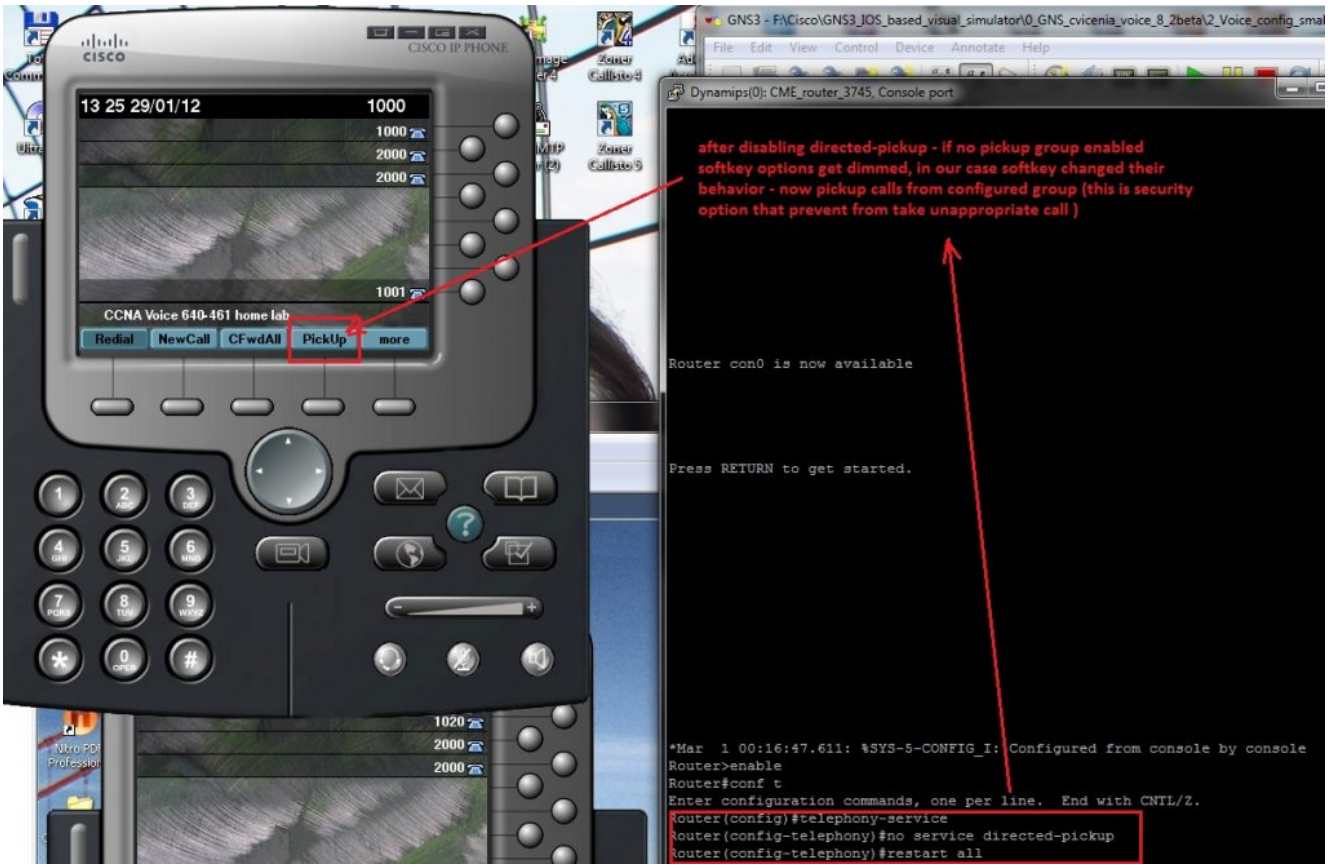
8. Call Pickup

Enable to answer a remote extension on our local phone. Using PickUp key on ephone and enter extension of ringing phone you can answer phone. If this is undesirable (any phone can pickup any ringing ephone in company) you must disable directed pickup feature (enabled by default). *Entering command*

no service directed-pickup

within telephony-service mode.

Next figure show *how to use mentioned command.*



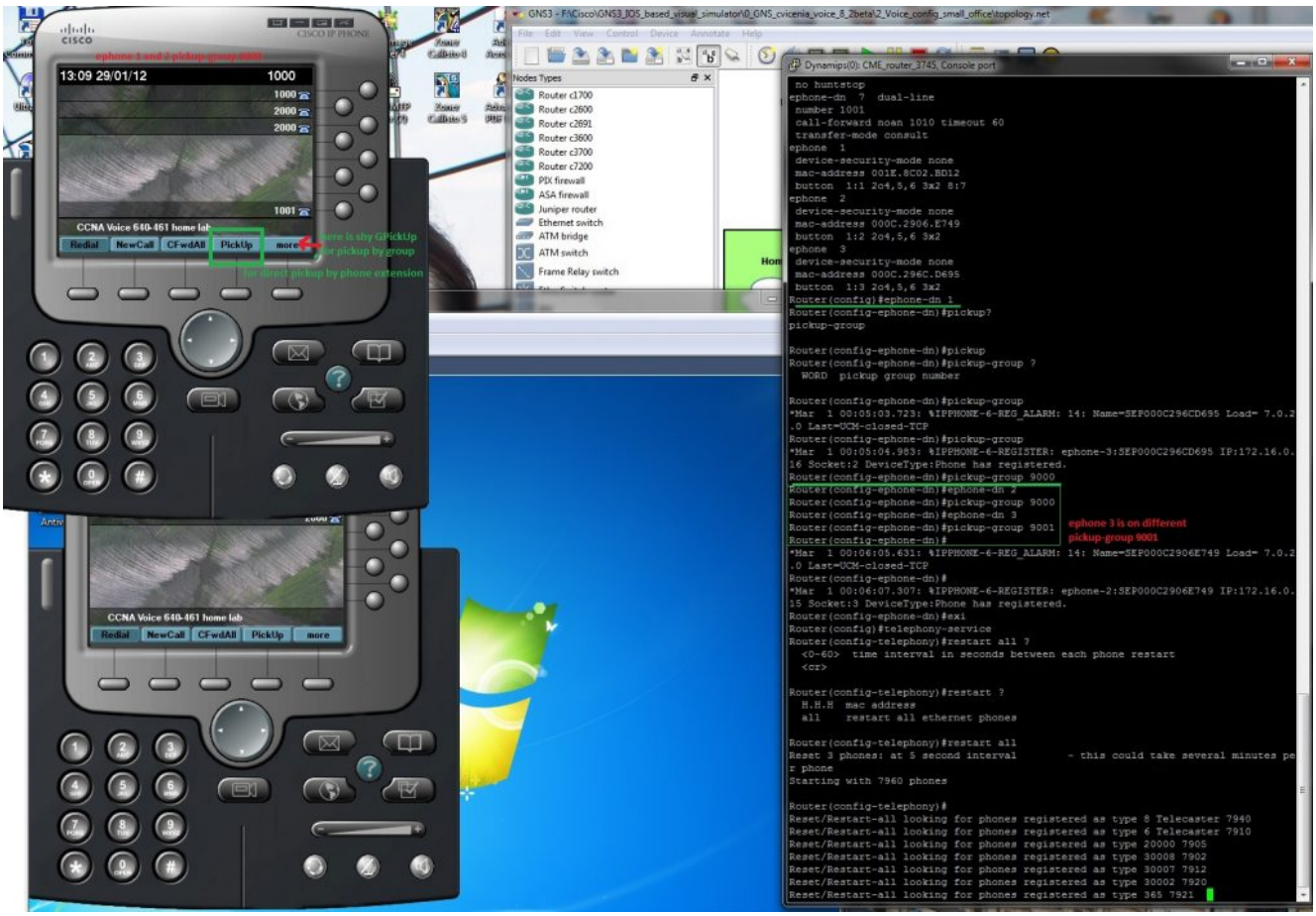
Much more control to pickup of ringing ephone introduce pickup groups. We can use pickup-group command in config ephone-DN. In our scenario it is

```
ephone-dn  1
 number 1000
 pickup-group 9000
```

```
 name Ciljak
!
!
ephone-dn  2
 number 1010
 pickup-group 9000
 name Worker 1
!
!
ephone-dn  3
 number 1020
 pickup-group 9001
 name Worker 2
!
```

Full config can be obtained from here (consist also from ephone-dn from previews labs). Ephone 1 and 2 share same pickup group 9000, ephone 3 with button associated with ephone-dn 3 belong to another pickup group 9001.

Closer look at configuration and pickup of call is on next pictures.



From phone 3 (1020) is placing call to ephone 2 (1010). This phone is on same pickup group 9000 as ephone 1 that will initiate pickup.

On ephone 1 is pressed softkey GPickUp (shy in more options on basic screen).

Pickup of call from another phone in same pickup group can begin with pickup group number entering. After call pickup is call answered from ephone 1 and not from desired destination of caller to ephone 2.


CISCO
CISCO IP PHONE
13:16 29/01/12
1000
1000
900 0
enter the group number
appropriate pickup group - 9000
in this case
1000
2000
2000
1001
Enter number
Redial
EndCall
CFwdAll
PickUp
more
1020
1020
1 To Worker 1
(1010)
2000
2000
Ring out
CallBack
EndCall
Acct
Zoner Callisto 4
Zoner Callisto 5


CISCO
CISCO IP PHONE
13:18 29/01/12
1000
1000
1
From Worker 2
(1020)
2:07
call was sucesfully picketup in group 9000 from ephone 2 to ephone 1
1000
2000
2000
1001
Connected
Hold
EndCall
Trnsfer
Confrn
more
1020
1020
1
To Ciljak
(1000)
2:52
2000
2000
Connected
Hold
EndCall
Trnsfer
Confrn
more

7. Call Transfer

Call transfer is process of moving an active phone call from one phone number to another.

This process can be *invoked by pressing Trnsfer softkey* and dialing the number where we wish to forward call.

Before we can transfer a call we must consider some aspects of call transfer.

1) *There are 3 transfer options that can be configured under telephony-service at CME router*

full-blind – transfer call immediately after entering a transfer number (available on single-line ephone-dn as only one options!!!)

full-consult – (default method but only if dual line available!!!) – allow you to speak to transfer nr. before call is forwarding. As it was mentioned earlier this setup requires dual-line ephone-DNs.

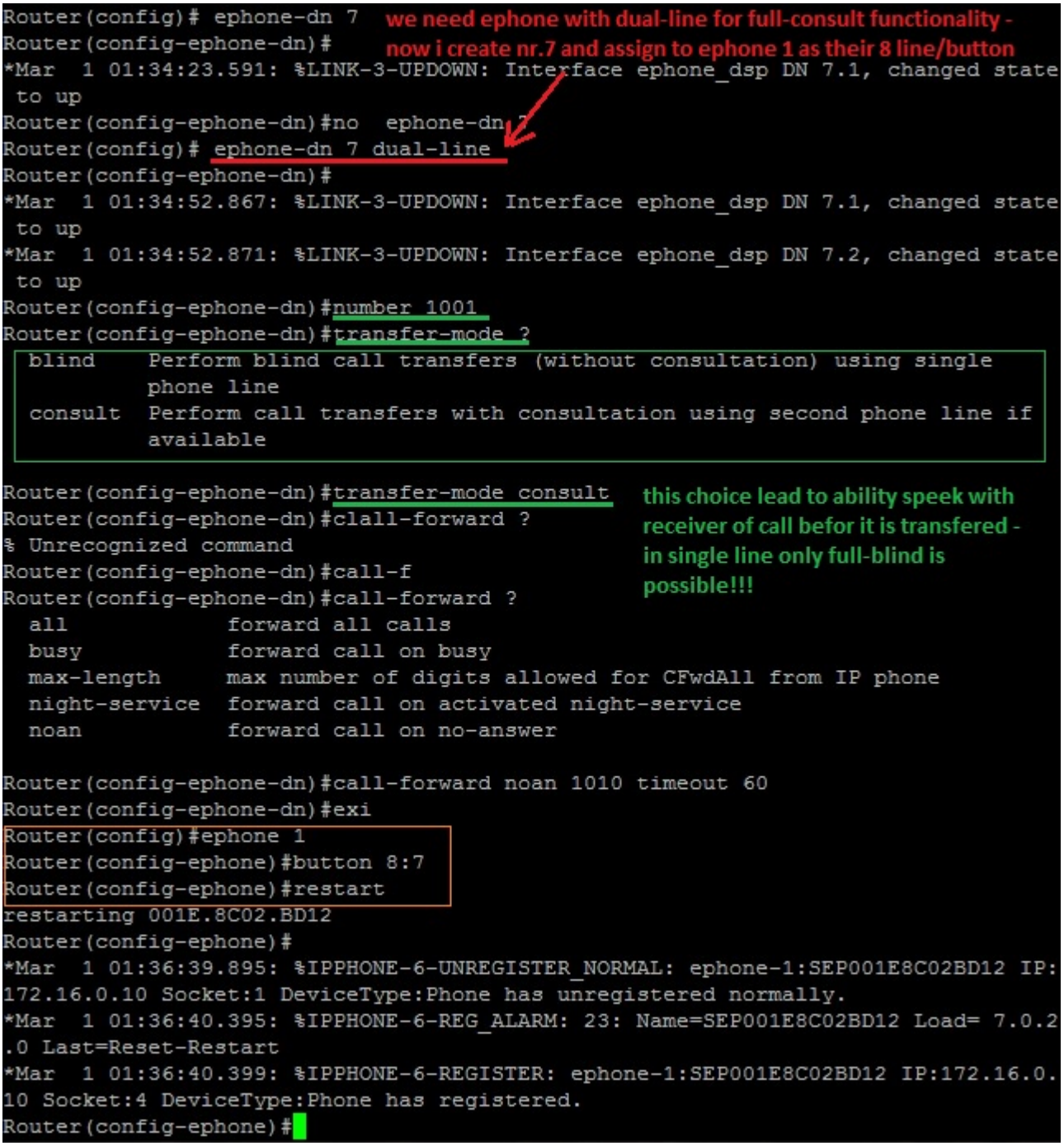
local-consult – (legacy options) – similar to full-consult but voice traffic low is inefficient. Is cisco proprietary method and should be used only for backward compatibility with older phones.

Please remember that for single-line ephone-DNs the only options is full-blind because consult transfers require use of second line.

2) *Transfer method can be configured also on individual ephone-DNs*

This is way how we configure transfer options in this training lab. But when we will test consult transfer we must to configure ephone-dn 7 dual-line as extension as previews labs and assign them to eight button (example) on our octoline

softephone IP communicator.



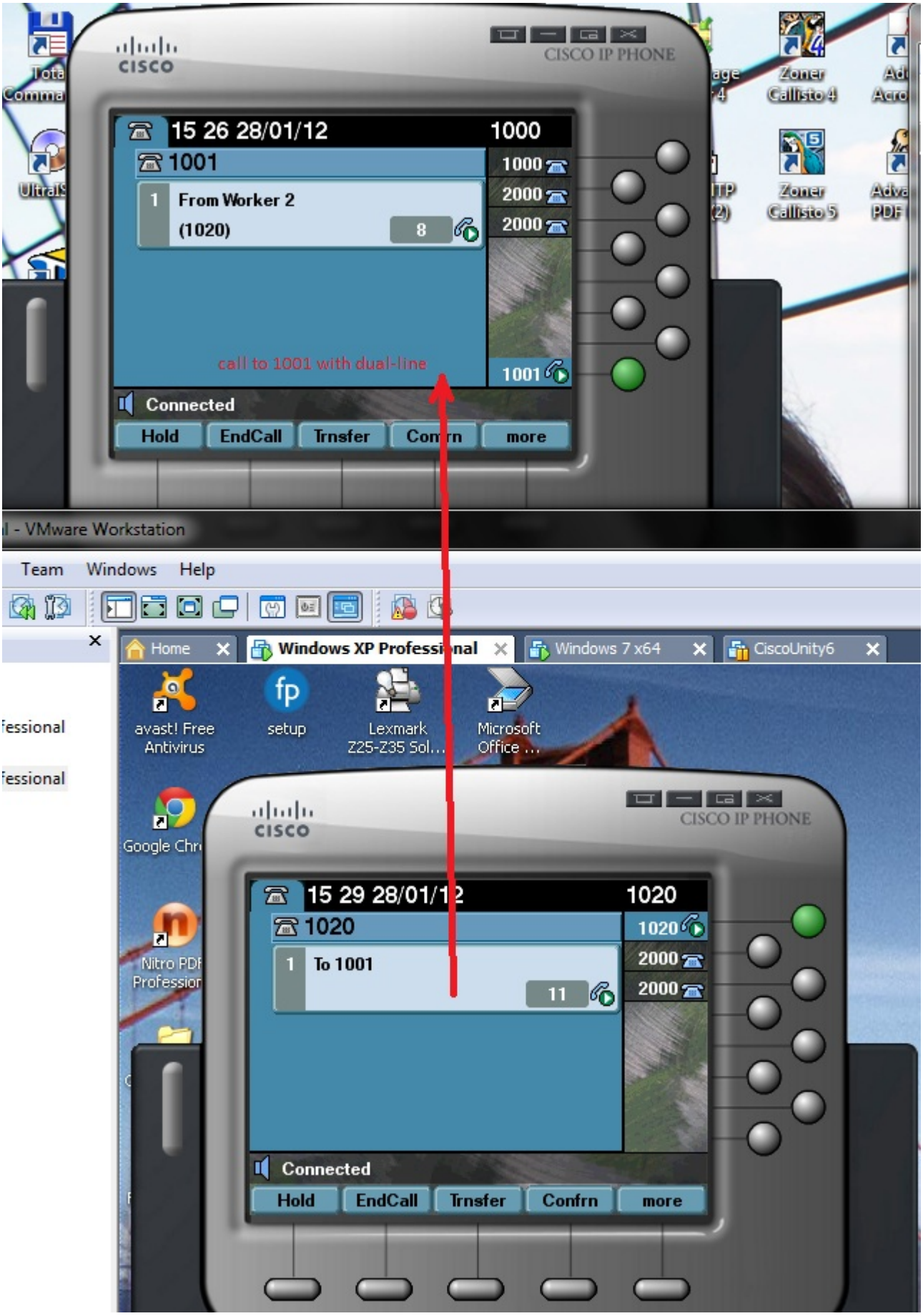

```
Router(config)# ephone-dn 7
Router(config-ephone-dn)#
*Mar  1 01:34:23.591: %LINK-3-UPDOWN: Interface ephone_dsp DN 7.1, changed state
 to up
Router(config-ephone-dn)#no  ephone-dn 7
Router(config)# ephone-dn 7 dual-line
Router(config-ephone-dn)#
*Mar  1 01:34:52.867: %LINK-3-UPDOWN: Interface ephone_dsp DN 7.1, changed state
 to up
*Mar  1 01:34:52.871: %LINK-3-UPDOWN: Interface ephone_dsp DN 7.2, changed state
 to up
Router(config-ephone-dn)#number 1001
Router(config-ephone-dn)#transfer-mode ?
  blind    Perform blind call transfers (without consultation) using single
           phone line
  consult  Perform call transfers with consultation using second phone line if
           available

Router(config-ephone-dn)#transfer-mode consult
Router(config-ephone-dn)#clall-forward ?
% Unrecognized command
Router(config-ephone-dn)#call-f
Router(config-ephone-dn)#call-forward ?
  all             forward all calls
  busy            forward call on busy
  max-length      max number of digits allowed for CFwdAll from IP phone
  night-service   forward call on activated night-service
  noan            forward call on no-answer

Router(config-ephone-dn)#call-forward noan 1010 timeout 60
Router(config-ephone-dn)#exi
Router(config)#ephone 1
Router(config-ephone)#button 8:7
Router(config-ephone)#restart
restarting 001E.8C02.BD12
Router(config-ephone)#
*Mar  1 01:36:39.895: %IPPHONE-6-UNREGISTER_NORMAL: ephone-1:SEP001E8C02BD12 IP:
172.16.0.10 Socket:1 DeviceType:Phone has unregistered normally.
*Mar  1 01:36:40.395: %IPPHONE-6-REG_ALARM: 23: Name=SEP001E8C02BD12 Load= 7.0.2
.0 Last=Reset-Restart
*Mar  1 01:36:40.399: %IPPHONE-6-REGISTER: ephone-1:SEP001E8C02BD12 IP:172.16.0.
10 Socket:4 DeviceType:Phone has registered.
Router(config-ephone)#
```

Full config from GNS cisco router 3745 vith CME capability can be obtained from here.

After restarting (hard rebooting ephone 1) we can see this display on ephone screen

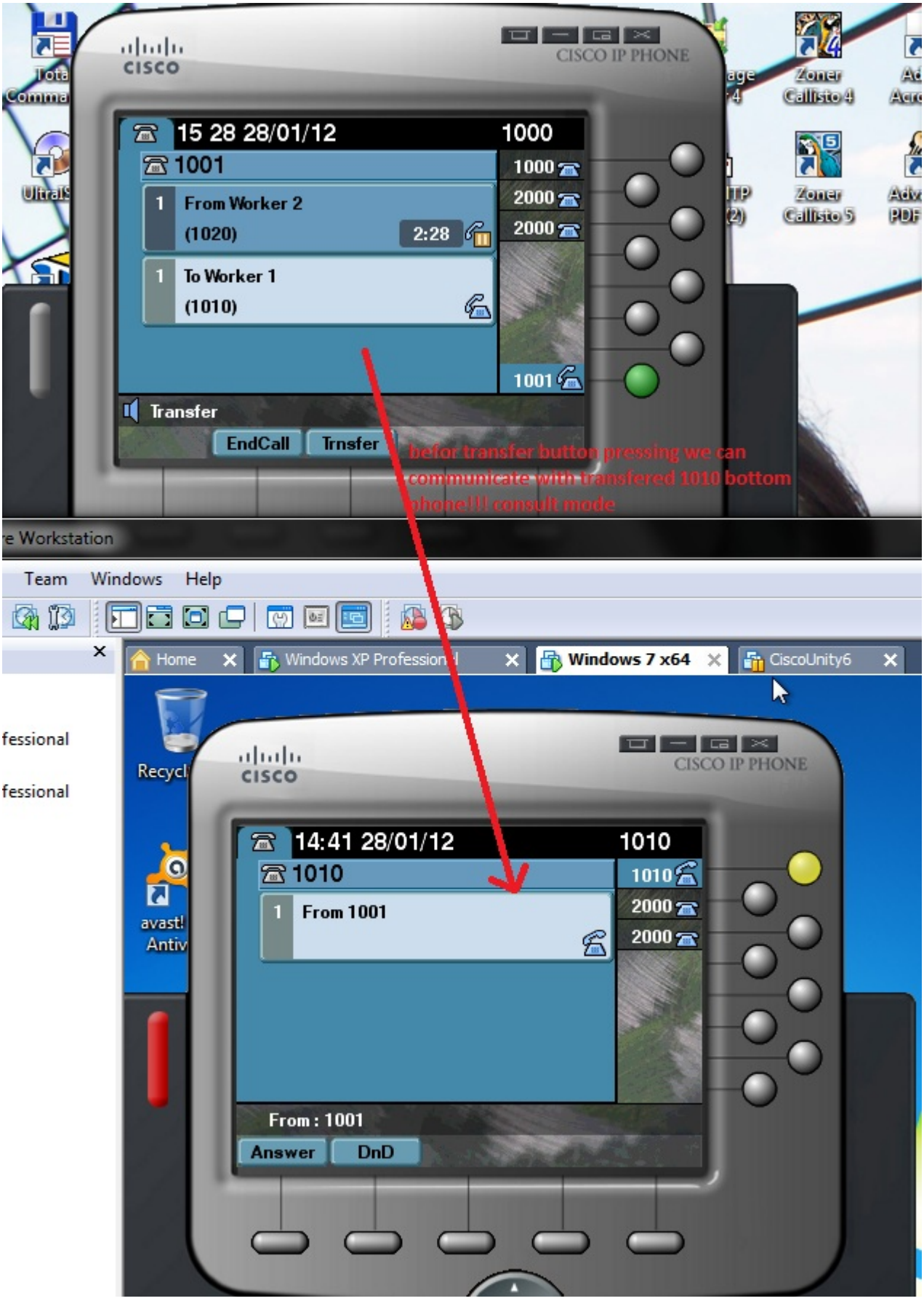
All we need we have at this time and transfer examination process can begin.

