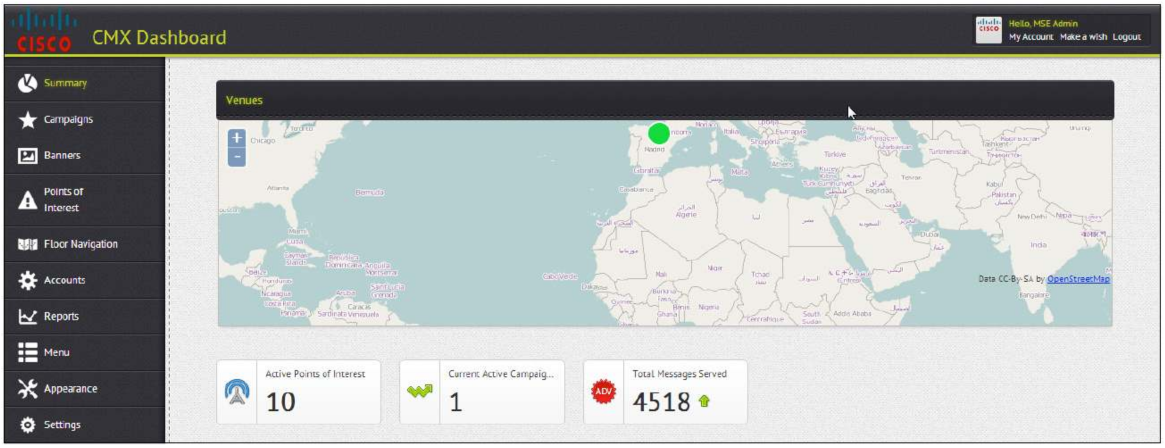
Cisco Connected Mobile Experiences (CMX)

Browser Engage Deployment Guide

Cisco Mobility Services Engine Software Release 7.5



Active Points of Interest 10

Current Active Campaig... 1

Total Messages Served 4518

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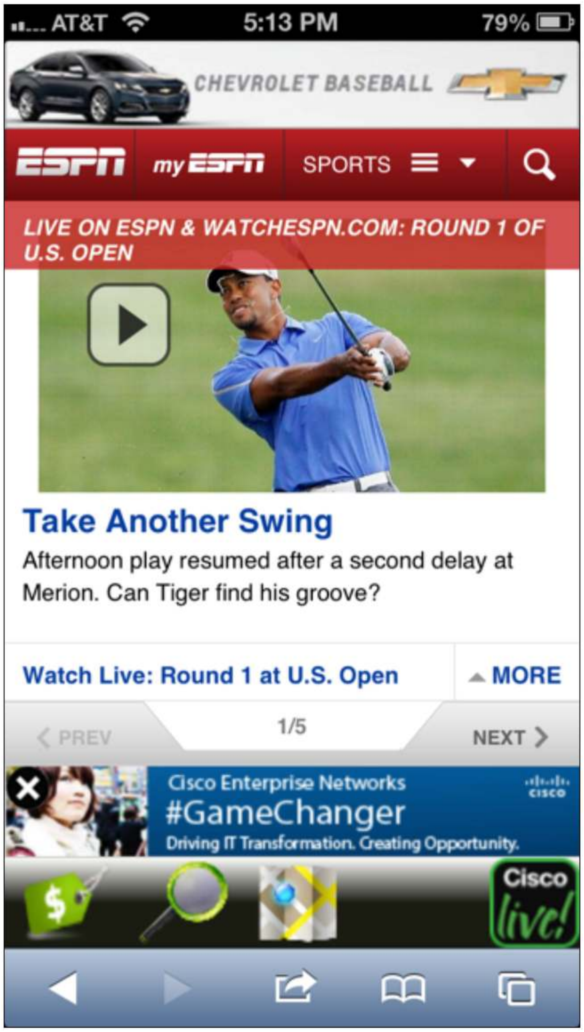
Cisco Connected Mobile Experience Browser Engage Overview

Cisco® Connected Mobile Experience (CMX) Browser Engage enables enterprises to use their offered network access (usually wireless) as a strategic revenue-generating tool. It enables the enterprise to place a context-relevant banner on the web browsers of endusers' wireless or wired devices while they are visiting an HTTP webpage.

Enterprises can use this web banner insertion to interact with their customers and provide them with services, guidance, and offers (Figure 1). This solution both provides a better experience for endusers (who can now easily find relevant information about the services around them, including locations and maps) and enables enterprises to monetize the web banner through the use of relevant advertisements and collect valuable analytical data about their customers' surfing behavior while on the enterprise network.

Figure 1. Enterprises Can Use Web Banners to Interact with Customers



AT&T
5:13 PM
79%
CHEVROLET BASEBALL
ESPN
my ESPN
SPORTS
LIVE ON ESPN & WATCHESPN.COM: ROUND 1 OF U.S. OPEN

Take Another Swing

Afternoon play resumed after a second delay at Merion. Can Tiger find his groove?

Watch Live: Round 1 at U.S. Open
MORE
PREV
1/5
NEXT
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#GameChanger
Driving IT Transformation. Creating Opportunity.
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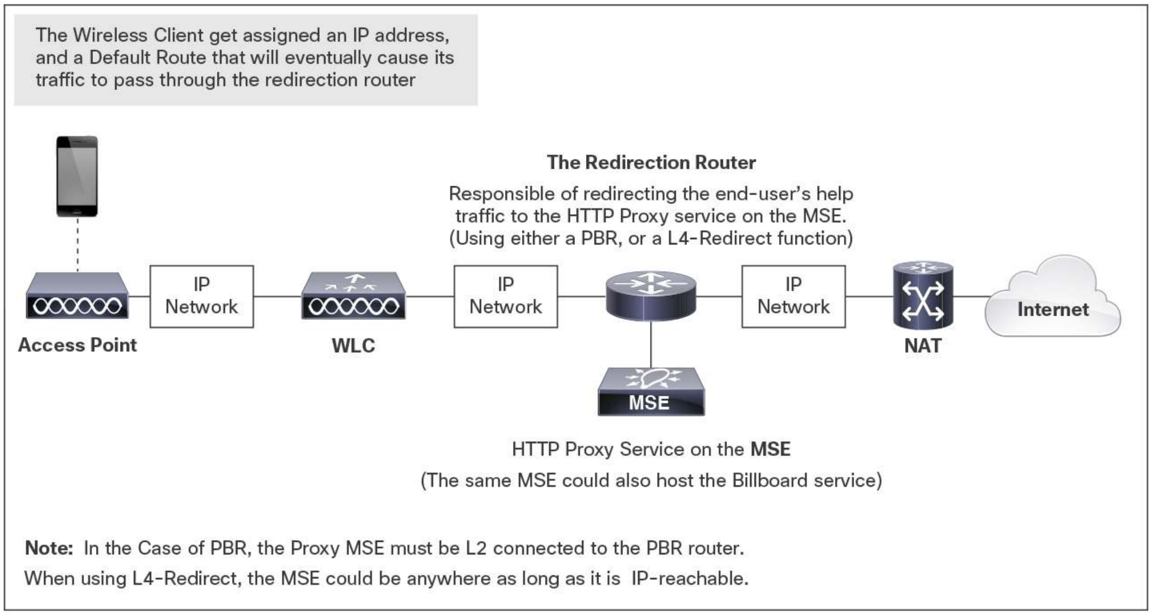
Starting with Cisco Mobility Services Engine (MSE) Software Release 7.5, CMX Browser Engage will be available as a service on Cisco MSE. CMX Browser Engage is licensed as an advanced location service. Thus, in addition to Context Aware Service (CAS), Wireless Intrusion Prevention System (wIPS), Mobile Concierge, and Location Analytics Service, CMX Browser Engage and the accompanying HTTP Proxy Service will be available as a new service.

CMX Browser Engage is the business user interface to the back-end configuration system for advertisement intelligence and information. It consists of two components:

- Cisco CMX dashboard: The dashboard resides on Cisco MSE and is used to manage Cisco CMX campaigns. It should be run on a separate Cisco MSE (if using a low-end Cisco 3355 MSE or a standard Cisco MSE Virtual Appliance [VMSE]) or on ahigh-end Cisco MSE with other services. For best performance, you should host the Cisco CMX dashboard on a separate Cisco MSE.
- HTTP Proxy Service: The HTTP Proxy Service can reside on either Cisco MSE (for a central switched environment; the low-end Cisco 3355 MSE and the standard Cisco VMSE are supported) or a Cisco Integrated Services Router Generation 2 (ISRG2) running a Cisco UCS® E-Series Server (for Cisco Flex local deployments). A high-end Cisco VMSE cannot be used for Cisco MSE HTTP Proxy Service. HTTP Proxy Service is the proxy service that receives the redirected end-user HTTP requests, terminating the TCP stack and inserting the banners and additional Java script in the returning HTTP page.

In addition to the CMX Browser Engage services running on Cisco MSE, another crucial component is a redirection router (for central deployments using Cisco MSE as a proxy). The router sits in the data path of the enduser’s traffic to the Internet and is responsible for intercepting and redirecting the enduser’s HTTP traffic to the Cisco MSE HTTP Proxy Service. This redirection can be implemented through policy-based routing (PBR) or through the Layer 4 Redirect function available on higher-end routers (such as the Cisco ASR 1000 Series Aggregation Services Routers with Cisco Intelligent Services Gateway [ISG]). Figure 2 shows the redirection router.

Figure 2. Cisco MSE with Redirection Router



The Wireless Client get assigned an IP address, and a Default Route that will eventually cause its traffic to pass through the redirection router

The Redirection Router

Responsible of redirecting the end-user's help traffic to the HTTP Proxy service on the MSE. (Using either a PBR, or a L4-Redirect function)

HTTP Proxy Service on the **MSE**
(The same MSE could also host the Billboard service)

Note: In the Case of PBR, the Proxy MSE must be L2 connected to the PBR router.
When using L4-Redirect, the MSE could be anywhere as long as it is IP-reachable.

Note: The end-user device need to be on a different subnet than the HTTP Proxy Service for proper operation.

Each redirection method (PBR and Layer 4 Redirect) has its ideal placement according to the requirements of the deployment. PBR alters only the destination MAC address of an Ethernet frame, but Layer 4 Redirect can alter both the destination IP address (making the destination the proxy server) and the destination port number (for example, it can change the HTTP destination port 80 to port 9090: the default port for the CMX Browser Engage HTTP Proxy Service). Figure 3 shows the two methods.

Figure 3. PBR and Layer 4 Redirect

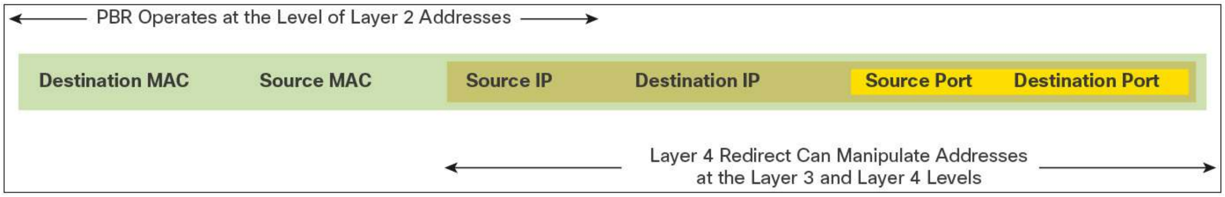
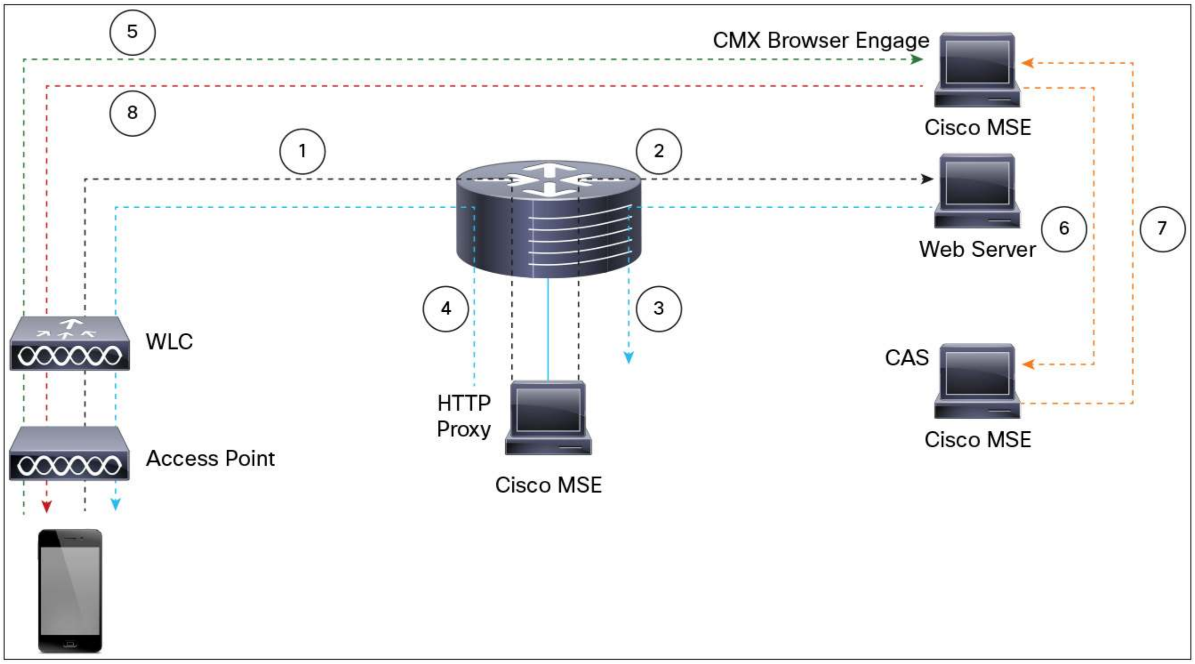

PBR Operates at the Level of Layer 2 Addresses
Destination MAC
Source MAC
Source IP
Destination IP
Source Port
Destination Port
Layer 4 Redirect Can Manipulate Addresses at the Layer 3 and Layer 4 Levels

Figure 4 shows the HTTP flow step by step as it is initiated from a wireless client and the interactions through the various components providing the CMX Browser Engage service.

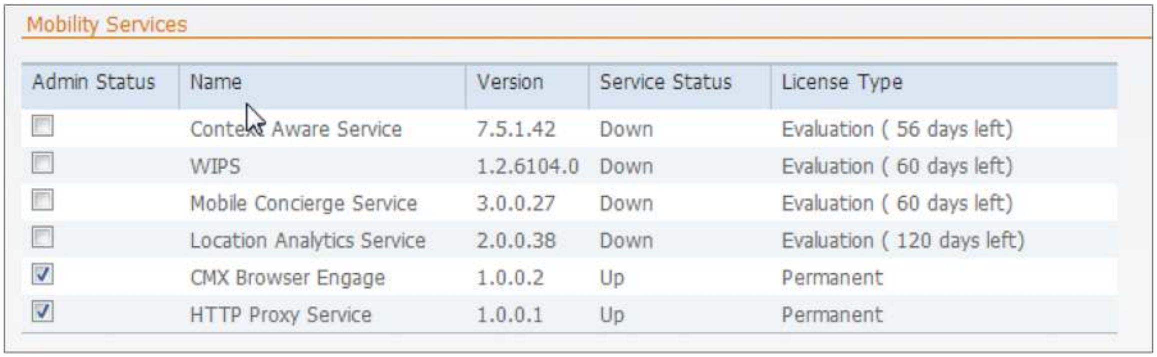
Figure 4. CMX Browser Engage Service Flow



1. Client browser makes HTTP request to the server. It is intercepted by the router using PBR/L4R and forwarded to the proxy service.
2. The proxy terminates the connection and opens another connection to the web server. It proxy the client request.
3. Web server response. The proxy transforms the html response by inserting a script tag with BBX server IP and client IP. (The Proxy needs to know the BBX server IP)
4. Proxy responds to the client with transformed html payload.
5. Client browser interprets the script tag and makes a request to the BBX server communicating the Client IP.
6. BBX server requests client location from the CAS server.
7. CAS server responds with the client location.
8. BBX serves the advertisement to the client using the location information and Campaign configuration.

The simplest deployment model for a CMX Browser Engage solution is a PBR router with the same Cisco MSE running both CMX Browser Engage sub services and the HTTP Proxy Service as shown in Figure 5.

Figure 5. Simple CMX Browser Engage Solution in Cisco Prime Infrastructure



Mobility Services

Admin Status	Name	Version	Service Status	License Type
□	Context Aware Service	7.5.1.42	Down	Evaluation (56 days left)
□	WIPS	1.2.6104.0	Down	Evaluation (60 days left)
□	Mobile Concierge Service	3.0.0.27	Down	Evaluation (60 days left)
□	Location Analytics Service	2.0.0.38	Down	Evaluation (120 days left)
☑	CMX Browser Engage	1.0.0.2	Up	Permanent
☑	HTTP Proxy Service	1.0.0.1	Up	Permanent

Complex deployments usually have multiple Cisco MSE devices, each running a single servic efor scalability. Cisco Prime™ Infrastructure allows Cisco MSE devices running CMX Browser Engage, HTTP Proxy Service, Context Aware Service, and Location Analytics Service to be linked with each other.

The Cisco MSE framework supportsthe starting and stopping of CMX Browser Engageservices. By default, both the platform and proxy subservices are started by the framework. For deployment models in which the proxy is not running on Cisco MSE, the proxy subservice can be disabled.

Note: Sometimes stopping and restarting CMX Browser Engage or HTTP Proxy Service can resolve a problem in a deployment.

Deployments requiring different Cisco MSE devices will use an honor-based licensing model in which Cisco Prime Infrastructure verifies that at leastone Cisco MSE has an appropriate CMX license before allowing a link between different Cisco MSE devices.

Deploying CMX Browser Engage with Cisco MSE

Upgrading the Cisco MSE Software

Command-line interface (CLI) access (through Secure Shell [SSH] or the console) to Cisco MSE is required to upgrade the Cisco MSE software. However, you can download the image for Cisco MSE using Cisco Wireless Control System (WCS), Cisco Prime Network Control System (NCS), or Cisco Prime Infrastructure; by using FTP or Secure Copy (SCP) from the Cisco MSE CLI; or by pushing the software remotely using SCP.

The following example transfers an image file from a user’s PC to Cisco MSE with the IP address 10.0.3.20 and places it in the folder /opt/installers/:

```
scp /Downloads/CISCO-MSE-L-K9-7-5-1-43-64bit.bin.gz
root@10.0.3.20:/opt/installers/
```

Note: The Cisco MSE software image is a compressed file (gzip). If you use Cisco Prime Infrastructure to download it to Cisco MSE, Cisco Prime Infrastructure automatically decompresses the image. If you use a manual file transfer method (SCP or FTP), an extra step is required to decompress the image file (gunzip).

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For more information about downloading the image through Cisco WCS, Cisco Prime NCS, or Cisco Prime Infrastructure, see this link: http://www.cisco.com/en/US/docs/wireless/mse/3350/quick/guide/mse_qsgmain.html#wp1048000.

The following link provides step-by-step instructions for downloading the image using FTP from the Cisco MSE CLI (in the example shown here, the image was on the FTP server of Cisco WCS, but it could have been on any other FTP server). The same instructions also discuss how to decompress the image and perform the installation process; these steps are the same regardless of whether Cisco Prime Infrastructure is used for the image file transfer.

http://www.cisco.com/en/US/docs/wireless/mse/3350/quick/guide/mse_qsgmain.html#wp1048837.

The instructions at both links are valid for both physical and virtual Cisco MSE appliances.

Configuring Cisco MSE

Cisco MSE has two Gigabit Ethernet interfaces. In traditional Cisco MSE deployments, one interface is usually used for Internet and management communications, and the second interface is used for check pointing to an HA paired device in a in a high-availability deployment.

As described earlier, when HTTP Proxy Service is enabled on Cisco MSE, a redirection router intercepts the HTTP traffic and sends it to one of the Cisco MSE interfaces.

The Cisco MSE setup script is used to configure the interfaces. It assumes that the default route is through Ethernet interface eth0, also giving the user the option user to add specific routes to eth1.

Note: For demonstration or basic deployments, use the default eth0 setup to make the configuration easier.

Some customers may have a policy requirement to separate management and data traffic; thus, one Ethernet interface can act as the management interface,and the other interface can act as the data interface (no interface would be left for high availability). Because by default, eth0is the interface used for the default route, eth0 is used as the data interface, and the management traffic is placed on eth1. (The user must make sure that the management routes are configured correctly for eth1.)

Configuring Domain Name Service and the Default Domain Name from the Cisco MSE Console

The HTTP Proxy Service requires that the Domain Name Service (DNS) and domain name to be configured in the proxy configuration file (/opt/mse/setup/setup.sh). The Cisco MSE setup script can be used to configure these values.

Note: If not set otherwise, HTTP Proxy Service will default to DNS **8.8.8.8** and domain name **cisco.com**.

Note: Check that you have a route to DNS 8.8.8.8 by using the nslookup tool.

