

Menghubungkan CUCM dengan PSTN Gateway

Alkindi Hafidz

Alkindi.h@outlook.com

Editor :

Mulyana Hasani (Aylumna@gmail.com)

Romi Satria Wahono (romi@brainmatics.com)

Lisensi Dokumen:

Copyright © 2003-2007 IlmuKomputer.Com

Seluruh dokumen di IlmuKomputer.Com dapat digunakan, dimodifikasi dan disebarkan secara bebas untuk tujuan bukan komersial (nonprofit), dengan syarat tidak menghapus atau merubah atribut penulis dan pernyataan copyright yang disertakan dalam setiap dokumen.

Tidak diperbolehkan melakukan penulisan ulang, kecuali mendapatkan ijin terlebih dahulu dari IlmuKomputer.Com.

Agar CUCM dapat melakukan panggilan keluar, CUCM membutuhkan sebuah koneksi ke PSTN (Public Switched Telephone Network) yang dapat dilakukan dengan sebuah gateway yang terhubung dengan telephony Interface seperti digital T1/E1 atau analog FXO Port dan juga VOIP domain.

CallManager sering memanfaatkan Skinny Client Control Protocol (SCCP) sebagai protokol komunikasi untuk menandakan titik akhir hardware dari sistem, seperti IP Phones. H.323, Media Gateway Control Protocol (MGCP) atau Session Initiation Protocol (SIP) digunakan untuk melewati sinyal panggilan ke gateway.

[H.323](#) dapat diterapkan pada berbagai aplikasi komunikasi yaitu suara saja (IP Telephony), suara dan gambar (Video Telephony), suara dan data, dan juga suara, gambar dan data. H.323 juga bisa diterapkan dalam point-to-point dan juga bisa digunakan dalam aplikasi multipoint conference.

Gateway dapat diintegrasikan dengan CUCM dengan menggunakan protokol yang berbeda seperti Media Gateway Control Protocol (MGCP), H.323 atau Session Initiation Protocol (SIP) untuk sinyal VOIP. Komunikasi dari CUCM ke PSTN dijumpai oleh gateway router menggunakan satu module E1 (30 Channel)

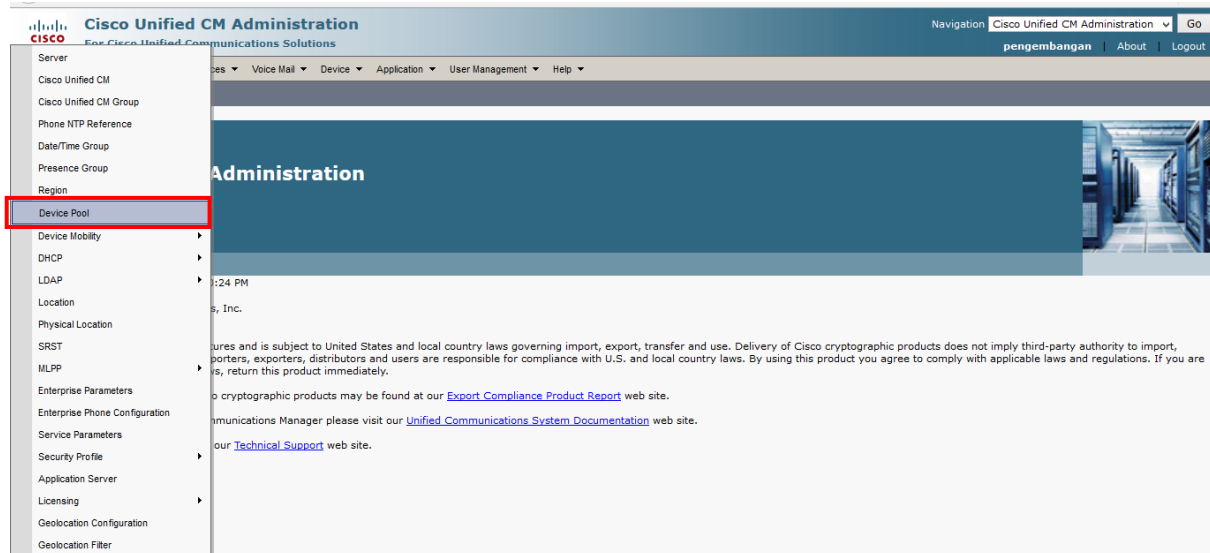
Penulis akan mencoba melakukan konfigurasi mengkoneksikan CUCM ke alamat Voice gateway (PSTN) dalam hal ini Router Gateway PSTN telah harus siap dengan Link E1 (PSTN) yang telah terkonfigurasi dengan baik.

