

Medical Q&A Using GraphRag

Oct 3, 2024

Agenda

- Dataset & Data Ingestion
- Graph
- Evaluation
- Graph Databases
- Deployment
- Next Steps

Dataset

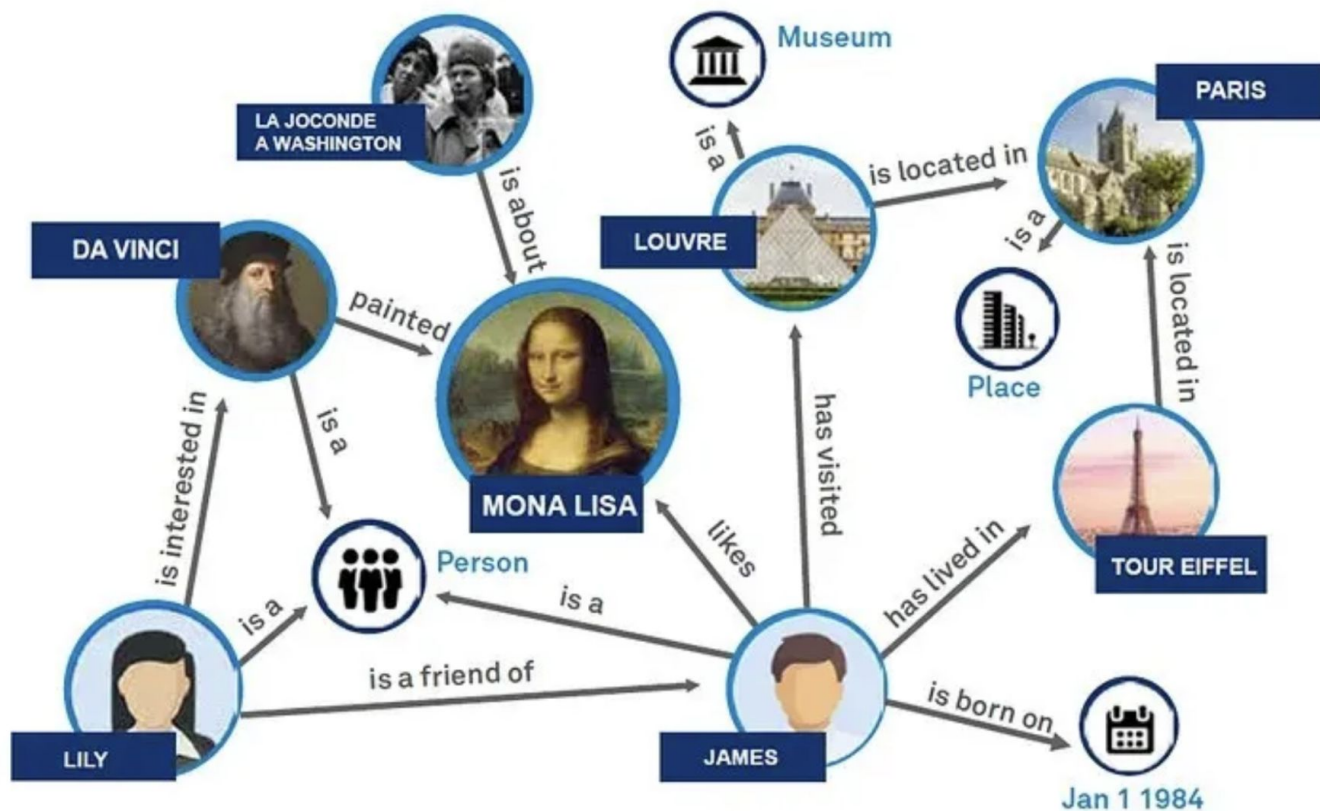
We built the small model locally, we extracted **25** papers, 25 questions, and 25 answers. Below are some examples.

