



Far South Networks:

Com.X Gateway Configuration manual

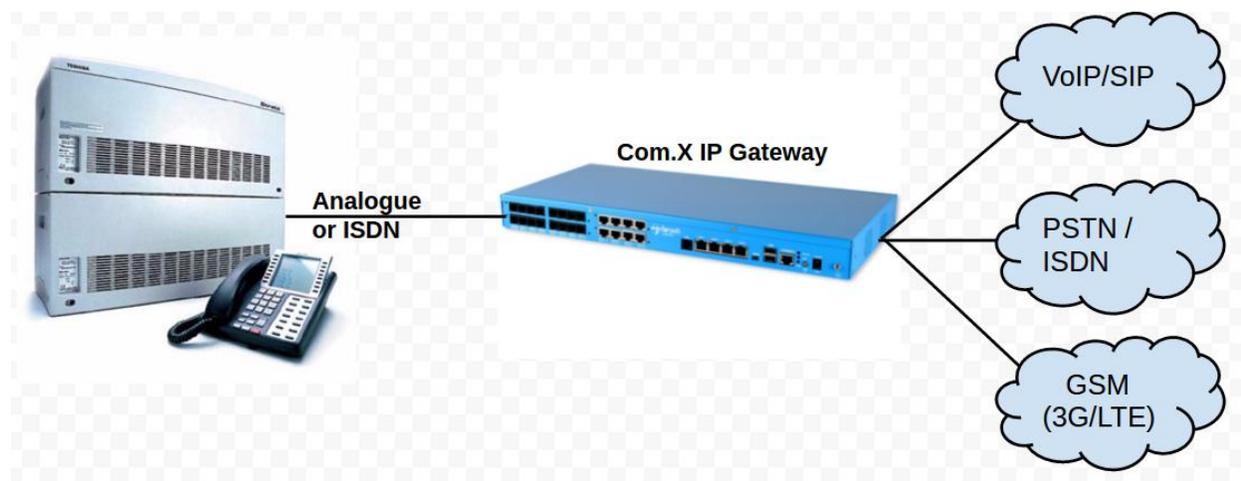
Revision History

Date	Version	Author	Comment
2016/07/12	1.0	A.Harrison	Initial
2016/07/12	1.1	M.Knight	Minor edits
2018/07/03	1.2	A.Speller	Minor Update

Inline Gateway description

An inline gateway is installed between a premise based PBX and available trunk lines. Trunks may be traditional telecom (Analogue PSTN, ISDN) or broadband IP (ADSL, FTTH, X.21, GSM/LTE, Metro Ethernet)

Common uses for gateways include allowing for VoIP breakout on legacy PBX systems, and recording and encrypting of call recordings.



Typically a call will route out of the legacy PBX and into a gateway, which then passes the call to one or more trunk providers (TDM or IP).

Call Routing

For the gateway, each call involves an inbound leg from the legacy PBX, connected to an outbound leg to the service provider.

The outbound leg could send the call to a SIP service provider, a PRI service provider, or even transparently to an analogue POTS service provider.

In order to facilitate gateway calls, trunks are required to the legacy PBX and to the service provider.

Trunks to the Legacy PBX

1. Analogue connections to the Legacy PBX

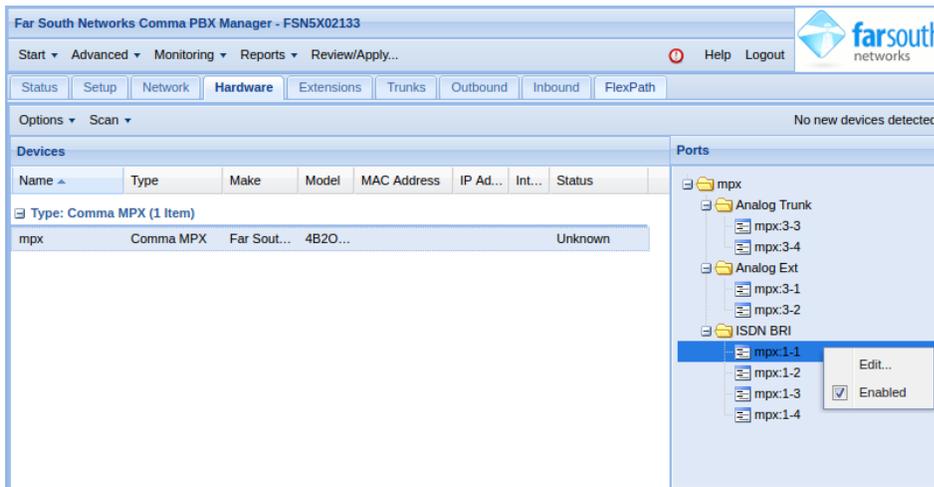
In analogue scenarios a CAT3 cable is usually connected between an FXO port on the legacy PBX, and an FXS port on the side of the service provider.

In an analogue gateway scenario the gateway replaces the service provider, and the connection is made between an FXO port on the legacy PBX and an FXS port on the gateway. Calls arriving on the FXS ports of the gateway will appear to the gateway as being no different than if a connected analogue phone on that FXS port had dialled the number.

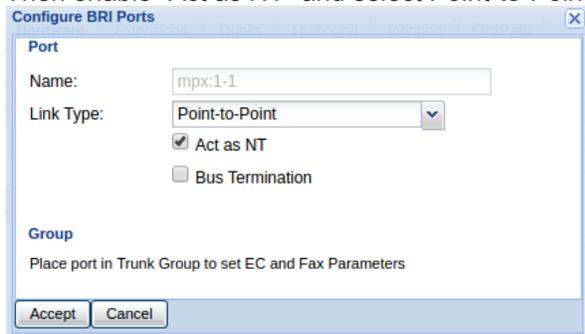
2. BRI connections to the Legacy PBX

In a BRI scenario, the client device is set to act as Terminal Equipment (TE) whilst the host or provider acts as the Network Termination (NT). In the case of a gateway scenario, the gateway would need to appear to the PBX as if it were the network termination of the service provider.

