Powering Generative AI Apps With Redis Cloud and Amazon Bedrock

April 11, 2024
Boston

Introductions

- Solutions Architect

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Redis

- Senior Partner Solutions Architect

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AWS

Agenda

01 Intro to Redis	1:00 - 1:45 p.m.
02 Break	1:45 - 2:00 p.m.
03 Intro to Amazon Bedrock	2:00 - 2:45 p.m.
04 Break	2:45 - 3:00 p.m.
05 Hands-on lab	3:00 - 4:30 p.m.
06 Open discussion	4:30 - 5:00 p.m.

How familiar are you with Redis?

1. Redis? Sounds like a mystery!! 🕵️
2. Redis in the Grapevine, but not in my toolbox! 🍇
3. A dash of sporadic usage! 🔄
4. Redis: My trusted sidekick in the daily grind! 🚀

How familiar are you with Vector Stores?

1. Vector Stores: alien territory! 🛸
2. Heard, but haven't explored! 🔍
3. Dipping my toes in! 🌊
4. My everyday arsenal! 🔥

Devs love us. Apps need us.

MOST ADMIRED

NoSQL Database, 2023

stackoverflow

MOST POPULAR

Container Images - 2020, 2021,2023

DATADOG

MOST LAUNCHED

Database technology

docker

We made the most-used database even better.

Redis Enterprise

Use cases

- Enterprise caching
- Primary database
- Session management
- Messaging
- Fraud detection
- Real-time inventory
- Leaderboards
- Online feature store
- Vector database

Enterprise-grade capabilities

- Linear scalability
- High availability
- Durability
- Backup & restore
- Geo-distribution
- Auto Tiering
- Multi-tenant
- Security

Data processing engines

- Data integration & write-through, write-behind
- Query and full-text Search
- Vector search
- Event streaming
- Triggers and functions

Developer experience

Redis desktop GUI

- Redis Insight

Fully supported client libraries

- NRedisStack
- Jedis
- redis-py
- node-redis
- Go-Redis

Data structures

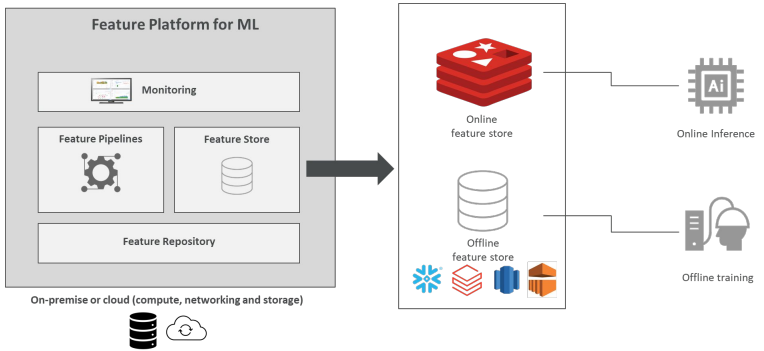
- Strings
- BitFields
- Sorted Sets
- Geospatial
- Lists
- Bitmaps
- Hashes
- Sets
- HyperLog
- Streams
- JSON
- Vector
- TimeSeries
- Probabilistic

Source available

Redis in AI/ML Space

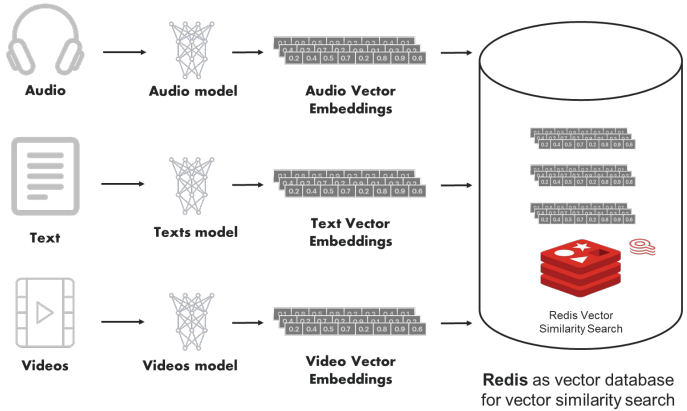
Single-digit millisecond Feature Retrieval

Redis as an online Feature Store



A composable platform for Intelligent Applications

Redis as a Vector Database



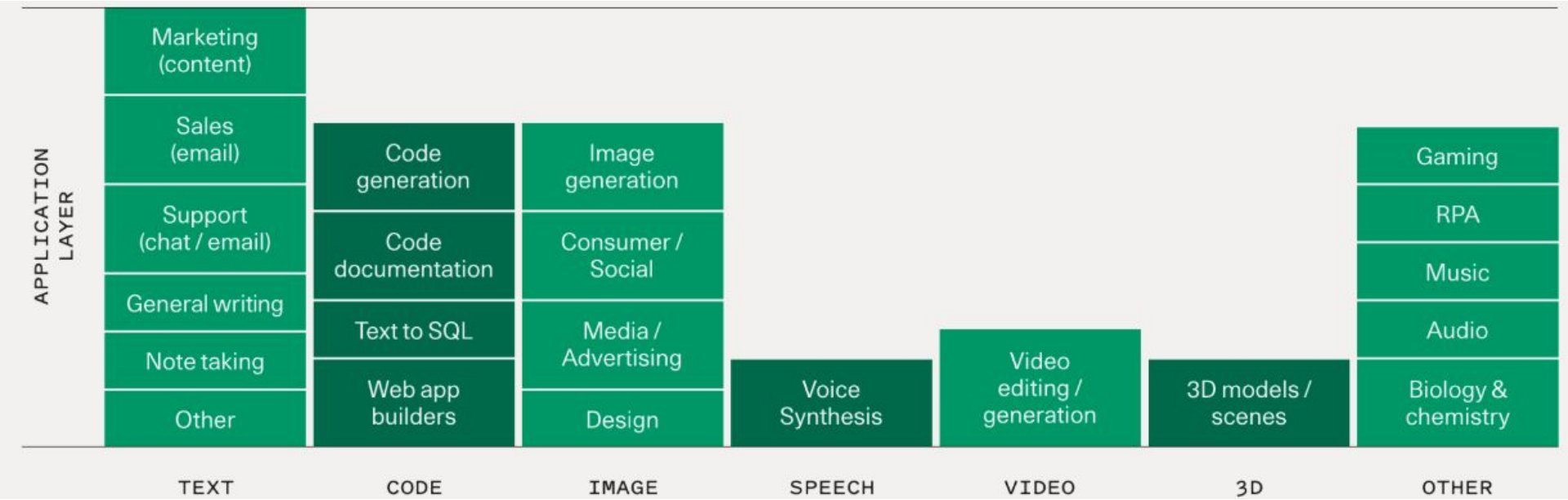
Redis as vector database for vector similarity search

What is Generative AI?

