

Fundamentals of Cloud Computing

INTRODUCTION TO AWS



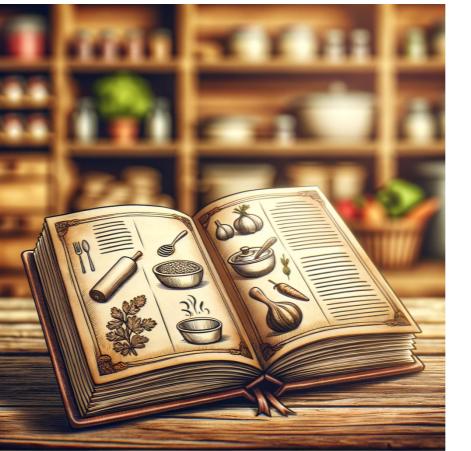
Amar Suchak
Software Engineer

What is cloud computing?

Compute: the head chef



Databases: recipe books

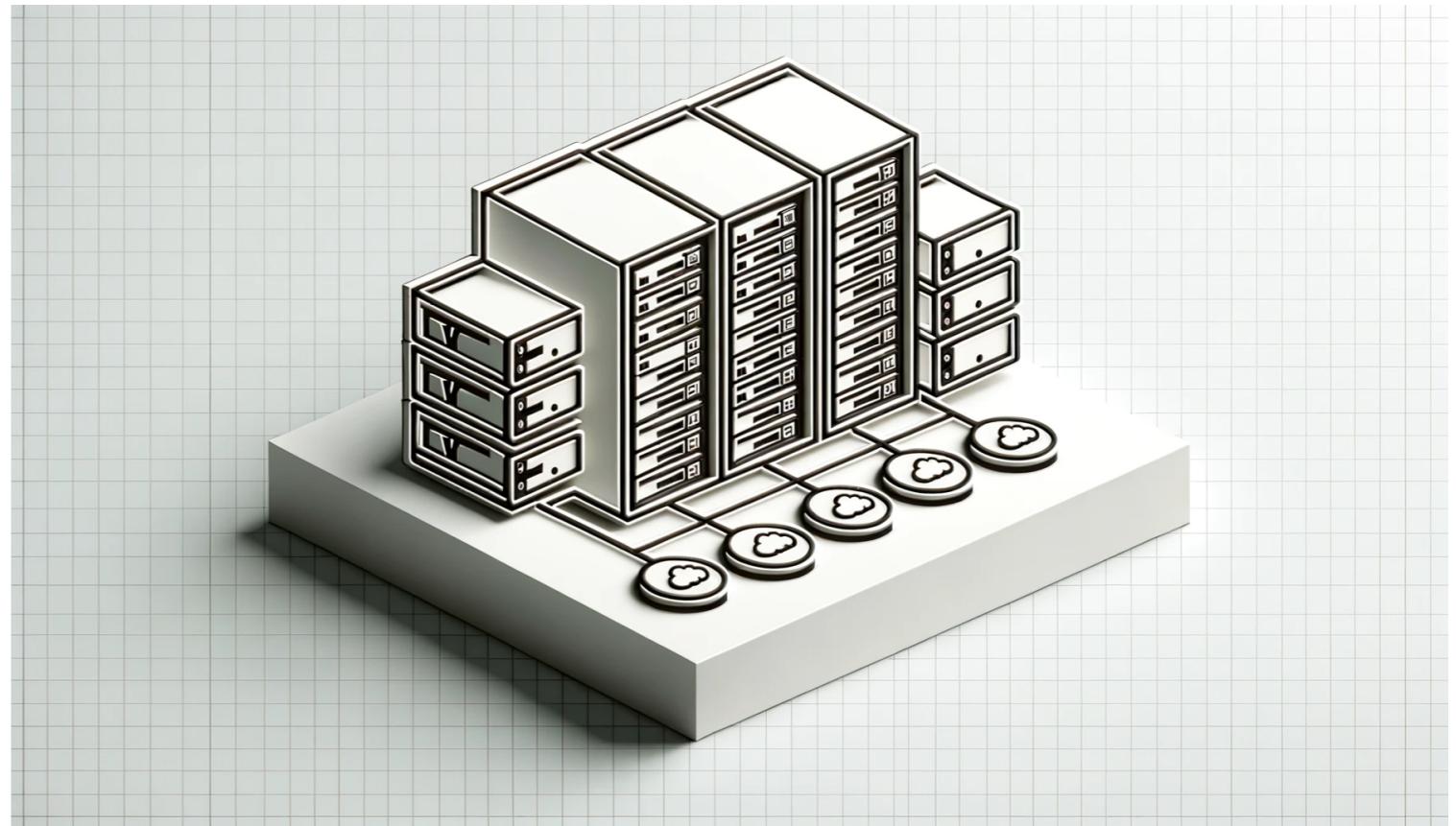


Storage: the pantry, the fridge



Cloud computing - servers

- Physical vs. Virtual Machines (VMs)
- Full control and customization
- Examples: web hosting, data analytics



Cloud computing - serverless

- No need to manage server infrastructure
- Runs code in response to events
- Examples: image processing, real-time data updates



Storage - more than just saving data



- Traditional vs. Cloud Storage
- Ensures availability, durability, swift retrieval times
- Enhanced reliability and scalability
- Cloud Storage: access anytime, anywhere

Databases - organizing and accessing data

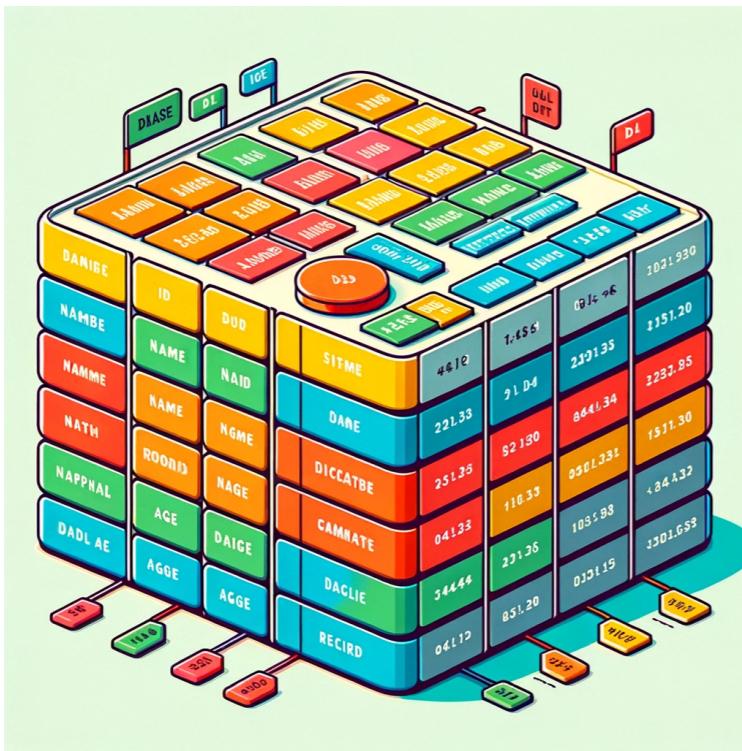
- Beyond storage: Organizing and retrieving data
- Like a library in the digital world
- Differentiating: relational vs. non-relational



