

Configure link compression facilities in the AR router

Introduction

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The entire range of Allied Telesyn routers are capable of enhancing WAN link performance with the use of data compression. All models have compression facilities built into their software; and can also be fitted with a compression accelerator board for even higher performance hardware compression.

In this document we are looking specifically at data link compression, i.e. compression that operates by compressing the whole data stream, including the network layer packet headers used for routing. The Allied Telesyn router also supports TCP header compression and payload compression, but they are beyond the scope of this particular document.

The Allied Telesyn Routers support two compression algorithms: STAC LZS (RFC [1974](#)) and Predictor (RFC [1978](#)). The compression can be enabled on three different WAN protocols: PPP, Frame Relay and X.25

NOTE: Predictor Compression is only available on PPP links. Frame Relay and X.25 only support STAC compression.

What information will you find in this document?

This document provides information on:

- “Software Compression” on page 2
- “Hardware Compression” on page 2
- “Compression Negotiation” on page 3
- “Configuring Compression on Frame Relay” on page 4
- “Configuring X.25 Compression” on page 5

What products does this information apply to?

- AR 300 series
- AR 400 series
- AR 700 series
- Rapier series

Link Compression Facilities in the AR Router

Software Compression

All Allied Telesyn routers are shipped with the ability to perform link compression in software. This facility is limited to 4 links per router. If you require a router to support more than 4 compressed links, then you need to move to hardware compression.

To use software compression, the number of channels required must be configured using the command:

```
set enco sw predchannels=0..4 stacchannels=0..4
```

This command must be run from the boot configuration script since the memory required by the software compression algorithms must be contiguous and the most efficient way to acquire contiguous memory is just after the router has rebooted. By default no compression channels are configured as they do use a large amount of memory---STAC LZS requires 13 KBytes per channel and Predictor requires 128 KBytes per channel.

For STAC LZS compression it is possible to select between compression speed and compression ratio using the command:

```
set enco sw stacspeed=0..3
```

Setting the STACSPEED parameter to a high value minimises compression time at the expense of the compression ratio and is most suitable for high aggregate line speeds. Setting the STACSPEED parameter to a low value maximises the compression ratio at the expense of processing time and is most effective for low aggregate link speeds.

Having configured the compression channels, and STAC speed (if necessary), you then need to configure compression on the WAN links that are to be compressed. The commands for doing this are described below.

Hardware Compression

Hardware compression can be provided by a mini acceleration card. There are no configuration commands for setting up hardware compression; you need simply configure compression on the WAN links that are to be compressed.

Configuring Compression on PPP

To configure a compressed PPP link, there are two things that must be specified:

1. The compression algorithm (STAC or Predictor).
2. The checking option. The checking process enables a received packet to be validated during decompression. This is useful because PPP does not guarantee reliable, in-order delivery of packets. If a packet is corrupted or lost, then when the next packet is received it's decompression will fail because the compression histories will be out of step. Adding a check value allows unsuccessful decompressions to be detected. The checking facility is only available for STAC compression, and has two choices: to add an 8-bit Longitudinal Check Byte (LCB) or an 8-bit sequence number to a compressed packet.

The syntax of the command for enabling compression on a PPP link is:

```
set ppp=n compression=on [compalgorithm={stac|predictor}]
[staccheck={lcb|sequence}]
```

For example, to enable STAC compression with LCB checking on ppp6, the command is:

```
set ppp=6 compression=on compalgorithm=stac staccheck=lcb
```

or, to enable predictor compression on ppp10, the command is:

```
set ppp=10 compression=on compalgorithm=predictor
```

NOTE: The hardware compression coprocessors only support STAC compression, so do not configure Predictor compression on a router that is using a dedicated compression board or an ENCO engine.

Compression Negotiation

There are, of course, two ends to a PPP link. If you configure a compression algorithm and check method on the PPP interface of the router at one end of the link, there is no guarantee that the data crossing the link will be compressed in the manner configured. The router at the other end of the link may not support compression, or it may not support the compression algorithm that you have configured on your end of the link.

To deal with situations where the configurations at the ends of a PPP link are dissimilar, the PPP protocol specifies a negotiation process whereby the two routers inform each other of options that they would like to use, and then work back to the set of options which they are both prepared to support. It is reasonably important to gain some understanding of how this negotiation process applies to PPP compression, as there is more to it than meets the eye, and it will likely have some impact on how you configure compression on your routers.

The first point to get clear is that the compression options that you configure on your PPP link are not hard and fast requirements, they are more in the nature of guidelines that the router can use when making decisions in the compression control protocol (CCP) phase of the PPP negotiation process.

The way that the negotiation proceeds is as follows:

1. The two routers inform each other of the algorithms that they have available for decompressing incoming packets. In the case of the Allied Telesyn router, the offered algorithms would be:
 - If a hardware compression board is installed, only the STAC algorithm will be offered.
 - If software compression is being used, then if STAC channels have been configured and there is still at least one free (i.e. not already in use by another compressed WAN link), then STAC will be offered. If Predictor channels have been configured, and there is still at least one free, then Predictor will be offered. If there are free STAC channels and free Predictor channels, then both will be offered.
2. Having received the list of decompressing algorithms that the peer router has available, each router chooses which of these options it wishes to use. The Allied Telesyn router bases this decision on the compression algorithm that you have configured on the link:

- If you have configured STAC as the compression algorithm, and the peer offers to decompress STAC, then the Allied Telesyn router will choose to use STAC to compress outgoing packets.
- If you have configured Predictor as the compression algorithm, and the peer offers to decompress Predictor, then the Allied Telesyn router will choose to use predictor to compress outgoing packets.
- If the compression algorithm that is configured on the PPP link is not among the decompressing options offered by the peer, the Allied Telesyn router will choose whichever (if any) of the offered options it can actually support. For example, if the PPP link was configured with STAC compression but the peer offers only to decompress with Predictor, then if the Allied Telesyn router is using software compression and has free Predictor channels, then it will choose to compress outgoing packets using the Predictor algorithm.
- If no compatible options are available, then the router will decline to do any compression.

So, it is worth noting that:

- Even if you configure a particular compression algorithm on a PPP interface, the router may not end up actually using that algorithm if the peer router does not support it.
- If you are using software compression and are unsure what compression algorithm the router at the other end of the PPP link will be using, it may pay to configure both STAC and Predictor channels on your router, so that both options are available.
- It is possible (and quite valid) to end up with a situation where packets going one way across the PPP link are being compressed using one algorithm, and those going the other way are being compressed using another algorithm. To see what compression algorithm and checking method are actually in use on any given PPP link, use the command:

```
show ppp=n config
```

This will display the options that your router has negotiated to use, and the options that the peer router has negotiated to use.

NOTE: The compression negotiation process and the compression algorithms employed by the Allied Telesyn router are fully RFC compliant (RFCs [1962](#), [1974](#), and [1978](#)) and will interoperate with any other devices that correctly implement these RFCs.

Configuring Compression on Frame Relay

The compression facilities for Frame Relay are not as fully featured as those for PPP. The only compression algorithm available for Frame Relay is STAC, and the only checking method available is LCB. Hence, it is not necessary to choose an algorithm and checking method when configuring compression on a Frame Relay interface. Also, when configuring Frame Relay compression, there is no need take into consideration whether you are using software or hardware compression---the options are the same either way.

There are two means available for configuring Frame Relay compression:

- I. A 'blanket' configuration whereby all DLCs that appear on a given interface are to be compressed. The command for this is:

```
set fr=n defcomp=on
```

2. As the Frame Relay interface learns of DLCs by LMI advertisements from the network, it will negotiate compression over each DLC.

Compression can be configured on a 'per DLC' basis:

```
set fr=n dlc=i compression=on
```

The effect of this is that the router creates a 'latent' or pending configuration for each of the DLCs that have been configured for compression. Then when the network actually informs the router of the existence of the DLC, the latent configuration will be applied to the real DLC, and compression will be negotiated over this DLC.

It is possible, and quite valid, to configure some of the /0_ on a particular Frame Relay interface to use compression, and some to not use compression.

If the device at the other end of a particular DLC is not configured to negotiate compression, then data will still be successfully sent across the DLC, but it will not be compressed.

It should be noted that the Frame Relay compression implementation on the Allied Telesyn router is not claimed to be interoperable with other vendor's routers.

To see which DLCs on a given Frame Relay interface are actually compressing, use the command:

```
show fr=n dlc
```

This will list all the DLCs known on the interface, and the state of their compression negotiation.

Configuring X.25 Compression

The compression used on X.25 links is configured on a per-MIOX circuit basis. The command is:

```
set miox=n circ=name compression=on
```

There are no options available, the only compression algorithm used is STAC and checking is not used as X.25 is a reliable transport protocol.

No negotiation process occurs with X.25 compression. Once compression is configured on a particular MIOX circuit, all data sent over that circuit is compressed, regardless of whether the device at the other end of the circuit is configured to use compression. Hence, if one end of the circuit is configured to use compression and the other end is not, then no effective data transfer will occur.

The X.25 compression implemented on the Allied Telesyn router is not claimed to be interoperable with other vendor's products.

