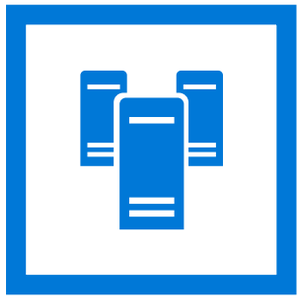
Run your apps in virtual network at high scale. Create an isolated environment specifically for your organization and access/manage all of the resources behind your public endpoint.

Azure Stack

Leverage cloud innovations in on-premises infrastructure. App Service on Azure Stack brings the power of Azure App Service to your own data centers.

Enterprise grade

Get the control you want with a variety of hosting options



50 data centers worldwide

Industry-verified compliance

Managed Service Identity support

Azure Virtual Network integration

Digital marketing websites

Enable global campaigns, digital events, and rich customer communications

Developers

Deliver fast, fluid app experiences

- High availability
- Backup & restore

Push out feature updates quickly

- SCC integration and CI/CD
- Staged deploy with slots

Integrate with the CMS you love

- WordPress
- Joomla
- Drupal

Go social, simplify sign-in/up process

- Easy authentication

Technical Leaders

Reach global users at scale smoothly

- Global scale
- Auto scale on demand
- Clone

Transform products through data driven approach

- A/B testing
- Monitoring and diagnostic

Engage users with rich media

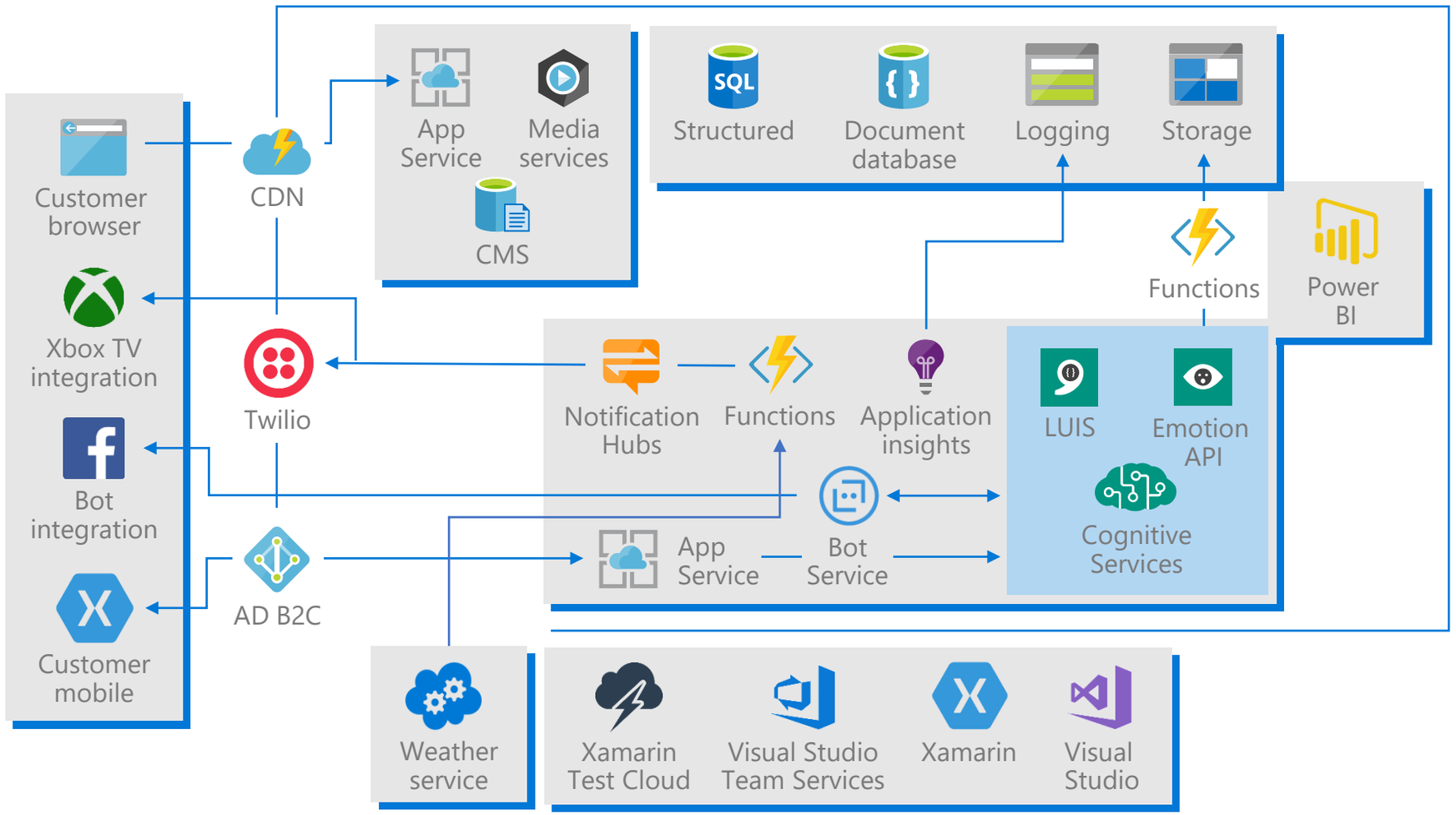
- CDN
- Media services

Deliver x-platform experiences w/ minimal development redundancy

- Offline sync
- Push notifications

Branded website

with personalized experience and mobile notifications



Transactional apps

Deliver personalized, scalable, and secure transactional experience

Developers

Deliver fast, fluid app experiences


High availability


Backup & restore

Push out feature updates quickly


SCC integration and CI/CD


Staged deploy with slots

Connect to enterprise systems or on-premises resources


VNET integration


Express routes


Logic Apps

Simplify B2C and B2B sign-on process


Easy authentication

Technical Leaders

Handle peak load and traffic seasonality


Redis cache


Auto scale on demand

Transform products through data driven approach

A/B testing


Monitoring and diagnostic

Secure critical customer and company information


WAF


App Service Environment


VPN support

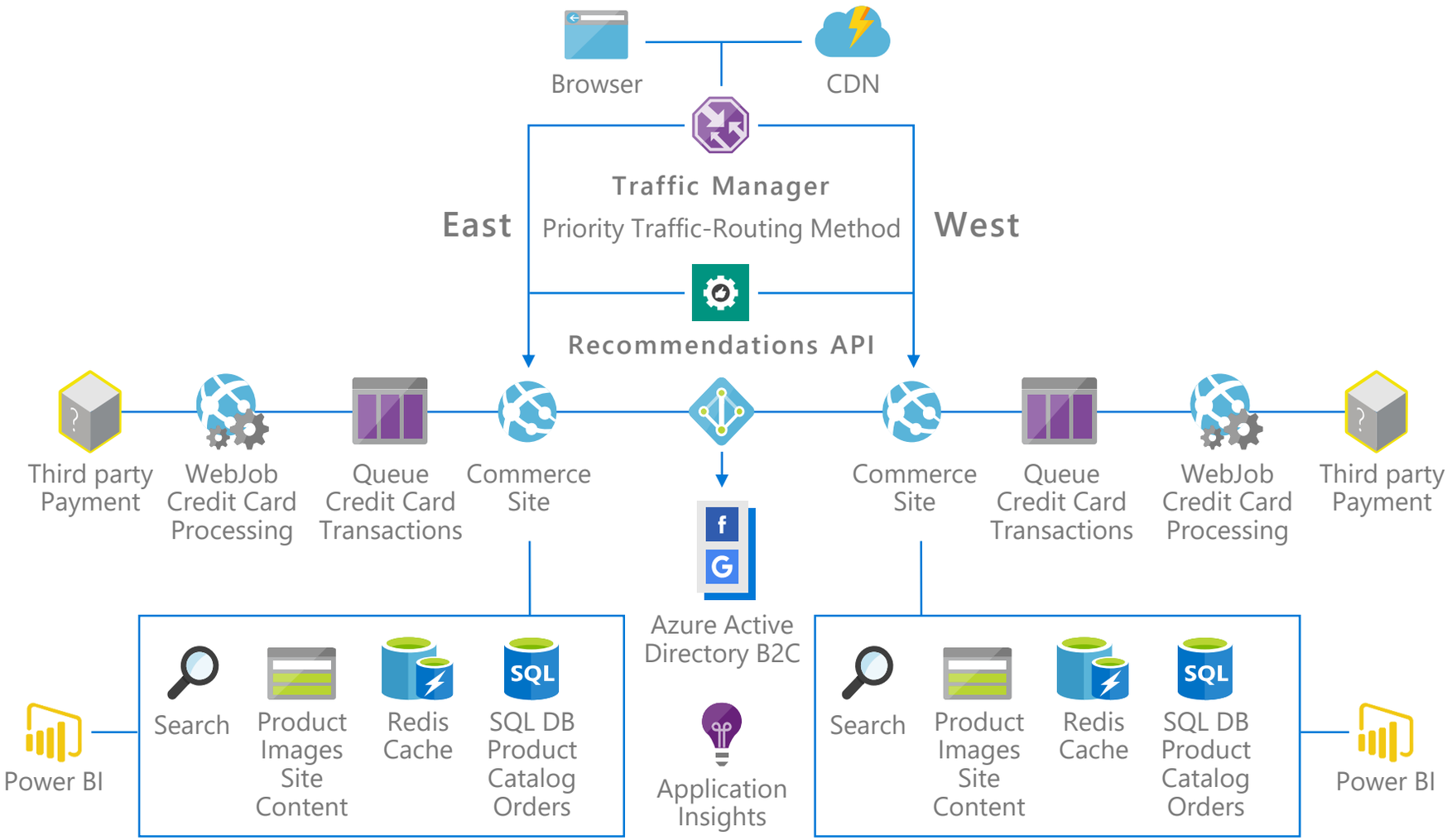
Deliver x-platform experiences w/ minimal development redundancy


