

Preview (COMST-00088-2012.R2)

From: ekram@EE.UManitoba.ca

To: b.soelistijanto@surrey.ac.uk, soelistijanto@yahoo.com

CC: b.soelistijanto@surrey.ac.uk, soelistijanto@yahoo.com, m.howarth@surrey.ac.uk

Subject: Communications Surveys and Tutorials - Manuscript ID COMST-00088-2012.R1

Body: 11-Dec-2012

Dear Mr. Soelistijanto:

Your manuscript entitled "Transfer Reliability and Congestion Control Strategies in Opportunistic Networks: A Survey" has been successfully submitted online and is presently being given full consideration for publication in the Communications Surveys and Tutorials.

Your manuscript ID is COMST-00088-2012.R1.

Please mention the above manuscript ID in all future correspondence or when calling the office for questions. If there are any changes in your street address or e-mail address, please log in to Manuscript Central at <http://mc.manuscriptcentral.com/comst-ieee> and edit your user information as appropriate.


You can also view the status of your manuscript at any time by checking your Author Center after logging in to <http://mc.manuscriptcentral.com/comst-ieee>.

Thank you for submitting your manuscript to the Communications Surveys and Tutorials.

Sincerely,

Ekram Hossain, Ph.D., P.Eng.
IEEE Commun. Surveys & Tut., EIC
Professor
Department of Electrical and Computer Engineering
University of Manitoba
75A Chancellor's Circle
Winnipeg, MB R3T 5V6 CANADA
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Date Sent: 11-Dec-2012

 Close Window



Decision Letter (COMST-00088-2012)

From: ekram@EE.UManitoba.ca

To: b.soelistijanto@surrey.ac.uk, soelistijanto@yahoo.com

CC: b.soelistijanto@surrey.ac.uk, soelistijanto@yahoo.com, m.howarth@surrey.ac.uk, comst@ic.unicamp.br, ekram.hossain@ad.umanitoba.ca

Subject: IEEE COMST: Decision COMST-00088-2012

Body: 13-Sep-2012

Dear Mr. Bambang Soelistijanto,

We have completed the review of your "A Survey of Transport Functionality Issues in Opportunistic Networks" authored by Soelistijanto, Bambang; Howarth, Michael, which you had submitted for consideration for publication in the IEEE Communications Surveys and Tutorials. Your manuscript has been reviewed by both generalist and expert reviewers.

As you will see from the enclosed reviews the reviewers found merit in your manuscript, but also pointed out a number of significant shortcomings that need to be addressed. I must therefore classify your manuscript as REVISE and RESUBMIT. As such, the manuscript, after revision would be sent out to the same reviewers, assuming you decide to revise and resubmit.

I believe the reviewers have made some very useful comments. I would therefore encourage you to undertake the revision. When you do resubmit please upload the following three items and make them accessible for review: (1) the revised manuscript, (2) the revised manuscript with the changed passages highlighted in some way (e.g., through underlining or bold font), and (3) a response document providing an item-by-item response to each of the reviewers' points, stating how and exactly where in the revised manuscript you have responded to the comment. Please submit these materials as a revision (not a new paper). In addition, please submit your comments, detailing the changes you have made, in the comments boxes, accessible when the manuscript is resubmitted. In the author center, you will see an entry with the paper id and a ".R#" appended, where # is the revision number. First click on the view comments button to enter comments to the associate editor and reviewers. Then, click the title of the paper to upload the three items listed above.

Please acknowledge the receipt of this editorial decision and let me know whether you will revise and resubmit the paper.

Please note that the DEADLINE for submission of your revised manuscript is 12-Dec-2012.

I thank you once again for submitting your work to IEEE Communications Surveys and Tutorials.

Sincerely yours,

Ekram Hossain, Ph.D., P.Eng.
IEEE Commun. Surveys & Tut., EIC
Professor
Department of Electrical and Computer Engineering
University of Manitoba
75A Chancellor's Circle
Winnipeg, MB R3T 5V6 CANADA
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Reviewer Comments:

Reviewer: 1

Recommendation: Revise And Resubmit

Comments:

This paper attempts to identify and elaborate on Transport Functionality Issues in Opportunistic Networks. This is at least what the title suggests. However, the authors seem to abruptly limit themselves to discussing issues related only to reliability and congestion control in the context of Intermittently Connected Networks (ICNs). In the reviewer's opinion, the role of the transport layer is to act as a "liaison" of sorts between the abstract world of applications at the higher layers, and the concrete functions of lower layers 1 to 3. As such, the transport layer has to provide functions that are necessary for enabling communication between software application processes on different entities. This encompasses a number of different but related duties. In light of this, I do not see that the title of the paper is convenient and has to be adjusted to reflect the fact that, out of all transport layer functions, only reliability and congestion control are considered.

Now, while, these two functions are associated to the Transport Layer (TL) of the popular 7-layer OSI architecture of typical networks, I do not believe that, in the context of ICNs, both of these functions are associated to that same layer. Although not explicitly mentioned, it is clear from RFCs 4838 and 5050 that may be found within the archives of the DTNRG. In the context of ICNs, these issues are handled at the Bundle Layer (BL). BL is quite different from TL. In particular, Custody Transfer (CT) is, thus far, the most popular technique to handle communication reliability over ICNs. It has its advantages and drawbacks but it is implemented as a function within the BL and not the TL.

In addition to the above, the reviewer has several major concerns related to the technical soundness and correctness of the paper. The most fundamental of these concerns will be listed below with references to each section of the paper.

A. Introduction:

Page 1, column 1, lines 40-41: "where nodes typically move relative to each other." This makes no sense. The term "ad-hoc" is sufficient to indicate that the nodes exhibit arbitrary random movements. When the word "relative" is used in the context of mobility evaluation, then ideally, there has to be some fixed reference point and node mobility in terms of distance, direction and speed is evaluated relatively to that point.

Page 1, column 1, line 48: "finding a pat". What kind of path? What are the origin and sink points that delineate this path? What is the type of this path?

Page 1, column 2, line 19: "disconnected periods". Time periods do not communicate and therefore cannot be disconnected. It is the network which is disconnected during a particular time period. The term "disconnection" better fits this particular phrase.

Page 1, column 2, line 24: "transport functionality required of the network". One requires something "from" and not "of".

