Welcome to Week 3

Cloud Accelerator Program

CDK, RDS, and DynamoDB

DevelopIntelligence
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

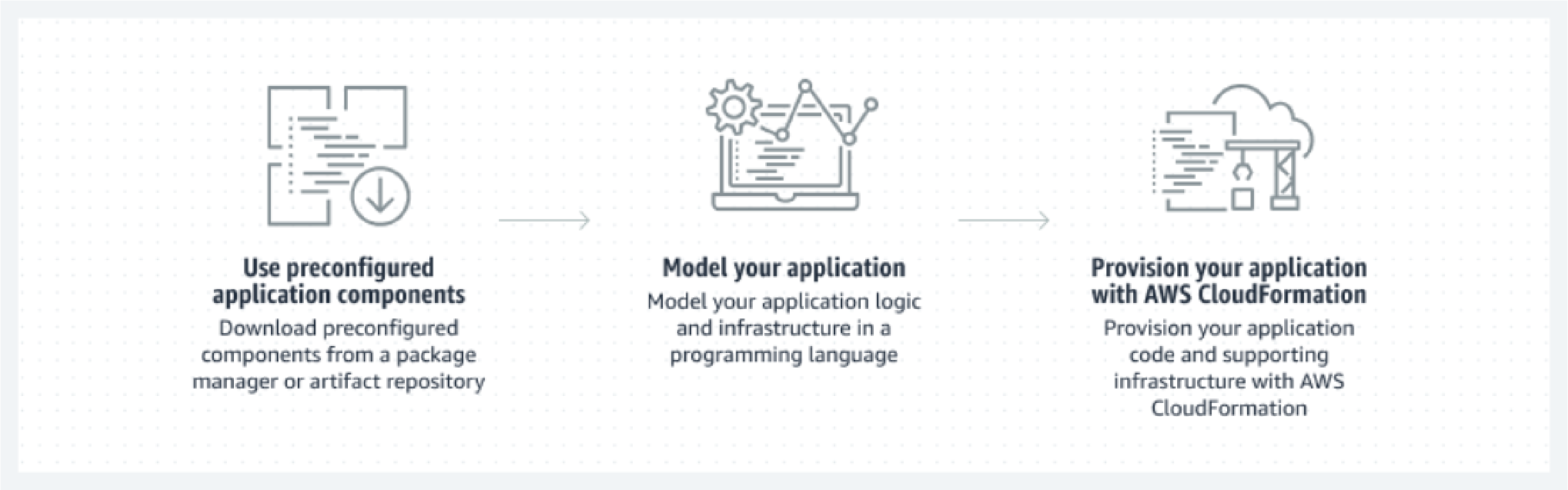
- Cloud Development Kit (CDK) – another IaC alternative in AWS
- Managed relational databases using RDS (Relational Database Service)
- Managed NoSQL databases using DynamoDB

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



Use preconfigured application components

Download preconfigured components from a package manager or artifact repository

Model your application

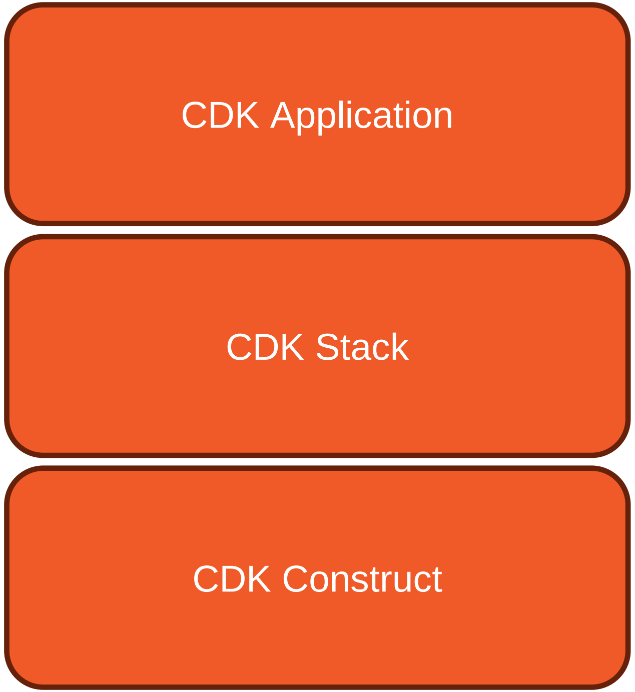
Model your application logic and infrastructure in a programming language

