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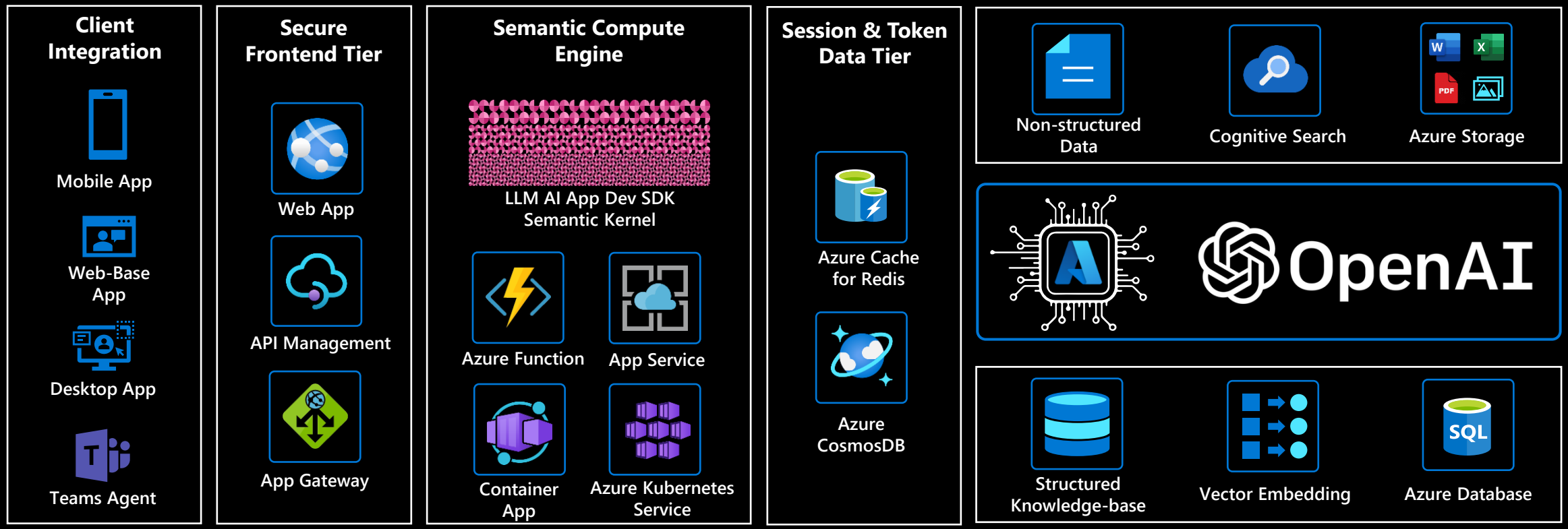
FY23 Q3 Azure In A Day Workshop

Enterprise “GPT-ize” Intelligent App Architecture



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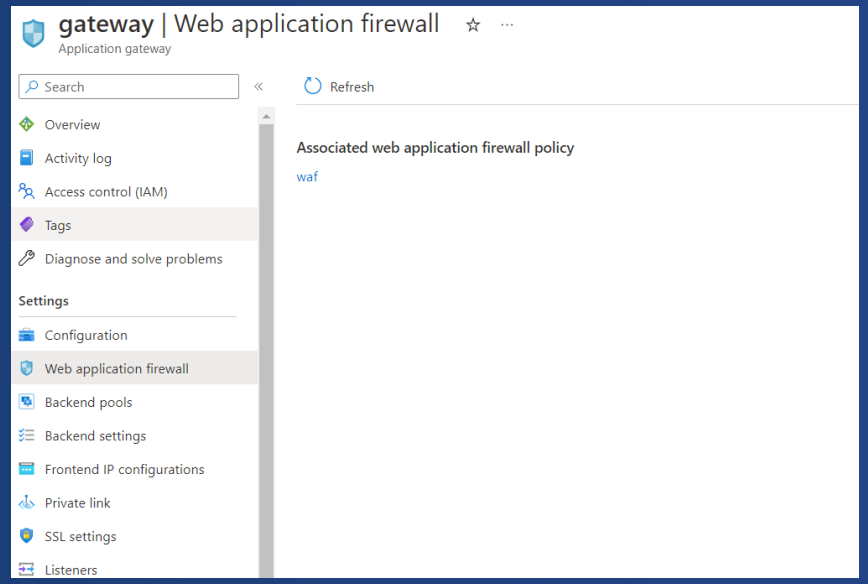
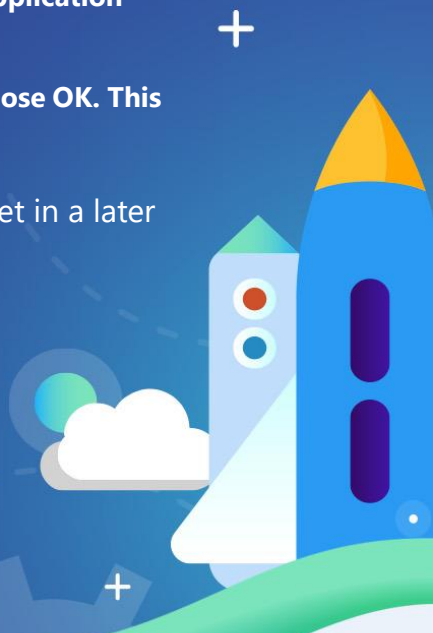


Create an application gateway (Application Gateway)

1.Select Create a resource on the left menu of the Azure portal. The New window appears。
2.Select Networking, and then select Application Gateway in the Featured list 。
3. On the Basics tab, enter these values as the following Application Gateway settings：
   - **Resource group: Select Create new to create a new one**。
   - **Application gateway name: Enter myAppGateway as the name of the application gateway**。
   - **Tier: Select WAF V2**”。
   - **WAF policy: Choose New, type a name for the new policy, and then choose OK. This creates a basic WAF policy with a managed core rule set (CRS).**。
4. Set up the frontend tab: Select Public
5. Set backend tab: Select Backend pool without target (configure the target in a later step)
6. Set the Configuration tab



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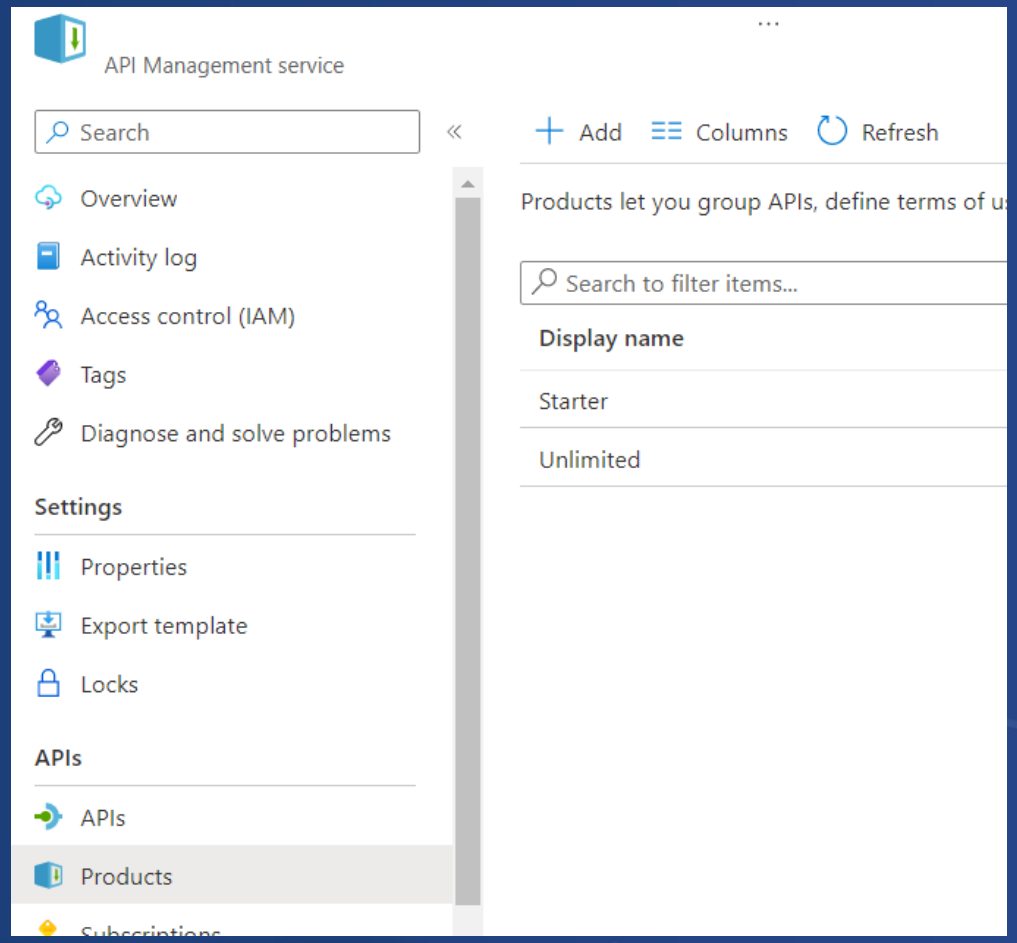
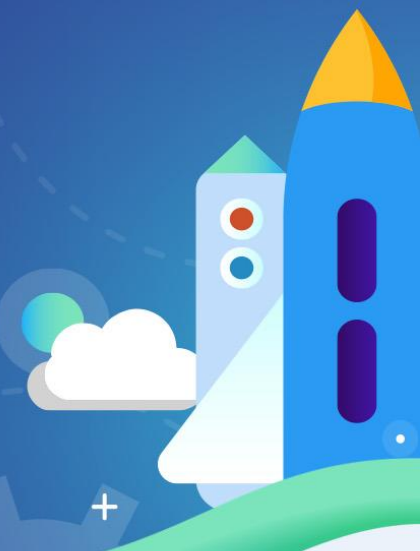


Create Azure API Management (APIM)

1. In the Azure portal menu, select Create a resource. You can also select Create a resource on the Azure Home page。
2. On the Create a resource page, select Integration > API Management.
3. In the Create API Management page, enter the settings
4. Select Review + create.
5. Import and publish the API (next steps)
6. Include your API (next steps)



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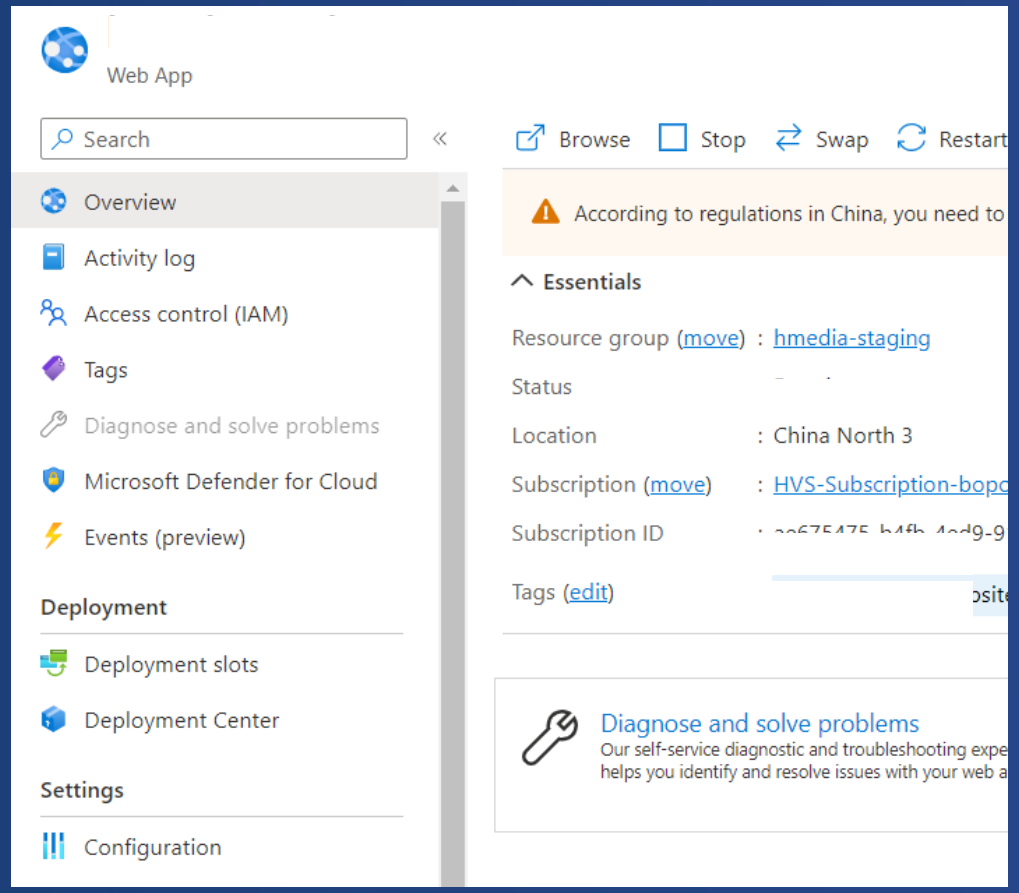
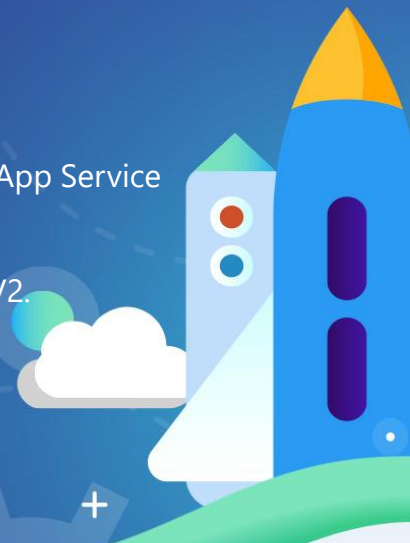


Create App Service: A front-end UI app

1. In the Azure portal, type App Service in the search box. Under Services, select Application Services
2. In the App Service page, select + Create.
3. In the Basics tab, under Project details, make sure the correct subscription is selected, and then select Create new to create a new resource group.
4. Set the Instance Information tab:
   - Under Name, type a globally unique name for your web app.
   - Under Publish, select Code.
   - Under Runtime stack, select .NET 6 (LTS).
   - Select "Operating System": Windows or Linux.
   - Select the Region where the instance runs: Any.
   - Under App Service plan, select Create new to create a new App Service plan:
   - Type a name.
   - Select Change Size to select a pricing tier, such as S3 or P3V2.
   - Deploy the front-end app (next steps)
   -



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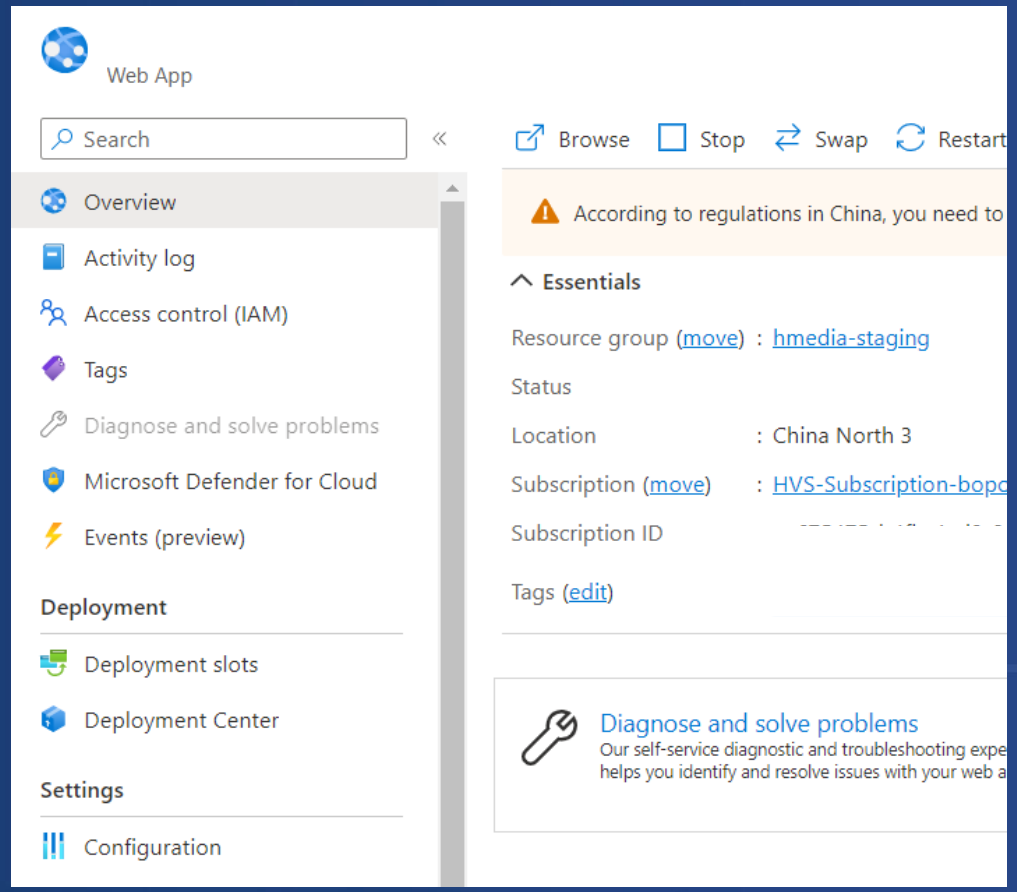
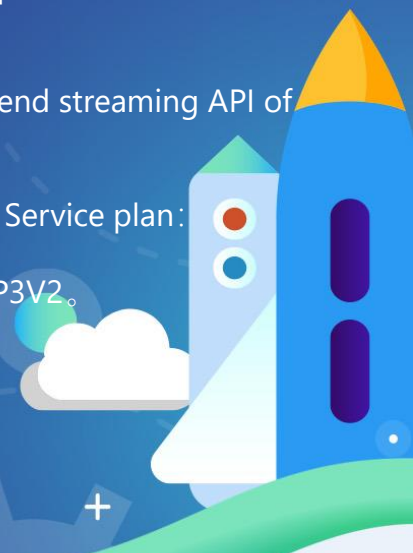


Create an App Service: A back-end API service

1. In the Azure portal, type App Service in the search box. Under Services, select Application Services
2. In the App Service page, select + Create.
3. In the Basics tab, under Project details, make sure the correct subscription is selected, and then select Create new to create a new resource group.
4. Set the Instance Information tab:
   - •Under Name, type a globally unique name for your web app.
   - •Under Publish, select Code.
   - •Under Runtime stack, select .NET 6 (LTS).
   - •Select "Operating System": Select Linux (note that the backend streaming API of this workshop requires Linux OS)
   - •Select the Region where the instance runs: Any。
5. Under App Service plan, select Create new to create a new App Service plan:
   - Type a name.
   - Select Change Size to select a pricing tier, such as S3 or P3V2。
6. Deploy the backend API service (next steps)



