1.4 Types of Cloud Computing

▼ Cloud Computing

- Cloud is like ***electricity***
  - only pay for what you need
  - don’t worry about how & when power plants upgrade to the latest technology
  - you don’t manage scaling, ex: many people can move to town and light will stay on
- Cloud computing
  - Solves management of hardware and software
  - = Renting resources, like storage space or CPU cycles, on another company’s computer
  - Flexible and cost-efficient - only pay for what you use
- Cloud Provider
  - Provides cloud computing services
  - Typical services:
    - Compute power: such as Linux/Windows servers or Web apps
    - Storage: such as files and DB
    - Networking: such as secure connections between cloud provider and your data center
    - Analytics: such as visualizing telemetry and performance data

▼ Cloud Deployment Models

- Defines

    - where your data is stored
    - how your customers interact with it - how do they get to it
    - where do the applications run?
- Choose depending on your budget, and on your security, scalability, and maintenance needs
    - how much of your own infrastructure you want or need to manage

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▼ Public cloud

- Most common deployment model
- No local hardware to manage or keep up-to-date, everything runs on your cloud provider’s hardware
- Save additional costs by sharing computing resources with other cloud users
- Can use multiple public cloud providers of varying scale
- Example use case
    - Deploy a blog / web application quickly without worrying about purchasing, managing or maintaining the hardware on which it runs
- **Advantages of Public cloud**
    - High scalability/agility: you don’t have to buy a new server in order to scale
    - Pay-as-you-go pricing: you pay only for what you use, no CapEx cost
    - You’re not responsible for maintenance or updates of the hardware
    - Minimal technical knowledge to set up and use: you can leverage the skills and expertise of the cloud provider to ensure workloads are secure, safe, and highly available
- **Disadvantages of Public cloud**
    - Specific security requirements that cannot be met by using public cloud
    - Government policies, industry standards, or legal requirements which public clouds cannot meet

    - You don’t own the hardware or services and cannot manage them as you may want to
    - Unique business requirements, such as having to maintain a legacy application might be hard to meet

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▼ Private cloud

- Cloud environment in your own datacenter
- Provide self-service to computer resources to users in your organization
- A simulation of a public cloud to users, but you remain completely responsible for the purchase and maintenance of the hardware and software services you provide
- Users can be external customer or specific internal departments such as Accounting
- Example use case
    - Have data that cannot be put in the public cloud because a govt policy requires specific data to be kept in-country or privately
- **Advantages of Private cloud**
    - Ensure the configuration can support any scenario or legacy application
    - Control (and responsibility) over security
    - Meet strict security, compliance, or legal requirements
- **Disadvantages of Private cloud**
    - Initial CapEx cost & must purchase the hardware for startup and maintenance
    - Owning the equipment limits the agility - to scale you must buy, install, and setup new hardware
        - Private clouds require IT skills and expertise that’s hard to come by

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▼ Hybrid cloud

- Combines public and private clouds, allowing you to run your applications in the most appropriate location
- Helpful when you have some things that cannot be put in the cloud, maybe for legal reasons
- Example use cases
  - Host a website in the public cloud and link it to a highly secure database hosted in your private cloud (or on-prem datacenter)
  - Some specific piece of data that cannot be exposed publicly (such as medical data) which needs to be held in your private datacenter
  - An application that runs on old hardware that can’t be updated. Keep the old system & connect it to the public cloud for authorization or storage
- **Advantages of Hybrid cloud**
  - Keep any systems running and accessible that use out-of-date hardware or an out-of-date operating system
  - Have flexibility with what you run locally versus in the cloud
    - Easier migration to Azure
    - Cloud-bursting: Use cloud when your compute resources are not enough
    - Pass data back and forth: Process part of your data in cloud, part of it on-prem
  - Take advantage of economies of scale from public cloud providers for services and resources where it’s cheaper, and then supplement with your own equipment when it’s not
  - Use your own equipment to meet security, compliance, or legacy scenarios where you need to completely control the environment
- **Disadvantages of Hybrid cloud**
  - More expensive than selecting one deployment model since it involves some CapEx cost up front

- More complicated to set up and manage
