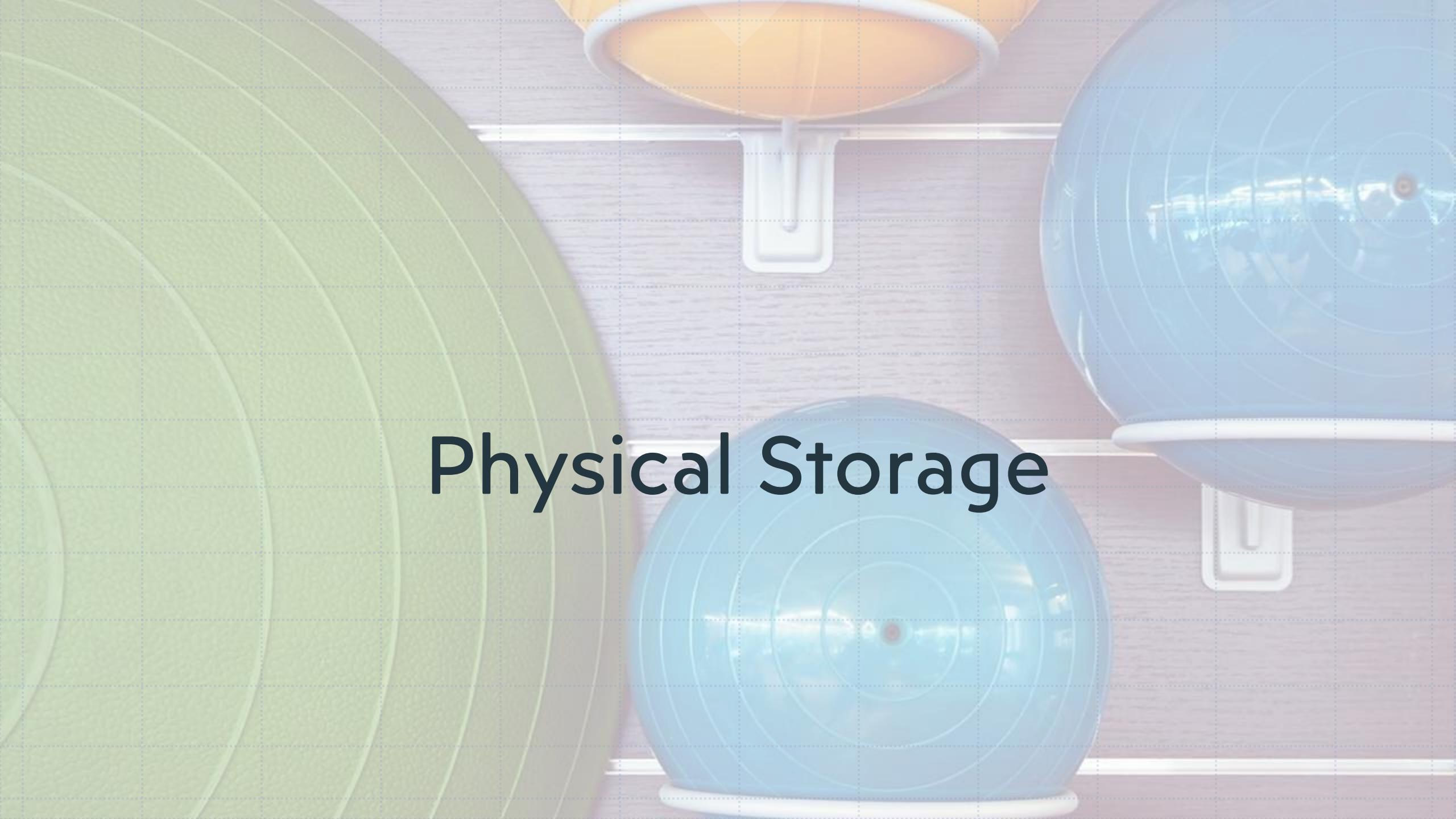


Understanding Physical Storage and Storage Types

- An introduction to physical storage systems and the different types that exist, including Single Disk Drives, JBOD, Volume, Storage Array, SCSI devices, DAS, NAS, and SAN



A stack of vinyl records in various colors (green, yellow, orange, blue) is arranged on a light-colored wooden surface. The records overlap each other, creating a sense of depth. The background is slightly blurred.

Physical Storage

What is Physical Storage?

- Physical storage refers to any media where data is kept in the digital environment
- Examples of physical storage devices include Hard Disk Drives , Solid State Drives , and tapes



Types of Physical Storage



Varieties of Physical Storage

- Different types of physical storage systems exist, including Single Disk Drives, JBOD , Storage Arrays, and more
- Each has its own advantages and use-cases



