

Vimpelcom Position paper for MaRNEW Workshop

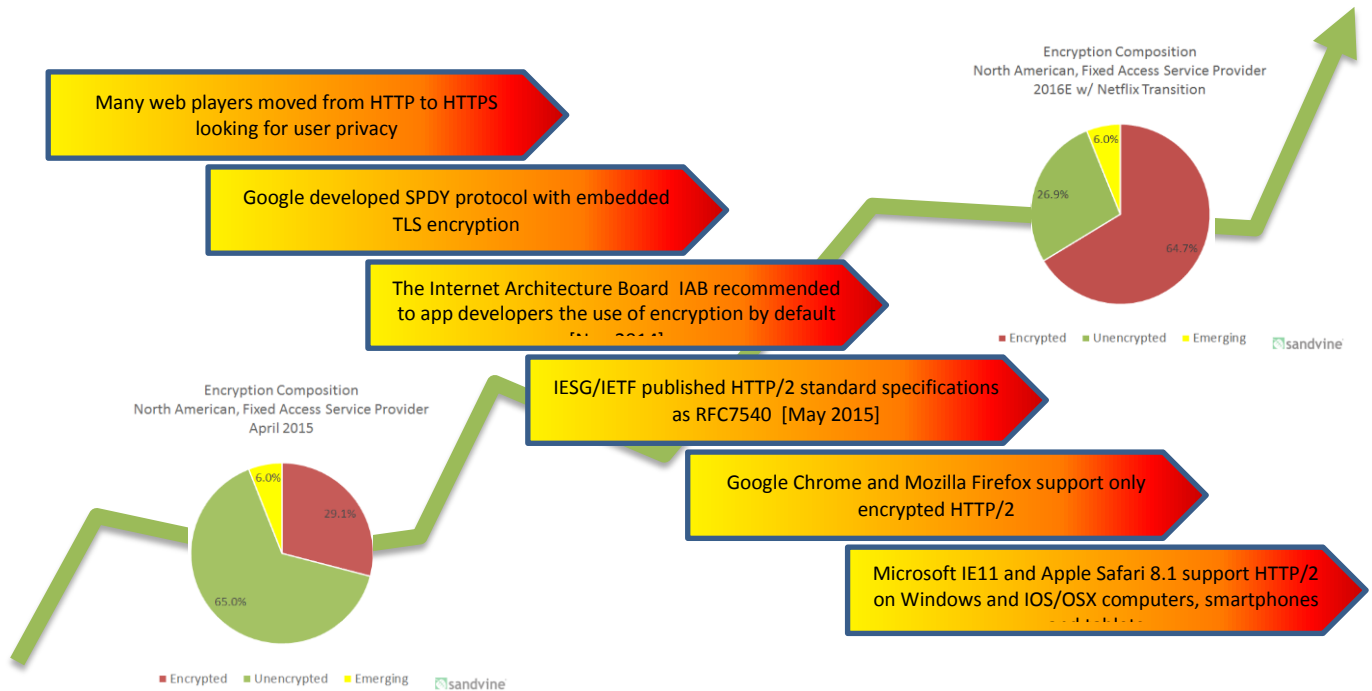
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1. Context: Internet is more and more the transport of personal information

- Global IP traffic has increased more than fivefold in the past 5 years, and will increase nearly threefold over the next 5 years. Overall, IP traffic will grow at a compound annual growth rate (CAGR) of 23 percent from 2014 to 2019.
- Content delivery networks will carry over half of Internet traffic by 2019. Globally, Sixty-two percent of all Internet traffic will cross content delivery networks by 2019 globally, up from 39 percent in 2014.
- Over half of all IP traffic will originate with non-PC devices by 2019. In 2014, only 40 percent of total IP traffic originated with non-PC devices, but by 2019 the non-PC share of total IP traffic will grow to 67 percent. PC-originated traffic will grow at a CAGR of 9 percent, while TVs, tablets, smartphones, and machine-to-machine (M2M) modules will have traffic growth rates of 17 percent, 65 percent, 62 percent, and 71 percent, respectively.
- Traffic from wireless and mobile devices will exceed traffic from wired devices by 2019. By 2019, wired devices will account for 33 percent of IP traffic, while Wi-Fi and mobile devices will account for 66 percent of IP traffic. In 2014, wired devices accounted for the majority of IP traffic at 54 percent.
- The number of devices connected to IP networks will be three times as high as the global population in 2019. There will be three networked devices per capita by 2019, up from nearly two networked devices per capita in 2014.
- Smartphone are more and more containing and transporting personal information, very sensible from privacy and confidentiality perspectives

2. Demand for user privacy and content confidentiality make encryption increase

- Many events happened in a couple of years (see figure)
- Forecast by Sandvine on US Fixed Access sees encrypted traffic going from 29% to 64% in the next year, due solely to Netflix transition.