Relational vs. non-relational databases

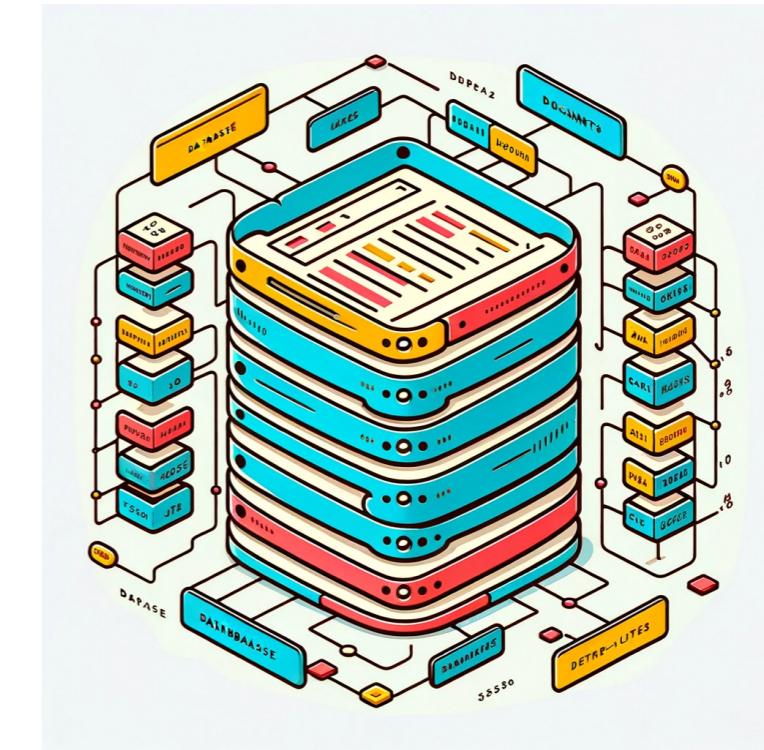
Relational (RDBMS):

- Table-based with a defined schema
 - SQL-based queries



Non-Relational (NoSQL):

- Flexible data models (document, key-value, etc.)
 - Often schema-less



Let's practice!

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AWS Compute Services

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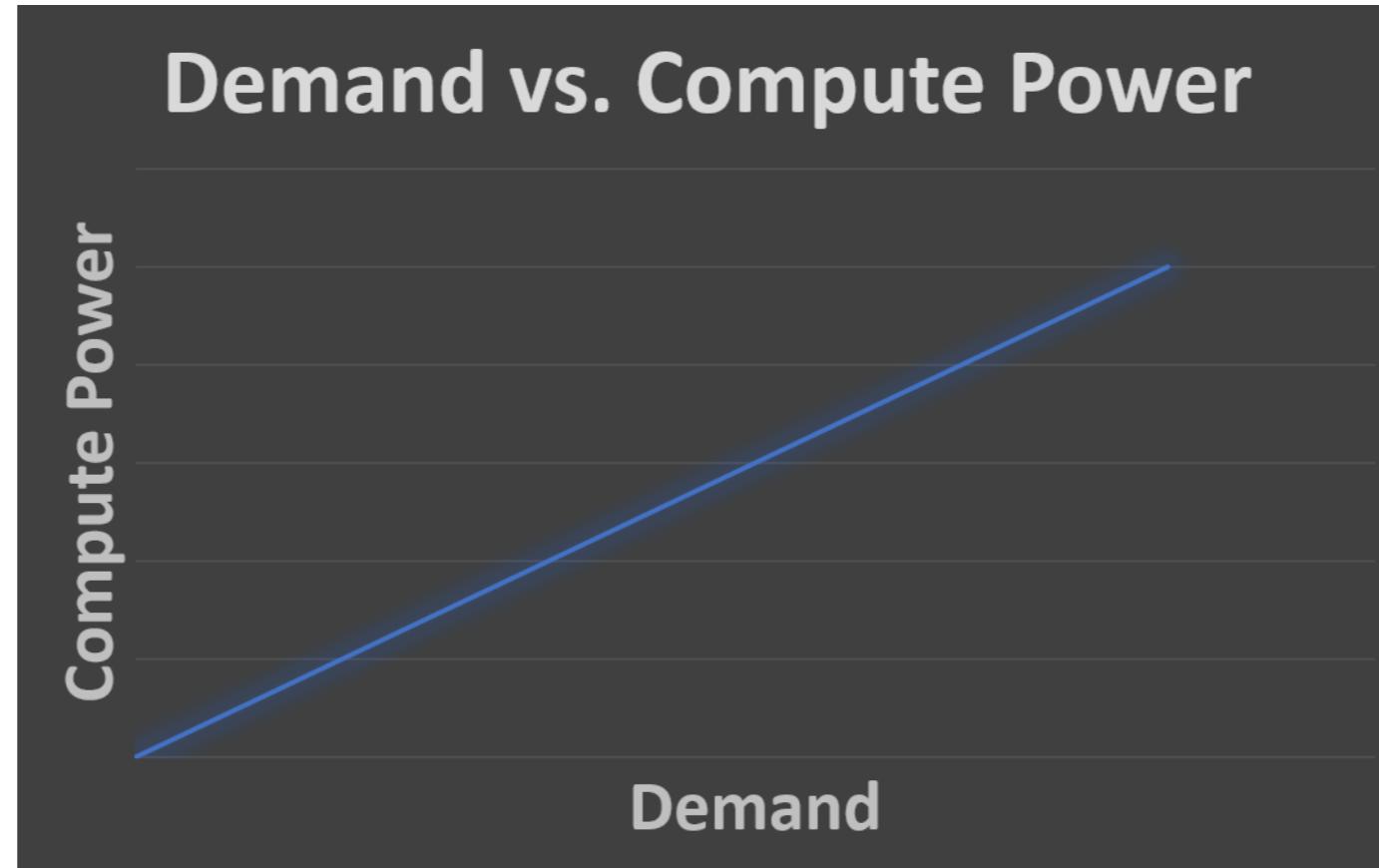
Why do we need compute services?