Page 1, column 2, line 52: "we have used the term DTNs to ... networks". Is there any motivating reason for doing so? This is technically incorrect. First, there is no such thing as DTNs in the sense of "Delay-Tolerant Networks". This term being openly used in the Literature does, by no means, indicate that it is correctly used. DTN is the acronym associated with the Delay-/Disruption-Tolerant Networking architecture. ICN is the correct term to be used in reference to a network that is subject to repetitive link disruptions that incur irregular delays. Now Inter-Planetary Networks (IPNs) are a subclass of ICNs and one cannot deliberately utilize the most general term, ICN, to represent a particular subclass of these networks. This has to be corrected all throughout the paper and not only here.

The reviewer has noticed that the authors utilize so many acronyms and names interchangeably without any previous notice in order to refer to the same type and category of networks. This is highly confusing to the reader.

Page 2, Figure 1, this taxonomy is the most confusing ever. Please consider revising and changing the classification criterion.

Page 2, column 1, line 60: "limited by know in advance". Do you really know when would a bike exactly arrive? How can you know? I can understand that you know when a satellite would be present since, usually satellites revolve around a well defined orbit and using the laws of physics one can determine when the satellite is there (yet, in practice the exact time cannot be known we usually determine a certain interval of time during which the satellite is there and tend to shrink this interval as much as possible). Now explain to me, how can you know the exact time when a bike will arrive?

Page 2, column 1, line 31: "Alternatively, multiple-copy forwarding..." Well these techniques can also be used by single-copy strategies. Why limit them to only multiple-copy?

Page 3, column 1: All the text and figure before subsection B is pretty much known in the literature and over the years. It can be easily removed without affecting the quality of the paper. Readers, at this level, are assumed to be quite knowledgeable of these issues.

Page 3, column 2, section II-A. Look at the title of the section and then right under it in the first line. This sudden abrupt change of DTN into ICN. Plus I know not whether DTN here is meaning IPN or what? This is so confusing.

Page 4, column 1, lines 28-30 add no value to the text. Please remove them.

Page 4, column 1, lines 55-60: I have a major problem with this paragraph as it is completely incorrect. First BL is not an application layer. It's an layer all by itself that lays in between the application layer and the transport layer. Within BL there is the "Store-Carry-and-Forward" (SCF) mechanism which is not equivalent to the typical SF. Please correct these major mistakes. This is not to mention that suddenly in column 2 you use the term SCF on line 53 and in between two quotes. This is totally confusing to the reader and tends to be misleading.

Page 4, column 2, lines 28-34: Earlier you referred to BL as an application layer and then suddenly, here, out of nowhere, you refer to the Bundle Protocol as a Transport Protocol? This is not acceptable at all.

Page 4, column 2, lines 35-40: You are referring the reader elsewhere for more information on issues related to what this paper is supposed to revolve around. You have to include such information here concisely and neatly. Otherwise what's the purpose of this survey or tutorial (I don't know what to call it).

Page 4, column 2, line 46: Again the use of the term DTNs with no indication what so ever on what it is supposed to represent under the title of a subsection that is supposed to talk about Opportunistic Networks which are the same as ICNs which the authors assume to be DTNs and those are finally IPNs? Geez ... This is so (with 10000000 "o") confusing.

Page 5, column 1, lines 30-32 and 51-52: I wonder if the authors have read this paper before submitting it. On lines 30-32 they say that storage management can be decoupled from routing and then right a few sentences after on lines 51-52 they contradict themselves saying that storage congestion control are closely related to the forwarding strategies. Can there be more contradicting and confusing? This is completely not acceptable.

Page 6, column 1, line 34: Warthman did not "propose" CT. He just wrote a tutorial on this matter.

Page 6, column 2, line 7: what do you mean by "Epidemic Custodians"? With all my experience in this field this is the first time I read such a term with no clarification what so ever.

Page 7 and beyond: please avoid the use of equations in a survey/tutorial. This is not supposed to be a technical paper.

Page 8, column 2, line 23: "we now consider" gives the impression that all of the summarized work afterwards has been written by the authors of this paper themselves which is not the case. Please change this.

Page 9, column 1, line 51: please refer to the work rather the name of the scheme.

Page 10 is full of "however" and "hence" ... Aren't there any other conjunctions in the English literature?

Page 12, column 2, lines 25-32: this paragraph does not read well. Consider revising.

In addition to all of the above, the paper is quite boring. The authors simply summarize the work done in the literature and add no attractive flavours to it. They do not give their opinion, their own view of things and their own interpretations. The reader cannot really learn any lesson from this paper. Reading it is more like engaging in going through a maze of tall and large paragraphs that present no fruitful conclusions. Future work directives are also not appealing and provide no useful information. I believe that, with 58 references, the authors can write a much more useful and informative manuscript. Please proof read the paper it has a lot of grammatical mistakes. The writing is a bit poor.

In accordance with the above, the reviewer suggests that this paper undergoes preminent revisions and be resubmitted for a second round of revision.

Additional Questions:

1. Please provide a one-paragraph description of the content of this manuscript.: This paper attempts to identify and elaborate on Transport Functionality Issues in Opportunistic Networks. This is at least what the title suggests. However, the authors seem to abruptly limit themselves to discussing issues related only to reliability and congestion control in the context of Intermittently Connected Networks (ICNs). In the reviewer's opinion, the role of the transport layer is to act as a "liaison" of sorts between the abstract world of applications at the higher layers, and the concrete functions of lower layers 1 to 3. As such, the transport layer has to provide functions that are necessary for enabling communication between software application processes on different entities. This encompasses a number of different but related duties. In light of this, I do not see that the title of the paper is convenient and has to be adjusted to reflect the fact that, out of all transport layer functions, only reliability and congestion control are considered.

