Cisco Expo 2009

Deployment of Cisco IronPort Web Security Appliance

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CCIE #20166

Session Abstract

Web security proxy is a must for world full of Web 2.0 threats.

Focus of our session will be placement of Web Security Appliance (WSA) in the network, real world deployment scenarios, tips and tricks related to authentication of users, load balancing and scalability.

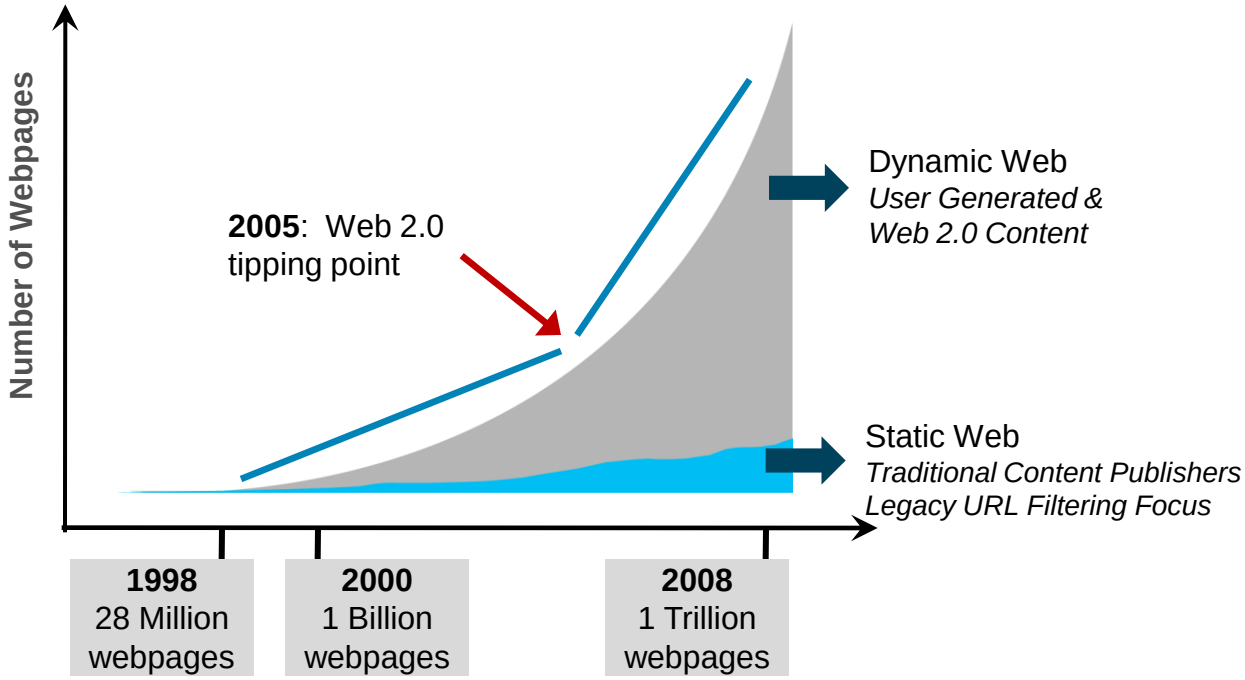
We would provide many answers to typical “how” and “why”. We assume knowledge of networking and basics of security concepts.

Agenda

1. Why
2. Testing
3. Deployment Options
4. Web Usage Controls
5. Q & A

Why

Web: Huge, Growing and Transient



Huge

1 Trillion
unique URLs

Growing

1 Billion
new pages added every day

Transient

30%
domain-level churn every year

Source: Multiple, including Cisco SIO, Google, Wikipedia

Traditional Firewall

1. ACL for L3/L4 filtering

   access-list inside permit udp DNS any eq 53

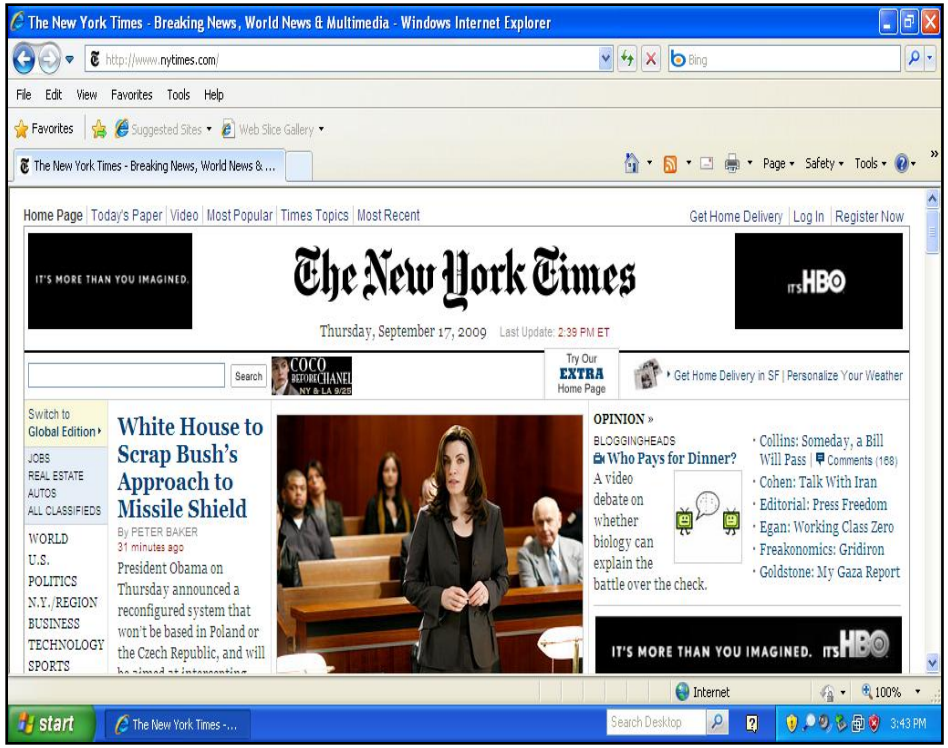
   access-list inside permit tcp LAN any eq 80

   access-list inside permit tcp LAN any eq 443

Page Sample

- 8 HTMLs
- 23 CSS
- 33 JS
- 56 images
- 3 Flash
- 11 cookies
- 123 GETs

The New York Times:
Victim of an advertiser attack!



1. **Seemingly legitimate** ad changed after NYT accepted it
2. **3 malicious redirections** before malware reaches user
3. **Ultimate destination:** protection-check07.com

America's Newspaper of Record

Testing

TESTING

I FIND YOUR LACK OF TESTS DISTURBING.

What we are after ?

1. We are interested in requests per seconds
2. Secondary in throughput
3. Features of course are important

Following permance details are really VERY ROUGH estimates.

Suggested Positioning

S660

10,000 – 30,000 users

S360

1000 – 10,000 users

S160

0 – 1000 users

Why ?

