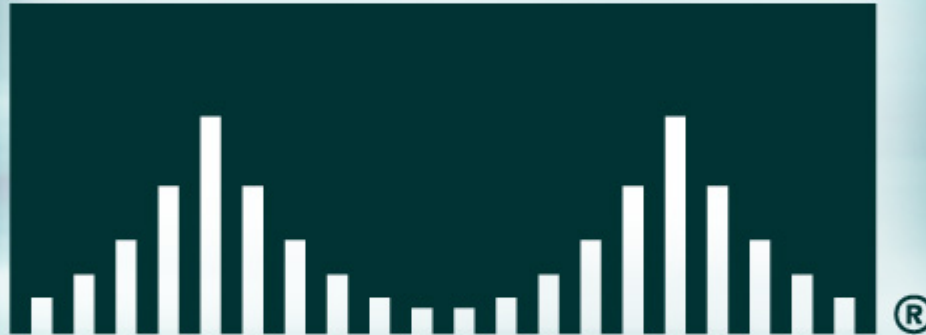


# CISCO SYSTEMS



# Designing and Developing IP Phone Services

Andres Martinez

# Agenda

- **Introduction**
- **Phone Capabilities**
- **Cisco SDK & Resources**
- **XML Objects and Tags**
- **Troubleshooting**
- **Sample Applications**
- **Q & A**



# Phone Basics

Cisco.com

- **Phone Handset**
- **Keypad**
- **LCD Display**
- **Rocker Key**
- **Service Buttons**
- **Softkeys**



