

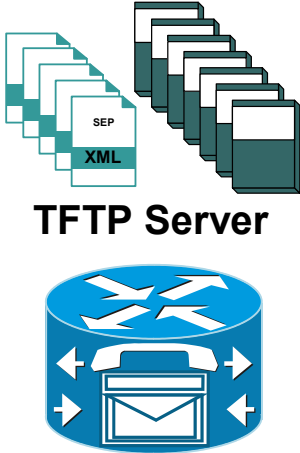
# IP Phone Registration

## Files

This topic describes IP phone firmware files and XML configuration files.

### Files

- Files critical to the IP phone
  - Firmware
  - SEPAAAABBBBCCCC.cnf.xml
  - XmlDefault.cnf.xml
  - SCCP-dictionary.xml
  - Phonemodel-dictionary.xml
  - Phonemodel-tones.xml



TFTP Server

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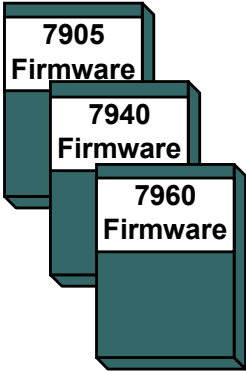
There are some files that are necessary for the proper operation of the IP phone or analog device so that it may register successfully with the Cisco CME router. The files that will be needed include:

- **Firmware** – The firmware is loaded into memory on the IP phone and will survive a reboot
- **XMLDefault.cnf.xml** – An XML configuration file that will specify the proper firmware, address, and port needed for the new phone to register
- **SEPAAAABBBBCCCC.cnf.xml** – An XML configuration file that is specific for one device based on the MAC address
- **SCCP-dictionary.xml** – An XML file that contains the device labels for the locale selected
- **Phonemodel-dictionary.xml** – An XML file that contains possible messages and dialogs that can appear on the screen of the IP phone for the selected locale
- **Phonemodel-tones.xml** – An XML file that contains the cadence and rings for the specified locale

All of the necessary firmware files for IP phones are stored internally on the Cisco CME router flash, so an external database or file server is not required. IP Phones will download firmware files from the router flash using Trivial File Transfer Protocol (TFTP) during registration. All

Cisco CME configuration and language files are located in the Dynamic RAM (DRAM) of the router under `system:/its/`.

## Files (Cont.): Firmware



7905  
Firmware

7940  
Firmware

7960  
Firmware

```
CMERouter1#show flash
# --length-- -----date/time----- path
1 399514 Mar 1 2002 12:56:28 P00305000301.sbn
2 22649180 Mar 1 2002 12:38:00 c3725-ipvoice-mz.123-7.T.bin
3 321939 Mar 1 2002 12:55:58 CP7902010200SCCP031023A.sbin
4 317171 Mar 1 2002 12:56:06 CP7905010200SCCP031023A.sbin
5 317968 Mar 1 2002 12:56:10 CP7912010200SCCP031023A.sbin
6 700651 Mar 1 2002 12:56:18 CiscoIOSTSP.zip
7 369950 Mar 1 2002 12:56:22 P00303020214.bin
8 333822 Mar 1 2002 12:56:30 P00403020214.bin
9 47904 Mar 1 2002 12:56:54 S00103020002.bin
10 301298 Mar 1 2002 12:56:56 ata18x-v2-16-ms-030327b.zup
11 496521 Mar 1 2002 12:57:22 music-on-hold.au
12 1908762 Mar 1 2002 12:56:54 P00503010100.bin
13 21 Mar 1 2002 12:56:18 OS7920.txt
14 839984 Mar 1 2002 12:57:18 cmterm_7920.3.3-01-06.bin
...
...
33 307067 Mar 1 2002 12:56:02 CP79050101SCCP030530B31.zup
34 710144 Mar 1 2002 12:57:06 cme-gui-3.1.1.tar
```

- Firmware is installed in flash RAM with the Cisco CME software or individually as needed
- Served up by the TFTP server on the Cisco CME router
- The command `tftp-server flash:firmware-file-name`

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The firmware of the supported devices within Cisco CME is stored in the flash memory of the Cisco CME router. These firmware files are installed in flash memory when the Cisco CME software is extracted and installed. The firmware required will vary with the devices, and needs to be available when a new phone or a phone with a different version of firmware comes online. The firmware files need to be made available through a TFTP server. This is done with the command `tftp-server flash:firmware-file-name`.

This command as well as other related commands will be covered in more detail in the next lesson.

The firmware names with `.sbin` are signed phone loads. Once a signed phone load is installed on a phone, that phone cannot go back to an unsigned phone load. The phone will always have to use a signed phone load even if used by CallManager.

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**Note** These files are specific to Cisco CME 3.1 and will vary with the version of Cisco CME.

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**Model      Firmware file**

ATA-186    ata18x-v2-16-ms-030327b.zup


ATA-188    ata18x-v2-16-ms-030327b.zup

7902        CP7902010200SCCP031023A.sbin

7905G CP7905010200SCCP031023A.sbin  
 7910 P00403020214.bin  
 7912G CP7912010200SCCP031023A.sbin  
 7914 S00103020002.bin  
 7920 cmterm\_7920.3.3-01-07.bin  
 7935 P00503010100.bin  
 7936 P00503010100.bin  
 7940G P00303020214.bin  
 7940G P00305000301.sbn  
 7960G P00303020214.bin  
 7960G P00305000301.sbn

## Files (Cont.): Device Configuration XML File

**SEPXXXXXXXXXXXX.cnf.xml**



\* **XXXXXXXXXXXX** = to the **MAC address**

```

<device>
<devicePool>
<callManagerGroup>
<members>
<member priority="0">
<callManager>
<ports>
<ethernetPhonePort>2000</ethernetPhonePort>
</ports>
<processNodeName>10.15.0.1</processNodeName>
</callManager>
</member>
</members>
</callManagerGroup>
</devicePool>
<versionStamp>{Jan 01 2002 00:00:00}</versionStamp>
<loadInformation>P00303020214</loadInformation>
<userLocale>
<name>English_United_States</name>
<langCode>en</langCode>
</userLocale>
<networkLocale>United_States</networkLocale>
<idleTimeout>0</idleTimeout>
<authenticationURL />
<directoryURL>http://10.15.0.1/localdirectory</directoryURL>
<idleURL />
<informationURL />
<messagesURL />
<proxyServerURL />
<servicesURL />
</device>

```

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The XML file *SEPAAAABBBBCCCC.cnf.xml* (where *AAAABBBBCCCC* is the MAC address of the IP phone) contains the IP address, port, firmware, locale, directory URL and many others, some of which cannot be currently used in Cisco CME. This file is generated by the system during the initialization of the Cisco CME software when the command **create-cnffiles** is found in the startup-config. This command and other related commands will be covered in more detail in the next lesson.

In the graphic, the configuration file contains the IP address and port representing the interface and port to which the phone will attempt to register on the Cisco CME router. Within the configuration file there is also a language defined that will be applied to the IP phone in question.

## Files (Cont.): Default XML File

**XMLDefault.cnf.xml**

Default

---

XML

```
<Default>
<callManagerGroup>
<members>
<member priority="0">
<callManager>
<ports>
<ethernetPhonePort>2000</ethernetPhonePort>
</ports>
<processNodeName>10.15.0.1</processNodeName>
</callManager>
</member>
</members>
</callManagerGroup>
<loadInformation6 model="IP Phone 7910">P00403020214</loadInformation6>
<loadInformation124 model="Addon 7914"></loadInformation124>
<loadInformation9 model="IP Phone 7935"></loadInformation9>
<loadInformation8 model="IP Phone 7940">P00303020214</loadInformation8>
<loadInformation7 model="IP Phone 7960">P00303020214</loadInformation7>
<loadInformation20000 model="IP Phone 7905"></loadInformation20000>
<loadInformation30008 model="IP Phone 7902"></loadInformation30008>
<loadInformation30002 model="IP Phone 7920"></loadInformation30002>
<loadInformation30019 model="IP Phone 7936"></loadInformation30019>
<loadInformation30007 model="IP Phone 7912"></loadInformation30007>
</Default>
```

**\* Notice there is no ATA or 7914**

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The file XMLDefault.cnf.xml is used by IP phones and devices that did not find a more specific SEPAAAABBBBCCCC.cnf.xml file. The IP phones that download this XML file through TFTP will now know the IP address and port of the Cisco CME router, as well as the required version of firmware that it will need to have to function with the Cisco CME properly. The file is generated by the Cisco CME system when the command **create-cnf** is entered in telephony service mode. This and other related commands will be covered in more detail in the next lesson.

