

## **VI. Maintenance and Repair (M&R) Domain Results and Analysis**

### **1.0 Description**

The purpose of this section is to present the specific tests, results, and analysis from KCI's evaluation of the systems, processes, and other operational elements associated with BellSouth's support for Wholesale Maintenance and Repair. Maintenance & Repair (M&R) includes the network information, diagnostic tools, personnel, and processes that allow Competitive Local Exchange Carriers (CLECs) to diagnose and solve customer trouble complaints or otherwise assist customers who experience service disruptions. The M&R tests assessed the functionality of repair systems and the adequacy and accuracy of operational processes and procedures and supporting documentation.

### **2.0 Methodology**

The scope of the M&R tests encompassed the review and analysis of BellSouth's processes, procedures, and systems for Wholesale trouble reporting and repair. This was accomplished by evaluating the equivalence of BellSouth's end-to-end processes for retail and wholesale trouble reporting and repair of xDSL lines, as well as by testing the Trouble Analysis Facilitation Interface (TAFI) and the Electronic Communications Trouble Administration (ECTA) functionality on resale lines.

#### **2.1 Business Process Description**

Three methods exist for BellSouth CLEC customers to report and resolve troubles: Submission of trouble tickets through the TAFI or ECTA Gateways, and by manually telephoning a trouble report to a BellSouth work center. These methods are described below.

#### **TAFI**

TAFI can be accessed using a Telnet protocol through a LAN-to-LAN or dial-up connection to BellSouth. It does not support a Graphical User Interface (GUI). Rather, it uses a non-traditional "window" format that is divided into three types: Main Menu, Sub Menus, and Pop-up Windows.

The TAFI application is a rules-based system that provides automated trouble receipt and screening functionality to both CLEC and BellSouth retail repair center users. Its design guides users through a series of questions and instructions in order to allow the initial point of contact to resolve or route telephone number-based- (TN-) based, Plain Old Telephone Service (POTS) customer service problems. In essence, TAFI acts as a tool that collects data from the user and the various downstream applications in order to generate recommendations for resolving POTS problems. Reports leaving TAFI as a result of a trouble fall into one of three categories: resolved/closed, routed to the

appropriate entity for resolution, or cancelled. While TAFI itself does not perform any repair functions, it allows access to downstream systems that can repair some trouble types in “real time.”

Both BellSouth and CLECs use the TAFI system for handling POTS trouble reports. BellSouth states that the version created for CLECs is similar to the BellSouth version for trouble processing functionality, with the following differences.

- The CLEC is restricted to accessing BellSouth records for its own customers.
- The TAFI Supervisor function is configured for a given CLEC user community.
- BellSouth processes its residential and business customers on different TAFI servers, while CLECs currently use one system for all of their customers.

In addition to these internal security measures, BellSouth has incorporated additional layers of security to restrict unauthorized usage. These layers include system user passwords that automatically expire, as well as SecurID tokens.

TAFI interacts with specific BellSouth downstream systems, the functions of which fall within two primary areas of activity:

- Trouble administration systems for POTS lines
- Test systems for fault identification.

The following table highlights each of the downstream systems and their functions as well as some reports accessed by TAFI. There are three different LMOS systems, 16 Predictor systems, and four March systems. Multiple systems exist for load balancing purposes, and provide identical functionality.

**Table VI-A: BellSouth M&R Downstream Systems and Reports Accessed by TAFI**

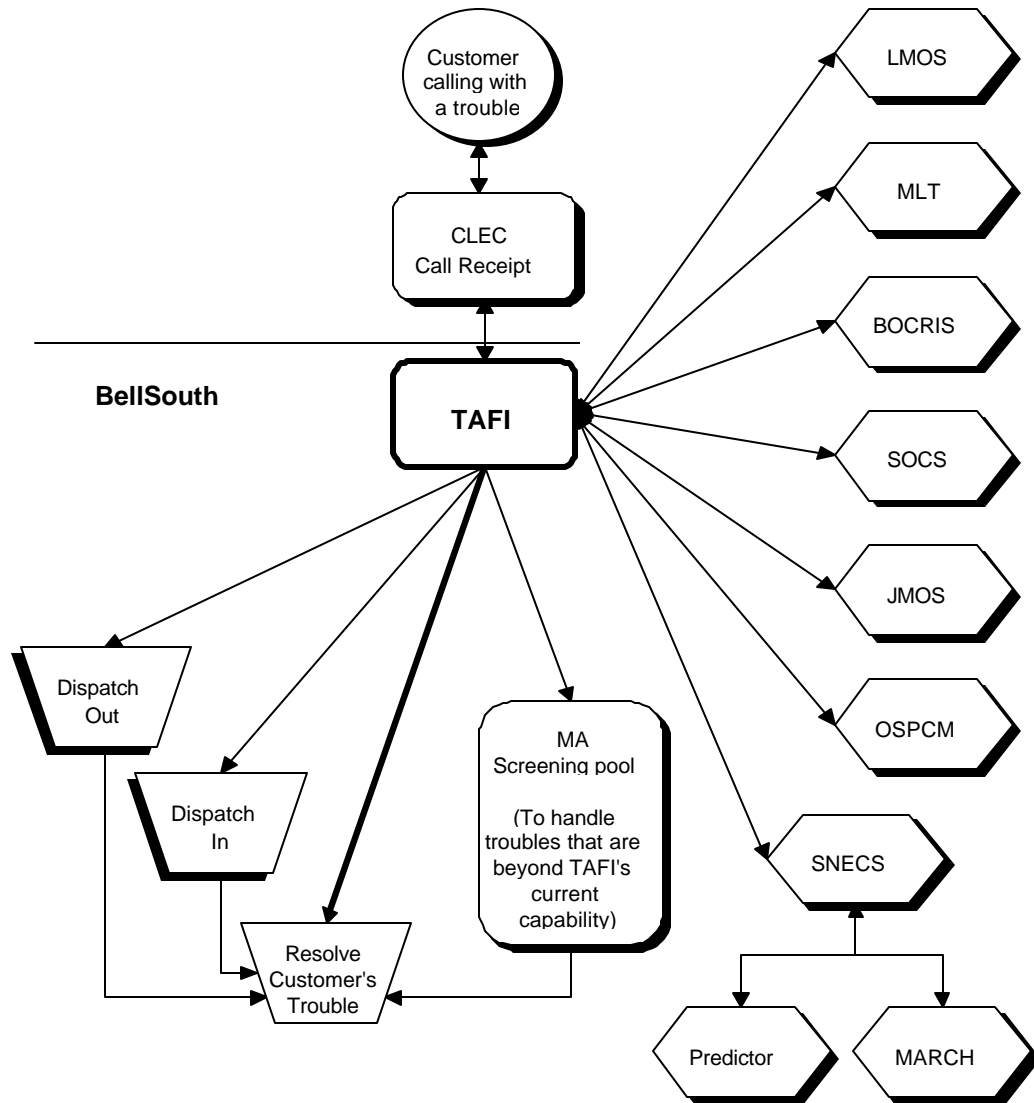
System	Description
BOCRIS: Business Office Customer Record Inventory System	Provides service order information including Name, Address, Class of Service, Maintenance Plan, Restrictions, Features, and Preferred Interexchange Carrier (PIC).
COSMOS: Computer System for Mainframe Operations	Provides frame data used in problem analysis.
JMOS: Job Management Operations System	Provides outside plant and construction workload scheduling and reporting. Used to track contractors performing buried service wire activity.
LFACS: Loop Facility Assignment and Control System	Provides facility data used in problem analysis.

LMOS: Loop Maintenance Operations System	Supplies trouble ticket processing and the following information: Name and Address verification, Working Condition, Trouble History, Commitments, Failure information, Unit #, Pending Reports, Status, Category of Report, Pending Service Order information, and facilities.
MARCH	Provides the mechanism to add or delete features to or from a line.
MLT: Mechanized Loop Testing	Provides loop testing on the customer's line number.
OSPCM: Outside Plant Construction Management System	The Navigator compatible replacement for JMOS.
PREDICTOR	Identifies and verifies line features present on the customer's line.
SNECS: Secured Network Element Contract Server	A peer to peer computer interface between TAFI and the Predictor and MARCH systems.
SOCS: Service Order Communication System	Issues a service order when adding a new feature to a customer's line, and verifies the status of an order.
DATH Trouble History	LMOS Display Abbreviated Trouble History - A trouble history report showing just the close out narrative on previous trouble reports.
DLETH Trouble History	LMOS Display Extended Trouble History - A trouble history report showing every line of status on previous trouble reports.
DLR	LMOS Display Line Record - Displays the customer's Line Record in LMOS.

