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Optimizing reasonably secure Long Distance Data Transfer

Or

How to transfer Data while being poor

The situation

- A scientific team gains on a daily basis 250 GB of observation data.
- In order to be processed and stored the data has to be transmitted over a long distance.
- Transmission with ftp performance is not faster than 160 GB per day.
- No influence on the network – no root permission – no privileges at all!

Keep it small if you are poor!

- BIG solutions (probably) exist.
- Big solutions require big ressources (manpower,hardware, $).

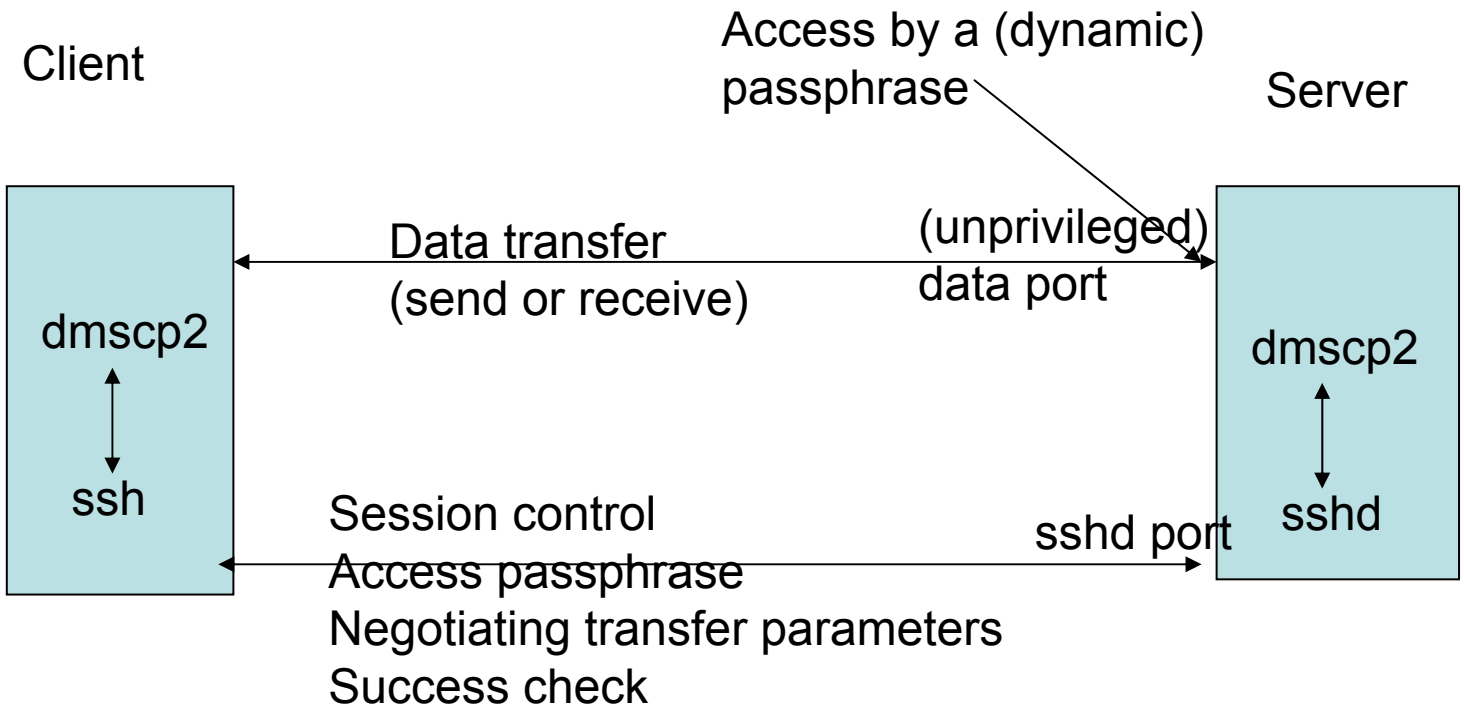
- I‘m proposing a small (inexpensive) solution

Steps

- Separate the (session and task) control flow from the data flow
- Secure the control flow
- Optimize the data flow
- Keep it simple

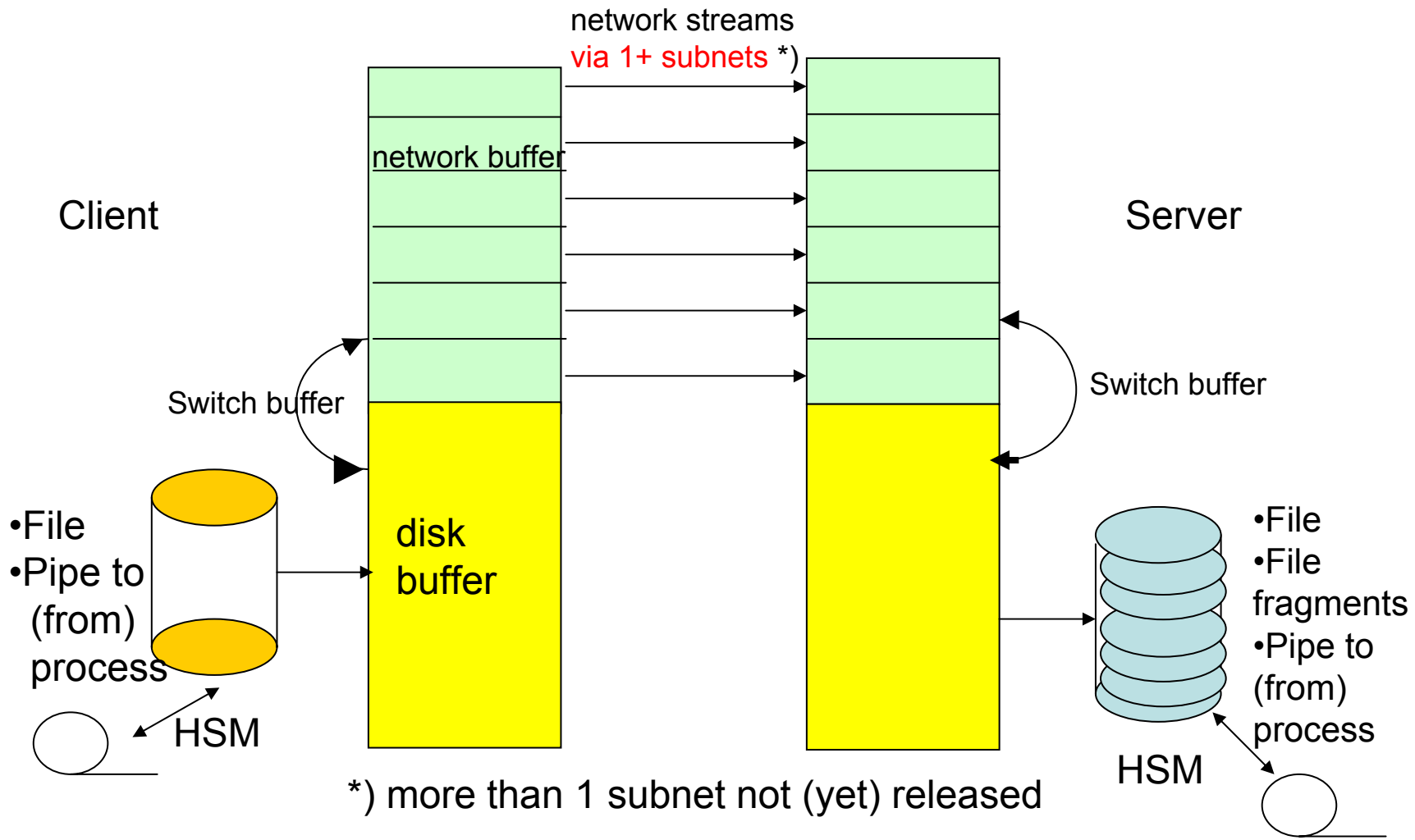
dmscp(2) control and data flow

This was done in dmscp(1) –
See San Diego MSS Conf. 2001



This runs with ftp performance → too slow!

Optimizing the data flow and data objects



Tuning parameters

- Number of network streams (-streams s)
- Size of network buffer (-maxbuf m)

The total buffer is 2*m*s

- TCP-Windowsize (-wsz w)

HSM related features of dmscp2 (user exits = perl or sh … scripts)

at certain events

e.g. *disk full error*

Examples (in perl) come with the source

More goodies

- Optional reading/writing from/to pipes at client and server instead of files,

- Recursive Copy of a file tree
  (Metadata via the secure line)

- Network tuning option (copy from core to core)

Success check

- Amount of data on server/client is compared
- Optional checksumming

Performance

Comparing
dmscp2 with
dmscp(1)/ftp (1.9 MB/s)
and
scp (0.6 MB/s)
Distance 200 Miles
Latency 5.7 ms
The line contains 100 Mbit components.

3.5 x faster than dmscp(1)/ftp

11.3 x faster than scp

streams	MB/sec
1	1.9
2	3.6
3	4.0
4	5.7
5	5.2
6	5.4
7	6.8
8	6.8

Performance (HPC involved)

- Local network (1 Gbit/s):

Latency < 1ms

hpscp 31 MByte/sec

(hpscp is a tuned scp *))

streams	MByte/sec
1	63
6	111
12 in 2 subnets	201 **)

- ~340 km (200 Miles)

Bandwidth 1 Gbit/s

Latency 3 ms

hpscp: 28 MByte/sec

streams	MByte/sec
1	9.2
16	63.2
40	81.1 (101.1 **)

*) http://www.psc.edu/networking/projects/hpn-ssh/

**) feature going to be released next week

**) core to core

dmscp2 needs

- No root permission for the installation
  Install it simply in your ~/bin directory!

- No daemon under root (except sshd)

dmscp2 is free and easy to install!

- http://mss.zib.de/mss contains

- This presentation (long version)
- a dmscp2 users guide
- The sources


Don‘t you mess with my data!