A Review of Improving Latency and QOS Using Various Vertical Handover Algorithm in MIH IEEE 802.21

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Abstract— Nowadays, everyone uses newly developed and quickly advancing technologies like 3GPP and UMTS. Finding the right neighbor access network when the mobile node is being handed over is crucial for implementing these technologies. We need changeover because a geographical region may have many networks (Wi-Fi, WIMAX, and UMTS) that are not very compatible in this heterogeneous environment. To choose the best network for the services, we utilize the Media Independent Information Service (MIIS) offered by IEEE802.21 MIH standards. The issues of handover are discussed in this study along with potential solutions. Finally, the ideal vertical handover solution is created out of several problems.

Keywords— Media Independent Handover,802.21

INTRODUCTION

The development of mobile communications in recent years, together with an exponential increase in their usage, The development of mobile communications in recent years has been accompanied by an exponential increase in the usage of the Internet for things like video conferencing, phone calls, and mobile TV. Building and operating multi-mode systems may become highly complex, but each entry machine has to be dealt directly and independently via the network's organizational structures. It becomes more worse when switching between multiple approaches since this requires a high level of organization across the specialized equipment. For this, the IEEE 802.21 work [1] enables mobility to and from 3G cellular networks. Although different from 802.x tools, cellular structure design offers a higher degree of intricacy. An exploratory software radio platform that offers a direct link between the IP protocol and the UMTS atmospheric border, and in that vein, provides an IP connectivity secure to that of the LTE form, provides cellular or global mobile terrestrial service access.

IEEE 802.21 [2] permits Media Independent Handovers (MIH). According to IEEE 802.21, a theoretical framework that provides information about link layer approaches to the top layers optimizes and improves parallel and perpendicular handovers.

After the purpose approach, technology is selected using a mobility decision algorithm, and MIH recommends the capability of executing the QoS resources, QoS materials are provided by MIH asking for the applicant approach technologies. The MIH structure must be able to set up QoS resources in the destination network prior to their motivation in order to ensure their accessibility for potential exertion because the time delay between the resource's uncertainty and stimulation might not be minimal and the network setting in the objective approach technology can change during this time. Additionally, the MIH design enables a seamless inter-technology handover process[2].

They demonstrate how IEEE 802.21's inclusive building design works. The intelligible diagram of the overall structure of the many nodes in the 802.21 network is shown in Figure 1. It shows a Mobile Node that is currently connected to the network via the 802 interface and has both 802 and 3GPP equipment.

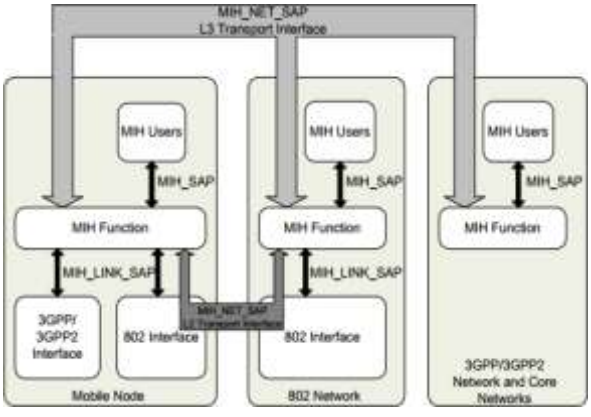

Figure 1: Framework of MIH (Media Independent Handover) [3]

A. All 802.21 compliant nodes have a common structure next to a middle substance called Media Independent Handover Function, as shown in the image. The MIHF is revealed as a layer that sits in between the upper and lower layers, and its main function is to manage the transfer of information and control among the many devices involved in obtaining handover results and enforcing the handovers. The Service Access Points (SAPs) are a group of specified service primitives that serve as the connectors between the MIHF and the extra operational substances, such as the MIHF users and the lower layers. The 802.21 standard includes a number of SAPs [3]: SAP MIH: This connection enables communication between MIHF layer users and users on higher MIHF layers.

