

Transforming Data Center Complexity to Velocity

Cisco Unified Service Delivery

In the current economic crisis, service providers are under increasing pressure to deliver more for less. When creating and executing a service delivery solution, the current emphasis is on consolidation and cost reduction in an environment where budgets are flat or even decreasing.

At the same time, service providers have to meet the growing demand of businesses for ever greater productivity, faster go-to-market, and customer requirements for more personalized experiences anytime, anywhere, on a variety of devices. All this means ensuring an end-to-end quality of experience, improving scalability, optimizing use of resources, and accelerating the deployment of new services.

To meet these pressing and sometimes conflicting demands, it is essential to transform service delivery, and many service providers have introduced virtualization as a possible solution. However, virtualization alone cannot deliver the benefits. Service delivery models have evolved as a collection of islands (data centers plus central offices, video head offices, and other delivery facilities that are becoming more and more like data centers) and a series of service-based silos that act as a barrier to service delivery speed and operational efficiency. The physical separation of storage, servers, and networks in this type of service delivery model also prevents service providers from achieving the full benefits of virtualization.

Cisco believes that a new approach – the Cisco® Unified Service Delivery solution – will enable service providers to move toward a fully virtualized service-oriented infrastructure, eliminating silo-based complexity, moving resources to where they are most needed, improving performance, reducing costs, and speeding up the delivery of services. The Cisco Unified Service Delivery solution is based on tight integration between the application software and the whole network delivering services to the end user, creating a secure, virtualized service-oriented infrastructure for multiple integrated business and consumer services.

The solution is not just about technology. A range of professional services are available to help service providers accelerate the transformation of service delivery and improve new service velocity, while mitigating risk, improving predictability, and upskilling through knowledge transfer.

For example, Cisco Services can help you build a business case that shows how you can save both operational and capital expenditures (OpEx and CapEx) by re-architecting your data center, or advise you on how to reduce power demands in your data center, or accelerate your transition to a virtualized data center, to enable earlier CapEx reductions.

This briefing document is designed to help technical decision makers understand the Cisco Unified Service Delivery solution and assess its potential benefits for their service delivery infrastructure.

“In this current economic climate, IT organizations are especially pressed to continue innovating while cutting costs and increasing efficiency. CIOs will invest in innovative technology if it increases productivity, protects their existing IT investments, and demonstrates real benefits that will extend the life of the data center.”

Gartner

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Meeting Customer Demands

The new generation of customers expects a richer, higher-quality media experience, and wants access to more kinds of content than ever before. Customers want to enjoy the same kind of interactivity, personalization, mobility, and control that they have come to expect from the Internet across all media. And they expect to be able to access any type of content, whenever and wherever they choose, over a variety of devices and screens.

These are the key trends that are changing service delivery requirements:

- **Explosive growth in video traffic:** According to a recent Cisco Visual Networking Index Study, global IP traffic will reach 44 exabytes (10¹⁸) per month by 2012, with video being the dominant driver of growth. This is more than six times the total traffic in 2007. The study also estimates that video will account for nearly 90 percent of all consumer IP traffic in 2012.
- **Expanding sources of content:** Service providers will need to manage and deliver applications and content from many different providers, including smaller-scale, semi-professional producers and over-the-top (OTT) providers.
- **Growing variety of end devices:** Customers can now access their content from a multitude of devices, including standard or high-definition television, personal computers, gaming consoles, smartphones, and portable media devices. Service providers will need to ensure that their infrastructure can serve all of these end devices seamlessly and cost-effectively.
- **Increasing social and interactive experiences:** Growing numbers of consumers and business users are already engaged in rich social networking and interactive content sharing on the Internet. They expect service providers to bring those same Web 2.0 capabilities to other media devices, bringing personalized home pages, sites such as MySpace and Flickr, RSS feeds, and web content into the whole media experience.
- **Greater mobility:** Customers want content that adapts to their own lives and schedules. They want to access whatever they want, whenever they want, wherever and however they choose. That means the ability to record and share content over the network, to access time-shift services, and to extend media content across multiple devices such as TV, PC, or mobile device, even within a single session. Delivering a media experience like this can be challenging, putting increasing pressure on service providers. It's not enough just to deliver new types of content. Delivering a media experience like this can be challenging, putting increasing pressure on Service Providers. It's not enough just to deliver new types of content.

To meet today's customer demands, service providers must balance a number of operational requirements:

- Manage content sourced from multiple application and content providers
- Ensure exceptional quality of experience (QoE) with end-to-end SLAs
- Ensure the highest levels of security in a multiservice, multitenant environment
- Scale the experience efficiently and cost-effectively
- Deliver content across a variety of devices
- Roll out new services quickly

Challenging Times: Businesses and Consumers are Demanding New Services

Consumers Want More Personalized Experiences

Businesses Demand Greater Productivity Experiences

Consumer Experiences: More Visual, More Social, More Personal

Business Experiences: More Collaboration, Better Returns, Improved Agility

In meeting these new service delivery requirements, service providers face two competing challenges:

- Need to consolidate infrastructure as much as possible to reduce costs
- Need to distribute infrastructure to provide higher quality of experience by pushing content such as video as close as possible to customers.

Cisco believes that it is important for service providers to have an end-to-end perspective of service delivery so that they can create the optimum experiences for their customers. Cisco provides various support offerings that enable service providers to achieve predictable outcomes in this area.

Operational Limitations

Many service providers are constrained by the operational limitations of silo-based infrastructures that have developed on an ad-hoc basis in service delivery models, adding to the cost and complexity of service delivery.

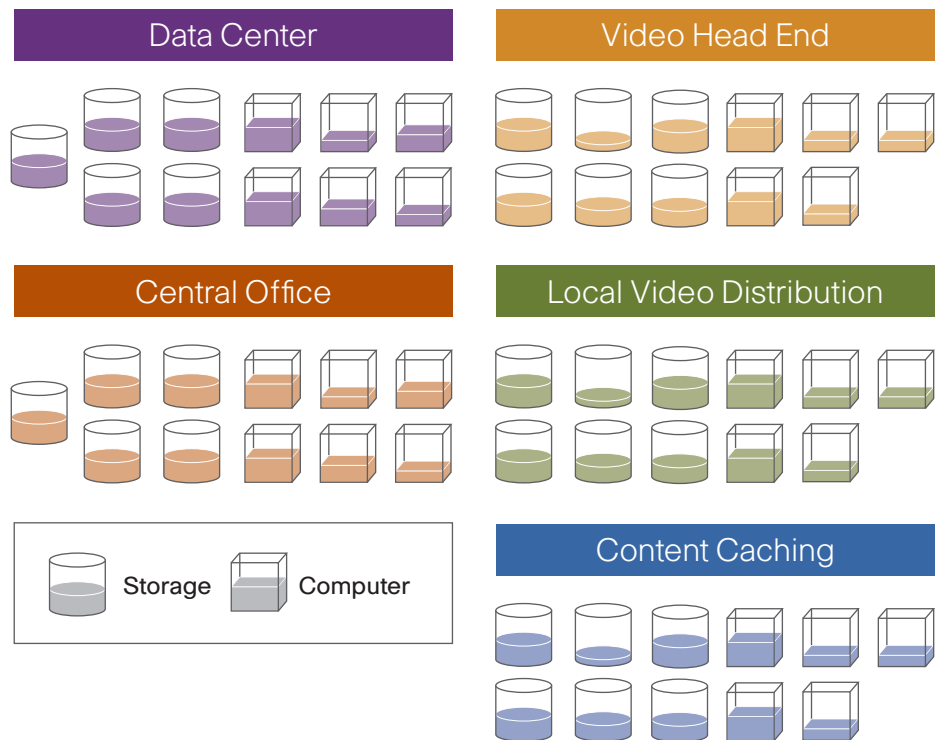
During the past 20 years, computer servers, networks, and storage systems have become separate islands.

Cisco has identified a further three dimensions within the service delivery infrastructure:

- Multiple physical centers spread throughout the service provider's network
- Separate service silos within each physical center
- Servers from different vendors that have been specified by third-party content and application providers or the service providers themselves.