If TAFI determines that one of its downstream systems cannot resolve the problem, it then routes the trouble to either the Maintenance Assistant Screening Pool for further analysis, or directly to the Work Management Center (WMC) for dispatching of technicians to the Central Office (Dispatch-In) or to the customer site (Dispatch-Out).

The following diagram illustrates the downstream systems and their relationship to TAFI.

Figure VI-A: BellSouth Trouble Administration Systems Used by CLECs



## ECTA

The BellSouth Electronic Communications Trouble Administration (ECTA) Gateway is BellSouth's implementation of an American National Standards Institute (ANSI) T1M1 compliant electronically bonded trouble administration interface<sup>1</sup>. Competitive Local Exchange Carriers (CLECs) must possess an electronic interface to access BellSouth's

<sup>1</sup> The T1M1 standard is outlined in ANSI documents T1.227, T1.228 and T1.262 as well as the General Network Information Model of which these ANSI standards are an extension.

ECTA Gateway. Currently, there are two options available for a CLEC that wants to use ECTA for trouble management. Option one is the Electronic Communication-Common Presentation Manager (EC-CPM) interface made available by BellSouth. This interface does not offer the full complement of available ECTA functions. Option two is an interface that a CLEC builds itself, based on the ANSI T1.227, T1.228 and T1.262 standards for trouble administration. Currently, there are no CLECs using the EC-CPM interface to access ECTA. CLECs that are currently using the ECTA Gateway for trouble administration have programmed their own interfaces for access to the BellSouth system. Presently, there are only two CLECs that have programmed this interface, and the current trouble volume being processed is approximately 35 trouble tickets per month.

CLECs can use the ECTA Gateway to run Mechanized Loop Testing (MLT) evaluations on lines<sup>2</sup>, enter and cancel trouble tickets, check the status of trouble tickets, and modify or add information to trouble tickets for both non-designed and designed services through an electronically bonded interface. When the user enters trouble tickets into the ECTA Gateway, they are routed to the appropriate downstream system, based on whether they are for designed or non-designed systems. Trouble tickets for designed systems are directed to the Work Force Administration (WFA) application and are processed manually.

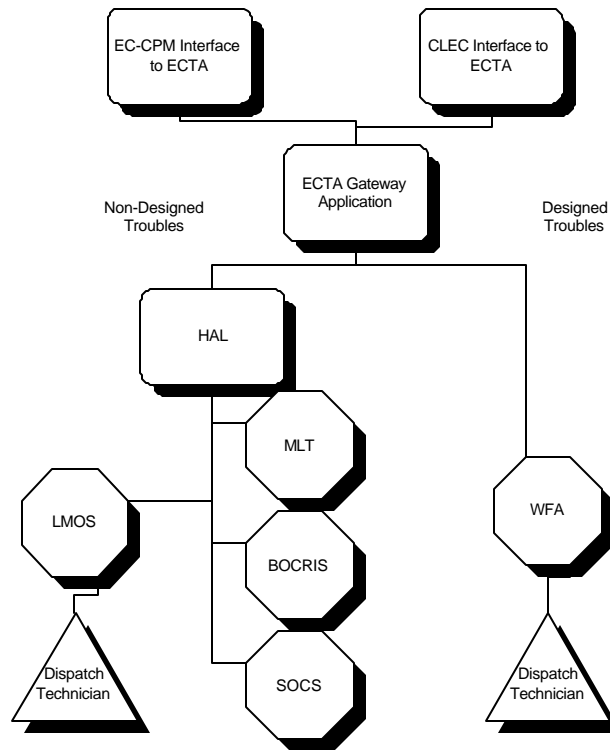
Trouble tickets for non-designed systems are forwarded to the "Hands-Off" Assignment Logic (HAL) system that further automates their processing. Upon receipt of a trouble ticket, the HAL system ensures data confidentiality by validating that telephone numbers for which trouble tickets are created belong to the CLEC submitting the ticket. HAL then initiates the correct Loop Maintenance Operations System (LMOS) transaction and processes the request. The HAL system has the capability to assess whether an MLT test is required and, if so, submits the request for an MLT evaluation. Once MLT results are returned, HAL has the capability to route trouble tickets to appropriate downstream systems based on those test results<sup>3</sup>.

The relationship between the various systems is illustrated below:

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<sup>2</sup> MLT is available only for POTS lines.

<sup>3</sup> See Table VI-B for a complete list of systems and their functions.