1. User's browsing habits could be very different
2. Traffic profile could be different
3. Configuration and activated features could differ a lot
4. Some traffic could be denied

HTTP Performance
Requests/second & Throughput

- Key metric: Requests/second or Transactions/second
- The larger the object size, the higher the throughput
  - **Throughput (Mbps) = Object size (bytes) × Request rate (req/s)**

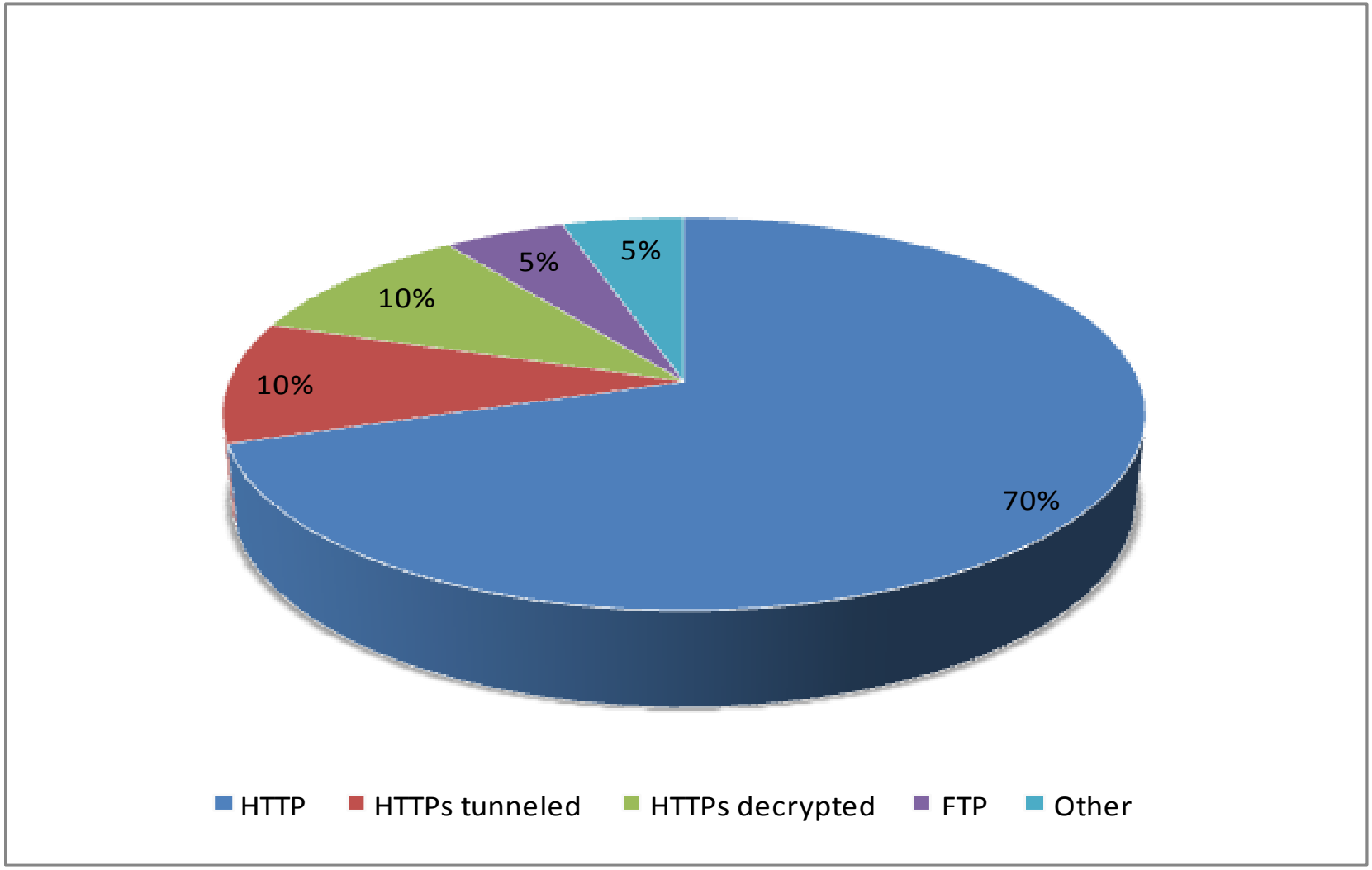
Throughput gets big… …as object size gets bigger… … even if the request rate stays constantly low.

Mbit/sec = Transactions Per Second (TPS) x Average HTTP object size (bytes) x bits in a byte (8) bits x in a megabit (1,000,000)

Rules of thumb:

• Each Request/second is approx. 80-90 Kbps of HTTP traffic
• Each Mbps of HTTP traffic translates to ~10 requests/second
• 100 Mbps of sustained HTTP traffic translates to ~1000 requests/second

Typical Traffic Profile



Performance testing

1. Nothing beats real life traffic
2. Almost any tool that is used to test HTTP servers could be used here
3. Have a bunch of powerful servers ready
4. Test features relevant to your deployment

   Antimalware, HTTPs decryption, IP Spoofing…

Tools One Could Use

1. Wget

   wget -l 3 -r --proxy=on --delete-after
   http://guide.opendns.com/s?service=web&q=music&search_type=guide

