

**B2B Strategy for Network Operators**

by

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Submitted to the Sloan School of Management  
in Partial Fulfillment of the Requirements for the Degree of  
Master of Science in Management of Technology

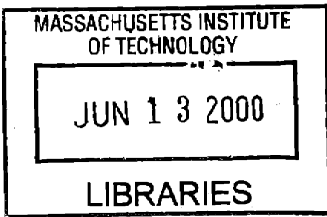
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### **ABSTRACT**

The telecommunications industry is highly competitive. Many of the players in the Carrier, Commercial and Network Construction Service markets are looking to have financial, personnel, marketing, other resources and other competitive advantages such as B2B Internet services. Increased consolidation and strategic alliances in the industry, resulting from the Telecommunications Act of 1996 is giving rise to significant new competition in the industry.

In addition to this, the advent of the Internet has made the traditional circuit-switched telephony no longer efficient and economical, and to a certain extent obsolete. The less expensive and easily maintainable IP-switched networks are in greater demand. Information age has made E-commerce the process of empowering the organizations for information exchange using digital technology.

This study includes an analysis of the effect of the above factors on a network operator's business. It also consists of the case studies of two new-age network operators, Level 3 and Qwest.

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## CHAPTER 1

### Introduction

E-business to business isn't about re-inventing business. It's about streamlining current business processes to improve operating efficiencies. It provides opportunities for attacking the embedded inefficiencies of organizations. For large corporations it also provides means to improve internal and external collaborations. It enhances Supply Chain Management by optimizing business processes and business value in every corner of the extended enterprise.

Network providers play a major role in the support of these backbone operations of E-B2B. The traditional role of network providers changed from providing the communication needs to total business solutions. Network providers have become major transporters of E-B2B, which also means they have to provide not only basic transportation, but also the bells and whistles to make the ride enjoyable. This also means network providers need to react to the fundamental shifts in technology and market needs. This study includes the following elements:

- Network provider's role and strategy
- Services they provide and shift in services
- Dynamics of changing markets and technologies
- Case study of two E-B2B companies, Level3 and Qwest

Today's telephone companies provide various B2B solutions, where traditional business functionality of providing bandwidth and communications is transformed into business service. The following are some of the services that change the network operator's traditional role as a communications service provider to that of a business solutions provider:

- Association Program
- Web Hosting/Outsourcing
- Online-Retail

**Association Program:**<sup>1</sup> This is where businesses can transfer their functionality of tracking their partners to network operators. Under this program the customers gets royalties on various services used by their members. The customers also receive value in communication services that include long distance, toll free numbers and data services. These programs are designed so that the participating customer and the network provider work together to ensure its success. Once the customer provides the necessary tools, the network operator goes to work on start-up, marketing, order fulfillment and ongoing evaluation. Most of the 800 and 900 telephone based small businesses are done this way.

**Web Hosting:** This is the environment where high bandwidth and reliability are more important. By using this service, the businesses do not have to worry about their growth rates in terms of IT infrastructure for the web. This way network operator provides options in storage and bandwidth that give customers virtually unlimited content flexibility as the business grows. Here the IT infrastructure burden of the growth of a business is transferred from the customer to the network provider. The advantages for the customers include flexible bandwidth, superior IT facilities, advanced connectivity and round the clock engineering support.

**Online-Retail:** Some providers offer complete online retail support services. This service also includes a one stop shopping solution for hardware, software, hosting and network solutions.

In order to understand how all this works, from the perspective of the network provider, we need to understand the following questions.

- How the market dynamics are changing?
- What are the implications of government regulations?
- What kind of network planning is required?
- What kind of services needs to be provided?
- What kinds of partnerships are needed?

Keeping the above in perspective this study is organized in 5 chapters.

*Chapter 1:* This chapter explains the issue of this study and organization of the study.

*Chapter 2:* This chapter deals with the industry structure, regulation, markets, paradigm shift and technology.

*Chapter 3:* This chapter is Level 3 case study. Here the company's history, network, products & services, alliances and mergers are discussed.

*Chapter 4:* This is the case study of Qwest. In this chapter the company's history, network, market segmentation, products & services, M&A and alliances are discussed. Apart from these, this chapter also includes the interview with John Charters, Chief Executive Officer of Qwest Cyber Solutions.

*Chapter 5:* This is the conclusion of this study.

## **CHAPTER II**

### **Industry**

To understand the strategy for any business it is important to know the business itself. This chapter deals with many topics that are important for this study including some history behind the telecommunications industry and its structure. The following describes the structure of this chapter:

- What is E-commerce? What is B2B?
- Why B2B?
  - Dominant Design
  - Mass-Customization
  - Value Chain Management
- Technological Changes
- Competition
- Pricing Pressures and Industry Capacity
- Government Regulations
- Network Operator Technologies
- Structure of Providers
- New Opportunities

#### **What is E-commerce? What is B2B?**

E-commerce is the process of empowering the organizations for information exchange using digital technology. Traditional paper-based processes are replaced by this digital technology to reduce costs, increase speed, minimize mistakes, provide economies of scale and accommodate collaboration among organizations. Though E-commerce is an



old phenomenon, the birth of the Internet has generated the explosive growth in its use. Web commerce or Internet commerce is the term often used to refer specifically to electronic commerce conducted over the Internet.

E-commerce can be divided into two categories: business-to-consumer (B2C) and business-to-business (B2B). B2C solutions generally refer to on-line retailing applications. Under this, some companies began selling goods and services and established themselves as Web commerce businesses such as Amazon. Other existing businesses have added Web commerce sites as an extension of their sales and distribution channels, an example being Dell.

Though the B2C market has received the most publicity, the B2B market size is larger in terms of dollars and is growing faster. Similar to B2C Web commerce, which can replace or reduce traditional storefronts, catalogues and sales force size, B2B Web commerce can replace sales phone calls, faxes and even direct sales forces used in sales and purchase operations. This also provides the means for post-sales customer support between businesses.

All this can be achieved only through reliable and efficient information flow over the networks. This means the communication channels provided by the network operators are not just physical pipelines any more. The customer requirements for the network operators changed from just bandwidth to value added services where they can leverage.

## Why B2B?

The question of "Why B2B?" can be answered by the following:

- Dominant Design
- Mass-Customization
- Value Chain Management

**Dominant Design:** Electronic data interchange (EDI) was the technology used to support business-to-business E-commerce and it is still an important part of the overall electronic commerce strategy for many big corporations. EDI is an expensive proposition for many companies and this high entry cost has limited the use of EDI to situations in which businesses communicate with other businesses. But the use of EDI is growing rapidly. These businesses are migrating from value added networks to less expensive virtual private networks (VPN)<sup>2</sup>. VPN uses the Internet as its network. Many companies are reinventing EDI altogether, to take advantage of the low-cost, open and interactive nature of the Internet.

The advent of the Internet has made the traditional circuit-switched telephony no longer efficient and economical, and to a certain extent obsolete. The less expensive and easily maintainable IP-switched networks are in greater demand. The fiber-optic network with IP-switching is the new dominant design for the networks.

**Mass-Customization:** This is the new phenomenon in the modern business. In order to compete in the market and differentiate the products and services, mass-customization is very effective. On the other hand, Information Technologies and the Internet offer consumers unprecedented flexibility and customization. Effective use of concept of the mass-customization can be used by businesses to capture greater market segments, including emerging sectors. This could

reduce the opportunity for disruptive technologies from entrant firms to gain a foothold.

An ASP (application service providers) business, which is a value-added service by network operators, is an example of mass customization. Consider email hosting, where one application can be used for many customers with different domain names and interfaces. Here the interaction between businesses will be seamless when compared to the situation where every business has their own server from different a vendor.

**Value Chain Management<sup>3</sup>:** In general, E-commerce for most companies refers to the transactions of buying and selling goods and services, and the associated methods of electronic payment/billing for these transactions. All this is just the basic of E-commerce. Beyond this, there are many opportunities for businesses to exchange information via the Internet. Using collaborative planning businesses can integrate supply chain management, improve and cut costs. These facilities/processes do not even exist in most companies today. The following defines some of the benefits of this process:

- Informing suppliers of the company's purchase plans enables them to meet company's demands effectively.
- Collecting the customer's medium to long-term purchase plans helps the company to estimate the budget and demand.
- The Web can also be used in coordinating trading partners and sharing information among them.

The question is what all this has to do with network operators? Along with the bandwidth all of the above mentioned value added services have become part of the network operator's business. The understanding of the management of the value chain is important in providing ASP

(Application Service Provider) services and Web hosting services.

### **Technological Changes**

The telecommunications industry is subject to rapid and significant changes in technology. For instance, recent technological advances permit substantial increases in transmission capacity of both, new and existing fiber. The introduction of new products or the emergence of new technologies may reduce the cost or increase the supply of certain services.

### **Competition**

The telecommunications industry is highly competitive. Many of the players in the Carrier, Commercial and Network Construction Service markets are looking to have financial, personnel, marketing, other resources and other competitive advantages such as B2B Internet services. Increased consolidation and strategic alliances in the industry resulting from the Telecommunications Act of 1996 is giving rise to significant new competition in the industry<sup>4</sup>.

For each long distance call, the originating and terminating LECs (Local Equipment Carriers) charge the long distance carrier an access fee to carry the call across their local networks. The long distance carrier charges the customer a fee for its transmission of the call, a portion of which consists of the access fees charged by the originating and terminating LECs. To encourage the development of competition in the long distance market, the LECs are required to provide all long distance carriers with access to local exchange service that is "equal in type, quality and

price". This "equal access" and related provisions were intended to prevent preferential treatment of Tier 1 carriers and to require that the LECs charge the same access fees to all long distance carriers, regardless of their volume of traffic. These provisions, along with the development and evolution of fiber optic technology with its increased capacity and transmission quality, have helped smaller long distance carriers emerge as alternatives to the largest companies for long distance telecommunication services.

