

## Performance Analysis of Mobility Management in Ieee 802.21 with Enhanced E2TX and DSR Flow Using NS2

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**Abstract:** The upcoming generation of the wireless network may integrate the several numbers of existing wireless networks within such interesting efforts and concept for the mobility management. There are already several techniques are being used for the improvement of mobility management such as handover technique with vertical and horizontal part. The existing technique are providing designing based intelligent concept while mobile nodes are moving different network area, however, this designing based concept is not sufficient to get a better accuracy for solving the next generation challenges in network. To approach a better and enhanced advancement and improvement for mobility management, proposed work is presenting and enhanced handoff technique with combined DSR Flow and Extremely Trust Opportunistic Routing (E2TX) Protocol. These proposed protocols provide a better enhancement in IEEE 802.21 network mobility management with NS2. The handoff technique is optimizing the mobile node procedure in IEEE 802.21 network services to get the extension of network mobility with several layers of networks. The proposed technique DSR flow and E2TX are providing a better network path discovery and candidate selection procedure for accessing the router discovery. The proposed mechanism of cross-layer is making an intelligent decision over handoff which transmit the packet information to the available link obtaining by handoff services and layer information as QoS (Quality of Service) required parameter. The proposed technique DSR Flow and E2TX is providing better result in mobility management over the IEEE 802.21 network; where these two protocols are playing a crucial role for select the packet and finding the perfect shortest path.

**Key words:** Network • IEEE 802.21 • E2TX • DSR Flow • ns Simulator • etc

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### INTRODUCTION

The development of wireless devices and data networks makes mobile Banking, Web browsing, multimedia entertainment and social network in today life. The propagation of different Wi-Fi access technologies [1] in licensed, unlicensed bands cellular networks to maintain high-rate data services packet like WiMAX [2], UMB (ultra mobile broadband) [3], LTE (long-term evolution) so it planning progression path. Debate continues considering three similar broadband mobile technologies; cost factors, issues of backward-compatibility and challenging business interests that industry will congregate on single standard. Device manufacturer combing additional network interfaces in their devices. Various models of phone now support 3G (third generation) and Wi-Fi wireless. For WiMAX, 3G and Wi-Fi notebook computers are available [4]. Supporting inters technology and seamless roaming is

key element to manage operators and flourish from heterogeneity. The operators change user session from one to another access technology can manage better networks and accommodate requirements service. If the application quality in one network poor mean then that application transferred to the another network there might be fewer delays, higher throughput and less congestion. IEEE 802.21 describe MH (Media independent handoff) framework that extensively increase handoff between technologies of heterogeneous network. Standard describes the tools needed to exchange data, commands and events to assist handoff preparation and handoff initiation. IEEE 802.21 doesn't endeavor to normalize the execution handoff mechanism [4]. MIH framework applicable to employ IP layers to SIP (employ Session Initiation Protocol) at application layer. With increasing requires for real time services and new data, wireless networks must support describes with various QoS (Quality of Service) guarantees and various traffic

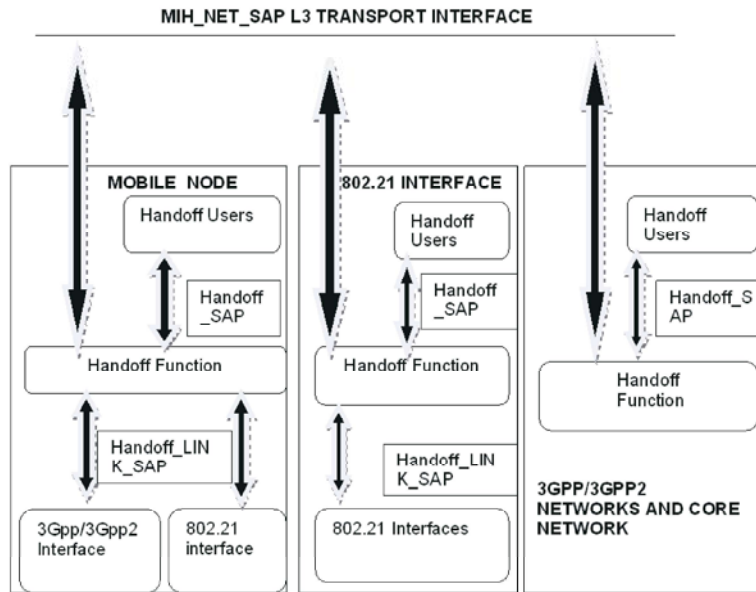


Fig. 1: General IEEE 802.21 Architecture

characteristics. In addition, different networks and wireless technologies exist presently that satisfy various requirements and needs of mobile user. These various wireless networks work as balancing each other within their suitability and capabilities for various applications. The Figure 1 is describing the architecture of mobile IP [5].