Provision your application with AWS CloudFormation

Provision your application code and supporting infrastructure with AWS CloudFormation

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

CDK – Key Concepts



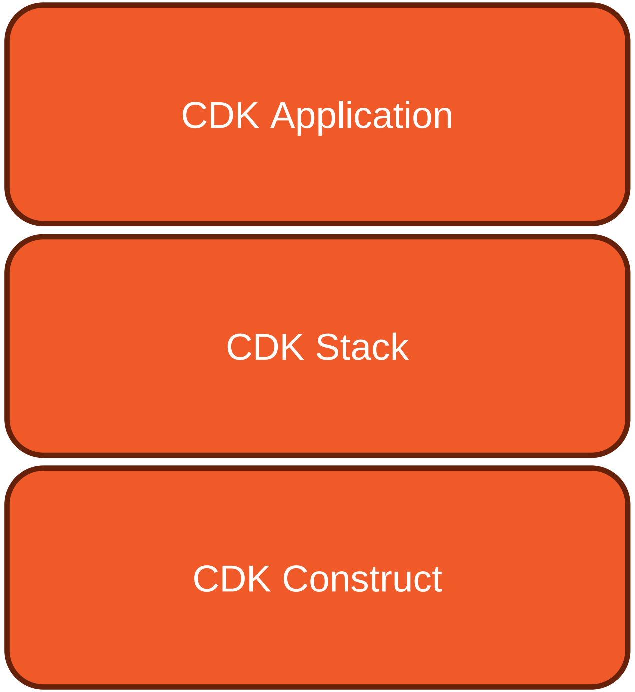
CDK Application

CDK Stack

CDK Construct

CDK – Key Concepts

Describes the infrastructure to be built using a programming language



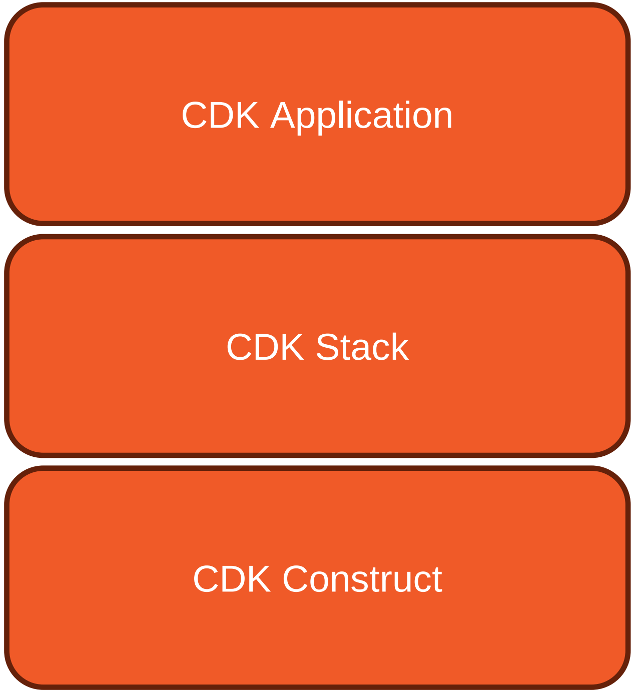
CDK Application

