CLOUD COMPUTING AND VIRTUALIZATION: CAN CLOUD COMPUTING EXIST SEPARATELY FROM VIRTUALIZATION?
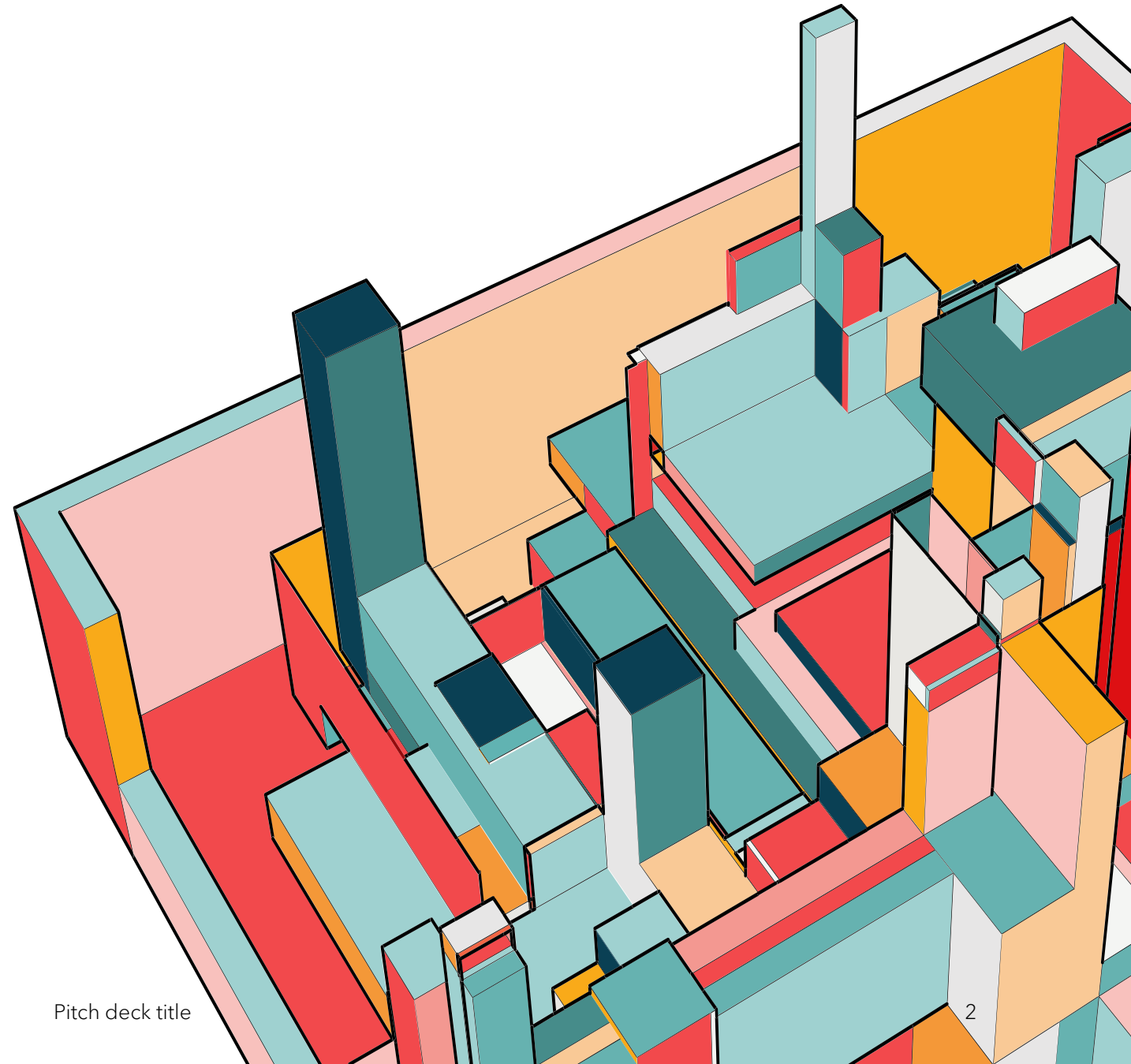
Mirjana Kocaleva Vitanova, Biljana Zlatanovska, Elena Karamazova Gelova, Zoran Zlatev