Single Disk Drive

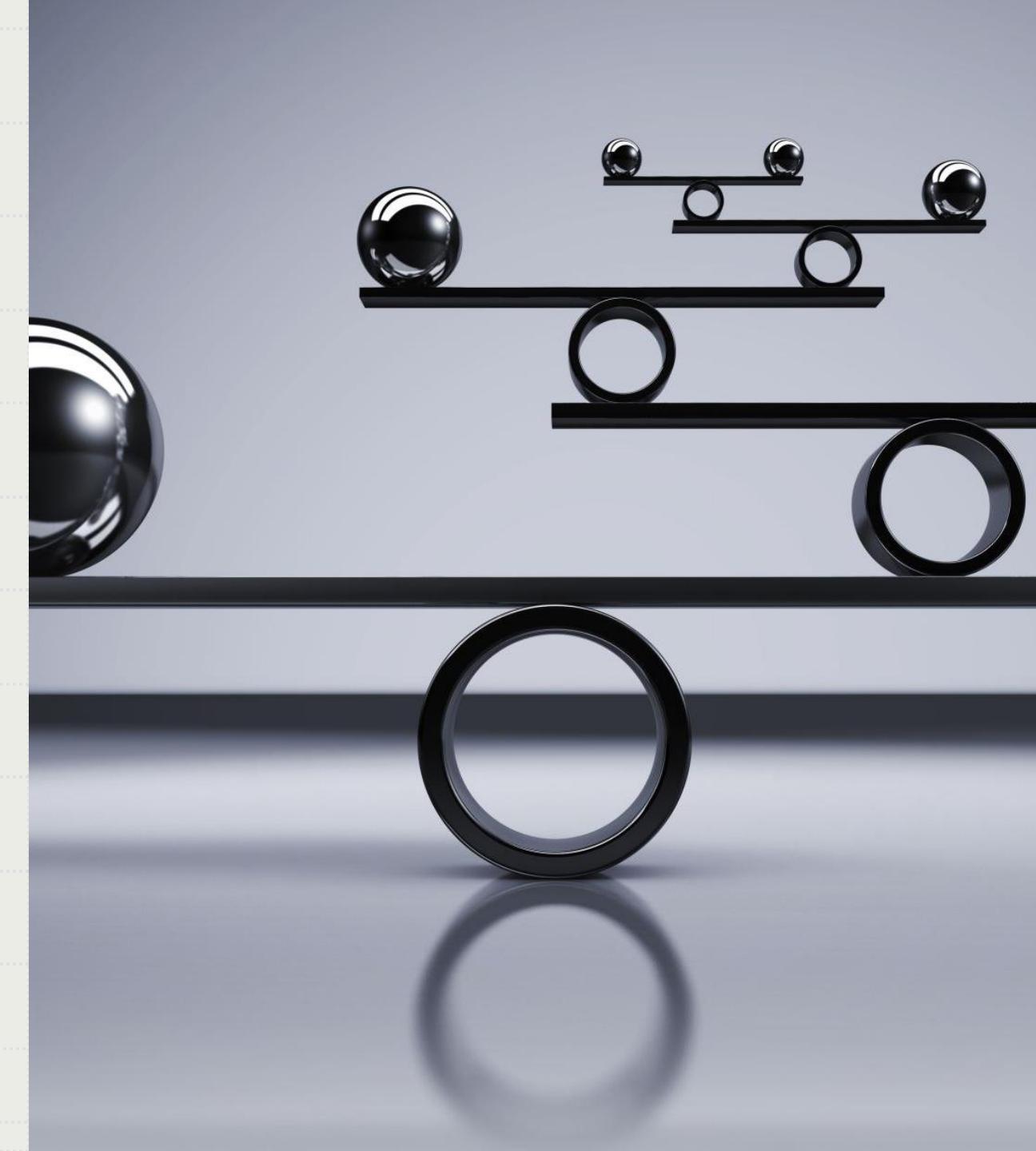


Understanding Single Disk Drive

- A single disk drive is the simplest form of storage, where data is stored on a single disk
- This could be a Hard Disk Drive or a Solid State Drive

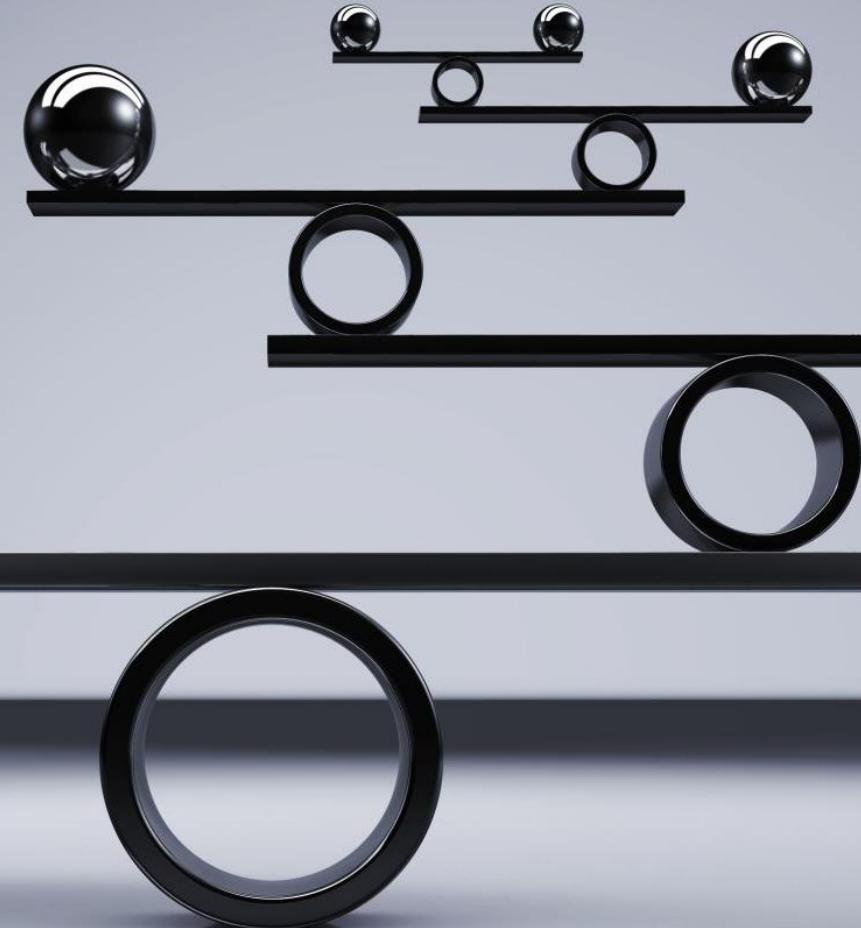


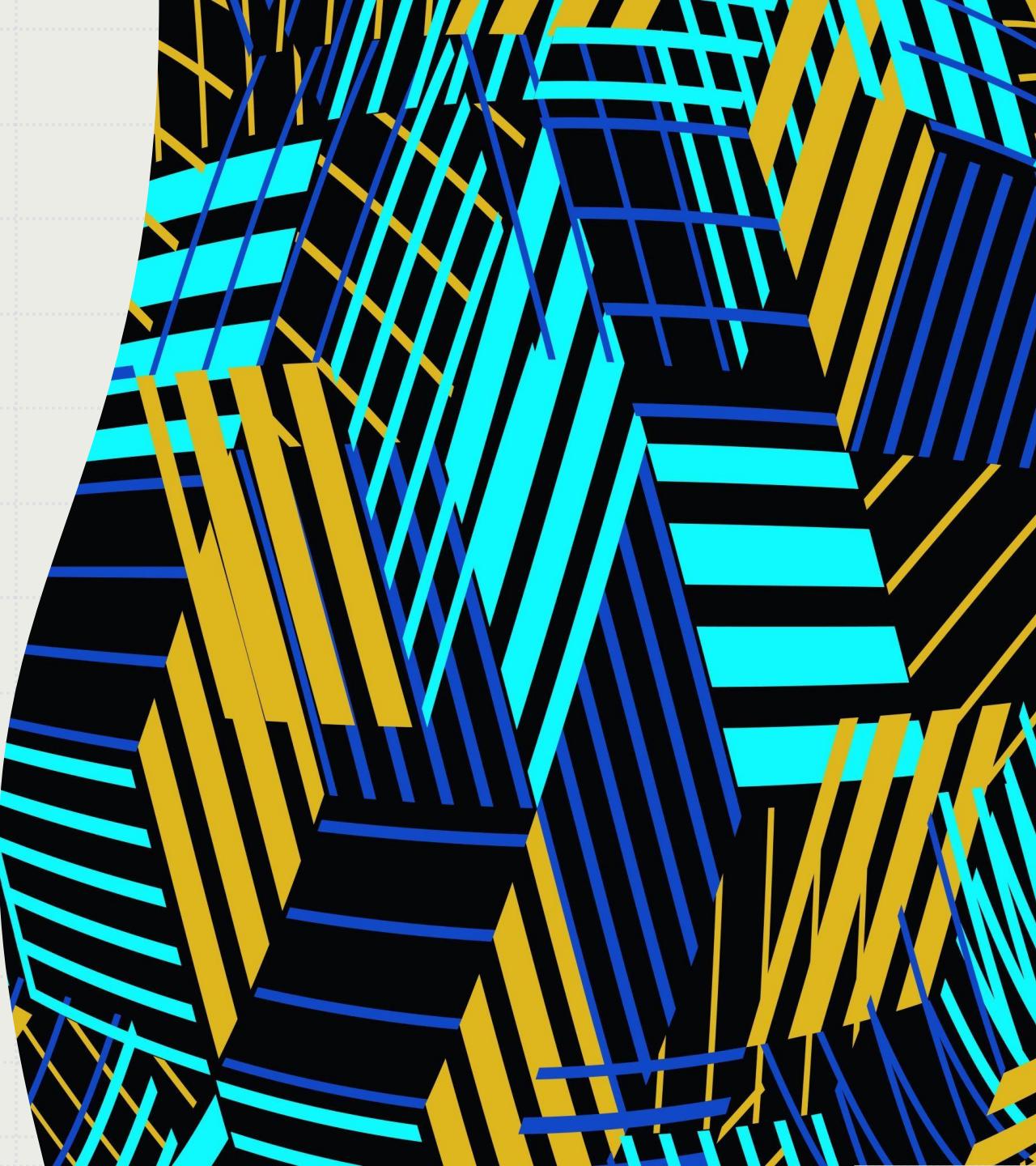
Single Disk Drive: Advantages & Disadvantages



