CISCO SYSTEMS

The Next Frontier in Application Networking

Jayshree Ullal

Senior Vice President, Datacenter, Switching & Security

Cisco Systems, Inc.

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1

GAAP Reconciliation and Forward-Looking Statements

GAAP RECONCILIATION

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Application Delivery Challenges for IT

Inefficient deployment and operations

- **New services require**
  - **new physical deployments,**
  - **new qualification cycles**
  - **dedicated resources**
- **Long time to deploy**
- **Complex workflows**
- **Underutilized resources**
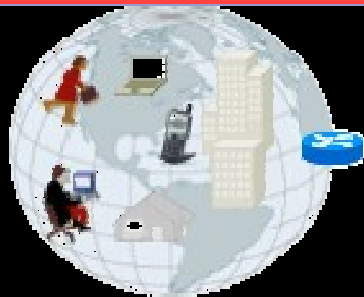
**Result: Complex, high touch, inflexible and expensive application infrastructure … when it works!**

Sys Admin

Net Admin

WAN

WebSphere

SIEBEL

ORACLE

PeopleSoft Apps

SAP

SecOps
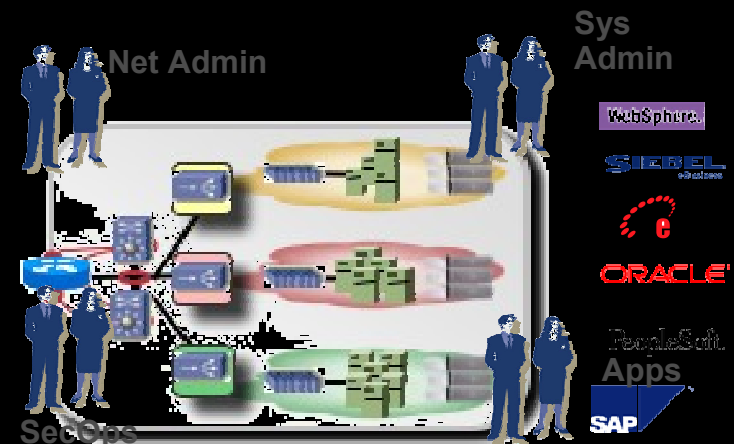
Poor application performance	Security vulnerabilities	Too many products and vendors to manage

Consolidate, Simplify, Optimize

Migrate application-independent processing from server to network
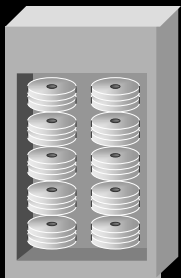
- Load balancing
- SSL
- Security
- Compression
- TCP optimizations
- Performance monitoring

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4

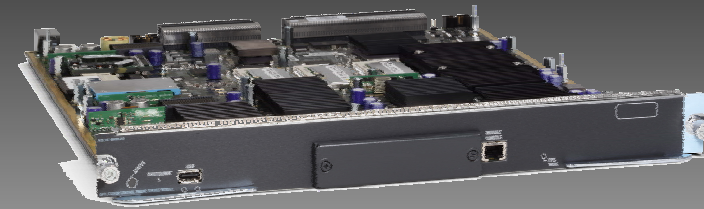# Introducing the New **A**pplication **C**ontrol **E**ngine
Data Center Edge Security and Application Networking

- **ACE provides a level of Application and Security integration unique in the industry**

- **16Gb/s Data Center Edge Firewall, L4-7 Load Balancing, SSL Termination, and Application Networking in one virtualized package**