   wget --proxy=on --delete-after –i list_of_sites.txt

2. Httperf

   http://sourceforge.net/projects/httperf/

3. Curl-loader

   http://curl-loader.sourceforge.net/

4. Pylot

   http://www.pylot.org/

5. Siege

   http://www.joedog.org/index/siege-home

6. Virus site of your choice :o)

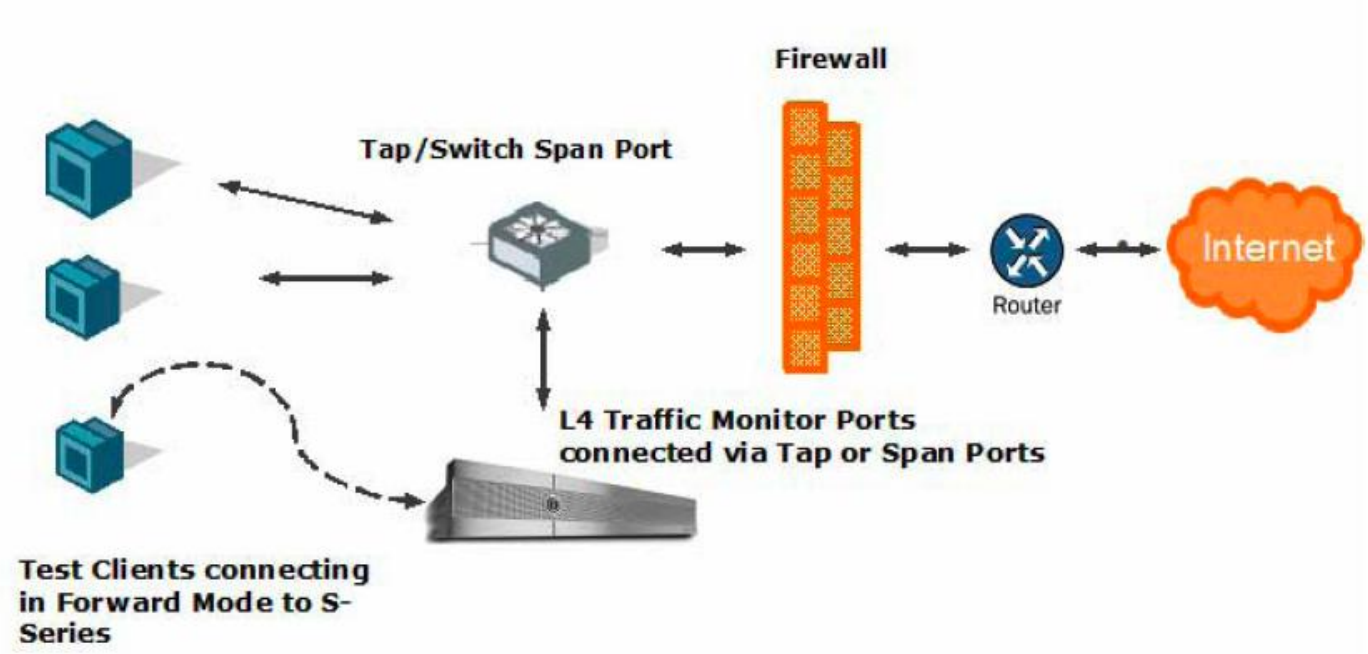
Deployment

Web proxy modes

1. Explicit forward mode

   Use for evaluation

2. Transparent mode
3. Multiple upstream proxies mode

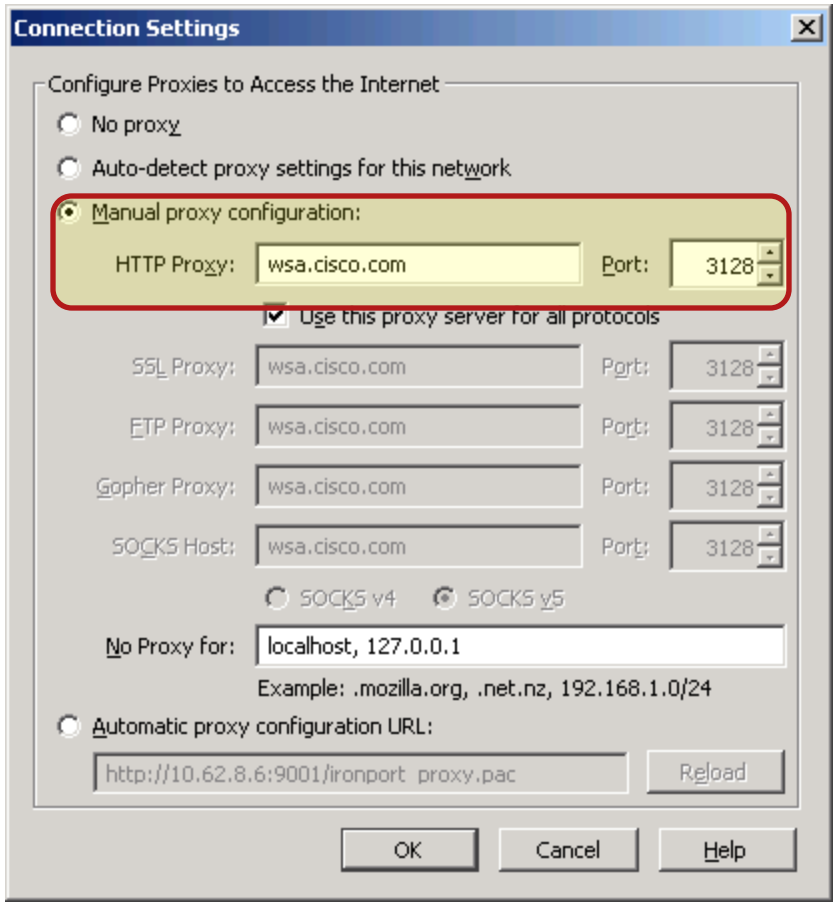


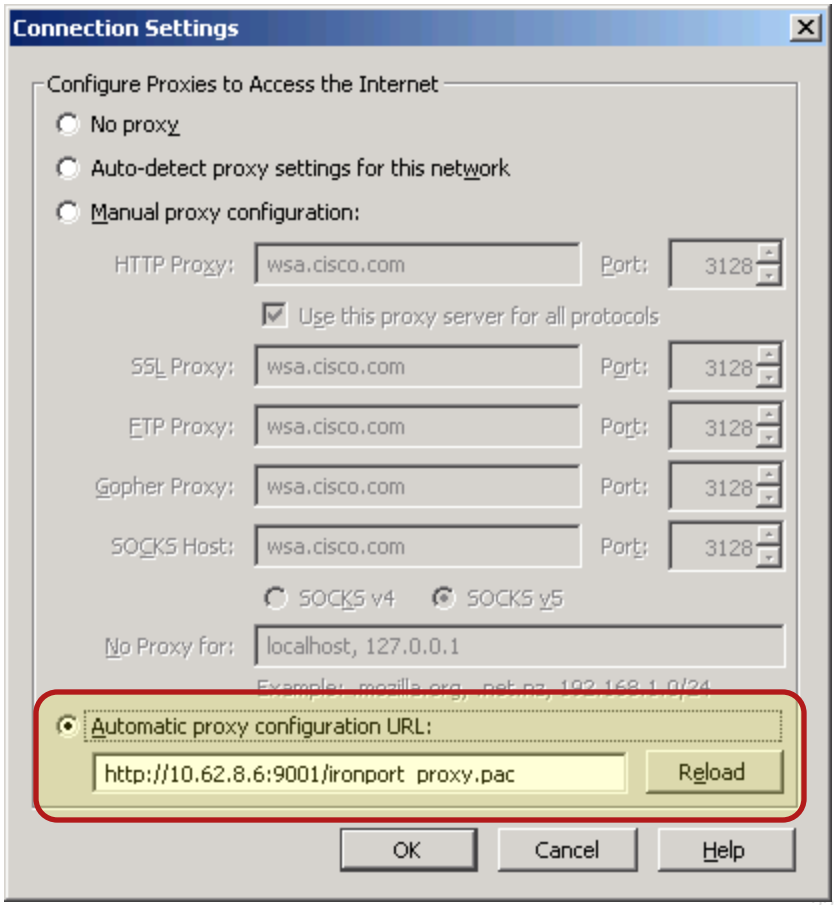
Proxy Selection Method

1. Deployment of Explicit Forward Proxy uniformly on many clients (Manual)
   - Avoid Configuration at the Desktop
   - Failover and/or Load Balancing
   - Performance
2. PAC file hosting
   - Locally on the desktop, on the server, or on the S-Series
3. WPAD

Explicit forward mode

1. Manual
2. PAC File





Creating the PAC file

1. Based on JavaScript
   - Main function “FindProxyForURL(url, host)”
   - 12 PAC functions with return: DIRECT or PROXY
2. Different browsers behavior
   - PAC file location
   - IE limitations
3. Google PAC tester
   - Test your PAC file if working properly
   - http://code.google.com/p/pactester/
4. PAC file example