It is type of artificial intelligence that focuses on creating new content, like text, images, music, audio, and videos.

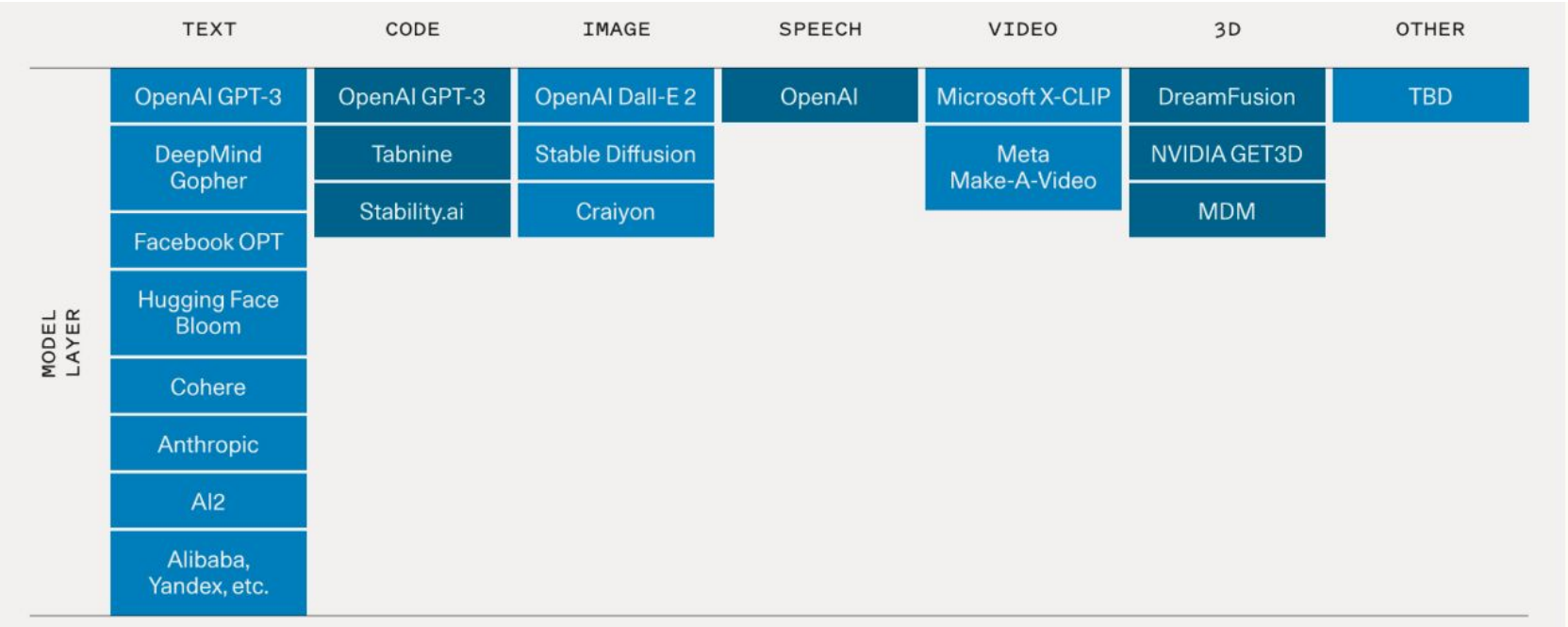
It is powered by Large AI models(a.k.a. foundation models).

Generative AI apps



Source: https://anjanasusarla.substack.com/p/the-second-coming-or-slouching-towards

