



# Architecture and Deployment Model – Revision Notes

## Cloud Service Models

### 1. Software as a Service (SaaS)

#### Definition:

Software delivered over the internet, licensed on-demand or via subscription, or sometimes free (e.g., ad-supported).

#### Characteristics:

- Accessible via web
- Centrally managed
- One-to-many delivery model
- Automatic updates and patching
- Integration via APIs

#### Best Use Cases:

- Collaborative/external interaction tools (e.g., email campaign)
- Short-term use software
- Mobile/web access needs
- High demand variability (e.g., tax season tools)
- Example: Salesforce CRM

#### Not Ideal For:

- Real-time data processing
- Regulatory restrictions on data location
- Fully satisfied by existing on-premise solutions

### 2. Platform as a Service (PaaS)

#### Definition:

Cloud platform for developing, testing, and deploying applications without managing infrastructure.

#### Characteristics:

- Complete app lifecycle tools (develop, test, deploy, host)
- Web-based UI development tools
- Multi-tenant architecture
- Scalable, supports load balancing & failover
- Integration with web services & databases
- Supports collaboration and project planning
- Billing/subscription management tools

#### Best Use Cases:

- Multi-developer projects
- Agile/rapid development cycles
- Automating testing & deployment
- Example: Microsoft Azure, Google App Engine

#### Not Ideal For:

- Highly portable apps
- Proprietary tools/languages (vendor lock-in risks)
- Performance requiring low-level customization

### 3. Infrastructure as a Service (IaaS)

#### Definition:

Cloud-based delivery of virtualized computing infrastructure (servers, storage, networking, OS).

#### Characteristics:

- On-demand hardware resources
- Dynamic scaling
- Pay-per-use model
- Shared hardware (multi-tenant)

#### Best Use Cases:

- Startups with low capital
- Rapidly scaling businesses
- Spiky infrastructure needs (e.g., product launches)
- Cost-effective trials or temporary environments

#### Not Ideal For:

- Compliance-heavy industries (data location issues)
- High-performance needs better served by dedicated hardware

## Network Function Virtualization (NFV)

#### Definition:

Technology to virtualize entire classes of network node functions into building blocks that may connect or chain together to create communication services.

#### Key Ideas:

- Use of standard servers, switches, and storage
- Software-based network functions (e.g., firewalls, load balancers)

- Flexible deployment across data centers, nodes, or user premises

## ☛ Cloud Deployment Models

### 1. Public Cloud

- Open to public use; hosted on the provider's premises
- Managed by third-party vendors
- Large-scale infrastructure, served via the internet
- Examples: Amazon EC2, Microsoft Azure, Google App Engine

### 2. Private Cloud

- Exclusive use by a single organization
- Can be hosted on-premises or by a third-party

#### Types:

- **On-Site Private Cloud:**
  - Hosted internally
  - Strong control & security
  - High setup costs, fixed resources
- **Outsourced Private Cloud:**
  - Hosted by a third-party
  - Dual security perimeters (client + provider)
  - Enhanced networking options

#### Challenges in Both:

- Multi-tenancy risks
- Workload invisibility to clients
- Data transfer limitations
- Performance sensitive tasks may be constrained

### 3. Hybrid Cloud

- Mix of public and private
- Enables data/application portability
- Often used for flexible workloads and gradual cloud adoption

### 4. Community Cloud

- Shared infrastructure for organizations with common concerns
- Often used in government, healthcare, or collaborative projects