



#Milano



Azure nel tuo laptop: Sviluppo e Testing locale con LocalStack

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improve



TD SYNnex

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Agenda

- 01 Introduction
- 02 LocalStack Overview
- 03 LocalStack for Azure
- 04 Demos
- 05 Roadmap and Next Steps

State of Enterprise Cloud Development

\$200B

Wasted Cloud Costs Annually

Driven by inefficient non-production workloads.

\$10M+

Average Cost of a Data Breach

Human error among leading risks in cloud breaches.

90%

Disrupted by Cloud Complexity

Slowing time to market & inflating operational costs.

Building on the cloud holds back the value of the cloud



Slowed time to market due to overhead & delays.



Millions in wasted cloud costs for non-production purposes.



Lost customers & reputational damage from testing & debugging obstacles.

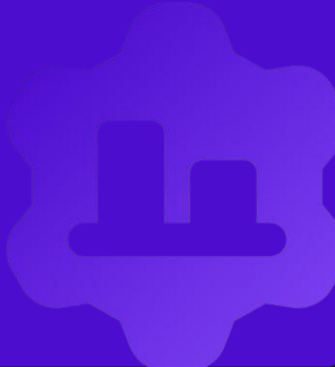
What is LocalStack?

Digital twin for cloud applications that runs on your local infrastructure

Safe



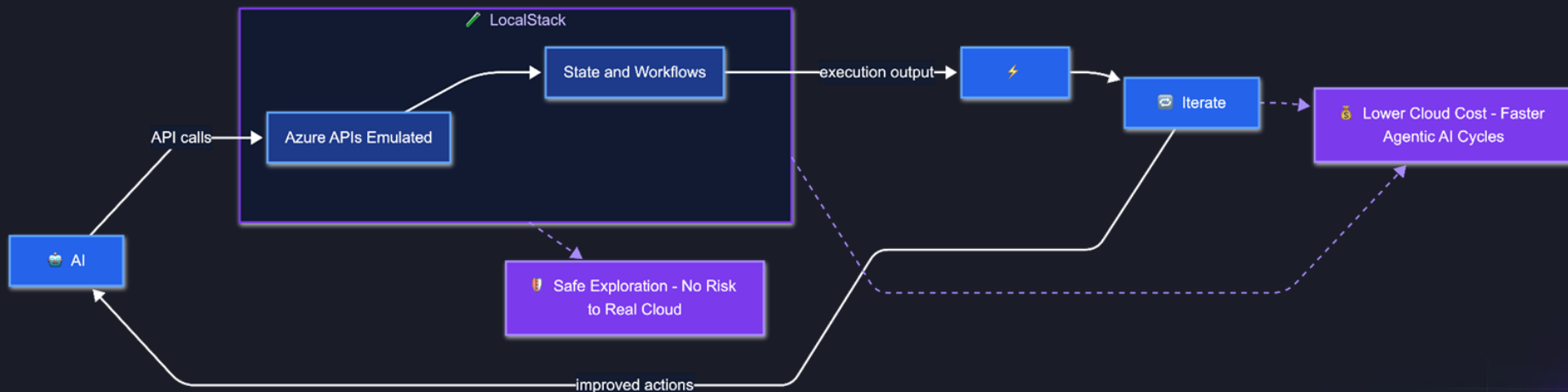
Efficient



Accurate



Safe Agentic AI Sandbox & Fast Feedback Loop



Accelerating time to market

- **Eliminate Overhead:** Safe, local sandboxes remove deployment delays, allowing teams to move faster.
- **API Fidelity:** Hundreds of REST API parity tests guarantee seamless control and data plane alignment with Azure.
- **Comprehensive Emulation:** Native support for all resources in Terraform, Bicep, and Azure CLI.
- **Seamless Execution:** Run existing templates and scripts without modifying or stripping resources.



Reduce Total Cost of Ownership (TCO):
Eliminate "pay-per-test" cloud costs and infrastructure waste.



Accelerate Inner Loop:
Instant provisioning and local debugging instead of time-consuming deployments to Azure.



Deterministic CI:
Eliminate flaky shared environments to unlock concurrent testing at scale.

\$20B+

in Value Delivered

Hundreds of thousands of developers rely on LocalStack to deliver high-quality applications every day.

SiriusXM



chime®

BOSCH

COMCAST

HITACHI



sanofi

taskrabbit

3M

Genentech

harness

workday.

