

The Business Case for Premium Internet Services



Network Strategy Partners, LLC

MANAGEMENT CONSULTANTS TO THE NETWORKING INDUSTRY

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Executive Summary

Introduction

Over the past decade service providers have made substantial capital investments in IP networks. However, during this same time, increased competition has resulted in broadband Internet and voice service pricing to drop to commodity levels. The conventional wisdom is that service providers are offering the full range of triple play services – High Speed Internet, Voice over IP (VoIP), IPTV, and Video on Demand (VoD) – to increase revenues. Unfortunately many service providers are either unwilling or unable to make even larger capital investments to accommodate the requirements for these new services. The question for service providers centers around how they can reap higher margins on their existing network infrastructure by providing subscribers and 3rd party content providers the option to upgrade their quality of service (QoS) to Premium IP service levels.

The concept behind Premium IP services is that subscribers can upgrade the specific services they desire. As an example, a subscriber who regularly downloads music files can reduce the time to retrieve these files by upgrading his service. Similarly, a subscriber using VoIP can experience better sound quality all the time by upgrading to a premium service level.

Premium IP services can provide extra levels of performance that target specific applications, users, and content and can be based on a flexible set of service policies. One market where Premium IP services have a huge potential is the emerging Internet VoD market. Multiple content providers are currently offering video delivered over the Internet. These emerging VoD offerings threaten to compete with direct IPTV and VoD offerings from network services providers. However, with a Premium IP services offering, services providers could offer subscribers guaranteed QoS for third party video services.

Service Provider Business Models

Premium Residential Services

Two potential models for premium residential services include wholesale and retail offerings. In the wholesale model, the service provider charges the content provider a monthly rate for premium network service that can be passed on to the end customer. In a retail model example, the network provider might offer premium video services directly to customers and allow for bandwidth-on-demand for any video content they desire. The customer would pay a monthly fee directly to the service provider.

Other premium services for residential customers could include premium gaming, premium peer-to-peer (P2P), and other multimedia services. Like video, the business models for these services could involve wholesale or retail approaches.

Premium Services for Business Customers

A common problem for many businesses is that they occasionally need high capacity connections to move data quickly. Since these connections are only required periodically, business customers are reluctant to continually pay for bandwidth that is rarely utilized. Bandwidth-on-Demand services provide a good solution to this problem. Business users can pay modest monthly rates for carrier Ethernet services with a fairly low fixed committed information rate (CIR). At times when extra bandwidth is needed (for example synchronization of remote databases or large file transfers), a Bandwidth-on-Demand service can provide the network capacity when it is needed and charge customers only for the extra capacity that is used.

A similar but more sophisticated business service offering is the Policy-based QoS. This service offers bandwidth-on-demand using network policies that provide capacity based on user, application, source, destination, or other variables. For example, a major retailer might want to transfer DVDs, music, photos, or other multimedia content from an operations center to a retail outlet. The retailer only pays for the network capacity when it is made available for multimedia data transfers. Policy-based QoS has the intelligence to automatically allocate bandwidth as needed for specific applications or users.

A New Strategy for Revenue: QoS Policy Control

In both residential and business premium service offerings, bandwidth and QoS are provided based on policies associated with subscribers, applications, web sites, and potentially other parameters. To offer these types of Internet premium services, it is necessary to have complete QoS control over subscriber Internet sessions. Furthermore, this control must be based on business policies and allow for flexible and easy integration with service provider OSS and network management systems.

By offering Premium IP services, service providers can immediately capitalize on their large IP investment without necessarily spending enormous sums of time and money on video head-ends and VoD services. Premium services allow service providers to reap high margins from Internet VoD and gaming services using strategic relationships with other content service providers. By working with Internet video providers (instead of competing against them) IP network service providers can leverage their existing capital investments while profiting from the investments made by others in VoD, network gaming, and other multimedia content services.

This paper examines the business case for leveraging existing network infrastructures with a minimal investment in a policy-based traffic management solution designed to take advantage of the Premium IP service opportunities.

Business Case for QoS-enabled Premium IP Services

Assumptions

To calculate the return on investment (ROI) for incorporating bandwidth policies in a network, it is first necessary to make assumptions regarding the business model for offering premium services.

The residential service assumptions are outlined in Table 1. Today it is possible to download and watch movies directly from the Internet. (Good examples of such services are those offered by MovieLink and CinemaNow.) With a premium IP business model, service providers would provide 'best effort' data rates permitted for video downloads *unless* users subscribe to a premium video service. If subscribers pay an extra \$2.00 per month for Premium Internet Video, they could choose from a variety of Internet video service providers and experience high speed downloads. If a subscriber pays an extra \$1.25 per month he can get the premium gaming service, allowing him high speed connections while playing Internet games. Similarly, the Peer-to-Peer service allows subscribers high speed connections for P2P connections (used for transferring music, video, and other multimedia information) for an additional \$1.25 per month.

The business service assumptions are specified in Table 2. For the Bandwidth-on-Demand service, we assume that a service provider charges \$2.50 for each Gigabyte sent over the high bandwidth connection. This service could also be structured such that a maximum limit of \$1000 per month is charged to the business customer for the Bandwidth-on-Demand service. In this analysis we assume that between 200 and 350 Mbps of bandwidth is used on-demand and average utilizations during an 8-hour busy hour of 0.5%. This amounts to between \$279 and \$488 per month for Bandwidth-on-Demand services which is well within the budget of most enterprises¹.

A similar, but more sophisticated service offering is Policy-based QoS. This service offers bandwidth-on-demand using network policies that provide capacity based on user, application, source, destination, or other variables. The pricing and monthly costs for these services are similar to Bandwidth-on-Demand services and are also well within the budget of most corporate customers.

¹ Specific details regarding the Bandwidth-on-Demand service assumptions are provided in the appendix of this paper.

