SA WG2 Meeting #S2-138E

20 - 24 April, 2020, Electronic meeting

S2-2003140

Multi PCF architecture for Dynamically Changed AM Policies in 5GC

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Requirement

- When some App traffic is started, change the AM policy (e.g. RFSP) by the PCF-AM, based on AF inputs
- It applies to the deployment scenarios where different PCF(s) are selected for the AMF and for the SMF
  - The issue can be resolved by selecting single PCF for the AMF and for the SMF; however, this may not be sufficient for all operators

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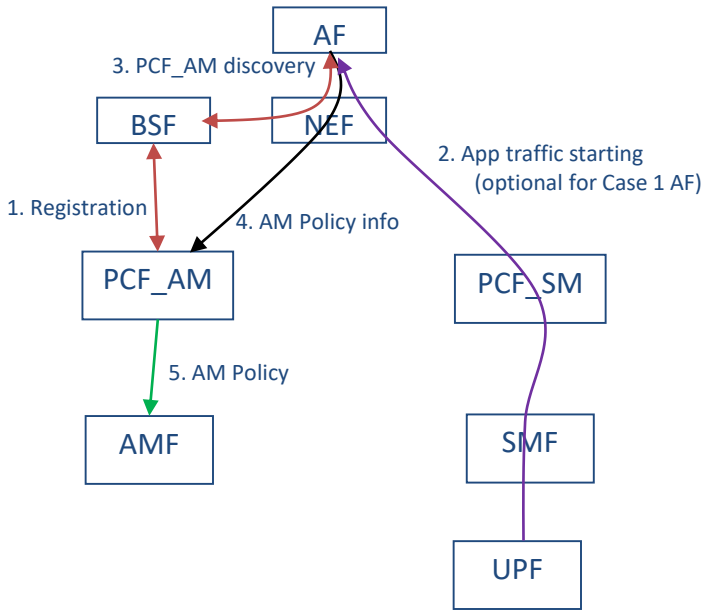
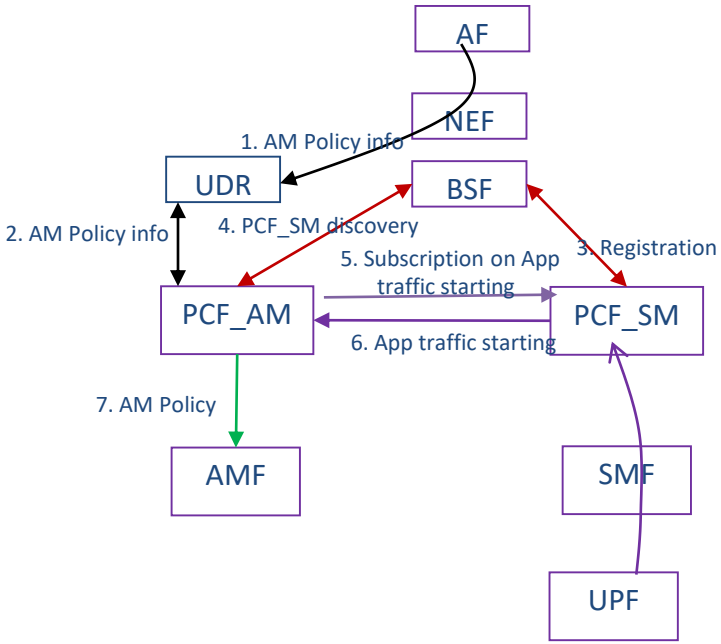
Solution Options



Option 1 AF based solution



Option 2 PCF based solution

- For HR case both solutions require inter PLMN N5 which is doubtful
- There could be 2 kinds of AFs:
  - Case 1: subscriber management OAM AF who doesn't know traffic start
  - Case 2: The AF that sends App traffic or knows that AF app traffic is going to be exchanged

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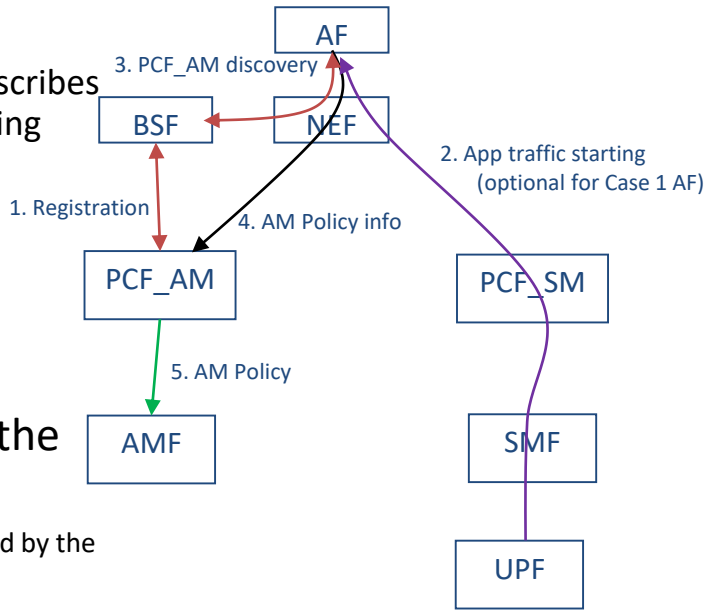
AF based Solution

- Case 1 AF is notified (by PCF_SM) that App traffic has started, so as to provide the updated AM policy to the PCF_AM (Step 2)
  - AF discovers PCF_SM (not shown in the figure for simplicity) and subscribes to PCF_SM about traffic start (e.g. create a new Nnef_TrafficMonitoring service).
  - Npcf_PolicyAuthorization_Notify is extended to support subscribing/reporting of a detected App to the AF
  - This step is skipped for Case 2 AF
- AF retrieves the PCF-AM from the BSF and issue Npcf_PolicyAuthorization_Create (SUPI, target RFSP) to the PCF-AM (Step 3&4)
  - PCF_AM is registered to the BSF (association SUPI – PCF-AM) so that it can be discovered by the AF.
- Resolve conflicts of AM policy required by different AFs
  - A priority is associated with the AM policy information to facilitate PCF_AM to determine which policy is adopted
  - Case 1 AF can determine the AM policy info based on its own logic



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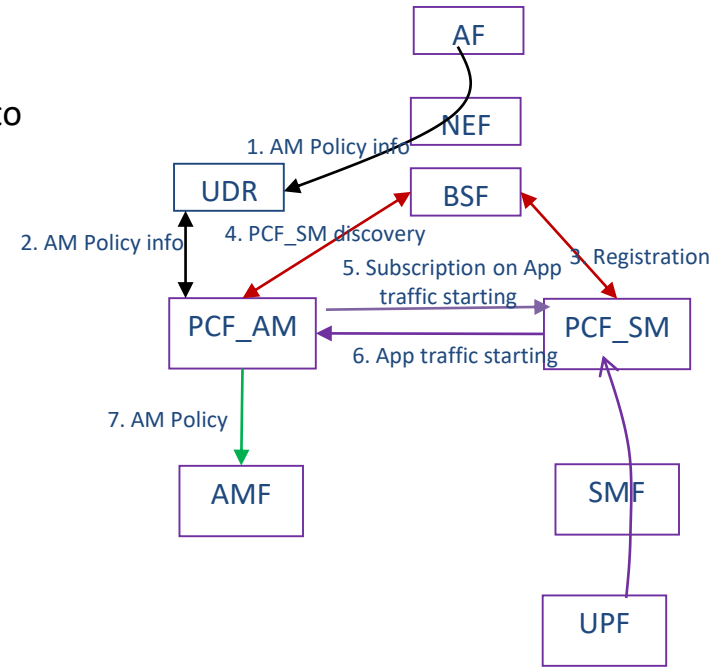
PCF based solution

- AF provides the policy data ("Application influence on AM policies") to the UDR (Step 1)
  - UDR (User Data Repository) policy data may define policies linking traffic of an application on a PDU Session towards a (DNN, S-NSSAI) to PCF-AM policies.
- The PCF-AM retrieves AM policy data from UDR during AM policy association establishment (Step 2)
- PCF-AM subscribes to PCF-SM serving a SUPI and (DNN, S-NSSAI) on the detection of the start of the application traffic so that PCF-AM knows when to update the AM policy (Step 5) and PCF_SM reports to PCF_AM about the App traffic start (Step 6)
  - To discover a PCF-SM, the PCF-AM subscribes to the BSF on the registration of PCF-SM for the SUPI and (DNN, S-NSSAI) (Step 4)
- PCF-AM modifies AM policy for a UE according to the UDR data and provides it to the AMF (Step 7)
- Resolve conflicts of AM policy required by different AFs
  - A priority is associated with the AM policy information to facilitate PCF_AM to determine which policy is adopted
  - Case 1 AF can determine the AM policy info based on its own logic



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Evaluation

	Impact to AF	Impact to UDR	Impact to PCF_SM	Impact to PCF_AM	Support of unregistered UE	AF single interaction with 5GC
AF based	• Subscribe to PCF_SM on start of the service traffic using existing service operation • PCF-AM discovery • PCF-SM discovery • Provide policy to the PCF_AM	no	• Notify AF on start of the service traffic per AF subscription using existing service operation	• Registration to BSF	Only when being notified by PCF_SM, the new policy is provided	AF interacts with NEF only; however, it has to provide some additional information to NEF for it to determine whether to route the request to PCF_AM or PCF_SM
PCF based	• Provide policy data to the UDR using NEF service operations • PCF-SM discovery	Policy is stored in the UDR and retrieved by PCF_AM	• Notify PCF-AM on start of the service traffic per PCF_AM subscription	• Registration to BSF • PCF_SM discovery • Subscribe to PCF_SM on start of the service traffic	Policy is retrieved by PCF_AM from the UDR during AM policy association establishment.	AF interacts with NEF only

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