BeyondTrust



IBM

trinet¹



Panasonic
AUTOMOTIVE



SCANIA

COX AUTOMOTIVE



CapitalOne

ATLASSIAN

CGI

CROWDSTRIKE

DUTCHBROS

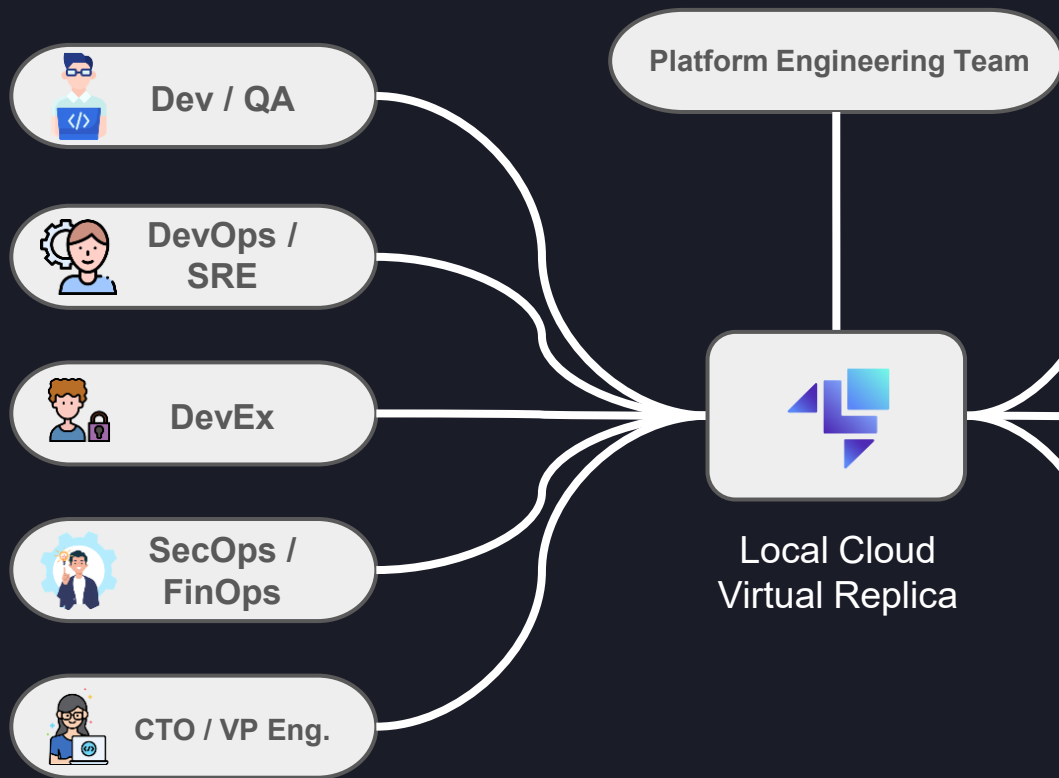
KOCH

RYANAIR

NHS

NETFLIX





Private Preview: Core Service Roadmap

Compute & Serverless Stack:

- Functions Apps
- Web Apps
- Container Instances
- Container Registry

Storage

- Blob Storage
- Table Storage
- Queue Storage
- File Storage

NoSQL Databases

- Cosmos DB (SQL, MongoDB)

Relational Databases

- Azure SQL DB
- Azure DB for PostgreSQL
- Azure DB for MySQL

IaC

- Bicep
- Terraform

Service Bus Messaging

- Service Bus Namespace
- Queues, Topics, Subscriptions

Event Grid

- Custom topics
- Subscriptions

Security

- Key Vault (secrets/certs)
- Managed Identities
- Role Definitions / Assignments

Observability

- Log Analytics
- App Insights

Networking

- Virtual Networks
- Private Endpoints
- Private DNS Zones
- Public IP / Public IP Prefix
- NAT Gateway
- Route Table
- Front Door

Azure App Services and Container Instances

Azure Web Apps

Languages:

- Python
- C# / .NET
- Java coming soon

Deployment:

- Zip deployment
- Custom container image support
- Automatic source-code builds via Oryx



Azure Functions Apps

Languages:

- Python
- C# / .NET
- Node.js

Deployment:

- Zip deployment
- Custom container image support
- Powered by Oryx and Azure Functions Core Tools

Triggers and Bindings

- HTTP trigger, Timer trigger
- Blob, Table, and Storage Queue triggers + output bindings
- Service Bus trigger + output bindings

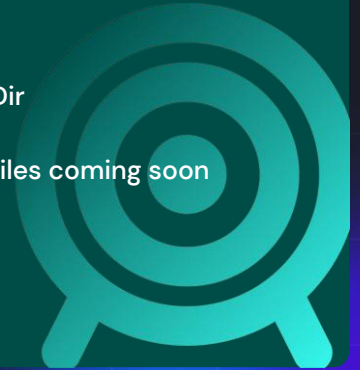
Azure Container Instances

Features:

- Container Registry support
- Run any container image with full lifecycle management
- Multi-container groups with shared networking

