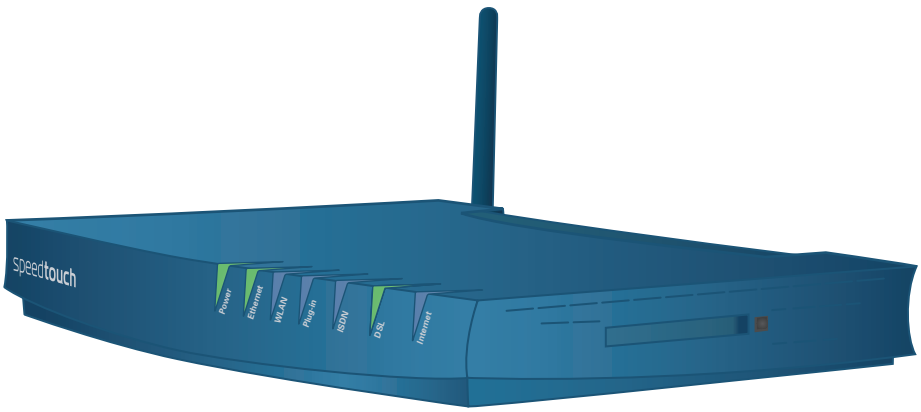
speedtouch™

SpeedTouch™

(Wireless) Business DSL Routers

Internet Connection Configuration Guide

Release R5.4 and higher



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SpeedTouch™

Internet Connection Configuration Guide R5.4 and higher

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Contents

About this SpeedTouch™ Internet Connection Configuration Guide

Used Symbols

The following symbols are used in this configuration Guide:

A ***note*** provides additional information about a topic.

A ***tip*** provides an alternative method or shortcut to perform an action.

A ***caution*** warns you about potential problems or specific precautions that need to be taken.

Typographical Conventions

Following typographical convention is used throughout this manual:

- Sample text indicates a hyperlink to a Web site.

  Example: For more information, visit us at www.speedtouch.com.
- Sample text indicates an internal cross-reference.

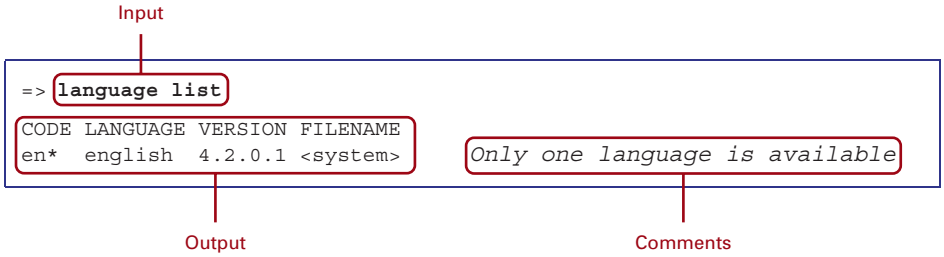
  Example: If you want to know more about guide, see "1 Introduction" on page 7.
- ***Sample text*** indicates an important content-related word.

  Example: To enter the network, you ***must*** authenticate yourself.
- **Sample text** indicates a GUI element (commands on menus and buttons, dialog box elements, file names, paths and folders).

  Example: On the **File** menu, click **Open** to open a file.
- **`Sample text`** indicates a CLI command to be input after the CLI prompt.

  Example: To obtain a list of all available command groups, type **`help`** at the top level.
- **`Sample text`** indicates input in the CLI interface.
- *`Sample text`* indicates comment explaining output in the CLI interface.

Example:



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1 Introduction

Scope

This document provides information on how to configure the SpeedTouch™ when trying to set up end-to-end connectivity with a Broadband Remote Access Server (BRAS). The aim of this configuration guide is to provide the essential information, so that non DSL experts can make the more advanced SpeedTouch™ configurations.

Applicability

This configuration guide is applicable to SpeedTouch™ Release R5.4 and higher.

History

Since the first introduction of the SpeedTouch™ DSL modems (the A1000 ADSL NT), the way data is passed back and forth between a computer or local LAN and the Internet Service Provider (ISP) broadband access machines has changed considerably. Starting from a plug and play IEEE 802.1D Transparent Bridge, DSL devices rapidly evolved to DSL Home gateways and IP routers with NAT/NAPT support for sharing a single public IP address with embedded firewalling techniques as a countermeasure to attacks from the Internet.

Overview

This chapter starts with some definitions and terminologies and then briefly describes the different interfaces of the SpeedTouch™ and how to configure them.

1.1 Definitions and terminologies

1.1.1 Local End / Remote End

Local ends Remote end

Irrespective whether a conversation happens between people or machines, there are at least two parties involved. In this document the SpeedTouch™ is referred to as the ***Local end***, and the Broadband Remote Access Server (BRAS) of the ISP the ***Remote end***.

The configuration at the remote end is fully controlled by the ISP.

The local end must be a mirror image of the remote end, but a few items can be selected autonomously by the subscriber.

1.1.2 Virtual Channels

ATM

The popular term “DSL Services” is actually a misnomer because it refers not only to the raw “DSL Technology” but also to virtual channels, encapsulation and formatting of packets.

Indeed, on the one hand, DSL refers to advanced modulation/demodulation techniques, applied to the copper wire between a subscribers’ home and the telephone service provider’s central office. The net result of this technology is a boost in bandwidth from a few tens of kilobytes per second to multiple megabits per second.

On the other hand, as the distance covered by DSL is limited to only a few kilometers, a wide area communication infrastructure is required to transport data to ISPs and corporate data centres. For this purpose, Asynchronous Transfer Mode (ATM) has been selected.

Virtual channels

A key aspect of ATM is its concept of ***Virtual Channels***. For DSL service, an ATM virtual channel is established between the DSL modem and the central office Digital Subscriber Line Access Multiplexer (DSLAM) of the telephone service provider.

ATM cells

Another key aspect is the concept of ***ATM cells***. Prior to DSL modulation, the SpeedTouch™ must encapsulate user data in ATM cells. Modulated ATM cells flowing along the virtual channel, are recovered in the central office of the telephone service provider and switched to the ISP or corporate data centre of the subscriber.

VPI/VCI

Each ATM cell carries two labels as part of its header:

- Virtual Path Identifier (VPI)
- Virtual Channel Identifier (VCI)

As a consequence, multiple virtual channels can reside on a single DSL line.

The SpeedTouch™ products support multiple combinations of Virtual Path Identifiers (VPI) and Virtual Channel Identifiers (VCI), thus supporting multiple Virtual Channels.

Commonly VPI is called virtual path and VCI virtual channel.

1.1.3 Connection Services

Concept

As part of the DSL service provisioning, the ISP configures a connection service at the remote end of each virtual channel.

Connectivity to the ***Internet*** or a company's ***Intranet*** is by far the most important service offered by an ISP. For practical realization though, some adjustments must be made. For example the BRAS enforces the use of a certain frame format on the virtual channel. Another important aspect is how the connection is bootstrapped (always-on / dial-up) and how IP settings like IP address, default gateway and DNS servers are configured at the local end.

All these items can be collectively referred to as ***connection service*** and consist of:

- a connection service name
- the virtual channel identifier
- the connection service type
- the ATM encapsulation type

Whether a connection is always-on or dial-up and the way IP configuration is accomplished in the remote end, is mostly implied in the ***connection service name***. For example PPPoE is native dial-up and IP configuration happens via PPP-IPCP.

Each ISP has its own policy for assigning connection services to virtual channel(s).

1.1.4 Packet Services

Function

The main function of a packet service is to forward frames or packets between the DSL line and the SpeedTouch™ LAN ports and vice versa. Therefore the connection service offered on the DSL line must be "attached" to the appropriate packet service in the SpeedTouch™.

Concept

The concept of packet services refers to:

- The type of packet or frame that is expected on the virtual channel
- The type of filtering/forwarding function that handles the frame/packet at the local end
- The pre- and post-processing steps that are applied on a per frame/packet basis
- Whether a connection is "dial-in" or is inherently "always-on"
- Whether frame/packet processing is done completely in the SpeedTouch™, or partially in the SpeedTouch™ and partially in the attached PCs
- Whether the connection can be shared or not
- The way parameters like IP addresses are negotiated, etc.

1.2 The SpeedTouch™ Interfaces

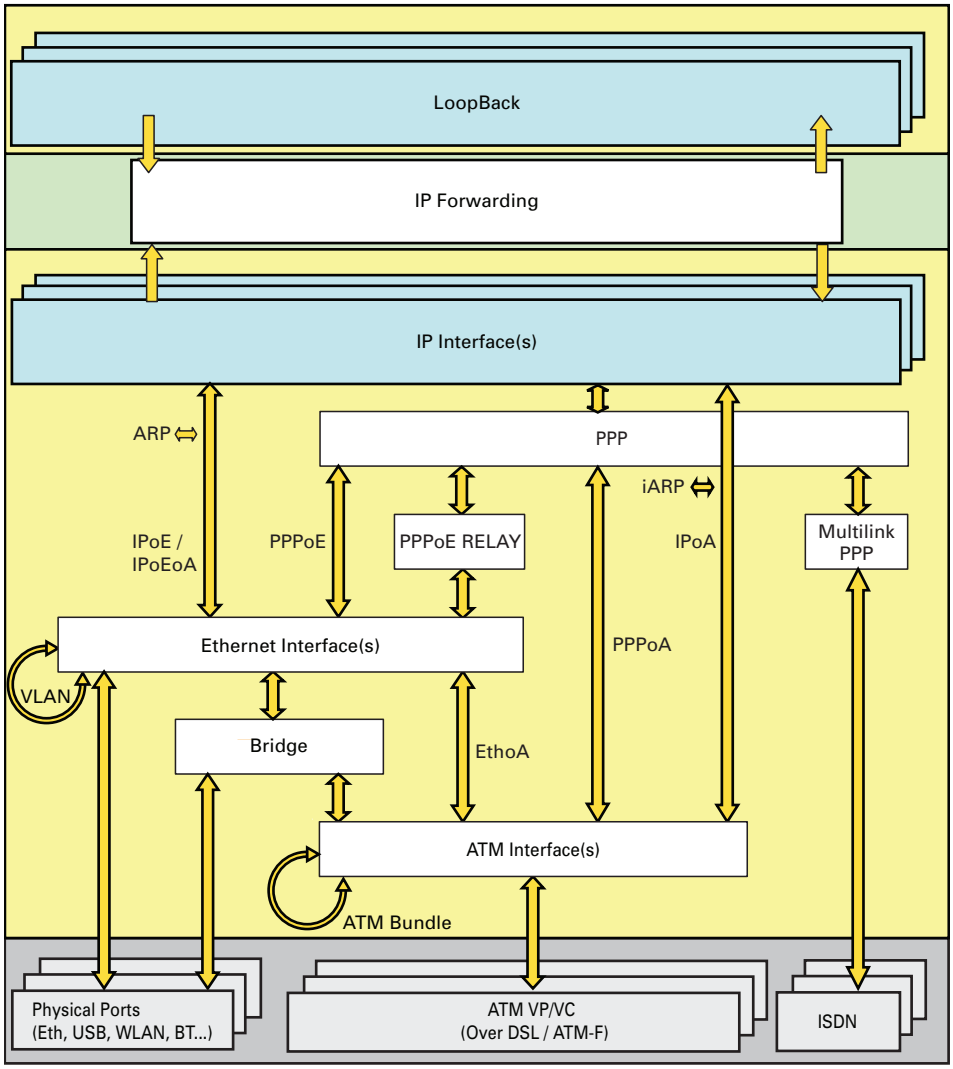
Types of interfaces

In the SpeedTouch™ release R5.4 and higher, there are five different types of interfaces:

- Physical interfaces:
  Interfaces that can be connected to other peripherals from outside the box:
  - Physical Ethernet interface
  - USB interface (USB 1.1 slave)
  - IEEE 802.11b/g WiFi Access Point
  - ISDN modem interface
  - DSL interface
- ATM interfaces:
  Interfaces that are created on top of an ATM address, or in case of an ATM bundle, on top of another ATM interface.
- Ethernet interfaces:
  Interfaces that are created on top of a physical interface, bridge, ATM interface, or in case of VLAN, on top of another Ethernet interface.
- IP interfaces:
  Interfaces that are created on top of an Ethernet interface, an ATM interface or exist on top of a PPP interface.
- PPP interfaces:
  Interfaces that are created on top of:
  - an Ethernet interface
  - an ATM interface
  - the ISDN interface
  - the PPPoE Relay

Schematic overview

The figure below shows the SpeedTouch™ interface architecture.



Configuration procedure

The configuration of an interface always exists of following three steps:

1. Creating the interface.
2. Configuring the interface.
3. Attaching the interface to its lower layer interface.

Every packet service consists of the configuration of different interfaces on top of each other.

In this document interfaces are configured by means of:

- The Command Line Interface (CLI)
- The Setup Wizard

Accessing the command line interface

Users can access the Command Line Interface via:

- The SpeedTouch™ CLI web pages:
  This requires that TCP/IP connectivity exists between the SpeedTouch™ and the host from which the web browser is opened.
- A Telnet session:
  This requires that TCP/IP connectivity exists between the SpeedTouch™ and the host from which the Telnet session is opened.
- The serial 'Console' interface.
  This requires a terminal emulation program.

Before you start

By default the SpeedTouch™ has the following interfaces already configured:

```
=>interface list
Name           Type       State            Use  UL Interfaces
ethif1         physical   connected        1    ethport1
ethif2         physical   connected        1    ethport2
ethif3         physical   connected        1    ethport3
ethif4         physical   connected        1    ethport4
RELAY          eth        connected        1    Internet_ppp
bridge         eth        connected        2    RELAY, lan1
OBC            bridge     connected        1    bridge
ethport1       bridge     connected        1    bridge
atm_0_35       atm        recovering       1    PPPoE_0_35
atm_8_35       atm        recovering       1    PPPoE_8_35
ethport2       bridge     connected        1    bridge
ethport3       bridge     connected        1    bridge
ethport4       bridge     connected        1    bridge
PPPoE_0_35     eth        connected        1    RELAY
PPPoE_8_35     eth        connected        1    RELAY
Internet_ppp   ppp        not-connected    1    Internet
Internet      *ip         not-connected    0
lan1           ip         connected        0
```

Proceed as follows to start without the default configuration:

```
=>:ppp relay flush
=>:eth flush
=>:atm flush
=>:ppp flush
=>:atm phonebook flush
=>:saveall
=>
```

With the SpeedTouch™ in this state you should be able to configure every packet service as described.

Document overview

In the next chapters the configuration of the following packets services will be explained:

- Bridged Ethernet
- Routed Ethernet
- Bridged PPPoE
- Routed PPPoE
- PPPoE Relay
- Routed PPPoA
- Routed PPPoI
- Routed IPoA.

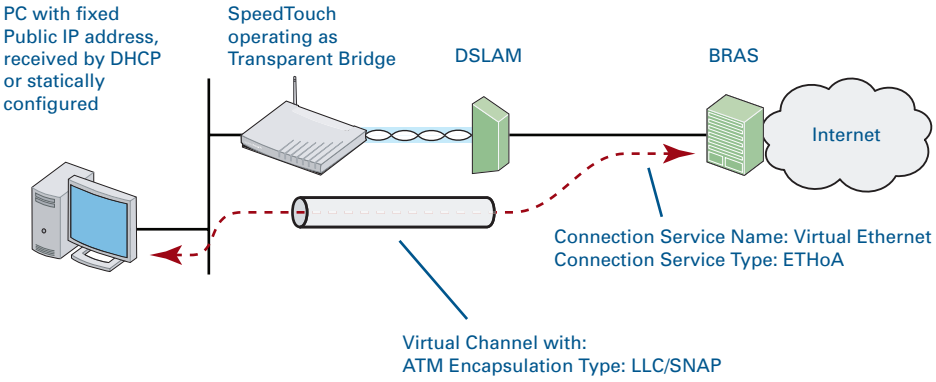
Templates

For your convenience, it also possible to configure these packet services using the SpeedTouch™ templates.

2 Bridged Ethernet

Introduction

Bridged Ethernet is by far the most simple packet service supported by the SpeedTouch™. The Bridging entity of the Digital Subscriber Line (DSL) modem joins the local Ethernet segment(s) connected to the local hosts, and the "virtual" Ethernet segment on the DSL line into one common Ethernet network. In this way it is as if the hosts are directly connected to the Service Provider (SP) access machine (remark the term "Transparent" Bridging).



Features

Bridged Ethernet has the following features:

- Platform and Operating System independent
- Simple to configure and easy to use
- Complete layer 3 and upwards protocol transparency
- Concurrent access to multiple remote destinations

Bridged Ethernet vs. connection service

The Bridged Ethernet Packet Service relies on the AAL5/RFC2684/Bridged Connection Service to achieve end-to-end connectivity.

For the SpeedTouch™, this amounts to using the ETHoA (Ethernet over ATM) Connection Service type. This connection service type implies the encapsulation of Ethernet frames (often referred to as IEEE802.3, MAC frames or Bridging frames) in AAL5/ATM.

All SpeedTouch™ products are compliant with RFC2684 "Multi-protocol Encapsulation over ATM Adaptation Layer 5" and support both the LLC/SNAP and VC-MUX encapsulation method for Bridged Ethernet V2.0/IEEE802.3 Protocol Data Units (PDUs). The default encapsulation method is set to LLC/SNAP.

Bridged Ethernet vs. protocol occupancy

Bridged Ethernet operates below the network layer and is transparent to any Layer 3 protocol. It does not impose any specific requirements to the local node's protocol layers. Make sure that these protocol layers are properly installed and supported by the remote node.

In most cases (and in all the examples) Transmission Control Protocol/Internet Protocol (TCP/IP) will be used.

Local Network TCP/IP configuration

Two TCP/IP scenarios are used for Bridged Ethernet implementations:

1. The Service Provider requires the use of DHCP for local node(s).
   Local DHCP clients receive their IP configuration from a remote DHCP server across the DSL line.
2. The Service Provider provides static public IP addresses to be configured on the local node(s) to globally uniquely identify the local end.

In both cases, alternatively, an additional private IP address can be manually configured (per local node) to allow Local Networking communication.

If the first scenario is used, the SpeedTouch™ DHCP server must be disabled to avoid two DHCP servers (i.e. the SpeedTouch™ DHCP server and the remote DHCP server) being active towards the local node(s) at the same time.

Using Bridged Ethernet

Using Bridged Ethernet is rather straightforward:

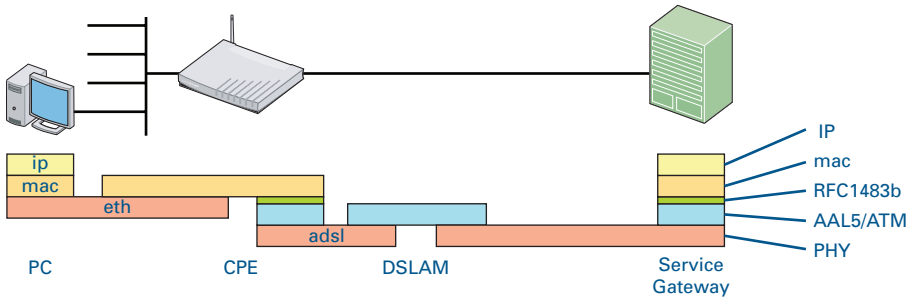
1. Make sure that the SpeedTouch™ is turned on first.
2. Turn on the computer(s).
3. Make sure that the Ethernet interface of the host computer is properly configured.
4. Start a web browser.

You are now on the Internet or you have Corporate Intranet access.

Although the access method of the bridge is Always–On, the remote organization might ask for a user name and password.

Protocol stack

The figure below shows the Bridged Ethernet protocol stack.



2.1 SpeedTouch™ Bridged Ethernet Configuration

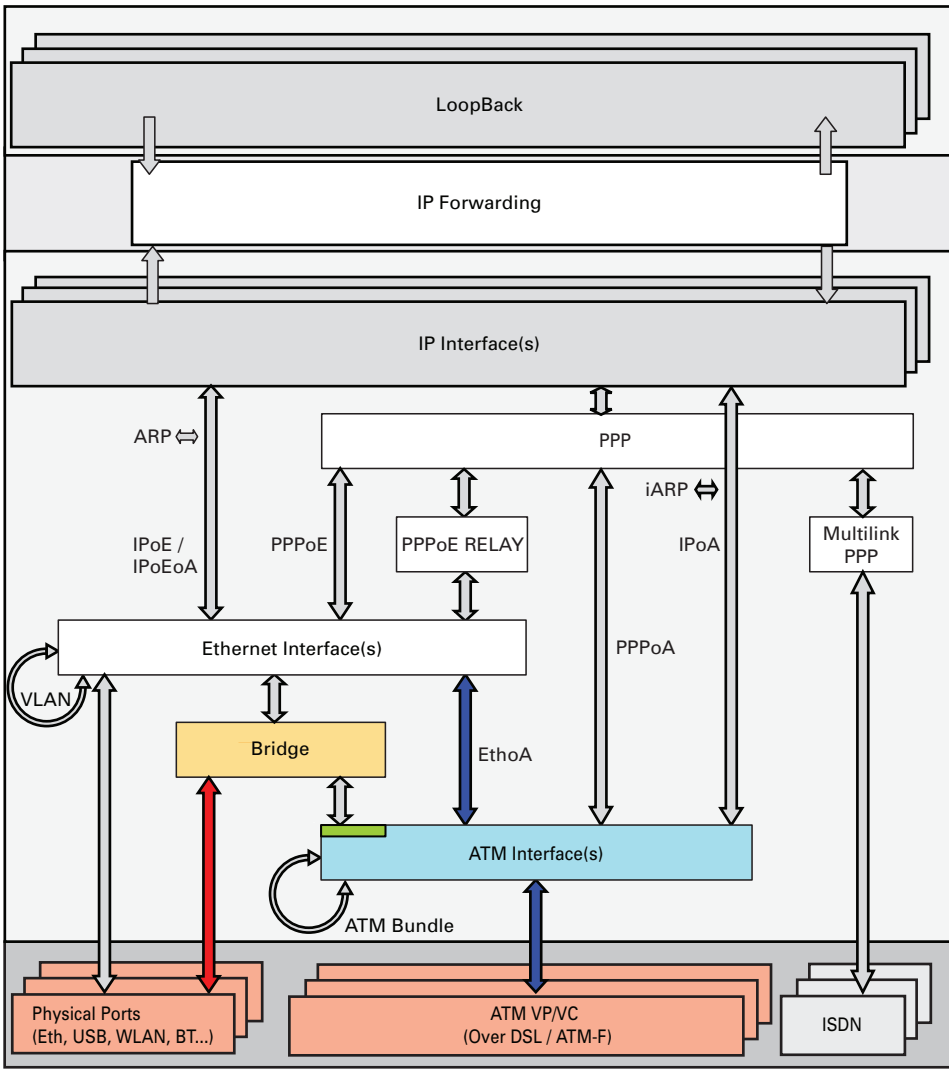
Preparatory steps for using Bridged Ethernet

To be able to configure the SpeedTouch™ successfully for the Bridged Ethernet Packet Service, the following information must be available:

- The VPI/VCI value of the Virtual Channel on which the ETHoA connection service is enabled.
- The encapsulation method (in most, if not all cases LLC/SNAP).
- The IP configuration of the local host.

Interface road map

The figure below shows the interfaces which have to be configured for Bridged ETHoA.



Interfaces connected with red arrows are by default created and connected.
Interfaces connected with blue arrows need to be created and connected.
The colours used correspond with the colours used in the " Protocol stack".

Configuration procedure

This procedure will guide you via the CLI through the configuration process.

The configuration procedure consists of the following steps:

1. Create, configure and attach/connect the ATM interface.
2. Create, configure and attach/connect the Bridge interface.
3. Check your configuration.

The ATM interface

Proceed as follows to create an ATM phonebook and the ATM interface.

1. Add a new phone book entry with name BrETHoA_ph, VPI/VCI =8.35.

```
=>atm phonebook add name=BrEthoa_ph addr=8.35
=>
```

If another phonebook entry with the same VPI/VCI already exists, you will have to delete that entry first.

2. Add a new ATM interface with name BrETHoA_atm.

```
=>atm ifadd intf=BrEthoa_atm
=>
```

3. Configure the new ATM interface with as destination the phonebook entry created above.

```
=>atm ifconfig intf=BrEthoa_atm dest=BrEthoa_ph ulp=mac
=>
```

By default, the encapsulation method will be LLC/SNAP.

4. Connect the ATM interface to the phonebook entry.

```
=>atm ifattach intf=BrEthoa_atm
=>
```

The Bridge interface

Proceed as follows to create, configure and attach/connect the bridge interface:

1. Create a new bridge interface with name BrETHoA_br.

```
=>eth bridge ifadd intf=BrEthoa_br
=>
```

2. Configure the new bridge interface with as destination the ATM interface created above.

```
=>eth bridge ifconfig intf=BrEthoa_br dest=BrEthoa_atm
=>
```

3. The Bridged Ethernet interface is not yet connected. Connect the bridge interface.

```
=>eth bridge ifattach intf=BrEthoa_br
=>
```

4. Execute **saveall** at the prompt to save this configuration.

```
=>saveall
=>
```

For a complete description of all CLI commands, see the SpeedTouch™ CLI Reference Guide.

Expected results

To check whether you have configured your connection correctly, take a look at the interface list. Normally you should be able to follow the path you have created. This interface list shows that the ATM interface with name BrETHoA_atm is connected to the bridge. With that every frame coming from the ATM interface BrETHoA_atm will be put on the bridge.

```
=>:interface list
Name          Type        State            Use  UL Interfaces
ethif1        physical    connected        1    ethport1
ethif2        physical    connected        1    ethport2
ethif3        physical    connected        1    ethport3
ethif4        physical    connected        1    ethport4
RELAY         eth         connected        0
bridge        eth         connected        1    lan1
OBC           bridge      connected        1    bridge
ethport1      bridge      connected        1    bridge
BrEthoa_atm   atm         connected        1    BrEthoa_br
BrEthoa_br    bridge      connected        1    bridge
ethport2      bridge      connected        1    bridge
ethport3      bridge      connected        1    bridge
ethport4      bridge      connected        1    bridge
lan1          ip          connected        0
```

The items in ***Italic*** are the interfaces created in this chapter.

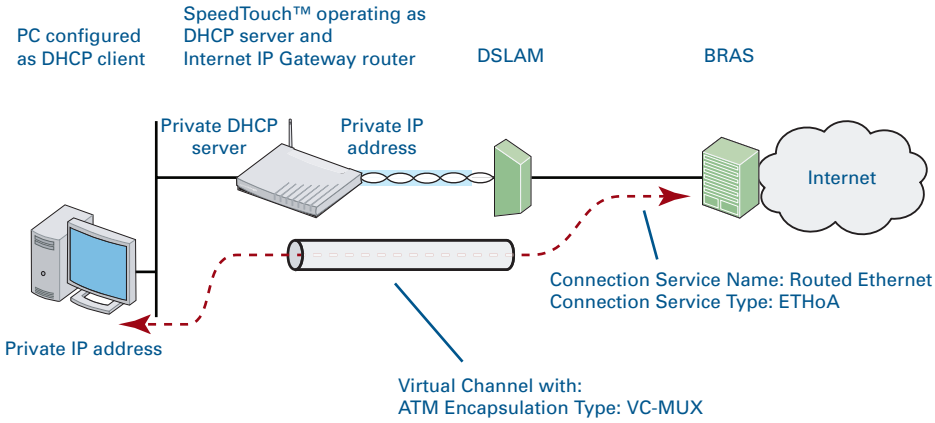
The interface list does not include the ATM phonebook entry. To check its state, go to the ATM phonebook list.

```
=>atm phonebook list
Name        Use  Address
BrEthoa_ph  1    8.35
```

3 Routed Ethernet

Introduction

Routed Ethernet, also commonly known as MAC Encapsulated Routing (MER) or IPoEoA (IP over Ethernet over ATM) relies on standard IP Routing for its forwarding. The IP packets are wrapped in Ethernet frames before they are sent out on the DSL line.



Features

Routed Ethernet has the following features:

- Provides Always-On type of connections.
- Is auto-configurable if DHCP is enabled on Ethoa interfaces.
- Multiple users can simultaneously share a single IP address if NAPT is enabled on the Ethoa interface or can hide the IP address if NAT is enabled.
- Allows the network to be shielded from the Internet via the SpeedTouch™ programmable firewall.
- Allows Intranet connections through an IPSec tunnel.
- Allows services such as IPQoS, SIP PBX, ISDN backup, IDS.

Routed Ethernet vs. connection service

The Routed Ethernet Packet Service relies on the AAL5/RFC2684 Connection Service to achieve end-to-end connectivity.

For the SpeedTouch™, this amounts to using the Ethernet over ATM (Ethoa) Connection Service type. This connection service type implies the encapsulation of Ethernet frames (often referred to as IEEE802.3, MAC frames or Bridging frames) in AAL5/ATM.

All SpeedTouch™ products are compliant with RFC2684 “Multi-protocol Encapsulation over ATM Adaptation Layer 5” and support both the LLC/SNAP and VC-MUX method for Routed Ethernet V2.0/IEEE802.3 Protocol Data Units (PDUs). By default the encapsulation method is set to LLC/SNAP.

Routed Ethernet vs. TCP/IP configuration

Two Transmission Control Protocol/Internet Protocol (TCP/IP) scenarios are used for Routed Ethernet implementations:

- The Service Provider requires the use of DHCP for the Routed Ethernet interface. The SpeedTouch™ embedded DHCP client, configured on top of the interface will receive its IP configuration from a remote DHCP server, across the DSL line.

- The Service Provider provides static Public IP addresses to be configured for the Routed Ethernet interface to uniquely identify the local end worldwide.

By enabling NAPT on the Routed Ethernet interface, the single public IP address can be shared by nodes on the Local Network.

Using Routed Ethernet

Using Routed Ethernet is rather straightforward:

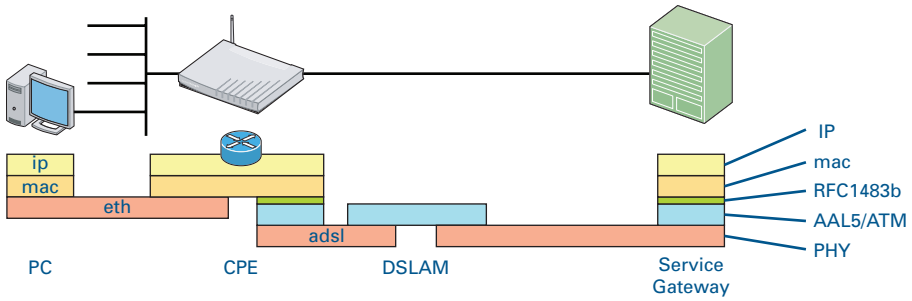
1. Make sure that the SpeedTouch™ is turned on first.
2. Turn on the computer(s).
3. Make sure that the Ethernet interface of the host computer is properly configured.
4. Start a web browser.

You are now on the Internet or you have Corporate Intranet access.

Although the access method of the bridge is Always–On, the remote organization might still ask for a user name and password.

Protocol stack

The figure below shows the Routed Ethernet protocol stack.



3.1 SpeedTouch™ Routed Ethernet Configuration

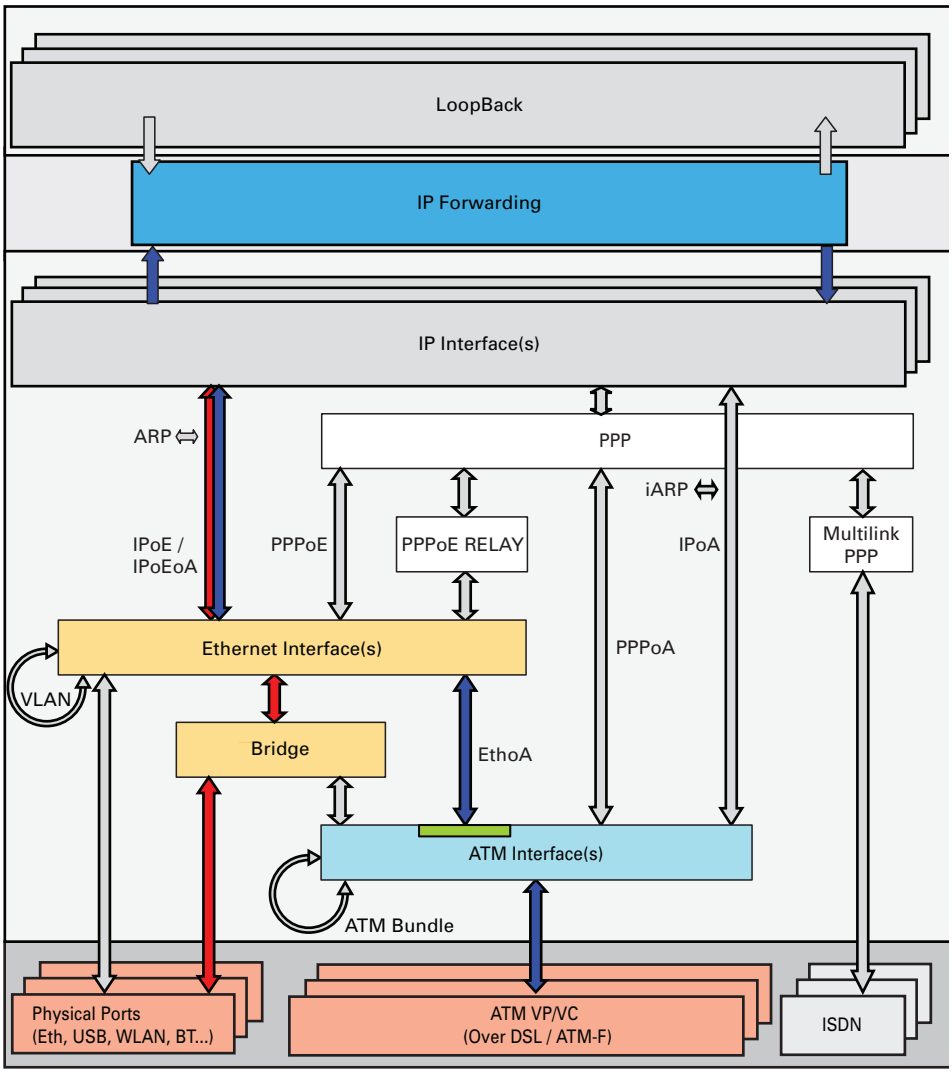
Preparatory steps for using Routed Ethernet

To be able to configure the SpeedTouch™ successfully for the Routed Ethernet Packet Service, the following information must be available:

- The VPI/VCI value of the Virtual Channel on which the Ethoa connection service is enabled.
- The encapsulation method (in most - if not all - cases LLC/SNAP).
- The IP configuration of the Routed Ethernet interface.

Interface road map

The figure below shows the interfaces which have to be configured for Routed Ethernet.



Configuration procedure

In this procedure we will guide you via the CLI through the configuration process.

The configuration procedure consists of the following steps:

1. Create, configure and attach/connect the ATM interface.
2. Create, configure and attach/connect the ETH interface.
3. Create, configure and attach/connect the IP interface.
4. Assign an IP address to the IP interface.
5. Check your configuration.

The ATM interface

Proceed as follows to create an ATM phonebook and the ATM interface.

1. Add a new phonebook entry with name RtEthoa_ph, VPI/VCI =8.35.

```
=>atm phonebook add name=RtEthoa_ph addr=8.35
=>
```

If another phonebook entry with the same VPI/VCI already exists, you will have to delete this entry first.

2. Add a new ATM interface with name RtEthoa_atm.

```
=>atm ifadd intf=RtEthoa_atm
=>
```

3. Configure the new ATM interface with as destination the phonebook entry created above.

```
=>atm ifconfig intf=RtEthoa_atm dest=RtEthoa_ph ulp=mac
=>
```

By default, the encapsulation method will be LLC/SNAP.

4. Connect the ATM interface to the phonebook entry.

```
=>atm ifattach intf=RtEthoa_atm
=>
```

The Ethernet interface

Proceed as follows to create, configure and attach/connect the Ethernet interface:

1 Create a new Ethernet interface with name RtEthoa_eth.

```
=>eth ifadd intf=RtEthoa_eth
=>
```

2 Configure the new Ethernet interface with as destination the ATM interface created above.

```
=>eth ifconfig intf=RtEthoa_eth dest=RtEthoa_atm
=>
```

3 Connect the Ethernet interface.

```
=>eth ifattach intf=RtEthoa_eth
=>
```

The IP interface

Proceed as follows to create, configure and attach/connect the IP interface:

1. Create a new IP interface with name RtEthoa_ip.

```
=>ip ifadd intf=RtEthoa_ip
=>
```

2. Configure the new IP interface with as destination the Ethernet interface created above.

```
=>ip ifconfig intf=RtEthoa_ip dest=RtEthoa_eth
=>
```

3. Connect the IP interface.

```
=>ip ifattach intf=RtEthoa_ip
=>
```

IP address assignment

Proceed as follows to assign an IP address to the IP interface:

1. Should the Routed Ethernet interface IP settings be obtained dynamically via DHCP?
   - If yes, go to step 2.
   - If no, go to step 3.
2. Configure the DHCP client interface.

```
=>dhcp client ifadd intf=RtEthoa_ip
=>dhcp client ifattach intf=RtEthoa_ip
=>
```

   Proceed with step 5.
3. Enter the static IP address (for example 192.6.11.67) and netmask (for example 255.255.255.0) for the local side of the Ethernet connection. These should be provided by your ISP.

```
=>ip ipadd addr=192.6.11.67/24 intf=RtEthoa_ip
=>
```

4. Optionally, make this interface your default gateway.

```
=>ip rtadd addr=0.0.0.0/0 intf=RtEthoa_ip
=>
```

5. Execute **saveall** at the prompt to save this configuration.

```
=>saveall
=>
```

For a complete description of all CLI commands, see the SpeedTouch™ CLI Reference Guide.