**Figure VI-B: ECTA Systems Diagram**

### Downstream Systems

ECTA is connected to BellSouth's legacy systems via the HAL system. The specific systems accessible through HAL are:

**Table VI-B: Systems Accessible through HAL**

System	Function
LMOS: Loop Maintenance Operations System	Supplies trouble ticket processing and provides account and trouble processing information.
MLT: Mechanized Loop Testing	Provides loop testing on the customer's line number.
BOCRIS: Business Office Customer Record Inventory System	Provides service order information including name, address, class of service, maintenance plan, restrictions, features, and Preferred Interexchange Carrier (PIC).
SOCS: Service Order Communication System	Issues a service order when adding a new feature to a customer's line and verifies the status of an order.

Once a trouble ticket has been submitted to ECTA, any change in the status of that ticket made by a BellSouth maintenance administrator is communicated back to the CLEC via an electronic Attribute Value Change (AVC) within the ECTA system.

### *ECTA Alternatives*

ECTA allows CLECs to enter trouble reports for either designed or non-designed circuits. Trouble reports for designed systems that are not entered into ECTA by a CLEC are telephoned to a BellSouth service center. BellSouth customer service representatives receiving these trouble reports enter the information directly into the WFA system and bypass the ECTA Gateway. This is the same process that occurs for BellSouth's own retail designed service trouble reports. In addition to using ECTA, CLECs also have the option of entering non-designed trouble tickets into the BellSouth-provided Trouble Administration Facilitation Interface (TAFI) system. CLEC trouble tickets that are reported through ECTA can be electronically bonded between the Operating Support Systems (OSS) of BellSouth and those of the owning CLEC. Trouble reports that are telephoned to a BellSouth service center and trouble reports entered into TAFI can not be electronically bonded to the CLEC's OSS. For these non-ECTA trouble reports, the owning CLEC must re-key data into their own OSS to keep an electronic record of the trouble.

### *ECTA Interface Implementation Process*

BellSouth does not produce any documentation available externally that outlines the full functionality of the ECTA Gateway. The only documentation produced by BellSouth concerning the ECTA Gateway is the CLEC-specific Joint Implementation Agreement (JIA), which is not intended to be used by ECTA end-users. The JIA outlines points specific to an implementation of an ANSI T1.227-, T1.228- and T1.262-compliant CLEC interface to BellSouth's ECTA Gateway.

Each implementation of an ECTA interface by a CLEC is customized based upon a CLEC's request for functionality/system objects, and negotiations between BellSouth and the CLEC to define final functionality and object support.

### *Interface Used for ECTA Testing*

As development of an ANSI-compliant interface for ECTA testing was not in the scope of the *Supplemental Test Plan*, KCI performed functional and performance testing using a Test Interface developed by BellSouth that is not available for CLEC use. BellSouth uses this Test Interface for internal development testing. Use of this interface allowed KCI to overcome limitations that would have arisen had one of the interface options available to a real CLEC been used: 1) the EC-CPM interface does not offer the full complement of ECTA functions currently available to CLECs, and the system responses through the required dial-up EC-CPM connection were judged to be too slow to allow for adequate performance testing; and 2) use of a CLEC-developed interface could compromise the ability to accurately evaluate ECTA functionality by introducing performance aspects of the CLEC's interface into the evaluation.

## ***Manual Telephone Call***

A CLEC also has the option of telephoning a BellSouth work center directly to report a trouble. In the case of troubles for non-designed services and POTS, the CLEC telephones the BellSouth Resale Maintenance Center (BRMC). In the case of troubles for designed services, the CLEC telephones the BellSouth Unbundled Network Element Center (UNEC). After taking the information from the CLEC, the BellSouth Maintenance Administrator (MA) would then determine into which M&R system to enter the trouble report (i.e., TAFI, LMOS, or WFAC).

### ***2.2 Scenarios***

Various M&R-related scenarios were used to evaluate the M&R trouble repair process and systems. Specific details are provided in each of the individual M&R Test descriptions.

### ***2.3 Test Bed***

The M&R test bed was designed to represent an appropriate mix of services (i.e., line types and feature types) that BellSouth offers its Wholesale customers. The following lists those included in the M&R test:

#### **Line Types**

Plain Old Telephone Service  
- UNE Loop  
- UNE Loop/Port Combo  
- Resale  
PBX  
Synchronet

#### **Feature Types**

3-way calling  
Call waiting  
Call forwarding  
Call blocking  
No dial tone  
Caller ID