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Strategic Telecommunications Plan, Columbus, IN

COL001 | Version: 2.0 | Last Revision: Friday, April 19, 2002

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Introduction

This report has been prepared by InfoComm Systems, Inc. (InfoComm) to present the results of Phase 1 of the statement of work, Strategic Telecommunications Plan for the City of Columbus. Work on this contract began on January 8, 2002. The following is a list of the work completed during the preparation of the strategic plan:

- Completed research into "world class" telecommunication infrastructures.
- Conducted network requirements discovery interviews with key city/county constituencies regarding current state, frustrations, and desired state of the telecommunication infrastructure in Columbus.
- Analyzed interview data to create accurate statements depicting the current state, frustrations, and desired state of all constituencies grouped into five categories: Business/Industrial, Government, Education, Social Service, and Residents.
- Established conceptual designs summarizing the collected requirements for the telecommunication infrastructure in Columbus. The designs were expressed in the following three categories based on time: 0-2 years, 2-4 years, and 4+ year vision.
- Identified and described key business elements pertaining to the continuation of the project into the implementation phase. The elements represent business decisions needing attention as the project moves forward.
- Completed a gap analysis between the current state and the 0-2 year desired state of telecommunications infrastructure.
- Documented a migration plan for the 0-2 year desired state. The migration plan highlights initial work for all continuums (entailing business and technology next steps) associated with the project.
- Provided a series of next steps mapping out procedures and processes that must be initiated to maintain project momentum and a resulting connected community model.

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Executive Summary

Phase 1 of the Metropolitan Area Network Strategy and Design project described the elements, processes, and decisions that must be undertaken for Columbus, IN to obtain the status of a "world class" connected community. Specifically, InfoComm documented and explored the current and desired states of telecommunications infrastructure in the city of Columbus and achieved the following results:

- A focused and concise definition of a "world class" telecommunications infrastructure married to a set of business and community expectations.
- A documented view of the current state resulting from situation analysis and asset identification studies that painted a portrait of the current status of telecommunications infrastructure throughout the community and inventoried all assets that could be leveraged into a resulting connected community model, respectively.
- A documented view of the desired state from the community's perspective and corresponding conceptual diagrams and business model elements that formulate these results into easy to understand logical designs of a conceptual community network.
- A documented migration plan that will provide vision from year 0 thru year 2 coupled with appropriate next steps that will map key decisions and outcomes that must take place in the interim to sustain project momentum.
- A full disclosure of all factors (risks) that could lead to the disruption and/or delay of a connected community result.

These results were achieved through approximately 40 interviews with key constituencies in the community encompassing the business/industrial, government, education, social service, and residential sectors of the community. In addition to these interviews, two key meetings between the Connected Community Partnership and InfoComm fostered representative community buy-in on current and desired states, the definition of "world class", as well as insight into the service goal of the proposed connected community network.

One of the most important discoveries in this study was the underlying need for a single point of contact within the community to govern, coordinate, direct, and manage and/or fulfill telecommunications initiatives. Furthermore, it was discovered that this lack of a formalized governance entity has undoubtedly led to the lack of competition in all telecommunications markets within Columbus.

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Problem Statement

According to members of the Columbus Economic Development Board (CEDB) and the Connected Community Partnership (CCP), while Columbus is considered "world class" in many regards, including building architecture and the city's ability to attract global business to the Columbus area, the telecommunications infrastructure in Columbus, is not "world class". Most of their concerns are related to redundancy, disaster recovery, customer service, and the overall availability of broadband services. These concerns are so significant they have spurred investigation into other options.

According to the members of the steering committee, a "world class" telecommunication infrastructure will do many things for the city of Columbus. It will spur economic development by encouraging high tech companies to move to the area. Opening up the infrastructure to encourage competition will lower prices and strengthen the quality of business and residential telecommunication offerings. High bandwidth to the classroom will encourage advanced teaching methodologies and broaden the offerings of local K-12 and higher education institutions. The list of benefits goes on and on, however, none of these will be possible without a highly structured plan for making Columbus' telecommunication infrastructure "world class".

InfoComm was hired by the CEDB in conjunction with the CCP to help define a "world class" telecommunication infrastructure and to determine how the city of Columbus can begin making the defined infrastructure a reality. InfoComm consultants have worked to ensure this strategic plan will provide a steady and profitable path to a "world class" telecommunication infrastructure.

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Purpose of the Document

The purpose of this document is to present the findings of the study InfoComm conducted for the CEDB in accordance with the aforementioned contract. Specific goals of the study were to do the following:

- Define the phrase "World Class Telecommunication Infrastructure"
- Assess the current telecommunication infrastructure
- Compare current infrastructure to a "world class" infrastructure
- Use the comparison to set future telecommunication goals for the city of Columbus
- Analyze the potential for the city to spearhead the realization of the identified telecommunication goals
- Present logical next steps for the CEDB and the CCP

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Intended Audience

This document is intended for project planners associated with the development of a Columbus connected community model. It is not intended to be a highly technical document for network designers.

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Acronyms

This section provides insight into acronyms used throughout this deliverable. Please reference table 1 below:

BCSC	Bartholomew-Columbus School Corporation
BCTC	Bartholomew-Columbus Telecommunications Commission
CATV	Cable Television
CCP	Connected Community Partnership
CEDB	Columbus Economic Development Board
CEDC	Columbus Enterprise Development Corporation
CLEC	Competitive Local Exchange Carrier
CO	Central Office
CRH	Columbus Regional Hospital
DSL (xDSL)	Digital Subscriber Loop
FDDI	Fiber Distributed Data Interface
GOB	Government Office Building
I-HETS	Indiana Higher Education Telecommunications System
I-Net	Institutional Network
ILEC	Incumbent Local Exchange Carrier
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
IT	Information Technology
ITN	Indiana Telecommunications Network
KDL	Kentucky Data Link
LAN	Local Area Network
LMDS	Local Multipoint Distribution System
NG-DLC	Next Generation Digital Loop Carrier
NOC	Network Operations Center
PON	Passive Optical Network
POP	Point-of-Presence
PSTN	Public Switched Telephone Network
REMC	Rural Electric Membership Corporation
SONET	Synchronous Optical Network
VPN	Virtual Private Network

Table 1 - Acronyms

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Definitions

Connectedness – In order to objectively assess the effectiveness of a given telecommunications infrastructure in achieving the stated goal of being "world class", metrics must be defined, collected, and analyzed. *Connectedness* is a descriptive, yet subjective or qualitative term that could be used to measure progress of a telecommunications infrastructure along a continuum toward a goal of achieving "world class" stature.

Measuring connectedness can be done using a variety of objective or quantitative metrics. Since progress towards the goal of a "world class" telecommunications infrastructure can only be measured by comparing similar metrics over time, it is important to choose fewer initial metrics that can be gathered with a realistic amount of effort and then include additional metrics in the future.

Yahoo! Internet Life creates a yearly study of most wired (highest degree of connectedness) colleges and universities in the United States. (www.wiredcolleges.com) By adapting and supplementing the metrics within the six evaluation categories from evaluating colleges to evaluating communities, a reasonable evaluation instrument for measuring community connectedness can be created.

The six categories are as follows:

1. Infrastructure
2. Computing resources
3. Web Portal
4. E-learning
5. Tech Support
6. Wireless Access

The table below, table 2, lists some of the potential community-related metrics that could be applied within each category. Scores (A-F, 4-0) can be computed for each category based on detailed metrics. In addition, a weighting factor could be assigned to each category to provide an overall weighted score reflective of community priorities.

Goals can be established in each connectedness category as an initial definition of "world class". Metrics recorded in a given category over time can be compiled for trend analysis and as a means of measuring progress towards the aforementioned "world class" goals.

Connectedness Category	Weighting Factor	Potential Metrics
Infrastructure		• % of residents/businesses with available cable modem/DSL (broadband services) • % of residents/businesses that subscribe to cable modem/DSL (broadband services) • % of residents/businesses that subscribe to dial-up and/or broadband services • Infrastructure reliability/availability (99%, 99.9%,

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		99.99% etc)/frequency of network outages • % of hotel rooms/conference facilities with high speed network access
Computing Resources		• % of residences with at least one personal computer linked to the community network • % of residences with a personal network linked to the community network • Number of kiosks available for visitors • Number of minutes of Internet access logged by visitors
Web Portal		• % of city/county government agencies & library that offer information on web portal • % of city/county government agencies & library that offer transaction capability on web portal
E-learning		• Number of e-learning courses offered per year • Number of institutions offering e-learning opportunities • Number of people taking advantage of e-learning opportunities
Tech Support		• Availability of tech support (24/7?) • Average time to close trouble call • % of tech support questions answered by users via web site • Number of calls closed per week, month, year • Availability of on-site tech support • Availability of training/orientation courses
Wireless Access		• % of high traffic areas (malls, downtown, business areas, college campuses, government buildings) provided wireless access to city-wide network infrastructure
Total	100%	

Table 2 - Measuring Connectedness

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Assumptions, Concerns, Constraints

Prior to completing additional phases of this project:

- Potential revenue streams will have to be identified
- Governance entity will have to be established (or nearly established)
- Financial and telecommunications partnerships will need to be formalized

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Guiding Principles

Guiding principles govern the development of a strategy by incorporating the culture and values of an enterprise into the document. Two enterprises may share the same vision and architecture, but their culture and values may dictate two totally different strategies.

Guiding principles of this strategic planning document include:

- All decisions and planning should be grounded in a concern for what is in the best interests of the citizens of Columbus and surrounding Bartholomew County, and the State of Indiana.
- Communication among partners should be open and truthful. It is expected that win-win partnerships should always be the goal.
- Neither cooperation nor competition with the ILEC, Ameritech, should be ruled out without detailed investigation into both possibilities.

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Mission Statement

As defined by the steering committee at the 01/08/02 meeting, the goal of this project is to:

- Set up a technical infrastructure to support economic development efforts
- Establish a "world class" info tech park
- Use technology to increase business productivity, efficiency, and collaboration
- Figure out how to do what we need to do in 2002 with technology to get where we need /want to be as a community in 2012

These goals have been summarized into the following mission statement:

> *The mission of this project is to determine what information technology infrastructure in 2012 we will wish we had built in 2002 in order to connect community resources, measured in terms of access and utilization, to enable people to collaborate to accomplish community goals (vital economy, effective government, excellent education, inclusiveness…)*

Objectives and Expectations

The previously mentioned mission statement and goals have been translated into the following objectives that can serve as evaluation criteria for the overall project.

Upon completion of this project we expect to be able to:

1. Have a clear understanding of where we are, be able to describe our desired states (0-2, 2-4, 4+ years), and have a plan (with approximate timetables) for getting from where we are to the desired state (at least 0-2 years out).
2. Understand the risks of doing and not doing things at each step
3. Understand what is realistic for the community – what makes sense here?
4. WOW people with the plan. Impress them that the community is moving forward with a good plan.
5. Generate a plan that will inform key constituencies as they make decisions about the connectedness from their entities to the community thereby avoiding duplication of effort, conflict, etc.
6. Narrow options for a suitable organizational structure for this community
7. Get a clear definition of what's required for a "world class" InfoTech Park and what's realistic as Columbus/Bartholomew County develop one here.
8. Define appropriate metrics for measuring connectedness – what measures will we use to determine whether we are a connected community?

Defining 'World Class'

In defining the intended outcome for this project, the following widely held beliefs were shared and agreed upon:

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- Columbus is widely considered as a “world class” city in many regards such its distinctive architecture
- The current telecommunications architecture cannot be considered on a par with other “world class” attributes of the community

As a result, a focus of this project became to define what a “world class” telecommunications infrastructure would look like for Columbus.

This “world class” telecommunications infrastructure was described from two distinct frames of reference:

1. From the perspective of an information technology oriented company that might be considering to locate in Columbus
2. From the perspective of a resident that expects to live and work in a pervasively connected community

Following are the details of the key characteristics of a “world class” telecommunications infrastructure from these perspectives. These same characteristics are also reflected in the conceptual desired state designs of the proposed telecommunications infrastructure.

World Class Expectation of IT Oriented Companies

At a high level, information technology corporations expect high bandwidth network services that are readily available, reasonably priced, and highly reliable. It must be understood that data and voice networks are the lifeblood of information technology corporations. They are equivalent to manufacturing lines in large multi-billion dollar manufacturing facilities. Just as shutting down a manufacturing line can cost a global corporation millions of dollars per minute, shutting down voice/data networks can cost an information technology oriented company equivalent amounts.

To be more specific, within a metropolitan area, it is reasonable for companies to expect inter-facility gigabit Ethernet services priced in the $1,000-$5,000 per month range. Over the next five years, these prices are expected to continue to fall while available bandwidth services continue to climb. The term “metropolitan area” can be misleading. In the case of Columbus, this would not mean only Columbus/Bartholomew County. Through access to fiber optic cable that runs throughout the region, such services could be offered between facilities from Louisville, Cincinnati, Indianapolis, Dayton and beyond. Which entity offers these services to these information technology oriented companies will be determined as part of the deliberations over governance and business models.

For smaller information technology companies intending to lease space in an incubator type facility, it is not unreasonable for these companies to expect high bandwidth network services to be available within hours of their occupying space in the shared facility. Such start up companies would also expect flexible lease arrangements to accommodate fast-changing needs for space. In addition, in order to avoid large initial capital expenditures, such companies would expect shared data center facilities for high performance computing and storage area networks from a truly “world class” facility.

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As previously mentioned, the reliability of such network services is crucial. Reliability starts at the premises or building of a given information technology company and moves from there throughout each stage of the network. Basically, there must be no single point of failure anywhere in the network between the source and destination of a given transmission. While a detailed technical analysis of network design reliability criteria is beyond the scope of this paper, following are some of the network characteristics that contribute to overall network reliability:

- Diverse fiber paths from the building assure that the physical connectivity to the building will not be terminated with a single fiber cut
- The metropolitan network that connects multiple companies throughout the region must be designed to be self-healing. Specifically, no single fiber cut or failure of a single piece of equipment should be able to cause network outages
- Finally, there must be multiple gateways from the metropolitan network to the rest of the world. In this manner, the catastrophic failure of a given carrier's facility or network will not effect the ability of the information technology companies to continue to access network based resources
- In order to achieve the previously mentioned "reasonably priced" criteria for network services, it is essential that the local metro network be open to competition in both voice (local and long distance) and data services
- It is expected that all of the previously mentioned network services would be professionally managed by properly trained network professionals in order to assure the expected levels of reliability

World Class Expectations of a Pervasively Connected Community

At a high level, people living and working in a pervasively connected community can reasonably expect to connect to anywhere from anywhere for transmission of data, voice, and or video. Obviously such expectations must be tempered by the limitations of currently available technology, but the vision of a pervasively connected community must remain as a driver for the achievement of "world class" status in telecommunications infrastructure deployment.

Specific expectations would include:

- High-speed network access from all local hotel rooms, convention centers, and public areas. Such standardized network access should become an expectation of local hotels wishing to participate in a coordinated "Pervasively Connected Community" effort in order to better serve the anticipated increase in networking professionals traveling to the area for business with newly established information technology companies.
- Visitors to the Columbus area should be able to easily buy and access network (Internet) connectivity from a variety of locales including the Visitor's Center, library, shopping malls, kiosks, and cafes.
- Residents of the Columbus/Bartholomew County area should be able to access broadband network services that are reliable and affordable. Specific targets

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should be set for penetration of such services. In InfoComm Systems' opinion, in order to deserve the label of "Pervasively Connected Community", broadband services should be available (although not necessarily purchased) for at least 90% of residences. Such services should be affordable, reliable, quickly installed, and serviced by excellent, knowledgeable customer service representatives. These goals will only be reached if the community drives these expectations of the local service providers and creates a competitive environment that provides incentives to these service providers to meet these levels of service penetration.

- Finally, the pervasively connected community itself must demonstrate effective and innovative use of these network services. City/county government, social service agencies, local businesses and media outlets must all collaborate to create an easy to use and powerful network-based presence for business-to-business and business to consumer transactions. The power of the network and associated information technology must be leveraged to allow all participants of the pervasively connected community to work smarter, not harder.

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Current State

The purpose of the current state section is to document the current initiatives and infrastructure of those interviewed in order to identify all possible assets for a Columbus connected community model. This information is highlighted in the following sections entitled *Situation Analysis* and *Asset Identification*.

Situation Analysis

A situation analysis focuses on the current state of all interviewed constituencies. The documentation that follows is based upon information obtained throughout the interview process. Current state does not imply telecommunications solely; all current state information pertinent to this project is presented below.

Business/Industrial

Telecommunications

Ameritech, the ILEC, sits on the throne of the telecommunications services provided in Columbus. All traffic, both data and phone, traverse a link back to Ameritech's CO before being switched out of town. Several CLEC operations have started in town, each co-locating in the Ameritech facility. This has proven to be an unsuccessful business plan as the only current CLEC still operational in Columbus is Choice One. Several CLEC operations commented that co-locating with Ameritech is no longer a sustainable option. Choice One is content to continue co-locating in the Ameritech CO offering their services to business customers.

There are several different options for Internet service in the greater Columbus area. For a simplified matrix of connectivity options within the Columbus area available to the community at the time this report was written, please consult *Appendix A: Columbus Connectivity Options*. Ameritech and TLS offer xDSL services to residents and businesses within 15,000 – 18,000 cable feet of Ameritech's CO. Choice One offers xDSL services to businesses within this range with no intent of extending the offering to residents. T-1 service is available from Ameritech for about $1200 per month and a 60 – 90 day wait for installation. Finally, SEI Data also offers T-1 access. This offering includes both full and fractional T-1 service.

Residential cable modem is available from Insight Communications; however, the quality of the network is unclear at this time. Cable modems are shared access meaning that the more users there are per node, the more congestion will be evident. Insight has not started marketing the cable modems so many people are unaware that they are available.

Satellite services are currently offered from REMC and Jim Gordon. The initial cost of satellite service is $200 for installation and $799 for the equipment. This is followed by a $49.95 per month charge for symmetrical speeds around 200 Kbps.

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Wireless access is available from TLS. The startup cost for wireless service is between $799 and up for business users and $499 for residential users. Following this up front cost is a $49.95 per month charge for symmetrical speeds up to 500 Kbps.

Utilities

The utility companies that were interviewed are actively becoming a part of the telecommunications world. Cinergy PSI, Insight, and REMC are pursuing side ventures in the telecommunications business. Currently, Cinergy is providing dark fiber services to many large clients through their subsidiary, Kentucky Data Link (KDL). Currently, KDL has not pursued clients in the Columbus area even though the Cinergy site in Columbus is a major node on their statewide network. The local Cinergy office is served out of the Plainfield office, which serves as the ISP and main hub on their network.

Insight currently offers CATV and cable modem access. They have begun rolling out cable modems, with availability leveled at approximately 90% of all homes passed with cable infrastructure. Insight is looking to increase cable modem users and to also offer phone services over cable in the Columbus area.

REMC is much more highly involved in the local telecommunications market. REMC currently provides dial-up, point-to-point T-1, and two-way satellite access. Aside from this, the REMC basement is a POP for themselves and IQuest.

Large Businesses

Large businesses in the area are fairly well served by the current telecommunications infrastructure provided locally by Ameritech.

ArvinMeritor expressed their current state in terms of risk as they are getting ready to put their national data center in Columbus; their intentions are to eventually make it their global data center. Any data center requires diverse paths and quick restoration whenever service is lost on one of the links. Currently, Ameritech does support diverse paths back to the CO, as ArvinMeritor's offices sit on a dual path SONET infrastructure. However, Arvin has expressed concern in the fact that both paths on the SONET infrastructure terminate at the Ameritech CO before switching to Cable and Wireless's national backbone. The Ameritech CO represents a major vulnerability to the IT staff at Arvin.

Cummins currently serves part of its global infrastructure through operations in Columbus. All Notes email servers are located in Columbus as well as 8,000 – 9,000 employees. The email servers and employees are serviced electronically by 36 strands of Ameritech fiber running Gigabit Ethernet and 12 Ameritech Fast Ethernet links. Ironically, Cummins pays Ameritech for FDDI services on the private fiber; however, they are running Gigabit Ethernet.

Irwin Financial represents the most centralized computing environment of all the large businesses interviewed, thus telecommunications infrastructure is highly depended upon. All IT services are run from the Columbus office including Citrix thin clients, dial tone,

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and VPN connections between offices. Currently Irwin relies upon point-to-point T-1s between offices even though Frame Relay is more desirable.

The other large businesses interviewed particularly NTN and TIEM, have T-1s running through the Ameritech CO and then out to national corporate networks.

Small Businesses

Small businesses in the area are served by a variety of telecommunications vendors, however, because of size most are limited in service selection and these are often very expensive.

The CEDC represents the voice of small businesses starting up in the Columbus area. They provide business development services ranging from office space to telecommunications services. As a consolidated office environment for small businesses the CEDC brokers bandwidth from a broadband link. Currently the link is provided from TLS in the form of point-to-point wireless. There are currently no other broadband service offerings in the CEDC area near the airport. As Columbus becomes more of a high tech community it is expected that many start-up businesses will require larger and larger amounts of bandwidth from the CEDC.

A generalization can be made about the other small businesses interviewed because all have similar current states. Services are being provided via Choice One xDSL for businesses within the allowed distance, TLS wireless, and Ameritech ISDN and T-1.

Government

City/County

The City of Columbus and Bartholomew County have been very progressive in the development of governmental telecommunications infrastructure. The first step taken by the two entities was to build a downtown telecommunications infrastructure connecting the GOB – main county office building, County Jail, County Courthouse, and Court Services Building. The infrastructure consists of 12 strands of private fiber. The county has leased Ameritech fiber from City Hall to Youth Service Center which includes the Youth Service Center, County Annex Building, Highway Department, and the 911 Dispatch Center. The city also has portions of their infrastructure leased from Ameritech. The portion linking the city and county is part of the joint venture between the two.

Chamber of Commerce

The Chamber of Commerce represents the voice of many community businesses. Particularly, the chamber represents a collective voice for many of the smaller businesses, as smaller voices are not heard independently. According to the chamber, small businesses are currently being served by a number of telecommunications vendors. Telecommunications is at the heart of the issues concerning the Chamber of Commerce and the businesses it represents.

