A NEW NOVEL PACKET CLASSIFICATION FRAMEWORK FOR OPTIMIZING CLASSIFIER COMPRESSION PROBLEM IN WIRELESS NETWORK

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Abstract :

In this project, proposing a new framework for compressing TCAM based packet classifiers and three new algorithms and proposing to implement or design and develop this framework. Classifier compression problem raise few rating issues there are different algorithms are discovered contains many unknown compression opportunities but they are not suitable bulk packet transmissions. Classifier compression problem, While packet ready to transmit over the network large amount of packet can be classified into smaller units each smaller units constructs a minimum size of TCAM but the compressed amount of packet may have several issues before classification itself that is high power computation high beat generation are needed to avoid issues proposing a new novel packet classification framework for optimizing classifier compression problem in wireless networks.

Keywords: Crowdsourcing, Mobility patterns, Access point. Wi-Fi- Bandwidth, Incentive Mechanism.

I. INTRODUCTION

Packet classification is the core mechanism that enables many networking devices, such as routers and firewalls, to perform services such as packet filtering, virtual private networks (VPNs), network address translation (NAT), quality of service (QoS), load balancing, traffic accounting and monitoring, differentiated services (Diffserv), etc. A packet classifier is a function that maps packets to a set of decisions,allowing packets to be classified according to some criteria. These classifiers are normally written as a sequence of rules where each rule consists of a predicate that specifies what packets match the rule and a decision for packets that match the rule. For convenience in specifying rules, more than one predicate is allowed to match a given packet. In such cases, the decision used comes from the first rule in the sequence whose predicate matches the packet. Table 1 shows a simplified example classifier with three rules. This packet classifier's predicates examine 5 fields of the packet, and has decision set {accept, discard}, as might be used on a firewall. Note that 1.2.0.0/16 denotes the IP prefix 1.2.*.*, which represents the set of IP addresses from 1.2.0.0 to 1.2.255.255. Packet classification is often the performance bottleneck for Internet routers as they need to classify every packet. Current generation fiber optic links can operate at over 40 Gb/s, or 12.5 ns per packet for processing. With the explosive growth of Internet-based applications, efficient packet classification becomes more and more critical. The de facto industry standard for high speed packet classification uses Ternary Content Addressable Memory (TCAM). Since 2003,most packet classification devices shipped were TCAM-based [1]. Although a large body of work has been done on softwarebased packet classification ([23]), because of the parallel search capability, TCAM remains the fastest and most scalable solution for packet classification because it is constant time regardless of the number of rules. The high speed that TCAM offers for packet classification does not come for free. First, a TCAM chip consumes a large amount of power and generates lots of heat. This is because every occupied TCAM entry is tested on every query. The power consumption of a TCAM chip is about 1.85 Watts per Mb [3], which is roughly 30 times larger than an SRAM chip of the same size [18]. Second, TCAM chips have large die area on line cards - 6 times (or more) board space than an equivalent capacity SRAM chip [10]. Area efficiency is a critical issue for networking devices. Third, TCAMs are expensive - often costing more than network processors [11]. This high price is mainly due to the large die area, not their market size [10]. Finally, TCAM chips have small capacities. Currently, the largest TCAM chip has 72 megabits (Mb). TCAM chip size has been slow to grow due to their extremely high circuit density. The TCAM industry has not been able to follow Moore's law in the past, and it is unlikely to do so in the future. In practice, smaller TCAM chips are commonly used due to lower power consumption, heat generation, board space, and cost. For example, TCAM chips are often restricted to at most 10%

of an entire board's power budget; thus, even a 36 Mb TCAM may not be deployable on many routers due to power consumption reasons. converting packet classification rules to ternary format typically results in a much larger number of TCAM entries. In a typical packet classification rule, the three fields of source and destination IP addresses and protocol type are specified as prefixes which are easily written as ternary strings. However, the source and destination port fields are specified in ranges (i.e., integer intervals), which may need to be expanded to one or more prefixes before being stored in a TCAM. This can lead to a significant increase in the number of TCAM entries needed to encode a rule. For example, 30 prefixes are needed to represent the single range [1, 65534],so 30 × 30 = 900 TCAM entries are required to represent the single rule r1.

II. EXISTING RELATED WORK

compression problem raise few rating issues there are different algorithms are discovered contains many unknown compression opportunities but they are not suitable bulk packet transmissions. Classifier Classifier compression problem, While packet ready to transmit over the network large amount of packet can be classified into smaller units each smaller units constructs a minimum size of TCAM but the compressed amount of packet may have several issues before classification itself that is high power computation high beat generation are needed to avoid issues proposing a new novel packet classification framework for optimizing classifier compression problem in wireless networks.

III Proposed related work

This frame work open a new direction for further based TCAM based packet classifier compression. It significantly improve the speed of the existing TCAM RAZOR algorithm with no loss in compression. Finally, TUF converts the ternary data structures to TCAM rules and chooses the smallest as the final result. Broadly,the two decisions that define a specific TUF algorithm are (1) the ternary data structure to represent the intermediate classifiers and (2) the procedure to combine intermediate classifiers. TUF advances the state of the art on TCAM classifier compression from two perspectives.

