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PID=1

systemd's





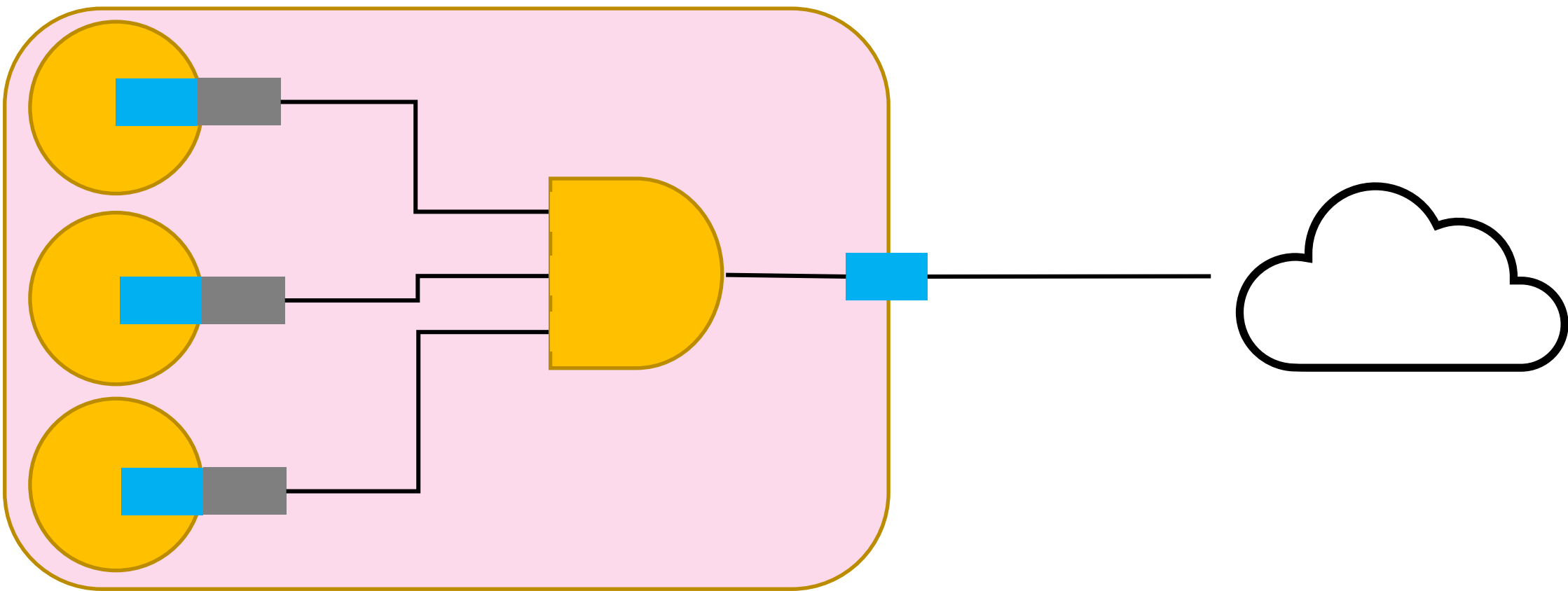






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- 
- 
- **files**
 - **mdns4_minimal**
 - **[NOTFOUND=return]**

 - **dns**
 - **mdns4**
- 





- Now apply the configuration to enable the bridge:

```
sudo netplan apply
```

- The new bridge interface should now be up and running. The `brctl` provides useful information about the state of the bridge, controls which interfaces are part of the bridge, etc.

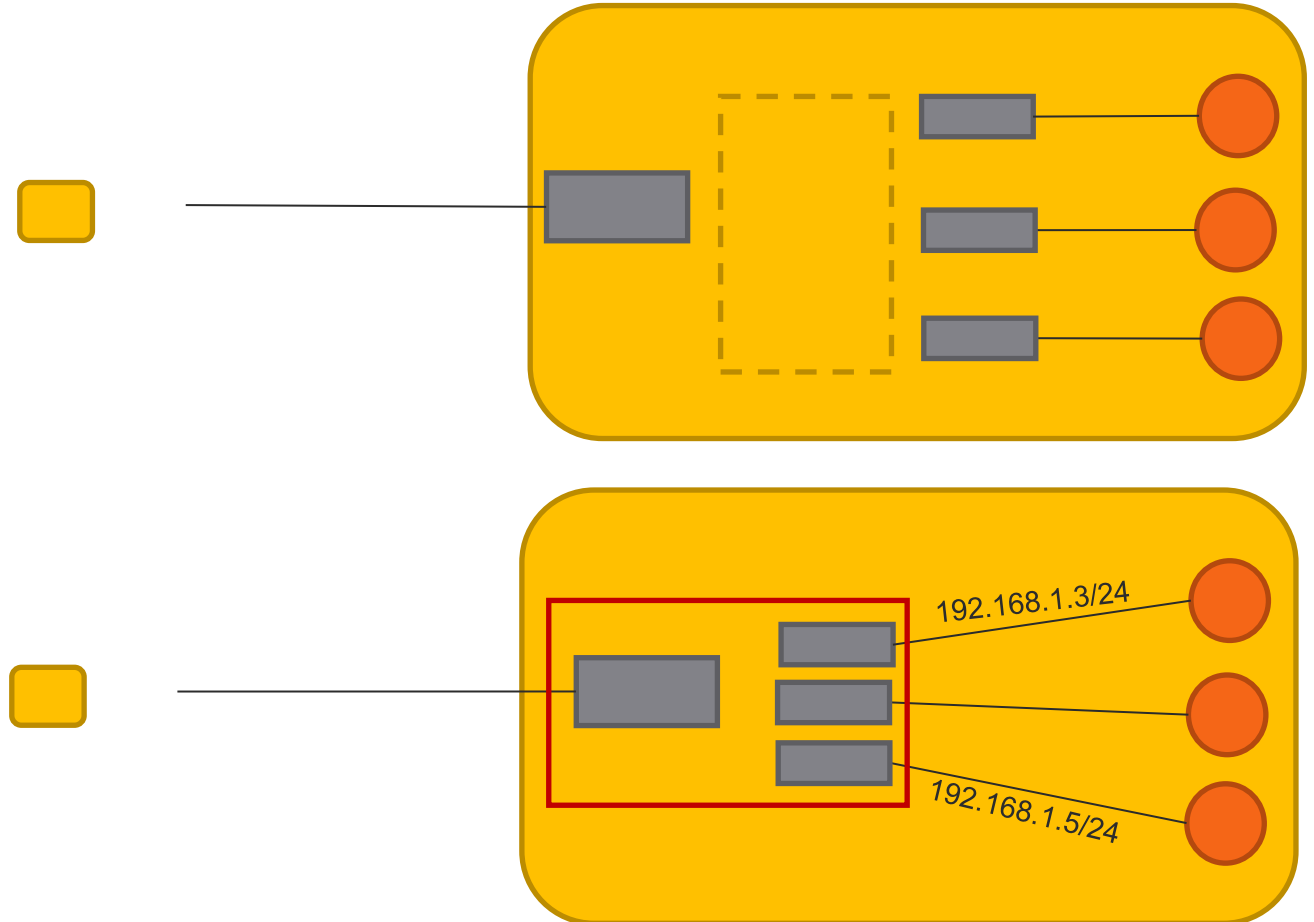
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Networking – Bridging (cont.)

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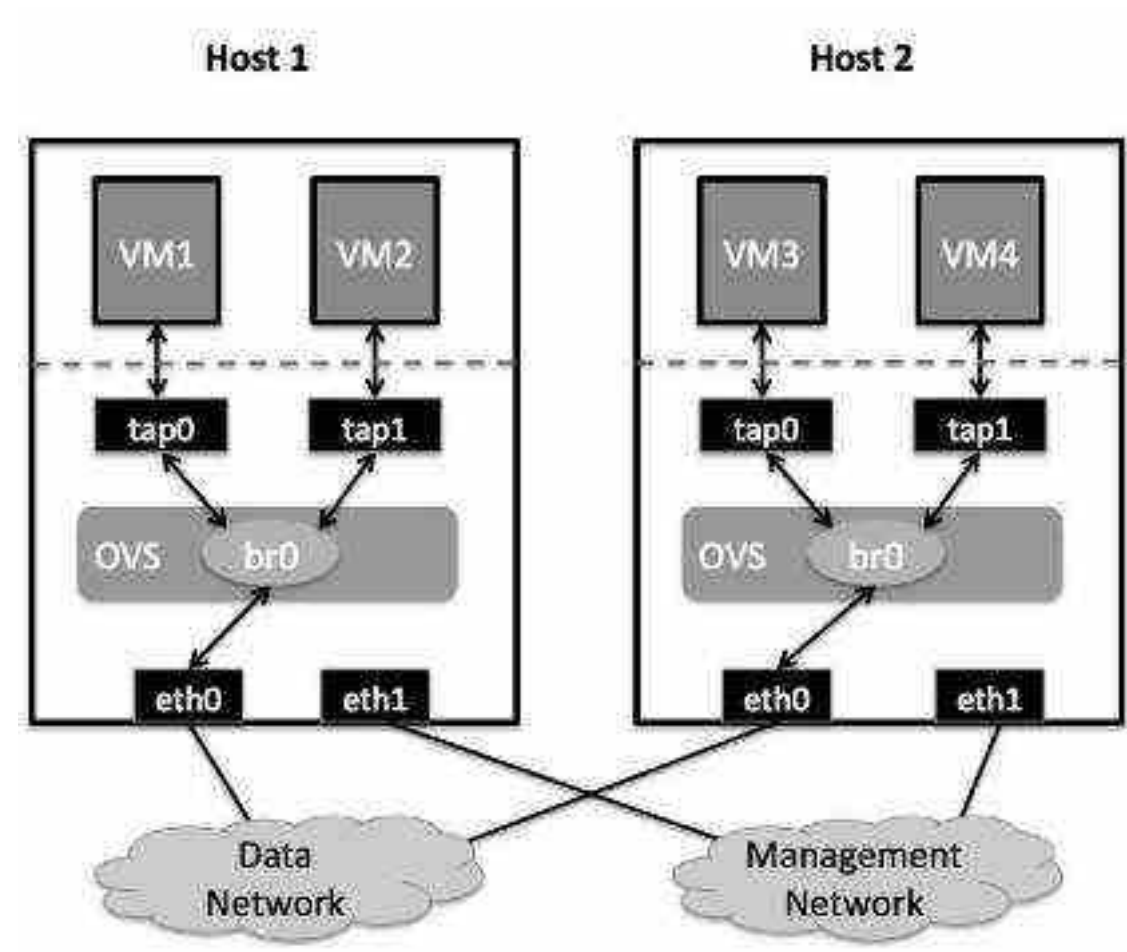
➤ utility provide ubuntu 's legacy bridging that can be installed using the following command.

