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Report on PhD dissertation submitted by Ing. Vladimir Vesely, entitled "A New Dawn of Naming, Addressing, and Routing on the Internet."

Scientific research is one of the unique characteristics of Western civilization. As Heilbron points out other civilizations developed mathematics, only the West developed proof . . . and the tradition of continually testing theories to find the smallest number of assumptions that will explain and predict the widest range of phenomena. Continually challenging, testing, to improve our understanding is why we do research and why freedom of thought is so important to that research.

With this in mind, I have reviewed the candidate's thesis in detail and provided extensive comments to him. We have had numerous discussions on the topics covered, exploring some of its implications. Let me comment on the suggested questions about the thesis.

1. *Does the dissertation contain current research topics?*

Naming, addressing and routing are probably the most important topics of research in the Internet today. Recently, a well-known researcher noted that with 5 – 10 years there will be more devices on the Internet in every major metropolitan area than are on the entire Internet today, and they have no idea how to route them. This thesis goes a long way to confirming that conclusion and showing that there is little hope in solving these problems with the current Internet architecture. From the exhaustive (and must have been exhausting) list of alternatives the candidate has investigated and found all of them lacking, it is clear that not only is the Internet architecture at a dead-end, but so are most Internet researchers. However, this thesis begins to explore the implications of the original internetworking concept that was proposed before the current aberration became dominant. That original approach has now been carried forward with new results that were unforeseen 40 years ago. This thesis makes significant strides making that point clear.

That said, I must comment on this question. If interpreted too literally, this question could be seen as trying to ensure groupthink, that the research conducted by the candidate not break out of the pack. The mark of truly great research is research that breaks new ground, that sees things differently, and opens our eyes to what we have been missing.

But I do have to admit that in most cases this path is too risky for a PhD student and should be left to the professors for whom it is not such a great risk. Therefore, we should be doubly impressed that this candidate took the leap, when it was discovered that LISP was not able to address the problems and considered alternatives.

2. *Does the dissertation include original contributions beyond the state-of-the-art? Elaborate on the novelty and impact.*

This dissertation makes significant original contributions to the field. First, RINASim is great contribution to the infrastructure for future research to discover new principles of networking and has been instrumental in the research reported here. Second as noted above, by reviewing all or most of the proposed solutions to the Internet addressing problems and finding them all wanting serves to indicate just how deep the hole is that the Internet finds itself. Third, the candidate in essence proves his point by developing two significant improvements to the current LISP proposals and still finds that even with these improvements LISP will not be adequate. It will be nowhere near the efficiency achieved by simply routing on the node address rather than the interface. Of course, we always learn more about the nuances of a problem from our mistakes than from our successes. Although, one could argue that the Internet is taking this to an extreme.

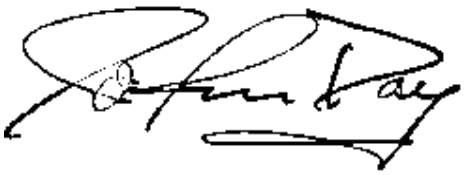
3. *Have the core ideas been published at an appropriate level?*

Yes, and more publications are probably warranted. A good survey article of the various loc/id proposals showing how futile this avenue of inquiry has been would be good addition. It might be good to pull all of the publications from this thesis together in one place in the thesis.

I realize that it is common among university requirements for a PhD that the candidate have published some number of papers (usually 3 or 4). (In some cases, the papers constitute the thesis.) I do not approve of this practice. It encourages the professor and the committee to abrogate their responsibility to ensure the quality of the candidate's research and guide his acquisition of the critical thinking skills. It allows them to wash their hands of any responsibility for the quality of the work, and furthers the impact of groupthink on the field.

4. *Do the candidate's achievements support granting the PhD title?*

Most definitely. The candidate has made significant contributions to the field. He has made significant contributions to our understanding of the limitations of the current direction. (Although, they could have been more strongly stated.) The RINA Simulator provides a important tool for further explorations of the fundamental principles of networking.



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