Pros & Cons of Single Disk Drive

- Advantages include simplicity and cost-effectiveness
- The primary disadvantage is susceptibility to data loss if the disk fails, as there is no built-in redundancy



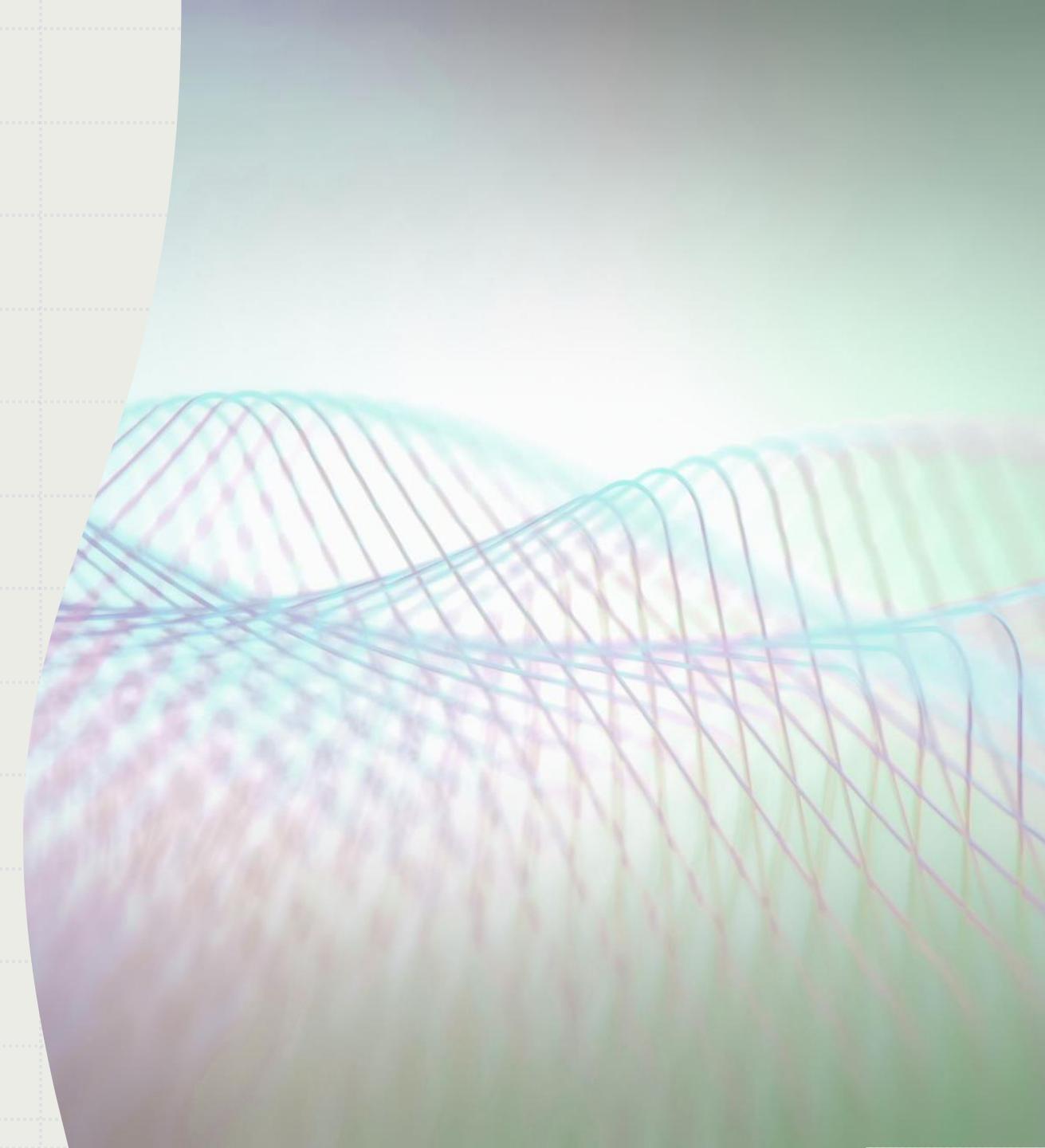


JBOD

Introduction to JBOD

- JBOD stands for "Just a Bunch Of Disks"
- It's a system that combines multiple physical disks into a single logical volume, without any RAID configuration

JBOD: Configuration



How to Set Up a JBOD?