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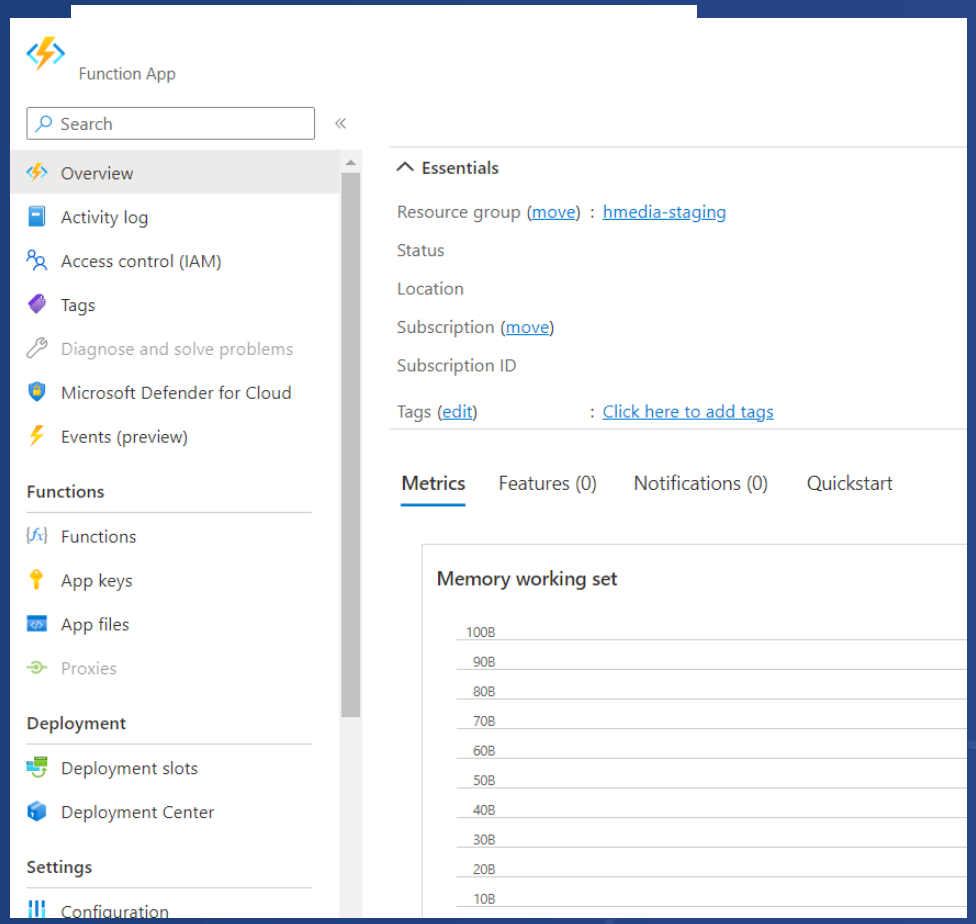
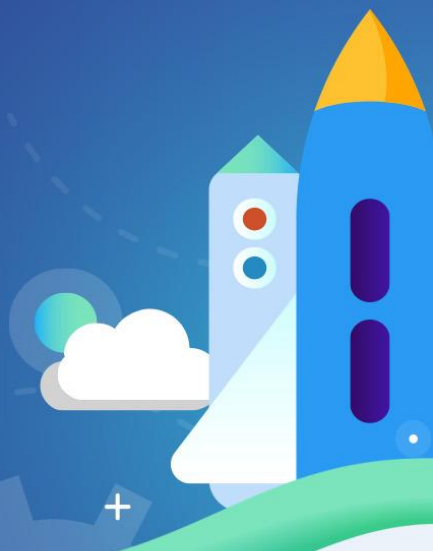


Create a function app service (Azure Function): A back-end API service

1.On the Azure portal menu or in the portal home page, select Create a resource.
2.On the New page, select Compute > Function App 。
3.On the Basics page, set up your function app：
- subscribe
- Resource group
- name
- Runtime language: C# class library
- Version:Latest

4.Select Next: Hosting. Set up：
1.Storage account number
2.Operating system: Windows
3.Plan: Select Consumption (serviceless mode.))
5. Next
6. create
7. Deploy API Service (Next Steps)



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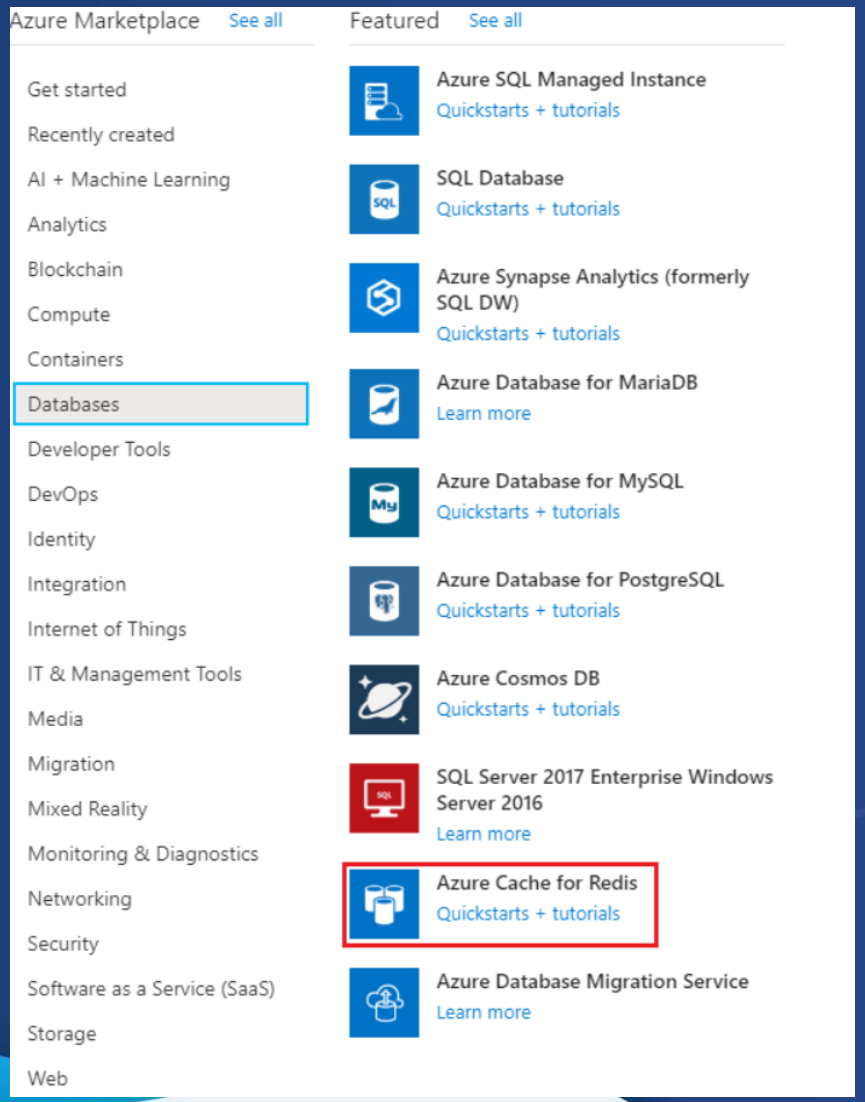
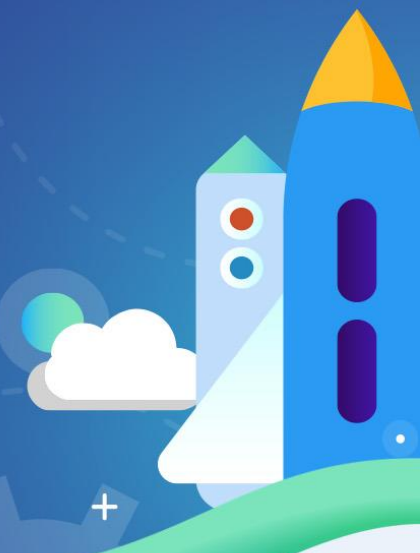


Create a cache service (Azure Redis)

1. Sign in to the Azure portal and select Create a resource 。
2. On the New page, select Database, and then select Azure Cache for Redis”。
3. On the New Redis Cache page, configure the settings for the new cache:
   - subscribe
   - Resource group
   - DNS Name : Unique name
   - location
   - Cache Type: Select a pricing tier, such as "C6 or P3.""
4. The next step is to set up the network
5. Next, "Advanced", select the latest Redis version
6. create
7. Get Redis connection string (next steps)



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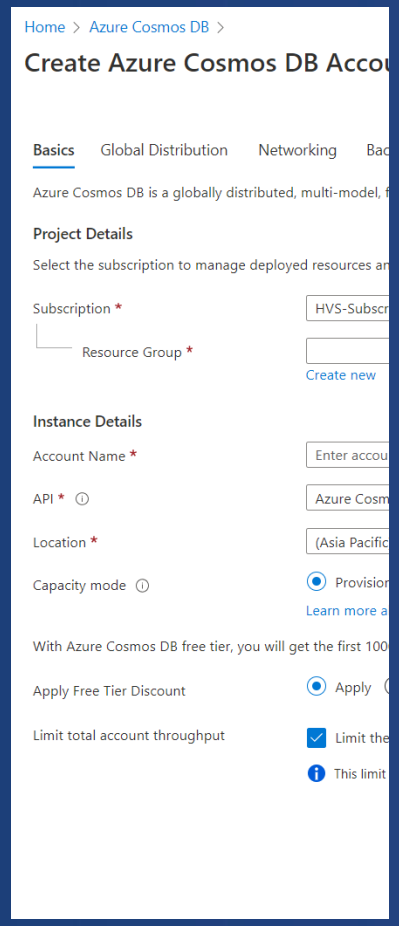
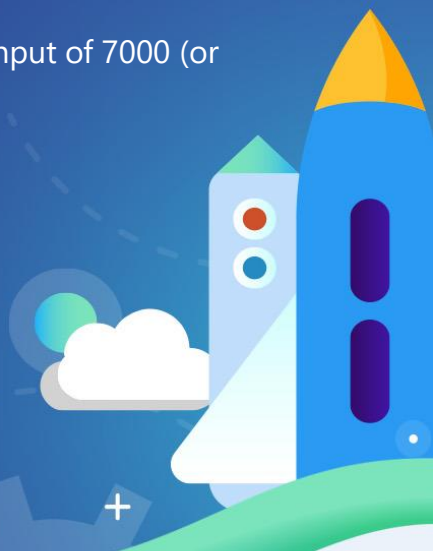


Create CosmosDB

1.In the Azure portal menu or home page, select Create a resource.
2.Search for Azure Cosmos DB. Select Create > Azure Cosmos DB.
3.On the Create Azure Cosmos DB account page, select the Create option in the Azure Cosmos DB for NoSQL section.
4.Select DB API: NoSQL
5.In the Create Azure Cosmos DB account page, enter the basic settings for your new Azure Cosmos DB account:
6.subscription

- Resource group
- Account Name: A unique name
- region
- Capacity mode: Select Provisioned throughput to set a maximum throughput of 7000 (or select Serverless mode.)")

6. Next
7. create
8. Get the database connection string (next steps)



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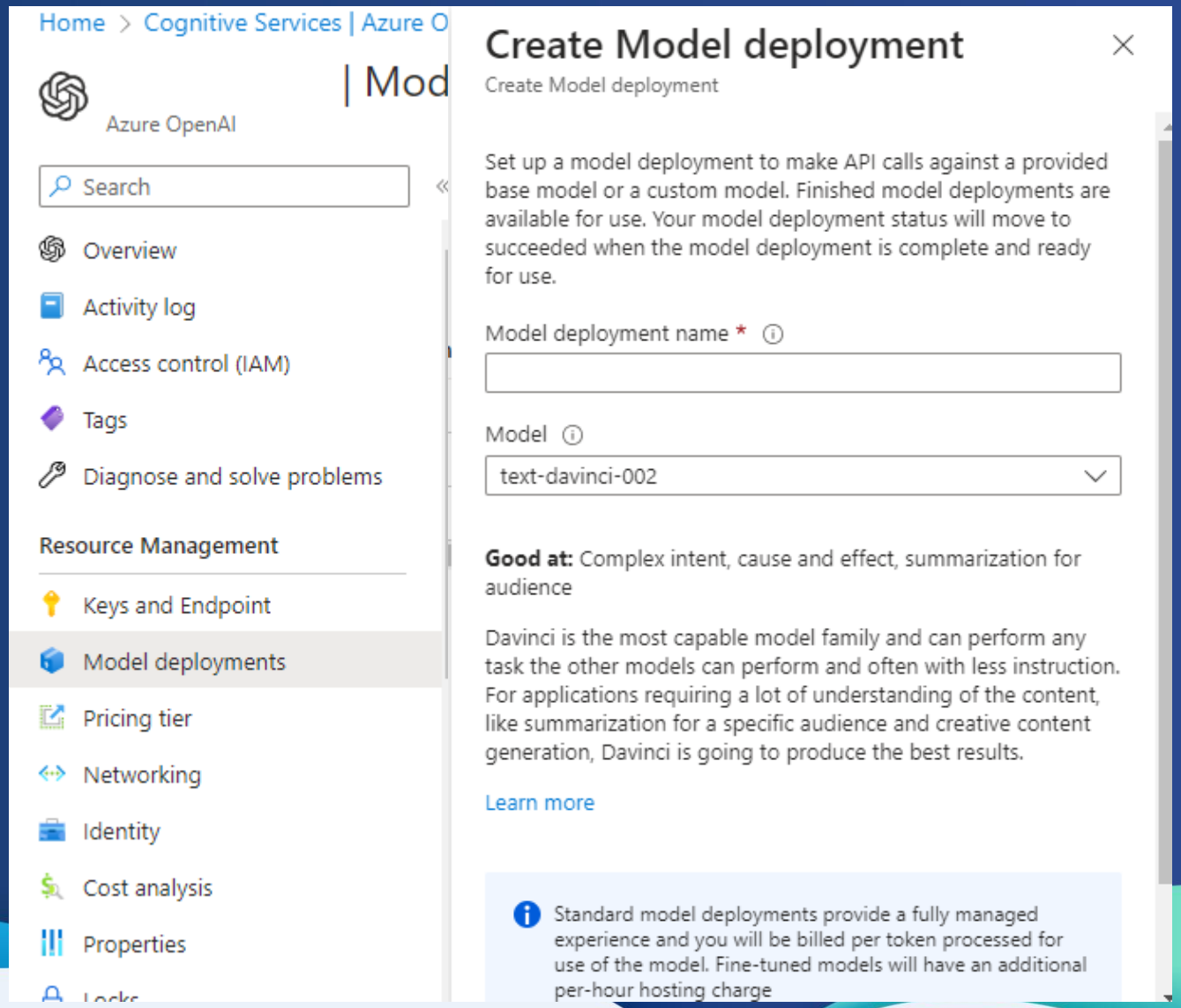
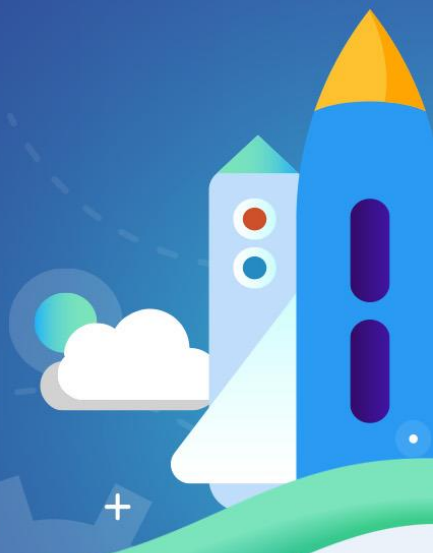


Create Azure OpenAI

1.In the Azure portal menu or home page, select Create a resource.
2.Search for Azure OpenAI. Select Create
3.Create a deployment model: Select text-davinci-003 (GPT3 model)
4. Get the instance in Keys and Endpoint
5.API address
6.Key



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Code : About the Azure OpenAI restful API

POST https://{your-resource-name}.openai.azure.com/openai/deployments/{deployment-id}/completions?api-version={api-version}

Path parameter	type	Whether it is required	illustrate
your-resource-name	string	Yes	Azure OpenAI Resource.
deployment-id	string	Yes	Deployment instance name
api-version	string	yes	YYYY-MM-DD format

Body parameter	type	Default value	illustrate
prompt	string		Prompt words
max_tokens	int	16	Maximum number of tokens

```
var options = new CompletionsOptions
{
    Prompt = { prompt },
    MaxTokens = MaxTokens
};
var completions = await _client.GetCompletionsAsync(_config.DeploymentId, options);
var completion = completions.Value.Choices[0].Text;
return completion;
```

https://learn.microsoft.com/en-us/azure/cognitive-services/openai/reference#completions

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Code: About using the Azure Redis caching service

1. Reduce the frequency of calls to Azure OpenAI through application-layer caching
2. The custom context caching mechanism is weak
3. Improve application layer performance with Redis Queue
4.

```
public class Engine: IEngine
{
    private readonly EngineConfig _config;
    private readonly OpenAIClient _client;
    private readonly CosmosClient _cosmosClient;
    0 references | James Zhou, 17 hours ago | 1 author, 1 change
    public Engine(EngineConfig config)...
    2 references | James Zhou, 17 hours ago | 1 author, 1 change
    public async Task<string> GetCompletionAsync(string userId, string prompt)
    {
        var cachedCompletion = await TryGetCachedCompletionAsync(userId,prompt);
        if (cachedCompletion != null)
        {
            return cachedCompletion;
        }
        else
        {
            var options = new CompletionsOptions
            {
                Prompt = { prompt }
            };
            var completions = await _client.GetCompletionsAsync(_config.DeploymentId, options);
            var completion = completions.Value.Choices[0].Text;
            await AddToCacheAsync(userId, prompt, completion);
            await SaveToDatabaseAsync(userId, prompt, completion);
            return completion;
        }
    }
```

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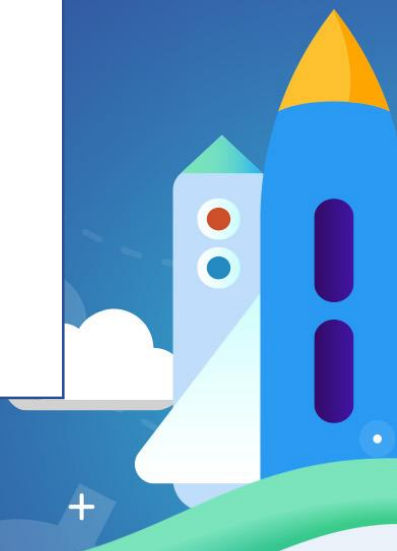
About Redis Windows native development:
https://learn.microsoft.com/en-us/azure/azure-cache-for-redis/cache-development-faq
https://github.com/microsoftarchive/redis/releases



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代码解析: 关于使用Cosmos DB

1. Session recording
2. Embeddings Store (domain knowledge base)

```
var database = _cosmosClient.GetDatabase("completionsDB");

var containerResponse = await database.CreateContainerIfNotExistsAsync(
                id: "completions",
                partitionKeyPath: "/userId",
                throughput: 400
);

await containerResponse.Container.CreateItemAsync<CompletionCacheItem>(new CompletionCacheItem
{
    UserId = userId,
    Prompt = prompt,
    Completion = completion
});
```

