POISONING NETWORK VISIBILITY ON SOFTWARE DEFINED NETWORK USING TOPOLOGY ALGORITHM

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ABSTRACT:

Software Defined Network(SDN) is a new networking paradigm that grants a controller and its applications an omnipotent power to have holistic network visiblity and flexibilty network programmability, thus enabling new innovations in network protocols and applications. One of the core advantages of SDN is its logically centralized control plane to provide the entire network visibility, on which many SDN applications rely. For the first time in the literature, we propose new attack vectors unique to SDN that seriously challenge this foundation. Our new attacks are somewhat similar in spirit to spoofing attacks in legacy networks (e.g., ARP poisoning attack), however with significant differences in exploiting unique vulnerabilities how current SDN operates differently from legacy networks. We then investigate the mitigation methods against the Network Topology Poisoning Attacks and present New TopoGuard, a new security extension to SDN controllers, which provides automatic and real-time detection of Network Topology Poisoning Attacks. Our evaluation on a prototype implementation of New TopoGuard in the Floodlight controller shows that the defense solution can effectively secure network topology while introducing only a minor impact on normal operations of Open Flow Controllers.

INTRODUCTION:

Now a days, social networking has become an important part of the online activities on the web.As the brain of the network, a SDN controller grants users a great tool to design and control. Not only in academic environments, but also in real-world production networks, SDN, particularly its popular realization Open Flow1, has been increasingly employed. We study network topology services/apps

of the mainstream OpenFlow controllers and identify several new vulnerabilities that an attacker can exploit to poison the network topology information in Open Flow networks. The whole network-wide visibility is one of the key innovations provided by SDN compared to legacy networking technologies. However, if such fundamental network topology information is poisoned, all the dependent network services will become immediately affected, causing catastrophic problems. For example, the routing services/apps inside the OpenFlow controller can be manipulated to incur a black hole route or man-in-themiddle attack.

EXISTING SYSTEM:

In Existing System Software-Defined Networking (SDN) is a new programmable network framework that decouples the control plane from the data plane. An SDN application in the control plane generates complicated network functions such as computing a routing path, monitoring network behavior, and managing network access control. Computer Networks connect countries, societies, companies, and individuals. These networks support many different types of communication and systems.

PROPOSED SYSTEM:

In order to mitigate such attacks, we investigate New TopoGuard(Topology Guard) possible defense strategies. We note that it is difficult to simply use static configuration to solve the problem (similar to using static ARP entry for hosts or the port security feature for switches to solve ARP poisoning attacks), because it requires tedious and error-prone manual effort and is not suitable for handling network dynamics, which is a valuable innovation of SDN. To better balance the security and usability, in this project, we propose New TopoGuard, a new security extension to the existing OpenFlow controllers to provide automatic and realtime detection of network topology exploitation. By utilizing SDN-specific features, TopoGuard checks precondition and post condition to verify the legitimacy of host migration and switch port property to prevent the Host Location Hijacking Attack and the Link Fabrication Attack.

LITERATURE REVIEW:

1Putting Home Users in Charge of their Network

In Yiannis Yiakoumis, has proposed Policy makers, ISPs and content providers are locked in adequate about who can control the Internet trace that ownsinto our homes. In this paper we argue that the user, nothe ISP or the

content provider, should decide how trace is prioritized to and from the home. Home users know most about their preferences, and if they can express them well to the ISP, then both the ISP and user are better off. To testthe idea we built a prototype that lets users express high level preferences that are translated to low-level semanticsand used to control the network.

2.Slicing Home Networks

In Yiannis Yiakoumis, has proposed Despite the popularity of home networks, they face a number of systemic problems: (i) Broadband networks are expensive to deploy; and it is not clear how the cost can beshared by several service providers (ii) Home networks are getting harder to manage as we connect more devices, usenew applications, and rely on them for entertainment, communication and work it is common for home networks tobe poorly managed, insecure or just plain broken; and (iii) Itis not clear how home networks will steadily improve, afterthey have been deployed, to provide steadily better serviceto home users.In this paper we propose slicing home networks as a way to overcome these problems. As a mechanism, slicing allowsmultiple service providers to share a common infrastructure and supports many policies and business models for cost sharing. We propose four requirements for slicing home networks bandwidth and trace isolation between slices, independent control of each slice, and the ability to modify and improve the behavior of a slice. We explore how these requirements allow cost sharing, out sourced management of home networks, and the ability to customize a slice to provide higher quality service. Finally, we describe an initial prototype that we are deploying in homes.

3.Towards Neutrality in Access Networks: A NANDO Deployment with OpenFlow

In Jon Matias, has proposed a text step in the evolution of Access Networks introduces a scenario in which the fair competition among service providers is enabled through the sharing of access infrastructure. CAPEX savings or regulatory aspects are currently promoting such a scenario. By adding neutrality, the positive feedback loop includes customers, service providers and network operators. The NANDO project implements a new layer 2 approach for Neutral Access Networks. This NAN proposal includes a network operator selection mechanism, a secure instantiation of services and a prefix based forwarding approach (Ethernet-PF). The Open Flow technology has been selected for its deployment. OpenFlow is a protocol by whichan

external entity (controller) can control/modify the flow table of a switch, which rules the forwarding process. This paper is focused on describing the NANDO scenario and the mostrelevant implementation details related to OpenFlow. In addition, a detailed description of the developed controller and its operational model are shown, including some representative examples. Finally, the functional feasibility of NANDO is validated in a scenario where multiple operators share the same physical infrastructure for service delivery.

.4.BWE: Flexible, Hierarchical Bandwidth Allocation for WAN Distributed Computing

In Alok Kumar, has proposed WAN bandwidth remains a constrained resource that is economically infeasible to substantially overprovision. Hence, it is important to allocate capacity according to service priority and based on the incremental value of additional allocation.For example, it may be the highest priority for one service to receive Ï«Gb/s of bandwidth but upon reaching such an allocation, incremental priority may drop sharply favoring allocation to other services. Motivated by the observation that individual flows with used priority may not be the ideal basis for bandwidth allocation, we present the design and implementation of Bandwidth Enforcer (BWE), a global, hierarchical bandwidth allocation infrastructure. BWE supports: i) service-level bandwidth allocation following prioritized bandwidth functions where a service can represent an arbitrary collection of flows, ii) independent allocation and delegation policies according to user-defined hierarchy, all accounting for a global view of bandwidth and failure conditions, iii)multi-path forwarding common in traffic engineerednetworks, and iv) a central administrative point to override (perhaps faulty) policy during exceptional conditions. BWE has delivered more service-co efficient bandwidth utilization and simpler management in production for multipleyears.

5. Time-Dependent Broadband Pricing: Feasibility and Benefits

In Carlee Joe-Wong, has proposed Charging different prices for Internet access at different times induces users to spread out their bandwidth consumption across times of the day. The questions are: is it feasible and how much benefit can it bring? We develop an efficient way to compute the cost minimizing time-dependent prices for an Internet service provider (ISP), using both a static session level model and a dynamic session model with stochastic arrivals. A key step is

choosing the representation of the optimization problem so that the resulting formulations remain computationally tractable for large scale problems. We next show simulations illustrating the use and limitations of time dependent pricing. These results demonstrate that optimal prices, which "reward" users for deferring their sessions, roughly correlate with demand in each period, and that changing prices basedon real-time traffic estimates may significantly reduce ISP cost.

SYSTEM CONFIGURATION:

HARDWARE REQUIREMENTS:

Processor :Pentium–Core 2Duo

Speed : 2.40 GHz

RAM :1GB DDR2

Hard Disk : 40 GB

Key Board :104 keys Keyboard

Mouse :MAXICOM

Monitor : LG

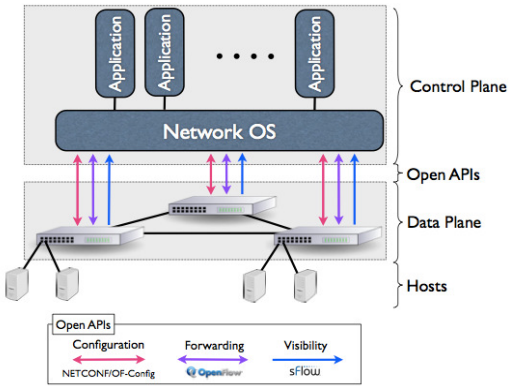
SOFTWARE REQUIREMENTS:

Operating system : Windows 7

Front End : JDK1.7/JAVA

IDE Used : Net Beans 8.0

Architecture for Software Defined Network:



MODULES DESCRIPTION:

ALLOCATION OF TRAFFIC ACROSS MULTIPLE ROUTING PATHS:

This module is used to allocating traffic across multiple routing paths in the presence of poision as a lossy network flow optimization problem. We map the optimization problem to that of asset allocation using portfolio selection theory which allows individual network nodes to locally characterize the poision impact and aggregate this information for the source nodes.We perform the first security analysis on the SDN/Open Flow Topology Management Service.

