

7. CME Telephony Features

D I R E C T O R Y

Local Directory—The internal company directory from names entered under each ephone-dn. Used for caller ID and browsable with a phone's "Directory" button. Changes are immediate. The directory button menu has categories like missed calls, received calls, and Local Directory. Can search by first or last name, iteratively re-filtering as you type. Default sort order is by first name.

To Automatically Create From an ephone-dn "name" line:

```
R(config)# ephone-dn 20
R(config-ephone-dn)# name Fred Flintstone
```

To Explicitly Create for FXS Ports That Lack an ephone-dn:

```
R(config-telephony)# directory { first-name-first | last-name-first }
R(config-telephony)# directory entry 1 1599 name Corporate Fax
Can add manual entries for things that don't have an explicit ephone-dn entry
"1" is a tag 1-100, "1599" is the phone # (free-form text), "Corporate Fax" is first & last name.
(max 24 chars)
```

```
R(config-telephony)# directory entry clear
Clears ALL directory entries
```

CCP—Directory entries happen when you associate a user to an extension (ephone-dn). CCP doesn't directly associate ephone-dns (extensions) to ephones. They are linked through user accounts.

Unified Communications → Users, Phones and Extensions → Phones and Users (User Tab)
The name entered here becomes the directory entry for any DNs in the "Phone" tab

Unified Communications → Advanced Telephony Settings (System Config tab)
Directory sorting option

Unified Communications → Telephony Features → Directory Services
Manual Directory entries

(Bonus not in Book) For directory entries to be usable from a phone, the router needs to be running an http server (secure-server won't work because phones don't know how to log in securely) and the ephone entry needs to say what kind of phone it is being used on.

```
R(config)# ip http server
```

```
R(config)# ephone 1
R(config-ephone)# type 7940
```

C A L L F O R W A R D I N G

From the Phone—To forward all calls, hit the softkey "CFwdAll." The phone beeps twice, and you enter a number and #. To later cancel call forwarding, just hit the CFwdAll button again. To forward all calls to voicemail, hit the CFwdAll button, followed by the "messages" button.

From the CLI [disavowed in 210-060, but provides additional options]—typically, destination is voicemail extension (e.g. 1559, below). For timing calculations, US phones ring cycle is 2 seconds ring + 4 seconds silence.

```
R(config)# ephone-dn 21
R(config-ephone-dn)# call-forward { all | busy | max-length | night-service
| noan } 1559 timeout 25
noan=no answer
max-length prevents long-distance toll fraud (e.g. 4 = can only fwd to a 4-digit extension)
max-length = 0 prevents forwarding, dimming the button and making it inaccessible.
```

From CCP

UC --> Users, Phones, and Extensions --> Extensions [edit] (advanced tab)

H.450.3 [Sneak peek at a CCNP topic]—Prevents hairpinning calls through a phone or branch office and back out. CME at a branch office can send a H.450.3-based redirect message instead of accepting the call. The caller automatically reoriginates the call to the new destination.

```
R(config-telephony)# call-forward pattern 15..
All 4-digit extensions beginning with "15" should support H.450.3 call forwarding
```

C A L L T R A N S F E R

From the phone—while on a call, hit “Trnsfer” softkey. At the new dial tone, dial the number you're transferring to. Two kinds of transfers can be configured in CME:

- Consult—requires a second line. After the party answers & you're done talking, hit “Trnsfer” again to drop self out of the conversation. (Was the caller hearing the consult?)
- Blind—fine for single-line

```
R(config-telephony)# transfer-system { full-blind | full-consult | local-consult }
• Full-blind and full-consult use H.450.2 to not hairpin the call
• Local-consult is Cisco-proprietary and won't be hairpinned on CISCO phones. If a second line isn't available, it'll revert to a blind (no consult) transfer
R(config-ephone-dn)# transfer-mode { blind | consult }
Overrides system-wide and uses H.450 (mentioned only in a sidebar)
```

Transfer Pattern—By default, Cisco doesn't allow transfers outside of its own local management, to prevent toll fraud / expensive transfers.

```
R(config-telephony)# transfer-pattern 5...
R(config-telephony)# transfer-pattern 9.....
Allow transfers to these phone numbers. Is the 5... a remote office (non-local mgmt) or local and required only because we opened this can of worms by having any patterns at all (like ACLs)
UC → Advanced Telephony Settings (Transfer Patterns tab)
```

C A L L P A R K

Can be configured to randomly choose a parking extension or allow the user to choose (e.g. parking extension for a store department). To configure, just designate one or more ephone-dns as “park-slot.” After the first parking slot is configured, restart the phones to make parking available.

```
R(config)# ephone-dn 60
R(config-ephone-dn)# number 6001
R(config-ephone-dn)# name Support
R(config-ephone-dn)# park-slot
```

More options...

```
R(config-ephone-dn)# park-slot [ reserved-for <ext> ] [ timeout <secs> ]  
    [ limit <#> ] [ notify <ext> | recall [ alternate... | retry ]  
    | transfer... ]
```

OPTION	MEANING
reserved-for <dn>	Only one DN (extension) can park calls in this slot
timeout <secs>	Seconds before notifying the extension that parked the call that it's still parked. (Ring for 1 second and show message on LCD.) Range 0-65535 seconds
limit <count>	Number of timeouts before dropping the call entirely. Best practice = set this high
notify <dn> [only]	On timeout, notify both the parker and this extra number [or only this extra number]
recall	On timeout, transfer the call back to the parker instead of just notifying
transfer <dn>	On timeout, transfer the call somewhere else
alternate <dn>	On timeout, transfer the call here if the "transfer" extension (above) is off-hook
retry <secs>	Time between attempts to transfer a timed-out parked call

To park a call, hit the "Park" softkey (first open slot) or transfer the call directly to a specific parking-slot extension.

To pick up a parked call (3 ways), dial the parking dn (extension), hit the "PickUp" softkey and dial the dn, or "PickUp" followed by the asterisk (*) for the most recently parked call.

CCP

Unified Communications --> Telephony Features --> Call Park [Create...]

Tell it a name, number of slots & starting #

C A L L P I C K U P

Call Pickup—Answer a phone ringing elsewhere. To configure, just add a pickup-group command to each DN that you want to be part of that pickup group. Assigning the first DN creates the group.

```
R(config)# ephone-dn 1  
R(config-ephone-dn)# pickup-group 5509  
R(config)# ephone-dn 2  
R(config-ephone-dn)# pickup-group 5509
```

For the user, there are three ways to pickup another ringing phone (oldest first):

- Directed Pickup—Press the "PickUp" softkey and dial the DN of the ringing phone

```
R(config-telephony)# no service directed pickup
```

*Disable this ability, turning the "PickUp" softkey into a local group pickup function (no *)*

- Local Group Pickup—If the ringing phone is in the same pickup group as your phone, press "GPickup" and the * button at the second dial tone. If CME only has one group, you'll be immediately connected with no second dial tone or need for the * button.
- Other Group Pickup—Press "GPickup" and dial the other group number

CCP

Unified Communications --> Telephony Features --> Call Pickup Groups [Create]

Fill in a popup window.

I N T E R C O M

Good for an executive and an assistant pairing. Technically, it's configured as a speed-dial and auto-answer speed-dial pair. The auto-answer is in muted speakerphone mode. To talk, the recipient hits the mute button to unmute her phone. Specifically, two new ephone-dns are created, one for each side of the connection.

```
R(config)# ephone-dn 60
R(config-ephone-dn)# number A100
R(config-ephone-dn)# intercom A101 label "Manager"
The number is chosen to be undialable, to prevent use by others. "Intercom" is a speed-dial definition. "Label" controls what is displayed next to the line button on the phone.
```

```
R(config)# ephone-dn 61
R(config-ephone-dn)# number A101
R(config-ephone-dn)# intercom A100 label "Assistant"
The mutuality of the intercom commands is what allows the muted auto-answer
```

```
R(config)# ephone 1
R(config-ephone)# button 2:60
R(config-ephone)# restart
```

```
R(config)# ephone 2
R(config-ephone)# button 2:61
```

Additional Options

```
R(config-ephone-dn)# intercom F9 label <label> { barge-in | no-auto-answer |
no-mute }


- Barge-in places any existing call on hold and causes the intercom to answer
- no-auto-answer rings the phone rather than auto-answer speakerphone
- no-mute auto-answers with an unmuted speakerphone

```

CCP

Unified Communications --> Telephony Features --> Intercom [Create]