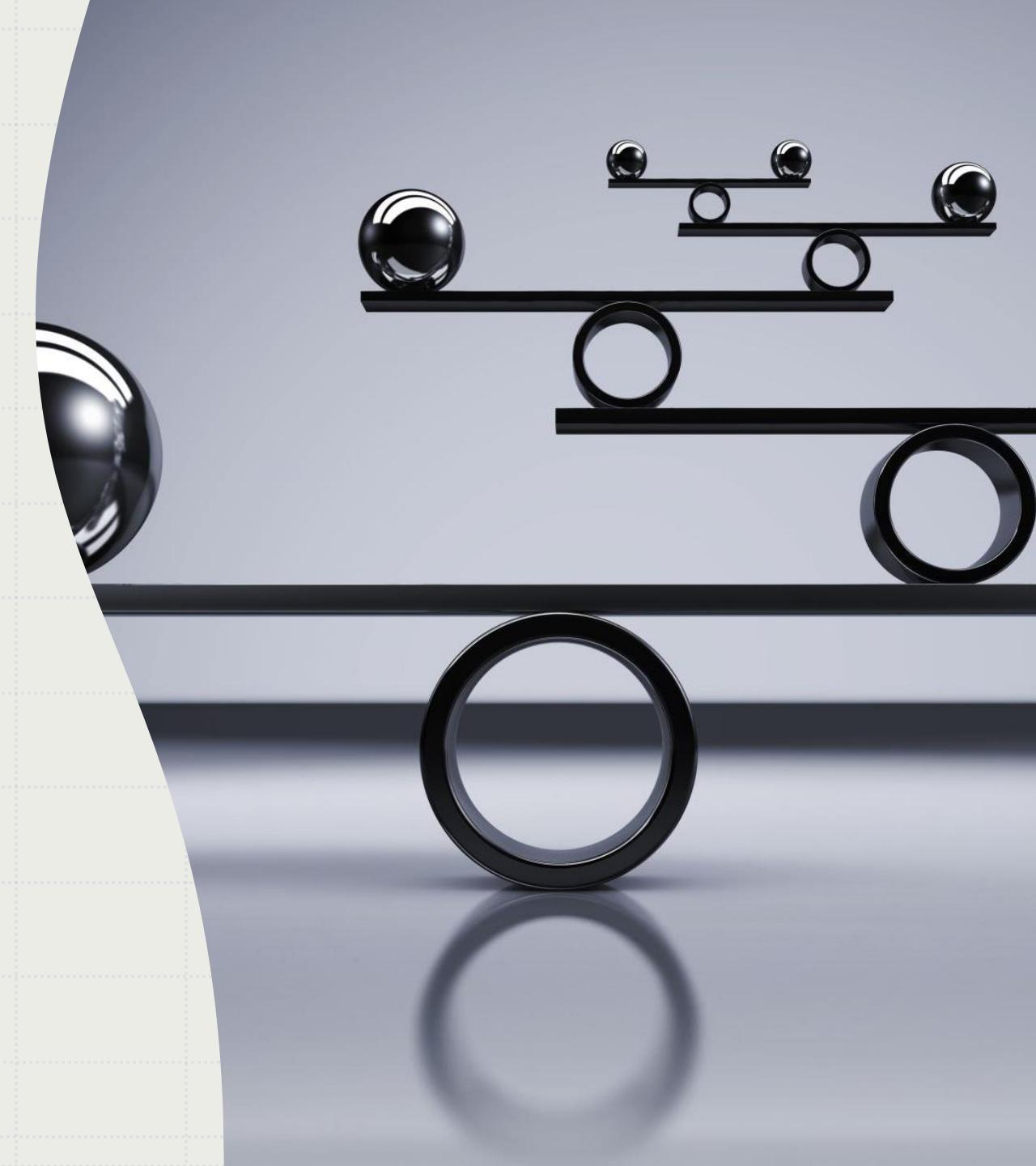
- In a JBOD setup, disks are concatenated together to create a larger logical volume
- This can be set up through hardware controllers or software



JBOD: Advantages & Disadvantages

Pros & Cons of JBOD

- JBOD's main advantage is the ability to utilize different types and sizes of disks
- The main disadvantage is the lack of redundancy - if one disk fails, all data on that disk is lost



Storage Volume



Understanding Volume Storage

- A volume is a storage area with a single file system
- A volume can be a part of a single disk, reside on a single disk, or span multiple disks



Storage Volume: Configuration



How to Create and Manage Volume?

- Volumes are created and managed using the operating system's disk management tools
- They can be resized, formatted, or assigned a drive letter



Volume: Advantages & Disadvantages



Pros & Cons of Volume Storage

- Volumes provide flexibility for storage management
- However, spanning volumes across multiple disks increases the risk of data loss, as the failure of one disk affects the entire volume



