D. Test Results: Electronic Communications Trouble Administration (ECTA) Peak Volume Performance Test (M&R-4)

1.0 Description

The ECTA Peak Volume Performance test evaluated the current release of BellSouth's ECTA Gateway for Maintenance and Repair trouble report processing under projected year-end 2001 (YE01) peak load conditions. The objectives of the test were to determine the effect of YE01 peak load conditions on the viability of functionality in the current version of the ECTA Gateway and this gateway's response times. This test was conducted by submitting the projected peak volume of ECTA transactions against resale and UNE test bed accounts and analyzing ECTA Gateway responses to these transactions[1].

Methodology

This section summarizes the test methodology.

2.1 Business Process Description

See Section VII, "Maintenance & Repair Overview" for a description of BellSouth's ECTA Gateway[2] and CLEC interface options.

2.2 Scenarios

The breakdown of ECTA transactions submitted for this test is shown below in Table VII-4.3. These transactions were submitted against a test bed comprised of 20 UNE lines and 9 resale lines.

2.3 Test Targets & Measures

The test target was the maintenance and repair process for resale and UNE services via the ECTA Gateway under peak load conditions. Sub-processes, functions, and evaluation criteria are summarized in the following table. The last column 'Test Cross-Reference' indicates where the particular measures are addressed in section 3.1 "Results & Analysis."

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[1] See Section VII, "M & R Overview" for details on the Maintenance and Repair test bed.

[2] A new release of BellSouth's ECTA was implemented in May 2000 that enhanced the middleware that captures data from WFA for complex trouble tickets. Based on KCI's understanding of the changes implemented, obtained through documentation review, it is KCI's opinion that these changes to the interface would not affect the results of this evaluation.

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Table VII-4.1: Test Target Cross-Reference

Sub-Process	Function	Evaluation Criteria	Test Cross-Reference
Trouble Reports	Create trouble report	Correctness of Response	M&R-4-1-1
		Timeliness of Response	M&R-4-2-1
	Request trouble ticket status	Correctness of Response	M&R-4-1-2
		Timeliness of Response	M&R-4-2-2
	Add trouble information	Correctness of Response	M&R-4-1-3
		Timeliness of Response	M&R-4-2-3
	Modify trouble report	Correctness of Response	M&R-4-1-4
		Timeliness of Response	M&R-4-2-4
	Cancel trouble report	Correctness of Response	M&R-4-1-5
		Timeliness of Response	M&R-4-2-5

See M&R-3: ECTA Normal Volume Performance test for a description of the time intervals targeted for this test.

2.4 Data Sources

The data collected for the test are summarized in the table below.

**Table VII-4.2: Data Sources for ECTA Peak Volume Performance Test**

Document	File Name	Location in Work Papers	Source
Joint Implementation Agreement for Electronic Communications Trouble Administration (ECTA) Gateway for Local Service Version 10/07/98	CLEC_JIA.doc	M&R-2-A-1	BLS
American National Standard for Telecommunications – Operations, Administration, Maintenance and Provisioning (OAM&P) – Extension to Generic Network Information Model for Interfaces between Operations Systems across Jurisdictional Boundaries to Support Fault Management (Trouble Administration) (ANSI T1.227-1995)	ANSI+T1[1].227-1995.pdf	M&R-2-A-2	American National Standards Institute

Document	File Name	Location in Work Papers	Source
American National Standard for Telecommunications – Operations, Administration, Maintenance and Provisioning (OAM&P) – Services for Interfaces between Operations Systems across Jurisdictional Boundaries to Support Fault Management (Trouble Administration) (ANSI T1.228-1995)	ANSI+T1[1].228-1995+(R1999).pdf	M&R-2-A-3	American National Standards Institute
E-Mail Communication Re: BLS Volume Forecast	No Electronic Copy	M&R-3-4-A-1	BLS
Volume Results Files	volume results.zip	M&R-3-4-A-3	KCI
Volume Transaction Sequence File	volume transaction sequence.zip	M&R-3-4-A-4	KCI

2.4.1 Data Generation/Volumes

See section 2.4.1 of M&R-3: ECTA Normal Volume Performance Test for a derivation of the YE01 normal expected transaction volumes.

