2023 U.S. Information Technology Collegiate Conference Network Design Competition

Do not put your name(s) or your school's name on anything that you turn in! This will result in disqualification of your team. Only use your team number.

Any solution that does not provide accurate citing of professional resources will be removed from consideration.

Examples include any of the following:

- Copying and pasting diagrams and images from a website
- Using descriptions and product data verbatim from source
- When in doubt, cite your source

After a string of high-profile incidents in your company's most critical data center it has become obvious that the infrastructure is not capable of meeting the demands placed on it by the business. Your company has asked you to lead up a team to retrofit the data center with best-in-class architecture. Your company has been investing in some of the latest trends in IT, like cloud computing, and have found themselves much further behind than expected. Your company requires five-nines of service from the data center and the new BC/DR site. The retrofit must be done in a way to minimize impact to the revenue generating components of the business. The product must be scalable and sustainable for up to 25,000 clients for now but will need to be scalable for larger deployments.

The primary stakeholders sponsoring of the project are led by the CIO and her appointed panel of vice-presidents. The advisory board is very detailed oriented and wants to be able to market the new back of the house infrastructure and support as a reason to move toward your company's services. One of the VP's recently mentioned a convention he attended in which he was interested in leveraging software defined networking, as well as physical to virtual conversions for at least 50% of the 550+ physical servers. The board also wants to leverage BYOD technology.

The current legacy infrastructure was sold as a one-stop-shop Cisco solution. The infrastructure is heavily dependent on older Cisco Catalyst 6500 series switches, FWSM L2 firewalls, and CSS load balancers. The current environment also has a pair of Checkpoint firewalls that handle the L3 traffic, and segment the DMZ. Any changes to firewalls need to be documented as to why as well as how and with what equipment.

Your high-level requirements are upgrade/add the following and more as needed:

- Refresh critical infrastructure that provides business continuity
    - Refresh L2/L3 firewalls
        - Must be PCI-DSS compliant
    - Provide additional 10G networking
        - Investigate next generation technology
            - Explain selections
    - Refresh load balancers
        - Convert routed mode legacy load balancers to SNAT solution (or better)
    - Provide an “out of band” solution
    - Address spanning tree issues
    - The UPS solution should be best-in-class
    - To prevent maintenance issues from existing vendors all equipment must be replaced in fiscal year 2024
    - Must maintain first party presence but willing to entertain cloud-based hybridization
    - FedRAMP compatible

The network should be robust, secure, functional, and support both wired and wireless clients in addition to remote clients. Your organization has a mix of email, live video conferencing, web-services, patch/change management, virus protection, basic perimeter-based security, IBM mainframe-based applications and DB’s, and a mixture of Windows, AIX, and other flavors of *NIX. Your team is free to make assumptions and recommendations so long as they are clearly documented and relayed to the stakeholders; include anything that your company believes will be needed.

Your submission must clearly articulate methodologies that address defining the business needs, determining the existing infrastructure and operations, developing timelines, migration, and mitigation plans, and implementing the solution. Be aware of and point out the cost to serve capabilities wherever possible. The solution can be O/S and Vendor agnostic but should work logically and physically. To meet the stakeholder’s needs your solution will be assessed on the scope, plan of implementation, migration, design, time to implement, and overall costing detail.