ZIPCODE
WILMINGTON

CLOUD COMPUTING
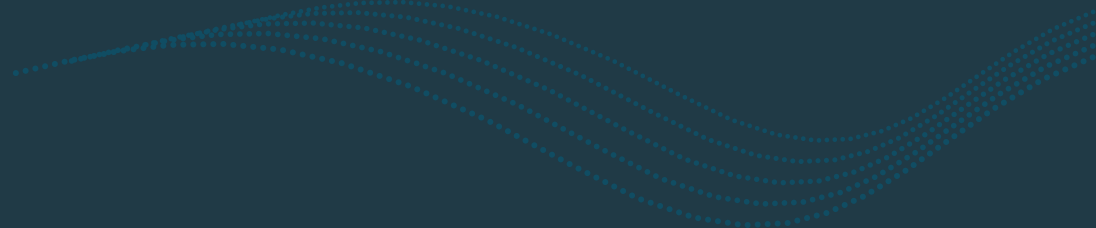
Alyssa Resh - Java 10.2

Gabrielle Damazio - Data 5.2

TABLE OF CONTENT
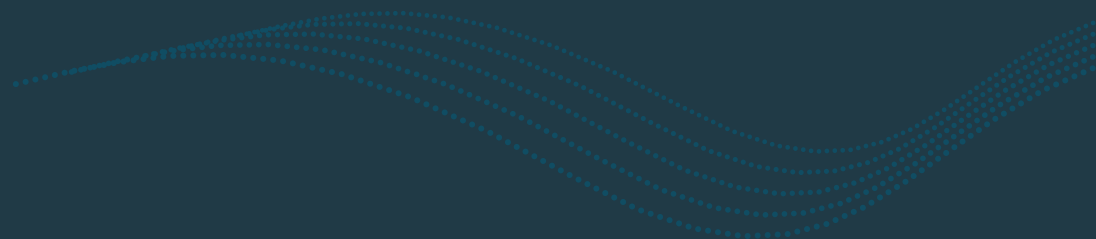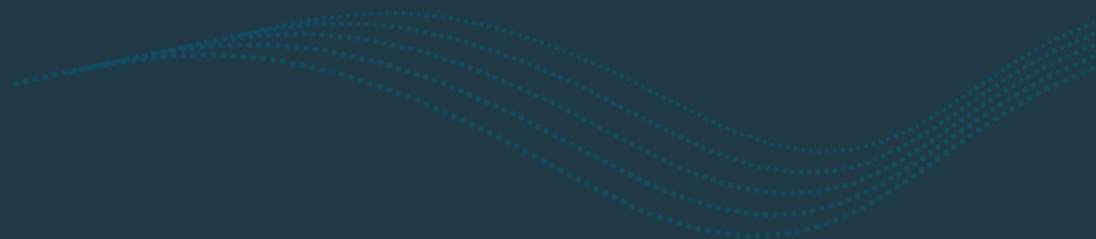
CLOUD COMPUTING

Overview

Cloud Computing delivers computing services like **servers, storage, databases, and software** over the internet on a pay-per-use basis.

It allows businesses and individuals to **access and scale** resources without owning or maintaining physical infrastructure, offering **flexible**, **scalable solutions** that **reduce operational costs**.

Mobile

Storage

Applications

CLOUD COMPUTING

Server

Database

Private cloud

Public cloud

Hybrid cloud

HOW IT WORKS

Deployment Methods | Delivery Models

Cloud Computing

Cloud Computing allows organizations to rent access to infrastructure, storage, and applications from service providers, rather than owning and maintaining their own data centers.It operates through a front end (client's applications and network) and a back end (servers, storage, and cloud infrastructure).