Expected results

To check whether you have configured your connection correctly, take a look at the interface list. Normally you should be able to follow the path you created.

```
=>interface list
Name          Type        State           Use  UL Interfaces
ethif1        physical    connected       1    ethport1
ethif2        physical    connected       1    ethport2
ethif3        physical    connected       1    ethport3
ethif4        physical    connected       1    ethport4
RELAY         eth         connected       0
bridge        eth         connected       1    lan1
OBC           bridge      connected       1    bridge
ethport1      bridge      connected       1    bridge
ethport2      bridge      connected       1    bridge
ethport3      bridge      connected       1    bridge
ethport4      bridge      connected       1    bridge
lan1          ip          connected       0
RtEthoa_atm   atm         connected       1    RtEthoa_eth
RtEthoa_eth   eth         connected       1    RtEthoa_ip
RtEthoa_ip    ip          connected       0
```

The items in ***Italic*** are the interfaces created in this chapter.

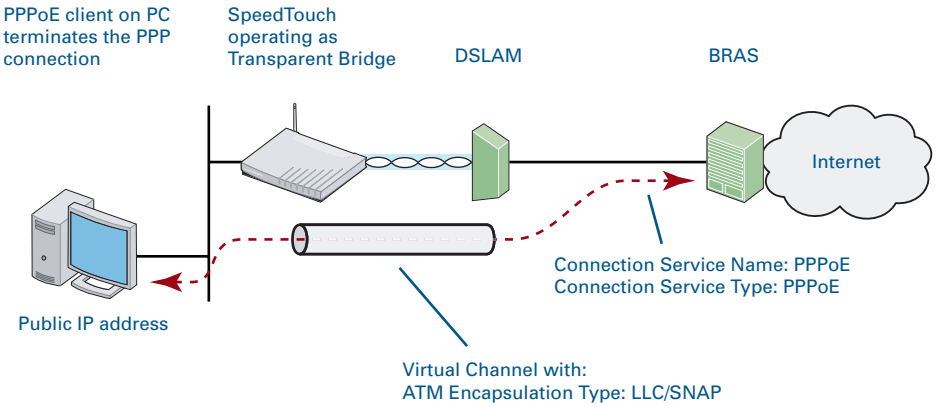
The interface list does not include the ATM phone book entry. To check its state, go to the ATM phone book list.

```
=>atm phonebook list
Name        Use  Address
RtEthoa_ph  1    8.35
```

4 Bridged PPPoE

Introduction

The SpeedTouch™ Bridged Ethernet Packet Service can be used in combination with a PPP over Ethernet (PPPoE) client installed on your computer. The resulting Bridged PPPoE packet service provides similar Dial–In experience as found on point–to–point connections.



Features

Bridged PPPoE has the following features:

- A Dial-In access method over a virtual Ethernet segment
- Platform and Operating System independent towards the SpeedTouch™
- The features of the SpeedTouch™ Bridged Ethernet Packet Service.

Bridged PPPoE vs. connection service

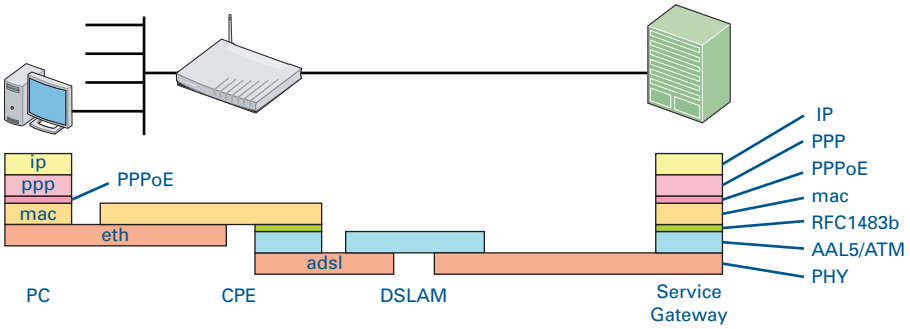
The Bridged PPPoE Packet Service relies on the AAL5/RFC2684/Bridged Connection Service to achieve end-to-end connectivity.

This connection service type implies the encapsulation of Ethernet frames (often referred to as IEEE802.3, MAC frames or Bridging frames) in AAL5/ATM.

All SpeedTouch™ products are compliant with RFC2684 “Multi-protocol Encapsulation over ATM Adaptation Layer 5” and support both the LLC/SNAP and VC-MUX encapsulation method for Bridged Ethernet V2.0/IEEE802.3 Protocol Data Units (PDUs). The default encapsulation method is set to LLC/SNAP.

Protocol stack

The figure below shows the bridged PPPoE protocol stack.



Using Bridged PPPoE

To use Bridged PPPoE, a third party PPPoE client must be used on the computer. The PPPoE client software will in most cases be provided by the Service Provider or might be embedded in your operating system.

Via the PPPoE client, you will be able to create PPPoE session entities, representing all the connection parameters, just like creating Dial-Up icons with the Dial-Up Networking application of Microsoft.

All you need is your user name and password for your account; although sometimes also a Service Name, and/or Access Concentrator is required. Check with the Service Provider which parameters are required.

For further details on how to fill in these parameters and use additional functionality, see "4.2 Connect to the Internet via a Host PPPoE Dial-In Client" on page 32. Also, consult the documentation delivered with the PPPoE client software or follow the instructions of your Service Provider.

4.1 SpeedTouch™ Bridged PPPoE Configuration

Introduction

As the Bridged PPPoE Packet Service implies nothing more than using the SpeedTouch™ Bridged Ethernet Packet Service; the default settings of the SpeedTouch™ will be sufficient to achieve connectivity.

However, you may need to configure the SpeedTouch™ Bridged Ethernet Packet Service in order to meet the requirements of your Service Provider regarding the AAL5/RFC2684/Bridged Connection Service to use for end-to-end connectivity.

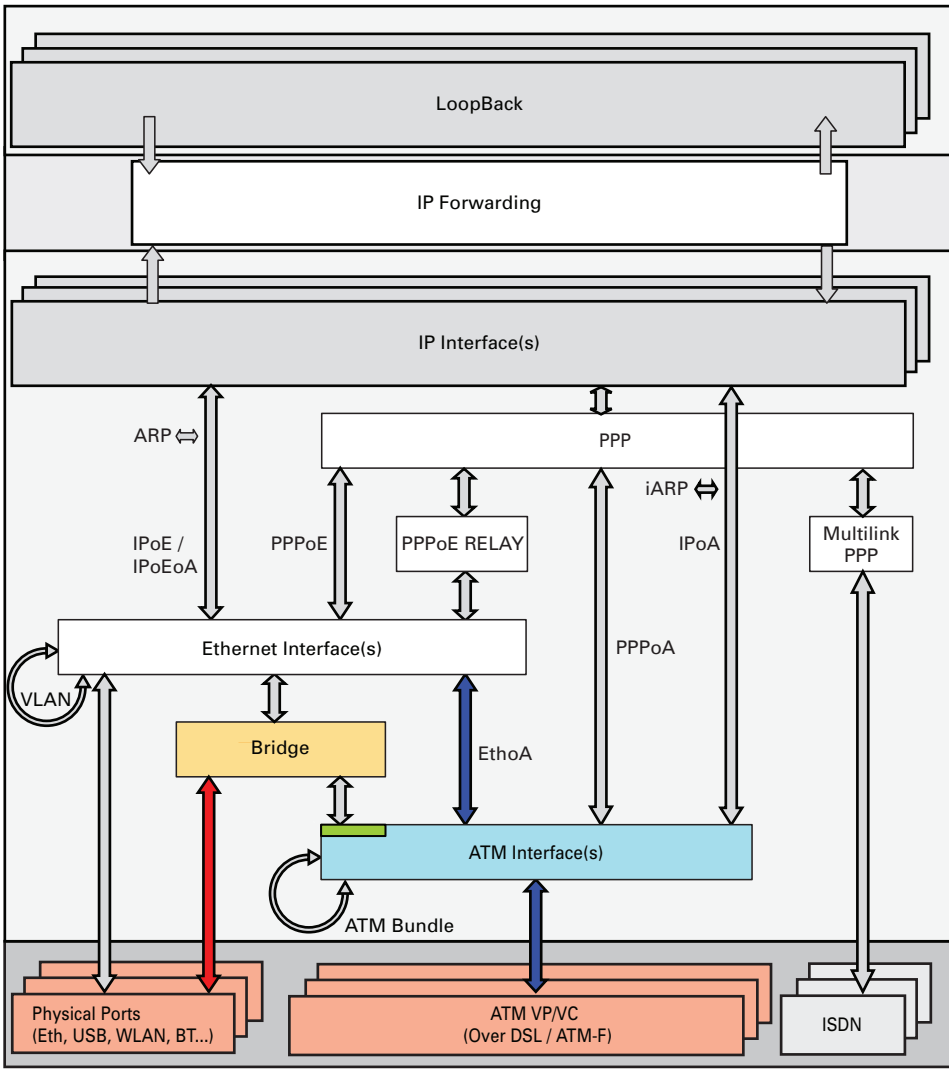
Preparatory Steps for usingBridgedEthernetfor Bridged PPPoE

To be able to configure the SpeedTouch™ successfully for the Bridged PPPoE Packet Service, the following information must be available:

- The VPI/VCI value of the Virtual Channel on which the PPPoE connection service is enabled.
- The encapsulation method (in most - if not all - cases LLC/SNAP).

Interface road map

The figure below shows the interfaces which have to be configured for Bridged PPPoE.



Interfaces connected with red arrows are by default created and connected.
Interfaces connected with blue arrows need to be created and connected.
The colours used correspond with the colours used in the " Protocol stack".

Configuration procedure

Proceed as follows to configure Bridged PPPoE:

1. Create, configure and attach/connect the ATM interface.
2. Create, configure and attach/connect the Bridge interface.
3. Check your configuration.

The ATM interface

Proceed as follows to create an ATM phonebook and the ATM interface.

1. Add a new phonebook entry with name BrPPPoE_ph, VPI/VCI =8.35.

```
=>atm phonebook add name=BrPPPoE_ph addr=8.35
=>
```

If another phonebook entry with the same VPI/VCI already exists, you will have to delete this entry first.

2. Add a new ATM interface with name BrPPPoE_atm.

```
=>atm ifadd intf=BrPPPoE_atm
=>
```

3. Configure the new ATM interface with as destination the phonebook entry created above.

```
=>atm ifconfig intf=BrPPPoE_atm dest=BrPPPoE_ph ulp=mac
=>
```

By default, the encapsulation method will be LLC/SNAP.

4. Connect the ATM interface to the phonebook entry.

```
=>atm ifattach intf=BrPPPoE_atm
=>
```

The Bridge interface

Proceed as follows to create, configure and attach/connect the bridge interface:

1. Create a new bridge interface with name BrPPPoE_br.

```
=>eth bridge ifadd intf=BrPPPoE_br
=>
```

2. Configure the new bridge interface with as destination the ATM interface created above.

```
=>eth bridge ifconfig intf=BrPPPoE_br dest=BrPPPoE_atm
=>
```

3. Connect the bridge interface.

```
=>eth bridge ifattach intf=BrPPPoE_br
=>
```

4. Execute **saveall** at the prompt to save this configuration.

```
=>saveall
=>
```

For a complete description of all CLI commands, see the SpeedTouch™ CLI Reference Guide.

Expected results

To check whether you have configured your connection correctly, take a look at the interface list. Normally you should be able to follow the path you created. This interface list shows that the ATM interface with name BrPPPoE_atm is connected to the bridge. In this way every frame coming from the ATM interface BrPPPoE_atm will be put on the bridge.

```
=>:interface list
Name          Type        State            Use  UL Interfaces
ethif1        physical    connected        1    ethport1
ethif2        physical    connected        1    ethport2
ethif3        physical    connected        1    ethport3
ethif4        physical    connected        1    ethport4
RELAY         eth         connected        0
bridge        eth         connected        1    lan1
OBC           bridge      connected        1    bridge
ethport1      bridge      connected        1    bridge
BrPPPoE_atm   atm         connected        1    BrPPPoE_br
BrPPPoE_br    bridge      connected        1    bridge
ethport2      bridge      connected        1    bridge
ethport3      bridge      connected        1    bridge
ethport4      bridge      connected        1    bridge
lan1          ip          connected        0
```

The items in ***Italic*** are the interfaces created in this chapter.

The interface list does not include the ATM phone book entry. To check its state, go to the ATM phone book list.

```
=>atm phonebook list
Name        Use  Address
BrPPPoE_ph  1    8.35
```

4.2 Connect to the Internet via a Host PPPoE Dial-In Client

Introduction

After the configuration of the bridged ethernet packet service. Some pc configuration is required for Internet connectivity.

This section describes how you can connect - in case you configured the bridged packet service - to the Internet using a Dial-In application on a computer running:

- Microsoft Windows XP
- Mac OS X

4.2.1 Using the Windows XP Embedded PPPoE Client

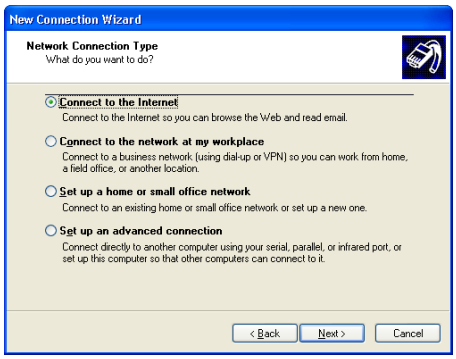
Configuring a Dial-In connection

Proceed as follows to create a new Dial-In connection on a Windows XP platform:

1. On the **Start** menu, click **Control Panel**.
2. In the **Control Panel** window, double-click **Network Connections**.
3. In the **Network Tasks** menu, click **Create a new connection**.
4. The **New Connection Wizard** starts:

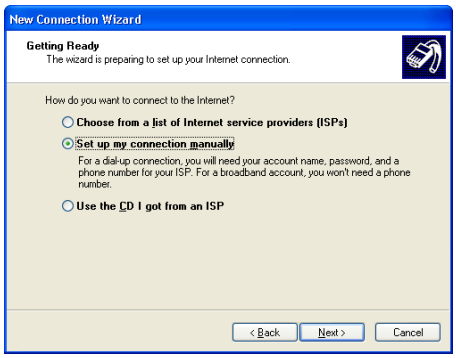
Click **Next**.

5. Select **Connect to the Internet**.



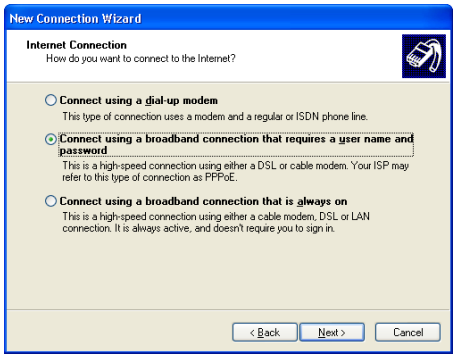
Click **Next**.

6. Select **Set up my connection manually**.



Click **Next**.

7 Select **Connect using a broadband connection that requires a user name and password**.



Click **Next**.

8 Subsequent screens will guide you through the wizard. Follow the instructions and enter the required information where needed.

This information should be provided by your Service Provider.

9 At the end of the configuration the following window appears:

Do one of the following:

- Click **Back** to make changes to the configuration.
- Click **Finish** to create the connection and close the wizard.
- Click **Cancel** to exit the wizard.

Starting a Dial-In Internet session

Proceed as follows to connect to the Internet on a Windows XP platform:

1. On the **Start** menu, point **Connect To** and click **MyISP**.
2. The **Connect MyISP** window appears:

Type your **User name** and **Password** if necessary.

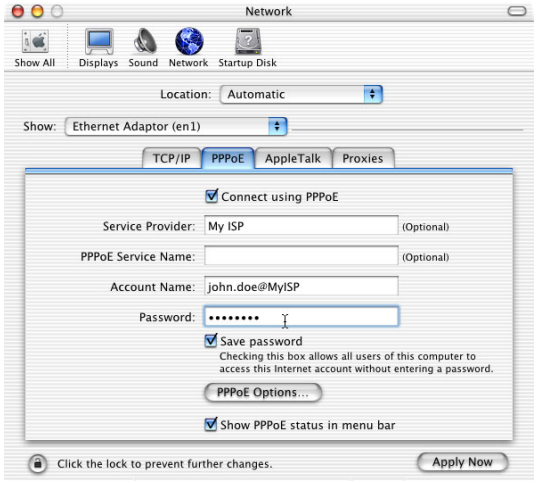
3. Click **Connect**.
Your computer connects to the Internet.

4.2.2 Using the Mac OS X Dial-In Client

Configuring a Dial-In connection on a Mac OS X platform

Proceed as follows to create a Dial-In connection:

1. On the **Apple** menu, click **System Preferences**.
2. In the **System Preferences** window, click the **Network** icon.
3. The **Network** window appears:

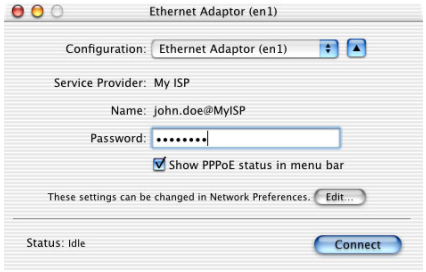


   In the **Show** list, select Ethernet Adaptor (enx) and click the **PPPoE** tab.
4. Type your **Account Name** and **Password** as provided by your Service Provider.
5. Click **Apply Now**.

Starting a Dial-In connection on a Mac OS X platform

Proceed as follows to connect to the Internet:

1. Click the **Internet Connect** icon in the dock.
2. The following window appears:



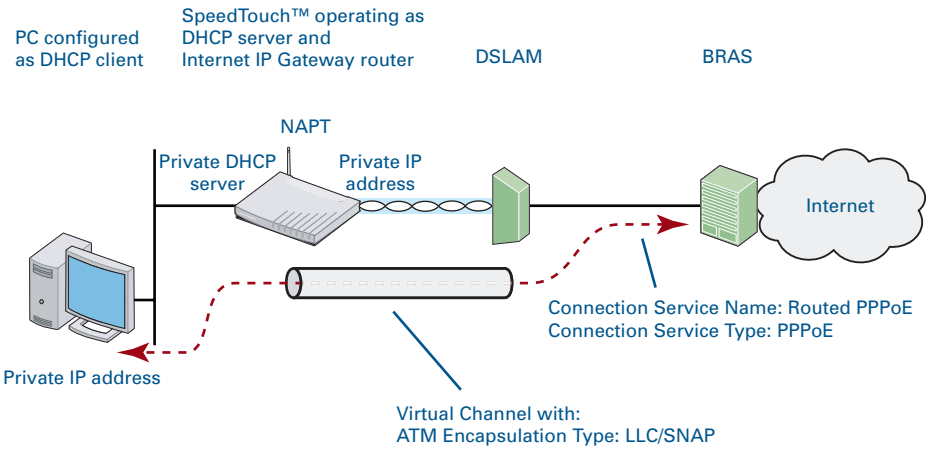
   Make sure Ethernet Adaptor (enx) is selected in the **Configuration** drop-down list.
3. Type your password.
4. Click **Connect**.

   Your Macintosh connects to the Internet.

