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Content Delivery Networks: Building New Value Into Your Network

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Cisco Systems



Content Delivery Networks

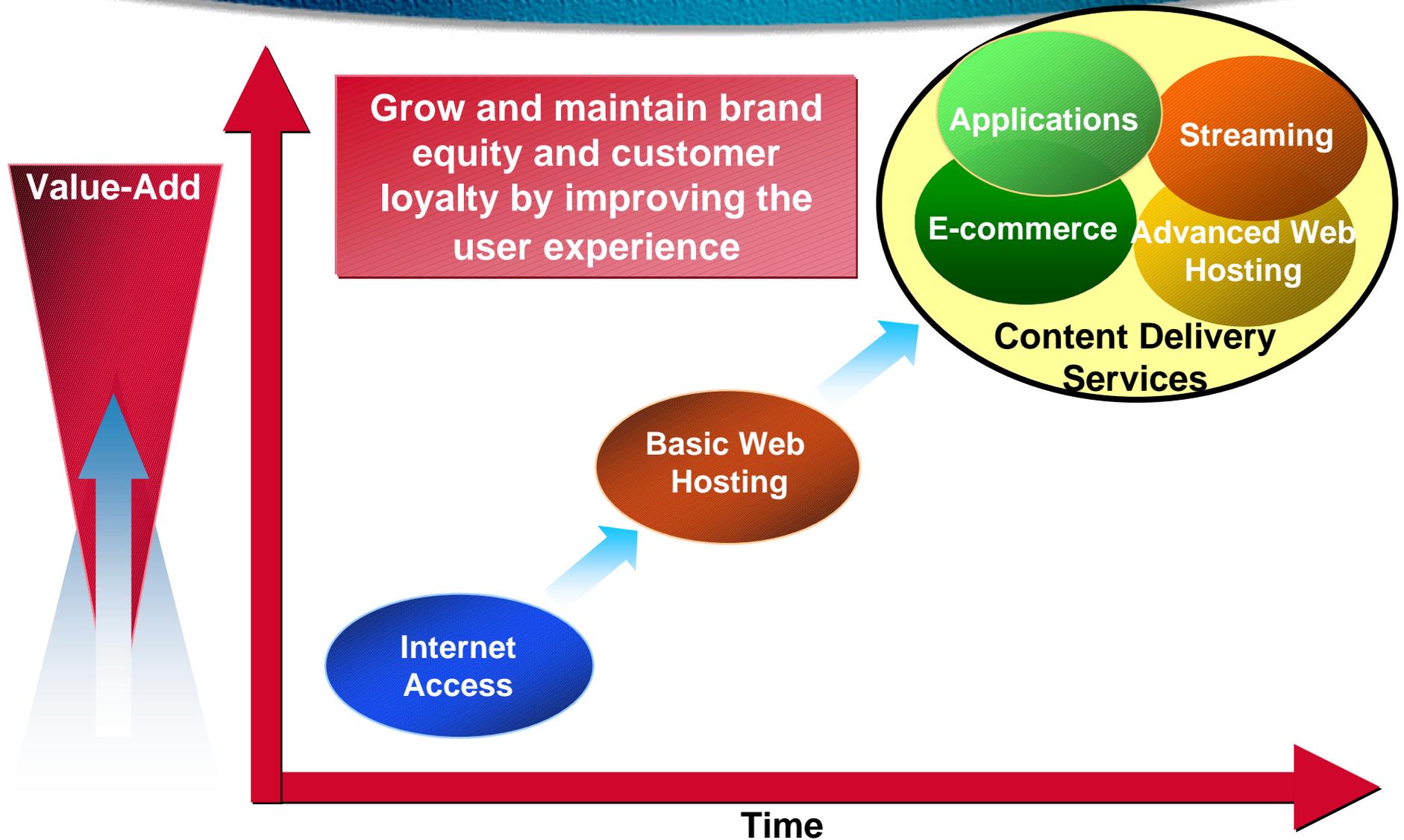
- **Important to deliver a complete system for Content Delivery Networks**
- **Enables Service Providers to build new value into their networks and to deploy highly profitable content delivery services**



CDN Market Dynamics

Value-Add Content Delivery Services

The SP's Vision



Emerging Content Services

Business to Consumer Services

Static Image acceleration
(this is the state of CDN's today)

Large Scale On-Demand
and Live Streaming Media
Delivery and Hosting

Content Rating and
Filtering

Distributed Dynamic
Content

Personalization (e.g. Ad
Insertion)

Business to Business Services

Distributed Web Hosting,
Applications Hosting, and
E-Commerce

Virtual Private Content
Delivery Nets (VPCDN's)

