List of Responses

Dear Editor and Reviewers:

Thank you very much for your comments concerning the manuscript entitled “Congestion Control Scheme Based on Path Recovery for Smart Grid Communication”. Those comments are very valuable and helpful for revising and improving our paper. We have studied these comments carefully and have made corrections which we hope to meet with approval. The revised parts are highlighted with yellow in the new manuscript. The responses to the comments are as follows.

Responses to the reviewer 1’s comments:

Concern#1: The literature review is insufficient.

Response#1. Many congestion control methods based on RTT and RTO are proposed to support efficient network performance. Most of these methods are optimized or improved according to the current congestion control methods of TCP/IP networks. Unfortunately, with caching ability and multi-path forwarding strategy, it’s hard to estimate the round-trip time, which makes those RTT-based timeout congestion control mechanisms inadequate. Therefore, some literature has been added in the revised manuscript in section I.

Concern#1: Authors need to check the article carefully. There are some grammatical errors or careless questions.

Response#2. Thank you for your comments very much. We study your comments thoroughly and realize that there are some inadequacies in the prior manuscript. The paper has been revised carefully.

Responses to the reviewer 2’s comments:

Concern#1 In ECN-PIE, the probability p is used for marking Data packets to inform the congestion to downstream routers. In page 3, there is a description "the probability p is obtained by the average queue length the average queue draining rate of each Data packet on its outgoing links within the cycle time." However, how to set p is unclear. The authors should clarify it.

Response#1. According to your comment, a new paragraph is added **in Section 2.3** to describe how to get the marking probability *p* from the queue length and the average queue draining rate.

The description of ECN-PIE was revised. Especially, the calculation of *p* introduced to make readers understand the congestion detection process clearly. ECN-PIE calculates the current queuing delay by measuring the average queue length and the average queue draining rate of each Data packet on its outgoing links within the cycle time (default is 15 ms), and then the marking probability *p* is obtained by combining the current queuing delay and last queuing delay.

Concern#2 The authors do not discuss how to select shunt nodes. Furthermore, there is no explanation on how to calculate alternative routes. They affect the performance of the proposed method. The reviewer thinks that there are cases where a loop is generated.

Response#2. According to your comments, the response is as follows.

For the first question, the forwarding strategy layer in a node (either a router or an end node) can dynamically select multiple interfaces from the FIB to forward each Interest packet. Therefore, it is not necessary to select a shunt node to forward the data packet, but only to determine whether the router is a shunt node. According to FIB, **if a node has multiple forwarding interface available, then the node is a shunt node.**

For the second question, based on information in the FIB and performance measurements, an adaptive forwarding strategy module in each router makes informed decisions about: which Interests to forward to which interfaces, load-balancing Interest forwarding among multiple interfaces, and choosing alternative paths to avoid detected failures. Therefore, it will select the next hop alternative path according to the interface performance ranking of FIB, and no other calculations is needed, so that no loop will be generated.

Concern#3 The proposed scheme assumes packet-level processing in intermediate routers. This requires very high-speed processing. The reviewer wonders if the proposed scheme can work well in practice.

Response#3. Actually, the processing of data packets by the intermediate node is normal, and there is no extra operation. The intermediate router nodes periodically detect its congestion status (usually by

detecting the average queue length). If congestion happens, the congested router will feed back the congestion information to other nodes. Generally, there are two kinds of feedback methods. One method is piggybacking the congestion information by Data packet by using special bit field. This method likes the ECN notification method proposed in the traditional IP network. The other method is using special control signal packet like the NACK proposed. Therefore, it can transmit marking information to downstream intermediate nodes and consumers only by changing its specific bits, without other complex operations.