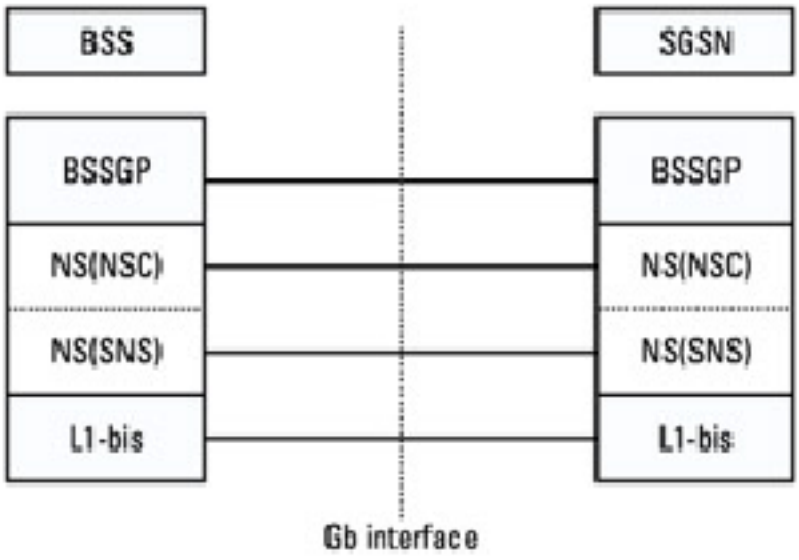
Contents

Introduction

This document describes about the Gb interface and its protocol stack in the GPRS Network Architecture and provides a good understanding to troubleshoot the problem with Network Service Virtual Connection (NSVC) and Network Service Entity Identifier (NSEI) in Gb over IP Network on the Cisco Aggregated Service Router(ASR) 5x00 Series.

Protocol Stack on Gb Interface

The Gb interface connects the Base Station System (BSS) and the Serving GPRS Support Node (SGSN). It allows the exchange of signaling information and user data. Base Station Controller (BSC) and SGSN vendor can be different because it is open system interface, so it is important to understand the message flow between the BSS and SGSN in order to identify the element in question and rectify the issue.



The Gb interface implements a protocol stack in the SGSN and the BSS that includes a User Datagram Protocol (UDP) layer over an IP layer. Data packets are then transmitted between the BSS and the SGSN over a connectionless IP network. The data packets carry information between functional entities in the SGSN and functional entities in the BSS.

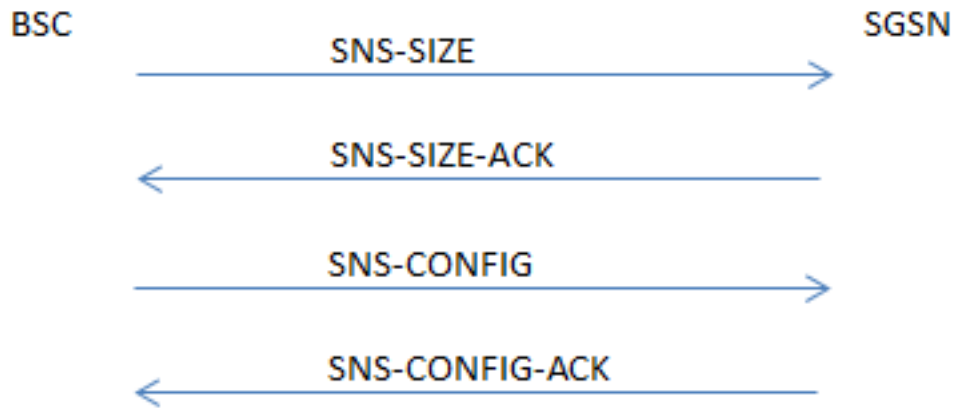
The stack also includes a modified Network Services (NS) layer which is divided into an upper NS Network Service Control (NS-NSC) sub-layer and a lower NS-SubNetwork Service (NS-SNS) sub-layer. The NS-NSC sub-layer maps to the Base Station System GPRS Protocol (BSSGP) layer

and manages the functional entities.

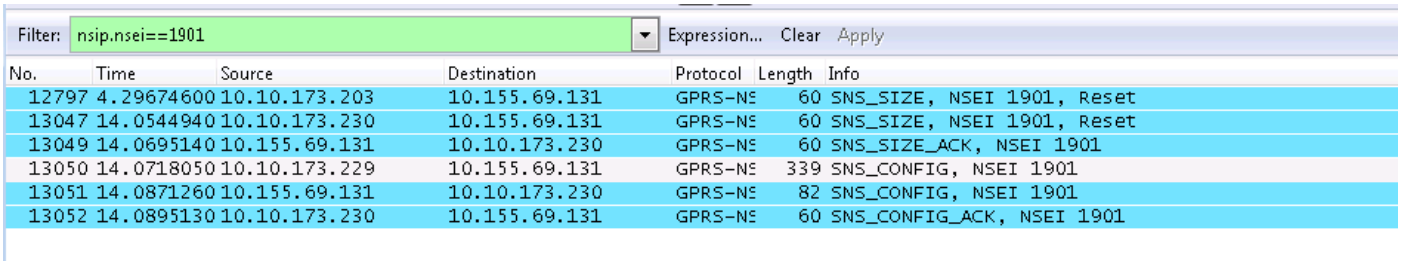
The BSSGP layer ensures the transmission of upper-layer data (LLC PDUs) from the BSS to the SGSN or from the SGSN to the BSS. It ensures the transmission of GPRS Mobility Management (GMM) signalling and NM (Network Management) signalling. The peer-to-peer communication across the Gb interface between the two remote BSSGP entities in the BSS and the SGSN is performed over virtual connections.

Normal Message Flow on Gb for NSEI Creation/Reset and NSVC Reset

1. NEW NSEI/NSEI RESET



As shown in this image, the Packet Capture displaying messages.



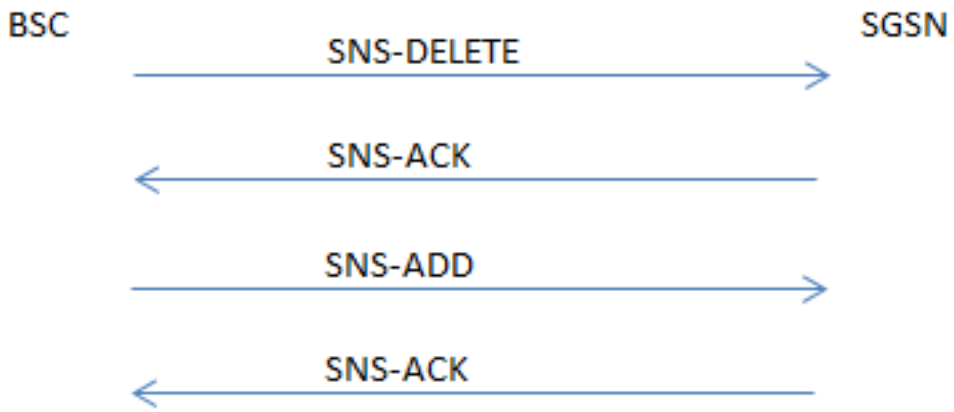
SNS-SIZE: The SNS-SIZE Protocol Data Unit (PDU) is used to indicate to the peer NSE the maximum number of NS-VCs or a change in the NS-VC capacity. The SNS-SIZE PDU is used to signal the restart of a NSE to a peer NSE.

SNS-SIZE-ACK: The SNS-SIZE-ACK PDU is used to acknowledge an SNS-SIZE PDU. The SNS-SIZE-ACK PDU is sent to the source IP Endpoint of the corresponding SNS-SIZE PDU.

SNS-CONFIG: The SNS-CONFIG PDU is used to configure a NSE to a peer NSE.

SNS-CONFIG-ACK: The SNS-CONFIG-ACK PDU is used to acknowledge an SNS-CONFIG PDU. The SNS-CONFIG-ACK PDU shall be sent to the source IP Endpoint of the corresponding SNS-CONFIG PDU.

2. NSVC BLOCK/DE-BLOCK (RESET)



SNS-DELETE: The SNS-DELETE PDU is used to delete previously configured IP Endpoints.

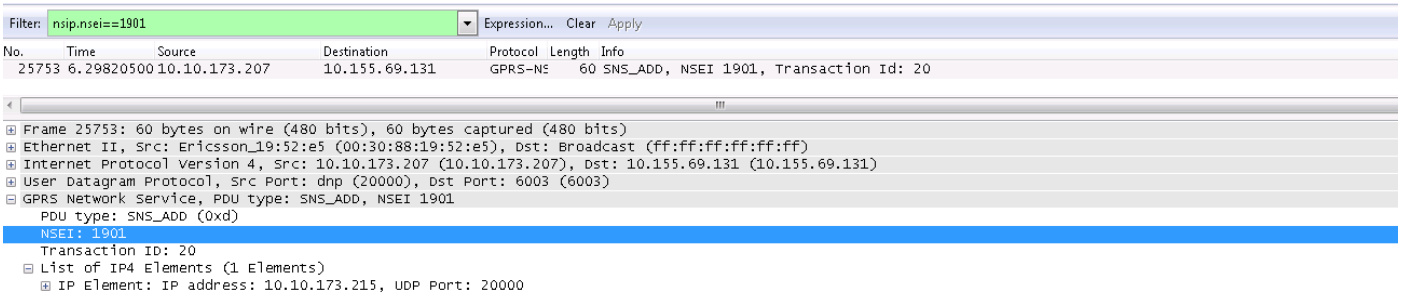
SNS-ACK: The SNS-ACK PDU is used to acknowledge the SNS-ADD PDU or the SNS-DELETE PDU.

SNS-ADD: The SNS-ADD PDU is used to add additional IP Endpoints.

Problem

Failure Scenario 1. NSVC does not come up after Packet Control Unit (PCU) reboot

In this scenario, the PCU sends **SNS-ADD PDU** before it sends any **SNS-DELETE PDU** SGSN after PCU reboot ,and hence the NSVC does not come up.

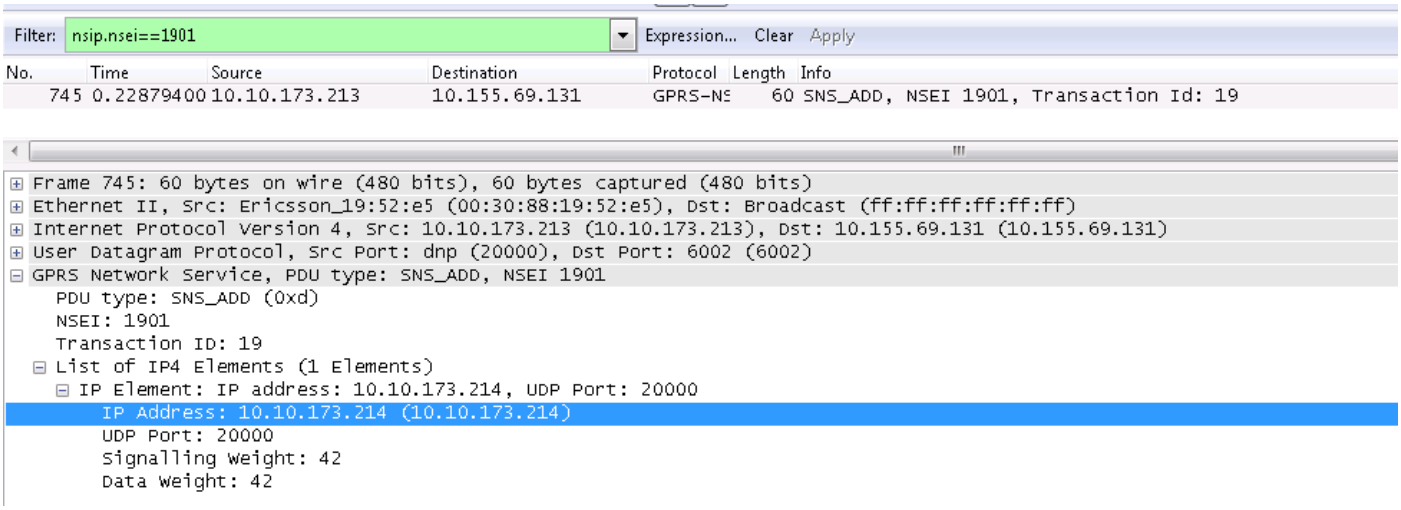


Failure Scenario 2. NSVC BLOCK command does not send SNS-DELETE PDU, hence NSVC cannot be reset.

For active NSVC, not carrying traffic (hung state), the **SNS-DELETE PDU** was not sent, while Blocking/De-Blocking the NSVC to perform reset.

Blocking NSVC

Deblocking NSVC that was Blocked



Troubleshoot

1. Capture wireshark trace on the Gb interface (Router connected to SGSN). If the Gb link is created on load shared basis, capture the trace on both the routers at the same time.
2. Select packet with UDP Protocol in the trace, right click and decode it as GPRS-NS, selecting Both option first.
3. Apply the filter with NSEI ID., for example nsip.nsei==xxxx, to check the PDU between BSC and SGSN.

Important CLIs available on ASR5x00 to analyze these issues

(Engineering mode)

Determine the element causing the problem and take the corrective action accordingly.