INTRODUCTION TO CLOUD COMPUTING

Outline

- Characteristics of web app
- Data centers
- Hardware utilization
- Application architecture
- Cloud computing
- History of cloud
- Cloud service models
- Cloud deployment models

Characteristics of Web App!

Scalability

Time to market

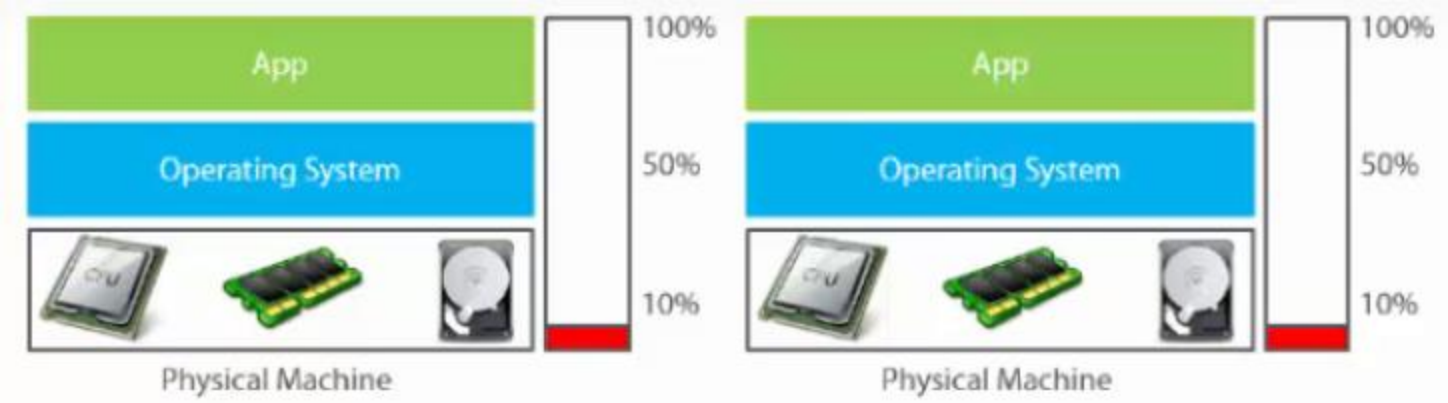
Security

Availability

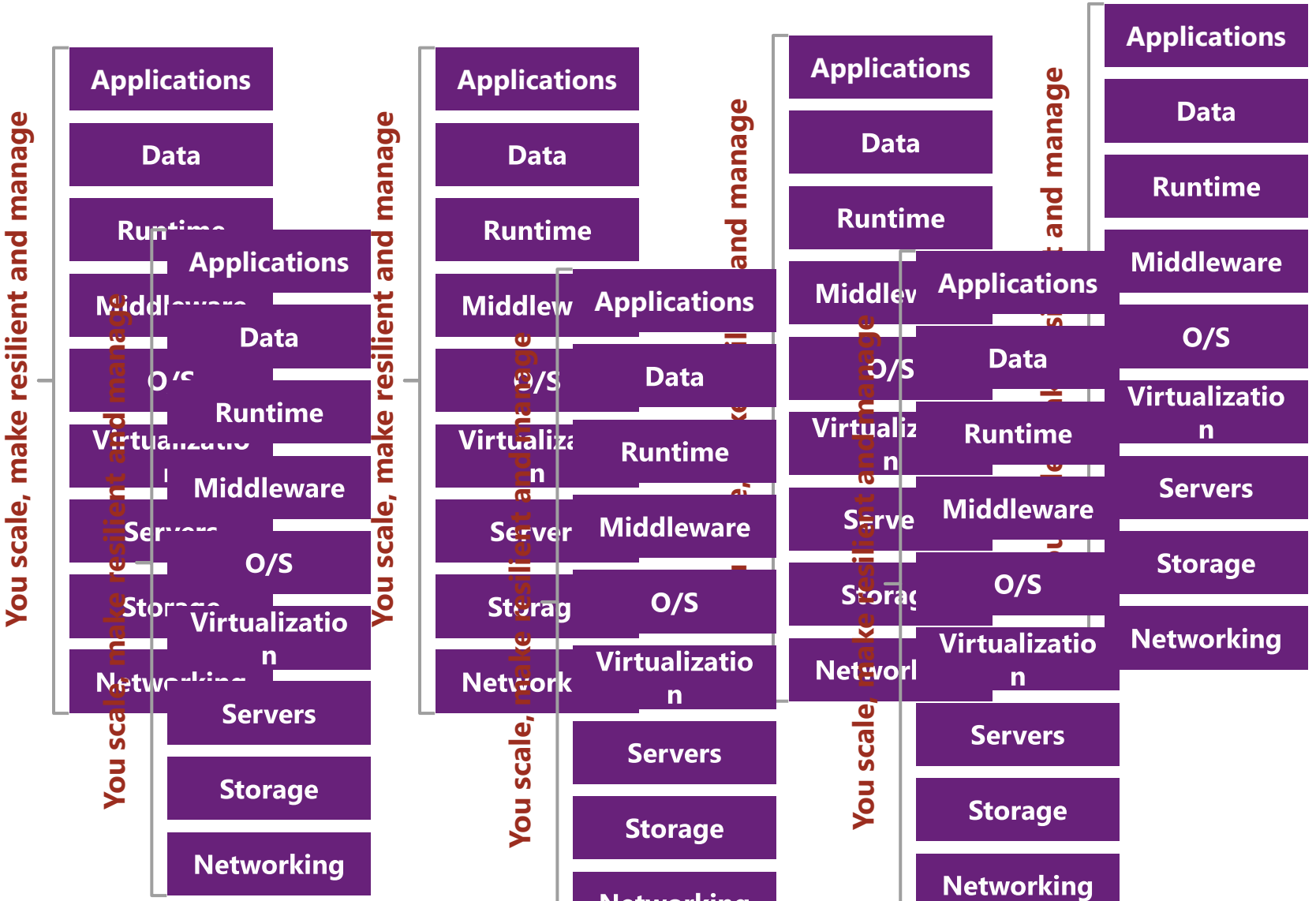
Reliability

Maintainability

Hardware Utilization
(1 APP – 1 SERVER)

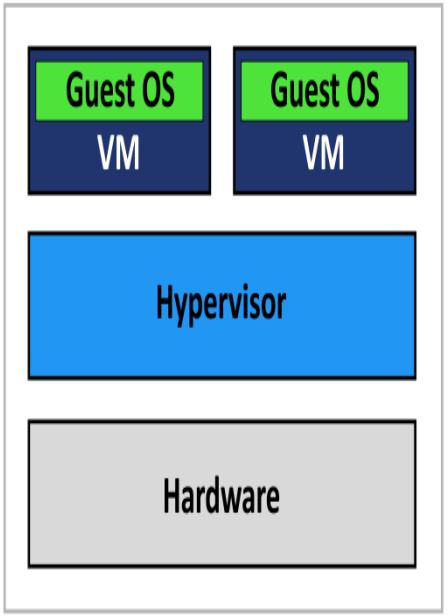


Traditional On Premises Model

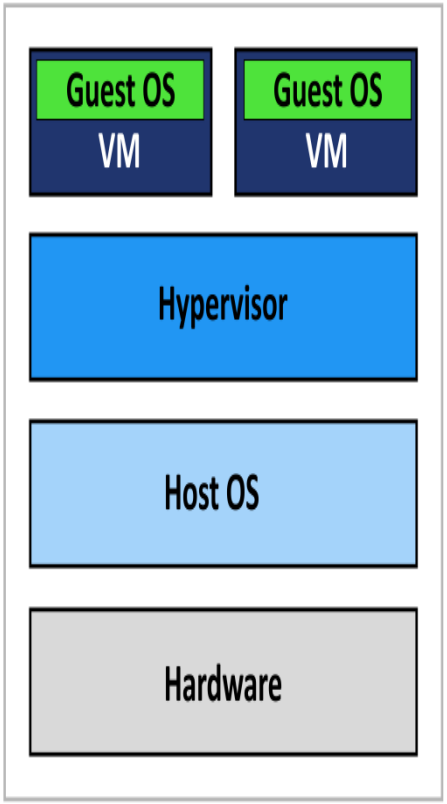


VIRTUALIZATION

- Is the process of running a virtual instance of a computer system in a layer abstracted from the actual hardware. Most commonly, it refers to running multiple operating systems on a computer system simultaneously.



Type 1 Hypervisor
(Bare-Metal Architecture)

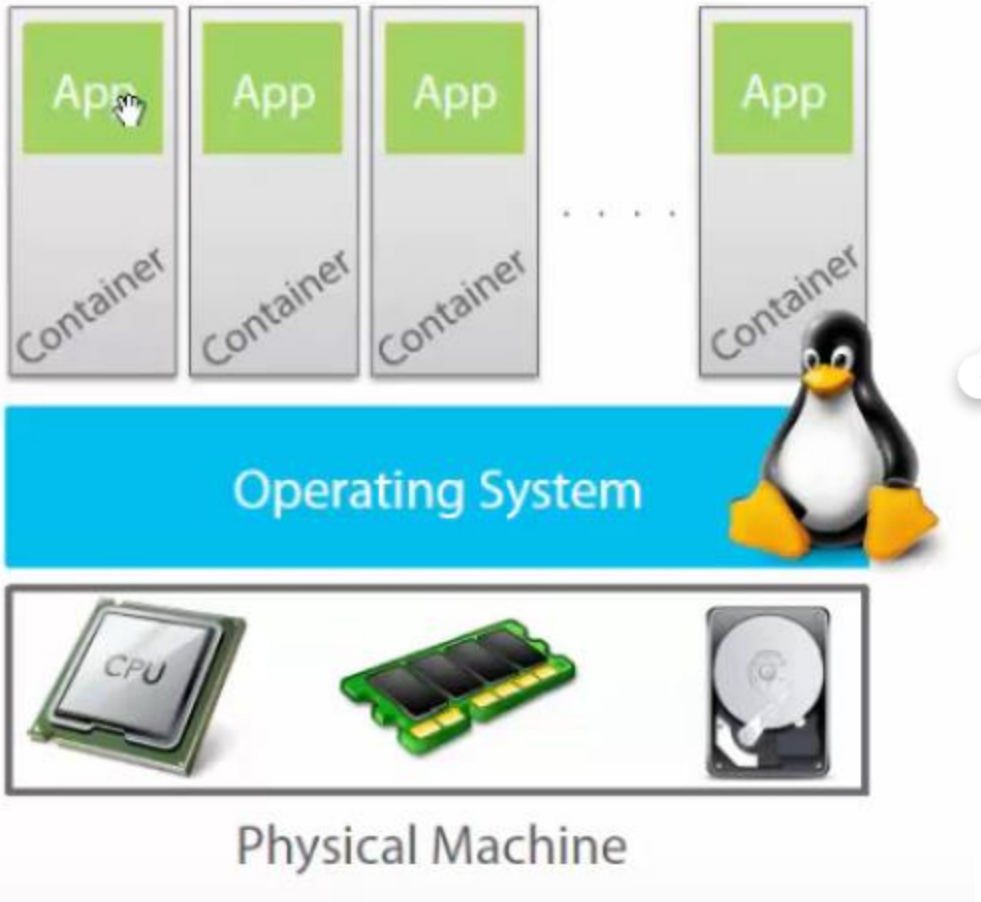


Type 2 Hypervisor
(Hosted Architecture)

CONTAINERIZATION

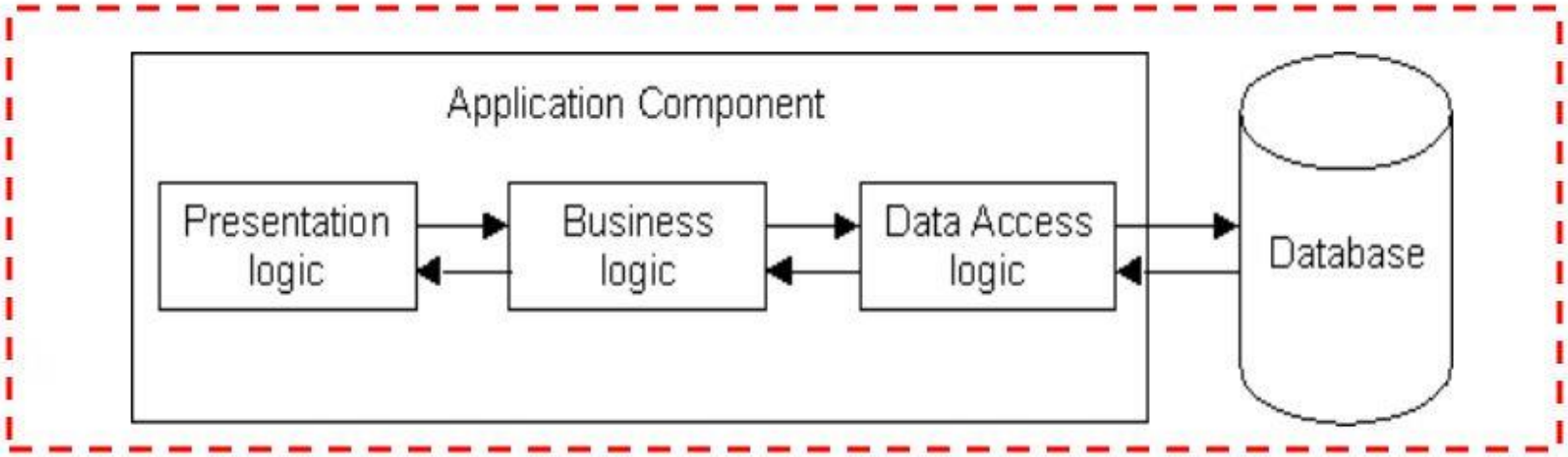
- **Involves bundling an application together with all of its related configuration files, libraries and dependencies required for it to run in an efficient and bug-free way across different computing environments.**

CONTAINERIZATION



Application Architectures!

1-Tier Architecture



All 3 layers are on the same machine

- All code and processing kept on a single machine

Presentation, Logic, Data layers are tightly connected

- Scalability: Single processor means hard to increase volume of processing
- Portability: Moving to a new machine may mean rewriting everything
- Maintenance: Changing one layer requires changing other layers

3-Tier Architecture

Presentation tier

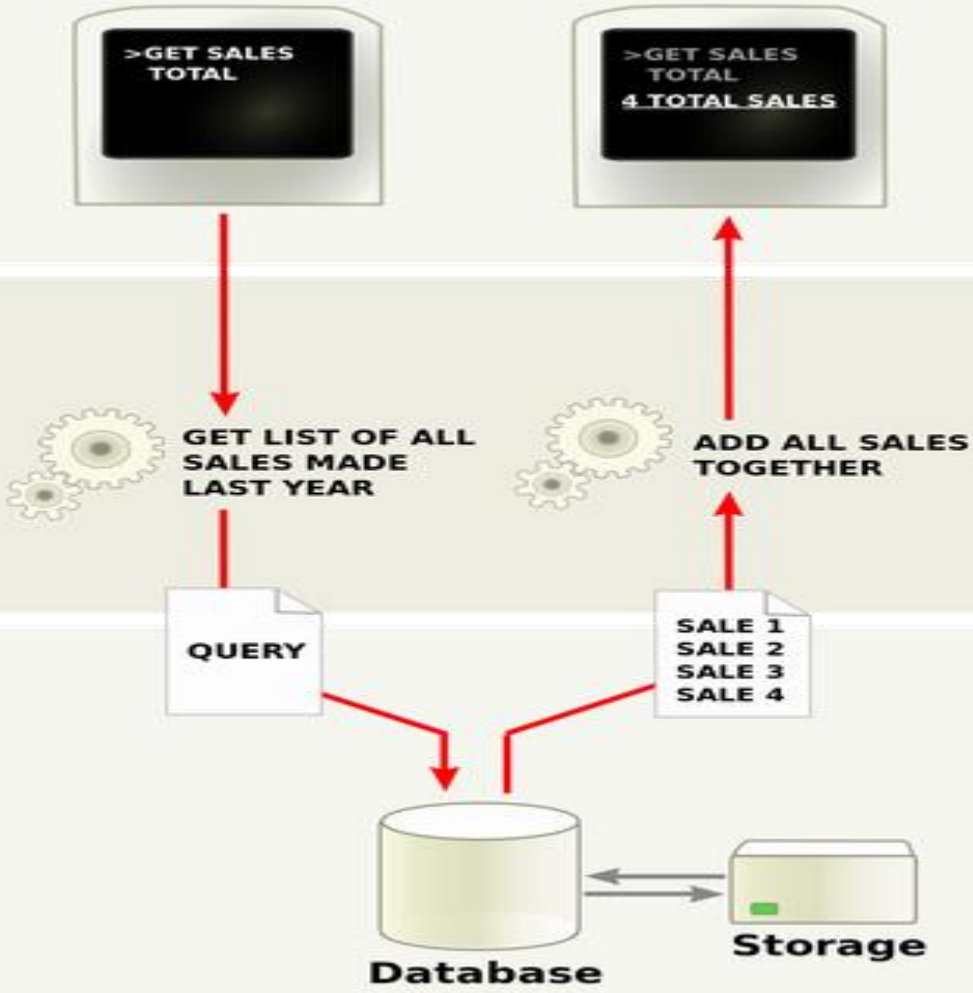
The top-most level of the application is the user interface. The main function of the interface is to translate tasks and results to something the user can understand.

Logic tier

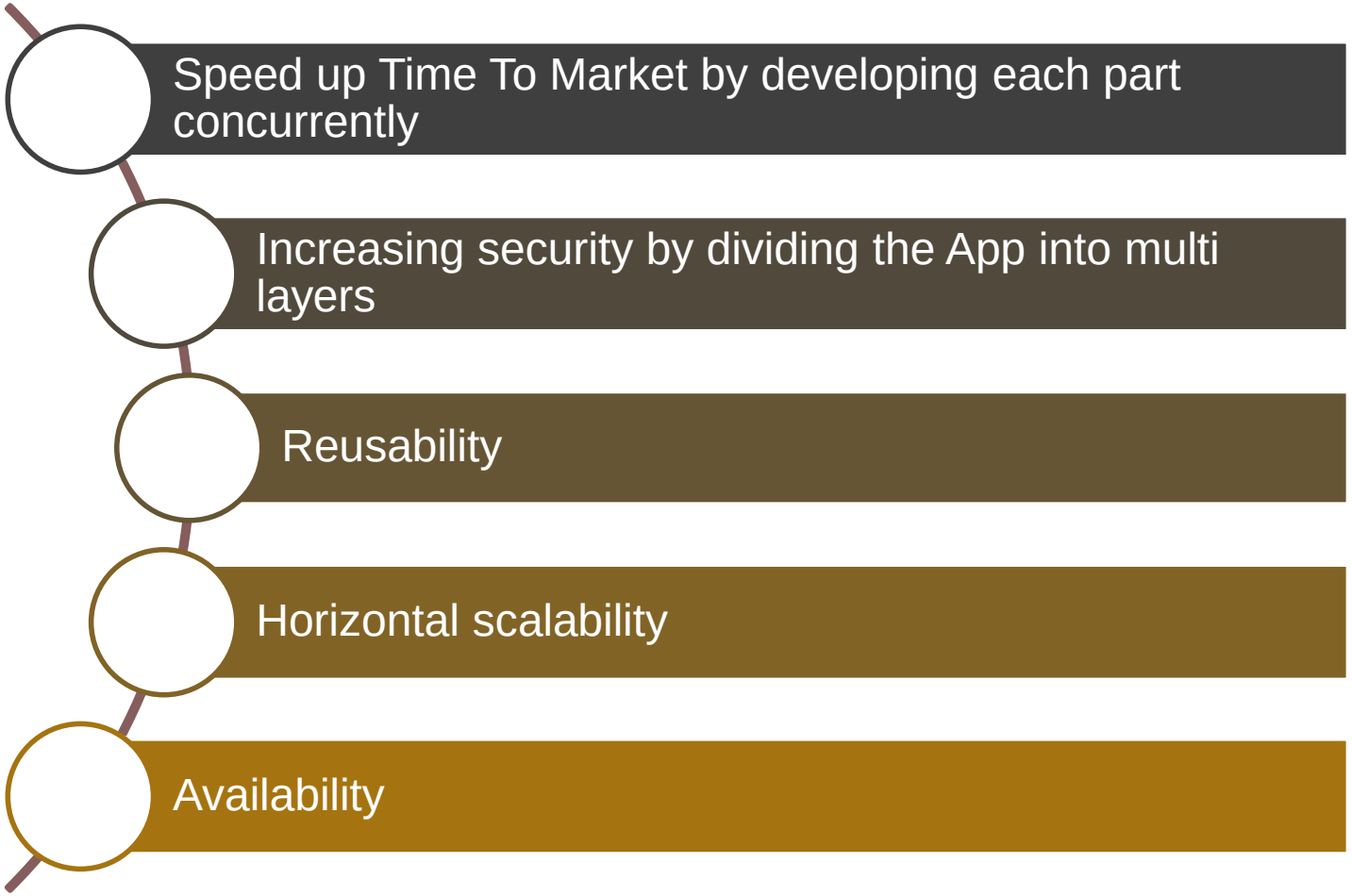
This layer coordinates the application, processes commands, makes logical decisions and evaluations, and performs calculations. It also moves and processes data between the two surrounding layers.

Data tier

Here information is stored and retrieved from a database or file system. The information is then passed back to the logic tier for processing, and then eventually back to the user.



