# Plan/feedback - Reviews (paper accepted)

## 4 Standards

### Review 1 (Reviewer B)

**major strengths (What are the major strengths of this paper?)**

The authors address an important area of research with respect to efficient network-wide monitoring in SDN.

**shortcomings (What are the major shortcomings of this paper?)**

1. Revisit for English tense and grammar. 2. The authors should write briefly, in a concise fashion, as currently it distracts the reader. For example, there is repetition when discussing the contributions in the last two paragraphs of the Introduction section.

=> Revise correspondent parts according to these comments (should write briefly, avoid repeat,…)

3. Fig. 1 and 2 discuss architecture from previous work of the authors that is used in this work. It is imperative to extend these figures to clearly illustrate how the proposed network-wide monitoring fits into the architecture. Though Fig. 3 provides an architectural overview, it does not clearly show how the proposal extends the previous architecture.

=> Revise figures. E.g., remove Fig. 1, Fig. 2, revise Fig. 3 as an extension of Fig.1 + Fig. 2 to illustrate the whole system/proposal (in a multi-switches scenario)

4. There is a lack of evaluation against state-of-the-art. The authors should compare with closely related work(s).

=> Add and explain more comparison with existing works/state-of-the-art

5. The authors correctly acknowledge that the monitoring proposals from state-of-the-art are not scalable that demands processing a large number of monitoring entries and show experimentation for large number of flows. However, the authors fail to justify the feasibility of the proposal for different application class, specifically applications with real-time requirements.

=> Consider to explain clearly the feasibility of proposal for specific/different application class (e.g, real-time apps).

**Comments (Comments for the authors. Please make sure to provide a solid and constructive review for the authors to improve their paper. Include detailed comments and inform any missing related work (especially in regard to previous CNSM editions and related journals).)**

1. Revisit for English tense and grammar. 2. The authors should write briefly, in a concise fashion, as currently it distracts the reader. For example, there is repetition when discussing the contributions in the last two paragraphs of the Introduction section. 3. Fig. 1 and 2 discuss architecture from previous work of the authors that is used in this work. It is imperative to extend these figures to clearly illustrate how the proposed network-wide monitoring fits into the architecture. Though Fig. 3 provides an architectural overview, it does not clearly show how the proposal extends the previous architecture. 4. There is a lack of evaluation against state-of-the-art. The authors should compare with closely related work(s). 5. The authors correctly acknowledge that the monitoring proposals from state-of-the-art are not scalable that demands processing a large number of monitoring entries and show experimentation for large number of flows. However, the authors fail to justify the feasibility of the proposal for different application class, specifically applications with real-time requirements.

=> (same as above)

### Review 2 (Reviewer C)

**major strengths (What are the major strengths of this paper?)**

1. This paper proposes an adaptive mechanism for network-wide monitoring in SDN and a reliable network-wide monitoring solution in SDN. It proposed an adaptive mechanism for network-wide monitoring in SDN with multiple switches.

**shortcomings (What are the major shortcomings of this paper?)**

1. There are many content duplications from your previous work. 2. The algorithm is an O(N2) algorithm. If there are N switches and each of switch has M monitoring entries, run time efficiency is O(N\*M) which is not efficient.

=> For each query, switch only sends/reports updated/new m-entry, not all m-entries in its m-table. And number of m-entries in each report much less than total number of m-entries in its m-table (depending on the number of updated/new m-entries/flows in each time period (query-time-interval) and the rate of appearance of new/update flows of traffic and traffic rate).

Your evaluation did not reflect this part, the number of flows and switches does not reflect a real network. 3. The core of your selection algorithm is based on a Hash table.Your evaluation does not include the justification of the accuracy, such as home many different flows out of your 600,000 flows? The categories of such flows can change your result.

=> Evaluate with more complicated network/scenario (e.g., 6 switches or more)

Consider to evaluate for other parameters/scenarios

4. The flow filtering process can take up lots CPUs from the controller. Paper needs to include CPU usage when run.

=> Consider to include/show CPU usage when run.

**Comments (Comments for the authors. Please make sure to provide a solid and constructive review for the authors to improve their paper. Include detailed comments and inform any missing related work (especially in regard to previous CNSM editions and related journals).)**

1. Typo and Grammar issues. Paper has lots grammar and typos, please consider do a serious proof-reading.example are: a) "infexibility" and much more from the context "large amount " -> "a large amount " "demands processing a " -> "to process " and much more... 2. consider include comments from shortcomings section.

=> Revise typo/grammar errors

### Review 3 (Reviewer D)

**major strengths (What are the major strengths of this paper?)**

In this paper the authors describe an adaptive mechanism for monitoring in network-wide SDN. They design and implement the network-wide monitoring mechanism on SDN-Mon which is a SDN-based monitoring framework.

**shortcomings (What are the major shortcomings of this paper?)**

The SDN-Mon architecture is too simple and lack of features. The characteristic of adaptive and distributed are not fully reflected in the monitoring framework and mechanism. The evaluation environment is too simple to verify the effectiveness of the monitoring scheme in the real scenario and its impact on the business environment.