Faculty of computer science, UGD, 2023

INTRODUCTION

We are going to talk about

- virtualization

- cloud computing

-virtualization in cloud

Pitch deck title

VIRTUALIZATION

- Virtualization is a technology that combines hardware and software.
- It allows the same computer to run several different operating systems that share common resources.
- In this way, the system is divided into several separate virtual entities that act as independent computer systems.
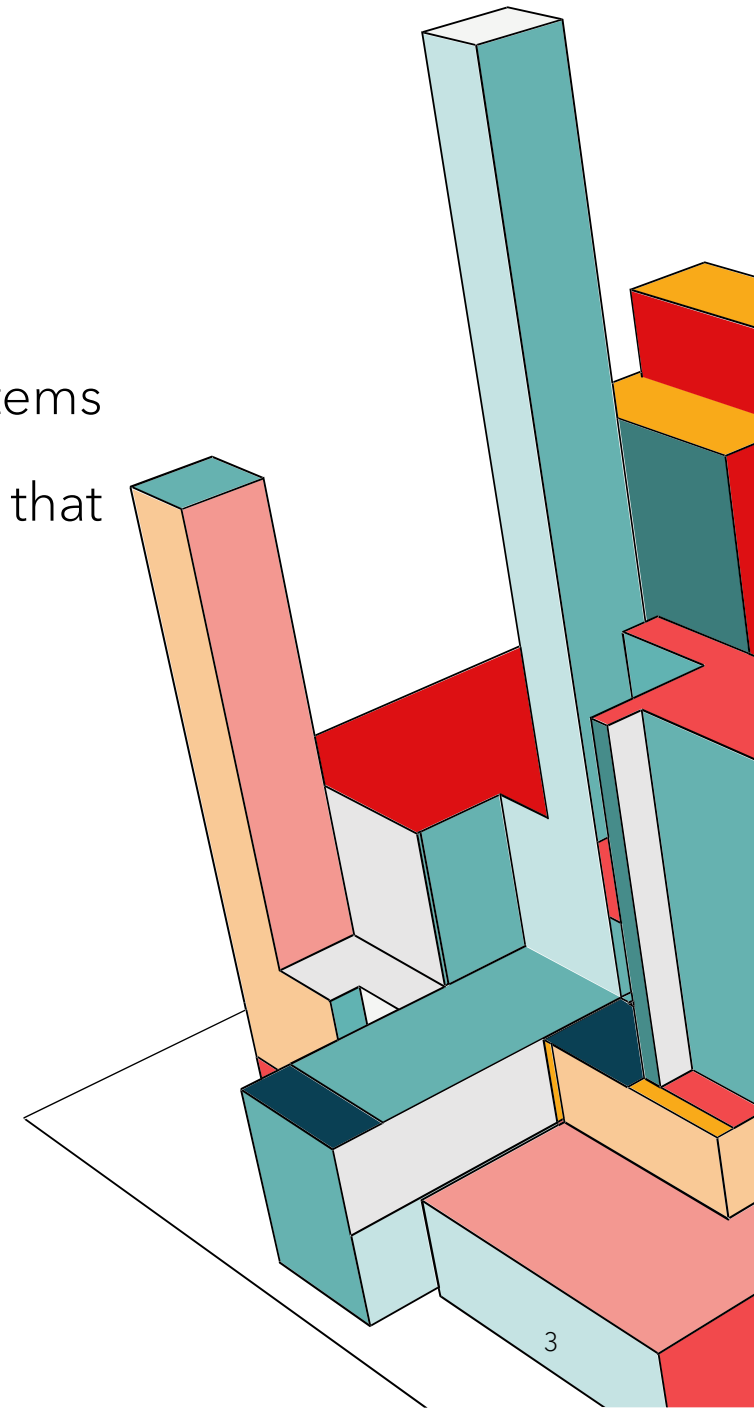
A virtual machine is a computing resource that uses software instead of a physical computer to run programs and deploy applications.

The main feature is that there are two users of the computer, namely:
• Host machine - the machine that represents the physical equipment and the main operating system.
• Guest machine - our installed virtual machine, running an operating system that corresponds to it.

Virtual Machines

Main Server

Pitch deck title
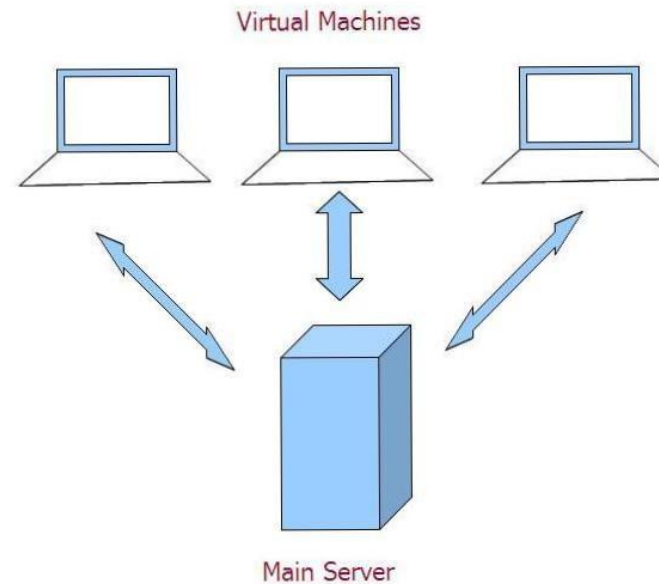
There are two different types of virtual machines, each with different functions:

• System virtual machines

- They provide a replacement for a real machine.

- This virtual machine makes it possible to represent the physics between several virtual machines, using software called a hypervisor.

- A hypervisor allows multiple environments to be isolated from each other but still exist on the same physical machine.