Offline sync


Push notifications

Fault-tolerant e-commerce

with personalized recommendations



Modern LOB apps

Enhance existing enterprise apps with modern experience and capabilities

Developers

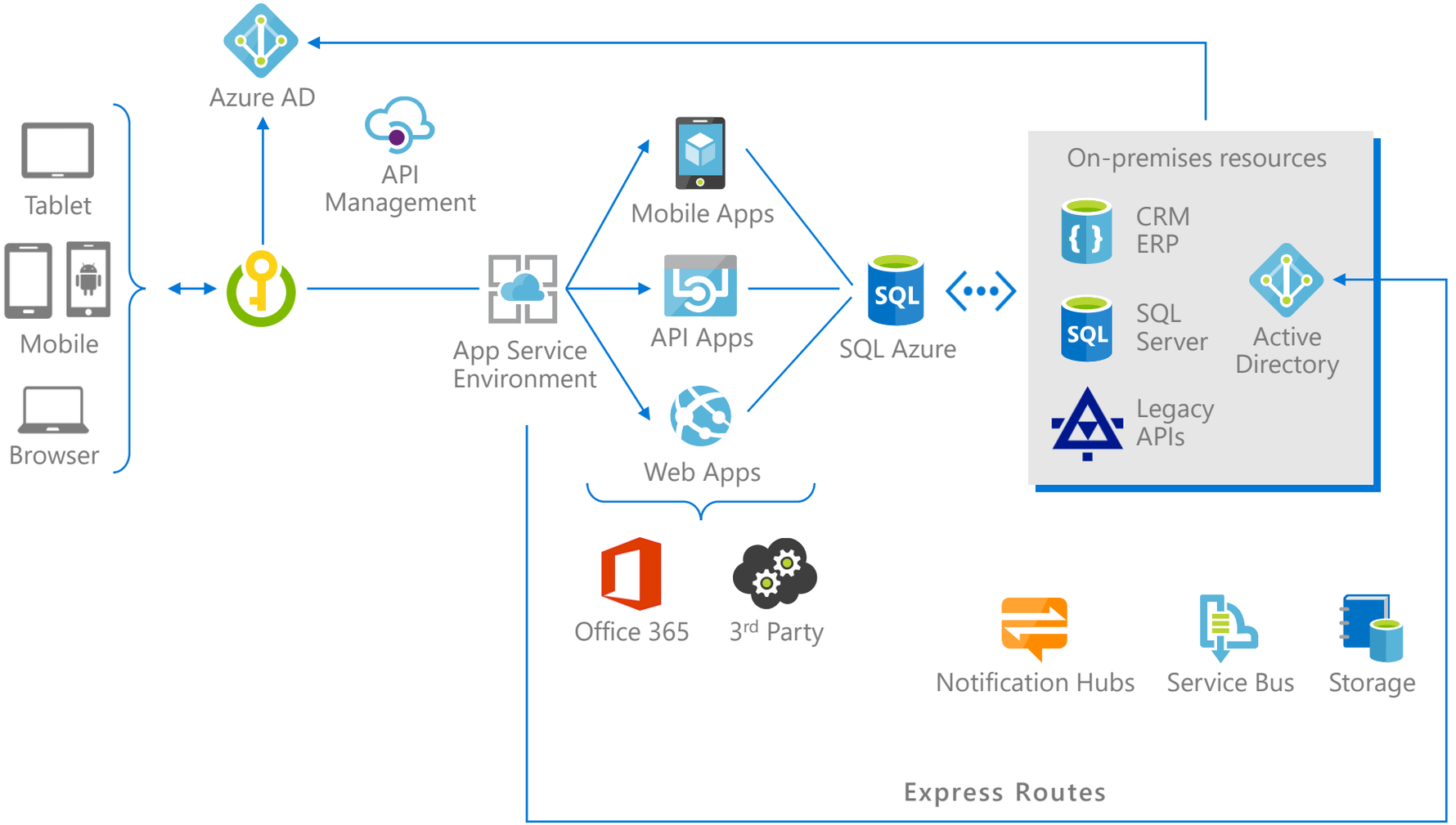
Deliver reliable app experiences	High availability	Backup & restore
Leverage existing, on-premises data	Express routes	VNET integration
Connect to business processes	API Management	Logic App
Simplify corporate identity integration	SSO	Corporate AAD

Technical Leaders

Supports global footprint for market expansion	Global scale	Clone
Reduce costs of supporting old application hardware	Auto patching	Monitoring and diagnostic
Secure critical company data and information	VPN support	WAF App Service Environment
Enable mobile workforce while minimizing development redundancy	Offline sync	Push notifications