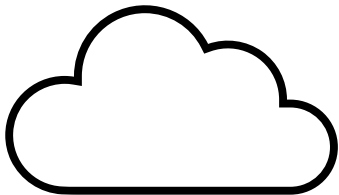
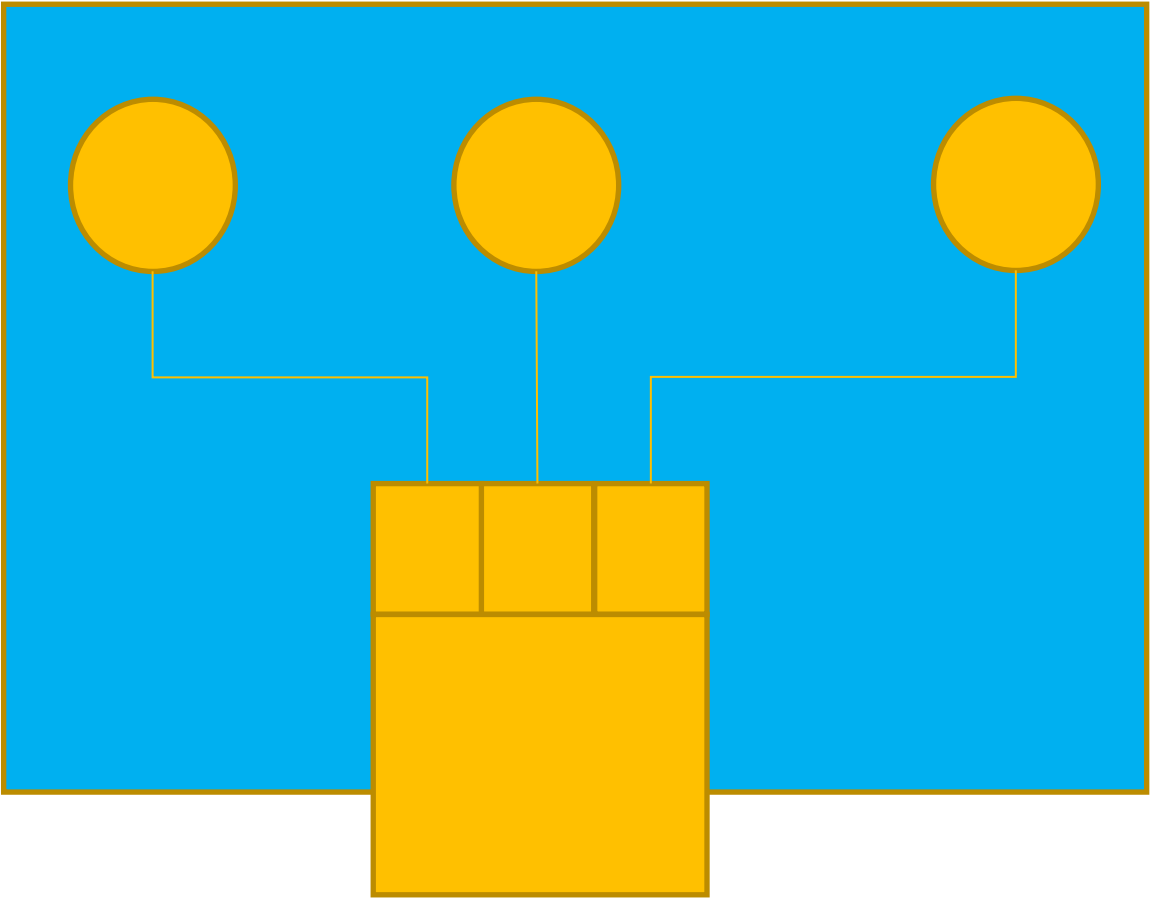
➤ creating a new bridge device, we'll create





servers similar to VMware's
Cisco's Nexus 1000V.



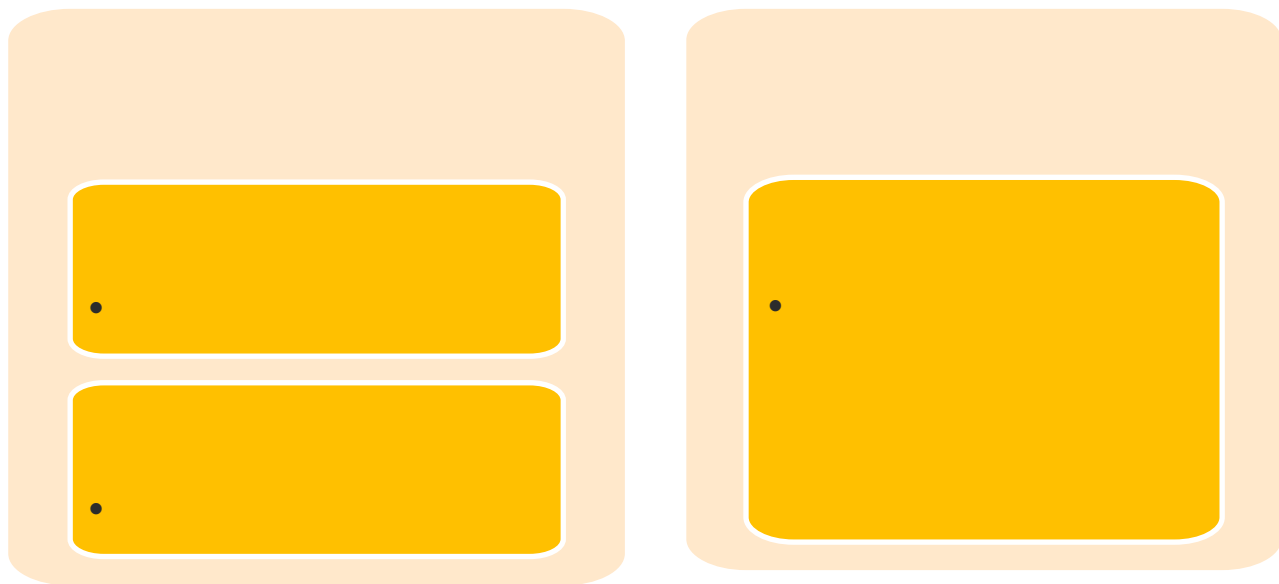


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Week # 4

User Management

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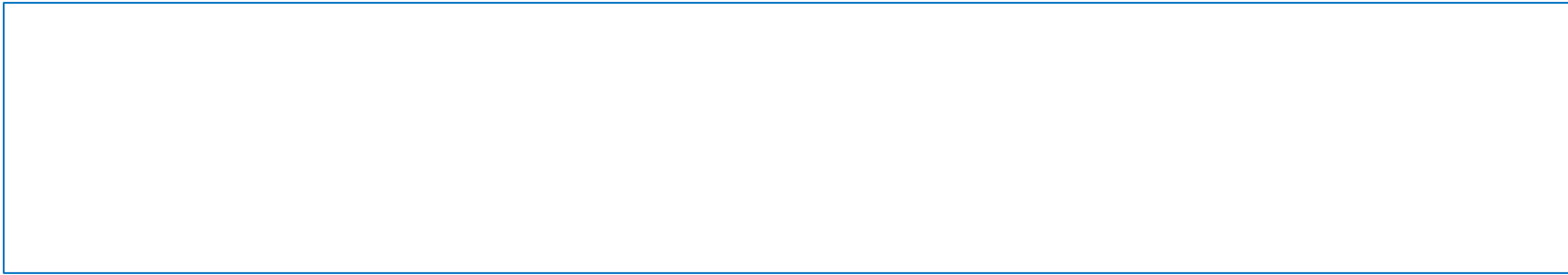


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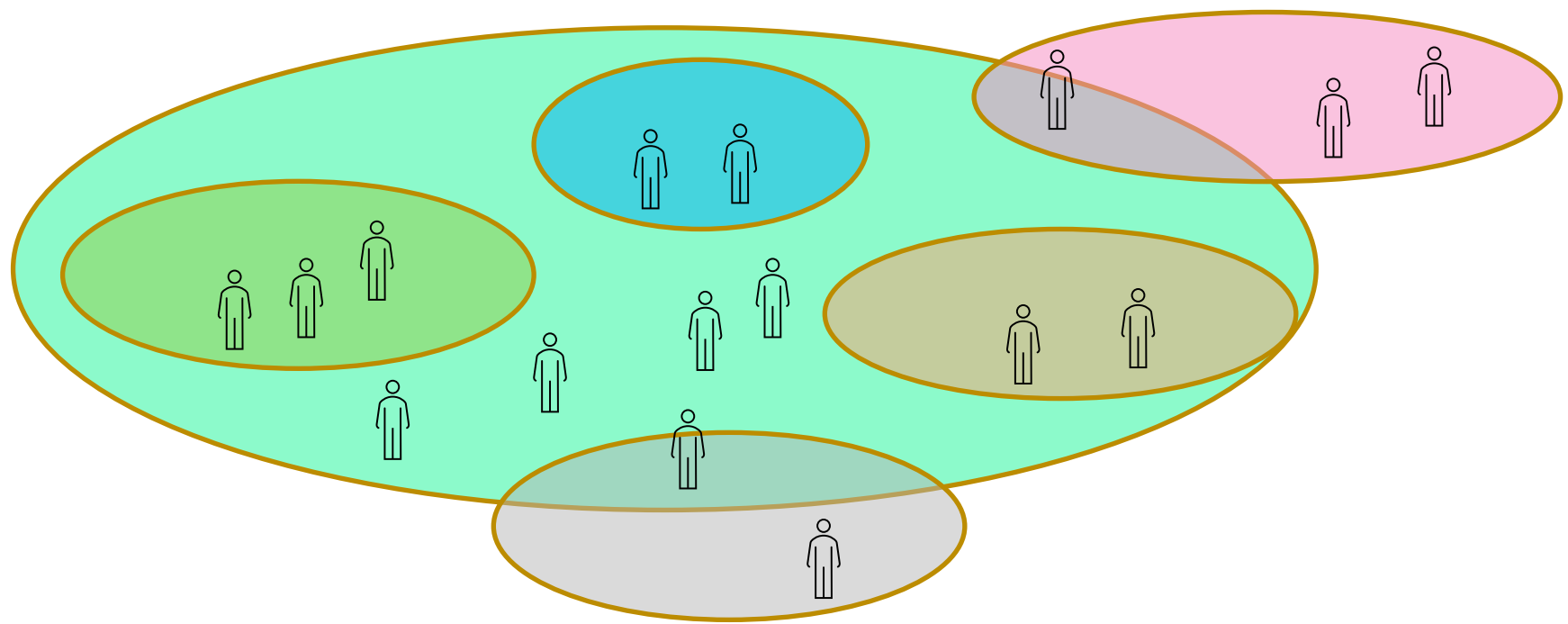
Add/Remove User

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Lock/Unlock User





- Every user is a member of at least one group. This first group is called the user's primary group. Any additional groups a user is a member of are called the user's secondary groups.
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- When a user creates a file, the user's primary group membership is used for the group ownership of the





Group	Description
root	This group account is reserved for the system administrator. Do not add a regular user to this group because it will provide the regular user with elevated access to system files.
adm	Members of this group typically have access to files related to system monitoring (such as log files). Being able to see the contents of these files can provide more information about the system than a regular user would typically have.
lp	This is one of many groups (including tty, mail, and cdrom) used by the operating system to provide access to specific files. Typically, regular users are not added to these groups because they are used by background processes called daemons.
sudo	This group is used in conjunction with the sudo command.
staff	A default group that was traditionally used on Unix systems but is rarely used in modern Linux distributions.
users	A default group that is rarely used in modern Linux distributions.
operators	A group that was traditionally used on Unix systems for users who required elevated privileges for specific system tasks. This group is rarely used in modern Linux distributions.



