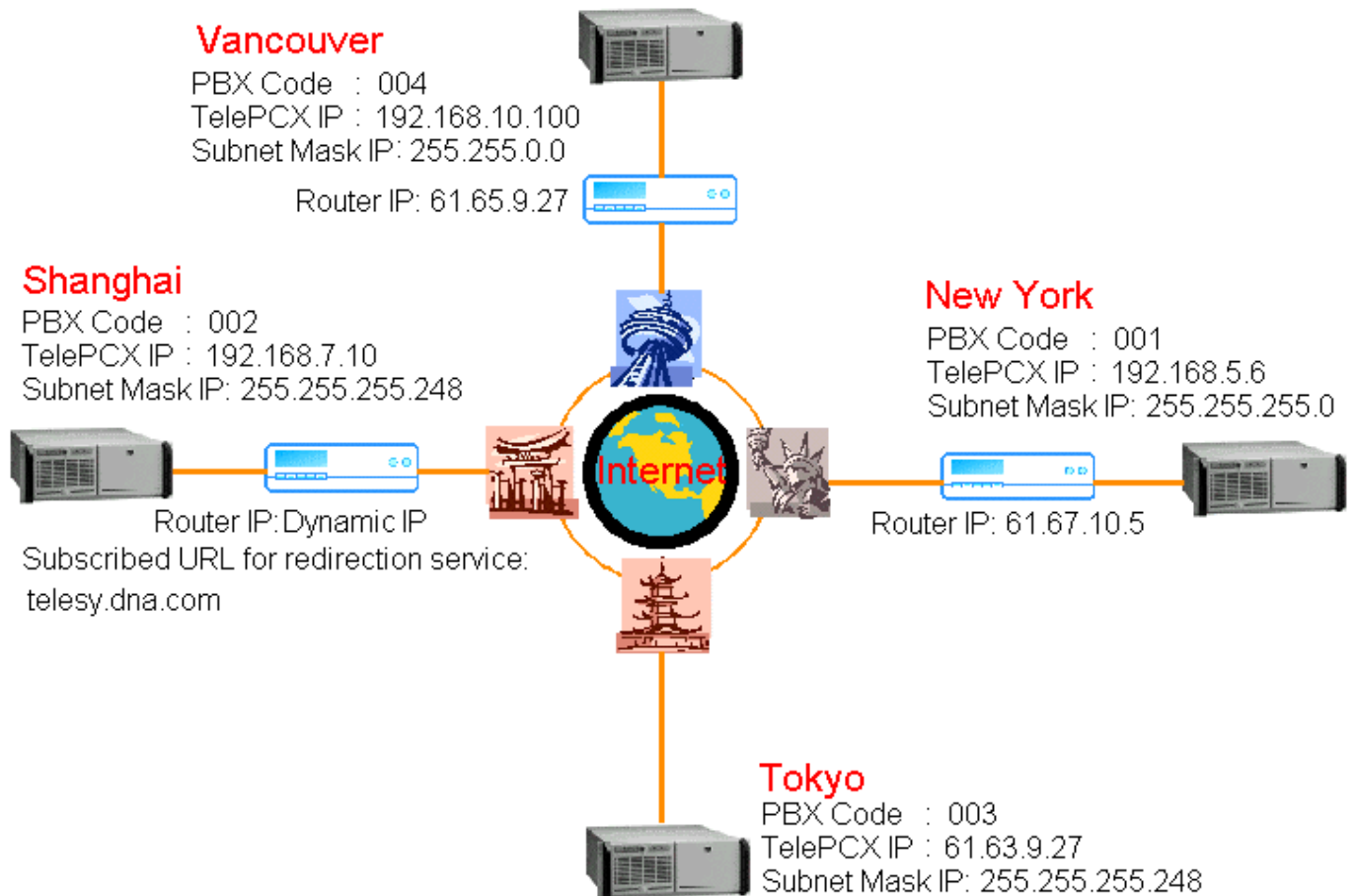


# VoIP and Multi Location

A company sets up 4 offices each in New York, Shanghai, Tokyo and Vancouver. Each of the 4 offices is planning to install one TelePCX36 communication server with Multi-Location solution, respectively. With Multi-Location solution, the staffs in each office can call each other by dialing extension number directly(no prefix digit is required). In addition, they can access any connected TelePCX's trunk line to make calls to remote sites. This cuts down fees spent on making international calls to contact overseas customers or any occasions when needed.

Below is the conceptual diagram to show how the Multi-Location is realized.



To successfully build up the connection among the offices, a summary of the needed configurations is listed in the table below.

Information	New York	Shanghai	Tokyo	Vancouver
Local PBX Code	001	002	003	004
Router IP/URL	61.67.10.5	telesy.dna.com	None	61.65.9.27
TelePCX IP	192.168.5.6	192.168.7.10	61.63.9.27	192.168.10.100
Subnet Mask of Local IP	255.255.255.0	255.255.255.248	255.255.255.248	255.255.0.0

In this Multi-Location structure, there are some key points to be aware of:

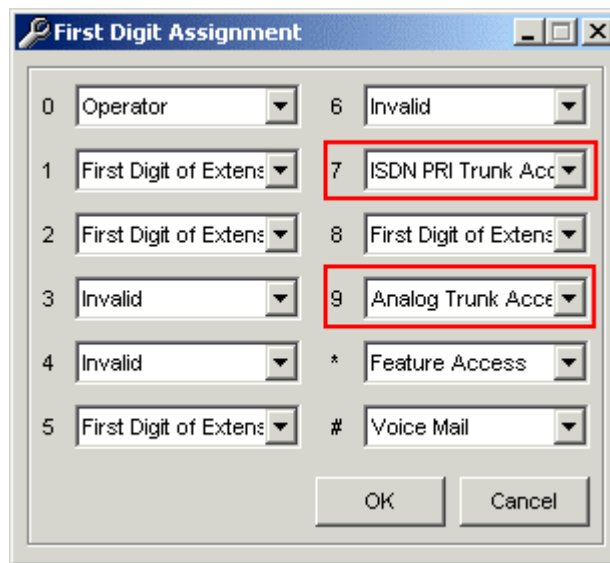
1. Except for Tokyo office, all other offices install their TelePCXs behind a router.

2. Tokyo office uses fixed IP for direct internet connection, without using router in between.
3. Shanghai office uses dial-up ADSL PPPoE (i.e. dynamic IP) Internet connection, so it must subscribe “URL redirection” service for other TelePCX’s to direct the call requests to Shanghai to get connected.
4. The setting of “First Digit of Extension” in the First Digit Assignment table of Config & Tools must include all other office’s “First Digit of Extension”. The table below summarizes the extension number created in each office and the setting of “First Digit of Extension” they must set in their First Digit Assignment table.

Information	New York	Shanghai	Tokyo	Vancouver
Extension Number	101~103	201~203	501~503	801~803
“First Digit of Extension” of the First Digit Assignment to every TelePCX	1, 2, 5, 8			

5. The setting of trunk access code in the First Digit Assignment table of Config & Tools must include all other office’s trunk access code. Assuming all TelePCX users must press 9 to get an analog trunk line or press 7 to get an ISDN PRI trunk line before they can dial a telephone number to make an external call, knowing this, the trunk access code they must set in the First Digit Assignment is suggested as the table below.

Information	New York	Shanghai	Tokyo	Vancouver
“Analog Trunk Access by One Digit” to every TelePCX	9			
“ISDN PRI Trunk Access by One Digit” to every TelePCX	7			



6. If the TelePCX seats behind a router, the router MUST set IP forwarding for H.323 to TelePCX
7. The firewall MUST turn on H.323 traffic and multi-location traffic (default port 3002)
8. TCP port 1720, 3000 ~ 3010 must be turned on.
9. UDP port 1719, 1,024 ~ 5,000 and 10,000 ~ 15,000 must be turned on.

## Local PBX Code Setup

As shown in the conceptual diagram, setup to local PBX code is straightforward.

- Local PBX Code of TelePCX located at New York office is 001.
- Local PBX Code of TelePCX located at Shanghai office is 002.
- Local PBX Code of TelePCX located at Tokyo office is 003.
- Local PBX Code of TelePCX located at Vancouver office is 004.

## VoIP System Config

This section describes how a TelePCX administrator builds up the TelePCX’s internet connection at local site. Things have to know before starting setup in this section includes the following;

1. If the TelePCX seats behind a router and the router uses fixed IP for Internet connection, select the radio button of “Through Router/Router IP” for “Communication with VoIP”.
2. If the TelePCX seats behind a router and the router uses dynamic IP for Internet connection, select the radio button of “Through Router/URL” for “Communication with VoIP”.

3. If the TelePCX does not connect with a router and uses fixed IP to connect to Internet directly, select the radio button of “VPN or LAN ” for “Communication with VoIP”.

Given the above information, the setting items to be selected and IP addresses to be filled in the “VoIP System Config” at each office’s TelePCX are summarized in the table below. When setup is done, restart the AP Engine, and proceed to next section to do “Connection Setup”.

<b>Options \ Offices</b>	<b>New York</b>	<b>Shanghai</b>	<b>Tokyo</b>	<b>Vancouver</b>
<b>Communication with VoIP</b>	Through Router / Router IP	Through Router / Router URL	VPN or LAN	Through Router / Router IP
<b>Router IP/URL</b>	61.67.10.5	telesy.dna.com	Not Applicable	61.65.9.27
<b>Subnet Mask of Local IP</b>	255.255.255.0	255.255.255.248	255.255.255.248	255.255.0.0
<b>GateKeeper IP</b>	192.10.5.6	192.168.7.10	61.63.9.27	192.168.10.100
<b>Register IP</b>	192.10.56	192.168.7.10	61.63.9.27	192.168.10.100

## Connection Setup:

This section describes how the TelePCX administrator located at the 4 different sites builds up VoIP connection with other TelePCXs located at remote.

### **New York Office(Local PBX Code = 001):**

The TelePCX administrator located at New York office have to build up its connection with Shanghai, Vancouver, and Tokyo, therefore, the administrator has to add the following settings to its Connection Setup table.

In the Configure & Tools, access PBX > VoIP and Multi Location > Connection Setup, click on tab “Remote PBX” and add the followings;

- Shanghai Office: (Router uses dynamic IP with URL redirection service.)  
Remote PBX Code:002  
Remote PBX IP Address/URL: telesy.dna.com
- Tokyo Office: (TelePCX uses fixed IP and directly connects to Internet, no router is applied.)  
Remote PBX Code:003  
Remote PBX IP Address/URL: 61.63.9.27
- Vancouver Office: (Router uses fixed IP.)  
Remote PBX Code:004  
Remote PBX IP Address/URL: 61.65.9.27

### **Shanghai Office(Local PBX Code = 002):**

The TelePCX administrator located at Shanghai office have to build up its connection with New York, Tokyo and Vancouver, therefore, the administrator has to add the following settings to its Connection Setup table.

In the Configure & Tools, access PBX > VoIP and Multi Location > Connection Setup, click on tab “Remote PBX” and add the followings;

- New York Office: (Router uses dynamic IP.)  
Remote PBX Code:001  
Remote PBX IP Address/URL: 61.67.10.5
- Tokyo Office: (TelePCX uses fixed IP and directly connects to Internet, no router is applied.)  
Remote PBX Code:003  
Remote PBX IP Address/URL: 61.63.9.27
- Vancouver Office: (Router uses fixed IP.)  
Remote PBX Code:004  
Remote PBX IP Address/URL: 61.65.9.27

**Tokyo Office(Local PBX Code = 003):**

The TelePCX administrator located at Tokyo office have to build up its connection with New York, Shanghai, and Vancouver, therefore, the administrator has to add the following settings to its Connection Setup table.

In the Configure & Tools, access PBX > VoIP and Multi Location > Connection Setup, click on tab “Remote PBX” and add the followings;

- New York Office: (Router uses dynamic IP.)  
Remote PBX Code:001  
Remote PBX IP Address/URL: 61.67.10.5
- Shanghai Office: (Router uses dynamic IP with URL redirection service.)  
Remote PBX Code:002  
Remote PBX IP Address/URL: telesy.dna.com
- Vancouver Office: (Router uses fixed IP.)  
Remote PBX Code:004  
Remote PBX IP Address/URL: 61.65.9.27

**Vancouver Office(Local PBX Code = 004):**

The TelePCX administrator located at Tokyo office have to build up its connection with New York, Shanghai, and Tokyo, therefore, the administrator has to add the following settings to its Connection Setup table.

In the Configure & Tools, access PBX > VoIP and Multi Location > Connection Setup, click on tab “Remote PBX” and add the followings;

- New York Office: (Router uses dynamic IP)  
Remote PBX Code:001  
Remote PBX IP Address/URL: 61.67.10.5
- Shanghai Office: (Router uses dynamic IP with URL redirection service)  
Remote PBX Code:002  
Remote PBX IP Address/URL: telesy.dna.com
- Tokyo Office: (TelePCX uses fixed IP and directly connects to Internet, no router is applied.)  
Remote PBX Code:003

# Table Summary

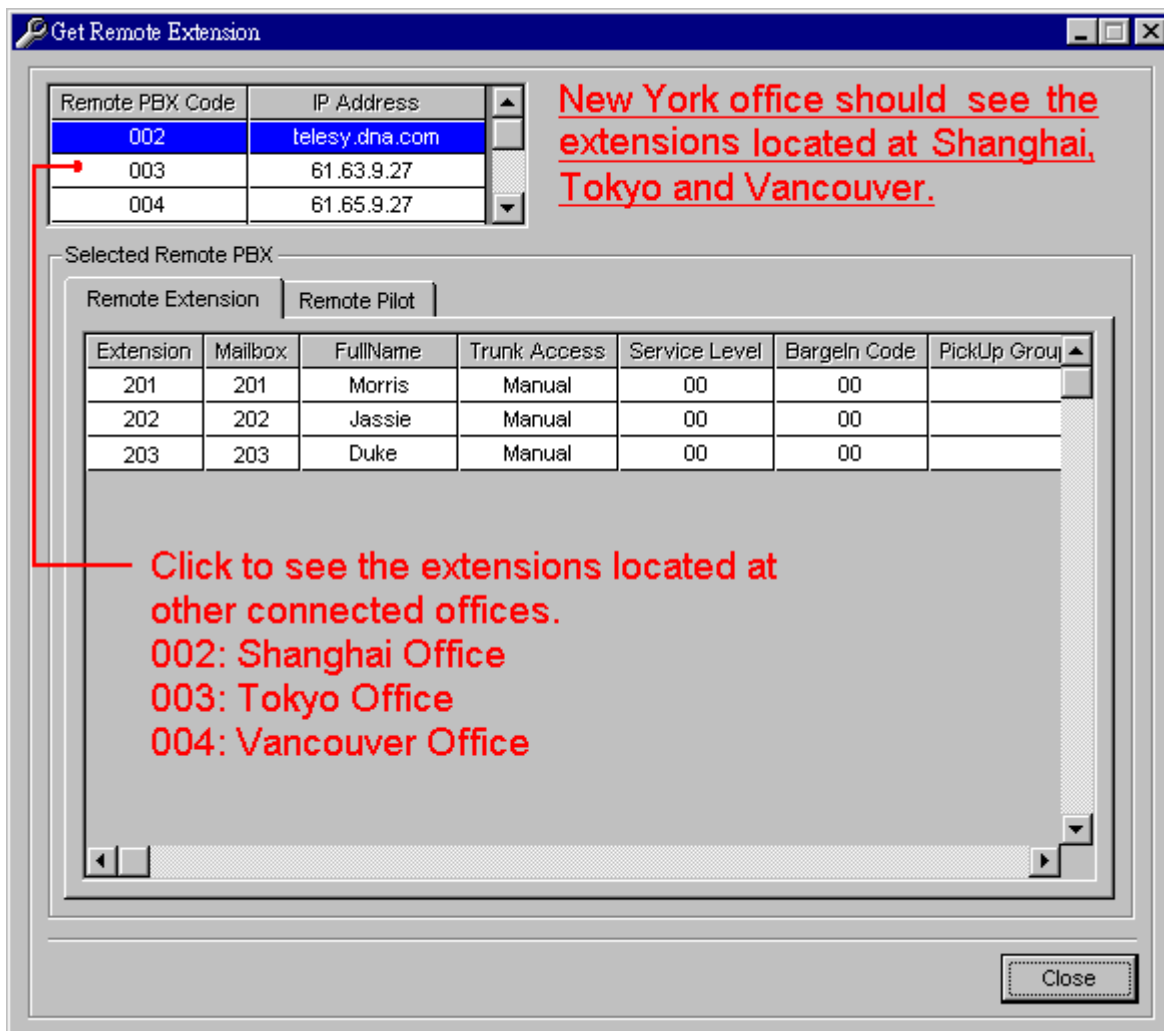
Finally, a table to show the complete setup at each office is presented as below. You can increase the page view ratio to see the screenshot.

<b>VoIP and Multi-Location</b>	<b>New York</b>	<b>Shanghai</b>	<b>Tokyo</b>	<b>Vancouver</b>
<b>Local PBX Code Setup</b>				
<b>VoIP System Config</b>				
<b>Connection Setup</b>				

Remember to restart the AP Engine after completing the above setup procedures.

## Check Get Remote Extension

Ensure all the TelePCXs have completed the above jobs. Once the job is done, they should be able to see the extension information of the connected remote TelePCX. For example, the New York office should see the extensions located Shanghai, Tokyo and Vancouver.



Note:

If you cannot see any one the connected TelePCX's extensions, do the followings;

1. Check to see if the internet connection is working properly.
2. Check the settings of "Local PBX Code Setup", "VoIP System Config" and "Connection Setup" from the beginning.
3. Check with the remote TelePCX administrator to see if the remote TelePCX has done all the needed configuration.
4. Ask remote TelePCX administrator to restart AP Engine.
5. Restart your TelePCX's AP Engine.

## Who needs URL redirection service?

If a TelePCX uses PPP over Ethernet (i.e. PPPoE) for Internet connection, the administrator of the TelePCX will need to subscribe a URL redirection service(i.e. Dynamic DNS service) to lead a dynamic IP address to a static hostname so that the connectivity of this TelePCX can be more easily and continuously connected from various connected TelePCXs on the Internet. After subscribing the URL redirection service, the administrator must do relevant setup on the router and must give the subscribed hostname, domain name to other TelePCX administrators to set in "Connection Setup" so that the remote TelePCX can use the static hostname to find where the

TelePCX is.

## **Where to get URL redirection service?**

There are some ways to find the information of URL redirection service providers.

- Search on Internet. (e.g. “<http://www.orgdns.org>”)
- Router’s manufacturers may provide this service or they might include some URL redirection service provider’s references in their router’s setup menu.