

CSS 11000 Series:

Device Configuration LAB

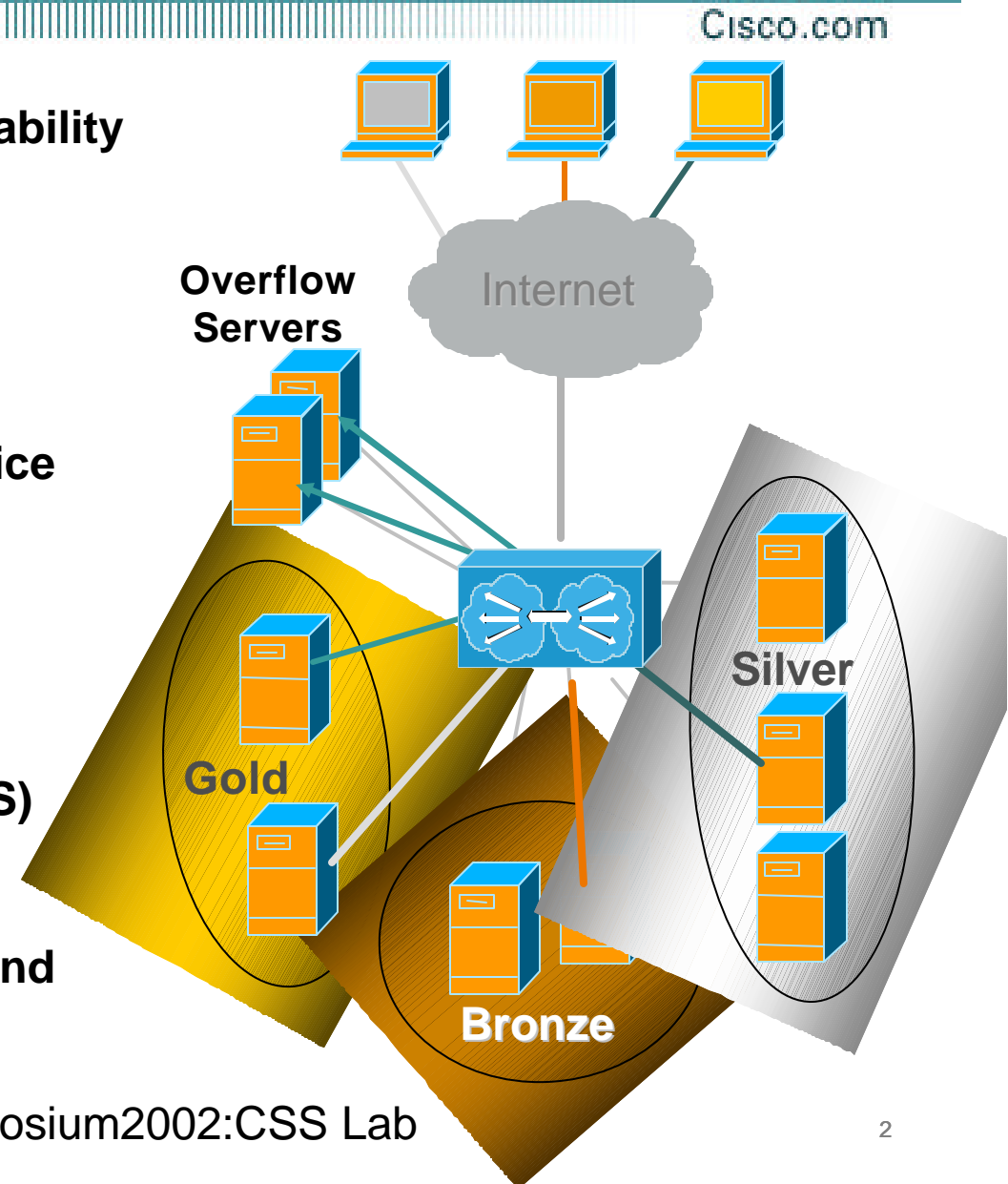
**Nick Di Pietro
Ian Gallagher
Bill Kastelic**

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Josh Kaya**

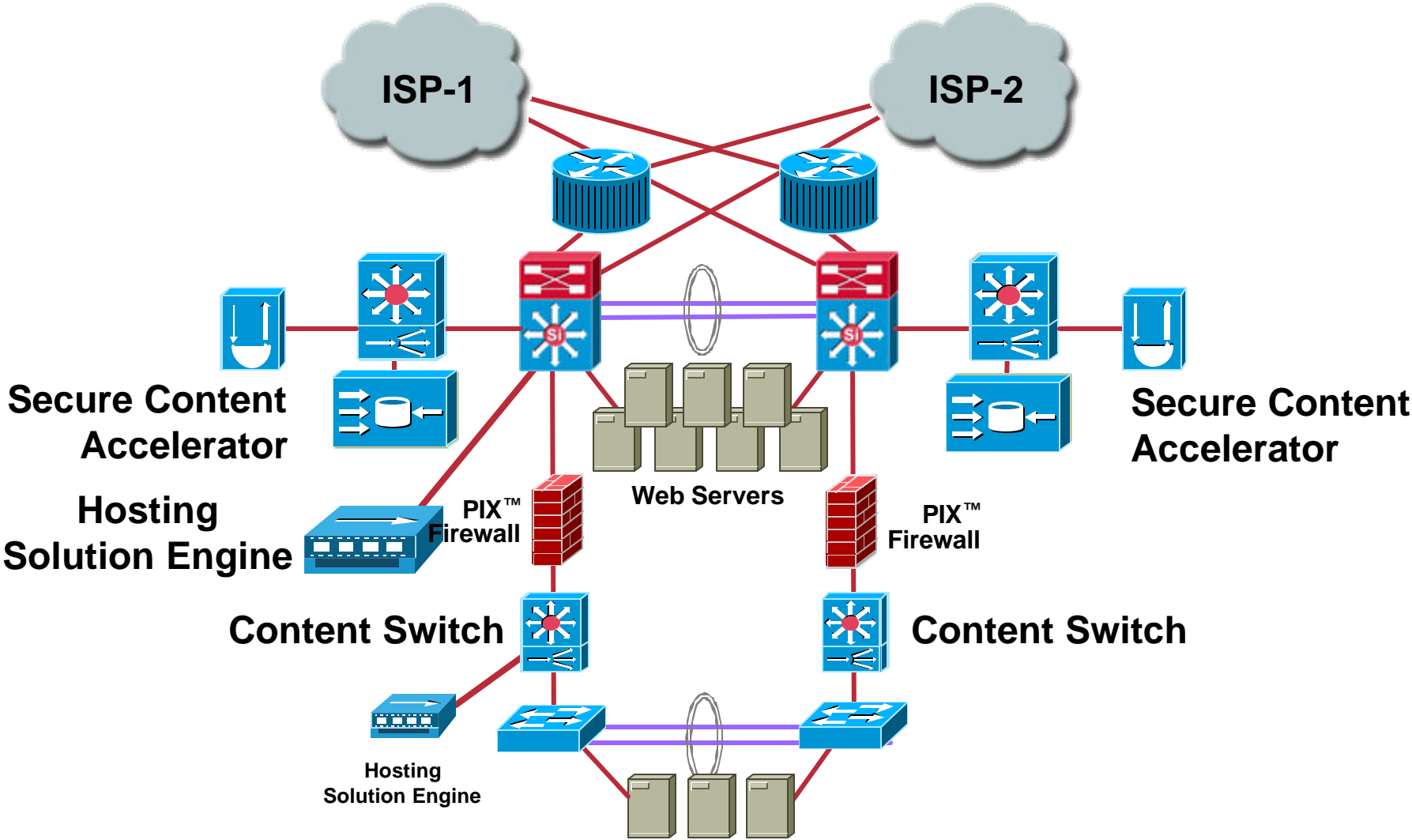
Cisco Content Switching

Applications

- **Local Load Balancing**
= improved utilization and availability (servers, Firewalls, caches)
- **User Prioritization**
= switch and stick by cookie (Silver, Gold, Platinum)
- **Client Device Discrimination**
= switch and stick by client device (PC, PDA, wireless)
- **Intelligent Content Positioning**
= switch by file type (.html, .gif, .cgi)
- **Security Optimization**
= all of the above in SSL (HTTPS) environment
- **Global Server Load Balancing**
= pick best site based on load and proximity (Tokyo, Paris, New York)



Data Center Load Balancing For Internet and Intranet



CSS11500 Management Options

Cisco.com

- CLI
- Embedded device management GUI
- CiscoWorks 2000
CiscoView
- Hosting services engine
- SNMP, RMON, log files
- Programmatic management API

Cisco Systems Content Smart Web Switch Management - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://161.44.233.190:8081/index.html>

CISCO SYSTEMS

Content Services Switch Management

To activate, suspend, modify or delete an existing **Content Rule**, select the name of the content rule from the Content Rule Name field in the Select Content Rule Name table and press the Activate, Suspend, Modify or Delete button.

If no content rules are defined, a message will be displayed letting the user know they may only add a new content rule.

Select Content Rule

Select Owner Name - Content Rule

Activate Suspend Modify Delete

To add a new **Content Rule**, you must select the name of the owner of the content and then enter a unique name for the content rule.

The content rule name must be unique and may be from 1 to 31 characters in length.

Once you have selected an owner and entered a new content rule name, press the Add button to continue entering information for the content rule.

Enter New Content Rule

Select Owner Name Content Rule Name

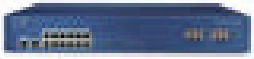



Add Cancel Help

Press Activate to activate this content rule

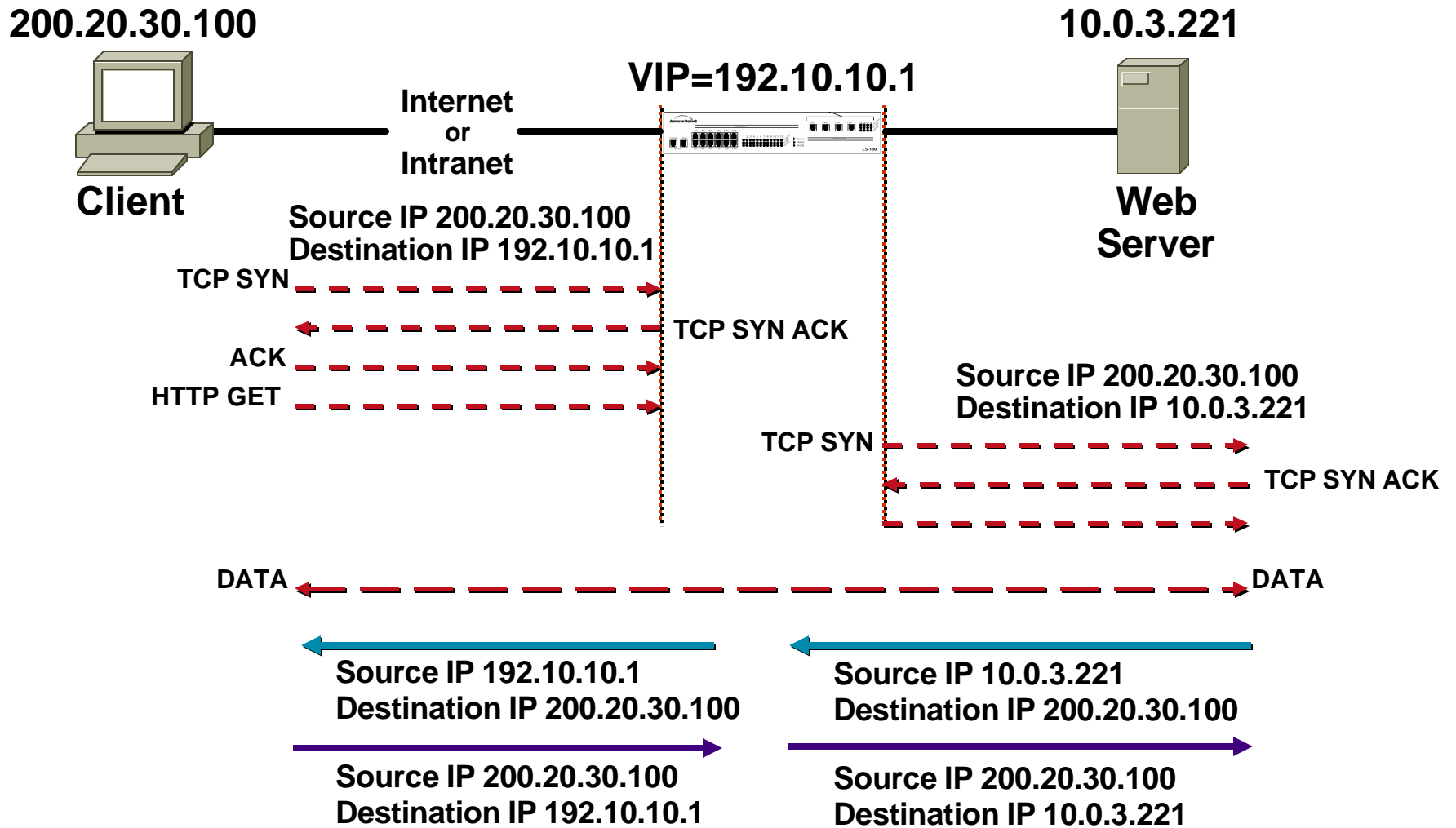
Start | Meeting ... | Cisco S... | 5.0 GUI ... | RE: 5.0 ... | Mentor ... | 1:06 PM