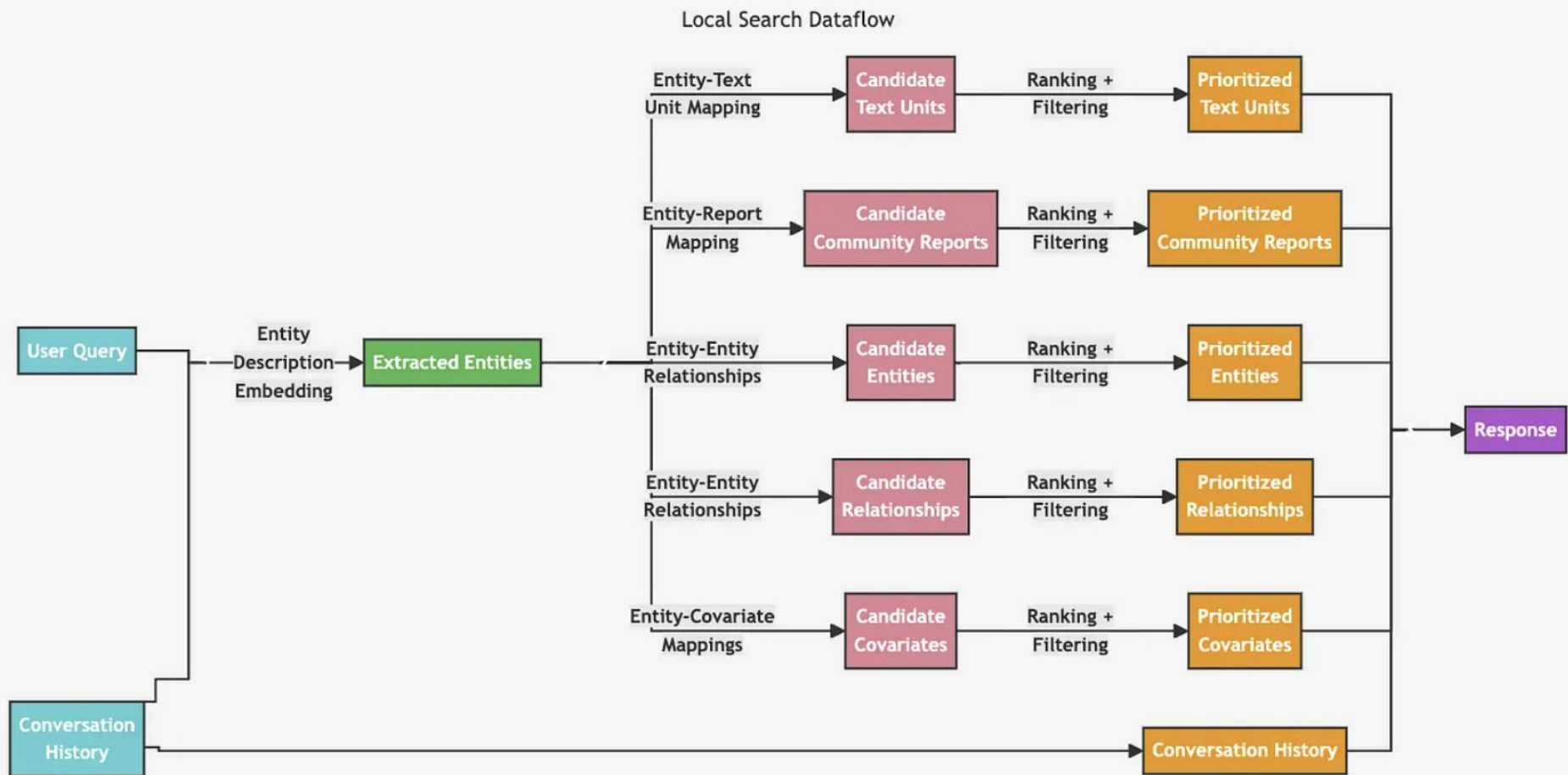
Question	Answer	Source
What is the outcome of steroid (combination) therapy in treating patients other comorbidities with severe sepsis ?	Two papers agreed with the use of steriod therapy the cumulative trial data suggest that if steroids do in fact improve survival in septic shock, the effect is modest at best.	APROCCHSS
How has Early Goal-Directed therapy (egdt) impacted mortality rate in Sepsis ?	There is no impact in mortality rate using egdt .	ProMISe