=> Consider writing the work in a different way, focus on important points with reference of evaluation. Evaluate the proposal in a more complicated network/scenarios

**Comments (Comments for the authors. Please make sure to provide a solid and constructive review for the authors to improve their paper. Include detailed comments and inform any missing related work (especially in regard to previous CNSM editions and related journals).)**

The evaluation environment should be more complicated or in real scenario to persuade the readers to recognize the effects of your architecture.

=> (same as above)

### Review 4 (Reviewer E)

**major strengths (What are the major strengths of this paper?)**

The paper proposes a mechanism, orchestrated by a single controller, for distributing monitoring tasks in Software Defined Networks. This mechanism relies on the elimination of duplicated monitoring flow-rules and on the balancing of monitoring tasks between multiple switches. The topic of the paper is within the scope of the conference.

**shortcomings (What are the major shortcomings of this paper?)**

I am not convinced that the paper makes significant contributions in addressing the problem of distributing the monitoring load in Software Defined Networks, given existing research in this domain. The paper does not clearly present improvements against the state of the art in terms of performance or ease of deployment. Part of the design choices behind the proposal can also be questioned.

=> The journal paper SDN-Mon (reference [4]) did not show our recent performance evaluation results where SDN-Mon achieves better performance than original SDN switch (demonstrated through our implementation on an instance of SDN switch, Lagopus). This could be a reason of this question of reviewer 4 about performance improvement (benefit) of proposal.

In particular, the adoption of SDN-Mon framework from reference [4] needs a stronger justification, especially because it is unclear whether this framework can only include software switches (like Lagapus switch, on which [4] is implemented), or it is also suitable to hardware switches. If SDN-Mon works with software switches, then the proposed load balancing mechanism (based on the switch memory usage) should be re-designed, since software switches are generally not constrained by the memory usage, compared to hardware switches.

=> The term ‘switch memory usage’ may result in confusion/misunderstanding to readers. In fact, the calculation for assigning m-entries to switches is based on number of m-entries and flow-entries, not based on memory usage information of switch. This calculation works for both software and hardware switches.

On the other hand, the feasibility of SDN-Mon on hardware switches requires a strong proof, given the modifications SDN-Mon requires on the switch architecture, e.g., by demonstrating that the novel switch features can all be supported by modern programmable switches and are deployable at line-rate. These considerations are missing in the paper, as well as in reference [4]

=> The design of system worked for software switch (as demonstrated through our implementation on Lagopus switch + Ryu controller). Feasibility of proposed design on hardware switch (e.g., using modern programmable switch) is under consideration/evaluation.

The evaluation section is rather weak, especially in terms of comparison of the proposed algorithms with existing solutions. Moreover, results only concern the number of monitoring rules per switch and the algorithm elapsed time. Other important attributes, for instance how the proposed mechanism copes with different “query intervals”, and what is the synchronisation overhead of the data managing scheme, are not evaluated. Finally, in some paragraphs of the paper I can find statements that require a better explanation. This can sometimes make the reader’s understanding quite difficult.

=> Add further evaluation on a more complicated network/scenario to make it more convincing. E.g., how proposed mechanism cope with different ‘query time interval’, synchronization overhead of data managing scheme,…

**Comments (Comments for the authors. Please make sure to provide a solid and constructive review for the authors to improve their paper. Include detailed comments and inform any missing related work (especially in regard to previous CNSM editions and related journals).)**

- Sec. I, paragraph 1. Please clarify the expression “flexible manageability”. - Sec. I, paragraph 2. “SDN-provided benefits”. I would like the authors to be more explicit on such benefits. - Sec. I, paragraph 3. “This causes significant overhead on switch computing and memory resources”. This part of the paragraph is not clear to me. - Sec. IV, paragraph 1. “..by adaptively selecting… monitoring tasks”. While consumed memory resources are quantified with the current monitoring table occupancy, it is not clear how the usage of computing resources is estimated. - Sec. IV.B, paragraph 1. “This scheme supports… at the controller”. Please rephrase this part of the paragraph. - Sec.. IV.B, paragraph 2. “The buffering table is a temporary table that supports efficiently processing the newly arriving m-entries”. This sentence needs to be rephrased.

=> Revised the points in paper.

- Sec. IV.C. The proposed mechanism to prevent duplicated monitoring entries implicitly assumes that one flow corresponds to one path in the network. However, there are cases where this assumption is not valid, for instance when monitoring traffic of an OD-pair (Origin, Destination pair) if ECMP is used.

=> In fact, the proposed mechanism does not assume that one correspond to one path in network. It proceeds based on monitoring match fields of flows/m-entries and using hash to facilitate/speedup its processing.

Another case is when the match fields of a flow identify (using wildcards) all the traffic going to a specific destination IP. I would like the authors to include such considerations and to clarify whether these cases are in the scope of the paper or not. - Sec. IV.C, last paragraph. “In addition… supports flexible and fast storing”. The authors should clarify why the storing is “fast”, and compared to which other data managing scheme in the literature the proposed system is faster. - Sec. V.B, paragraph 2. “and measure the number of m-entries… in the injecting traffics”. Please clarify this part of the paragraph.

=> Revise paper on these points. Consider allowing wildcards in m-table.