## Files (Cont.): Language Specific XML Files

7960-dictionary.xml

SCCP-dictionary.xml



Contents will vary based upon language selected with the user-locale command

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<phrases>
<phrase i="173" t="Login"/>
<phrase i="172" t="Flash"/>
<phrase i="171" t="Acct"/>
<phrase i="170" t="Incompatible device type"/>
<phrase i="169" t="Another Barge exists"/>
<phrase i="168" t="Failed to setup Barge"/>
<phrase i="167" t="Barge" />
<phrase i="166" t="Network congestion,rerouting" />
<phrase i="165" t="CallBack" />
<phrase i="164" t="SAC" />
<phrase i="163" t="DND" />
<phrase i="162" t="TrnsfVM" />
<phrase i="161" t="SetWtch" />
<phrase i="160" t="Intrcpt" />
<phrase i="159" t="ImmDiv" />
<phrase i="158" t="Voicemail"/>
<phrase i="157" t="RmLstC"/>
<phrase i="156" t="Unknown Number"/>
<phrase i="155" t="Not Enough Bandwidth"/>
<phrase i="154" t="Private"/>
<phrase i="153" t="Park Number"/>
<phrase i="152" t="Conference"/>
<phrase i="151" t="Error Mismatch"/>
<phrase i="150" t="Error Unknown"/>
<phrase i="149" t="Error Pass Limit"/>
...
```

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88

The files `SCCP-dictionary.xml` and `phonemodel-dictionary.xml` configure the language for the IP phones in the system. These contain the labels for buttons as well as messages that could be displayed on the screen of the IP phones. This is set with the **user-locale locale** command and this will be covered along with related commands in more detail in the next lesson.

---

**Note** A language is installed on the IP phone by these two files.

---

The following languages are supported on the IP phones:

*CMERouter1(config-telephony)#user-locale ?*

*DE Germany*

*DK Denmark*

*ES Spain*

*FR France*

*IT Italy*

*NL Netherlands*

*NO Norway*

*PT Portugal*


*RU Russian Federation*

SE Sweden

US United States

## Files (Cont.): Call Progress XML File

**7960-tones.xml**



**Contents will vary based upon call progress tones selected with the network-locale command**

```
<tones>
  <tone c1="30831" i1="-2032" c2="30467" i2="-1104" d="2"
t="ringing">
    <part m="on" t="2000"/>
    <part m="off" t="4000"/>
    <repeat c="65535"/>
  </tone>
  <tone c1="30467" i1="-1104" c2="28959" i2="-1404" d="2"
t="reorder">
    <part m="on" t="250"/>
    <part m="off" t="250"/>
    <repeat c="65535"/>
  </tone>
  <tone c1="30467" i1="-1104" c2="28959" i2="-1404" d="2"
t="busy">
    <part m="on" t="500"/>
    <part m="off" t="500"/>
    <repeat c="65535"/>
  </tone>
  <tone c1="30743" i1="-1384" c2="29780" i2="-1252" d="2"
t="odial">
    <part m="on" t="65535"/>
    <repeat c="65535"/>
  </tone>
  <tone c1="30831" i1="-2032" c2="31538" i2="-814" d="2"
t="idial">
    <part m="on" t="65535"/>
    <repeat c="65535"/>
  </tone>
</tones>
```

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The file named *phonemodel-tones.xml* contains the cadence, rings, and progress tones that the phones in the Cisco CME system will use. This command sets the country-specific tones that the users of that country are familiar with. This is set with the command **network-locale locale**. This and other related commands will be covered in detail in the next module.

This is a system-wide setting that will apply to all IP phones in the system. The call progress tones file is loaded into RAM at start up and will be how the call progress tones are defined.

CMERouter1(config-telephony)#**network-locale ?**

- AT Austria
- CA Canada
- CH Switzerland
- DE Germany
- DK Denmark
- ES Spain
- FR France
- GB United Kingdom


IT	Italy
NL	Netherlands
NO	Norway
PT	Portugal
RU	Russian Federation
SE	Sweden
US	United States

# IP Phone Information

This topic describes the process of Cisco CME identifying IP phones.

## IP Phone Information

No 7914 in the XMLDefault.cnf.xml