Cisco Content Switching Product Line

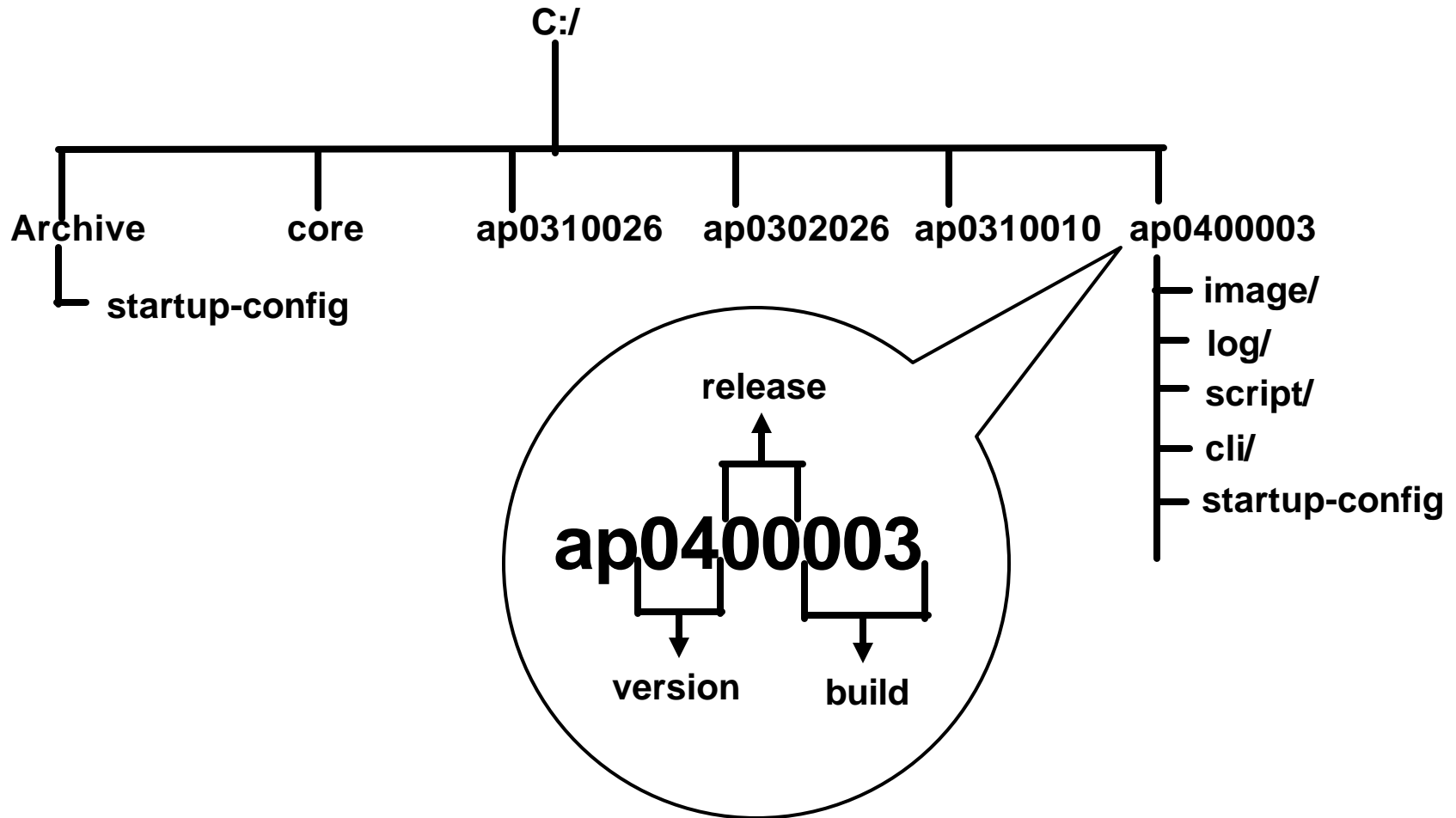
Cisco.com

Decision Points	CSS 11050 	CSS 11503 	CSS 11506 	CSM for Catalyst® 6500 
Form factor	Standalone Appliance	Standalone Modular	Standalone Modular	Integrated Module
Max density	1 GE, 8 FE	6 GE/2 GE,32 FE	12 GE/ 2 GE,80 FE	8-178 GE, 46-528 FE
Site activity/intensity	Low	Medium	High	Highest
Hardware scalability	★	★★★	★★★	★★★★
Hardware redundancy	No	No	Yes	Yes
Session redundancy	Future	Yes	Yes	Yes
Layer 2/3 networking	★	★	★	★★★★
CS management	★★★★	★★★★	★★★★	★★★
SSL acceleration	External	Internal	Internal	Future Blade
Load balancing	Servers, Caches, Firewalls			Servers, Caches Firewalls, VPNs

CSS Software Session Spoofing



CSS Software File Structure



Product Features

Server Load Balancing

Content Verification

HTTP Header Load Balancing

Sticky Connections

Support for Web Caching services

Domain Name Services

Network Proximity

HTTP Redirects

NAT Peering

Firewall Load Balancing

Product Features (cont.)

Cisco.com

Smart Content Replication

Replication for dynamically scalable Web sites

Replication for distributing and updating content

Redundancy

Web Site Security

Full command line interface (CLI)

Embedded Device Management

Service Level Agreement support through:

MIB

SNMP

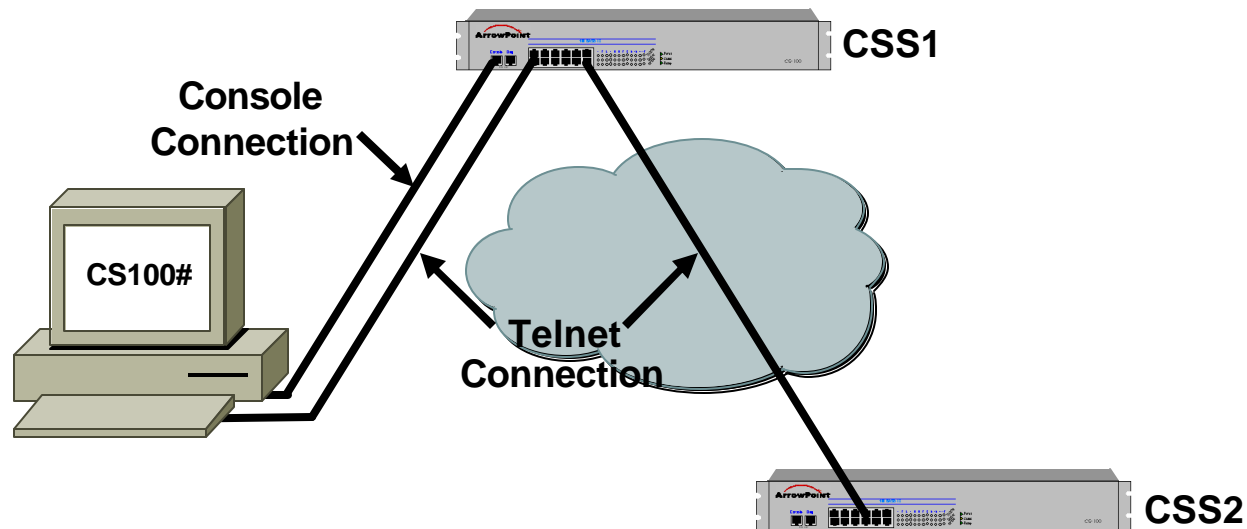
RMON

Logging subsystem

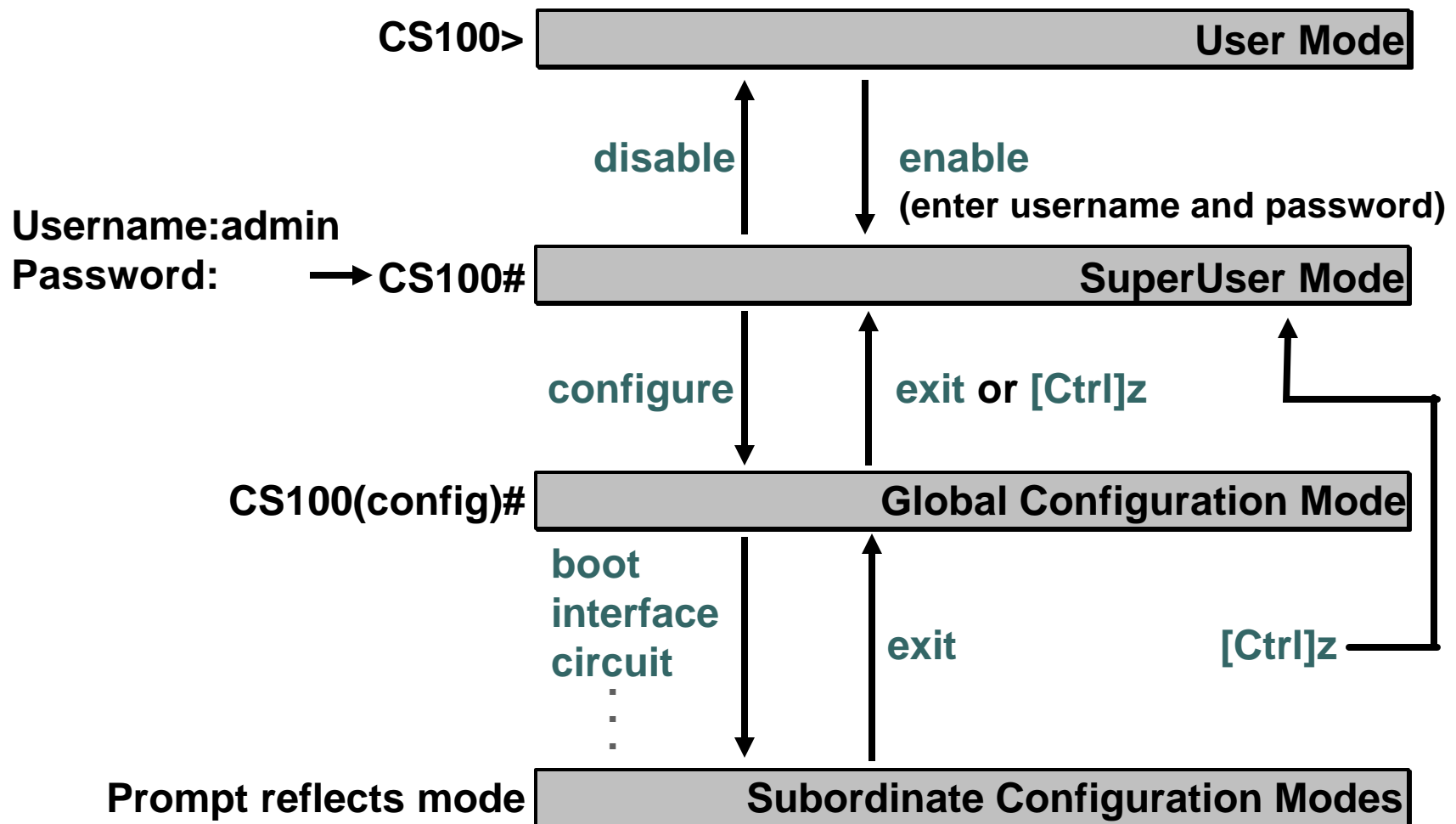
Command Line Interface (CLI)

