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An end to end QOS Based network Extraction Scheme for 4G Systems

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ABSTRACT

In mobile communication systems, after 2G and 3G, the Fourth Generation (4G) was originally expected as ultra-high speed broadband wireless system. Exponential growth of user demands on a single convergence platform has brought researchers to explore various aspects/features of 4G Mobile Communication System. Rank based on distance function has been computed for various available services/access technologies, called networks. Weighted distance function is obtained based on multiple QoS parameters as per user needs. The proposed algorithm shows better results compared to single parameter based system, under a heterogeneous network system.

I.INTRODUCTION:

A final agreement on what features characterize 4G mobile system, is yet to be reached. Sharing the 4G objectives within research community is still open and lot of features and applications have been suggested by the researchers. Delivery of Services to users in different location, under different conditions with quality of service available in fixed environment, was some of the major issues [2]. The WWRF, aiming at defining features of "beyond 3G" wireless communications [3], the Japanese MIRAI project [4], the Mobile VCE, and several European IST projects (such as Daidalos, Magnet, Simplicity, Ambient Networks, etc.) are only a few examples of international groups devoted to 4G deployment.

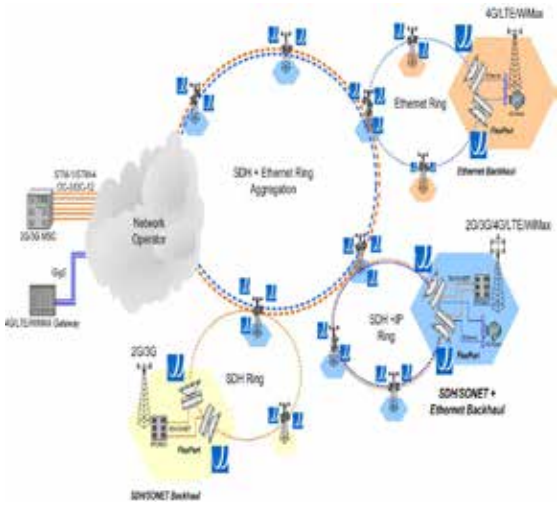

Fig: 4G Heterogeneous Network

Further, it will be worth mentioning that the 4G systems are expected to co-exist and inter-work with existing 2G and 3Gmobile communication systems as well as satellite, WLAN, and IEEE 802.16e networks, all interconnected through the service provider's IP backbone networks and the Internet as shown in Figure 1. This inter connected network has lead to the evolution of a new paradigm for future communications, namely "Always Best Connected" (ABC), in comparison to typical 2G and 3G concept of "Always Connected". In new paradigm shift [10], [11], [12] from "Always Connected" to "ABC", the user will always be connected through the best network, getting the benefit of the best service and access technology.

In such an environment, a terminal must be able to discover all networks that are available for use. A more challenging issue is to discover and select the best network whenever a In a user-centric environment, flexibility and ease-of-access at the user level are essential requirements for the people to adopt the new technology. 4G has been proposed to have both these features for network selection. In this paper, a multi-attribute algorithm for network selection is proposed for 4G systems.

II.OVERALL ARCHITECTURE

The QoS architecture combines a hierarchical organization of data-path network elements with off-path control functions. We consider a hierarchical network topology combined with strategic placement of QoS and mobility control entities allowing support of integrated QoS and mobility over networks.

To meet up the increasing demands of subscribers different generations of wireless communication from 1G to 4G are introduced. 1G was completely analog and used only for voice transmission where 2G networks were for voice services and slow data transmission. The cellular services combined with GPRS became 2.5G for WAP access, MMS and for Internet communication services [1]. Despite of these facilities 2G lacks single worldwide radio band standard as well as inefficient use of spectrum resources for burst data

3G networks offer users a wider range of more advanced services with greater network capacity, improved spectral efficiency, and greater degree of security than predecessors. This 3G allows simultaneous use of speech and data services and higher data rates [2]. However 3G does not provide mobility and service portability since it is based on primarily a wide-area concept. For this facility hybrid network is required. We need all digital packet networks that utilize IP in its fullest form with converged voice and data capability. And this great opportunity will be fulfilled by 4G wireless communications

Fourth Generation (4G) wireless technology, the 4G network combines the mobility you need from your cell phone with the speed you want from broadband. That means you have the same full internet experience you get at home while on the move. So go ahead and watch videos or download music with 4G you can do what you want, where you want.

In this paper we mainly deals with interoperability- the most important and special characteristic of 4G wireless communications. Section II describes the major and differentiating characteristics of 4G and the motivation for 4G other than 3G. Section III focuses how 4G based on layered modification provide interoperability. Section IV describes interoperability provided by long-term evolution

III. USER SELECTION PARAMETERS

The new concept, introduced by 4G, is based on the assumption that each user has his/her own requirements that are unique [13]. User also demands that the network selection should be as per his/her needs, even during the handoff process. The user need not specify his/her specific requirements at the time of handoff. The device must also be able to select the network that satisfies the current session's QoS requirements. Thus, a novel network discovery and selection mechanism must be provided. The proposed network selection algorithm works on the choice of the user specified QoS parameters. Since handoff must take place in order to provide continued service, the network selection is done intelligently out of the available options for the user. A dis-

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covery and selection mechanism to find a new Base Station (BS) must be done within the specified time. Hence, we also explore user specific performance parameters that are used in the network selection algorithm.