Intranet/Extranet Streaming
Media Delivery

Streaming Media Delivery
and Hosting

Enterprise Controlled
Content Access and
Delivery

Huge Emerging Opportunity

1

Internet Generation



2



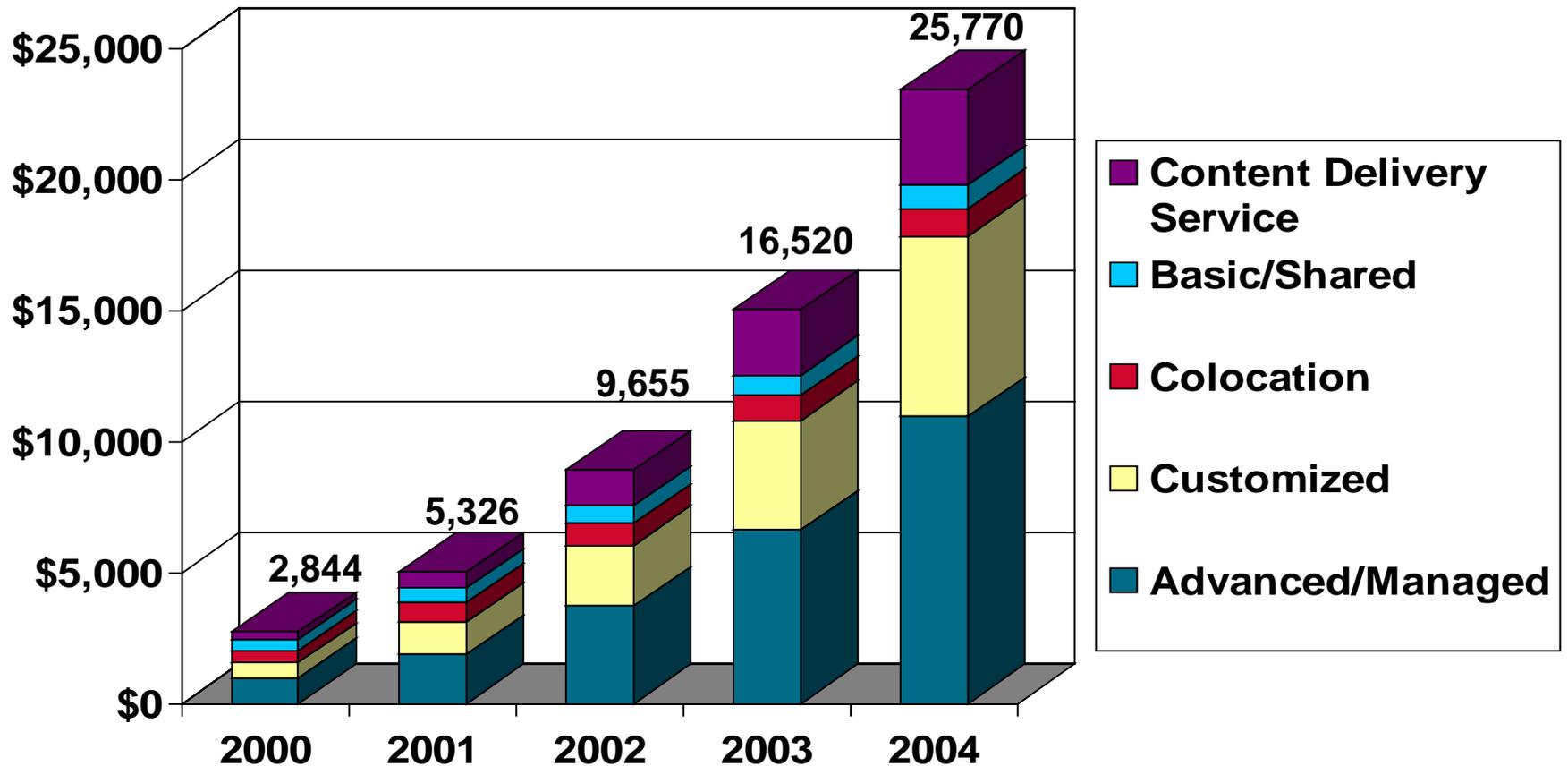
**Rich Content and
Broadband Access**

3

**Drive need for scalable Content
Delivery and New Hosting
Services**

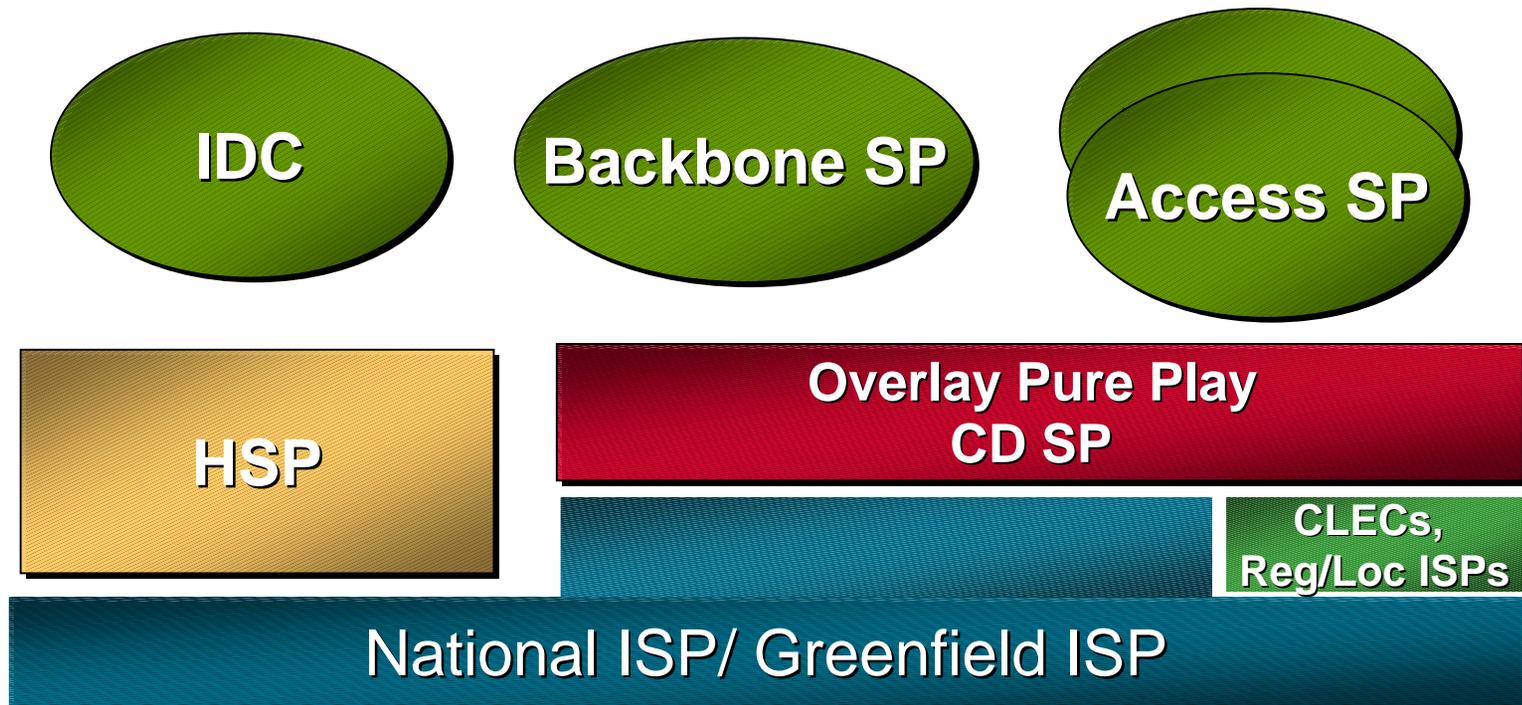
U.S. Web Hosting and Content Delivery Service Revenue: 2000 - 2004

Millions



Source: Forrester Research, 2000
Internet Research Group, 2000

CDN Opportunities



Content Delivery Services

Challenges to be Solved

The Challenges

- Network bandwidth congestion
- Distance/Speed of Light
- Origin Server Scalability
- Peaks/Flash Crowd dynamic congestion

The Solution

- Distribute content closer to the user while maintaining security and freshness
- Adapt content access to dynamic real world demands



Cisco's Content Delivery Network Solution

Cisco's Content Delivery System

- **Enables New Content Based Services**
- **Improves end-user experience**
- **Provides superior scalability and “flash crowd” protection for e-business**
- **Insures high levels of content availability and security**
- **Leverages investment in Cisco IP Infrastructure**

Enables SPs to build additional value into their networks - value which will translate into higher revenues, better margins, and increased customer loyalty

Content Delivery Networks

Required System Building Blocks

Content Delivery Services

Web Hosting E-Commerce Streaming Applications

Content Delivery Networks

Content Distribution & Management Content Routing Content Switching Content Edge Delivery