We initiate call from number 1020 to number 1001 that can look like this



Extension 1001 (my ephone answer the call and decide to transfer it to 1010). I press Trnsfer softkey and type 1010 as

forwarding destination – there is dual-line important for consult mode. Transferring call is placed on hold (on picture upper subline of duall line) and transfer consult to 1010 begin (second subline in dual-line on picture).



User on transferring destination with extension 1010 lift the handset of ephone and consult.

When consult is at its end i can press Trnsfer softkey for second time that definitive transfer call from my ephone with extension 1001 to 1010 extension. As you can see call is

transferred from 1001 to 1010 and all communication is now only between 1020 (initiator of call) and 1010 (call was transferring from 1001 to new extension 1010).

Steady state after call transfer show next picture


CISCO
CISCO IP PHONE
15:36 28/01/12
1000
after consulting and
second transfer
button pressing - call
is transfered to 1010
extension
1000
2000
2000
1001
CCNA Voice 640-461 home lab
Redial
NewCall
CFwdAll
PickUp
more
Team
Windows
Help
Home
Windows XP Professional
Windows 7 x64
CiscoUnity
CISCO
CISCO IP PHONE
14:49 28/01/12
1010
1010
1
From Worker 2
(1020)
5:36
1010
2000
2000
Connected
Hold
EndCall
Trnsfer
Confrn
more

6. Call Forwarding

Call forward is a voice productivity feature that can to direct all of your calls to different ephone.

There are 2 different types of call forward:

1) *Dynamic call forwarding* – forward calls on the cisco phone itself.

To forward call you can press CFwdAll softkey on ephone, enter the phone number you want forward a calls to and press End softkey or # button. This step by step process show next pictures.


CISCO IP PHONE
13:20 28/01/12
1000
1000
2000
2000
CCNA Voice 640-4 1 home lab
Redial
NewCall
CFwdAll
PickUp
more
Static call forwarding options from ephone

You can see icon in upper-right corner to indicate that phone has been forwarded.

When forwarded call is received by appropriate device on their screen show message: call to number 1000 Ciljak from 1020 was forward to Worker 2 (1010).

When we will stop phone to forwarding calls, press the CFwdALL softkey again.

2) *Static call forwarding* – configure forwarding within cisco IOS. These are more options that offer dynamic call forwarding method. There are these options that can be configured at ephone-DN.

all – forward all incoming call

busy – forward calls when phone is busy

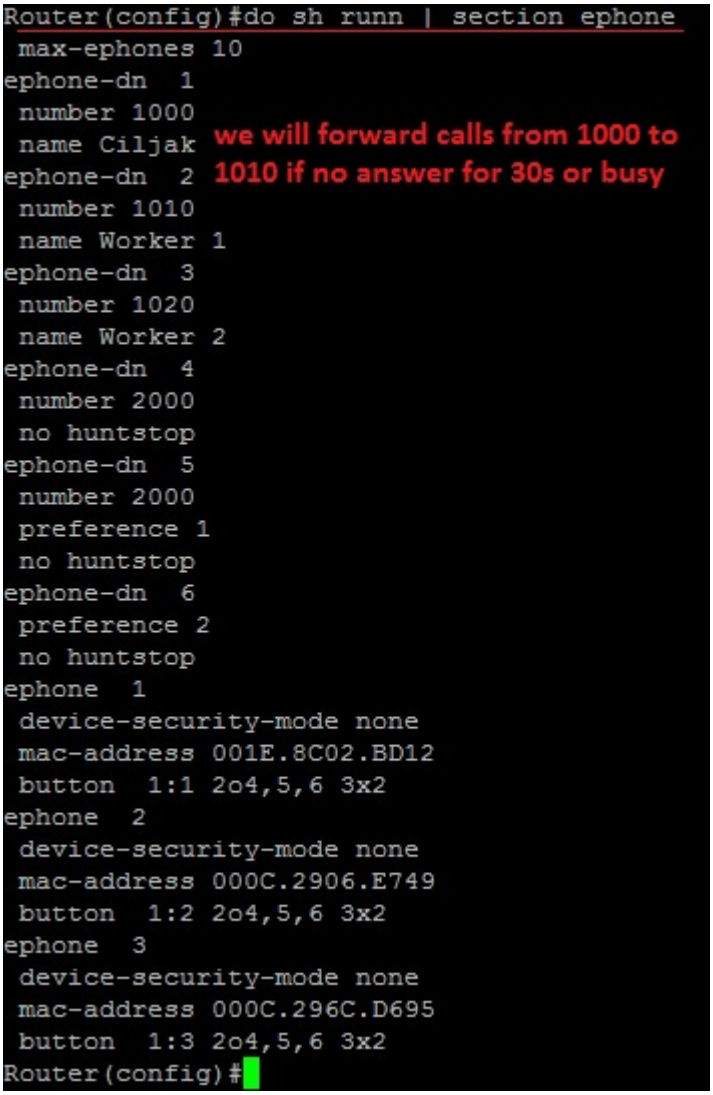
night-service – forward calls when CME is in night-service active time mode

noan – forward calls after a specified amount of time when phone has not been answered

example of config:

```
CME(config)#ephone-dn 1

CME(config-ephone-dn)#call-forward noan 1010 timeot 30

CME(config-ephone-dn)#end
```

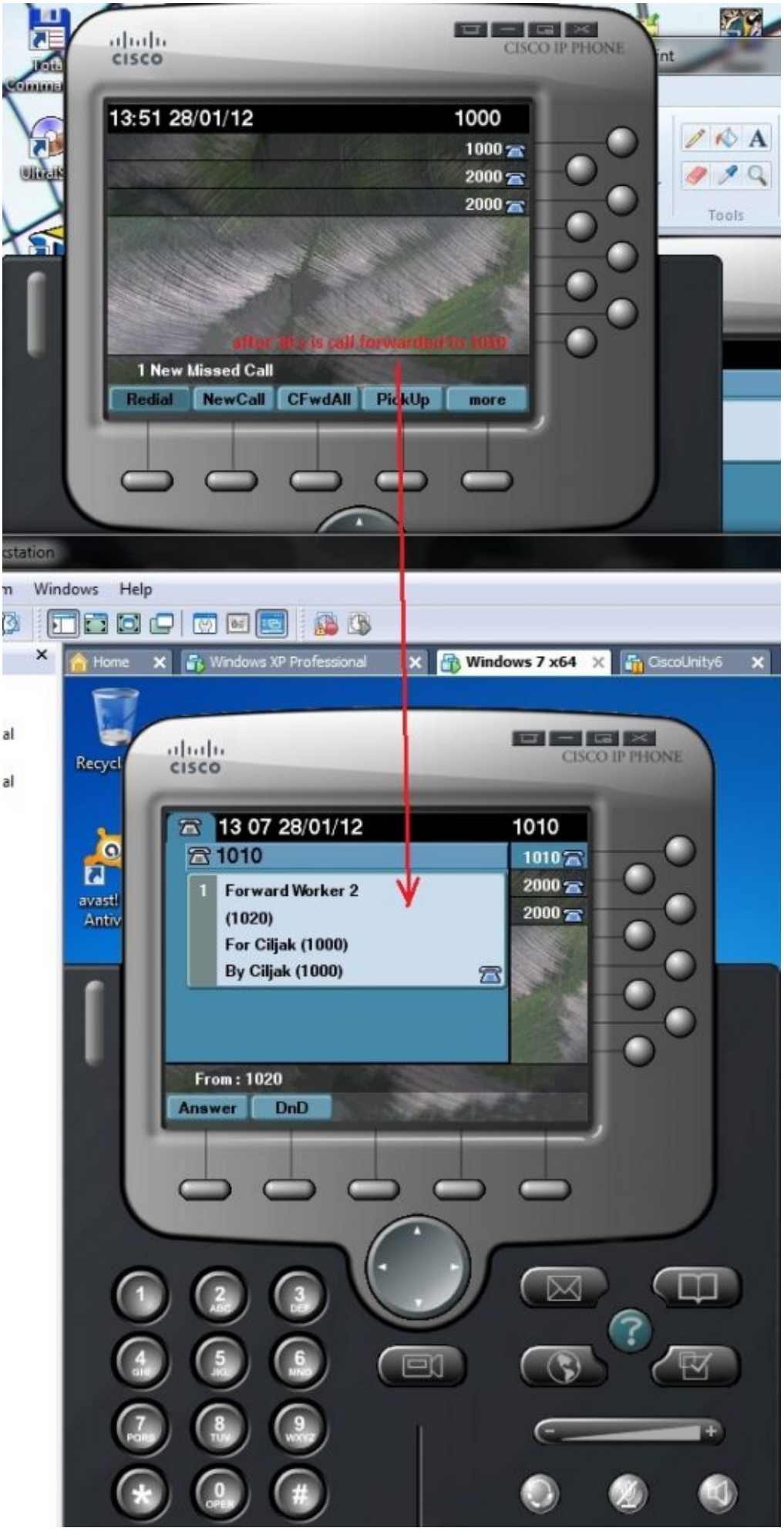
Closer look at noan and busy call forwarding show next pictures:


Router(config)#do sh runn | section ephone
max-ephones 10
ephone-dn 1
number 1000
name Ciljak
ephone-dn 2
number 1010
name Worker 1
ephone-dn 3
number 1020
name Worker 2
ephone-dn 4
number 2000
no huntstop
ephone-dn 5
number 2000
preference 1
no huntstop
ephone-dn 6
preference 2
no huntstop
ephone 1
device-security-mode none
mac-address 001E.8C02.BD12
button 1:1 2o4,5,6 3x2
ephone 2
device-security-mode none
mac-address 000C.2906.E749
button 1:2 2o4,5,6 3x2
ephone 3
device-security-mode none
mac-address 000C.296C.D695
button 1:3 2o4,5,6 3x2
Router(config)#
we will forward calls from 1000 to 1010 if no answer for 30s or busy

```
Router(config)#ephone-dn 1  we forward static calls from ephone-dn 1 1000 to 1010 if:
Router(config-ephone-dn)#call-forward ?
  all             forward all calls
  busy            forward call on busy
  max-length      max number of digits allowed for CFwdAll from IP phone
  night-service   forward call on activated night-service
  noan            forward call on no-answer

Router(config-ephone-dn)#call-forward noan ?
  WORD  A sequence of digits - representing E.164 number

Router(config-ephone-dn)#call-forward noan 1010 ?
  timeout  Ringing no answer timeout duration

Router(config-ephone-dn)#call-forward noan 1010 timeout ?
  <3-60000>  Ringing no answer timeout duration in seconds

Router(config-ephone-dn)#call-forward noan 1010 timeout 30 ?
  dialplan-pattern  forward to dial-peer created for the dialplan-pattern
  primary           forward to dial-peer created for the primary number
  secondary         forward to dial-peer created for the secondary number
  <cr>

Router(config-ephone-dn)#call-forward noan 1010 timeout 30
Router(config-ephone-dn)#call       extension 1000 no answer for 30s
Router(config-ephone-dn)#call-fo
Router(config-ephone-dn)#call-forward bus
Router(config-ephone-dn)#call-forward busy ?
  WORD  A sequence of digits

Router(config-ephone-dn)#call-forward busy 1010 ?
  dialplan-pattern  forward to dial-peer created for the dialplan-pattern
  primary           forward to dial-peer created for the primary number
  secondary         forward to dial-peer created for the secondary number
  <cr>

Router(config-ephone-dn)#call-forward busy 1010
Router(config-ephone-dn)#exi      or extension 1000 (ephone-dn 1) is busy
Router(config)#
```

Now we look at no answering ephone 1 with extension 1000 that will be forwarding to 1010 after 30s timeout of no answering.


CISCO
CISCO IP PHONE
13 50 28/01/12
1000
1000
1 From Worker 2
(1020)
1000
2000
2000
From : 1020
Answer
DnD
1
2 ABC
3 DEF
4 GHI
5 JKL
6 MNO
7 PQRS
8 TUV
9 WXYZ
*
0 OPER
#


CISCO
CISCO IP PHONE
13:51 28/01/12
1000
1000
2000
2000
after 30 s is call forwarded to 1010
1 New Missed Call
Redial
NewCall
CFwdAll
PickUp
more
Tools
Windows
Help
Home
Windows XP Professional
Windows 7 x64
CiscoUnity6
CISCO
CISCO IP PHONE
13 07 28/01/12
1010
1010
1010
2000
2000
1 Forward Worker 2
(1020)
For Ciljak (1000)
By Ciljak (1000)
From : 1020
Answer
DnD

5. Hybrid phone system for helpdesk environment

This training environment will introduce network helpdesk office. 3 ephones are configured with unique numbers but also with overlay button and third button is used for overlay line extension (x button). Each ephone can in future answer a call incoming from PSTN (call of clients calling to helpdesk).

```
ephone-dn 1
number 1000
name Ciljak


ephone-dn 2
number 1010
name Worker 2
no huntstop

ephone-dn 3
number 1020

these number are individual

ephone-dn 4
number 2000
no huntstop
priority 0

ephone-dn 5
number 2000
no huntstop
priority 1

ephone-dn 6
```

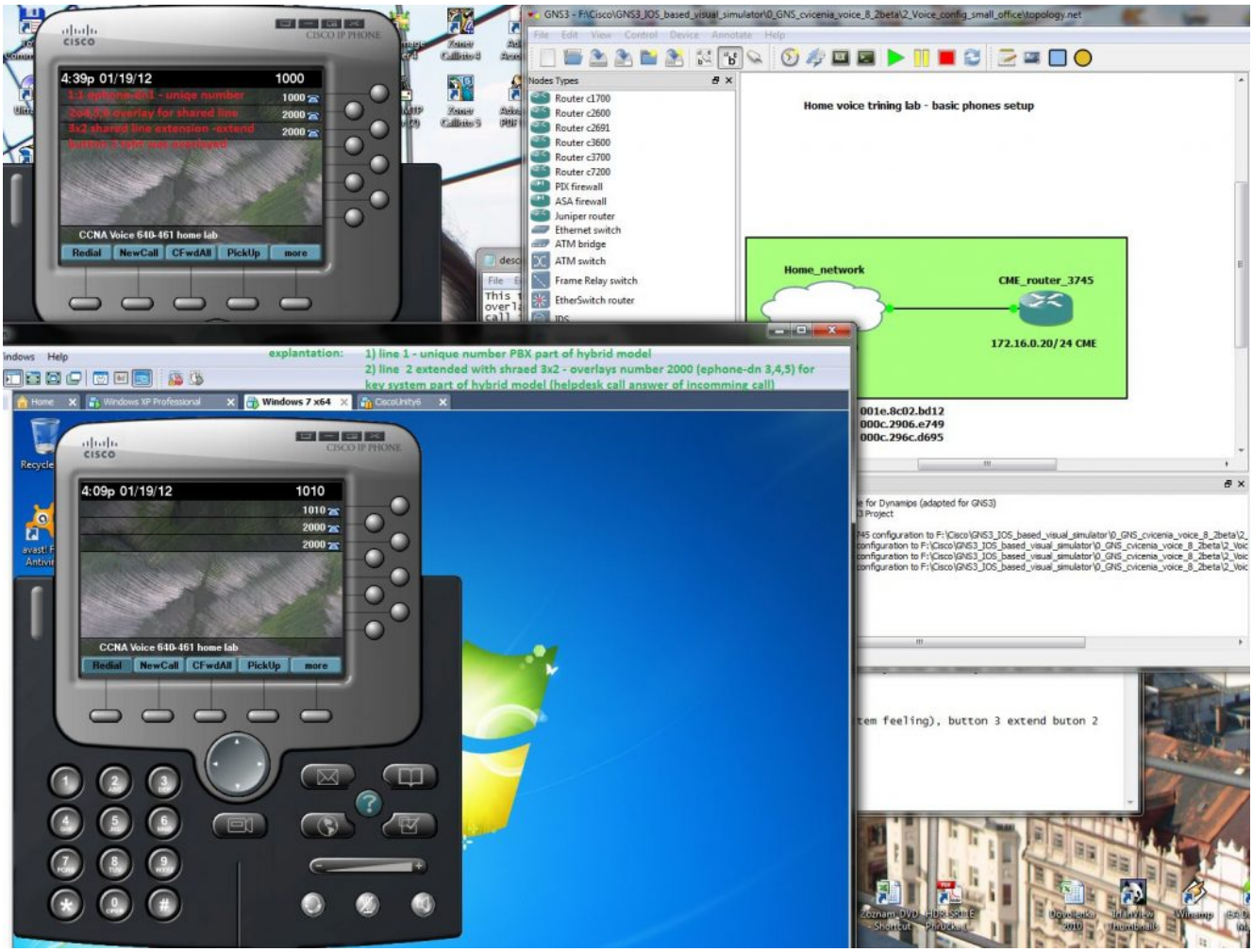
```
number 2000
no huntstop
priority 2
```

ephone-dn 4 to 6 introduce shared line feeling and overlay assignment enable equal response from all phones with ability answer call from other phones when any other is busy (in active call).

```
ephone 1
mac xxxx.xxxx.xxxx
button 1:1 2o4,5,6 3x2
```

button 1 individual dn, button 2 is overlay (key system feeling), button 3 extend button 2 overlay line.

Configured ephones will look like this



4. Extended watch line scenario

New scenario will extend previews with new ephone. Now we have three ephones. Our lab consist of:

1) *Ephone 1* – extension 2001 – name Ciljak – IP 172.16.0.10/24 on hosting pc

2) *Ephone 2* – extension 2002 – Name Office – IP 172.16.0.15/24 hosted on win 7 virtual PC

3) *Ephone 3* (new) – extension 2003 and two watch line monitoring activity on ephone 1 and 2 (can act as receptionist ephone) IP 172.16.0.16/24.

Our goal is ephone-dn assignment to phone buttons as it is on next picture

CME was configured with these commands:

```
ephone-dn  1
 number 2001
 name Ciljak
!
!
ephone-dn  2
 number 2002
 name Office
```

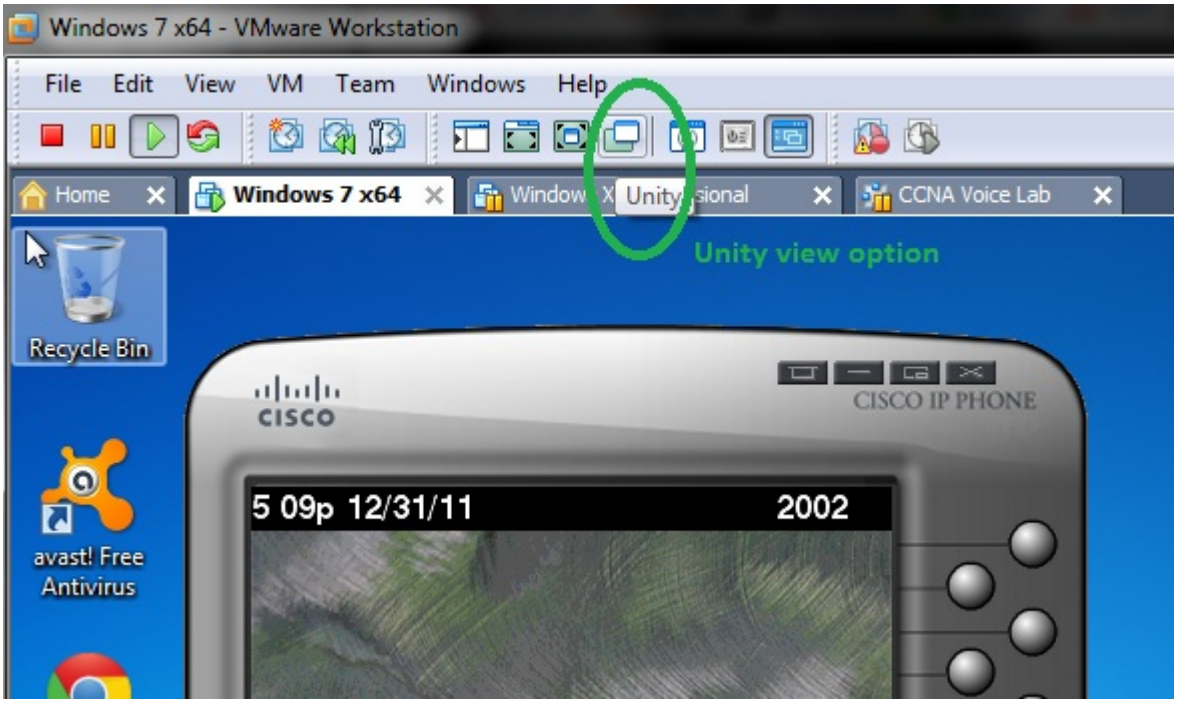
```
!
!
ephone-dn  3
 number 2003
!
!
ephone  1
 mac-address 001E.8C02.BD12
 type CIPC
 button  1:1
!
!
!
ephone  2
 mac-address 000C.2906.E749
 button  1:2
!
!
!
ephone  3
 mac-address 000C.296C.D695
 type CIPC
 button  1:3 2w1 3w2
```

Commands introducing new ephone in this testing lab are marked with green color.

Watching ephone 3 detect activity on ephone 1

also as activity on ephone 2 (office) on their third line

VMware workstation offer for us unity view of application running in hosted environment. This options you can enable activating tool button marked next



When we „set free“ GUI of IP communicators then our lab will be much interesting

3. Monitor and watch line button separator

Monitor (m) separator allows receptionist or assistant phone to monitor your ephone-dn and examine your currently calls. Receptionist can optionally take care about your call and take message for you.

Example of config is:

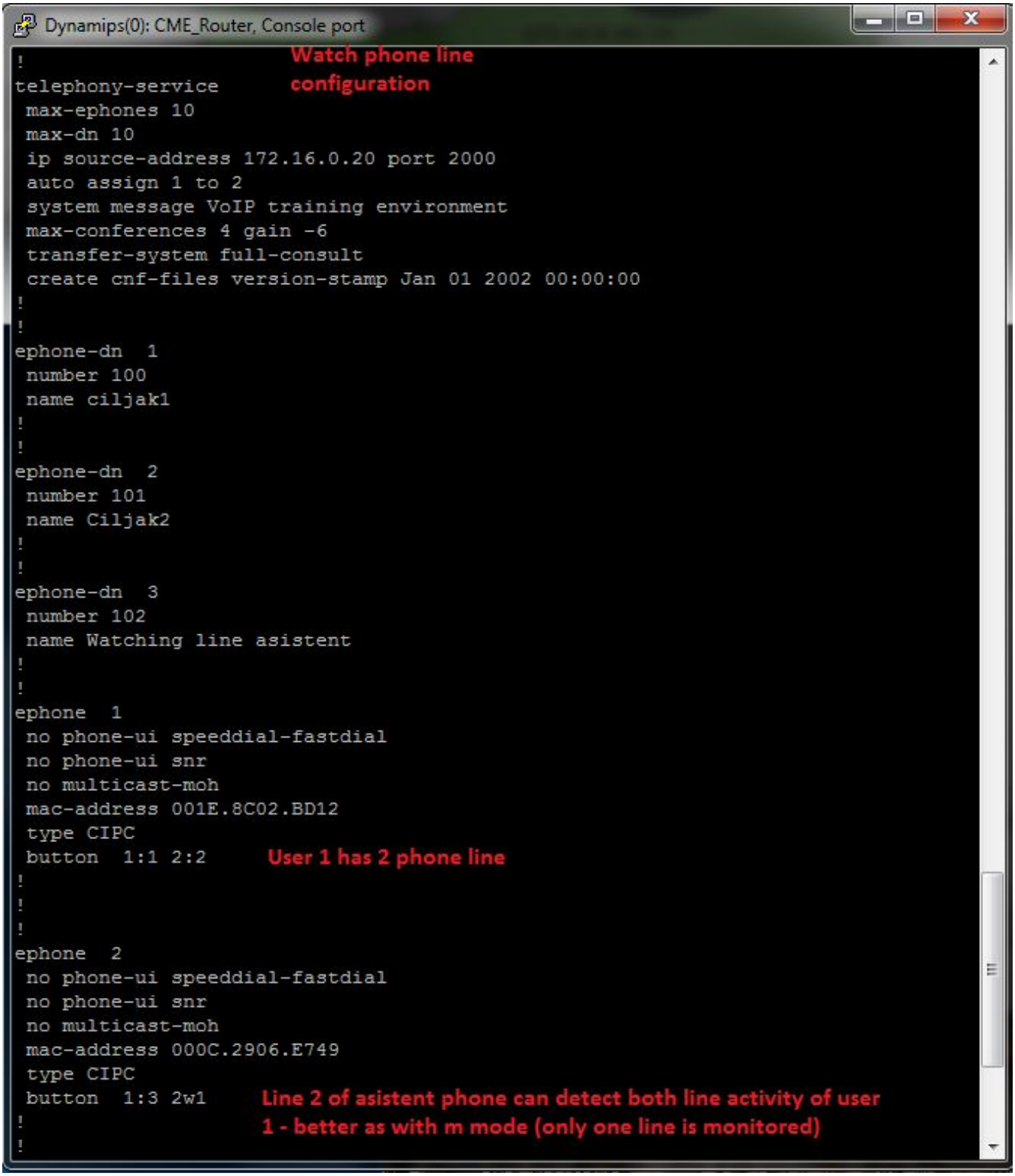
```
cme(config)#ephone-dn 1

cme(config-ephone-dn)#number 2001

cme(config-ephone-dn)#ephone-dn 2

cme(config-ephone-dn)#number 2002

cme(config-ephone-dn)#exit

cme(config)#ephone 1

cme(config-ephone)#button 1:1

cme(config-ephone)#ephone 2

cme(config-ephone)#button 1:2 2m1          – line 2 on receptionist ephone monitor activity of ephone-dn 1

cme(config-ephone)# end
```

Possible problem will arise when there is 2 or more ephone-dn configured on monitored ephone. Then you need configure multiple monitor button on monitoring receptionist ephone.

Possible and preferred solution is configure watch phone (w) button options that does same thing with exception that it monitors all the ephone-dn instead of just one (m – mode).

Implementation of watch line feature for phone line in our testing environment:

1) *Configuration commands*



2) *Look at prepared ephones in idle state*


CISCO
CISCO IP PHONE
3 30p 12/03/11
100
100
101
VoIP training environment
Redial
NewCall
CFwdAll
PickUp
more

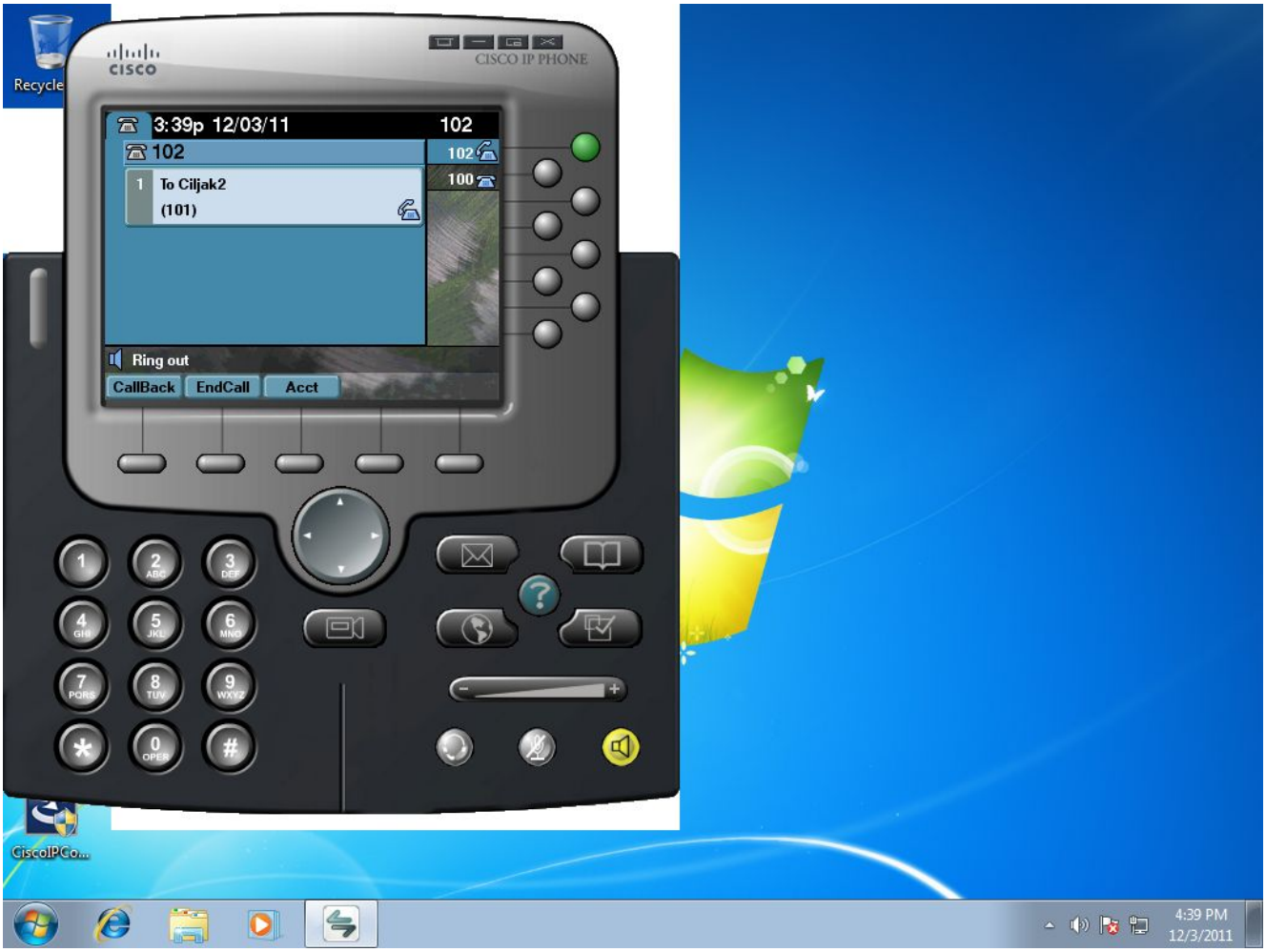

Windows
Help
Home
Windows 7 x64
Windows XP Professional
CCNA Voice Lab
Recycle
CISCO
CISCO IP PHONE
3:30p 12/03/11
102
102
100
VoIP training environment
Redial
NewCall
CFwdAll
PickUp
more

3) *Watch line activity during call on upper ephone (watch line is second line on bottom ephone that monitor upper ephone line active – call to 101 or 100 number)*


CISCO
CISCO IP PHONE
3:36p 12/03/11
100
100
100
101
1
To Ciljak2
(101)
Acct
<<
EndCall


Windows
Help
Home
Windows 7 x64
Windows XP Professional
CCNA Voice Lab
Recycle
CISCO
CISCO IP PHONE
3:36p 12/03/11
102
102
100
watching line - uper
phone activity on one
of its line will indicate
(in monitor m only one
line is monitored!!)
VoIP training environment
Redial
NewCall
CFwdAll
PickUp
more

Call to 101 Ciljak 2 ephone-dn on upper ephone




CISCO
CISCO IP PHONE
3:41p 12/03/11
100
101
100
101
1
From Watching line asistent
(102)
48
Connected
Hold
EndCall
Trnsfer
Confrn
more


Windows
Help
Home
Windows 7 x64
Windows XP Professional
CCNA Voice
Recycle
CISCO
CISCO IP PHONE
3 41p 12/03/11
102
102
102
100
1
To Ciljak2
(101)
48
Connected
Hold
EndCall
Trnsfer
Confrn
more

2. Ephone button options

Button ephone-config commands are used to assign ephone-DNs to specific ephone.Button separator are used between line number (appropriate telephony line) and ephony-DN.

Example of config ephone 1 for normal beep:

router(config) # ephone-dn 1

router(config-ephone-dn) #number 2001

…

router(config) # ephone 1

router(config-ephone) # button 1:1

router(config-ephone) #end

Lets look at configurable button separators:

: – normal phone line

s – silent ring, ringer muted, call waiting beep muted

b – silent ring, ringer muted, call waiting beep not muted

f – feature ring

m – monitor line, silent ring, call waiting display suppressed

w – watch line, watch the phone off-hook via the phones primary ephone-dn

o – overlay lines, combine multiple lines per physical button

c – overlay call-waiting, combine multiple lines per physical button

x – expansion/ overflow, define additional expansion lines that are used when the primary line for an overlay button is

occupied by an active call

For each button can be used different separator

button 1f2 2s3 3o5,5 …

Our next article will focus on watch line configuration, that will expand m – monitor mode (only one monitored line, but not all ephone-dn in use). This feature is used on receptionist phones to see if an employee is using the ephone.

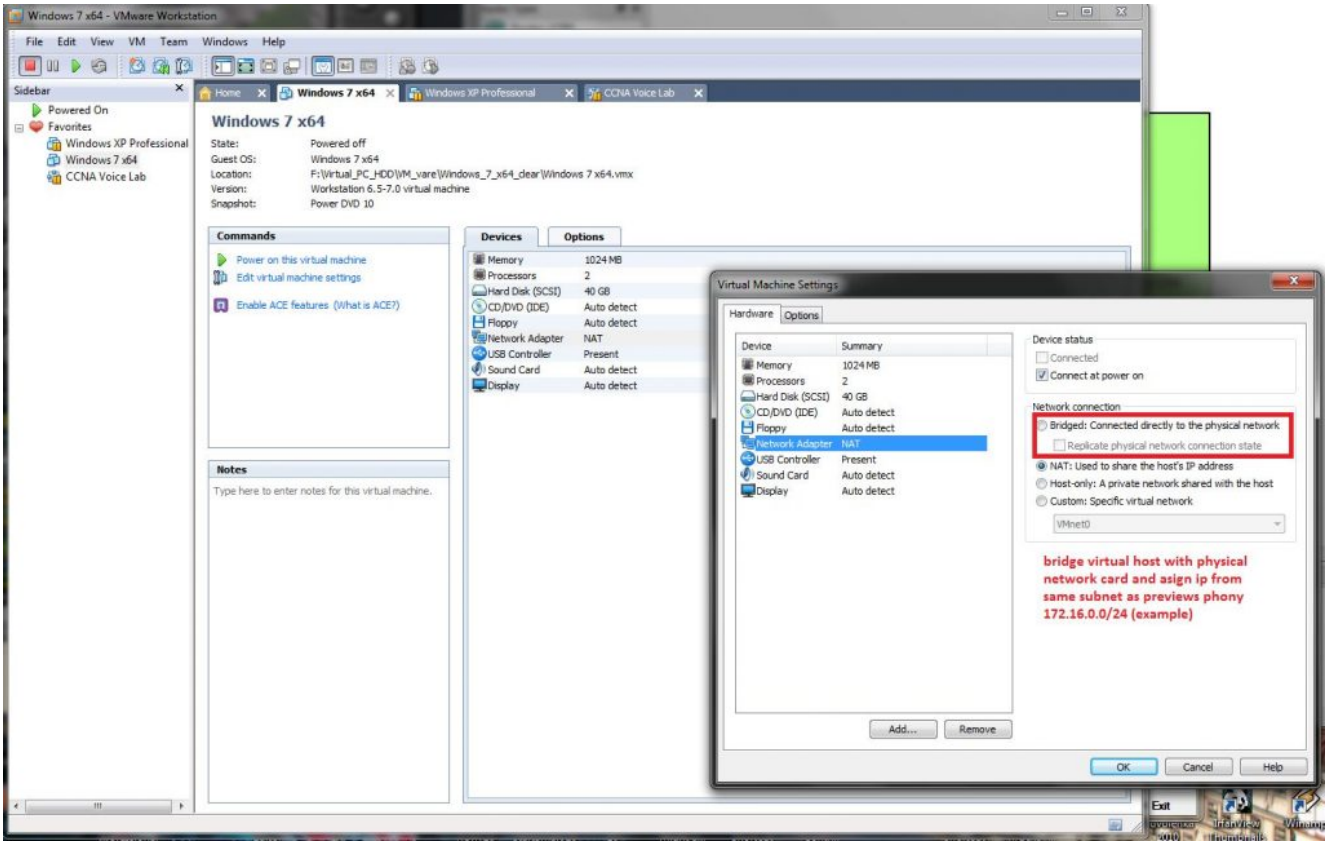
---

1. Basic VoIP lab with two ephone for upcoming experiments

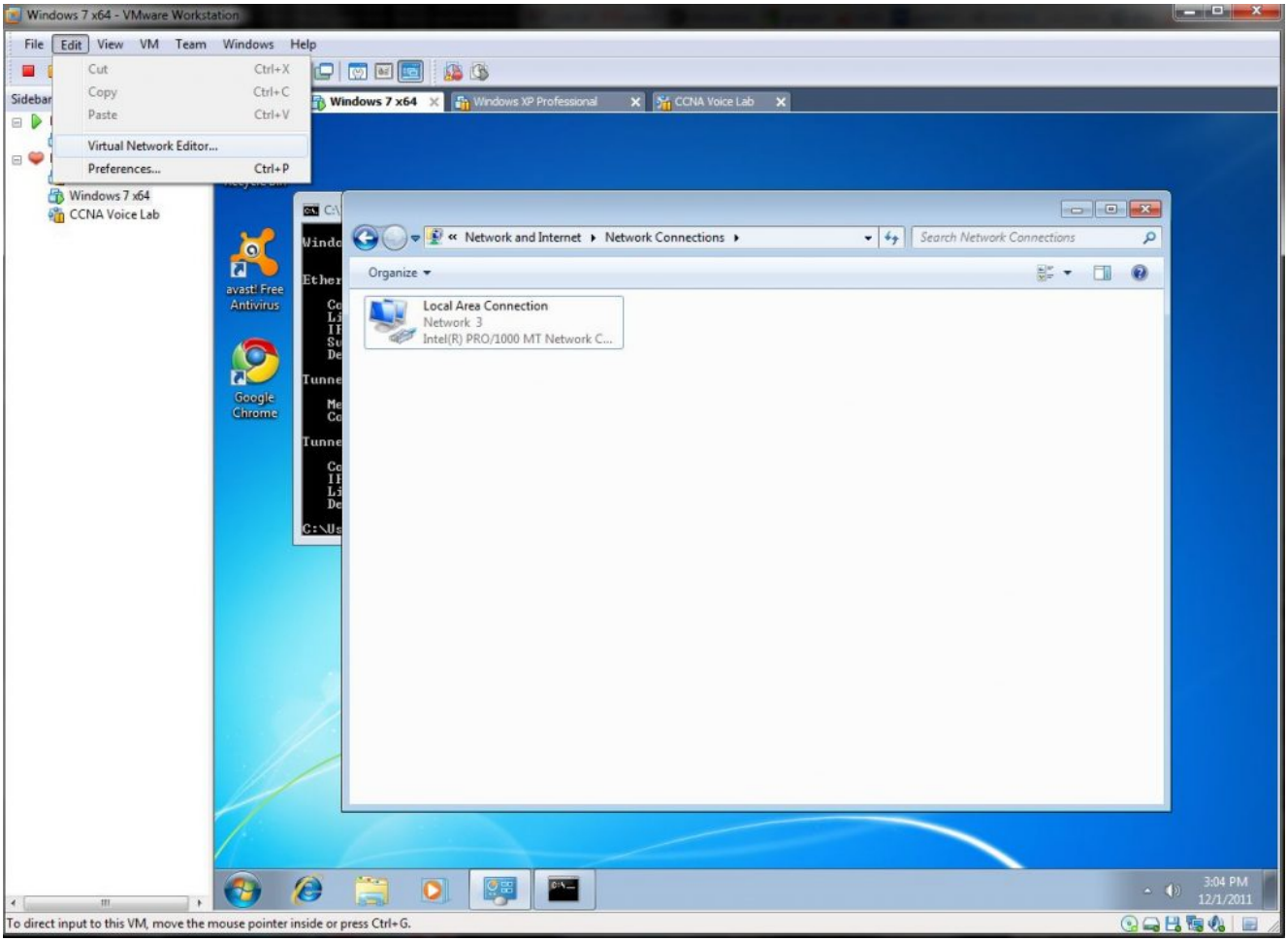
At first we must add second ephone (cheaper training solution is second cisco IP communicator) on VMware hosted client. As obvious install os on virtual PC. Next you need to configure network bridging with hosting pc. In our scenario hosting (physical PC) belong to network 172.16.0.0/24 with default gateway 172.16.0.1/24 and CME gateway was configured with 172.16.0.20/24, first ephone is on hosting pc with IP 172.16.0.10/24.

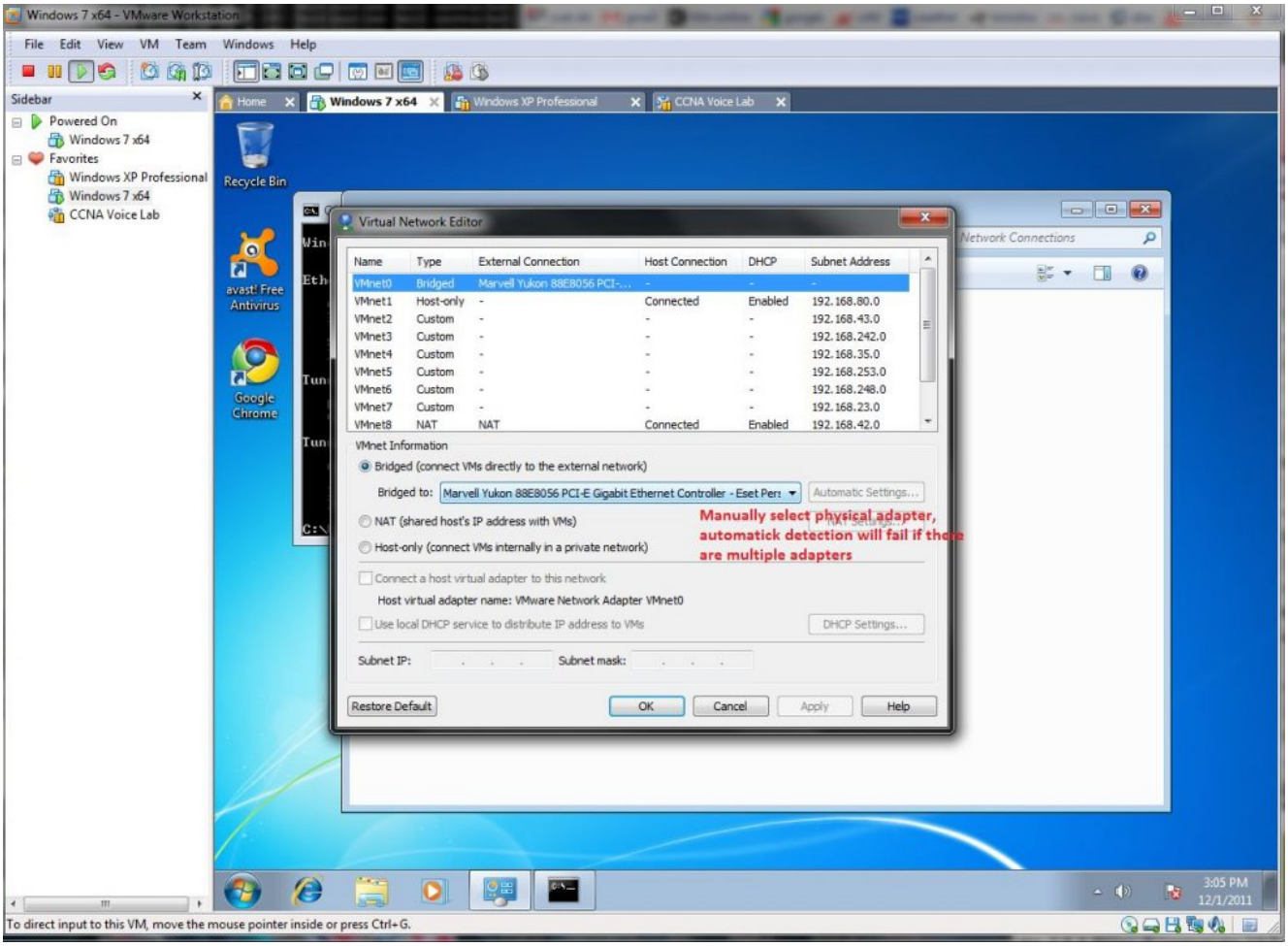
Setup process for bridging hosted pc to hosting network adapter is described in next pictures:

1) *Open Virtual Network settings dialog and set bridged (not NAT)*

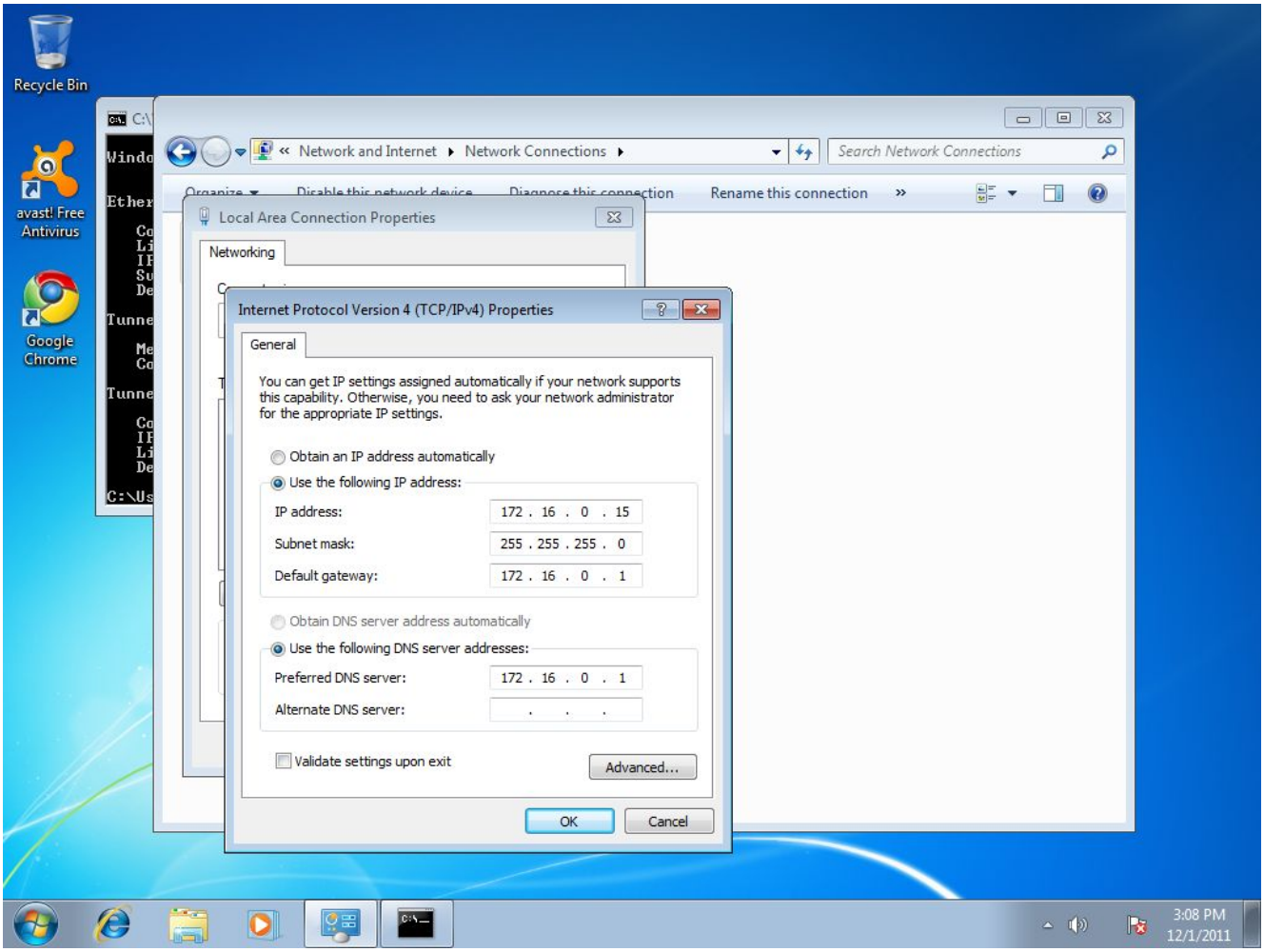


2) *If you have more than one installed network adapter* (WiFi, second network card, or virtual card of VMware) you must manually select appropriate bridging adapter as hosting client physical adapter (better is if you check it)

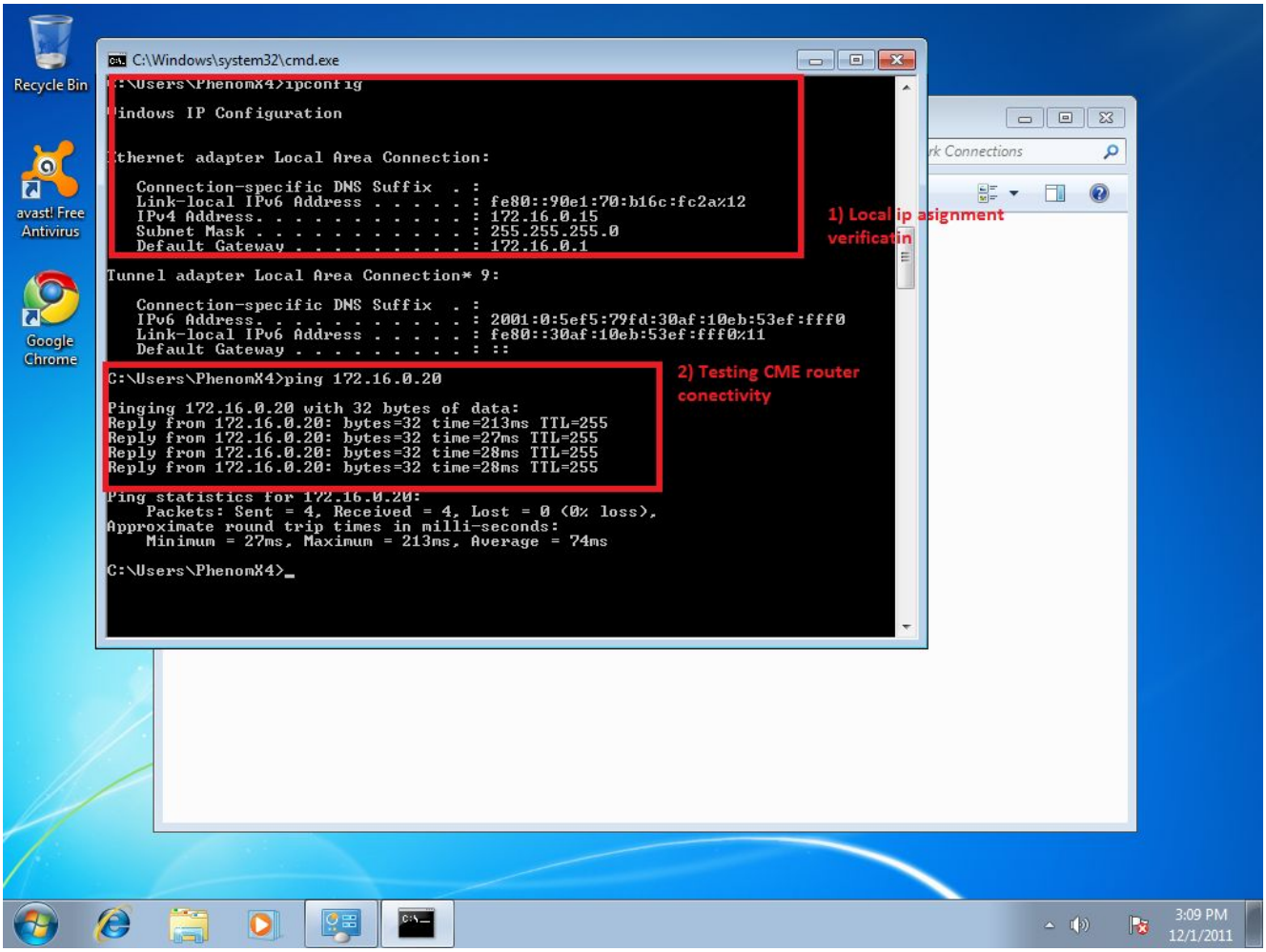

Windows 7 x64 - VMware Workstation
File Edit View VM Team Windows Help
Cut Ctrl+X
Copy Ctrl+C
Paste Ctrl+V
Virtual Network Editor...
Preferences... Ctrl+P
Windows 7 x64
CCNA Voice Lab
Windows XP Professional
Network and Internet ▸ Network Connections ▸
Search Network Connections
Organize
Local Area Connection
Network 3
Intel(R) PRO/1000 MT Network C...
avast! Free Antivirus
Google Chrome
3:04 PM
12/1/2011
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.


Windows 7 x64 - VMware Workstation
File Edit View VM Team Windows Help
Sidebar
Powered On
Windows 7 x64
Favorites
Windows XP Professional
Windows 7 x64
CCNA Voice Lab
Home
Windows 7 x64
Windows XP Professional
CCNA Voice Lab
Recycle Bin
avast! Free Antivirus
Google Chrome
Virtual Network Editor
Name Type External Connection Host Connection DHCP Subnet Address
VMnet0 Bridged Marvell Yukon 88E8056 PCI-... - - -
VMnet1 Host-only - Connected Enabled 192.168.80.0
VMnet2 Custom - - - 192.168.43.0
VMnet3 Custom - - - 192.168.242.0
VMnet4 Custom - - - 192.168.35.0
VMnet5 Custom - - - 192.168.253.0
VMnet6 Custom - - - 192.168.248.0
VMnet7 Custom - - - 192.168.23.0
VMnet8 NAT NAT Connected Enabled 192.168.42.0
VMnet Information
Bridged (connect VMs directly to the external network)
Bridged to: Marvell Yukon 88E8056 PCI-E Gigabit Ethernet Controller - Eset Pers
Automatic Settings...
NAT (shared host's IP address with VMs)
Host-only (connect VMs internally in a private network)
Manually select physical adapter, automatick detection will fail if there are multiple adapters
Connect a host virtual adapter to this network
Host virtual adapter name: VMware Network Adapter VMnet0
Use local DHCP service to distribute IP address to VMs
DHCP Settings...
Subnet IP: Subnet mask:
Restore Default
OK Cancel Apply Help
3:05 PM
12/1/2011
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

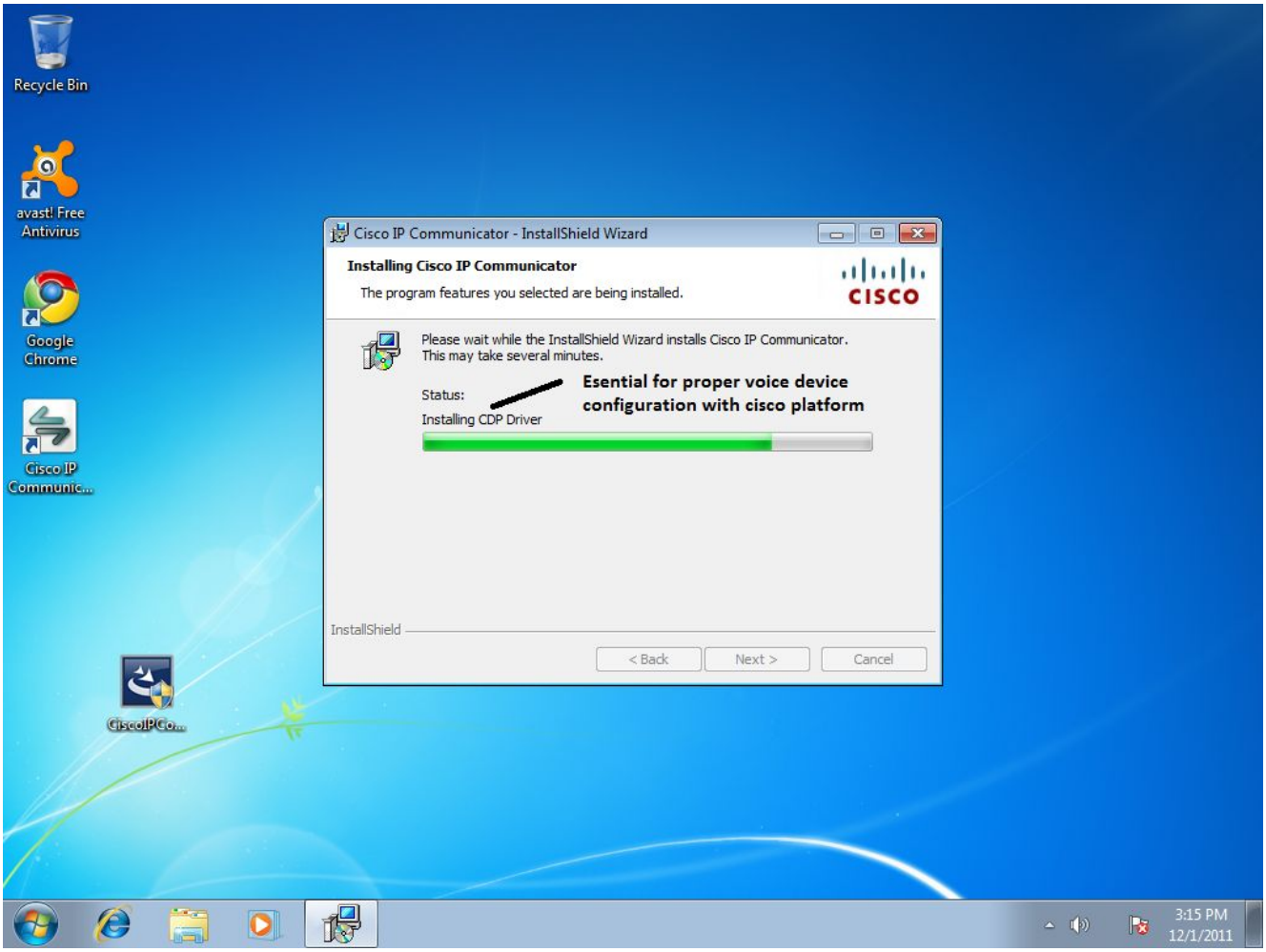
3) *Configure IP address in hosted PC* (in our scenario we used 172.16.0.15/24 and 172.16.0.1 as default gateway) -address assignment must be derived from your home network config – CME router and ephones are in this simple scenario in same subnet.

