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Contents

Intellectual Property Rights 2
Foreword 2
Foreword 7
1 Scope 8
2 References 8
3 Definitions and abbreviations 10
3.1 Definitions 10
3.2 Abbreviations 10
4 Architecture 11
4.1 Architecture for an MO call 11
4.2 Architecture for an MT call 12
4.3 Architecture for a TO call 12
5 Information flows 13
5.1 Information flow for an MO call 13
5.2 Information flow for retrieval of routeing information for an MT call 16
5.2.1 Mobile Terminating Roaming Retry Call 17
5.3 Information flow for an MT call 19
6 Principles for interactions with supplementary services 21
6.1 Call Deflection service (3GPP TS 23.072) 22
6.2 Line identification services (3GPP TS 23.081) 22
6.2.1 Calling Line Identification Presentation (CLIP) 22
6.2.2 Calling Line Identification Restriction (CLIR) 22
6.2.3 Connected Line Identification Presentation (COLP) 22
6.2.4 Connected Line Identification Restriction (COLR) 22
6.3 Call forwarding services (3GPP TS 23.082) 22
6.3.1 Call Forwarding Unconditional (CFU) 22
6.3.2 Call Forwarding on mobile subscriber Busy (CFB) 22
6.3.3 Call Forwarding on No Reply (CFNRy) 22
6.3.4 Call Forwarding on mobile subscriber Not Reachable (CFNRc) 22
6.4 Call wait (3GPP TS 23.083) 23
6.5 Call hold (3GPP TS 23.083) 23
6.6 Multiparty (3GPP TS 23.084) 23
6.7 Closed user group (3GPP TS 23.085) 23
6.8 Advice of charge (3GPP TS 23.086) 23
6.9 User-to-user signalling (3GPP TS 23.087) 23
6.10 Call barring (3GPP TS 23.088) 23
6.10.1 Barring of outgoing calls 23
6.10.2 Barring of incoming calls 23
6.11 Explicit Call Transfer (3GPP TS 23.091) 24
6.12 Completion of Calls to Busy Subscriber (3GPP TS 23.093) 24
6.13 Multicall (3GPP TS 23.135) 24
7 Functional requirements of network entities 24
7.1 MO call 25
7.1.1 Functional requirements of serving MSC 25
7.1.1.1 Process OCH_MSC 25
7.1.1.2 Procedure Process_Access_Request_MSC 25
7.1.1.3 Procedure OG_Call_Setup_MSC 25
7.1.1.4 Procedure Obtain_IMSI_MSC 27
7.1.1.5 Procedure Authenticate_MSC 27
7.1.1.6 Procedure Obtain_IMEI_MSC 27
7.1.1.7 Procedure Check_IMEI_MSC 27

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7.1.1.8 Procedure Establish_Originating_TCH_If_Required 28
7.1.1.9 Procedure Set_CLI_Presentation_Indicator_MSC....28
7.1.1.10 Procedure Send_Alerting_If_Required 28
7.1.1.11 Procedure Set_COLP_Info_MSC 28
7.1.1.12 Procedure Send_Access_Connect_If_Required....28
7.1.1.13 Procedure Handle_AoC_MO_MSC....28
7.1.1.14 Procedure TCH_Check 29
7.1.2 Functional requirements of VLR 55
7.1.2.1 Process OCH_VLR 55
7.1.2.2 Procedure Process_Access_Request_VLR 55
7.1.2.3 Procedure OG_Call_Subscription_Check_VLR....55
7.1.2.4 Procedure Obtain_Identity_VLR 55
7.1.2.5 Procedure Obtain_IMSI_VLR 55
7.1.2.6 Procedure Authenticate_VLR 55
7.1.2.7 Procedure Obtain_Authentication_Sets_VLR....56
7.1.2.8 Procedure Start_Tracing_VLR....56
7.1.2.9 Procedure Check_IMEI _VLR....56
7.1.2.10 Procedure Obtain_IMEI_VLR 56
7.1.2.11 Process Fetch_Authentication_Sets_VLR 56
7.1.2.12 Procedure Check_BAOC 56
7.1.2.13 Procedure OG_CUG_Check 56
7.1.2.14 Procedure Get_LI_Subscription_Info_MO_VLR....56
7.1.2.15 Procedure Get_AoC_Subscription_Info_VLR....56
7.1.2.16 Procedure Check_OG_Barring 56
7.1.2.17 Process Update_Location_VLR....56
7.2 Retrieval of routeing information for MT call....83
7.2.1 Functional requirements of GMSC....83
7.2.1.1 Process MT_GMSC 83
7.2.1.2 Procedure Obtain_Routeing_Address....85
7.2.1.3 Procedure Send_ACM_If_Required 86
7.2.1.4 Procedure Send_Answer_If_Required....86
7.2.1.5 Procedure Send_Network_Connect_If_Required....87
7.2.1.6 Procedure Handle_COLP_Forwarding_Interaction_MSC....87
7.2.1.7 Procedure Activate_CF_Process 87
7.2.1.8 Process MT_CF_MSC 87
7.2.1.9 Macro CUG_Support_Check_GMSC....89
7.2.2 Functional requirements of HLR 115
7.2.2.1 Process SRI_HLR 115
7.2.2.2 Procedure Check_Parameters....117
7.2.2.3 Procedure Subscription_Check_HLR 117
7.2.2.4 Procedure First_Forwarding_HLR....118
7.2.2.5 Procedure PRN_Error_HLR 118
7.2.2.6 Procedure Forward_CUG_Check 118
7.2.2.7 Void....118
7.2.2.8 Procedure Check_IC_Barring 118
7.2.2.9 Procedure IC_CUG_Check....118
7.2.2.10 Procedure Handle_CFU 118
7.2.2.11 Procedure Handle_CFNRc....118
7.2.3 Functional requirements of VLR 136
7.2.3.1 Process PRN_VLR....136
7.2.3.2 Process Restore_Subscriber_Data_VLR....137
7.2.3.3 Process PSI_VLR....137
7.2.3.4 Procedure Retrieve_Location_Info_VLR 137
7.2.3.5 Procedure Active_Info_Retrieval_VLR....137
7.2.4 Functional requirements of MSC....152
7.2.4.1 Process Prepage_MSC 152
7.2.4.2 Procedure Prepaging_Page_MS_MSC....152
7.2.4.3 Prepaging_Search_For_MS_MSC 152
7.2.4.4 Process OSI_MSC....152
7.2.4.5 Process RCL_MSC 152
7.2.4.6 Procedure Active_Info_Retrieval_Page_MSC....152
7.2.4.7 Procedure Active_Info_Retrieval_Search_MSC....152

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7.2.4.8 Procedure Retrieve_IMEI_If_Required 153
7.3 MT call 161
7.3.1 Functional requirements of serving MSC 161
7.3.1.1 Process ICH_MSC 161
7.3.1.2 Procedure Page_MS_MSC 163
7.3.1.3 Procedure Search_For_MS_MSC 164
7.3.1.4 Procedure Complete_Call_In_MSC 165
7.3.1.5 Void 166
7.3.1.6 Procedure Set_CLIP_Info_MSC 166
7.3.1.7 Void 167
7.3.1.8 Procedure Establish_Terminating_TCH_If_Required 167
7.3.1.9 Procedure Handle_AoC_MT_MSC 167
7.3.1.10 Procedure Set_COL_Presentation_Indicator_MSC 167
7.3.2 Functional requirements of VLR 208
7.3.2.1 Process ICH_VLR 208
7.3.2.2 Void 209
7.3.2.3 Procedure Search_For_MS_VLR 209
7.3.2.4 Procedure Get_CW_Subscription_Info_VLR 209
7.3.2.5 Procedure Get_LI_Subscription_Info_MT_VLR 209
7.3.2.6 Procedure Handle_CFB 209
7.3.2.7 Procedure Handle_CFNRy 209
7.4 Subs_FSM 223
7.4.1 Functional requirements of serving MSC 223
7.4.1.1 Process Subs_FSM 223
7.4.1.1.1 Macro Check_Ongoing_Calls 224
7.4.1.1.2 Macro Update_Non_Speech_Calls_Status 224
7.4.1.1.3 Macro Increment_Call_Counter 224
7.4.1.1.4 Macro Decrement_Call_Counter 224
7.5 TO call 246
7.5.1 Functional requirements of inter-connecting MSC 246
7.5.1.1 Process TO_MSC 246

8 Contents of messages 254
8.1 Messages on the B interface (MSC-VLR) 255
8.1.1 Abort 255
8.1.2 Authenticate 255
8.1.3 Authenticate ack 256
8.1.4 Authenticate negative response 256
8.1.5 Call arrived 256
8.1.6 Check IMEI 256
8.1.7 Check IMEI ack 256
8.1.8 Check IMEI negative response 256
8.1.9 Complete Call 257
8.1.10 Complete Call ack 258
8.1.11 Complete Call negative response 258
8.1.12 Forward New TMSI 258
8.1.13 Forward New TMSI ack 258
8.1.14 Forward New TMSI negative response 258
8.1.15 Obtain Subscriber Info 258
8.1.16 Obtain Subscriber Info ack 258
8.1.17 Page MS 259
8.1.18 Page MS ack 259
8.1.19 Page MS negative response 259
8.1.20 Page MS via SGSN 260
8.1.21 Process Access Request 260
8.1.22 Process Access Request ack 260
8.1.23 Process Access Request negative response 261
8.1.24 Process Call Waiting 261
8.1.25 Process Call Waiting ack 261
8.1.26 Process Call Waiting negative response 262
8.1.27 Provide IMEI 262
8.1.28 Provide IMEI ack 262

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8.1.29 Provide IMSI 262
8.1.30 Provide IMSI ack 262
8.1.31 Radio connection released 262
8.1.32 Search For MS 262
8.1.33 Search For MS ack 263
8.1.34 Search For MS negative response 263
8.1.35 Search for MS via SGSN 264
8.1.36 Send Info For Incoming Call 264
8.1.37 Send Info For Incoming Call ack 265
8.1.38 Send Info For Incoming Call negative response 265
8.1.39 Send Info For Outgoing Call 266
8.1.40 Send Info For Outgoing Call negative response 266
8.1.40A Send UESBI-Iu to Access Network 266
8.1.41 Start security procedures 266
8.1.42 Trace subscriber activity 267
8.1.43 Use existing TMSI 267
8.1.44 Release MSRN 267
8.2 Messages on the C interface (MSC-HLR) 267
8.2.1 Send Routeing Info 267
8.2.2 Send Routeing Info ack 269
8.2.3 Send Routeing Info negative response 269
8.3 Messages on the D interface (VLR-HLR) 270
8.3.1 Provide Roaming Number 270
8.3.2 Provide Roaming Number ack 271
8.3.3 Provide Roaming Number negative response 271
8.3.4 Provide Subscriber Info 272
8.3.5 Provide Subscriber Info ack 272
8.3.5.1 Location information 273
8.3.6 Provide Subscriber Info negative response 273
8.3.7 Restore Data 273
8.3.8 Restore Data ack 274
8.3.9 Restore Data negative response 274
8.4 Messages on the F interface (MSC-EIR) 274
8.4.1 Check IMEI 274
8.4.2 Check IMEI ack 274
8.4.3 Check IMEI negative response 274
8.5 Messages on the MSC internal interface 274
8.5.1 CF cancelled 275
8.5.2 Perform Call Forwarding 275
8.5.3 Perform Call Forwarding ack 275
8.5.4 Perform Call Forwarding negative response 275
8.6 Messages on the VLR internal interface 275
8.6.1 Call arrived 275
8.6.2 PAR completed 275
8.7 Messages on the Gs interface 276
8.7.1 Page MS 276
8.7.2 Send MS information 276
8.7.3 Send MS information ack 276
8.7.4 Send MS information negative response 276
8.8 Messages on the E interface (GMSC-VMSC) 277
8.8.1 Release Resources 277

Annex A (informative): Handling of an IAM at an MSC 278

Annex B (informative): Change history 280

History 283

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Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The present document specifies the technical realization of the handling of calls originated by a 3G mobile subscriber and calls directed to a 3G mobile subscriber, up to the point where the call is established within the 3GPP system.

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1 Scope

The present document specifies the technical realization of the handling of calls originated by a UMTS or GSM mobile subscriber and calls directed to a UMTS or GSM mobile subscriber, up to the point where the call is established. Normal release of the call after establishment is also specified. Trunk Originated call is also modelled.

In the present document, the term MS is used to denote a UMTS UE or GSM MS, as appropriate.

The handling of DTMF signalling and Off-Air Call set-up (OACSU) are not described in the present document.

The details of the effects of UMTS or GSM supplementary services on the handling of a call are described in the relevant 3GPP TS 23.07x, 3GPP TS 23.08x and 3GPP TS 23.09x series of specifications.

The specification of the handling of a request from the HLR for subscriber information is not part of basic call handling, but is required for both CAMEL (3GPP TS 23.078 [12]) and optimal routeing (3GPP TS 23.079 [13]). The use of the Provide Subscriber Information message flow is shown in 3GPP TS 23.078 [12] and 3GPP TS 23.079 [13].

The logical separation of the MSC and VLR (shown in clauses 4, 5 and 7), and the messages transferred between them (described in clause 8) are the basis of a model used to define the externally visible behaviour of the MSC/VLR, which is a single physical entity. They do not impose any requirement except the definition of the externally visible behaviour.

If there is any conflict between the present document and the corresponding stage 3 specifications (3GPP TS 24.008 [26], 3GPP TS 25.413 [27], 3GPP TS 48.008 [2] and 3GPP TS 29.002 [29]), the stage 3 specification shall prevail.

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- For a specific reference, subsequent revisions do not apply.
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[1] 3GPP TS 43.020: "Security related Network Functions".

[2] 3GPP TS 48.008: "Mobile Switching Centre - Base Station System (MSC - BSS) interface Layer 3 specification".

[3] 3GPP TS 52.008: "Telecommunication management; GSM subscriber and equipment trace".

[4] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[5] 3GPP TS 23.003: "Numbering, addressing and identification".

[6] 3GPP TS 23.012: "Location management procedures".

[7] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".

[8] Void

[9] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[10] 3GPP TS 23.066: "Support of GSM Mobile Number Portability (MNP); Stage 2".

[11] 3GPP TS 23.072: "Call deflection Supplementary Service; Stage2".

[12] 3GPP TS 23.078: "Customized Applications for Mobile network Enhanced Logic (CAMEL); Stage 2".

[13] 3GPP TS 23.079: "Support of Optimal Routeing (SOR); Technical realization; Stage 2".

[14] 3GPP TS 23.081: "Line identification Supplementary Services; Stage 2 ".

[15] 3GPP TS 23.082: "Call Forwarding (CF) Supplementary Services; Stage 2".

[16] 3GPP TS 23.083: "Call Waiting (CW) and Call Hold (HOLD) Supplementary Service; Stage 2".

[17] 3GPP TS 23.084: "Multi Party (MPTY) Supplementary Service; Stage 2".

[18] 3GPP TS 23.085: "Closed User Group (CUG) Supplementary Service; Stage 2".

[19] 3GPP TS 23.086: "Advice of Charge (AoC) Supplementary Service; Stage 2".

[20] 3GPP TS 23.087: "User-to-User Signalling (UUS) Supplementary Service; Stage 2".

[21] 3GPP TS 23.088: "Call Barring (CB) Supplementary Service; Stage 2".

[22] 3GPP TS 23.091: "Explicit Call Transfer (ECT) supplementary service; Stage 2".

[23] 3GPP TS 23.093: "Technical realization of Completion of Calls to Busy Subscriber (CCBS); Stage 2".

[24] 3GPP TS 23.116: "Super-charger technical realization; Stage 2".

[25] 3GPP TS 23.135: "Multicall supplementary service; Stage 2".

[25a] 3GPP TS 23.195: "Provision of UE Specific Behaviour Information to Network Entities".

[26] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".

[27] 3GPP TS 25.413: "UTRAN Iu interface RANAP signalling".

[28] 3GPP TS 27.001: "General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

[29] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[30] 3GPP TS 29.007: "General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[31] 3GPP TS 29.010: "Information Element Mapping between Mobile Station - Base Station System (MS - BSS) and Base Station System - Mobile-services Switching Centre (BSS - MSC) Signalling Procedures and the Mobile Application Part (MAP)".

[32] 3GPP TS 33.102: "3G Security; Security architecture ".

[33] ITU-T Recommendation Q.761 (1999): " Signalling System No. 7 - ISDN User Part functional description ".

[34] ITU-T Recommendation Q.762 (1999): "Signalling System No. 7 - ISDN User Part general functions of messages and signals".

[35] ITU-T Recommendation Q.763 (1999): "Signalling System No. 7 - ISDN User Part formats and codes".

[36] ITU-T Recommendation Q.764 (1999): " Signalling System No. 7 – ISDN user part signalling procedures".

[37] ITU-T Recommendation Q.850 (1996): "Usage of cause and location in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN User Part".

[38] 3GPP TS 23.172: "Technical realization of Circuit Switched (CS) multimedia service ; UDI/RDI fallback and service modification; Stage 2"

[39] 3GPP TS 23.067: "enhanced Multi-Level Precedence and Pre-emption service (eMLPP) - Stage 2"

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3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

A subscriber: the calling mobile subscriber

B subscriber: the mobile subscriber originally called by the A subscriber

C subscriber: the subscriber to whom the B subscriber has requested that calls be forwarded
The C subscriber may be fixed or mobile.

Location Information: information to define the whereabouts of the MS, and the age of the information defining the whereabouts

PLMN Bearer Capability: information transferred over the UMTS or GSM access interface to define the information transfer capabilities to be used between the MS and the network for a circuit-switched connection

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

A&O	Active & Operative
ACM	Address Complete Message
ANM	ANswer Message
AoC	Advice of Charge
BC	Bearer Capability
BOIC-exHC&BOIZC	Barring of Outgoing International Calls except those directed to the HPLMN Country & Barring of Outgoing InterZonal Calls
BOIZC	Barring of Outgoing InterZonal Calls
BOIZC-exHC	Barring of Outgoing InterZonal Calls except those directed to the HPLMN Country
CCBS	Completion of Calls to Busy Subscriber
CFB	Call Forwarding on Busy
CFNRc	Call Forwarding on mobile subscriber Not Reachable
CFNRy	Call Forwarding on No Reply
CFU	Call Forwarding Unconditional
CLIP	Calling Line Identity Presentation
CLIR	Calling Line Identity Restriction
COLP	COnnected Line identity Presentation
COLR	COnnected Line identity Restriction
CUG	Closed User Group
CW	Call Waiting
FTN	Forwarded-To Number
FTNW	Forwarded-To NetWork
GMSCB	Gateway MSC of the B subscriber
GPRS	General Packet Radio Service
HLC	Higher Layer Compatibility
HLRB	The HLR of the B subscriber
HPLMNB	The HPLMN of the B subscriber
IAM	Initial Address Message
IPLMN	Interrogating PLMN - the PLMN containing GMSCB
IWU	Inter Working Unit
LLC	Lower Layer Compatibility
MO	Mobile Originated
MPTY	MultiParTY
MT	Mobile Terminated
NDUB	Network Determined User Busy
NRCT	No Reply Call Timer
PgA	Paging Area

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PLMN BC	(GSM or UMTS) PLMN Bearer Capability
PRN	Provide Roaming Number
PUESBINE	Provision of User Equipment Specific Behaviour Information to Network Entities
SCUDIF	Service Change and UDI/RDI Fallback
SGSN	Serving GPRS support node
SIFIC	Send Information For Incoming Call
SIFOC	Send Information For Outgoing Call
SRI	Send Routeing Information
TO	Trunk Originated
UDUB	User Determined User Busy
UESBI-Iu	User Equipment Specific Behaviour Information over the Iu interface
VLRA	The VLR of the A subscriber
VLRB	The VLR of the B subscriber
VMSCA	The Visited MSC of the A subscriber
VMSCB	The Visited MSC of the B subscriber
VPLMNA	The Visited PLMN of the A subscriber
VPLMNB	The Visited PLMN of the B subscriber

4 Architecture

Subclauses 4.1 and 4.2 show the architecture for handling a basic MO call and a basic MT call. A basic mobile-to-mobile call is treated as the concatenation of an MO call and an MT call.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/c22e0e89-84d2-4ed1-96fb-10d3f4d826d6/etsi-ts-123-018-v8.2.0-2009-09

4.1 Architecture for an MO call

A basic mobile originated call involves signalling between the MS and its VMSC via the BSS, between the VMSC and the VLR and between the VMSC and the destination exchange, as indicated in figure 1.

In figure 1 and throughout the present document, the term BSS is used to denote a GSM BSS or a UTRAN, as appropriate.

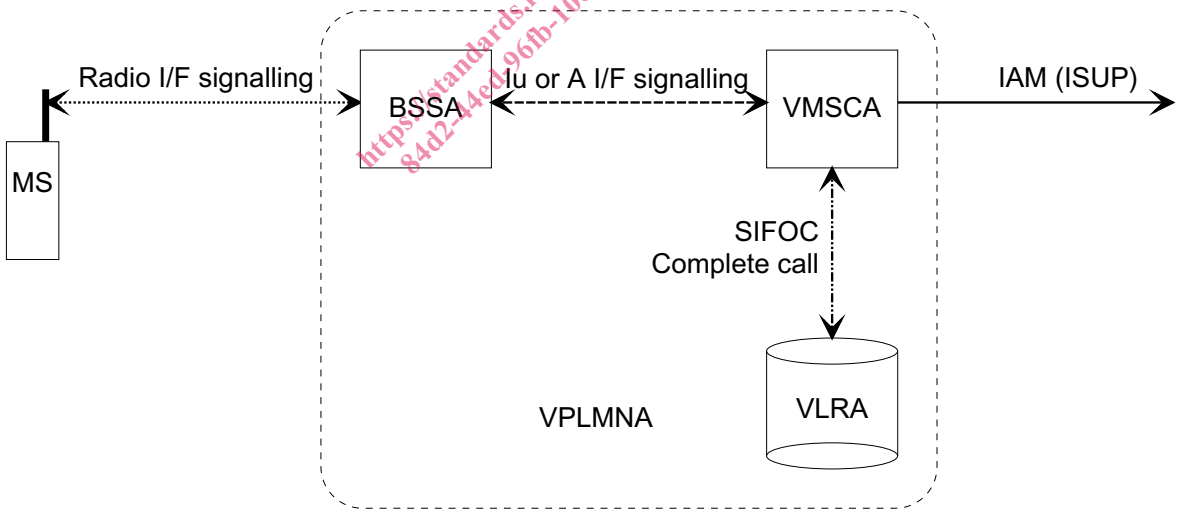

Figure 1: Architecture for a basic mobile originated call

In figure 1 and throughout the present document, the term ISUP is used to denote the telephony signalling system used between exchanges. In a given network, any telephony signalling system may be used.

When the user of an MS wishes to originate a call, the MS establishes communication with the network using radio interface signalling, and sends a message containing the address of the called party. VMSCA requests information to handle the outgoing call (SIFOC) from VLRA, over an internal interface of the MSC/VLR. If VLRA determines that the outgoing call is allowed, it responds with a Complete Call. VMSCA:

- establishes a traffic channel to the MS; and
- constructs an ISUP IAM using the called party address and sends it to the destination exchange.

4.2 Architecture for an MT call

A basic mobile terminated call involves signalling as indicated in figure 2. Communication between VMSCB and the MS is via the BSS, as for the mobile originated case. If VPLMNB supports GPRS and the Gs interface between VLRB and the SGSN is implemented (see 3GPP TS 23.060 [9]) and there is an association between VLRB and the SGSN for the MS, the paging signal towards the MS goes from VMSCB via VLRB and the SGSN to the BSS. The IPLMN, containing GMSCB, is in principle distinct from HPLMNB, containing HLRB, but the practice for at least the majority of current UMTS or GSM networks is that a call to an MS will be routed to a GMSC in HPLMNB.

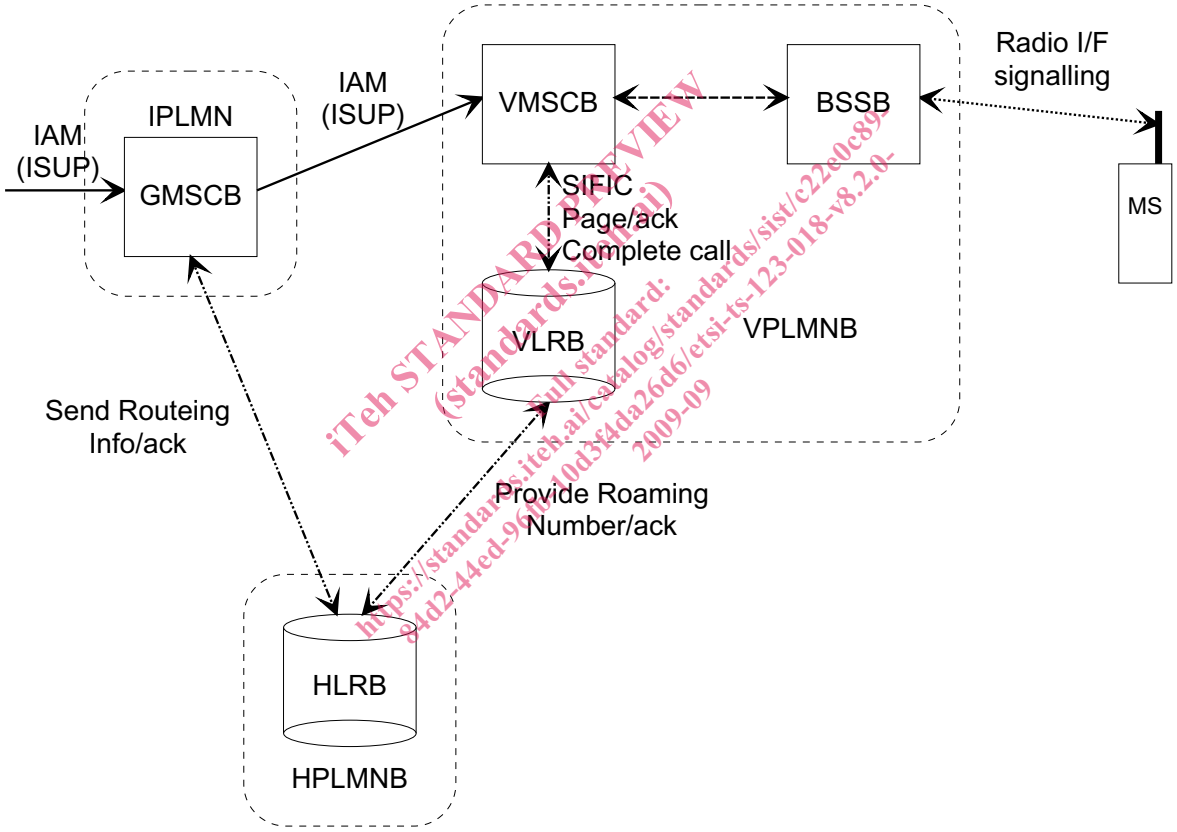

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Figure 2: Architecture for a basic mobile terminated call

When GMSCB receives an ISUP IAM, it requests routeing information from HLRB using the MAP protocol. HLRB requests a roaming number from VLRB, also using the MAP protocol, and VLRB returns a roaming number in the Provide Roaming Number Ack. HLRB returns the roaming number to GMSCB in the Send Routeing Info ack. GMSCB uses the roaming number to construct an ISUP IAM, which it sends to VMSCB. When VMSCB receives the IAM, it requests information to handle the incoming call (SIFIC) from VLRB, over an internal interface of the MSC/VLR. If VLRB determines that the incoming call is allowed, it requests VMSCB to page the MS. VMSCB pages the MS using radio interface signalling. When the MS responds, VMSCB informs VLRB in the Page ack message. VLRB instructs VMSCB to connect the call in the Complete call, and VMSCB establishes a traffic channel to the MS.

4.3 Architecture for a TO call

A basic trunk originated call involves signalling between the PSTN and the PLMN"s MSC, as indicated in figure x. The originating exchange may also be another MSC of the same or different PLMN.