P A G I N G

An ephone-dn is designated as a paging number for all phones assigned to that given paging group. Each phone can be in only one paging group, but paging numbers can be created that page multiple groups. Three paging configurations are possible: unicast, multicast, and multiple-group. Unicast paging is limited to groups of 10 phones.

```
R(config)# ephone-dn 80
R(config-ephone-dn)# number 5555
R(config-ephone-dn)# paging [ ip 239.1.1.100 port 2000 ]
The ip option establishes multicast paging.
R(config)# ephone 1
R(config-ephone)# paging-dn 80
Assign this phone to paging group 80
R(config)# ephone 2
R(config-ephone)# paging-dn 80
```

To page, a user can call extension 5555. To do multigroup paging, we can add:

```
R(config)# ephone-dn 81
R(config-ephone-dn)# number 5556
R(config-ephone-dn)# paging
    Our second paging group
R(config)# ephone-dn 82
R(config-ephone-dn)# number 5557
R(config-ephone-dn)# paging group 80,81
    Our company-wide paging. Up to 10 paging numbers can be used with "paging group"
R(config)# ephone 3
R(config-ephone)# paging-dn 81
    Give the second group a phone—nothing to see here; move along, move along
```

CCP

Unified Communications --> Telephony Features --> Paging Numbers

Create a paging number (dn) with a name, number, and optional multicast IP, then associate phones (designated by MAC address & user name) by dragging from list of available phones to a list of selected phones.

Unified Communications --> Telephony Features --> Paging Groups

Same as above except that the associations are drag-drop from a list of paging numbers to a list of selected paging numbers.

AFTER - HOURS CALL BLOCKING

Certain phones can be exempted; certain users can be given a PIN to exempt a phone for a configurable period. Even more powerful options are available using COR (Class of Restriction) but for now, define “after hours,” blocked number patterns, and exemptions.

Define “After Hours”

```
R(config-telephony)# after-hours day mon 17:00 8:00
R(config-telephony)# after-hours day tue 17:00 8:00
    and so on...
R(config-telephony)# after-hours date dec 25 00:00 00:00
R(config-telephony)# after-hours date jan 1 00:00 00:00
```

Define Phone Numbers That Are Blocked After Hours

```
R(config-telephony)# after-hours block pattern 1 91.....
    Pattern index numbers are in the range 1-32
R(config-telephony)# after-hours block pattern 2 9011T
R(config-telephony)# after-hours block pattern 3 91900..... 7-24
    Even phones exempted from other patterns are subject to 7-24 patterns
```

Define Exceptions to the Rules

```
R(config)# ephone 1
R(config-ephone)# after-hour exempt

R(config)# ephone 2
R(config-ephone)# pin 1234
    The PIN can be 4 to 8 digits
R(config)# ephone 3
R(config-ephone)# pin 4321

R(config-telephony)# login timeout 120 clear 23:00
```

*This line undims (makes usable) the “login” softkey on the phones (Reset or restart needed).
“Timeout” is idle time in minutes (default 60), clear is an absolute time of day (11pm here) after
which any PINs have to be re-entered.*

CCP

Unified Communications --> Telephony Features --> After-Hour Tool-bar

C A L L A C C O U N T I N G

CDR (Call Detail Record)—Can be logged to the router's RAM buffer, the Syslog server, or both. Book mentions Kiwi Syslog Daemon (free—www.kiwisyslog.com).

For RAM logging:

```
R(config)# logging buffered 512000
                    512,000 bytes dedicated to logging
R(config)# dial-control-mib retain-timer 10080
                    10,080 minutes = 7 days
R(config)# dial-control-mib max-size 700
                    Store a maximum of 700 CDR entries. (Max 1200)
R# show logging
                    Displays the logging config, then the RAM buffer entries
```

For Syslog:

```
R(config)# gw-accounting syslog
                    Tell CME, specifically, to use syslog
R(config)# logging 172.30.100.101
                    This is the normal syslog statement for all of IOS (and now CME)
```

Accounting Codes—users can push the “Acct” softkey and enter a department billing code during the “ring out” or connected phase of the call without affecting the call itself. CME will add the billing code to the CDR.

