Application Overview

Disaster Recovery Strategy for Frame Relay

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Disaster Recovery Strategy for Frame Relay

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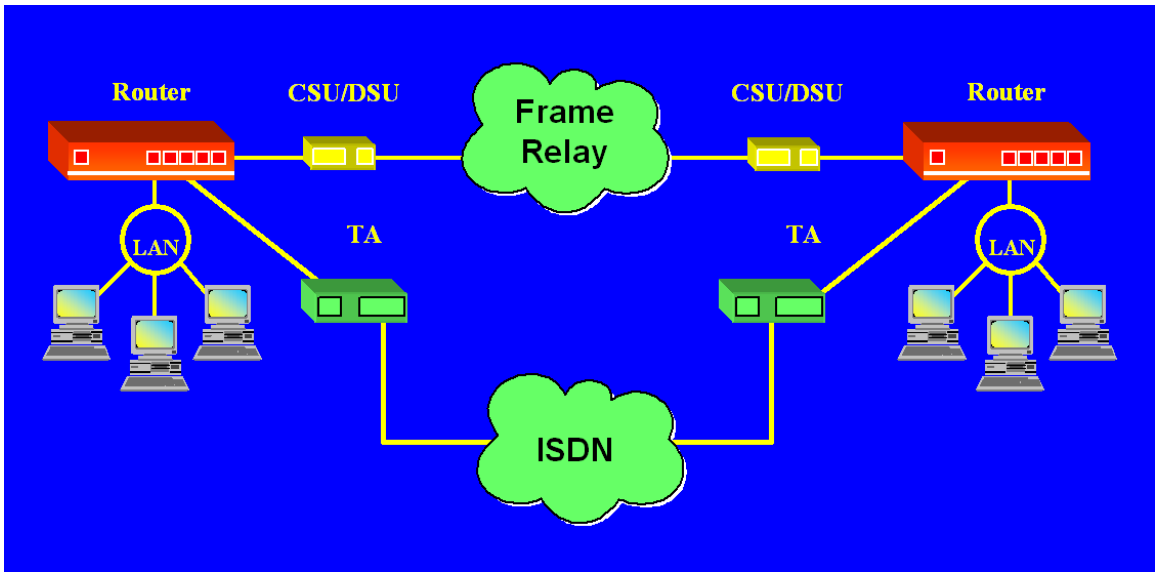
Disaster Recovery Strategy for Frame Relay

Providing a backup plan for Frame Relay circuits is not difficult, and is a very good idea. When your Frame Relay network fails, you can back it up in less than two seconds using ISDN to place circuit switched data calls.

This application uses a single ISDN Basic Rate Interface (BRI) and an ISDN Terminal Adapter.



For our example we are connecting two routers using Frame Relay. This design will be sufficient for Frame Relay CIR's up to 128 Kbps. If you need more bandwidth than this, refer to the AHK Application Overview entitled "Disaster Recovery Strategy for T1 circuits using ISDN BRI". This document will discuss using Inverse Multiplexer in the place of Terminal Adapters to create virtual circuits up to 2 Mbps.

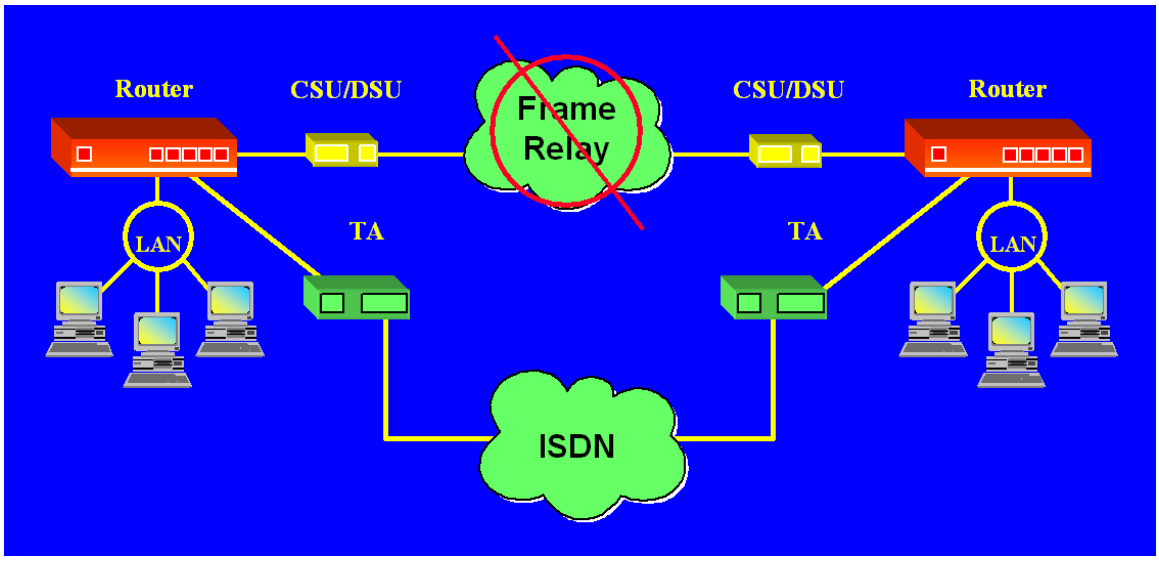
These routers have dual WAN ports programmed to perform the Alternate Path Switch function. Install the frame relay in a normal fashion, either with an external CSU/DSU as shown above, or using an internal CSU/DSU in the router. This is considered the "Primary" connection.

Connected to the second port of the router is an ISDN Terminal; Adapter. The Terminal Adapter supports up one (1) ISDN BRI line. This line is not used unless there is a Primary circuit failure. The connection between the Terminal Adapter and the router will typically be an RS-232 or V.35 interface.

> **Alternate Path Switch (APS)** is a device that will sense when the primary data path has been interrupted, and is no longer available. Under these conditions the APS will attempt to transmit data through the designated "Alternate Path". Routers with more than one WAN port can sometimes be programmed in this manner. Alternatively, you can use a stand-alone dual port CSU/DSU, which has been equipped with APS technology. Companies line Cisco make routers with APS capability, and companies like Control Ware make APS enabled DSU's.

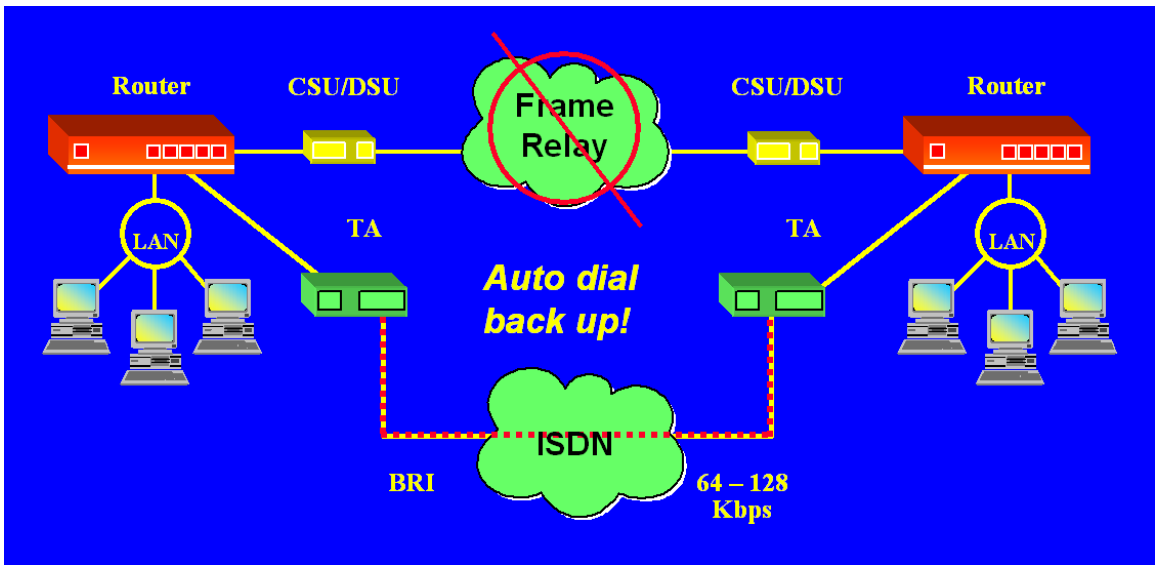
Circuit Failure

Should the Frame Relay (primary path) fail for any reason, the router will attempt to transmit data through the secondary path.



The Terminal Adapter “listens” for data by monitoring the Data Terminal Ready lead in the RS-232 or V.35 interface. This lead, or wire, only becomes energized when the router attempts to send data over the secondary path.

When the Terminal Adapter detects an energized DTR condition, this triggers the connection process. The Terminal Adapter will dial up one or two B channel circuit switched data calls over the BRI line. This will connect it to a second Terminal Adapter at the distant site. A BRI line supports two (2) B channels. Each B channel supports a 64 Kbps circuit switched data call. The Terminal Adapter will use the BONDING protocol to aggregate the two B channels and provide a virtual 128 Kbps connection for use in this application.



BONDING

BONDING is a protocol used by Inverse Muitiplexer's and Terminal Adapters to aggregate the bandwidth of individual B channels into a single high-speed "virtual circuit". BONDING (an acronym for Bandwidth On Demand Interoperability Group) is a process developed to deal with the problem of delay in circuit switched calls. Each of the B channel data calls will find a unique path through the network. Since each path will be unique, each path will have a different propagation delay. Since each path has a different propagation delay, the bits streaming down the individual circuits will arrive in a mis-ordered fashion. This is because the two paths used by the two B channels will not be the same. Some data will take a shorter path, and get there faster, and other data will take the longer path and be delayed by a few milliseconds.

The BONDING process is used to address this problem through its "Delay Equalization" feature. Delay Equalization determines the delay on each circuit, and inserts calculated delay into the shorter circuits. This introduced delay will equalize the data delivery rate across all the circuits. Once this equalization has been established, all the channels will have the same delay, and the packets will no longer be miss ordered.

Compression

Adding a hardware compression module to the Terminal Adapter can provide a 4:1 compression ratio. This will yield a speed of nearly 512 Kbps per second and is delivered as a fully duplex virtual circuit.

Set Up Time

The recovery process is remarkably fast. Both calls are placed in a matter of milliseconds, and the data stream will be re-established within one or two seconds. ISDN operates as a fully duplex circuit, and you will have 128 Kbps of bandwidth.

Approximate Costs

A Terminal Adapter suitable for this application will cost approximately $300.00. You will need two of them. You will need a BRI circuits at each site, and these cost approximately $40 per month when purchased unbundled, with no call packs. You will incur usage charges for the calls places during a circuit recovery.

Additional Help

AHK & Associates Inc. can help you implement the process in this Application Overview. We can provide complete turnkey installation including; hardware selection and component sourcing, circuit provisioning, and equipment programming. Once it is all done, we provide operational and support training so that you will get the most out of your investment.

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"Innovative" . . .

"Visionary design" . . .

"Remarkably well informed"

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