• Virtual machines processes designed to run computer programs in a platform-independent environment
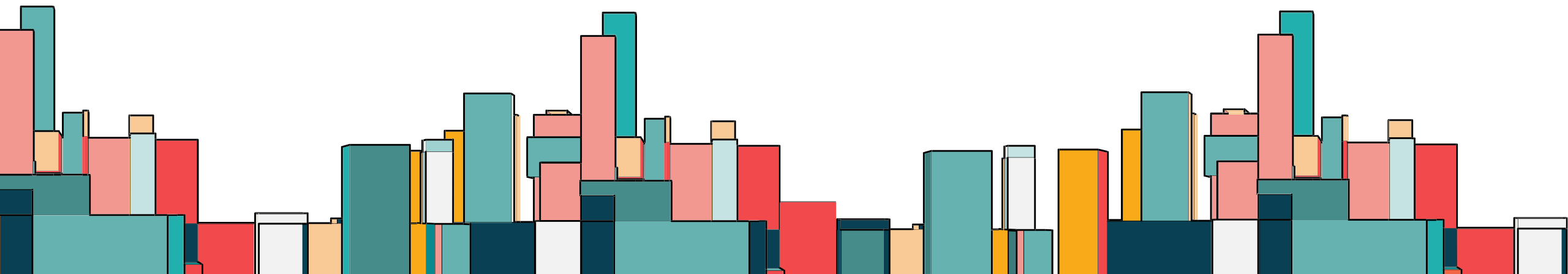
Advantages of virtual machines
• We have different operating systems that can exist on the same machine,
• A virtual machine has a simpler instruction architecture than a real computer.
• It can be portable
• At the business level, they cause economic savings and space savings.
• there is no physical hardware, no worry about the damage that can be caused when installing a program.

Disadvantages of virtual machines
• Virtual machines are slower.
• They can consume a lot of resources.
• When there is a need to access the hardware, it is not very efficient.
• When multiple virtual machines are running at the same time, unstable performance occurs.
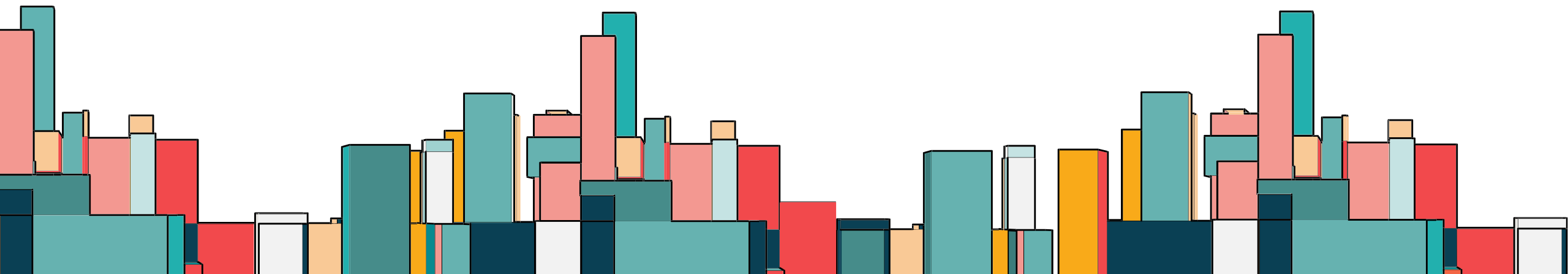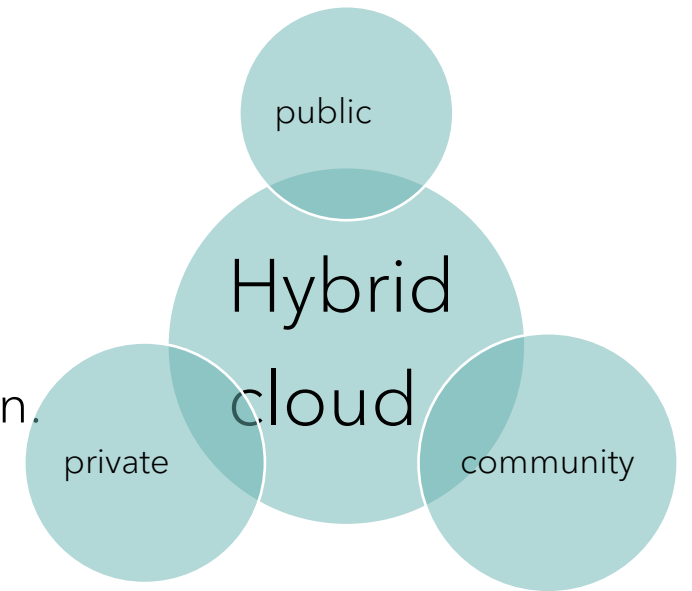
CLOUD COMPUTING

- Cloud computing helps to reduce IT costs, to improve agility and time to value and to scale more easily and economically

- Cloud computing is some kind of Internet-based computing where application, storage and servers are given via internet connection.

- Cloud Computing consists of several services:

  - SaaS: Users can get and use software with less money than buying and installing it.

  - IaaS: Infrastructure can be scaled up or down based on the requirement.