Residential Service	Description	Pricing
Premium Internet Video	Subscribers can get high quality video from content service providers (such as Yahoo or Google).	\$2.00 per month
Premium Gaming	Subscribers can subscribe to premium gaming services that guarantee high speed connections for game traffic flows.	\$1.25 per month
Premium P2P	This service provides extra bandwidth for P2P flows that can be used by subscribers for a variety of purposes.	\$1.25 per month

Table 1
Assumptions - Residential Premium Services

Business Service	Description	Pricing
Bandwidth-on-Demand	Many corporate customers need to transfer data at high speeds for short periods of time. Bandwidth-on-Demand allows customers to transmit data at high rates for short periods of time paying usage charges. One example of such an application is database synchronization.	\$2.50 per Gbyte transferred
Policy-based QoS	A more sophisticated service than Bandwidth-on-Demand, Policy-based QoS is based on network policies. These policies can be based on user, application, source, destination, or other variables. Usage-based pricing could also be used for this service.	\$2.50 per Gbyte transferred

Table 2
Assumptions - Business Premium Services

ROI Analysis and Results

In this section of the paper the results of an ROI analysis are presented showing a compelling business case for Premium IP services. The business case is examined separately for residential and business services taking into account the fundamental differences in the nature of network traffic, services, and pricing between the two types of customers. Media Controllers are used as the policy-based traffic management solution in both the residential and business case analyses.

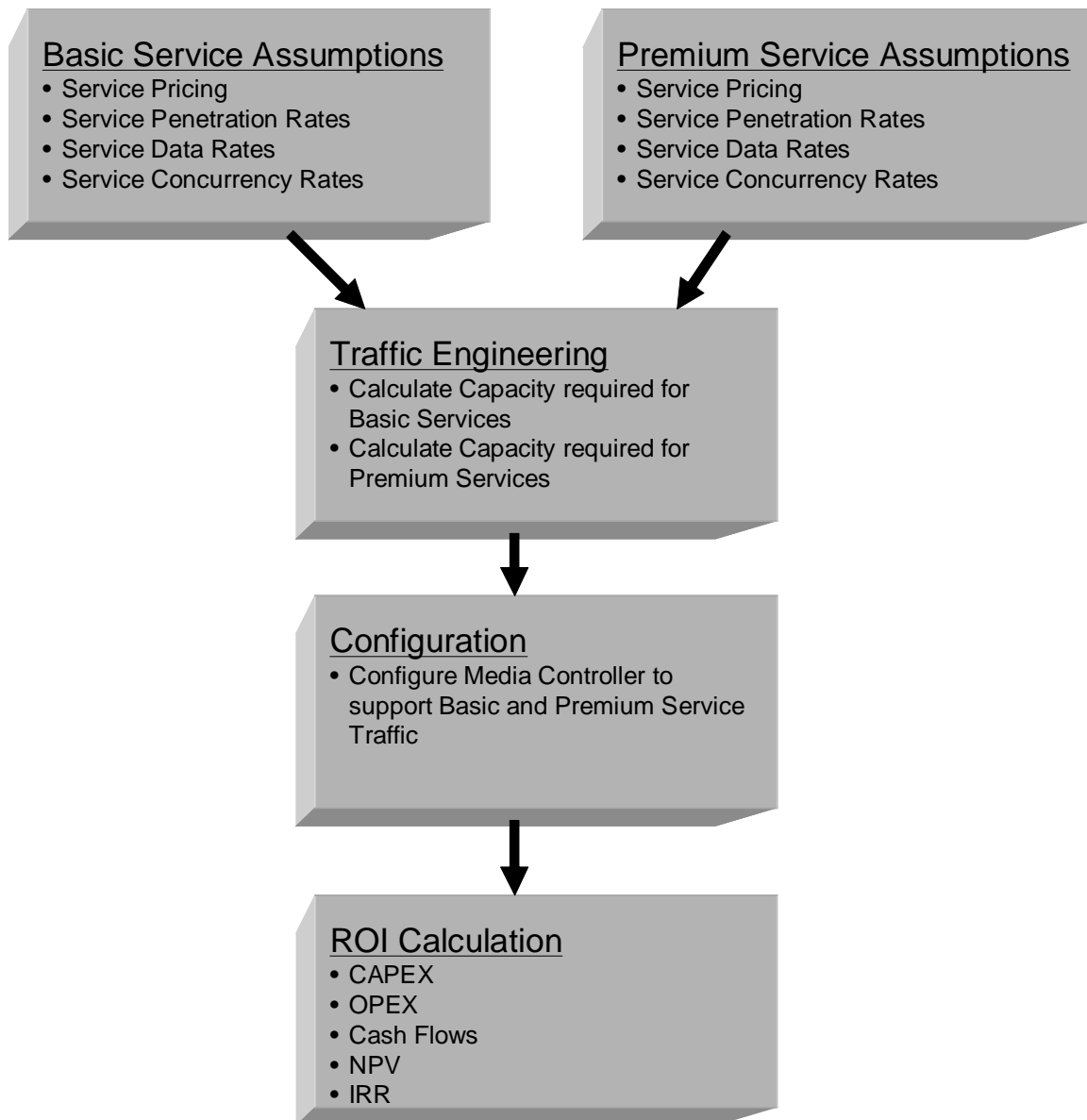


Figure 1
Flow Chart of ROI Model

Both ROI models follow the logic outlined in the flow chart in Figure 1. For residential services we assume that a service provider is offering a standard array of triple play services consisting of High Speed Internet, VoIP, IPTV, and VoD. We also assume that the service provider is offering a set of Premium IP services consisting of Premium Internet Video, Premium Gaming, and Premium P2P². For each type of service we make basic assumptions³ regarding:

- Service Pricing
- Service Penetration Rates
- Service Data Rates

² See Table 1 for details.

³ See the appendix of this white paper for specific details on the assumptions made in this model.

- Service Concurrency Rates

Using these assumptions, a network traffic engineering model is used to configure the Media Controller and calculate extra network transport expenses required to carry premium traffic. After the traffic engineering and configuration are complete, we calculate CAPEX, OPEX, Discounted Cash Flows, Net Present Value (NPV), and the Internal Rate of Return (IRR) for the project.

Residential Services ROI

The ROI for residential Premium IP services is characterized in Figure 2 and Figure 3. The payback for the capital investment in Media Controllers is just over one year at 13.7 months, the NPV of the investment is over \$41 million, and the IRR is 99%. For any high risk capital investment, a rule of thumb is that the Internal Rate of Return (IRR) should be greater than 30%. Also a positive NPV indicates that a capital investment will have a positive ROI. In this example the NPV is significantly higher than the total capital investment⁴ which is less than \$11 Million over the five-year period of study. Figure 2 shows revenues, total cost of ownership (TCO) [CAPEX, OPEX, SG&A], and cash flows. Note the positive trend in cash flows after the first year. Figure 3 illustrates the breakdown between CAPEX and operations expenses⁵. As expected, CAPEX is a small percentage of the TCO of operating the premium services.

⁴ The CAPEX includes Media Controller equipment, engineering, installation, and OSS integration expenses.

⁵ Operating expenses include the OPEX and SG&A expenses associated with offering Premium IP services.

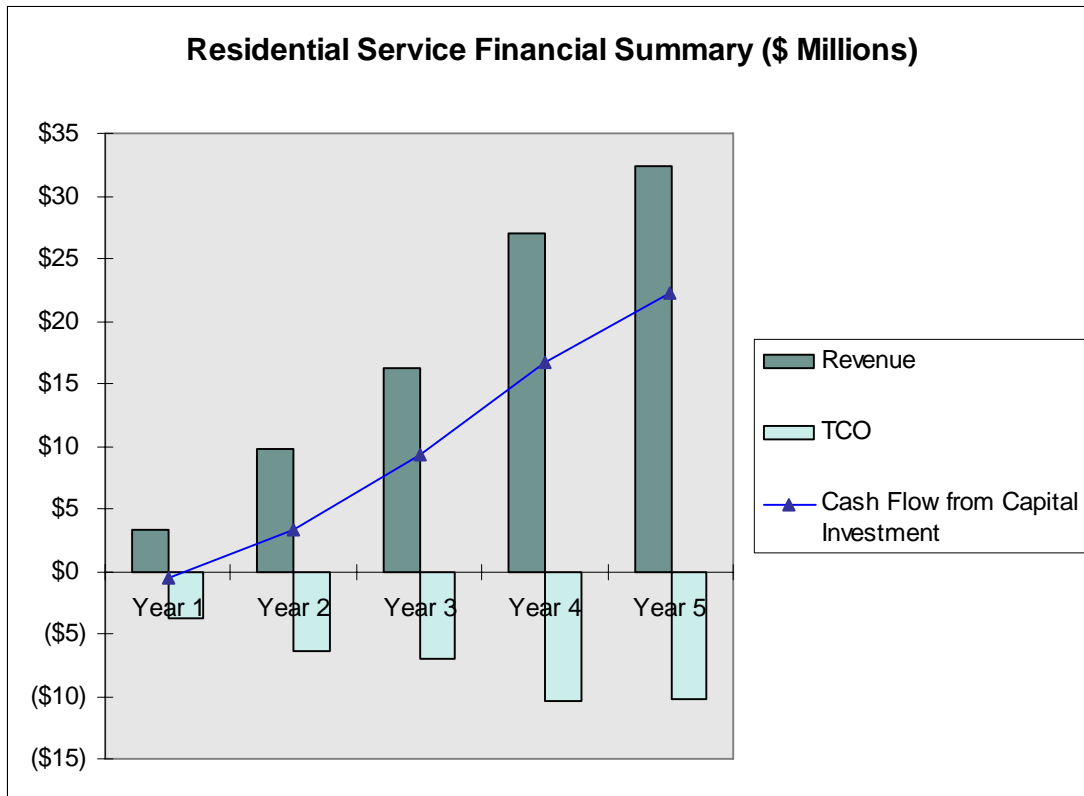


Figure 2
Financial Summary for Premium Residential Services

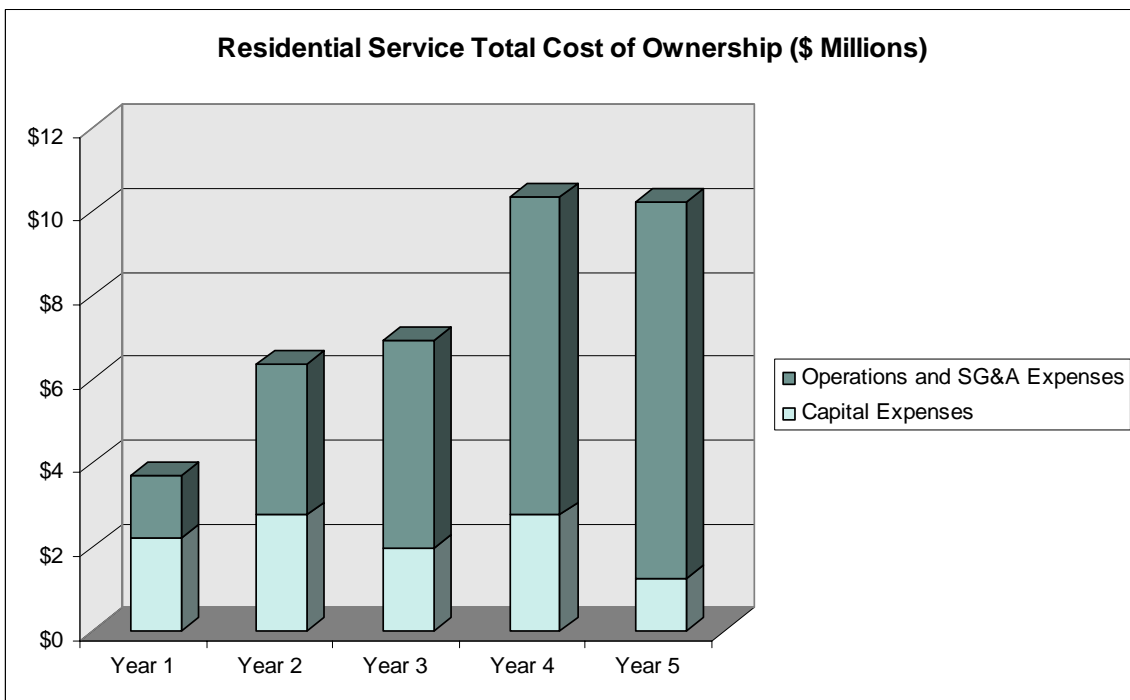


Figure 3
Total Cost of Ownership for Premium Residential Services

Business Services ROI