Generative AI is powered by



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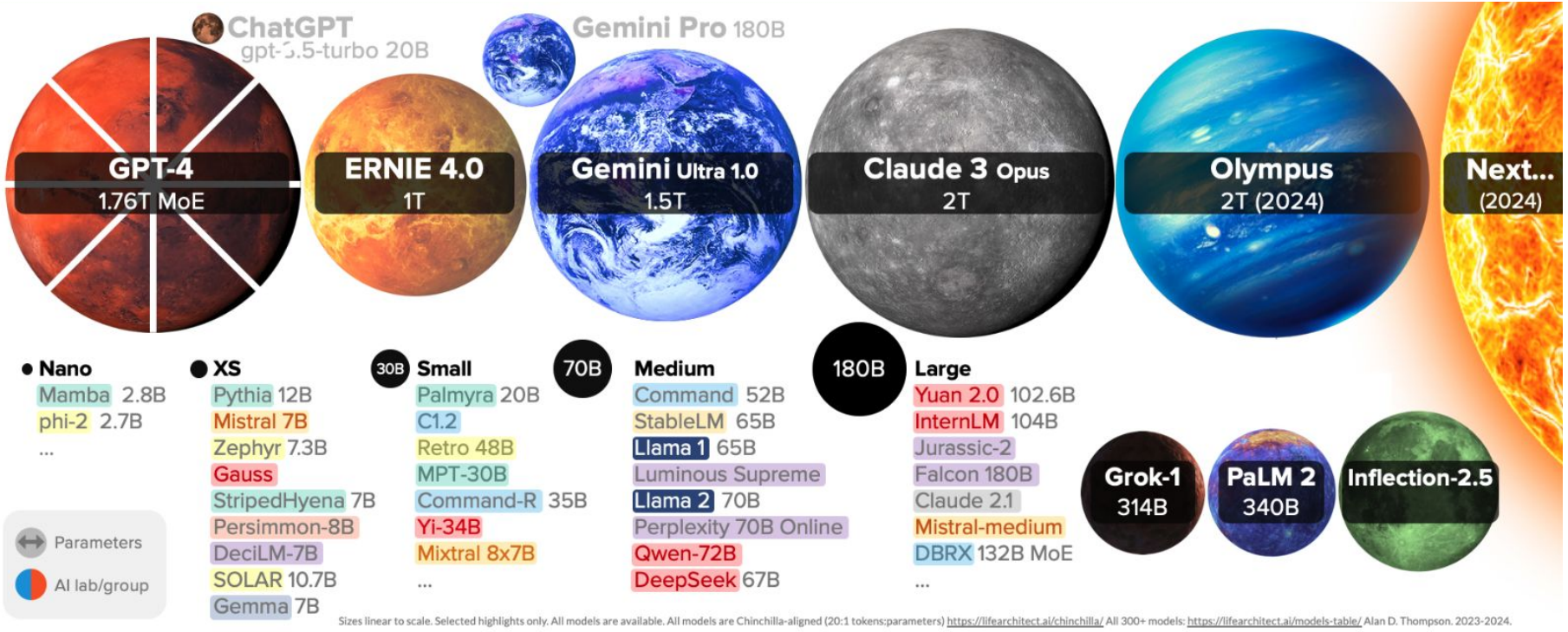
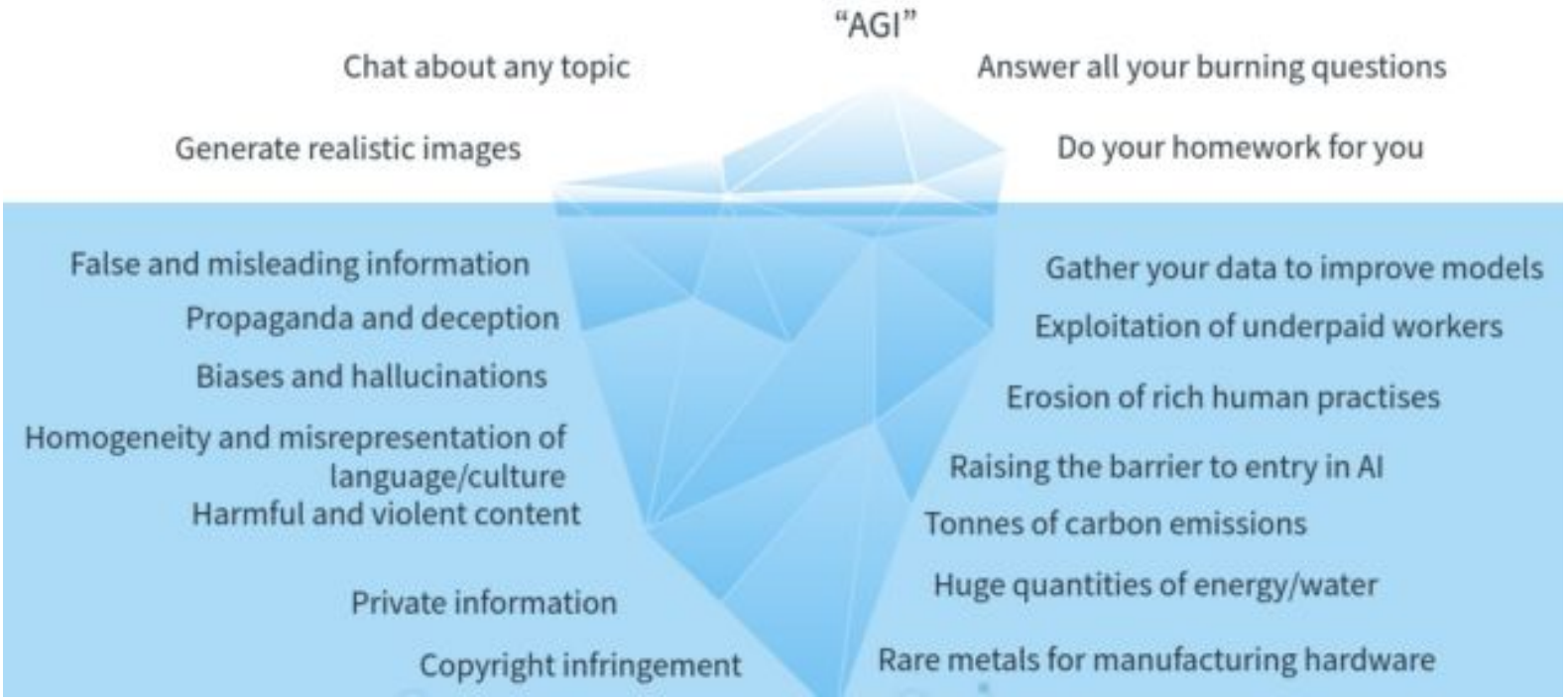
Current Large Language Models landscape

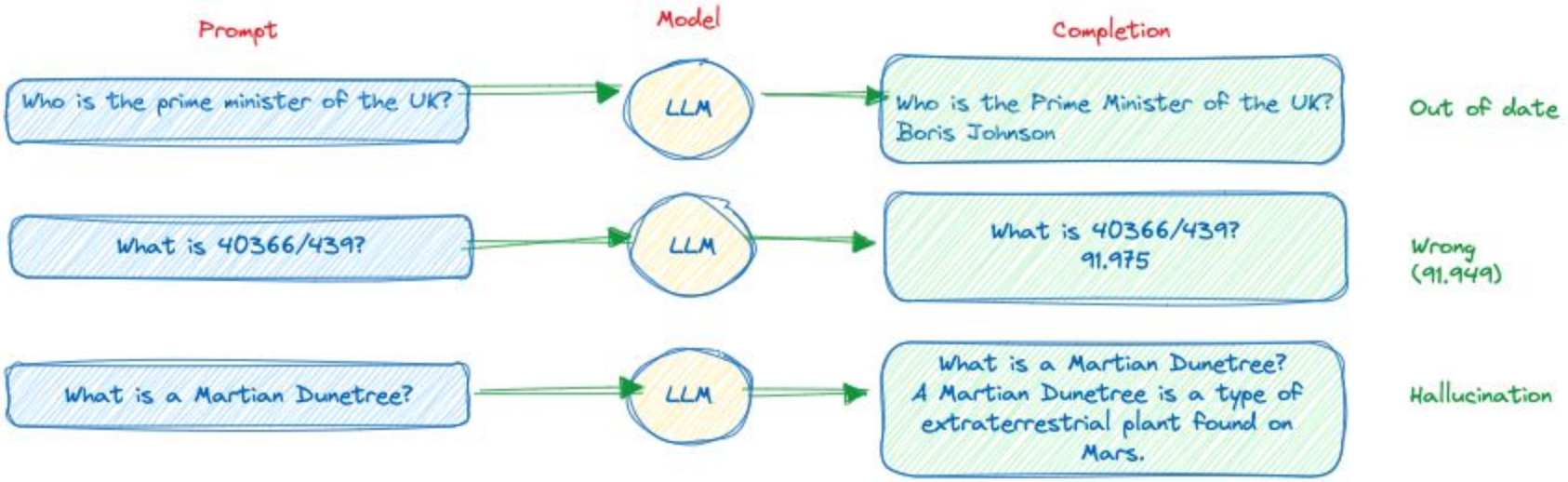


LifeArchitect.ai/models

Generative AI challenges



Challenges of Adopting Generative AI in Enterprises



Challenges of adopting Generative AI in enterprises cont.