Challenging Times: Service Providers Are under Increasing Pressure

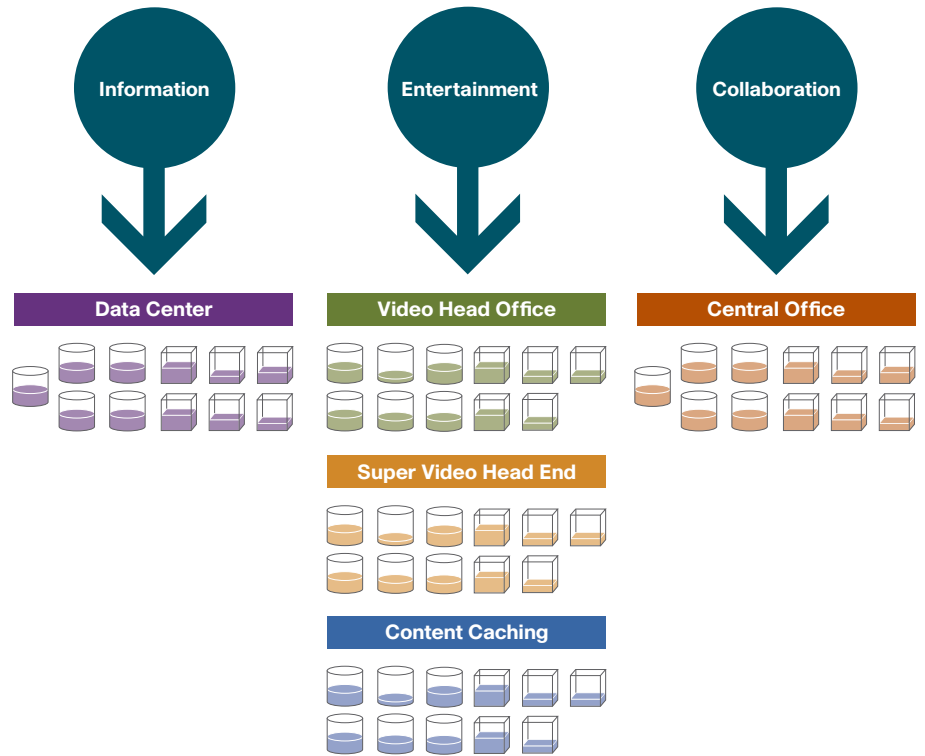
Managing Service Delivery Islands and Increasing Complexity



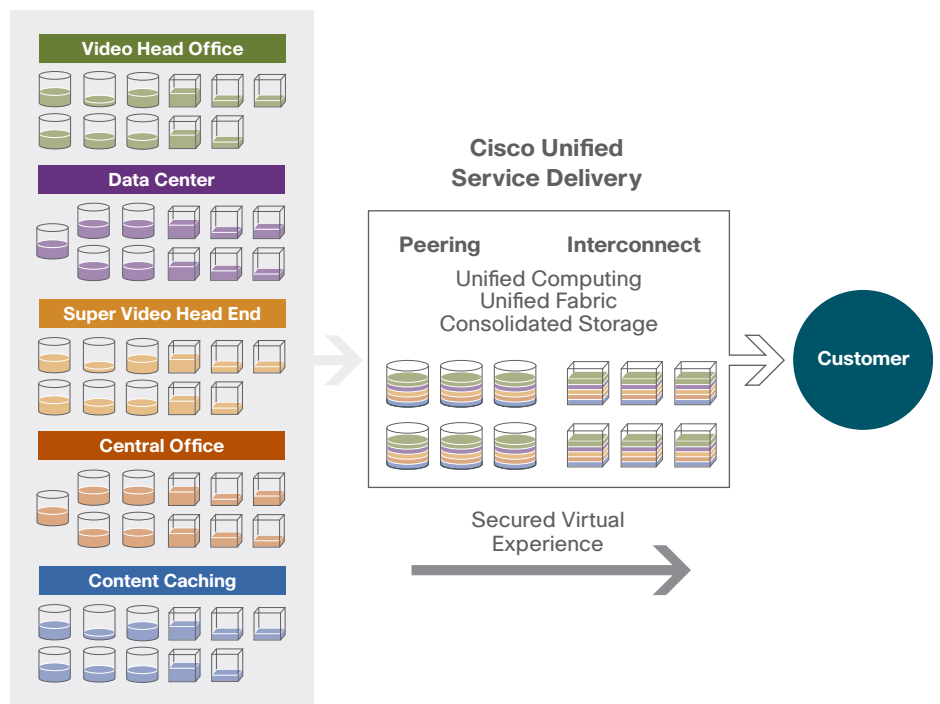
The silo nature of service means duplication of resources, as well as increased complexity and cost of cooling, power, and cabling. The array of connection and networking standards found in different parts of the service delivery infrastructure can be bewildering. Until now, service providers have had to run multiple parallel network connections for server-to-server connections, Internet links, and storage systems. This requires a typical server to have from 4 to 10 different communications interfaces, raising the cost of each server and increasing the administrative burden.