- Imagine it's Black Friday
- Your website crashes due to high traffic
- What do you do?

The backbone of digital solutions

- Definition: providing computing power on-demand
- Importance: scalability, flexibility, and cost-efficiency



Meeting the challenge with AWS

Server Based

- Continuous availability
- Dedicated resources
- More control
- Customization (like owning a car)



Serverless

- On-demand execution
- No server management
- Event-driven
- Cost-effective
- It's like using a taxi service; it's there when you need it and gone when you don't



EC2 unpacked



Amazon EC2

- Virtual servers in the cloud
- Customizable configurations (OS, storage, location)
- Focus on customization

Lambda unpacked



- Serverless computing platform
- Name comes from Lambda calculus
- Event-driven architecture (file uploads, database changes)
- Focus on convenience

In real life

EC2

- Hosting websites
- Scalability and customization



Lambda

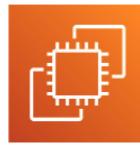
- Real-time image processing
- Event-driven tasks



Beyond EC2 and Lambda

AWS Compute

Instance



Amazon EC2



Amazon EC2 Spot



Amazon EC2 Auto Scaling



Amazon Lightsail



AWS Batch

Containers



Amazon ECS



Amazon ECR



Amazon EKS



AWS Fargate

Serverless



AWS Lambda

Edge and hybrid



AWS Outposts



AWS Snow Family



AWS Wavelength



Vmware Cloud on AWS



AWS Local Zones

Cost and capacity management



AWS Savings Plan



AWS Compute Optimizer



AWS Elastic Beanstalk



EC2 Image Builder



Elastic Load Balancing

Let's practice!

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AWS Storage Services

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Why is storage crucial?



Understanding storage types

Active Storage (Direct Storage)

- Like your recent emails, readily accessible
- Ideal for day-to-day operations
- **AWS S3:** designed for ease of access and management

Archival Storage

- Like old emails, accessed infrequently
- Ideal for long-term data retention
- **AWS Glacier:** cost-effective for long-term storage

Unveiling AWS storage solutions

- Amazon S3
 - Object storage service
 - Used for storing and retrieving any amount of data, anytime, from anywhere
 - Can get pricey
- Amazon Glacier
 - Used for data archiving and long-term backup
 - Long-term, low-cost, and secure cloud storage service



Diving into S3

- S3 stands for Simple Storage Service
- Highly scalable, durable, and secure
- Wide variety of use cases like website hosting, data backup, and content distribution



Glacier unpacked

- Designed for long-term storage
- Cost-effective solution for data archiving and backup

