

Content Switch Test – Results of the first independent test of Layer 7 content switches

***commissioned and published by Light Reading
undertaken by EANTC***

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European Advanced Networking Test Center



Agenda



- About EANTC and Light Reading
- Test Motivation
- Introduction to Content Switches
- Test Methodology
- Participants and Products
- Tests in Detail
- Test Results

About EANTC

EANTC provides highly specialized services in the field of network technologies.

EANTC offers vendor independent network quality assurance.



EANTC, Berlin-Charlottenburg

EANTC business areas are:

- Test and certification of network components for manufacturers.
- Test of high-speed enterprise / service provider networks and network design consultancy.
- Research and development of test methods and analysis tools.
- Vendor-neutral technology seminars (both ATM & MPLS).



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About Light Reading



A Web Site ...

www.lightreading.com

... Networking the Telecom Industry.



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Need for Testing Content Switches?



Why Testing Content Switches?

- New product category that promise to help network operators and carriers in many ways
 - Keep up with the pace of new Internet service developments
 - Offer different service levels
 - Cut costs
 - Improve security
- Why has their use not taken off?
- Relatively unproven technology yet → ready for an independent test



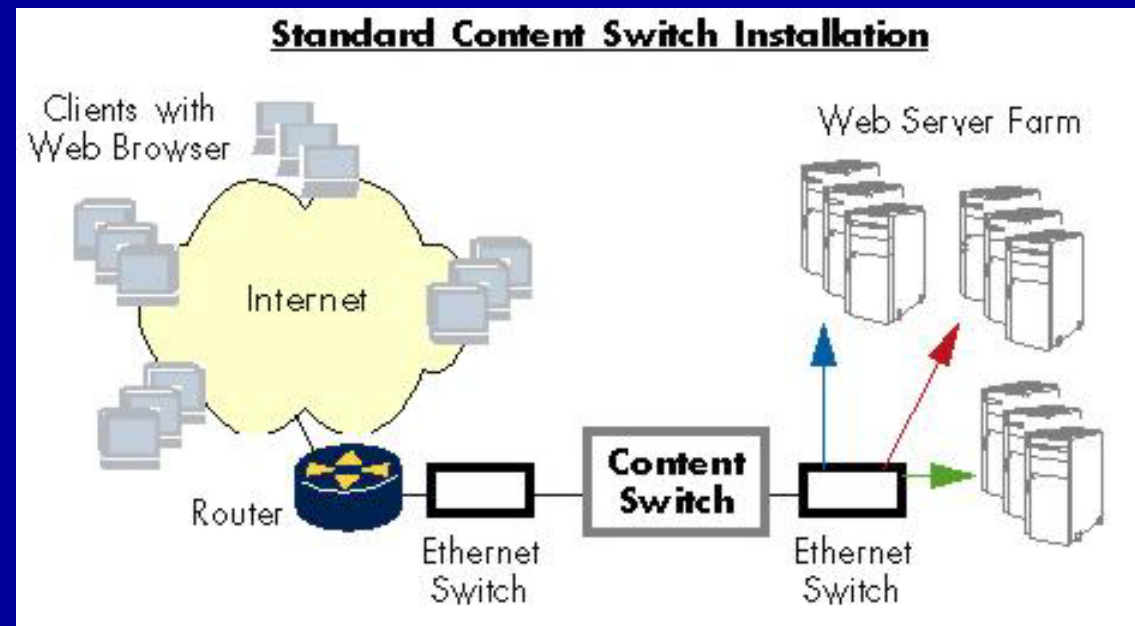
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Introduction to Content Switches

Content switches are typically installed in data centers between the Internet access router and server farms.

Identify individual Layer 7 HTTP sessions and switch them to the appropriate server



Test Methodology and Testbed

Hardware-based performance analyzer

- IXIA 1600T, IxWeb, IxAttack

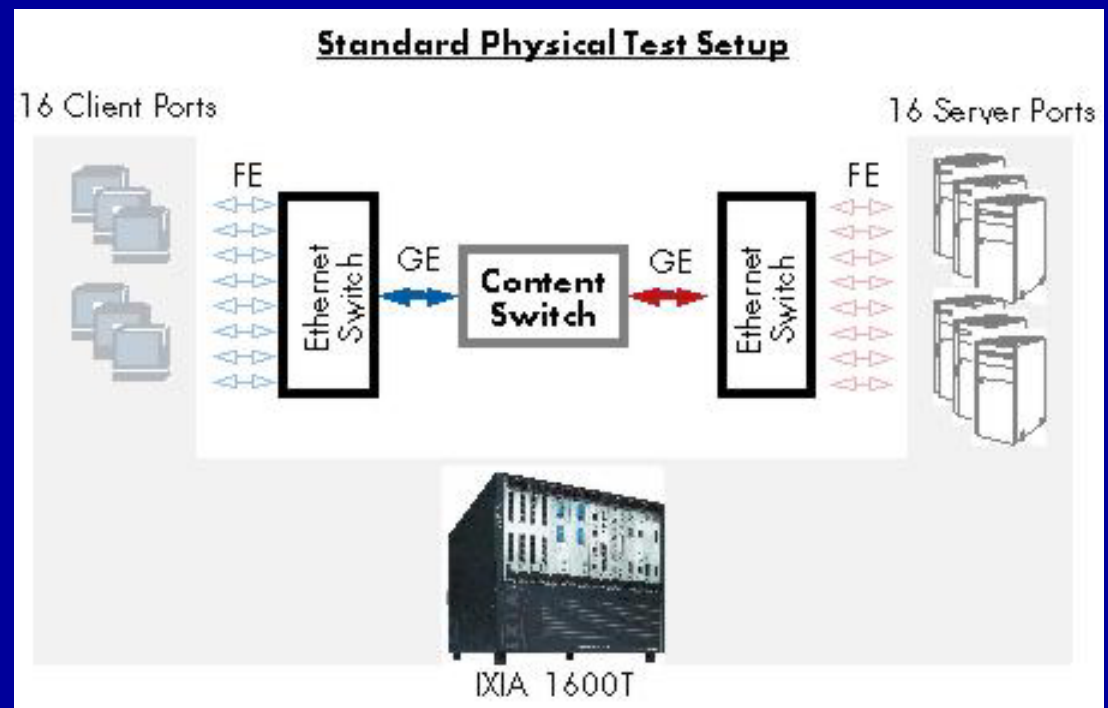
Script-based tests

Connection types

- HTTP 1.0 and
- HTTP 1.1

Testmodes

- full stack vs
- performance stack



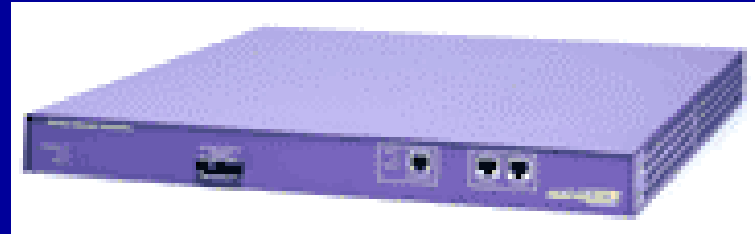
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Participants and Products

- Extreme Networks

- SummitPx1
- \$ 49,995



- Netscaler

- RS9800
- \$ 24,999



- WinCom Systems

- Switching Server FGS
- \$ 50,000



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Scoring

Exact interpretation of results is difficult

- Help of star scoring system
- To keep things simple
- Overall score using weightings for different aspects of switches that we've evaluated

Score: *	- Poor
Score: **	- Fair
Score: ***	- Good
Score: ****	- Very Good
Score: *****	- Excellent

Test Groups

HTTP Test Group

- We looked in detail at HTTP session setup rates, HTTP concurrent session capacity, HTTP latency, and Layer 7 content switching (a.k.a. load balancing) performance.

TCP Test Group

- We tested the TCP connection setup rate and the TCP concurrent connection capacity.

Security Test Group

- We analyzed the distributed denial of service (DDOS) attack resilience and the secure sockets layer (SSL) transaction performance

In addition, we compared the switches' prices and features.



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Details – HTTP Rate/Capacity

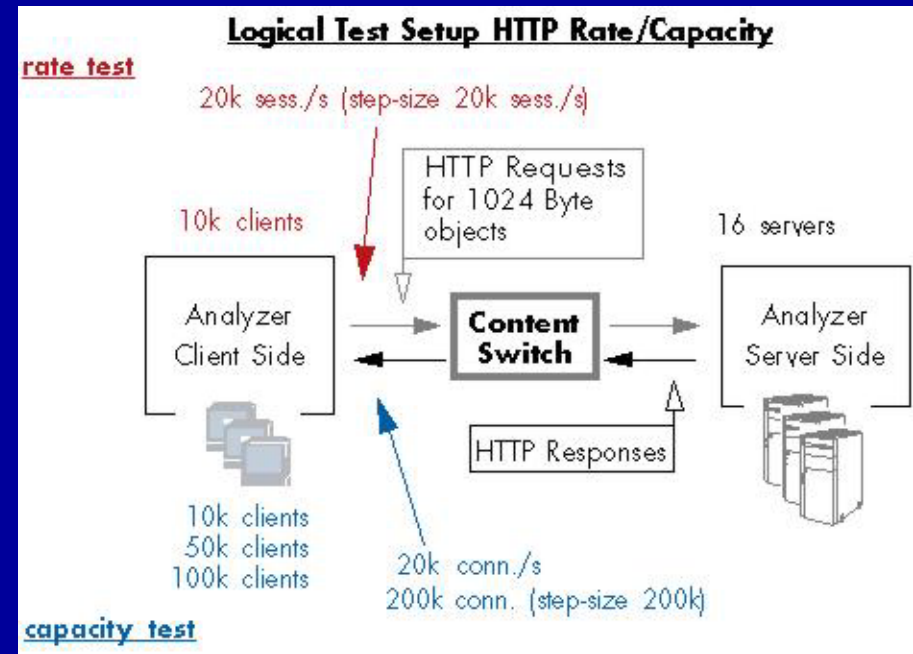
As Web traffic increase, the rate and overall capacity at which HTTP sessions can be processed are critical issues regarding scalability

