



Cisco Unified Service Delivery

The Pathway to Cloud Services



Re-engineering for New Service Delivery Models

The goal of IP service delivery has always been to deliver voice, video, and data services using a single, all-encompassing service network. Though once considered cutting-edge, bundled triple-play services are almost the price of basic entry in today's dynamic world of IP service delivery. Customer demand for Web 2.0, rich-media content, self-publishing, IPTV, collaborative business tools, on-demand services, and TelePresence is changing the landscape of 21st century service delivery.

The multitudinous ways in which consumers are seeking to combine voice, video, and data elements; self-publish content; and create entirely new social networks continue to redefine requirements for residential service delivery, with video at the front and center. A complex web of collaborative business services is also emerging – sometimes borrowing heavily from the consumer trends, but designed for mission-critical functions.

Having the right service delivery model is of critical importance to creating new levels of scalability, efficiency, and flexibility within a provider's network to profitably deliver these new services and help enable a smooth transition to cloud-based services. This transition will require a re-engineering of service provider networks in new ways that increase service agility and provide operators with clear competitive advantage.

The ultimate goal of cloud-based service delivery is to rely on a variety of thin clients (PDAs, personal media players, netbooks, TVs, etc.) that seamlessly access remote networked storage, compute, content, and application resources. Service provider networks need to deliver services without boundaries, requiring fundamental shifts in design.

Cisco® Unified Service Delivery helps service providers enhance, optimize, and assure delivery of services across their entire service portfolio. This solution provides both a mechanism to improve the quality and efficiency of traditional services, and helps create the foundation for providers to deliver cloud-based services.

Cisco Unified Service Delivery allows providers to re-engineer their data centers and networks by combining the capabilities of the Cisco Unified Computing System and the Data Center 3.0 initiative with the capabilities of the Cisco IP Next-Generation Network (IP NGN). The result is an entirely new way to create dynamic interconnections and harness capabilities that facilitate an integrated approach to service delivery.

Data Center Silos Result in a Cost Spiral

The data center plays a central role in any new service delivery model. Yet, today's service provider data centers are often purpose-built silos that are highly complex, geographically dispersed, and operationally fragmented.

In these data centers, assets are often dedicated to a single service or application, much as the networks were a decade or two ago. Often, different services do not share common infrastructure in the data center until they connect to the IP NGN for transport to the subscriber. Servers, LAN switches, security, storage, load balancing, and other appliances are often procured on a service-by-service basis, and implementations can vary widely across services, leading to an extremely complex and fragmented infrastructure.

This fragmented approach is both costly and inefficient, because storage and compute networks are never fully utilized. And when equipment must be scaled, the multiplier effect across data centers can result in dramatic increases in power consumption, real estate, cooling, and cabling costs. Server and storage utilization rates can be as low as 20 to 40 percent in a data center.

Provisioning costs continue to rise from the increasing complexity and vastness of data center farms that also require significant manual repurposing to launch new services or implement upgrades, changes, or new features. The setup, upgrade, and teardown costs further complicate timely service delivery.

To address these issues, more and more service providers will move to a cloud computing model where resources exist in the network cloud and are made available to a subscriber or service offering on demand. The way in which a service delivery network is crafted, therefore, becomes increasingly more important as an enabler for delivering new services quickly and efficiently.



A New Approach: Cisco Unified Service Delivery

What if service providers could use advanced networking and virtualization technology to unify their compute, storage, application, and LAN capabilities within any given data center? What if virtual machines running on compute servers could be fully integrated with the network in ways that allowed them to be moved virtually from one physical machine to another with LAN and service profiles intact? What if data center islands could be interconnected to better leverage resources pools across the entire overall provider network and then joined with one of the industry's most advanced application- and subscriber-aware delivery networks?

Cisco Unified Service Delivery brings these capabilities to service providers, and in doing so provides a highly effective pathway to cloud-based service delivery.

The Cisco Unified Service Delivery solution fuses compute, storage, application, and LAN resources virtually through a unique unified network fabric. This helps enable service providers to optimally utilize pools of resources within any given data center, apply them to any service offering, or interconnect their data center islands to further combine resources and significantly reduce capital and operational costs.

Securely interconnecting data center islands across a service provider's network extends the benefits of shared resource pools and features. For example, a provider can more easily integrate video features into managed service offers or more easily apply security features to a residential service. Moving service delivery from a store-and-forward to a two-way, local, and distributed mode is a fundamental transition for provider networks.

