

Principles of cloud computing

1 What is cloud computing

Services typically offered

- Compute power
- Storage
- Networking
- Analytics

Containers - Provide a consistent, isolated execution environment for applications.

- Standard runtime environment used to execute the app
- Leading platform is docker

Serverless computing - Run application code without creating, configuring or maintaining a server

- Application is broken into separate functions that run when triggered by some action
- Only pay for the processing time used by each function as it executes

2 Benefits of cloud computing

Cost effective

- No upfront infrastructure costs
- Not buying infrastructure that isn't fully utilised
- Can scale up and down with demand

Scalability

- Vertical scaling (scaling up)
 - Adding more resources to a server
- Horizontal scaling (scaling out)
 - Adding more servers

Elasticity

- Automatically adding more resources to handle traffic

Current

- Don't have to think about having current hardware and patches

Reliability (Microsoft responsibility)

- Provided backup, recovery replication etc
- Fault tolerance

Global

- Fully redundant datacenters
- High availability (shared responsibility)
- Lower customer latency

Security (shared responsibility)

- Both physical and digital

Agility (speed to set up)

3 Compliance terms and requirements

Questions include

- How compliant is the cloud provider when it comes to handling sensitive data
- How compliant are the services offered by the cloud provider
- How can I deploy my own cloud-based solutions to scenarios that have accreditation or compliance requirements?
- What terms are part of the privacy statement for the provider?

4 Economies of scale

- Less expensive
- More efficient
- Pass benefits on

5 CapEx vs OpEx

5.1 CapEx (Capital expenditure)

- Spend on physical infrastructure
- Storage
- Network
- Backup and archive
- Organisation continuity and disaster recovery
- Datacentre infrastructure
- Technical personnel

5.2 Benefits

Fixed costs make prediction easier

5.3 OpEx (operational expenditure)

- Monthly bill
- Pay as you go
- Get set up immediately
- No upfront costs
- Leasing software and customised features
- Scaling charges based on usage/demand
- Billing at the user or organisation level

Azure follows a consumption based model, which just has operational expenditure

5.4 Benefits

Easier to respond to change

6 Types of cloud models

Name	Description	Advantages	Disadvantages
Private cloud	Cloud set up in own datacenter	<ul style="list-style-type: none"> • Ensure the configuration is as needed • Control over security and compliance 	<ul style="list-style-type: none"> • Some initial capEx Costs • Limited agility • Require IT skills
Public cloud	No local hardware, all running on cloud providers hardware	<ul style="list-style-type: none"> • High scalability/agility • Pay as you go pricing • Not responsible for maintenance or updates of the hardware • Minimal technical knowledge required 	<ul style="list-style-type: none"> • May be security requirements that can't be met • May be government policies, industry standards or legal requirements that can't be met • Can't manage hardware in way you want to • May not work with legacy applications
Hybrid cloud	Combining public and private clouds	<ul style="list-style-type: none"> • Keep any legacy systems running • Flexibility to choose where things run • Get economies of scale from public cloud when available • Meet more compliance • Run things where it is most appropriate 	<ul style="list-style-type: none"> • Increased cost • Increased complexity

7 Types of cloud services

7.1 IaaS

Not responsible for:

- Datacenter
- Networking firewalls
- Servers+Storage

Most flexible Configure and manage hardware

7.2 PaaS

Not responsible for:

- IaaS + OS

Focus on application development

7.3 SaaS

Only responsible for data+access

Access in Azure via marketplace

Pay as you go pricing

Users pay for software they use on a subscription model

7.4 Comparison

- Moving up the stack reduces costs as managing less