Main Services Models of
Cloud Computing

Software-as-a-service
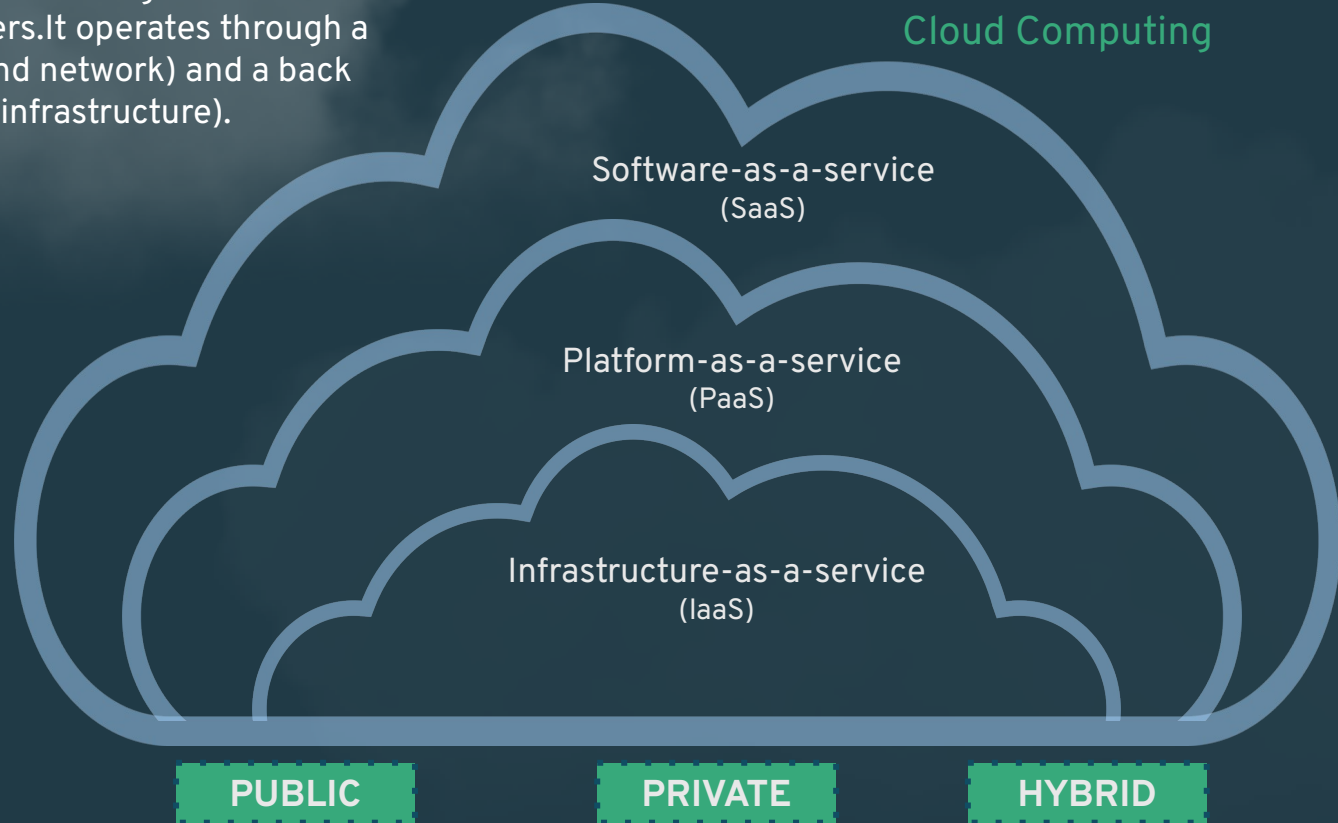(SaaS)

Platform-as-a-service
(PaaS)

Infrastructure-as-a-service
(IaaS)

Types of
Cloud Deployment

PUBLIC   **PRIVATE**   **HYBRID**

DEPLOYMENT MODELS

A **deployment model** is the way cloud infrastructure is set up and made available to users. It determines where the cloud resources are hosted, who manages them, and how users can access them.

PUBLIC CLOUDS

are owned by third-party providers and offer on-demand compute, storage, and network resources to the general public.

PRIVATE CLOUDS

operates by a single organization, either on-premise or off-premise, offering control, security, and shared resources for internal use.

HYBRID CLOUDS

combine public and private models, enabling secure, compliant private cloud use alongside public cloud services.

DELIVERY MODELS

A delivery model in cloud computing defines the type of cloud service a provider offers, determining the level of control, management, and responsibility a user has over infrastructure and applications. It impacts how resources are accessed, managed, and paid for.

Infrastructure as a Service
IaaS

- Rent servers, storage, & networking from providers
- No need to own or manage infrastructure
- Provider manages servers, updates, and network security
- User Responsibility: Operating system, applications, and data management

Platform as a Service
PaaS

- Provides cloud platforms for developing, testing, and managing applications
- Software developers deploy apps without handling infrastructure

Users: Software Developers

Software as a Service
SaaS

- Cloud providers host and manage software applications on a pay-as-you-go basis
- No maintenance required from users

Users: End Customers

NEW PIZZA AS A SERVICE

| Traditional On-Premises (Legacy)	Infrastructure as a service (IaaS)	Platform as a service (Paas)	Software as a service (Saas)
Dining Table	Dining Table	Dining Table	Dining Table
Drinks	Drinks	Drinks	Drinks
Electric / Gas	Electric / Gas	Electric / Gas	Electric / Gas
Oven	Oven	Oven	Oven
Fire	Fire	Fire	Fire
Pizza Dough	Pizza Dough	Pizza Dough	Pizza Dough
Tomato Sauce	Tomato Sauce	Tomato Sauce	Tomato Sauce
Toppings	Toppings	Toppings	Toppings
Cheese	Cheese	Cheese	Cheese

■ You manage   ■ Vendor manages

BENEFITS

Driving Innovation and Growth
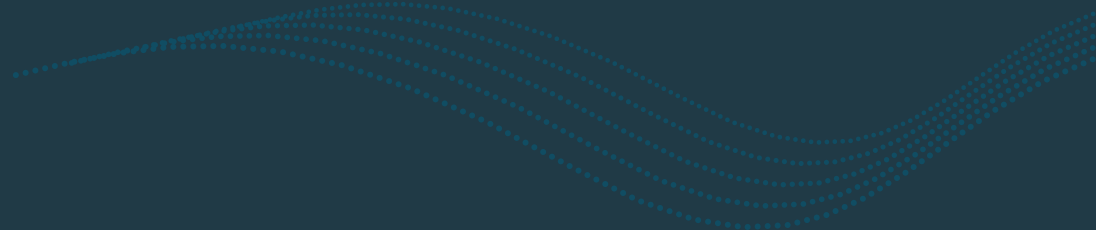
KEY BENEFITS

COST EFFICIENCY

Pay-as-you-go model reduces upfront costs (Salesforce, Oracle).
Lowers operating expenses and improves budgeting (ResearchGate).

DATA SECURITY & RECOVERY

Advanced encryption and disaster recovery solutions (ResearchGate, Digital Realty).

SCALABILITY & FLEXIBILITY

On-demand resources for fluctuating workloads (Google Cloud, Oracle).

ENHANCED PERFORMANCE

High-speed infrastructure with global reach (Digital Realty, Oracle).

COLLABORATION & ACCESSIBILITY

Real-time data sharing and remote access for hybrid teams (Salesforce, ResearchGate).

SUSTAINABILITY

Shared resources reduce carbon footprints (Oracle, Google Cloud).
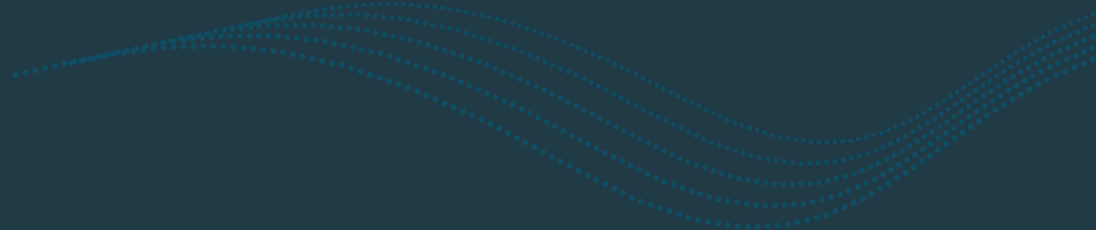
INNOVATION & AGILITY

Access to AI, ML, and big data technologies (Google Cloud, ResearchGate).

