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Integrating the Cisco® Unified Presence Server in Your Unified Communications Network

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Introduction

Have you ever sat down and tried to count the times that you've called other people, just to get a busy tone? Or, maybe you've tried to send them an Instant Message just to sit there and wait forever for a response and didn't know why?

In this white paper, we will discuss an option that will allow our users to see availability status information of other users in the network via the Cisco Unified Presence Solution (CUPS) version 7.0.

What Is Presence?

Presence can be defined as "the ability and willingness of a user to communicate across a set of devices," as specified in the Unified Communications SRND version 7.0. Put into plain English, presence is the indication, based on user-provided information, regarding whether coworkers are available and how they prefer to be reached.

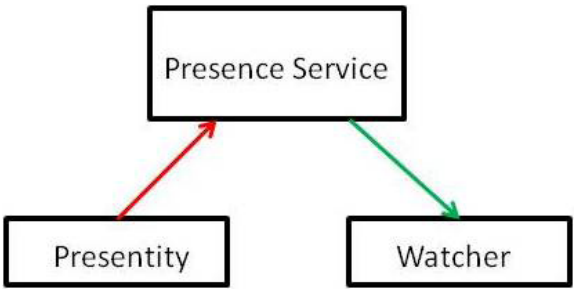
For example, if the person I want to call is on the phone, the CUPS will relay an unavailable status back to my initiating device. As a result, I will see the busy status on my phone and will avoid wasting my time making the call. Instead, I'll know to wait until later.

Important Terminology

As with many technical topics, Cisco Unified Presence has a specific set of terms that are important to with the user. Let's take a look at some of the main terms.

1. **User –** This is defined within Cisco Unified Communications Manager 6 and 7 as the end user whose device's primary extension or line appearance is associated with a specific availability status.
2. **Status –** Status is a dual-purpose value that indicates both the capability of the endpoint device (voice, video, web, etc) and the attributes showing the current condition of the device or user (available, busy, etc.).
3. **Consumption –** This is the use of current status information by various applications and devices to provide real-time updates for end users.
4. **Presentity –** This is the first of two types of clients for a Presence service and provides availability information that will be stored and distributed.
5. **Watcher –** This is the second type of Presence service client and receives the presence information from the service.

Graphically, these last two terms function as follows.



Looking even deeper, RFC 2778 defines two types of Watchers.

1. **Fetcher –** This entity requests the current value of some Presentity's presence information from the Presence Service. A specialized type of Fetcher is called the Poller, because it is designed to fetch information on a regular basis.
2. **Subscriber –** This entity requests notification from the Presence Service of future changes in some Presentity's presence information.

Therefore, it can be summarized that, while the Fetcher is interested in obtaining current presence information, the Subscriber makes sure that, if anything changes in the future, it knows about it.

Main Components

Cisco Unified Presence is comprised of the following components.

1. **Cisco Unified Presence Server (CUPS) –** This is the brain of the Presence architecture and works in almost the same manner that the Cisco Unified Communications Manager (CUCM) does. For example, CUPS servers are organized into clusters of up to six servers for redundancy. Also, the first CUPS server is designated as the Publisher and the other servers are designated as Subscribers.

One difference between CUPS and CUCM clusters is the ability to form subclusters, which can have two CUPS servers each. A main cluster can support up to three subclusters.

2. **Cisco Unified Communications Manager (CUCM) –** This is the main call-processing component of any Voice over IP (VoIP) infrastructure and will be the primary device the CUPS cluster will integrate with. It is the CUCM that controls the endpoint devices that will report the presence status to the CUPS server and, if watching devices are located across different dialing areas, it will be the CUCM server that will be responsible for properly routing the call between endpoints.

3. **Cisco Unified Personal Communicator (CUPC) –** This is a desktop application that enables employees to launch a single application to access all of their frequently used unified communications services. The CUPC client registers to both the CUPS and CUCM servers and unifies the functionality of the following two clients.

a. **Softphone style** functionality that is similar to Cisco IP Communicator (CIPC)

b. Video client functionality that is similar to Cisco Unified Video Advantage (CUVA)

Note: The CUPC client also provides instant messaging capabilities.