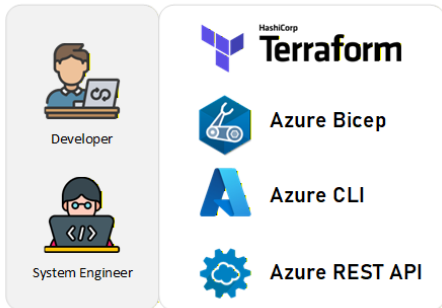
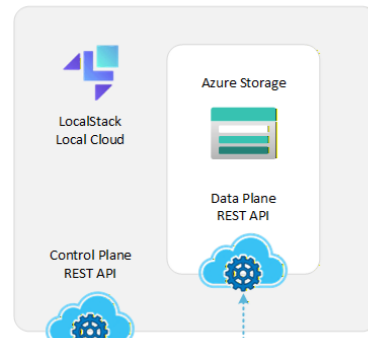
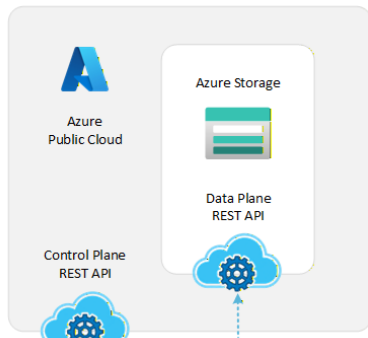
Volumes:

- emptyDir
- secret
- Azure Files coming soon



LocalStack for Azure

```
paolo@baboshird:~$ azlocal start-interception
LocalStack interception started. Azure CLI commands are now routed to LocalStack for Azure REST API.
Run "azlocal stop-interception" to restore traffic to Azure management endpoints.
paolo@baboshird:~$ az cloud list --output table
IsActive Name Profile
-----
False AzureCloud latest
False AzureChinaCloud latest
False AzureUSGovernment latest
False AzureGovernmentCloud latest
True LocalStack latest
paolo@baboshird:~$ az group create --name sample-rg --location westeurope
{
  "id": "/subscriptions/00000000-0000-0000-0000-000000000000/resourceGroups/sample-rg",
  "location": "westeurope",
  "managedBy": null,
  "name": "sample-rg",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}
paolo@baboshird:~$
```



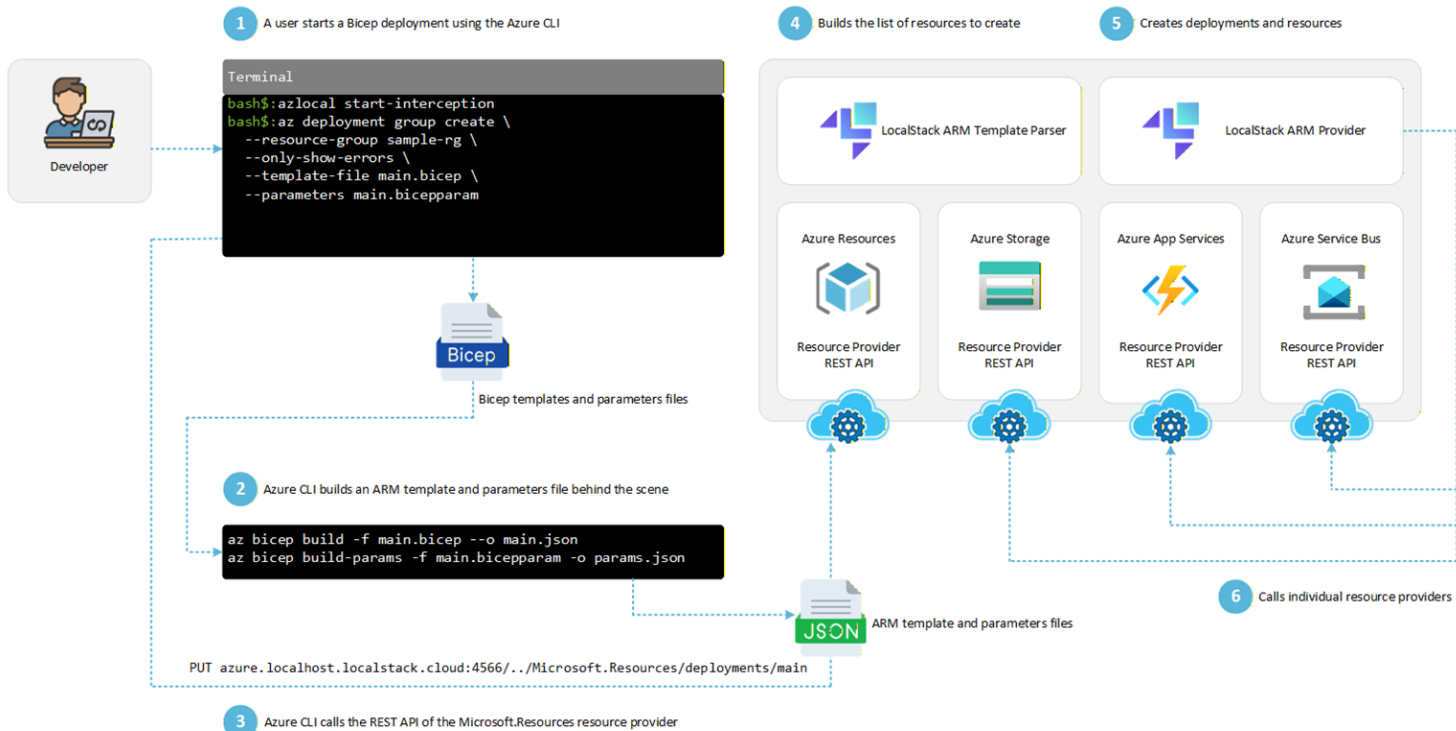
<https://management.azure.com>

<https://myaccount.blob.core.windows.net>

<https://azure.localhost.localstack.cloud:4566>

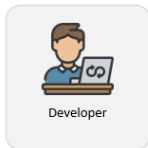
<https://myaccount.blob.core.azure.localhost.localstack.cloud:4566>

