Name:
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Hard Problem Area:
Resilient Architectures

Overall Research Goal(s):
What do you ultimately hope to show with your research? This section can involve some jargon, but try to relate these goals to your broad impact section. Start with the larger goal(s) and narrow the scope towards your specific study (and specific goals, below).

The goal of our research is to ease the management of network and security devices by providing a centralized and automated way of configuring them. We believe that leveraging recent advances in networking can help ease security policy enforcement.

Broad Impact:
Why is your research important? This section should avoid any technical jargon and should be meaningful to the general public. Try to keep this down to five sentences. This should be hierarchical: the broad impact decomposed into more specific impacts that connect your overall research goals to your more specific goals.

Networks have become a crucial part of today's infrastructure, both inside and outside of the tech industry. Ensuring good quality of service often means ensuring security and resiliency of the underlying network. This, in turn, requires systems capable of expressing the security and resiliency requirements and translating them into network configurations.

Specific Research Goals:
Lay out the steps you are going to take to achieve your overall research goal. You can get technical here.

- Focus on network security applications, i.e., software that enforces network policies and manages network and security appliances (e.g., intrusion detection middleboxes, firewalls, etc.)
- Identify common goals across and approaches across applications. For example, many routing policies are expressed in terms of paths and many resource management tasks are performed using convex optimizations.
- Identify inefficiencies and missing features of current approaches when it comes to composing multiple applications on a single network (e.g., slow responsiveness to network changes, inability to balance security and network objectives, etc.)
• Propose a system which leverages a unified multi-objective optimization that balances the goals of multiple applications fairly and efficiently.

**Proposed Data Collection (if applicable):**
What data will you collect to answer your research goals? How will you collect it? Will it be an observational study, randomized comparative experiment, or simulation study? Include potential biases and be prepared to explain how the data will achieve your specific research goals.

A simulation study involving comparison of state-of-the-art available technologies and the proposed system.

**Success Criteria:**
How will you determine whether you satisfied your specific and overall research goals?

By performing a quantitative comparison of the proposed system against existing techniques. This includes metrics such as runtime and resource utilization as functions of network size, number of applications (and policies) and network congestion.

**Anticipated Difficulties, Limitations, and Criticisms:**
What will make the above specific research goals difficult to achieve? How do you plan on dealing with these difficulties if they arise?

Two major difficulties include:
1. Identifying scenarios where the proposed framework provides the most benefit is challenging due to the number of parameters that have an effect on the final optimization solution: network size, network density, application and policy type, traffic variability.
2. Formally reasoning about the expressiveness of the framework for different types of applications.