STUDY ON ACCESS NETWORK DISCOVERY AND SELECTION BASED ON INTELLIGENT RESOURCE MANAGEMENT IN EPS

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Abstract: The paper investigates the interworking between Access Network Discovery and Selection Function (ANDSF) and Policy and Charging Rules Function in the Evolved Packet System (EPS). ANDSF allows the network operator to define policies that prioritize between different access technologies if several non-3GPP access networks are available. Generic functions of the interface between ANDSF and PCRF are identified and signaling procedures are designed. ANDSF may interact with policy and charging control to assist the resource reservation in re-selection and handover procedures; and with application logic to provide user location information. A use case is considered in order to illustrate the usage of the proposed extended functionality.

Keywords: Access network discovery and selection, Application Server, Evolved Packet System, Policy and Charging Control.

1. INTRODUCTION

Next Generation Networks will be all Internet Protocol based and will support different technologies for radio access. Evolved Packets System (EPS) is standardized as an evolution of the radio access and the core network [1]. Service provisioning is access-independent and relies on IP connectivity which allow addition of new access network technologies to the system later on. On the other hand, the operator possesses mechanisms and tools for intelligent resource management to optimizing network use, balancing the network load, lowering network congestion, and delaying CAPEX investments. Policy and Charging Control in EPS allows the operator to monitor and control the usage of networks resources [3]. Access Network Discovery and Selection Function (ANDSF) enables the network operator to control how users and their devices prioritize between different access technologies if several non-3GPP access networks are available. The ANDSF is a logical entity, which interacts with the User Equipment (UE) over interface called S14. The ANDSF is in an initial stage of standardization. Only a minimal interface to UE is defined. The definition on how the ANDSF

allocation of the users on the different access networks available using as central concept that handovers can and should be triggered by the modifications on the resources required by the mobile devices in order to optimize the overall usage of the wireless

indicators when deciding on admission, dropping or handover of users from one network to another. A multilink architecture with evolved ANDSF and Policy and Charging Rule Function (PCRF) is suggested in [8].

should interwork is limited and there are no interfaces between ANDSF and other entities. Further, so far the ANDSF relies only on its own information in order to make decisions [2]. The definition on how the ANDSF should work is limited and currently the only ANDSF interface is defined to UE. Further, the ANDSF relies only on its own information for decisions. The following extensions are proposed in [4]. First, the ANDSF decisions should be based on subscription. Second, the ANDSF decisions should use dynamic access network information and the ANDSF should support from the always-best-connected enabler towards the services. Third, the ANDSF should provide the means to integrate femto-accesses for network discovery and selection.

The idea of using dynamic access network information is developed in [5], [6], [7] and [8]. In [5], the authors propose a solution that combines ANDSF and MIH (Media Independent Handover Service standard 802.21 from IEEE) for improving the inter-system handover behavior. In [6], the authors propose novel access reselection procedures which enable a network provider to optimize the environment. An algorithm for network discovery and selection in a heterogeneous scenario involving next generation wireless networks is proposed in [7]. The proposed algorithm includes an extended set of selection parameters that refer to key performance

In this paper, we present a study on ANDSF interworking functionality with PCRF in assisting the resource reservation in re-selection and handover procedures; and with Application Server (AS) to provide user location information to application logic. Generic
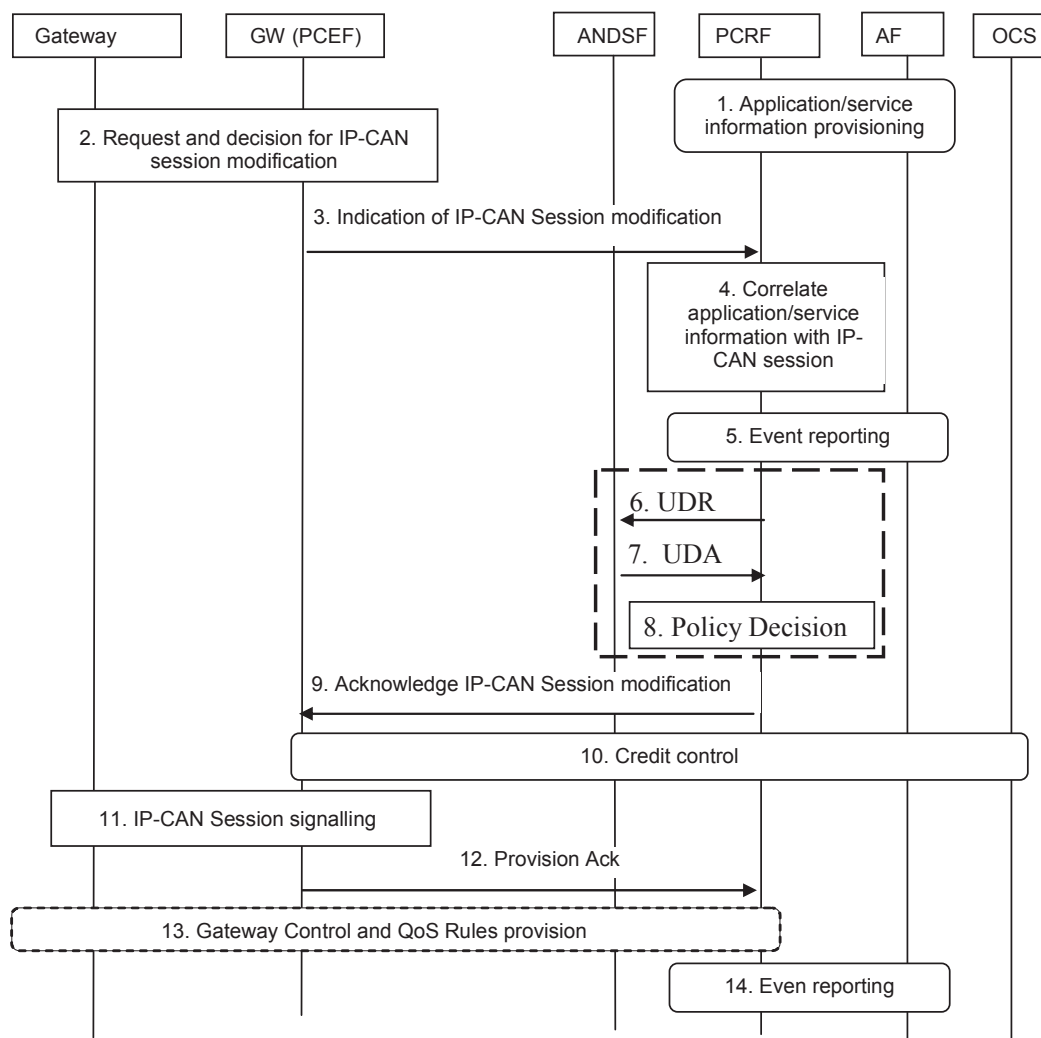
Figure 5 Extended IP connectivity access network session modification procedure

V. CONCLUSION

To optimize network usage a network operator may deploy functions for access network discovery and selection. The network discovery and selection procedures can be optimized by search and prioritize the best available links based on pre-defined requirements such as QoS, bandwidth, latency, jitter, power consumption, operator policies, etc.

The paper investigates the interworking between access network discovery and selection function and other functional entities in order to optimize network procedures. Generic functions for ANDSF interaction with PCRF and AS are identified. The ANDSF procedures with PCRF and AS are studied and signaling flows are described. The ANDSF interworking with PCRF may support the resource authorization

procedures as a part of intersystem handover. The ANDSF may be used as an entity that provides UE location information to service providers.

The proposed extension defines ANDSF interfaces to other network entities, and dynamic access network discovery and selection information for resource authorization as well as location information. Our future work will include simulations of different use case scenarios in order to prove the expected benefits of the proposed extension.

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