# Processing Capabilities

Cisco.com



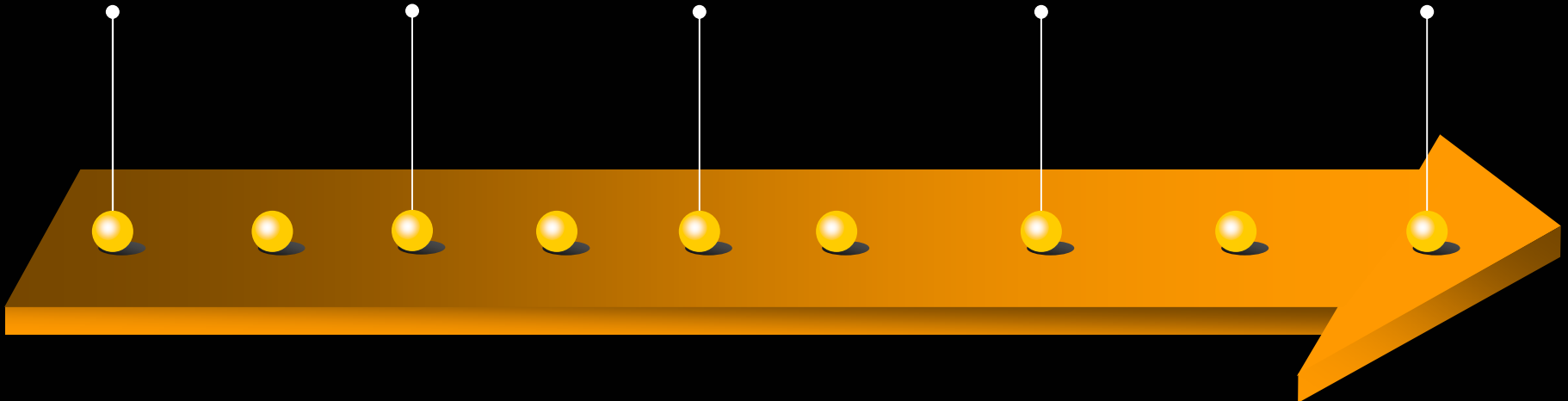
Cell Phone

XML  
Phone

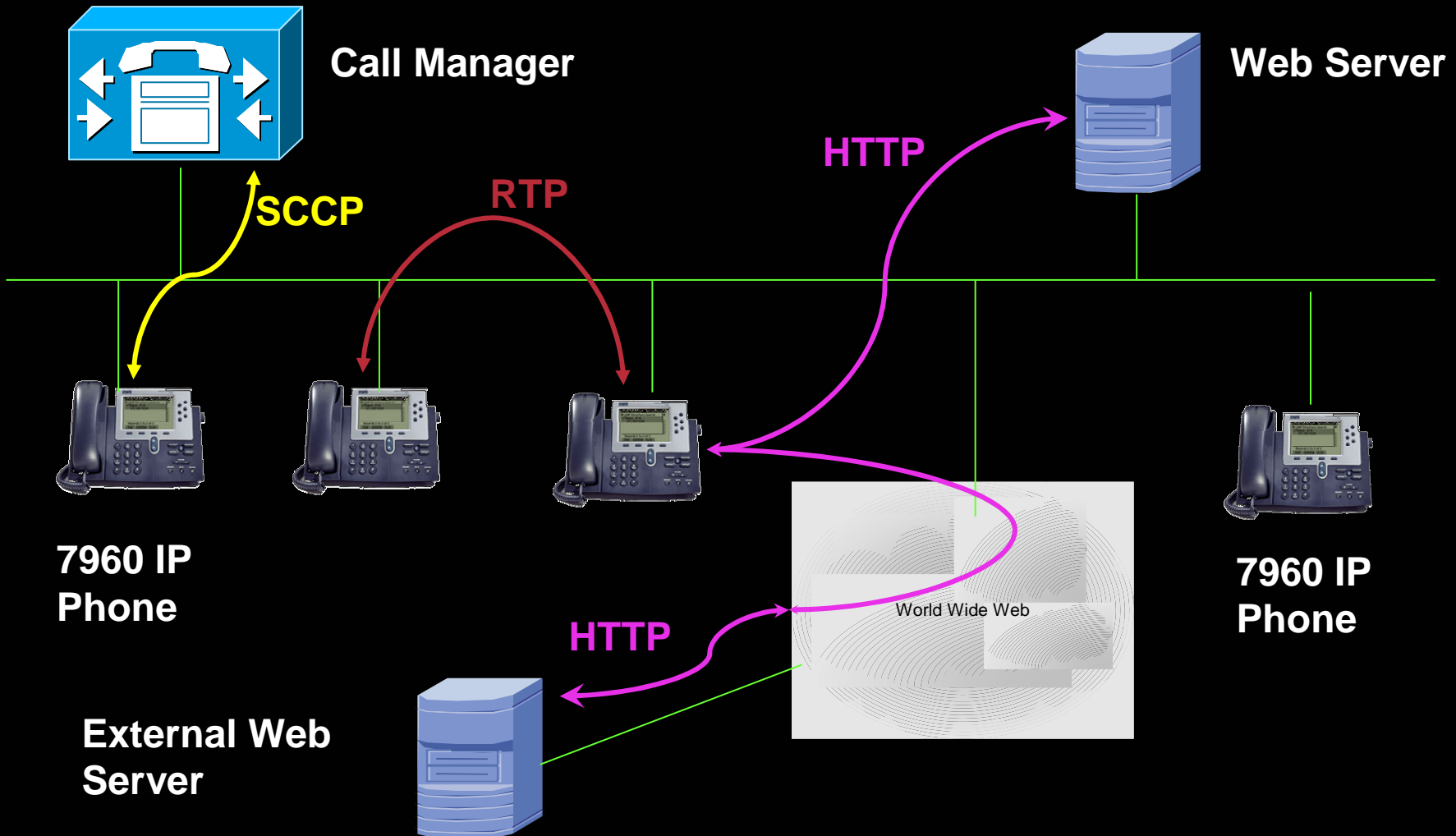
Messaging  
Device

Handheld  
PC

Personal  
Computer



# Service Architecture



# IP Phone Services Configuration

## User Subscribed Services

Cisco.com

**2** Developer Or CallManager Administrator Copies the Web Script Files to a Web (HTTP) Server that the CallManager Will Point to for IP Phone Services