B. MIH LINK SAP: This is the link between the protocol stack's lower levels and the MIHF layer.

MIH NET C SAP: It's an interface that prevents distant MIHF entities from using duplicate data.

It is beneficial for the MIH LINK SAP to complete all connections between the MIHF and lower levels. This SAP has been designed as a technology-neutral, media-independent user interface.

MIH SERVICES

A. *Media Independent Event Service*

This work will be used to discover the need for handovers [4]. For example, a sign that the link will intermission to convey MAC SDUs at some point soon. This decreases time interpreted to handover between attachment locations .

Table 1 is a subset of the recommended occurrences for the 802.21 event service [5]. Event 3 will supply higher layers with a prognostic mark of network demotion. Internally, 802.21 purposes signal determination as an indicator of approaching link failure

TABLE 1: 802.21 EVENT SERVICE – EVENT LIST [4]

Event Id	Event Type	Event Name	Description
1	State Change	Link Up	L2 connection has been established
2	State Change	Link Down	L2 connection has been broken
3	Predictive	Link Going Down	L2 connection loss is imminent

B. ***Media Independent Information Service***

A framework and supplementary tools are provided by Media Independent Information Service so that a MIHF person may identify and obtain network information that is present within a certain geographic area in order to forward handovers.In essence, MIIS offers a set of IEs, their setup, interpretation, and justification sort of knowledge relocation strategy. Data change for the event task is modeled using an asynchronous devalue approach [4].

C Independent Command Service for the Media

The principle of maintenance gives upper levels the authority to control the logical and physical connection layers locally or remotely. Using a series of handover instructions, the upper layers control the reconfiguration of a suitable connection. For instance, a mobile node may be asked to switch between connections using the command service. [4]. The following three guiding principles [3] serve as the required aim of MIH.

the framework that makes smooth handover between various systems possible. This structure is built on a stack of procedures that are run in each of the devices involved in the handover. The described protocol stack focuses on comprehending the essential, basic interactions between devices for improving handover outcomes. The justification of a new link layer SAP that mimics a standard interface for link layer purposes while being independent of technological details. This SAP is mapped to the specific complimentary technology primitives for each technology found in 802.21. Some of the samplings are included in the widely used representation. The description of a group of handover-enabling operations that provide mobility management protocols like Mobile IP [6] and other top layers the practicality they need to handle escalated handovers. These roles cause the associated local or remote link layer primitives to be activated through the 802.21 framework.

The remainder of the paper is structured as follows: The review of the literature is included in Section II. The obstacles facing MIH are covered in Section III. The study's findings and future work are detailed in Section IV.

RELATED WORK

The three processes of network identification, handover judgment, and handover performance are part of the vertical handover approach, which is used to operate the handover across different wireless technologies. An MN gets neighbor net

instructions, such as cost, network safety, jitter, bit error rate, and so on, during the network discovery stage. The MN or IS chooses the intended net that will be associated in the handover judgment stage by applying the obtained neighbor network instruction. The MN hands over to the desired network at the handover performance phase. The plan identification and handover judgment steps both contain the IEEE 802.21 MIH. This section provides a discussion of vertical handoff algorithms based on the MIH standard [7].
On the basis of an upgraded information server, Kim et al. [8] demonstrated an improvement to the current MIH instruction server and presented an enhanced vertical handover method. Situations are evaluated using spatial and temporal location at the EIS in this newly presented wireless route method, avoiding the time-consuming route scanning phase. For this procedure to calculate the measurements of MN's current location, localizing techniques like GPS are required. The results of the simulation demonstrate that the new approach minimizes vertical handover delay in a variety of settings.

On the basis of the IEEE 802.21 framework, Makris et al. proposed a mobile River vertical handover system in [9]. The advantage of the proposed technique is that it takes into account user preferences as well as network requirements, resulting in better process efficiency and service connection.

Eastwood et al. [10] presented additional VHO techniques based on IEEE 802.21 to encourage vertical handoff between Wi-Fi and Wi MAX. The lack of interaction between the MIH structure and the QoS specifications of acquired technologies is a drawback of the proposed system. The new method's performance calculations are not provided.

