Optimized Link State Routing Protocol

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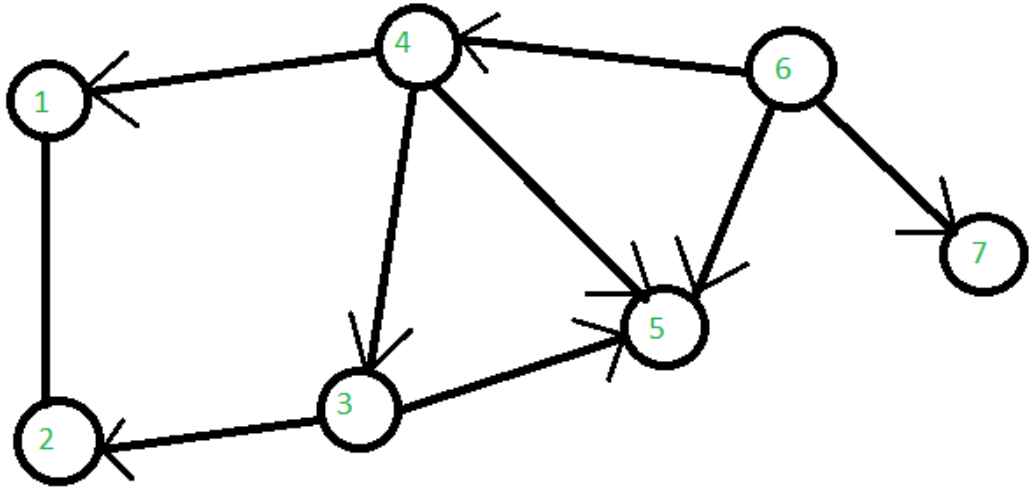
OLSR stands for **Optimized Link State Routing** Protocol. In this, each node periodically floods status of its links. Each node re-broadcasts link state information received from its neighbors. Each node keeps track of link state information received from other nodes. Each node uses above information to determine next hope to each destination. It is proactive and table-driven.

Link State Routing :

- Each node expands a spanning tree.
- Each node can obtain the whole network topology.

Example:

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TC(6) = <4, 5, 7>
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- Node 6 generates a TC message advertising nodes in MS(6) = {4, 5, 7}.
- Node 4 forwards TC(6) from Node 6 and Node 3 forwards TC(6) from Node 4.
- After nodes 3, 4 and 6 have generated TC messages, all nodes have link-state information to route to any node.

It utilizes a technique to reduce message flooding – **MultiPoint Relaying (MPR)**. In this, each node N in the network selects a set of neighbor nodes as multipoint relays, MPR(N), that retransmit control packets from N- Neighbors not in

Advantages of OLSR:

- OLSR has less average end-to-end delay therefore it is used for applications that needs minimum delay.
- The OLSR implementation is more user-friendly and worked with fewer headaches than other protocols.
- It is also a flat routing protocol.
- It does not need a central administrative system to handle its routing process.
- It increases the protocol's suitability for an ad hoc network with the rapid changes of the source and destination pairs.
- It does not require the link which is reliable in controlling messages, since the messages are sent periodically and the delivery does not have to be sequential.
- Reduced network overhead: OLSR reduces the amount of network overhead by only transmitting topology information when there is a change in the network topology. This helps to conserve network resources and reduce congestion.
- Scalability: OLSR is designed to be scalable, which means that it can handle large networks with many nodes without a significant increase in overhead or delay. This makes it suitable for use in large ad hoc networks.
- Multiple routes: OLSR is capable of finding multiple routes between source and destination nodes, which can help to increase the reliability and resilience of the network.
- Energy efficiency: OLSR is designed to be energy-efficient, which makes it suitable for use in wireless networks with limited battery power. This is achieved by reducing the number of broadcast messages and optimizing the routing process.
- Dynamic network topology: OLSR is capable of adapting to changes in the network topology quickly, which makes it suitable for use in dynamic environments such as mobile ad hoc networks.

Disadvantages of OLSR :

- It maintains routing table for all the possible routes.
- When the number of mobile hosts increases, then the overhead from the control messages also increases.
- It needs considerable time to re-discover a broken link.

- Limited Scalability: OLSR can suffer from scalability issues in large-scale networks with thousands of nodes. As the network grows, the size of the routing table increases, which can lead to a significant increase in control message overhead.
- Increased Latency: OLSR may introduce additional latency in the network due to the time it takes to discover and update routes. This latency can be especially problematic in real-time applications such as video conferencing or online gaming.
- Susceptible to Security Attacks: OLSR's reliance on broadcast messages makes it vulnerable to attacks such as spoofing and black hole attacks. These attacks can disrupt the network by causing nodes to send traffic to incorrect destinations.
- Limited Quality of Service Support: OLSR does not provide strong support for Quality of Service (QoS) requirements. This can be problematic in applications that require guaranteed levels of bandwidth, latency, or packet loss.
- Difficulty in Configuration: OLSR can be difficult to configure, especially for non-experts. The protocol has a large number of parameters that need to be tuned correctly for optimal performance, and this can be a challenge for users who are not familiar with networking concepts.

Application of OLSR:

1.Military correspondences: OLSR is generally utilized in military interchanges organizations, where it tends to be utilized to lay out and keep up with correspondence joins between military vehicles and staff. This is significant for strategic tasks in the field, where dependable and proficient correspondence is basic.

2.Disaster reaction: OLSR can likewise be utilized in a debacle reaction situations, where it very well may be utilized to lay out correspondence joins between crisis responders in the field. This is significant for planning search and salvage endeavors, and for guaranteeing that basic data is divided among responders progressively.

3.Smart urban areas: OLSR can be utilized in shrewd city applications to lay out and keep up with correspondence joins between various sensors and gadgets in the organization. This can empower ongoing checking and control of different

4.Industrial computerization: OLSR can be utilized in modern robotization applications, where it tends to be utilized to lay out correspondence joins between various sensors and gadgets in a plant or other modern setting. This can empower constant observing and control of different modern cycles, which can further develop proficiency and lessen costs.

5.Wireless Mesh Networks: OLSR can be used in wireless mesh networks (WMNs) to establish and maintain routing paths between different nodes in the network. WMNs are used in various applications such as community networks, disaster response networks, and sensor networks.

6.Internet of Things (IoT): OLSR can be used in IoT applications to establish and maintain communication links between different devices in the network. This can enable real-time monitoring and control of various IoT devices such as sensors, actuators, and smart home appliances.

7.Mobile Ad hoc Networks: OLSR can be used in mobile ad hoc networks (MANETs) to establish and maintain communication links between different mobile devices in the network. MANETs are used in various applications such as military communications, disaster response, and vehicle-to-vehicle (V2V) communications.

8.Multimedia Streaming: OLSR can be used in multimedia streaming applications to establish and maintain high-bandwidth communication links between different nodes in the network. This can enable real-time streaming of multimedia content such as video and audio.

9.Sensor Networks: OLSR can be used in sensor networks to establish and maintain communication links between different sensors in the network. This can enable real-time monitoring of various environmental parameters such as temperature, humidity, and air quality.

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