2. Please identify and discuss the contribution of this manuscript. Please include in your discussion items such as the following:

- a. Does the paper have significant tutorial content? That is, is there enough background provided so that the generalist in communications can understand its main contributions? Elaborate.
 - b. Does the paper contain original contributions? What is the nature of the contributions?
 - c. Is there a description of lessons learned that are given to the reader to help the reader avoid pitfalls in his own work?
 - d. Is there a need for a paper such as this in the communications community? For example, are there articles that are already available which cover more or less the same topic at about the same depth?: Please refer to my feedback on the paper below.
3. Please discuss the quality of the citations in this manuscript. If you think the citations should be improved, please provide specific references or sources of articles, such as journals or magazines, that should be consulted. : Good but can be improved.
 4. Please comment on the organization of the paper, and offer any suggestions that you think will improve the paper and its readability.: Good but can be improved. Please see more details below.
 5. Please comment on the technical correctness of the manuscript in general, identify any specific technical inaccuracies that you find, and make suggestions for correcting those.: Good but can and should be improved. Please refer to my feedback below.
 6. If the manuscript does not require major revision, please provide a list of minor changes, such as spelling or grammatical errors, that need to be made. Please use the format 'p. 7., l. 18 somth ==> smooth' to mean 'on line18 of page 7, correct the spelling from somth to smooth.':
 7. Please provide a summary comment on the overall suitability of the paper for publication in IEEE Communications Surveys and Tutorials, assuming the recommended revisions are made. For example, if this is an outstanding contribution, please so state. If a major revision is needed, please so state. If the manuscript requires major editing, please so state.:

Reviewer: 2

Recommendation: Revise And Resubmit

Comments:

It is my judgment that this article on the topic is necessary and valuable. I do support this article. However, a major revision is needed.

Additional Questions:

1. Please provide a one-paragraph description of the content of this manuscript.: This article identifies and discusses the transport functions needed for data delivery in opportunistic networks. Especially, two main transport functions are focused. They are transfer reliability and storage congestion control.
2. Please identify and discuss the contribution of this manuscript. Please include in your discussion items such as the following:
 - a. Does the paper have significant tutorial content? That is, is there enough background provided so that the generalist in communications can understand its main contributions? Elaborate.
 - b. Does the paper contain original contributions? What is the nature of the contributions?
 - c. Is there a description of lessons learned that are given to the reader to help the reader avoid pitfalls in his own work?
 - d. Is there a need for a paper such as this in the communications community? For example, are there articles that are already available which cover more or less the same topic at about the same depth?: Firstly, it is very obvious that there is a strong need for a paper on this topic due to the applications of reliable services in opportunistic networks. And, it is my own judgment that the authors did make some contributions on this topic in the article. However, this article at the current status might not be strong enough to reach the quality level of our journal. Therefore, more works are necessary for improving the quality of this article and providing the systematic descriptions on transfer reliability and storage congestion control.
3. Please discuss the quality of the citations in this manuscript. If you think the citations should be improved, please provide specific references or sources of articles, such as journals or magazines, that should be consulted. : It is O.K.
4. Please comment on the organization of the paper, and offer any suggestions that you think will improve the paper and its readability.: It is my impression that the article is hard for readers to understand completely. More works are necessary to polish and smooth the contents and descriptions. As the authors pointed out, two main transport functions are focused and discussed. It is necessary to discuss them systematically and completely. Furthermore, it is a must to clearly describe the research issues and problems on this topic with the detailed reference information, which might be the most valuable part to the readers. The authors did provide 4 research issues on PP. 12-13. However, they are very few, not with sufficient reasoning and valuable directions, and more references required.
5. Please comment on the technical correctness of the manuscript in general, identify any specific technical inaccuracies that you find, and make suggestions for correcting those.: In the article, it is better for the readers to clarify the transport layer functionality, transport functionality, and transport protocols. More mathematical expressions and theoretical derivations are needed to make readers understand the contents quantitatively.
6. If the manuscript does not require major revision, please provide a list of minor changes, such as spelling or grammatical errors, that need to be made. Please use the format 'p. 7., l. 18 somth ==> smooth' to mean 'on line18 of page 7, correct the spelling from somth to smooth.': The manuscript requires major revision.
7. Please provide a summary comment on the overall suitability of the paper for publication in IEEE Communications Surveys and Tutorials, assuming the recommended revisions are made. For example, if this is an outstanding contribution, please so state. If a major revision is needed, please so state. If the manuscript requires major editing, please so state.: It is my judgment that this article on the topic is necessary and valuable. I do support this article. However, a major revision is needed.

Responses to the Reviewers' Comments

Reviewer: 1

Comments:

This paper attempts to identify and elaborate on Transport Functionality Issues in Opportunistic Networks. This is at least what the title suggests. However, the authors seem to abruptly limit themselves to discussing issues related only to reliability and congestion control in the context of Intermittently Connected Networks (ICNs). In the reviewer's opinion, the role of the transport layer is to act as a "liaison" of sorts between the abstract world of applications at the higher layers, and the concrete functions of lower layers 1 to 3. As such, the transport layer has to provide functions that are necessary for enabling communication between software application processes on different entities. This encompasses a number of different but related duties. In light of this, I do not see that the title of the paper is convenient and has to be adjusted to reflect the fact that, out of all transport layer functions, only reliability and congestion control are considered

Now, while, these two functions are associated to the Transport Layer (TL) of the popular 7-layer OSI architecture of typical networks, I do not believe that, in the context of ICNs, both of these functions are associated to that same layer. Although not explicitly mentioned, it is clear from RFCs 4838 and 5050 that may be found within the archives of the DTNRC. In the context of ICNs, these issues are handled at the Bundle Layer (BL). BL is quite different from TL. In particular, Custody Transfer (CT) is, thus far, the most popular technique to handle communication reliability over ICNs. It has its advantages and drawbacks but it is implemented as a function within the BL and not the TL.

In addition to the above, the reviewer has several major concerns related to the technical soundness and correctness of the paper. The most fundamental of these concerns will be listed below with references to each section of the paper.

Response to reviewer 1 general comments:

Response to paragraph 1: We have changed the title of the paper: "Transfer Reliability and Congestion Control Strategies in Opportunistic Networks: A Survey", to reflect the focus of paper on the two functions.

Response to paragraph 2: We now specifically discuss the DTN architecture proposed by IRTF-DTNRG in Section II.A. In the last sentence in this section, we note that some important data delivery tasks, e.g. routing and forwarding, reliability and custody transfer, congestion and flow control, are defined in the Bundle layer in the DTN architecture.

A. Introduction:

Page 1, column 1, lines 40-41: "where nodes typically move relative to each other." This makes no sense. The term "ad-hoc" is sufficient to indicate that the nodes exhibit arbitrary random movements. When the word "relative" is used in the context of mobility evaluation, then ideally, there has to be some fixed reference point and node mobility in terms of distance, direction and speed is evaluated relatively to that point.

Response: We changed the sentence to be: "...where nodes can move freely." (Page 1, column 1, line 47)

Page 1, column 1, line 48: "finding a path". What kind of path? What are the origin and sink points that delineate this path? What is the type of this path?