Data Ingestion

- ChatGPT to scrape Abstract and Conclusion
- Downloading PDFs and putting it into a Google Docs
- Using PubMed ID to scrape directly the abstract

Graph





Evaluating Models Using 5 Documents

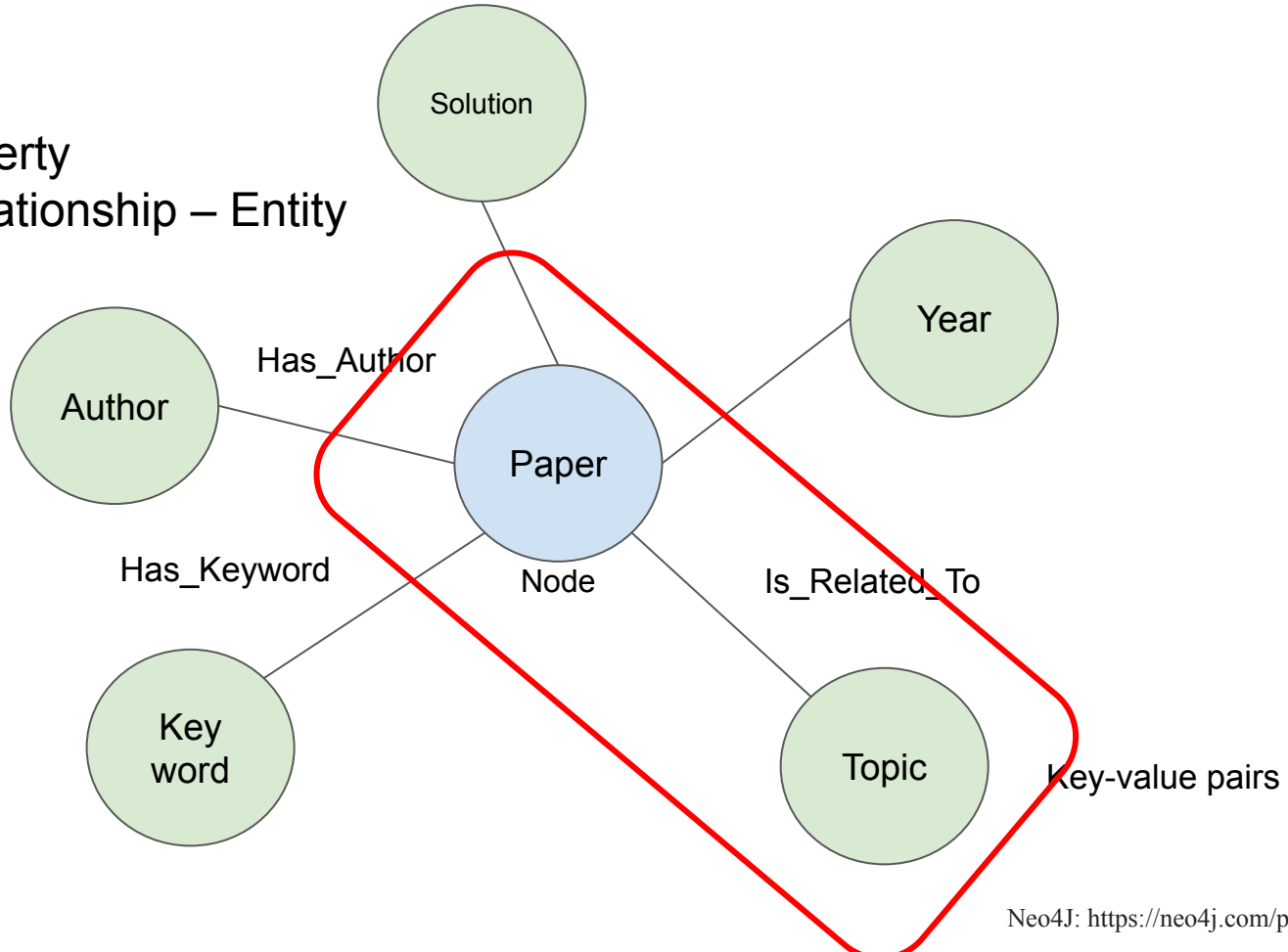
Question	Answer (Ground Truth)	Answer (Simple graphRAG)*	Answer (Naïve RAG)
Does administration of cisatracurium improve survival when compared to placebo in ICU patients undergoing mechanical ventilation for early severe ARDS	Paralysis with cisatracurium for 48 hours in patients with early severe ARDS improves 90 day survival and increases ventilator-free days.	Based on the provided summary, there is insufficient information to determine whether the administration of cisatracurium improves survival compared to placebo in ICU patients undergoing mechanical ventilation for early severe ARDS. To answer this query, further detailed data or studies focusing on the effects of cisatracurium on survival rates in this specific patient population would be necessary.	According to the study, the administration of cisatracurium besylate in ICU patients undergoing mechanical ventilation for early severe ARDS does improve survival when compared to placebo. ...(complete answer)**