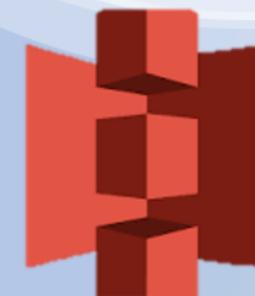


In practice

- S3
 - Hosting static websites
 - Real-time big data analytics
- Glacier
 - Historical data archiving
 - Long-term backups



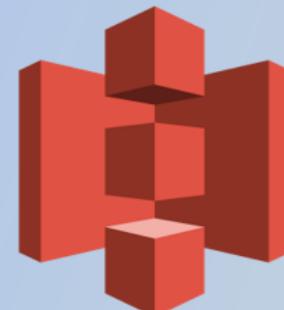
AWS Storage Services



Amazon S3



AWS Elastic Block Storage



AWS Elastic File System



Amazon Storage Gateway



Shared File Storage ([FSx](#))

Let's practice!

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AWS database services

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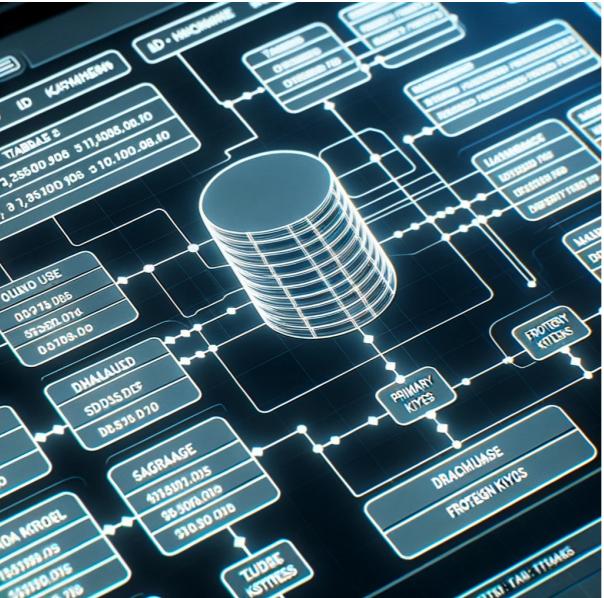
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Why are databases crucial?