  - PaaS: Provides greater flexibility, speed and agility to the development process and it reduces server storage costs [13].
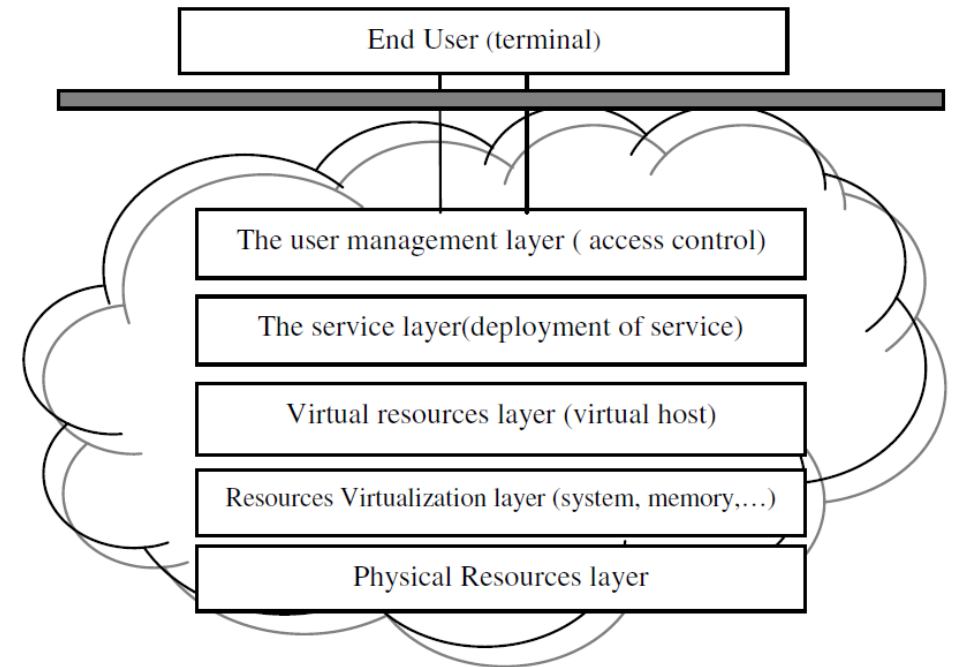
CLOUD COMPUTING

- There are four deployment models of Cloud computing:

  - Private cloud is aimed for businesses and used by single organization.

  - Public cloud is aimed for software development and projects.

  - Hybrid cloud is combination of two clouds (private, public or community) and is aimed for big businesses.

  - Community cloud is collaborative platform used by more organizations for sharing same applications.

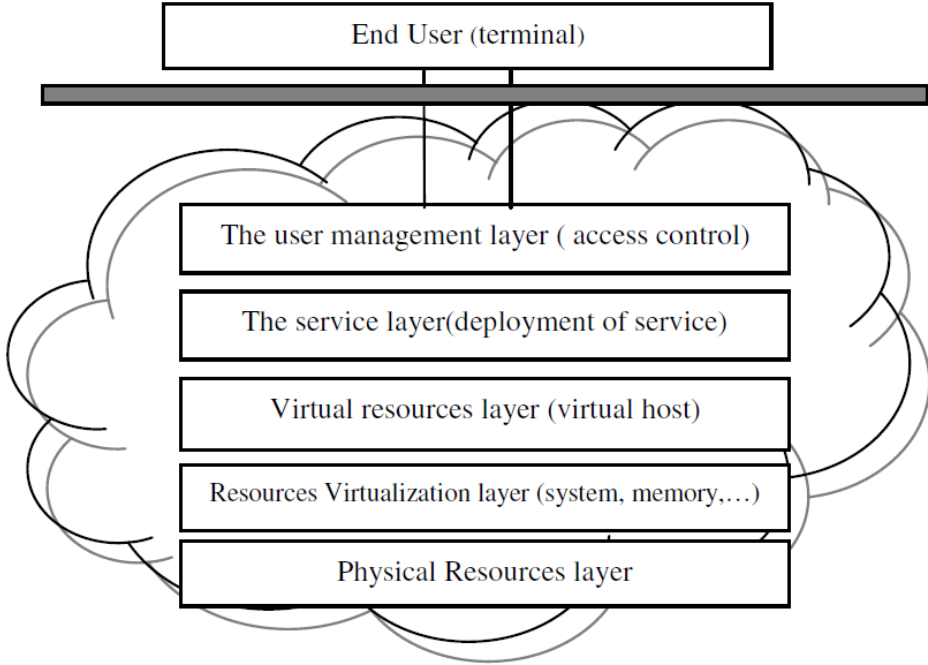public

Hybrid cloud

private

community

CLOUD COMPUTING

- Cloud computing services first were offered by Amazon, Google, Microsoft, but now exist many more.

- These services are used in many areas like software industries, government sectors, health care sectors...

- Architecture of cloud computing from the point of virtualization is given in Fig.4 [11].

CLOUD COMPUTING

End User (terminal)

The user management layer (access control)

The service layer(deployment of service)

Virtual resources layer (virtual host)

Resources Virtualization layer (system, memory,…)

Physical Resources layer

- The user management layer is the relationship between user and cloud, and the user access "clouds" through it.

- The service layer converts the cloud resources into the services

- Virtual resources layer combines and handles virtualized resources.

- The second last layer handles the virtualization of all kinds of computing resources

- The last layer is the base of the entire platform for cloud computing, storage of real physical resources.