- **Service interworking unattainable by any of today's competitors**

L4-7 SLB

SSL

DCFW
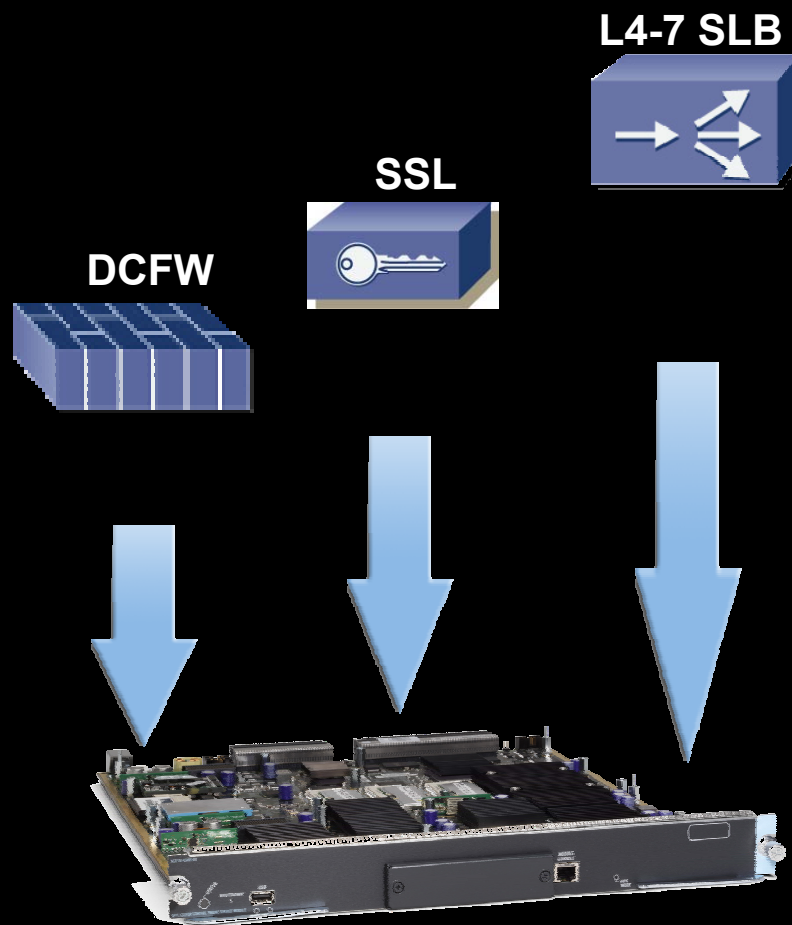
Application Control Engine Highlights

- **Combines Data Center Edge Security and Application Networking Services**

- **First truly Virtualized Application Networking Element**

- **Enables End-to-End Segmented and Virtualized Data Center Deployments**

- **Highest Performance L4-7 system, throughput and connections.**

- **Centralized Roles Based Administration for 'Split' Admin Models with Network and Application team joint ownership**
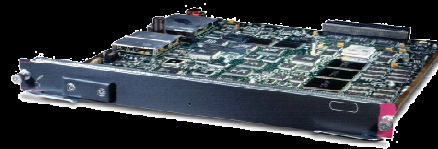
ACE

AVS 3120

CSM

CSS 11506

CSS 11501 **CSS 11503**

Target Deployment

Performance

ACE vs. Competitor Performance

60% higher throughput!
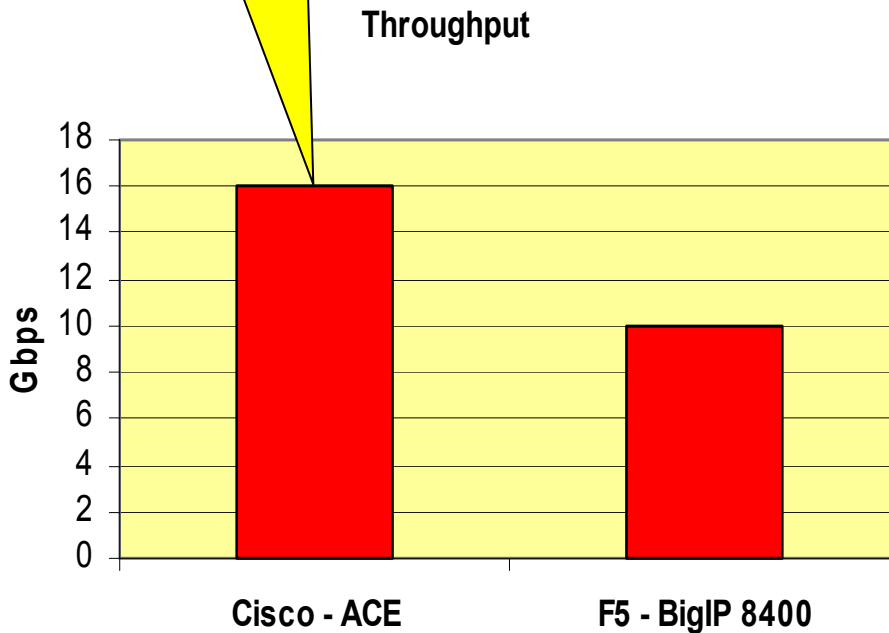
250% higher connection setup!

Throughput

Gbps	Cisco - ACE	F5 - BigIP 8400

(Cisco - ACE ≈ 16 Gbps, F5 - BigIP 8400 ≈ 10 Gbps; Y-axis: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18)

L4 Connection Setups

(Cisco - ACE ≈ 345,000 CPS, F5 - BigIP 8400 ≈ 135,000 CPS; Y-axis: 0, 50,000, 100,000, 150,000, 200,000, 250,000, 300,000, 350,000, 400,000)

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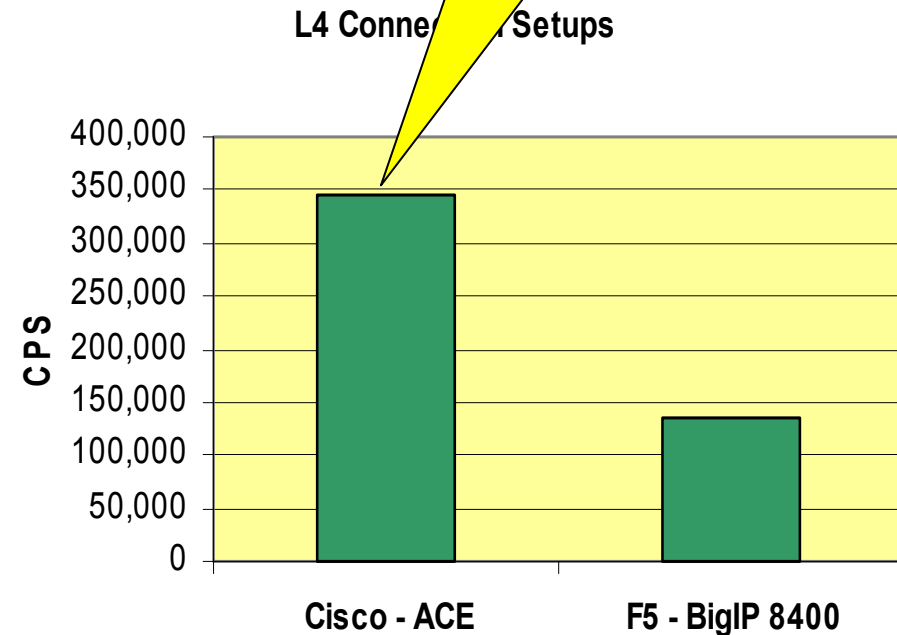
ACE Collapses Application Silos

Feature Concurrency at "line-rate"

Rx	Fast Path	Fast Path	Fast Path
Fast Path	Fast Path	IP Frag Timers	ICM
OCM	CCM	TCP	HTTP
HTTP	SSL Record	RegEx	FixUps TCP Norm.
XScale Processor			

- **ACE Controls**
  - **Up to 250 separate application or customer contexts per device**
  - **Resource reservation per context**
  - **Role-based access control**
  - **In-flow security**
  - **Graphical multi-device management**
  - **Programmability – XML API**
  - **Data-plane segmentation (dual)**
  - **Control-plane segmentation (16 micro-engines)**
  - **Supports all other data center virtualization modes**

Service Virtualization – System Separation

One physical device

**Multiple virtual systems
(dedicated control and data path)**

100% → **25%** **25%** **15%** **15%** **20%**
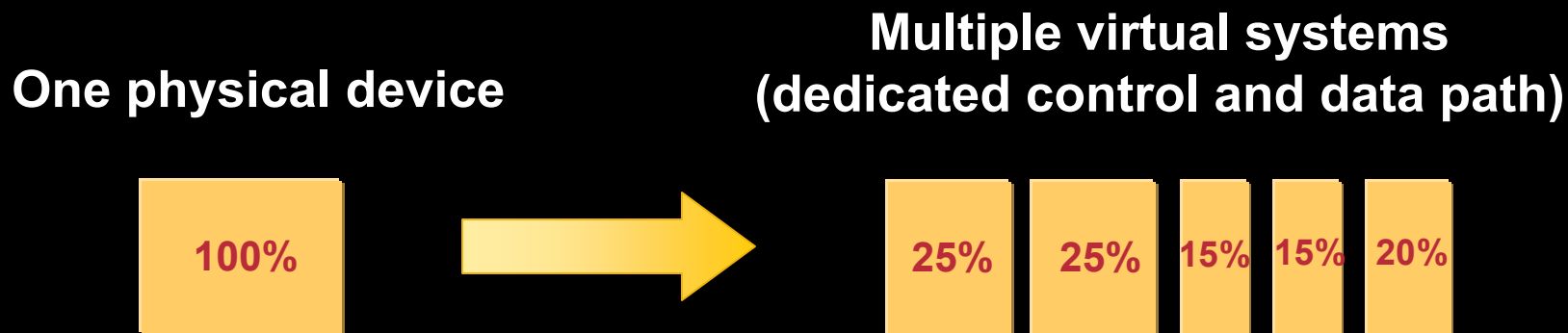
Traditional device

Single configuration file

Single routing table

Limited RBAC

Limited resource allocation

ACE Virtualization

Distinct configuration files

Separate routing tables

RBAC with Contexts, Roles, Domains

Management and data resource control

Independent application rule sets

Global administration and monitoring

ACE and AVS Bring Application Security

SECURED

MAC **IP** **TCP** **Application Protocol** **Payload**

- **Policy match must include major application protocol and payload data: HTTP, SIP, Email, FTP, DNS**

- **Full complement of security services at the application protocol and payload level: encryption, logging, intrusion prevention, access control, rewrite, QoS**

- **Result: Security services once only available through software coding are now core network services**

AVS Delivers Applications Securely

INSPECTS FOR:

SQL Injection
Cross-Site Scripting
Command Injection
Cookie/Session Poisoning
Application Reconnaissance
LDAP Injection
Buffer Overflows
Directory Traversals
Attack Obfuscation
Application Platform Exploits
Cookie Poisoning
Parameter Tampering

- **Capture and model application behavior**
- **Thwart application reconnaissance**
- **Enforce application security policy**
- **Stop leakage of private data**
- **Log and enable application layer forensics**

ACE Device Manageability

Modular Policy Command (MPC)

- Structured IOS-like CLI based on C3PL (Cisco Common Class-based Policy Language)
- Seamless integration of SLB, SSL and Security features
- Familiar class-map, policy-map; New HTTP parameter map

SNMP

- Supervisor agent provides environmental status of ACE
- SNMP agent is virtualized to allow SNMP settings per virtual context
- Up to 10 SNMP hosts are supported per virtual context
- ACE supports SNMP v1, v2c and v3

XML Interface

- Configuration, Provisioning and Monitoring
- All features on ACE can be configured using XML over HTTP / HTTPS
- Monitoring support via XLM-ized "show commands"
- XML DTD is available for both Monitoring and Provisioning

ACE Application-Network- Manager
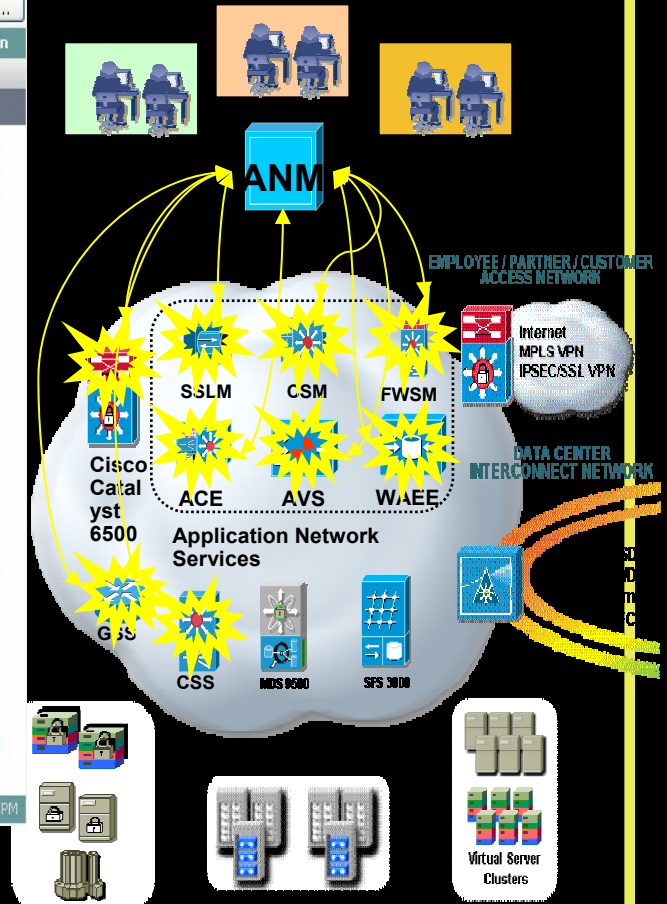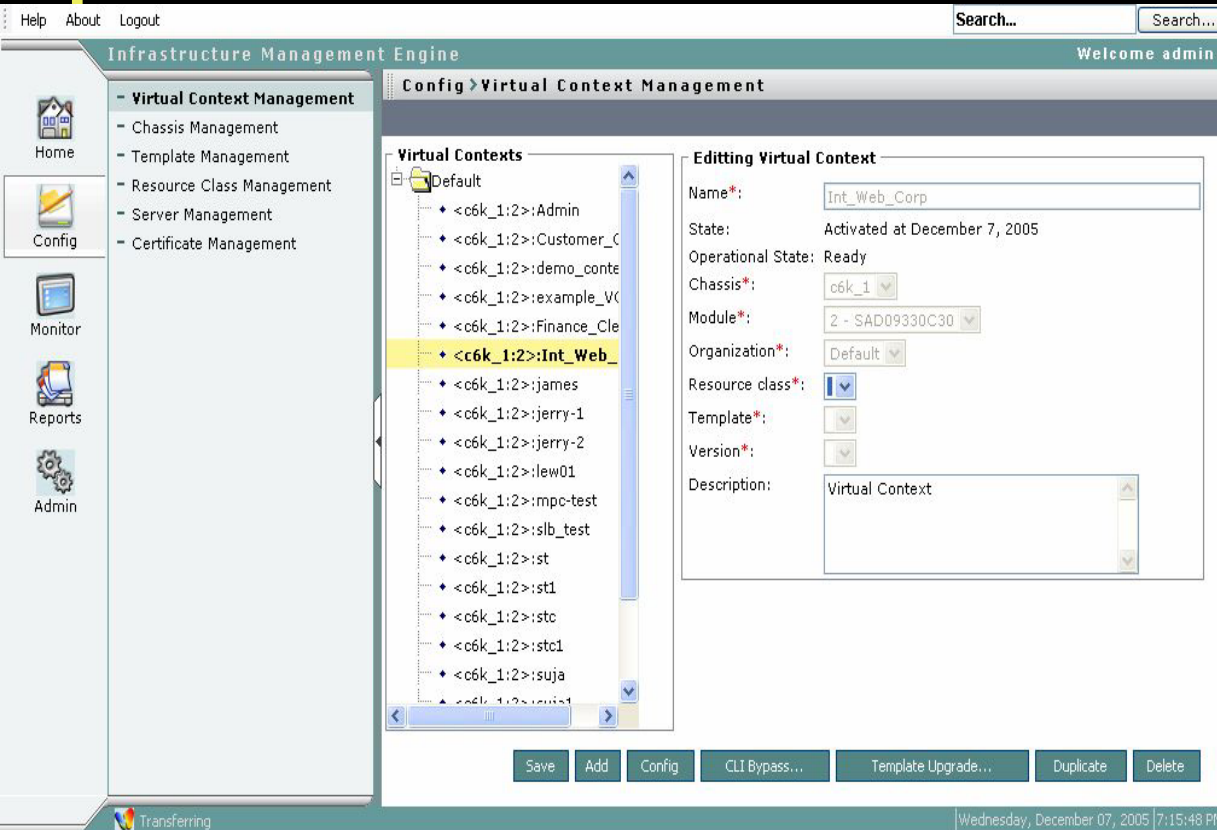
ACE | CSM | CSS | GSS | SSLM | AVS

FWSM | C6500 | Cat 4500 | NAM | Other..

14

ACE & AVS Innovations At-a-Glance

Application Infrastructure Control

- **Virtual Partitioning**
- **Hierarchical Management Domains**
- **Role-Based Access Control**
- **Highly Available**

Application Performance

Innovation

- **Highest Throughput**
- **Maximum Scalability**
- **Multi-tiered reliability, availability, and scalability**
-

Base

- **Server Load Balancing**
- **Content Switching**
- **Web Acceleration**
- **Intelligent Compression**

Application Security

Innovation

- **Richest App-Layer Security***
- **DCFW Protocol Control for DNS,FTP,ICMP,RSTP**
- **Highest Performing NAT & Access Control List (ACL)**

Base

- **Limited Network Address Translation**
- **DDoS Protection**

Infrastructure Simplification

Innovation

- **Layer 2-7 Network Integration**
- **Functional Consolidation**
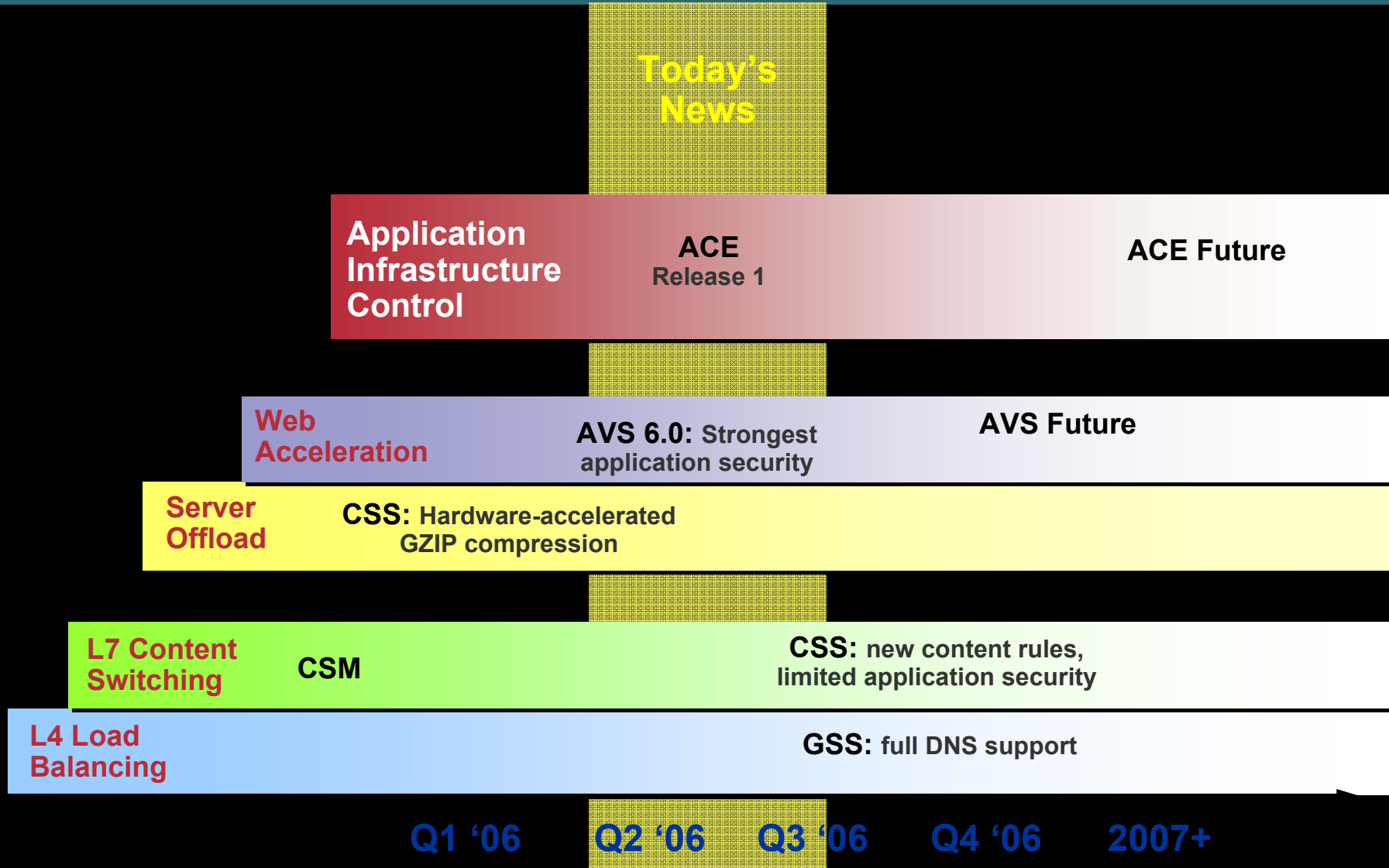- **Application Network Management solution**

Base

- **TCP Optimization**
- **SSL Termination**
- **XML API**

*Available in AVS Today

ACE Enables the Agile Data-Center

FUNCTIONALITY

Today's News

Application Infrastructure Control
ACE
Release 1
ACE Future

Web Acceleration
AVS 6.0: Strongest application security
AVS Future

Server Offload
CSS: Hardware-accelerated GZIP compression

L7 Content Switching
CSM
CSS: new content rules, limited application security

L4 Load Balancing
GSS: full DNS support

Q1 '06   Q2 '06   Q3 '06   Q4 '06   2007+

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ACE in the Datacenter

Traditional Stove-pipe Data Center

Security

- Users
- LAN/WAN
- Compute
- SAN
- Disk/Tape

Security

ACE

- Service Virtualization
- Server Virtualization
- Mgmt Virtualization

Catalyst

- L2-3 VPN
- Virtual Firewall
- IP/Ethernet Switching
- Virtual LAN (VLAN)
- Network Virtualization
- VRF Segmentation
- SAN Virtualization

Virtualized Data Center

- VLAN-5 — HR App
- VLAN-24 — ERP App
- VRF-2329 — Finance App
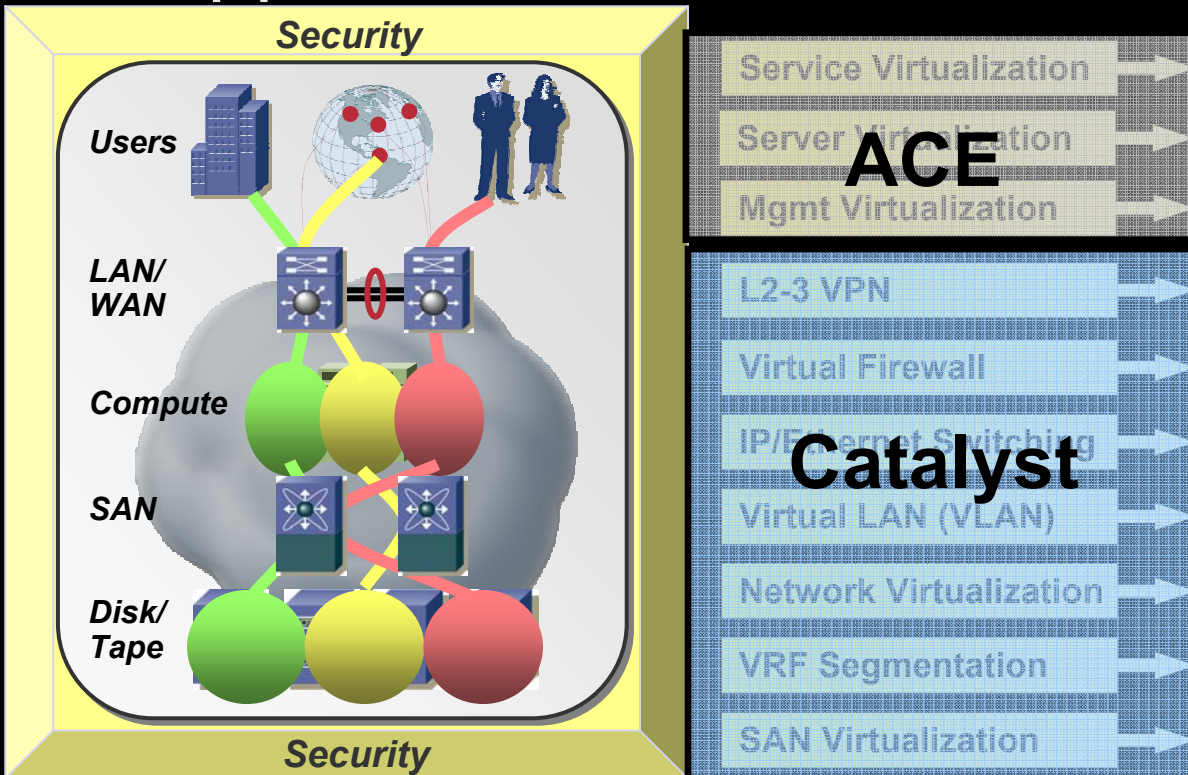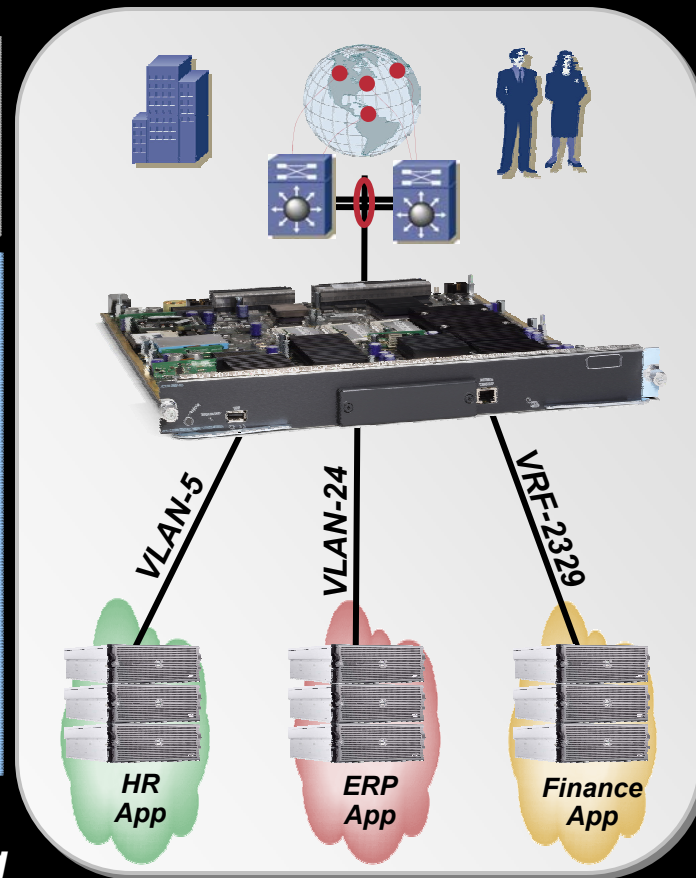
Industry's first *Virtualized Application Networking* enables robust consolidation of application stovepipes

ACE Up the Sleeve

"My customer tried ACE during the EFT. They loved its flexibility, in particular virtualization and the MPC. They were pleasantly surprised to discover advanced application security features, seamlessly integrated.

Thanks to ACE, we have secured a Cisco end-to-end Data-Center, and a solid integrated model ready to be re-used for other Data-Centers worldwide."

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