To configure a BRI port to act as NT, select the MPX or ITA device on the hardware page of the GUI, and then edit the appropriate port in the ports tree:

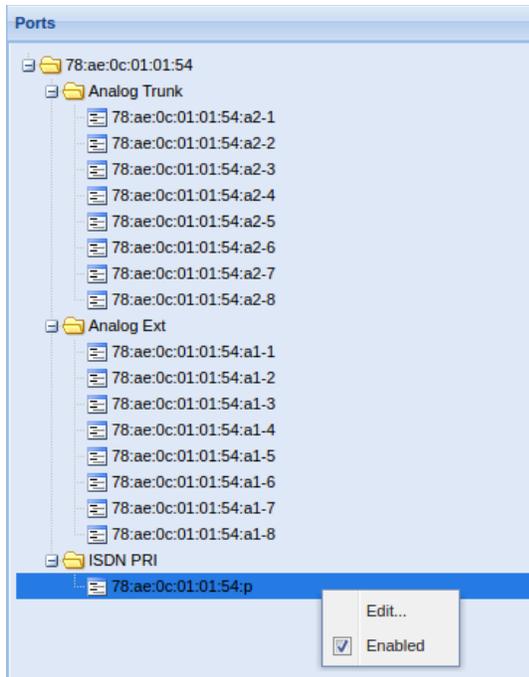


Then enable "Act as NT" and select Point-to-Point as the link type.



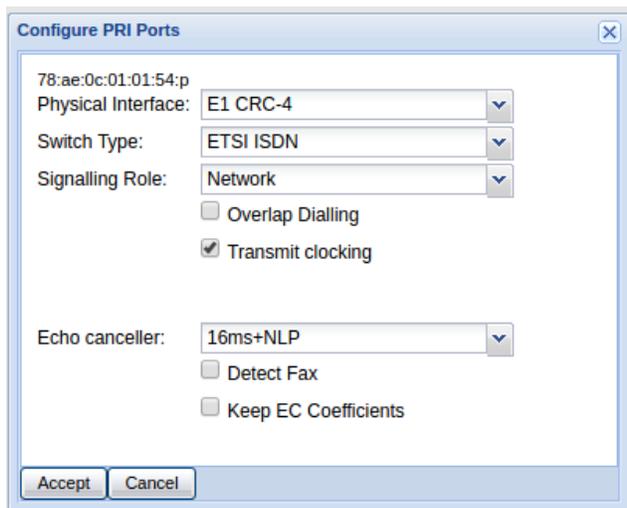
3. PRI Connections to the legacy PBX

When connecting a PRI port to the legacy PBX, the gateway acts as if it were a service provider. Navigate to the hardware page, select the ITA device and edit the PRI port from the ports tree on the right.



The interface then needs to be configured to act as the Network device and to transmit clocking to any connected terminal devices, as in the image below.

Note: The values of the Physical Interface and Switch Type fields are likely to remain as “E1 CRC-4” and “ETSI ISDN” respectively, however, if the legacy PBX is expecting configurations different to these, then these fields should be edited accordingly.



4. SIP trunk connections to the legacy PBX

In some cases, the PBX may be capable of SIP telephony, but a gateway is installed to achieve call recording or low cost routing. In this scenario, a SIP trunk can be configured between the legacy PBX and the service provider. In such a scenario, select Act as Provider and have the PBX register with the username set as the trunk's name by the host.

The image shows a window titled "SIP Provider" with three tabs: "Basic", "Advanced", and "Codecs". The "Basic" tab is selected. The window contains the following fields and options:

- Enable Trunk
- Outbound Caller ID:
- Outbound Dial Prefix:
- Name:
- Description:
- SIP Server:
- Port:
- Username:
- Realm:
- Password:
- Act as Provider
- Register with Provider
- Identify by username

At the bottom of the window are "Accept" and "Cancel" buttons.

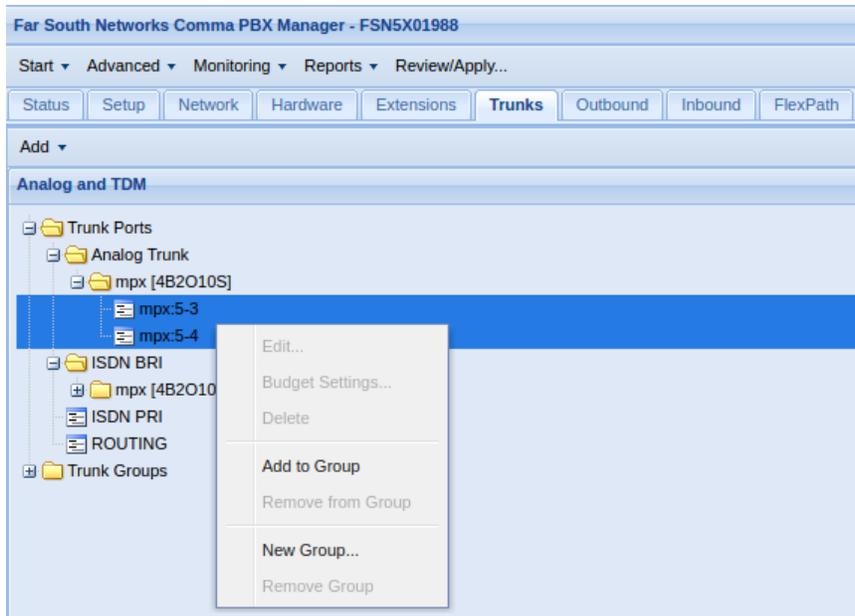
Trunks to the service provider

In order to facilitate the processing of outbound calls, trunks between the gateway and a service provider need to be configured.

Trunk Groups

Analogue and BRI ports can be grouped together in trunk groups. This allows the inclusion of a batch of trunk ports in an outbound route rather than a long list of individual ports.

To group ports into a trunk group, navigate to the Trunks page, expand the devices and using Ctrl click, select multiple ports of the same type. Right-click and then create a new group or add the ports to an existing group.



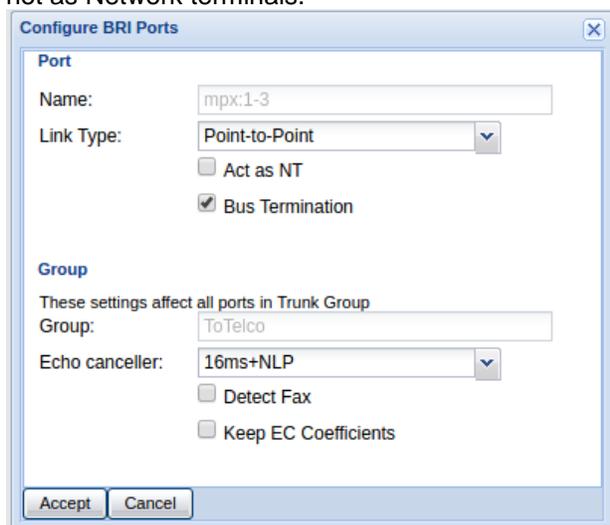
1. Analogue Trunks to a service provider

Much like the PBX sends calls out over FXO ports, the gateway can send analogue ports to the service provider if the FXO port is connected using a CAT3 cable, to an FXS port on the service provider side. These need only be included in a trunk group and added to an outbound route in order for calls to be processed through them.

