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Wireless Intelligent Network

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ABSTRACT:

Wireless Intelligent Network (WIN) is a concept being developed by the Telecommunications Industry Association (TIA) Standards Committee TR45.2. The charter of this committee is to drive intelligent network (IN) capabilities, based on interim standard (IS)-41, into wireless networks. IS-41 is a standard currently being embraced by wireless providers because it facilitates roaming. Basing WIN standards on this protocol enables a graceful evolution to an IN without making current network infrastructure obsolete.

Today's wireless subscribers are much more sophisticated telecommunications users than they were five years ago. No longer satisfied with just completing a clear call, today's subscribers demand innovative ways to use the wireless phone. They want multiple services that allow them to handle or select incoming calls in a variety of ways. Enhanced services are very important to wireless customers. They have come to expect, for instance, services such as caller ID and voice messaging bundled in the package when they buy and activate a cellular or personal communications service (PCS) phone. Whether prepaid, voice/data messaging, Internet surfing, or location-sensitive billing, enhanced services will become an important differentiator in an already crowded, competitive service-provider market.

Enhanced services will also entice potentially new subscribers to sign up for service and will drive up airtime through increased usage of PCS or cellular services. As the wireless market becomes increasingly competitive, rapid deployment of enhanced services becomes critical to a successful wireless strategy. Intelligent network (IN) solutions have revolutionized wireline networks. Rapid creation and deployment of services has become the hallmark of a wire line network based on IN concepts. Wireless intelligent networks (WIN) will bring those same successful strategies into the wireless networks.

INTRODUCTION:

The Wireless Intelligent Network (WIN) is a network which supports the use of intelligent network skills to provide unified mortal services, personal mobility services, and advanced network services in the mobile environment. (WIN) is an annotation being developed by the Telecommunications Industry Association (TIA) Standards Committee TR45.2. The charter of this committee is to put intelligent network (IN) capabilities, based on provisional standard (IS)-41, into wireless networks. IS-41 is a standard currently being used by wireless providers because it enables roaming. Basing WIN standards on this protocol enables an elegant development to an IN without making current network structure obsolete. As the wireless market becomes progressively competitive, rapid positioning of enhanced services becomes dangerous to a successful wireless strategy. Improved services are very imperative to wireless customers.

Emerging telecommunications services require industries and standardization bodies (ANSI, ETSI, ISO, ITU, TIA, etc.) to describe increasingly complex functionalities, architectures, and protocols. This is especially true of wireless systems, where the mobility of users and of terminals brings an additional dimension of complexity. In that context, special attention haste is brought to the early stages of the design and standardization processes, where the focus should be on system and functional views rather than on details belonging to a lower level of abstraction, or to later stages in those processes. Nowadays, communication services and features are commonly described using an amalgam of informal operational and declarative descriptions, tables, and visual notations such as Message Sequence Charts (MSCs) [15]. As these descriptions evolve, they quickly become error-prone and difficult to manage. There is an urgent need for high-quality documents that are concise, descriptive, maintainable, consistent, and understandable by readers with different needs and perspectives (designers, engineers, testers, marketing people,etc.). Over the years, several approaches have attempted to provide such documents. Proponents of formal methods have claimed to solve the problem by providing unambiguous and mathematical notations and verification techniques, but the penetration of these methods in industry and in standardization bodies remains, unfortunately, low [3]. Scenario-driven approaches have raised a higher level of interest and acceptance, mostly because of their intuitive representation of services [3][16]. This paper presents such a methodology, but within an approach to the level of scenario abstraction slightly different from that of most popular techniques. It focuses on the very first stage of design and standardization processes, where much information and design decisions are often lost or hidden behind implementation details. Such details should be omitted at this stage, whereas the general flow of responsibilities should be emphasized.

Benefits of Intelligent Networks

The main benefit of intelligent networks is the ability to improve existing services and develop new sources of revenue. To meet these objectives, providers require the ability to accomplish the following:

2.1. Introduce new services rapidly**:-**IN provides the capability to provision new services or modify existing services throughout the network with physical intervention.

2.2. Provide service customization:-Service providers require the ability to change the service logic rapidly and efficiently. Customers are also demanding control of their own services to meet their individual needs.

2.3. Establish vendor independence:-A major criterion for service providers is that the software must be developed quickly and inexpensively. To accomplish this, suppliers must integrate commercially available software to create the applications required by service providers.

2.4. Create open interfaces:-Open interfaces allow service providers to introduce network elements quickly for individualized customer services. AIN technology uses the embedded base of stored program-controlled switching systems and the SS7 network. The AIN technology also allows for the separation of service-specific functions and data from other network resources. This feature reduces the dependency on switching system vendors for software development and delivery schedules. Service providers have more freedom to create and customize services.