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Connected Community Partnership

The CCP is currently utilizing different telecommunications solutions to provide access to homes participating in the Home-School program. A combination of dial-up and cable modem access is used to provide Internet connectivity to those participating in the program. The CCP is presently looking into all Internet access technologies in order to maximize the bandwidth per cost of the selected technology. Ultimately, one goal of the CCP is to provide broadband access to the homes of all children in the community.

Economic Development Board

The Economic Development Board of Columbus is currently in the process of recruiting high tech industries to the area. It is the feeling of the board that as Columbus progresses high tech service industries will be crucial to support other industry and to also spur growth in new sectors. The board is not currently a major user of telecommunications in a physical sense; however, it is the subject of a significant part of their recruiting efforts.

Education

Bartholomew Consolidated School Corporation / Flatrock Hawcreek

The school corporations in Bartholomew County currently utilize telecommunications in a number of ways. Vision Athena and Ameritech provide the content and infrastructure for video conferencing initiatives. Video conferencing is utilized for Distance Learning and IHETS. The TV lab at Columbus East is utilized for broadcast over local cable channel 3.

The telecommunications infrastructure of BCSC consists of twenty buildings. Fifteen of these are served by leased point-to-point T-1s from Ameritech. Each of these T-1s links the remote schools back to the NOC in the basement of the middle school. The five other buildings are located on the same campus and are served by private fiber. A map of this infrastructure is shown below in Figure 1 of *Appendix B – Additional Network Diagrams*.

The telecommunications infrastructure of Flatrock Hawcreek is much more limited. The buildings located on the campus are connected. Hope Elementary and Hauser Elementary are connected by private fiber. Cross Cliff Elementary is connected back to the campus via dialup access.

Columbus Learning Center

The Columbus Learning Center is currently under construction and no information on specific telecommunications infrastructure was available.

Higher Education

The higher education telecommunications usage in Columbus is focused around the all encompassing umbrella of distance learning and the need to communicate back to the Indiana, Purdue, and Ivy Tech main campuses. IHETS and ITN are the major providers

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for distance learning videoconferencing. IHETS provides the one-way video while ITN provides the two-way audio. The Ivy Tech statewide two-way video network is also administered by IHETS. There is also a PolyComm videoconferencing unit with a direct T-1 linked to Purdue's West Lafayette campus from Columbus. Among the videoconferencing users, Ivy Tech provides the largest offering of distance learning classes. There are currently 14 courses with 200+ students.

The infrastructure supporting the links back to each of the main campuses differs by institution. ITN supports the majority of the higher education users in the state. Utilizing Genuity fiber, illustrated in figure 2 of *Appendix B – Additional Network Diagrams*, the ITN provides Internet services to IUPUC via the IUPUI campus. Ivy Tech utilizes private T-1 access.

Library

The library serves as the central Internet access point for many people in the community. They offer free Internet access and computer help to those new to computers or those without computers at home. In many ways the library is the community service center for technology. The infrastructure providing this Internet access is the connection to the Indiana IHETS backbone. This access is through a T-1 administered and partially paid for by IHETS.

Social Service

211 / United Way

The 211 initiative of Columbus utilizes telecommunications and information storage to provide a valuable service to the community. When dialed, 211 will direct the caller to an operator in the 211 office. The purpose of the office is to provide insight into all social service organizations and information regarding how to get help for a number of social issues and problems. In order to provide this service the 211 uses database storage of social service information. Currently, this information is just collected for the Columbus area; however, future trends show that the 211 database will eventually be shared statewide.

The United Way is spearheading the move of most Columbus social service organizations to the old Arvin building. This will centralize all social services as well as centralize the telecommunications and technology needs of each of these organizations.

Columbus Area Arts Council

The Columbus Area Arts Council is currently utilizing telecommunications infrastructure to host a web site. Telecommunications advantages are still unclear to the council, although the insight and vision of those interviewed will surely reflect in an increasing interest in telecommunications.

Columbus Regional Hospital

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CRH is currently involved in numerous telecommunications initiatives. CRH is connected to the hospital in Bloomington via an OC-12 SONET link for a Southern Indiana Clinical Labs joint venture. CRH also has a DS-3 link to the Ameritech CO, which provides T-1 connectivity to all remote offices and a T-1 connection to the Internet.

Residential

Residential information was collected from all interviewees. This information was consistent among all those interviewed. Currently, the majority of residents are using dial-up modems as their primary technology for Internet access. As cable modems are becoming more popular with increased penetration many residents are switching to this broadband alternative. xDSL and wireless access are utilized by the smallest population of Internet users.

Asset Identification

This section details all elements of the Columbus community that could be leveraged as assets in this connected community project. Some assets leverage tangible elements such as fiber and workforce, while other leverage intangible assets such as services or pseudo-political responsibilities. Nevertheless, it will take a combination of most every element listed to successfully create a "world class" telecommunications infrastructure.

Ameritech Infrastructure

The ability to lease expensive to build links is a major asset for the city and this project. Ameritech's infrastructure is vast, thus utilization of their infrastructure in appropriate cases can save large sums of money in either permanent or temporary situations.

Bartholomew-Columbus Telecommunications Commission

The Bartholomew/Columbus Telecommunications Commission (BCTC), by virtue of its original charter, is an asset to the creation of any telecommunications initiatives within the city of Columbus. The BCTC represents the telecommunications voices of the community and the government through city and county appointees residing on the commission. Although the original focus has shifted more to governing the CATV franchise, the following refocusing suggestions by the mayor renew the possibility of the BCTC playing a major role in any telecommunications initiative:

- Follow best practices from a community committee perspective
- Find new, creative revenue streams

Along with these comments from the mayor, the BCTC is currently working on a rights-of-way document to further aid the city's telecommunications future and also to create new revenue streams.

Cable Television System

Residential access is by far the most expensive and difficult service to provision for any Internet service provider or CLEC. Currently, however, Insight Communications is providing cable modem access to the majority of the residents of Columbus. These cable

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modem offerings serve as an asset to the city as it will allow all residents to have broadband access to any infrastructure initiative put forth by the city.

Cinergy/REMC Utility Poles

In planning infrastructure expansion an important aspect to consider is how the infrastructure will reach more and more businesses and residents. If wireless is chosen towers are purchased and their locations are heavily engineered. In a wired environment, one of two options is decided upon, buried or aerial. If the latter is chosen then utility poles are needed in order to string the wire from location A to location B.

An asset to this project and to the city of Columbus is that the majority of the county already has existing utility poles either owned by Cinergy or REMC. These poles represent an asset because of the fact that leasing space on these poles is much less expensive than buying and installing new poles altogether.

City/County Entrepreneurial Attitude

One of the most important pieces of information obtained during requirements interviews is the attitude of all constituencies regarding the project. In the case of this project and the city of Columbus it is the opinion of InfoComm engineers that the support voiced collectively by constituencies is exceptionally strong. This is a crucial asset to any initiative, as it will provide support for the decisions of those governing such a project.

City/County Fiber

Much like the I-Net above, the City/County fiber infrastructure provides another fully functional asset for any city/county initiatives. Once again this piece of infrastructure should be utilized for the specific purpose it was built, however, adding additional governmental and city operations to those already connected may prove to be highly valuable.

City Land/Potential Buildings for Co-Location POP

Something to consider when contemplating a project like the one underway in Columbus is the need for buildings and/or land to place city and other company equipment in. Any city owned lands or buildings qualify as assets for this purpose. Also, during requirements interviews it became obvious to InfoComm that many of the constituencies are more than willing to lend space within their respective buildings for such a purpose.

CLEC Operations

There are currently several CLEC operations within and around the Columbus area serving as major assets to any future telecommunications initiatives. Interviews were conducted with Enhanced Telecommunications Corporation (formerly Sunman), Hancock Telecom, and SEI Data. Each of the three companies is waiting for the right moment to make the move to Columbus. All three mentioned a willingness to partner with key players (e.g. the community) to increase competition in Columbus.

Hancock Telecom is a CLEC licensed telephone company and ISP located in Southeastern Indiana with a state of the art network and switching facility. They run a

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multiple node SONET ring with the potential to provide dial tone access from their tandem switch on the Northeast side of Indianapolis. This location is ideal as they have local dial tone access to the PSTN in Indianapolis. They currently offer advanced dialing features and multiple Internet services to their customers including: Centrex, T-1, Dial-up, and xDSL.

SEI Data is a CLEC licensed telephone company and ISP located in Southeastern Indiana with POPs in 12 counties including Bartholomew. They currently have a DS-3 to their offices located in Columbus with the ability to offer T-1 and fractional T-1 services to business customers in Columbus. SEI's network consists of an OC-12 redundant backbone connected by 100% privately owned fiber. The CLEC philosophy of SEI is to overbuild and backhaul all traffic to their switch in Dillsboro so that interaction with the ILEC is unnecessary.

Aside from the two previously mentioned CLECs, there are several other companies either in or entering the CLEC competition space. Sunman, now known as ETC (Enhanced Telecommunications Corporation), is a CLEC licensed company located in Southeastern Indiana with offerings including: Local telephone, Long distance, Cable TV, Internet access, as well as the LMDS. The LMDS license is by far the most important asset of ETC as it is the broadband wireless technology used to deliver voice, data, Internet, and video services in the 25-GHz and higher spectrum (depending on licensing) at speeds above Gigabit per second (once again depending on licensing and network engineering).

Another company mentioned in the area is McLeod USA. There is not a lot of information available regarding their intentions in the area, however, NTN uses McLeod for long distance and Mike Jamerson is familiar with other McLeod offerings in the area.

In interviews with IQuest of Indianapolis it was made known that IQuest will also offer phone and Internet services in the area sometime in the future. The same is true for the local cable company Insight Communications. Choice One currently offers business broadband Internet access via Ameritech's existing infrastructure.

Connected Community Partnership

The Connected Community Partnership (CCP) represents a major asset to the city of Columbus as it is made up of empowered, highly motivated volunteers with great technological insight. The CCP has proven their ability to create, plan, procure funding, and execute community wide technology initiatives with their Home-School program. Beyond Home-School, the following mission statements of the CCP align perfectly with creating a "world class" telecommunications and technology environment:

- Enhance economic development by devising strategies to attract professionals and information technology companies to the area
- Build technological capacity in individuals
- Promote a better environment through the reuse and recycling of technological resources

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Genuity Fiber

Much the same as the MetroXmit fiber, Genuity has fiber many places throughout the state. This can be seen in Figure 2 of *Appendix B – Additional Network Diagrams*. Genuity's infrastructure may be seen as an asset because of its potential to allow Columbus to link with other metropolitan areas via paths other than those followed by Ameritech.

Indiana Telecommunications Network

The exact potential of a relationship with the Indiana Telecommunications Network (ITN) or Intelenet, is uncertain at this time. However, the ITN can be considered an asset as their goal is to provide reduced cost Internet bandwidth for non-profit commercial and governmental agencies.

I-Net

The Institutional Network (I-Net) is a hybrid fiber/coax network comprised of approximately 13 locations around the city all connected together and then back to Insight Communications. The BCTC has been given sole authority over the I-Net although Insight will continue to monitor and maintain the network.

The I-Net represents a major asset to the city and this project as it can be used as the foundation for any future infrastructure initiatives. Considering the fact that it is owned and maintained by Insight, it makes the most sense to rely upon the I-Net as a non-commercial section of any community initiative allowing low cost connectivity to those institutions who qualify.

Inter Exchange Carriers

Several Inter Exchange Carriers (IXC) currently offer services in the Columbus area. They provide the links out of town connecting Columbus with many other cities in the Midwest and across the nation. The introduction of new IXCs will not only promote additional competition but will also introduce new routes out of town. Both of these effects should lower costs to customers as well as increase the redundancy of the telecommunications infrastructure in Columbus.

Large Business Support

During the interview process many large businesses in the Columbus area were very excited about the project. ArvinMeritor expressed interest in the project due to the variety of options it may provide to Arvin's data center currently under construction. It has since been learned that Arvin will be supported by Ameritech in their data efforts, however, it is the opinion of InfoComm that Arvin will still be interested in the backup and alternative path support the project could bring to Columbus.

Cummins Diesel is also interested in the prospects of the project. Cummins has the desire to have the ability to purchase/ lease dark fiber in order to connect several of their sites within Columbus and Seymour.

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Learning Center

If the Learning Center project goes as planned it could prove to be a huge asset to community access and training initiatives. Providing a location for public access to the Internet and also to the Columbus network is essential for such a project as not all residents are fortunate enough to have such access to technology. Along with this, those unfamiliar with computers and working in a networked environment will need a location to attend proper training classes. The Learning Center is the prime candidate for providing both of these community services.

MetroXmit Fiber

As it is in any major telecommunications environment, connectivity back to major metropolitan areas is crucial. In the instance of this project and the position of the city of Columbus, those metropolitan areas include Indianapolis, Louisville, and Cincinnati.

A potential asset that could provide this connectivity is the fiber infrastructure of MetroXmit. Metro fiber runs through the downtown area of Columbus currently terminating at their hut on 7th St. By tapping into this infrastructure the city of Columbus would have the ability to connect to one or all of these major metropolitan locations.

CommTech Study

CommTech conducted a study highlighting the telecommunications details of several business and government sites within Columbus. This information includes the locations of many of the constituencies in the Columbus area. This information as well as the rest of the study will be very helpful when engineering and constructing infrastructure.

TLS Wireless

One characteristic of a "world class" telecommunications infrastructure is to not only provide high speed wired access but to also provide high speed wireless access. This access will provide alternatives to those without wired service offerings as well as a good back-up should the wired infrastructure go down.

The Total Logic Solutions (TLS) wireless infrastructure serves as the asset providing these additional "world class" services to the city of Columbus. *Figure 3 in Appendix B – Additional Network Diagrams* shows the existing TLS wireless infrastructure. As can be seen the service is fairly extensive with service offered anywhere line of sight can be obtained within a 15-mile radius of any location designated with an "A".

Towns with similar interest

InfoComm Systems has or will work with several of the communities in the Southeastern section of Indiana. Based upon initial responses, many of these communities are interested in similar ventures. Opportunities could surface as communities look to connect together and share resources.

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Desired State

The desired state for any given constituent can be categorized as a description of wants, needs, and/or dreams for future telecommunications related initiatives. This section explores the representative desired state for each interviewed constituent and paints a picture of what a connected community network might look like from inside looking out.

Summarized Requirements

After completing the Network Requirements Discovery portion of MetroMorphosis™, InfoComm network engineers categorized each of the almost 40 interviewed constituencies into one of the following five categories:

- Business/Industrial
- Government
- Education
- Social Services
- Residential

Categorizing each of these constituencies allowed InfoComm Engineers to focus on the representative needs of each specific group. The collective data for each group was then carefully analyzed and formulated into statements that accurately portrayed the requirements for that group's desired state.

The data collected from the Network Requirements Discovery portion of MetroMorphosis™ is available for review in *Appendix C – Network Requirements Discovery* of this document.

Business/Industrial

This category is composed of the following business entities listed below. This list is representative of both large and small business and was created through recommendations from the Columbus Economic Development Board and other key constituencies.

- Ameritech
- Approved First Mortgage
- ArvinMeritor
- Choice One
- Cinergy
- Columbus Area Arts Council
- Columbus Area Economic Development Board
- Columbus Enterprise Development Corporation
- Columbus Municipal Airport
- Cummins
- Enhanced Telecommunications Corporation
- InfoTech Park
- Insight Communications
- IQuest
- Irwin Financial
- Jim Gordon
- John Hackett (venture capitalist)
- MetroXmit
- NTN Drive shaft
- REMC
- SEI Communications

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- TATA Consultancy Services
- The Republic
- Total Logic Solutions
- Toyota – TIEM

There were four conclusions drawn from the data collected within this Business/Industrial category. The following statements summarize the needs of this group:

1. Share information between sites over private medium: Many companies require the ability to transmit information between key business sites within their metropolitan area. This network infrastructure must be both private and secure to facilitate the transfer of proprietary company data.

2. Reduced cost for services between sites (data, video, voice): In addition to requiring a metropolitan private medium from which information can be shared, companies also demand competitive telecommunications rates from local providers for meeting their data, voice, and video needs.

3. Two-way videoconferencing between sites: Global and regional businesses organize distributed meetings in which their employees or key constituents are off-site or sometimes in another geographic location entirely. Two-way videoconferencing enables businesses to conduct their meetings, achieving the same results, independent of one employee's physical location by bring real-time video of the individual.

4. Infrastructure enabling business continuity planning: Large and small businesses alike require telecommunications infrastructure that can support business continuity in the event of a disaster. Businesses require multiple routes through multiple carriers to ensure that they have options for continuing business outside of the Columbus metropolitan area in the event of a disaster.

Government

This category is composed of the following Government agencies/entities/funded locations listed below. This list is a comprehensive representation of both city and county government and governing agencies within the Columbus/Bartholomew County area.

- BCTC
- Bartholomew-Columbus Planning Department
- CCP
- City Administrative
- County Administrative
- County Legislative
- Intelenet
- Library

There were three conclusions drawn from the data collected within this Government category. The following statements summarize the needs of this group:

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1. On-line communication between government agencies: It is necessary for various local city and county government agencies to communicate with one another on a daily basis. This information flow would be more effective and efficient if gathered and transmitted electronically using E-government web-based forms and procedures.

2. Ability to offer on-line services to the community: Citizens are interested in government and are always open for suggestions on how they can play a more integral part in local government. Local government must answer these needs with E-government information services that not only allow citizens to interact with their government in a more direct manner, but also support services such as online property tax payment, etc.

3. Collaboration among all government agencies: Future city and county joint ventures such as a local government data center, shared technical support structure, brokering bandwidth from city/county fiber network, and shared Internet connectivity would promote efficiency and communication within local government.

Education

This category is composed of the following education and learning establishments listed below. This list incorporates all facets of education from K-12 to the proposed Columbus Learning Center:

- BCSC
- Columbus Learning Center
- IUPUC
- Ivy Tech

There were five conclusions drawn from the data collected within this Education category. The following statements summarize the needs of this group:

1. Access to course curricula and materials from home – distance learning: All materials and services available on campus should be extended to students that reside in the virtual classroom. Books, assignments, labs, and research materials should be available to the student at home enabling this person to engage in all course-related activities.

2. Two-way videoconferencing - distance learning: Two-way videoconferencing is the key component in every distance learning curriculum. The real-time communication between the off-site student and classroom fortifies the distance learning experience by enabling the student to visually participate in the course.

3. Utilize institutional loop for inter-school (BCSC) connectivity: City owned infrastructure (hybrid fiber-coax) is currently in place to support the transmission of video between educational facilities in Bartholomew County. This

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infrastructure is underutilized and should incorporate voice, video, and data to enable these educational centers to provide state-of-the-art programs to their students and faculty.

4. Collaboration among education centers: Education centers could be more efficient if they would pool together resources such as Internet connectivity, inter-institution connectivity, data centers, servers, and technical support structures. Sharing resources could result in a cost savings for each educational center, as they would not have the sole burden of a large capital investment in both infrastructure and staff.

5. Support structure for advanced teaching methodologies: Underlying infrastructure has to be put in place to train teachers on the use of advanced telecommunications equipment in the classroom. Many teachers are afraid to incorporate such tools in the classroom because they lack the knowledge necessary to utilize them. A rewards system must also be put in place to encourage teachers to adopting state-of-the-art teaching methods in their classroom.

Social Services

This category is composed of the following social service organizations listed below. While this is not a comprehensive list of all social service offerings within Columbus and Bartholomew County, the needs of this list accurately represent the needs of all social service organizations throughout the community.

- United Way
- 211 Initiative
- Columbus Regional Hospital

There were two conclusions drawn from the data collected within this Social Services category. The following statements summarize the needs of this group:

1. Collaboration among all social service organizations: In this context, collaboration refers to the sharing of joint telecommunications assets. Based on the utilization levels of Internet bandwidth, network hardware, and servers, social service organizations have voiced the need to pool resources. By pooling resources, larger amounts of Internet bandwidth could be purchased and divided on an as needed basis among the organizations and servers could be shared enabling the organizations the ability to offer a broader range of services to their customers.

   In addition to the pooling of telecommunications hardware, shared technical support, as well as electronic customer records (within the limits of the law) and research would also enable the organizations to work more efficiently with one another promoting a better quality of service for the community.

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2. Community awareness of current social service offerings: The community can't take advantage of services that it doesn't know exist. Making social service offerings available in a more efficient manner over multiple media forms such as the web and public telephone will extend the reach of the helping arm of the community to the people that need it the most.

Residential

This category encompasses the collective telecommunications needs of all residents in the Columbus/Bartholomew County community. All constituents interviewed throughout this Networks Requirements Discovery portion of MetroMorphosis™, were asked, in addition to specific questions formulated for their professional or work related category, to wear there "residential hat" and speak to their telecommunications needs as a resident of the community.

While certain individuals interviewed were not residents of Columbus, they did live in communities directly affected by the city of Columbus and its telecommunications infrastructure (or lack there of). The following results are accurate and representative of the needs of the Columbus metropolitan area as a whole.

1. Telecommute from workplace: Members of management in many of the larger businesses interviewed in this section expressed the desire to have the option of working from home. If the telecommunications infrastructure were in place within the residential community, employees could conduct real-time videoconferences as well as have a high speed connection to their job site enabling them to conduct business from the comfort of their residence.

2. One bill for services: At one time one bill for voice, video, and data was a luxury for residents. But with rise in popularity of companies differentiating their market share by multiple service offerings, one bill service is becoming an expectation.

   Cable television, local and long distance telephone service, and a broadband services detailed separately on one monthly statement with one amount to be tendered to one service provider every billing cycle takes the confusion out shuffling multiple providers and multiple bills.

3. Knowledgeable, empowered, 24x7 support structure: Support services are arguably just as important as the service offering itself. Reliable customer/technical support is difficult to come by in the era of off-site, out of state, underpaid, and understaffed call centers. Residents demand knowledgeable customer/technical support that is qualified and able to make the decisions necessary to correct and eliminate a customer issue.

