
Exercise for Lecture Software Defined Networking

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Contact: Please use the Moodle forum to post questions and remarks on the exercise.

Web: <http://www.ps.tu-darmstadt.de/teaching/ws1617/sdn/>

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Problem 5.1 - NEC guest lecture: ShadowSwitch

This assignment refers to the ShadowSwitch concept presented in the lecture. For answering the questions, refer to the slides and the original paper on ShadowSwitch: <http://conferences.sigcomm.org/sigcomm/2015/pdf/papers/p343.pdf>.

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- a) ShadowSwitch tackles the problem of low flow installation performance of current SDN hardware switches. Which two approaches are combined in the ShadowSwitch concept? Discuss their respective advantages and disadvantages.
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b) Having two flow tables may cause the issue of cross dependencies. Assume a switch's software and hardware tables contain the following entries. Which entry matches a packet with SRC_IP=A,DST_IP=B?

Hardware table:

H1: SRC_IP=A,DST_IP=B,PRIORITY=30

H2: SRC_IP=A,DST_IP=*,PRIORITY=20

HD: SRC_IP=*,DST_IP=*,PRIORITY=0

Software table:

S1: SRC_IP=A,DST_IP=*,PRIORITY=40

S2: SRC_IP=A,DST_IP=B,PRIORITY=20

HD: SRC_IP=*,DST_IP=*,PRIORITY=0

c) Discuss how the existence of two flow tables may affect programming the switch with a controller software.

Problem 5.2 - NEC guest lecture: In-switch Processing (InSP)

This assignment refers to the InSP concept presented in the lecture. For answering the questions, refer to the slides and the original paper on InSP: http://conferences.sigcomm.org/sosr/2016/papers/sosr_paper42.pdf.

- a) InSP allow to generate packets from within switches. Please discuss two scenarios, where the possibility to generate packets via the switch itself instead of using the controller may be beneficial.
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- b) InSP introduces a Packet Template Table. Explain the concept of this table and the respective entries.
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- c) You are given the same InSP tables as on slide 41 of the lecture on InSP. Describe the reaction of the switch, if the following triggering packets arrive. If InSP is triggered to generate a packet, describe the structure of the packet.
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P1: SRC_MAC=MAC_D,
DST_MAC=BROADCAST,
TYPE=ARP-Request,
ARP_IPS=1.2.3.5,
ARP_IPD=1.2.3.4

P2: SRC_MAC=MAC_E,
DST_MAC=BROADCAST,

TYPE=ARP-Request,
ARP_IPS=1.2.3.6,
ARP_IPD=1.2.3.4

P3: SRC_MAC=MAC_E,
DST_MAC=BROADCAST,
TYPE=ARP-Request,
ARP_IPS=1.2.3.6,
ARP_IPD=1.2.3.5