

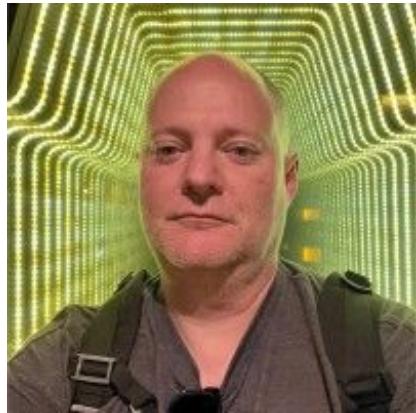


Discussion on Vector Databases, Unstructured Data and AI

Tim Spann | Zilliz



Speaker



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Unstructured Data Meetup



<https://www.meetup.com/unstructured-data-meetup-new-york/>

This meetup is for people working in unstructured data. Speakers will come present about related topics such as vector databases, LLMs, and managing data at scale. The intended audience of this group includes roles like machine learning engineers, data scientists, data engineers, software engineers, and PMs. This meetup was formerly Milvus Meetup, and is sponsored by [Zilliz](#) maintainers of [Milvus](#).



OLFAI
& DATA

Easy Setup

Pip-install to start coding in a notebook within seconds.



Reusable Code

Write once, and deploy with one line of code into the production environment



Integration

Plug into OpenAI, Langchain, LlmalIndex, and many more



Feature-rich

Dense & sparse embeddings, filtering, reranking and beyond



Milvus is an open-source vector database for **GenAI** projects. pip install on your laptop, plug into popular AI dev tools, and push to production with a single line of code.



27.5K+

GitHub Stars

2,700+

Forks



25M+

Downloads



250+

Contributors

The evolution of AI made the semantic search of unstructured data possible



Search by Probability

Statistical analyses of common datasets established the foundation for processing unstructured data, e.g. NLP, and image classification



AI Model Breakthrough

The advancements in BERT, ViT, CBT etc. have revolutionized semantic analysis across unstructured data

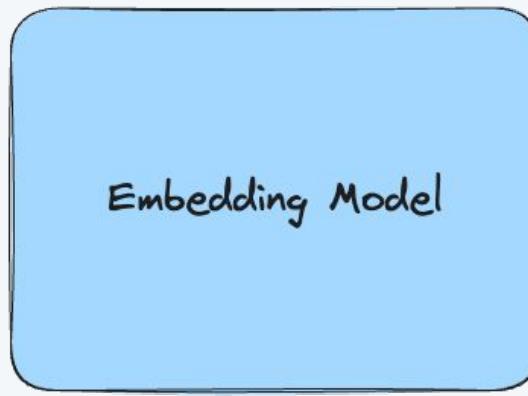


Vectorization

Word2Vec, CNNs, Deep Speech pioneered unstructured data embeddings, mapping the words, images, videos into high-dimensional vectors

What your data looks like

happy dog wagging tail



$[-0.096, -0.026, -0.044, 0.012, \dots, -0.011]$

This new AI breakthrough requires new databases to fully unleash its potential



Support multiple use case types

Accommodate diverse data requirements, enhancing flexibility and effectiveness in varied operational contexts



Scale as needed

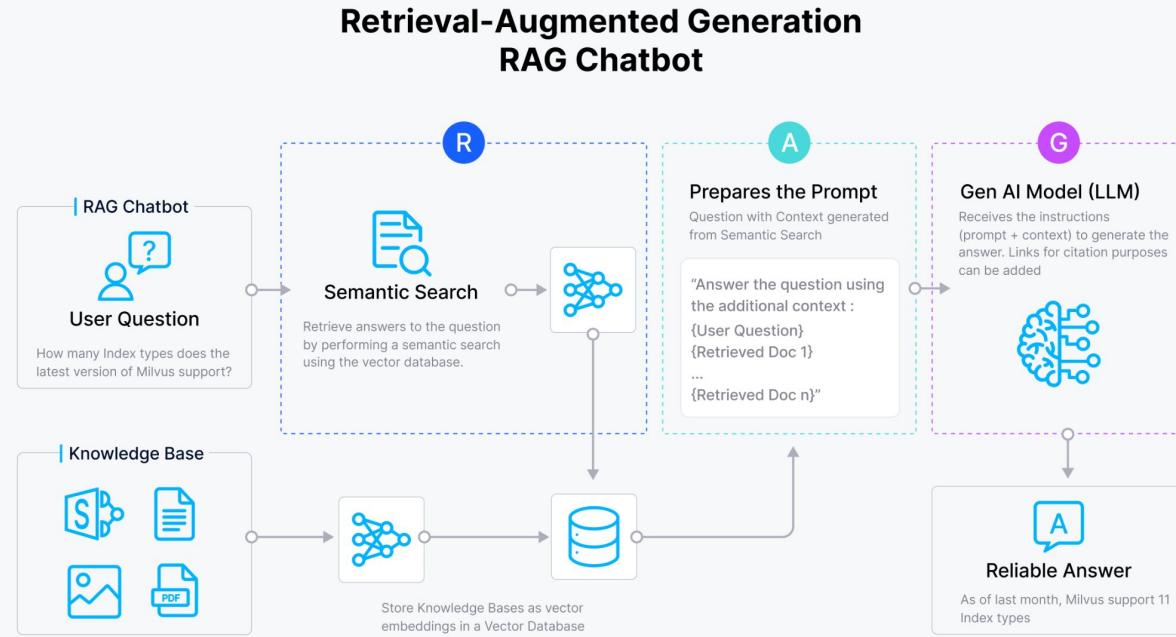
Enable robust handling of expanding data volumes and search demands



Highly performant

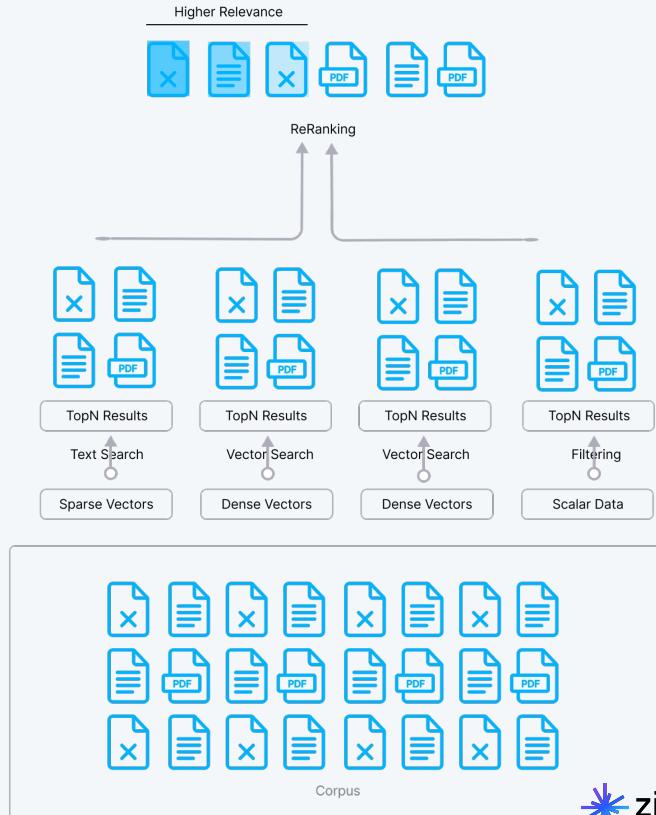
Ensures swift and accurate query responses, crucial for optimal user experience

Vector Databases are core component for Retrieval Augmented Generation (RAG)



...different types of data and schemas needs to be thoroughly planned ahead of time

Field Name	Type	Description	Example Value
chunkID	Int64	Primary key, uniquely identifies different parts of a document	123456789
userID	Int64	Partition key, data partitioning is based on userID to ensure searches occur within a single userID	987654321
docID	Int64	Unique identifier for a document, used to associate different chunks of the same document	555666777
chunkData	varchar	A part of the document, containing several hundred bytes of text	"This is a part of the document..."
dynamicParams	JSON	Stores dynamic parameters of the document, such as name, source URL, etc.	{"name": "Example Document", "source": "example.com"}
sparseVector	Specific format	Data representing a sparse vector. Specific format will have non-zero values only in certain positions to represent sparsity.	[01, 0, 0, 0.8, 0.4, 0]
denseVector	Specific format	Data representing a dense vector. Specific format will have a fixed number of dimensions with values in each.	[0.2, 0.3, 0.4, 0.11]



...powers searches across various types of unstructured data



Retrieval Augmented Generation (RAG)

Expand LLMs' knowledge by incorporating external data sources into LLMs and your AI applications.



