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WIN Distributed Functional Model

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Revision History

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PART 730

1 WIN DISTRIBUTED FUNCTIONAL MODEL

Figure 1 shows the DFP model for WIN. This diagram depicts the functional entities and relationships applicable to WIN. This diagram is based on the generic IN DFP model described in ITU-T recommendation *Q.1224*. A general explanation of functional entities, relationships, and the ITU IN DFP model are contained in *Q.1224*.

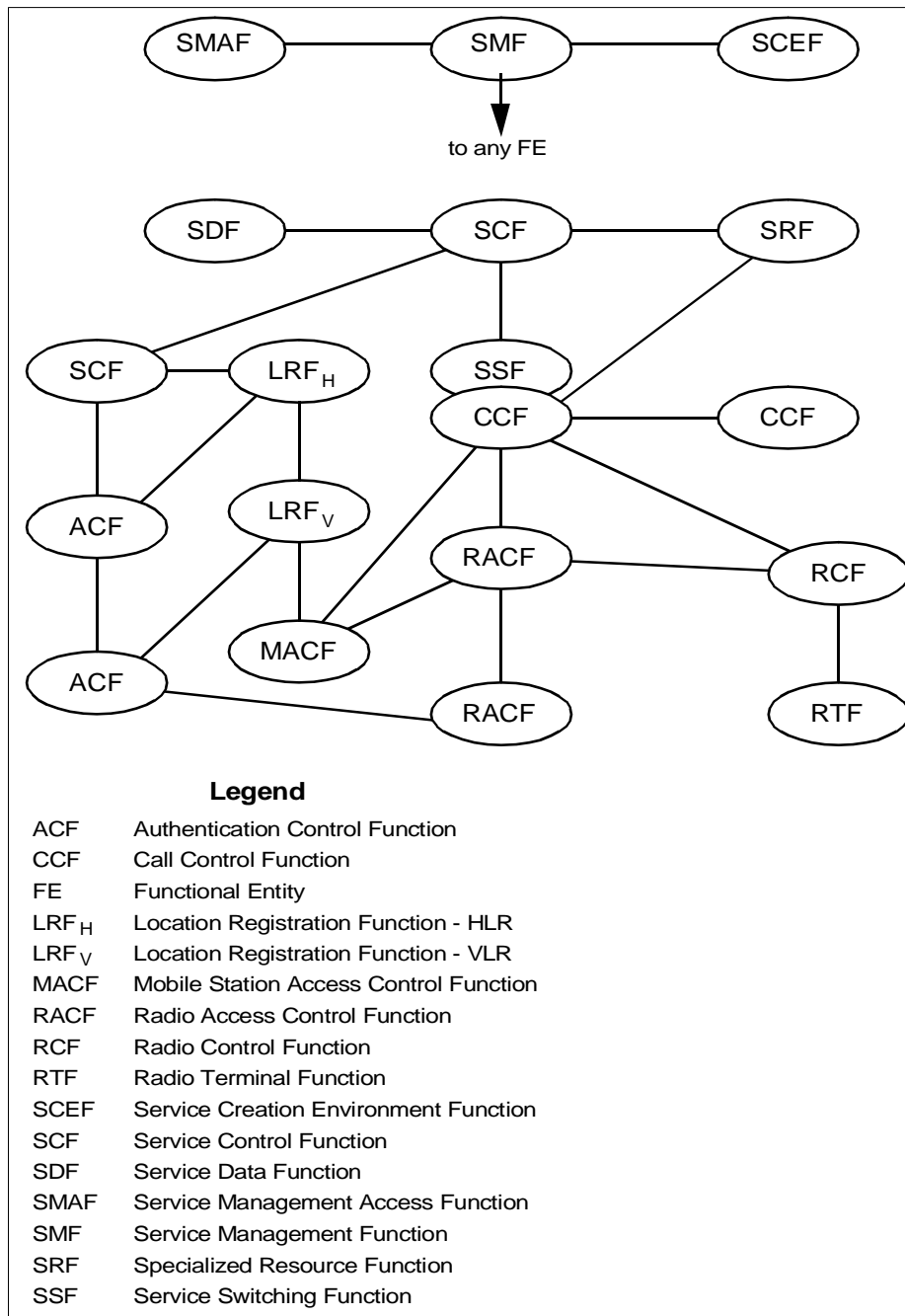


Figure 1 WIN Distributed Functional Model

Functional modeling facilitates the development of information flows between the FEs in modeling network functionality and services. This model has been developed to be non-service specific. It is a functional model and does not imply any limitations regarding physical implementations or distribution of functions to physical platforms. Annex C provides an example mapping of these FEs to NEs. Such mapping facilitates the development of protocols between NEs.