CDK Stack

CDK Construct

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

CDK – Key Concepts



CDK Application

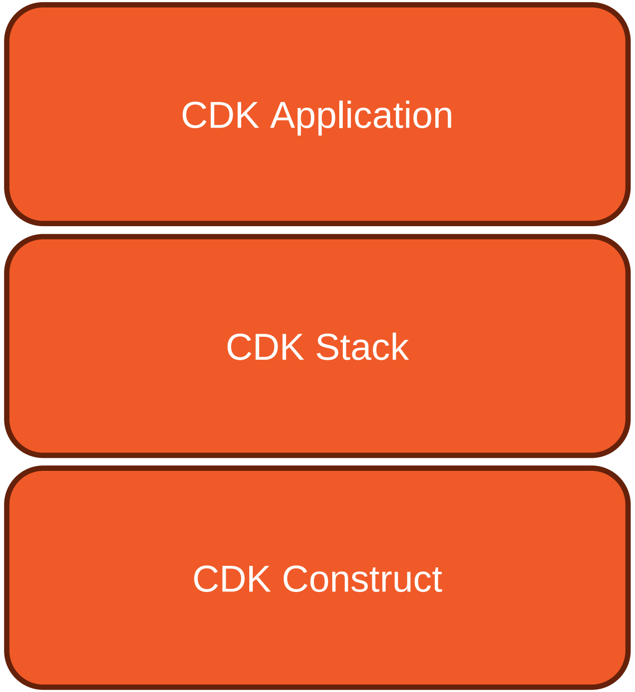
CDK Stack

CDK Construct

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

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

CDK – Key Concepts



CDK Application

CDK Stack

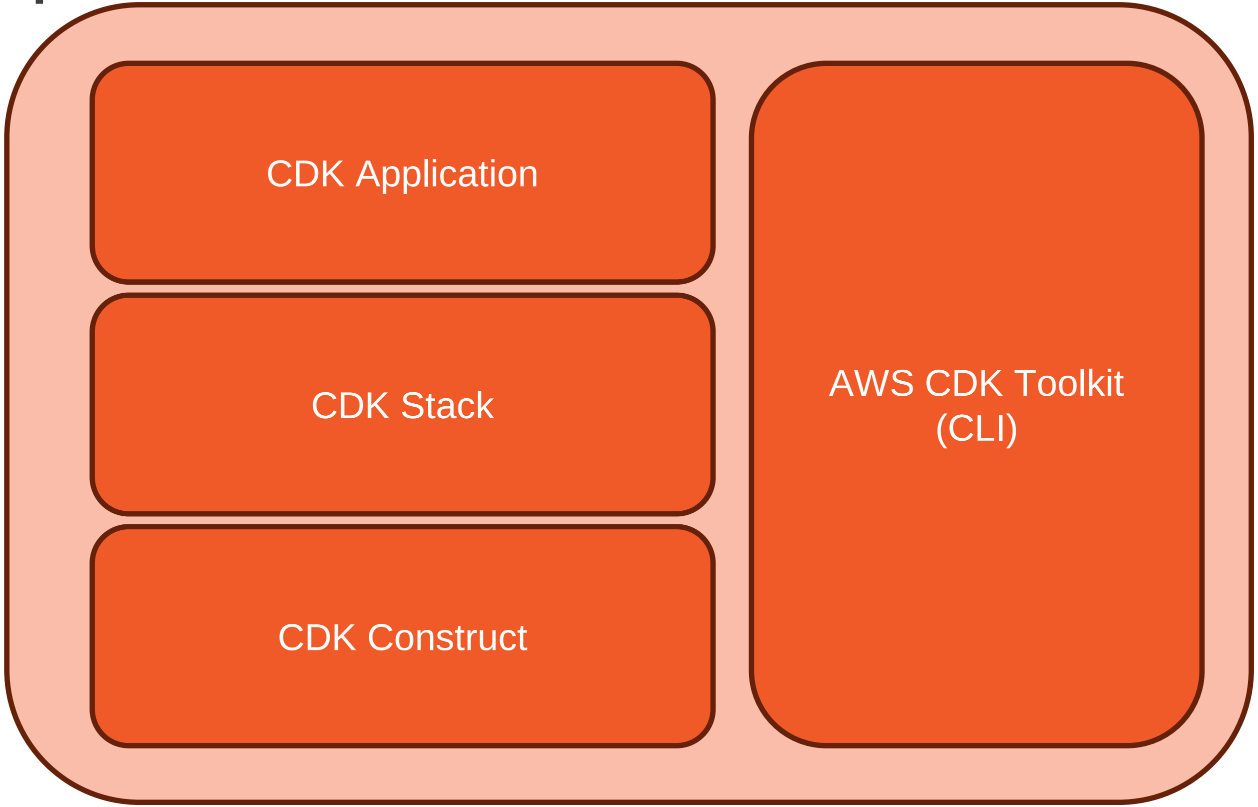
CDK Construct

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 Application