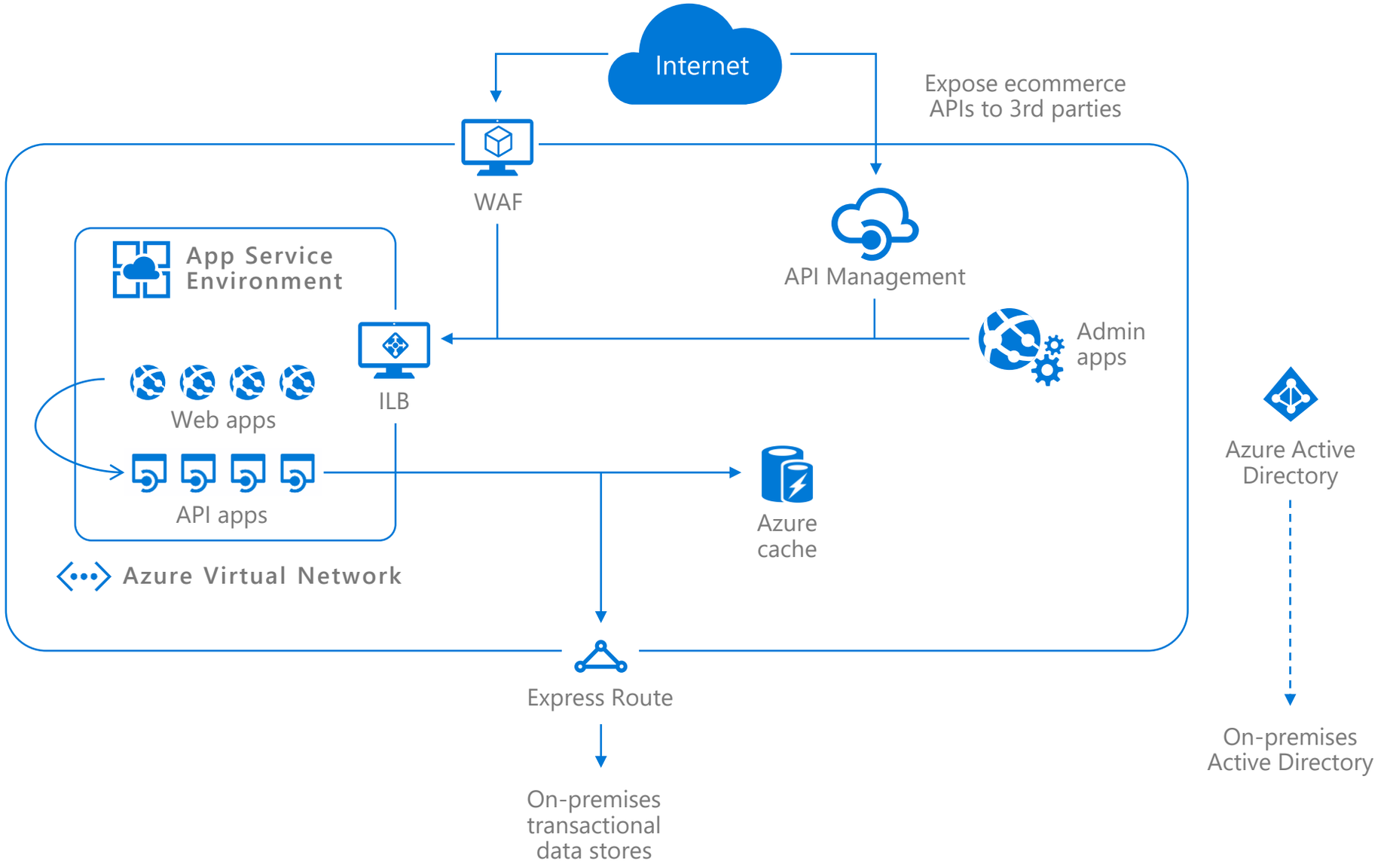
Line of business app

with VPN and access to on-premises resources



E-commerce app

with scalable and secure architecture



Multi-tier app

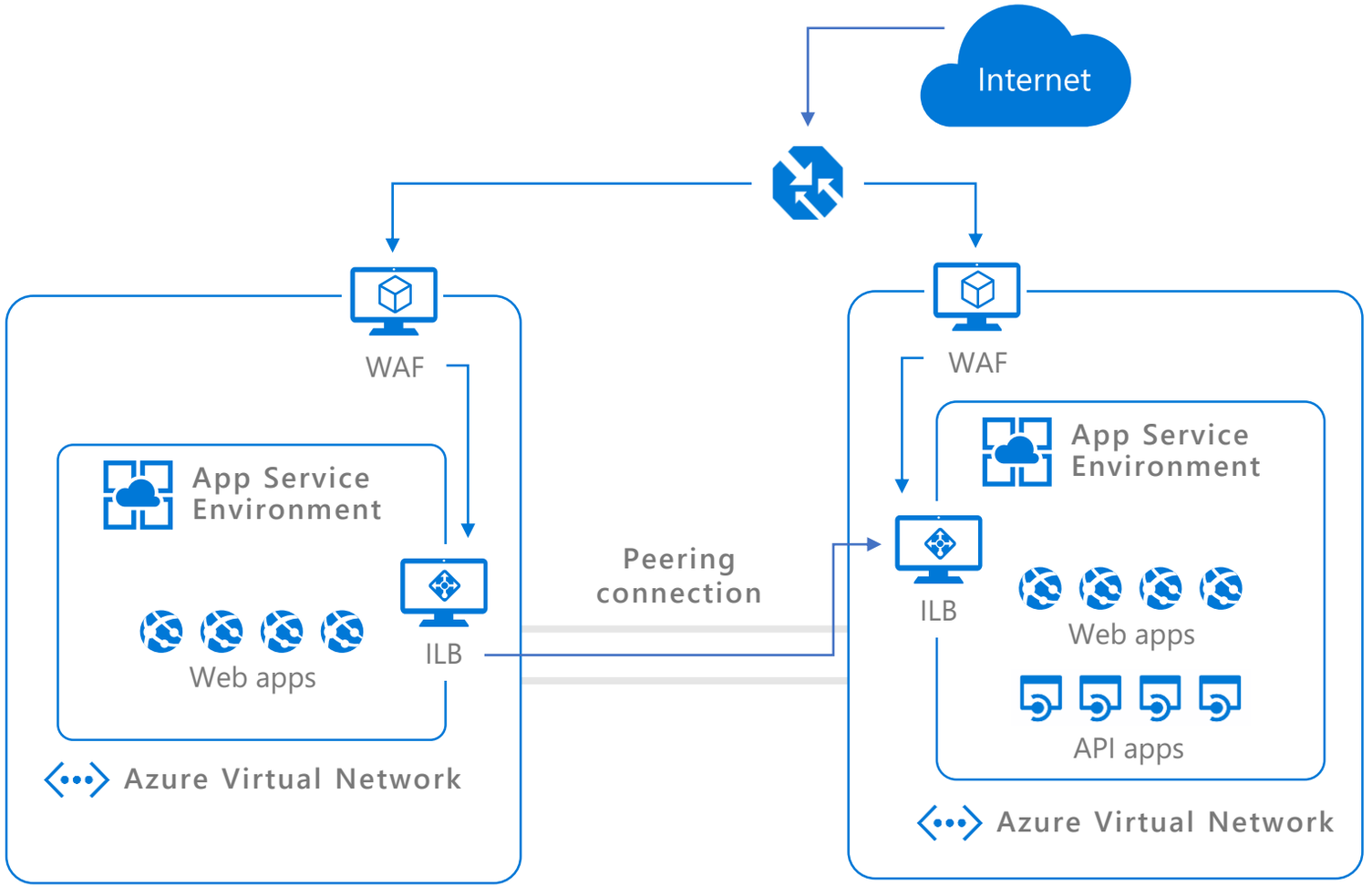
based on ILB ASE with geo distribution

Use NSGs to lock down access to user facing app

Use ILB ASE to enhance network access security

Add Web Application Firewall virtual device for extreme app security

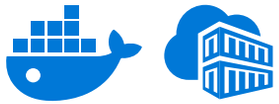
Use Traffic Manager to distribute load geographically



Web app for containers

Easily deploy and run container-based web apps at scale

Accelerated outer loop



Tight integration w/ Docker Hub, Azure Container Registry

Built-in CI/CD w/ Deployment Slots

Intelligent diagnostics & troubleshooting, remote debugging

Fully managed platform

Automatic scaling and load balancing

High availability w/ auto-patching

Backup & recovery

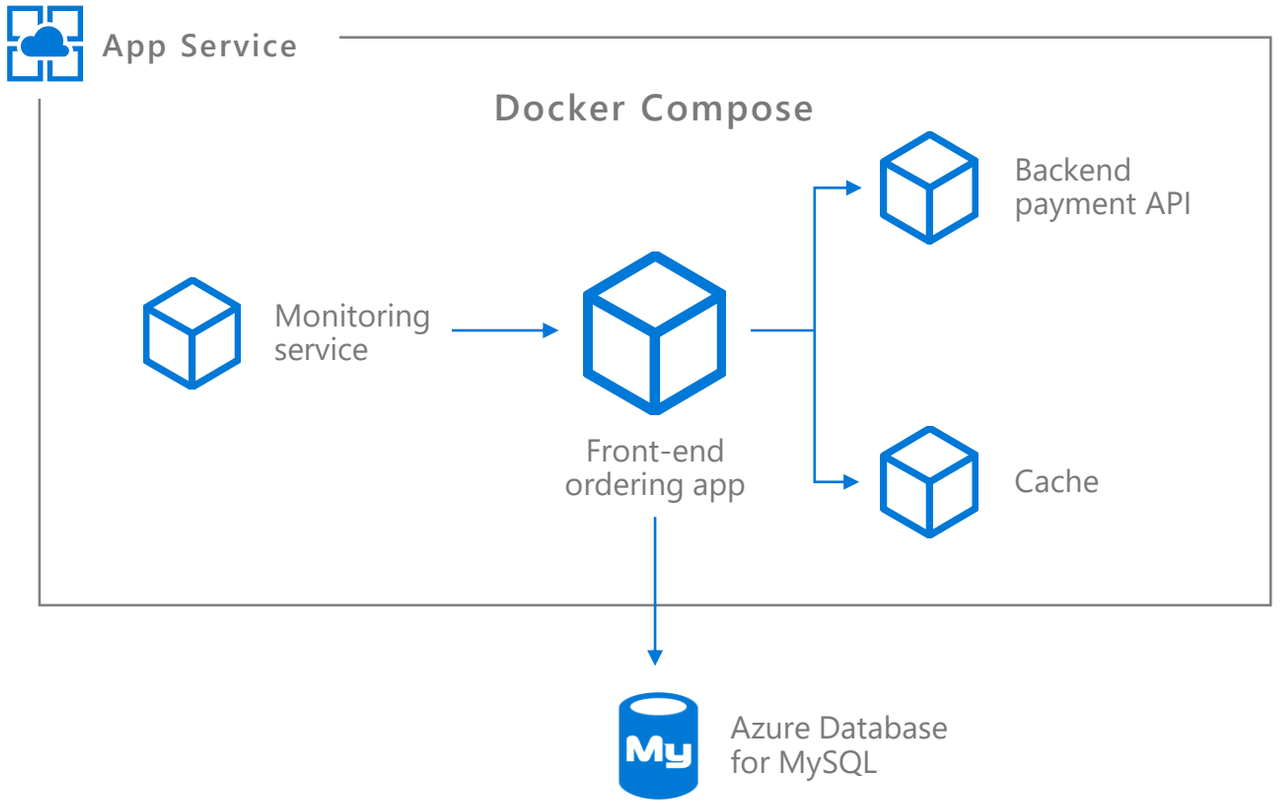
Flexibility & choices

From CLI, portal, or ARM template

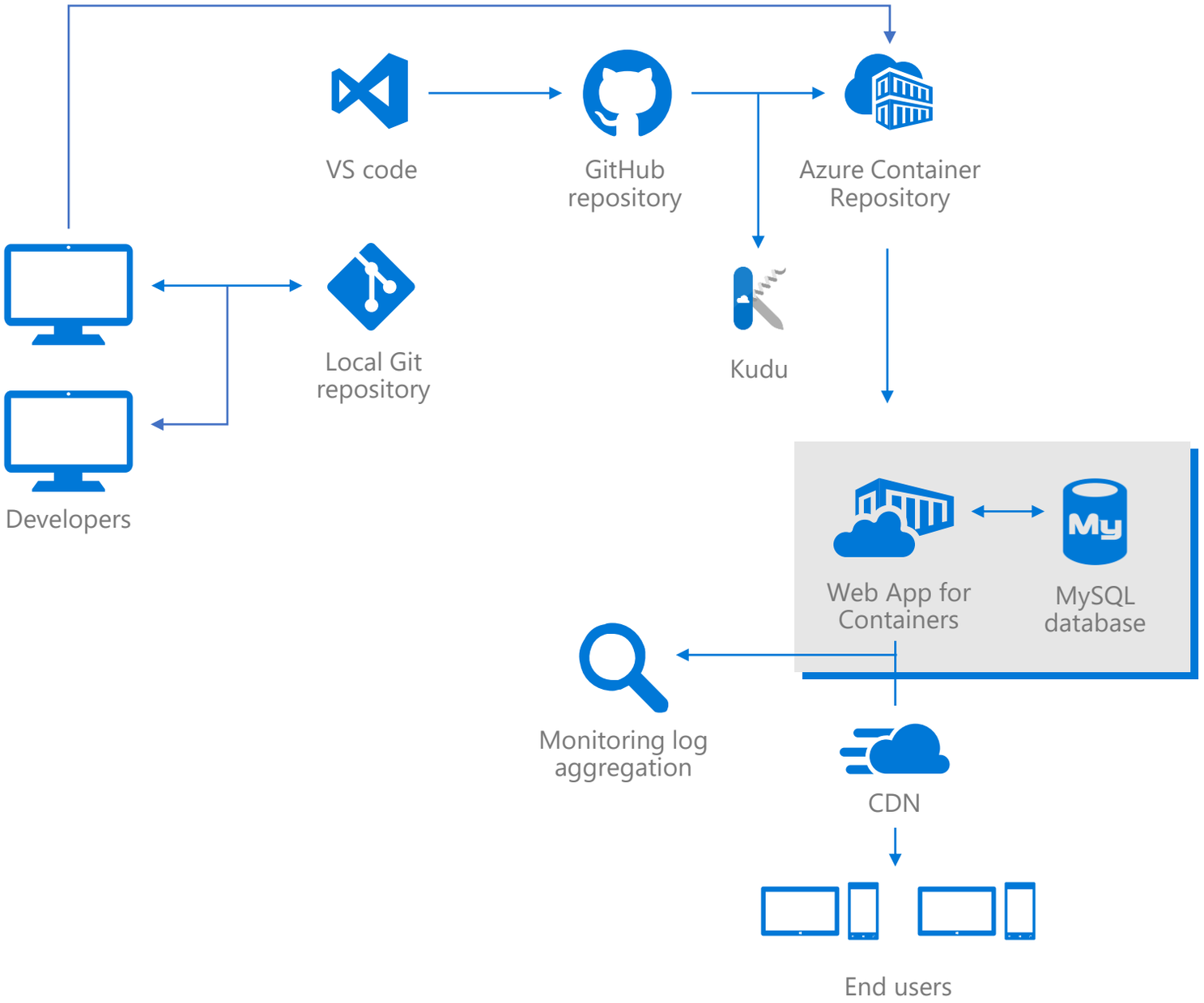
Single Docker image, multi container w/ Docker compose, or Kubenetes Pod Definition

