Behavior of BitTorrent service in PCP-enabled networks with Address Sharing

draft-boucadair-pcp-bittorrent
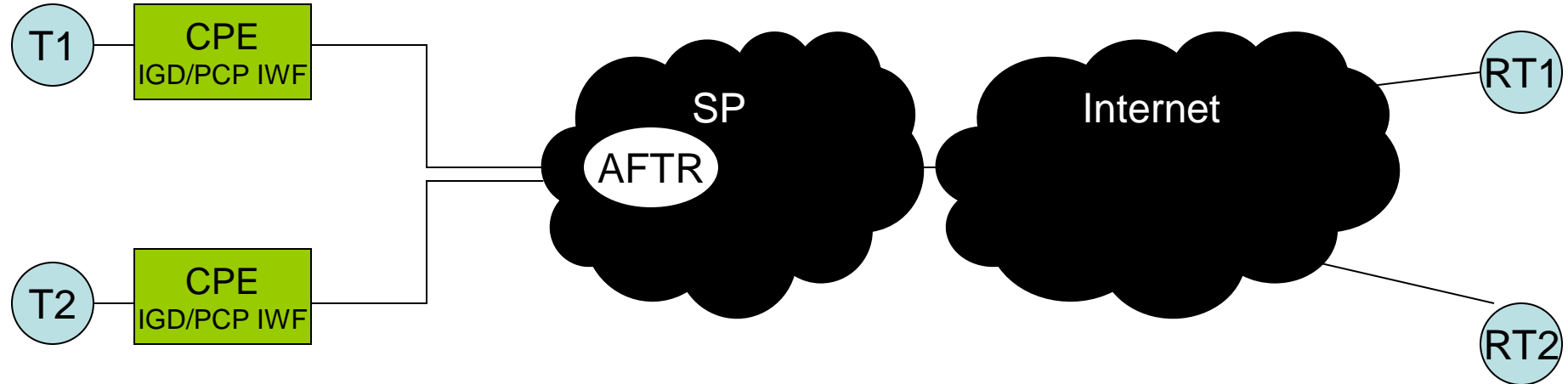
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Goals

- Assess the impact of IP shared address on BitTorrent

- Assess the impact of activating PCP on BitTorrent in the context of address sharing

Testbed Topology

- The AFTR assigns a shared IP address to T1 and T2
- For some tests, the AFTR is configured to assign the same IP address to T1 and T2
- RT1 and RT2 are assigned with public IP addresses

Methodology

- BitTorrent client can be configured to accept multiple connections using the same IP address
  - A dedicated parameter can be positioned
  - This parameter is called: `bt.allow_same_ip`
  - Possible values that can be taken by this parameter are: `FALSE (0)` or `TRUE (1)`
- Four configurations were tested
- When PCP is disabled, all port forwarding entries are flushed out
- A detailed test plan was used (see the draft)
- Download speed is also reported (see detailed results in the draft)

Configuration	bt.allow_same_ip	PCP
1	TRUE in all machines (T1, T2, RT1, RT2)	Disabled
2	FALSE in all machines (T1, T2, RT1, RT2)	Disabled
3	TRUE in all machines (T1, T2, RT1, RT2)	Enabled
4	FALSE in all machines (T1, T2, RT1, RT2)	Enabled

Main Conclusions

- Mutual file sharing between hosts sharing the same IP address has been checked
  - Machines having the same IP address can share files with no alteration compared to current IP architectures only if port forwarding (PCP in our case) is enabled

- Mutual file sharing between hosts behind an IP address sharing function has been also checked
  - Machines having distinct IP addresses but located behind an address sharing function can share files with no alteration compared to current IP architectures only if port forwarding (PCP in our case) is enabled

Main Conclusions

- Even if PCP is enabled, two limitations were experienced:
  - When two clients sharing the same IP address want to simultaneously retrieve the SAME file located in a SINGLE remote peer
    - Due to the default BitTorrent configuration on the remote peer which does not permit sending the same file to multiple ports of the same IP address
    - Clients sharing the same IP address can exchange portions with each other, provided the clients can find each
    - Even if they can not, we observed that the remote peer begin serving portions of the file automatically as soon as the other client finished downloading
    - This limitation is eliminated if the remote peer is configured with `bt.allow_same_ip == TRUE`

  - When a client tries to download a file located on several seeders, when those seeders share the same IP address
    - This is because the clients uses `bt.allow_same_ip == FALSE`
    - The client will be able to connect to one seeder, among those having the same IP address, to download the file
    - The client can retrieve the file from other seeders having distinct IP addresses
    - This limitation is eliminated if the local client is configured with `bt.allow_same_ip == TRUE`, which is somewhat likely as those clients will directly experience better throughput by changing their own configuration