4. **Cisco Unified MeetingPlace/MeetingPlace Express –** These servers integrate voice, video, and web conferencing capabilities, and let you incorporate media interactions in a broad range of communication scenarios. Cisco Unified MeetingPlace is deployed as an on-premise solution run over internal networks. By doing this, you can ensure several benefits, to include the following.
   a. Enhancing security by isolating sensitive meetings behind firewall appliances, such as the Cisco ASA platform
   b. Reducing toll charges by ensuring that conferences run on your internal networks on-net
   c. Ensuring that integrations with other applications are easy to install and administer

5. **Cisco Unity/Unity Connection –** These servers are powerful Unified Communications solutions that provide advanced, convergence-based communication services such as unified messaging and voice messaging. Cisco Unity is a Windows-based application capable of supporting unified messaging, while Unity Connection is a Redhat Linux-based appliance solution that supports voicemail only.

6. **Cisco Unified Videoconferencing –** Designed to scale to both small and large networks, the Cisco Unified Videoconferencing solution provides a modular and stackable architecture that can support as few as three parties and up to several hundred in a single conference.

   This 3500-series video switch product family encompasses a range of stackable and modular, chassis-based products to optimize capacity and functionality. Smaller, stackable multipoint control units (MCUs) offer a built-in enhanced media processor, compact design, and easy installation.

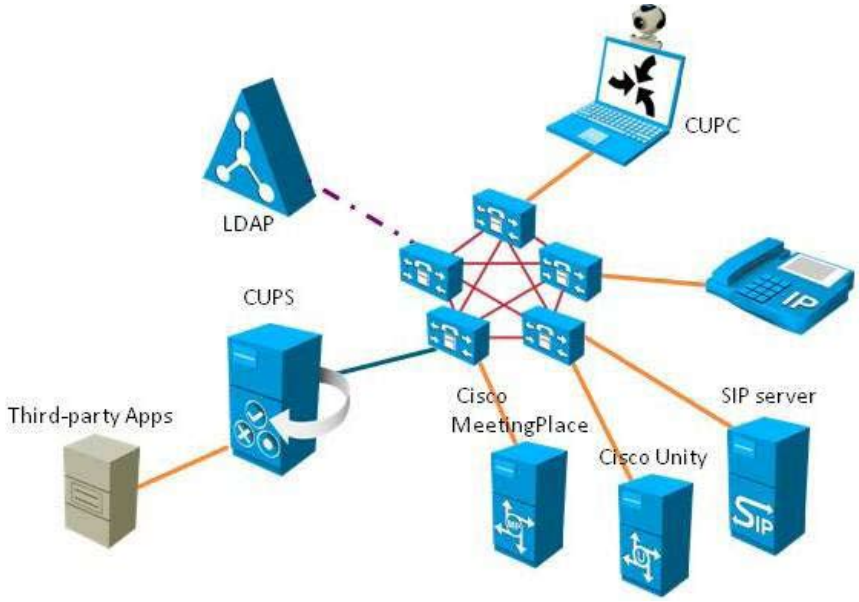
7. **Lightweight Directory Access Protocol (LDAP) version 3.0 –** LDAP is an industry-standard protocol designed for accessing and modifying specialized databases called Directories that are optimized for very efficient reading by client applications and devices. This provides a very robust means for organizations to centrally locate and organize all of their user information into this Directory.

   An example of an LDAP-compliant directory is Microsoft's Active Directory. One major benefit of Microsoft's solution is that their directory is a multi-master design. This means that many servers can maintain a read/write copy of the database, and that each of these servers will replicate the database between them, providing redundancy and load-balancing.

8. **Cisco Unified IP Phones –** Cisco's 7900-series of IP phones are used as the client endpoint-devices that will report the Presence status for the assigned user.

9. **Third-Party Presence Servers –** CUPS is able to integrate with other vendor solutions, such as the Microsoft Live Communications Server or Office Communication Server. By using Session Initiation Protocol (SIP), as well as a protocol named SIMPLE (SIP for Instant Messaging and Leveraging Extensions), we can define the accepted messaging to initiate and maintain a status request and to provide appropriate responses.

