**3GPP TSG-SA WG6 Meeting #46-e meeting S6-212619**

**15th Nov – 23rd Nov 2021, Online**

**Source: Nokia, Nokia Shanghai Bell**

**Title: Addition of solution to key issue on NAT deployments**

**Spec: 3GPP TR 23.700-98**

**Agenda item: 10.8**

**Document for: Approval**

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# 1 Introduction

In the EDGEAPP architecture, a NAT is oftentimes deployed within the edge data network, e.g. typically load balancers implement NAT functions. In that case the EES and the EAS have no means to know the IP address that is known by the core network. Therefore, access to network services is prevented. This contribution provides a possible solution to overcome the NAT traversal issue as identified in KI 16: “support of NAT deployed within the edge data network”.

# 2 Discussion

NAT is oftentimes deployed within edge data networks. Such an operational constraint will prevent the EES and EAS to have an IP address of the UE that is known by the underlying 3GPP network.

One possible solution to the issue is to use **application level sessions** and build a binding in the EES between the UE IP@ (known by 5GC and EEC) and the NATed IP@ (known by EAS).

**An application level session:** application level protocols (such as HTTP) are typically stateless, meaning that every request is run independently from others. This means whenever a request is made (in our case between AC and EAS) if that request requires a context it will need to convey session information to find out about the context. For instance Json Web Tokens (typically allocated at session establishment) are used for this purpose, but there are other mechanisms as well.

In the context of EDGEAPP, the AC could request the EEC to build an association in the EES between the Application Level Session, the NATed IP@ and the 5GC allocated IP address. Through this mechanism the EES and EAS could have the knowledge of the IP@ known by the 5G Core when accessing network services for that UE.

This proposal suggests the addition of a solution to overcome this key issue.

# 3 Proposal

It is proposed to modify the text of TR 23.700-98 as follows.

*1st CHANGE*

## Solution #x: Determining an IP address of a UE that is known by the core network when NAT is deployed within the edge data network

### 7.x.1 Architecture enhancements

None.

### 7.x.2 Solution description

In Figure 7.x.2-1 a binging is built in the EES between the NATed IP@ and the UE IP@ that is know by 5GC.



Figure 7.x.2-1: building a binding between UE IP@ and NATed IP@ in the EES

The different steps of the solution are as follows:

Step 1: Application session is established between the AC and EAS. The EAS assigns an Application Session ID to the AC to be used for subsequent interactions

Note: Step 1 is outside of EDGEAPP architecture but is shown for completeness

Step 2: the AC requests from the EEC to build a mapping between the Application Session ID and the UE IP@ inside the EES

Step 3: the EEC informs the EES about the binding between an Application Session ID and the UE IP@

Step 4: the EAS informs the EES about the binding between an Application Session ID and the NATed IP@ of the UE

Step 5: thanks to the common Application Sessions ID a binding is built between the UE IP@ and the NATed IP@

Step 6 and step 7 are about the use of core network services where the EES translates the NATed IP@ to UE IP@ known by 5GC.

### 7.x.3 Solution evaluation

This solution address KI#16. It leverage a commonly used concept in application which is application session, which serves the exact purpose of identifying context information. In this case it is used to build a binding between the UE IP@ and the NATed IP@.

*END OF CHANGES*