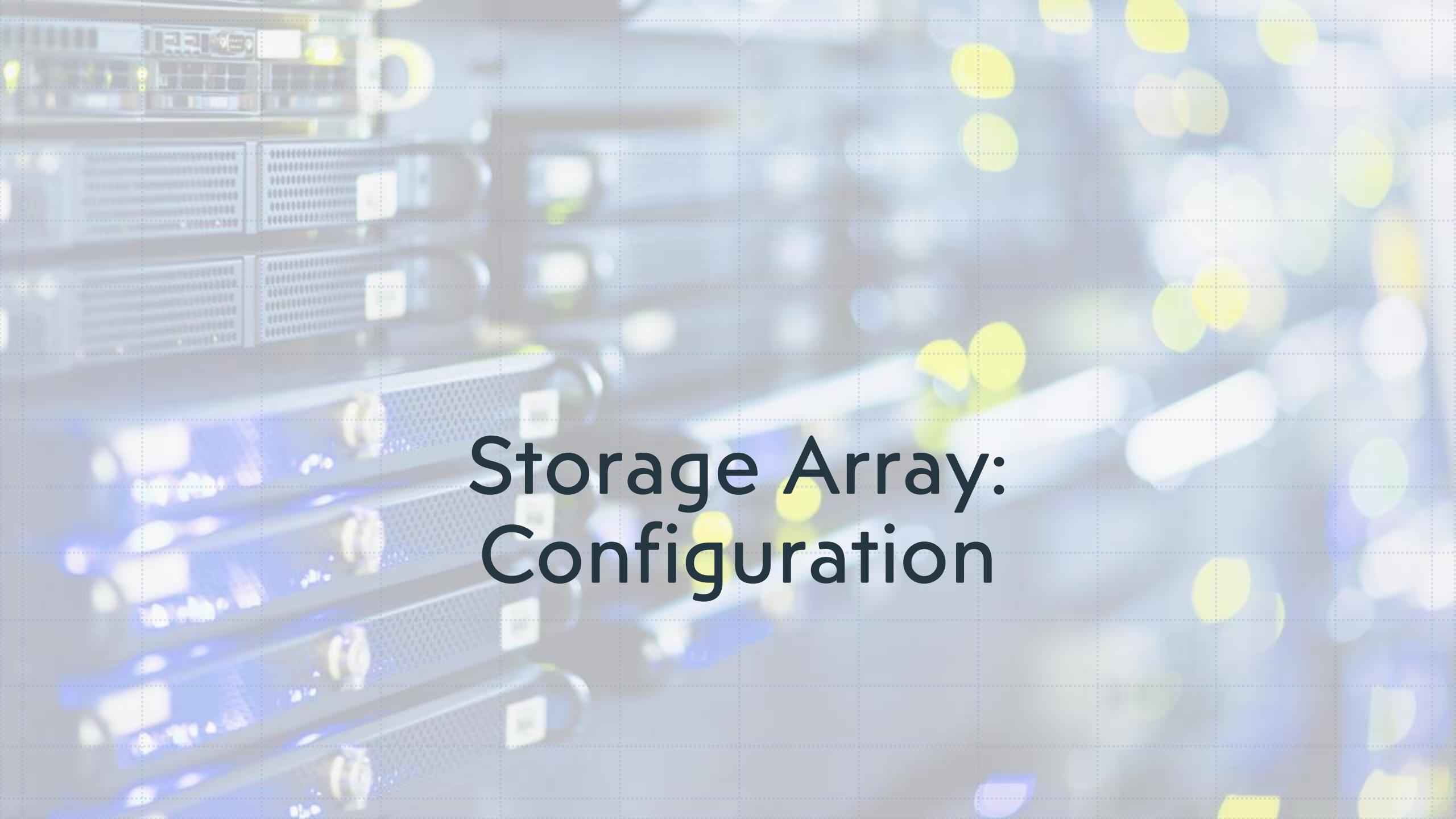


Storage Array

Introduction to Storage Array

- A storage array is a high-capacity storage system composed of multiple drives
- It provides shared, reliable, and efficient storage for large networks





Storage Array: Configuration

Setting Up a Storage Array

- Storage arrays are set up and managed through dedicated management software provided by the vendor
- Configuration will vary depending on the specific product and the required setup



Storage Array: Advantages & Disadvantages



Pros & Cons of Storage Array

- Storage arrays provide high-capacity, scalable, and reliable storage, making them ideal for large networks
- However, they can be complex to manage and have a higher cost of entry compared to other solutions



SCSI Device



Understanding SCSI Devices

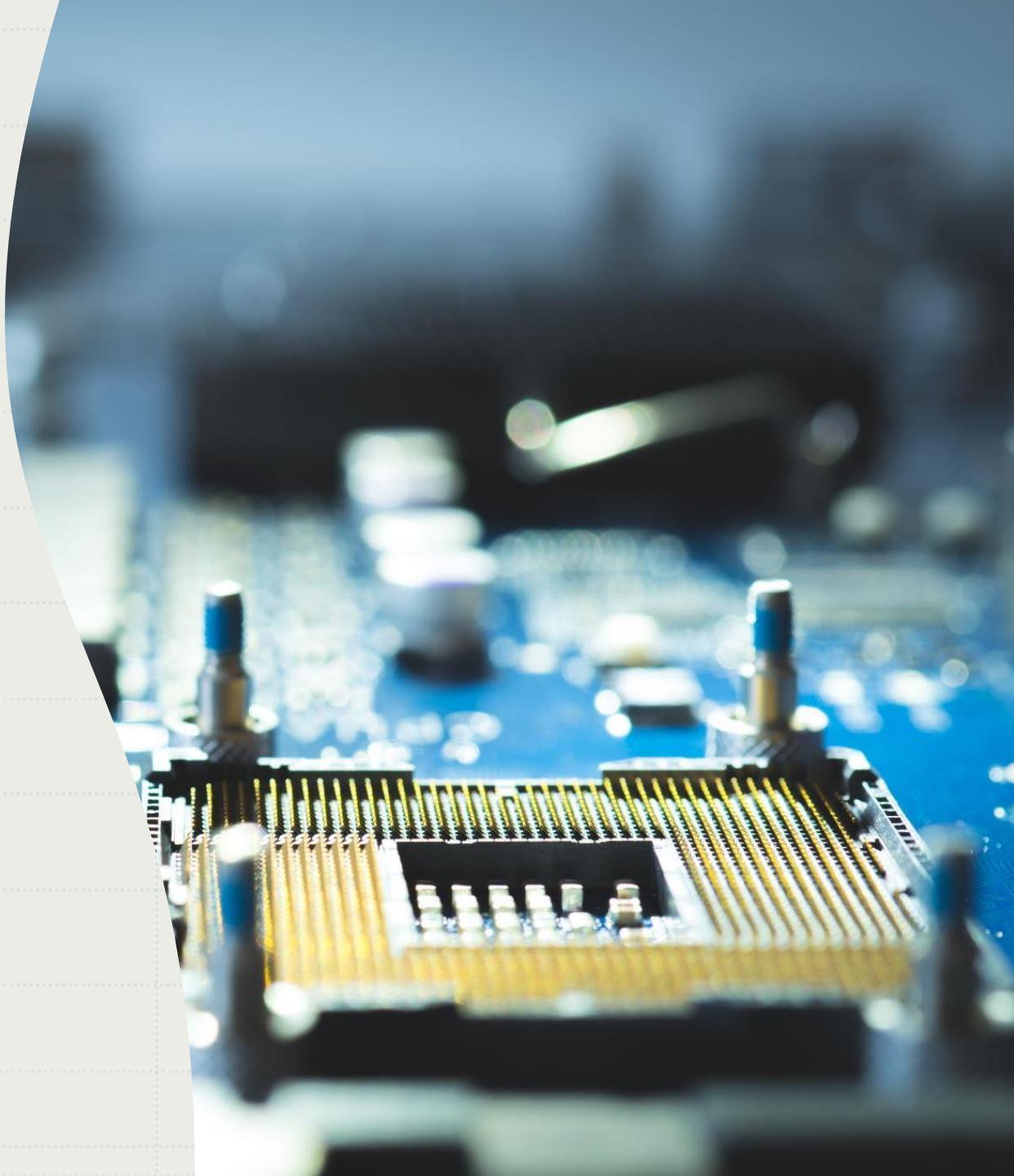
- SCSI is a standard for connecting and transferring data between computers and peripherals
- SCSI devices can include hard drives, tape drives, CD-ROMs, printers, and more



SCSI Device: Configuration

Setting Up a SCSI Device

- Setting up a SCSI device involves connecting the device using a SCSI cable, configuring the SCSI ID, and possibly terminating the SCSI chain, depending on the type of SCSI used