Benefits of 3-Tier & MS

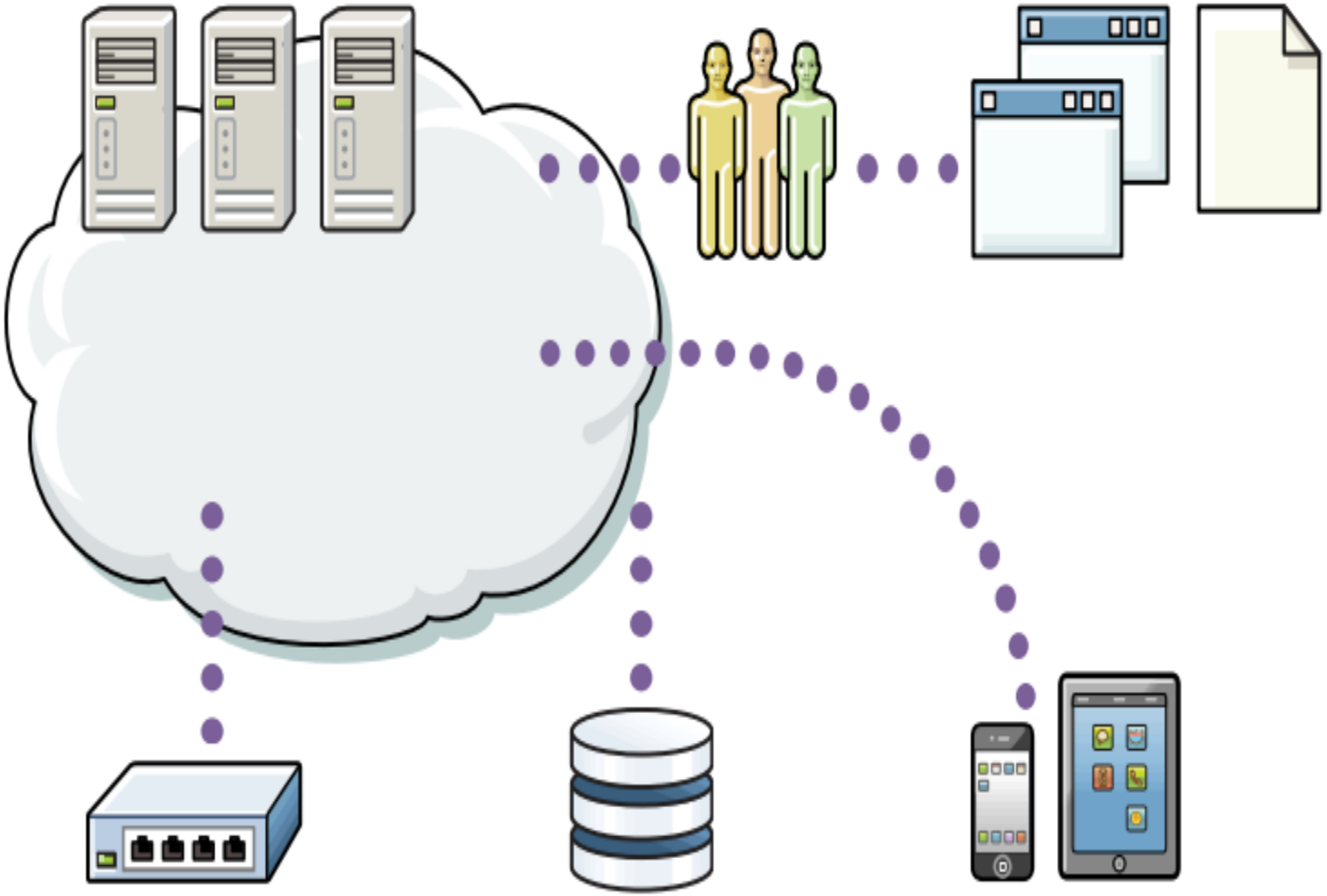


What is Cloud?

"Cloud Computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction."

What is cloud?

- Computing power
- Applications

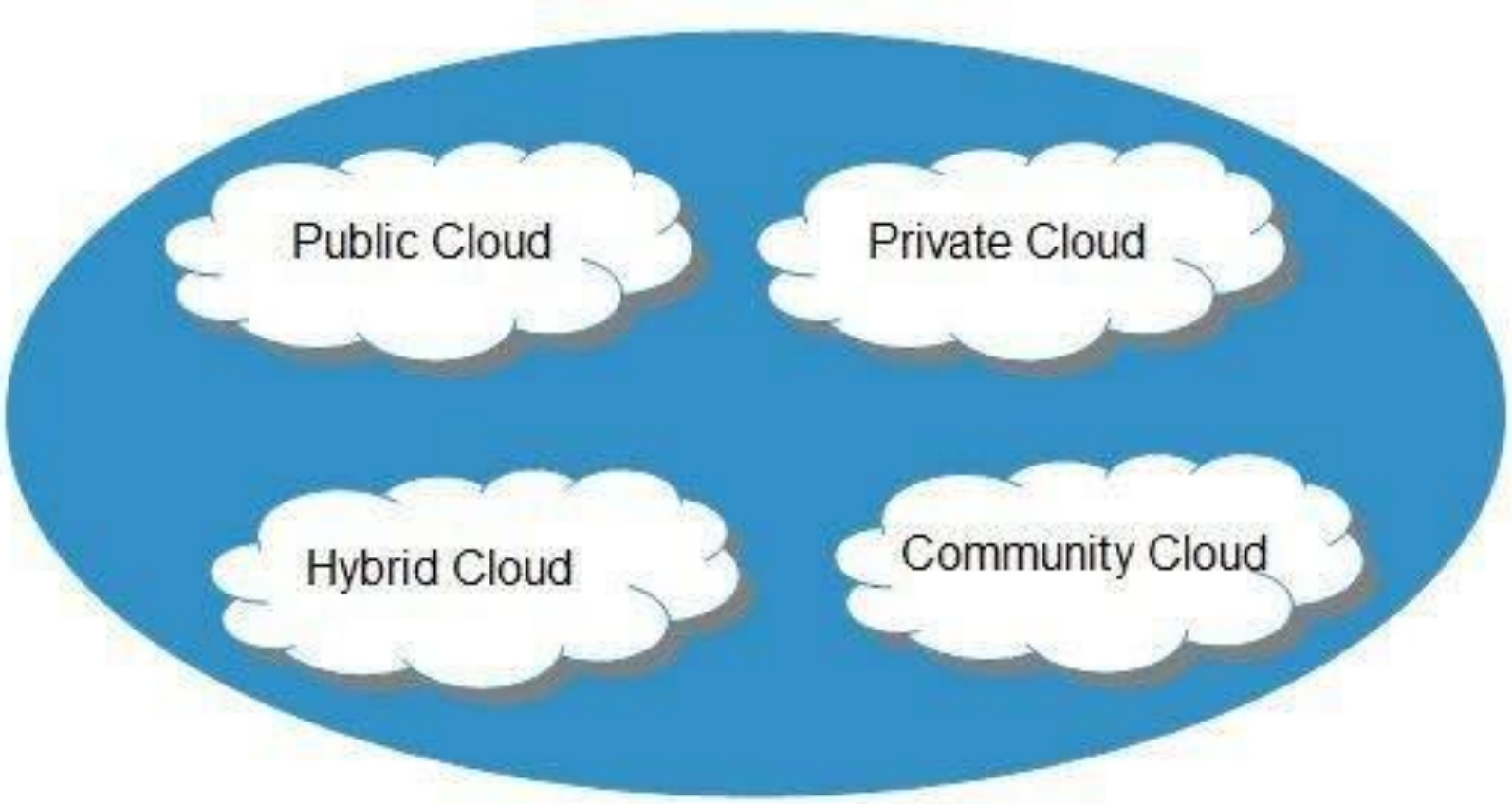


- Networking
- Data storage
- Services

Why the Cloud?

- **Rapidly setup environments to drive business priorities**
- **Scale to meet peak demands**
- **Increase daily activities, efficiency and reduced cost.**

Deployment Models



	Public	Private	Hybrid	Community
Ease of setup	Very easy	Very hard	Very hard - interconnected systems	Easy - community practices
Data control	Low - provider has all	Very high -you own the system	Very high	High (if members collaborate)
Scalability	Low	Very high	High	Fixed capacity limits scalability
Security & privacy	Very low	Very high	Very high - data on a private cloud	High
Cost	Very Inexpensive	Very expensive	Cheaper than a private model, pricier than a public one	Members share the costs

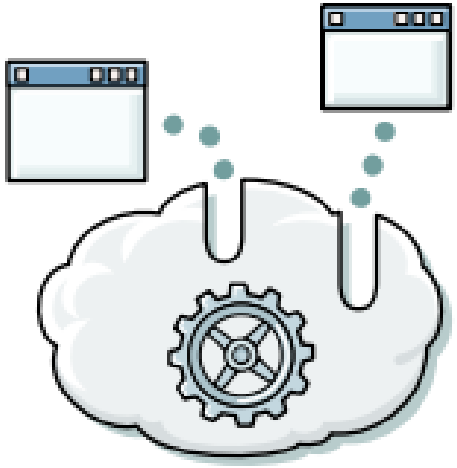
Infrastructure as a service (IaaS) archit.

- An infrastructure provider (IP) makes an entire computing infrastructure available “as a service”

- Manages a large pool of computing resources and uses virtualization to assign and dynamically resize customer resources
- Customers rent processing capacity, memory, data storage, and networking resources that are provisioned over a network

Platform as a service (PaaS) archit.