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4. Community portal: With the explosion of the Internet in the last 5-7 years, residents expect to find out key information and conduct business with their community on-line. Such activities could include accessing the following resources:

    - Restaurant guide
    - Local news/News paper
    - Community calendar/events schedule
    - Local weather
    - On-line government forms
    - Library resources
    - Access to community related education resources
    - Social services offerings
    - Local business guide
    - Community job posting service
    - Community forum

    A community portal should service as an on-line convenience store for information relevant to the lives of a community's residents; a one-stop-shop where a resident can have their finger on the pulse of Columbus by merely logging on to the Internet from anywhere in the world.

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Conceptual Designs

The requirements that comprised the desired state, detailed in the above section, were categorized into logical time frames that described when each could be realistically met. Once each requirement was fit into a time frame, the pieces were combined into a conceptual design. This conceptual design depicts a graphical illustration of what logical elements must be in place to meet the allotted technology goals (requirements) for the corresponding time frame. The following sections discuss three time frames:

- 0-2 Year Desired State
- 2-4 Year Desired State
- 4+ Year Vision Desired State

The introduction summarizes the requirements collected during Network Requirements Discovery in a concise bulleted list. This section is followed by a graphical representation of a conceptual design and a general description of its elements and meaning. Finally, this section concludes by discussing the characteristics and opportunities that are necessary to achieve the outcomes of the corresponding desired state.

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0-2 Year Desired State

Introduction

Client expectations for 0-2 year desired state include:

- Share information between business sites over private medium
- On-line communication between government agencies
- Utilize institutional loop for inter-school (BCSC) connectivity
- Community awareness of current social service offerings
- Community portal

Conceptual Design

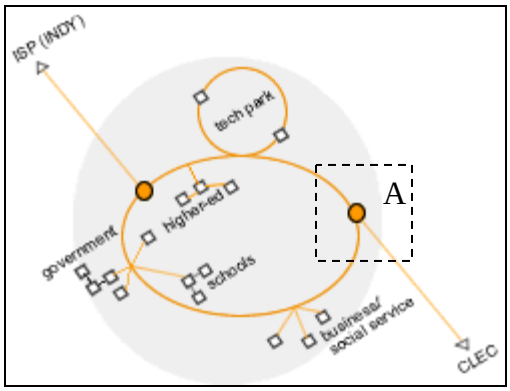

Figure 1 - 0-2 Year Conceptual Design

General Description

This conceptual design highlights the initial infrastructure builds necessary to meet the 0-2 year goals. The first noticeable element of this design is that there is a ring-based infrastructure built around the city of Columbus. This ring provides the building block for all other telecommunication initiatives and offerings. Although not detailed in this diagram, the most logical path for the ring will be engineered prior to implementation.

Co-location connection points along the ring allow the infrastructure to expand and serve as many constituencies as possible. There are two types of co-location points detailed in the diagram; the one denoted by an orange circle represents a co-location point where outside companies may connect to the infrastructure in order to offer services. Detailed information about this point can be read in the section entitled *Service Co-Location* below. The other co-location points denoted by other orange lines intersecting the ring represent points where the infrastructure extends outward offering connectivity to locations not directly on the ring.

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The number of infrastructure extension co-location points in the initial build cannot be determined in this conceptual diagram. All that can be determined is the type of entities gaining initial access. The exact constituencies along with the number of connections will be determined at a later time, however, it can be said with reasonable assurance that the schools (BCSC and higher-ed), connected government buildings, the Info Tech park, and some businesses will be on the list of initial connections. Educational institutions can be added to the network by simply connecting to existing infrastructure that currently provides intra-school connectivity for the BCSC campus (I-Net) and higher-ed facilities. The same goes for those government buildings that are currently connected. The other initial connections to the tech parks and to major businesses are a part of the initial build in order to start a revenue stream for the project.

Service Co-Location

The orange circle in the above conceptual diagram represents a service co-location point on the metropolitan ring. Service co-location can be defined as a single point where multiple companies may gain access to the infrastructure in order to provide services. Service offerings may include the following:

- Phone service
- Storage area networking
- Internet bandwidth
- Videoconferencing services
- Cable TV
- Wireless access
- Point-to-point connection

Figure 2 below represents a zoomed in image of a service co-location point denoted by the box with an A in the above conceptual diagram.

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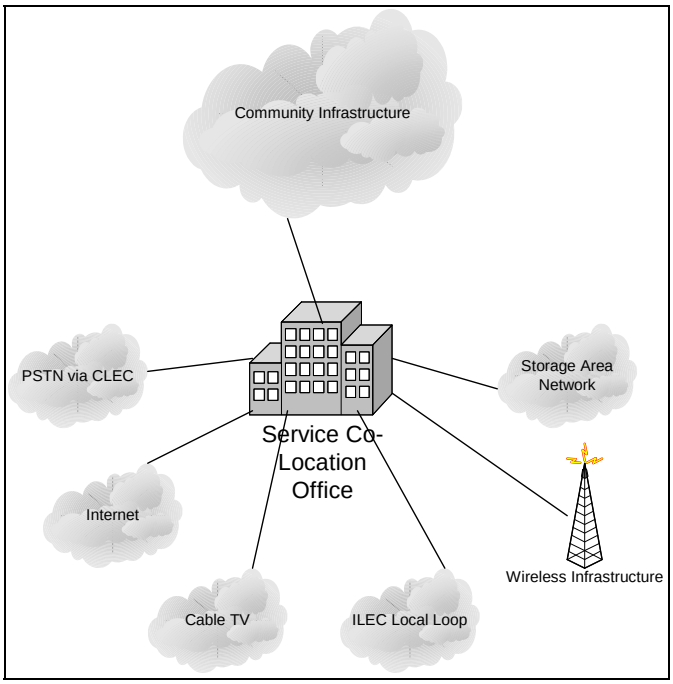

Figure 2 – Service Co-Location Point

Following are the major categories of opportunities that must be explored in order to achieve these key outcomes.

Characteristics & Opportunities

1. Engineer Metropolitan Optical Ring
    a. Formulate initial design
        i. Identify/Prioritize/Finalize potential customers
        ii. Formalize network route through town
        iii. Create initial design of potential multi-tier, redundant network
    b. Write Request for Proposal for equipment manufacturers
        i. Identify vendors/manufacturers to receive RFP
        ii. Send out RFP
        iii. Review proposals, Vendor interviews
        iv. Technology assessment/Vendor assessment
        v. Technology selection/Vendor selection
    c. Finalize optical architecture
        i. Determine/formalize taps/lateral runs to potential customers
        ii. Determine service co-location points on the ring
        iii. Finalize design of potential multi-tier, redundant network
    d. Construct co-location facilities
        i. Survey co-location sites
        ii. Approve building sites (CBPD)
        iii. Construct facilities
    e. Install fiber optic cable

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        i. Verify right of ways and/or pole space
        ii. Order fiber
        iii. Decide on contractor to install fiber
        iv. Formulate and formalize time tables/schedules
        v. Bury/hang fiber optic cable
        vi. Network maintenance agreements

2. Light the network
    a. Install/Implement Equipment
        i. Purchase equipment
        ii. Hire qualified staff for implementation and management
        iii. Configure and test equipment
        iv. Plan and exercise disaster recovery scenarios

3. Post-build Strategy
    a. Develop a growth plan
        i. Formalize growth plan
        ii. Set benchmarks for vendors and network growth
        iii. Set benchmarks for competition (evaluation)
    b. Public awareness (marketing)

4. Service offering
    a. Limited intra-community connectivity
    b. Alternative Internet Service Provider for community
    c. Alternative voice carrier for community
    d. Should see initial evidence of “world class” telecommunications infrastructure
        i. IT Oriented Companies
        ii. Pervasively Connected Community

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2-4 Year Desired State

Introduction

Client expectations for 2-4 year desired state include:

- Reduced cost for services between business sites (data, voice)
- Two-way videoconferencing between business sites
- Government able to offer on-line services to the community
- Two-way videoconferencing enabling distance learning
- Collaboration among education centers
- Collaboration among social service organizations
- Telecommute from workplace
- One bill for residential services (voice, video, data)

Conceptual Design

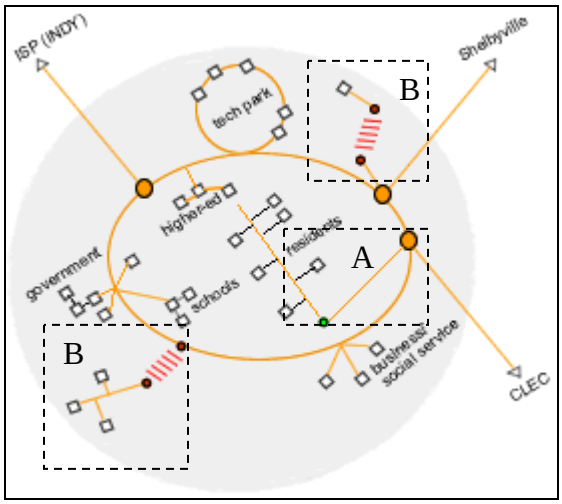

Figure 3 - 2-4 Year Conceptual Design

General Description

This conceptual diagram builds upon the initial infrastructure detailed in the 0-2 year conceptual diagram. The major changes in this diagram include the addition of residential users, a connection to another town, and wireless access for those outside the wired area.

Higher education access will be a crucial step in obtaining city wide academic connectivity. It may also aid in enticing other cities and entities into connecting with the city of Columbus.

Inter-town connectivity is also presented as a new element in the 2-4 year phase. In the conceptual diagram Shelbyville is used as an example. It should be noted that any town

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capable of supporting inter-town connectivity will be a potential candidate. Inter-town connectivity will be vital to collaboration and information sharing. It may also enable four digit dialing between towns as well as many other opportunities.

Residential access is a much more complicated decision and process requiring careful analysis of return on investment figures. The first decision will be whether to overbuild or provide telephone services over existing ILEC copper. The second decision will come to a head if the overbuild option is chosen. Someone will have to determine whether it makes sense for the city to do the build and own some of the edge equipment, or whether it makes the most sense for the city to solely own the infrastructure. The section *Residential Access* below details the equipment and infrastructure required for residential service in order to better answer the second question.

Wireless services will help extend the access out to the edge of the county as the wired network slowly makes its way out. In the conceptual diagram wireless access is shown as being provided by both the city and third party partners. At this time it is uncertain which entity will want to be responsible for the wireless services.

Residential Access

The green dot in the above conceptual diagram represents the edge device responsible for providing advanced service offerings to residential areas. This device may be a number of things, but at the present time it is either a next generation Digital Loop Carrier (NG-DLC) or a number of electronics making up a Passive Optical Network (PON). Both technologies trunk multiple service lines onto a single fiber connection back to a co-location point. As each technology is enhanced the line separating them will slowly fade away until each technology provides the same set of service offerings at the same speed. However, in the instance of this report PON technology will be the focus.

Figure 4 below represents a zoomed in image of the box denoted with an A in the above conceptual diagram. In this figure PON services and equipment are detailed clearly depicting the decision the city will have to make regarding the ownership of the infrastructure and the equipment.

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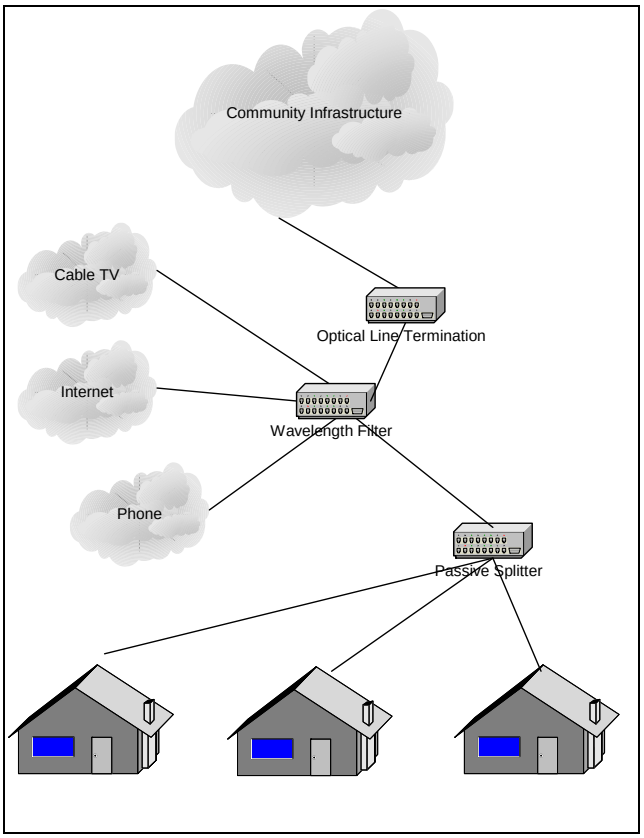

Figure 4 – PON

As can be seen in the above figure, the Optical Line Terminator and the Wavelength Filter can be located in either a service co-location point or in an extension co-location point. The exact location is determined by the ownership of the equipment and the infrastructure extending services to the residents.

Wireless Access

The red dashes in the above conceptual diagram represent wireless access for those outside the reach of the wired environment. Wireless access can be obtained in many different ways, however, InfoComm engineers feel that LMDS (Local Multipoint Distribution System) will continue to advance and become the wireless broadband methodology of choice. Figure 5 below represents a zoomed in image of the boxes denoted with a B in the above conceptual diagram. In this figure LMDS network services and equipment are detailed.

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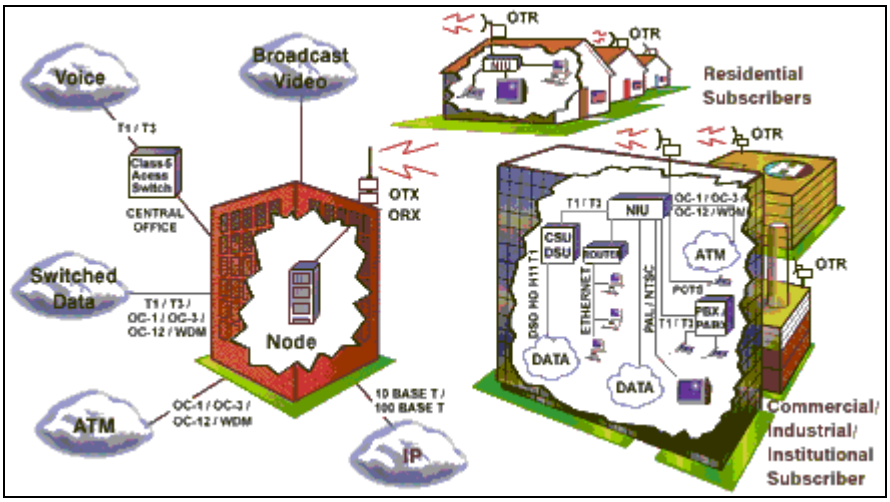

Figure 5 – LMDS Service and Equipment

The "Node" denoted in the red box represents the location from which the LMDS signal is generated. The "Node" is connected to many different wired services, which it then offers to LMDS subscribers via wireless antennae links. The service area is much like that of a cell for mobile phone service. Line-of-site must be available; however, it is acceptable within all 360 degrees around the generating antennae. LMDS systems are very flexible depending upon the modulation and architecture serving customers with speeds up to and above 1 Gbps.

Following are the major categories of opportunities that must be explored in order to achieve these key outcomes.

Characteristics & Opportunities

1. Physical network expansion from Columbus outward
    a. Local (City, County)
        i. Additional fiber
        ii. LMDS
        iii. Microwave
        iv. PONs
    b. Neighboring communities
        i. Network
        ii. Fiber
        iii. Microwave
        iv. PONs

2. Network service expansion
    a. Local
        i. Increased residential connectedness
        ii. Increased business connectedness
        iii. Internet kiosks

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iv. Should meet nearly all “world class” telecommunications infrastructure expectations
    1. *IT Oriented Companies*
    2. *Pervasively Connected Community*
v. Community learning center

b. Neighboring communities
    i. Local dial tone (test)
    ii. Off-site backups/Hot site
    iii. School to school connectivity
    iv. Transparent LANs

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4+ Year Vision Desired State

Introduction

Client expectations for 4+ year vision desired state include:

- Infrastructure enabling business continuity planning
- Collaboration among all government agencies
- Access to course curricula and materials from home – distance learning
- Support structure for advanced teaching methodologies
- Knowledgeable, empowered, 24x7 technical support structure for residents

Conceptual Design

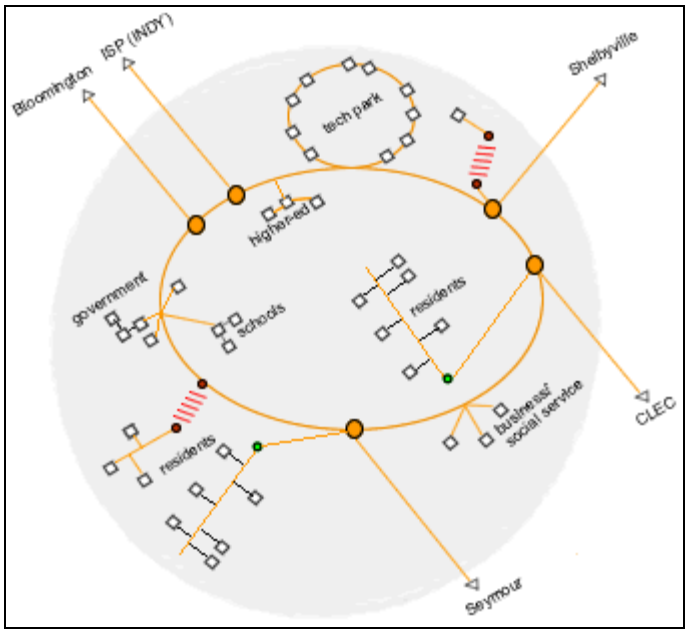

Figure 6 - 4+ Year Conceptual Design

General Description

This conceptual diagram builds upon the initial infrastructure detailed in the 0-2 year and the conceptual diagram detailed in the 2-4 year. There are no major changes in this diagram; the conceptual design simply depicts the addition of more of the same services offered before. This includes the addition of more towns, more residential access, more businesses, and an expansion of the tech parks

Following are the major categories of opportunities that must be explored in order to achieve these key outcomes.

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Characteristics & Opportunities

1. Continue physical network expansion
    a. Provide connectivity for outlying areas of Bartholomew County

2. Network service expansion
    a. Local
        i. 100% intra-community connectivity
        ii. Storage Area Network and hot site capabilities
        iii. Broadcast video over network
        iv. Virtual offices for teachers
        v. Interactive distance learning
        vi. Community data center
        vii. All "world class" telecommunications infrastructure expectations should be met and revamped
            1. *IT Oriented Companies*
            2. *Pervasively Connected Community*
    b. Neighboring communities
        i. Local dial tone
        ii. 4 digit inter-city for businesses
        iii. Hotline functionality between cities
            1. Police Department
            2. Hospital
            3. Fire Department
        iv. City-to-city Communication with other hospitals

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Business Model Elements

The purpose of this section is to highlight the business model elements that require consideration in order to achieve the technological goals described in the *Desired State* section of this document. In order to meet the desired state requirements of those interviewed during this phase, the Steering Committee must make several key decisions. The decisions are business-oriented in nature and will help to define the organizational structure created by the Steering Committee.

The following section first identifies all business elements related to this project. The elements are listed with a brief description as well as any information pertaining to the element gathered during previous phases of the project. The section is concluded with the *Business Model Preparation* section highlighting the logical progression for making the identified decisions regarding the business model elements.

Purpose

Every organization is formed for a specific purpose and this section covers the reason for the organization's existence and the way that it developed. There are several elements of purpose that will help better define the reasons for the creation of the organization as well as what the organization intends to do. These elements include a mission statement, a vision, and a unified set of goals.

The elements associated with purpose are crucial in defining the focus of any organization created by the Steering Committee. Having focus will help establish a set of objectives and goals describing precisely why the organization was created and what it is hoping to provide and eventually become.

During the meeting on April 1st the Steering Committee came to the decision that one goal is to promote open competition among service providers in all areas of telecommunications.

Structure

Defining the structure elements of the organization is not as cut and dry as some of the other business elements. The Governance Board can be formed without a great deal of additional information, however, defining the Governance Model requires information pertaining to many other business elements.

Governance Board

The governance board is created to manage all identified assets of the project and ensure that the focus and goals of the project/organization are achieved. This board of individuals represents all facets of the community, encompassing business (small and large), social service, education, and political sectors of the community.

The Steering Committee for this project has yet to define the governance board. This is a crucial step as the governance board can be seen as the board of directors of a company.

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When the board is decided upon the organization is established with the task of accomplishing the unified set of goals defined in the purpose. It is the job of the governance board to make the educated decisions that define all elements of the organization.

There are several options to consider when deciding how the governance board should be created and who should sit on it. In Columbus, the existence of the BCTC should be considered a major asset. However, it is uncertain at this time whether the BCTC charter will allow for expansion/redefinition of purpose into the telecommunications realm. Other options for governance board creation include:

Governance by an existing non-profit agency

It is strongly recommended that the agency establish a sub-committee of its existing board or a separate advisory group, similar in membership to that of the Steering Committee.

Governance by the community

Here, the Steering Committee develops organizational documents (such as articles of incorporation, bylaws, and mission statement) that are required for the establishment of a nonprofit entity that is tax-exempt according to section 501(c)(3) of the Internal Revenue Code. This entity would then be governed by an elected board of directors (constituted similarly to the Steering Committee).

Part of City Utilities

Here the project/organization is rolled up under existing city utilities. There are many other options for governance board creation that have not been mentioned here. All should be explored and weighed in order to determine the best situation for the project/organization. It should be stressed heavily here that the specifics of the governance board will limit/expand the types of governance models and funding options that are available to the project/organization.

Governance Model

The governance model forms the rules, policies, and regulations of the organization. Depending upon the strategic location of the governance board, governance opportunities may or may not exist.

An example of this would be the leveraging of the city rights-of-way ordinance. If the governance board is strategically positioned as a city organization the rights-of-way asset may be leveraged in order to have some control over other telecommunications initiatives within the city.

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There are several other purposes of the rules, policies, and regulations that form the governance model. These guidelines set forth parameters for engagement that include service level and usage agreements, as well as equipment and service prerequisites. They also determine partnership responsibilities.

