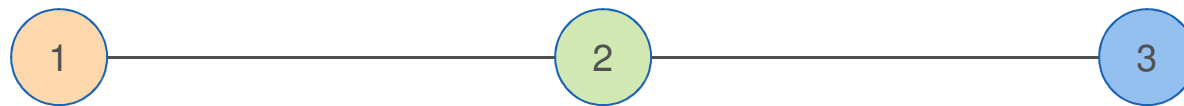


# Native route discovery algorithm

Starting conditions

- Node 1 needs to send data to node 3
- Routing tables are empty
- There is no direct path between node 1 and node 3



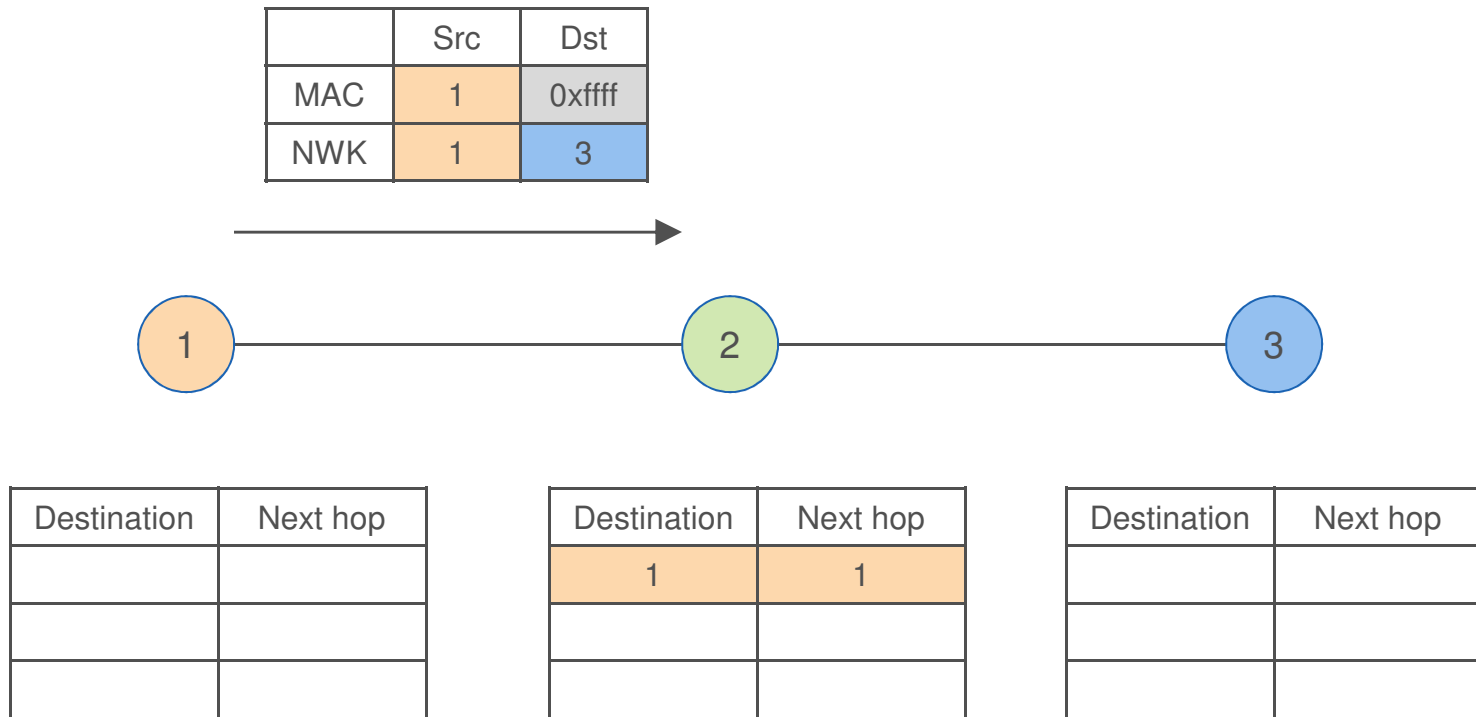
| Destination | Next hop |
|-------------|----------|
|             |          |
|             |          |
|             |          |

| Destination | Next hop |
|-------------|----------|
|             |          |
|             |          |
|             |          |

| Destination | Next hop |
|-------------|----------|
|             |          |
|             |          |
|             |          |

