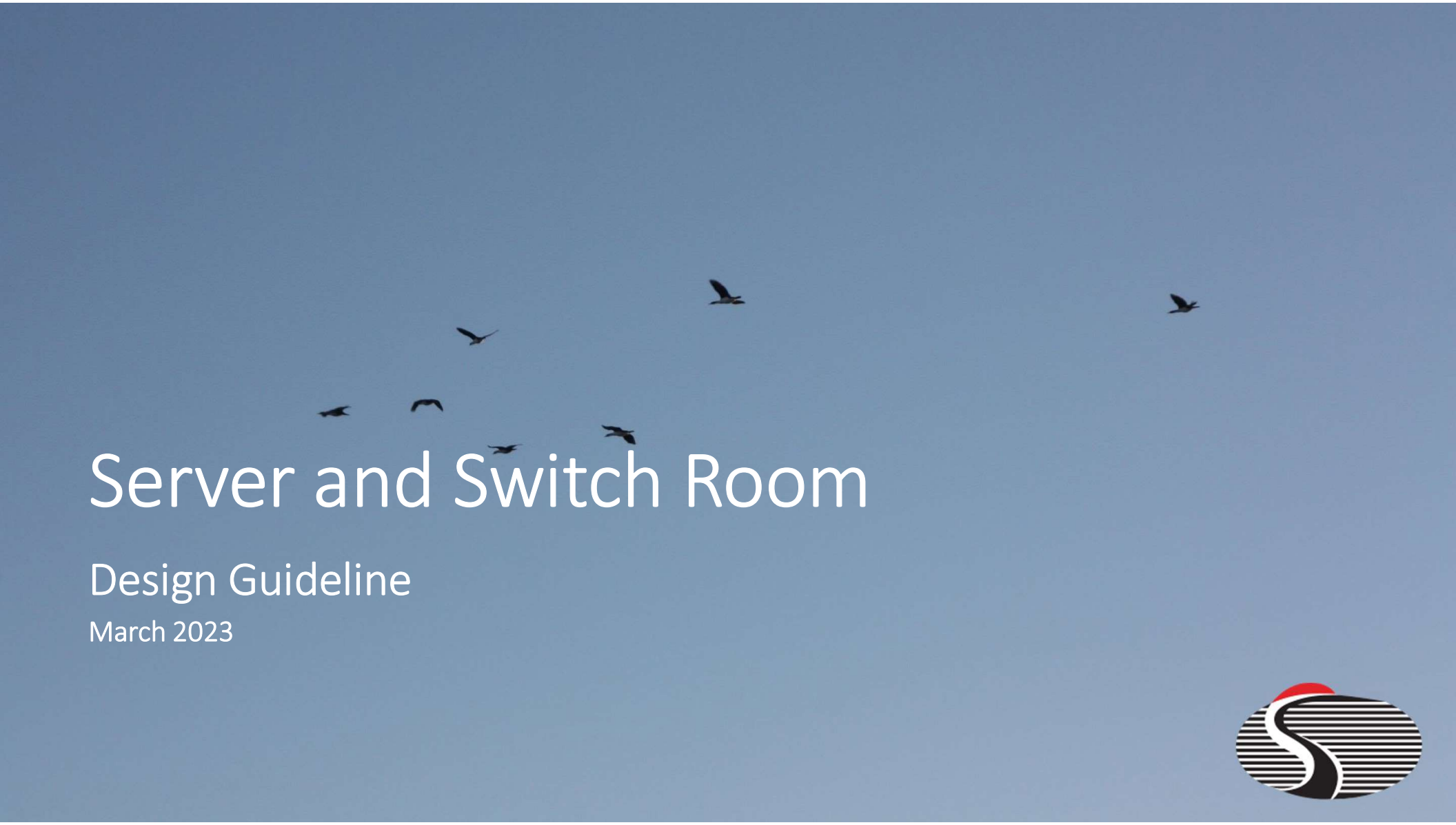


Server and Switch Room

Design Guideline

March 2023

General Guidelines for Server / Switch Room

To Begin,

- Require to observe is this a new setup on the server or Switch room
- Or amendment to the existing server / Switch room

❖ New Setup

- ✓ Determine Business requirement. This will assist to plan how much space is required.
- ✓ Suitable location as it should be secure, Dry, and cool environment with good power supply.
- ✓ Room should be design to good ventilation.

❖ Amendment to Server / Switch Room

- ✓ Review business requirement if expansion or improving current setup
- ✓ Review the objective as why require to amend the current setup
- ✓ Review any Audit comments on the existing rooms
- ✓ Changing location of the room

Guidelines for Server Room

➢ *Location*

- Review the location on the server room including the surrounding or away from potential hazards such as water, dust, extreme temperatures, high voltage switch room, High electromagnetic interference (EMI), etc
- If the server room in on the ground floor, raise floor is recommended with minimum of 18 inches or 2 feet.