We discussed:

- Hallucinations
- Staleness / Revision

Others:

- Attribution
- Customization
- Cost
- Performance
- Security

Solutions:

- Couple with an external memory (i.e. Vector Store)

External Memory: addressing LLM challenges

- Hallucinations are significantly reduced.
- Data in external memory can be swapped out on demand.
- Addresses shortcomings like Staleness, Revision and Customization
- Attribution or Data Grounding
- Security & Privacy
- Cost
- Performance
- Overcomes token limit

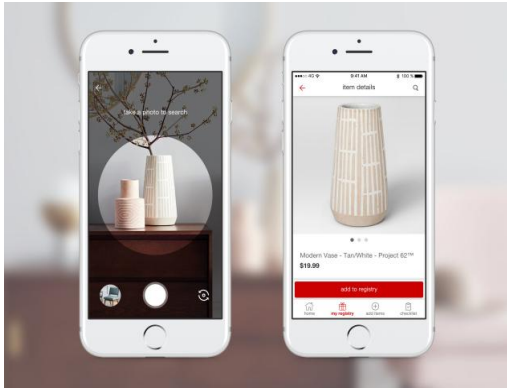
Vector Store

Use cases

Large Language Models

Semantic search, RAG, Q&A, Document Retrieval, Chatbots, LLM Caching, Chat memory

Visual Search

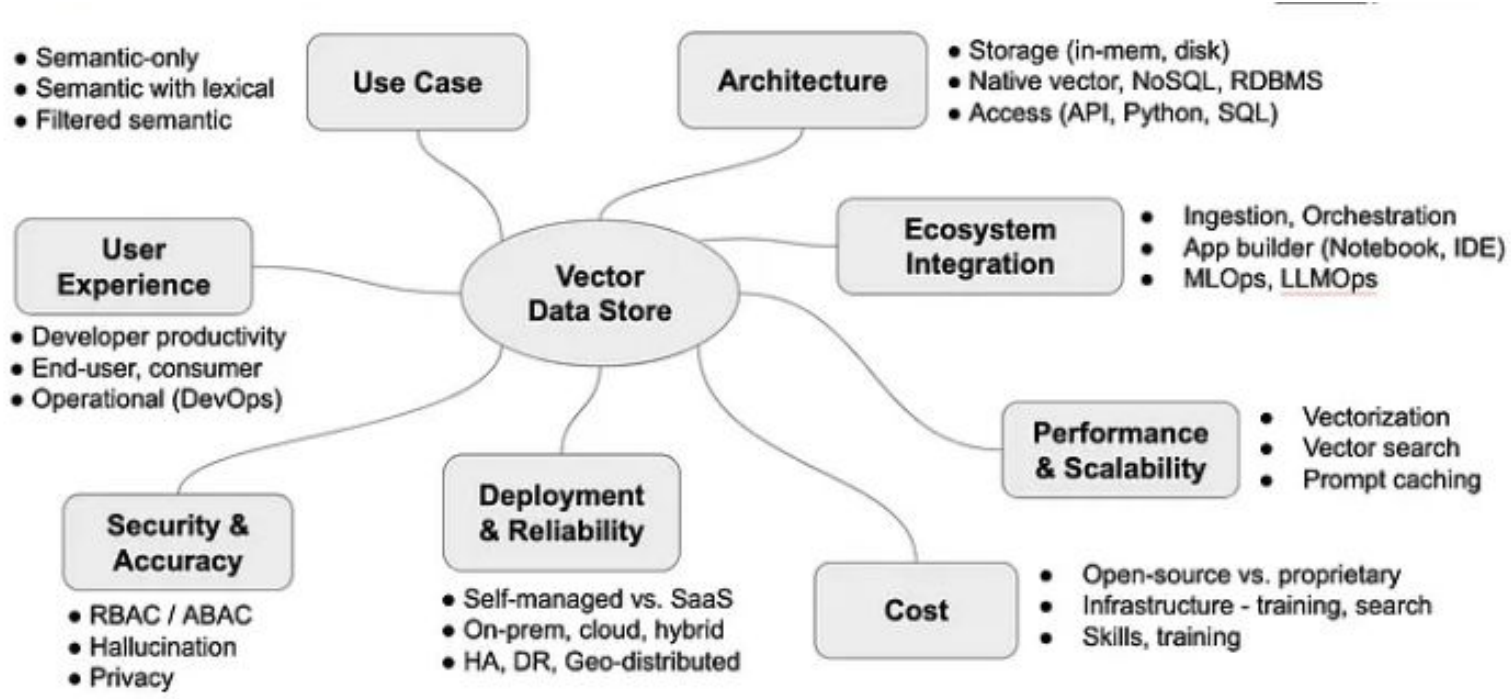


Find similar products through image data

Recommenders

Recommend personalized products, brands, properties, offers, etc.