GLOBAL REACH

Deploy solutions closer to customers for better experience (Salesforce, Digital Realty).

APPLICATION

Real World Application

SCENARIO: A PIZZA DELIVERY APP FOR A GROWING BUSINESS

PROBLEM

You've been hired by a growing pizza chain to build a scalable app where customers can place orders, track delivery in real-time, and earn loyalty points. The app needs to handle high traffic during lunch and dinner peaks, process payments securely, and provide personalized promotions based on customer behavior.

Why Cloud for this App?

SCALABILITY
Handle peak traffic efficiently

COST EFFICIENCY
Pay only for resources used

REAL-TIME UPDATES
Low latency for smooth user experience

ADVANCED ANALYTICS
AI-driven recommendations to boost sales and engagement

DATA ENGINEERING

Real-Time Analytics and Reporting: Process live order data using **cloud-based data processing** tools.

→ Helps management adjust staffing levels and promotions dynamically without investing in hardware upfront.

Loyalty Program Data Management: Store and manage loyalty points in a scalable database and process customer data through **data integration services**.

→ Ensures a seamless experience for loyalty program participants making sure data is always accessible without interruptions.

Historical Data for ML: Store historical order data in a **data storage solution** and use **machine learning platforms** for analysis.

→ Enables predictive insights such as popular pizza combinations or customer behavior trends.

SOFTWARE ENGINEERING

Backend for Pizza Ordering System
Task: Build an API for placing and tracking orders.

→ Ensures the system can handle requests, update inventory, and notify customers, scaling efficiently during high traffic periods.

Real-Time Delivery Tracking
Task: Implement geolocation for tracking delivery drivers.

→ Provides live tracking of drivers without having to maintain real-time communication between drivers, the app, and users.

Hosting and Deployment of the App
Task: Host the pizza app and ensure reliable performance.

→ Automates scaling and minimizes downtime for seamless performance during high traffic, while offering uptime guarantees, backups, and patching to ease operations.
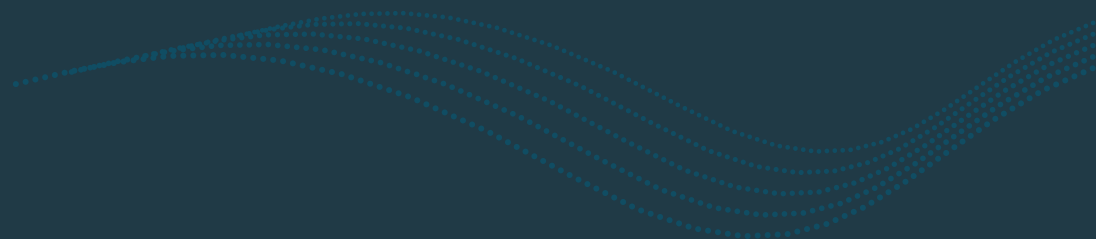
Payment Processing
Task: Integrate secure payments.

→ Simplifies integration with external payment systems while ensuring secure, compliant transaction processing.

TRENDS

The Future of Cloud

TRENDS

AI AS A SERVICE (AIaaS)

Cloud-based AI solutions, like pre-trained models and APIs, help businesses integrate AI without investing in infrastructure, reducing costs and accelerating innovation.

HYBRID & MULTI-CLOUD

Companies use multiple cloud providers to optimize costs, increase resilience, and enhance disaster recovery.

SUSTAINABILITY

Cloud providers focus on energy-efficient solutions, such as carbon-neutral data centers, to align with sustainability goals.