- Service provider (SP) supplies the software platform or middleware where the applications run
- Service user is responsible for the creation, updating, and maintenance of the application



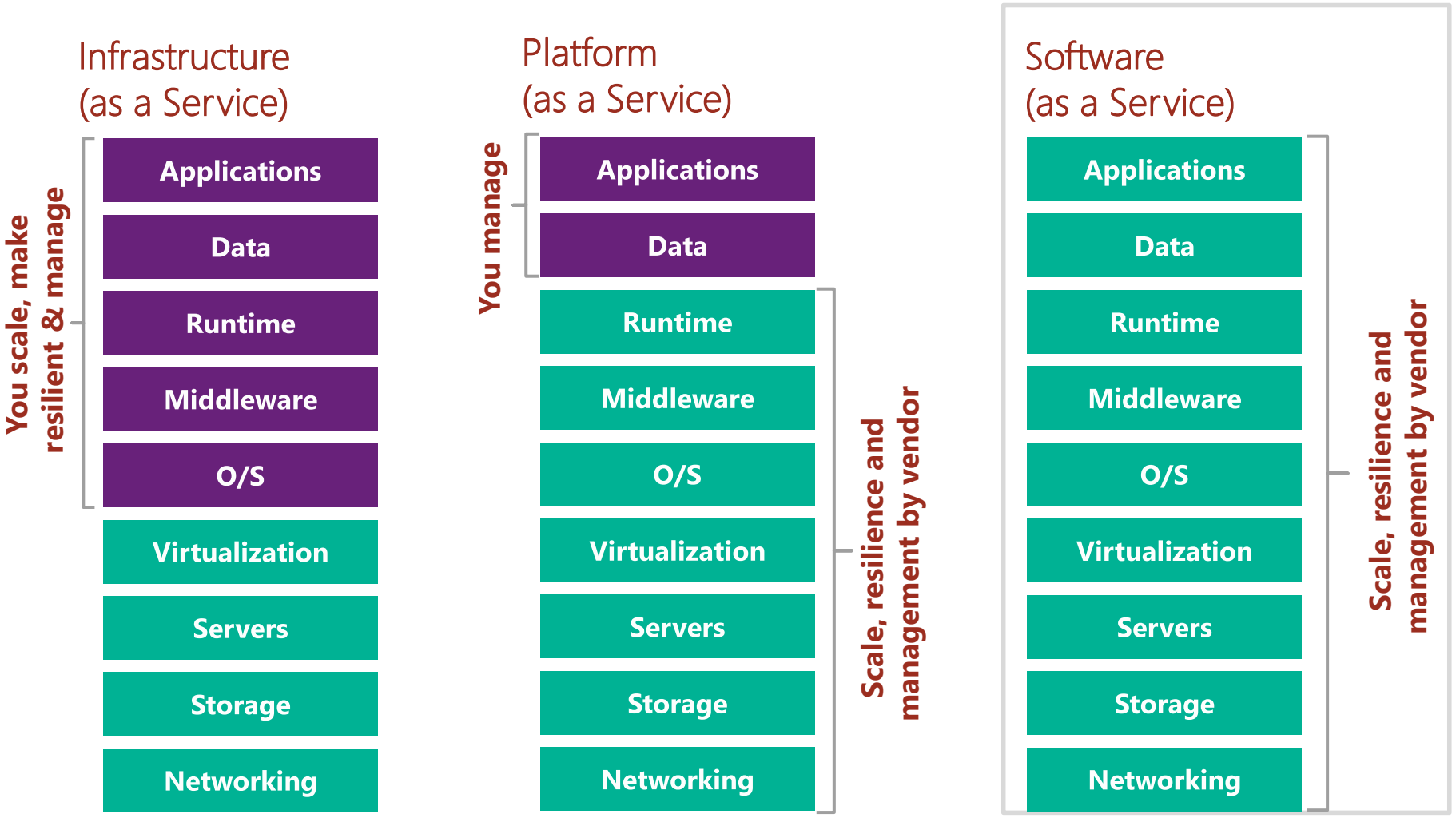
- The sizing of the hardware that is required for the execution of the software is made in an understandable manner

Software as a service (SaaS) archit.

- Service provider (SP) is responsible for the creation, updating, and maintenance of software and application