In order to finalize the policies making up the governance model, most details of the business model must be solidly defined. Combining both the governance board and the finalized governance model will provide an overall view of the organization's structure. Thus far in the project, the Steering Committee has successfully narrowed the focus of the governance model to the encouragement of competition among service providers in the Columbus area. See *Appendix D – Organizational Structure* for more details.

Enablers

The desire to create an organization is often amplified with the addition of enabler elements. These elements are those details helping the organization get a "foot in the door". Without these elements, entry into the market may not be prosperous or even recommended. The potential value of the following enabler elements must be investigated, analyzed, and leveraged.

Assets

This element identifies all of the potential assets available to the organization and then quantifies the potential value of each. Potential assets have been identified in the *Asset Identification* portion of the *Current State* section of this document; these assets have also been verified. In order to evaluate the potential value, each of these assets must still be compared to the goals of the project/organization.

Financing

The financing element is very important to the continuation and success of the organization. First, the potential funding options are identified. There are a number of capital funding options that are characterized by governance decisions described above and also by the funding mechanisms employed. Some examples of possible financing options are described below.

<u>Municipal Bonds</u>

Municipal bonds would have to be sold in the open financial market and would require a financial underwriter to assume the capital risk. The interest rates would need to be competitive with comparable municipal investment instruments. The development of a bond issue requires voter approval. The financial offering would need to comply with regulations of the Security and Exchange Commission. The disclosure would have to demonstrate appropriate financial return and revenue projections. The process is time-consuming and politically risky.

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Tax Assessment District

A tax assessment district could be established to pay off the bonds. A tax assessment to support the funding of a telecommunications network venture is feasible if this approach is deemed to be politically viable.

General Fund

Both low interest loans and appropriations funded from the General Fund would have to compete for priority with other projects to obtain access to limited funding resources. A business plan would be needed to demonstrate appropriate financial payback and revenue stream.

Funds from Infrastructure Lease

This mechanism could provide ongoing resources for system operation and maintenance, but by itself would not provide sufficient capital outlay necessary to develop and deploy any system.

City Loan Guarantee

A City loan guarantee would, by necessity, carry a higher interest rate than the low-cost loans discussed earlier, but would not require any City outlay of funds (unless the borrower defaults on the loan payments).

Stock Issue

A stock issue would not require any interest to be paid, but would divert a portion of revenue to pay stockholder dividends, if deemed feasible. A stock issue would also require compliance with Security and Exchange Commission provisions.

Third Party Investors

Privately raised funds could contribute to system development.

Combinations of Funding Options

Appropriate combinations of funding options can be configured that provide complementary advantages, while alleviating disadvantages associated with individual options.

Following the identification of all funding options, it is important to establish an estimate of the funding potential of the project. This will help identify the scale and partnership requirements of any build.

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Once the funding potential has been established, it is essential that the organization engage vendors in order to establish differing costs of implementation. Following the establishment of implementation costs, potential return on investment information must be extracted from a market analysis in order to verify the profitability of any investments. This information will be useful when determining which implementation strategy will be the most profitable.

Influences

Influences may constrain what the organization can accomplish, threaten its very existence, or open up opportunities which can be exploited.

Constraints

Constraints are any of the political, legal, or regulatory issues that may restrict the freedom of action enjoyed by the organization. Legal and regulatory issues are not of much concern as municipalities are not restricted in the area of telecommunications. However, if the organization decides to provide telephone services as a CLEC legal and regulatory constraints become a problem. On the political side, it is unclear at this time how the political members in the city of Columbus will react to the proposed organization and the project they will initiate. Political strategies will be required in order for the project to become attractive to all members of the city and county legislature.

Risks and Threats

As requested by the Steering Committee, a full disclosure of the risks associated with the project is documented in a separate section.. This can be viewed on page 58.

Opportunities

Opportunities arise through change, whether to the marketplace, legislation, population profiles or technology. An organization needs to promote and encourage an environment where opportunities can be recognized and taken advantage of. In Columbus there are several opportunities that have already been identified, they are the following:

- IQuest's willingness to participate in the project. The sensitivity of this opportunity is high as IQuest is looking to move into Columbus by June, with or without the help of the community.
- Insight's need for new service providers for upstream bandwidth. The sensitivity of this opportunity is high as Insight's timetable is limited.

These opportunities as well as any others must be identified and analyzed for their potential value. Many are time sensitive so it is important to move on opportunities quickly so that they may be leveraged at the most opportune time for the organization.

Competitors

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Competition occurs when organizations seek to defend their position or do better than their peers. This may be holding on to or gaining market share, obtaining resources (skilled staff, access to funds, land, etc.) or being at the top of league tables. Once the purpose and overall structure of the organization have been defined it will be important to analyze the potential competitors in the chosen market. The goal of a city run project should be to create an organization that offers something no one else does, ensuring minimal competition as well as minimal hostility from existing companies.

In Columbus, a preliminary market analysis has been done while conducting requirements interviews. The *Current State* section of this document could serve as such a high level analysis. It details who is serving the telecommunications needs of the majority of the community. A more in depth analysis may be necessary, depending upon the alignment of the organization.

Activities

Activities are the essentials of what the organization does. Some activities are concerned with producing the products or service (line-of-business). Other activities will be management processes or monitoring the adherence to regulations.

Line of Business

These are the essential and necessary activities, which the organization performs and are directly related to the products and services it produces. They add value to the product or service. It is what the organization is there to do. In defining these activities the organization will solidify the extent of things they will do versus the things the organization will require others to do.

Deliverables

Deliverables consist of the efforts of the organization resulting in products, services or both.

Products and Services

Products and services define what the organization is offering and providing to their customers. In Columbus, the products and services are still unclear as other information is required before these details may be finalized. It is clear, however, that one service of the organization will be to promote competition in the service provider arena. The extent of the encouragement is still unclear at this time.

Participants

Participants are people, groups, or other organizations that are involved with the organization and have a common interest in it being successful.

Partners

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The value of partnerships needs to be investigated in order to assess the business case for entering into them. This value will be assessed through RFPs sent out to all potential partners. Potential partners could include entities such as established telecommunications service providers, data communications vendors, network designers and operators, Internet access providers, and cable construction companies. Partnering would reduce or eliminate the need for the organization to outlay funds for system development, but would also result in less control by the organization resulting in reduced potential revenue.

Some of the partnership considerations that have bearing on how capitalization is handled include:

1. City ownership and operation of system
2. City ownership of system; contractual arrangements with outside organization to operate and administer system.
3. City partnership with outside organization. City contributes infrastructure and expertise; private partner provides funding, operates and administers system.

Possible partnerships have been identified throughout the requirements interviewing process. The current list includes, but is not limited to, the following:

- Ameritech
- SEI Data
- Sunman (ETC)
- Hancock Telecom
- IQuest
- Choice One
- Netisun
- McLeod
- Large Local Businesses
- Cinergy
- Insight
- REMC

Business Model Preparation

The following is an outline identifying the suggested time frame in which the business elements identified above should be pursued. It is important to notice that the majority of the tasks associated with these business elements occur very early on in the project, as it is important to have the organization/business structure in place before implementation begins.

1. Pre-build Strategy
    a. Gather Network Requirements
        i. Establish a vision for the project
        ii. Determine the network requirements of the community
        iii. Determine the current state of telecommunications within the community
        iv. Formulate these requirements into a desired state
        v. Illustrate desired state with conceptual diagrams
    b. Secure partnerships/Formulate budget
        i. Decide who will light/manage the network

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1. Identify network partners to receive RFP
2. Write brief Request for Proposal for network partners
3. Send out RFP
4. Review proposals, Partner interviews
5. Technology assessment/Partner assessment
6. Decision on engagement

ii. Identify other partnership opportunities

c. Sell the opportunity
   i. Meet with all key community and business leaders individually
   ii. Schedule and plan Community Information Meeting
   iii. Hold Community Information Meeting
   iv. Follow-up as necessary based on individual meetings and Community Information Meeting
d. Establish Governance
   i. Governance Board
   ii. Governance Model (procedures, policies)

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Requirements versus Current State

The purpose of this section is to highlight the fundamental differences between the current telecommunications offerings in Columbus and the summarized requirements of all constituencies collected during the interview process. This information is presented in the table below.

Characteristics from Summarized Requirements	**Current State Status**
Business	
Share information between sites over private medium	Limited Availability
Reduced cost for services between sites (data, video, voice)	Unavailable
Two-way videoconferencing between sites	Limited Availability
Infrastructure enabling business continuity planning	Unavailable
Government	
On-line communication between government agencies	Available
Ability to offer on-line services to the community	Available
Collaboration among all government agencies	Available
Education	
Access to course curricula and materials from home	Available
Two-way videoconferencing	Limited Availability
Utilize institutional loop for inter-school connectivity	Unavailable
Collaboration among education centers	Limited Availability
Support structure for advanced teaching methodologies	Limited Availability
Social Services	
Collaboration among all social service organizations	Available
Community awareness of current social service offerings	Available
Residential	
Telecommute from home	Limited Availability
One bill for service	Unavailable
Knowledgeable, empowered, 24x7 support structure	Unavailable
Community portal	Available

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Gap Analysis

To visualize the difference between current and 0-2 year desired states, the two must be viewed side-by-side to gauge a comparison. The difference, or gap, between the two states will become evident and this understanding, coupled with a strategic migration plan for the goal of a 0-2 year desired state, will help fortify the common vision established at the beginning of the project and contribute to the momentum sustained by this project thus far.

Characteristic	Current State	0-2 Year Desired State
Pre-Build Strategy		
- Gather Network Requirements	Completed	-
- Secure Partnerships/Formulate budget	To be done	Completed
- Establish Governance	Begun	Formalized structure
- Sell the Opportunity	Begun	Community buy-in
Engineer Metropolitan Optical Ring		
- Formulate Initial Design	To be done	Completed
- Write Request for Proposal for Equipment Manufacturers	To be done	Written/Evaluated
- Finalize Optical Architecture	To be done	Designed
- Construct Co-location Facilities	To be done	Constructed
- Install Fiber Optic Cable	To be done	Installed
Light the Network		
- Install/Implement Equipment	To be done	Installed, Implemented
Post-build Strategy		
- Develop a growth plan	To be done	Formalized
- Public awareness (marketing)	To be done	Began

Table 2 - Gap Analysis

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Migration Plan

A migration plan combines next steps related to both business and technology decisions. The following task list outlined in figure 7 details the steps necessary to achieve the results detailed in the 0-2 year conceptual diagram. This migration plan clearly establishes the milestones that must be completed in the next two years to establish a successful foundation for a connected community within Columbus, IN.

ID	Task Name	Successors	Predecessors
1	**Pre-build Strategy**	**25**	
2	**Gather Network Requirements**	**8,27**	
3	Establish a vision for the project	18,4	
4	Determine the network requirements of the community	5	3
5	Determine the current state of telecommunications within the community	6	4
6	Formulate these requirements into a desired state	7	5
7	Illustrate desired state with conceptual diagrams		6
8	**Secure partnerships/Formulate budget**	**17,27**	**2**
9	**Decide who will light/manage the network**	**,50,52,16,4**	
10	Identify network partners to receive RFP	11	
11	Write brief Request for Proposal for network partners	12	10
12	Send out RFP	13	11
13	Review proposals, Partner interviews	14	12
14	Technology assessment/Partner assessment	15	13
15	Decision on engagement		14
16	Identify other partnership opportunities		9
17	**Establish Governance**	**20**	**8**
18	Governance Board	19	3
19	Governance Model (procedures, policies)		18
20	**Sell the opportunity**	**26**	**17**
21	Meet with all key community and business leaders individually	22	
22	Schedule and plan Community Information Meeting	23	21
23	Hold Community Information Meeting	24	22
24	Follow-up as necessary based on individual meetings and Community Inform		23
25	**Engineer Metropolitan Optical Ring**	**51**	**1**
26	**Formulate initial design**		**20**
27	Identify/Prioritize/Finalize potential customers	28	2,8
28	Formalize network route through town	29	27
29	Create initial design of potential multi-tier, redundant network		28
30	**Write Request for Proposal for equipment manufacturers**	**36**	**9**
31	Identify vendors/manufacturers to receive RFP	32	
32	Send out RFP	33	31
33	Review proposals, Vendor interviews	34	32
34	Technology assessment/Vendor assessment	35	33
35	Technology selection/Vendor selection		34
36	**Finalize optical architecture**	**44,40**	**30**
37	Determine/formalize taps/lateral runs to potential customers	38	
38	Determine service co-location points on the ring	39	37
39	Finalize design of potential multi-tier, redundant network		38
40	**Construct co-location facilities**	**44**	**36**
41	Survey co-location sites	42	9
42	Approve building sites (CBPD)	43	41
43	Construct facilities		42
44	**Install fiber optic cable**	**52**	**36,40**
45	Verify right of ways and/or pole space	46	
46	Order fiber	47	45
47	Decide on contractor to install fiber	48	46
48	Formulate and formalize time tables/schedules	49	47
49	Bury/hang fiber optic cable	50	48
50	Network maintenance agreements		9,49
51	**Light the network**	**57,58**	**25**
52	**Install/Implement Equipment**		**9,44**
53	Purchase equipment	54	9
54	Hire qualified staff for implementation and management	55	9,53
55	Configure and test equipment	56	9,54
56	Plan and exercise disaster recovery scenarios		9,55
57	**Post-build Strategy**		**51**
58	**Develop a growth plan**	**62**	**51**
59	Formalize growth plan	60	
60	Set benchmarks for vendors and network growth	61	59
61	Set benchmarks for competition (evaluation)		60
62	Public awareness (marketing)		58

Figure 7 - Migration Plan

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Risk Assessment

The Risk Assessment is meant to be a full disclosure of all risks, known by InfoComm Systems at the present time, associated with continuing or discontinuing this project. It is presented below in a list format.

If the project is discontinued the following risks are assumed:

- Telecommunications services in the city of Columbus may advance at a rate slower than the national average creating what is commonly referred to as the "Digital Divide". A "Digital Divide" may slowly limit the economic development of a city until a point is reached where either the problem is corrected or it is no longer viable to start a business in Columbus.
- The research and documentation provided by InfoComm Systems may go to waste and never be utilized to its fullest extent.

If the project is continued the following risks are assumed:

- Certain large telecommunications businesses may try and put the project out of business by either pricing services below market value or hanging the progression of the project up in court.
- The project may not generate the direct returns expected thus limiting the profitability of the investment.
- The city/county legislature may disagree with the project posing as a crucial roadblock in the progression of the project.
- Potential partners may not be willing to cooperate with the city on the project.
- One or more of the partners chosen for engagement may go out of business leaving the project with a gaping hole in a crucial location.
- Certain customers/employees may perform illegal operations on any proposed infrastructure making the project liable.
- The technology chosen as the basis for the infrastructure may become outdated.

The risks presented in this section are all hypothetical situations. Certain measures can be taken to limit the possibility of their existence.

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Next Steps

InfoComm Systems approaches all projects in a phased manner ensuring the ultimate flexibility for clients. At the end of a phase all engagement may be terminated or InfoComm has the ability to continue the project into the next phase. The report is written to reflect this flexibility. It can be handed off to virtually any qualified individual or company and after reading the report they should have the ability to continue the overall project where InfoComm left off.

In order to continue the project along the current path there are several important steps listed below that the Steering Committee must consider:

- It should be agreed that the project is vital for continuation
- A project manager should be chosen to ensure the project is pressing forward
- The Steering Committee must designate a single point of contact for the project manager; this may result from the formation of the Governance Board
- Timeframes must be agreed upon by the Steering Committee

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Conclusion

This report details the background and research information critical to the success of a project of this scope and magnitude. InfoComm engineers first conducted over 40 interviews enabling the documentation of both the *Current State* and *Desired State* sections. This information is an asset to the project as the *Situation Analysis* documents the current telecommunications initiatives of all constituencies in Columbus. Following this the *Asset Identification* brings to the forefront all of the large and small details that will be beneficial to the project once design and implementation begins.

The *Summarized Requirements* then details the "wish-lists" of all interviewed constituencies. This is very important as these "wish-lists" drive the direction of the project. The *Summarized Requirements* were then broken into timeline phases and plotted in both visual and list format in the *Conceptual Design* section.

Finally, the tasks required for the formation of the organizational / business structure needed to support the technology initiatives are outlined in the *Business Model Elements* section. The *Conceptual Design* and *Business Model Elements* timeframes were merged and used to complete the remaining sections of the report documenting the steps toward implementation.

The remainder of the document outlines the factors and steps associated with continuing the project beyond this initial phase. *Gap Analysis* begins the steps toward implementation. The *Gap Analysis* identifies the differences between the current state and the desired state. The identified differences are then prioritized and documented in the *Migration Plan* section, which forms a schedule for the project. The risks associated with continuing or discontinuing the project are detailed in the *Risk Assessment* section. Finally, the *Next Steps* section highlights those tasks to be completed immediately following the handoff of the final report.

As can be seen in the *Migration Plan* section there are many business and technology decisions to be made in the recommended progression of the project. Most of these decisions will require a business case as well as some background investigation. It is imperative, for the sake of the project that someone is responsible for pushing the project forward utilizing the information required to make these critical decisions.

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Appendix A: Columbus Connectivity Options

The matrix below (table 1) outlines broadband connectivity options available to the Columbus area at the time this deliverable was written. InfoComm network engineers discovered the options during the Network Requirements Discovery portion of this phase.

It should be noted that this does not represent a comprehensive list of every conceivable service offering available to the community. There could be additional service offerings available upon the request of a customer.

Service	Provider	Offering	Notes
T-1			
	Ameritech	~$1,200/month	60-90 wait on installation
	SEI Data		Offer full and fractional T-1 service
Cable Modem			
	Insight Communications	Quality unclear	Not currently marketing this service – testing partial rollout
xDSL			
	Ameritech	Business, Residential	Must be < 12,000-18,000 cable feet of Ameritech CO
	Choice One	Business	Must be < 12,000-18,000 cable feet of Ameritech CO
	TLS	Business, Residential	Must be < 12,000-18,000 cable feet of Ameritech CO
Satellite			
	REMC	$200 installation, $799 for equipment, $49.99/month	Speeds up to 200Kbps
	Jim Gordon	$200 installation, $799 for equipment, $49.99/month	Speeds up to 200Kbps (symmetrical)
Wireless			
	TLS	$799+ for equipment (business) $499 for equipment (residential) $49.99/month	Speeds up to 500Kbps (symmetrical)

Table 1 - Connectivity Options

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Appendix B: Additional Network Diagrams

Illustrated below are additional diagrams that document various systems corresponding to entities within the Columbus. These diagrams were collected during the Requirements Discovery Portion of this phase.

