Server Management: Server Hardware Installation and Management

Server Concepts

Server Concepts

Overview

Getting Started with Servers

Server Form Factors

Knowing What to Buy

CPUs

Memory

System Board Considerations

Server Maintenance

Module Summary

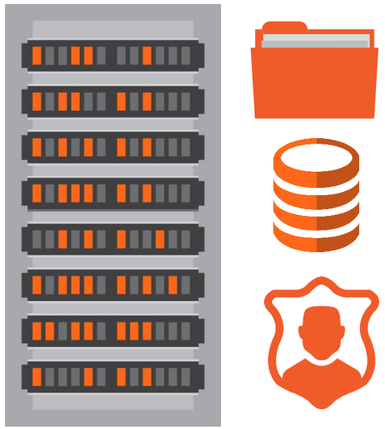
Getting Started with Servers

Storyline

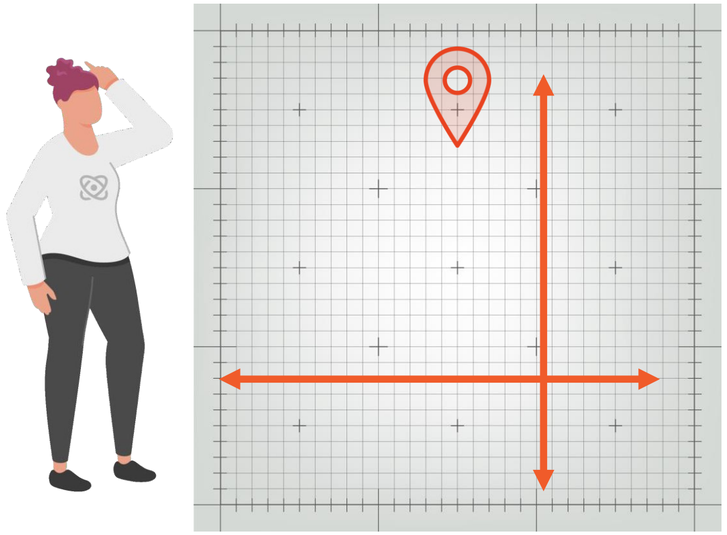
GLOBOMANTICS

Globomantics is purchasing a new application to help run their business.

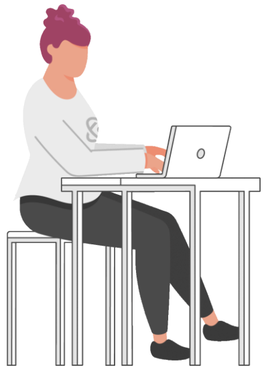
They don’t have a server for the application today, but they wish to buy one.



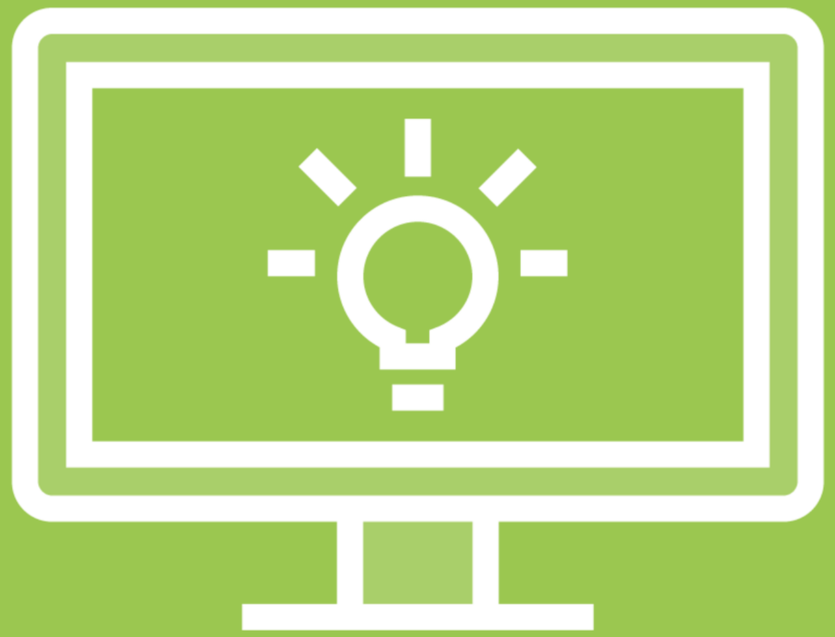
What Do You Need to Know?



Where will it be located?



What job will the server perform?



