

Next Generation Data Center Services:
Building the Virtual Service Advantage

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Introduction

The dust of the great Internet gold rush is settling. Capital spending in Internet infrastructure peaked in 2000, following a period when speed of execution was considered one of the most essential skills in Internet business operations. The expression “in Internet time” made it to mainstream English, testifying to the spirit of the times. As the entire Internet industry adjusts its business practices to become profitable, the focus is on reducing operational costs and leveraging the huge investments made in developing expertise.



New data center services and network improvements continue to be deployed. The few carriers that have not yet embraced the Internet are getting on the bandwagon now. Internet application, access and hosting service providers are merging and consolidating. The dot.com crash of 2001 ultimately means less capital waste and a healthier Internet sector. Some survivor companies will consolidate into large-scale concerns, while others will choose narrow and specialized niches.

Even as we witness an explosion in data center traffic, the generation of high-margin revenue and creation of unique customer value from selling pure bandwidth remains a challenge. IP service providers continue to seek ways to generate additional revenue through differentiated services while remaining focused on core competencies.

Service providers operate in a highly competitive environment that makes it difficult to maintain Internet and service differentiation. When a service provider successfully deploys a new managed service, competing service providers can easily replicate the service by purchasing the same network equipment. The criterion for selecting network equipment used in managed services continues to evolve with market requirements. The most sought after managed service products provide cost saving advantages and leverage existing expertise.

The advent of managed services will result in a scramble as service providers attempt to capitalize on a multi-billion dollar high margin revenue opportunity.

Managed services will require a value-based network infrastructure that can provide a platform for incorporating new services based on market demand, improvements in operation and configuration and management, and integration into existing service provider environments.

Market Background

Service providers face many business and technical decisions, the most important of which involve the deployment of new services designed to maintain their competitive edge. Most IP providers are experts in transport services; they have the ability to manage day to day network operations and expansion, thereby ensuring customers of quality network access and performance. For colocation and Web hosting services, life in the data center is complicated by ever increasing performance demands and the myriad of technologies required to satisfy these demands. The level of expertise required to effectively manage the data center environment grows with each new technology and must scale with customer growth.

The current hosting market consists of very high-end players, such as Digex, offering specialized services that cater to large Web sites. Providers such as Verio offer less complex basic shared hosting services to the lower end of the market. Only a few players, such as Rackspace, are addressing the market for hosting services that exists between the high and low end of the market. In "The 2000 Content Delivery Service Study," we found that 69% of US companies with 500 or more employees still host their own Web sites. Why haven't these companies moved their Web site to a hosting provider? Based on our research, we think these self-hosters view the high end hosting market as too expensive, and the low end as not offering the services they require. Most price points for managed services are too high for companies in this vast middle market. In order to attract these 14,500 self-hosters, providers must offer hosting and managed services that cost effectively scale with demand.



Most providers are familiar with rolling out basic services that just break-even, and layering services on top of the basic services. For example, bandwidth is arguably a basic service, for which providers generate slim profit margins. Providers are now examining high margin value added services that are layered on top of basic bandwidth.

Value added services can and will play a significant role in service differentiation.

Future

The current economic climate has forced many service providers to painstakingly search for ways to reduce costs and increase revenue. In familiar terms, providers need a better mouse trap. For managed services, service providers need a product that provides more functions and costs less to buy and operate. Equipment that can leverage existing expertise and reduce administration time is of paramount importance in making managed services successful. Historically, managed services in the data center included point products that performed single functions. For example, a managed firewall service included a single firewall product installed in a customer rack. The provider installed, managed, and maintained the firewall. Each service function required different products for local and global load balancing, VPN, firewall, SSL acceleration, bandwidth shaping, and intrusion detection. Installing, resolving integration and compatibility issues, and managing the day-to-day operations of disparate systems tended to consume precious human resources.

Providers require a solution that gives them the ability to satisfy the changing value proposition of managed services. Service flexibility is also critical to moving forward, as providers introduce new managed services. The value in being first-to-market with a successful managed service is short-lived, as other providers will quickly replicate any successful service. Providers must have the ability to rapidly create and change service bundles to accommodate the changing market. Time remains an essential factor, and the provider who can decrease the time it takes to develop, deploy, and deliver effective managed service bundles has an important competitive advantage. Moreover, providers must sustain revenue flexibility by maintaining a diverse service portfolio that attracts new and existing customers.

