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Yang

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(54) **METHOD FOR SEPARATING AND PROCESSING SIGNAL AND BEARER IN ALL IP RADIO ACCESS NETWORK**

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(73) Assignee: **Yamazaki Holdings, LLC**, Wilmington, DE (US)

(21) Appl. No.: **12/288,314**

(22) Filed: **Oct. 17, 2008**

Related U.S. Patent Documents

Reissue of:

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Issued: **Oct. 17, 2006**
Appl. No.: **09/863,483**
Filed: **May 23, 2001**

(30) **Foreign Application Priority Data**

Aug. 21, 2000 (KR) 2000-48434

(51) **Int. Cl.**
H04W 4/00 (2009.01)

(52) **U.S. Cl.**
USPC **370/328**; 370/338; 370/352

(58) **Field of Classification Search**
USPC 370/328, 338, 352
See application file for complete search history.

(56) **References Cited**

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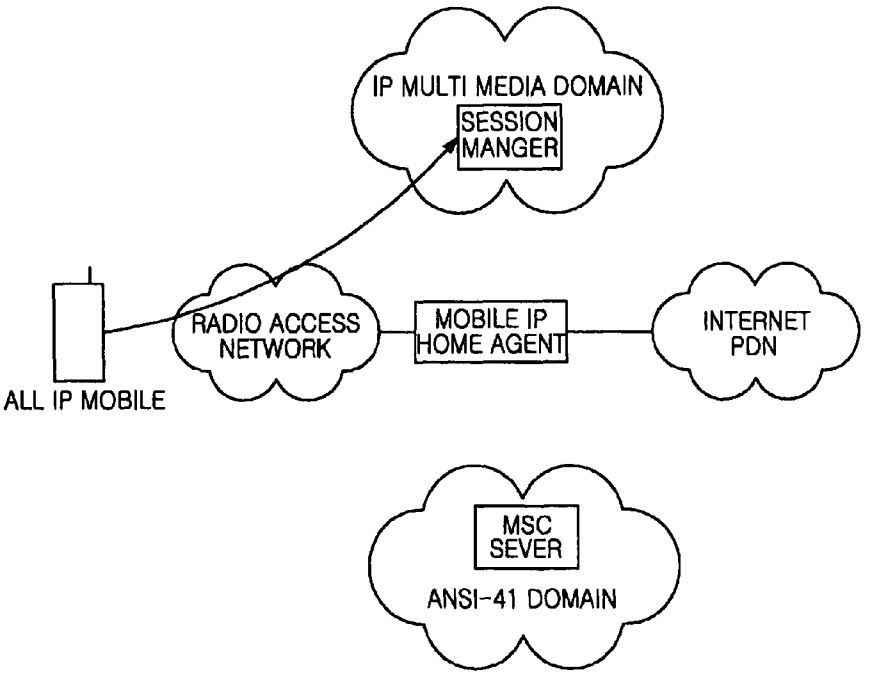
Primary Examiner — Andrew Chriss
Assistant Examiner — Mohammad Anwar

(57) **ABSTRACT**

A method for processing a signal and a bearer separately in an ALL IP network system includes the steps of: transmitting a service request message (SRM) from a mobile station (MS) to a radio network (RN); at the RN, determining whether a circuit related service or a packet related service is requested; if the circuit related service is requested: (i) transmitting a CM service request message to a MSC server, (ii) receiving a service request acknowledgement (SRA) message from the MSC server, and (iii) assigning a bearer in response to the SRA message; and if the packet-related service is requested: (i) transmitting the (SRM) from the RN to a core network without processing the SRM; (ii) at the core network, processing the SRM and transmitting an assignment request to the RN, the assignment request requesting that the RN assign the bearer; and (iii) assigning the bearer in response to the assignment request.

19 Claims, 6 Drawing Sheets



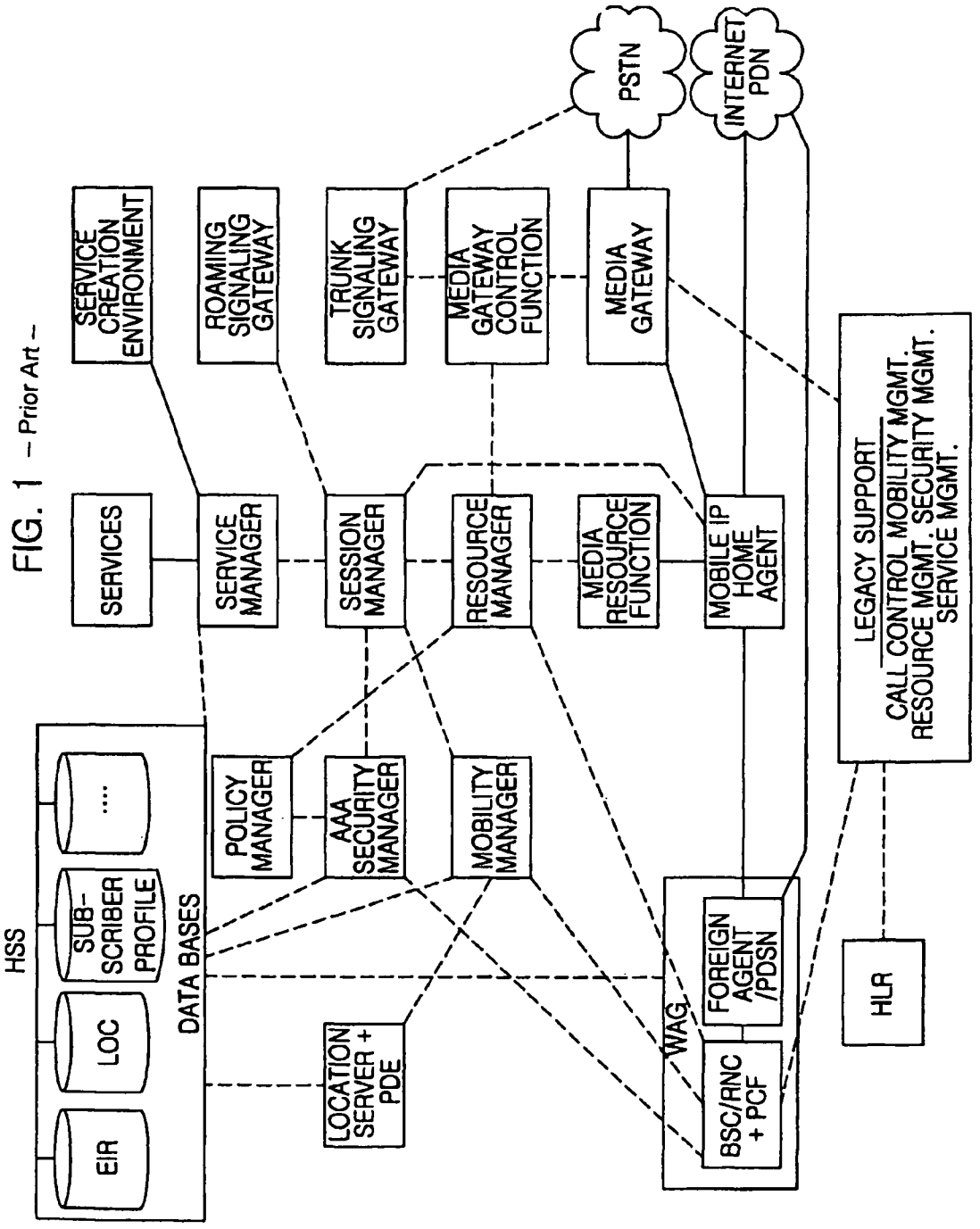
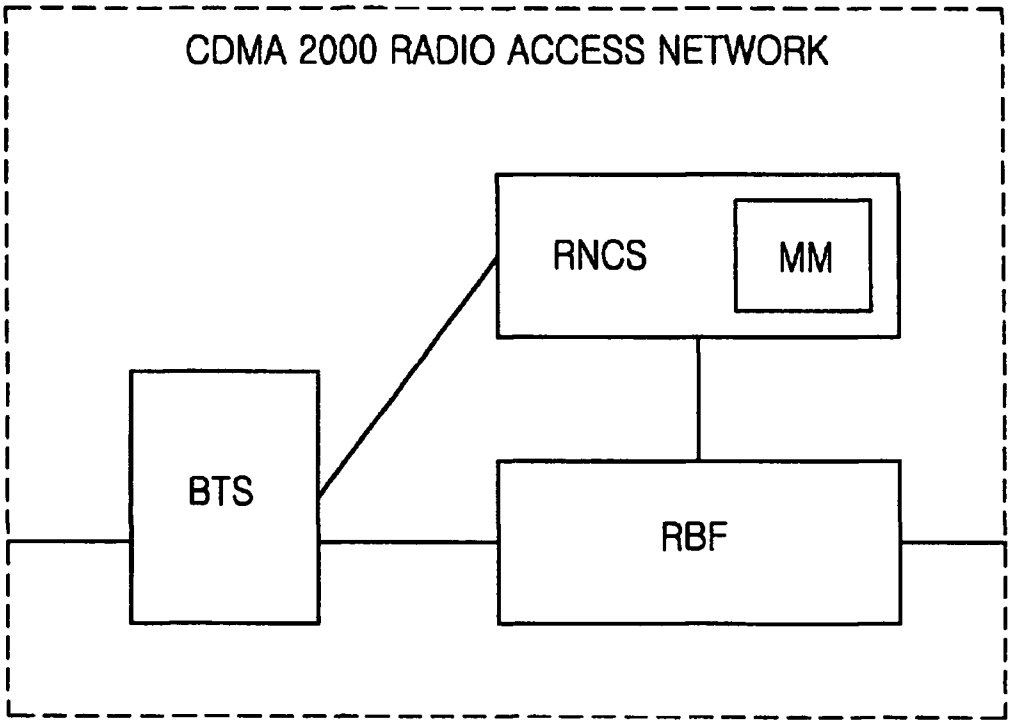


