Capstone Project

WAN Encryption

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Self Introduction:

Professional Experience:

- More than 16 years' IT industry experience in the data networking and information security

Family Background:

- Married with two children (8Years & 2Years)

Educational Qualification:

- Bachelor of Science IT-Security from WGU

Current Status:

- WGU student of MS Cybersecurity, living in Charleston, SC
- Currently working as a full time employee in Government Agencies as a Network and Security Consultant.

Why Did I Choose This Project?

- According to Small Business Trends, 43% of cyber security attacks target small businesses (Sophy J., 2016). So it should be protected very well.
- WAN encryption technique facilitates secure site-to-site connections over the Internet, where all traffic between the locations are automatically encrypted and authenticated
- Implement over the low-cost Internet link by deploying VPN which eliminates the needs of costly MPLS link
- Make the customers feel secured as their data are protected from unauthorized access, and it will soothe their worries
- Offer the IT department a chance to prove the Business that they can transform corporate needs into viable, economical solutions that meet business security strategies.

Overview of the Problem:

- Small financial services company ACME and its four branches ware connected over the MPLS link, and it was plaintext / unencrypted data communication which was dangerous

- Losing the business due to severe cyber-attacks like Man-in-the-middle attacks, IP spoofing attacks from the competitors and disgruntled employees

- Data security is essential for all kind of organizations. The employees' data, client information, bank account details are very hard to change and most dangerous if it falls into the wrong hands like cyber criminals. These vital details should be protected at all times to confirm the confidentiality and integrity

- MPLS is costly, it is more expensive compare to the Internet.

Project Details:

- Systematic cost-benefit analysis between the MPLS link and the Internet link was performed
- WAN encryption was implemented using the existing WAN routers over the low-cost Internet link
- New Internet links were procured for all four brunches and installation, and testing were performed
- WAN encryption policies were designed according to corporate policies
- Prototype model was built in GNS3 simulator for testing and development
- Network devices were configured according to the design documents, and penetration tests were performed.

Special Strategies:

- Management was planning to cut off the IT budget, so the strategy was on cost saving solution
- WAN encryption project was executed by using the existing Cisco routers and its IOS (Internetwork Operating System) software
- Before implementing in production system entire solution was tested and evaluated in GNS3 simulator prototype environment
- The internal IT workforces were deployed this solution with the help of Cisco Technical Assistance Center (Cisco TAC).

Milestone Successes:

- All milestones of this project were achieved on timely manner
- WAN data encryption project over the low-cost Internet link was completed on time and within budget
- By replacing the expensive MPLS link with the Internet, the IT department saved annually more than $ 100,000.00 for IT budget with better Internet bandwidth and better performances
- Two central goals of this capstone project were completed successfully
  - Data encryption with secure authentication for protecting WAN traffic from external attacks and
  - The cost effective solution.

Issues Encountered:

- Due to the funding approval delay, the new Internet links ordering also got delayed, and quick installation and testing fixed it

- During the building of prototype GNS3 test environment on Windows 7 laptop, it was crashed due to high computing resources processing at a time, which was fixed by using high-end Windows 7 computer

- When the DMVPN router was configuring at data center location, some routing issues arose between DMVPN router and MPLS router, which was fixed by creating Cisco TAC ticket.

Cyber law, Regulations, Compliance:

- According to the Computer Fraud and Abuse Act of 1986, "Intentionally accesses a computer without authorization or exceeds authorized access and obtains financial information, United States department or agency information, or protected information from any protected computer involving interstate or foreign communication [3]" is illegal

- According to PCI DSS (Payment Card Industry Data Security Standard), the business should maintain a secured network for protecting the card holders' data and encrypting the transmission across the public networks like Internet.

- The research methodology was used for this project to investigate the problem included with the vulnerability assessment and security audit

- Organized the security training for all employees.

Leadership and Professionalism:

- Learned how to implement a project systemically and collaboratively to promote corporate goal
- Render the corporate needs into viable, economical solutions that meet business security strategies
- This project trained how to write business needs into project solution proposal
- Enhanced the configuration and troubleshooting skills of critical VPN technology
- Enhanced the corporate policies for compliance with federal, state mandates.

Security Planning and Management:

- WAN encryption (DMVPN solution) needs to be added into the current business continuity planning (BCP)
- WAN encryption required to be incorporated into the Change Management procedure, and any further changes need to be approved by Change Control Board
- Reviewed and customized the details of efficient project deliverables
- Analyzed and addressed the advantages and inadequacies of the delivered project.

System Security:

- Coordinate with the security team to confirm that all the WAN routers were part of the vulnerability assessment process
- Exploit the known vulnerabilities to close the security gap or repair them
- Verified the PSK (Pre-shared key) strength by PSK sniffing and cracking
- Collected all WAN routers log file into the Syslog server, for generating reports, and sending an email warning when certain thresholds are met such as any attack.

Applying What I Learned in Professional Work:

- Knowledge on how systemically and collaboratively implement a project to promote corporate goal and enrich brand value
- Render the corporate needs into viable, low budget solutions that meet business security strategies
- Learned how the existing WAN setup, Cisco Routers could enhance the security measures using inbuilt ‘securityk9 IOS technology package’ software
- This project trained how to write business needs into project solution proposal
- It Improved the configuration and troubleshooting skills of critical VPN technology

References:

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Sophy J. (2016), *43 Percent of Cyber Attacks Target Small Business*, online https://smallbiztrends.com/2016/04/cyber-attacks-target-small-business.html