Silo structures also mean that new services have to be built from the ground up. Service delivery islands are difficult to manage and scale, resulting in redundancy and other barriers to ensuring the anytime, anywhere delivery that customers demand.

Managing multiple service delivery islands and ever increasing complexity



USD virtualizes all SP resources to deliver the secured virtualized experience



“The time is right for integrated data center systems. It makes lots of sense. The server, network, and traffic have to be in sync. At some point, all of the silos in the data center need to be taken down.”

IDC

“Many of the problems in the data center stem from incongruent silos of networking, computing and storage technologies. Each area has its own layer of administration, people, tools, interfaces, and quirks. The skills and personnel in these facilities have been as divided as its technology.”

Gartner

The silo legacy has left service providers facing a range of challenges:

- Consolidate servers, storage, and network facilities
- Reduce cabling
- Eliminate multiple parallel networks and interfaces
- Lower cooling and power consumption requirements
- Reduce space requirements
- Simplify administration, maintenance, and management.

Until now, the equipment needed to break down the silo barriers was not available. Essentially, that requires a common infrastructure across all the elements. Service providers who can overcome these silo-based issues can continue to separate their services from a business point of view, but won't need to separate them physically. And third-party providers won't need to worry about which physical server their application or content resides on. In the longer term, teams can link those physical islands and multiple centers together to create a single virtual service delivery center.

Building on Virtualization

A key element in dealing with operational challenges and optimizing service delivery is virtualization. Many service providers have already turned to virtualization to reduce their costs and improve asset utilization by supporting server consolidation.

However, although virtualization appears to offer a clear path toward improving service delivery, experience indicates that, in many cases, the technology has also created greater complexity and increased the burden of management. Like physical servers, virtual servers need to talk to each other as well as to the network and other machines. Operational staff must identify, monitor, move, and update these devices. And with each physical server hosting a number of virtual machines, virtualization creates many more servers for staff to manage and maintain.

Virtualization has been a challenge for many service providers. Because it has increased their operational problems, they have been reluctant to take virtualization very far and have failed to realize significant benefits.

Cisco believes that, to achieve full benefit, the entire service delivery infrastructure needs to be optimized for virtualization. Problems occur when service providers try to virtualize servers and move the containers for applications. The network may not be aware of the changes and this can create very complex operational issues in trying to locate virtualized content. By optimizing the network for virtualization and linking servers, storage, and all the elements that need to be virtualized together, the network can link the application or content to the user no matter where it is running, no matter what server. This overcomes the major operational issues and provides a firm basis for transforming service delivery.

The Cisco Unified Service Delivery solution

Cisco's strategy for dealing with the new challenges facing service providers is the Cisco Unified Service Delivery solution – an approach that represents a new way of thinking about service delivery infrastructure. The Cisco Unified Service Delivery solution is based on tight integration between the application software and the whole network delivering services to the end user, creating a secure, virtualized service-oriented infrastructure for multiple integrated business and consumer services.