Intelligent Network Services

L2/L3 Networks

Highly available, scalable, performance network at Layer 2/3



Mobile



Fixed Wireless



Cable



DSL

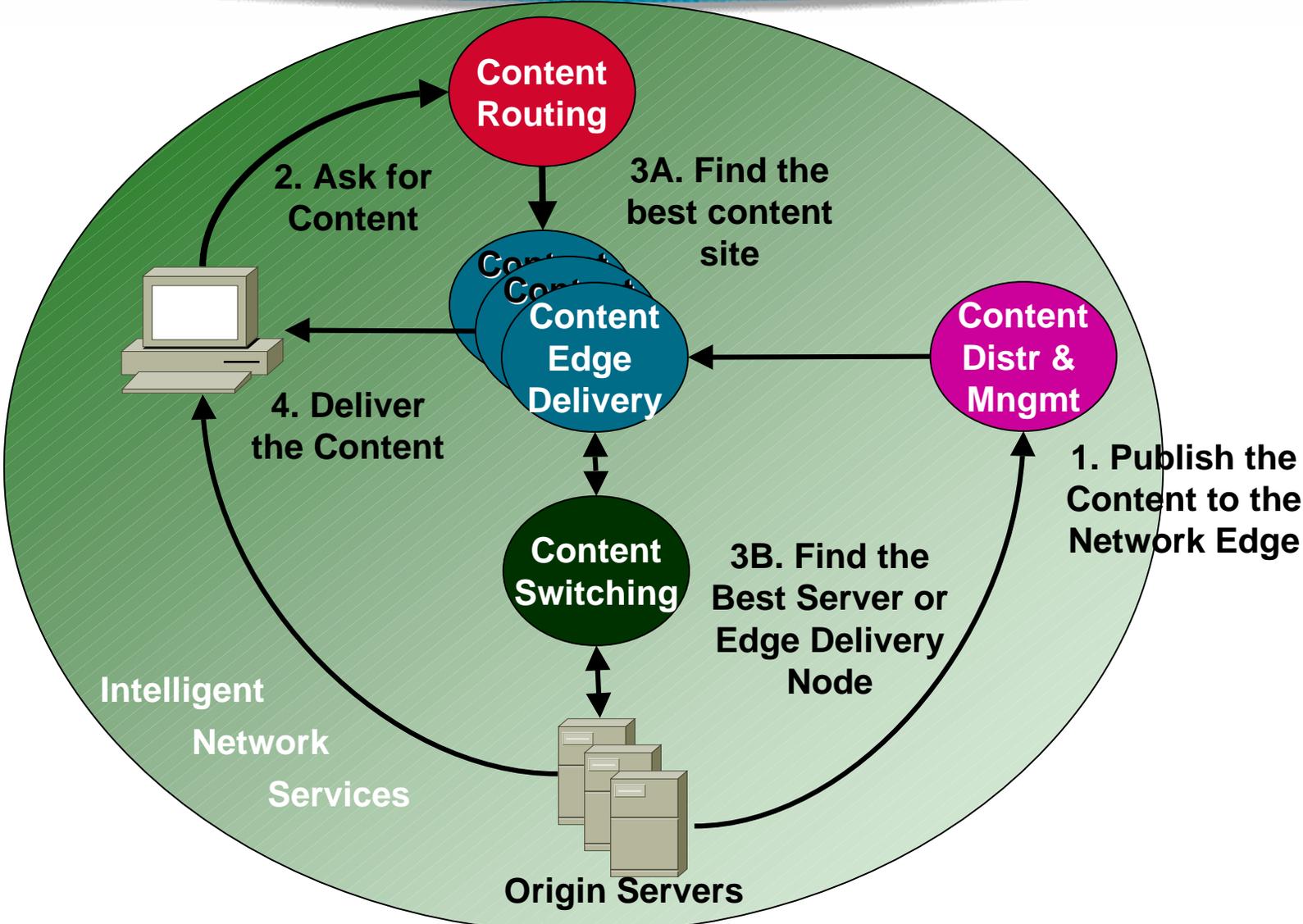


Dedicated/ATM/FR



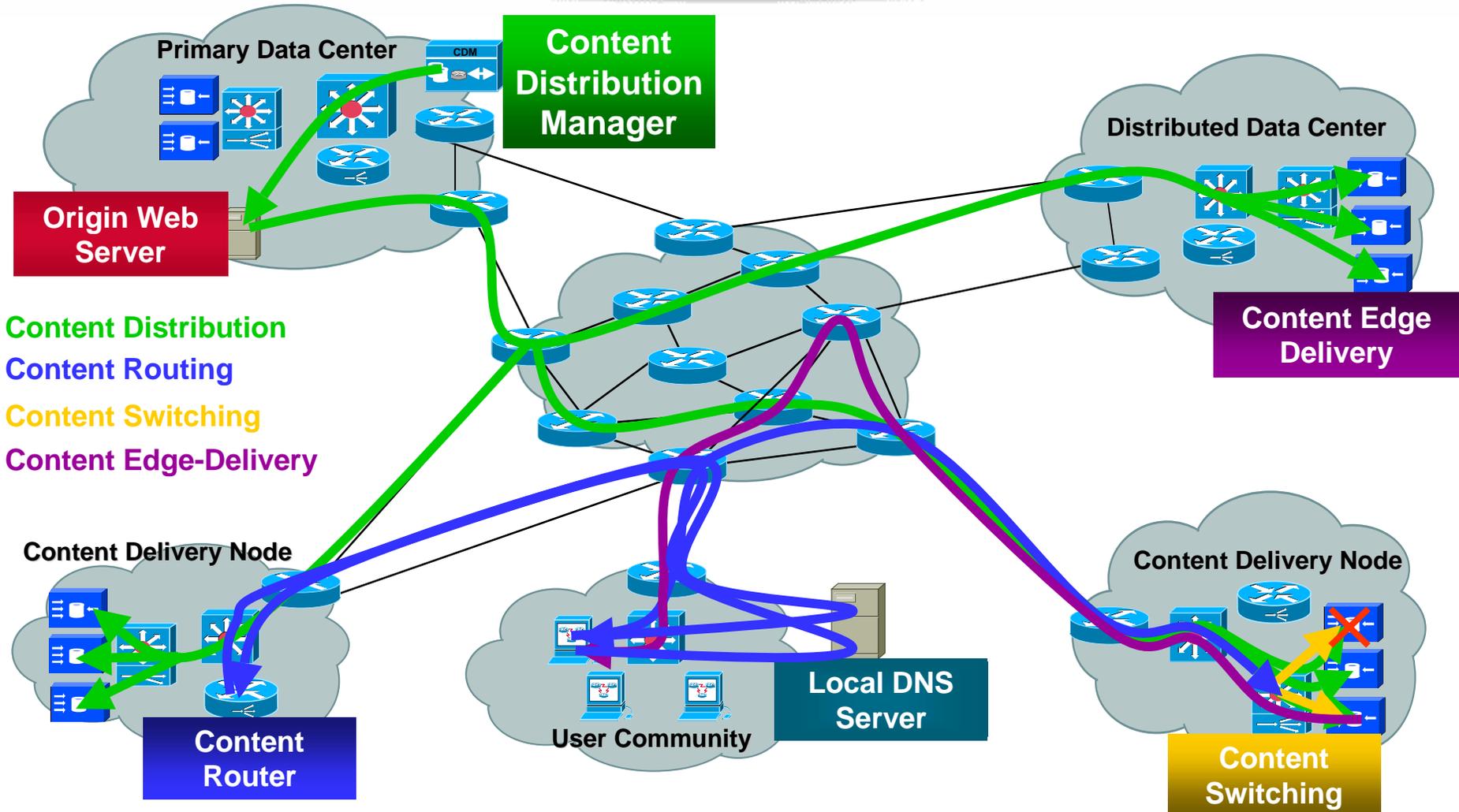
ISDN/Dial

CDN Platform Overview



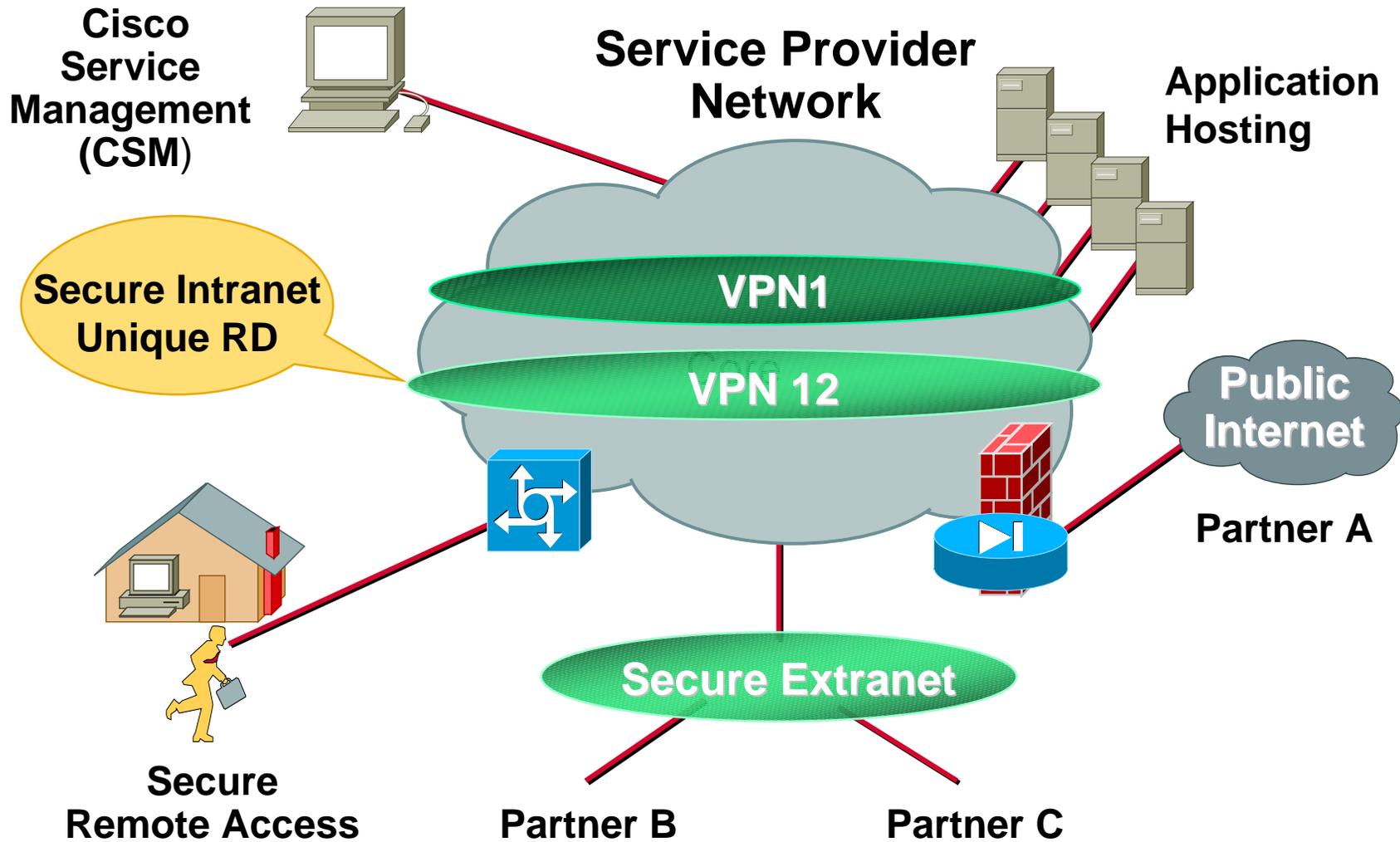
Content Delivery Networks

Bringing Content Closer to Users

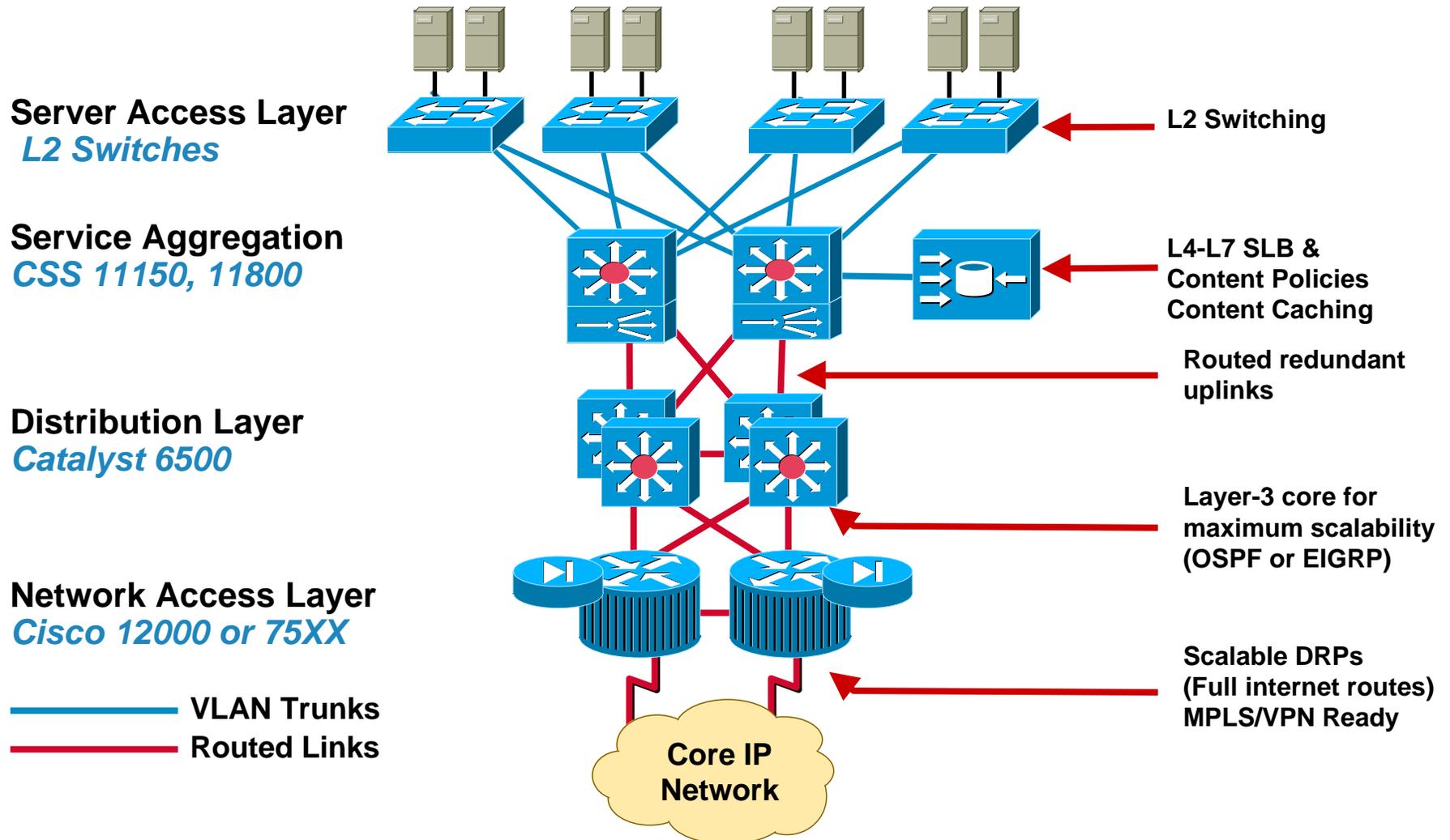


Intelligent Network Services

Security, QoS, VPNs, and Multicast



Content Switching Shared Infrastructure