VIRTUALIZATION IN CLOUD COMPUTING

Virtualization in Cloud Computing creates a virtual framework of the server operating system and storage devices. This will allow the same resource to be shared among multiple users at the same time.
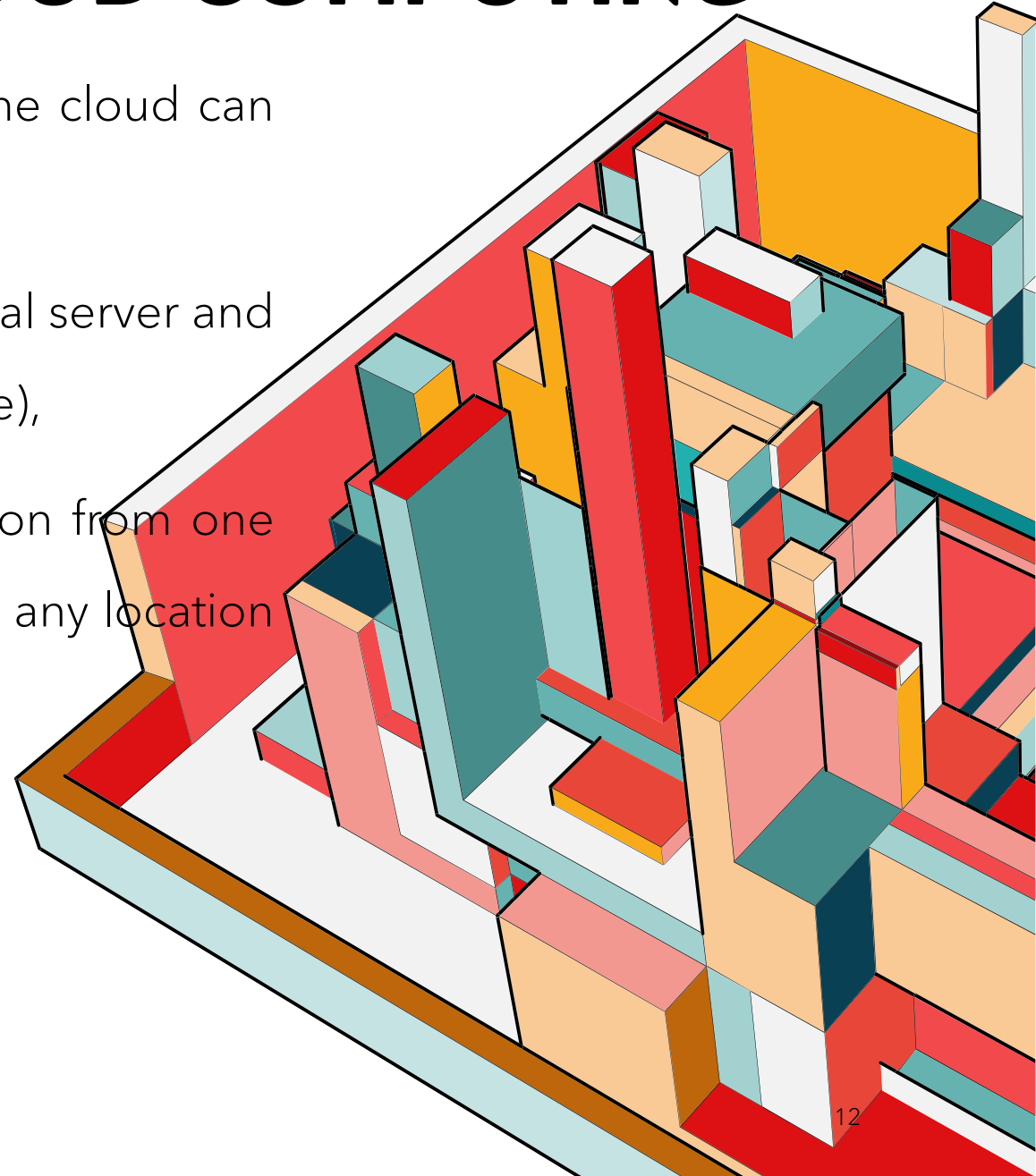
Main gains of virtualization in cloud are:

- Security (security is by means of firewalls that help keep data private.)

- Flexible operations (technical errors can be resolved in physical systems.)