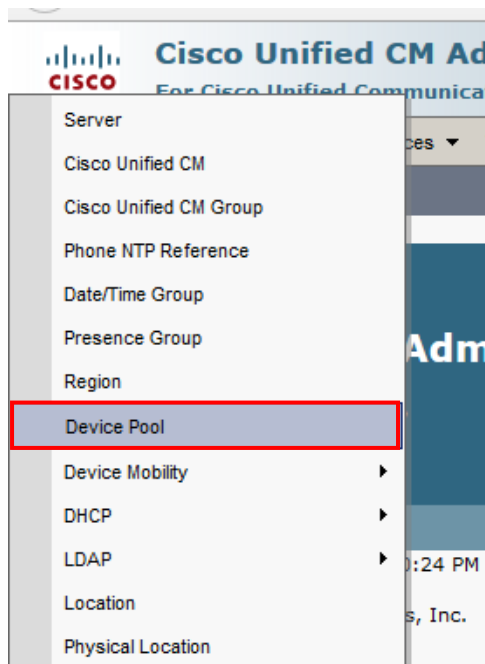
Berikut ini langkah-langkahnya :

1. Membuat Buat Device Pool

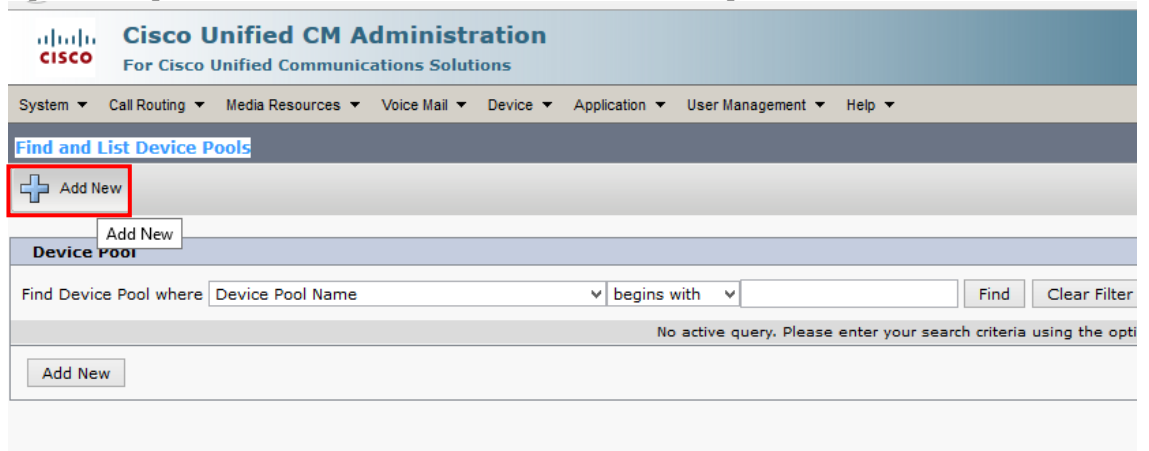
Pada artikel “**Langkah-langkah Mengkonfigurasi Device Pool**” terdapat beberapa item yang diperlukan apabila kita akan membuat device pool. Saat ini penulis akan membuat device pool berdasarkan data-data yang telah dibuat pada artikel sebelumnya :

- a. Login ke CUCM, apabila telah berhasil login, pilih menu **system** lalu pilih **Device Pool** :





Apabila tampilan **Find and List Device Pools** telah terbuka, pilih **Add New** :



Maka akan muncul tampilan Device Pool Configuration seperti berikut ini :

The screenshot shows the Cisco Unified CM Administration interface for Device Pool Configuration. The page title is "Cisco Unified CM Administration For Cisco Unified Communications Solutions". The navigation menu includes System, Call Routing, Media Resources, Voice Mail, Device, Application, User Management, and Help. The main content area is titled "Device Pool Configuration" and includes a "Save" button. The configuration is divided into three sections: Status, Device Pool Information, Device Pool Settings, and Roaming Sensitive Settings. The Status section shows "Status: Ready". The Device Pool Information section shows "Device Pool: New". The Device Pool Settings section includes fields for Device Pool Name*, Cisco Unified Communications Manager Group* (set to "-- Not Selected --"), Calling Search Space for Auto-registration (set to "< None >"), Reverted Call Focus Priority (set to "Default"), and Local Route Group (set to "< None >"). The Roaming Sensitive Settings section includes fields for Date/Time Group* (set to "-- Not Selected --"), Region* (set to "-- Not Selected --"), Media Resource Group List (set to "< None >"), Location (set to "< None >"), Network Locale (set to "< None >"), SRST Reference* (set to "-- Not Selected --"), Connection Monitor Duration*** (empty), and Single Button Barge* (set to "Default").

Isi pada kolom Device Pool Settings dan Roaming Sensitive Settings seperti contoh berikut ini :

The screenshot shows the Cisco Unified CM Administration interface for Device Pool Configuration. The page title is "Cisco Unified CM Administration For Cisco Unified Communications Solutions". The breadcrumb trail is "System > Call Routing > Media Resources > Voice Mail > Device > Application > User Management > Help". The main heading is "Device Pool Configuration". Below the heading are buttons for "Save", "Delete", "Copy", "Reset", "Apply Config", and "Add New". The current device pool is "DP_JKT (71 members**)".

The "Device Pool Settings" section includes:

- Device Pool Name* (text input)
- Cisco Unified Communications Manager Group* (dropdown menu)
- Calling Search Space for Auto-registration (dropdown menu, set to "< None >")
- Reverted Call Focus Priority (dropdown menu, set to "Default")
- Local Route Group (dropdown menu, set to "< None >")

The "Roaming Sensitive Settings" section includes:

- Date/Time Group* (dropdown menu, set to "WIB")
- Region* (dropdown menu)
- Media Resource Group List (dropdown menu)
- Location (dropdown menu, set to "Jakarta")
- Network Locale (dropdown menu, set to "Indonesia")
- SRST Reference* (dropdown menu, set to "Disable")
- Connection Monitor Duration*** (text input)
- Single Button Barge* (dropdown menu, set to "Default")
- Join Across Lines* (dropdown menu, set to "Default")
- Physical Location (dropdown menu, set to "< None >")
- Device Mobility Group (dropdown menu, set to "< None >")

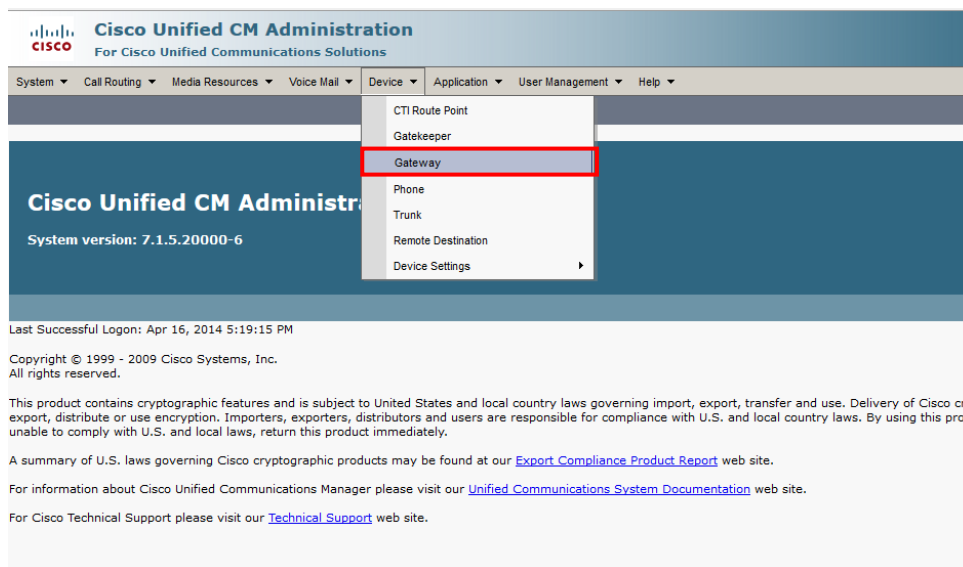
Red callout boxes provide instructions:

- "Isikan nama Device Pool yang akan kita buat dengan nama yang" (Fill in the Device Pool name)
- "Tekan tombol tanda panah kebawah untuk memilih CUCM Group" (Click the down arrow to select CUCM Group)
- "Pada Kolom ini, pilih WIB sesuai yang telah dibuat pada" (Select WIB in this column)
- "Pada Kolom ini, pilih region yang kita buat pada" (Select region in this column)
- "Pilih Location Jakarta pada kolom ini" (Select Location Jakarta in this column)
- "Pada Kolom ini pilih Indonesia" (Select Indonesia in this column)
- "Pada kolom ini, isikan MRGL yang telah dibuat" (Fill in MRGL in this column)

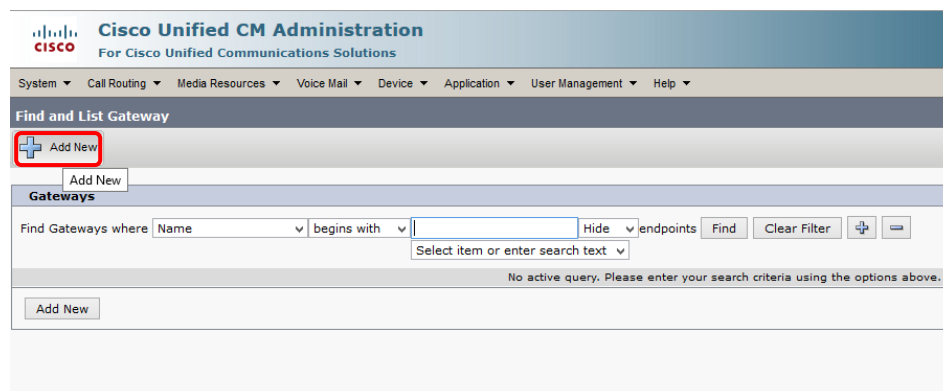
Pada kolom **Device Mobility Related Information, Geolocation Configuration** dan **Incoming Calling Party Settings** tidak perlu dirubah, biarkan tetap terkonfigurasi secara default.

Apabila telah selesai melakukan konfigurasi seting pada Device Pool, jangan lupa melakukan **Save**.

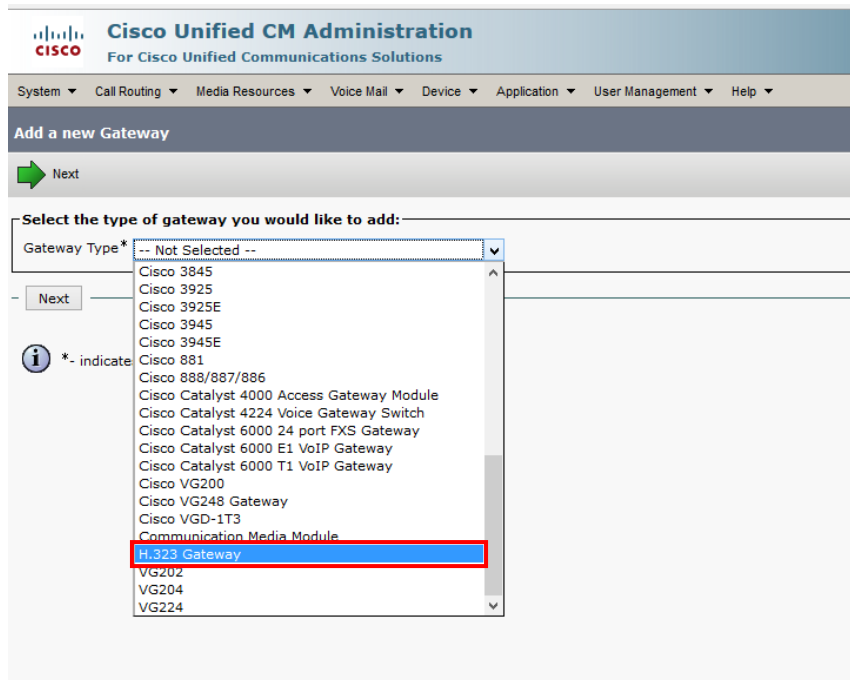
2. Buat koneksi H.323 antara Voice gateway dengan CUCM, dengan cara :
 - a. Login ke CUCM kemudian pilih menu **Device** lalu pilih menu **Gateway** :



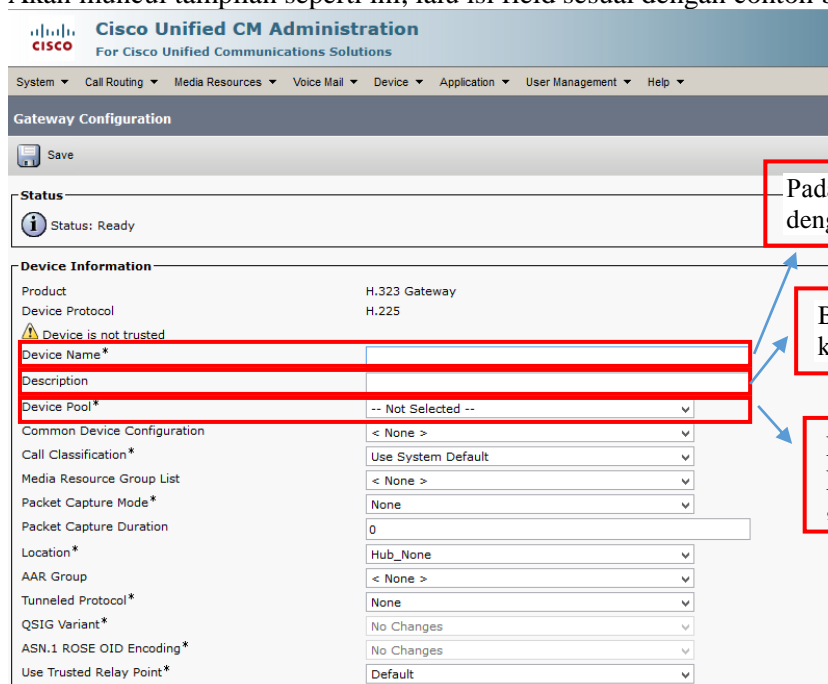
- b. Setelah masuk ke menu **Gateway**, pilih menu **Add New** kemudian akan muncul sebagai berikut :



Pilih **H.323 Gateway** lalu pilih **Next** :



Akan muncul tampilan seperti ini, lalu isi field sesuai dengan contoh berikut ini :



Signaling Port*

Media Termination Point Required

Retry Video Call As Audio

Wait for Far End H.245 Terminal Capability Set

Path Replacement Support

Transmit UTF-8 for Calling Party Name

SRTP Allowed - When this flag is checked, IPSec needs to be configured in the network to provide end to end security. Failure to do so will expose keys and other information.

H.235 Pass Through Allowed

Multilevel Precedence and Preemption (MLPP) Information

MLPP Domain

MLPP Indication Not available on this device

MLPP Preemption Not available on this device

Call Routing Information - Inbound Calls

Significant Digits*

Calling Search Space

AAR Calling Search Space

Prefix DN

Redirecting Number IE Delivery - Inbound

Enable Inbound FastStart

Call Routing Information - Outbound Calls

Calling Party Selection*

Calling Party Presentation*

Called party IE number type unknown*

Calling party IE number type unknown*

Called Numbering Plan*

Calling Numbering Plan*

Caller ID DN

Display IE Delivery

Redirecting Number IE Delivery - Outbound

Enable Outbound FastStart

Codec For Outbound FastStart

Called Party Transformation CSS

Use Device Pool Called Party Transformation CSS

Calling Party Transformation CSS

Use Device Pool Calling Party Transformation CSS

Pada Calling Party IE number type unknown pilih National

Pada Calling Numbering Plan pilih ISDN

Geolocation Configuration

Geolocation

Geolocation Filter

Incoming Calling Party Settings

If the administrator sets the prefix to Default this indicates call processing will use prefix at the next level setting (DevicePool/Service Parameter). Otherwise, the value configured is used as the prefix unless the field is empty in which case there is no prefix assigned.