**3** CallManager Administrator Adds IP Phone Services and Makes It Available to The Users

**4** User Logs into CallManager User Preferences and Configures Which Services to Be Displayed on the Phone

Sample.asp  
XML Tags



**1** Web Developer Creates the IP Phone Services Application



**5** User Presses the "Services" Button, Which Sends an HTTP GET Message Calling Getservicesmenu.Asp, Located on the CallManager Where the IP Phone Is Configured

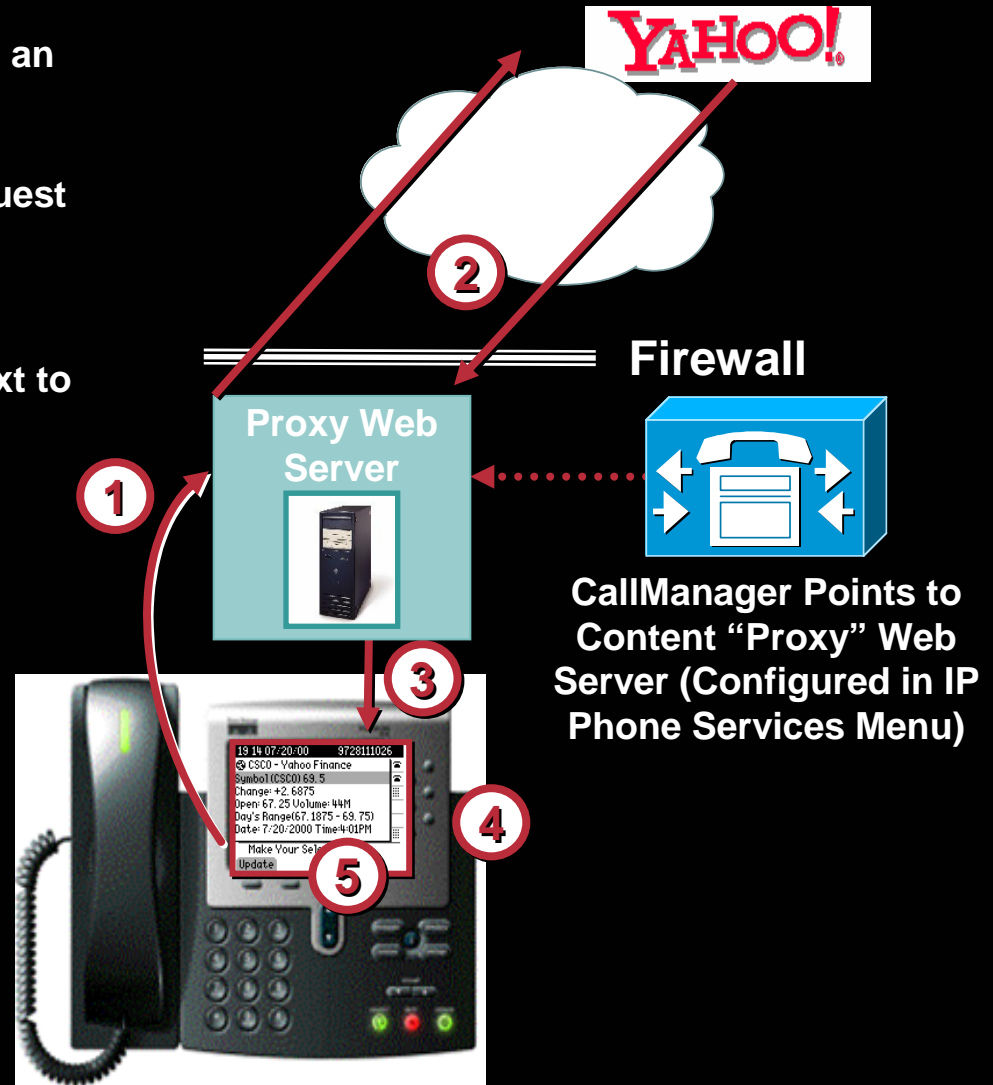
# IP Phone Services Example

## Getting the Cisco Stock Quote

Cisco.com

1. Cisco IP Phone HTTP Client Performs an “HTTP GET” for a Specified URL
2. HTTP Web Server Processes the Request and Formats the Data Returned
3. HTTP Web Server Returns the HTTP Response of XML Objects or Plain Text to the Phone
4. Phone Parses the HTTP Response Header for ContentType of “Text/XML” (Note1)
5. Phone Presents Data and Options to the User per the Server Response

**Note1: This Is NOT a Full XML Parser; Only the Supported CiscoIPphone XML Objects Are Successfully Parsed**



# Web Server

Cisco.com

- Almost any standard Web Server can be used
- Apache [WWW.Apache.Org](http://WWW.Apache.Org)
- IIS [WWW.Microsoft.Com](http://WWW.Microsoft.Com)
- Sun-One/iPlanet [WWW.Sun.com](http://WWW.Sun.com)
- Server Side Scripting Support required

# Cisco IP Phone SDK

Cisco.com

## Development Tools

- **Cip.8bi**—Photoshop plug-in that allows .cip extensions to be viewed and saved.
- **Cip2Gif.exe**—DOS-based program that converts .cip files to .gif.
- **Gif2Cip.exe**—DOS-based program that converts .gif files to .cip.
- **ImageViewer.exe**—Windows application that displays .cip graphic files.
- **Cisco URL Proxy**—Proxy server that is needed to use the sample services (automatically installed).
- **Cisco LDAP Search**—Service that is installed to do LDAP searches (automatically installed).

## Documentation

- **Cisco IP phone Services Application Development Notes (this document)** in Adobe .pdf format
- **Cisco URL Proxy Guide** in rich text format
- **Cisco LDAP Programming Guide** in Microsoft Word format
- **Cisco CIP Image Release Notes** in Microsoft Word format

# Cisco IP Phone SDK

Cisco.com

- **WebServer Software with Scripting is required for development and testing**
- **SDK Cannot be installed on the Call Manager Server**
- **SDK provides MS Windows helper MS Com objects and script samples**

# Development Resources

Cisco.com

- [WWW.HotDispatch.Com](http://www.hotdispatch.com)
- <http://www.hotdispatch.com/cisco-ip-telephony/officefront-2-product?ID=15100214>
- <http://www.hotdispatch.com/cisco-ip-telephony/iptel-resources.html>

- Cisco Press “Developing Cisco IP Phone Services”
- Cisco Press CD-ROM Samples and CM-SIM software
- Innovation Through Convergence (ITC) Exposition (featuring the XML Bake-Off)
- [Developer-Support@Cisco.Com](mailto:Developer-Support@Cisco.Com)
- Cisco Developers Support Central

<http://www.cisco.com/go/DeveloperSupport>

Solutions Products Ordering Support Partners Training Corporate

Service and Support

## Developer Support Central

Home What's New How to Buy Login Register Feedback Search Map/Help

Program Home Page  
Program Benefits  
Options/Fees  
Response Times  
Who Should Join  
How to Join  
Program FAQs  
Support Agreement  
Contact Us

SUPPORTED PRODUCTS  
Enterprise  
Service Provider

**New!**  
[BBSM SDK v5.1](#)  
Now Available!

Welcome to the Cisco Developer Services Program! This program is dedicated to providing support expertise to companies who are enabling their products with Cisco supported interfaces. As a member of our program, you will receive quality support that you can depend on while leveraging Cisco interfaces throughout your development projects.

HotDispatch -- IP Telephony Resources - Microsoft

### HotDispatch

## RESOURCES

[Phone Services Emulator](#)  
[Cisco CallManager - IP Phone Applications SDK Frequently Asked Questions](#)  
[Cisco IP-Telephony White Papers](#)

If you have questions about using this marketplace, write to [cipr-feedback@hotdispatch.com](mailto:cipr-feedback@hotdispatch.com).

APPLICATIONS CATALOG TECHNICAL SUPPORT OFFICEFRONTS

1 2 ABC 3 DEF  
4 5 6  
messages directories  
services settings

# HTTP Client Request

Cisco.com

- The Cisco IP Phone HTTP client performs an HTTP GET for a specified URL
- The HTTP server processes request and returns an XML object or plain text
- The phone processes the supported HTTP headers
- The phone parses the XML object if ContentType is “text/xml”
- The phone presents data and options to the user based on the server response

# HTTP Headers

- **“ContentType”**  
Used to notify the phone of the mime type sent
- **“Refresh” (Time in Seconds, URL)**  
If no time is set or it is zero, then the refresh is set to manual  
If no URL is set, then the current URL is used
- **“Expires” (Date/Time in GMT the page is to expire)**  
Pages that have expired before being loaded will not be added to the URL stack in the Phone (The phone does not cache content)

# XML Objects

Cisco.com

## “Services” Objects

- Menu
- Text
- Input
- Directory
- Image
- Graphic Menu
- Icon Menu
- Phone Execute
- Phone Response

## “Directories” Objects

- Menu
- Text
- Input
- Directory



# Mandatory Escape Sequences

By XML convention, the XML parser also requires that you escape a few special characters

Character	Name	Escape Sequence
&	Ampersand	&amp;
"	Quote	&quot;
'	Apostrophe	&apos;
<	Left angle bracket	&lt;
>	Right angle bracket	&gt;

**Note: This is also a requirement for Call Manager Services Names**

# Text



<CiscoIPPhoneText>

<Title/>

<Prompt/>

<Text/>

</CiscoIPPhoneText>

The CiscoIPPhoneText XML object displays ordinary 8-bit ASCII text on the phone display.

The <Text> message must not contain any control characters, except for carriage returns, line feeds, and tabs.

The Cisco IP phone firmware controls all other pagination and word-wrap issues.

# Image

Cisco.com



<CiscoIPPhoneImage>

<Title/>

<Prompt/>

<LocationX/>

<LocationY/>

<Width/>

<Height/>

<Depth/>

<Data/>

</CiscoIPPhoneImage>

**Cisco IP phones include a bitmap display with a 133 x 65 pixel pane that is available to access services.**

**Each pixel includes four greyscale settings. A value of three (3) displays as black, and a value of zero (0) displays as white**

# Menu



<CiscoIPPhoneMenu>

<Title/>

<Prompt/>

<MenuItem>

<Name/>

<URL/>

</MenuItem>

</CiscoIPPhoneMenu>

Cisco IP phones allow a maximum of 100 MenuItems. Each MenuItem includes a Name and an associated URL

The Name field under the <MenuItem> supports 64 characters. This field accepts two carriage returns to allow the MenuItem name to span three lines on the display

# Graphic Menu

Cisco.com



**<CiscoIPPhoneGraphicMenu>**

**<Title/>**

**<Prompt/>**

**<LocationX/>**

**<LocationY/>**

**<Width/>**

**<Height/>**

**<Depth/>**

**<Data/>**

**<MenuItem>**

**<Name/>**

**<URL/>**

**</MenuItem>**

**</CiscoIPPhoneGraphicMenu>**

# Input



**<CiscoIPPhoneInput>**

**<Title/>**

**<Prompt/>**

**<URL/>**

**<InputItem>**

**<DisplayName/>**

**<QueryStringParam/>**

**<InputFlags/>**

**<DefaultValue/>**

**</InputItem>**

**</CiscoIPPhoneInput>**

**The InputItem tag delimits each item in the list. The number of InputItems must not exceed five.**

**Each input item has a DisplayName, which is the prompt written to the display for that particular item.**

**Each item also has a QueryStringParam, which is the name of the parameter appended to the URL when it is sent out after input is complete.**

# Input Flags

<b>A</b>	<b>Plain ASCII text. Use the DTMF keypad to enter text consisting of uppercase and lowercase letters, numbers, and special characters</b>
<b>T</b>	<b>Telephone number. Enter only DTMF digits for this field. The acceptable input includes numbers, #, and *.</b>
<b>N</b>	<b>Numeric. Enter only numbers as the only acceptable input</b>
<b>E</b>	<b>Equation. The acceptable input includes numbers and special math symbols</b>
<b>U</b>	<b>Uppercase. Enter only uppercase letters as the only acceptable input</b>
<b>L</b>	<b>Lowercase. Enter only lowercase letters as the only acceptable input</b>
<b>P</b>	<b>Password field. Individual characters display as they are entered using the standard keypad-repeat entry mode. As soon as each character is accepted, the system converts it to an asterisk, allowing for privacy of the entered value</b>

# Directory

Cisco.com



```
<CiscoIPPhoneDirectory>
  <Title/>
  <Prompt/>
  <DirectoryEntry>
    <Name/>
    <Telephone/>
  </DirectoryEntry>
</CiscoIPPhoneDirectory>
```

A single CiscoIPPhoneDirectory object can contain a maximum of 32 DirectoryEntry objects.

If more than 32 entries must be returned, use multiple CiscoIPPhoneDirectory objects in subsequent HTTP requests.

# Service Creation



- Under the Feature menu select “Cisco IP Phone Services”
- You can insert, update or delete a service definition
- After the service is inserted you can insert, update, or delete service parameter definitions
- The “Update Subscriptions” button is used to rebuild all of the user subscriptions if the service has been modified after subscriptions exist

# Service Parameter Creation

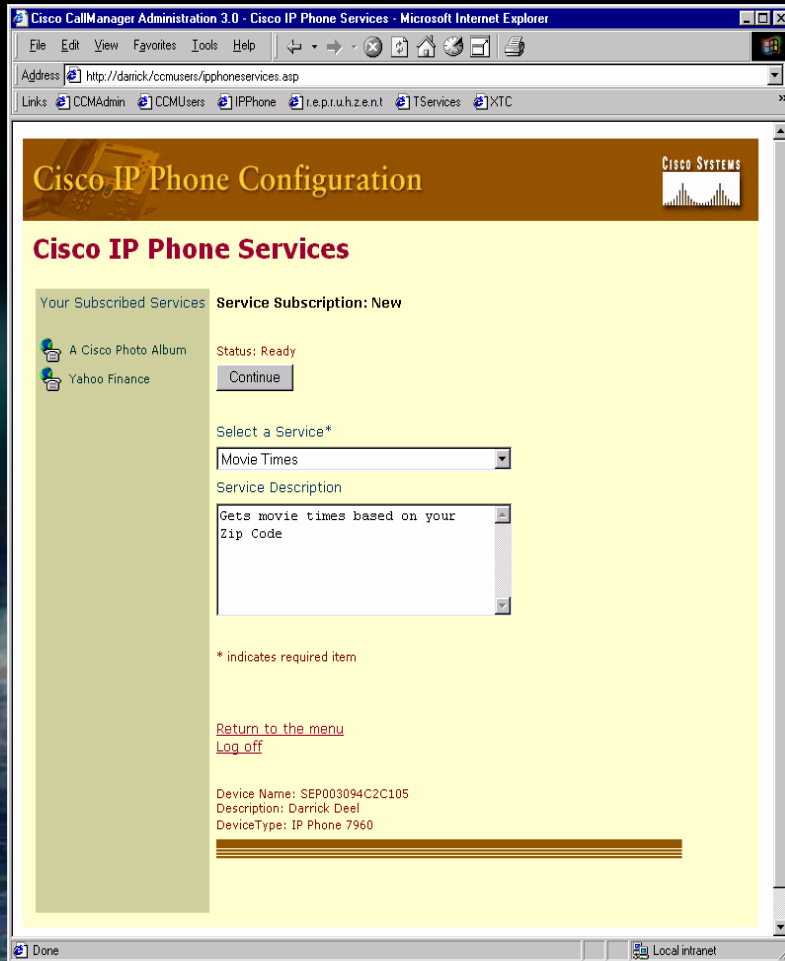
The screenshot shows a web-based configuration window titled "Cisco CallManager Administration 3.0 - IP Phone Service Parameter Configuration". The main heading is "Movie Times: Parameter Configuration" with a status of "Ready". There are five buttons: "New", "Update", "Update and Close", "Delete", and "Cancel". The form contains the following fields:

- Parameter Name\*:** ZipCode
- Parameter Display Name\*:** Zip Code
- Default Value:** 75013
- Parameter is Required
- Parameter Description\*:** Enter the Zip Code for the desired theater.