* graphRAG: chunk size = 600, time used for conducting the graph ~3 hrs

** RAG: correctly selected the correct document

Neo4j

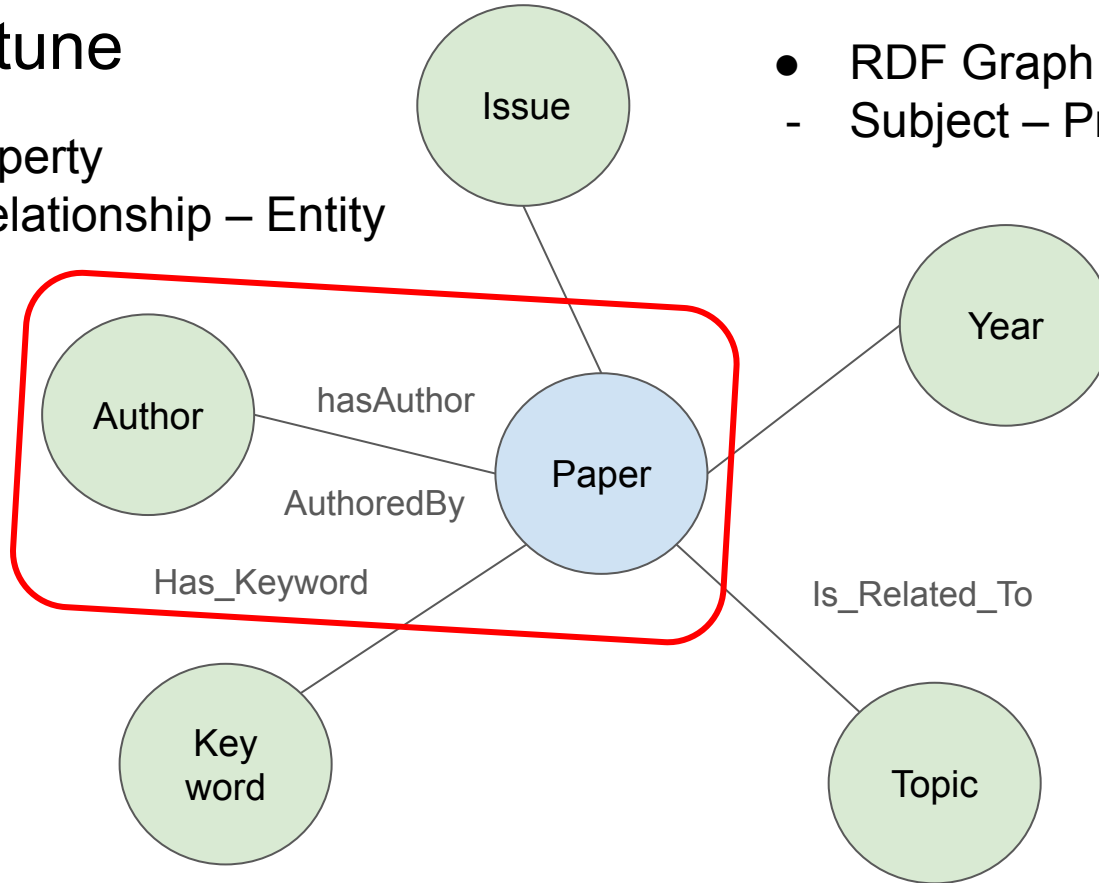
- Graph Property
 - Entity – Relationship – Entity