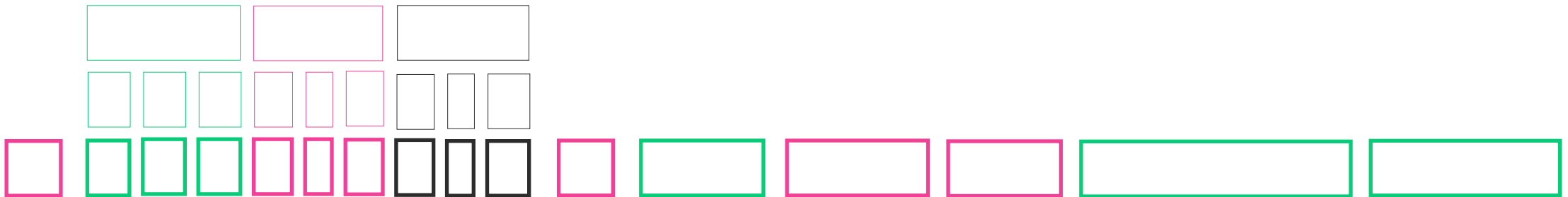
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User Level Security

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adduser

- -
-
- This means that all users can browse and access the contents of other user's home directories.
-





DIR_MODE=0750





Last password change : Jan 20, 2015
Password expires : never
Password inactive : never
Account expires : never
Minimum number of days between password change : 0
Maximum number of days between password change : 99999
Number of days of warning before password expires : 7





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< End >

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Remote Administration

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- OpenSSH is a freely available version of the Secure Shell (SSH) protocol family of tools for remotely controlling, or transferring files between, computers.
- Traditional tools used to accomplish these functions, such as telnet or rcp, are insecure and transmit the user's password in cleartext when used.
- OpenSSH provides a server daemon and client tools to facilitate secure, encrypted remote control and file transfer operations, effectively replacing the legacy tools.





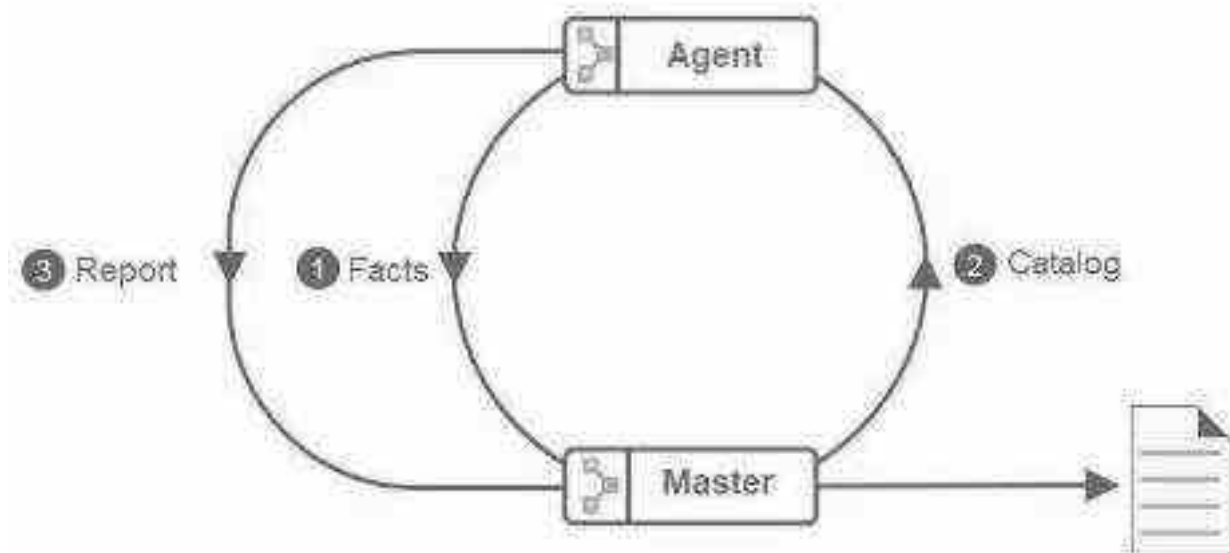






➤ Puppet is great not only during the initial installation of a system, but also throughout the system's entire











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Integrated

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Opensource

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Configuration

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Advantage

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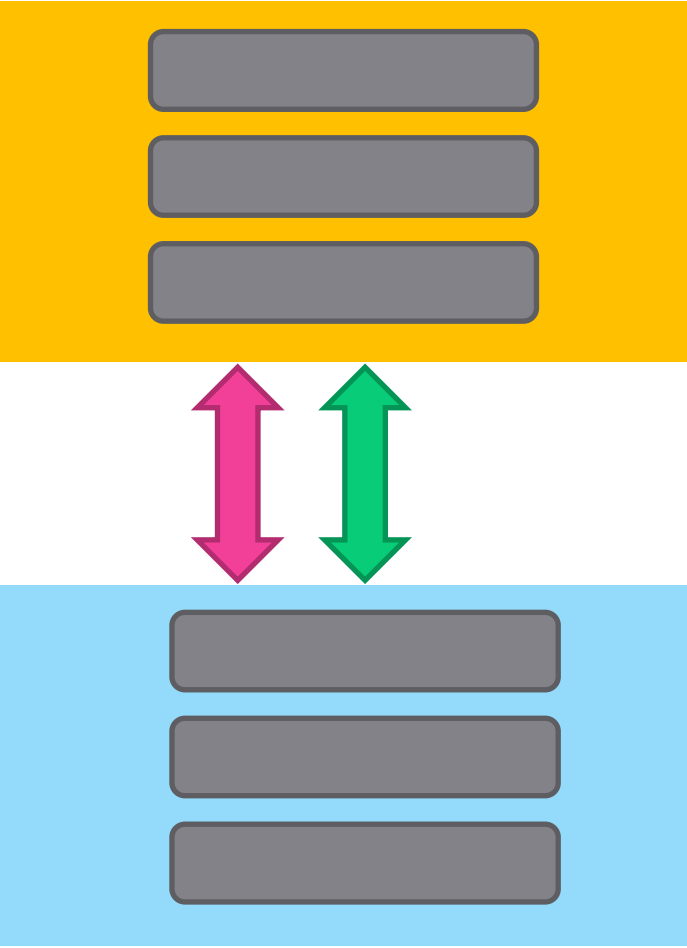




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Logging

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The ring buffer is a circular buffer that is

the first datastructure storing log messages when the system boots up.

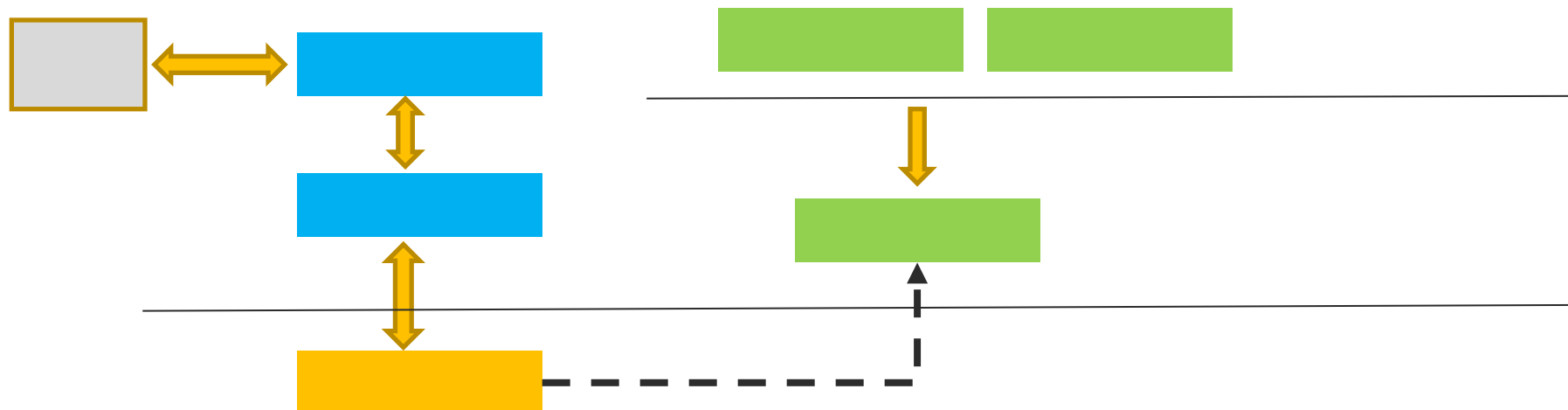
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use the “ ” command.



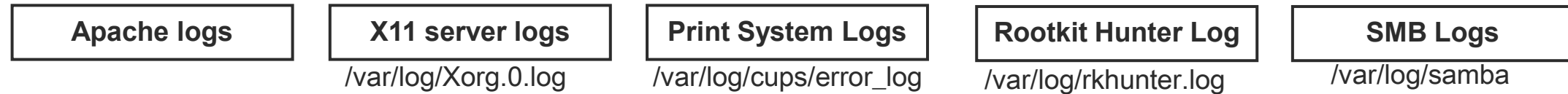
Log files locations



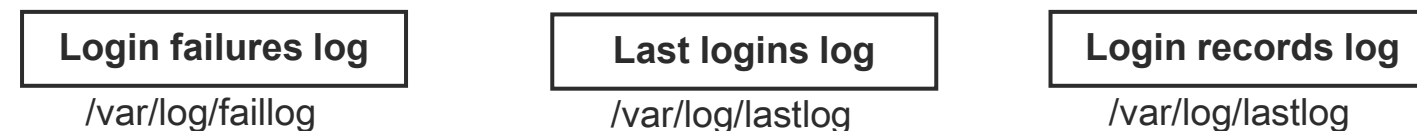
➤ System logs



➤ Application logs



➤ Non-human-readable logs





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search term in the file. For example, to search for lines containing “test” in file.txt, you would run `grep "test" file.txt`.