The window has a "Done" button and a "Local intranet" indicator at the bottom.

- The “Parameter Name” is the exact query string parameter to be used when building the subscription URL
- The “Parameter Display Name” is presented to the user
- The “Default Value” will appear when a service is being subscribed to for the first time
- Check the “Parameter is Required” box if the user must enter data for this parameter before the subscription can be saved
- The “Parameter Description” will be available to the user while they are subscribing to the service

# User Service Subscription



- User service subscriptions are configured with the CCMUsers web site after the user has logged in and selected a device
- “Configure your Cisco IP Phone Services” is a new option in the Encore release
- Select the desired service, review the description and click “Continue” to proceed

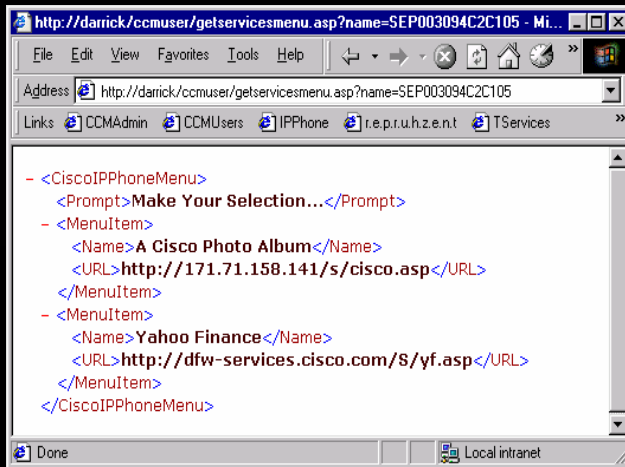
# User Service Subscription

Cisco.com

The screenshot shows the Cisco CallManager Administration 3.0 interface in a Microsoft Internet Explorer browser. The page title is "Cisco IP Phone Configuration" and the main heading is "Cisco IP Phone Services". On the left, under "Your Subscribed Services", there are links for "A Cisco Photo Album" and "Yahoo Finance". The main content area shows a "Service Subscription: Movie Times" with a "Status: Ready" and buttons for "Subscribe", "Back", and "Cancel". Below this is a "Service Information" section with two required fields: "Service Name\*" containing "Movie Times" and "Zip Code\*" containing "75013". A note indicates that an asterisk (\*) denotes a required item. At the bottom, there are links for "Return to the menu" and "Log off", and device information: "Device Name: SEP003094C2C105", "Description: Darrick Deel", and "DeviceType: IP Phone 7960".

- The user can then customize the name of the service when it is displayed on their services list
- The user can enter any service parameters available for the selected service
- The user can review the description of each parameter
- After all the required fields are set the user can click “Subscribe”
- A custom URL is built and stored in the database for this subscription
- The service should then appear on the device’s services list

# Troubleshooting



- **Internet Explorer 5 or higher can display the XML source with it's default style sheet**
- **Standard IP troubleshooting techniques are important for HTTP Errors**
  - Externally verify name resolution (Phone has DNS set)
  - If DNS is suspected use IP addresses in URLs
  - Browse the URL in question with IE5 or download and verify with Netscape
  - Use a logged telnet session to verify that the desired HTTP headers are returned (Telnet to server on port 80, then enter get /path/page)
- **XML Parsing Errors**
  - Verify the object tags (Case Sensitive)
  - Verify that "&" and the other four special characters are used per the restrictions in the Developer Notes (ENG-68782) while inside of the XML objects

# Error Messages

- **Error messages appear on the prompt line of the phones display**
- **There are only three messages that should appear.**