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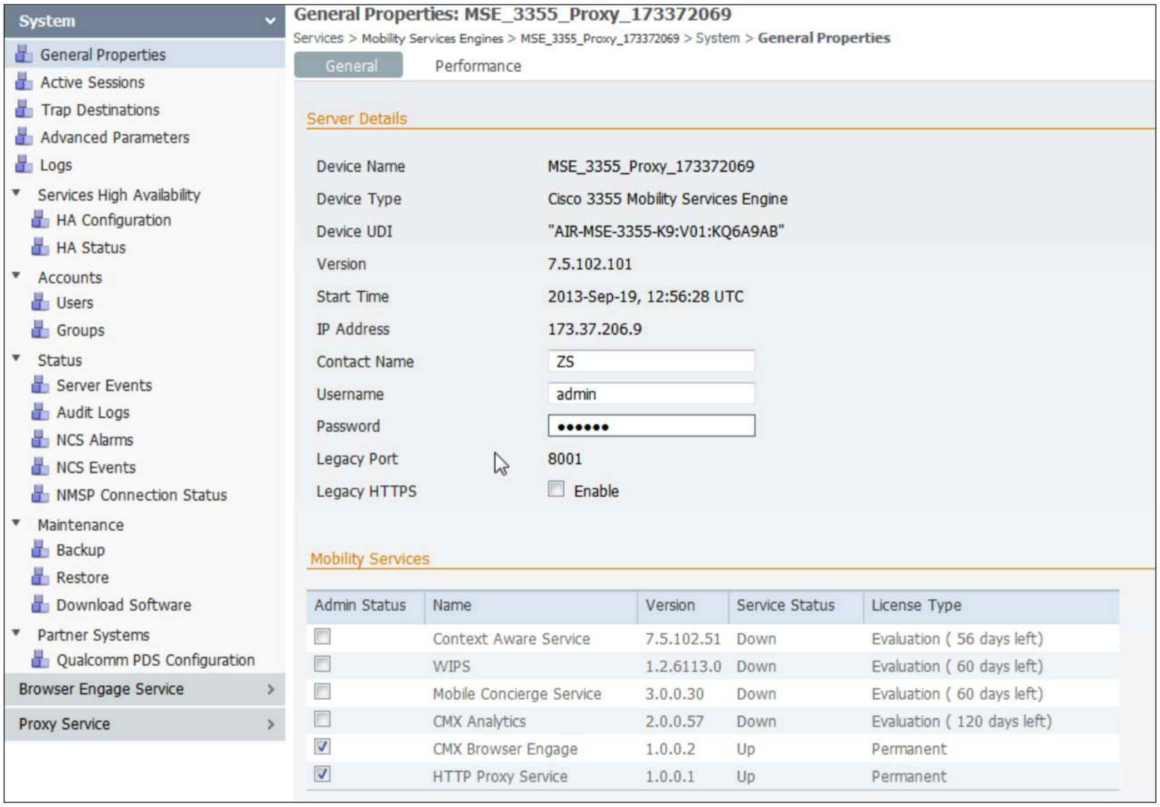
Enabling CMX Browser Engage from Cisco Prime Infrastructure

Step 1. To enable CMX Browser Engage and HTTP Proxy Services in Cisco MSE using Cisco Prime Infrastructure 1.4, choose Services >Mobility Services Engines>MSE_3355_Proxy_173372069> System >General Properties.



General Properties: MSE_3355_Proxy_173372069

Services > Mobility Services Engines > MSE_3355_Proxy_173372069 > System > **General Properties**

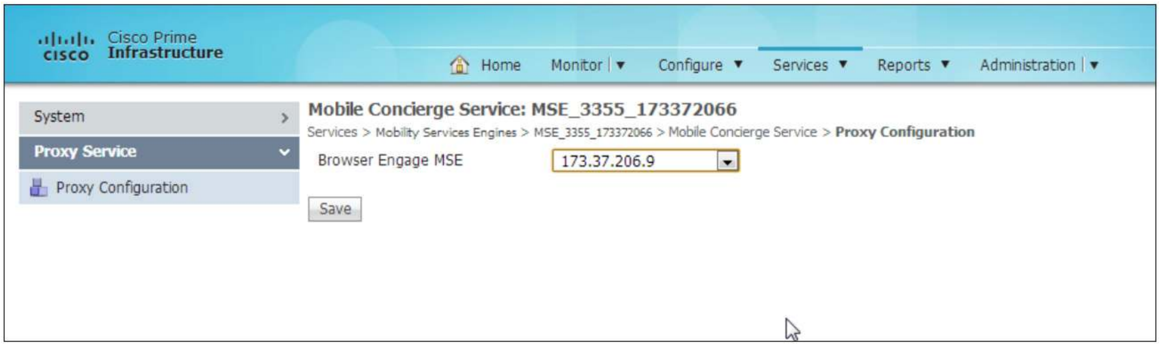
Server Details

Device Name	MSE_3355_Proxy_173372069
Device Type	Cisco 3355 Mobility Services Engine
Device UDI	"AIR-MSE-3355-K9:V01:KQ6A9AB"
Version	7.5.102.101
Start Time	2013-Sep-19, 12:56:28 UTC
IP Address	173.37.206.9
Contact Name	ZS
Username	admin
Password	••••••
Legacy Port	8001
Legacy HTTPS	□ Enable

Mobility Services

Admin Status	Name	Version	Service Status	License Type
□	Context Aware Service	7.5.102.51	Down	Evaluation (56 days left)
□	WIPS	1.2.6113.0	Down	Evaluation (60 days left)
□	Mobile Concierge Service	3.0.0.30	Down	Evaluation (60 days left)
□	CMX Analytics	2.0.0.57	Down	Evaluation (120 days left)
☑	CMX Browser Engage	1.0.0.2	Up	Permanent
☑	HTTP Proxy Service	1.0.0.1	Up	Permanent

Step 2. Select Proxy Service and provide the CMX Browser Engage MSE IP address.

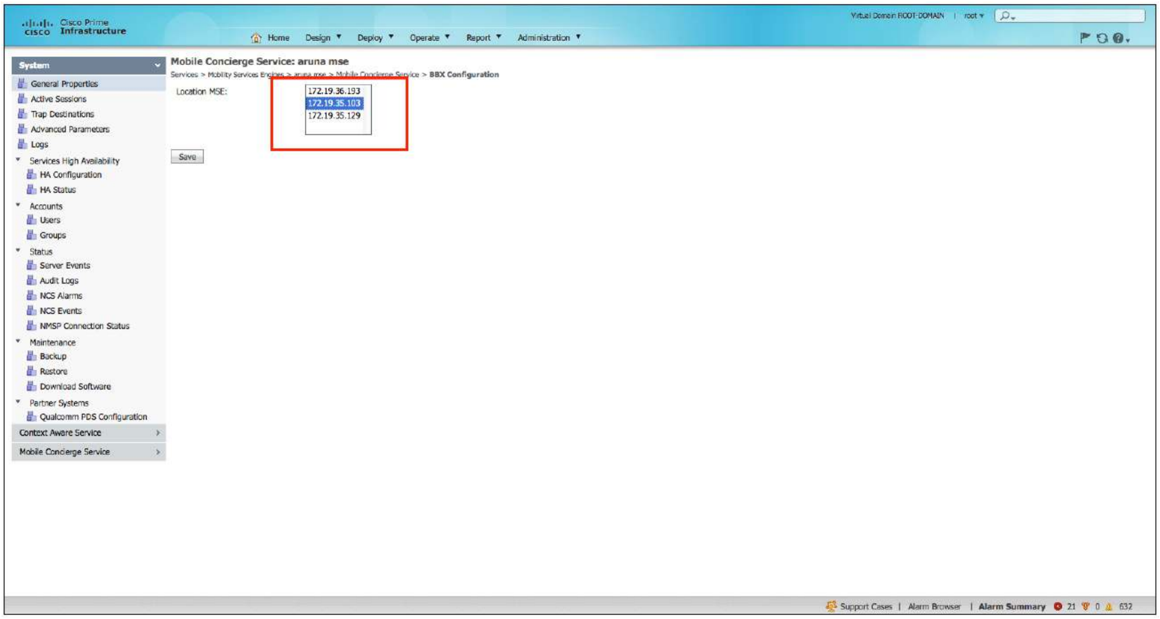


Mobile Concierge Service: MSE_3355_173372066

Services > Mobility Services Engines > MSE_3355_173372066 > Mobile Concierge Service > **Proxy Configuration**

Browser Engage MSE 173.37.206.9

Step 3. Provide Cisco MSE Location Analytics Service information to the CMX Browser Engage server. Then click Save. After you click Save on this page, all the campus, building, and floor information managed by the selected Cisco Prime Infrastructure and Cisco MSE Location Analytics Service is sent to the CMX Browser Engage server along with the floor images and dimensions.



Mobile Concierge Service: aruna mse

Services > Mobility Services Engines > aruna mse > Mobile Concierge Service > **BBX Configuration**

Location MSE: 172.19.36.193 / 172.19.35.103 / 172.19.35.129

Configuring CMX Browser Engage

This section discusses the CMX Browser Engage dashboard and how to use it to create a campaign.

Creating a Campaign with CMX Browser Engage

The following are the main steps for creating a campaign with CMX Browser Engage:

1. The super administratorcreates a store or account.
2. The super administrator adds a store to the floor navigation with keywords to search the store (for example, coffee, café, etc. for a store like Starbucks).
3. The administrator for the store or account logs in and creates the banners required for the campaign and makes them active.
4. The administrator for the store or account creates a campaign and uses the banners at specific points of insertion(POIs).
5. The administrator for the store or account makes the campaign active.
6. The administrator for the store or account uses the Appearance tab to verify the look and feel of the campaign.
7. The administrator uses the Appearance tab to customize the way that the campaign appears in various clients.

Note: For a proof-of-concept (POC) or quick setup, the super administrator account can be used to configure the campaign.

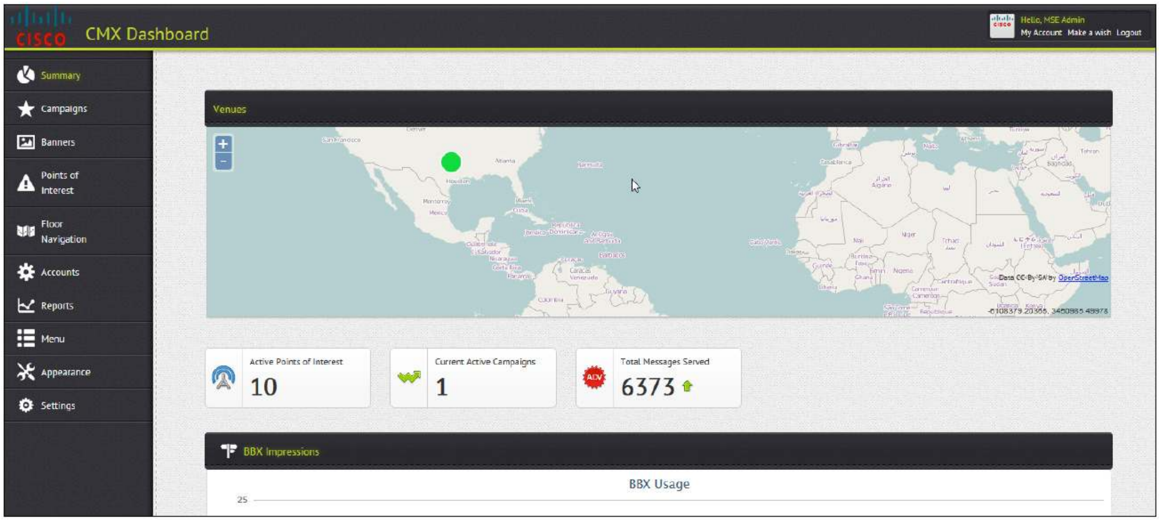
CMX Browser Engage Dashboard

To access the CMX Browser Engage service GUI, use the URL http://<MSE_IP_address>:8081/Mario.

The default username is ***admin***, and the default password is ***admin***.

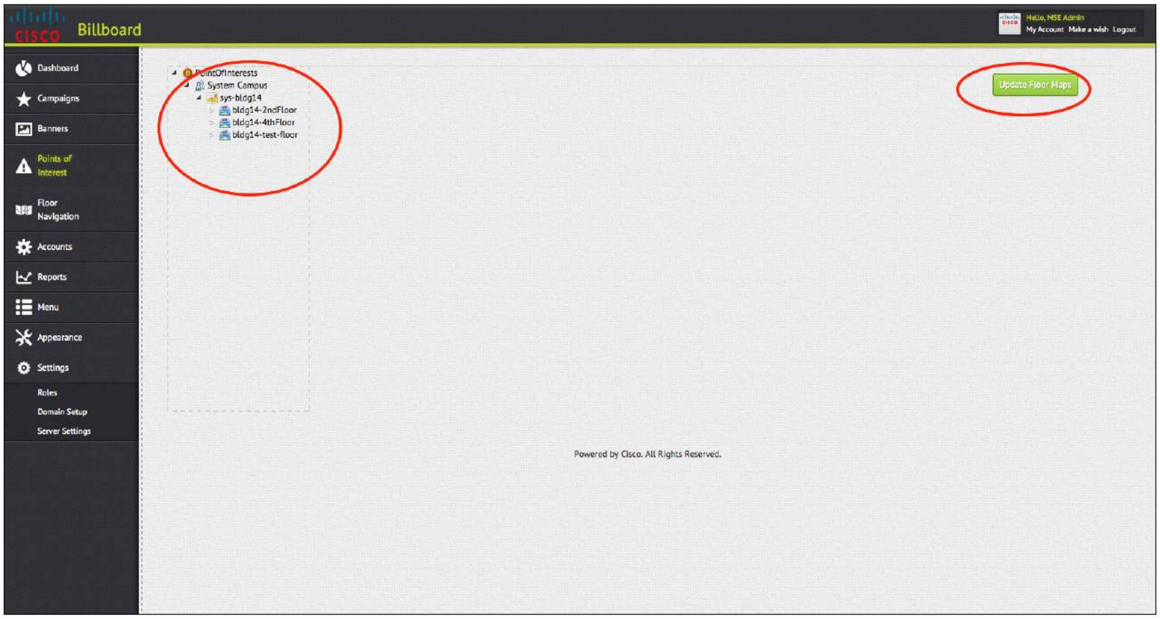
Note: You can create additional accounts from the Accounts tab on the Cisco CMX Dashboard.

Note: All CMX Browser Engage service accounts are both read and write enabled.



Points of Interest Tab

The Points of Interest tab shows all the campus, building, floor, and zone (POI) information pulled from the Cisco MSE Location Analytics Service. If any changes in the floor dimensions or map image are made in Cisco Prime Infrastructure, the administrator needs to manually update that information using the Update Floor Maps button.



Note: The Update Floor Maps button does not look like a typical expansion button, but it is.

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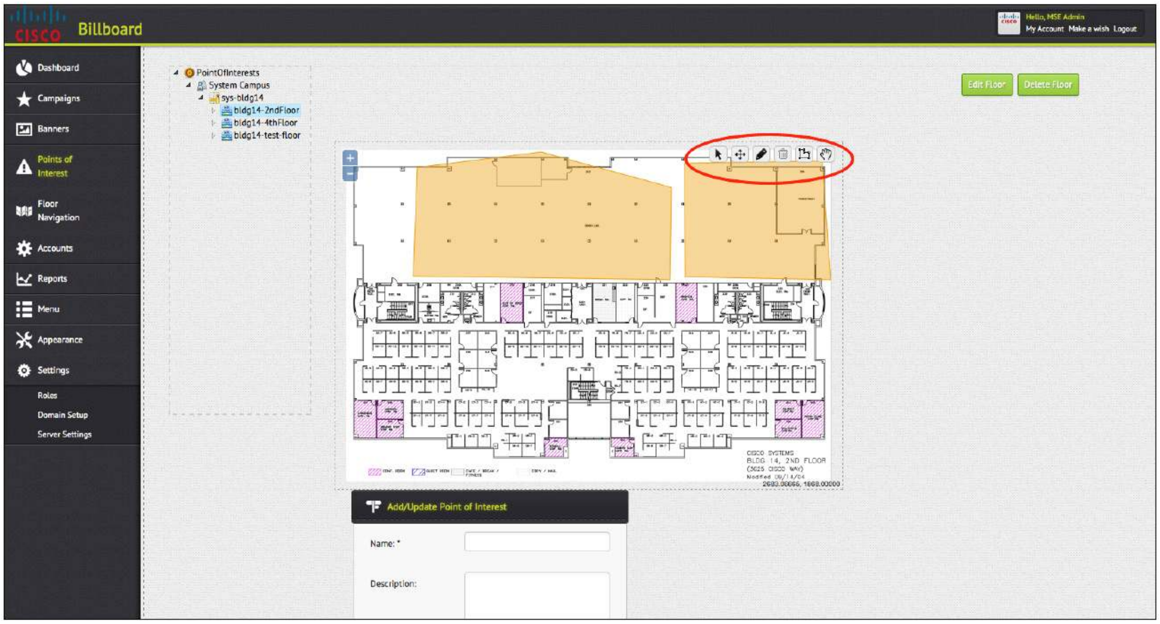
The user can draw any additional POIs on the floors using the tools available on the floor map.

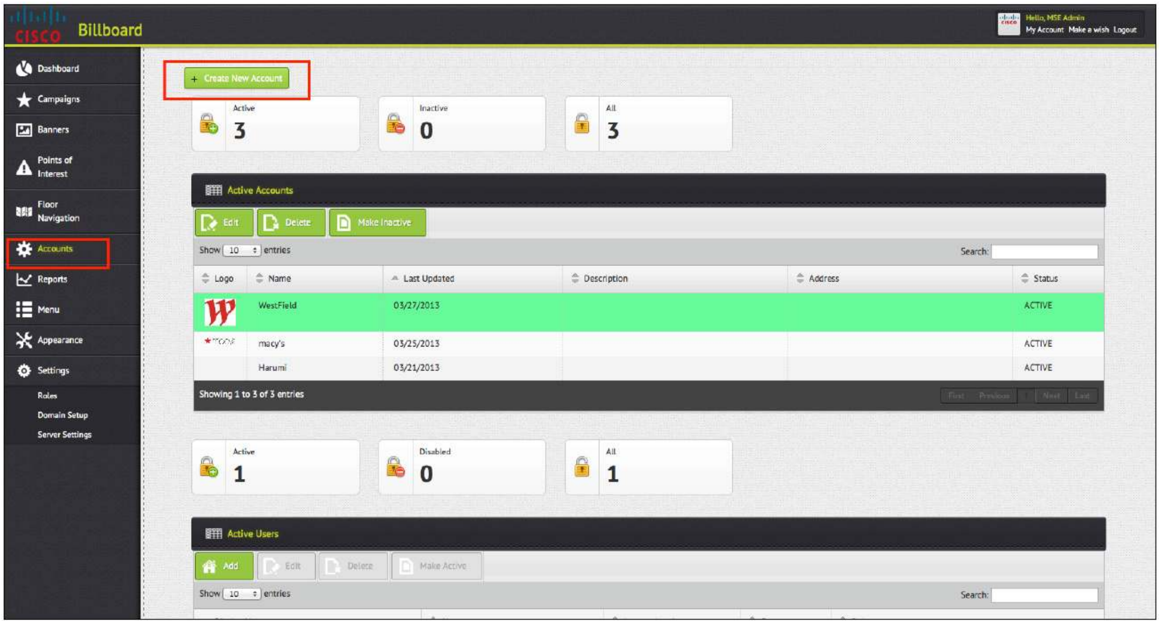


Name: *

Description:

Accounts Tab

The Accounts tab lets you define different sets of accounts and users for each account and store. For example, for a shopping mall, the administrator can define separate accounts for each store: Macys, Starbucks, MacDonald's, etc. Keywords associated with each account help locate the stores when the end user searches on them. The account information is used in plotting the store in the floor navigation.



Active 3 | Inactive 0 | All 3

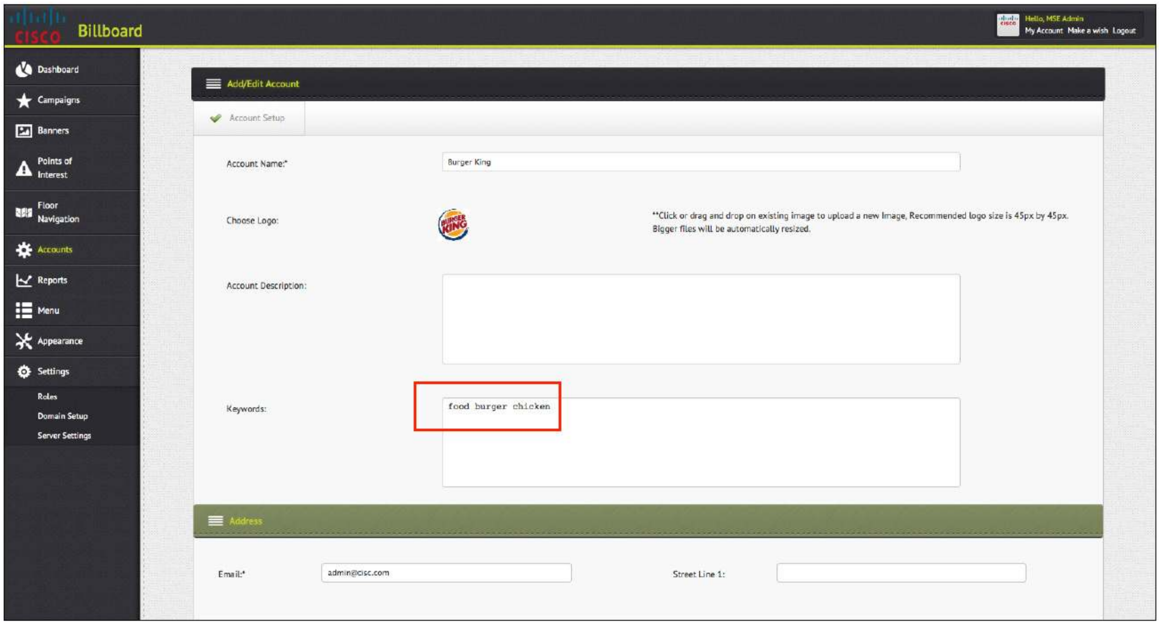
Show 10 entries   Search:

Logo	Name	Last Updated	Description	Address	Status
W	WestField	03/27/2013			ACTIVE
★macy's	macy's	03/25/2013			ACTIVE
	Harumi	03/21/2013			ACTIVE

Showing 1 to 3 of 3 entries

Active 1 | Disabled 0 | All 1

Show 10 entries   Search:



Add/Edit Account

Account Setup

Account Name:* Burger King

Choose Logo:

**Click or drag and drop on existing image to upload a new Image, Recommended logo size is 45px by 45px. Bigger files will be automatically resized.