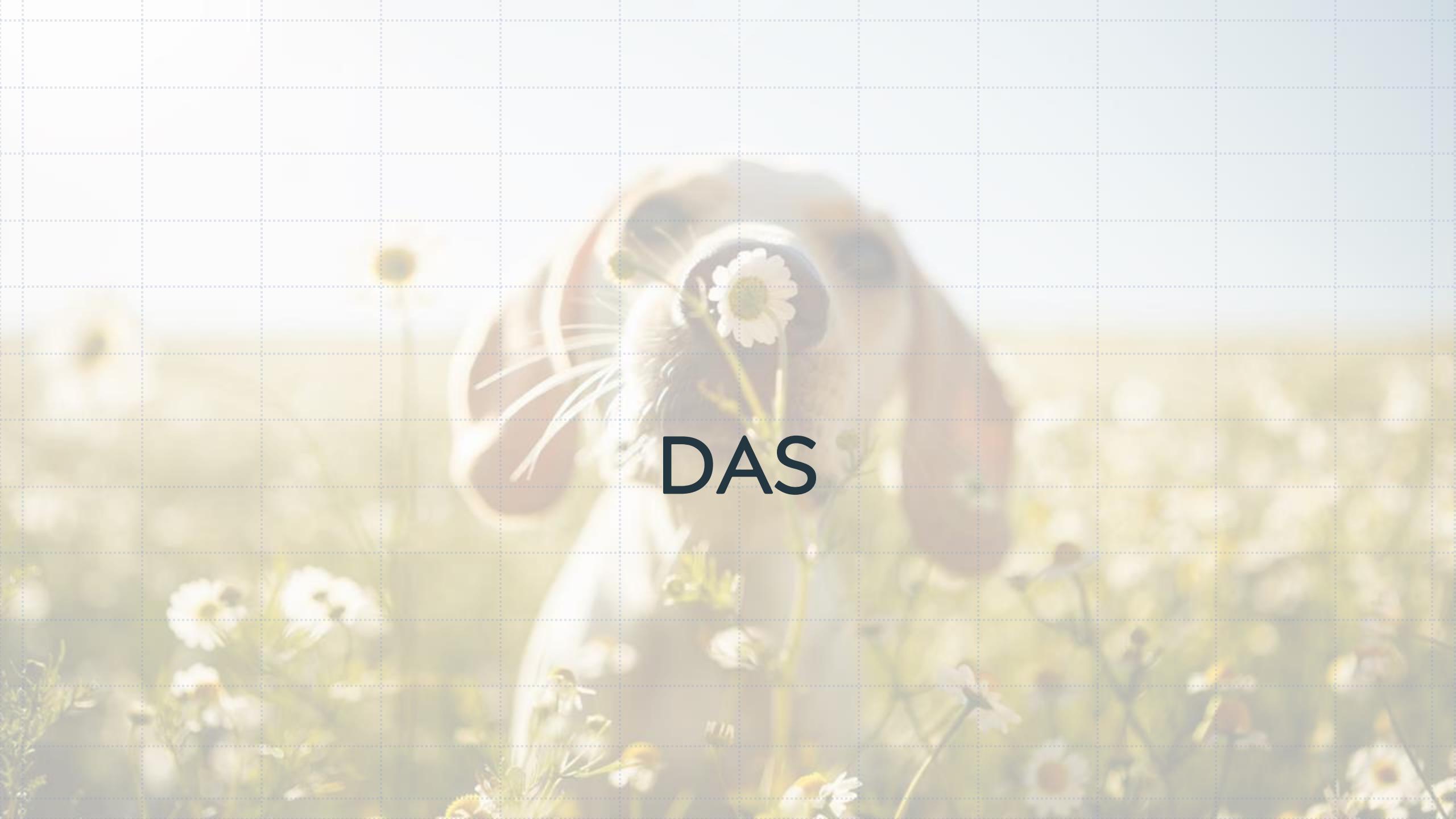


SCSI Device: Advantages & Disadvantages

Pros & Cons of SCSI Devices

- SCSI devices are fast and reliable, and they allow for multiple devices to be connected to one SCSI port
- However, they can be more expensive and more complex to set up than other types of devices





DAS

Introduction to DAS

- DAS stands for Direct Attached Storage
- It is a digital storage system directly attached to a server or workstation, without a network in between



DAS: Configuration



Setting Up DAS

- DAS is typically set up through a physical connection to the server or workstation
- This might be through a USB, FireWire, or Thunderbolt connection, or it might involve installing a drive internally



DAS: Advantages & Disadvantages

Pros & Cons of DAS

- DAS offers fast data transfer but has limited scalability and sharing capabilities since the storage is tied to one machine



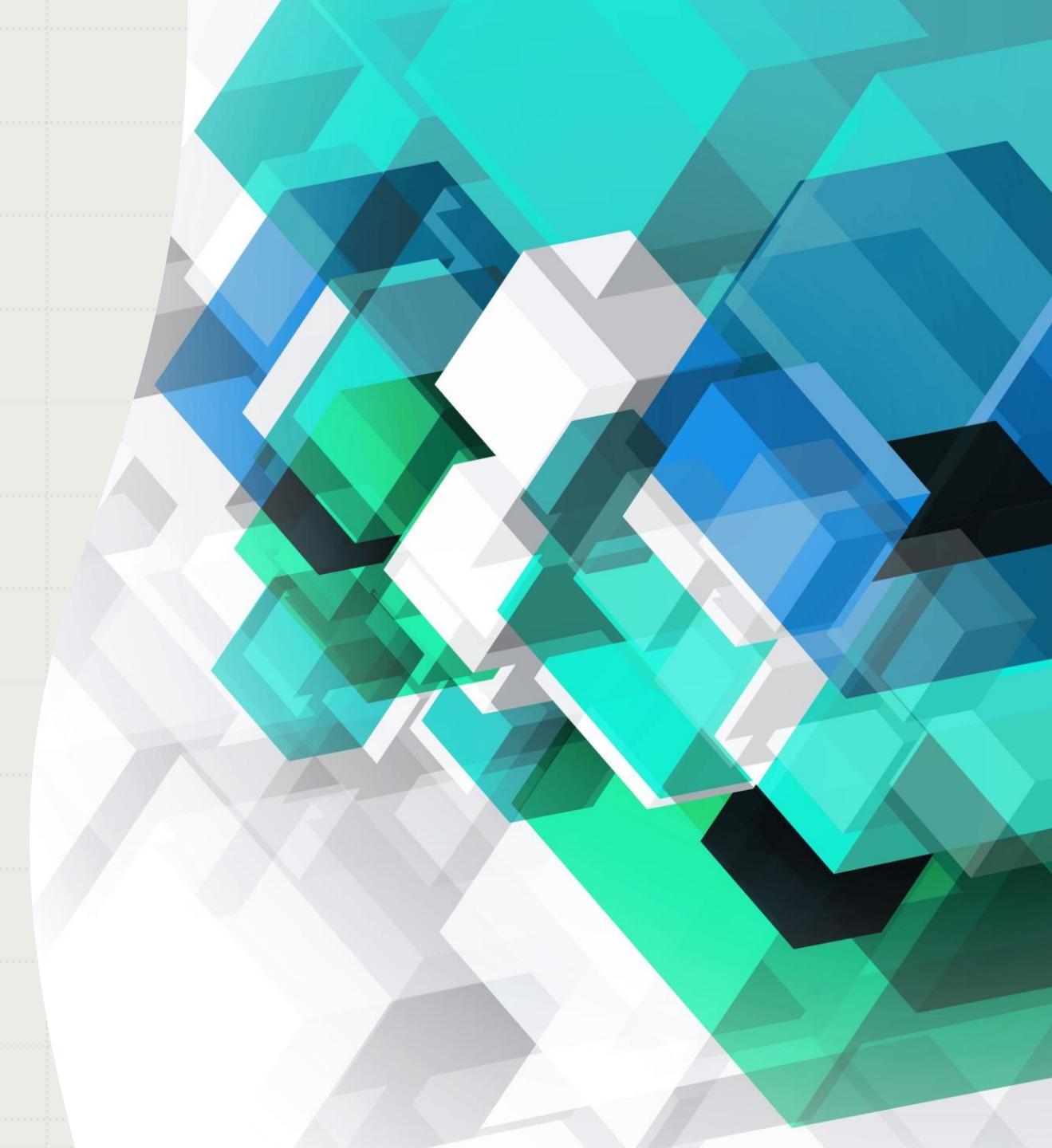
NAS

Understanding NAS

- NAS stands for Network Attached Storage
- It is a dedicated device connected to a network that provides data access to a heterogeneous group of clients



NAS: Configuration



Setting Up NAS

- NAS is typically configured through a web-based interface, where you can set up user accounts, permissions, and other settings

The image shows a close-up of a person's hand pointing their index finger towards a computer monitor. The monitor displays a dark-themed code editor with Python script content. The hand is positioned such that the tip of the index finger is pointing directly at the screen.

```
mirror_mod = modifier_obj.modifiers[mirror_index]
# Set mirror object to mirror
mirror_mod.mirror_object = mirror_object
if operation == "MIRROR_X":
    mirror_mod.use_x = True
    mirror_mod.use_y = False
    mirror_mod.use_z = False
elif operation == "MIRROR_Y":
    mirror_mod.use_x = False
    mirror_mod.use_y = True
    mirror_mod.use_z = False
elif operation == "MIRROR_Z":
    mirror_mod.use_x = False
    mirror_mod.use_y = False
    mirror_mod.use_z = True

# Selection at the end - add
modifier_obj.select = 1
modifier_obj.select = 0
context.scene.objects.active = modifier_obj
bpy.context.selected_objects.append(modifier_obj)
data.objects[one.name].select = 1
print("please select exactly one object")

-- OPERATOR CLASSES -->

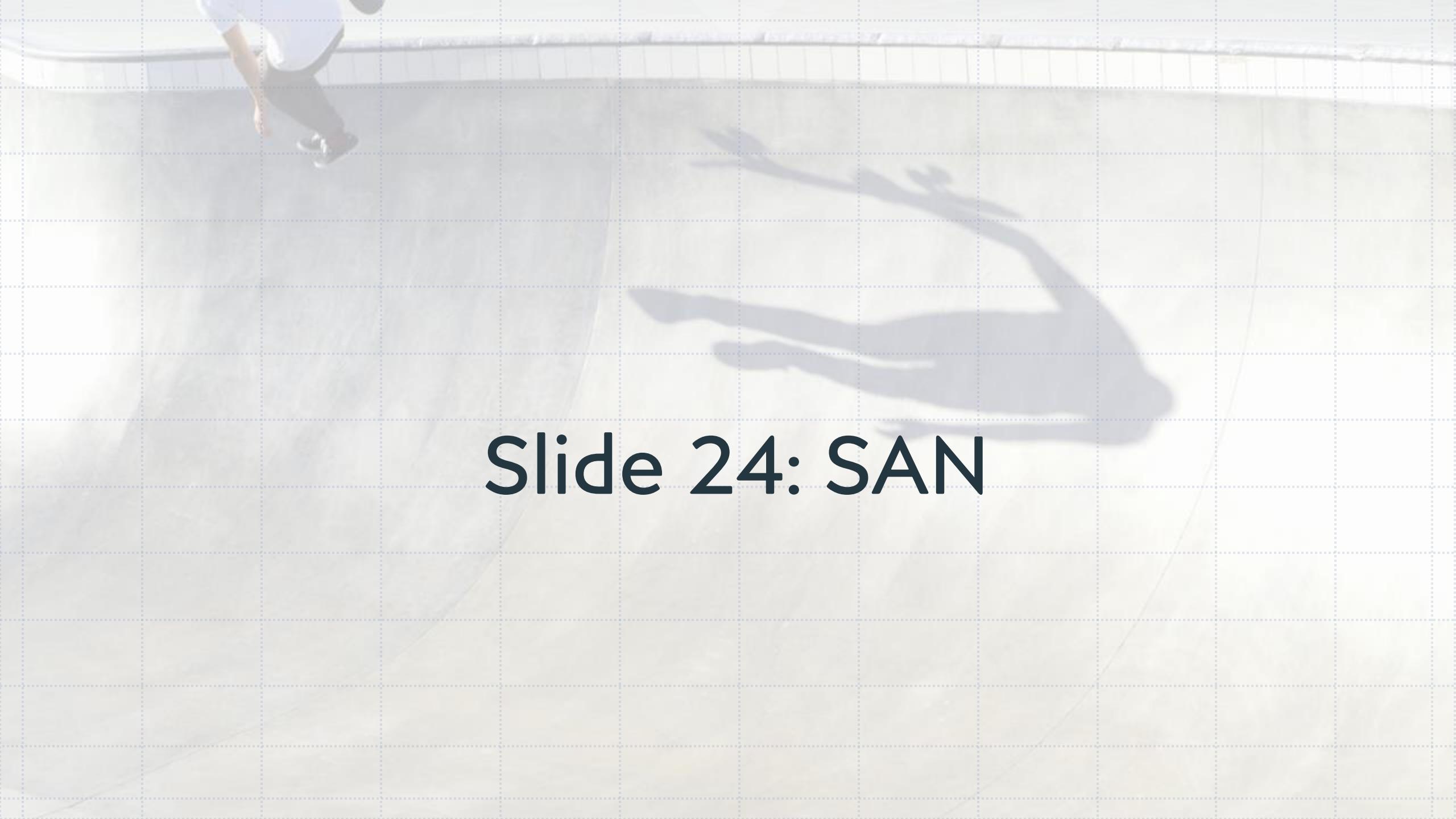
@types.Operator:
def execute(self, context):
    # X mirror to the selected object.mirror_mirror_x
    # or X"
    if context:
        if context.active_object is not None:
```

NAS: Advantages & Disadvantages

Pros & Cons of NAS

- NAS is ideal for small businesses or home users needing centralized, shared data storage
- It is simple to set up and manage, but it may not be suitable for larger networks or high-performance applications due to its lower speed compared to SAN



A blurry, overexposed photograph of a person's lower body walking across a light-colored, possibly wooden or tile, floor. The person is wearing white pants and dark shoes. The image is out of focus and serves as a background for the text.