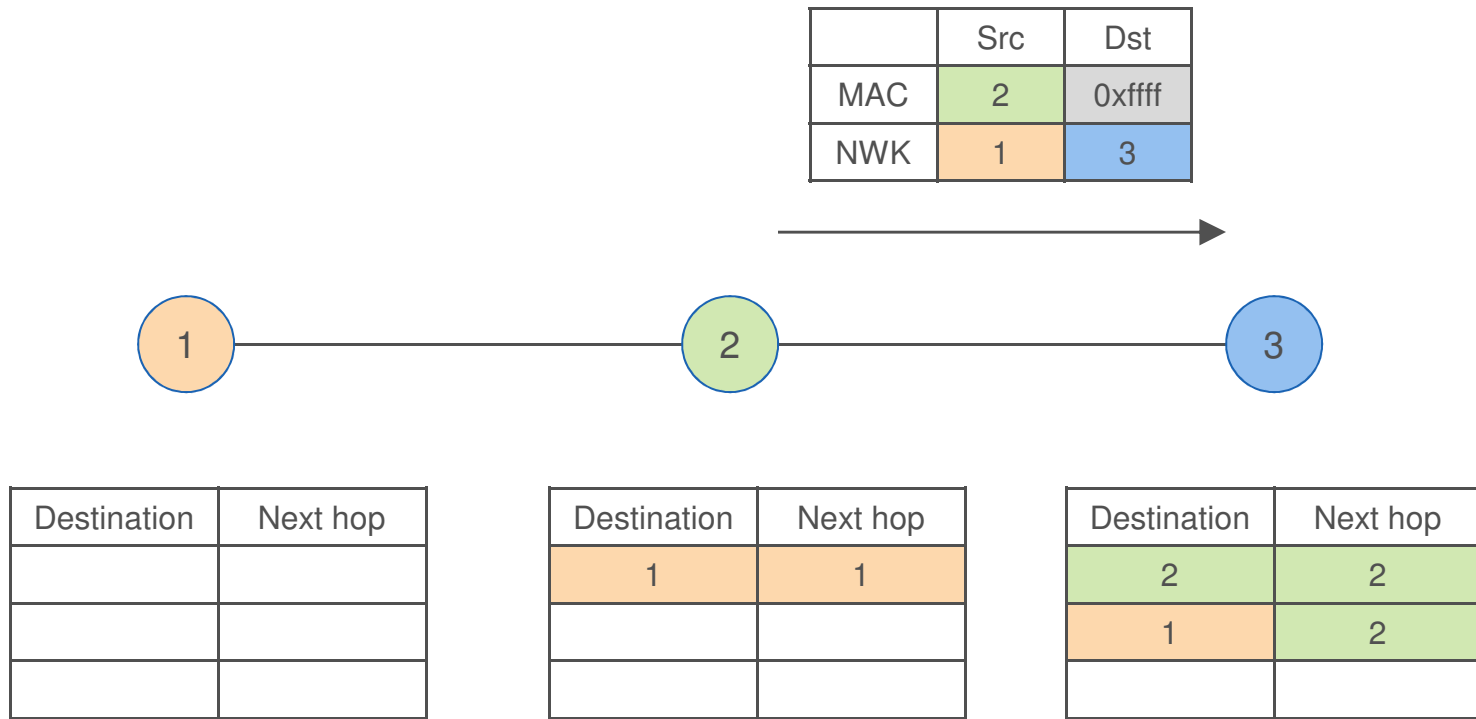
# Native route discovery algorithm

Step 1 of 5



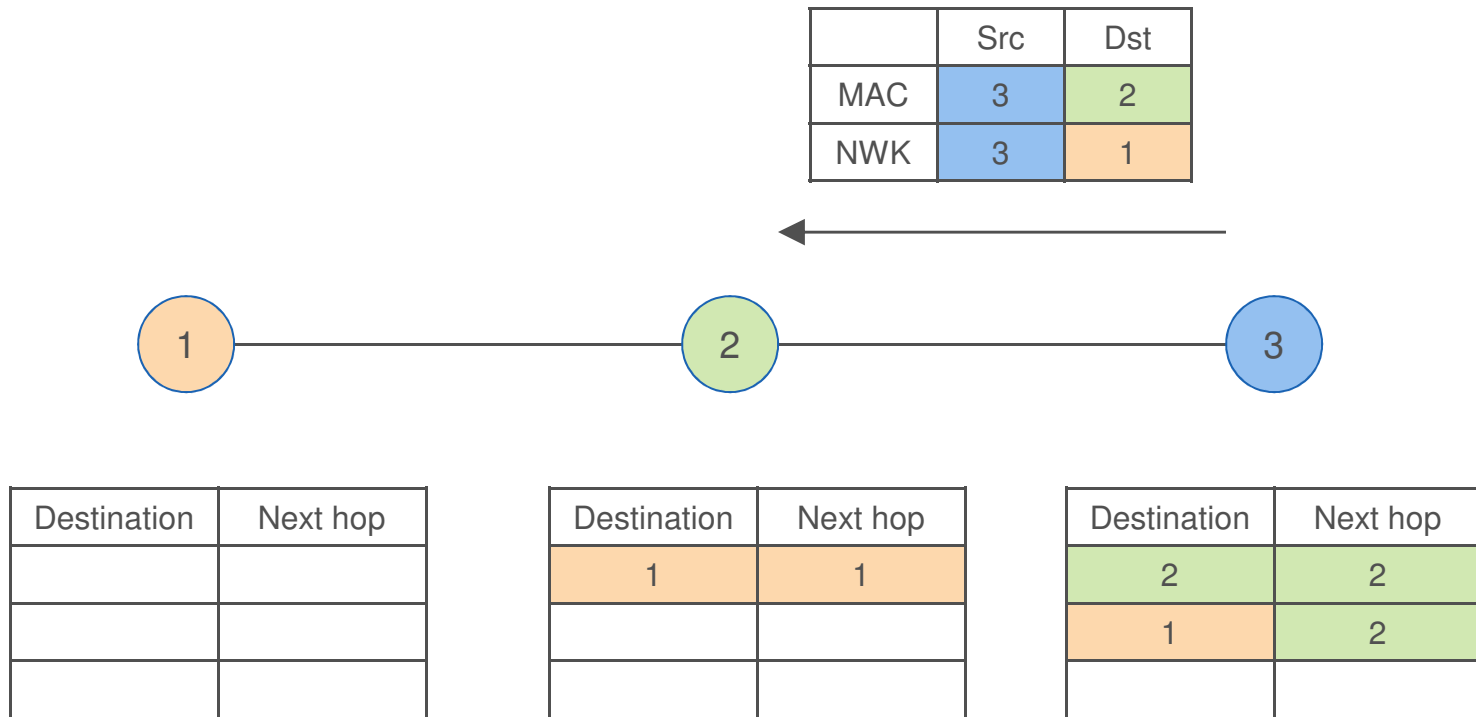
# Native route discovery algorithm

Step 2 of 5



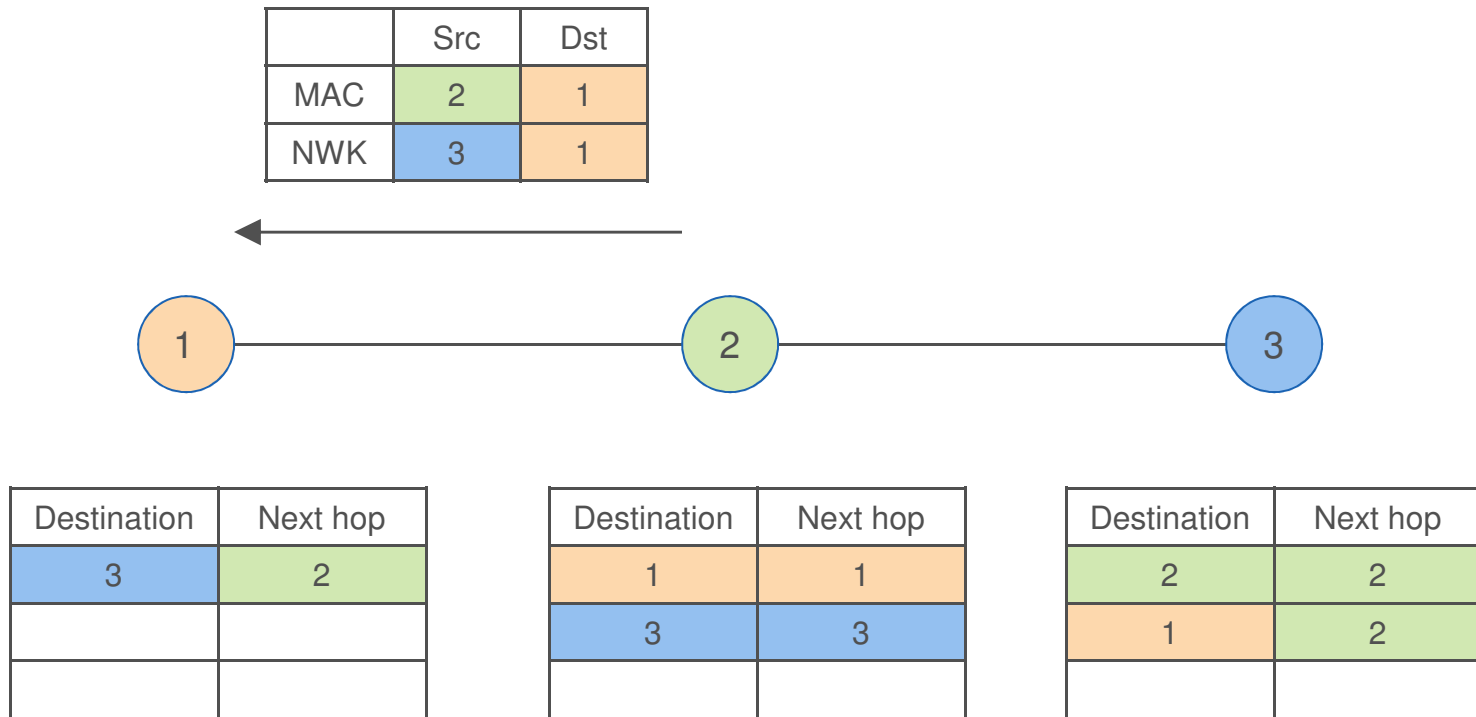
# Native route discovery algorithm

Step 3 of 5



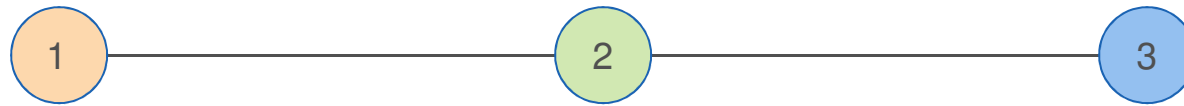
# Native route discovery algorithm

Step 4 of 5



# Native route discovery algorithm

Step 5 of 5



| Destination | Next hop |
|-------------|----------|
| 3           | 2        |
|             |          |
|             |          |