```
<loadInformation6 model="IP Phone 7910">P00403020214</loadInformation6>  
<loadInformation124 model="Addon 7914"></loadInformation124>  
<loadInformation9 model="IP Phone 7935"></loadInformation9>  
<loadInformation8 model="IP Phone 7940">P00303020214</loadInformation8>  
<loadInformation7 model="IP Phone 7960">P00303020214</loadInformation7>  
<loadInformation20000 model="IP Phone 7905"></loadInformation20000>  
<loadInformation30008 model="IP Phone 7902"></loadInformation30008>  
<loadInformation30002 model="IP Phone 7920"></loadInformation30002>  
<loadInformation30019 model="IP Phone 7936"></loadInformation30019>  
<loadInformation30007 model="IP Phone 7912"></loadInformation30007>
```

- The 7914 expansion module cannot auto register
- Require the use of the “type” command entered by the administrator
- All other valid devices can be recognized automatically by the Cisco CME system

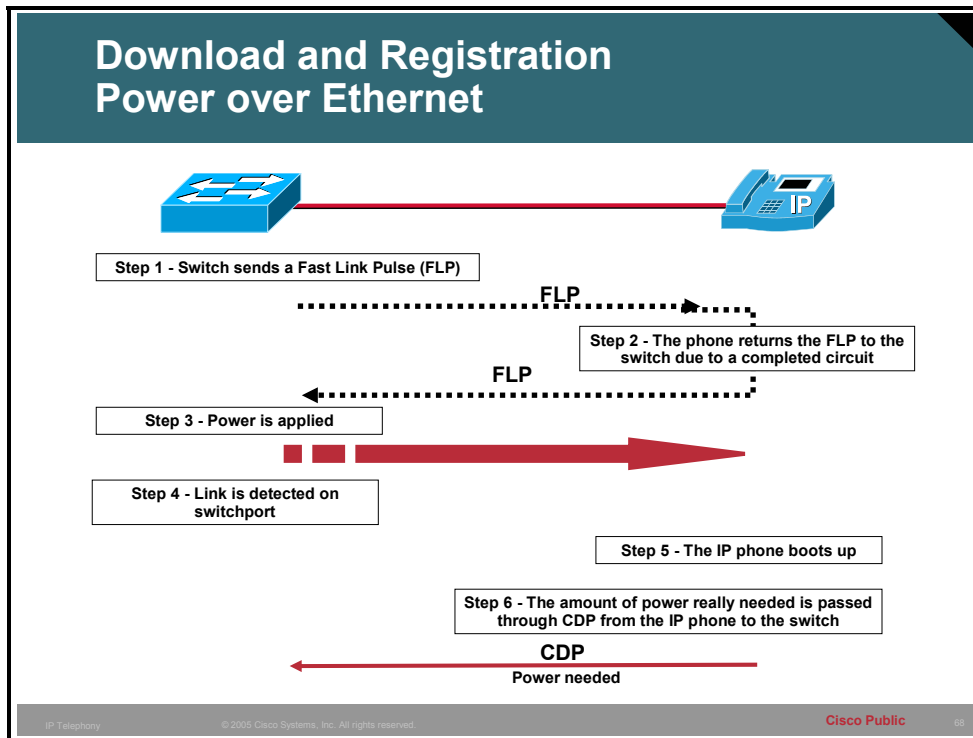
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The 7914 module cannot auto register and the use of the **type** command under the ephone is required. This command will be covered in the next lesson in more detail. None of the other valid IP phones and ATA devices in Cisco CME require the type command, and can be determined automatically by the system.



# Download and Registration

This topic describes the mechanism of an IP phone obtaining its XML configuration file and IP address.



Step 1 – The switch sends a special tone called a Fast Link Pulse (FLP) out the interface. This FLP will go to the Powered Device (PD) which is an IP phone in this case.

Step 2 – The PD has a physical link when there is no power between the pin on which the FLP arrives and a pin that goes back to the switch. This creates a circuit and the end result is that the FLP arrives back at the switch. This will never happen when the device attached is not a PD, like a PC. As a result, if the FLP does not make it back to the switch, no power will be applied.

