XDP hands-on tutorial

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Outline

Introduction - what is XDP and who are we?

About this tutorial - plan for today

Bonus tasks

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What is XDP?

XDP basically: New layer in the kernel network stack

- Before allocating the SKB
- Driver level hook at DMA level

Means: Competing at the same “layer” as DPDK / netmap

- Super fast, due to
  - Take action/decision earlier (e.g. skip some network layers)
  - No memory allocations

Not kernel bypass; data-plane is kept inside the kernel

- Via eBPF: makes early network stack run-time programmable
- Cooperates with the kernel stack

We are the “network vikings” (apparently)

Mostly, we work on XDP upstream: https://github.com/xdp-project/xdp-project

About this tutorial

This tutorial is meant as a living document, developed on Github:

https://github.com/xdp-project/xdp-tutorial

This session is the beta test of the live version.

- Please send feedback; or even better, pull requests!

Plan for today's session

- This introduction
- You each go through the tutorial in the git repo
- We will help answer questions
- Follow-ups every ~half hour

Structure of the tutorial

Comprised of seven topical lessons, in the numbered directories in the git repo.

We recommend you complete them in this order:

- basic01-xdp-pass
- basic02-prog-by-name
- basic03-map-counter
- basic04-pinning-maps
- packet01-parsing
- packet02-rewriting
- packet03-redirecting

Read the README.org file in each directory to get started.

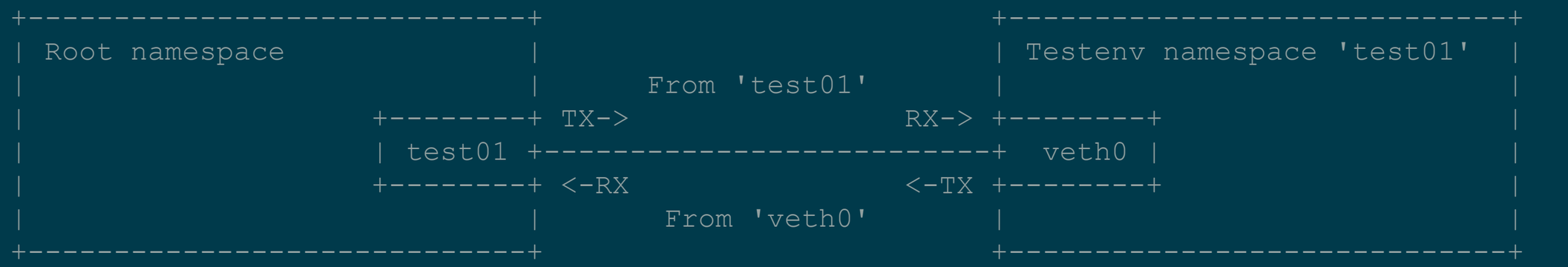
The test environment helper script

The `testenv` directory contains a helper script to setup a test environment.

- Uses network namespaces and virtual network devices to simulate a real setup
- Requires kernel version 4.19 or higher
  - Due to `veth` driver getting native-XDP support (incl. fixes)
  - Preferred kernel is 4.20 as `veth` got ethtool statistics
- See README.org in the testenv directory for instructions
- Easy alias: `eval $(./testenv alias)`, then `t setup`

Namespaces and virtual ethernet devices

- The testenv script uses network namespaces and virtual ethernet devices to simulate a real environment.



- XDP programs are installed on the test01 interface in root namespace
- Generate traffic from inside the namespace

Bonus tasks

As we said, this is a beta test. So some of you may finish all tasks before we run out of time.

Here are some suggestions for extra tasks:

- Improve the tutorial and send a pull request
- Implement your own use case and test it (we'll help!)
- Write a blog post about your experience with XDP

Getting started

```
$ git clone https://github.com/xdp-project/xdp-tutorial
$ cd xdp-tutorial
$ git submodule update --init
$ less README.org
```