➢ *Racks*

- Install racks to organize the devices as servers , storage and network equipment.
- Server racks should be purchased from a reputable rack supplier vendor and with power sockets install on both sides of the racks.
- The equipment placed on a sturdy racks that able to provide ample space, cable management, and easy for maintenance. The racks should be designed to prevent vibration and earthing is essential for protection for the equipment, and safety in the server room.
- Refer to slide 10 for recommended rack dimension

➢ *Power Supply*

- Server room require a reliable and sufficient power supply with backup options.
- Recommended Redundancy power supply from different DB (Decibel) source to connect to the rack power socket separately.
- Uninterrupted Power Supply should be installed as to allowed graceful shut down on equipment in the event of power disruption.
- Power consumption of all equipment need to be calculated and may need to add a safety margin for future growth.

Guidelines for Server Room

➢ *Cool and Ventilation*

- The room should be properly ventilated to prevent overheating of the equipment.
- Air conditional or ventilation system required to regulate the temperature.
- Choose a cooling system that is suitable for the size of the room and the heat generated by the equipment.
- Room temperature recommend between 18C to 27 C degrees and humidity is between 40% to 60% relatively.

➢ *Security / Lighting*

- Room MUST have adequate physical security measure such as Biometric access controls or locks
- Security cameras are to be installed to prevent unauthorized access and able records all access, activity in the room.
- CCTV cameras recording are kept with minimum 30days and up to 90 days is recommended. It should be backup regularly and stored in a secure location.
- Security measure should comply with the relevant regulations and standards.
- Rooms should have adequate lightning for visibility and easy maintenance.
- Recommend to choose LED lights that are energy-efficient and provide bright, even illumination.

➢ *Fire Suppression*

- Server room should be equipment with fire suppression systems (if needed) or smoke detectors.
- Fire rated doors with minimum 2 hours is recommended and require to review with Business requirement.
- Fire extinguishers, to prevent damage or loss of data in case of fire.
- The fire suppression systems should comply with relevant codes and standard with local country.

Network racks or connectivity

➢ *Cable Management*

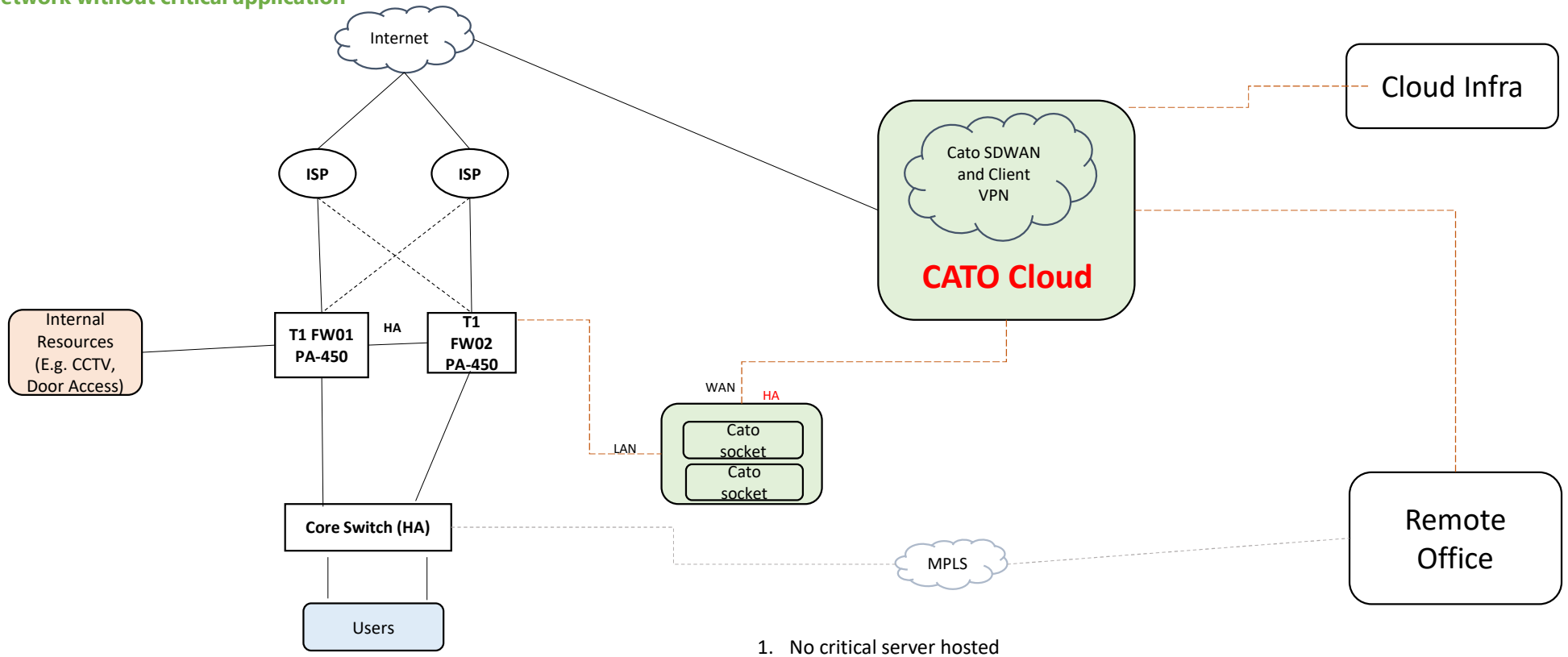
- Network cables within the racks on connected to network devices should be proper label from A to B point.
- Ensure all the labelling are standardize to make easier for troubleshooting, patching, asset management.
- Cable from external to server room recommend to be a Drop down from the ceiling
- If more than 1 rack, networks cables should not lay outside the racks or prevent the rack door from closing.
- Should consider to use fiber (10G) uplink from Access switch to Core switch with redundant link.
- Recommended to user UTP CAT 6/6A
- Cable length should not be more than 80 meters from the switch to another point to avoid data loss.

➢ *Redundancy*

- Strongly recommended Core switch to have redundancy setup.
- Internet links should have redundancy (Primary and secondary)
- Cato socket/ Firewall devices

Design 1

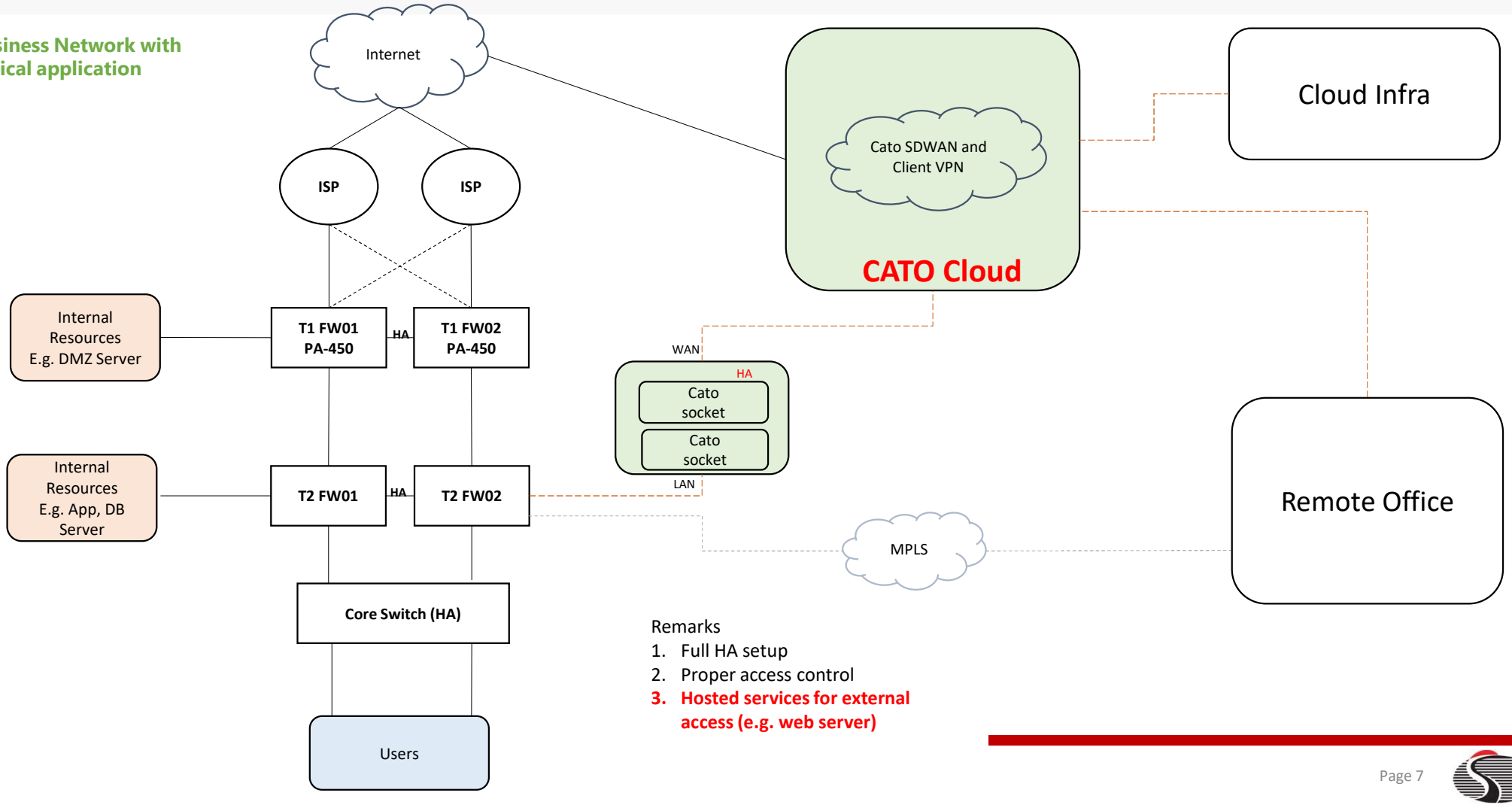
Office Network without critical application



