

**Welcome to Week 3**

# **Cloud Accelerator Program**

**CDK, RDS, and DynamoDB**

 **Develop**Intelligence

A PLURALSIGHT COMPANY

Hello

**HELLO**  
my name is

**Allen Sanders**  
with DevelopIntelligence,  
a Pluralsight Company.

About me...



- 27+ years in the industry
- 23+ years in teaching
- Certified Cloud architect
- Passionate about learning
- Also, passionate about Reese's Cups!



## Agenda

- Cloud Development Kit (CDK) – another IaC alternative in AWS
- Managed relational databases using RDS (Relational Database Service)
- Managed NoSQL databases using DynamoDB

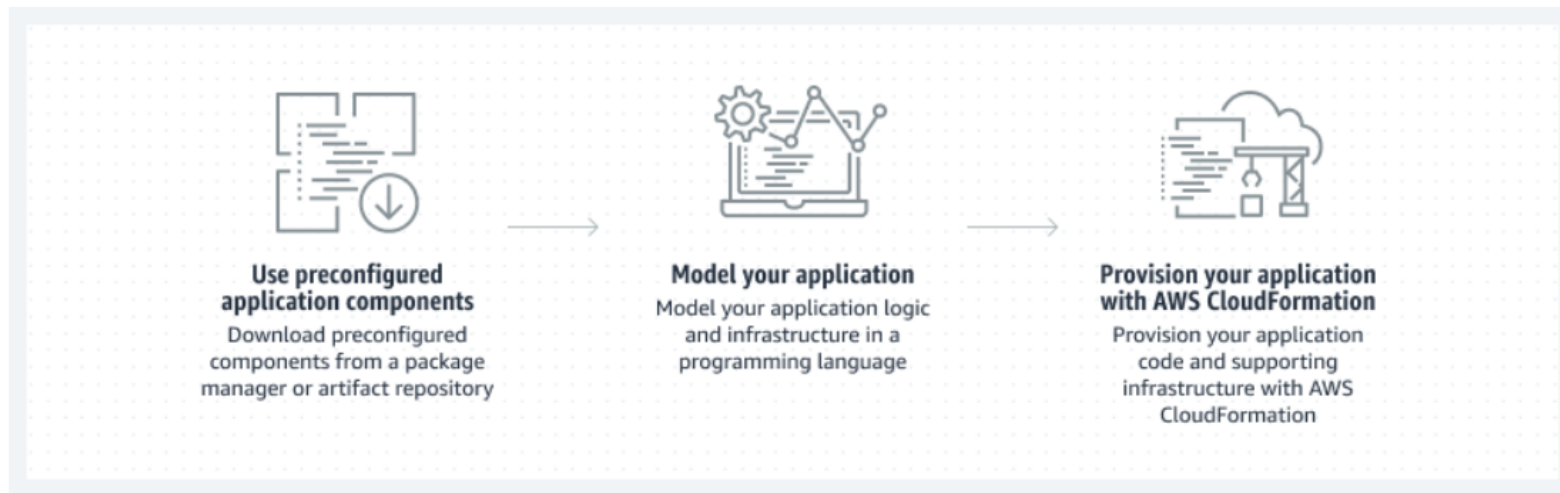


## How we're going to work together

- Slides and words to highlight key concepts
- Demos to bring those concepts “to life”
- Lab work (which will take place in sandboxes provided by “A Cloud Guru”) for hands-on reinforcement
- NOTE: I welcome being interrupted – if you need more info, or clarification, or anything else, just break in and ask. I am here to help you.

# Cloud Development Kit (CDK)

# CDK – Key Concepts



Source: <https://aws.amazon.com/cdk/>

## CDK – Key Concepts

CDK Application

CDK Stack

CDK Construct

## CDK – Key Concepts

Describes the infrastructure  
to be built using a  
programming language

CDK Application

Built using  
TypeScript/JavaScript,  
Python, Java, C#, or Go

CDK Stack

CDK Construct



## CDK – Key Concepts

Equivalent to a CloudFormation stack – a collection of related resources to be deployed

CDK Application

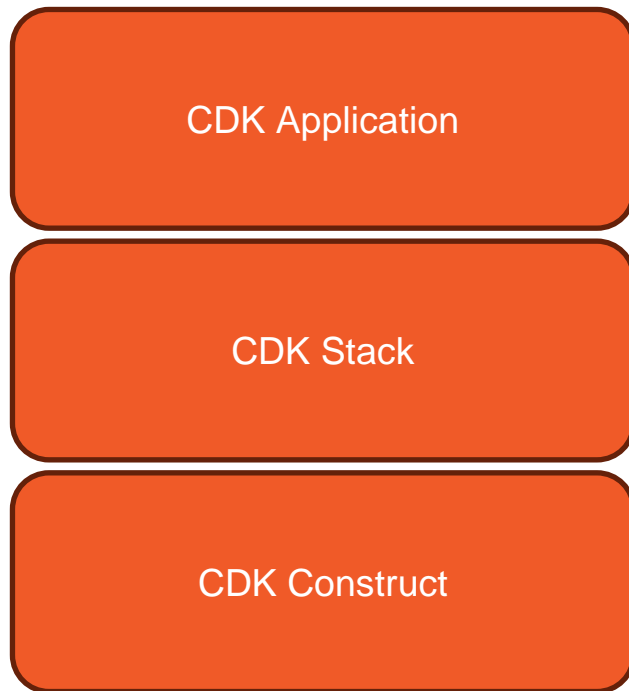
CDK Stack

CDK Construct

A process called “synthesis” is used to convert CDK stacks to CloudFormation templates

## CDK – Key Concepts

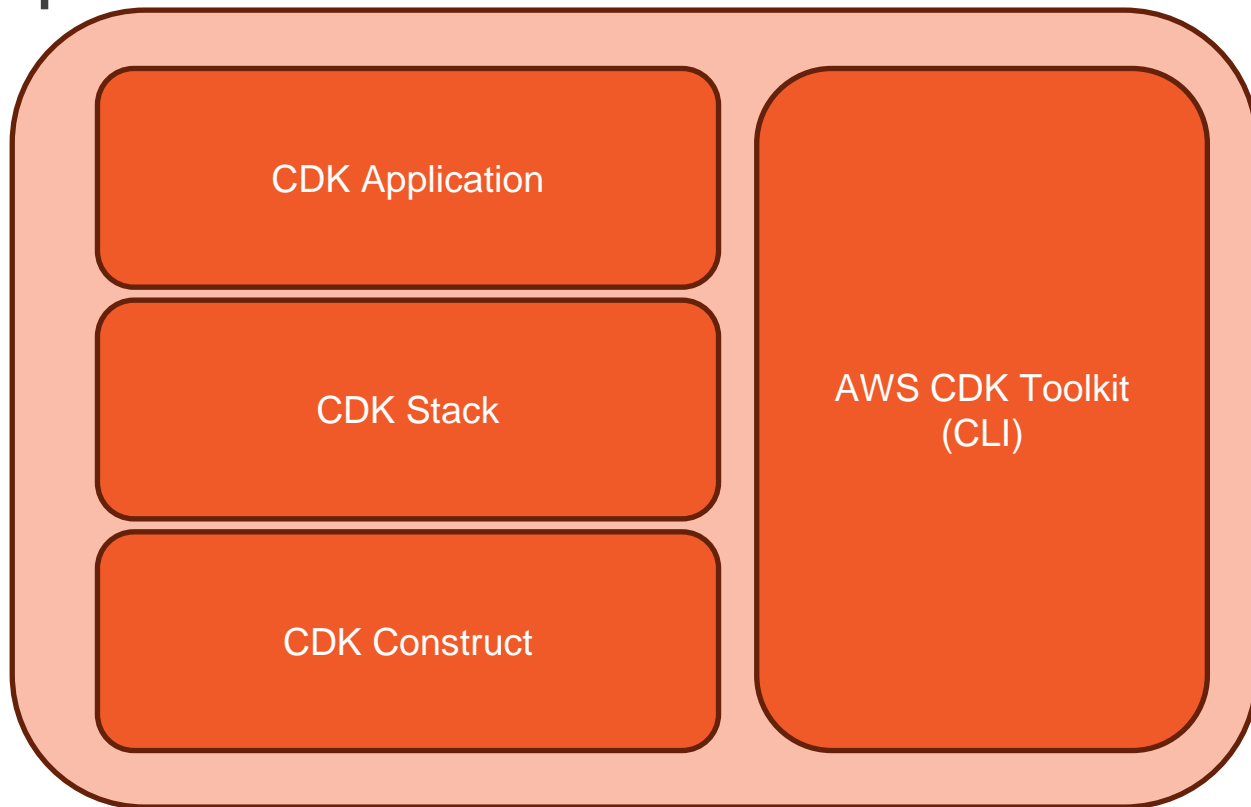
Representation of one or more Cloud resources categorized into multiple “levels”