Account Description:

Keywords: food burger chicken

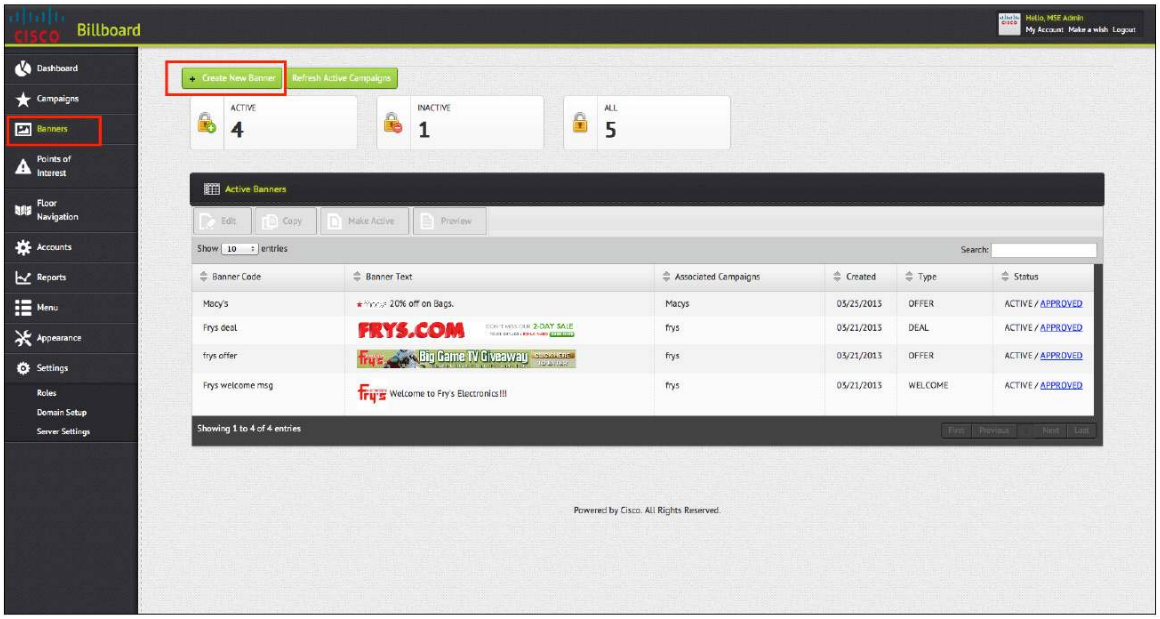
Address

Email:* admin@cisc.com

Street Line 1:

Banners Tab

To create a campaign, you need to create some banners. Banners are simply messages that float in the CMX Browser Engage toolbar.



ACTIVE 4

INACTIVE 1

ALL 5

Active Banners

Show 10 entries

Search:

Banner Code	Banner Text	Associated Campaigns	Created	Type	Status
Macy's	20% off on Bags.	Macys	03/25/2013	OFFER	ACTIVE / APPROVED
Frys deal	FRYS.COM DON'T MISS OUR 2-DAY SALE	frys	05/21/2013	DEAL	ACTIVE / APPROVED
frys offer	Fry's Big Game TV Giveaway CLICK HERE TO ENTER	frys	05/21/2013	OFFER	ACTIVE / APPROVED
Frys welcome msg	Fry's Welcome to Fry's Electronics!!!	frys	05/21/2013	WELCOME	ACTIVE / APPROVED

Showing 1 to 4 of 4 entries

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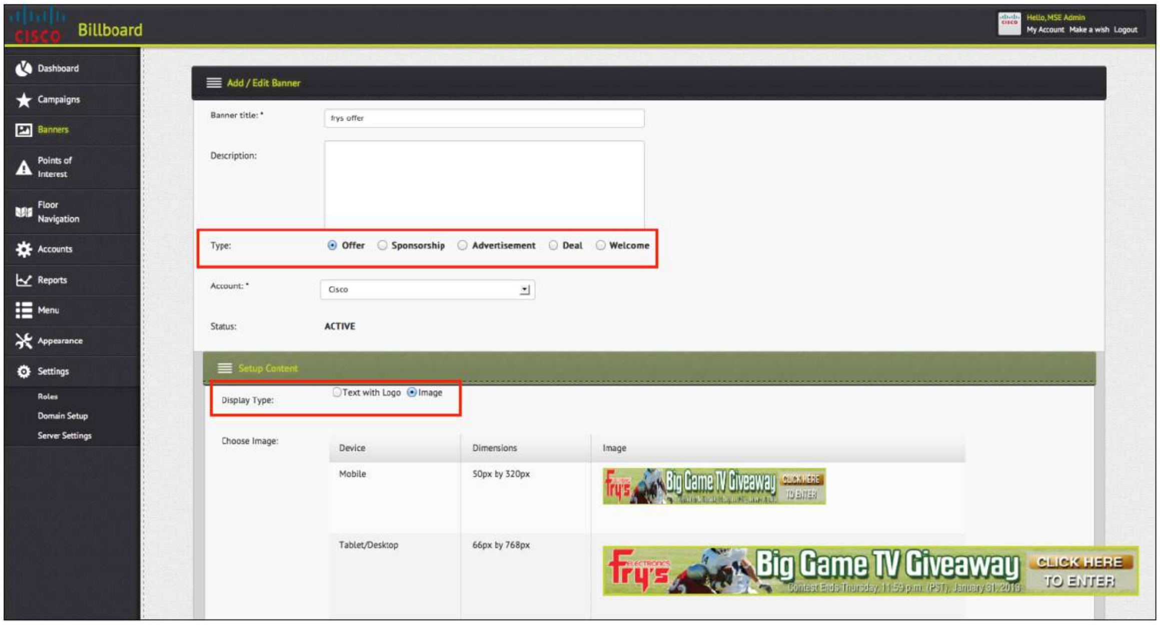
When creating banner, the administrator needs to choose the type of banner. Five types of banners are available:

- Welcome message
- Offer
- Deal
- Sponsorship
- Advertisement

Each type has different rules and displays that the administrator can define. For example, a welcome message is displayed in the toolbar, and the administrator can choose whether the message is displayed every time the user clicks the CMX Browser Engage icon or only the first time that the user is detected. Offers and deals are displayed above the CMX Browser Engage toolbar, and the administrator can choose to provide the offer based on loyalty: for example, only after the user has remained at a specific POI for a specified amount of time.



Add / Edit Banner

Banner title: * frys offer

Description:

Type: ● Offer ○ Sponsorship ○ Advertisement ○ Deal ○ Welcome

Account: * Cisco

Status: ACTIVE

Setup Content

Display Type: ○ Text with Logo ● Image

Choose Image:

Device	Dimensions	Image
Mobile	50px by 320px	
Tablet/Desktop	66px by 768px	

By default, all banners that are newly created are inactive. If the administrator is assigned a role that allows approval of banners, the administrator can click the Make Active button to activate a banner.

Note: Inactive banners are not displayed.

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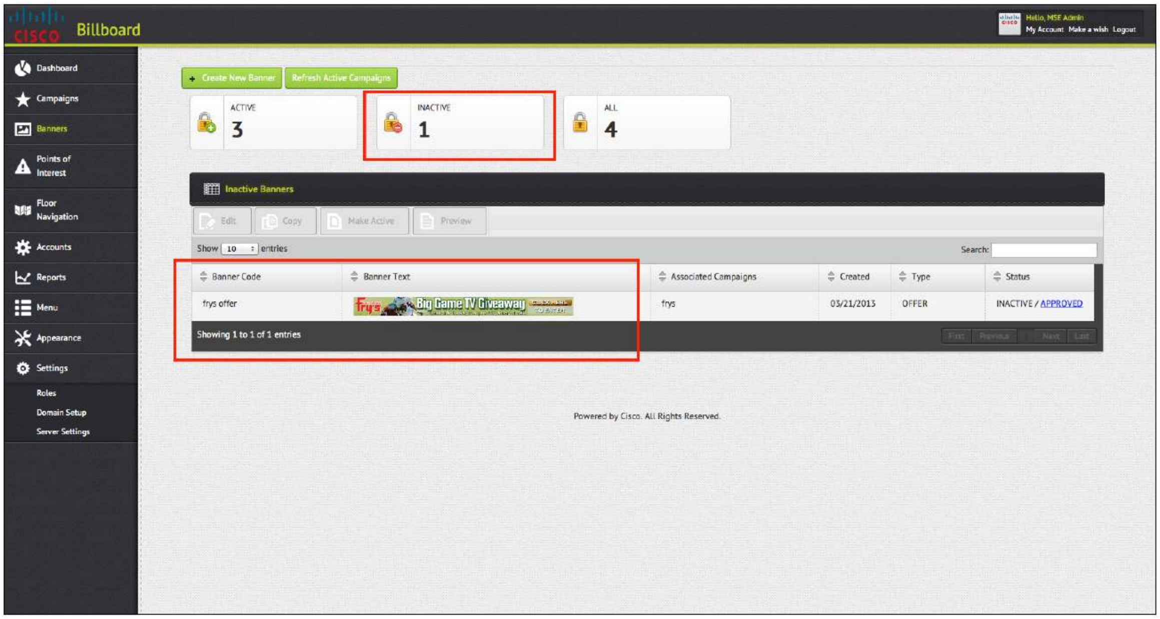


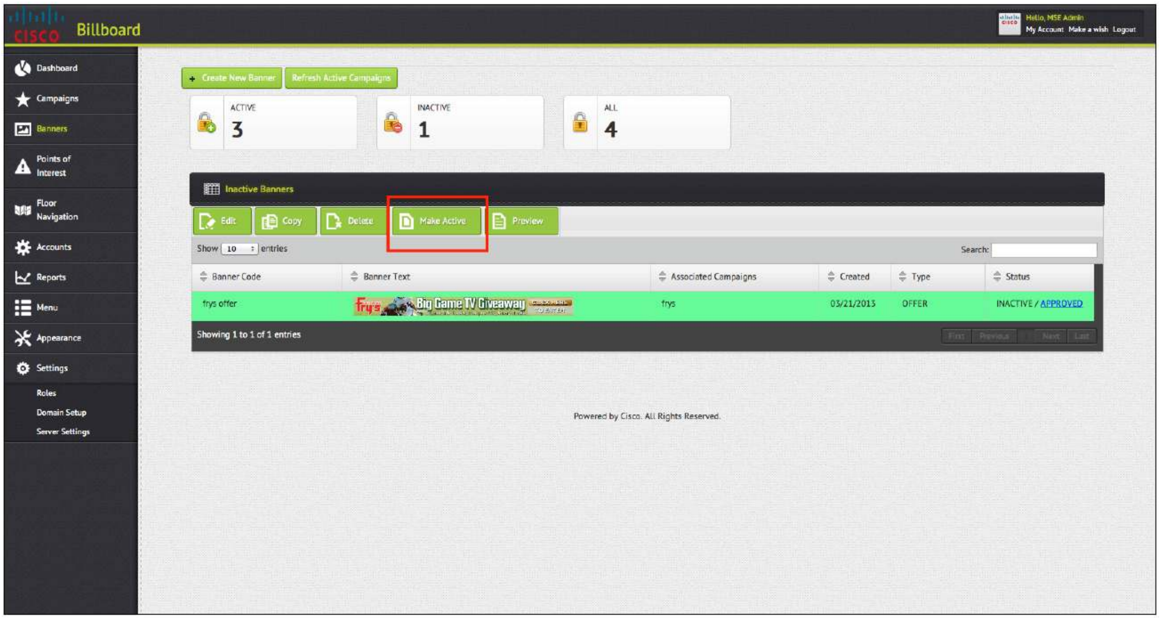
ACTIVE 3

INACTIVE 1

ALL 4

Banner Code	Banner Text	Associated Campaigns	Created	Type	Status
frys offer	Fry's Big Game TV Giveaway	frys	03/21/2013	OFFER	INACTIVE / APPROVED

Showing 1 to 1 of 1 entries



ACTIVE 3

INACTIVE 1

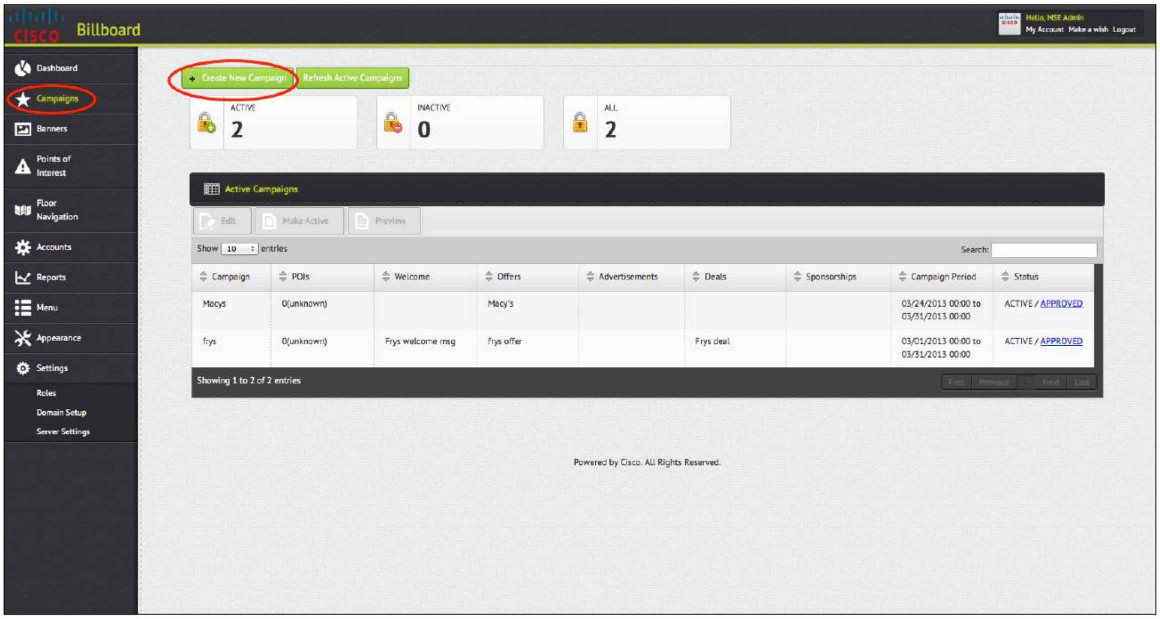
ALL 4

Banner Code	Banner Text	Associated Campaigns	Created	Type	Status
frys offer	Fry's Big Game TV Giveaway	frys	03/21/2013	OFFER	INACTIVE / APPROVED

Showing 1 to 1 of 1 entries

Campaigns Tab

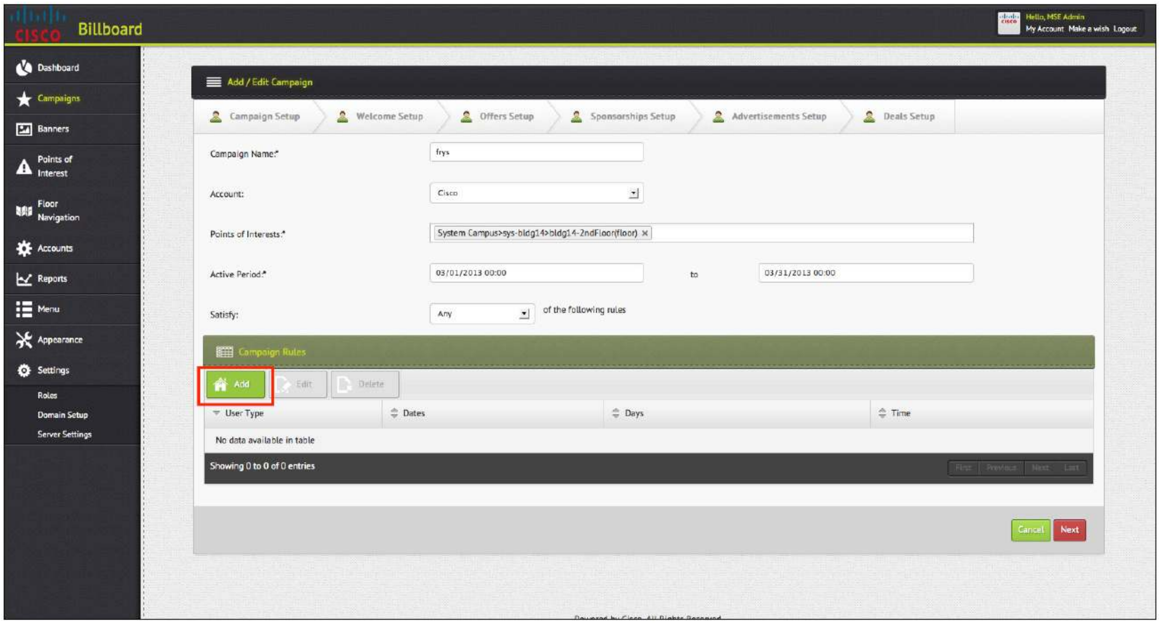
On the Campaigns tab, you create a campaign using the banners that you created and adding some rules that define when and where those banners are displayed.



Campaign	POIs	Welcome	Offers	Advertisements	Deals	Sponsorships	Campaign Period	Status
Macys	0(unknown)		Macy's				03/24/2013 00:00 to 03/31/2013 00:00	ACTIVE / APPROVED
frys	0(unknown)	Frys welcome msg	frys offer		Frys deal		03/01/2013 00:00 to 03/31/2013 00:00	ACTIVE / APPROVED

Showing 1 to 2 of 2 entries

In addition to the overall time period that is defined here, you can define rules that specify that the campaign is applicable only on specific days of the week and in a certain time period.



Campaign Name:* frys

Account: Cisco

Points of Interests:* System Campus>sys-bldg14>bldg14-2ndFloor(floor) ×

Active Period:* 03/01/2013 00:00 to 03/31/2013 00:00

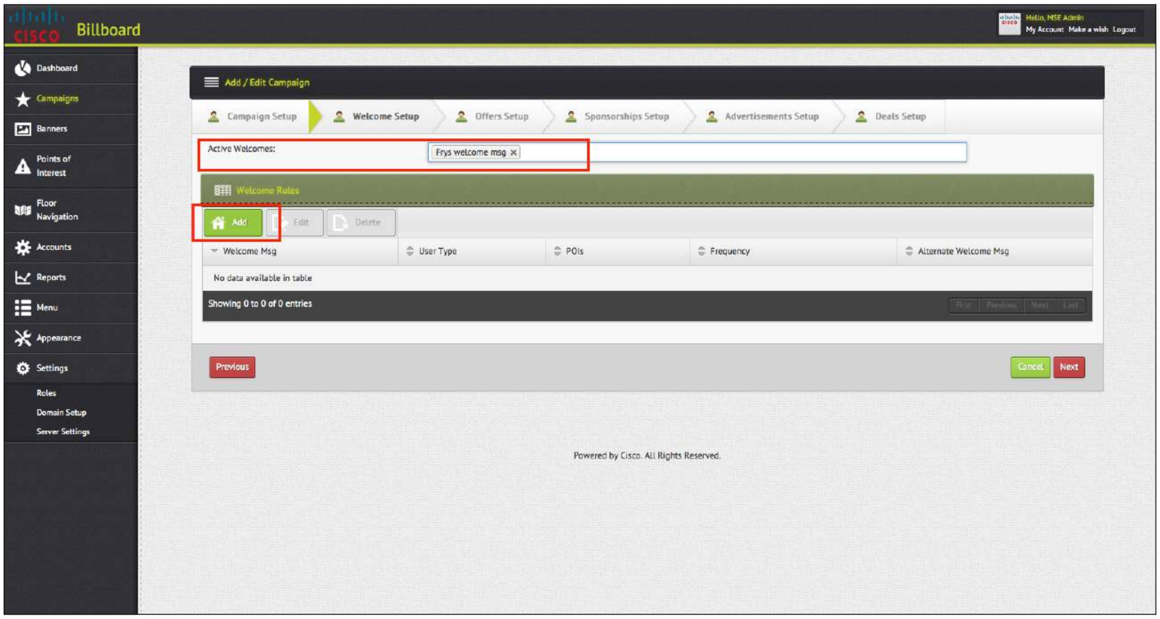
Satisfy: Any of the following rules

User Type	Dates	Days	Time
No data available in table			

Showing 0 to 0 of 0 entries

A campaign creation wizard allows you to choose the banners that are available and associate rules with each banner type.

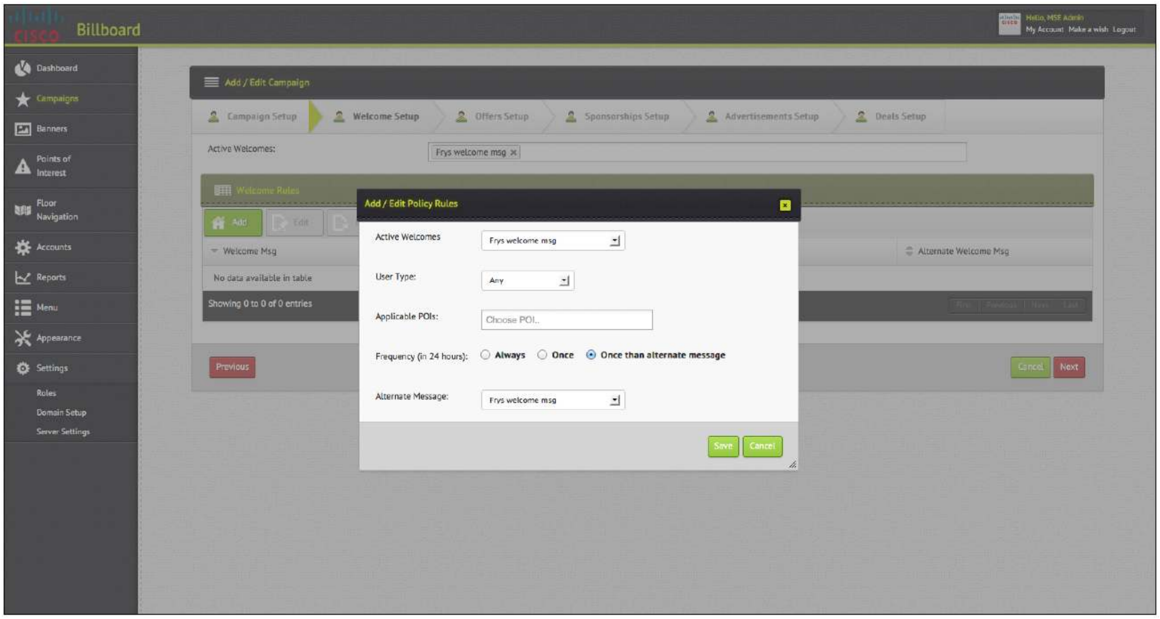
Note: Make sure to create your banners first.



Active Welcomes: Frys welcome msg ×

Welcome Msg	User Type	POIs	Frequency	Alternate Welcome Msg
No data available in table				

Showing 0 to 0 of 0 entries



Active Welcomes: Frys welcome msg

User Type: Any

Applicable POIs: Choose POI..

Frequency (in 24 hours): ○ Always ○ Once ● Once than alternate message

Alternate Message: Frys welcome msg

Like banners, by default newly created campaigns are inactive. If the administrator is allowed to approve campaigns, the administrator can select a campaign in the Inactive campaigns list and click Make Active to move the campaign to the Active campaigns list.

Appearance Tab

You can see how the banners appear on an end device on the Appearance tab. Here you can define the way that you want to display the toolbar and the CMX Browser Engage icon. You can also define the default icon that appears on the end device.

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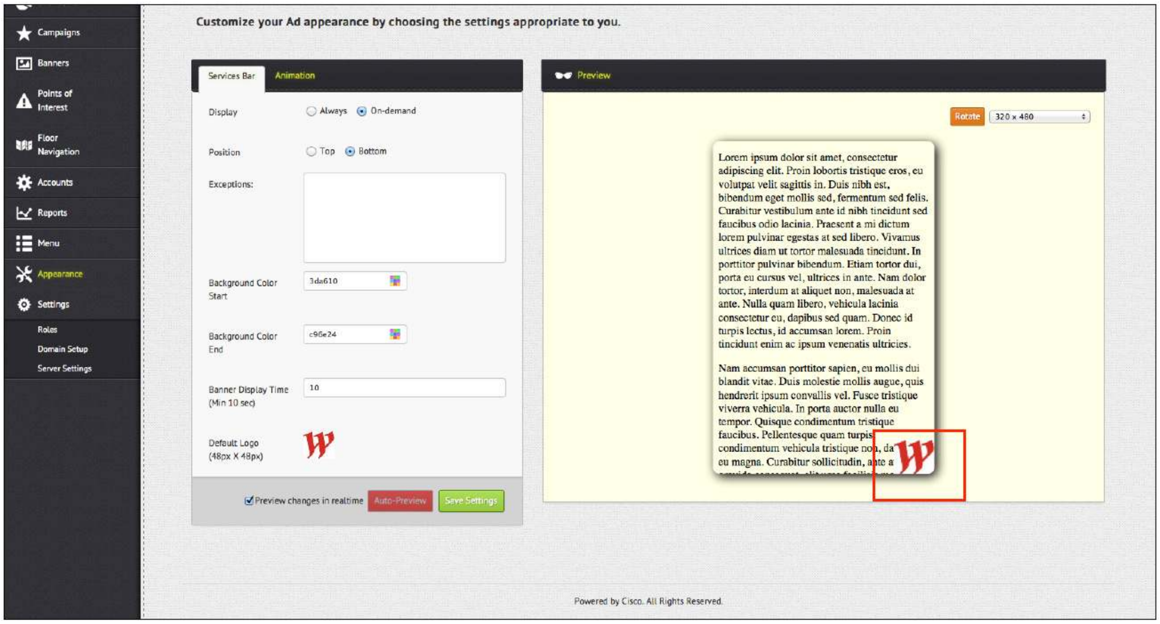
Some of the elements that are important on this tab are:

- Display:Defines whether the CMX Browser Engage toolbar is always expanded or is expanded only when the user clicks the icon
- Position:Defines whether the icon and toolbar should be displayed at the top or bottom of the screen
- Exceptions: Displays the icon and toolbar at the top or bottom of the screen as defined in the Position field, except for the URLs defined here
- Banner Display Time: Specifies how often each banner is refreshed
- Default Logo: Defines the default logo or icon that is displayed on the end device
- Animation tab: Specifies how the logo is displayed on the end device



Customize your Ad appearance by choosing the settings appropriate to you.

Display ○ Always ● On-demand

Position ○ Top ● Bottom

Exceptions:

Background Color Start: 3da610

Background Color End: c96e24

Banner Display Time (Min 10 sec): 10

Default Logo (48px X 48px)

☑ Preview changes in realtime

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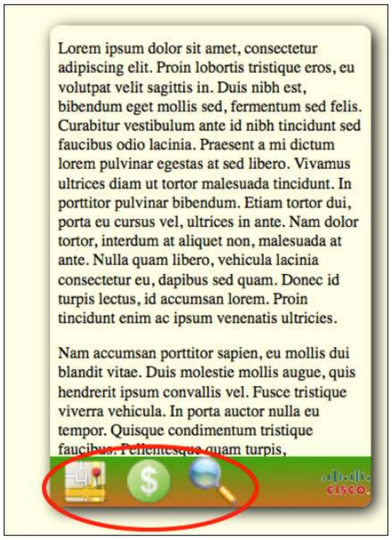


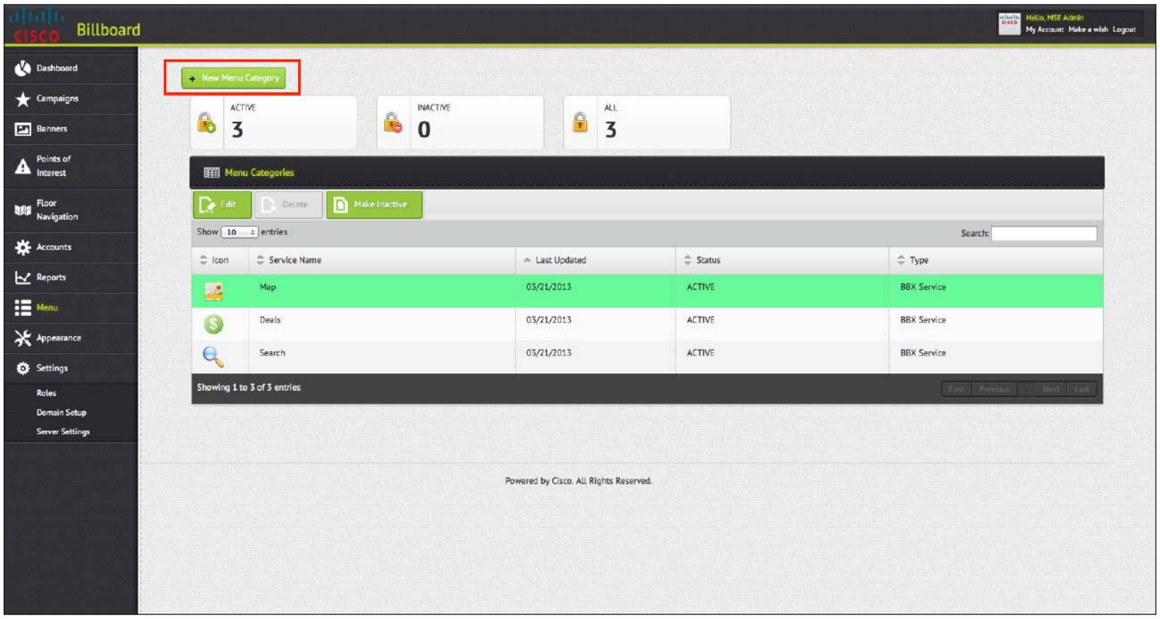
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Proin lobortis tristique eros, eu volutpat velit sagittis in. Duis nibh est, bibendum eget mollis sed, fermentum sed felis. Curabitur vestibulum ante id nibh tincidunt sed faucibus odio lacinia. Praesent a mi dictum lorem pulvinar egestas at sed libero. Vivamus ultrices diam ut tortor malesuada tincidunt. In porttitor pulvinar bibendum. Etiam tortor dui, porta eu cursus vel, ultrices in ante. Nam dolor tortor, interdum at aliquet non, malesuada at ante. Nulla quam libero, vehicula lacinia consectetur eu, dapibus sed quam. Donec id turpis lectus, id accumsan lorem. Proin tincidunt enim ac ipsum venenatis ultricies.

Nam accumsan porttitor sapien, eu mollis dui blandit vitae. Duis molestie mollis augue, quis hendrerit ipsum convallis vel. Fusce tristique viverra vehicula. In porta auctor nulla eu tempor. Quisque condimentum tristique faucibus. Pellentesque quam turpis,

Menu Tab

By default, three services are available on the CMX Browser Engage toolbar:

- Map
- Deals
- Search



ACTIVE 3 | INACTIVE 0 | ALL 3

Menu Categories

Show 10 entries   Search:

Icon	Service Name	Last Updated	Status	Type
	Map	03/21/2013	ACTIVE	BBX Service
	Deals	03/21/2013	ACTIVE	BBX Service
	Search	03/21/2013	ACTIVE	BBX Service

Showing 1 to 3 of 3 entries

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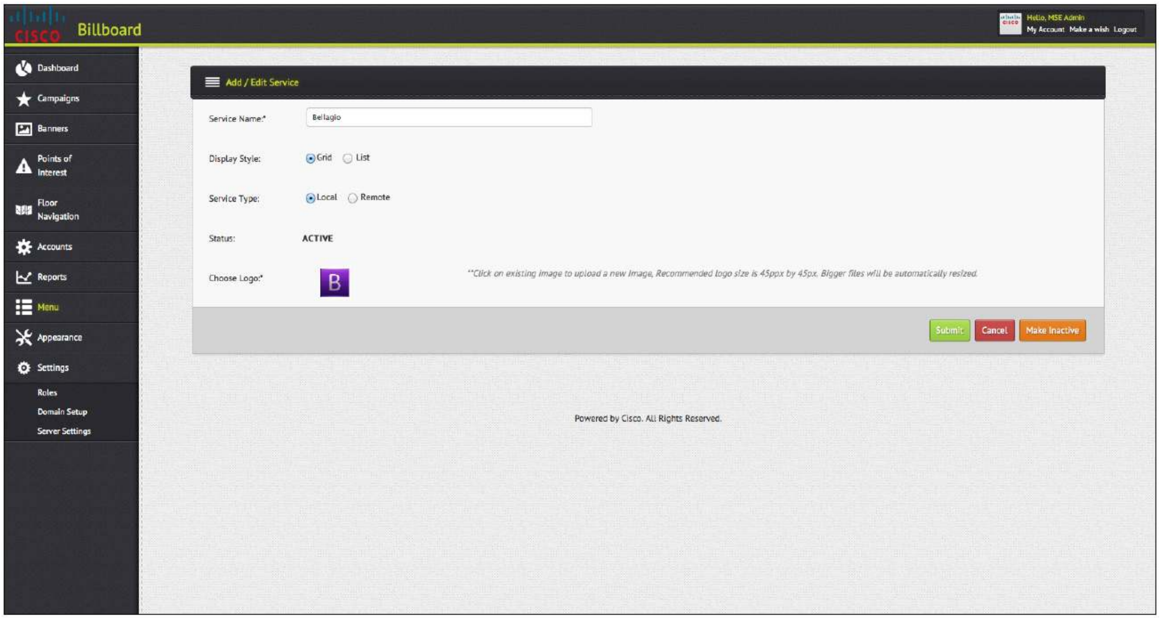
You can define custom menu items and define service items for each custom menu item.



Add / Edit Service

Service Name:* Bellagio

Display Style: ● Grid ○ List

Service Type: ● Local ○ Remote

Status: ACTIVE

Choose Logo:* B

***Click on existing image to upload a new Image, Recommended logo size is 45ppx by 45px. Bigger files will be automatically resized.*

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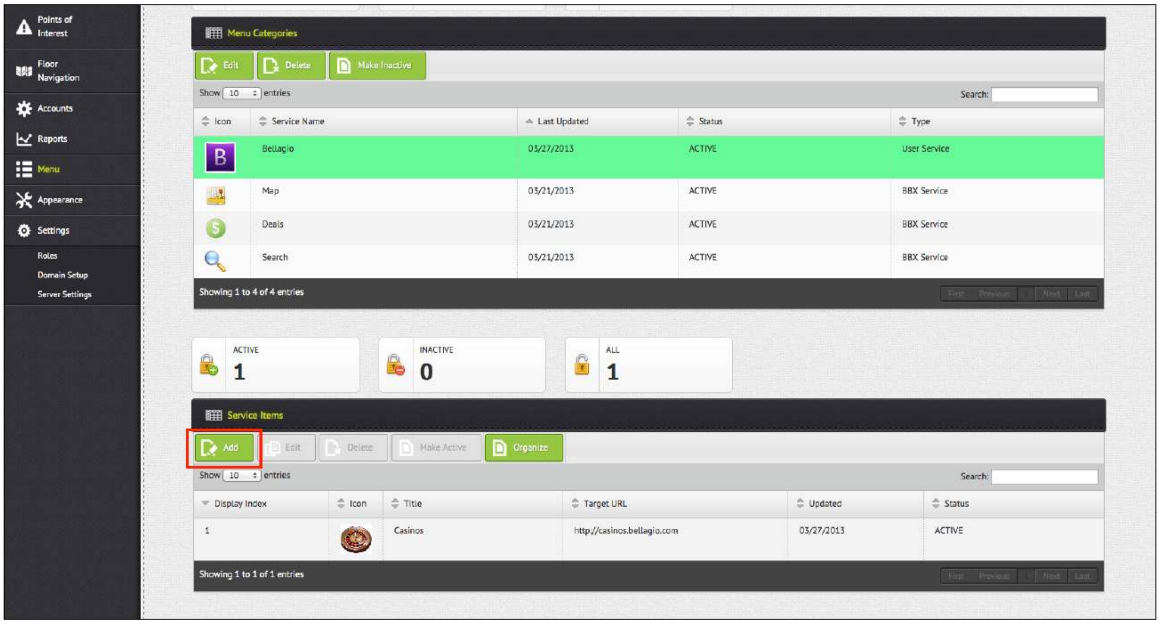


Menu Categories

Edit | Delete | Make Inactive

Show 10 entries   Search:

Icon	Service Name	Last Updated	Status	Type
B	Bellagio	03/27/2013	ACTIVE	User Service
	Map	03/21/2013	ACTIVE	BBX Service
$	Deals	03/21/2013	ACTIVE	BBX Service
	Search	03/21/2013	ACTIVE	BBX Service

Showing 1 to 4 of 4 entries

ACTIVE	INACTIVE	ALL
1	0	1

Service Items

Add | Edit | Delete | Make Active | Organize

Show 10 entries   Search:

Display Index	Icon	Title	Target URL	Updated	Status
1		Casinos	http://casinos.bellagio.com	03/27/2013	ACTIVE

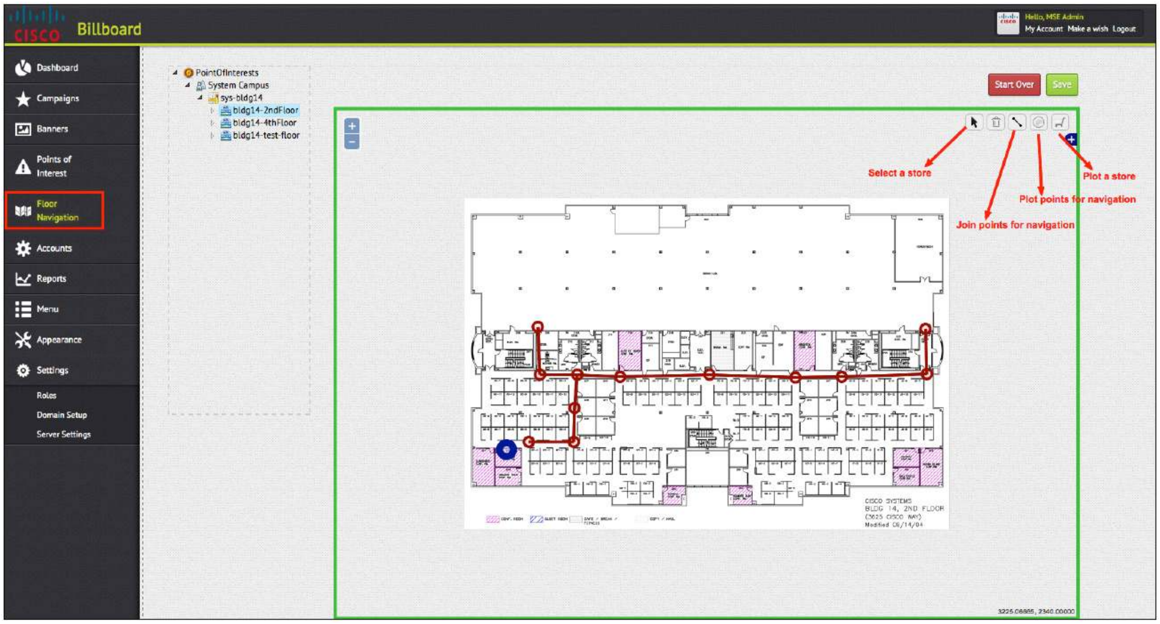
Showing 1 to 1 of 1 entries

Floor Navigation Tab

When the end user clicks the Map icon in the CMX Browser Engage toolbar, the floor map is displayed along with a blue dot showing the user's current location. The user can then search for a specific item - for example, **food** - using a keyword entered for the account, and all the stores will be searched and locations with food will be marked on the map. Then the user can click a specific store and get directions.

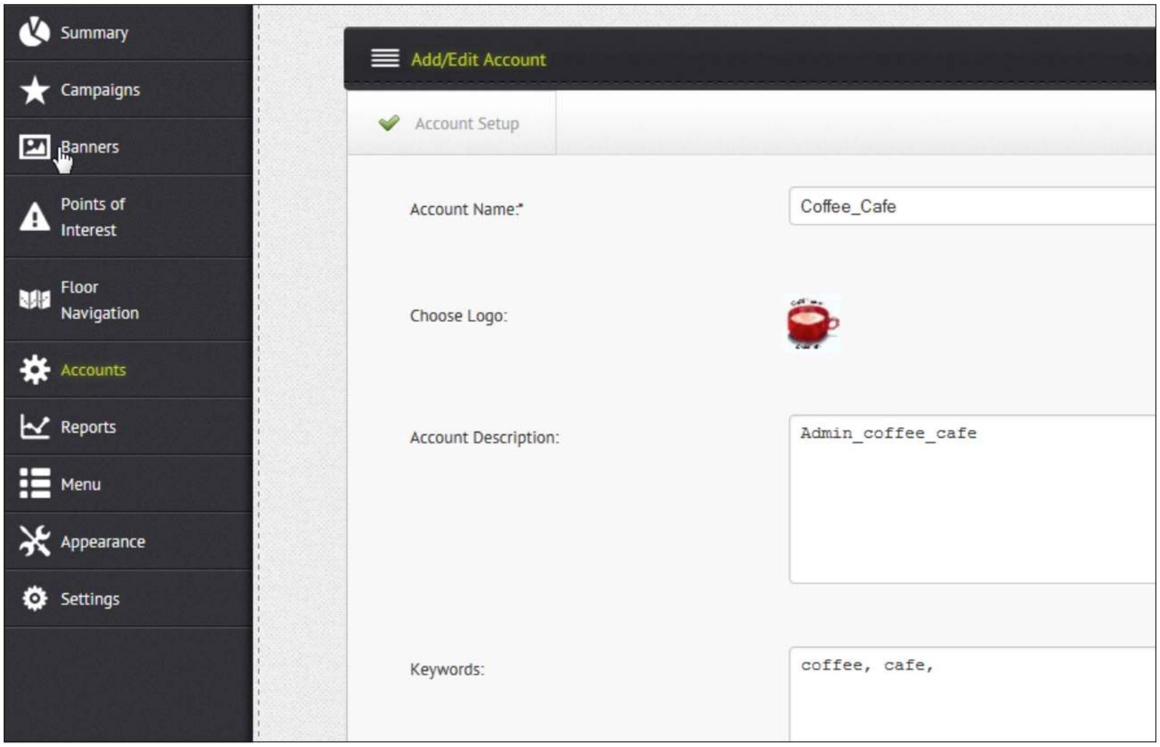
Here is the process for setting up floor navigation:

Step 1. The super administrator plots all possible paths on the floor map using tools provided on the Floor Navigation tab.



Step 2. The super administrator places a store at the appropriate location on the map using the Floor Navigation tools.

Step 3. On the Accounts tab, specify all keywords for the account or store that can be used to locate the store or type of service.



Account Name:* Coffee_Cafe

Account Description: Admin_coffee_cafe

Keywords: coffee, cafe,

Settings Tab

On the Settings tab, the administrator can use the Domain Setup feature to define the URLs that are of interest to the venue owner. When the end user browses any of these URLs and searches for a specific keyword that matches any of the banner keywords, the CMX Browser Engage toolbar immediately expands, and a search is triggered in the CMX Browser Engage toolbar to display the banners that match those keywords. To provide this function, the administrator needs to define the URLs and the key handler that is used to search in that website. This task can be accomplished by searching on that website and viewing the URL for the search handler.

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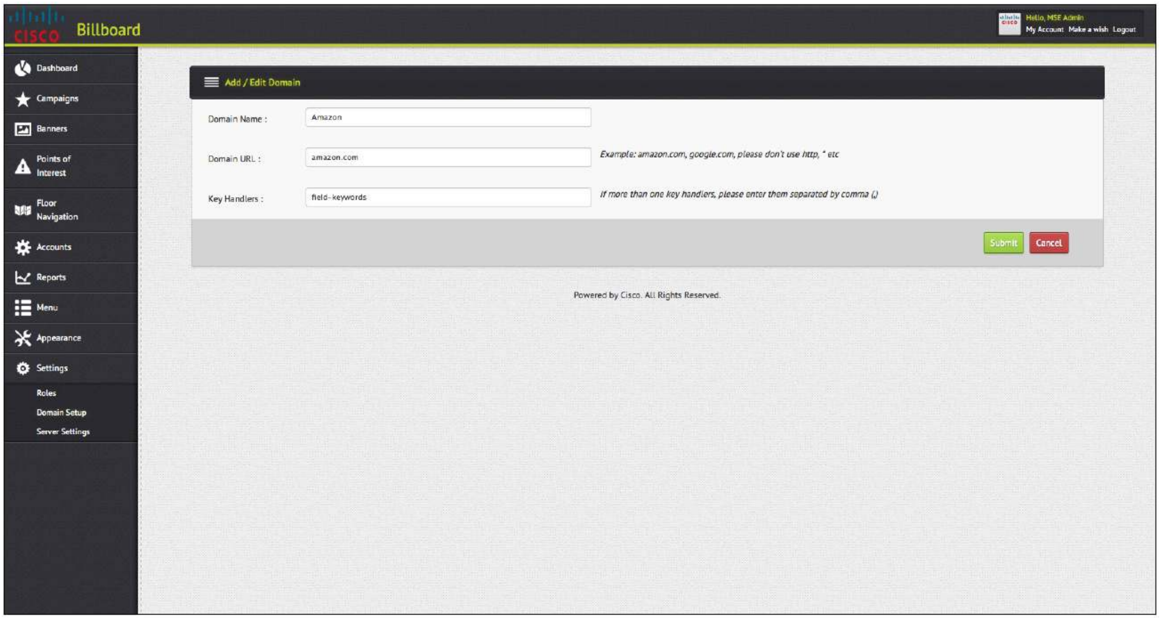

Add / Edit Domain

Domain Name : Amazon

Domain URL : amazon.com *Example: amazon.com, google.com, please don't use http, * etc*

Key Handlers : field-keywords *If more than one key handlers, please enter them separated by comma (,)*

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For example, a URL for a keyword search might be http://www.ask.com/web?q=hot+dogs.

- Search engine: ask.com
- Search term: hot dogs

Metrics

The Dashboard and Reports tabs provide data for some useful metrics.

The administrator can define a civic address for a venue (building) on the Edit Venue page on the Points of Interest tab.

Note: The civic address is helpful in displaying the correct splash page, so be sure to enter it correctly for your venue.

In the dashboard, all the venues that have civic addresses defined will be displayed on the map with a green dot. When the administrator clicks the green dot, some high-level statistics appear in a pop-up window along with a link to the Location Analytics Service page. Clicking the venue also filters all the metrics shown below the map filtered by that specific venue.

Configuring the Redirection Router

This section describes the redirection methods and presents a sample configuration for each method.

Note: Regardless of which redirection method you use (PBR or Layer 4 Redirect), no particular configuration is required for Cisco MSE. By default, Cisco MSE listens to both TCP port 9090, and TCP port 80 (to accommodate PBR redirection). When outbound HTTP traffic arrives atport 80, Cisco MSE uses its internal translation table to direct the traffic from port 80 to 9090. Hence, if the redirection router in a deployment supports Layer 4 Redirect, you should configure the redirection to port 9090 at the router to free more resources on Cisco MSE.

Policy-Based Routing

PBR is available on most routers, and most network administrators are familiar with its use. Configuration is by means of a simple routemap matching HTTP traffic and then altering the MAC address of the destination to the MAC address of the IP next hop (**set ip next-hop x.x.x.x**). A critical point in this model is that Cisco MSE must reside in the same Layer 2 network as the PBR router.

Sample PBR Router Configuration

```
!
hostname PBR-Router
!
interface GigabitEthernet0/0
description<Interface towards the Clients>
ip address 192.168.1.10 255.255.255.0
ip policy route-map pbr
!
interface GigabitEthernet0/1
description<Interface to the MSE>
ip address 192.168.2.10 255.255.255.0
!
interface GigabitEthernet0/2
description<Interface towards the INTERNET>
ip address 192.168.3.10 255.255.255.0
!
!# default route towards the Internet
ip route 0.0.0.0 0.0.0.0 192.168.3.254
!
!# the access list matches traffic from the client subnet to TCP port 80
access-list 2000 permit tcp 192.168.1.0 0.0.0.255 any eq www
!
route-map pbr permit 10
matchip address 2000
setip next-hop 192.168.2.15
!# the “set” command syntax should not be confused to be altering the “IP”
address of next hop. What really happens here is that the router applies ARP to
the defined IP address, and changes the destination “MAC” address only of the
traffic matching the ACL to the MAC address of the Cisco MSE NIC with the defined
IP address (here,192.168.2.15).
!
!
end
```

Layer 4 Redirect

Layer 4 Redirect is available on high-end routers providing subscriber services (usually found in hospitality and service provider deployments). Configuration may appear more complicated, but in essence the feature matches the HTTP traffic from the enduser and redirects it. Layer 4 Redirect allows alteration of both the Layer 3 and Layer 4 destination information (destination IP address and destination port): hence, the name Layer 4 Redirect.

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With Layer 4 Redirect, Cisco MSE can be located anywhere inthe network as long as it can be reached using IP. In addition, typical load-balancing techniques can be used to scale the capacity of the proxy solution.

Note: One of the primary reasons to use Layer 4 Redirect is that it allows Cisco MSE to be located anywhere.

Routers capable of Layer 4 Redirect usually also support failover mechanisms using a combination of IP service-level agreements (SLAs)and event management applets (see the sample configuration in the “References” section at the end of this document).

Sample Layer 4 Redirect Configuration

```
!
hostname ASR1K
!
aaa new-model
!
aaa authorization subscriber-service default local
!
subscriber authorization enable
!
!# the following command define the MSE proxy IP(s) and the respective Port(s)
they are listening to
redirect server-group CMX BROWSER ENGAGE_PROXY
serverip 192.168.2.15 port 9090
!
!# the following configuration define the Control Policy that activates L4-
Redirect service when a subscriber session is first detected, and the traffic
match the condition set by the ACL (to http)
class-map type traffic match-any CMX BROWSER ENGAGE_L4
match access-group input name L4_ACL
!
policy-map type service CMX BROWSER ENGAGE_L4_Policy
 10 class type traffic CMX BROWSER ENGAGE_L4
redirect to group CMX BROWSER ENGAGE_PROXY
!
!
policy-map type control CMX BROWSER ENGAGE_L4_REDIRECT
class type control always event session-start
  10 service-policy type service name CMX BROWSER ENGAGE_L4_Policy
!
interface TenGigabitEthernet0/0/0.91
description<Interface towards L4RDCT Clients>
encapsulation dot1Q 91
ip address 192.168.11.10 255.255.255.0
service-policy type control CMX BROWSER ENGAGE_L4_REDIRECT
ip subscriber l2-connected
initiator unclassified mac-address
!
interface TenGigabitEthernet0/0/0.92
```

```
description<Interface to the MSE>
encapsulation dot1Q 92
ip address 192.168.2.10 255.255.255.0
!
interface TenGigabitEthernet0/0/0.93
description<Interface towards the INTERNET>
encapsulation dot1Q 93
ip address 192.168.3.10 255.255.255.0
!
ip route 0.0.0.0 0.0.0.0 192.168.3.254
!
!# a numbered ACL - like the one in the PBR example- would have served the same
purpose
ip access-list extended L4_ACL
permittcp 192.168.11.0 0.0.0.255 any eq www
!
!
!# adding the following aliases obviously are not mandatory, but can be handy for
troubleshooting
alias exec sss show subscriber session
alias exec css clear subscriber session
alias exec srt show redirect translation
!
end
```

Troubleshooting

This section provides some techniques to help troubleshoot CMX Browser Engage deployments.

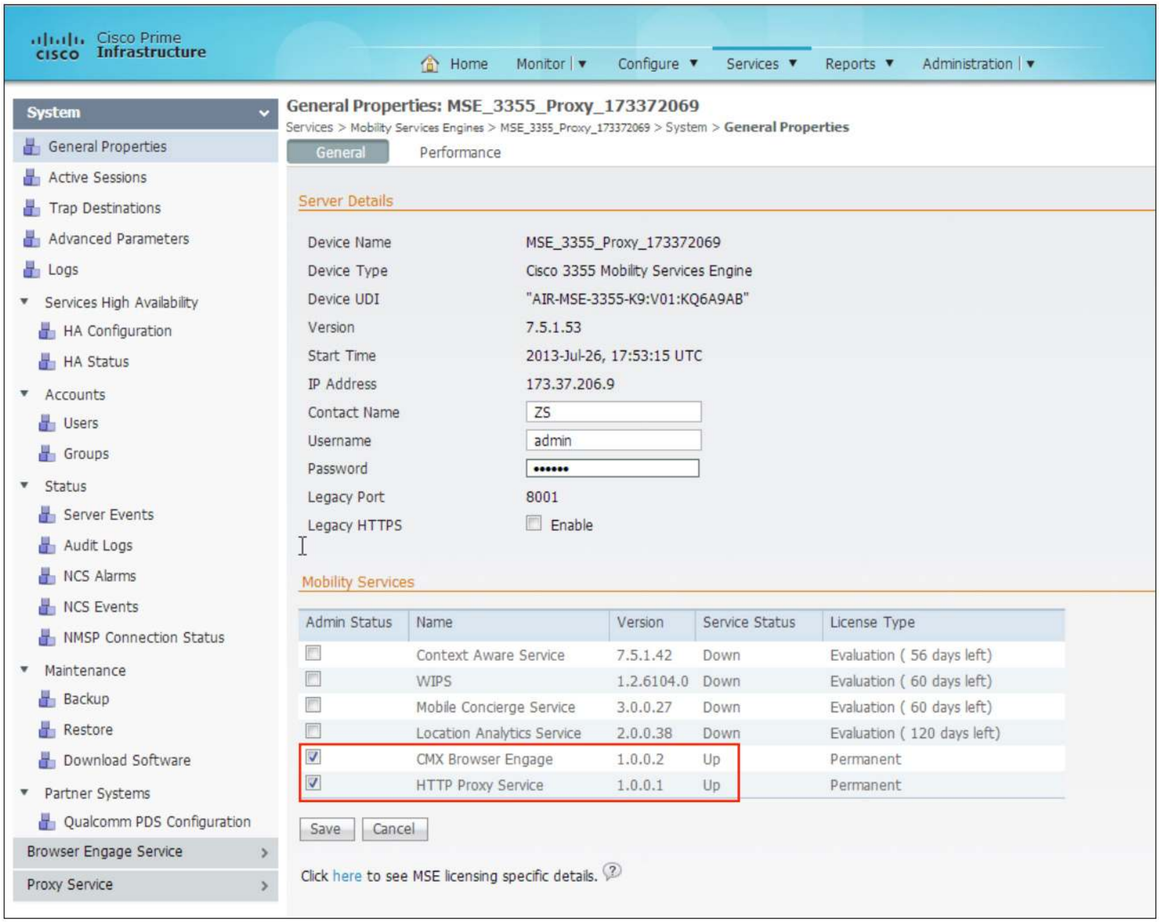
No Internet Pages Loading on the Client

If Internet pages do not load on the client, check whether other Internet traffic (other than traffic on TCP port 80) is passing through (for example, non-HTTP email, HTTPS, and application traffic).

If the problem occurs with all Internet traffic, then check the routing, and possibly temporarily remove PBR or Layer 4 Redirect to simplify troubleshooting.

If the problem is specific to HTTP traffic (port 80) and other Internet applications are functional, troubleshoot according to the problem with the requested HTTPpage.

- If the requested page is timing out: Verify that PBR or Layer 4 Redirect is indeed intercepting the traffic and directing it to Cisco MSE (see the **show route-map counter** example in the following section called “ **The Page Is Loading, but the Banner Does Not Appear”**
- You may have an incorrect Cisco MSE IP address or redirection port configured in the redirection rule for the router.However, if you find that the traffic is indeed reaching Cisco MSE, check the following:
    - Confirm that the HTTP Proxy Service is running by entering **get server info** from the Cisco MSE CLI or from the Cisco Prime Infrastructure GUI.



General Properties: MSE_3355_Proxy_173372069

Services > Mobility Services Engines > MSE_3355_Proxy_173372069 > System > **General Properties**

Server Details

Device Name	MSE_3355_Proxy_173372069
Device Type	Cisco 3355 Mobility Services Engine
Device UDI	"AIR-MSE-3355-K9:V01:KQ6A9AB"
Version	7.5.1.53
Start Time	2013-Jul-26, 17:53:15 UTC
IP Address	173.37.206.9
Contact Name	ZS
Username	admin
Password	••••••
Legacy Port	8001
Legacy HTTPS	□ Enable

Mobility Services

Admin Status	Name	Version	Service Status	License Type
□	Context Aware Service	7.5.1.42	Down	Evaluation (56 days left)
□	WIPS	1.2.6104.0	Down	Evaluation (60 days left)
□	Mobile Concierge Service	3.0.0.27	Down	Evaluation (60 days left)
□	Location Analytics Service	2.0.0.38	Down	Evaluation (120 days left)
☑	CMX Browser Engage	1.0.0.2	Up	Permanent
☑	HTTP Proxy Service	1.0.0.1	Up	Permanent

Click here to see MSE licensing specific details.

  - If HTTP Proxy Serviceis already enabled, check that Cisco MSE can reach the client subnet, and that it has Internet connectivity (for example, from the CLI ping an active client IP address and http://www.ask.com).
  - If the client and Internet are reachable but the problem persists, try restarting HTTP Proxy Service. From Cisco Prime Infrastructure, uncheck the box next to HTTP Proxy Service and click Save. After the screen refreshes and the service is shown as Down, recheck the box and click Save again and confirm that the service is now listed as Up.
- If you receive the “HTTP Error: 502 Bad gateway” message: This message means that your redirection configuration on the router is successfully sending the traffic to a Cisco MSEproxy. In this case, the problem is probably related to your Cisco MSE proxy settings (confirm that you can reach DNS from Cisco MSE; you may have configured a bad DNS IP address).

Note: CMX Browser Engage redirects only HTTP traffic; however, about 5 percent of the sites on the Internet and 100 percent of the sites that permit financial services transactions use HTTPS. When a website uses an HTTPS connection between the client and the server, a proxy cannot inject traffic. About 90 percent of all websites use HTTP because it is easier and cheaper to deploy than HTTPS, but 10 percent of all websites, including several large sites such as Facebook.com and Google.com, default to an HTTPS connection.

The Page Is Loading, but the Banner Does Not Appear

If the page loads, but the banner does not appear, do the following:

1. From the client's browser, view the loaded HTTP webpage source (for example, in Google Chrome, right-click the page and choose View Page Source).
2. Search for the string **CMX Browser Engage**.
3. If the string **CMX Browser Engage** is found in the page source code, but the banner is still not loading, look for this statement:

   ```
   <scriptsrc="http://<CMX Browser Engage-server>:8081/Mario/CMX Browser Engage.js"
   type="text/javascript"></script>
   ```

   The value <**CMX Browser Engage-server**> is the variable you configured earlier in Cisco Prime Infrastructure (see the section "Provide CMX Browser Engage Server Information to Proxy Service"). If the variable is configured correctly, it should display the CMX Browser Engage service IP address or a valid resolvable hostname pointing to it. If instead you see the exact string **CMX Browser Engage-server** displayed instead of the proper IP address, confirm that the configuration is correct using the Cisco Prime Infrastructure interface (see "Provide CMX Browser EngageServer Information to Proxy Service").

4. If,after viewing the webpage source code, you find that the CMX Browser Engage script was not inserted:

   a. Check that the router is indeed intercepting the HTTP traffic: for PBR, watch the counters on the PBR route map (they should increase), and for Layer 4 Redirect, view the subscriber redirect translation. A PBR example is shown here:

   ```
   PBR-Router#sh route-map
   route-map pbr, permit, sequence 10
   Match clauses:
   ip address (access-lists): 2000
   Set clauses:
   ip next-hop 192.168.2.15
   Policy routing matches: 369 packets, 24930 bytes
   ```

   b. Check that the proxy Cisco MSE interface is receiving the intercepted traffic:

   ```
   /opt/mse/proxy/bin/exec_show_stat_proxy.sh
   ```

   From the output of the this command, verify the following:

   - The IP table rule is inserted.
   - IP forwarding is enabled.

   c. For more details, collect trace information using tcpdump (tcpdump.rpm is included in /opt/mse/proxy/bin). To install tcpdump, enter the command **rpm -ivh**<**tcpdumpx.x.rpm**> as shown in this example: (Note the x.x.rpm refers to version numbers and platforms, Use the example below for version number 3.4a5-3 on the i386 platform (ie Intel).

   ```
   rpm -ivhtcpdump-3.4a5-3.i386.rpm
   ```

   Atcpdump trace on the Cisco MSE, client, or HTTP server device is often a very useful troubleshooting tool. The following code provides sample syntax:

   ```
   tcpdump -i<interface> -p tcp -host <ip> -s 65535 -w <output file>
   ```

   For more information, see the tcpdump manua lpage at http://www.tcpdump.org/tcpdump_man.html.

   d. You can also check the proxy error logs, located at /opt/mse/proxy/nginx/logs/error.log using **grep** to filter the output to see only the client IP being debugged.

Note: In the case of PBR, if Cisco MSE is running, and the proxy service is not enabled, Cisco MSE will still allow Internet traffic to pass through (this is not the case with Layer 4 Redirect). Always make sure that the required services are indeed running (for more information, see the section "Enabling CMX Browser Engage from Cisco Prime Infrastructure".

References

Proxy Error and Access Logs

Proxy-related logs are located in:

```
/opt/mse/logs/proxy/

/opt/mse/logs/proxy/proxy-hmon.out(Proxy Health Monitor logs)

/opt/mse/logs/proxy/proxyServiceMonitor-sh.out(Health Monitor Start stop script
output)

/opt/mse/logs/proxy/proxyServiceMonitor-nginx-sh.out(NGINX proxy start, stop
script output)

/opt/mse/proxy/nginx/logs/error.log (NGINX proxy error log)

/opt/mse/proxy/nginx/logs/access.log (NGINX proxy access log)
```

Configuration Snippets Pertaining to the Fail over Mechanism Available When Using Layer 4 Redirect

```
!
track 11 ipsla 11 reachability
!
ipsla 11
 http get http://192.168.2.15:9090/nginx_status
 timeout 15000
ipsla schedule 11 life forever start-time now
!
event manager applet no_redirect_policy
 event track 11 state down
 action 1 cli command "conf t"
 action 2 cli command "interface TenGigabitEthernet0/0/0.911"
 action 3 cli command "no service-policy type control CMX BROWSER
ENGAGE_L4_REDIRECT"
 action 4 cli command "end"
 action 5 cli command "clear subscriber session all" pattern "confirm"
 action 6 syslog priority errors msg "192.168.2.15 HTTP Proxy DOWN; Removing
Redirect Policy "
event manager applet redirect_policy
 event track 11 state up
 action 1 cli command "conf t"
 action 2 cli command "interface TenGigabitEthernet0/0/0.911"
 action 3 cli command "service-policy type control CMX BROWSER
ENGAGE_L4_REDIRECT"
```

```
 action 4 cli command "end"
 action 5 cli command "clear subscriber session all" pattern "confirm"
 action 6 syslog priority errors msg "192.168.2.15 HTTP Proxy UP; applying
Redirect Policy "
!
end
```

Sample show **Commands at the Time of the Event**

```
ASR1K#sh track 11
Track 11
  IP SLA 11 reachability
  Reachability is Up
    7 changes, last change 00:05:14
  Latest operation return code: OK
  Latest RTT (millisecs) 2
  Tracked by:
    EEM applet redirect_policy
    EEM applet no_redirect_policy



ASR1K#sh track 11
Track 11
  IP SLA 11 reachability
  Reachability is Down
    8 changes, last change 00:00:00
  Latest operation return code: No connection
  Tracked by:
    EEM applet redirect_policy
    EEM applet no_redirect_policy



ASR1K#show event manager history events
No.  Job Id Proc Status   Time of Event            Event Type        Name
1    1      Actv abort    Tue Apr30 18:45:13 2013  track             applet:
redirect_policy
2    2      Actv abort    Sun May 5 11:48:30 2013  track             applet:
no_redirect_policy
3    3      Actvsuccess   Sun May 5 11:54:15 2013  track             applet:
redirect_policy
4    4      Actvsuccess   Sun May 5 11:57:30 2013  track             applet:
no_redirect_policy
5    5      Actvsuccess   Sun May 5 12:06:15 2013  track             applet:
redirect_policy
6    6      Actvsuccess   Sun May 5 12:11:30 2013  track             applet:
no_redirect_policy
```

Sample show log **Output**

```
*May  5 11:46:04.037: %SYS-5-CONFIG_I: Configured from console by Admin on vty0
(10.82.235.77)
```

```
*May  5 11:48:30.068: %TRACKING-5-STATE: 11 ipsla 11 reachability Up->Down
*May  5 11:52:51.802: %SYS-5-CONFIG_I: Configured from console by Admin on vty0
(10.82.235.77)
*May  5 11:54:15.161: %TRACKING-5-STATE: 11 ipsla 11 reachability Down->Up
*May  5 11:54:15.503: %SYS-5-CONFIG_I: Configured from console by  on vty1
(EEM:redirect_policy)
*May  5 11:54:15.508: %HA_EM-3-LOG: redirect_policy: 192.168.2.15 HTTP Proxy UP;
applying Redirect Policy
*May  5 11:57:30.169: %TRACKING-5-STATE: 11 ipsla 11 reachability Up->Down
*May  5 11:57:30.511: %SYS-5-CONFIG_I: Configured from console by  on vty1
(EEM:no_redirect_policy)
*May  5 11:57:30.516: %HA_EM-3-LOG: no_redirect_policy: 192.168.2.15 HTTP Proxy
DOWN; applying Redirect Policy
*May  5 12:05:02.071: %SYS-5-CONFIG_I: Configured from console by Admin on vty0
(10.82.235.77)
*May  5 12:06:15.241: %TRACKING-5-STATE: 11 ipsla 11 reachability Down->Up
*May  5 12:06:15.599: %HA_EM-3-LOG: redirect_policy: 192.168.2.15 HTTP Proxy UP;
applying Redirect Policy
*May  5 12:07:35.117: %SYS-5-CONFIG_I: Configured from console by Admin on vty0
(10.82.235.77)
*May  5 12:09:35.690: %SYS-5-CONFIG_I: Configured from console by Admin on vty0
(10.82.235.77)
*May  5 12:11:30.293: %TRACKING-5-STATE: 11 ipsla 11 reachability Up->Down
*May  5 12:11:30.536: %SYS-5-CONFIG_I: Configured from console by  on vty1
(EEM:no_redirect_policy)
*May  5 12:11:30.650: %HA_EM-3-LOG: no_redirect_policy: 192.168.2.15 HTTP Proxy
DOWN; applying Redirect Policy
*May  5 12:13:15.293: %TRACKING-5-STATE: 11 ipsla 11 reachability Down->Up
*May  5 12:13:15.534: %SYS-5-CONFIG_I: Configured from console by  on vty1
(EEM:redirect_policy)
*May  5 12:13:15.650: %HA_EM-3-LOG: redirect_policy: 192.168.2.15 HTTP Proxy UP;
applying Redirect Policy
ASR1K#
```

Running CMX Browser Engage in Cisco Flex Local Mode

For Cisco Flex local deployments, the HTTP Proxy Service feature needs to be enabled locally at the remote site, where client traffic is being switched. For this type of deployment,you can use Cisco ISR G2 with a Cisco UCS E-Series Server, which will run the Cisco Cloud Connector (sometimes referred to as C3) proxy feature (Figures 6 and 7).