5 Routed PPPoE

Introduction

The Point-to-Point Protocol (PPP) is today's de-facto standard for making connections towards the Internet. The Routed PPP over Ethernet (PPPoE) Packet Service is a second method to create point-to-point links next to the Routed PPPoA Packet Service. Similar to Routed PPPoA, Routed PPPoE combines the strength of the PPP technology and the advanced IP routing and address translation features of the SpeedTouch™ to provide an easy to use, yet powerful method to access the Internet.



Features

Routed PPPoE has the following features:

- A point-to-point Dial-In access method over a virtual Ethernet segment
- An authenticated session concept: it supports authentication, authorization and accounting.
- No PPPoE session client required on the computer(s) (thanks due to the embedded SpeedTouch™ PPP session client), avoiding special installation procedures.
- Multiple users sharing simultaneously a single IP address if NAPT is enabled on the PPPoE interface or can hide the IP address if NAT is enabled.
- The network can be shielded from the Internet via the SpeedTouch™ programmable firewall.
- Allows Intranet connections through an IPSec tunnel.
- Allows services such as IPQoS, SIP PBX, ISDN backup, IDS.

Routed PPPoE vs. connection service

The Routed PPPoE Packet Service relies on the AAL5/RFC2684/Bridged Connection Service to achieve end-to-end connectivity.

This connection service type implies the encapsulation of Ethernet frames (often referred to as IEEE802.3, MAC frames or Bridging frames) in AAL5/ATM.

All SpeedTouch™ products are compliant with RFC2684 "Multi-protocol Encapsulation over ATM Adaptation Layer 5" and support both the LLC/SNAP and VC-MUX method for Routed Ethernet V2.0/IEEE802.3 PPP Protocol Data Units (PDUs). However, by default the encapsulation method is set to LLC/SNAP.

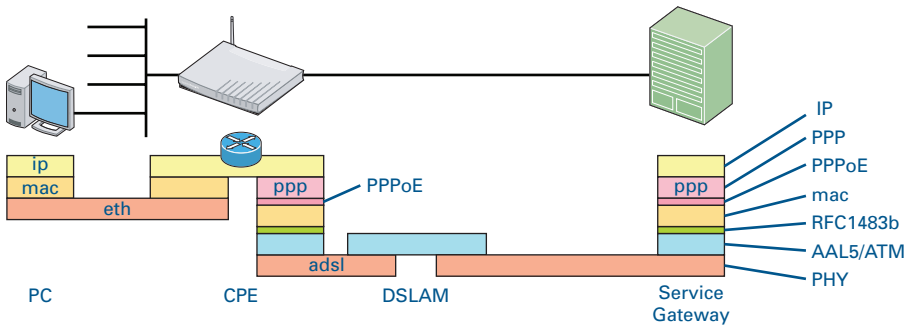
Routed PPPoE – TCP/IP Configuration

Three popular TCP/IP scenarios exist for Routed PPPoE implementations:

- The Routed PPPoE interface negotiates a local PPP peer IP address with the remote PPP peer of the Broadband Remote Access Server (BRAS) (actually the remote PPP peer will provide the local PPP peer IP address to use). By enabling NAPT on the Routed PPPoE interface, IP Routing makes communication possible between the interface and the nodes on the Local Network. Whether the IP configuration of the local nodes is done manually or via the DHCP server of the SpeedTouch™ is irrelevant for end-to-end connectivity.
- The Service Provider assigns an IP address to the Routed PPPoE connection. When the Routed PPPoE session is started, the SpeedTouch™ will put this IP address in an existing local DHCP pool. The next time a local node renews its IP address, the SpeedTouch™ assigns the public IP address to the local node. The SpeedTouch™ itself stays in unnumbered mode.
  This scenario is referred to as DHCP spoofing.
- The Service Provider assigns a subnet to the Routed PPPoE connection. When this Routed PPPoE session is started, the SpeedTouch™ will populate an existing local DHCP pool with this subnet. The next time a local node renews its IP address, it receives an IP address from the PPP IPCP subnet masking DHCP pool.
  This scenario is often referred to as IPCP subnet masking.

Protocol stack

The figure below shows the routed PPPoE protocol stack.



Connection modes

Three modes exist to start a Routed PPPoE session:

- Dial-in: The session is opened manually.
- Always-On: After the SpeedTouch™ is powered, it automatically tries to start the session.
- Dial-on-Demand: The session is started automatically, triggered by packets arriving from the local network, destined for a Routed PPPoE connection.

The Dial-In connection mode is the only connection mode that requires an intervention from the user. The user can open Routed PPPoE Dial-In connections via the SpeedTouch™ Web interface.

5.1 SpeedTouch™ Routed PPPoE Configuration.

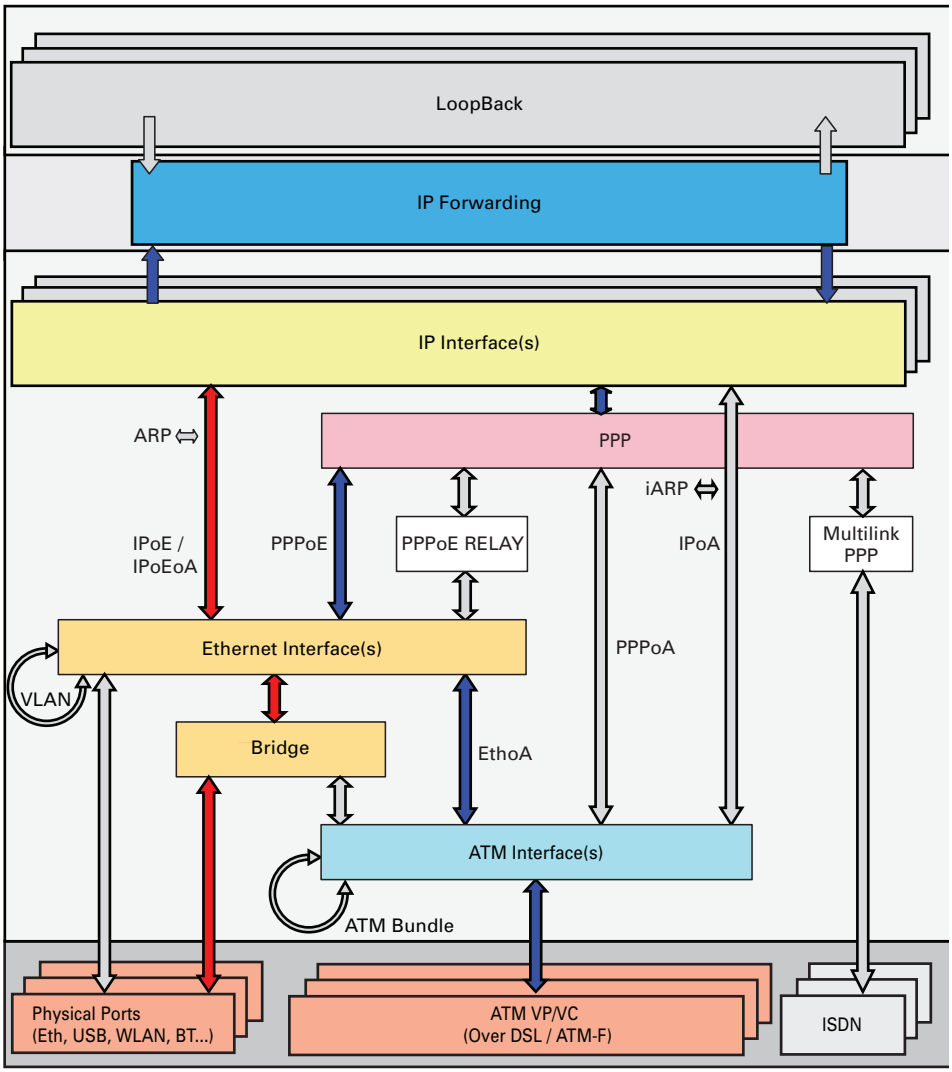
Preparatory steps for using Routed PPPoE

To be able to configure the SpeedTouch™ successfully for the Routed PPPoE Packet Service, the following information must be available:

- The VPI/VCI value of the Virtual Channel on which the PPPoE connection service is enabled.
- The encapsulation method (normally LLC/SNAP).
- The Routed PPPoE interface's IP configuration, either via single IP address, or via IPCP subnet masking. The latter configuration requires all local nodes to be configured for DHCP and the SpeedTouch™ DHCP server being active.
- The user name and password for the ISP account.
- Optionally, a Service name and/or Access Concentrator name.

Interface road map

The figure below shows the interfaces which have to be configured for Routed PPPoE.



Interfaces connected with red arrows are by default created and connected.
Interfaces connected with blue arrows need to be created and connected.
The colours used correspond with the colours used in the " Protocol stack".

Configuration scenarios

Two popular TCP/IP scenarios exist for Routed PPPoE implementations (see section" Routed PPPoE – TCP/IP Configuration" on page 38). This section gives an example of the configuration procedure for both scenarios:

1. Routed PPPoE with NAPT
2. Routed PPPoE with DHCP Spoofing

5.1.1 Routed PPPoE with NAPT

Configuration procedure

Proceed as follows to configure a Routed PPPoE entry:

1. Create, configure and attach/connect the ATM interface.
2. Create, configure and attach/connect the Ethernet interface.
3. Create, configure and attach/connect the PPP interface.
4. Check your configuration.

The ATM interface

Proceed as follows to create an ATM phonebook and the ATM interface.

1. Add a new ATM phonebook entry with the correct VPI/VCI values.

```
=>atm phonebook add name=RtPPPoE_ph addr=8.35
=>
```

If another phonebook entry with the same VPI/VCI already exists, you will have to delete this entry first.

2. Add a new ATM interface with name RtPPPoE_atm.

```
=>atm ifadd intf=RtPPPoE_atm
=>
```

3. Configure the new ATM interface with as destination the phonebook entry created above. Define also the upper layer interface type.

```
=>atm ifconfig intf=RtPPPoE_atm dest=RtPPPoE_ph ulp=mac
=>
```

By default, the encapsulation method will be LLC/SNAP.

4. Connect the ATM interface to the phonebook entry.

```
=>atm ifattach intf=RtPPPoE_atm
=>
```

The Ethernet interface

Proceed as follows to create, configure and attach/connect the Ethernet interface:

1. Add a new Ethernet interface.

```
=>eth ifadd intf=RtPPPoE_eth
=>
```

2. Configure the new Ethernet interface with as destination the ATM interface created above.

```
=>eth ifconfig intf=RtPPPoE_eth dest=RtPPPoE_atm
=>
```

3. Connect the ETH interface.

```
=>eth ifattach intf=RtPPPoE_eth
=>
```

The PPP interface

Proceed as follows to create, configure and attach/connect the PPP interface:

1 Add a new PPP interface.

```
=>ppp ifadd intf=RtPPPoE
=>
```

The SpeedTouch™ creates an IP interface with the name RtPPPoE and will add the PPP tag behind the PPP interface. In this case it will save the PPP interface as RtPPPoE_ppp. Look at the interface list for verification.

2 Create a route that will be injected to the routing table when the PPP link comes up.

```
=>ppp rtadd intf=RtPPPoE dst=0.0.0.0/0
=>
```

3 Configure the PPP interface.

```
=>ppp ifconfig intf=RtPPPoE dest=RtPPPoE_eth user=johndoe@ISP
password=johndoe
=>
```

4 Enable NAT before attaching the PPP interface.

```
=>nat ifconfig intf=RtPPPoE translation=enabled
=>
```

5 Connect the PPP interface.

```
=>ppp ifattach intf=RtPPPoE
=>
```

6 Execute **saveall** at the prompt to save this configuration.

```
=>saveall
=>
```

For a complete description of all CLI commands, refer to the SpeedTouch™ CLI Reference Guide.

Expected results

To check whether you have configured your connection correctly, take a look at the interface list. Normally you should be able to follow the path you created.

```
=>interface list
Name          Type        State            Use  UL Interfaces
ethif1        physical    connected        1    ethport1
ethif2        physical    connected        1    ethport2
ethif3        physical    connected        1    ethport3
ethif4        physical    connected        1    ethport4
RELAY         eth         connected        0
bridge        eth         connected        1    lan1
OBC           bridge      connected        1    bridge
ethport1      bridge      connected        1    bridge
ethport2      bridge      connected        1    bridge
ethport3      bridge      connected        1    bridge
ethport4      bridge      connected        1    bridge
lan1          ip          connected        0
RtPPPoE_atm   atm         connected        1    RtPPPoE_eth
RtPPPoE_eth   eth         connected        1    RtPPPoE_ppp
RtPPPoE_ppp   ppp         connected        1    RtPPPoE
RtPPPoE       ip          connected        0
```

The items in ***Italic*** are the interfaces created in this chapter.

The interface list does not include the ATM phone book entry. To check its state, go to the ATM phone book list.

```
=>atm phonebook list
Name        Use  Address
RtPPPoE_ph  1    8.35
```

5.1.2 Routed PPPoE with DHCP Spoofing

Configuration procedure

Proceed as follows to configure a Routed PPPoE entry:

1. Create, configure and attach/connect the ATM interface.
2. Create, configure and attach/connect the Ethernet interface.
3. Create, configure and attach/connect the DHCP server.
4. Create, configure and attach/connect the PPP interface.
5. Check your configuration.

The ATM interface

Proceed as follows to create an ATM phonebook and the ATM interface.

1. Add a new ATM phonebook entry with the correct VPI/VCI values.

```
=>atm phonebook add name=RtPPPoE_ph addr=8.35
=>
```

If another phonebook entry with the same VPI/VCI already exists, you will have to delete this entry first.

2. Add a new ATM interface with name RtPPPoE_atm.

```
=>atm ifadd intf=RtPPPoE_atm
=>
```

3. Configure the new ATM interface with as destination the phonebook entry created above. Define also the upper layer interface type.

```
=>atm ifconfig intf=RtPPPoE_atm dest=RtPPPoE_ph ulp=mac
=>
```

By default, the encapsulation method will be LLC/SNAP.

4. Connect the ATM interface to the phonebook entry.

```
=>atm ifattach intf=RtPPPoE_atm
=>
```

The Ethernet interface

Proceed as follows to create, configure and attach/connect the Ethernet interface:

1 Add a new Ethernet interface.

```
=>eth ifadd intf=RtPPPoE_eth
=>
```

2 Configure the new Ethernet interface with as destination the ATM interface created above.

```
=>eth ifconfig intf=RtPPPoE_eth dest=RtPPPoE_atm
=>
```

3 Connect the ETH interface.

```
=>eth ifattach intf=RtPPPoE_eth
=>
```

The DHCP server

Proceed as follows to configure the DHCP server:

1 Add a new DHCP server pool.

```
=>dhcp server pool add name=spoof_pool
=>
```

2 Configure the DHCP server pool.

```
=>dhcp server pool config name=spoof_pool intf=lan1 index=0
unnumbered=enabled
=>
```

It is important to give this pool priority over the default address pool by setting index=0. When the spoofing pool does not have an address, local PCs will be served by the next pool (default pool).

The PPP interface

Proceed as follows to create, configure and attach/connect the PPP interface:

1 Add a new PPP interface.

```
=>ppp ifadd intf=RtPPPoE
=>
```

The SpeedTouch™ creates an IP interface with the name RtPPPoE and will add the PPP tag behind the PPP interface. In this case it will save the PPP interface as RtPPPoE_ppp. Look at the interface list for verification.

2 Configure the PPP interface.

```
=>ppp ifconfig intf=RtPPPoE dest=RtPPPoE_eth user=myUserName
password=myPassword pool=spoof_pool unnumbered=enabled
=>
```

3 Connect the PPP interface.

```
=>ppp ifattach intf=RtPPPoE
=>
```

4 Execute **saveall** at the prompt to save this configuration.

```
=>saveall
=>
```

For a complete description of all CLI commands, refer to the SpeedTouch™ CLI Reference Guide.

Expected results

To check whether you have configured your connection correctly, take a look at the interface list. Normally you should be able to follow the path you created.

```
=>interface list
Name          Type        State           Use  UL Interfaces
ethif1        physical    connected       1    ethport1
ethif2        physical    connected       1    ethport2
ethif3        physical    connected       1    ethport3
ethif4        physical    connected       1    ethport4
RELAY         eth         connected       0
bridge        eth         connected       1    lan1
OBC           bridge      connected       1    bridge
ethport1      bridge      connected       1    bridge
ethport2      bridge      connected       1    bridge
ethport3      bridge      connected       1    bridge
ethport4      bridge      connected       1    bridge
lan1          ip          connected       0
RtPPPoE_atm   atm         connected       1    RtPPPoE_eth
RtPPPoE_eth   eth         connected       1    RtPPPoE_ppp
RtPPPoE_ppp   ppp         connected       1    RtPPPoE
RtPPPoE       ip          connected       0
```

The items in ***Italic*** are the interfaces created in this chapter.

The interface list does not include the ATM phonebook entry. To check its state, go to the ATM phonebook list.

```
=>atm phonebook list
Name        Use  Address
RtPPPoE_ph  1    8.35
```

6 PPPoE Relay

Introduction

PPPoE has become one of the standard technologies used by Internet Service Providers (ISPs) to connect DSL customers to the Internet. This drove ISPs to distribute PPPoE clients to end-users. Distribution and updates of PPPoE clients to end-users makes PPPoE a heavy connection technology. ISPs asked to remove PPPoE from the end-user side and to integrate it in the SpeedTouch™.

In order to keep backward compatibility with end-users using PPPoE clients, and be transparent to the Broadband Remote Access Server (BRAS), the SpeedTouch™ has to relay PPPoE traffic from the end-user to the ISP. The difference between the bridging model and the routing model is that in the bridging model the BRAS will see as source MAC address the MAC address of each of the PCs, while in the routing model the BRAS will see as source MAC address the MAC address of the SpeedTouch™.

Furthermore, ISPs request that if multiple end-users are connecting using PPPoE through the same SpeedTouch™, all connections from the SpeedTouch™ to the DSLAM use the same ETHoA-configured ATM PVC.

This is what is called PPPoE Relaying.

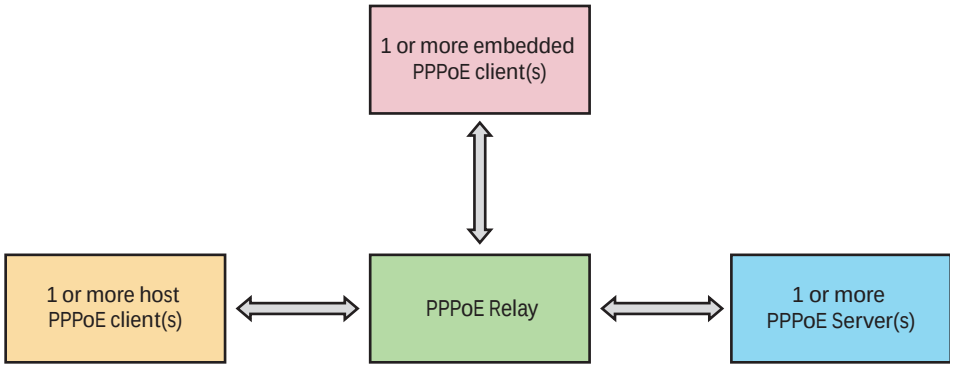
Features

The PPPoE Relay is a mechanism to allow for the following features:

- Simultaneous PPPoE sessions from the LAN in parallel to PPPoE sessions from the SpeedTouch™, on the same Virtual Channel (VC).
- One or multiple PPPoE sessions from the SpeedTouch™ over the LAN to the network (for example: SpeedTouch™ connected via Ethernet over a cable modem to the network).
- Simultaneous PPPoE sessions from the LAN in parallel Routed Ethernet sessions from the SpeedTouch™ on the same VC. The SpeedTouch™ is capable of initiating multiple PPPoE sessions per VC.