2. BRI Trunks to a service provider

If multiple BRI ports are being connected to a service provider, it is best to first assign them to a trunk group as detailed above.

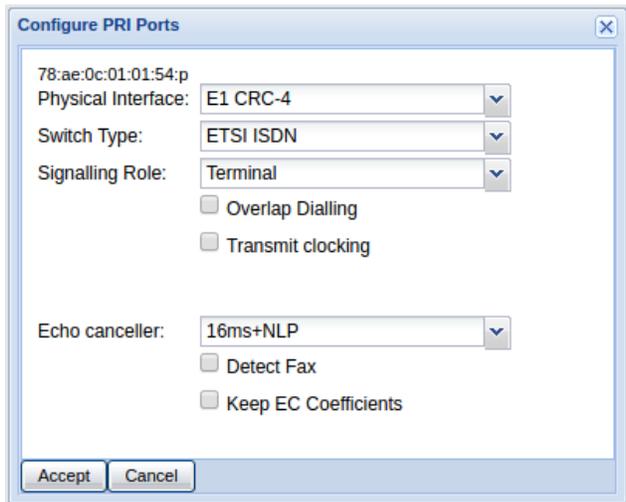
Thereafter, the gateway trunk ports that are connecting to the service provider need to appear as if they are the trunk ports on the legacy PBX. This means they need to be configured as Bus Terminations and not as Network terminals.



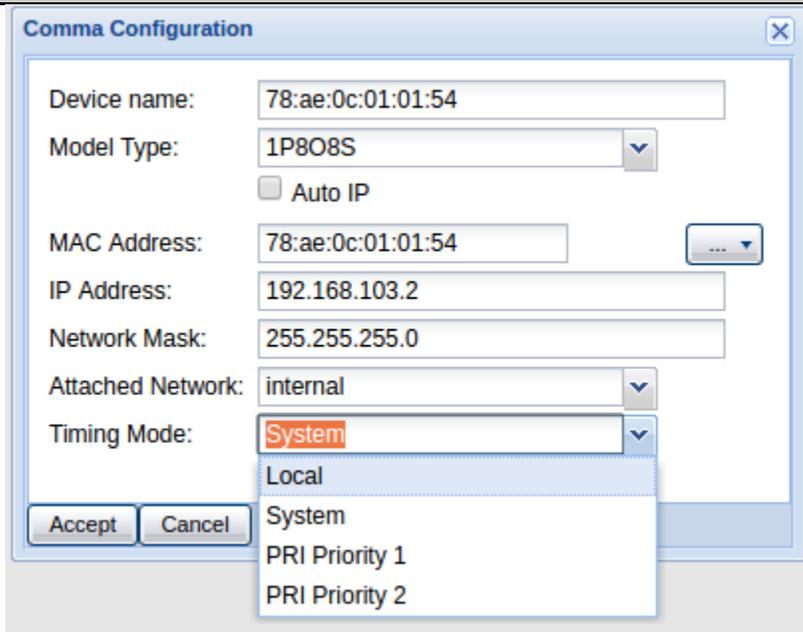
These ports will receive their clocking from the service provider.

3. PRI Trunks to a service provider

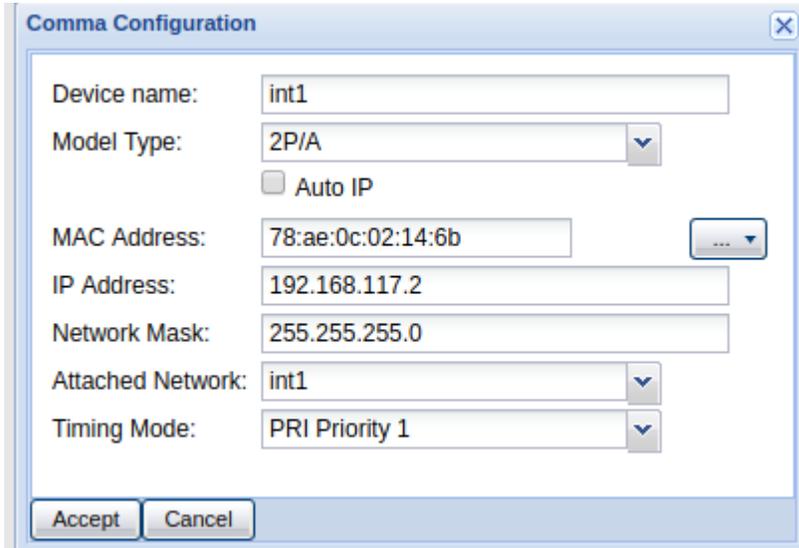
PRI ports connecting to the Telco need to be configured as Terminal ports with the "transmit clocking" disabled. These ports will receive their clocking from the service provider.



Note: If the BRI or PRI ports connecting to a service provider are on an ITA then it's important that the timing mode of the ITA be configured to either BRI priority 1 or PRI priority 1. In the event of the PRI ports connecting to a legacy PBX being on a separate ITA device, then that ITA's timing mode should be set to "System".



Note: In the event of a PRI to PRI gateway setup, where one PRI connection goes to a service provider and the other PRI connection goes to a legacy PBX, ensure that the timing mode of the ITA is configured to PRI priority 1. Then ensure that P1 is connected to the service provider and configured as a Terminal port with the "transmit clocking" disabled, and P2 is connected to the legacy PBX and configured as Network device with the "transmit clocking" enabled.



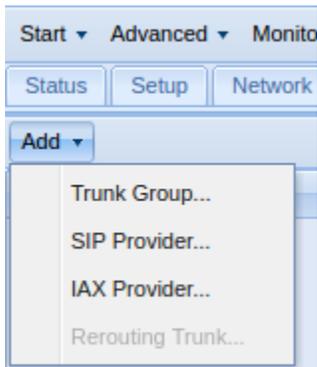
The image shows a 'Comma Configuration' dialog box with the following fields and values:

- Device name: int1
- Model Type: 2P/A
- Auto IP:
- MAC Address: 78:ae:0c:02:14:6b
- IP Address: 192.168.117.2
- Network Mask: 255.255.255.0
- Attached Network: int1
- Timing Mode: PRI Priority 1

Buttons: Accept, Cancel

4. SIP Trunks to a service provider

To set up a SIP trunk to the service provider, navigate to the trunks page, and then select Add, and SIP provider.



