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Analyze the Effect of Varying Misbehavior nodes on VOD over Wi_{max} using SVC Code

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ABSTRACT : In this paper the performance of IPTv over wi_{max} is analyzed by varying misbehavior nodes. For this SVC code is used. This performance is analyzes by using different modulation techniques. To analyze this performance Opnet modeller-14.5 is used. This performance is compared in terms of Throughput, traffic received and packet end to end delay. The result shows that when siso and mimo transmitters are used then the performance of QPSK is better than other modulation techniques.

Key words: Wimax, SVC, Opnet, Video Conferencing, IPTv

I. INTRODUCTION

Wireless Communication is the most required in everyone's life; various strategies are utilized to convey through remote innovation like WiMax, MANET, VANET, Wi-Fi, Bluetooth and so forth. WiMAX is Wireless Interoperability for Microwave Access; it is the most recent development for Wireless Communication which is in perspective of the IEEE 802.16-2004 and IEEE 802.16e-2005 benchmarks and was illustrated with much effect from Wi-Fi. IEEE 802.16 sponsorships two sorts of transmission duplexing: Time Division Duplexing (TDD) and Frequency Division Duplexing (FDD) and reinforce both full and half duplex stations [1, 4, 5]. WiMAX deals with the IEEE 802.16 standard to make the correspondence. WiMAX standard IEEE 802.16 is sub partitioned into different classification like 802.16a, 802.16c, 802.16d and 802.16e this standard gives the point-to multipoint broadcast in 10 to 66 GHz rehash range for Line of Sight (LOS) environment [13, 16].
There are two types of WiMax Transmitter.

A. SISO means Single Input Single Output

SISO has been being utilized after the making of remote framework. It alludes to a remote correspondences framework in which one radio wire is utilized at the source and one reception apparatus is utilized at the destination. SISO frameworks are ordinarily less convoluted than multiple-input multiple-output (MIMO) frameworks. SISO is utilized as a part of radio, satellite, GSM and CDMA frameworks.

B. MIMO implies Multiple Input Multiple Output.
MIMO is suitably a radio reception apparatus innovation as it uses numerous receiving wires at the transmitter and recipient to allow a variety of sign ways to convey the information, picking separate ways for every radio wire to empower various sign ways to be utilized. It uses numerous reception apparatuses to make utilization of reflected signs to give picks up in channel vigor and throughput. Wi-Fi, LTE; Long Term Evolution, and numerous other radio, remote and RF advances are utilizing the new MIMO remote innovation to give expanded connection limit and otherworldly proficiency. MIMO framework passes on higher information rate due to transmission of numerous information images all the while utilizing different reception apparatuses. MIMO is utilized as a part of cutting edge remote innovations, for example, portable Wimax - 16e, WLAN-11n.11ac, 11ad, 3GPP LTE and so on.
Wimax can be used for different types of application like vod, voip etc. In VOD clients have to choose and perspective to feature on interest. VoD content that can be transmitted through IPTV stage incorporates a library with motion picture titles, music on interest and so on. VoD is used to transmit data through Internet Protocols. With feature on interest, viewers can fast forward, rewind or rest.

VOD is proposed to transmit the surges of feature programming to each user.VOD is offered through a connection, broadband or telephone supplier. These streams are persistent. Every client can choose the stream they need to see. This procedure is practically indistinguishable to the programming conveyed by nearby telecasters [4, 7]. Administration suppliers need canny systems in center and in conveyance systems to offer VOD administrations. VOD administration suppliers get content in unmistakable configurations and from various sources. Through VOD innovation these configurations ought to be changed over in IP design keeping in mind the end goal to be transmitted to client as administration with high caliber in the same IP system.

SVC regulates the encoding of a first class highlight bit stream that moreover contains one or more subset bit streams. The SVC codec translates bits from a system information stream into a photo and after that again makes an understanding of camera highlight into a bit stream. It isolates feature bit streams into bit stream subsets that incorporate layers of value and determination to feature signal. SVC has fulfilled critical redesigns in coding adequacy with an extended level of upheld versatility in appreciation to the versatile profiles of prior feature coding principles. The accompanying features applications can profit by SVC are Streaming, Conferencing, Surveillance, Broadcast [5].

II. EXPERIMENTAL SETUP

In this experiment the Effect of Misbehavior Nodes on VOD over WiMAX is analyzed by using OPNET Simulator. This effect is analyzed over VOD code which is SVC code. OPNET Simulator 14.5 [10] was used to analyze the performance of WiMAX. We used OPNET modeler, as OPNET modeler provides a comprehensive development environment supporting the modeling of communication network and distributed systems. OPNET modeler provides better environment for simulation, data collection and data analysis [9]. In this experiment In each scenario seven Hexagonal cells are taken. Each cell has a radius of 2 Km. In each cell there is one Base station and 15 mobile nodes are taken. These nodes are circularly placed. The BS connected to the IP backbone via a DS3 WAN link. The base stations are connected to backbone cloud through ppp_DS3 link. The Backbone Cloud is also connected to VOD server through Sonet os12 link. To analyze the performance of misbehavior nodes different experiment is carried out as follows:-

Experiment 1: here we used scenarios simulation to study the performance of SVC code of VOD over WiMAX networks without misbehavior nodes. This scenarios is repeated by using different modulation techniques (16qam1/2, 64qam1/2 and qpsk1/2). These scenarios are repeated by using SISO and MIMO transmitter.

Experiment 2: here we used scenarios simulation to study the performance of SVC code of VOD over WiMAX networks with misbehavior nodes. In these first 4 misbehavior nodes is taken than 6 misbehavior nodes are taken. These scenarios are repeated by using different modulation techniques (16qam1/2, 64qam1/2 and qpsk1/2). These scenarios is repeated by using SISO and MIMO transmitter

III. RESULT

In this paper the effect of varying misbehavior node is analyzed in terms of throughput, Packet end to end delay and traffic received.

A. Throughput

Table 1 shows the result of throughput for 16QAM1/2 modulation. When there is no misbehavior nodes the throughput is more which is 100000 bits/sec, when the misbehavior nodes come then the throughput decreases to 980000 bits/sec further if misbehavior nodes increases to 6 then throughput decreases to 90000 bits/sec.

Table 1: Throughput for SISO Transmitter for different modulations.

	16QAM1/2	64QAM1/2	QPSK1/2
No Misbehavior Node	100000 bits/sec	56000 bits/sec	170000 bits/sec
4 Misbehavior Node	98000 bits/sec	55000 bits/sec	160000 bits/sec
6 Misbehavior Node	90000 bits/sec	53000 bits/sec	130000 bits/sec

It shows that as we increase the misbehavior nodes the performance decreases. The result of throughput for 64QAM1/2 modulation as shown in table 1 is, when there is no misbehavior nodes the throughput is more which is 56000 bits/sec, when the misbehavior nodes come then the throughput decreases to 55000 bits/sec further if misbehavior nodes increases to 6 then throughput decreases to 53000 bits/sec. It shows that as we increase the misbehavior nodes the performance decreases. It also shows the result of throughput for QPSK1/2 modulation that when there is no misbehavior nodes the throughput is more which is 170000 bits/sec, when the misbehavior nodes come then the throughput decreases to 160000 bits/sec. Further if misbehavior nodes increases to 6 then throughput decreases to 130000 bits/sec. It shows that as we increase the misbehavior nodes the performance decreases.

Table 2: Throughput for MIMO Transmitter for different modulations.

	16QAM1/2	64QAM1/2	QPSK1/2
No Misbehavior Node	35000 bits/sec	25000 bits/sec	41000 bits/sec
4 Misbehavior Node	42000 bits/sec	35000 bits/sec	41000 bits/sec
6 Misbehavior Node	50000 bits/sec	56000 bits/sec	170000 bits/sec

Table 2 shows the result of throughput for 16QAM1/2 modulation. When there is no misbehavior nodes the throughput is more which is 35000 bits/sec, when the misbehavior nodes come then the throughput increases to 42000 bits/sec further if misbehavior nodes increases to 6 then throughput increases to 50000 bits/sec. It shows that as we increase the misbehavior nodes the performance increases. The result of throughput for 64QAM1/2 modulation as shown in table 2 is, when there is no misbehavior nodes the throughput is more which is 25000 bits/sec, when the misbehavior nodes come then the throughput increases to 35000 bits/sec further if misbehavior nodes increases to 6 then throughput increases to 56000 bits/sec. It shows that as we increase the misbehavior nodes the performance increases. It also shows the result of throughput for QPSK1/2 modulation that when there is no misbehavior nodes the throughput is more which is 41000 bits/sec, when the misbehavior nodes come then the throughput remains 41000 bits/sec. Further if misbehavior nodes increases to 6 then throughput increases to 170000 bits/sec. It shows that as we increase the misbehavior nodes the performance increases.

B. Packet End-to-End Delay

Table 3 shows that the results of packet end to end delay. At 16QAM1/2 modulation table3 shows that when there is no misbehavior node the Packet end to end delay is more which is 2.8sec, when the misbehavior nodes come then the Packet end to end delay decreases to 2.6sec further if misbehavior node increases to 6 then Packet end to end delay decreases to 2.5. More the end to end delay more the packets are sent performance is increased. This shows that as we increase the misbehavior nodes the performance decreases.

The result of Packet end to end delay for 64QAM1/2 modulation, table 3 shows that when there is no misbehavior nodes the Packet end to end delay is more which is 3.2sec, when the misbehavior nodes come then the Packet end to end delay decrease to 2.8sec further if misbehavior nodes increases to 6 then Packet end to end delay decreases to 2.6 sec. More the end to end delay more the packets are sent performance is increased. It shows that as we increase the misbehavior nodes the performance decreases.

The result of Packet end to end delay for QPSK1/2 modulation, Table 3 shows that when there is no misbehavior nodes the Packet end to end delay is more which is 2.1sec, when the misbehavior nodes come then the Packet end to end delay decrease to 2 sec further if misbehavior nodes increases to 6 then Packet end to end delay decreases to 1.8 sec. More the end to end delay more the packets are sent performance is increased.. This shows that as we increase the misbehavior nodes the performance decreases.

Table 3: Packet End-to-End delay for SISO Transmitter for different modulations.

	16QAM1/2	64QAM1/2	QPSK1/2
No Misbehavior Node	2.8 sec	3.2 sec	2.1 sec
4 Misbehavior Node	2.6 sec	2.8 sec	2 sec
6 Misbehavior Node	2.5 sec	2.6 sec	1.8 sec

Table 4 shows that the results of packet end to end delay. At 16QAM1/2 modulation table 4 shows that when there is no misbehavior node the Packet end to end delay is more which is 2 sec, when the misbehavior nodes come then the Packet end to end delay decreases to 1.8 sec further if misbehavior node increases to 6 then Packet end to end delay increases to 2.3sec. More the end to end delay more the packets are sent performance is increased. This shows that as we increase the misbehavior nodes the performance increases. The result of Packet end to end delay for 64QAM1/2 modulation, table 4 shows that when there is no misbehavior nodes the Packet end to end delay is more which is 3.5 sec, when the misbehavior nodes come then the Packet end to end delay decrease to 2 sec further if misbehavior nodes increases to 6 then Packet end to end delay increases to 3 sec. More the end to end delay more the packets are sent performance is increased. It shows that as we increase the misbehavior nodes the performance decreases. The result of Packet end to end delay for QPSK1/2 modulation, Table 4 shows that when there is no misbehavior nodes the Packet end to end delay is more which is 2.1sec, when the misbehavior nodes come then the Packet end to end delay decrease to 1.6 sec further if misbehavior nodes increases to 6 then Packet end to end delay increases to 1.8 sec. More the end to end delay more the packets are sent performance is increased. This shows that as we increase the misbehavior nodes the performance decreases.

Table 4: Packet End-to-End delay for MIMO Transmitter for different modulations.

	16QAM1/2	64QAM1/2	QPSK1/2
No Misbehavior Node	2 sec	3.5 sec	2.1 sec
4 Misbehavior Node	1.8 sec	2 sec	1.6 sec
6 Misbehavior Node	2.3 sec	3 sec	1.8 sec

C. Traffic Received

Table 5 shows the result of Traffic received for 16QAM1/2 modulation. It shows that when there is no misbehavior nodes the Traffic received is more which is 445 bytes/sec, when the misbehavior nodes come then the Traffic received increases to 450 bytes/sec, further if misbehavior nodes increase to 6 then Traffic received decreases to 400 bytes/sec. This shows that as we increase the misbehavior nodes coming in network the performance decreases.

The result of Traffic received for 64QAM1/2 modulation, table 5 shows that when there is no misbehavior node the Traffic received is more which is 340 bytes/sec, when the misbehavior nodes come then the Traffic received decrease to 230 bytes/sec further if misbehavior nodes increase to 6 then Traffic received increases to 250 bytes/sec. This shows that as we increase misbehavior nodes coming in network the performance decreases.

Table 5: Traffic Received for SISO Transmitter for different modulations.

	16QAM1/2	64QAM1/2	QPSK1/2
No Misbehavior Node	445 bytes/sec	340 bytes/sec	1500 bytes/sec
4 Misbehavior Node	450 bytes/sec	120 bytes/sec	700 bytes/sec
6 Misbehavior Node	400 bytes/sec	250 bytes/sec	600 bytes/sec

Table 6: Traffic Received for MIMO Transmitter for different modulations.

	16QAM1/2	64QAM1/2	QPSK1/2
No Misbehavior Node	120 bytes/sec	60 bytes/sec	150 bytes/sec
4 Misbehavior Node	160 bytes/sec	120 bytes/sec	160 bytes/sec
6 Misbehavior Node	260 bytes/sec	260 bytes/sec	600 bytes/sec

The result of Traffic received for QPSK1/2 modulation, table shows that when there is no misbehavior nodes the Traffic received is more which is 1500 bytes/sec, when the misbehavior nodes come then the Traffic received decrease to 700 bytes/sec further if misbehavior nodes increase to 6 then Traffic received decreases to 600 bytes/sec. This shows that as we increase misbehavior nodes coming in network the performance decreases.

Table 6 shows the result of Traffic received for 16QAM1/2 modulation. It shows that when there is no misbehavior nodes the Traffic received is less which is 120 bytes/sec, when the misbehavior nodes come then the Traffic received increases to 160 bytes/sec, further if misbehavior nodes increase to 6 then Traffic received increases to 260 bytes/sec. This shows that as we increase the misbehavior nodes coming in network the performance increases. The result of Traffic received for 64QAM1/2 modulation, table 6 shows that when there is no misbehavior node the Traffic received is less which is 60 bytes/sec, when the misbehavior nodes come then the Traffic received increases to 120 bytes/sec further if misbehavior nodes increase to 6 then Traffic received increases to 260 bytes/sec. This shows that as we increase misbehavior nodes coming in network the performance increases. The result of Traffic received for QPSK1/2 modulation, table 6 shows that when there is no misbehavior nodes the Traffic received is less which is 150 bytes/sec, when the misbehavior nodes come then the Traffic received increases to 160 bytes/sec further if misbehavior nodes increase to 6 then Traffic received decreases to 600 bytes/sec. This shows that as we increase misbehavior nodes coming in network the performance increases.

IV. CONCLUSION

In this paper the comparison of different modulation technique is done in the presence of misbehavior nodes for IPTv. To Compare this performance SVC Codes are used. The comparison is done in terms of Throughput, traffic received and packet end to end delay. To do this 7 cell is made of radius 2km. In each cell there is 20 nodes are placed randomly in which some are misbehavior nodes. This comparison is done by using SISO and MIMO transmitter. The result shoes that when SISO and MIMO transmitters are used then the performance of QPSK1/2 is better than other modulation techniques. The result also shows that when SISO is used than the performance comes better.

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