Number Type	Prefix	Strip Digits	Use Device Pool CSS	Calling Search Space
National Number	<input type="text" value="Default"/>	<input type="text"/>	<input checked="" type="checkbox"/>	<input type="text" value="< None >"/>
International Number	<input type="text" value="Default"/>	<input type="text"/>	<input checked="" type="checkbox"/>	<input type="text" value="< None >"/>
Unknown Number	<input type="text" value="Default"/>	<input type="text"/>	<input checked="" type="checkbox"/>	<input type="text" value="< None >"/>
Subscriber Number	<input type="text" value="Default"/>	<input type="text"/>	<input checked="" type="checkbox"/>	<input type="text" value="< None >"/>

i * - indicates required item.

i ** - Device reset is not required for changes to Packet Capture Mode and Packet Capture Duration.

Jangan lupa melakukan **Save** ketika telah selesai mengisi Field yang diperlukan.

Contoh :

The screenshot shows the Cisco Unified CM Administration interface for configuring an H.323 Gateway. The page is titled "Gateway Configuration" and includes a navigation menu at the top with options like System, Call Routing, Media Resources, Voice Mail, Device, Application, User Management, and Help. Below the navigation menu, there are icons for Save, Delete, Copy, Reset, Apply Config, and Add New.

The main configuration area is divided into several sections:

- Product:** H.323 Gateway
- Device Protocol:** H.225
- Registration:** Unknown
- IPv4 Address:** [Redacted]
- Warning:** Device is not trusted
- Device Name*:** [Redacted]
- Description:** CCM to PSTN
- Device Pool*:** DP_JKT
- Common Device Configuration:** < None >
- Call Classification*:** Use System Default
- Media Resource Group List:** < None >
- Packet Capture Mode*:** None
- Packet Capture Duration:** 0
- Location*:** Jakarta
- AAR Group:** < None >
- Tunneled Protocol*:** None
- QSIG Variant*:** No Changes
- ASN.1 ROSE OID Encoding*:** No Changes
- Use Trusted Relay Point*:** Default
- Signaling Port*:** 1720

Below these fields, there are several checkboxes for advanced settings:

- Media Termination Point Required
- Retry Video Call As Audio
- Wait for Far End H.245 Terminal Capability Set
- Path Replacement Support
- Transmit UTF-8 for Calling Party Name
- SRTP Allowed - When this flag is checked, IPsec needs to be configured in the network to provide end to end security. Failure to do so will expose keys and other information.
- H.235 Pass Through Allowed

The next section is **Multilevel Precedence and Preemption (MLPP) Information**:

- MLPP Domain:** < None >
- MLPP Indication:** Not available on this device
- MLPP Preemption:** Not available on this device

The final section is **Call Routing Information - Inbound Calls**:

- Significant Digits*:** All
- Calling Search Space:** CSS_Global
- AAR Calling Search Space:** < None >
- Prefix DN:** [Redacted]
- Redirecting Number IE Delivery - Inbound
- Enable Inbound FastStart

Call Routing Information - Outbound Calls

Calling Party Selection* Last Redirect Number (External) [v]
 Calling Party Presentation* Default [v]
 Called party IE number type unknown* Cisco CallManager [v]
 Calling party IE number type unknown* National [v]
 Called Numbering Plan* Cisco CallManager [v]
 Calling Numbering Plan* ISDN [v]
 Caller ID DN [text]
 Display IE Delivery
 Redirecting Number IE Delivery - Outbound
 Enable Outbound FastStart
 Codec For Outbound FastStart G711 u-law 64K [v]
 Called Party Transformation CSS < None > [v]
 Use Device Pool Called Party Transformation CSS
 Calling Party Transformation CSS < None > [v]
 Use Device Pool Calling Party Transformation CSS

Geolocation Configuration

Geolocation -- Not Selected -- [v]
 Geolocation Filter < None > [v]

Incoming Calling Party Settings

If the administrator sets the prefix to Default this indicates call processing will use prefix at the next level setting (DevicePool/Service Parameter). Otherwise, the value configured is used as the prefix unless the field is empty in which case there is no prefix assigned.