The relationship among these components can be seen in the following diagram.



CUCM Configuration Requirements for Integration

1. **Licensing –** There are two main licenses that must be addressed when deploying the CUPS server in the network.

    a. **Cisco Unified Presence user feature license –** One Device License Unit (DLU) is required for each Unified Presence user in the network, no matter how many physical devices each user has. Enabling this user feature license permits the user to send and receive presence messaging updates. These licenses are uploaded to the CUCM Publisher.

    b. **Cisco Unified Presence server license –** One server license is required for each CUPS server. This license is responsible for allowing the Presence Engine and Proxy Services to be activated on the CUPS server. Up to six CUPS servers are allowed in a single cluster; however, a separate license must be purchased for each one. Nonetheless, all server licenses need only be loaded to the first node in the CUPS cluster.

    In addition to the CUPS user and server licenses, we also have to ensure that the appropriate number of Cisco Unified Personal Communicator (CUPC) licenses have been uploaded to the CUCM Publisher server. Just as with endpoint devices, the CUCM server keeps track of how many CUPC licenses are in the license store, and how many have been checked out for use.

With CUPC licenses, there are two possible license configurations.

1. **CUPC Basic Functionality –** This configuration requires the following two licenses:
   a. **CUPC software license –** One DLU is required for every user.
   b. **CUPC user feature license –** One DLU is required for every user.
2. **CUPC Softphone Mode –** In addition to the above license requirements, this configuration mode consumes three DLUs on the CUCM server.

CUCM Configuration

In order to integrate the CUPS server into the Unified Communications network, configurations must be completed on both the CUCM and CUPS servers. This section outlines the basic configurations required on the CUCM server.

The following four tasks are required configuration of the CUCM server to integrate with the CUPS server.

1. User and Device Configuration
2. Presence Service Parameter Configuration
3. SIP Trunk Configuration
4. Verification that Required Services are Running

Step 1: User and Device Configuration

Ensure the following tasks are completed on the CUCM server when integrating with the CUPS server.

A. Modify the User Credential Policy

This is configured via the **User Management -> Credential Policy Defau**lt menu option.

> **Note:** This is not required if integrating with CUCM server versions previous to version 6. Additionally, CUCM does not use the credential policy if you are using an LDAP server to authenticate your users on the CUCM server.

B. Configure the phone devices, and associate a Directory Number (DN) with each device

This is configured via the **Device -> Phone** menu option as you would normally add or edit a phone and its lines.

> **Note:** Check the Allow Control of Device from CTI option to allow the phone to interoperate with the CUPC client.

C. Configure the users, and associate a device with each user

This is configured via the User Management -> End User menu option as you would normally add or edit an end user.

> **Note:** If you will be installing the CUPC clients, you need to ensure that the user ID value is unique for each user. This may sound obvious, but the reason for this is that the user ID is converted into the softphone device name. If two users happen to have the same user ID and, thus, the same softphone device

name, then the CUPS server will be unable to correctly identify the proper device name. Because of this, the CUPC client will not function correctly.

D. Associate a user with a line appearance

This is configured via the **Device -> Phone** menu option.

Note: This is only needed on CUCM server version 6.0 and later.

E. Add users to CTI-enabled user group

This is configured via the **User Management -> User Group** menu option.

Note: This is only needed if you will be deploying the CUPC client. To enable CUPC desk phone control, add the CUPC users to a CTI-enabled user group.

Step 2: Configure the Presence Service Parameter

The next step will be to enable group subscriptions between Presence Groups to allow users in one Presence Group to subscribe to the availability information for users in a different presence group.

To configure the Presence Service Parameter, following the following procedure.

1. Open the Unified Communications Manager Administration webpage and navigate to the **System -> Service Parameters** menu option
2. Select the appropriate CUCM server from the drop-down Server menu
3. Select the **Cisco CallManager** service from the drop-down menu
4. Select the **Allow Subscription** parameter for the Default Inter-Presence Group Subscription option, which is located in the Clusterwide Parameters – (System – Presence) section
5. Click the **Save** button either at the top or bottom of the page

Step 3: Configure the SIP Trunk

The CUPS server makes heavy use of the SIP protocol and therefore, a SIP trunk is required to be configured for proper communication between the CUCM server and the CUPS server.

