State the problem the paper is trying to solve/discuss.

[Answer:] In this paper, authors address the problem of interference aware routing in multi-radio infrastructure mesh networks wherein each mesh node is equipped with multiple radio interfaces. Basically, this paper defines a new metric iAWARE(Interference Aware Routing Metric) and an improved routing protocol(AODV-MR) to find paths that are better in terms of reduced inter-flow and intra-flow interference.

State the main contribution of the paper.

[Answer:] 1. This paper presents one method to factor-in wireless interference into the routing metric. The new metric iAWARE combines the interference ratio IR with the existing metric ETT(Expected Transmission Time). 2. This paper also proposed a new multi-radio routing protocol AODV-MULTI-RADIO(AODV-MR) based on traditional AODV protocol. 3. The measurement results based on the wireless mesh testbed show that iAWARE tracks changes in interfering traffic far better than existing well known link metrics(ETT and IRU). Also the AODV-MR protocol has better performance in throughput compared with WCETT and MIC routing metrics.

Summarize the key ideas.

[Answer:] There are two key ideas in this paper. One is about the iAWARE metric, the other is about the AODV-MR routing protocol. 1. iAWARE metric is calculated by following steps. First, for node u in the link i=(u,v), \( SNR_i(u) = \frac{P_v(u)}{N} \), where \( P_v(u) \) denotes the signal strength of a packet from node v at node u and N denotes the background noise. Second, \( SINR_i(u) = \frac{P_v(u)}{N + \sum_{u \in N(u)} \eta(u) P_u(u)} \), where \( \eta(u) \) denotes the set of nodes from which u can hear or sense and \( \tau(u) \) is the normalized rate at which node w generates traffic averaged over a period of time. Third, we get \( IR_i(u) = \frac{SINR_i(u)}{SNR_i(u)} \). Then the link (i=(u,v)) interference ratio IR is defined as \( IR_i = \min(IR_i(u), IR_i(v)) \). The last step is to get the link metric \( iAWARE_i = \frac{ETT_i}{IR_i} \), where \( ETT_i \) is the expected transmission time on link i. Based on the metric on each link, the weighted cumulative path metric of path p is calculated as: \( iAWARE(p) = (1 - \alpha) \times \sum_{i=1}^{n} iAWARE_i + \alpha \times \max_{1 \leq j \leq k} X_j \). 2. The second key idea is about the AODV-MR routing protocol, which decides the link usage depending on the link metric. Periodic HELLO packets are sent out by each node to calculate the ETX and IR discussed above. RREQ packet is also used to carry link metric and the channels used by each link. The intermediate nodes keep the better path by comparing the path metric (which can be calculated according to the info contained in RREQ packet). And the intermediate nodes will keep on forwarding the RREQ message by appending the link information(iAWARE and channel). The destination(or the intermediate node who has an active route towards the destination) will generate an Route Reply(RREP). RREP message is unicast toward the source along the reverse route build during the RREQ propagation. During which, RREP also carries the link information. After the source receives the RREP packet, it builds the route to the destination.

Discuss the strengths and the weaknesses of the paper.

[Answer:] Strength: 1. This work did a nice job about the related works and discussed about limitations of existing metrics and then provided their own interference aware metric. 2. A new metric iAWARE and a improved routing protocol are proposed. 3. According the results, routing using interference aware metrics shows a better performance compared with other existing metrics. 4. A lot of performance evaluation are done on the testbed. The results is convincing.

Weakness: 1. As the authors mentioned in the paper, this paper just simply defines the link metric iAWARE as \( \frac{ETT_i}{IR_i} \). In fact, perhaps there are other better functions to correlate ETT and IR. 2. This paper just models the receiver-side interference. In fact, sender side interference is also important. 3. In this paper, authors just assume that the channels are assigned and then authors consider the routing. 4. The size of the testbed is not large. The authors can study the performance of their routing protocol under different size of network. If so, it will prove that the proposed routing protocol is scalable.

State what open problem(s) can be derived from the work.

[Answer:] 1. It is possible that there are other better functions to correlate ETT or some other metrics with IR. In this paper IR is simply the ratio of ETT over IR. More relation functions can be studied to get the most efficient one. 2. This paper just models the receiver-side interference. In fact, sender side interference is also important. So how to combine the receiver-side and sender-side interference could also be a candidate research topic. 3. In this paper, authors just assume that the channels are assigned and then authors consider the routing. But if we can combine the channel assignment and routing together, perhaps the system can have better performance.