Recommender System

Match user behavior or content features with other similar ones to make effective recommendations.



Text/ Semantic Search

Search for semantically similar texts across vast amounts of natural language documents.



Image Similarity Search

Identify and search for visually similar images or objects from a vast collection of image libraries.



Video Similarity Search

Search for similar videos, scenes, or objects from extensive collections of video libraries.



Audio Similarity Search

Find similar audios in large datasets for tasks like genre classification or speech recognition



Molecular Similarity Search

Search for similar substructures, superstructures, and other structures for a specific molecule.



Anomaly Detection

Detect data points, events, and observations that deviate significantly from the usual pattern



Multimodal Similarity Search

Search over multiple types of data simultaneously, e.g. text and images

We've built technologies for various types of use cases



Index Types

Offer a diverse range of **11+ index types**, including popular ones like HNSW, IVF, PQ, and GPU index

Empower developers with tailored search optimizations, catering to specific performance and accuracy needs



Search Types

Provide diverse search types such as **top-K ANN, Range ANN, hybrid ANN** and metadata filtering

Enable unparalleled query flexibility and accuracy, allowing developers to tailor their data retrieval needs



Multi-tenancy

Enable **multi-tenancy** through collection and partition management

Allow for efficient resource utilization and customizable data segregation, ensuring secure and isolated data handling for each tenant