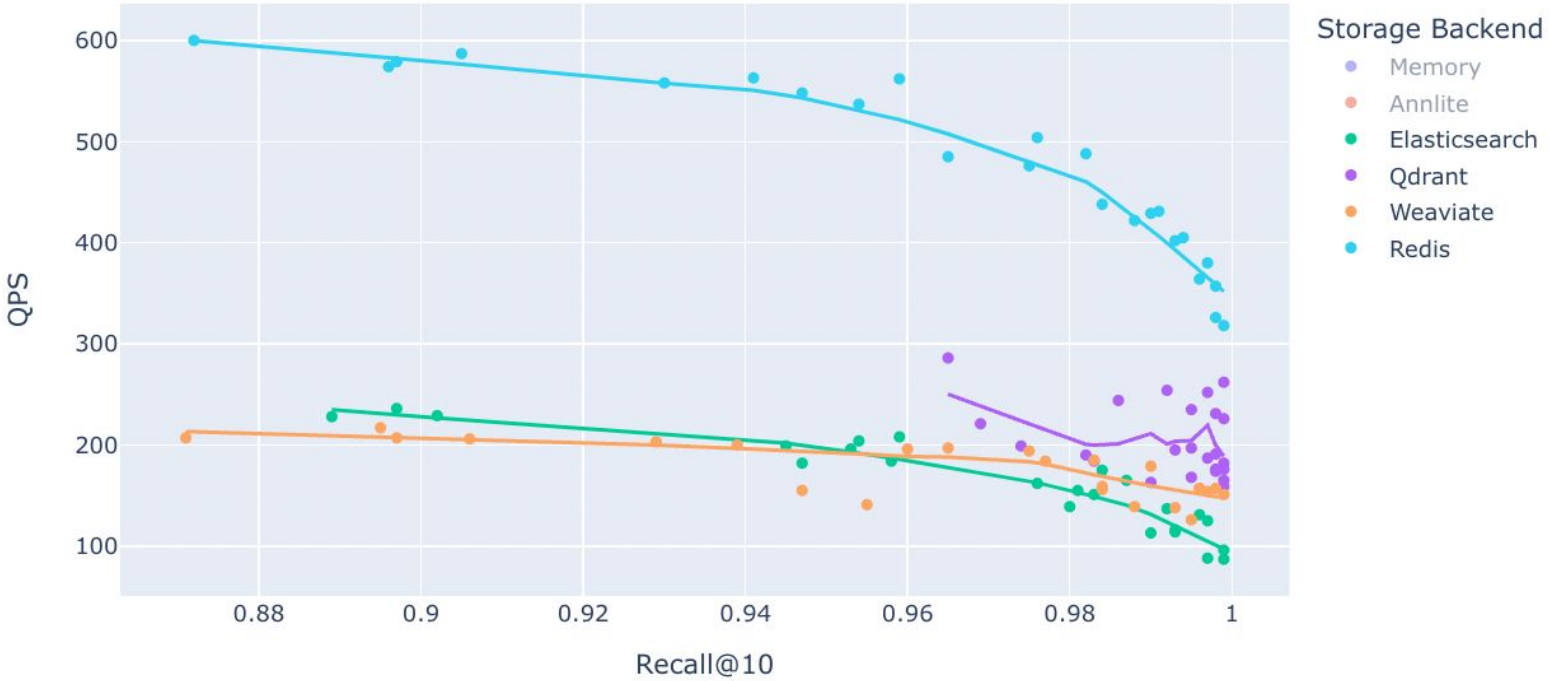
Vector Store: evaluation criteria



Source: Sanjeev Mohan (https://sanjmo.medium.com/vector-data-store-evaluation-criteria-6d7677ef3b60)

3rd Party Assessed Performance

QPS to Recall



https://jina.ai/news/benchmark-vector-search-databases-with-one-million-data/

Customer References

DOCUGAMI

About Docugami

Document engineering empowers business users with impact on Day One, without any massive investment in machine learning, staff training, or IT development. Docugami developed a proprietary Business Document Foundation Model, an LLM for Generative AI applied to your documents.

Scan for full story

Challenge

Docugami is a document engineering company that built its own Business Document Foundation Model.

The company analyzes and searches tens of thousands of documents (and millions of pages). That meant Docugami needed to scale easily.

Speed and reliability of its data layer was a crucial factor. But the company encountered bottlenecks with its Apache Spark document processing pipeline.

Solution

Redis Enterprise was employed as a vector database to handle embeddings more efficiently, which improved consistency and accuracy.

Docugami also uses Redis Enterprise to store Apache Spark checkpoint data, which means the company can use a single data platform.

It provides its enterprise customers with valuable data from their extensive set of business documents-and generates new content.

Results

Redis Enterprise makes it easy to store, search, and update vector embeddings at scale, improving the user experience by ensuring that Docugami's foundation model receives the most timely, relevant and up-to-date context.

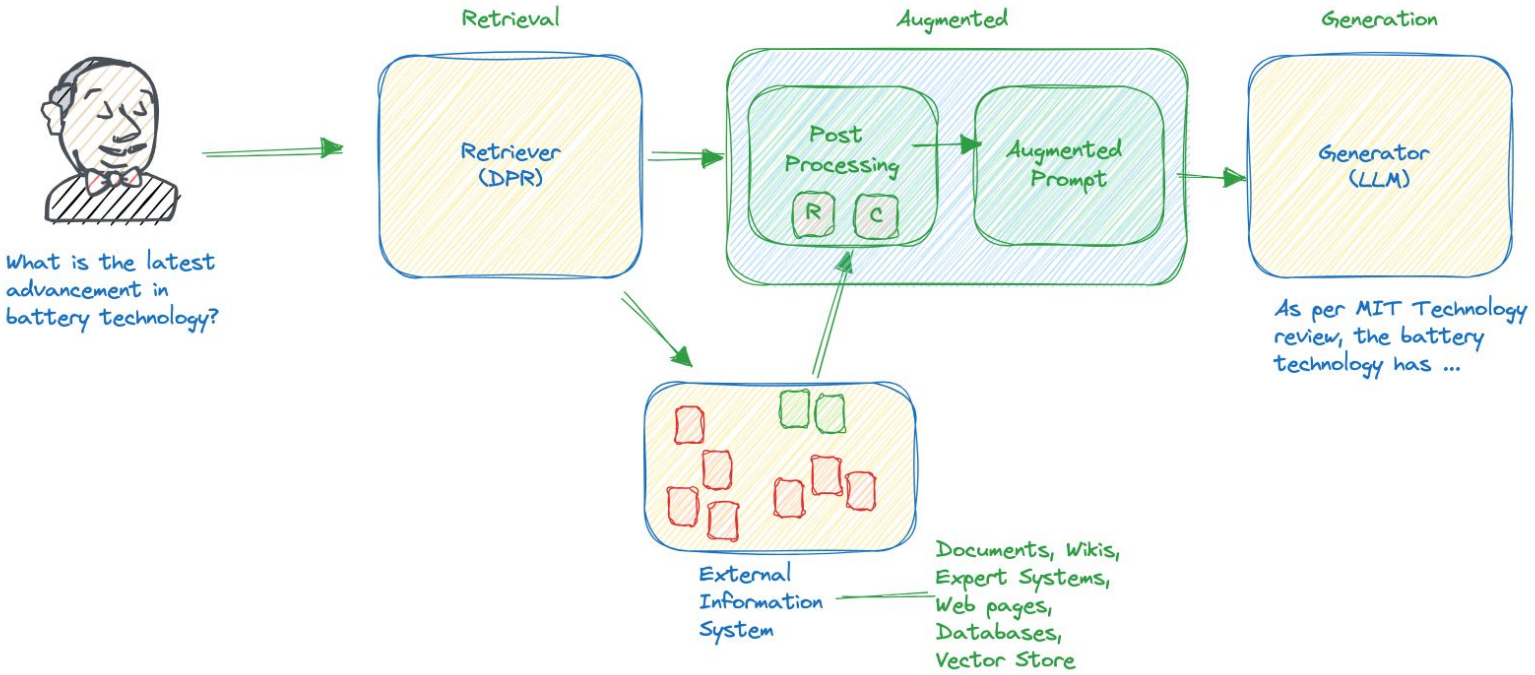
Redis also mitigated the bottlenecks in Docugami's Apache Spark processing pipeline, which was stymied due to high I/O.

