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A COMPARATIVE STUDY ON EXECUTION OF WIMAX NETWORKS WITH HAND OFF STATION

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ABSTRACT

IEEE 802.16 is a Broadband Wireless Access (BWA) organization and along these lines it is viewed as an elective answer for wired broadband advances. Transfer station assumes a promising part of expanding the scope of Base station for significant distances in WiMAX organizations. Transfer station is reasonable to regions with restricted foundation, for example, country, uneven and lakes, where it is hard to introduce many Base stations with each having wired associations and it is additionally appropriate to those stages where deterrents made the inclusion restricted. The Relay station is set in *the* organization network from Base stations and broadens the inclusion of a solitary Base station. In this paper the exhibition examination of WiMAX innovation including Relay station has been finished. This paper likewise centers around expanding number of hubs and distance from base station to the presentation of WiMAX organizations.

Keywords : I EEE 802 .16 , Light WiMAX Simulator (LWX), Bandwidth Allocation Algorithm (BWA)

1. INTRODUCTION

Broadband Wireless Access (BWA) is an answer for fast prerequisite of web association for information, voice and video administrations. BWA is a quick and simple option of link net-works and Digital Subscriber Line (DSL) advancements . The IEEE working gathering has planned another standard dependent on BWA frameworks for last mile remote access named IEEE 802.16. The IEEE 802.16 engineering is intended to accomplish objectives like simple arrangement, high information rate, huge region and enormous recurrence range. The IEEE 802.16 arise as a domi-nant innovation for cost serious pervasive broadband remote access, supporting fixed, migrant, convenient and completely portable activities offering coordinated voice, video and information administrations. The highlight multipoint (PMP) design of IEEE 802.16 can be sent in simple and practical way in jam-packed topographical regions (metro urban communities) and country regions where no wired framework is accessible. Hand-off stations add an added substance advantage for information to be moved for various administrations. The highlight multipoint (PMP) engineering of IE802.16 comprises of one Base Station (BS) and numerous Subscriber Stations (SSs) including Relay stations. Customers are associated with SS for information move or any SS would itself be able to be a customer. All SSs must be synchronized with BS. SSs are additionally permitted to send information through a Relay station where inclusion region isn't upheld by Base stations. The BS conveyed to all SS in the start of each casing by means of Uplink Map (UL MAP) . Numerous scientists have given systems for moving information Light WiMAX. The greater part of these works center around IEEE 802.16 data transmission distribution calculations.

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2. HAND-OFF STATION

IEEE 802.16j is an improvement to past 802.16 principles to offer help for transfers, along these lines accommodating expanded limit as well as inclusion, contingent upon the scenario. The standard doesn't allow changes to SSs, henceforth the progressions presented by the standard spotlight on interchanges between (upgraded) BS and the new RSs. One issue which emerges in this setting is the way to move toward network arranging a multi-bounce radio access network brings about new issues which have not been tended to in past radio arranging draws near. Here, it is proposed how RS offers advantage to a bunch of BSs and SSs. In this work, the advantage of utilizing RS in an organization of BS and SS has been proposed. Multihop hand-off (MR) is might be utilized to give extra inclusion or execution advantage in an entrance network.

In MR organizations, the BS might be supplanted by a multihop hand-off BS (MR-BS) and at least one transfer stations (RS). Traffic and motioning between the SS and MR-BS are transferred by the RS in this way broadening the inclusion and execution of the framework in regions where RSs are conveyed. Every RS works under the management of a MR BS. In an in excess of two jump framework, traffic and motioning between an entrance RS and MR-BS may likewise be handed-off through moderate RSs. The RS might be fixed in area (i.e., appended to a structure) or, on account of an entrance RS, it could be portable. The SS may likewise discuss straightforwardly with the MR-BS. The different MR highlights characterized all through this standard license a multihop hand-off framework to be designed in a few modes. New usefulness has been indicated on the hand-off connection to help the MR highlights. Two distinct modes brought together and appropriated booking) are indicated for controlling the assignment of data transfer capacities for a SS or a RS. In unified booking mode, the data transfer capacity allotment for a RS's subordinate not really set in stone at the MR BS; alternately in circulated planning mode, the data transmission portion of a RS's subordinate stations is dictated by the RS in collaboration with the MR-BS.

Two unique sorts of RS are characterized, specifically straightforward and non-straightforward . A non-straightforward RS can work in both incorporated and circulated booking mode, while a straightforward RS can just work in brought together planning mode. A straightforward RS speaks with the superordinate stations utilizing a similar transporter recurrence.

A non-straightforward RS might speak with the super ordinate station and subordinate stations utilizing something similar or distinctive transporter frequencies. Transfer based organizations has little structure factor, minimal expense re-lays related with Base stations. Three principle benefits gave from hand-off based design over single bounce ar-chitecture are throughput upgrade, inclusion increment and arrangement cost. It is relied upon to build framework ca-pacity by conveying RSs in a way that empowers more aggressive spatial reuse. The transfer innovation is relied upon to further develop the inclusion unwavering quality in geographic regions that are seriously shadowed from the BS or potentially to broaden the scope of a BS. Hand-off based frameworks can possibly convey cost gains over customary single bounce remote access frameworks. Utilizing RSs, an administrator could convey an organization with wide inclusion at a lower cost than utilizing just (more) costly BSs to give great inclusion and framework limit. Hand-off ing methods incorporate the regular procedures of time space, recurrence area, half breed time recurrence area and helpful time transferring area strategies.

3. NETWORK SETUP AND SIMULATION STUDY

The organization arrangement is utilized to dissect the exhibition of Light WiMAX with Relay Station. Two distinct situations are viewed as each including a Base station Subscriber stations and Relay stations

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WIMAX WITH_HAND-OFF STATION (TOPOLOGY)

Topology as shown in fig.1 is used for the performance analysis of hand-off station in Light WiMAX.

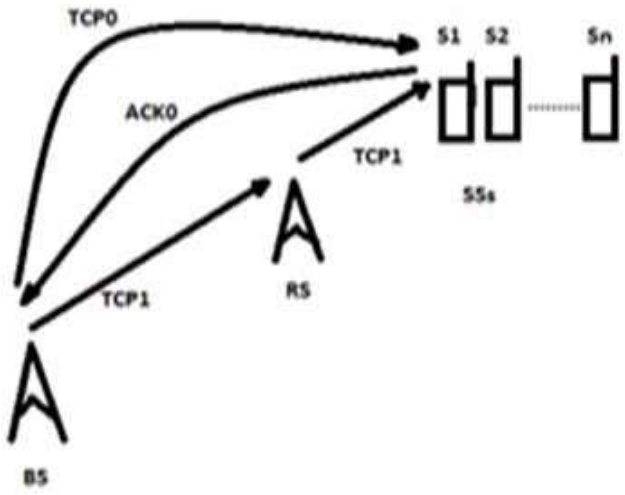

Fig. 1 Case_with_RS

The recreation geography above contains one BS, one RS and numerous SSs. The associations from BS to SS are taken downlink and different cases are taken to examine the exhibition. The downlink transmission is handed-off by BS to SSs by means of RS just as BS to SSs without RS. TCP associations are made for uplink bundle transmission with Ack. There are two downlink TCP associations from BS to SSs (one TCP association through RS and one more TCP association without RS).

WIMAX WITHOUT HAND-OFF STATION (TOPOLOGY)

The reenactment geography as displayed in fig. 2 beneath contains one BS and numerous SSs. The associations from BS to SSs are downlink associations from BS to SSs. TCP associations are made for downlink parcel transmission with Ack. Following geography is utilized for execution investigation of Light WiMAX without hand-off station. The downlink transmission is transferred by BS to SSs. TCP associations are made for uplink and downlink parcel transmission with Ack. There is a downlink TCP association from BS to SSs.

SIMULATION PARAMETERS

The performance of Relay stations is analyzed in WiMAX scenarios by considering following simulation parameters given in table I:

TABLE I. PARAMETERS USED FOR SIMULATION

Parameter	Value
Routing Protocol	AODV
Transmission Protocol	TCP
Bandwidth Allocation Algorithm	Round Robin For Relay
Simulation Time	300 Seconds
Numbers Of Node	5,15,25,35,…….95

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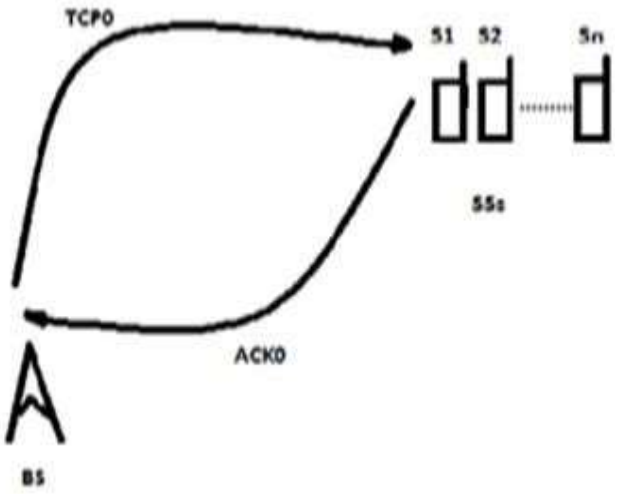

Fig. 2 Case_without_RS

PERFORMANCE METRICS

The three performance metrics are considered to evaluate the performance:

- Throughput that measures the amount of raw bytes sent by a source.
- Goodput that measures bytes that are successfully received.
- Number of dropped packets

4. RESULTS

It is seen from the diagram displayed beneath in fig. 3 that the worth of throughput is acquired greatest shown when distances of hubs are closer to base station in light of the fact that higher request regulation procedures is utilized with OFDM. Various pieces are conveyed in a solitary OFDM image. A remote channel experiences postpone spread because of the presence of different proliferation ways (particularly in NLOS conditions). At the point when the information image is longer, the defer spread is a little and irrelevant part of the image length, so the impact because of postpone spread is limited.

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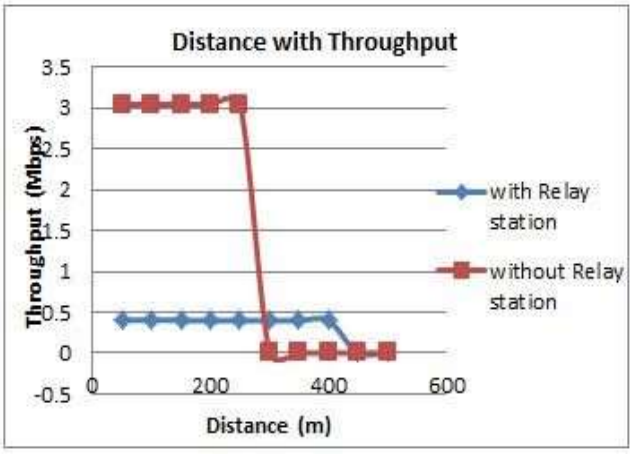

Fig. 3 Coverage of Relay station with distance and Throughput

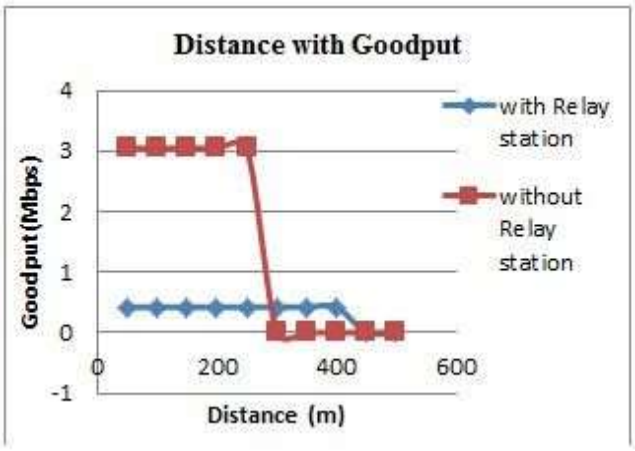

Fig. 4 Coverage of Relay station with distance and Goodput

It is seen from the diagram displayed in fig 4 that the worth of Goodput is acquired greatest when distance of hubs are closer to base station for Downlink association. This is because of the way that as number of parcels each second moved likewise builds, information bandwidth of channel additionally increments and subsequently is acquired most noteworthy close to base stations. As distance of hubs from base station builds, it is seen that after a restricted distance, the inclusion of base station closes and the goodput becomes zero. On the off chance that we add a Relay station, the inclusion space of base station is amplified to more distance and information could be moved to more distances successfully. Likewise It is seen from diagram shown that as the distance increments dropped parcels additionally increments. In the event of with Relay station, it is seen that

number of dropped parcels with transfer station are more than without hand-off station and this is because of the way that when bundles are send straightforwardly then there is less chance of bundles to be lost since the sign is communicating with most extreme force from base station. As the traffic load builds then, at that

point, calls are not adjusted as expected and are dropped after significant delay [10].

It is seen that from fig. 5 beneath that Dropped bundles are likewise expanded since high adjustment can't be kept up with over the whole length of the connection or in a Non Line of sight climate. For such cases the mistake rates increases and the versatile balance include drops the adjustment to bring down thickness balance.

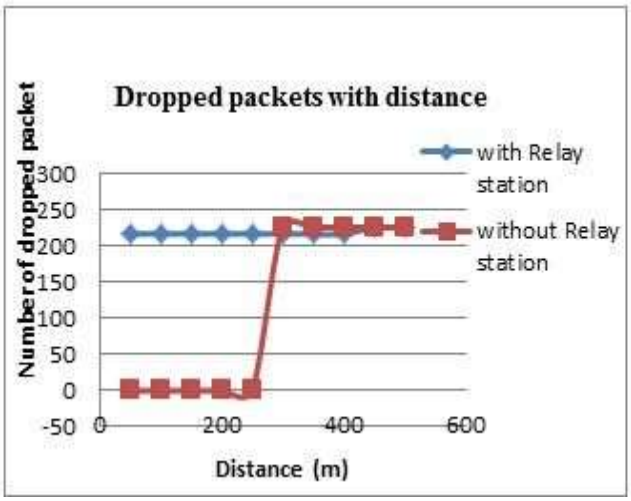

Fig. 5 Coverage of Relay station with distance and Dropped packets

WiMAX being able to provide up to 38 Mbps over 25 Km for 10 MHz bandwidth would not be factually correct for all distances. The data rates changes through the entire coverage area and depends on whether the reception is LOS or NLOS. In case of NLOS reception the data retes drop significantly because of change of modulation.

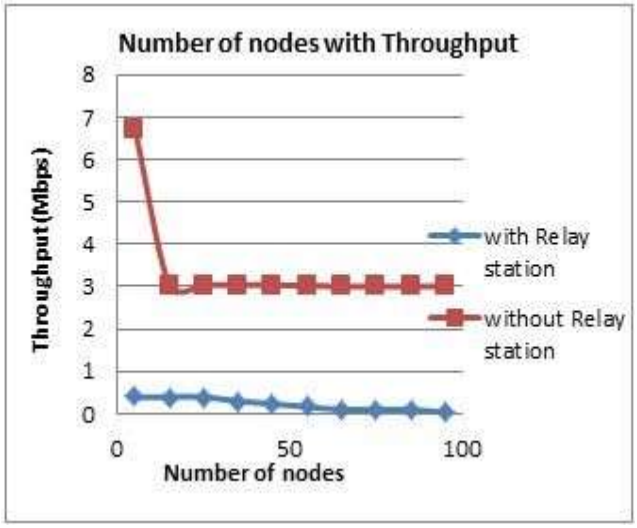

Fig. 6 Coverage of Relay station with Number of nodes and Throughput

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It is observed from the graph shown in fig 6 that through- put per user is decreased when number of subscriber

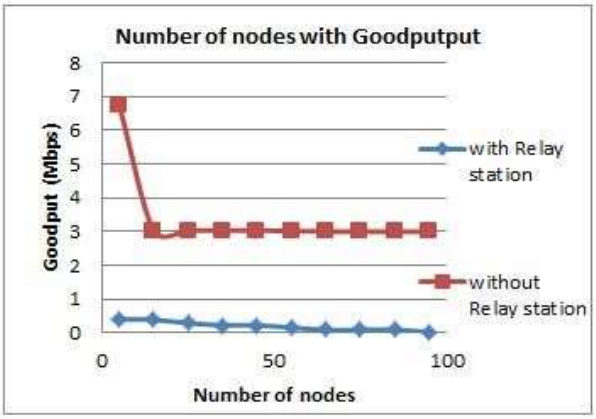

Fig. 7 Coverage of Relay station with Number of nodes and Goodpu

stations increases. This implies that for full utilization of relay station, the use of wider channel is necessary. If this condi- tion is satisfied, the system capacity may be increased, e.g. for 15 active users, the bit rate per user is improved from 0.4 Mbps to 6.73 Mbps. It is observed that nominal bit rate is obtained 0.03 Mbps up to 95 users against 3 Mbps up to 95 users without Relay station before congestion occurs.

It is seen from the chart displayed in fig 7 that the Goodput per client is diminished when number of supporter stations increments. fig 7 shows that for channel size 3 MHz the presentation with or without Relay station is indistinguishable. This suggests that for full use of transfer station, the utilization of more extensive channel is essential. On the off chance that this condition is fulfilled, the framework limit might be expanded, for example for 15 dynamic clients, the piece rate per client is improved from 0.4 Mbps to 6.73 Mbps. It is seen that ostensible piece rate per goodput client is 0.03 Mbps up to 95 clients without Relay station before blockage happens. dropped bundles are more than without transfer station and this is because of the way that when parcels are send straightforwardly then there is less opportunities for bundles to be lost since the sign is communicating with most extreme force from base station. As the traffic load expands then calls are not overhauled as expected and are dropped after significant delay [8]. Dropped parcels are likewise noticed expanded since high balance can't be kept up with over the whole length of the connection or in a Non Line of sight climate. For such cases the mistake rates will increase and the versatile adjustment elements will drops the modu-lation to bring down thickness balance .This implies that the information rate will drop.

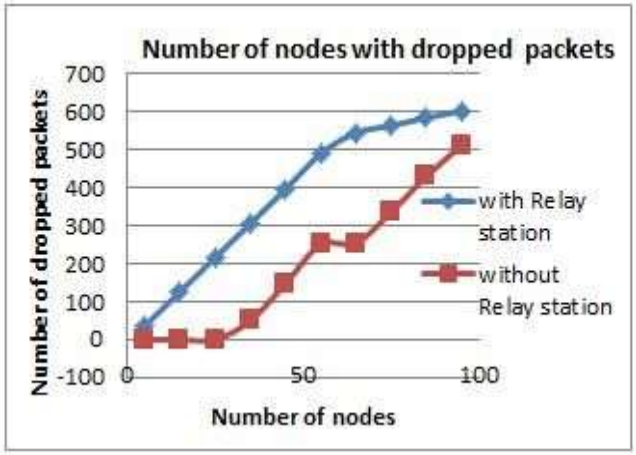

Fig. 8 Coverage of Relay station with Number of nodes and dropped packets

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CONCLUSION

In this paper the exhibition of WiMAX framework is broke down when hand-off stations are utilized and when transfer station isn't utilized. The reproduction results show that adding hand-off station to base stations expands the inclusion of base station and it is seen that after 250 m it is 100% higher than without transfer station. Likewise adding Relay station could add more number of hubs to the base stations for significant distances. At the point when number of hubs expands it is seen that throughput is gotten higher than with hand-off station. As number of hubs builds worth of throughput is noticed higher with 65 hubs with transfer station. Essentially for goodput likewise, at first the worth acquired higher than with transfer station up to separate up to 200 meters. In any case, as the distance increments after 200 meters the worth of goodput with hand-off station is acquired higher than without transfer station. At the point when distance builds it is seen that dropped bundles are acquired higher than with transfer station. Likewise for number of hubs additionally at first dropped bundles is less yet as hubs builds worth of dropped parcels likewise increment for the two cases, additionally dropped parcels increments with hand-off stations

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