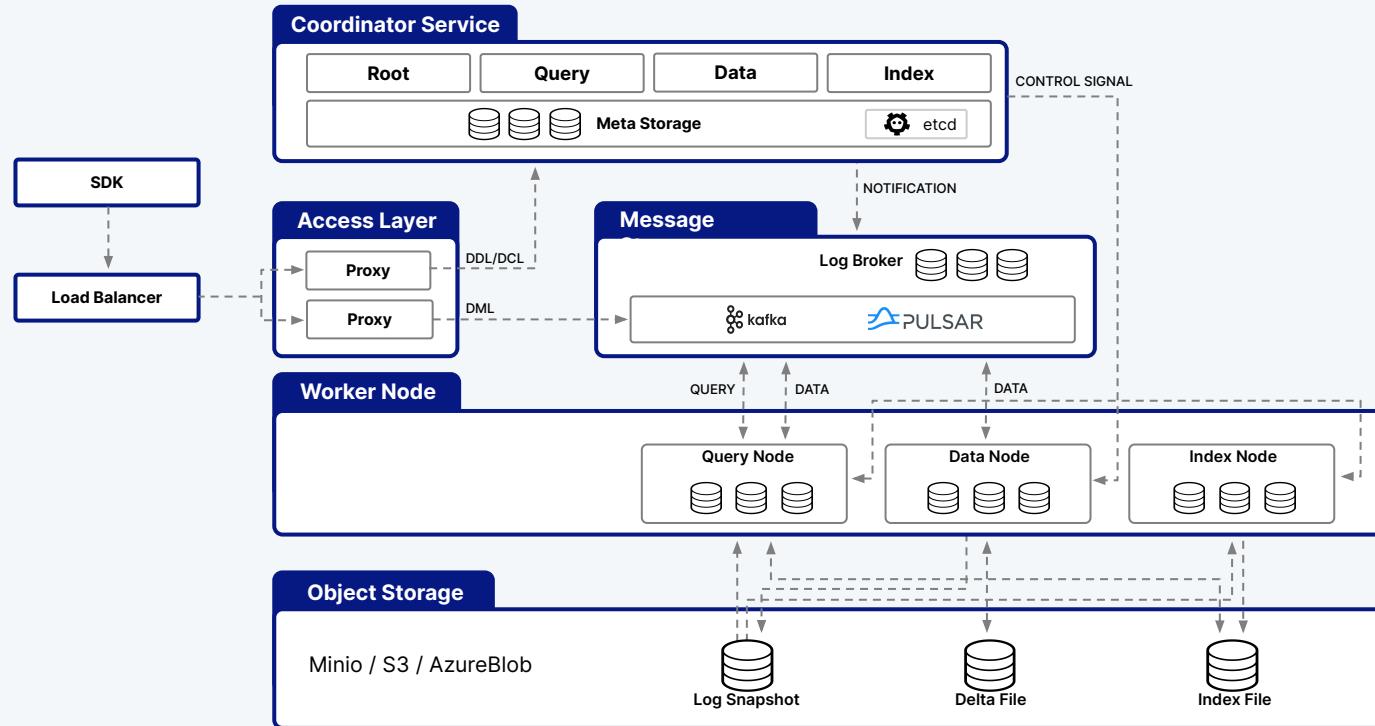


Compute Types

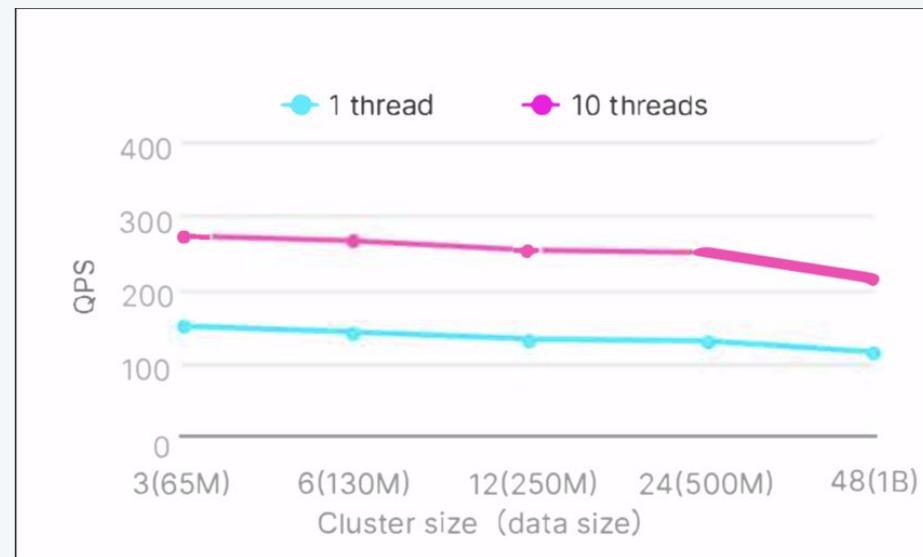
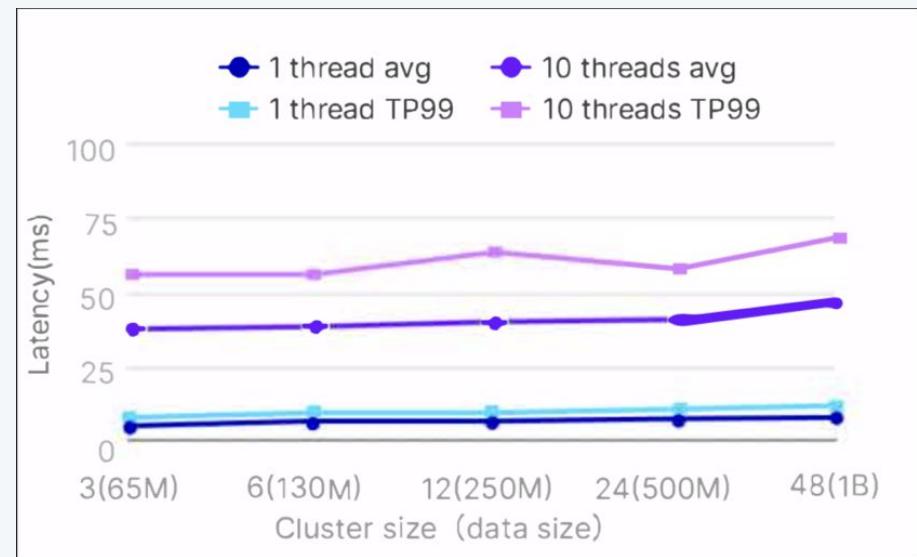
Support different types of compute powers, such as **AVX512, Neon for SIMD execution, quantization & cache-aware optimization, and GPU**

