

Malicious Call Barring Service

DoCoMo has launched a new network service called "Malicious Call Barring Service" in January 1999, which enables for users to reject troublesome call automatically by easy operation.

This paper explains the outline of this service from the service and the network aspect.

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Introduction

With the rapid development of mobile communications market in recent years, there has been an increasing demand from users for the countermeasure to deal with so called "malicious call" meaning nuisance call and repetitive wrong call. In consideration of such demand from the users, DoCoMo has decided to propose the "Malicious Call Barring Service". This is considered to be an effective countermeasure for users who have long had to change their phone number to cope with such malicious calls or those who used to have been troubled by the malicious calls without caller number identification.

It can be said that this service is the called side service that can reflect the called person's will, as opposed to the sender side service that reflects the sender's will whether or not to have the caller number identification.

In the pages that follow, service outline, connection configuration, connecting sequence are explained respectively.

Service

Service Outline

In "Malicious Call Barring Service", the subscriber number of the malicious call once terminated is registered, and from that time on, termination of the call from this subscriber shall be rejected. Figure 1 shows an outline of rejecting call in "Malicious Call Barring Service".

- ① Disconnect the call terminated.
- ② After the call, caller's subscriber number is stored temporarily in M-SCP that stores subscriber data.
- ③ Rejecting call register request is sent to M-SCP by special service code operation.
- ④ Upon receiving the rejecting call register request, M-

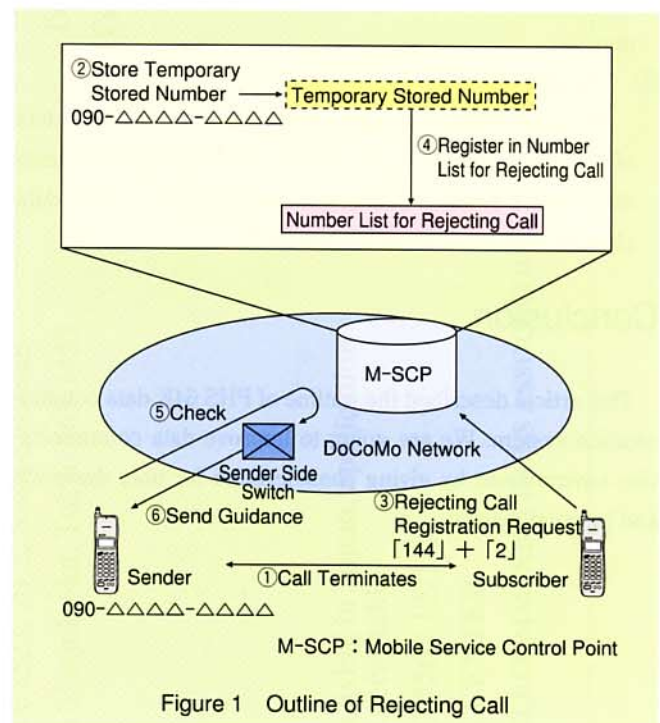


Figure 1 Outline of Rejecting Call

SCP registers the temporary stored number to the rejecting call list.

- ⑤ When a new call is terminated to a subscriber, the caller's number is checked with the rejecting call list.
- ⑥ If, as a result of the check, the caller's number is registered in the rejecting call number list, the rejecting call response is sent back by M-SCP. The caller side switch that received the call rejecting response then sends the guidance (if the caller's number is not registered in the rejecting call number list, normal connection shall be conducted).

Service Specification

Table 1 shows DoCoMo's service specification for the "Malicious Call Barring Service" at this stage.

Table 1 Service Specification

| | | |
|--|---------------------------------------|---|
| Terminals for Service | | Digital Mobile/Car Phone, Satellite Mobile/Car Phone, Satellite Maritime Mobile Phone |
| Numbering System | Rejecting Call Registration | 144+2 |
| | Deletion of Registered Rejecting Call | 144+9 |
| Maximum Number of Rejecting Call to be Registered* | | 30 |

* From the 31st registration onward, the oldest number registered shall be deleted for registration of a new number.

Outline of Configuration

(1) Rejecting Call Registration

Rejecting call registration is the function to register the last caller's subscriber number as the connection refused number for the network. When subscribing this service, whether there is the caller number identification or not, the network shall have the function to store the subscriber number of the call last terminated (this data shall be updated when a new call is terminated and is disconnected). If a subscriber dials a special service code of rejecting call under the condition that the number is stored, the network recognizes the said number as a target of the rejecting call and starts rejecting the call from the said number from that time on.

(2) Deletion of Registered Rejecting Call Number

Deletion of registered rejecting call number is the function to delete the rejecting call register numbers registered in (1) collectively. When a subscriber dials a special service code, the network shall delete all the rejecting call register numbers registered. Since it is not possible to identify the number registered by subscribers in this function, delete function for each individual number is not being provided.

(3) Rejecting Call

Rejecting call is the function that allows the network to send out the guidance saying the called person cannot answer on behalf of the called subscriber and disconnect when there was a call again from the number registered as rejecting call by the subscriber. Even during the guidance, subscribers' call termination or origination shall not be affected. The guidance shall be charged as it is the substitute response for the subscriber, trying to deter the caller from calling again.

Network

Network Configuration

Figure 2 shows the network configuration of Malicious

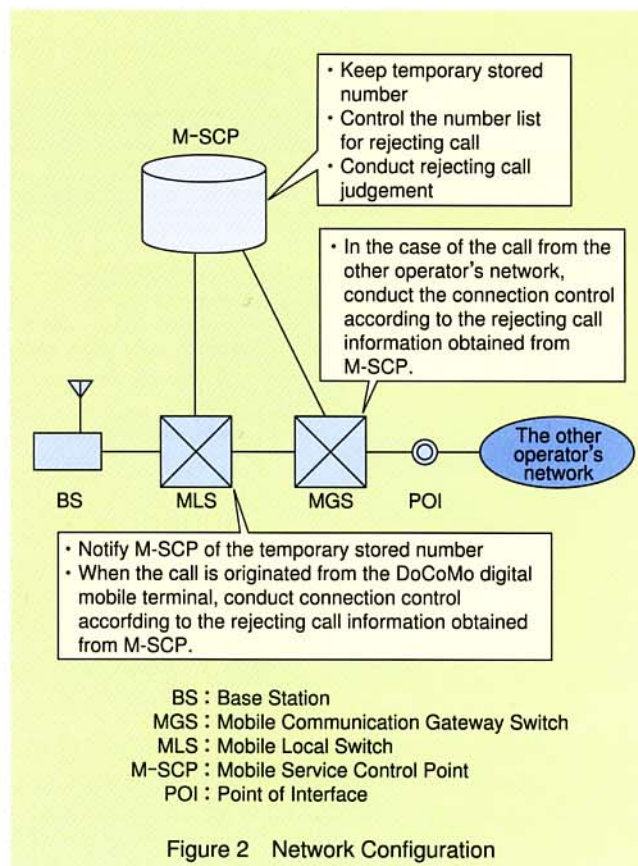


Figure 2 Network Configuration

Call Barring Service.

The service is provided by DoCoMo network consisting of base station (BS), Mobile Local Switch (MLS), Mobile Communication Gateway Switch (MGS) and Mobile Service Control Point (M-SCP).

This service is addressed for the call from the other operators in addition to the internal communications (connection of mobile stations) of DoCoMo network.

Connecting Sequence

Sequence of temporary store of the caller number, sequence of changing/deleting the number list of rejecting call and sequence of rejecting call (called from a digital MS within DoCoMo network) are explained in order as follows :

(1) Sequence of Temporary Store of the caller Number (Figure 3)

- ① The sender number of the said call is set to the LM (Line Memory) control signal when the call terminated to a "Malicious Call Barring Service" subscriber is disconnected.
- ② Being associated with the Malicious Call Barring Service subscriber, the said caller number is stored temporarily in M-SCP.

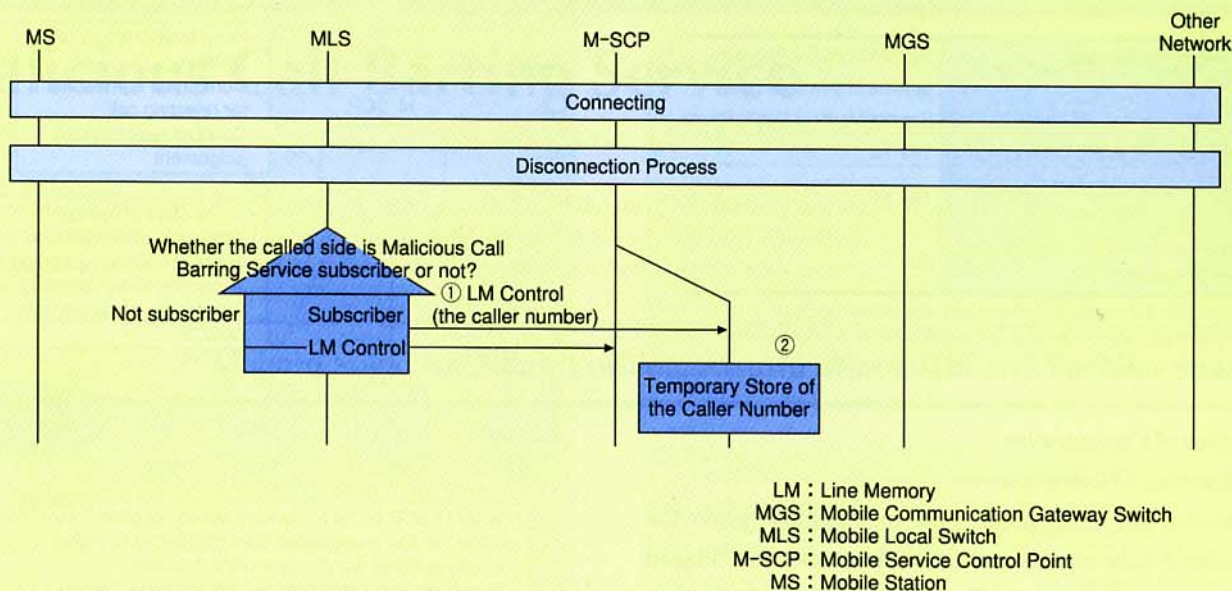


Figure 3 Sequence of Temporary Store of the Caller Number

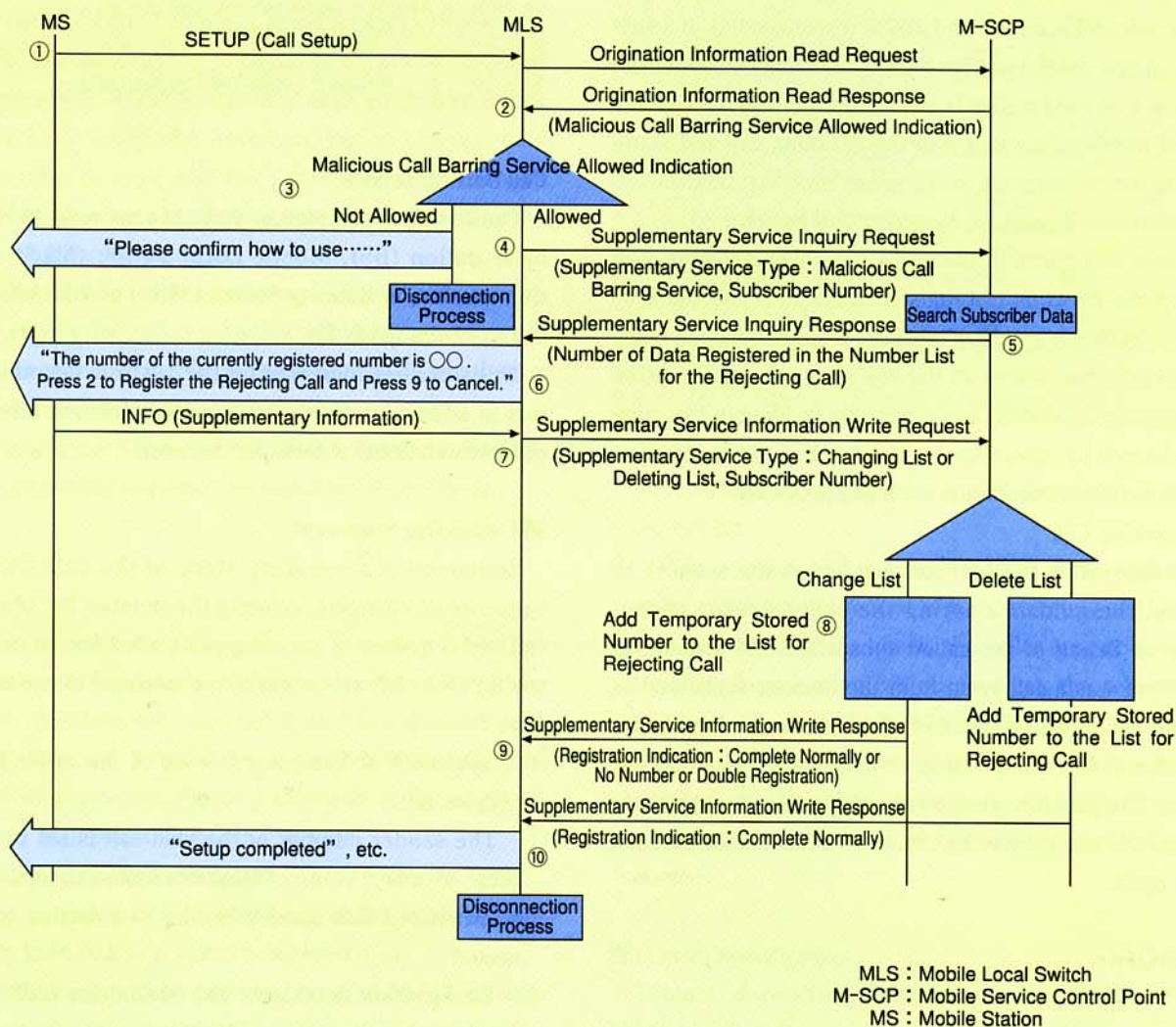
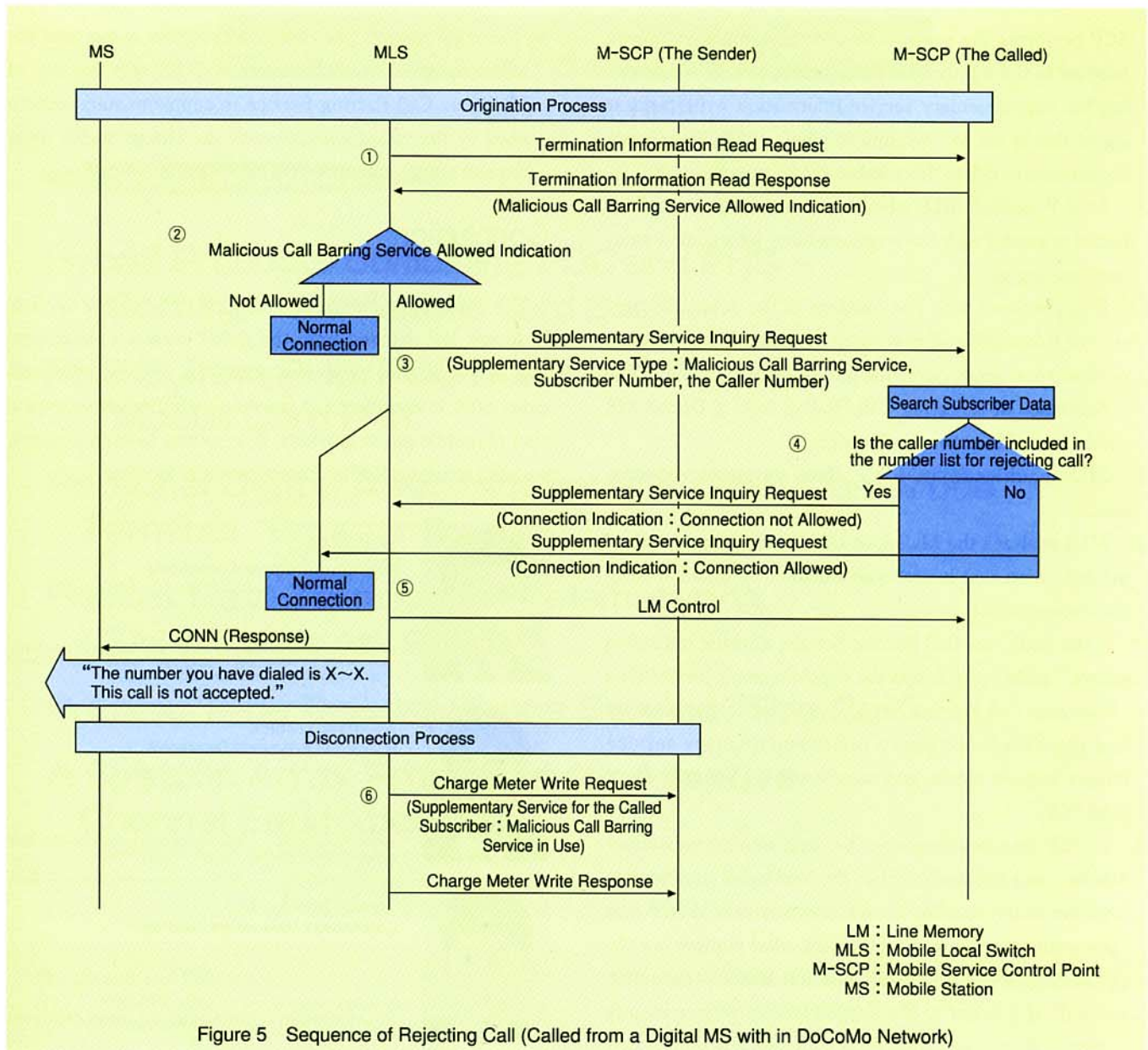


Figure 4 Sequence of Changing / Deleting the Number List for Rejecting Call



(2) Sequence of Changing/Deleting the Number List for Rejecting Call (Figure 4)

- ① Dial 144 from the mobile terminal.
- ② MLS inquiries from M-SCP about the origination information.
- ③ MLS analyzes the Malicious Call Barring Service allowing indication that is set to origination information read-out answer signal.
- ④ If the Malicious Call Barring Service allowing indication shows "allow", MLS sets the supplementary service type - Malicious Call Barring Service - and the subscriber number to the supplementary service inquiry request signal, and then sends out the said signal to M-SCP.
- ⑤ M-SCP searches the subscriber data with the subscriber number, sets the number of data in the number list for

rejecting call to the supplementary service inquiry response signal, and then respond to MLS with the said signal.

- ⑥ MLS sends out the guidance "The number of the currently registered number is○○. Press 2 to register the rejecting call and press 9 to cancel", allowing the state to have the second dial operation.
- ⑦ After second dial from the mobile terminal, MLS sets the supplementary service write type - changing the list (when "2" is input) or deleting the list (when "9" is input) - and the subscriber number to the supplementary service information write request signal, and then sends out to M-SCP.
- ⑧ When receiving the supplementary service information write request signal that is set to "changing the list", M-

SCP performs the process to add the temporary stored number to the number list for rejecting call. When receiving the supplementary service information write request signal that is set to "deleting the list", M-SCP performs the process to delete the number list for rejecting call.

- ⑨ M-SCP notifies MLS whether or not the process completed normally with the supplementary information write response signal.
 - ⑩ In accordance with the contents of the supplementary service information write response signal, MLS selects the guidance and sends out to the mobile terminal.
- (3) Sequence of Rejecting Call (Called from a Digital MS within DoCoMo network) (Figure5)
- ① MLS inquiries from M-SCP about terminator information.
 - ② MLS analyzes the Malicious Call Barring Service allowing indication that is set to termination information read-out answer signal.
 - ③ If the Malicious Call Barring Service allowing indication shows "allow", MLS sets the supplementary service type - Malicious Call Barring Service -, the subscriber number and the caller number to the supplementary service inquiry request signal, and then sends out the said signal to M-SCP.
 - ④ M-SCP searches the subscriber data with the subscriber number, and decides whether the said caller number has been set in the number list for rejecting call. M-SCP sets "connection not allowed" if the said caller number is a target number for rejecting call, and if it is not "connection allowed" if it is not to the supplementary service inquiry response signal, and then respond to MLS with the said signal.
 - ⑤ MLS analyzes the supplementary service inquiry response signal and if it is "connection allowed", it performs normal connection. If it is "connection not allowed", it sends out the guidance and disconnect the call.

- ⑥ In order to meet the charging condition at the time the rejecting guidance is connected, MLS sets the use of Malicious Call Barring Service in supplementary service used by the called subscriber to the charge meter write request signal, and sends the said signal to M-SCP.

Conclusion

The above is an outline of Malicious Call Barring Service. In future, the demand from the called person's standpoint, that is represented by a countermeasure to cope with malicious calls, is considered to increase with the further expansion of mobile phone markets. In response to such demand, we shall strive for further improvement of facilities.