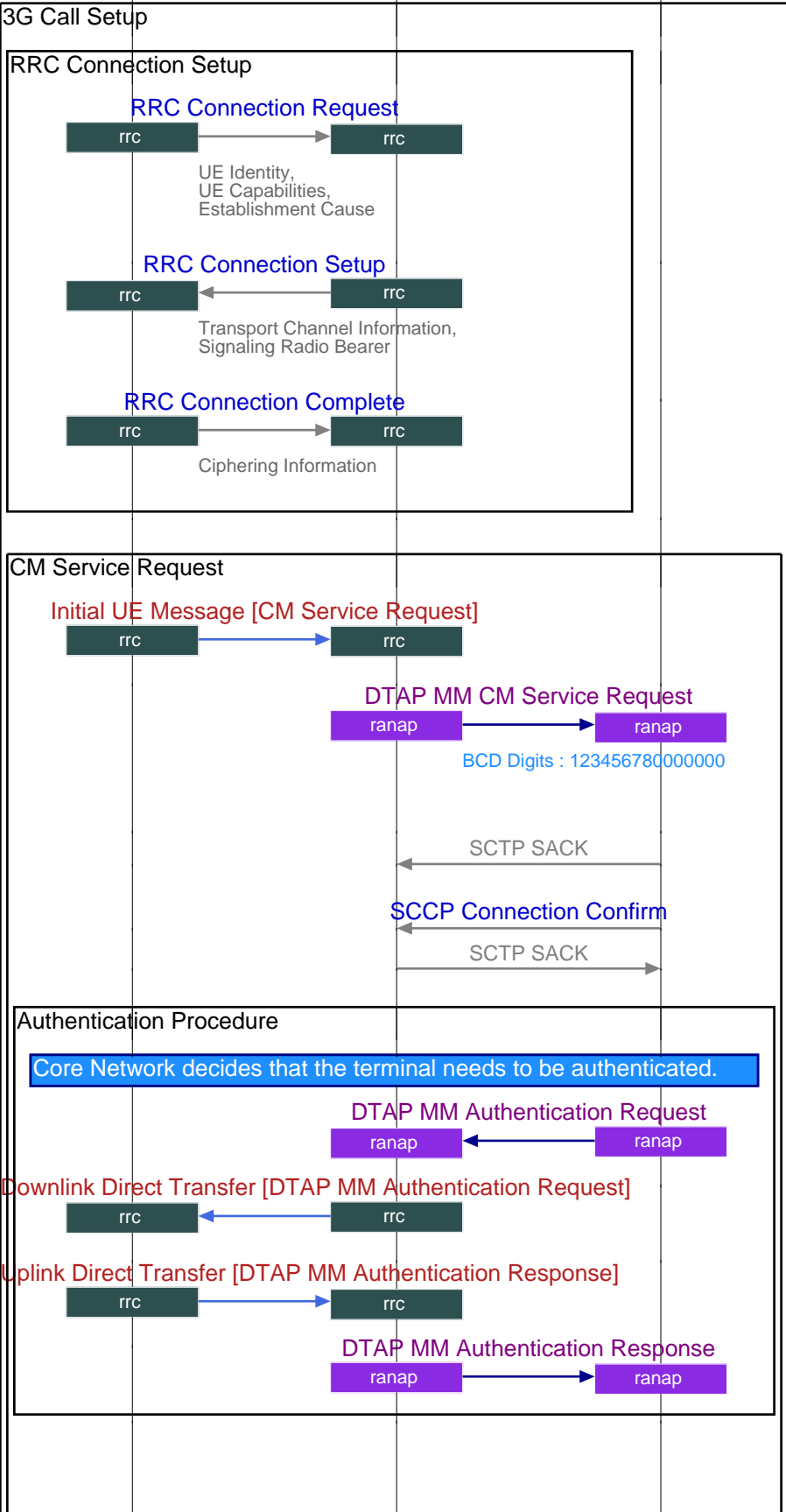


A 3G-UMTS originating call is described here. Setup radio bearers and RANAP signaling are covered in detail. You can click on most RANAP messages to see the full content of the message.

This call flow has been generated with from a Wireshark PCAP file using VisualEther (<http://www.eventhelix.com/VisualEther/>). The generated call flow was later modified with EventStudio (<http://www.eventhelix.com/EventStudio/>) to add comments and terminal level interactions.



UE wishes to establish a voice call so it requests a Radio Resource Control (RRC) connection.

The RNC accepts the RRC Connection Request and assigns a traffic channel. The message also creates a Signaling Radio Bearer (SRB).

The UE responds back to signal the completion of the RRC Connection Setup.

The mobile sends an Initial UE Message that carries the CM Service Request as a NAS (Non Access Stratum) payload.

The CM Service Request is the first message to be received for the call from the RNC. This message also sets up the SCCP connection between the RNC and the Core Network. The "CM Service Request" also marks the start of an lu connection.

The Core Network sends an SCTP level ack for the CM Service Request message.

SCCP connection setup is confirmed.

SCTP ack for SCCP Connection Confirm message.

The Authentication Request is carried as NAS payload in a Downlink Direct Transfer RRC message.

The Authentication Response is carried as NAS payload in a Uplink Direct Transfer RRC message.

Component Interfaces (Originating Call)

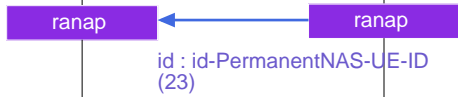
User Equipment

UTRAN

Core Network

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RANAP CommonID



SCTP SACK

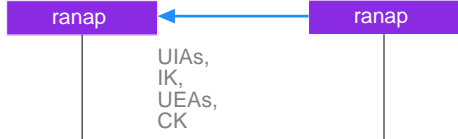
IMSI is sent to the RNC.

SCTP level ack for Command ID.

Security Procedure

Core Network sends new keys for ciphering and integrity protection.

Security Mode Command



CN domain, UIA, UEA, FRESH, Security Capability, MAC-I

RRC Security Mode Complete



Security Mode Complete



Core Network initiates ciphering and integrity Protection. The "MSC/VLR" sends the Security Mode Command message to RNC.

The RNC generates the RRC message Security mode command. The message includes the UE security capability, the ciphering capability, the UIA and FRESH to be used and if ciphering shall be started also the UEA to be used. This is the first message to be integrity protected. It contains the MAC-I integrity protection "checksum".

DTAP MM CM Service Accept



SCTP SACK

Downlink Direct Transfer [CM Service Accept]



The Core Network accepts the service request.

Ack for "MM CM Service Accept".

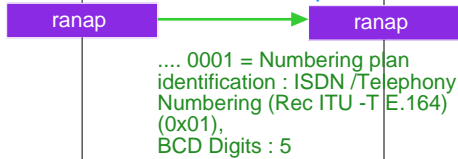
RNC carries the CM Service Accept as a NAS payload.

Call Connection Setup

Uplink Direct Transfer [DTAP CC Setup]



DTAP CC Setup



SCTP SACK

DTAP CC Call Proceeding



SCTP SACK

Downlink Direct Transfer[DTAP CC Call Proceeding]



Call Setup is received as a NAS payload.

Call Setup request is received from the RNC.

Ack for call setup request.

"Core Network" signals that the call setup is proceeding.

SCTP ack for call proceeding.

The call proceeding message is wrapped in a Downlink Direct Transfer and sent to the UE.

Component Interfaces (Originating Call)

User Equipment

UTRAN

Core Network

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RAB Assignment

RANAP RAB -Assignment

id : id -RAB -SetupOrModifyList,
id : id -RAB -SetupOrModifyItem,
id : id -Alt -RAB -Parameters

SCTP SACK

Radio Bearer Setup



Radio Bearer Setup Complete



RANAP RAB -Assignment



id : id -RAB
-SetupOrModifiedList (52),
id : id -RAB
-SetupOrModifiedItem (\$1),
id : id -Ass -RAB -Parameters
(90)

SCTP SACK

Core Network initiates a Radio Access Bearer (RAB) Assignment. The message specifies the Quality of Service parameters.

Ack for RAB Assignment received from Core Network.

RNC responds to Core Network after completing RB Setup with the Terminal.

Ack for RAB Assignment response sent from RNC to Core Network.

DTAP CC Alerting



SCTP SACK

Downlink Direct Transfer [DTAP CC Alerting]



DTAP CC Connect



SCTP SACK

Downlink Direct Transfer[DTAP CC Connect]



Uplink Direct Transfer[DTAP CC Connect Acknowledge]



DTAP CC Connect Acknowledge



SCTP SACK

Ask RNC to Notify the terminal that the subscriber is being rung.

Ack to Alerting.

Alert is sent to the UE.

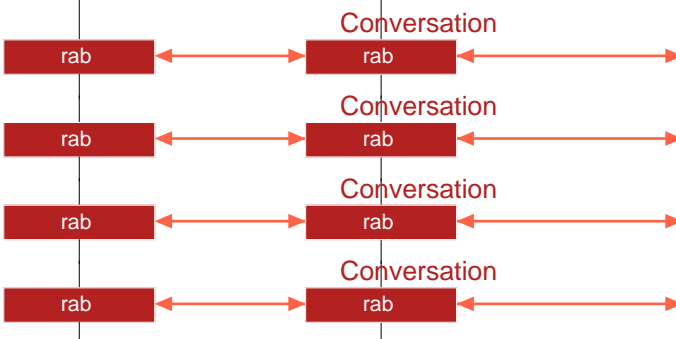
Notify the RNC that the called subscriber has answered.

Ack for Connect.

RNC responds back with completion of connect.

Ack for Connect Acknowledge.

Conversation



Voice communication in progress.

Component Interfaces (Originating Call)

User Equipment

UTRAN

Core Network

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Call Release

Call Connection Release

Uplink Direct Transfer [DTAP CC Disconnect]



DTAP CC Disconnect



.001 0000 = Cause : (16)
Normal call clearing

SCTP SACK



DTAP CC Release



SCTP SACK



DTAP CC Release Complete



Downlink Direct Transfer [DTAP CC Release Complete]



SCTP SACK



Iu Connection Release

RANAP Iu-Release



id : id -Cause (4)

SCTP SACK



RANAP Iu-Release



SCTP SACK



RRC Connection Release

RRC Connection Release



RRC Connection Release Complete



Received call release from originating subscriber

RNC sends call disconnect to the Core Network.

SCTP ack for disconnect.

Core Network releases the session.

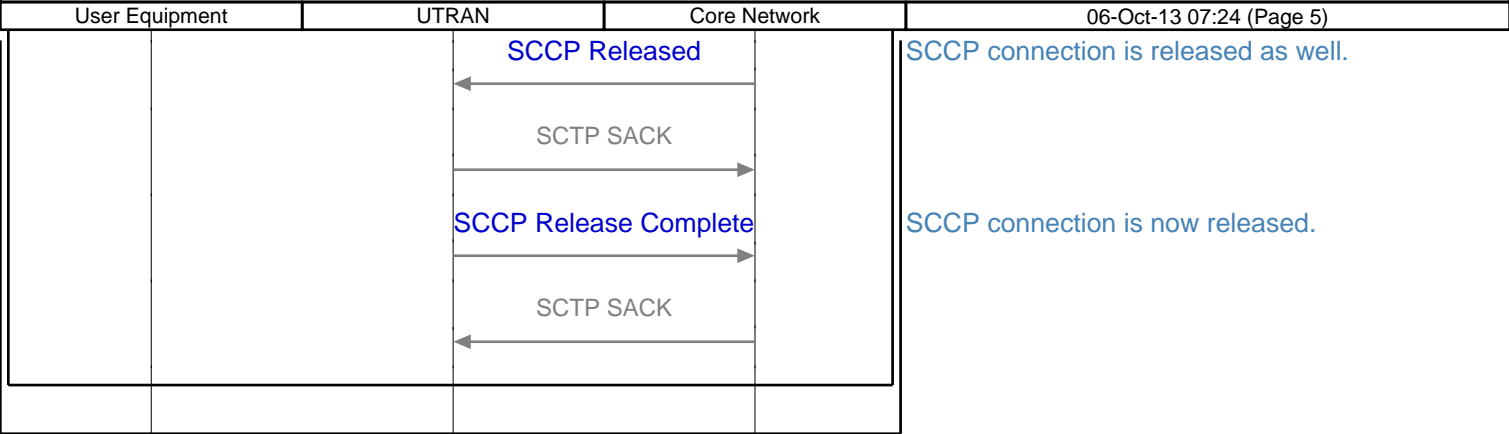
RNC signals release complete to Core Network

The call is cleared so the Iu connection can now be released.

Core Network initiates the Iu release.

RNC signals back the release of the Iu connection.

Component Interfaces (Originating Call)



This call flow has been generated with from a Wireshark PCAP file using VisualEther (<http://www.eventhelix.com/VisualEther/>). The generated call flow was later modified with EventStudio (<http://www.eventhelix.com/EventStudio/>) to add comments and terminal level interactions.

Explore more call flow diagrams at: <http://www.eventhelix.com/realtimemantra/telecom/>