Overview:

Today's wireless subscribers are much more sophisticated telecommunications users than they were five years ago. No longer satisfied with just completing a clear call, today's subscribers demand innovative ways to use the wireless phone. They want multiple services that allow them to handle or select incoming calls in a variety of ways. Enhanced services are very important to wireless customers. They have come to expect, for instance, services such as caller ID and voice messaging bundled in the package when they buy and activate a cellular or personal communications service (PCS) phone. Whether prepaid, voice/data messaging, Internet surfing, or location-sensitive billing, enhanced services will become an important differentiator in an already crowded, competitive service-provider market. Enhanced services will also entice potentially new subscribers to sign up for service and will drive up airtime through increased usage of PCS or cellular services. As the wireless market becomes increasingly competitive, rapid deployment of enhanced services becomes critical to a successful wireless strategy.

Intelligent Network (IN) solutions have revolutionized wireline networks. Rapid creation and deployment of services has become the hallmark of a wire line network based on IN concepts. Wireless Intelligent Network (WIN) will bring those same successful strategies into the wireless networks. The evolution of wireless networks to a WIN concept of service deployment delivers the following advantages, similar to the IN benefits reaped by wire line providers: • Multi Vendor product offerings that faster competition • Uniform services to subscribers across service areas • Efficient network use • Service creation and deployment.

1. HANDS-FREE, VOICE-CONTROLLED SERVICES:

The MS terminates the radio path on the user side of the network permitting the user to gain contact services from then network. It integrates user interface function, radio function, and control function with the most common equipment applied in the form of a mobile telephone.

2. BASE STATION:

The basic station dismisses the radio path on the network side and offers connection to the network. It is composed of two fundamentals: Base Transceiver Station (BTS) Base Station Controller (BSC).

3. MOBILE SWITCHING CENTER (MSC):

The MSC provides a programmed switching between users within the same network or other public switched networks, synchronizing calls and routing procedures. In general, an MSC controls several BSCs, but it may also serve in different abilities. The MSC provides the SSP function in a wireless IN.

4. VISITOR LOCATION REGISTER (VLR):

The VLR is a database containing provisional records related to subscribers under the status of a caller. A subscriber is considered a caller if such a subscriber is being served by another system within the same home service area or by another system away from the respective home service area. The information within the VLR is saved from the HLR. A VLR is usually co-located with an MSC.

5. HOME LOCATION REGISTER (HLR):

The HLR is the primary database for the home subscriber. It maintains information records on subscriber current location, identification, user profile

and so on. As HLR may be co-located with an MSC or it may be located independently of the MSC.

6. GATEWAY (GTW):

The GTW helps as an interface between the wireless network and the external network.

WIN SERVICES

• WIN services are related to AIN services. AIN was first introduced for the wire line Industry in late 1980's. The best known AIN application is the "800 service" which opened the door to a host of new services offered on a platform other than the switch. WIN, enhancing the AIN concept with the mobility management aspect of wireless communication, will offer services consistent with what wire line AIN offers. Furthermore,

• Personal and terminal mobility,
• Internetwork handoff,
• Security,
• Fraud prevention and detection.

1. VOICE CONTROLLED DIALING (VCD)

• VCD allows a subscriber to originate calls by dialing digits using spoken commands Instead of the keypad. VCD may be used during call origination or during the call Itself.

2. VOICE-CONTROLLED FEATURE CONTROL (VCFC)

• VCFC permits a calling party to call a special VCFC directory number, identify the Calling party as an authorized subscriber with a mobile directory number and Personal identification number (PIN), and specify feature operations via one or more Feature-control strings. This service is similar to remote feature control (RFC) except That the subscriber is allowed to dial feature-control digits or commands using Spoken words and phrases instead of keypad digits.

3. VOICE-BASED USER IDENTIFICATION (VUI)

• VUI permits a subscriber to place restrictions on access to services by using VUI to Validate the identity of the speaker. VUI employs a form of ASR technology to validate The identity of the speaker rather than determine what was said by the speaker. VUI requires that the subscriber register the service by training the ASR system by Recording a word or phrase. When a user attempts to access a service, the ASR System prompts the user to say the special phrase.

4. INCOMING CALL-RESTRICTION/CONTROL

• Incoming calls to a subscriber may be given one of the following terminations Treatments: the call is terminated normally to the subscriber with normal or Distinctive alerting; it is forwarded to voicemail or to another number; it is routed to a Subscriber-specific announcement; or it is blocked. These kinds of services help Subscribers control incoming calls and their monthly airtime bills. From a marketing Standpoint, they entice cost-conscious customers who might not want unlimited access from callers.