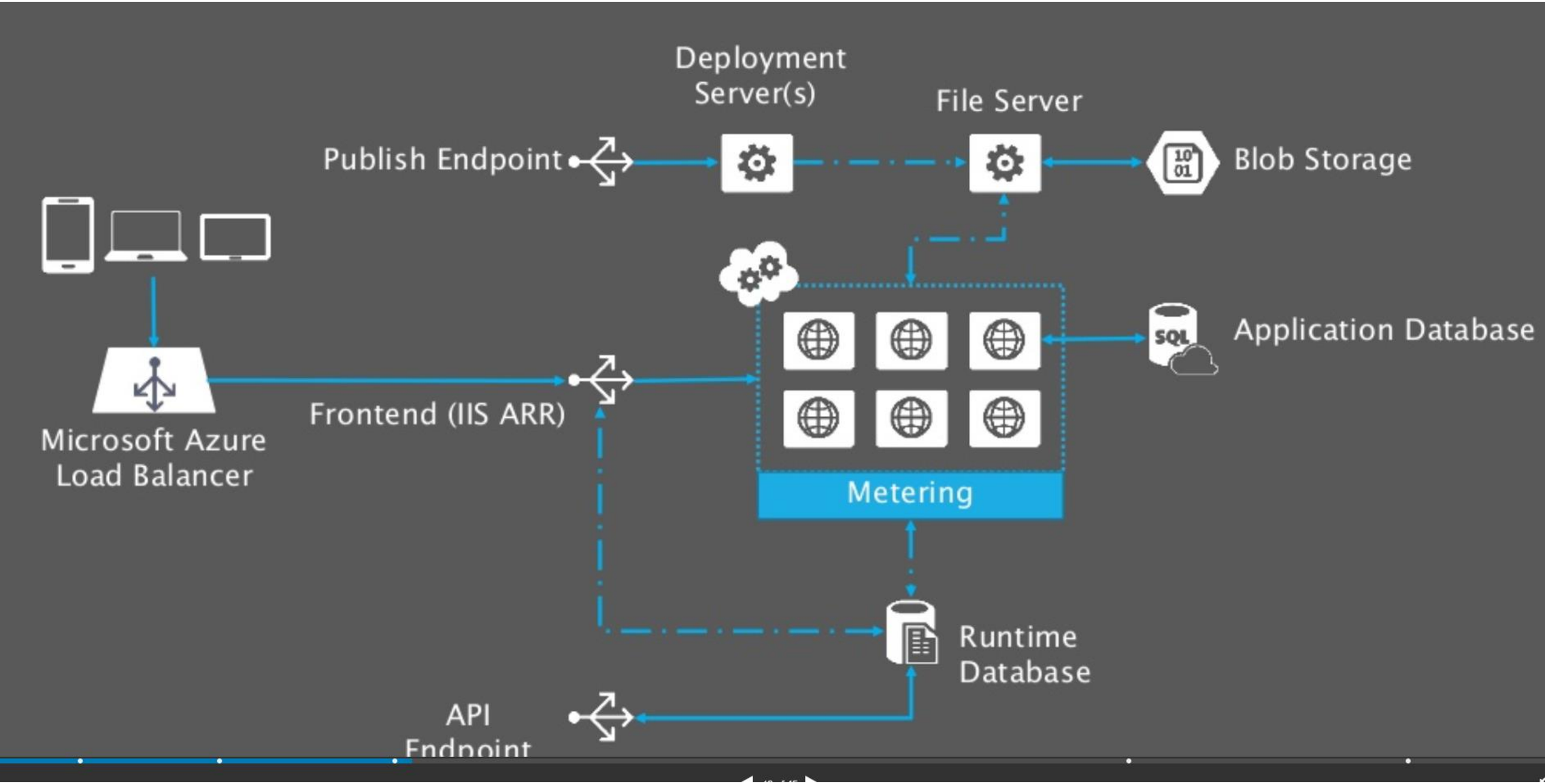
IntelliJ, , Jenkin, Maven Visual Studio family

Multi-container sample architecture



Sample architecture




Deployment
Server(s)
File Server
Publish Endpoint
Blob Storage
Application Database
Microsoft Azure
Load Balancer
Frontend (IIS ARR)
Metering
Runtime
Database
API
Endpoint

Web App

- **Multiple languages and frameworks** - ASP.NET, ASP.NET Core, Java, Ruby, Node.js, PHP, or Python. You can also run PowerShell and other scripts or executables as background services.
- **DevOps optimization** - Set up continuous integration and deployment with Visual Studio Team Services, GitHub, BitBucket, Docker Hub, or Azure Container Registry.
- **Global scale with high availability** - Scale up or out manually or automatically.
- **Connections to SaaS platforms and on-premises data** - Choose from more than 50 connectors for enterprise systems (such as SAP), SaaS services (such as Salesforce)
- **Security and compliance** - App Service is ISO, SOC, and PCI compliant.
- **Application templates** - Choose from an list of application templates in the Azure Marketplace, such as WordPress, Joomla, and Drupal.
- **API and mobile features** - turn-key CORS support for RESTful API scenarios, and simplifies mobile app scenarios by enabling authentication, offline data sync, push notifications, and more.
- **Serverless code** - Run a code snippet or script on-demand and pay only for the compute time your code actually uses

App Service Plan

- Defines a set of compute resources Region (West US, East US, etc.)
  - Number of VM instances
  - Size of VM instances (Small, Medium, Large)
  - Pricing tier (Free, Shared, Basic, Standard, Premium, PremiumV2, Isolated, Consumption)
- Multiple apps can run inside an App Service Plan
- Consider separate App Service Plans when
  - The app is resource-intensive.
  - You want to scale the app independently from the other apps the existing plan.
  - The app needs resource in a different geographical region

OS functionality available to App Service “sandbox”

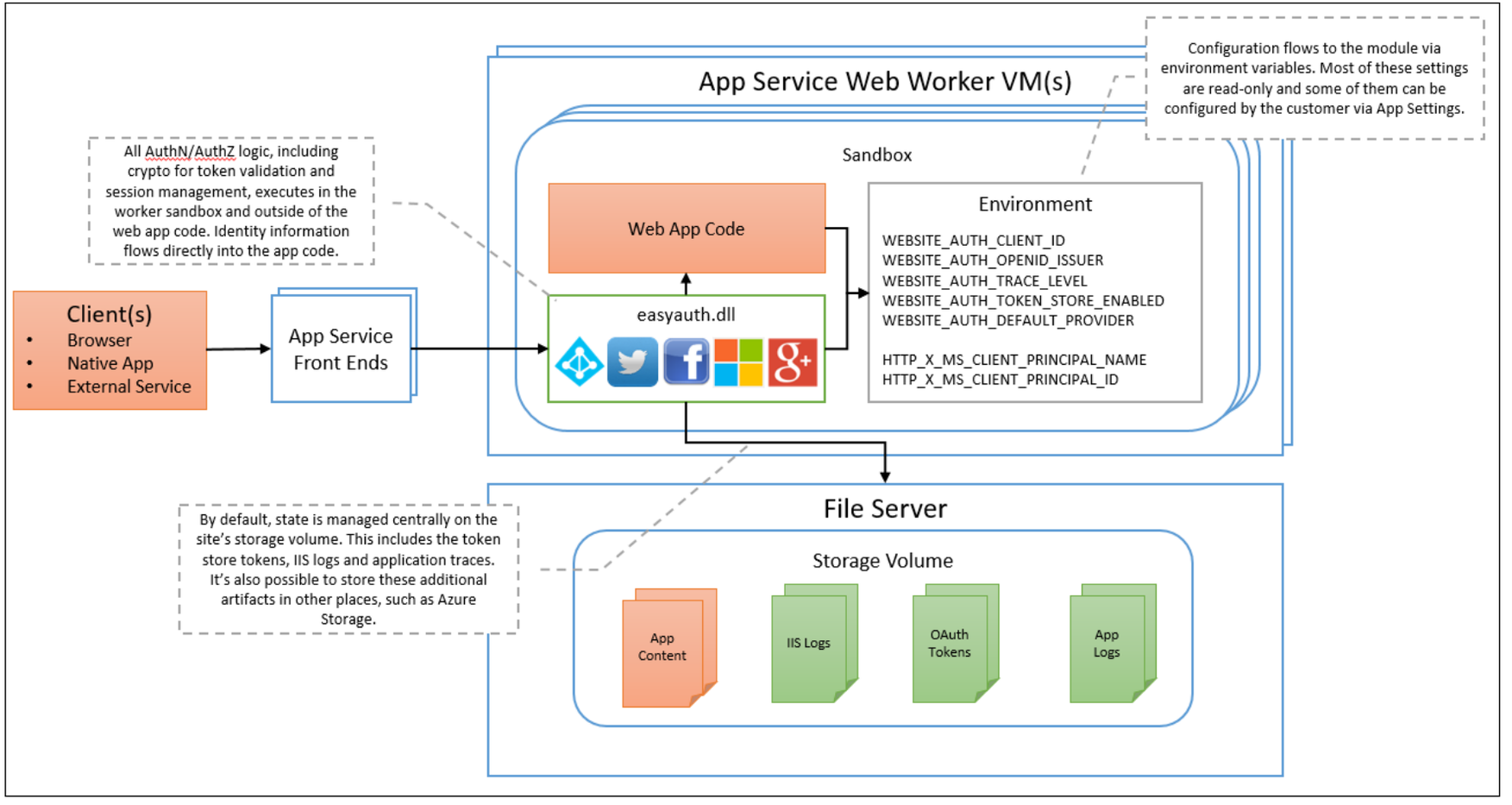
- Read access to registry
- Virtualized Event Log
- User32 / GDI 32
- Restricted access to the file system
  - D:\home
  - D:\local
- HTTP and HTTPS
  - Two processes within the same app can talk over sockets
- Frameworks like Syncfusion, Siberix may not work