Creating the PAC file

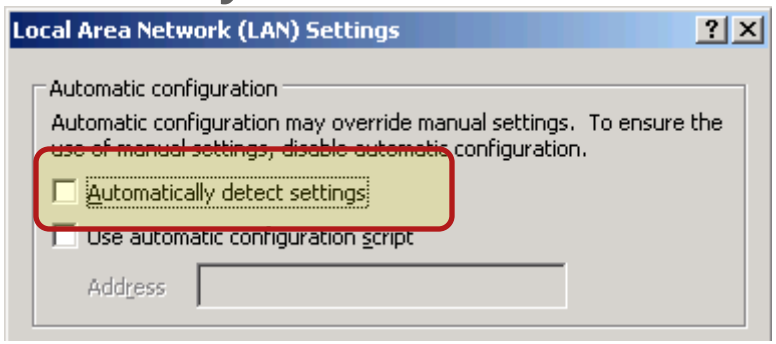
```
function FindProxyForURL(url, host) {
 // If IP address is internal or hostname resolves to internal IP, send direct.
   var resolved_ip = dnsResolve(host);
   if (isInNet(resolved_ip, "10.0.0.0", "255.0.0.0") ||
     isInNet(resolved_ip, "172.16.0.0",  "255.240.0.0") ||
     isInNet(resolved_ip, "192.168.0.0", "255.255.0.0") ||
     isInNet(resolved_ip, "127.0.0.0", "255.255.255.0"))
     return "DIRECT";
   // Use a different proxy for each protocol.
       if (shExpMatch(url, "http:*"))  return "PROXY proxy1.domain.com:3128";
       if (shExpMatch(url, "https:*")) return "PROXY proxy2.domain.com:3128";
       if (shExpMatch(url, "ftp:*")) return "PROXY proxy3.domain.com:3128";
  // If I`m not in corporate network, send direct
       if (!isInNet(myIpAddress(),"144.254.0.0","255.255.0.0"))
       { return "DIRECT"; }
  // URL based load balancing
       function FindProxyForURL(url,host){switch(URLHash(url)%2){
       case 1:  return "PROXY proxy1.domain.com:3128";
       default: return "PROXY proxy2.domain.com:3128";}}
       function URLHash(url) {server_name=url.split("/")[2]
       if(!server_name) {return url.length;}return server_name.length;}
   // All other traffic uses below proxies, in fail-over order.
       return "PROXY 1.2.3.4:8080; PROXY 4.5.6.7:8080; DIRECT";
}
```

WPAD Web Proxy Autodiscovery Protocol (WPAD)

1. Using DHCP
   - Specification of PAC's URLfile using DHCP
   - In DHCP environment uses option 252 "auto-proxy-config"
   - Be aware of security when in use
2. Using DNS via A or CNAME

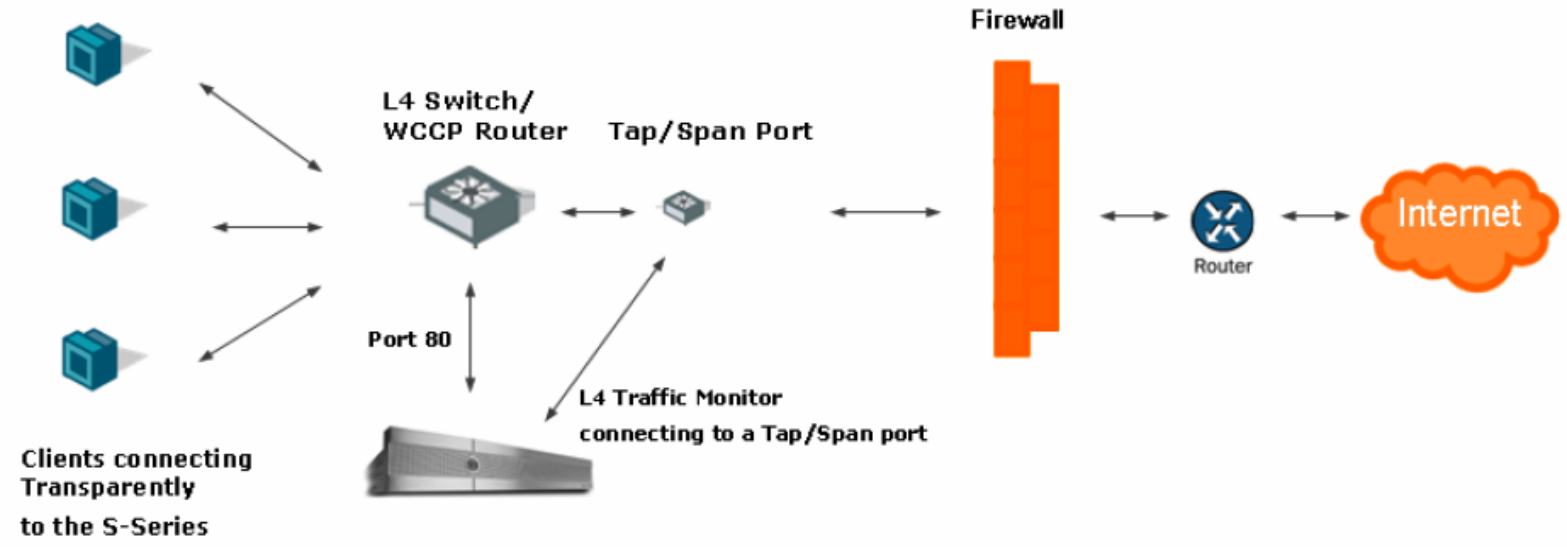
   host wpad

   PAC file should be then located on http://wpad.<domain>/wpad.dat
3. FF doesn't support DHCP option, only DNS



Transparent Mode

1. User (browser, process...) doesn't know it's traffic is being proxied
2. Could be challenging sometimes, let's say while having needs to authenticate users
3. Nothing needs to be done on users desktops



Transparent Proxy deployment

1. Configure transparent redirection
   - PBR – L4 Switch, simple usage
   - WCCP – WCCPv2 router, more complex, but more flexible
2. Configure the return method
   - Layer 2 or GRE
3. Configure IP Spoofing or X-Forwarded-For Headers
   - When upstream proxies requires to identify the client
   - Via Headers
   - IP Spoofing in Forward mode
4. Configure Transparent Bypass List
   - To exclude any special HTTP application servers or clients

WCCP

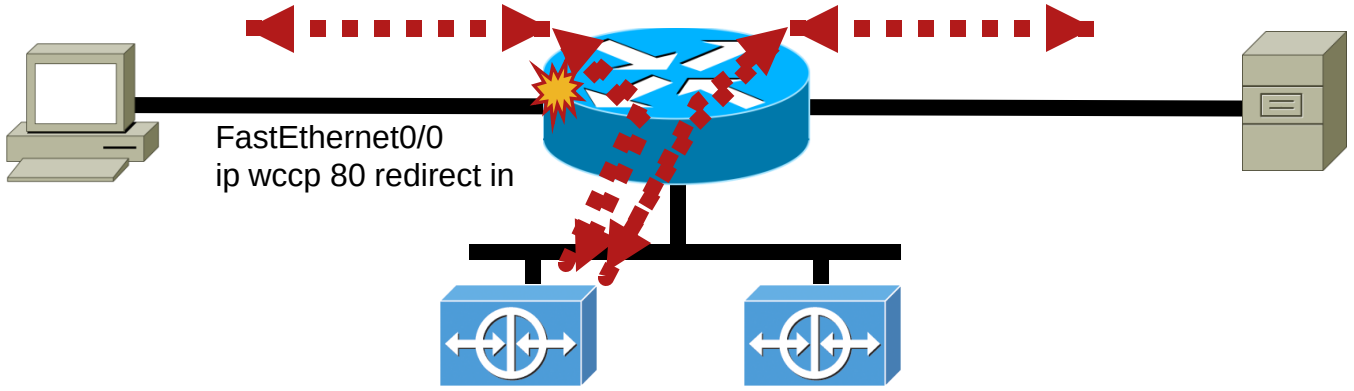
1. Identify traffic

   Ingress redirection (preferred)