- Economical (saving money on physical systems, data is stored on a virtual server which is a much cheaper investment)
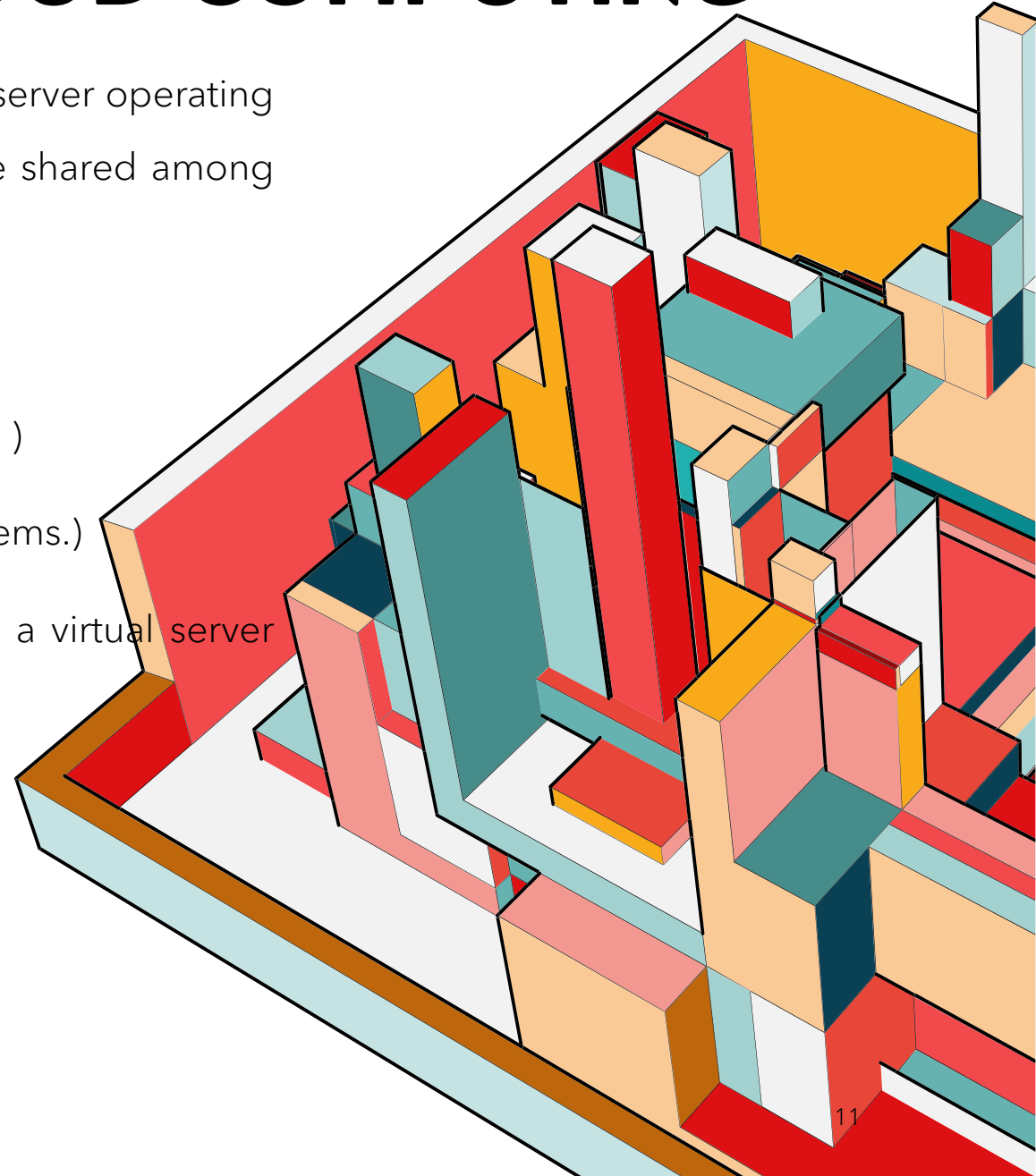
VIRTUALIZATION IN CLOUD COMPUTING

- Eliminates the risk of system failure (data stored in the cloud can

be retrieved at any time with any device),

- Flexible transfers of data (the data is located on a virtual server and

no time is wasted to find it because it is easily accessible),

- Availability increases with Virtualization (Data migration from one

server to another is safe. Also, we can access data from any location

and at any time from any device),

- Disaster Recovery is efficient and easy

- Virtualization saves Energy,

- Quick and easy setup.

Pitch deck title

VIRTUALIZATION IN CLOUD COMPUTING

- With the introduction of virtualization, cloud computing enables users to not have to worry about the maintenance of the physical host, the problem of management and optimization

- With the use of virtualization, cloud computing brings not only benefits of convenience and efficiency, but also great challenges in data security and privacy protection.