When configuring the SIP Trunk, it is important to note that port number that will be configured will be different, depending on the CUCM server version. If you are installing the SIP trunk on a CUCMv6.0 server, then you will configure port number 5070. If you are installing the SIP trunk on CUCMv7.0, however, you will configure port number 5060 instead.

Configuring the SIP trunk requires the following two steps

1. Configure the SIP Trunk Security Profile for Cisco Unified Presence
2. Configure the SIP Trunk for Cisco Unified Presence

Sub-Step 1. Configure the SIP Trunk Security Profile for Cisco Unified Presence

i. Go to the **System -> Security Profile -> SIP Trunk Security Profile** menu option

ii. Select **Find**

iii. Select **Non Secure SIP Trunk Profile**

iv. Ensure that the Device Security Mode setting is set to Non Secure

v. Ensure that the Incoming Transport Type is set to **TCP+UDP**

vi. Ensure that the Outgoing Transport Type is set to **TCP**

vii. Enable the following items by checking the checkbox

1. Accept Presence Subscription
2. Accept Out-of-Dialog REFER
3. Accept Unsolicited Notification
4. Accept Replaces Header

viii. Click the **Save** button

Sub-Step 2. Configure the SIP Trunk for Cisco Unified Presence

Note: If you want presence messaging to be shared equally among all servers used for presence information exchange in your network, you must configure the SIP trunk with a **DNS SRV** record of the Cisco Unified Presence Publisher and Subscriber servers. Additionally, you must configure the Presence Gateway on the CUPS server with a **DNS SRV** record of the CUCM subscriber nodes.

Complete the following steps to configure the SIP trunk for Cisco Unified Presence.

1. Go to the **Device -> Trunk** menu option
2. Click the **Add New** button
3. Select **SIP Trunk** from the drop-down Trunk Type menu
4. Select **SIP** from the drop-down Device Protocol menu
5. Click the **Next** button
6. Type in a name for the Device Name (for example: CUPS-SIP-Trunk)
7. Select the appropriate device pool from the **Device Poo**l menu
8. In the SIP Information section at the bottom of the window, configure the following values
   a. In the **Destination Address** field, enter the IP address, Fully Qualified Domain Name (FQDN), or DNS SRV record for the CUPS server
   b. Enter the appropriate port number, depending on your CUCM version number (Port number **5060** or **5070** – See note at beginning of Step 3)
   c. Select **Non Secure SIP Trunk Profil**e from the SIP Trunk Security Profile menu
   d. Select **Standard SIP Profi**le from the SIP Profile menu
9. Click the **Save** button

Note: It is important to know that you must configure a SIP trunk for EACH CUPS server that will be integrated with the CUCM server.

Step 4:Verify the Required Services are running on the CUCM Server

As a final configuration check on the CUCM server, we need to verify that the appropriate services are running on the CUCM server to support the CUPS server integration.

To Verify

1. Open the Cisco Unified Communications Manager Serviceability webpage and navigate to the **Tools -> Control Center -> Feature Services** webpage.
2. Select the appropriate CUCM server from the drop-down Server menu.
3. Ensure the following services are activated and running.
    a. Cisco CallManager
    b. Cisco TFTP
    c. Cisco Extension Mobility
    d. Cisco Communications Manager
    e. Cisco IP Phone Services
    f. Cisco AXL Web Service

Configuring the CUPS for Integration with the CUCM Server

To finalize the association with the CUCM server, we must configure the CUPS server for proper integration.

The following must be configured on the CUPS Publisher server.

1. Configure the System Topology
2. Configure a Cluster-Wide Cisco Unified Presence Address
3. Upload the Server License File

The following will be configured on all CUPS servers in the cluster.