**XML Error[4] = XML Parser error (Invalid Object)**

**HTTP Error[8] = Unknown HTTP Error**

**HTTP Error[10] = HTTP Connection Failed**



# Examples of IP Phone Services Apps

Cisco.com

[http://wwwin.cisco.com/voice/evvbu/news/post\\_bakeoff041002.shtml](http://wwwin.cisco.com/voice/evvbu/news/post_bakeoff041002.shtml)

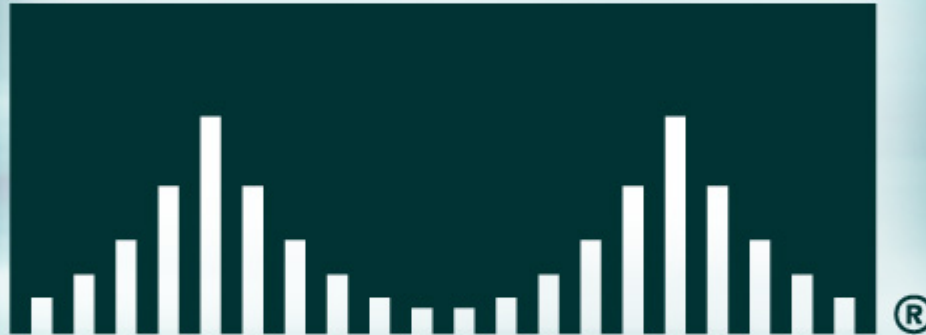
Industry	AVVID Partner	IP Phone Service Application
Healthcare	Calence	Myrx: Prescription Lookup; Order Status
K-12	AAC Associates	Mobile Teacher Room Tracking; Hall Pass Processing; Homework Assignments, Alerts, Schedule Reminders, Etc...
Horizontal	First Virtual Communications	Web Conferencing Solution that Seamlessly Integrates Voice, Video, Data, IM, and Streaming Communications
Horizontal	Eyretel	Execrecord: Extends IP Phone Services Interface to Call Recording Solution
Hospitality	MDR Switchview	Property Mgt System (PMS) Integration to CallManager
Hospitality	Netcom Systems	Property Mgt System (PMS) Integration to CallManager
Legal/Horizontal	Dimension Data	Call Authorization and Tracking Tools
Horizontal	Berbee	Emergency Broadcast Application—Pushes Voice and Text to Thousands of Phones, by Zones If Preferred
Healthcare	Logical	Phonenet Healthcare: Integration into Medical Databases for Diagnoses and Medication Management
Retail	Vytek	Search, Request, and Track Product Statuses by Voice or Data
Finance	CheckMate	Dynamic Business Dashboards and Integration with Various CRM, ERP, and Other Business Solutions

# Cisco IP Phone Summary

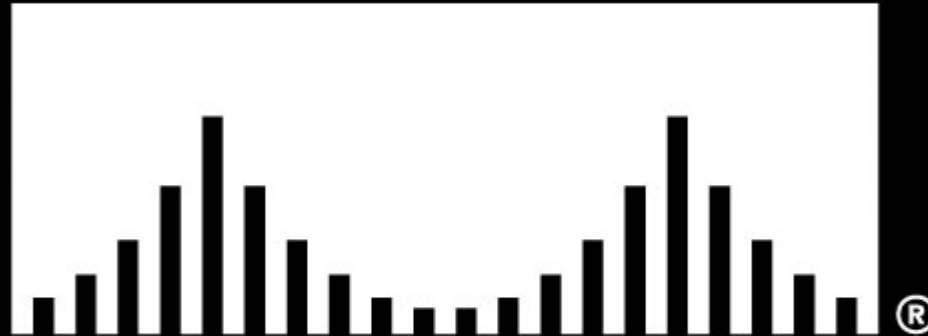
- **Lightweight services platform**
- **Always on, instant messaging**
- **Simple development environment**
- **Converged Desktop device**



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EMPOWERING THE  
INTERNET GENERATION