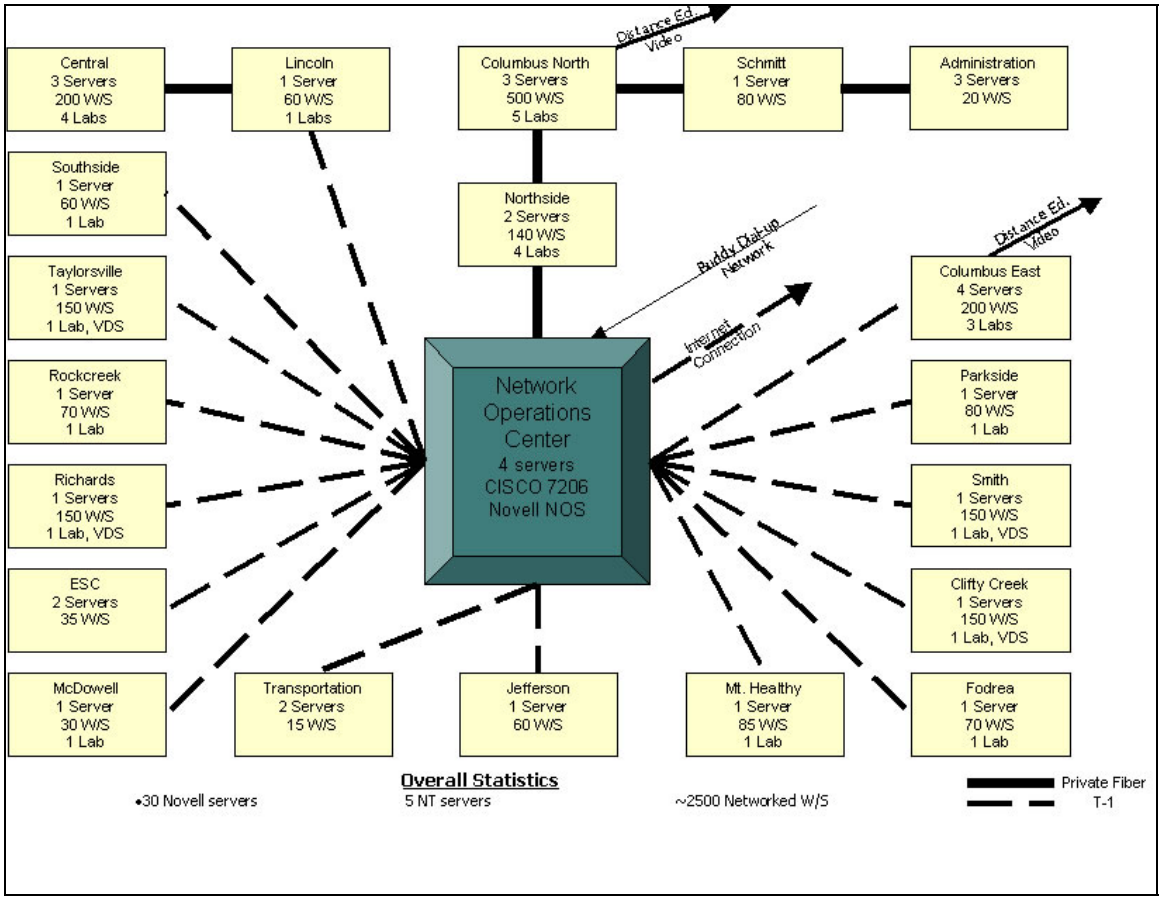

Figure 1 - BCSC High Level Network Diagram

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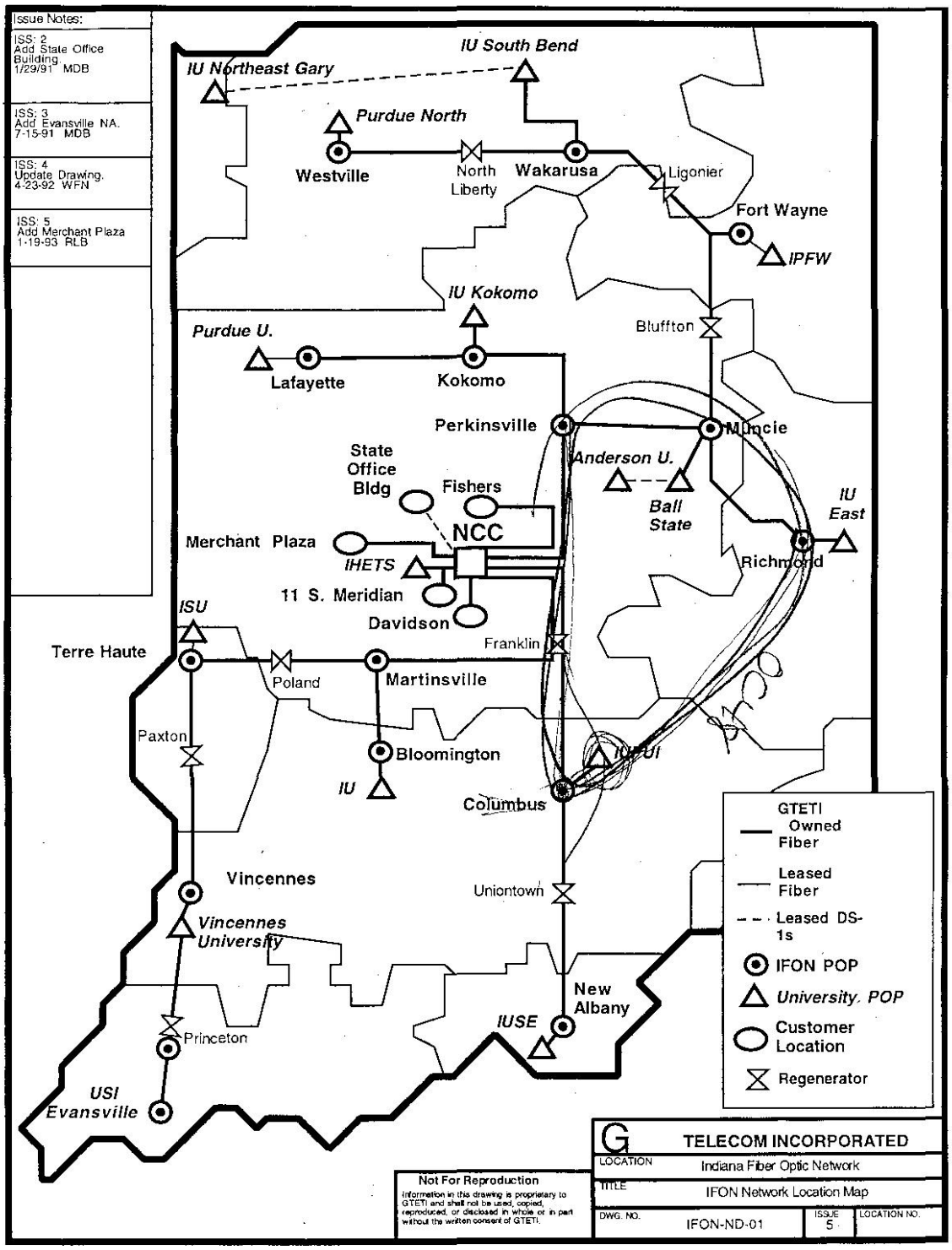

Figure 2 - Genuity Fiber

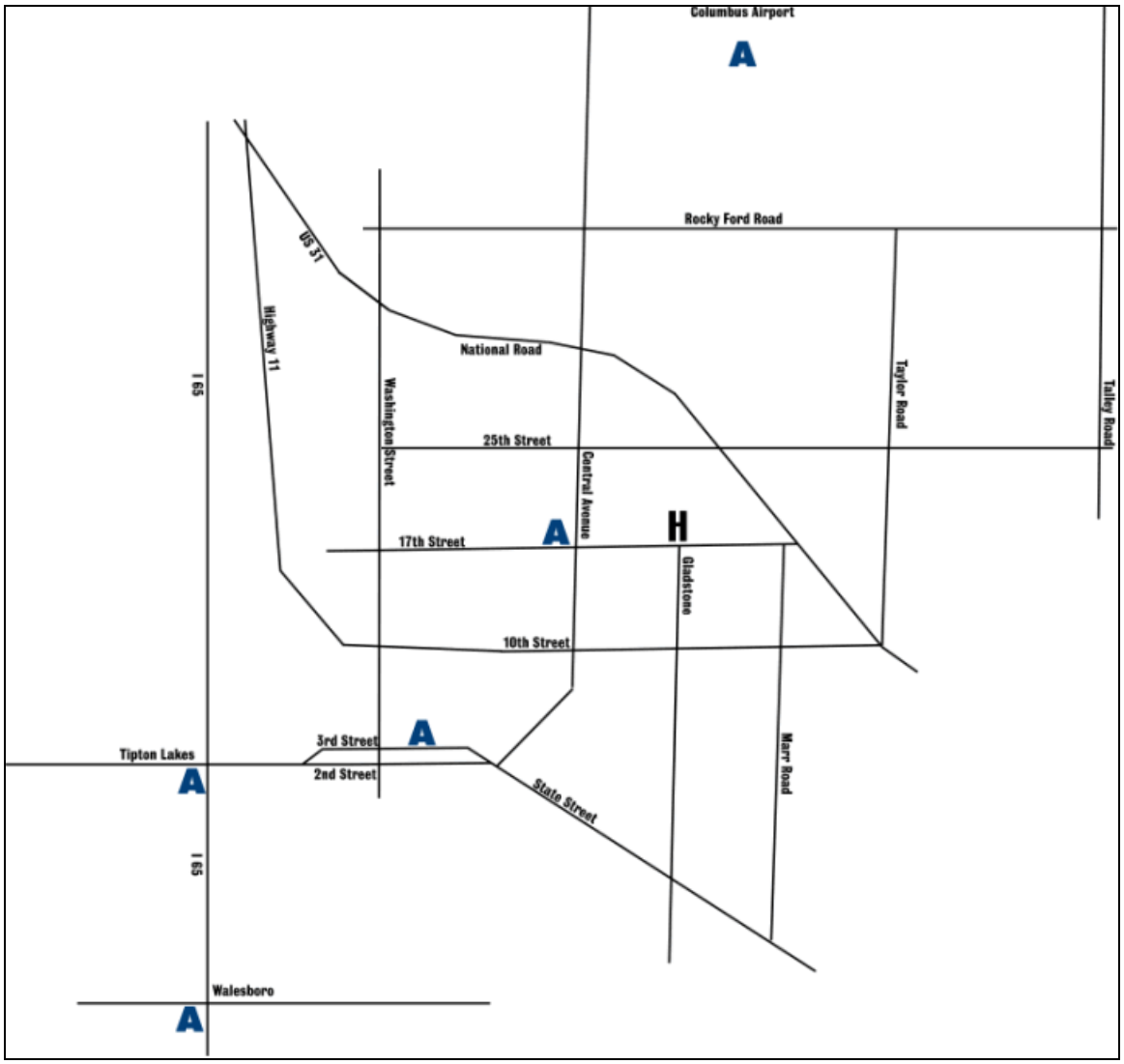

Figure 3 - TLS Wireless Map

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Appendix C: Network Requirements Discovery

The following notes are an aggregate representation of the ideas and vision outlined during the corresponding interview with each key constituency. These notes are in raw data form and were meant for internal use and should be treated as such.

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211 Initiative & United Way

Discovery Topics

1. Address network related problems/difficulties/needs
    - Frustrations
        - Very hard to work with Ameritech
        - No special services/support for non-profit
    - Expansion
        - Only build to areas where there is at least 40 homes per mile
2. Current/Future bandwidth capacity, infrastructure, & services
    - Current Services – 211 Initiative
        - Health and human service information center
            - Maintain two separate databases on local network
                - Social service organization information
                - Child care provider information
            - Over 10,000 calls per year
                - Abuse situations
                - Addictions
                - Assessment and information
        - Working from Indiana state model
    - Current Infrastructure – 211 Initiative
        - Must support
            - Call data and services
                - Rollover
                - Abandoned calls
                - Auto transfer for suicide intervention
                - All local and national services
            - Four call center stations (2 phone lines)
                - 1 or 2 lines dedicated to child care
        - Centrex phone service from Ameritech
            - Fee to track phone statistics
        - Voicemail from Intelysis
            - Problems with voicemail
    - Future Services – 211 Initiative
        - Looking to become regional 211 call center
            - 5 counties
            - Very likely by October 1
            - In order to become regional center need:
                - Relationships
                - Phone companies
                - County service/data centers
                - Must have access to their data
    - Future Infrastructure – 211 Initiative
        - Databases will be standardized

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        - On national level
        - Web based query and updates
    - More phone lines will be needed
        - Advanced features
            - Statistics
            - Expandable phone capacity when volume is high
            - Traveling user preferences for phone
                - Users can access their stored numbers from any handset/desk
    - Web based information
    - Voice mail is very important
3. Current network service provider(s)
    - United Way – DSL through Cummins
    - 211 Initiative -
4. Key contact persons
    - Anne Schairbaum – Executive Director – aschairbaum@yahoo.com
    - Sally Jamerson – Administrative Services Director – sjamerson@compuserve.com
5. Residential broadband service/needs
6. Additional Notes
    - Moving all social services to old Arvin building (starting April/May 2002)

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Ameritech

Discovery Topics

1. Address network related problems/difficulties/needs
    - Concerns
        - Telecom has become competitive with deregulation
            - Trying to drive costs down, centralized support
            - Ameritech cut too deeply at first
            - People still remember the bad times
            - Automated call centers give Ameritech bad reputation
    - Frustrations
        - Seymour
            - Maintenance and management problems
                - Dealing with two phone companies
                - Ameritech
                - GTE
2. Current/Future bandwidth capacity, infrastructure, & services
    - Current Infrastructure
        - Fiber out to or running by all areas of significance
            - Remotes connected to CO via SONET connections
                - Hub and spoke
            - All IXCs connect in CO
            - LiteSpan Digital Loop Carriers provide fiber connection from neighborhoods to remotes
                - Can offer DSL through LiteSpan
        - DSL available within 12,000 – 15,000 cable feet of CO
            - No plan to rollout DSL in the remote COs
                - Remotes located at Tipton Lakes, Edinburgh, Elizabethtown, and Hope
                - Fiber SONET MUX between CO and remote
                - Legislature may push DSL to remotes
        - ISDN available at CO and remotes
        - Pricing
            - ISDN PRI
                - 23 B & 1 D
                - $1200-$1500/month
            - T-1
                - $278/month
        - ISP
            - No Internet bandwidth is provided as Ameritech is regulated as an intralata carrier
            - Do offer bundled Internet bandwidth from Prodigy for DSL customers
        - Tandem (toll) switch is in Bloomington
            - Connection to Columbus CO via fiber on State Road 46

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            - Can be re-routed quickly
        - Columbus CO
            - 12 switching technicians
            - Engineering office
            - Support
                - 2-4 hour fix on DS-3
                - No formalized SLAs
                - Cut fiber can be rerouted
            - End office switch
                - Northern Telecom DMS-100
                - Centrex features (most)
            - FLM
                - Fujitsu
                - Moving to Nortel
        - "Residents rates in Columbus are among the lowest in the state."
            - $15.00/month for a single line
    - Future Infrastructure
        - InfoTech Park
            - Have fiber in area
            - 90 days or more for build to park
        - No interest in offering dark fiber
        - Filing for authority to serve nationwide long distance in Indiana
        - Continue to maintain switch
        - DSL will slowly penetrate
        - State of the art equipment upgrades
3. Current network service provider(s)
4. Key contact persons
    - Eric Herrmann – Global Service Executive – eric.x.herrmann@ameritech.com
5. Residential broadband service/needs
    - "Connectivity is reasonable in its current form."
6. Additional Notes

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Approved First Mortgage

Current/Future bandwidth capacity/infrastructure/ services

- Choice One provides all telecommunications services – one bill
    - Long distance, SDSL – 128/128, local service
        - Previously had Vectris xDSL through TLS
            - First to sign up…
            - TLS didn't do a good job of keeping people informed…
        - 7 lines (5 voice, 1 fax, 1 data for backup of credit report)
- Heavily encrypted data (mortgage approval) to Fannie Mae, etc
    - Need loans approved in 1 minutes as opposed to 20 minutes
- The physical building is an estate
    - AFM would like to purchase building from owner and turn into multi-tenant building with high speed access - create executive suites.
- Fax intensive
    - Digital signatures are legal, but not supported by AFM constituencies
- In the future, automated underwriting – SSL or VPN

Frustrations

- Difficult to get broadband access in Columbus
    - No one understands broadband needs of community
- No broadband in home currently
- No AOL access number – use TLS dial-up

Additional Information

- Choice One does not appear to market in Columbus
- Jim Gordon resells IQuest service
    - Looking into wireless service via satellite or microwave
- Mortgages in 04Q01 were 20; 01Q02 ~13
- Realtors use MLS (Multiple Listing Service)

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ArvinMeritor

Discovery Topics

1. Address network related problems/difficulties/needs
    - ArvinMeritor Data Center
        - Network infrastructure is key factor in successful Data Center
        - Dual ring out to the Tech Park
            - Still negotiating a diverse route with Ameritech
        - MetroXmit was supposed to run the fiber, but backed out
        - Fiber needs to be run to the building by Summer 2002
        - Data Center needs multiple COs to ensure reliability
        - High risk to ArvinMeritor by agreeing to put Data Center in Columbus
        - $10 million is nothing to back out of if infrastructure is not there
        - Multiple routes within city and also out of city are required
        - Need high speed connectivity between Walesboro and Tech Park
    - Ameritech
        - Ameritech has been very slow
        - Network doesn't break, however, the support received is terrible
    - Community Network
        - Concerned about accountability/reliability of network, need to understand the big job of keeping a network up and running
2. Current/Future bandwidth capacity, infrastructure, & services
    - Current ArvinMeritor Columbus infrastructure
        - Committed to new $10 million building for Data Center
        - All web hosting and databases for e-business and e-commerce located in Columbus
        - Research/Engineering Center in Walesboro
        - Do not own electronics and don't have the personnel to do so in the future
    - Current ArvinMeritor global infrastructure
        - North American data/computing center located in Columbus
            - 75 employees on opening day
        - 1200 people located in Troy, MI
        - 130 locations
        - 33,000 people worldwide
    - Long Term Vision for ArvinMeritor
        - ArvinMeritor global Data Center located in Columbus
        - Demand carrier level service, not a big deal to leave town
        - Manufacturing company realizing the importance of data
        - Business continuity between here and Troy is important, this includes disaster recovery plans and backup sites
        - InfoTech park network must be scalable
    - Long Term ArvinMeritor Visions for Columbus

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        - Promote competition among vendors to ensure "world class" telecommunications infrastructure and support
        - Need to establish revenue stream to make anything happen
            - Revenue stream would pay full time employees as well as for upgrades in infrastructure and equipment.
        - Shifting from a location for manufacturing only to more information oriented businesses
        - Would greatly benefit city and existing businesses to have new IT businesses come to town
        - IT businesses will ask "Can I connect to the world?" before even considering the move to Columbus
        - Important to show this as a Win-Win Partnership and not one driven by large commercial entities
3. Current network service provider(s)
    - Cable and Wireless current ISP
    - Transferring to WorldCom
    - 4-5 locations on Ameritech SONET Ring
        - Fujitsu FLM 150s
        - OC-3
        - Electronics owned by Ameritech
    - UUnet/WorldCom – PAC World Dialer (VPN)
        - POP here in town
        - Old CompuServe node
    - Sprint exclusively in North America for long distance
4. Key contact persons
    - Bud Phillips – 812-379-3504 – bud.phillips@arvinmeritor.com
    - Mark McHolland – 812-379-3666 - mark.mcholland@arvinmeritor.com
5. Residential broadband service/needs
    - Work from home is very important, so high speed connectivity to entire county is a must
    - Without broadband services the type of people needed to work for IT businesses will not be attracted
    - First question of every person will be "Can I connect to the world?"
    - Tipton Lakes is still without broadband
6. Additional Notes
    - CEO Perry Lipe was in attendance
    - Need multiple alternatives with pros and cons for fiber to the Data Center
    - Technology is constantly evolving, must have identifiable revenue stream for this to be self-sustaining

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Bartholomew County Library

Current/Future bandwidth capacity/infrastructure/ services

- T-1 access to state backbone since 1998
    - State maintains (Intellesis & IHETS)
        - IHATS provides support
    - Got grant to pay $500/$1,500 per month bill
    - Will have to meet future guidelines for filtering – July 1st
        - Child Internet Protection Act (CIPA)
        - Feel filtering will hinder performance
- Have 10 computers for adults, 2 for children, 4 in Hope branch, 1 for disabled folks
    - For public Internet access
    - $ 0.10 per page per copy or to print
    - People come to the library during lunch time for high speed access
    - Lines after school – busy!
    - Major uses of Internet access for adults are research, email, and chat
- Library web site http://www.barth.lib.in.us
    - References
    - On-line catalog (JAVA script based but moving to HTML)
    - Served from library location over T-1
    - BMV documents linked to from library web site
    - TLS supports web page and email
- Have a firewall
- Will provide instruction for Internet usage/training for young and old
    - One-on-one
    - Lack space for this initiative
    - Money is not a constraint
    - Too many Internet users are taking the staff away from book-based reference duties
- Have intranet just recently – staff getting familiar
- Onsite backup
- Schools can't see on-line catalog because of JAVA script but will be fixed after change to HTML

Additional Information

- AOL has dial-up number in Columbus (just happened this month 01/02)
    - Could pay for access to AOL 800# in the past
    - Dell tried to sell PCs at Office Max but packaged computers with AOL and this hindered sales – no dial-up # in Columbus!
- As bandwidth in the community increases, the crowds getting access to the Internet via the library will decease – Beth Booth Poor
- Elevated dropout rate in Columbus

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- Many people in Bartholomew County have no prior Internet experience when they come to the library
- Use Jim Gordon for technical services (outside of IHETS) within the library
- Last year, the library circulated 700,000 items
- Book checkout still major circulation item

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BCTC

Discovery Topics

1. Network related problems/difficulties/needs
    - BCTC frustrations/concerns
        - Redundant path fiber availability for InfoTech Park
        - Fiber connectivity for Columbus Learning Center
        - Broadband residential access
            - Using Insight cable network
                - Slowly certifying neighborhoods for cable modem one at a time
                - 90% complete according to Tom Flora
                - Unsure about quality of support
                - Contracted Jonathon Kramer to test the cable plant
        - No option for an alternate carrier
        - Lack of HDTV - video
        - Few low cost Internet services – CCP
        - Lack of security awareness among cable modem users
        - Community might want to consider expanding BCTC's scope to include voice and data in addition to its current video responsibilities.
            - If the scope is expanded in this manner, the community might want to revisit BCTC membership
        - Change among community not necessarily supported
            - Selling the vision will be hard
        - The resident's interest level in community-wide technology is unstudied.
        - Maintaining quality of service will be a problem
        - Idea of a CIO for the City was considered but not implemented
        - $8.00/hour is average salary in Columbus
2. Current/Future bandwidth capacity, infrastructure, & services
    - BCTC organization
        - Original ordinance was broader than current vision, included all telecom
        - Current CATV franchise tax is 3%
        - 3 county / 3 city appointees
        - County commissioners have no contact because of traditional BCTC dealings
            - Mostly deal with city cable subscribers
        - BCTC doesn't deal with money
            - Started as 2 tier committee
                - Trustees – dealt with money
                - Council – recommended to Trustees how to spend money

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            - New mayor started the Review Commission to dispense money
                - Could override Review Commission by going directly to City Council
            - City Council is now solely in charge of dispensing money
            - The future of how the Mayor and County Commissioners want to manage and distribute these funds will need to be confirmed with them.
        - Mayor refocused committee with a suggestion
            - Follow best practices from a community committee perspective
            - Find new, creative revenue streams
            - Focus on the city only
    - I-Net
        - 2 strands of fiber going from head-end to Learning Center area
        - The asset belongs to the BCTC
        - Does BCTC have authority to commercialize
        - Proposal given by Mike Jamerson of BCSC to utilize I-Net
            - No engineering done yet
            - 3-6 months to think about progression
        - Any action by any entity should be shared with other connected entities and should not preclude future use by any other entity
        - Only being used to transmit video from East to headend and then out on Ch. 3
    - Dark Fiber
        - Fiber already ran throughout sewers?
        - Owner unknown?
        - Need routes
    - Future Initiatives
        - BCTC has broader scope than just cable
            - Need to determine how much broader?
            - Any other emerging technologies
        - Working on a Public Rights of Way ordinance
            - NATOA strategy
        - BCTC community needs assessment
            - Put on hold until InfoComm delivers final document
            - Need clearer understanding of current state and future desires among community cable subscribers
    - Possible current/future city assets
        - I-Net
        - Rights of Way ordinance
        - Possibly dark fiber
        - Data system designed, installed, but never utilized
            - Possibly designed for CAD

3. Current network service provider(s)

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    - Does not pertain to this constituent
4. Key contact persons
    - Audrey Tyree
    - Mark McHolland
    - Stan Gamso
5. Residential broadband service/needs
    - Need high speed residential access
6. Additional Notes