Clear Prefix Settings Default Prefix Settings

Number Type	Prefix	Strip Digits	Use Device Pool CSS	Calling Search Space
National Number	Default	0	<input checked="" type="checkbox"/>	< None > [v]
International Number	Default	0	<input checked="" type="checkbox"/>	< None > [v]
Unknown Number	Default	0	<input checked="" type="checkbox"/>	< None > [v]
Subscriber Number	Default	0	<input checked="" type="checkbox"/>	< None > [v]

Route Group Membership

RG PSTN PSTN TELKOM

Save Delete Copy Reset Apply Config Add New

*- indicates required item.
 **-. Device reset is not required for changes to Packet Capture Mode and Packet Capture Duration.

Jika sudah mengisi field sesuai dengan contoh diatas, lakukan **save**.

Apabila konfigurasi berhasil, akan muncul Route Group PSTN yang telah kita buat ke dalam Route Group Membership.

- Langkah selanjutnya adalah Membuat route group untuk PSTN, yang berfungsi sebagai jalur komunikasi masing-masing device IP Telephony agar bisa melakukan dan menerima panggilan dari luar.

Cara membuat route Group ini ada di artikel sebelumnya dengan judul :
“Mengintegrasikan VoIP dengan 3Cx menggunakan CUCM”

Buat Route-Group dengan nama Route Group PSTN, atau dengan nama yang spesifik dan mudah diingat.

Selanjutnya, Di Route group yang telah dibuat, lihat pada kolom **Find Devices to Add to Route Group**, lalu lihat pada kolom **Available Devices**, pilih IP Address Router

Gateway yang tadi telah didaftarkan pada langkah nomor 1 kemudian klik **Add to Route Group**.

The screenshot displays the Cisco Unified CM Administration interface for configuring a Route Group. The page title is "Route Group Configuration". At the top, there are navigation tabs: System, Call Routing, Media Resources, Voice Mail, Device, Application, User Management, and Help. Below the tabs, there are icons for Save, Delete, and Add New. The main configuration area is divided into three sections:

- Route Group Information:** Contains a text field for "Route Group Name*" with the value "RG_PSTN" and a dropdown menu for "Distribution Algorithm*" set to "Circular".
- Route Group Member Information:** Contains a "Find Devices to Add to Route Group" section with a "Device Name contains" input field and a "Find" button. Below this is a list of "Available Devices**" with a scrollable list box. A "Port(s)" dropdown is set to "None Available". A red box highlights the "Add to Route Group" button.
- Current Route Group Members:** Contains a "Selected Devices***" list box with a "Reverse Order of Selected Devices" button. Below it is a "Removed Devices****" list box.

Ini berfungsi agar seluruh panggilan yang berasal dari perangkat telephony bisa dipanggil serta memanggil panggilan dari dan ke luar.

Jika semua langkah telah dilakukan, untuk pengetesannya lakukan tes menggunakan CIPC yang telah anda instal sebelumnya (hardware atau software) dengan melakukan panggilan dari device IP Telephony ke luar maupun dari luar ke dalam. Jika dari luar sudah dapat melakukan panggilan ke nomor anda, maka seting konfigurasi Router gateway ini telah berhasil dengan baik.

Referensi :

1. <https://supportforums.cisco.com/community/netpro/collaboration-voice-video/ip-telephony/blog/2011/11/27/implementing-pstn-gateways-in-cucm>
2. <http://www.kajianpustaka.com/2012/10/protokol-h323.html#.Ukk4p9Lrwil>

3. Tharom, Tabratas, dan Purbo W. Onno, “Teknologi VoIP (Voice over Internet Protocol)”, PT. Elex Media Komputindo, Jakarta, 2001
4. <http://www.kajianpustaka.com/2012/10/protokol-h323.html#ixzz2gMeYEpx>
Follow us: [@kajianpustaka on Twitter](#) | [KajianPustaka on Facebook](#)
5. http://my.safaribooksonline.com/book/certification/ccna/9780132904087/chapter-5dot-cisco-unified-communications-manager-cucm-administration-and-management/ch05lev1sec25_html

Biografi Penulis



Alkindi Hafidz.
Menyelesaikan S1 di universitas Muhammadiyah Malang Jurusan Teknik Informatika lulus tahun 2009. Berminat dengan dunia networking terutama Voip.