The Cisco Cloud Connector proxy feature uses the Cisco Open Network Environment (ONE) Platform Kit (Cisco onePK)service set to intercept local traffic and insert the scripts needed for CMX Browser Engage.

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The following process occurs at the local router:

1. The router interface is configured to intercept packets and to redirect all client traffic to the Cisco UCS E-Series Server.
2. Cisco Cloud Connector HTTP Proxy Service terminates the client TCP connection and binds to port 80 to receive all HTTP traffic.
3. HTTP Proxy Service binds to the client’s IP address and port number and opens a new TCP connection to the destination web server (acts as an endpoint).
4. HTTP Proxy Service intercepts server responses, inserts billboard (BBX) ad script in the HTTP message, and forwards the response to the client.
5. The client browser runs the inserted ad script to fetch the ad from the BBX ad server.

Figure 6. Cisco Flex Deployment with Enterprise Cisco ISR

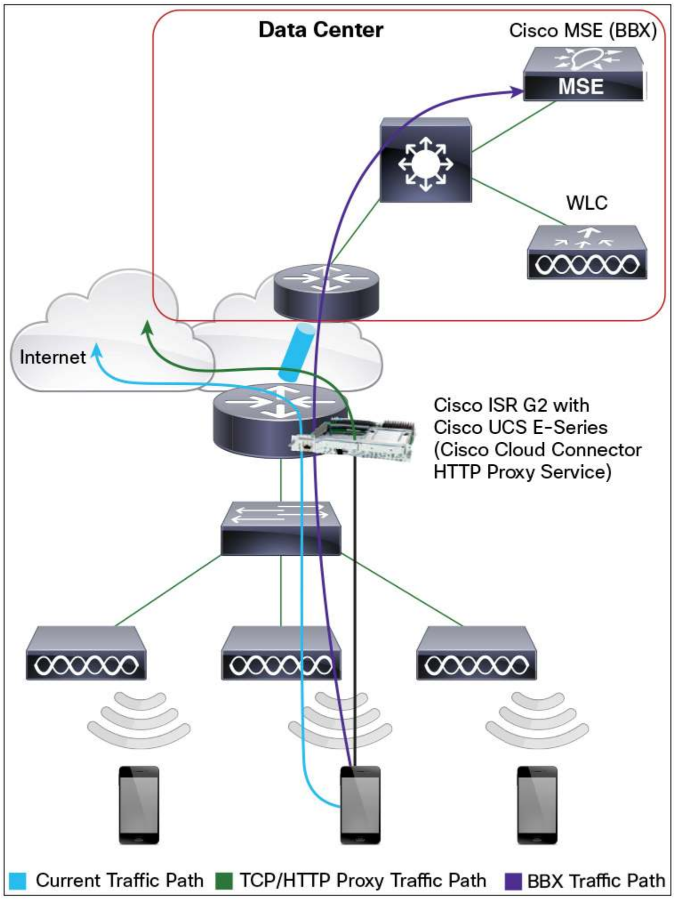
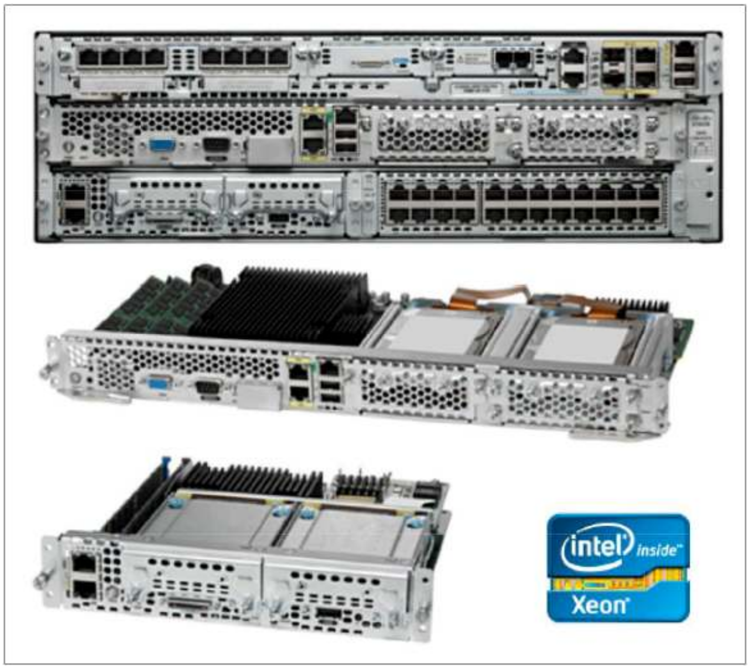


Figure 7. Cisco UCS E-Series Servers with Cisco 3945 ISR



Data sheets for the Cisco UCS E-Series Servers can be found at http://www.cisco.com/en/US/prod/collateral/ps10265/ps12629/data_sheet_c78-705787.pdf.

Hardware Comparison: Cisco UCS E-Series Switches

Table 1 provides a comparison of the Cisco UCS E-Series Switches.

Table 1. Cisco UCS E-Series Switches

	UCS-E140S	UCS-E140D(P)/UCS-E160D(P)
Processor	Intel Xeon (Sandy Bridge) E3-1105C (1 GHz)	Intel Xeon (Sandy Bridge) E5-2428L (2 GHz)/E5-2418L (1.8 GHz)
Core	4	4/6
Memory	8-16 GB DDR3 1333 MHz	8-48 GB DDR3 1333 MHz
Storage	200 GB - 2 TB (2 HDD) SATA, SAS, SED, SSD	200 GB - 3 TB (3 HDD*) SATA, SAS, SED, SSD
RAID	RAID 0 & RAID 1	RAID 0, RAID 1 & RAID 5*
Network Port	Internal: 2 GE Ports External: 1 GE Port	Internal: 2 GE Ports External: 2 GE Ports PCIE Card: 4 GE 1 10 GE FCOE

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Deploying Cisco Cloud Connector Proxy

Following are the prerequisites for using the Cisco CMX dashboard connector:

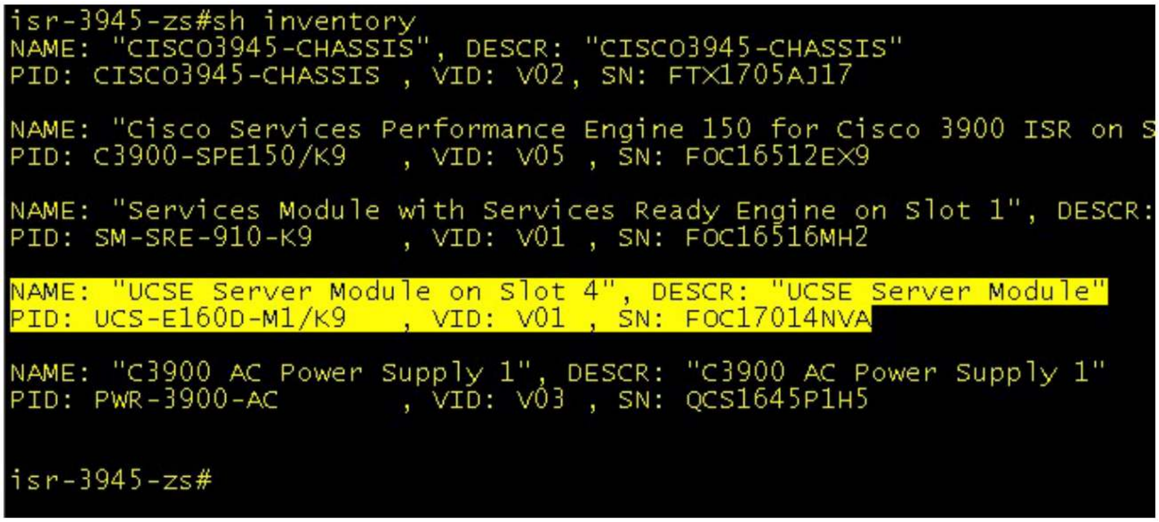
- You must have a Cisco ISR G2 with Cisco IOS® Software Release 15.3-M0.2 or higher (a Cisco IOS Software release with Cisco onePK support is needed).
- You must have a Cisco UCSE-Series Server with VMware ESXi 5.1 preinstalled.
- The Cisco UCSE-Series server needs 4GB of memory, four virtual CPUs (vCPU), and a 250GB hard drive.
- The Cisco UCSE-Series Server module must be installed in the Cisco ISR.
- You must have configured the Cisco UCSE-Series parameters such as the IP address and networking through the Cisco Integrated Management Controller (IMC) GUI.
- You must be able to access VMware ESXi on the Cisco UCSE-Series module through the VMware vSphere client.
- You must have the Cisco Cloud Connector proxy Open Virtualization Format (OVA) file C3-CMX-1.0.0.ova.

For more information about installing and provisioning the Cisco UCSE-Series module, please see the following link: http://www.cisco.com/en/US/docs/unified_computing/ucs/e/1.0/roadmap/e_series_road_map.html.

Note: Cisco ISR G2 routers that support the Cisco CMX dashboard are Cisco 2911, 2921, 2951, 3925, and 3945 ISRs ("E" versions of the Cisco ISR G2 routers are not supported).

Follow the steps presented here to configure Cisco Cloud Connector Proxy.

These steps assume that the Cisco UCSE-Server blade is installed in slot 4 of the Cisco 3945 ISR G2. To check, use the **show inventory** command:



```
isr-3945-zs#sh inventory
NAME: "CISCO3945-CHASSIS", DESCR: "CISCO3945-CHASSIS"
PID: CISCO3945-CHASSIS , VID: V02, SN: FTX1705AJ17

NAME: "Cisco Services Performance Engine 150 for Cisco 3900 ISR on S
PID: C3900-SPE150/K9    , VID: V05  , SN: FOC16512EX9

NAME: "Services Module with Services Ready Engine on Slot 1", DESCR:
PID: SM-SRE-910-K9      , VID: V01  , SN: FOC16516MH2

NAME: "UCSE Server Module on Slot 4", DESCR: "UCSE Server Module"
PID: UCS-E160D-M1/K9    , VID: V01  , SN: FOC17014NVA

NAME: "C3900 AC Power Supply 1", DESCR: "C3900 AC Power Supply 1"
PID: PWR-3900-AC        , VID: V03  , SN: QCS1645P1H5


isr-3945-zs#
```

Step 1. Configure the router as follows:

- Use Cisco IOS Software Release 15.3(3)M with Cisco onePK installed.
- Configure the interface for the wireless client traffic (the gateway for wireless clients).
- Configure the Cisco UCSE-Series slot with the Cisco IMC IP address.
- Set a maximum transmission unit (MTU) of 1700 on the Cisco UCSE-Series interface.

- Configure the interface for a generic route encapsulation (GRE) tunnel between the router and the Cisco Cloud Connector proxy.
- Configure the Cisco onePK settings.
- Configure the username and password with privilege 15 to be used in the Cisco Cloud Connector HTTP Proxy Service configuration (to be used in the Cisco Cloud Connector web management user interface).
- Set the routes from the router to access the Cisco UCSE-Series module for the VMware ESXi server and Cisco Cloud Connector proxy.

Note: When using this type of deployment, you are using Cisco onePK and not PBR to move the packets from the router to the Cisco MSE proxy, but the router is still essentially performing the same function; it is just using a different method.

A sample configuration is shown here:

```
isr-3945#
!
username CISCO privilege 15 password 7 02470752180500701E1D
!
interface GigabitEthernet0/0.12
OOB management interface to router
encapsulation dot1Q 12
ip address 173.37.206.10 255.255.255.0
!
interface GigabitEthernet0/1
description P2P Link to Internet
ip address 10.10.240.253 255.255.255.0
duplex auto
speed auto
!
interface GigabitEthernet0/2.245
description wireless client subnet
encapsulation dot1Q 245
ip address 10.10.245.254 255.255.255.0
ipnat inside
ip virtual-reassembly in
!
interface ucse4/0
mtu 1700
ip unnumbered GigabitEthernet0/0.12
imcip address 10.89.46.11 255.255.255.0 default-gateway 10.89.46.254
imc access-port dedicated
!
interface Vlan1
description for GRE tunnel to C3 proxy
mtu 1700
ip address 10.100.100.1 255.255.255.0
noautostate
```

```
!
ip route 0.0.0.0 0.0.0.0 10.10.240.254
ip route 173.37.206.12 255.255.255.255 ucse4/0
ip route 173.37.206.13 255.255.255.255 ucse4/0
!
onep
datapath transport gre sender-id 1 interface Vlan1
transport type tcp
!
isr-3945#
```

Step 2. Configure access to the Cisco IMC port on the Cisco UCSE-SeriesServer through the router console to install VMware ESXi 5.1.

```
!
interface ucse4/0
mtu 1700
ip unnumbered GigabitEthernet0/0.12
imcip address 10.89.46.11 255.255.255.0 default-gateway 10.89.46.254
imc access-port dedicated
!
```

The configuration shown here uses a dedicated port (an Ethernet cable is plugged into the Cisco UCSE-Series Server IMC port). You can configure access to the Cisco MIC port through the router (no Ethernet cable plugged into the Cisco UCSE-Series Server) using the command **imc access-port shared-lom**. Be sure to include the route to the Cisco IMC port through the router if you use **shared-lom**.

For more information about configuring the Cisco IMC on the Cisco UCSE-Series, see http://www.cisco.com/en/US/docs/unified_computing/ucs/e/2.0/gs/guide/b_2_0_Getting_Started_Guide_chapter_0101.html.

For more information about installing VMware ESXi using the Cisco IMC port, see http://www.cisco.com/en/US/docs/unified_computing/ucs/e/2.0/gs/guide/b_2_0_Getting_Started_Guide_chapter_01000.html.

Be sure that appropriate routes have been setup on the Cisco ISR to access the VMware ESXi server through the Cisco UCSE-Series slot. The following example shows a route to the VMware ESXi host and Cisco Cloud connector that will be deployed in the next step:

```
ip route 173.37.206.12 255.255.255.255 ucse4/0 (route to ESXi host)
ip route 173.37.206.13 255.255.255.255 ucse4/0 (route to C3 connector running on
ESXi host)
```

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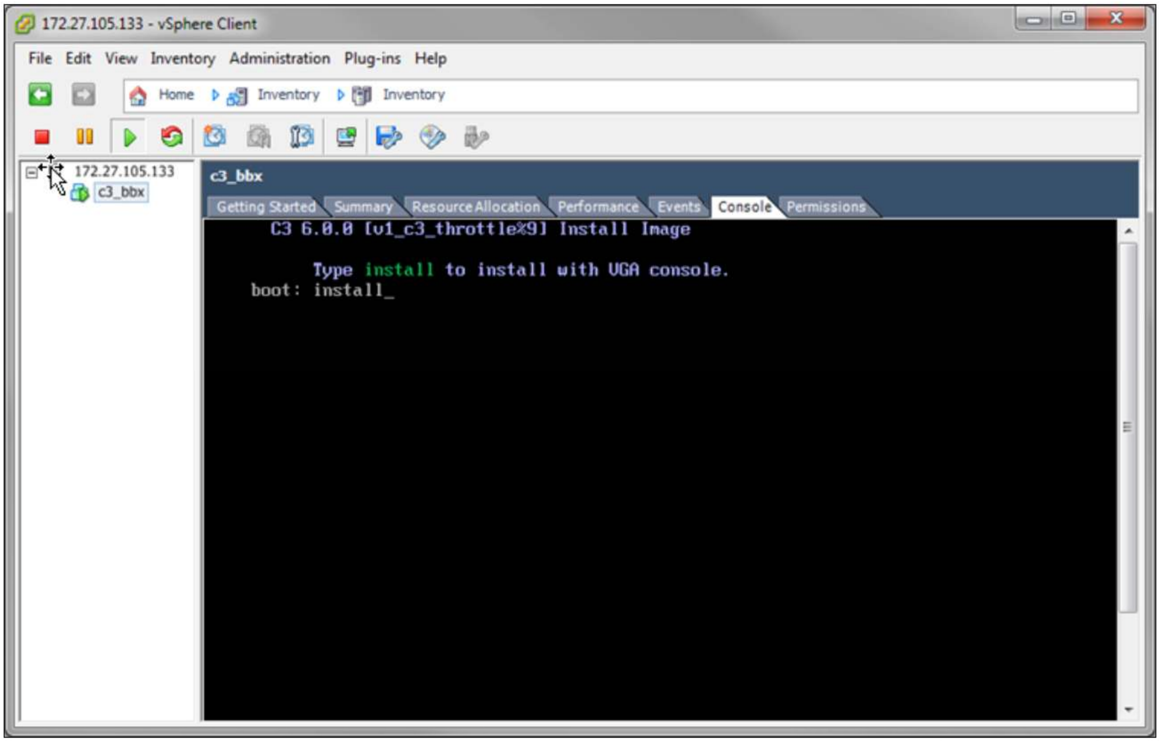
Step 3. After VMware ESXi has been loaded onto the Cisco UCS E-Series Server, deploy the Cisco Cloud Connector OVA file on the VMware ESXi server using the VMware vSphere client.



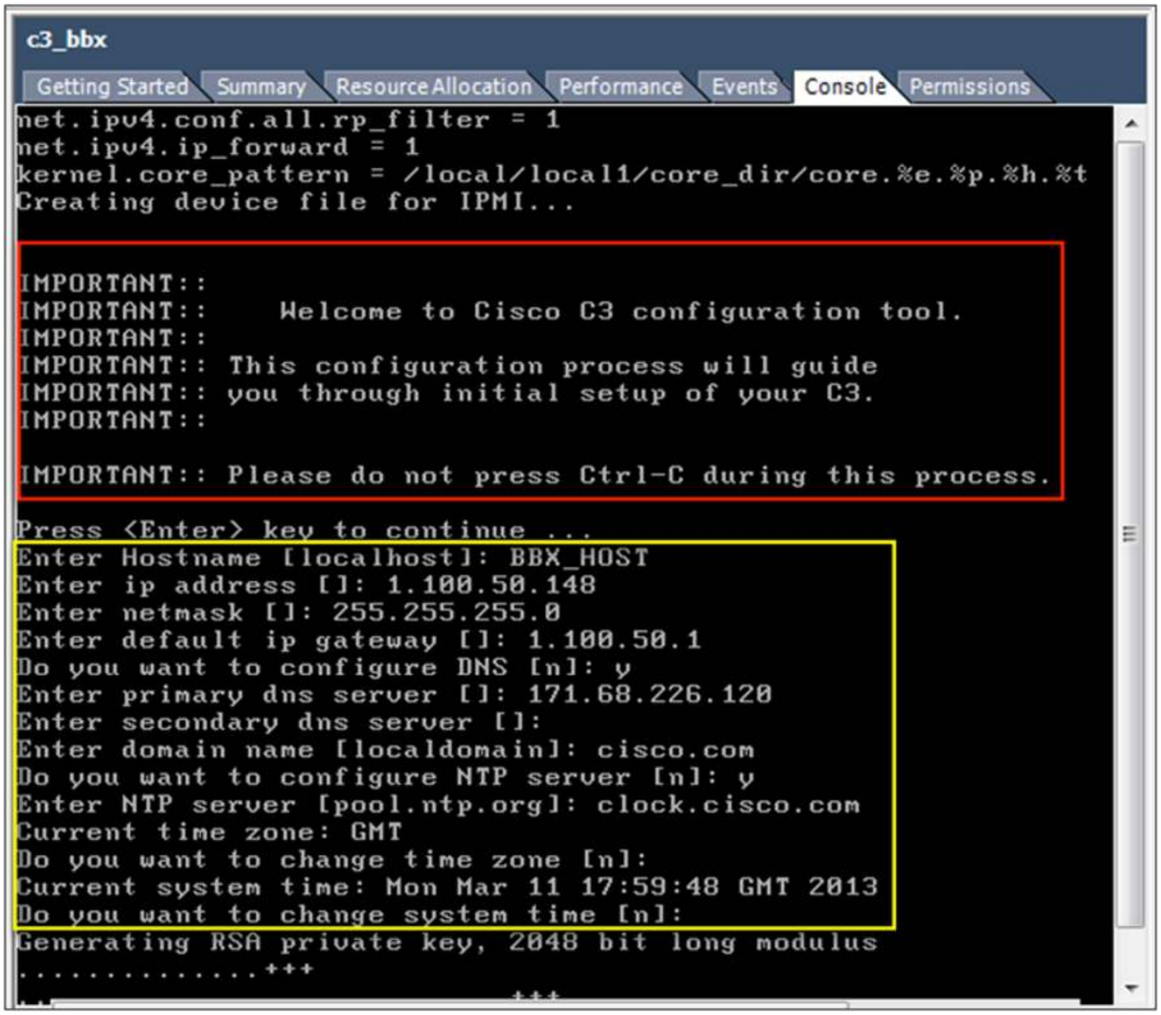
172.27.105.133 - vSphere Client
File Edit View Inventory Administration Plug-ins Help
Home Inventory Inventory
172.27.105.133
c3_bbx
c3_bbx
Getting Started Summary Resource Allocation Performance Events Console Permissions

```
      C3 6.0.0 [v1_c3_throttle%9] Install Image

            Type install to install with VGA console.
    boot: install_
```

Step 4. After the Cisco Cloud Connector OVA file has been deployed, the Cisco Cloud Connector installation process can begin. You get access to the VGA console of the virtual machine. Enter **install** to install the Linux-based Cisco Cloud Connector hosting environment.

