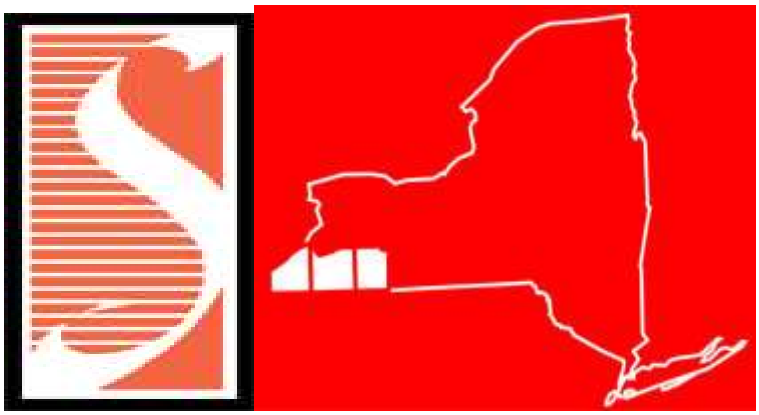
Southern Tier West Region Planning and Development Board (STWRPDB)

Broadband Inventory Study



Final Report
Spring 2009

Prepared by:

ECC TECHNOLOGIES

Statement of Confidentiality

Table of Contents

Executive Summary

1.1 Commission of the Study

The stated mission of the Southern Tier West Regional Planning and Development Board (STWRPDB) located in Salamanca, NY is to coordinate and enhance planning and development activities in Allegany, Cattaraugus, and Chautauqua Counties to promote social, physical, and economic development in these counties. In December of 2008, the Southern Tier West Regional Planning and Development Board contracted with ECC Technologies to perform an inventory of the broadband / telecommunications infrastructure and services within the region. The purpose of this inventory is to gather and document telecommunication infrastructure and services information which will be used to support economic, educational, municipal, and healthcare development.

1.2 The Inventory Collected

This inventory study is a compilation of the telecommunication service providers and supporting infrastructure in the STW region. The scope of work included documenting critical infrastructure and services available in the region. The data collected includes all the relevant service providers; incumbent service providers, competitive service providers, and wireless providers. Information on infrastructure was also collected including fiber and coaxial cabling, wire line boundaries, central office locations with available services, and wireless towers with contact information for each.

Research Methodology

To gather the information required for this study, ECC technologies conducted one-on-one interviews with the major telecommunications providers, and performed field surveys or "wind shield studies" to identify and document outside plant (OSP) or cabling infrastructure. Publicly available databases managed by federal and state agencies, and information purchased from telecom industry database research organizations were additional sources used to complete the inventory.

Other Resources

Other resources include telecommunication provider websites, telecommunication industry professionals, outside plant engineers, ECC Technologies' experience and knowledge of the telecommunications industry.

GIS Mapping / Database

All infrastructure information discovered in this inventory project has been integrated into a GIS model developed by the GIS department at the STWRPDB. This GIS database will be administered, stored and updated by the Regional Planning Board to ensure security and continuity of the resource.

The GIS database of information was developed to support telecommunications and economic development initiatives. This information will be used by Economic Development departments, including IDA's, and Planning departments for regional and county level use. The maps included in this report represent the region's telecommunications infrastructure documented in the spring of 2009.*

The objectives of the Telecommunications Inventory were to:

1. Inventory telecommunications infrastructures and services.
2. Create a GIS telecommunications mapping tool.
3. Provide telecommunications related marketing information for economic development (focus sites).
4. Identify county telecommunications strengths and weaknesses.
5. Lay the groundwork for telecommunications improvement plans.

The information compiled by ECC Technologies is presented in the following pages of this report. Much of this information has also been placed into an interactive electronic geographic information system (GIS) database by the Southern Tier West Regional Planning & Development Board (STWRPDB). This database tool consists of interactive mapping elements that can be used to identify and locate the major telecommunications resources within the region for economic development and regional planning purposes.

ECC Technologies contact information:

ECC Technologies
845 Fairport Office Centre, Fairport, NY 14450
(585) 377-1850

* Please note when viewing the report maps, due to the limited size and scale of the print the fiber optic cable shown can represent one or a number of provider's fiber lines following a particular route or roadway.

1.3 Introduction

With the announcement of the Federal Broadband Technology Opportunity $7.2B grant program, the importance of telecommunications services in general and broadband access specifically have come to the forefront. Many organizations across the country are developing plans to assess and improve their respective broadband access situation. To do that, they must first understand what they currently have available to them and where the gaps in coverage exist.

With that in mind and through the process of this inventory study, we have discovered that the STW region is not unlike many upstate NY rural areas. The developed areas, such as villages and cities, are better served than the outlying regions. As illustrated in the maps included in this report, there are many areas in the region that do not have access to land based or wireless technologies, let alone choice of provider. Overall, the rural areas of the region are consistent with and comparable to other rural communities in the state with the exception of Allegany County. Although rural areas in each of the counties could benefit from telecommunications investment, we have found that Allegany County is among the neediest counties in the state.

Through interviews with each of the major providers in the region, it has been made apparent that the service providers are anticipating very little activity and investment in the foreseeable future in terms of new services or infrastructure. However, there are number of municipal-based initiatives currently being proposed that could have a sizable impact on the region if successful. The first is a regional fiber optic build initiative that will route through the southern half of the three counties and connect the developed areas within the counties. The second initiative is a proposed wireless project in the northern part of Allegany County. A third initiative is a municipal based Open Access Fiber build throughout Allegany County. In addition there are two other wireless programs a Northeast Chautauqua County DFT and STWRPDB initiative and a Cattaraugus County countywide WiMax network initiative.

Although these projects are only proposed at this point, each will have a significant impact on their respective regions once implemented. At this point we believe each of these projects could qualify for the Broadband Stimulus Program grants.

After conducting this inventory study it is our belief that the STWRPDB and the corresponding counties should develop teams or committees to identify opportunities within their counties for federal funds that are now available. Much of the information needed to respond to the grant applications is located in the details of this report. Furthermore, this information could be used to develop public / private partnerships with the industry to foster infrastructure development.

1.4 Telecommunications Infrastructure

Telecommunication services in the Southern Tier West region are delivered via a number of competing providers using different technologies and infrastructures. The primary owners of telecommunications infrastructure in the region include the following six (6) incumbent telephone companies: Verizon Communications, Frontier / Citizens Telephone, Armstrong Telephone, FairPoint Communications, Dunkirk Fredonia Telephone (DFT) Communications, and Windstream Communications. In addition to these incumbent telephone companies there are numerous wireless companies and two (2) cable TV companies, Time Warner Cable and Atlantic Broadband. These organizations provide voice, video, and data services using a variety of technologies and

infrastructures which include land based telephone and cable television (CATV) lines as well as a wireless towers. The telecommunications infrastructures in use by the industry today in the STW region are land lines consisting of copper, coaxial, and fiber optics or wireless based technology utilizing strategically placed towers.

Wire Line Infrastructure

Wire line infrastructure includes telephone and cable TV cables which are either buried in the ground or placed on utility poles. Wire line cables can be fiber optic, coaxial or twisted pairs of copper wire. The wire line infrastructure for the region is primarily owned and operated by the incumbent telephone carriers and the cable TV companies.

Copper Telephone Infrastructure

Traditional telephone copper cable is still the infrastructure most used to serve homes and businesses across the STW region. Copper cable is used by the telephone companies primarily to connect central offices (building location for telephone switch equipment) to end users for the purpose of providing traditional voice and data services. It should be noted that copper cable has a very limited capacity for broadband service and is typically the reason why advanced telecommunications services are not available in certain areas. The limitation of providing broadband access over copper is a direct result of distance from the central office, the age of the cable, and the poor performance qualities of the cable in general.

Coaxial Cable TV Infrastructure

The cable TV industry utilizes a hybrid fiber optic/coaxial cable network to provide high quality video, high speed data and voice services to their customers in the region. The high performance characteristics of coaxial cable make it possible to support the transmission of telephone, video and data simultaneously. Broadband access is available in many parts of the region via this hybrid fiber / coaxial infrastructure installed by the incumbent cable TV providers.

Fiber Optic Infrastructure

Telecommunication companies have fiber optic cabling installed throughout the Southern Tier West region, using it primarily as an aggregation or a backbone resource. This infrastructure is used to interconnect central office locations (location of telephone company switches), aggregate copper lines or in some cases to make fiber connections to the end user. The cable TV companies have also installed fiber throughout the region and typically use it to extend service into neighborhoods and communities. Both the telecommunications companies and the cable TV providers have made a significant investment in fiber optic cable in the region over the past 10 years.

Wireless Infrastructure

Wireless technologies are the fastest growing segment of the telecommunications industry. Wireless infrastructure supports cell phones, pagers, personal digital assistants (PDAs), mobile data terminals, messaging, and Internet services. Wireless access is available from wireless towers as well as tall building locations in many areas of the Southern Tier West region. However, as with other areas in upstate NY, due to terrain issues and lack of potential users many remote rural areas do not have wireless coverage.

Cellular Infrastructure

Cellular towers are used by the cell phone service providers to transmit voice conversations from one area or "cell" to another. These towers are strategically placed to provide the most coverage with the least number of sites placed. Cellular towers in the region are placed primarily along major traffic corridors and populated areas throughout the region so that the cellular companies can provide coverage to the most number of users.

Satellite Communications

Satellite service is an option for deploying voice, data and Internet services to areas with limited landline infrastructure and/or poor line of site for terrestrial wireless communications. Satellite communications is still considered a "last resort" service because it is expensive, has latency issues, and can be unreliable.

Central Offices

The central office or CO is a building structure that the incumbent telephone company uses to operate voice, data and video switching equipment. The services available from the local central office for a given area determine the level and availability of services within that wire boundary or area. The region has six (6) primary incumbent local exchange carriers (ILECs) that have installed and provide service from a number of central offices (CO) within the region boundaries.

Verizon's available services are limited in many of the COs that they have in the region. DSL is not available in nearly half of the Verizon central offices (12 out of 26). The other ILECs have offerings that include at a minimum DSL. In terms of providing higher bandwidth services, each of the ILECs will generally build infrastructure and procure equipment if market demands warrant it. Refer to the information below and Section 3 for central office details.

1.5 Regional Telecommunications Summary

ECC Technologies has identified six (6) incumbent local exchange carriers (ILEC), four (4) extended link based competitive local exchange carriers (CLECs) and twelve (12) long distance companies in the three (3) county area. Additionally there are nineteen (19) Internet service providers, two (2) cable TV providers, three (3) major cell phone service providers, and two (2) dark fiber providers.

From an infrastructure standpoint there are 54 central offices that are primarily located in the villages and cities, 151 FCC registered towers, with the majority of these located in close proximity to developed areas and major transportation corridors. In addition, there are many miles of fiber infrastructure installed along the major transportation corridors linking towns and communities.

1.6 Primary Telecom Providers Summary

Through meetings and a telecommunications questionnaire each service provider was asked to provide information on the boundaries of their territory, the available services in that area, the type of equipment in use, their availability of system and network redundancy and any future plans for service upgrades or improvements (one to two years out). Listed below are the primary

telecommunications companies located in the STW region and a summary of the information they provided.

ILECS

Of the six (6) ILECs operating 54 central offices in the three (3) county areas, the two (2) largest service providers in terms of territory are Verizon and Windstream. The other incumbent providers are Frontier, FairPoint Communications and two (2) smaller independents. Listed below are the ILECs in the region.

Armstrong Telephone

Armstrong Telephone Company is located in the town of Addison, NY in Steuben County and provides service into a small area of eastern Allegany County. Armstrong offers T1 and T3 service from a single central office in Whitesville, NY. Armstrong provides service to approximately 300 customers, primarily residential, in Allegany County. In terms of system redundancy Armstrong's Whitesville Central Office is connected in a ring topology via fiber cable with local Verizon COs in Wellsville and Corning. Regarding future infrastructure plans, Armstrong has stated that they will be part of the Independent Optical Network * (or ION) when it becomes available, that they are committed to the future, and that they will install fiber optic cable whenever they're installing new copper infrastructure.

Dunkirk Fredonia Telephone (DFT) Communications

Dunkirk Fredonia Telephone is headquartered in Fredonia, NY and services nearly 13,000 customers in Chautauqua County. DFT is a combination of Cassadaga Telephone Company, Dunkirk and Fredonia Telephone Company and DFT Communications (a CLEC). DFT offers its customers both analog and VOIP (Voice Over IP) telephone service, long distance service, dial-up and DSL Internet service along with DirecTV Satellite Television service. They also offer business phone services such as T1, T3, PRI (Primary Rate Interface) and gigabit Ethernet. To provide redundancy and access to metro markets DFTs' two (2) central offices are connected via fiber ring architecture with connections that span from Jamestown to Buffalo.

In terms of future plans DFT is currently working with Chautauqua County and STWRPDB to expand services across the southern tier of New York State by building fiber infrastructure across the southern portion of Chautauqua, Cattaraugus and Allegany Counties. Once in place, this infrastructure will allow DFT to provide much needed competition in many areas of the region.

FairPoint Communications

FairPoint Communications' main business office supporting Chautauqua County is in Westfield NY. FairPoint utilizes a fiber ring that provides service in and out of their COs. FairPoint offers dial-up, DSL, T1, and T3 service from all of its COs. FairPoint also has voicemail service with operator transfer and auto attendant capabilities. FairPoint's future plans include a newly renovated corporate office building located in Westfield, NY that has been wired with optical fiber cable to attract new high tech tenants. In addition, FairPoint has installed a high speed fiber cable that connects St. Vincent's Hospital in Erie, Pa. with Westfield Memorial Hospital in Westfield to transfer medial images and patient records. FairPoint plans to expand the use of the cable to provide high bandwidth service to other customers in the Westfield area.

*ION is a fiber infrastructure based initiative founded on the vision and investment of the affiliates of fifteen (15) Independent Telephone service providers in NYS.

Frontier (Citizen's) Communications

Frontiers main business location for the region is based in Norwich, NY. Frontier offers service in Allegany and Cattaraugus Counties. They have approximately 5,500 customers in the two county territory and list Alfred State College, Alfred University and West Valley Nuclear as their largest customers. From their COs, Frontier offers dial-up, Frame Relay (FR), DSL, and T1 services. Frontier's central offices in the region are connected via fiber optic OC3 rings for redundancy and diversity. Besides the physical fiber ring redundancy, Frontier has equipped their COs with battery backup. At this time Frontier did not state any future plans for the region.

Verizon Communications

Verizon Communications territory covers more than half of the region and is the dominant incumbent telephone company in the Southern Tier West region, providing service in all three (3) counties. Verizon's main hub for network support and business operations for the region is located in Buffalo, NY. Verizon offers dial-up, T1 and DSL from many of its COs located in the counties. The Verizon central offices in the region are interconnected via fiber optics, with many configured in a ring to provide redundancy. Verizon stated they have no plans in the near future to introduce new DSL services. However, if a large enough opportunity arises they will consider additional services. Verizon did not comment on any other future plans.

Windstream NY Inc.

Windstream's business office supporting Cattaraugus and Chautauqua Counties is located in Jamestown, NY. Windstream has central offices in Cattaraugus and Chautauqua Counties and, depending on the area, employs physical diversity, route diversity, ring diversity and logical diversity within its network. Windstream offers dial-up, Frame Relay (FR), ISDN, DSL, T1, T3, and gigabit services from all of the COs in the region. Windstream has stated their future plans for the region are to constantly implement new services and upgrade cable plant and equipment.

CLECS

CLECs or competitive local exchange carriers are telephone service companies that compete with the incumbent telephone company within the incumbent's territory. They are a product of the 1996 Telecommunications Act that sought to put competition in the telecommunications industry.

AT&T

AT&T Communications of New York, Inc. has its main office that supports the STW region in Syracuse, NY. AT&T provides the following services to select customers in the area: local, long distance, VoIP, DSL, FR, MPLS, T1, T3, and ATM services via leased lines to switches located outside the region. AT&T provides service primarily to business and public organizations. AT&T utilizes incumbent infrastructure to provide service in the region and did not comment on future plans for the area.

Broadview Networks

Broadview's main business office and maintenance garage supporting the STW region is located in Cheektowaga, NY. Broadview Networks can offer the following services to the region through leased lines, voice over IP service**,** MPLS, dial-up, T1, T3, and Gig E on an individual case basis. Broadview Networks switches are located outside the region with their nearest equipment location in the Buffalo area. Regarding future infrastructure plans, Broadview Networks is targeting the Olean area where they plan to install a voice and data switch in the next two years.

DFT Communications
DFT provides services outside its incumbent territory. DFT can provide voice services, Internet access, wireless services and DirecTV (satellite) to its customers. See information above in ILEC section.

Paetec Communications Inc.
Paetec Communications has locations in Rochester and Buffalo, NY that support the region. Paetec focuses on general businesses, government and education in the area. Paetec can provide voice services which include a "centrex like" service that is IP based, T1, T3 and Gig E. These services are made possible through an extended link from their main Lucent 5ESS switch and Plexus VoIP switch located in Fairport, NY. In terms of system backup, Paetec has redundant generators at their Rochester Central Office. Paetec is currently developing interconnect agreements with a number of the incumbents to provide competitive service throughout the region. Paetec has stated that their plans for the area are dependent on the ILEC and their access carriers.

Others

Qwest Communications
Qwest Communication's main sales office for the region is located in Clifton Park, NY. Qwest is an international company with over 33,000 employees. Although not providing local phone service (which technically means they are not a CLEC) Qwest provides the following services: long distance, VoIP, Frame Relay (FR), ATM, SONET, Internet Access, and MPLS. In terms of future plans Qwest stated they will build out infrastructure to meet and exceed the needs and requirements of a customer as the service is required.

CABLE TV PROVIDERS

Atlantic Broadband
Atlantic Broadband located in Bradford, NY and in Johnstown, PA serves nearly 2,500 customers in Cattaraugus County with cable television, high speed Internet, point to point data and digital phone services. Atlantic Broadband's service area includes Olean, Great Valley, Little Valley, Ellicottville, Salamanca, and Limestone. Customers are serviced and supported from Johnstown, PA. Officials did not indicate any plans to broaden infrastructure in the Southern Tier West region. The main area of focus for the company is development of their Aiken, South Carolina property.

Time Warner Cable
Time Warner Cable (TWC) is the second largest cable operator in the United States providing service to more than 14 million customers. Time Warner Cable is the predominant cable operator in the Southern Tier West region. TWC provides cable TV, high speed Internet and digital phone service to many areas in Allegany, Cattaraugus and Chautauqua counties for both residential and commercial customers, as well as fiber optic services. TWC has stated that do not foresee any new infrastructure development for the region in the near future.

1.7 Other Providers Summary

In addition to the primary telecom providers in the region there are a host of alternative telecommunication resources available to the area.

Internet Service Providers

There are over a dozen local or regional ISPs in the Southern Tier West region. The larger and more dominate providers are the ILECs and cable TV companies. Due to the number of companies offering Internet access service across the region, the choice of providers is high. However, many of these organizations utilize the incumbent's cable and equipment infrastructure to provide their services. The exception is wireless Internet service providers (WISP) which include the cellular industry and small startup WISP such as Southern Tier Wireless.

Dark Fiber Providers

There are three identified fiber optic cable providers or construction companies that will build fiber optic networks in the region. The companies are Fibertech, Finger Lakes Technologies Group, and Syracuse Utilities. This type of service is based on building a fiber network for the specific customer and handing over full ownership, after which the customer will light and manage their dedicated fiber optic network.

Broadband over Power Lines (BPL)

BPL technology utilizes electrical lines to provide Internet access and other communications services to local customers. This technology has been hotly debated over the years due to a number of documented issues: an inherent potential to interfere with Ham (amateur radio) and emergency radio transmissions, unproven ability to scale meaningful bandwidth levels and its ability to provide a proven supportable business plan for the service provider.

In the upstate NY area, New Visions Powerline Communications, located in Solvay NY, is a relatively new provider of voice, video and data services over power lines. According to the New Visions website their typical bandwidth services for Internet access ranges from 5 to 10 Mbps.

Wireless System

There are currently 151 wireless towers constructed in region, as registered on the FCC website. Most of the towers in the region have cellular equipment installed on them to provide cell phone coverage. The majority of these towers are located on major roadways and population centers, with the highest concentration of towers positioned in and around the major cities. This is done to provide the most coverage to the highest number of users with the least amount of towers. Unfortunately, because of this strategy cell coverage can be spotty or non-existent in many of the remote areas on the region. The service coverage of a typical cellular equipped tower can be anywhere between 1 and 10 miles depending on the equipment in use, how the equipment is configured and the height of the towers. There are14 wireless service providers in the area that are either a service provider or a service reseller; either way choice enables healthy competition. The major cellular providers in the region are Verizon Wireless, AT&T Mobility, and Sprint / Nextel.

Cell Towers

Cell tower owners consist of real estate developers and wireless telecom providers. Some of the larger cell tower owners in the region are Crown Atlantic, SBA, and Verizon Wireless. The first two are cell tower builders that lease space to other providers and the third is a provider of service.

Cellular Service Providers
Of the three major providers, Verizon Wireless uses the highest number of towers followed by AT&T, then Sprint Nextel. The cellular providers in the region are working on moving their services to 3G or third generation cellular which will allow for higher bandwidth and better applications. However, as with wire-line service their resources are limited.

Wireless Access Providers
Southern Tier Wireless is a small independent wireless Internet provider located in Allegany County. This organization can provide Internet access and broadband point-to-point connectivity in areas that have no other alternatives. Southern Tier Wireless is currently involved in an initiative to bring wireless Internet to the northeastern part of Allegany County.

1.8 Municipal Infrastructure

The Public Safety Communication Systems

Allegany County
The Allegany County Public Safety Communications System consists of seven (7) wireless towers that are set up in a three (3) tower microwave ring backbone with UHF spurs to four (4) remote towers. Allegany County 911 communications would like to upgrade the entire backbone system to microwave or fiber connections to all towers. In addition, they are looking to incorporate new radio systems from towers to the field to improve coverage and provide higher bandwidth capacity. Currently the system covers 80% of the County for mobile communications and paging. The County was recently awarded a $1.7M federal grant, however it is estimated that it will cost up to $3.5M to do a complete refresh of the system.

Cattaraugus County
Cattaraugus County declined to be part of the study.

Chautauqua County
The Chautauqua County Emergency Management system consists of 12 towers set up in a ring configuration. Ten (10) of the tower locations are connected via a ten (10) year old microwave and fiber backbone (backhaul) set up in SONET OC3 ring configuration. The other two (2) towers are connected at 4xT1 speed. Currently the system covers approximately 90% of the County for mobile communications and paging.

Educational Systems

BOCES
Erie 1 Board of Cooperative Educational Services (BOCES) located in West Seneca, NY has contracted with Time Warner Cable and Fibertech to provide fiber-based services to create the WAN network interconnecting the schools, districts and regional hubs. Erie 1 BOCES, through the WNY Regional Information Center, provides network services to Chautauqua, Cattaraugus and Allegany Counties. Chautauqua County is served by Erie 2 BOCES, Cattaraugus County is served by Cattaraugus /Allegany BOCES and Allegany County is served by Cattaraugus /Allegany BOCES and GST BOCES West.

BOCES has stated that they would like to have a viable competitor to Time Warner Cable. They are interested in the concept of a municipal fiber network, and in particular, its ability to provide cost savings. Even though they have a fiber based WAN some school districts are connected in a spur topology meaning there is only one fiber route connecting the school which makes them vulnerable to fiber cuts. BOCES would like to cost effectively solve the vulnerability issue due to the lack of ring architecture.

Jamestown Municipal Fiber

Jamestown Board of Public Utilities (BPU) owns and operates a 20 mile fiber ring and spur network in the City of Jamestown that connects its remote locations for internal use. In addition, the BPU has leased fiber strands to organizations such as DFT and Chautauqua County to reduce overall costs of the infrastructure.

1.9 Allegany County Summary

Telecommunications

The three (3) ILECs in Allegany County are Armstrong Telephone, Frontier / Citizens and Verizon; Time Warner Cable (TWC) also provides services in the County. They are the major owners of telecommunications and cable TV infrastructure respectively. Frontier and Verizon territory covers over 90% of the County from an ILEC standpoint and TWC is the only CATV. The County's ILECs have developed a total of 14 central offices within the County. These central offices represent the core of telecommunications in Allegany County. Armstrong and Frontier / Citizens offer DSL from all of their COs with Verizon providing DSL from some. In addition to the ILEC's infrastructure, TWC has a head-end, or point of equipment (POE), located in the town of Wellsville which is fed out of a major head-end located in Olean and provides voice, video, and data services.

Owners of Fiber Infrastructure

There is a network of fiber optic transmission routes through the center of the County. Outside of single fiber routes, the northern half of the County is devoid of telecom fiber cable. The telecom fiber optic cable in the County is primarily between COs and not typically providing service directly to customers. Cable TV fiber is located in the northwest, central and southwest portions of the County.

Types of Services

Armstrong is a small local telephone company whose service offerings are limited to DSL and T1 into a small area in the eastern part of the County. Frontier offers DSL, Frame Relay and T1/T3 as standard services and will offer ISDN, ATM and gigabit Ethernet on an individual case basis. Verizon offers DSL from all of its COs except Angelica, Belfast, Canaseraga, Cuba, and Rushford. These services are limited to the structure of cable plant available in their respective areas.