   Egress redirection

2. WSA failure results in redistribution of load to remaining WSAs in 30 sec

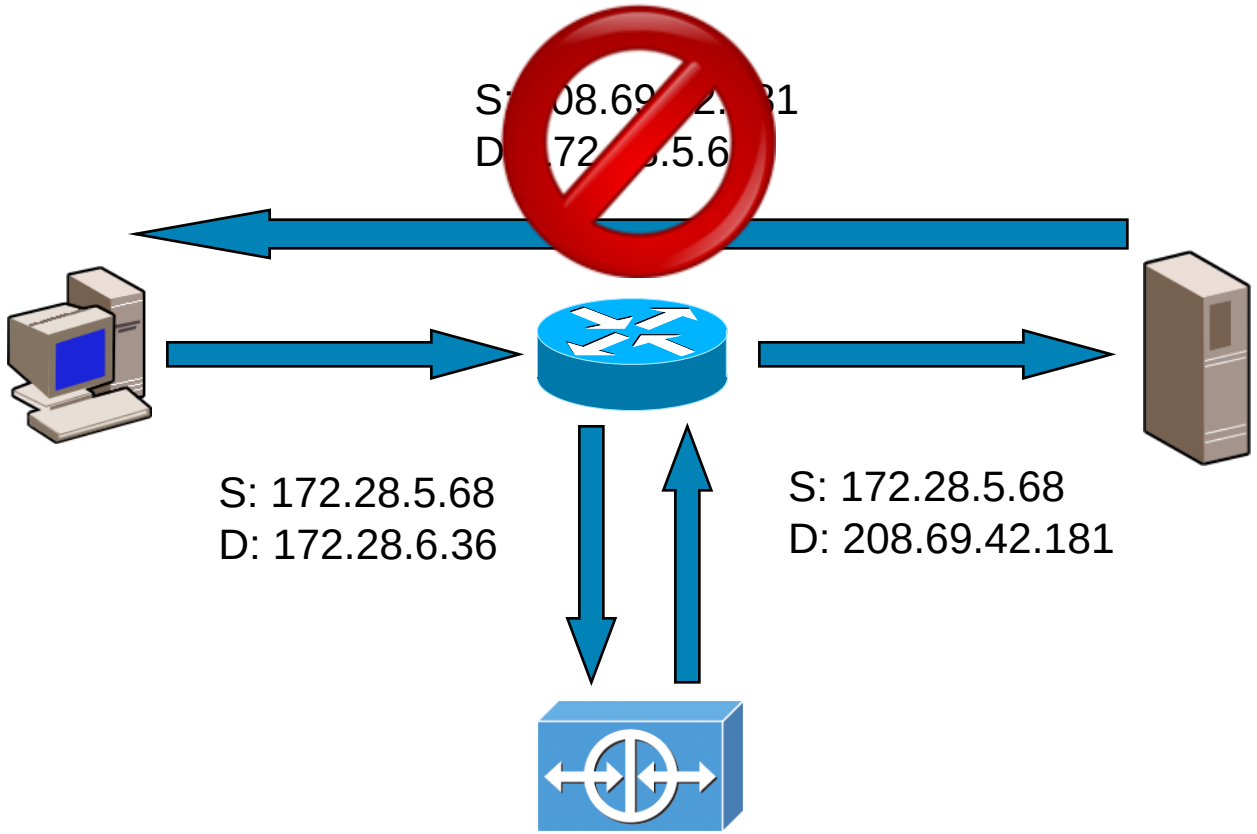
3. If no remaining WSA's service group is taken offline and packets are not redirected (fail-open)



IP Spoofing Explained

1. Using proxy means connection to server would come from proxy address
2. Sometimes we need to identify client/subnet after proxy (think firewall, QoS, NAT, malicious requests detection)
3. Using spoofing we could, well, spoof ☺ source IP address
4. We would use original (clients) IP address

IP Spoofing in Forward Mode



Without redirection, the packets go straight back to the client!

Headers for Identification

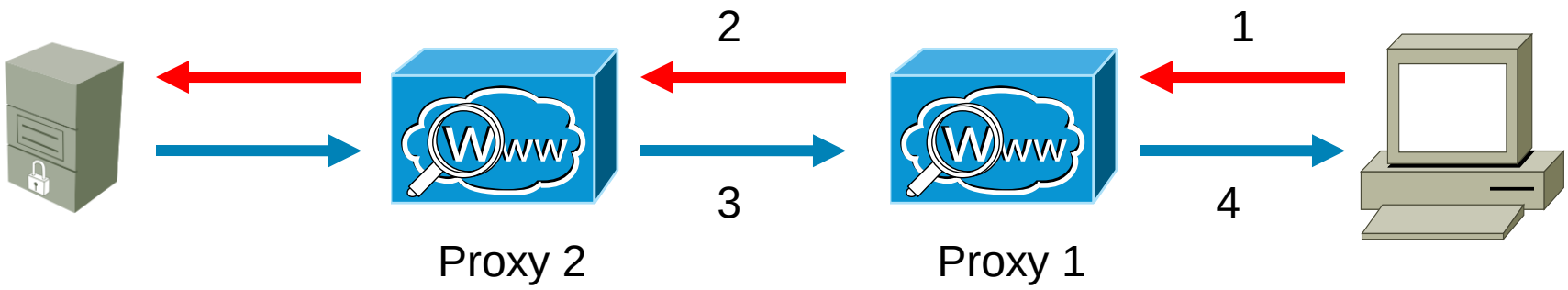
1. XFF (not sent by default)