SLB vs. Content Switching

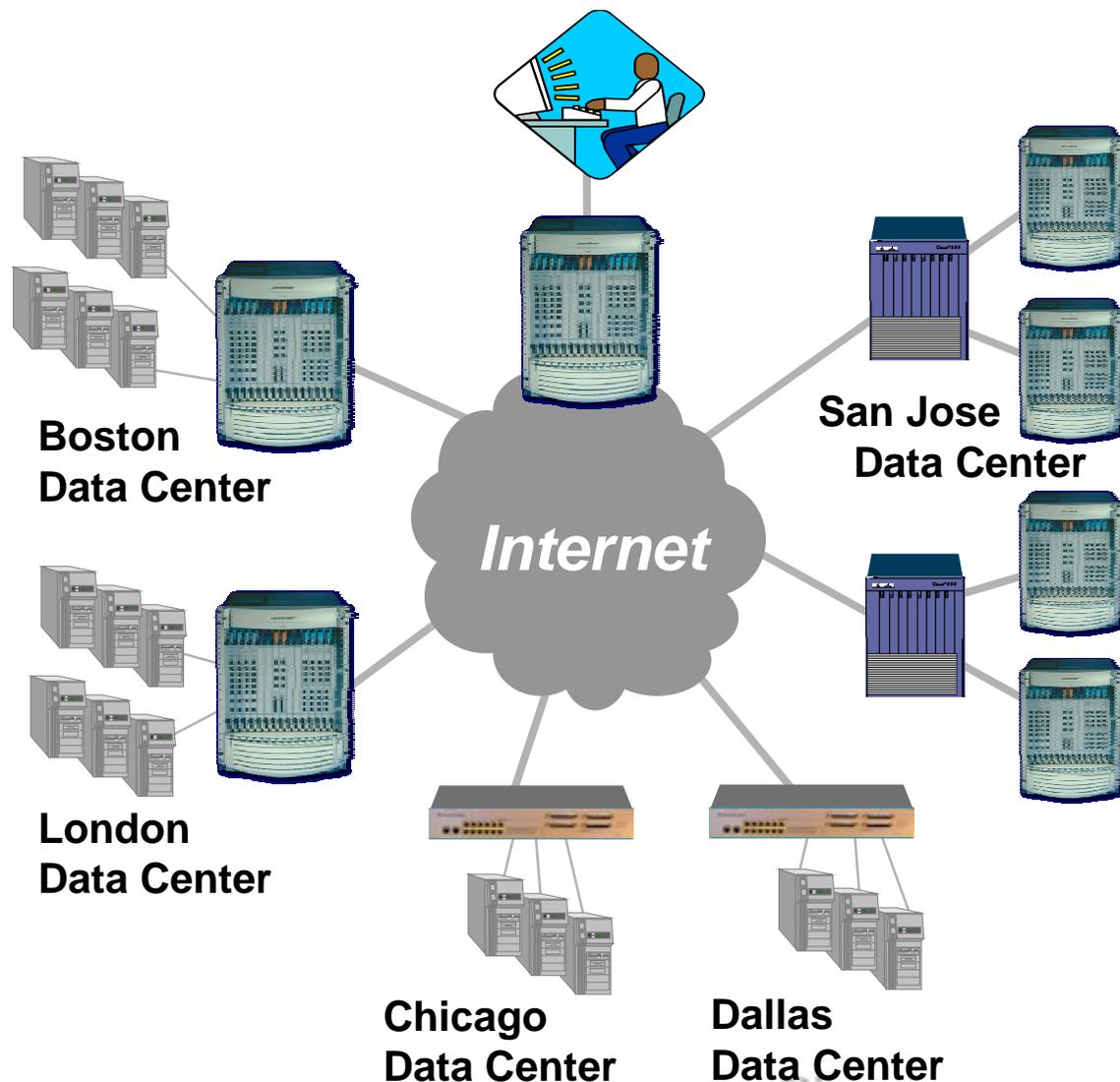
SLB

- Local server load balancing
- Local URL filtering
- Server-specific policies
- Policies local to a switch
- Inbound traffic management
- Standalone switches
- Layer 2,3,4

Content Switching

- Content request routing
- Network-wide content discovery, distribution and synchronization
- Server, user, content, network, application policies
- Content-specific and network-wide policies
- In/outbound application/flow states intelligence
- Switch clustering across network
- Layer 4-7