L1, L2, and L3

## CDK – Key Concepts

Supports application  
bootstrapping,  
application  
synthesis, and  
deployment



## CDK – Languages Supported

TypeScript / JavaScript

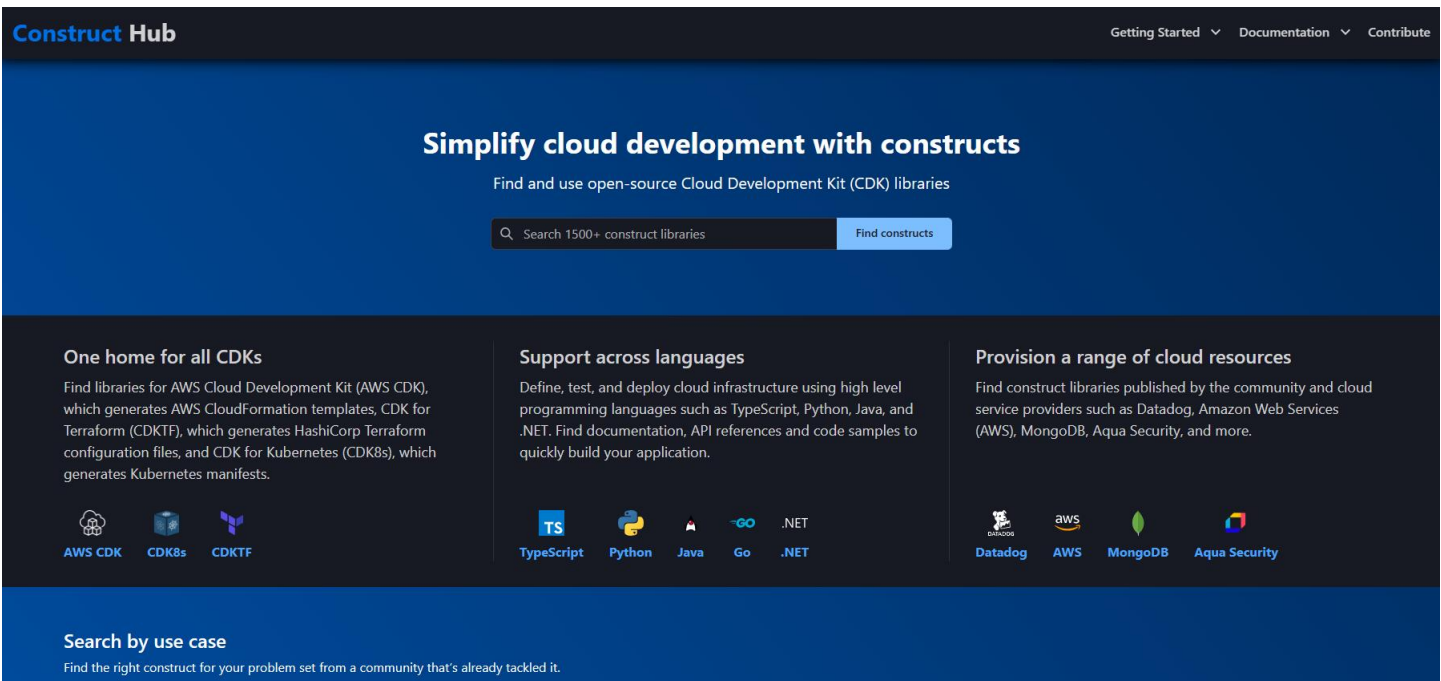
Java

Python

C#

See [https://docs.aws.amazon.com/cdk/v2/guide/getting\\_started.html](https://docs.aws.amazon.com/cdk/v2/guide/getting_started.html) for more info

# CDK – Construct Hub



The screenshot shows the Construct Hub website with a dark blue header and main content area. The header includes the 'Construct Hub' logo and navigation links for 'Getting Started', 'Documentation', and 'Contribute'. The main content area features a large blue banner with the title 'Simplify cloud development with constructs' and a subtitle 'Find and use open-source Cloud Development Kit (CDK) libraries'. Below the banner is a search bar with the text 'Search 1500+ construct libraries' and a 'Find constructs' button. The page is divided into three columns: 'One home for all CDKs', 'Support across languages', and 'Provision a range of cloud resources'. Each column contains a description and a row of logos for various services and languages.

**Construct Hub** Getting Started ▾ Documentation ▾ Contribute




## Simplify cloud development with constructs

Find and use open-source Cloud Development Kit (CDK) libraries

🔍 Search 1500+ construct libraries Find constructs

### One home for all CDKs






Find libraries for AWS Cloud Development Kit (AWS CDK), which generates AWS CloudFormation templates, CDK for Terraform (CDKTF), which generates HashiCorp Terraform configuration files, and CDK for Kubernetes (CDK8s), which generates Kubernetes manifests.

AWS CDK CDK8s CDKTF

### Support across languages





Define, test, and deploy cloud infrastructure using high level programming languages such as TypeScript, Python, Java, and .NET. Find documentation, API references and code samples to quickly build your application.

TypeScript Python Java Go .NET

### Provision a range of cloud resources

Find construct libraries published by the community and cloud service providers such as Datadog, Amazon Web Services (AWS), MongoDB, Aqua Security, and more.

Datadog AWS MongoDB Aqua Security

**Search by use case**  
Find the right construct for your problem set from a community that's already tackled it.

See <https://constructs.dev/> for more info

## LAB:

Deploying Your  
First CDK Stack

Execute the “Hands-On” lab available at  
[https://github.com/KernelGamut32/cloud-accel-aws-2024-  
public/tree/main/week03/labs/lab01](https://github.com/KernelGamut32/cloud-accel-aws-2024-public/tree/main/week03/labs/lab01)

## LAB:

Blue/Green  
Deployments  
with CDK

Execute the “Hands-On” lab available at  
[https://github.com/KernelGamut32/cloud-accel-aws-2024-  
public/tree/main/week03/labs/lab02](https://github.com/KernelGamut32/cloud-accel-aws-2024-public/tree/main/week03/labs/lab02)