Response: We have clarified that we are talking about "finding a delivery path to a destination" (Page 1, column 1, line 56).

Page 1, column 2, line 19: "disconnected periods". Time periods do not communicate and therefore cannot be disconnected. It is the network which is disconnected during a particular time period. The term "disconnection"

better fits this particular phrase.

Response: We changed the sentence to be: “These networks may experience frequent partitioning, with the disconnections lasting for long periods.” (Page 1, column 2, line 27)

Page 1, column 2, line 24: "transport functionality required of the network". One requires something "from" and not "of".

Response: We removed this sentence in the revised paper.

Page 1, column 2, line 52: "we have used the term DTNs to ... networks". Is there any motivating reason for doing so? This is technically incorrect. First, there is no such thing as DTNs in the sense of "Delay-Tolerant Networks". This term being openly used in the Literature does, by no means, indicate that it is correctly used. DTN is the acronym associated with the Delay-/Disruption-Tolerant Networking architecture. ICN is the correct term to be used in reference to a network that is subject to repetitive link disruptions that incur irregular delays. Now Inter-Planetary Networks (IPNs) are a subclass of ICNs and one cannot deliberately utilize the most general term, ICN, to represent a particular subclass of these networks. This has to be corrected all throughout the paper and not only here.

The reviewer has noticed that the authors utilize so many acronyms and names interchangeably without any previous notice in order to refer to the same type and category of networks. This is highly confusing to the reader.

Response: We now use the term “DTN” to only refer to the DTNRG DTN architecture. We use the term “ICN” to refer to networks that frequently experience in intermittent link connections. In Section II.B., we then classify ICNs into scheduled or predicted contact and opportunistic contact networks. We give the revised taxonomy of today’s communication networks in Fig. 3 (Page 3, column 1, line 33).

Furthermore, throughout the discussion in the paper, we follow this definition.

Page 2, Figure 1, this taxonomy is the most confusing ever. Please consider revising and changing the classification criterion.

Response: We have revised our taxonomy in Fig. 3 to better reflect standard terminology and classify the ICNs into *scheduled/predicted contact* (in static node networks we mention WSNs and in mobile node networks we mention space communication networks and deterministic mobility terrestrial networks) and *opportunistic contact* (we mention opportunistic networks, e.g. vehicular and human networks) (Page 3, Fig. 3)

Page 2, column 1, line 60: "limited by know in advance". Do you really know when would a bike exactly arrive? How can you know? I can understand that you know when a satellite would be present since, usually satellites revolve around a well defined orbit and using the laws of physics one can determine when the satellite is there (yet, in practice the exact time cannot be known we usually determine a certain interval of time during which the satellite is there and tend to shrink this interval as much as possible). Now explain to me, how can you know the exact time when a bike will arrive?

Response: We remove this example in the revised paper and no longer give a detailed explanation of each ICN example. Instead, at the beginning of Section II, we briefly give examples of ICNs, such as deep space communication, sparse sensor networks, animal wildlife monitoring networks and human (social) networks (Page 2, column 1, line 50).

Page 2, column 1, line 31: "Alternatively, multiple-copy forwarding..." Well these techniques can also be used by single-copy strategies. Why limit them to only multiple-copy?

Response: The original sentence was unclear and we have revised it as follows: “In opportunistic contact, a node knows nothing about future contacts or network topology. In this case, a routing strategy can stochastically estimate future node contacts and forward several copies to other nodes to increase delivery probability (a multiple-copy forwarding strategy).” (Page 3, column 2, line 9)

Page 3, column 1: All the text and figure before subsection B is pretty much known in the literature and over the years. It can be easily removed without affecting the quality of the paper. Readers, at this level, are assumed to be quite knowledgeable of these issues.

Response: we removed Fig.3 of the original paper and the related text regarding multiple copy forwarding.

Page 3, column 2, section II-A. Look at the title of the section and then right under it in the first line. This sudden abrupt change of DTN into ICN. Plus I know not whether DTN here is meaning IPN or what? This is so confusing.

Response: As we have said above, we have clarified our terminology (DTN/ICN/opportunistic networks). The revised Section II.C, "Poor performance of TCP in ICNs", explains the difficulties of applying TCP in ICNs in general. In the last paragraph in this section we discuss the requirements of applying transfer reliability and congestion control in scheduled contact ICNs, e.g. deep space networks. (Page 3, column 2).

Page 4, column 1, lines 28-30 add no value to the text. Please remove them.

Response: we removed these lines and the related paragraph. We have replaced Fig. 6 of the original paper with Fig. 1 in the revised paper as an example of ICNs, and discuss how communications occur between ICN nodes. This allows us to illustrate a store-forward (SF) mechanism, e.g. in satellite networks, and store-carry-forward (SCF) mechanism, e.g. in vehicular networks (Page 2, column 2, line 38).

Page 4, column 1, lines 55-60: I have a major problem with this paragraph as it is completely incorrect. First BL is not an application layer. It's an layer all by itself that lays in between the application layer and the transport layer. Within BL there is the "Store-Carry-and-Forward" (SCF) mechanism which is not equivalent to the typical SF. Please correct these major mistakes. This is not to mention that suddenly in column 2 you use the term SCF on line 53 and in between two quotes. This is totally confusing to the reader and tends to be misleading.

Response: as noted above we have rewritten the DTN architecture in Section II.A. We also discuss in detail the difference between SCF and SF mechanisms (Page 2, column 2, line 38).

Page 4, column 2, lines 28-34: Earlier you referred to BL as an application layer and then suddenly, here, out of nowhere, you refer to the Bundle Protocol as a Transport Protocol? This is not acceptable at all.

Response: as we mentioned above, we have revised the discussion of the DTN architecture and removed these errors.

Page 4, column 2, lines 35-40: You are referring the reader elsewhere for more information on issues related to what this paper is supposed to revolve around. You have to include such information here concisely and neatly. Otherwise what's the purpose of this survey or tutorial (I don't know what to call it).

Response: in the revised paper, we briefly discuss the challenge of designing transport protocol for deep space networks in order to compare the requirements of transfer reliability and congestion control in these networks with those of opportunistic networks. Finally, in the revised paper we refer the reader elsewhere for more information on ICN routing protocols (Section II.B) and reliable transport protocols in the deep space Internet (Section II.C) since these topics are not the focus of this paper.