A.Service Cost: A user may be connected through one of the various available types of networks or service providers, which may have different billing schemes. Personalized network selection scheme asks the user about his willingness to pay more in monetary terms for high QoS requirements or choose for economical network or service provider.

B.Bandwidth Utilization: Based on the application to be performed, user may choose a service provider or network according to the maximum bandwidth offered. This preference of the user needs to be stored, because any degradation in the available effective bandwidth beyond a certain limit may result in handover of the user from one network to another.

C.Security: The subscriber performing a E-transaction requires high security. This preference of the user needs to be stored,so this proposed system enables the subscriber to latch to the network which provides high security. So it's highly advantageous to the subscribers performing the bank transactions specially.

D. Other network related parameters: Apart from the above parameters, the network selection depends on many other network related parameters such as, security level offered and area covered. A user interested in accessing a network to perform e-transaction would be more concerned about the level of security provided by the available networks. However, other user, moving frequently might give preference to the network which offers uniform signal strength and/or results in less number of handovers.

Based on the Applications which the user wants to use, the network is selected. The mobile device calculates the rank based on the input given by the user. The input can be voice, video call, security etc. As the number of parameters increases the complexity for the user to select the network also increases. So this algorithm helps the end user to resolve the complexity and select the best network available for his selected application.

IV.Algorithm:

Input: Rank lists α_1, α_2, α_3, α_n of m networks from the set N corresponding to each of the n parameters.

Output: an optimally ordered list N ().

Begin initialize

1: Sort respective lists α_1, α_2, α_3, α_n

2: Assign a position score for each network in each of the n lists.

3: For j = 1 to m

4: For x = 1 to n

5: $S_x(j)$ = the number of networks whose score of parameter x is ranked below j in α_x

6: end for

7: $N(j) = \sum_{x=1}^{n} S_x(j)$

8: end for

9: sort N (j) in decreasing order where j = 1 to m.

V.IMPLEMENTATION:

In our project, we are introducing the method to select optimal network. User can use more suitable network with various parameters. In this project, user can select particular services according to user need. After giving the input value, the device can analysis the service parameters and it ll provide result according to the network availability and different parameters.

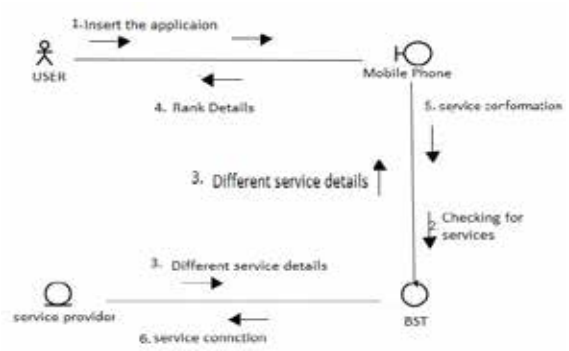

Fig: Flow Of Rank selection

In our model, device collects the information about network availability. The device will analyze the parameter when user giving specific input. After analyzing the parameter in various networks, device can select the optimal network.

This flow path is shown in pictures

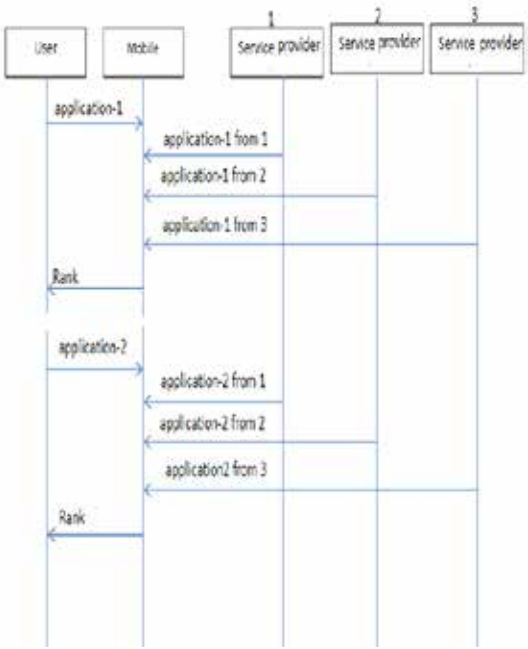

Fig: Choices available to the subscriber to select the network based on application

VI.CONCLUSIONS

The main contribution in this paper is applying an adaptive algorithm to the 4G network to improve QoS and security of the network without using any complex methods. As 4G system supports multi-mode and reconfigurable devices to support inter-working of heterogeneous networks. The algorithm selects appropriate network during handoff based on user preferences and interests. The user can opt for multiple QoS parameters like bandwidth, cost of service, security level, call drop probability etc. to select appropriate networks.

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