



**PROGRAMME: ONLINE MASTER OF BUSINESS
ADMINISTRATION**

COURSE NAME: MANAGEMENT INFORMATION SYSTEMS

COURSE CODE: OMBA 5314

FACULTY: BUSINESS & TECHNOLOGY



Learning objectives

Learning outcome: CLO2: Analyze the economic values of information systems to an organization.

Supporting the learning outcome are the following aspects:

- Defining the infrastructure, components, and their evolution.
- Hardware trends.
- Software / Application / Platform trends.
- The complexities of managing infrastructure.

What is to be covered



5.1

Defining infrastructure, components and the evolution



5.2

Hardware/Software/Application/Platform trends



5.3

The complexities of managing infrastructure.

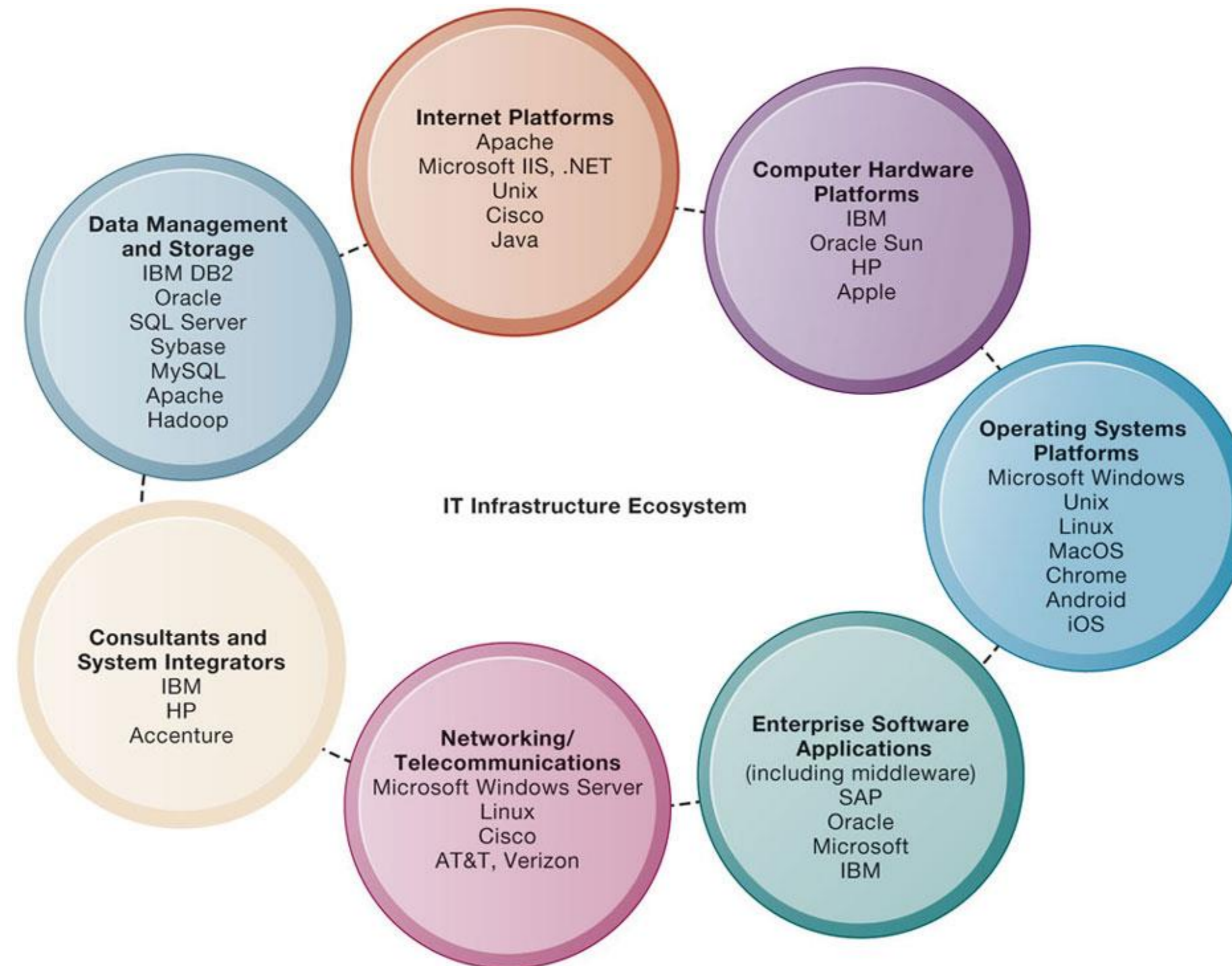
1. Defining infrastructure

- IT infrastructure comprises physical equipment and software applications needed for an entire enterprise to be of value.
- Includes human competences and supporting technologies that facilitate the appropriate use of the infrastructure.
- Examples:
 - Computing/hardware platforms. Telecommunication/Networking platform services.
 - Data management platforms/services. Operating system/Application software platform services.
 - Physical facilities management services. IT management services.
 - IT standards services.

What Are the Components of IT Infrastructure?

1. Computer hardware platforms
2. Operating system platforms
3. Enterprise software applications
4. Data management and storage
5. Networking/telecommunications platforms
6. Internet platforms
7. Consulting system integration services

Figure 5.8 The IT Infrastructure Ecosystem



Defining the infrastructure, components, and their evolution.

Computing/hardware platforms. These enable the connection of business stakeholders on a virtual environment (digital) for interaction on smartphones, PCs, and data stored or accessed on servers and so on. For example, HP, Dell, Apple, etc.

Telecommunication/Networking platform services. These provide connectivity services, such as data, voice for the concerned stakeholders. For example, Linux, Maxis, Cisco.

Data management platforms/services. These are services concerned with the data to information transformation process providing data collection/generation, and insights generation processes. For example, IBM DB2, Oracle MySQL.

Defining the infrastructure, components, and their evolution.

Operating system/Application software platform services. These are services which ensure enterprise software capabilities, and other functional software is accessible and shared by the multiple users. Office 365, Windows, iOS, Android

Physical facilities management services. These are services that enable the installation and management of physical components of technological infrastructure on a physical location or building.

IT management services. These coordinate the business needs to develop or manage the appropriate infrastructure to respond to the technological requirements of specific functional units in an enterprise.

Defining the infrastructure, components, and their evolution.

IT standards services. These services coordinate and govern the use and access of technology by providing policies on who, when and how employees utilise technology. Understanding the infrastructure based on the services rendered, enables a better appreciation of how technology infrastructure provides value in the business.

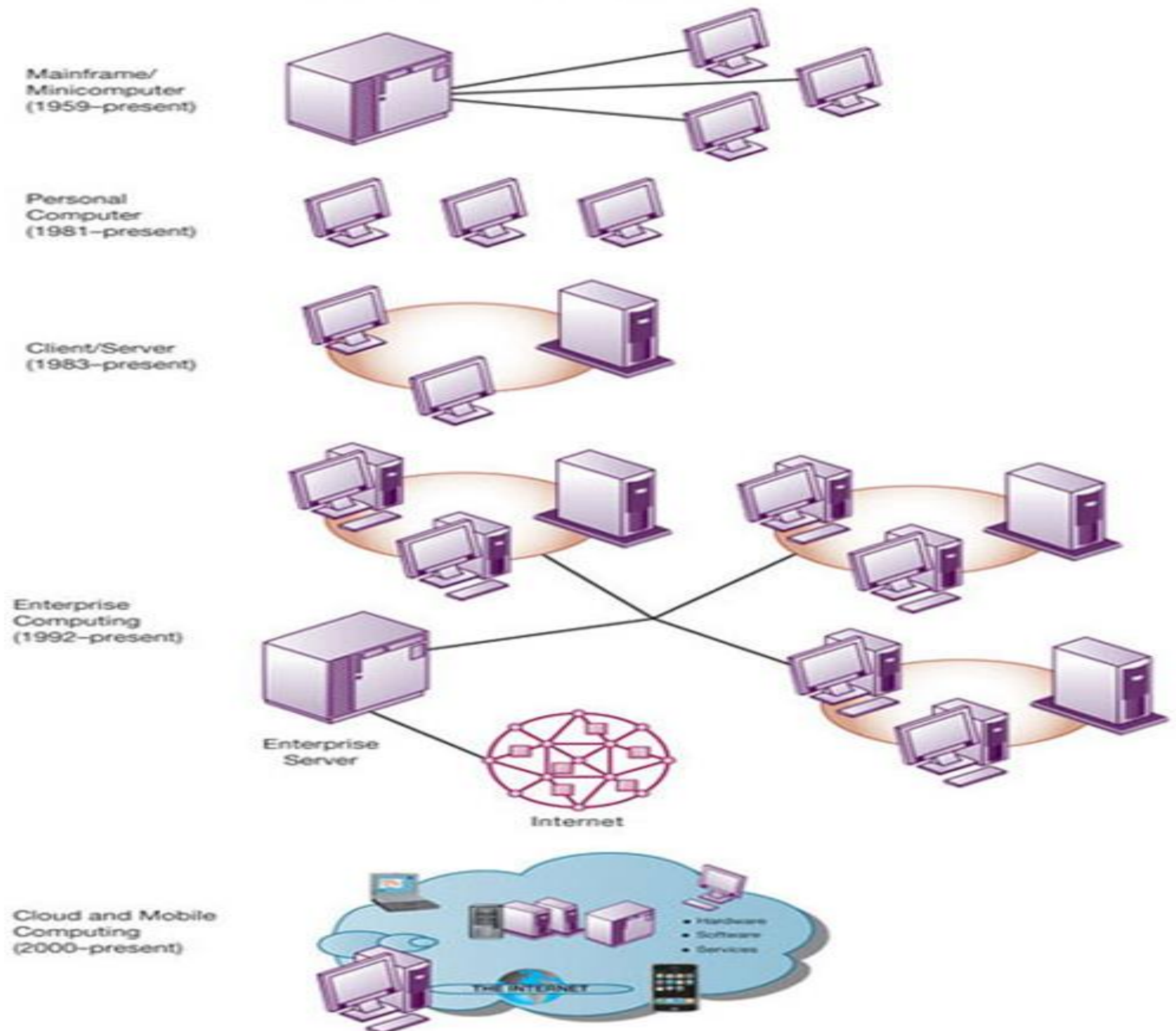
Evolution of IT Infrastructure

- General-purpose mainframe and minicomputer era: 1959 to present
 - Personal computer era: 1981 to present
 - Client/server era: 1983 to present
 - Enterprise computing era: 1992 to present
 - Cloud and mobile computing: 2000 to present
- Lets look at IBM's history

<https://www.youtube.com/watch?v=yzGGYHZxMQA>

[1957 Automatic Data Processing, IBM 705](#)
[Mainframe Data Center, IBM 650, ARMY](#)
[Computers - YouTube](#)

Stages in IT Infrastructure Evolution



Evolution of IT

THE ERAS OF BUSINESS COMPUTING

Period	Hardware	Operating System	Software
Mainframe (70s)	Terminals and the mainframe computer.	Time-sharing (TSO) on MVS	Custom-written MRP
PC (80s)	IBM PC with the expansion card. Microsoft the Operating system company	MS-DOS	WordPerfect, Lotus 123
Client-Server (80s to 90s)	IBM PC “clone” on a Novell Network. Amazon the online store..	Windows for Workgroups	Microsoft Word, Microsoft Excel
World Wide Web (90s to 2000s)	PC “clone” to intranet. Google the search engine..	Windows XP	Microsoft Office, Internet Explorer, Netscape browser
Post-PC (today and beyond)	Tablet, laptop and smartphone	Android, iOS, Windows 10	Mobile websites, mobile apps

What has been driving these changes

Moore's Law and Microprocessing Power. The sum of elements on a chip with the least production costs per element has doubled each year.

Law of Mass Digital Storage. The volume of data is expanding yearly, while the expense of data storage is dropping at an exponential rate of 100%/ yr.

Metcalfe's Law and Network Economics. The value or power of a network grows at a higher rate depending on the network membership. There are growing returns to scale for the existing membership as new members sign up.

Declining Communications Costs and the Internet. The sharp drop in communication costs and the high expansion of internet services.

Standards and Network Effects. Requirements that determine the interoperability of technology products to communicate in a network.

Figure 5.4 Moore's Law and Microprocessor Performance

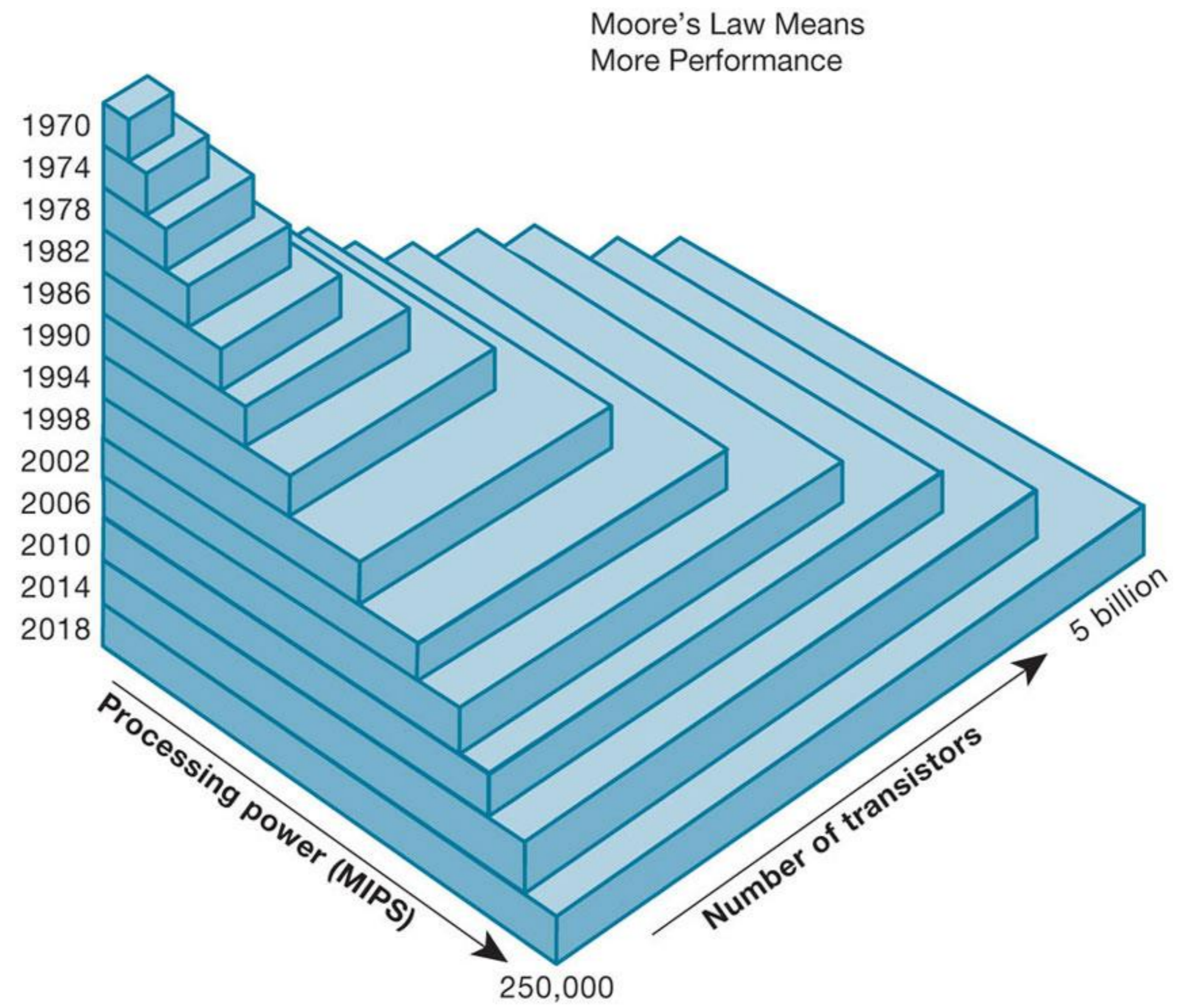
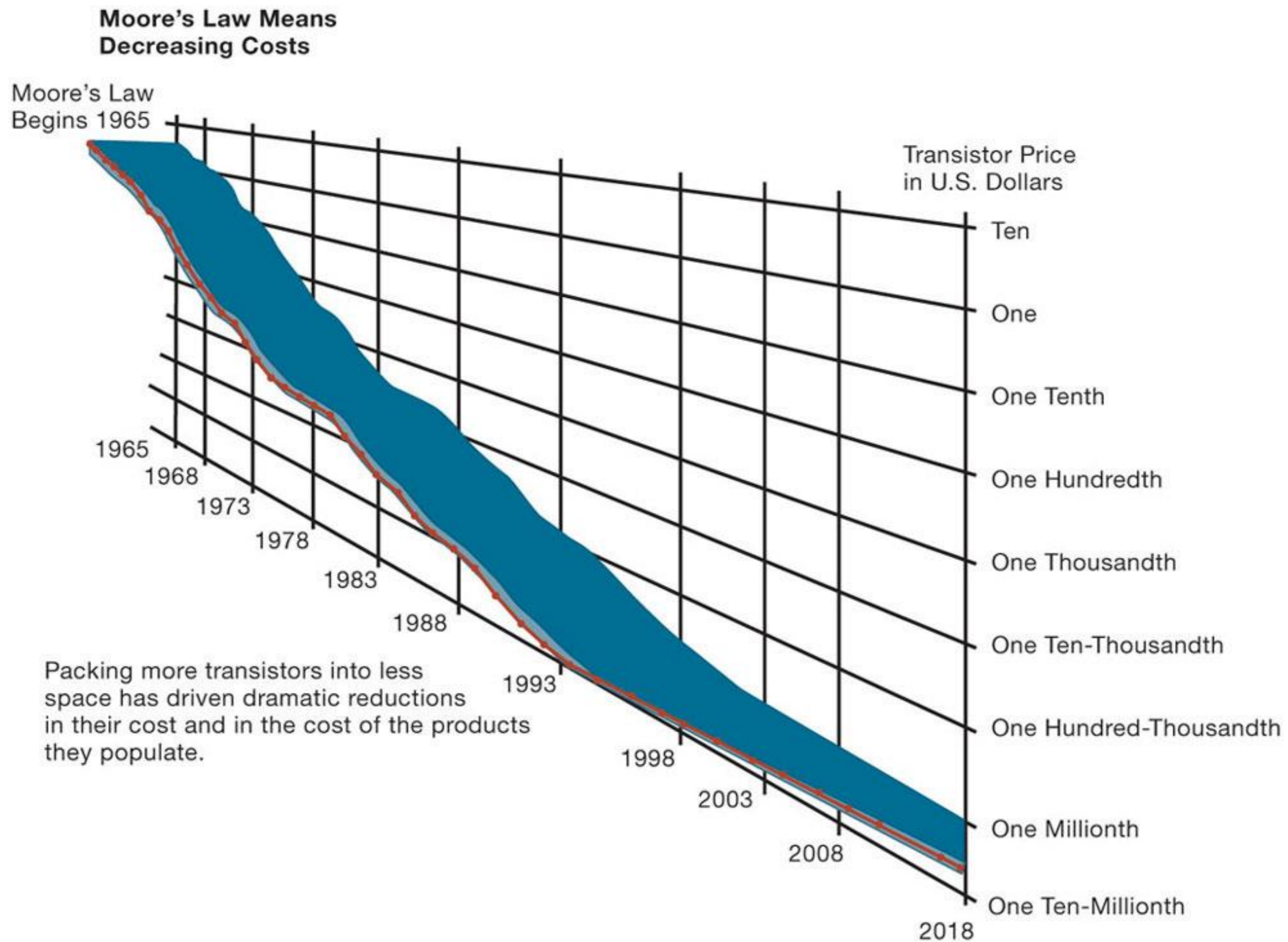


Figure 5.5 Falling Cost of Chips



2. Hardware/Software/Application/Platform trends.

- The changes in the technology trends are matched with a consistent evolution in the hardware requirements.
- For example, the diverse forms of data and its creation are requiring a responsive processing capacity able to collect and process the data corresponding to the velocity of its generation.

Hardware/Software/Application/Platform trends

Quantum computing. Quantum computing uses the quantum physics principles to process and store data much better and faster than the current traditional computers. Traditional computers utilise 0s and 1s (known as bits) when storing and carrying data operations, and also carries these functions mostly sequentially- that is one after the other. Quantum computing utilises the existence of another state between 0 and 1 allowing parallel data storage and computations at a much faster rate than sequential processing.

Virtualisation. This concept utilises the capability for remote access and connectivity of computer users or computational processes without necessarily being in a single or a configured physical presence. Cloud computing is an example of such a capability, allowing access for important information to be accessed simultaneously by several users in multiple locations. Server virtualisation has enabled businesses to reduce costs by having multiple systems hosted on a single server thus reducing the need for expensive hardware for each system required by a business.

Cloud computing

- Cloud computing utilises virtualisation capability by pooling f mostly storage and processing services available on the web or on the internet accessing it on demand basis; that is, when required for use.

Has 3 types of services:

- Infrastructure as a service (IaaS).
- Software as a service (SaaS).
- Platform as a service (PaaS).

Cloud computing

Infrastructure as a service (IaaS). This service enables consumers to use only what is necessary, allowing them to scale (increase usage) when the need arises. This means, the customers have no need of buying hardware servers outright but purchase storage space which they consider as necessary optimising their resource allocation. Amazon Web services is one provider of such using products as Simple Storage Service (S3)- basic data storage or Elastic Compute Cloud (EC2) running preferred applications.

Software as a service (SaaS). In this service, consumers utilise or access an application hosted by the service provider on their cloud infrastructure and offered as a service through a network, for example Apple iTunes and iCloud or Google drive offered on Google cloud. The customer can upgrade their storage by paying a subscription fee.

Cloud computing

Platform as a service (PaaS). PaaS allows customers to utilise infrastructure and software development tools enabled by the cloud services vendor to develop their own applications. For example, UiPath which allows businesses to build a robotic process automation (RPA) capability for their businesses.

https://www.youtube.com/watch?v=SP_JGuHr2VA (introduction)

<https://www.youtube.com/watch?v=OyQAhrCBr9U>

Digital twin technology

Digital twin technology. This is a technology that uses software and different sensors or other IoT enabled devices to replicate an object as it exists in reality or will exist in reality. It is utilised in industrial engineering or architectural designs. It has also extended in replicating supply processes to predict how these will change in reality allowing for example scenario planning. E.g Huntington Ingalls industries

<https://www.youtube.com/watch?v=TuaRx2SUxMs>

https://www.youtube.com/watch?v=93za-vO_ffs

<https://www.youtube.com/watch?v=XvAPZYuzj44>

Summary of the trends

- These are just a few of the many trends.
- Other trends include Artificial Intelligence
- (This has been a trend arguably in the last decade but is still a hot concept yet to be fully exploited as it is embedded in cross industrial applications), Autonomous things, Hyperautomation etc. Find out how these are influencing organisations. Bear in mind that these will continuously change.

3. The complexities of managing technology

Infrastructure changes. This aspect depends on the size of the business. If a firm has to expand, its customer size increases, employees and stakeholders also increase meaning its data also expands as well as the need for collaboration increases.

Governance. This concern relates to who the organisation identifies as taking responsibility of the infrastructure. Is there a possibility for other units to have separate support within the department? Such a concern covers the structure components of the organisation.

Considering the costs of investment. A business has to consider the cost of technology infrastructure. However, the cost is not as straightforward. Overspending will imply locking funds which could have been utilised elsewhere. Other considerations are, how will technology impact the skills needs?