AWS Neptune

- Graph Property
 - Entity – Relationship – Entity

- RDF Graph
 - Subject – Predicate – Object



Neo4j vs. AWS Neptune

	Neo4j	AWS Neptune
Query Language	Cypher (Similar to SQLite)	Gremlin, SPARQL (Hard to learn)
Management	Self-managed or Neo4j Aura	Fully-managed
Scalability	Limited scalability in large datasets	Auto-scalability, optimized for large datasets
Community Support	Strong open source community	Managed by AWS
Cloud Integration	Cloud or on-premise options	Full AWS integration
Cost	Enterprise/Aura (may be expensive)	Usage-based cost
Flexibility	Flexible data modeling	Choose between Gremlin and SPARQL models

AWS User Group

[IAM](#) > User groups

User groups (4) [Info](#)

A user group is a collection of IAM users. Use groups to specify permissions for a collection of users.



Delete

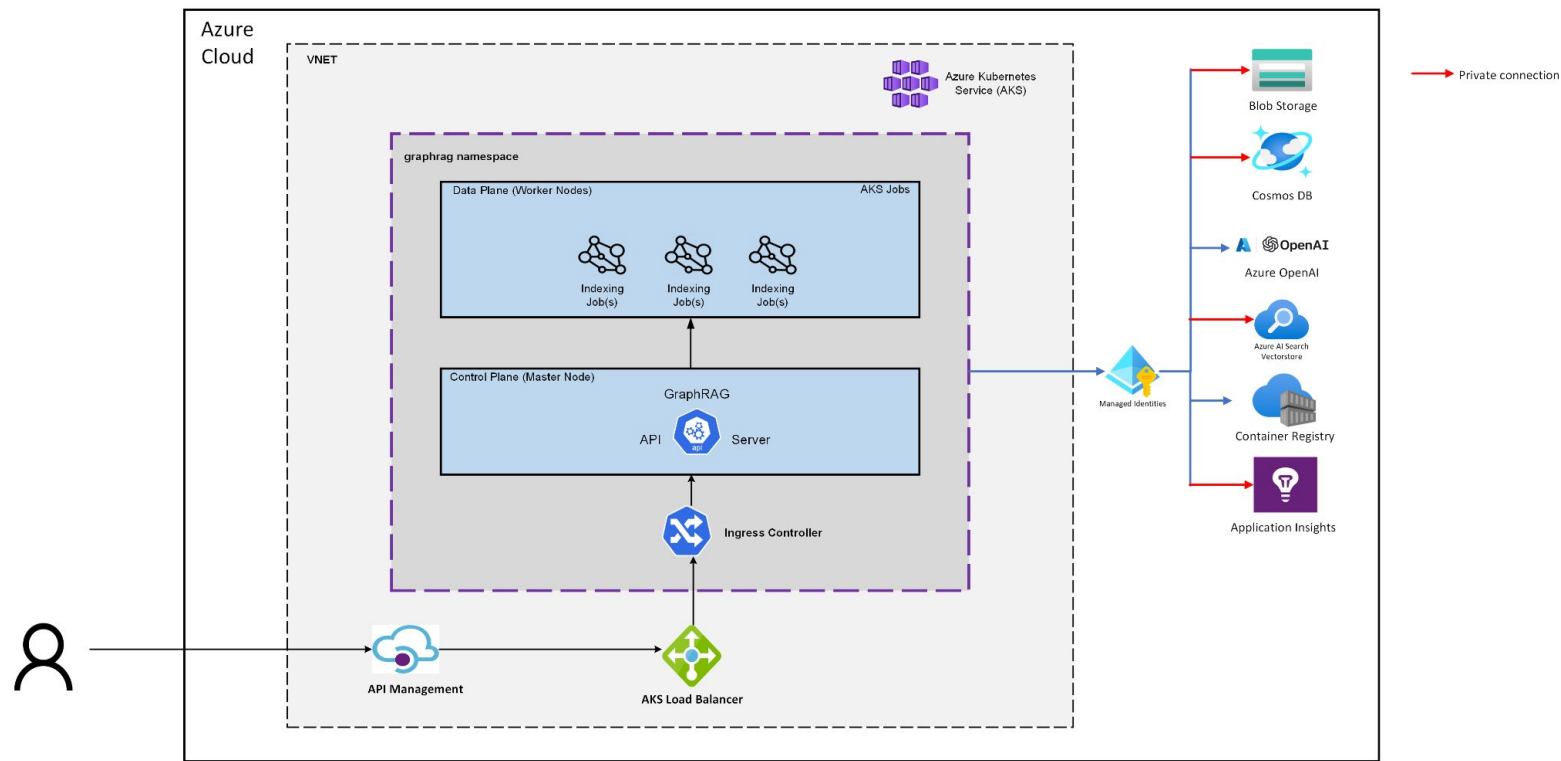
Create group

Search

< 1 >

<input type="checkbox"/>	Group name ▲	Users ▼	Permissions ▼	Creation time ▼
<input type="checkbox"/>	CodeCatalyst_Students	1	✓ Defined	13 days ago
<input type="checkbox"/>	IDS706_Student	⚠ 0	⚠ Not defined	16 days ago
<input type="checkbox"/>	Meta_Capstone	⚠ 0	⚠ Not defined	7 days ago
<input type="checkbox"/>	Rag_Team_Group	3	✓ Defined	7 days ago