For M&R-4, the normal hour for a peak day was calculated as a multiple of the normal day baseline load from M&R-3: ECTA Normal Volume Performance Test, using 1.5 as the multiple factor. The resulting profile of 'trouble ticket creates' per hour is shown in Figure VII-4.1 below.

Figure VII-4.1: Distribution of Trouble Reports[3]
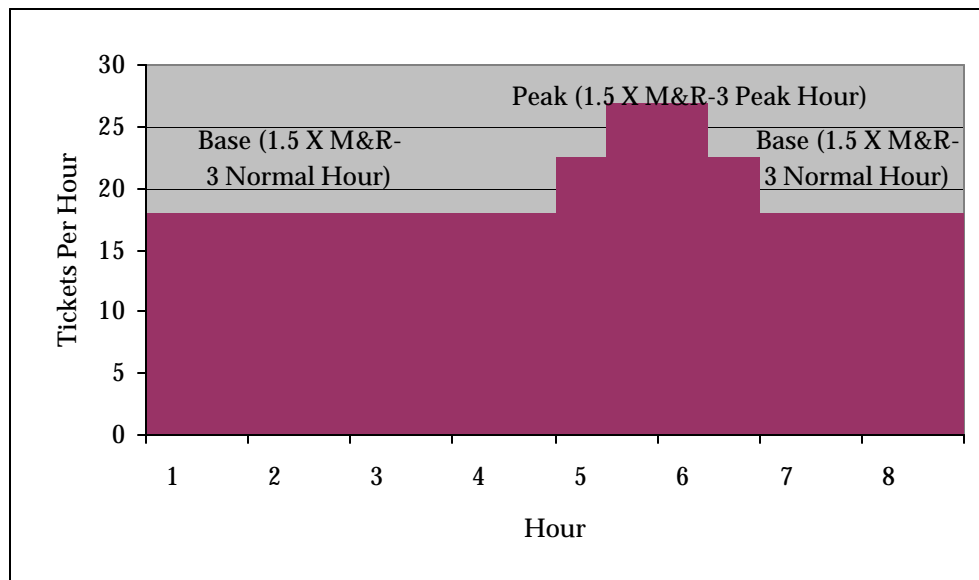
Using the same methodology described in M&R-3: ECTA Normal Volume Performance Test, the total number of transactions for a base hour were calculated off of the peak baseline number of trouble tickets per hour. The resulting transaction distribution is shown in Table VII-4.3.
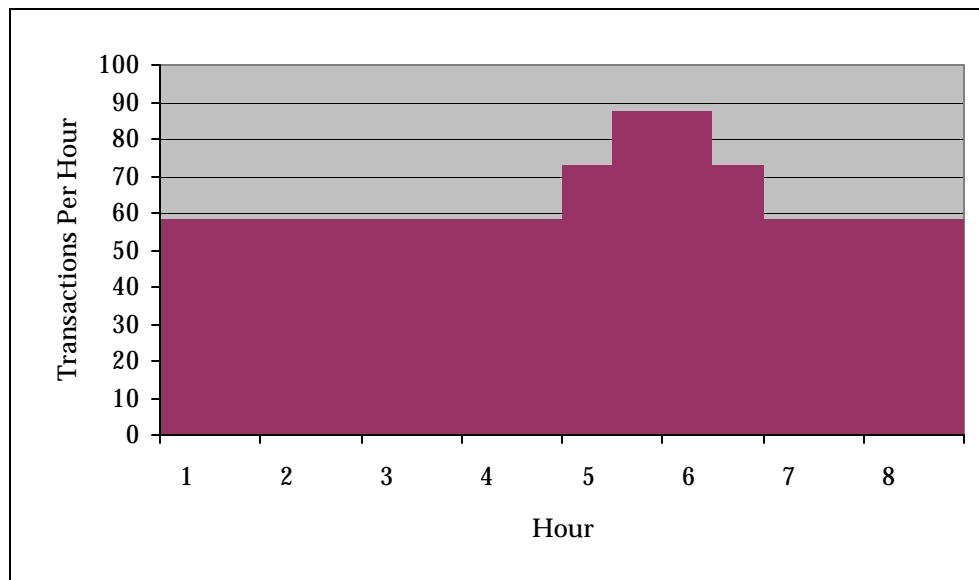
TableVII-4.3: Transactions Per Hour[4]

