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**IP TRACEBACK OF DOS ATTACKS**

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**ABSTRACT**

*IP trace back means the capability of identifying the actual source of any packet sent across the Internet. Because of the vulnerability of the original design of the Internet, It may not be able to find the actual hackers at present. In fact, IP trace back schemes are considered successful if it identify the zombies from which the DDoS attack packets entered the Internet. The efforts on IP trace back are limited. This System proposes a IP trace back using information theoretical parameters, and there is no packet marking in the proposed strategy; therefore, can avoid the inherited shortcomings of the packet marking mechanisms. The packets are categorized; that are passing through a router into flows, which are defined by the upstream router where a packet came from, and the destination address of the packet. During non attack periods, routers are required to observe and record entropy variations of local flows. In this paper flow entropy variation or entropy variation is used interchangeably.*

**KEYWORDS**

Distributed Denial-of-Service, Entropy Variation, Forwarding packets from sender to receiver, Measuring link loss rate.

**1. INTRODUCTION**

IP trace back methods should be independent of packet pollution and various attack patterns. The new approach compares the packet number distributions of packet flows, which are out of the control of attackers once the attack is launched, and it is found that the similarity of attack flows is much higher than the similarity among legitimate flows, e.g., flash crowds.

Once a DDoS attack has been identified, the victim initiates the following pushback process to identify the locations of zombies: the victim first identifies which of its upstream routers are in the attack tree based on the flow entropy variations it has accumulated, and then submits requests to the related immediate upstream routers. The upstream routers identify where the attack flows came from based on their local entropy variations have monitored.[2][3]

**2. DISTRIBUTED –DENIAL OF SERVICE ATTACK**

A distributed denial of service attack (DDoS) occurs when multiple systems flood the bandwidth or resources of a targeted system, usually one or more web servers. These systems are compromised by attackers using a variety of methods.

It is important to note the difference between a DDoS and DoS attack. If an attacker mounts an attack from a single host it would be classified as a DoS attack. In fact, any attack against availability would be classed as a Denial of Service attack[1]

**3. DRAWBACK OF EXISTING SYSTEM**

The existing system has following disadvantages,

- Priority Inference is applied based on packet types.
- Port based load sharing is not discussed.
- Speed reduction in high speed packet sending application is not possible.
- Theoretical discussion only available and lack of implementation.

**4. SCOPE OF THE SYSTEM**

- Minimize the packet loss rate.
- To create a topology that sends the packets between two nodes without failure.
- Create a communication method that updates the failure nodes offline status to all the dependent nodes immediately.
- To improve the routing table configuration information to network administrators.
- To update the upcoming nodes status to all the nodes in the network immediately so as to make automatic routing configuration
- Assists in regulation of malicious packet sending nodes.
- Alert sending to affecting router.
- The proposed strategy can trace back fast in larger scale attack networks

**4.1. FORWARDING PACKETS FROM SENDER TO RECEIVER**

The router metric such as incoming bit rate of normal TCP nodes, high speed torrent like application's port's incoming bit rate and time to live in queue are stored first. The client application sends packets to server application which acts as router, The packets if arrived has reached the maximum limit of router then it will be added in queue. The packets remain there up to their time to live. If the traffic is less enough, then the packets are routed to destination nodes otherwise if time exceeds it will be simply dropped.[4]

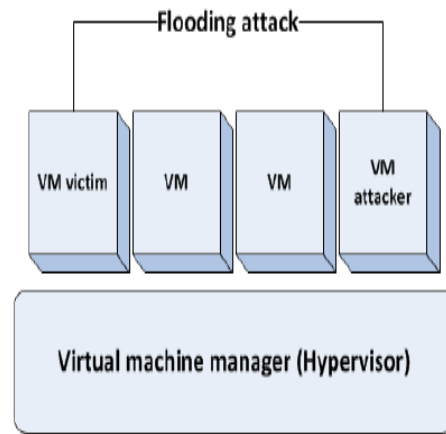
**4.2. MEASURING LINK LOSS RATE**

The packets lost details are logged in a database table to measure the loss rate. The details are analyzed whether the high speed port applications cause the more loss rate. Packet dropping start time and end time are kept in log so as to measure the loss rate.

**4.3 CHANGE QUEUE PRIORITY BASED ON PORT BASED LOAD SHARING**

The packets lost details are measured and queue priority is maintained between normal queue and high speed port's queue. Details are gathered such that the incoming packets arrived quickly from high speed port's application are responsible for packet loss in normal traffic.

FIGURE 1: CHANGE QUEUE PRIORITY BASED ON PORT BASED LOAD SHARING



#### 4.4 ALERTING NODES WHICH SEND MORE PACKETS

The link loss rate is measured and decided whether the high speed ports are responsible for that loss. If the condition is met, then the loss amount as well as rate is calculated and nodes that containing high speed torrent applications are notified to reduce the packet sending speed.