Concept

The figure below shows the concept of the SpeedTouch™ PPPoE Relay:



To the PPPoE Relay, you are able to connect 1 or multiple:

- host PPPoE clients, which can be any kind of Ethernet interface, such as:
  - a logical Ethernet interface
  - the Ethernet interface Bridge
  - an Ethernet interface which is connected to an ATM interface
- PPPoE servers which can be any kind of Ethernet interface, such as:
  - a logical Ethernet interface
  - the Ethernet interface Bridge
  - an Ethernet interface which is connected to an ATM interface
- embedded PPPoE clients

6.1 SpeedTouch™ PPPoE Relay Configuration

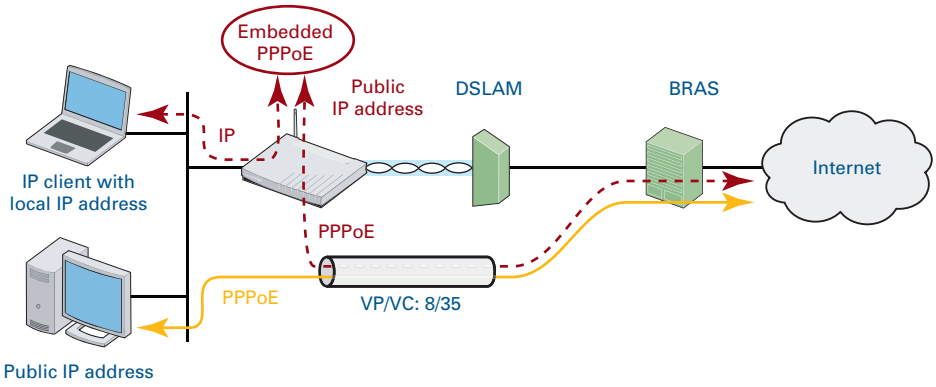
Description

In this scenario, the end users are connected either via IP or PPPoE. Traffic is sent over the same VP/VC to the Internet.

Both PPPoE connections (external and embedded) can use different Access Concentrators.

Setup

The figure below shows the setup for the example scenario:



- an embedded PPP client on the SpeedTouch™ (red)
- a host PPP client on a PC on the LAN (blue)

Configuration scenarios

Two scenarios exist for configuring the SpeedTouch™ Relay. This section gives an example of the configuration procedure for both scenarios:

1. General configuration scenario
2. Configuration making use of ILMI (autopvc)

6.1.1 General Configuration

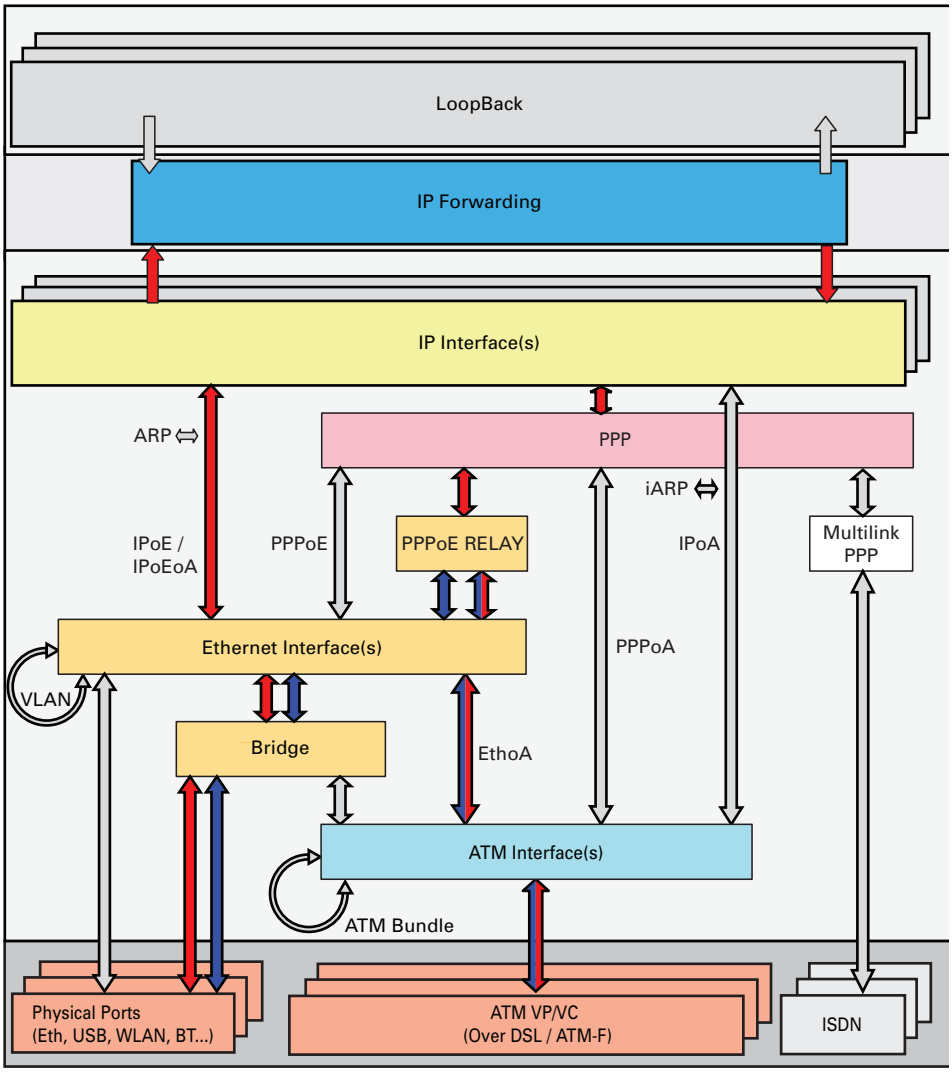
Preparatory steps

To be able to configure the SpeedTouch™ successfully for the PPPoE Relay Service, the following information must be available:

- The VPI/VCI value of the Virtual Channel on which the connection is enabled.
- The encapsulation method (normally LLC/SNAP).
- The PPPoE interface's IP configuration, either via a single IP address, or via IPCP subnet masking.
- The user name and password for the ISP account.
- Optionally, a Service name and/or Access Concentrator name.

Interface road map

The figure below shows the interfaces which have to be configured to use the relay.



Interfaces connected with red arrows correspond with the interfaces needed to configure an embedded PPP client on the SpeedTouch™ (red).
Interfaces connected with blue arrows correspond with the interfaces needed to configure a host PPP client on a PC on the LAN (blue).
Interfaces connected with double coloured arrows are interfaces used by both parts of the setup.

Configuration Procedure

Proceed as follows to configure the PPPoE relay:

1. Create, configure and attach/connect the ATM interface.
2. Create, configure and attach/connect the Ethernet interface.
3. Put the Ethernet interfaces into the relay.
4. Create, configure and attach/connect the PPP interface.
5. Control your configuration.

The ATM interface

Proceed as follows to create an ATM phonebook and the ATM interface.

1 Add a new ATM Phonebook entry with the correct VPI/VCI values.

```
=>atm phonebook add name=Relay_ph addr=8.35
=>
```

If another phonebook entry with the same VPI/VCI already exists, you will have to delete this entry first.

2 Add a new ATM interface with name Relay_atm.

```
=>atm ifadd intf=Relay_atm
=>
```

3 Configure the new ATM interface with as destination the phonebook entry created above. Define also the upper layer interface type.

```
=>atm ifconfig intf=Relay_atm dest=Relay_ph ulp=mac
=>
```

By default, the encapsulation method will be LLC/SNAP.

4 Connect the ATM interface to the phonebook entry.

```
=>atm ifattach intf=Relay_atm
=>
```

The Ethernet interface

Proceed as follows to create, configure and attach/connect the Ethernet interface:

1 Add a new Ethernet interface.

```
=>eth ifadd intf=Relay_eth
=>
```

2 Configure the new Ethernet interface with as destination the ATM interface created above.

```
=>eth ifconfig intf=Relay_eth dest=Relay_atm
=>
```

3 Connect the ETH interface.

```
=>eth ifattach intf=Relay_eth
=>
```

The PPPoE relay

Proceed as follows to add the eth interfaces to the PPPoE Relay:

1 Add the Ethernet interface with the name Relay_eth to the PPPoE relay.

```
=>ppp relay ifadd intf=Relay_eth
=>
```

2 Add the Ethernet interface with the name bridge to the PPP relay to allow for host PPPoE clients to make use of the PPPoE Relay.

```
=>ppp relay ifadd intf=bridge
=>
```

The PPP interface

Proceed as follows to create, configure and attach/connect the PPP interface:

1 Add a new PPP interface.

```
=>ppp ifadd intf=Relay
=>
```

The SpeedTouch™ creates an IP interface with the name RtPPPoE and will add the ppp tag behind the ppp interface. In this case it will save the PPP interface as RtPPPoE_ppp.
Look at the interface list for verification.

2 Create a route that will be added to the routing table when the PPP link comes up.

```
=>ppp rtadd intf=Relay dst=0.0.0.0/0
=>
```

3 Configure the PPP interface. Give as destination the PPPoE relay

```
=>ppp ifconfig intf=Relay dest=RELAY user=johndoe@ISP
password=johndoe
=>
```

4 Enable NAT before attaching the PPP interface.

```
=>nat ifconfig intf=Relay translation=enabled
=>
```

5 Connect the PPP interface.

```
=>ppp ifattach intf=Relay
=>
```

6 Execute **saveall** at the prompt to save this configuration.

```
=>saveall
=>
```

For a complete description of all CLI commands, refer to the SpeedTouch™ CLI Reference Guide.

Expected results

To check whether you have configured your connection correctly, take a look at the interface list. Normally you should be able to follow the path you have created.

```
=>interface list
Name         Type       State           Use  UL Interfaces
ethif1       physical   connected       1    ethport1
ethif2       physical   connected       1    ethport2
ethif3       physical   connected       1    ethport3
ethif4       physical   connected       1    ethport4
RELAY        eth        connected       1    Relay_ppp
bridge       eth        connected       2    RELAY, lan1
OBC          bridge     connected       1    bridge
ethport1     bridge     connected       1    bridge
Relay_atm    atm        connected       1    Relay_eth
Relay_eth    eth        connected       1    RELAY
ethport2     bridge     connected       1    bridge
ethport3     bridge     connected       1    bridge
ethport4     bridge     connected       1    bridge
Relay_ppp    ppp        connected       1    Relay
Relay        ip         connected       0
lan1         ip         connected       0
```

The items in ***Italic*** are the interfaces created in this chapter.

The interface list does not include the ATM phone book entry. To check its state, go to the ATM phone book list.

```
=>atm phonebook list
Name       Use  Address
Relay_ph 1    8.35
```

6.1.2 Configuration making use of ILMI (autoPVC)

Configuration procedure

Proceed as follows to configure the PPPoE Relay interface using ILMI:

1. Add a new (embedded) PPP interface.

```
=>ppp ifadd intf=autoPPP
=>
```

2. Configure the PPP interface (user name and password for the ISP) and with destination RELAY.

```
=>ppp ifconfig intf=autoPPP user=johnDoe@ISP password=johnDoe
dest=RELAY
=>
```

3. Create a route that will be added to the routing table when the PPP link comes up.

```
=>ppp rtadd intf=autoPPP dest=0.0.0.0/0
=>
```

4. Configure the PPP relay.

```
=>ppp relay ifadd intf=bridge
=>ppp relay ifadd intf=autoPPP
=>
```

5. Activate the autoPVC.

```
=>autopvc config mode=active type=pppoerelay
=>
```

6. Execute save all at the prompt to save this configuration.

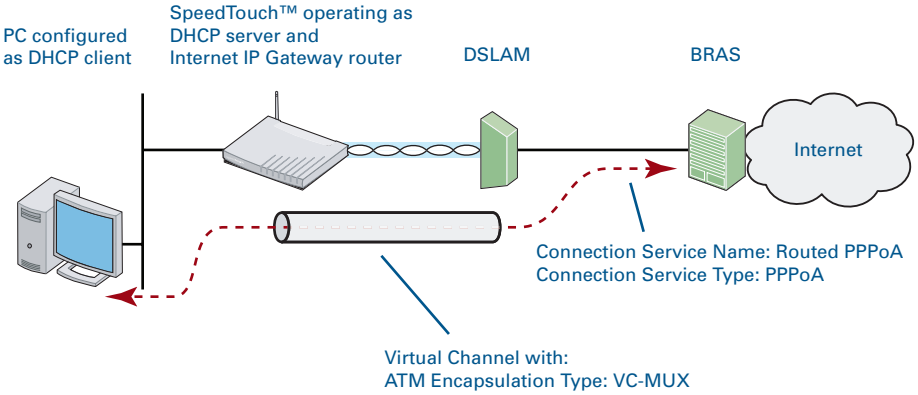
```
=>saveall
=>
```

For a complete description of all CLI commands, refer to the SpeedTouch™ CLI Reference Guide.

7 Routed PPPoA

Introduction

The Point-to-Point Protocol (PPP) is today's de-facto standard for making connections over the Internet Protocol (IP) network. The SpeedTouch™ Routed PPP over ATM (PPPoA) Packet Service combines the strength of the PPP technology and its advanced IP routing and address translation features to provide an easy to use, yet powerful method to access the Internet.



Features

Routed PPPoA has the following features:

- An authenticated session concept: it supports authentication, authorization and accounting.
- No PPPoA session client required on the computer(s) (due to the embedded SpeedTouch™ PPP session client), avoiding special installation procedures.
- Allows multiple users to simultaneously share a single IP address if NAPT is enabled on the PPPoA interface or can hide the IP address if NAT is enabled.
- Allows the network to be shielded from the Internet via the SpeedTouch™ programmable firewall.
- Allows Intranet connections through an IPSec tunnel.
- Allows services such as IPQoS, SIP PBX, ISDN backup, IDS.

Routed PPPoA vs. connection service

The Routed PPPoA Packet Service relies on the AAL5/RFC2364/PPP Connection Service to achieve end-to-end connectivity.

For the SpeedTouch™, this amounts to using the PPPoA (PPP over ATM) Connection Service type. This connection service type implies the encapsulation of PPP Protocol Data Units (PDUs) in AAL5/ATM.

All SpeedTouch™ products are compliant with RFC2364 "PPP over ATM Adaptation Layer 5" and support both the VC-MUX and LLC/NLPID method for PDUs.

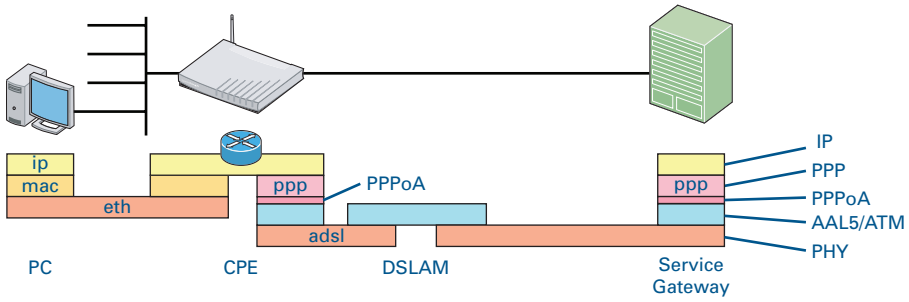
Routed PPPoA vs TCP/IP configuration

Three popular TCP/IP scenarios exist for Routed PPPoA implementations:

- The Routed PPPoA interface negotiates a local PPP peer IP address with the remote PPP peer of the Broadband Remote Access Server (BRAS) (actually the remote PPP peer will provide the local PPP peer IP address to use). By enabling NAPT on the Routed PPPoA interface, IP Routing makes communication possible between the interface and the nodes on the Local Network. Whether the IP configuration of the local nodes is done manually or via the DHCP server of the SpeedTouch™ is irrelevant for end-to-end connectivity.
- The Service Provider assigns an IP address to the Routed PPPoA connection. When the Routed PPPoA session is started, the SpeedTouch™ will put this IP address in a existing local DHCP pool. The next time a local node renews its IP address, the SpeedTouch™ assigns the public IP address to the local node. The SpeedTouch™ itself stays in unnumbered mode.
  This scenario is referred to as DHCP spoofing.
- The Service Provider assigns a subnet to the Routed PPPoA connection. When this Routed PPPoA session is started, the SpeedTouch™ will populate an existing local DHCP pool with this subnet. The next time a local node renews its IP address, it receives an IP address from the PPP IPCP subnet masking DHCP pool.
  This scenario is often referred to as IPCP subnet masking.

Protocol stack

The figure below shows the routed PPPoA protocol stack.



Connection methods

Three modes exist to start a Routed PPPoA session:

- Dial-In:
  The session is opened manually.
- Always-On:
  After the SpeedTouch™ is powered, it automatically tries to start the session.
- Dial-on-Demand:
  The session is started automatically, triggered by packets arriving from the local network, with as destination the PPP interface.

The Dial-In connection mode is the only connection mode that requires an intervention from the user. The user can open Routed PPPoA Dial-In connections via the SpeedTouch™ Web interface.

7.1 SpeedTouch™ Routed PPPoA Configuration

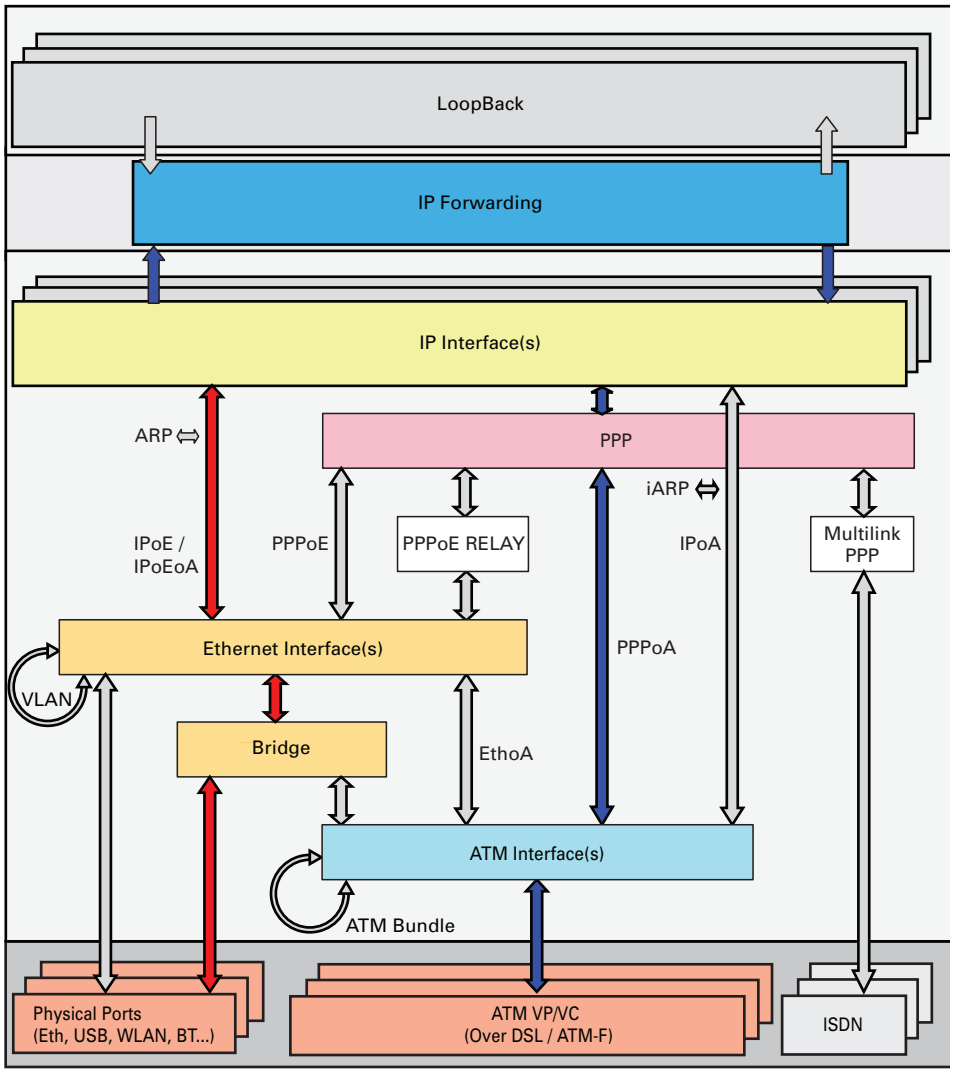
Preparatory steps for using Routed PPPoA

The following information must be available to successfully configure a Routed PPPoA interface on the SpeedTouch™:

- The VPI/VCI value of the Virtual Channel on which the PPPoA connection service is enabled.
- The encapsulation method (normally VC-MUX).
- The Routed PPPoA interface's IP configuration, either via single IP address, or via IPCP subnet masking. The latter configuration requires all local nodes to be configured for DHCP and the SpeedTouch™ DHCP server being active.
- The user name and password for the ISP account.

Interface road map

The figure below shows the interfaces which have to be configured for Routed PPPoA.



Configuration scenarios

Two popular TCP/IP scenarios exist for Routed PPPoA implementations (see" Routed PPPoA vs TCP/IP configuration" on page 60).

This section gives an example of the configuration procedure for the two scenarios:

- Configuration Procedure for Routed PPPoA with NAPT
- Configuration Procedure for Routed PPPoA with DHCP spoofing

7.1.1 Configuration Procedure for Routed PPPoA with NAPT

Configuration procedure

Proceed as follows to configure Routed PPPoA:

1. Create, configure and attach/connect the ATM interface.
2. Create, configure and attach/connect the PPP interface.
3. Control your configuration.

The ATM interface

Proceed as follows to create an ATM phonebook and the ATM interface.

1. Add a new ATM Phonebook entry with the correct VPI/VCI values.

```
=>atm phonebook add name=RtPPPoA_ph addr=8.35
=>
```

If another phonebook entry with the same VPI/VCI already exists, you will have to delete this entry first.

2. Add a new ATM interface with name RtPPPoA_atm.

```
=>atm ifadd intf=RtPPPoA_atm
=>
```

3. Configure the new ATM interface with as destination the phonebook entry created above. Define also the upper layer interface type.

```
=>atm ifconfig intf=RtPPPoA_atm dest=RtPPPoA_ph ulp=ppp
encaps=vcmux
=>
```

By default, the encapsulation method will be LLC/SNAP.

4. Connect the ATM interface to the phonebook entry.

```
=>atm ifattach intf=RtPPPoA_atm
=>
```

The PPP interface

Proceed as follows to create, configure and attach/connect the PPP interface:

1. Add a new PPP interface.

```
=>ppp ifadd intf=RtPPPoA
=>
```

The SpeedTouch™ creates an IP interface with the name RtPPPoA and will add the PPP tag behind the PPP interface. In this case it will save the PPP interface as RtPPPoA_ppp. Look at the interface list for verification.

2. Create a route that will be added to the routing table when the PPP link comes up.

```
=>ppp rtadd intf=RtPPPoA dst=0.0.0.0/0
=>
```

3. Configure the PPP interface.

```
=>ppp ifconfig intf=RtPPPoA dest=RtPPPoA_atm user=johndoe@ISP
password=johndoe
=>
```

4. Enable NAT before attaching the PPP interface.

```
=>nat ifconfig intf=RtPPPoA translation=enabled
=>
```

5. Connect the PPP interface.

```
=>ppp ifattach intf=RtPPPoA
=>
```

6. Execute **saveall** at the prompt to save this configuration.

```
=>saveall
=>
```

For a complete description of all CLI commands, refer to the SpeedTouch™ CLI Reference Guide.

Expected results

To check whether you have configured your connection correctly, take a look at the interface list. Normally you should be able to follow the path you created.

```
=>interface list
Name          Type        State            Use  UL Interfaces
ethif1        physical    connected        1    ethport1
ethif2        physical    connected        1    ethport2
ethif3        physical    connected        1    ethport3
ethif4        physical    connected        1    ethport4
RELAY         eth         connected        0
bridge        eth         connected        1    lan1
OBC           bridge      connected        1    bridge
ethport1      bridge      connected        1    bridge
ethport2      bridge      connected        1    bridge
ethport3      bridge      connected        1    bridge
ethport4      bridge      connected        1    bridge
lan1          ip          connected        0
RtPPPoA_atm   atm         connected        1    RtPPPoA_atm
RtPPPoA_ppp   ppp         connected        1    RtPPPoA
RtPPPoA       ip          connected        0
```

The items in ***Italic*** are the interfaces created in this chapter.

The interface list does not include the ATM phone book entry. To check its state, go to the ATM phone book list.

```
=>atm phonebook list
Name        Use  Address
RtPPPoA_ph  1    8.35
```

7.1.2 Configuration Procedure for Routed PPPoA with DHCP spoofing

Configuration procedure

Proceed as follows to configure Routed PPPoA:

1. Create, configure and attach/connect the ATM interface.
2. Create, configure and attach/connect the DHCP server.
3. Create, configure and attach/connect the PPP interface.
4. Control your configuration.

The ATM interface

Proceed as follows to create an ATM phonebook and the ATM interface.

1. Add a new ATM Phonebook entry with the correct VPI/VCI values.

```
=>atm phonebook add name=RtPPPoA_ph addr=8.35
=>
```

If another phonebook entry with the same VPI/VCI already exists, you will have to delete this entry first.

2. Add a new ATM interface with name RtPPPoA_atm.

```
=>atm ifadd intf=RtPPPoA_atm
=>
```

3. Configure the new ATM interface with as destination the phonebook entry created above. Define also the upper layer interface type.

```
=>atm ifconfig intf=RtPPPoA_atm dest=RtPPPoA_ph ulp=ppp encaps=vcmux
=>
```

By default, the encapsulation method will be LLC/SNAP.

4. Connect the ATM interface to the phonebook entry.

```
=>atm ifattach intf=RtPPPoA_atm
=>
```

The DHCP server

Proceed as follows to configure the DHCP server.

1. Add a new DHCP pool.

```
=>dhcp server pool add name=dhcp_pool
=>
```

2. Configure the DHCP pool.

```
=>dhcp server pool config name=dhcp_pool intf=Lan1 index=0
unnumbered=enabled
=>
```

The PPP interface

Proceed as follows to create, configure and attach/connect the PPP interface:

1 Add a new PPP interface.

```
=>ppp ifadd intf=RtPPPoA
=>
```

The SpeedTouch™ creates an IP interface with the name RtPPPoA and will add the PPP tag behind the PPP interface. In this case it will save the PPP interface as RtPPPoA_ppp. Look at the interface list for verification.

2 Configure the PPP interface.

```
=>ppp ifconfig intf=RtPPPoA dest=RtPPPoA_atm user=johndoe@ISP
password=johndoe pool=dhcp_pool unnumbered=enabled
=>
```

3 Connect the PPP interface.

```
=>ppp ifattach intf=RtPPPoA
=>
```

4 Execute **saveall** at the prompt to save this configuration.

```
=>saveall
=>
```

For a complete description of all CLI commands, refer to the SpeedTouch™ CLI Reference Guide.

Expected results

To check whether you have configured your connection correctly, take a look at the interface list. Normally you should be able to follow the path you created.

```
=>interface list
Name          Type        State           Use  UL Interfaces
ethif1        physical    connected       1    ethport1
ethif2        physical    connected       1    ethport2
ethif3        physical    connected       1    ethport3
ethif4        physical    connected       1    ethport4
RELAY         eth         connected       0
bridge        eth         connected       1    lan1
OBC           bridge      connected       1    bridge
ethport1      bridge      connected       1    bridge
ethport2      bridge      connected       1    bridge
ethport3      bridge      connected       1    bridge
ethport4      bridge      connected       1    bridge
lan1          ip          connected       0
RtPPPoA_atm   atm         connected       1    RtPPPoA_atm
RtPPPoA_ppp   ppp         connected       1    RtPPPoA
RtPPPoA       ip          connected       0
```

The items in ***Italic*** are the interfaces created in this chapter.

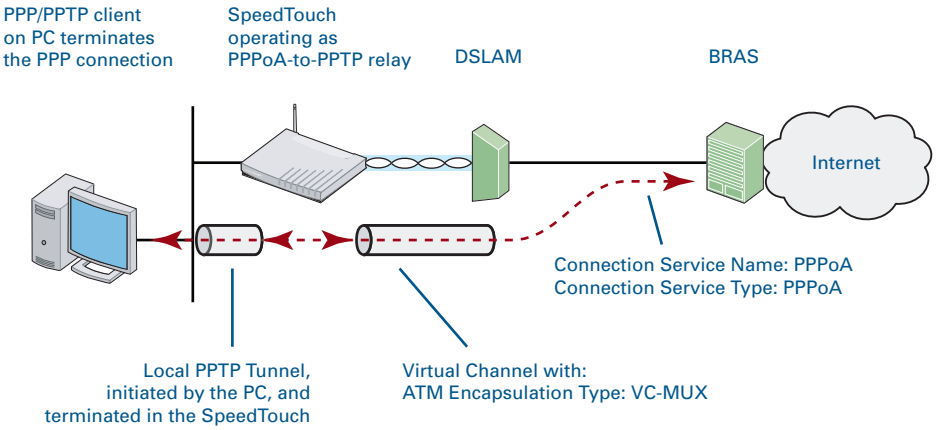
The interface list does not include the ATM phonebook entry. To check its state, go to the ATM phonebook list.

```
=>atm phonebook list
Name        Use  Address
RtPPPoA_ph  1    8.35
```

8 PPTP-to-PPPoA relaying

Introduction

A client establishes a PPP session with the ISP's PPP server (BRAS). However, the client is a PPP/PPTP client, establishing a local PPTP tunnel and encapsulating IP packets into PPP frames. Instead of the Bridge, a PPP relay is used, forwarding the PPP frames undisturbed from the local PPTP tunnel towards a virtual channel. Conceptually, one might say that the local PPTP tunnel extends the ATM virtual channel up to the client.



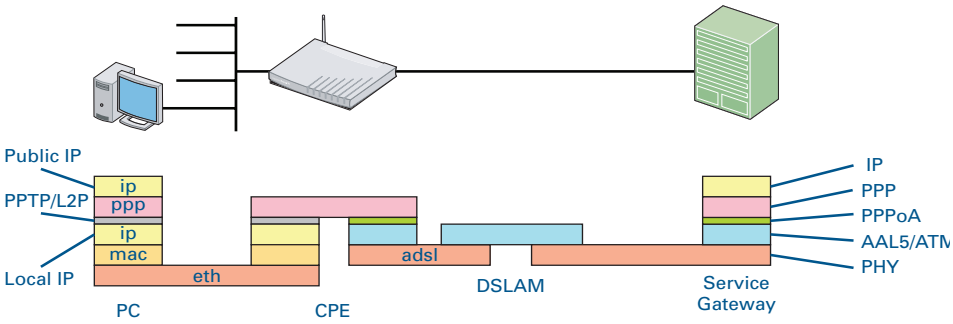
Features

PPTP-to-PPPoA relaying has the following features:

- A Dial-In access method through a PPTP tunnel.
- Platform and Operating System independent towards the SpeedTouch™

Protocol stack

The figure below shows the PPPoA-to-PPTP protocol stack.



Using relayed PPPoA

To use relayed PPPoA, a third party PPTP client must be used on the computer. The PPTP client software will in most cases be provided by the Service Provider or might be embedded in your operating system.

Via the PPTP client, you will be able to create PPTP session entities, representing all the connection parameters, just like creating Dial-Up icons with the Dial-Up Networking application of Microsoft.

The PPTP client must comply with RFC 2637.

All you need is your user name and password for your account; although sometimes also a Service Name, and/or Access Concentrator is required. Check with the Service Provider which parameters are required.

For further details on how to fill in these parameters and use additional functionality, see “8.1.1 Using the Windows XP Embedded PPP Client” on page 72. Also, consult the documentation delivered with the PPTP client software or follow the instructions of your Service Provider.

8.1 Configuration Procedure for Relayed PPPoA

Introduction

The relayed PPPoA Packet Service implies nothing more than creating a pvc and enabling the PPTP service.

Preparatory Steps for relayed PPPoA

To be able to configure the SpeedTouch™ successfully for the relayed PPPoA Packet Service, the VPI/VCI value of the Virtual Channel on which the PPPoA connection service is enabled, must be available.

Configuration procedure

Proceed as follows to configure Relayed PPPoA:

1. Create a phone book entry.
2. Enable the PPTP service.
3. Proceed with the configuration of the PC as described in "8.1.1 Using the Windows XP Embedded PPP Client".

Phone book entry

1. Add a new phone book entry with name BrPPPoA_ph, VPI/VCI =8.35.

```
=>atm phonebook add name=BrPPPoA_ph addr=8.35
=>
```

If another phonebook entry with the same VPI/VCI already exists, you will have to delete this entry first.

PPTP service

1. Enable the PPTP service with the following CLI command:

```
=>service system modify name=PPTP state=enabled
```

8.1.1 Using the Windows XP Embedded PPP Client

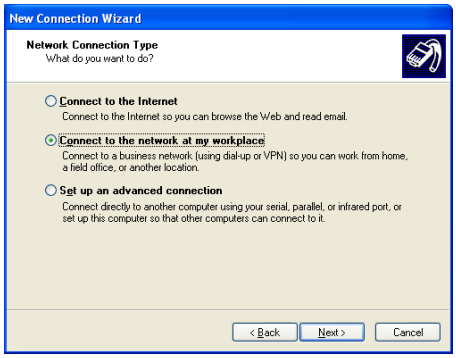
Configuring a Dial-In connection

Proceed as follows to create a new Dial-In connection on a Windows XP platform:

1. On the **Start** menu, click **Control Panel**.
2. In the **Control Panel** window, double-click **Network Connections**.
3. In the **Network Tasks** menu, click **Create a new connection**.
4. The **New Connection Wizard** starts:

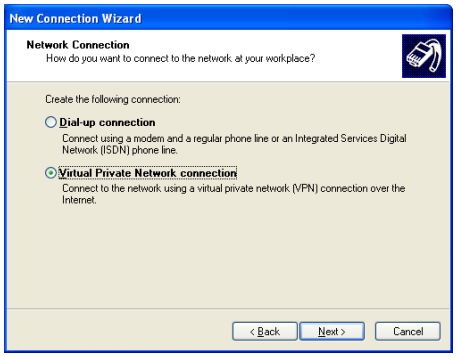
Click **Next**.

5. Select **Connect to the network at my workplace**.



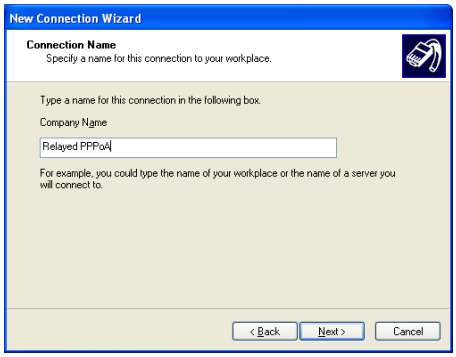
Click **Next**.

6. Select **Virtual Private Network Connection**.



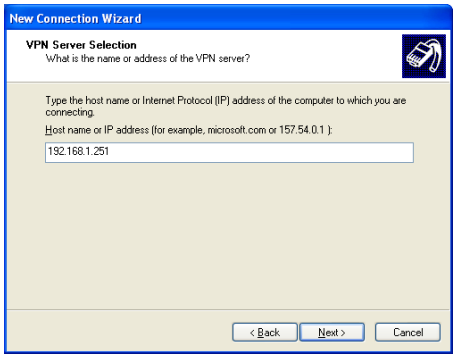
Click **Next**.

7 Specify a name for the connection.



Click **Next**.

8 Provide the IP address of the SpeedTouch™.



By default this will be 192.168.1.254.

Click **Next**.

9 Subsequent screens will guide you through the wizard. Follow the instructions and enter the required information where needed.

This information should be provided by your Service Provider.

10 At the end of the configuration the following window appears:

Do one of the following:

- Click **Back** to make changes to the configuration.
- Click **Finish** to create the connection and close the wizard.
- Click **Cancel** to exit the wizard.

Starting a Dial-In Internet session

Proceed as follows to connect to the Internet on a Windows XP platform:

1. On the **Start** menu, point **Connect To** and click **MyISP**.
2. The **Connect MyISP** window appears:

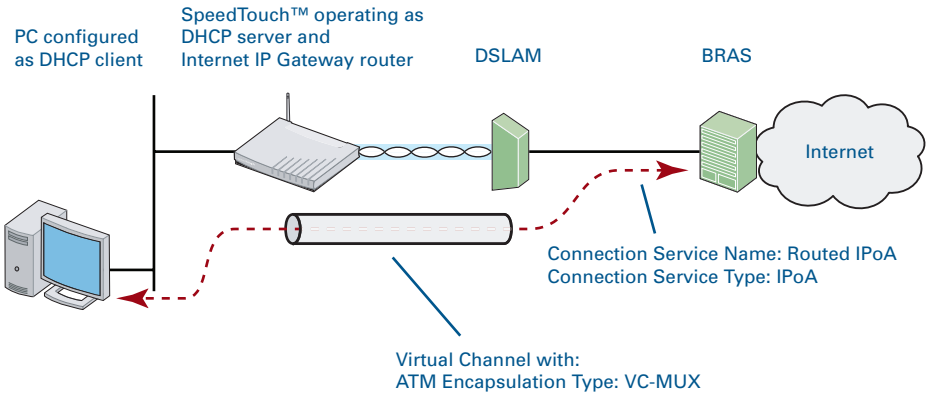
Type your **User name** and **Password** if necessary.

