2. ORDERING

With the preorder steps completed, the requisite information will have been obtained from the CLEC and the initiation of a service order can begin. Submitting a service order will result in the provisioning and installation, if necessary, of a customer's service. The capabilities required to order service are: open a service order, check facility availability, reserve an appointment if technician work is required, reserve a telephone number if appropriate, cancel a service order, change a service order, send a firm order confirmation, support for work order status queries, and send notification of order completion.

Work Order Request/Cancel/Change

The work order provides the information and actions required for USWC to provision products, services and features. This transaction will also be used to cancel and change existing work orders. The information contained in a work order identifies the CLEC, the customer-desired due date, the service being requested, the order type (only change and migration to CLEC), POA (Proof of Authorization), class of service, telephone number and additional information needed to successfully provision the requested service to the customer. Once a work order is accepted by USWC, the assigned service order number will be returned to the CLEC. The CLEC can then use the service order number to status the work order.

Initially, this capability will allow the CLEC to electronically submit the service request, but because the gateway will not be able to fully complete the conversion into a valid USWC Service Order, the service request will be electronically forwarded to a manual order entry clerk, who will translate and submit the order on the CLEC's behalf. Firm order confirmation and status requests will be processed manually until the translation process is fully automated.

Facility Availability

For each new line requested, this transaction will indicate if existing facilities are available or if new facilities are required, and if a technician must be dispatched to provide the facilities requested at the customer's address. This transaction must be executed for any new line(s) requested. This transaction does not reserve facilities and does not guarantee that facilities will be available when the work order is submitted.

Appointment Availability/Reservation

This allows a CLEC to select an appointment from a calendar of available appointments. USWC will automatically execute this transaction after the Work Order has been submitted, where a dispatch is required. Appointment Reservation enables the CLEC to reserve an appointment after the appointment availability calendar has been displayed. USWC will return a confirmation number.

Design services resale (and therefore unbundled elements as well) do not use appointments, but instead rely upon a standard "critical dates" template, which will be provided as an alternative to appointment scheduling.

Telephone Number ("TN") Availability
This enables a TN to be assigned to a line. The CLEC customer service representative will be able to accept the TN or exchange the TN for two other numbers. One of these three TNs must be selected to proceed with the Work Order. If the customer requests a specific number or a vanity number, CLEC must call the USWC Number Assignment Center ("NAC") and the request will be handled manually, consistent with how USWC processes these requests.

Return Telephone Numbers enables a CLEC to reject the unused TNs returned by the Telephone Number Availability transaction. Telephone Number Accept allows a CLEC to reserve one telephone number for a period of one (1) day so that the customer can be informed of the TN(s) prior to the actual submission of a Work Order. The Work Order must be submitted before the TN expires, otherwise the TN will be returned to the available pool of TNs and may no longer be available.

Circuit Request
This enables the CLEC to request and obtain a circuit ID for designed services.

Firm Order Confirmation
Firm Order Confirmation means that USWC has received the order and assigned an order number for tracking. However, validation checks are performed at multiple stages in the ordering process subsequent to this step, so this confirmation only confirms the receipt of the order, and not that it is error-free.

Status Query
This transaction will allow the CLEC to obtain the status of a work order. USWC will return the current status, remarks, and due date for specified work order. Order Completion and Jeopardy Notification are status indications potentially returned through this transaction.

Order Completion
This provides a daily (Monday - Saturday) electronic report which identifies all work orders that were completed by USWC on that date. This report is called the CLEC Completion Report.

3. REPAIR

Repair functions allow the CLEC to report trouble with communications circuits and services provided by USWC. The functions, processes, and systems used in repair are based on a Trouble Report ("TR"), which contains information about the customer, the trouble, the status of the work on the trouble and the results of the investigation and resolution efforts. These business processes have been summarized and will be made available to the CLEC in the following functional set: open a trouble report, cancel a trouble report, send notification of status change and close a trouble report.

Open Trouble Report
This gives the CLEC the capability to submit a trouble report to USWC. The Open Trouble Report Response contains status information about the trouble.

Cancel Trouble Report
This instruction allows the CLEC to cancel a previously opened trouble report.

Status Trouble Report
This provides notification that the status of a previously opened trouble report has changed.

Completion Notification
This provides notification that a trouble report has been closed because the trouble was resolved.

Verify Feature
This transaction is used to verify which vertical switch features the customer currently owns.

Modify Trouble Report
This allows a change to certain data in a trouble report which was previously opened, possibly affecting current USWC repair activities. Trouble reports are only readable or modifiable by the CLEC that initiated the report.