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1.1 WIN Functional Model

The WIN DFP is based on the DFP for IN CS-2. The Authentication Control Function (ACF), Location Registration Function (LRF), Mobile Station Access Control Function (MACF), Radio Access Control Function (RACF), Radio Control Function (RCF) and Radio Terminal Function (RTF) functional entities provide functionality specifically related to wireless access and mobility. Requirements for the Service Management Function (SMF), Service Creation Environment Function (SCEF) and Service Management Access Function (SMAF) functional entities and related interfaces are for further study.

1.2 WIN Functional Entities

The WIN functional entities provide the following functionality:

1.2.1 Authentication Control Function (ACF)

The Authentication Control Function (ACF) provides the service logic and service data function to provide authentication, voice privacy and signaling message encryption functions. The ACF:

- a. interacts with the SCF, LRF_H, LRF_V, RACF and other ACF functional entities for the authentication of mobile stations
- b. maintains the authentication parameters for the MS
- c. authenticates the MS access
- d. computes the voice privacy mask and signaling message encryption key for MS origination and page response accesses
- e. updates the MS's authentication parameters
- f. provides trigger mechanisms to access WIN service logic (for further study)

1.2.2 Call Control Function (CCF)

The Call Control Function (CCF) provides call and service processing and control. The CCF:

- a. establishes, manipulates and releases call and connection as requested by the MACF, RACF, RCF and by other CCF functional entities
- b. provides the capability to associate and relate RCF functional entities, and other CCF functional entities that are involved in a particular call and/or connection instance (that may be due to SSF requests)
- c. manages the relationship between RCF functional entities and between other CCF functional entities involved in a call (e.g. supervises the overall perspective of the call and connection)
- d. interacts with the MACF and RACF to establish an information exchange path (e.g., call delivery, short message delivery) to an MS
- e. provides trigger mechanisms to access WIN functionality (e.g., passes events to the SSF)

1.2.3 Location Registration Functions (LRF_H, LRF_V)

The Location Registration Function (LRF) provides the service logic and service data function to manage the mobility aspects for wireless users. There are two complementary LRF FEs: LRF_H and LRF_V.

The LRF_H:

- a. interacts with the LRF_V and MACF¹ functional entities to maintain the location and active/inactive status for mobile stations
- b. maintains the subscriber profile (e.g., switch-based features, triggers) and interacts with the LRF_V functional entity to transfer and update the subscriber profile
- c. interacts with the LRF_V functional entity to provide a routing address for establishment of an information exchange path (e.g., call delivery, short message delivery)
- d. interacts with the ACF functional entity to provide authentication, voice privacy and signaling message encryption for mobile stations.
- e. maintains mobile station access information (e.g., SMS pending flag)
- f. provides trigger mechanisms to access WIN service logic at an SCF (for further study)

The LRF_V:

- a. interacts with the LRF_H and MACF functional entities to maintain the location and active/inactive status for mobile stations
- b. stores the subscriber profile (e.g., switch-based features, triggers) and interacts with the LRF_H and the MACF functional entities to transfer and update the subscriber profile
- c. interacts with the LRF_H and the MACF functional entities to provide a routing address for establishment of an information exchange path (e.g., call delivery, short message delivery)
- d. interacts with the ACF functional entity to provide authentication, voice privacy and signaling message encryption for mobile stations
- e. at the request of the LRF_H functional entity, interacts with the MACF functional entity to provide mobile station notification information
- f. provides trigger mechanisms to access WIN service logic at an SCF (for further study)

1.2.4 Mobile Station Access Control Function (MACF)

The Mobile Station Access Control Function (MACF) stores subscriber data and dynamically associates system resources with a particular set of call instance data. The MACF:

- a. interacts with the LRF_H², LRF_V and RACF functional entities to maintain the location and active/inactive status for mobile stations

¹ This is for cases when the mobile station is in the home system.

² This is for cases when the mobile station is in the home system.

- b. stores the subscriber profile (e.g., switch-based features, triggers) and interacts with the SSF/CCF and with the LRF_v functional entities to transfer and update the subscriber profile
- c. provides subscriber profile information (e.g., switch-based services, triggers) and authorization information to the CCF and RACF functional entities
- d. maintains the mobile station access information (e.g., SMS pending flag)
- e. interacts with the RACF and LRF_v functional entities to provide a routing address for establishment of an information exchange path (e.g., call delivery, short message delivery) to an MS
- f. interacts with the RACF functional entity to establish an information exchange path (e.g., call delivery, short message delivery) to an MS
- g. interacts with the RACF functional entity to verify the presence of the mobile station
- h. at the request of the LRF_v functional entity, interacts with the RACF functional entity to provide mobile station notification information
- i. interacts with the LRF_v functional entity to provide the paging strategy to the RACF functional entity to verify the presence of the mobile station
- j. provides trigger mechanisms to access WIN service logic (for further study)

1.2.5 Radio Access Control Function (RACF)

The Radio Access Control Function (RACF) provides the service logic and service data functionality specifically related to the radio link. The RACF:

- a. interacts with the CCF, ACF, MACF, RCF and with other RACF functional entities in the processing of call, non-call, or service related functions
- b. interacts with the CCF and MACF to establish an information exchange path (e.g., call delivery, short message delivery) to an MS
- c. interacts with the ACF to authenticate the MS access
- d. interacts with the MACF to provide a routing address for establishment of an information exchange path (e.g., call delivery, short message delivery)
- e. manages the RCF functions for associated RCFs
- f. provides radio access control functions such as assignment of radio resources
- g. interacts with the associated RCF and with other RACF functional entities to coordinate handoff activities, including the determination of target RCFs, handoff decision and handoff completion
- h. interacts with other RACF functional entities to process border cell operations
- i. contains service logic functionality to handle service requests that are specific to radio bearer requirements
- j. executes mobile station paging

1.2.6 Radio Control Function (RCF)

The Radio Control Function (RCF) provides the radio port and radio port control. The RCF:

- a. establishes, manipulates and releases call/connection as “requested” by the RACF, CCF, and RTF
- b. provides radio functions including carrier generation, signal amplification, selective filtering, modulation and demodulation, radio channel assignment and supervision
- c. provides interconnection between the radio and network bearer connections

1.2.7 Radio Terminal Function (RTF)

The Radio Terminal Function (RTF) provides access for wireless users. It is the interface between the wireless user and network call control functions. The RTF:

- a. provides for user access, interacting with the user to establish, maintain, modify and release as required, a call or instance of service
- b. interacts with the Radio Control Function (RCF) using service requests (e.g., setup, transfer, hold, etc.) for the establishment, manipulation and release of a call or instance of service
- c. receives indications relating to the call or service from the RCF and relays them to the user as required
- d. maintains call and service state information as perceived by this functional entity

1.2.8 Service Control Function (SCF)

The Service Control Function (SCF) commands call control functions in the processing of WIN provided and custom service requests. The SCF may interact with other functional entities to access additional logic or to obtain information (service or user data) required to process a call and service logic instance. The SCF:

- a. interfaces and interacts with service switching function/call control function
- b. contains the logic and processing capability required to handle WIN provided service attempts
- c. interfaces and interacts with other SCFs for secured data acquisition and manipulation, distributed service control, and unsolicited service notifications, if necessary
- d. interfaces and interacts with SDFs for data acquisition and manipulation of data
- e. interfaces and interacts with SRFs

1.2.9 Service Creation Entity Function (SCEF)

The Service Creation Entity Function (SCEF) provides the capability for the creation, verification, and testing of WIN services. The output of the SCEF includes service logic and service data templates. Specific requirements for the SCEF are for further study.

1.2.10 Service Data Function (SDF)

The Service Data Function (SDF) contains customer and network data for real-time access by the SCF in the execution of WIN-provided services. The SDF interfaces and interacts with SCFs as required. The SDF contains data relating directly to the provision or operation of WIN-provided services, thus it does not necessarily encompass data provided by a third party such as credit information, but may provide access to the data.

1.2.11 Service Management Access Function (SMAF)

The Service Management Access Function (SMAF) provides the human interface to service management functions. Specific requirements for the SMAF are for further study.

1.2.12 Service Management Function (SMF)

The Service Management Function (SMF) provides overall service management functionality for the network. The SMF may interact with any or all of the other FEs to perform service provisioning, monitoring, testing, and subscriber data management functions. Specific requirements for the SMF are for further study.

1.2.13 Service Switching Function (SSF)

The Service Switching Function (SSF) is associated with the CCF and provides the set of functions required for interaction between the CCF and a service control function (SCF). The SSF:

- a. extends the logic of the CCF to include recognition of service control triggers and to interact with the SCF
- b. manages signaling between the CCF and the SCF
- c. modifies call and connection processing functions (in the CCF) as required to process requests for WIN provided service usage under the control of the SCF

1.2.14 Specialized Resource Function (SRF)

The Specialized Resource Function (SRF) provides the specialized resources required for the execution of WIN-provided services (e.g., digit receivers, announcements, conference bridges, etc.). The SRF:

- a. interfaces and interacts with SCF and SSF (and with the CCF)
- b. may contain the logic and processing capability to receive, send and convert information received from users
- c. may contain functionality similar to the CCF to manage bearer connections to the specialized resources

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