"With Redis Enterprise as our vector database and our backing data store for Apache Spark, we've achieved superior latency, throughput, and embedding search result accuracy. Redis is helping us turn dense, lengthy documents into valuable data as a Document XML Knowledge Graph for our customers at massive scale."

Jean Paoli
CEO and co-founder of Docugami

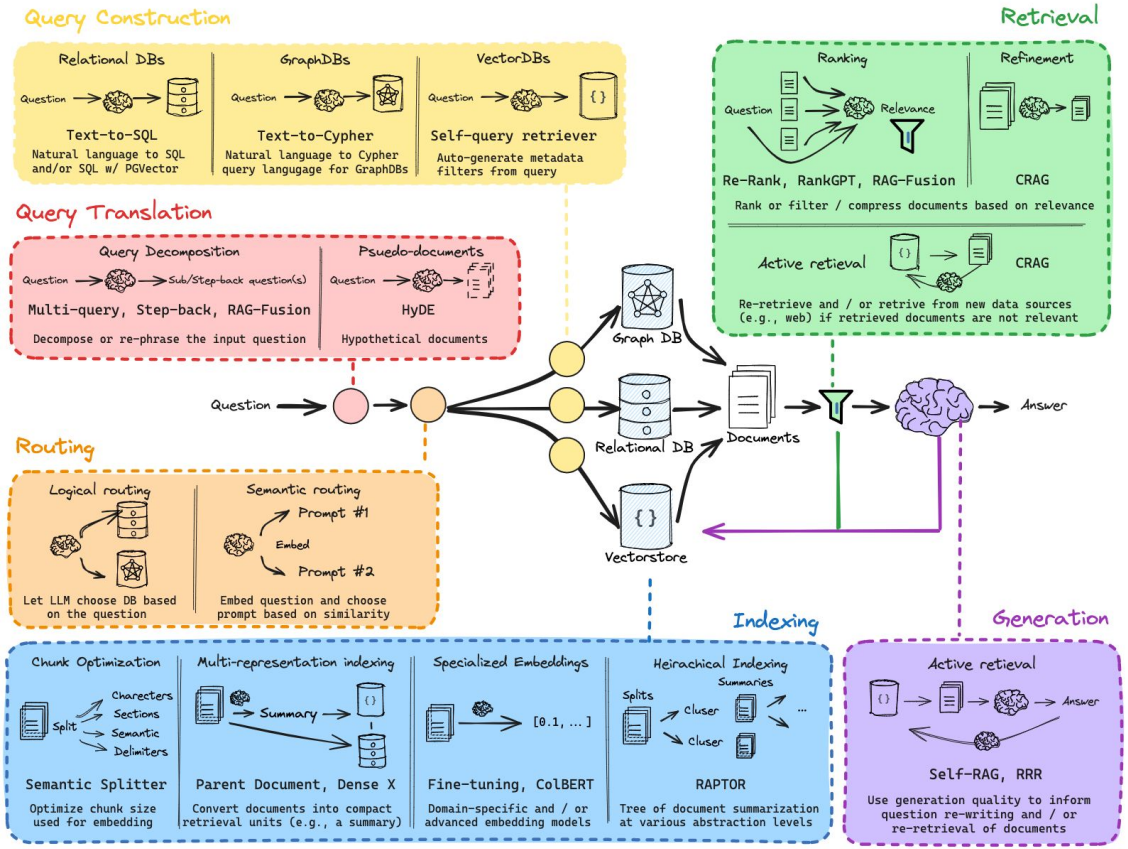
Architecture

Retrieval Augmented Generation framework

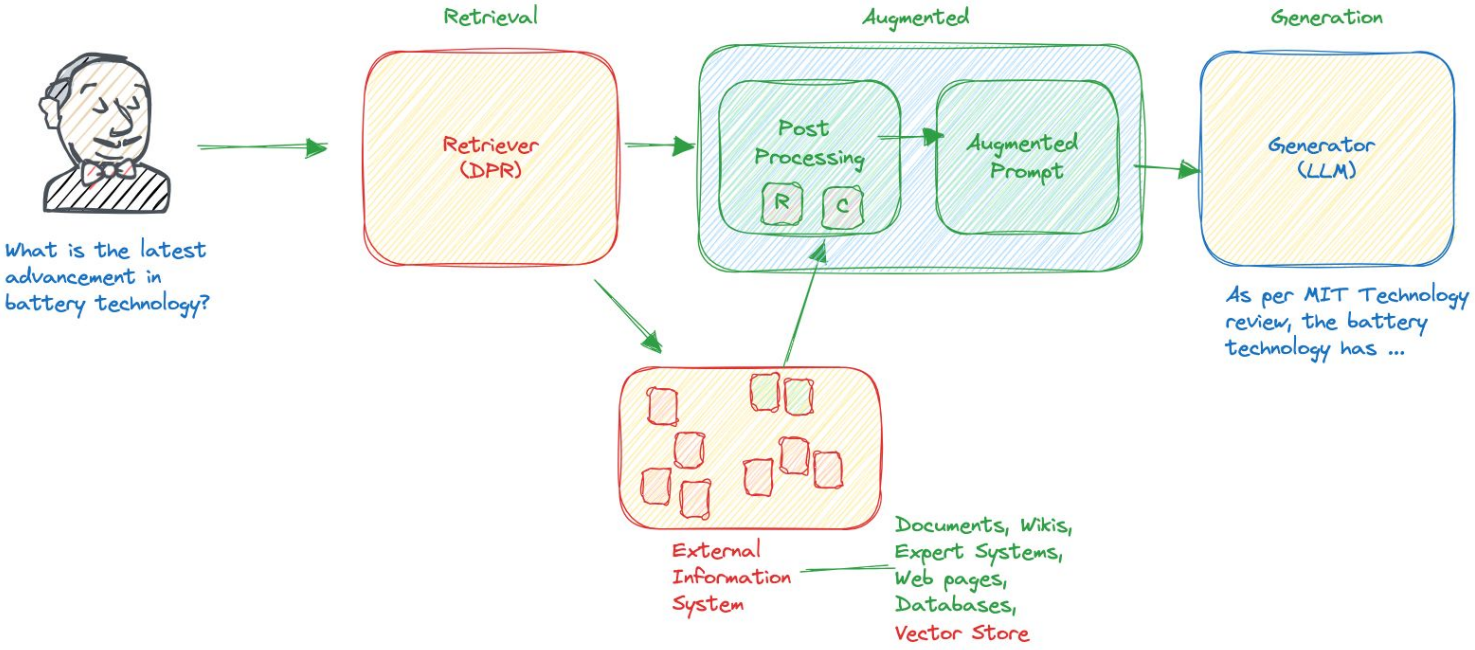


Source: https://newsletter.artofsaience.com/p/beyond-guesswork-the-rise-of-retrieval

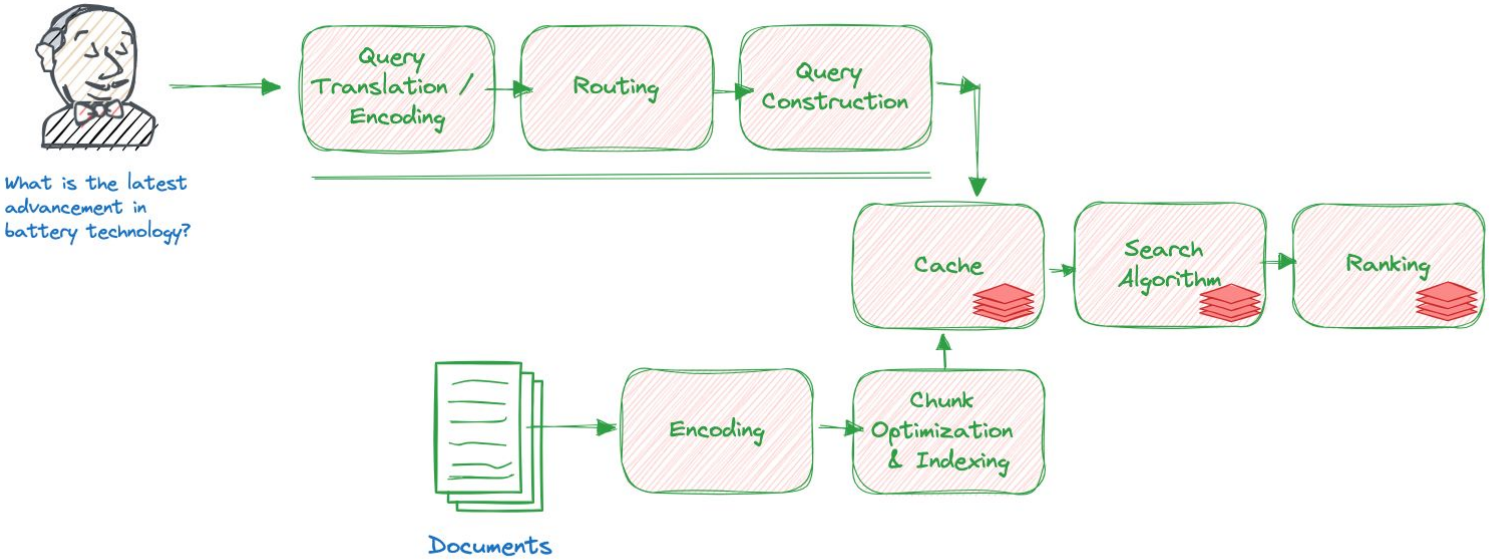
The RAG landscape gets complex quickly...



Today's workshop will touch on



Here are some sub-components our workshop



For the workshop you need following resources:

→Start your free trial today!

Welcome to the joint workshop hosted by AWS and Redis. To get started with your sandbox setup, please follow the instructions below:

1. Visit the registration page at https://events.oneblink.ai.
2. Enter the event code **161590**.
3. Verify your email address by checking for a validation code and follow the provided instructions to confirm.

After completing these steps, you'll gain access to the Sandbox environment, which includes AWS services and Redis. The AWS Bedrock service is pre-configured for your convenience.

Should you encounter any issues with sandbox, please don't hesitate to contact our support team at support@oneblink.ai for assistance.

Get started with workshop:

On AWS Console

1. Select AWS Sagemaker
2. On left bar, scroll and look for Notebook
3. Select Notebook instances
4. Select AWSBedrockRedisVSSSageMakerNotebook
5. Select Open JupyterLab

Lab 1:

- Open redis-py-01.ipynb
- Select Kernel: 'conda_python3'
- Learning Objectives: Redis and RediSearch
  - Text embedding
  - Indexing
  - Search & Ranking

Lab 2:

- Open langchain-02.ipynb
- Select Kernel: 'conda_python3'
- Learning Objectives:
  - Dataset Preparation
  - RAG with Redis Vector Store and LangChain

Questions?