Transaction Type	Transactions / Create	Transactions / Hour
Enter Trouble Report	1.00	18
Request Trouble Report Status	0.42	8
Add Trouble Information	0.42	8
Modify Trouble Administration Information	0.42	8
Cancel Trouble Report	1.00	18
Total	3.25	60

Figure VII-4.2 below shows the total transaction distribution across time:

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[3] Testing took place between 8:30 A.M. and 4:30 P.M. on the first day of testing and between 9:30 A.M. and 5:30 P.M. on the second day.

[4] See M&R-3: ECTA Normal Volume Performance Test for a description of the data in this table.

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Figure VII-4.2: Transactions Per Hour[5]

As with M&R-3, transaction volumes were boosted by 15% to compensate for transaction failures caused by the BLS Test Interface. In the actual tests, Test Interface error levels did not exceed 13% and therefore did not compromise the planned volume of test transactions. See Section VII, "M&R Overview" for a description of the Test Interface employed by KCI in this evaluation.

2.5   Evaluation Methods

The ECTA Peak Volume Performance Test evaluated the behavior and performance of the ECTA interface under "peak[6]," YE01 projected transaction load conditions. The test cycle was executed using UNIX test scripts capable of submitting large volumes of resale services and UNE trouble test cases in a manner consistent with ECTA's forecasted daily usage patterns and transaction mix, including error conditions. The test was executed during two, eight-hour periods by modeling expected, normal daily usage. The peak volume forecast was a multiple applied to the non-peak hourly load calculated in M&R-3: ECTA Normal Volume Evaluation.   Trouble transaction loads were distributed geographically across multiple Georgia Central Offices (COs) to reflect a realistic operating environment.

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[5] Testing took place between 8:30 A.M. and 4:30 P.M. on the first day of testing and between 9:30 A.M. and 5:30 P.M. on the second day.

[6] For the purposes of this evaluation, peak volumes are a multiple applied to the average expected volume as defined in M&R-3: ECTA Normal Volume Evaluation.

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The ECTA Peak Volume Performance Test evaluated each of the ECTA functional processes against two criteria: correctness of system responses and timeliness of system responses. The evaluation consisted of the following steps:

1. A Load Profile was developed outlining the timing between transactions per BellSouth's volume projections for YE01 (see section 2.4.1 for a detailed description).

2. The order and timing of each test transaction was outlined in two test sequence files, one for each eight-hour period. Each line in these files included the following:

    • Data to be entered into the ECTA Test Tool.

    • A line of UNIX test code to submit a transaction to the ECTA Test Tool.

3. Data input files and UNIX test scripts were developed from the test sequence files and uploaded to the BellSouth Test Tool system.

4. Each test script was executed to submit transactions to the ECTA Test Tool.

5. The ECTA Gateway system agent log and response messages to the ECTA Test Tool were analyzed to log transaction times and to verify expected system responses[7]. Exceptions or mismatched responses were flagged and investigated.

6. Data from Step 5 were compiled and mapped against the individual evaluation criteria.

2.6   Analysis Methods

The ECTA Peak Volume Performance Test included a checklist of evaluation criteria developed by KCI during the initial phase of the BellSouth - Georgia OSS Evaluation. These evaluation criteria, detailed in the *Master Test Plan*, provide the framework of norms, standards, and guidelines for the ECTA Peak Volume Performance Test.

The data collected from transaction processing were analyzed employing the evaluation criteria referenced above.

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[7] The ECTA Gateway automatically produces entries into the agent log as transactions occur. KCI monitored the agent log during testing and downloaded the test log for analysis directly from the ECTA server. The integrity of the ECTA agent log was verified in M&R-2: ECTA Functional Test.

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3.0   Results Summary

This section identifies the evaluation criteria and test results.