The trunk should be enabled, with the username and password set according to the service provider. CODECs are added by selecting the CODECs tab, and then using Ctrl-click to select multiple CODECs for the trunk.

If the trunk is connecting to a VOIP provider, leave the "Act as service provider" flag disabled.

Note: Some service providers do not require the trunk to register. If this is the case, disable Register with Provider.

SIP Provider [X]

Basic | Advanced | Codecs

Enable Trunk

Outbound Caller ID:

Outbound Dial Prefix:

Name:

Description:

SIP Server:

Port:

Username:

Realm:

Password:

Act as Provider

Register with Provider

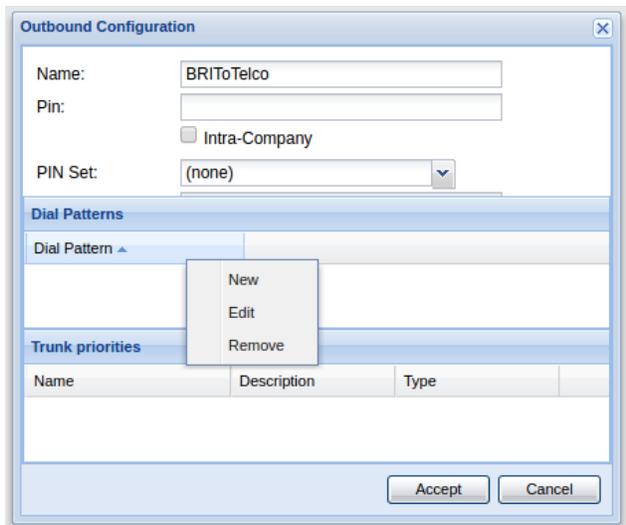
Identify by username

Accept Cancel

Call Routing

Outbound Routes

Outbound routes are methods of sending calls out over particular trunks, based on the number that is dialled.



To add a new dial pattern to an outbound route, right-click over the “Dial Pattern” text as in the image and select New.

Dial Pattern	Matches
Digits 0-9	Match the digits themselves
[0123456789]	Square brackets indicate a single digit, where any 1 of the digits within the square brackets will match. For instance, [247] would match the digit 2, the digit 4 or the digit 7.
X	A capital letter X matches any digit from 0 to 9
Z	A Capital letter Z matches any digit from 1 to 9
.	A single . character matches any number of digits or characters. A route featuring a simple “.” dial pattern will match every number dialed.

For the most simple of gateway configurations, you’ll need a single route catching all numbers and going to the PBX on one set of trunks, and then a second route, also catching all numbers, and sending them out towards the service provider on another set of trunks.

Outbound Configuration

Name:

Pin:

Intra-Company

PIN Set: ▾

Time limit (s):

Dial Patterns

Dial Pattern ▾

.

X.

Trunk priorities

Name	Description	Type
BRtoPBX		TRUNK GROUP

Outbound Configuration

Name:

Pin:

Intra-Company

PIN Set: ▾

Time limit (s):

Dial Patterns

Dial Pattern ▾

.

X.

Trunk priorities

Name	Description	Type
SIPtoTelco		SIP

Directing the calls

Flexpaths allow us to create custom dial plans for each port, or set of ports. We can use flexpaths to catch all calls originating on the legacy PBX and directing them to the outbound route facing the service provider.

Similarly, we could use another flexpath to catch all call originating on the trunks facing the service provider, and directing them to the outbound route facing the legacy PBX.

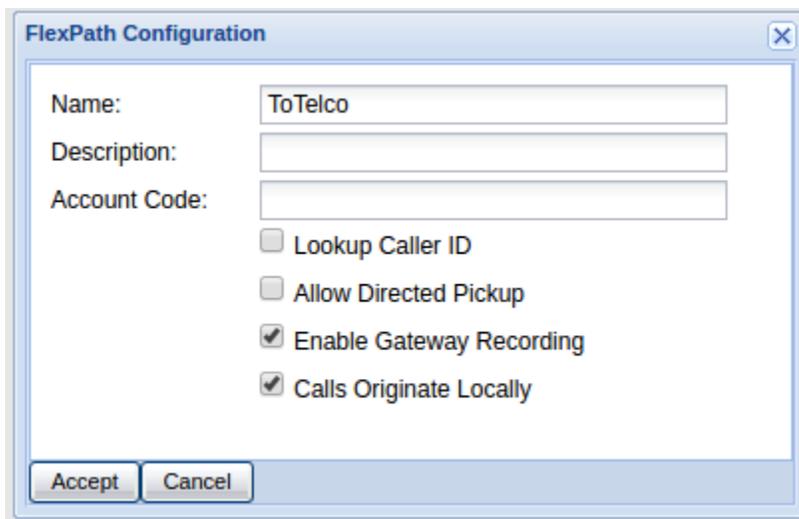
Creating the Outbound Flexpath

This flexpath is supposed to catch all calls originating at the legacy PBX and direct them to the trunks facing the telco.

To create a new flexpath, click on “Add path”.



Name the path with a sensible name, that indicates that it is facing towards the telco.

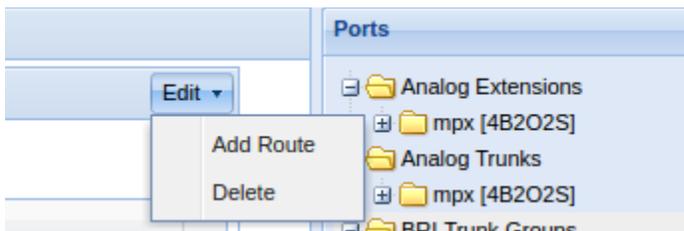


Check the “Calls Originate Locally” box, to indicate that calls being processed by this flexpath are outbound calls, from the PBX to the Telco.