CHARACTERIZING THE IMPACT OF POISIONING:

In this Module the network nodes to estimate and characterize the impact of position and for a source node to incorporate these estimates into its traffic

allocation. In order for a source node s to incorporate the poision impact in the traffic allocation problem, the effect of poision on transmissions over each link must be estimated. However, to capture the jammer mobility and the dynamic effects of the poision attack, the local estimates need to be continually updated.

EFFECT OF JAMMER MOBILITY ON NETWORK:

In this module the capacity indicating the link maximum number of using min max scheduling which can be transported over the wireless link. Whenever the source is generating data with high packet deliver rate be transmitted at the time poision to be occurring. Then the throughput rate to be less. If the source node becomes aware of this effect the allocation of traffic can be changed low delivery ratio on each of paths thus recovers the poision path.

ESTIMATING END-TO-END PACKET SUCCESS RATES:

The packet success rate estimates for the links in a routing path, the source needs to estimate the effective end-to-end packet success rate to determine the optimal traffic allocation. Assuming the total time required to transport packets from each source s to the corresponding destination is negligible compared to the update relay period.

Conclusion:

The Poisoning Network Routing has been developed in such a structured manner which is reducing the traffic further development. The coding is done in simplified manner as they are more understandable and flexible. The evaluate the effect of varying network and protocol parameters in order to observe the performance trends using the poison aware traffic allocation formulation. In particular, We are interested in the effect of the update relay period and the maximum number of routing paths on the performance of the flow allocation. In order to compare trials with different update times or numbers of paths, we average the simulated results over each simulation run, yielding a single.

REFERENCES:

1. Y. Yiakoumis et al., “Putting home users in charge of their network,” in Proc. ACM UbiComp, Sep. 2012, pp. 1114–1119.
2. Y. Yiakoumis, K. Yap, S. Katti, G. Parulkar, and N. McKeown, “Slicing home networks,” in Proc.

SIGCOMM HomeNets Workshop, Aug. 2011, pp. 1–6.

3. J. Matias, E. Jacob, N. Katti, and J. Astorga, "Towards neutrality in access networks: A NANDO deployment with OpenFlow," in Proc. Int. Conf. Access Netw., Jun. 2011, pp. 7–12.
4. A.Kumar et al., "BwE: Flexible, hierarchical bandwidth allocation for WAN distributed computing," in Proc. ACM SIGCOMM, Aug. 2015, pp. 1–14.
5. C.Joe-Wong, S. Ha, and M. Chiang, "Time-dependent broadband pricing: Feasibility and benefits," in Proc. IEEE ICDCS, Jun. 2011, pp. 288–298.
6. P. Danphitsanuphan, "Dynamic bandwidth shaping algorithm for Internet traffic sharing environments," in Proc. World Congr. Eng., Jul. 2011, pp. 1–4.
7. Nikolaos Laoutaris, Michael Sirivianos, Xiaoyuan Yang, and Pablo Rodriguez "Inter-Datacenter Bulk Transfers with NetStitcher"Telefonica Research Barcelona, Spain nikos@tid.es, irivi@tid.es, yxiao@tid.s, pablorr@tid.es
8. A.Mahimkar et al., "Bandwidth on demand for inter-data center communication," in Proc. ACM HotNets Workshop, Nov. 2011, Art. no. 24.
9. R. K. P. Mok, E. W. W. Chan, and R. K. C. Chang, "Measuring the quality of experience of HTTP video streaming," in Proc. IFIP/IEEE Int. Symp. Integr. Netw. Manage., May 2011, pp. 485–492.
10. H. H. Gharakheili, A. Vishwanath, and V. Sivaraman, "Pricing usersanctioned dynamic fast-lanes driven by content providers," in Proc. IEEE INFOCOM Workshop Smart Data Pricing (SDP), Apr. 2015, pp. 528–533.