Competition

The economic downturn of 2001 has been officially labeled a recession, further pressuring service providers to compete on price. Target customers are migrating to survival mode, resulting in widespread cost cuts. Although the economy is in the process of turning around, price is a major positioning point for many services, and especially for managed services. Competitive pressures will result in price differentiation where maintaining customers depends on the providers ability to lower capital and operational costs, thereby remaining price competitive in the market. Providers of hosting and colocation services must expand the revenue generated per square foot in data centers without expanding real estate.



Market Direction

Internet service is affordable and accessible to the large population of business Web sites. Although profit margins are thin, many providers depend on plain vanilla hosting services for sizable portions of their revenues. Network service providers are having to reassess their hosting services. Technology has enabled a growing variety of data center managed services. For providers of hosting services, the way to profit growth is through managed services. Many providers are eager to offer high-value managed services because they offer stable path to greater profitability. Some see managed services as natural extensions to their hosting activities that can increase their revenue and profit margins.

Internet businesses tend to be volume-driven: attaining critical mass is a priority for most service providers. However, controlling production costs is just as important. Until recently, the financial valuation of most Internet businesses was often based on user counts and customer acquisition speed, combined with potential for revenue growth. Rarefied access to capital markets has forced most Internet enterprises to realign their business models. Internet businesses need to deliver positive cash flows sooner rather than later; profitability tops current priority lists.

Building Virtual Services

The market for data center services is poised to grow, as the thousands of corporate self-hosted Web sites migrate to colocation and hosting services. The challenge, as pointed out earlier, is delivering hosting and managed services at a price point that is attractive to this burgeoning middle market. We believe virtual data center services are the answer. For this paper, we define virtual data center services as multiple on-demand layer 4-7 managed services delivered from a single networking platform simultaneously.



Unlike existing managed solutions that use disparate single function boxes, virtual services platforms use a single box that performs many functions. Disparate single-function point products are generally used in the high-end Web colocation market. Managing point products can be time consuming because of ongoing product compatibility issues. Virtual service platforms offer operational efficiencies and time savings gained through guaranteed service compatibility and streamlined and automated service provisioning. A virtual service platform enables providers to leverage existing expertise, so that fewer network administrators can do more in less time. Because services are virtualized, "rack ninjas" are no longer required to walk out to customer racks and install equipment. Services are simply turned on in the virtual service platform. Virtualization of data center services can leverage centralized experts and scale across multiple time zones. One of the most important distinctions among virtual service platforms will be network management and support functions.

For customers buying managed hosting services, low-end services may not meet their needs, while high end solutions are too costly. Commercial hosting services require multiple levels of managed services to meet the needs of the mid-market. Services must be backed by Service Level Agreements (SLAs) that providers can guarantee, because they know they can trust their managed service infrastructure.

Pay-for-service compensation improves economic efficiency: it is common in business. Airlines offer multiple service classes. Couriers offer same-day, next-day and other tiered service levels. Restaurants offer standard menus or a la carte fare. Managed services should offer tiered service levels, to reflect the real-world differences in economic value to customers. Service providers should be able to match actual customer requirements with ad-hoc managed service bundles, which can increase revenues at minimal cost. A commercially viable Internet requires tiered delivery systems that match the variety of needs of all users, content and application providers. Providers need to be able to sell, and reliably deliver, higher-priced managed services to customers who will pay more for advanced features or higher performance levels.

Virtual Service Platform Requirements

Virtual service platforms are relatively new to the market. Hosting and colocation providers have unique requirements for their data center environments. However, there are some basic requirements we feel every provider will require. The requirements include service management, dedicated resources, reporting, billing and accounting, service quality, extensibility, service velocity, security, and uptime.



Service Management

Telecommunications providers significantly differentiate based on operational efficiencies—how well they provision, operate, maintain, and support voice network services. Providers of hosting and colocation services must also differentiate on how effectively they manage services. Virtual service platforms must enable providers to competently manage multiple services across many unique customer partitions. Mistakes in Web site managed services are unforgiving as mismanagement often means significant customer site downtime. Daily operations, such as software updates, flash updates, and configuration modifications also interrupt services. Virtual services platforms provide streamlined, automated management consoles across multiple service offerings that increase service velocity and decrease mistakes.