4. Configure the Presence Information
5. Turn on the Cisco Unified Presence Services

Step 1: Configure the System Topology on the CUPS Server

A. Create **Subclusters** within the System Topology

1. On the CUPS Publisher node, select the Cisco Unified Presence Administration webpage and navigate to the **System -> Topology** menu option
2. Click on the **Add New Subcluste**r button
3. Define a unique name for the subcluster
4. Optionally, you can also define a **DNS SRV** record for the subcluster
5. Click the **Save** button

B. Create and Assign Remaining Subscriber Nodes to the System Topology

1 On the CUPS Publisher node, select the Cisco Unified Presence Administration webpage and navigate to the **System -> Topology** menu option

2. Select **Add New Node**

3. Define a unique name for the node

4. Click the **Save** button

5. Assign nodes to subclusters by dragging it into the empty slot in the subcluster via the GUI admin tool

C. Configure User Assignments in the CUPS Server System Topology

Note: This procedure is not required if adding users via the Bulk Administration Tool (BAT). It is only applicable to the manual addition of users.

1. Access the **System -> Topolo**gy menu

2. Select **Assign Use**rs

3 Use the **Find User Assignment** window to find and display users

4. Check the desired users and select the **Assign Selected Users** option

5. Click the **Save** button

Step 2: Configure a Cluster-Wide Cisco Unified Presence Address

A. Parameters menu option

B. Select the CUPS server from the Server drop-down menu

C. Select **Cisco UP Sip Prox**y from the Service menu

D. Edit the **SRV Cluster Name** field in the General Proxy Parameters (Clusterwide) section. The default value for this parameter is an empty field.

E. Select **SRV** from the Address Resolution Type menu in the General Proxy Parameters (Clusterwide) section

F. Select **Save**

Step 3: Upload the Server License File on the CUPS server

A. Access the Cisco Unified Presence Administration webpage and click on the **System -> Licensing -> License File Upload** menu option

B. Select **Upload License File**

C. Browse to the file on your local computer

D. Select **Upload**

Step 4: Configure the Presence Information on All Nodes in the CUPS cluster

A. Configure the **Presence Gateway** Information

a. Click on the **Presence -> Gateways** menu option

b. Select **Add New**

c. Select CUCM for the **Presence Gateway Type**

d. Enter a description of the **Presence Gateway**

e. Specify the IP address, **FQDN**, or the **DNS SRV** record of the associated CUCM server in the **Presence Gateway** field

f. Select **Save**

B. Configure the **Presence Settings**

a. Click on the **Presence -> Settings** menu option

b. Configure the following settings:

i. Enable Instant Messaging (cluster-wide)

ii. (Optionally) Max Contact List Size (per user)

c. Check **Enable SIP Publish** on CUCM

d. Select a SIP Trunk from the **CUCM SIP Publish Trunk** menu

e. Select **Save**

C. Configure the **Proxy Server Settings**

a. Access the **Presence -> Routing -> Settings** menu option

b. Select **On** for the Method/Event Routing Status

c. Select **Default SIP Proxy TCP Listener** for the Preferred Proxy Server

d. Select **Save**

Step 5: Turn on the Cisco Unified Presence Services

A. Turn on the **Sync Agent**

a. Access the **System -> Service Parameters** menu option

b. Select the CUPS server from the Server menu

c. Select Cisco UP Sync Agent server from the Service menu

d. Select a value for the User Assignment Mode to one of the following

i. Balanced – Assigns users across nodes in the topology to load balance

ii. Active/Standby – users are assigned to first node only in subcluster and 2nd node remains in standby

iii. None – does not assign users to nodes, which requires manual administrative assignment

e. Select **Save**

B. Turn on the Proxy Service

a. Access the **System -> Service Parameters** menu option

b. Select the CUPS server from the Server menu

c. Check Cisco UP SIP Proxy server

d. Select **Save**

C. Turn on the Cisco Unified Presence Services

a. Open the Cisco Unified Presence Serviceability webpage and access the **Tools -> Service Activation** menu option

b. Select the CUPS server from the Server menu

c. Select the desired services to activate

d. Select **Save**

Summary

In this discussion, we've taken a look at the Cisco Unified Presence solution, including what presence is and what components are involved in the CUPS architecture. Additionally, we walked thru a high level integration configuration procedure for both the Cisco Unified Communications Server and the Cisco Unified Presence Server. It is my hope that you will find this paper a valuable reference when you integrate the CUPS server into your VoIP network.

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