- Service user accesses the service through Internet-based interfaces

Provider VS. Consumer responsibilities



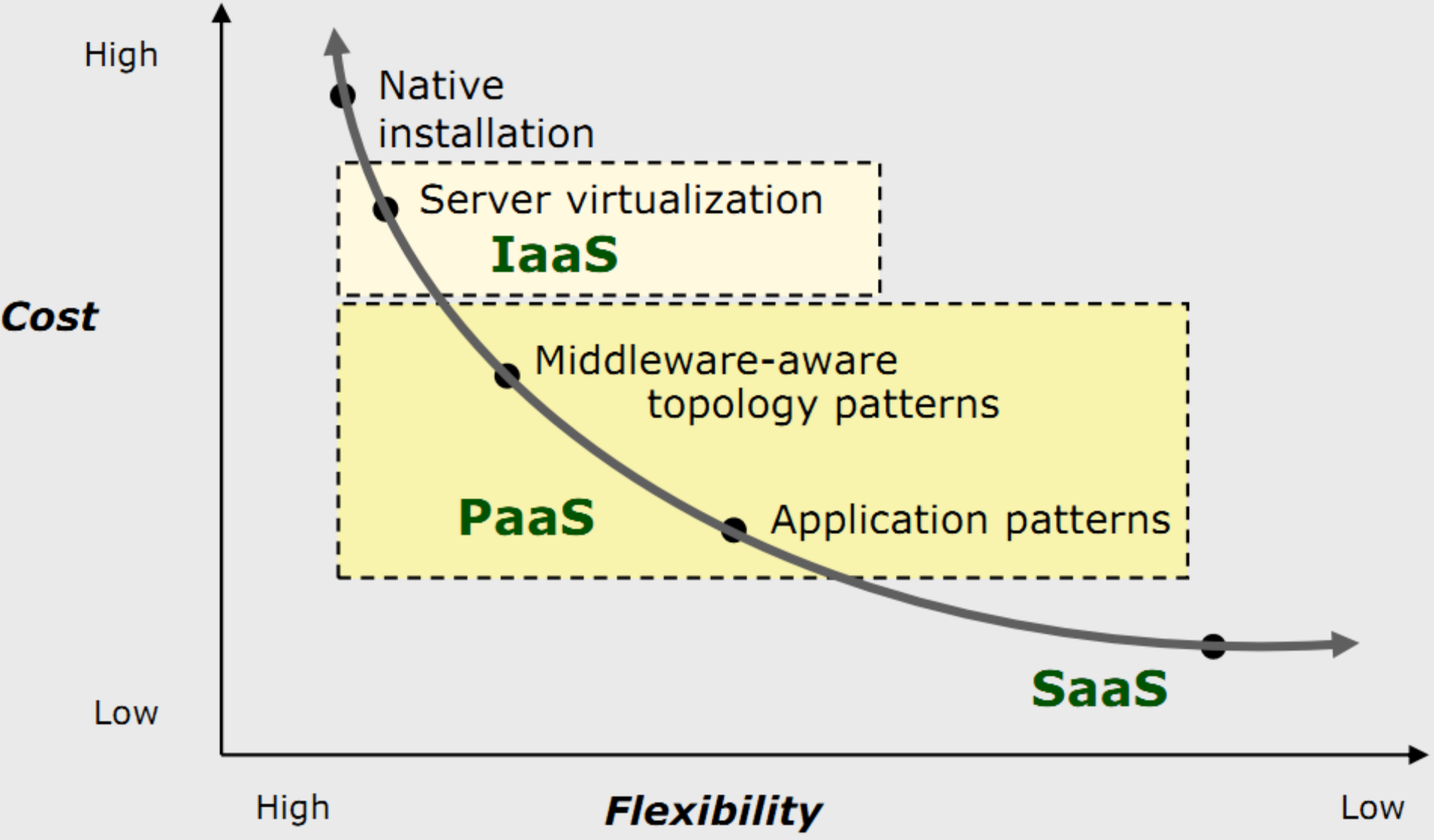
Cloud Providers

1999

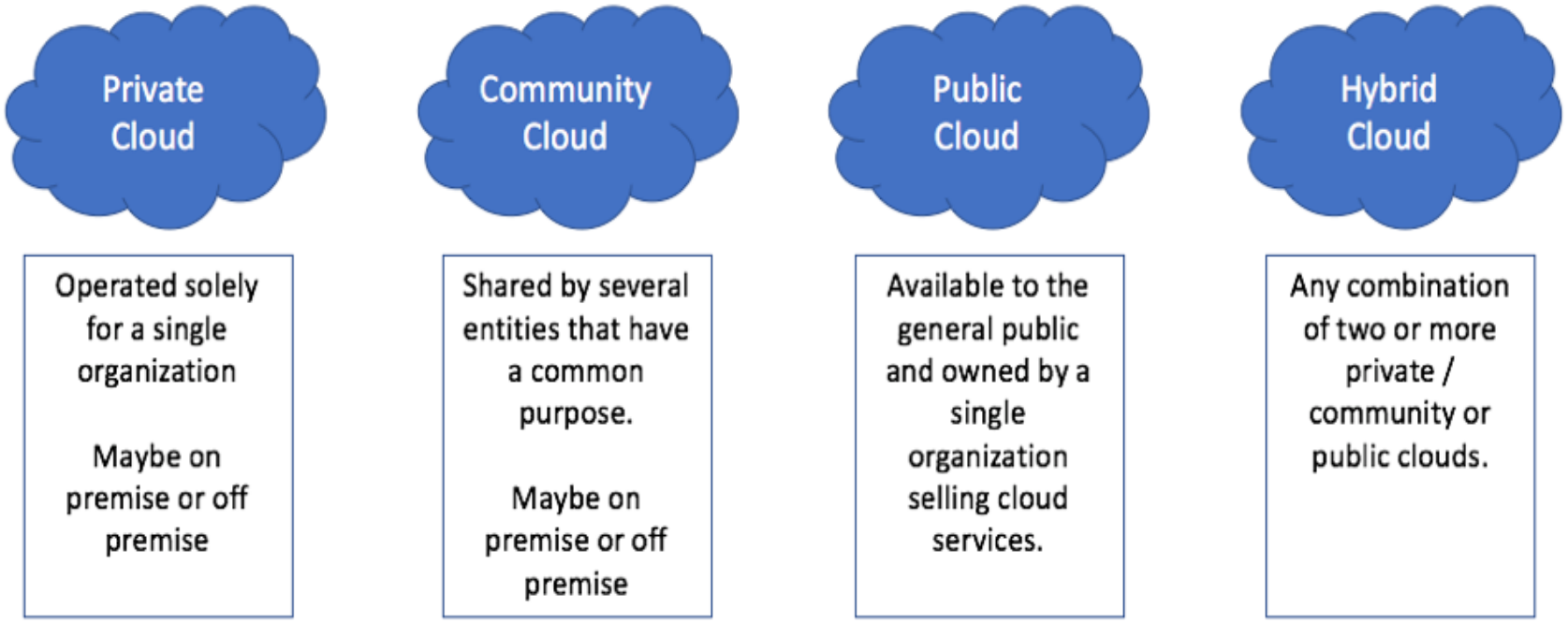
2002

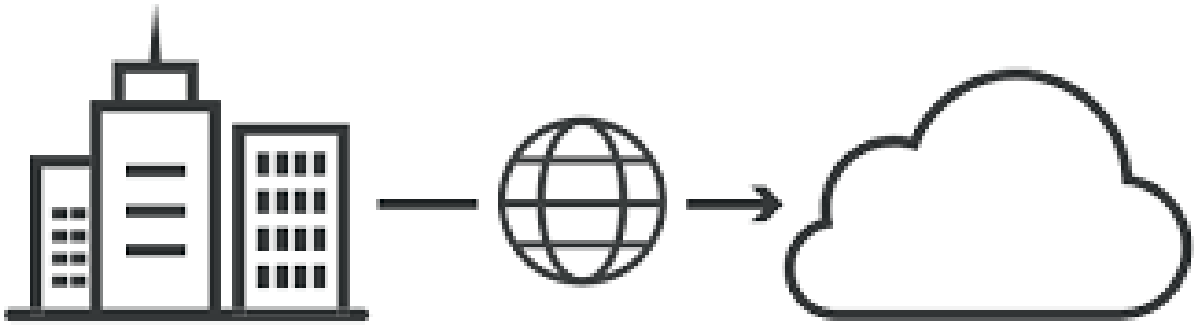
2009