Competition

In addition to the incumbent's presence in the County, remote switch / extended link and resell services are available from a number of CLECs including AT&T, Paetec, and Broadview. These organizations are not "co-located" or have equipment in the County and are therefore either reselling service or extending services from outside the area. Either way, this set up limits their effectiveness as competitors. Cellular coverage is supplied by AT&T Mobility, Sprint / Nextel, and Verizon Wireless.

The County is served by 14 ILEC central office and 39 wireless tower locations. Cable TV and wireless access are more readily available in the southern half of the County. For the most part higher order telecommunications services (such as ATM or gigabit Ethernet) are not available. The ILEC, CLECs, and third party organizations such as Southern Tier Wireless offer Internet service to select areas.

- ILECs: Verizon, Frontier, Armstrong
- CLECs: AT&T, Broadview, Paetec
- Central Offices: 14
- Cellular Towers: 39
- Cable Providers: Time Warner Cable
- Wireless Providers: AT&T Mobility, Sprint/Nextel, Verizon Wireless, Southern Tier Wireless
- Fiber Providers: Services based – Frontier, Verizon & Time Warner Cable
  Dark Fiber based – Fibertech

Allegany County Conclusion

Of the three counties, Allegany County has the largest areas of limited or no broadband access from both land based and wireless technologies. Many of the central offices (Verizon) do not offer basic DSL service and due to the distance limitation of DSL and the size of the area each CO serves, many areas that have DSL available are out of its reach in terms of service. Cable TV access is limited as well, with much of the fiber and coaxial cable needed to provide this service located only in the villages and major roads. In addition there are areas in the northern half of the county that are very limited in the number of wireless towers. However it should be noted that this County has a small WISP that is working to provide access to the northern half of the County. Allegany County would be considered below average in comparison to a typical upstate NY rural county regarding broadband availability.

Currently there is a proposed county wide Open Access fiber network under development that if successful will create a foundation to support future telecommunications investment and further development. These types of initiatives provide low cost access to fiber which becomes a catalyst for competitive providers to move into the area. In addition it is anticipated that the successful deployment of the fiber will have a significant impact on the global competitiveness of the County and the entities within.

Insert Map 4.1 ALLEGANY COUNTY

1.10 Cattaraugus County Summary

Telecommunications

There are three (3) ILECs in Cattaraugus County: Frontier / Citizens, Verizon, and Windstream. There are two cable TV providers, Time Warner Cable (TWC) and Atlantic Broadband. These five companies are the major owners of telecommunications and cable TV infrastructure respectively. Verizon's territory covers over approximately 80% of the County, followed by Windstream 15% and Frontier 5%. The county's ILECs have developed a total of 16 central offices within the County. These central offices represent the core of telecommunications in Cattaraugus County. Frontier / Citizens and Windstream offer DSL from all of their COs with Verizon providing DSL from some of their COs. In addition to the ILEC's infrastructure, TWC has one head-end located in Dunkirk, and one in Jamestown.

Owners of Fiber Infrastructure

There are fiber optic transmission routes throughout the County. The telecom fiber optic cables in the County are single route runs that are typical of connecting COs and not necessarily providing service directly to customers. However there are some fiber routes that appear to provide customer connections. Cable TV fiber is located in the north and southeast areas of the County.

Types of Services

Frontier offers DSL, Frame Relay and T1/T3 as standard services and will offer ISDN, ATM and gigabit Ethernet on an individual case basis from its COs. Verizon offers DSL from 7 of its 13 central offices and gigabit Ethernet on an individual case basis (ICB). Windstream offers many of the desirable high bandwidth services except ATM from its COs. FairPoint provides ISDN, DSL, T1, and T3. DFT offers ISDN, DSL, T1 / T3, and gigabit Ethernet. TWC provides cable TV service, high speed Internet, and point-to-point services. These services are limited to the structure of cable plant available in their respective areas.

Competition

In addition to the incumbent's presence in the County, remote switch / extended link and resell services are available from a number of CLECs including AT&T, DFT, Paetec, and Broadview. Except for DFT these organizations are not "co-located" or have equipment in the County and are therefore either reselling service or extending services from outside the area. Either way this configuration limits their effectiveness as competitors. Cellular coverage is supplied by AT&T Mobility, Sprint / Nextel, and Verizon Wireless.

The County is served by 16 ILEC central office and 43 wireless tower locations. Cable TV and wireless access are more readily available in the southern half of the County. For the most part, higher order telecommunications services (such as ATM or gigabit Ethernet) are not available. The ILECs and CLECs offer Internet service to select areas.

- ILECs: Verizon, Frontier / Citizens, Windstream
- CLECs: AT&T, Broadview, DFT, Paetec
- Central Offices: 16
- Cellular Towers: 43
- Cable Providers: Time Warner Cable, Atlantic Broadband
- Wireless Providers: AT&T Mobility, Sprint/Nextel and Verizon Wireless
- Fiber Providers: Services based – DFT, FairPoint, Frontier, Verizon, Windstream, TWC, Atlantic Broadband
  Dark Fiber based – Fibertech

Cattaraugus County Conclusion

Cattaraugus County has large areas with no broadband access available from either land based or wireless technologies. Many of the central offices (Verizon) do not offer basic DSL service, and due to the distance limitation of DSL and the size of the area each CO serves many areas that have DSL available are out of its reach in terms of service. Cable TV access is limited as well, with much of the fiber and coaxial cable needed to provide this service located only in the villages and along major roads. The highest concentration of CATV coaxial cable is located in Salamanca and Olean. In addition there are "pocket" areas in the northwest and central-east portion of the County that are very limited in the number of wireless towers. By comparison Cattaraugus County would be considered average to a typical upstate NY rural county regarding broadband availability.

Insert Map 4.2 CATTARAUGUS COUNTY

1.11 Chautauqua County Summary

Telecommunications

There are five (5) ILECs in Chautauqua County: DFT, FairPoint Communications, Frontier / Citizens, Verizon, and Windstream Communications. There is one (1) cable TV provider, Time Warner Cable (TWC). These are the major owners of telecommunications and cable TV infrastructure in the County respectively. Frontier territory covers over 50% of the County, FairPoint approximately 25%, Verizon 20% and DFT the remaining. The County's ILECs have developed a total of 24 central offices within the County. These central offices represent the core of telecommunications in Chautauqua County. Windstream, FairPoint, DFT and Frontier / Citizens offer DSL from all of their COs with Verizon providing it from some. In addition to the ILEC's infrastructure TWC has a head-end, or point of equipment (POE), located in the towns and provides voice, video, and data services.

Owners of Fiber Infrastructure

In the County there is an extensive network of fiber optic transmission routes from the telecommunications and CATV industries through the center of the County in Jamestown and Fredonia and along the shore of Lake Erie. With the high number of central offices in the County, the telecom fiber optic cable in the County is primarily between COs and not typically providing service directly to customers. Cable TV fiber is present in the populated areas of the County.

Types of Services

DFT is a small local independent telephone company that provides ISDN, DSL, and gigabit Ethernet services into a small area in the northern part of the County. FairPoint Communications provides service to the western part of the County and has ISDN and DSL available. Verizon service offerings are limited to DSL and T1 services into an area in the northern tip of the County. Windstream is the largest provider in the County and offers DSL, Frame Relay, T1/T3, ISDN, and gigabit Ethernet to the central and eastern parts of the County. These services are limited to the structure of cable plant available in their respective areas.

Competition

In addition to the incumbent's presence in the County, remote switch / extended link and resell services are available from a number of CLECs including AT&T, Paetec, and Broadview. These organizations are not "co-located" or have equipment in the County and are therefore either reselling service or extending services from outside the area. Either way, this set up limits their effectiveness as competitors significantly. Cellular coverage is supplied by AT&T Mobility, Sprint / Nextel, and Verizon Wireless.

The County is served by 24 ILEC central offices and 69 wireless tower locations. Cable TV is more readily available in Fredonia, Jamestown, and the northwestern half of the County. For the most part, higher order telecommunications services (such as ATM or gigabit Ethernet) are not available. The ILEC, CLECs, and third party organizations such as Transwave offer Internet service to select areas.

- ILECs: Verizon, Frontier, Armstrong
- CLECs: AT&T, Broadview, Paetec
- Central Offices: 24
- Cellular Towers: 69
- Cable Providers: Time Warner Cable
- Wireless Providers: AT&T Mobility, Sprint/Nextel, and Verizon Wireless
- Fiber Providers: Services based – Frontier, Verizon, Time Warner Cable
  Dark Fiber based - Fibertech, Frontier

Chautauqua County Conclusion

Of the three counties, Chautauqua County has the smallest areas with no broadband access from both land based and wireless technologies. Almost all of the central offices offer basic DSL service and the small size of the individual CO territories provides for adequate coverage. However cable TV access is limited, with much of the fiber and coaxial cable needed to provide this service located only in the cities, villages and major roads. Most of the CATV coax is located between Jamestown and Chautauqua. There are an average number of wireless towers in the County. By comparison, Chautauqua County would be considered average to above average to a typical upstate NY rural county regarding broadband availability.

Insert Map 4.3 CHAUTAUQUA COUNTY

1.12 Development Sites

Ten (10) Economic Development Sites were identified by the EDA directors in each County. These sites were chosen as the key locations for their ability to attract business. As shown in the body of this report, marketing profiles from a telecommunications perspective have been created for each of these sites.

Many of these sites are located in and around villages and cities and are therefore served by the most advanced telecommunications resources available by the incumbents. In addition, fiber optics and/or coaxial cable were found at or in close proximity to the many of these development sites.

1.13 Conclusion

As with many areas of New York State, we have found that the majority of telecommunications infrastructure, and therefore available services, are located in the population centers in the region and along the main thoroughfares. Almost predictably, the incumbents have invested in areas that will give them the largest return on investment and left many of the more rural areas behind.

With the exception of Verizon, the incumbent telephone companies have installed at a minimum DSL equipment at each of their respective central offices (Verizon has stated they have no plans in the immediate future to install new DSL locations). However, since DSL has a practical distance from the CO limitation of approximately two and one half miles, there are many areas that assuredly do not have access. In addition, the majority of fiber in the region appears to only connect the central offices together and therefore provides limited, if any, benefit to the larger organizations in the region that are potential users of this technology.

The cable TV industry has likewise installed fiber and coaxial cable which they use to provide voice, Internet, and video services to the select areas of the region. Time Warner Cable typically builds to areas with a minimum home density of 12 homes per linear mile. Those areas with less than 12 homes per mile typically cannot support the investment required to build the infrastructure. Cable TV services are typically delivered into a neighborhood by optical fiber and delivered to homes via coaxial cable. Typically coaxial cable is engineered to extend out to 0.5 mile from the fiber.

The cellular industry in the region has placed the majority of their towers in the more populated areas and much fewer in the remote areas. With only one (1) of the three (3) major providers stating that they will be adding towers in the future, the pace of improvement for cellular coverage will be slow at best. In addition, most towers are connected via T1's so there is limited bandwidth for next generation technologies. Satellite technology is a viable option, however, it is limited in the bandwidth that can be delivered and is still relatively expensive.

The fiber initiative between DFT and the STWRPDB, previously mentioned in the DFT summary, could become a very important asset to the region if the fiber is routed to the right places and connects the areas of need. It will also be important that this infrastructure be designated as an Open Access System meaning that it is available or open to any organization that wishes to use it, and can be used to lure telecommunications competition into the region. If these two conditions are met, the prospects of a sustainable high bandwidth telecommunications backbone could make a tremendous impact on the economic development and quality of life in the region.

With the recent announcement of the United States Federal Broadband Stimulus Fund. which has put aside $7.2B to fund underserved and un-served areas of the country, the timing of this inventory could not be better. However, it is our opinion that without the active support of the municipal organizations across the region that the telecommunications profile will not experience significant improvements.

1.14 Inventory Maintenance

As stated previously, this information has also been placed into an electronic geographic information system (GIS) database by the STWRPDB planning department for the purpose of economic development and regional planning. This GIS database consists of interactive mapping elements that can be used to identify and locate the major telecommunications resources within the region. The information was compiled into an ARC/INFO GIS format.

This report identifies the current status of the telecommunications services, infrastructure and providers in the Southern Tier West region. Since telecommunications has become so important to everyday life, it is vital to keep this information as up to date and accurate as possible. This information should be reviewed and updated on an annual basis and become the foundation for future telecommunications initiatives. Several options exist for updating this information in the future.

1) Develop a regional program to include the planning and development departments within each of the counties. As construction permits are filed for the installation of infrastructure, have copies sent to the STWRPDB for inclusion into the GIS database. Updates on service providers and available services can be provided by periodic meetings, Franchise Agreements and Applications for New Business etc.

2) The STWRPDB team can assign an internal resource to meet with and query service providers for new information and updates on an annual basis. This information can be provided to and updated by the team's GIS staff.

3) The STWRPDB team can hire a consulting team such as ECC Technologies to identify and provide updates and changes on an annual basis.

1.15 Recommendations

Needs Assessment & Goal Setting

Meet with and interview key county organizations to assess their telecommunications needs and goals for improvement. Organizations that would be included in the needs assessment and goal setting process are:

a) Educational institutions (school districts, BOCES, colleges, libraries)
b) Municipalities and government agencies (state, county, town, village)
c) Emergency management & public safety
d) Hospital and healthcare organizations
e) Economic development agencies
f) Key corporations and businesses within the region

Alternative & Economic Impact Analysis

Based upon the Infrastructure Assessment and Needs Assessment, develop strategies (alternatives) that will support and advance the telecommunications and economic development goals of the Southern Tier West region. Typically these alternatives have varying degrees of investment resources and phasing. An analysis of the alternatives should be evaluated for their economic impact, realizing the regions overall goals for economic development and improved quality of life.

Alternatives should be evaluated to encourage private telecommunication service provider investment in fiber, wireless infrastructures, and digital technologies that result in improved and competitively priced services. Community network infrastructures should also be evaluated for opportunities to improve economic development and community access to competitively priced telecommunications services.

Each of the strategies and alternatives identified as potential solutions for meeting the region's short and long term goals should be evaluated for costs, economic impacts and benefits to the community.

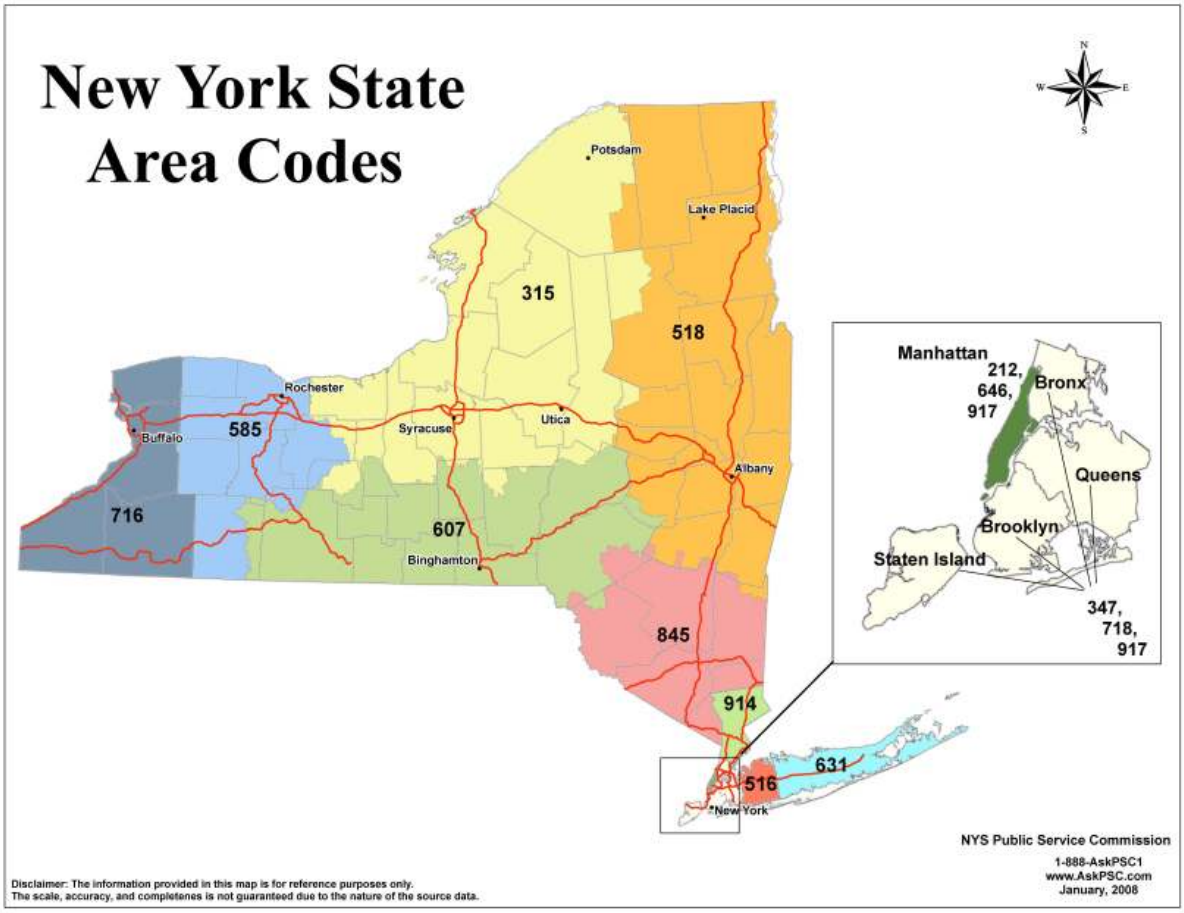
INSERT ExecutiveSummaryMapFinal (all Telecom)

INSERT DSLmap

2.0 Southern Tier West Telecommunications

2.1 Calling Areas & LATAs

The Southern Tier West region is primarily within the (716) area code and the Buffalo Region's Local Access Transport Area - LATA 140, with the exception of Allegany County which is part of the Rochester LATA 974 and the (585) area code and the Binghamton LATA 240 and the (607) Area Code.



2.2 Telecommunications Wire Line Services

Local Exchange Carriers (LECs)

A LEC or local exchange carrier is a telephone company that offers local and long distance telephone service within a defined region referred to as the LATA - Local Access & Transport Area. Service to points outside the LATA is provided by inter-exchange carriers (IXCs) commonly referred to as long distance service providers. Local Exchange Carriers can be either an ILEC's or a CLEC's.

An ILEC, or Incumbent Local Exchange Carrier, provides telephone services within a local calling area. Therefore the ILEC is responsible for the development, maintenance, and support of telephone cabling infrastructure necessary to provide telecommunications services within that calling area. In the STW region, Verizon is the dominant incumbent LEC except for Chautauqua County where there is a presence of five (5) phone companies splitting the territory.

Southern Tier West ILECs

Armstrong Telephone

The Armstrong Telephone Company owns and operates local, independent telephone companies in West Virginia, Maryland, Pennsylvania, and New York. These companies provide local and long distance services, digital calling features, dial-up Internet, DSL, T1, and T3 service. Armstrong provides service to approximately 300 customers in Allegany County. The Armstrong Telephone Company is located at 136 Front Street in the town of Addison, NY and provides sales and maintenance operations to the eastern part of Allegany County. The company's maintenance garage and service department is located at the same address.

Armstrong operates four (4) COs in the southwest area of Steuben County and has a small territory in Allegany County. Their repair center is manned 24 X 7 by three (3) full time and two (2) part time telecommunication engineers.

For voice and data services Armstrong employs a Siemens - Stromberg Carlson DCO (digital central office) switch in Addison as the host switch and Siemens DCO RLS, Siemens DCO RLG's and Occam equipment as remotes. Armstrong offers voice services such as call forward, voicemail and caller ID to its customers. In addition Armstrong has claimed 99% coverage in its territory for their DSL (up to 4 Mbps) service.

In terms of system redundancy, each of their four (4) COs is connected in a ring topology via fiber cable to Verizon COs in Wellsville and Corning. Armstrong plans to be part of Independent Optical Network or ION when it becomes available. ION is a fiber infrastructure based initiative founded on the vision and investment of the affiliation of fifteen (15) independent telephone service providers in NYS. Regarding future infrastructure plans, Armstrong has stated that they are committed to the future and that they will install fiber optic cable whenever they're installing new copper infrastructure.

Dunkirk and Fredonia Telephone Company / Cassadaga Telephone Company

DFT Communications is headquartered in Fredonia, NY and serves nearly 13,000 subscribers in the Southern Tier West region. Founded in 1898, DFT Communications is comprised of three companies, the Dunkirk and Fredonia Telephone Company, Cassadaga Telephone Company, and DFT Communications. The Dunkirk and Fredonia Telephone Company and Cassadaga Telephone Company represent the ILEC (Incumbent Local Exchange Carrier) arms of DFT Communications. DFT Communications is the registered CLEC (Competitive Local Exchange Carrier).

DFT Communications offers local telephone service through Dunkirk and Fredonia Telephone Company and Cassadaga Telephone Company. Cassadaga Telephone is an independent phone company serving 2,000 customers in Cassadega, NY. Dunkirk and Fredonia Telephone Company is likewise an independent phone company serving 6,000 customers in Fredonia, NY. The DFT Communications CLEC provides services to nearly 5,000 customers in Chautauqua County.

DFT Communications offers additional services such as long distance voice, Internet phone, wireless services and Internet service through DFT Wireless, 24 hour Call Center Services (Customer Care Center) through DFT Priority One, and security systems and monitoring through DFT Security.

DFT offers a variety of services including dial-up, DSL, T1, T3, PRI, and gigabit Ethernet in Chautauqua County. Dunkirk and Fredonia Telephone in Fredonia offers three DSL tiers including 1Mbps, 3Mbps and 12 Mbps speeds. In Jamestown, six DSL tiers are offered with speeds ranging from 256Kbps to 6Mbps. All customers are serviced and supported out of the Temple Street facility in Fredonia, NY. DFT and Cassadaga Telephone maintain Taqua T7000 switching systems in the Cassadaga and Fredonia COs respectively. The DFT CLEC uses a Nortel Softswitch for Voice Over IP services. Each of the switches are inter-connected via fiber ring. This ring also connects Jamestown to Buffalo.

DFT has been aggressively working with Chautauqua County and Southern Tier West Regional Planning and Development Board to expand its ability to provide services across the southern tier of New York State by building fiber infrastructure across the southern portion of Chautauqua, Cattaraugus and Allegany Counties. DFT has explored fiber to the home but has been unsuccessful in creating a sustainable business model for the service.

FairPoint Communications

FairPoint owns and operates local exchange companies in 18 states, offering advanced communications including local and long distance voice, data, Internet, television, and broadband services. FairPoint is traded on the New York Stock Exchange under the symbol FRP. FairPoint's business office supporting Chautauqua County is located at 30 Main St. in Westfield NY. This location is their main hub for network support and business operations. FairPoint's maintenance garage location for the County is at 95 Bourne Street in Westfield NY.

FairPoint's central offices are located in Brocton, Findley Lake, Mayville, Ripley, Sherman, and Westfield; all located in Chautauqua County. FairPoint utilizes a fiber ring that supports all of their trunking in and out of their COs. They also have an internal ring that ties all of their remote sites to their host office. From all of their COs, FairPoint offers dial-up, DSL, T1, and T3. FairPoint has voicemail service with operator transfer and auto attendant capabilities at all COs. FairPoint has approximately 11,000 access lines in the region.

FairPoint's host central office in Westfield is equipped with a Nortel DMS-500 switch which is connected to one SONET remote switch and four RCC remotes. Regarding quality of service, FairPoint is committed to providing repair within 24 hours of receipt of a call and operates 24/7 for business customers. Residential customers are also 24/7 but repairs are excluded on Sundays and holidays. Besides the physical fiber ring redundancy, FairPoint has equipped all of their COs with backup equipment consisting of battery backup and emergency generators.

FairPoint future plans include the former Welch Corporate Office building that has been wired for new tenants. This building has been set up with a 1524 Gbps switch which serves as a core Ethernet fiber optic switch that will support high speed uplinks. The entire building is equipped with a fiber optic backbone to accommodate high tech businesses. FairPoint also has a high speed fiber cable that connects St. Vincent's Hospital in Erie, Pa. with Westfield Memorial Hospital in Westfield to

transfer medial images and records. FairPoint envisions utilizing this resource to expand services in the greater Westfield area sometime in the future.

Frontier Communications

For the STW region Frontier is based at 11 East Main Street in Norwich, NY with company headquarters in Burnsville, MN. Frontier offers service in Allegany and Cattaraugus Counties. They have approximately 5,500 customers in the two county territory and list Alfred State, Alfred University, and West Valley Nuclear as their largest customers.

From their COs, Frontier offers dial-up, Frame Relay (FR), DSL, and T1. Frontier provides voice services and voicemail. Frontier's central offices are equipped with Nortel DMS-10s or Siemens DCOs (digital central office). Regarding quality of service, Frontier has stated it provides 24/7/365 repair and utilizes a regional network operating center (NOC) to provide support. Frontier's central offices in the region are connected via fiber optic OC3 rings for redundancy and diversity. Besides the physical fiber ring redundancy, Frontier has equipped their COs with battery backup. Frontier did not disclose future plans for the region.

Verizon Communications

Verizon Communications was formed on June 30, 2000, with the merger of Bell Atlantic Corp. and GTE Corp. Verizon Communications Corporate headquarters is located at 140 West Street, New York, NY. Verizon delivers broadband and other wireless and wire-line communications services to consumers, business, government, and wholesale customers. Verizon is a publically traded company and is listed on the New York Stock Exchange under the VZ symbol.

Verizon is by far the largest telephone company in the state and is the dominant incumbent telephone company in the STW region with territory that covers over half of the three County area. Verizon territory covers most of Allegany and Cattaraugus Counties. Verizon provides voice and data services to the areas that are in its territory. However, through a search of their DSL locator website DSL is not available in many of their COs. In terms of system redundancy, Verizon has interconnected the following CO's in a fiber ring configuration: Olean, Portville, Bolivar, Wellsville, Belmont, Friendship, Cuba, Hinsdale, Franklinville, Rushford, Belfast, and Angelica. Verizon systems have round-the-clock backup electrical power in the form of batteries and/or diesel generators.

Verizon has no plans to roll out any new DSL services in the STW region in the future, however they did state that if there is a large enough opportunity they would consider rolling out gigabit services and possibly their fiber to the home service called FIOS.

Windstream NY Inc.

Windstream was formed through a spin-off of Alltel's landline business and a merger with VALOR Telecom. Windstream operates approximately 3.2 million access lines in 16 states located primarily in the east and southeast areas of the US. Windstream employs over 8,000 workers and is listed on the NYSE under the ticket symbol WIN.

Windstream's business office supporting Cattaraugus and Chautauqua Counties is located at 201 E. 4th Street in Jamestown, NY. Windstream's maintenance garage location for the counties is at 132 Fluvanna Avenue, Jamestown, NY. Windstream has central offices in Cattaraugus and Chautauqua Counties and, depending on the area, employs physical diversity, route diversity, ring diversity and logical diversity within its network.

Windstream offers the following services from all of its COs in the region; dial-up, FR, ISDN, DSL, T1, T3, and gigabit services. In addition Windstream provides the following services; analog, Centrex, voicemail, Dish Network, Ethernet, Ethernet Internet access, voice and data customer premise equipment and maintenance, network security services, web hosting, and electronic billing.

Windstream's central offices are equipped with Nortel DMS-100/200 class 4/5 and Nortel DMS 10 Class 5 switches. All Windstream systems and major nodes are monitored through Windstream's network operating center (NOC). All nodes have battery and generator backup. In terms of service commitment, Windstream has received commendations from the NYSPSC for quality service for three consecutive years. Windstream has stated their future plans for the region are to constantly implement new services and upgrade cable plant and equipment.

Pricing

Standard pricing for business class lines typically range from $15.00 to $35.00 per line depending on added features*. Large installations are priced on an individual case basis (ICB). Usage rates are priced on destination area.

*Verizon's NYS OGS rate for a measured business line is:
$15.74 monthly fee + $6.41 FCC charge, $1.42 FUSF = $23.57

To provide a reference in terms of size the following chart represents the ILEC in the region compared by number of lines in the state (approximately 14,007,000 in New York State).

Local Exchange Companies Ranked by Local Service Line State Wide (December 2002)**

Company	Lines	Lines % of Total
Verizon-NY	9,247,518	66%
Frontier / Citizens of NY	853,757	6%
Windstream	101,290	.70%
Chautauqua & Erie Tel (FairPoint)	12,872	.09%
Dunkirk Fredonia Tel (DFT) & Cassadaga	6,253	.04%
Armstrong	3,728	.027%

* PSC info **Number of lines from 2002

Table 2.1 – Local Exchange Companies

LEC Territory – Central Offices

Telephone infrastructure in the STW region is primarily supplied by the six (6) ILEC organizations (as previously listed). A total of 54 central offices were identified across the STW region, 14 of which are in Allegany County, 16 are in Cattaraugus County and 24 are in Chautauqua County. Of these Verizon owns and operates 26, Windstream owns 14, FairPoint owns 6, Frontier / Citizens owns 5, DFT / Cassadaga owns 2, and Armstrong owns 1.

Each CO is unique in that they offer varying levels of bandwidth services and network technologies. A breakdown of territory and contacts is listed below.

Incumbent Local Exchange Carrier (I-LEC)	Allegany County	Cattaraugus County	Chautauqua County
Armstrong Telephone **Jack Robinson** **(607) 359-2211**	**X**		
FairPoint Communications **Harry Bastian** **(716) 753-6902**			**X**
DFT **Dave Pihl** **(716) 673-3031**			**X**
Frontier Communications **Judy McIntyre** **(607) 336-4099**	**X**	**X**	
Verizon Communications **Kristin LaMastra** **(716) 851 6212**	**X**	**X**	**X**
Windstream Communications **Kelly Snow** **(716) 661-5119**		**X**	**X**

Table 2.2 – ILECS by County

LEC Services

A varying range of telecommunications services are available from the incumbent local exchange carriers at each central office (CO) location within Southern Tier West region. The services at the CO can include voice lines, ISDN, DSL, T1/DS1, T3/DS3, Frame Relay, ATM, and gigabit Ethernet. A detailed inventory of the services offered through each LEC's central office, is provided on a county by county basis later in this section.

Insert Map 3.1 ILEC Boundaries and Central Offices in the STW Region

Insert Map 3.3 Regional Telephone Fiber with ILEC Boundaries Territories

CLECs

A Competitive Local Exchange Carrier (CLEC) is a telephone company that competes with the incumbent telephone company in the incumbent's territory. The formation of these organizations was a direct result of the Telecom Act of 1996.

There are three basic types of CLECS:

Reseller CLEC - A resale CLEC purchases LEC services and resells them to their customer.

Switched Based CLEC - A switched based CLEC purchases the use of the ILEC cable plant and last mile connection but has its own switching equipment located at a Central Office. The switch can be located either inside the territory or outside which will utilize an "extended link" or leased line from the incumbent. Extended link service is more expensive and therefore less competitive.

Switched and Facilities Based CLEC - A switched and facilities based CLEC owns the switching equipment and cable plant infrastructure to provide services independent of the ILEC.

The following example illustrates how the three (3) types of CLECs might set their pricing strategies. (The ILEC sells dial-up line and service to a customer for $12.00 per line.)

1) A reseller CLEC buys dial-up line and service from the ILEC for $10.00 and resells it for $11.50.

2) A switched based CLEC buys the dial-up line only for $8 and sells line and service for $11.00.

3) A switched and facilities based CLEC owns equipment, cabling and sells service for $10.00.

CLECs in the STW Region

AT&T

AT&T serves millions of customers in 22 states providing broadband, long distance, and local voice services. AT&T Communications of New York, Inc. supports the STW region from offices based in Syracuse, NY. AT&T has the ability to offer local, long distance via traditional circuit switched, and VoIP, FR, MPLS, T1, T3, and ATM services via leased lines to regionally located switches. AT&T can provide service to residential, business, and public organizations and will do so under profitable instances. AT&T has no switching equipment or cable facilities in the region and did not comment on future plans.

Paetec Communications Inc.

Paetec Communications has business office locations in Rochester and Buffalo, NY that supports the region. Since its 2008 merger with McLeod USA, it has nearly doubled its size to 2500 employees. The combined company serves over 47,000 enterprise customers nationally. Paetec delivers service to business-class customers in more than 80 percent of the nation's top 100 metropolitan areas. Paetec services include data, voice, and Internet communications services. In addition they can provide data center solutions, communications management software, and financing programs.

In the STW region Paetec focuses on general businesses, government and education. Paetec can provide voice services which include a Centrex-like service that is IP based, T1, T3, and Gig E.

Paetec offers local business lines on an analog or digital basis, Direct Outward Dial (DOD) and Direct Inward Dail (DID) trunks, two-way trunks and TeleBlock (an outbound call screening service). These services are made possible through an extended link from their main Lucent 5Es switch and Plexus VoIP switch located in Fairport, NY. In terms of system backup Paetec has redundant generators at their Rochester Central Office and performs bi-weekly routine maintenance checks. Paetec has stated that their plans for the area are dependent on the ILEC and their access carriers.

Broadview Networks

Broadview's main business office and maintenance garage for the region are located at 495 Aero Drive, Suite 2, Cheektowaga NY. They provide competitive services to the ILECs through their nearest collocation point which is in the Buffalo area.

Broadview Networks has the following services available in the region: VoIP service, MPLS, dial-up, T1, T3, and Gig E on an individual case basis. Broadview claims to have thousands of customers in the region with 99% of them being businesses. Of their customers in the region, Bishop Walsh High School was named as one of their larger. In terms of network system backup equipment. Broadview employs batteries and generators at their collocation points. In terms of future infrastructure plans, Broadview Networks has stated that they are considering collocating a voice and data switch in the Olean CO. This is a possible target in the next two years.

DFT Communications

DFT provides services outside its incumbent territory via CLEC status. See information above in ILEC section.

Qwest Communications

Qwest Communication's main sales office for the region is located in Clifton Park, NY. Qwest is an international company with over 33,000 employees. They are an ILEC in the mid-western United States and their main headquarters are in Denver, CO. For other areas of the country Qwest provides long-distance services, broadband data, voice, and video services.

Although not providing local phone service (which technically means they are not a CLEC) Qwest provides services in NYS to both the commercial and public sectors. They offer the following services: LD, VoIP, Frame Relay, ATM, SONET, Internet access, and MPLS.

Qwest's business model in NYS is to utilize their long haul fiber backbone to provide the bandwidth required to meet the needs of the varied telecom solutions their customers require from them. In non-major metropolitan areas they will typically lease carrier class collocation space in a centrally located facility. From this location they will secure local access from either the LEC or a CLEC, aggregate the traffic on their long haul network and transport it to a major Qwest POP where the final service is provisioned.

The type of networking equipment utilized to deliver end user services is dependent upon the application and geographic locations. Qwest utilizes both Northern Telecom and Lucent class 4 tandem switches for classic switched/dedicated LD, Juniper and Cisco core routers for WAN product offerings, and Ciena optical networking equipment for their transport network. Qwest's long haul fiber network is fully redundant as they utilize full SONET capabilities. Their core

switches and routers are fully redundant as well. In terms of future plans, Qwest has stated that they will develop services and infrastructure on an as needed basis.

Excel and MetTel Telecom
Excel and MetTel Telecom are resellers in Verizon territory and provide Verizon services with value added services, such as combined billing, at slightly lower prices than the incumbent.

Competitive Local Exchange Carrier (CLEC)			
Company Name	**Contact**	**Type of CLEC**	**Phone Number**
AT&T	Joe Liebel	Extended Link	(585) 512-6194
Broadview Networks	Dan Fecher	Extended Link	(716) 995-2717
DFT	Ellen DiTonto	Reseller	(716) 673-3913
Excel Telecom	Sales	Reseller	(877) 392-3548
MetTel	Sales	Reseller	(800) 876-9823
Paetec Communications	Kevin O'Keefe	Extended Link	(585) 413-2325
Qwest	Peter Antoinette	Network / Data	(518) 348-2935

Table 2.3 – Competitive Local Exchange Carriers

Other Providers

In addition to the traditional telephone companies serving the STW region, there are a number of other types of telecommunications providers: long distance, network, Internet, wireless, and satellite service provider.

Inter-Exchange Carriers (IXC)

An IXC is an organization that provides long distance services in a certain area. Communities in the STW region have several competitive options for long distance services. The larger carriers in the region include Frontier, Verizon, AT&T, and Qwest. There are two (2) types of long distance services; calls within a Local Access & Transport Areas (LATA) and inter-LATA or calls between separate calling areas. All long distance providers in the study provide both types of long distance services through point of presence equipment (POPs). POPs are the physical access location interface between a local exchange carrier and an inter-exchange carrier' (IXC). The following companies offer long distance services in the STW region.

IXC Services Long Distance, 800 and Calling Cards	Telephone No.
Armstrong Tel	(607) 359-2211
AT&T Local	(585) 512-6194
DFT Communications	(877) 653-3100
Dunkirk & Fredonia Tel / Cassadaga Tel	(716) 673-3031
FairPoint (Chautauqua & Erie Tel)	(716) 753-6902
Frontier	(877) 392-5160
One Communications, Inc.	(716) 854-2494
Paetec	(315) 703-0006
Qwest	(518) 348-2935
Time Warner Cable	(866) 668-6044
Verizon	(716) 851-6212
Windstream (Alltel)	(716) 661-5119

Table 2.4 – IXC Services

Cable Modem Service Providers

Time Warner Cable

Time Warner Cable (TWC) is the second largest cable operator in the United States providing service to more than 14 million customers. Time Warner Cable is the dominant cable operator in the Southern Tier West region providing cable TV, high speed Internet and digital phone service to the majority of Allegany, Cattaraugus and Chautauqua counties. They provide both residential and commercial based services.

Road Runner High Speed Online is Time Warner Cable's residential high speed Internet service and is offered in four speed tiers, Road Runner Lite (768Kbps), Road Runner Basic (2Mbps), Road Runner Standard (7Mbps) and Road Runner Turbo (15 Mbps bursting up to 22Mbps) and is available wherever cable TV service is available.

Time Warner Cable Business Class offers several tiers of high speed Internet access via cable modem up to 10 Mbps and offers fiber based services from 3Mbps to 1Gbps. Recently, Time Warner Cable launched Business Class Ethernet service which utilizes cable modem technology in a point-to-point and point-to-multipoint configuration. Bandwidth for this service is from 512Kbps to 2Mbps and was created to directly compete with T-1 private line services.

Digital Phone service is provided nearly everywhere cable TV services are offered. Time Warner Cable Business Class offers Voice Over IP (VOIP) telephone service to businesses requiring from 1 – 12 lines. They can provide service to businesses requiring more than 12 lines on an individual case basis. TWC has recently added Primary Rate Interface services to its business suite of products. This gives TWC the ability to provide services to companies with PBX phone systems.

TWC has an extensive fiber network throughout many high population residential neighborhoods. Standard construction guidelines call for infrastructure builds in areas with a minimum of 12 homes per mile. Since Business Class Services have not been a major focus of the company until recent years, some office parks and business locations have yet to have facilities built to them.

Officials from the company have confirmed that capital budgets for infrastructure builds have been severely cut in 2009. They do not anticipate any new investment in infrastructure builds in the Southern Tier West Region in the foreseeable future. The company is focusing its efforts on deploying switched digital technology which will allow them to more efficiently utilize bandwidth to deliver services through existing infrastructure.

Atlantic Broadband:
Serving over 286,000 subscribers, Atlantic Broadband, a privately held company, and is ranked as the 15th largest cable operator in the United States. Atlantic Broadband operates in four regions of the eastern United States including central Pennsylvania, Miami Beach, Maryland/Delaware, and their newest acquisition in Aiken, South Carolina.

Atlantic Broadband serves nearly 2,500 customers in Cattaraugus County. Cable TV service, high speed Internet, and point-to-point services are available in Olean, Great Valley, Little Valley, Ellicottville, and Limestone. Salamanca has the best coverage and widest choice of services including cable TV, high speed Internet, point to point and digital phone service. Customers are serviced and supported from Johnstown, PA.

Three bandwidth tiers are offered including Max Service (8Mbps/512Kbps), Preferred Service (5Mbps/512Kbps) and Starter Service (512Kbps/512Kbps). Atlantic Broadband also offers a 12Mbps tier for businesses.

Officials did not indicate any plans to broaden infrastructure in the Southern Tier West region. The main area of focus for the company is development of their Aiken, South Carolina property.

Overall, Southern Tier West has 87 Townships of which 65 (or 74.7%) have some presence of all four services offered by a cable TV company. Chautauqua County has 27 Townships, each with some presence of TWC. TWC offers CATV, voice, Internet and point-to-point services wherever they have coax and fiber. Cattaraugus County has 32 Townships. Of the 32 townships, 19 are full service provided by TWC. Atlantic Broadband covers 4 townships with CATV, Internet and point-to-point. However, they only offers voice services in Salamanca.

State Contract Pricing

Time Warner Communication's business solution (Road Runner) service is $72.00 per month for usiness Level3 Managed Security Service 0 – 1.544Mbps.

COMPANY	COUNTY	SERVICE NAME	TECHNOLOGY	DOWNLOAD SPEEDS
Time Warner Cable				
(TWC Central NY)	Allegany	Road Runner	Cable Modem	512Kbps – 22Mbps
(TWC Western NY)	Allegany	Road Runner	Cable Modem	512Kbps – 22Mbps
(TWC Western NY)	Cattaraugus	Road Runner	Cable Modem	512Kbps – 22Mbps
(TWC Western NY)	Chautauqua	Road Runner	Cable Modem	512Kbps – 22Mbps
Atlantic Broadband	Cattaraugus	High Speed Internet	Cable Modem	512Kbps – 12Mbps

Table 2.5 –CATV and Cable Modem Service Providers

Below is a listed of the CATV Territories in the STW Region

CABLE TV SERVICE AVAILABILITY BY COUNTY & TOWNSHIP					
Allegany	**CATV Franchise**	**Cattaraugus**	**CATV Franchise**	**Chautauqua**	**CATV Franchise**
Centerville	N/A	Perrysburg	TWC	Ripley	TWC
Rushford	N/A	Dayton	TWC	Mina	TWC
New Hudson	N/A	Leon	N/A	French Creek	TWC
Cuba	TWC	Conewango	TWC	Westfield	TWC
Clarksville	TWC	Randolph	TWC	Sherman	TWC
Genesee	TWC	South Valley	N/A	Clymer	TWC
Hume	TWC	Persia	TWC	Portland	TWC
Canadea	TWC	Otto	N/A	Chautauqua	TWC
Belfast	TWC	New Albion	TWC	North Harmony	TWC
Friendship	TWC	Napoli	N/A	Harmony	TWC
Wirt	TWC	Cold Spring	N/A	Dunkirk	TWC
Bolivar	TWC	East Otto	TWC	Pomfret	TWC
Granger	N/A	Mansfield	TWC	Stockton	TWC
Allen	N/A	Little Valley	Atlantic	Ellery	TWC
Angelica	TWC	Salamanca	Atlantic	Busti	TWC
Amity	TWC	Red House	N/A	Sheridan	TWC
Scio	TWC	Ashford	TWC	Arkwright	TWC
Alma	TWC	Ellicottville	TWC	Charlotte	TWC
Grove	N/A	Great Valley	Atlantic	Gerry	TWC
Birdsall	N/A	Carrollton	Atlantic	Ellicott	TWC
West Almond	N/A	Yorkshire	TWC	Kiantone	TWC
Ward	N/A	Machias	TWC	Hanover	TWC
Wellsville	TWC	Franklinville	TWC	Villenova	TWC
Burns	TWC	Humphrey	N/A	Cherry Creek	TWC
Almond	TWC	Allegany	TWC	Ellington	TWC
Alfred	TWC	Freedom	TWC	Poland	TWC
Andover	TWC	Farmersville	N/A	Carroll	TWC
Independence	N/A	Lyndon	N/A		
		Ischua	TWC		
		Hinsdale	TWC		
		Olean	TWC		
		Portville	TWC		

.

Table 2.6 –CATV Territories in the STW Region

Internet Service Providers (ISPs)

A LEC that is also an ISP can offer both the physical network connection and Internet service. Many ISPs are not telephone or CATV companies and require that the customer connect to their site via some type of network circuit (telephone line, ISDN, T1, DSL, etc.). With numerous local and national providers of dial-up the choice to residents and businesses is large, however the choice of high bandwidth Internet is not.

Insert Map 3.2 Cable Provider Fiber and Coax in the STW Region

Internet service providers (ISPs) are dependent for the most part on the LECs and IXCs infrastructure. An ISP's service may or may not include the network connection. For instance, dial-up accounts to an ISP typically do not include the cost of the phone line, whereas a cable modem account does include the cable modem service to the home or business. Internet service providers offer their services in one of two ways: by using wire line infrastructure such as telephone or cable TV, or by using wireless infrastructure such as towers and satellite.

Internet speed (bandwidth) to an ISP is dictated by the infrastructure supporting the Internet connection. Regular telephone lines supporting a dial-up connection to an ISP have a maximum speed of 56 Kbps. Customers within two (2) to three (3) miles of a telephone company's central office equipment can use digital subscriber lines (DSL) for Internet speeds between 128 Kbps to 1.5 Mbps. Higher bandwidth connections are available depending upon infrastructure available, such as cable modem, T1, frame relay, SONET, and Ethernet connections.

ISP	Telephone No.
Armstrong Telephone	607-359-2211
AT&T Local	585-512-6194
Atlantic Broadband	888-536-9600
Comet Network Solutions	716-326-2663
Broadview Networks	716-995-2717
DFT Communications	877-653-3100
Earthlink	866-240-3887
EarthNet	866-240-3887
FairPoint Communications	800-400-5568
Final Communications	716-934-4923
Frontier / Citizens Communications	800-921-8101
Hughes Network - Broadband Satellite	888-684-5260
LocalNet	585-593-3233
NETSYNCIP Internet Services	800-642-4294
PeoplePC Online	866-236-5649
Paetec Communications	315-703-0006
Time Warner Cable	866-668-6044
Verizon Communications	877-300-4498
Windstream	800-843-9214

Table 2.7 – ISPs Listed in Local Phonebooks for the STW Region

Voice over Internet Protocol (VoIP) Providers

A Voice over Internet Protocol (VoIP) provider uses existing broadband Internet connections (cable TV phone service is a VoIP service) to provide local and long distance telephone service to their customers. By using an adapter box that converts a regular analog voice signal into a digital signal, conversations are sent over the Internet as apposed to the traditional way over the public switched telephone network (PSTN). Since this is done over existing customer leased lines and Internet

services the price for this service can be significantly less than typical ILEC voice service. However there are potential issues with this technology; one drawback can be the porting or transfer of existing telephone numbers. For VoIP providers to convert existing telephone numbers in a particular area they must first establish agreements for numbers in that particular area's rate or calling center. In some instances, when these agreements are not in place, businesses have been assigned business numbers that are not part of a local area code and exchange. Emergency 911 calling can also be an issue, as the portability of the VoIP device calls cannot be traced back to the source. It is recommended that all VoIP users register their location with their service provider prior to service conversion.

Vonage America, Inc. is a VoIP provider that offers consumers and small business VoIP Internet phones and service. They provide their own account subscription, maintenance, billing, and customer care. In recent years, Vonage has encountered legal and financial difficulties and it is uncertain, with the bundled services coming from the telecom and cable industries, what the future holds for this company. The following table describes the typical Vonage rates for residential and business customers.

Vonage **Contact Info: Edison NJ 1(800) 647-9275**
Residential Plan • $24.99/month Premium Unlimited Plan - Unlimited local, regional, US nationwide long distance, and calls to Canada. • $17.99/month Vonage Basic 500 Plan - 500 minutes of US nationwide long distance, local and regional / 3.9¢ per minute after the first 500 monthly minutes.
Small Business Plan • Business Premium Unlimited Plan - $49.99/month • Business Basic 1500 Minutes Plan - $39.99/month

Table 2.8 – Vonage VoIP Rates

Interconnect Network Providers

An interconnect network provider may be a LEC, IXC, cable TV or ISP. Depending upon the geography being served, multiple providers may be required to interconnect a particular network. Network service provider's can interconnect remote sites and provide high speed Internet connections. Availability and cost of these data circuits is dependent upon the carrier's cable plant, Point of Presence (POP) location, and equipment.

High bandwidth (broadband) services, as defined by the FCC, are data communication services that support download transmission rates of at least 756 Kbps. Telecommunications carriers provide high bandwidth services through a variety of technologies. Most network service providers can offer T1, ISDN, Frame Relay, and SONET services in the developed and partially developed areas of the STW region.

Pricing

Network service costs are impacted by the distance to a central office or Point of Presence (POP) location. Services are priced on an Individual Case Basis (ICB).

Broadband over Power Lines (BPL)

BPL utilizes radio frequencies over the local power company's electrical lines to provide Internet access and other communications services. In recent years, this technology has been hotly debated due to its inherent potential for interference with amateur and emergency radios and its ability to sustain profitable business models for implementation. At this time there are less than 5000 subscribers in the United States using this service.

Due to its low adoption rate, providers of BPL are small start up companies that have a limited numbers of customers and unproven long term business models. However, IBM Corporation has recently announced a partnership with a third party company called International Broadband Electric Communications Inc. to develop BPL access to rural areas. Rural areas have been targeted mainly due to the fact that they typically do not have the traditional telecommunication infrastructure needed to provide broadband access.

New Visions Power Line Communications, based in Syracuse, NY, has a service called Blink that claims to have a download speed of 20 Mbps and an upload speed of 7 Mbps. The New Visions service utilizes fiber optic infrastructure as a backbone and delivers "last mile" service via the incumbent electrical service provider's infrastructure.

Dark Fiber Providers

Dark Fiber is fiber optic cable that is owned or leased and operated by the end user. Dark fiber is typically used to connect multiple locations together to create a private network. One advantage of dark fiber is that it allows the owner control over the type of technology used. However a drawback of owning the fiber is the responsibility of operation and maintenance of the infrastructure. Listed below are companies in central NY that provide this type of infrastructure. At this time there is no known dark fiber company marketing in the three county area.

Dark Fiber Providers	
Company	**Phone Number**
Fibertech	(585) 697-5183
FLTG	(315) 548-7506
Syracuse Utilities	315-676-2021

Table 2.9 – Dark Fiber Providers

Pricing

Fiber costs are impacted by the distance and number of fiber lines leased. Prices often range from $45 to $100 per fiber mile per month. Fiber strands per mile are priced on an individual case basis (ICB).

2.3 Wireless Services

Wireless Communications

Wireless communications utilize radio frequencies (RF) from 400 MHz to 38 GHz. Generally speaking, the higher the frequency, the higher the bandwidth, however the higher frequencies typically provide less coverage. Also lower frequency radio transmissions tend to provide broad reception, whereas high frequency microwave frequencies are typically used as point-to-point line of sight transmission. Wireless communications includes radio dispatch, paging, cellular telephone, digital telephone, data, and Internet services. In addition to these services, the tower/antennae infrastructure also supports line of sight communications such as microwave.