The United States international long distance industry is large and growing. This growth in international long distance can be attributed to three factors. The first is to the deregulation, which stirred the competition, decreasing in prices and improvement in service offerings and customer service. The second can be attributed to technological innovations and the expansion of telecommunications infrastructure. The third is the worldwide trend towards deregulation and open economies.

Continuing developments in multimedia applications are bringing new entrants to the telecommunications market. Internet service providers and cable television, entertainment and data transmission companies are the new customers for voice, data and video communications over high bandwidth networks<sup>5</sup>.

### **Pricing Pressures and Industry Capacity**

For many years the main business of network operators included local, long distance and data transmission services. This is an increasingly intense competitive arena because of industry consolidations and over capacity of networks. This has driven these players to look into other alternative

markets and services to sustain their market share and growth rates.

According to the industry the capacity of the long distance transmission has exceeded its utilization capacity. Moreover the long distance prices are continuously declining ever since the divestiture of AT&T in 1984. However, in the last several years Internet usage has increased the demand, which has resulted in a shortage of capacity and slowed the decline in prices. This intense competition is eroding the bottom line of the network operators long distance business. The prices for Carrier and Commercial Services will continue to decline primarily due to:

- i) Existing infrastructure and competition. There are already enough networks in telecommunications industry and the marginal cost of carrying additional traffic is almost nothing, which fueled the price wars. Especially installations of fiber that provides substantially more transmission capacity than will be needed over the short or medium term and will create a tremendous price pressure.
- ii) Technological advances in the transmission capacity that permits substantial increases over both existing and new fiber.
- iii) Industry consolidation and strategic alliances, such as long distance capacity purchasing alliances, will create enormous investment and purchasing power, which will further fuel the competition in the industry.

In the United States, the profitability of international long distance market is determined by the difference between settlement rates and billed rates. The settlement rate is the rate paid to the other carriers for the termination of an international call. The difference in

cost between providing domestic long distance and international service is minimal. Increased worldwide competition has already brought about certain reductions in settlement rates and end user prices, thereby reducing overseas termination costs for United States-based carriers. However certain foreign countries use settlement rates to subsidize their domestic call rates, contributing to significantly higher rate for certain international calls compared to domestic long distance calls. The FCC has proposed measures intended to overhaul the system of international settlements, although such proposals have not yet been implemented and remain subject to modifications or appeals to the courts.

### **Government Regulations**

Regulation of the telecommunications industry is changing rapidly and the regulatory environment varies substantially from country to country. As the various regulations of different countries are not possible to study in the time frame of the report, it is decided to limit this to the regulations of the USA.

In the USA telecommunication operations are subject to extensive federal and state regulation. Carrier and Commercial Services are subject to the provisions of the Communications Act of 1934, as amended, including the Telecom Act of 1996<sup>6</sup>. FCC regulations as well as the applicable laws and regulations of the various states, including regulation by Public Utility Commissions and other state agencies will complicate the regulations of the industry. Federal laws and FCC regulations apply to interstate telecommunications, including international telecommunications that originate or terminate in the United States. The state regulatory

authorities have jurisdiction over telecommunications both originating and terminating within a state. This means that the network operators must obtain and maintain certificates of authority from regulatory bodies in most states where they offer intrastate services. Network operators must also obtain prior regulatory approval of tariffs for its intrastate services in most of these jurisdictions.

Moreover, as deregulation at the federal level occurs, some states are reassessing the level and scope of regulation that may be applicable to the industry. All of the industry's operations are also subject to a variety of environmental, safety, health and other governmental regulations. There can be no assurance that future regulatory, judicial or legislative activities will not have a financial adverse effect on the industry.

A recent federal legislative change, the Telecom Act of 1996, has resulted in significant effects on the operations of network operators. The Telecom Act of 1996, among other things, allows the RBOCs (Regional Bell Operating Companies), the General Telephone Operating Companies and other entities to enter the long distance business. The new entities include affiliations with utilities and ventures between LECs (Local Equipment Carriers) and cable television companies, to provide an expanded range of telecommunications services. Entry of such companies into the long distance business resulted in substantial additional competition in Commercial and Carrier Services, affecting the industry and its customers.



## **Network Operator Technologies**

The communications needs for voice, data and video are primarily served by fiber optic and coaxial copper cables, microwave systems and satellites. Until the emergence of fiber optic networks copper cables were the main terrestrial network medium. Cost effective and higher capacity fiber optic cables replaced most of these copper wires by 1990s.

*Fiber Optic Systems:* In these systems, ultra-thin fiber loops provide the medium, illuminated by laser generated light, to transmit voice, data and video. A typical fiber optic cable consists of 100 or more such fibers can carry up to 40,000 voice channels. Some of the qualities of fiber optic systems include larger capacity, better sound quality and resistance to interference. They also interface directly into the digital switching equipment. The transmission through fiber needs regeneration and amplification due to signal dispersion. The technological improvements reduced this effort and lowered installation and operating costs. The new technologies can transmit up to 60 miles without any regeneration and amplification, whereas the old technologies allowed only 20-45 miles. Right now SONET and DWDM are two technologies used in these systems. SONET is more reliable due to its inherent self-healing characteristic but DWDM provides more bandwidth and less latency.

*Microwave Systems:* Digital microwave systems are effective and reliable for transmitting low volumes and narrow bandwidths of voice, data and video. But the bandwidth capacity, when compared to fiber optic systems, limits these systems. Microwave electro-physical properties make the transmission possible through air with relatively less power. A transmitting antenna and a receiving antenna make the

circuit. These high frequency radio waves can be focused, beamed and reflected in a line-of-sight transmission path. This requirement of line-of-sight makes the systems not concealable like fiber cables and is one of the drawbacks. These microwaves disperse over a certain distance and need to be repeated at repeater stations. Like any other weak signal, these waves also need to be amplified and retransmitted. Usually these repeaters need to be located on an average of 22 miles apart.

*Satellite Systems:* Initially these were the systems used for point-to-point transmission for both television and long-distance telephone. However, proven cost-effective fiber optic systems are replacing these satellite systems. Though satellites are not cost effective for point-to-point high volume transmission, they are still in use to broadcast television programming due to its simultaneous coverage of vast areas and long distances. These are also useful where the infrastructure of terrestrial networks is not available or possible. Most of the developing countries depend on these due to lack of land-based networks. Ease of accessibility without much land based equipment makes it more useful especially in remote places.

## **Structure of Providers**

Though the telecommunication companies may generally be categorized as "facilities-based" carriers and "nonfacilities-based" carriers, it can be further divided into 3 Tier segments.

*Tier 1:* These are the carrier companies that own their own network transmission facilities and switching equipment. Their networks are spread over an extensive geographical area. These are also known as facilities-based carriers because of their huge investments in network infrastructure. They also lease transmission facilities from other carriers to maintain the network reliability, to reduce traffic bottlenecks and to compensate the areas where they don't have their own network footprint.

*Tier 2:* This segment consists of medium-sized long distance companies, where they also have limited national capabilities. They primarily operate on leased facilities and some of them own part of their transmission facilities. Because of this they are also known as partial facilities-based carriers. However, most of these carriers are nonfacilities-based carriers. Similar to Tier 1 carriers, Tier 2 carriers also design, manage and operate their own networks. Tier 2 networks are much smaller in scale and limited to a certain regional geographic area. They normally operate their own switches and like Tier 1, these are also known as switch-based carriers. Most of the carriers that own facilities on their service routes sell their capacity to maintain their operational costs low. Some Tier 2 carriers lease high volume capacity from other carriers and resell low volume capacity at higher unit prices.

*Tier 3:* These carriers don't own or operate their facilities or networks. They buy minutes from other carriers to resell and are known as switchless carriers. They primarily focus on sales and marketing activities and significantly vary in size. They buy large volumes at wholesale prices, for a low per minute price, from the switch-based carriers. Reselling those minutes at a higher price generates their profits. Normally these carriers bill their customers based on the invoice received from the underlying carrier. Sometimes these also act as agents for switch-based carriers; in these cases, the end customer will receive bill directly from the underlying carrier. The minimal infrastructure cost makes the barriers to entry low in this long distance market and that allowed many players to enter this segment. Once the business is well established, these Tier 3 carriers may install their own switches and move up to Tier 2 category.

Operator service companies mainly focus on operator services. They also provide communications services to long distance companies, institutions and other card based service companies. Sometimes they also lease their entire equipment and manage their own network, switching and equipment.

Competition in the retail long distance industry is based upon pricing, customer service, network quality and valued-added services, creating opportunities for smaller long distance providers. To cut costs, telemarketing and temporary workers have become the sales forces for long distance companies. This has created an opportunity for smaller companies to compete in certain segments of the long distance market, and many of them are quickly able to build sizable customer bases on the strength of their marketing efforts and distribution channels.

## **New Opportunities**

Overall electronic commerce volumes are exploding and the business-to-business segment is growing fastest of all. This growth creates many opportunities for those businesses that act quickly. B2B technologies can help companies to quickly take advantage of the opportunities this growth opens up. One of the major benefits of E-commerce is elimination of inter-mediation by bypassing traditional links in the supply chain. In other words distributors can ship directly to consumers and the manufacturers can ship directly to retailers. This also means a lower transaction cost to customers. Web commerce technology provides the means of being price competitive. The Internet has also accelerated the process of replacing the traditional links of the supply chain management with web based links. Today new businesses are designed from the ground up as electronics business and these firms are putting tremendous pressure on the traditional distribution chains.