Cost versus flexibility



Cloud computing deployment models





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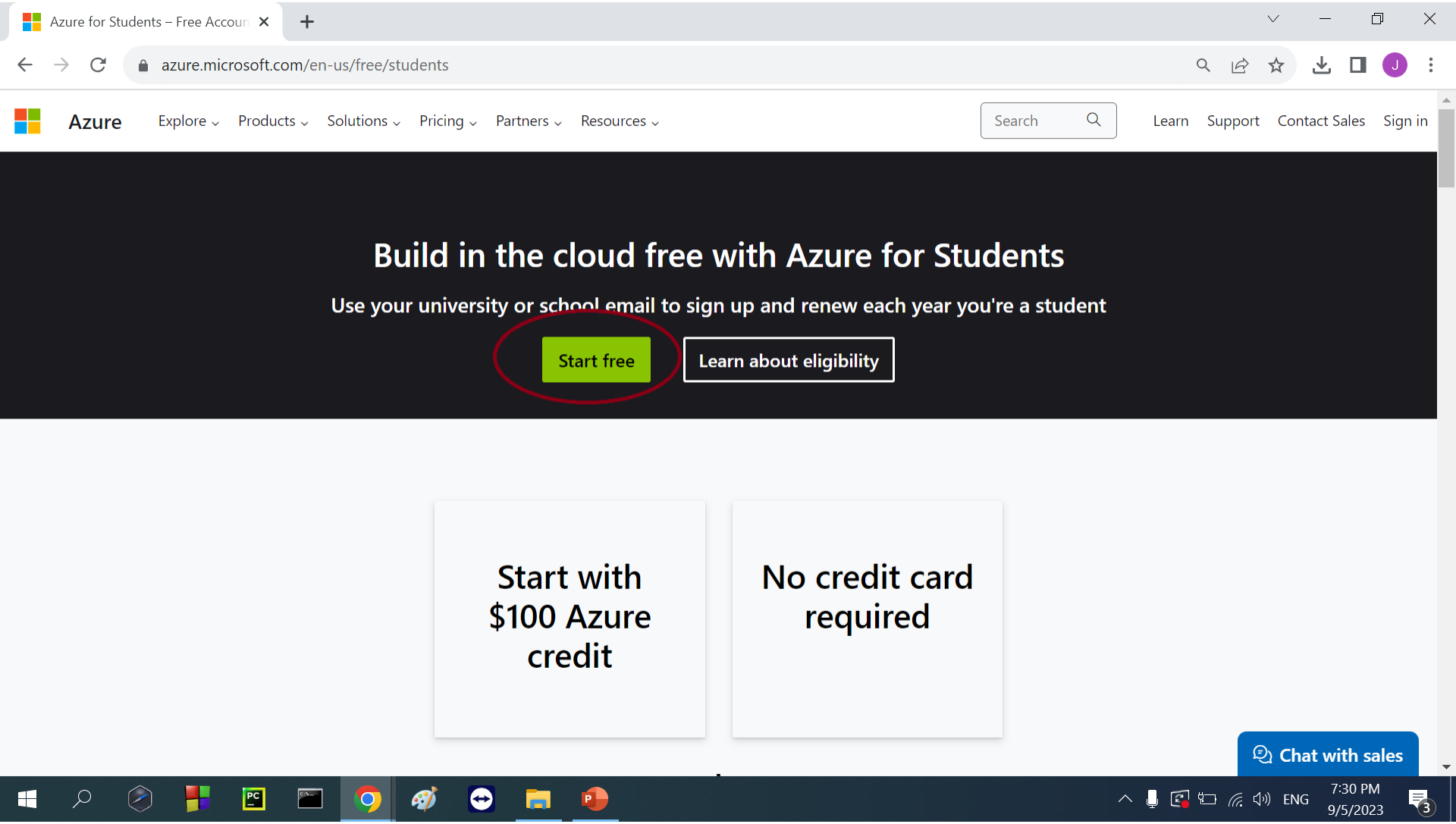
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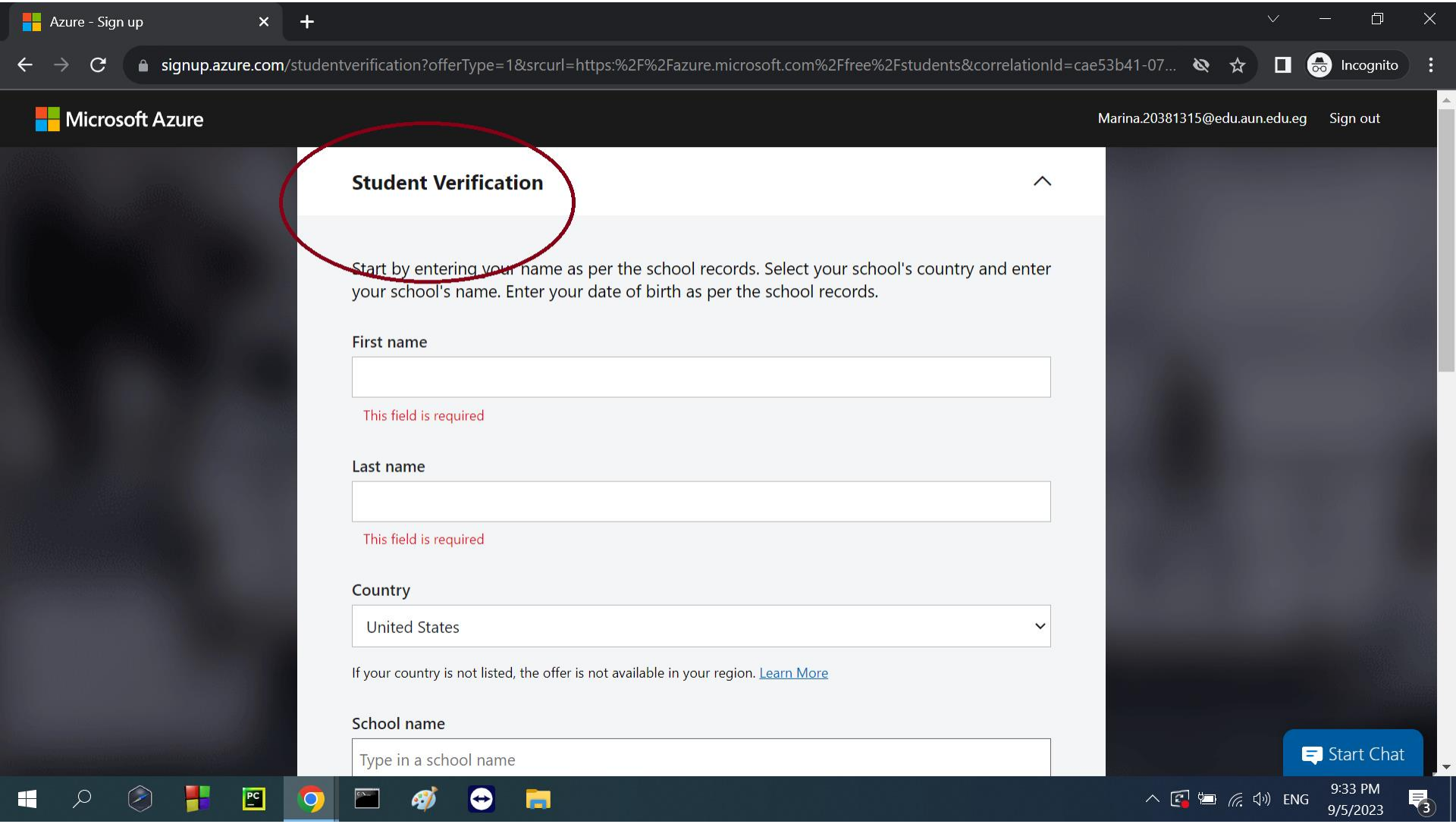