At the first installation of the OVA file, you will be prompted for the initial setup of the system, needed for setting the Admin users, networking, time zones, etc.



```
net.ipv4.conf.all.rp_filter = 1
net.ipv4.ip_forward = 1
kernel.core_pattern = /local/local1/core_dir/core.%e.%p.%h.%t
Creating device file for IPMI...


IMPORTANT::
IMPORTANT::    Welcome to Cisco C3 configuration tool.
IMPORTANT::
IMPORTANT:: This configuration process will guide
IMPORTANT:: you through initial setup of your C3.
IMPORTANT::

IMPORTANT:: Please do not press Ctrl-C during this process.

Press <Enter> key to continue ...
Enter Hostname [localhost]: BBX_HOST
Enter ip address []: 1.100.50.148
Enter netmask []: 255.255.255.0
Enter default ip gateway []: 1.100.50.1
Do you want to configure DNS [n]: y
Enter primary dns server []: 171.68.226.120
Enter secondary dns server []:
Enter domain name [localdomain]: cisco.com
Do you want to configure NTP server [n]: y
Enter NTP server [pool.ntp.org]: clock.cisco.com
Current time zone: GMT
Do you want to change time zone [n]:
Current system time: Mon Mar 11 17:59:48 GMT 2013
Do you want to change system time [n]:
Generating RSA private key, 2048 bit long modulus
..............+++
                           +++
```

The setup utility sets up two system users:

root and Admin.

The VGA console transitions to the login prompt for the interactive Linux shell. Only the root user can log into the Linux shell. The Admin user administers the web user interface.

You can rerun the setup utility to change the configured parameters by entering the "**setup**" command at the shell.

After the initial networking setup is complete, the Linux shell can also be accessed using an SSH client. The interactive Linux shell is used mainly fordebugging and troubleshooting. Most other management and configuration tasks are performed using the web user interface.

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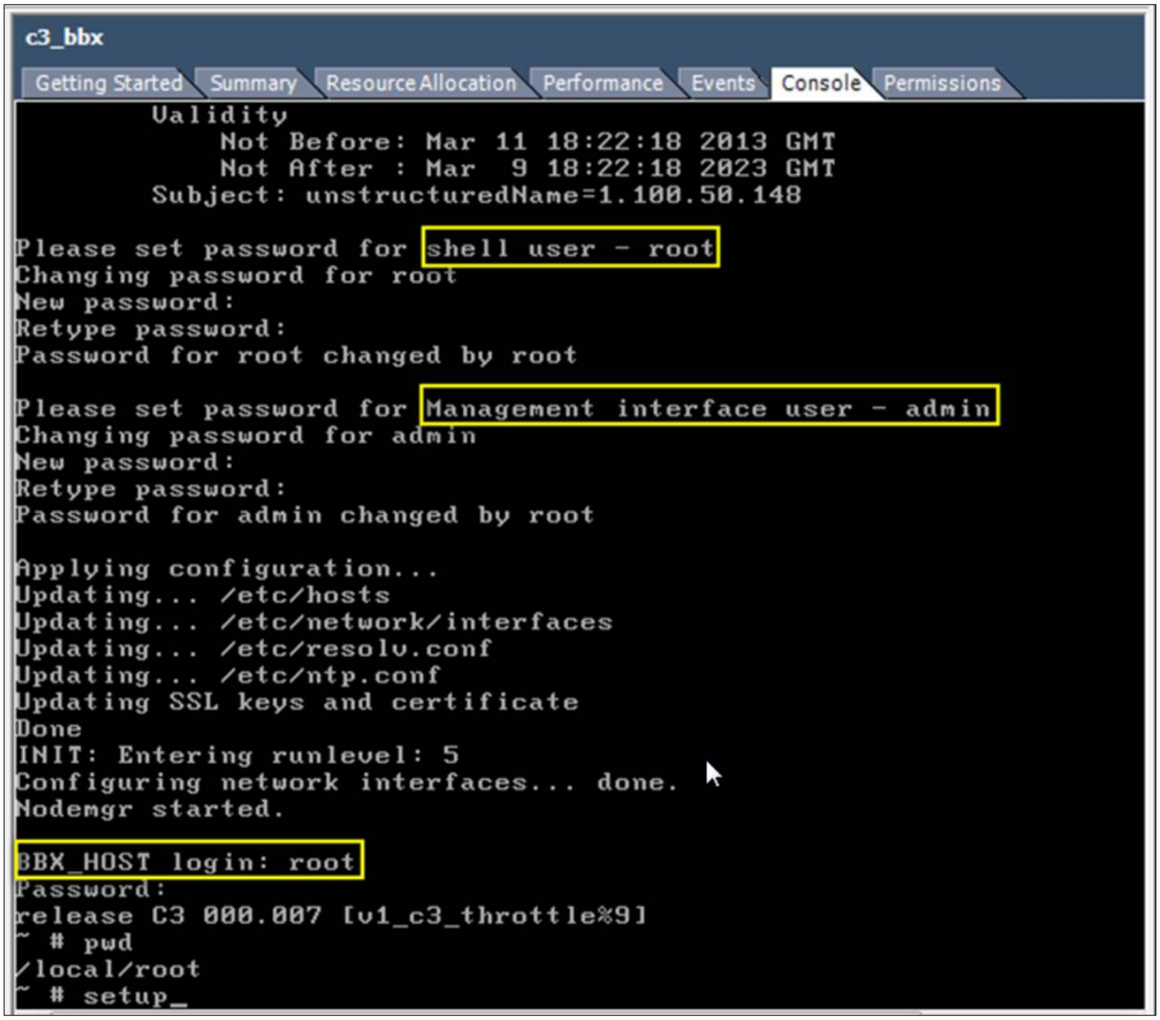
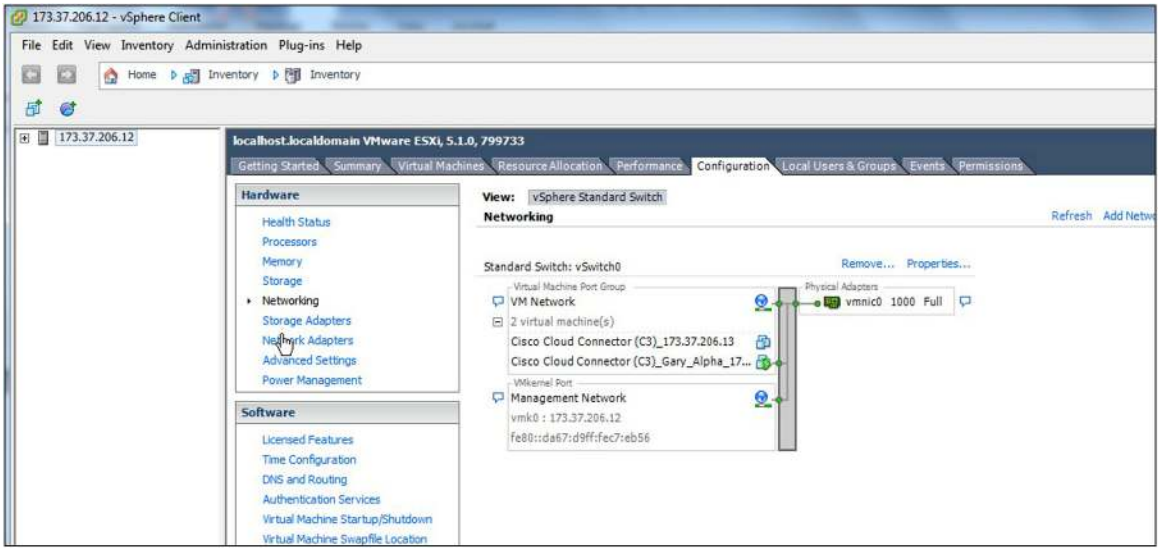


```
          Validity
              Not Before: Mar 11 18:22:18 2013 GMT
              Not After : Mar  9 18:22:18 2023 GMT
          Subject: unstructuredName=1.100.50.148

Please set password for shell user - root
Changing password for root
New password:
Retype password:
Password for root changed by root

Please set password for Management interface user - admin
Changing password for admin
New password:
Retype password:
Password for admin changed by root

Applying configuration...
Updating... /etc/hosts
Updating... /etc/network/interfaces
Updating... /etc/resolv.conf
Updating... /etc/ntp.conf
Updating SSL keys and certificate
Done
INIT: Entering runlevel: 5
Configuring network interfaces... done.
Nodemgr started.

BBX_HOST login: root
Password:
release C3 000.007 [v1_c3_throttle%9]
~ # pwd
/local/root
~ # setup_
```

Step 5. After the Cisco Cloud Connector proxy has been installed and configured, set the MTU size to 1700 so that the Cisco Cloud Connector proxy processes packets accurately.

a. Select the host machine and open the Configuration tab and select Networking.



View: vSphere Standard Switch

Networking

Standard Switch: vSwitch0

Virtual Machine Port Group
VM Network
2 virtual machine(s)
Cisco Cloud Connector (C3)_173.37.206.13
Cisco Cloud Connector (C3)_Gary_Alpha_17...

Physical Adapters
vmnic0 1000 Full

VMkernel Port
Management Network
vmk0 : 173.37.206.12
fe80::da67:d9ff:fec7:eb56

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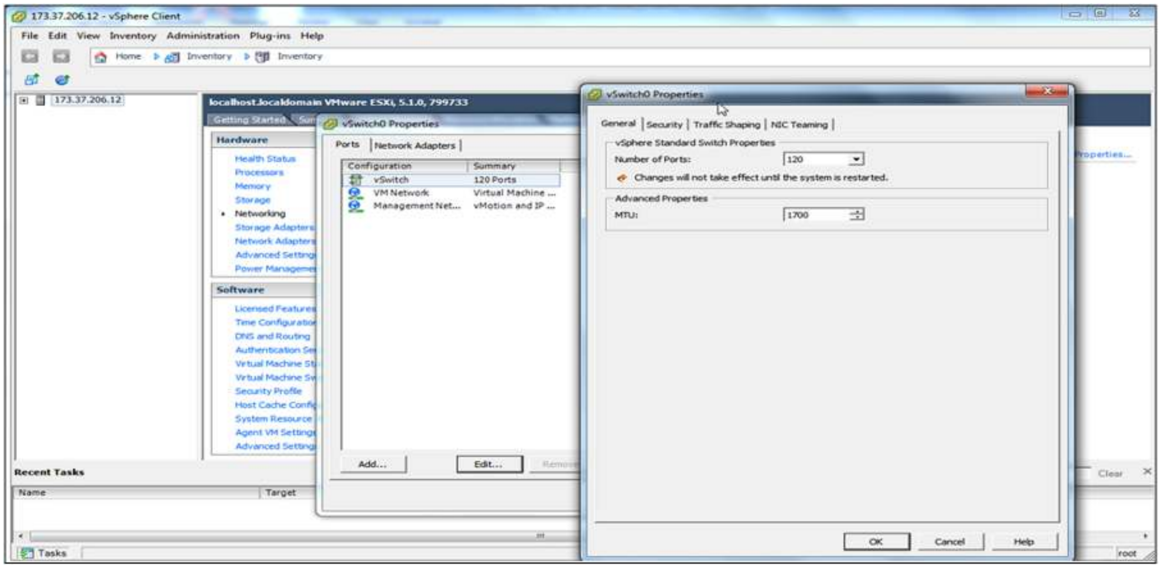
b. Under Standard Switch: vSwitch0, select the propertiesyou want to set and click Edit. Click OK to apply the settings.



Configuration	Summary
vSwitch	120 Ports
VM Network	Virtual Machine ...
Management Net...	vMotion and IP ...

vSphere Standard Switch Properties

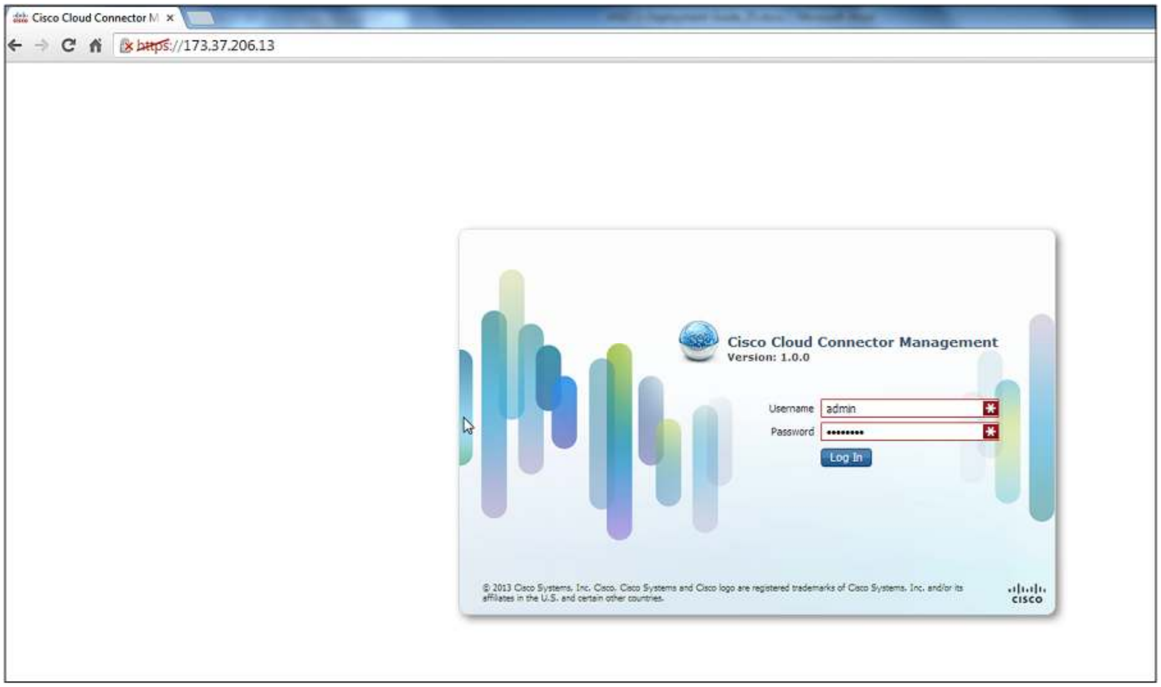
Number of Ports: 120

Changes will not take effect until the system is restarted.

Advanced Properties

MTU: 1700

Step 6. Access Cisco Cloud Connector. When the setup utility is complete, the Cisco Cloud Connector Connector management web user interface is accessible from a browser. The username is **admin** and the password is the one you specified during Cisco Cloud Connector setup.



Cisco Cloud Connector Management
Version: 1.0.0

Username admin

Password ••••••••

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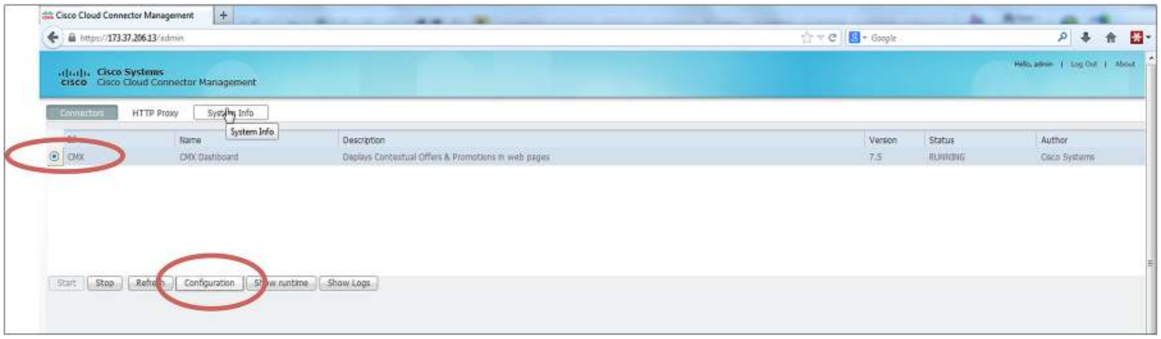
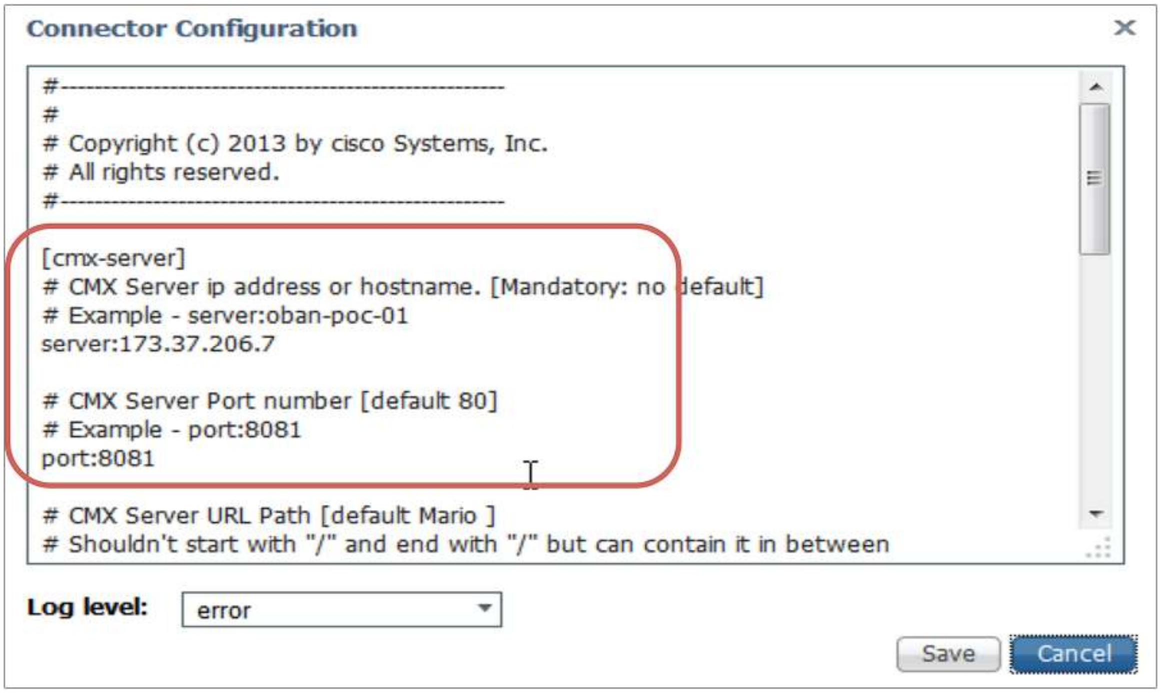
Step 7. ConfigureCisco Cloud Connector.

a. After you are logged into the web management user interface of Cisco Cloud Connector, select the Connectors tab and click the CMX button. Then select the Configuration tab at the bottom of the screen.


Cisco Cloud Connector Management
https://173.37.206.13/admin
Google
Cisco Systems
Cisco Cloud Connector Management
Hello, admin | Log Out | About
Connectors
HTTP Proxy
System Info
System Info
Start
Stop
Refresh
Configuration
Show runtime
Show Logs

	Name	Description	Version	Status	Author
● CMX	CMX Dashboard	Displays Contextual Offers & Promotions in web pages	7.5	RUNNING	Cisco Systems

b. In the configuration file that opens, enter the Cisco MSE (portal) IP address and port number to access the Cisco CMX Dashboard portal. The example shown here uses IP address 173.37.206.7 and port 8081.



```
#-----------------------------------------------------
#
# Copyright (c) 2013 by cisco Systems, Inc.
# All rights reserved.
#-----------------------------------------------------

[cmx-server]
# CMX Server ip address or hostname. [Mandatory: no default]
# Example - server:oban-poc-01
server:173.37.206.7

# CMX Server Port number [default 80]
# Example - port:8081
port:8081

# CMX Server URL Path [default Mario ]
# Shouldn't start with "/" and end with "/" but can contain it in between
```

Log level: error

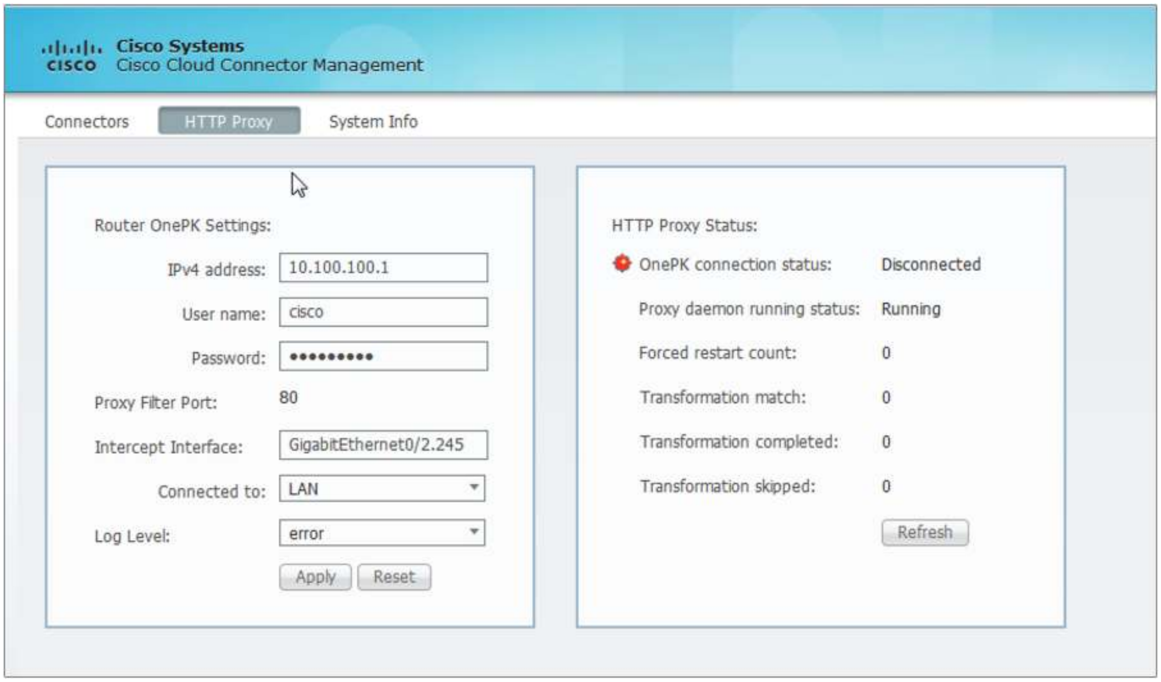
c. When the configuration is complete, click Save.

