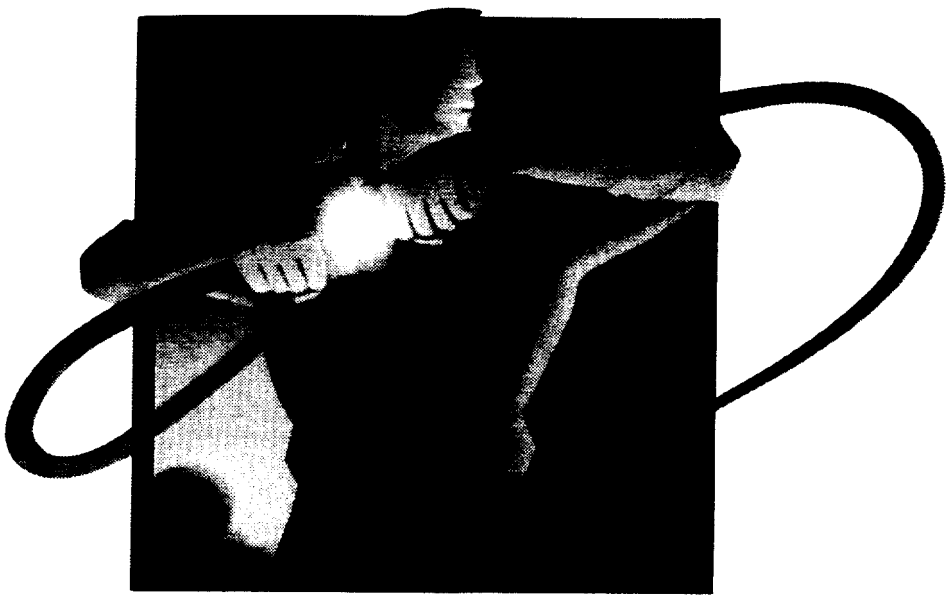


ECONOMIC ASSESSMENT OF DEPLOYING HFC BASED INTERNET ACCESS TO SMALL BUSINESSES

CISCO SYSTEMS

This paper provides a representative financial analysis for deploying business-class Internet access to small businesses with up to 100 employees. Included are the results of an economic profile developed using the Cisco broadband services economic tool. The model incorporates parameters for a mid-size multiple systems operator (MSO) leveraging an existing residential two-way service infrastructure. The profile, which considers market penetration, service revenue, equipment and operating costs, indicates a considerable opportunity in the small business segment. This provides approximately a 30 percent increase in NPV of operating cash flow over that generated from residential data and voice services. This is without even considering additional business-focused value-added services enabled by the same infrastructure (e.g., voice, managed virtual private networks, managed security), or other business segments (such as telecommuter branch offices, multiple tenant units, universities and hotels) The analysis presents a strong economic case for deploying commercial services to the small business segment.

Economic Assessment of Deploying HFC Based Internet Access to Small Businesses

Executive Overview

This paper studies the economics of deploying commercial cable services as an addition to the regular residential cable services. The study focuses on the economics of one new service—Internet access for small businesses. The financial analysis considers revenue, capital expenditure, and operating expenses in determining the economic opportunity for a typical mid-size multiple systems operator (MSO). The base case assumptions for this paper are:

- MSO has a coverage area of 1.55 million homes passed (HP)
- The same MSO also passes approximately 78,000 small businesses[1]

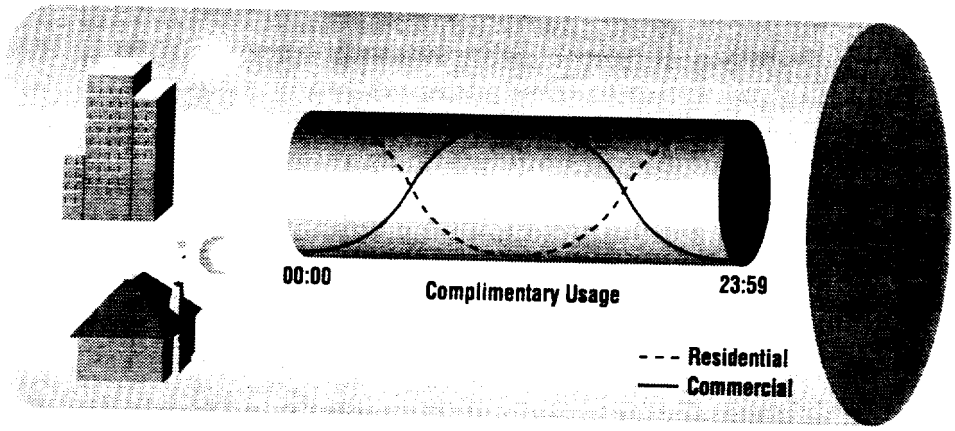
The MSO has three compelling reasons to offer small business high-speed Internet access service:

- The service can leverage the existing network infrastructure
- Small business high-speed Internet access is a large revenue opportunity
- MSOs can further up-sell other commercial services (such as managed services and voice)

Leveraging Existing Residential Networks

Residences and businesses typically have complementary usage patterns. Residences have peak usage during the evening and night, while businesses have peak usage during the day. (See Figure 1.)

Figure 1 One Network



MSOs can leverage this complementary usage pattern to provide residential and commercial services over one network. Commercial services like small business high-speed Internet access, help maximize the MSOs return on investment for the network infrastructure.

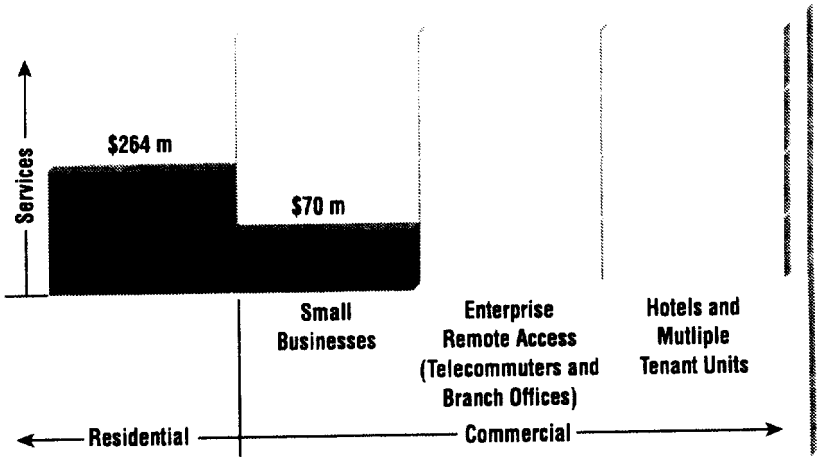
Large Revenue Opportunity

The base case—roll-out of residential data and voice services—has a net present value (NPV) of $264 million[2]. Leveraging the existing residential network infrastructure and considering the incremental expenses and investments required for adding small business Internet access services (in many cases just modem cards or additional routers), this study projects a 27 percent increase in NPV, or $70 million.

1. Based on market research data. There are about 96-million homes passed and 7.6-million small businesses, or about 1 small business for every 12 homes. Gartner Group estimates that about 60 percent of small businesses are passed by cable (Gartner Group/Dataquest Cable Opportunities: Connecting the SOHO Small Business Market. 1998 Study). Combining the two data points, the paper assumes one small business for every 20 homes passed
2. The Cisco document entitled "A Business Case for Two-Way Service Deployment Over HFC Networks" (Lit #953929) includes a detailed economic analysis of a residential voice and data services roll-out.

It is important to note that the analysis provided in this paper considers only one of many possible commercial services—small business high-speed Internet access. Although certainly workable within the Cisco model, roll out of additional value-added services such as voice, managed virtual private networks (VPNs), or managed security, is not assessed in this study. Nor does the analysis regard roll-out to other market segments that may be represented within the same service area—telecommuters, branch offices, hotels, multiple dwelling units, or universities (see Figure 2).

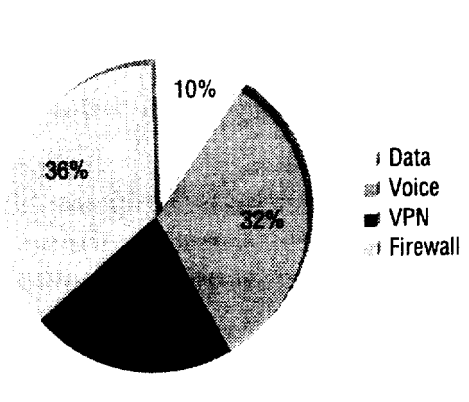
Figure 2 Opportunity for Commercial Services



Other Value Added Services

While the paper does not delineate the considerable revenue potential these added services and segments may represent, it clearly shows the tremendous potential of commercial services and provides the business rationale for commercial services deployment. The analysis presented here considers only Internet access, a service area that represents just 10 to 15 percent of the revenue potential from small business services, as illustrated in Figure 3.[3]

Figure 3 Small Business Revenue Potential



3. The revenue data in Figure 3 is estimated by Cisco marketing based on market data and competitive offers. Voice revenue is based on data from IDC Corporation (1999 US Small Business Survey). Firewall and VPN prices are estimated based on market data.