Cellular Service Providers in STW

In the STW region cellular telephone and digital mobile service is primarily provided by AT&T Mobility, Sprint/Nextel Communications and partner IPCS, and Verizon Wireless. These wireless companies are expanding services to include wireless Internet access. Presently many of these companies are making infrastructure upgrades from the current 2G wireless networks to next generation 3G network technology.

AT&T Mobility

AT&T Mobility's main business address for the region is in Jamestown, NY. In 2007, AT&T Mobility acquired Dobson Wireless and inherited their existing network in the area. AT&T Mobility has 75 cellular access locations in the region.

AT&T has 34 wireless access locations in Chautauqua County, 25 in Cattaraugus and 16 in Allegany County. They typically have two to three land based T1s connected to their cell towers for bandwidth access. AT&T Mobility has battery backup and generators at all towers in the region. They offer voice services based on GSM technology, and data and Internet based on EDGE/GPRS technology (a 2.5G technology) from many of cell towers in the area. Chautauqua County is moving

to 3G at 850 Mhz for better propagation at all towers and Cattaraugus County is seeing 11 of their towers move to 3G by the end of the year. No 3G upgrades are planned for Allegany County this year.

AT&T Mobility's largest customer in the region is Chautauqua County government which has over 500 "lines" of service. At this time, AT&T Mobility has plans to add additional tower locations in Houghton in Allegany County, and Napoli and St Bonaventure in Cattaraugus County.

Sprint / Nextel Communications (and IPCS)

iPCS is a affiliate of Sprint/ Nextel which has exclusive right to sell wireless mobility communications network products and services under the Sprint brand. Sprint Nextel's corporate office for the region is located at 3500 Winton Place in Rochester, NY. iPCS has a main business location for the region located at 1901 N Roselle Rd. Suite 500 Schaumburg, IL.

Sprint / Nextel and iPCS have a combined coverage of 10 towers in Allegany County, 21 towers in Cattaraugus County and 37 in Chautauqua County for a total of 68 towers in the region. From these towers Sprint / Nextel and iPCS offer digital voice, walkie-talkie, and wireless data services. Sprint / Nextel offers voice and data service in this area. The Internet access is a mix of 2.5G and 3G technologies. iDEN is currently available in some areas, with CDMA via roaming services and 3G-1X is available in limited locations. For connecting their tower locations together and connecting to the PSTN Sprint / Nextel and iPCS utilize a combination of copper T1s, fiber cable and microwave wireless access. Sprint / Nextel has NYS contract pricing available for governmental entities to buy off of a NYS OGS contract.

In terms of system backup and redundancy, some towers in the region have generators and some do not. Also, the towers are not set up in a ring topology. At this time Sprint / Nextel have stated they have no future development plans for the region regarding new tower locations. However they will be providing upgrades to service.

Verizon Wireless

Verizon Wireless has a main business location for the region at Calkins Rd in Rochester, NY. Verizon Wireless has 13 towers in Allegany County, 19 Towers in Cattaraugus County and 24 in Chautauqua County for a total of 56 towers in the region.

Verizon Wireless tower connections are typically copper T1 based, with some microwave backbone technology. From these towers Verizon Wireless offers voice, data and Internet access services. The Internet access is a mix of 2.5G and 3G technologies. Verizon tower sites are generally equipped with backup batteries and /or fuel powered generators. According to the Verizon Wireless coverage website they have digital based coverage in approximately 90% of the region with a few no coverage areas in the southern parts of Allegany and Cattaraugus Counties . Verizon Wireless stated they were unable to provide future network plans for the region.

In addition to the major providers, there are a number of reseller companies that provide choice and competitive pricing. Table 2.10 lists these providers.

Insert Map 3.4 Wireless Tower Map for STW Region

Wireless Providers	
Company	**Phone Number**
America's Wireless Company	716-672-2840
AT&T	866-662-4548
Blue Wireless	716-763-0101
DFT Wireless	716-673-3031
Dicomm Cellular Telephone Company	716-679-5000
Horizon Wireless	716-945-5965
Jitterbug	866-681-3319
Pro Enterprises	716-372-7700
Radio Shack	585-593-4260
Schacter Communications	716-373-8256
Sprint Store	716-375-4257
Verizon Wireless	716-763-7500
Wireless Express	716-363-0700
Wireless World	585-593-7900

Table 2.10 – Wireless Providers

Cell Tower Owners

In the region, there are 151 towers registered with the FCC for cellular service. The larger tower owners (2 or more tower sites in the region) are listed below. The tower owners lease tower space to wireless companies for their equipment and service access point. In some cases the towers are owned by the service providers themselves. The majority of towers are located on major roadways and in population centers. The service coverage of a single cell tower is up to a 10 mile radius, therefore the placement of these towers and how they are linked is critical to the type of coverage available.

Cell Tower Owners		
AAT Communications Corp	**Dunkirk and Fredonia Telephone Co.**	**Pembrook Pines Elmira Ltd**
Ed Roach	Mark Maytum	Robert Pfuntner
5900 Broken Sound Pkwy, Boca Raton, FL 33487	40 Temple St, Fredonia, NY 14063	1705 Lake Rd, Elmira, NY 14901
(561) 995-7670	(716) 673-3031	(607) 733-5626
Atlantic Broadband LLC	**Equinox Broadcasting Corp.**	**Pembroke Pines Inc.**
Donna Garofano	Kevin Fitzgerald	Harry Cole
1 Batterymarch Park Quincy, MA 02169	PO Box 20155, Scranton, PA 18502	1300 N. 17th St, Arlington, VA 22209
(617) 778-8800	(570) 602-1361	(703) 812-0483
Allegany Cattaraugus Com	**Family Life Ministries Inc**	**Pinnacle Towers LLC**
David Nicholas	James Travis	Christine Verre
1459 Olean Portville Rd, Olean, NY 14760	7634 Campbell Creek Rd, Bath NY 14810	2000 Corporate Dr, Canonsburg, PA 15317
(716) 372-2212	(607) 776-4151	(724) 416-2000
American Towers Inc	**Global Tower LLC**	**Robert Greenwald**
Reg Dept	FCC Contact	Robert Greenwald
116 Huntington Ave, Boston, MA 02116	1810 Clint Moore Rd, Boca Raton, FL 33487	3138 Eckman Rd, Jamestown, NY 14701
(617) 585-7600	(561) 995-0320	(716) 665-2457
Armstrong Telephone Company	**GRI Telecom Inc**	**Saia Communications**
James Matyas	Gordon Ichikawa	Mike Saia
One Armstrong Place, Butler, PA 16011	56 Gail Drive, Owego, NY 13827	100 Stradtman St, Buffalo, NY 14206
(412) 283-0925	(607) 687-5544	(716) 892-2900
Associates Paging Inc.	**Horizon Cellular / Cellular One**	**SBA Towers Inc.**
Thomas Mott	Bill Fritzinger	Edward Roach
PO Box 504, Frewsburg, NY 14738	1800 Rand Bldg, Buffalo, NY 14203	5900 Broken Sound Pkwy, Boca Raton, FL 33487
(716) 569-6060	(716) 854-8900	(561) 995-7670
AT&T Wireless PCS LLC	**John Paleski**	**SUNY**
David Jatlow	John Paleski	Thomas Massara
1150 Connecticut Ave, Washington, DC 20036	139 White Oak Lane, Old Bridge, NJ 08857	Alfred State College, Alfred, NY 14802
(202) 223-9222	(732) 607-2828	(607) 587-4348
Backyard Broadcasting Olean Licensee LLC	**John Thomas**	**STC Five LLC**
	Russ Taylor	
4237 Salisbury Road Ste 225 Jacksonville, FL 32216	1301 K St NW, Washington, DC 20005	PO Box KSOPHT0101, Overland Park, KS 66251
(904) 674-0260	(202) 408-7100	(877) 265-6872
C & S Communications	**Liberty Towers LLC**	**Subcarrier Communications Inc**
Jim Cicirello	Michael Hofe	Radio Engineer
4871 Reddy Rd, Wellsville, NY 14895	51 Monroe St, Rockville, MD 20850	125 High St, Oliver Twr, Boston, MA 02110
(716) 593-4655	(202) 420-7300	(617) 743-5951

Table 2.11 – Cell Tower Owners

Cell Tower Owners - Continued		
Cattaraugus County	**MCI Communications Service Inc**	**Tennessee Gas Pipeline Co**
Joseph Grube	Laura Bikelbach	Jacqueline Murry
301 Court St, Little Valley, NY 14755	2400 N. Glenville Dr. Richardson, TX 75082	27725 Stansbury Blvd, Farmington Mills, MI 48334
(716) 938-9191	(972) 729-6406	(248)994-4072
Chadwick Bay Broadcasting Corp	**Media One Group LLC**	**Time Warner Entertainment**
Roy Stype	Jim Embrescia	Dan Sambol
2324 N. Cleveland-Massallon Rd, Bath, OH 44210	147 Bell St, Chargin Falls, OH 44022	13241 Woodland Park Rd, Herdon, VA 20171
(330) 659-4440	(216) 292-8113	(703) 345-3549
Chautauqua County of	**Metro Electronics Srv of WNY Inc**	**Tri State Christian TV**
Matthew Trusso	Jan Jarecki	Tom Nolan
PO Box 128, Mayville, NY 14757	500 Areo Dr, Cheektowaga, NY 14225	Rte 37N, Marion, IL 62959
(716)753-4646	(716) 634-3944	(618) 997-9333
Chautauqua Lake Central School	**Mobile Communications Service Inc.**	**Troyka Development Corp**
Barry Larson	A. Smith	Ora Larsen
100 N Erie St. Mayville, NY 14757	16343 Conneaut Lake Rd, Meadville, PA 16335	PO Box 1139, Jamestown, NY 14701
(716) 753-5825	(814) 724-1234	(716) 487-1151
Choice Tower Rentals	**National Grid USA Service Company**	**Verizon New York, Inc.**
Charles Bordonaro	Robert Tiller	Susan Lott
245 N Union St, Olean, NY 14760	300 Erie Blvd, Syracuse, NY 13202	139 White Oak Lane, Old Bridge, NJ 08857
(716) 373-5838	(315) 428-6372	(732) 607-2828
Crown Atlantic Company LLC	**Norfolk Southern Corp.**	**Vox Allegany LLC**
Monica Gambino	Dwain Word	David O'Neil
2000 Corporate Dr, Canonsburg, PA 15317	99 Spring St, Atlanta, GA 30303	1350 Connecticut Ave, Washington, DC 20036
(724) 416-2516	(404) 529-1493	(202) 296-2007
CSX Transportation Inc.	**Northeast Tower Rental**	**WNY Public Broadcasting Assoc**
Tom Miller	Van Michael	Jonathon Herrington
5220 Belfort Rd, Jacksonville, FL 32256	4271 Muncy-Exchange Rd, Turbotville, PA 17772	PO Box 1263, Buffalo, NY 14240
(904) 332-5965	(570) 412-6295	(716) 845-70000
DBM Communications Inc.	**NY RSA No. 3 Cellular Partnership**	**Zafa Tower – PA LLC**
Richard Mangels	Jerri Janjua	Maria Scotti
82 Railroad Ave, Wellsville, NY 14895	1120 Sanctuary Pkwy, Alpharetta, GA 30004	40 Woodland St, Hartford, CT 06106
(585) 593-6070	(770) 797-1070	(860) 547-1444

Table 2.11 – Cell Tower Owners (continued)

Satellite Communications

Satellite service is an option for deploying telephone, data, and Internet services to areas with limited landline infrastructure or poor line of site for wireless communications. For customers that do not have access to CATV, they have the option of installing satellite dishes to receive television channels and Internet access. New dishes can support both TV and Internet communications simultaneously.

Hughes Network Systems, Spacenet, Inc., and WildBlue Communications, Inc. offer satellite based Internet access, data, and voice services. Over the past few years satellite Internet access has increased in download and upload speeds, but it is still not recommended for some time sensitive (micro-second) Internet applications such as VOIP, some VPN technologies, video gaming, and conferencing.

Pricing

Residential and small business cost for service is currently about $600 - $1000 for installation with $49 - $200/month service charges depending on the user subscription data speeds.

Satellite Providers

Hughes Network System
Hughes Network Systems provides satellite service solutions for residential, small business, enterprise, government and service provider customers. HughesNet (formerly Direcway) provides two-way satellite service plans from 700 Kbps to 2 Mbps download speeds.

Spacenet Inc.
Spacenet's Starband service offers Internet access to consumers and small businesses with free email, web hosting space, and download speeds up to 20 times faster than dial-up. Through their Connexstar product they offer commercial grade private VSAT (Very Small Aperture Terminal) networks to large enterprise customers that have more than 500 locations.

WildBlue Communication Inc.
WildBlue provides Internet access with download speeds up to 1.5 Mbps and upload speeds up to 256 Kbps. Their market segments include small and medium businesses, government, education, and healthcare.

Satellite Service Providers		
Company	**Location**	**Phone Number**
Hughes Network Systems	**Germantown, MD**	**(301) 428-5500**
Spacenet Inc.	**McLean, VA**	**(703) 245-5400**
WildBlue Com Inc.	**Englewood, CO**	**(866) 945-3258**

Table 2.12 – Satellite Service Providers

Microwave Providers

With the introduction of low cost, high frequency (5.8 GHz – 38 GHz) radios over the last few years, microwave networks are gaining in popularity. Microwave applications are a private network technology and have typically been used for short haul point-to-point applications. With the development of lower frequency (2.4 GHz – 5.8 GHz) and lower cost unlicensed microwave radios, many companies and organizations are deploying microwave networks for locations that have clear line of sight which is necessary for this type of technology. There are a number of microwave providers and integrators that support the upstate NY area.

Tables 2.12 and 2.13 (on the following page) provides contact information and details for microwave providers.

Microwave Providers		
Company	**Contact**	**Phone Number**
Harris Microwave Communications	Tom Courtney	(301) 360-9632
Aurora 2400 & 5800 – 2.4 and 5.8 GHz (1 T1 up to 30 miles) Velox LE – 2.4 and 5.8 GHz (T1 voice with full Duplex throughput up to 50 Mbs) Constellation – 6 to 11 GHz (8/16/28) MegaStar – 5 to 11 GHz (155 Mbits)		
Motorola Corporation	Karen Demarco	(585) 383-1873
MOTOwi4 – Canopy - voice, video and data point-to-point backhaul, and for wireless Internet service in rural and developing areas. It delivers data rates of 20 Mbps in 2.4, 5.2 and 5.7.		

Table 2.13 – Microwave Providers

Pricing

Point-to-point equipment ranges from $15,000 to $30,000 per connection for up to eight (8) T1 capacity (pricing does not include tower structures).

Microwave Providers

As costs for high frequency (5.8GHz – 38GHz) radios continue to decline customer owned microwave networks are making significant gains in popularity. For the most part microwave networks are set up by using customer owned equipment / private network technology that allows short point-to-point telecommunications connectivity. With the development of lower frequency (2.4Ghz – 5.8Ghz) and lower cost unlicensed microwave radios, many private companies and organizations are deploying microwave networks for locations that have clear line of sight.

Microwave Providers Pricing

Point to point equipment ranges from $15,000 to $30,000 per connection for up to (8) T1 capacity (pricing does not include tower structures).

Microwave Providers

Harris Microwave Communications
Contact Info: Melbourne, Fl (800) 442-7747

Voice, Data and Video services from 2 to 40 Ghz

Product Name:	**Frequency:**
Aurora 2400 & 5800	2.4 and 5.8 GHz (1 T1 up to 30 miles)
Constellation	6 to 11 GHz (8/16/28 T1s)
Galaxy	23/26/38 GHz (155 Mbits)
MDL	2 to 38 GHz (2,4,8 or 16 x 2Mbits/sec)
MegaStar	5 to 11 GHz (155 Mbits)
MicroStar	7 to 38 GHz (2/4/8/16 DS1, DS3)
Quadlink	multi channel 2 GHz (1/4/5/8 DS1s)

Table 2.14 – Microwave Providers

Microwave Integrators

Company	**Contact**	**Phone Number**
Finger Lakes Communications	Jeff Willis	(800) 724-0146
Transwave	David Bassanello	(716) 626-9020

Table 2.15 – Microwave Integrators

Wireless Internet Providers

Southern Tier Wireless
Southern Tier Wireless (STW), started in 2004, is a small wireless based access company with a main business location at 8450 Glen Rd. Route 243 Rushford in Allegany County. STW provides high-speed Internet access service for homes, home offices and small offices. It has two (2) employees subcontracted. STW has over 80 customers in Allegany County with a customer breakdown of 80% residential and 20% business. Service is available in Rushford, NY. STW utilizes fixed wireless technology and currently has eight access points in Allegany County. Backhaul equipment is Mikrotik or Redline sets, access points are all Mikrotik boards with custom

software. Their service offerings include Internet access up to 512K up and downstream. For system redundancy, STW employs battery backup on each of its multi-path backhaul access points. Their future plans include reusing existing towers to cover more areas of Allegany County and adding ten new towns to their coverage area.

2.4 Additional Infrastructure

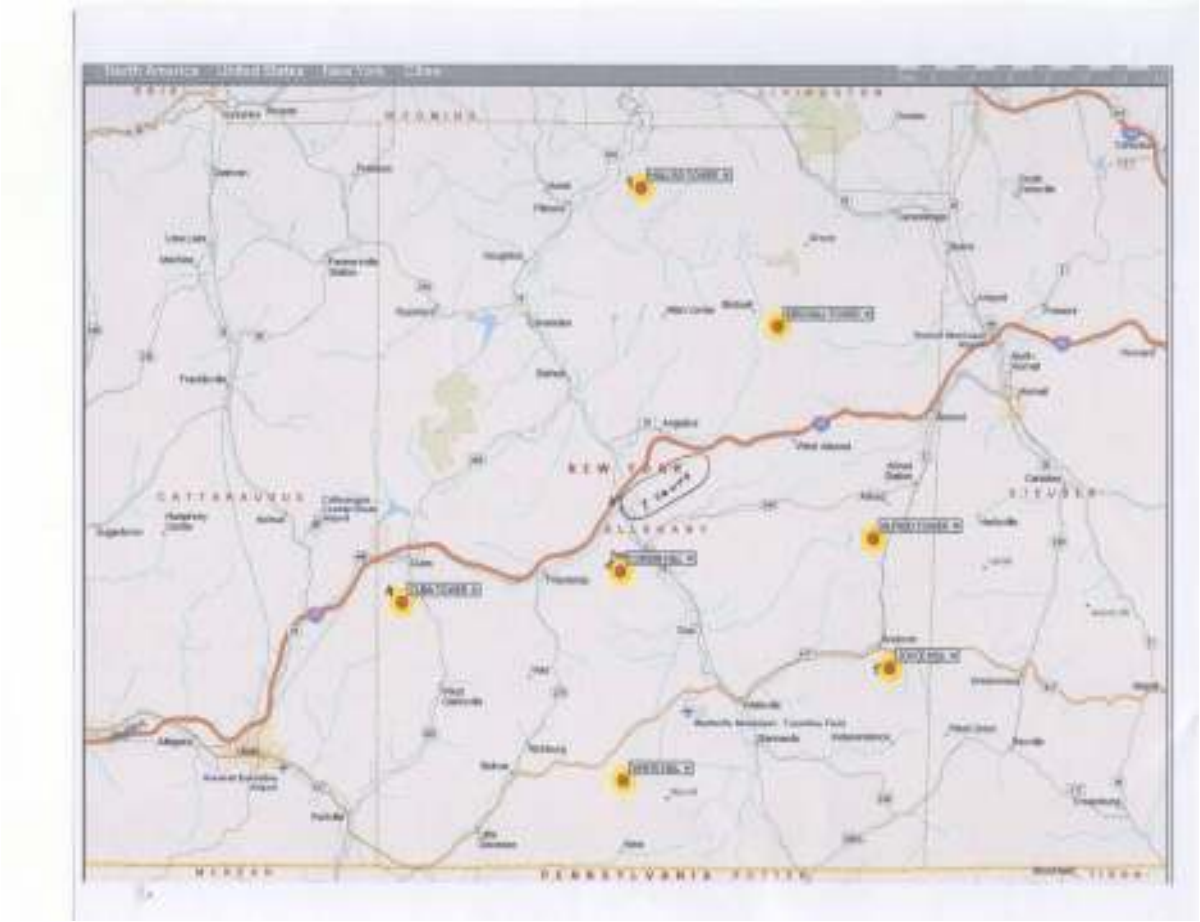
Area County Public Safety and Emergency Management System (EMS)

These types of systems typically support mobile and portable radios for fire, highway, ambulance, and police communications

Allegany County
The Allegany County PSAP/E911 and Sheriff Dispatch is located in the Public Safety Building at 4884 State Route 19 in Belmont, NY. The EMS system is based on a three (3) year old three (3) tower 5.8 GHz Motorola Canopy microwave backbone (backhaul) set up in a in a ring configuration. In addition there are four (4) remote towers that connect to the system through UHF radios. Currently the system has approximately 80% County coverage for mobile communications and paging.

The communications system infrastructure consists of seven (7) tower sites, some of which are owned by the County. The sites are located in the following areas of the County: five (5) County owned towers in Belmont, Amity, Andover, Cuba, Granger and two (2) privately owned towers in Alma and Alfred.

Allegany County 911 would like to refresh the entire backbone system to microwave or fiber to all towers, and new radio systems from towers to the field to support better coverage and higher bandwidth programs. *It should be noted that Allegany County was recently awarded a $1.7M grant for through the National Telecommunications and Information Administration (NTIA) via the Public Safety Interoperable Communications (PSIC) Grant Program. However the County must replace equipment with P25 complaint units which are estimated to costs up to $3.5M. In addition there is a 20% local matching share associated with the grant award.



Cattaraugus County PS and Emergency Management System (EMS)

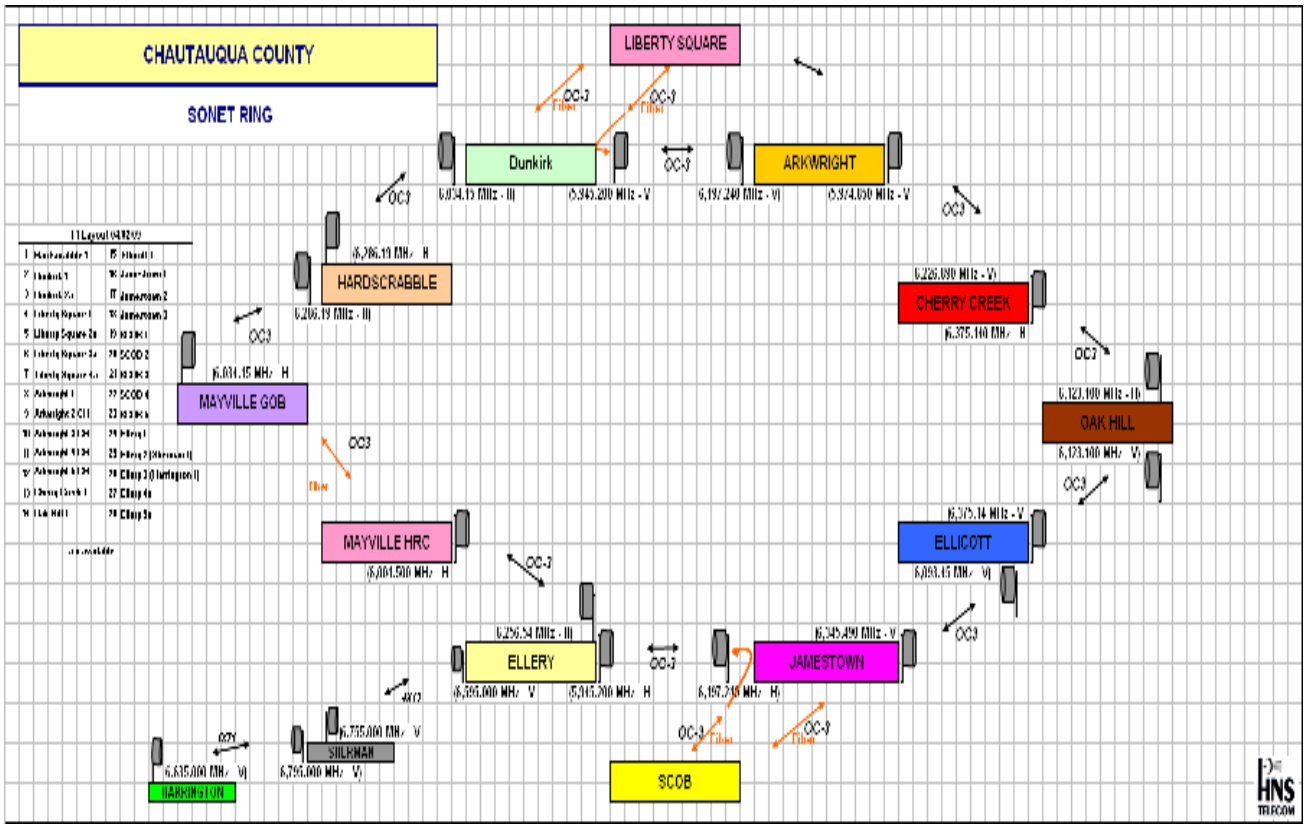
Cattaraugus County declined to participate in the inventory.

Chautauqua County Public Safety and Emergency Management System (EMS)

The Chautauqua County Emergency Management Services Dept is located at 2 Academy Street, Mayville, NY. The EMS system is based on a ten (10) year old ten (10) tower microwave and fiber backbone (backhaul) set up in SONET OC3 ring configuration. There are two (2) towers that are connected at 4xT1 speed. The system uses Harris Microwave Megastar (OC3) and Constellation (4xT1) equipment. Currently the system has approximately 90% coverage for mobile communications and paging across the county.