Leverage specific strengths of each hardware type efficiently, ensuring high-speed processing and cost-effective scalability for diverse application needs

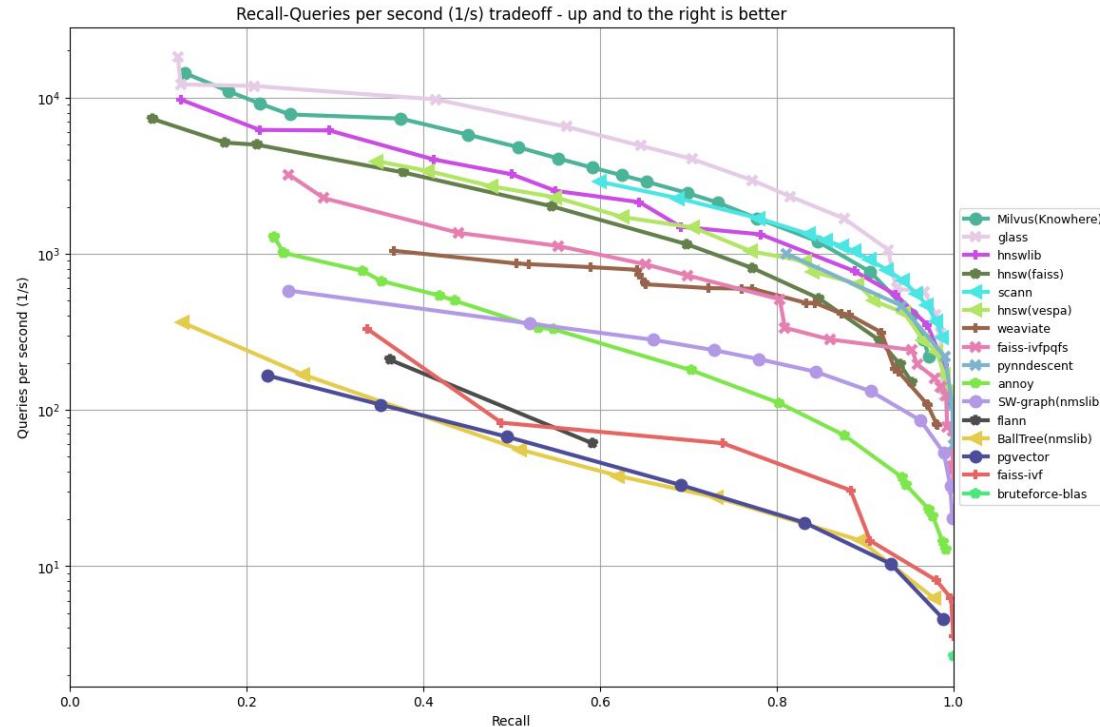
Milvus' fully distributed architecture is designed for scalability and performance



Tests shows consistent query performance when scaled from 65 million to 1 billion vectors



ANN Benchmark has recognized Milvus as the performance leader among vector database players



We provide deployment flexibility for different operational, security and compliance requirements