https://github.com/projectkudu/kudu/wiki/Azure-Web-App-sandbox

App Service Shared Networking

- Except the Isolated Tier (we will talk about it next)
- Apps share network infrastructure
- Regardless of the number of instances you get a single inbound
  - You can get a Static IP via IP SSL Binding
- Set of outbound IPs (for an outbound connection to the SQL)
- Outbound IPs can change when scale up and down

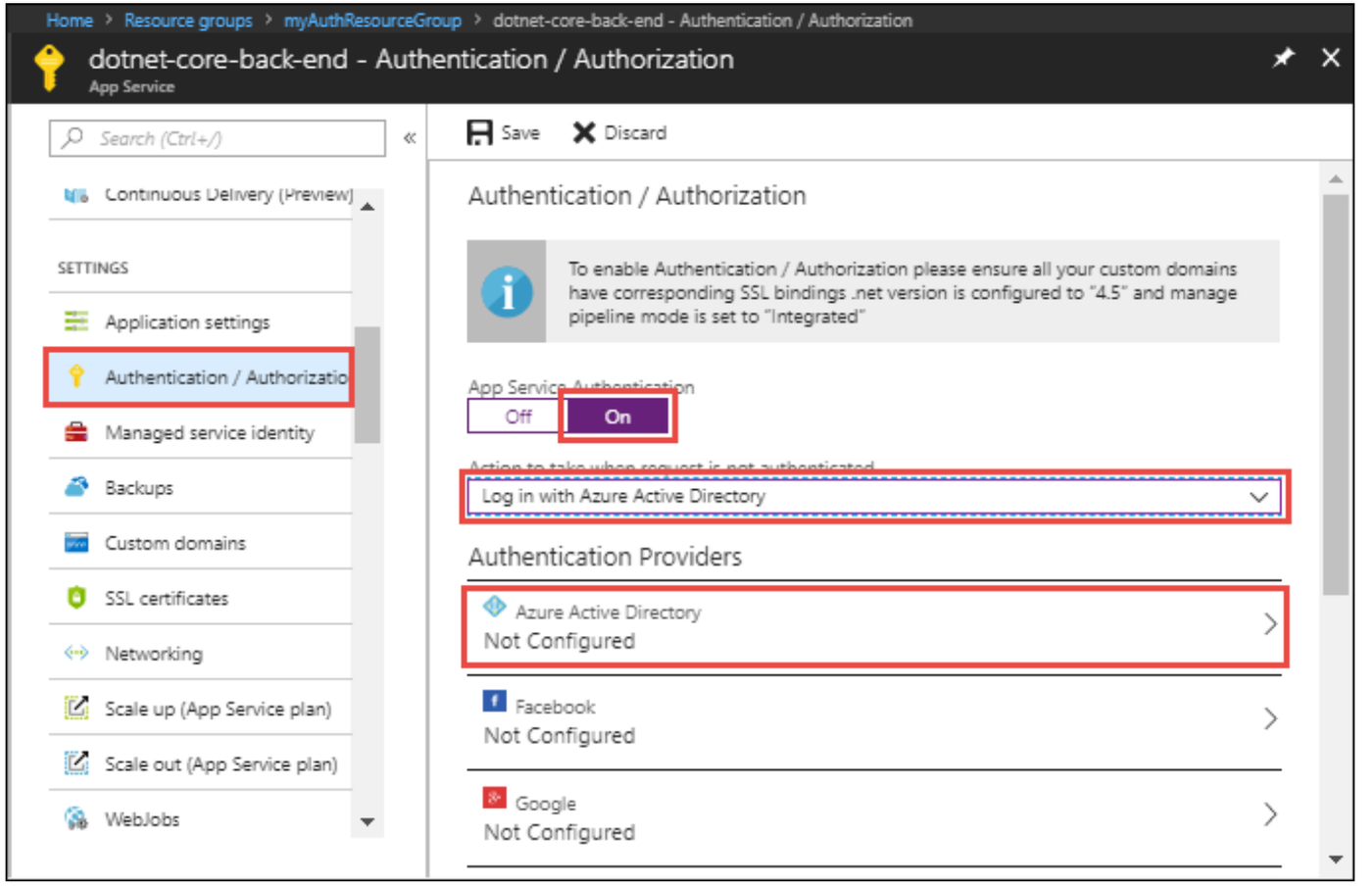
Authentication and Authorization



Identity Providers

Provider	Sign-in endpoint
Azure Active Directory	/.auth/login/aad
Microsoft Account	/.auth/login/microsoft
Facebook	/.auth/login/facebook
Google	/.auth/login/google
Twitter	/.auth/login/twitter

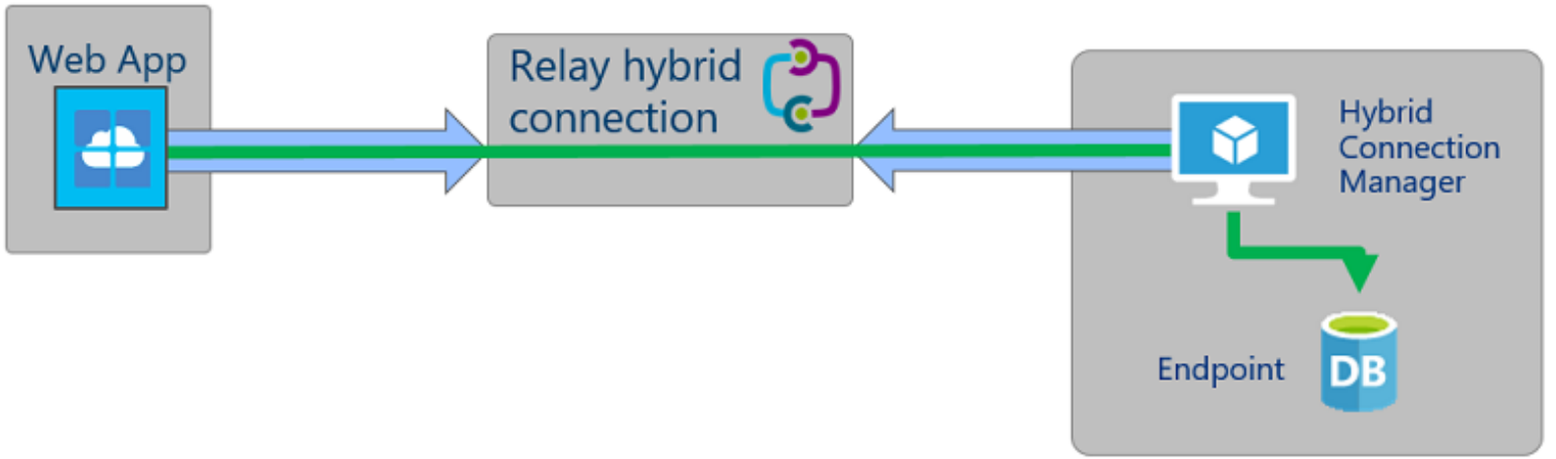
Enabling Auth



Auth Flow

Step	Client Side Flow	Server Side Flow
1. Sign user in	Redirects client to /.auth/login/<provider>.	Client code signs user in directly with provider's SDK and receives an authentication token. For information, see the provider's documentation.
2. Post-authentication	Provider redirects client to /.auth/login/<provider>/callback.	Client code posts token from provider to /.auth/login/<provider> for validation.
3. Establish authenticated session	App Service adds authenticated cookie to response.	App Service returns its own authentication token to client code.
4. Serve authenticated content	Client includes authentication cookie in subsequent requests (automatically handled by browser).	Client code presents authentication token in X-ZUMO-AUTHheader (automatically handled by Mobile Apps client SDKs).