## LAB:

Serverless Java  
App with CDK

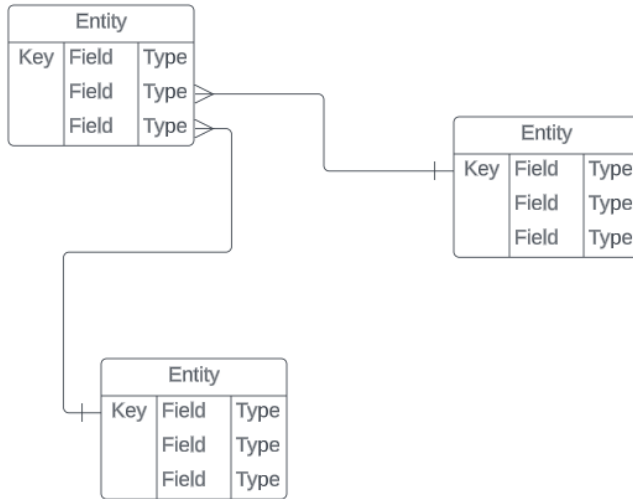
Execute the “Hands-On” lab available at  
[https://github.com/KernelGamut32/cloud-accel-aws-2024-  
public/tree/main/week03/labs/lab03](https://github.com/KernelGamut32/cloud-accel-aws-2024-public/tree/main/week03/labs/lab03)