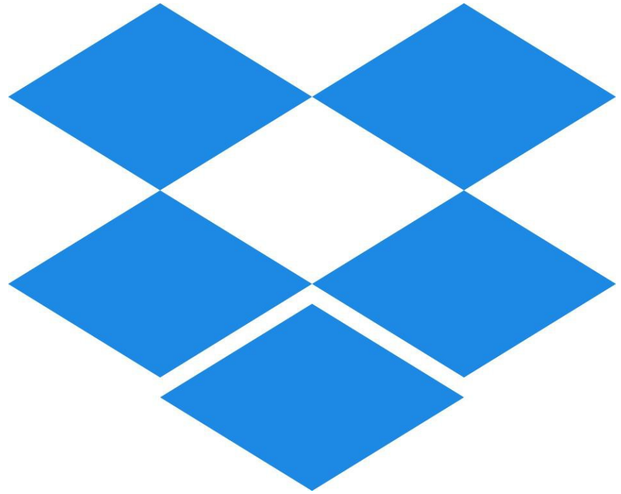
Tech Point

What is a Server?

Servers – What They Do, and Where We Keep Them?

Email

Web



Data storage

Public or Private

Public Servers (Consumers)

Internet-based services

Gmail

Pluralsight

DropBox

Private Servers (Corporate)

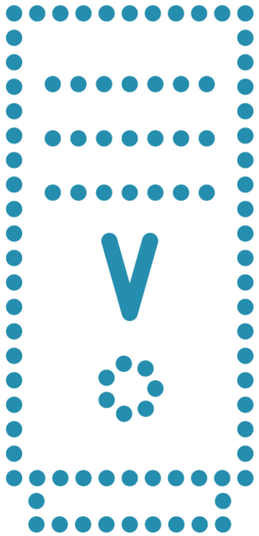
Corporate Services

Email

Intranet / Applications

Home directory

Virtual or Physical

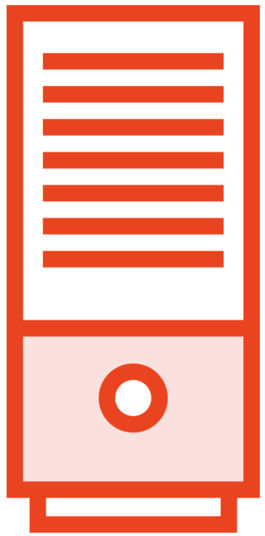


Virtual Servers

a.k.a. Virtual Machines (VMs)

Private or Public Cloud Computing

(See Course ### for more information)



Physical Servers

a.k.a. bare metal servers

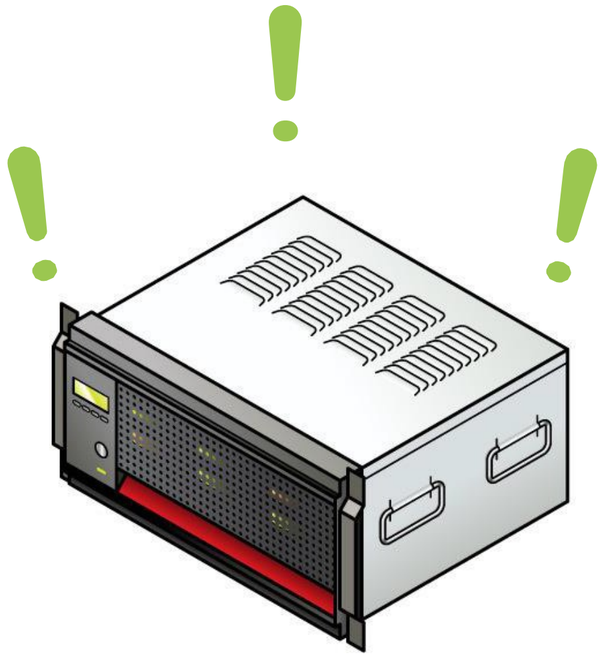
Physical servers may host VMs

(This course focuses on physical servers)

Critical Servers

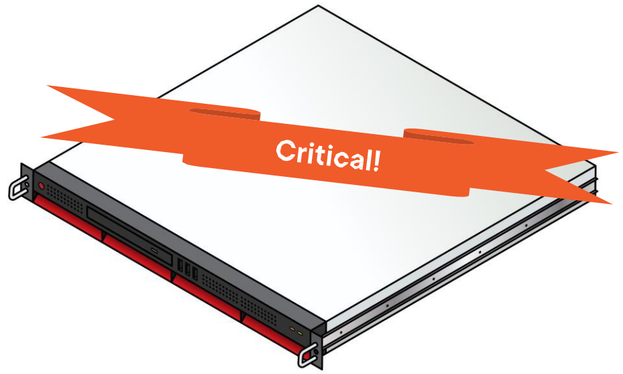
Myth

The biggest, most powerful server in the data center is the most critical server



Reality

The server's function, and the importance of that function to the organization, defines the server's criticality



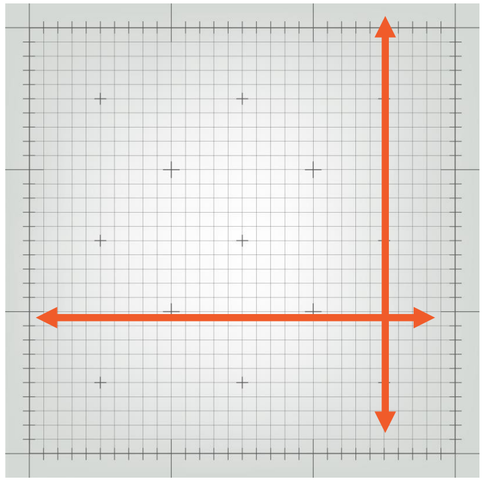
Server Form Factors

Tower

Rack Mount

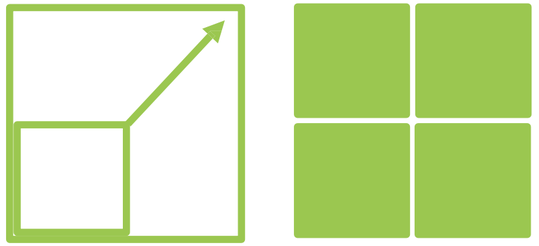
Blade Technology

Why Does the Form Factor Matter?

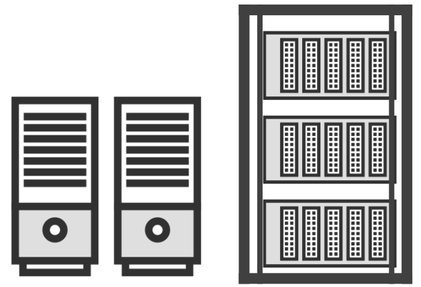


Physical size

Power input type



Expansion vs. density



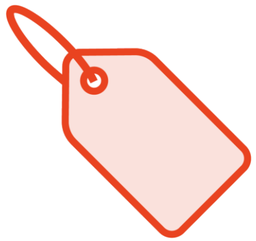
Free-standing vs. fixed mounted

Server Form Factors

Storyline

Globomantics' Needs

The server will be used to host their new line of business software and will serve as file storage for the five office employees



They don't plan to purchase more servers this year

They work in a small office building

GLOBOMANTICS

DECISIONS

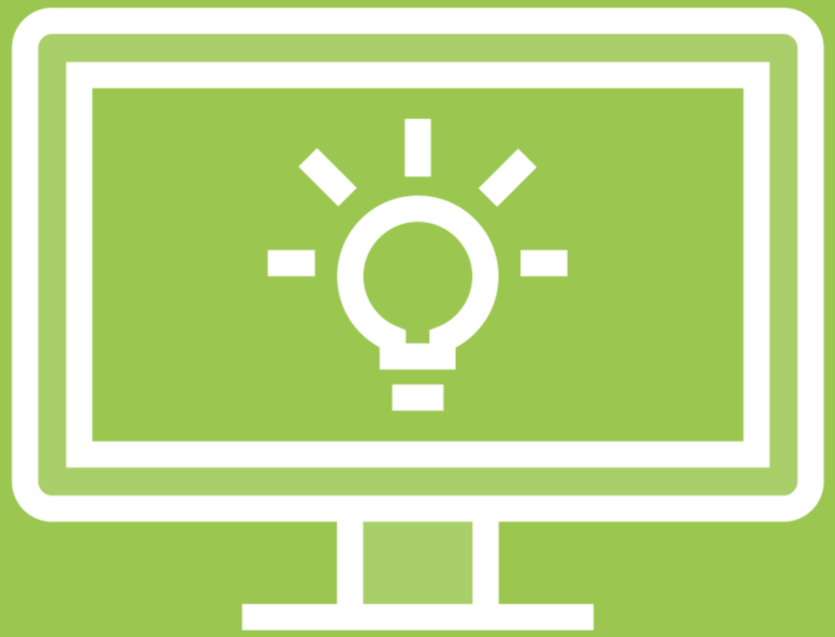
They work in a small office building, and they only intend to purchase one server.

The tower form factor suits their needs best.

They don’t have a dedicated server room, but want to secure the server

Well-ventilated, locked room

Now, let’s learn about the choices



Tech Point

Tower Form Factor

Tower Form Factor

Servers That Stand Alone

Characteristics

- Free-standing vertical computer
- Often rectangular, but shape can vary
- Requires no special mounting hardware
- Removable ‘feet’ keep the server off the ground
- Typically serviced via a removable side panel

Use Cases

Small Office / Home Office (SOHO)

Small Computer Rooms

Specialty, purpose-built servers

- **Manufacturing Floors**
- **Telecommunications / Voice Mail**

Tower Form Factor

Advantages

Portability

Racks are not required

Standard utility power (120V / 240V)

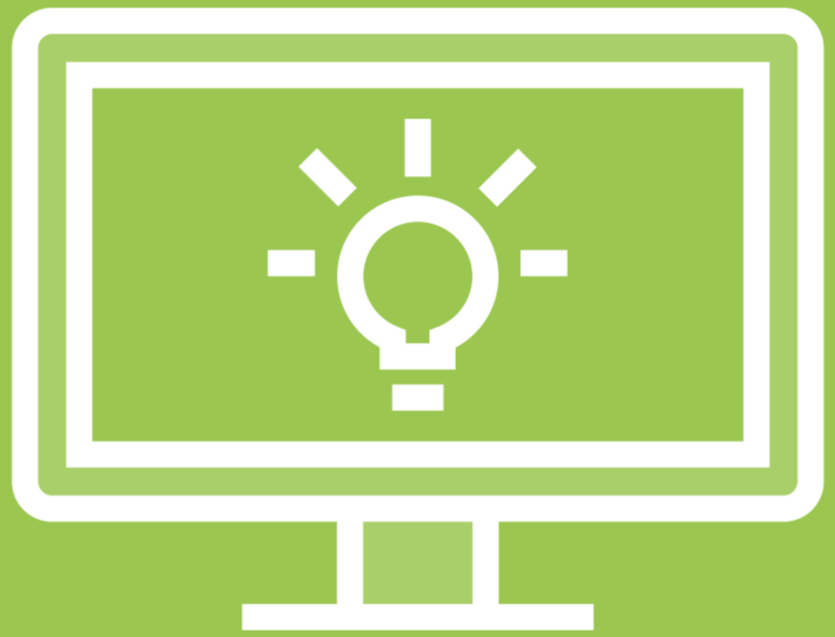
Expansion cards may be easily added

Disadvantages

Bulky

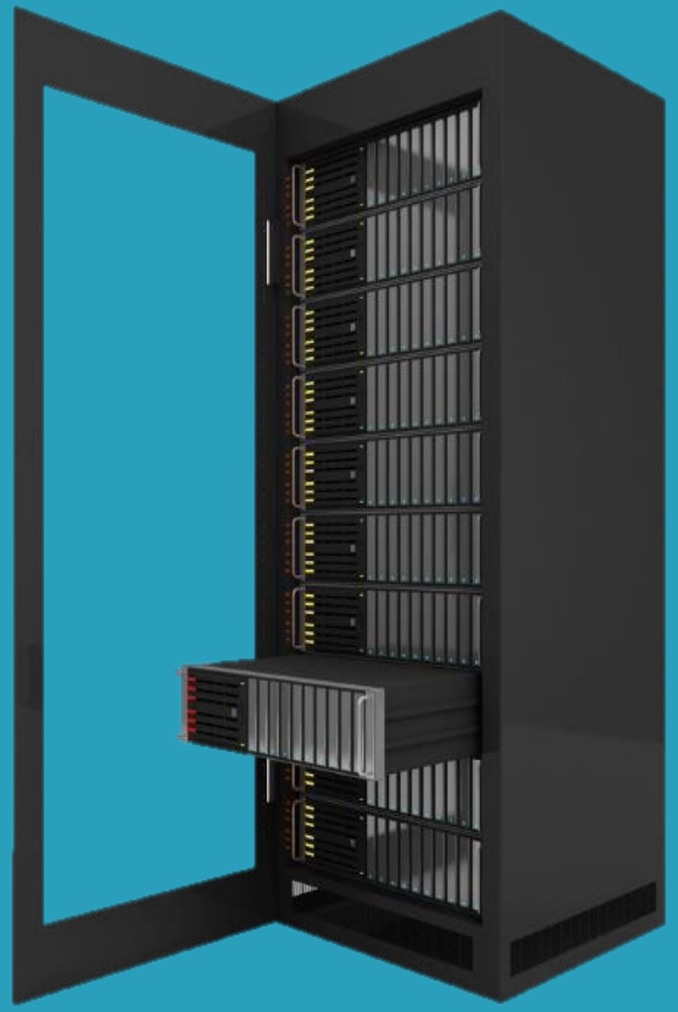
Hard to stack

Cable mess



Tech Point

Rack Mount Form Factor



Rack Mount Form Factor

Allows You to Safely Stack Multiple Servers

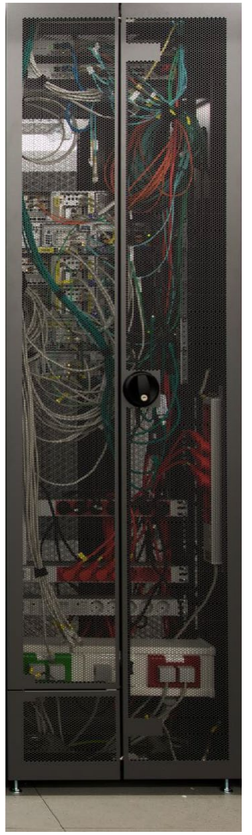
What Are Rack Mount Servers?

Mounted in rack enclosures

Horizontal server with a special case for mounting hardware

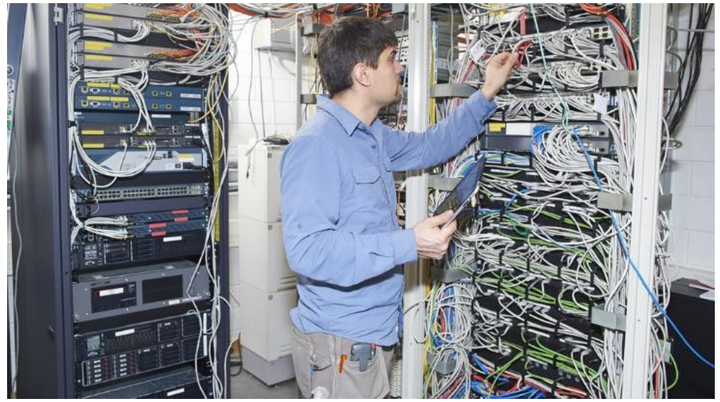
NOT a tower on its side

Typically includes rails and cable management arms



Common Use Cases

Rack mounted servers are the most common server form factor



Wiring Closet

Single-tenant Data Center

Multi-tenant Data Center

Rack Mount Form Factor

Advantages

Increased server density

Optimized floor space

Built-in cable management

Lockable enclosures to protect cabling

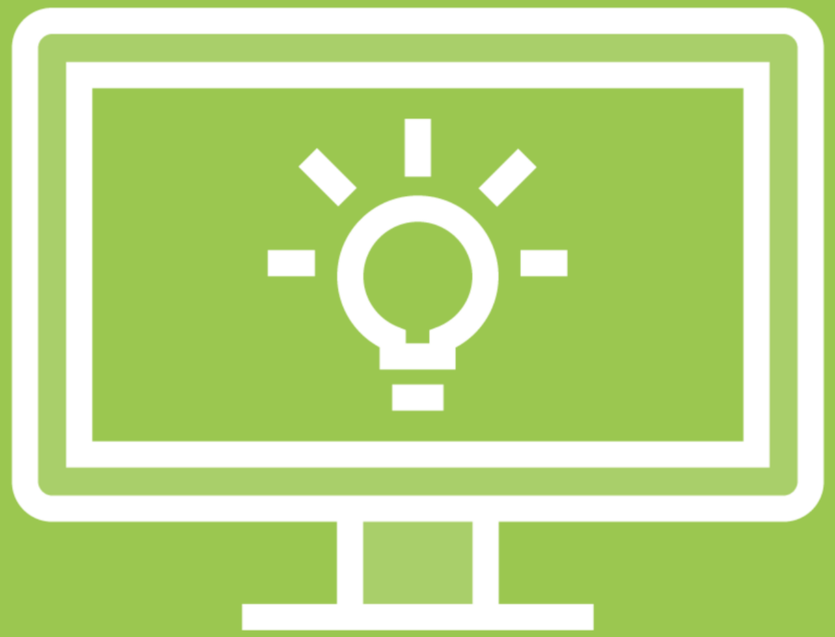
Standard utility power (120V / 240V)

Disadvantages

Requires a rack enclosure

Special server mounting procedures

Requires shelving for monitor and keyboard



Tech Point

Blade Technology

Blade Technology

A lot of servers in a small rack-mountable package

What Is a Blade Server?

High density servers

Very few (if any) moving parts on the blade

Blades plug into an enclosure with:

- Power and cooling
- Network switching
- Storage connectivity
- Secure management access

What Is a Blade Enclosure?

Highly redundant enclosure for the blade servers

Supplies power and connectivity to all blades

Greatly reduces the amount of cables in a rack full of servers

Most serviceable components are hot-pluggable

Often requires high amperage power circuits

Blade Enclosure Anatomy

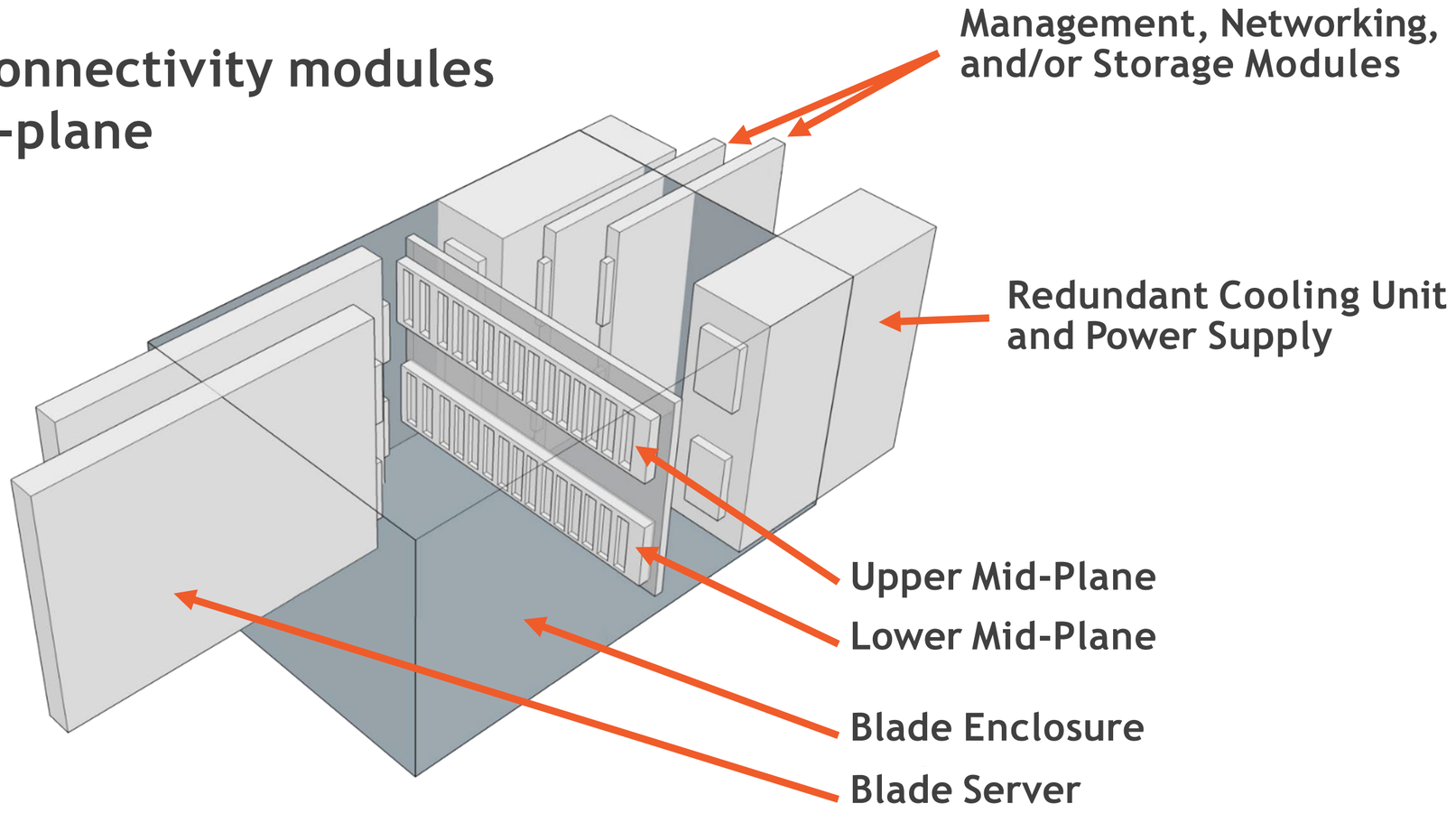
Bays and slots

- Back: Management and connectivity modules
- Inside: Mid-plane or Back-plane
- Front: Server blade slots

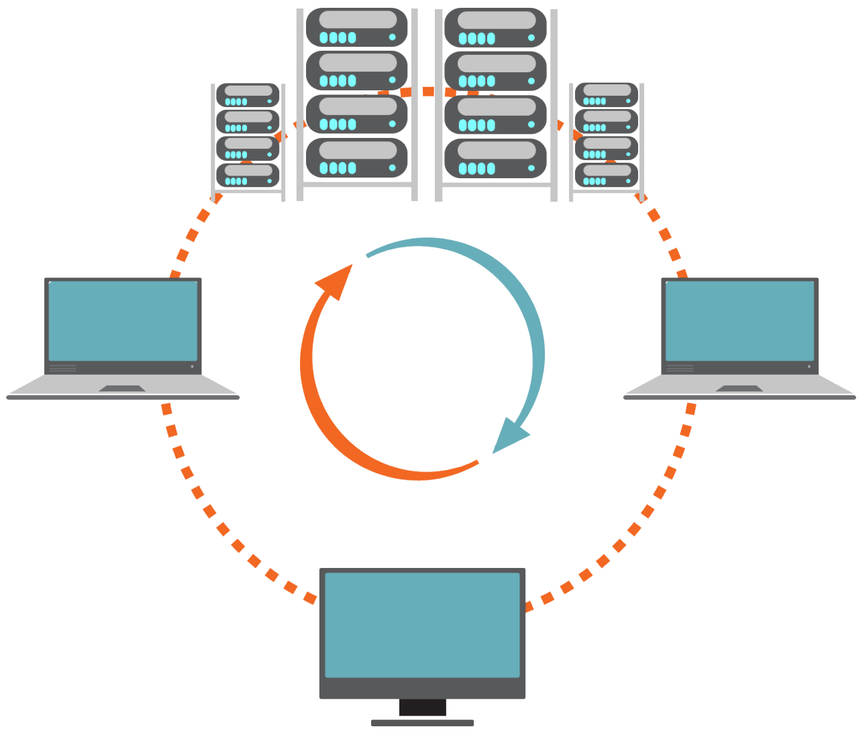
Service Modules

- Network / Storage
- Management

Power/Cooling



Managing a Blade



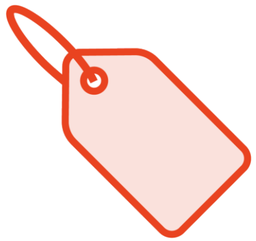
- Designed for 100% remote management
- Web browser to management module
- User security for blades and modules
- IPMI based KVM and power controls
- Remote DVD to install server OS

Hindsight


GLOBOMANTICS

Reviewing Globomantics' Needs

The server will be used to host their new line of business software and will serve as file storage for the five office employees



They don't plan to purchase more servers this year

They work in a small office building

GLOBOMANTICS

DECISIONS

They work in a small office building, and they only intend to purchase one server.

The tower form factor suits their needs best.