Bicep Deployment



Terraform Deployment

1 A user starts a deployment using the Terraform CLI



Developer

```
Terminal
bash$ azlocal start-interception
bash$ terraform apply
```

```
terraform {
  required_providers {
    azurearm = {
      source = "hashicorp/azurearm"
      version = "4.60.0"
    }
  }
}

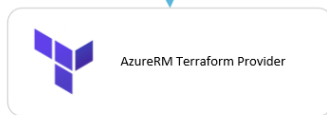
provider "azurearm" {
  .. # Emulator control plane REST API
  metadata_host = "localhost.localstack.cloud:4566"

  .. # LocalStack default subscription ID
  subscription_id = "00000000-0000-0000-0000-000000000000"
}
```

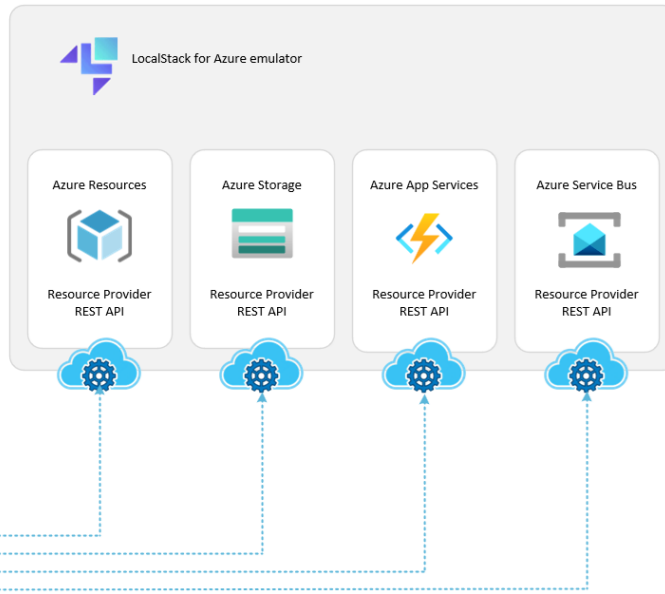
providers.tf



Terraform templates and variables files



AzureRM Terraform Provider



2 AzureRM Terraform Provider calls the control plane REST API to create a resource group and individual resources

Microsoft Graph API (1 of 2)

- Local emulation of Microsoft Graph endpoints enables developers to test Identity and Access Management (IAM) integrations and directory workflows without the need for a live Azure tenant.
- Key Supported Features:
 - ❑ **Directory Objects:** Full lifecycle management and retrieval of core entities such as service principals and directory objects.
 - ❑ **OData Query Filtering:** Advanced support for OData query parameters, specifically the \$filter syntax (e.g., startsWith, eq) for precise resource discovery.
 - ❑ **Bulk Retrieval:** Support for the getByIds endpoint via POST requests, allowing efficient fetching of multiple directory entities in a single call.

Microsoft Graph API (2 of 2)

```
# List all Service Principals
```

```
curl -ks https://azure.localhost.localstack.cloud:4566/v1.0/servicePrincipals
```

```
# OData Filtering (Filtering by Display Name or AppId)
```

```
curl -ks '.../servicePrincipals?$filter=startsWith(displayName, "LocalStack")'
```

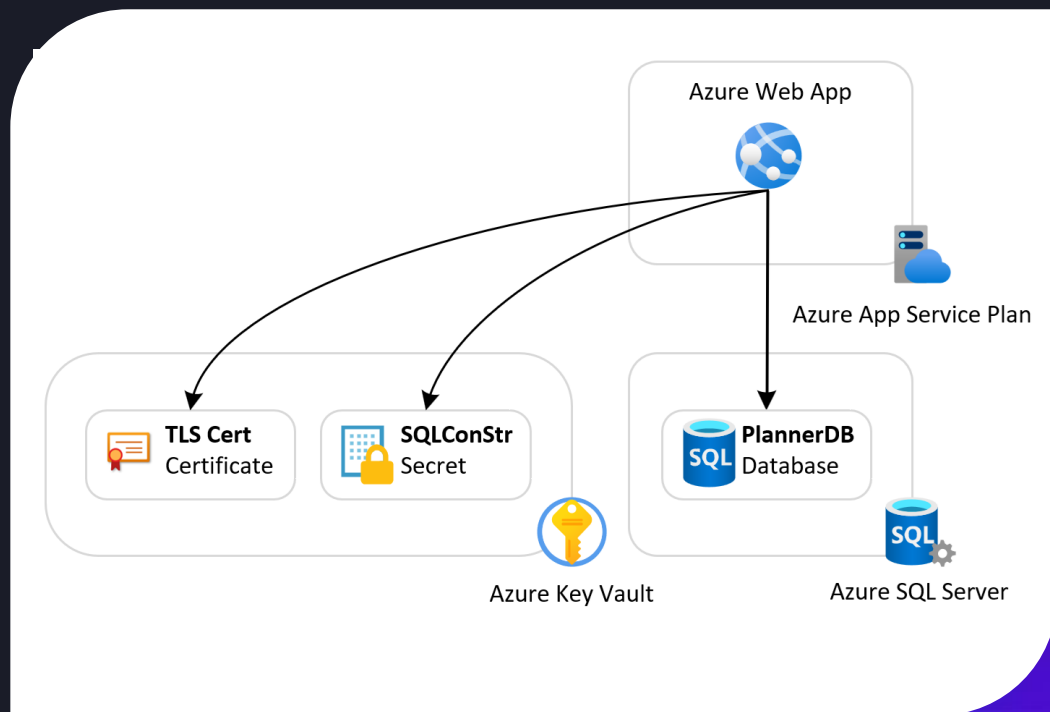
```
curl -ks '.../servicePrincipals?$filter=appId eq "c22990cd-..."'
```

```
# Batch Get Directory Objects by ID
```

```
curl -ks -X POST -d '{"ids": ["..."], "types": ["servicePrincipal"]}' \  
    https://azure.localhost.localstack.cloud:4566/v1.0/directoryObjects/getByIds
```