Algorithm 1: TUFCore(c)

Input: A 2-tree *c* representing a classifier

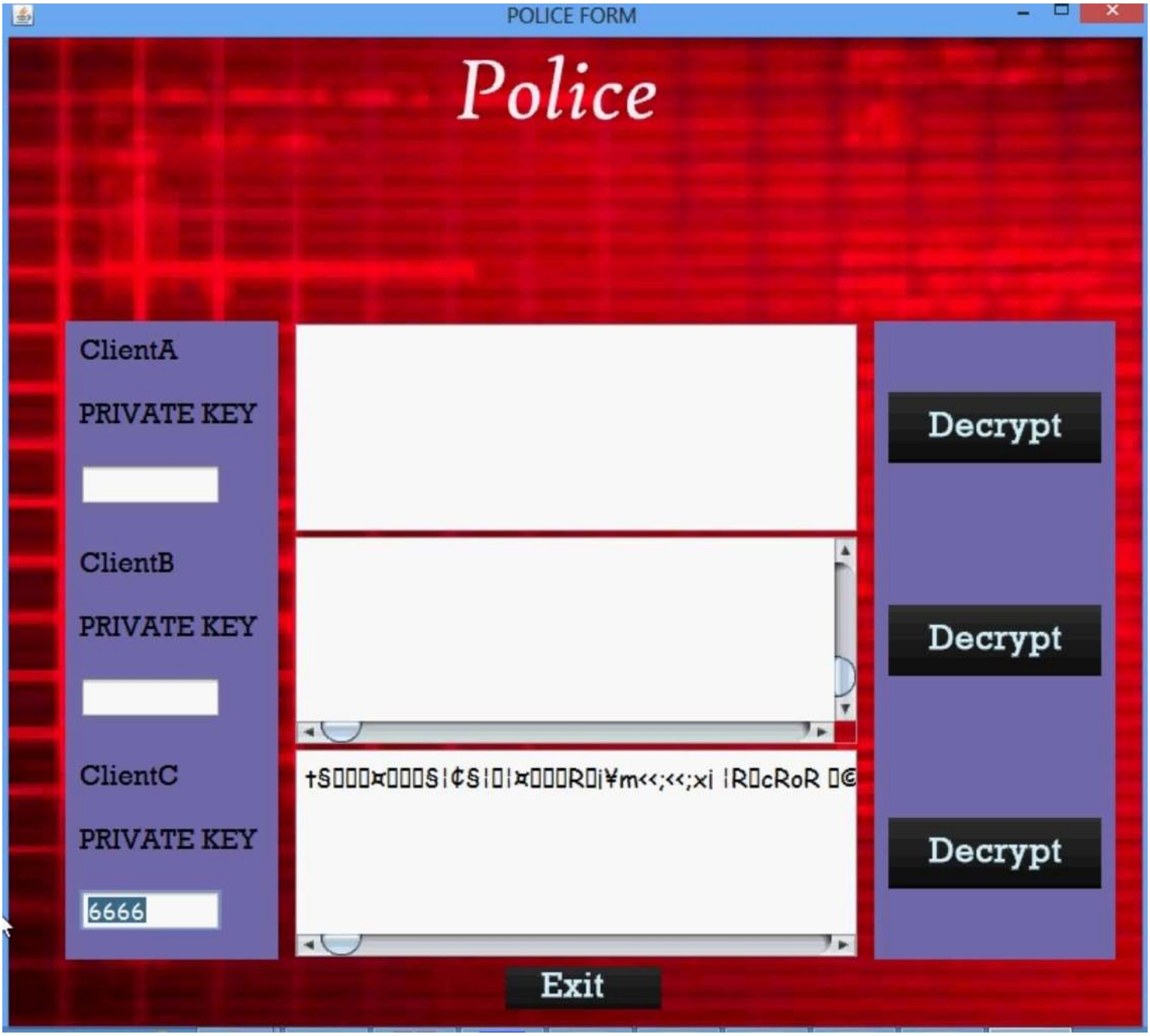
Output: An equivalent ternary data structure

```
switch c do
    case Leaf dec
        return Singleton (dec);
    case Node(left,right)
        LeftSol := TUFCore (left);
        RightSol := TUFCore (right);
  return LRMerge (LeftSol,RightSol;
```

CONTRIBUTIONAL WORK

1. It is a general framework, encompassing prior tree based classifier compression algorithms as special cases. Because of the structure that TUF imposes on tree based classifier compression algorithms, it allows us to understand them better and to easily identify optimization opportunities missed by those algorithms.
2. This framework provides a fresh look at the TCAM classifier compression problem and allows us to design new algorithms along this direction.
3. The experimental results shows that TUF can be speed up the prior algorithm TCAM RAZOR by its improved compression performance.

IV COMPARATIVE RESULTS



III. CONCLUSION

In this paper, we propose a new framework for compressing TCAM-based packet classifiers and three new algorithms for implementing this framework. This framework allows us to look at the classifier compression problem from a fresh angle, unify many seemingly different algorithms, and discover many unknown compression opportunities. Our experimental results show that TUF gives insights that (1) significantly improve the speed of the existing TCAM Razor algorithm with no loss in compression and (2) lead to new algorithms that compress better than prior algorithms. More importantly, this framework opens a new direction for further work on TCAM-based packet classifier compression

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