# Poster: CO2: Collaborative Packet Classification for Network Functions with Overselection

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***Abstract*—The growing number of network functions drives the need to install increasing numbers of fine-grained packet classification rules in the network switches. However, this demand for rules is outstripping the size of switch memory. While much work has focused on compressing classification rules, most of this work proposes solutions operating in the memory of a single switch. This paper proposed, instead, a collaborative approach encompassing switches and network functions: we couple approximate classification at switches with fine-grained filtering where needed at network functions to accomplish overall classification. This architecture enables a trade-off between usage of (expensive) switch memory and (cheaper) downstream network bandwidth and network function resources. Our implementation uses approximate classification and Prefiltering to reduce switch memory usage. Our system can reduce memory significantly compared to a strawman approach, as shown by simulations of real traffic traces and rules.**

## I. Introduction

Software Defined Networking (SDN) is a powerful enabler for Network Function Virtualization (NFV). By moving network appliance functionality from proprietary hardware to

50%, no systematic treatment of the consequences of the resulting false positives has been provided.

This paper addresses the problem of how to store and apply large numbers of classification rules to network traffic. Our work is based on the observation that network bandwidth and downstream processing resources are relatively cheap compared with switch memory. We propose *COllaborative Overselection (CO2)* , a framework for packet classification that distributes classification functionality between switches and the network functions at end hosts in order to achieve the best trade-off between switch memory, communication bandwidth, and computational resources. Figure 1 shows the CO2 architecture. At a high level, the SDN controller installs the traffic classification rules at the switch. The switch performs Approximate Packet Classifier (APC) based on these rules, which has the side-effect of forwarding the overselected packets to the receivers. The receivers detect overselection and provide feedback to the controller, which then dynamically reconfigures the classifiers at the switches in order to control