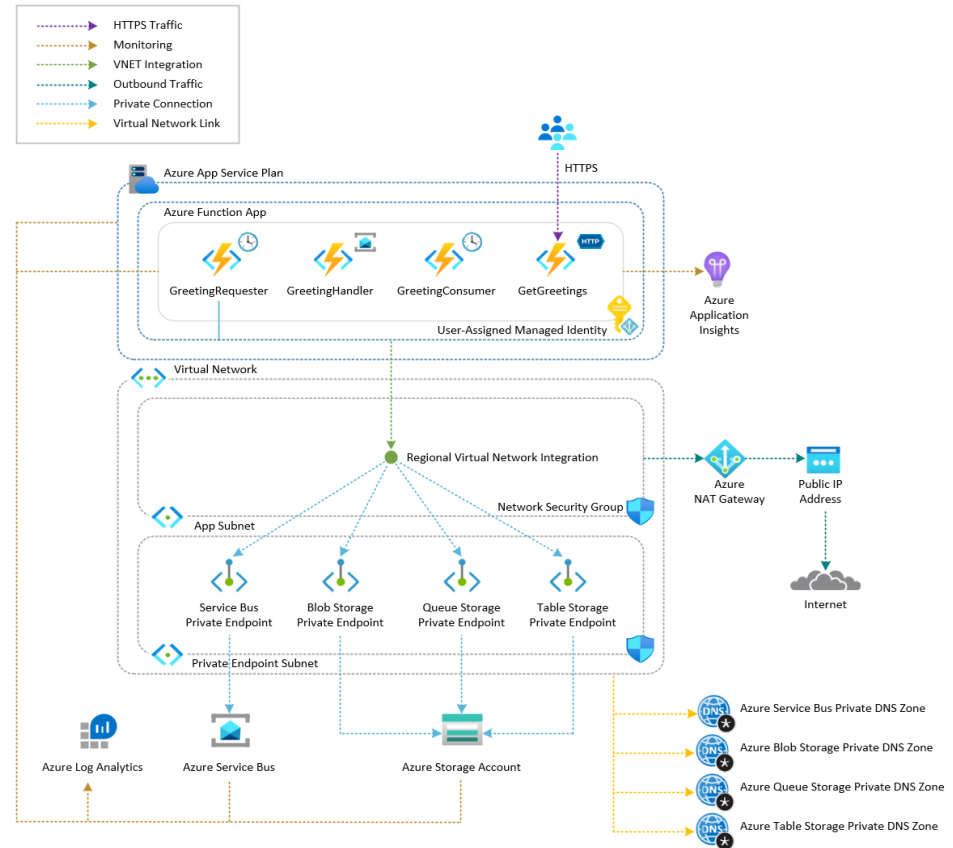
Demo: Web App + SQL Database

- This sample showcases Vacation Planner, a Python Flask SPA deployed on [Azure App Service](#).
- The architecture leverages [Azure SQL Database](#) for robust data persistence.
- Secret material, such as the SQL Server connection string and and HTTPS certificate are stored within [Azure Key Vault](#).



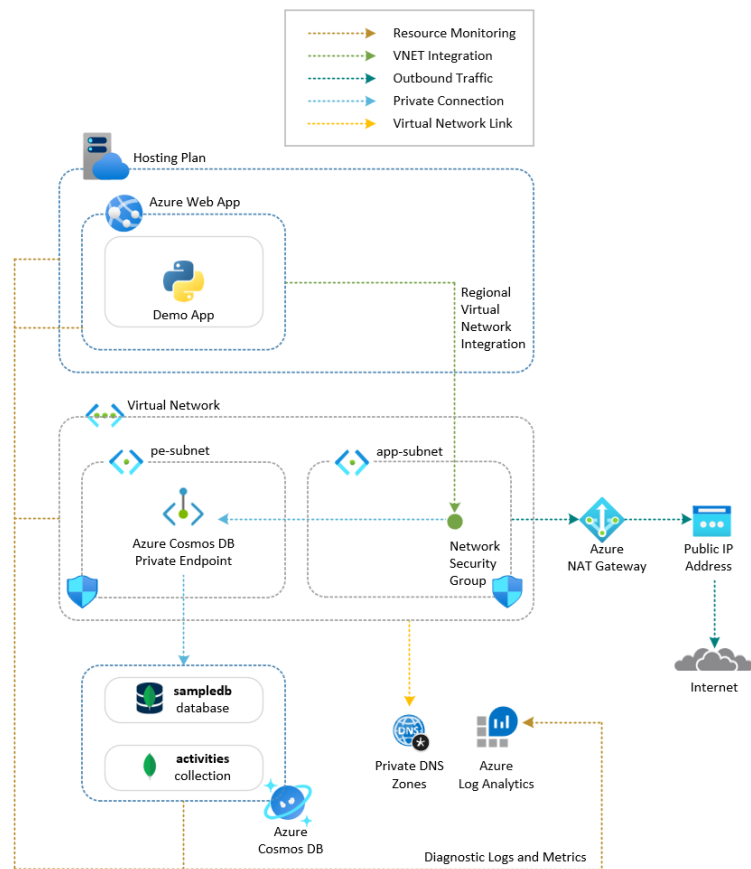
Demo: Function App

- This sample demonstrates how to deploy an [Azure Functions App](#) on an [Azure App Service Plan](#) that exchanges messages through queues in a [Service Bus](#) namespace.
- The function app authenticates to Azure resources using a [user-assigned managed identity](#) and connects to the Service Bus namespace via an [Azure Private Endpoint](#) for secure, private network communication.



Demo: Web App + Mongo

- This sample demonstrates a Python Flask single-page web application called *Vacation Planner* hosted on an [Azure Web App](#).
- The app runs on an Azure App Service Plan and stores activity data in the activities collection of a MongoDB database on an [Azure Cosmos DB for MongoDB](#) account.
- The app uses a private endpoint to access the Azure Cosmos DB account.



Roadmap



APRIL/MAY 2026

- App Services
- Cores Services
- Bicep
- Terraform
- Python and .NET SDK

SEPTEMBER/OCTOBER 2026

- Azure Kubernetes Service (AKS)
- Azure Container Apps (ACA)
- Azure Managed Redis
- More Services
- Model Context Protocol (MCP)

GA - JANUARY 2027

- Persistence
- New `lstk` CLI support
- Azure OpenAI Service (Tentative)
- Resource Browser
- Docker Extension
- Visual Studio Code Extensions

References



criptio

Documentation

<https://docs.localstack.cloud/azure>



Slack Community Channel

<https://slack.localstack.cloud/>
<https://localstack-community.slack.com>



Samples

<https://github.com/localstack/localstack-azure-samples>



Contacts

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<https://github.com/paolosalvatori>



Authentication Token

<https://docs.localstack.cloud/aws/getting-started/auth-token/>

Thank you!

<https://www.localstack.cloud/>





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Slide e video:

<https://www.globalazuremilano.it>

Appendix

Storage

Name	Resource Type	Description
Azure Storage Account	Microsoft.Storage/storageAccounts	Top-level container for all Azure Storage data objects.
Azure Blob Storage	Microsoft.Storage/storageAccounts/blobServices	Object storage optimized for massive amounts of unstructured data.
Blob Containers	Microsoft.Storage/storageAccounts/blobServices/containers	Logical grouping of blobs within a storage account.
Azure Files	Microsoft.Storage/storageAccounts/fileServices/shares	Fully managed file shares accessible via SMB and NFS protocols.
Azure Queue Storage	Microsoft.Storage/storageAccounts/queueServices/queues	Simple message queuing for asynchronous processing between application components.
Azure Table Storage	Microsoft.Storage/storageAccounts/tableServices/tables	NoSQL key-value store for structured, non-relational data.

Relational Databases

Name	Resource Type	Description
Azure SQL Database	Microsoft.Sql/servers	Fully managed relational database engine based on SQL Server.
SQL Databases	Microsoft.Sql/servers/databases	Individual databases hosted on a logical SQL server.
SQL Firewall Rules	Microsoft.Sql/servers/firewallRules	Server-level IP firewall rules controlling network access.
MySQL Flexible Server	Microsoft.DBforMySQL/flexibleServers	Fully managed MySQL database service with flexible scaling.
MySQL Databases	Microsoft.DBforMySQL/flexibleServers/databases	Individual databases within a MySQL Flexible Server instance.
MySQL Firewall Rules	Microsoft.DBforMySQL/flexibleServers/firewallRules	IP-based access control for MySQL Flexible Server.
PostgreSQL Flexible Server	Microsoft.DBforPostgreSQL/flexibleServers	Fully managed PostgreSQL database service with flexible scaling.
PostgreSQL Databases	Microsoft.DBforPostgreSQL/flexibleServers/databases	Individual databases within a PostgreSQL Flexible Server instance.
PostgreSQL Firewall Rules	Microsoft.DBforPostgreSQL/flexibleServers/firewallRules	IP-based access control for PostgreSQL Flexible Server.

