

Using Virtual Network to Solve Freight Company Problems

¹Jamil Sameh Al-Azzih and ²Mazin Al Hadidi

¹Al-Balqa Applied University, Department of Engineering,
Faculty of Engineering Technology, Amman, Jordan

²Al-Balqa Applied University, Department of Engineering,
Dept. of Computer Engineering, Amman, Jordan

Abstract: This paper talk about a large organization has a large distribution center and large number of haulage vehicles called Freight company. This company faces many problems during their works. The problems are summarized in how does the company contact with their vehicles and how does the company control the humidity and temperature of each warehouse. The warehouses hold valuable shipments. So that, it is important to the company The proposed solution is to use a technology provide a secure connection, save time and increase efficiency, the best option is Virtual Private Network and Global Position System to determine the location of each vehicle.

Key words: Virtual Private Network • Global Position System and geographic information system

INTRODUCTION

Many organizations such as freight agencies have a large number of haulage vehicles and a large distribution center. This organization is willing to use technology in their complicated business, it wants to reduce the costs, increase and create better efficiency. Freight agency need to find communications solution for its complicated business. It needs to operate a supply chain services via roads, rails and sea. The company requires a large number of reports and documentations for daily operation, these reports and documentation should be on time. This company needs to monitor each stage well for processing large and valuable cargo shipments. The process of monitoring is important to this firm. The company requires a means of sharing data on the status of cargo shipments, temperature and humidity of the warehouses because temperature and humidity of warehouse is very important to the company.

For a large organization like freight agency, it is difficult to find each haulage vehicle accurately in the exact location without using secure communication. In addition, it extremely difficult to monitor the temperature and humidity of the warehouses without using internal network for accessing and adjusting the temperature and humidity of warehouses.

In addition, information arrival time can not be known by the company. Managers do not have the ability to manage the temperature by altering fans and heaters. Secure connection for tracking these haulage vehicles is not available. The company does not have time to spend on other activities of the business. Secure and reliable remote access is not available in this large company. productivity is very low and the support calls in increasing.

According to the increasing amount of data and training required for employees, combined with the amount of business data to be shared. We suggest the development of an intranet based on internet and virtual private network (VPN) in order to solve the difficulties and problems that the company faces.

The structure of this paper begins with introduction that describes the main subject of this paper; problem formulation and the proposed solution. Secondly, the background describes the basics of the Virtual Private Network; Intranet and (VPN) protocols. Main work describes the problem solution, the advantages of this solution and disadvantages. The conclusion describes the concluded main work. Finally, the references.

Corresponding Author: Jamil Sameh Al-Azzih, Al-Balqa Applied University, Department of Engineering,
Faculty of Engineering Technology, Amman, Jordan.

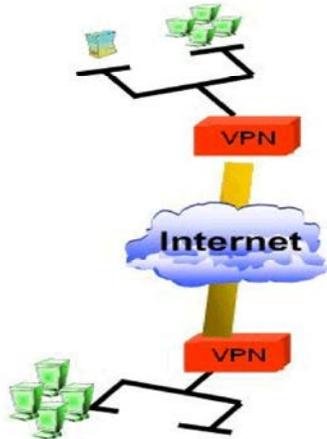


Fig. 1:
Types of VPNs:

Backgrounds: [1] VPN, Virtual Private Network, is an end-to-end tunnel for secure communication. The data sent from one end to the other is encrypted when transmitted and decrypted when received. This gives the encrypted end-to-end communication, which is almost like directly tunneling data from one end to the other. Data sent in a tunnel is authenticated to make sure that only valid user are allowed to access the tunnel and that the data comes from the valid user. IPSec performs an authentication check on each packet sent in a tunnel. The authentication is done to prevent certain types of attacks, i.e. it is not enough to encrypt the data.

VPN uses the already existing network connections and often the TCP/IP protocol. This makes it easy to deploy a VPN device anywhere in a network or on the Internet as it occurred in freight agencies. A VPN includes authentication and encryption to protect data integrity and confidentiality. VPN is illustrated in Figure 1.

Remote Access VPN: It provides access to internal corporate network over the Internet. It reduces long distance, modem bank and technical support costs. The term intranet refers to the fact that the web or other internet applications are being run completely on the inside of a private network often without a direct connection to the internet.

Why Use Virtual Private Networks (Intranet)?

- More flexibility because it use multiple connection types (cable, DSL, T1, T3), Secure and low-cost way to link, Ubiquitous ISP services and Easier E-commerce.

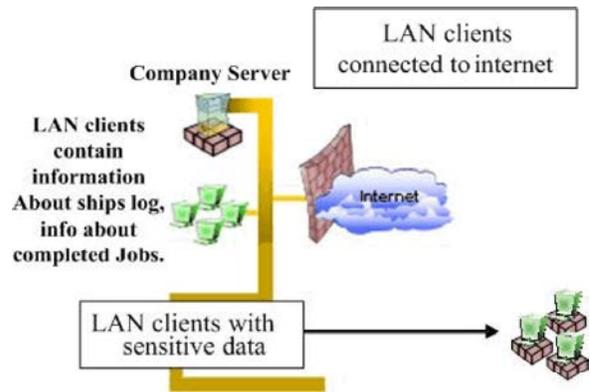


Fig. 2:

- More scalability, this means we can add new sites and new users quickly, scale bandwidth to meet demand.
- Lower cost, reduce leased line costs, Reduce long distance, reduced equipment costs (modem) and it reduce technical training and support.

Related Work: Megan Watzke wrote in his article that published on http://www.wachovia.com/small_biz about many businesses that used the intranet as a solution for their problems. I will explain in detail some these applications:

Intranets for Internal Company Applications: An intranet—not to be confused with its larger, freer cousin, the Internet—allows companies to share information amongst employees, much the way traditional offices use memos or cork boards. Using the same software and other development tools common on publicly-accessed Web sites, intranets take advantage of the point-and-click ease of the Web, but access to the site can be limited to a single company or even a specific group of employees within a firm. Password protections and other methods can be used to ensure that private information remains private[12].

Intranets Can Help with Telecommuting: For many smaller entities, intranets can become important if many workers telecommute or if the company has a few employees in separate locations. In addition, a desire to spend employee or partner time more efficiently may spur a small business to consider an intranet. Steve Telleen, director of marketing strategy for Intranet Partners of California, said he recently worked on a project to set up an intranet for just four people—including himself—all of whom worked on very tight schedules. To maximize the quality of meetings among the four, each member

continually posted his or her progress on a given topic using the company's intranet. Each member of the group could then examine all the work done to date when time permitted, hash it over in a discussion thread and work out many details—all before the first scheduled meeting. "The value of the intranet is letting you work asynchronously," said Telleen. "Our actual face-to-face meetings were very efficient because we did not have to take time bringing the other members of the project up to speed and we could spend more time on the creative process" [12].

VPN for a business in San Francisco Area

Business Issue: Nowadays most corporate offices operate through a computer network. Most offices also use the Internet, whether for research, e-mail or other communications. Although network firewalls prevent most attacks from outsiders seeking to breach into the network using the Internet, they also prevent remote users to access essential data. That's where VPN comes in. By ensuring that only properly configured and authenticated users can access network data and that this data is secure because encrypted, companies can implement mobile network access and telecommuting from any Internet-enabled location [13].

VPN Solution: VPNs enable secure broadband connections (through cable modems, DSL, etc.). VPNs make it easy to manage T1 lines, phone and data lines and remote access terminals. VPNs can create significant communication savings in particular when lots of remote users dial-in from outside the local calling area. VPNs may provide less bandwidth than by using direct lines. VPNs is more prone to Internet connectivity problems. VPN being mostly Internet-based, it is dependent on connections to be up [13].

Main Work: A large organization like freight agency, Intranet VPN will help it to ease its operations, facilitate contacting with employees and haulage vehicles and encrypt the sent data between end users. So, secrecy in connection will exist.

Because temperature and humidity of warehouse is very important to the company, We suggest using an Intranet VPN and site-to-site VPN to access and adjust the heating and the humidity of the warehouse. Intranet VPN and internet make the company able to remotely control the humidity of warehouse by running monitoring

software. Because there are large valuable cargo shipments, the company needs to monitor each stage well and determine the location of each haulage vehicle. To solve this problem, We suggest using Global Position System (GPS). Prior illustrating how the company will track each haulage vehicle lets define GPS. GPS is a Global Navigation Satellite System (GNSS) developed by the United States Department of Defense. It uses a constellation of between 24 and 32 Medium Earth Orbit satellites that transmit precise microwave signals, which enable GPS receivers to determine their current location, the time and their velocity [10]. So that, by putting GPS receivers in each haulage vehicle that allow the company to determine the current location of each haulage vehicle, the arrival time of each haulage vehicle and the velocity of each vehicle.

GPS enables automatic vehicle location and in-vehicle navigation systems that are widely used throughout the world today. By combining GPS position technology with systems that can display geographic information or with systems that can automatically transmit data to display screens or computers, the large fleet of the company can be tracked accurately [11].

A geographic information system (GIS) stores, analyzes and displays geographically referenced information provided in large part by GPS [11].

Today GIS is used to monitor vehicle location, making possible effective strategies that can keep transit vehicles on schedule and inform the company of precise arrival times of the ships and haulage vehicles. Also, the customers and the agents of this company can track the haulage vehicle, ships and the steel warehouses by using geographic information system (GIS).

Benefits of GPS: Using GPS technology to help track and forecast the movement of freight. Freight companies' use GPS for tracking to guarantee delivery and pickup at the time promised, whether over short distances or across time zones. Better location information with electronic maps to provide in-vehicle navigation systems for both commercial and private users [11].

The design of the proposed solution is illustrated in Figure 3.

Company informs the customers once jobs have been completed. Information about the ships log and information about completed job are provided to the customers and clients quickly. The information is available in internet.

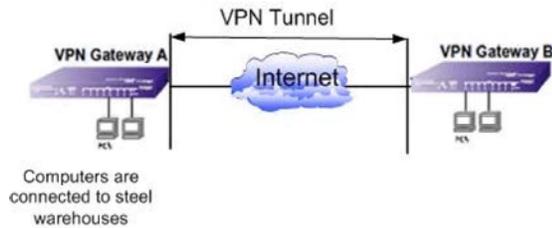


Fig. 3:

In addition, all employees and staff can access the freight agency central data base for all the information required for running a an application or running a business, information about haulage vehicles movements time, information about temperature and humidity of warehouse and information about the arrival time of each haulage vehicle.

Information about training opportunities, holiday's forms and family bounce from, car bounce forms regulatory handbook are available in internet to employees of the company.

Therefore, the company has time to spend on other activities of the business. The company may expand their business by using air cargo. Increase their transactions.

The benefits which the company has obtained from using VPN techniques are:

- Making significant cost saving, support calls have decreased, productivity has increased. Reduce leased line costs, reduce long distance and reduced equipment costs.
- Save employee time.
- develop positive and long-term relationships with clients.
- Run the business remotely as the company has used the virtual private network technology.
- More scalability, this means we can add new haulage vehicle, add new employees.
- All the information required for running the business is immediately available on the intranet.
- The company has earned more profits since it used virtual private network.

CONCLUSION

The result from using VPN types such as Intranet and site-to-site VPN combined with Global Position System and Geographic information system is to increase the

efficiency of the freight company by allowing the employees of this company to run the business remotely and to control the humidity and the temperature of the steel warehouse remotely. Exploiting VPN technology has made a significant influence in the company by saving employee time, saving employee efforts, increasing the profits of the company and reducing long distance and supports calls.

In addition, GPS and GIS are the best means to track the haulage vehicles and determine their location accurately.

Using GPS and GIS allow the company to monitor the ocaction of each vehicle. This system Increased efficiencies and reduced costs in surveying roads.

Ultimately, there are some recommendations for future work. We suggest building web-based real-time reports to provide customers and the agents of the company the recent information about the goods.

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