There are total of 9 wireless protocols, which are listed below:

1. Wi-Fi
2. Bluetooth
3. RF
4. GPRS/3G/LTE
5. NFC

PROTOCOL IN WIRELESS NETWORK

1) WIFI:

We all know about Wife actually, many of you might be using it now to read this blog. It allows accessing the internet while on the move. Wi-Fi enabled computers send and receive data indoors and outfits just as fast as cable modem connection. It refers to the IEEE 802.11 communications standard. It usually establishes a Local Area Network (LAN).

Wireless LAN:

- It uses high frequency radio waves rather than wires to communicate and transmit data.

- An Access Point connects wired and wireless networks together and enables the sending and receiving of data between wireless clients and the wired network.
- The wireless SSID, also known as the 'Network Name', is the Service Set Identification that controls access to a given wireless network.

Applications of Wi-Fi:

- Internet Access
- Hotspots
- City-wide Wi-Fi
- Campus-wide Wi-Fi
- Direct computer-to-computer communications

- Wireless ad hoc network

2) Bluetooth:

Open standard for development of personal area network (PAN).Its features include low cost, low power and short range typically about 10 meters. It can exchange information with other Bluetooth devices over a radio. It is used for creating a small network of devices that are close to one another. It supports IEEE802.15.4 and works at 2.4GHz frequency range.

Applications of Bluetooth:

- Wireless networking between laptops and desktop computers, or desktops that are in a confined space and little bandwidth is needed.
- The transfer of files, images and MP3, between mobile phones.
- Bluetooth technology headsets for smart phones and cell phones.
- Data logging equipment that transmits data to a computer via Bluetooth technology.

3) RF (Radio Frequency):

Integrated circuits designed to transmit and/or receive radio signals. They have a radio transmitter and/or receiver. An umbrella term that includes many different pieces of hardware. It works on several different wireless protocols. Antennas are used to transmit and receive data. It uses either wireless serial or a specific protocol. The signals containing data or information are modulated.

Application of RF Module:

- Vehicle monitoring
- Remote control
- Telemetry
- Small-range wireless network
- Wireless meter reading
- Access control systems

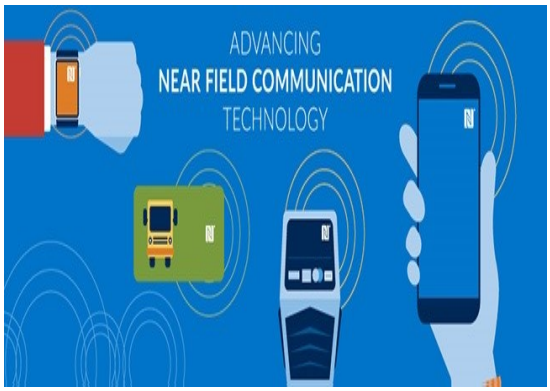
4) GPRS/3G/4G (LTE):

3G Technology:

- 3G technology refers to the third generation which was introduced in year 2000s.Data Transmission speed increased from 144kbps- 2Mbps.Typically called Smart Phones and features increased its bandwidth and data transfer rates to accommodate web-based applications and audio and video files.
- **4G Technology:**
- 4G technologies refer to or short name of fourth Generation which was started from late 2000s.It is capable of providing 100Mbps — 1Gbps speed. One of the basic terms used to describe 4G is MAGIC. MAGIC stands for Mobile Multimedia, Anytime Anywhere, Global Mobility Support, Integrated Wireless Solution, Customized Personal Services. Also known as Mobile Broadband Everywhere.

5) NFC:

NFC is the acronym for Near Field Communication. It is a short-range high frequency wireless communication technology that enables the exchange of data between devices. It enables two electronic devices, one of which is usually a portable device such as a Smartphone, to establish communication by bringing them within 4 cm (1.6 in) of each other.



Applications of NFC:

- Your phone is your t*ravel card.*
- Share data and files between devices.
- Get information by touching *smart posters*.
- Your phone is your *credit/debit card.*

Conclusion:

The conventional service arrangement in the Public Land Mobile Network (PLMN) is known as Wireless Intelligent Networks (WIN). The basis behind Intelligent Networks is splitting service intelligence from the switching and calling control functions of telecommunication networks and unifying it. Specific resource capabilities, such as text-to-speech conversion can also be incorporated for greater efficiency and cost savings. Additionally, by regulating the interfaces for

Communicating between the elements, one could mix and match elements from numerous network equipment dealers, thus providing elasticity and organization choices to the service providers and carriers. WIN has solved at least the two problems such as opening the networks and multi-standard compatibility.

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