Escalate Trouble Report
This allows a CLEC to bring a trouble report that the CLEC had previously opened with USWC to the attention of a higher level of supervision. As with the modify command, it is only allowed on trouble reports which were entered by the CLEC requesting the escalation. Process descriptions for how such escalations are subsequently treated are beyond the scope of systems testimony. This feature is only available for services (i.e., circuits) supported in Work Force Administration ("WFA") and is not used for POTS.

Text Messaging
This supports the exchange of written electronic communication between USWC and CLEC personnel for the purpose of resolving the trouble. The messages are logged in the trouble report. Specific uses of this messaging include allowing the CLEC to add descriptive information about the trouble, and allowing USWC to request additional trouble information. This feature is only available for services (i.e., circuits) supported in WFA, and is not used for POTS.

Trouble History
This provides the CLEC with trouble history information currently retained on the circuit.

Testing
This notifies a CLEC of the results of initial or subsequent circuit tests for a trouble report previously opened by that CLEC.

4. BILLING

Upon completion of the turn up of the requested service or element from the CLEC, USWC's billing process will be updated to charge the CLEC for the service or element requested as well as begin to collect the relevant CLEC end user usage data. On a monthly cycle USWC will bill the CLEC for the services and elements they have purchased. On a daily basis USWC will

provide the CLEC with usage data so that they may bill their customers appropriately. Additionally, USWC will provide the CLEC with Local Account Maintenance data indicating when a customer has moved their service from the CLEC to another provider.

Summary Billing

Monthly billing information will include all connectivity charges, credits, and adjustments related to network elements and USWC-provided local service. USWC will utilize the Customer Record Information System ("CRIS") and the existing EDI standard for the message format and the transmission of monthly local billing information. EDI is an established standard under the auspices of the American National Standards Institute/Accredited Standards Committee ("ANSI/ASC") X12 Committee. A proper subset of this specification has been adopted by the TCIF as the "811 Guidelines" specifically for the purposes of telecommunications billing.

Usage Data

Daily usage data is the accumulated set of call information for a given day as captured, or "recorded," by the network switches. USWC will provide this data to CLECs with the same level of precision and accuracy it provides itself. Such precision cannot and will not exceed the current capabilities of the software in the switches today.

Using the Centralized Message Distribution System ("CMDS"), USWC will also include interLATA collect, calling card, and third number billed messages to the CLEC as part of this daily message data.

Win/Loss Reporting

The Local Account Maintenance report consists of the list of phone numbers to which the carrier started providing service since the last report, and the list of phone numbers to which the carrier is no longer providing service since the last report. Some CLECs have requested that the customer name be supplied with this information, but USWC may no longer possess the customer name if service has been provided through another CLEC. Since this portion of the report cannot be provided with any reliability, only the phone number (or appropriate billing account identification) is proposed.

ATTACHMENT C

USWC OSS INTERFACE GATEWAY ARCHITECTURE

1. Overview

When attempting to understand the complexity of the task of developing an Operations Support System ("OSS") electronic interface Gateway, it is useful to understand the software architecture from a logical perspective that is required to provide the specified requirements. Figure 1 is a representation of the architecture which will support a CLEC's requests for pre-ordering, ordering, provisioning, and maintenance and repair. (Note: Billing data is handled through other "batch" interfaces and not *via* this Gateway.)

This gateway will act as a mediation or control point between CLECs and USWC OSS's. It is responsible for implementing security for the interface, protecting the integrity of USWC's network and its databases, and ensuring that information privacy is maintained (e.g., Customer Proprietary Network Information or "CPNI").

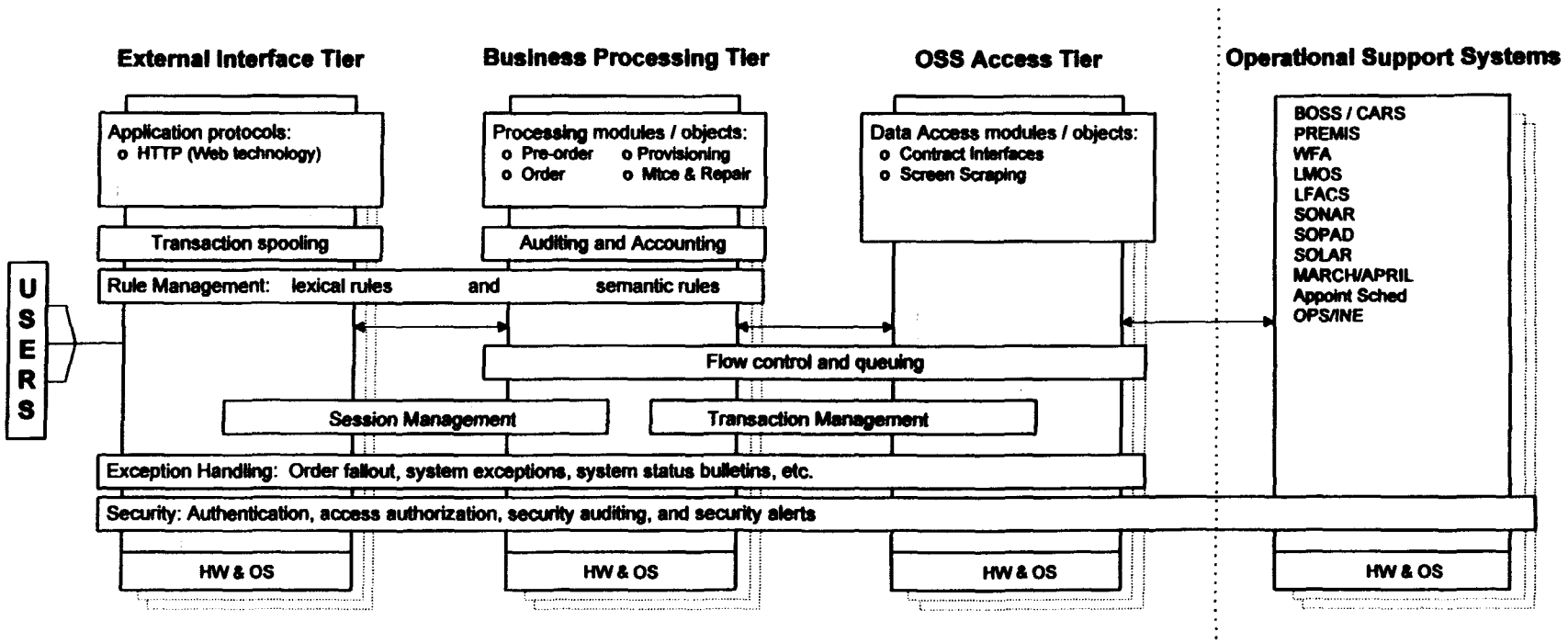
The architecture is divided into three layers, as indicated in Figure 1:

- The External Interface Tier ("EIT") is the software layer that provides the communication function between the Gateway and the CLEC. It contains the software that implements the protocols supported by the Gateway. In this case, the transport protocol underlying the Internet or Web-technology, called HTTP (Hyper Text Transport Protocol), is supported. This could be expanded to support other protocols specified in National Standards as they are developed.

- The Business Processing Tier ("BPT") contains the software that defines the commands that the CLEC users are able to execute. For example, this layer understands that "*create trouble ticket*" is a supported command, and it knows what Loop Maintenance Operations Systems ("LMOS") or Work Force Administration ("WFA") transactions need to be executed in order to process this command. Further, this layer also has responsibility for any semantic validation of the command request, such as checking that the requesting CLEC is indeed the owner of the circuit for which the trouble report is being submitted.

- The OSS Access Tier ("OAT") connects the Gateway to the other USWC Operation Support Systems. This layer contains the software that knows whether there is a machine-to-machine interface (or application programming interface - "API") to the designated OSS, or whether terminal emulation (or "screen scraping") is to be used. This layer also knows how to format the request in the way the receiving OSS will understand.

Figure 1: Logical Architecture, USWC Mediated Access for Pre-Order, Order, Provision, Maintenance & Repair



Work in progress -- details subject to change without notice

1.1. Technology Selection

USWC is developing the Gateway using the software technologies that underlay the public Internet or World Wide Web ("www"). This technology is typically refered to by two acronyms: HTML, for Hyper Text Mark-up Language, which is the software language used to defined the screen displays referred to as Web pages; and HTTP, which is the collection of protocol software that carries the commands and data across the Internet. This technology was selected for a number of reasons:

- Web technology has been successfully used by USWC in the rapid development and deployment of a customer service application[1] which is used while the customer is on the phone to determine the availability of telephone facilities to the customer's premises. The result is then used to decide what installation interval to offer to the customer.

- Customer service representatives use a so-called "Web browser" to connect with the application from their existing desktop computer. No USWC software development was required on the desktop to deploy this application. This greatly simplified the development and distribution problems. These browsers are available for an exceptionally wide range of hardware and software environments (by today's computing standards) from Microsoft, Netscape, and other independent software suppliers. USWC does not need to specify requirements or constraints for the CLEC's customer service representative's computing environment.

- The rapid growth of the Internet has demonstrated the viability of this technology as one that can and is being used in commercial settings for interfacing between companies. No other software networking technology in computing history has seen this kind of widespread growth. Nearly all of the telecommunications companies looking to becoming CLECs have some experience with this technology as demonstrated by the existence of their own Web pages.

- While HTTP/HTML is primarily used to develop user-readable screens, these screens can be readily interpreted by other software programs to develop machine-to-machine software interfaces. The software to perform this function already exists in the public domain. Therefore, CLECs have the option of using this same USWC interface either directly as a human interface, or developing a Gateway interface from their own software applications to link to USWC OSS's.

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[1] More information on this USWC customer application and this use of the Netscape browser can be found in a recent article authored by CIO Dave Laube, which is posted on Netscape's own home page.

1.2. Security

No discussion of the commercial viability of Internet-based applications would be complete without examining the security issues. Internet security mechanisms are only in their infancy, and have not as yet been proven completely foolproof. Therefore, USWC is **not** proposing to make its OSS gateway interface accessible *via* the public Internet or World Wide Web. Two interfaces are offered in the proposal. The primary access mechanism is direct telecommunications links between the CLEC and USWC, complete with a security firewall capable of screening out unexpected traffic. The alternative mechanism will be dial-up modems, secured with commercial "smart card" technology administered by USWC using SecureID cards. Since the number of companies that will use this OSS interface is relatively small, and because the traffic volume of this link is eventually expected to be reasonably high, the use of private links is in fact technically desirable to support the traffic throughput.

1.3. National Standards

The commands or transactions supported by the Gateway interface should eventually be based upon national standards that allow the ILECs and CLECs to interface in a common way. These standards, as described in the affidavit text, have not been completed to enable development yet. However, USWC has made every effort to base its work on the standards work completed thus far. The Ordering commands are based on the current draft version of the Local Service Request forms resulting from the October, 1996 work of the Ordering and Billing Forum ("OBF"). Similarly, the Maintenance commands have been developed along guidelines used in the Electronic Communication Implementation Committee ("ECIC") work on the Interexchange Carrier ("IXC") interface (see MEDIACC example, paragraph **3x**, main text).

This layered architecture approach maximizes the likelihood that the software system can be easily modified and enhanced in the future to accommodate changes, such as those expected as national standards work is completed.

2. Architecture Subsystem Detail

USWC has defined and created this architecture and will be testing and implementing it in the short time span of a four-month period, as required by the FCC in its First Report and Order. By necessity, the level of robustness of each layer is directly proportional with the timeframe to deliver. USWC will continue to refine and improve the robustness of the interface software concurrent with the introduction of new features, paced with the growth of the business requirements of USWC and the CLECs.

2.1. External Interface Tier (EIT)

The EIT is the gateway that connects the CLECs to U S WEST's systems and capabilities. The essential modules found in the EIT are:

2.1.1. *Application Protocols*. Provides support for one or more application protocols that encapsulate transaction requests and system responses, and transport them between the CLECs and USWC. Initially supports HTTP.

2.1.2. *Transaction Spooling*. Provides support for queuing specific incoming transactions and specific transaction outgoing responses. Note that the transaction data format is totally independent of any particular application protocol. Also note that only asynchronous transactions will be spooled. If a synchronous transaction cannot be performed, this will be detected by the Business Processing Tier ("BPT") and the customer notified to try again later.

2.1.3. *Session Management*. The EIT works with the BPT to maintain the context of each user's session. Sessions, in the sense of the user's queued transactions and responses, have a persistent state. When a user ends his or her session, the state of the user's transactions is maintained.

2.1.4. *Lexical Rule Checking*. Invalid transactions (exceptions) are not queued on the BPT, but instead are returned to the user with an explanation of the problem. Exceptions of this form should be noted in the log, because they are either the result of an error in programming or a user error. This information will be useful for subsequent root cause analysis.

2.1.5. *Security Authentication*. Only valid users of the system shall have access to the functions of the EIT. Session logs are recorded by the EIT.

2.2. Business Processing Tier

The BPT is responsible for the successful execution of the transaction set. The essential modules found in the BPT are:

2.2.1. *Transaction Processing Modules*. These modules encapsulate logically related transactions, such as pre-ordering, ordering and provisioning.