A line-oriented interface that has a set of commands for configuring, managing, and monitoring the CSS.

Accessed through a local console or Telnet connection



CLI Modes



ICSOC

Cisco.com

Owner

acme.com

content Layer5_rule

vip address 192.1.1.1

service www_server1

service www_server2

balance roundrobin

url “/*”

xyz.com

content Layer3_rule

vip address 192.1.1.2

add service server1

add service server 2

Services

www_server1

ip address 10.1.1.1

keepalive type http

keepalive port 8001

keepalive protocol tcp

keepalive uri “index.html”

www_server2

ip address 10.1.1.2

keepalive type http

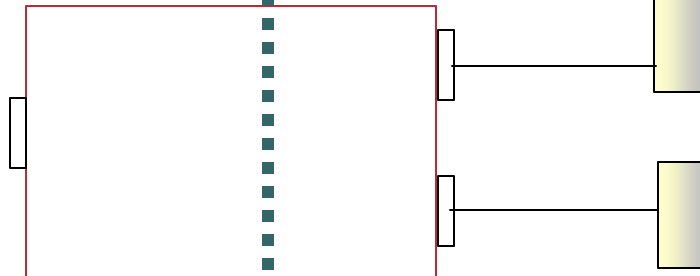
keepalive port 8001

keepalive protocol tcp

keepalive uri “index.html”