| Destination | Next hop |
|-------------|----------|
| 1           | 1        |
| 3           | 3        |
|             |          |

| Destination | Next hop |
|-------------|----------|
| 2           | 2        |
| 1           | 2        |
|             |          |

# AODV route discovery algorithm

## Introduction

- AODV – Ad-hoc On-demand Distance Vector
- LQI (Link Quality Indicator) is used to evaluate and compare potential routes
- LQI from the transceiver is linearized to get a Link Quality index proportional to the probability of delivery of the frame over the segment.
- Combined Link Quality of two segments is calculated as

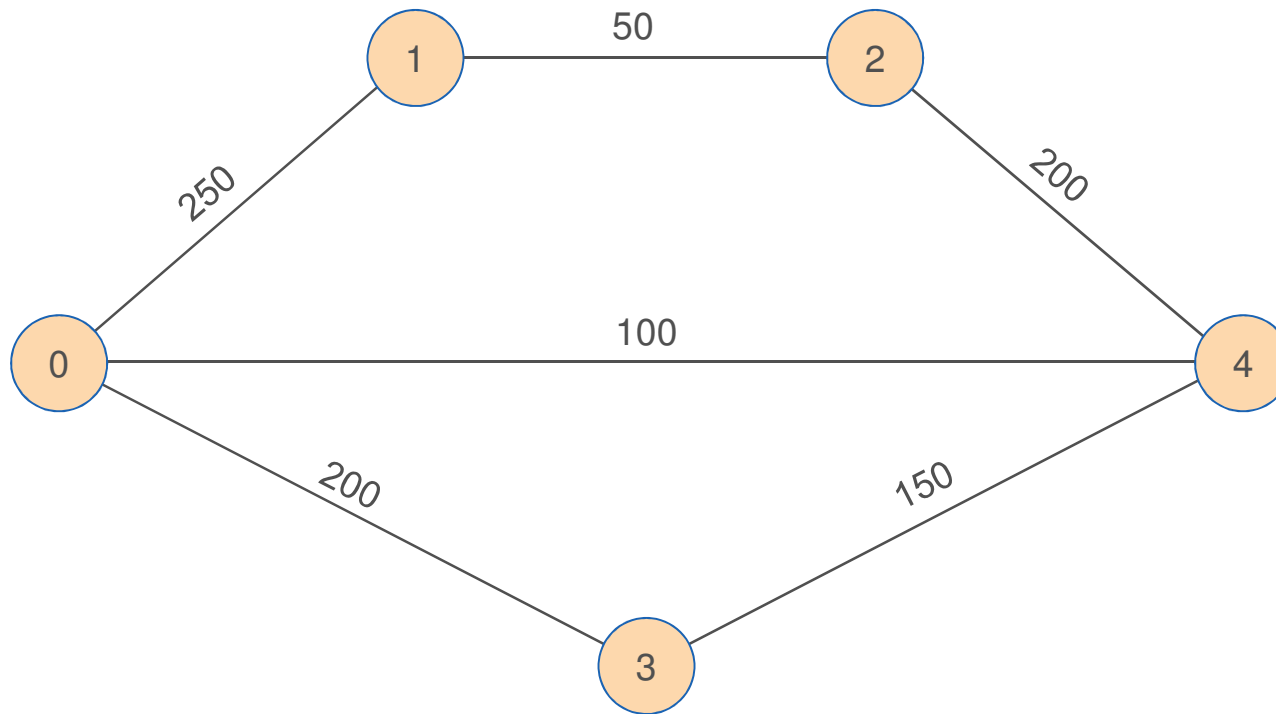
$$LQ_{ab} = (LQ_a * LQ_b)/256$$

- Other parameters of the link can be used as a Link Quality index

# AODV route discovery algorithm

Starting conditions

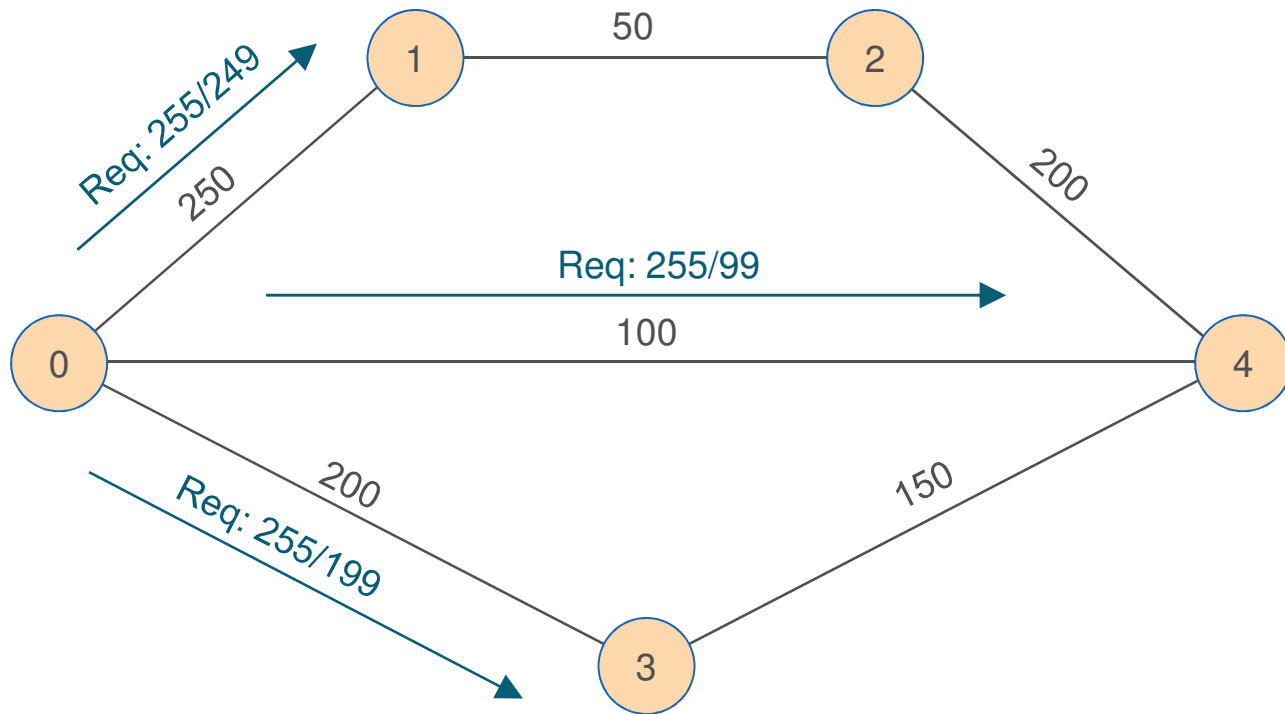
- Node 0 needs to discover route to the node 4





