Contents

Foreword 5

1 Scope 6

2 References 6

3 Definitions and abbreviations 7

3.1 Definitions 7

3.2 Abbreviations 7

4 Reference Architecture for Data Analytics 7

4.1 General 7

4.2 Non-roaming architecture 7

In addition to existing short description for Analytics architecture, add the following:

- Data Collection Coordination and Delivery architecture (short description)

- ADRF Storage Architecture (short description)

- Other architectures (e.g. multiple NWDAF instances) (short description)

4.3 Roaming architecture 8

5 Network Data Analytics Functional Description 8

5.1 General 8

5.2 NWDAF Discovery and Selection 9

5A Data Collection Coordination and Delivery Functional Description

5A.1 General

5A.2 Data Collection Coordination

5A.3 Data Delivery

5A.3.1 Data Delivery via DCCF

5A.3.2 Data Delivery via Messaging Framework

5A.4 Data Formatting and Processing

5A.5 Historical Data Handling

5B Analytics Data Storage Functional Description

5B.1 General

5B.2 ADRF specific section(s)

6 Procedures to Support Network Data Analytics 9

6.0 General 9

6.1 Procedures for analytics exposure 9

6.1.1 Analytics Subscribe/Unsubscribe 9

6.1.1.1 Analytics subscribe/unsubscribe by NWDAF service consumer 9

6.1.1.2 Analytics subscribe/unsubscribe by AFs via NEF 10

6.1.2 Analytics Request 11

6.1.2.1 Analytics request by NWDAF service consumer 11

6.1.2.2 Analytics request by AFs via NEF 11

6.1.3 Contents of Analytics Exposure 12

6.1.x Analytics Exposure using DCCF

6.1.x.1 General

6.1.x.2 Analytics Exposure via DCCF

6.1.x.3 Analytics Exposure via Messaging Framework

6.2 Procedures for Data Collection 13

6.2.1 General 13

6.2.2 Data Collection from NFs 15

6.2.2.1 General 15

6.2.2.2 Procedure for Data Collection from NFs 16

6.2.2.3 Procedure for Data Collection from AF via NEF 17

6.2.2.4 Procedure for Data Collection from NRF 19

6.2.2.5 Usage of Exposure framework by the NWDAF for Data Collection 19

6.2.3 Data Collection from OAM 20

6.2.3.1 General 20

6.2.3.2 Procedure for data collection from OAM 20

6.2.4 Correlation between network data and service data 21

6.2.x Data Collection using DCCF

6.2.x.1 General

6.2.x.2 Data Collection via DCCF

6.2.x.3 Data Collection via Messaging Framework

6.3 Slice load level related network data analytics 21

6.3.1 General 21

6.3.2 Void 22

6.3.2A Input data 22

6.3.3 Void 22

6.3.3A Output analytics 22

6.4 Observed Service Experience related network data analytics 22

6.4.1 General 22

6.4.2 Input Data 23

6.4.3 Output Analytics 25

6.4.4 Procedures to request Service Experience for an Application 27

6.4.5 Procedures to request Service Experience for a Network Slice 28

6.5 NF load analytics 29

6.5.1 General 29

6.5.2 Input data 29

6.5.3 Output analytics 30

6.5.4 Procedures 31

6.6 Network Performance Analytics 33

6.6.1 General 33

6.6.2 Input Data 34

6.6.3 Output Analytics 34

6.6.4 Procedures 36

6.7 UE related analytics 37

6.7.1 General 37

6.7.2 UE mobility analytics 37

6.7.2.1 General 37

6.7.2.2 Input Data 37

6.7.2.3 Output Analytics 38

6.7.2.4 Procedures 39

6.7.3 UE Communication Analytics 41

6.7.3.1 General 41

6.7.3.2 Input Data 41

6.7.3.3 Output Analytics 42

6.7.3.4 Procedures 43

6.7.4 Expected UE behavioural parameters related network data analytics 44

6.7.4.1 General 44

6.7.4.2 Input Data 45

6.7.4.3 Output Analytics 45

6.7.4.4 Procedures 45

6.7.4.4.1 NWDAF-assisted expected UE behavioural analytics 45

6.7.5 Abnormal behaviour related network data analytics 46

6.7.5.1 General 46

6.7.5.2 Input Data 47

6.7.5.3 Output Analytics 48

6.7.5.4 Procedure 51

6.8 User Data Congestion Analytics 52

6.8.1 General 52

6.8.2 Input data 53

6.8.3 Output analytics 53

6.8.4 Procedures 54

6.8.4.1 Procedure for one-time or continuous reporting of analytics for user data congestion in a geographic area 54

6.8.4.2 Procedure for one-time or continuous reporting of analytics for user data congestion for a specific UE 56

6.9 QoS Sustainability Analytics 58

6.9.1 General 58

6.9.2 Input data 59

6.9.3 Output analytics 60

6.9.4 Procedures 607 Nnwdaf Services Description 61

7.1 General 61

7.2 Nnwdaf\_AnalyticsSubscription Service 63

7.2.1 General 63

7.2.2 Nnwdaf\_AnalyticsSubscription\_Subscribe service operation 63

7.2.3 Nnwdaf\_AnalyticsSubscription\_Unsubscribe service operation 63

7.2.4 Nnwdaf\_AnalyticsSubscription\_Notify service operation 63

7.3 Nnwdaf\_AnalyticsInfo service 64

7.3.1 General 64

7.3.2 Nnwdaf\_AnalyticsInfo\_Request service operation 64

8 Ndccf Services Description

8.1 General

8.2 Ndccf\_DataManagement Service

8.3 Ndccf\_DataContextManagement Service

9 Nadrf Services Description

9.1 General

9.2 Nadrf\_DataStorage Service

9.3 Nadrf\_DataRetrieval Service

10 Nmaf Services Description

10.1 General

10.2 Nmaf\_3daDataManagement Service

10.3 Nmaf\_3caDataManagement Service

Annex A (informative): Change history 65