- Interfaces
- Circuits
- Services
- Owners
- Content Rules

Interface 1/1
bridge vlan 2

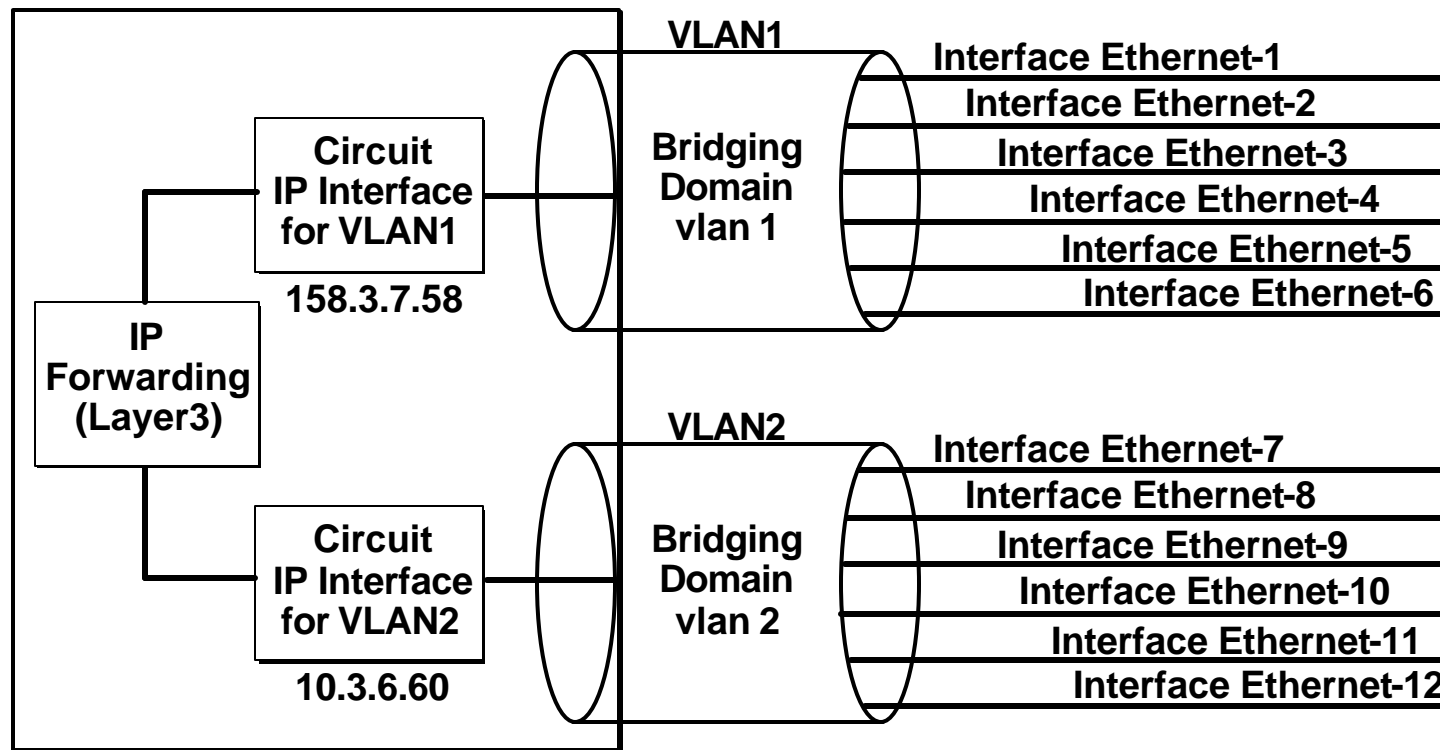


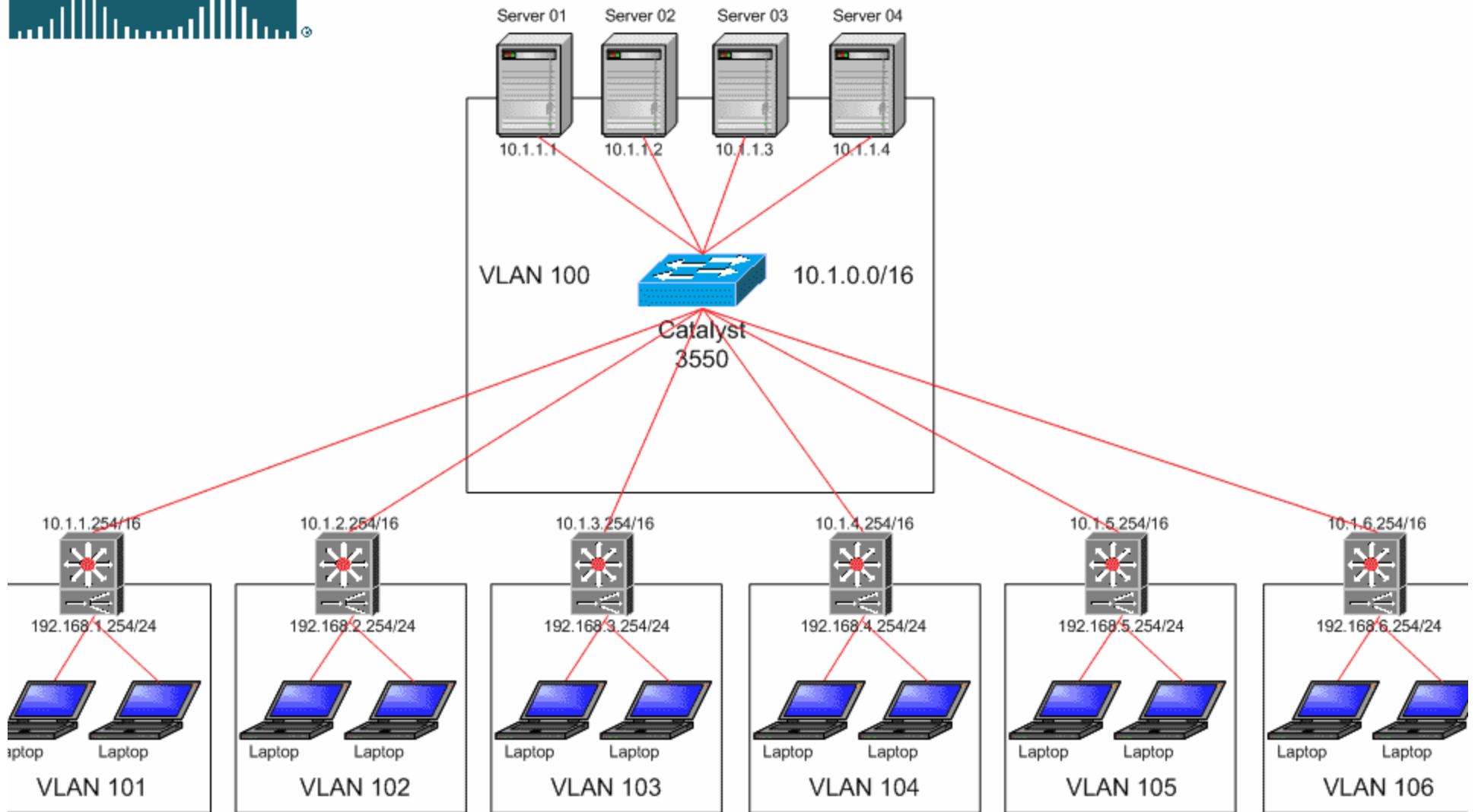
Circuit VLAN2
ip address 192.1.1.254

Circuit VLAN1
ip address 10.1.1.254

- **Interface**
 - **Circuit**
- **Service**
- **Owner**
- **Content**

Interfaces, VLANs, and Circuits





CLI

Lab01-a

- version
 - sh installed-software
 - sh running
 - sh startup
 - copy running startup
 - configure terminal
 - archive
 - restore
- Shutdown
- sh boot-config
- sh profile
- sh alias
- sh chassis
- expert

Interface & Circuit Lab01-b

Cisco.com

```
!***** GLOBAL *****  
  
!***** INTERFACE *****  
interface e1  
  bridge vlan 100  
Interface e5  
  bridge vlan 10P  
Interface e6  
  bridge vlan 10P  
Interface e7  
  bridge vlan 10P  
Interface e8  
  bridge vlan 10P  
  
!***** CIRCUIT *****  
circuit VLAN100  
  ip address 10.1.P.254 255.255.255.0  
circuit VLAN10P  
  ip address 192.168.P.254 255.255.255.
```

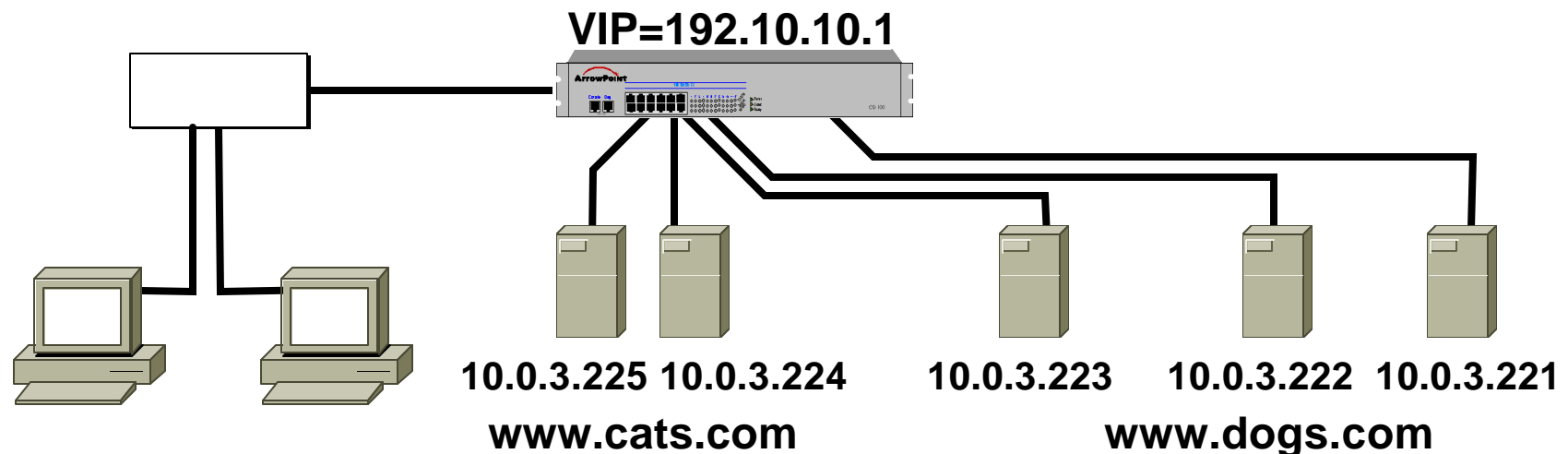
P=POD Number

- sh phy
- sh circuit
- sh ip route
- sh ip config
- sh ip statistics
- sh interface
- sh arp
- ping

- **Interface**
 - **Circuit**
 - **Service**
 - **Owner**
 - **Content**

Service Overview

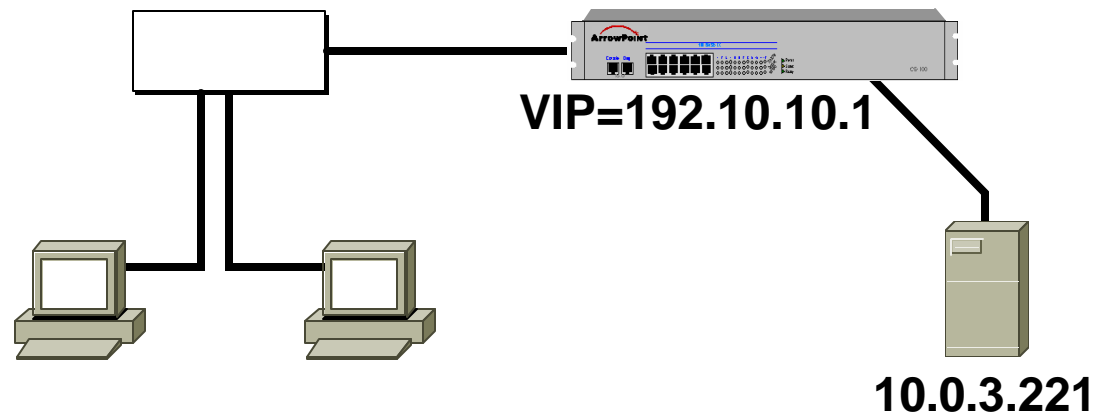
- A service is a destination location where a piece of content resides
- A service is created first and then added to content rules
- The service is identified by a name that can be associated by an IP address, and optionally, a protocol and port number



Service Configuration

Configuring Server1:

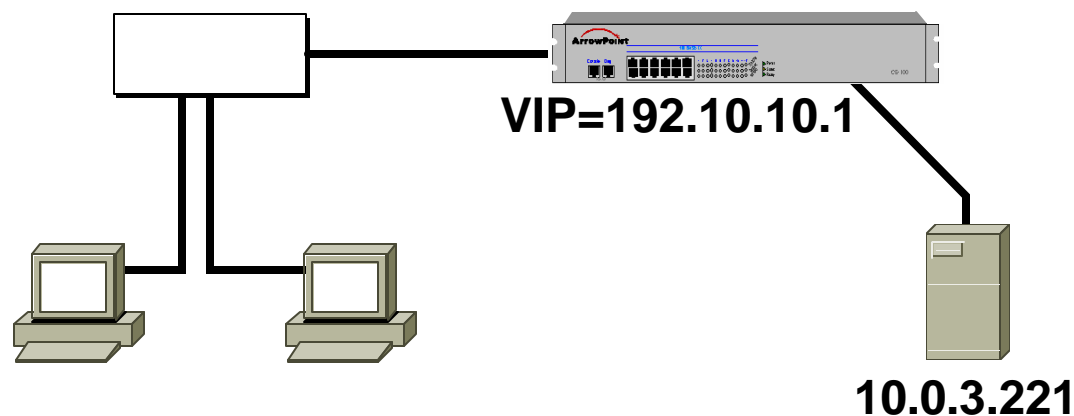
- CS100(config)# service Server1
- CS100(config-service)[Server1]# type local
- CS100(config-service)[Server1]# ip address 10.0.3.221
- CS100(config-service)[Server1]# port 81
- CS100(config-service)[Server1]# protocol tcp
- CS100(config-service)[Server1]# max connections 10
- CS100(config-service)[Server1]# weight 1
- CS100(config-service)[Server1]# active



Service Configuration (cont.)

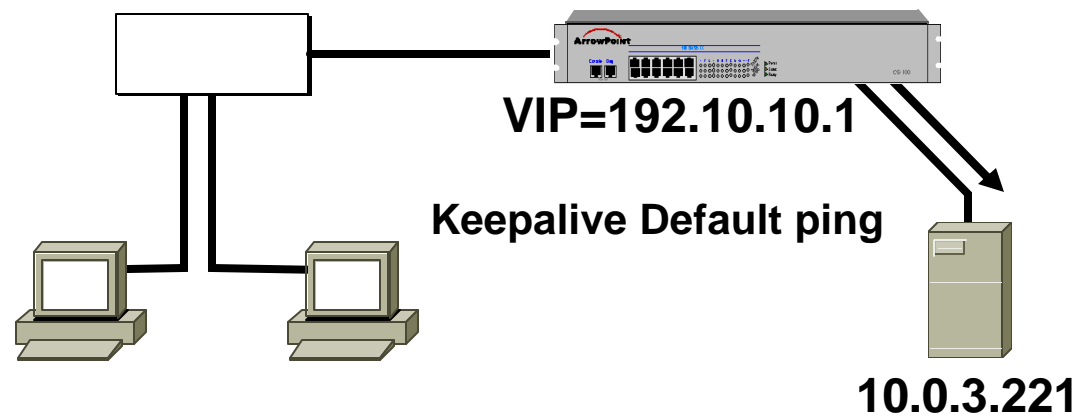
Configuring Server1:

- `CS100(config)# service Server1`
- `CS100(config-service)[Server1]# suspend`
- `CS100(config-service)[Server1]# exit`
- `CS100(config)# no service Server1`



Service Keepalive

- keepalive frequency
- keepalive maxfailure
- keepalive retryperiod
- keepalive port
- keepalive type
- keepalive method
- keepalive uri



Displaying a Service

- The **show service** command enables you to display information for a specific service or all services currently configured.
- The **show service-summary** command displays just summary information for each service.
- The **show service** command displays the following information:

CS100# show service

Name: Server1 Index: 0 State: ALIVE

Type: Local

Rule (10.0.3.210 TCP 81)

Keepalive: (HEAD:HTTP:/index.html 5 3 5)

State Transitions: 1

Connections: 0 Max Connections: 0

Weight: 1 Avg Load: 254 Long Load: 0

Mtu 1500 QOS Avg Min Rate: 14400 QOS Min BW: 100000000

Service Lab

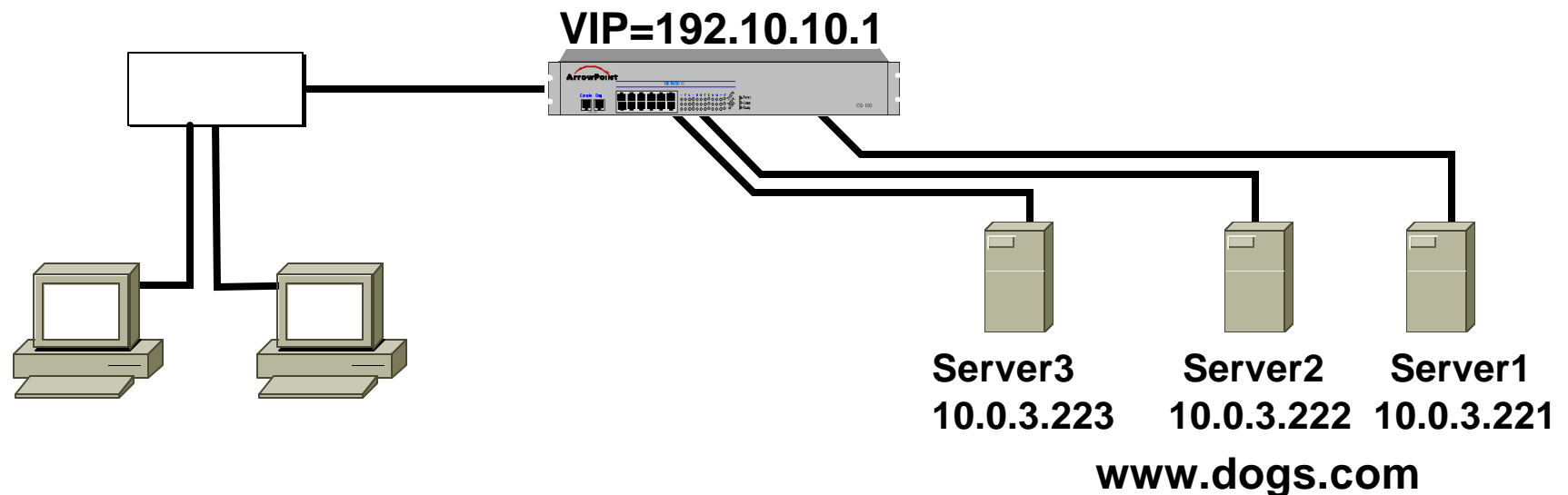
Lab02-Section 1

- sh service
- sh service summary
- sh keepalive
- sh keepalive-summary
- monitor "show service summary"

- **Interface**
 - **Circuit**
 - **Service**
 - **Owner**
 - **Content**

Owner Overview

- Owner = www.cisco.com
- The Owner allows for partitioning of content rules
- Content Rules are always configured under an Owner
- Can specify Owner case sensitivity
- Can specify Owner Address, Billing Information, and Email Address



Owner Configuration

- When creating an owner, you may want to use the owner's DNS name for clarity:

```
CS100(config)# owner cisco.com
```

A service type local designates the service for local load balancing. Other options are proxy-cache, transparent-cache, and redirect.