Step 8. Configure the HTTP Proxy Service on Cisco Cloud Connector.

a. Select the Http Proxy tab from with the management user interface.

b. Under Router OnePK Settings, enter the interface IP address for the router interface that will be sending traffic to the Cisco Cloud Connector application. This example uses the VLAN1 interface with an IP address of 10.100.100.1. Also enter the username and password that you created on the router (with Privilege 15 access).

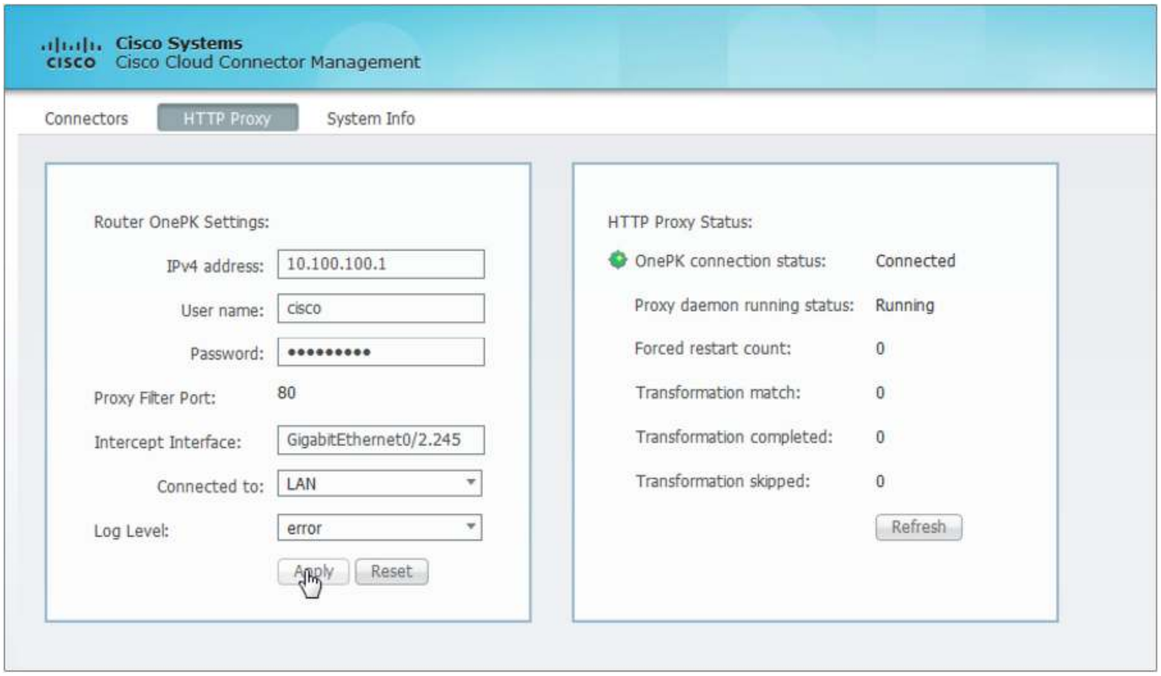
c. Enterthe interface on which the interception of traffic will occur. The example here uses the wireless client subnet interface GigabitEthernet0/2.245 on the LAN side.



Router OnePK Settings:
IPv4 address: 10.100.100.1
User name: cisco
Password: •••••••••
Proxy Filter Port: 80
Intercept Interface: GigabitEthernet0/2.245
Connected to: LAN
Log Level: error

HTTP Proxy Status:
● OnePK connection status: Disconnected
Proxy daemon running status: Running
Forced restart count: 0
Transformation match: 0
Transformation completed: 0
Transformation skipped: 0

d. After the appropriate information has been entered, click Apply. The HTTP Proxy Service status should change from “OnePK connection status: Disconnected” to “OnePK connection status: Running.”

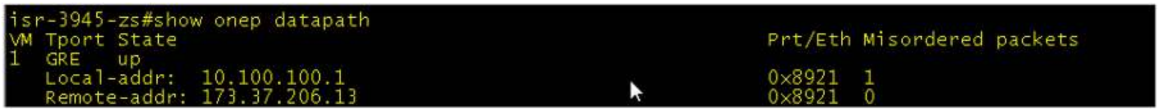


Router OnePK Settings:
IPv4 address: 10.100.100.1
User name: cisco
Password: •••••••••
Proxy Filter Port: 80
Intercept Interface: GigabitEthernet0/2.245
Connected to: LAN
Log Level: error

HTTP Proxy Status:
● OnePK connection status: Connected
Proxy daemon running status: Running
Forced restart count: 0
Transformation match: 0
Transformation completed: 0
Transformation skipped: 0

Note: The Cisco Cloud Connector management GUI looks like the Cisco Prime Infrastructure GUI, but it is not connected to Cisco Prime Intrastucture.

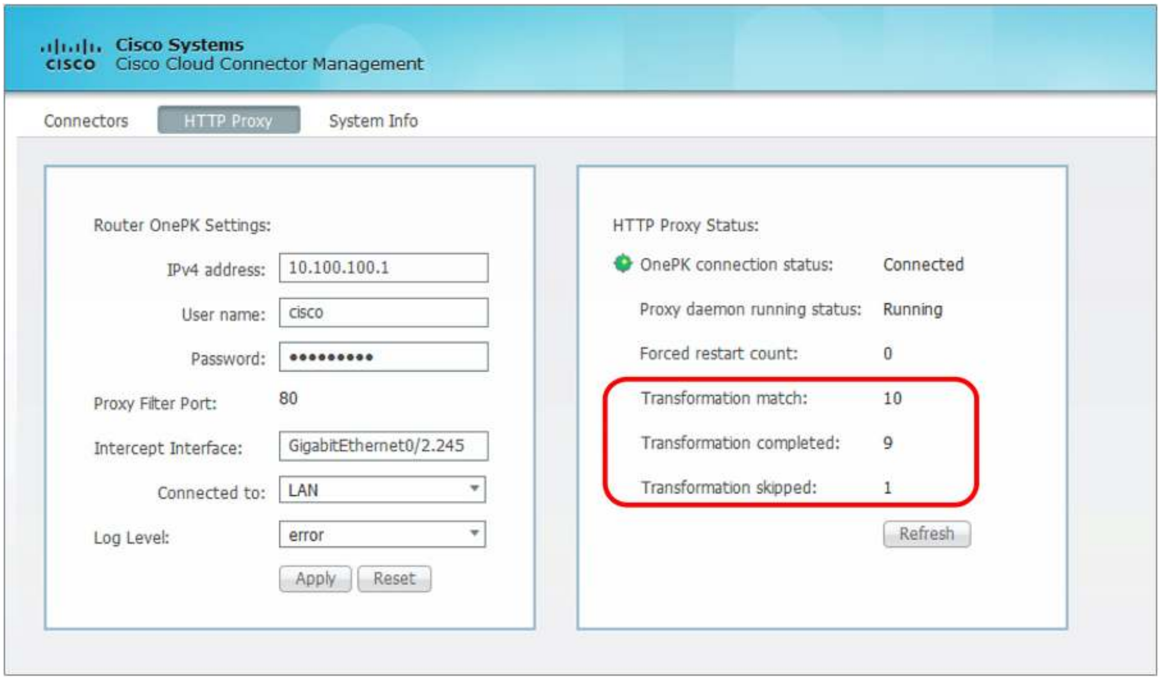
e. To verify connectivity from the router side, enter the command Show onep datapath. The GRE status should be up, and both the local and remote addresses should be shown.



```
isr-3945-zs#show onep datapath
VM Tport State                                          Prt/Eth Misordered packets
1   GRE   up
    Local-addr:  10.100.100.1                           0x8921  1
    Remote-addr: 173.37.206.13                          0x8921  0
```

Your CMX Browser Engage service should now be ready for use (assuming that you have your campaigns setup in the Cisco CMX dashboard on Cisco MSE; if you do not, see the “CMX Browser Engage Service Configuration” section of this document for configuration details).

Step 9. Verify that the Cisco Cloud Connector proxy is processing client traffic by selecting the HTTP Proxy tab. Look at the “Transformation match” and “Transformation completed” counters.If they are incrementing, then the Cisco Cloud Connector proxy is receiving intercepted traffic bound for port 80.



Router OnePK Settings:

IPv4 address: 10.100.100.1

User name: cisco

Password: ●●●●●●●●●

Proxy Filter Port: 80

Intercept Interface: GigabitEthernet0/2.245

Connected to: LAN

Log Level: error

HTTP Proxy Status:

OnePK connection status: Connected

Proxy daemon running status: Running

Forced restart count: 0

Transformation match: 10

Transformation completed: 9

Transformation skipped: 1

Tips

You can change the location of the green dot on the CMX Browser Engage start page.

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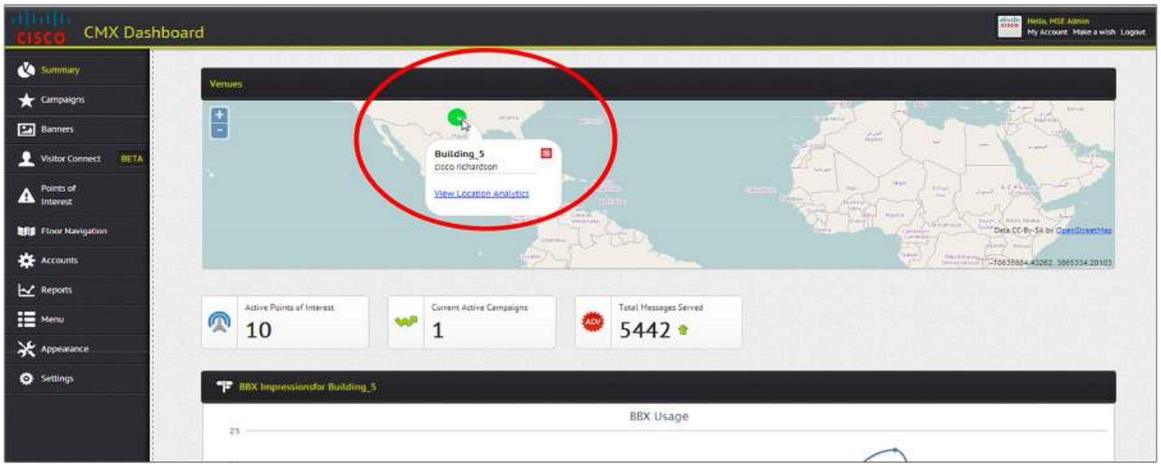
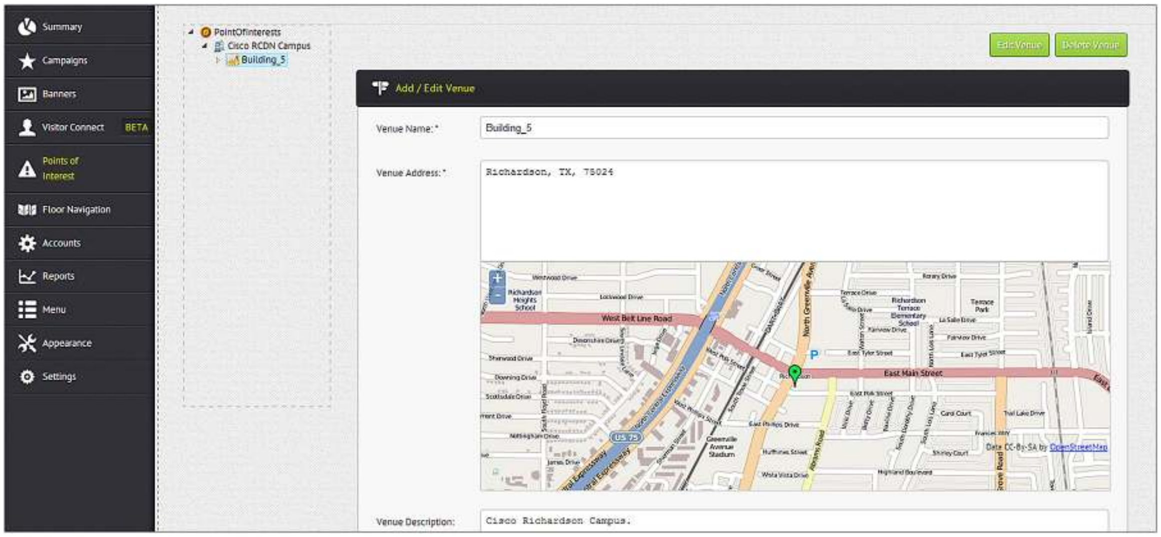


Active Points of Interest 10

Current Active Campaigns 1

Total Messages Served 5442

On the Point of Interest tab, edit the address of the venue. The address is based on its OpenStreetMap location (openstreetmap.org).

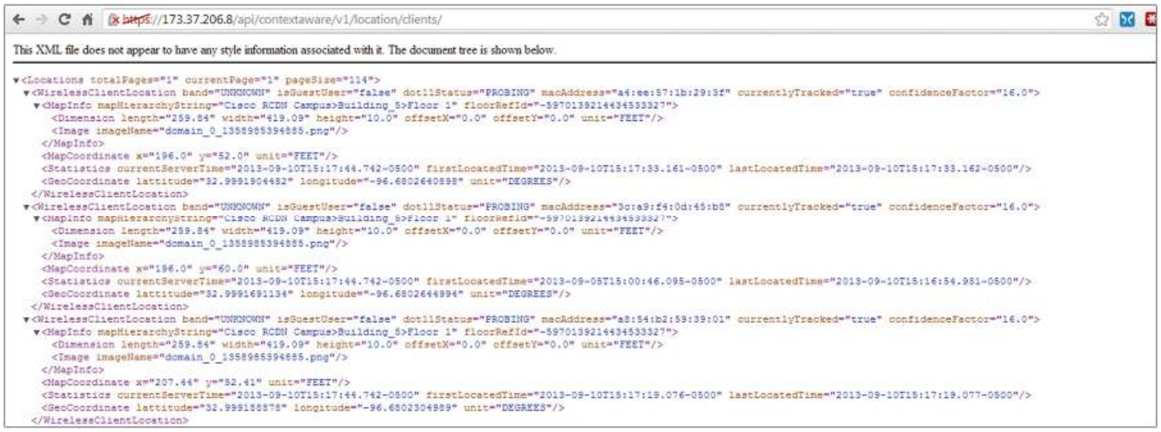


Venue Name:* Building_5

Venue Address:* Richardson, TX, 75024

Venue Description: Cisco Richardson Campus.

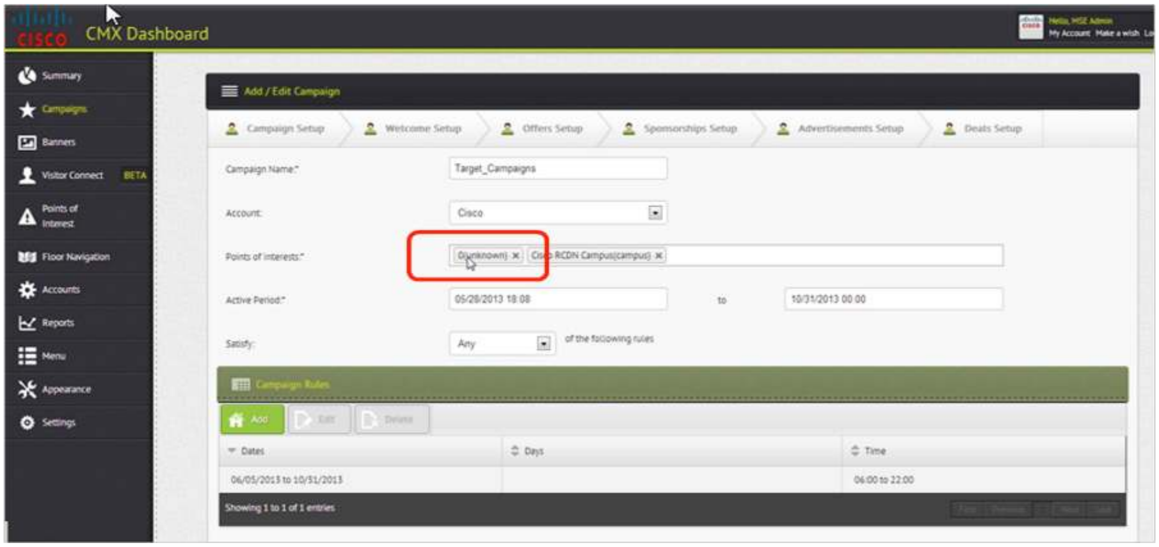
If banners do not appear in the client, but the **show route-map debug** command on the router shows matching packets and no 502 errors in the browser, check whether client appears in the location or zone in the Cisco MSE running location services (CAS). Search for the MAC address of your client.



This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
▼<Locations totalPages="1" currentPage="1" pageSize="114">
 ▼<WirelessClientLocation band="UNKNOWN" isGuestUser="false" dot11Status="PROBING" macAddress="a4:ee:57:1b:29:3f" currentlyTracked="true" confidenceFactor="16.0">
  ▼<MapInfo mapHierarchyString="Cisco RCDN Campus>Building_5>Floor 1" floorRefId="-5970139214434533327">
     <Dimension length="259.84" width="419.09" height="10.0" offsetX="0.0" offsetY="0.0" unit="FEET"/>
     <Image imageName="domain_0_1358985394885.png"/>
   </MapInfo>
   <MapCoordinate x="196.0" y="52.0" unit="FEET"/>
   <Statistics currentServerTime="2013-09-10T15:17:44.742-0500" firstLocatedTime="2013-09-10T15:17:33.161-0500" lastLocatedTime="2013-09-10T15:17:33.162-0500"/>
   <GeoCoordinate lattitude="32.9991904482" longitude="-96.6802640898" unit="DEGREES"/>
  </WirelessClientLocation>
 ▼<WirelessClientLocation band="UNKNOWN" isGuestUser="false" dot11Status="PROBING" macAddress="3c:a9:f4:0d:45:b8" currentlyTracked="true" confidenceFactor="16.0">
  ▼<MapInfo mapHierarchyString="Cisco RCDN Campus>Building_5>Floor 1" floorRefId="-5970139214434533327">
     <Dimension length="259.84" width="419.09" height="10.0" offsetX="0.0" offsetY="0.0" unit="FEET"/>
     <Image imageName="domain_0_1358985394885.png"/>
   </MapInfo>
   <MapCoordinate x="196.0" y="60.0" unit="FEET"/>
   <Statistics currentServerTime="2013-09-10T15:17:44.742-0500" firstLocatedTime="2013-09-05T15:00:46.095-0500" lastLocatedTime="2013-09-10T15:16:54.981-0500"/>
   <GeoCoordinate lattitude="32.9991691134" longitude="-96.6802644994" unit="DEGREES"/>
  </WirelessClientLocation>
 ▼<WirelessClientLocation band="UNKNOWN" isGuestUser="false" dot11Status="PROBING" macAddress="a8:54:b2:59:39:01" currentlyTracked="true" confidenceFactor="16.0">
  ▼<MapInfo mapHierarchyString="Cisco RCDN Campus>Building_5>Floor 1" floorRefId="-5970139214434533327">
     <Dimension length="259.84" width="419.09" height="10.0" offsetX="0.0" offsetY="0.0" unit="FEET"/>
     <Image imageName="domain_0_1358985394885.png"/>
   </MapInfo>
   <MapCoordinate x="207.44" y="52.41" unit="FEET"/>
   <Statistics currentServerTime="2013-09-10T15:17:44.742-0500" firstLocatedTime="2013-09-10T15:17:19.076-0500" lastLocatedTime="2013-09-10T15:17:19.077-0500"/>
   <GeoCoordinate lattitude="32.999188878" longitude="-96.6802304989" unit="DEGREES"/>
  </WirelessClientLocation>
```

If the client MAC address is not found, then the client is not seen by the Cisco MSE location service. Verify that the access point to which you are connected is within a zone on the mapin Cisco Prime Infrastructure. In the Points of Interests field for the campaign, choose the 0(unknown) location. Now the banner will be shown no matter what zone the client is in.



Campaign Name:* Target_Campaigns

Account: Cisco

Points of Interests:* 0(unknown) × Cisco RCDN Campus(campus) ×

Active Period:* 05/28/2013 18:08 to 10/31/2013 00:00

Satisfy: Any of the following rules

Dates	Days	Time
06/05/2013 to 10/31/2013		06:00 to 22:00

Showing 1 to 1 of 1 entries

CMX Browser Engage Service Specifications and Considerations

Keep these points in mind when using the CMX Browser Engage service:

- HTTP Proxy Service can run on a Cisco 3355 MSE (for central switched environments) or a Cisco ISR running a Cisco UCS E-Series module (for Cisco Flex deployments).
- The Cisco CMX dashboard and HTTP Proxy Servicecan run together if deployed on a Cisco 3355 MSE or standard Cisco VMSE (no additional services should be deployed on this Cisco MSE).
- HTTP Proxy Service is supported on all Cisco MSE platforms except the high-end Cisco MSEvirtual machine.
- The maximum supported throughput for HTTP Proxy Service running on the Cisco 3355 MSE and standard Cisco VMSE is approximately 660 Mbps with 2000 connections per second (cps).
- The maximum supported throughput for HTTP Proxy Service running on the Cisco ISR and Cisco UCS E-SeriesServer with Cisco Cloud Connector is approximately 60 Mbps.
- The Microsoft Internet Explorer (IE) browser **is not** supported for CMX Browser Engage service in Cisco MSE Release 7.5.
- Certain pages on certain devices may not be rendered as expected, especially if a site is redirected to a mobile version of a page at m.sitename.com. The results can be unexpected.

For More Information

See http://www.cisco.com/go/mse.

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