Video Application and FAP over Satellite

Git available : https://github.com/CNES/fap-video

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Overview of the solution



www.viveris.f r

www.cnes.fr

Agenda

- Purpose
- Architecture
- Features
- Performance

Purpose

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Common issues in SATCOM systems

- SATCOM service providers' contracts are often limited in terms of bandwidth and data consumption.
- Users have bad knowledge about the status of their quota.
- Users tend to consume much data at the beginning of the month.

➔ Users have a bad data consumption management and consume their available data too soon.

Purpose of the solution

- Monitor the data consumption.
- Give a comfy access to the current data consumption quota.
- Apply different techniques to reduce data consumption without reducing the QoE.

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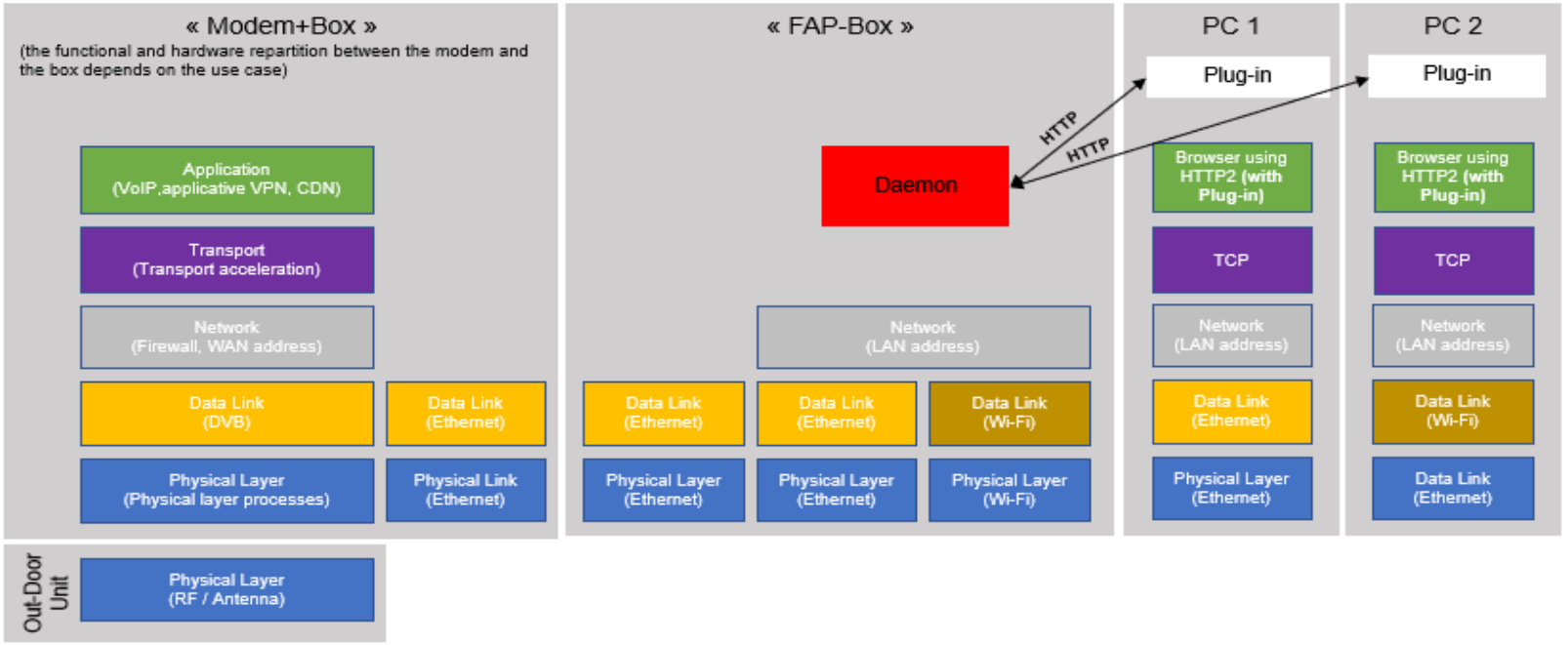
Architecture

The solution is composed of 2 parts : Plugin + Daemon



Daemon

- Python script running in the background on the FAP-Box entity (machine between the Modem and the users, e.g. a router, Raspberry Pi, Linux machine, etc.…).
- Performs centralized actions which require superuser privileges.
- Supports Debian distributions only.

Plugin

- It is a Firefox add-on.
- HMI and manager of the system.
- Can be installed in 1 or multiple machines which belong to the client's LAN.
- Supports Linux and Windows machines.

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Features

Features of the system

- Display the current consumption of the Internet access contract :
  - Amount of data consumed during the "limited data" period (data which belongs to the contract).
  - Amount of data consumed during the "unlimited data" period (free data).

- Display information about the Internet access contract :
  - Maximal amount of data to download per month.
  - Maximal amount of data to upload per month.
  - The monthly anniversary of the contract.
  - The time interval corresponding to the "unlimited data" period.

- Apply different techniques to reduce data consumption :
  - Limit the video quality (limit the download bandwidth in order to reduce automatically the video quality).
  - Block ads (integration of uBlock Origin : https://addons.mozilla.org/es/firefox/addon/ublock-origin/).
  - Disable videos autoplay.
  - Generate an alert Pop-Up when the user is going to play videos during the "limited data" period.
  - Use a Firefox supported version of WebBoost (existing Chrome plugin which caches generic web elements like css, js, etc...) : https://chrome.google.com/webstore/detail/web-boost-wait-less-brows/ahbkhnpmoamidjgbneafjipbmdfpefad

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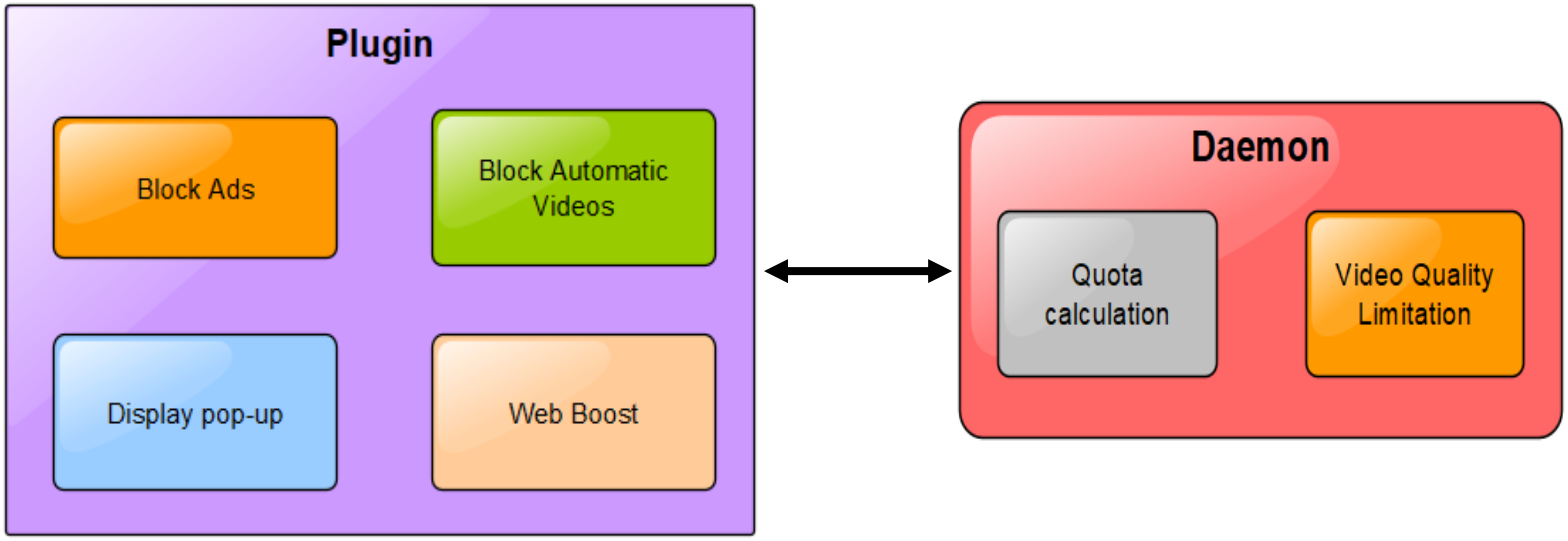
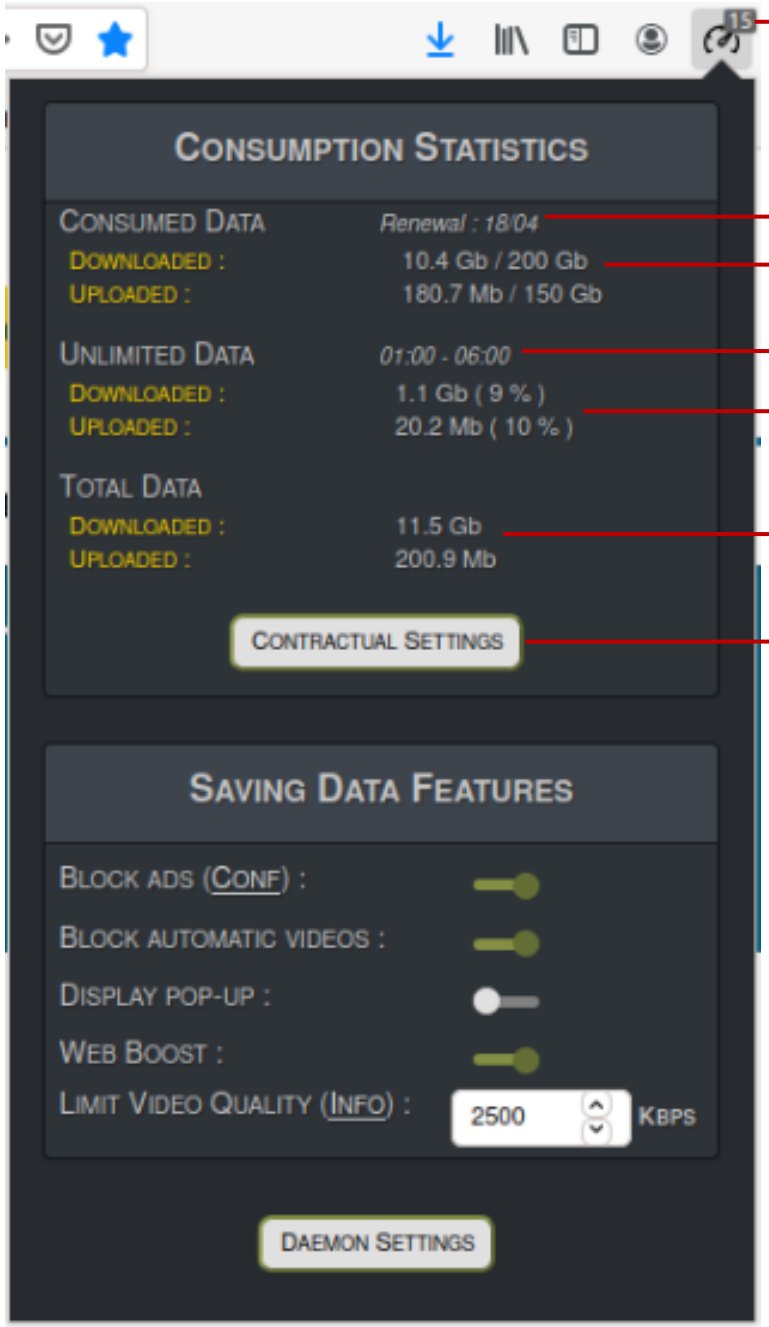
Each component performs its own features :



Plugin HMI



Number of ads blocked

Monthly anniversary of the contract

Current quota of data consumption

Daily period of “unlimited data” (free data)