The communications system infrastructure consists of 12 tower sites, some of which are owned by the County. The sites are located in the following areas of the County: Arkwright, Cherry Creek, Dunkirk, Ellery Center, Ellicott, Westfield, Harrington Hill, Jamestown, Mayville, Clymer, and Sherman.

The following diagram represents the Chautauqua County Public Safety Communications Backbone.



Chautauqua County EMS Towers

2.5 Regional Wide Area Networks

New York State K-12 Educational System Networks

BOCES

Throughout New York State the Board of Cooperative Educational Services (BOCES) system has been a leader and developer of wide area networks (WANs) that connect individual school districts across the state together. In addition to district-to-district connectivity these networks are also connecting individual schools to the rest of the world via Internet access and carrier based solutions such as private ATM and gigabit networks.

Through the use of cooperative bidding and aggregation of demand the BOCES has been able to provide affordable services into areas of the region that otherwise would not be able to do so. Some of the wide area network (WAN) based programs that BOCES offers include distance learning programs, email, Internet access, and data networks for financial, student and administrative uses.

Erie 1 BOCES

Erie 1 Board of Cooperative Educational Services (BOCES) located in West Seneca, NY leases and operates fiber optic cable provided by Time Warner Cable and Fibertech.

ERIE 1 BOCES WAN Overview:
Western New York Regional Information Center (WNYRIC) provides WAN services via 8Gbps trunks to five regional hubs:

- Orleans/Niagara (O/N) BOCES
- Erie 1 BOCES
- Erie 2 BOCES
- Cattaraugus/Allegany (C/A) BOCES
- Greater Southern Tier (GST) BOCES West

Each regional hub connects to its respective school district via 1Gbps Ethernet fiber connection. One hundred school districts consisting of 115 sites are connected to their respective regional hubs.

At this time, BOCES provides data and Internet access only, but are starting to implement Voice over IP service. In addition the BOCES has a distance learning program that is available to the connected schools.

The WNYRIC provides network services to Chautauqua, Cattaraugus and Allegany Counties through the following component BOCES.

- Chautauqua County is served by Erie 2 BOCES.
- Cattaraugus County is served by Cattaraugus /Allegany BOCES
- Allegany County is served by Cattaraugus /Allegany BOCES and GST BOCES West.

Erie 1 obtained the services of Adelphia (now Time Warner Cable) and Fibertech to provide 1Gbps and 8Gbps services to create the WAN network interconnecting the schools, districts and regional hubs.

Connection to the Internet is provided via two 1gigabit Ethernet connections. One is provided by Time Warner Cable and the other is provided by Global Crossing. However, it is expected that the Global Crossing link will be replaced by another provider. The average throughput on these connections is 750Mbps over a five hour period. Soon they will be in need to expand the capacity of these connections.

Erie 1 is currently connected to the Little Valley school district via a T1 providing only 1.544Mbps of bandwidth as compared with the 1Gbps of the other schools. The BOCES would like to see this school connected via fiber like its peers. In addition, BOCES expressed interest in connecting Frewsburg High School to the observatory 7-9 miles away.

Future services include IP phone solutions for the school districts. The BOCES described a vision of connecting all the school districts together to enable school to school calling with no usage charges. The ultimate goal is to aggregate all long distance calls originating form every school in the RIC. These VOIP services are E-rate eligible.

BOCES estimates that 90% of fiber outages have been experienced on the main 8Gbps trunks connecting the regions to the RIC. When one of these trunks goes down, many school districts are impacted with no service until the repair is made. Few outages have occurred on the 1Gbps connections connecting schools to their districts. Interconnecting the regional hubs using ring architecture would provide a diverse path and drastically reduce the probability of such catastrophic outages from occurring due to a single fiber being cut.

BOCES would like to have a viable competitor to Time Warner Cable. They are interested in the concept of a municipal fiber network, in particular, in its ability to provide cost savings. They would like to cost effectively solve the vulnerability issue the schools and regional hubs are currently enduring due to the lack of ring architecture.

This wide area network (WAN) connects the BOCES locations to the school districts in the table below. The network is used primarily for student instruction and staff development.

School Districts with fiber connections to Erie 1 BOCES		
Allegany County CSDs	**Cattaraugus County CSDs**	**Chautauqua County CSDs**
Alfred-Almond Central Schools District	Allegany - Limestone School District	Bemus Point Central Schools District
Andover Central Schools District	Cattaraugus Little Valley CSD	Brocton Central Schools District
Belfast Central Schools District	Ellicottville School District	Cassadaga Valley Central Schools District
Bolivar-Richburg Central Schools District	Franklinville School District	Chautauqua Lake Central Schools District
Canaseraga Central Schools District	Gowanda School District	Clymer Central Schools District
Cuba-Rushford Central Schools District	Hinsdale School District	Dunkirk City Schools District
Fillmore Central Schools District	Olean City School District	Falconer Central Schools District
Friendship Central Schools District	Portville School District	Forestville Central Schools District
Genesee Valley Central Schools District	Randolph School District	Fredonia Central Schools District
Scio Central Schools District	Salamanca City School District	Frewsburg Central Schools District
Wellsville Central Schools District	West Valley School District	Jamestown City Schools District
Whitesville Central Schools District	Yorkshire-Pioneer School District	Panama Central Schools District
		Pine Valley CSD (South Dayton)
		Ripley Central Schools District
		Sherman Central Schools District
		Silver Creek Central Schools District
		Southwestern Central Schools District At Jamestown
		Westfield Central Schools District

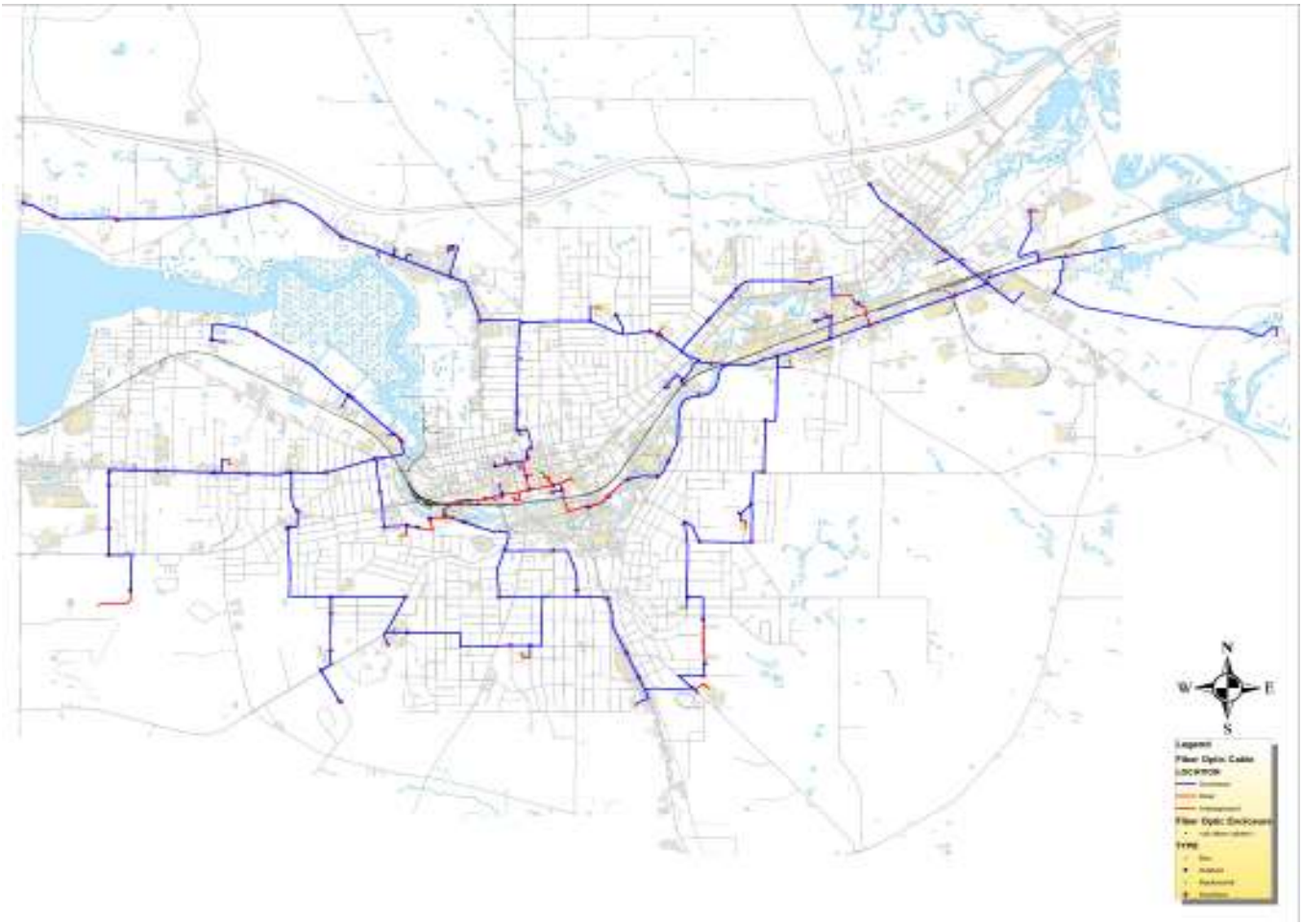
Table 2.16 – School Districts w/Fiber Connection to Erie 1 BOCES

In addition to the fiber connections back to the BOCES many school districts have taken the initiative and constructed fiber optic links between their inter-district buildings. There are only two (2) schools in the three County area that do not have a fiber connection: Little Valley Elementary School in Cattaraugus County, and Limestone Elementary School in Allegany County. They are connected to their respective school district via T1.

Jamestown Board of Public Utilities (BPU) Fiber

Jamestown Board of Public Utilities owns and operates a 20 mile fiber ring and spur network in the City of Jamestown that connects the BPUs remote locations for internal use. In addition, the BPU has leased fibers to organizations such as DFT and Chautauqua County to reduce their overall costs of the infrastructure. The Chautauqua County government has connections at the South County Office Building, Veterans/OFA office on W. 3rd St, Jamestown City Hall, CARTS on Hopkins Ave, DPF Falconer on Work Street and South Center Sewer in Celeron. With the assistance of the BPU and Erie BOCES Jamestown Public Schools has created an 11 building wide area network (WAN) throughout the City of Jamestown.

In addition a few businesses in the Jamestown area also have fiber connections into the backbone. The Woman's Christian Association (WCA) Hospital was connected to the fiber recently.



Jamestown Board of Public Utilities (BPU) Fiber Routes in Jamestown

2.6 Southern Tier West Region

Central Offices and Fiber Routes

The six (6) ILEC territories are displayed on the regional map following this section. The telecom companies' central offices are located (approximately) in the center of each of the wire center boundaries. As discussed earlier, telecom fiber optic cable is evident throughout the region and is used to connect central offices, provide out of the region long haul connectivity. and aggregate copper wire facilities. When possible and financially feasible the ILECs have connected the COs in a ring configuration thus creating physical redundancy and increased service reliability. Thousands of miles of fiber infrastructure have been strategically planned, designed, and installed along the major transportation corridors, linking villages, towns, cities and counties (and states).

Illustrated on the regional map (following page) are the 151 registered tower sites have that been identified across the STW region. As evident from the map the majority of these located in close proximity to developed areas and major transportation corridors.

Regional Broadband Initiatives

With the Federal announcement of $7.2 billion available through Stimulus Grant programs for improved broadband access in rural areas a heightened level of activity is occurring on a national basis regarding municipal owned broadband access initiatives.

At this time there are no less than five (5) such initiatives being planned for in the STW region. Two of the initiatives involve the STWRPDB organization and DFT Communications. These organizations are planning for a three County fiber project that will connect the western part of Chautauqua County to the eastern part of Allegany County and pick up larger anchor customers along the way including potentially colleges, school districts, and healthcare. The second initiative is a wireless project to bring broadband access into rural areas of northeast Chautauqua County.

Another initiative involves Southern Tier Wireless (STW) and would provide improved wireless Internet access in the northern part of Allegany County. STW is looking to reuse existing towers in rural areas to improve the availability of broadband access.

The fourth initiative is the Allegany County Open Access Fiber build plan which will be submitted as a second round applicant to the Federal Stimulus program. If the $5M funding becomes available for the initiative, municipally owned dark fiber will be routed throughout the County connecting community institutions and anchor organizations such as EMS towers, school districts, hospitals and more.

The final initiative is a Cattaraugus County countywide WiMax network initiative which is being planned by the IT / County planning / GIS departments in the County. This wireless based project is budgeted at $12M and will be submitting for Federal Grant dollars as well.

Insert Map 3.5 STW Regional Telecom Map

2.7 Allegany County Summary

Telecommunications

The three (3) ILECs in Allegany County are Armstrong Telephone, Frontier / Citizens and Verizon; Time Warner Cable (TWC) also provides services in the County. They are the major owners of telecommunications and cable TV infrastructure respectively. Frontier and Verizon territory covers over 90% of the County from an ILEC standpoint and TWC is the only CATV. The County's ILECs have developed a total of 14 central offices within the County. These central offices represent the core of telecommunications in Allegany County. Armstrong and Frontier / Citizens offer DSL from all of their COs with Verizon providing DSL from some. In addition to the ILEC's infrastructure, TWC has a head-end, or point of equipment (POE), located in the town of Wellsville which is fed out of a major head-end located in Olean and provides voice, video, and data services.

Owners of Fiber Infrastructure

There is a network of fiber optic transmission routes through the center of the County. Outside of single fiber routes, the northern half of the County is devoid of telecom fiber cable. The telecom fiber optic cable in the County is primarily between COs and not typically providing service directly to customers. Cable TV fiber is located in the northwest, central and southwest portions of the County.

Types of Services

Armstrong is a small local telephone company whose service offerings are limited to DSL and T1 into a small area in the eastern part of the County. Frontier offers DSL, Frame Relay and T1/T3 as standard services and will offer ISDN, ATM and gigabit Ethernet on an individual case basis. Verizon offers DSL from all of its COs except Angelica, Belfast, Canaseraga, Cuba, and Rushford. These services are limited to the structure of cable plant available in their respective areas.

Competition

In addition to the incumbent's presence in the County, remote switch / extended link and resell services are available from a number of CLECs including AT&T, Paetec, and Broadview. These organizations are not "co-located" or have equipment in the County and are therefore either reselling service or extending services from outside the area. Either way, this set up limits their effectiveness as competitors. Cellular coverage is supplied by AT&T Mobility, Sprint / Nextel, and Verizon Wireless.

The County is served by 14 ILEC central office and 39 wireless tower locations. Cable TV and wireless access are more readily available in the southern half of the County. For the most part higher order telecommunications services (such as ATM or gigabit Ethernet) are not available. The ILEC, CLECs, and third party organizations such as Southern Tier Wireless offer Internet service to select areas.

- ILECs: Verizon, Frontier, Armstrong
- CLECs: AT&T, Broadview, Paetec
- Central Offices: 14
- Cellular Towers: 39
- Cable Providers: Time Warner Cable
- Wireless Providers: AT&T Mobility, Sprint/Nextel, Verizon Wireless, Southern Tier Wireless
- Fiber Providers: Services based – Frontier, Verizon & Time Warner Cable
  Dark Fiber based – Fibertech

Allegany County Conclusion

Of the three counties, Allegany County has the largest areas of limited or no broadband access from both land based and wireless technologies. Many of the central offices (Verizon) do not offer basic DSL service and due to the distance limitation of DSL and the size of the area each CO serves, many areas that have DSL available are out of its reach in terms of service. Cable TV access is limited as well, with much of the fiber and coaxial cable needed to provide this service located only in the villages and major roads. In addition there are areas in the northern half of the county that are very limited in the number of wireless towers. However it should be noted that this County has a small WISP that is working to provide access to the northern half of the County. Allegany County would be considered below average in comparison to a typical upstate NY rural county regarding broadband availability.

Currently there is a proposed county wide Open Access fiber network under development that if successful will create a foundation to support future telecommunications investment and further development. These types of initiatives provide low cost access to fiber which becomes a catalyst for competitive providers to move into the area. In addition it is anticipated that the successful deployment of the fiber will have a significant impact on the global competitiveness of the County and the entities within.

Insert Map 4.1 ALLEGANY COUNTY

2.8 Cattaraugus County Summary

Telecommunications

There are three (3) ILECs in Cattaraugus County: Frontier / Citizens, Verizon, and Windstream. There are two cable TV providers, Time Warner Cable (TWC) and Atlantic Broadband. These five companies are the major owners of telecommunications and cable TV infrastructure respectively. Verizon's territory covers over approximately 80% of the County, followed by Windstream 15% and Frontier 5%. The county's ILECs have developed a total of 16 central offices within the County. These central offices represent the core of telecommunications in Cattaraugus County. Frontier / Citizens and Windstream offer DSL from all of their COs with Verizon providing DSL from some of their COs. In addition to the ILEC's infrastructure, TWC has one head-end located in Dunkirk, and one in Jamestown.

Owners of Fiber Infrastructure

There are fiber optic transmission routes throughout the County. The telecom fiber optic cables in the County are single route runs that are typical of connecting COs and not necessarily providing service directly to customers. However there are some fiber routes that appear to provide customer connections. Cable TV fiber is located in the north and southeast areas of the County.

Types of Services

Frontier offers DSL, Frame Relay and T1/T3 as standard services and will offer ISDN, ATM and gigabit Ethernet on an individual case basis from its COs. Verizon offers DSL from 7 of its 13 central offices and gigabit Ethernet on an individual case basis (ICB). Windstream offers many of the desirable high bandwidth services except ATM from its COs. FairPoint provides ISDN, DSL, T1, and T3. DFT offers ISDN, DSL, T1 / T3, and gigabit Ethernet. TWC provides cable TV service, high speed Internet, and point-to-point services. These services are limited to the structure of cable plant available in their respective areas.

Competition

In addition to the incumbent's presence in the County, remote switch / extended link and resell services are available from a number of CLECs including AT&T, DFT, Paetec, and Broadview. Except for DFT these organizations are not "co-located" or have equipment in the County and are therefore either reselling service or extending services from outside the area. Either way this configuration limits their effectiveness as competitors. Cellular coverage is supplied by AT&T Mobility, Sprint / Nextel, and Verizon Wireless.

The County is served by 16 ILEC central office and 43 wireless tower locations. Cable TV and wireless access are more readily available in the southern half of the County. For the most part, higher order telecommunications services (such as ATM or gigabit Ethernet) are not available. The ILECs and CLECs offer Internet service to select areas.

- ILECs: Verizon, Frontier / Citizens, Windstream
- CLECs: AT&T, Broadview, DFT, Paetec
- Central Offices: 16
- Cellular Towers: 43
- Cable Providers: Time Warner Cable, Atlantic Broadband
- Wireless Providers: AT&T Mobility, Sprint/Nextel and Verizon Wireless
- Fiber Providers: Services based – DFT, FairPoint, Frontier, Verizon, Windstream, TWC, Atlantic Broadband
  Dark Fiber based – Fibertech

Cattaraugus County Conclusion

Cattaraugus County has large areas with no broadband access available from either land based or wireless technologies. Many of the central offices (Verizon) do not offer basic DSL service, and due to the distance limitation of DSL and the size of the area each CO serves many areas that have DSL available are out of its reach in terms of service. Cable TV access is limited as well, with much of the fiber and coaxial cable needed to provide this service located only in the villages and along major roads. The highest concentration of CATV coaxial cable is located in Salamanca and Olean. In addition there are "pocket" areas in the northwest and central-east portion of the County that are very limited in the number of wireless towers. By comparison Cattaraugus County would be considered average to a typical upstate NY rural county regarding broadband availability.

Insert Map 4.2 CATTARAUGUS COUNTY

2.9 Chautauqua County Summary

Telecommunications

There are five (5) ILECs in Chautauqua County: DFT, FairPoint Communications, Frontier / Citizens, Verizon, and Windstream Communications. There is one (1) cable TV provider, Time Warner Cable (TWC). These are the major owners of telecommunications and cable TV infrastructure in the County respectively. Frontier territory covers over 50% of the County, FairPoint approximately 25%, Verizon 20% and DFT the remaining. The County's ILECs have developed a total of 24 central offices within the County. These central offices represent the core of telecommunications in Chautauqua County. Windstream, FairPoint, DFT and Frontier / Citizens offer DSL from all of their COs with Verizon providing it from some. In addition to the ILEC's infrastructure TWC has a head-end, or point of equipment (POE), located in the towns and provides voice, video, and data services.

Owners of Fiber Infrastructure

In the County there is an extensive network of fiber optic transmission routes from the telecommunications and CATV industries through the center of the County in Jamestown and Fredonia and along the shore of Lake Erie. With the high number of central offices in the County, the telecom fiber optic cable in the County is primarily between COs and not typically providing service directly to customers. Cable TV fiber is present in the populated areas of the County.

Types of Services

DFT is a small local independent telephone company that provides ISDN, DSL, and gigabit Ethernet services into a small area in the northern part of the County. FairPoint Communications provides service to the western part of the County and has ISDN and DSL available. Verizon service offerings are limited to DSL and T1 services into an area in the northern tip of the County. Windstream is the largest provider in the County and offers DSL, Frame Relay, T1/T3, ISDN, and gigabit Ethernet to the central and eastern parts of the County. These services are limited to the structure of cable plant available in their respective areas.

Competition

In addition to the incumbent's presence in the County, remote switch / extended link and resell services are available from a number of CLECs including AT&T, Paetec, and Broadview. These organizations are not "co-located" or have equipment in the County and are therefore either reselling service or extending services from outside the area. Either way, this set up limits their effectiveness as competitors significantly. Cellular coverage is supplied by AT&T Mobility, Sprint / Nextel, and Verizon Wireless.

The County is served by 24 ILEC central offices and 69 wireless tower locations. Cable TV is more readily available in Fredonia, Jamestown, and the northwestern half of the County. For the most part, higher order telecommunications services (such as ATM or gigabit Ethernet) are not available. The ILEC, CLECs, and third party organizations such as Transwave offer Internet service to select areas.

- ILECs: Verizon, Frontier, Armstrong
- CLECs: AT&T, Broadview, Paetec
- Central Offices: 24
- Cellular Towers: 69
- Cable Providers: Time Warner Cable
- Wireless Providers: AT&T Mobility, Sprint/Nextel, and Verizon Wireless
- Fiber Providers: Services based – Frontier, Verizon, Time Warner Cable
  Dark Fiber based - Fibertech, Frontier

Chautauqua County Conclusion

Of the three counties, Chautauqua County has the smallest areas with no broadband access from both land based and wireless technologies. Almost all of the central offices offer basic DSL service and the small size of the individual CO territories provides for adequate coverage. However cable TV access is limited, with much of the fiber and coaxial cable needed to provide this service located only in the cities, villages and major roads. Most of the CATV coax is located between Jamestown and Chautauqua. There are an average number of wireless towers in the County. By comparison, Chautauqua County would be considered average to above average to a typical upstate NY rural county regarding broadband availability.

Insert Map 4.3 CHAUTAUQUA COUNTY

3.0 Development Sites

As communities compete to retain and attract new business, the availability of telecommunications services has become a key factor in many site location decisions. As a means to assist the IDAs in the three Counties, this study includes an evaluation of the telecommunications resources currently serving ten (10) prime development sites in each County. These sites were chosen by the respective County industrial development agency (IDA) based upon a number of factors including geographic location, availability to business-related resources, and overall economic development appeal.

A summary of the telecommunications facilities that are available at each economic development focus site has been included in this section of the report. This information has also been incorporated into a GIS database. The GIS database can be used to determine the proximity of a particular site to various Central Offices, cellular tower locations, and major fiber optic routes in the area.

Mapping documents created by:
John Buzzard
Information Services Associate
Southern Tier West RP&DB
Phone: 716.945.5301 ext: 208
Web: www.southerntierwest.org

3.1 Allegany County Development Sites

Of the ten (10) development or focus sites identified, three are in the village of Alfred, two are in the village of Wellsville and the rest are spread across the county in the following towns: Caneadea, Grove, Angelica, Friendship, and Cuba

All but four of the economic development sites are served by Verizon central offices with only the Swain Ski Resort site not having DSL available to it. The other sites are served by Frontier / Citizens which can provide DSL and fiber to the locations. All sites except for the Swain site have either telephone company-owned fiber or CATV fiber or both in front of the site itself. This will allow providers to provide a new prospective business with many desirable telecommunications resources. These resources include proximity to central offices, fiber optics and broadband technology, network redundancy and wireless communication. The sites that are located in or near the villages will have a greater level of provider competition and choice as compared to the sites in the more remote areas. All sites are with a five mile distance from numerous wireless towers except for the Swain Ski Resort.

INSERT 10 Allegany County EDA SITES

3.2 Cattaraugus County Development Sites

Of the ten (10) development or focus sites identified four (4) are in the Village of Olean, and the rest are spread across the county in the following towns: Allegany, Cattaraugus, Gowanda, Limestone, Randolph, and Salamanca.

All but one (1) of the economic development sites are served by Verizon central offices with only the Limestone site not having DSL available to it. The other site in Randolph is served by Windstream which can provide DSL, Gig E and fiber. All sites have either telephone company-owned fiber or CATV fiber or both in front of the site itself. This will allow providers to provide a new prospective business with many desirable telecommunications resources. These resources include proximity to central offices, fiber optics and broadband technology, network redundancy and wireless communication. The sites that are located in or near the villages will have a greater level of provider competition and choice as compared to the sites in the more remote areas. All sites except for Ames Plaza in Allegany are within a five (5) mile distance from numerous wireless towers. The Ames Plaza has two (2) providers within five (5) miles which are AT&T Mobility and Verizon Wireless.