CDK Stack

CDK Construct

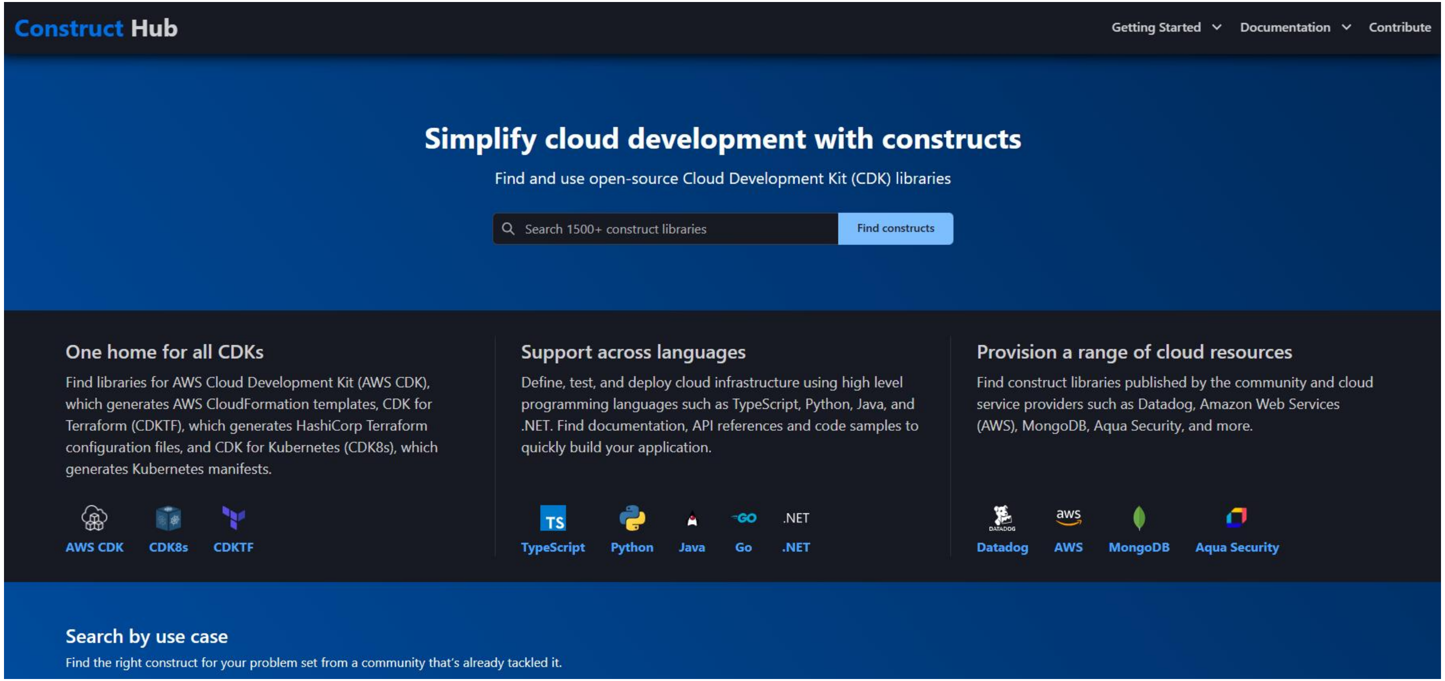
AWS CDK Toolkit (CLI)

CDK – Languages Supported

- TypeScript / JavaScript
- Java
- Python
- C#

See https://docs.aws.amazon.com/cdk/v2/guide/getting_started.html for more info

CDK – Construct Hub



Simplify cloud development with constructs

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

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.