Slide 24: SAN

Introduction to SAN

- SAN stands for Storage Area Network
- It is a high-speed network of storage devices that are accessible to multiple servers



SAN: Configuration



Setting Up SAN

- Setting up a SAN involves installing and configuring network switches, connecting storage devices and servers to the switches, and setting up appropriate access controls





SAN: Advantages & Disadvantages

Pros & Cons of SAN

- SANs offer high speed and high capacity, and they can be scaled to accommodate large networks
- However, they are complex to manage and can be costly to implement

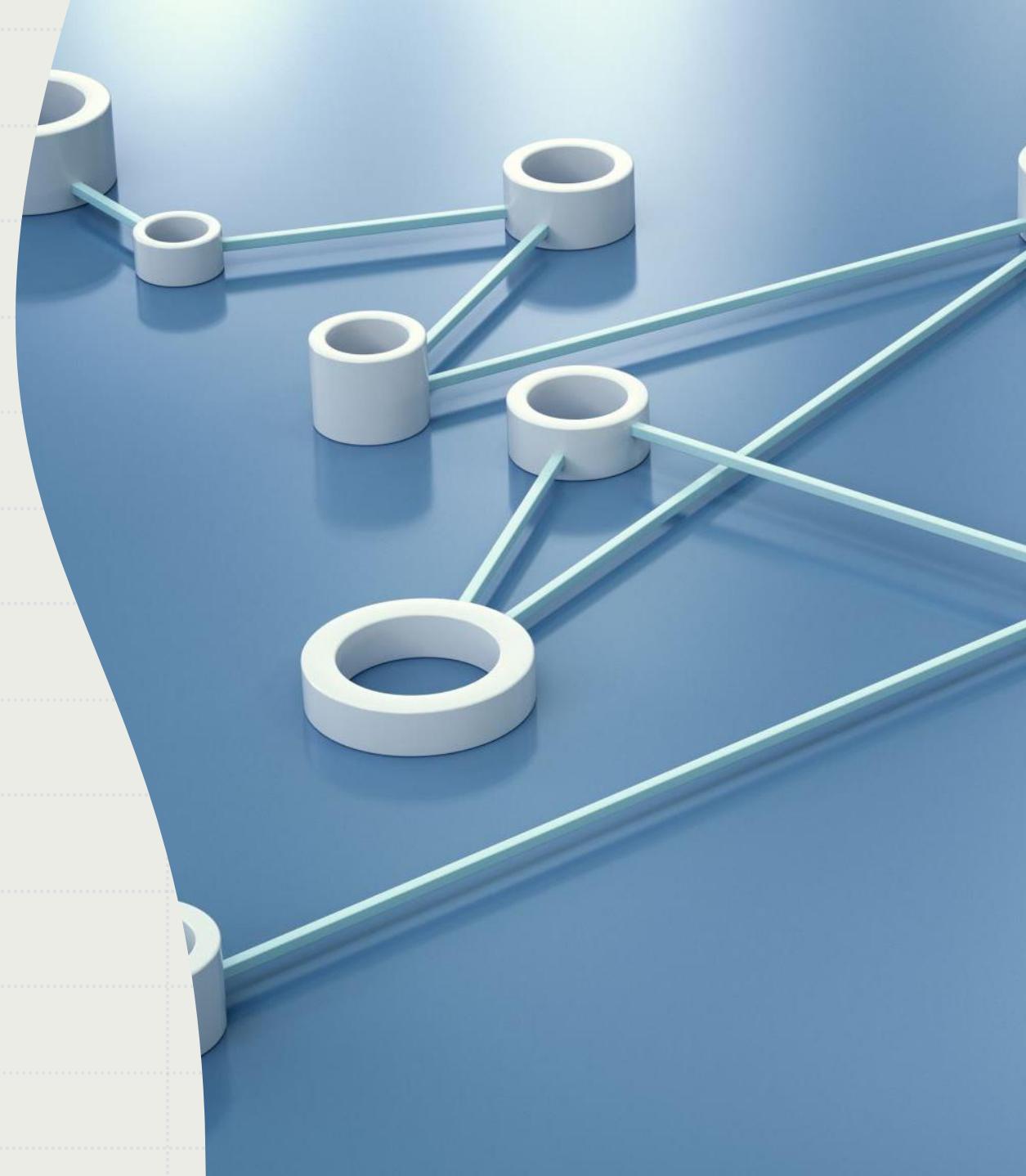




iSCSI

Understanding iSCSI

- iSCSI stands for Internet Small Computer Systems Interface
- It is a network protocol that allows for the transport of block-level data over IP networks



Storage Protocols

Overview of Storage Protocols: iSCSI, FC, NFS

- Storage protocols such as iSCSI, FC , and NFS facilitate data transfer between storage and servers, each with unique features and best use cases





RAID

Understanding RAID

- RAID stands for Redundant Array of Independent Disks
- It combines multiple physical disk drive components into a single logical unit for data redundancy, performance improvement, or both



RAID: Levels and Configurations



Exploring RAID Levels and Their Configuration

- RAID configurations, also known as levels , offer different benefits and trade-offs in terms of data redundancy, performance, and storage efficiency



Storage Access

Introduction to Storage Access

- Storage access refers to the methods by which data in storage systems is accessed and manipulated
- This can include block-level access, file-level access, and object-level access





File Organization

Understanding File Organization

- File organization is the logical arrangement of files on physical storage media
- It determines how data is stored and retrieved, affecting system efficiency



File Organization: Techniques



Techniques for Efficient File Organization

- Different techniques for file organization exist, such as sequential, direct, and indexed file organization
- Each method has its own advantages and trade-offs in terms of speed, efficiency, and complexity





Recap

Recap: Storage Systems Overview

- Review of the various physical storage systems, their configurations, pros and cons, and suitable use-cases



Conclusion

signature

Final Thoughts: The Future of Storage Systems

- As data demands continue to grow, future trends in storage systems involve developing more efficient, robust, and scalable storage solutions
- Technologies like cloud storage, AI-driven storage management, and NVMe over Fabrics are paving the way