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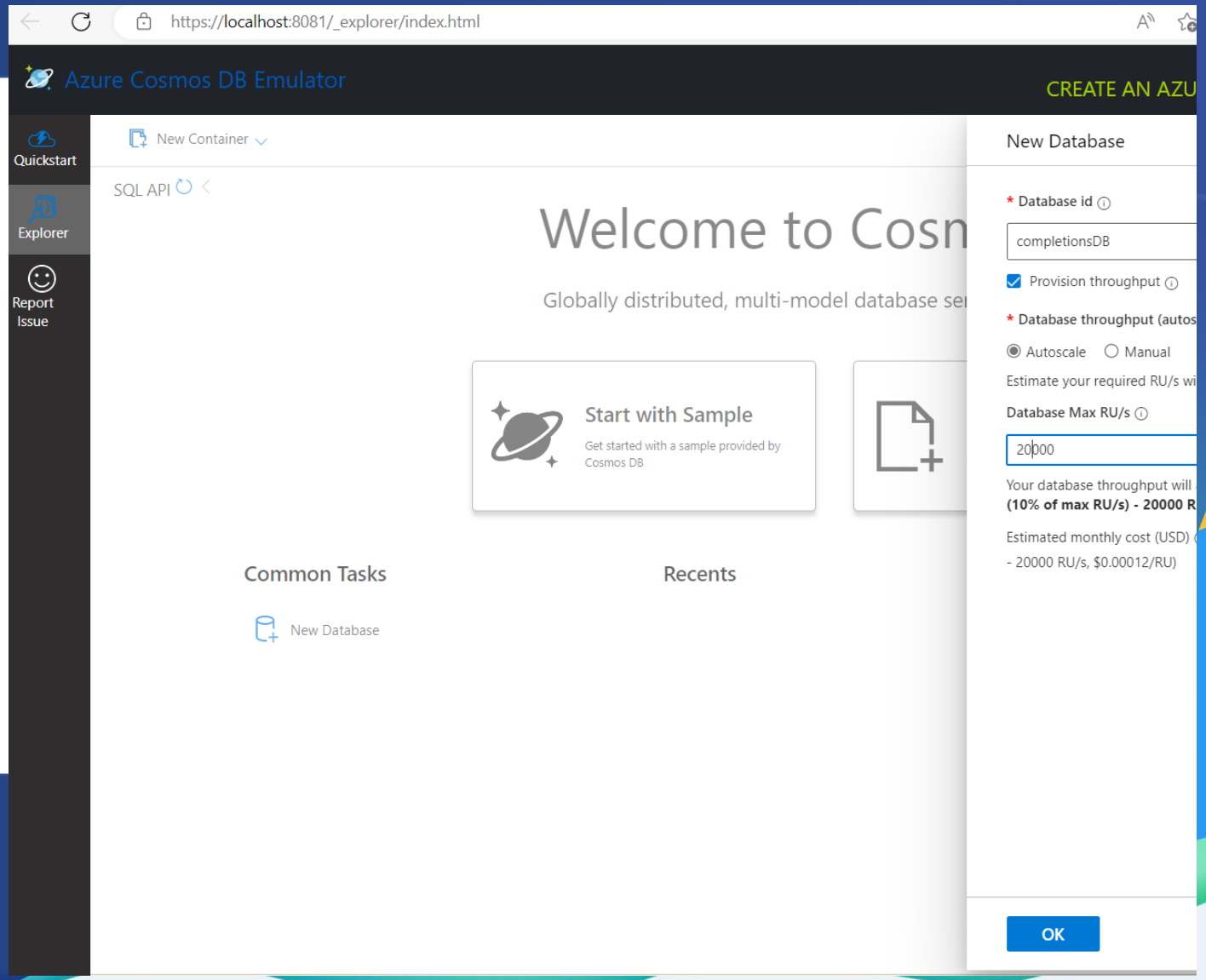
About local development of CosmosDB:

https://learn.microsoft.com/en-us/azure/cosmos-db/local-emulator?tabs=ssl-netstd21

https://localhost:8081/_explorer/index.html



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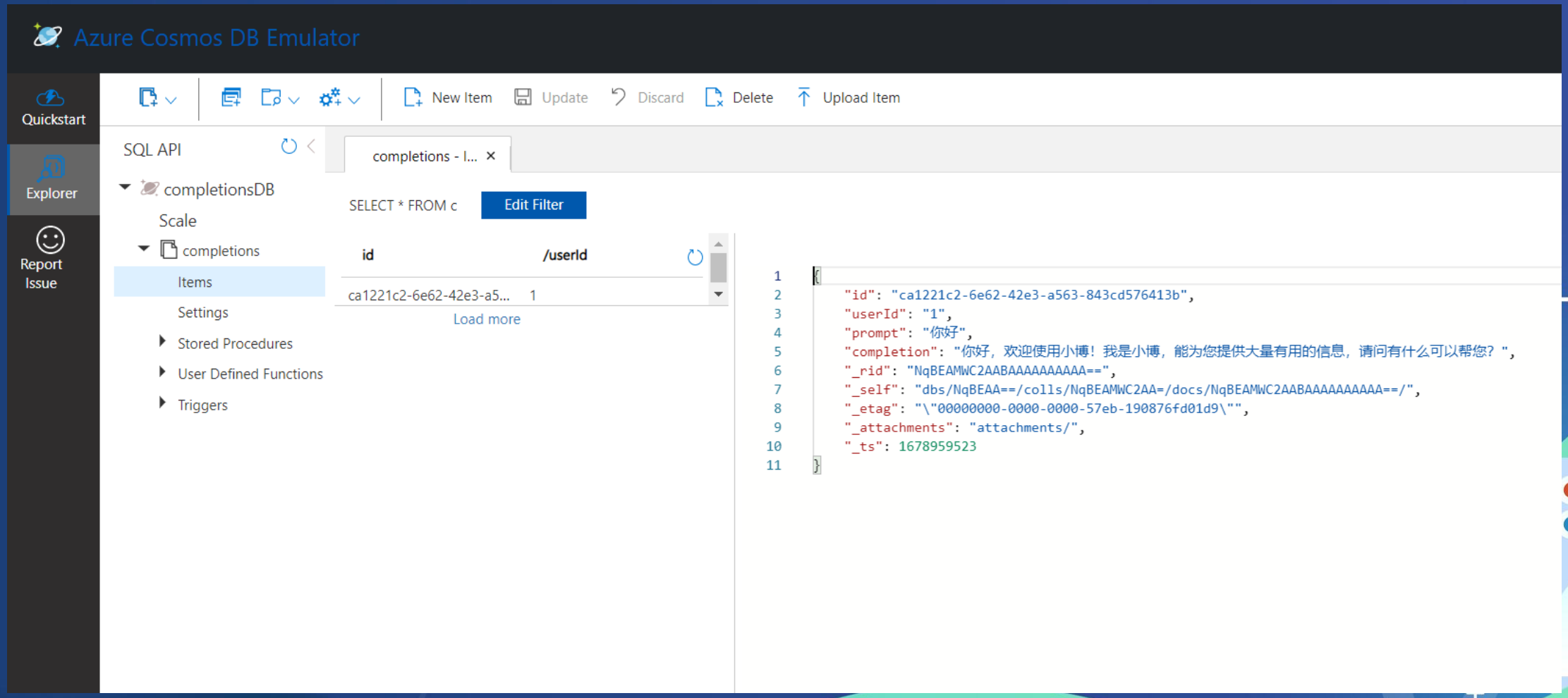

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Code: About configuration information

You must configure the following information:
AzureOpenAIAPIURL
AzureOpenAIKey
AzureOpenAIDeploymentId
RedisConnectionString
CosmosbDBConnectionString
CosmosDBName

```
"EngineConfig": {
  "AzureOpenAIAPIURL": "",
  "AzureOpenAIKey": "",
  "AzureOpenAIDeploymentId": "",
  "RedisConnectionString": "",
  "CosmosDBConnectionString": "",
  "CosmosDBName": "completionsDB",
```

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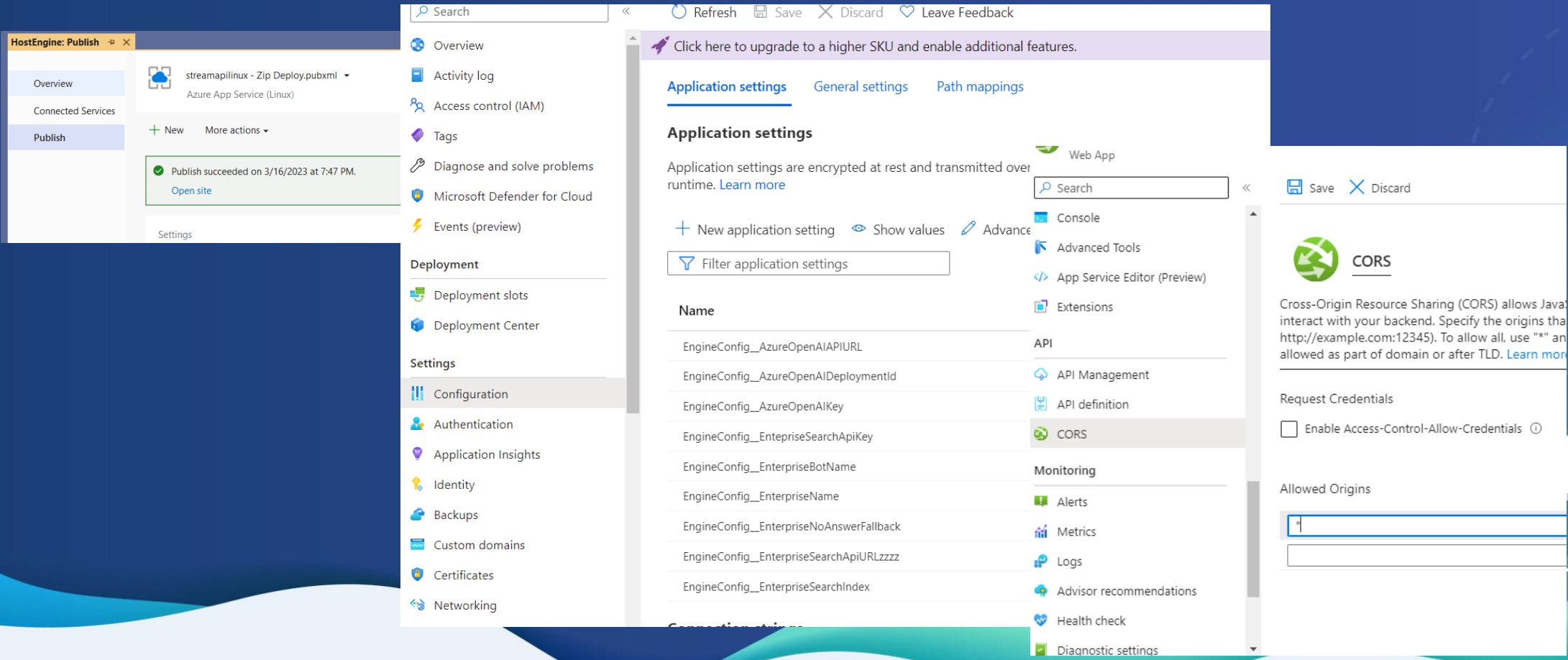
Deployment and Configuration: Backend Services (APIs)