SELF MANAGED SOFTWARE



Milvus

Most widely-adopted open source vector database

Self hosted on any machine with community support



Local



Docker



K8s

FULLY MANAGED SERVICE



Zilliz Cloud

Milvus Re-engineered for the Cloud

Available on the leading public clouds



Google Cloud

Azure

BRING YOUR OWN CLOUD



Zilliz BYOC

Enterprise-ready Milvus for Private VPCs

Deploy in your virtual private cloud



Google Cloud

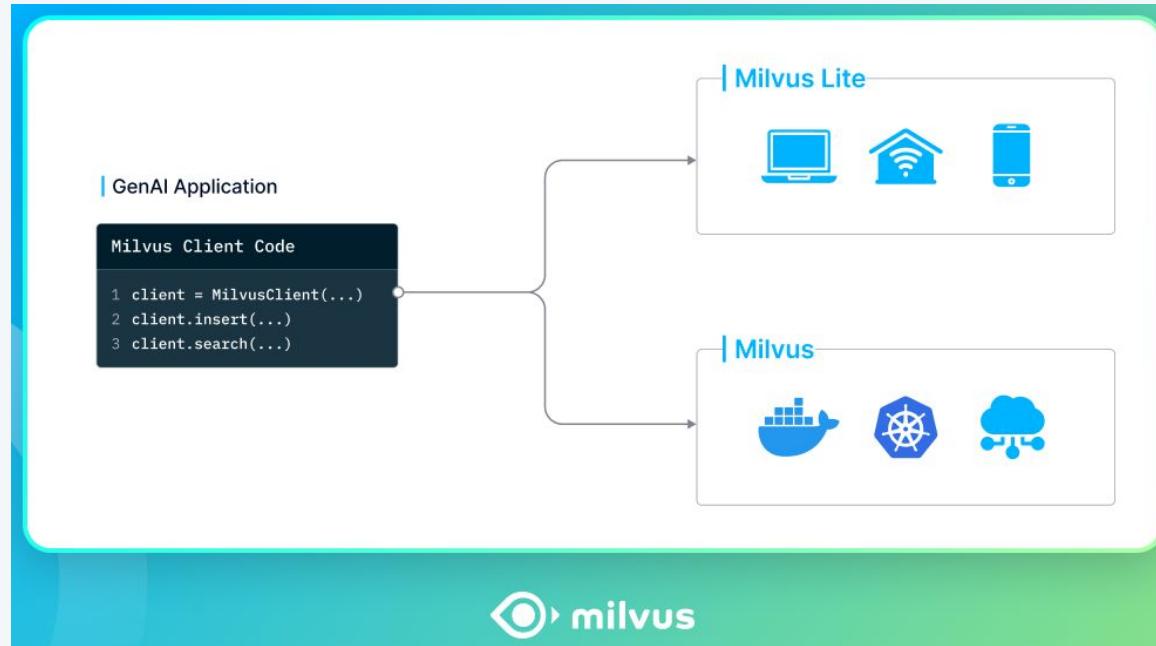
Coming Soon!

Azure

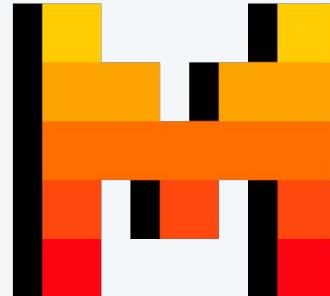
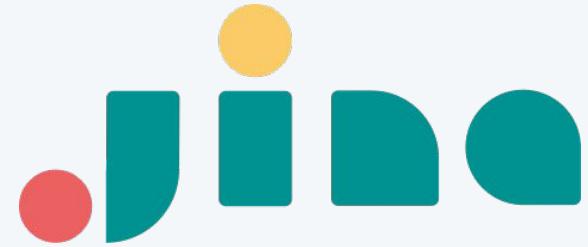
Coming Soon!

Milvus Lite

pip install pymilvus



Embeddings Models



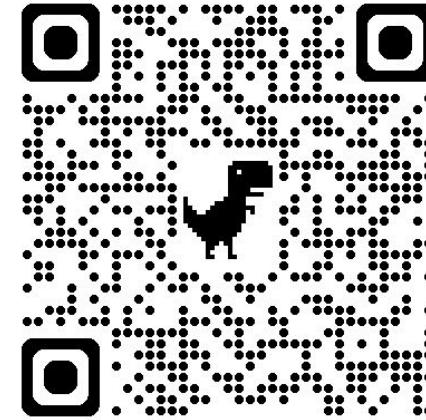
Questions?

Give Milvus a Star!



github.com/milvus-io/

Code on Github



github.com/tspannhw