- Virtualization is important in cloud computing because it abstracts compute resources and enables rapid scaling of resources
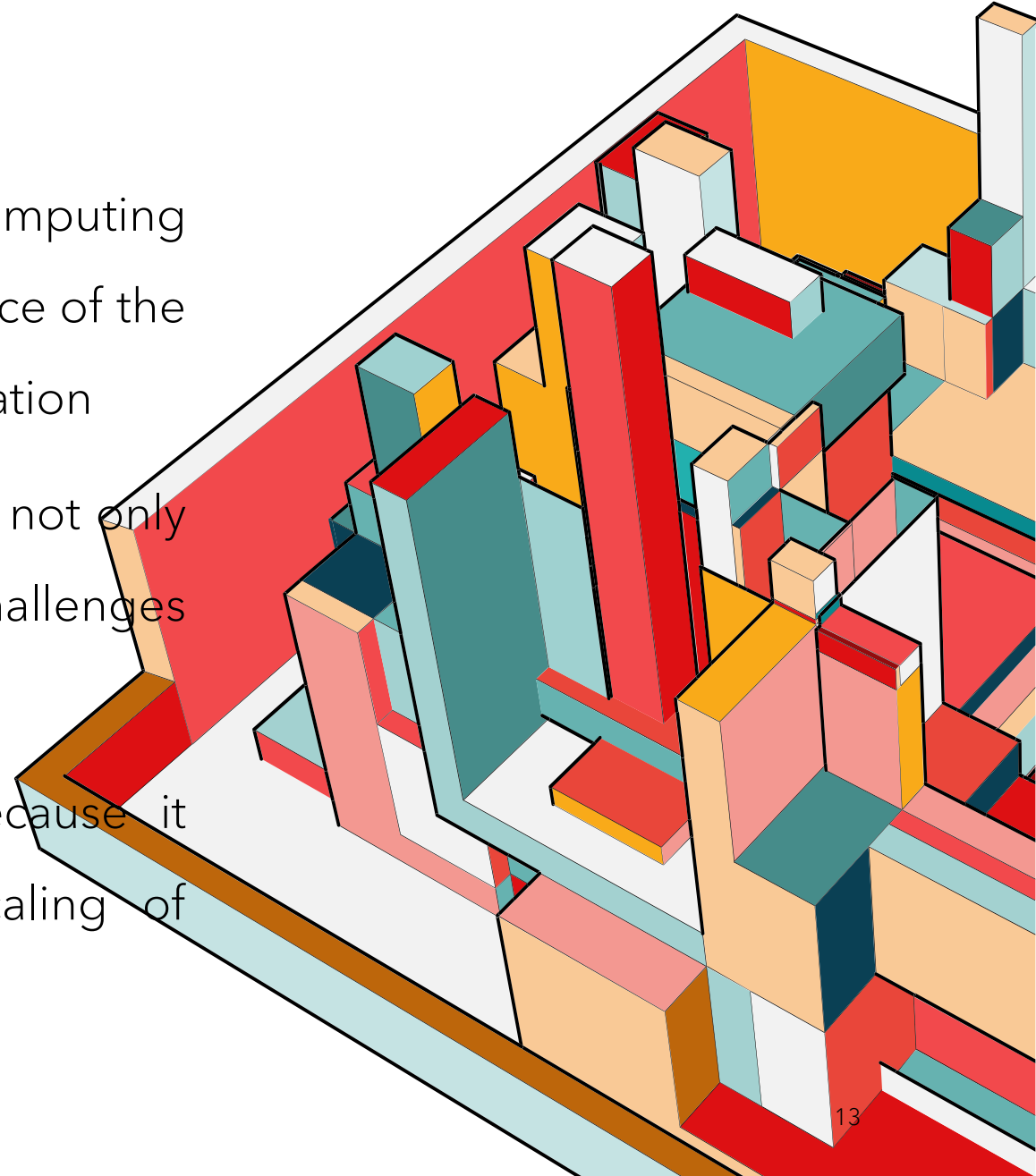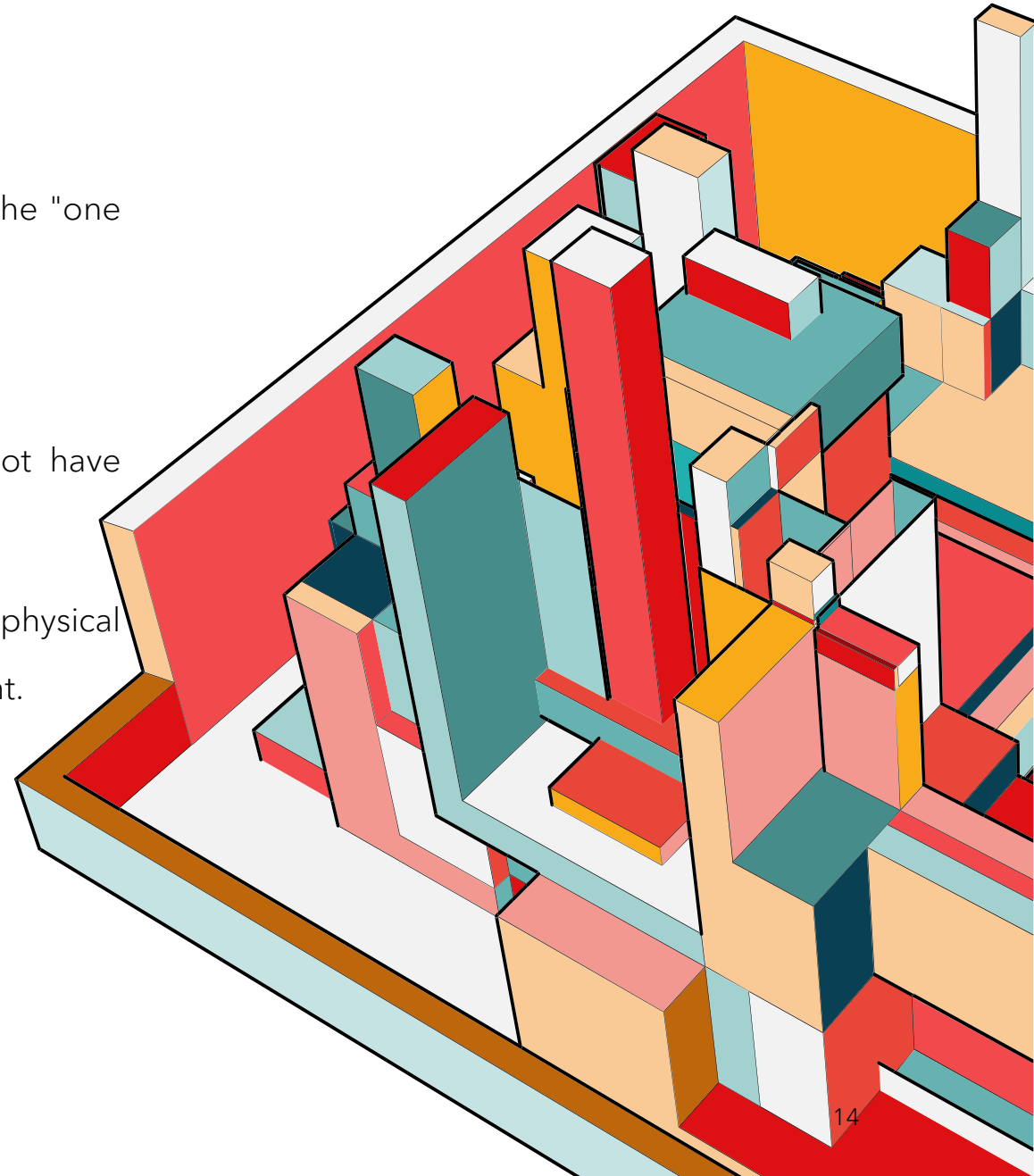
CONCLUSIONS

Virtualization of computer systems is an old idea in a new edition. It destroys the "one computer - one operating system" concept.