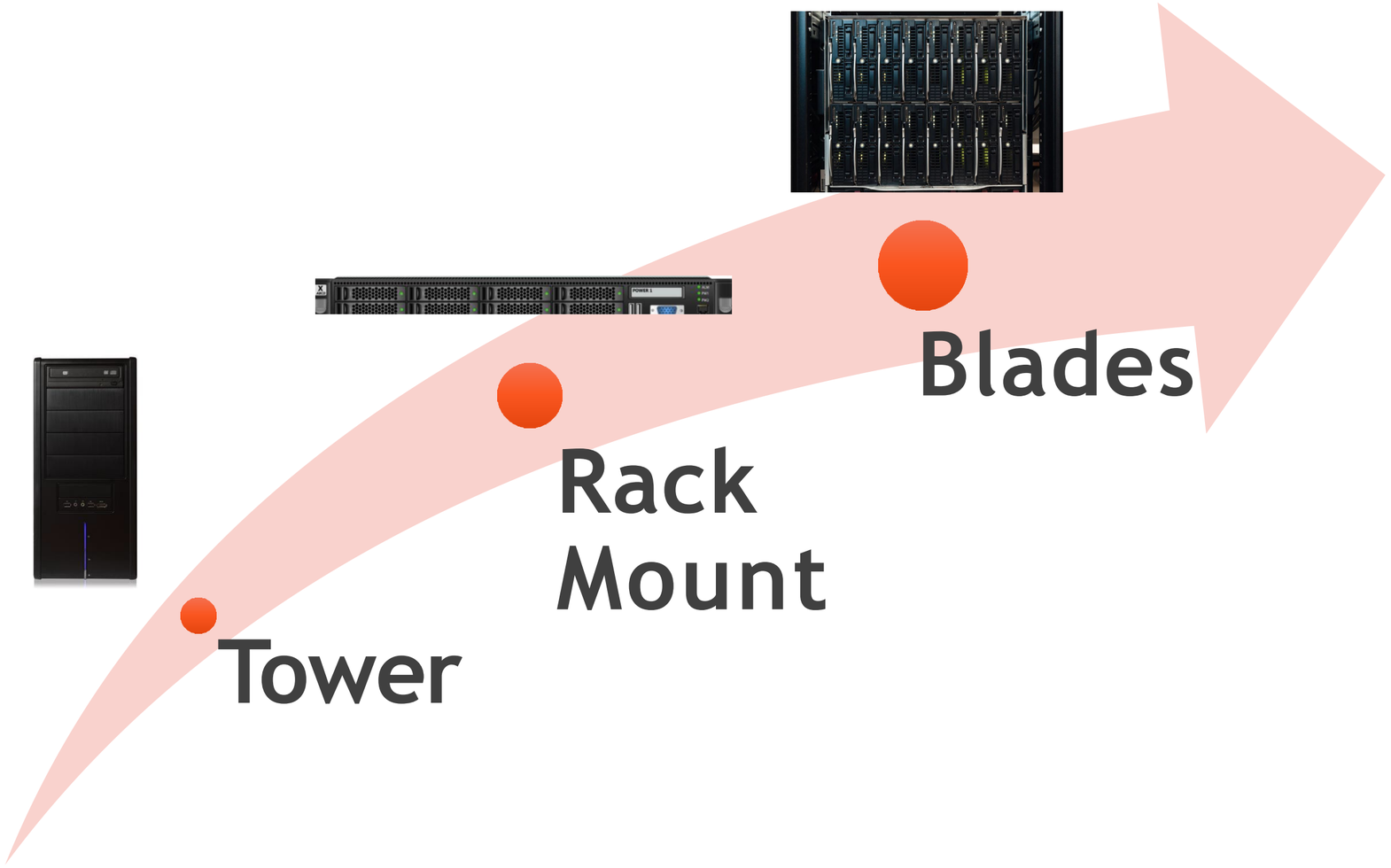
They don’t have a dedicated server room, but want to secure the server

Well-ventilated, locked room

Now, let’s learn why they made these choices

Decision Points

How Many Servers Do You Need?



Planning to Scale up or Out?

Density

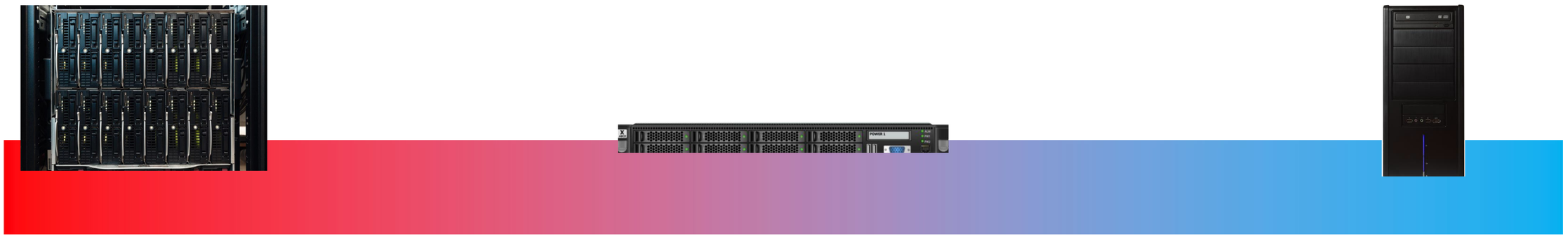
Scale **Out**

More servers per cubic foot / meter

Expandability

Scale **Up**

The ability to add more components to the server



Where Will the Server Be Located?

SOHO

- Tower

Wiring Closet

- Tower
- Rack Mount

Data Center

- Rack Mount
- Blade s

Small Office Home Office (SOHO)

Tower Servers

- Typically only one server is needed per office

Not Blades because

- Typical small / home offices do not meet the necessary power / cooling requirements

Not Racks because

- Typical small / home offices do not have the floor space for a rack of servers

Wiring Closets

Rack Mount Servers

- For all servers
- Reduces cable management

Tower Servers

- For specialty servers or areas where racks will not fit
- Towers are bulky and present cable management challenges

Not Blades because

- They only need a few servers, and don’t require the high density
- With only a few servers, the ROI of blades may be negative

Data Center

Blade Technology

- For hypervisors (hosting virtual machines)
- Greatly simplifies the server cabling requirements

Rack servers

- For servers that will later need hardware upgrades

Not Tower because cable management is a major concern

Knowing What to Buy

Storyline

GLOBOMANTICS

We know we need a tower form factor server.

How do we determine the rest of the hardware?