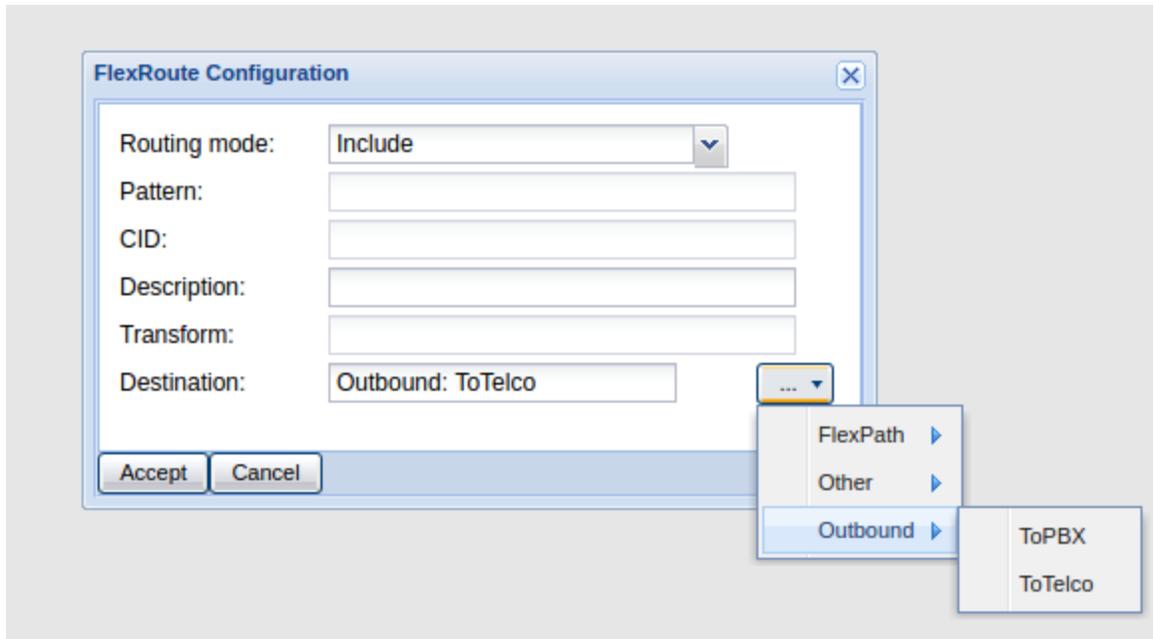
You can also enable gateway recording from this screen.

Accept.

Then select the Edit button, and Add route.



Select a route of type Include, and then, as the destination select the outbound route facing the Telco.



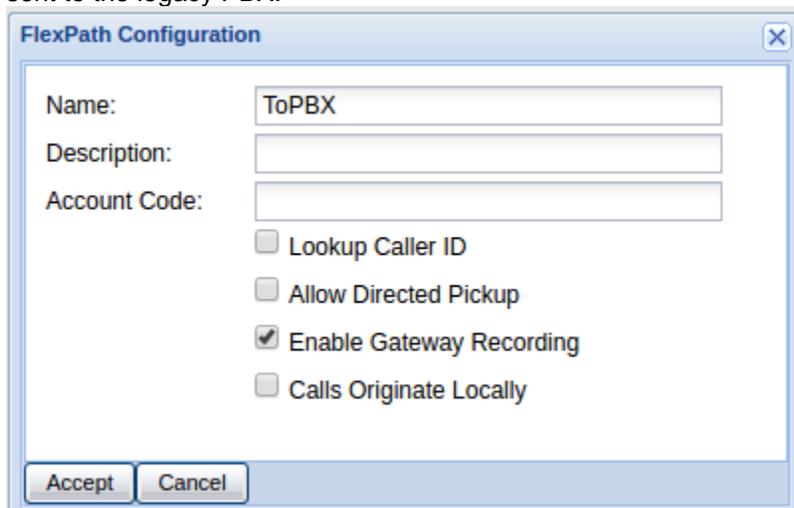
Finally, select the ports/trunk group that is facing the PBX and put in into this flexpath context. This configuration will take any inbound call that arrives on the trunks facing the PBX and sends them straight to the ToTelco outbound route, regardless of the number dialed.

Note: when the gateway is connected to the PBX via analogue trunks, you will need to place the FXS ports into the flexpath, rather than any trunk ports. The FXS ports are connected directly to the trunks of the legacy PBX, and all calls originating on them should be passed to the Telco.

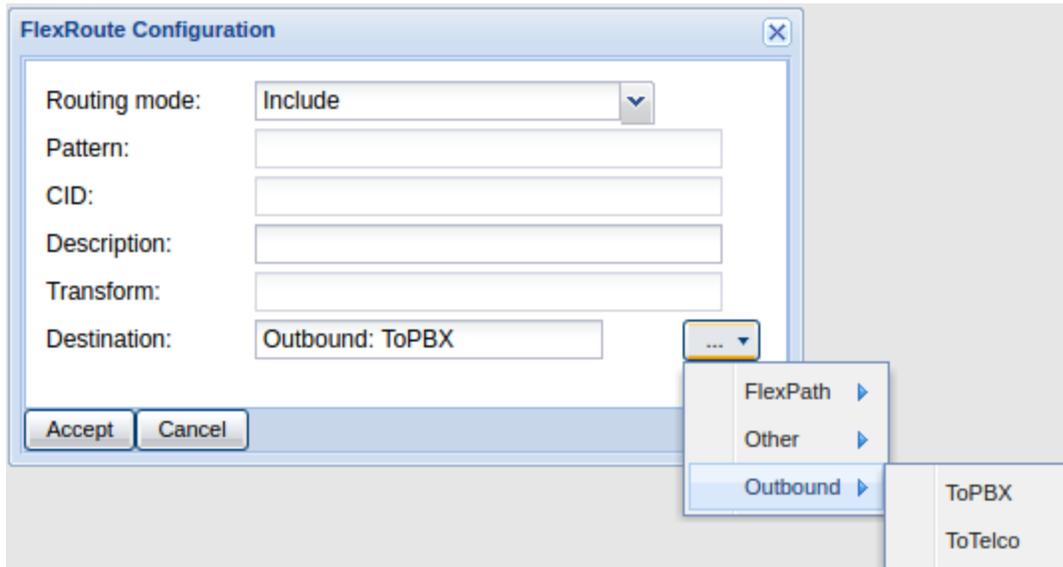
Creating an Inbound Flexpath (From Telco through to PBX)

Now you need to create a flex path that receives all calls from the service provider, and directs them to the outbound route facing the legacy PBX.

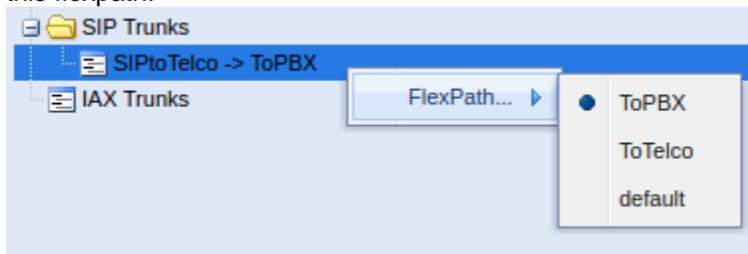
Create another new flex path, and give it a name that demonstrates that it faces the PBX. Leave “Calls originate locally” unchecked, as the calls in this flexpath are originating at the service provider and being sent to the legacy PBX.