HTTP Session Rate

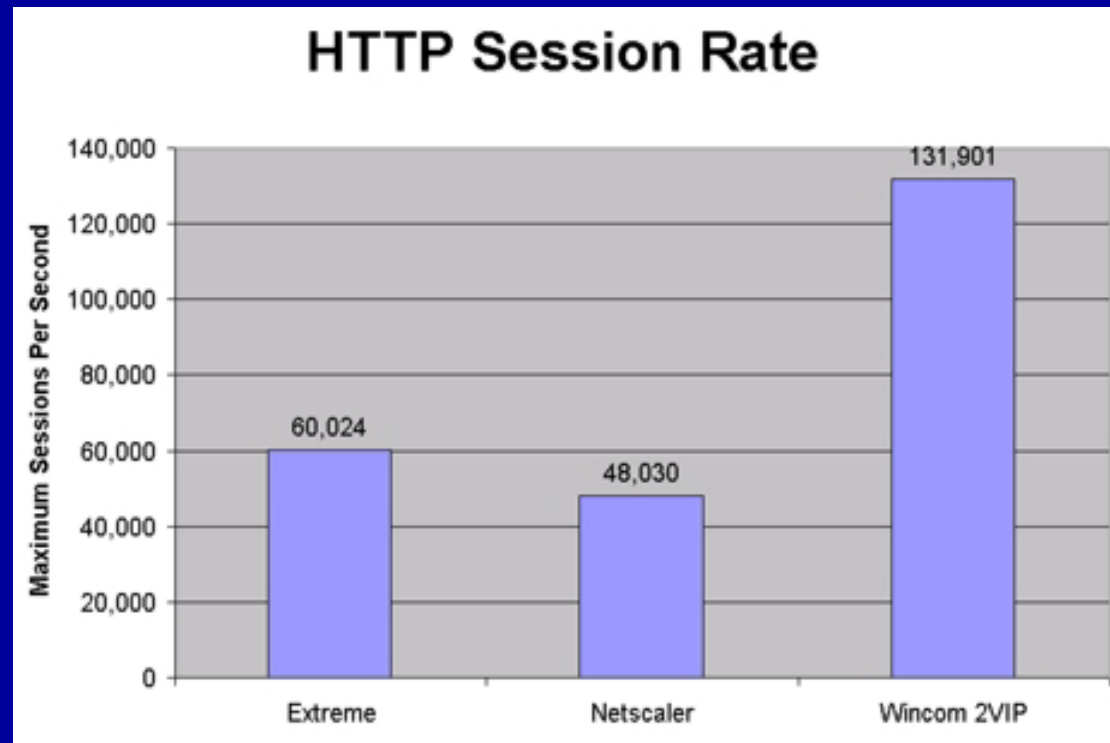
- the speed at which the switch can process Web requests

HTTP Session Capacity

- the maximum number of concurrent Web sessions between clients/servers and the content switch



