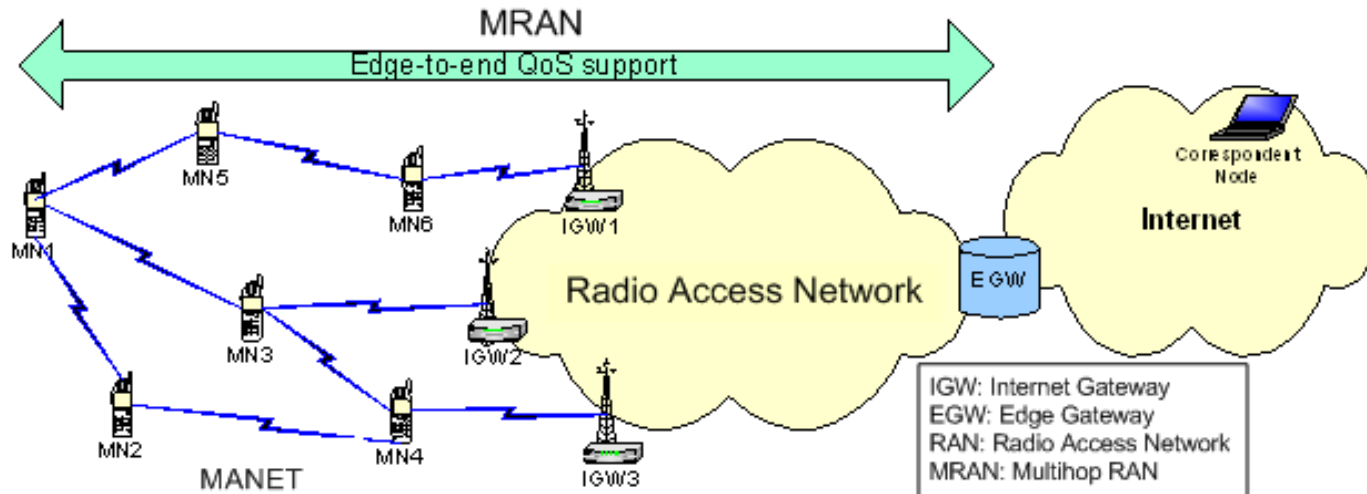


# An Optimised Gateway Selection Mechanism for Wireless Ad hoc Networks Connected to the Internet

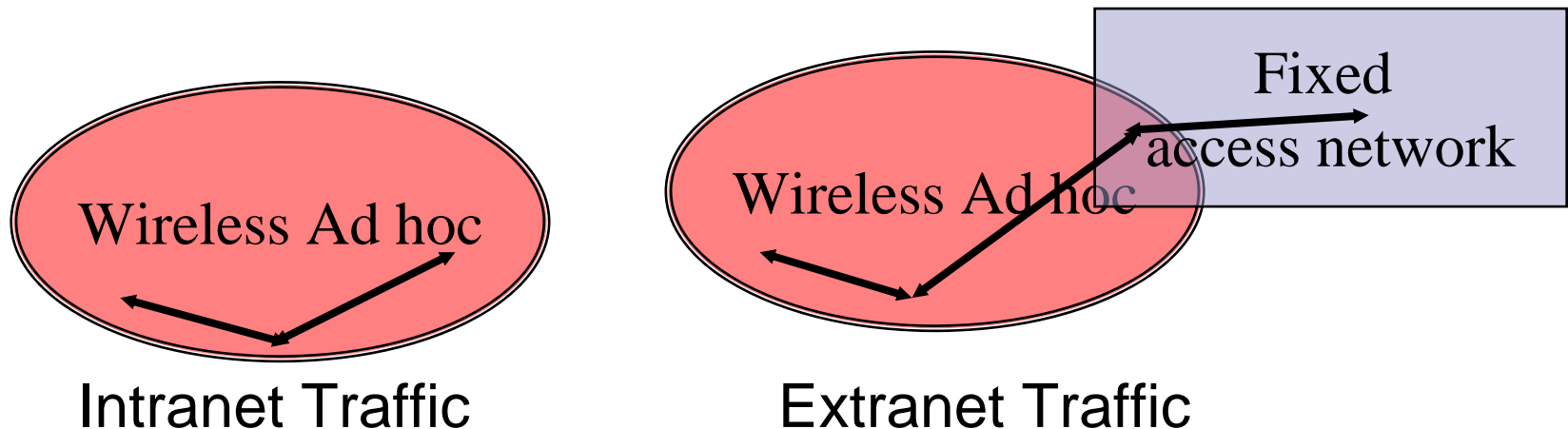
# Presentation Outline

- Problems and motivations to support QoS in Multihop Radio Access Networks (MRANs)
- Proposed Edge-to-End QoS mechanism for MRANs
- Analysis of the proposed mechanism
- Summary and Conclusions