FIG. 1 – Prior Art –

FIG. 2



RNCS : RADIO NETWORK CONTROL SYSTEM
RBF : RADIO BEARER FUNCTION
MM : MOBILITY MANAGEMENT

FIG. 3

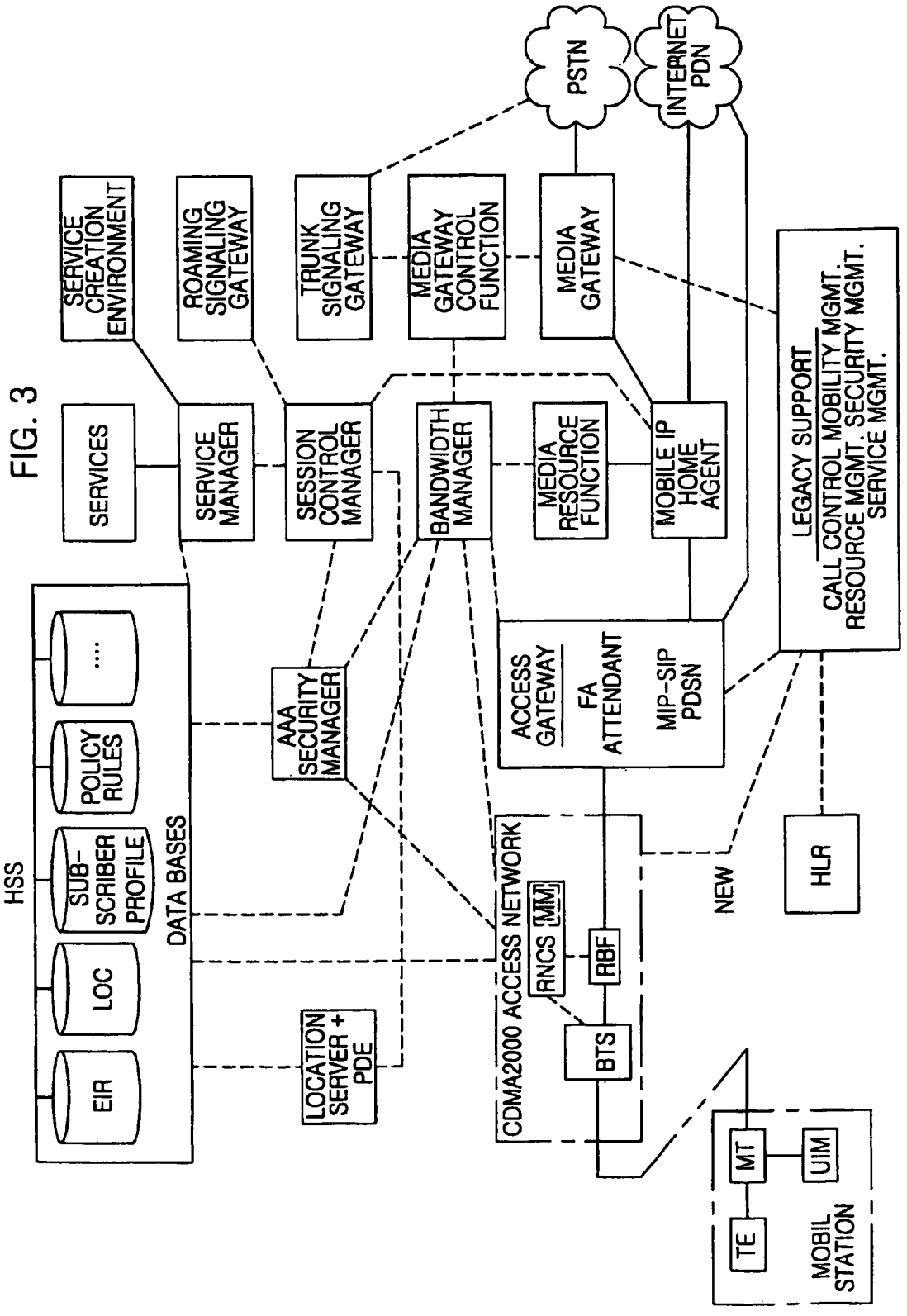

PSTN
INTERNET PDN
SERVICE CREATION ENVIRONMENT
ROAMING SIGNALING GATEWAY
TRUNK SIGNALING GATEWAY
MEDIA GATEWAY CONTROL FUNCTION
MEDIA GATEWAY
SERVICES
SERVICE MANAGER
SESSION CONTROL MANAGER
BANDWIDTH MANAGER
MEDIA RESOURCE FUNCTION
MOBILE IP HOME AGENT
LEGACY SUPPORT
CALL CONTROL MOBILITY MGMT.
RESOURCE MGMT. SECURITY MGMT.
SERVICE MGMT.
HSS
DATA BASES
....
POLICY RULES
SUB-SCRIBER PROFILE
LOC
EIR
AAA SECURITY MANAGER
ACCESS GATEWAY
FA
ATTENDANT
MIP-SIP PDSN
NEW
HLR
CDMA2000 ACCESS NETWORK
RNCS
MM
RBF
BTS
LOCATION SERVER + PDE
MOBIL STATION
TE
MT
UIM

FIG. 4

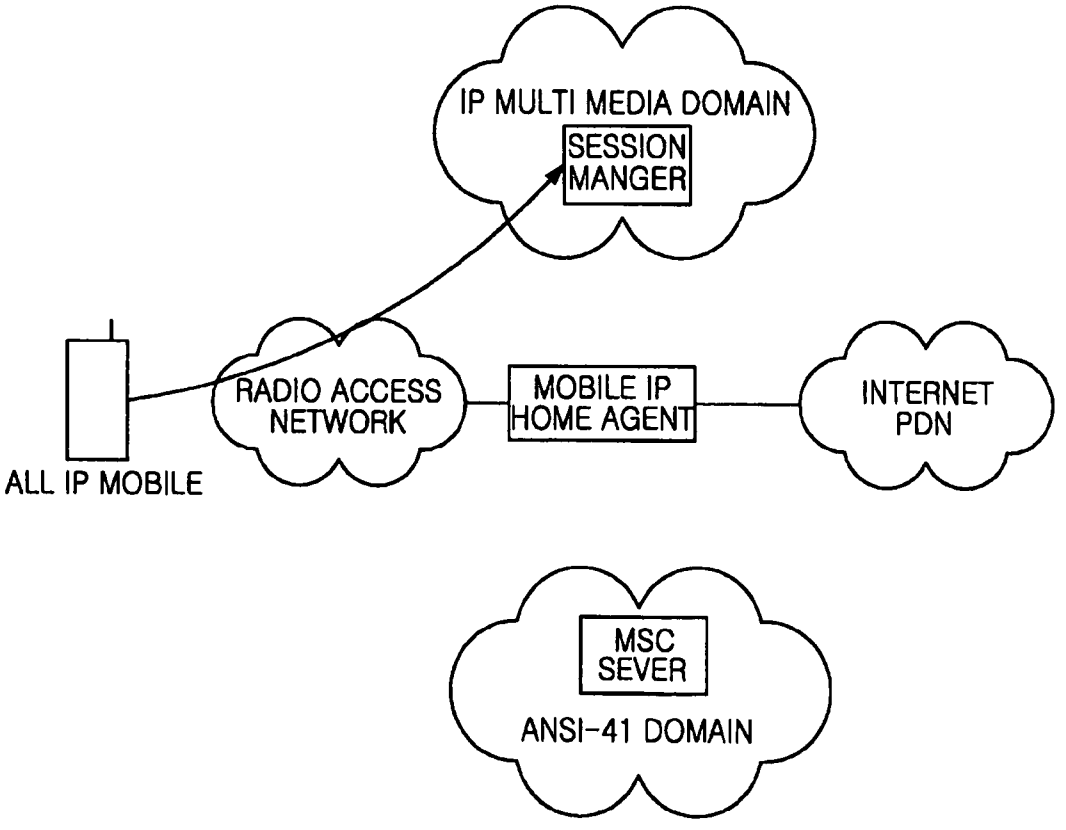

IP MULTI MEDIA DOMAIN
SESSION MANGER
RADIO ACCESS NETWORK
MOBILE IP HOME AGENT
INTERNET PDN
ALL IP MOBILE
MSC SEVER
ANSI-41 DOMAIN

FIG. 5

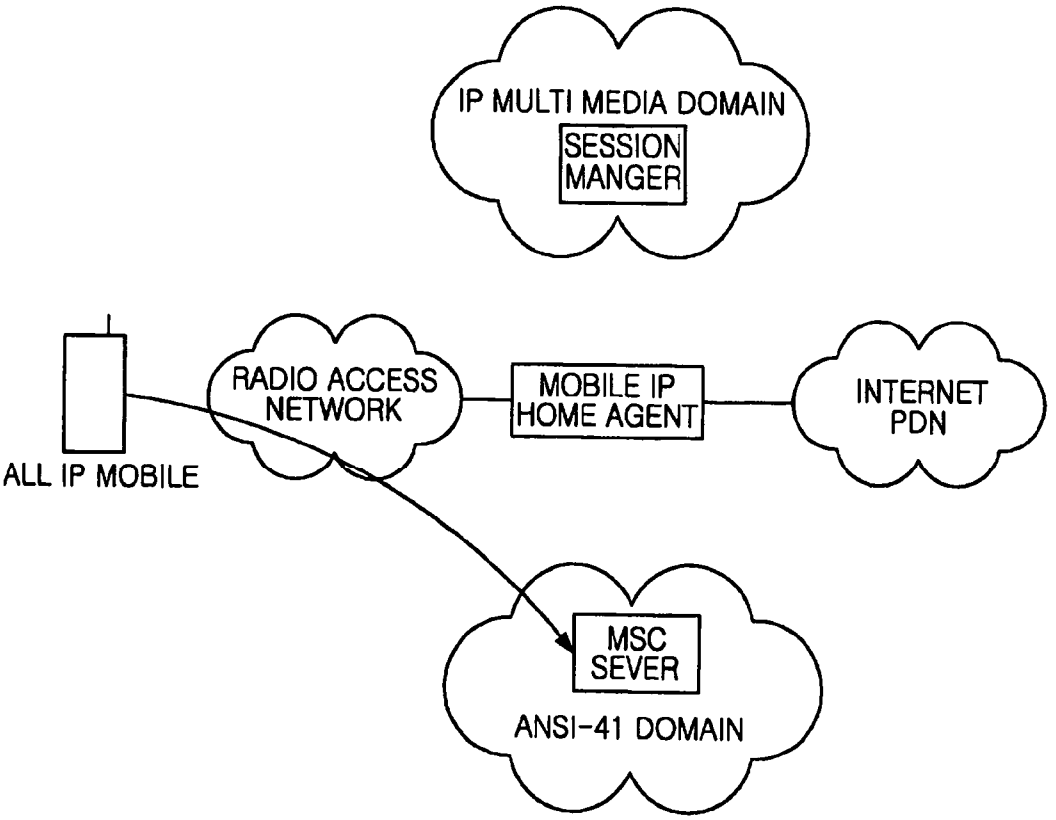
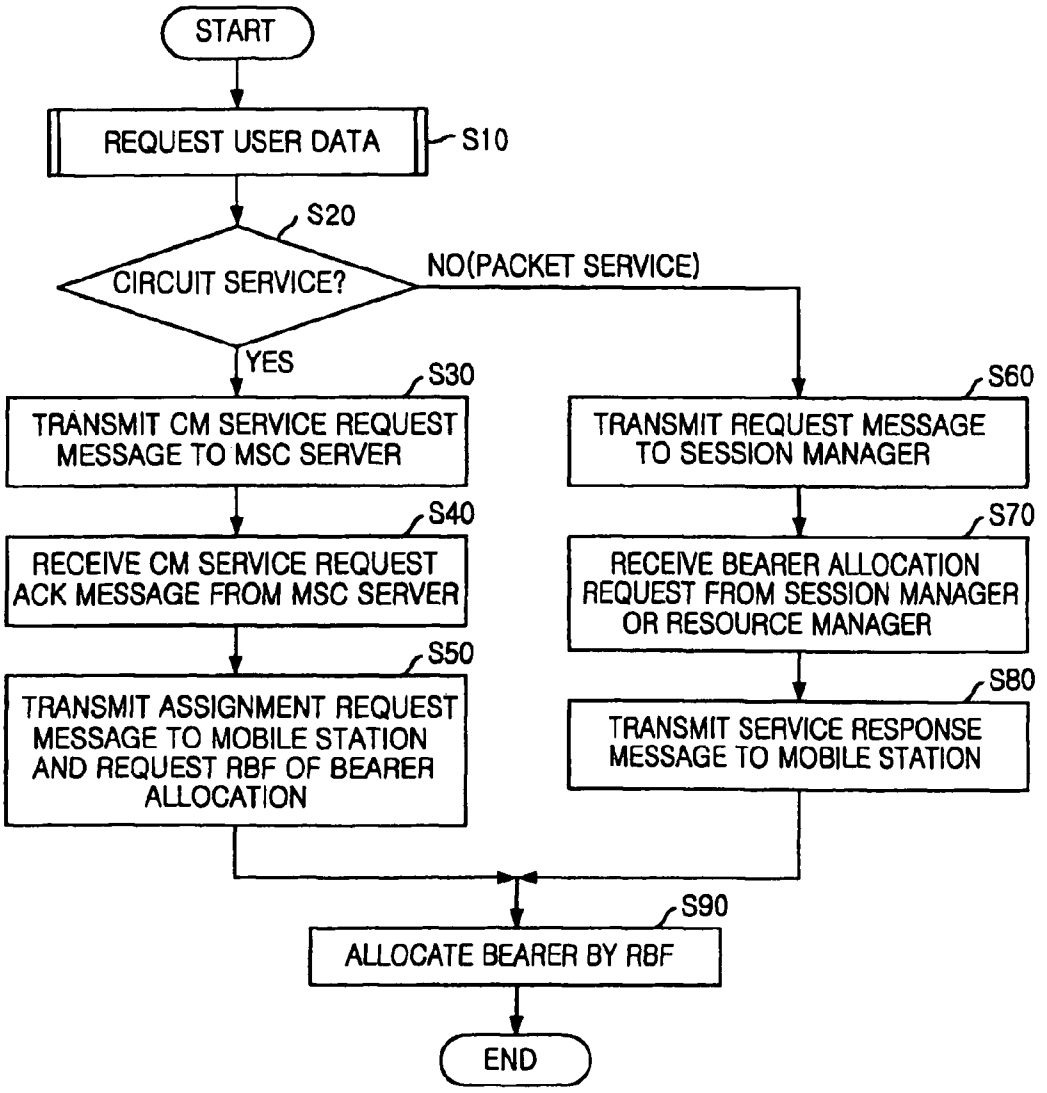

IP MULTI MEDIA DOMAIN
SESSION MANGER
RADIO ACCESS NETWORK
MOBILE IP HOME AGENT
INTERNET PDN
ALL IP MOBILE
MSC SEVER
ANSI-41 DOMAIN

FIG. 6


START
REQUEST USER DATA
S10
S20
CIRCUIT SERVICE?
NO(PACKET SERVICE)
YES
S30
TRANSMIT CM SERVICE REQUEST MESSAGE TO MSC SERVER
S40
RECEIVE CM SERVICE REQUEST ACK MESSAGE FROM MSC SERVER
S50
TRANSMIT ASSIGNMENT REQUEST MESSAGE TO MOBILE STATION AND REQUEST RBF OF BEARER ALLOCATION
S60
TRANSMIT REQUEST MESSAGE TO SESSION MANAGER
S70
RECEIVE BEARER ALLOCATION REQUEST FROM SESSION MANAGER OR RESOURCE MANAGER
S80
TRANSMIT SERVICE RESPONSE MESSAGE TO MOBILE STATION
S90
ALLOCATE BEARER BY RBF
END

METHOD FOR SEPARATING AND PROCESSING SIGNAL AND BEARER IN ALL IP RADIO ACCESS NETWORK

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application is a reissue of U.S. patent application Ser. No. 09/863,483 (now U.S. Pat. No. 7,123,594), filed May 23, 2001, which claims priority to Korean Pat. App. No. 200048434, filed Aug. 21, 2000, both of which are hereby incorporated by reference.

FIELD OF THE INVENTION

This invention relates to an ALL IP radio access network; and more particularly, to a method for separating and processing a signal and a bearer in an ALL IP radio access network.

DESCRIPTION OF THE ART

These days, it is under detailed discussion at international standardization conferences, such as 3GPP and 3GPP2 conferences, that an entire network of a 3G system is to be configured as an ALL IP network based on IP (IP=Internet Protocol).

The ALL IP network is based on a Mobile IP of an IETF (IETF=International Engineering Task Force). In the Mobile IP case, a two-tier address system is adopted for an address conversion technique at the IP layer. In other words, a first address is a COA (COA=care-of address) that is used for path assignment and for transferring data. A second address is a home address that is a unique home address of a mobile host and is used for identifying the mobile host and for session connection.

A unique Internet address called a home address is assigned to a mobile station for the ALL IP network, wherein the unique Internet address corresponds to a host name, similar to the case of an existing fixed host. Also, the mobile station for the ALL IP network has a COA (care-of address) as a packet transfer point, wherein the COA gets changed as the mobile station for the ALL IP network moves between networks. At the present time, the IETF defines three components for mobile IP service: a mobile node, an HA (HA=home agent) and an FA (FA=foreign agent), as described below.

The mobile node is operated as a host or route that supports a mobile service. The mobile node is able to move between networks without modifying an IP address thereof and also communicate continuously with other nodes of the internet by a fixed IP address thereof.

The HA (home agent) is an agent included in a home network of a mobile node, wherein the home network manages a current COA (care-of address) and a home address of the mobile node. The HA (home agent) performs a tunneling function in order to transfer a datagram addressed to the mobile node to a network to which the mobile node is currently attached when the mobile node is in an external (or foreign) network.

The FA (foreign agent) is an agent assigning the COA (care-of address) when the mobile node is in the external network. The FA can assign an IP address as a COA or a temporary IP address to the mobile node. The FA provides a routing service for any mobile node when the mobile node moves into a service area covered by the FA. After performing a detunneling function on a datagram that was tunneled from an HA of the mobile node, the FA transfers the datagram to the mobile node. The FA also provides a gateway service for datagrams transmitted from the mobile node.

A standard model being used in ALL IP networks defines an IPMM (IPMM=IP multi-media) domain and an ANSI-41 domain (ANSI=American National Standards Institute) for a core network. Here the IPMM domain is used for a packet service and the ANSI-41 domain is used for an existing circuit service. Protocols for the IPMM domain are based on Mobile IP, the Session Initiation Protocol (SIP) or the like. Protocols for the ANSI-41 domain are based on IS-2000, IOS, ANSI-41 or the like.

According to a model being currently used, a single entity performs processing of a signal and a bearer in a radio network as shown in FIG. **1**. However, this model can be unsuitable for development into an open type structure.

Currently, a message that a mobile station sends to request a connection is transmitted to an MSC (MSC=mobile switching center) via a BSC (BSC=base station controller) according to IS-2000. A currently-operating BSC includes one entity for controlling a call-related signal and a bearer of user data and for providing a path.

As a currently operating network evolves into an ALL IP network, it is required to control and manage a new service and new user data. To do so, a core network is classified into the ANSI-41 domain for the existing service and the IPMM (IP multi-media) domain. The IPMM domain provides the new service and an internet-based service.

Accordingly, it is required to configure the BSC to include a signal-related entity and a bearer related entity to process the signal and the bearer separately.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a method for separating and processing a signal and a bearer in an ALL IP radio access network and computer-readable recording media storing instructions for performing the method to perform a flexible configuration of a radio network based on IP.

In accordance with an aspect of the present invention, there is provided a method for processing a signal and a bearer separately in an ALL IP network system including one or more mobile stations, one or more radio networks and one or more core networks, the method including the steps of: transmitting a service request message from a mobile station to a radio network; at the radio network, determining whether a circuit-related service or a packet-related service is requested; if the circuit-related service is requested: (i) transmitting a CM service request message to a mobile switching center (MSC) server, (ii) receiving a service request acknowledgement message from the MSC server, and (iii) assigning a bearer in response to the service request acknowledgement message; and if the packet-related service is requested: (i)transmitting the service request message from the radio network to a core network without processing the service request message; (ii) at the core network, processing the service request message and transmitting an assignment request to the radio network, the assignment request requesting that the radio network assign a bearer for user data; and (iii) assigning the bearer in response to the assignment request.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects and aspects of the invention will become apparent from the following description of the embodiments with reference to the accompanying drawings, in which:

FIG. **1** shows a configuration of an ALL IP network;

FIG. **2** shows a configuration of a radio network in which a signal and a bearer are separated in accordance with the present invention;

FIG. **3** shows a configuration of an ALL IP network including a radio access network (RAN) shown in FIG. **2**;

FIG. **4** shows a signaling message flow for a packet service;

FIG. **5** shows a signaling message flow for a circuit service; and

FIG. **6** is a flow chart illustrating a method for separating and processing a signal and a bearer in an ALL IP radio access network in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. **1** is a simplified block diagram of an exemplary radio network known in the prior art. As shown in FIG. **1**, the radio network includes databases, a policy manager, a AAA security manager, a mobility manager, a location server, a service creation environment, a roaming signaling gateway, a trunk signaling gateway, a media gateway control function, a media gateway, a PSTN, a PDN, a service manager, a session manager, a resource manager, a media resource, a media resource function, a HLR, and a mobile IP home agent.

FIG. **2** shows a configuration of a radio network in which a signal and a bearer are separated.

As shown in FIG. **2**, a RAN (RAN=radio access network) includes a first entity for processing a signal or the like, a second entity for providing a path related to a user data process and a base transceiver station (BTS) that is directly coupled to a mobile station (MS).

FIG. **2** is a simplified block diagram of an exemplary CDMA2000 Radio Access Network which comprises a radio network control system (RNCS), a radio bearer function (RBF) and a mobility management (MM).

FIG. **3** is a schematic diagram illustrating an ALL IP network including a radio access network (RAN) shown in FIG. **2**.

FIG. **3** includes the CDMA2000 Access network of FIG. **2** in the radio network of FIG. **1**.

FIG. **4** shows a signaling message flow for a packet service.

FIG. **4** comprises an ALL IP mobile, a radio access network, a session manager which is part of an IP multimedia domain, a mobile IP home agent, an internet PDN, and an MSC server which is part of the ANSI-41 domain. As shown in FIG. **4**, the ALL IP mobile communicates with the session manager of the IP multi-media domain.

FIG. **5** shows a signaling message flow for a circuit service.

FIG. **5** comprises an ALL IP mobile, a radio access network, a session manager which is part of an IP multimedia domain, a mobile IP home agent, an internet PDN, and an MSC server which is part of the ANSI-41 domain. As shown in FIG. **5**, the ALL IP mobile communicates with MSC server.

Referring to FIGS. **4** and **5**, the mobile station performs a Signaling suitable for the packet or the circuit services in order to transmit user data. A RNCS (RNCS=radio network control system) of a RAN (radio access network) performs a corresponding function in response to a request of the mobile station. Here, the mobile station is assumed to be a dual mode mobile station where an existing circuit and a packet services are possible to provide.

FIG. **6** is a flow chart illustrating a method for separating and processing a signal and a bearer in an ALL IP radio access network in accordance with the present invention.

At the step S**10**, a service request of a user is received in a message form from a mobile station.

At the step S**20**, an RNCS (radio network control system) of a RAN (radio access network) determines whether a first message related to a circuit service or a second message related to a packet service is received.

There are a plurality of methods for service determination. Herein is provided a method for the determination using an address of a TCP/IP header. In other words, since the packet service message is transmitted to a session manager of a core network, the address of the TCP/IP header has an address of the session manager. On the contrary, since the circuit service message is transmitted to an MSC (MSC=mobile switching center) server of the core network, the address of the TCP/IP header has an address of the MSC server.

If the first (circuit service) message is received, at the step S**30**, the RNCS of the RAN transmits a CM service request message to the MSC server, wherein the CM service request message is generated in an IOS message form.

At the step S**40**, the MSC receives and processes the CM service request message and then transmits a CM service request Ack message to the RNCS.

At the step **550**, after receiving the CM service request Ack message, the RNCS transmits an assignment request message to the mobile station in order to assign a radio channel and then transmits a bearer assignment request message to an RBF unit (RBF=radio bearer function) in order to assign a bearer for transmitting user data.

If the second (packet service) message is received, at the step S**60**, the RNCS transmits the second message to the session manager of the core network without any message processing.

At the step S**70**, the session manager or a resource manager of the core network processes the second message and then requests that the RNCS assign the bearer for processing the user data.

At the step S**80**, the RNCS transmits a response message related to the service request to the mobile station and then transmits the bearer assignment request message to the RBF unit in order to assign the bearer for transmitting the user data.

At the step S**90**, after receiving the bearer assignment request message from the RNCS, the RBF assigns the bearer.

In accordance with the present invention, there is an effect that a signal and a bearer are separated and processed in a RAN system of an ALL IP network to thereby facilitate network configuration of an open type structure, increase extension capability of each system and perform a flexible configuration of a network based on IP.

Although the preferred embodiments of the invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions, and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

What is claimed is:

1. A method for processing a signal and a bearer separately in an ALL IP network system including one or more mobile stations, one or more radio networks and one or more core networks, the method comprising the steps of:

a) transmitting a service request message from a mobile station to a radio network;

b) at the radio network, determining whether a circuit related service or a packet-related service is requested;

c) if the circuit related service is requested:

(i) transmitting a connection management (CM) service request message to a mobile switching center (MSC) server;

(ii) receiving a service request acknowledgement message from the MSC server; and

(iii) assigning a bearer in response to the service request acknowledgement message; and

d) if the packet-related service is requested:

(i) transmitting the service request message from the radio network to a core network without processing the service request message;

(ii) at the core network, processing the service request message and transmitting an assignment request to the radio network, the assignment request requesting that the radio network assign a bearer for user data; and

(iii) assigning the bearer in response to the assignment request.

2. The method as recited in claim **1**, wherein the radio network includes a radio network control system (RNCS) and a radio bearer function (RBF) unit, the RBF unit performing bearer assignment.

3. The method as recited in claim **2**, wherein the core network includes the MSC server and a session manager, the session manager managing a packet-related message.

4. The method as recited in claim **3**, wherein whether the circuit-related service or the packet related service is requested is determined by reading an address of a TCP/IP header allocated to each service request message.

5. The method as recited in claim **4**, wherein if the address of the TCP/IP header has an address of the session manager, it is determined that the packet-related service is requested.

6. The method as recited in claim **5**, wherein the step d)(iii) includes the steps of:

(A) transmitting a response message related to the service request from the RNCS to the mobile station;

(B) at the RNCS, requesting that the RBF unit assign the bearer; and

(C) at the RBF unit, assigning the bearer.