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BCSC

Discovery Topics

1. Address network related problems/difficulties/needs
    - Frustrations
        - Scheduling hassles with the Vocational School
            - Students have to give up 1-2 classes/day for travel
            - Narrow window of bus availability
        - Distance Learning
            - Vision Athena
                - Pay content fee for live two way sessions
                - May also have to pay long distance fees
            - Ameritech
                - Must be set up in advance
                - Pay monthly flat fee of $840/month for 24 hours of connectivity
2. Current/Future bandwidth capacity, infrastructure, & services
    - Current Initiatives/Infrastructure
        - C4 Vocational School
            - Located in 3 buildings
            - Serves 8 school corporations
            - Cisco Network Academy
                - Self-paced
        - Distance Learning
            - Vision Athena
                - Content consortium
                - Content provider for 2-way video conferencing distance learning
            - Infrastructure
                - Uses Ameritech's Advanced VS for classroom setup and delivery
                    - 2-way 384Kb/s
        - TV Lab
            - Columbus East
            - Vic Fields
            - Broadcast Channel 3 on cable
            - Full studio
        - IHETS
            - Two-way audio, broadcast video
        - Network
            - Flatrock-Hawcreek School Corp.
                - Fiber between Hope Elementary and Hauser
                - Cross Cliff Elementary is six miles from main Flatrock-Hawcreek campus and one mile from airport and served with dialup only

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            - Possibly TLS wireless
            - Suscom cable plant
        - Bartholomew Consolidated School Corp.
        - 20 buildings, 17 instructional, 3 administrative
        - NOC
            - In basement of Middle School
            - 15 buildings served by Ameritech FLM
                - 15 T-1s all data
                - One for each building
                - Hub and spoke
            - 5 buildings served by private fiber
        - Many building have voice switches
        - All have Centrex
        - No PRIs – but planned for 1Q2002
        - Four buildings on the campus are connected with private fiber
            - 10-100 Mb/s Ethernet
        - Servers currently distributed across all buildings
- Future Vision
    - Increased community/parent/student access to school and teacher websites
    - Increased web-enabled applications – student management, business systems, instructional sources
    - CLC
        - Will have facilities for sourcing video
    - Connections across school districts
        - Greensburg
            - Proposed satellite for C4
        - Flat Rock
            - Potential satellite site
        - ISTEP Software
            - Web based software for ISTEP prep
        - Should hit steep accelerating access curve for Internet bandwidth
        - Dept. of Ed is going to move to more electronic filing of forms
        - Going to have to support Real Audio/Video for in-service
        - Video for staff development
    - Upgrade all links to GigE
        - Servers can then be consolidated
    - Data center
        - Cummins CIS Building could be used as community data center
            - Level of collaboration in question
            - Level of comfort with outsourcing also in question
            - Could use currently vacant buildings as data center

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            - Any co-location site would have to house additional staff from BCSC Technology
    - Video-on-demand
        - Video distribution
            - Video jukebox with scheduling
            - Next generation network
    - Adult Education
        - McDowell Adult Ed Center
            - Serves same service area as C4
            - Focused on basic skills
                - GED, etc..
            - Would like to offer to other school districts, especially if the schedule is flexible
3. Current network service provider(s)
    - BCSC - 2 T-1s to Intelenet for Internet access
    - Flatrock-Hawcreek - ?
4. Key contact persons
    - Denise Ollensted – IT – Superintendent's office
    - Marilyn Metzler – metzlerm@bcsc.k12.in.us
    - Mike Jamerson
    - Tom Book – Superintendent Flat Rock
    - Robin Cain – AutoCAD trainer – cairn@bcsc.k12.in.us
    - Dennis Steele – Construction Tech - steeled@bcsc.k12.in.us
5. Residential broadband service/needs
6. Additional Notes

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Breeden Realty (InfoTech Park)

Current/Future bandwidth capacity/infrastructure/ services

- Developer of InfoTech park
    - Started talking in Fall 2000, ground broke 1 yr ago
    - New economic development strategy met well with ArvinMeritor's new data center
    - Ameritech has voiced the ability to support the tech park's need now
    - Tech part land owned by the FAA (leased out)
        - No profit on sale of lots and therefore no cash for telecom infrastructure improvements
    - Tech park will require diverse communication and power routes
- No current issues with fiber for developments
    - Will be in the future
- Future goals of "world class" communications network
    - Residents
        - Fiber to the curb
    - Business
        - Broadband in hotel rooms, apartments, condos
        - Real-time teleconferencing - collaborate applications within metro area

Frustrations

- Must build infrastructure to support even the largest corporations that want to build in the tech park
    - Needed by ArvinMeritor for data center
    - Needed to recruit large corporations

Additional Information

- Public/private partnership
- Breeden handles residential, commercial, industrial construction
- Shift from manufacturing to IT, biomedical, and advanced technology
- Satellite transmission used by State Farm and AG Edwards – company initiatives

Action Items

- Possible follow-up with Mark McHolland after Ameritech meeting
- Mark Pratt would like tour of incubator at PU and INTech
- Need exact details of what Ameritech is proposing for tech park infrastructure support

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CCP

Current/Future bandwidth capacity/infrastructure/services

- Home/School
  - Visionary use of home/school connections
    - 100% connection w/kids - Every home gets connected (with public school child) – 20% homes have public school children
    - Traditional info – schedule parent/teacher conference
    - Videoconferencing
    - All curriculum materials available on-line including all required software
    - Increased flow of traditional information, parent awareness
  - Last year 4 teachers, 77 students; This year 26 teachers, 600+ students
    - Teachers become instructors
    - 5th/6th grade (couldn't get all of 5th grade)
  - Teachers get laptop with understanding of expectations that program has certain data requirements
    - Track communications (pre/past)
    - Rubric with elements of tech
    - Survey
    - Web Page
    - Must participate in on-line discussions via hospital web site
    - Could receive 3 credits for free from IUPUC
    - CEU (Continuing Education Units)
- Tech Reconnect
  - Community recycling event each year
  - C4 vocational program
  - Dell has program where students can build their own PCs
    - May be interested in
    - Ideal location would be in IVYTECH -> A+ certification

Additional Information

- CCP break down
  - Executive Committee – John, Tim, Will
  - Steering Committee – other sm. -> med. Businesses, Arvin, edus.
  - Working Committee – Beth, hospital, Cummins, Arvin, schools, Heather Brock part-time
- EDB formed CCP to look at tech development in the community
  - Group of volunteers
  - Researched Advanced Manufacturing Center
  - Focus shifted to community part
  - 4/2000 – new direction including Ed on Steering committee
    - Formalized charter
  - 5/2000 – new group – is it possible to get collective buying power? -> PCs, network infrastructure

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        - Sent out RFI and then 24 RFPs for infrastructure development and hardware
        - PeoplePC responded
            - Couldn't come up with Community Model
            - Wouldn't share corporate plan
            - Corporate sponsors significant underwriters
        - Spoke with Gateway
        - Tried to establish partnership with Cinergy
        - Ultimately, no response to RFP
            - Will be reissued for parts not covered by InfoComm
- Telecommunication Review Board
    - 3 appointed by Mayor, 3 appointed by commissioners
    - City governs 70% of funds, 30% governed by City Commissioners
- BCTC pledged two things
    - Promised Community Needs Assessment necessary to negotiate cable franchise agreement
        - In 2000 Cable franchise agreed to provide cable modem access (Beta testing in 3Q2001)
    - Do technical needs assessment ~ more infrastructure than was related
        - Probably more cable related
- BCTC sets excise tax, City Council approves and goes into fund for telecom projects
    - Fund pays for BCTC, $100,000/yr.
    - Balance @ $1,000,000; $200,000 annually
- CCP needed to know the % of people connected or not connected.
- CCP suggested broader needs assessment
- Judy - Jackson Community Development Director
    - Recommendation -> want to go to City Council for actual approval
    - Approved 15k -> suggested $300k/yr. for next 3 yrs.
    - Budget: $300 ($270.5) -> June 30, 2002
- CCP is not appointed – just an ad hoc group
- Launched a pilot and collected data (just a few months)
    - May '01 – Tremendous results – Presented results publicly in June
    - July '01 – presented to City Council
- CICP (Central Indiana Corporate Partnership) is funding the InfoComm work
    - Lilly endowment
    - 11,000 BCSC students, Flat Rock/Haw Creek has 1,500 students

Action Items

- Re-define BCTC
- Incorporate/formalize CCP
- Identify revenue stream
- Talk to Mike Jamerson about the superintendent of other schools bringing on IT person (Denise)
- Email Beth about city/county people (done)

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- Community Networks White Paper version 1.3

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Choice One

Current/Future bandwidth capacity/infrastructure/ services

- Switching in Bloomington
    - Fiber to Ameritech in Columbus (long haul T-3)
- DSLAM here in Columbus
- Setup SONET ring with ILEC to Choice One network
    - Could expand SONET ring to large corporations
- 65% of network is fiber
- Overbuild key business sectors of the community
- Local-based customer service
- Cost savings in the voice pricing for a business helps with cost of data
- Provide CPE equipment for digital services upgrade (T-1)
- Offer SDSL exclusively
- Can offer all telecommunications services in one bundle – one bill
- 3-4 months ago started signing up customers
- 80% of revenue comes from local service
- Get Internet bandwidth from tier 2 provider
    - UUNET, MCI
    - Run at 60-70% capacity
- Can fit SLA to client's needs
    - Client gets what they pay for

Future Initiatives

- Expansion to outlying areas of Columbus
- Enhanced data services (VPN, NAT, firewall)
    - Savings in equipment for the customer
- Fully funded through the end of the year

Frustrations

- Have trouble offering service around the outer edges of town
- Lots of business bound to Ameritech contracts in Columbus and Bloomington areas (of unreasonable lengths)
- Can't offer service in 342 exchange
- No broadband options in Columbus

Additional Information

- Company has 300,000 access lines and 50,000 customers
- Facility based company
- 11% market in Bloomington (20% is the goal)
- No plans to become dark fiber provider

Action Items

- Get map of Choice One service area

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Cinergy

Discovery Topics

1. Address network related problems/difficulties/needs
    - Future Needs
        - Remote meter reading beneficial to Cinergy
2. Current/Future bandwidth capacity, infrastructure, & services
    - Current Infrastructure
        - Cinergy telecom here in Columbus
            - Serve most of the state out of Columbus
            - Intra-LATA connections back to Columbus
                - From Columbus back to Plainfield & Cincinnati
        - Disaster recovery hot site in Columbus
        - Fully redundant ring
            - Microwave at DS-3 speeds
            - Columbus is a backbone hub
            - T-3 ATM backbone to serve voice and data
                - Negotiated right-of-ways for T-3 links from MCI
                - Took 12 years to finally
        - SCADA – Supervisory Control And Data Acquisition
            - Control/monitoring of substations
        - Own most of the poles in the city
    - Current Services
        - Cinergy communications
            - ISP
            - Subsidiary partnership with KDL to bring bandwidth
                - KDL is a CLEC
            - Not sure if they still have any iniciatives
3. Current network service provider(s)
    - Private ring
        - Connections through MCI/AT&T
        - Microwave for backup
    - Internet
        - 2 connections
            - Cincinatti
            - Plainfield
                - T-3 to IQuest in Plainfield
                - Southern offices served by Plainfield
4. Key contact persons
    - Steve Pizarek – Network Engineer – spizarek@cinergy.com
    - Chip Orben – Economic Development Representative – corben@cinergy.com
5. Residential broadband service/needs
6. Additional Notes

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City (Administrative)

Current/Future bandwidth capacity/infrastructure/services

- Oakel used to handle city and county networks until April 2001
    - Scott Mayes his successor for the county
- City & county created Columbus downtown campus (see map)
    - 12 pair throughout network
        - Mostly use only one pair
    - Most buildings tied together
        - Running at 100Mbit full duplex (private)
        - Ameritech at 10Mbit -> contract up in 2004; paid for by city, county, and city utilities
        - Private piece owned by JV between city and county
    - Used for
        - Internet access, email, financials
        - Work between police and dispatch
        - GIS system for surveying
            - GIS system was a city and county JV (county keeps most of the data)
        - Possible plans for phone over the campus network
    - County and city have separate network support
        - Each location responsible for their purchasing and maintaining their own equipment
        - Very little maintenance
    - County has a wealth of information that could be made available electronically (maps, records, etc)
- City currently provides on-line park reservation
- Just signed a contract with McLeod to provide interlada and intralada long distance

Frustrations

- Telecommunications Commission disabled telecom progress
    - Tried to create overall city network – focus was TV
        - Cable provider to link buildings together
    - Held money for project funding
        - Should not hold funds – stopping private projects from happening
- Ameritech - trouble getting line and feature repairs done in a prompt manner to difficulties with directory listings

Additional Information

- Locations that are not part of the campus network as of yet:
    - Fire stations 2-6 (dial-up to Citrix box)
    - Airport
    - Animal Control
    - Police/Fire Garage

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- Commons

Future

- Would like to see high speed access to the home
- Internet-based exchange of information
- More Columbus related content for users
- E-Commerce for city and county

Action Items

- Oakel getting electronic copies of city maps - email

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Columbus Area Chamber of Commerce

Current/Future bandwidth capacity/infrastructure/ services

- Launched a web site
- Have dial-up connection
- Used distance learning in past
    - Could be in the forefront
- Bring in theatrical/musical events
- Family programming
- Important position within the community
    - Dynamic organization
    - A lot of impact on the community

Future Initiatives

- Could be hope for videoconferencing
    - Programming could include show, puppets, artists, workshops
- Capacity to put on live events electronically
- Provide images/video of artist's work online
- Dreams
    - Center for the arts
    - Connect to actor's theatre
    - Eventually model business after United Way
    - Workshops/demonstrations on how-to
- Continue service of being the presenter
- Archive city architecture

Additional Information

- Two main functions the Art Council serves
    - Raise dollars to support future arts development
    - Service as a presenter (theatrical and musical acts)
- Not an agency of the city
    - Supported financially by the City (have a seat on the Mayor's Agency Head Council)
- Work with state; have 9 county area – re-grant funds (NEA and state dollars)
- Work with BCSC – hired as arts and entertainment coordinator
    - Work with Kennedy Center – One of two partners in the state
    - VSA Arts of Indiana
    - Involved with Visitor's Center and Historical Society
- Partner with Columbus Parks and Recreation Department
- Oversee daily operations of civic space (The Commons)
- Responsible for programming and scheduling of The Commons and the Custer-Nugent Amphitheater in Mill Race Park
- Partner with Bartholomew County Youth Services to develop arts programming for at-risk youth

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- Provide financial support (in excess of $100,000 annually) to nonprofit arts organizations through granting processes
- Present all art forms to community including: dance, theater, music, painting, sculpture, photography, crafts
- Work cooperatively with kidscommons
    - Columbus Indiana Philharmonic
    - Columbus Symphony Orchestra
    - Dancers Studio
    - ARTColumbus
    - Mill Race Players
    - Senior Center, and
    - Renfro Development
- Joint venture with BCSC is ARTS EDUCATION coordinator (not that it can't be entertaining as well)

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Columbus Area Arts Council

Current/Future bandwidth capacity/infrastructure/ services

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Columbus-Bartholomew Planning Department

Desired State

- Ability to televise local government meetings over local cable
    - Would like 2 way infrastructure with government –
    - 1 way initially - if even over Internet
- Would like a means to connect with stake holders
    - Development committee
    - Utilities
    - Elected officials
    - Public
- Schools interconnected
    - Receive information from government (e.g. meetings, etc.)
    - Vitally important to get schools connected to one another
- Talked to Eric Herrman from Ameritech about future infrastructure for community
- New Info Tech Park area must be a priority

Additional Information

- In Blacksburg they have the ability to televise government meetings
- There are architectural limitations for city buildings
- MetroXmit 7th/Central – out of compliance (landscaping)
- CBPD is permitting clearing house for the city
- City engineer handle right-of-way (Dave Hayward)
- Board of Works handles permits and control right of ways
- Must provide need for a new tower, otherwise must co-lo
- George Dutro very supportive

Action Items

- Get document discussing how tower placement is handled in community – Roger Hunt
- Schedule meeting with George Dutro – Roger Hunt
- Holland, MI – city and cable Co. who provided fiber? City/county or Cable Co.? - InfoComm

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Columbus Learning Center

Current/Future bandwidth capacity/infrastructure/ services

- Will bring together (service model) all institutions (IUPUC, Purdue School of Technology, IVY TECH) as well as workforce development
- Aggregate resources to offer "full" courses
- Sharing of information using learning center as hub and having satellite office within the community
- http://educationcoalition.com

Frustrations

- Not a significant flow of data between education institutions and workforce development
    - Employers don't use Work One
- Employers don't tap into education community
- Employers aren't good at telling what they want and need
- Need placement function
- Information not available on course offerings currently available
- Columbus treated like a 3rd world company – no xDSL!!!

Future Initiatives

- Provide seamless education for an individual from birth to death
- Make courses available for corporations that are interested (asynchronous learning)
- Use as technology hub (schools, home, or workplace)
- Sharing information (workforce) for community access.
- Bring course from anywhere in the world – not location specific

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Columbus Municipal Airport

Current/Future bandwidth capacity/infrastructure/ services

- Went from dial-up to TLS wireless
    - TLS utilizes airport tower
    - Not a reseller of TLS wireless
    - Pleased with TLS service – no problems to date
- Fiber in the area (InfoTech Park)
    - Possibly fiber on airport campus (Cummins)
- 2,000 acres (farming, runways, InfoTech Park, small industrial park)
- Data flows from airport to City Hall
    - No link to City Hall

Frustrations

- Problems with Ameritech phone service

Desired State

- Internet services menu for businesses that want to build on airport land
    - Dial-up, wireless, fiber
- Wireless infrastructure through entire facilities

Additional Information

- Self-funding, but city owned

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Columbus Regional Hospital

Discovery Topics

1. Address network related problems/difficulties/needs
    - Need full fault tolerance including both COs
        - 95% of Columbus on same CO
        - CRH has noticed few Telco related outages
        - Small central office COs near Woodside/Walesboro, IN
        - Ameritech CO in Columbus and in Woodside/Walesboro area
        - Overall, need multiple carriers and diverse paths out of Columbus
    - CRH would like local calling to those involved in lab JV in Bloomington
        - Southern Indiana Clinical Labs
        - Hospitals are separate entities
        - Centralized fax
        - CPU located at CRH and BH to access applications via WAN
    - CRH Needs to Expand its Data Center - Options Include:
        - Renovate
            - K-12 data center may relocate here
        - Relocate Data Center
            - Cummins Data Center has capacity with experience and capability
                - EDS built/Lockheed Martin running Cummins Data Center
                - Previously discussed shared space for the hospital's data center within the Cummins Data Center
                - Initial discussions included the potential for Cummins to become outsource Data Center provider for other healthcare facilities outside of Columbus and use CRH as a reference
                - A shared Data Center may not be a viable business concept for CRH and/or Cummins
                - Columbus has a potential to create redundant data centers with redundant network connectivity. Is this something the community even wants to pursue?
                - Columbus Learning Center – 2nd major data center
                - Use as sales tool for incoming companies
                - Links to IUPUC/Ivy TECH
                - High Tech life-long learning center/neutral learning center
    - Toll access to Indianapolis, Bloomington, Franklin, Jennings County
        - (812) area code, close to (317)
2. Current/Future bandwidth capacity, infrastructure, & services

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- Local cable company (Insight Communications, AT&T) installed "videoconferencing network"
    - Institutional Loop, fiber?
    - Circa 1996, 1997
    - Schools and city hall
    - 13 approximate locations
    - Insight provides the infrastructure and AT&T manages it
- CRH will have OC-12 SONET to CO
    - Diverse paths
    - 5 year lease fiber/infrastructure by Ameritech
        - FLM 600
    - Long Term Vision – Community Health Information Network concept
    - Include any location where health data is generated and/or captured such as Employers, schools, social agencies, health providers, hospitals, etc.
    - Healthcare information is currently collected at numerous sites throughout the community and is not easily shared today. The long-term vision of an electronic medical record will have potential implications on the community network.
    - Moving toward Electronic Medical Records
        - Bandwidth driven my Electronic Medical Record
        - Some Old medical records are in the process of being scanned to optical image.
        - Some Teleradiography exists today– Digital
    - Currently, hybrid to 13+ facilities via T-1s
    - Note: 2 in Nashville, 1 in North Vernon
        - Partnership with St. Vincent's (317) in North Vernon
        - Will probably hook to lab JV
        - As CRH portal and web interface expands, will need multiple ISPs with multiple firewalls
- Clinical data repository – beyond electronic medical records plus instrumentation, read outs, etc.
    - Underlying data to electronic medical records with access to entire community
- Portal Concept – CRH in the process of researching various "portal" options to provide authorized access to:
    - Patients
    - Employees
    - Physicians
    - Other medical and business partners
- EDI with suppliers and SCM
    - New SCM solution forthcoming
- PACS – Picture Archiving System
- Potential for Tele-Medicine
    - Continuing Medical Education (CME) for professional education

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        - Clinical experts – video transmission
        - E-Learning for physicians available to people at their homes
        - Physicians have Internet Access through CRH via 128 bit SSL
            - Provided since 1998
            - Access to patient records
            - AS5200
    - Clinical Browser – via Internet
    - Ob-link – can use fetal step & heart beat over Internet
    - Investigating Horizon Physician's Portal
    - Tele-Radiography – on-call staff with joint venture with St. Vincent's
        - Columbus Regional Hospital – 6 Physicians homes - St. Vincent's, North Vernon
        - 2 BRIs
        - Partially meshed network
        - Client-side technical assistance
3. Current network service provider(s)

Columbus has Ameritech

    - Bloomington has Ameritech
    - Jennings County has Verizon
    - Challenge to get there cost effectively
    - AT&T used for long distance
    - Two dedicated T-1s for long distance
        - National purchasing plan pricing through VHA
        - Ameritech provides single T-1 for CRH's access to IQuest (Internet Service Provider) in Indianapolis
        - PIX 10000 for all Internet traffic
        - PIX 10000 for application vendors (separate)
4. Key contact persons
    - Verizon
    - TATA
    - AT&T
    - Columbus Learning Center – Georgia Miller, John Burnett
5. Residential broadband service/needs/options
    - Investigate availability/penetration of cable modem and Ameritech xDSL
    - Feasible in Columbus for single bill (voice/data/video) for residents (overbuild)?
    - Investigate Tipton Lakes – no broadband service
6. Additional Notes
    - Audrey Tyree is the BCTC co-chair
    - Investigate DC Ranch, Scottsdale
    - Investigate Wireless – TLS
    - Investigate AT&T and infrastructure from Columbus out
        - Buried?
    - Print out detailed maps of MetroXmit fiber for key constituencies

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Additional Data

1. Diagram of current/future network design(s)
    - *CRH: Steve*
    - Obtain “Institutional Loop” map from Insight/AT&T
2. Location of the demarcation point
    - *CRH: Steve*
3. Building plans (with utilities)
    - *CRH: Steve*
4. Location of equipment closet
    - *CRH: Steve*

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County (Administrative, Legislative)

Discovery Topics

1. Address network related problems/difficulties/needs
    - Frustrations – difficulty in troubleshooting & solving problems due to involvement of multiple agencies, companies. Multiple agencies owning and operating equipment and fiber.
        - Very frustrating trying to deal with Ameritech – very difficult to get ahold of the right people through dispatch center, esp. for Centrex problems
        - Weekly problems, esp. with Centrex, problems are not diagnosed and fixed quickly. 3-4 month turnaround on problem/requests ; even with centralized Ameritech expediter designed to work with county and lobby within Ameritech for more coordinated service
    - Expansion
2. Current/Future bandwidth capacity, infrastructure, & services
        - Current Services –
            - Current Infrastructure –
            - All 4 downtown buildings currently linked by private fiber (12 strands, 6 single mode, 6 multi mode)
                - GOB – Main County office building
                - County Jail
                - County Courthouse
                - Court Services Building
            - Some 100M Ethernet, one pt-to-pt GigE link
            - Topology is hub & spoke with all fiber terminating in Probation (Court Services) building. 5 yr plan is to get gigabit Ethernet all the way to the servers
            - Want to shift net mgmt center to GOB (Main county office building), this is underway
            - Leased fiber (Ameritech) from City Hall to Youth Service Center (east Columbus campus: corner of Illinois & Cherry) Includes: Youth service center, County annex building, Highway department, 911 dispatch center
            - City buildings: all inter-building connections leased from Ameritech
            - Voice – currently using Centrex from Ameritech as joint venture with city; long distance is currently with AT&T but Scott believes they have switched to another company
            - City – has a Northstar system hooked up to Centrex
            - Wireless – county owned paging equipment linked in Indiana Paging network via county's 911 tower
            - Internet service – TLS has wireless antenna on top of county building and takes special care of county as a result. 3Mbps guaranteed bandwidth

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        - Desktops – working toward standardized desktops Windows 2000, about 280-300 workstations, 12 Intel servers, 1 Unix server, 1 AS-400 (state owned) for ISETS (child support system), converting from coax (5250) transmission to terminal emulation on PCs over ethernet in June
    - Future Services –
        - Trend is toward more on-line governmental services. County government does not have a sense that there is a large demand for these types of services; currently have a county web site (< 1yr old) , taxes can be paid on-line, and e-mail can be sent to all county offices. GIS (Geographic Information Systems) tied to a data warehouse with all information layered above a given parcel should be available "very, very soon". All publicly available information re: a given parcel will be available to everyone although registration will be required. Public court records will also be available via the internet soon, currently only available via private direct dial-up
    - Future Infrastructure –
        - Looking to replace leased fiber link from City Hall to Youth Service Center with proposed private fiber; going to bid for work, will be 12 strands single mode
        - Looking to add Layer 3 switching – no VLANs, more concerned with QoS than securityProposed private fiber from Court services bldg to central dispatch will replace current wireless link
        - Plan is to get off Ameritech Centrex and bring in their own PBX with distributed switches at various county buildings
3. Current network service provider(s): Ameritech, AT &T, TLS
4. Key contact persons
    - Scott Mayes, Director, Bartholomew County Information Services
    - 379-1542; smayes@bartholomewco.com
5. Residential broadband service/needs
    - Complaints on poor quality of cable tv reception, esp. north of 27th st. Fuzzy reception on local cable access channel and picture fades in and out in general
    - Very bad trying to get repairs (weeks)
    - Takes forever to get lines moved (for construction projects)
6. Additional Notes
    - It was mentioned that fiber was run about 10yrs ago along "people trails" in Mill race park. Who owns that fiber?
    - Management of the proliferation of microwave towers is a concern. Carriers lease an acre or so from land owners and expect the landowners to pay county fees and submit re-imbursement requests to the carriers, county wants to deal directly with carriers

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- County needs to know exactly where lines are buried. Currently lack good followup after project completion to determine where lines were actually buried as opposed to where they were supposed to be buried.
- There is a definite need for training on basic apps such as MS Word to not only increase user productivity but also allow network and IS support personnel to make better use of their time.

Additional Data

- Map of fiber (wireless, T-1) between city/county buildings (owned and leased) provided –hardcopy
- Mark will forward electronic AutoCAD file

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Cummins

Discovery Topics

1. Address network related problems/difficulties/needs
    - Dealings with Ameritech have been less than adequate
        - Single CO
        - Cummins uses Gigabit Ethernet, however, being charged for FDDI and the monitoring of the links
        - Links are failure prone
        - No option for dark fiber
        - Trying to get fiber to Seymour, 20 miles total, 12 owned by Ameritech and 6 owned by GTE
            - Ameritech and GTE will not work together
        - All city telecom runs through 3 block section of downtown
            - Vulnerable to disaster
        - Ameritech will not move fast until another CLEC comes to town
        - Cummins would like more control over CPE equipment
    - Centralized management of IT services
        - Redundant links within and out of Columbus required
            - Two ISPs
            - Two COs
2. Current/Future bandwidth capacity, infrastructure, & services
    - Current Cummins Columbus infrastructure
        - 8-9,000 people in Columbus/Seymour
        - Mid-range engine plant and engineering facility in Walesboro
        - FastEthernet services over Ameritech fiber
            - 12 links
        - Centrex phones
            - DMS100 in CO
        - Private fiber
            - 36 strands in 1 multimode fiber
            - 1 block - 7th and Brown
            - Running Gigabit Ethernet
        - Dark fiber
            - Running Gigabit Ethernet
            - 6 strands
            - single mode
            - Between IT building and Breeden Realty
        - EDS built/Lockheed Martin running Cummins Data Center
    - Current Cummins Global infrastructure
        - 500 Routers – 1000 Circuits
        - 300 Point of Presences in the U.S.
        - 98% IP based network
        - Some IPX
        - SNA is tunneled over IP, no native SNA

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        - All Cisco switches/routers, mostly frame relay
        - 25,000 Notes users
            - Servers located in Columbus
        - Vitalnet from Lucent monitors link status and capacity management information
            - Long Term Vision
        - IT building will become organizationally centralized Data Center and NOC, will follow applications strategy
        - Following initial Data Center plan, remote NOC and Data Center plans will begin
        - Currently in negotiations over new contracts with Ameritech
            - Plan for future will be clearer after February 4th meeting
        - BRP and DWDM
3. Current network service provider(s)
    - Seymour serviced by GTE
    - MCI (UUnet T-1) and AT&T (fractional T-3) for ISPs
    - Ameritech provides Centrex
    - AT&T provides long distance
4. Key contact persons
    - Cummins – John Crowther – 812-377-3544 - john.m.crowther@cummins.com
    - Cummins – Michael T. Gallant – 812-377-7908 – mike.t.gallant@cummins.com
    - Cummins – Floyd K. Rutan – 812-377-8458 – floyd.k.rutan@cummins.com
    - Cummins – Vernon Wilson – vwilson@cummins.com
5. Residential broadband service/needs
    - Investigate availability/penetration of cable modem and Ameritech xDSL
    - Investigate Tipton Lakes – no broadband service
    - Choice One – DSLAM in CO
    - Insight looking for new ISP partner
    - Wireless networking
6. Additional Notes
    - Jim Henderson is on the board of SBC
    - Arvin Meritor also has person on the SBC board
    - City has private fiber between City Hall, County Courthouse, Jail, and Government Building
    - 3 Big Obstacles
        - Vulnerability with one CO
        - Dark Fiber when wanted
        - Ameritech and GTE providing link to Seymour
    - Received additional diagrams and information from Mike Gallant concerning City networking initiatives spearheaded by United Way

Additional Data

1. Most diagrams and related material can be obtained from Mike Gallant

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Economic Development Board

Current/Future bandwidth capacity/infrastructure/ services

- Home/School
  - Visionary use of home/school connections
    - 100% connection w/kids - Every home gets connected (with public school child) – 20% homes have public school children
    - Traditional info – schedule parent/teacher conference
    - Videoconferencing
    - All curriculum materials available on-line including all required software
    - Increased flow of traditional information, parent awareness
  - Last year 4 teachers, 77 students; This year 26 teachers, 600+ students
    - Teachers become instructors
    - 5th/6th grade (couldn't get all of 5th grade)
  - Teachers get laptop with understanding of expectations that program has certain data requirements
    - Track communications (pre/past)
    - Rubric with elements of tech
    - Survey
    - Web Page
    - Must participate in on-line discussions via hospital web site
    - Could receive 3 credits for free from IUPUC
    - CEU (Continuing Education Units)
- Tech Reconnect
  - Community recycling event each year
  - C4 vocational program
  - Dell has program where students can build their own PCs
    - May be interested in
    - Ideal location would be in IVYTECH -> A+ certification

Additional Information

- CCP break down
  - Executive Committee – John, Tim, Will
  - Steering Committee – other sm. -> med. Businesses, Arvin, edus.
  - Working Committee – Beth, hospital, Cummins, Arvin, schools, Heather Brock part-time
- EDB formed CCP to look at tech development in the community
  - Group of volunteers
  - Researched Advanced Manufacturing Center
  - Focus shifted to community part
  - 4/2000 – new direction including Ed on Steering committee
    - Formalized charter
  - 5/2000 – new group – is it possible to get collective buying power? -> PCs, network infrastructure

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        - Sent out RFI and then 24 RFPs for infrastructure development and hardware
        - PeoplePC responded
            - Couldn't come up with Community Model
            - Wouldn't share corporate plan
            - Corporate sponsors significant underwriters
        - Spoke with Gateway
        - Tried to establish partnership with Cinergy
        - Ultimately, no response to RFP
            - Will be reissued for parts not covered by InfoComm
- Telecommunication Review Board
    - 3 appointed by Mayor, 3 appointed by commissioners
    - City governs 70% of funds, 30% governed by City Commissioners
- BCTC pledged two things
    - Promised Community Needs Assessment necessary to negotiate cable franchise agreement
        - In 2000 Cable franchise agreed to provide cable modem access (Beta testing in 3Q2001)
    - Do technical needs assessment ~ more infrastructure than was related
        - Probably more cable related
- BCTC sets excise tax, City Council approves and goes into fund for telecom projects
    - Fund pays for BCTC, $100,000/yr.
    - Balance @ $1,000,000; $200,000 annually
- CCP needed to know the % of people connected or not connected.
- CCP suggested broader needs assessment
- Judy - Jackson Community Development Director
    - Recommendation -> want to go to City Council for actual approval
    - Approved 15k -> suggested $300k/yr. for next 3 yrs.
    - Budget: $300 ($270.5) -> June 30, 2002
- CCP is not appointed – just an ad hoc group
- Launched a pilot and collected data (just a few months)
    - May '01 – Tremendous results – Presented results publicly in June
    - July '01 – presented to City Council
- CICP (Central Indiana Corporate Partnership) is funding the InfoComm work
    - Lilly endowment
    - 11,000 BCSC students, Flat Rock/Haw Creek has 1,500 students

Action Items

- Re-define BCTC
- Incorporate/formalize CCP
- Identify revenue stream
- Talk to Mike Jamerson about the superintendent of other schools bringing on IT person (Denise)
- Email Beth about city/county people (done)

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- Community Networks White Paper version 1.3

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ETC (formerly Sunman)

Current/Future bandwidth capacity/infrastructure/ services

- Connect to Verizon in Seymour for PSTN
- 500 lines to ILEC
- Based in Sunman, IN
- OC-12 from Sunman->New Point->Batesville->Sunman
    - CLECing Batesville
    - Have fiber between Batesville and Greensburg
- Provide Internet, cable TV (own headend), wireless, dial tone
- 2 fibers connecting schools in Greensburg (20 year IRU)
    - Within next year, telephone & Internet services
- Bought fiber from MetroXmit (through Columbus->Shelbyville)
- Looking at 802.16 for metropolitan area wireless
- Have LMDS license in Columbus, Seymour, North Vernon
    - 28GHz – 1Ghz of bandwidth
    - Delivery of services over LMDS
    - Residential cost prohibitive
- Sprint wireless could be bought up in Columbus
    - Can market product as their own through Sunman
- Batesville
    - Long build-out
    - 70% penetration for business (2500 lines is goal)
    - ~800 customers
    - Want to be known for quality service provider (slightly cheaper than Verizon)

Frustrations

- Restricted with Verizon
- Want to stop switching through Verizon

Future Initiatives

- Need to know the right time to move into Columbus
    - Are willing to partner
    - Would like to connect to Ameritech on an IXC
- Looking for alternative routes to IXCs

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Higher Ed (IUPUC, Ivy Tech, Intelenet)

Discovery Topics

1. Address network related problems/difficulties/needs
    - Frustrations
        - Funding for CLC needs to be released
            - State must approve the CLC project and the IUPUI housing project, both on Senate Bill 501
        - Distance Learning
            - Lack of support for teachers trying to utilize technology
        - Links to other educational institutions needed
            - Higher education should be networked to K-12, high school
            - Higher Ed and K12 can be networked today through ITN and in fact, that is one of the key reasons we have folks on a common integrated system. Perhaps the issue is that neither community knows that it is there or how to use it?
            - Links to Internet 2 needed
                - Not a concern yet, however could lead to good interaction with R&D at main campuses
                - ITN is linked to Internet2 today as a SEG-P partner sponsored by IU. The connectivity currently is carrying about 25M of traffic to from ITN to Internet2 and this is exclusively from higher ed connected to ITN. It could be much more with higher capacity connectivity but the driver has to be collaborative projects and R&D between institutions on other reaches of the Internet 2 fabric. I can't solve that piece, the education partners need to do that. We are working to develop a DS-3 burstable service on ITN that will allow for full use of the DS-3 access line for ITN intranet and Internet 2 use and a restructured cost for commodity Internet drainage over the same utility.

            - Links to CLC needed
        - Policy problems for Intelenet because communities are asking for help from Intelenet
            - Intelenet cannot help communities
            - This is not an entirely accurate statement. It is possible to help communities, the issue is that Intelenet can not directly support a commercial entity or non-authorized user. However, if an "authorized user", like a city or county government or some local government controlled public entity, was the broker for local interests, then Intelenet can support that entity who would deal with the various local

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community players. I can support the mission of authorized users, so find the user who will be the local broker.
        - Have to stay in the public institution realm
        - Yes, given the context of above. However, having said that this approach is not meant to fly in the face of the marketplace, our interests would be to stimulate commercial broadband development and/or to be the broadband provider of last resort absent the commercial market. If that's what we do, we need the public entity construct noted above.
    - Ivy Tech
        - Bandwidth problems, could use another T-1
        - Communication problems with Ameritech
    - Inter-institution cooperation
        - Internal and external issues preventing such cooperation
        - Separate institution integrity must be maintained
        - Better videoconferencing between W. Lafayette and IUPUC
- Concerns
    - What are the geographic boundaries of the community
        - Five county area (Franklin, Greensburg, Versailles, Seymour, etc.)
            - Expandable
            - South Central Indiana Education Coalition
            - South East Indiana Education Coalition
        - Within city limits
        - Within county limits
    - Security
        - When students take classes at company sites, the company does not want students accessing their internal network
        - Students sometimes experience difficulty accessing internet-based courseware due to company firewalls and security policies
        - Access to Learning Center resources is important, not only from high school, but from everywhere classes are taken
    - Community Network Business
        - Service level is an issue
            - Support cannot be volunteer based
            - Community based utility
            - Significant resource consideration
        - Lack of money, training and equipment
        - Should develop local technical talent that is willing to stay and be rewarded for their efforts
        - Must be scalable to reach outside city/county limits to reach other students

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        - Must have community content as well as Internet access
2. Current/Future bandwidth capacity, infrastructure, & services
    - Current Initiatives/Infrastructure
        - CLC Building
            - Cosintini consulting group from NY did planning for new CLC building
            - Broke ground in August
            - Problem is that Work1 (State agency for welfare) must have secure network and separate servers locked by themselves
            - BCSC to have data center in CLC
        - Distance Learning
            - Classes in high school and in mall
            - IHETS satellite
                - I know most folks know this but IHETS satellite is one-way video and two-way with audio. The two-way video is provided via ITN connectivity and currently via ATM service but we are implementing the H323 pilot this spring with Higher Ed hopefully making it production in the fall. This again will most likely drive need for the DS-3 broadband product I noted above where burstable 45Mbs rates on ITN will be supported for needs like videoconferencing.
                - We use IHETS satellite (one way video/two way audio) and the Ivy Tech statewide Two-Way Video network, which is "administered" by IHETS. I'm not sure what the correct wording is for this -- our multipoint scheduling is done through IHETS, our line charge is paid to IHETS, and IHETS Control provides our technical support for connectivity issues. Our units are V-TEL. Jason Whiteaker, ITSC Central Office can address the technical side of our statewide two-way video network.
            - PolyComm viderconferencing
                - 2-way between Columbus and West Lafayette
                - T-1 dedicated to PolyComm
                    - Switched to Indianapolis
            - Ivy Tech Internet based courses
                - Completely Internet based
                    - 14 courses
                    - 200+ students
                        - 249 enrollments in Columbus originated Internet courses for spring

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            - 124 enrollments of Columbus students in courses originated by other Ivy Tech campuses for spring
        - Students can be anywhere in the state
    - Academic.com – good for adjunct faculty
    - Academic.com is the Ivy Tech statewide course management platform; Academic.com is reseller for Blackboard.com. It is used for both Internet course delivery and document sharing and communication for on campus courses as well. All faculty (full-time/adjunct) and all students have accounts automatically created by Student Information System.
    - Early childhood education
        - 3 2-way video classes
        - We have 2 Early Childhood Education two-way video classes this spring, and 3 Paralegal two-way video classes this spring. I believe the Nursing programs online are IUPUI originated.
    - Nursing programs done heavily online
  - Community Learning Network
    - Designed to help K-12 bring technology to the classroom
  - IU Distributed Learning Initiative
- Satellite Campuses
  - IU has agreed to offer degree programs in Columbus
- Intelenet
  - IT services to public sector institutions
    - Limited to what can be provided over copper
    - This has a large practical reality in many rural parts of Indiana but the ITN network is not constrained to only copper for as we pursue the broadband connectivity options especially around DS-3 access service arrangements, they must be delivered on fiber or wireless. However, copper is the dominant medium.
    - Looking to bring government IT initiatives from distributed to centralized
    - The initiative is not an e-government initiative but an economic and support initiative across ITN. Given the service contracts on bandwidth and its postalized rates across the state, from a support and cost perspective, it does not make sense to have distributed switching/routing nodes throughout the state. Consequently the support issues on the

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complex networking technology are more easily supported centrally in Indy. And we are moving to do that through this summer.
        - There is an e-government initiative underway but it is not relevant to Central or distributed network resources on ITN.
    - Fiber infrastructure
        - Looking to leverage right-of-ways along Federal highways
        - IU and Purdue are pushing the build of 74 in order to bring Cincinnati and Champaign onto I2.
        - Intelenet does not own the fiber
        - IUPUC will be off Genuity network (2 T-1s)
        - Intelenet is working with IU on this but I suspect that this will happen later this year. Probably move to AT&T contract. Again, this info may not be relevant to overall study. The following capacity point probably is more relevant especially to IUPUC.
        - IUPUC is not going to be changed off of T-1s though
        - Node at AT&T POP in Columbus
        - Again, we are moving to centralized design but we will still use AT&T POPs for circuit aggregation back to central services in Indy.
- Future Vision
    - Access to web for the following individuals:
        - Schools, Government, People, Business
        - Not a computer in every home, but accessibility across all strata
        - A level of connection beyond dial-up, broadband
    - Oncourse
        - Want to work with students via 2-way videoconference
    - Distance Learning
        - Faculty at all institutions to use telecommunications to deliver courses
            - Must have support in order to encourage faculty to participate
        - 2-way video interactions with business sites
        - Blend of classroom/virtual delivery
            - "Distributed Learning"
        - More delivery of flagship campus courses to satellites
        - Access to learning center resources via local secondary education locations
    - All three Columbus institutions working together
        - CLC will provide place to interact together

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        - Ivy Tech believes training programs could be utilized by community
        - Less network, more support to start
3. Current network service provider(s)
    - Genuity fiber to IUPUC campus, interconnects to IUPUI
        - Intelenet run on GTE lines
        - ISP is IUPUI
        - 2 T-1s
    - CoreComm out of Seymour is an ISP
    - 2 T-1s to Ivy Tech
        - 1 to Ivy Tech central office
        - 1 to IHETS
    - SEI provides phone towards the southern part of county
4. Key contact persons
    - Georgia Miller
    - Jerry Sullivan
5. Residential broadband service/needs
    - Frustrations
        - No alternative broadband service for residents
    - Future
        - Workforce in future will market skills independently & work from home selling these skills to many different companies
        - Alternative services should be considered for the greater Columbus area
            - TLS Line-of-Site wireless
6. Additional Notes

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Insight Communications

Discovery Topics

1. Address network related problems/difficulties/needs
    - Ownership
        - Growth initiatives uncertain at this time
            - Owned by AT&T
            - Managed by Insight
            - Insight trying to purchase
        - @Home cable modem service going away
    - Expansion
        - Only build to areas where there is at least 40 homes per mile
2. Current/Future bandwidth capacity, infrastructure, & services
    - Current Cable Plant
        - 70 analog CATV channels
        - Passes 20,000 Bartholomew County homes
            - 63% of these subscribe
        - 750 MHz 2-way fiber backbone
        - Digital service capable
            - Compresses 12 channels into one analog channel
            - Not providing this service yet
        - High speed Internet services offered over cable modem
            - Currently not marketing
            - 90% has access to cable modems
            - 10% still have bugs
                - Most bugs are in multi-tenant units where wiring is inadequate
            - Guarantee 100x 26K
                - 300-1000 people per node
            - Focus on residential, not commercial
        - Home-runs from nodes to head-end
        - DS-3 interconnected with Ameritech and AT&T (Henry Street)
            - Option for up to 3 DS-3s
        - Signal generation
            - All satellites in Columbus are inactive
            - Optical Fiber Manager at local site
            - Digital signals generated from satellite in Bloomington, then sent to Columbus via fiber through Seymour
            - Analog signals generated from satellite in Seymour, then sent to Columbus via fiber
        - Offices interconnected throughout the state
        - Using some of MetroXmit fiber to west
            - This is the longest run
    - Current Services
        - In house support and splicing

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        - Willing to offer this service to other fiber owners
        - Already service entire South Eastern Indiana AT&T cable network
    - Future Cable Plant
        - 2003 will offer telephone services
            - Currently model being implemented in Louisville
        - Will connect AT&T/AOL in Indianapolis
        - Willing to open ISP service to multiple businesses
            - Must meet company specifications
            - Must also meet FCC rules and regulations
        - Willing to lease fiber
            - Must be cost beneficial
3. Current network service provider(s)
    - Ameritech & AT&T interconnect to get to Henry Street
4. Key contact persons
    - Keith Rogers – call local Insight office
    - Robert Hensley – call local Insight office
    - Linda Colaluca – District VP – 812-355-7811
    - Tom Flora – Operations Manager – 812-373-2165 Ext. 210
5. Residential broadband service/needs
6. Additional Notes

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Irwin Financial

Discovery Topics

1. Address network related problems/difficulties/needs
   - Frustrations – Telcos here are:
     - Undermanned
     - Poor quality service, unstable
     - Poor quality of physical lines
   - Ameritech frame relay service does not appear to support bursts, AT&T better
   - Expansion
2. Current/Future bandwidth capacity, infrastructure, & services
   - Current Services –
     - All IT services are run from the Columbus office
     - New growth strategy in outside So. Indiana.
     - Trying to push voice over the data network but does not work well when voice must cross both AT&T and Ameritech's frame network
     - All web services are outsourced
     - E-commerce provided by outsourced web providers, Irwin has a frame relay connection to them, Not happy with the stability of the Net Teller product
     - Use Jack Henry Assoc. 2nd largest provider of bank svcs, maintain mission critical sites for disaster recovery
   - Current Infrastructure –
     - Gone to a thin client architecture – Citrix
     - Lowered costs in So. Indiana paid for expansion into other areas
     - Currently lacking here – good frame technology to many locations, it is still cheaper to deploy pt-to-pt circuits esp. over short distances
     - Just starting net-net VPNs
     - Have a dual fiber access ring to Ameritech , brought in as DS-3 from Ameritech
     - Internet access currently – T-1 to Qwest, probably wired thru Ameritech, back-up with Ameritech DSL T-1(copper)
     - Ameritech is secondary ISP
     - More Internet traffic from HQ than to HQ
     - Adtran units for bandwidth management on pt-to-pt T-1s in So. Indiana
     - Today – two T-1s would do all voice and data over the Internet
     - Currently send foreign dial tone to branch offices
     - Trying to solve voice problems on Ameritech frame first – Does Ameritech offer SLAs?

