Journal of Basrah Researches (Sciences) **51**(2), 293 (2025)
DOI: https://doi.org/10.56714/bjrs.51.2.21

# Direct QoE Measurement of Real-Time H.264 Streaming in OLSR-Based MANETs: An ns-3 and FFmpeg Experimental Framework

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ARTICLE INFO

| | |
|---|---|
| Received | 30 October 2025 |
| Revised | 06 November 2025 |
| Accepted | 20 December 2025 |
| Published | 31 December 2025 |

Keywords:

Mobile Ad Hoc Networks (Manets), Optimized Link State Routing (OLSR), Real-Time Video Transmission, Quality Of Service (Qos), Quality Of Experience (Qoe), H.264 Video Streaming.

**Citation:** H. S. F. Al-Asadi et al., J. Basrah Res. (Sci.) **50**(2), 293 (2025). DOI:https://doi.org/10.56714/bjrs.51.2.21

ABSTRACT

Mobile Ad Hoc Networks (MANETs) are infrastructure-less wireless networks in which mobile nodes communicate through multi-hop links. Supporting real-time video transmission in such networks is challenging due to node mobility, dynamic topology, limited bandwidth, and frequent route changes. Among proactive routing protocols, the Optimized Link State Routing (OLSR) protocol is widely used because of its low route acquisition delay, which makes it suitable for delay-sensitive multimedia applications.

In this study, a complete experimental evaluation of real-time video transmission over an OLSR-based MANET is presented using the ns-3.41 network simulator under Ubuntu Linux. A pre-encoded H.264 video stream was transmitted over progressively larger network scenarios, starting from small topologies and extending to a dynamic 25-node MANET using the Random Waypoint mobility model. Video quality assessment was performed directly on the received video files using FFmpeg-based tools, without relying on the Evalvid framework.

Both Quality of Service (QoS) and Quality of Experience (QoE) metrics were analyzed. The results show that OLSR is capable of delivering real-time video with acceptable visual quality in moderately dense MANET scenarios, achieving average Peak Signal-to-Noise Ratio (PSNR) values of approximately 29.6 dB, Structural Similarity Index(SSIM) values between 0.93 and 0.95, and Mean Opinion Score(MOS) scores ranging from 3.5 to 3.9. This work provides a validated experimental baseline for future research on QoE-aware optimization and adaptive video transmission in MANET environments.

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ISSN: 1817-2695 (Print); 2411-524X (Online)
Online at: https://jou.jobrs.edu.iq

## 1. Introduction

Mobile Ad Hoc Networks (MANETs) are decentralized wireless networks, meaning they consist of mobile nodes connected with multi-hop links which cannot be controlled by either a central infrastructure or a centralized point, as defined by [1], [2]. They serve simultaneously as host and router forwarding packets over other nodes. Being non-infrastructure-based, MANETs can be deployed in short bursts of time and with high flexibility, which is advantageous for services applications such as emergency response systems, military telecommunication, disaster recovery, and temporary wireless networking systems [3], [4]. However, it is not enough to rely on centralized control, the mobility of nodes, combined with the regular topology updates, leaves the problem of preserving stable and reliable communication somewhat difficult. Recently, real-time video streams over MANET have been increasingly considered in research. Contrary to the classical data traffic, the video streams are very fragile to network damage, caused by packet loss, delay, jitter [5], [6]. Even slight network-layer disruptions can yield distinct effects on application layer functionality, including frames freezing, distortion or playback interruptions. The traits result in video transmission being one of the most challenging services for mobile ad hoc. Widely adopted, among the MANET routing protocols for this task, the Optimized Link State Routing (OLSR) protocol is well-known for a proactive routing strategy and low route acquisition latency [7]. OLSR updates routing tables with control messages at intervals and uses the MultiPoint Relay (MPR) feature to save routing overhead without sacrificing network connection. As a consequence, proactive routing protocols are considered to be more suitable for delay-sensitive multimedia than reactive protocols [8], as has been the case in previous work on OLSR. The available work on video transmission using MANETs focuses on network performance, but the most common measurements are Quality of Service (QoS) throughput, delay, and packet delivery ratio. But by themselves QoS metrics do not represent actual visual quality perceived by end users. Quality of Experience (QoE) metrics, which compare video quality based on the streams that are received, offer a more realistic assessment of user perception [9]. Nonetheless, such practice works on directly pulling QoE metrics from the actual video files received in dynamic MANET environments are quite scarce. Driven by these findings, this work provides the experimental examination of real-time video transmission in an OLSR-mediated MANET based on the ns-3.41 network simulator. The research also follows a stepwise experimental approach from small network sizes up to a dynamic 25-node MANET, which is based on Random Waypoint mobility model. The quality of video is examined from the video streams received by objective QoE metrics, offering a sound experimental benchmark to further research in multimedia transmission and QoE-aware updates in MANET scenarios.