When you create the owner, the CLI drops you into owner mode:
CS100(config-owner[cisco.com])#

Displaying an Owner

- **The show owner command enables you to display information for a specific owner or all services currently configured.**
- **The show owner command displays the following information:**

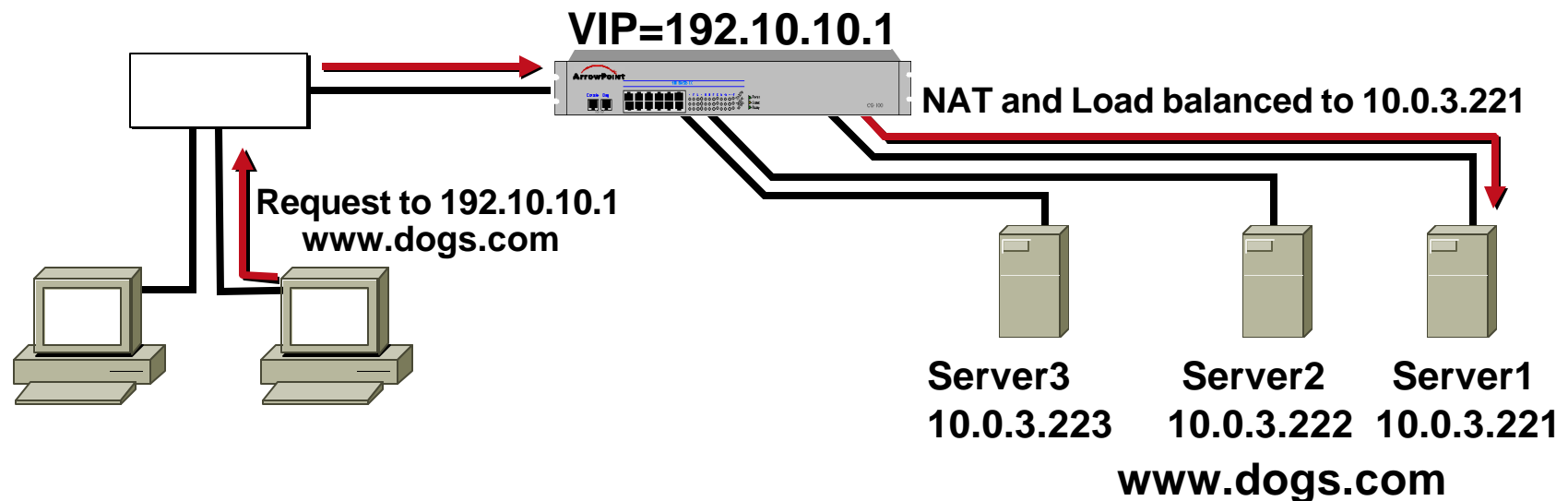
CS100# show owner cisco.com

Owner Configuration:

Name : cisco.com
Billing Info: finance
Address: 235 Littleton Rd. Westford, MA 01886
Email Address: support@cisco.com
DNS Policy: none
Case Matching: insensitive

Content Rule Overview

- Describes what content is accessible by visitors to the web site
- Describes how content is mirrored and load balanced to multiple services
- Translates the Owner VIP address using Network Address Translation (NAT) to the service's IP address and port
- Checks for available services that match the content request



Content Rule Overview

- **An content rule is a hierarchical rule set containing individual rules that describe which content is accessible by visitors to the web site, how the content is mirrored, on which server the content resides, and how the CSS should process requests for the content.**
- **When a request for content is made, the CSS:**
 - Uses the owner content rule to translate the owner Virtual IP Address (VIP) using Network Address Translation to the corresponding service IP address and port.**
 - Checks for available services that match the content request.**
 - Uses the content rule to choose which service can best process the request for content.**
 - Applies all content rules to service the request for content (for example, load balancing method, redirects, failover, sticky, cookies)**

Creating Content Rules

- **The CSS uses content rules to determine:**
 - Where the content physically resides, whether local or remote.**
 - Where to direct the request for content (which service or services).**
 - Which load balancing method to use.**
- **The types of content rule are as follows:**
 - A layer 3 content rule implies source IP address of the host or network.**
 - A layer 4 content rule implies a combination of source IP address and port.**
 - A layer 5 content rule implies a combination of source IP address, port, and URL that may contain an HTTP cookie.**

Assigning Content Rules

- To assign a content rule to an owner, use the `content` command. You assign content rules to an owner by creating the content rule in the mode for that owner.
- The following example creates a content rule named *layer3* and assigns it to the owner *cisco.com*:

```
CS100(config-owner[cisco.com])# content layer3
```

- Once you assign a content rule to an owner, the CLI prompt changes to reflect the specific owner and content rule mode:

```
CS100(config-owner[cisco.com-layer3])#
```

From here, the content rule can be entered.

- To remove an existing content rule from an owner, issue the `no content` command from owner mode:

```
CS100{config-owner[cisco.com]}# no content layer3
```


Basic Content Rule Config

- To configure a Layer 3 content rule, enter the following from the owner mode:

```
(config-owner[cisco.com-layer3]# vip address 192.168.11.5
```

Configure a Virtual IP address for the owner content.

```
(config-owner[cisco.com-layer3]# balance aca
```

Specify a load balancing type

```
(config-owner[cisco.com-layer3]# add service serv1
```

```
(config-owner[cisco.com-layer3]# add service serv2
```

Add previously configured services to the content rule.

```
(config-owner[cisco.com-layer3]# active
```

Activates the content rule.

- This rule load balances based on **VIP only**.
- Only traffic destined for VIP address will get load balanced.

Owner and Content Rule

Lab02 Section 2,3 and 4

- **sh service**
- **sh service summary**
- **sh rule**
- **sh rule-summary**
- **sh summary**
- **monitor “show summary”**

Server Load Balancing

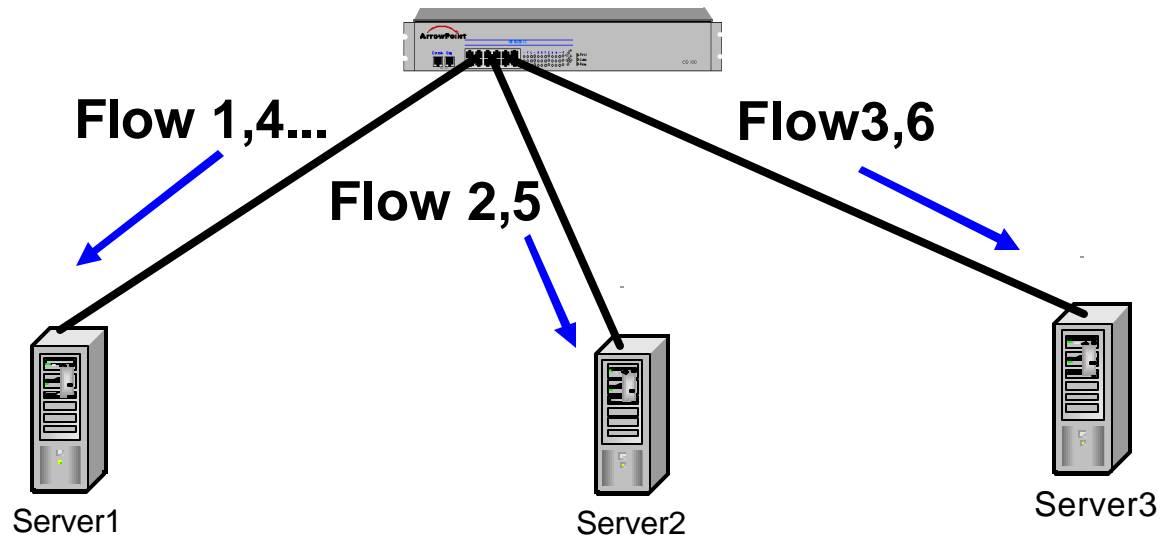
- To specify the load balancing algorithm for a content rule, use the **balance** command available in content configuration mode:
 - balance aca** - ArrowPoint Content Awareness algorithm. The CSS uses the normalized response time from client to server to determine the load on each service. ACA balances the traffic over the services based on load.
 - balance roundrobin** - Round-robin algorithm (**default**)
 - balance weightedrr** - Weighted round-robin load balancing. The CSS uses round-robin but weighs some services more heavily than others. You can configure the weight of a service when you add it to this rule.
 - balance leastconn** - Least connections load balancing. The CSS chooses a running service that has the least number of connections.

