WESTERN DIGITAL NETWORK DESIGN PROJECT

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INTRODUCTION

- Western Digital Corporation is a global leader in the data storage industry.
- Western Digital was founded in 1970 and is known today for designing, developing, manufacturing, and selling hard disk drives, NAND flash memory, solid state drives, and enterprise storage platforms.
- Headquarters: San Jose, California, USA
- Offices and facilities are worldwide, including in the United States, Canada, China, India, Japan, Singapore, and Europe.
- Western Digital employs approximately 70,000 employees globally. The company's workforce is diverse and comprises various roles and positions.

SERVICES/DATABASE & TECHNOLOGY

- Western Digital is known for designing, developing, manufacturing, and selling data storage products such as hard disk drives, NAND flash memory, solid-state drives, and enterprise storage platforms.
- There collaboration is with computer manufacturers, system integrators, and cloud service providers is integral to ensuring product integrity and compatibility.
- Western Digital uses an email server to facilitate client communication and email delivery using POP3 (post office protocol version 3).
- The company utilizes SQL server databases for managing data in a relational database management system.
- For specific products like My Cloud, the file format used is EXT4, a Linux OS format.
- Our Cloud is a personal cloud storage device that connects to a Wi-Fi router at home, offering data storage and organization capabilities. It supports up to 800 active directory user accounts with specific rules, including username constraints and domain membership requirements.

NETWORK TECHNOLOGY

- We have chosen Ethernet as the primary network technology. Ethernet is a widely adopted and versatile technology that offers high-speed data transmission, scalability, and reliability. It is an excellent choice for both local area networks (LANs) and wide area networks (WANs).
- The LAN will serve as the foundation of Western Digital's internal network infrastructure. It will contain all on-site devices, including workstations, servers, and networked appliances. We will implement a star topology for the LAN, connecting all devices to central switches. This topology simplifies network management and ensures efficient data flow within the organization.
- Western Digital operates globally, with multiple offices and data centers in different geographical locations. To interconnect these sites, we will rely on MPLS (Multiprotocol Label Switching) technology. MPLS over Ethernet connections will provide the organization with reliable, high-performance WAN connectivity, ensuring seamless data transfer between sites.

NETWORK COMPONENTS

- **Switches and Routers:** Ethernet switches and routers are the core networking devices that facilitate data routing and switching within the LAN and WAN.
- **Servers:** Western Digital's network will include various types of servers, such as file servers, application servers, email servers and database servers.
- **Cabling and Infrastructure:** High-quality cabling infrastructure, including Ethernet cables, fiber-optic cables, and cable management systems, will ensure reliable data transmission and minimize network downtime.
- **IP Addressing and Subnets:** We will assign IP addresses and configure subnets for all network segments, allowing for efficient addressing and routing of data within the network. After pinging the website, we determined the IP address to be “23.1.199.149”. The IP address "23.1.199.149" is classified as a Class A IP address. We would then implement Dynamic Host Configuration Protocol (DHCP) servers for automatic IP address assignment to workstations and devices where dynamic addressing is appropriate.
- **Redundancy and Failover Mechanisms:** Redundancy will be implemented at critical points in the network to ensure uninterrupted network operation. Failover mechanisms will provide backup paths in case of link failures.

NETWORK PROTOCOLS

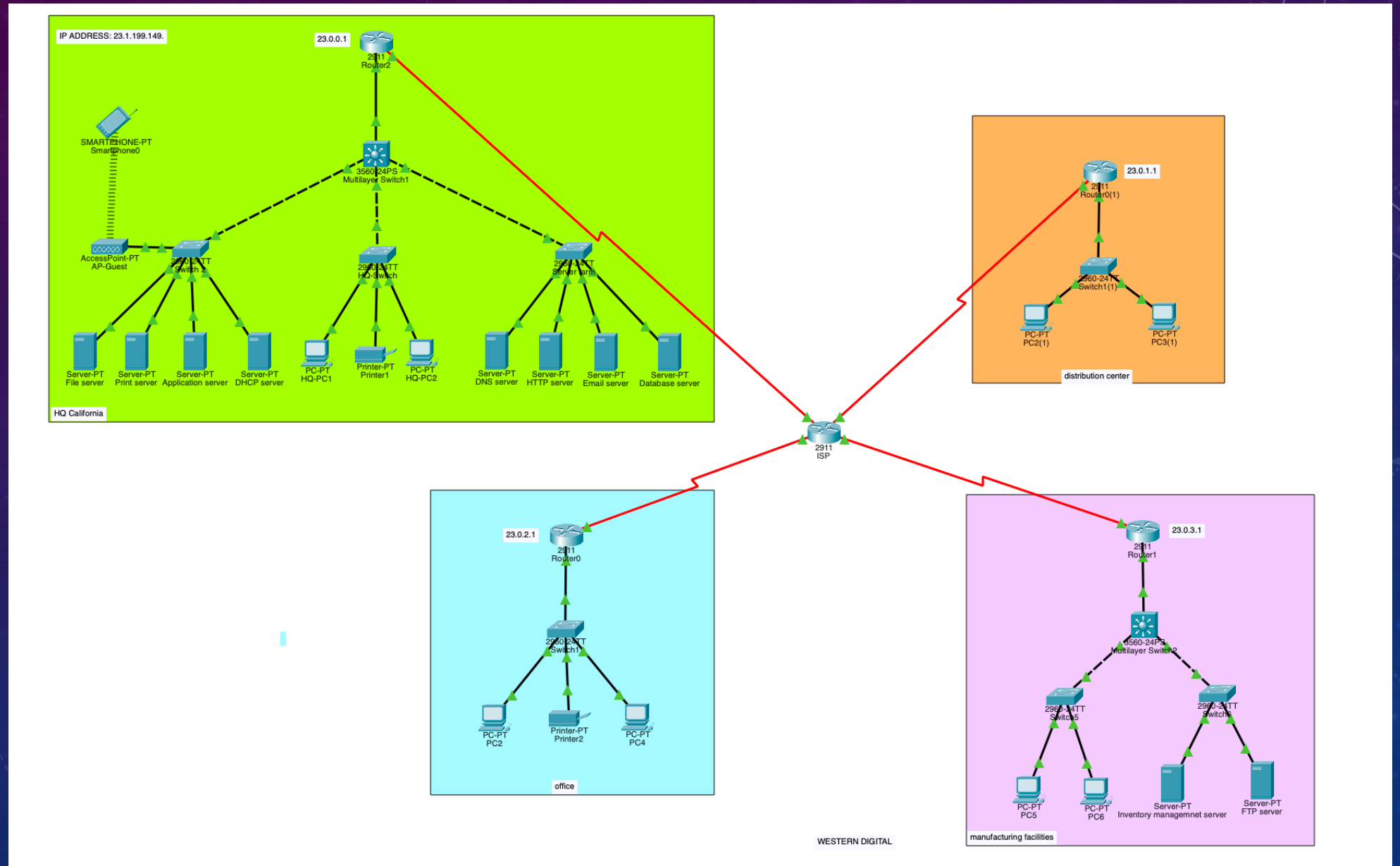
- Western Digital uses HTTP (hypertext transfer protocol) the functions that align with western digital's HTTP is their website , they use a web server to store ,process and deliver required information or webpages to an end user , which help's them to maintain and build their website in which they use it to deliver information, entertain and allow users to browse through their products on their computer or mobile device. At the application layer.

- Western digital uses SMTP (simple Mail transfer protocol) The way that Western digital implements this protocol is Allowing customers to receive emails about when their packages will be delivered or when they system will be installed. Another way this protocol is implemented is it allows for employees to send and receive emails back-and-forth discussing future plans within the company? Doing so at the seventh layer ,the application layer.

TOPOLOGY

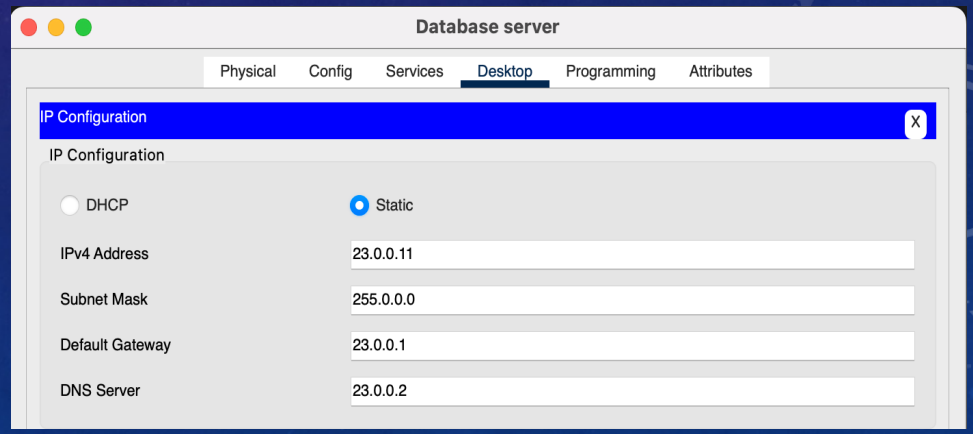
- Logical Topology:
- Star Topology: The logical topology we employed for Western Digital's network predominantly follows a star configuration. In this layout, all devices, including servers, PCs, and manufacturing equipment, are connected to a central hub or switch. This centralized design simplifies network management, as all data flows through a central point, making it easier to monitor and control traffic.
- Physical Topology:
- Star Topology: The physical layout of the network closely mirrors the logical star topology. At each location, a central switch serves as the primary point of connection for all devices. For redundancy and reliability, these switches are often interconnected, creating a meshed star topology.

NETWORK DESIGN



SUBNETTING

- To determine the subnets, we used the IP address 23.1.199.149 and the subnet mask 255.255.255.224 considering 30 hosts.
- Subnet 1: 23.1.199.128(Usable IPs: 129-158, Network Address: 128, Broadcast Address: 159)
- Subnet 2: 23.1.199.160(Usable IPs: 161-190, Network Address: 160, Broadcast Address: 191)
- Subnet 3: 23.1.199.192(Usable IPs: 193-222, Network Address: 192, Broadcast Address: 223)
- Subnet 4: 23.1.199.224 (Usable IPs: 225-254, Network Address: 224, Broadcast Address: 255)
- Headquarters: IP range 23.0.0.0/24
- Office: IP range 23.0.2.0/24
- Manufacturing Facilities: IP range 23.0.3.0/24
- Distribution Center: IP range 23.0.1.0/24
- Each location is allocated a subnet of 254 usable host IP addresses, providing enough room for future growth.



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