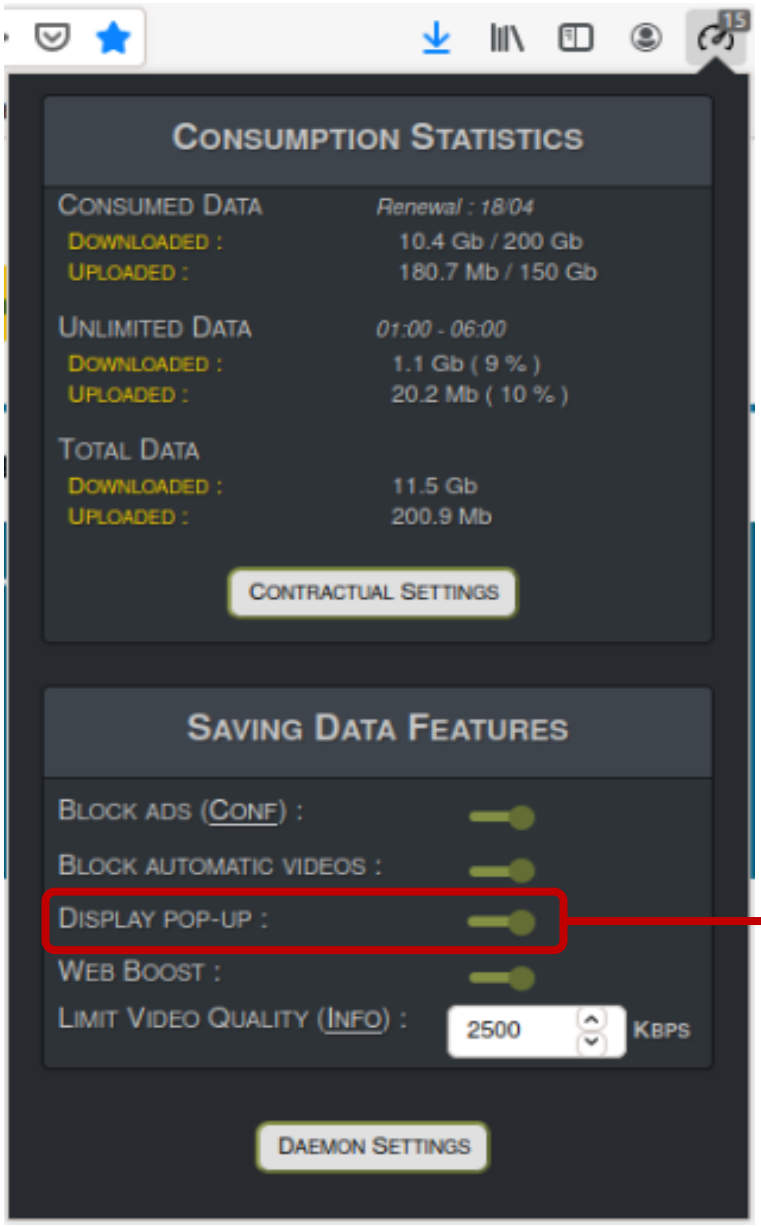
Amount and percentage of “unlimited data” consumed