Azure GraphRAG Accelerator



Deployment parameters and Model configuration

```
1  {
2    "GRAPHRAG_API_BASE": "https://azure-openai-rag-team.openai.azure.com/",
3    "GRAPHRAG_API_VERSION": "2023-03-15-preview",
4    "GRAPHRAG_EMBEDDING_DEPLOYMENT_NAME": "text-embedding-ada-002",
5    "GRAPHRAG_EMBEDDING_MODEL": "text-embedding-ada-002",
6    "GRAPHRAG_LLM_DEPLOYMENT_NAME": "gpt-4",
7    "GRAPHRAG_LLM_MODEL": "gpt-4",
8    "LOCATION": "East US",
9    "RESOURCE_GROUP": "rag_team_resources"
10 }
```

```
Microsoft Entra ID Management - Registered accounts - Registered
• vscode@codespaces-e55088:/graphrag-accelerator$ az account show
{
  "environmentName": "AzureCloud",
  "homeTenantId": "cb72c54e-4a31-4d9e-b14a-1ea36dfac94c",
  "id": "1756adbe-5c05-44c3-abc9-e1cc5b1e7df3",
  "isDefault": true,
  "managedByTenants": [],
  "name": "Rag_Team",
  "state": "Enabled",
  "tenantDefaultDomain": "ProdDuke.onmicrosoft.com",
  "tenantDisplayName": "Duke University",
  "tenantId": "cb72c54e-4a31-4d9e-b14a-1ea36dfac94c",
  "user": {
    "name": "zz347@duke.edu",
    "type": "user"
  }
}
```

Model deployments

Deploy a model with your private API key and an endpoint URI (Uniform Resource Identifier).

