Massachusetts Institute of Technology
Department of Electrical Engineering and Computer Science

Proposal for Thesis Research in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

TITLE:	Network Layer Support for Overlay Networks
SUBMITTED BY:	John Jannotti 545 Technology Sq., #520 Cambridge, MA 02139
	(SIGNATURE OF AUTHOR)
DATE OF SUBMISSION:	January 28, 2002
EXPECTED DATE OF COMPLETION:	July, 2002
LABORATORY:	Laboratory for Computer Science

BRIEF STATEMENT OF THE PROBLEM:

This thesis will describe an approach to supporting overlay networks in the Internet's network layer. Two primitives, Packet Reflection and Path Painting, will be described and evaluated.

Overlay networks represent a flexible and deployable means for applications to obtain new network semantics, but they suffer from some efficiency concerns. To alleviate these concerns while maintaining flexibility, two new primitives are proposed for implementation in the network layer. *Packet Reflection* allows end hosts to request short-circuit packet routing and duplication in nearby routers. *Path Painting* allows multiple end hosts to determine where their disparate paths to a rendezvous point meet, in order to facilitate overlay topology building.

These primitives have been designed to allow their benefit to be gained locally, promoting incremental deployment. Numerous applications of these primitives are considered to demonstrate their utility - application level multicast systems with various semantics, an extended Resilient Overlay Network with greater latency benefits, and a hierarchy of web caches.

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Doctoral Thesis Supervision Agreement

TO: Department Graduate Committee
FROM: Professor M. Frans Kaashoek

The program outlined in the proposal:

TITLE: Network Layer Support for Overlay Networks
AUTHOR: John Jannotti
DATE: January 28, 2002

is adequate for a Doctoral thesis. I believe that appropriate readers for this thesis would be:

READER 1: Professor Hari Balakrishnan
READER 2: Professor Ion Stoica

Facilities and support for the research outlined in the proposal are available. I am willing to supervise the thesis and evaluate the thesis report.

SIGNED: ______________________________
PROFESSOR OF ELECTRICAL ENGINEERING
AND COMPUTER SCIENCE

DATE: ______________________________

Comments:

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Doctoral Thesis Reader Agreement

To:	Department Graduate Committee
From:	Professor Hari Balakrishnan

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Date:	January 28, 2002
Supervisor:	Professor M. Frans Kaashoek
Other Reader:	Professor Ion Stoica

is adequate for a Doctoral thesis. I am willing to aid in guiding the research and in evaluating the thesis report as a reader.

Signed: ______________________________
Assistant Professor of Electrical Engineering
and Computer Science

Date: ______________________________

Comments:

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Doctoral Thesis Reader Agreement

TO: Department Graduate Committee
FROM: Professor Ion Stoica

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SIGNED: ______________________
ASSISTANT PROFESSOR OF COMPUTER SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

DATE: ______________________

Comments: