SESSION 8

TECHNOLOGICAL DRIVERS OF CLOUD

OBJECTIVES

- SOA
- Virtualization
- Multicore, memory storage technology
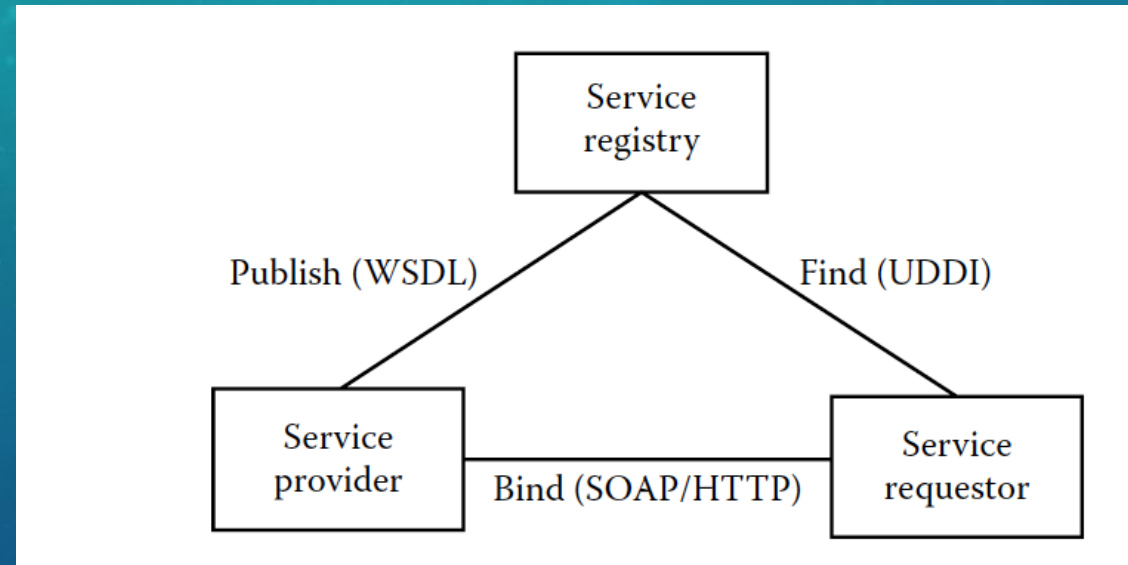- Web 2.0 and 3.0
- Pervasive computing

SERVICE-ORIENTED ARCHITECTURE(SOA)

➤ SOA enables mutual data exchange between programs of different vendors without the need for additional programming or changes to the services.

➤ A service need not have prior knowledge of the calling application, and the application does not need to have knowledge about how the tasks are performed by a service

BENEFITS OF SOA

➢ *Reuse of services:* Various services can be reused by different applications on different platforms

➢ *Agility*: SOA can bring the architectural agility in an enterprise through the wide use of standards such as web services.

➢ *Monitoring*: It helps to monitor the performance of various services to make the required changes.

➢ *Extended reach*: In the collaboration between enterprises or in the case of shared processes
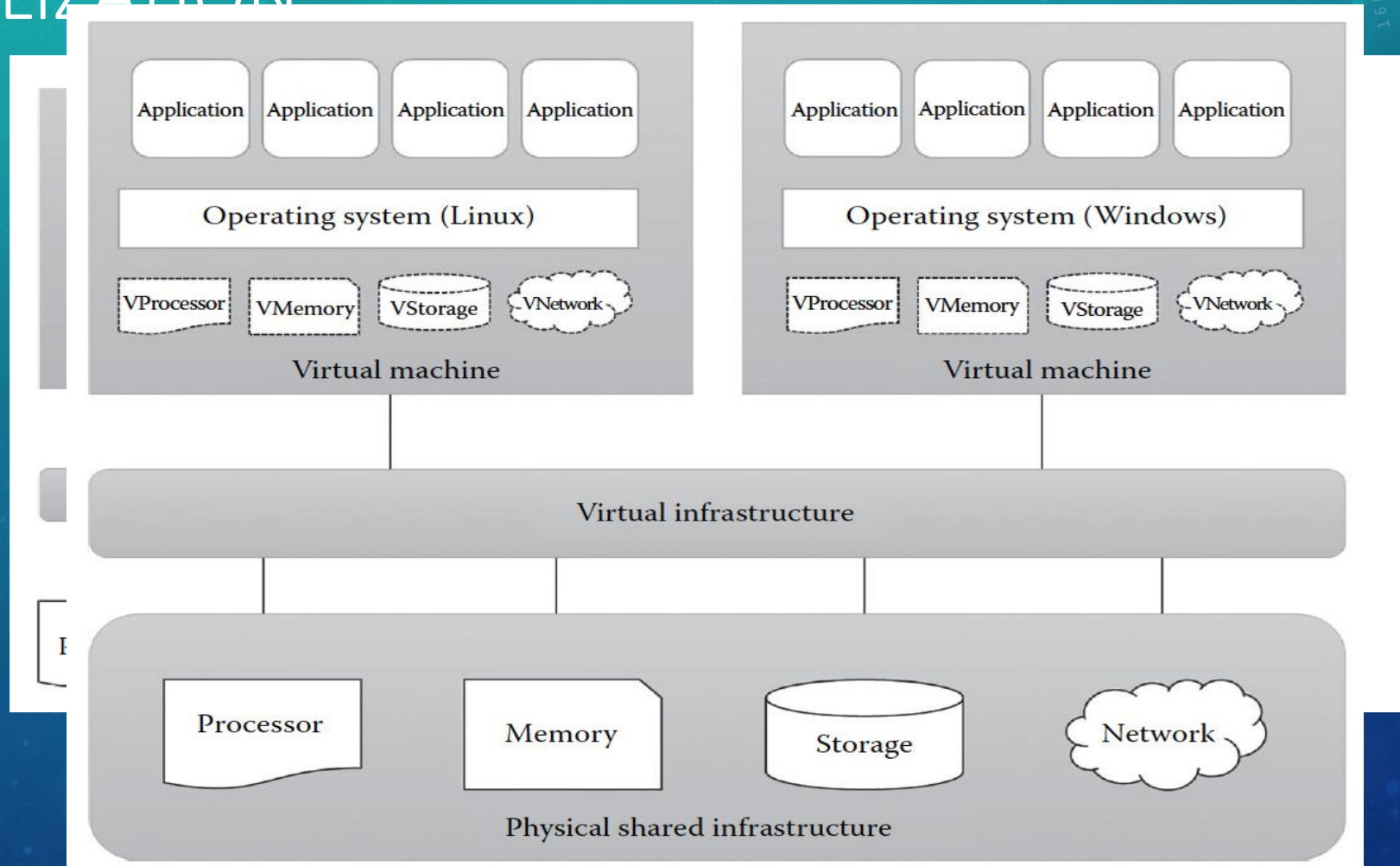
SERVICES ARCHITECTURAL MODEL OF SOA

VIRTUALIZATION

➢ Virtualization is a technology that enables the single physical infrastructure to function as a multiple logical infrastructure or resources

➢ Virtualization is not only limited to the hardware, it can take many forms such as memory, processor, I/O, network, OS, data, and application

➢ It helps to improve scalability and resource utilization of the underlying infrastructure.

➢ It also enables the IT personnel to perform the administration task easier

OSS AND APPLICATIONS BEFORE AND AFTER VIRTUALIZATION

Before

BENEFITS OF VIRTUALIZATION

➤ Better resource utilization

➤ Increases ROI

➤ Dynamic data center

➤ Supports green IT

➤ Eases administration
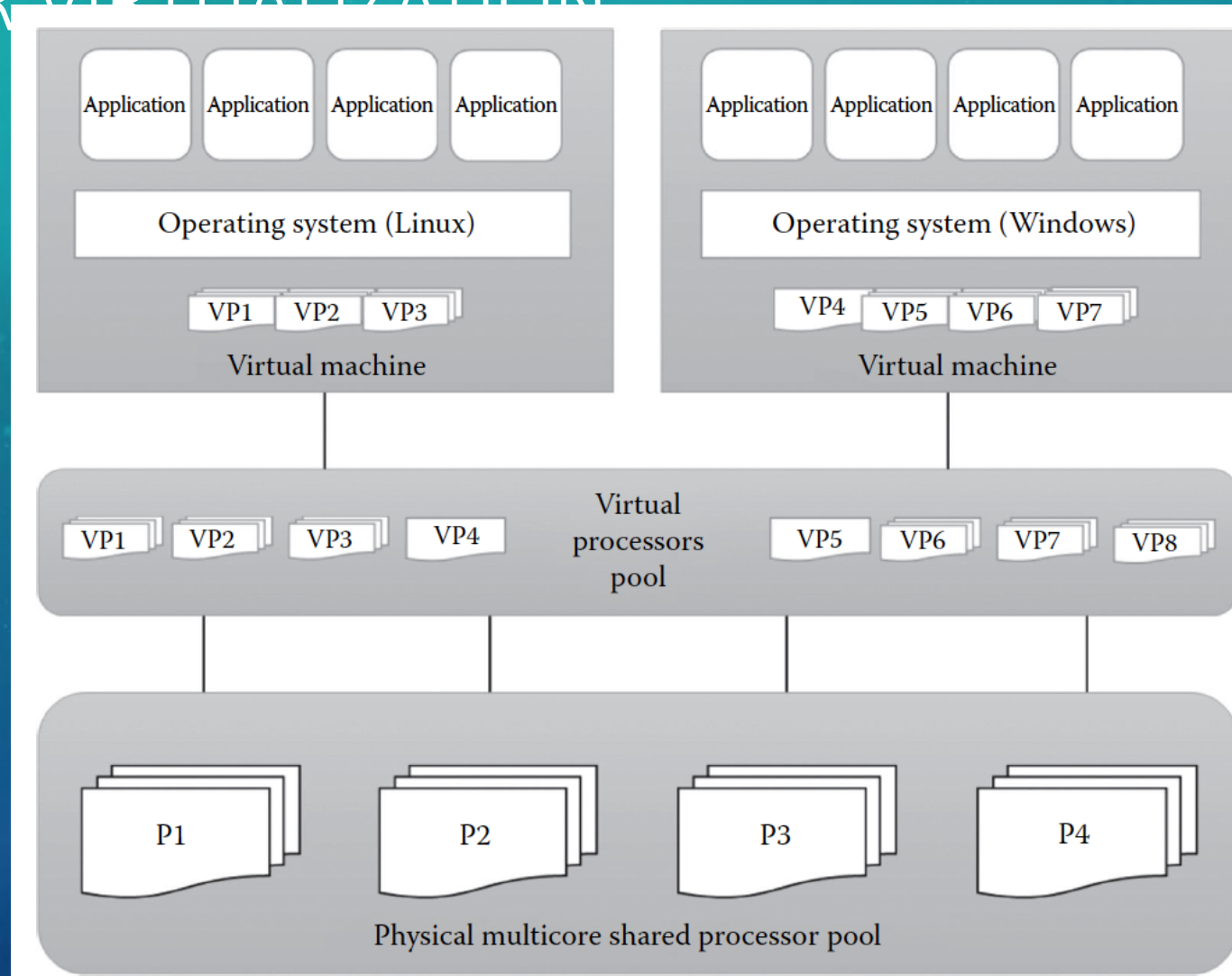
➤ Improves disaster recovery

DRAWBACK OF VIRTUALIZATION

➢ Single point of failure

➢ Demands high-end and powerful infrastructure

➢ May lead to lower performance

➢ Requires specialized skill set

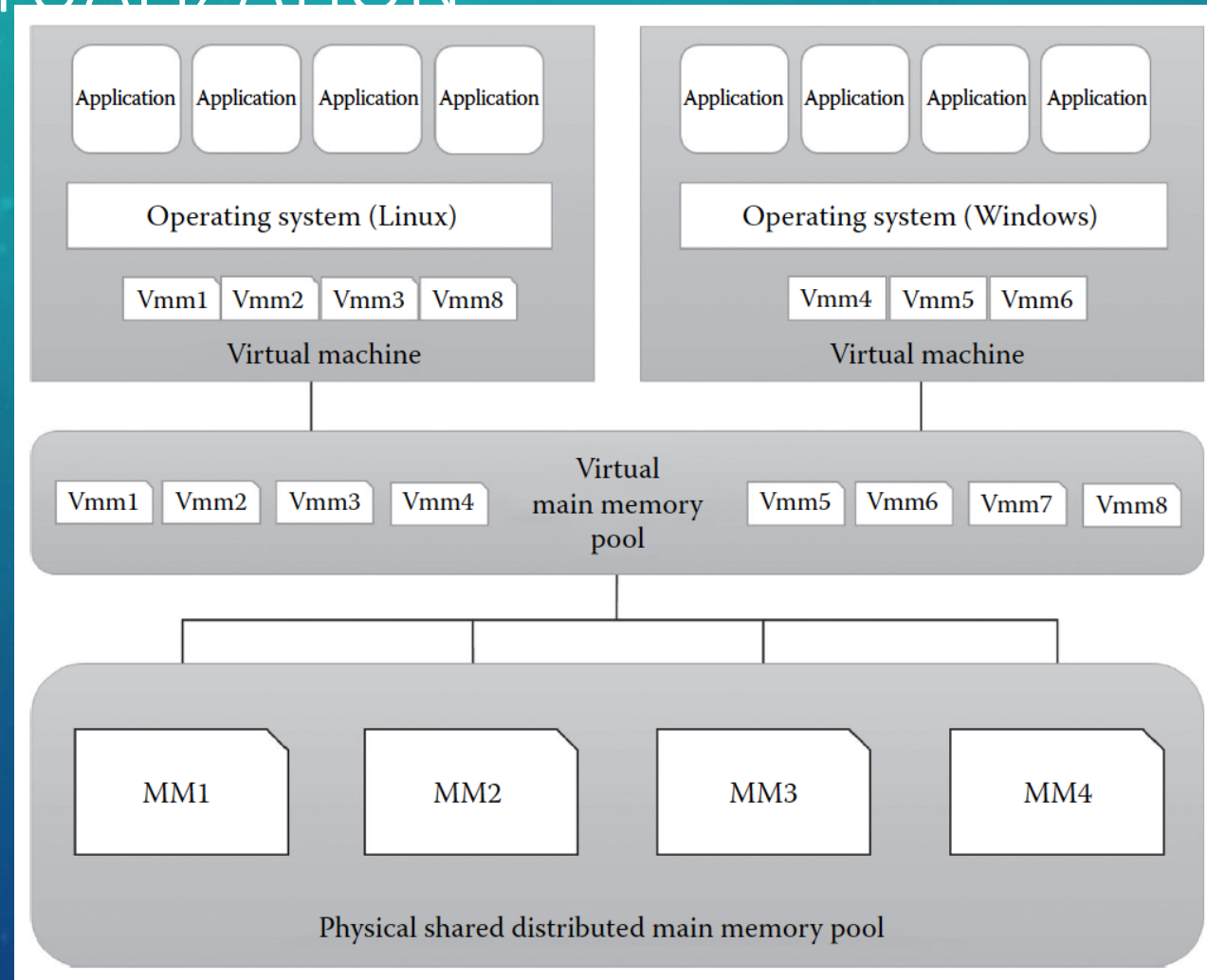# VIRTUALIZATION OPPORTUNITIES

➤ The different resources like **memory, processors**, **storage**, and **network** can be virtualized using proper virtualization technologies.
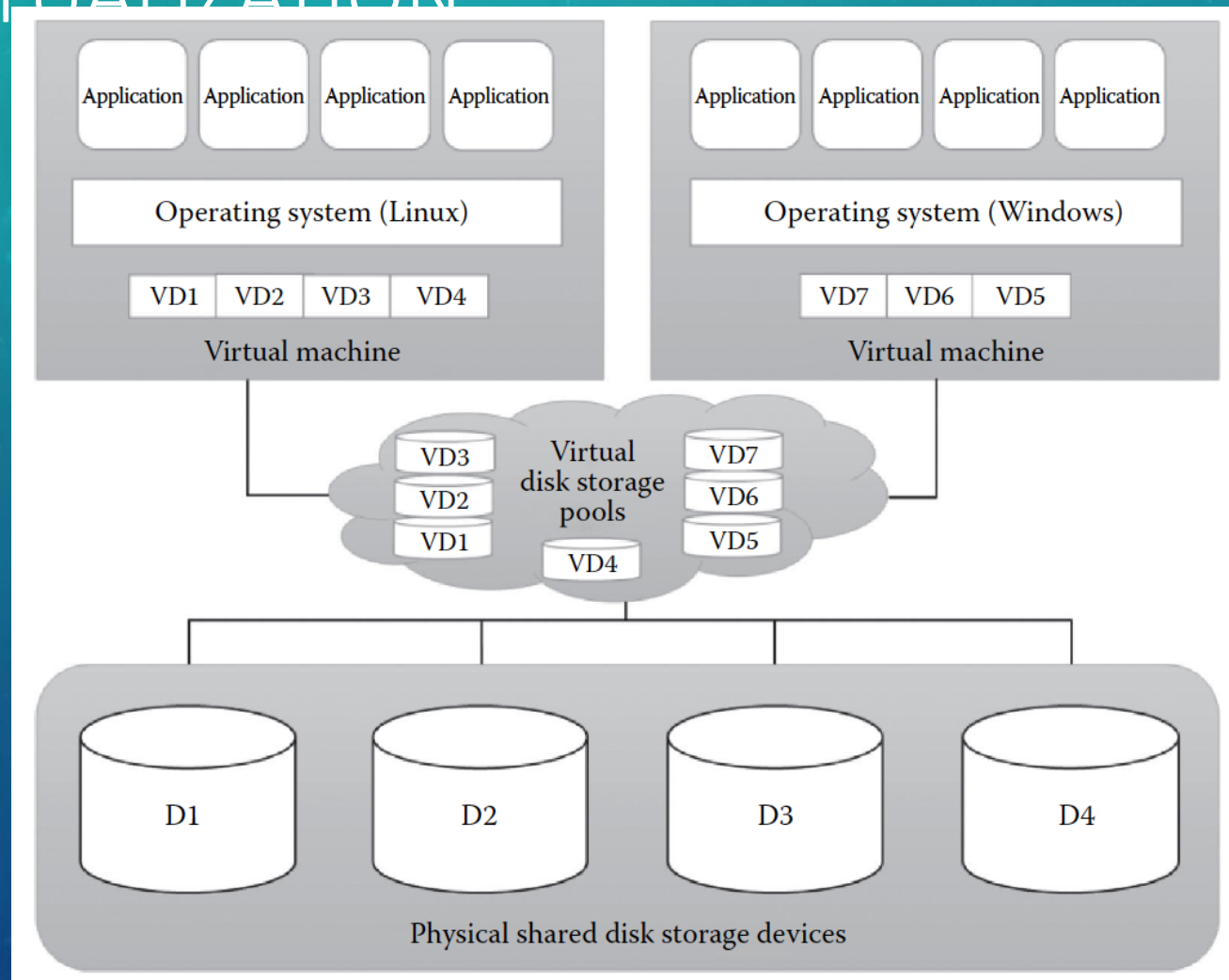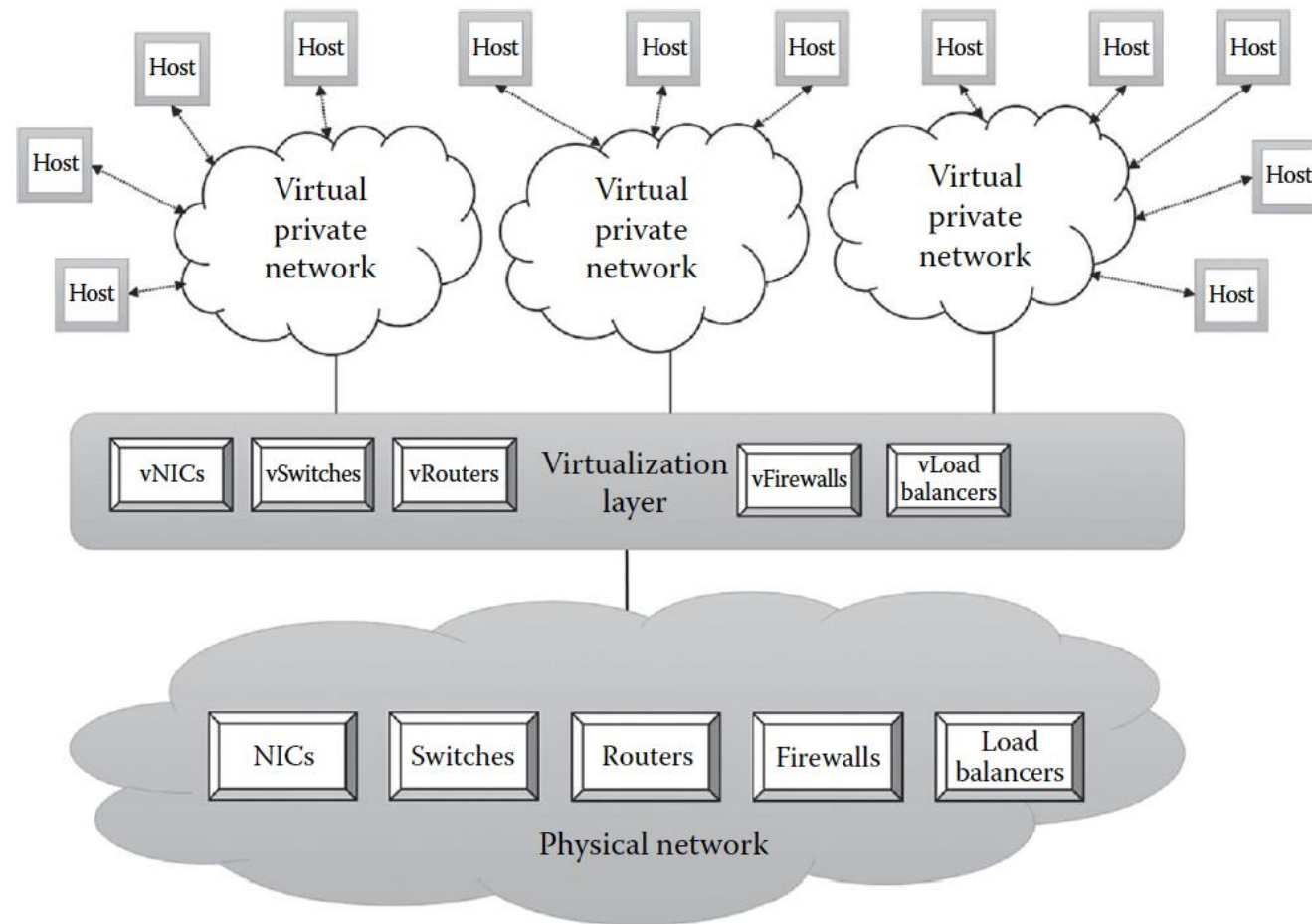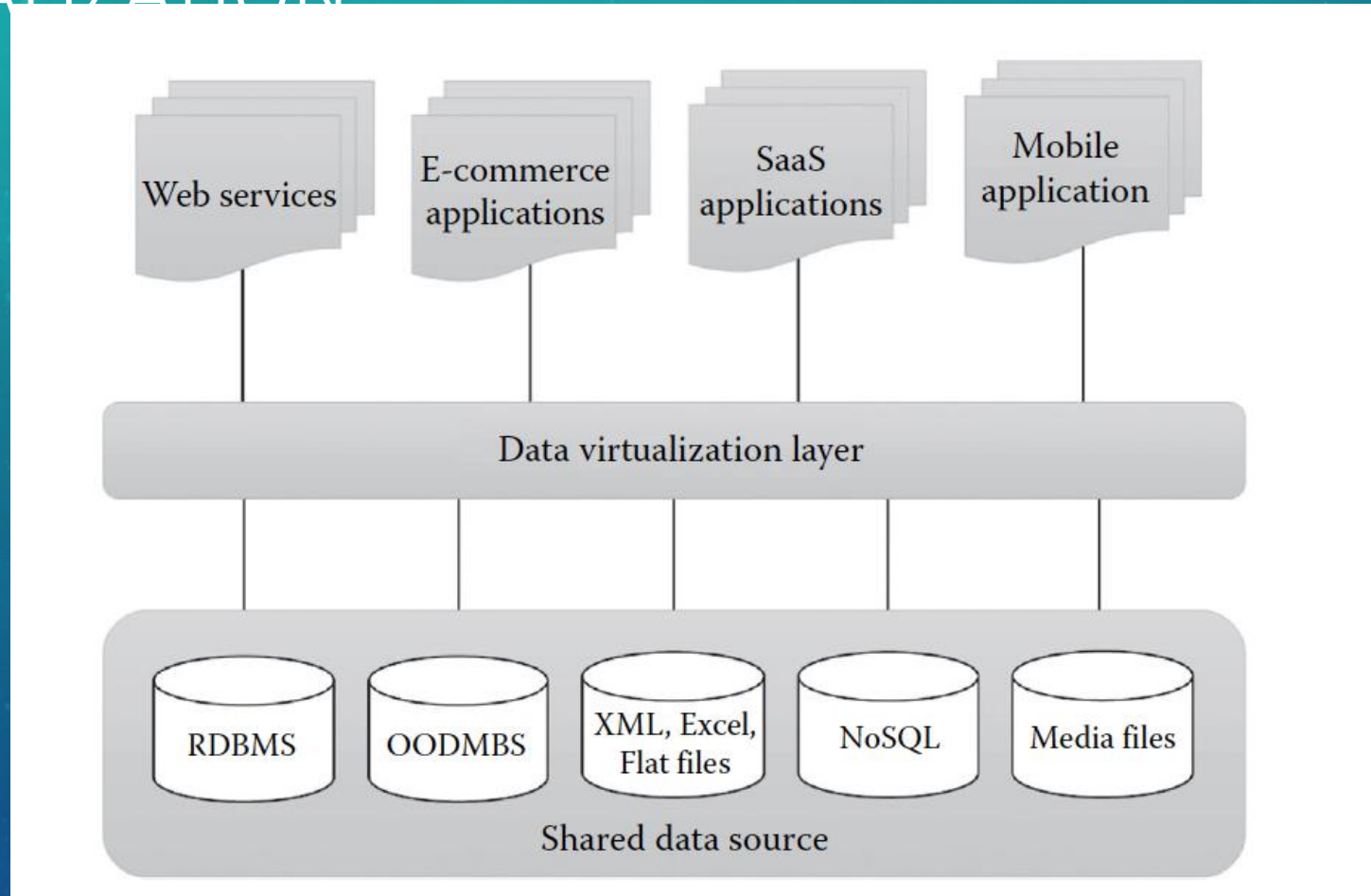
PROCESSOR VIRTUALIZATION