Page 4, column 2, line 46: Again the use of the term DTNs with no indication what so ever on what it is supposed to represent under the title of a subsection that is supposed to talk about Opportunistic Networks which are the same as ICNs which the authors assume to be DTNs and those are finally IPNs? Geez ... This is so (with 10000000 "o") confusing.

Response: again, we have clarified our terminology in the revised paper.

Page 5, column 1, lines 30-32 and 51-52: I wonder if the authors have read this paper before submitting it. On lines 30-32 they say that storage management can be decoupled from routing and then right a few sentences after on lines 51-52 they contradict themselves saying that storage congestion control are closely related to the forwarding strategies. Can there be more contradicting and confusing? This is completely not acceptable.

Response: we address this issue and rewrite these sentences as: "Congestion control strategies in opportunistic networks are closely related to the number of message copies distributed throughout the network." (Page 5, column 2, line 45).

Page 6, column 1, line 34: Warthman did not "propose" CT. He just wrote a tutorial on this matter.

Response: we revised this sentence into: "Warthman describes four classes of reliable message transfer service in ICNs....." (Page 6, column 1, line 58).

Page 6, column 2, line 7: what do you mean by "Epidemic Custodians"? With all my experience in this field this is the first time I read such a term with no clarification what so ever.

Response: we have removed this phrase and revised the discussion of transfer reliability in opportunistic networks when epidemic routing is used (Page 6, column 2, line 40).

Page 7 and beyond: please avoid the use of equations in a survey/tutorial. This is not supposed to be a technical paper.

Response: we have removed almost all equations and only retain one simple equation in our discussion of the CafRep proposal (Page 11, column 2). We also note that Reviewer 2 asked for more mathematical expression; however given that a survey paper is not intended for specialists, we trust that both reviewers will accept our approach in the revised paper.

Page 8, column 2, line 23: "we now consider" gives the impression that all of the summarized work afterwards has been written by the authors of this paper themselves which is not the case. Please change this.

Response: we have modified this sentence to: ".....and in the following we discuss some proposals described in the literature." (Page 8, column 2, line 47).

Page 9, column 1, line 51: please refer to the work rather the name of the scheme.

Response: we revised it as: "The CAA algorithm improves" (Page 9, column 2, line 57).

Page 10 is full of "however" and "hence" ... Aren't there any other conjunctions in the English literature?

Response: we have revised the text on page 10, and made the English a more pleasant read.

Page 12, column 2, lines 25-32: this paragraph does not read well. Consider revising.

Response: we revised the paragraph (Page 13, column 2, line 13).

In addition to all of the above, the paper is quite boring. The authors simply summarize the work done in the literature and add no attractive flavours to it. They do not give their opinion, their own view of things and their own interpretations. The reader cannot really learn any lesson from this paper. Reading it is more like engaging in going through a maze of tall and large paragraphs that present no fruitful conclusions. Future work directives are also not appealing and provide no useful information. I believe that, with 58 references, the authors can write a much more useful and informative manuscript.

Response: we have added our opinion and comments on many of the papers discussed in Sections IV, V and VI, including discussion of the papers' drawbacks and potential improvements. In addition, we have revised Section VII on future research issues, and discuss some points, especially in storage congestion control that we believe are important in the context of opportunistic networks.

Please proof read the paper it has a lot of grammatical mistakes. The writing is a bit poor. In accordance with the above, the reviewer suggests that this paper undergoes preeminent revisions and be resubmitted for a second round of revision.

Response: the quality of the writing has been substantially improved, including both grammar and the structure of the discussion.

Reviewer: 2

Recommendation: Revise and Resubmit

Comments:

It is my judgment that this article on the topic is necessary and valuable. I do support this article. However, a major revision is needed.

Additional Questions:

1. Please provide a one-paragraph description of the content of this manuscript: This article identifies and discusses the transport functions needed for data delivery in opportunistic networks. Especially, two main transport functions are focused. They are transfer reliability and storage congestion control.

2. Please identify and discuss the contribution of this manuscript. Please include in your discussion items such as the following:

a. Does the paper have significant tutorial content? That is, is there enough background provided so that the generalist in communications can understand its main contributions? Elaborate.

b. Does the paper contain original contributions? What is the nature of the contributions?

c. Is there a description of lessons learned that are given to the reader to help the reader avoid pitfall in his own work?

d. Is there a need for a paper such as this in the communications community? For example, are there articles that are already available which cover more or less the same topic at about the same depth?:

Firstly, it is very obvious that there is a strong need for a paper on this topic due to the applications of reliable services in opportunistic networks. And, it is my own judgment that the authors did make some contributions on this topic in the article. However, this article at the current status might not be strong enough to reach the quality level of our journal. Therefore, more works are necessary for improving the quality of this article and providing the systematic descriptions on transfer reliability and storage congestion control.

Response: we have substantially restructured the paper, both in the introductory sections I, II and III, and in the detailed presentation of the paper's core in sections IV, V and VI. To improve the quality of the paper's contribution, we have also added our opinion and comments on many of the papers we discuss in Section IV, V and VI, including discussions of these paper's drawbacks and potential improvements. In addition, the quality of the writing has been substantially improved.

3. Please discuss the quality of the citations in this manuscript. If you think the citations should be improved, please provide specific references or sources of articles, such as journals or magazines, which should be consulted. : It is O.K.

4. Please comment on the organization of the paper, and offer any suggestions that you think will improve the paper and its readability: It is my impression that the article is hard for readers to understand completely. More works are necessary to polish and smooth the contents and descriptions. As the authors pointed out, two main transport functions are focused and discussed. It is necessary to discuss them systematically and completely. Furthermore, it is a must to clearly describe the research issues and problems on this topic with the detailed reference information, which might be the most valuable part to the readers. The authors did provide 4 research

issues on PP. 12-13. However, they are very few, not with sufficient reasoning and valuable directions, and more references required.

Response: we have changed the title of the paper to reflect the two main functions that are considered in the paper. The paper now flows from a discussion of ICNs (and routing and transport protocols) in Section II, through an introduction to opportunistic networks and the transfer reliability and congestion control functions (Section III), to the detailed discussion of the literature in Section IV to VI. We also added our opinions and comments on many of the papers discussed in Section IV-VI to give directions for future development or possible improvements of the proposals. We also clarified and refined the discussion on future research issues (Page 13-14), providing a more thorough discussion. We have given more references, both in the research issue discussion and in the paper overall (expanded from 58 to 73 references).

5. Please comment on the technical correctness of the manuscript in general, identify any specific technical inaccuracies that you find, and make suggestions for correcting those.: In the article, it is better for the readers to clarify the transport layer functionality, transport functionality, and transport protocols. More mathematical expressions and theoretical derivations are needed to make readers understand the contents quantitatively.

Response: transfer reliability and congestion control traditionally are defined in transport layer, but in DTN architecture both of them are defined in the Bundle layer; hence in our revised paper we have changed the title and instead we focus on the functionality and how it can be supported in opportunistic networks. On the subject of mathematical equations, we note that Reviewer 1 asked us to avoid the use of equations in survey/tutorial paper while Reviewer 2 has asked for more mathematical expressions. Given that a survey paper such as ours is not intended for specialists, we have opted to remove almost all equations, retaining only one simple equation in our discussion of the CafRep proposal (Page 11, column 2). We believe that our revised discussion of the paper is sufficient to give the reader an appropriate level of understanding of the papers. We trust that both reviewers will accept our approach and find the revised paper satisfactory.

6. If the manuscript does not require major revision, please provide a list of minor changes, such as spelling or grammatical errors, that need to be made. Please use the format 'p. 7., l. 18 somth ==> smooth' to mean 'on line 18 of page 7, correct the spelling from somth to smooth.': The manuscript requires major revision.

Response: we have made the major revisions as requested by both reviewers and additionally corrected the minor grammatical errors and improved the paper's styling.

7. Please provide a summary comment on the overall suitability of the paper for publication in IEEE Communications Surveys and Tutorials, assuming the recommended revisions are made. For example, if this is an outstanding contribution, please so state. If a major revision is needed, please so state. If the manuscript requires major editing, please so state.: It is my judgment that this article on the topic is necessary and valuable. I do support this article. However, a major revision is needed.

Response: major revision made as noted above. We thank the reviewer for supporting the article, which we believe to be worthwhile contribution in an area of growing importance.

Decision Letter (COMST-00088-2012.R1)

From: ekram@EE.UManitoba.ca

To: b.soelistijanto@surrey.ac.uk, soelistijanto@yahoo.com

CC: b.soelistijanto@surrey.ac.uk, soelistijanto@yahoo.com, m.howarth@surrey.ac.uk, ekram.hossain@ad.umanitoba.ca, comst@ic.unicamp.br

Subject: IEEE COMST: Decision COMST-00088-2012.R1

Body: 26-Feb-2013

Dear Mr. Bambang Soelistijanto,

We have completed the review of your "Transfer Reliability and Congestion Control Strategies in Opportunistic Networks:

A Survey" authored by Soelistijanto, Bambang; Howarth, Michael, which you had submitted for consideration for publication in the IEEE Communications Surveys and Tutorials. Your manuscript has been reviewed by both generalist and expert reviewers.

As you will see from the enclosed reviews the reviewers found merit in your manuscript, but also pointed out a number of significant shortcomings that need to be addressed. I must therefore classify your manuscript as REVISE and RESUBMIT. As such, the manuscript, after revision would be sent out to the same reviewers, assuming you decide to revise and resubmit.

I believe the reviewers have made some very useful comments. I would therefore encourage you to undertake the revision. When you do resubmit please upload the following three items and make them accessible for review: (1) the revised manuscript, (2) the revised manuscript with the changed passages highlighted in some way (e.g., through underlining or bold font), and (3) a response document providing an item-by-item response to each of the reviewers' points, stating how and exactly where in the revised manuscript you have responded to the comment. Please submit these materials as a revision (not a new paper). In addition, please submit your comments, detailing the changes you have made, in the comments boxes, accessible when the manuscript is resubmitted. In the author center, you will see an entry with the paper id and a ".R#" appended, where # is the revision number. First click on the view comments button to enter comments to the associate editor and reviewers. Then, click the title of the paper to upload the three items listed above.

Please acknowledge the receipt of this editorial decision and let me know whether you will revise and resubmit the paper.

Please note that the DEADLINE for submission of your revised manuscript is 27-May-2013.

I thank you once again for submitting your work to IEEE Communications Surveys and Tutorials.

Sincerely yours,

Ekram Hossain, Ph.D., P.Eng.
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Reviewer Comments:

Reviewer: 1

Recommendation: Accept With Minor Revision

Comments:

The authors have addressed our comments in their revision. I have some minor issues which are related to the quality of the figures. Almost throughout the manuscript the figures may need to be checked for their quality. However, I don't think the paper should come back to me for another round. If that is done, then the paper should be ready for publications.

Additional Questions:

1. Please provide a one-paragraph description of the content of this manuscript.:

2. Please identify and discuss the contribution of this manuscript. Please include in your discussion items such as the following:

- a. Does the paper have significant tutorial content? That is, is there enough background provided so that the generalist in communications can understand its main contributions? Elaborate.
- b. Does the paper contain original contributions? What is the nature of the contributions?
- c. Is there a description of lessons learned that are given to the reader to help the reader avoid pitfalls in his own work?
- d. Is there a need for a paper such as this in the communications community? For example, are there articles that are already available which cover more or less the same topic at about the same depth?:

3. Please discuss the quality of the citations in this manuscript. If you think the citations should be improved, please provide specific references or sources of articles, such as journals or magazines, that should be consulted. :

4. Please comment on the organization of the paper, and offer any suggestions that you think will improve the paper and its readability.:

5. Please comment on the technical correctness of the manuscript in general, identify any specific technical inaccuracies that you find, and make suggestions for correcting those.:

6. If the manuscript does not require major revision, please provide a list of minor changes, such as spelling or grammatical errors, that need to be made. Please use the format 'p. 7., l. 18 somth ==> smooth' to mean 'on line18 of page 7, correct the spelling from somth to smooth.':

7. Please provide a summary comment on the overall suitability of the paper for publication in IEEE Communications Surveys and Tutorials, assuming the recommended revisions are made. For example, if this is an outstanding contribution, please so state. If a major revision is needed, please so state. If the manuscript requires major editing, please so state.:

Reviewer: 2

Recommendation: Revise And Resubmit

Comments:

Please see the above. The reviewer strongly recommend and encourage you revise the manuscript, because the topic is very attractive and useful.