Hybrid Connections

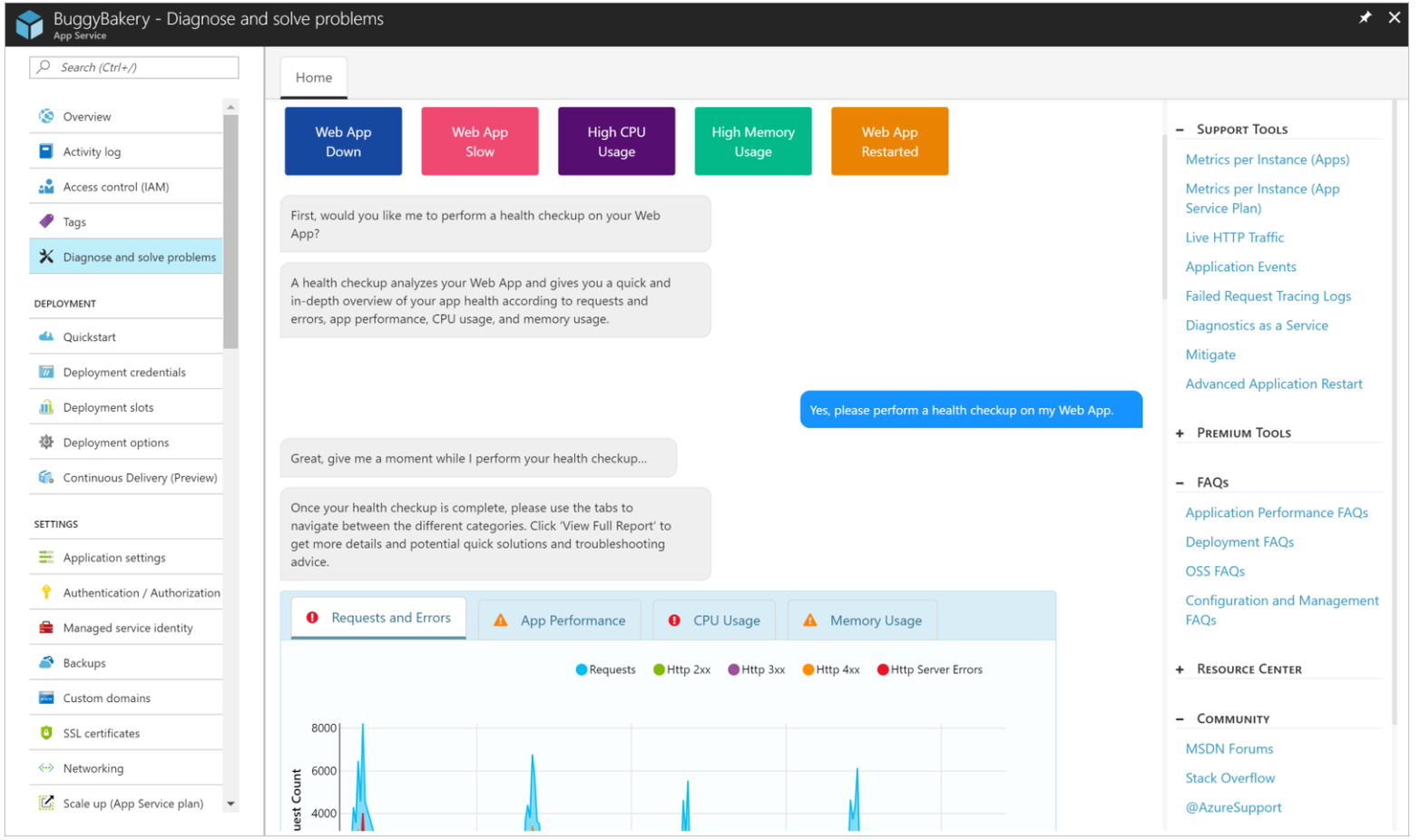


Local Cache

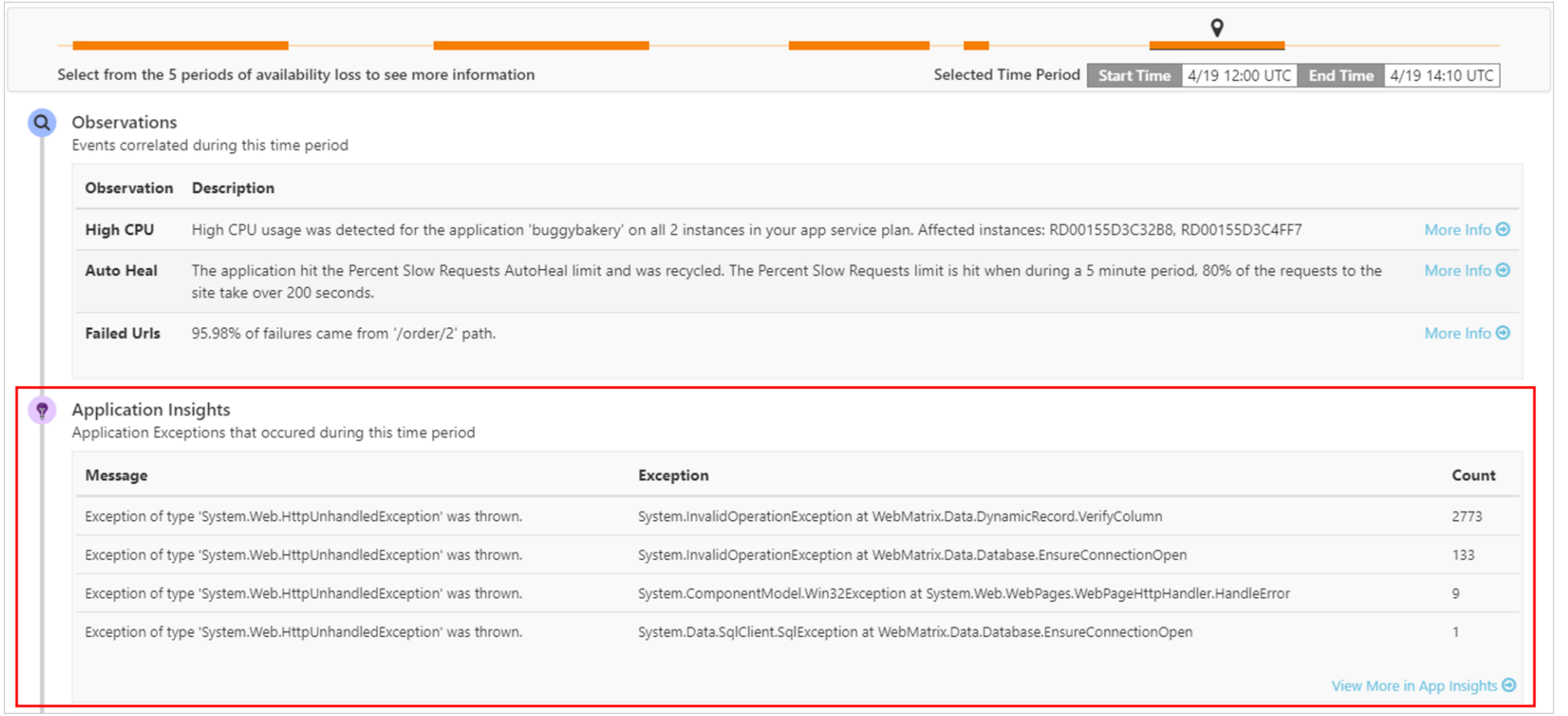
- Web App Content inside an App Service is shared
  - Stored in Azure Storage
  - Durable
  - Log and Data files are placed under the same content folder
  - Changing the content was cause a restart.

- Web apps requiring high-performance can
  - Cache this content locally (enable local cache up to 2 GB)
  - Immune to content changes
  - D:\Home will now point to local cache

Diagnostics



App Insights Integration



Demo: Site Extensions

Site Extensions

- Modify IIS applicationhost.config using XDT Transforms
- Deploy sub apps inside the Kudu folder for management actions
- https://github.com/projectkudu/kudu/wiki/Azure-Site-Extensions

Support for multiple languages

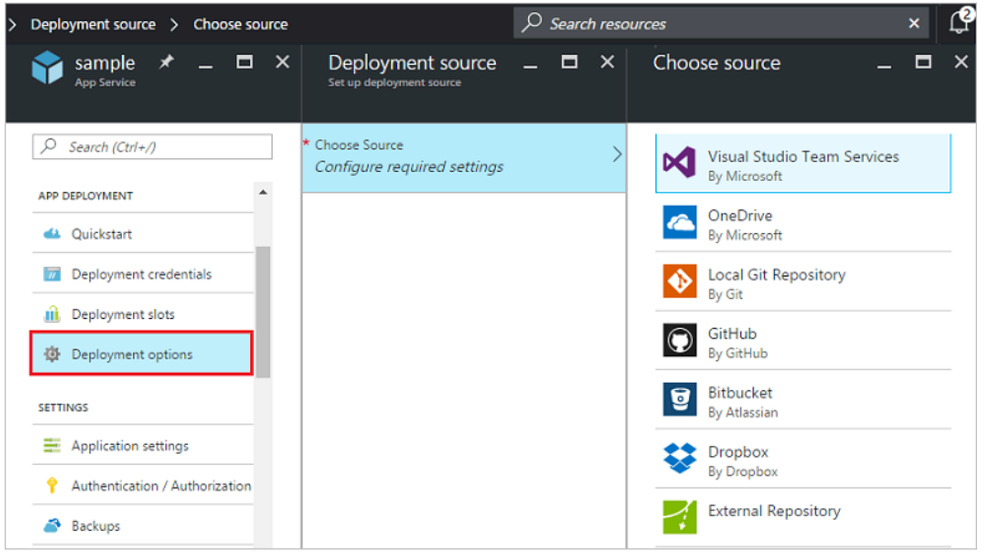
- App Settings
  - .NET configuration (injected into the .NET configuration)
  - PHP, Python, Java -> environment variables
  - For example Connection Strings
    - .NET configuration element - ConnectionStrings
    - MYSQL environment variable called MYSQLCONNSTR_
- Default documents
- Enabling Java for your app disables the .NET, PHP, and Python options