Web Hosting and ASP Services



www.abc.com
www.nbc.com

**Business-class
Shared Web Hosting**



ASP/Hosting

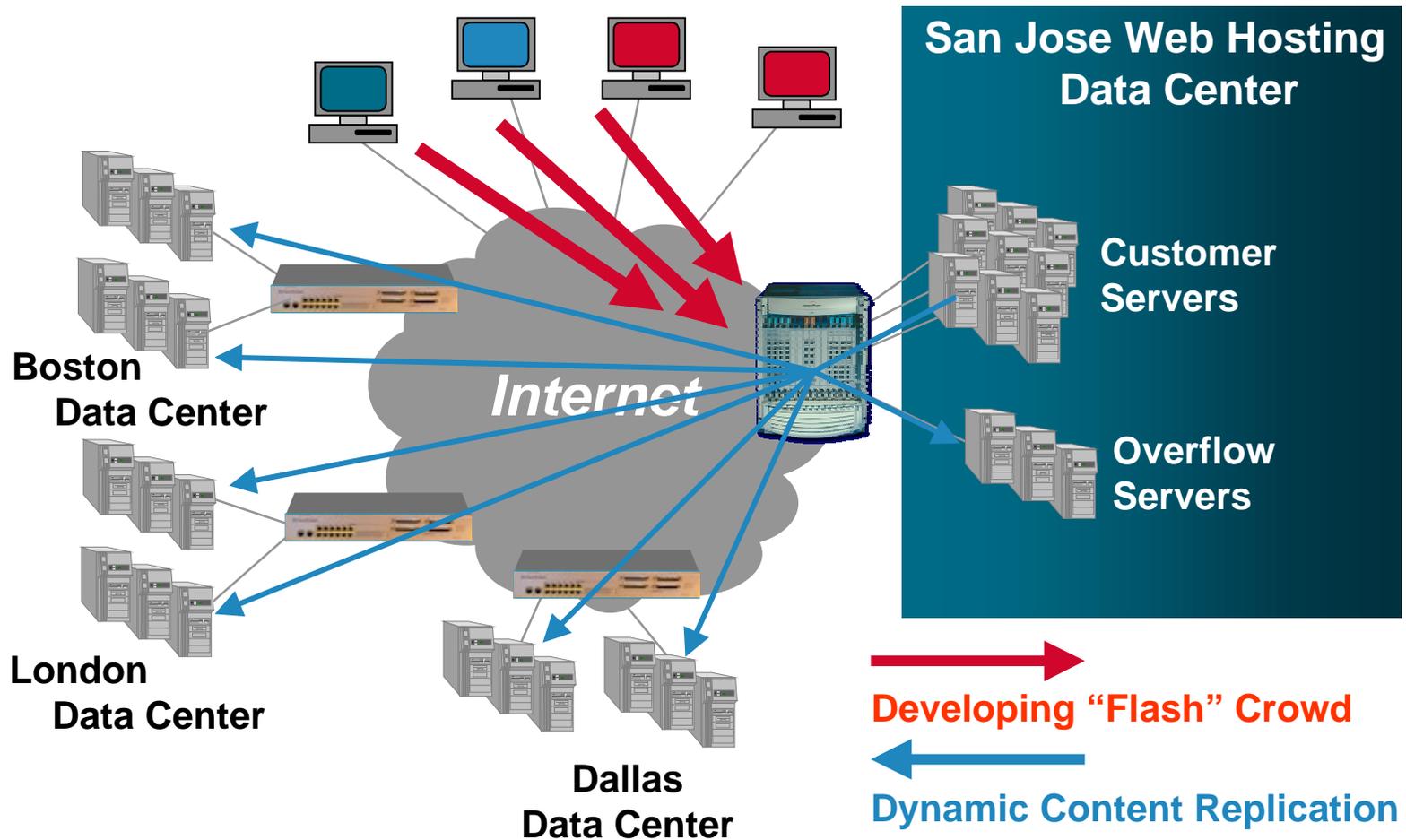
- E-commerce Services
- Distributed Data Centers
- Flash Crowd Insurance
- Content Distribution



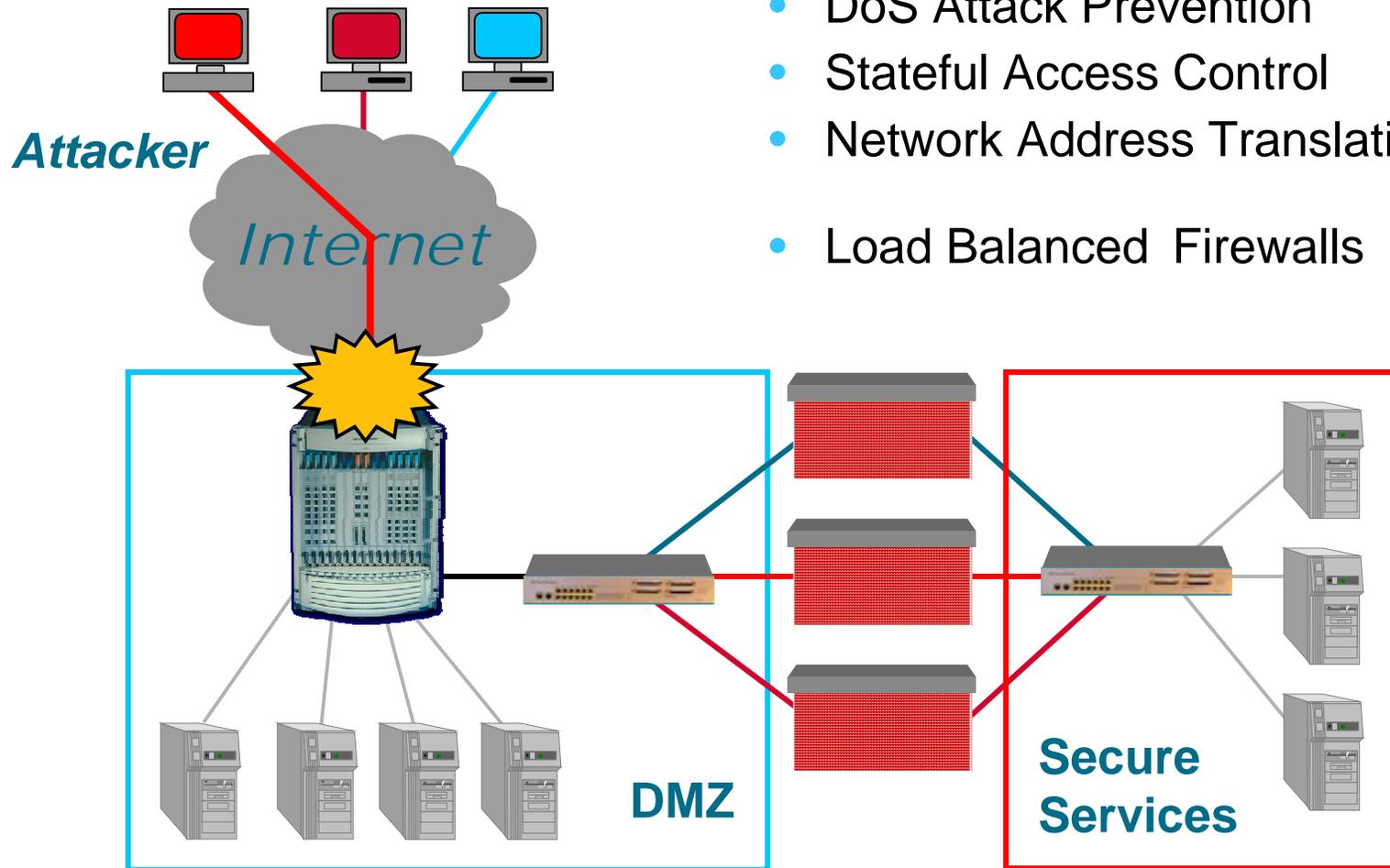
www.acme.com

Co-located Customers

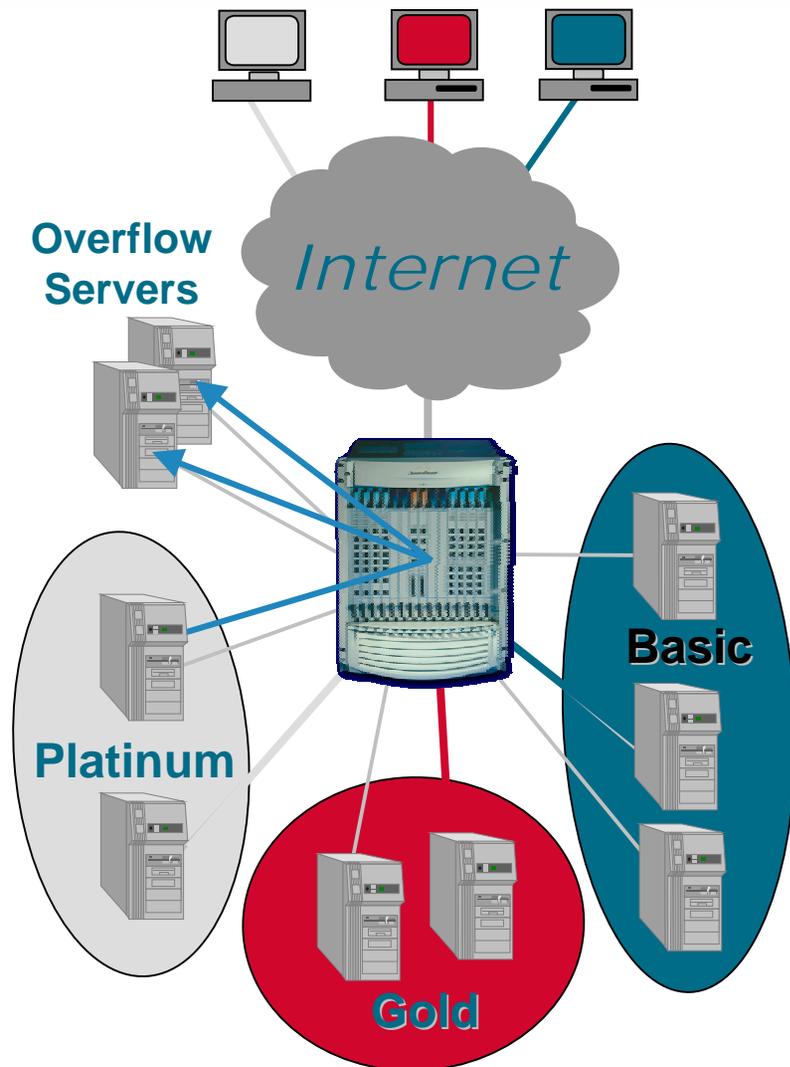
Dynamic Content Replication: *Flash Crowd Insurance Services*



Web Site Security Services



Premium Services for Users and Transactions



- *Cookie Switching* enables prioritized services for important customers
 - Route users to specific servers based on user's cookie**
 - Restrict max # of transactions on "Platinum" servers to ensure best performance**
 - ACA selects best server within each group**
 - Provide overflow servers for *Gold* and *Platinum* customers**

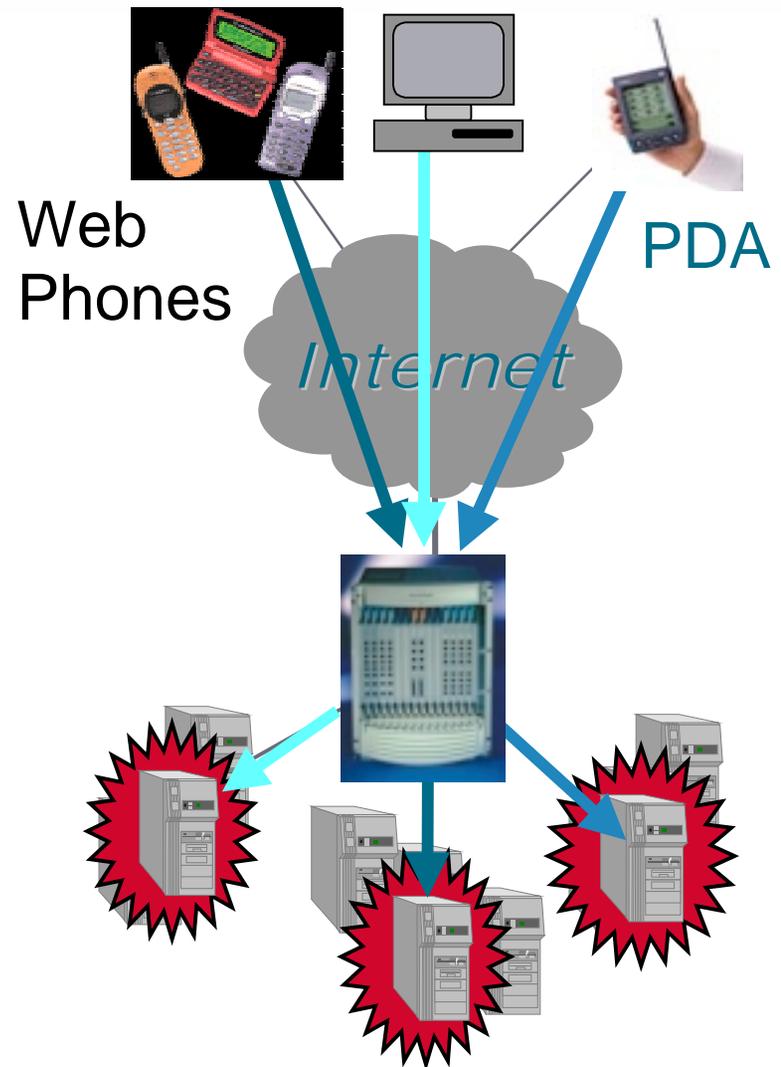
New Web Access Devices

Challenge:

Web sites must deliver content in different formats for different devices: Internet phones, PDAs

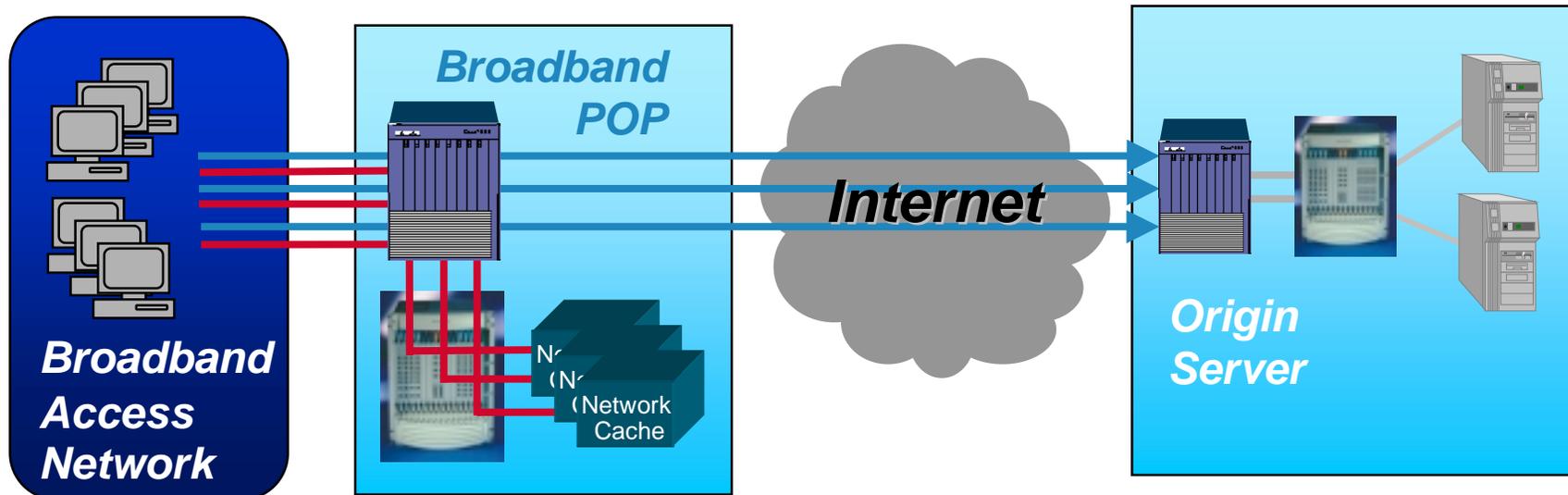
Solution:

Content services switch detects browser type in HTTP request and routes to appropriate Web servers or transformation gateways



Transparent Caching Services

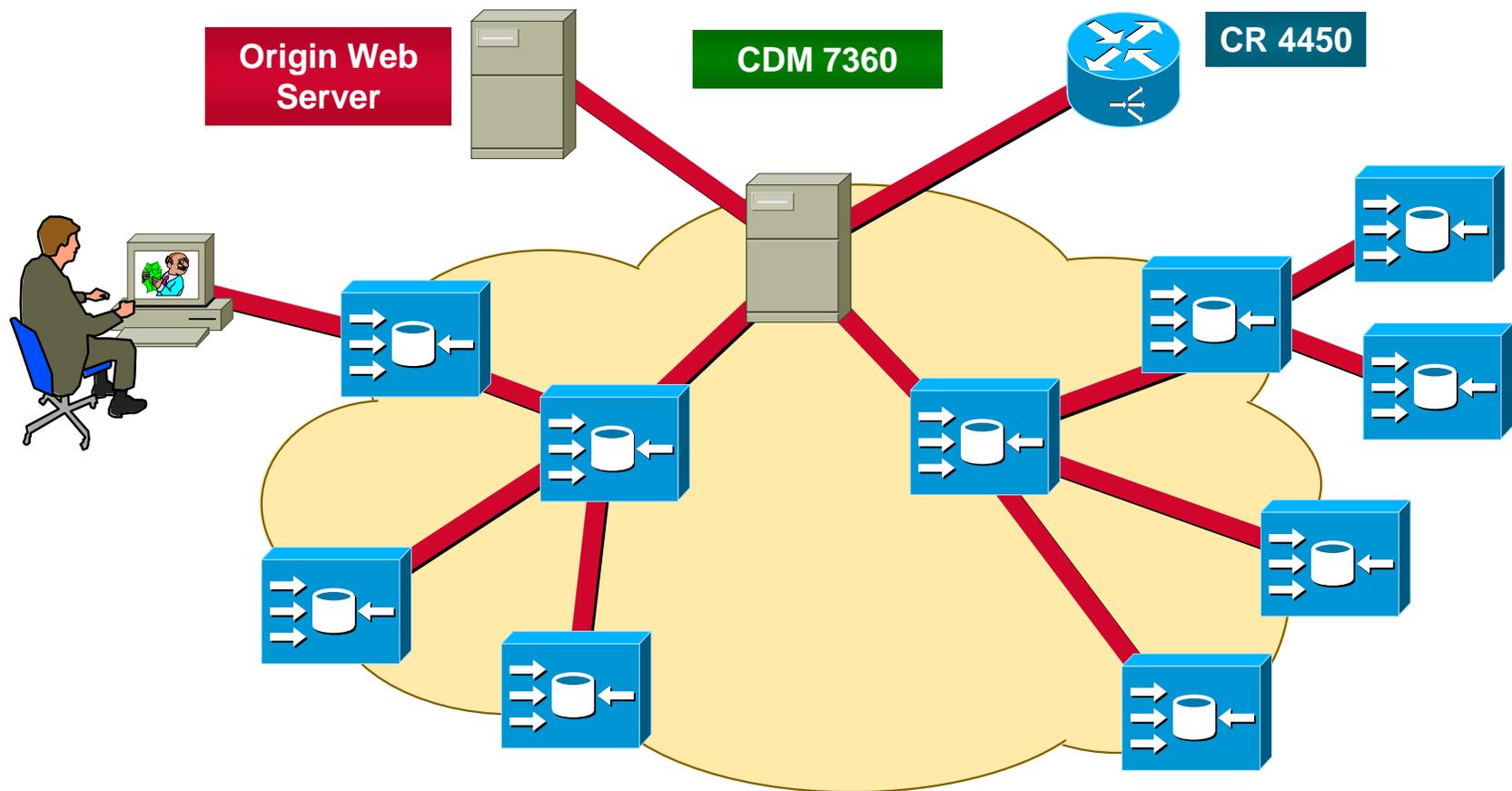
Optimizing Broadband Access



- Transparent - no browser configuration required
- Improves performance by bypassing cache for non-cacheable content or cache failures
- Content policy allows include, exclude (bypass), or block actions based on Access Control Lists

Based on IP address, TCP port or URL

Content Routing Using SODA



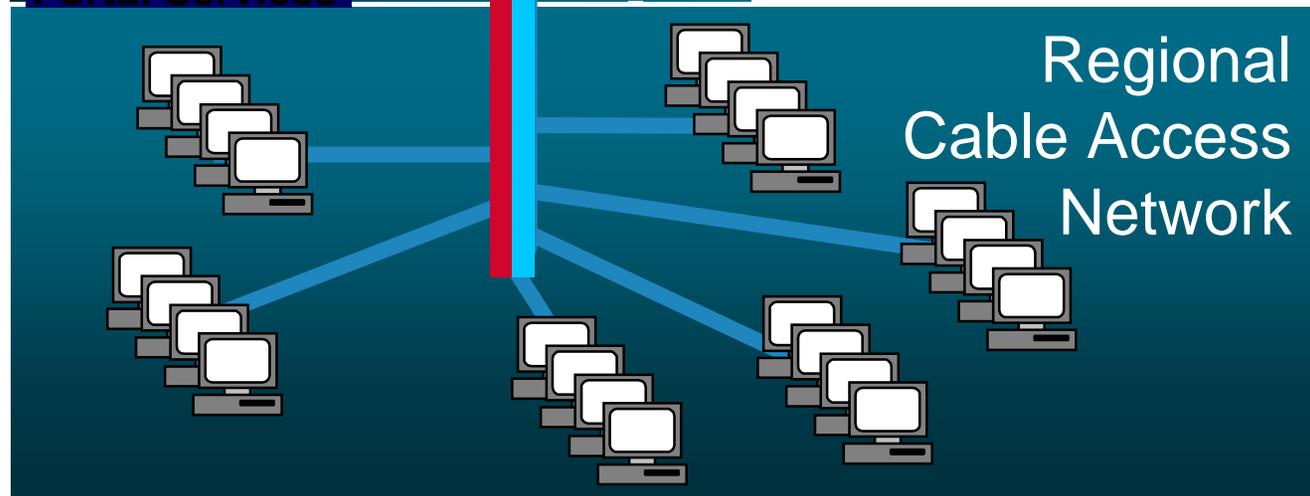
- Client is routing to best server using DNS
- Feedback information on the “best” server is stored in the Content Router
- Clients can be routed to the “best” server using policies, such as location of content

Broadband Network Services



ROAD RUNNER
HIGH SPEED ONLINE™

*25% savings
on Internet backbone
connections: \$15M per year*



*75% response
time
improvement for
roadrunner.com
content*

www.roadrunner.com/*.* www.everything_else.com/*.*

Cisco Forms Content Alliance

Accelerate Adoption of CN Services

- **Objectives of the Content Alliance**

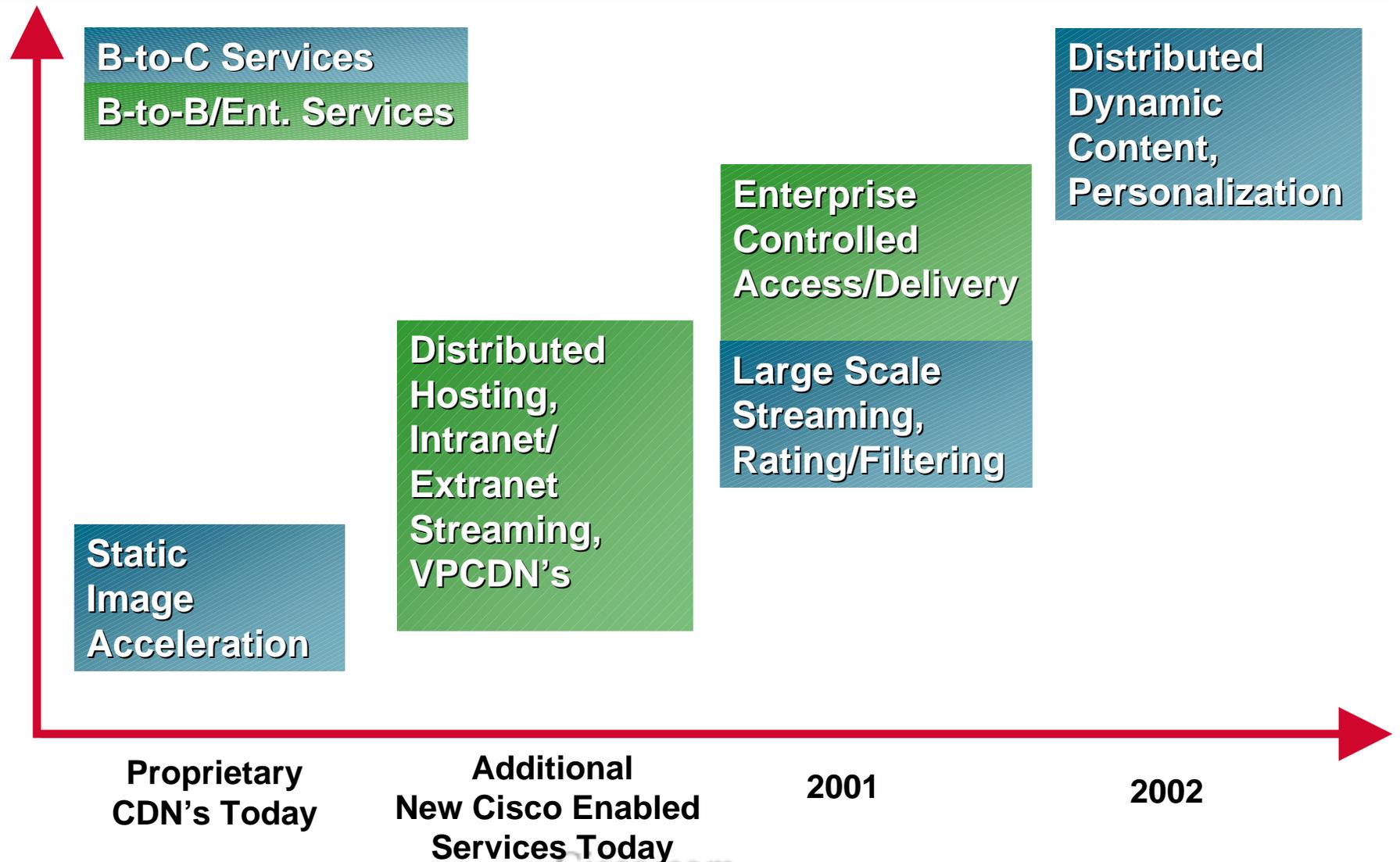
 - Develop and promote open standards for Content Peering

 - Drive the creation of other standards needed to speed the adoption of Content Networking services

- **28 Charter Members**

 - ARC, America Online, Inc., Cable & Wireless, Cisco Systems, Digex, Digital Island, Documentum, EMC, Entera, Genuity, Global Center, HelloNetwork.com, Mirror Image Internet, NaviSite, NetSat Express, Network Appliance, OBCTV.com, Primedia Workplace Learning, PSINet, ServInt, SolidSpeed Networks, StorageNetworks, Streampipe.com, Sun Microsystems, Telefónica Data, US Data Authority, Vividon, and Walt Disney Internet Group

CDN Roadmap for Service Providers



Content Delivery Networks

Delivering the Complete System

	Content Distribution & Management	Content Routing	Content Switching	Content Edge-Delivery	Intelligent Network Services
Key Features / Benefits	<ul style="list-style-type: none"> Global / centralized provisioning Real time monitoring Ensuring fresh content Self organizing distribution network 	<ul style="list-style-type: none"> Scalability Routing to best most proximate content Adaptive routing around failures / congestion 	<ul style="list-style-type: none"> Flash crowd protection Optimal handling for non-cacheable content (e-commerce, etc) E-commerce transaction assurance Core distribution capabilities 	<ul style="list-style-type: none"> High-performance content delivery for POPs Integrated caching for transparent insertion into the network Full scalable range product range with common architecture 	<ul style="list-style-type: none"> Leverage existing network infrastructure QoS Security Multicast VPNs
Products	CONTENT DISTRIBUTION MANAGERS <ul style="list-style-type: none"> • CDM 4670 • CDM 4650 • CDM 4630 	CONTENT ROUTERS <ul style="list-style-type: none"> • CR 4450 • CR 4400 • Distributed Director 	CONTENT SWITCHES <ul style="list-style-type: none"> • CSS 11000 + • Catalyst 6500 	CONTENT ENGINES <ul style="list-style-type: none"> • CE 7320 • CE 507/560/590 	NETWORK SERVICES <ul style="list-style-type: none"> • Cisco IOS

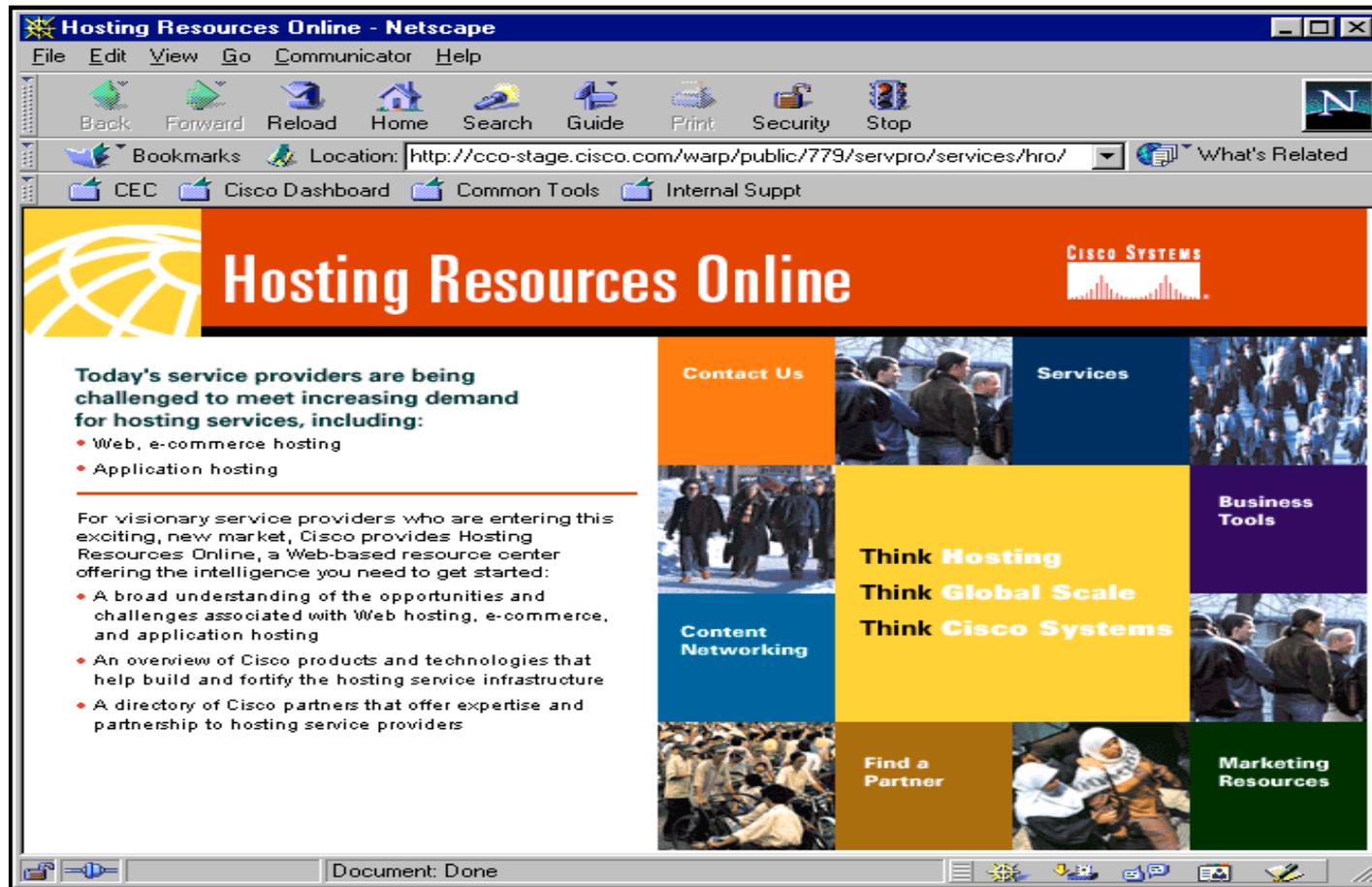


Resources You Can Use

Hosting Resources Online

Centralized Portal for Content/Hosting Info

<http://www.cisco.com/go/hosting>



<http://wwwin.cisco.com/splob/solutions/hosting/>

Cisco.com

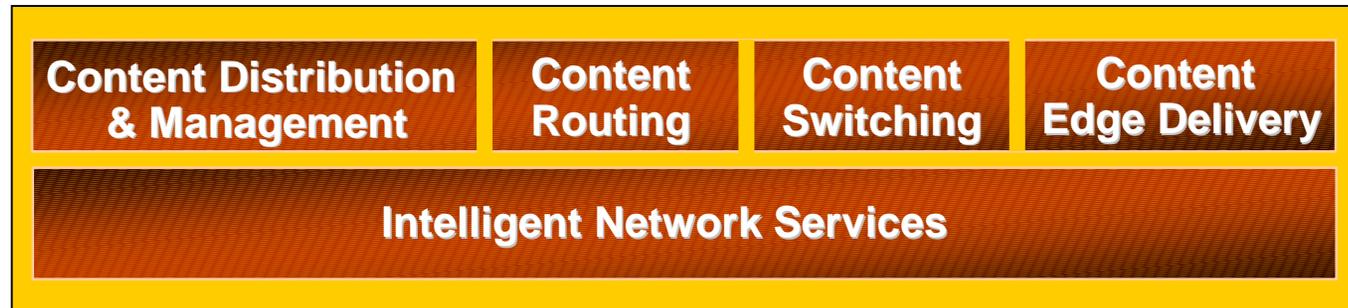
Hosting Business Model

An Interactive Modeling Tool

http://www.in.cisco.com/splob/solutions/hosting/business_model.shtml

Summary		Year 1	Year 2	Year 3
System Sizing				
Number of Hosting Customers		1,240	4,546	13,886
Number of Applications Customers		475	1,471	3,627
Number of Integration Days		3,300	7,245	15,932
Number of Racks		357	864	2,203
Profit & Loss				
Revenue				
Hosting Revenue		\$ 9,595,331	\$ 40,708,538	\$ 120,014,878
Application Revenue		\$ 44,288,035	\$ 171,585,508	\$ 431,034,813
Other Revenue		\$ 7,762,752	\$ 21,506,081	\$ 52,111,081
Total Revenue		\$ 61,646,118	\$ 233,800,128	\$ 603,160,772
Expenses				
Depreciation		\$ 11,637,736	\$ 34,284,362	\$ 80,880,499
Cash Expenses		\$ 43,432,938	\$ 136,160,447	\$ 307,153,739
Total Expenses		\$ 55,070,674	\$ 170,444,809	\$ 388,034,238
Gross Operating Margin		\$ 6,575,444	\$ 63,355,298	\$ 215,126,535
Gross Operating Margin Percentage		11%	27%	36%
Incremental Capital Investment		\$ 39,708,908	\$ 74,251,060	\$ 147,820,990
Cash From Operations		\$ (21,495,728)	\$ 23,388,621	\$ 148,186,044
Return on Investment		23%	93%	159%

Content Delivery Networks



- Important to deliver a complete system for Content Delivery Networks and Next Generation Content Based Services
- Enables Service Providers to build new value into their networks and to deploy highly profitable content delivery services

CISCO SYSTEMS



EMPOWERING THE
INTERNET GENERATIONSM