# FBLA NETWORK DESIGN
# FINAL CASE STUDY

## PARTICIPANT INSTRUCTIONS

1. You have 20 minutes to review the case.
2. Presentation time is seven minutes. At six minutes the timekeeper will stand and hold up a colored card indicating one minute is left and at seven minutes the timekeeper will stand and hold up a colored card indicating time is up. Five points are deducted if presentation goes over seven minutes.
3. The judges will have a three-minute question and answer period following the presentation.
4. Each team member will be given two note cards. A flip chart also will be available.
5. All members of the team must participate in the presentation, as well as answer the questions.

### PERFORMANCE INDICATORS

- Logical solution is selected and presented with positive and negative aspects of its implementation given
- Alternatives are recognized with pros and cons stated and evaluated
- Thoughts and statements are well organized and clearly stated; appropriate business language is used
- Demonstrates ability to effectively answer questions

### CASE STUDY SITUATION

You have been hired by Roman Motor Company to design and implement a networking solution for their main office and for two satellite offices in different parts of town. Their main office is located approximately 10 miles from each of the satellite offices in opposite directions. The main office is provided with Internet access from the local telephone company in the form of a shared T1 line. Roman Motor Company plans to add at least one new satellite office within the next five years, providing that the business continues to grow as forecasted. At present, employees at the satellite offices have their own computer and networking systems that are completely separate from the main office, and manually take their backups to the main office, which is becoming very cumbersome. You must determine the best way to connect the satellite offices back to the main office. Upon initial planning, the following network requirements have been identified:

- Purchase and setup the proper networking equipment (including an IP addressing solution) within each satellite office in order for a secure, highly-available connection

back to the main office. The inventory and sales systems in place in the satellite locations are consistent with the main office.

- Provide kiosks in the satellite locations where customers can have Internet access to look up CARFAX® information and do price comparisons with other car dealers in the area. These kiosk machines should not be able to access any of the other network resources in the offices, but should have the ability to print out information.
- Provide for additional capacity as the new satellite office is brought 'online'
- Provide for centralized printing for invoicing and financial documentation for sales
- Provide for limited downtime
- Provide for centralized management and control of the computers in the two offices, as well as those in the main office, so that you can maintain the network from off-site
- Provide for long-term cost effectiveness
- Provide a suite of software tools for the employees to effectively communicate with each other at all locations

The company does not have any networking equipment at the satellite locations, but does have one computer at each of the satellite offices where the sales personnel can access the same sales software that is used at the main office, although it is not tied to the main office. Your plan should include a complete network system that meets these requirements and allows for future expansion plans.

One of the satellite locations is located within a suburban area that has current technological infrastructures and related technology offerings. The other location currently does not have access to the phone company network or the local cable company broadband network.

Complete your proposal including costs for computing equipment for the kiosks, network infrastructure, network servers, printers, and related hardware, software, and accessories. Include as much detail as possible as well as justification as to your selections. Diagram and explain your physical network and computer design as well as the logical network design (server installation, domain layout, etc.). As you are a working for a small business, cost is a major factor and should be minimized.

**2011 NLC FBLA NETWORK DESIGN**
**CASE STUDY**
**JUDGES' NOTES**

## JUDGING THE PRESENTATION

1. This is a team presentation event where the students will read a case study and present the case and suggestions to the judges.
2. Review the Judges' Instructions and the Case Study Situation.
3. After introductions, the participant team will begin its presentation.
4. Teams have up to seven minutes to present. Penalty points are assigned if a team goes over the time limit.
5. Judges have three minutes for questions and answers following the presentation.
6. Please ask each team at least one question, but not necessarily the same questions.
7. You will close the event by thanking the participants for their input.
8. Complete the rating sheet.

## JUDGES' INSTRUCTIONS

- Purchase and setup the proper networking equipment (including an IP addressing solution) within each satellite office in order for a secure, highly-available connection back to the main office. The inventory and sales systems in place in the satellite locations are consistent with the main office.
    - The network solution should include security mechanisms for the sales and inventory systems, and should make sure that the customer kiosk network does not have access to the sales network (look for a VLAN solution here, making sure that switches are part of the network design solution at the satellite offices). Firewalls should be included and security tightened on them. NAT or PAT (or some combination thereof) also could be used to minimize IP address needs.
    - Between office network solutions should be encrypted for sales traffic. A secure WAN solution should be proposed. As cost is a factor, this could be a VPN solution using locally available cable modems, or DSL, etc. between the satellite offices and the main office. As cable/DSL solutions are not available for one of the satellite offices, expect discussion of dial-up versus satellite technologies for Internet access at this location. Cost effective solutions for the other office should focus on local DSL, or cable technologies. Switches will have to be placed in each office, probably no more than one, since VLANs can be utilized to keep the kiosk network separate from the sales network. Router placements and installations will include one at each location. Since the network is small, lower-end switches and routers may be used, and enterprise-level equipment is not necessarily needed. The computer network between the satellite offices and the

main office should be secured (with solutions such as an IPsec VPN). Since cost is a factor, students should not consider using a dedicated VPN concentrator.
    - The network must provide adequate security for all of the company communications and documents.
    - Appropriate permissions on files, shares, etc. User rights management, and strong password policy for company information. File encryption is another possible implementation (EFS).

- Provide kiosks in the satellite locations where customers can have Internet access to look up CARFAX® information and do price comparisons with other car dealers in the area. These kiosk machines should not be able to access any of the other network resources in the offices, but should have the ability to print out information
    - Include costs and specifications associated with purchasing either stand-alone PCs, or thin clients for the kiosk locations. If thin clients are utilized, the team should have support for them included in the server specifications.
    - Printing also should be allowed on the kiosk computers, but these printers should not be connected in any way to the centralized printing for sales.

- Provide for additional capacity as the new satellite office is brought 'online'.
    - Include 100 mbps or higher network switches with extra network wiring and ports, as well as extra open ports on the switches to accommodate future growth. Include centralized server hard drive capacity as well.

- Provide for centralized printing for invoicing and financial documentation for sales.
    - Provide mid-range capacity printers that are dedicated behind the counter at the dealerships. A dedicated print server is not needed for this small network.

- Provide for limited downtime
    - Ensure that vendors provide next day (or less) support for all critical systems, including servers, switches, routers, etc. Because of cost, if smaller inexpensive routers and switches are used, consider having a backup on-hand for each. A backup routine should be detailed for the server. A UPS solution also should be included. As cost is a factor, backup generators/power supplies should not be included.

- Provide for centralized management and control of the computers in the two offices, as well as those in the main office, so that you can maintain the network from off-site.
    - Provide for mechanisms such as remote desktop, VNC, or 3rd party LAN management tools, etc. to maintain all the systems from one central location. Provide for centralized servers, either using Microsoft Active Directory or an open source solution such as LDAP. Any off-site access to servers strongly encrypted (expect discussion of securing remote access).

- Provide for long-term cost effectiveness
    - No large long-term costs and/or contract fees.

- Provide a suite of software tools for the employees to effectively communicate at all locations.
    - Provide for the installation of some sort of complete communication system. This could be done with open source software such as the Open Office suite, or with

cloud computing options such as Google Docs. The teams also should include adequate e-mail and communication services (again, could be open source, such as Mozilla Thunderbird or Gmail).

The entire project should have reasonable pricing. Projects that are complete and have minimal costs should be given higher priority. Using open source software solutions will minimize software costs for servers and communication suites. The use of cloud computing for software solutions would show forward, current thinking. Using Thin Clients also is coming back into vogue as a cost-reduction measure.