3. Click **Connect**.
Your computer connects to the Internet.

9 Routed IPoA

Introduction

Routed IP over ATM, also referred to as RFC2684 Routed relies on standard IP Routing for its forwarding.



Features

Routed IPoA:

- Provides Always-On type of connections.
- Is auto-configurable if DHCP is enabled on IPoA interfaces.
- Allows multiple users to simultaneously share a single IP address in case NAPT is enabled on the IPoA interface.
- Allows your network to be shielded from the Internet via the SpeedTouch™ programmable firewall.

Routed IPoA vs. connection service

The Routed IPoA Packet Service relies on the AAL5/RFC2684/Routed IP Connection Service to achieve end-to-end connectivity.

For the SpeedTouch™ this boils down in using the IPoA (IP over ATM) Connection Service type, which implies the encapsulation of IP packets in AAL5/ATM.

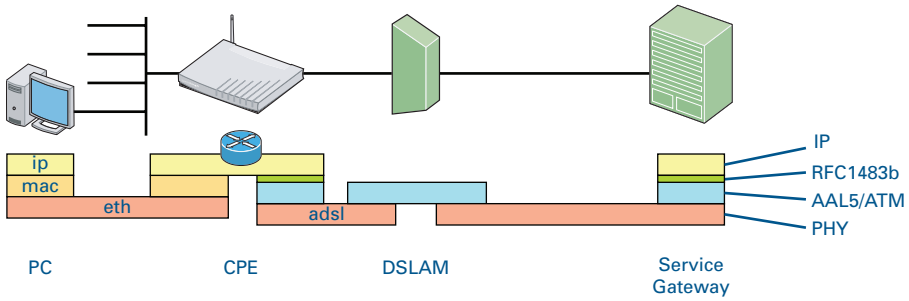
The SpeedTouch™ products are compliant with RFC2684 “Multiprotocol Encapsulation over ATM Adaptation Layer 5” and support the LLC/SNAP and VC-MUX method for Routed non-ISO PDUs.

Routed Ethernet vs. TCP/IP Configuration

As the Routed IPoA Packet service completely relies on the TCP/IP Protocol stack, all that is required on the local LAN is the TCP/IP protocol.

Protocol stack

The figure below shows the routed IPoA protocol stack.



Using Routed IPoA

Using Routed IPoA is rather straightforward:

1. Make sure that the SpeedTouch™ is switched on.
2. Turn on the computer(s).
3. Start a Web browser.

You are on the Internet or have Corporate Intranet access.

9.1 SpeedTouch™ Routed IP over ATM Configuration

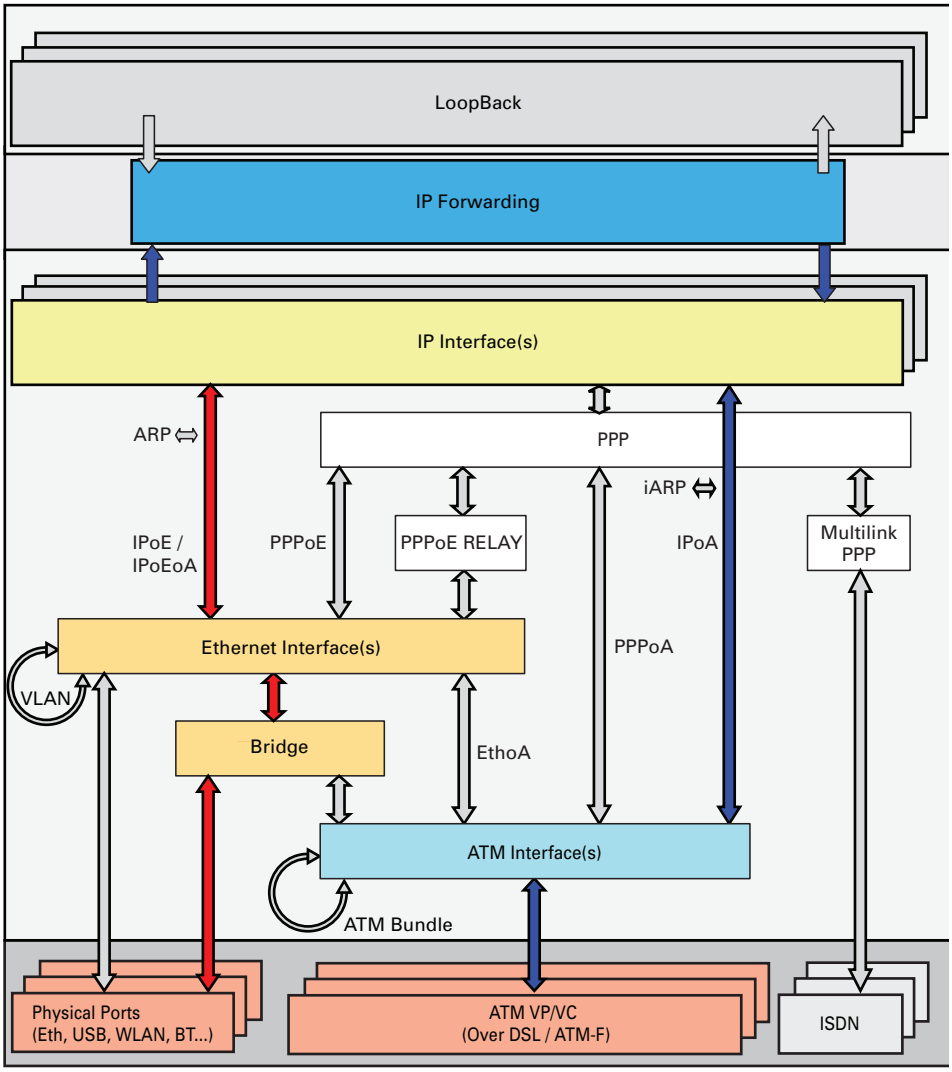
Preparatory steps for using Routed IPoA

To be able to configure the SpeedTouch™ successfully for the Routed IPoA Packet Service, the following information must be available:

- The VPI/VCI value of the Virtual Channel on which the IPoA connection service is enabled
- The encapsulation method (in most, if not all cases LLC/SNAP)
- The Routed IPoA local and remote interfaces' IP configuration

Interface road map

The figure below shows the interfaces which have to be configured for Routed IPoA.



Interfaces connected with red arrows are by default created and connected.
Interfaces connected with blue arrows need to be created and connected.
The colours used correspond with the colours used in the " Protocol stack".

9.1.1 Routed IPoA with NAPT

Configuration procedure

Proceed as follows to configure a Routed IPoA entry:

1. Create, configure and attach/connect the ATM interface.
2. Create, configure and attach/connect the IP interface.
3. Assign an IP address to the IP interface.
4. Check your configuration.

The ATM interface

Proceed as follows to create an ATM phonebook and the ATM interface.

1. Add a new ATM Phonebook entry with the correct VPI/VCI values.

```
=>atm phonebook add name=RtIPoA_ph addr=8.35
=>
```

If another phonebook entry with the same VPI/VCI already exists, you will have to delete this entry first.

2. Add a new ATM interface with name RtIPoA_atm.

```
=>atm ifadd intf=RtIPoA_atm
=>
```

3. Configure the new ATM interface with as destination the phonebook entry created above. Define also the upper layer interface type.

```
=>atm ifconfig intf=RtIPoA_atm dest=RtIPoA_ph ulp=ip
=>
```

By default, the encapsulation method will be LLC/SNAP.

4. Connect the ATM interface to the phonebook entry.

```
=>atm ifattach intf=RtIPoA_atm
=>
```

The IP interface

Proceed as follows to create, configure and attach/connect the IP interface:

1 Add a new IP interface with as destination the ATM interface created above.

```
=>ip ifadd intf=RtIPoA_ip
=>:ip ifadd intf=RtIPoA_ip dest=RtIPoA_atm
=>
```

2 Connect the IP interface.

```
=>:ip ifattach intf=RtIPoA_ip
=>
```

IP address assignment

Proceed as follows to assign an IP address to the IP interface:

1 Should the Routed Ethernet interface IP settings be obtained dynamically via DHCP?

- If yes, go to step 2.
- If no, go to step 3.

2 Configure the DHCP client interface.

```
=>dhcp client ifadd intf=RtIPoA_ip
=>dhcp client ifattach intf=RtIPoA_ip
=>
```

Proceed with step 5.

3 Enter the static IP address (e.g. 202.202.202.66) and netmask (e.g. 255.255.255.0) for the local side of the Ethernet connection. In case of a point-to-point link, enter the remote address. These should be provided by your ISP.

```
=>:ip ipadd addr=202.202.202.66/24 pointtopoint=202.202.202.1
intf=RtIPoA_ip
=>
```

4 Optionally, make this interface your default gateway.

```
=>:ip rtadd dest=0.0.0.0/0 intf=RtIPoa_ip
=>
```

5 Execute **saveall** at the prompt to save this configuration.

```
=>saveall
=>
```

For a complete description of all CLI commands, see the SpeedTouch™ CLI Reference Guide.

Expected results

To check whether you have configured your connection correctly, take a look at the interface list. Normally you should be able to follow the path you have created.

```
=>interface list
Name          Type        State            Use  UL Interfaces
ethif1        physical    connected        1    ethport1
ethif2        physical    connected        1    ethport2
ethif3        physical    connected        1    ethport3
ethif4        physical    connected        1    ethport4
RELAY         eth         connected        0
bridge        eth         connected        1    lan1
OBC           bridge      connected        1    bridge
ethport1      bridge      connected        1    bridge
ethport2      bridge      connected        1    bridge
ethport3      bridge      connected        1    bridge
ethport4      bridge      connected        1    bridge
lan1          ip          connected        0
RtIPoA_atm    atm         connected        1    RtIPoA_ip
RtIPoA_ip     ip          connected        0
```

The items in ***Italic*** are the interfaces created in this chapter.

The interface list does not include the ATM phone book entry. To check its state, go to the ATM phone book list.

```
=>atm phonebook list
Name        Use  Address
RtPPPoA_ph 1    8.35
```

10 Routed PPPoI

Introduction

Next to the DSL, Ethernet and Wireless interface, the SpeedTouch™ features an ISDN modem, to allow the end user Internet connectivity.

Scenarios

The ISDN modem can be used as:

- A stand alone WAN interface to connect to the Internet or corporate network
- A fall back interface for the DSL interface.
- Dial-in WAN interface for remote access or dial-in networking.

For more information see, “Fall-back Connections with the Integrated ISDN Modem Application Note”

ISDN software key

It is necessary to enable the ISDN module for full deployment.

For more information see, “The SpeedTouch™ 605/608 (WL)/ User’s Guide”.

The ISDN modem as initiator or responder

The ISDN modem can be configured as follows:

- As ***Initiator*** (Dial out)*:*
  The SpeedTouch™ starts the connection.
- As ***Responder*** (Dial in)*:*
  Configure the SpeedTouch™ as a responder if you want to set up a connection from another device towards the SpeedTouch™.

Security

There are 3 ways of securing the ISDN modem of the SpeedTouch™.

- Reduce the amount of people that can dial in to the SpeedTouch™ by configuring a group of allowed dial-in numbers.
- On a higher layer level, it is possible to configure the Stateful inspection firewall to allow a range or one single IP address to dial in to SpeedTouch™.
- Maintain a smart user policy by configuring users, using the multi-level SpeedTouch™ access policy.

PPP on top of the ISDN Modem

The SpeedTouch™ supports PPP over ISDN (PPPoI), which implies that all the features of a PPP connection are applicable on the SpeedTouch™ ISDN modem such as dial-on-demand (dod) connections which are mostly used for ISDN connections.

If both an ADSL and ISDN interface are configured, make sure to give a proper value to the dod delay of the ISDN modem.
For more information see, “Fall-back Connections with the Integrated ISDN Modem Application Note”

Scenario examples

The following two scenarios are examples of using the ISDN modem as a responder:

- Dialling in to the SpeedTouch™ for remote management purposes:

  This scenario is a good alternative for when the DSL line is down or for when the SpeedTouch™ doesn't have a fixed IP address.

  Take into account the following configuration factors:

  - Log in with an account that is able to change the SpeedTouch™ configuration using a WAN interface.
  - Add the ISDN modem to the required service you want to use.
- Dialling in via the SpeedTouch™ to surf to the corporate network.
  Take into account the following configuration factors:
  - The router configuration of the SpeedTouch™ is correct.
  - The correct firewall rule is added to allow traffic from the ISDN modem towards to corporate network.

10.1 How to Configure the ISDN Modem

General configuration procedure

Proceed as follows to configure the ISDN modem:

1 Add a new ISDN interface with name ISP1:

```
=>:isdn ifadd intf=ISP1
```

2 Configure the new ISDN interface with the dial-in number of the ISP:

```
=>:isdn ifconfig intf=ISP1 number=090934100 mlppp=disabled
mode=dialout
```

The PPP Multilink protocol **(mlppp)** can be either enabled or disabled:

- Disabled: dial up 64 Kbps
- Enabled: dial up 128 Kbps

MLPPP is by default disabled. Choose mode=dialin to configure the ISDN modem as a responder.

3 Attach the ISDN interface:

```
=>:isdn ifattach intf=ISP1
```

ISDN group configuration

Proceed as follows to configure a group of allowed numbers:

1 Create a new group with the name friends:

```
=>:isdn group addgroup name=friends
```

2 Add the phone number 036467348 to the allowed list:

```
=>:isdn group addrule group=friends number=036467348
```

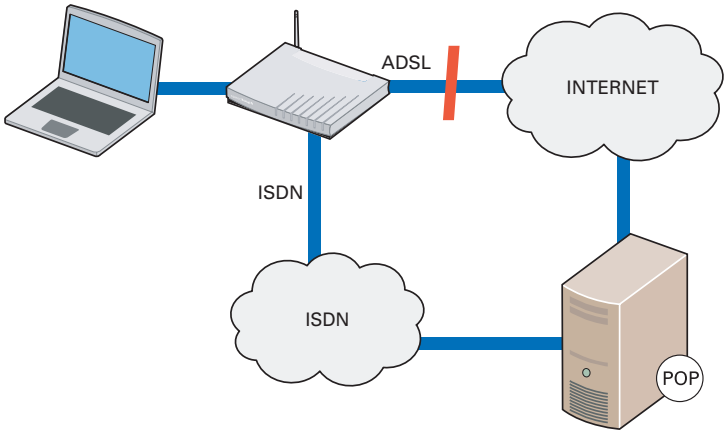
3 Use the character *?* to add wild cards to the phone numbers in the allowed list:

```
=>:isdn group addrule group=friends number=0154548??
```

10.2 ISDN Backup

ISDN Backup

The SpeedTouch™ has an ISDN interface that can be used to create an ISDN backup for the ADSL line. The process is shown in the diagram below:



When the ADSL line fails, the SpeedTouch™ establishes a dial-in connection towards the ISDN network. A PPP connection is then established over this ISDN connection which takes over the traffic from the failed ADSL line.

ISDN Callback

If the SpeedTouch™ establishes the ISDN connection from the user end, the user will be charged with the connection cost. To avoid this, it is possible to use the call back option (if the other end supports it).

The SpeedTouch™ establishes a dial in connection and provides all necessary information, and disconnects. The system then waits for a call back to establish the ISDN connection over which the PPP connection is established.

Dial-In Modes

The dial in connection line can operate in one of two modes:

- ***Always on:*** the backup connection is always on
- ***Dial on demand:*** the backup connection is established when necessary, i.e. when the ADSL line fails.

Configuring Callback

In order to configure call back, you need to do the following:

1. Configure the ISDN Dial-In Connection
2. Configure the PPP connection

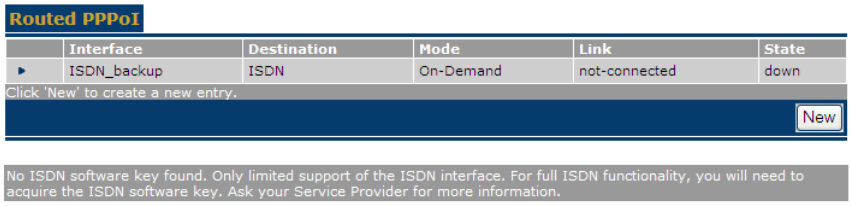
10.2.1 How to Configure the ISDN Dial-In Connection

Via the Web Interface

Proceed as follows to configure the ISDN dial-in connection via the Web interface:

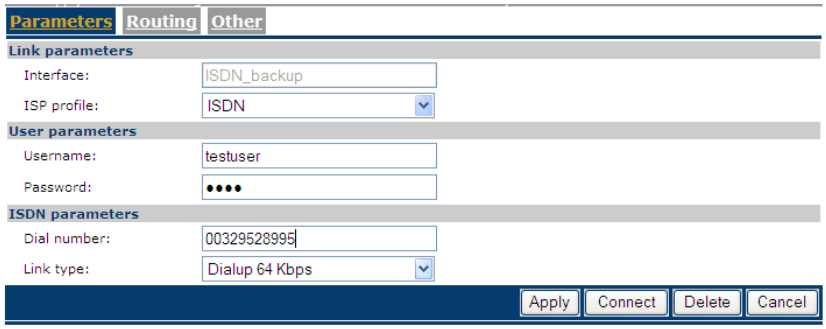
1. Go to **Expert** mode
2. Click **Connections**
3. Click **Routed PPoI**

   Result: on the page that appears, you see a predefined connection called **ISDN backup**.



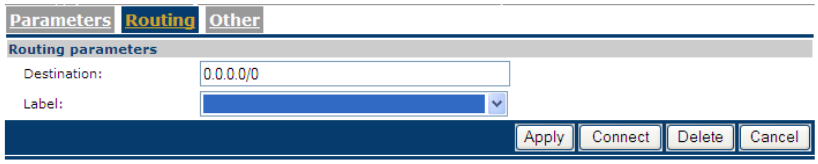
4. Click the arrow to open the configuration pages for this connection.

   Result: the Parameters page appears:



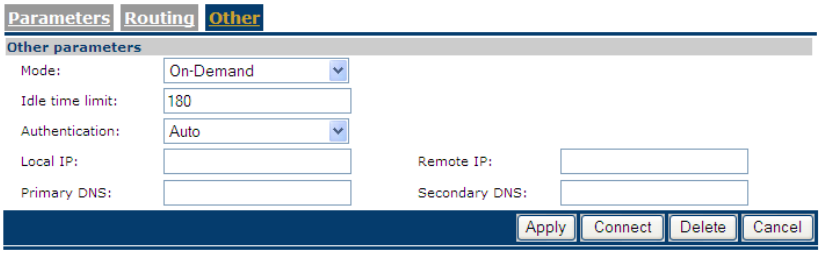
5. Fill in the user name and password for the connection, as well as the dial-in number. Also select the link type. Click **Apply**.
6. Click **Routing**.

   Result: the Routing page appears:.



7. If necessary, fill in the destination and a label. Click **Apply**.
8. Click **Other**.

   Result: the Other page appears:



9 Select the Mode (**On-Demand** or **Always On**)

10 Fill in the idle time limit. If the connection is On-Demand, and the connection is idle for this amount of time (i.e. no traffic), the connection shuts down.