OS and runtime patching

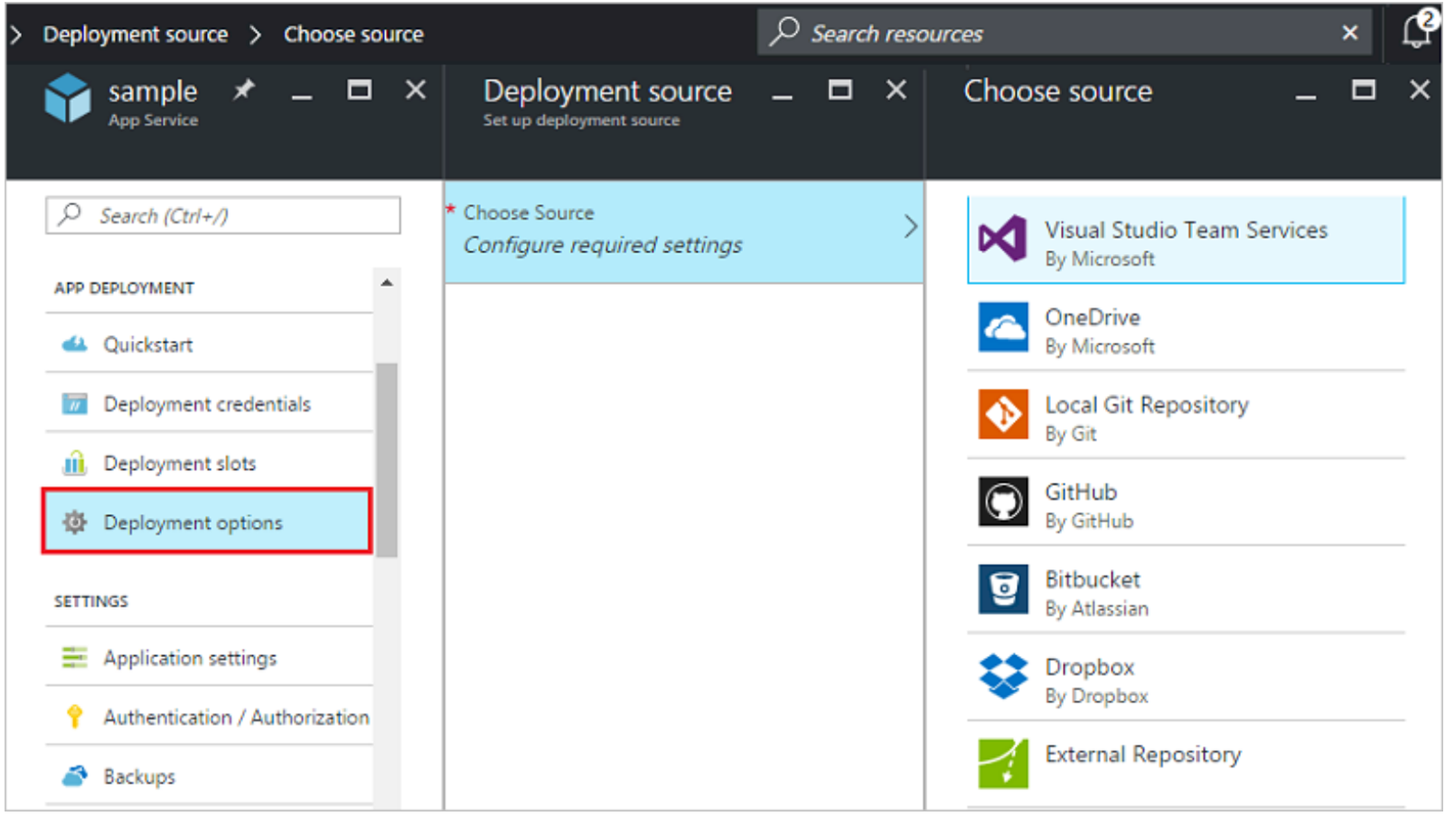
- New stable versions of language runtime (.NET, PHP, JAVA)
- Update can be:
  - Automatically installed (your app runs on new runtime)
  - Installed side by side (you need to manually upgrade your app)
  - Python patches need to be manually installed

Deploy Web App

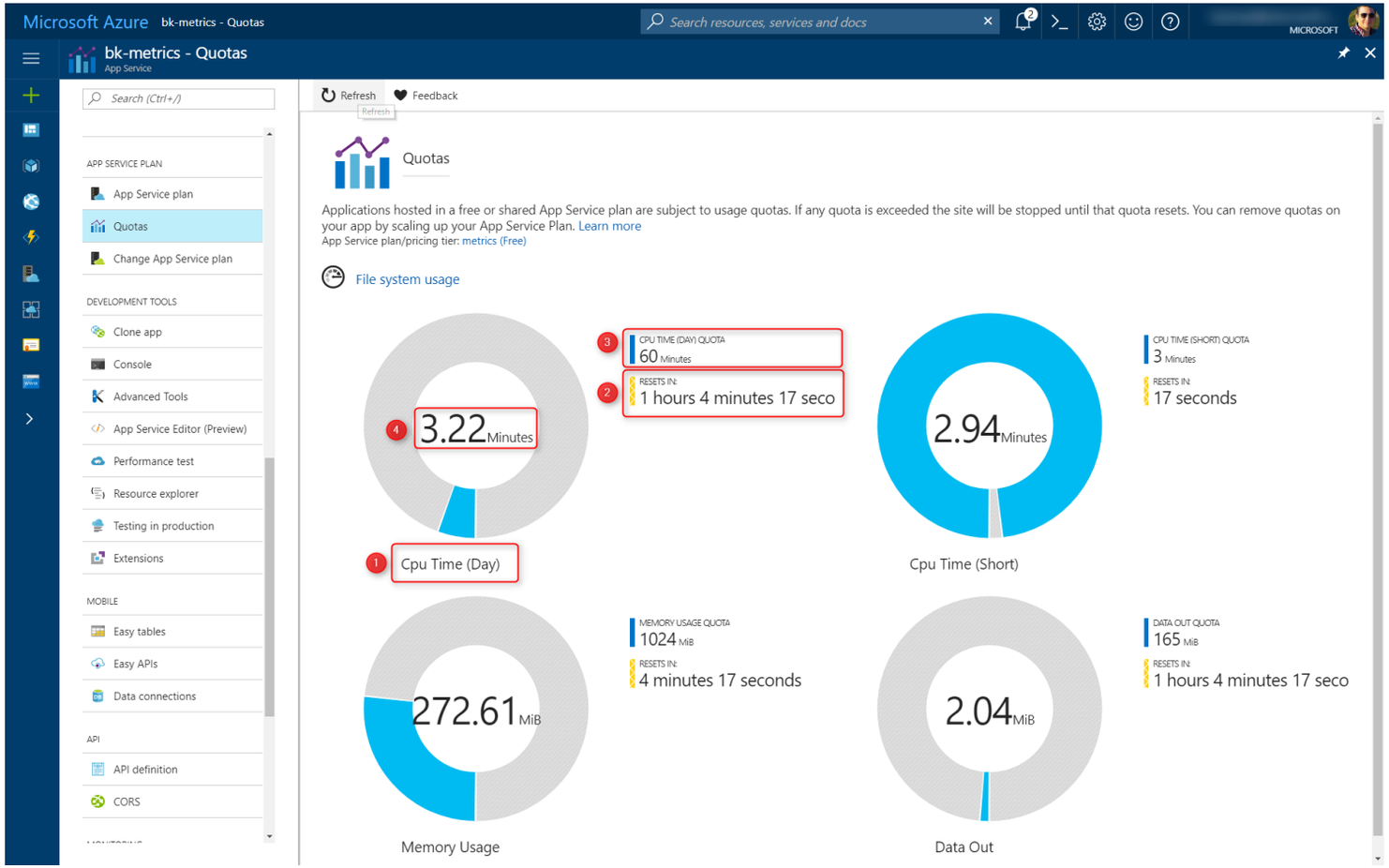
- ZIP or WAR file
- FTP
- Cloud Sync (Drop Box or One Drive)
- Continuous Deployment
- ARM Template



Deployment Slots



Quota and Metric Alerts



Backup and Restore

- Manual or scheduled
- What gets backed up
  - App Configuration
  - File Content
  - Database connected to your app
- Restore an app to previous snapshot
- Also look at App Cloning