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        - Voice – have 300 DID lines – Centrex?
        - Rolling out remote access VPN for users now
        - Network to Network VPN probably in the next 6 months, Cisco, Symantec is firewall vendor
    - Future Services –
        - Customers will want full real-time access to all information
        - QOS will be enabled to provide better support for voice over the data network
        - Key to efficiency – more services, all Internet based, wireless delivery of all services to mobile devices 10 years out
        - Offered to pay for broadband DSL for at home workers
        - Biggest key is Internet access – reliable, high speed, cost effective
        - Wireless will be important for end customers but will be from the customer to the ISP, not to Irwin
    - Future Infrastructure –
        - Next 18 months – all frame , pt-to-pt with dual internet access, VPN technology
        - eventually -All internet based
        - Vision – voice and data intra company within the Internet. Will use TDM over IP via E&M cards on Cisco routers initially – IP trunking on existing PBXs
        - Currently lots of exposures – desire is for better disaster recovery (even a HS gym) – revenue for community network – support for community data center?
        - Pre-equipped facilities, community owned, shared hot sites, cover all community entities, backups via dark fiber
        - Carmel branch is current hot site, in an emergency AT&T would swing all HQ circuits to that branch

3. Current network service provider(s): Ameritech
    -
    - Service outages
        - Last 1-2 years, 1 branch for 1 day 2 times per year
        - 2 branches per year for 1-2 hrs
        - Local branches can all run for one day in standalone mode
4. Key contact persons – Randy Brewer: VP of IT, 812-376-1830; randy.brewer@irwinunion.com
5. Residential broadband service/needs
    -
6. Additional Notes
    - Irwin is extremely reliant on telecomm
    - It must be reliable, quickly deployed, delivered at the negotiated bandwidth, and be cost effective
    - There are currently problems in meeting all of the above criteria

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Jim Gordon

Discovery Topics

1. Address network related problems/difficulties/needs
    - Frustrations
        - Small businesses lack cost effective option for broadband
            - T-1, ISDN and wireless(satellite) are all too costly
            - DSL is the answer
                - Infrastructure is not there yet
2. Current/Future bandwidth capacity, infrastructure, & services
    - Current Services
        - ISP
            - Work with IQuest
                - Resell their Internet
                - Looking into MetroXmit fiber to Columbus
                - Servicing out of REMC location
        - Provide full networking solutions for small businesses
            - Do not provide wiring services
                - Contracts Dave Lambert or Forester Electric to do wiring
                - Currently pulling fiber for county
        - Wireless
            - Downtown up and running
3. Current network service provider(s)
        - T-1 through I-Quest
4. Key contact persons
    - Glen Gordon – Certified Netware Engineer – ggordon@jginc.com
    - Jack Carr – President – IQuest
5. Residential broadband service/needs
6. Additional Notes

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John Hackett

Current Needs

- Need community network to attract high tech companies

Future Needs

- Single entity/voice for meeting needs of community
- Education for public awareness of community networks
- Sell how infrastructure needs to change in order to affect
- Get mayor, city council, clerks, visionary citizens to sell what needs to be done
- Network could be a private venture – limited partnership
- Need economic study of business possibilities and business plan
- Need a program to let community know what needs to be done to be "more advanced" – could be fashioned into a profitable business if favorable rate of return can be proven
    - Surcharge goes back to investors for investment
    - Beneficiaries could be IUPUC, IVY TECH, library
    - Higher Ed. would definitely need higher speed
    - Possibly check into cable provider

Additional Information

- AT&T $19.99 long distance
- Traverse City doing high tech initiatives

Frustrations

- Ameritech is an increasing handicap – getting worse – handle on state level
- Lack of education/community awareness hinders progress
- Sluggish state government

Action Items

- Why delay in getting AOL number in Columbus?
- Why only one AOL number now?
- John Hackett would like to see InfoComm plan for Columbus.
- Talk with investor, Dick Johnson (Bigfoot)
    - Lives in Columbus
    - Offices on Washington St.
    - Have John sit in – referred us

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NTN Drive Shaft

Current/Future bandwidth capacity/infrastructure/ services

- 3 T-1s
    - 1 T-1 Broadwing for long distance -> changing to McCloud USA
    - 1 T-1 to Internet through CoreCom (~Ameritech)
    - 1 T-1 to HQ in Chicago/Mt. Prospect (~AT&T)
- 2 ISDN (corporate office purchase)
    - 1 for CAD and videoconferencing (~Ameritech)
    - 1 for backup to Mt. Prospect
        - Portion of corporate office, (shipping dept.) located in Columbus, use this link
- Almost all traffic goes through Chicago (star topology)
- Aside from ISDN line, no redundant path through the network
    - Planning for redundant paths in the future (through Greensburg plant)
- Onsite data storage
    - Talk about centralized data repository in the future – possibly
- Long distance T-1 not over utilized

Frustrations

- Ameritech
    - Bad support
    - No competition – Ameritech has locked
    - Clueless employees sent to meetings
    - Supposed to meet to discuss telecom issues – Ameritech cancelled
    - Had a telephone problem that took Ameritech 1 year to diagnose and correct
- Difficulty getting ISDN
    - No ISDN in 342 exchange
    - Said ISDN was unavailable and recommended switched 56k – changed their mind ~ vice versa was the case
- Long distance to suppliers/key constituents
    - Indianapolis (317)
    - Seymour
    - Shelbyville
    - Richmond
    - Louisville
- Residential line problems and no broadband

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REMC

Discovery Topics

1. Address network related problems/difficulties/needs
    - Frustrations
        - Biggest frustration is Ameritech
            - Cost
2. Current/Future bandwidth capacity, infrastructure, & services
    - Current Services
        - Electric utility
            - Bartholomew and Jennings counties
                - Majority of customers outside city
            - Bills posted electronically to some residential customers
                - March
            - Detailed bill format for large businesses
                - Online
                - Availability will be for twelve main customers
            - 16 Co-ops in Southern Indiana
                - REMC part of larger Co-op
                - All own Hoosier Energy
                    - Generates and sends electricity from Bloomington
        - ISP
            - Dial-up
            - Point-to-point T-1s
            - Two-way satellite
                - Four customers currently
                - Limit 200-300
            - Customer base is generally 50+ years old
                - Niche identification
                - Focusing on this niche
    - Current Infrastructure
        - Electric utility
            - 1000 miles of lines
            - ~20000 poles
            - 11,000 customers
            - Prescriptive right-of-ways
                - Need to talk to legal department about them
        - ISP
            - Ameritech T-1s
                - Two T-1 outbound
                - Nine T-1 inbound for dial-up
                    - 216 dial-up lines
                - $1100/month per T-1

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            - Two point-to-point T-1 customers
                - $300-$400/month
    - Future Infrastructure
        - Electric utility
            - Remote meter reading
                - Over phone line
                - 1 min. download time
                - Product made by NRTC (National Rural Telecom Co-op)
                - Enable home owner to read own meter over Internet
                - Turtle is one option
            - SCADA
                - Not currently using
                - Possibly in the future
        - ISP
            - Lease space on poles
            - Get into dark fiber
3. Current network service provider(s)
    - Two T-1s to the Internet
        - Bandwidth through NRTC
4. Key contact persons
    - Dan Arnholt – General Manager/CEO – Darnholt@bcremc.com
5. Residential broadband service/needs
    - Most areas in Columbus cannot get DSL because of distance limitations
6. Additional Notes

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SEI Communications

Discovery Topics

1. Address network related problems/difficulties/needs
    - Concerns
        - Columbus
            - Services in Columbus depend on what the market bears
            - Don’t want to bankroll an entire CLEC project
    - Frustrations
        - Columbus
            - Seems that all talk and no walk
                - City complains of no broadband, yet no one will buy it when it is offered
2. Current/Future bandwidth capacity, infrastructure, & services
    - SEI Overview
        - 3 businesses
            - Southeastern Indiana Telephone
                - Rural telephone co-operative
                - Started 50 years ago
            - SEI Data
                - Grant money given to school system started ISP
                    - $250,000
                - ISP started in 1995
            - Hoosier Telecom
                - Call center
    - Current Services
        - Southeastern Indiana Telephone
            - Serve 4000 rural customers with phone
                - ILEC in Dillsboro
                    - Main hub
                - Broadband
                    - DSL offered to all phone customers
            - Infrastructure
                - All CLEC and ISP traffic backhauled to ILEC POP
        - SEI Data
            - ISP services to 12,000 customers
                - 12 counties
                - Dialup
                - Local dial tone
                - Broadband
                    - DSL offered to all phone customers
                    - T-1 and fractional T-1
                - Have fiber splicing truck
                    - May offer splicing service to others

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- CLEC operations
    - Madison
- Infrastructure
    - Backbone
        - POP sites in all 12 counties
        - Connected by privately owned fiber
            - Fully redundant
            - OC-12
        - Also have dark fiber
    - CLEC
        - Madison
            - Overbuild
            - 4000 total households and businesses passed
            - 400 customers
            - Worked out deal with Chamber of Commerce
            - Traded state-of-the-art videoconferencing capabilities for promotion
    - Columbus
        - DS-3 transport to main hub in offices in Columbus
        - Can offer T-1 and fractional T-1 services
            - $695 for T-1 to Internet
                - Prices more expensive for remote CO
                - Exchanges 341,342,374, and 377
        - No marketing yet
        - No phone service
        - Today no initiatives to CLEC Columbus
- Hoosier Telecom
    - Call center
        - Ability to handle many businesses
            - SEI Communications
            - Pegasis
            - Blackfoot (ISP in Montant)
        - 24 x 7 technical support for ISPs
            - Troubleshooting, etc.
- Future Initiatives
    - Willing to partner with communities/businesses who have taken the initiative to foster CLEC growth

3. Current network service provider(s)
    - WorldCom and Sprint for transport to Internet
        - Links from Dillsboro terminate in Cincinnati

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        - 42 T-1s to Internet
4. Key contact persons
    - Darin Kroger – SEI Data Manager – kroger@seidata.com
    - Bonnie Laker-Jeffries – Direct Sales Manager – laker@seidata.com
5. Residential broadband service/needs
6. Additional Notes
    - Look into Cape Grant from Lilly
        - $5 million set aside for each county

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TATA Consultancy Services

Current/Future bandwidth capacity/infrastructure/ services

- Use client's on-site infrastructure for communication needs
- Regional US sites communicate to centralized HQ in Northeast US before communicating directly with India

Additional Information

- Reliant on Cummins for majority of work in Columbus
- Leading and well-respected consultancy firm in India
- Software engineering – deploy individuals according to business need

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The Republic

Current/Future bandwidth capacity/infrastructure/ services

- Paper in Franklin
    - Two production facilities that need to communicate to Columbus
- Need broadband for The Republic to become a hub for printing in the area - as acquisitions are made
- HQ in Columbus
- Usage in short bursts – when printing and sending large images
- 1 T-1 to the Internet via McCloud (~Ameritech)
    - 14 hops between Columbus and Indianapolis over this T-1
- 1 T-1 to Woodside printing center for data (pt.-to-pt.)
- 1 T-1 to Woodside printing center for phone (pt.-to-pt.)
- AT&T has long distance service
- Want a large, cheap, reliable connection to the Internet – ideal situation
- Currently talking to TLS about wireless services
    - 8Mb/sec
- Shift toward remotely sending stores and pictures to the office while reporter is in the field

Additional Information

- Jeff Brown is President of Home News – parent company of The Republic
- 25,000 circulating newspapers
- 1,000 electronic subscribers
- 2,500 web site subscribers
- The Republic lost broadband connection (within 3 days notice) when had WinStar T-1 – WinStar defunct
- Use digital pictures exclusively
- AP uses satellite for news/pictures and now use Internet and modem too
- Virii a problem

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TLS

Discovery Topics

1. Address network related problems/difficulties/needs
    - Frustrations
        - Ameritech
            - Large amount of man hours spent on fixing incorrect billing
            - $60,000 debt that was fabricated
2. Current/Future bandwidth capacity, infrastructure, & services
    - TLS Overview
        - 12 year old
        - Focus on database and web development and ISP services
            - Very selective in database developer and CG recruiting
            - World-wide web development
        - ISP is 7 years old
    - Current Infrastructure
        - Wireless Internet access
            - Coverage from Whalesboro to Airport
            - Frequency hopping (72 channels)
            - Backbone is Wireless Inc. equipment running at 8 Mb/s
            - Distribution is BreezeCom equipment
            - Service level agreement is possible but not likely as 8 Mb/s backbone will be saturated quickly
            - Pricing
                - $799 initial for businesses
                - $499 initial for residents
                - $49.95/month for 500Kb/s up and down
        - Fiber connection to Ameritech
            - FLM and LiteSpan
                - (OC-3 or DS-3?) local loop to Ameritech
        - Ameritech DSL to some customers
            - 12 day installation period
    - Future Initiatives
        - Continue to upgrade the wireless network
3. Current network service provider(s)
        - UUNet
            - Fractional DS-3
4. Key contact persons
    - Phil Luzious -
5. Residential broadband service/needs
    - DSL will not be offered in Tipton Lakes because of copper/fiber network
6. Additional Notes
    - Need map of wireless access nodes and coverage

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Toyota – TIEM

Current/Future bandwidth capacity/infrastructure/ services

- 4 T-1 voice lines
    - 1 voice
    - 1 to ISP (Cable & Wireless)
    - 2 to two different Toyota global networks
        - Connections to sales group in California
            - Sales traffic is the largest user of global network
        - Connections to San Jose data center
        - Connections to Takhama, Japan
- Currently using EDI
- IP-based network
- "Distributed" data center – non-traditional; data kept here
- Some managers work from home – limited telecommuting
- PBX

Frustrations

- Problem with long distance T-1 when it rains – data lines are fine

Future Initiatives

- Toyota Tshuio – will be first commercial VPN client
    - Communicate through system in California through satellite link
    - Currently using EDI
    - JIT warehouse
- Moving toward hybrid solution of both VPN & EDI
- Maybe centralized data centers in the future

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Appendix D: Organizational Structure

This appendix serves to highlight the information presented to the Steering Committee on April 1st. The information that follows serves as a replacement for the organizational structures that appeared in that presentation. It was determined during the meeting that the Steering Committee was not in a position to make decisions regarding certain business model details. As a correction the organizational structure information has been broken into different business elements documented in the *Business Model Elements* section. The decisions made during the April 1st meeting have been documented below.

In defining the infrastructure and services elements it is important that the community have a good sense of the current state assets and the desired state requirements. Keeping these in mind aids the decisions associated with defining these elements. Figures 1 and 2 below represent decision trees for making this determination.

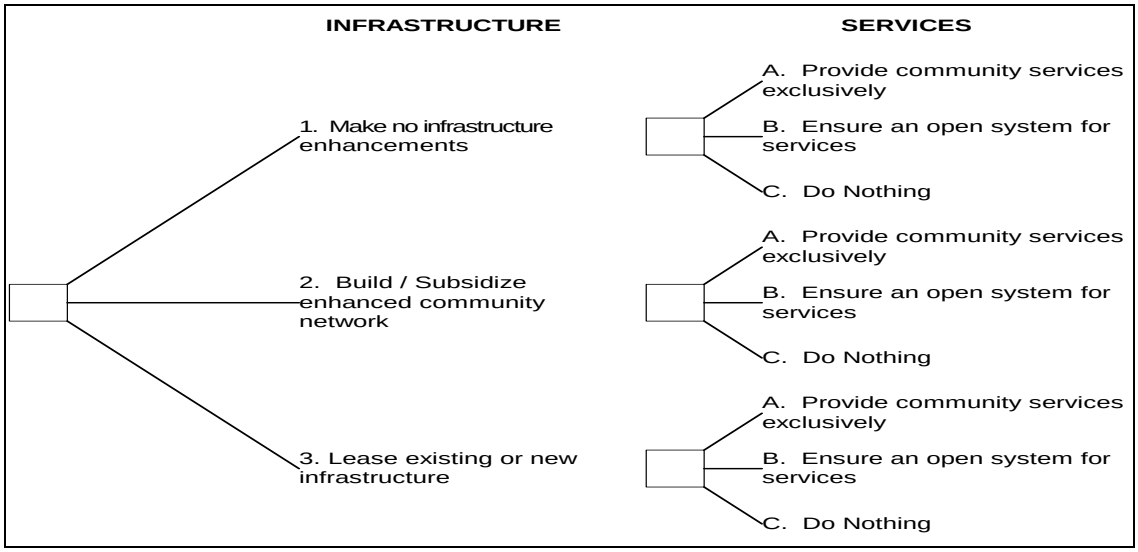

Figure 4 - Decision Process Starting with Infrastructure

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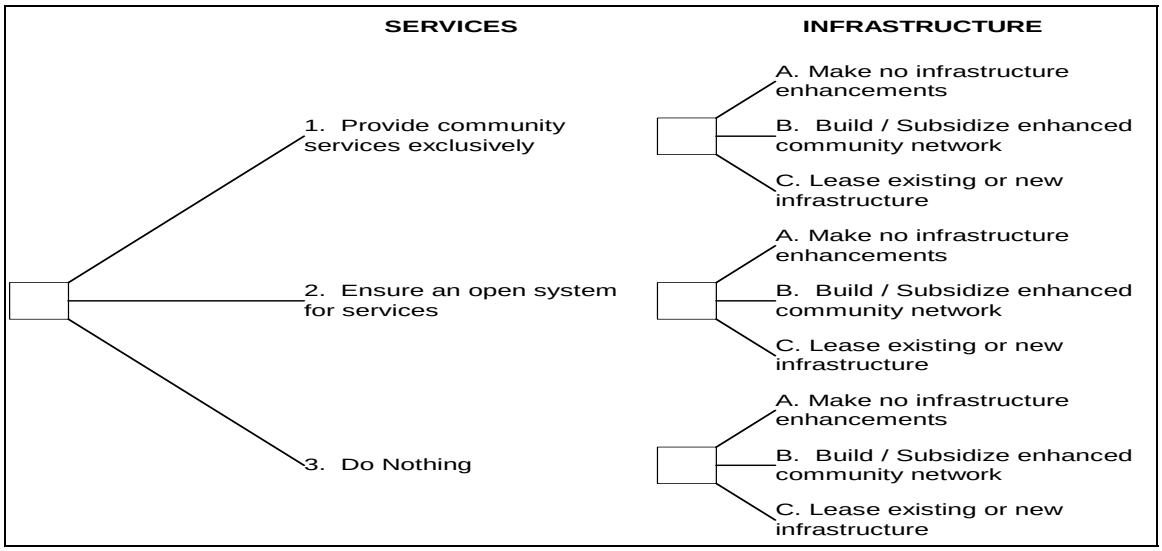

Figure 5 - Decision Process Starting with Services

During the April 1st meeting with the Steering Committee for the Columbus project, the options presented in the figure above were narrowed. The Steering Committee was able to unanimously decide that the encouragement of competition among service providers is a goal they would like to pursue. As can be seen in the above figure, this aligns with 2-B and 3-B in Figure 1 and 2-B and 2-C in Figure 2. The direction of the Steering Committee in regards to infrastructure is still unclear, as that decision requires additional business information.

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