NoSQL Databases

Name	Resource Type	Description
Azure Cosmos DB	Microsoft.DocumentDB/databaseAccounts	Globally distributed, multi-model database service for NoSQL and relational workloads.
Cosmos DB for NoSQL – Databases	Microsoft.DocumentDB/databaseAccounts/sqlDatabases	Databases within a Cosmos DB account using the NoSQL (SQL) API.
Cosmos DB for NoSQL – Containers	Microsoft.DocumentDB/databaseAccounts/sqlDatabases/containers	Containers for storing JSON items within a NoSQL database.
Cosmos DB for MongoDB – Databases	Microsoft.DocumentDB/databaseAccounts/mongodbDatabases	Databases within a Cosmos DB account using the MongoDB API.
Cosmos DB for MongoDB – Collections	Microsoft.DocumentDB/databaseAccounts/mongodbDatabases/collections	Collections for storing BSON documents within a MongoDB database.
Cosmos DB for PostgreSQL – Clusters	Microsoft.DBforPostgreSQL/serverGroupsv2	Distributed PostgreSQL clusters powered by Citus, managed through Cosmos DB.

Compute Services

Name	Resource Type	Description
Azure App Service Plans	Microsoft.Web/serverfarms	Defines the compute resources for hosting web applications.
Azure App Service (Web Apps)	Microsoft.Web/sites	Fully managed platform for building, deploying, and scaling web applications.
Azure Functions	Microsoft.Web/sites	Event-driven serverless compute platform for running code on demand.
Azure Container Instances	Microsoft.ContainerInstance/containerGroups	Run containers on demand without managing servers or orchestrators.
Azure Container Apps (ACA)	Microsoft.App/containerApps	Serverless container platform for microservices and event-driven applications.
Container Apps Managed Environments	Microsoft.App/managedEnvironments	Shared environment boundary for a group of container apps.
Azure Kubernetes Service (AKS)	Microsoft.ContainerService/managedClusters	Managed Kubernetes cluster for deploying and scaling containerized applications.
AKS Agent Pools	Microsoft.ContainerService/managedClusters/agentPools	Node pools that provide the compute resources for an AKS cluster.
Azure Container Registry	Microsoft.ContainerRegistry/registries	Private Docker registry for storing and managing container images.

NOTE: AKS and ACA emulators are still under construction.

Messaging

Name	Resource Type	Description
Azure Service Bus	Microsoft.ServiceBus/namespaces	Enterprise message broker with queues and publish-subscribe topics.
Service Bus Queues	Microsoft.ServiceBus/namespaces/queues	FIFO message delivery channel with at-least-once delivery guarantees.
Service Bus Topics	Microsoft.ServiceBus/namespaces/topics	Publish-subscribe messaging channel for one-to-many communication.
Service Bus Subscriptions	Microsoft.ServiceBus/namespaces/topics/subscriptions	Named subscription to a topic that receives a copy of each published message.
Service Bus Subscription Rules	Microsoft.ServiceBus/namespaces/topics/subscriptions/rules	Filters and actions applied to messages delivered to a subscription.
Azure Event Grid – Domains	Microsoft.EventGrid/domains	Management container for grouping related Event Grid topics.
Event Grid – Topics	Microsoft.EventGrid/topics	Custom endpoints for publishing events to Event Grid.
Event Grid – Event Subscriptions	Microsoft.EventGrid/topics/eventSubscriptions	Routes events from a topic to a configured handler endpoint.
Event Grid – Namespaces	Microsoft.EventGrid/namespaces	MQTT and HTTP-based eventing with pull and push delivery.
Event Grid – System Topics	Microsoft.EventGrid/systemTopics	Auto-created topics for events generated by Azure services.

Monitoring

Name	Resource Type	Description
Azure Application Insights	Microsoft.Insights/components	Application performance monitoring for live web applications.
Azure Monitor – Action Groups	Microsoft.Insights/actionGroups	Collection of notification preferences and actions triggered by alerts.
Azure Monitor – Metric Alerts	Microsoft.Insights/metricAlerts	Alert rules that evaluate metric-based conditions at regular intervals.
Azure Monitor – Scheduled Query Rules	Microsoft.Insights/scheduledQueryRules	Alert rules that evaluate log query results on a defined schedule.
Azure Monitor – Activity Log Alerts	Microsoft.Insights/activityLogAlerts	Alert rules triggered by specific Activity Log events.
Azure Monitor – Autoscale Settings	Microsoft.Insights/autoscaleSettings	Automatic scaling rules for supported Azure resource types.
Data Collection Rules	Microsoft.Insights/dataCollectionRules	Define how monitoring data is collected, transformed, and sent to destinations.
Data Collection Endpoints	Microsoft.Insights/dataCollectionEndpoints	Network-accessible endpoints for ingesting monitoring data.
Azure Monitor – Diagnostic Settings	Microsoft.Insights/diagnosticSettings	Route platform logs and metrics to supported destinations.
Azure Workbooks	Microsoft.Insights/workbooks	Interactive reports for analyzing and visualizing monitoring data.
Azure Monitor – Web Tests	Microsoft.Insights/webTests	Availability tests that monitor the uptime of web endpoints.
Log Analytics Workspaces	Microsoft.OperationalInsights/workspaces	Central repository for log and performance data collected by Azure Monitor.

Networking (1 of 2)

Name	Resource Type	Description
Azure Virtual Network	Microsoft.Network/virtualNetworks	Isolated network for securely connecting Azure resources.
Subnets	Microsoft.Network/virtualNetworks/subnets	Segmented address ranges within a virtual network.
Network Security Groups	Microsoft.Network/networkSecurityGroups	Filter network traffic with inbound and outbound security rules.
NSG Security Rules	Microsoft.Network/networkSecurityGroups/securityRules	Individual allow or deny rules within a network security group.
Route Tables	Microsoft.Network/routeTables	Custom routing tables for controlling traffic flow in virtual networks.
Routes	Microsoft.Network/routeTables/routes	Individual route entries specifying next-hop behavior for destination prefixes.
Public IP Addresses	Microsoft.Network/publicIPAddresses	Static or dynamic public IP addresses for internet-facing resources.
Public IP Prefixes	Microsoft.Network/publicIPPrefixes	Contiguous range of public IP addresses reserved from an Azure region.
NAT Gateways	Microsoft.Network/natGateways	Outbound-only internet connectivity for virtual network resources via SNAT.

Networking (2 of 2)

Name	Resource Type	Description
Network Interfaces	Microsoft.Network/networkInterfaces	Virtual NIC that connects a VM or service to a subnet.
Azure Bastion	Microsoft.Network/bastionHosts	Fully managed service for secure RDP/SSH access to virtual machines.
Private DNS Zones	Microsoft.Network/privateDnsZones	Name resolution for virtual networks using custom domain names.
Virtual Network Links	Microsoft.Network/privateDnsZones/virtualNetworkLinks	Associates a private DNS zone with a virtual network for name resolution.
Private Endpoints	Microsoft.Network/privateEndpoints	Network interface providing private connectivity to an Azure service.
Azure Front Door (CDN Profiles)	Microsoft.Cdn/profiles	Global content delivery and application acceleration with intelligent routing.
AFD Endpoints	Microsoft.Cdn/profiles/afdEndpoints	Globally distributed entry points for routing user traffic.
AFD Origin Groups	Microsoft.Cdn/profiles/originGroups	Logical grouping of backend origins with health probing and load balancing.
AFD Origins	Microsoft.Cdn/profiles/originGroups/origins	Individual backend servers serving content through Front Door.
AFD Routes	Microsoft.Cdn/profiles/afdEndpoints/routes	Routing rules mapping incoming requests to origin groups.

Security & Identity

Name	Resource Type	Description
Azure Key Vault	Microsoft.KeyVault/vaults	Centralized secrets management for keys, secrets, and certificates.
Key Vault Secrets	Microsoft.KeyVault/vaults/secrets	Securely store and control access to tokens, passwords, and API keys.
Key Vault Certificates	Microsoft.KeyVault/vaults/certificates	Certificate support provides for management of your X.509 certificates
Managed Identities	Microsoft.ManagedIdentity/userAssignedIdentities	Automatically managed credentials for authenticating to Azure services.
Federated Identity Credentials	Microsoft.ManagedIdentity/userAssignedIdentities/federatedIdentityCredentials	Trust relationships enabling workload identity federation with external IdPs.
Role Assignments	Microsoft.Authorization/roleAssignments	Grant access by assigning Azure RBAC roles to security principals.
Role Definitions	Microsoft.Authorization/roleDefinitions	Collection of permissions that can be assigned to users, groups, or service principals.

API Management

Name	Resource Type	Description
Azure API Management	Microsoft.ApiManagement/service	Full lifecycle API management platform for publishing, securing, and analyzing APIs.
APIM Gateways	Microsoft.ApiManagement/service/gateways	Self-hosted or managed gateways that process API requests.
APIM APIs	Microsoft.ApiManagement/service/apis	API definitions representing a set of ops available to consumers.
APIM API Operations	Microsoft.ApiManagement/service/apis/operations	Individual HTTP operations (GET, POST, etc.) exposed by an API.
APIM Backends	Microsoft.ApiManagement/service/backends	Backend service definitions that APIs route requests to.

Resource Management

Name	Resource Type	Description
Resource Groups	Microsoft.Resources/resourceGroups	Logical container for grouping related Azure resources.
ARM Deployments	Microsoft.Resources/deployments	Declarative infrastructure deployments using ARM templates or Bicep.
Azure Resource Graph	Microsoft.ResourceGraph	Query service for exploring and analyzing Azure resources at scale.



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