Additional Questions:

1. Please provide a one-paragraph description of the content of this manuscript.: This manuscript surveys the state of the art of proposals for transfer reliability and storage congestion control strategies in opportunistic networks. And, this is the R1 revision. Supposedly, it should be a complete version. Unfortunately, it is not what we expected.

2. Please identify and discuss the contribution of this manuscript. Please include in your discussion items such as the following:

- a. Does the paper have significant tutorial content? That is, is there enough background provided so that the generalist in communications can understand its main contributions? Elaborate.
- b. Does the paper contain original contributions? What is the nature of the contributions?
- c. Is there a description of lessons learned that are given to the reader to help the reader avoid pitfalls in his own work?
- d. Is there a need for a paper such as this in the communications community? For example, are there articles that are already available which cover more or less the same topic at about the same depth?: The topic of this manuscript is very valuable and important.

3. Please discuss the quality of the citations in this manuscript. If you think the citations should be improved, please provide specific references or sources of articles, such as journals or magazines, that should be consulted. : It is O.K.

4. Please comment on the organization of the paper, and offer any suggestions that you think will improve the paper and its readability.: The reviewer has read the manuscript several times. It is his impression that this manuscript is hard to read, especially for the new comers to the field. Some improvements on readability are needed.

5. Please comment on the technical correctness of the manuscript in general, identify any specific technical inaccuracies that you find, and make suggestions for correcting those.: There are some places which are not clear.

For example, on P. 13, the authors claim that "In the future, researchers should decide whether congestion control should be investigated independently or together within routing protocol development, by considering for example their mutual benefits and complexities." Why should researchers decide this matter in the future? What are the reasons behind this? The reviewer does not agree with this totally; he does not think this is reasonable. Obviously, this is not a right direction provided to the readers.

On P. 13, the authors claim that "To the best of our knowledge, there is no existing proposal of congestion control that considers node's message generation rate when calculating node storage congestion probability." The reviewer doubts the importance of this matter to the topic of this manuscript, because it is an issue within one node. The topic of this manuscript is in opportunistic networks. More important issues should be emphasized.

On P. 14, in "Non-random network structure," it might be better that the descriptions are clarified to go to the point.

On P. 14, in "Localized centrality measures," it might be better to show your final conclusions with the reasons.


Due to space limitation, only a few can be listed.

6. If the manuscript does not require major revision, please provide a list of minor changes, such as spelling or grammatical errors, that need to be made. Please use the format

'p. 7., l. 18 somth ==> smooth' to mean 'on line18 of page 7, correct the spelling from somth to smooth.': Many corrections or improvements are needed. For example, on P. 3, "... the principal Internet transport protocol, Transmission Control Protocol ..." should delete "principal" in order to clarify the meaning to the readers, because there is only one transport protocol in Internet. On P. 3, the "between a client and a server" in "Fig. 4(a) shows that three messages are required to establish the TCP session between a client and a server." should be changed to "between a sender and a receiver".
Due to space limitation, it is not possible to list all.

7. Please provide a summary comment on the overall suitability of the paper for publication in IEEE Communications Surveys and Tutorials, assuming the recommended revisions are made. For example, if this is an outstanding contribution, please so state. If a major revision is needed, please so state. If the manuscript requires major editing, please so state.: The topic of this manuscript is necessary and useful to our journal. However, the current status of this manuscript might not reach the quality level of our journal. Some works are needed to improve the quality and value of this manuscript.

Date Sent: 26-Feb-2013

 Close Window

COMST-00088-2012.R2

Response to the Reviewer comments on COMST-00088-2012.R1

We are very pleased that Reviewer 1 has recommended that the article be accepted, and we are very grateful to Reviewer 2 for his comments; they have allowed us to refine and clarify the paper. Our specific responses to his comments are below.

"The reviewer has read the manuscript several times. It is his impression that this manuscript is hard to read, especially for the new comers to the field. Some improvements on readability are needed."

Response: we have revised thoroughly the manuscript, as will be seen by inspecting the version of the manuscript that has the changes highlighted, with the key objective of making the article easier to read. There are too many changes to mention each individually, but some of the key changes are:

- Social networking concepts / terms are now defined at the start of Section V.B, before their first use in the article.
- We have clarified the definition of tie-strength in Section V.B.
- We have re-ordered and clarified the descriptions of the work of Kathiravelu et al. in [45] and [51] in Section V.B.
- In Section VII we have simplified the terminology (for example, addressing the over-use of words such as: module, domain, component, strategy).
- In the entire article, we have simplified sentence structures, and made our terminology more consistent.

"on P. 13, the authors claim that "In the future, researchers should decide whether congestion control should be investigated independently or together within routing protocol development, by considering for example their mutual benefits and complexities." Why should researchers decide this matter in the future? What are the reasons behind this? The reviewer does not agree with this totally; he does not think this is reasonable. Obviously, this is not a right direction provided to the readers."

Response: we agree with the Reviewer that researchers are unlikely to decide such things. We have rephrased the sentence to clarify our intention: namely, that there are two key issues: (a) how congestion might best be measured using local metrics; and (b) to what degree should congestion control algorithms and routing algorithms be integrated - i.e. what are the tradeoffs of using loosely coupled or tightly coupled algorithms.

"On P. 13, the authors claim that "To the best of our knowledge, there is no existing proposal of congestion control that considers node's message generation rate when calculating node storage congestion probability." The reviewer doubts the importance of this matter to the topic of this

manuscript, because it is an issue within one node. The topic of this manuscript is in opportunistic networks. More important issues should be emphasized."

Response: we have clarified that this is a network-wide issue, like TCP congestion control in conventional networks where TCP entities respond to network congestion by reducing their window size and therefore the amount of data they send on to the network. The problem is made more interesting /challenging in opportunistic networks because of (a) the long delays, and also (b) information is available both to the end nodes and to the intermediate nodes (since all nodes act both as routers and as message source/destinations).

"On P. 14, in "Non-random network structure," it might be better that the descriptions are clarified to go to the point."

Response: this research issue has been rewritten and clarified.

"On P. 14, in "Localized centrality measures," it might be better to show your final conclusions with the reasons."

Response: this research issue has been rewritten and clarified.

In addition, two new research issues (5 and 6) have been introduced. Other changes have been made to clarify the article as we noted at the top of this document.

