
Azure App Service – Overview

1. What is Azure App Service?

Azure App Service is a **fully managed Platform-as-a-Service (PaaS)** offering from Microsoft Azure that allows developers to build, deploy, and scale web apps, REST APIs, and mobile backends without managing the underlying infrastructure.

It supports multiple programming languages and frameworks, integrates with DevOps pipelines, and offers enterprise-grade security, availability, and scalability.

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2. Key Features

- **Multi-language support** – .NET, Java, Python, PHP, Node.js, Ruby, and custom containers.
- **Fully managed** – Microsoft handles infrastructure, patching, load balancing, and scaling.
- **Autoscaling** – Scale up (vertical) or out (horizontal) based on demand.
- **High availability** – SLA-backed uptime (up to 99.95%).
- **Continuous deployment** – Integration with GitHub, Azure DevOps, Bitbucket, or any CI/CD tool.
- **Global reach** – Deploy apps across multiple Azure regions.
- **Built-in authentication & authorization** – Supports Microsoft Entra ID (formerly Azure AD), Google, Facebook, GitHub, and more.

- **Hybrid connectivity** – Connect securely to on-premises resources via VNET integration.
- **Monitoring & diagnostics** – Application Insights and Log Analytics for performance tracking.

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3. Types of Applications Supported

1. **Web Apps** – Host modern web applications.
2. **API Apps** – Build and consume RESTful APIs.
3. **Mobile Apps** – Backend for mobile applications (offline sync, push notifications).
4. **Functions** – Run event-driven serverless code (if combined with Azure Functions).
5. **Linux & Docker Containers** – Deploy apps in containers for flexibility.

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4. Deployment Options

- **Code Deployment**
    - Push code from GitHub, Azure Repos, or Bitbucket.
    - Use FTP/SFTP, ZIP deployment, or Visual Studio publish.
- **Container Deployment**

    - Use Docker Hub or Azure Container Registry.
    - Deploy custom or prebuilt container images.

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5. App Service Plans

An **App Service Plan** defines the **region, pricing tier, and compute resources** for your apps.

- **Free & Shared (F1/D1)** – For testing and basic apps, limited features.
- **Basic (B1-B3)** – Dedicated compute, custom domain/SSL, better scaling.
- **Standard (S1-S3)** – Production workloads, auto-scaling, daily backups.
- **Premium (P1V3, P2V3, etc.)** – Advanced workloads, faster processors, VNET integration, higher scalability.
- **Isolated (I1, I2, I3)** – For highly secure, compliance-heavy applications, running in a dedicated environment.

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6. Scaling

- **Vertical scaling (Scale Up)** – Change pricing tier to increase CPU/RAM.
- **Horizontal scaling (Scale Out)** – Add multiple instances to handle load.
- **Autoscale rules** – Based on CPU usage, memory usage, or schedules.

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7. Security

- **Authentication & Authorization** – Integrated identity providers.
- **Networking** – Restrict access using VNET integration, private endpoints, and access restrictions.
- **SSL/TLS Certificates** – Free App Service-managed certificates or custom certificates.
- **Compliance** – Meets global standards (ISO, SOC, GDPR, HIPAA).

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8. Monitoring & Diagnostics

- **Application Insights** – Real-time performance monitoring, usage analytics, error detection.
- **Log Streaming** – View live logs directly from the portal.
- **Diagnostic Tools** – Identify performance bottlenecks.
- **Alerts** – Automated notifications when metrics exceed thresholds.

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9. Integration with DevOps

- **CI/CD Pipelines** – GitHub Actions, Azure DevOps Pipelines.

- **Blue-Green Deployment** – Use **deployment slots** to swap staging and production without downtime.
- **Infrastructure as Code** – Deploy App Services using ARM templates, Bicep, or Terraform.

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10. When to Use Azure App Service

Use Azure App Service when you need:

- A **managed hosting environment** for web apps or APIs.
- **Quick deployment** with minimal infrastructure management.
- **Built-in scaling and monitoring** without writing custom scripts.
- **Integration with DevOps pipelines** for continuous delivery.
- **Secure access** with enterprise identity providers.

Not ideal for:

- Applications requiring **low-level OS access** or custom networking.
- Very high-performance workloads needing specialized hardware.

✅ **In summary:**
Azure App Service is best for developers who want to **focus on writing code** while Azure manages infrastructure, scaling, and security. It's an enterprise-ready, cost-effective, and highly scalable PaaS solution for web applications and APIs.