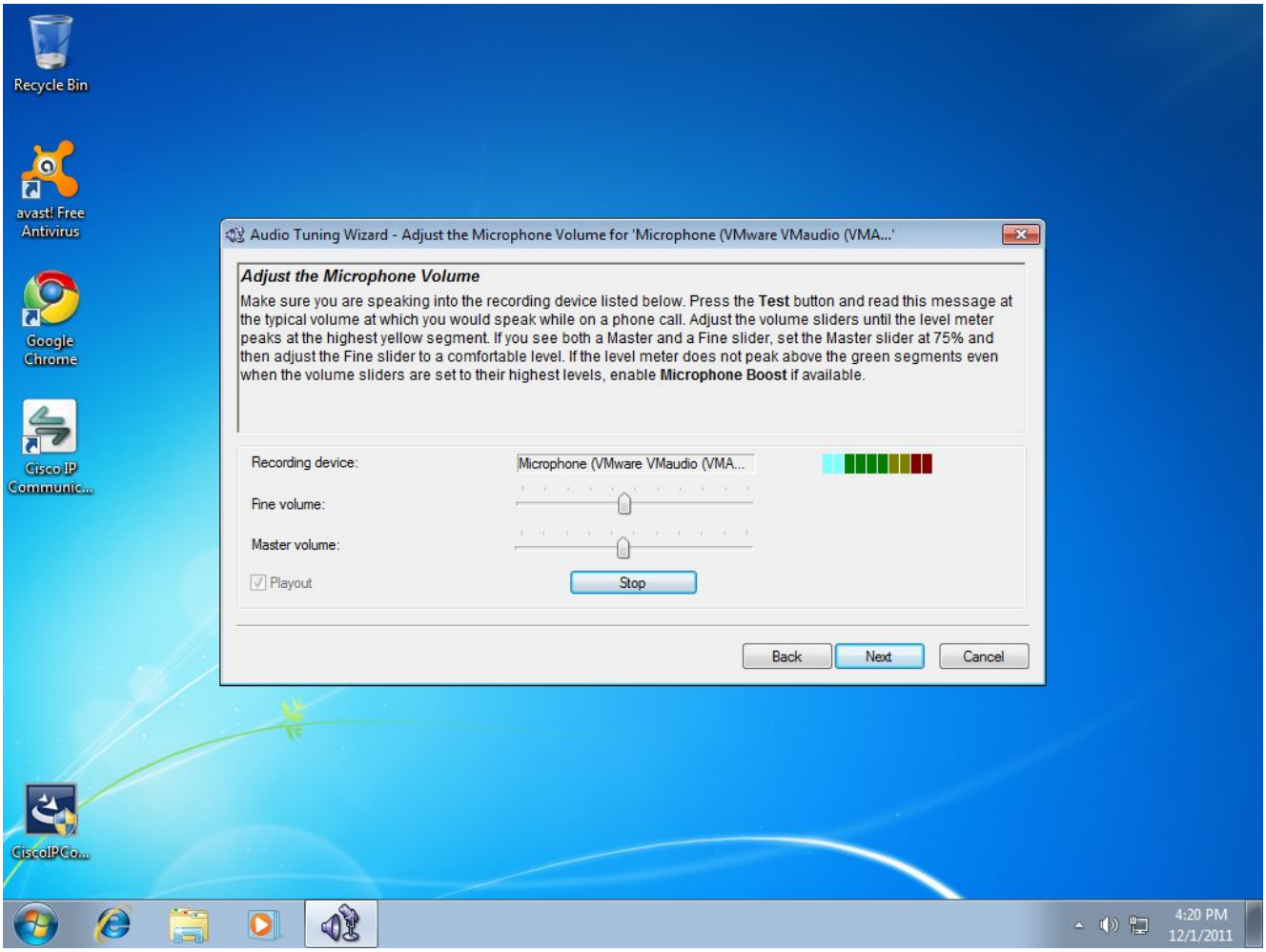


4) *Verification of local stack* and connectivity with CME router 172.16.0.20/24 from hosted PC (installed in VMware)

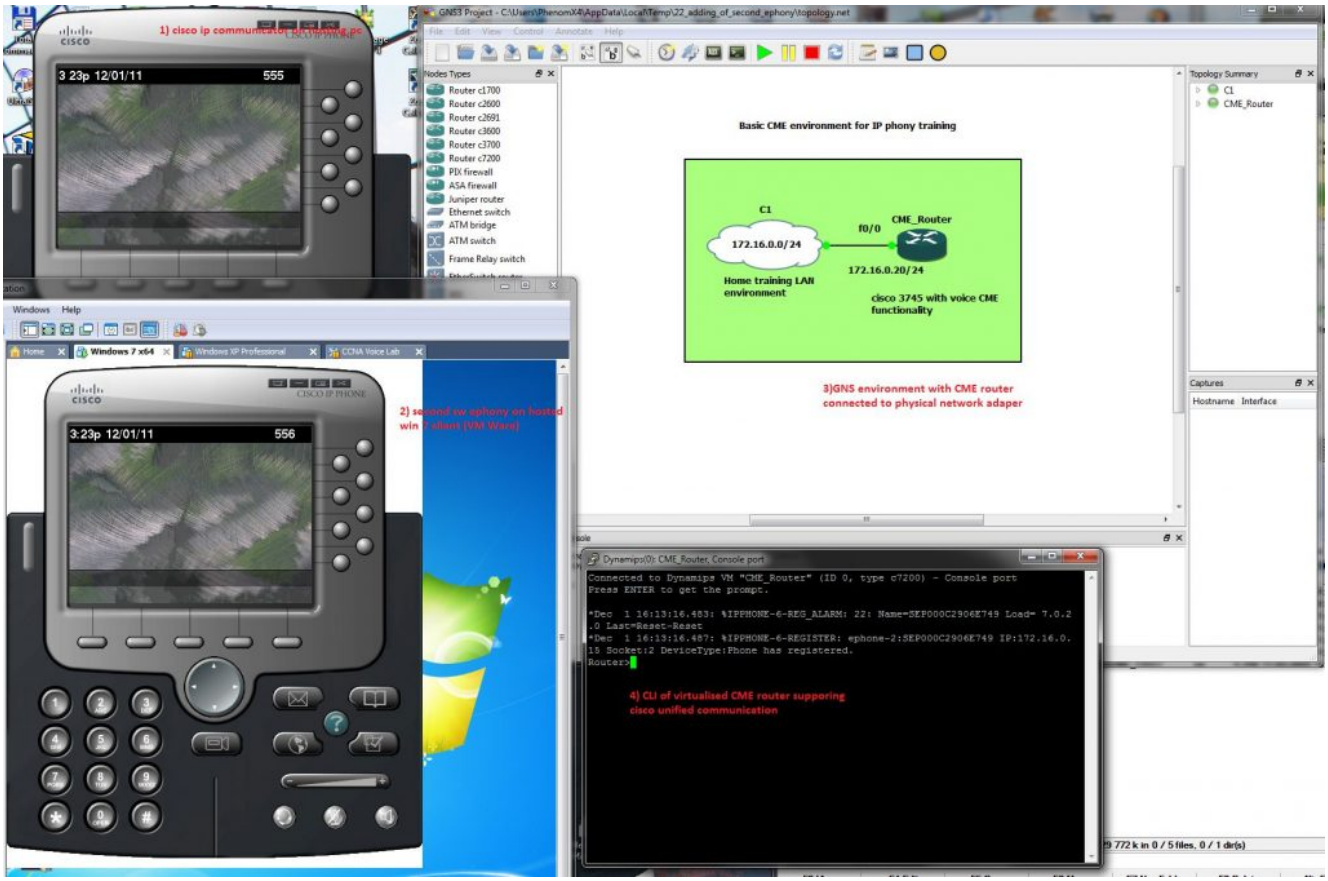


When we successfully configured network adapter bridging for hosted PC, next step is install and setup of cisco IP communicator:


Recycle Bin
avast! Free Antivirus
Google Chrome
Cisco IP Communic...
CiscoIPCo...
Cisco IP Communicator - InstallShield Wizard
Installing Cisco IP Communicator
The program features you selected are being installed.
CISCO
Please wait while the InstallShield Wizard installs Cisco IP Communicator. This may take several minutes.
Status:
Installing CDP Driver
Esential for proper voice device configuration with cisco platform
InstallShield
< Back
Next >
Cancel
3:15 PM
12/1/2011



When all is done, our testing home lab will look like this:

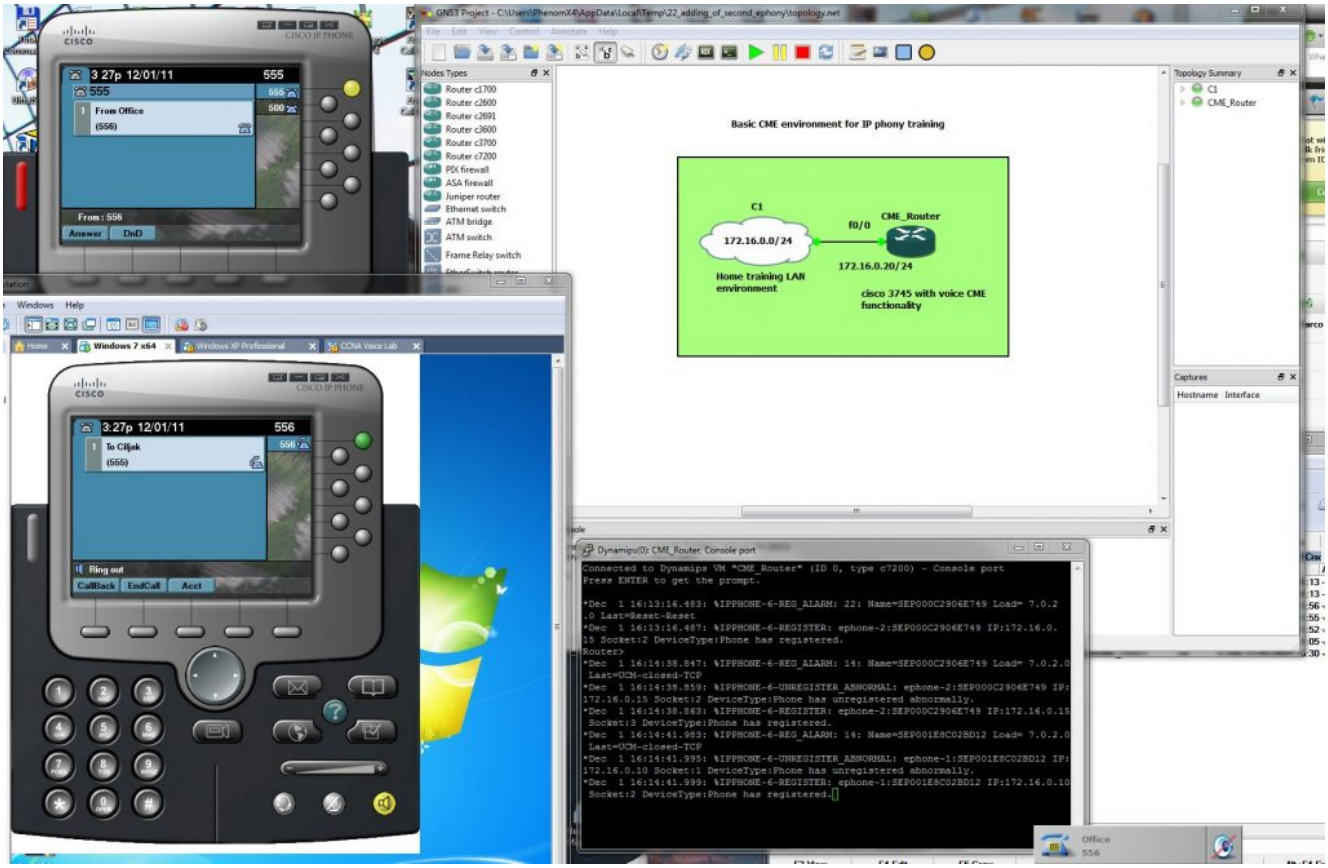


Ephone at top is installed in hosting PC with 172.16.0.10/24 IP, bottom ephone installed in hosted (virtualized) PC with 172.16.0.15/24 IP and GNS emulated cisco IOS with telephony service has its fa0/0 interface configured with ip 172.16.0.20/24 and acting as CME router (voice gateway).

Our first tested config (it will be explained in next articles) is

```
ephone-dn  1
 number 555
 name Ciljak
!
!
ephone-dn  2
 number 556
 name Office
!
ephone-dn  3
 number 500
!
ephone  1
 mac-address 001E.8C02.BD12
 type CIPC
 button  1:1,2f3
!
!
!
ephone  2
 mac-address 000C.2906.E749
 button  1:2
— some output was omitted
```

Now lets go for call placement from Office (bottom) ephone to Ciljak (me) top ephone:



Closer look at phones during call processing is:


CISCO
CISCO IP PHONE
3 32p 12/01/11
555
555
555
500
1 From Office
(556)
2:54
Connected
Hold
EndCall
Trnsfer
Confrn
more
GNS3 Project - C:\Users\Phenor
File Edit View Control
Nodes Types
Router c1700
Router c2600
Router c2691
Router c3600
Router c3700
Router c7200
PIX firewall
ASA firewall
Juniper router
Ethernet switch
ATM bridge
ATM switch
Frame Relay switch
Windows Help
Home
Windows 7 x64
Windows XP Professional
CCNA Voice Lab
CISCO
CISCO IP PHONE
3 32p 12/01/11
556
556
1 To Ciljak
(555)
2:54
Connected
Hold
EndCall
Trnsfer
Confrn
more

For obtaining info about ephones and ephone-dn to buttons (lines) of physical ephone use #show ephone CLI command: