Micronet
Faster and Easier Networks

How to Build IP Telephony Network Using Micronet VoIP Gateways

Technical White Paper

Abstract

IP telephony users may not have the expertise or resources to adequately understand Micronet IP telephony products to determine the requirements for their environment. This white paper details usage scenarios and configuration scripts for some network examples. It also describes the configuration script steps by steps, which could assist users well understand how to setup their own infrastructure correctly.

Contents

Introduction

Micronet VoIP Gateways let customers provide voice/fax service over IP network with H.323 V3 protocol. By connecting with your existing ADSL, cable modem or any network connection from your ISP which allow the use of single network for voice and fax services with consequent saving in network infrastructure and greatly reduced telephone charges. It's ideal solution for providing low cost communications between headquarters and branch offices in the world, as well as for SOHO and enterprise telephony applications. In this white paper, some of products are used in the scenarios:

- SP5002/SP5004: Micronet IP Telephony Gateway with FXS interface. FXS interface can be connected to normal telephone set, fax machine, or external line card from PBX (not extension line card).
- SP5050/SP5052/SP5054: Micronet IP Telephony Gateway with FXO interface. FXO interface can be connected to PSTN line directly, or can be connected to extension line card of PBX. This white paper will use SP5050 in the scenario. User can select one of these 3 Gateways which is suitable for their environment and requirement.
- SP5100: Micronet IP Phone. It provides a RJ-11 port to connect to PSTN and a RJ-45 port to connect Internet. So, it can play as role of both IP Phone and PSTN Telephone.
- SP888: DSL/Cable Router with DMZ host feature. When deploy IP telephony network with corporate data network, SP888 can be used as IP sharing device. User does not need public IP address for VoIP gateways. SP888 will map the relative traffic to VoIP gateway which is deployed in the corporate network.

White Paper Scope

This white paper is not written to introduce the Micronet IP telephony product feature, functions, commands and specification. Users can refer to manual and QIG (Quick Installation Guide) for detail command information. Rather, the aim is to describe some scenarios how Micronet IP telephony product family implement the scenario. Therefore, a number of assumptions in this white paper were made. User must have basic understanding of Micronet IP telephony product family.

IP telephony brings users some of benefit. The first of all is save huge long distance and international phone bill. Users rely on the telephone communication every day through PBX and PSTN. IP telephony can be used to work with PBX. Corporate can migrate some long distance and international connection from PSTN to IP telephony to get the most of benefits. This white paper will give corporate operation manager and IT manager how to work in the scenarios and requirements.

Executive Summary

This target audience of this white paper is technical person who would like to deploy corporate IP telephony network using Micronet VoIP gateways. Here are 5 scenarios. Micronet will add more application scenarios in the coming version.

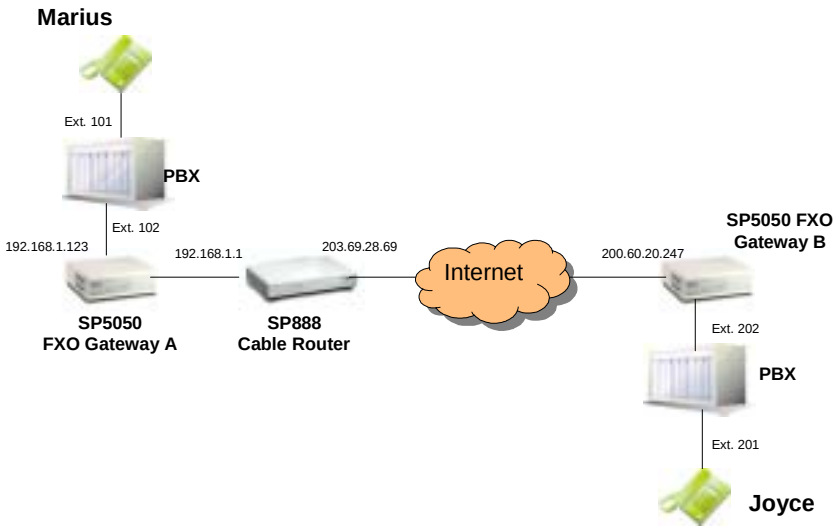
Every scenario is separated 3 sections. The first section, “Description”, describes the background of the scenarios. The requirements might include network infrastructure and dial operation. Reader can treat this section as the requirement of the scenarios. You can read this section first to find out which scenario is most like your planned IP telephony network.

The second section is “dialing scenario”. After the infrastructure is setup, we will give reader some example how the operation works during the infrastructure. It starts from user pick up a phone and issue a calling.

The third section is the “configuration script” to configure the Micronet VoIP gateway in the infrastructure. Technical people can follow the script steps by steps to make it work.

Integrate IP Telephony into Corporate Network using SP888 and SP5050 Series

The purpose of this section is to show how the Micronet VoIP products work with NAT (Network Address Translation) equipment.



Description

ACME company has ADSL connection and would like to deploy IP telephony service through the ADSL connection. ACME only owns limited fixed IP addresses and IT policy is not allow server's IP address to be seen directly on the Internet. A possible implementation way is to use Micronet VoIP Gateway and NAT (Network Address Translation) device equipment, for example, SP888, together. SP888 is DSL/Cable router with NAT and DMZ features.

AP888's NAT feature can let VoIP gateway be deployed on DMZ, and route traffic of relative voice package to VoIP gateway.

ACME select Micronet VoIP gateway SP5050 with FXO interface and SP888 for its implementation. SP5050 can be connected to PSTN line and extension line of PBX which let ACME's branch offices be able to call each other without long distance or international phone charge.

Dialing Scenario

Marius can call to PSTN through PBX or connect to IP telephony network through Gateway A without any problem. Joyce can call Marius from the outside of ACME through NAT device SP888. For Joyce, the call is transparent. She does not have any idea there is a NAT device between her and Marius.

Marius calls Joyce

1. Pick up the phone on extension 101.
2. Dial extension line connect to Gateway A, 102
3. After hearing dial tone, dial to Gateway B according to the record in phone book. 555 plus Joyce's extension 202.
4. The dial sequence from Marius is 102-555202#[1]

Joyce calls Marius

1. Pick up the phone on extension 201.
2. Dial extension line connect to Gateway B, 202
3. After hearing dial tone, dial to Gateway A according to the record in phone book. 666 plus Marius's extension 101.
4. The dial sequence from Marius is 201-666101#

[1] the "#" is necessary in the peer-to-peer mode

Configuration Script

SP888 configuration script:

link http://192.168.1.1 from browser:

Click on “setup”

After configure password, click “Next>>”.

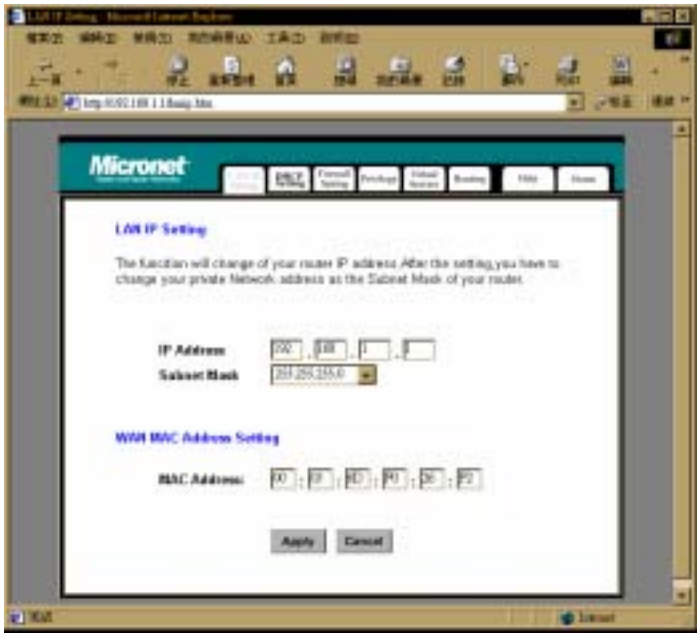
Click “YES” for first question. Click “NO” for second question (you can modify it later, if your ISP require you a host name”. Click “Next>>”

Select “YES” and Input your fixed IP address of SP888. Click “Next>>”

Click “YES” and input IP address of DNS server. Click “Next>>”

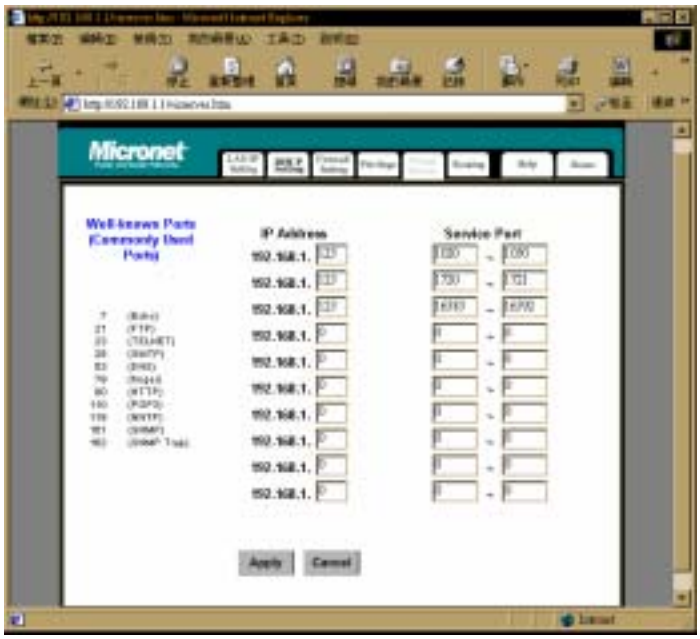
Set your time zone, and Click Finish

After back to home page, click “Advanced”.



Configure private IP address and subnet mask of SP888. Click Apply. Click “DHCP”.

Click NO (You can change it to “YES” if you are using SP888 as DHCP server). Click “Apply”. Click “Virtual Server”.



Configure the IP address as SP5050’s private IP address and service ports for H.323 relative services as following screen. Click Apply.

You have finished SP888 configuration.

SP5050 Gateway A configuration script:

Ifaddr –ip 192.168.1.123 –subnet 255.255.255.0 –gate 192.168.1.1

Sysconf –2nddial 0

Pbook –add name gatewayB ip 203.69.28.247 e164 555

SP5050 Gateway B configuration script:

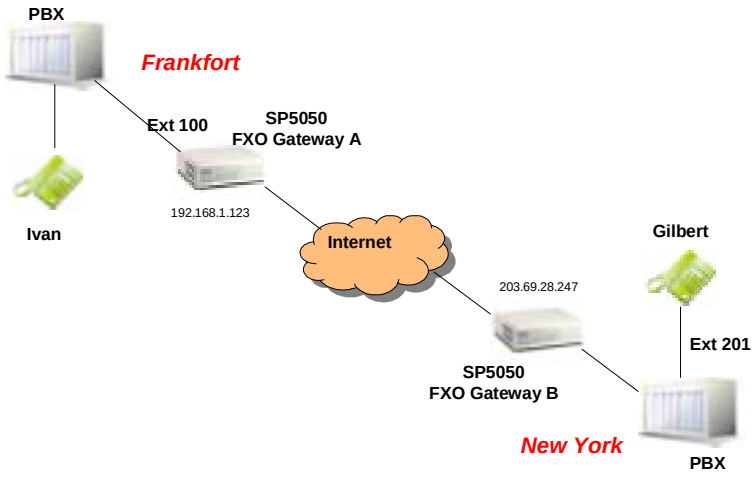
Ifaddr –ip 203.69.28.247 –subnet 255.255.255.0 –gate 203.69.28.254

Sysconf –2nddial 0

Pbook –add name gatewayA ip 203.69.28.69 e164 666

Deploy IP Telephony among Branch Offices Using SP5050 Series

This section describes how it is easy to deploy IP telephony among different organizations in the corporate. Users can use it as use extension phone call.



Description

ACME company has branch offices at Frankfort in Germany and New York in United States. When business is growing up, the telephone usage is getting heavier between branch offices which make international phone bill increase dramatically. Today, the Internet infrastructure and IP telephony is getting mature. ACME would like to deploy IP telephony among its branch offices. Employee can use IP telephony like extension phone call in corporate. But, every branch office has its own PBX system. They don't want to replace it.

ACME chooses Micronet VoIP gateway SP5050 which has 6 FXO ports for connection to PSTN line or PBX extension. It can be use as a gateway between PBX system and IP Telephony network. Through Internet, SP5050 connect PBX system at branch offices together. Employee use PBX for domestic phone call. They can make international call or call to employee at the other countries through SP5050 and Internet now. They will not have international phone bill any more.

Dialing Scenario

Most of time, user in Frankfort will contact the co-worker at New York. Sometimes, users in Frankfort need to contact customers at New York directly. ACME would like to make the dial sequence as easy and short as possible.

Ivan call Gilbert

1. Pick up the phone and call to extension 100 (to connect Frankfort SP5050).
2. After hearing dial tone, dial 20 (stands for New York branch office prefix) plus Gilbert extension 201.
3. The dialing sequence from Ivan to Gilbert is 100-20201#

Ivan calls a customer at New York City

1. Pick up the phone and call to extension 100 (to connect Frankfort SP5050).
2. After hearing dial tone, dial 20 (stands for New York branch office prefix) plus 0 (for external call from branch office of New York) and domestic phone number 5551234.
3. The dialing sequence from Ivan to Gilbert is 100-2005551234#

Configuration Script

SP5050 Gateway A configuration script:

Flash -clean

Ifaddr –ip 192.168.1.123 –subnet 255.255.255.0 –gate 192.168.1.1

h323 -mode 1

Sysconf –2nddial 0

Sysconf –drule in_drop 10

Pbook –add name gatewayB ip 203.69.28.247 e164 20

SP5050 Gateway B configuration script:

Flash -clean

Ifaddr –ip 203.68.28.247 –subnet 255.255.255.0 –gate 203.69.28.254

h323 -mode 1

Sysconf –2nddial 0

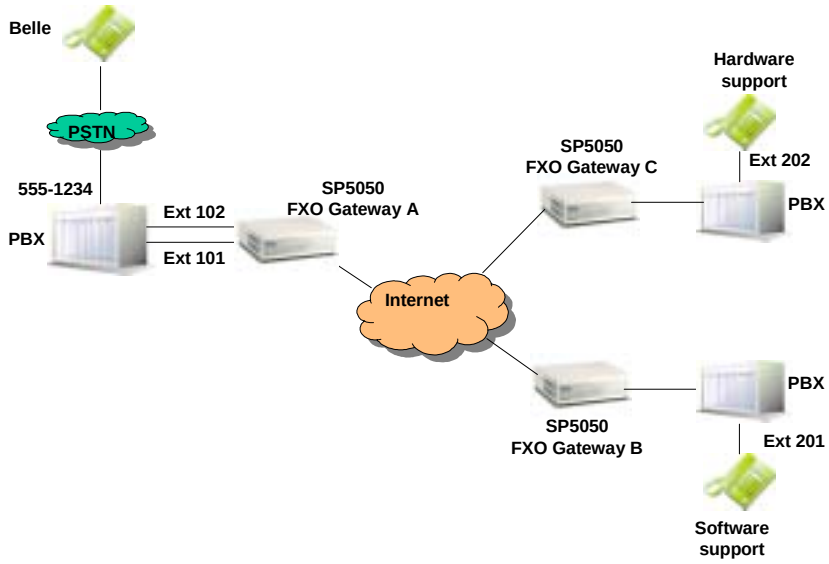
Sysconf –drule in_drop 20

Pbook –add name gatewayA ip 192.168.1.123 e164 10

Deploy Customer Services Hotline Using SP5050 Series

Two remote sites are connected by 2 SP5050 VoIP gateways with FXO interface and each SP5050 connect to local PBX system. This section describes how to set up a calling to local PBX extension and transfer the call to remote PBX specific extension. The configuration can be setup for hotline support. User calls the local extension, but the phone will be answered directly and the callee is located remote site.

Description



ACME company is a network solution provider. It focuses on network solution development including hardware and software. Because of resource limitation, ACME outsourced the technical support to 3rd party. They sign a contract with software supporting company and sign hardware support contract with another company. But, they still would like customer can contact the support group via their telephone number published to market. Besides, after customers hear a greeting, customer can dial different extension number for different support categories.

The support company doesn't need to have engineers work in ACME office. That is, the outsourced engineers still work in their office. ACME uses Micronet VoIP gateway to setup hotline infrastructure. Customers call to ACME's for support. The outsourced engineers seem like answer the phone in the ACME office, but actually, they are working remotely.

The support companies locate at remote side. If the hotline support infrastructure is built on traditional telephone system, there will be lots of long distance or international phone bill for transfer the call to the outsource

company. Otherwise, ACME has to prepare working space for the outsourced engineers. Through the IP telephony infrastructure built by Micronet VoIP Gateways, ACME corporate can have much more flexibility to build up the support team from outsourced company.

Dialing Scenario

When customer calls to ACME telephone number, after hearing greeting, dial extension 101 for software support, and dial 102 for hardware support.

Customer calls for software support

1. Pick up the phone and call to ACME telephone number from PSTN, 555-1234.
2. After hearing dial tone, dial 101 for software support.
3. The extension phone at 201 in outsourced software supporting company will answer the phone.
4. The dialing sequence from customer to ask software support is 5551234-101.

Customer calls for hardware support

1. Pick up the phone and call to ACME telephone number from PSTN, 555-1234.
2. After hearing dial tone, dial 102 for hardware support.
3. The extension phone at 202 in outsourced hardware supporting company will answer the phone.
4. The dialing sequence from customer to ask software support is 5551234-102.

Configuration Script

SP5050 Gateway A configuration script:

```
Flash -clean

ifaddr -ip 192.168.1.2 -mask 255.255.255.0 -gate 192.168.1.254

h323 -mode 1

sysconf -service 2

bureau -table 1 203.69.28.66 201

bureau -table 2 10.1.10.10 202
```

commit

reboot

SP5050 Gateway B configuration script:

ifaddr -ip 203.69.28.66 -mask 255.255.255.0 -gate 203.69.28.254

h323 -mode 1

sysconf -service 2

sysconf -2nddial 0

commit

reboot

SP5050 Gateway C configuration script:

Flash -clean

ifaddr -ip 10.1.10.10 -mask 255.255.255.0 -gate 10.1.10.254

h323 -mode 1

sysconf -service 2

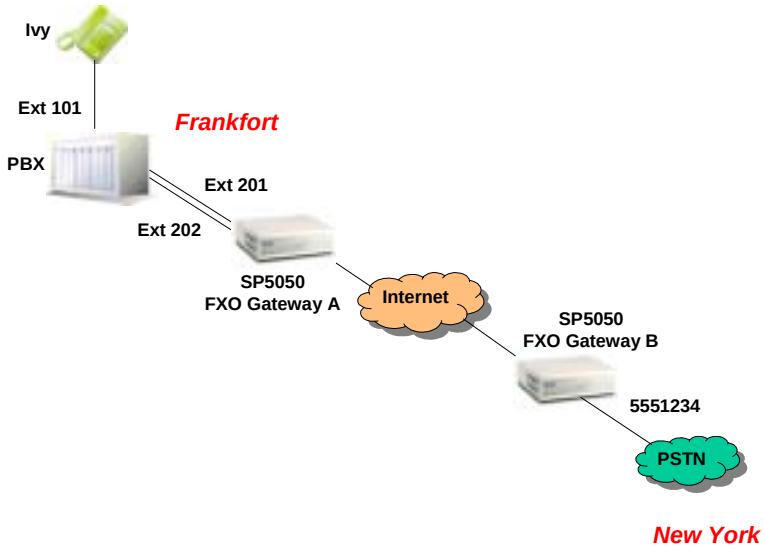
sysconf -2nddial 0

commit

reboot

Free Long Distance and International Phone Bill Using SP5050 Series

The basic and the most benefit of IP telephony is saving long distance and international phone bill for enterprise. This section will demonstrate how to built IP telephony with local PBX system. User still make a local call via local PBX system without any difference, and make a long distance and international call through Micronet VoIP Gateway.



Description

ACME company has lots of communication by telephone among the cities all over the world, special between Frankfort and New York. ACME's headquarter is located at Frankfort, and have some strategic customers and sales representatives at New York. Using telephone call between Frankfort and New York makes the international phone call fee increase dramatically.

HQ at Frankfort has basic Internet infrastructure with ADSL connection and PBX system, but do not have any branch office at New York. They would like to save the international phone bill by using Micronet VoIP Gateways.

At New York, they rent a space from ISP, setup an Internet connection from ISP to Micronet VoIP Gateway SP5050 with FXO interface. And get a PSTN line from local telephone operator to connect to SP5050's FXO port. That's all for hardware and infrastructure setup. Now, employee at Frankfort can free make a call to sales representatives or customers at New York without international phone charge.

Dialing Scenario

Employee make a local call through PBX system at Frankfort is no difference. When they would like to call customers or representatives at New York. They go through PBX and Micronet VoIP SP5050 to connect to SP5050 at New York. Now, they can dial via the PSTN line to contact whoever they want to contact.

