V. FIREWALL GENERATION

The firewall that is generated consists of a series of rules, each of which corresponds to a decision path in the indicated FDBTD f.

The rules r0, , rm−1 that make up a firewall over the fields F0, , and Fn−1 are each of the following forms: F0 ∈ S0 ∧ ・ ・ ・∧ Fn−1 ∈ Sn−1 → Decision

Each Si is either a nonempty set of numbers drawn from the domain of field Fi or the mark ALL (which is an interval of consecutive nonnegative integers).There are two options: a (for accept) or d. (for discard).The r1 and r2 in this instance stand for accept and discard.

When the Create firewall conditions are applied to Figure 3 (Reduced FDBTD), the resulting generate firewall is shown in table 2.

r 1 = F0 ∈ [3, 5] ∧ F1 ∈ [0, 1] ∪ [1, 3] ∪ [2, 7] ∪ [2, 3] ∪ [6, 8] → a
r 2 = F0 ∈ [3, 8] ∧ F1 ∈ [0, 1] ∪ [1, 3] → d

Table 2 Packet Filter Firewall Rule Set

FIREWALL COMPACTNESS

If a firewall has no redundant rules, it is referred to as compact. The firewall in Figure 3 can be easily argued to be small.

r 1 = F0 ∈ [3, 5] ∧ F1 ∈ [0, 8] → a

r 2 = F0 ∈ [3, 8] ∧ F1 ∈ [0, 3] → d

Theorem for Redundancy of Firewall Rules

Let (r0, r, rm-1) act as a firewall over fields F0, r, rm-1, and Fn-1.In this firewall, a rule ri is redundant if at least one of the following two requirements is true for each j, I j m-1:

1. rj's decision is the same as ri's decision.

2.No packet over fields F0, , and Fn1 satisfies the criteria.

ri.op ∧ (¬ri+1.ep ∧ ・ ・ ・ ∧ ¬rj−1.ep) ∧ rj.ep

where the original predicate of ri and rj is indicated by ri.op.ep stands for rj's demonstrated predicate.

VI. PROPOSED METHODOLOGY

We require an efficient firewall access rule set that enables early packet rejection and acceptance while minimizing computing overhead. The goal is to develop an efficient set of dynamic access rules based on packet traffic patterns, and then to convert this optimized rule set to binary in order to improve early packet rejection and lower computation overhead. The method of optimization applied to the initial firewall rule set. Figure 3 shows the three filtering settings used for this optimization.

When using our primary implementation, a user must first define an FDBTD f.It is possible to systematically verify the consistency and completeness properties of f, perhaps with the use of a computer programme.F should not be used to directly generate firewall even though it ensures that the finished firewall is consistent and complete. Regrettably, some redundant rules may still be included in the firewall that was generated (even though this firewall is generated after applying the reduction technique).

VII. CONCLUSION

Our two approaches in this study are our contribution. First, decide how to use a firewall. Early in the design process for firewalls, binary tree diagrams are used to specify firewalls. These diagrams' fundamental benefit is that their consistency and completeness can be methodically examined. The second method involves applying a number of different theorems to a firewall decision binary tree diagram in order to produce a concise list of firewall rules while preserving the consistency, completeness, compactness, and identification of redundant rules in the original firewall design. However, this design strategy may be simply expanded to let a firewall choose from a wide range of options.

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