## 2. Background and related work

### 2.1. Overview of the OLSR Routing Protocol

OLSR (Optimized Link State Routing) is a proactive routing protocol for Mobile Ad Hoc Networks (MANETs). Unlike reactive routing protocols, which route only when data transmission is needed, OLSR maintains active routing information to all reachable nodes in the network by using periodic control messages [10], [11]. This proactive approach eliminates route discovery delay, which is especially critical for delay-sensitive applications (e.g., real-time video communications). OLSR uses two major forms of control messages: HELLO messages for neighbor detection and link sensing, and Topology Control (TC) messages to disseminate network topology information. In order to reduce excessive flooding overhead, OLSR mainly applies the MPR (MultiPoint Relay) approach, where only a subset of nodes retransmits control messages while maintaining proper network connectivity [12], [13]. OLSR has established itself as the fundamental underlying protocol for MANET research because of this reason and has been widely applied and standardized by the IETF in RFC 3626 [7].

### 2.2. Video Transmission over MANETs Using OLSR

Apart from the various routing protocols like OLSR and AODV, previous works have reported on the feasibility of transmitting video streams over MANETs. Previous works have indicated that proactive routing protocols usually give much less end-to-end delay due to their lower latencies than reactive protocols, which can be a plus in multimedia applications [12]. Of course, OLSR has shown improved performance in maintaining continuous video playback under moderate mobility conditions. However, most existing work has mainly concentrated on network-level performance indicators like delay, throughput, routing overhead, and packet delivery ratio, rather than a comprehensive scrutiny of the actual video quality perceived by the end user [13]. Consequently, the inferences from these studies cannot be taken accurately in the visual aspect, especially the results of the actual visual experience of the users might be inaccurate, especially in highly dynamic MANET scenarios.

## 2.3. QoS and QoE Evaluation in MANET Multimedia Studies

Quality of Service (QoS) metrics have been extensively used to assess the performance of multimedia transmission over MANETs. Typical QoS measures include end-to-end delay, jitter, throughput, and packet loss ratio, which offer information related to network behavior and routing efficiency [9]. These are key metrics to analyze, but they do not give insight about the perceived quality of video at the user level. Recently, there has been a growing attention paid to Quality of Experience (QoE) evaluation to remedy this issue. QoE metrics including Peak Signal-to-Noise Ratio (PSNR), Structural Similarity Index (SSIM), and Mean Opinion Score (MOS) measure video quality through visual content and human perception [9]. However, the majority of current findings are based on theoretical models, offline datasets, or simplified evaluation frameworks, which do not rely on the direct extraction of QoE metrics from received video files under realistic MANET conditions.

## 2.4. Research Gap and Motivation

From the literature review, it can be seen that while OLSR has been studied as a MANET routing protocol quite a bit, experimental work that also considers the dynamic node mobility, multi-hop routing as well as direct QoE extraction from real video streams is still missing. The majority of the previous works highlight the QoS-based evaluation, and the practical QoE assessments are still scarce. This gap means there needs to be validated experimental baseline evaluation scenarios to realistically examine video transmission performance based on objective QoE metrics over OLSR-based MANETs.

## 2.5. Related Work

In order to provide a clear overview of existing research efforts and to show the relative importance of the contribution of the work in the literature, a comparative summary of the relevant work of the literature on video transmission over MANETs is shown in Table 1. The comparison addresses the chosen routing protocols, video transmission methods, the evaluation metrics, and experimental characteristics. This structured comparison reveals generic limitations present in existing papers and elucidates what the present work does differently by presenting simulation-driven evaluation with immediate Quality of Experience (QoE) extraction from received video streams.