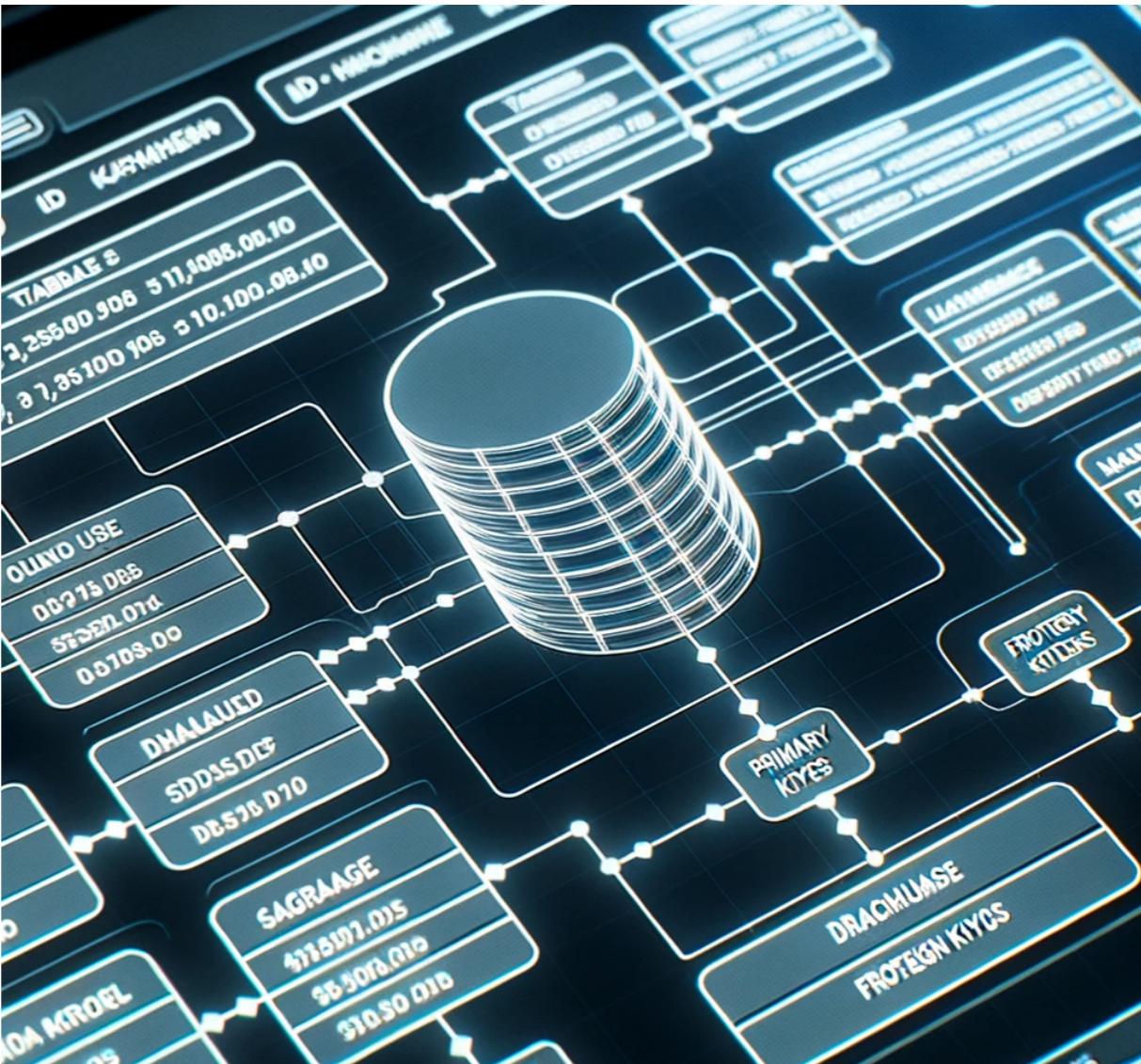
Understanding database types

- Relational Databases (RDS)
 - Like a well-organized bookshelf
 - Structured data with clear relations
 - Ideal for traditional applications
 - AWS RDS: the sturdy bookshelf of the digital world
- NoSQL Databases (DynamoDB)
 - Like a dynamic magazine rack
 - Flexible schema for unstructured data
 - Ideal for mobile apps, IoT, gaming
 - AWS DynamoDB: adaptable and ready for ever-changing content



Diving into RDS

- Scalable and cost-effective
 - Supports multiple database engines like MySQL, PostgreSQL, etc



DynamoDB unpacked

- Designed for web-scale applications
- Provides single-digit millisecond latency



Understanding DynamoDB's key-value pairs

- DynamoDB uses a key-value model
- A key maps to a value



In practice

- RDS
 - Financial systems
 - E-commerce platforms
- DynamoDB
 - Real-time bidding systems
 - Leaderboards for gaming

AWS database services

Database type	Examples	AWS service
Relational	Traditional applications, enterprise resource planning (ERP), customer relationship management (CRM), ecommerce	 Amazon Aurora  Amazon RDS  Amazon Redshift
Key-value	High-traffic web applications, ecommerce systems, gaming applications	 Amazon DynamoDB
In-memory	Caching, session management, gaming leaderboards, geospatial applications	 Amazon ElastiCache  Amazon MemoryDB for Redis
Document	Content management, catalogs, user profiles	 Amazon DocumentDB (with MongoDB compatibility)
Wide column	High-scale industrial apps for equipment maintenance, fleet management, and route optimization	 * Amazon Keyspaces
Graph	Fraud detection, social networking, recommendation engines	 Amazon Neptune
Time series	Internet of Things (IoT) applications, DevOps, industrial telemetry	 Amazon Timestream
Ledger	Systems of record, supply chain, registrations, banking transactions	 Amazon Ledger Database Services (QLDB)

¹ <https://aws.amazon.com/products/databases/>

Let's practice!

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