   X-Forwarded-For: client1, proxy1, proxy2

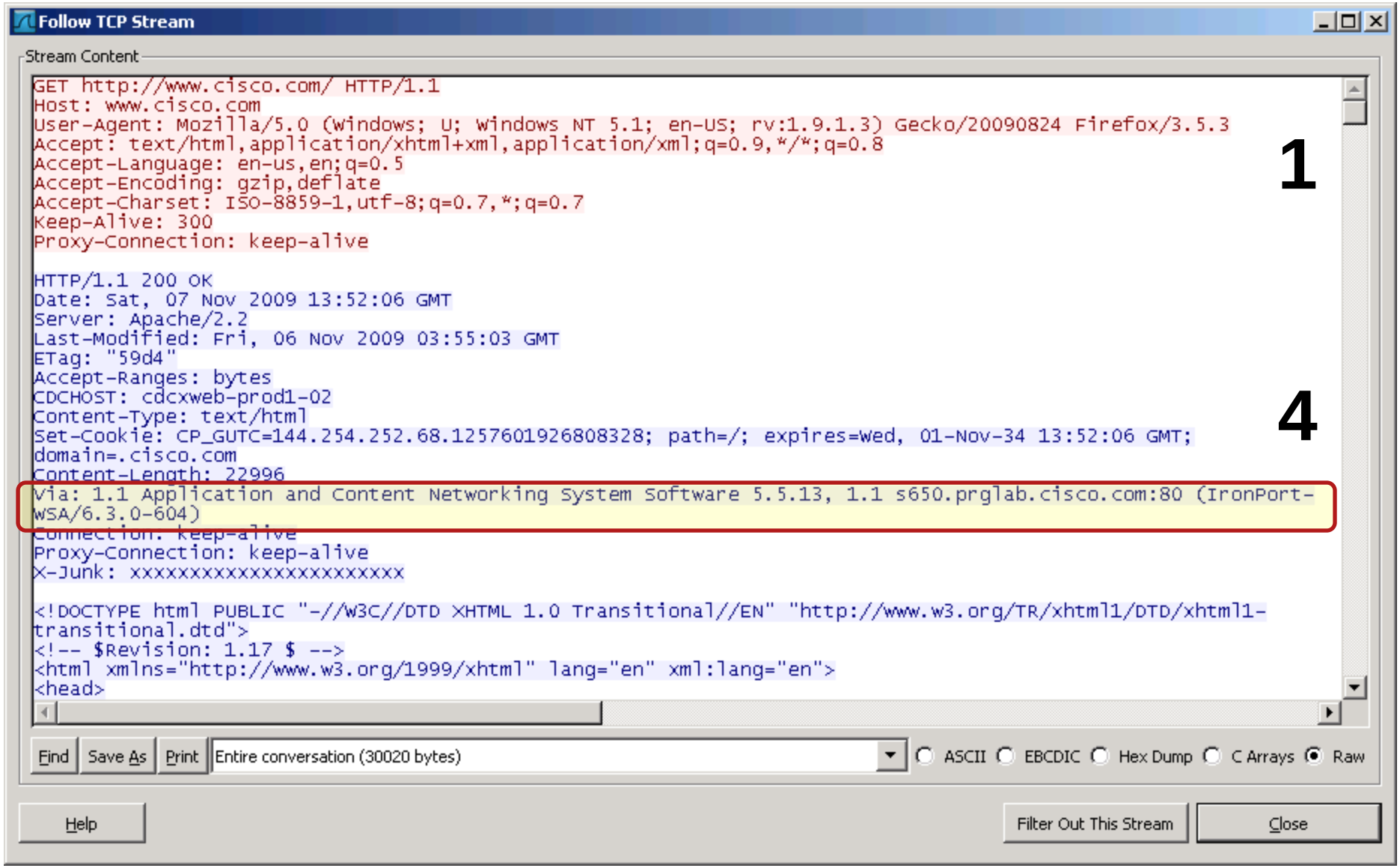
2. Via (sent by default)

   Used for identification of gateway or proxy server

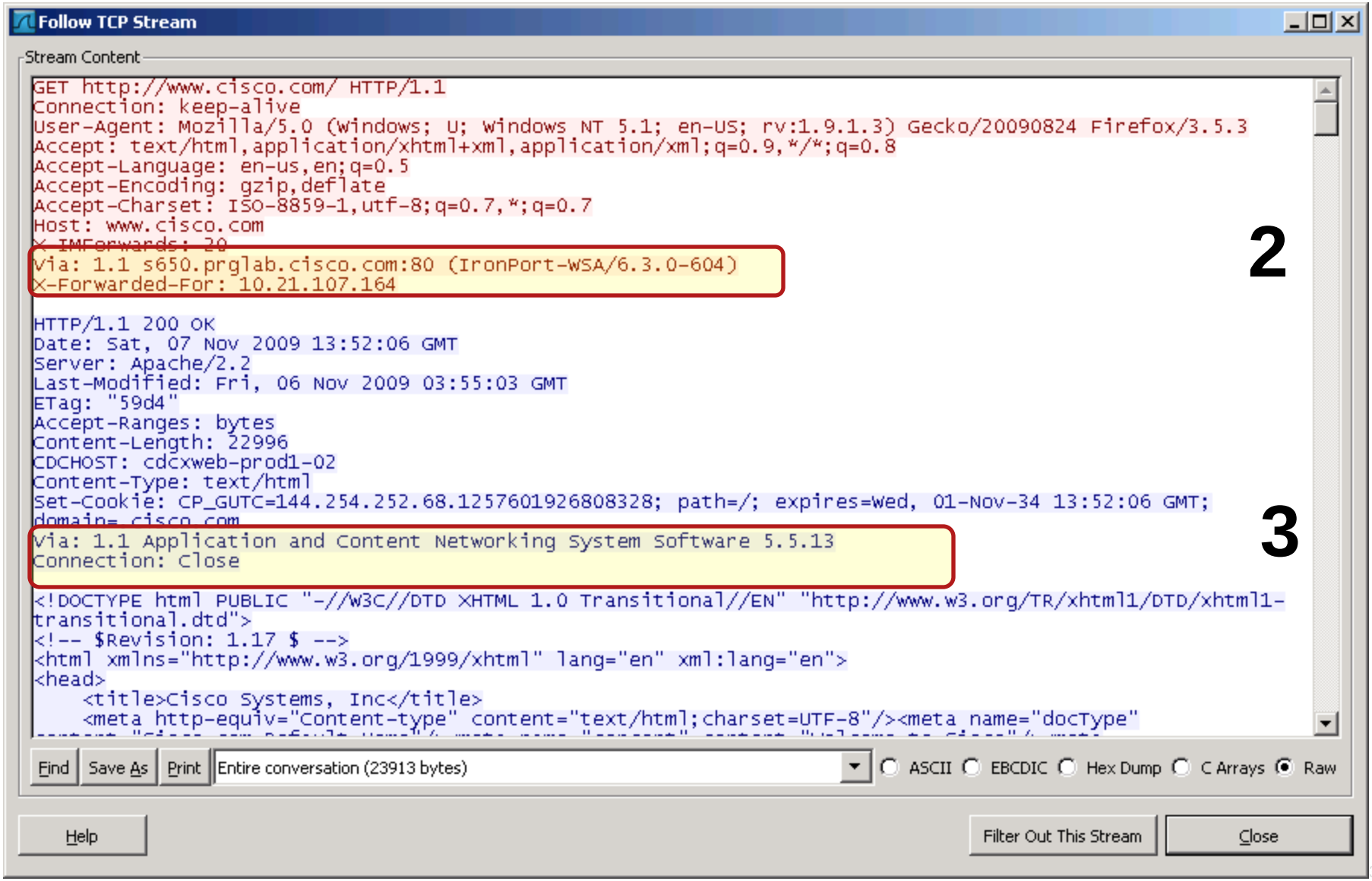
   VIA: http protocol-version, host



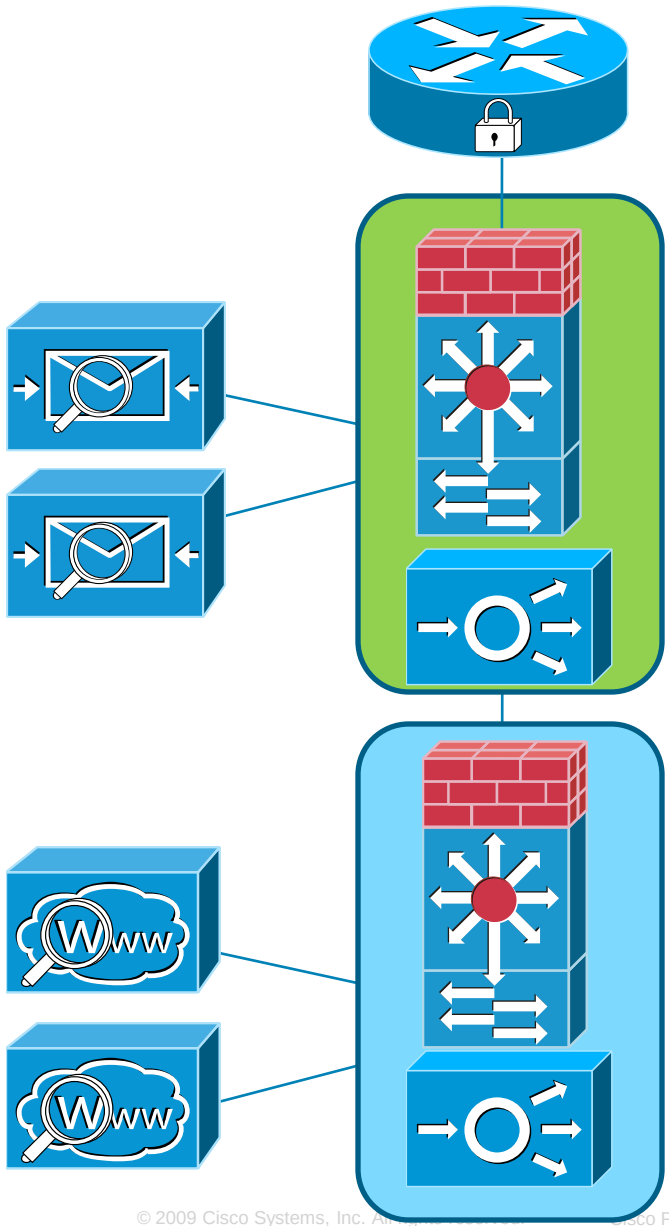
From Client & To Client (request, answer)



From Proxy & To Proxy (request, answer)

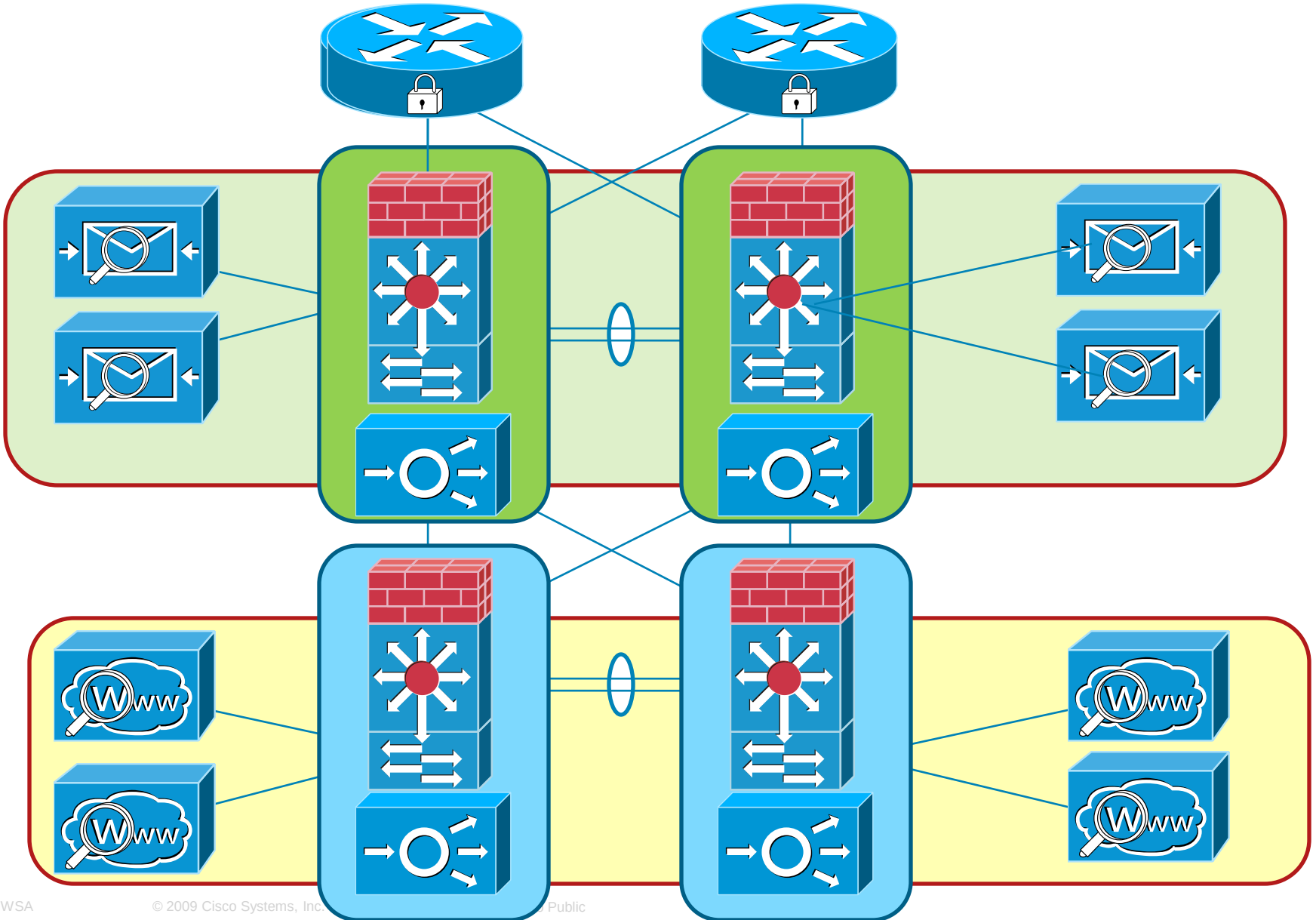


ACE Loadbalancing Example



1. Using VIP (virtual IP address) for WSA cluster
2. ACE would provide HA and loadbalancing for both ESA and WSA
3. Could (and does) work for both transparent and explicit deployment
4. Using “IP Spoofing” gives us a option to identify traffic later in “green zone”

ACE Loadbalancing Bigger Picture



Cisco Web Usage Controls

Customer Problem

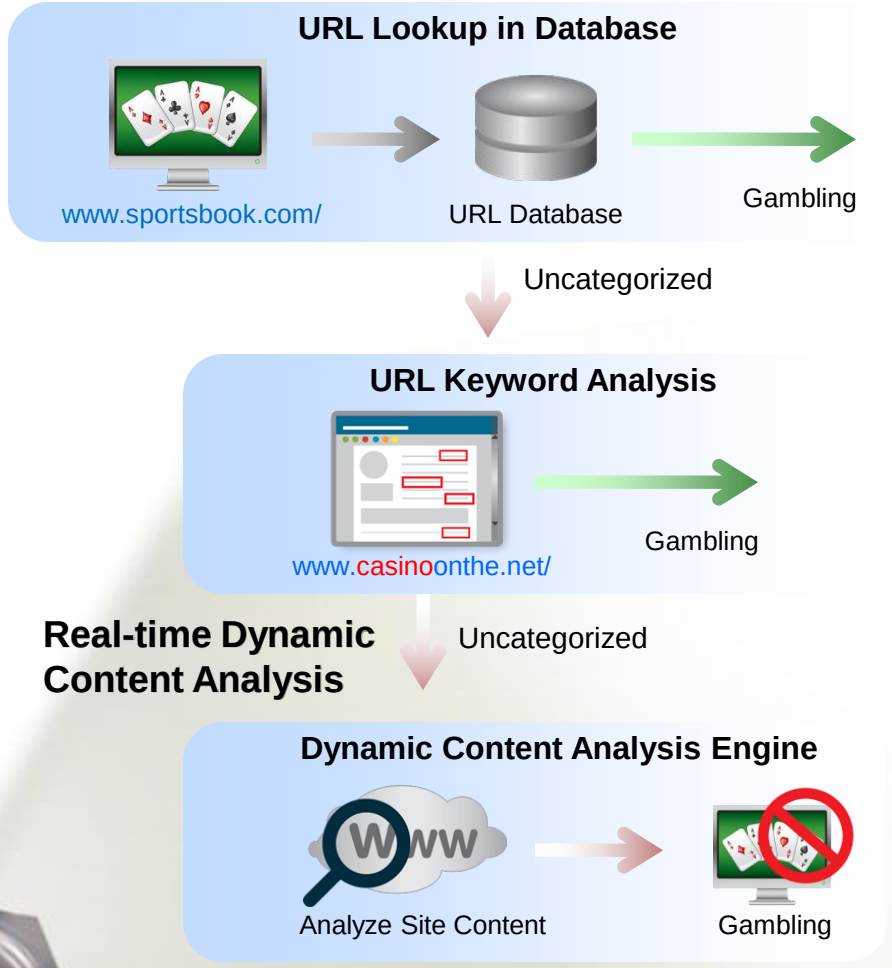
The Dark Web

80% of the web is uncategorized, highly dynamic or unreachable

- *Dynamic content*
- *Password protected sites*
- *User generated content*
- *Short life sites*

Introducing Cisco IronPort Web Usage Controls

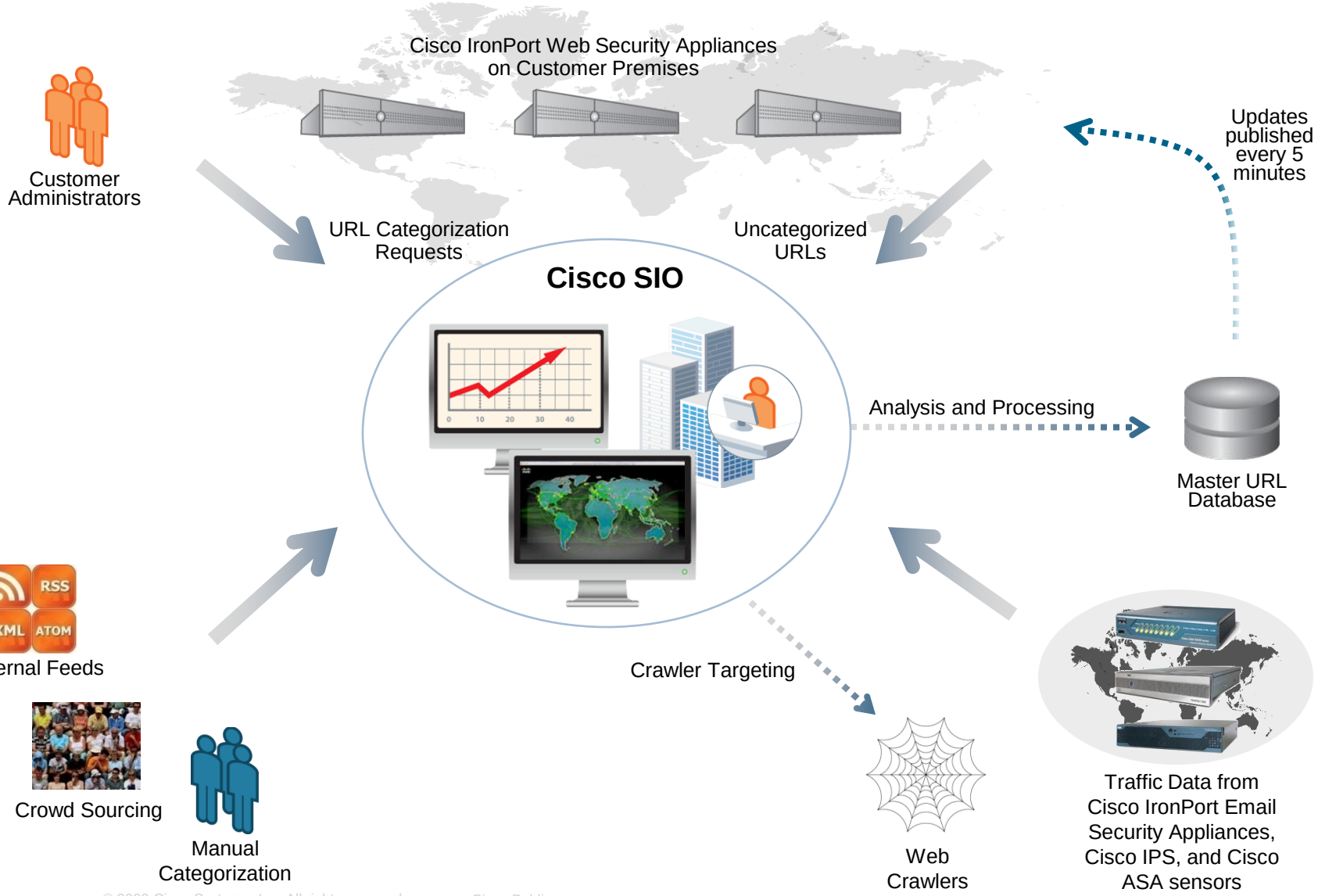
A Spotlight for the Dark Web



1. Industry-leading URL database efficacy
   - 65 categories
   - Updated every 5 minutes
   - Powered by Cisco SIO
2. Real-time Dynamic Content Analysis Engine accurately identifies over 90% of Dark Web content in commonly blocked categories

Cisco Security Intelligence Operations (SIO)

Unmatched Visibility Drives Unparalleled Efficacy



Agenda

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Registrujte se za Cisco Networkers
25-28. januar 2010. Barselona
28-31. mart 2010. Bahrein