**Table 1**. Comparative summary of related work on video transmission over MANETs

| Ref | Year | Protocols | Video | Metrics | Key Findings | Comparison with the Present Study |
|---|---|---|---|---|---|---|
| [14] | 2020 | QoS/QoE Mobility Modeling (No Routing Protocol Examined) | No | Mobility Metric, Poisson Distribution, QoS/QoE | Proposed a Poisson-based mobility model to theoretically improve QoS/QoE and network stability without | The study is purely theoretical and does not evaluate real video streaming. In contrast, the present study provides a practical H.264 video transmission framework with direct QoE extraction from received video files. |

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| | | | | | modifying routing protocols. No real video simulation was conducted. | |
| [15] | 2021 | QoE VCS Framework (Smartphone-based) | Yes | MOS (User-Based QoE) | Proposed a video content selection algorithm based on MOS feedback collected from smartphone users. | While this work focuses on smartphone-based QoE selection, the present study evaluates real-time video transmission over MANETs using OLSR with objective QoE metrics extracted from received video streams. |
| [16] | 2021 | MANET + VLC + Neural Network (No OLSR Simulation) | Yes | MOS, BRISQUE, Feature Extraction | Utilized datasets and machine learning techniques for QoE prediction without real MANET routing simulation. | This study relies on datasets and machine learning without simulating real MANET routing. The present study performs actual video transmission over a dynamic MANET with multi-hop routing and real QoE evaluation. |
| [17] | 2021 | Multimetric Routing (QoS + Social Tie Strength) | Yes | Delay, Jitter, Packet Loss, Tie Strength | Improved QoS using social-aware routing metrics; experiments were limited to ns-2 and did not extract real video QoE. | Although QoS is improved using social-aware metrics, QoE is not extracted from real video transmission. The present study evaluates real video QoE using ns-3.41 and FFmpeg-based analysis. |
| [18] | 2022 | OLSR, AODV | Yes | Delay, Load, Throughput | Demonstrated that OLSR outperforms AODV for video streaming based on QoS metrics. | While this work compares routing protocols using QoS metrics only, the present study extends the evaluation by measuring actual QoE metrics derived from received video files. |
| [19] | 2022 | QoE Assessment / Adaptive Streamin | Yes | PSNR, SSIM, MS-SSIM, SROCC, | Highlighted the lack of real QoE evaluation from received video files | This study identifies the research gap without generating real data. The present study addresses this gap by producing received H.264 video files and extracting QoE metrics, |

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| | | g / ML Models | | PLCC, SQI | and emphasized the need for practical datasets. | providing a practical experimental baseline. |
| [20] | 2022 | AODV, OLSR, ZRP (Comparison) | No | Delay, Throughput, Jitter, Routing Overhead | Showed better delay and throughput for OLSR but did not include real video streaming or QoE evaluation. | Although routing performance is analyzed, real video transmission and QoE evaluation are absent. The present study completes this missing aspect through real video transmission and QoE analysis. |
| [21] | 2023 | OLSR, AODV, DSDV, DSR | Yes | Delay, Jitter, PDR, PD, Overhead, Throughput | Reported superior QoS performance of OLSR compared to other routing protocols. | This work evaluates routing performance using QoS metrics only. In contrast, the present study includes direct QoE evaluation from received video streams, offering a more realistic multimedia assessment. |
| [22] | 2023 | UDP-based Adaptive Video Streaming over WLAN | Yes | Throughput, Buffer Status, Rate Adaptation | Developed an ns-3-based adaptive streaming platform for wireless networks. | While this study focuses on WLAN environments, the present study evaluates video transmission over MANETs with mobility, OLSR routing, and real QoE extraction. |
| [23] | 2024 | Enhanced OLSR + Deep Learning + Blockchain | Yes | PDR, AED, Throughput, Routing Overhead | Achieved improved video transmission performance using intelligent routing and security mechanisms. | This work applies advanced optimization techniques, whereas the present study evaluates standard OLSR and establishes a baseline with real QoE results suitable for future enhancements. |
| [24] | 2024 | AI-based MANET over Bluetooth (No NS-3 / No Routing Protocol) | Yes | Latency, RSSI, BER, Throughput, QoS, QoE | Improved latency and stability using AI-based compression in offline Bluetooth MANETs. | This study does not simulate routing protocols or ns-3 environments. The present study evaluates real OLSR-based MANET video transmission with dynamic mobility using ns-3. |
| [25] | 2025 | DRL-based Adaptive Video Streamin | Yes | QoE, Bitrate Adaptation, Buffer, | Improved QoE using cross-layer DRL techniques | Although DRL is applied in non-MANET scenarios, the present study provides a real OLSR-based MANET baseline that can be extended using |