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.

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.

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

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

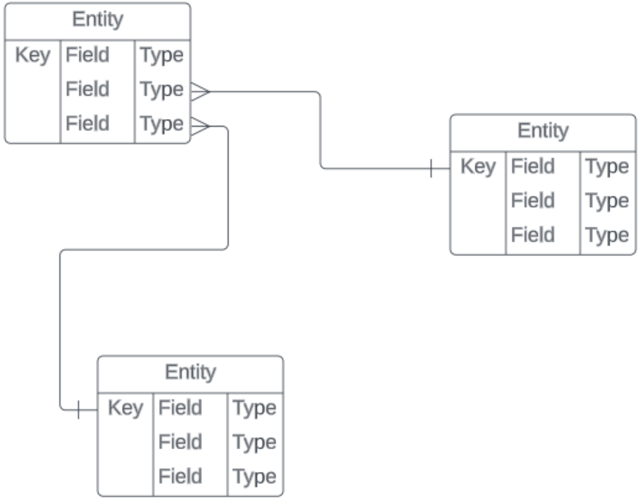
LAB:

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

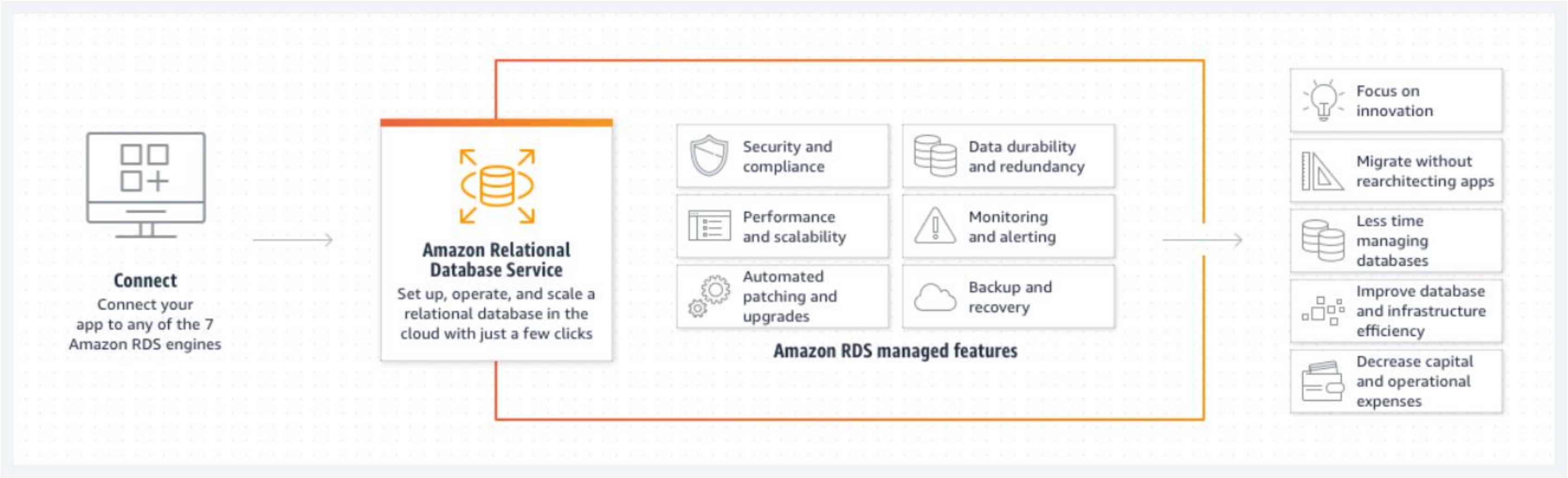
Relational Database Service (RDS)

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



Connect

Connect your app to any of the 7 Amazon RDS engines

Amazon Relational Database Service

Set up, operate, and scale a relational database in the cloud with just a few clicks

Security and compliance

Data durability and redundancy

Performance and scalability

Monitoring and alerting

Automated patching and upgrades

Backup and recovery

Amazon RDS managed features

Focus on innovation

Migrate without rearchitecting apps

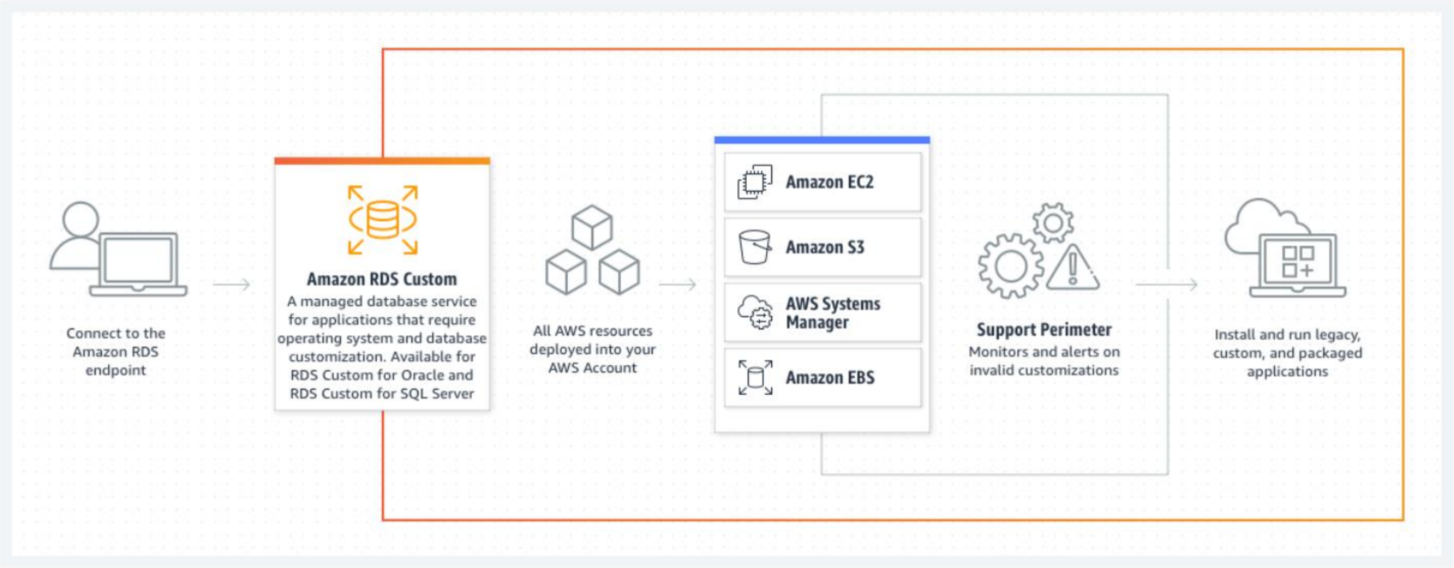
Less time managing databases

Improve database and infrastructure efficiency

Decrease capital and operational expenses

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

Amazon RDS Custom

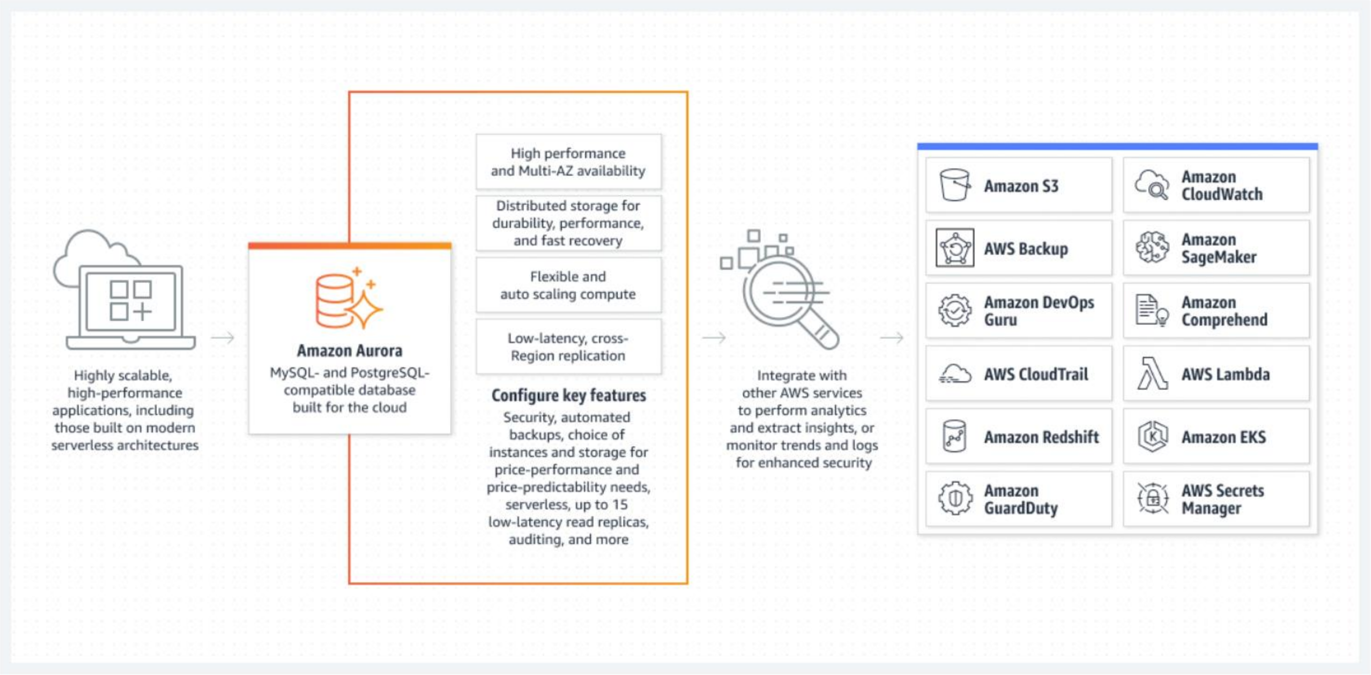

Connect to the Amazon RDS endpoint
Amazon RDS Custom
A managed database service for applications that require operating system and database customization. Available for RDS Custom for Oracle and RDS Custom for SQL Server
All AWS resources deployed into your AWS Account
Amazon EC2
Amazon S3
AWS Systems Manager
Amazon EBS
Support Perimeter
Monitors and alerts on invalid customizations
Install and run legacy, custom, and packaged applications

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

Amazon RDS – Supported Database Engines

- MariaDB
- Microsoft SQL Server
- MySQL
- Oracle
- PostgreSQL

Amazon Aurora



Highly scalable, high-performance applications, including those built on modern serverless architectures

Amazon Aurora

MySQL- and PostgreSQL-compatible database built for the cloud

High performance and Multi-AZ availability

Distributed storage for durability, performance, and fast recovery

Flexible and auto scaling compute

Low-latency, cross-Region replication

Configure key features

Security, automated backups, choice of instances and storage for price-performance and price-predictability needs, serverless, up to 15 low-latency read replicas, auditing, and more

Integrate with other AWS services to perform analytics and extract insights, or monitor trends and logs for enhanced security

Amazon S3	Amazon CloudWatch
AWS Backup	Amazon SageMaker
Amazon DevOps Guru	Amazon Comprehend
AWS CloudTrail	AWS Lambda
Amazon Redshift	Amazon EKS
Amazon GuardDuty	AWS Secrets Manager

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

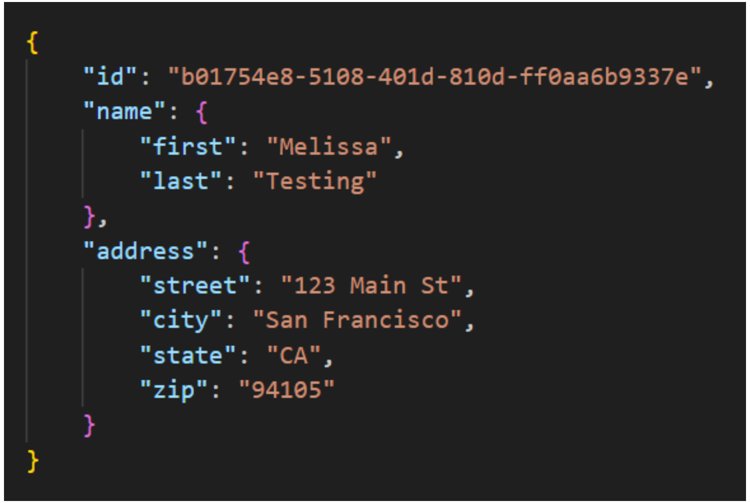
LAB:

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

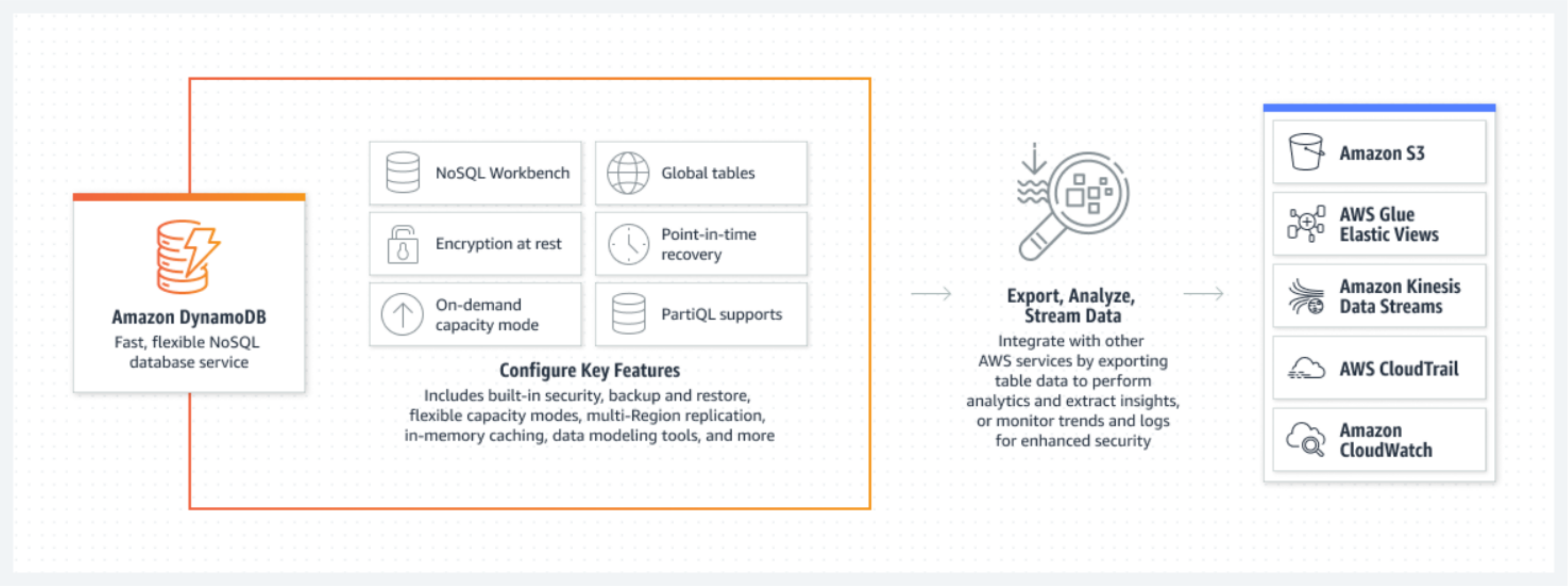
Document Databases



```
{
    "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



Fast, flexible NoSQL database service

Includes built-in security, backup and restore, flexible capacity modes, multi-Region replication, in-memory caching, data modeling tools, and more

Integrate with other AWS services by exporting table data to perform analytics and extract insights, or monitor trends and logs for enhanced security

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

Thank you!

If you have additional questions,
please reach out to me at:
asanders@gamuttechnologysvcs.com