"on P. 3, "... the principal Internet transport protocol, Transmission Control Protocol ..." should delete "principal" in order to clarify the meaning to the readers, because there is only one transport protocol in Internet. On P. 3, the "between a client and a server" in "Fig. 4(a) shows that three messages are required to establish the TCP session between a client and a server." should be changed to "between a sender and a receiver"."

Response: we have implemented these changes as requested, but we note that it is conventional to refer in TCP to the client and server during the 3-way handshake (see for example http://en.wikipedia.org/wiki/Transmission_Control_Protocol#Connection_establishment and many standard texts on TCP).

Other changes have been made to remove minor grammatical errors as we noted at the top of this document.

Decision Letter (COMST-00088-2012.R2)

From: ekram@EE.UManitoba.ca

To: b.soelistijanto@surrey.ac.uk, soelistijanto@yahoo.com, pubsub@comsoc.org

CC: b.soelistijanto@surrey.ac.uk, soelistijanto@yahoo.com, m.howarth@surrey.ac.uk, ekram.hossain@ad.umanitoba.ca, comst@ic.unicamp.br, elsayhesham@hotmail.com

Subject: IEEE COMST: Decision COMST-00088-2012.R2

Body: 17-Apr-2013

Dear Mr. Bambang Soelistijanto,

We are happy to inform you that your manuscript COMST-00088-2012.R2 Transfer Reliability and Congestion Control Strategies in Opportunistic Networks: A Survey has been accepted for publication in the IEEE Communications Surveys and Tutorials. Please find enclosed the reviewer comments.

Instructions for preparation of your publication package can be found at: <http://www.comsoc.org/cst/information-authors> in the section "Authorkit for accepted papers." Please contact Sue Lange at suelange1@verizon.net if you have any questions on manuscript preparation. Be advised that although your article will not be published for quite some time, it can be posted early at the IEEE Xplore site. The sooner you get your materials in to the publications department, the sooner it can be posted there. Please, return the material for camera ready production at most 1 (one) month after the reception of this notification.

Note: all files should be placed into a folder which should then be compressed using zip, stuffit, tar, or other compression formatting scheme and then uploaded to the publications ftp site: [ftp.comsoc.org](ftp://ftp.comsoc.org), directory: 2012; user id: commpaper; password: 3Em=!!a (case sensitive). If you are unable to ftp your files, contact Sue Lange for a mailing address where they can be sent. Once you have uploaded the files please email pubsub@comsoc.org with the name of the file.

I take this opportunity to thank you for submitting your work for consideration to IEEE Communications Surveys and Tutorials. I look forward to seeing your work published in the near future.

IMPORTANTPlease note that you have the option to make your article "open-access", i.e. available to non-subscribers from IEEE Xplore, for a fee of \$1750 paid to the IEEE. If you wish for your article to be open access, please let the Publications Editor, Joe Milizzo, know. More information about IEEE open access policy may be found at: http://www.ieee.org/publications_standards/publications/authors/open_access.html.

Sincerely yours,

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Reviewer Comments:

Reviewer: 1

Recommendation: Accept

Comments:

The authors have revised the manuscript to the satisfaction of the reviewer.

Additional Questions:

1. Please provide a one-paragraph description of the content of this manuscript.:

2. Please identify and discuss the contribution of this manuscript. Please include in your discussion items such as the following:

- a. Does the paper have significant tutorial content? That is, is there enough background provided so that the generalist in communications can understand its main contributions? Elaborate.
- b. Does the paper contain original contributions? What is the nature of the contributions?

- c. Is there a description of lessons learned that are given to the reader to help the reader avoid pitfalls in his own work?
- d. Is there a need for a paper such as this in the communications community? For example, are there articles that are already available which cover more or less the same topic at about the same depth?:
3. Please discuss the quality of the citations in this manuscript. If you think the citations should be improved, please provide specific references or sources of articles, such as journals or magazines, that should be consulted. :
4. Please comment on the organization of the paper, and offer any suggestions that you think will improve the paper and its readability.:
5. Please comment on the technical correctness of the manuscript in general, identify any specific technical inaccuracies that you find, and make suggestions for correcting those.:
6. If the manuscript does not require major revision, please provide a list of minor changes, such as spelling or grammatical errors, that need to be made. Please use the format 'p. 7., l. 18 somth ==> smooth' to mean 'on line18 of page 7, correct the spelling from somth to smooth.':
7. Please provide a summary comment on the overall suitability of the paper for publication in IEEE Communications Surveys and Tutorials, assuming the recommended revisions are made. For example, if this is an outstanding contribution, please so state. If a major revision is needed, please so state. If the manuscript requires major editing, please so state.:

Reviewer: 2

Recommendation: Accept

Comments:

It is my recommendation that the .R2 version of this manuscript be accepted for publication in our journal.

Additional Questions:

1. Please provide a one-paragraph description of the content of this manuscript.: This manuscript is the .R2 version.
2. Please identify and discuss the contribution of this manuscript. Please include in your discussion items such as the following:
- a. Does the paper have significant tutorial content? That is, is there enough background provided so that the generalist in communications can understand its main contributions? Elaborate.
 - b. Does the paper contain original contributions? What is the nature of the contributions?
 - c. Is there a description of lessons learned that are given to the reader to help the reader avoid pitfalls in his own work?
 - d. Is there a need for a paper such as this in the communications community? For example, are there articles that are already available which cover more or less the same topic at about the same depth?:
3. Please discuss the quality of the citations in this manuscript. If you think the citations should be improved, please provide specific references or sources of articles, such as journals or magazines, that should be consulted. :
4. Please comment on the organization of the paper, and offer any suggestions that you think will improve the paper and its readability.:
5. Please comment on the technical correctness of the manuscript in general, identify any specific technical inaccuracies that you find, and make suggestions for correcting those.:
6. If the manuscript does not require major revision, please provide a list of minor changes, such as spelling or grammatical errors, that need to be made. Please use the format 'p. 7., l. 18 somth ==> smooth' to mean 'on line18 of page 7, correct the spelling from somth to smooth.':
7. Please provide a summary comment on the overall suitability of the paper for publication in IEEE Communications Surveys and Tutorials, assuming the recommended revisions are made. For example, if this is an outstanding contribution, please so state. If a major revision is needed, please so state. If the manuscript requires major editing, please so state.: It is my recommendation that the .R2 version of this manuscript be accepted for publication in our journal.

Date Sent: 17-Apr-2013