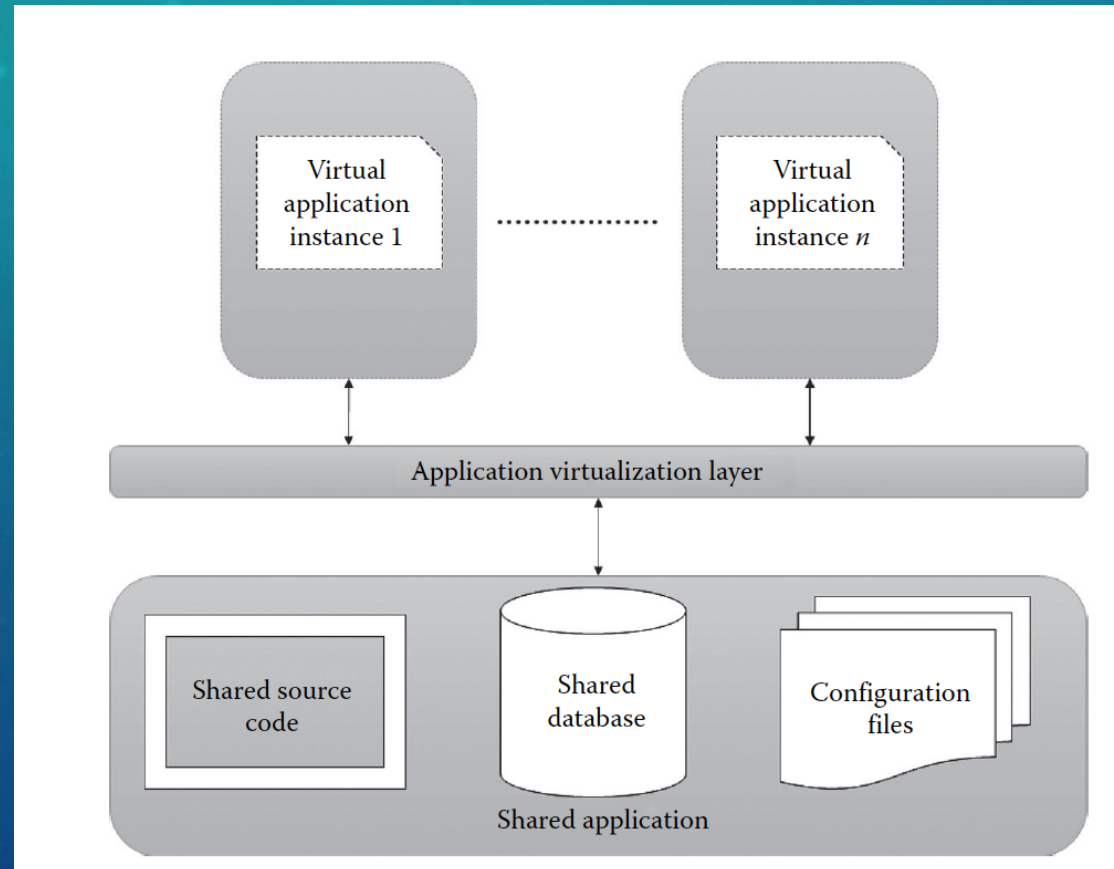# MEMORY VIRTUALIZATION

STORAGE VIRTUALIZATION

NETWORK VIRTUALIZATION

DATA VIRTUALIZATION

APPLICATION VIRTUALIZATION

MULTICORE TECHNOLOGY

➢ In multicore technology, two or more CPUs are working together on the same chip.

➢ These processors are packaged into a single integrated circuit (IC). These single ICs are called a die

➢ Multicore technology can also refer to multiple dies packaged together

➢ It also helps in reducing the power consumption and achieving more efficient, simultaneous processing of multiple tasks.

➢ Multicore architecture has become the recent trend of high-performance processors

MEMORY AND STORAGE TECHNOLOGIES

➢ The cloud storage has to deal with various kinds of data such as medical images, MP3, photos, 3D high-definition imaging, video streaming, surveillance camera captures, and film animations

CLOUD STORAGE REQUIREMENTS

➤ Scalability

➤ High availability

➤ High bandwidth

➤ Constant performance

➤ Load balancing

NETWORK REQUIREMENTS FOR CLOUD

➢Consolidate   vice (IaaS) to
various tena

➢Provide VM

➢Ensure conn

➢Speed appli

WEB 2.0

➢ Is the popular term given to the advanced Internet technology and applications that include blogs, wikis, really simple syndication (RSS), and social bookmarking

➢ Web 2.0 facilitates greater collaboration and information sharing among Internet users, content providers, and enterprises. Hence, in that sense, this can be considered as a migration from the *read-only web* to a *read/write web*

WEB 2.0 EXAMPLES

➢ BookFinder4U allow the users to upload book reviews to the site and also help the users find rare and out-of-print books at a reasonable price

➢ Wikipedia permit users not only to read the stored information but also to create and edit the contents of the information database in multiple languages

WEB 3.0

➤ It refers to the third generation of Internet-based services that is collectively called *the intelligent web*

➤ Includes services on the Internet that use technologies such as semantic web, natural language search, machine learning, recommendation agents, and artificial intelligence to achieve machine-facilitated understanding of information in order to provide a more productive and intuitive experience to the web users

WEB 3.0 EXAMPLES

➢ The Facebook Open Graph is a great example for the scalability feature offered by Web 3.0

➢ The *Like* button provided by Facebook could be considered as a simple manifestation of all these because a single click can offer the analysts an invaluable amount of information that could later be used for further communication with friends and also to make recommendations and discoveries.