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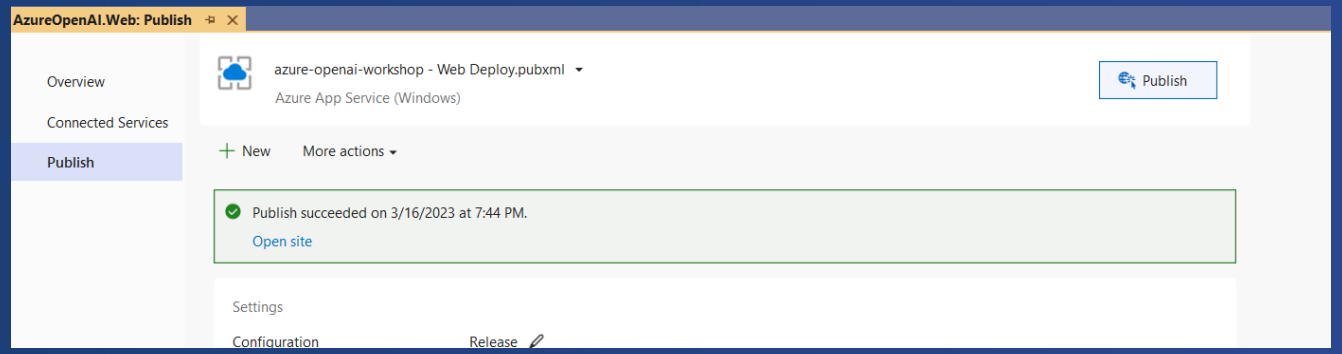
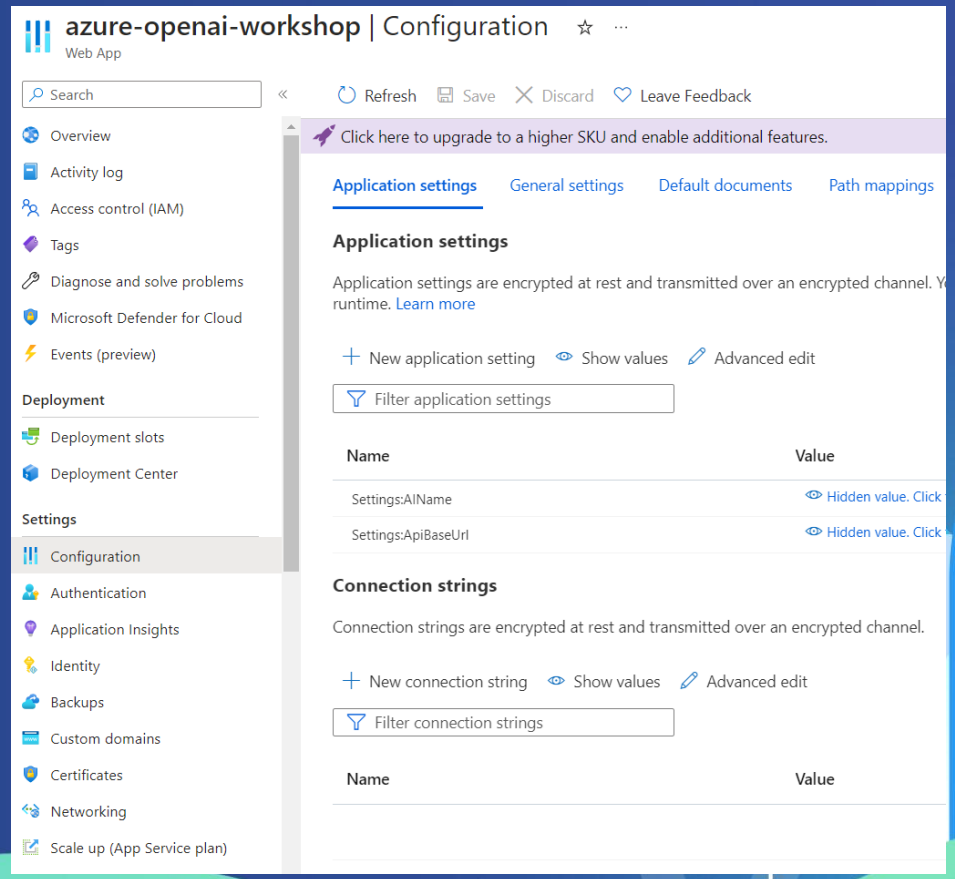
Deployment & Configuration: Front-End Apps (UI)





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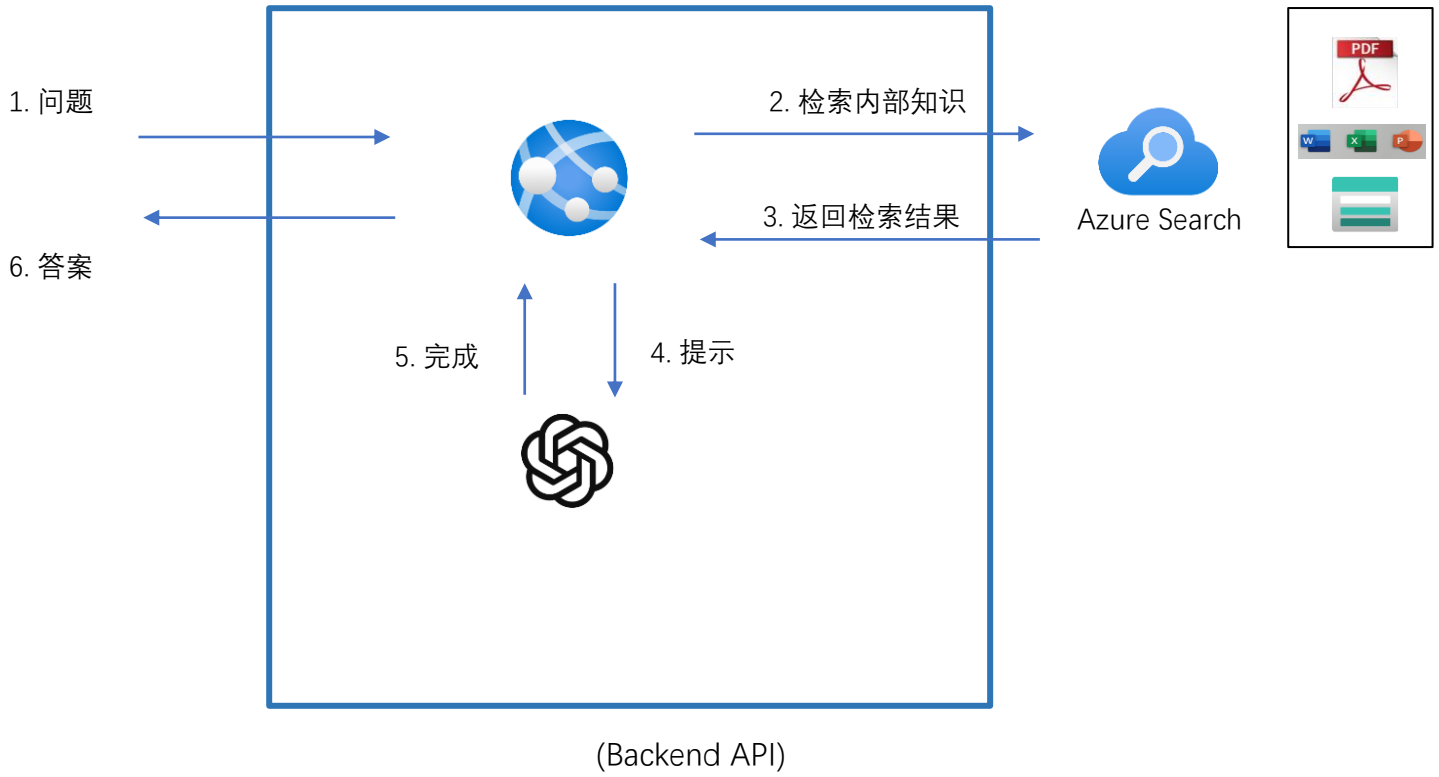
ChatGPT + enterprise knowledge base/data