# AODV route discovery algorithm

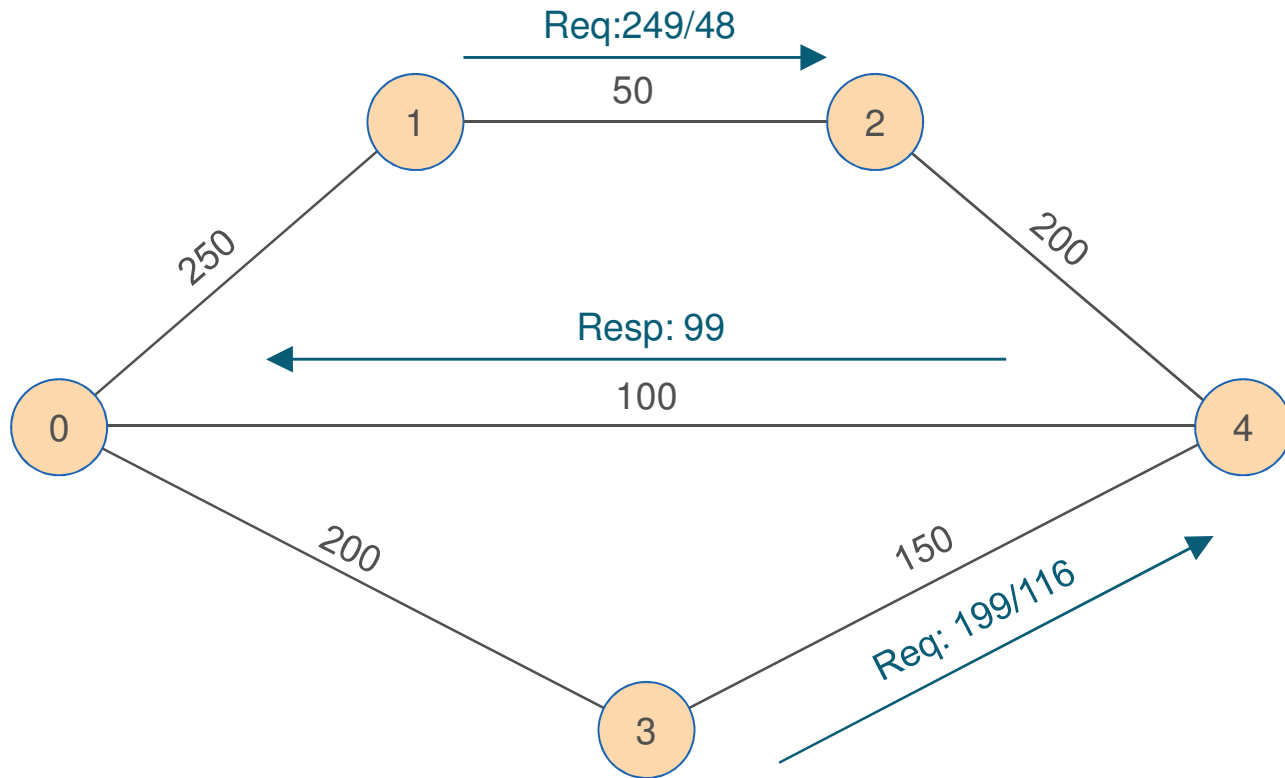
Step 1 of 6



| Dest | Next hop | LQ |
|------|----------|----|
| 4    | -        | -  |

# AODV route discovery algorithm

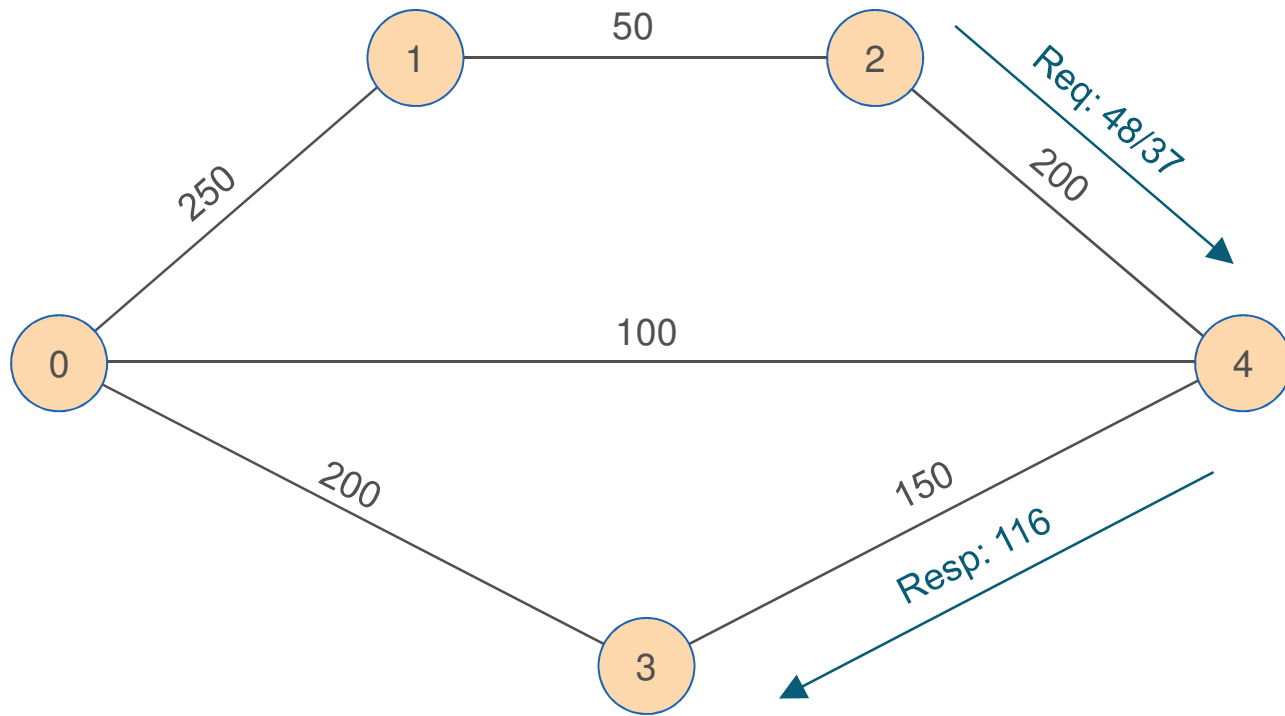
Step 2 of 6



| Dest | Next hop | LQ |
|------|----------|----|
| 4    | 4        | 99 |

# AODV route discovery algorithm

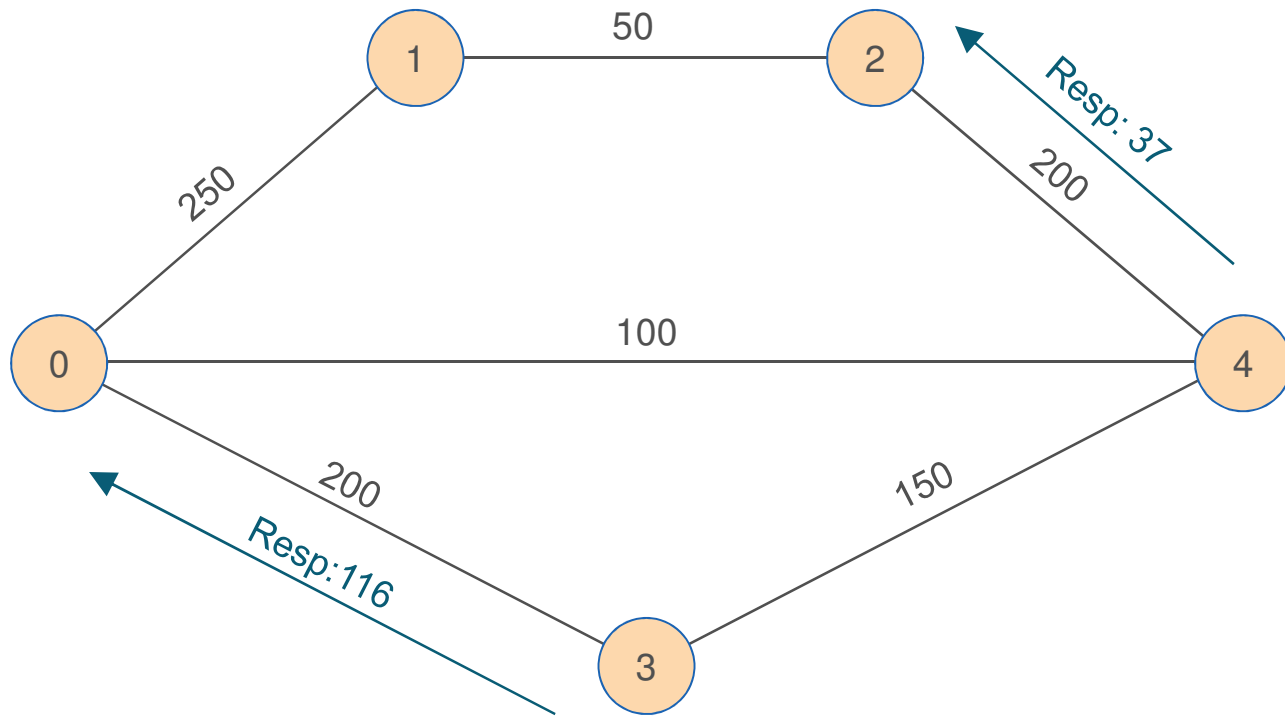
Step 3 of 6



| Dest | Next hop | LQ |
|------|----------|----|
| 4    | 4        | 99 |

# AODV route discovery algorithm

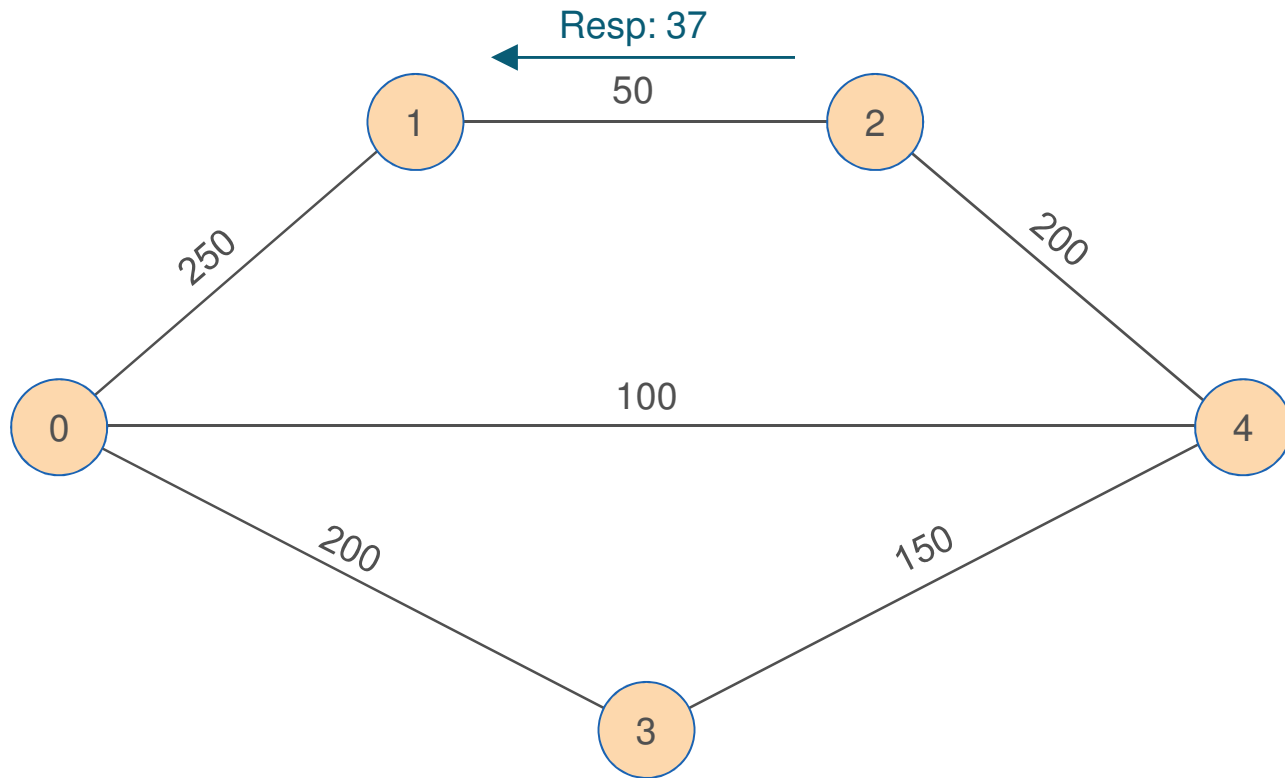
Step 4 of 6



| Dest | Next hop | LQ  |
|------|----------|-----|
| 4    | 3        | 116 |

# AODV route discovery algorithm

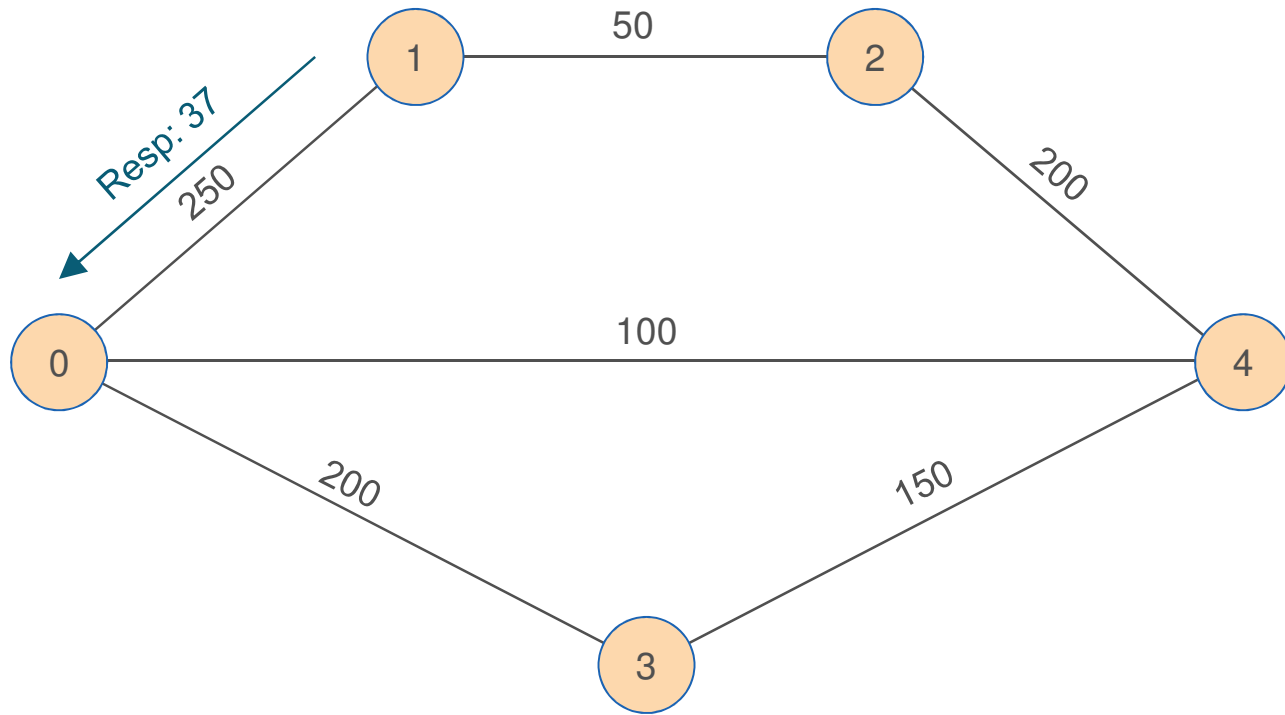
Step 5 of 6



| Dest | Next hop | LQ  |
|------|----------|-----|
| 4    | 3        | 116 |

# AODV route discovery algorithm

Step 6 of 6



| Dest | Next hop | LQ  |
|------|----------|-----|
| 4    | 3        | 116 |

# Comparison of route discovery algorithms

## Native route discovery

- Pros
  - Fast route discovery time
  - Route discovery happens at the same time as data delivery
  - Low network load while route discovery is performed
  - Routes are being optimized even after route discovery is over
  - Tends to discover potentially more reliable routes
  - Low memory footprint
- Cons
  - Only local optimizations are performed, so discovered routes are not globally optimal
  - Tends to discover longer routes
  - Routes may change over life time due to route optimization after route discovery is over
  - Cannot perform multicast route discovery

# Comparison of route discovery algorithms

## AODV route discovery

- Pros
  - Performs global optimizations based on a true probability of delivery
  - Discovered routes are stable and don't change over life time
  - Can perform multicast route discovery
- Cons
  - Slower route discovery
  - Route discovery is separated from data delivery
  - Higher network load while route discovery is performed
  - No route optimizations are performed after original discovery
  - Higher memory footprint (both Flash and RAM)





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