Dedicated Resources

For virtual services platforms, each customer partition must be separated in hardware, each having dedicated resources that are completely separate from those of other customers. This prevents disruptive events in one customer partition from affecting other customer partitions and ensures predictable service performance. As we mentioned earlier, security continues to play an increasing role in business, and virtual service platforms must provide secure and dedicated services.

Reporting

Reporting is a key element of a virtual service platform for providers as well as virtual service customers. Reporting provides vital information on customer usage, performance, and SLA confirmation. Service providers and their customers need access to important information on the health and performance of their virtual data center services.

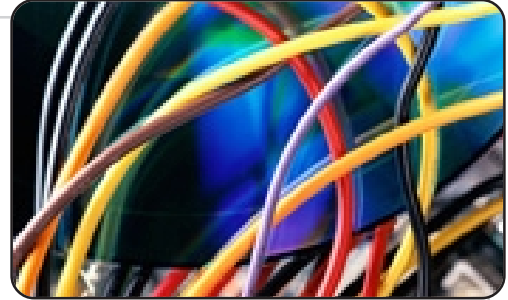
Billing and Accounting

Providers of managed services can learn from previous generations of service providers, who are enmeshed in inflexible, proprietary billing systems. It is very difficult to integrate new services and pricing options into such frameworks. The managed service environment is changing as previous business practices become obsolete, creating the need for new service architectures.

The new billing architecture must create advantages through dynamic deployment of new and bundled services that can parallel changing business models and embrace changing pricing models. The time involved in bringing a service to market has always been a competitive factor in developing successful services. Time is critical when integrating customer care, operations software (OSS), service management, and billing software.

Service Quality

Virtual service platforms must guarantee data center services and measure service quality for each service delivered. Virtual service platforms are uniquely positioned to offer accurate performance metrics on tightly integrated service functions, enforced through equipment resource management.



Extensible Framework to Add New Functions

An effective architecture will include an extensible framework that supports the creation and deployment of new integrated services. The development of standards-based “interface compatible” components, the building blocks of virtual services, will enable providers to integrate new services quickly.

Service Velocity

Virtual services enable service providers to set up managed services in a matter of minutes without outrageous staff and equipment expenditures. Internet products and services are being developed and deployed so quickly that product cycles are referenced in Internet years-short periods of time that are a fraction of a normal calendar year. Using virtual service platforms, providers of managed services can provide organizations with a unique time-to-market advantage; on-demand managed data center services.

Security

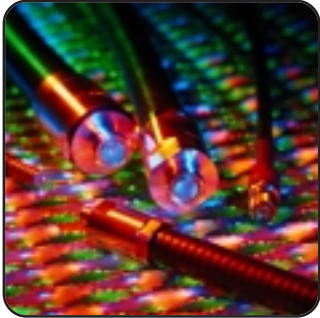
Since multiple customers are present on a single virtual services platform at the same time, the platform must offer high levels of security between customers and for the system itself. The platform must separate customer traffic into separate partitions and separate customer statistics and performance information in the management console. As described previously, resources should be dedicated for each customer in the traffic path to prevent a denial of service (DoS) attack or other traffic spike on one customer from affecting the performance of the system or compromising any other customer’s security.

Uptime, uptime, uptime

It goes without saying that services that are not available don’t sell very well. Indeed, reliability is a fundamental requirement for data center services and virtual service platforms must include redundant service architectures. Redundant elements must provide an “always on” architecture that gracefully deals with component failures, including both hardware and software.



Virtual Services Offerings



The deployment of managed services depends on the expertise a service provider maintains. The popularity of core managed services in the data center, such as SSL acceleration, will continue increase over time. Customer requirements will vary from basic hosting to highly customized managed solutions. Virtual service platforms enable economical managed services for popular data center services. Current virtual service platforms include VPNs, firewall, SSL acceleration, and load balancing.

The forecasts below come from our content delivery, performance streaming, and storage research. One of the most significant factors influencing growth in our forecast is the increasing number of study respondents planning to use streaming applications and rich media in their current and future plans. We found significant increases in the number of respondents planning to incorporate live and on-demand streaming media in their Web sites.

VPN Services

Data VPN technology has matured over the past several years and is now a common for business applications such as remote access and Web site management. The benefit of using VPNs in the data center environment is to enable secure content updates without the need for expensive dedicated leased lines for Web site management. VPN technologies can use the Internet for secure data communications, allowing Web site administrators to connect from almost anywhere.

Firewall Services

Installing, managing, and maintaining firewall solutions requires a high level of security expertise. This is one of the primary reasons customers prefer to outsource firewall services. Maintaining security expertise is costly for Web site organizations. Security expertise is scarce and many corporate customers will look to their hosting provider for managed security services.



SSL Acceleration

The amount of secure content on the Web is steadily increasing along with security concerns and awareness. According to our "2000 Content Delivery Service Study," 76% of the study respondents (at companies with 500 or more employees) use secure content (primarily SSL) on their Web site in 2001. SSL acceleration is a requirement for most e-commerce sites, and a requirement for managed services.

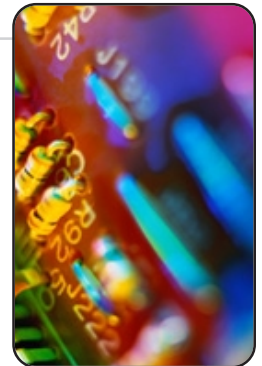
Load Balancing

Load balancing solutions distribute incoming traffic to multiple servers. Local load balancing distributes traffic to servers within a single data center; global load balancing distributes traffic to multiple data centers. According to our "2000 Content Delivery Service Study," 58% of the study respondents (at companies with 500 or more employees) planned to use load balancing solutions in 2001. Maintaining redundant Web site resources reduces downtime when network problems occur. Respondents from the same study cited hardware failure (46%) as the leading cause for Web site degradations and outages. Load balancing is often used to increase the overall performance and consistency of a Web site.

Data Center Service Models

We examined two basic scenarios for data center services: the old model which includes service revenue and costs with individual point products, and the new model which includes service revenue and costs with a virtual service platform. Business models and value propositions for IP services change frequently. Because of this frequent change, successful NSPs are implementing flexible business and technical infrastructures that accommodate rapid change. The managed service opportunity will grow significantly over the next few years, and new revenue models will continually be developed and tested in the market.

Capital expenditures are on the mind of every business leader, as they provide the basis for profitability and efficiency. New products have been developed for providers of managed services. These new virtual service platforms take advantage of economies of scale, processing power, and increased performance through ASIC development. Providers of managed services look for two important elements in managed service products, cost and manageability. Through this first model, we look at the basic costs of equipment. Because scale is important in our scenario, 100 customers will need Firewall, VPN, SSL acceleration, and load balancing services. For this scenario we examined two solutions: virtual services platforms and individual point products.



Virtual Services Platforms

Virtual service platforms are being developed by multiple companies, including Inkra Networks and Nexsi Systems. We have assumed a rough list pricing of \$600,000 for a virtual service platform that supports at least 100 customers. This number does not reflect the pricing of any single company and is used to provide a comparison to the appliance scenario in the analysis. For individual product pricing, contact the appropriate companies.

www.inkra.com

www.nexsi.com

VIRTUAL SERVICE PRODUCTS	LIST PRICE
Configured for 100 customers	\$600,000

Single Point Products

We have chosen representative products in the firewall, VPN, load balancing, and SSL acceleration categories. These products are widely deployed and their pricing is representative of other products in the same class. We have collected list pricing information on these products from publicly available sources. Pricing is always subject to change and you should contact the appropriate companies directly for more up to date pricing information.

www.checkpoint.com

www.f5.com

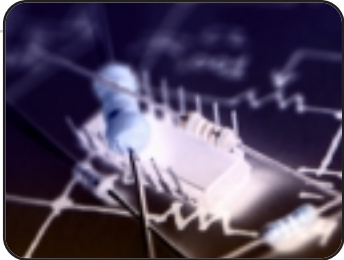
www.intel.com

POINT PRODUCTS	LIST PRICE
Checkpoint Firewall/VPN-1	\$9,995
F5 BigIP Load Balancer	\$15,000
Intel 7110 SSL Acceleration	\$6,995
Total	\$31,990

The managed services market is poised for healthy growth. Using the list pricing information, the cost differential alone warrants further investigation of virtual service solutions. The table below shows the total cost and price per customer for 100 managed services customers for Firewall, VPN, Load Balancing, and SSL Acceleration.

	VIRTUAL SERVICES	POINT PRODUCTS
Total Cost	\$600,000	\$3,199,000
Cost per customer	\$6,000	\$31,990

Existing Service Model



As noted previously, the old model for managed services uses point products that are implemented and managed for hosting and colocation customers. The assumptions used in the creation of these models are based on feedback from service providers, public pricing information, product manufacturers, and extrapolations based on industry trends. These models are intended for use as guidelines only. Actual costs and revenues will vary.

When a customer signs up for managed services, network administrators must order the required equipment, in our case, a Firewall/VPN-1 from Checkpoint, BigIP load balancer from f5, and an Intel 7110 SSL accelerator. Network administrators then install and configure equipment to suit the customer’s environment. The speed at which equipment is configured and installed largely depends on the experience and expertise of the administrator configuring the equipment. If all goes well, configuration takes 4 to 8 hours per box. However, configuration problems frequently arise, and normal installations may take days instead of hours. After managed service equipment is installed, administrators generally spend 4 to 6 hours per month maintaining each piece of equipment.

Pricing for managed services can vary depending on the size of the customer’s web site, amount of capacity, and customer data center configuration. Customers can expect to pay a setup fee ranging from \$150 to \$3,000, and monthly fees ranging from \$150 to \$3,000.

For simplicity in our service model, we assume that 100 customers subscribe to managed services simultaneously. In reality, customers subscribe over time. We deploy 3 pieces of equipment (firewall/VPN, load balancing, and SSL acceleration) into every customer data center cage. The assumptions are listed below.

Revenue is generated through a one-time \$1,000 setup fee, a monthly \$2,500 fee for Firewall/VPN, \$2,500 for load balancing, and \$1,000 for SSL acceleration.

Assumptions

# of customers	100
Revenue: Set up fee per customer per service	\$1,000
Revenue: Firewall and VPN services per month	\$2,500
Revenue: Load balancing service per month	\$2,500
Revenue: SSL acceleration per month	\$1,000
Cost: Per Hardware Checkpoint Firewall/VPN	\$9,995
Cost: Per Hardware f5 BigIP Load Balancer	\$15,000
Cost: Per Hardware Intel 7110 SSL Accelerator	\$6,995
Cost: Labor per hour	\$60
Cost: Labor per service setup (8 hours)	\$480
Cost: Labor per service maintenance per month (4 hours)	\$240
Total up front hardware costs: \$3,199,000	

Point Product Managed Service Model

Our service model is set up so that equipment is depreciated over a 3 year period. The results obtained with this service model reveal a healthy opportunity for service providers in the managed service market.

(\$ IN THOUSANDS)					TOTAL
Revenues	Month 1	Year 1	Year 2	Year 3	Year 1+2+3
Set up fees	\$400	\$400	\$0	\$0	\$400
Firewall/VPN revenue	\$250	\$3,000	\$3,000	\$3,000	\$9,000
Load Balancing revenue	\$250	\$3,000	\$3,000	\$3,000	\$9,000
SSL Acceleration revenue	\$100	\$1,200	\$1,200	\$1,200	\$3,600
Total revenue	\$1,000	\$7,600	\$7,200	\$7,200	\$22,000
Cost of sales Opportunity cost					
Depreciation on Equipment	\$89	\$1,066	\$1,066	\$1,066	\$3,199
Labor Set up	\$192	\$192	\$0	\$0	\$192
Labor Maintenance	\$96	\$1,152	\$1,152	\$1,152	\$3,456
Management overhead	\$100	\$760	\$720	\$720	\$2,200
Total cost of sales	\$477	\$3,170	\$2,938	\$2,938	\$9,047
Gross Profit	\$523	\$4,430	\$4,262	\$4,262	\$12,953
% of revenues	52.3%	58.3%	59.2%	59.2%	58.9%
SG&A expense @ 15%	\$150	\$1,140	\$1,080	\$1,080	\$3,300
Operating profit	\$373	\$3,290	\$3,182	\$3,182	\$9,653
% of revenues	37.3%	43.3%	44.2%	44.2%	43.9%





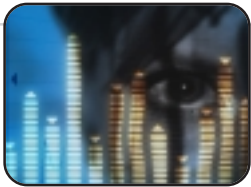
The table below shows the NPV, PV Expense, PV Revenue, and ROI for point product managed services model. The table also shows three different percentage scenarios for the cost of capital. As we stated before, this model was created to demonstrate the financial aspects of current managed service offerings. Real world models will include a customer ramp up period, starting with a few customers and increasing over time. Point products allow costs to be spread more incrementally as providers need only purchase the products they need for managed services at the time of deployment. However, point products do not scale as well over time as they are far more expensive per customer and limit service differentiation based on price. Further, the operational expenses incurred with installation and service changes are dramatically higher than with virtual services platforms.

Table 1: NPV, IRR, PV Expense, PV Revenue, and ROI Calculations

COST OF CAPITAL	NPV	PV Expense	PV Revenue	ROI
15%	\$5,167,279	\$7,257,676	\$16,787,047	131%
20%	\$4,258,750	\$6,802,500	\$15,500,000	128%
25%	\$3,510,765	\$6,398,944	\$14,374,400	125%



Virtual Service Model



In this model, we examined the service revenue and costs with a virtual service platform. The assumptions used in the creation of these models were the result of feedback from service providers, public pricing information, product manufacturers, and extrapolations based on industry trends. These models are intended as guidelines only. Actual costs and revenue will vary.

When a customer signs up for managed virtual services, network administrators must remotely configure services for the firewall, VPN, load balancer, and SSL accelerator. Unlike the existing point product model, any configuration change is made through a virtual service interface which allows services to be added or removed in minutes instead of hours. Because installation and configuration is done remotely, providers can centralize expertise efficiently utilizing existing expertise. If all goes well, configuration may take a matter of minutes. After services have been configured, administrators generally spend 1 hour per month maintaining each service of equipment.

As with the previous model, managed services pricing can vary depending on the size of the customer’s web site, amount of bandwidth, and customer data center configuration. The customer can pay a setup fee ranging from \$150 to \$3,000, and monthly fees ranging from \$150 to \$3,000.

For simplicity in our service model, we assume that 100 customers subscribe to managed services. In reality, customers subscribe over time. We deploy a single virtual services solution for every 100 customers. Each virtual service solution handles up to 100 unique partitions and can provide 3-5 managed services per partition. The assumptions are listed below.

Revenue is generated through a one-time \$1,000 setup fee, a monthly \$2,500 fee for Firewall/VPN, \$2,500 for load balancing, and \$1,000 for SSL acceleration.

Assumptions

# of customers	100
Revenue: Set up fee per customer per service	\$1,000
Revenue: Firewall and VPN services per month	\$2,500
Revenue: Load balancing service per month	\$2,500
Revenue: SSL acceleration per month	\$1,000
Cost: Hardware Virtual Service Platform	\$600,000
Cost: Labor per hour	\$60
Cost: Labor per service setup (30 minutes)	\$30
Cost: Labor per service maintenance per month (2 hours)	\$120
Total up front hardware costs: \$600,000	

Managed Virtual Service Model

Our service model is set up so that equipment is depreciated over a 3 year period. While the point product managed service model indicates a healthy return, the virtual service model provides a much lower cost per customer and per service. Further, the operational expenses are much lower. As a result, this model indicates a higher return on investment than is realized with traditional point product solutions.



Managed Virtual Service Mode

(\$ IN THOUSANDS)					TOTAL
Revenues	Month 1	Year 1	Year 2	Year 3	Year 1+2+3
Set up fees	\$400	\$400	\$0	\$0	\$400
Firewall/VPN revenue	\$250	\$3,000	\$3,000	\$3,000	\$9,000
Load Balancing revenue	\$250	\$3,000	\$3,000	\$3,000	\$9,000
SSL Acceleration revenue	\$100	\$1,200	\$1,200	\$1,200	\$3,600
Total revenue	\$1,000	\$7,600	\$7,200	\$7,200	\$22,000
Cost of sales					
Depreciation on Equipment	\$17	\$200	\$200	\$200	\$600
Labor Set up	\$12	\$12	\$0	\$0	\$12
Labor Maintenance	\$48	\$576	\$576	\$576	\$1,728
Management overhead	\$100	\$760	\$720	\$720	\$2,200
Total cost of sales	\$177	\$1,548	\$1,496	\$1,496	\$4,540
Gross Profit	\$823	\$6,052	\$5,704	\$5,704	\$17,460
% of revenues	82.3%	79.6%	79.2%	79.2%	79.4%
SG&A expense @ 15%	\$150	\$1,140	\$1,080	\$1,080	\$3,300
Operating profit	\$673	\$4,912	\$4,624	\$4,624	\$14,160
% of revenues	67.3%	64.6%	64.2%	64.2%	64.4%

The financial model for managed virtual services looks very attractive compared to the point product managed service model. Table 2 below shows the NPV, PV Expense, PV Revenue, and ROI for virtual managed virtual services model. As was shown in Table 1 for the point product scenario, the table also shows three different percentage scenarios for the cost of capital. As we stated before, this model was created to demonstrate how current managed service offerings look like. Real world models will include a customer ramp up period, starting with a few customers and increasing over time. Managed virtual services scales well with customer growth. For virtual service platforms, providers purchase a chassis, and propagate it with line cards as needed. Both virtual service and point product managed service strategies make effective use of capital, as expenses are only incurred as the number of customers increase.

Table 2: NPV, IRR, PV Expense, PV Revenue, and ROI Calculations

COST OF CAPITAL	NPV	PV Expense	PV Revenue	ROI
15%	\$8,680,847	\$3,526,016	\$16,787,047	376%
20%	\$7,618,056	\$3,273,333	\$15,500,000	374%
25%	\$6,725,478	\$3,051,392	\$14,374,400	371%

Model Summary

The financial models for both managed virtual services and point products are attractive. The table below summarizes the major differences in the two models. The managed virtual services model shows the lowest up front costs, the greatest return on investment, and yields the best gross profit over a 3-year period.

Table 3: Model Summary Results

MANAGED SERVICES	VIRTUAL SERVICE	POINT PRODUCT
Up Front Cost	\$600,000	\$3,199,000
3 Year Gross Profit	17,460,000	\$12,953,000
NPV ROI	374%	128%



What is the Effect in the Industry?

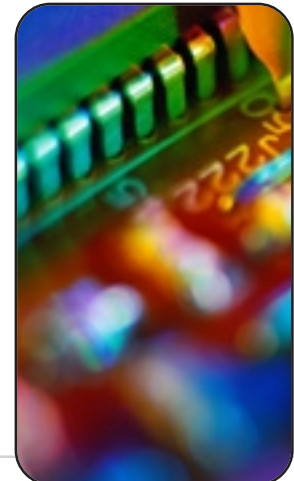
It is clear that managed services represent a healthy revenue stream, even when constructed from point products. Service providers must move to capture this revenue stream or plot a strategy through the commoditization trend on basic service products such as rack space and bandwidth.

Service providers who aggressively adopt the virtual services strategy for managed services will have pricing advantages in the short term. This short-term advantage enables service providers to generate greater profits, providing more capital for business growth. When competitive pressures drive the price of managed services down, those with a virtual service strategy will be well positioned in the market. Providers with virtual service platforms have greater profit margins and can compete more effectively on service price.

Further, many providers are incentivized to drive pricing down quickly. As described previously, 69% of US companies with 500 or more employees still host their own Web sites. While pricing is not the only issue involved, this segment is price elastic. As managed services achieve greater penetration in the high end of the market, service providers will look to this mid-market as a prime area for future revenue growth and will construct service products at attractive price points to enter this market segment and gain market share.

As the price of managed services erodes to slimmer margins, it is likely that more service providers will invest in virtual services to remain competitive. The greater the cost difference between point products and virtualization, the faster that service providers will shift to a managed virtual service platform.

This market evolution is not new. Indeed, service providers understand virtualization quite well, as many made a similar shift when they began offering Frame Relay services. Before Frame Relay was available, providers offered dedicated point-to-point lines for connectivity. Frame Relay is cost effective for providers because they can set up virtual circuits with committed information rates for customers. The virtualization of bandwidth for customers offered cost reductions in equipment and increased operational efficiencies through standardization. The introduction of Frame Relay also enabled providers to over subscribe network capacity and increase revenue.





Conclusion

Using virtual services platforms, service providers can offer the latest data center services in an on-demand, pay-as-you-go format, with little incremental investment. Managed services offer a viable and attractive outsourcing alternative to internal enterprise IT initiatives that are both capital and resource intensive.

Managed services are an attractive service product, whether constructed from point products or virtual services platforms. Virtual services platforms offer far greater returns, however, and greater short-term profits. Competitive pressures from providers enabled with virtual services platforms will drive prices for managed services down over time. The resulting price reductions will enable many small and medium enterprises, who previously could afford neither extensive internal IT departments nor high-end outsourcing, to gain access to managed services, growing the market even further.

Service providers operate in a fiercely competitive market, making service differentiation the key to survival. Increased competition will result in further price differentiation for managed services. Managed services will require a value-based network infrastructure that can provide a platform incorporating new and existing services based on market demand.