According to Christakos et al. [11], Media Independent Information Service may improve the handover behavior for quick Mobile IPv6. The target may be supported by the MN while connecting at another location on the network thanks to pre authentication. This method minimizes the handover time by using MIIS to provide authentication instructions. The technique as it is now implemented does not deliberate a MIH signal to expose the authentication of MN accompanied by PoA.

In [12], a handover decision method using MIH services is shown. Utilizing a QOS metric, the approach is used to authenticate vertical handoff between Wi-Fi and WiMAX networks. The technique use simple additive weighting or MEM to compute the QoS record and uses Analytic Hierarchical Procedure to calculate the values of various traffic characteristics. Compared to the standard vertical handover procedure, the presented method specifies quicker changeover times and a lower rate of level lowering.

Neves et al. improved MIIS in [13] by including context-aware teaching. The newly presented context-aware instruction server may store, manage, and create real-time dynamic instruction drawn from terminal and network bodies such as user preferences, mobile node properties, active services, and offered network resources. The advantages of the proposed process include the optimization of the handover research and judgment phases using a context-aware instruction server.

In accordance with IEEE 802.21, Tamijchelvyet al. [[14]] optimized the vertical handover usefulness is shown on a variety of WLAN/Wi MAX networks. A media-free handover combines network benefits from several approach technologies into a regular series of events, commands, and services. The vertical handover behavior is computed using the introduced handover technique, which uses multimode terminals with WLAN/Wi MAX coordinates and IEEE 802.21 materials. The capability shows an expert method for mobility, excursion, and multiple homing for a combination of different networks. The new method may also significantly reduce handover delay, ground station scanning interval time, and traffic overhead between Wi MAX/WLAN sets. Utilizing their service continuity during and after the vertical handover, the available handover program ends.

A program by Daniel Corujo, Carlos Guimaraes, Bruno Santos, and Rui L. Aguiar[15] highlighted ODTONE's enduring features and impact while providing a clear handover control framework for network-based generalized mobility management. They combined their middleware through the IP mobility management protocol Proxy MIP IPv6. They believed that the ODTONE project not only offered an execution but also advanced the standard and connections area through a comprehensible middleware framework that is utilized to examine, expand and develop the boundaries of current and prospective framework, protocols, and mechanisms that direct to apply dispersed mobile management algorithms.

HANDOFF CHALLENGES AND SOLUTIONS

The main challenges in vertical handover are optimum triggering and network access selection. Finding the accurate time to execute a handover is a crucial problem. Simply, during stimulate effects can a handover be originated and achieved effectively. For vertical handover, it requires to transfer the information in the form of signals. These signals may stand an essential overhead in a way of bandwidth and dispensation requirements including an important impact on the presentation of handovers. So, a type situation would be to reduce the signaling overhead while feasible in sort to recover and optimize the handover implementation.There exists three types of solutions for vertical handover i.e. multilayer mobility management (mobile IP), SIP with IP encapsulation and hybrid solution. In the solution of multilayer mobility management between two domains is obtained by using SIP for real time traffic and mobile IP with the help of location register for non real time traffic. Whereas in pure solution of SIP with IP encapsulation real time traffic can be handled by extended SIP and non real traffic by using SIP and IP encapsulation .In hybrid solution both SIP and mobile IP are

used for real and non real time traffic. The hybrid solution is found to be better as it covers mobile IP as well as the SIP.

CONCLUSION

The reason of IEEE 802.21 is to recover the user knowledge through giving an MIH functionality which ease mutually mobile-initiated and network-initiated handovers. The standard identifies the tools compulsory to replace information, actions, and guidelines to make easy handover opening and handover research. IEEE 802.21 does not try to normalize the real handover implementation method. So, MIH structure is uniformly appropriate to schemes that use mobile IP by the IP layer as to systems that utilize Session Initiation Protocol (SIP) at the application layer. In future, handover between Wi-fi to WLAN via WIMAX can be performed by using vertical handover algorithm in MIH.

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