Again select Include as the routing mode, and this time, select the outbound route facing the PBX as the destination.



Then, from the ports tree on the right, select the trunk that will receive calls from the telco, and assign it to this flexpath.



Note: In the case that the legacy PBX is connected to the gateway via analogue ports, then rather than an outbound route directing the calls to the PBX, simply direct the calls to the extensions or a ring group (if each FXS port is not associated with only one DID serviced by the Telco).

Worked Examples

Analogue in-line gateway

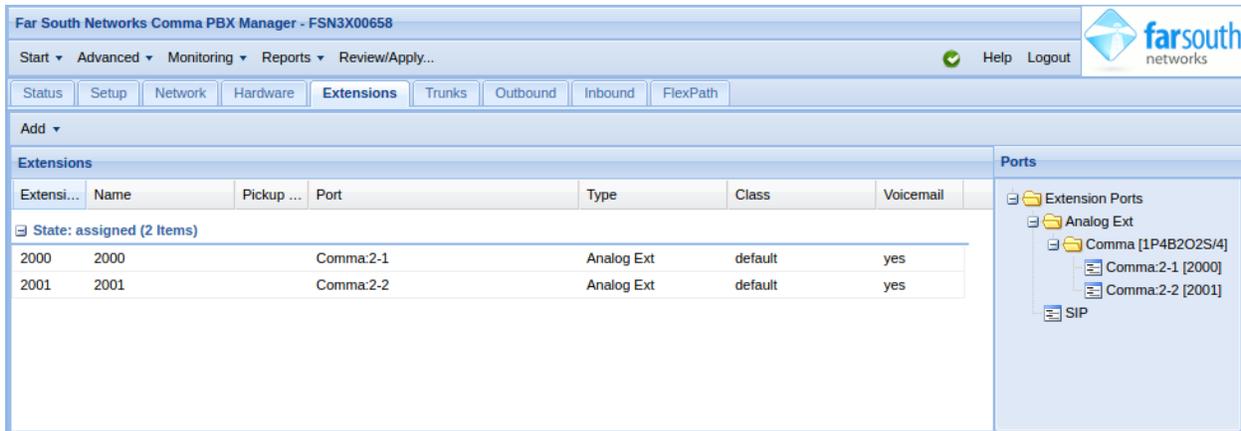
This example will detail the configuration of a Com.X gateway to act as an analogue to SIP gateway.

This will be covered in 4 steps:

1. Establish a connection to the PBX (in this case through FXS ports)
2. Establish a connection to the service provider
3. Use Flexpaths to record the calls and indicate call direction.

1. Establish a connection to the PBX

In this scenario, the FXS ports on the gateway are plugged directly into FXO ports on the legacy PBX, so an outbound trunk to the PBX is not necessary. Instead, we configure extensions on the FXS ports, and direct all calls from the service provider to these extensions. These call signals are then passed directly to the FXO ports of the legacy pbx across a CAT3 cable.



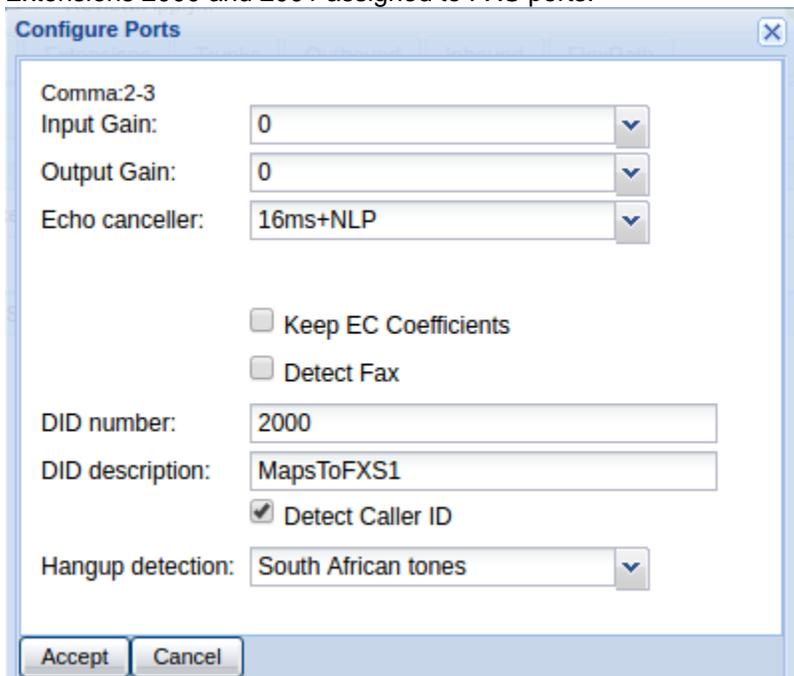
The screenshot shows the 'Far South Networks Comma PBX Manager - FSN3X00658' interface. The 'Extensions' tab is active, displaying a table with the following data:

Extensi...	Name	Pickup ...	Port	Type	Class	Voicemail
State: assigned (2 Items)						
2000	2000		Comma:2-1	Analog Ext	default	yes
2001	2001		Comma:2-2	Analog Ext	default	yes

The 'Ports' tree on the right shows the following structure:

- Extension Ports
 - Analog Ext
 - Comma [1P4B2O2S/4]
 - Comma:2-1 [2000]
 - Comma:2-2 [2001]
 - SIP

Extensions 2000 and 2001 assigned to FXS ports.