**Related Work:** Based on the previous works related to the Mobility Management Mechanisms are classified into the following categories:

- Identification and Discovery of network and neighbour devices.
- Multi-assistance in advanced heterogeneous network.
- Information retrieval for available white space for geo-location database.
- The opportunity for operator-governed management for maintenance, termination and creation

The Handoff technology is providing the services, such as:

- PHY and MAC state is changing the events
- Link Parameter events
- Handoff link events
- Predictive events
- Transmission of link events

Kun Zhu *et al.* (2009) proposed a survey about Mobility and Handoff Management in Vehicular Networks.

Sahana Bhosale *et al.* (2013) proposed Investigations on IEEE 802.21 based Media Independent Handoff Algorithm for Access Network Selection between WiFi and WiMAX.

Mayuri Pophali *et al.* (2014) proposed Trust Based Opportunistic Routing Protocol for VANET Communication.

Mohammed Waseem Akram *et al.* (2015) proposed about Performance Analysis of Mobile Node Using Media Independent Handover.

**Extremely Trust Opportunistic Routing Protocol:**

The Extremely Trust Opportunistic Routing Protocol (E2TX) is using the base concept of ExOR and ETX for selecting the forwarding candidate. The ExOR has the major issues in the transmission process that all nodes are candidate set which needs to wait for the sending packet to nodes within the higher priority; the multicast process is also not being implemented over here. The ETX is being calculated over the link of quality for making a forwarding decision, to forward the quality metric of the link is get added for the value trusted association within the every node in the network. The E2TX has combined the two metrics such as trust value and link quality metric in the IEEE 802.21 network for relay prioritization and selection of the candidate. Every node in the 802.21 network is deriving the value of E2TX for all the depending and neighbors over the value of E2TX and candidate is being determined [6].

**Dsr Flow Protocol:** The DSR Flow protocol based on the source-route within the on-demand routing protocol. The node is maintaining the caches route which contains the source route. The nodes are updating the route entries to collect the information about new entered node in the network. There are two important phase for transmitting a packet and communicating with destination node, which are Route Maintenance and Route Discovery. If the source node has to transmit any packet to destination or any other node, commonly it deciding at the route cache that is being already in the destination. If the source finds the any unexpired or feasible node at destination then source transmitting the packet to the destination node. But, if it's not there then source will broadcast the packet sending request at every route to discover the path, every intermediate node will look for the possible route to transmit the packet at destination. The DSR Flow is not only attending the source request, it considers any node has to transmit the packet at destination. The packet is being collected from any nodes which have to transmit at the destination, the nearest neighbors are collecting the packet or the path which originated to the destination is transmitting the packet. The DSR Flow is following two processes to maintaining the route: Acknowledgement and Route Error Packet. When any of the nodes is facing or reporting for issues with fatal transmission at the layer of data link, then it is providing the Route Error Packet. When any of the nodes are receiving any packet with route error, then it's deleting the HOP from the packet route cache [7].

**Selection of Candidate:** The selection of candidate in the trust routing protocol is proposing the several distinct strategy over the multicast module and measurement of the possible longest distance in every quadrant. The selection of candidate is for the possible longest distance in the quadrant is done within the proposed algorithm [8].

**Algorithm Pseudocode:**

```

Get the multicast group list N.
For node I in N do
  For multicast region in 4 quadrants R do
    If  $i \in r$  then
      Add I to r list
    end if
  end for
end for
for  $i \in R$  do
  if r.list  $\neq 0$ 

```

```

    replicate packet
    Summing r.list in packet header
    Candidate selection for possible length network area
    Availability of node in region
    Broadcast the packet
  end if
end for

```

**Mobility Manager:** The technique of mobility management could get used by using the enhanced mobile devices experience for addressing the several types of issues with MICS, MIIS and MIES. The mobility management is having such different issues such as:

- The continuity of services, the service continuation after and in process of the handover while it minimizing the aspects as loss of data, time breaks at handover without any user intervention.
- The policies of the mobility management that fulfills user requirements such as security and cost.
- The saving of power is an important issue in mobile device, the interface of wireless network for the energy and technology for activating the interfaces when it needed to extend the battery lifetime.
- The support over the adaptation for any level of application: The Quality of Service (QoS) could be getting significantly distinct while it roams over the heterogeneous IEEE 802.21 network, especially real-time and streaming could enhance the node behavior of node for adapting the changes.
- The decision system of handoff needs a central decision point.
- An application need to review the resource network within the high level of abstraction for providing the handoff function.

A general interface system of mobility events could allow the simple design for adaptive application.

**RESULT AND DISCUSSION**

The proposed technique is executed on the NS-2 configured system and has produced a better result in compare to the existing technique Vertical Handover. The simulated parameter has been described in Table 1.

Table 1: Requirement Table

S. No	Item	Count
1.	Access Point	2
2.	WLAN	1
3.	Cellular Network	1
4.	Region	4
5.	Nodes	17

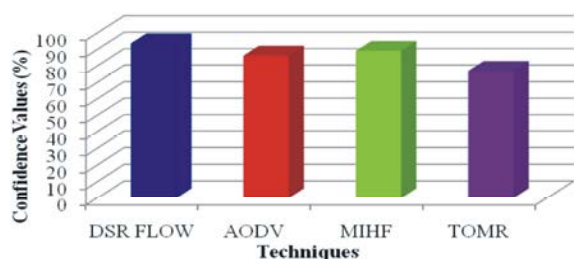


Fig. 2: Confidence Value

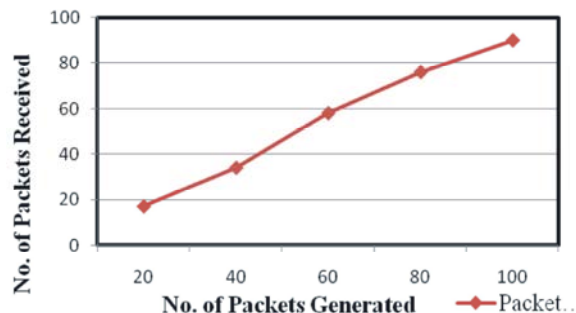


Fig. 3: Packet Delivery Ratios

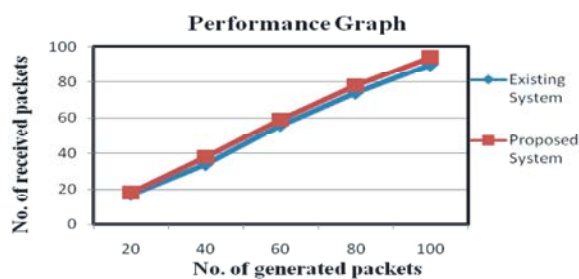


Fig. 4: Performance Analysis

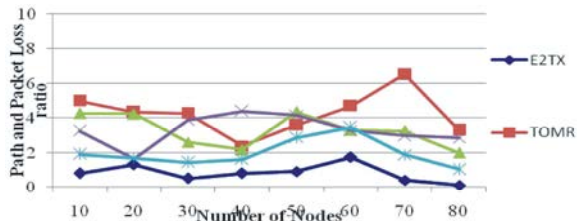


Fig. 5: Path and Packet Loss Ratio

Table 2: Confidence Level Value

Techniques	DSR FLOW	AODV	MIHF	TOMR
Confidence Level	93.58	86.19	89.1	76.91

Table 3: Packet Delivery Ratio

	Packet Delivery Ratio					
	Generated Packet	20 Pac	40 Pac	60 Pac	80 Pac	100 Pac
Received Packet	17	34	58	76	90	

**Confidence Value:** The Figure 2 is describing about the confidence value, which represents the packet delivery accuracy to the destination. The Proposed technique DSR Flow is producing better result in compare to existing techniques. The other researchers work is based on the AODV (Ad hoc On-Demand Distance Vector) with 86.19%, TOMR (Trust Opportunistic Multicast Routing) with 76.91, MIHF (Media Independent Handover Function) with 89.1% and the proposed system DSR FLOW (Dynamic Source Routing Flow) is being compared and proposed technique provides better result within 93.58%.

The Table 2 is proposing the confidence value of several protocols on the IEEE 802.21 network. The proposed protocol is producing better result for the confidence level.

**Packet Delivery Ratios:** The Table 3 is presenting the delivery ratio based on the several numbers of generated packets on IEEE 802.21 network.

The Figure 3 illustrates the packet delivery in heterogeneous wireless network using vertical handover Algorithm. The proposed algorithm achieves maximized packet delivery ratio in both wireless and cellular networks.

**Performance Graph:** The Figure 4 illustrates the packet delivery ratio in heterogeneous wireless network for both existing system and our proposed multi scan approach algorithm. In figure, compare with existing system our proposed algorithm achieves maximized packet delivery ratio in both wireless and cellular networks (i.e, Packet delivery ratio= no. of packets generated / no. of packets received).

**Path and Packet Loss Ratio:** The Figure 5 is describing the accuracy of E2TX proposed technique. The E2TX is providing a better accuracy than Trust Opportunistic Multicast Routing (TOMR), Reverse Address Resolution Protocol (RARR) and Wireless Body Sensor Network (WSBN) over the path and packet loss.

Table 4: Packet and Path Loss

Techniques?	Packet and Path Loss								
	Number of Nodes?	10	20	30	40	50	60	70	80
E2TX		0.8	1.3	0.5	0.8	0.9	1.72	0.39	0.1
TOMR		4.97	4.35	4.26	2.38	3.59	4.68	6.51	3.29
RARR		4.26	4.23	2.59	2.16	4.35	3.28	3.24	1.98
WSBN		3.24	1.65	3.85	4.39	4.16	3.27	2.98	2.84
Vertical Handover		1.9	1.67	1.43	1.59	2.86	3.46	1.88	1.02

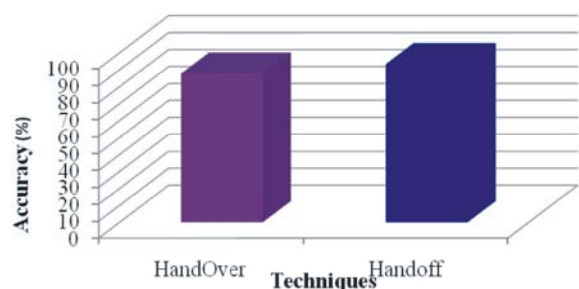


Fig. 6: Accuracy Comparison

**Accuracy Comparison:** The Figure 6 is proposing the comparison between existing and proposed technique, where proposed technique is providing better result. The different researcher has provided the result or output value for handover and the proposed technique is being compared. The accuracy of existing technique Handover is 87.59% and the proposed technique Handoff 93.12%.

### CONCLUSION

The proposed technique is providing the enhancement over the IEEE 802.21 network for next generation by using Handoff technique with enhanced protocols like E2TX (Extremely Trust Routing Protocol) and DSR FLOW that defines an enhanced implementation of smart agent for mobility management, which is known as mobility manager, to communicate with the IEEE 802.21 network to implement handoff decision with DSR Flow and E2TX policies. These policies are defining the interface of adaptive application. The produced result is obtaining the adaptive management for application and handoff mobility management for IEEE 802.21 network. The proper implementation of the network is proving the service quality of IEEE 802.21 network and the application connection quality, which provides the specification of the IEEE 802.21 network. The aim of the IEEE 802.21 network is to enable the inter-technology for maximizing the session continuity to improve the user satisfaction with enhanced handoff technology while using mobile in the presented network. The terminals of mobile are getting used worldwide with several interfaces of the accessed technologies. The proposed technique is providing an enhanced way to make a communication over the IEEE 802.21 network to get a better mobility management for finding a way to transmit the packet and locate the sources to every node. Proposed technique could be tends to the future enhancement by investigating the integration option with SDR (Software Defined Ratio) to aim the solution for delivering the cellular on demand

service for end-users. The proposed technique would be a better option for storing more energy in the network or node and will focus for less consumption of energy with the enhancement of accuracy and efficiency or reactive time. The less consumption of energy would be very useful for increasing the node lifetime.

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