The economic benefits of using the Internet are straightforward and undebatable. If we translate these benefits into return on investment, they are marketing, cost reduction and increased customer satisfaction. The Internet is also a great marketing tool and makes it easy to convey product information effectively and uniformly to all customers. The Internet reduces the transaction costs significantly and sometimes even eliminates it. The Internet reduces the labor costs, transactional errors, process time and restocking costs. It provides means to the businesses to take advantages of economies of scale. It gives freedom to the customer to choose products without any pressure. The Internet, when done correctly, is also used to provide customer service effectively and efficiently without any added cost. Used in this way, it can enhance the customer

satisfaction. The Internet also provides the means to increase customer satisfaction by easy, fast and accurate transactions.

The transformation of the telecommunications industry is affecting the nature of both the network operators and the markets. The information highway is approaching new heights and this can be qualified as "revolutionary" rather than "evolutionary". The Internet is the great divide between yesterday's telephone and today's web. This changing landscape can be attributed to the following factors:

- Liberalization and globalization of markets.
- Increased competition and number of players.
- New technologies and services, i.e. convergence of data, audio and video.

For the past several years, the communications industry has been experiencing a significant increase in mergers, acquisitions and consolidations among local service providers, long distance providers, broadband Internet providers, cable television companies and other emerging technology companies<sup>7</sup>. These industry changes have resulted from significant competitive, regulatory and technological changes over the last few years and are an indication that the most effective competitors in the communications industry are expected to be those companies that offer the most complete array of products and services without geographic limitations. Strong national and international players, which have formed, and are forming through mergers, acquisitions and alliances, are looking to lead the telecommunications industry by offering customers one-stop shopping for their communications services, including broadband Internet services.

Network Operators have to reposition themselves rapidly in the changing market; they have already started

diversification strategies by launching new services and by trying to enter new markets. For the most competitive network operators, this means rapid rationalization of their activities through reduction of costs and segmentation of their markets. This also means that their services should correspond not only to customer needs and desires but also to economic and social environments of clients. The prices are not set by the service providers but imposed by the competition. New entrants into the network operator business count on different variety of assets such as network infrastructure, rights of way, availability of capital and the existing client base. In addition to this, new entrants also claim the client base from their partners, such as electricity supply and cable operators to offer alternative solutions.

This change in the markets also puts pressure on suppliers and they have become the partners of network operators. Suppliers, in turn, must respond to the new needs of operators by offering global solutions while responding to the specific requirements of each client by introducing new products, providing financing schemes, and sharing risks and profits with operators. This created a major co-competition between network operators and equipment suppliers. This paradox to be resolved between the suppliers and the network operators is to understand the balance of the delivery of globally standardized products and the ability to create the special services needed by network operators.

Volume, space and time are not the constraints any more for information distribution. The spectacular advances in the ease of digitization of information have lead to the evolution of new services. Today, business success depends increasingly on the acquisition, sharing and mastering of information. Digitization of information has become the key

to achieving the above business processes. A new world of convergence has emerged from the technological breakthroughs and transformations in telecom sectors. The multimedia industry is a creator of new services, which like the Internet has profoundly changed our environment and has created new needs as a result of the explosion in traffic volumes.

The telecommunication services still remain as the most dynamic sector of the economy and will diversify further. In future the structure of the traditional parts of the telecommunications industry for both carriers and equipment manufacturers can be attributed to the competition rather than the number of competitors. The size and the cost of the capital are still a major factor in the telecommunications industry. For carriers this is a problem because the activity requires huge investments and fixed costs. At the same time, alliances and partnerships have been created to offer seamless services on a worldwide scale. On the other hand, we will see a proliferation of content and service providers because they do not require heavy infrastructure investments. In other words the competition will be greater and tougher in geographic terms and for all types of services. But the competition between carriers and broad range equipment manufacturers will be limited to a small number of entities.

Today's networks are offering a heterogeneous mix of services. These include distributive and interactive, asymmetric and symmetric, broadband and narrow-band, wireless and wire-line, multimedia, and so on. In an ideal world, all these services would be available to end users in a fully transparent way, regardless of the networks to which they are connected, but in many cases it is impossible to integrate services over heterogeneous networks. The issues that will need to be resolved over the next few years, include the



rising popularity of on-line services, the need for high quality content, the trend towards greater user mobility, and the demand for more customized services. All these needs can only be met by the eventual emergence of multi-service networking based on a "network of networks" and more widespread intelligence in the network. The data networks will address this problem in a very reasonable way.

Telecommunications and data communications are converging ever more rapidly than ever. Data networks have existed for many years, but modern trends in computing, local and wide area networking, the workplace and personal recreation have created a demand for higher speed, multi-service networking. Combining data, video and voice traffic on one infrastructure removes the need for separate networks and offers an economical solution to the networking equation. Almost overnight, the Internet has taken center stage, and its technology is now taking hold in private networks. Evolution of the Internet and corporate intranets into multi-service networks will require sophisticated, high speed switching systems for both local and wide area networking. Current technologies include native LAN protocols, Frame Relay and ATM, while the introduction of IP switching and gigabit routing is being hotly debated in the industry. Multi-service networks will handle multiple protocols and traffic types, becoming the cornerstone for tomorrow's networks.

The introduction of broadband capabilities in parallel with market liberalization is leading to an explosion in the number of services offered and challenging the information technologies used to provide these services. Powerful negotiation mechanisms are required between stakeholders, which will allow advanced services to be developed and introduced rapidly. Software agents are currently being

widely proposed as a way of meeting these needs. Essentially a software agent is a program that can act on behalf of a user, simulating some human intelligence. As such, it can understand the user's goals and take the initiative in meeting these goals, using its built-in capabilities to negotiate with other agents.

The Internet revolution has been extended to corporate networks in the form of Intranets. These are private networks, which use the same technology as the World Wide Web, including the Hypertext Markup Language and the Hypertext Transfer Protocol. This merging of corporate networks and the Internet will make it easier for employees to obtain the information they need to work effectively in an age where success increasingly depends on having the right information at the right time. If we look at how Intranets will drive the design of corporate networks, and the impact they will have on LAN and WAN infrastructures. We can conclude that switched LAN infrastructures and IP WAN transport will be required to underpin the Intranet revolution, which will bring the information age to the desktop<sup>8</sup>.

The Internet is posing problems for network operators who are attempting to meet increasing user demands and to make money. To achieve these goals, they must overcome network congestion points and improve real-time response; otherwise users will be frustrated with the Internet. The bottlenecks, including the Internet backbone, insufficient router capacity, slow access networks and uploading data to remote servers. ISDN access is improved the situation, and new access technologies, such as ADSL, are providing much higher performance. Both ISDN and ADSL technology can be easily and rapidly introduced by an upgrade to switching systems.

As the Internet seems to become slower and slower, and users demand high bandwidth multimedia services, even the fastest modems are proving inadequate. In the short term ISDN offers better performance, but some users already need much higher speeds. ADSL technology offers a high speed downstream channel for multimedia services and downloading large multi-mega-bit files, together with a sufficiently fast upstream channel to support interactive services.

## CHAPER III

### Level 3

In 1998 Kiewit Diversified Group Inc., a subsidiary of Peter Kiewit Sons, Inc., changed its name to Level 3 Communications, LLC to concentrate on communications and information services business. Level 3 (the company) is a pure IP-based (Internet Protocol), packet switching, network operator. The company being a new comer to the industry, has the advantage of building its low cost IP network from the beginning when compared to its competitors who trying to convert circuit-switching networks to packet-switching networks. The company also has a subsidiary PKS Information Services, Inc. (PKSIS), through which it delivers information services to its global customers.

Level 3 claims that it is the world's first IP based end-to-end international communications network operator. Being a new network, Level 3 is building its networks more adaptable to future technological upgrades. The company is concentrating on communication services such as local, long distance, data transmission, other enhanced services and Internet access services. All these services are targeted to Web-centric business markets when compared to traditional communication markets.

The strategic direction of any company is important for its evolution and survival. Right from its birth Level 3 focused its strategy in the direction it wants to head. With that intention Level 3 derived its name from the OSI model of a network, where this layer handles the routing of the data, sending it in the right direction to the right destination on outgoing transmissions and receiving incoming transmissions at the packet level. *"The Company's strategy generally calls for the services to be provided in the first three levels of*

*these technical specifications*". In order to differentiate from and compete with the rest of the telecommunications providers, Level 3 built its entire IP-based network from ground up. Through this cost-effective new network Level 3 is able to pass the savings to its business customers.

In order to grab market share and remain as a leader, the standards are important in any technological industry. With that vision Level 3 formed a Technical Advisory Committee (TAC) with leading communications software and hardware companies. The TAC developed new protocol standards; Internet Protocol Device Control (IPDC) for the seamless integration of IP-based networks with circuit based public telephone networks. To further cement its leadership and expand its scope Level 3 merged IPDC standards with Simple Gateway Control Protocol (SGCP) developed by Bellcore and Cisco Systems, which are under the review of industry standards organization. SGPC protocol is used to control and manage equipment operating at the edge of media gateway controllers such as voice over IP/ATM gateways, modems, soft PBXs...etc.

Network operators have to provide enhanced services to increase the value of their service. Information services are part of this enhanced services business. PKS Information Services (PKSIS) is the technology arm of Level 3. Through PKSIS it provides Infrastructure Services, E-Business Services, Application Services. Infrastructure Services include Computer Outsourcing, Managed Application Hosting and Data Center facilities. E-Business services include the design and development of e-commerce solutions that integrate to legacy and back-office systems. These services also include data warehousing and database administration services. Application services include application maintenance services and offshore capabilities though its

development centers in Ireland and India. PKS plays a major role in selling and supporting gateway space for colocation service.

### **Network**

Network is the basic element of the network operator's infrastructure. Three factors that matter in the construction of a network are technology, security and footprint.

