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Wireless Intelligent Networks

Revision History

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PART 700

1 INTRODUCTION

The Wireless Intelligent Network (WIN) is a network which supports the use of intelligent network capabilities to provide seamless terminal services, personal mobility services, and advanced network services in the mobile environment. 700 Intelligent network capabilities are all those functional capabilities which support creation and execution of service logic programs which reside outside of switching equipment, but work in collaboration with the switching equipment based upon a common definition of call models and protocols. These service logic programs may utilize data resources and physical resources which also reside outside of the switching equipment.

Terminal mobility services are services created using intelligent network capabilities to serve customers with mobile terminals. A set of these services will be associated with each mobile terminal based on the capabilities of the terminal and subscription selections. Some prerequisites of providing these services are the abilities to identify and authenticate the terminal and to provide seamless operations capabilities between wireless and wireline networks.

Personal mobility services are services created using intelligent network capabilities to serve customers who are mobile. A set of these services will be associated with each customer based on personal subscription selections. The customer may utilize a variety of mobile and fixed terminals at different locations. Some prerequisites of providing these services are the abilities to:

- identify and authenticate the person (subscriber) who has been provisioned for the service
- provide seamless operations capabilities among the wireless, fixed and other networks (e.g., broadband, internet, data networks)
- provide a unique set of services to the subscriber based on the subscriber's access point to the WIN service

Advanced network service has the functionality to identify the capability of the serving network, to provide service based on the network and terminal capability, and to provide seamless service mobility between wireless and wireline networks.

The basic difference between terminal mobility service, personal mobility service, and advanced network service is as follows:

- **Terminal mobility services**: services based on the terminal capability irrespective of the terminal user.
- **Personal mobility services**: services based on personal needs or business entity needs irrespective of terminals or networks.
- **Advanced network services**: customized services which can be provided ubiquitously in home or roaming networks (wireless or wireline).

Service management functionality is used to provision and manage the service control functionality, the service data functionality, and the specialized resource functionality in the network. Service creation functionality is used to create services. Service management and service creation functionality may use standardized interfaces. However, the ability of a service subscriber to interact directly with subscriber-specific service management information will not be excluded or constrained for WIN.

Initial WIN standards describe a distributed functional plane (DFP) architecture, call models, and advanced network services such as calling name presentation capabilities, voice controlled services, and incoming call screening services. Future WIN standards will add additional WIN capabilities and functionality.

1.1 OBJECTIVE

The DFP defines the WIN architecture in terms of functional entities (FEs), each of which performs distinct actions in the network. A grouping of actions across one or more FEs, when coordinated by communication flows, provides the required WIN service execution.

The WIN DFP provides a different view of the network than is provided by the wireless network reference model (NRM). The NRM defines network entities and the associated interface reference points that may logically comprise a wireless network. The WIN DFP identifies FEs that perform distinct actions in the network. Multiple FEs can be included in a single network entity.

1.2 SCOPE

This part of *TIA-41* defines the distributed functional plane (DFP) for the Wireless Intelligent Network (WIN).

Specifically, the scope of this part of the Standard is:

1. To define the WIN functional entities and the relationships applicable to WIN.
2. To specify a high level model description of call control function (CCF) activities required to establish and maintain communication paths for users.
3. To specify a high level model description of service switching function (SSF) activities required for interaction between the CCF and a service control function (SCF).
4. To specify WIN triggers and provide a high level model description of detection point processing.
5. To describe mobility management and radio access control functions in the context of WIN.
6. To illustrate how the WIN basic call state models interact with *TIA-41* signaling.

2 WIN DISTRIBUTED FUNCTIONAL PLANE

The distributed functional plane (DFP) for the Wireless Intelligent Network (WIN) is based on the ITU-T *Q.1224* recommendation for IN CS-2. The DFP defines the WIN architecture in terms of functional entities (FEs), each of which performs distinct actions in the network. A grouping of actions across one or more FEs, when coordinated by communication flows, provides the required WIN service execution.

The WIN DFP provides a different view of the network than is provided by the wireless network reference model (NRM). The NRM defines network entities and the associated interface reference points that may logically comprise a wireless network. The WIN DFP identifies FEs that perform distinct actions in the network. Multiple FEs can be included in a single network entity.

2.1 Scope of WIN Distributed Functional Plane

The scope of the DFP architecture for WIN is driven by the requirements of desired wireless services and is constrained by the capabilities of the embedded base of evolvable network technology.

The functions required to support the desired wireless services include:

- end user access to call and service processing
- service invocation and control
- end user interaction with service control
- service management

The scope of each of these functions is described below.

2.1.1 End User Access

End user access to call and service processing will be provided via the following access arrangements:

- line interfaces that are provided by radio access systems
- traditional trunk and SS7 interfaces
- other types of network access arrangements such as roamer ports

2.1.2 Service Invocation and Control

Call and service processing for WIN builds upon the call processing infrastructure of existing MSCs. It does so by using a generic model of existing call control functionality to process basic two-party calls, then adding service switching functionality to invoke and manage WIN service logic. Once invoked, WIN service logic is executed under the control of service control functionality in conjunction with service data functionality. With this distributed approach to call and service processing, the existing call control functionality retains ultimate responsibility for the integrity of calls, as well as for the control of call processing resources.

The following call and service processing constraints apply for WIN:

a. Call control and service switching functionality are tightly coupled in the MSC, thus the relationship between SSF and CCF is not standardized.

b. A call is either between two or more end users that are external to the network and addressable via a directory number or combination of directory number and bearer capability, or a call is between one or more end users and the network itself.

c. A call may be initiated by an end user, or by an SCF within the network on behalf of an end user. To supplement a call, WIN service logic may either be invoked by an end user served by a WIN MSC, or by the network on behalf of an end user.

d. A call may span multiple MSCs. As such, each MSC only controls the portion of the call in that MSC. Call processing is functionally separated between MSCs. WIN service logic invoked on WIN MSCs in such an inter-MSC call are managed independently by each WIN MSC.

e. MSCs can be viewed as having two functionally separate sets of call processing logic that coordinate call processing activities to create and maintain a basic two-party call. This functional separation is provided between the originating portion of the call and the terminating portion of the call. This functional separation should be maintained in a WIN MSC to allow WIN service logic invoked on the originating portion of the call (i.e. on behalf of the calling party) to be managed independently of WIN service logic invoked on the terminating portion of the call (i.e. on behalf of the called party).

f. It is desirable to allow multiple WIN-supported service logic instances to be simultaneously active for a given end user. It is also recognized that non-WIN service logic will continue to exist in the network. As such, service feature logic instances mechanisms for WIN should:

   » determine which service logic to invoke for a given service request. This mechanism should select the appropriate WIN-supported service logic or non-WIN-supported service logic, and block the invocation of any other service logic for that particular service request;

   » manage WIN- and non-WIN-supported service logic instances which are simultaneously active (this may require limiting the service logic instances which are active);

   » ensure that simultaneously active WIN-supported service logic instances adhere to single-ended, single point of control service processing.

g. The distributed approach and added complexity of call and service processing for WIN requires mechanisms for fault detection and recovery, allowing graceful termination of calls and appropriate treatments for end users.

2.1.3 End User Interaction

End user interaction with the network to send and receive information is provided by service switching and call control resources, augmented by specialized resources. These specialized resources are controlled by service control functionality, and are connected to end users via call control and service switching functionality.

2.1.4 Service Management

Service management functionality is used to provision and manage the service control functionality, service data functionality, and specialized resource functionality in the network, outside of the context of call and service processing. Standardized interfaces for this functionality are outside the scope of WIN. However, the ability of a service subscriber to interact directly with subscriber-specific service management information will not be excluded or constrained for WIN.