- 10-15 min

Break

Antony Prasad Thevaraj

Amazon Bedrock Presentation

- 10-15 min

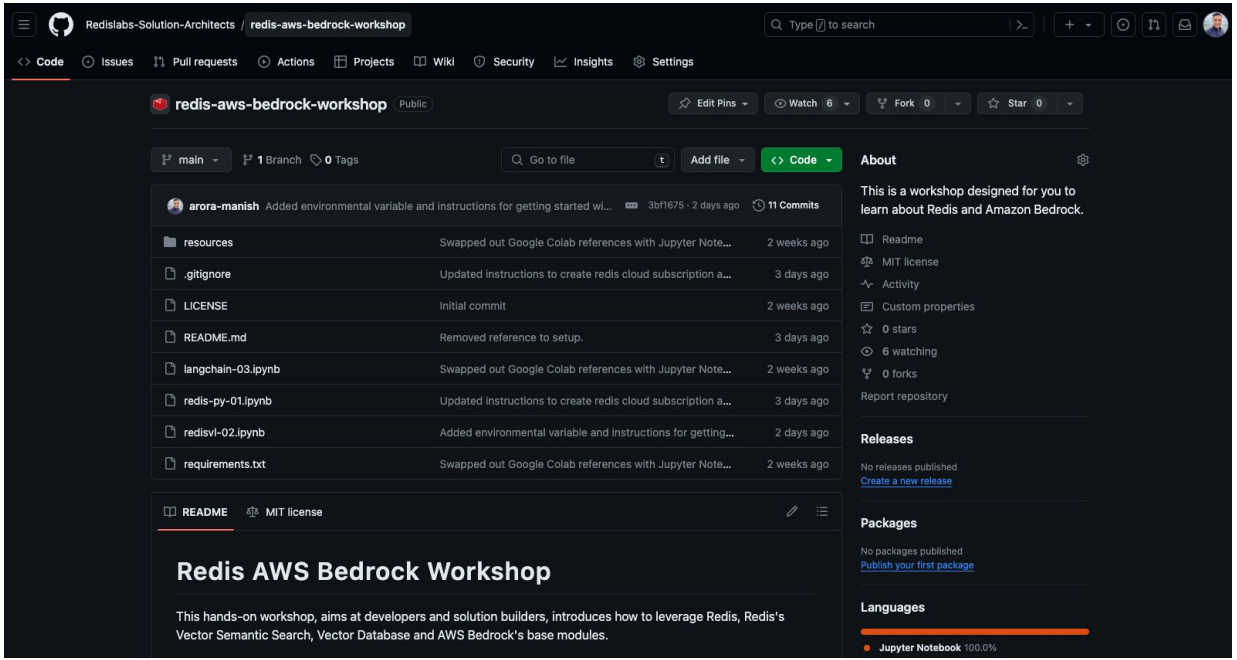
Break

Hands-on workshop with Redis Vector Store + Amazon Bedrock

Github Resource

- Dedicated training materials for building semantic search and RAG applications with Redis in Python.
- Runnable on Jupyter Notebook or Google Collab.
- Client options:
  - Redis Py
  - RedisVL
  - LangChain

https://github.com/Redislabs-Solution-Architects/redis-aws-bedrock-workshop/



Popular Redis Client Libraries for AI Use Cases

Redis Python

Base client libraries offer the most configurability and performance, at a cost of more complexity.

https://github.com/redis/redis-py

RedisVL

Purpose-built frameworks wrap base clients for specific use cases. Focused on ease of development.

https://github.com/RedisVentures/redisvl

LangChain, LlamaIndex, et al

AI orchestration frameworks that natively integrate with LLMs, Storage, APIs, Vector DB, and more.

https://python.langchain.com/docs/integrations/providers/redis

A few more hands-on examples

- Document search application: https://github.com/RedisVentures/redis-arXiv-search
- Chatbot application: https://github.com/RedisVentures/gcp-redis-llm-stack/tree/main/examples/chat-your-pdf
- OpenAI Cookbook: https://github.com/openai/openai-cookbook/tree/main/examples/vector_databases/redis

model = 'amazon.titan-tg1-large'

[108]:
```
query = "What was Nike's revenue last year compared to this year??"
res=qa(query)
res['result']
```

[108]:
```
' $40 million less'
```

[109]:
```
query = "How many products does Nike offer? What is the industry that Nike is part of?"
res=qa(query)
res['result']
```

[109]:
```
' Nike offers consumer products and the industry that Nike is part of is the athletic footwear, apparel and equipment industry'
```

[110]:
```
query = "Is Nike an ethical company?"
res=qa(query)
res['result']
```

[110]:
```
' No'
```

[111]:
```
query = "How many employees work at Nike???"
res=qa(query)
res['result']
```

[111]:
```
' 44,538'
```

model = 'amazon.titan-text-lite-v1'

[74]:
```
query = "What was Nike's revenue last year compared to this year??"
res=qa(query)
res['result']
```

[74]:
```
' 42,293 44,538'
```

[75]:
```
query = "How many products does Nike offer? What is the industry that Nike is part of?"
res=qa(query)
res['result']
```

[75]:
```
' Nike offers 42 products. Nike is part of the athletic footwear, apparel and equipment industry.'
```

[76]:
```
query = "Is Nike an ethical company?"
res=qa(query)
res['result']
```

[76]:
```
' Yes'
```

[77]:
```
query = "How many employees work at Nike???"
res=qa(query)
res['result']
```

[77]:
```
' 44,538'
```

model = 'OPENAI_API'

[92]:
```
query = "What was Nike's revenue last year compared to this year??"
res=qa(query)
res['result']
```

[92]:
```
" As of May 31, 2023, Nike's revenue was $42,293 million, which is a 10% increase from the previous year's revenue of $44,538 million (as of May 31, 2022)."
```

[93]:
```
query = "How many products does Nike offer? What is the industry that Nike is part of?"
res=qa(query)
res['result']
```

[93]:
```
' Nike offers a wide range of products including athletic footwear, apparel, and equipment. It is part of the athletic footwear, apparel, and equipment industry, which is highly competitive both in the United States and worldwide.'
```

[94]:
```
query = "Is Nike an ethical company?"
res=qa(query)
res['result']
```

[94]:
```
" I'm sorry, I cannot determine if a company is ethical. This information is not provided in the context given."
```

[95]:
```
query = "How many employees work at Nike???"
res=qa(query)
res['result']
```

[95]:
```
' As of May 31, 2023, Nike had approximately 51,217 employees.'
```

- Open discussion

Q&A

Thank you for joining us today

Please fill out the survey to receive a Redis swag bundle:

- Next steps

Redis resources

- Start building your Apps today for FREE with our 14-day trial
- Redis Cloud on AWS Marketplace
- Checkout our Developer Hub at developer.redis.com
- Try Fraud Detection: Git Repo
- Bedrock + Redis Getting Started Resources
- Hands-on-labs: Redis VSS
- Want to connect? Email Redis at aws@redis.com

AWS resources

- AWS Reference Architecture: Real-time Fraud Detection
- Migrate Redis to Redis Enterprise Cloud in AWS - Prescriptive Guide

→Start your free trial today!

thank you.