MULTI-LEVEL PRECEDENCE AND PREEMPTION
AS A TELECOMMUNICATIONS SERVICE
FEATURE IN ISDNs

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ABSTRACT

This paper proposes the addition of a new service, Multi-Level Precedence and Preemption (MLPP), to the ISDN User Part. This service allows the prioritization of calls and ensures that higher precedence calls will be completed during periods of network and exchange congestion.

INTRODUCTION

This paper describes methods to provide designated subscribers with preferred service and the ability to preempt low precedence calls in order to complete higher precedence calls. Implementation of Multi-Level Precedence and Preemption (MLPP) is intended as a network option.

To provide this feature, the modifications required to the CCITT Q.76X series include the addition of call precedence levels, a release cause parameter, and call preemption procedures. Call precedence levels would be coded into the Initial Address Message. A release cause parameter is necessary in the Release Message to distinguish circuit releases caused by preemption. Preemption procedures would be applicable to any network which provides the MLPP capability. Utilization of MLPP provides essentially non-blocking service to high precedence users.

PRECEDENCE SERVICE

The precedence level of a call is stored in the call data bases of the originating, intermediate, and destination exchanges servicing the call. This prevents a call from being preempted by another call initiated at a lower or equal precedence level. Each subscriber or terminal is assigned a maximum authorized precedence level. At each exchange, an idle circuit which is selected to service a call is marked busy at the selected precedence level.

Signaling System No. 7 currently has the capability to identify two calling party precedence levels within the mandatory Calling Party Category parameter field. These are coded as an "ordinary calling subscriber" and as "calling subscriber with priority." This paper

recommends that five levels of precedence be coded in the Calling Party Category field.

RELEASE CAUSE PARAMETER

Certain released circuits of a preempted call are utilized to resume the routing of the preempting call. Two types of preemption release are defined to indicate whether or not the circuit being released is required to complete the preempting call. The circuit is either "reserved for reuse" or "not reserved for reuse" when it is released.

It is proposed that a release cause parameter be added to the release message to indicate a call release due to preemption. A preemption release is a type of network release. The release cause parameter would be coded for the two types of preemption release (i.e., circuit reserved for reuse and circuit not reserved for reuse). Upon receiving a preemption release message, an exchange would invoke special call release treatment.

CALL HANDLING PROCEDURES FOR MULTI-LEVEL PRECEDENCE AND PREEMPTION (MLPP)

The intent of call processing in a network which provides MLPP is to follow the basic call control signaling procedures outlined in CCITT Recommendation Q.764 as much as possible. However, it is proposed that circuit preemption based on call precedence be provided to subscribers that are designated for this capability. This feature permits the preemption of low precedence calls in order to successfully complete higher precedence call setups that encounter congestion. Normal call setup procedures apply until all other methods for completing a call (i.e., alternate routing) have been attempted. A congestion condition has been encountered when: (1) it is determined that all circuits in the selected trunk group are busy, and; (2) all other network methods to route the call have been attempted and have failed. If the call cannot be completed by these methods, preemption procedures are invoked.

In order to successfully preempt, the signaling must support the following actions:

35.2.1

- a. Release of all trunks servicing the established call to be preempted.
- b. Determine whether a released trunk is to be reused or idled.
- c. Provide a means to support notification of preempted parties.
- d. Continue the call setup process for the preempting call.

Release of an established call because of preemption is initiated when a search successfully locates a preemptable inter-exchange circuit to service the preempting call. The exchange performing the search is referred to as the preemption initiating exchange. At the preemption initiating exchange, circuit release sequences are generated for the established call being preempted.

Figure 1 depicts an example of the signaling associated with a high precedence call successfully completed by preemption. The Set-up message indicates a call initiated by the calling party. The Set-up message is translated into the IAM of Signaling System No. 7 at the Local Originating Exchange. At the first Transit Exchange, the call encounters circuit congestion. Because the call has a higher precedence than an already established call occupying a circuit in the desired circuit group, the established call is preempted so that the higher precedence call may progress. The preemption of the established call consists of a network release of the established call beginning with the selected circuit. The figure shows the release of the one circuit of the established call that was selected by the preempting call. The remaining circuits of the established call receive release messages coded "not reserved for reuse" (this is not shown). After the selected circuit is released, the signaling associated with the preempting call continues by sending the IAM to the next transit exchange. The call is then successfully completed as shown.

NETWORKS WITHOUT MLPP OPTION

Since Multi-Level Precedence and Preemption is an optional service to a network, the treatment in networks which do not implement MLPP procedures but which may act as carrier networks, shall be limited to conveying intact the parameters associated with MLPP. The network shall treat the Calling Party Category, if coded with one of the five precedence levels, the same as if it were coded as an ordinary calling subscriber. The network shall treat a release with a preemption cause the same as a network initiated release. In other words, normal treatment rather than MLPP treatment is given to the call while it passes through networks without MLPP service.

CONCLUSION

This paper proposes that a feature for prioritizing subscribers' calls be added to the CCITT Recommendation of Q.76X series. The availability of this feature ensures that the calls of high precedence subscribers would be completed in periods of network or exchange congestion. Existing messages require minimal modification and additional messages are not required. Optional procedures would be specified to implement this service.

Figure 1