The Cisco Unified Service Delivery solution is the convergence of two trends:

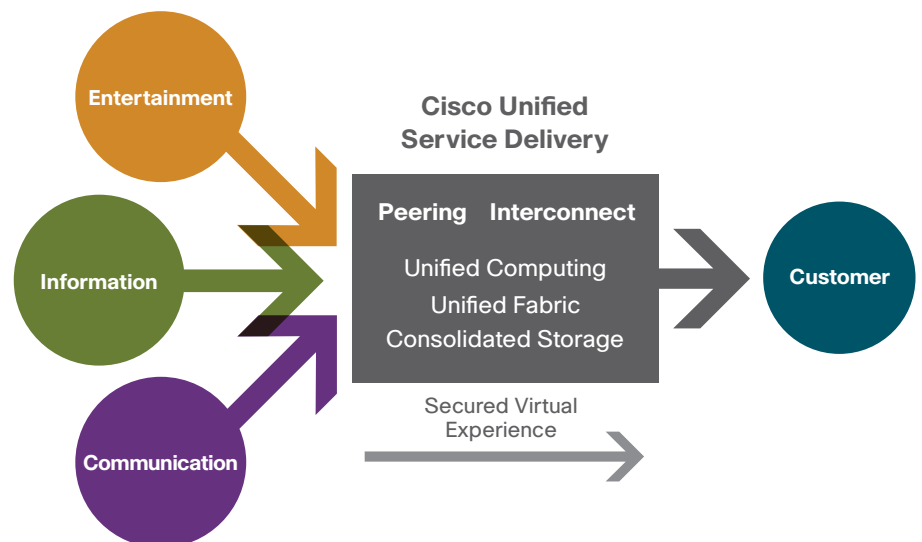
- The re-engineering of the classic service delivery model with unified computing, virtualization, and unified fabric
- Leveraging the service provider's IP Next-Generation Networks (IP NGNs) to provide network intelligence, peering, interconnect, and application performance and security.

This represents an alignment of Cisco and service providers' strengths in networking to optimize service delivery capacity and capability. It presents a clear path for service providers to solve the silo problem and meet the conflicting demands of consolidation and quality of experience – challenges that will only become more difficult with the continuing growth of high-definition data traffic.

From a traditional data center perspective, the Cisco Unified Service Delivery solution approach re-engineers service delivery infrastructures to meet business and operational demands. It builds on developments in consolidation, virtualization, and unification to combine all service delivery islands, eliminating the silo problem and creating a common service-oriented infrastructure for the complete service portfolio.

Unified Service Delivery

Combines all the service delivery islands to deliver the Secured Virtualized Experience



From a network perspective, the Cisco Unified Service Delivery solution reconciles the conflicting demands of consolidation and distribution by making the service delivery infrastructure network-centric rather than server-centric. It interlocks application software with the whole network, and delivers content to customers. Next-generation IP networks provide the performance, intelligence, and peering to optimize the platform for virtualization, while the service-oriented infrastructure provides a single modular system that is simpler to manage and scales as a single system without increasing complexity.

To help providers achieve data center network consolidation and unification, driving greater scale and lower costs, Cisco has introduced a new technology innovation called Cisco Data Center Ethernet. The Cisco Data Center Ethernet architecture is a collection of extensions providing enhancements to classical Ethernet. The enhancements – which include lossless fabric, Layer 2 multipathing (L2MP), and extensions to Ethernet – when grouped together form solutions for scenarios encountered in the data center.

Transforming service delivery is critical to a service provider's operational efficiency. Cisco provides a range of Advanced Services that define, engineer, and optimize service delivery to accelerate new service delivery and reduce costs. Cisco specialists design solutions that enable new services to be fitted into the overall infrastructure while optimizing the infrastructure and minimizing the impact on existing services.

Reduced Management Complexity

Until now storage, networks, and compute power have existed as separate elements in service delivery, each requiring separate management, even if they were virtualized. The consolidation and unification that are integral to the Cisco Unified Service Delivery solution take away that problem by combining these elements. The solution reduces cost and introduces more accessibility, automatic redundancy, and much more transparent management. The creation of a common infrastructure reduces the complexity of setup, cabling, cooling, provisioning, and resource allocation. That helps service providers benefit from the full flexibility of virtualization.

