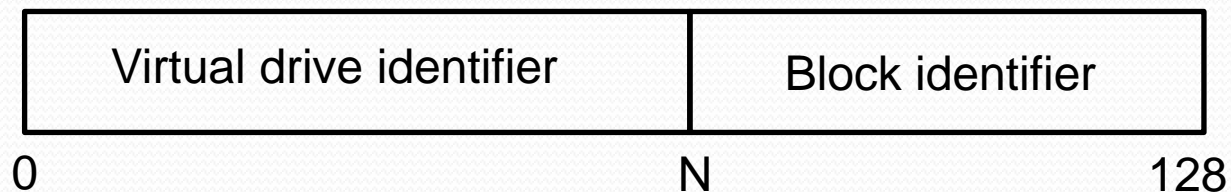# TCP Fast Open for IPv6 prefixes

draft-hawari-tcpm-tfo-ipv6-prefixes-00

Introduction

- Research project about an IPv6-centric distributed storage system.

- Emulation of a hard drive by mapping each Logical Block Address to an IPv6 address.

- Send requests concerning a given block to the corresponding IPv6 address.

Virtual drive identifier	Block identifier

0   N   128

Motivation for the use of Fast Open

- A TCP connection is created for each request to the drive.
- Achievable throughput on the disk is very sensitive to RTT according to our measurement.
- Very transactional traffic : **Use of TCP Fast Open**

Current limitations of TCP Fast Open

- A TFO cookie is only valid for one IPv6 address
- It provides no real gain in the context of sparse connections to address within a same prefix.
- Idea : to extend the TFO cookie's validity domain to a whole IPv6 prefix.
- Applicability :
  - Assigning an IPv6 prefix to a server
  - Reusing a cookie for several servers in the same prefix

Proposed solution

- Let the server advertise the prefix length for which a TFO cookie is valid when the cookie is delivered to the client.

- TCP Fast Open Prefix Length Option proposed in draft-hawari-tcpm-tfo-ipv6-prefixes-00

```
+-------------+-------------+-------------+
| TCP Option  |   Length    |   Prefix    |
| Kind Number |             |   Length    |
| (1 BYTE)    |  (1 BYTE)   |  (1 BYTE)   |
+-------------+-------------+-------------+
```

- The client knows if it may reuse a cookie for an adjacent IPv6 address in a further connection.

Discussion

- This solution addresses the initial issue and is completely backwards-compatible with the previous behavior of TFO.

- **But it is far from ideal**
  - It requires a new TCP option and it is not necessarily worth it.
  - Perhaps we can let each application decide for which prefix length TFO cookies are valid. It would require that current implementations of TFO exposes a new API to the Application Layer.

Questions ?