INSERT 10 Cattaraugus EDA SITES

3.3 Chautauqua County Development Sites

Of the ten (10) development or focus sites identified two (2) are in and around the City of Jamestown, and three (3) are in the City of Dunkirk. The rest are spread across the County in the towns of Chautauqua, Lakewood, Clymer, Ripley, and Westfield.

Five (5) of the economic development sites are served by Windstream central offices, Three (3) are served by Verizon and two (2) are served by FairPoint. All sites have serving COs with DSL available. All sites have either telephone company-owned fiber or CATV fiber or both in front of the site itself. This will allow providers to provide a new prospective business with many desirable telecommunications resources. These resources include proximity to central offices, fiber optics and broadband technology, network redundancy and wireless communication. The sites that are located in or near the villages will have a greater level of provider competition and choice as compared to the sites in the more remote areas. All sites are within a five (5) mile distance from numerous wireless towers.

INSERT 10 Chautauqua EDA SITES

4.0 Recommendations

The goal of this recommendations section is to deliver a plan to enhance the availability of universal service of both basic and advanced telecommunication services to all areas of the Southern Tier West region. This includes the development of a healthy level of provider competition that promotes consumer choice, reliability of service and competitive cost.

The recommendation piece of this report is made up of two (2) parts, first what to do and then how to do it. Below is a list of approaches that can be taken to improve the region's current telecommunications infrastructure.

1. Update GIS Telecom Database

- Develop a schedule of GIS updates to keep the database current. Develop a regional program to include the planning and development departments within each of the Counties. As construction permits are filed for the installation of infrastructure, have copies sent to the STWRPDB (for inclusion into the GIS database).

- Contact the telecom providers periodically to get updates on new coverage areas and services. The STWRPDB team can assign an internal resource to meet with and query service providers for new information and updates on an annual basis. This information can be provided to and updated by the team's GIS staff.

- The STWRPDB team can hire a consulting team such as ECC Technologies to identify and provide updates and changes on an annual basis.
- Review FCC, PSC and telecom industry databases on an annual basis.

2. Establish a Telecommunications Focus Group

- Provide strategic planning and set policy for the development of region-wide telecommunications.
- Educate and inform public leaders and policy makers of telecom issues and concerns.
- Promote the region's telecommunication resources.
- Lobby PSC and telecom industry for the region's telecom issues and concerns.
- Coordinate the region's telecom efforts with other NY State regions.
- Identify and pursue telecom and broadband grants and other funding opportunities (either through partnerships with telecom providers or individually).

3. Telecom Coalitions

Create telecommunication coalitions and cooperatives which would include members from municipalities, businesses, healthcare and educational institutions. The more organizations involved the more likely that telecom providers will be responsive. Coalition examples might include:

- Schools for distance learning and e-learning programs.
- Healthcare organizations for telemedicine networks.
- Business associations for cellular, long distance, and/or Internet services.

4. Seminars and Workshop Events

Conduct technology fairs and workshops to educate the community on technology developments and opportunities. Involve the carriers and telecom companies as lecturers, presenters, and exhibitors. This allows both the consumer and the provider an opportunity to meet and discuss mutual opportunities.

5. County or Region Wide Franchise Agreements

Negotiate county or region wide franchise agreements with the telecom and cable TV carriers instead of agreements negotiated at the city, town or village level. This will create more negotiating power for all involved as well as develop equality of service throughout the region. The first step in this process is gathering existing documentation on current franchise agreements. This process is most successful if directed at a regional or county level on behalf of all residence and businesses.

6. Focus Group Needs Analysis Meetings

Meet with municipalities, businesses, healthcare, and educational organizations around the region for the purpose of needs analysis and gap setting. To truly understand the basic needs of the community at large in the Southern Tier West region, arrange for group meeting to set base lines, educate and discuss openly the current state of telecom in the region.

Appendix A-1

County Central Office Services
&
Provider Information

Allegany County Central Office Services

Services

The following tables describe the telecom services currently available within each of the LEC's central office exchanges. These services are supported by the switch technology at the central office locations and may or may not be available to a customer within the exchange dependant upon the cabling infrastructure available and/or the distance to the central office.

Please note * ICB is Individual Case Basis. If a service box is left blank the service provider declined to provide information.

Telephone I-LECs by Central Office location / Services

Company/Contact	CO	Exchange	Services Supported at CO	Bandwidth	Available 2009 (Yes/No)
Armstrong Telephone	Whitesville	(607) 356-####	Analog	9.6k-56k Dialup	Yes
ILEC	WHVLNYXA		ISDN	64k-1.5Mbs	No
136 East Front St.			Frame Relay	16k-1.5Mbs PVCs	No
Addison, NY 14801			DSL	128k – 1.5Mbs	Yes
Jack Robinson			T1/DS1	128k – 1.5Mbs	Yes
General Manager			T3/DS3	1.5mb – 45Mbs	Yes
607 359-2211			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	No
Frontier Tel	Alfred	(607) 587-####	Analog	9.6k-56k Dialup	Yes
ILEC	ALFENYXA	(607) 871-####	ISDN	64k-1.5Mbs	ICB
11 E. Park Place			Frame Relay	16k-1.5Mbs PVCs	Yes
Norwich, NY 13815			DSL	128k – 1.5Mbs	Yes
Judy McIntyre			T1/DS1	128k – 1.5Mbs	Yes
Sales			T3/DS3	1.5mb – 45Mbs	ICB
(607) 336-4099			ATM (OC3)	1.5mb – 155Mbs	ICB
			Gig-E	1000Mbs	ICB
Frontier Tel	Almond	(607) 276-####	Analog	9.6k-56k Dialup	Yes
ILEC	ALMDNYXA		ISDN	64k-1.5Mbs	ICB
11 E. Park Place			Frame Relay	16k-1.5Mbs PVCs	Yes
Norwich, NY 13815			DSL	128k – 1.5Mbs	Yes
Judy McIntyre			T1/DS1	128k – 1.5Mbs	Yes
Sales			T3/DS3	1.5mb – 45Mbs	ICB
(607) 336-4099			ATM (OC3)	1.5mb – 155Mbs	ICB
			Gig-E	1000Mbs	ICB
Frontier Tel	Andover	(607) 478-####	Analog	9.6k-56k Dialup	Yes
ILEC	ANDVNYXA		ISDN	64k-1.5Mbs	ICB
11 E. Park Place			Frame Relay	16k-1.5Mbs PVCs	Yes
Norwich, NY 13815			DSL	128k – 1.5Mbs	Yes
Judy McIntyre			T1/DS1	128k – 1.5Mbs	Yes
Sales			T3/DS3	1.5mb – 45Mbs	ICB
(607) 336-4099			ATM (OC3)	1.5mb – 155Mbs	ICB
			Gig-E	1000Mbs	ICB

Telephone I-LECs by Central Office location / Services -continued

Company/Contact	CO	Exchange	Services Supported at CO	Bandwidth	Available 2009 (Yes/No)
Frontier Tel	Fillmore	(585) 567-####	Analog	9.6k-56k Dialup	Yes
ILEC	FLMRNYXA		ISDN	64k-1.5Mbs	ICB
11 E. Park Place			Frame Relay	16k-1.5Mbs PVCs	Yes
Norwich, NY 13815			DSL	128k – 1.5Mbs	Yes
Judy McIntyre			T1/DS1	128k – 1.5Mbs	Yes
Sales			T3/DS3	1.5mb – 45Mbs	ICB
(607) 336-4099			ATM (OC3)	1.5mb – 155Mbs	ICB
			Gig-E	1000Mbs	ICB
Verizon Tel	Angelica	(585) 466-####	Analog	9.6k-56k Dialup	Yes
ILEC	ANGENYAG		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	No
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Tel	Belfast	(585) 365-####	Analog	9.6k-56k Dialup	Yes
ILEC	BLFSNYBZ		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	No
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Tel	Belmont	(585) 268-####	Analog	9.6k-56k Dialup	Yes
ILEC	BLMTNYBM		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	Yes
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB

Telephone I-LECs by Central Office location / Services -continued

Company/Contact	CO	Exchange	Services Supported at CO	Bandwidth	Available 2009 (Yes/No)
Verizon Tel	Bolivar	(585) 928-####	Analog	9.6k-56k Dialup	Yes
ILEC	BLVRNYBX		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	Yes
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Tel	Canaseraga	(607) 545-####	Analog	9.6k-56k Dialup	Yes
ILEC	CNSRNYCX		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	No
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Tel	Cuba	(585) 968-####	Analog	9.6k-56k Dialup	Yes
ILEC	CUBANYEM	(716) 968-####	ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	Yes
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Tel	Friendship	(585) 973-####	Analog	9.6k-56k Dialup	Yes
ILEC	FRSHNYFS		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	Yes
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB

Telephone I-LECs by Central Office location / Services -continued

Company/Contact	CO	Exchange	Services Supported at CO	Bandwidth	Available 2009 (Yes/No)
Verizon Tel	Rushford	(585) 437-####	Analog	9.6k-56k Dialup	Yes
ILEC	RSFRNYRF	(716) 437-####	ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	No
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Tel	Wellsville	(585) 593-####	Analog	9.6k-56k Dialup	Yes
ILEC	WLVLNYNM	(585) 596-####	ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	Yes
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB

Allegany County Service Providers

A) Wire-line Service System				
Company Name	**Address**	**City**	**State**	**Telephone Number**
Armstrong	136 East Front St	Addison	NY	1-607-359-2211
Frontier	180 South Clinton Ave	Rochester	NY	1-800-921-8101
Verizon	Prospect Ave	Buffalo	NY	1-716-851-6212
Broadview Networks	495 Aero Drive	Cheektowaga	NY	1-716-995-2717
Quest	21 Corporate Dr	Clifton Park	NY	1-518-348-2935
Paetec	600 Willow Brook	Fairport	NY	1-585-413-2325
B) Long Distance Service				
Company Name	**Address**	**City**	**State**	**Telephone Number**
AT&T	400 West Ave	Rochester	NY	1-585 512-6194
Frontier	180 South Clinton Ave	Rochester	NY	1-877-392-5160
Quest	21 Corporate Dr	Clifton Park	NY	1-518-348-2935
Time Warner Cable	4449 Bolivar Road	Wellsville	NY	1-866-668-6044
C) Cable Provider				
Company Name	**Address**	**City**	**State**	**Telephone Number**
Time Warner Cable	4449 Bolivar Road	Wellsville	NY	1-866-668-6044
D) ISP – Internet Service Provider				
Company Name	**Address**	**City**	**State**	**Telephone Number**
Frontier	180 South Clinton Ave	Rochester	NY	1-800-921-8101
USA DataNet	318 South Clinton	Syracuse	NY	1-716-968-9000
LocalNet	Main St	Wellsville	NY	1-585-593-3233
Southern Tier Wireless	8450 Glen Rd	Rushford	NY	1-585-322-3616
E) Wireless Service Provider				
Company Name	**Address**	**City**	**State**	**Telephone Number**
Blue Wireless	1 E William St	Bath	NY	1-5851801-9500
Cellular One (AT&T)	Wellsville Retail Center	Wellsville	NY	1-585-593-3281
Horizon Wireless	704 Broad Street	Salamanca	NY	1-716-945-5965
Jitterbug				1-866-681-3319
Pro Enterprises	23 South Main Street	Wellsville	NY	1-585-593-4260
Radio Shack	137 Bolivar Road	Wellsville	NY	1-585-593-1834
Verizon Wireless	3048 West State Street	Olean	NY	1-716-383-2056
Wireless World	52 North Main Street	Wellsville	NY	1-585-593-7900
F) Satellite Providers				
Company Name	**Address**	**City**	**State**	**Telephone Number**
DirecTV		Olean	NY	1-716-372-2962
Frontier	180 South Clinton Ave	Rochester	NY	1-800-921-8102

Cattaraugus County Central Office Services

Services

The following tables describe the telecom services currently available within each of the LEC's central office exchanges. These services are supported by the switch technology at the central office locations and may or may not be available to a customer within the exchange dependant upon the cabling infrastructure available and/or the distance to the central office.

Telephone I-LECs by Central Office location / Services

Company/Contact	CO	Exchange	Services Supported at CO	Bandwidth	Available 2009 (Yes/No)
Frontier Tel	West Valley	(716) 942-####	Analog	9.6k-56k Dialup	Yes
ILEC	WSVYNYXA		ISDN	64k-1.5Mbs	ICB
11 E. Park Place			Frame Relay	16k-1.5Mbs PVCs	Yes
Norwich, NY 13815			DSL	128k – 1.5Mbs	Yes
Judy McIntyre			T1/DS1	128k – 1.5Mbs	Yes
Sales			T3/DS3	1.5mb – 45Mbs	ICB
(607) 336-4099			ATM (OC3)	1.5mb – 155Mbs	ICB
			Gig-E	1000Mbs	ICB
Verizon Communications	Arcade	(585) 492-####	Analog	9.6k-56k Dialup	Yes
ILEC	ARCNYAE	(585) 496-####	ISDN	64k-1.5Mbs	
Buffalo, NY		(716) 492-####	Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra		(716) 496-####	DSL	128k – 1.5Mbs	Yes
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Communications	Cattaraugus	(716) 257-####	Analog	9.6k-56k Dialup	Yes
ILEC	CTRGNYSO		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	No
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB

Telephone I-LECs by Central Office location / Services - continued

Company/Contact	CO	Exchange	Services Supported at CO	Bandwidth	Available 2009 (Yes/No)
Verizon Communications	Ellicottville	(716) 699-####	Analog	9.6k-56k Dialup	Yes
ILEC	ELCVNYEV		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	Yes
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Communications	Franklinville	(585) 676-####	Analog	9.6k-56k Dialup	Yes
ILEC	FKVLNYFK	(716) 676-####	ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	Yes
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Communications	Gowanda	(716) 532-####	Analog	9.6k-56k Dialup	Yes
ILEC	GWNDNYGD		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	Yes
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Communications	Hinsdale	(716) 557-####	Analog	9.6k-56k Dialup	Yes
ILEC	HNDLNYHI		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	No
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB

Telephone I-LECs by Central Office location / Services - continued

Company/Contact	CO	Exchange	Services Supported at CO	Bandwidth	Available 2009 (Yes/No)
Verizon Communications	Limeston e	(716) 925-####	Analog	9.6k-56k Dialup	Yes
ILEC	LMSTNY LM		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	No
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Communications	Little Valley	(716) 938-####	Analog	9.6k-56k Dialup	Yes
ILEC	LTVYNYL I		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	No
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Communications	Machias	(716) 353-####	Analog	9.6k-56k Dialup	Yes
ILEC	MCHSNY MA		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	Yes
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Communications	Olean	(585) 376-####	Analog	9.6k-56k Dialup	Yes
ILEC	OLENNY HA	(716) 372-####	ISDN	64k-1.5Mbs	
Buffalo, NY		(716) 373-####	Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra		(716) 375-####	DSL	128k – 1.5Mbs	Yes
Account Manager		(716) 376-####	T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212		(716) 379-####	T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095		(716) 806-####	ATM (OC3)	1.5mb – 155Mbs	
		(716) 925-####	Gig-E	1000Mbs	ICB

Telephone I-LECs by Central Office location / Services - continued

Company/Contact	CO	Exchange	Services Supported at CO	Bandwidth	Available 2009 (Yes/No)
Verizon Communications	Portville	(585) 933-####	Analog	9.6k-56k Dialup	Yes
ILEC	PRTVNYPV	(716) 933-####	ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	No
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Communications	South Dayton	(716) 988-####	Analog	9.6k-56k Dialup	Yes
ILEC	SDTNNYPI		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	No
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Communications	Salamanca	(716) 244-####	Analog	9.6k-56k Dialup	Yes
ILEC	SLMNNYWW	(716) 945-####	ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	Yes
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Windstream Communications	Randolph	(716) 358-####	Analog	9.6k-56k Dialup	Yes
ILEC	RNDHNYXA		ISDN	64k-1.5Mbs	Yes
201 E. 4th Street			Frame Relay	16k-1.5Mbs PVCs	Yes
Jamestown, NY 14701			DSL	128k – 1.5Mbs	Yes
Joel Pomroy			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 326-1352			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	Yes
Windstream Communications	Steamburg	(716) 354-####	Analog	9.6k-56k Dialup	Yes
ILEC	STBGNYXA		ISDN	64k-1.5Mbs	Yes
201 E. 4th Street			Frame Relay	16k-1.5Mbs PVCs	Yes
Jamestown, NY 14701			DSL	128k – 1.5Mbs	Yes
Joel Pomroy			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 326-1352			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	Yes

Cattaraugus County Service Providers

A) Wire-line Service System				
Company Name	**Address**	**City**	**State**	**Telephone Number**
Frontier	180 South Clinton Ave	Rochester	NY	1-800-921-8101
Verizon	Prospect Ave	Buffalo	NY	1-716-851-6212
Broadview Networks	495 Aero Drive	Cheektowaga	NY	1-716-995-2717
Quest	21 Corporate Dr	Clifton Park	NY	1-518-348-2935
Paetec	600 Willow Brook	Fairport	NY	1-585-413-2325
B) Long Distance Service				
Company Name	**Address**	**City**	**State**	**Telephone Number**
AT&T	400 West Ave	Rochester	NY	1-585 512-6194
Frontier	180 South Clinton Ave	Rochester	NY	1-877-392-5160
Quest	21 Corporate Dr	Clifton Park	NY	1-518-348-2935
Time Warner Cable	4449 Bolivar Road	Wellsville	NY	1-866-668-6044
C) Cable Provider				
Company Name	**Address**	**City**	**State**	**Telephone Number**
Time Warner Cable	4449 Bolivar Road	Wellsville	NY	1-866-668-6044
Atlantic Broadband	24 Main St	Bradford	PA	1-888-536-9600
D) ISP – Internet Service Provider				
Company Name	**Address**	**City**	**State**	**Telephone Number**
Frontier	180 South Clinton Ave	Rochester	NY	1-800-921-8101
LocalNet	Main St	Wellsville	NY	1-585-593-3233
DFT	332 Fluvanna Avenue	Jamestown	NY	1-888-411-5144
PeoplePC Online				1-866-222-6350
Hughes – Broadband Satellite				1-888-528-7453
Fitzpatrick Security	91 Plum St	Great Valley	NY	1-716-699-5797
E) Wireless Service Provider				
Company Name	**Address**	**City**	**State**	**Telephone Number**
Blue Wireless	1 E William St	Bath	NY	1-585-801-9500
AT&T Mobility	West State St	Olean	NY	1-716-373-1220
Horizon Wireless	704 Broad Street	Salamanca	NY	1-716-945-5965
Pro Enterprises	18 West State St	Olean	NY	1-716-372-7700
Radio Shack	137 Bolivar Road	Wellsville	NY	1-585-593-1834
Verizon Wireless	3048 West State Street	Olean	NY	1-716-383-2056
Sprint Store	2108 W State St	Olean	NY	1-716-375-4257
F) Satellite Providers				
Company Name	**Address**	**City**	**State**	**Telephone Number**
DirecTV		Olean	NY	1-716-372-2962

Chautauqua County Central Office Services

Services

The following tables describe the telecom services currently available within each of the LEC's central office exchanges. These services are supported by the switch technology at the central office locations and may or may not be available to a customer within the exchange dependant upon the cabling infrastructure available and/or the distance to the central office.

Telephone I-LECs by Central Office location / Services

Company/Contact	CO	Exchange	Services Supported at CO	Bandwidth	Available 2009 (Yes/No)
DFT- Cassadaga Telephone Corp	Cassadaga	(716) 595-####	Analog	9.6k-56k Dialup	Yes
ILEC	CSDGNYXA		ISDN	64k-1.5Mbs	Yes
40 Temple Street			Frame Relay	16k-1.5Mbs PVCs	No
Fredonia, NY 14063			DSL	128k – 1.5Mbs	Yes
Account Executive			T1/DS1	128k – 1.5Mbs	Yes
Ellen DiTonto			T3/DS3	1.5mb – 45Mbs	Yes
(716) 673-3913			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	Yes
Dunkirk & Fredonia Telephone Co	Fredonia	(716) 672-####	Analog	9.6k-56k Dialup	Yes
ILEC	FRDNNYXA	(716) 673-####	ISDN	64k-1.5Mbs	Yes
40 Temple Street		(716) 679-####	Frame Relay	16k-1.5Mbs PVCs	No
Fredonia, NY 14063		(716) 680-####	DSL	128k – 1.5Mbs	Yes
Account Executive			T1/DS1	128k – 1.5Mbs	Yes
Ellen DiTonto			T3/DS3	1.5mb – 45Mbs	Yes
(716) 673-3913			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	Yes
FairPoint Communications	Brocton	(716) 792-####	Analog	9.6k-56k Dialup	Yes
ILEC	BRTNNYXA		ISDN	64k-1.5Mbs	Yes
30 Main St			Frame Relay	16k-1.5Mbs PVCs	No
Westfield, NY 14787			DSL	128k – 1.5Mbs	Yes
Harry Bastian			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 753-6902			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	No

Telephone I-LECs by Central Office location / Services - continued

Company/Contact	CO	Exchange	Services Supported at CO	Bandwidth	Available 2009 (Yes/No)
FairPoint Communications	Findley Lake	(716) 769-####	Analog	9.6k-56k Dialup	Yes
ILEC	FILKNYXA		ISDN	64k-1.5Mbs	Yes
30 Main St			Frame Relay	16k-1.5Mbs PVCs	No
Westfield, NY 14787			DSL	128k – 1.5Mbs	Yes
Harry Bastian			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 753-6902			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	No
FairPoint Communications	Mayville	(716) 269-####	Analog	9.6k-56k Dialup	Yes
ILEC	MYVLNYXA	(716) 753-####	ISDN	64k-1.5Mbs	Yes
30 Main St		(716) 290-####	Frame Relay	16k-1.5Mbs PVCs	No
Westfield, NY 14787			DSL	128k – 1.5Mbs	Yes
Harry Bastian			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 753-6902			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	No
FairPoint Communications	Ripley	(716) 252-####	Analog	9.6k-56k Dialup	Yes
ILEC	RPLYNYXA	(716) 736-####	ISDN	64k-1.5Mbs	Yes
30 Main St			Frame Relay	16k-1.5Mbs PVCs	No
Westfield, NY 14787			DSL	128k – 1.5Mbs	Yes
Harry Bastian			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 753-6902			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	No
FairPoint Communications	Sherman	(716) 761-####	Analog	9.6k-56k Dialup	Yes
ILEC	SHMNNYXA		ISDN	64k-1.5Mbs	Yes
30 Main St			Frame Relay	16k-1.5Mbs PVCs	No
Westfield, NY 14787			DSL	128k – 1.5Mbs	Yes
Harry Bastian			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 753-6902			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	No

Telephone I-LECs by Central Office location / Services - continued

Company/Contact	CO	Exchange	Services Supported at CO	Bandwidth	Available 2009 (Yes/No)
FairPoint Communications	Westfield	(716) 326-####	Analog	9.6k-56k Dialup	Yes
ILEC	WSFDNYXA	(716) 793-####	ISDN	64k-1.5Mbs	Yes
30 Main St			Frame Relay	16k-1.5Mbs PVCs	No
Westfield, NY 14787			DSL	128k – 1.5Mbs	Yes
Harry Bastian			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 753-6902			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	No
Verizon Tel	Cherry Creek	(716) 296-####	Analog	9.6k-56k Dialup	Yes
ILEC	CHCKNYCE		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	No
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Tel	Dunkirk	(716) 363-####	Analog	9.6k-56k Dialup	Yes
ILEC	DNKRNYDK	(716) 366-####	ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	Yes
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Verizon Tel	Forestville	(716) 965-####	Analog	9.6k-56k Dialup	Yes
ILEC	FSVLNYFL		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	No
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB

Telephone I-LECs by Central Office location / Services - continued

Company/Contact	CO	Exchange	Services Supported at CO	Bandwidth	Available 2009 (Yes/No)
Verizon Tel	Silver Creek	(716) 934-####	Analog	9.6k-56k Dialup	Yes
ILEC	SLCKNYSI		ISDN	64k-1.5Mbs	
Buffalo, NY			Frame Relay	16k-1.5Mbs PVCs	
Kristin LaMastra			DSL	128k – 1.5Mbs	Yes
Account Manager			T1/DS1	128k – 1.5Mbs	
Phone 716 851 6212			T3/DS3	1.5mb – 45Mbs	
Mobile 716 799 2095			ATM (OC3)	1.5mb – 155Mbs	
			Gig-E	1000Mbs	ICB
Windstream Communications	Bemus Point	(716) 386-####	Analog	9.6k-56k Dialup	Yes
ILEC	BMPNNYXA		ISDN	64k-1.5Mbs	Yes
201 E. 4th Street			Frame Relay	16k-1.5Mbs PVCs	Yes
Jamestown, NY 14701			DSL	128k – 1.5Mbs	Yes
Joel Pomroy			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 326-1352			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	Yes
Windstream Communications	Chautauqua	(716) 357-####	Analog	9.6k-56k Dialup	Yes
ILEC	CHTQNYXA		ISDN	64k-1.5Mbs	Yes
201 E. 4th Street			Frame Relay	16k-1.5Mbs PVCs	Yes
Jamestown, NY 14701			DSL	128k – 1.5Mbs	Yes
Joel Pomroy			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 326-1352			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	Yes
Windstream Communications	Clymer	(716) 355-####	Analog	9.6k-56k Dialup	Yes
ILEC	CLYMNYXA		ISDN	64k-1.5Mbs	Yes
201 E. 4th Street			Frame Relay	16k-1.5Mbs PVCs	Yes
Jamestown, NY 14701			DSL	128k – 1.5Mbs	Yes
Joel Pomroy			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 326-1352			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	Yes