The 'Configure Ports' dialog box for 'Comma:2-3' contains the following settings:

- Input Gain: 0
- Output Gain: 0
- Echo canceller: 16ms+NLP
- Keep EC Coefficients
- Detect Fax
- DID number: 2000
- DID description: MapsToFXS1
- Detect Caller ID
- Hangup detection: South African tones

Buttons: Accept, Cancel

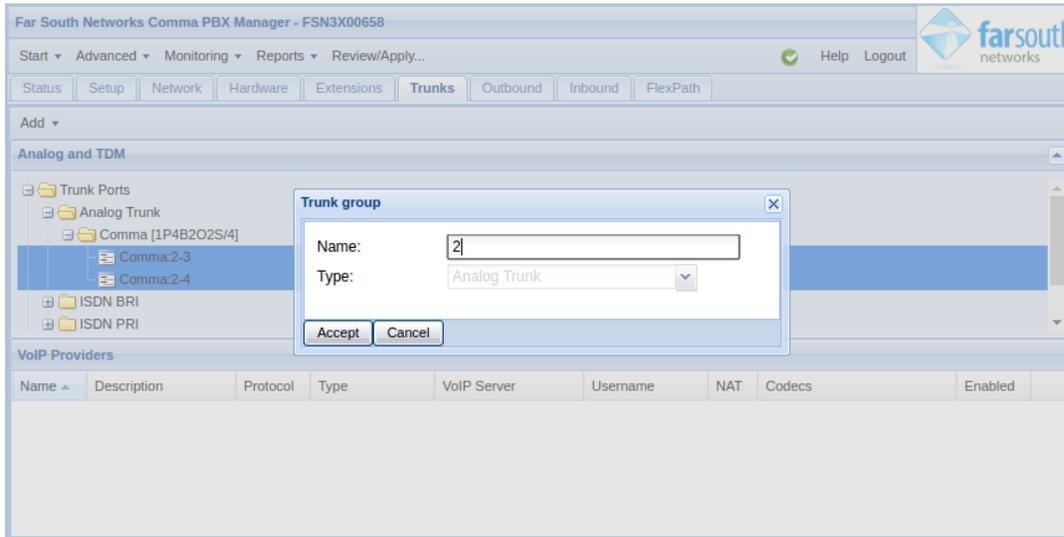
Then assign the FXO ports with DIDs 2000 and 2001 to match the extensions configured on the FXS ports. These ports face the service provider and deal with external incoming calls.

When a call is detected on these FXO ports, the system will behave as if someone had made a call to 2000 and 2001 respectively.

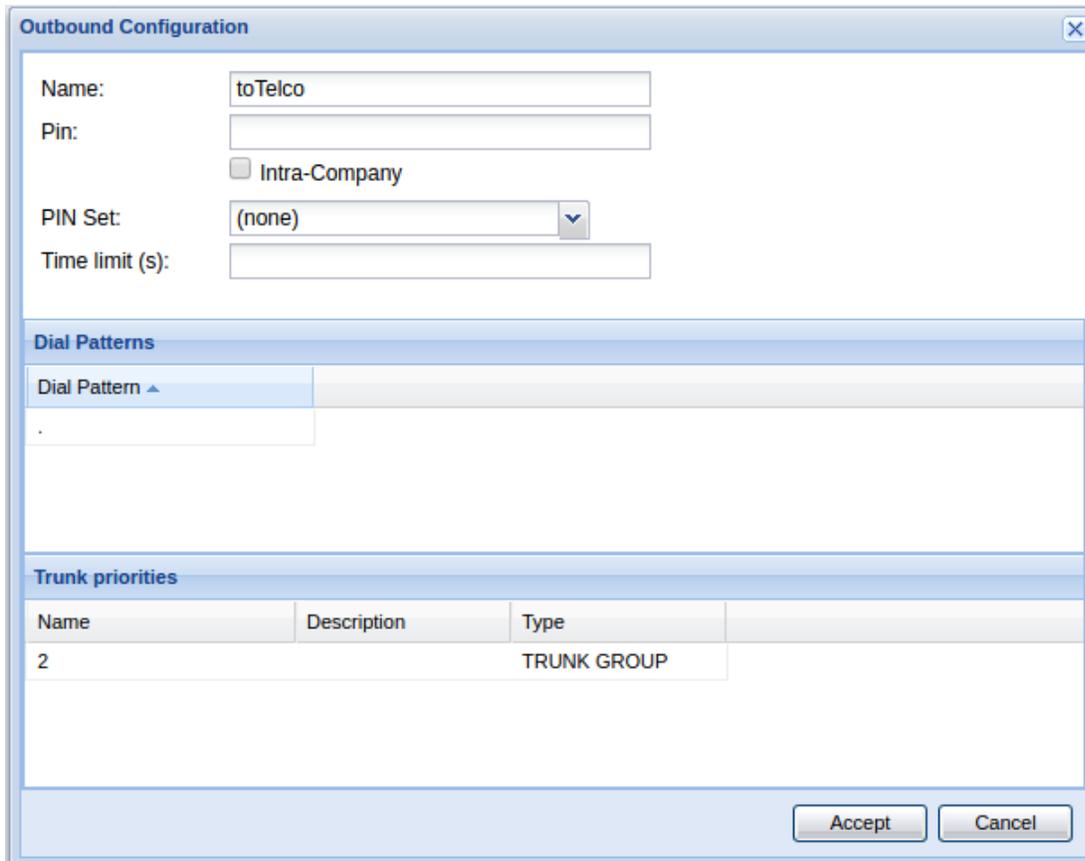
No inbound route is required if the DID on an FXO port matches the number of an extension.

2. Establishing a Connection to the Service Provider

First, the analogue trunk (FXO) ports should be placed into a trunk group.



Then create an outbound route, routing calls to the service provider, across the FXO trunk group. This route should match any number dialed. This requires a pattern match, matching a single full stop character.

