5.7.7　UE Communication Analytics

This procedure is used by the NF to obtain UE communication analytics, which is calculated by the NWDAF based on the information collected from the AMF, SMF, UPF, and/or AF. If the NF is an AF which is untrusted, the AF will request analytics via the NEF as described in clause 5.2.3.2.
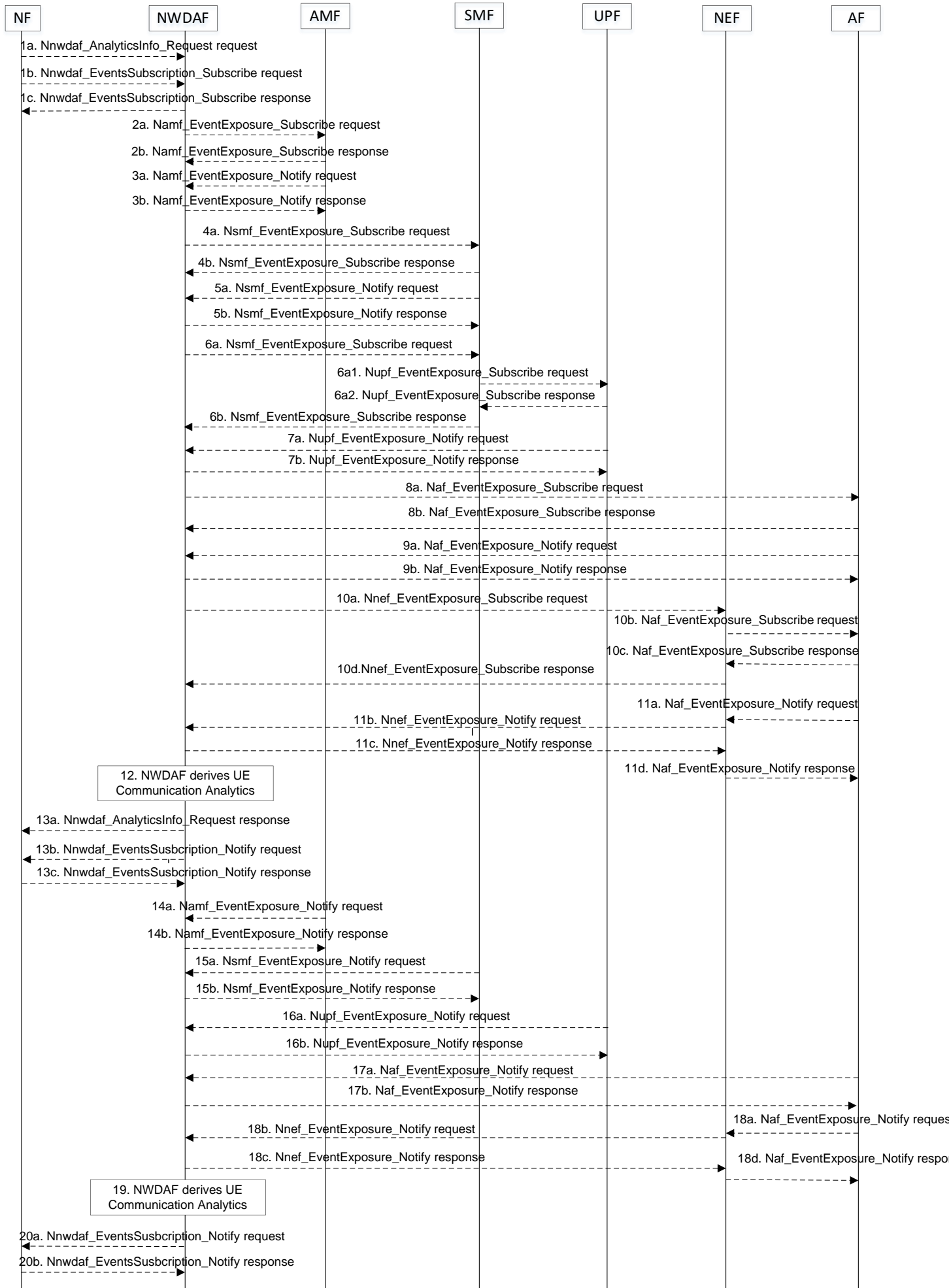
Participants: NF, NWDAF, AMF, SMF, UPF, NEF, AF

1a. Nnwdaf_AnalyticsInfo_Request request
1b. Nnwdaf_EventsSubscription_Subscribe request
1c. Nnwdaf_EventsSubscription_Subscribe response

2a. Namf_EventExposure_Subscribe request
2b. Namf_EventExposure_Subscribe response
3a. Namf_EventExposure_Notify request
3b. Namf_EventExposure_Notify response

4a. Nsmf_EventExposure_Subscribe request
4b. Nsmf_EventExposure_Subscribe response
5a. Nsmf_EventExposure_Notify request
5b. Nsmf_EventExposure_Notify response

6a. Nsmf_EventExposure_Subscribe request
6a1. Nupf_EventExposure_Subscribe request
6a2. Nupf_EventExposure_Subscribe response
6b. Nsmf_EventExposure_Subscribe response
7a. Nupf_EventExposure_Notify request
7b. Nupf_EventExposure_Notify response

8a. Naf_EventExposure_Subscribe request
8b. Naf_EventExposure_Subscribe response
9a. Naf_EventExposure_Notify request
9b. Naf_EventExposure_Notify response

10a. Nnef_EventExposure_Subscribe request
10b. Naf_EventExposure_Subscribe request
10c. Naf_EventExposure_Subscribe response
10d. Nnef_EventExposure_Subscribe response

11a. Naf_EventExposure_Notify request
11b. Nnef_EventExposure_Notify request
11c. Nnef_EventExposure_Notify response
11d. Naf_EventExposure_Notify response

12. NWDAF derives UE Communication Analytics

13a. Nnwdaf_AnalyticsInfo_Request response
13b. Nnwdaf_EventsSusbcription_Notify request
13c. Nnwdaf_EventsSusbcription_Notify response

14a. Namf_EventExposure_Notify request
14b. Namf_EventExposure_Notify response

15a. Nsmf_EventExposure_Notify request
15b. Nsmf_EventExposure_Notify response

16a. Nupf_EventExposure_Notify request
16b. Nupf_EventExposure_Notify response

17a. Naf_EventExposure_Notify request
17b. Naf_EventExposure_Notify response

18a. Naf_EventExposure_Notify request
18b. Nnef_EventExposure_Notify request
18c. Nnef_EventExposure_Notify response
18d. Naf_EventExposure_Notify response

19. NWDAF derives UE Communication Analytics

20a. Nnwdaf_EventsSusbcription_Notify request
20b. Nnwdaf_EventsSusbcription_Notify response

Figure 5.7.7-1: Procedure for UE Communication analytics

1a. In order to obtain the UE communication analytics, the NF may invoke Nnwdaf_AnalyticsInfo_Request service operation as described in clause 5.2.3.1.

1b-1c.   In order to obtain the UE communication analytics, the NF may invoke Nnwdaf_EventsSubscription_Subscribe service operation as described in clause 5.2.2.1.

2a-2b.   The NWDAF may invoke Namf_EventExposure_Subscribe service operation as described in clause 5.3.2.2.2 of 3GPP TS 29.518 [18] to retrieve one or more Type Allocation codes, UE connection management state, UE access behaviour trends and UE location trends from AMF. The AMF responds to the NWDAF an HTTP "201 Created" response.

3a-3b.   If step 2a and step 2b are performed, the AMF may invoke Namf_EventExposure_Notify service operation as described in 3GPP TS 29.518 [18] clause 5.3.2.4. The NWDAF responds to the AMF an HTTP "204 No Content" response.

4a-4b.   The NWDAF may invoke Nsmf_EventExposure_Subscribe service operation by sending an HTTP POST request targeting the resource "SMF Notification Subscriptions" as described in 3GPP TS 29.508 [6] to request the information of the UE to calculate the analytics. The SMF responds to the NWDAF an HTTP "201 Created" response.

5a-5b.   If step 4a and step 4b are performed, the SMF may invoke Nsmf_EventExposure_Notify service operation by sending an HTTP POST request to the NWDAF identified by the notification URI received in step 4a. The NWDAF responds to the SMF an HTTP "204 No Content" response.

6a-6b.   The NWDAF may invoke Nsmf_EventExposure_Subscribe service operation by sending an HTTP POST request targeting the resource "SMF Notification Subscriptions" as described in 3GPP TS 29.508 [6] to subscribe via the SMF to UPF information for a specific UE. The SMF subscribes to the UPF on behalf of the NWDAF using the Nupf_EventExposure_Subscribe service operation as described in 3GPP TS 29.564 [40] and, after having received the successful response from the UPF, it responds to the NWDAF with an HTTP "201 Created" response.

7a-7b.   If step 6a and step 6b are performed, the UPF may invoke Nupf_EventExposure_Notify service operation as described in 3GPP TS 29.564 [40] by sending an HTTP POST request to the NWDAF identified by the notification URI provided in step 6a. The NWDAF responds to the UPF an HTTP "204 No Content" response.

8a-8b.   If the AF is trusted, the NWDAF may invoke Naf_EventExposure_Subscribe service operation by sending an HTTP POST request targeting the resource "Application Event Subscriptions" to request the service data from AF directly. The AF responds to the NWDAF an HTTP "201 Created" response.

9a-9b.   If step 8a and step 8b are performed, the AF may invoke Naf_EventExposure_Notify service operation by sending an HTTP POST request to the NWDAF identified by the notification URI received in step 8a. The NWDAF responds to the AF an HTTP "204 No Content" response.

10a-10d.   If the AF is untrusted, the NWDAF may invoke Nnef_EventExposure_Subscribe service operation to the NEF by sending an HTTP POST request targeting the resource "Network Exposure Event Subscriptions" and then the NEF invokes Naf_EventExposure_Subscribe service operation by sending an HTTP POST request targeting the resource "Application Event Subscriptions". The AF responds to the NEF an HTTP "201 Created" response and then the NEF responds to the NWDAF an HTTP "201 Created" response.

11a-11d.   If step 10a to step 10d are performed, the AF may invoke Naf_EventExposure_Notify service operation by sending an HTTP POST request to the NEF identified by the notification URI received in step 8b and the NEF invokes Nnef_EventExposure_Notify service operation by sending an HTTP POST request to the NWDAF identified by the notification URI received in step 8a. The NWDAF responds to the NEF an HTTP "204 No Content" response and then the NEF responds to the AF an HTTP "204 No Content" response.

12. The NWDAF calculates the requested UE communication analytics based on the data collected from AMF, SMF, UPF and/or AF.

13a. If step 1a is performed, the NWDAF responds to the Nnwdaf_AnalyticsInfo_Request service operation as described in clause 5.2.3.1.

13b-13c.   If step 1b and step 1c are performed, the NWDAF may invoke Nnwdaf_EventsSusbcription_Notify service operation as described in clause 5.2.2.1.

14a-14b.   The same as step 3a and step 3b.

15a-15b.   The same as step 5a and step 5b.

16a-16b.   The same as step 7a and step 7b.

17a-17b.   The same as step 9a and step 9b.

18a-18d. The same as step 11a and step 11d.

19. The same as step 12.

20a-20b. The same as step 13b and step 13c.

NOTE 1: For details of Nsmf_EventExposure_Subscribe/Notify service operations refer to 3GPP TS 29.508 [6].

NOTE 2: For details of Naf_EventExposure_Subscribe/Notify service operations refer to 3GPP TS 29.517 [12].

NOTE 3: For details of Nnef_EventExposure_Subscribe/Notify service operations refer to 3GPP TS 29.591 [11].

NOTE 4: For details of Nnwdaf_EventsSubscription_Subscribe/Unsubscribe/Notify or Nnwdaf_AnalyticsInfo_Request service operations refer to 3GPP TS 29.520 [5].