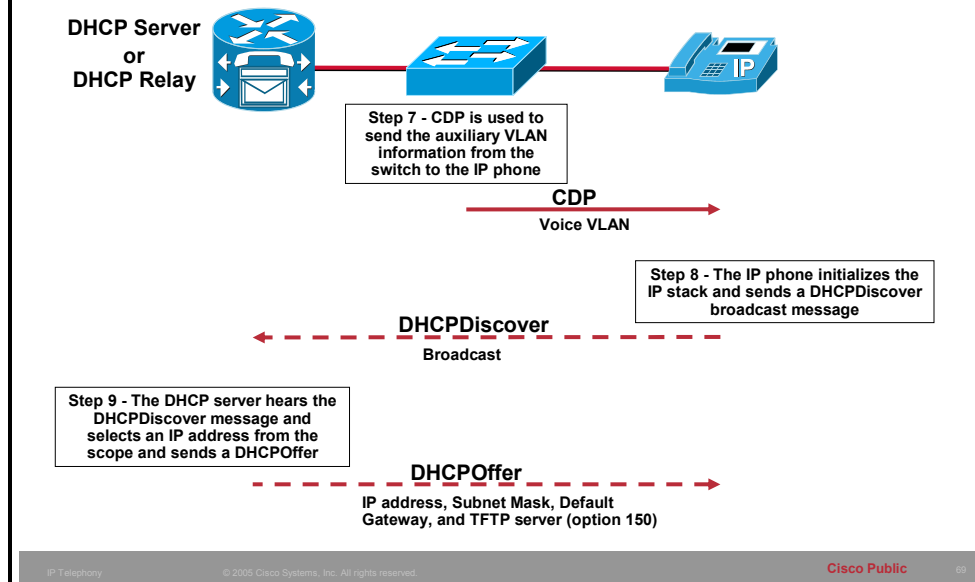
Step 3 – The switch applies power to the line.

Step 4 – Within five seconds the link should go up.

Step 5 – The PD (IP phone) boots up.

Step 6 – Through the Cisco Discovery Protocol (CDP), the IP phone tells the switch specifically how much power it needs.

## Download and Registration (Cont.) DHCP



Step 7 – Through CDP, the switch informs the IP phone of its Voice VLAN (auxiliary VLAN).

Step 8 – The IP phone initializes the IP stack and sends out a DHCPDiscover broadcast looking for an IP address on the voice VLANs scope.

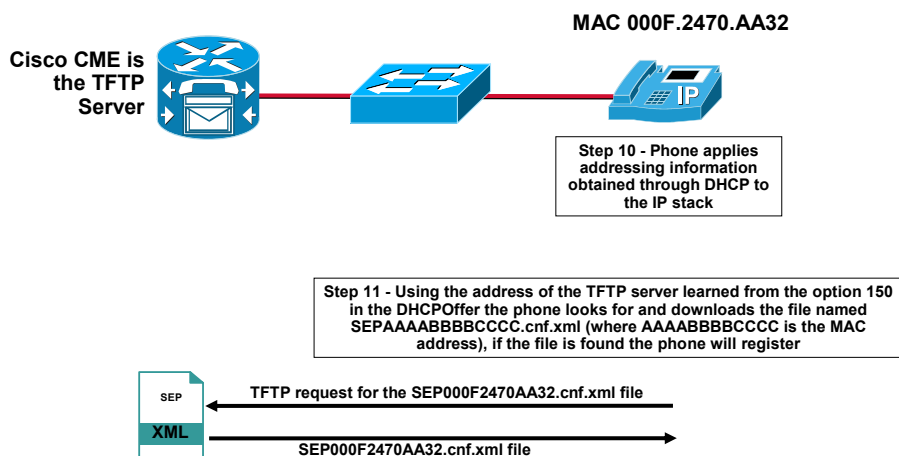
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**Note** It is possible to hard code the IP address, Subnet Mask, Default Gateway, DNS, and TFTP server on the IP phone and skip the DHCP steps. It is advised that DHCP be used to minimize administrative load required to hard code these settings.

---

Step 9 – The DHCP server hears the broadcast (or it was relayed to it) and assigns an IP address from the scope for the voice VLAN subnet, a subnet mask, default gateway, DNS (optional), and the address of the TFTP server (the CallManager Express router). All settings are then sent back to the IP phone in the form of a DHCPOffer message.

## Download and Registration (Cont.) Existing IP Phone



**If no SEP XML file is found go to Step 14**

Step 10 – The phone receives the DHCP Offer and applies the values contained.

Step 11 – One of the values carried in the DHCP Offer message is the address of the TFTP server. The phone uses this information to make a connection to the TFTP server and attempt to download a file by the name of SEP000F2470AA32.cnf.xml. This file, if found, contains the information needed to register with the Cisco CME, including the IP address, port, locale, and the firmware file that should be loaded on the IP phone.