ACME employee call to New York

1. Pick up the phone and call to extension 201 or 202 which is dependent on how many lines are supported by ACEM company for international phone call.
2. After hearing greeting, it request caller to input access code.
3. Caller input access code 1234. The code is accepted.
4. Caller dial 105551234 to contact the people at New York (“10” stands for the prefix of New York, and 5551234 is the native phone number of the person).

Sale representative and customer at New York call to Frankfort

1. Call to telephone of PSTN line connected to SP5050.
2. After hearing greeting, it request caller to input access code.
3. Caller input access code 4321. The code is accepted.
4. Caller dial 20101# to contact the Ivy at Frankfort (“20” stands for the prefix of Frankfort), or dial 2002041234 (“20” stands for the prefix of Frankfort , “0” is used to control PBX to seize an available external line, “2041234” is the native telephone number of Frankfort).

Configuration Script

SP5050 Gateway A configuration script:

ifaddr -ip 192.168.1.2 -mask 255.255.255.0 -gate 192.168.1.254

sysconf -2nddial 0

sysconf –access set1 1234#

sysconf –access set2 1234#

pbook –add name NewYork ip 203.69.28.247 e164 10

commit

reboot

SP5050 Gateway B configuration script:

Flash -clean

ifaddr -ip 203.69.28.247 -mask 255.255.255.0 -gate 203.69.28.254

sysconf -2nddial 0

sysconf –access set1 4321#

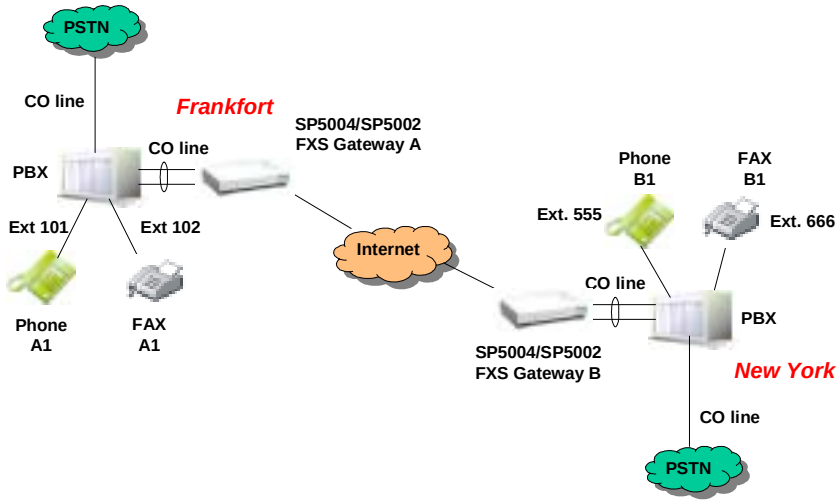
pbook –add name Frankfort ip 192.168.1.2 e164 20

commit

reboot

Free Long Distance and International Phone Bill Using SP5002/SP5004

The basic and the most benefit of IP telephony is saving long distance and international phone bill for enterprise. Micronet VoIP Gateway not only support voice over Internet, but also support Fax over Internet standard T.38. This section will demonstrate how to built IP telephony with local PBX system. Users can make a long distance and international call and send a Fax through Micronet VoIP Gateways SP5002/SP5004 which are with FXS interface.



Description

ACME company has lots of communication by telephone among the cities all over the world, special between Frankfort and New York. Besides, ACME also sends international Fax very frequently. ACME's headquarter is located at Frankfort, and have branch office at New York. Using telephone call and Fax between Frankfort and New York make the international phone call fee increase dramatically.

HQ at Frankfort has basic Internet infrastructure with ADSL connection and PBX system, and there is same infrastructure at New York. They would like to save the international phone bill by using Micronet VoIP Gateways.

ACEM choose Micronet VoIP Gateway SP5004 with FXS interface. They connect the FXS interface to central office line card of PBX. Because of these connections, when employee use phone or Fax, PBX will seize an available CO line automatically for caller. It is not necessary for caller to remember what extension numbers are used for IP telephony.

The PBX can be configured as press 0 for normal PSTN line, and press 1 for IP telephony connection.