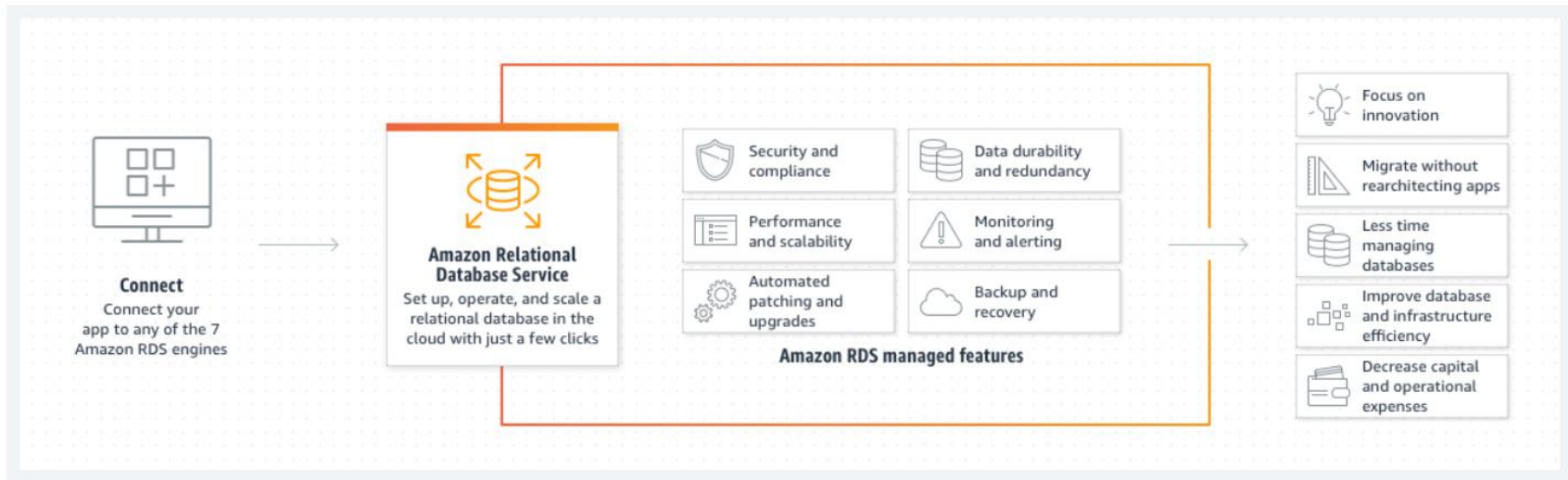
# **Relational Database Service (RDS)**

# Relational Databases



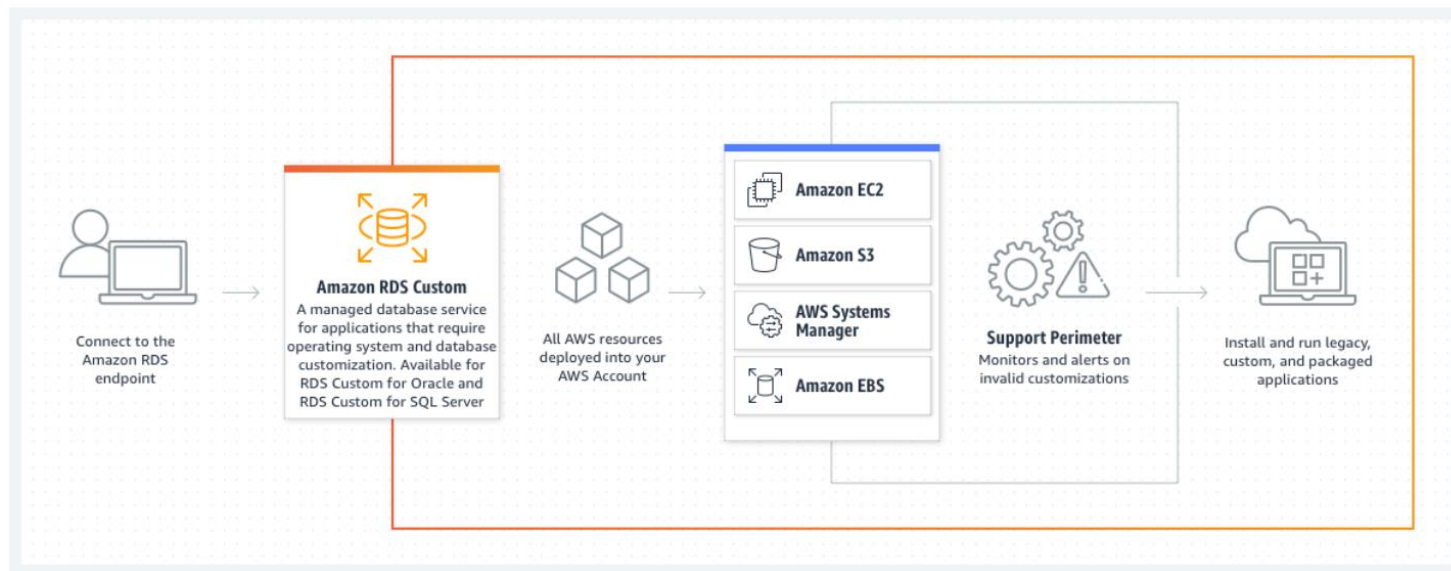
- Collection of related tables (representing entities) and fields (representing entity attributes)
- Supports identification of keys that can be used to quickly locate and uniquely identify entities
- Normalized relationships used to create hierarchies of connected entities and minimize data duplication
- Strict data design (schema)

# Amazon RDS



Source: <https://aws.amazon.com/rds/>

# Amazon RDS Custom



Source: <https://aws.amazon.com/rds/>

## Amazon RDS – Supported Database Engines

MariaDB

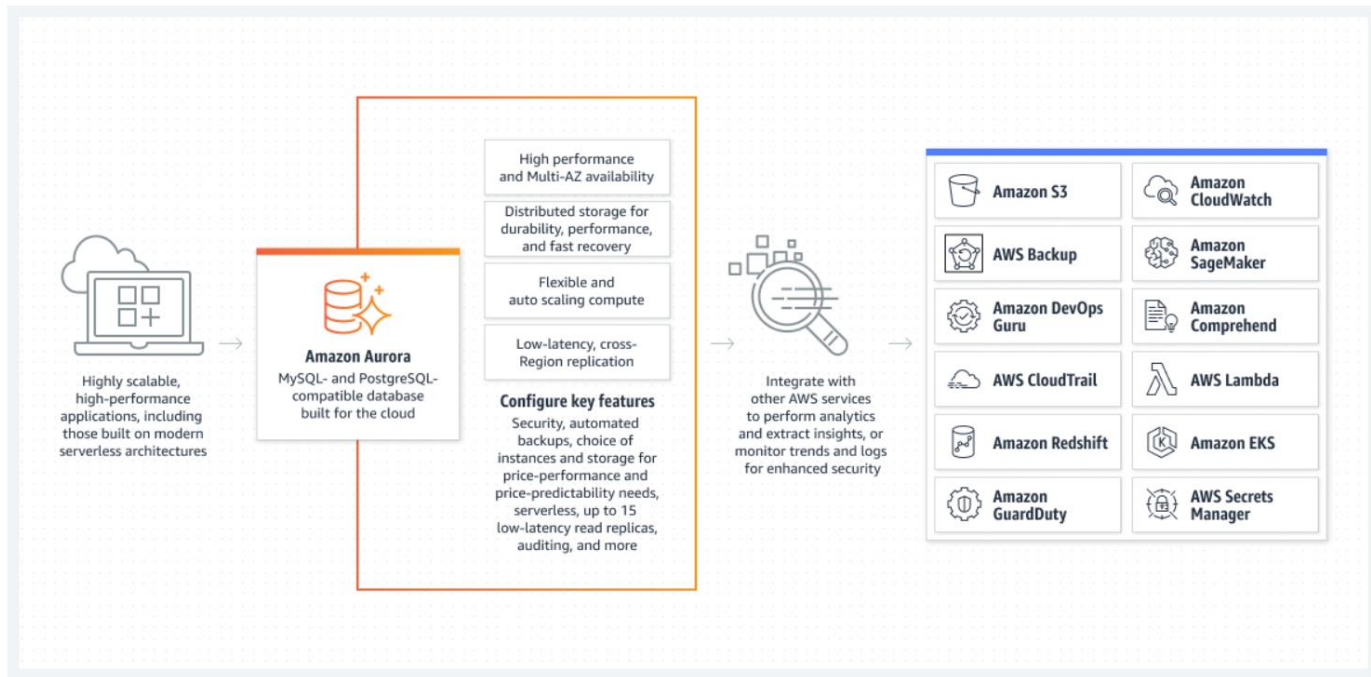
Microsoft SQL Server

MySQL

Oracle

PostgreSQL

# Amazon Aurora



Source: <https://aws.amazon.com/rds/aurora/>

## LAB:

Aurora Serverless with Lambda

Execute the “Hands-On” lab available at

<https://github.com/KernelGamut32/cloud-accel-aws-2024-public/tree/main/week03/labs/lab04>



# DynamoDB

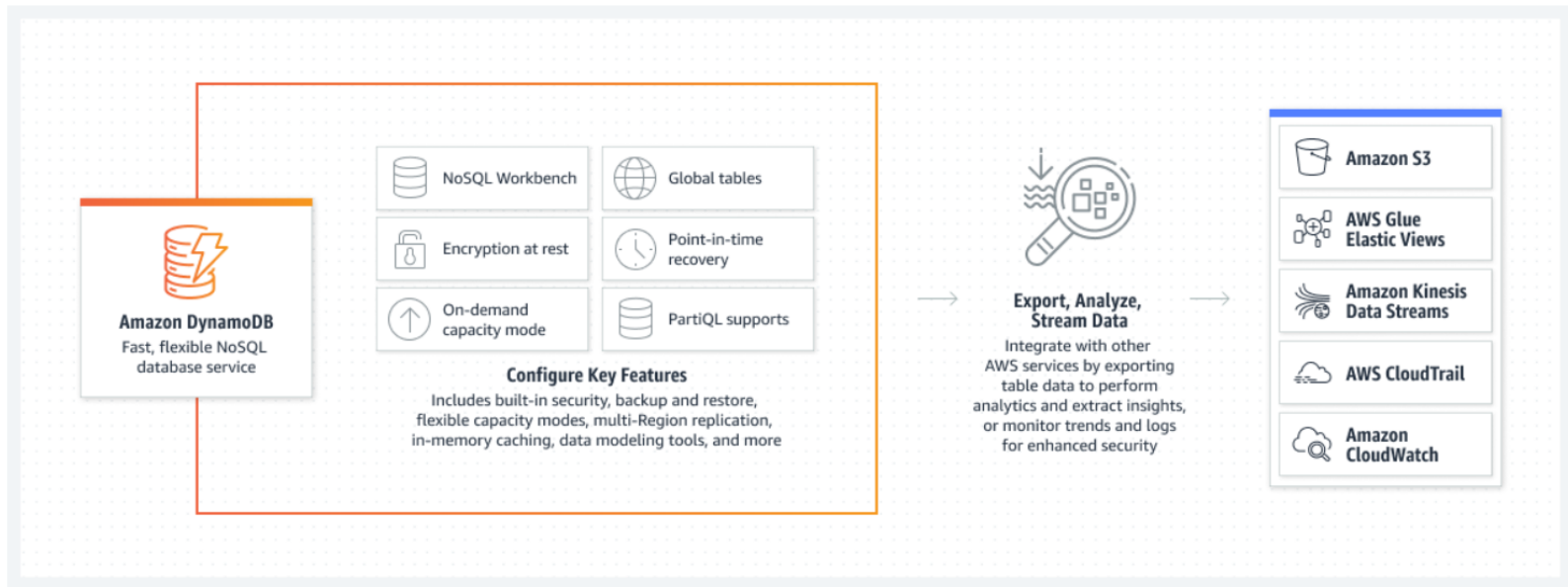


# Document Databases

```
{
  "id": "b01754e8-5108-401d-810d-ff0aa6b9337e",
  "name": {
    "first": "Melissa",
    "last": "Testing"
  },
  "address": {
    "street": "123 Main St",
    "city": "San Francisco",
    "state": "CA",
    "zip": "94105"
  }
}
```

- Data represented as a logical grouping of attributes and relationships
- Captures entire hierarchy (parent and children) used to describe an entity (or “document”)
- Data is repeated (rather than normalized), fully encapsulating all detail about an entity in the system
- Fluid data design

# Amazon DynamoDB



Source: <https://aws.amazon.com/dynamodb/>

## LAB:

Microservices with DynamoDB

Execute the “Hands-On” lab available at  
<https://github.com/KernelGamut32/cloud-accel-aws-2024-public/tree/main/week03/labs/lab05>

## DEMO:

CDK Aspects & Config

<https://github.com/KernelGamut32/cloud-accel-aws-2024-public/tree/main/week03/demos/aspects-and-config>



# Knowledge Check



## Question #1

Q: To create a pipeline definition for automated build and deploy in GitLab, what file do you need to create in the root of your repository?

1. `.gitlab-ci.yml`
2. `pipeline_def.json`
3. `build-it.yml`
4. None of the above

Enter your answer in the chat...



## Question #2

Q: True or False: A CDK Stack is different from a CloudFormation Stack.

1. True
2. False

Enter your answer in the chat...



## Question #3

Q: Which of the following is the capability provided by CDK to convert your CDK code/application into a CloudFormation template for deployment to AWS?

1. Bootstrapping
2. Build
3. Deploy
4. Synthesis

Enter your answer in the chat...





## Question #4

Q: Which construct level in CDK is typically used for defining reusable use case-based patterns of infrastructure deployment where multiple related components can more easily be deployed together?

1. L1
2. L2
3. L3
4. L4

Enter your answer in the chat...



## Question #5

Q: Which of the following is the capability provided by CDK to prepare your AWS account for running CDK deployments in the account?

1. Bootstrapping
2. Build
3. Deploy
4. Synthesis

Enter your answer in the chat...



## Question #6

Q: True or False: Bootstrapping an AWS account for CDK is something you should only have to do once.

1. True
2. False

Enter your answer in the chat...



# Thank you!

If you have additional questions,  
please reach out to me at:  
[asanders@gamuttechnologysvcs.com](mailto:asanders@gamuttechnologysvcs.com)