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. It's also used to read files in the



- **missingok** –
- **notifempty** –
- **size** –
- **daily** –
- **create** –



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< End >

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Shell Scripts

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➤ Vim is based on the original Vi editor, which was created by Bill Joy in 1976. In the 90's, it started





➤ Insert mode commands

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➤ Command mode commands

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➤ Editing Commands

- ...delete the characters from the cursor position up to the position given by the next command
- c ...change the character from the cursor position up to the position indicated by the next command.
- y ...copy the characters from the current cursor position up to the position indicated by the next command.
- p ...paste previous deleted or yanked (copied) text after the current cursor position

➤ Undo and Redo

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➤ Searching and Replacing

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➤ Save the file

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“Hello Virtual University Student, What is your student ”

“WELCOME !, \$VUID”



Variables

- **Variable Names**
- **Defining Variables**
- **Accessing Values**
- **Read-only Variables**
- **Unsetting Variables**
- **Variable Types**
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➤ **Basic Syntax**

➤ **For the ksh shell, here is the syntax of array initialization**

➤ **For the bash shell, here is the syntax of array initialization**

➤ **Accessing Array Values**





-eq

-ne

-gt

-lt

-ge

-le



!

-o

-a



=

!=

-z

-n

str



-b file

-c file

-d file

-f file

-g file

-k file

-p file

-t file

-u file

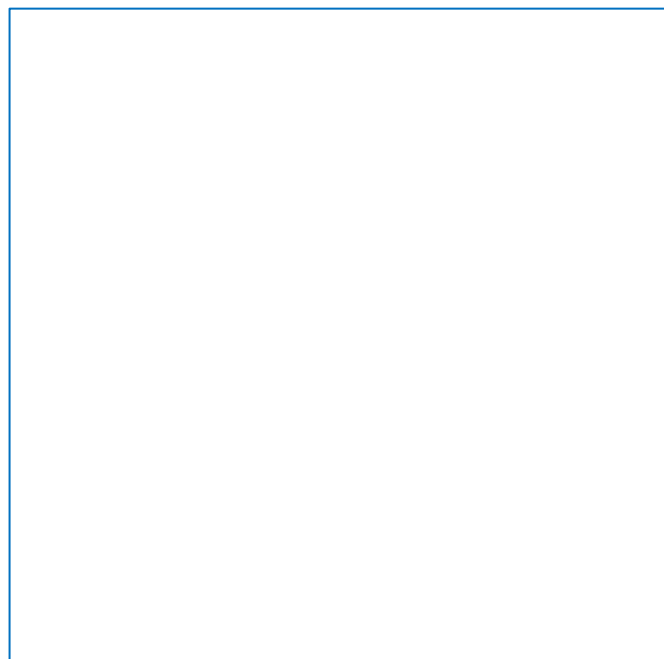
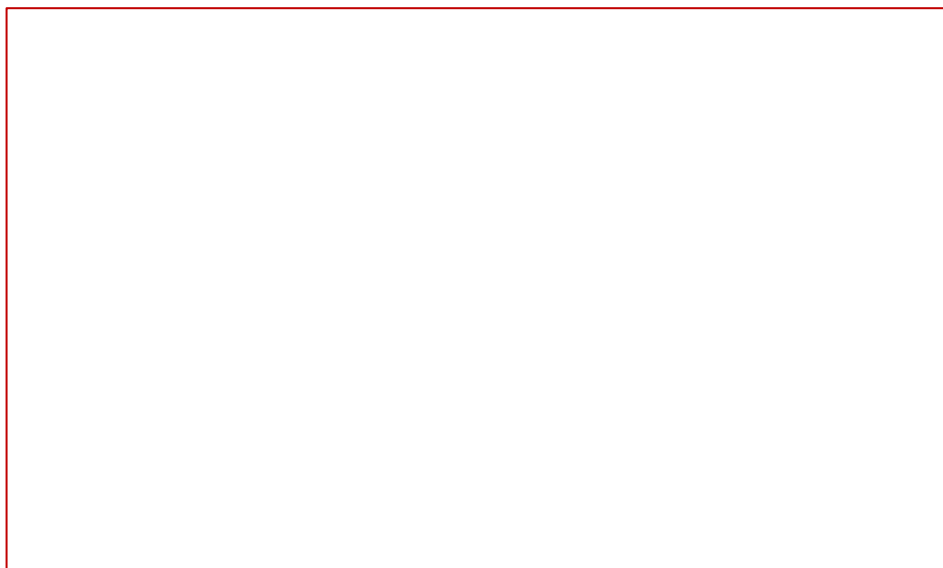
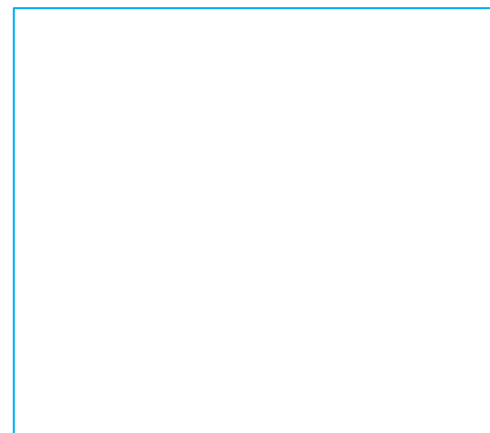
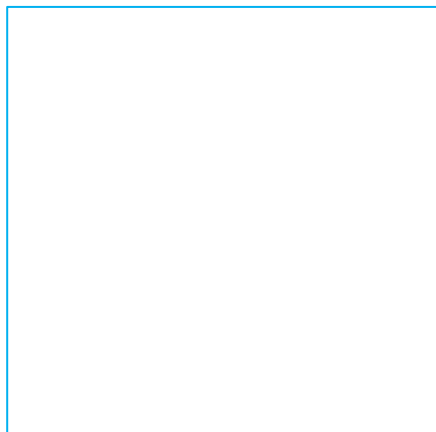
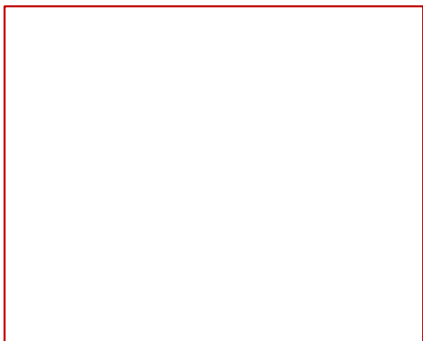
-r file

-w file

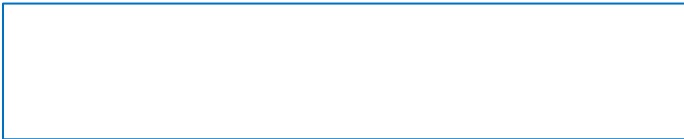
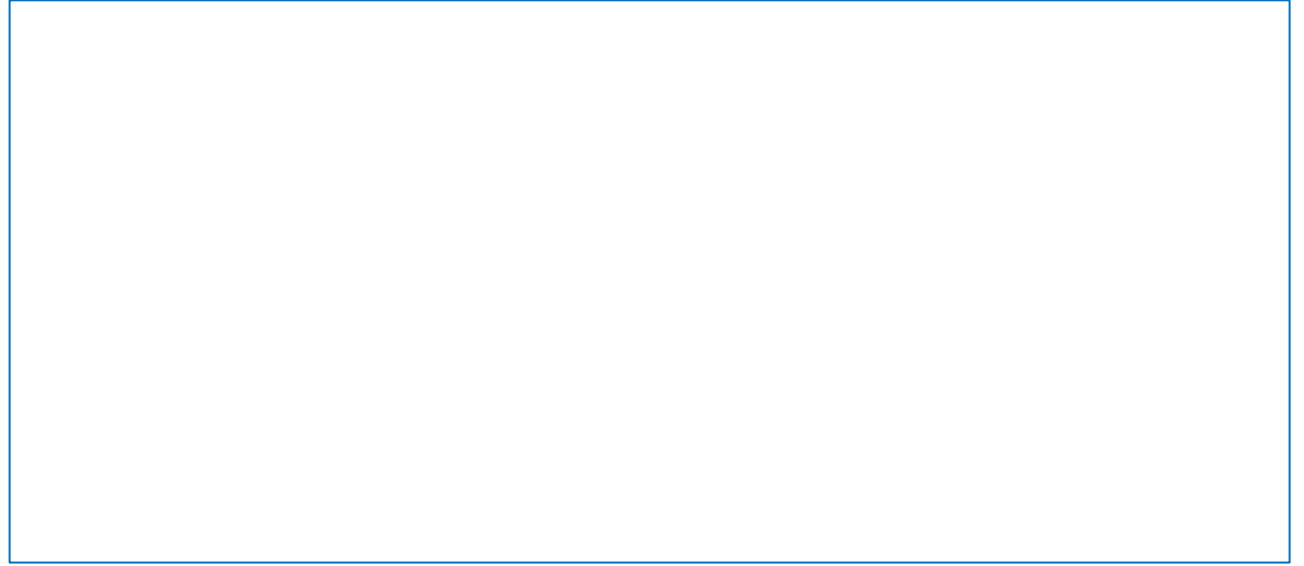
-x file

-s file

-e file



Nesting while Loops



```
//  
la  
lb  
lc  
lf  
ln  
lr  
lt  
lv
```

Creating Functions

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< End >

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Week # 5

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A *server* is a computer machine consisting of.

- **Hardware**



- **Operating System**



- **Software packages**



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There are two main types of server processors:

X86.

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RISC

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CPU

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Clock speed

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Cores

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Memory support

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-

Expand-ability

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Efficient Data Management

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Cost and Power Consumption

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Budget

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Workload

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1- Intel Xeon

2 - AMD Opteron

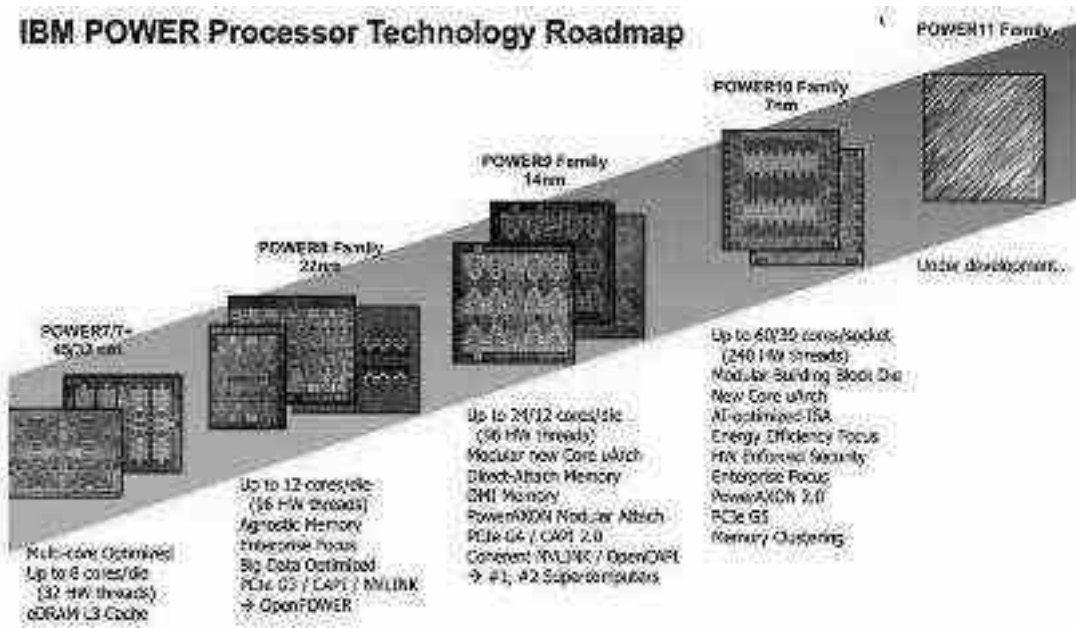
- (a) - 4, 6, 8, or 12 cores @ 1.4 to 3.2 GHz
- (b) - Up to 12 MB L3 cache

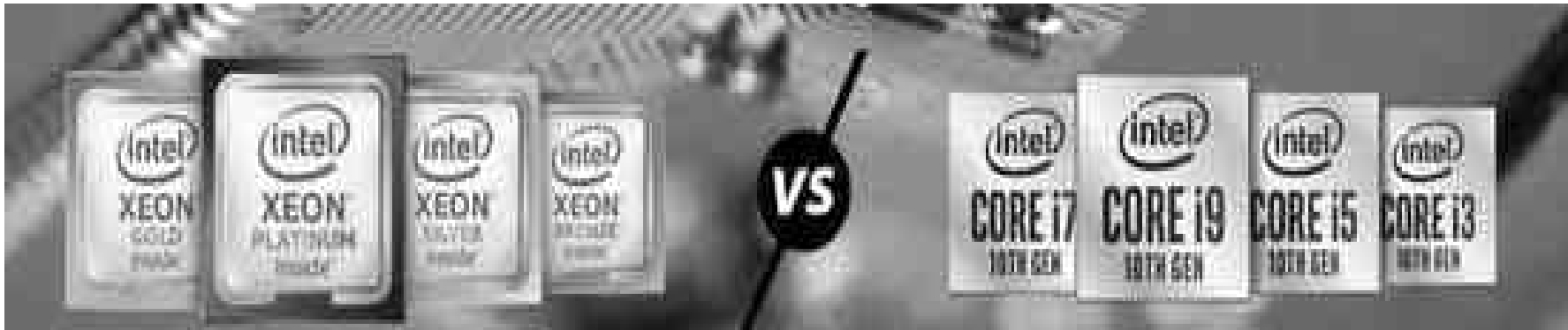
3 - IBM Power 7/8/9/10...

- (a) - 4, 6, or 8 cores with 4 threads each @ 3.0 to 4.25 GHz
- (b) - 4 MB L3 cache per core (up to 32MB for 8-core)

4 - Sun Niagara 3

- (a) - 16 cores with 8 threads each @ 1.67 GHz
- (b) - 6 MB L2 cache





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Intel Processor Families

1) Intel® Xeon® Scalable Processors

1) Intel® Xeon® Max Series

1) Intel® Xeon® W Processor

1) Intel® Xeon® D Processor

1) Intel® Xeon® E Processor

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Server memories are concerned with

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Two Major aspects of server memory are

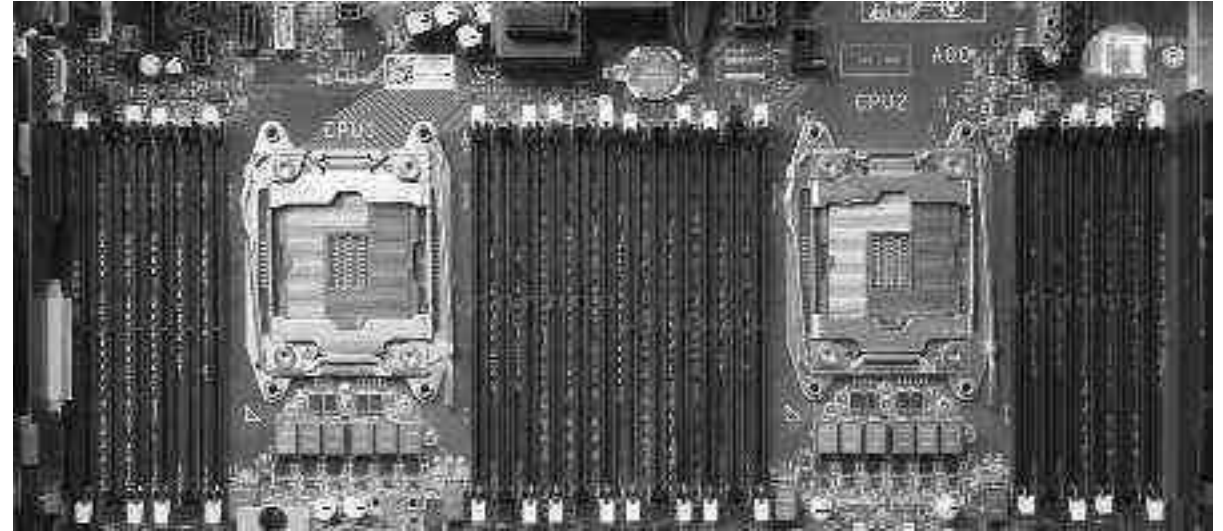
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x86 supports up to 64GB with PAE.

x86-64 supports 1 PB (1024 TB)

Servers need faster RAM than desktops.

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FBDIMM

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UDIMM

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RDIMM

-

LRDIMM

-

SODIMM

MicroDIMM

SDRAM

-

DDR

-

DDR2

—

DDR3

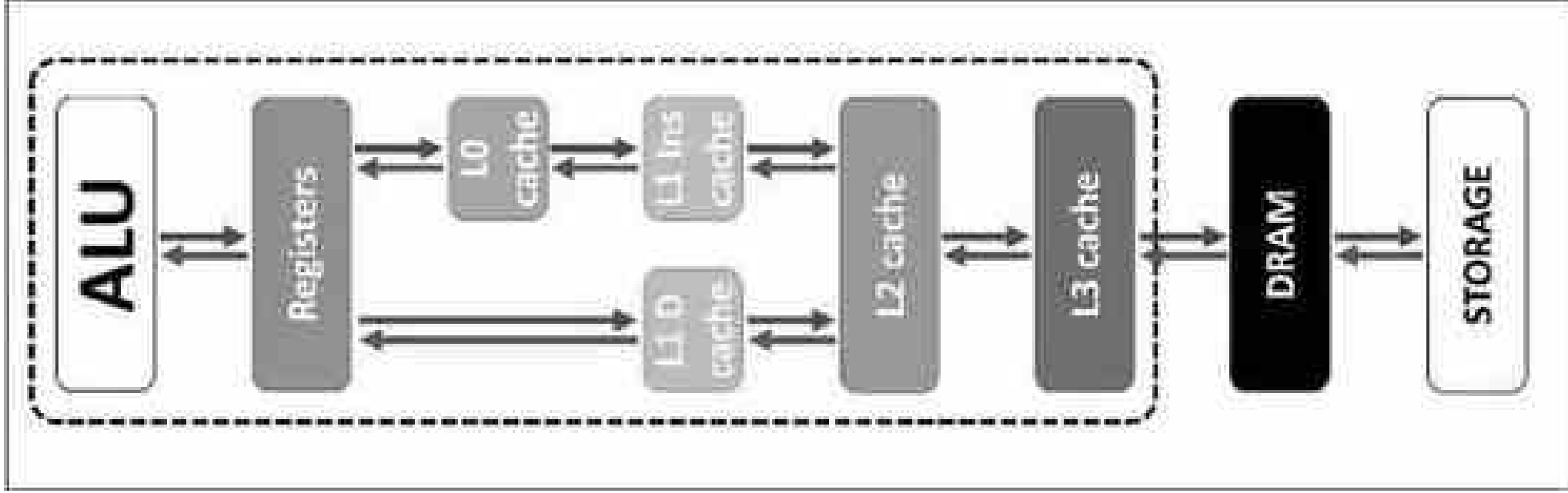
DDR4

DDR SDRAM Standard	Internal rate (MHz)	Bus clock (MHz)	<u>Prefetch</u>	Data rate (MT/s)	Transfer rate (GB/s)	Voltage (V)
SDRAM	100-166	100-166	1n	100-166	0.8-1.3	3.3
DDR	133-200	133-200	2n	266-400	2.1-3.2	2.5/2.6
DDR2	133-200	266-400	4n	533-800	4.2-6.4	1.8
DDR3	133-200	533-800	8n	1066-1600	8.5-14.9	1.35/1.5
DDR4	133-200	1066-1600	8n	2133-3200	17-21.3	1.2

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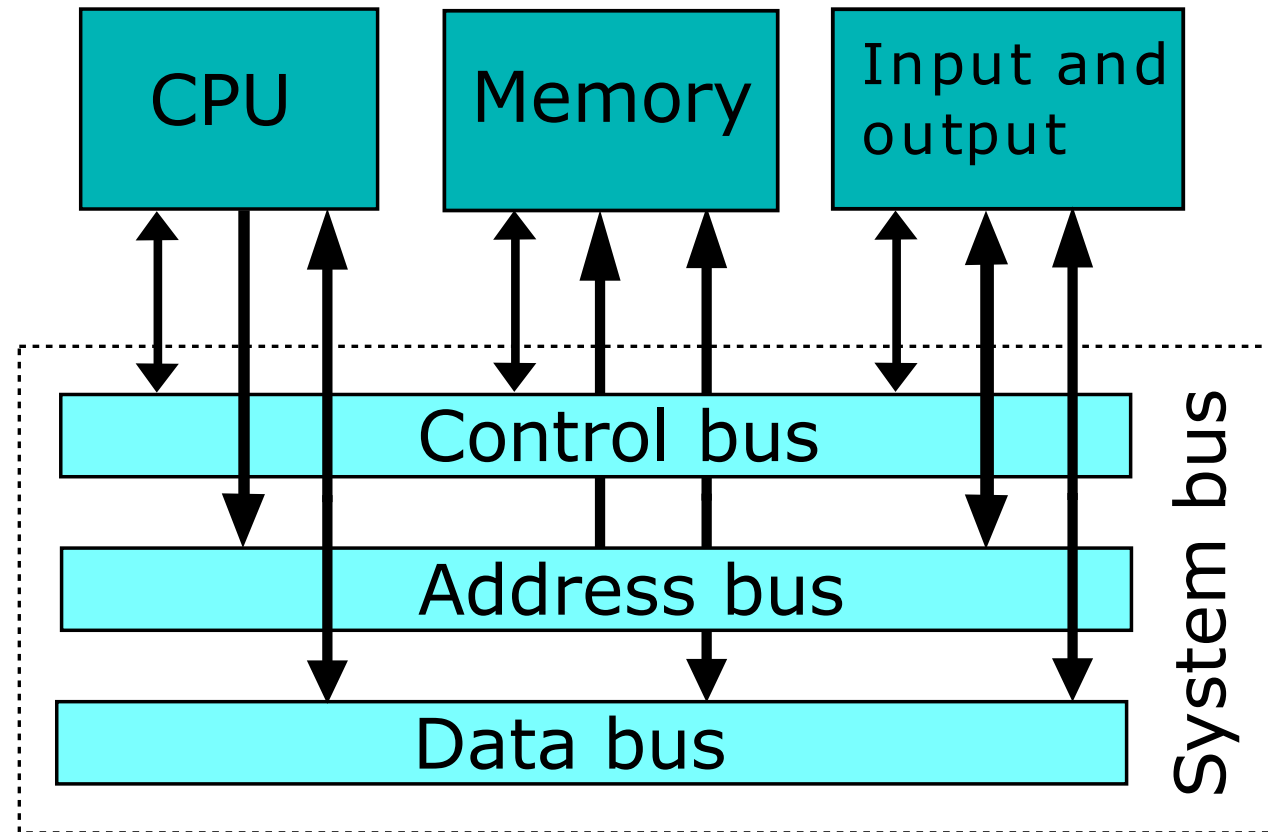
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➤ **Data sharing**

➤ **Addressing**

➤ **Power**

➤ **Timing**



➤ **ISA**

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➤ **MCA -**

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➤ **EISA - Extended Industry Standard Architecture**

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➤ **VESA -**

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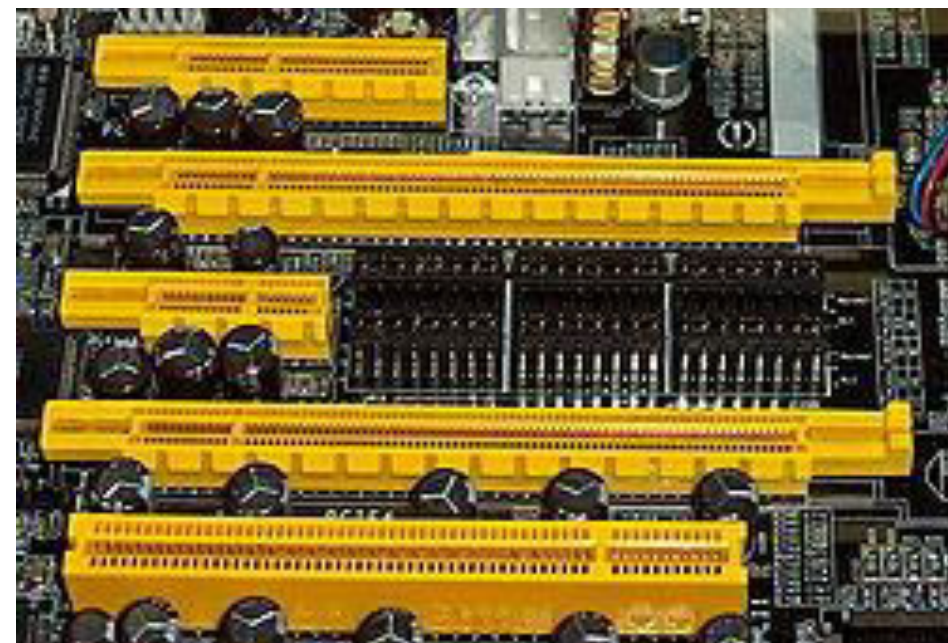
➤ **PCMCIA -**

➤ **AGP -**

➤ **SCSI -**

➤ **Universal Serial Bus (USB)**

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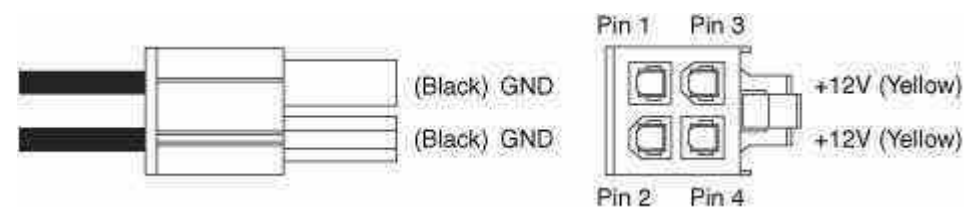
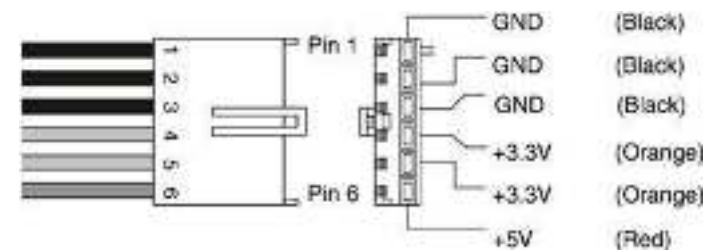
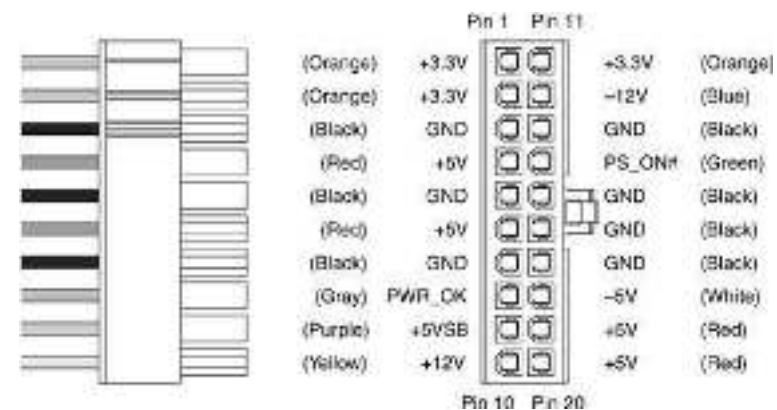


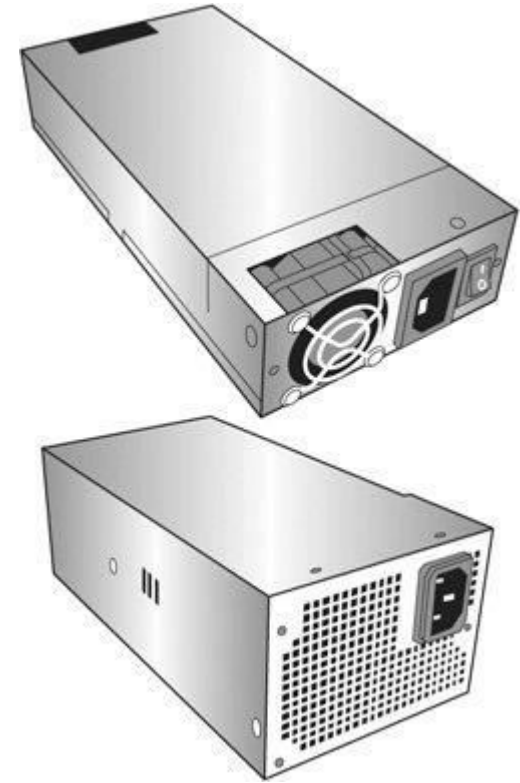
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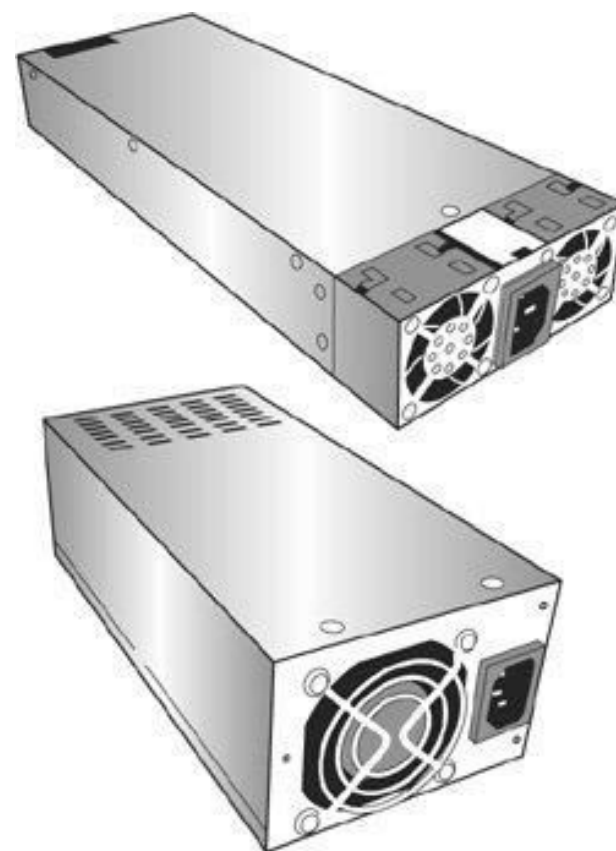
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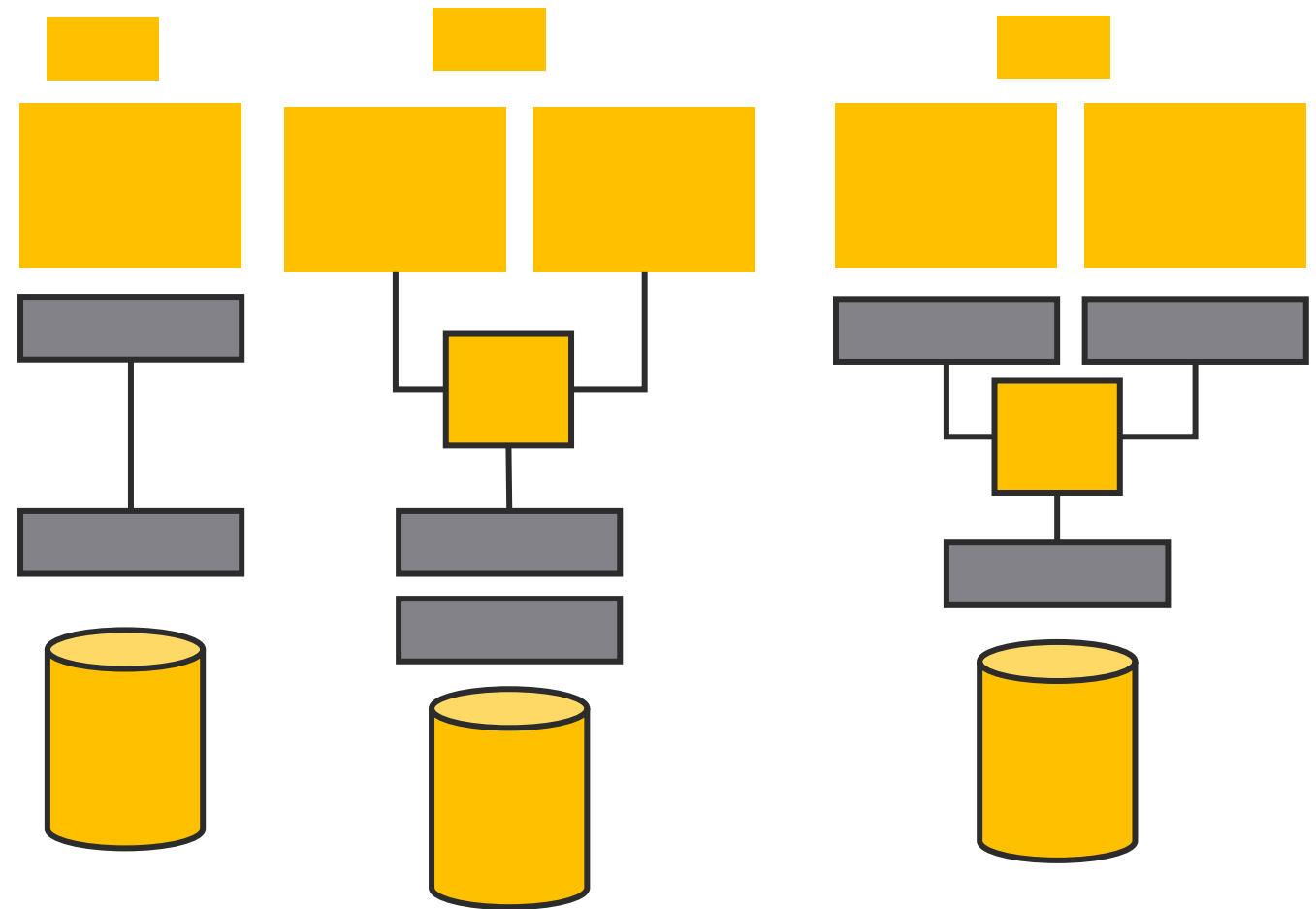
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➤ Direct-attached storage

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➤ Direct-attached storage

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➤ Network-attached storage

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➤ Storage area network

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➤ Cloud Storage

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➤ Hard Disks:

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➤ SSDs

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because they do not have to “seek” the data on the disk, and latency is low

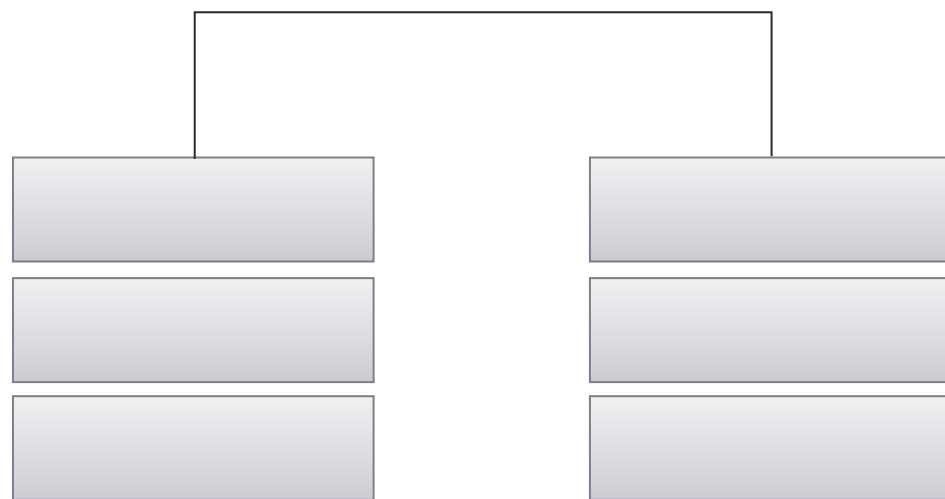
➤ Hard Disks:

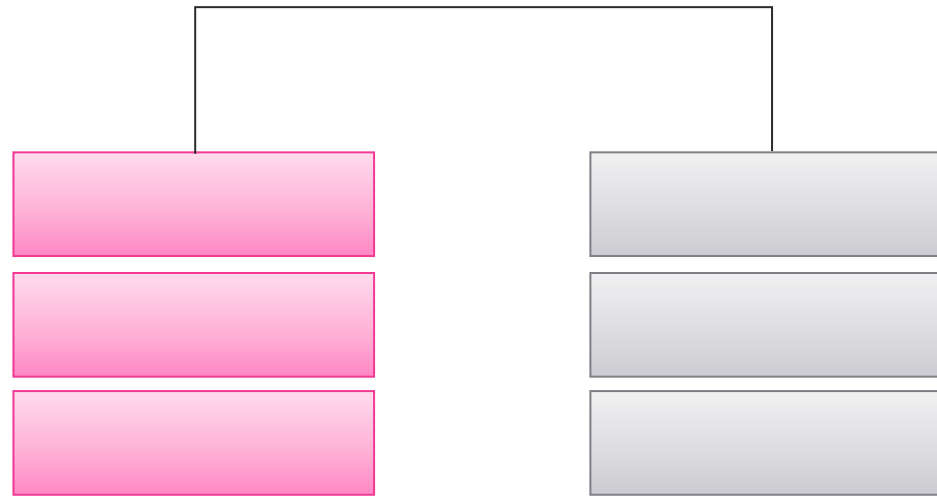


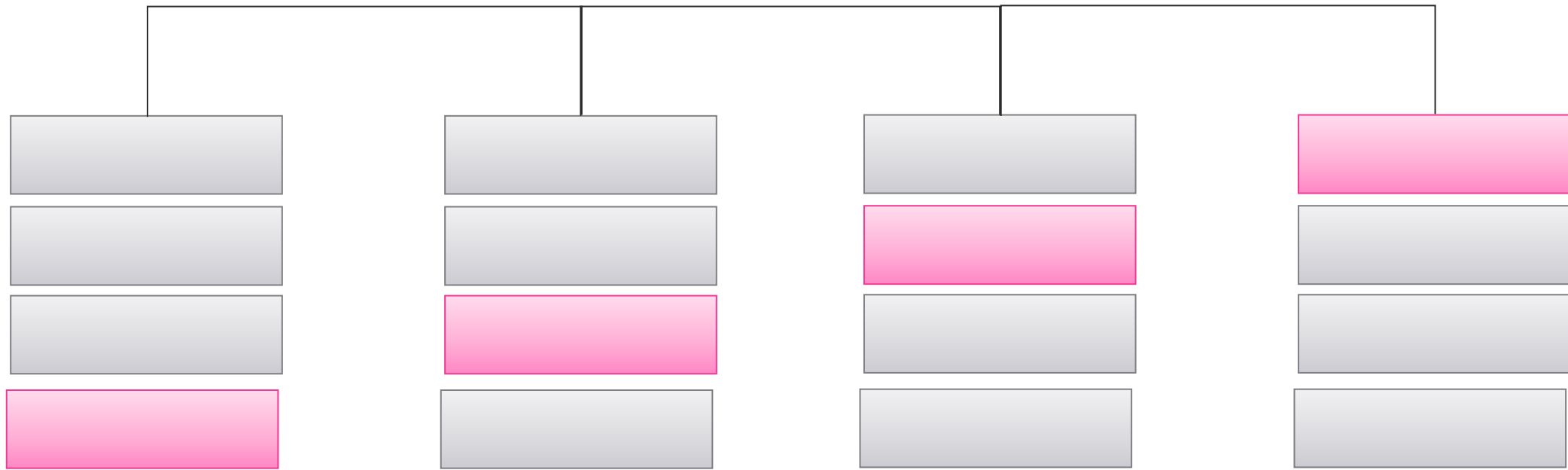
U.2 to U.3 to newer standards such as E1.S, also known as “ruler” SSDs

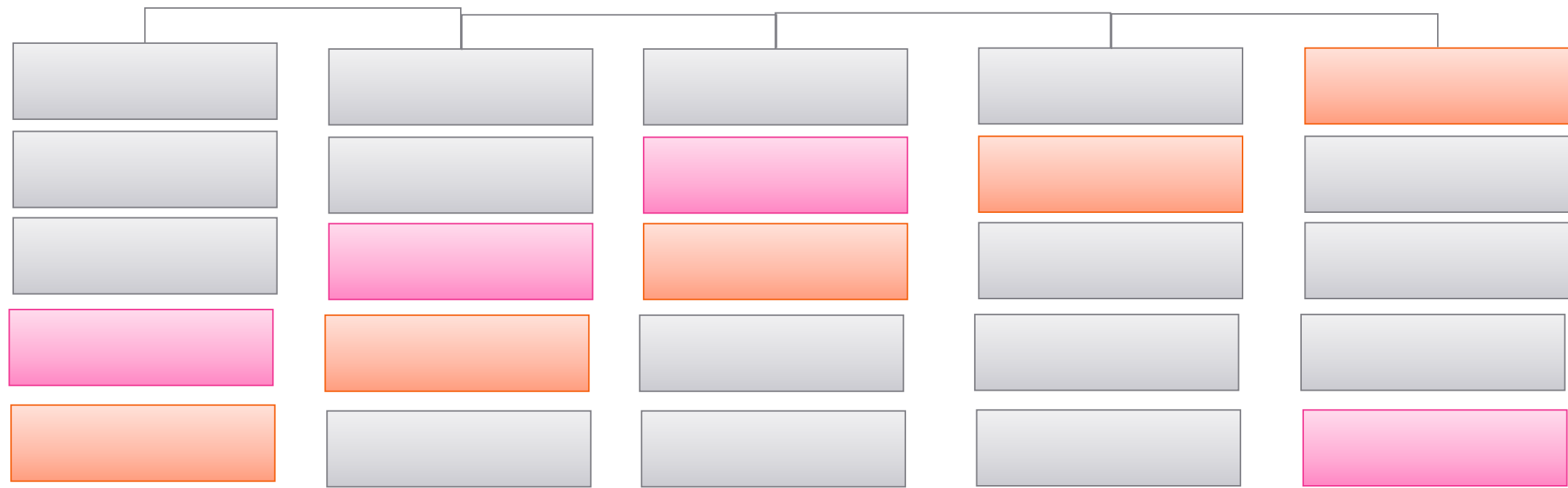


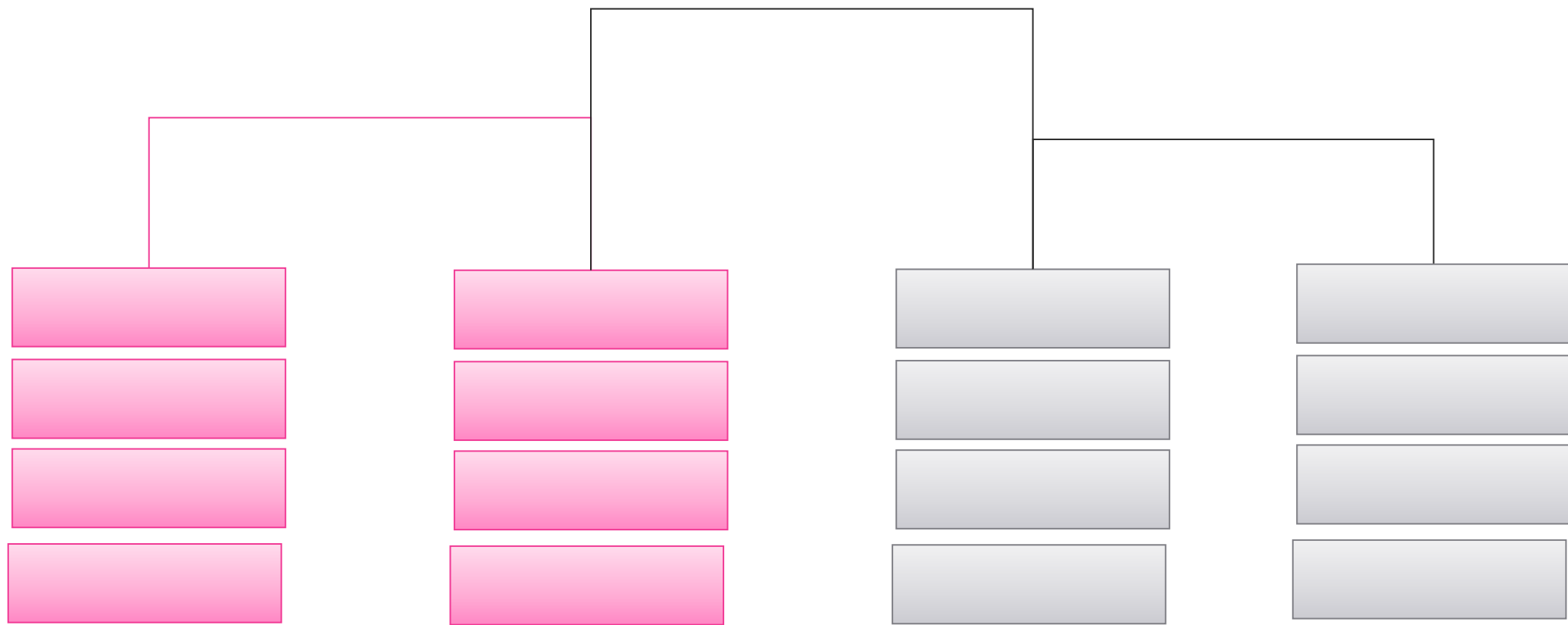


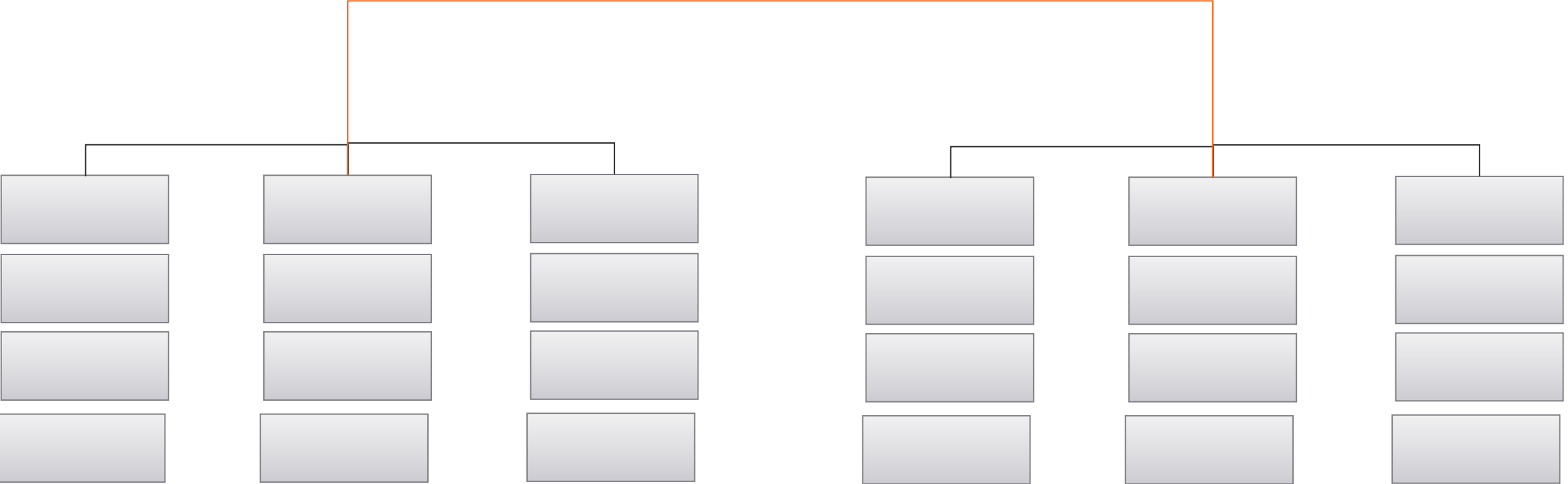


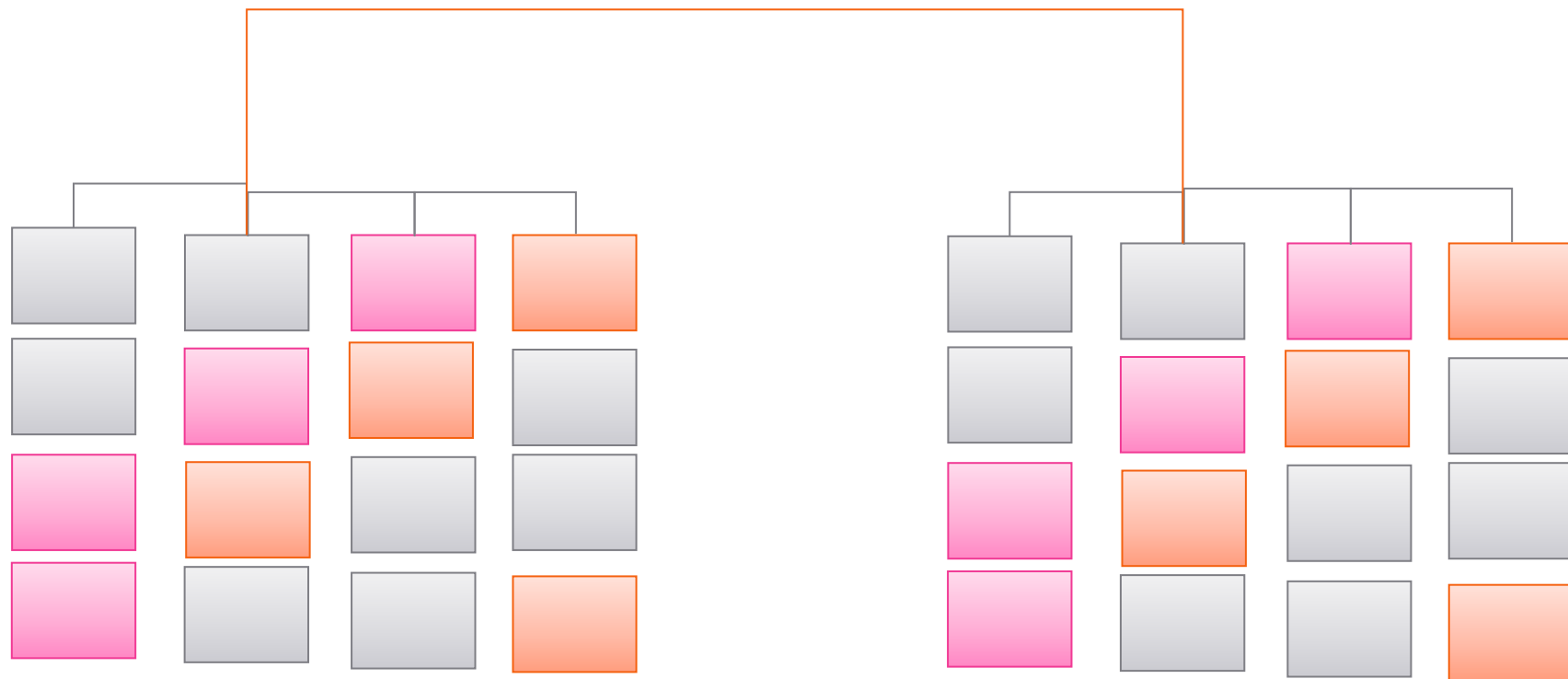












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Week # 6

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Server Racks



➤ Rack Standardization



100 or DIN 41494 in other regions. (There's also a standard for

Server Racks

Rack Units



the letter “U”. For example, a 42U rack contains 42 rack units.



little extra space at the top and bottom that isn’t usable rack space.



whether it’s 42 x 1U switches, 14 x 3U servers or 21 x 1U switches with 7 x 3U servers.



Server Racks

Rack Types



—



floor space and fitting in areas where other racks can't. They can be



Server Racks

➤ Basic rack options

- Doors
- Side Panels
- Roof
- Casters and Levelers
- Locks
-
-
- Color
- Toolless Mounting

➤ Factors influencing Rack Choice

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-
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Server Racks

Rack enclosure and Cooling

-
-
-
- Cable Management
-
- Active Heat Removal
- Close-Coupled Cooling

Other Considerations

-
-
-
- Patch Panels
- Environmental Monitoring
- Security
- Shock Pallet
- Knockdown
- Stability
- Environmental Protection
- Seismic Protection

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Primary Approaches

- **All eggs in one basket:**

One machine used for many purposes

- **Beautiful snowflakes:**

Many machines, each uniquely configured

- **Buy in bulk, allocate fractions:**

Large machines partitioned into many smaller virtual machines using virtualization or containers

Other Approaches

- **Grid computing:**

Many machines managed one as unit

- **Blade servers:**

A hardware architecture that places many machines in one chassis

- **Cloud-based compute services:**

Renting use of someone else's servers

- **Software as a service (SaaS):**

Web-hosted applications

- **Server appliances:**

Purpose-built devices, each providing a different service

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