Sum of limited + unlimited data

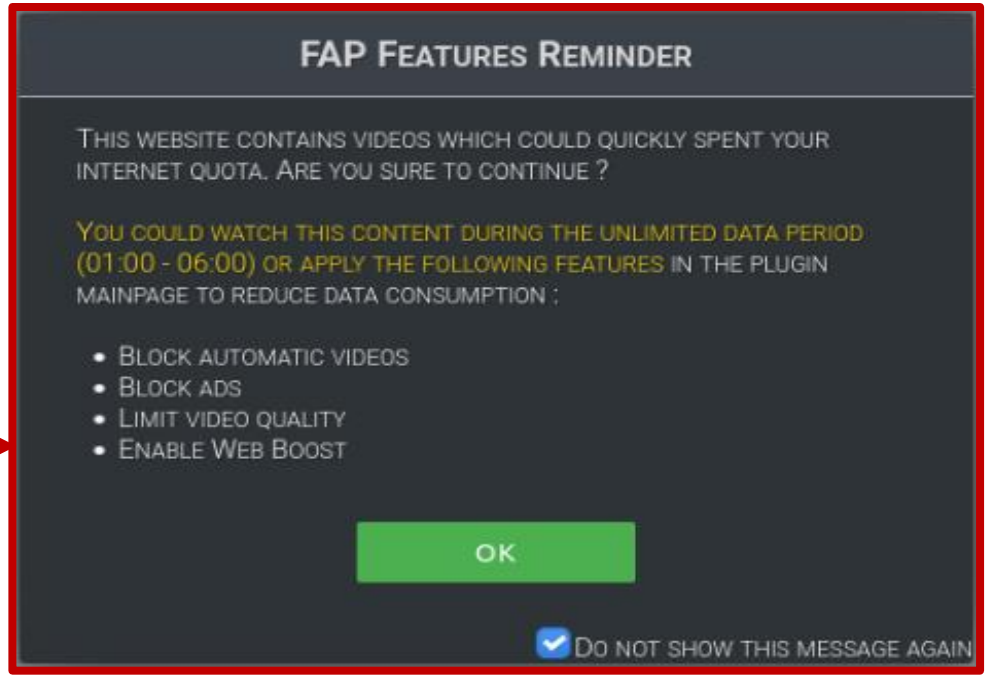
Setup the contract characteristics

Features to reduce data consumption

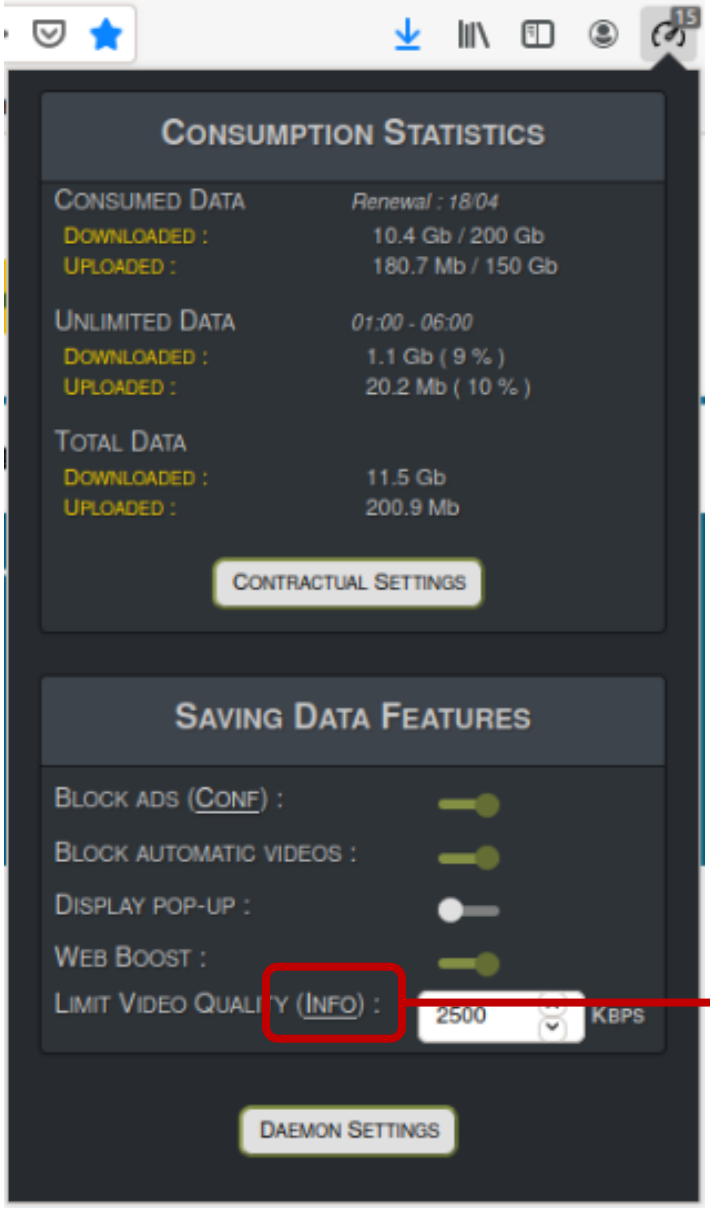
Feature « Display Pop-Up »



This Pop-Up appears if a video is going to be played during the « limited data » period



Guide of reference to apply video quality limitation :



QUALITY LIMITATION

RATE LIMITATION VALUES RECOMMENDED :