2.2.2. *Semantic (Business) Rule Checking*. Invalid transactions (exceptions) are removed from the input queue and returned to the user with an explanation of the problem. Inappropriate (or validly blocked) responses from the OSS Access Tier ("OAT") are screened before returning the OSS response to the user.

2.2.3. *Flow Control and Queuing*. The BPT works in cooperation with the OAT to make sure the back-end systems are not overloaded—and that the queued transactions proceed at an efficient pace.

2.2.4. *Session Management*. The BPT keeps requests and responses in persistent queues, as well as guaranteeing that responses are returned to the correct users.

2.2.5. *Transaction Management*. The BPT is responsible for the overall transaction integrity—which means processing each transaction to a known endpoint state. The BPT is also responsible for keeping an audit trail of all transactions, and must provide the means for accounting and security operations.

2.2.6. *Exception Handling*. The BPT must handle transaction fallout in a predictable and efficient manner so that exceptions get resolved as quickly as possible. Where necessary, the BPT will notify human operators of particular exceptions that require their attention.

2.2.7. *Security*. The BPT is responsible for access authorization, transaction logging and alerting management to access violations.

2.3. OSS Access Tier

The OAT is responsible for providing a set of access methods to the Operation Support Systems. The essential modules found in the OAT are:

2.3.1. *Data Access Module/Objects*. These are the functional modules/objects that know how to access the OSS's for the execution of transactions or commands. Possible access methods range from screen-scraping to MQ Series to previously-built customized access software (e.g., Data Arbiter, MEDIACC, etc.). These modules are also responsible for routing the request to the appropriate copy of the selected OSS. Where more than one copy of a particular OSS is used by USWC, this layer will check the contents of the user's request to decide which copy contains the proper data to service the request (i.e., different states within the USWC region are typically supported on different copies of an OSS).

2.3.2. *Flow Control and Queuing*. The OAT works in cooperation with the BPT to make sure the back-end systems are not overloaded—and that transactions proceed at the fastest possible rate. Where the OSS is not capable of providing appropriate levels of flow control to the OAT, the OAT may need to spool output received from the OSS and/or return an exception to the BPT.

2.3.3. *Transaction Management*. The OAT is responsible for flowing transactions to the back-end systems and providing the expected response (or exception) to the BPT. The OAT is also responsible for mapping responses to requests so that the BPT can determine with which transaction the output is associated. In the case of an exception, the BPT will decide how to handle it.

2.3.4. *Security*. The OAT only allows authorized BPT processes to call the services it provides. The OAT complies with the security measures already in place for the OSSs. The OAT maps specific user data and transaction requests with those that have been approved. Users requesting data they are not authorized to have or transactions they are not authorized to execute, will be notified via an exception to the BPT.

3. Requirements

This section describes the detailed requirements for the interface gateway. These are provided to give an overview of the total set of software capabilities that must be considered in developing an interface to USWC's OSS's. Some of the requirements described below which do not affect the external view of the OSS interface gateway as seen by CLECs will not be met with the first release of the interface, but will be delivered in subsequent phases to enhance its supportability and maintainability.

3.1. Application Protocols

3.1.1. Shall utilize HTTP for CLEC access to USWC OSSs.

3.2. Transaction Spooling

3.2.1. Shall provide a queue for storage of incoming transactions.

3.2.2. Shall provide a queue for storage of transaction responses.

3.2.3. For synchronous transactions that cannot be processed, shall notify the user indicating that the requested OSS is not available for processing at this time and to try again later.

3.2.4. Shall support the batching of asynchronous transaction.

3.2.5. Shall support a persistent state for all transactions.

3.3. Lexical Rules Management

3.3.1. Shall support the creating, updating and deleting of lexical rules for each transaction.

3.3.2. Shall perform transaction specific lexical rule evaluation.

3.3.3. Shall identify and record lexical errors by transaction for each user.

3.3.4. Shall notify the user of lexical errors in real time.

3.3.5. Shall provide an inquiry facility for users to request information regarding transactions that erred out.

3.4. Session Management

3.4.1. Shall support the creation and destruction of a user session.

3.4.2. Shall provide services to maintain context throughout a users session.

3.4.3. Shall support the auditing of customer usage by session.

3.4.4. Shall support status operations for all transactions in progress.

3.5. Semantic Rules Management

3.5.1. Shall support the creating, updating and deleting of business rules for each transaction.

3.5.2. Shall perform transaction specific business rule evaluation.

3.5.3. Shall identify and record semantic errors by transaction for each user.

3.5.4. Shall notify the user of semantic errors in real time.

3.5.5. Shall notify the application administrator of semantic errors in real time.

3.5.6. Shall provide an inquiry facility for users and administrators to request information regarding transactions that erred out.

3.6. Flow Control and Queuing

3.6.1. Shall provide the facility to capture metrics associated with Operation Support System throughput, load and response time on a real time basis.

3.6.2. Shall provide the facility to create, update and delete Operation Support System through put, load and response time thresholds.

3.6.3. Shall provide the facility to create, update and delete rules for managing threshold overload conditions.

3.6.4. Shall monitor Operation Support System loads thresholds on a real time basis.

3.6.5. Shall manage Operation Support System threshold overload conditions by balancing transaction workloads and deferring transactions according to user specified rules.

3.7. Reliability, Availability, Serviceability

3.7.1. Shall monitor and report on mean time between failures by application component (i.e., Session Management, Transaction Spooling, etc.).

3.7.2. Shall monitor and report on mean time between failures by infrastructure component (i.e., EIT hardware, EIT Operating System, BPT hardware, network, etc.)

3.7.3. Shall monitor and report on mean time to repair by application component (i.e., Session Management, Transaction Spooling, etc.).

3.7.4. Shall monitor and report on mean time to repair by infrastructure component (i.e., EIT hardware, EIT Operating System, BPT hardware, network, etc.)

3.7.5. The proposed solution shall be available 24 hours a day, 7 days a week, 365 days a year with less than a 2 hour maintenance window once a week.

3.7.6. Whenever possible, application and infrastructure components shall be updateable without side effects. Meaning that when one component is undergoing preventative maintenance or configuration changes, its state adversely effects the smallest number of related components.

3.7.7. Shall support the deferred processing of asynchronous transactions.

3.7.8. Shall notify users of the success or failure of all transactions.

3.8. Performance (each server)

3.8.1. Shall support 1,000 logged in (e.g., defined) users by the first half of 1997.

3.8.2. Shall support 200 concurrent users by the first half of 1997.

3.8.3. Shall support incremental scaleability improvements.

3.9. Accounting

3.9.1. Shall provide a facility to gather session and transaction accounting metrics.

3.9.2. Shall provide a system for charge back of resources consumed by user and by company.

3.9.3. Shall provide the ability to modify the level of accounting as required without restarting the application (i.e., change aggregation or disaggregation levels).

3.10. Security

3.10.1. Shall support the unique identification of potential application users.

3.10.2. Shall support the authentication of potential application users.

3.10.3. As part of the authentication process, shall ensure the integrity of all data elements accessed. No Access, Read Only or Read/Write data access restrictions are to be enforced.

3.10.4. Shall support CPNI data access restrictions.

3.10.5. Shall secure access to transactions by user and by company.

3.10.6. Shall secure access to any facility and customer data by user and by company.

3.10.7. Shall provide a facility for auditing user sessions and transactions.

3.11. Transaction Management

3.11.1. Shall support the creation of unique transaction identifiers.

3.11.2. Shall manage transaction commit, roll back and roll forward.

3.11.3. Shall support the auditing of customer usage by transaction.

3.12. Fault

3.12.1. Shall support Infrastructure (e.g., BroadVision, Netscape, etc.) Exception Handling; alarming to USWC's Operations Center management platform for Server faults.

3.12.2. Shall support Application Exception Handling; alarming to U S WEST's Operations Center management platform for all components (i.e., Transaction Spooling, Session Management, etc.) of the Mediated Access application.

3.12.3. Shall record interim status (when appropriate) and the final status (e.g., Completed, Failed) for every transaction executed.

3.12.4. Shall support the generation of System Status Bulletins.

3.13. Operability/Manageability

3.13.1. Systems Administrators shall be able to start up, shut down and query status for each Infrastructure component.

3.13.2. Application Administrators shall be able to start up, shutdown and query status for each Application component.

3.14. Configuration

3.14.1. Component changes shall be implemented in an automated fashion remotely *via* HP's Software Distributor.

CERTIFICATE OF SERVICE

I, Rebecca Ward, do hereby certify that on this 11th day of December, 1996, I have caused a copy of the foregoing **PETITION FOR WAIVER** to be served via hand-delivery upon the persons listed on the attached service list.

Rebecca Ward

Rebecca Ward

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