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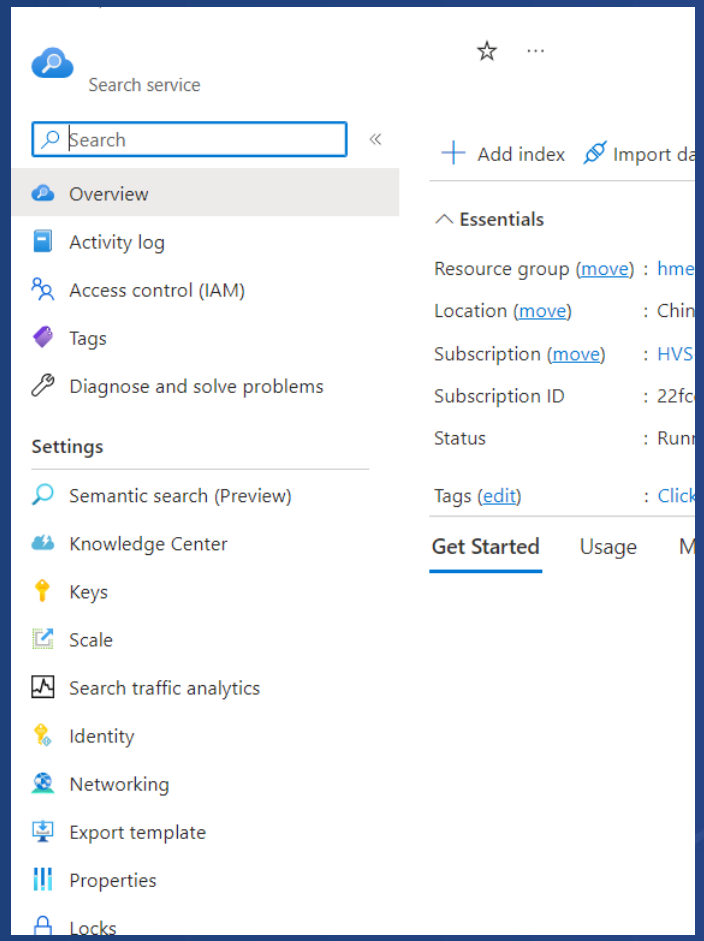
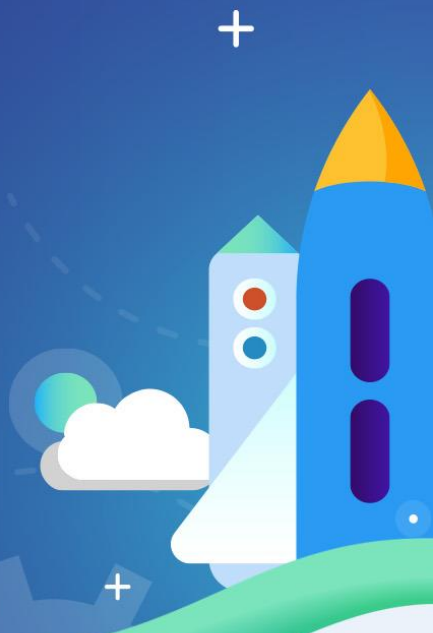
Create an Azure Search service





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Create an Azure Search index

```
var indexClient = new SearchIndexClient(new Uri(searchServiceEndPoint), new AzureKeyCredential(searchServiceKey));
var indexerClient = new SearchIndexerClient(new Uri(searchServiceEndPoint), new AzureKeyCredential(searchServiceKey));

var searchFields = new List<SearchField>
{
    new SimpleField("Id", SearchFieldDataType.String) { IsKey = true, IsFilterable = true, IsSortable = true},
    new SearchableField("Name") { IsFilterable = true, IsSortable = true },
    new SearchableField("Content"), // large content don't enable filterable, sortable, faceting
};
var index = new SearchIndex(searchIndextName, searchFields);
await indexClient.CreateOrUpdateIndexAsync(index);

var docDataSource = new SearchIndexerDataSourceConnection(
    assetIndexDataSourceName,
    SearchIndexerDataSourceType.AzureBlob,
    assetBlobConnectionString,
    new SearchIndexerDataContainer(assetBlobContainerName)
);
await indexerClient.CreateOrUpdateDataSourceConnectionAsync(docDataSource);
var docIndexerParameters = new IndexingParameters();
docIndexerParameters.IndexingParametersConfiguration = new IndexingParametersConfiguration();
docIndexerParameters.IndexingParametersConfiguration.IndexedFileNameExtensions = ".pdf, .docx, .doc, .docm, .pptx, .ppt, .pptm";
docIndexerParameters.IndexingParametersConfiguration.DataToExtract = BlobIndexerDataToExtract.ContentAndMetadata;
var docIndexer = new SearchIndexer(assetIndexerName, docDataSource.Name, index.Name)
{
    Parameters = docIndexerParameters,
    Schedule = new IndexingSchedule(TimeSpan.FromDays(1)),
    FieldMappings =
    {
        new FieldMapping("Id") { TargetFieldName = "Id"},
        new FieldMapping("Name") { TargetFieldName = "Name", MappingFunction = new FieldMappingFunction("urlDecode")},
        new FieldMapping("content") { TargetFieldName = "Content"}
    }
};
await indexerClient.CreateOrUpdateIndexerAsync(docIndexer);
```

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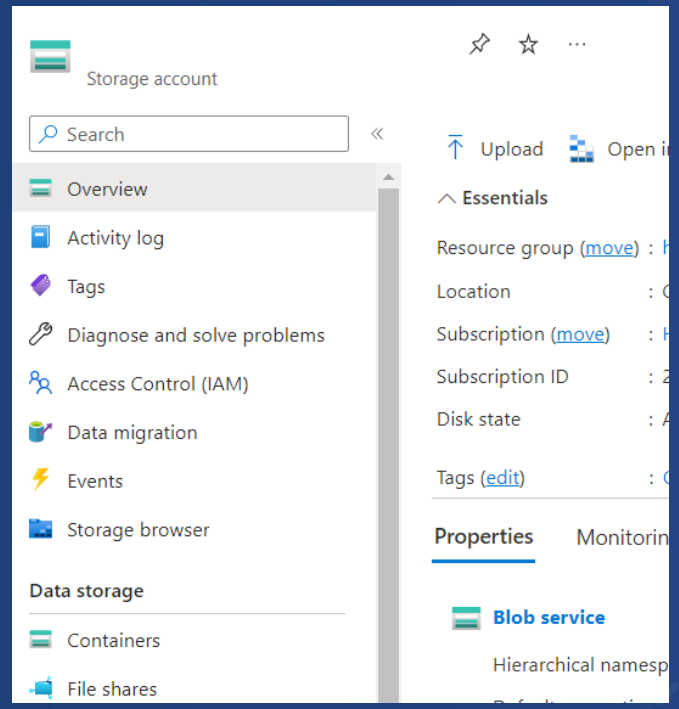
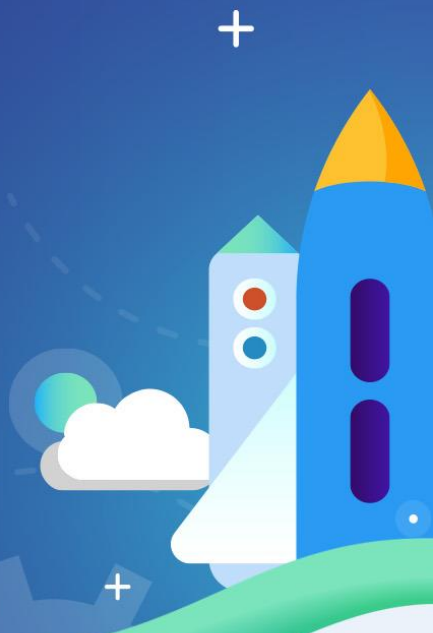
Create a Storage Account (to store enterprise knowledge base files)



1. Create a storage account
2. Create a container in the Blob service "workshop"



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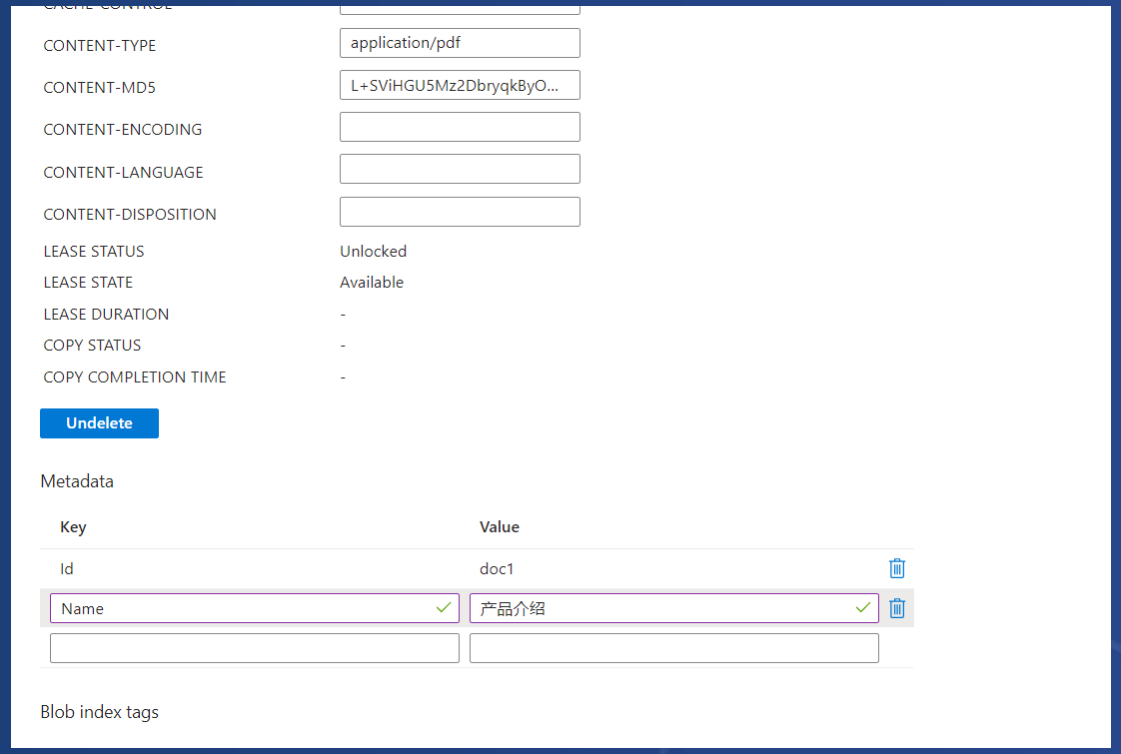
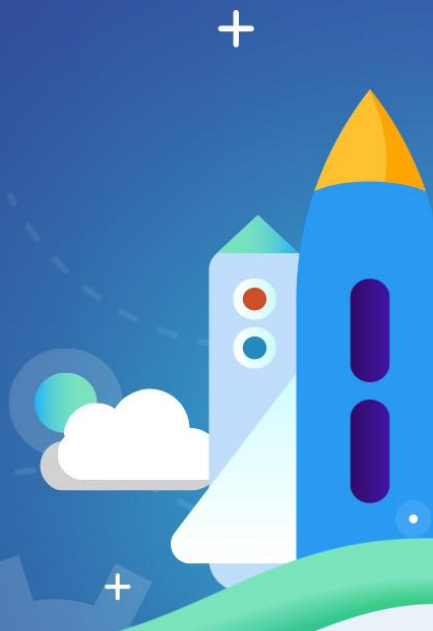
Upload a sample document (enterprise knowledge base file)