7. **[**Computer-readable recording media storing instructions for performing a method for processing a signal and a bearer separately in an ALL IP network system including one or more mobile stations, one or more radio networks and one or more core networks, the method comprising the steps of**]** *A non-transitory computer-readable medium having instructions stored thereon, that upon execution by a computing device cause the computing device to perform operations comprising*:

a) transmitting a service request message from a mobile station to a radio network;

b) at the radio network, determining whether a circuit-related service or a packet-related service is requested;

c) if the circuit related service is requested:

(i) transmitting a connection management (CM) service request message to a mobile switching center (MSC) server;

(ii) receiving a service request acknowledgement message from the MSC server; and

(iii) assigning a bearer in response to the service request acknowledgement message; and

d) if the packet-related service is requested:

(i) transmitting the service request message from the radio network to a core network without processing the service request message;

(ii) at the core network, processing the service request message and transmitting an assignment request to the radio network, the assignment request requesting that the radio network assign a bearer for user data; and

(iii) assigning the bearer in response to the assignment request.

8. The *non-transitory* computer-readable **[**recording media**]** *medium* as recited in claim **7**, wherein the step d)(iii) includes the steps of:

(A) transmitting a response message related to the service request from a radio network control system (RNCS) to the mobile station;

(B) at the RNCS, requesting that a radio bearer function (RBF) unit assign the bearer; and

(C) at the RBF unit, assigning the bearer.

9. An apparatus for processing a signal and a bearer separately in an ALL IP network system, the apparatus comprising:

a memory configured to store computer-readable instructions; and

a computing device configured to execute the computer-readable instructions to:

receive a service request message from a mobile station;

determine whether a circuit-related service or a packet related service is requested;

if the circuit-related service is requested:

transmit a connection management (CM) service request message to a mobile switching center (MSC) server;

receive a service request acknowledgement message from the MSC server; and

assign a bearer in response to the service request acknowledgement message; and

if the packet-related service is requested:

transmit a second service request message to a core network without processing the second service request message;

receive an assignment request message from the core network, wherein the assignment request message requests that a radio network control system assign the bearer in response to processing of the second service request message by the core network; and

transmit a request to assign the bearer in response to the assignment request, wherein the bearer is assigned by a radio network element serving a radio bearer function.

10. The apparatus of claim 9, wherein the apparatus is an element of a radio network configured to communication with mobile devices.

11. The apparatus of claim 9, wherein the computing device is further configured to execute the computer-readable instructions to determined whether the circuit related service or the packet-related service is requested by reading an address of a TCP/IP header allocated to each service request message.

12. The apparatus of claim 11, wherein if the address of the TCP/IP header has an address of a session manager of the core network, it is determined that the packet-related service is requested.

13. The apparatus of claim 12, wherein the computing device is further configured to execute the computer-readable instructions to transmit a response message related to the service request to the mobile station.

14. A method comprising:

receiving a service request message from a mobile station at a radio network control system;

at the radio network control system, determining whether a circuit-related service or a packet related service is requested;

if the circuit-related service is requested:

transmitting a connection management (CM) service request message to a mobile switching center (MSC) server from the radio network control system;

receiving a service request acknowledgement message at the radio network control system from the MSC server; and

assigning, at the radio network control system, a bearer in response to the service request acknowledgement message; and

if the packet-related service is requested:

transmitting a second service request message from the radio network control system to a core network without processing the second service request message;

receiving an assignment request message at the radio network control system from the core network, wherein the assignment request message requests that the radio network control system assign the bearer in response to processing of the second service request message by the core network; and

transmitting a request from the network control system to assign the bearer in response to the assignment request, wherein the bearer is assigned by a radio network element serving a radio bearer function.

15. The method of claim 14, wherein the core network includes the MSC server and a session manager configured to manage a packet-related message.

16. The method of claim 14, wherein whether the circuit related service or the packet-related service is requested is determined by reading an address of a TCP/IP header allocated to each service request message.

17. The method of claim 16, wherein if the address of the TCP/IP header has an address of a session manager of the core network, it is determined that the packet-related service is requested.

18. The method of claim 14, further comprising transmitting a response message related to the service request from the RNCS to the mobile station.

19. A non-transitory computer-readable medium having instructions stored thereon, the instructions comprising:

instructions to receive a service request message from a mobile station;

instructions to determine whether a circuit-related service or a packet related service is requested;

instructions to, if the circuit-related service is requested:

transmit a connection management (CM) service request message to a mobile switching center (MSC) server;

receive a service request acknowledgement message from the MSC server; and

assign a bearer in response to the service request acknowledgement message; and

instructions to, if the packet-related service is requested:

transmit a second service request message from a radio network to a core network without processing the second service request message;

receive an assignment request message from the core network, wherein the assignment request message requests that the radio network assign the bearer in response to processing of the second service request message by the core network; and

transmit a request to assign the bearer in response to the assignment request, wherein the bearer is assigned by a radio network element serving a radio bearer function.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : RE44,243 E
APPLICATION NO. : 12/288314
DATED : May 28, 2013
INVENTOR(S) : Yan

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the title page, item (57), under "ABSTRACT", in Column 2, Line 5, delete "circuit related service or a packet related service" and insert -- circuit-related service or a packet-related service --, therefor.

On the title page, item (57), under "ABSTRACT", in Column 2, Line 6, delete "if the circuit related" and insert -- if the circuit-related --, therefor.

On the title page, item (57), under "ABSTRACT", in Column 2, Line 11, delete "(SRM)" and insert -- SRM --, therefor.

On the title page, in the Figure, delete "MSC SEVER" and insert -- MSC SERVER --, therefor.

In the Drawings

In Fig. 3, Sheet 3 of 6, delete "MOBIL STATION" and insert -- MOBILE STATION --, therefor as shown on the attached page.

In Fig. 4, Sheet 4 of 6, delete "MSC SEVER" and insert -- MSC SERVER --, therefor as shown on the attached page.

In Fig. 5, Sheet 5 of 6, delete "MSC SEVER" and insert -- MSC SERVER --, therefor as shown on the attached page.

In the Specification

In Column 1, Line 26, delete "DESCRIPTION OF THE ART" and insert -- DESCRIPTION OF THE PRIOR ART --, therefor.

Signed and Sealed this
Thirteenth Day of May, 2014

Michelle K. Lee

Michelle K. Lee
Deputy Director of the United States Patent and Trademark Office

In Column 1, Line 52, delete "route" and insert -- router --, therefor.

In Column 2, Line 11, delete "Here" and insert -- Here, --, therefor.

In Column 2, Line 60, delete "(i)transmitting" and insert -- (i) transmitting --, therefor.

In Column 3, Line 61, delete "Signaling" and insert -- signaling --, therefor.

In Column 4, Line 28, delete "550," and insert -- S50, --, therefor.

In the Claims

In Column 5, Lines 1-2, in Claim 1, delete "circuit related" and insert -- circuit-related --, therefor.

In Column 5, Line 3, in Claim 1, delete "circuit related" and insert -- circuit-related --, therefor.

In Column 5, Line 30, in Claim 4, delete "packet related" and insert -- packet-related --, therefor.

In Column 5, Line 56, in Claim 7, delete "circuit related" and insert -- circuit-related --, therefor.

In Column 6, Lines 25-26, in Claim 9, delete "packet related" and insert -- packet-related --, therefor.

In Column 6, Line 53, in Claim 11, delete "determined" and insert -- determine --, therefor.

In Column 6, Line 53, in Claim 11, delete "circuit related" and insert -- circuit-related --, therefor.

In Column 7, Line 2, in Claim 14, delete "packet related" and insert -- packet-related --, therefor.

In Column 7, Lines 32-33, in Claim 16, delete "circuit related" and insert -- circuit-related --, therefor.

In Column 8, Line 12, in Claim 19, delete "packet related" and insert -- packet-related --, therefor.

(19) **United States**
(12) **Reissued Patent**
Yang

(10) **Patent Number: US RE44,243 E**
(45) **Date of Reissued Patent: May 28, 2013**

(54) **METHOD FOR SEPARATING AND PROCESSING SIGNAL AND BEARER IN ALL IP RADIO ACCESS NETWORK**

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(73) Assignee: **Yamazaki Holdings, LLC**, Wilmington, DE (US)

(21) Appl. No.: **12/288,314**

(22) Filed: **Oct. 17, 2008**

Related U.S. Patent Documents

Reissue of:

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Filed: **May 23, 2001**

(30) **Foreign Application Priority Data**

Aug. 21, 2000 (KR) 2000-48434

(51) **Int. Cl.**
H04W 4/00 (2009.01)

(52) **U.S. Cl.**
USPC **370/328**; 370/338; 370/352

(58) **Field of Classification Search**
USPC 370/328, 338, 352
See application file for complete search history.

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Primary Examiner — Andrew Chriss
Assistant Examiner — Mohammad Anwar

(57) **ABSTRACT**

A method for processing a signal and a bearer separately in an ALL IP network system includes the steps of: transmitting a service request message (SRM) from a mobile station (MS) to a radio network (RN); at the RN, determining whether a circuit related service or a packet related service is requested; if the circuit related service is requested: (i) transmitting a CM service request message to a MSC server, (ii) receiving a service request acknowledgement (SRA) message from the MSC server, and (iii) assigning a bearer in response to the SRA message; and if the packet-related service is requested: (i) transmitting the (SRM) from the RN to a core network without processing the SRM; (ii) at the core network, processing the SRM and transmitting an assignment request to the RN, the assignment request requesting that the RN assign the bearer; and (iii) assigning the bearer in response to the assignment request.

19 Claims, 6 Drawing Sheets

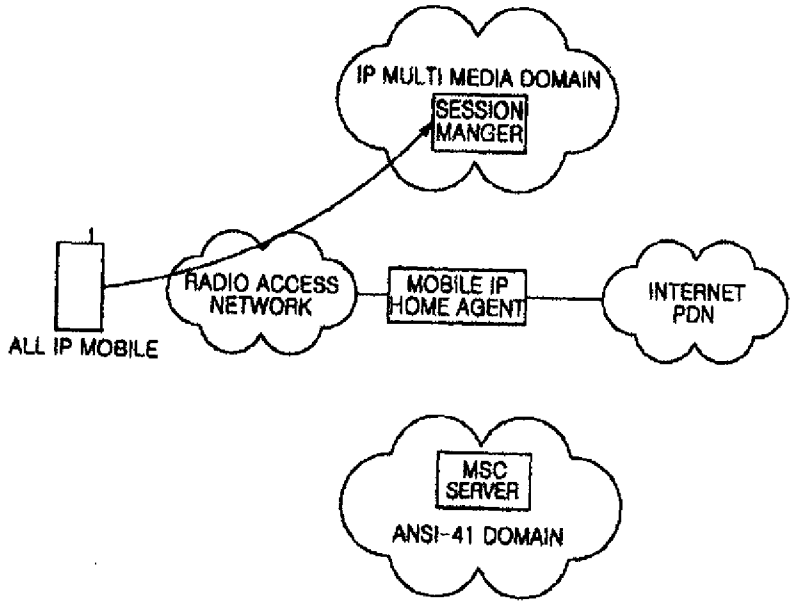


FIG. 3

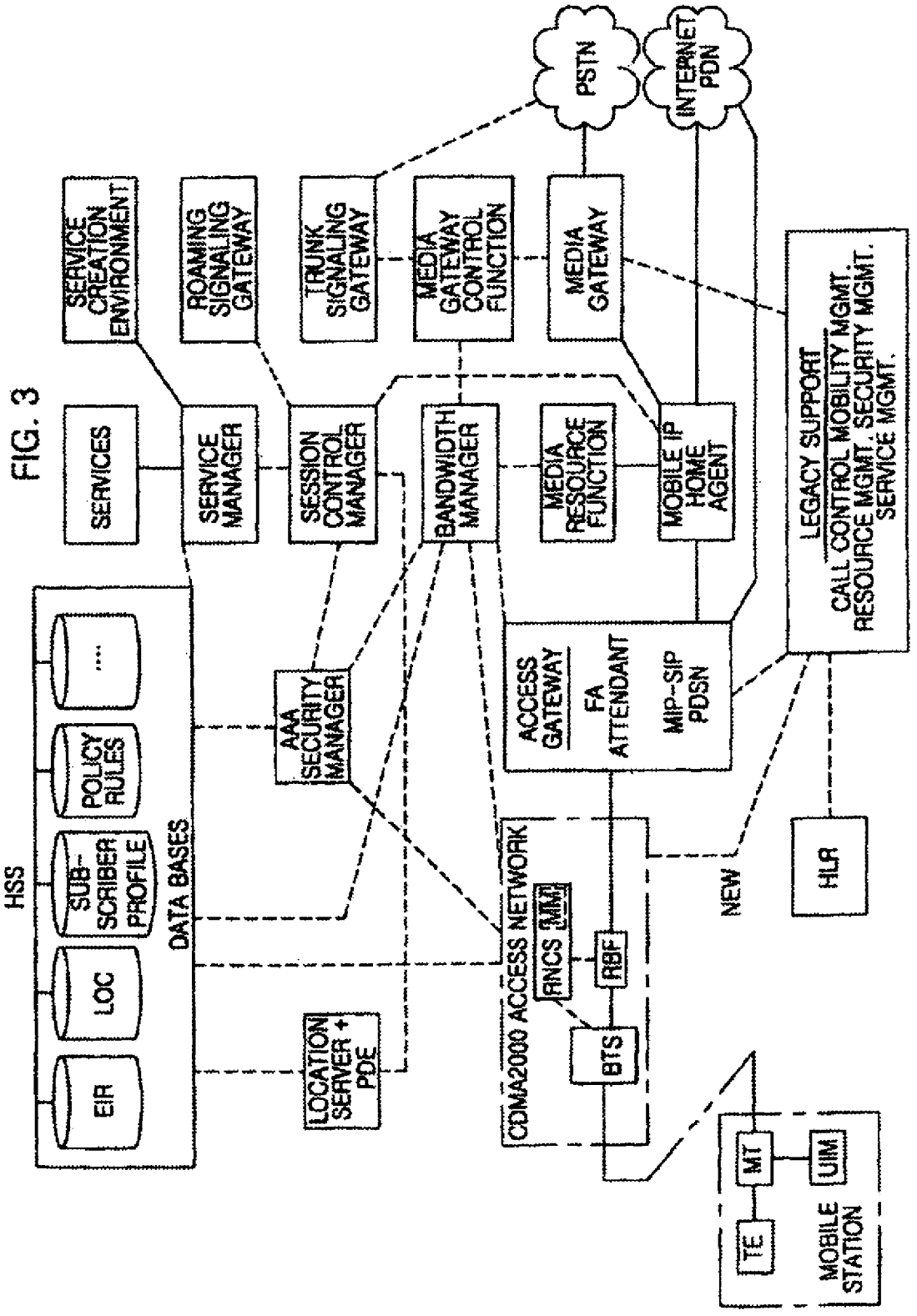

PSTN
INTERNET PDN
SERVICE CREATION ENVIRONMENT
ROAMING SIGNALING GATEWAY
TRUNK SIGNALING GATEWAY
MEDIA GATEWAY CONTROL FUNCTION
MEDIA GATEWAY
SERVICES
SERVICE MANAGER
SESSION CONTROL MANAGER
BANDWIDTH MANAGER
MEDIA RESOURCE FUNCTION
MOBILE IP HOME AGENT
LEGACY SUPPORT
CALL CONTROL MOBILITY MGMT.
RESOURCE MGMT. SECURITY MGMT.
SERVICE MGMT.
HSS
DATA BASES
....
POLICY RULES
SUB-SCRIBER PROFILE
LOC
EIR
AAA SECURITY MANAGER
LOCATION SERVER + PDE
ACCESS GATEWAY
FA ATTENDANT
MIP-SIP PDSN
CDMA2000 ACCESS NETWORK
RNCS
UIM
RBF
BTS
NEW
HLR
MT
UIM
TE
MOBILE STATION