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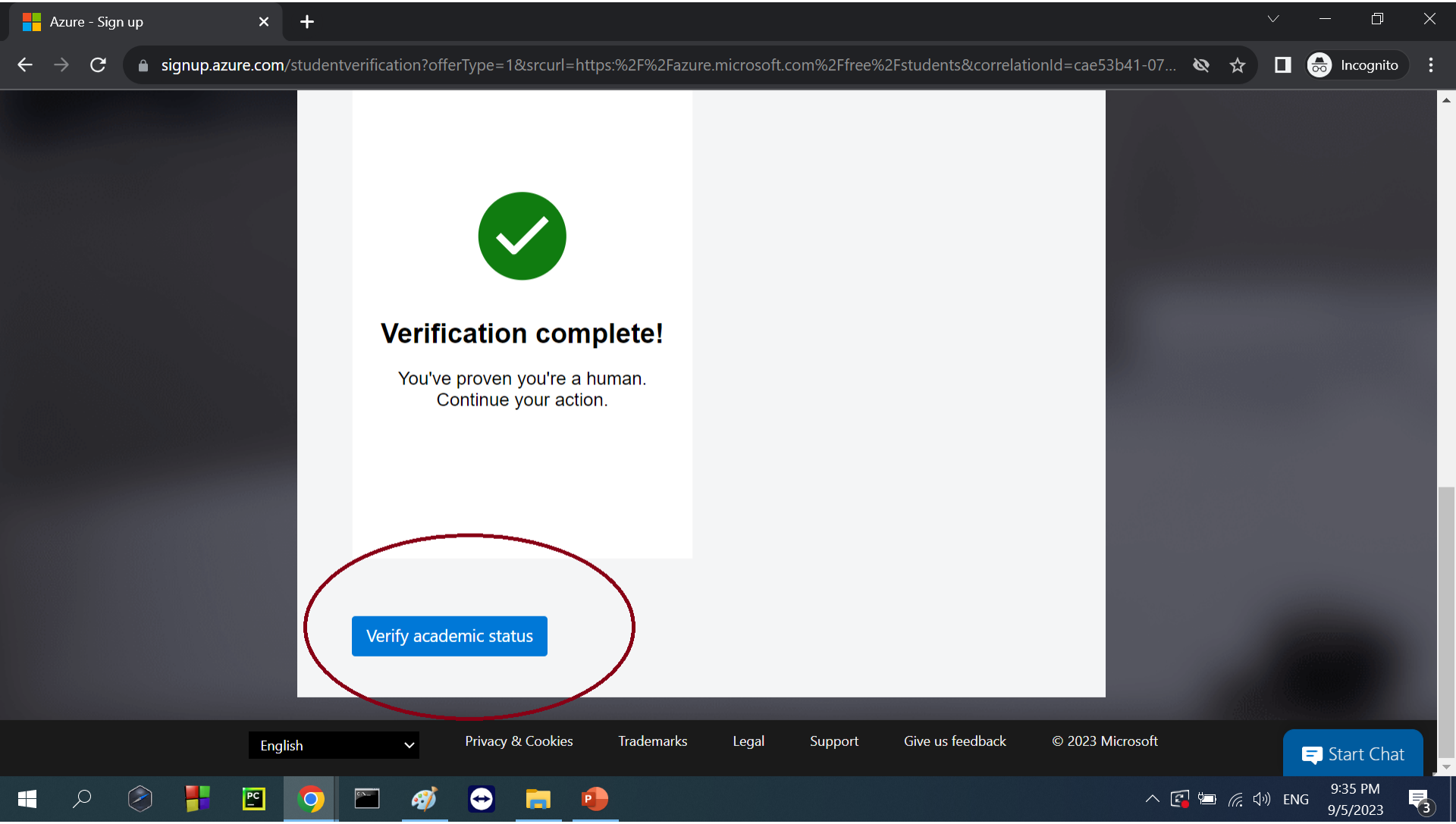
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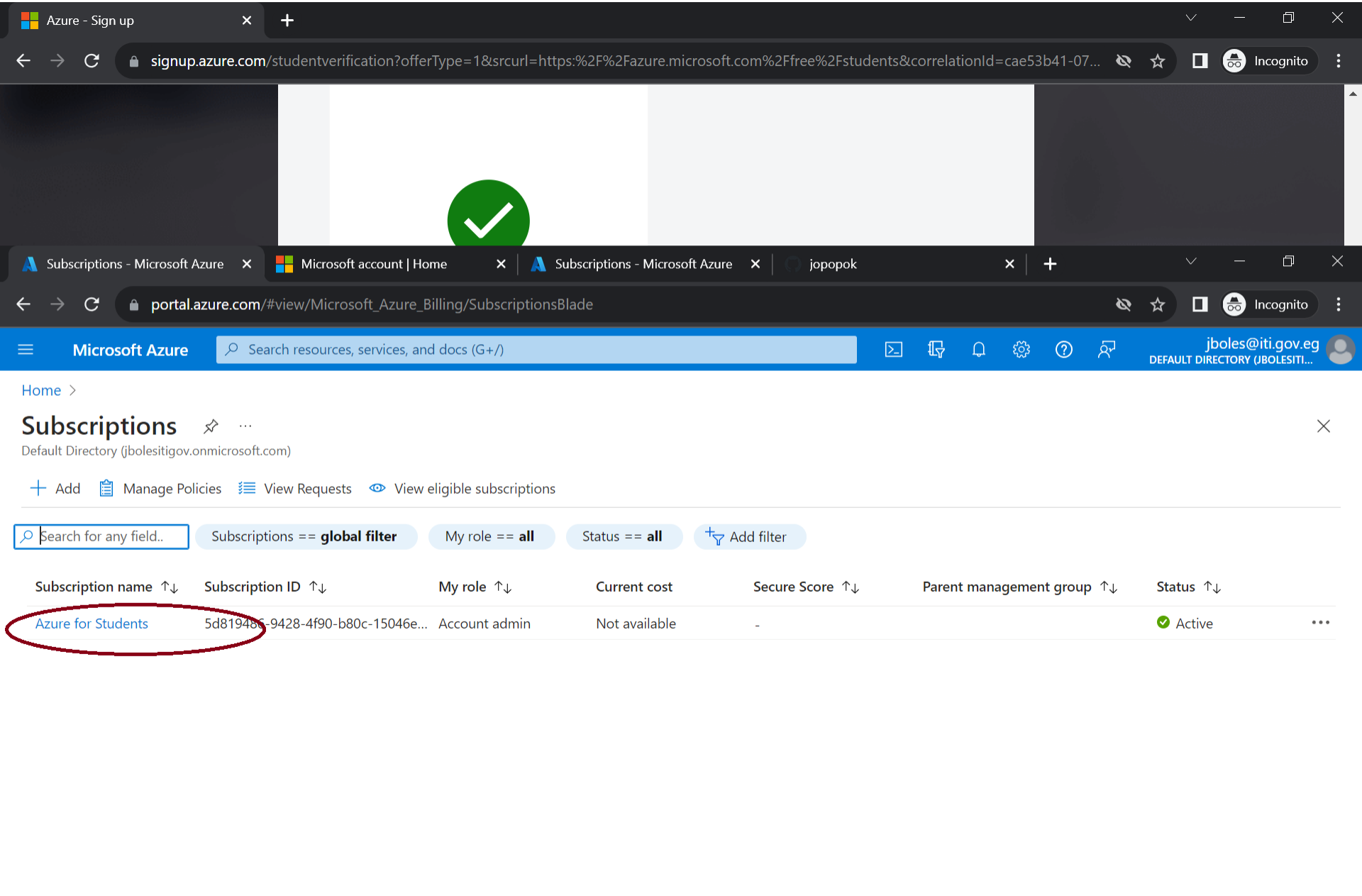
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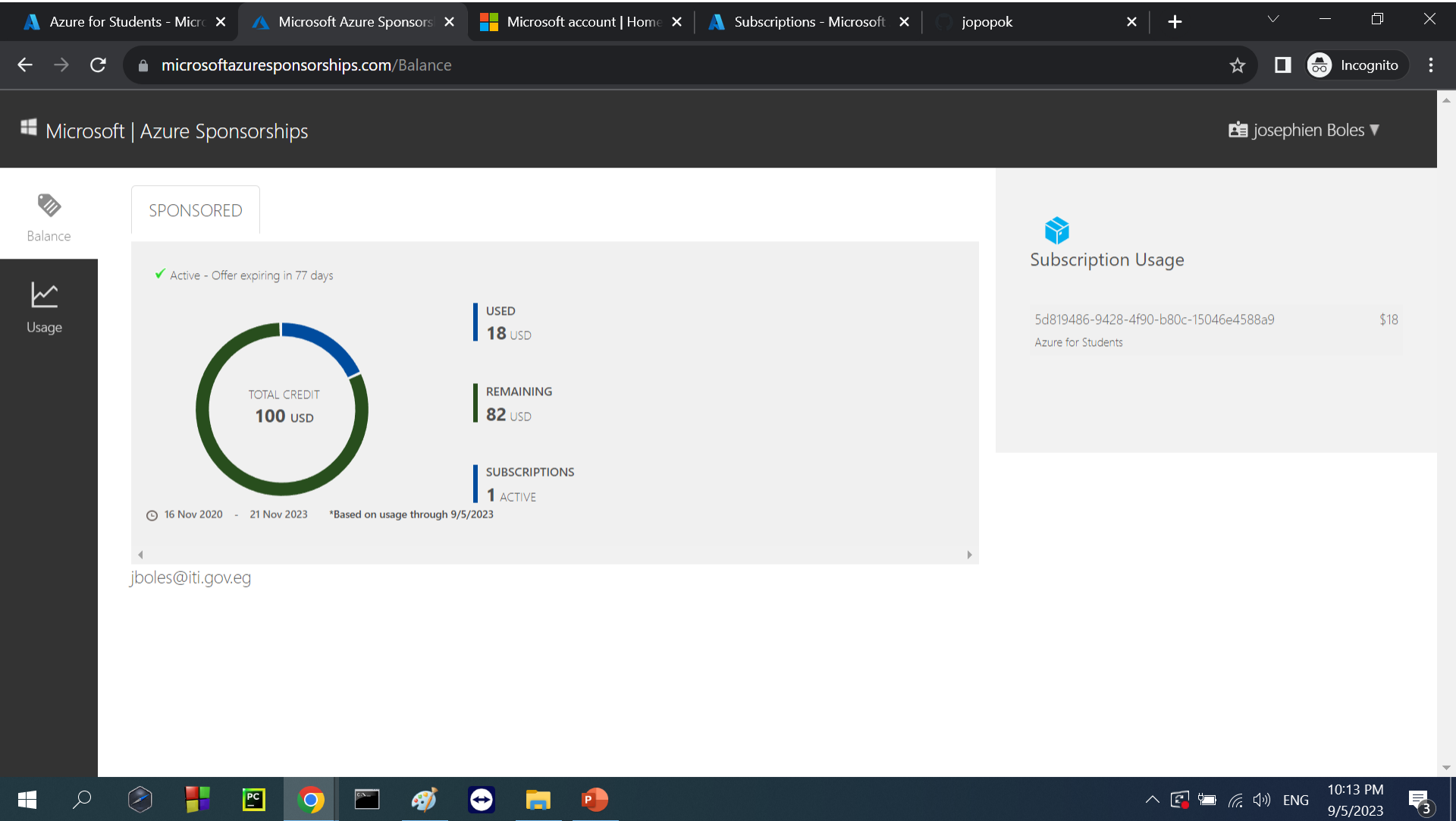

Exercises