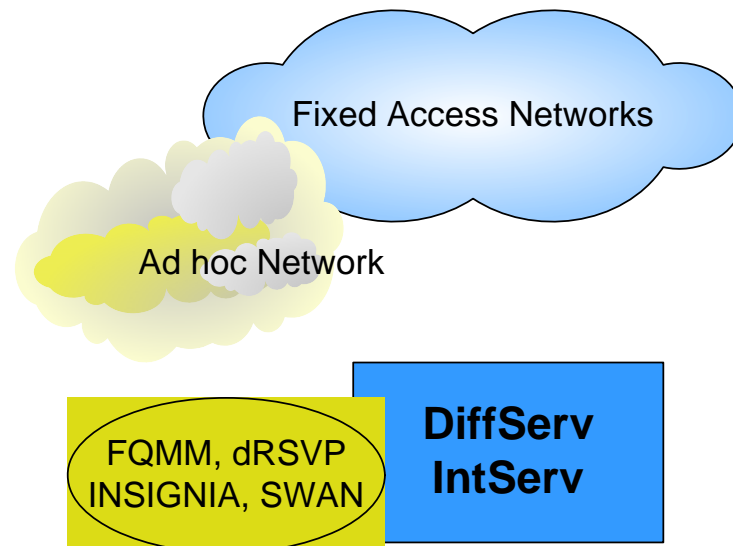
# Problems and Motivations to support QoS in MRANs

- QoS requirements are likely to be more demanding for extranet traffic.
- Interaction between two domains
- Different QoS models work on either segments of multihop radio access network (MRAN).



# Solutions for QoS Support in MRANs

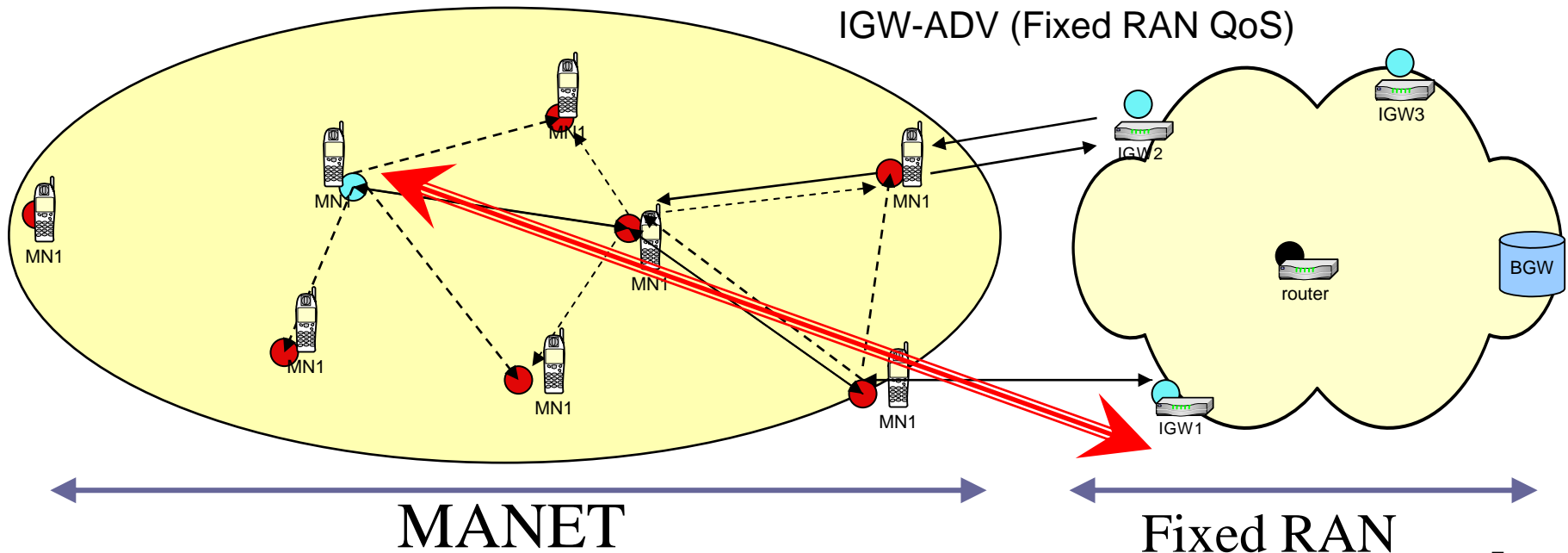
- **Integration** : Existing QoS models for different domains (fixed vs. ad hoc) will not converge in foreseeable future.
- **Interworking** : A model is needed to define interoperability between the two sides (ad hoc and fixed domains).
- **Optimum IGW discovery**