The Cisco Unified Service Delivery solution creates a service-oriented infrastructure: a single modular system that is simpler to manage and scales as a single system without increasing complexity. Because the Cisco Unified Service Delivery solution provides a common infrastructure for network, computing, and storage, it doesn't matter what the service is. Specific services such as video or collaboration tools may require different elements, so the service provider can add the appropriate application housed within a common infrastructure and add all virtualized elements.

The solution architecture allows all service delivery elements to be placed on top of the common infrastructure – at the same time if necessary. Because all the elements are virtualized, it doesn't matter where they are running. However, to run multiple services side by side, security is very important. The Cisco Unified Service Delivery solution is designed to boost performance and security while lowering costs – enabling a secure virtualized experience. This allows the service provider to deliver multiple, integrated services securely, at reduced cost and with increased velocity.

The Cisco Unified Service Delivery solution also gives service providers the opportunity to meet demands for a more energy-efficient service delivery model with reduced cooling requirements and optimized resources. Industry experience indicates that utilization of servers can increase from less than 20 percent to 70 percent or more, with reduced property requirements.

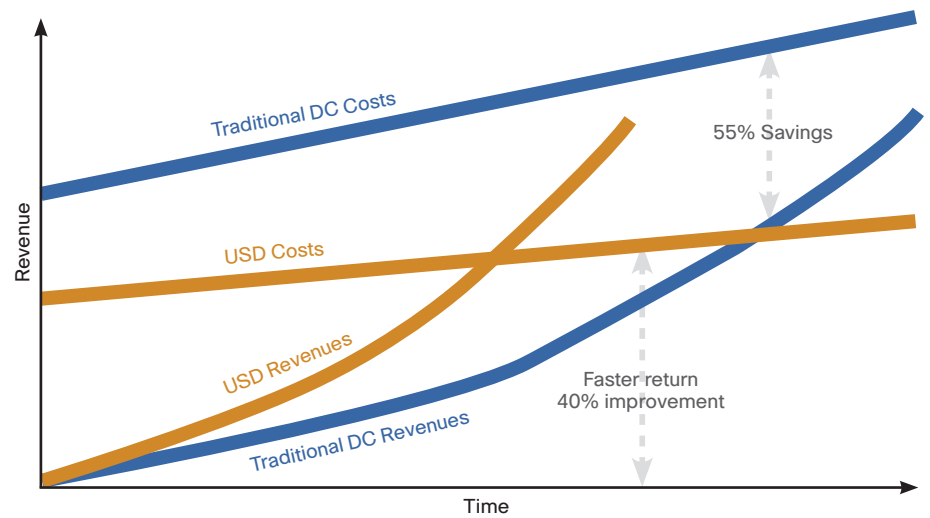
The virtualized approach combines the manageability, energy, and space savings of a centralized infrastructure with the flexibility of a locally distributed system to:

- Increase operational efficiency and utilization of service delivery infrastructure
- Reduce power consumption and cooling requirements
- Eliminate underutilized and low-value infrastructure.

Lower Service Delivery Costs

Implementing the Cisco Unified Service Delivery solution delivers a clear cost advantage by reducing the operational complexity involved in managing disparate silo-based environments. Cisco estimates that this can achieve a combined OpEx/ CapEx saving of 55 percent on traditional service delivery costs and provide 40 percent improvement in ROI.