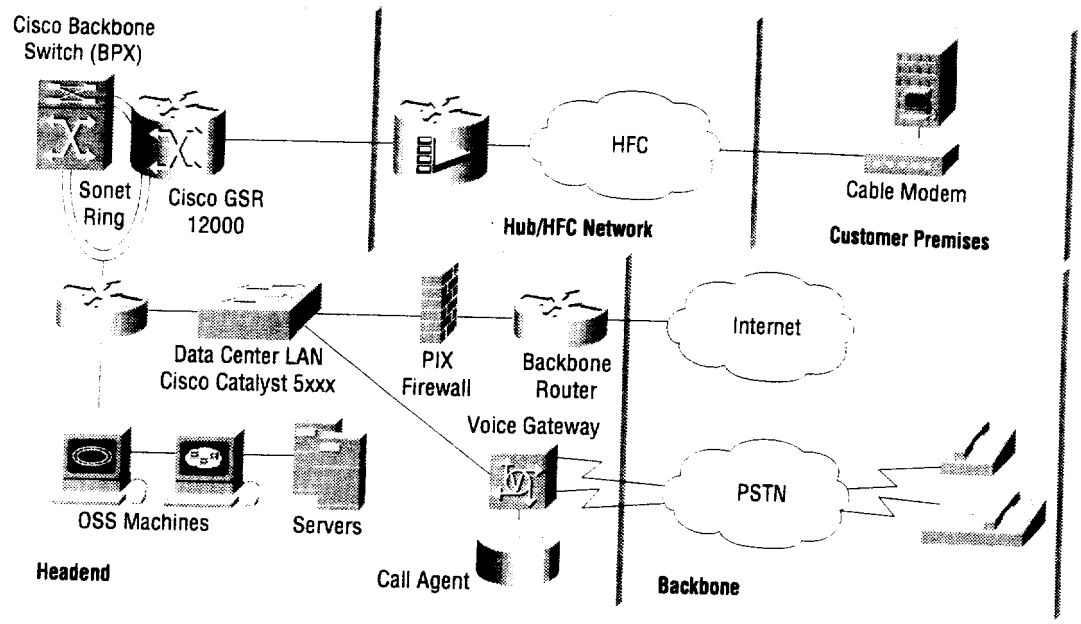
This paper covers:

- A discussion of the required network architecture for deployment of two-way services
- A description of key variables in the economic profile, including usage patterns and determining factors
- Development of the base case, including demand-side and economic assumptions
- Model output analysis, including cost breakdown, and profitability and cash flow projections
- Both high-level and detailed process flow charts, outlining a suggested MSO business flow to enable rapid, successful deployment of commercial Internet access
- Five appendices that provide detailed explanations of the methods used and assumptions made in calculating market penetration, equipment pricing, data revenues, operations costs, and salary expenses.

The Cisco financial model represents a wealth of collective experience reflecting real-world data collected by network designers and engineers, administrators, market research firms, and MSOs across a broad spectrum of size and market focus. The base case was formulated to clearly define a starting point for an MSO's own analysis. MSOs should contact Cisco Systems for personal assistance in deployment planning and for access to the complementary Cisco Network Analysis model.

THE NETWORK ARCHITECTURE

Figure 4



As shown in Figure 4, two-way service hybrid fiber coaxial (HFC) networks require these basic components:

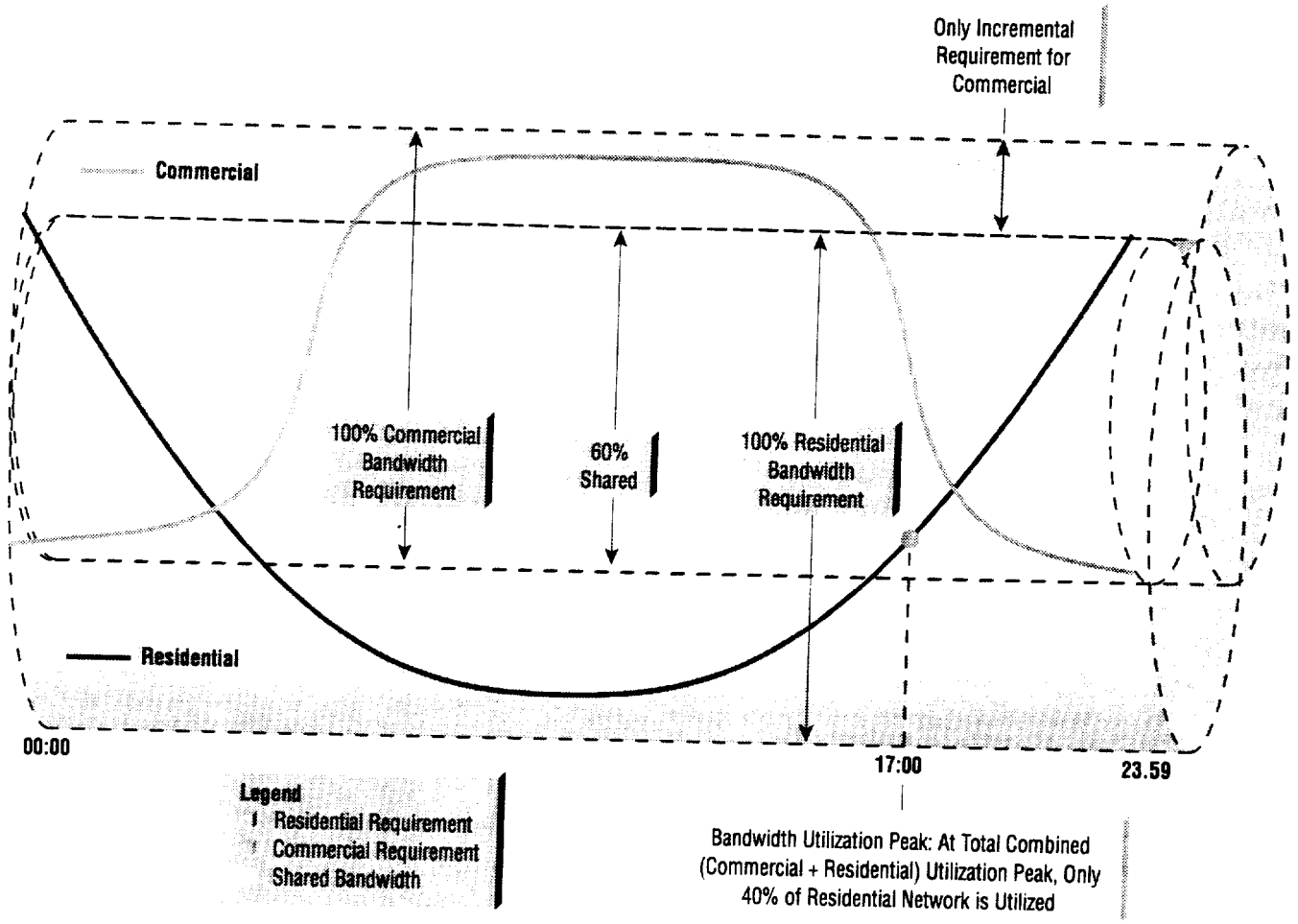
- A high-speed network backbone that transports digital data (data, voice, video) to external networks that support these applications.
- Headends that pass the data between the backbone and hub/HFC network.
- Hubs/HFC network to connect the subscriber premises to the headend/backbone infrastructure, converting traditional digital packets into the RF format used to transmit the information through the fiber coaxial portions of the plant.
- DOCSIS-compliant customer premise equipment (CPE) that resides at the subscriber premise and converts the RF data streams generated at the hub and carried over the HFC network into the usable data, voice, and/or video information supplied to the end user. (The CPE also enables end user-to-network communications by to converting IP data into RF format. A cable modem is an example of CPE.)

Network Usage Patterns

It should be noted that residences and businesses typically have a complementary usage pattern. Residences have their peak usage during the night, while businesses have their peak usage during the day. Cisco Systems can help MSOs understand their specific network usage and assist in the design, implementation and optimization of individual cable networks. Cisco Systems can also assist the MSO in understanding their specific traffic patterns using Cisco's Netflow tool.

The base case assumes the following usage patterns defined as a percentage of individual peak usage over time. (All model data, unless otherwise noted, is based on Cisco's extensive experience in real-world MSO deployments.)

Figure 5

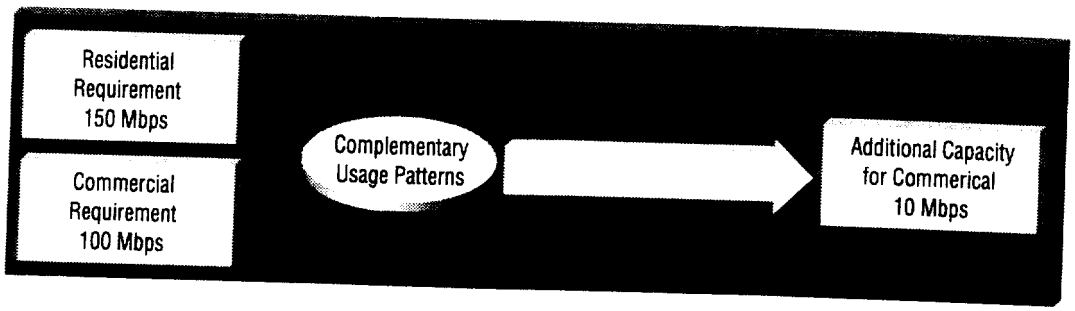


Complementary usage patterns allow the commercial service to leverage much of the residential bandwidth to the Internet. In all cases, Internet connectivity should be calculated for peak usage. In the above case, peak usage is at 5:00 p.m. when the commercial network is being utilized at 100 percent of its required capacity at peak, whereas the residential network is being utilized at 40 percent of its required capacity at peak. This means that to provide commercial services, the MSO does not have to purchase separate Internet connectivity for businesses, but can utilize 60 percent of the existing residential bandwidth to the Internet.

AN EXAMPLE

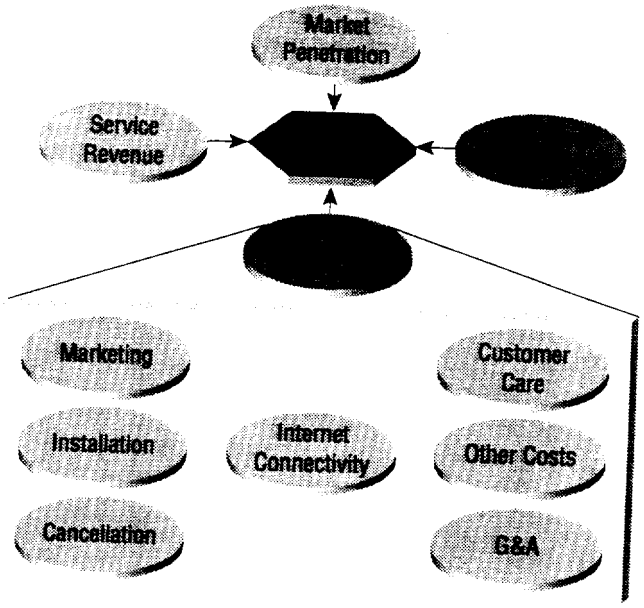
If the residential service requires 150 Mbps to the Internet, and the commercial service requires 100 Mbps to the Internet, the MSO need not purchase a full 250 Mbps from an Internet Service Provider (ISP). In this case, it is clear that at least 60 percent of the residential bandwidth can be used for the commercial service (see Figure 6). Hence the MSO can use 90 Mbps (60 percent of 150 Mbps) from the residential service for the commercial service, and need only purchase an additional 10 Mbps for the commercial service (100 Mbps for the commercial requirement; 90 Mbps for residential spillover). The base case conservatively assumes that bandwidth to the Internet can be purchased at $500 per MB.

Figure 6 Figure 6



Data from MAE West of San Jose, California indicates that busy hour traffic for data seems to last all day. This statistic represents business and commercial segments, and hence validates the complementary usage patterns. For more information on traffic patterns, please refer to Cisco Systems' white paper, "Multimedia Traffic Engineering for HFC networks."

Figure 7 High Level Economics



THE HIGH-LEVEL ECONOMICS

The primary factors that drive profit margins and affect the economics of deploying any service include: service revenue; equipment cost (capital expenditure) and operations cost (operational expenditure); and market penetration (see Figure 7). The following sections consider these items and comprehensively analyze the economics of deploying commercial services (specifically small business Internet access) for an MSO that has a basic network infrastructure in place.

BASE CASE ASSUMPTIONS: DEMAND-SIDE

The base case includes the network topology parameters for a typical network rollout in the case of a mid-tier MSO. It is assumed that the topology spans 10 systems of various sizes (Table 1), two systems each with 400,000; 200,000; 100,000; 50,000; and 25,000 homes passed, for a total of 1.55 million homes. U.S. research data suggests that this service area would also include 78,000 small businesses[1].

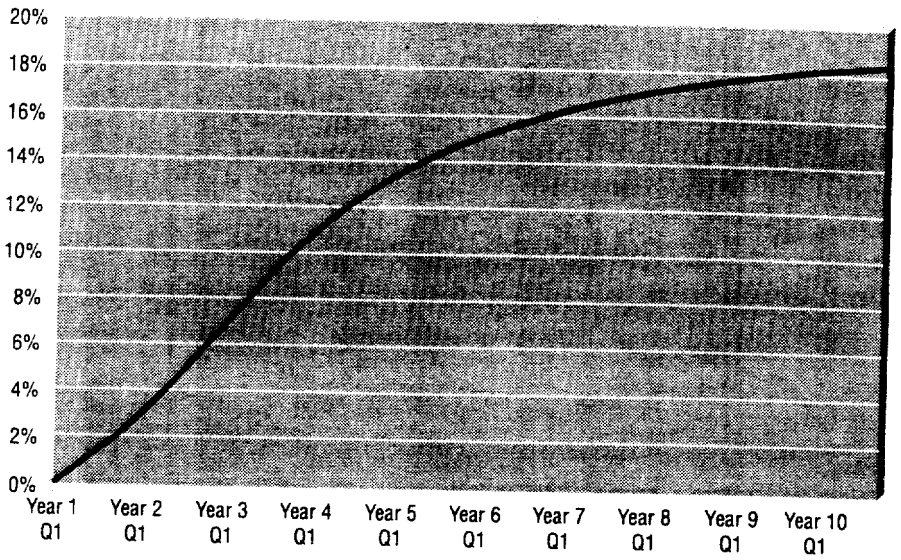
By blending five different system sizes, the base case represents an average cable network and gives the model the ability to accurately depict the network connectivity and aggregation properties of the equipment in locations with varying sizes, as well as to explore the impact of plant density (Table 1).

Table 1. Network Topology

Large System	Medium-Large System	Medium System	Small-Medium System	Small System	
# of Headends	1	1	1	1	1
# of Hubs per Headend	1	1	1	1	1
# of Nodes per Hub	400	200	100	50	25
# of small Businesses per node	50	50	50	50	50
# of small Businesses	20000	10000	5000	2500	1250

It is challenging to quantify market penetration since it is a function of several variables. Market penetration ultimately depends on a host of different factors such as product awareness, price, perceived quality, purchase timing, competitive pressures, installation or cancellation barriers, and customer switching preferences. Historical data is used to build a reliable starting point and then statistical methodology enables a forecast of future growth rates. Figure 8 illustrates the market penetration profile for high-speed Internet services to small businesses. Appendix A.1 gives further details regarding these assumptions for market penetration.

Figure 8 Market Penetration (2-Way Enabled CPE)



For simplicity of economics, this base case assumes that only basic high-speed Internet connectivity is provided to these small businesses. It should be noted that other services such as voice, managed VPNs and managed security offer large upsell revenue opportunities at a marginal increase in equipment cost. Market analysis[4] of small business size indicates that in the U.S. 89 percent of small businesses have fewer than 20 employees. The remaining 11 percent employ between 20 and 99 employees.

For simplicity, the base case assumes that the fewer-than-20 segment will require a 512-Kbps symmetric business class service, whereas the 20–99-employee segment will require a 1.5-Mbps symmetric business class service.

Base Case Assumptions: Economics

Assumptions for equipment pricing are based on observations of price trends in the industry. Refer to appendix A.2 for more specific network equipment pricing information. Using data collected by Cisco from real-world MSOs, the base case also assumes that installation will be 15 percent of equipment costs, with a monthly maintenance cost equal to one percent of the equipment cost.

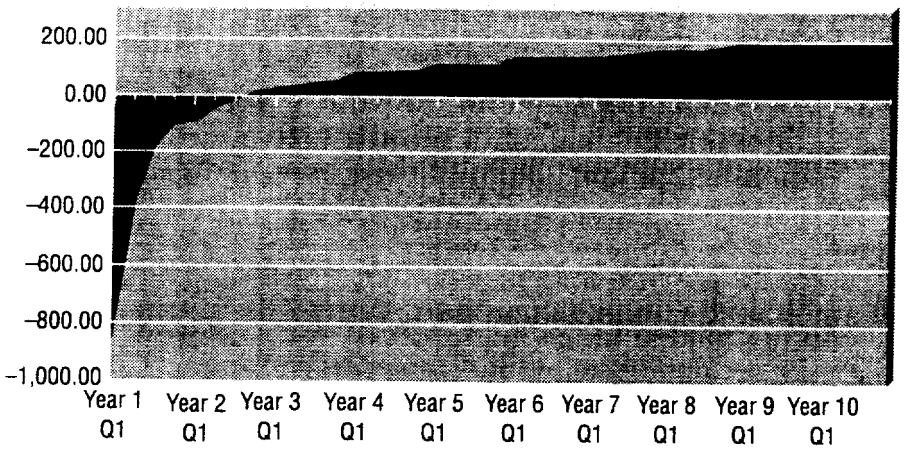
The base case assumes a flat monthly fee of $250 for the symmetric 512-Kbps business class service and $450 for the symmetric 1.5-Mbps business class service (based on market data for business class services). Other assumptions made to derive base case operational costs are listed in Appendix A.3.

4. IDC: 1999 Small Business Telecom Market Outlook

Output Analysis: Profitability and Cash Flow

All of the following results have been derived using the Cisco Tops Down Analysis tool, modified to model the small business case. In the base case scenario, the small business data services show an operating profit fairly quickly—typically in fewer than six quarters. Figure 9 illustrates that an MSO incurs an initial net loss of approximately $800 per subscriber, but net income breaks even before the end of year 2. In year 5, the network is generating a fairly steady profit level of approximately $120 per month averaged over all small businesses.

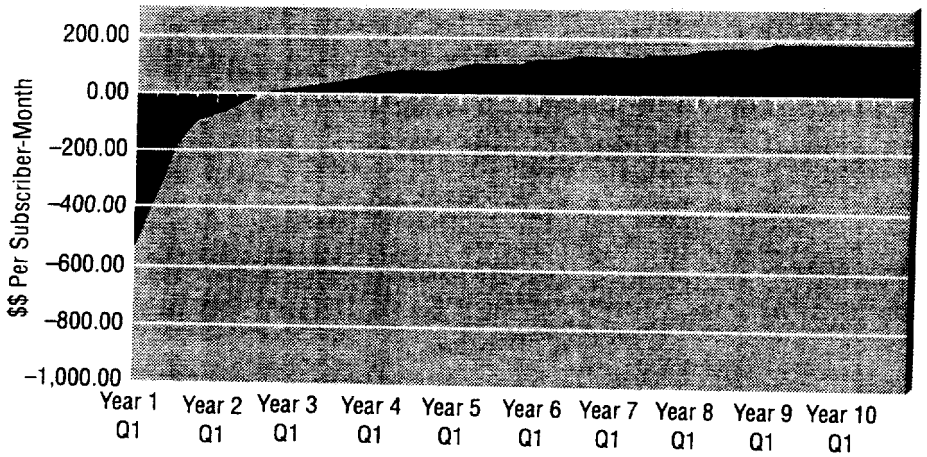
Figure 9 Net Income



The net present value of the net income stream for the base case scenario is approximately $75 million. Any additional equipment required to support higher penetration levels when the network is not operating at its economically efficient state contributes to the bumpiness shown in the profitability profile.

Compared to traditional cable offerings, small business data services can add significantly to cash flow. As reflected in Figure 10, operating cash flow is negative $500 per small business subscriber per month, but then starts turning positive after five quarters, and finally approaches $120 per small business subscriber per month by year 5. The NPV of the operating cash flow for the base case scenario is approximately $71 million.

Figure 10 Operating Cash Flow



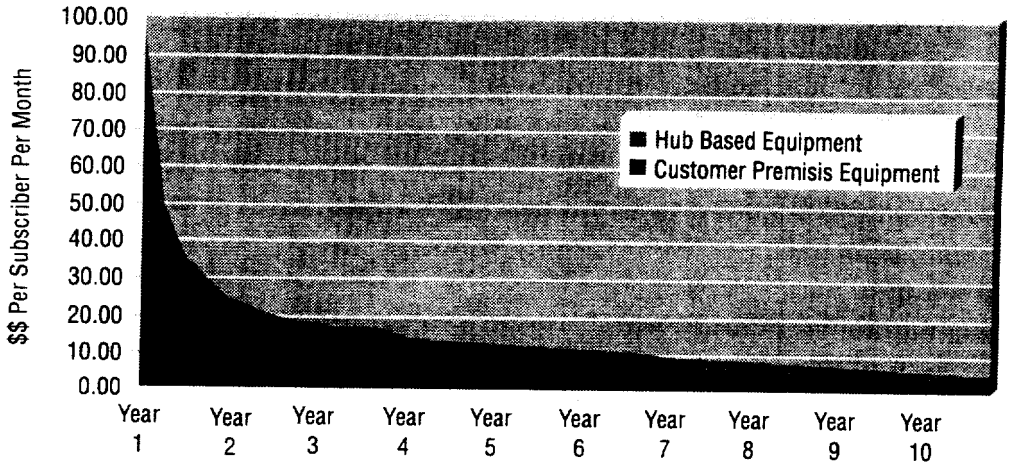
The difference between the previous two income graphs is that the first (Figure 9) shows the net income over time. Figure 10 depicts the operating cash flow over the same period. Usually operating cash flow is used in MSO valuations. If we add the net income stream to the depreciation and the accounts payable, and subtract the accounts receivable, we get the operating cash flow stream shown in Figure 10.

Cost Breakdown

Some valuable insights into the base case scenario can be obtained from a cost analysis. As illustrated in Figure 11, most of the capital equipment costs are concentrated around the CPE. The relatively high percentage of capital equipment costs concentrated around the hub (versus the CPE) in the early years illustrates the fact that the network has not reached an efficient utilization state. Once the user requirements have scaled the network to reasonable levels, the CPE costs dominate the capital expense profile.

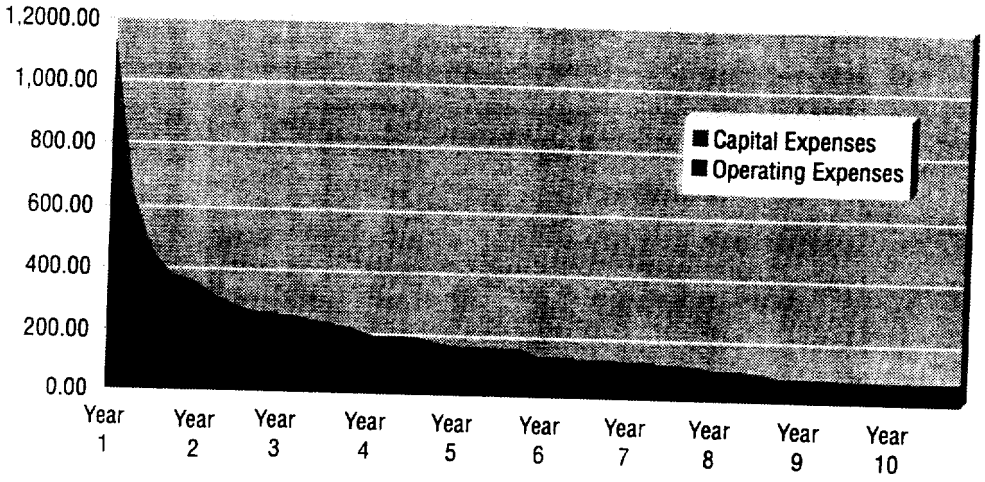
The base case assumes that the core network equipment like the gigabit switch router (GSR) already exists in the MSO network. The analysis also assumes that the universal broadband router (uBR) chassis is also in place for the residential network, and that the commercial network requires only the addition of Cisco MC16x modem cards. In the case where there are no slots left in the CMTS (due to the existence of the residential cards), a new cable modem termination system (CMTS) must be purchased.

Figure 11 Capital Expenditure



Capital costs are approximately $80 per small business per month in year 1 and then moderate to about $13 by year 5. Figure 12 illustrates that once scale is achieved, capital costs are fairly small as compared to the operating costs.

Figure 12 Cost Per Subscriber Per Month



Note that operating costs shown in Figure 12 include installation, marketing, customer care, and Internet connectivity costs. For the base case scenario, customer care and Internet connectivity costs represent bulk of the operations costs (Figure 13). While installation costs are high initially, they are not an important factor in the ongoing cost picture. Marketing costs also come into play, with customer acquisition costs factoring into the overall cost breakdown. As expected, the marketing and customer acquisition costs become a less-prominent element in operations costs once the customer base matures (see Figure 14), while Internet connectivity and customer care become the more important factors in the long-term cost picture.

Operation costs contain elements that grow with the subscriber base, whereas equipment costs (except for CPE) tend to experience greater economies of scale. On an amortized basis, it is interesting to note that equipment costs comprise a small percentage of providing service. For example, once the data backbone is built, the incremental cost of adding a new subscriber is small. However, a customer call center must be staffed proportionately with the subscriber base, just as Internet connectivity costs scale proportionately with the subscriber base.

Detailed cost assumptions are provided in Appendix A.4.

Figure 13 Profit Shapshot for Average Subscriber-Month as of Year 1, Q4

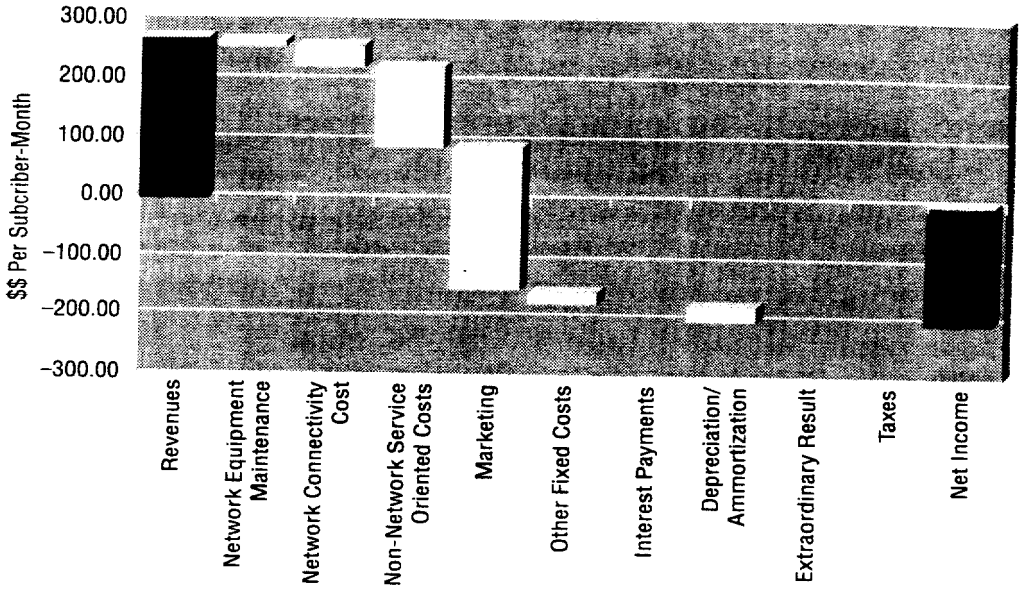
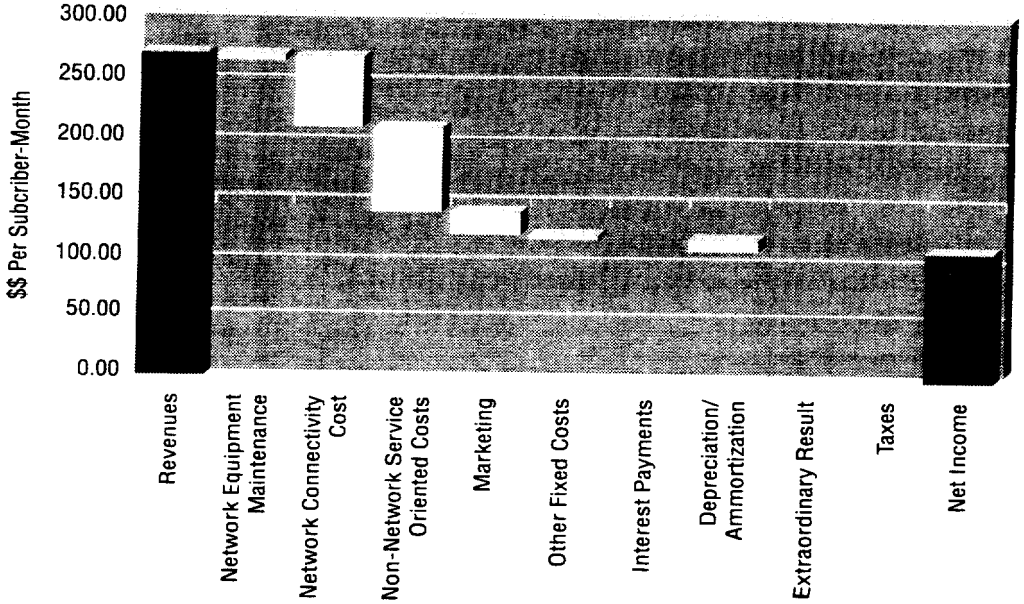


Figure 14 Profit Shapshot for Average Subscriber-Month of Year 5, Q4



ACTIVITY-BASED OPERATIONS FLOW

Figures 15 and 16 illustrate specific activities (and their associated costs) typically required in the deployment process. To ensure a realistic profile, the high-level and detail process flows and cost estimates are based on extensive Cisco research and field experience. Activity based costing gives the MSO a more thorough understanding of operational costs and activities as opposed to other methods such as fractions of revenue. Note that in Figure 15, marketing, sales, installation and cancellation are all one time costs. Customer care is shown on a per month basis.

Figure 15 Activity-Based Operations Flow: High Level

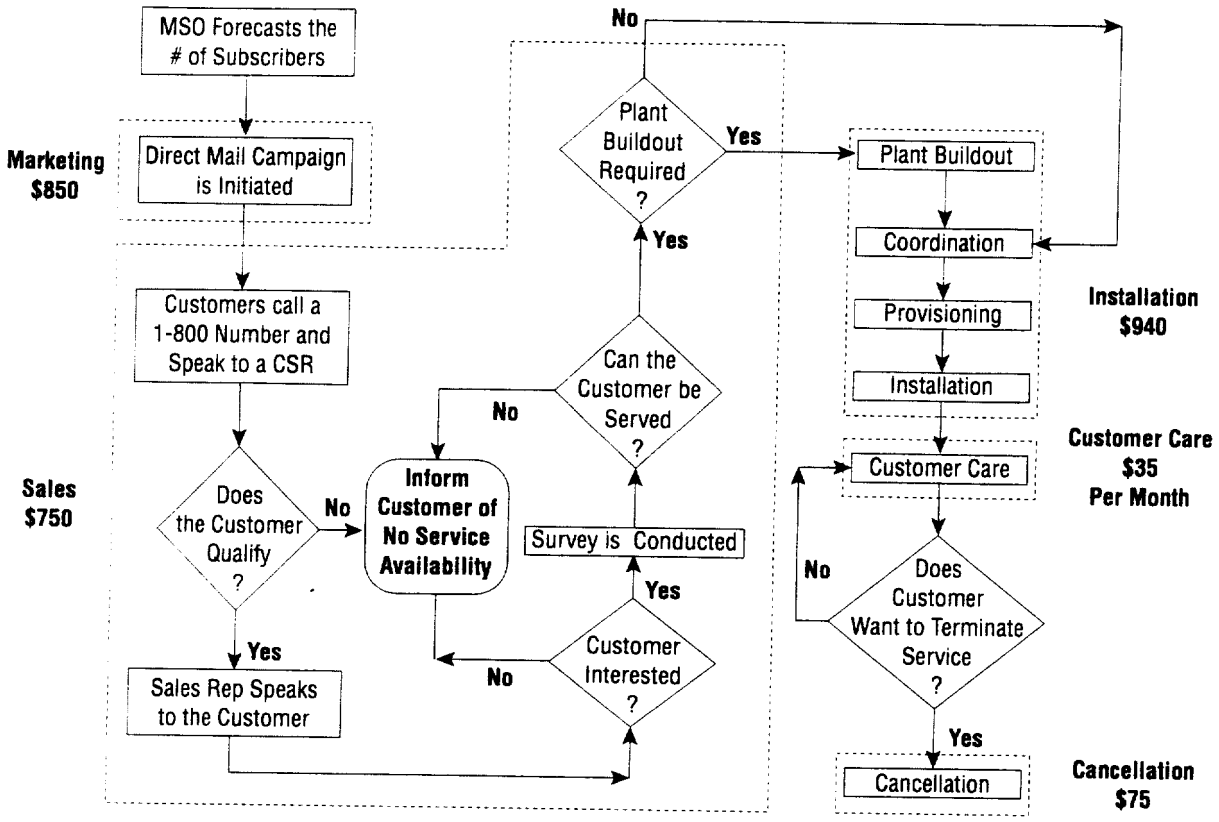
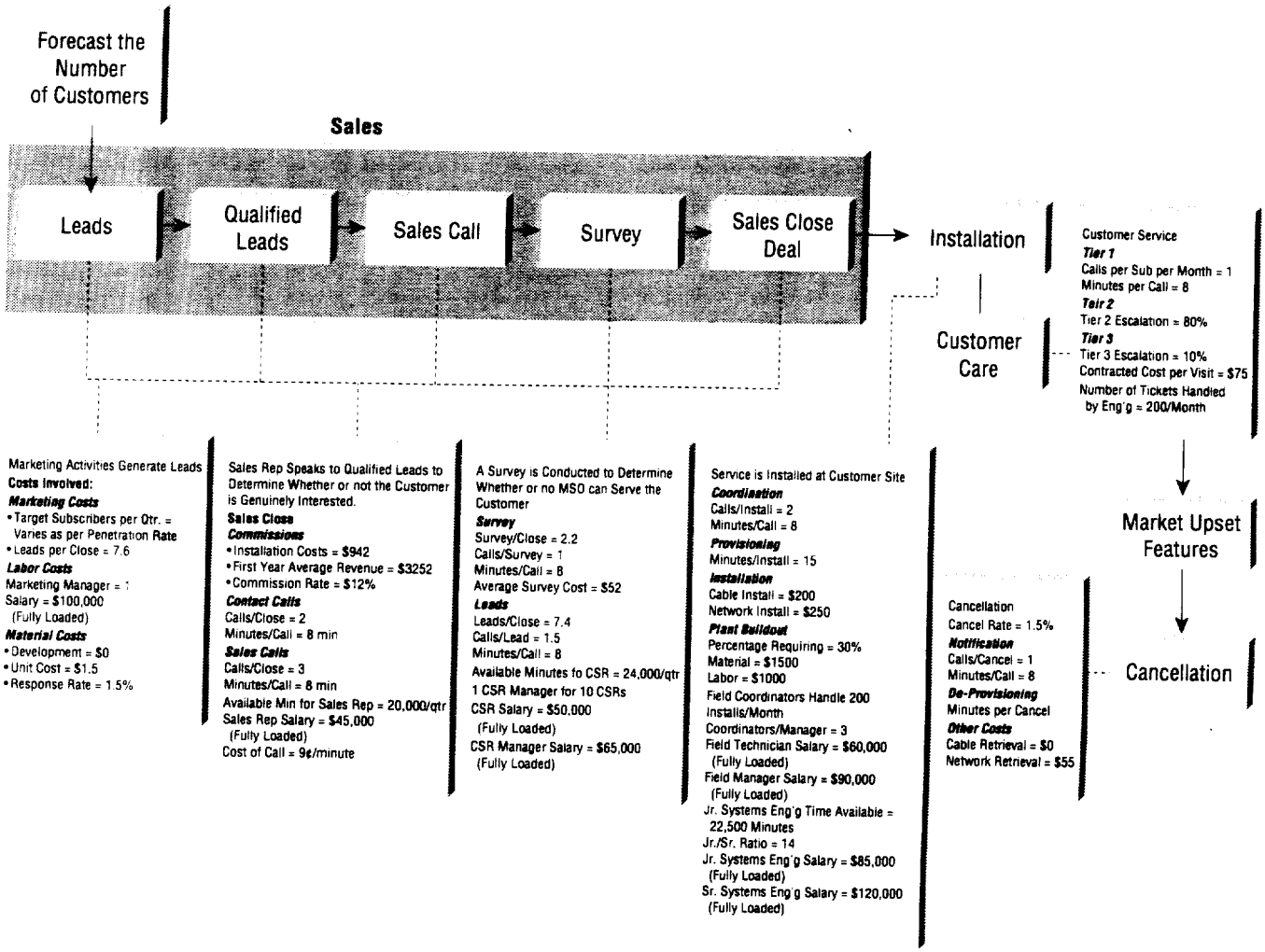


Figure 16 Activity-Based Operations Flow: Detailed



Human Resource Requirements

Deploying high-speed Internet access to small businesses requires supplemental staffing. The base case suggests the minimal starting headcount illustrated in Figure 17. As the number of subscribers increases, the Commercial Services staffing should scale accordingly, as presented in Figure 18. The Cisco model provides a valuable tool for estimating both start-up and on-going staffing requirements to track the growth of the subscriber base.

Figure 17

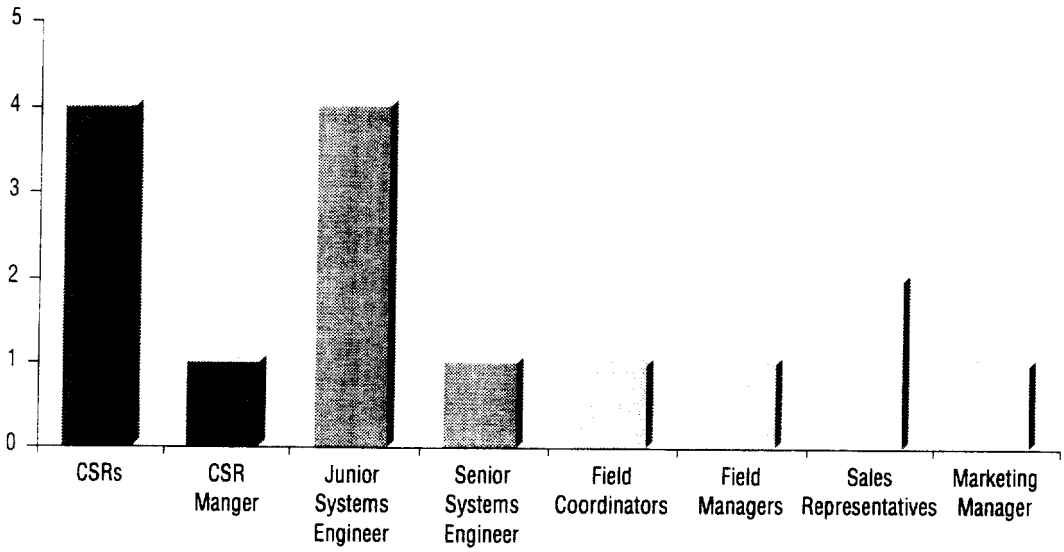
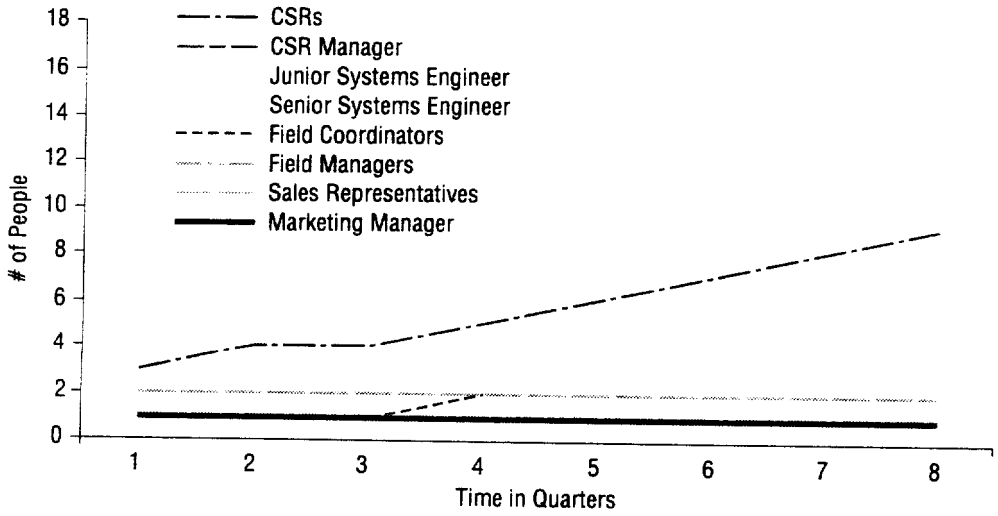


Figure 18



In Figures 17 and 18, the roles of the staff members include:

- Customer Service Representative (CSR): taking customer inquiry calls and qualifying them from a database. Verified customers are then passed to a sales representative. CSRs also handle Tier 1 customer care calls.
- CSR Manager: training, time scheduling, and other management responsibilities for approximately 10 CSRs.
- Junior Systems Engineer: installing CPE router (network install and cable install)
- Senior Systems Engineer: training, time scheduling and other overseeing functions for approximately 10 Junior Systems Engineers.
- Field Coordinators: scheduling installations with customers and coordinating activities between the installation team and tech team.
- Sales Representatives: talking to interested customers and identifying legitimate sales leads; authorizing the survey team to survey customer site; closing deals after site surveys.
- Marketing Manager: planning and implementing all marketing activities; developing collateral; tracking competitive moves; working on direct mail campaigns and advertising.

Conclusion

The case analyzed in this example indicates a significant opportunity for MSOs to increase revenues through the deployment of business-class Internet access. The financial analysis shows potential for a 27-percent increase in the NPV of the operating cash flow—even without considering upsell services or additional market segments. The example also points out that the incremental investment can be very minimal. In many cases, only modem cards and possibly routers or CMTS equipment are required to augment the existing residential infrastructure. While the variables will differ for each MSO and target market, the base case should present a compelling case for exploration of commercial services delivery. The financial model and data input are based on real-world experience and deployments, and should provide convincing indication of the magnitude of opportunities in the commercial arena.

Cisco representatives can provide additional expertise and help MSOs further explore the tools and analyses presented in this paper. The complimentary model can be utilized directly or with Cisco assistance in walking through the process. Contact your local Cisco office, or visit www.cisco.com/analysis

Appendix A.1 Demand Side: Market Penetration

Penetration of data services for small businesses.
The market penetration profile was derived by blending data from IDC and Forrester Research. Typically, initial market penetration is about 2 percent by end of year 1, but this variable also depends on the maturity of the market. This assumption was made to model the base case market penetration profile. It typically takes 1-2 years to ramp up service. Thereafter market penetration grows by 1 percent per year. In future years, we extrapolated market penetration rates based on market research data that Cisco obtained from IDC and Forrester Research. IDC forecasts the penetration for broadband Internet access for small businesses to reach 40.1 percent by 2003 (IDC, U.S. Small Business Forecast, 1998–2003). Based on this data, Cisco believes that the penetration for broadband will reach 45 percent by the year 2004. We assume that 33 percent of these broadband subscribers will use cable Internet access, totaling to an aggregate penetration of about 15 percent by 2004. Thereafter, we assume the penetration increases by only 1 percent per year. Cisco believes the market penetration profile is valid because it resembles the S-shaped curve that is characteristic of the growth cycle that most services experience.

Churn for data.
This is assumed to increase at 0.125 percent per quarter starting out at 1.5 percent. This data is an average and has been obtained from several MSOs that have started deploying commercial services.

Product usage for basic high-speed data.
Over-subscription is a widely debated topic in the networking industry. Internet service providers usually study traffic patterns and optimize the over-subscription ratio over time. Cisco has seen over-subscription ratios ranging from 7 percent to 25 percent of the service sold to business customers. It is important to note that to provide business-class services to small businesses, the ISP would have to provision more bandwidth to the Internet as compared to the residential case. The base case assumes an over-subscription ratio of 20 percent. This means that if the MSO sells a 512 Kbps service to a small business, they need to provision only 102.4 Kbps to the Internet. Or, in other words, they need to design their network taking into consideration 102.4 Kbps for that small business.

APPENDIX A.2 EQUIPMENT PRICING

It is assumed that this is an overlay network and that the residential network is either in place or is being built simultaneously. In that case, we assume that headend equipment like the GSR already exists. Furthermore, we assume that CMTSs are in place at the hubs and the commercial network will require additional modem cards (Cisco MC16 modems). In the case where there are no slots available for a commercial modem card, an additional CMTS chassis is purchased.

Table 2

Equipment Name	List Price	Installation Cost	Initial Discout Rate	Moore's Law Quarterly Discout	Cap Yrs
uBR9xx	$645.00	$-	30.00%	4%	3
Node		$-		4%	3
MC16 Modem	$30,250.00	$4,537.50	30.00%	4%	3
uBR 7246 Chassis	$53,850.00	$8,077.50	30.00%	4%	3
OC-3 Ring		$-		4%	3
GSR OC-3 Line	$	$		4%	3
GSR 12008 Chassis	$	$		4%	3
AS5300 Voice Gateway	$	$-		4%	3
Internet Connectivity Network Servers (per web, email	$	$-		4%	3

APPENDIX A.3 DATA REVENUES

It is assumed that the average small business with fewer than 20 employees subscribes to a symmetric 512-Kbps business class service, whereas a small business with 20–99 employees subscribes to a symmetric 1.5-Mbps service. We assume the MSO charges $250 for the 512-Kbps service and $450 for the 1.5-Mbps service. These assumptions are based on market data. It should be noted that these revenue figures are region-specific, and the MSO may be able to charge something slightly higher or lower than these prices.

Broadband service providers sometimes have pricing structures on their websites along with details about the services. There are numerous websites; a few of them have been listed here for reference. The Internet access pricing was derived using the pricing information on the websites given below and a few others.

FIRSTWORLD: http://www.firstworld.com/internet_solutions/dsl/index.html

AT&T: http://www.ipservices.att.com/ipaccess/dsl/dsl_pricing.html

Concentric: http://www.concentric.com/products_services/dsl/pricing.html

linkLine: http://www.linkline.net/prodserv/dslpricingbus.asp

APPENDIX A.4 OPERATIONS COSTS

Please refer to the operations flow diagram for a high-level picture of the operations. All these numbers have been obtained from Cisco's interaction with various US MSOs

Customer Care

Customer care is assumed to be, on an average, $39 per month for each small business. It is assumed that each small business makes one eight-minute call to a customer service representative per month. Of these calls, 80 percent escalate to Tier 2 and have to be handled by a junior engineer. Out of these, 10 percent require a field visit and the contracted rate per field visit is $75. Salary rates are listed in Appendix A.5.

Installation

It is assumed that the MSO will have to build out to 30 percent of the small businesses passed. This data is an average and has been obtained from Cisco's interaction with several MSOs. Before installation, two calls, each lasting eight minutes, are made to a customer service representative (CSR). If a build-out is required, costs are assumed to be $1500 in material and $1000 in labor. (This is an average figure and includes aerial drops as well as build-outs.) Further, for each small business, there is a $250 network installation cost, which includes deploying labor to install the CPE in the small business and to configure the LAN or independent computer systems, as the case may be. However, based on observation of competitive technologies, an MSO can charge approximately $100 per small business for installation. This basic fee represents the cost of the truck roll to provision the business for service. A junior engineer spends 15 minutes provisioning the CPE. Total average cost per install works out to be approximately $943.

Cancellation

It is assumed that there is one eight-minute call to a CSR before each cancellation. De-provisioning takes 15 minutes and the network retrieval costs $55. The total cost per cancellation works to be $75 on average.

Sales

It is assumed that the commissionable revenue per sale is the sum of the installation plus the first year's service revenue. The commission rate is assumed to be 12 percent. Further, it is assumed that there are two contact calls per close (with a CSR) and three sales calls (with a sales representative) per close. We also assume that if the sales representative decides that the customer is genuinely interested, a survey is conducted to determine whether or not the customer can be served. This is contracted at $55 per survey.

Marketing

We assume that one marketing manager is required for this segment. We also assume that a direct mail campaign is initiated and that each unit (mail letter) costs $1.50. The development costs (creative aspects) are not considered. It is also assumed that the response rate is 1.5 percent (a standard accepted direct mail response rate).

APPENDIX A.5 OPERATIONS: SALARY EXPENSES

Table 3 outlines the salary assumptions for various personnel involved in the operations.

Table 3

Employee	Fully Loaded Salary
CSR	$50,000
CSR Manager	$65,000
Jr. Systems Engineer	$85,000
Sr. Systems Engineer	$120,000
Sales Executive	$45,000
Marketing Manager	$100,000
Field Technician	$60,000
Field Manager	$90,000

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Debate Persists Over Look of Interactive TV

Continued from Page 35

ing and at retail point-of-purchase displays.

Because the set-top boxes are software-upgradable, AOL can download updates as it measures consumer response to the initial products, Strobel said.

Initially, the AOLTV hardware will be sold exclusively at retail through Circuit City Stores Inc. consumer-electronics stores or over the Internet at CircuitCity.com or AOL.COM.

A Circuit City spokesman said the retailer also plans to help market AOL services for mobile phones and handheld devices in the future as part of the company's "AOL Anywhere" strategy.

The first AOLTV model comes equipped with a 56-kilobit-per-second modem and requires a connection to a telephone line. Also built in is a universal-serial-bus port for future services that could connect to cable or digital subscriber lines, the company said.

DirecTV Inc. has already said that it plans to introduce an AOLTV service later this year that takes advantage of broadband direct-broadcast satellite television delivery.

Separately, DirecTV's sister company, Hughes Network Systems, is in beta-tests for an "AOL Plus" service delivered via satellite to PCs through HNS' "DirecPC" hardware.

Current DirecPC models use a telephone-return path. Hughes Electronics Corp., DirecTV's and HNS' parent company, has plans for two-way broadband-satellite services, starting with DirecPC later this year.

Earlier this month, DirecTV announced it would also team up with Microsoft Corp. to deliver a combination DirecTV/WebTV Networks set-top box with a built-in digital-video recorder under the brand name, "UltimateTV."

The product will also include a second DBS tuner, allowing viewers to record one channel while watching another.

Although DirecTV's first AOLTV boxes are not likely to include digital hard drives, future generations are expected to include TiVo Inc. personal-video recorders.

TiVo has separate relationships with Philips, DirecTV and most recently with AOL, which announced earlier this month that it would invest up to $200 million in TiVo.

Microsoft will likely extend the UltimateTV brand to future generations of EchoStar Communications Corp.'s "DISHPlayer," WebTV senior director of marketing Rob Schoeben said.

Executives at WebTV "have been pleased to see over the past several months the increased interest in enhanced television," Schoeben said, adding that WebTV was introduced nearly five years ago.

Microsoft, which purchased WebTV several years ago, currently offers two service platforms, "WebTV Classic" and the more robust "WebTV Plus." The company is currently promoting free WebTV hardware to new subscribers in exchange for three-year service commitments.

The promotion is not a direct response to AOLTV's plans to enter the market, Schoeben contended, but rather a means of creating consumer excitement in the typically slow summer months.

> *"We have to make the content so rich that viewers want to check us out on a regular basis."*
>
> ***Tim Megaw, vice president of broadcasting, QVC Inc.***

In the future, Microsoft may offer special benefits to WebTV customers who also subscribe to Microsoft's Internet-service provider, MSN.

There's still much debate over what the ideal interactive-television service should look like and how big a role the Internet should play in TV.

For its TV-based service, Excite@Home Corp. plans to pay close attention to the user interfaces that allow viewers to navigate between broadband content such as animation, video games and streaming media, director of set-top products Kent Libbey said.

"The objective is to avoid delivering a static and silent Web page to the TV," Libbey said. "People have 40 or 50 years' experience with their television, and they bring certain expectations."

AOLTV not only plans to offer its popular buddy list, e-mail, chat and "You've Got Pictures" functions from its online service over the television, but also to add television-specific features such as electronic programming guides and help with recording on VCRs or digital-video recorders.

Television networks will also be able to deliver enhanced content such as actor biographies, sports statistics and electronic-commerce offers.

Liberate Technologies provides an open software platform that allows cable programmers such as E! Entertainment Television, The Weather Channel and Oxygen to create content for AOLTV that could also be ported over to other interactive-television platforms.

Although AOLTV did not grant exclusivity to Liberate, the software provider hopes the AOLTV endorsement will help to bring broad acceptance of its technology as it becomes widely deployed, Liberate vice president of marketing Charlie Tritschler said.

Liberate encourages programmers to join the company's "Pop-TV" program, which allows content providers to create to a single standard, rather than rewriting content for each new interactive platform. "Using open standards allows you to deploy quickly," Tritschler said.

Starz Encore Media Group LLC is among the programmers working with AOL.

"From everything we seen, their objective is make it very TV-centric a consumer-friendly," Starz E core director of busin development Tom Wen said. Heexpects the AOL platform to help enable s scription video-on-dema through its navigational terface, he added.

Starz Encore also plans back up its movies with m in-depth information, so of which it may repurpo from its Web sites, to gi viewers a behind-the-scen look at the actors starring each film, for example.

Home shopping progra mer QVC Inc. plans to in grate the best of its te vision programming with t more detailed information its Web site into its AOL content. "We have to ma the content so rich that vie ers want to check us out a regular basis," QVC vi president of broadcasti Tim Megaw said.

Even on-air, QVC is alrea rich in text and graphics b cause "we want our viewers make informed purchase de sions," he noted.

A certain amount of QVC enhanced-television conte will be cached in the AOLT box, Megaw said. Because u ing the enhanced-televisio service will be quicker tha dialing up an Internet co nection and searching for Web site, such repurpose content can speed consum reaction time, he added.

Courtroom Television Ne work senior vice president f research and market deve opment Galen Jones said t network already encourag its viewers to go online to i Web site as they watch t channel.

He added that the W site's strong audio and vid components make it a nat ral for transitioning conte over to the television.

"If we were a Web site th was much more text-drive and didn't have a video con ponent or a network partne this probably wouldn't b a particularly meaningf thing to do," Jones said. "It jus so happens that from a cor tent perspective, we're ideal.

QVC and Starz Encor executives said they hav not yet finalized e-commerc revenue-sharing models wit AOLTV. Jones said Court T has no current plans for e commerce. —BW

Sky TV Founders Buy Firm Back

DALLAS — Just 18 months after selling in-flight-programming, video-production and broadcasting company Sky Television, founders Mark Bunting and Tom Hoitsma have completed a deal to buy the company back from ZDTV Inc.

Bunting, Sky Television's CEO, sold the company to ZDTV's former parent, Ziff-Davis Inc., in October for $72 million in cash and earn-out provisions. Terms of the most recent deal were not disclosed.

Z-D sold ZDTV to Microsoft Corp. cofounder Paul Allen's Vulcan Ventures Inc. in January for $204.8 million. Vulcan had previously owned part of the company.

Sky Television produces in-flight, cable-TV, corporate-video and Internet-broadcast content primarily within the computer and Internet arenas. The transaction closed June 16.

Sky Television has produced programming for ABC Inc., CBS Corp., NBC and Fox Broadcasting Co. affiliates, as well as CNBC, Discovery Channel, The Learning Channel, Fox Net and WAM! America's Kidz Network.

Its shows include *Bunting's Window*, *The Computer Guy* and children's series *Mark's Web World*.

"We have concluded the transfer process, and we are taking Sky Television back to its independent roots," Bunting said in a prepared statement. "The recent financial troubles and subsequent breakup of the Ziff-Davis properties created an opportunity for us to return Sky Television to its entrepreneurial heritage and leverage our position as the preeminent video-content producer and distributor of high-tech and dot-com company brands."

Computer-trade-magazine publisher Z-D ran into financial trouble last year, prompting it to initiate a restructuring and shed its non-Internet assets. —BW

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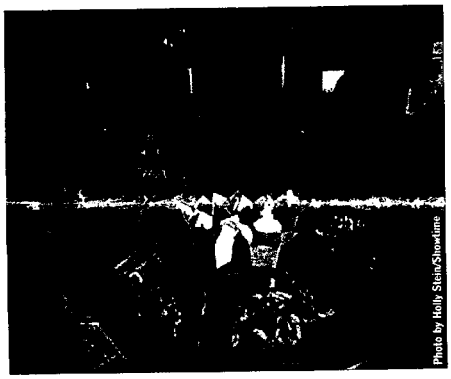
BROADBAND WEEK®

CABLE TECHNOLOGY, TELECOM, DATACOM AND NEW MEDIA

Streamer On2.com Scores With Showtime, USAi Deals



ON THE BOULEVARD: With the help of On2Com-Inc.'s "TrueMotion VP3" technology, Showtime Networks Inc. will develop a site for new series *Resurrection Blvd.* with video diaries of show characters, cast-member interviews and series highlights.

By DAVID ILER

Video-streaming provider On2.com Inc. notched two big deals recently, as Showtime Networks Inc. and USA Networks Interactive (USAi) announced separately that they will use its streaming technologies.

The deals are big wins for On2.com, which competes with entrenched streaming-technology providers Microsoft Corp., maker of the "Windows Media Player"; Apple Computer Inc., developer of the "QuickTime" player and format; and RealNetworks Inc., with its "RealPlayer."

The deals also shed light on the diverging streaming-media strategies of Showtime and USAi as they determine how best to complement their traditional business of delivering video programming to the TV with their Internet properties, which are now accessible by more and more broadband users.

Showtime will use On2.com's video-compression and decompression (codec) technology, dubbed "TrueMotion VP3," to offer video content on the Web and promote its new series, *Resurrection Blvd.* and *Soul Food*.

USAi will use TrueMotion VP3 across its media properties, starting with SCIFI.COM, where it will offer short science-fiction films and progress to more complex "multipath" and interactive programming.

On2.com will provide both programmers with video encoding, serving and hosting services. The company uses a proprietary video codec and player technology that allows for streaming over the Internet at data rates of 250 kilobits per second and above to produce high-quality, full-screen (640-by-480-pixel), full-motion video. Bit rates can be dynamically adjusted to accommodate varying Internet-connection speeds.

According to Gene Falk, senior vice president of Showtime's Digital Media Group, the programmer selected On2.com because of the quality of the video displayed by its player.

"One of the barriers to using broadband for video is compression," Falk said.

See ON2.COM, Page 36

'AOLTV' Sees Mid-July Launch For Interactive-Television Test

By MONICA HOGAN

America Online Inc. announced plans last week to launch its new interactive-television service, "AOLTV," in eight test markets next month, including such secondary cities as Baltimore, Phoenix and Sacramento, Calif.

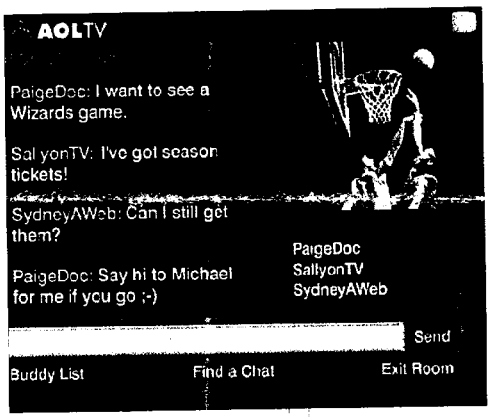
Philips Consumer Electronics Co. will supply the first stand-alone AOLTV set-top boxes, which will retail for $249.95, including remote control and wireless keyboard.

AOLTV will charge a monthly service fee of $24.95 for new subscribers who don't take the AOL online PC service. Current AOL customers will pay an additional $14.95 per month for AOLTV.

AOL and Philips plan to co-promote the service through television, infomercials, radio, print and a heavy dose of online ads, Philips vice president of set-top-box marketing John Strobel said.

The companies are launching a controlled retail trial in mid-July to ensure that they have the correct — and consistent — consumer messages both in their advertis-

See DEBATE, Page 40



CHATTING IT UP: Chat rooms are among the features America Online Inc. plans to import from its online service to its upcoming "AOLTV" interactive-television service.

Cable Group Rebuts NAB Digital Gripes

By TED HEARN

WASHINGTON — The cable industry is firing back at broadcasters in response to accusations that it, among others, is slowing the transition to digital television.

The National Cable Television Association said broadcasters should get on with digital business plans that are attractive to consumers and resist seeking regulatory handouts from the Federal Communications Commission.

"It's time for them to stop asking for more regulatory favors and to develop such a service to make the transition succeed. Their problems, in short, are not in Washington, and it is [well-nigh] time for Washington to tell them so," the NCTA said in comments filed at the FCC June 16.

Last month, the National Association of Broadcasters urged the FCC to mandate cable carriage of digital- and analog-TV signals, to impose performance standards on digital-TV sets and to ensure compatibility between cable systems and digital-TV sets.

The NAB repeated those requests in a letter a June 19 letter to FCC chairman William Kennard.

Claiming the migration to digital is "faltering," the NAB's letter told Kennard he must "take immediate steps" to ensure the success of digital TV.

See NCTA, Page 36

THIS WEEK IN BROADBAND

Into the Coffers
Three MSOs were among the companies involved in the latest round of financing for broadband-content-delivery company Into Networks Inc.
Page 36

Going Home Again
Sky Television's founders reached a deal to buy the programming and production company back from ZDTV Inc.
Page 40

GROSSO

X-Attachments:

notice, bigger than e-commerce.

http://www.zdnet.com/intweek/stories/news/0,4164,2583335,00.html

Meanwhile, cable operators are rebuilding their networks in order to begin competing in other telecommunications and entertainment services. A brief explanation of some of the major new businesses under development is described below.

DIGITAL VIDEO

Cable companies are using their rebuilt digital networks to offer a wide array of new broadband video services to customers. Through the use of compressed digital video technology, which converts, on average, one analog channel into a digital format and compresses such signal into 8 to 12 digital channels, cable operators are able to greatly increase their channel offerings. The digitally compressed signal is uplinked to a satellite, which sends the signal back down to a cable system's headend to be distributed, via optical fiber and coaxial cable, to the customer's home. At the home, a set-top video terminal converts the digital signal back into analog channels that can be viewed on a normal television set. We believe the implementation of digital technology will significantly enhance the quantity and quality of channel offerings, allowing the cable operator to offer near video-on-demand, premium services and incremental special interest programming.

<PAGE>

An estimated 1.5 million homes currently subscribe to a digital cable service. The number of digital service customers is expected to increase approximately seven times to 10.6 million homes by the end of 2000, representing a penetration of 10.9% of the homes passed, and to approximately 47.6 million

homes by 2008, representing a penetration of 45.3% of the homes passed.

HIGH-SPEED DATA

The broad bandwidth of cable network enables data to be transmitted up to 100 times faster than traditional telephone-based modem technologies, and the cable connection does not interfere with normal telephone activity or usage. For example, cable's on-line customers can download large files from the Internet in a fraction of the time it takes when using any widely available telephone modem technology. Moreover, surfing the Internet on a high-speed network removes the long delays for Web pages to fully appear on the computer screen, allowing the experience to more closely approximate the responsiveness of changing channels on a television set. In addition, the cable modem is always on and does not require the customer to dial into an Internet service provider and await authorization. We believe that these factors of speed and easy accessibility will increase the use and impact of the Internet among our customers. Although other high-speed alternatives are being developed to compete with cable, we believe that the cable platform currently is best able to deliver these services.

In 1998, cable companies delivered Internet services into over 100 markets throughout the United States. In 1999, approximately 29.0 million homes will be passed by cable systems offering high-speed, residential cable Internet services, which is projected to increase to approximately 39.0 million homes by 2000, and to more than 73.6 million homes by 2008.

Over 500,000 cable customers currently subscribe to cable access to

the
Internet. The number of cable high-speed data service customers is expected to
increase more than 6.6 times to approximately 3.3 million homes by the end of
2000, representing a penetration of 4.9% of basic customers that will have been
marketed this service. It is further expected that data service customers will
increase to approximately 18.0 million homes by the end of 2008, representing a
penetration of 24.6% of basic customers that will have been marketed this

Our marketing strategy is designed to capitalize on these trends by offering our customers an array of entertainment, information and telecommunication services on a bundled basis. By bundling our products and
services, our customers would have an increased choice of services at a reduced
cost, which we believe would result in higher customer satisfaction, increased
use of our services and greater customer retention. Because our broadband cable
network can offer such a wide variety of communication services, we believe our
service offering will provide us with a competitive advantage over alternative
wireline and wireless telecommunications and multichannel video providers, such
as incumbent telephone companies and direct broadcast satellite television
systems. We began offering new and enhanced products and services, such as
interactive digital video and high-speed data access, during the second quarter
of 1999 and intend to offer telecommunication services beginning in 2000.

INTRODUCE NEW AND ENHANCED PRODUCTS AND SERVICES

Our marketing strategy is to offer our customers an array of entertainment,
information and telecommunication services on a bundled basis. We believe

by bundling our products and services our customers will have an increased choice at a reduced cost resulting in higher customer satisfaction, higher penetration and reduced churn. We have conducted research and held numerous focus group sessions in our local markets which lead us to believe that these services will have high customer appeal. We expect that our ability to provide bundled services will provide us with a strong competitive advantage over alternative video providers, such as direct broadcast satellite television systems, and incumbent telephone companies. To accelerate the deployment of these services, we have entered into letters of intent or agreements with several industry leaders, including a letter of intent with AT&T and an agreement with @Home. See "--Products and Services--New and Enhanced Products and Services--High-Speed Data" and "--Telephony."

As of March 31, 1999, on a pro forma basis, approximately 32% of our customers had addressable converters in their homes. Addressable technology enables us to electronically control the cable television services being delivered to the customer's home. Addressable technology allows us to electronically upgrade or downgrade services to a customer immediately, from our customer service center, without the delay or expense associated with dispatching a technician to the customer's home. Addressable technology also reduces premium service theft, is an effective enforcement tool in the collection of delinquent payments and enables us to offer pay-per-view services,

Here is a trade story about the purchase of the advanced Phillips boxes. Notice the comment about how the cable operators get to decide which functionality is available.
http://www.multichannel.com/b1.shtml

"Each set-top will house Philips' "TriMedia" programmable media processor, which provides real-time processing of audio, video, graphics and communications data streams.

That software-processing platform, Kaplan said, is capable of providing two-way applications such as electronic commerce, gaming, personal video recording and video-on-demand. Philips is working with United Pan-Europe Communications N.V. (UPC) on a similar platform in Holland, Kaplan added.

The technology inside Philips' box also gives it "residential gateway" capabilities. By conforming to the HAVi (Home Audio-Video Interoperability) home-networking standard, each set-top has the ability to distribute bandwidth among other consumer electronics such as digital cameras and Web pads.

Which advanced applications the box will support commercially will be up to the cable operator, Kaplan said."

AOL, by the way, is using Phillips boxes.

I noticed this after I sent off the packet. Notice some of ACTV's major clients are owned by TW.

Overview

Since our inception, the primary focus of our operating activities has been to develop patented, proprietary technologies that enable programmers and advertisers to create individualized programming and programming enhancements -- first for television and later also for the emerging area of "enhanced TV," or television/Internet convergence. We call our technologies for the television and enhanced TV markets Individualized TV and HyperTV(TM), respectively. Individualized TV enables television programmers and advertisers to create customized "one-to-one" programming and ads, and allows viewers to instantly and seamlessly customize their viewing experiences. HyperTV has pioneered the delivery of synchronized Internet content with standard programming and advertising.

We derived all of our revenues for 1999 and for the three months ended March 31, 2000 from HyperTV, which is targeted at the entertainment and education markets. We anticipate that the most significant portion of future HyperTV revenues will be derived from the entertainment market, for which we introduced a HyperTV application in late 1999. We subsequently entered into HyperTV programming alliances for this market with The Box Music Network, TNT, TBS, Showtime, and New Line Television. Sources of revenue from the entertainment market include software licensing, data management services, Internet advertising and commerce and program hosting and content creation fees.

In April 2000, we entered into a strategic marketing venture for HyperTV with Liberty Livewire, which is the U.S. leader in audio and video post-production and location services. Livewire will market HyperTV to its clients in the feature film, television and music video production businesses. In addition, Livewire will provide HyperTV clients with content creation services and--through its affiliate AT&T IP Services, giving us much greater scalability in growing the HyperTV business. In addition, we received warrants

another AOL-AT&T link, Open TV.

http://www.opentv.com/customers/

This may be of interest as background. Please note walled garden reference.

http://www.forrester.com/ER/Press/Release/0,1769,366,FF.html

Multichannel News reported on June 12th, 2000 that AT&T Broadband plans to "deploy" Liberate Technologies on the middleware for its interactive-television service. As you know, AOL is an investor in Liberate.

If you need the clip, let me know.

From SEC filing, Insight Communications, 1999 (Insight has a partnership with AT&T Broadband). See use of bundling as advantage over competitive high-speed offerings by wireline, etc. The following is direct from the filing. Sorry if this is "old" information.

Many cable operators are rebuilding their infrastructure to deliver new technologies, products and services to provide their customers with greater value and choices in the face of growing competition in their core businesses. Modern network architecture now can connect customers to a broadly enhanced range of video, voice and high-speed data communication possibilities, as well as improved signal reliability, better quality and superior two-way transmission capability. Cable operators spent approximately $7.7 billion in 1998 to rebuild their network in order to create new capability for the delivery of more channels, digital and high definition television programming and two-way interactive services.

According to the National Cable Television Association, in 1998, the channel capacity of cable television systems increased to an average of 61 channels, up from 39 channels in 1992. As cable continues to expand its channel capacity, we expect that the industry's competitive position relative to direct broadcast satellite television systems and other multichannel video providers should be further enhanced.

http://www.itvt.com/dbab.html

listen to the online presentation as well.