YOUTUBE

QUALITY	RATE LIMIT
360p	700 Kbps
480p	1100 Kbps
720p	2500 Kbps
1080p	5000 Kbps

SOURCE : HTTPS://SUPPORT.GOOGLE.COM/

NETFLIX

QUALITY	RATE LIMIT
SD	3000 Kbps
HD	5000 Kbps
Ultra HD	25000 Kbps

SOURCE : HTTPS://HELP.NETFLIX.COM/

Performance

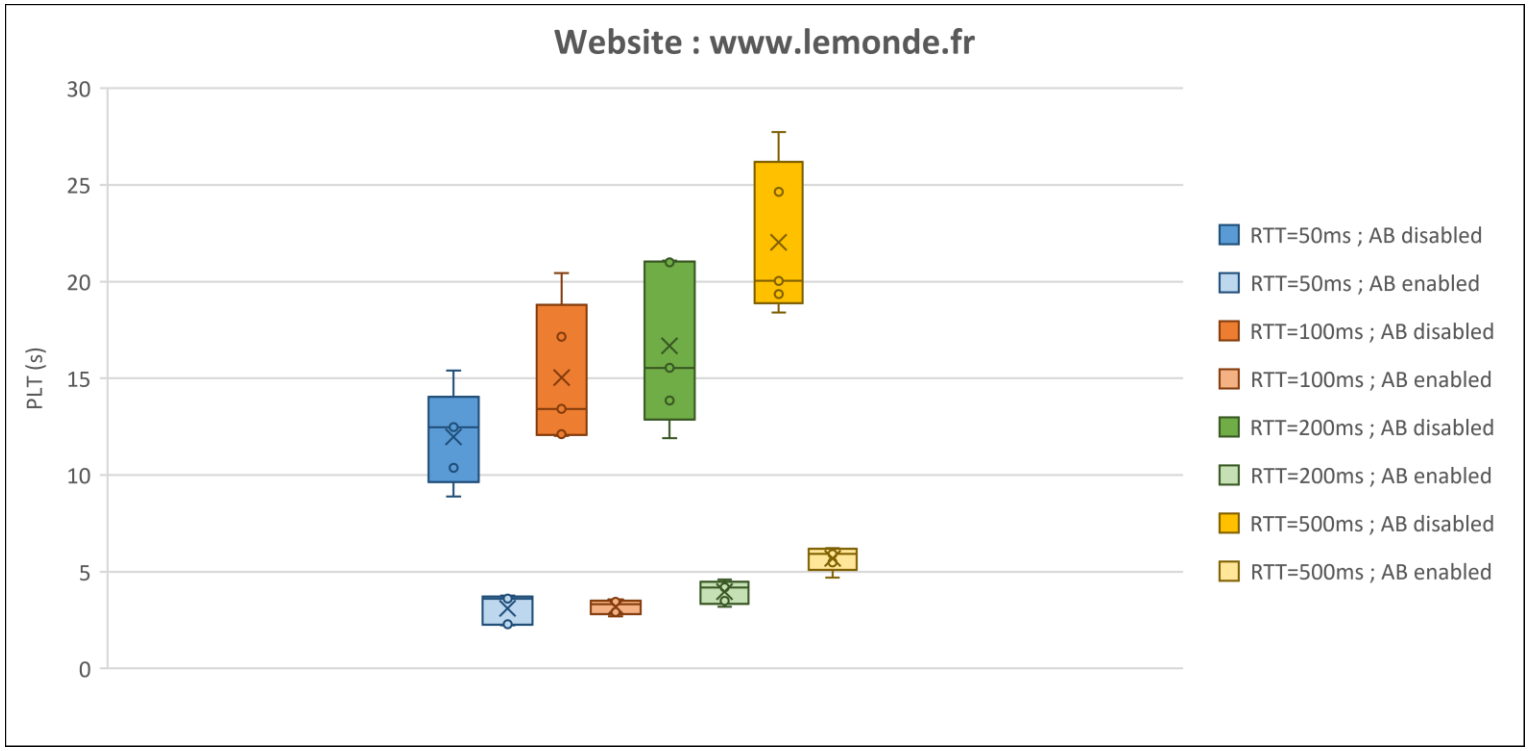
Reduction of data consumption performed by each feature on different websites :

	Reduction of data downloaded		
Web site	Block ads	Block automatic videos	WebBoost
Le Monde	- 58 %	- 59 %	- 3,7 %
L'Equipe	- 80 %	- 30 %	- 29,2 %
Le Figaro	- 30 %	- 26 %	- 29,7 %
Reddit	+ 3 %	- 17 %	- 3,7 %
Twitter page	-	- 49 %	-

Reduction of data consumption when using the video quality limitation in YouTube :

Limitation applied	Downloaded data (MBytes)	Consumption difference compared to "No Limit" test
No Limit	44,2	-
2500 Kbps (720p)	35,7	- 19,3 %
1100 Kbps (480p)	16,6	- 62,4 %
700 Kbps (360p)	10,4	- 76,3 %

Capacity to reduce the PLT with the « Block Ads » feature in different satellite conditions :



RTT (ms)	Minimal gain	Maximal gain
50	57 %	85 %
100	70 %	86 %
200	61 %	84 %
500	66 %	83 %

Similar results have been found with other websites like www.lefigaro.fr and www.lequipe.fr