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SSF/CCF Call and Service Logic Model

Revision History

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PART 750

1 SSF/CCF CALL AND SERVICE LOGIC MODEL

1.1 General

WIN call and service logic processing encompasses call and connection processing in the SSF/CCF, service logic execution in the SCF, and the use of supporting resources and data in the SRF and SDF, respectively. This section describes the WIN call and service logic processing in terms of call modeling and modeling of service logic processing.

- Call modeling provides a high-level service, vendor, and implementation independent abstraction of WIN call and connection processing in the SSF/CCF. This abstraction provides an observable view of SSF/CCF activities and resources to the SCF, enabling the SCF to interact with the SSF in the course of executing service logic.
- The modeling of service logic processing provides an abstraction of SCF activities needed to support this service logic execution, as well as an abstraction of SRF and SDF activities and resources accessible to the SCF.

Since this modeling only provides an observable (i.e., external) view of SSF/CCF, SCF, SRF and SDF activities and resources, this modeling does not imply an obligation to vendors to implement functional entities into products as a one-to-one mapping of functional entity model components. In particular, there is no requirement at this time to partition the SSF/CCF into separate SSF and CCF nor to identify which resources are located within the SSF or CCF.

1.1.1 Feature and Service Interaction Management

Feature and service interactions managers provide mechanisms for controlling feature interactions. These may be customized per subscriber. The SSF-based feature interactions manager (FIM) coordinates interactions between SSF/CCF-executed features and the interactions with SCF. The SCF-based service interactions manager (SIM) coordinates interactions among SCF-executed service logic programs (SLPs). These SLPs may be on different SCFs. Rules for feature precedence and the coordination of data modifications that affect call processing must be enforced by the FIM and SIM.

Basic rules include:

a. Feature invocation precedence is managed at the SSF/CCF by the FIM.

b. Feature invocation precedence at the SCF is managed by the SIM.

c. A single response is given to the Basic Call Manager (BCM) representing the results of one or more feature invocations.

d. A response to the BCM that keeps the TCAP transaction open for subsequent triggering of this BCM to the same SLP sending the response, is a capability for a future phase of WIN (e.g., EDP-R, EDP-N). Setting new WIN triggers for subsequent TCAP transactions may be done in the response to the BCM, but no assumption is made regarding the SLP interaction at the SCF.

The FIM and SIM are introduced in WIN to handle the additional complexity of managing feature interactions in a WIN environment. Prior to WIN, pre-defined rules were used for managing precedence among multiple features that may be invoked at the same point in call processing. Feature interactions for *TIA/EIA-664* features have been defined, and the SSF/CCF-based FIM has only to invoke the subscribed features in the prescribed order. A premise of WIN is that feature interactions are not pre-determined. Service providers create value-added services by offering subscribers flexibility in how features interact. This creates a need for the FIM and SIM to manage service interactions on a per subscriber basis.

With WIN, the FIM must manage not only the pre-defined feature interactions of a pre-WIN system but also the interactions of these features with invocations of WIN features. Some guidelines have been defined for the FIM: within a Detection Point trigger precedence is specified, although locally allowed numbers may escape certain triggers. The precedence of features invoked from a WIN trigger is not specified; however, the precedence of *TIA/EIA-664* defined features is specified in that standard. The FIM is further defined in Section 1.1.2.

The concept of a SIM is introduced with WIN. A SIM manages feature interactions at a single WIN trigger which may result in multiple feature invocations. The features invoked by the SIM may include HLR-based features existing prior to WIN. In this case the relative precedence of features is determined by the SIM and may differ from the precedence defined in *TIA/EIA-664*. The SIM resides on the SCF platform to which the trigger query is sent. For that specific trigger, the SIM manages the invocation of multiple subscribed services, some of which may reside on separate physical platforms. The SIM is further defined in Section 1.1.3.

1.1.2 Feature Interactions Manager (FIM) - SSF/CCF

The feature interactions manager (FIM) at the SSF coordinates the invocation of SSF/CCF-executed features and SCF-executed features as illustrated in Figure 1.

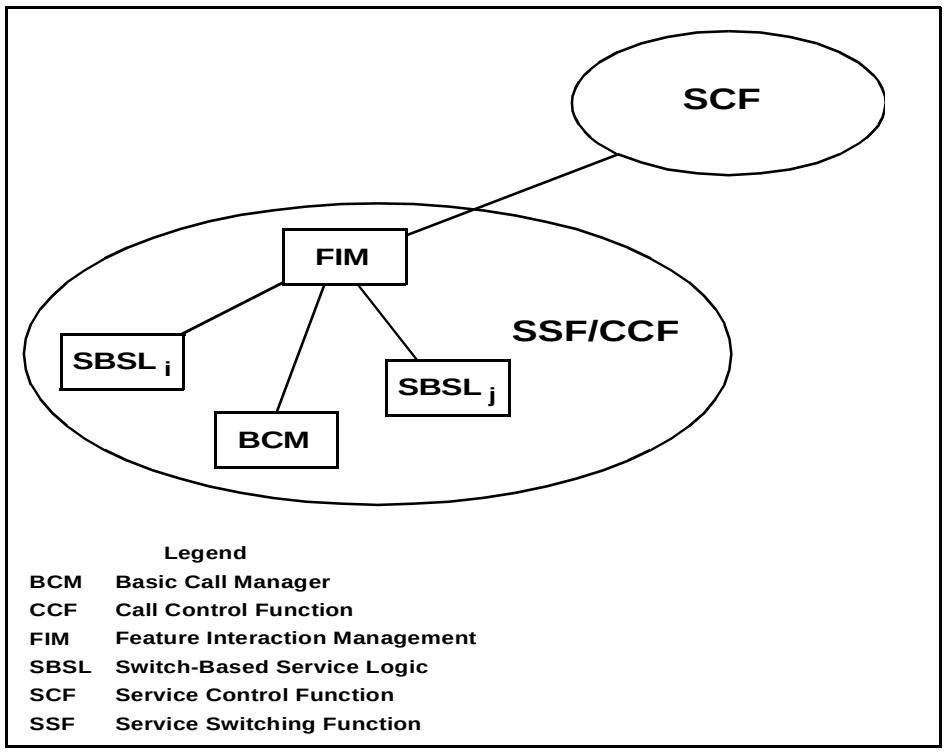

Figure 1 Feature Interactions Manager at the SSF/CCF

Basic rules include:

a. At a particular Detection Point (DP), if a locally allowed number (e.g., 9-1-1, * 9-1-1, N11, *N11) is dialed, treatment as a locally allowed number will take precedence over other treatments. In some cases, these locally allowed numbers may invoke SCF-executed features instead of SSF/CCF-executed features. Such invocations are done on an office-basis and cannot be individually subscribed.

b. At the same Detection Point (DP), SCF-executed features receive the next highest precedence, after completion of the execution of locally allowed numbers. The rules for DP processing are further described in Section 1.2.3.6.

c. Following the conclusion of SCF-executed feature processing, if call processing continues at the DP, the SSF/CCF-executed features may be invoked. In cases where the *TIA-41* query has not been identified for invoking SCF-executed features and services, these queries are considered part of the SSF/CCF-executed feature set. If call processing is resumed at a different point in call, any remaining criteria at the DP from which the service logic was invoked are not processed and similarly, if DPs are bypassed as the result of call processing resuming at a different point in call, no processing of the bypassed DPs is done. This is illustrated in Figure 2 and Figure 3.

d. Whether execution of an active SSF/CCF-executed feature may be interrupted for the invocation of an SCF-executed feature is for further study.

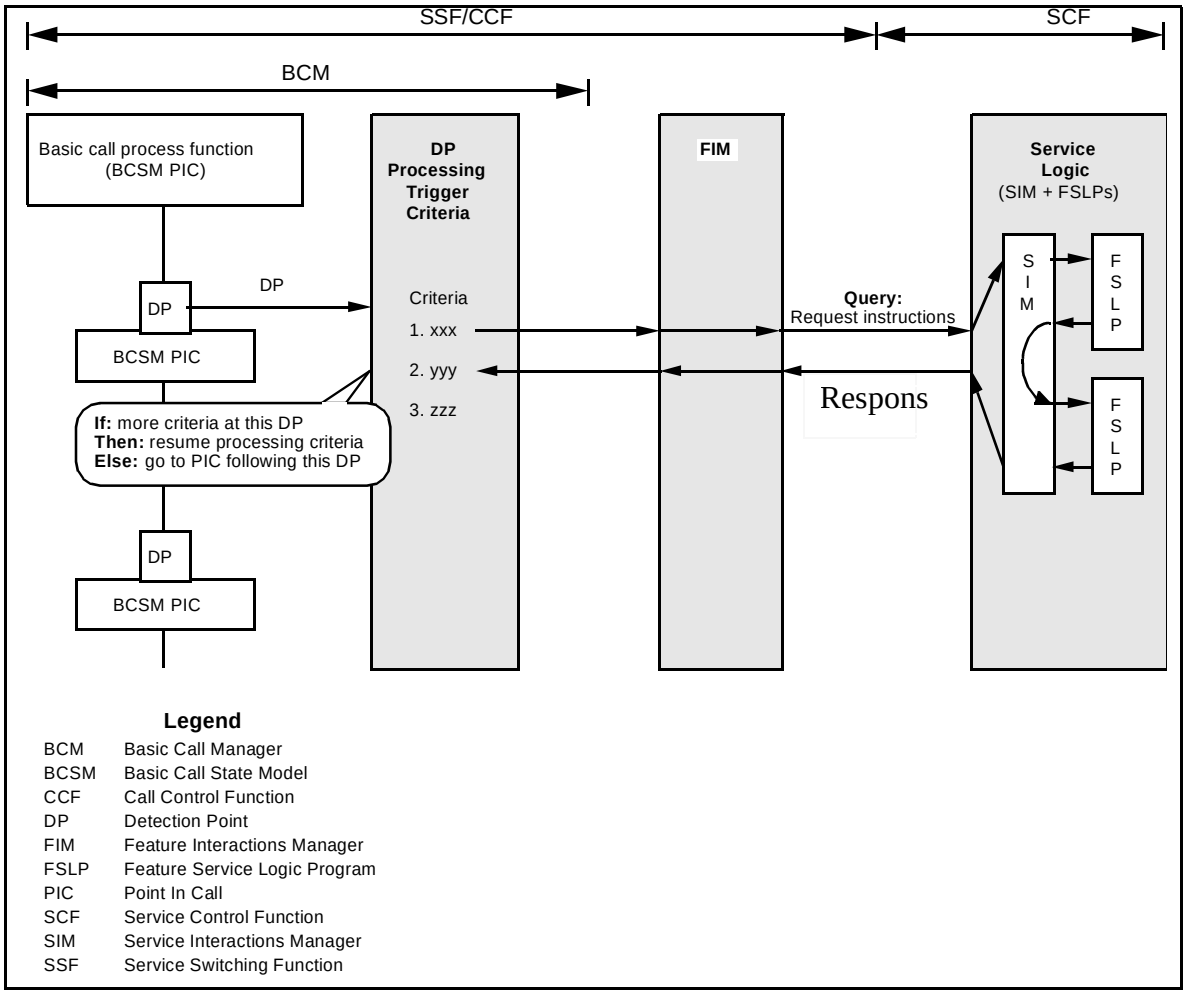

Figure 2 Effect of "Continue" Response to SSF /CCF

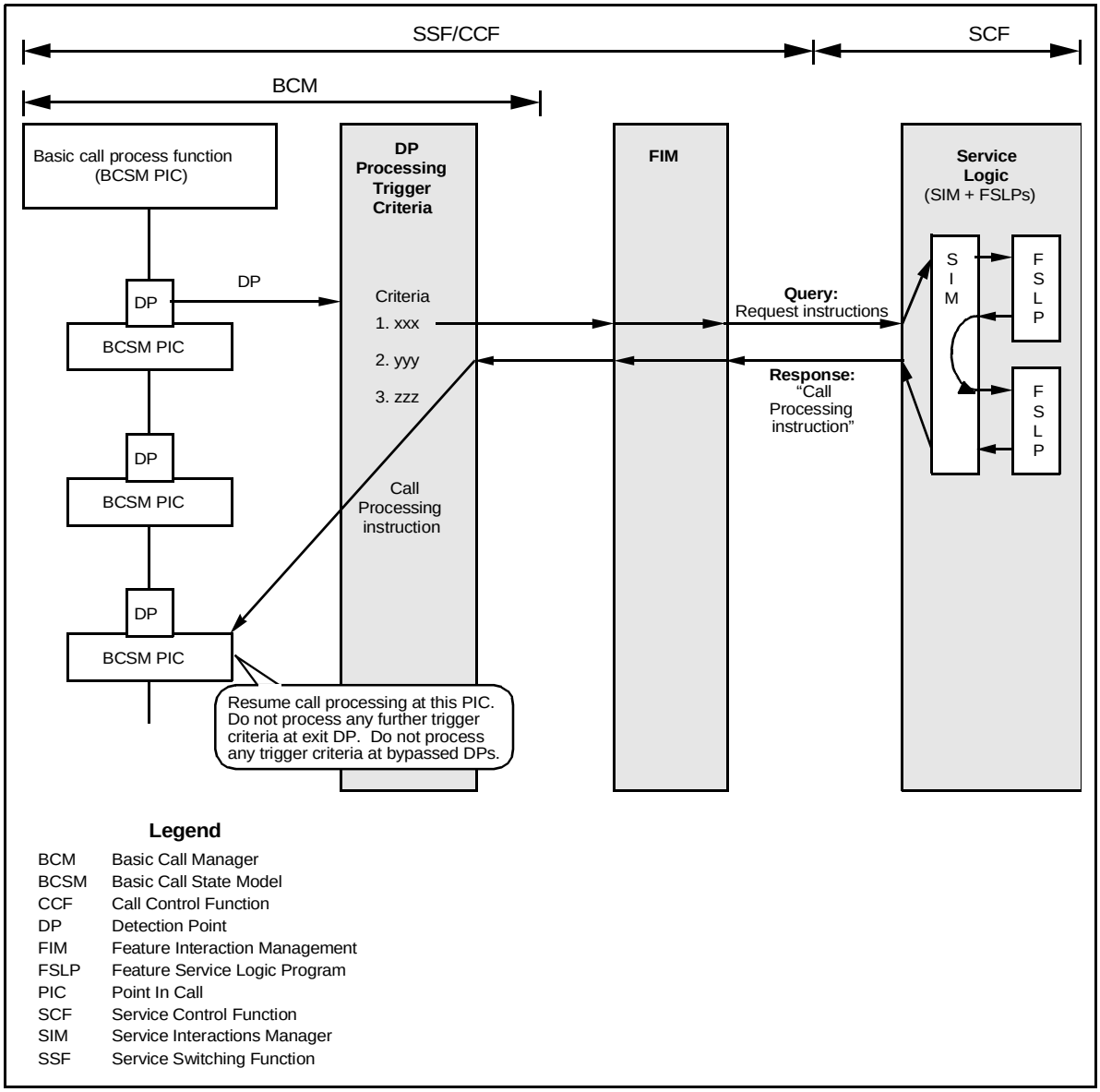

Figure 3 Effect of Returning to a Different PIC at the SSF/CCF

1.1.3 Service Interactions Manager (SIM) - SCF

The service interactions manager (SIM) at the SCF coordinates the invocation of features applicable for a subscriber at a given trigger at a Detection Point (DP). The SIM has knowledge of the relevant SCF-executed features resident on the same SCF and an indication when another feature on a separate SCF requires interaction at certain points in the SIM logic flow. When service logic is distributed across multiple SCFs, the SIM is also distributed. The first SIM invoked by the trigger must coordinate the precedence and data changes that affect call processing within the SCF and between SCFs. This is illustrated in Figure 4.

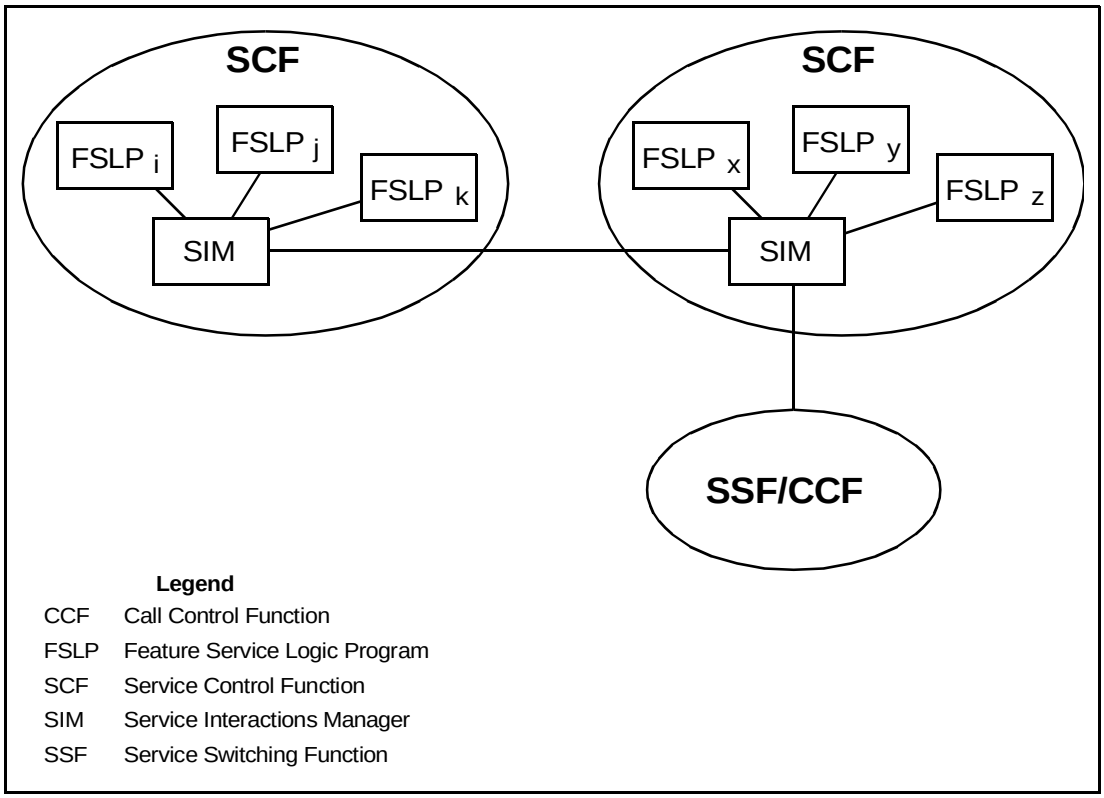

Figure 4 Service Interactions Manager at the SCF

Basic rules include:

a. Once an SCF-executed feature is given control, it must complete its task before returning control to the SIM. The setting of Event Detection Point - Response (EDP-Rs) indicates the need for the feature to regain control at a future DP, but yields current control of service logic to other features.

b. SIM rules include the actions to be taken based on the response of the feature's invocation. Additional features in this SCF may be invoked or a response may be prepared for the entity (another SIM or BCM) which had invoked the SIM processing.

c. The SIM coordinates the response to the invoking entity (SSF or CCF). The response is based on the responses of all features invoked. A single response is sent to the invoking entity regardless of the number of features invoked.

d. Coordination of EDP-N, EDP-R, TDP-N and TDP-R events and triggers is done by the SIM. Thus, the response to the invoking entity may contain information that would not be in a single feature's response, but represents a synthesis of all of the features that were invoked.

e. The SIM determines if dynamically armed triggers are required after service logic execution is completed. If the call is not being redirected by service logic, dynamically arming triggers will result in any previously armed triggers for the call being disarmed. The dynamically armed triggers will be armed for the remainder of the call in progress (or until the subsequent TriggerAddressList is received). If the call is being redirected by the service logic, dynamically armed triggers will be applied to the redirected call leg.

As part of managing service execution interactions, the SIM is responsible for handling WIN Feature Code processing. For example, a SIM associated with the *Single_Introducing_Star* and *Home_System_Feature_Code* triggers receives WIN feature codes entered by a subscriber. This SIM will determine where feature codes are to be processed and, if necessary, forward feature codes to another physical platform for processing.

1.2 SSF/CCF Model

A model of the SSF/CCF is shown in Figure 5 The purpose of this model is to provide a framework for call modeling subjects with respect to the SSF/CCF.

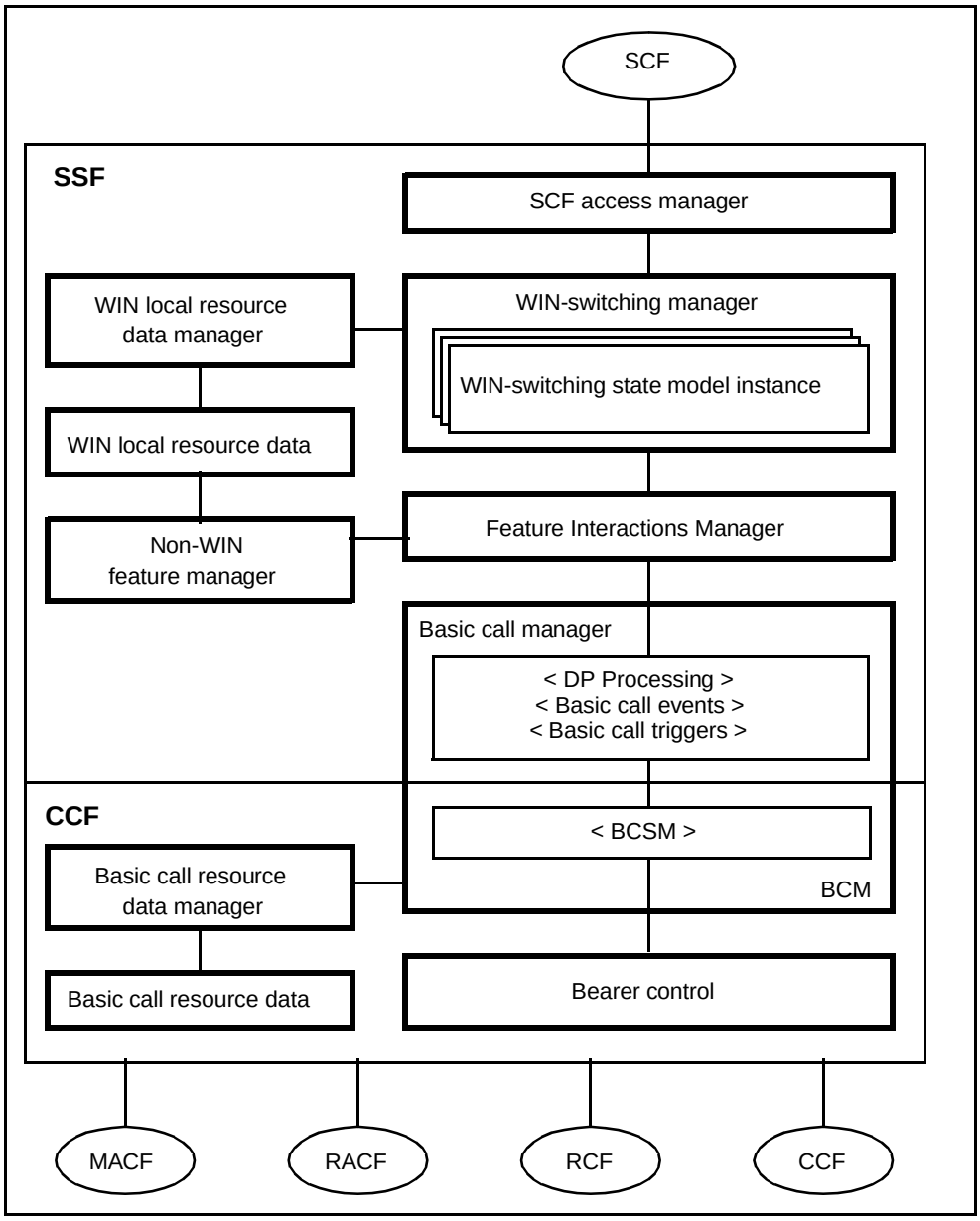

Figure 5 SSF/CCF Model

The aspects of the SSF/CCF model briefly described below include the basic call manager (BCM), the WIN-switching manager (WIN-SM), the feature interactions manager (FIM), and the non-WIN feature manager (Non-WIN FM).

a. ***BCM*** – The BCM is not a functional entity. It provides an abstraction of a part of an MSC that implements basic call and connection control to establish communication paths for users and to interconnect such communication paths. It detects basic call and connection

control events that can lead to the invocation of WIN service logic instances or should be reported to active WIN service logic instances, and manages SSF/CCF resources required to support basic call and connection control. The BCM also interacts with the FIM. The BCM also implements the BCSM and the DP processing. The DP processing is the entity of the BCM that interacts with the FIM as described below.

b. ***WIN-SM*** – The WIN-SM is the entity in the SSF that interacts with the SCF in the course of providing WIN service features to users. It provides the SCF with an observable view of SSF/CCF call and connection processing activities, and provides the SCF with access to SSF/CCF capabilities and resources. It also detects WIN call and connection processing events that should be reported to active WIN service logic instances, and manages SSF/CCF resources required to support WIN service logic instances. The WIN-SM interacts with the FIM.

c. ***FIM*** – The FIM is the entity in the SSF/CCF that provides mechanisms to support multiple concurrent instances of WIN service logic and non-WIN service logic for a single call. In particular, the FIM arbitrates multiple instances of WIN and non-WIN service logic. The FIM integrates these interaction mechanisms with the BCM, Non-WIN-FM, and WIN-SM to provide the SSF/CCF with a unified view of call/service processing for a single call.

d. ***Non-WIN-FM*** – The Non-WIN-FM is the entity in the SSF/CCF that provides non-WIN service features to users. It may contain service logic, service data, and special resources as required to provide "switch-based" services to the end user. The FIM manages the relationship between execution of WIN and non-WIN service logic by controlling the activities of the WIN-SM and Non-WIN-FM. The FIM may need to limit simultaneously active WIN- and Non-WIN-supported service logic.

1.2.1 Basic Call Manager (BCM)

The BCM subjects described in this section include the basic call state model (BCSM), basic call and connection events that can lead to the invocation of WIN service logic instances, and basic call and connection events that should be reported to active WIN service logic instances.

The BCSMs consist of the Originating and Terminating BCSMs. The BCSMs reflect call processing associated with *TIA-41* Intersystem Operations. The BCSMs satisfy the general criteria identified in the *Q.1224* ITU-T recommendations.

The BCSMs provide a high-level vendor and implementation independent abstraction of call and connection processing. Differences in implementations are not represented in the BCSMs. The BCSMs identify uniform call and connection processing across multiple vendor implementations.

1.2.1.1 BCSM

The BCSM is a high-level model description of Call Control Function (CCF) activities required to establish and maintain communication paths for users. As such, it identifies a set of basic call and connection activities in a CCF and shows how these activities are joined together to process a basic call and connection (i.e. establish and maintain a communication path for a user). The relationship between the BCSM and the separation of the basic call and connection processing is for further study.

Many aspects of the BCSM are not externally visible to WIN service logic instances. However, aspects of the BCSM that are reflected upward to the Service Switching Function (SSF) are visible to WIN service logic instances. Only the visible aspects of the BCSM will be the subject of standardization. As such, the BCSM is primarily an explanatory tool for providing a representation of CCF activities that can be analyzed to determine which aspects of the BCSM will be visible to WIN service logic instances, if any, and what level of abstraction and granularity is appropriate for this visibility.

The BCSM identifies points in basic call and connection processing when WIN service logic instances are permitted to interact with basic call and connection control capabilities. In particular, it provides a framework for describing basic call and connection events that could lead to the invocation of WIN service logic instances or that should be reported to active WIN service logic instances, for describing those points in call and connection processing at which these events are detected, and for describing those points in call and connection processing when the transfer of control can occur.

Figure 6 shows the components that have been identified to describe a BCSM, including: Points in Call (PICs), Detection Points (DPs), transitions and events. PICs identify CCF activities required to complete one or more basic call and connection states of interest to WIN service logic instances. DPs indicate points in basic call and connection processing at which transfer of control can occur. Transitions indicate the normal flow of basic call and connection processing from one PIC to a DP or to another PIC. Events cause and are associated with transitions.

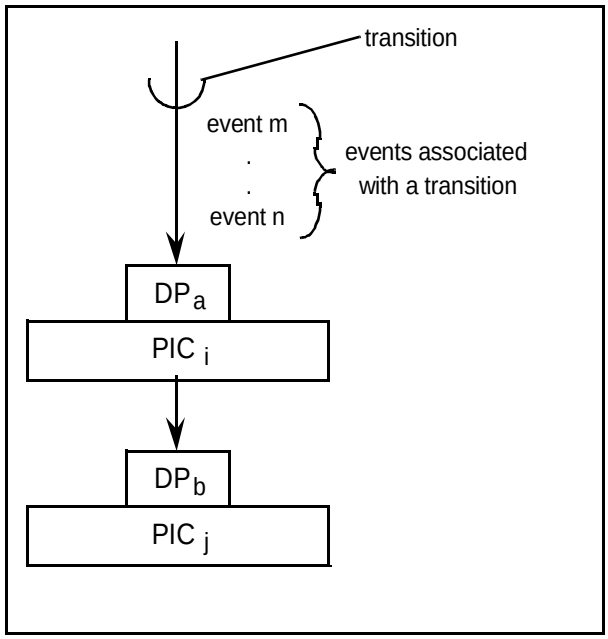

Figure 6 BCSM Components

Given a target description of a BCSM using these components, different subsets of PICs, DPs, transitions and events can be identified to align with specific capability sets as they are defined. In addition, though Location Registration Function (LRF), Mobile Station Access Control Function (MACF), Radio Control Function (RCF) and Radio Access Control (RACF) functionality are not explicitly modeled in the BCSM, a mapping is required between access signaling events and BCSM events, for each access arrangement supported by a given capability set.

Since the BCSM is generic, it may describe events that do not apply to certain access arrangements. It is important to understand how each access arrangement applies to the BCSM, and may be desirable to show in separate representations the aspects of the BCSM that apply to each arrangement.

The BCSM should model existing switch processing of basic two-party calls and should reflect the functional separation between the originating and terminating portions of calls.

1.2.2 WIN BCSM Description

The BCSM described in this section is based on the overall BCSM in Section 4 of *Q.1224*, refined as applicable for WIN. It reflects the functional separation between the originating and terminating portions of calls as illustrated in Figures 8 and 9. These figures show an originating half BCSM and a terminating half BCSM, each of which is managed by a functionally separate Basic Call Model in the SSF/CCF. The description is a starting point to identify the aspects of the BCSM that are visible to WIN service logic instances.

In order to maintain uniqueness of DP names between the originating and terminating half BCSMs, "O" and "T" is prefixed to certain originating and terminating DP names, respectively.

The relative ordering of certain PICs may be interchanged as described in the Originating and Terminating BCSM transition tables. The BCSMs described in this section show normal call flow progression and the more commonly encountered exception conditions.

For ease of reference, the DPs associated with the transition implied by each entry and exit event for each PIC are listed along with the PIC descriptions.

1.2.2.1 Originating BCSM

The originating half of the BCSM corresponds to that portion of the BCSM associated with the originating party (seeFigure 7). The descriptions for each of the PICs in the originating half of the BCSM are described below:

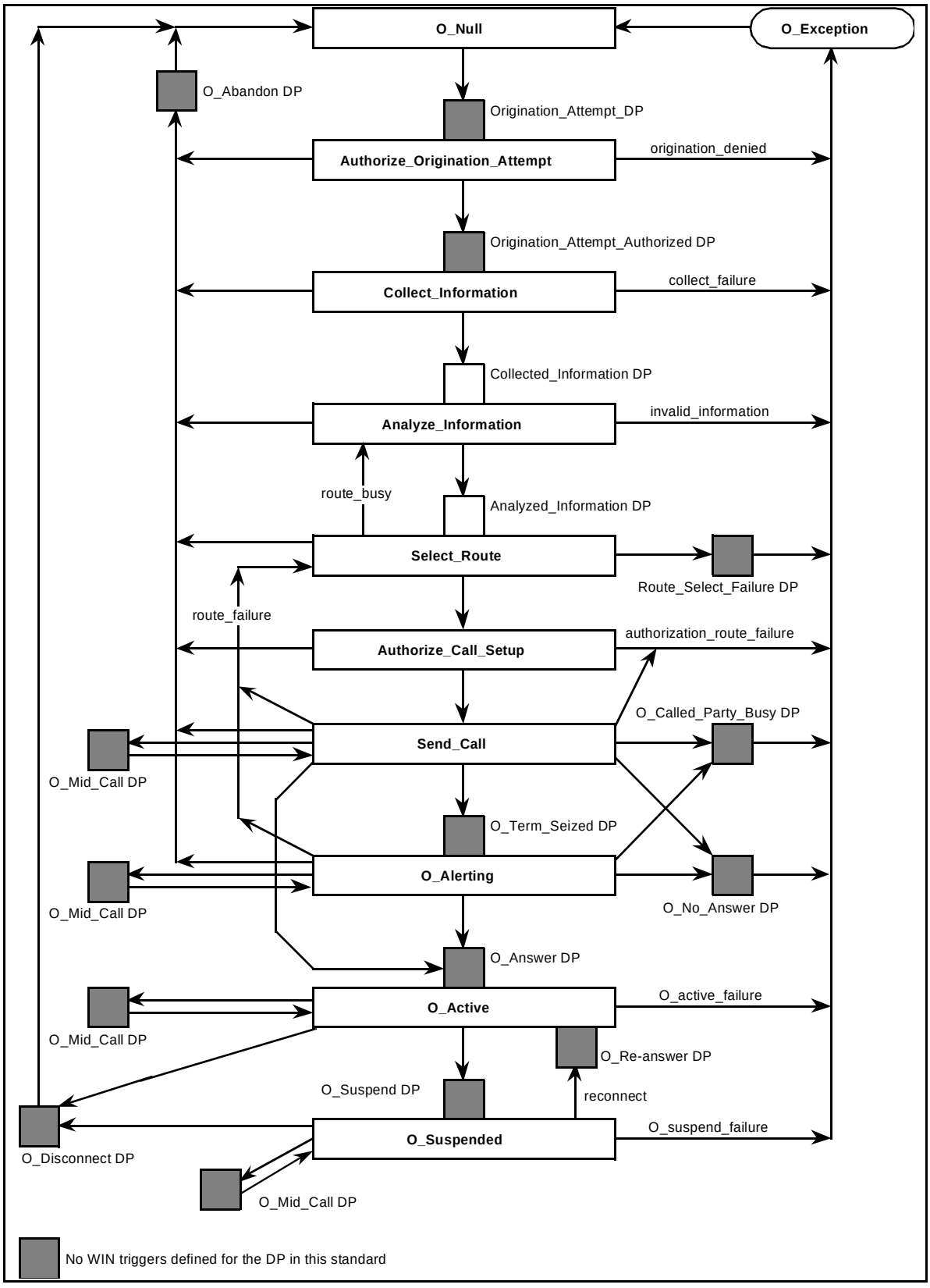

Figure 7 Originating BCSM

O_Null

Entry Event:

- Disconnect and clearing of a previous call. (DPs: O_Disconnect and O_Abandon).
- Default handling of exceptions by SSF/CCF completed (Transition from O_Exception PIC).

Functions:

- Clear any resources allocated to the originating party (no call exists, no call reference exists, no radio channel allocated for call, etc.).

Exit Event:

- Indication of a desire to place an outgoing call (e.g., an indication is received from the RACF of an origination attempt by an MS user). (DP: Origination_Attempt).
- Other indication from an originating party of a desire to place a call (e.g., ISDN-UP IAM message). (DP: Origination_Attempt).
- The following exception exit event is applicable to the O_Null PIC. For this PIC, if the call encounters this exception during O_Null PIC processing, the exception event is not visible because there is no corresponding DP.
  - The O_Abandon occurs when the calling party disconnects.

Authorize_Origination_Attempt

Entry Event:

- An indication is available that the originating MS needs to be authorized (DP: Origination_Attempt).

Functions:

- Collects the information required to authorize the call for MS origination.
- The originating MS rights are checked using the MS identity and service profile. The right of the MS to place the call with given properties (e.g., bearer capability, subscriber profile restrictions) is verified.
- For MS origination, sends an indication to the RACF to select a radio channel (i.e., select RCF) for MS origination and order the MS to use the channel. If no channel is immediately available, the RACF may invoke Priority Access and Channel Assignment (PACA) to wait for a channel to become available.

Exit Event:

- Authority/ability to place outgoing call verified. For MS origination, radio channel is available and assigned to the MS. (DP: Origination_Attempt_Authorized).
- Authority/ability to originate call is denied. This event causes a transition to the O_Exception PIC.
- Failure to select a radio channel for the MS. This event causes a transition to the O_Exception PIC.

- A disconnection indication is received from the originating party. (DP: O_Abandon).

Collect_Information

Entry Event:

- Authority/ability to place outgoing call verified. For MS origination, radio channel available and assigned to the MS. (DP: Origination_Attempt_Authorized).

Functions:

- Initial information package/dialing string (e.g., service codes, prefixes, dialed address digits) being collected from originating party. Information being examined according to dialing plan to determine end of collection. No further action may be required if an en bloc signaling method is in use (e.g., an incoming SS7 trunk).
- Subsequent digit collection according to the subscriber profile (e.g., for PIN collection). After digit collection is completed, the SSF/CCF should be able to verify that the MS is authorized for the outgoing call.

Exit Event:

- Availability of complete initial information package/dialing string from originating party. (This event may have already occurred in the case of en bloc signaling, in which case the duration of this PIC is zero). (DP: Collected_Information).
- Originating party abandons call. (DP: O_Abandon).
- After digit collection is complete, authority to originate call is denied. This event causes a transition to the O_Exception PIC.
- Information collection error has occurred (e.g., invalid dial string format, digit collection timeout). This event causes a transition to the O_Exception PIC.

Comment: Some digit analysis is required to determine the end of dialing. However, it is assumed that this analysis may be modeled as separable from the rest of digit analysis, which occurs in the Analyze_Information PIC. There is no intention to specify an implementation. However, an MSC should externally present the separable views described[1].

Analyze_Information

Entry Event:

- Availability of complete initial information package/dialing string from originating party. (DP: Collected_Information).

[1] The separable views are provided by supporting distinct DPs for Collected_Information and Analyzed_Information and by populating information flows accordingly for corresponding TDP and EDP information flows to the SCF.

Functions:

- Information being analyzed and/or translated according to dialing plan to determine routing address and call type (e.g., termination to MS, local exchange call, transit exchange call, international exchange call).

Exit Event:

- Availability of routing address and call type. (DP: Analyzed_Information).
- The invalid information event (e.g., invalid dialed digits). This event causes a transition to the O_Exception PIC.
- Originating party abandons the call. (DP: O_Abandon).

Comment: Note that routing address does not necessarily mean that the final physical route has been determined (e.g., route list has not been searched, hunt groups have not been searched, directory number has not yet been translated to a physical port address), though this may be the case (e.g., when routing to a special private facility).

Select_Route

Entry Event:

- Availability of routing address and call type. (DP: Analyzed_Information).
- Route failure reported from the Send_Call PIC or O_Alerting PIC.

Functions:

- Routing address and call type being interpreted. The next route is being selected. This may involve sequentially searching a route list, translating a directory number into a physical port address, etc. The individual destination resource out of a resource group (e.g., a multi-line hunt group, a trunk group) is not selected.

Exit Event:

- Unable to select a route (e.g., unable to determine a correct route, no more routes on the route list). (DP: Route_Select_Failure).
- The route_busy event leading to the Analyze_Information PIC. Route_busy is a non-WIN transition which is part of a basic call. If the trunk group selected for the call is busy at this switch, the SSF/CCF attempts to route the call on the next trunk group that has been specified for the call. Call processing moves to the Analyze_Information PIC when routing to a particular intra-network or inter-network carrier has been tried and an alternate carrier is allowed.
- Terminating resource (group) to which call should be routed has been identified. This event causes call processing to move to the Authorize_Call_Setup PIC.
- Originating party abandons the call. (DP: O_Abandon).

Authorize_Call_Setup

Entry Event:

- Terminating resource (group) to which call should be routed has been identified.

Functions:

- The authority of the calling party to place this particular call is verified.

Exit Event:

- Authority of originating party to place this call is denied (e.g., business group restriction mismatch, toll restricted calling line). This event causes a transition to the O_Exception PIC.
- Authority of originating party to place this call is verified. This event causes call processing to move to the Send_Call PIC.
- Originating party abandons the call. (DP: O_Abandon).

Send_Call

Entry Event:

- Authority of originating party to place this call is verified.

Functions:

- The originating half BCSM sends an indication to the terminating half BCSM of the desire to set up a call to the specified called party. Continued processing of call setup (e.g., ringing, audible ring indication) is taking place. The originating half BCSM waits for the indication that the call has been answered by the terminating party.

Exit Event:

- An indication is received from the terminating half BCSM that the terminating party is busy. (DP: O_Called_Party_Busy). In addition to terminating party busy events, the following call_rejected conditions are also treated as O_Called_Party_Busy events:
  - a termination_denied indication is received from the terminating half BCSM (Authorize_Termination_Attempt PIC); or,
  - a call_rejected indication is received from the terminating half BCSM (T_Alerting PIC) that does not specify busy.
- An indication is received from the terminating half BCSM that the terminating party does not answer. (DP: O_No_Answer).
- An indication is received from the terminating half BCSM that the terminating party is being alerted. (DP: O_Term_Seized).
- An indication is received from the terminating half BCSM that the call is accepted and answered by the terminating party. (DP: O_Answer DP).
- A route_failure event is detected when

- an indication of a T_Busy event specifying route busy is received from the terminating half BCSM, or
- an indication of a call_rejected event specifying route busy (received when the route is found to be busy at a switch other than the local switch) is received from the terminating half BCSM (T_Alerting PIC).
- an indication of a presentation_failure event specifying route busy is received from the terminating half BCSM (Present_Call PIC).

In all these cases, the originating half BCSM returns to the Select_Route PIC. This event is not detected at a DP.
Note: The route_failure event takes precedence over the O_Called_Party_Busy and O_No_Answer events.

- An indication is received from the RCF of a service feature request by the originating MS. (DP: O_Mid_Call).
- For SS7-supported trunk interface, the authorization_route_failure event occurs when the continuity check procedure results in failure. This event causes a transition to the O_Exception PIC.
- Originating party abandons the call. (DP: O_Abandon).

O_Alerting

Entry Event:

- An indication is received from terminating half BCSM that the terminating party is being alerted. (DP: O_Term_Seized).

Functions:

- Continue processing of call setup.
- Waiting for indication from the terminating half BCSM that the call has been answered by the terminating party.

Exit Event:

- A route failure event is detected when all of the following conditions are met:
  - the O_Called_Party_Busy event or O_No_Answer event occurs as specified below
  - call forwarding applies
  - there are more called party numbers left to try

  Note: the Route_Failure event takes precedence over the O_Called_Party_Busy and O_No_Answer events.
  In this case the originating call portion returns to the Select_Route PIC. This event is not detected at a DP in WIN.
- An indication is received from the terminating half BCSM that the terminating party does not answer within a specified time period. (DP: O_No_Answer).

- An indication is received from the terminating half BCSM that the call is accepted and answered by the terminating party. (DP: O_Answer).
- From this PIC, the O_Called_Party_Busy event occurs either when:
  - an indication of a call_rejected event specifying user busy is received from the terminating half BCSM (T_Alerting PIC), or
  - an indication of a call_rejected event not specifying user busy is received from the terminating half BCSM (T_Alerting PIC). For example, the terminating party may reject the call.

The originating half BCSM moves to the O_Called_Party_Busy DP.

- An indication is received from the RCF of a service feature request by the originating MS. (DP: O_Mid_Call).
- Originating party abandons the call. (DP: O_Abandon)

O_Active

Entry Event:

- An indication is received from the terminating half BCSM that the call is accepted and answered by the terminating party. (DP: O_Answer).
- A reconnect indication is received from the terminating party via the terminating half BCSM. (DP: O_Re-answer).

Functions:

- Connection established between originating and terminating party. Message accounting/charging data may be collected. Call supervision is being provided.

Exit Event:

- An indication is received from the RCF of a service feature request by the originating MS. (DP: O_Mid_Call).
- A disconnect indication is received from the originating party. (DP: O_Disconnect).
- A disconnect indication is received from the terminating party via the terminating half BCSM. (DP: O_Disconnect).
- A suspend indication is received from the terminating party via the terminating half BCSM. (DP: O_Suspend).

  Note: This transition to the O_Suspend DP is not applicable for terminating wireless calls.
- A connection failure occurs. This event causes a transition to the O_Exception PIC.

O_Suspended

Entry Event:

- A suspend indication is received from the terminating party via the terminating half BCSM. (DP: O_Suspend).

  Note: This transition to the O_Suspended PIC applies for wireless originations to an analog phone.

Functions:

- The connection with the originating party is maintained and depending on the incoming access connection, appropriate signaling takes place.
  - In case that a disconnect indication is received from the terminating half BCSM, this PIC is exited to the O_Disconnect DP. As an option for MS originated calls, the call can be continued for an appropriate period in order to offer follow-on initiated by O_Mid_Call.
  - If the reconnect indication from the terminating half BCSM is received, the originating and terminating parties are reconnected.
  - Other features may be required during this PIC (for further study).

Exit Event:

- A reconnect indication is received from the terminating party via the terminating half BCSM. Connection to the terminating party is resumed. The originating half BCSM returns to the O_Active PIC. (DP: O_Re-answer).
- An indication is received from the RCF of a service feature request by the originating MS. (DP: O_Mid_Call).
- A disconnect indication is received from the originating party. (DP: O_Disconnect).
- A disconnect indication is received from the terminating party via the terminating half BCSM. (DP: O_Disconnect).
- An exception event is encountered. This event causes a transition to the O_Exception PIC.
- An indication of expiration of the timer waiting for re-answer request is received from the terminating half BCSM. (DP: O_Disconnect).
- A trigger at O_Mid_Call is not initiated during an appropriate period. (DP: O_Disconnect).

O_Exception

Entry Event:

- An exception event is encountered as described above for each PIC.

Functions:

- Default handling of the exception condition is being provided. This includes general actions necessary to ensure no resources remain inappropriately allocated, such as:

- If any relationships exist between the SSF and SCF(s), send an error information flow to the SCF(s) closing the relationships and indicating that any outstanding call handling instructions will not run to completion.
- The SSF/CCF should make use of vendor-specific procedures to ensure release of resources so that radio, trunk, and other resources are made available for new calls.

Exit Event:

- Default handling of the exception condition by SSF/CCF completed.
  (Transition to O_Nul PIC)

1.2.2.2 Terminating BCSM

The terminating half of the BCSM corresponds to that portion of the BCSM associated with the terminating party (see Figure 8). The description for each of the PICs in the terminating half of the BCSM are described below:

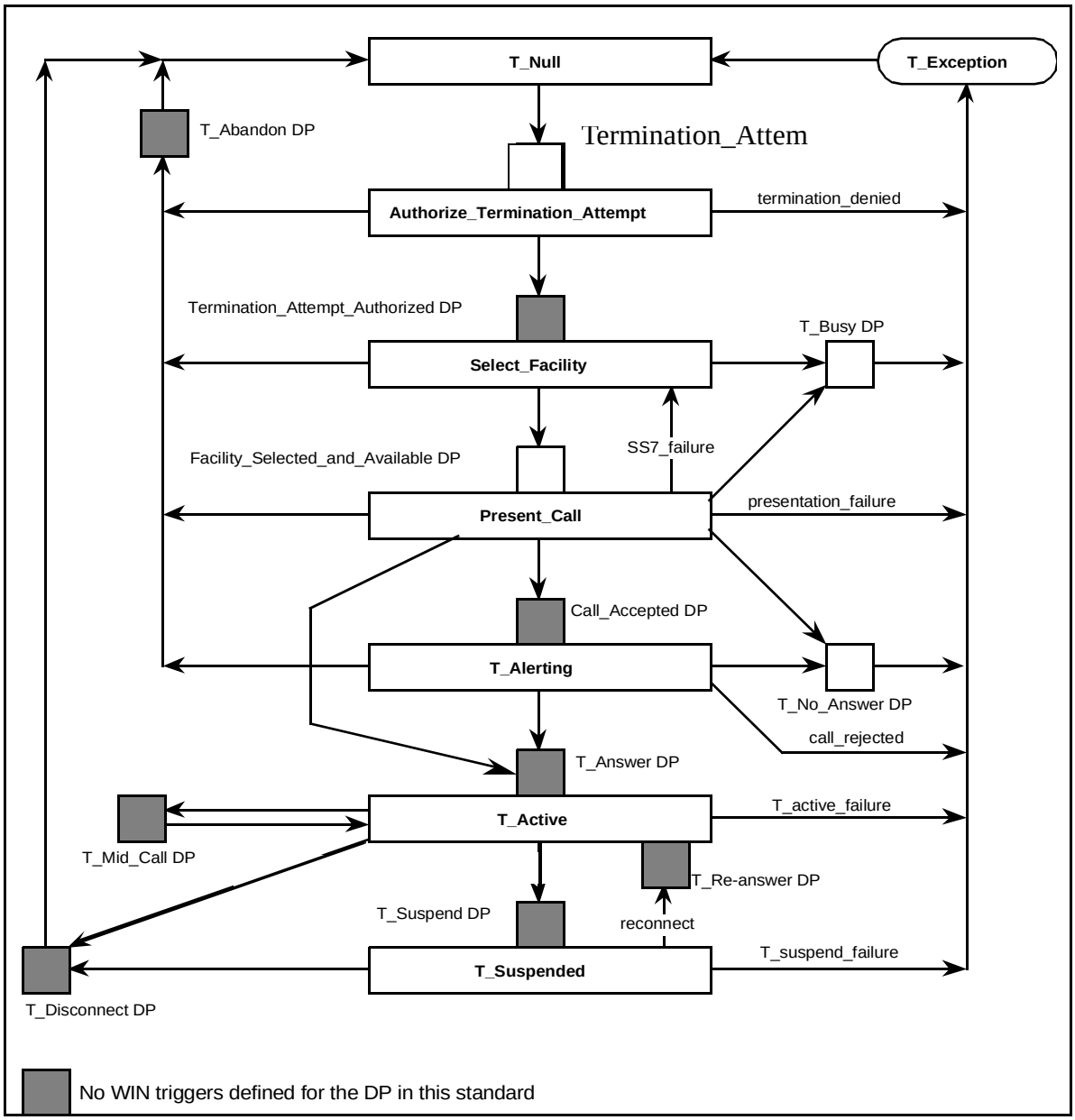

Figure 8 Terminating BCSM

T_Null

Entry Event:

- Disconnect and clearing of a previous call (DPs: T_Disconnect or T_Abandon)
- Default handling of the exception condition by SSF/CCF completed. (Transition from T_Exception PIC).

Functions:

- Clear any resources allocated to the terminating MS.

Exit Event:

- An indication of incoming call is received from the originating half BCSM. (DP:Termination_Attempt).
- The following exception exit event is applicable to this PIC: T_Abandon.
  - The T_Abandon occurs when an indication of call disconnection is received from the originating half BCSM. If the call encounters T_Abandon during PIC processing, the exception event is not visible because there is no corresponding DP.

Authorize_Termination_Attempt

Entry Event:

- Indication of incoming call received from the originating half BCSM.
  (DP: Termination_Attempt)

Functions:

- Authority to route the call to the terminating access (e.g., MS or trunk group) is being verified, e.g., check business group restrictions, restricted incoming access to line, or bearer capability compatibility.

Exit Event:

- Termination_Attempt_Authorized event. This event occurs when the MSC has verified the authority to terminate the call to the terminating access.
  (DP: Termination_Attempt_Authorized).
- The Termination Denied event occurs when the authority to route these call to the terminating user is denied. (This causes a transition to the T_Exception PIC).
- The T_Abandon event occurs when an indication of clearing is received from the originating half BCSM. (DP: T_Abandon).

Select_Facility

Entry Event:

- Termination_Attempt_Authorized event. This event occurs when the MSC has verified the authority to terminate the call to the terminating access.
  (DP: Termination_Attempt_Authorized).
- An SS7 failure occurs causing a re-attempt. The SS7 failure in the Present_Call PIC can be caused by a timer expiry upon sending the first Circuit Reservation Message (CRM) or a continuity check failure.

Functions:

- A particular network resource is being selected. It is possible that all resources in the group could be busy or unavailable. A single resource is considered a group of one.

- For MS termination, the terminating half BCSM sends an indication to the RACF to select facilities (e.g., page the MS, MS page response, trunk to cell, radio channel within cell) for the call. The MS is assigned to the radio channel[1].
- The busy/idle status of the terminating access is determined.
  - For termination to an MS, the MS is treated as user busy if it is already involved in an existing call and cannot receive another call (e.g., call waiting is not active).
  - For termination to an MS, the MS is treated as network busy if no radio channels are available or a routing failure occurs while attempting to complete the call.
  - For termination to an MS, the MS is treated as unavailable if it is not available for call termination, an indication that the MS does not respond to a page is received from the RACF[2], or an indication of a failure to assign the MS to a radio channel is received from the RACF.
  - For calls routed out of this SSF/CCF, network-determined user busy is the detection of terminating party busy.
  - For calls routed out of this SSF/CCF, network busy is when all trunks within the selected trunk group are busy.

For call arrival with TLDN, if the MS status is busy (user or network) or unavailable and the subscriber profile indicates call redirection on *Busy*, *No Page Response*, *No Answer* or *Routing Failure*, a RedirectionRequest INVOKE[3] is sent to the Originating MSC with the RedirectionReason parameter set to indicate the reason for redirection. The response determines the exit event.

Exit Event:

- Terminating access is not busy, available terminating resources available and facilities selected. (DP: Facility_Selected_and_Available).
- For call arrival with TLDN, the MS status is busy or unavailable, and the response to the RedirectionRequest INVOKE indicates success. (DP: T_Abandon).
- A T_Busy event occurs when the terminating access is busy or unavailable (as defined above) and there is no call redirection (i.e., local termination, TLDN call arrival with call redirection not applicable, TLDN call arrival with response to RedirectionRequest INVOKE indicating failure). (DP: T_Busy).
  After detecting T_Busy, if WIN service logic is not needed on the call and no switch-based features apply, an indication of the T_Busy event describing the type of busy (e.g., user or network) is passed to the originating half BCSM (Send_Call PIC). If a terminating feature acts on the T_Busy event and changes the event (e.g., as in the Call Waiting feature), the event is not passed to the originating half BCSM.
- The T_Abandon event occurs when an indication of clearing is received from the originating half BCSM. (DP: T_Abandon).

---

[1] If the MS is already assigned to a radio channel, only the selection of a trunk to the serving cell may be reuired.

[2] The MS is treated as unavailable if it fails authentication when it responds to the page.

[3] The REDREQ will not be sent if office provisioning indicates that call redirection will be done by the Serving MSC.

Present_Call

Entry Event:

- Available terminating resource identified and facilities selected.
  (DP: Facility_Selected_and_Available).

Functions:

- Terminating resource informed of incoming call (e.g., indication sent to RCF about the call).

Exit Event:

- Terminating party is being alerted (e.g., indication from RCF that ringing is being applied, ringing being applied, ISDN-UP ACM message). (DP: Call_Accepted).
- Call is accepted and answered by terminating party (e.g., indication from RCF of call answer by MS, terminating party goes off hook, ISDN-UP answer message received). (DP: T_Answer).
- For call routed out of this SSF/CCF to an MS, RedirectionRequest INVOKE received with the RedirectionReason parameter indicating *Busy*, *No Page Response*, *Unavailable* or *Unroutable*. (DP: T_Busy).

  After detecting T_Busy, if WIN service logic is not needed on the call, an indication of the T_Busy event is passed to the originating half BCSM (Send_Call PIC). If a terminating feature acts on the T_Busy event and changes the event (e.g., as in the Call Forwarding feature), the event is not passed to the originating half BCSM.
- For call routed out of this SSF/CCF to an MS, RedirectionRequest INVOKE message received with the RedirectionReason parameter indicating *No Answer* or *Call Refused*.
  (DP: T_No_Answer).

  After detecting T_No_Answer, if WIN service logic is not needed on the call, an indication of the T_No_Answer event is passed to the originating half BCSM (Send_Call PIC). If a terminating feature acts on the T_No_Answer event and changes the event [e.g., as in the Call Forwarding feature], the event is not passed to the originating half BCSM.
- A timer expiry upon sending the first Circuit Reservation Message (CRM) or a continuity check failure. (SS7 failure). This event causes call processing to move to the Select_Facility PIC.
- Presentation Failure: For call routed out of this SSF/CCF, the call cannot be presented, (e.g., ISDN user determined busy, ISDN-UP release message with busy cause). This event causes the terminating half BCSM to move to the T_Exception PIC and an indication sent to the originating half BCSM (Send_Call PIC).
- An indication of originating party abandon is received from originating half BCSM.
  (DP: T_Abandon).

T_Alerting

Entry Event:

- Terminating party is being alerted of incoming call (DP: Call_Accepted).

Functions:

- An indication is sent to the originating half BCSM that the terminating party is being alerted. Continued processing of call setup (e.g., ringing, audible ring indication) is taking place. Waiting for the call to be answered by the terminating party.
- For call arrival with TLDN, if the MS does not answer the alert and the subscriber profile indicates call redirection on a "no answer" condition[1], a RedirectionRequest INVOKE is sent to the Originating MSC with the RedirectionReason parameter indicating *No Answer* or *Call Refused*, as appropriate. The response determines the exit event.

Exit Event:

- Call is accepted and answered by terminating party (e.g., indication from RCF of call answer by MS, terminating party goes off hook, ISDN-UP answer message received). (DP: T_Answer).
- For call arrival with TLDN, the MS does not answer the alert and the response to the RedirectionRequest INVOKE indicates success. (DP: T_Exception).
- Terminating party does not answer before the MSC-based ringing timer expires. For call arrival with TLDN, the MS does not answer the alert and the response to the RedirectionRequest INVOKE indicates failure. For MS termination, loss of radio contact with MS. For call routed out of this SSF/CCF to an MS, RedirectionRequest INVOKE received with the RedirectionReason parameter indicating *No Answer* or *Call Refused*. (DP: T_No_Answer). After detecting T_No_Answer, if WIN service logic is not needed on the call, an indication of the T_No_Answer event is passed to the originating half BCSM (Send_Call PIC). If a terminating feature acts on the T_No_Answer event and changes the event [e.g., as in the Call Forwarding feature], the event is not passed to the originating half BCSM.
- Call_rejected exception event may happen when a user rejects a call while being alerted. This event causes the terminating half BCSM to move to the T_Exception PIC and an indication sent to the originating half BCSM (Send_Call PIC).
- Indication of originating party abandon received from the originating half BCSM. (DP: T_Abandon).

T_Active

Entry Event:

- Call is accepted and answered by terminating party. (DP: T_Answer).
- A reconnect indication (e.g., SS7 resume message) is received from the terminating party. (DP: T_Re-Answer).

Functions:

- An indication is sent to the origination half BCSM that the terminating party has accepted and answered the call. Connection established between originating and terminating party. Call supervision is being provided.

Exit Event:

[1] The REDREQ will not be sent if office provisioning indicates that call redirection will be done by the Serving MSC.

- An indication is received from the RCF of a service feature request by the terminating MS. (DP: T_Mid_Call).
- A disconnect indication is received from the terminating party. (DP: T_Disconnect).
- A suspend indication is received from the terminating party. (DP: T_Suspend).

  Note: This transition to the T_Suspend DP is not applicable for terminating wireless calls.
- A disconnect indication is received from the originating party via the originating half BCSM. (DP: T_Disconnect).
- A connection failure occurs or loss of radio contact with MS. This event causes the terminating half BCSM to move to the T_Exception PIC and an indication sent to the originating half BCSM.

T_Suspended

Entry Event:

- A suspend indication is received from the terminating party. (DP: T_Suspend).

Functions:

- The physical resources associated with the call remain connected.
- A suspend indication is sent to the originating half BCSM.
- If a disconnect indication (e.g., Q.931 disconnect message, SS7 release message) is received from the terminating party, this PIC is exited to the T_Disconnect DP and a disconnect indication is sent to the originating half BCSM.
- For an SS7 supported trunk, when the receiving network initiates a suspend message, a timer is started and the call processingwaits for re-answer request from the terminating party. If a reconnect indication (e.g., off-hook, SS7 resume message) is received from the terminating party before the timer expires, a reconnect indication is sent to the originating half BCSM and the originating and terminating parties are reconnected.

  Note: Both a Call Resume timer and a Call Retention timer may exist in this PIC. WIN implementations may use a single timer for both conditions.

Exit Event:

- Reconnect indication (e.g., off hook, SS7 resume message) is received before the timer expires. The T_BCSM returns to the T_Active PIC. (DP: T_Re-answer).
- The expiration of the timer waiting for re-answer from the terminating party. (DP: T_Disconnect).
- A disconnect indication is received from the terminating party (DP: T_Disconnect).
- A disconnect indication is received from the originating party via the originating half BCSM. (DP: T_Disconnect).
- An exception event is encountered. This event causes a transition to the T_Exception PIC.

T_Exception

Entry Event:

- An exception event is encountered as described above for each PIC.

Functions:

- An indication of the exception condition is sent to the originating half BCSM. Default handling of the exception condition is being provided. This includes general actions necessary to ensure no resources remain inappropriately allocated, such as:
  - If any relationships exist between the SSF and SCF(s), send an error information flow to the SCF(s) closing the relationships and indicating that any outstanding call handling instructions will not run to completion.
  - The SSF/CCF should make use of vendor-specific procedures to ensure release of resources so that radio, trunk, and other resources are made available for new calls.

Exit Event:

- Default handling of the exception condition by SSF/CCF completed.
  (Transition to O_Nul PIC)

1.2.2.3 BCSM Transitions

The complete set of transitions for the Originating BCSM are shown in Table 1 below. The shaded DPs do not have triggers defined in this standard. The **Nature of BCSM Transition** indicates whether the transition is Basic or Extended.

Basic: call processing resumes in sequence (i.e., continue).

Extended: the next step in call processing is specified by SCF.

Table 1 Originating BCSM Transitions

From	To	Nature of BCSM Transition
Origination_Attempt DP	Authorize_Orig._Attempt PIC	
Orig._Attempt_Authorized DP	Collect_Information PIC	
Collected_Information DP	Collect_Information PIC	Extended
	Analyze_Information PIC	Basic
	Select_Route PIC	Extended
Analyzed_Information DP	Collect_Information PIC	Extended
	Analyze_Information PIC	Extended
	Select_Route PIC	Basic
O_Term_Seized DP	O_Alerting PIC	
Route_Select_Failure DP	O_Exception	
O_Called_Party_Busy DP	O_Exception	
O_No_Answer DP	O_Exception	
O_Answer DP	O_Active PIC	
O_Suspend DP	O_Suspended PIC	
O_Re-Answer DP	O_Active PIC	
O_Mid_Call DP	Send_Call PIC	
O_Mid_Call DP	O_Alerting PIC	
O_Mid_Call DP	O_Active PIC	
O_Mid_Call DP	O_Suspended PIC	
O_Disconnect DP	O_Null PIC	
O_Abandon DP	O_Null PIC	
O_Null PIC	Origination_Attempt DP	
Authorize_Orig._Attempt PIC	Orig._Attempt_Authorized DP	
	O_Abandon DP	
	O_Exception	Basic
Collect_Information PIC	Collected_Information DP	Basic
	O_Abandon DP	
	O_Exception	Basic
Analyze_Information PIC	Analyzed_Information DP	Basic
	O_Abandon DP	
	O_Exception	Basic
Select_Route PIC	Analyze_Information PIC	Basic
	Authorize_Call_Setup PIC	Basic
	Route_Select_Failure DP	
	O_Abandon DP	

Table 1 (Continued)Originating BCSM Transitions

From	To	Nature of BCSM Transition
Authorize_Call_Setup PIC	Send_Call PIC	Basic
	O_Abandon DP	
	O_Exception	Basic
Send_Call PIC	O_Term_Seized DP	
	O_Mid_Call DP	
	O_Called_Party_Busy DP	
	O_Answer DP	
	O_No_Answer DP	
	Select_Route PIC	Basic
	O_Abandon DP	
	O_Exception	Basic
O_Alerting PIC	Select_Route PIC	Basic
	O_Mid_Call DP	
	O_Answer DP	
	O_No_Answer DP	
	O_Called_Party_Busy DP	
	O_Abandon DP	
O_Active PIC	O_Mid_Call DP	
	O_Disconnect DP	
	O_Suspend DP	
	O_Exception	Basic
O_Suspended PIC	O_Re-Answer DP	
	O_Mid_Call DP	
	O_Disconnect DP	
	O_Exception	Basic
O_Exception	O_Null PIC	Basic

The complete set of transitions for the Terminating BCSM are shown in Table 2 below. The shaded DPs do not have triggers defined in this standard.

Table 2 Terminating BCSM Transitions

From	To	Nature of BCSM Transition
Termination_Attempt DP	Auth._Term._Attempt PIC	Basic
Term._Attempt_Auth. DP	Select_Facility PIC	
Facility_Selected_And_Avail. DP	Present_Call PIC	Basic
Call_Accepted DP	T_Alerting PIC	
T_Busy DP	Select_Facility PIC	Extended
	Present_Call PIC	Extended
	T_Exception	Basic
T_No_Answer DP	Select_Facility PIC	Extended
	T_Exception	Basic
T_Answer DP	T_Active PIC	
T_Suspend DP	T_Suspended PIC	
T_Re-Answer DP	T_Active PIC	
T_Mid_Call DP	T_Active PIC	
T_Disconnect DP	T_Null PIC	
T_Abandon DP	T_Null PIC	
T_Null PIC	Termination_Attempt DP	Basic
Auth._Term._Attempt PIC	T_Exception	Basic
	T_Abandon DP Term._Attempt_Auth. DP	
Select_Facility PIC	Facility_Selected_And_Avail. DP	Basic
	T_Busy DP	Basic
	T_Abandon DP	
Present_Call PIC	Select_Facility PIC	Basic
	T_Abandon DP	
	T_Busy DP	Basic
	T_No_Answer DP	Basic
	T_Exception	Basic
	Call_Accepted DP T_Answer DP	

Table 2 Terminating BCSM Transitions

From	To	Nature of BCSM Transition
T_Alerting PIC	T_Answer DP T_Abandon DP	
	T_Exception	Basic
	T_No_Answer DP	Basic
T_Active PIC	T_Exception	Basic
	T_Mid_Call DP T_Disconnect DP T_Suspend DP	
T_Suspended PIC	T_Disconnect DP T_Re-Answer DP	
	T_Exception	Basic
T_Exception	T_Null PIC	Basic

1.2.3 BCSM Detection Points

Certain call and connection events may be visible to WIN service logic instances. DPs are the points in the call processing at which these events are detected.

A DP can be armed in order to notify a WIN service logic instance that the DP was encountered, and potentially to allow the WIN service logic instance to influence subsequent call processing. If a DP is not armed, the SSF/CCF continues call processing without SCF involvement.

DPs are characterized by the following four attributes:

- *Arming/disarming mechanism*. A DP must be armed in order for the event to be detected. A DP may be statically armed or dynamically armed. A DP is statically armed through service feature provisioning. Statically armed DPs are of type TDP-R or TDP-N.

  A DP may be dynamically armed by a Service Logic Program (SLP) instance at an SCF within the context of the current call and the current control relationship with that SLP instance at that SCF. Dynamically armed DPs of this type are labeled EDP-R or EDP-N.

  While the SSF/CCF-SCF control relationship exists, the dynamically armed triggers at EDPs may be adjusted as needed by the SLP instance at the SCF. EDPs may remain armed to provide notifications only to the SLP instance at the SCF when the relationship shifts from control to monitoring. These dynamically armed EDPs are automatically disarmed when the relationship terminates, even if the call continues. If the relationship shifts to monitoring mode, a new control relationship may be established with another SLP instance at the same or a different SCF within the same call.

  When a mobile station initially registers within the serving area of an SSF/CCF, the set of DPs armed, the trigger criteria and related information (e.g., the SCF to which a call handling instruction request should be addressed) need to be placed in the SSF/CCF serving the subscriber when the registration takes place. This represents *dynamic geographic placement* of statically armed DPs, and is distinct from dynamic DP arming as discussed above. This requires that an image of the statically armed DPs (type TDP-R and TDP-N) for the registering

subscriber be provided to the SSF/CCF as part of the registration notification process.

Upon intersystem handoff, the original SSF/CCF becomes the anchor SSF/CCF and remains responsible for the relationship(s) to the SCF(s) influencing the call. Therefore, there is no impact as a result of the handoff.

Specific triggers may be dynamically armed as TDPs within the context of the current call. The SCF response to the SSF/CCF can provide this trigger arming information and may disarm previously armed triggers for the duration of the current call.

- *Criteria.* In addition to the condition that a DP be armed, DP criteria must be satisfied in order to notify the SCF that the DP was encountered.
- *Relationship.* Given that an armed DP was encountered and DP criteria are satisfied, the SSF may provide an information flow via a relationship:
  - If this relationship is between the SSF/CCF and the SCF for the purpose of call and service logic processing, it is considered to be a WIN service relationship. This relationship may be of two types:
    - » a control relationship if the SCF is able to influence call processing via the relationship
    - » a monitor relationship if the SCF is not able to influence call processing via the relationship
  - If this relationship is between the SSF/CCF and the SCF or the SMF for management purposes, it is considered to be a service management control relationship. This relationship is for further study.
- *Call processing suspension*. Given that an armed DP was encountered and DP criteria are satisfied for a WIN service control relationship, the SSF may suspend call processing to allow the SCF to influence subsequent call processing. When call processing is suspended, the SSF sends an information flow to the SCF requesting instructions, and waits for a response. When call processing is not suspended, the SSF sends an information flow notifying the SCF that a DP was encountered, and does not expect a response. This attribute is set by the same mechanism that arms the DP.

Based on these attributes, four types of DPs are identified for WIN. The DP types are:

- Trigger Detection Point – Request (TDP-R)
- Trigger Detection Point – Notification (TDP-N)
- Event Detection Point – Request (EDP-R)
- Event Detection Point – Notification (EDP-N)

1.2.3.1 Detection Points Types

These DP types are defined by the DP attribute values in Table 3.

Table 3 BCSM DP Types

DP Type	Arming Mechanism	Criteria	WIN Service Relationship	Call Suspension
TDP-R	Static	Specific to DP	Control initiated	Yes
TDP-R	Dynamic	Specific to DP	Control initiated	Yes
TDP-N	Static	Specific to DP	None (single message to SCF)	No
TDP-N	Dynamic	Specific to DP	None(single message to SCF)	No
EDP-R	Dynamic	None	Control	Yes
EDP-N	Dynamic	None	Control or Monitor	No
DP Type	Arming Mechanism	Criteria	WIN Service Relationship	Call Suspension

A *Trigger Detection Point* (TDP) is statically or dynamically armed. Each TDP is associated with specific criteria. When a TDP-R is detected, a query is launched to the SCF to initiate a control relationship between the SSF/CCF and the SCF. No further TDP-Rs may be processed while this relationship continues and remains as a control relationship. When a TDP-N is detected, a single message notification is launched to the SCF outside the context of any existing relationship. When a TDP-R is detected, call processing can be suspended. A TDP-N cannot suspend call processing.

An *Event Detection Point* (EDP) is dynamically armed in the context of an existing control relationship between the SSF/CCF and the SCF. EDPs are not associated with specific criteria. When an EDP-R is detected, a query is launched to the SCF within the context of the existing control relationship between SSF/CCF and SCF. When an EDP-N is detected, a single message notification is launched to the SCF as part of a control or monitor relationship between the SSF/CCF and the SCF. When an EDP-R is detected, call processing can be suspended. EDP-Ns cannot suspend call processing.

When TDP-R and all EDP-R processing is completed, but there remain armed EDP-Ns, the relationship between the SSF/CCF and the SCF transitions to a monitoring relationship. This relationship may not transition back to a control relationship.

When the relationship between the SSF/CCF and the SCF is terminated, any remaining EDP-Rs or EDP-Ns are deleted since they are meaningful only within the SSF/CCF-SCF relationship in which they were armed.

1.2.3.2 Trigger Detection Point Criteria

TDP criteria are conditions that must be satisfied in order to notify the SCF that the TDP was encountered. The following criteria are assigned to a TDP.

1.2.3.2.1 Trigger Assigned Criteria

The *Trigger Assigned* criteria can be used by itself or in conjunction with other criteria at a TDP. If this criteria is unconditional, then it is used by itself and no other criteria needs to be satisfied.

1.2.3.2.2 Termination Trigger Criteria

The *Termination Trigger* criteria identify call termination conditions that may require distinctive call processing treatment. Examples of this criteria include:

- busy
- no page response
- no answer
- not reachable
- routing failure

1.2.3.2.3 Origination Trigger Criteria

The *Origination Trigger* criteria identify call origination conditions that may require distinctive call processing treatment. Examples of this criteria include:

- all originations
- local calls
- Local toll calls
- Non-Local toll calls
- international calls
- World Zone 1 calls
- calls to an unrecognized number
- revertive calls
- pound (first dialed digit is an # [octothorpe])
- double pound (first two dialed digits are ##)
- star (first dialed digit is an * [asterisk])
- double star (first two dialed digits are **)
- no digits dialed
- one digit dialed
- two digits dialed

• • •

- fifteen digits dialed

1.2.3.2.4 Dialed Digits Criteria

The *Dialed Digits* criteria identifies specific dialed digit sequences that may require distinctive call processing treatment.

1.2.3.2.5 Calling Party Information Criteria

The *Calling Party Information* criteria identifies information about the calling party that may influence call processing. Examples of this criteria include:

- calling party number display information
- calling party number display restriction
- calling party name display information
- calling party name display restriction

1.2.3.2.6 Called Party Information Criteria

The *Called Party Information* criteria identifies information about the called party that may influence call processing. Examples of this criteria include:

- mobile directory number

1.2.3.2.7 Bearer Capability Criteria

The *Bearer Capability* criteria identifies the type of radio or trunk facility in use. Examples of this criteria include:

- type of radio link (AMPS, NAMPS, TDMA, CDMA)
- type of trunk (PSTN, roamer port, inter-switch trunk)
- messaging capability (Short Message Service)

1.2.3.2.8 Class of Service Criteria

The *Class of Service* criteria identifies specific user capabilities that may require distinctive call processing treatment. Examples of this criteria include:

- preferred language indicator
- geographic authorization
- SPINI indicator
- PACA indicator

1.2.3.3 Triggers

Triggers must be one of three categories:

- *Subscriber-based*. If a trigger is subscriber-based, only calls involving the subscriber (mobile station or user) can encounter the trigger. Subscriber-based criteria are sent from the HLR to the Serving MSC (e.g., RegistrationNotification RETURN RESULT) as the subscriber roams.
- *Group-based*. If a trigger is group-based, only calls involving a member of the group (mobile station or user) can encounter the trigger. Group-based trigger criteria may be sent from the HLR to the Serving MSC (similar to the subscriber-based criteria), or may reside as static data in the MSC (similar to office-based criteria).

- *Office-based*. If a trigger is office-based, then any call that satisfies the DP criteria can encounter the trigger. Office-based trigger criteria reside as static data in the MSC.

A WIN trigger occurs when all of the following conditions are satisfied:

- the CCF is processing a call and encounters a *Trigger Detection Point*
- the trigger is active and armed
  - if the trigger is subscriber-based, the call must be originating or terminating with the subscriber for the trigger to be active
  - if the trigger is group-based, the call must be originating or terminating with a member of the group for the trigger to be active
  - if the trigger is office based, the trigger is active for all calls
- appropriate trigger criteria are stored at the MSC
- the information available at the MSC satisfies the trigger criteria

WIN triggers may occur in the Originating BCSM or Terminating BCSM. When a trigger occurs, the MSC typically launches an *TIA-41* query to another network entity (e.g., SCP) in order to obtain the information needed to continue processing the call.

Triggers can be active for various types of interfaces: trunk, line (radio port) or roamer port.

After detecting a trigger and sending a query to an SCP, the MSC receives a response indicating how to process the call. Subsequent call processing may lead to other triggers. To protect switch and network resources from possible infinite looping, the MSC shall terminate (i.e., apply final treatment to) any call that encounters more triggers than the value of MaximumSerialTriggers without routing out of the same MSC. MaximumSerialTriggers shall be administered by the network operator with a default, office-wide value of 6.

1.2.3.4 Trigger Types and Trigger Precedence

Trigger types denote classes of events of interest. They are used to establish trigger precedence rules at TDPs and to indicate to the SCF the service logic to be invoked. A non-exhaustive list of trigger types is defined. Definition of future trigger types is for further study.

The trigger types are described in terms of:

- TDP - the DP at which the trigger can be detected.
- DP Criteria - the conditions needed to trigger. Criteria may be conditional - effective only when the trigger is active and the criteria is satisfied, or unconditional - always effective when the trigger is active.
- Category - office, group, or subscribed (subscriber based).
- Interface - type of interface to which it can be assigned (e.g., inter-office trunk, mobile origination, mobile termination).
- Trigger Type - the value that identifies the type of criteria that caused the SSF/CCF to detect a valid trigger condition at this TDP.

- Fault Handling - defines fault handling procedures for the case when the SCF does not respond to the SSF/CCF message. Details on possibilities for fault handling are for further study.
- *TIA-41* operation - identifies the *TIA-41* operation used to query WIN service logic (e.g., SCP).
- Arming Mechanism - identifies the possible mechanisms by which the trigger is armed. Subscribed triggers may be armed by parameters received by the MSC (e.g., in a `regnot, qualreq` or `QUALDIR`). Triggers may be dynamically armed on a per call basis by parameters within call related operations (e.g., `orreq`, `featreq`, `locreq`, `ROUTREQ`) Office based triggers are armed in the provisioning process by separate service management systems that are beyond the scope of this standard.

Since multiple triggers may be armed as TDP-Rs at a DP, precedence rules for trigger processing are specified as:

- subscribed triggers have precedence over group triggers
- group triggers have precedence over office triggers
- more specific triggers take precedence over less specific triggers (e.g., a 6-digit trigger takes precedence over a 3-digit trigger)

The sequence for processing WIN triggers should be as detailed in Tables 4 and 5 below.
Note: A significant change in the *TIA-41-E* from *IS-771* is that the Mobile_Termination, Advanced_Termination and Location triggers have been moved from the Originating BCSM to the Terminating BCSM.

Table 4 WIN Trigger Precedence for Originating BCSM

Trigger Detection Point	Trigger Type
Collected_Information	All_Calls
	Double_Introducing_Star
	Single_Introducing_Star
	Home_System_Feature_Code
	Double_Introducing_Pound
	Single_Introducing_Pound
	Revertive_Call
	K-Digit
Analyzed_Information	Local_Call
	Local_Toll_Call
	Non-Local_Toll_Call
	World_Zone_Call
	International_Call
	Unrecognized_Number
	Prior_Agreement
	Specific_Called_Party_Digit_String

Table 5 WIN Trigger Precedence for Terminating BCSM

Trigger Detection Point	Trigger Type
Termination Attempt	Mobile_Termination
	Advanced_Termination
	Location
Facility_Selected_and_Available	Terminating_Resource_Available
T_Busy	T_Busy
	T_No_Page_Response
	T_Unroutable
T_No_Answer	T_No_Answer

Locally allowed numbers escape the subscribed triggers at the Collected_Information and Analyzed_Information Detection Points. However these subscribed triggers at the Collected_Information and Analyzed_Information Detection Points do take precedence over "hot line."

1.2.3.4.1 All_Calls

The All_Calls trigger is detected for all MS originated calls.

- TDP - Collected_Information
- DP Criteria - Trigger assigned (unconditional)
- Category - Subscribed
- Interface - mobile origination
- Trigger Type - All_Calls
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - OriginationRequest INVOKE
- Arming Mechanism - subscriber profile (e.g., regnot) or dynamically for a single call (e.g., `orreq`)

1.2.3.4.2 Double_Introducing_Star

The Double_Introducing_Star trigger is detected for MS originated calls having '**' as the first two dialed digits.

- TDP - Collected_Information
- DP Criteria - Conditional
- Category - Subscribed
- Interface - mobile origination
- Trigger Type - Double_Introducing_Star

- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - OriginationRequest INVOKE
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `orreq`)

1.2.3.4.3 Single_Introducing_Star

The Single_Introducing_Star trigger is detected for MS originated calls with '*' as the first dialed digit but not as the second dialed digit.

- TDP - Collected_Information
- DP Criteria - Conditional
- Category - Subscribed
- Interface - mobile origination
- Trigger Type - Single_Introducing_Star
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - OriginationRequest INVOKE
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `orreq`)

1.2.3.4.4 Home_System_Feature_Code

The Home_System_Feature_Code trigger is detected for MS originated calls with '*' as the first dialed digit but not as the second dialed digit.

- TDP - Collected_Information
- DP Criteria - Conditional
- Category - Subscribed
- Interface - mobile origination
- Trigger Type - Home_System_Feature_Code
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - FeatureRequest INVOKE
- Arming Mechanism - (Note)

  Note: This trigger type is armed at the Serving MSC when the Single_Introducing_Star trigger type is not armed. The Home_System_Feature_Code trigger type is mutually exclusive with the Single_Introducing_Star trigger type. When the Home_System_Feature_Code trigger type is armed, the address associated with this trigger type is the address of the HLR for the served subscriber.

1.2.3.4.5 Double_Introducing_Pound

The Double_Introducing_Pound trigger is detected for MS originated calls having '##' as the first two dialed digits.

- TDP - Collected_Information
- DP Criteria - Conditional
- Category - Subscribed
- Interface - mobile origination
- Trigger Type - Double_Introducing_Pound
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - OriginationRequest INVOKE
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `orreq`)

1.2.3.4.6 Single_Introducing_Pound

The Single_Introducing_Pound trigger is detected for MS originated calls having '#' as the first dialed digit but not as the second dialed digit.

- TDP - Collected_Information
- DP Criteria - Conditional
- Category - Subscribed
- Interface - mobile origination
- Trigger Type - Single_Introducing_Pound
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - OriginationRequest INVOKE
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `orreq`)

1.2.3.4.7 Revertive_Call

The Revertive_Call trigger is detected when the dialed digits are equal to the MS's mobile directory number (or MIN if the MDN is not available).

- TDP - Collected_Information
- DP Criteria - Conditional
- Category - Subscribed
- Interface - mobile origination
- Trigger Type - Revertive_Call

- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - OriginationRequest INVOKE
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `orreq`)

1.2.3.4.8 K_Digit[1]

Sixteen distinct and independent K_Digit triggers are defined for values of K from 0 to 15. For values of K from 0 to 14, the associated K_Digit trigger is detected if the MS dialed digits are precisely K digits in length. The 15-Digit K_Digit trigger is detected if the MS dialed digits are at least 15 digits in length.

- TDP - Collected_Information
- DP Criteria - Conditional
- Category - Subscribed
- Interface - mobile origination
- Trigger Type - K_Digit
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - OriginationRequest INVOKE
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `orreq`)

1.2.3.4.9 Local_Call

The Local_Call trigger is detected when the digits dialed are recognized as a local call according to the dialing plan in use.

- TDP - Analyzed_Information
- DP Criteria - Conditional
- Category - Subscribed
- Interface - mobile origination
- Trigger Type - Local_Call
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - OriginationRequest INVOKE
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `orreq`)

[1] All digits (e.g., *,#) are counted in determining whether the K_Digit trigger criterion is met.

1.2.3.4.10 Local_Toll_Call

The Local_Toll_Call trigger is detected when the digits dialed are recognized as a toll call within the local service provider's service area (e.g. intra_LATA tall call within the NANP) according to the dialing plan in use.

- TDP - Analyzed_Information
- DP Criteria - Conditional
- Category - Subscribed
- Interface - mobile origination
- Trigger Type - Local_Toll_Call
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - OriginationRequest INVOKE
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `orreq`)

1.2.3.4.11 Non-Local_Toll_Call

The Non-Local_Toll_Call trigger is detected when the digits dialed are recognized as toll call outside the local service provider's service area according to the dialing plan in use.

- TDP - Analyzed_Information
- DP Criteria - Conditional
- Category - Subscribed
- Interface - mobile origination
- Trigger Type - Non-Local_Toll_Call
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - OriginationRequest INVOKE
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `orreq`)

1.2.3.4.12 World_Zone_Call

The World_Zone_Call trigger is detected when the digits dialed are recognized as a call to a World Zone different from the World Zone in which the call has originated according to the dialing plan in use (not recommended for use).

- TDP - Analyzed_Information
- DP Criteria - Conditional
- Category - Subscribed
- Interface - mobile origination

- Trigger Type - World_Zone_Call
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - OriginationRequest INVOKE
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `orreq`)

1.2.3.4.13 International_Call

The International_Call trigger is detected when the digits dialed are recognized as an international call according to the dialing plan in use.

- TDP - Analyzed_Information
- DP Criteria - Conditional
- Category - Subscribed
- Interface - mobile origination
- Trigger Type - International_Call
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - OriginationRequest INVOKE
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `orreq`)

1.2.3.4.14 Unrecognized_Number

The Unrecognized_Number trigger is detected when the digits dialed are not recognized as a valid call type.

- TDP - Analyzed_Information
- DP Criteria - Conditional
- Category - Subscribed
- Interface - mobile origination
- Trigger Type - Unrecognized_Number
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - OriginationRequest INVOKE
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `orreq`)

1.2.3.4.15 Prior_Agreement

The Prior_Agreement trigger is detected when the digits dialed match the criteria of a prior agreement.

- TDP - Analyzed_Information
- DP Criteria - Conditional
- Category - Subscribed
- Interface - mobile origination
- Trigger Type - Prior_Agreement
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - OriginationRequest INVOKE
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `orreq`)

1.2.3.4.16 Specific_Called_Party_Digit_String[1]

The Specific_Called_Party_Digit_String trigger is detected when the appropriate sequence of digits is dialed according to the dialing plan in use. For example, a 3, 6, or 10 digit sequence of digits can be provisioned as the trigger. Trigger provisioning specifies whether the MSC performs some manipulation of the dialed digits (e.g., digit insertion, deletion, or translation to public numbers), or queries the SCF with the digits as dialed. The numbering plan in force should ensure that emergency service numbers are distinct from provisionable specific digit strings.

- TDP - Analyzed_Information
- DP Criteria - Trigger assigned (conditional). Specific called party number string.
- Category - Office-based
- Interface - mobile origination or interoffice trunk
- Trigger Type - Specific_Called_Party_Digit_String
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - AnalyzedInformation INVOKE
- Arming Mechanism - office provisioning

1.2.3.4.17 Mobile_Termination

The Mobile_Termination trigger is detected when the called party number is determined to be a mobile directory number.

- TDP - Termination_Attempt.
- DP Criteria - Trigger assigned (conditional), called party number identified as a mobile directory number.
- Category - Office-based
- Interface - mobile termination or interoffice trunk

[1] Known as Specific_Digit_String in ITU-T *Q.1224*.

- Trigger Type - Mobile_Termination
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - LocationRequest INVOKE with the TRIGTYPE parameter set to indicate the *Mobile_Termination* trigger was encountered
- Arming Mechanism - office provisioning

1.2.3.4.18 Advanced_Termination

The Advanced_Termination trigger is detected when it has been armed by the TriggerAddressList parameter received in the `locreq` response to a `LOCREQ` sent upon detection of the Mobile_Termination trigger.

- TDP - Termination_Attempt.
- DP Criteria - Trigger assigned (unconditional)
- Category - Subscribed
- Interface - mobile termination or interoffice trunk
- Trigger Type - Advanced_Termination
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - AnalyzedInformation INVOKE
- Arming Mechanism - TriggerAddressList parameter in the `locreq`

1.2.3.4.19 Location

The *Location* trigger is armed by the TriggerAddressList parameter received in the `locreq` response to a `LOCREQ` sent upon detection of the *Mobile_Termination* trigger. The *Location* trigger is detected when the called party is determined to be a mobile directory number and no routing information[1] is available.

- TDP - Termination_Attempt.
- DP Criteria - Trigger assigned (conditional – called party is determined to be a mobile directory number and no routing information is available)
- Category - Subscribed
- Interface - mobile termination or interoffice trunk
- Trigger Type - Location
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - LocationRequest INVOKE with TRIGTYPE parameter set to indicate the *Location* trigger was encountered

[1] Routing information can specify Intersystem Termination, Local Termination or PSTN Termination.

- Arming Mechanism - TriggerAddressList parameter in the `locreq`

1.2.3.4.20 Terminating_Resource_Available

The Terminating_Resource_Available trigger is detected by the Serving MSC when the MS has been paged and responded, and the alerting information is being prepared for transmission to the MS.

- TDP - Facility_Selected_and_Available
- DP Criteria - Trigger assigned (conditional)
- Category - Subscribed
- Interface - mobile termination
- Trigger Type - Terminating_Resource_Available
- Fault Handling - Final treatment (other treatments such as Default Routing or Continue Call Processing are for further study).
- *TIA-41* operation - FacilitySelectedAndAvailable INVOKE
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `ROUTREQ`)

1.2.3.4.21 T_Busy

The T_Busy trigger is detected when the terminating access is determined to be busy (i.e., network determined user-busy). This trigger may be detected either at the Serving MSC when the calling party connection has been made and busy is detected, or at the Originating MSC when, for instance, a busy indication is received in the LocationRequest RETURN RESULT or RedirectionRequest INVOKE.

- TDP - T_Busy
- DP Criteria - Trigger assigned (conditional)
- Category - Subscribed
- Interface - mobile termination
- Trigger Type - T_Busy
- Fault Handling - Continue call processing (other treatments such as Default Routing or Final Treatment are for further study)
- *TIA-41* operation - TransferToNumberRequest INVOKE (trigger is armed by mechanism other than the TriggerAddressList parameter), TBusy INVOKE (trigger is armed by the TriggerAddressList parameter)
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `ROUTREQ`)

1.2.3.4.22 T_No_Page_Response

The T_No_Page_Response trigger is detected when a called mobile station does not respond to a page. This trigger may be detected either at the Serving MSC when the mobile station does not respond to a page, or at the Originating MSC when, for instance, a *No page response* indication is received in the LocationRequest RETURN RESULT or RedirectionRequest INVOKE.

- TDP - T_Busy
- DP Criteria - Trigger assigned (conditional)
- Category - Subscribed
- Interface - mobile termination
- Trigger Type - T_No_Page_Response
- Fault Handling - Continue call processing (other treatments such as Default Routing or Final Treatment are for further study)
- *TIA-41* operation - TransferToNumberRequest INVOKE (trigger is armed by mechanism other than the TriggerAddressList parameter), TBusy INVOKE (trigger is armed by the TriggerAddressList parameter)
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `ROUTREQ`)

1.2.3.4.23 T_Unroutable

The T_Unroutable trigger is detected when a routing failure occurs when attempting to complete a call. This trigger may be detected either at the Serving MSC or at the Originating MSC when, for instance, an *Unroutable* indication is received in the RedirectionRequest INVOKE.

- TDP - T_Busy
- DP Criteria - Trigger assigned (conditional)
- Category - Subscribed
- Interface - mobile termination
- Trigger Type - T_Unroutable
- Fault Handling - Continue call processing (other treatments such as Default Routing or Final Treatment are for further study)
- *TIA-41* operation - TransferToNumberRequest INVOKE (trigger is armed by mechanism other than the TriggerAddressList parameter), TBusy INVOKE (trigger is armed by the TriggerAddressList parameter)
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `ROUTREQ`)

1.2.3.4.24 T_No_Answer

The T_No_Answer trigger is detected when the no-answer timer associated with the terminating access expires. This trigger may be detected at the Serving MSC when the calling party connection has been made and the no answer timer expires, or at the Originating MSC when, for instance, a no answer indication is received in the RedirectionRequest INVOKE.

- TDP - T_No_Answer
- DP Criteria - Trigger assigned (conditional)
- Category - Subscribed
- Interface - mobile termination
- Trigger Type - T_No_Answer
- Fault Handling - Continue call processing (other treatments such as Default Routing or Final Treatment are for further study)
- *TIA-41* operation - TransferToNumberRequest INVOKE (trigger is armed by mechanism other than the TriggerAddressList parameter), TNoAnswer INVOKE (trigger is armed by the TriggerAddressList parameter)
- Arming Mechanism - subscriber profile (e.g., `regnot`) or dynamically for a single call (e.g., `ROUTREQ`)

1.2.3.5 Trigger Profile

The information contained in the trigger profile is shown in Table 6. When a mobile station initially registers within the serving area of an SSF/CCF or at other times, the set of DPs armed, the trigger criteria and related trigger profile information need to be placed in the SSF/CCF serving the subscriber.

Table 6 Information Contained in Trigger Profile

Information	Usage
DP	Identifies the BCSM DP to be armed
Trigger Type	Denotes the class of events of interest (e.g., Specific_Called_Party_Digit_String); some DPs have multiple trigger types, others only one
Criteria	The conditions that must be satisfied in order to notify the SCF that the DP was encountered (e.g., NPA=613); may be “unconditional”
DP Type	TDP-R (SCF response is required, call processing is suspended) TDP-N (notification only, call processing is not suspended)
SCF Address	The address to which the information flow will be sent (e.g., SS7 PC_SSN)

1.2.3.6 DP Processing

DP processing rules include service and feature interaction management rules. These are described in Section 1.1.2 , and should be referred to in conjunction with the following.

DP processing involves:

1. traffic management actions (call gapping and service filtering – not subject to standardization at this time)

2. determining if DP criteria are satisfied
3. handling service logic instance interactions when invoking new instances of WIN and non-WIN service logic
4. formulating information flows to send to one or more SCFs

The DP processing associated with each DP type is shown in Figure 9.

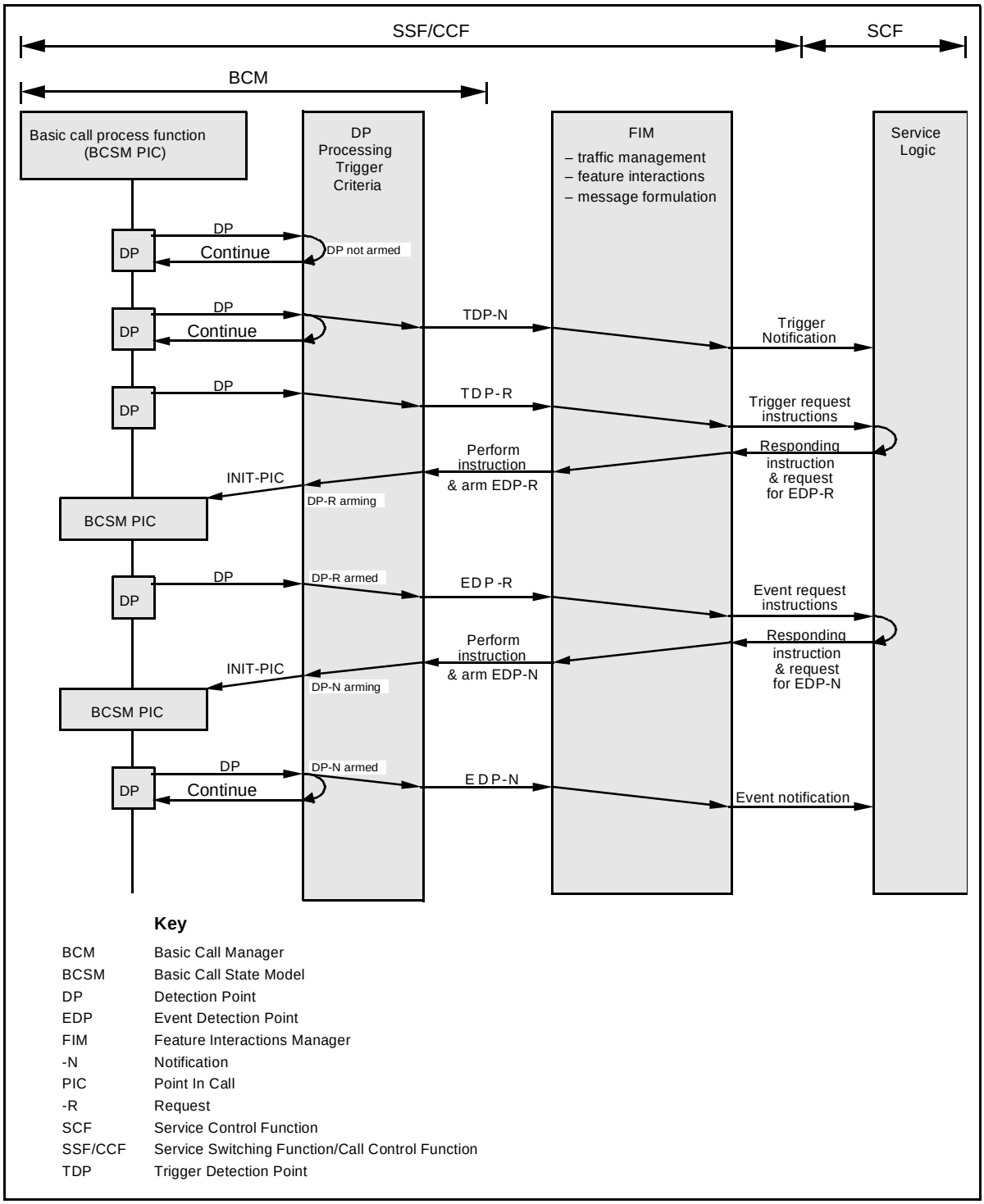

Figure 9 DP Processing for each DP type

If a DP is armed, it may be armed as a TDP, as an EDP, or as both a TDP and an EDP for the same instance of a BCSM. The SSF/CCF shall apply the following set of rules during DP criteria processing to ensure a single point of control:

Rule 1: At any DP, a specific trigger condition can only trigger one service logic program instance (SLPI) at a time. The SSF shall act on one trigger at a time, even if multiple triggers are detected at a DP.

Rule 2: At any DP, processing of notification type DPs (EDP-N and TDP-N) has higher priority than processing of request type DPs (EDP-R and TDP-R).

Rule 3: If a DP is both armed as EDP and TDP, then the EDP processing has higher priority than the TDP processing since the EDP has been armed in an already existing SSF-SCF relationship.

Rule 4: If a DP is both armed as EDP-R and TDP-R, The EDP-R is processed first and, if the control relationship is terminated as a result of the EDP-R processing, processing of the TDP-R is allowed.

In summary, the SSF processes DPs in the following priority order:

Highest priority: EDP-N
TDP-N
EDP-R

Lowest priority: TDP-R

If a TDP-R or EDP-R is detected, the SSF shall formulate and send a request message to a SCF, start a timer and wait for a response from the SCF prior to resumption of call processing by the CCF.

If a TDP-N or EDP-N is detected, the SSF shall formulate and send a notification message to an SCF.

TDP-N criteria may be processed whether or not there is an existing control relationship for the same portion of the call, since a TDP-N does not open a control relationship. This procedure has no effect on the existing control relationship.

Only TDP-Rs are supported in this standard.