Results – HTTP Rate

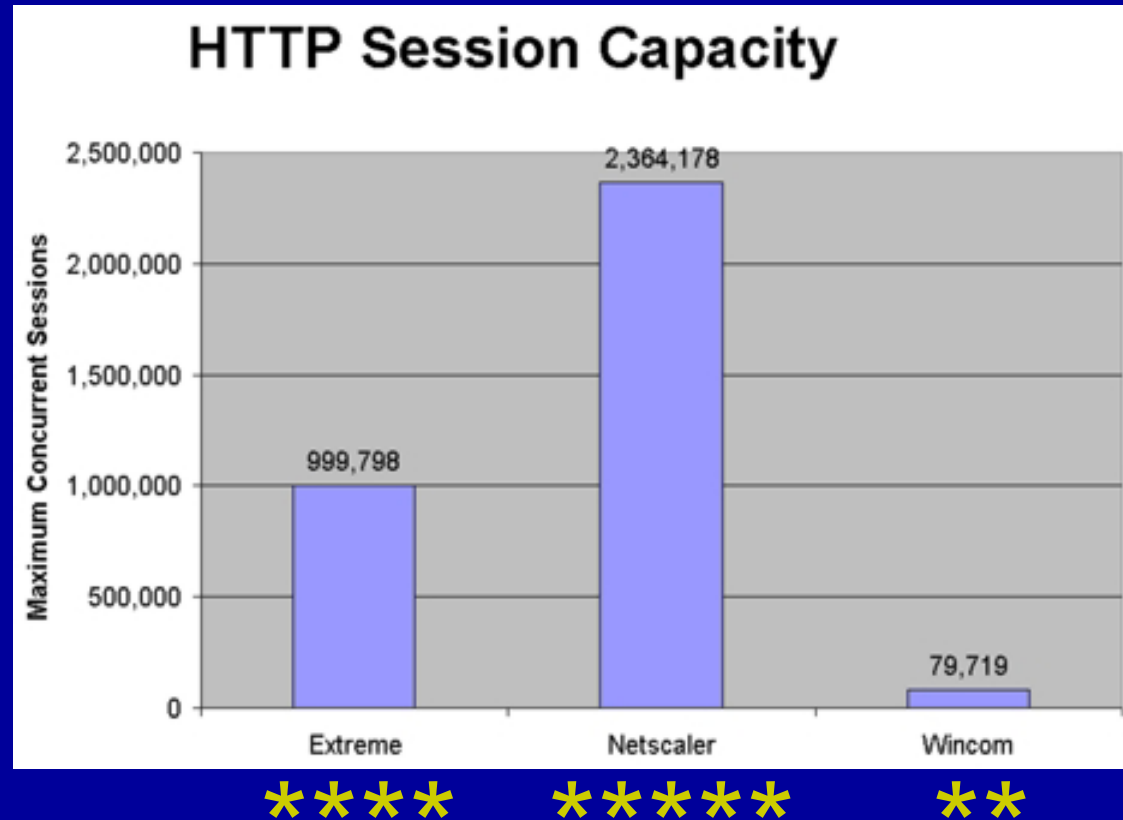




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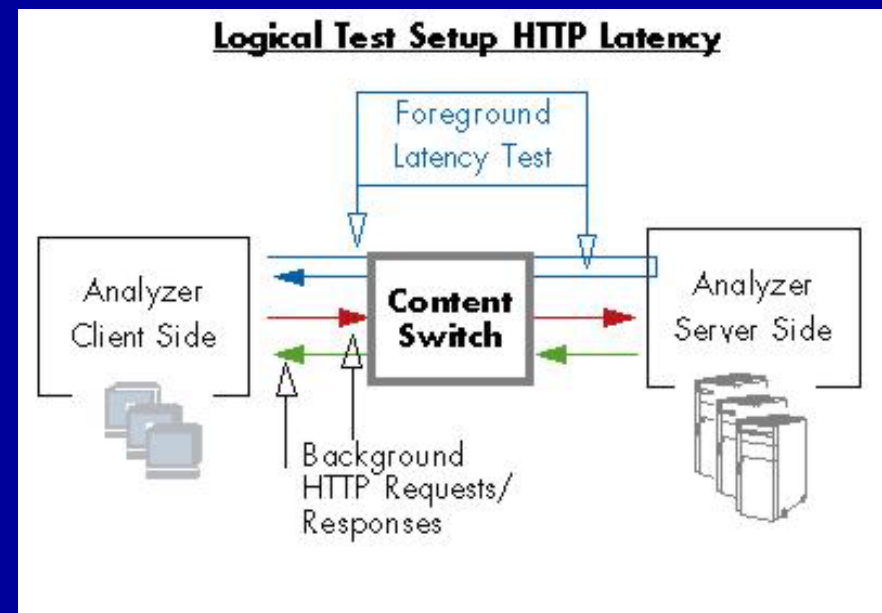
Results – HTTP Capacity



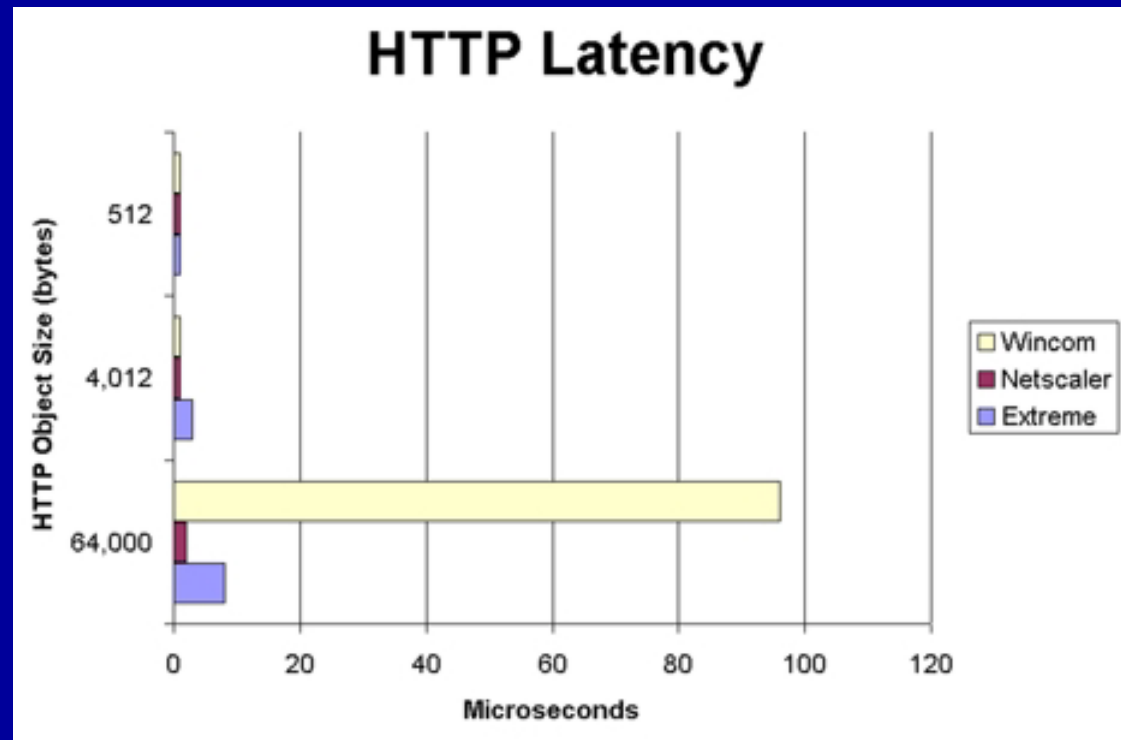
Details – Web Latency

Expression of how much time it takes for a Web request from leaving the client site to coming back as a response from the server

- Plays a crucial role in determining HTTP transaction performance.
- Fast reaction of the content switch is important to serve Web content with a small delay.



Results – Web Latency

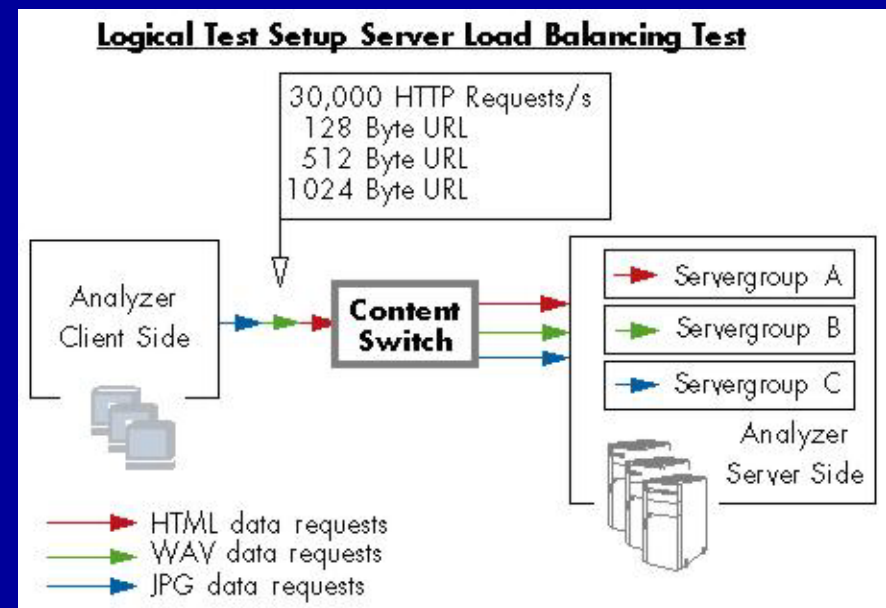


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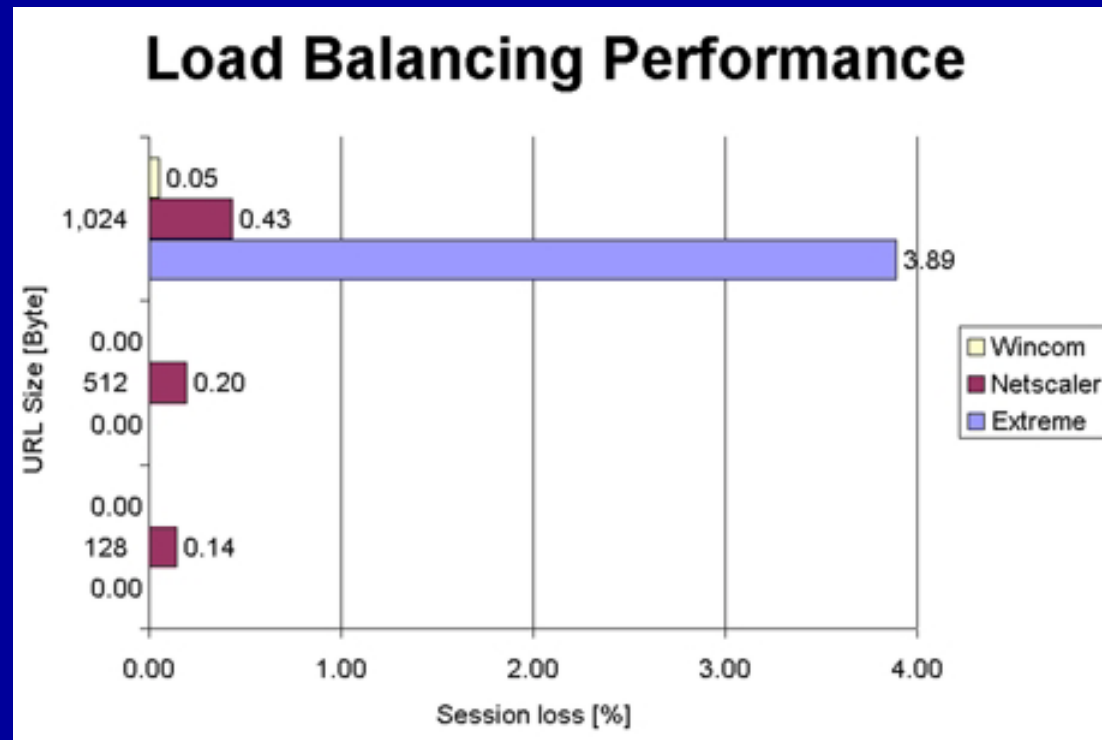
Details – Server Load Balancing

Content switching / server load balancing

- The performance of switches when handling different types and sizes of HTTP requests
- Important issue when designing large Web infrastructures.



Results – Server Load Balancing



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Details – TCP Performance

An important differentiator for customers offering also non-HTTP services

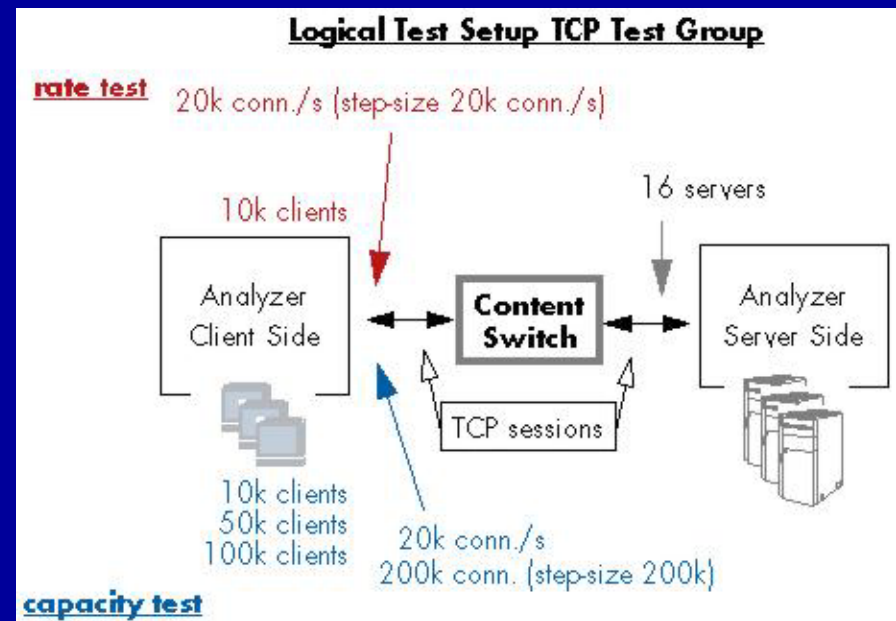
- The better the TCP performance of the hardware, the more users can be served, meaning better profitability

TCP Connection Rate

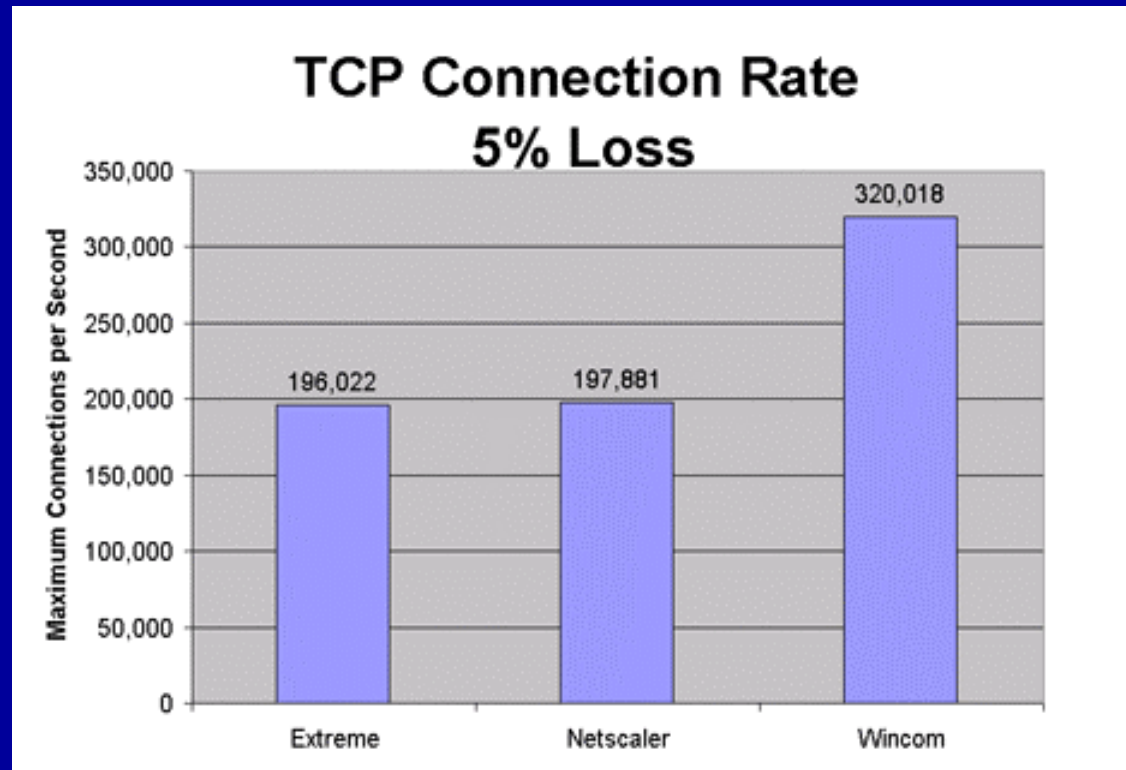
- maximum rate at which TCP connections run through the switch

TCP Connection Capacity

- maximum number of concurrent connections between clients/servers and the switch



Results – TCP Rate

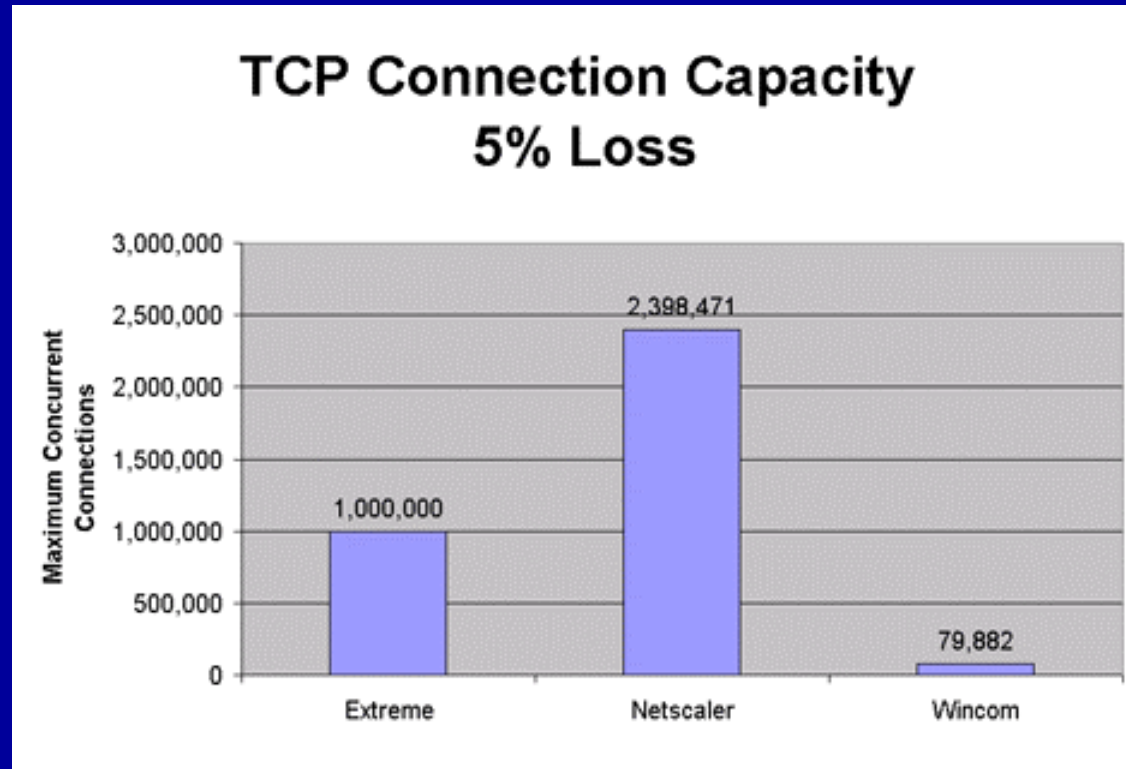




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Results – TCP Capacity

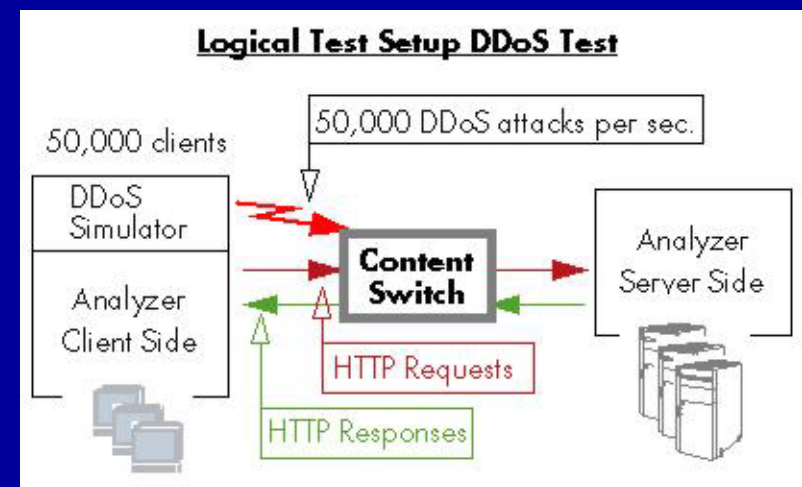


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Details – DDoS Tests

In many application areas there is no dedicated firewall between the Internet access router and the content switch.

- So here the content switch must actively prevent becoming a DOS victim. The resilience against these attacks is a key factor for profitability, especially if services are bound into service level agreements.
- Results: varying according to the type of attack, but always below 1% of offered packets

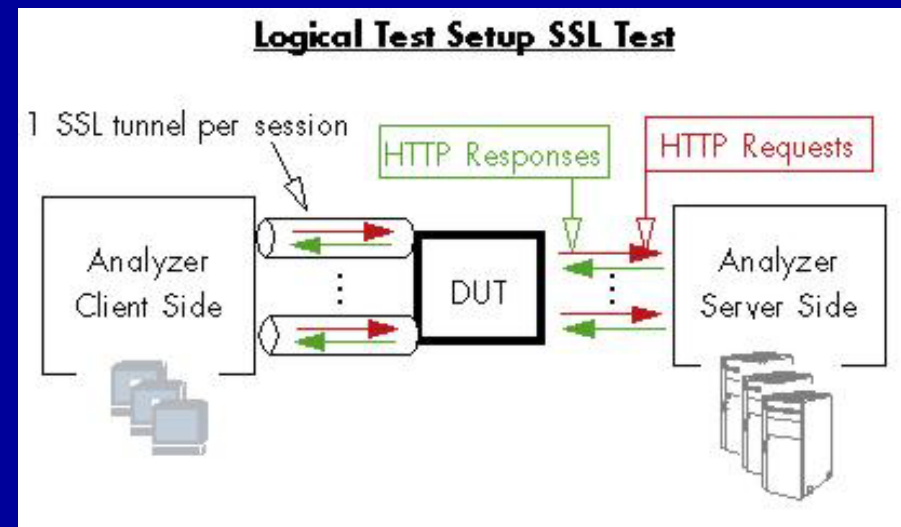


All vendors: ★★★★★

Details – SSL Tests

SSL encryption is used today in many applications running over the Internet.

- Therefore, the content switches supporting this feature need to prove how fast they can handle this type of traffic
- Results
(Extreme supported no SSL)
Session capacity 12000+
reaching test bed boundary
Session rate: Netscaler 4800 (test bed), Wincom 2400



Test Results

Test	Extreme Summit Px1	Netscaler RS9800	WinCom Switching Server FGS
Layer 7 HTTP Test Group (weight: 35%)			
HTTP Session Rate	****	***	*****
HTTP Session Capacity	****	*****	**
HTTP Latency	****	*****	*
Content Switching Performance	**	***	****
Group score	3.5	4.0	3.0
Layer 4 TCP Test Group (weight: 25%)			
TCP Connection Rate	****	*****	*****
TCP Connection Capacity	****	*****	**
Group score	4.0	4.5	3.5
Security Test Group (weight: 10%)			
Distributed Denial of Service Attack Resilience	****	*****	****
Secure Sockets Layer Performance	***	****	***
Group score	3.5	4.0	3.5
Feature List and Price			
Feature List (weight: 15%)	***	*****	*****
Price (weight: 15%)	***	****	***
Overall Weighted Score	3.5	4.3	3.5

Scores represent a balanced approach for distinguishing the different designs



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Influence of Applications

Different scenarios / different score tables

- More customers with TCP instead of HTTP services
 - No changes
- Security focused customer or customers looking for a rich feature list
 - WinCom 2nd, Extreme 3rd
- Prefer concurrent sessions over high rates (sites with many persistent connections)
 - Extreme 2nd, WinCom 3rd
- Super fast users, prioritize connection/session rate
 - WinCom wins



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Summary

- Performance of all evaluated switches is outstanding
- All three switches in this test are ready for serious use
- Clear winner: NetScaler (score and price)
- While the first "Web switches" on the market a few years ago were basically enhanced Layer 4 switches, these systems are highly specialized, focusing on all aspects of HTTP switching
- Initial statement "L7 content switches are relatively unproven technology" is not true
- Again: Why has their use not taken off?



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Thanks! Any Questions?

Please visit our homepage to read more about quality assurance in high speed networks and related services!

You will find also links to this and other test reports

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