M U S I C O N H O L D

MOH (Music on Hold) can be streamed by CME from .wav or .au files in the flash memory of the router as unicast or multicast using G.711 (better) or G.729 codecs. The music file, itself, is pre-encoded in G.711 or G.729.

```
CME_Voice(config-telephony)# moh bonjovi.wav
                    Make sure you own the rights to this song; MOH is considered broadcasting.
CME_Voice(config-telephony)# multicast moh 239.1.1.55 port 2123
                    RTP Port range 2000-65535
```

S I N G L E N U M B E R R E A C H

After a specified timeout, a second phone (cell phone) can begin ringing too. You can also transfer a call to your second device during the call by hitting the “Mobility” softkey, or grab it back with the “Resume” softkey. This is a light version of CUCM's Mobile Connect, which rings multiple devices simultaneously. Note that you'll need a second PSTN trunk, since this works by CME maintaining the call at all times.

```
R(config)# ephone-dn 2 dual-line
R(config-ephone-dn)# snr 14805551212 delay 8 timeout 30 cfwd-noan 2000
    (Single Number Reach) Delay of 8 gives two full rings (2+4+2) and immediately rings the cell
    phone ALSO. 2000 is the voicemail number (after 30 seconds)
R(config-ephone-dn)# mobility
    This allows the transfer of active calls to the cell phone
```

In CCP

Unified Communications --> Users, Phones, and Extensions --> Extensions --> (advanced tab)
 "Single Number Reach" from the menu in the left pane

E P H O N E H U N T G R O U P S

Good for help-desks and other situations where a caller wants to reach a department instead of an individual. Multiple phones ring; the first to answer gets the call.

Pilot Number—a special number representing the whole hunt group of phones that will ring. We then assign DNS to the hunt group

Hunt Group Handling—one of the following:

HUNT GROUP TYPE	MEANING
Longest Idle	Round-Robin. Phones ring in order (as added to the hunt group), starting with the one that's been on-hook the longest
Peer	Round-Robin. In order, starting with the phone after the one that most recently answered a call
Parallel	All extensions in the group ring simultaneously
Sequential	Strict top-down in order. The first extension gets a lot of calls.

Extension Timeout—How long to ring each hunt group member before moving on to next. 10 seconds is a good compromise between giving an extension time to answer and not trying the patience of the caller who thinks that the same phone has been ringing the whole time.

Final Forwarding—what to do with unanswered calls (or where all phones in the hunt group are busy)

CCP FINAL FORWARD OPTION	MEANING / POSSIBLE USES
Originating Number	Back to the extension that transferred the call into the hunt group
Final Number (+ enter an extension #)	The pilot number of a different hunt group A voicemail pilot number Any specific extension number

In CCP, can set the pilot number, the handling "Type", and a list of included extensions using drag & drop.

Unified Communications → Telephony Features → Hunt Groups [Create]

Extension timeout is set using a button at the bottom

N I G H T S E R V I C E

In CCP, define “after hours” and maybe set a manual activation code

UC → Telephony Features → Night Service Bell

*Fill in a schedule table that defines “after hours” (weekly, annual, and daily schedules)
Optionally, set a manual night service activation code in the final section of the screen*

Then tell individual extensions to participate in night service (do for each night service extension)

UC → Users, Phones and Extensions → Extensions (pick an extension)

*In the “Edit Extension” popup, in the left pane menu, choose “Night Service Bell”
Check the “Enable night service” box
Choose either “Allow Night Service Phones to Pick Up Call” or “Automatically Forward Calls to Designated Number”*

Then set which phones should ring for night service

UC → Users, Phones and Extensions → Phones and Users (pick a phone)

In the “Phone Settings” tab, in the “Night Service” section, check the box “Enable This Phone to Receive Calls to Unstaffed Extensions”

S H A R E D E P H O N E - D N

Just put the same DN (extension) on the buttons of two different phones, just like you would to put it on one phone's button (just do it twice, with two different phones).

UC → Users, Phones and Extensions → Phones and Users [Edit] → (phone tab)

Assign the extension to a button

E X T E N S I O N M O B I L I T Y

A user can log into a phone and it received their settings. Configure the following:

- A Logout Profile—phone settings for when no one is logged in. Typically, emergency and internal dialing.
- A User Profile—for each user who might use extension mobility. Includes their extension number, speed dials, etc.
- Each candidate phone must be subscribed to the EM service to provide a login prompt. Alpha logins are like texting (the 2 key cycles through 2, A, B, C, a, b, c while displaying on the phone screen)