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Foreword

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1 Scope

This Stage 1 description of the first phase of Support of Optimal Routing (SOR):

- compiles the basic service requirements for SOR;
- describes the interactions for Supplementary Services (SS) in order to cater for SOR;
- refers to modifications to network features required by SOR.

This specification does not address the following:

- There is no need for optimisation of the routing of calls originally directed to a fixed network subscriber, because the physical address of a fixed network terminating line cannot differ from its logical address.
- SOR in non-PLMNs is not a subject of this TS, but might be possible by bilateral arrangement between PLMN operators and those non-PLMN operators.

The purpose of SOR is to reduce the number of unnecessary inter-PLMN call legs.

The first phase of SOR applies to:

- OR for the benefit of the B party i.e. Mobile terminated calls with late call forwarding to the home or visited country (scenarios 1 and 2),
and optionally;
- OR for the benefit of the A party, e.g. Mobile to mobile calls where both mobile subscribers are in the same country (scenarios 3 to 10).

The complete set of scenarios included in the phase 1 of OR is presented in the paragraph for normal procedures. All other scenarios are excluded from Phase 1 of OR.

Note that Optimal Routing is applicable to national roaming situations, that is to calls directed to a mobile subscriber roaming in her home country, but registered in a PLMN different from her HPLMN.

All further call scenarios, including multiple call forwarding, are left to subsequent phases of SOR. Subsequent phases of SOR shall be backwards compatible with this first phase.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
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[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

3 Definitions and abbreviations

Administrative PLMN: The complete set of all functional entities normally regarded as a single PLMN.

Basic OR : Routing of a call by the direct route when no forwarding occurs.

Direct route: A call uses the direct route if it is routed from the serving network of the original calling party to the serving network of the ultimate called party without any intermediate PLMN.

HPLMN route: A call uses the HPLMN route if the destination is deduced from the MSISDN of the called party. This forces the call to be routed via the HPLMN of the called party.

HPLMN leg: The HPLMN leg is that part of the HPLMN route from the IPLMN to the HPLMN of the called party.

IPLMN: An IPLMN is a PLMN which interrogates the HPLMN of a called party in order to determine the whereabouts of that party.

Early Call Forwarding : Early Call Forwarding is Call Forwarding performed from the IPLMN before the call has been extended to the VPLMN of the forwarding subscriber (i.e. Call Forwarding Unconditional and Conditional Call Forwarding on Not Reachable known at the IPLMN before extension of the call)

Functional PLMN: For the purposes of this description the Administrative PLMN is divided into functional PLMNs that represent different aspects of the Optimal Routing functionality.

Late Call Forwarding: Late Call Forwarding is Call Forwarding performed after the call has been extended to the VPLMN of the forwarding subscriber (i.e. Conditional Call Forwarding on Busy, Conditional Call Forwarding on No Reply and Conditional Call Forwarding on Not Reachable detected in the VPLMN of the forwarding subscriber). Late Call Forwarding may be invoked in the IPLMN or in the VPLMN of the forwarding subscriber.

Special mobile network number: For the purposes of this description special mobile network numbers are numbers belonging logically to a PLMN but not to a mobile subscriber. Examples are the customer service number or value added service numbers.

Abbreviations are given in TR 21.905 [1].

4 Description of Optimal Routing

Support of Optimal Routing (SOR) is a network feature which enables the calls directed to a mobile subscriber to be routed directly to the mobile subscriber's actual location, or to her forwarded-to destination (instead of via the HPLMN or in the case of Late Call Forwarding via the VPLMN).

The IPLMN handling the call shall decide whether or not to optimise the routing of the call taking into account information provided by the called mobile subscriber's HPLMN. For given subscribers, as a network option, the HPLMN may permit or deny OR on a per call basis.

5 Functional requirements

5.1 General

SOR shall be provided for all circuit switched Telecommunication Services, except emergency calls, Dedicated PAD and Dedicated Packet Access (GPRS is for further study).

The network feature shall be applied automatically for all calls except for those calls for which the HPLMN of the called party denies the optimal routing.

5.2 Normal operation

In the first phase of SOR, the routes of calls will be optimised for the cases of OR being performed within a country or towards the country where the call would have been routed normally.

Under all other circumstances, the basic call routing is applied:

- If the IPLMN detects that basic OR cannot be applied, the IPLMN routes the call according to the dialled number.

- If the IPLMN detects that OR for Late Call Forwarding cannot be applied, the Call Forwarding will be performed in the VPLMN of the forwarding subscriber.

If the serving network of the ultimate destination supports SOR, the serving network of the caller shall be able to indicate to the network visited by the ultimate destination that the call has been optimally routed and to indicate the originating PLMN of the optimally routed leg.

The complete set of scenarios included in phase 1 of SOR is described below.

The notation used for the scenario diagrams is defined in figure 1.

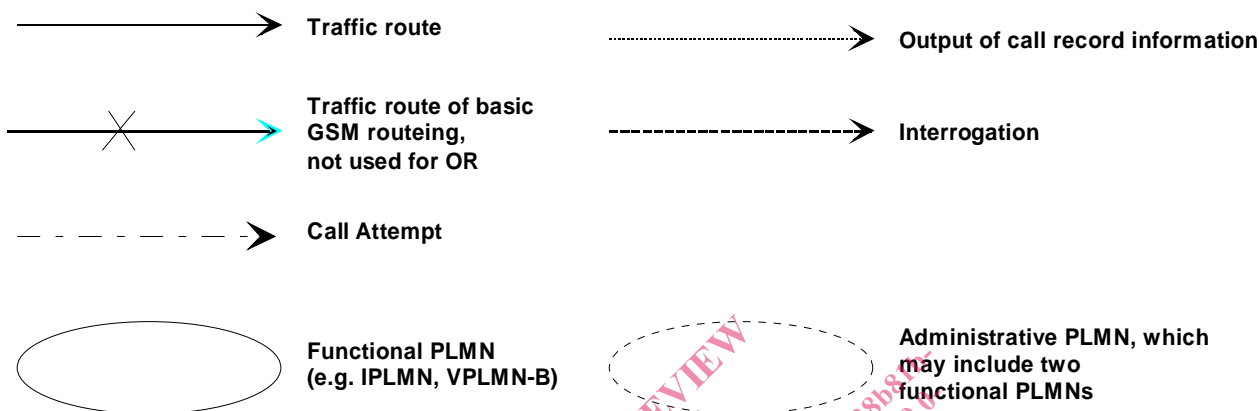


Figure 1: Notation used in scenario diagrams

If one of those scenarios occurs, SOR shall be invoked.

The assumptions taken are the following :

- A subscriber A sets up a call to a mobile subscriber B, who may have forwarded her calls to a subscriber C.
- The C subscriber may be either a fixed subscriber or a mobile subscriber.

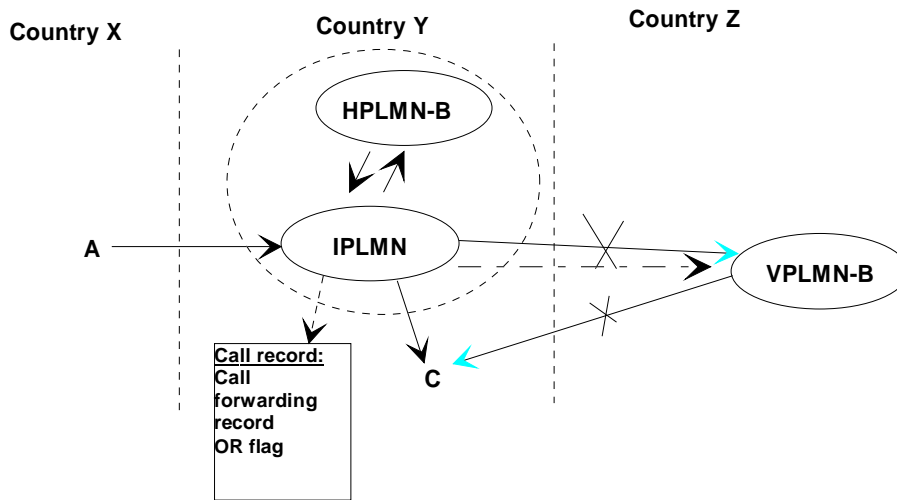
If C is a mobile subscriber, the location of C taken into account in the following paragraphs is the location of HPLMN-C.

5.2.1 A is a fixed subscriber or a mobile subscriber who may not benefit from OR

As the originating network does not have the ability to interrogate the HPLMN of the B subscriber, the normal call handling is applied.

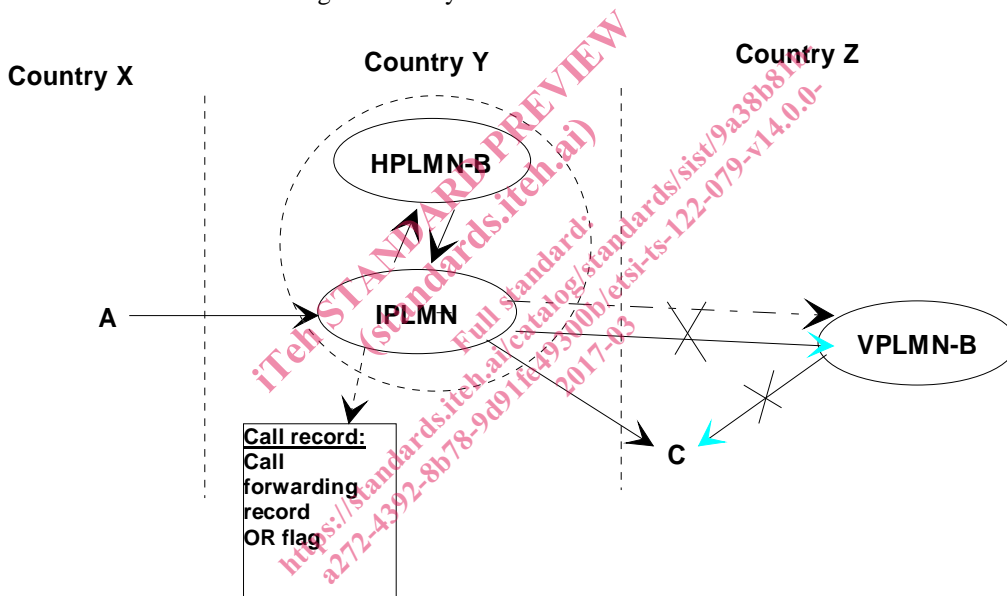
Once the HPLMN of the B subscriber has the control of the call, the call may be optimised in the case of a forwarded call towards a party located in the Home Country of the B subscriber or in the country visited by the B subscriber.

- NOTE:
- A may be in any country.
 - In the two following cases, the IPLMN is HPLMN-B.



Scenario 1: OR for Late Call Forwarding, C is in the same country as HPLMN-B

NOTE: Call records shown in the figure are only for information



Scenario 2: OR for Late Call Forwarding, C is in the same country as VPLMN-B

NOTE: Call records shown in the figure are only for information

5.2.2 A is a mobile subscriber who may benefit from OR

5.2.2.1 Description of the call routing

If A sets up a call to B, then the originating PLMN shall interrogate the HPLMN of the mobile subscriber B in order to know how to route the call.

If B is registered in the same country as A, then the call shall be routed directly to B as described below.

If B has activated a Call Forward to a destination located in the Home Country of B or in the country where A is registered and this leads to the invocation of Early Call Forwarding, then the call shall be routed directly from A to the forwarded-to-party.

In any other cases, the call shall be routed to the mobile subscriber B via HPLMN(B).

If the call cannot be completed, the originating PLMN shall receive an indication of the reason of the failure of the call completion.