Level 3 is building an advanced fiber optic network using IP based technology. Its network includes both DWDM and SONET technologies. Due to technological changes and increasing competition, it is essential to have the future upgradability as a part of the network construction. Level 3 is building all these networks with a forward vision of continuous upgradability with new fiber optic network technologies. The physical structure of this land-based network includes ten to twelve conduits. Out of this only one will have fiber and the rest left empty for future use. This will cut the cost of the future network upgrade dramatically and will also eliminate the network disruption during upgrades. It also intends to sell its spare capacity to other communications companies, which decreases the network maintenance cost dramatically.

One of the most important aspects of the network is network security and Distributed Denial of Service (DDoS), where flood of IP packets from multiple sources are sent to disrupt the service, making businesses more vulnerable than ever. Security maintenance is one of the expensive things in network operations. To make a network secure, network needs to be configured properly, monitored constantly and able to track the source. Level 3 networks are configured to deny

IP-directed broadcasts, redirects and proxy arps. It also constantly monitors its network and takes immediate action to prevent any damage that might result by these illegal distributions. Level 3 also has DDoS tracking system, which can trace attacks all the way to the edge of their network. Level 3 also provides the scan facility to its customers for the analysis of network exposure though two leading security service providers free of cost.

In today's open economy, it is important to have a larger footprint of the network, to reach wide geographical ranges. Rights of way and funding are the two main factors in network construction. Level 3 obtained the rights-of-ways for entire US intercity network. All the phases of network construction are pre-funded. Level 3 planned its network in 6 fully operable phases in US, Europe and Asia. Level 3's network is designed to connect both local and long distance customers end-to-end. Customer acquisition is important to keep the network utilized. So Level 3 started its operations with leased networks without waiting for the network completion. It leased over 8,300 miles from Frontier Corporation, over 7,000 miles from IXC and various local network miles from different vendors.

The following table outlines the network construction progress for the first 4 phases (source: [www.level3.com](http://www.level3.com)):

Metric	1998		1999				2000				2001
	3 <sup>rd</sup> Q Actl	4 <sup>th</sup> Q Actl	1 <sup>st</sup> Q Actl	2 <sup>nd</sup> Q Actl	3 <sup>rd</sup> Q Actl	4 <sup>th</sup> Q Actl	1 <sup>st</sup> Q Actl	2 <sup>nd</sup> Q Est	3 <sup>rd</sup> Q Est	4 <sup>th</sup> Q Est	1 <sup>st</sup> Q Est
Markets in Service	10	17	17	21	2	27	30 (29)	35	37	49	56
Markets with Fiber Networks	0	0	7	11	17	22 (20)	23	24	25	26	26

Intercity Rights-Of-Way Miles	10,500	14,400	15,200	15,920	16,000	16,000	16,000	16,000	16,000	16,000	16,000
Intercity Miles Under Construction + Completed	175	1,234	4,054	9,270	13,313	15,528 (14,000)	15,896 (15,600)	15,896	16,000	16,000	16,000
Intercity Route Miles Completed	0	410	1,355	2,495	5,954	9,334 (8,000)	11,800 (11,000)	12,500	14,500	16,000	16,000

Phase V will add 1.8 million square feet of global gateway space with additional local fiber facilities. Phase VI will include 8 international markets, European intercity Ring 3 and 1.3 million additional Gateway space.

Footprints are not limited to the size of the network and can be expanded by connecting to the other networks. This enhances the size of the network and the service options due to interoperability. So Level 3's network also interconnects with other carriers along with its own rings worldwide. The 1.28 terabit transatlantic cable system is under construction and right now it leased its capacity with Global Crossing.

Level 3's entire network plan is as shown in the following fig (source: [www.level3.com](http://www.level3.com)):





## Products & Services

Level 3 being the first end-to-end IP-based international communications network, their services are all Web-centric. Level 3 also provides consolidated billing and traffic reports for each of these services. The following are the list of the services Level 3 currently offers<sup>9</sup>:

1. (3)Voice
2. Private Line
3. Internet Access
4. Colocation
5. IT solutions
6. IP CrossRoads
7. Managed Modem

1. (3) Voice: This is a service for the regular telephone operator customers where they resell services to their own customers. Right now this entire customer base is required to have SS7 signaling (other signaling services will be supported in the future) ability through their own facilities and need to divert their traffic to leased Managed Trunking Gateway ports. These Gateways may be shared with other customers but are maintained and operated by Level 3. Under this service, initial calls are delivered to Gateway ports where the calls will be converted and delivered in IP protocol. These calls will also be carried by Level 3 on its own network to the nearest Level 3 Gateway to the destination of calls. Here the calls are converted back from IP to circuit-switch format accepted by terminating facility. This service is provided for both domestic and international calls.

This is an end-to-end seamless service to its customers. The cost of carrying a call on IP network is much cheaper than on a traditional network. The main advantage of

this service to these customers is not requiring any additional equipment, which is a major factor in operations. Since this is an open architecture the customers can develop their value-added services on top Level 3's network. One of major factor in communications industry, especially in voice applications, is the reliability. Level 3 monitors and maintains its network for any latency and packet loss problems, which are common for a voice over IP network. Level 3 also assures its carrier-grade quality for its customers. Level 3 re-routes its IP calls through PSTN in case of network problem or congestion to maintain reliability of the network. These customers also receive the CDRs (Call Detailed Records) and other Tele-management reports. All these customers are provided support from a single contact point, which is unprecedented in the industry.

2. Private Lines: This is a dedicated point-to-point service, which is maintained by Level 3 for its customers. In other words no maintenance or coordination burden for the customers. Under this, Level 3 offers Metro Private Line, US National Private Line, International Private Line services and The Level 3 Hub. All these services also come with a service agreement of 99.99% availability between Gateways and a mean time repair of two hours. They also provide industry standard reports and customer specific circuit-performance reports.

Under Metro Private Line service it offers Point-to-Point and Access services, in each its Gateway cities. The bandwidth of this service varies on the city because of the network structure. These lines are managed and monitored by Network Operating Centers in US and Regional Management Centers internationally.

US National Private Line Service is connectivity between two major US cities. These are maintained by Network Operating Centers.

International Private Line is a service between two Level 3 international Gateway cities. These networks are maintained and monitored by Regional Management Centers. This package is used to bundle services to US customers to European colocation services across the Atlantic.

3. Internet Access: This is similar to ISP services, where Level 3 provides DNS, News feeds, registration, IP address allocation and other services. They provide service from 1.544 Mbps to 155 Mbps in US and 64 Kbps to 21Mbps in International markets. In this service they have two options of fixed price and burstable-rate, where they use 90<sup>th</sup> percentile billing when compared to others of 95<sup>th</sup> percentile. The service delay averages only 40ms, which less than the industry standard. For this service the customers will be given access to manage their account through the web.

4. Colocation: This is the fastest growing segment in network operations. The customers here use the facilities, network and support services rather than investing on their own facilities. This service provides the means of faster, economical and scalable solutions to customers. These customers include ISPs, Fortune 1000 and Medium-size Internet strategy businesses. Level 3 has more than two million square feet of space around the world, which is highly secure, monitored and maintained. Since all the related business partners are colocated, the service improves the communication performance across business partners of its customers. This service also helps to reduce network traffic congestion and latency resulting in improved customer satisfaction.

5. IT Solutions: This service is provided through PKS Information Services, a subsidiary of the parent company. These services include infrastructure, applications and e-business services.

They provide outsourcing services for technology, facilities and human resources to manage IT system under the Infrastructure Services division. The Application Services division will deploy business projects and help develop and maintain applications. The e-business Services include providing e-Commerce and data warehousing solutions. This division provides services to bring businesses to the web through enterprise-wide solutions and migrate legacy systems to e-Commerce platforms.

6. IP CrossRoads: This service is targeted towards data-intensive Net-centric businesses delivering IP broadband content. This service is a strategy to leverage the network facilities and colocation services. Customers include New Media Content Providers, Broadband Content providers, ISPs, Application Outsourcers and E-commerce providers. The service charges depend on bandwidth and origination & destination, which forces the traffic directly to partners to optimize the usage. This service deals with Intra-Gateway Exchange, On-Net Transport and Off-Net Transit.

Intra-Gateway Exchange is the transport of information on the same SONET ring. This unlimited service is provided for a fixed price. On-Net Transport is between customers and peers on two different Level 3 SONET rings, where usage is charged on 90<sup>th</sup> percentile rate. Off-Net Transit is an enhanced On-Net Transit, where it includes connectivity to other major Internet carriers.

The advantages of this service include:

- Access thorough Gigabit Ethernet to the Level 3 Internet Network.

- Ports allocated are dedicated and full duplex connectivity with 100% availability.
- Redundant infrastructure for key components and hot fail-over support for all network elements.
- Guaranteed 40 ms one-way average delay between Gateways.
- Allow customers to optimize and manage their networks through Border Gateway Protocol route announcements.
- 30 min response time and 2 hour mean problem resolve time, with a single point of contact for all the issues.

7. Managed Modem Service: This is to provide dial-in connectivity to private networks. This service includes setup of local Internet dial network, deployment of modems and maintenance of network and hardware. This service provides two types of services, i.e. Dedicated and Transit. The service provides local number for dial-in access. This is the alternative solution for avoiding deployment of expensive point-to-point frame relay and elimination of expensive 800 usage. This service covers both analog and ISDN over the same trunking facility. For security radius authentication is managed by customer's radius server and exchanged over a network connection.

Under Dedicated service, users connect over dial-in modem connection housed in a Level 3 facility. This traffic is aggregated and sent to a router in the customer's private network via a dedicated connection. Once the traffic is delivered to the customer premises router, then it is the customer's responsibility to route its traffic to end point.

In Transit Service, users will connect to the public network via high speed Internet connections directly through Level 3 managed modem banks located in Gateway facilities.

This service is also used to help the initial launch of Dedicated Service.

### **Strategic Alliances and Acquisitions**

In this competitive market the role of a network operator is not just providing bandwidth but to provide total business solutions. On its own, no single provider will be able to provide all the services to its customers. So M&A, partnership and alliances strategy is the best way to address this issue. Like many other communications giants, Level 3 is also using this strategy to grow faster and provide wider range of services<sup>10</sup>. Level 3's alliances and acquisitions can be categorized into Network Expansion, Customer Acquisition and Service Enhancement.

Network Expansion needs agreements with other network providers and network construction companies. In Oct 1998, it signed an agreement with Global Crossing to gain to its transatlantic network, most heavily trafficked network, to connect US and European customers. It also announced the construction of its own terabit transatlantic cable system at a cost of \$600-\$800 million. The explosion of IP-based communications business necessitated the agreement with IXC communications to lease 7,335 route miles.

The constant evolution of new network technologies and capacities are major factors in operations. To keep up with the technology Level 3 entered a construction contract with Tyco Submarine Systems Ltd., which is upgradable up to 1.28 terabit capacity. Simultaneously it also started the construction of European Ring 1 of about 2000 miles connecting 5 major European cities.

Network construction costs are a big issue and this forced many operators collaborate to share the networks to

keep the costs down. This is part of the European network strategy for Level 3. So in Mar 1999, it entered an agreement with COLT to share the construction costs in European network. Under this agreement, both will construct network with multiple conduits and share the network and its costs. In July 1999, it partnered with Alcatel to design, develop and construct an undersea cable system between UK and Belgium, which will provide the scalability and security needed for Level 3 European operations.

Rights-of-way is a way to achieve easy network maintenance and low costs. In June 1998, Level 3 entered into an agreement with Burlington Northern and Santa Fe Railway Company for rights of way to build its network. In 1998, Level 3 also sold its excess capacity to INTERNEXT, LLC (subsidiary of NEXTLINK) for \$700 million. This is to share bandwidth and certain facilities and INTERNEXT is restricted to sell or lease to its affiliated companies.

Acquisitions and mergers are also part of customer and technology acquisition. In April 1998, Level 3 entered a major strategic merger agreement with a Cambridge, MA, based CLEC (Competitive LEC) called XCOM Technologies, Inc. XCOM was a data phone company, CLEC, and developed communications software. XCOM developed and owned the proprietary rights to the gateway interconnect technology that bridges PSTN to IP-based network. This is the key element of the Level 3 network. XCOM also provides virtual points of presence to ISPs and remote access services to corporate customers. It also acquired a high-speed transatlantic telecommunications company, called UltraLine Limited to access its business customer base.

The GeoNet acquisition, in Aug 1998, was a strategic one for both network and customer perspective. GeoNet specialized in turnkey Internet solutions to business

customers. GeoNet also had its own nationwide IP network over ATM backbone built on leased lines. In Sep 1998, it acquired a German ISP known as Miknet Internet Based Services GmbH as part of its overseas operational strategy. Miknet had just under 50 POPs and connections to the most important nodes to provide reliable and high performance transmission. In Jan 1999, it also acquired BusinessNet, a London based ISP for European market operations.

The service expansion can be attributed to two factors: newer markets and newer services. In order to expand its markets Level 3 entered into a 5-year strategic agreement in May 1999 with Broadcast.com, a broadcasting media company on the web. Broadcast.com delivers live and on-demand audio and video programs on the net and it will use Level 3 network for its services. Broadcast.com net services include 410 radio stations and 50 television stations and apart from these it provides services to streaming needs to its business customers. For Level 3 this is a huge strategic alliance with an enormous net community.

Introduction of new services based on advanced technologies is necessary to acquire new customers and to provide competitive services. For this Level 3 entered into a strategic alliance with Lucent Technologies for soft-switch technologies in June 1999. This deal is crucial for Level 3's launch of (3) Voice service, where IP-based network is used to carry PSTN telephone calls.

Data services are part of the enhanced services business for network operators. In Oct 1999, the company entered into an alliance with Storage Technology Corporation (StorageTek), to provide storage utility services. Through this agreement StorageTek leverages Level 3 network and colocation facilities to provide storage products, management software and services. This is an important part of Level 3's



colocation strategy.

ISP and ASP services are important of business customer services. ASP business provides a way to introduce other business related and non-network services. In Jan 2000 Level 3 formed an alliance with Convergys Corporation, a leading provider of outsourced business support systems to ISPs, ASPs and other Web-centric businesses. Through this alliance Level 3 can bundle its IP services at a competitive price. It also provides billing and customer care services through this alliance.

DSL is a new way to compete with cable modems and set-top boxes. It partnered with Rhythms NetConnections Inc. to provide high speed DSL services. With this Level 3 will connect its network with Rhythms' DSL network to provide ISP, ASP and other customers with DSL services.

Apart from these, Level 3 also entered an agreement with AOL to provide managed modem and network connection services. It entered a reciprocal compensation agreement with Bell Atlantic for the call termination rates and settled its past disputes regarding the rate differences. This deal put Level 3 in a better position in the Managed Modem and SoftSwitch related services.

## CHAPTER IV

### Qwest

Anschutz Company is the parent company of Qwest Communications International Inc (Qwest). On June 27, 1997 Qwest issued common stock in an initial public offering. The parent company owns approximately 85% of outstanding common stock of Qwest. Qwest and its subsidiaries are a leading Internet communications company engaged in both Communications Services and Construction Services. Qwest is headquartered in Denver with 80 sales offices worldwide and employs more than 10,000 people. Qwest Macro Capacity Fiber Network spans around 18,500 route miles in US alone. Today with its partner, KPN, Qwest shares around 3,500 km of European first and second rings of the six ring network and plans to expand another just under 11,500 miles by the middle of 2001. Apart from these it has additional 1,400 miles (approximately) on Mexican network.

Qwest Communications Services part of the business provides full range of voice, data, video and related services to businesses, consumers, including government agencies. Qwest also provides high volume voice and conventional private line services. In this segment its customers include communications providers, Internet service providers and other data service companies. Qwest Construction Services business installs fiber optic systems for the companies own use as well as other communications providers. Installation of dark fiber ("fiber that lacks the requisite electronic and optronic equipment necessary to use the fiber for transmission"), to other network providers, is the big part of this business.

## Strategy and Network

"The Qwest's objective is to become a leading, coast-to-coast facilities-based provider of communications services to other communications providers, businesses and consumers"

Qwest Macro Capacity Fiber Network, a high-capacity IP-based fiber optic network designed to allow customers to seamlessly exchange multimedia content - images, data and voice, is the core of its strategy. This technologically advanced network spans approximately 18,500 route-miles with an additional 300 route-mile segment scheduled for completion by the end of 1999. This network is built on self-healing SONET ring architecture to keep the down time and the maintenance costs low. For reliability it is also equipped with advanced fiber and state-of-the-art transmission equipment. Qwest's network architecture supports the following technologies<sup>11</sup>:

- IP
- Asynchronous Transfer Mode (ATM)
- Frame Relay Services
- Circuit Switched Services

By 1998 Qwest built a transcontinental IP based fiber optic network. This network supports operations from Los Angeles to San Francisco to New York. By implementing this nation's first OC-48 network Qwest has become the leader in fiber optic network services. This network supports high-speed dedicated Internet access, web hosting, IP-based virtual private network services and expanded availability of voice over IP long distance services.

In 1997 Qwest sold its Mexican subsidiary to Bestel of Mexico in return to dark fibers in a network Bestel was constructing. This over 1400 route mile network enabled Qwest to connect 14 different Mexican cities and bridge with the

network to the USA. This network has a capacity of servicing 80% of population in Mexico.

In 1998 Qwest joined a consortium of communications companies to build a 13,125-route mile submarine cable system by 2000 connecting the United States to Japan. This network is designed with a self-healing ring and an advanced Synchronous Digital Hierarchy (SDH) technology to transmit 640 gigabits per second.

In Europe Qwest partnered with KPN, the Dutch telecommunications company, for its network services. By January 1999 Qwest completed its first of six EuroRings of 1,468 route miles. This network is linked with the transatlantic network to provide broadband services, as well as IP-based services designed for businesses of all sizes.

Though Qwest is a fairly young company, when compared to other major network operators, it established an unprecedented spot in the network operator space. Its network supports multiple technologies and it services multiple market segments. Through construction services and dark fiber sales it established competitive positioning. Qwest, through its alliances with major companies is able to capture the value throughout the market. This is one way of creating a differentiation of its products and services from its competitors. From all of this it can be inferred that Qwest is at the beginning of its S-curve and is ready to reap its profits in the very near future.

Qwest being a new network company, has built its entire uniform network in fiber. It is being the constructor of networks for its own competitors. It has the clear cost, operational and technological advantages over other operators. Qwest also identified the markets and captured those segments with its network bandwidth. By completion of transcontinental network it was able to deliver its services

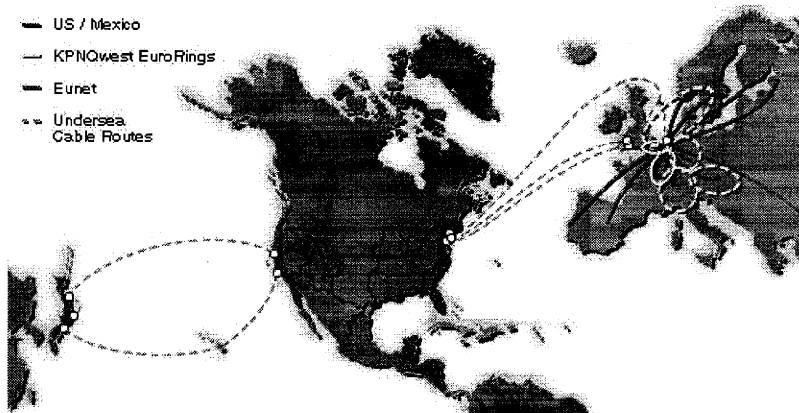
seamlessly through out all the markets. Through its alliances it was able to serve different segments and trying to capture major share of the market. This way Qwest is able to create value to its customers and provides total B2B solutions.

One the major advantages for Qwest is its veteran management team. Its management team and board of directors include individuals with significant experience at major telecommunications companies. For example its CEO, Joseph Nacchio, was the EVP of Consumer and Small Business Division at AT&T with 27 years of telecommunications experience. He is also an MIT Sloan Fellow. Qwest's Construction Services is made up of experienced teams too. Qwest understood its limitations of reaching the markets with the existing technology. It has established coalitions with the major information businesses to add the silver lining to its services. Here Qwest is trying to take advantage of expertise of these coalitions by managing these relationships rather than trying to enter where it doesn't have any core-competency.

Qwest clearly understands its competitive advantage. It has bought rights-of-way with railways to build its networks, which are cheaper and safer compared to any other land routes. The fact that it builds competitors networks and dark fiber along its own network gives Qwest gives a tremendous advantage over its competitors' strategy. Qwest uses these services to its own advantage of keeping construction and maintenance cost low. It sells dark fiber along its network to keep the cost low. Qwest established a major market position through Qwest Macro Capacity Fiber Network by providing multiple services in cost-effective way and reliable service through its self-healing networks. By providing the total e-business solutions through its

alliances Qwest is able to capture value created by its network services.

Qwest global network diagram (source: [www.qwest.com](http://www.qwest.com)):



### **Market Segmentation**

The Internet revolution has recently been extended to corporate networks in the form of Intranets. These Intranets use the same technology as the World Wide Web. This enables the employees to access the information at the right time, which is an important factor in this information age. This demand also created the LAN and WAN infrastructure. Though the Internet was invented several years ago, only recently it caused a major impact on the way that the business is done. Users are demanding more bandwidth and as result Internet is growing at an exponential rate.

Qwest Communications Services concentrates on the following segments:

- Internet and Multimedia Services
- Business Services
- Consumer Services and Wholesale Services

Internet and Multimedia Services provides solutions for Internet Protocol (IP) services such as Internet access, web hosting, co-location and remote access. This business is totally concentrated on B2B and IP related services. These services are tailored according to the customer and market demands. Here Qwest is trying to create mass-customization of services using the underlying basic technologies and partnerships.

Business Services and Consumer Services provide a full range of voice, data, video and related services to business customers, governmental agencies and consumers.

Wholesale Services is the traditional telecommunication business where it sells high-volume voice and conventional private line services to other communications providers, Internet service providers (ISPs) and other data service companies.

Qwest Construction Services, the other part of its major business, where it constructs and installs fiber optic systems its own use and to other communications providers. This business started as the construction of fiber optic conduit systems for cash and capacity to the major long distance carriers. Qwest also entered into major construction contracts for the sale of dark fiber to Frontier, MCI WorldCom and GTE where it installs dark fiber for each along its network. Apart from these there are other agreements with other communication providers and government agencies for the sale of dark fiber. Here Qwest leveraged its construction experience to have an advantage over its competitors. By doing these services Qwest can understand the strategy and limitations of the market where it can build its own business. This also provides a competitive edge to Qwest where it can reduce its construction and maintenance costs.

By doing all of the above Qwest is trying to establish the first mover's advantage.

### **Products & Services**

Qwest being the leader in broadband internet-based communication companies, offers a wide variety of services. Its products come with technology, abundant broadband capacity and strategic alliances. The following are some of the services offered to businesses:

- IP/Internet
- Data
- Voice
- Consulting
- Business Solutions
- Wholesale

**IP/Internet:** Under this it offers both national and international Dedicated Internet Access (DIA) services to its business customers. It also offers DSL and local access services. Dedicated Web Hosting is another service where it provides services through CyberCenters to maintaining servers and equipment for businesses. Qwest network provides high-speed connectivity to handle applications, including corporate Intranet & extranet, video streaming and e-commerce.

**Data:** Under this it provides ATM, frame relay, private line services for both local and international access. It also provides business equipment services. The network offerings allow the flexibility of using ATM for large traffic and use frame relay for lower volumes. In the USA frame relay is the standard for LAN-LAN communications and Qwest extends it internationally through its Macro Capacity network. In



collaboration with BellSouth it provides the NNI (Network-Network Interface) frame relay to their customers. Under dedicated private line service it provides end-to-end secure connection over predetermined circuits and with the KPN collaboration this service is extended all the way to Europe. Through Equipment Services it provides turnkey solution for the installation, management and financing of virtual enterprise needs. Qwest works with customers to identify their equipment needs and provides technical, procurement, installation, configuration and even budgetary services.

**Voice:** Under this Qwest provides some of the standard services like most of the network operators. It targets Hospitality businesses, Military and Educational institutions with specific packages designed for them.

**Consulting:** This is a very elaborate and extensive e-business solution provision service. Under this Qwest has two kinds of services, Professional Services and Online Commerce. Under professional services it provides strategic consulting and system integration, Internet solution, access, hosting, virtual internetworking, IP network services and applications support.

The following is a list of services Qwest offers under this service:

- *Strategic Internet consulting -- provides business strategies for the Internet.*
- *Online branding -- creates online brand recognition.*
- *Relationship support management -- analyzes the impact of the Internet on business and incorporates effective data gathering to measure strategy results.*
- *Interactive design and site architecture -- builds custom, interactive Web sites.*

- *Custom application development -- provides functional Web applications that can be delivered on time and within budget.*
- *Qwest Online Commerce -- enables quick entry into eBusiness.*
- *Systems integration -- provides installation, configuration, and maintenance of hardware and software.*
- *Site stress testing -- provides a comprehensive set of Web site stress tests to manage demand and keep your site operating.*
- *Quality assurance / functional testing -- provides independent application testing to ensure that end results conform to system specifications.*
- *Site quality reviews -- assures site quality and correct content.*
- *On-site infrastructure support -- supplies on-site personnel to support infrastructure.*
- *Complex application support -- offers around-the-clock support for hosted applications.*
- *Residency consulting -- provides supplemental staffing from Qwest for Web-related needs.*

Under Online Commerce services Qwest creates the virtual storefronts for online businesses. Qwest provides the means to track customer purchasing habits and demographic information for cross-selling and up-selling opportunities. Through this customers can offer services which their customers need and improve customer relationships.

**Business Solutions:** This is various voice, data, multimedia, IP services and other services under different packages such

as Q Port, Q.biz, Q.guaranteed, Q.Show, Qwest Control, QwestLink and Qwest Cyber.Solutions.

**Wholesale:** Wholesale Services is the traditional telecommunication business where it sells high-volume voice and conventional private line services to other communications providers, Internet service providers (ISPs) and other data service companies.

### **Mergers, Partnerships and Joint Ventures**

In April 1998, Qwest announced strategic alliance with Cisco. Through this it built advanced broadband IP network for delivery of multimedia services like videoconferencing, whiteboarding, multicasting...etc. In the same month it acquired a leading European ISP EUNET which has operations spread over 14 countries and 60,000 business customers. It also started, along with others like Nortel and Cisco, a consortium of universities to develop a most advanced research backbone Internet2 network called Abilene. Qwest donated a portion of its nationwide network for this project. This network is used create and test future applications.

In June 1998, Qwest acquired LCI International, a long distance carrier. Through this it got the access to LCI's sales and marketing expertise, distribution channels and backend billing system.

In September 1998, Qwest and Netscape Corporation formed an alliance to provide communication services to Netcenter site. This is part of the customer acquisition and revenue sharing strategy.

In December 1998, Qwest acquired Icon CMT, an end-to-end Internet business solutions provider. This is foundation

for Qwest's Cyber Centers, which provides web-enabling applications and Internet enterprise solutions.

In December 1998, Qwest formed a \$3 billion five-year alliance with Microsoft to provide Web hosting and other mission-critical business software applications and services.

In January 1999, Qwest made its first strategic investment in DSL through Covad Communications. Through this Qwest is able to offer high-speed, end-to-end connectivity in 22 major markets. As part of this broadband strategy in April 1999, it invested in Rhythms Netconnections.

In February 1999, it acquired Germany's second largest ISP, Xlink Internet Service GmbH. It also claims that this acquisition seeks "to boost global expansion with IP-based services increasing reach to 80 percent of world's Web users".

In April 1999, Qwest and KPN Telecom B.V. (KPN), the Dutch telecommunications company, formed a joint venture. This pan-European network is connected with Qwest's North American network for data, video and voice services for 46 European cities.

In April 1999, it formed a strategic alliance with BellSouth. BellSouth invested \$3.5 billion for a 10% stake in Qwest. According to this Qwest offers data networking, IP and voice services and BellSouth provides local networking services. They both jointly develop and deliver IP business solutions, especially in broadband area.

In May 1999, Qwest formed alliances with Hewlett-Packard, SAP AG and Siebel Systems to provide e-business solutions. This is part of the Qwest's ASP service strategy. According to this alliance, Siebel Systems provides front office solutions, SAP provides high-end ERP solutions and HP provides server hardware necessary to host these application services. This unified service can be delivered from a single

point, Qwest's business solutions. To further cement its leadership in ASP, in June 1999, Qwest became Oracle's first preferred applications hosting and network infrastructure provider.

In June 1999, Qwest formed a joint venture with a professional services firm, KPMG LLP, called Qwest Cyber Solutions LLC. The joint venture provides end-to-end application service provider, application hosting, and application management services to business for their IP requirements. Qwest owns 51% of the venture and invested approximately \$60.0 million.

In June 1999, Qwest signed a definitive agreement to invest \$90.0 million, for the construction of high-speed wireless network, in Advanced Radio Telecom Corp (ART). ART is a facilities-based, broadband ISP that provides a direct connection from customer location to the Internet.

The latest and the biggest merger of Qwest is with US West. This combined company has more bandwidth than AT&T, Sprint and MCI Worldcom combined and with customer base of 29 million. This combined company has 3.9 million (2.6 US +1.3 rest of the world) miles of deployed fiber worldwide. One of the advantages of this merger is to leverage Qwest's next-generation Internet backbone with US West DSL and VDSL services. Another one is through Qwest's Cyber Solution service to offer US West customer base web-hosted enterprise resource planning, sales force automation, and customer service applications using its alliances with KPMG, Siebel Systems, SAP and Oracle. On other hand through US West's US Internetworking, Qwest can offer its customers Real Networks streaming media, database hosting, Lotus Notes and Domino hosting services, distance learning applications, as well as Sun Microsystems and Microsoft-managed platform solutions,

hosted e-mail and collaboration services, managed firewall solutions, and hosted applications.

In March 2000, Qwest formed an alliance with IBM to deliver e-business services and applications through data-centers known as Qwest CyberCenters. According to this Qwest has selected IBM Global Services to build and provide operational support for 28 new CyberCenters over the next three years. IBM will also purchase hosting space for its customers' e-commerce initiatives in the CyberCenters it builds. The \$5 billion revenue generated through this alliance will be shared half-and-half.

### **Interview**

In order to understand this B2B strategy I have conducted a 'telephone and email' interview with John Charters, CEO of Qwest Cyber Solutions. The following are the details of that interview "in his own words":

Q. The strategic partnerships in B2B services are multiple? What I meant by this is that you have major partnerships with both KPMG and Cisco, who also provides some kind of network services. How does this effect your relationship with KPMG, is Cisco some kind of a competitor? Is this like a big collaboration or competition or co-opetition?

*First you have to through one of the relationships over there. We have a strategic relationship with Ariba, SAP and Oracle. They all are have B2B services, like Oracle's I-procurement platform, Ariba's their product set, SAP through its market places part of MySap.com. KPMG providers the knowledge and experience in business advisory functionality how to setup B2B commerce through business processes. Cisco*

is an infrastructure provider relative to the execution of that strategy. The SAP, Oracle and Ariba products are solution set that we can tailor to meet specific vertical needs. In manufacturing, SAP may have the best B2B commerce engine, where is in the health care or some other business Ariba or Oracle may have the best product set. It is really more of a service kartisu, where we do portfolio assemblage, if you will. The reason this is important, for the Qwest perspective, is that there are obviously good margins in selling Internet connectivity and connectivity in general. But bandwidth and bandwidth services are in rapid commoditization mode and you want to be able to provide value added services on top of the bandwidth to create: a) margin opportunities, b) lock in your customers. So when Level 3 comes up with cheaper bandwidth to the same customer, you provide much higher layer complex services like a portal or an exchange with a commerce engine. Associated and integrated into your infrastructure through the relationships likes of Cisco the decision to switchover to cheaper pipe is less of an issue.

Q. So your value added services are more valuable than the transportation of data.

Yes, the relationship that it creates with your customer and the ability to cross help multiple services like long distance, web hosting, VPN capabilities and other type of services offerings, which you would normally sell as stand alone services, now become just part of the solution.

Q. In B2B, partnerships are the key elements in delivering the services, due to wide variety of services. Single partner may not be able to provide all the services you want to

deliver. How does your customers feel about this? What I meant is, where is the single contact point? For example I have a problem with an exchange server, do I go to Microsoft or come to you? Or for Oracle problems do I go there? Where do you draw the line between Qwest services and your partnership services?

*First I need to make sure that you are clear on something. Qwest Cyber Solutions the joint venture created by KPMG and Qwest. Qwest provides the basic infrastructure services like IP, VPN and data center space. I don't control the data centers. KPMG gave me resources like people, knowledge, expertise, processes, templates...etc...etc. When we position a solution to a customer for e-commerce, lets say based on Ariba platform, we have bundle all the elements of the service, those we get from Qwest and the knowledge base we have from KPMG, we provide as a single point solution to our client. We have a 24 by 7 helpdesk where we perform a triage as I would call it and in this triage center we determine whether it is just a network connectivity issue or network performance or hardware platform issue. Qwest has support center where we open up trouble tickets in on behalf of our customers and to the client they see us as a single point of contact.*

Q. For them it is a seamless integration right from you.

*As well and so we also have a strategic relationship with Ariba where we provide tier 1 and tier 2 support. So I have trained my people on how to support, program and manage the Ariba code. However if we run into bugs or problems that we can't solve, Ariba provides tier 3 technical support, as do*



*all my other software partners. So we are the point of contact to the customers.*

Q. Your partnerships are spread all over the world and around the nation. How do you manage these resources, I mean different people, different vendors. Its kind of a hot issue, isn't it? Managing all these relationships with all these vendors?

*Not really, we only have 6 products (SAP, Oracle, People Soft, Captura and Siebel). We build a practice around each product and we built cross product solutions to do vertical approaches to that before selling the products, if necessary. We built an organizational structure around the common elements the infrastructure, the hosting platforms. The servers managed by one group across all products and all services. Then we built practices, if you will, around each of the product sets and then we also have the horizontal and vertical slides that works based on the vertical. It is actually fairly easy, it is still people oriented but still fairly easy to manage.*

Q. So you have the process and structures in place to eliminate all these kinds of issues.

*You never eliminate all issues and you just try to manage them.*

Q. How do you differentiate from your competition? Do you consider Level 3 as your competitor?

*See Qwest Cyber Solutions takes the hosting and the colo (colocation) business to the next level right? We actually*

support and develop applications around our product sets. Level 3 provides only colocation and web hosting.

Q. They (Level 3) have that PKSIS, PKS information services.

I don't know what that is. We don't see them in the market place. Companies like US Internetworking, EDS, Future Link and Breakaway, those are the companies we compete with. Our differentiation against those companies is that we have imminent control of all aspects. Qwest owns 51% of this business that gives me cost and operational leadership over the physical infrastructure, right? So I have direct access to the data centers and onto the networks that Qwest owns, where other customers are buying from retailer product from Qwest may not have as good as cost position including as good as an operational position that I have. KPMG over the last 10 years built processes and templates for implementing these solutions in templated environment, true what the ASP business is all about. My competitors are spending money building those templates and I already have those templates in house. They were contributed to me as a part of their (KPMG) capital contribution for their ownership position in the company. So I have that leadership position from that standpoint. And I have two very, very strong brands Qwest and KPMG to leverage my channel perspective because both are my channels and have brand awareness.

Q. IBM and Qwest announced \$5 billion strategic alliance building the data centers. I assume those are your support centers. I am right?

*Yes, all that deal did is collect and build fast enough the kind of partner who is capable of helping them accelerate their data center space.*

Q. And according to the deal part of the space, I think 25% of the space, is rented by IBM itself.

*They needed the space too. In that sense that this is a co-opetition.*

Q. Are there any synergies that you can take advantage and offer services among your customers? What I meant by this is even though you may not offer certain services, one of your B2B customers might and using this relationship to build connection between those two customers.

*Synergies can exist between both Qwest for ld (long distance) and other traditional telco services and KPMG for integration or other business advisory services that Qwest Cyber Solutions (qcs) does not offer. Some customers are also partners in that we can take either their implementation of a certain application and offer it to out customers as a template or that they can do for their business partners.*

Q. Some people in the industry say that the Internet business, whether it is B2B and B2C, is dependent on community building. What is your opinion on this? Do you have any particular programs to enrich your e-customer communities? If so what are they and how do you see their direction in the future?

*I agree with the viewpoint that the marketplaces that are forming are communities and are interdependent on those*

*communities for success -without them who would be the customer? Can you imagine what you would have to spend to attract the buyers and sellers - say look at Ariba or Commerce one as case studies on that kind of spending.*

Q. B2B involves the supply chain management, customer relationship management and business management. Does this mean that as a service provider you have to understand everybody's business?

*Yes, that's where the relationship with KPMG comes in, they have years experience and are structured to understand all the verticals we serve.*

Q. Internet changed most of the network provider's business, especially in B2B, from communication services to business services. I think that this is a fundamental shift in your business (Qwest's perspective) model and strategy. Are there any cultural differences between two organizations? How do you deal with this as an organization?

*The biggest cultural issue was converting consultants to capitalists - in other words getting them to convert to options plans, performance based salaries - i.e. base plus bonus with bonus based upon company and business unit results. There was also the "urgency" factor - consultants are more oriented towards billable hours and not efficiency so that created cultural issues as well.*

Q. What is the biggest issue you are facing now in B2B? Is security on the net is an issue for you? How are you addressing it now?

*I am not sure that I can give you a relevant answer given my*

*position as CEO, but the issue for me is to create a platform that enables B2B to occur efficiently and securely in an outsourced environment that also scales.*

Q. Does govt. regulation play a major role in B2B? Especially when the services are delivered across borders. How important is for you to be in the country you operating to solve this issue?

*This would not be the issue of an ASP, but that of the commerce provider.*

## **CHAPTER V**

### **Conclusion**

The technological advancements have shaken the landscape of the telecommunications industry, which has resulted in intense competition. The increased competition can also be attributed to the opening of the markets by 1996 Telecommunications Act. This communications revolution forced network operators to introduce new products and services to grow their market shares and revenues. Especially the adoption of the Internet as a medium of enhancing productivity and growth by businesses has created enormous opportunities in the communications and IT industry.

The new challenge for the network operators is to deliver applications and services that are information centric. These info-centric services are dependent on the convergence of voice, data and video services, which demand higher bandwidth, transmission rates, reliability, mobility and lower cost. So the network operator business has two elements to it: one is to provide communication needs and the other is to provide enhanced services and applications to their business customers.

Keeping this in mind and studying both, Level 3 and Qwest, the following framework might be a way to analyze the strategy for network operators:

- Network Strategy
- Market Strategy
- Partnership/Alliance Strategy

## **Network Strategy**

The network remains the major part of a network operator's business. Traditional networks used to electricity to carry voice over copper wire and now those networks are being replaced by a revolutionary technology called photonics, which uses light as a transportation medium<sup>12</sup>. Today the OC-192, the most advanced, network can transmit voice, data and video at a speed of 10 gigabits/sec. The plans to increase this capacity to 40 gigabits/sec are already in the way. As for as the network technologies are concerned SONET (Synchronous Optical Network) and DWDM (Dense Wavelength Division Multiplexing) are the two dominant designs. SONET provides the cheapest solution for reliability. DWDM provides the increase in bandwidth capability but survivability of DWDM system need to be improved to replace the SONET technology. DWDM technology will increase the network capacity to multiples of the existing capacities.

The industry is crowded and new comers are still entering the market with enormous investments. Rights of way is an important factor in building networks and that is one of the main reasons most of the construction, gas and oil companies are entering this market. Both Qwest and Level 3 have experience in the construction business and have leveraged this expertise to build their networks much faster just by acquiring the rights of way from railway companies. The reason for this is that it will be cheaper to lay the network along an existing way and the maintenance is cheaper because of ease of accessibility. With this vision Aerie Networks announced its strategy in April 2000<sup>13</sup>. What Aerie was able to put together is a coalition of 12 big oil and gas companies, like BP Amoco Plc, CMS Energy Corp...etc. Aerie is

building most of its 20,000 miles nationwide network with a 8.9 million fiber miles alongside gas pipelines.

It will be cheaper to have their own network and customer acquisition is the most important factor in this business. This can be observed from Level 3's initial strategy of leasing its network to launch services even before starting to build its own network. All the new networks are built with empty conduits for future expansion and in case of both Level 3 and Qwest, they are using only a fraction of this capacity. This means that there is a lot more network capacity than needed. This also means that these network operators need more partners to share their networks to maintain and keep the operating costs low. This implies that in future there will be lot more co-opetition in this business than competition. The consortium of network companies is more likely to evolve than the independent operators. This strategy of consortiums may not be applicable for local regional networks but could be applied for both national and international networks. The network to Japan, where Qwest built it with a consortium, is a perfect example. Most of these global networks are concentrated in North America, Europe and Japan. There is lot of opportunity for expansion in South Asia and China where a huge concentration of people live. Governmental regulations may play a major role in these markets.

Even with this huge footprints all over the world these network operators need to have the local access capabilities. In other words the last mile access to the customers. Qwest's merger with US West is part of this strategy, especially in the consumer markets. Both Qwest and Level 3 have acquired and signed partnership agreements with broadband service providers like DSL service businesses as a part of last mile strategy.



The reliability of the IP technologies have to be improved for voice based services. The quality and reliability of circuit-switched networks may be hard to meet now but in the very near future this might not be an issue.

### **Market Strategy**

Network operator market strategy includes the following two elements:

- Communications Services
- Infrastructure Services

**Communication Services:** Though this is part of their traditional business, this segment has gone through a revolutionary change with the introduction of the Internet. Circuit switching is moving to cheaper and highly scalable IP switching. Price wars are bringing the revenues down yet the competition is growing. The strategy for this segment needs to cover both broadband and narrowband. The infrastructure and the investment done by communications companies in the narrowband area will not be replaced overnight by broadband<sup>14</sup>. Narrowband is going to be in service for a while and the market opportunities for new services in this area are growing. At this point the strategy is rather ignoring them finding alternative ways to improve revenues by offering services. DSL services, where copper wire is used to deliver broadband services, is part of this strategy. This is also an alternative strategy to compete with cable companies and set top boxes in broadband services. As a matter of fact DSL can offer much faster rates of transmission than the cable modems and set top boxes.

Currently in the USA, IP based ISP services are enjoying the elimination of access charges and it might change in future. Access charges are paid to CLECs by long distance carriers to

originate and terminate calls on their networks. FCC is reviewing them now and will decide how much and to whom to pay these charges. This is one of the future hurdles for these services and this could potentially change the way the industry is operating today.

**Infrastructure Services:** This is the largest growing segment in the industry and should grow in multiples for a while. B2B commerce segment is projected to soar to \$1 trillion by 2003, according to Forrester Research. B2B has already surpassed the B2C market, which is projected to be \$103 billion by 2003 by the same study. Keeping the exponential growth in mind the network operators have to align their market strategies with the B2B market demands.

Right now these services, both for Qwest and Level 3, are IT centric. IT centric means they are providing variety ASP services, hosting service, online services like launching web sites...etc. In other words network operator strategy has changed from bandwidth provider to business enabler. This is the disruptive opportunity to their traditional business. Both Qwest and Level 3 are addressing this disruption either through their subsidiaries or through their partnerships. In order to capture and retain this segment the network operator strategy should revolve around:

- Elimination of inefficiencies
- Standardization
- Reliability

Through web hosting and consulting services both Qwest and Level 3 are providing means to eliminate the organizational inefficiencies and allowing the business to concentrate on the main business. This is also a part of customer lockup strategy to network operators. Once the IT processes are in place for an organization it is difficult to switch the vendor due to the disruption of service and burden

of educating the new service provider. In order to switch, not only the main business, but also the associates might have to shift. This makes it more difficult. One of the drawbacks is that if one business moves then that entire network might migrate. To address this problem the strategy is to maintain customer satisfaction and retention. Colocation service solves major part of this problem by the nature of the service.

Standards are important to maintain the integrity of business data and processes. Custom built applications are expensive to develop and maintain. The interaction between supply chain management and ordering system is one of most important factor in today's experienced economy. So the protocol based applications is the answer for this problem. Through ASP services network operators are able to provide solutions. ASP provides the flexibility of having the customized interfaces without the disruption of data flow among businesses. The standards are the key to the seamless integration of communication among business partners. For this, network operator strategy should include the deployment of industry standard tools rather than customized tools. Standards also make application migration much easy and seamless.

Reliability is the heart of the communications business. As the dependency of the IT infrastructure moves towards the responsibility of network operator services, the reliability has to become the major factor of the strategy. Reliability does not mean just the network reliability but it also includes the communication consistency among the applications across platforms and businesses. Dependability is also part of this strategy, where business doesn't have to worry about growth of IT needs and investments as it grows. Scalable network bandwidth and applications, depending on the

demand, will address these issues without any operational disruption or application migration.

Data centers and colocation services are part of the solution to this problem. By using these centralized IT facility hubs along their networks Qwest and Level 3 are able to offer services far better than any other network operators. These facilities will provide the instant scalability of demands by sharing the resources through virtual networks. They could pass on the cost of savings from centralization and standardization of services to its customers. They are using this enormous network effect to leverage their partnerships with other suppliers and support service providers.

### **Partnership/Alliance Strategy**

Business partnerships are very important for network operators to offer services and gain market share. The complexity of business services and applications makes it almost impossible for any single operator to provide the services at the level market demands. The network effect plays a major role to execute this partnership strategy. The bigger the partnership network, the broader network operator services will be.

The last mile access is important for network operators to deliver their services to the customers. The acquisition of ISPs and other broadband DSL services are part of this strategy for both Qwest and Level 3. This also provides an edge for their customers to reach the consumer markets. These partnership are not just limited to communication providers but also spread to any utility companies, where the businesses can provide enhanced services, leveraging their huge customer bases.

For ASP and colocation, strategic partnerships are the key. These partnerships bring the credibility to service. For example the alliance with Microsoft makes it more credible and attractive for Exchange services. Qwest has better partnerships when compared to Level 3 for this strategy.

Data center maintenance is a monumental task for any single business. As part of this strategy Qwest partnered with IBM and Level 3 partnered with Navisite. Both these partnerships bring their expertise of providing web-based services and hosting services. This is also part of community building strategy. These data centers are virtual industrial parks where business can leverage the network effects by collocating with their other business partners and associates. These partnerships bring their customers for their communication needs. This is the part of co-opetition strategy rather than competition.

Community building needs to be enhanced with partnerships with network operator customers. By hosting the vertical B2B customers, the value of service is as the square of the number of participants, according to the article "Let's Get Vertical" on [www.business2.com](http://www.business2.com). This is due to the network effect of both buyers and sellers. The B2B business hubs could be market focused or function focused<sup>15</sup>. The market-focused customers are where the main business focuses on every aspect of any one particular business. This kind of customers will create a huge network on the growth of the network operator business because they tend to gather the industry together. The other functional focused B2B customers, where the main business is one particular aspect of the entire business. These are like market makers and setters for that particular product or service.

For this community strategic partnership and alliances with portals like Yahoo, AOL and Lycos, and consumer sites

like Amazon and Ebay will be a good fit. Portals not only provide infomediary services but also have cyber shopping malls. Right now directing the orders to the secondary businesses provides some of these services. Using the colocation service, if all the sites are maintained from a single point and integrate the order entry points to supplier's supply chain management, it will take away all the delays and inefficiencies from the system. This kind of business system will not only be useful to run a business but also increase the customer satisfaction, which in turn reduce the churn rate of on-line customers.

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