➢ Search Optimization and Web Commerce: Best Buy

PROGRAMMING MODELS IN CLOUD

➢ There are different programming models that are used for solving various compute- or data-intensive problems in cloud

➢ The model to be selected depends on the nature of the problem and also on the QoS expected from the cloud environment
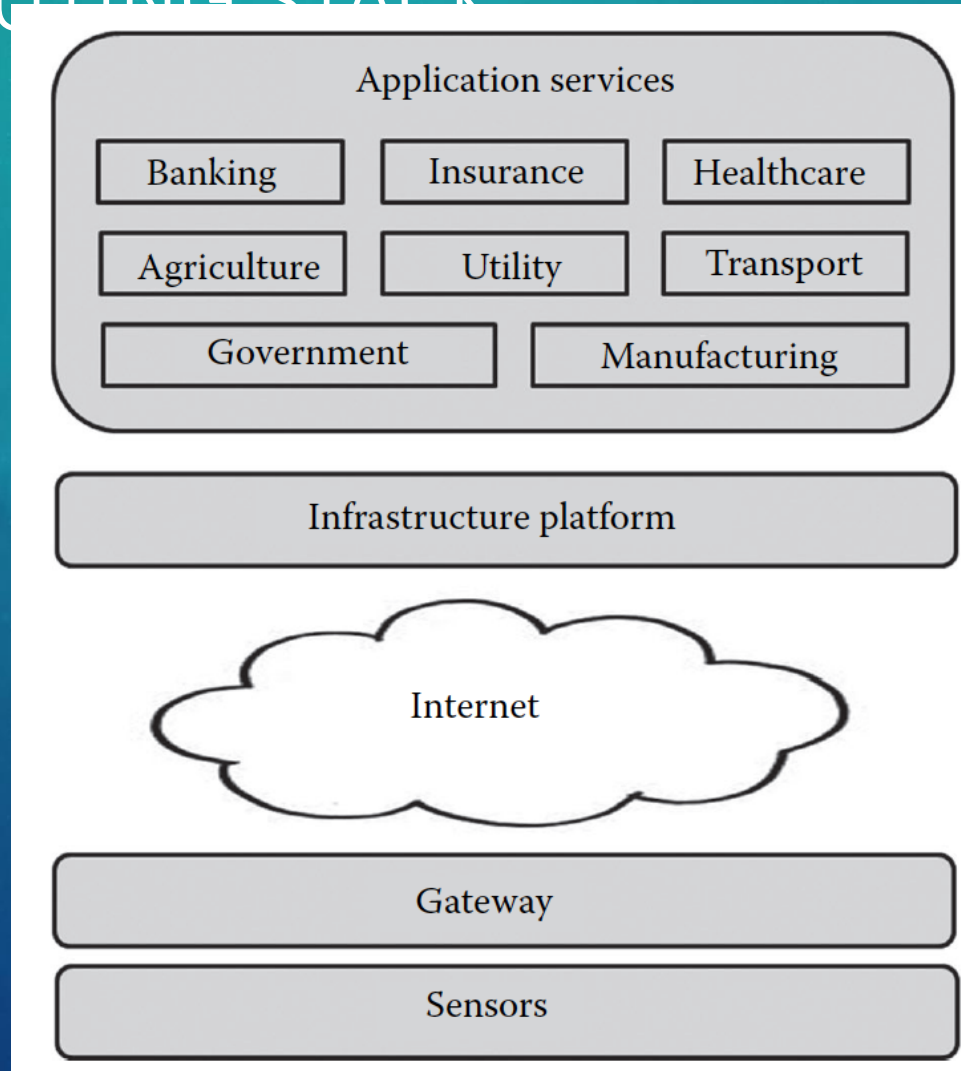
PROGRAMMING MODELS EXAMPLE

➢ Bulk synchronous parallel (BSP) model has been widely applied in parallel databases, search engines, and scientific computing

➢ MapReduce Model is able to support convenient access to the large-scale data for performing computations while hiding all low-level details of physical environments

➢ SAGA is a high-level programming interface that provides the ability to create distributed applications in an infrastructure-independent way

➢ Transformer: various models such as MapReduce , Dryad, and All-Pairs can be built

➢ Grid Batch Framework: an alternative to parallel computational models

PERVASIVE COMPUTING

➤ Is a combination of technologies, such as Internet capabilities, voice recognition, networking, artificial intelligence, and wireless computing, used to make computing anywhere possible

➤ Pervasive computing is also called ubiquitous computing

➤ The words pervasive and ubiquitous mean *existing everywhere*

PERVASIVE COMPUTING STACK

SUMMARY

➢ SOA

➢ Virtualization

➢ Multicore, memory storage technology

➢ Web 2.0 and 3.0

➢ Pervasive computing