3.1   Results & Analysis

The results of this test are presented in the table below.   Definitions of evaluation criteria, possible results, and exceptions are provided in Section II.

Table VII-4.4: M&R-4 Evaluation Criteria and Results -- Presence of Functionality

Test Cross-Reference	Evaluation Criteria	Result	Comments
M&R-4-1-1	The user receives the correct response when entering a trouble ticket into ECTA.	Satisfied	The correct response was received on 392 of 397 create request transactions. On five transactions, an error was received indicating that the LMOS system had assigned a trouble ticket ID that already existed in the ECTA Gateway database. These tickets, once created, were not accessible through the ECTA Gateway and had to be manually cancelled by BLS personnel. KCI issued Exception 15 to describe this defect. BLS responded by changing system maintenance parameters to purge old trouble report IDs from the ECTA Gateway database more frequently. KCI testing verified that BLS had indeed changed the purge parameter. Given this, KCI concluded that the likelihood of similar problems occurring in the future had been reduced to acceptable levels. Exception 15 is closed. See Exception 15 for additional information on this issue.
M&R-4-1-2	The user receives the correct response when requesting the status of a trouble ticket using ECTA.	Satisfied	The correct response was received for 144 out of 144 request status transactions.
M&R-4-1-3	The user receives the correct response when adding trouble information to a trouble ticket using ECTA.	Satisfied	The correct response was received for 160 out of 160 add transactions.

Test Cross-Reference	Evaluation Criteria	Result	Comments
M&R-4-1-4	The user receives the correct response when modifying trouble administration information using ECTA.	Satisfied	The correct response was received for 143 out of 143 modify transactions. 57 of the 143 transactions contained intentional errors. Correct error responses were received for these transactions.
M&R-4-1-5	The user receives the correct response when canceling a trouble ticket using ECTA.	Satisfied	The correct response was received for 319 of 319 cancel transactions.

Table VII-4.5: M&R-4 Evaluation Criteria and Results -- *Timeliness of Response*

Test Cross-Reference	Evaluation Criteria	Result	Comments
M&R-4-2-1	The response when entering a trouble report using ECTA is within BLS published specifications[8].	Satisfied	The MTTR[9] for 392 create requests was 16 seconds. Four responses were received in excess of 30 seconds. All responses were received within 180 seconds.
M&R-4-2-2	The response when requesting trouble report status using ECTA is within BLS published specifications[8].	Satisfied	The MTTR for 144 status requests was less than 0.5 seconds. All responses were received within 30 seconds.
M&R-4-2-3	The response when adding trouble information using ECTA is within BLS published	Satisfied	The MTTR for 160 add requests was seven seconds. All responses were received within 30 seconds.

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[8] BellSouth's *Joint Implementation Agreement (JIA) for Electronic Communications Trouble Administration (ECTA) Gateway for Local Service between CLEC and BellSouth,* Version 10/07/98 states "The end-to-end protocol target response time will be 30 seconds or less for 90% of the requests while handling 40 messages per minute. End to End [sic] maximum response time will not exceed 180 seconds." During this test, the maximum number of KCI messages per minute for any hour in the test was 22.9. KCI observed that there was no discernable difference in ECTA performance during the periods of highest message volume.

[9] Mean Time To Response (MTTR) measures the average response time for all valid transactions. Individual response times are calculated as the difference between the time that the transaction is entered (time T2 in Figure VII-3.1) and the time that the response comes back from the ECTA Gateway (time T7 in Figure VII-3.1).

Test Cross-Reference	Evaluation Criteria	Result	Comments
	specifications[8].		
M&R-4-2-4	The response when modifying trouble report administration information using ECTA is within BLS published specifications[8].	Satisfied	The MTTR for 86 modify requests was seven seconds. The MTTR for 57 modify requests with intentional errors was less than 0.5 seconds. All responses were received within 30 seconds.
M&R-4-2-5	The user receives the correct response when canceling a trouble ticket using ECTA[8].	Satisfied	The MTTR for 319 cancel requests was seven seconds. Two responses were received in excess of 30 seconds. All responses were received within 180 seconds.