Costs decrease when compute and storage resources are shared more efficiently and amortized across many different service offers. The result is that purpose-built data centers are transformed into multiservice data centers using the power of virtualization and the capabilities of the intelligent network. The Cisco solution extends beyond the walls of individual data centers to provide peering and interconnect capabilities between data centers, allowing service integration, flexibility, and agility for provisioning entertainment, information, and communication-based services. Data center resources are securely joined together across the network using the MPLS peering, scalable interconnect, and secure Internet gateway capabilities of Cisco IOS® XR Software. With Cisco Unified Service Delivery, providers can achieve highly secure, logical, and physical separation of services – helping to provide privacy and security for business and residential customers.

A Universal I/O Map Within the Data Center

The Cisco Nexus™ family of data center switches provides the high-density bandwidth and scale to support multimedia-intensive applications and cutting-edge business applications while simultaneously enabling the movement of virtual machines (VMs) across the data center at wire speeds. The benefits extend far beyond the dramatic simplification of cabling schemes. The application of Virtual Device Contexts (VDCs) creates highly secure, separate domains within the data center, each of which is maintained securely. All network faults are limited to their respective domain to help ensure that they are contained and quickly resolved. This is a primary requirement when creating multiservice delivery capabilities within any given service provider data center.

VM-aware networking at wire speed combined with the Cisco unified fabric allows compute resources and their respective profiles to be fused together and managed virtually across the network. This level of integration is made possible by close collaboration with VMware, a leading provider of virtualization technology. VMware allows a single physical machine to host upwards of 700 virtual machines, which, when combined with the Cisco intelligent network, allows virtual machines to be mobilized and moved across the data center in ways never before possible. By joining virtual machines to the network, VM sprawl is eliminated and LAN, SAN, and compute functions can now be fully integrated and managed virtually and holistically.

Cisco Unified Service Delivery brings the power of the network and the virtual machine together, allowing the service provider to:

- Establish multiservice data centers
- Optimize workloads and extend their return on investment by reducing their total cost of ownership
- Create a universal I/O map of virtual machines which are wired "once" to connect LAN, SAN, and compute resources
- Optimize and consolidate storage usage
- Dramatically reduce cabling schemes

Cisco Unified Service Delivery takes full advantage of Cisco's Data Center 3.0 strategic vision whereby virtualization and consolidation of resources within the data center can be achieved.

Third-Party Virtualization

Cisco Unified Service Delivery recognizes the importance of interoperability with third-party solutions and integration with a service provider's overall environment. Cisco offers extensive integration services and has developed a broad ecosystem of industry relationships offering an array of storage, systems integration, and service orchestration capabilities that further complement the overall solution.

Because service provider networks are multivendor by nature, the Cisco Unified Service Delivery solution avoids a wholesale replacement strategy, enabling incremental implementation and integration alongside existing operations. The overall solution is designed to co-exist, interoperate, and co-reside alongside the many network elements that comprise a service provider data center.

The Cisco Nexus 1000V Series Switches allow third-party blade servers to be easily integrated into the overall data center virtualization model. This permits service providers to make independent purchase decisions while simultaneously melding third-party elements to the virtualization and networking capabilities offered by Cisco Unified Service Delivery.

Cisco Unified Computing System

The Cisco Unified Computing System is the latest technology development in the Cisco Data Center 3.0 vision – helping evolve the data center to a more consolidated, virtualized, and automated environment for cloud computing. Together with industry-leading partners, Cisco has created a unified architecture for the virtualized data center that smoothly integrates compute, virtualization, and network resources into a single system.

By combining the vision of the Cisco Data Center 3.0 initiative, VMware's virtualization capabilities, and the fully preconfigured, tested, and integrated solution set offered by the Cisco Unified Computing System, the Cisco Unified Service Delivery solution helps ensure that data center resources can be easily virtualized, unified, and integrated on demand.



Beyond the Four Walls of a Data Center: Services without Boundaries

The Cisco Unified Service Delivery solution combines the power of the interconnected data center with the fully application- and subscriber-aware IP NGN. Now service providers can incorporate the personalized, on-demand features of the Cisco IP NGN to tailor their offerings to individual preferences and to deliver transaction-based services right to a single desktop. These highly secure, virtually delivered, personalized services can greatly boost the provider's competitive advantage.