Telephone I-LECs by Central Office location / Services - continued

Company/Contact	CO	Exchange	Services Supported at CO	Bandwidth	Available 2009 (Yes/No)
Windstream Communications	Ellington	(716) 287-####	Analog	9.6k-56k Dialup	Yes
ILEC	ELTNNYXA		ISDN	64k-1.5Mbs	Yes
201 E. 4th Street			Frame Relay	16k-1.5Mbs PVCs	Yes
Jamestown, NY 14701			DSL	128k – 1.5Mbs	Yes
Joel Pomroy			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 326-1352			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	Yes
Windstream Communications	Frewsburg	(716) 569-####	Analog	9.6k-56k Dialup	Yes
ILEC	FWBGNYXA		ISDN	64k-1.5Mbs	Yes
201 E. 4th Street			Frame Relay	16k-1.5Mbs PVCs	Yes
Jamestown, NY 14701			DSL	128k – 1.5Mbs	Yes
Joel Pomroy			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 326-1352			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	Yes
Windstream Communications	Gerry	(716) 985-####	Analog	9.6k-56k Dialup	Yes
ILEC	GRRYNYXA		ISDN	64k-1.5Mbs	Yes
201 E. 4th Street			Frame Relay	16k-1.5Mbs PVCs	Yes
Jamestown, NY 14701			DSL	128k – 1.5Mbs	Yes
Joel Pomroy			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 326-1352			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	Yes
Windstream Communications	Jamestown	(716) 483-####	Analog	9.6k-56k Dialup	Yes
ILEC	JMTWNYXA	(716) 484-####	ISDN	64k-1.5Mbs	Yes
201 E. 4th Street		(716) 485-####	Frame Relay	16k-1.5Mbs PVCs	Yes
Jamestown, NY 14701		(716) 487-####	DSL	128k – 1.5Mbs	Yes
Joel Pomroy		(716) 488-####	T1/DS1	128k – 1.5Mbs	Yes
Account Executive		(716) 489-####	T3/DS3	1.5mb – 45Mbs	Yes
(716) 326-1352		(716) 661-####	ATM (OC3)	1.5mb – 155Mbs	No
		(716) 664/665	Gig-E	1000Mbs	Yes

Telephone I-LECs by Central Office location / Services - continued

Company/Contact	CO	Exchange	Services Supported at CO	Bandwidth	Available 2009 (Yes/No)
Windstream Communications	Kennedy	(716) 267-####	Analog	9.6k-56k Dialup	Yes
ILEC	KNDYNYXA		ISDN	64k-1.5Mbs	Yes
201 E. 4th Street			Frame Relay	16k-1.5Mbs PVCs	Yes
Jamestown, NY 14701			DSL	128k – 1.5Mbs	Yes
Joel Pomroy			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 326-1352			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	Yes
Windstream Communications	Lakewood	(716) 456-####	Analog	9.6k-56k Dialup	Yes
ILEC	LKWDNYXA	(716) 763-####	ISDN	64k-1.5Mbs	Yes
201 E. 4th Street			Frame Relay	16k-1.5Mbs PVCs	Yes
Jamestown, NY 14701			DSL	128k – 1.5Mbs	Yes
Joel Pomroy			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 326-1352			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	Yes
Windstream Communications	Panama	(716) 782-####	Analog	9.6k-56k Dialup	Yes
ILEC	PANMNYXA		ISDN	64k-1.5Mbs	Yes
201 E. 4th Street			Frame Relay	16k-1.5Mbs PVCs	Yes
Jamestown, NY 14701			DSL	128k – 1.5Mbs	Yes
Joel Pomroy			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 326-1352			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	Yes
Windstream Communications	Sinclairville	(716) 962-####	Analog	9.6k-56k Dialup	Yes
ILEC	SNCVNYXA		ISDN	64k-1.5Mbs	Yes
201 E. 4th Street			Frame Relay	16k-1.5Mbs PVCs	Yes
Jamestown, NY 14701			DSL	128k – 1.5Mbs	Yes
Joel Pomroy			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 326-1352			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	Yes

Telephone I-LECs by Central Office location / Services - continued

Company/Contact	CO	Exchange	Services Supported at CO	Bandwidth	Available 2009 (Yes/No)
Windstream Communications	Stedman	(716) 789-####	Analog	9.6k-56k Dialup	Yes
ILEC	STMNNYXA		ISDN	64k-1.5Mbs	Yes
201 E. 4th Street			Frame Relay	16k-1.5Mbs PVCs	Yes
Jamestown, NY 14701			DSL	128k – 1.5Mbs	Yes
Joel Pomroy			T1/DS1	128k – 1.5Mbs	Yes
Account Executive			T3/DS3	1.5mb – 45Mbs	Yes
(716) 326-1352			ATM (OC3)	1.5mb – 155Mbs	No
			Gig-E	1000Mbs	Yes

Chautauqua County Service Providers

A) Wire-line Service System				
Company Name	**Address**	**City**	**State**	**Telephone Number**
AT&T	400 West Ave	Rochester	NY	1-585 512-6194
Frontier	180 South Clinton Ave	Rochester	NY	1-800-921-8101
FairPoint	30 West Main St	Westfield	NY	1-716-753-6902
DFT	332 Fluvanna Avenue	Jamestown	NY	1-888-411-5144
Verizon	Prospect Ave	Buffalo	NY	1-716-851-6212
Broadview Networks	495 Aero Drive	Cheektowaga	NY	1-716-995-2717
Quest	21 Corporate Dr	Clifton Park	NY	1-518-348-2935
Paetec	600 Willow Brook	Fairport	NY	1-585-413-2325
Windstream	201 E 4th St	Jamestown	NY	1-716-326-1352
B) Long Distance Service				
Company Name	**Address**	**City**	**State**	**Telephone Number**
AT&T	400 West Ave	Rochester	NY	1-585 512-6194
Frontier	180 South Clinton Ave	Rochester	NY	1-877-392-5160
Quest	21 Corporate Dr	Clifton Park	NY	1-518-348-2935
Time Warner Cable	4449 Bolivar Road	Wellsville	NY	1-866-668-6044
C) Cable Provider				
Company Name	**Address**	**City**	**State**	**Telephone Number**
Time Warner Cable	4449 Bolivar Road	Wellsville	NY	1-866-668-6044
D) ISP – Internet Service Provider				
Company Name	**Address**	**City**	**State**	**Telephone Number**
Frontier	180 South Clinton Ave	Rochester	NY	1-800-921-8101
DFT	332 Fluvanna Avenue	Jamestown	NY	1-888-411-5144
FairPoint	30 West Main St	Westfield	NY	1-716-753-6902
Final Communication	44 Central Ave	Silver Creek	NY	1-716-034-4923
Hughes Network				1-888-684-5260
Comet Network Solutions	East Main St	Westfield	NY	1-716-326-2663
Earthlink				1-888-240-3887
PeoplePC Online				1-866-236-5649
Windstream	201 E 4th St	Jamestown	NY	1-716-326-1352
E) Wireless Service Provider				
Company Name	**Address**	**City**	**State**	**Telephone Number**
Blue Wireless	Chautauqua Mall	Lakewood	NY	1-716-763-0101
AT&T				
America's Wireless Co	10220 Rte 60	Fredonia	NY	1-716-672-2840
DFT Wireless	40 Temple St	Fredonia	NY	1-716-673-3031
Verizon Wireless	901 Fairmont Ave	Jamestown	NY	1-716-763-7500
Freedom Wireless	Chautauqua Mall	Lakewood	NY	1-716-763-2353
Wireless Express	8945 Vinyard Dr	Dunkirk	NY	1-716-363-0700

Chautauqua County Service Providers - continued

F) Satellite Providers				
Company Name	**Address**	**City**	**State**	**Telephone Number**
DFT DirecTV	40 Temple Street	Fredonia	NY	1-800-280-4388
Chautauqua Satellite LLC	West Side Hill Rd	Ripley	NY	1-716-736-4380
Lane TV Satellite Service and Sales	6073 Rte 380	Sinclairville	NY	1-716-595-3240
Windstream	201 E 4th St	Jamestown	NY	1-716-326-1352

Appendix A-2

History of Telecommunications

Introduction to Telecommunications Systems (Telecom 101)

Telephony is the science of transmitting voice, data, and video signals over a distance. The word derives from the Greek meaning, "far sound". In the age of the global economy this is an appropriate definition. The ability to transmit signals around the world is based on a network system that connects users together via a matrix or web of end user locations, connection points (Central Offices), local access lines (local loops), and regional and international transmission lines.

Public Switched Telephone Network (PSTN)

The PSTN is the public switched telephone network provided by telecommunications carriers. The PSTN allows the entire country to make local calls through Local Exchange Carriers (LECs) within a Local Access Transport Area (LATA), and long distance calls outside of the LATA through Inter-exchange Carriers (IXC) via one public network.

Local Access and Transport Area (LATA)

LATA is a term for the geographic area covered by one or more local telephone (LEC) companies. There are seven (7) LATAs in NY State.

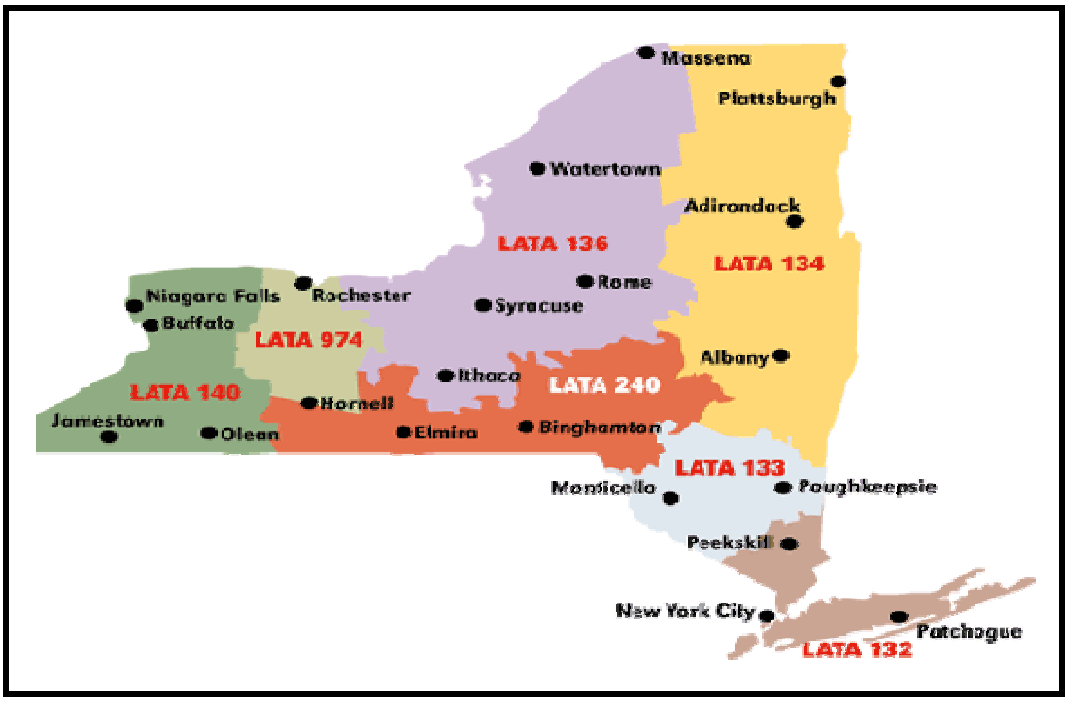


Figure A2-1 – New York State LATA Map

Local Exchange Carriers (LECs)

A LEC is a telephone company that offers local and long distance telephone service within a defined region referred to as the LATA. Service to points outside the LATA is provided by inter-exchange carriers (IXCs), commonly referred to as long distance service providers.

Telephone calls are considered local when calling another number with the same 3-digit exchange number (e.g. 315-531-wxyz to 315-531-abcd). Calls to other exchanges within a LATA may or may not be considered within the local calling area, depending upon exchange agreements and network arrangements.

Calls outside the local calling area, but within the LATA's boundary are charged intra-LATA rates.

Calls made outside the LATA, but within New York State are charged inter-LATA (intra-state) rates.

Calls outside New York State, but within the continental US are charged inter-state rates.

Calls outside the continental US are charged varying international rates depending upon the country being called.

2.3 Public Telephone Network Infrastructure

Local Loop (End User)

The local loop is the infrastructure which connects the customer's physical location, either residential or business, to the local telephone service provider's nearest central office. Also referred to as the subscriber loop, this connection can be either a 2 wire copper POTS (plain old telephone service) line, T1 line, high bandwidth line (fiber,) or wireless.

Central Office

The central office (CO) is a facility that houses equipment used to switch both local and long distance telephone calls. Each CO is designated one or more specific 3-digit dialing codes which are used for call routing identification within an area code. The 3-digit codes are referred to as your telephone exchange. A typical telephone number is made up of an area code (NPA), exchange prefix (NXX) and four digit line number (NPA-NXX-####). For example: (315) 531-1234, where 531 is the exchange.

Central offices are typically found within a few miles of the customers they serve. The local telephone company constructs and maintains COs in each city and town across the territory that they provide service to. The CO is based on a "switched" call system. The fundamental principle of switched calls is quite simple; because it would be impossible to install a line between all callers, each line is connected to a central location and "switched" or connected together when a telephone call is made. Computers are used to determine call routing or switching.

Equipment that is typically located in the CO:

- Distribution frame for connecting the incoming and outgoing lines.
- Switching equipment for cross connecting calls.
- Transmission equipment used to connect COs together.

- Test equipment for trouble identification.

Inter-Office Facilities (IOF)

The IOF is the cabling infrastructure that interconnects the LEC's central offices. Typically an IOF is a fiber optic cable, but copper IOF is also common.

Inter-Exchange Carriers (IXCs)

The Inter-Exchange Carriers provide long haul communications between cities and LATAs. They are commonly known as long distance providers. Fiber optic cabling is used to inter-connect a large majority of LATAs, with a few using satellite communications.

2.4 Infrastructure Media

The infrastructure medium is the physical circuit that transmits telecommunications signals. The predominant media are copper and fiber optic cables, but other media include cellular, microwave, and satellite communications.

Copper Twisted Pair

Copper twisted pair is typically what is used to deliver telephone service to residences and business. This is referred to as the local loop between the subscriber and the central office. It is a low grade cable capable of supporting voice and 56 Kbps dial-up communications, also commonly referred to as a plain old telephone system (POTS) line.

Under certain conditions, these POTS lines can support higher bandwidth communications such as ISDN and DSL services. Special conditioned 4-wire copper circuits support higher grade voice and data communications such as T1 and ISDN PRI services.

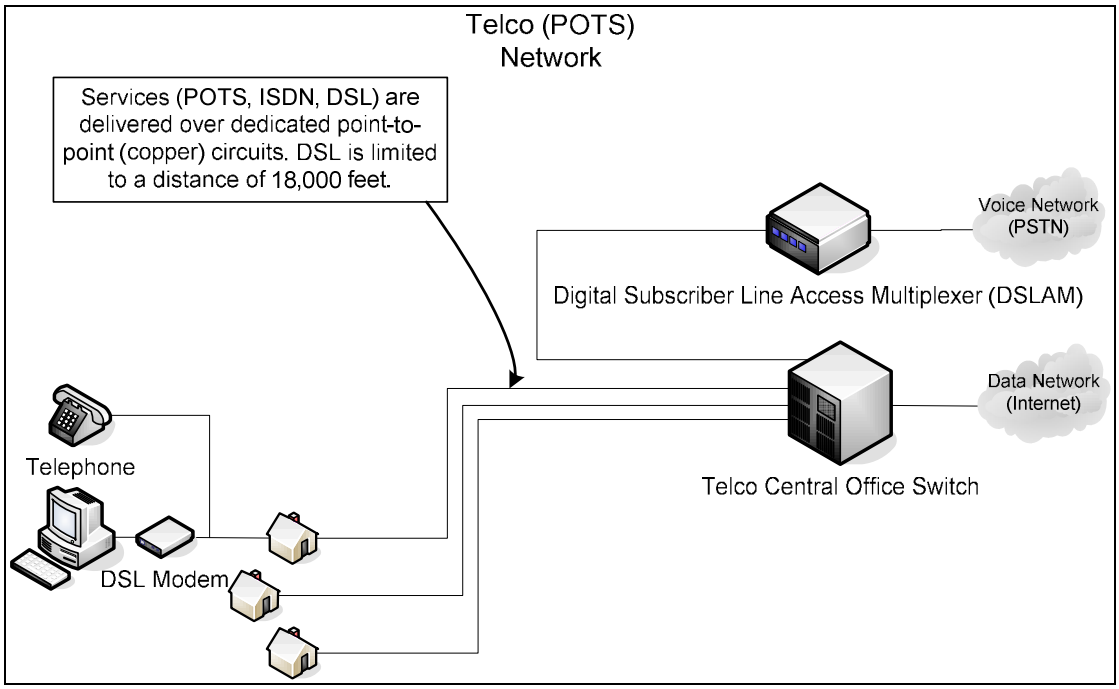


Figure 2.2 - Telco POTS Network

Coaxial (Cable TV)

Coaxial cable supports broadband communications and is commonly used to deliver cable TV channels to customers. Today's cable modem technology allows both cable TV and Internet service to share the same coaxial cable. Cable modem service providers deliver television programming, Internet and voice services over a hybrid fiber/coaxial network. Services are originated in a head-end. This is comparable to a telephone company's central office. These services are distributed out to neighborhoods via fiber optic cables to neighborhood "Nodes".

At the node, a media converter takes the light signals and converts them to electrical signals and distributes Internet, Phone and Television via coaxial cable to individual customer homes and businesses. At the customers location a special modem called a cable modem connects the end user's computer and/or phone to the Internet. Unlike DSL, where throughput is negatively affected based upon the length of the wires connecting the customer to the telephone company central office, cable modems connected to a node share upstream and downstream bandwidth with other cable modems served by the same node. Typically, up to 250 cable modems are served by a single node. During peak times, heavy demand for bandwidth on a particular node could impact speed performance. Cable companies typically monitor and look for these conditions. When the condition exists, a new node can be created. Customers on the heavily burdened node can be moved onto the new node improving performance.

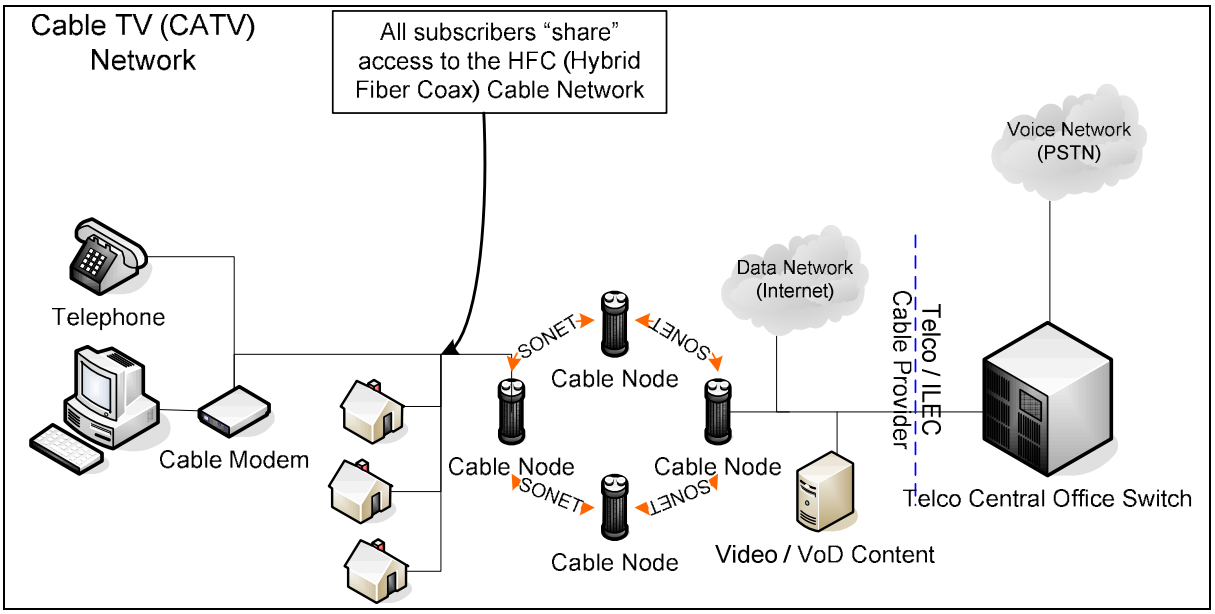


Figure 2.3 - Cable TV Network

Fiber Optic

Much of today's telephone network infrastructure was built more than 25 years ago using copper wire which, at the time, was considered state of the art. This copper infrastructure has become known as the weak link in the network. As a replacement strategy, most new infrastructure installations are taking advantage of fiber optic cable. Fiber optics, as a transfer medium, is far superior to its copper predecessor in bandwidth capacity, speed, and reliability.

Fiber optic capacity has not been exceeded by today's technology. Current fiber optic cable bandwidth is limited only by the electronics placed on each end that generate the digital signals.

Wireless Communications

Wireless communications utilize radio frequencies (RF) from 400 MHz to 38 GHz. Generally speaking the higher the frequency is the higher the bandwidth is. Higher bandwidth often translates to reduced distance. Lower frequency radio transmissions have broad reception, where high frequency microwave is used for point-to-point line of sight transmission.

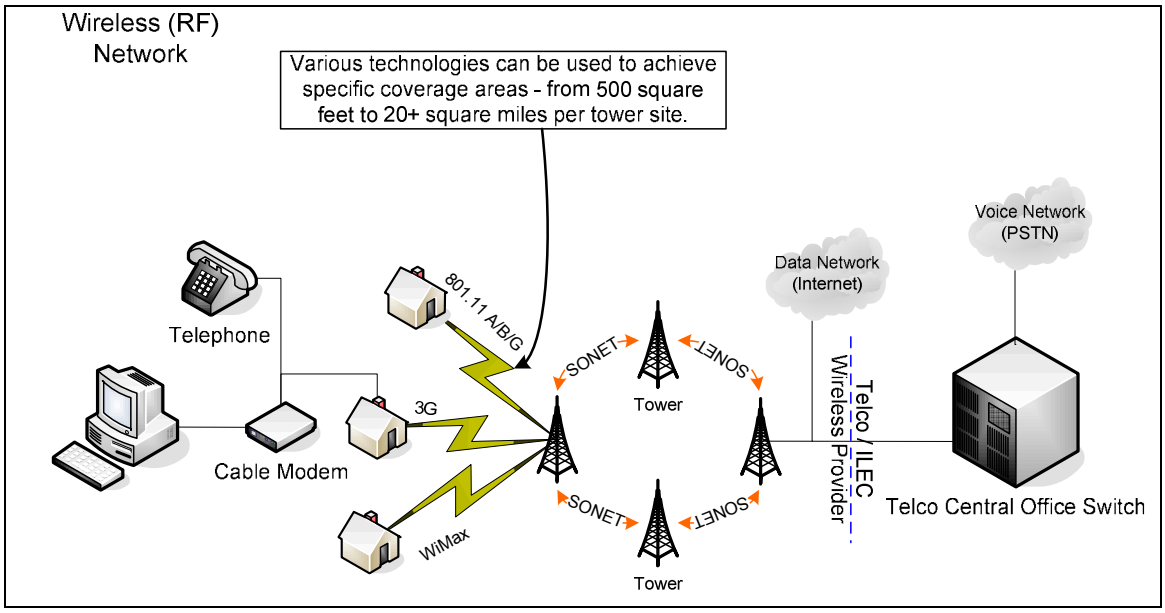


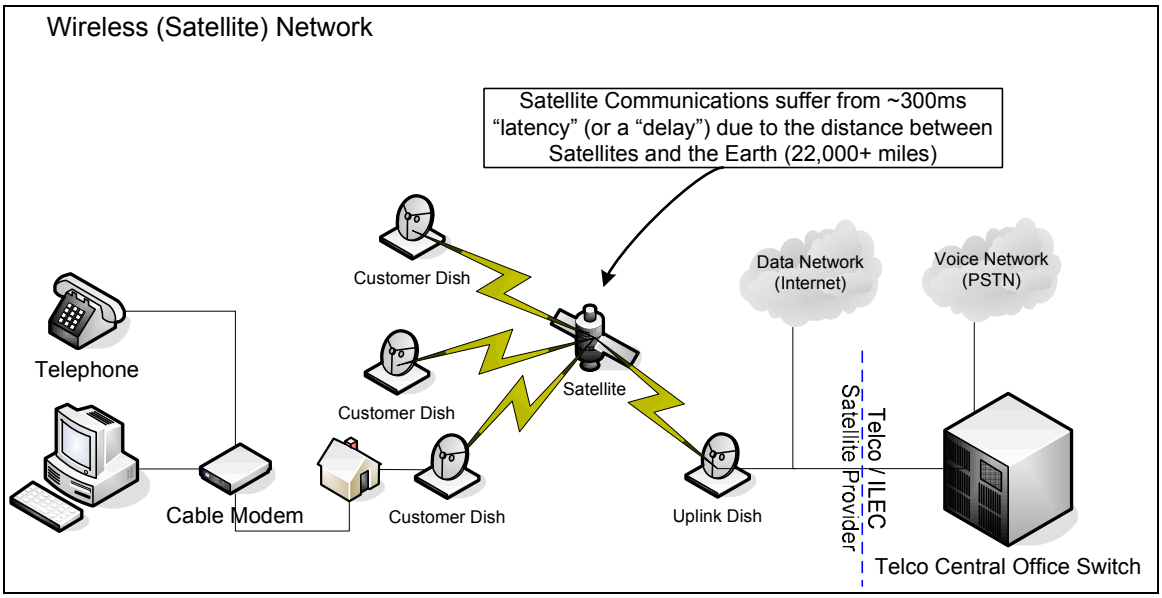
Figure 2.4 - Wireless (RF) Network

Cellular Service

Cellular service gets its name from the technology used to send and receive the cellular signal. Instead of one (1) large transmitter/receiver base tower location sending and receiving cellular signals to subscribers many smaller separate transmitters/receiver towers are used. The transmitter/receivers towers therefore send, receive and hand off signals from one area "or cell" to the next available tower. For calls to traditional home and business phones each cell tower is connected back to the PSTN via land line cables hard wired to the nearest central office.