The new approach includes maximum throughput algorithm to serve the nodes better. Maximum throughput scheduling is a procedure for scheduling data packets in a packet-switched best-effort communications network, typically a wireless network, in view to maximize the total throughput of the network, or the system spectral efficiency in a wireless network. This is achieved by giving scheduling priority to the least "expensive" data flows in terms of consumed network resources per transferred amount of information.

#### 4.5 ENTROPY PROCESS

Network traffic for a router may dynamically change a lot from peak to off-peak service times. However, this kind of change lasts for a relatively long time interval, e.g., at least at the level of minutes.

If it break down these changes into seconds, the change of traffic is quite smooth in the context. The number of attack packets is at least an order of magnitude higher than that of normal flows[6][11]

### 5. PROPOSED SYSTEM

The proposed system is required to analyze the loss rate and change queue priority. Hence a system with efficient algorithm is required to minimize the loss rate by normal nodes. An effective and efficient IP trace back scheme against DDoS attacks based on entropy variations. It is a fundamentally different trace back mechanism from the currently adopted packet marking strategies. Many of the available work on IP trace back depend on packet marking, either probabilistic packet marking or deterministic packet marking.

The proposed system keeps log the packet queues and drop details. The continuous packet drops are easily notified and alerting procedure is invoked to reduce the loss rate. The new approach helps in efficient packet forwarding in the router. The new system uses maximum throughput scheduling algorithm so as to serve high speed as well as normal TCP packets to flow efficiently. In proposed system it contains the several algorithms as such local flow monitoring algorithm mainly contribute the trace out the path while transferring the data with less degradation of data loss. In entropy variation during the specified time period client send the data from one system to another system. Ingress and outgress router of the path tracing can be carried out in a less period time. Capturing router can prevent packet loss with the respective known able IP address.

On the other hand, the proposed method can work independently as an additional module on routers for monitoring and recording flow information, and communicating with its upstream and downstream routers when the pushback procedure is carried out.

### 6. ADVANTAGES OF THE PROPOSED SYSTEM

The proposed system has following advantages,

- Statistical analysis of packets received, queued and dropped are possible with more information.
- Less time consuming in analyzing the packets.
- Minimize the packet loss rate.
- Assists in regulation of malicious packet sending nodes.
- Alert sending to affecting router.
- The proposed strategy can trace back fast in larger scale attack networks

### 7. FURTHER ENHANCEMENTS

Trace back mechanism from the currently adopted packet marking strategies. Many of the available work on IP trace back depend on packet marking, either probabilistic packet marking or deterministic packet marking. Because of the vulnerability of the Internet, the packet marking mechanism suffers a number of serious drawbacks: lack of scalability; vulnerability to packet pollution from hackers and extra ordinary challenge on storage space at victims or intermediate routers. On the other hand, the proposed method needs no marking on packets, and therefore, avoids the inherent shortcomings of packet marking mechanisms. It employs the features that are out of the control of hackers to conduct IP trace back.

Some of the further enhancements that can be made in this system are as follows:

- The metric for DDoS attack flows could be further explored. The proposed method deals with the packet flooding type of attacks perfectly. However, for the attacks with small number attack packet rates, e.g., if the attack strength is less than seven times of the strength of non attack flows, then the current metric cannot discriminate it. Therefore, a metric of finer granularity is required to deal with such situations.
- Location estimation of attackers with partial information when the attack strength is less than seven times of the normal flow packet rate, the proposed method cannot succeed at the moment. However, it can detect the attack with the information that have accumulated so far using traditional methods.
- Differentiation of the DDoS attacks and flash crowds
- In this system, it did not consider this issue the proposed method may treat flash crowd as a DDoS attack, and therefore, resulting in false positive alarms

### 8. CONCLUSION

In this proposed an effective and efficient IP trace back scheme against DDoS attacks based on entropy variations. It is a fundamentally different trace back mechanism from the currently adopted packet marking strategies. Many of the available work on IP trace back depend on packet marking, either probabilistic packet marking or deterministic packet marking.



Because of the vulnerability of the Internet, the packet marking mechanism suffers a number of serious drawbacks: lack of scalability; vulnerability to packet pollution from hackers and extraordinary challenge on storage space at victims or intermediate routers.

On the other hand, the proposed method needs no marking on packets, and therefore, avoids the inherent shortcomings of packet marking mechanisms. It employs the features that are out of the control of hackers to conduct IP trace back. It observes and store short-term information of flow entropy variations at routers. Once a DDoS attack has been identified by the victim via detection algorithms, the victim then initiates the pushback tracing procedure.

The trace back algorithm first identifies its upstream routers where the attack flows came from, and then submits the trace back requests to the related upstream routers. This procedure continues until the most far away zombies are identified or when it reaches the discrimination limitation of DDoS attack flows.

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