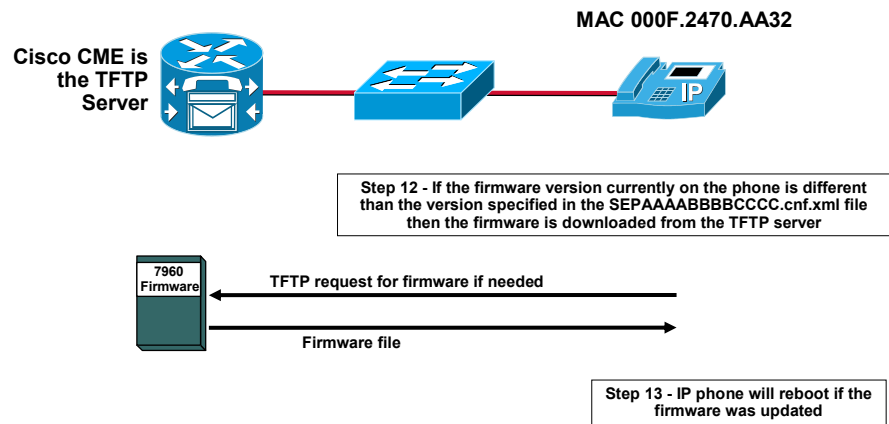
If the phone has the correct firmware, the IP phone will register and get its configuration. If the firmware is not correct, then proceed to the next step.

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**Note** The extension numbers, speed dials and other settings are assigned when the phone registers. They are not contained in the SEP XML file.

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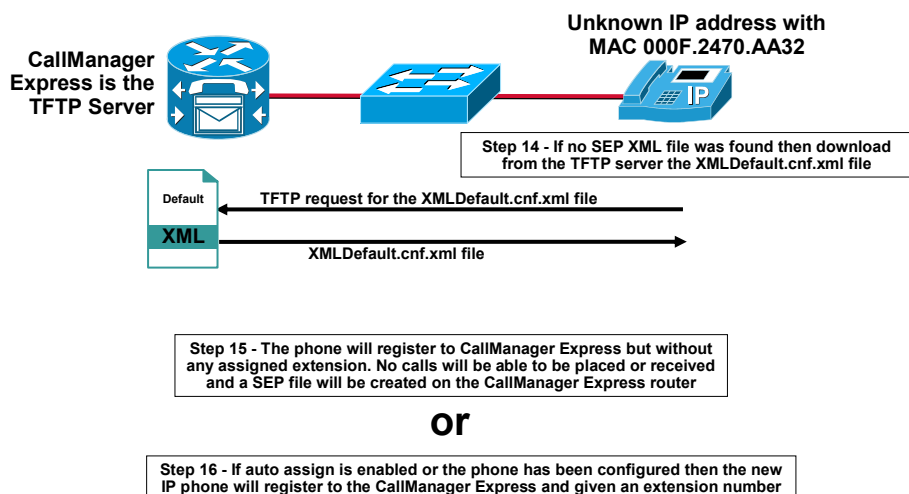
## Download and Registration (Cont.) Unknown IP Address



Step 12 – If the firmware is out-of-date or different than the one specified, the IP phone will go back to the TFTP server and download the appropriate firmware.

Step 13 – The IP phone will reboot after the firmware is downloaded.

## Download and Registration (Cont.) Unknown IP Phone



Step 14 – If no SEP XML file exists for the specific device, this indicates this device is new. The new IP phone will then proceed to get a file from the TFTP server called XMLDefault.cnf.xml. The XMLDefault.cnf.xml file specifies the IP address, port, and firmware file needed by the new IP phone. If needed, the new IP phone will download the correct firmware and reboot. If the firmware is correct, the new phone now has the information it needs to register with the Cisco CME.

Step 15 – The phone will register with the Cisco CME system using SCCP messages and, if “auto assign” is set up, the IP phone will be assigned an extension automatically by the Cisco CME system. If “auto assign” is not configured, the phone will have no extension and will not be able to place or receive any calls. The “auto assign” function will be covered in more detail in the next lesson.