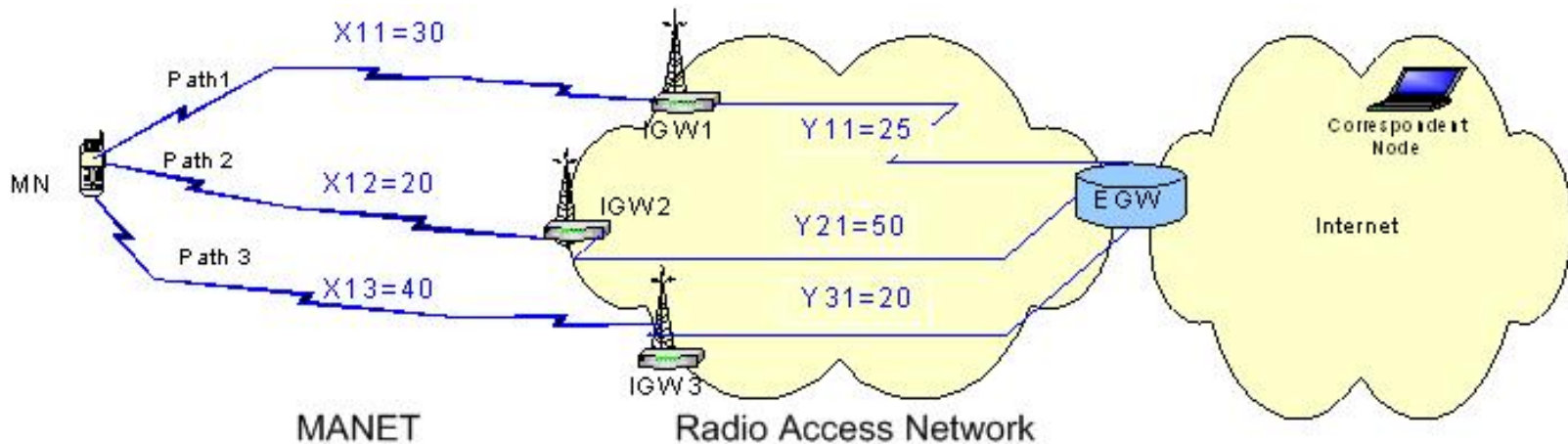
# Edge-to-end QoS support

- Reactive
- Proactive

} → Hybrid Solution



# Edge-to-end QoS routing scenario



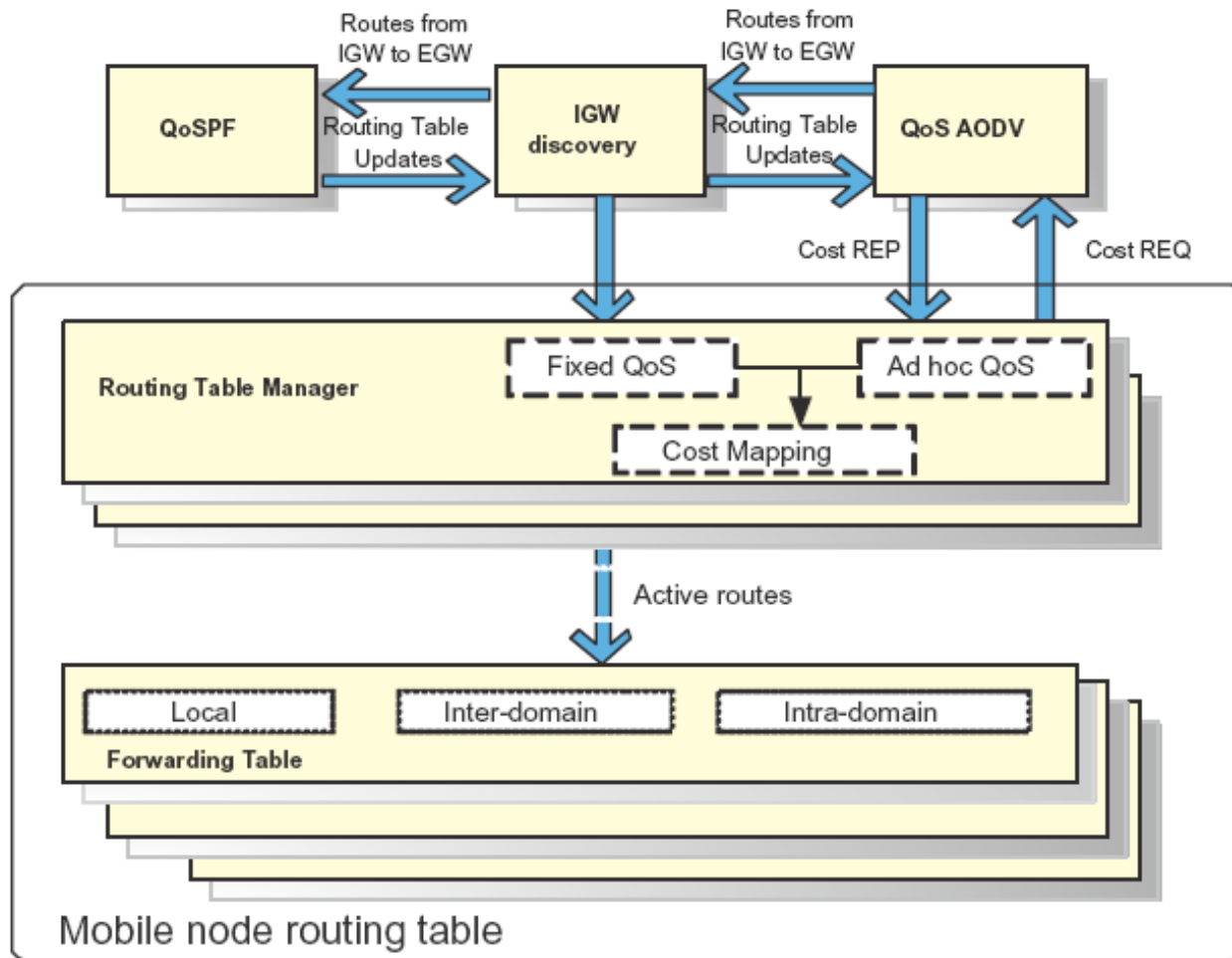
$$C_p = f(X_{ip}) + g(Y_{pj})$$

MANET: Best path (lowest cost) through IGW2

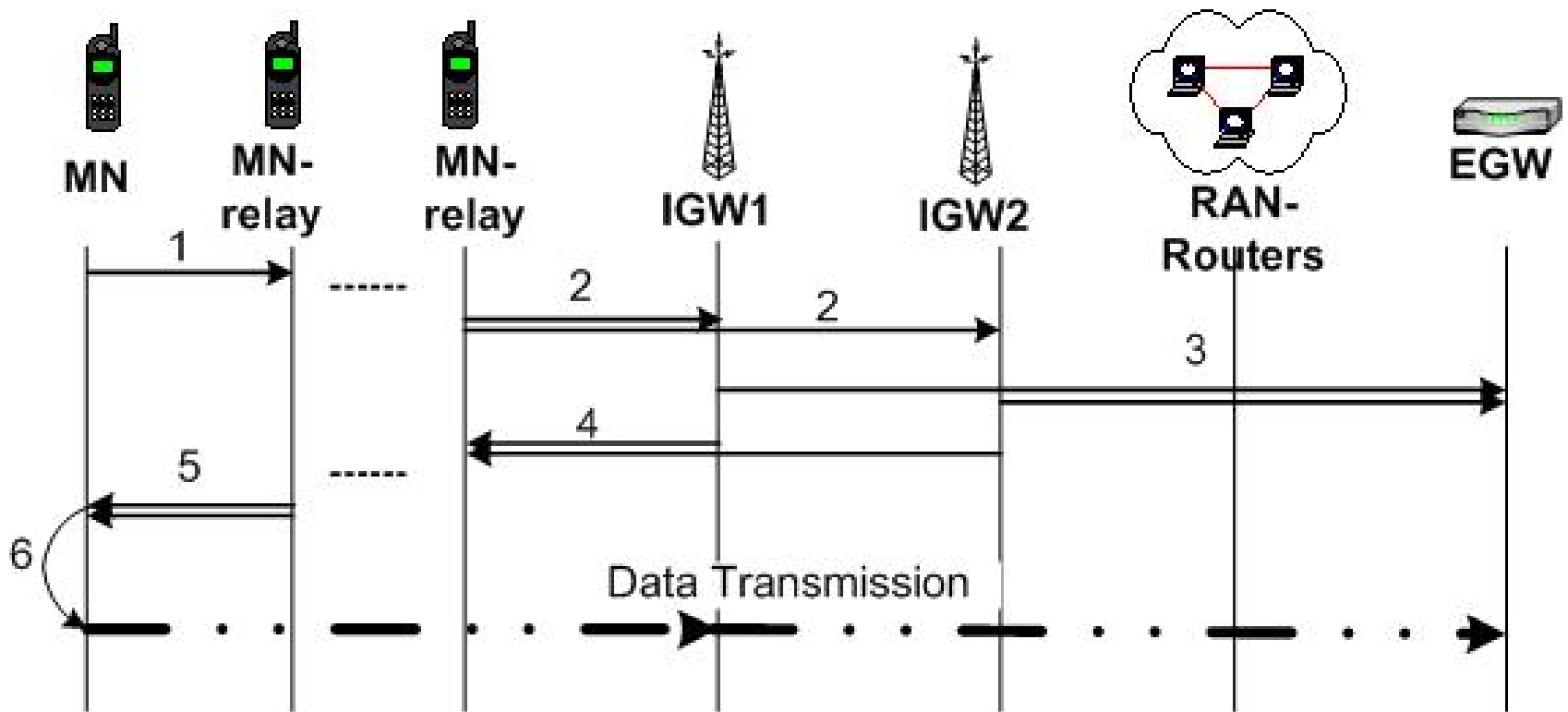
Fixed RAN: Lowest cost path through IGW3

MRAN: Overall low cost path through IGW1

# QoS Information Interaction in the source mobile node



# Reactive QoS routing approach from MN to EGW



# Analysis of edge-to end QoS

## ■ Reactive

- Lower overhead compare to proactive
- But no route optimization
- Solution: solicitation messages for the overall path cost send periodically.

## ■ Proactive

- Floods overhead
- But maintain optimised path
- Solution: adaptive intervals between updates.

## ■ Hybrid

- First: Reactive approach to find the optimum path
- Then: the IGWs inform the MN about the costs from IGWs to BGW(s) periodically or only when any changes occur.

# Summary & Conclusions

- Existing solutions for QoS support in either fixed or ad hoc networks have been designed especially for those types of networks and are not suitable for application on a multihop radio access network.
- A proposed edge-to-end QoS solution to interact the QoS from EGWs in the radio access network to the mobile nodes in the ad hoc network is proposed and discussed in this paper.
- The source node receives cost information of both segments of the multihop radio access network and selects an optimum IGW to forward its traffic.
- Discussion on the applicability, packet delivery delay and the overhead of the proposed mechanisms for an optimum IGW selection.
- In the network initiated approach, the number of the periodical update packets gets larger as the rate of QoS changes in the radio access network increases. The initial path set up delay in the mobile initiated approach increases depending on the size of the segment of the network where the destination node resides.