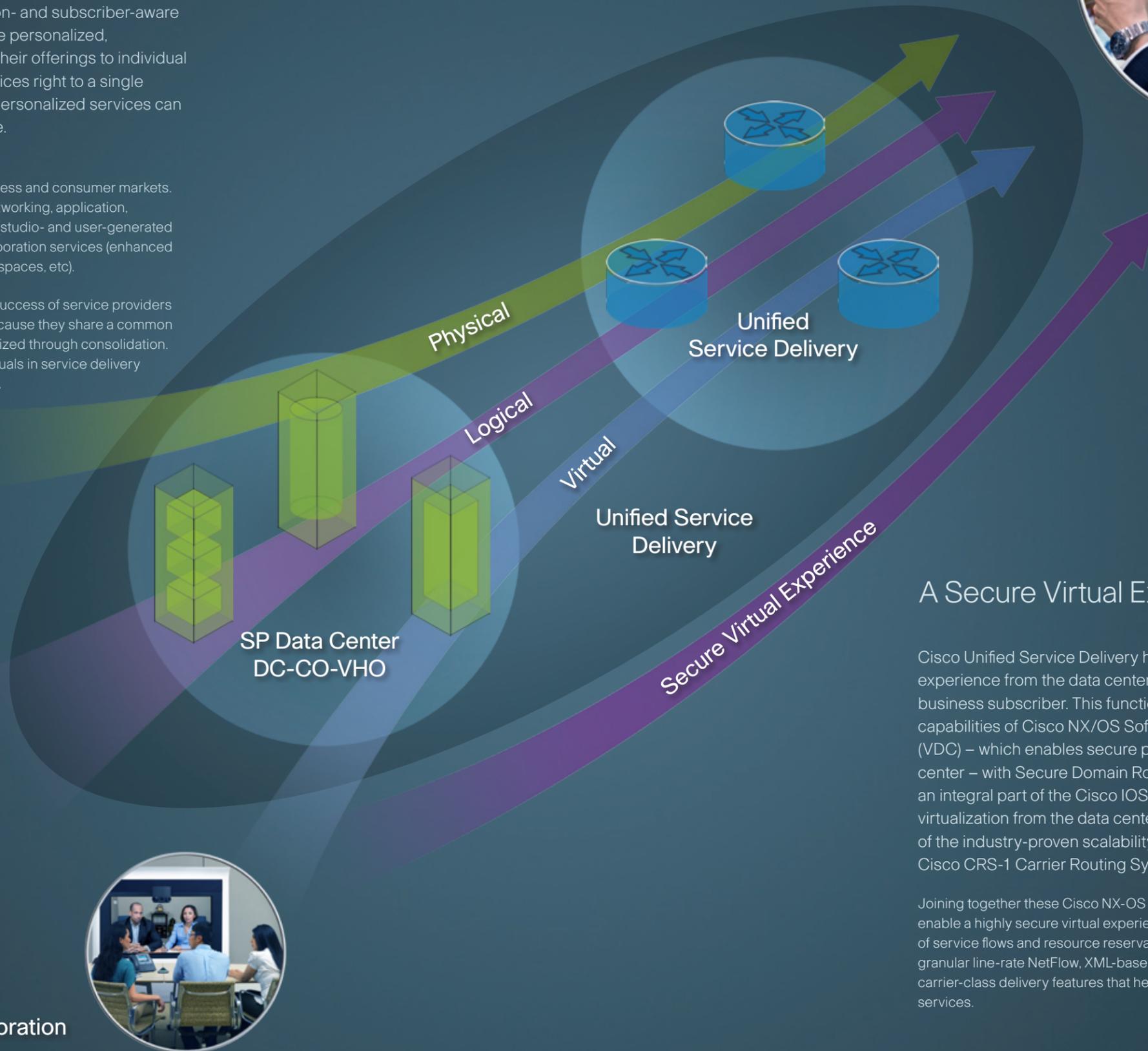
The IP NGN enables the delivery of services for both business and consumer markets. It also delivers offerings that span information services (networking, application, computing, storage, and security), entertainment services (studio- and user-generated video, music, gaming, etc.), and communications and collaboration services (enhanced voice services, conferencing, TelePresence, collaboration spaces, etc.).

The result is that the IP NGN has helped contribute to the success of service providers and their offerings. Services are integrated more easily because they share a common infrastructure. Capital assets and facilities are optimally utilized through consolidation. And a core set of common technologies used by all individuals in service delivery improves operational effectiveness and service availability.

Unified Service Delivery Cisco Secure Virtual Architecture



Customer



Entertainment



Information



Collaboration



A Secure Virtual Experience

Cisco Unified Service Delivery helps to enable a highly secure virtual experience from the data center all the way to the residential or business subscriber. This functionality is the result of combining the capabilities of Cisco NX/OS Software such as Virtual Device Context (VDC) – which enables secure partitioning of domains within the data center – with Secure Domain Routers (SDRs) that are supported as an integral part of the Cisco IOS XR operating system. SDRs extend virtualization from the data center to the customer and take advantage of the industry-proven scalability and high-availability features of the Cisco CRS-1 Carrier Routing System.

Joining together these Cisco NX-OS and Cisco IOS XR Software capabilities helps enable a highly secure virtual experience, providing physical and logical separation of service flows and resource reservation while simultaneously allowing for granular line-rate NetFlow, XML-based APIs for common management, and other carrier-class delivery features that help enable highly secure, virtually delivered services.

Operational Agility and On-Demand Services

With unified service delivery and common pools of on-demand resources, providers can rapidly repurpose their networks to accommodate change requests, add features, or reallocate resources from service one to another. This operational agility allows providers to more easily address the dynamic nature of service delivery and move toward an on-demand service delivery model – reducing provisioning time from months to minutes.

By utilizing a common infrastructure from the production point all the way to the point of consumption, service providers can offer a full array of media services that rely upon common ingest, cache, streaming, and assurance technologies ranging from branded video services to over-the-top video or cooperative partner services. The IP NGN delivers these services securely while offering the advantages of hierarchical quality of service (QoS) and application-aware policy management.

By providing a highly flexible, scalable platform for business collaboration applications, services providers can minimize the costs of delivery and significantly improve the customer experience.

Similarly, information services can more fully utilize unified compute resources, unified fabric, application fluency, and secure transport all based on a common suite of infrastructure, whether to provide software as a service, infrastructure as a service, or platform as a service. The economies of scale for the service provider and the significant pricing advantages that ensue are critical to compete in this growing market.

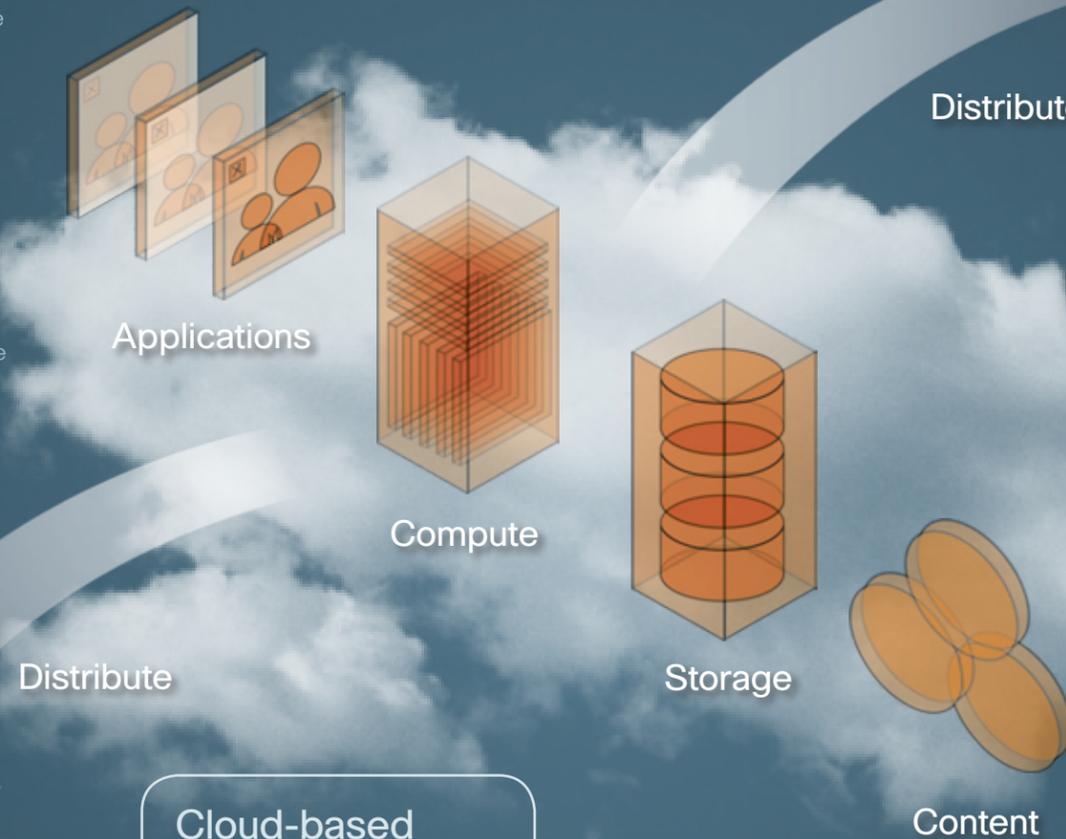
Cisco Unified Service Delivery offers significant costs savings to the service provider by helping reduce provisioning times by almost 50 percent or more while simultaneously helping to reduce capital and operating expenses, which are estimated to each exceed 20 percent of their overall budget.



Virtual Business Services
Thin and remote clients



Virtual Residential Services
Thin and remote clients



Cloud-based Services
The Ultimate Destination

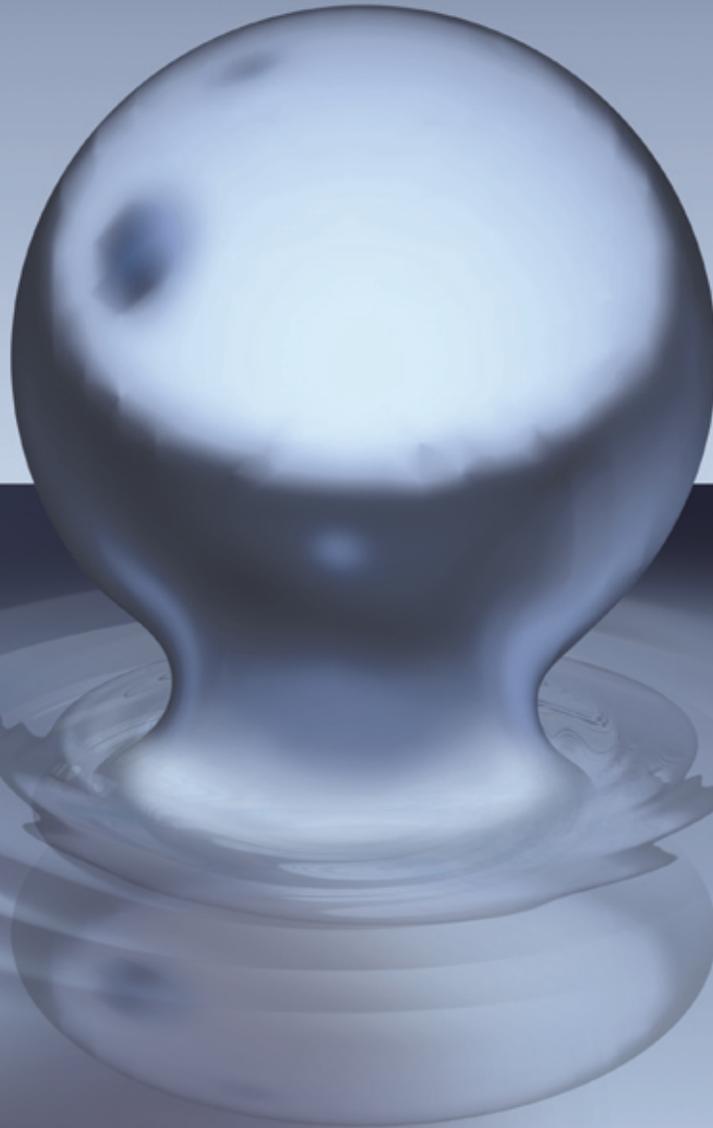
- IPTV
- Unified Communications
- Collaboration,
- Web 2.0
- Social Networking
- Hyper-Syndication

Clear Skies Ahead

Cisco Unified Service Delivery offers network enhancements that are not easily duplicated by competitive offerings. Cisco's uniquely comprehensive portfolio spans the production point or data center all the way to the subscriber.

The fusing of the Cisco Unified Computing System and Data Center 3.0 vision with the Cisco IP NGN truly differentiates the Cisco Unified Service Delivery solution. Highly secure, virtualized service delivery is complemented by a fully application- and subscriber-aware NGN that helps service providers to apply granular policy management and offer individualized services to residential and enterprise customers.

By virtualizing and unifying data center resources and applying them to on-demand service offers, by interconnecting data centers to securely optimize the delivery system, and by utilizing the full suite of application- and subscriber-aware capabilities of the Cisco IP NGN, service providers position themselves to effectively deliver cloud-based services.



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