WebJobs

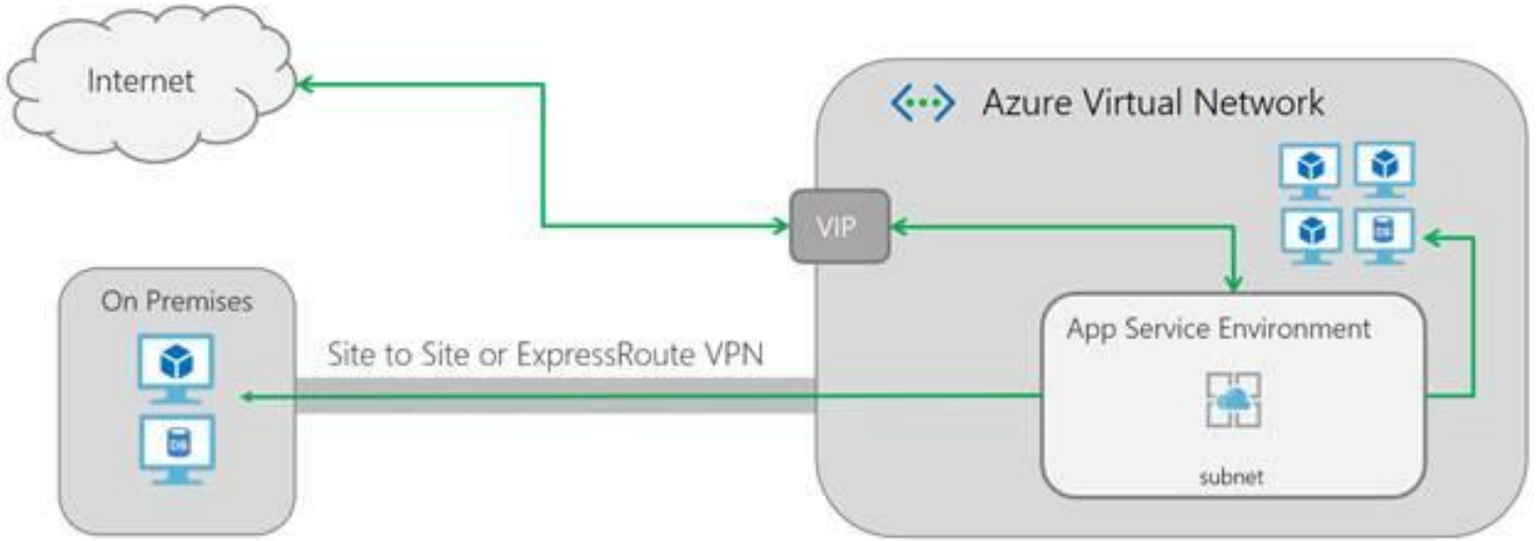
- Run a program in the same context as a web app
- Triggered or schedule
- .cmd, . ps1, .sh, .js etc
- Webjobs SDK –
  - simplifies creation of WebJobs
  - Structured (JSON) syntax for specifying event triggers
- Azure Functions is based on WebJobs SDK

```
public static void Run(
    [QueueTrigger("items")] string myQueueItem,
    [Blob("workitems/{queueTrigger}", FileAccess.Read)] Stream myBlob,
    TraceWriter log)
{
    log.Info($"BlobInput processed blob\n Name:{myQueueItem} \n Size: {myBlob.Length} bytes");
}
```

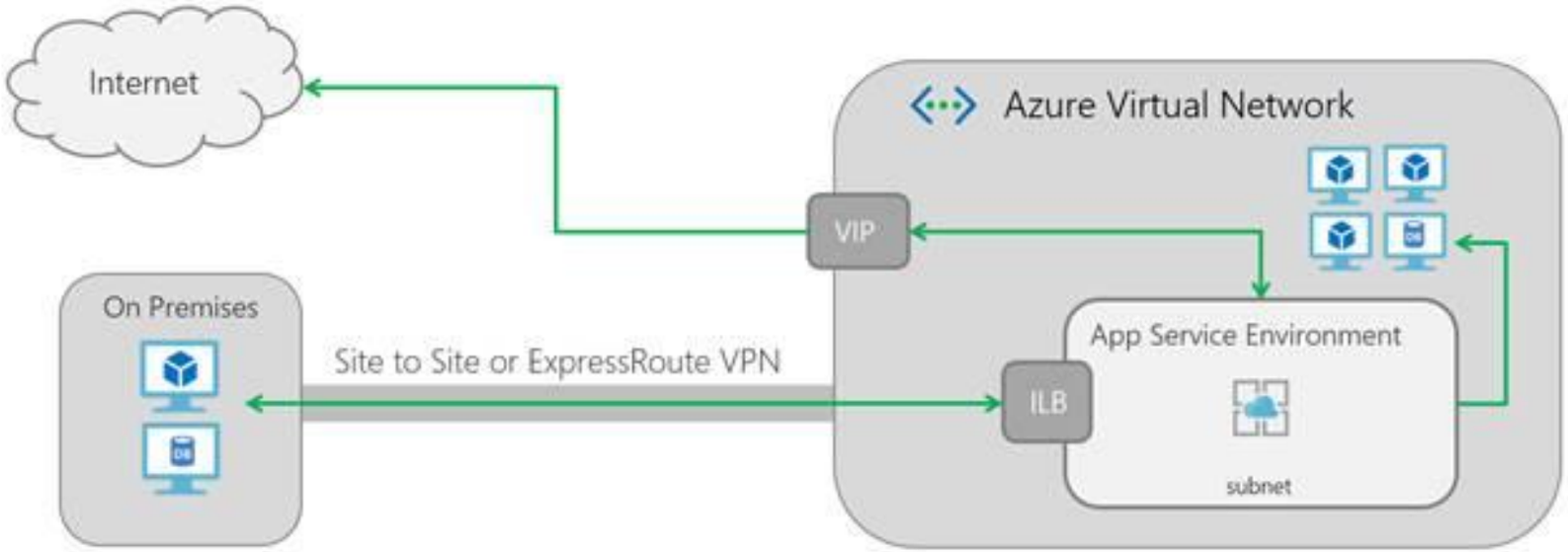
Dedicated Environment

- Fully isolated and dedicated environment
  - Windows, Linux, Docker Containers
- Appropriate for
  - High scale
  - Network isolation
  - High memory utilization
- ASE can be internet facing or internal-facing

External ASE



Internal ASE



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Single Docker image,
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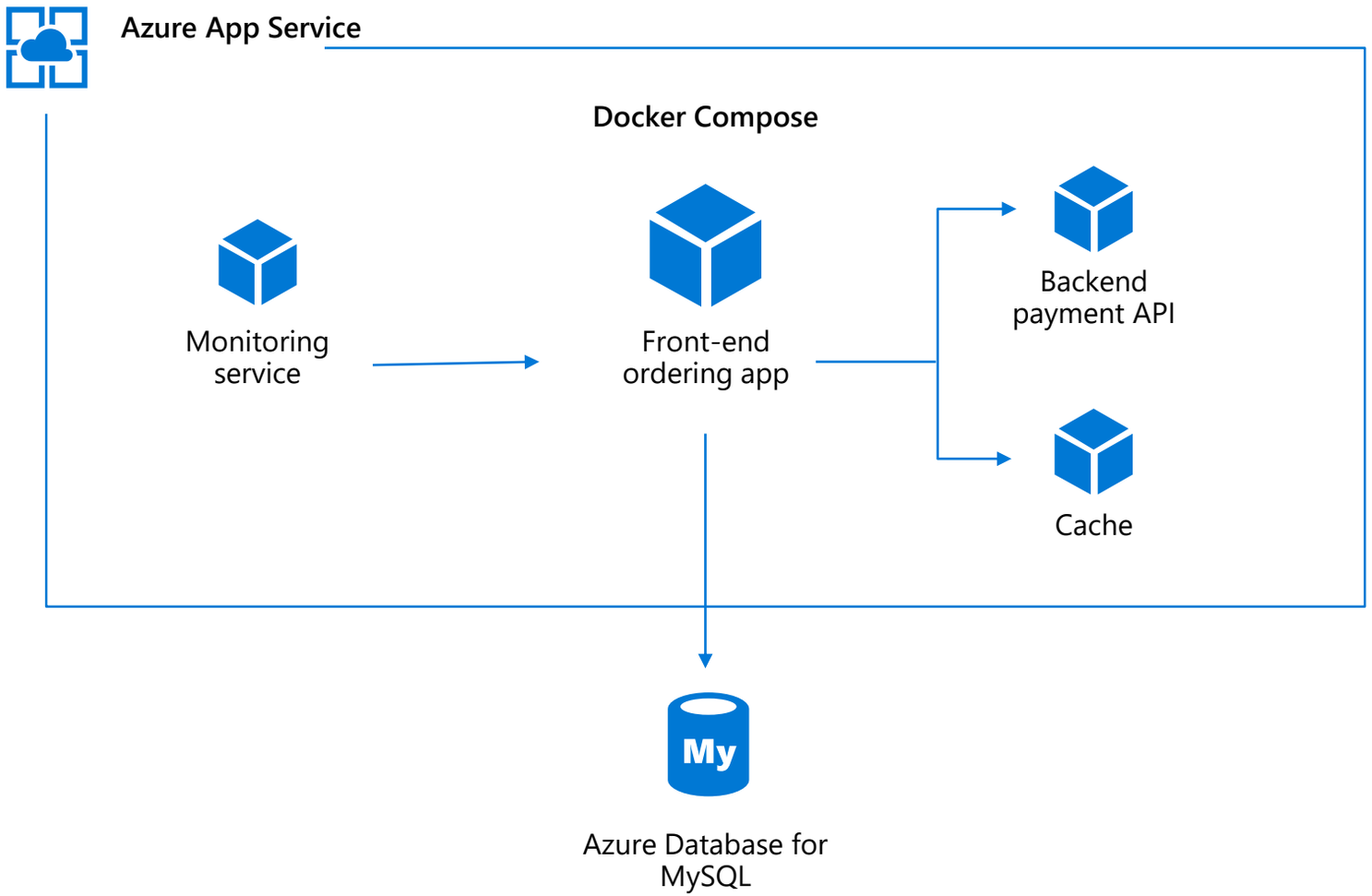
Multi-container sample architecture



Demos

App Service Windows Containers

App Service + Windows Containers