A virtual machine is a computer within a computer.

Virtual machine can be used for everyday use even by people who do not have extensive knowledge of information services.

Administrators can manage multiple operating systems at once from a single physical server. They are independent of each other, making them hardware independent.
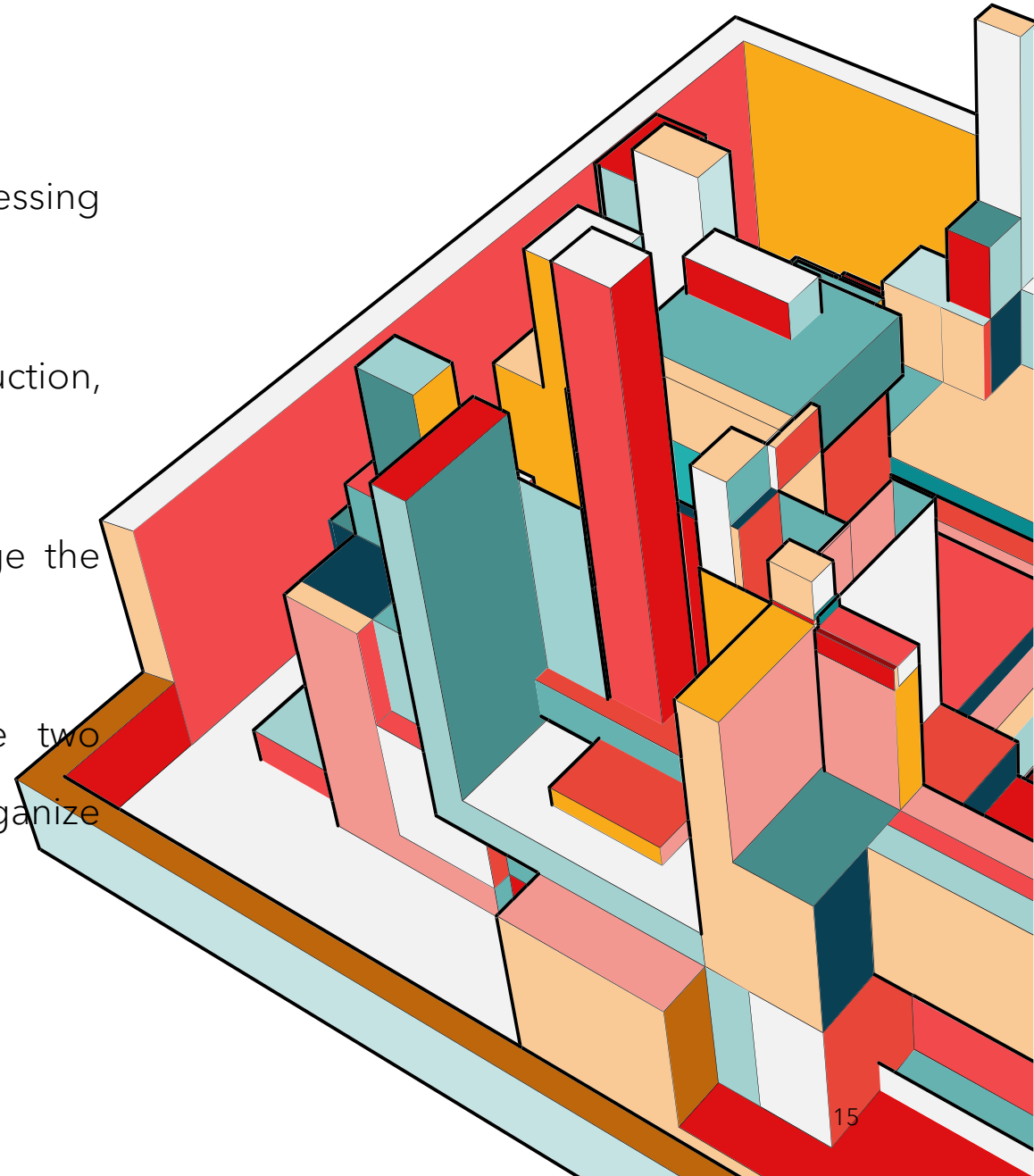
Pitch deck title

CONCLUSIONS

Cloud computing helps to get over the problems of losing data, accessing data whenever needed and data security.

This technology is mainly service oriented and focuses on cost reduction, hardware reduction and only service pay.

Virtualization makes cloud computing environment easier to manage the resources.

With the many advantages and possibilities provided by these two technologies, we can say that these technologies will continue to reorganize and modify many fields of human venture for years to come [15].

Pitch deck title

THANK YOU FOR YOUR ATTENTION