General Purpose Load Balancing Algorithms

Cisco.com

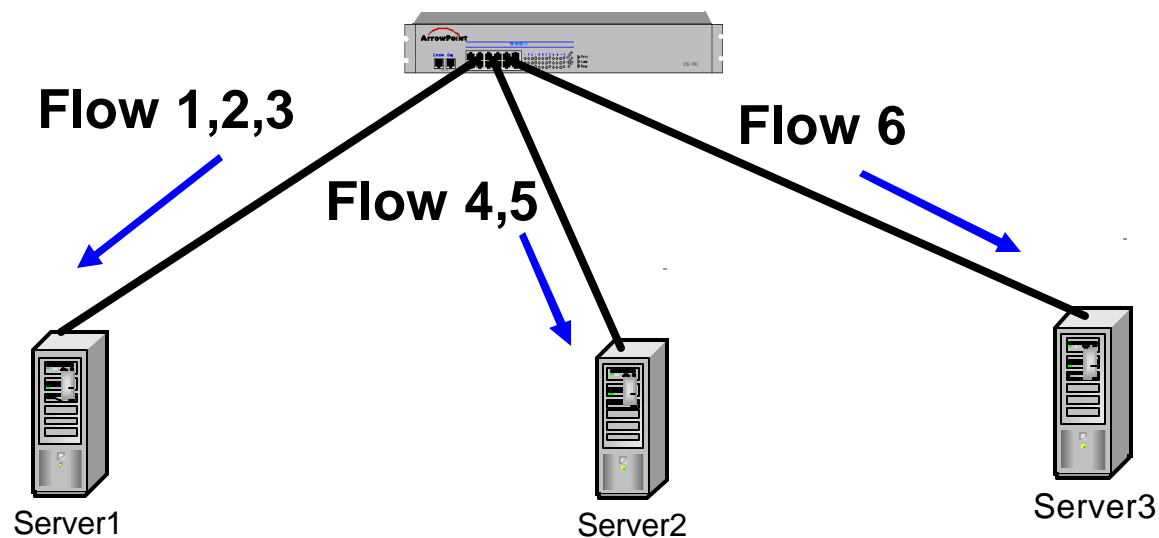
- **Round Robin**
- **Weighted Round Robin**
- **Least Connections**
- **ACA**
- **Weighted ACA**

Round Robin



```
content rule1
vip address 192.10.10.1
balance roundrobin
add service server1
add service server2
add service server3
active
```

Weighted Round Robin



```
content rule1
vip address 192.10.10.1
balance weightedrr
add service server1 weight 3
add service server2 weight 2
add service server3 weight 1
```

Least Connections

Services:

Name: serv1 Index: 0 State: ALIVE
Type: Local
Rule (10.0.3.210 TCP 80)
Keepalive: (ICMP 5 3 5)
State Transitions: 0
Connections: 2 Max Connections: 0

Name: serv2 Index: 1 State: ALIVE
Type: Local
Rule (10.0.3.211 TCP 80)
Keepalive: (ICMP 5 3 5)
State Transitions: 0
Connections: 0 Max Connections: 0

Content Smart Switch keeps track of current connections to servers and serves requests to server with the least number of connections

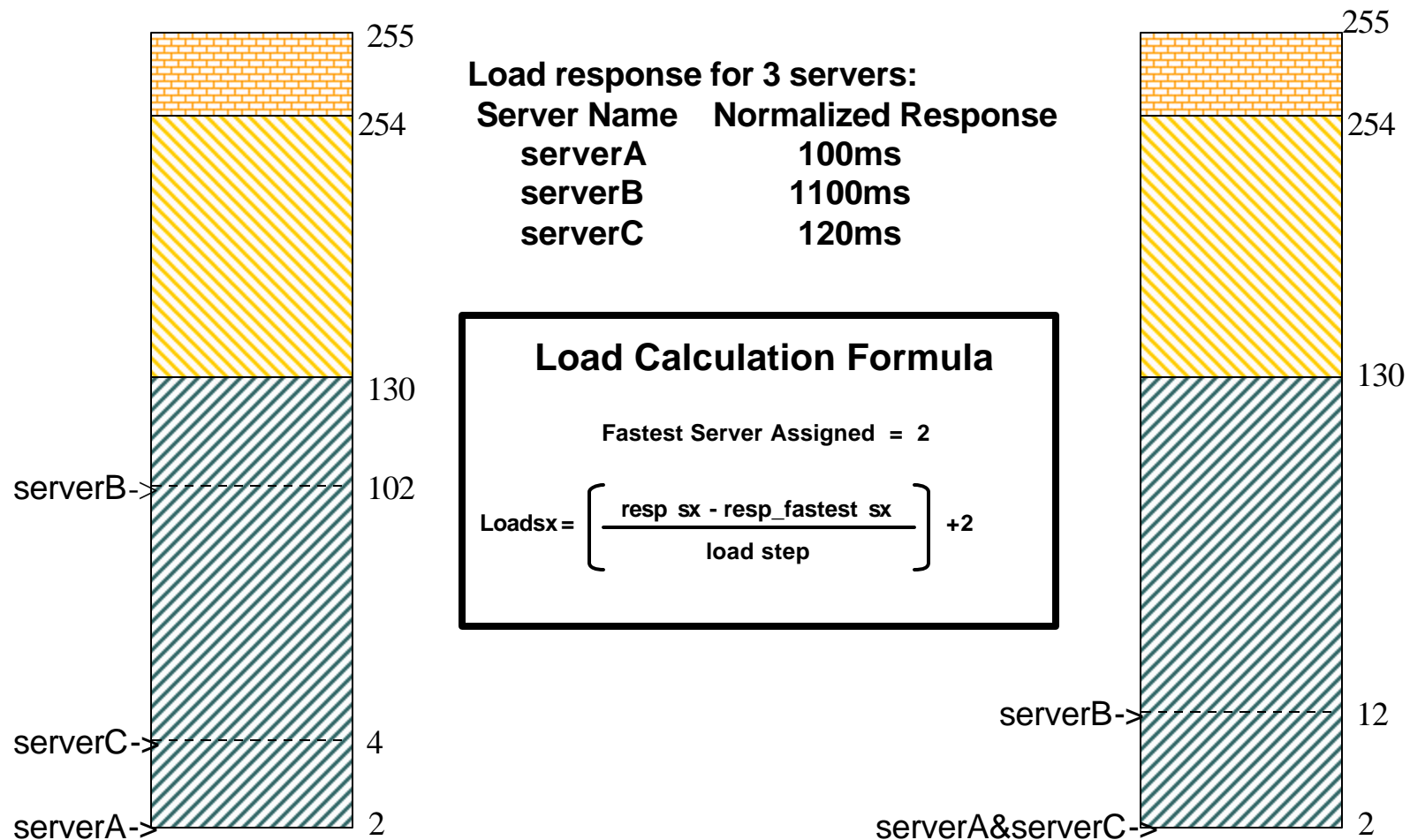
ACA Load Balancing

- Arrowpoint Content Awareness algorithm
- Load balances servers based on normalized flow attributes **calculated at flow tear down time**
- Manages dynamic unpredictable server load and performance
- Periodically calculates server load and dynamically balances more flows to fastest servers
- Prunes slow servers from eligible list

ACA Parameters

- **Load step *msec* dynamic - (10msec default) dynamic or static**
- **Load threshold - (254 default) is the maximum Load Number for service eligibility**
- **Load reporting - enable or disable**
- **Load teardown-timer seconds - (20 seconds default)**
- **Load ageout-timer seconds - (60 seconds default) Interval to bring back removed services. Resets load to 2.**

ACA Load Calculation



Loads with load step-size equal to 10ms.

Load with load step size equal to 100ms

Show Load

```
CS100(config)# show load
Global load information:
```

```
Step Size:Dynamic Configured:10 Actual:10
Threshold:254 Ageout timer:60
```

```
Service load information:
```

Service Name	Load Number for Short Lived Flows	Load Number for Long Lived Flows
serv1	2	2
serv2	2	2
serv3	10	12
serv4	254	254

Configuring Basic L7 Server Load Balancing

Lab03

Cisco.com

- **sh service**
- **sh service summary**
- **sh rule**
- **sh rule-summary**
- **sh summary**
- **monitor “show summary”**

CISCO SYSTEMS