Dialing Scenario

Employee make a local call and send Fax to native called through PBX system at Frankfort is no difference. That is, press 0 and dial out. When they would like to call customers or representatives at New York. They go through PBX and SP5004 at Frankfort to connect to SP5004 at New York. Now, they don't need to remember the extension number. Just press 1, PBX will get an available external line connected to SP5004 automatically.

ACME employee calls or sends Fax to New York

1. Pick up the phone A1 of extension 101 and press 1. PBX will seize CO line connected to SP5004 FXS port if there is any available.
2. After hearing dial tone, press 20, then 555 to connect phone B1.
3. The dial sequence is 1-20555#
4. Similar scenario can be duplicate between Fax machine A1 and B1 (extension 102 to extension 666).

Configuration Script

SP5004 Gateway A configuration script:

ifaddr -ip 192.168.1.2 -mask 255.255.255.0 -gate 192.168.1.254

h323 –line1 10

support –t38 1

pbook –add name NewYork ip 203.69.28.247 e164 20

commit

reboot

SP5004 Gateway B configuration script:

Flash -clean

ifaddr -ip 203.69.28.247 -mask 255.255.255.0 -gate 203.69.28.254

h323 –line1 20

support –t38 1

pbook –add name Frankfort ip 192.168.1.3 e164 10

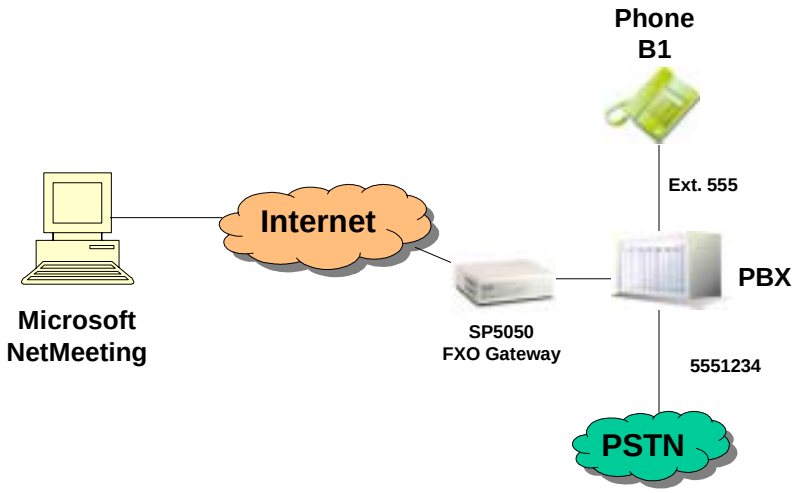
commit

reboot

Make a phone call from PC to Phone Using SP5050

The power of IP telephony is not only made calls from phone to phone and from PC to PC, but also make call from PC to phone. Microsoft NetMeeting is the most popular conference tool that is free distributed by Windows OS. What end user needs to do is getting a headphone and plugs it to PC. The PC becomes an IP telephone now. The PC can make a call to traditional phone via Micronet VoIP gateway SP5050. The SP5050 with FXO interface is used to connect to PSTN line or PBX extension line.

Description



ACME company would like to setup customer support channel from web. Users can call to ACME's customer support by click the NetMeeting icon from web page or start NetMeeting directly from Microsoft Windows environment.

Besides, ACME would like to use single telephone to answer the call no matter the call is from PSTN or Internet.

Micronet VoIP Gateway SP5050 supports FXO interface that can be connected to PBX system. It also is able to become the gateway between PC and traditional telephone system.

Dialing Scenario

User can make with Micronet Netmeeting to dial 555 via Micronet VoIP gateway to contact same extension telephone.

Customer call from NetMeeting to contact Telephone B1

1. User starts NetMeeting by click Start->Programs->Accessories->Communication->NetMeeting
2. input 555 in the dial field as following screen. Then press the telephone icon.

3. The telephone B1 will answer the call.

Configuration Script

NetMeeting 3.0 configuration script:

Start NetMeeting by click Start -> Programs -> Accessories -> Communication ->NetMeeting.

click tools->options…

Click Advanced Calling in General window

Select “Use a gateway to call telephones and videoconferencing systems.” And input 203.69.29.66 of SP5054’s IP address in Gateway field.

Press OK twice and back to NetMeeting main window.

SP5050 Gateway configuration script:

Flash -clean

ifaddr -ip 203.69.28.66 -mask 255.255.255.0 -gate 203.69.28.254

sysconf –2nddial 0

commit

reboot