The ROI for Business Premium IP services is characterized in Figure 4 and 5. The payback for the capital investment in Media Controllers is 10.3 months, the NPV of the investment is over \$23 million, and the IRR is 165%. In this example the NPV is significantly higher than the total capital investment which is less than \$1 million over the five-year period of study. Figure 4 shows revenues, TCO (CAPEX, OPEX, SG&A), and cash flows. Note the positive trend in cash flows after the first year.

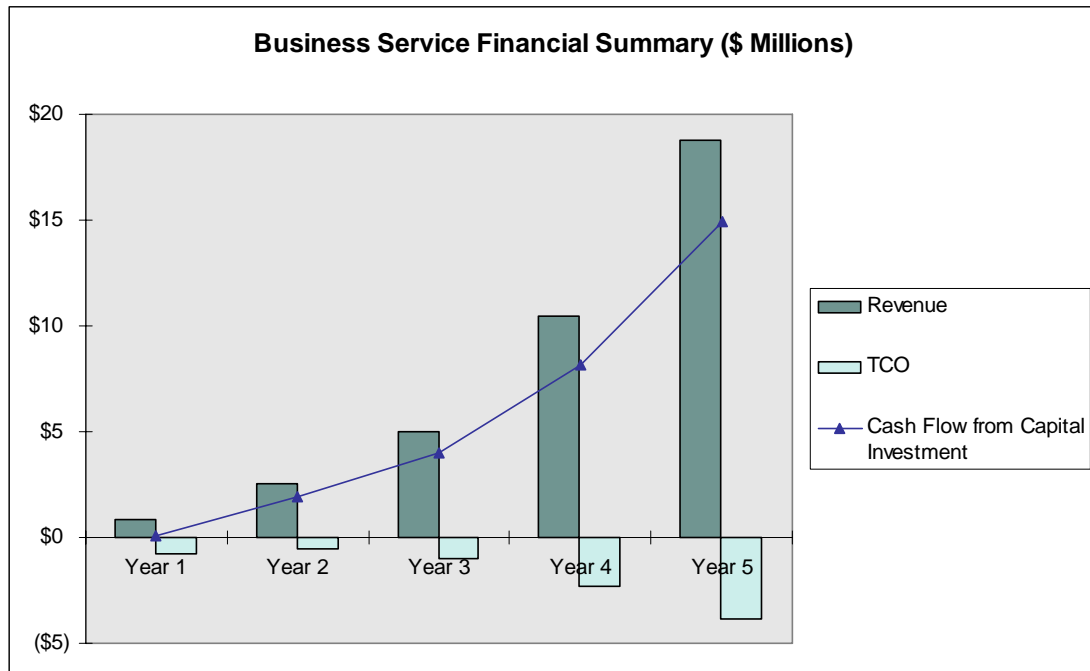


Figure 4
Financial Summary for Premium Business Services

Figure 5 illustrates the breakdown between CAPEX and operations expenses. In this example the capital investment made in Year 1 serves network traffic requirements until Year 4 when additional capital investments are needed. CAPEX is a much smaller component of the TCO than OPEX and SG&A.

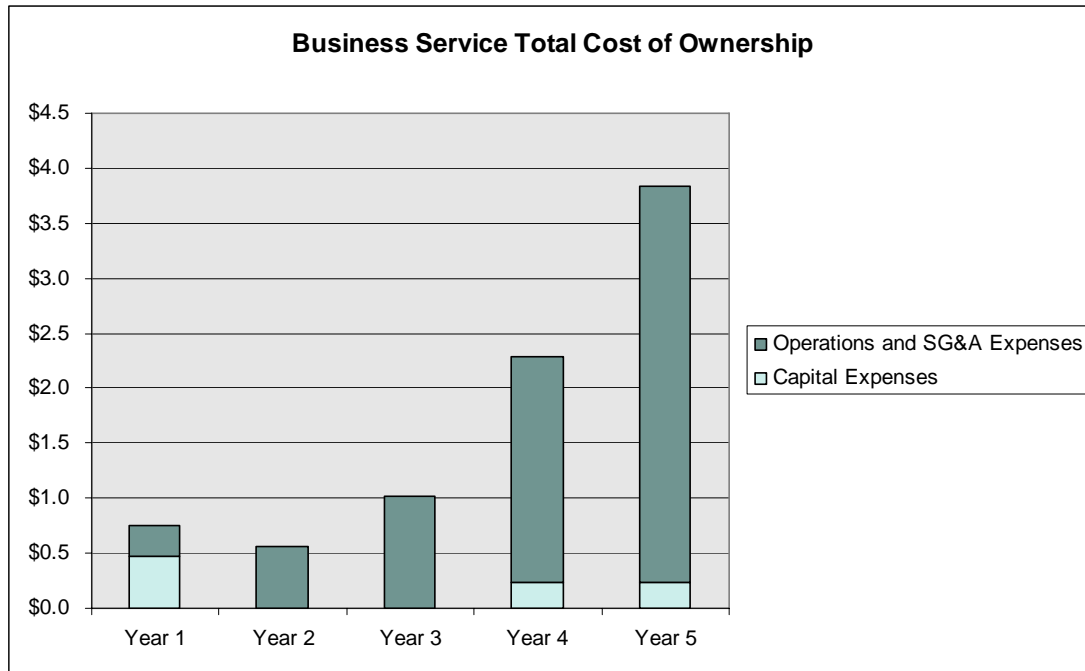


Figure 5
Total Cost of Ownership for Premium Business Services

Conclusion

Using policy-based traffic management solutions, service providers can now leverage their existing IP networks to offer premium IP services with a relatively small capital investment. Premium IP services can generate higher margins than basic “best effort” services *and* allow network service providers to set up wholesale and retail relationships with various multimedia web content providers. Premium services allow business customers to access bandwidth-on-demand and thus generate additional high margin revenue. The Media Controller provides a simple and unique solution for offering Premium IP services. This paper has demonstrated how Premium IP services can generate a positive ROI by investing in Media Controllers.

Appendix

This appendix provides the details of the assumptions used in our ROI model and more detailed financial results than those presented in the main body of the paper.

Detailed Modeling Assumptions and Results

Residential Services

Today many service providers are planning rollouts of triple-play services. The ROI model considers both a basic set of services that are offered by all service providers and a set of premium services. The basic services consist of:

- Broadcast TV
- Video-on-Demand (VoD)
- High Speed Internet
- Telephone (VoIP)

These services are considered to be “table stakes” for next generation residential service providers. These basic triple-play services can be offered using a variety of networking equipment and technology in the access and aggregation network. Typical networks are using Ethernet DSLAMs and OLTs, Carrier Ethernet Transport, and MPLS core IP networks.

In addition to the basic services, the benefits of offering a set of premium services are considered. These services help differentiate a service provider’s offerings and also create higher profit margins. Three value-added residential services are modeled:

- Wholesale Premium Internet Video
- Premium Gaming
- Premium P2P

The details regarding these service offerings are specified in Table 1.

Assumptions Used in Residential Services ROI Analysis

This paper models a hypothetical service provider that operates a network serving one million homes. Assumptions reflecting typical operating conditions for service penetration rates and traffic characterization are used to calculate traffic and equipment configurations.

CAPEX, OPEX, and cash flows for the Media Controller solution are driven by network traffic generated by both basic services and premium services. The model assumes that all traffic (both basic and premium) is processed by the Media Controller at the intersection of the aggregation network and the core IP network.

Assumptions for Calculating Basic Residential Network Traffic

Basic network traffic consists of Broadcast IPTV, VoD, Internet, and VoIP traffic. Broadcast IPTV is multicast IP traffic and VoD is unicast IP traffic. Additionally both IPTV and VoD consist of Standard Definition (SD) and High Definition (HD) content. The assumptions for distribution of SD and HD content and the number of SD and HD IPTV channels are specified in Table 3 and Table 4.

HD & SD Service Distribution	Year 1	Year 2	Year 3	Year 4	Year 5
Standard Definition IPTV & VoD	98%	95%	90%	85%	80%
High Definition IPTV & VoD	2%	5%	10%	15%	20%

Table 3
HD & SD Service Distribution

Number of Channels	Year 1	Year 2	Year 3	Year 4	Year 5
Total Channels	200	250	300	300	300
SD Channels	196	238	270	255	240
HD Channels	4	13	30	45	60

Table 4
Number of SD & HD Channels

An important determinant of network traffic is the penetration rates for broadband services as specified in Table 5 . These penetration rates are used to calculate the percentage of the one million homes passed by the network that become subscribers of the basic triple-play services.

Service Penetration Rates	Year 1	Year 2	Year 3	Year 4	Year 5
IPTV	8%	20%	30%	45%	60%
VoD	8%	20%	30%	45%	60%
Internet	30%	40%	50%	60%	70%
VoIP	2%	5%	15%	25%	30%

Table 5
Service Penetration Rates

Additional assumptions that drive network traffic are average data rates associated with each service and average concurrencies of subscribers simultaneously using the service. These assumptions are presented in Table 6 and Table 7.

Service Data Rates (Mbps)	Year 1	Year 2	Year 3	Year 4	Year 5
SDTV & VoD	3.75	2.93	2.38	1.69	1.00
HDTV & VoD	15.00	12.90	11.50	9.75	8.00
Internet	0.25	0.50	0.50	0.50	0.50
VoIP	0.06	0.06	0.06	0.06	0.06

Table 6
Average Service Data Rates

Service Concurrency	Year 1	Year 2	Year 3	Year 4	Year 5
IPTV	30%	30%	30%	30%	30%
VoD	15%	15%	15%	15%	15%
Internet	15%	15%	15%	15%	15%
VoIP	15%	15%	15%	15%	15%

Table 7
Concurrency Rates for each Service

The assumptions specified above are used to calculate average IP traffic from the network to the subscriber specified in Table 8.

Traffic (Mbps)	Year 1	Year 2	Year 3	Year 4	Year 5
SDTV	735	695	641	430	240
HDTV	60	161	345	439	480
SD VoD	44100	83363	96188	96820	72000
HD VoD	3600	19350	51750	98719	144000
Internet	11250	30000	37500	45000	52500
VoIP	192	480	1440	2400	2880
Total	59937	134048	187864	243808	272100

Table 8
Traffic for Basic Residential Services

Assumptions for Calculating Premium Services Residential Network Traffic

Value-added traffic consists of the applications discussed earlier in this paper:

- Wholesale Premium Internet Video
- Premium Gaming
- Premium P2P

Table 9 specifies the assumptions for the retail pricing and monthly profit (after content costs) for each service. For example, the Wholesale Premium Internet service

is priced at \$4.00 per month, and the cost of that content is \$2.00 per month yielding a monthly profit of \$2.00 per month.

Services	Monthly Pricing	Monthly Profit
Wholesale Premium Internet Video	\$ 4.00	\$ 2.00
Premium Internet Gaming	\$ 2.50	\$ 1.25
Premium Internet P2P	\$ 1.25	\$ 1.25

Table 9
Value-added Service Pricing and Profit

The assumptions for penetration rates, average data rates, and concurrency rates for premium services are presented in Table 10, Table 11, and Table 12 respectively. These assumptions are used to calculate how many subscribers are purchasing premium services and the required network capacity to support premium services.

Service Penetration Rates	Year 1	Year 2	Year 3	Year 4	Year 5
Wholesale Premium Internet Video	6%	18%	30%	50%	60%
Premium Internet Gaming	6%	18%	30%	50%	60%
Premium Internet P2P	6%	18%	30%	50%	60%

Table 10
Premium Service Penetration Rates

Service Data Rates (Mbps)	Year 1	Year 2	Year 3	Year 4	Year 5
Wholesale Premium Internet Video	1.00	1.00	1.00	1.00	1.00
Premium Internet Gaming	0.50	0.50	0.50	0.50	0.50
Premium Internet P2P	0.25	0.25	0.25	0.25	0.25

Table 11
Average Data Rates for Premium Services

Service Concurrency	Year 1	Year 2	Year 3	Year 4	Year 5
Wholesale Premium Internet Video	15%	15%	15%	15%	15%
Premium Internet Gaming	15%	15%	15%	15%	15%
Premium Internet P2P	15%	15%	15%	15%	15%

Table 12
Service Concurrency Percentages for Premium Services

The total traffic that is generated by the premium services is presented in Table 13. This traffic is added to the traffic generated by basic triple-play services to calculate the Media Controller configurations and CAPEX.

Premium Service Traffic (Mbps)	Year 1	Year 2	Year 3	Year 4	Year 5
Wholesale Premium Internet Video	9000	27000	45000	75000	90000
Premium Internet Gaming	4500	13500	22500	37500	45000
Premium Internet P2P	2250	6750	11250	18750	22500
Total	15750	47250	78750	131250	157500

Table 13
Traffic Generated by Premium Services

The additional traffic generated by these premium services results in increased network transport costs. These costs are accounted for as wholesale monthly transport costs and are presented in Table 14. As optical networks and Carrier Ethernet becomes widely deployed, the cost of transport continues to fall. This trend is reflected in our transport cost assumptions.

Network Transport Costs	Year 1	Year 2	Year 3	Year 4	Year 5
Monthly GigE Transport Cost	\$ 2,500	\$ 1,500	\$ 700	\$ 500	\$ 500
Monthly 10 GigE Transport Cost	\$ 25,000	\$ 12,000	\$ 10,000	\$ 5,000	\$ 5,000

Table 14
Monthly Wholesale Transport Costs

ROI Results for Residential Services

The business case for the Media Controller capital investment is quite compelling. The key financial metrics for the investment decision are presented in Table 15. In general, a Net Present Value (NPV) greater than zero indicates that a capital investment returns positive value to the business. In the case of the Media Controller investment, the NPV is quite high: \$41,265,189. For any high risk capital investment a rule of thumb is that the Internal Rate of Return (IRR) should be greater than 30%. The IRR of the Media Controller investment far exceeds that value at 99%. Payback is also fairly rapid at 13.7 months.

Key Financial Metrics	Value
NPV over Five Years	\$ 41,265,189
IRR (Internal Rate of Return)	99%
Payback Period (Months)	13.7

Table 15
Key Financial Metrics

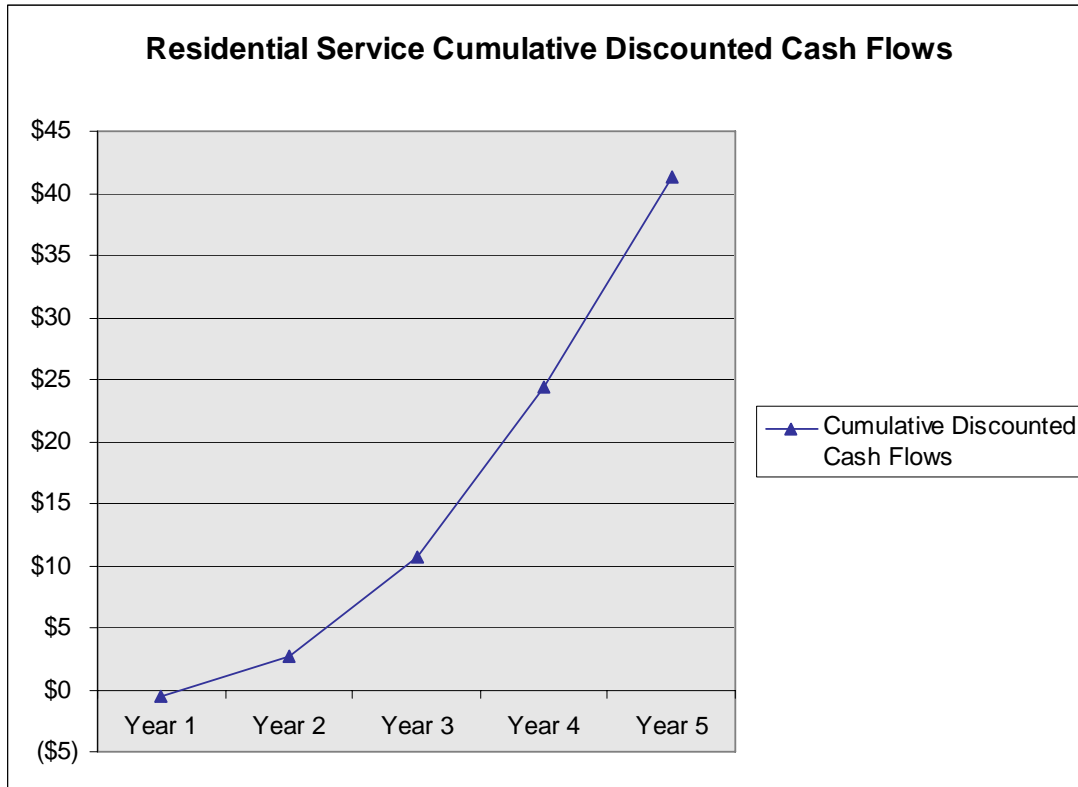


Figure 6
Cumulative Discounted Cash Flows

The cumulative discounted cash flows are depicted in Figure 6. Cumulative discounted cash flows can also be defined as the NPV of the investment at each year of the five-year period of study. This is a very important metric because it accounts for the time value of money.

ROI for Premium Internet Services	Year 1	Year 2	Year 3	Year 4	Year 5
Additional Revenue Generated from Premium Services	\$ 3,240,000	\$ 9,720,000	\$ 16,200,000	\$ 27,000,000	\$ 32,400,000
Media Controller Equipment Capital Expense	\$ (1,906,000)	\$ (2,554,000)	\$ (1,817,000)	\$ (2,554,000)	\$ (1,169,000)
Engineering and Installation Expense (EF&I)	\$ (152,480)	\$ (204,320)	\$ (145,360)	\$ (204,320)	\$ (93,520)
OSS Integration	\$ (150,000)	\$ -	\$ -	\$ -	\$ -
OPEX (Maintenance, Environmental, and Transport Expenses)	\$ (921,696)	\$ (1,857,360)	\$ (2,049,432)	\$ (2,729,496)	\$ (3,138,000)
Selling, General, and Administrative (SG&A)	\$ (583,200)	\$ (1,749,600)	\$ (2,916,000)	\$ (4,860,000)	\$ (5,832,000)
Cash Flow from Capital Investment	\$ (473,376)	\$ 3,354,720	\$ 9,272,208	\$ 16,652,184	\$ 22,167,480
Discounted Cash Flows from Capital Investment	\$ (473,376)	\$ 3,135,252	\$ 8,098,706	\$ 13,593,142	\$ 16,911,464

Table 16
Results of Cash Flow Analysis

The full details of the cash flow analysis are presented in Table 16. The additional revenue from premium services is calculated from the assumptions for monthly revenue in Table 9 and the penetration rate assumptions for premium services in Table 10. The capital expense for the Media Controller is calculated by modeling the configuration necessary to support the network traffic generated by both basic triple-play and premium services as specified in Table 8 and Table 13. Two other components of CAPEX that are considered in this model are Engineering and Installation Expenses (EF&I) and OSS Integration Expenses. These are the capital expenses that are incurred to design, install, and integrate the Media Controller into

the network. Ongoing expenses consist of the OPEX and SG&A. OPEX is the cost of maintenance and environmental expenses for the Media Controller. OPEX also includes the cost of network transport for the additional traffic added to the network by the premium services. The transport expenses are calculated using the network traffic specified in Table 13 and the wholesale transport expense assumptions specified in Table 14. The SG&A expenses are the on-going expenses incurred in selling, marketing, and administrative overhead associated with premium services. Cash flows and discounted cash flows are calculated in the normal way.

Business Services

The major paradigm shift occurring today in business network services is the transition from legacy TDM, Frame Relay, and ATM services to Carrier Ethernet services. Carrier Ethernet services include E-LAN and E-LINE services with basic levels of QoS guarantees for Ethernet virtual circuits (EVC)⁶. One of the major problems faced by service providers is the falling price points for data services as the market moves towards high speed Carrier Ethernet. This analysis shows how service providers can make money on Carrier Ethernet services by offering premium Ethernet services using the Media Controller. The premium services that are analyzed are:

- Bandwidth-on-Demand
- Policy-based QoS

The characteristics of these services were described earlier in Table 2.

Assumptions Used in Business Services ROI Analysis

The Bandwidth-on-Demand service provides scheduled increases in network capacity based on user requests while the Policy-based QoS offering provides extra bandwidth based on user, application, location, and policy. It assumes that a usage-based pricing model is used for both services. When a higher capacity connection is established across the network, the business subscribers are charged \$2.50 for each gigabyte of data transferred across the high capacity connection. Usage charges are *only incurred* when the high capacity value-added connection is established, and these charges are *not* incurred on data transferred across the standard Ethernet virtual circuit.

Penetration Rates	Year 1	Year 2	Year 3	Year 4	Year 5
Basic Carrier Ethernet	5%	10%	15%	25%	35%
Bandwidth on Demand	3%	8%	12%	20%	32%
Policy-based QoS Service	2%	5%	10%	18%	28%

Table 17
Penetration Rates for Business Services

⁶ For a more detailed description of Carrier Ethernet services see the Metro Ethernet Forum web site: www.metroethernetforum.org.

Average CIR (Mbps)	Year 1	Year 2	Year 3	Year 4	Year 5
Basic Carrier Ethernet	10	15	25	35	50
Bandwidth on Demand	200	225	250	300	350
Policy-based QoS Service	100	120	150	180	200

Table 18
Average CIR for Business Services

Business Service Concurrency	Year 1	Year 2	Year 3	Year 4	Year 5
Basic Carrier Ethernet	25.0%	25.0%	25.0%	25.0%	25.0%
Bandwidth on Demand	0.5%	0.5%	0.5%	0.5%	0.5%
Policy-based QoS Service	1.0%	1.0%	1.0%	1.0%	1.0%

Table 19
Business Service Concurrency during the Busy Period

Business Traffic (Mbps)	Year 1	Year 2	Year 3	Year 4	Year 5
Basic Carrier Ethernet	625	1875	4688	10938	21875
Bandwidth on Demand	150	450	750	1500	2800
Policy-based QoS Service	100	300	750	1620	2800
Total	875	2625	6188	14058	27475

Table 20
Traffic from Business Services (Mbps)

Average Monthly Cost for Premium Services per Subscriber	Year 1	Year 2	Year 3	Year 4	Year 5
Bandwidth on Demand	\$ 279	\$ 314	\$ 349	\$ 419	\$ 488
Policy-based QoS Service	\$ 279	\$ 335	\$ 419	\$ 502	\$ 558

Table 21
Average Monthly Cost of Business Premium Services per Subscriber

Table 17 specifies the penetration rates for basic Carrier Ethernet, Bandwidth-on-Demand, and Policy-based QoS offerings. We assume that there are 5000 business customers that can be reached by the service provider's network. The penetration rates are used to calculate the number of subscribers to each service over the five-year period of study.

The average data rates for each service are specified in Table 18. The reason that average data rates are higher for the two premium services compared with standard Carrier Ethernet services is because the higher bandwidth is only used *on-demand* for the premium services. These data rates are used in conjunction with the service concurrency assumptions in Table 19 to calculate the total traffic generated from business services which is specified in Table 20.

Given the assumptions for pricing (\$2.50 per gigabyte), average data rates, and concurrency during the 8-hour business day, the average monthly cost for premium

services is presented in Table 21. These costs are well in line with most corporate budgets for telecommunications.

Results of Business ROI Analysis

For business services, the ROI for the Media Controller capital investment is also quite compelling. The key financial metrics for the investment decision are presented in Table 22. In general, a Net Present Value (NPV) greater than zero indicates that a capital investment returns positive value to the business. In the case of the Media Controller investment, the NPV is quite high: \$23,442,030. For any high risk capital investment a rule of thumb is that the Internal Rate of Return (IRR) should be greater than 30%. The IRR of the Media Controller investment far exceeds that value at 165%. Payback is also fairly rapid at 10.3 months.

Key Financial Metrics	Value
NPV (Net Present Value)	\$ 23,442,031
IRR (Internal Rate of Return)	165%
Payback Period (Months)	10.3

Table 22
Key Financial Metrics for Business Service Capital Investment

The cumulative discounted cash flows for business premium services are depicted in Figure 7. Cumulative discounted cash flows can also be defined as the NPV of the investment at each year of the five year period of study. This is a very important metric because it accounts for the time value of money.

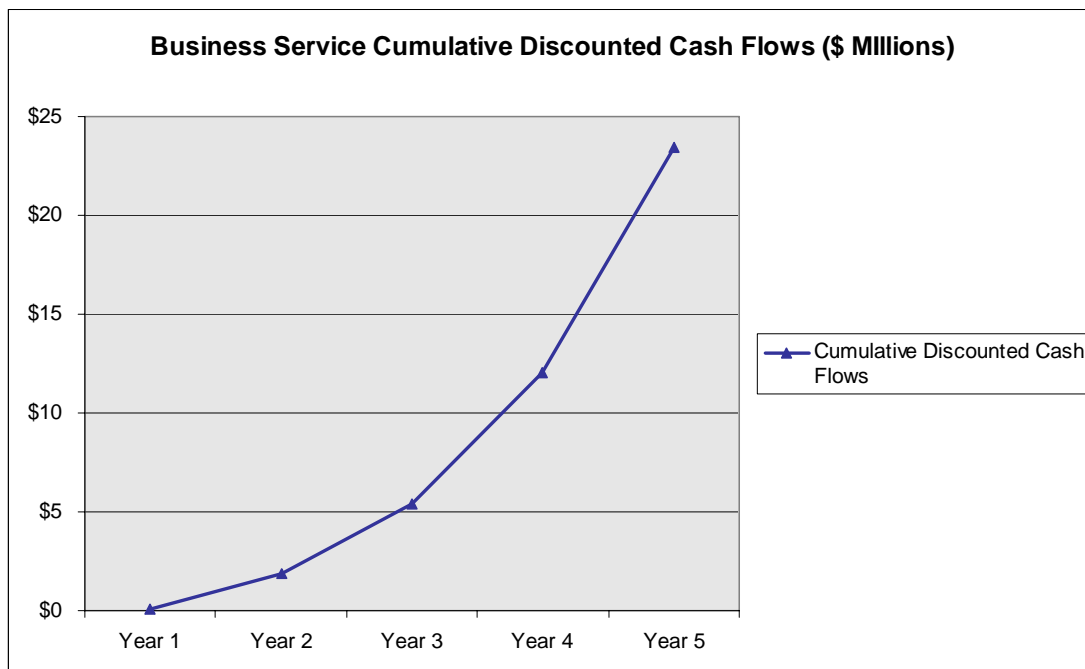


Figure 7
Business Service Cumulative Discounted Cash Flows

ROI for Premium Business Services	Year 1	Year 2	Year 3	Year 4	Year 5
Additional Revenue Generated from Premium Services	\$ 837,000	\$ 2,511,000	\$ 5,022,000	\$ 10,445,760	\$ 18,748,800
Media Controller Equipment Capital Expense	\$ (305,000)	\$ -	\$ -	\$ (216,000)	\$ (216,000)
Engineering and Installation Expense (EF&I)	\$ (24,400)	\$ -	\$ -	\$ (17,280)	\$ (17,280)
OSS Integration	\$ (150,000)	\$ -	\$ -	\$ -	\$ -
OPEX (Maintenance, Environmental, and Transport Expenses)	\$ (125,880)	\$ (113,880)	\$ (112,680)	\$ (166,536)	\$ (225,192)
Selling, General, and Administrative (SG&A)	\$ (150,660)	\$ (451,980)	\$ (903,960)	\$ (1,880,237)	\$ (3,374,784)
Cash Flow from Capital Investment	\$ 81,060	\$ 1,945,140	\$ 4,005,360	\$ 8,165,707	\$ 14,915,544
Discounted Cash Flows from Capital Investment	\$ 81,060	\$ 1,817,888	\$ 3,498,437	\$ 6,665,649	\$ 11,378,997

Table 23
ROI for Premium Business Services

The full details of the cash flow analysis for business premium services are presented in Table 23. The additional revenue from premium services is calculated using the assumptions that bandwidth-on-demand is priced at \$2.50 per gigabyte. The penetration rate assumptions in Table 17 are used to calculate the number of customers buying the service. The capital expense for the Media Controller is calculated by modeling the configuration necessary to support the business service traffic generated by both basic Carrier Ethernet and premium services as specified in Table 20. Two other components of CAPEX that are considered in this model are engineering and installation expenses (EF&I) and OSS integration expenses. These are the capital expenses that are incurred to design, install, and integrate the Media Controller into the network. On-going expenses consist of the OPEX and SG&A. OPEX is the cost of maintenance and environmental expenses for the Media Controller. OPEX also includes the cost of network transport for the additional traffic added to the network by the premium services. The transport expenses are calculated using the network traffic specified in Table 20 and the wholesale transport expense assumptions specified in Table 14. The SG&A expenses are the on-going expenses incurred in selling, marketing, and administrative overhead associated with premium services. Cash flows and discounted cash flows are calculated in the normal way.