1. Upload the document
2. Edit the document metada:
   Id
   Name



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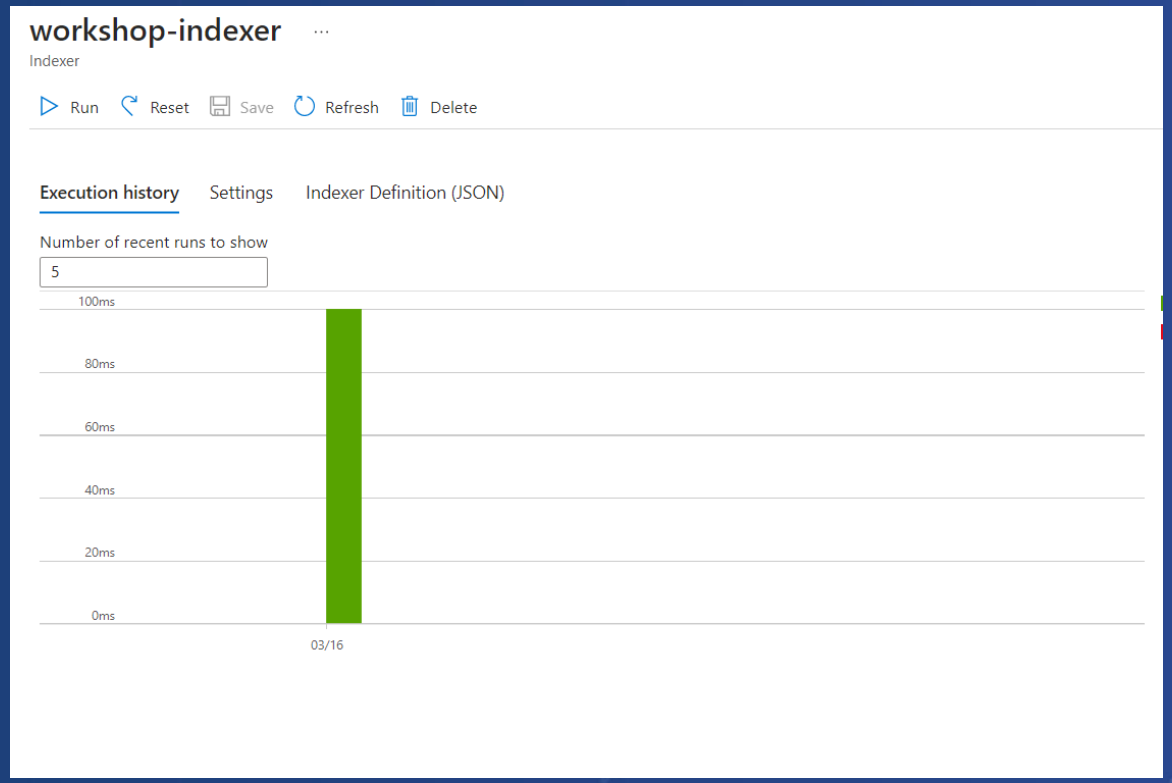
Run the indexer



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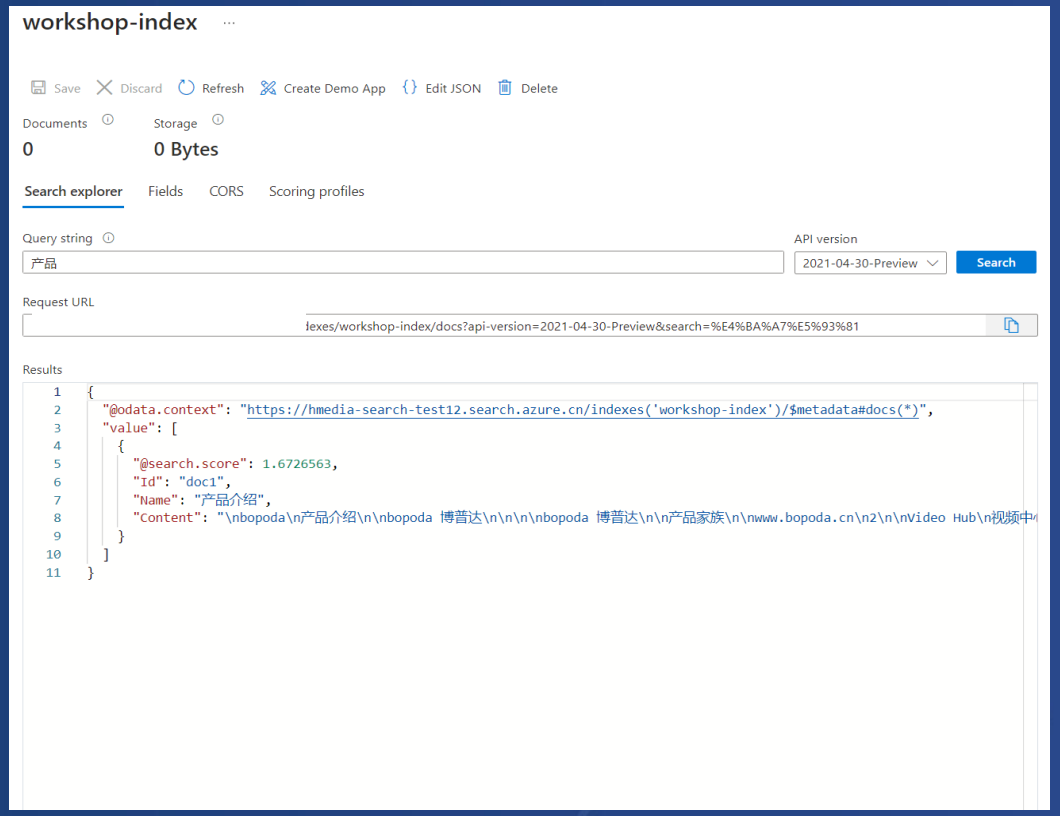
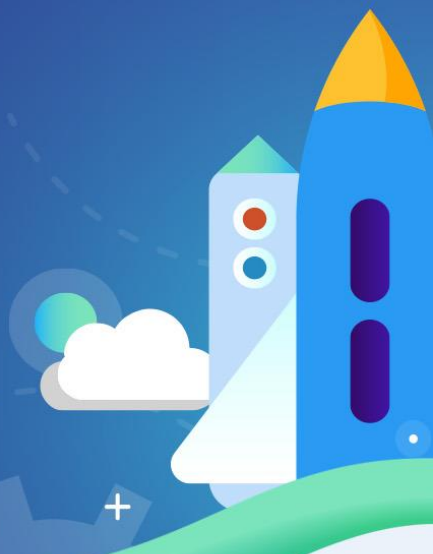
Debug indexes



reference：
https://learn.microsoft.com/en-us/azure/search/search-explorer



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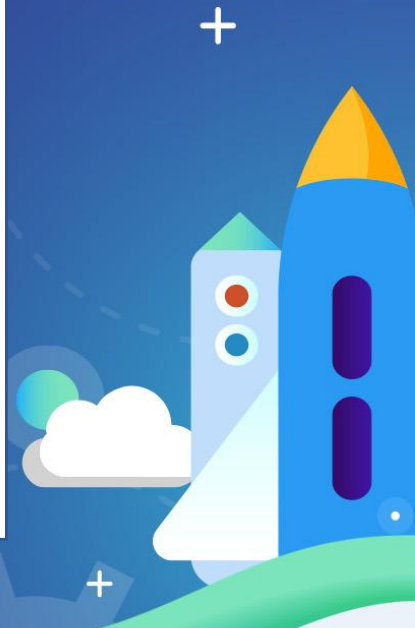
ChatGPT + enterprise knowledge base/data

```
var internalData = await SearchEnterpriseData(prompt);
var internalResult = internalData?.Content ?? "";
var options = new CompletionsOptions
{
    MaxTokens = MaxTokens,
    Prompt = { BuildPropmtGPT3(prompt, internalResult) }
};
var completions = await _client.GetCompletionsAsync(_config.DeploymentId, options);
var completion = completions.Value.Choices[0].Text;
return completion;
```



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Code: About configuration information

You must configure the following information：
EnterpriseBotName
EnterpriseName
EnterpriseNoAnswerFallback
EnterpriseSearchApiURL
EnterpriseSearchApiKey
EnterpriseSearchIndex

```
"EnterpriseBotName": "",
"EnterpriseName": "",
"EnterpriseNoAnswerFallback": "",
"EnterpriseSearchApiURL": "",
"EntepriseSearchApiKey": "",
"EnterpriseSearchIndex": ""
}
```

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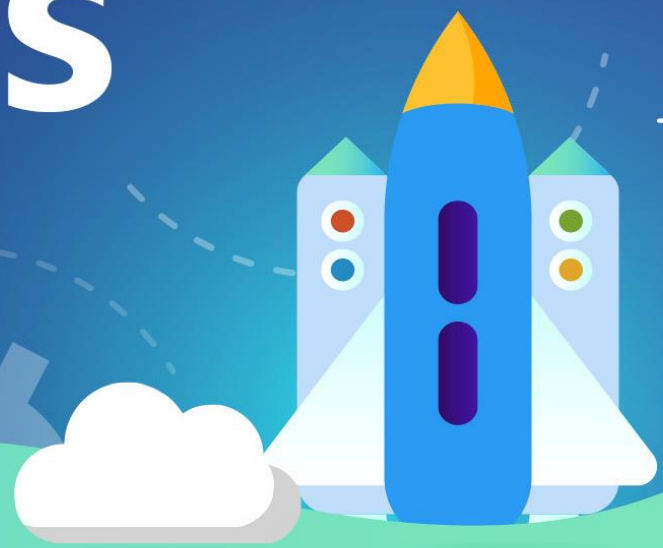
Thanks