Model deployments App deployments

[+ Deploy model](#) [Refresh](#) [Edit](#) [Delete](#) [Open in playground](#) [Reset view](#)

Name	Model name	Model version	State	Model retirement date	Content filter	Deployment type
gpt-4	gpt-4	0613	Succeeded	Jun 5, 2025 8:00 PM	DefaultV2 ⌵	GlobalBatch
text-embedding-ada-002	text-embedding-ada-002	2	Succeeded	Apr 2, 2025 8:00 PM	DefaultV2 ⌵	Standard

Deployment Setbacks

```
-h      Print this help menu.
-d      Disable private endpoint usage.
-g      Developer mode. Grants deployer of this script access to Azure Storage, AI Search, and CosmosDB. Will disable private endpoints (-d) and enable debug mode.
-p      A JSON file containing the deployment parameters (deploy.parameters.json).
```



```
Checking for required tools... Done.
Checking required parameters... Done.
Checking optional parameters...
  setting APIM_TIER=Developer
  setting AISEARCH_ENDPOINT_SUFFIX=search.windows.net
  setting AISEARCH_AUDIENCE=https://search.azure.com
  setting PUBLISHER_NAME=publisher
  setting PUBLISHER_EMAIL=publisher@microsoft.com
  setting CLOUD_NAME=AzurePublicCloud
  setting REPORTERS=blob,console,app_insights
  setting GRAPHRAG_COGNITIVE_SERVICES_ENDPOINT=https://cognitiveservices.azure.com/.default
  setting GRAPHRAG_IMAGE=graphrag:backend
```

```
Done.
Checking if resource group rag_team_resources exists... Yes.
Checking if sshkey exists... No.
Creating sshkey... WARNING: Connection verification disabled by environment variable AZURE_CLI_DISABLE_CONNECTION_VERIFICATION
/opt/az/lib/python3.11/site-packages/urllib3/connectionpool.py:1063: InsecureRequestWarning: Unverified HTTPS request is being made to host 'management.azure.com'. Adding certificate verification is strongly advised. See: https://urllib3.readthedocs.io/en/1.26.x/advanced-usage.html#ssl-warnings
  warnings.warn(
WARNING: Connection verification disabled by environment variable AZURE_CLI_DISABLE_CONNECTION_VERIFICATION
/opt/az/lib/python3.11/site-packages/urllib3/connectionpool.py:1063: InsecureRequestWarning: Unverified HTTPS request is being made to host 'management.azure.c
```

```
}}
Assigning 'Cognitive Services OpenAI Contributor' role to managed identity... _____
{ Uh oh, an error has occurred. }
{ Please see message below. }

  ~ ~
  \o/ \o/
  ~ ~

Unable to parse service principal id from azure outputs, exiting...
```


Next Steps:

- Increase Dataset Size
 - Documents
 - Questions/ Answers
- Study ways to Evaluate Answers
- Dive into Graph Database Storage with simple model (workshop for Neo4j)
- Finish deploying Azure GraphRAG accelerator `css`

Make something happen locally first, understand it.

And then think about do in on the cloud.

Start with chunk size (600-1200) and try other things later. Oct. 21

Backup

Complete RAG Response

According to the study, the **administration of cisatracurium besylate in ICU patients undergoing mechanical ventilation for early severe ARDS does improve survival** when compared to placebo.

Key findings from the trial include:

- The **hazard ratio for death at 90 days** in the **cisatracurium group**, as **compared with the placebo group**, was **0.68** (95% confidence interval [CI], 0.48 to 0.98; $P=0.04$), indicating a significant survival benefit after adjustment for baseline differences.
- The **crude 90-day mortality rate was lower in the cisatracurium group** (31.6%) compared to the placebo group (40.7%), although this difference was not statistically significant ($P=0.08$).
- **Mortality at 28 days was significantly lower with cisatracurium** (23.7%) compared to placebo (33.3%) ($P=0.05$).
- The **administration of cisatracurium did not significantly increase** the rate of **ICU-acquired paresis**.

Thus, the study concludes that **early administration of the neuromuscular blocking agent cisatracurium improves adjusted 90-day survival** and **increases the time off the ventilator for patients with severe ARDS**, without increasing the incidence of muscle weakness.

[BACK](#)