Unified Service Delivery Financial Re-engineering



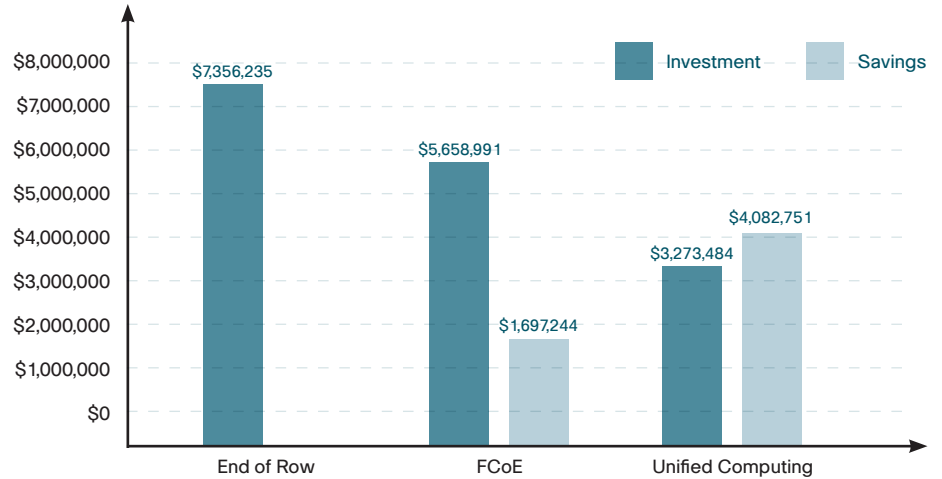
The key areas of savings include:

- Consolidation of servers, storage and network facilities
- Reduced cabling
- Elimination of multiple parallel networks and interfaces
- Lower cooling and power consumption requirements
- Reduced space requirements
- Simplified administration, maintenance and management.

To compete for customers and market share, service providers must continually invest in new capabilities and services. The Cisco Unified Service Delivery solution allows service providers to manage rapidly expanding bandwidth requirements more effectively and deliver more content, more efficiently, without increasing costs. It also provides a highly flexible, scalable, standards-based platform that can continually adapt to new services and requirements, providing ongoing investment protection.

By utilizing Cisco's Advanced Services, service providers can reduce the upfront costs involved in transforming service delivery. Cisco has the tools, processes, people, and experience to help eliminate risk before revenue and provide predictable outcomes from the outset. Service providers do not incur initial upskilling costs and do not have to make provision for failure costs in the business case.

An example ROI Assessment Service



An example illustrates the potential savings in utilizing the Cisco Unified Service Delivery solution to transform service delivery for a facility with 1000 servers:

- An end of row solution could incur approximately \$7.3 million in upfront costs
- A fiber channel solution could incur approximately \$5.6 million in upfront costs
- A Cisco Unified Service Delivery solution could incur just \$3.3 million in upfront costs, giving potential savings in excess of \$4 million.

Migrating to a Unified Service Delivery Infrastructure

The Cisco Unified Service Delivery solution builds on existing developments in service delivery consolidation such as virtualization and fabric unification.

Cisco believes that the best way to migrate to the new service delivery model is to follow a three-stage process:

1. Identify how and where to consolidate the infrastructure to eliminate individual silos
2. Virtualize resources and see how best to run applications from virtual machine containers
3. Unify network resources, storage resources and computing resources.

This is a clear, proven process with support available in the form of professional services to help Service Providers migrate seamlessly without disrupting existing operations and services, accelerate the generation and delivery of new business opportunities and achieve CapEx and OpEx reduction.

The services provide important support at every stage of the migration:

- Advisory Services help define new business and service models and deliver operational process transformation.
- Advanced Services help define, engineer and optimize service delivery infrastructure to enable new service delivery and reduce costs.
- Technical Services provide traditional maintenance support plus proactive diagnostic capabilities to assure higher availability, lower operational costs and reduce risk.
- Remote Management Services provide comprehensive 24x7 remote monitoring, issue resolution and day-to-day management.

A key element in the migration process is knowledge transfer. By working closely with internal teams, Cisco support specialists transfer knowledge, upskilling Service Provider staff and reducing future risk.

Cisco and Next Generation Service Delivery

To create the Cisco Unified Service Delivery solution, Cisco is partnering with service providers and an ecosystem of business partners. From the outset, Cisco has worked with best-in-class vendors to integrate all the elements that meet the needs of today's service delivery requirements and applications while providing the foundation for tomorrow's services and applications.

Cisco's commitment to the development and deployment of the Cisco Unified Service Delivery solution is an integral part of its Data Center 3.0 and IP NGN strategies, which are providing the infrastructure for next-generation service delivery of high-value services. Cisco provides the latest generation of products and solutions combined with an unrivalled ecosystem of virtualization, technology, application, and business process partners to help service providers transform their business.




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