Satellite Communications

For areas with limited landline infrastructure or poor line of site for wireless communications, satellite service is a viable, and in many cases the only, option for telephone, data and Internet access. Customers own wireless dishes that communicate with orbit-fixed satellites, which in turn is linked to the service provider's network operation center. Connections then continue from the network operations center to the public telephone system and the Internet. Satellite has unavoidable transmission delays due to the extreme distances between base stations, customer location and satellites. The delay, known as "latency", can exceed 0.5 seconds as compared to the latency on a fiber network which is less than 0.1 seconds coat-to-coast. This makes interactive applications such as telephone, video conference, and web surfing seem slow. In most cases "upload" data rates are less than 10% of "download" transfers. Satellite is good, however, for streaming media (radio, movies, etc) and large file downloads because of the high, one-way bandwidth that it can provide.



2.5 Telecommunications Services

All telecommunications services require a certain amount of electronic bandwidth. Bandwidth is the combination of capacity and speed at which a signal is communicated across the network. Typically voice transmissions require the least amount of bandwidth, then data, progressing to video requiring the most. The type of signal transmission is based on the equipment on the ends and everything in between.

Basic telecommunications services typically include such services as residential or business telephone lines, faxes, or dial-up Internet access. These services generally operate over existing copper infrastructure and are widely available throughout rural and developed areas. The maximum transmission rate is 56 kbps which, until the Internet wave of the 1990's took hold, was considered sufficient capacity. The desire for increased Internet capacity and global economic competition has increased the dependence on higher capacity services.

High bandwidth (broadband) services, as defined by the FCC, are data communication services that support download transmission rates of at least 200 Kbps. Telecommunications carriers provide high bandwidth services through a variety of programs. Most providers can offer T1, ISDN, Frame Relay, and SONET services in the developed/sub-developed areas of the region. The services are described below.

Integrated Switched Digital Network (ISDN)

ISDN refers to switched digital services with transmission rates of 64 Kbps, 128 Kbps, 384 Kbps and 1.5 Mbps. This service requires a provisioned line with a monthly recurring access cost plus per minute usage charges. ISDN is commonly used for high capacity telephone service (with digital features like caller-ID, ANI, DID) and/or video conferencing.

Frame Relay

Frame relay is also a switched digital service that establishes a minimum committed information rate (CIR), but allows customers to burst to higher bandwidth rates if network capacity permits.

Customers pay a monthly recurring charge per frame relay circuit, but there are no per minute charges.

Frame relay is commonly used for interconnecting facilities in wide area networks that span multiple locations within a region. Frame relay is particularly suited for batch processing and back office operations that can take place unattended after hours to maximize burst speeds and network resources.

Digital Subscriber Line (DSL)

DSL is a technology that allows for the simultaneous transmission of voice and Internet data over a single telephone line. Central offices that have DSL technology can support DSL services to customers within approximately 12,000-18,000 feet of the central office.

DSL is delivered either asymmetrically (ADSL) or symmetrically (SDSL). ADSL lines have download transmission rates higher than upload rates and are typical for residential or business users that receive much more Internet content than they send. SDSL are for businesses that generate and receive large amounts of Internet data.

DSL turns a normal telephone line into a high speed Internet connection; unfortunately the technology is dependent on old wire plant (local loops) and therefore is sometimes unreliable. New DSL services have connection speeds of 600 Kbps to 1.5 Mbps. DSL subscribers need to be within three (3) miles of a central office equipped with DSL hardware in order to support the higher speed connection.

DS1 (T1)

A DS1 line is a point-to-point 1.5 Mbps digital connection between two locations. Its voice counterpart is referred to as a T1 line which supports 24 simultaneous phone conversations. DS1/T1 lines run locally from a customer location to the central office and then use the public switched telephone network to connect to other locations worldwide. DS1 lines may also be used for Internet access to an Internet Service Provider (ISP) or as the "local circuit" for Frame Relay networks.

DS3 (T3)

A DS3 line is similar to a DS1 circuit, but with 30 times the bandwidth (45 Mbps). DS3 is supported by ILEC central offices, but requires specialized fiber optic cable infrastructure and equipment to the customer's location.

MPLS

Multiprotocol Label Switching or MPLS is called *multiprotocol* because it works with the Internet Protocol (IP), Asynchronous Transport Mode (ATM), and frame relay network protocols. MPLS provides "any-to-any" connectivity. MPLS is a standards-approved technology for speeding up network traffic flow and making it easier to manage. MPLS involves setting up a specific path for a given sequence of packets, identified by a label put in each packet, thus saving the time needed for a router to look up the address to the next node to forward the packet to.

Synchronous Optical Network (SONET)

SONET is a standard for optical telecommunications transport, which provides high capacity, fault tolerance, and self healing characteristics to telecommunications networks. SONET uses Asynchronous Transfer Mode (ATM) switching for very high-speed transmission from 1.5 Mbps to 2.5 gigabit/sec. ATM provides simultaneous transfer of voice, video and data over one circuit. SONET uses a fiber optic ring infrastructure to provide both bandwidth and a redundant network path. SONET is the predominant technology used by telecommunications carriers for high bandwidth services to large enterprise customers.

SONET technology requires specialized fiber optic cabling infrastructure and equipment to the customer's location.

Ethernet

Ethernet technology is the dominant network topology for local area networks and is emerging as a wide area network technology supporting transmission rates of 10 Mbps, 100 Mbps (Fast Ethernet), and 1000 Mbps (gigabit Ethernet). Ethernet service requires specialized fiber optic cabling infrastructure and equipment to the customer's location.

Table 2.1 summarizes the average transmission speeds for a number of the previously discussed telecommunication services.

Transmission Speed	Connection	Data Link	1MB File Throughput
56 Kbps	Latest modem	analog	2minutes 22 seconds
128 Kbps	ISDN (BRI)	digital	1 minute 2 seconds
500 Kbps	Cable modem	digital	16 seconds
1.544 Mbps	ISDN(PRI) & T1	digital	5 seconds
11 Mbps	Wireless RF	digital	0.67 seconds
45 Mbps	T3 & Microwave	digital	0.18 seconds
155 Mbps	OC3,ATM (SONET Fiber Optics)	digital	< 0.08 seconds
1000 Mbps	Gigabit Ethernet (Fiber Optics)	digital	< 0.02 seconds

Table 2.1 – Illustrates Data Transmission Speeds for a 1 MB Picture File

Appendix A-3

Glossary of Terms

ACCESS CHARGE
Access charge is a fee charged to subscribers or other telephone companies by a local exchange carrier for the use of its local exchange networks.

ANALOG SERVICES
Analog Services refers to communications that transmit voice at its different frequencies without changing it. In voice communication, there is some fluctuation in frequencies, similar to the gradual change of a sine wave; in fact, a person's voice creates its own specific sine wave as he/she speaks. This wave, except for the frequency changed for transmission, is exactly how the signal is sent.

ANALOG SIGNAL
A signaling method that uses continuous changes in the amplitude or frequency of a radio transmission to convey information.

ASYMMERTICAL DIGITAL SUBSCRIBER LINE (ADSL)
ADSL allows one-way transfer rates from 128 Kbps to greater than T-1 speeds over ordinary copper telephone lines. There is a distance limitation of approximately 12,000 to 18,000 feet from the nearest main facility (telephone company central office or equivalent).

ASYNCHRONOUS TRANFER MODE (ATM)
ATM is a high-speed, low-delay transmission method. ATM uses fixed length cells (chunks) to transfer voice, data and video over twisted pair and optical fiber. ATM can be configured to allocate bandwidth appropriately to meet the needs of time-sensitive and non-time- sensitive applications. ATM permits flexible allocation of available bandwidth for data, voice, images and video. ATM uses a scalable architecture, making it easily upgradeable. Engineering studies indicated that ATM is capable of data rates of 622 Mbps over fiber optic cable (SMF and MMF) and 155 Mbps over Category 5 UTP copper.

BANDWIDTH
Bandwidth is the amount of data that can be carried by a circuit between two points of a network. Bandwidth is typically measured in Hertz (cycles per second), bits per second or kilobits per second (shortened to Bps or Kbps). The top speed of today's modems is 56,000 BPS or 56 Kbps. The wire connecting a private home to the telephone company carries up to 128,000 BPS while one strand of fiber optics can carry 20,000,000,000 (20 gigabits). A 20 Gbps fiber optic strand can interconnect 357,000 telephone calls.

BROADBAND
Broadband is a descriptive term for evolving digital technologies that provide consumers a signal switched facility offering integrated access to voice, high-speed data service, video-demand services, and interactive delivery services. The FCC has defined broadband as any bandwidth service over 200 kbps.

BACKBONE
Backbone, in the context of networking, refers to the highest speed and widest bandwidth point of a communications circuit or path. In most cases, all information central to the users is connected to the backbone (e.g., shared databases or servers).

BROADBAND VIDEO
Broadband Video defines the capability of the network to carry numerous channels of television via one medium, coaxial or fiber optics. Fiber optics can carry up to 110 television channels 20 miles, while coaxial distances are much shorter. Citywide cable systems carry broadband video.

CELLULAR TECHNOLOGY
This term, often used for all wireless phones regardless of the technology they use, derives from cellular base stations that receive and transmit calls. Both cellular and PCS phones use cellular technology.

COMMERCIAL LEASED ACCESS
Manner through which independent video producers can access cable capacity for a fee.

COMMON CARRIER
In the telecommunications arena, common carrier is the term used to describe a telephone company.

CABLE TELEVISION SYM (CATV)
A broadband communications capable of delivering multiple channels of programming from a set of centralized satellite and off-air antennae, generally by coaxial cable, to a community. Many cable-television designs integrate fiber-optic and microwave links.

CARRIER
A telecommunications company that offers communications services to the general public via shared circuits at published tariff rates. In the United States, the Federal Communications Commission or various state public-utility commissions regulate common carriers.

CENTRAL OFFICE (CO)
A CO is a major equipment center designed to serve the communications traffic of a specific geographic area. CO coordinates are used in mileage calculations for local and interexchange service rates. A Central Office usually has less than 100,000 telephone lines per in its territory. COs are usually owned and operated by LECs.

CENTREX
Centrex refers to a suite of services that a local telephone company would offer to a business. It allows the business to use PBX-type services located at the company's central switching office (e.g., call forward, call park, and intercom). It also provides extensions so that per-call, local charges are incurred when one person calls another within the same organization but at a different site.

COMPETITIVE LOCAL EXCHANGE CARRIER (CLEC)
A CLEC is a telephone company that competes with the incumbent telephone company, the formation of these organizations is a direct result of the Telecom act of 1996.

COAXIAL CABLE
A type of cable used for broadband data and cable systems. Also known as "coax." Coaxial Cable is composed of an insulated central conducting wire wrapped in another cylindrical conducting wire. It is usually wrapped in another layer and an outer protective layer and has the capacity to carry great quantities of information.

CODEC (Coder/Decoder)
CODEC is a device that converts analog-based audio and video (as produced by microphone or camera) to a digital signal that can be sent across the street or around the world. A second CODEC is then required to return the digital signal to analog for speaker and or display device. Digital rates must match on each end of a connection.

COMMUNITY ANTENNA TELEVISION (CATV)
A service through which subscribers pay to have local television stations and additional programs brought into their homes from an antenna via a coaxial cable.

DARK FIBER
Dark Fiber is fiber optic cable, typically between end user locations, that the end user owns, lights and operates.

DIGITAL
A function that operates in discrete Steps as contrasted with a continuous, or analog, function. Digital computers manipulate numbers encoded in binary (on-off) forms, while analog computers sum continuously varying forms. Digital communications is the transmission of information using discontinuous, discrete electrical or electromagnetic signals that change in frequency, polarity, or amplitude. Analog forms may be encoded for transmission on digital communications systems.

DIGITAL SUBSCRIBER LINE (DSL)
DSL is new technology that allows for the simultaneous transmission of voice and Internet data over a single telephone line. Central Offices that have DSL technology can support DSL services to customers within approximately 18,000 feet of the central office.

DSL is delivered either asymmetrically (ADSL) or symmetrically (SDSL). ADSL lines have download transmission rates higher than upload rates and are typical for residential or business users that receive much more Internet content than they send. SDSL are for businesses that generate and receive large amounts of Internet data.

DISTANCE LEARNING
Providing scholastic instruction to one or more remote locations from an originating classroom. This may be either one-way video with two-way audio or two-way video and audio. The transmission may be via satellite, cable TV, or switched networks.

DIRECT BROADCAST SATELLITE (DBS/DISH)
A high-powered satellite that transmits or retransmits signals which are intended for direct reception by the public. The signal is transmitted to a small earth station or dish (usually the size of an 18-inch pizza pan) mounted on homes or other buildings.

DS-0
DS-0 (see also 56 Kbps) is the bandwidth required for one voice conversation. It is 64 Kbps and is one of 24 channels in a DS-1, or T-1.

DS-1
DS-1 (see also T-1) is the near equivalent of a T-1 though it is generally not channelized into 64 Kbps sub-channels. A DS-1 consists of 1.544 Mbps of bandwidth and may be carried by public or private services on two pair of copper cables. It takes 24 DS-0s to make up one DS-1.

DS-3
DS-3 is a digital circuit available from the PSTN with a bandwidth of 45 Mbps or 28 DS-1 circuits. A DS-3 requires the use of fiber optics or microwave for transmission.

FIBER OPTICS
The technology of guiding and projecting light for use as a communications medium. Hair- thin glass fibers that allow light beams to be bent and reflected with low levels of loss and interference are known as "glass optical wave guides" or simply "optical fibers." This cable comes in two types, single mode and multimode, each with its own unique place in communications. Single mode FO cable is typically used where long distances and very high speeds are required, while multimode is used for intra-building communications and places where lower bandwidths are required.

FIBER-OPTIC CABLE
A cable containing one or more optical fibers.

56 Kbps (56,000 bits per second)
56 Kbps is the bandwidth required for one phone conversation and a common WAN connection speed, referred to as DS-0. The 56 Kbps transmission speed is achieved by breaking a DS-1 (1.5436 Mbps) into its 24 component channels.

FRAME RELAY
Frame relay is also switched digital service that establishes a minimum committed information rate (CIR), but allows customers to burst to higher bandwidth rates if network capacity permits. Customers pay a monthly recurring charge per frame relay circuit, but there are no per minute charges. Frame relay is commonly used for interconnecting facilities in wide area networks that span multiple locations within a region. Frame is particularly suited for batch processing and back office operations that can take place unattended after hours to maximize burst speeds and network resources.

FREQUENCY MODULATION (FM)
A signaling method that varies the carrier frequency in proportion to the amplitude of the modulating signal.

GLOBAL POSITIONING SYSTWM (GPS)
A US satellite system that lets those on the ground, on the water or in the air determine their position with extreme accuracy using GPS receivers.

HEADEND
The control center of a cable-television system, where incoming signals are amplified, converted, processed, and combined into a common cable for transmission to subscribers.

IMCUMBENT LOCAL EXCHANGE CARRIER (ILEC)
An ILEC is the local telephone company that provides service to business, organizations and residence within the LATA. The ILEC is responsible for the development, maintenance and support of cabling infrastructure necessary to provide telecommunication services within the LATA.

INTEGRATED SERVICES DIGITAL NETWORK (ISDN)
A public-switched network providing digital connections for the concurrent transmission of voice, video, data, and images. Often seen as a technological bridge between the current telephone system and an upgraded, broadband network.

INTERNET
A widely used public computer network, initially developed by the U.S. military, that links smaller computer networks and allows users on different electronic-mail to communicate with one another on a global scale.

INTERNET PROTOCOL (IP)
In TCP/IP, a connection Internet layer protocol that provides a best-efforts datagram delivery service. Note the functional layer (TCP/IP) corresponds to the OSI model network layer. The Internet layer provides routing and relaying functions that are used when data must be passed from a host to some other network in the Internet. It operates in the source and destination hosts and in all the routers along the path between the hosts.

ISP
ISP is an Internet Service Provider.

ISDN (Integrated Services Digital Network)
ISDN is a transmission scheme that comes in two different capacities: 1) BRI (Basic Rate Interface), which equates to 128 Kbps of usable bandwidth, and 2) PRI, Primary Rate Interface, equivalent to a T1 (1.5436 Mbps). ISDN is divided into bearer (or B-channels) and data (or D-channels). In BRI, ISDN is composed of 2B+D; the two bearer channels are 64 Kbps used to carry user data or one voice conversation and one 16 Kbps for control and signaling information.

LANDLINE
Traditional wired phone service.

LAST-MILE
Last Mile is used to describe the final connection to a building, as differentiated from the high capacity circuits extending across a city or county. The connection from the cable television trunk cable to your house is considered a “last-mile” connection.

LOCAL EXCHANGE CARRIERS (LECs)
A LEC is a telephone company or Telco that offers local and long distance telephone service within a defined region referred to as the LATA - Local Access & Transport Area. A LATA or is the regional calling area within which the incumbent local telephone company provides local and long distance services. Service to points outside the LATA is provided by long distance carriers.

LEASED LINE SERVICES
Leased lines are typically voice, video or data communications circuits provided by a telephone company or cable company and leased for a cost-per-month to a customer. Typical lease lines include 56 Kbps, ISDN BRI and PRI, T-1, and DS-3.

MAN (Metropolitan Area Network)
MAN is generally defined as a network used to connect LANs together, usually within the limits of a campus, city or metropolitan area. This is generally a higher speed connection than a typical wide area network (WAN) and uses various access methods.

NETWORK
Any connection of two or more computers that enables them to communicate. Networks may include transmission devices, servers, cables, routers and satellites. The phone network is the total infrastructure for transmitting phone messages.

ON-LINE
Being actively connected to a network or computer system; usually being able interactively to exchange data, commands, and information.

PERSONAL COMMUNICATIONS SERVICE (PCS)
Any of several types of wireless, voice and/or data communications systems, typically incorporating digital technology. PCS licenses are most often used to provide services similar to advanced cellular mobile or paging services. However, PCS can also be used to provide other wireless communications services, including services that allow people to place and receive communications while away from their home or office, as well as wireless communications to homes, office buildings and other fixed locations.

POTS (Plain Old Telephone System)
POTS refers to an un-enhanced telephone service with the ability to send and receive phone calls. Features like call-waiting and call-forward are available.

RF (Radio Frequency)
RF refers to the electromagnetic waves operating between 10 KHz and 3 MHz propagated without guide (wire or cable) in free space.

RIGHT-OF-WAY (plural: Rights-of-Way)
ROW refers to a designated space alongside a street or other access (such as a railroad line). An entity wishing to install fiber optic cable between various sites/locations must first obtain the rights to a path along those routes. As the cable may be installed underground or on poles, right-of-way access may be granted by a city, a private landowner or the owner of poles such a cable company, a telephone company or power company. Cities typically require written permits – usually for a fee.

ROAMING
The use of a wireless phone outside of the "home" service area defined by a service provider. Higher per-minute rates are usually charged for calls made or received while roaming. Long distance rates and a daily access fee may also apply.

SATELLITE
A radio relay station that orbits the earth. A complete satellite communications system also includes earth stations that communicate with each other via the satellite. The satellite receives a signal transmitted by an originating earth station and retransmits that signal to the destination earth station(s). Satellites are used to transmit telephone, television and data signals originated by common carriers, broadcasters and distributors of cable TV program material.

SCANNER
A radio receiver that moves across a wide range of radio frequencies and allows audiences to listen to any of the frequencies.

SERVICE PROVIDER
A telecommunications provider that owns circuit switching equipment.

SINGLE-MODE FIBER
Single-mode fiber is fiber optic cable designed to carry only the single wavelength selected for transmission.

SPECTRUM
The range of electromagnetic radio frequencies used in the transmission of sound, data and television.

SPREAD SPECTRUM
Spread Spectrum is used to mix an analog signal with “noise” and spread it out over a broad FM frequency range in order to provide a secure transmission of information in a wireless environment. Anyone attempting to “listen in” would only hear unintelligible bits.

T-1 (DS-1)
The T-1 standard, has a speed of 1.544 Mbps in the United States. The T-1 standard has carried over to data networking from the voice arena where it was used to describe a carrier that could carry 24 voice conversations over a clear channel (64 Kbps, DS-0).

T1 LINE
Telecommunications line with bandwidth capacity of 1.54 Mbps.

T3 LINE
Telecommunications line with bandwidth capacity of 45 Mbps.

TARIFF
The documents filed by a carrier describing their services and the payments to be charged for such services.

TELECONFERENCE
The simultaneous visual and/or sound interconnection that allows individuals in two or more locations to see and talk to one another in a long-distance conference arrangement.

TELEPHONY
The word used to describe the science of transmitting voice over a telecommunications network.

TRUNK is a communication line between two switching systems, which typically include equipment in a central office (the telephone company) and PBXs.

UNBUNDLING
The term used to describe the access provided by local exchange carriers so that other service providers can buy or lease portions of its network elements, such as interconnection loops, to serve subscribers.

UNIFIED MESSAGING
Unified Messaging generally refers to a system or group of systems that bring the various forms of messaging (voice mail, facsimile, e-mail) to one point of retrieval for the end user.

VIDEO DESCRIPTION
An audio narration for television viewers who are blind or visually disabled, which consists of verbal descriptions of key visual elements in a television program, such as settings and actions not reflected in dialog. Narrations are inserted into the program's natural pauses, and are typically provided through the Secondary Audio Programming channel.

VIDEO HEADEND
Video Headend is the originating point of a signal in TV cable distribution systems. Video editing and other electronic equipment are generally found at the "headend."

VIDEO STREAMING
Video Streaming makes it possible to transport high quality video and audio efficiently over broadband networks, optimizing bandwidth and enabling video services and applications via an organization-wide computer network.

WAN (Wide Area Network)
WAN is used to extend LAN connectivity beyond a city or county, usually through common carrier facilities at either 1.544-Mbps or 56-Kbps. Typical technologies used are frame relay, X.25, and ISDN.

WIRELESS
Wireless describes a means of sending signals (voice, video or data) "over the air" rather than using cables. To date, wireless bandwidth rates (capacities) are significantly lower than wire rates. There are significant new developments in wireless, many of which will come to market in 2002 and beyond. Some wireless systems are designed to allow the user to move about ("roam") while still connected, but in these cases the bandwidth is minimal. Thus, the transmission rate for today's wireless phones that can access the Internet is 14.4 Kbps (considerably slower than a wired modem at 56 Kbps).

WORLD WIDE WEB (WWW)
An Internet service that lets users retrieve hypertext and graphics from various sites. Often just called "the Web," it has become one of the most popular Internet services over the past two years.

* All terms and definitions listed in this Glossary originated from various public resources.

Appendix A-4

Telecom Provider Questionnaire

Education, Corporate & Community Technologies

STW Regional Planning and Development Board
Telecommunications Study Questionnaire

(ILEC)

STWRPDB
Allegany, Cattaraugus, & Chautauqua Counties Telecommunications Study Questionnaire

ILEC

1) Full Company Name – XYZ Telephone Corporation

2) Please provide Business Office Address and Sales Contact Information for Region.

3) Please provide Maintenance Garage Address and Service Contact Information for Region.

4) Please provide information on service level commitment for the Region.

5) Please provide Number of customer currently serving in the territory of the study.

6) Please provide list of the names of your larger customers in the Region.

7) Please provide Map of Service Territory / Map of outside plant – System Redundancy in region – (ie. Ring Physical and/or logical diversity between COs)

8) Central Office – Type of networking equipment, Type of switch, classification & numbering plan

9) Please provide information on area network System Backup equipment.

10) Please provide information on Quality of Service (QoS) equipment.

11) Future infrastructure plans for the County or region including any new plans for service rollouts and additional outside plant builds.

12) Any other marketing information about your company that you would like to share.

List of Services available at each Central Office (including but not limited to)

1) Calling Services available at the Chautauqua County Central Offices - Voicemail capabilities? MPLS? Ect..

Please fill out information on Central Office below

Central Office Name (County) (NPA) NXX
Address:

Services Supported at CO	Bandwidth	Available 2009 (Yes/No)
Analog	9.6k-56k Dialup	
ISDN	64k-1.5Mbs	
Frame Relay	16k-1.5Mbs PVCs	
DSL	128k - 1.5Mbs	
T1/DS1	128k - 1.5Mbs	
T3/DS3	1.5mb - 45Mbs	
ATM (OC3)	1.5mb - 155Mbs	
Gig-E	1000Mbs	