1. No critical server hosted locally
2. **No server hosted for external access**
3. Internet outgoing access
4. Full HA setup
5. Proper access control

Design 2

Business Network with critical application



Remarks

1. Full HA setup
2. Proper access control
3. **Hosted services for external access (e.g. web server)**

Network Switches Specifications

Below are the specifications to consider when deploy

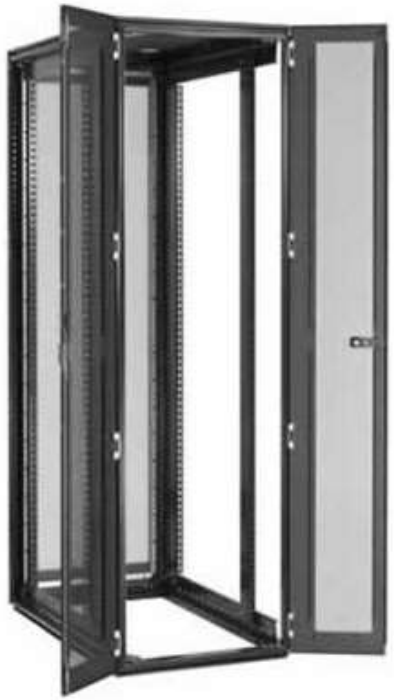
- Switches must allow for mass port changes on multiple switches simultaneously
- Switches must alert Administrators of changing port status or configuration change.
- Switch Ports must have the ability to run cable tests and packet captures via the management console.
- Switches must include a network topology, that dynamically shows how the switches and other devices are connected, without having to purchase 3rd party software tools.
- Switch Ports must track uptime history for troubleshooting purposes.
- Switch shall be able to be stackable to have a great stacking capability with up to 800 Gbps that are non-blocking virtually.
- Switch shall be able to prevent DHCP snooping whereby preventing rogue DHCP server exist in the network environment.
- When a switch needs to be replaced due to hardware failure, the system must allow configurations to be automatically copied to the replacement switch.
- The solution must allow for 1-click mass upgrades for all switches simultaneously, regardless of model. Additionally, the solution must notify Administrators when a new feature or firmware version is available.
- The solution shall be able to be monitor centrally with a single dashboard

Wireless Specifications

Below are the specifications to consider when deploy

- Access Points must be at least equipped with Wi-Fi 6 (802.11 ax) Wi-Fi technology that have up to 8 spatial streams MU-MIMO that enable video and voice.
- Access Points must include full time auto RF and WIPS/WIDS while simultaneously serving clients.
- Access Points must have the ability to run local layer 2, layer 3, and layer 7 firewall rules and it have the capabilities to enable self-learning analytic application aware within the detected or travel traffic.
- Access Points must support multiple SSIDs simultaneously. (E.g., Guest, Office SSID)
- Access Points must have the ability to identify themselves by flashing their LED status light on command.
- Access Points must have wireless health analytics for connection performance monitoring.
- Access Points must be able to graphically display a floor plan with a heatmap and show where wireless devices are connected or detected.
- Access Points must allow for 1-click mass upgrades for all Access Points simultaneously, regardless of model.
- The solution shall be able to be monitor centrally with a single dashboard.

Rack Specification Recommendation



42U Universal Rack – rear split doors

42U Universal Rack Features

- Contemporary, sleek appearance, strong frame structure
- Multiple vendor equipment compatibilities
- Full line of accessories & a family of sizes and styles

42U Universal Rack Dimensions

- Width: EIA Standard 19" Rack Rails
- External Width: 23.6" – 600mm
- Height: 78.74" – 2,000mm – Rack Units: 42U
- Depths: 39.37" & 41.34"
- Racks in other dimensions are available

42U Universal Rack Accessories

- Sidewalls, Split rear Doors
- Baying Kits, Toolless Shelves, Casters, Bolt Down Kits, Cable Management
- Power Strips – Vertical or Rackmount, Enclosure Monitoring System
- Toolless Blanking Panels, Fans