The other values are automatically retrieved when the PPP connection is established

.

You cannot enable Callback via the Web interface. For this, you must use CLI. If you do not enable it, the SpeedTouch™ will establish the ISDN connection over which the PPP connection is made.

Via CLI

Use the following command sequence to configure the ISDN dial-in connection via CLI:

```
[isdn]=>ifconfig
intf                    number                  mlppp
BODstart                BODend                  mode
callback                group
[isdn]=>ifconfig
intf = buisdn
[number] = 025292222
[mlppp] =
disabled                enabled
[mlppp] = disabled
[BODstart] = 40
[BODend] = 38
[mode] = dialout
[callback] =
disabled                enabled
[callback] = disabled
[group] = empty
:isdn ifconfig intf=buisdn mlppp=disabled callback=disabled
[isdn]=>:isdn ifconfig intf=buisdn mlppp=disabled callback=enabled
[isdn]=>saveall
[isdn]=>:ppp
[ppp]=>ifattach intf bu_isdn
[ppp]=>
[ppp]=>
```

CLI Parameters:

The table below provides a description of the relevant parameters:

Parameter	Value	Description
intf	text string	name of the ISDN interface
number	numeric	Dial-in number for the ISDN line
mlppp	**enabled** or **disabled**	Enable or disable multilink ppp. This means that the ppp can be established over 1 or 2 ISDN B links (64 kbps), thus creating a bandwidth of either 64 or 128 kbps
BODStart	Numerical (in kbps) Default: 40	If multilink ppp is enabled and the required bandwidth exceeds this value, a second ISDN B link is used for the ppp connection
BODEnd	Numerical (in kbps) Default: 38	If multilink ppp is enabled and the required for it drops below this value, the second ISDN B link in the ppp connection is dropped.
mode	dialout	SpeedTouch™is set for dialout. This value is mandatory.
callback	**enabled** or **disabled**	Enable or disable callback. Note that the dial-in end must also be set for callback if you enable it.

10.2.2 How to Configure the PPP Connection

How to Configure the PPP Connection Via the Web Interface

If you used the Web interface to configure the Dial-In connection, you do not need any additional configuration.

How to Configure the PPP Connection Via CLI

Use the following command sequence to configure the PPP connection via CLI:

```
[ppp]=>ifconfig
intf = bu_isdn
[dest] = buisdn
[user] = cpesit@rednet
[password] =
[pcomp] = disabled
[accomp] = enabled
[trace] = disabled
[auth] = auto
[restart] = enabled
[retryinterval] = 10
[passive] = disabled
[silent] = disabled
[echo] = enabled
[mru] = 1500
[laddr] =
[raddr] =
[netmask] =
[format] =
[format] = none
[pool] =
[savepwd] = enabled
[demanddial] = enabled
[doddelay] = 30
[primdns] =
[secdns] =
[dnsmetric] =
[idletime] = 45
[idletrigger] = Tx
[unnumbered] = disabled
:ppp ifconfig intf=bu_isdn format=none
[ppp]=>
```

CLI Parameters:

The table below provides a description of the relevant parameters. Do not alter the default value of the parameters not shown in this table:

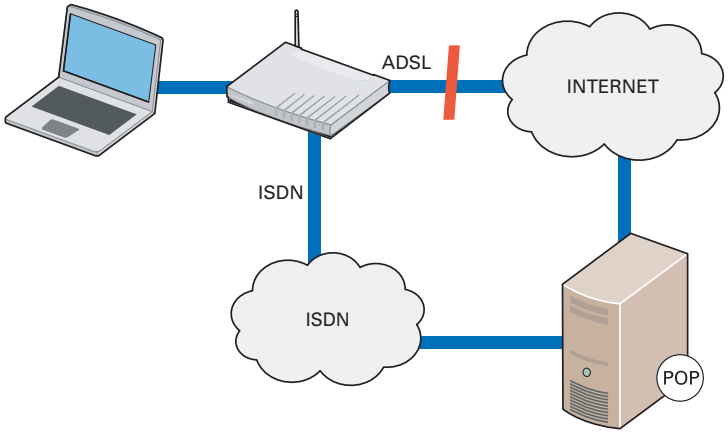
Parameter	Value	Description
intf	text string	name of the PPP interface
dest	text string	name of the ISDN interface on which the PPP connection is built
user	text string	Username needed for the PPP connection
password	text string	Password needed for the PPP connection
auth	**pap**, **chap** or **auto**	Sets the authentication protocol
restart	**enabled** or **disabled**	Enable or disable the retry function. This means that the system will try again if establishing the link fails.
retryinterval	numeric	If the connection fails, and restart is enabled, the system will retry establishing the connection after this interval.
passive	**enabled** or **disabled**	Enable or disable passive mode
silent	**enabled** or **disabled**	Enable or disable silent mode
echo	**enabled** or **disabled**	Enable or disable echo
mru	numeric	
IPaddress	IP address	Local IP address of the PPP connection. This is completed automatically when establishing the connection. Do not fill it in manually.
raddress	IP address	Remote IP address of the PPP connection. This is completed automatically when establishing the connection. Do not fill it in manually.
netmask	Format depends on the format setting	Netmask for the ppp connection. This is completed automatically when establishing the connection. Do not fill it in manually.
format	**cidr**, **dotted** or **none**	Set the format of the netmask to cidr or dotted, or use no netmask.
savepwd	**enabled** or **disabled**	Save the password. After establishing the ppp link for the first time, you no longer need to provide it for subsequent connections.

Parameter	Value	Description
demanddial	**enabled** or **disabled**	Enable or disable dial-on-demand (DOD). This means that the system will engage the ISDN backup if the DSL line fails
doddelay	numeric (in s) Default: 120	Delay during which DOD is disengaged; This interval is meant to allow the DSL line time to synchronize
primdns	ip address	IP address of the primary dns server
secdns	ip address	IP address of the secondary dns server
idletime	numeric	If the connection is idle for this amount of time, the link is disconnected
idletrigger	Tx or Rx	Idle time is triggered on either transmission side (Tx) or receive side (Rx)

10.3 ISDN Callback

ISDN Backup

The SpeedTouch™ has an ISDN interface that can be used to create an ISDN backup for the ADSL line. The process is shown in the diagram below:



When the ADSL line fails, the SpeedTouch™ establishes a dial-in connection towards the ISDN network. A PPP connection is then established over this ISDN connection which takes over the traffic from the failed ADSL line.

ISDN Callback

If the SpeedTouch™ establishes the ISDN connection from the user end, the user will be charged with the connection cost. To avoid this, it is possible to use the callback option (if the other end supports it).

The SpeedTouch™ establishes a dial in connection and provides all necessary information, and disconnects. The system then waits for a callback to establish the ISDN connection over which the PPP connection is established.

This is typical for connections which are governed by a Service Level Agreement (SLA).

More Information

For more information, refer to the WAN Fallback Application Note.

Dial-In Modes

The dial in connection line can operate in one of two modes:

- ***Always on:*** the backup connection is always on
- ***Dial on demand:*** the backup connection is established when necessary, i.e. when the ADSL line fails.

Configuring Callback

In order to configure callback, you need to do the following:

1. Configure the ISDN Dial-In Connection
2. Configure the PPP connection

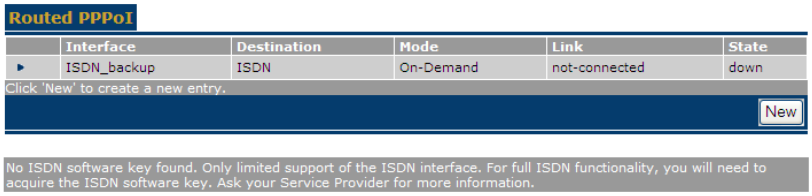
10.3.1 How to Configure the ISDN Dial-In Connection

Via the Web Interface

Proceed as follows to configure the ISDN dial-in connection via the Web interface:

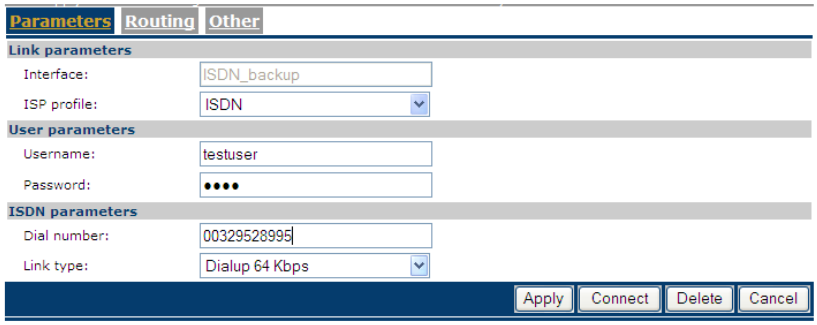
1. Go to **Expert** mode
2. Click **Connections**
3. Click **Routed PPoI**

   Result: on the page that appears, you see a predefined connection called **ISDN backup**.



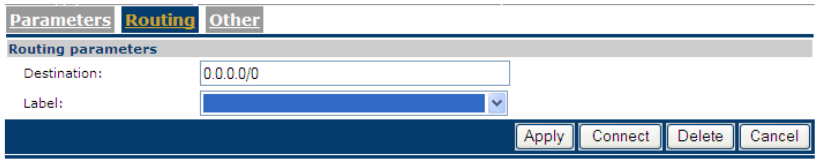
4. Click on the arrow to open the configuration pages for this connection.

   Result: the Parameters page appears:



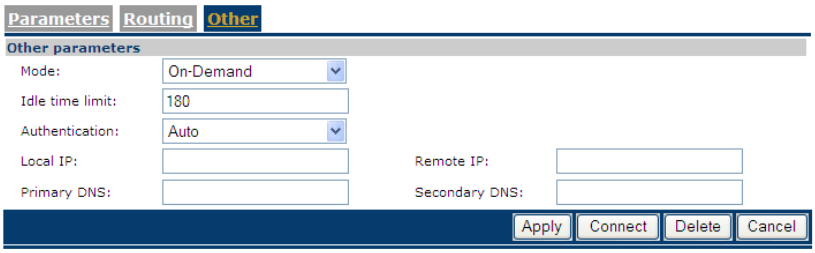
5. Fill in the username and password for the connection, as well as the dial-in number. Also select the link type. Click **Apply**.
6. Click **Routing**.

   Result: the Routing page appears:.



7. If necessary, fill in the destination and a label. Click **Apply**.
8. Click **Other**.

Result: the Other page appears:



9 Select the Mode (**On-Demand** or **Always On**)

10 Fill in the idle time limit. If the connection is On-Demand, and the connection is idle for this amount of time (i.e. no traffic), the connection shuts down.

The other values are automatically retrieved when the PPP connection is established.

You cannot enable Callback via the Web interface. For this, you must use CLI. If you do not enable it, the SpeedTouch™ will establish the ISDN connection over which the PPP connection is made.

Via CLI

Use the following command sequence to configure the ISDN dial-in connection via CLI:

```
[isdn]=>ifconfig
intf                    number                  mlppp
BODstart                BODend                  mode
callback                group
[isdn]=>ifconfig
intf = buisdn
[number] = 025292222
[mlppp] =
disabled                enabled
[mlppp] = disabled
[BODstart] = 40
[BODend] = 38
[mode] = dialout
[callback] =
disabled                enabled
[callback] = disabled
[group] = empty
:isdn ifconfig intf=buisdn mlppp=disabled callback=disabled
[isdn]=>:isdn ifconfig intf=buisdn mlppp=disabled callback=enabled
[isdn]=>saveall
[isdn]=>:ppp
[ppp]=>ifattach intf bu_isdn
```

CLI Parameters:

The table below provides a description of the relevant parameters:

Parameter	Value	Description
intf	text string	name of the ISDN interface
number	numeric	Dial-in number for the ISDN line
mlppp	**enabled** or **disabled**	Enable or disable multilink ppp. This means that the ppp can be established over 1 or 2 ISDN B links (64 kbps), thus creating a bandwidth of either 64 or 128 kbps
BODStart	Numerical (in kbps) Default: 40	If multilink ppp is enabled and the required bandwidth exceeds this value, a second ISDN B link is used for the ppp connection
BODEnd	Numerical (in kbps) Default: 38	If multilink ppp is enabled and the required for it drops below this value, the second ISDN B link in the ppp connection is dropped.
mode	dialout	SpeedTouch™is set for dialout. This value is mandatory.
callback	**enabled** or **disabled**	Enable or disable callback. Note that the called party must also be set to support callback.

10.3.2 How to Configure the PPP Connection

How to Configure the PPP Connection Via the Web Interface

If you used the Web interface to configure the Dial-In connection, you do not need any additional configuration.

How to Configure the PPP Connection Via CLI

Use the following command sequence to configure the PPP connection via CLI:

```
[ppp]=>ifconfig
intf = bu_isdn
[dest] = buisdn
[user] = cpesit@rednet
[password] =
[pcomp] = disabled
[accomp] = enabled
[trace] = disabled
[auth] = auto
[restart] = enabled
[retryinterval] = 10
[passive] = disabled
[silent] = disabled
[echo] = enabled
[mru] = 1500
[laddr] =
[raddr] =
[netmask] =
[format] =
[format] = none
[pool] =
[savepwd] = enabled
[demanddial] = enabled
[doddelay] = 30
[primdns] =
[secdns] =
[dnsmetric] =
[idletime] = 45
[idletrigger] = Tx
[unnumbered] = disabled
:ppp ifconfig intf=bu_isdn format=none
[ppp]=>
```

CLI Parameters:

The table below provides a description of the relevant parameters. Do not alter the default value of the parameters not shown in this table:

Parameter	Value	Description
intf	text string	name of the PPP interface
dest	text string	name of the ISDN interface on which the PPP connection is built
user	text string	Username needed for the PPP connection
password	text string	Password needed for the PPP connection
auth	**pap**, **chap** or **auto**	Sets the authentication protocol
restart	**enabled** or **disabled**	Enable or disable the retry function. This means that the system will try again if establishing the link fails.
retryinterval	numeric	If the connection fails, and restart is enabled, the system will retry establishing the connection after this interval.
passive	**enabled** or **disabled**	Enable or disable passive mode
silent	**enabled** or **disabled**	Enable or disable silent mode
echo	**enabled** or **disabled**	Enable or disable echo
mru	numeric	
IPaddress	IP address	Local IP address of the PPP connection. This is completed automatically when establishing the connection. Do not fill it in manually.
raddress	IP address	Remote IP address of the PPP connection. This is completed automatically when establishing the connection. Do not fill it in manually.
netmask	Format depends on the format setting	Netmask for the ppp connection. This is completed automatically when establishing the connection. Do not fill it in manually.
format	**cidr**, **dotted** or **none**	Set the format of the netmask to cidr or dotted, or use no netmask.
savepwd	**enabled** or **disabled**	Save the password. After establishing the ppp link for the first time, you no longer need to provide it for subsequent connections.

Parameter	Value	Description
demanddial	**enabled** or **disabled**	Enable or disable dial-on-demand (DoD). This means that the system will engage the ISDN backup if the DSL line fails
doddelay	numeric (in s) Default: 120	Delay during which DoD is disengaged; This interval is meant to allow the DSL line time to synchronize
primdns	ip address	IP address of the primary dns server
secdns	ip address	IP address of the secondary dns server
idletime	numeric	If the connection is idle for this amount of time, the link is disconnected
idletrigger	Rx, Tx or RxTx	Consider the link as being idle if no traffic is received (Rx), sent (Tx) or neither sent nor received (RxTx)

10.4 ISDN Remote CAPI

About Remote CAPI

Using RemoteCAPI, the ISDN interface of the SpeedTouch™ can be used by PC applications that typically need an ISDN board integrated into the PC.

The Remote CAPI function only works with PC applications using the Rcapi.dll driver e.g. RVS COM.

About RVS COM

RVS COM is an application that allows you to use voice based services such as:

- Sending and receiving faxes.
- Sending and receiving SMS.
- PC Answering machine with auto-attendant.

It features an address manager and Outlook integration.

HowtoInstallRemoteCAPI

Proceed as follows:

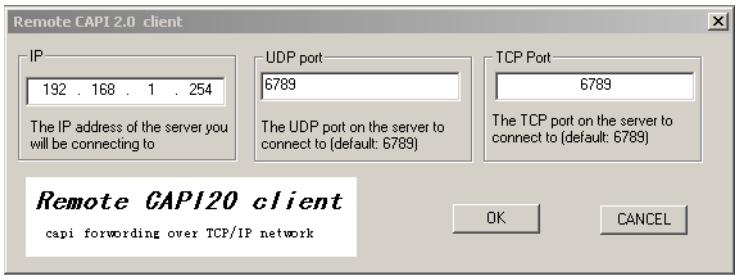
1. Rename the following file on your pc: **C:\windows\system32\capi2032.dll.**
2. Copy the file **rcapi.dll**:
   - From the sub folder **Remote_CAPI** on the installation disk
   - To the following location on your PC: **C:\windows\system32**
3. Rename the file Rcapi you just copied to **capi2032.dll.**
4. Run **rcapi.exe** located on the installation disk in the sub folder **Remote_CAPI**.

How to Configure the Remote CAPI Client

The above installation procedure adds the Remote CAP20 Client application to your system. You can access it via the **Control Panel**.

Proceed as follows to configure this client:

1 Use the Control Panel to start the Remote CAP20 Client application:



2 In the IP box, enter the IP address of the SpeedTouch™ (192.168.1.254).

3 In the UDP Port box, enter the UDP port if necessary (default is 6789).

4 In the TCP Port box, enter the TCP port if necessary (default is 6789).

HowtoConfigureRemote CAPIviatheWebinterface

Prerequisite:

You need to have RVS Communication Center or any other software that uses the Rcapi driver.

Procedure:

Proceed as follows to enable Remote CAPI via the Web Interface:

1 On the Web interface home page, click **Expert**

2 In the navigation pane, click SpeedTouch™

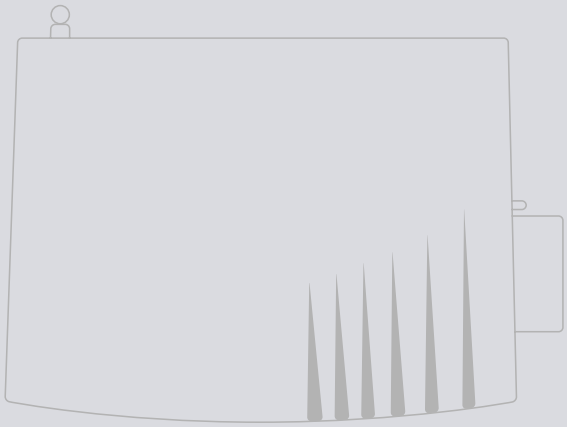
3 Go to SpeedTouch™ **Services**

4 Select **Remote CAPI Daemon**

How to Enable Remote CAPI via CLI

Use the following command sequence to enable RCAPI:

```
=>rcapi
[rcapi]=>
[rcapi]=>config
[RCAPID] state: disabled
[rcapi]=>config state enabled
```



Need more help?

Additional help is available online at www.speedtouch.com