To: NSF Program Managers, Computer and Network Systems

From: Guohui Wang, Software Engineer on Network, Facebook

October 4, 2013

Subject: Letter of support for NSF proposal titled ""**Flexible All-Wireless Inter-Rack Fabric for Datacenters Using Free-Space Optics**"

I am writing this letter to express the support for the aforementioned NSF proposal for developing a flexible and reconfigurable inter-rack fabric for datacenters using free-space optical links.

I am an engineer in Facebook's network infrastructure team. Our group is involved in the design and management of Facebook's large network infrastructures and datacenters that support billions of requests per day.

The proposed research will examine fundamental issues in leveraging free-space optical technologies as a basis for constructing a dynamically reconfigurable datacenter network. This is very relevant to, and will greatly influence the networking efforts at Facebook, and the broader networking and systems community.

On a personal front, I am really excited to hear about this research since I have worked in the space of datacenter network design and was involved in one of the earliest efforts in using optics to augment datacenter capacity (e.g., c-Through which appeared at SIGCOMM 2010). That research was still in its infancy, but even then we were able to show significant benefits from a dynamically configurable network topology. In this early effort, our design was constrained by the use of traditional optical technologies that limits the type, scale, and speed of the re-configurability that could have been enabled. In addition, our design still suffered from the bane of the "cabling complexity" that is a fundamental problem for large-scale deployments. Parallel work in the research community proposed the use of traditional wireless technologies, but those are limited in range, bandwidth, and power considerations.

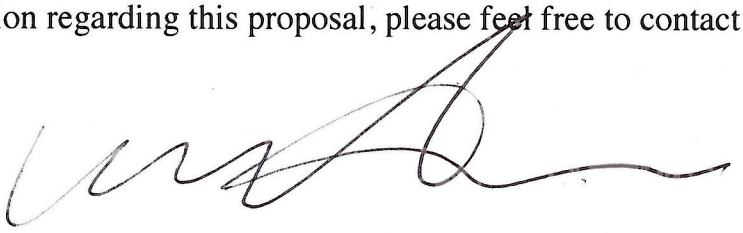
By proposing an "all-wireless" inter-rack fabric using free-space optics, the proposed research is taking a significant leap in pushing the surface of datacenter designs in addressing all of these concerns with our prior work. I cannot stress enough the cabling complexity and performance problems that the datacenter networks face today and our experiences further confirm this.

On a logistical front, we would like to support this research in the following ways:

- We will use our university research channels to inform the key design constraints from actual datacenter deployments (e.g., size, placement of racks) and validate the proposed research ideas;
- We will encourage internship opportunities for graduate students working on this project.

I strongly believe that the proposed research will significantly push the bar on datacenter network design. I am personally very excited about this research proposal, and I know first-hand that several of my other colleagues are excited as well!

I will offer my full support to make this research happen and see these ideas come to fruition. If you need any additional information from me to assist in your decision regarding this proposal, please feel free to contact me.



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