

YOUR SOURCE FOR SHARING WORDS

Proposal to

Nassau County Public Libraries

September 23, 1998

**APPROVED**

DATE 10/12/98 *JMK*

 **BELLSOUTH**



September 23, 1998

Mrs. Dawn Bostick  
Director  
Nassau County Public Libraries  
25 N. 4th Street  
Fernandina Beach, Florida 32034

Dear Dawn:

Thank you for the opportunity to analyze your requirements. Our goal is to provide Nassau County Public Libraries with the best available communications services in the most cost-effective manner.

We hope the enclosed proposal demonstrates to you that BellSouth provides the best package of services to meet your requirements.

We value our relationship with the libraries and look forward to participating in your continued growth and success. Please call me at 904-359-7248 if you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "Eileen Hallums".

Eileen Hallums  
Account Manager

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## **SECTION 1. EXECUTIVE SUMMARY**

BellSouth recognizes the important role communications can play in the overall success of Nassau County Public Libraries. We understand that your primary concern is congestion on your existing network and have designed a solution to address that concern. Our proposed solution consists of FIRN Advanced Telecommunications Services (ATS) package 1B, and offers the libraries many benefits, including fully managed service connection to a Firm location for access to shared data resources and the internet..

We understand that customers don't buy technology — they buy solutions. We invest in powerful technologies and develop practical ways to apply them to solve our customers' business problems and help them realize opportunities for improvement. We propose to meet and exceed your goals with a comprehensive solution through leading-edge technology, strategic partnering, and flexible, innovative pricing.



- Focused strategies
- Seeing our business through the eyes of the customer
- Seizing opportunities for growth
- Financial strength

BellSouth is a strategically focused communications leader whose dedication to the Southeast region is unmatched. As an award-winning regional network service provider, BellSouth has demonstrated our commitment to being the number one communications company in the Southeast by providing world class service and support, and aggressive pricing to maximize your shareholder value. Our financial strength and commitment to the Southeast ensure that we will continue to be a long-term communications partner.

At BellSouth, we are driven to earn the loyalty of our customers. We appreciate the opportunity to earn yours.

BellSouth's Frame Relay service is offered through the following access lines:

- **IntraLATA - Broadband Exchange Line (BBEL).** BBEL service allows for access speeds of 56 Kbps (DS0), 1.536 Mbps (DS1), 45 Mbps (DS3), 64 Kbps, 128 Kbps, and 44.210 Mbps.
- **InterLATA - Network to Network Interface (NNI)** coordinated with several Interexchange Carriers (IXCs). Through the use of NNI standards, local exchange carrier Frame Relay networks can connect with IXC Frame Relay networks to achieve interLATA transport. NNIs can be either public or private.
  - ♦ **Public NNIs** allow several customers to share transport facilities.
  - ♦ **Private NNIs** allow several customers to transport traffic between multiple Frame Relay networks over dedicated facilities.

Data is transmitted from the end-device terminal, packaged into variable length frames, and transported through the network using pre-defined logical connections (PVCs). Through a single UNI, the end user can communicate with multiple end-points by establishing a single PVC for each. Therefore, statistical multiplexing is used per UNI to efficiently share network resources and also to provide applications with bandwidth on demand.

In each Frame Relay frame, a Data Link Connection Identifier (DLCI) identifies the PVC to be used for that frame. The CPE will place a DLCI in the address field and the network will relay the frame through to the far end. A Committed Information Rate (CIR) will be associated with each DLCI. CIR is the established throughput of the network over a particular PVC. When a customer's traffic starts to exceed the selected CIR, frames will be marked discard eligible (DE). Should congestion occur in the network, the frames marked DE may be discarded. However, as long as there is no congestion in the network, the frames marked DE will be transported through the network with the same reliability as those not marked DE.

Today, the Frame Relay service supports only PVCs, which means that all potential end-points of a network need to be defined so that a DLCI can be assigned for each one. In the future, Frame Relay Switched Virtual Circuits (SVCs) will allow for any-to-any connectivity without the requirement for pre-established PVCs.

## Features and Benefits

Features and benefits of Frame Relay include:

- Uses standard HDLC protocols and LAP-D frame format.
- Data Link Connection Identifier (DLCI) identifies the PVC to be used for that frame.
- User to Network Interface (UNI) defines protocol standards and frame formats for customer access.
- Current service supports PVCs.

## SECTION 2. PRODUCT SOLUTION

### FRAME RELAY

#### Overview

Frame Relay is a variable length, frame-based, packet service designed to provide data communications over a Wide Area Network (WAN). Frame Relay was designed to emulate private line networks and can provide any-to-any connectivity through the establishment of Permanent Virtual Circuits (PVCs) between end locations.

As a data service, Frame Relay is ideally suited for the "bursty" data that is typical of LAN traffic. While best suited for delay-insensitive traffic, transport of voice and video over Frame Relay has been trialed using the appropriate customer premises equipment. When multiple locations are connected in a meshed network, Frame Relay can be a cost-effective solution compared to dedicated private lines.

Fast packet networks use statistical multiplexing to provide maximum efficiency. Although LAN traffic presents high transmission speed and high bandwidth requirements for the wide area, LAN activity typically occurs in individual bursts. Statistical multiplexing manages the bursty nature of LANs more efficiently than time division multiplexing.

Fast packet technologies:

- Take advantage of the more reliable digital facilities that are available today.
- Rely on upper level protocols at end stations to provide error correction, thereby eliminating a significant portion of the processing that occurs within an X.25 network.
- Are scalable, making them an attractive solution for meeting present and future bandwidth demands.

Frame Relay uses standard HDLC protocols and LAP-D frame format. The protocol relies on end-to-end error correction and flow control and, therefore, does not implement all of the overhead associated with X.25. This reduces the delay seen across a WAN. A typical X.25 node imposes a 5-20 msec delay while a Frame Relay node has less than 2 msec of delay.

The customer premises interface to a Frame Relay network is called the User to Network Interface (UNI). The UNI defines protocol standards and frame formats for customer access to the Frame Relay switch. The UNI would terminate on a customer's premise in a router that supports the Frame Relay protocol or a Frame Relay Assembler/ Disassembler (FRAD) device. Also, several IBM SNA devices now have a direct Frame Relay interface.

- Throughput over a logical circuit can vary up to the speed of the access link. Customer connections are available from 56 Kbps to 44.210 Mbps with CIRs less than or equal to the access rate of the specified link.

## **Why BellSouth?**

BellSouth's Frame Relay:

- Improves performance and manages the bursty nature of LANs more efficiently than time division multiplexing.
- Eliminates process typical of X.25 networks.
- Eliminates link-by-link error monitoring.
- Offers speeds ranging from 56 Kbps (DS0) up to 45 Mbps (DS3).
- Reduces the delay seen across WANs from the 5-20 msec typical of X.25 to less than 2 msec.
- Offers significant savings over traditional, dedicated, private line network services when more than three locations in a metropolitan area need to communicate.

## **Network Monitoring**

Monitoring, surveillance, and troubleshooting duties are performed by the BellSouth Integrated Business Unit - Regional Operation Center (IBU-ROC), which consists of two operations centers:

- The Data Customer Support Center (DCSC) in Tucker, Georgia is responsible for orders, service, and maintenance/surveillance aspects of high-speed data services, including Frame Relay. The DCSC operates 24 hours a day, 7 days a week, and is the fold-down center for the Broadband Operation Center.
- The Broadband Operation Center (BBOC) in Charlotte, North Carolina is responsible for orders, service, and maintenance/surveillance aspects of broadband services. The BBOC operates 12 hours a day, 5 days a week.

## **Redundancy and Contingency**

The following attributes of BellSouth's Frame Relay network provide for network redundancy and contingency:

- All switches are designed to have diverse trunking for connectivity to the network.
- Each trunk is terminated on diverse input/output modules for component diversity.

- Each trunk is ordered through diverse carriers by site.
- Each trunk is designed with diverse physical routes by site.
- Backbone trunking is designed with ring-type topology.
- Current backbone trunk utilization is less than five percent.
- If the average trunk utilization ever exceeds 85 percent of existing trunk capacity during typical busy hours, additional capacity will be added.

The Cascade B-STDX 9000 broadband packet switch used throughout the BellSouth Frame Relay network is designed to support true hybrid networking among broadband packet networks, including Frame Relay, SMDS, and ATM. The switch provides fully redundant, high-performance, and flexible broadband packet-switching capability using standards-based foundations suited for both public carriers and private networks.

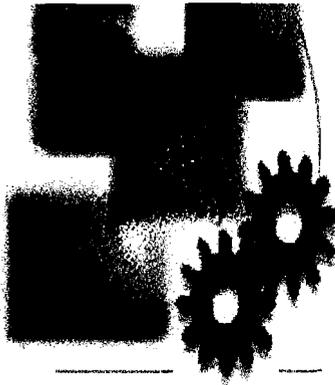
The hardware architecture employs symmetrical RISC multiprocessing that consists of a Control Processor (CP) interacting with multiple input/output (I/O) modules. The CP provides network and system management and network routing functions in support of the real-time switching functions provided by the multiple I/O modules.

The switch is equipped with four to eight Mbytes of frame buffer to accommodate traffic bursts, two to eight Mbytes of flash memory for on-line software updates, and 128 Mbytes of battery-backed-up RAM for configuration storage. It also implements special hardware for efficient allocation of processing power between packet processing and the background chores. High-resolution timer hardware is implemented to allow precise implementation of time average queue length algorithms for congestion control. The switch platform is based on a 1.2 Gbps backplane bus capable of supporting 12 OC-3c connections. The 1.2 Gbps bus can support approximately 2.3 million BTU transfers per second, or about 0.8 million 128-byte packets of Frame Relay data per second.

## **SECTION 3. CUSTOMER SUPPORT**

### **ACCOUNT TEAM SUPPORT**

Dedicated, responsive, and knowledgeable account personnel are vital to a successful partnership.



- Knowledgeable and Experienced Account Team
- Responsive, Dependable Support
- Commitment to Teamwork
- Extensive Telecommunications Training

Your BellSouth Account Team exemplifies our commitment to teamwork and is supported by the following resources:

- Customer Service Associate
- Systems Designer
- Project Manager
- Support Account Manager

Additionally, executive oversight is provided by:

- State Vice President
- Assistant Vice President
- Business Development Director
- Business Development Manager

A well informed account team can help your business by applying technology to solve business problems. BellSouth provides extensive telecommunications training to ensure that your account team is well informed on all telecom issues, products, and services. Employee training includes 12 weeks of introductory basic training, service excellence training, 12 weeks of data intensive training, and ongoing technology training.

## **BUSINESS REPAIR CENTERS**

There are eight BellSouth Business Repair Centers (BRCs) that are responsible for the installation and maintenance of network services throughout the BellSouth region. The BRCs are staffed on a 24x7 basis and interface with other BellSouth entities to test circuits, isolate trouble conditions, and coordinate the work activities necessary to provide outstanding customer service.

Their primary responsibilities are to:

- Receive trouble reports.
- Sectionalize or isolate the trouble condition, direct the efforts of local forces to resolve the trouble condition and ensure that the service is restored.
- Provide internal proactive escalation on existing trouble to ensure timely resolution of the service interruption.
- Provide the customer with trouble report status on a proactive and scheduled basis.
- Assume the role of customer advocate on all trouble conditions reported.
- Receive and act upon escalation requests from the customer.

## **Trouble Reporting**

Once a problem has been detected with a BellSouth service, the libraries needs to:

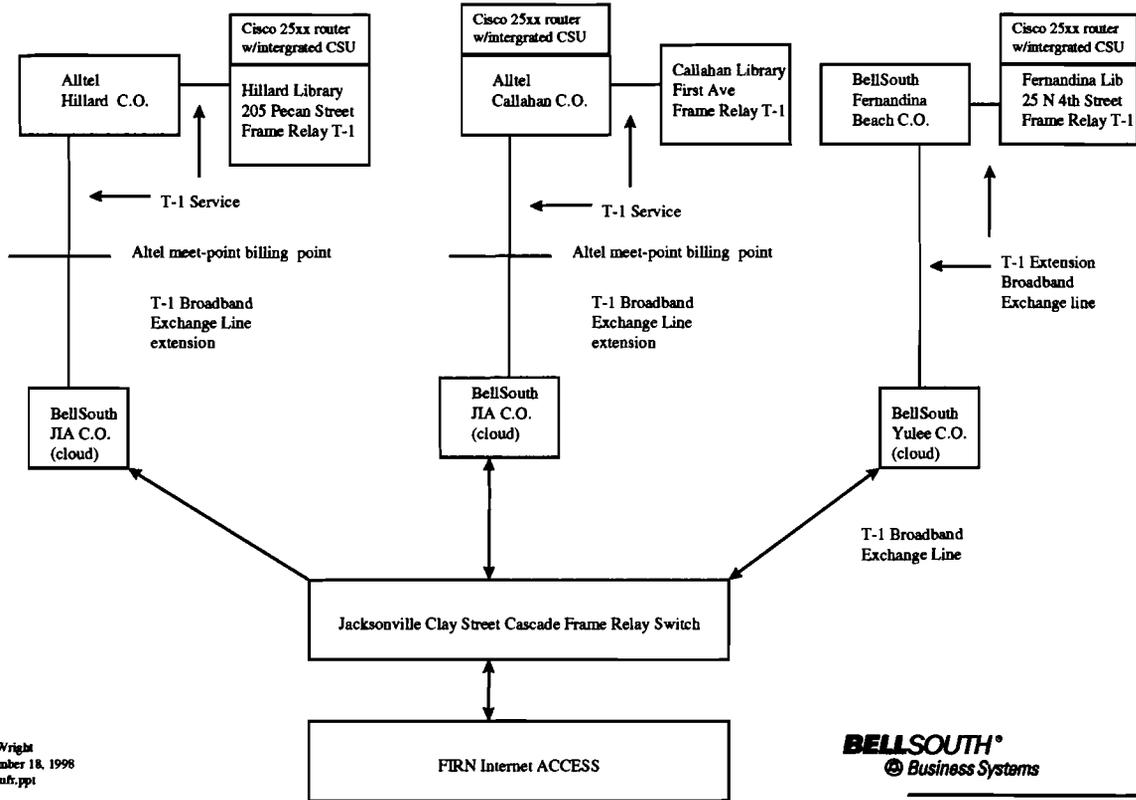
- Contact your BellSouth Business Repair Center.
- The caller reporting the trouble will need to know:
  - ♦ The telephone number (or circuit) with problems,
  - ♦ Whether the libraries considers it out of service,
  - ♦ The specific type of trouble, and
  - ♦ A contact number for calling the caller back.
- With the above information, the BRC determines whether it is a designed or non-designed service.
- If the trouble report is on a non-designed service (e.g., POTS):
  - ♦ The maintenance administrator will enter the trouble ticket into TAFI (Trouble Analysis Facilitation Interface), an automated test system that determines whether the trouble is inside the CO (central office), outside the CO, or at the customer's premises. If possible, the maintenance administrator will stay on the line with the caller until the initial test is run to report the result and an estimated time of repair.
  - ♦ If TAFI determines the trouble is in the CO, TAFI will drop the ticket in the DI (dispatch in) pool for a CO technician to pick up and test/analyze further.

- ◆ During this process, the maintenance administrator will periodically check the status of each ticket entered during the day to update the caller on the progress of the repair effort. Our objective is to status the caller:
  - After the initial test/screen,
  - When a technician is dispatched,
  - If our commitment is in jeopardy,
  - Upon arrival and departure for the premises, and
  - When the ticket is closed.
- ◆ If the problem is determined to be a software type of trouble, the maintenance administrator can perform some basic software verifications in the CO switch to determine if the line is translated properly.
- ◆ If the software appears to be correct but the problem persists, the maintenance administrator drops the ticket in the pool for the NISC (Network Infrastructure Support Center) to verify and analyze further.
- ◆ In all cases, the maintenance administrator is the point of contact for the caller on the status and resolution of trouble reports on POTS lines.
- ◆ If the trouble analysis at the customer premises shows that the trouble is behind the network interface, the caller will be advised and the ticket closed.
- If the trouble report is on a designed service (e.g., MegaLink Channel Service):
  - ◆ The maintenance administrator will enter the trouble ticket into the Integrated Testing System, an automated testing system. Each designed service has a circuit design card that the Integrated Testing System can look at to determine where the test points are located in the circuit and then begin the trouble isolation process. Designed services differ from non-designed services in that they often involve more than one CO and can have multiple points in which to test and isolate trouble.
  - ◆ If the Integrated Testing System can isolate the trouble to a particular segment of the circuit, it will drop the ticket into a DI (dispatch in) or DO (dispatch out) pool as appropriate, and the appropriate technician will act upon the test results along with the comments that the Integrated Testing System has added to the log.
  - ◆ If the Integrated Testing System cannot isolate the trouble, or if the test results are inconclusive, it will drop the ticket back in the pool for a testing technician to test further.
  - ◆ The testing technician will then handle and route appropriately after the manual tests are run.
  - ◆ The testing technician will also inform the caller:

- After the initial test,
- When a technician is dispatched,
- If our commitment is in jeopardy,
- Upon arrival at the premises,
- Upon departure from the premises, and
- At the close.

## SECTION 4. NETWORK DESIGN

### Nassau County Library Frame Relay Network



Fred Wright  
September 18, 1998  
Nassau.fr.ppt

**BELLSOUTH®**  
Business Systems

Please refer to the following page for pricing information.

## **SECTION 5. PRICING**

**FIRN ATS PACKAGE 1 - INTRANET/FIRN (INTERNET) ACCESS**

FIRN Advanced Telecommunications Services (ATS) Package 1 provides fully managed service connection to a FIRN or District Area network (DAN) hub location for access to shared data resources and the Internet.

All Package 1 Services require appropriate connectivity to the BellSouth Fast Packet network including BellSouth provisioned Broadband Exchange Lines (BBELs) at both the end user and the FIRN or DAN hub locations. FIRN currently provides appropriate BellSouth Fast Packet connections and BellSouth provisioned Broadband Exchange Lines for the FIRN hubs. These fast packet connections may be established at DS-0, DS-1 AND DS-3 speeds.

FIRN ATS Package 1 includes lower packaged frame relay (Contract Service Arrangements NF97-3967-00 & NF97-3969-00) coupled with CPE rates under terms compliant with the Universal Service Fund. Customer Premises Equipment (CPE) provisioning options are available as follows:

- FIRN ATS Package 1A - NEW customer provided equipment compliant with BellSouth Specifications.
- FIRN ATS Package 1B - NEW BellSouth provided equipment.
- FIRN ATS Package 1C - EXISTING customer provided equipment compliant with BellSouth specifications.

**NASSAU COUNTY PUBLIC LIBRARIES PACKAGE WILL INCLUDE FIRN ATS PACKAGE 1B- NEW BELLSOUTH PROVIDED EQUIPMENT.**

General Service Description:  
 FIRN ATS PACKAGE 1B allows the libraries to acquire the equipment configurations listed below, directly from BellSouth, as part of their FIRN ATS connection. With this option, all customer premises equipment is owned, managed and maintained by BellSouth.

Assembly	Access Speed	Router	Software	Revision	CSU/DSU	WAN Ports	LAN Ports	WAN Protocol	LAN Connection
A	DS-0 Only	Cisco 1602	11.1(9AA) or later	Integrated	Integrated	1	1	IP only	Ethernet (AUI) or 10BaseT
C	DS-1	Cisco 2524/2525	11.0 or later	Integrated	Integrated	1	1	IP only	Ethernet (AUI) or 10BaseT or Token Ring (DB9-FTP or UTP)
E	DS-1	Cisco 3810	11.3.1M or later	Integrated or Digital	Link Dual Port CSU/DSU	2 (1 Frame Relay/1 ATM when required)	1	IP only	Ethernet (AUI) or Token Ring when available.

**CONFIGURATION AND STAGING:**

BellSouth will stage and configure the devices according to customer requirements. Configuration and staging activities may include address information, routing table definition, routing protocol support and other programming necessary to ensure proper management of the equipment after installation. Upon completion of configuration and staging, BellSouth will ship the equipment to the customer for installation.

## INSTALLATION:

FIRN ATS PACKAGE 1B supports the installation of equipment by BellSouth.

## MONITORING and MANAGEMENT:

BellSouth shall provide service management for non-critical work (intermittent performance related or both) during normal business hours (8:00 a.m. to 5:00 p.m. EST, MONDAY THROUGH Friday) and shall make available 24 hours a day, 7 days a week for critical work (complete service outage). This function includes the monitoring, administration and configuration of service connections. BellSouth is responsible for all software revision and hardware upgrades necessary to ensure network integrity and manageability. Ensuring the integrity of the customer's connection, from the premises all the way through the network to a FIRN ATS point of presence, may require configuration/permissions changes in the separately provided FIRN or DAN hub router. Therefore, access to the appropriate limited subset of hub router commands must be negotiated with hub owner prior to the implementation of this option. If BellSouth does not have appropriate limited access to the hub router, end-to-end service levels may be affected. Support of future user applications may require premises equipment upgrades involving additional fees to the customer.

## TROUBLE ISOLATION and RESOLUTION:

BellSouth will be the customer's Single point of contact (SPOC), in BellSouth defined service areas, for non-applications oriented trouble isolation and resolution. BellSouth shall provide these services, for non-critical work (intermittent, performance related or both), during normal business hours (8:00 a.m. to 5:00 p.m., EST, Monday through Friday). Out of hours trouble isolation and resolution may also occur for critical work (complete service outage). Should a service affecting problem exist, BellSouth will coordinate the appropriate resources, and execute the appropriate actions to resolve the problem. In conjunction with these activities, BellSouth will provide the designated customer contact with periodic progress reports until the problem is resolved. BellSouth will work closely with the appropriate FIRN network engineers and technicians to quickly resolve BellSouth provisioned Internet (State of Florida Internet Access (SOFIA)) related issues and problems. The customer is responsible for providing real-time access to their facilities, for BellSouth and their service contractors. BellSouth reserves the right to bill the customer for unsuccessful attempts to gain real-time access or chronic trouble not found conditions.



# Nassau County Library Frame Relay Network