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| | | g (Non-MANET) | | Online Tuning | outside MANET environments. | similar learning-based techniques. |
| [26] | 2025 | AI-based QoE Prediction (5G Networks) | Yes | MOS, Resolution Changes, RSRP, RSRQ, SNR | Demonstrated that QoE can be predicted using channel metrics in 5G networks. | This study does not evaluate MANET routing. The present study generates realistic QoE data from actual video transmission over MANETs, supporting future ML-based QoE models. |
| Present Study | 2025 | MANET with Dynamic Mobility – 25 Nodes | Yes | PSNR, SSIM, MOS, Delay, Jitter, Throughput | Developed a step-by-step experimental framework from 2 to 25 nodes with real QoE extracted from received video streams. | This work establishes a validated experimental MANET baseline suitable for future metaheuristic routing and adaptive video transmission research. |

## 3. System Model and Methodology

In this section, the overall system model and the developed method to achieve performance measures, the implementation and validation for real-time video transmission in a MANET (Mobile Ad Hoc Network) using the Optimized Link State Routing (OLSR) protocol, respectively, are reported. The approach considered here is the development of a feasible and reproducible simulation scenario that is realistic for MANETs when nodes move around and multi-hop communication occurs. The system deployed is composed of a cluster of ad hoc wireless mobile nodes. Each node carries an interface connected to WiFi so as to send packet forwarding through the OLSR routing protocol. A source node sends a pre-coded video stream to a designated destination node, while the remaining nodes act as intermediate routers. This arrangement creates multi-hop routing paths and allows an evaluation of a routing protocol under dynamic network conditions. Communication video transmission is done using User Datagram Protocol (UDP). This is a technology used for real-time multimedia applications because it makes it easy to transmit video without having additional transmission overhead and is tolerant to packet loss. The original video sequence is encoded offline using the H.264 compression standard and segmented into packets suitable for transmission over the wireless network. At the receiver side, the received packets are reconstructed to generate the received video stream. Instead of utilizing a fully-built video simulation framework, we employ a manual video processing pipeline in FFmpeg. This allows you to have a direct manipulation of video encoding and decoding and quality assessment, while at the same time preventing compatibility-related problems with other platforms outside the toolkit. The quality of the downloaded video is evaluated subsequently by comparing it with the original video through objective Quality of Experience (QoE) metrics. The experimental framework was developed gradually to ensure reliability and correctness. Initially, the experiments were performed on very small networks to test packet transmission, routing behaviour, and video reconstruction. The system was later gradually scaled to larger and more dynamic situations. The step-by-step approach allowed each instrument to be systematically and objectively verified prior to performing final experiments under realistic MANET conditions.

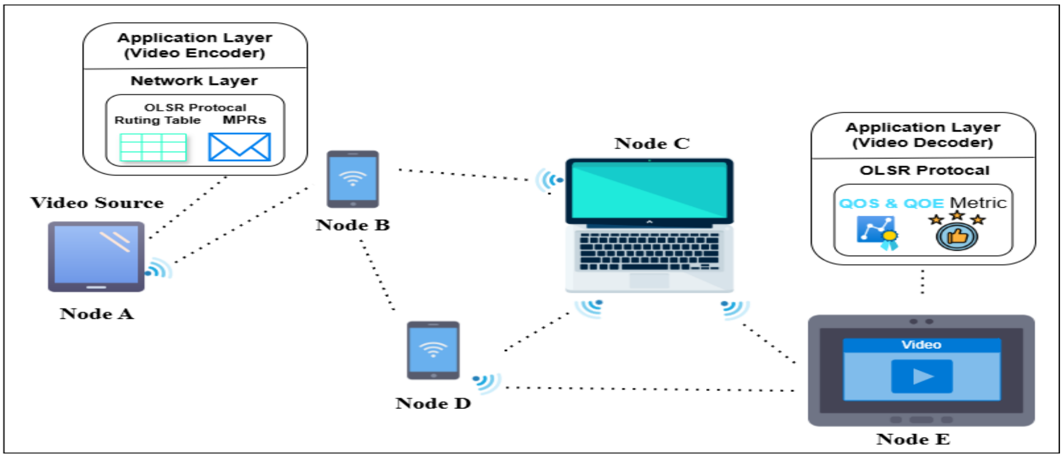


**Fig. 1.** System architecture for real-time video transmission over OLSR-based MANET

## 4. Simulation Environment and Configuration

This section presents the simulation environment and configuration parameters used to evaluate real-time video transmission over an OLSR-based Mobile Ad Hoc Network (MANET). All experiments were conducted using the ns-3.41 network simulator on Ubuntu Linux. The simulated network consists of mobile ad hoc wireless nodes equipped with IEEE 802.11g Wi-Fi interfaces operating in ad hoc mode. A constant physical layer (PHY) data rate of 6 Mbps was used with OFDM modulation, and the maximum effective communication range was set to approximately 80 m per node. This setup represents a true MANET environment with no fixed infrastructure or access points, where communication relies solely on multi-hop wireless links.

The wireless channel followed the Log-Distance propagation model. The H.264 video stream was pre-encoded at a resolution of 640×360 pixels, a frame rate of 30 fps, and a target bitrate of 300 kbps before transmission over UDP.

The mobility of nodes was characterized using the Random Waypoint (RWP) mobility model widely used in MANET simulations. In this model, each node picks a destination randomly within the simulation area, moves toward it at a random speed, pauses for a predetermined time before continuing the process. This mobility behavior results in dynamic topological variations and realistic routing problems for the OLSR protocol.

The simulation scenarios were developed gradually to evaluate scalability and routing behavior at increasing network density. The number of nodes is incremented from smaller to a dynamic MANET with 25 mobile nodes. For every case, a single source–destination pair was utilized for video transmission and other nodes were placed in the middle of the network as forwarding routers. This setup has the advantage of multi-hop routes and systematized performance comparison for routing under different mobility and network size. The default ns-3.41 configuration was utilized to implement the OLSR routing protocol on all nodes. For OLSR operation, they rely on periodic HELLO messages for neighbor discovery and Topology Control (TC) messages for route dissemination. No protocol-specific optimizations were applied that would affect the baseline results of existing standard OLSR under realistic MANET conditions.

## 5. Performance Metrics

To assess the performance of real-time video in OLSR-based Mobile Ad Hoc Network (MANET), a combination of Quality of Service (QoS) and Quality of Experience (QoE) metrics are used commonly followed in MANET multimedia studies [9], [27], [28]. These metrics permit the full assessment of network behavior and perceived quality of video.

### *A. Quality of Service (QoS) Metrics*

The network performance is assessed with performance measurement using the following QoS measures which are commonly adopted in MANET video transmission analysis [9], [23], [26]:

- End-to-End Delay:

End-to-end delay is the average time from the source node to the destination node for the data packets. In mobile ad hoc network contexts, delay values lower than about 500 ms are generally considered acceptable for real-time video transmission. This threshold is consistent with the ITU-T G.114 recommendations, which indicate that one-way audio and video latency within this range remains tolerable for interactive and conversational multimedia services[30].

- Jitter:

Jitter describes the variation in packet delay over time. Lower jitter values signal stable packet arrival [26] and allow smoother video playback. MANET video streaming generally considers jitter values within the short range of milliseconds as acceptable [23], [26].

- Throughput:

Throughput is a measure of the effective data transfer rate achieved to the receiver. The throughput of the streaming video should be enough to give continuous playback, and this interpretation is closely associated with the chosen video bitrate and packetization strategy[27].

### *B. Quality of Experience (QoE) Metrics*

The perceived visual quality of the received video is measured with an objective QoE metric that can be retrieved from the content of the received video streams. These measurements have been widely used in multimedia MANET research, showing a direct relationship between network performance and user perception [9], [27], [28].

- Peak Signal-to-Noise Ratio (PSNR): PSNR measures the distortion between frames of the original and received video. In practical applications of MANET videos, it is generally accepted that PSNR values greater than 28 dB are acceptable for the visual aspects and PSNR values greater than 30 dB correspond to a good image quality [27], [28].
- Structural Similarity Index (SSIM): The Structural Similarity Index (SSIM) measures the structural similarity between the original and received video sequences, with values from 0 to 1. Values of SSIM generally beyond 0.90 are seen as high visual similarity in dynamic wireless video-transmitting conditions [28], [29].
- Mean Opinion Score (MOS): MOS represents the perceived video quality on a subjective scale (1= poor, 5= excellent). In MANET based video studies, MOS values of 3 to 4 are frequently linked with good or acceptable visual quality [28].

Through these QoS and QoE measurements, they allow for meaningful interpretation of experimental results and direct comparison between the values obtained and the reported accepted quality ranges in other MANET multimedia studies.

## 6. Results And Discussion

In this section, experimental results from the assessment of real-time video streaming via the OLSR-based MANET are presented and discussed. It describes Quality of Service and Quality of Experience (QoE) metrics and demonstrates how network density, mobility and the transmission parameters affect video delivery performance.

### *A. QoS Performance Analysis*

Real-time video transmission quality of service (QoS) performance on the OLSR-based MANET was analyzed by taking its end-to-end delay, jitter and throughput metrics from the ns-3 trace files. This was compared across increasing magnitude network scenarios to measure the effect on routing behaviour of node density and mobility. This was also seen to increase with increasing the size of the network, as end-to-end delay increased. This is largely due to longer multi-hop paths and more frequent route updates, which occur due to node mobility. Regardless, the average delay for video traffic remained well within acceptable limits despite the largest evaluated scenario of 25 mobile nodes; suggesting that the proactive routing by OLSR effectively minimizes the route acquisition delay. Values of jitter were relatively low and stable across all scenarios, consistent with the same packet arriving at the receiver in the presence of frequent topology changes. Low jitter is a vital condition in real-time video streaming, reducing playback interruptions and buffering events. The stability evidenced here indicates that OLSR is capable of providing time-aware packet consistency on moderate MANET mobility. After throughput analysis, we observed that the network was able to maintain the video bitrate required under all scenarios. Some small variations in throughput were observed with increasing network density, but the output video levels were sufficient for on-going video playback. These results suggest that although QoS measures may be the evidence that the network performance is acceptable, they are not enough to provide a complete view of perceived video quality, which is examined with QoE.

## *B. QoE Performance Analysis*

The QoE evaluation provides a direct measure of the perceived visual quality of the received video streams. For the final 25-node MANET scenario, the Peak Signal-to-Noise Ratio (PSNR) obtained was around 29.6 dB, which falls within the acceptable range for video transmission over dynamic multi-hop wireless networks. This suggests that the video received in this case retained a reasonable fidelity in spite of packet loss and mobility-induced disruptions. In addition, the Structural Similarity Index (SSIM) scores were similarly in the range of 0.93-0.95, indicating a high degree of structural similarity, since the original and received video sequences were significantly similar. These numbers imply that the critical video visuals were fairly consistent during transmission. The Mean Opinion Score (MOS) values of the scenarios were between 3.5 and 3.9 (perceived video quality good to very good according to standard MOS interpretation scales). These findings verify that the video was still perceptually acceptable to the end-users under moderate network density and mobility. For illustration of how transmission conditions affect video quality, the change seen in PSNR and SSIM with respect to transmission power for the 25-node MANET scenario can be found in Figures 2 and 3. It can be seen that improving the transmission power brings higher video quality up to a level at which the gains are negligible or very low in comparison to the transmission strength and network interference.

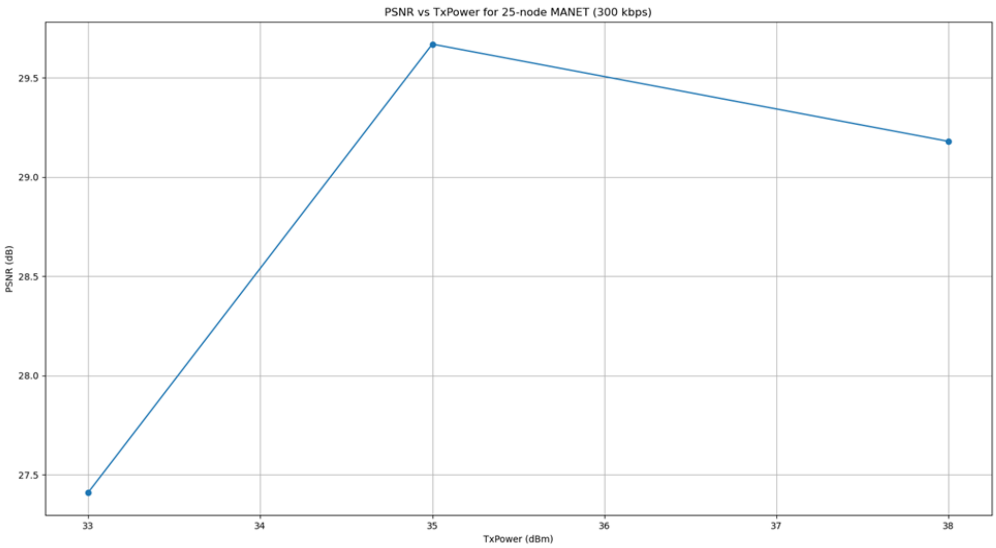


**Fig. 2.** PSNR variation with transmission power for a 25-node MANET at 300 kbps

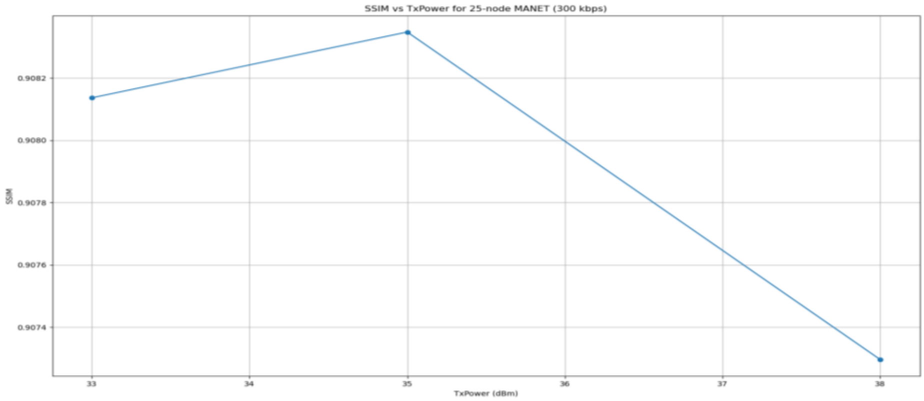


**Fig. 3.** SSIM performance versus transmission power in a 25-node MANET scenario.

### *C. Joint QoS–QoE Interpretation*

A notable observation based on the experiment results is the discrepancy between QoS and QoE indicators. While some cases reached relatively enhanced throughput, the visual quality was worse due to higher packet loss and distortion at the application layer. However, for the ones with some less throughput but consistent response: Results were better in terms of the QoE metrics. As a result, it validates that increased throughput in the network doesn't have to be better for user experience. Finally, the results show that standard OLSR can handle real-time video transmission over MANETs up to a moderate network size. But as the number of nodes increases and mobility increases, the drawbacks of baseline routing become apparent. These results underscore the need for integrating QoE-aware mechanisms into the future MANET routing and adaptation strategies.

## 7. Conclusion And Future Work

In this paper, we conducted a full experimental evaluation of real-time video transmission using the Optimized Link State Routing (OLSR) protocol over a Mobile Ad Hoc Network (MANET). It applied an iterative experimental approach starting with small network configurations and escalating to a dynamic MANET system with 25 mobile nodes. It was essential to study the routing behavior and the performance of video streams at different network density and mobility. The results show that baseline OLSR can be used to transmit video in real-time under moderate MANET conditions. The Quality of Service (QoS) metrics we evaluated were still within acceptable limits for multimedia applications, and the Quality of Experience (QoE) metrics we extracted demonstrated that the received video quality was satisfactory. Regarding the PSNR, SSIM, and MOS values, we can see that the visual experience remained usable with video transmission despite restrictions imposed by node mobility and multi-hop wireless routing. Nonetheless, the consequences also demonstrate the inevitable constraints of conventional OLSR under dynamic networks. With the increased node density and mobility, the overhead of routing and link instability start to affect the quality of video, which are suggestive that traditional routing mechanisms are insufficient to offer good quality multimedia content in highly dynamic MANET setups. Thus this analysis results in a verified experimental baseline and not an end-in-all resolution. It provides a basis for further work that aims to improve video transmission performance through Quality of Experience–aware optimization mechanisms, adaptive transmission strategies, and intelligent routing approaches capable of responding dynamically to network conditions. These extensions are likely to raise the level of video quality and robustness far beyond the capacity of baseline OLSR.

**Conflict of Interest Statement:** No potential conflicts of interest were reported by the authors or editors involved in this work.

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Journal of Basrah Researches (Sciences) **51**(2), 293 (2025)
DOI: https://doi.org/10.56714/bjrs.51.2.21

# قياس مباشر لجودة التجربة (QoE) لبث الفيديو المباشر بتقنية H.264 في شبكات MANETالمعتمدة على بروتوكول OLSR: إطار عملي تجريبي باستخدام ns-3 وFFmpeg

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**معلومات البحث**

الاستلام 30 تشرين أول 2025
المراجعة 06 تشرين ثاني 2025
القبول 20 كانون أول 2025
النشر 31 كانون أول 2025

**الكلمات المفتاحية**

شبكات الاتصال المتنقلة ذاتية التنظيم (MANETs) ، بروتوكول التوجيه بالحالة المحسّنة للوصلات(OLSR) ، نقل الفيديو في الزمن الحقيقي،جودة الخدمة(QoS) ، جودة التجربة (QoE)، بث الفيديو بصيغةH.264 .

**Citation:** H. S. F. Al-Asadi et al., J. Basrah Res. (Sci.) **50**(2), 293 (2025). DOI:https://doi.org/10.56714/bjrs.51.2.21

**الملخص**

تُعد شبكات الاتصال المتنقلة ذاتية التنظيم (MANETs) من الشبكات اللاسلكية التي تعمل دون بنية تحتية ثابتة، حيث تتواصل العقد المتحركة فيما بينها عبر مسارات متعددة القفزات. ويُعد نقل الفيديو في الزمن الحقيقي عبر هذا النوع من الشبكات تحدياً كبيراً بسبب حركة العقد المستمرة، وتغيّر الطوبولوجيا، ومحدودية عرض الحزمة، وعدم استقرار المسارات.

في هذا البحث، تم تقديم تقييم تجريبي كامل لنقل الفيديو في الزمن الحقيقي عبر شبكة MANETتعتمد بروتوكول التوجيه OLSR باستخدام محاكي الشبكات ns-3.41ضمن بيئة نظام تشغيل لينكس. جرى إرسال فيديو مشفّر مسبقاً بصيغة H.264عبر سيناريوهات شبكية متدرجة، بدءاً من شبكات صغيرة وانتهاءً بشبكة مكونة من 25 عقدة متحركة باستخدام نموذج الحركة Random Waypoint تم تقييم جودة الفيديو مباشرة من الملفات المستلمة باستخدام أدوات FFmpeg دون الاعتماد على إطارEvalvid .

تم تحليل مقاييس جودة الخدمة (QoS) وجودة التجربة(QoE) ، وأظهرت النتائج أن بروتوكول OLSR قادر على دعم نقل الفيديو بجودة مقبولة ضمن شبكات MANETذات كثافة متوسطة، حيث تم تسجيل قيم نسبة الإشارة إلى الضجيج القصوى(PSNR) بحدود 29.6 dB، وقيم مؤشر التشابه البنيوي(SSIM) بين 0.93 و0.95، إضافة إلى متوسط درجة الرأي(MOS) تراوحت بين 3.5 و3.9. ويوفر هذا العمل أساساً تجريبياً موثوقاً للأبحاث المستقبلية في تحسين جودة التجربة في شبكاتMANET .

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ISSN: 1817-2695 (Print); 2411-524X (Online)
Online at: https://jou.jobrs.edu.iq