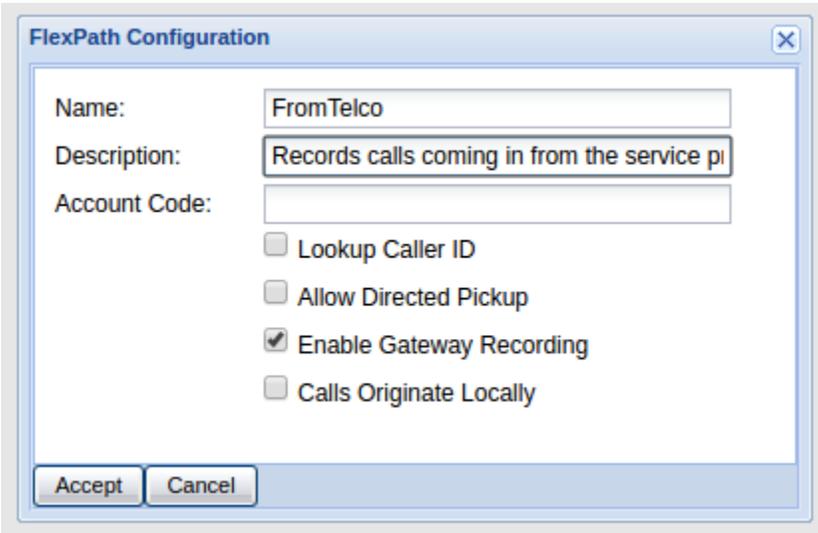


3. Using flexpaths to record calls and indicate call direction

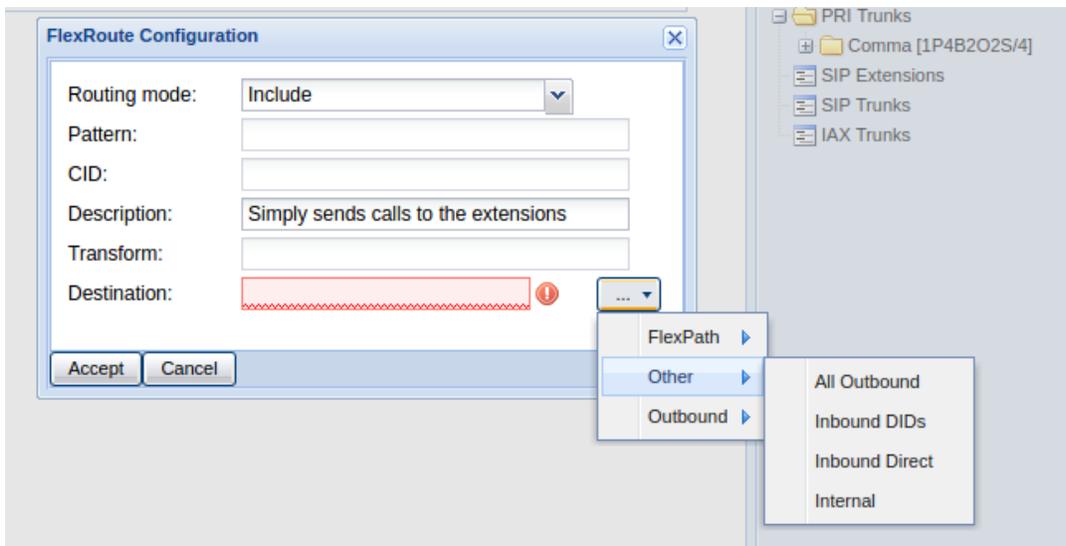
Finally, we can use two very simple flexpaths to record the calls, and indicate whether the call is incoming or outgoing. We create one flexpath to deal with calls from the PBX, sending them to the service provider, and another to deal with calls from the service provider, sending them to the PBX.

3.1. Calls from the service provider

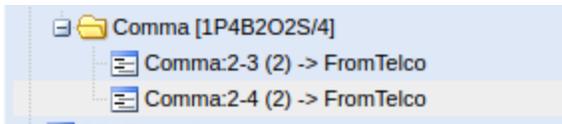
Calls from the service provider, will arrive on the FXO trunk group, and we'd like to record them and send them to the analogue extensions. The calls received from the service provider should be marked as inbound calls.



Gateway recording is enabled, and the Calls Originate Locally flag is left unchecked, as calls on the FXO ports are originating behind the service provider.



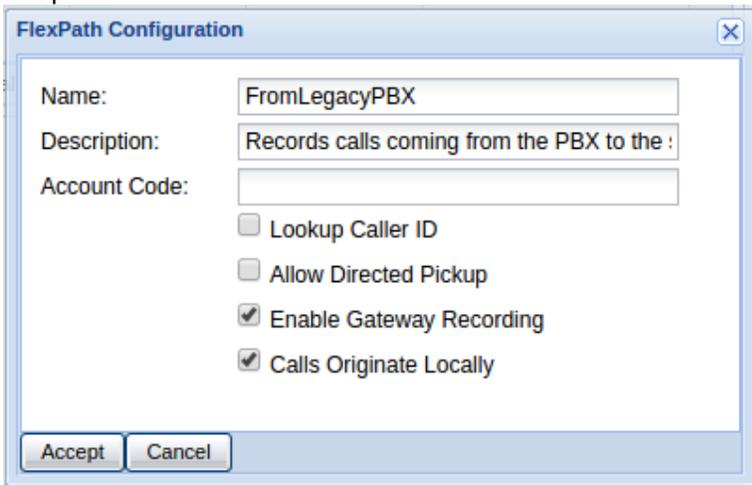
We create a flexpath containing this trunk group, and create a single include route, with the inbound direct context (which contains all of the extensions on the system) as the destination.



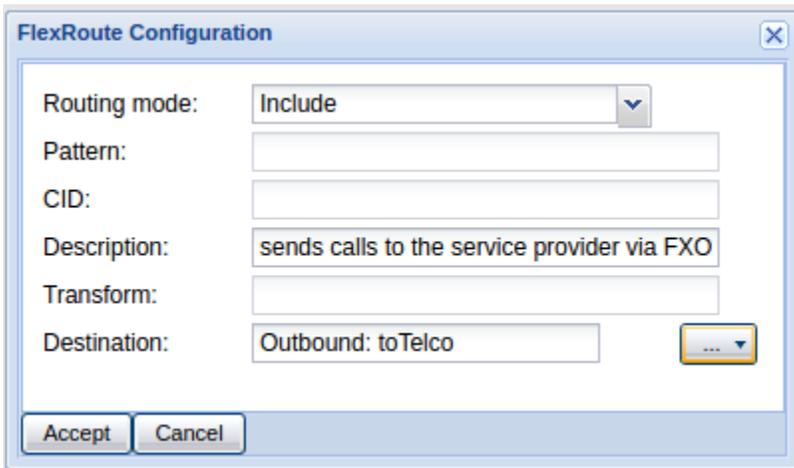
Don't forget to assign the FXO ports to the flexpath.

3.2. Calls from the PBX

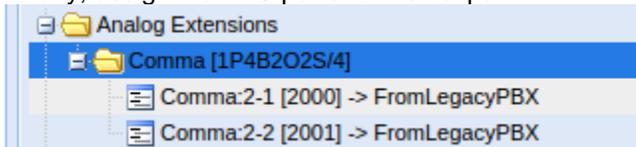
Calls originating on the PBX will arrive on the FXS ports, as if they had been made by extensions 2000 and 2001. We need to mark these calls as outbound, by enabling the "calls originate locally" flag on the flex path.



The flexpath should contain a single include route, with the outbound route to the service provider as the destination.



Finally, assign the FXS ports to this flexpath.



Note: In this example, we use flexpaths only to record the calls and to indicate whether they are inbound or outbound. The routing in these flexpaths is identical to how the calls would be routed if the ports were left in the default context.