FIG. 4

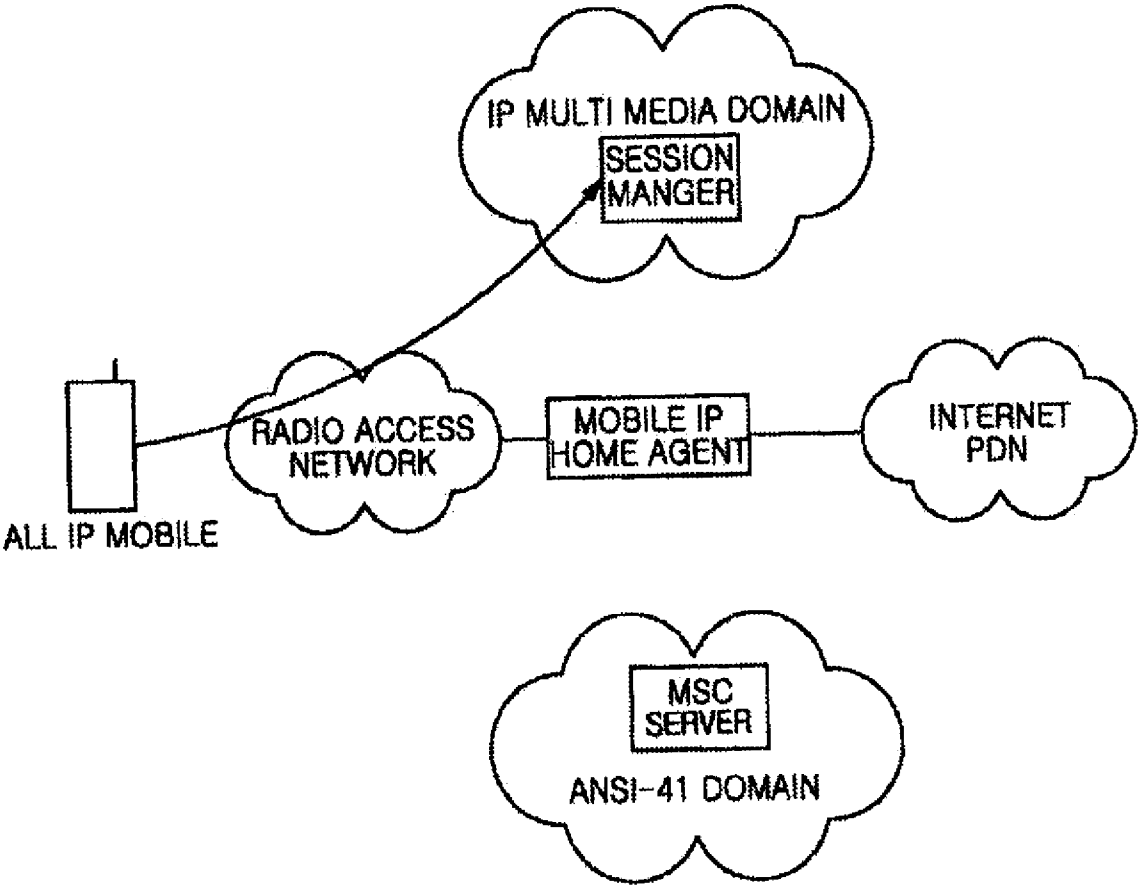
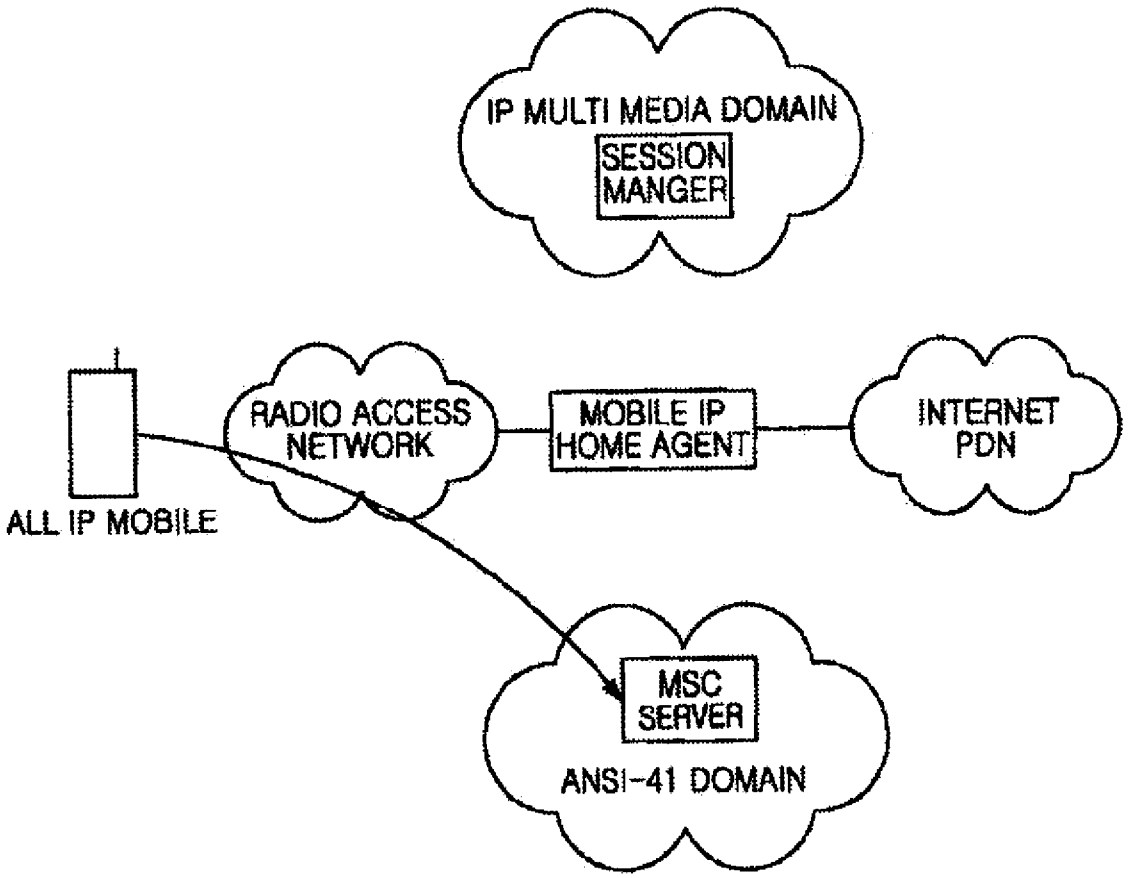

IP MULTI MEDIA DOMAIN
SESSION MANGER
RADIO ACCESS NETWORK
MOBILE IP HOME AGENT
INTERNET PDN
ALL IP MOBILE
MSC SERVER
ANSI-41 DOMAIN

FIG. 5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