SERVERLESS COMPUTING

Eliminates server management, allowing developers to focus on building and deploying scalable applications cost-effectively.
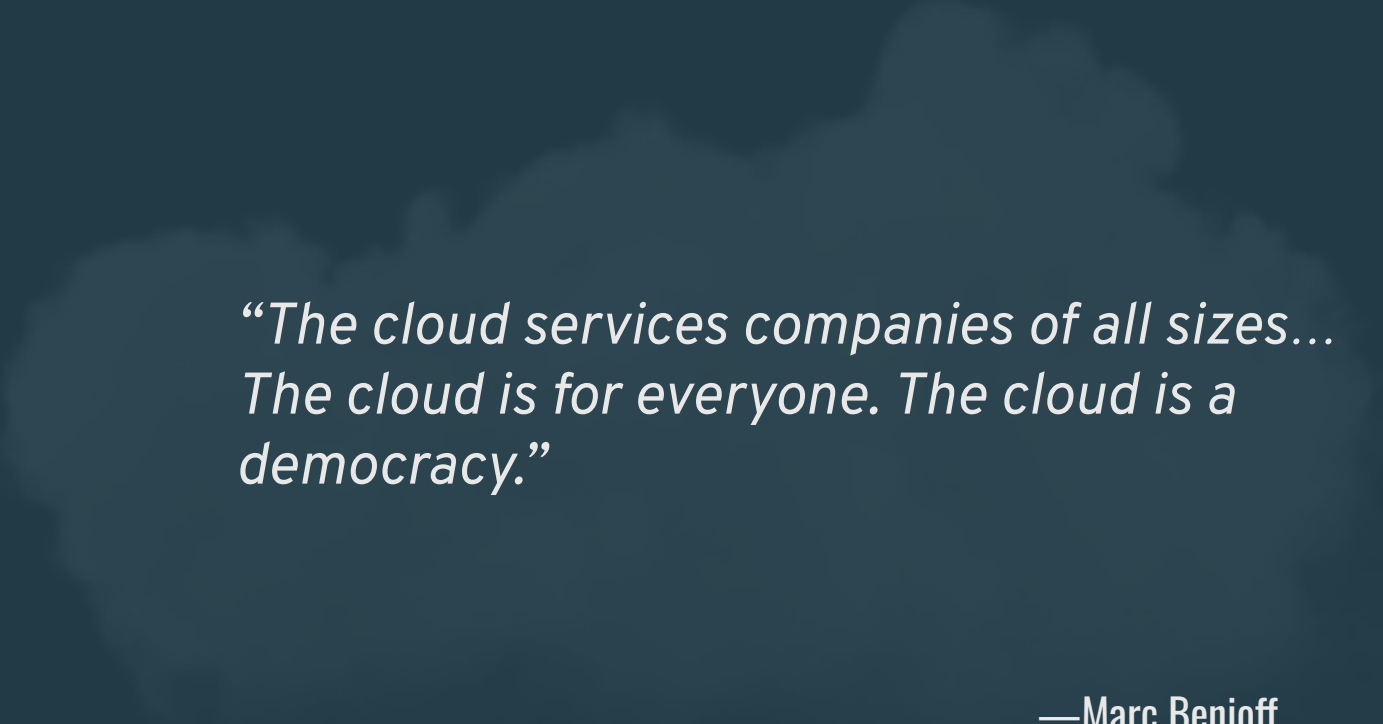
CLOUD-NATIVE DEVELOPMENT

Using cloud-native architectures and DevOps methodologies, businesses build scalable, resilient apps with tools like Kubernetes and Docker.

QUANTUM COMPUTING

Early-stage, but cloud-based quantum computing promises breakthroughs in cryptography, drug discovery, and logistics.

"The cloud services companies of all sizes… The cloud is for everyone. The cloud is a democracy."

—Marc Benioff
\Founder, CEO and Chaiman of Salesforce, pioneer of Cloud Computing