3. Infrastructures are challenged by volumes and different QoS requirements

- Different applications are differently sensitive to network parameters
- Different priority is a way to provide the required network quality, optimizing infrastructure utilization
- Operators need to identify each service in order to preserve the user experience

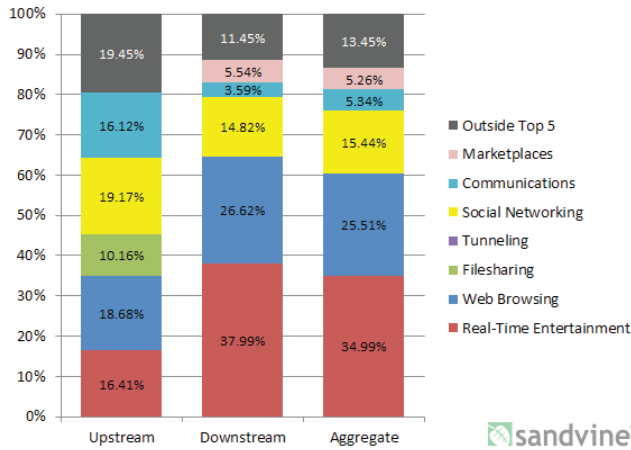
→ **Pervasive encryption prevent operators from providing the right QoS**

4. Users' demand is recurrent and polarized on video and images

- Users' behavior tends to concentrate on few web sites, especially on entertainment players (video, music) and social networking (video, images)
- Content published on social web sites are frequently accessed by many user's connected people
- Suggestions on video and images are typically shared among users, generating sequences of requests for the same content in a short period of time
- Content caching and video optimization may provide significant savings on infrastructure costs and improve user experience, particularly for mobile access users

→ **Pervasive encryption prevent operators from optimizing content**

Peak Period Traffic Composition (Europe, Mobile Access)

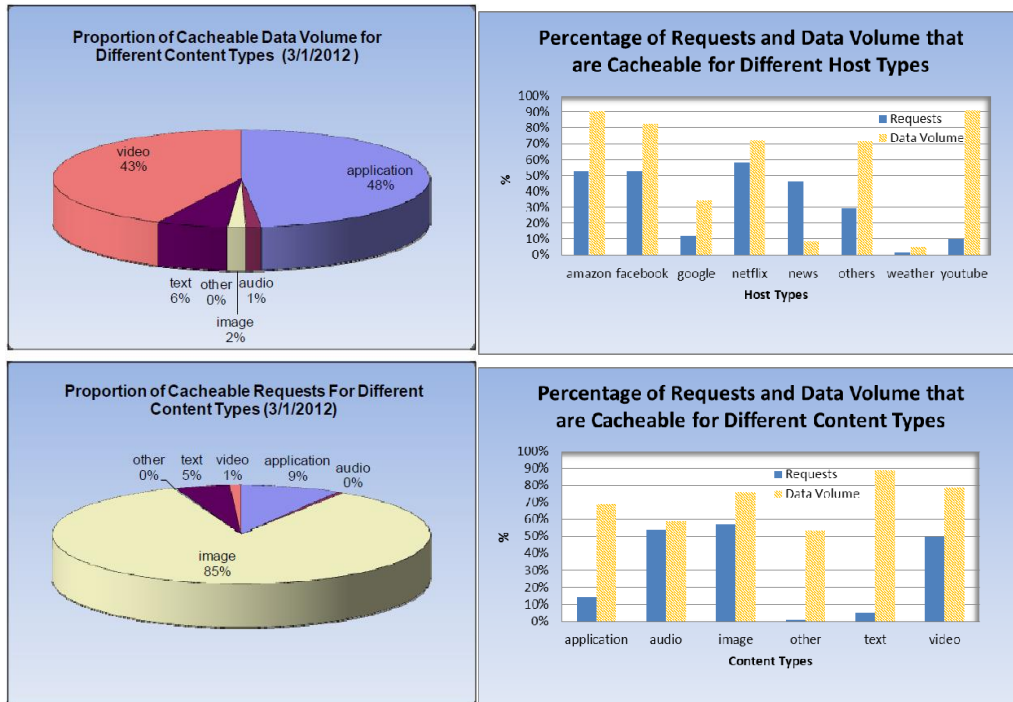


Rank	Upstream		Downstream		Aggregate	
	Application	Share	Application	Share	Application	Share
1	HTTP	15.38%	HTTP	24.60%	HTTP	23.31%
2	Facebook	14.76%	YouTube	20.89%	YouTube	19.04%
3	BitTorrent	8.99%	Facebook	12.16%	Facebook	12.54%
4	Skype	8.33%	MPEG - OTHER	3.77%	BitTorrent	3.82%
5	YouTube	7.41%	SSL	3.06%	MPEG - OTHER	3.44%
6	SSL	5.70%	Flash Video	3.03%	SSL	3.42%
7	Google Cloud	3.39%	BitTorrent	3.01%	Flash Video	2.66%
8	iTunes	1.88%	Google Cloud	1.90%	Skype	2.43%
9	Instagram	1.76%	Google Market	1.67%	Google Cloud	2.10%
10	Apple iMessage	1.47%	iTunes	1.61%	iTunes	1.64%
		69.05%		75.70%		74.43%

Source: Sandvine Global Internet Phenomena Report 2H 2014

5. Caching services may provide huge benefits for operators and users

- Efficiency of caches is clearly evident on video and images
 - Very high percentage of requests and data volumes would be cacheable
 - Caching content will result in significant bandwidth savings at a high storage overhead
 - In many cases, caching contents will result in excellent user perceived latency
- **Pervasive encryption prevent operators from caching content**



Source: Cacheability Analysis of HTTP traffic in an Operational LTE Network, Bell Research 2013

6. Conclusions: Need to find technical ways for a fair network management maintaining the required Internet security and user privacy

- **Securing the Internet and ensure user privacy** is a common scope, operators have all the interest in being considered trusted partners by their customers and defend them from threats.
- **Effect of ubiquitous encryption are by the way affecting users**, too, either in terms of cost generated by inapplicable synergies, or in terms of performance due to inapplicable tools¹.
- **Encryption does not necessarily mean obfuscation**: some applications may encrypt user data and content as a privacy measure, but without attempting to evade detection and management. In many cases, encryption could be employed as part of DRM strategy, in an attempt to control access to and reproduction of information².
- **Traffic management is feasible even without content decoding**: for instance, to make a file cacheable, it is sufficient to know a file id in order to select the right bit stream, even without being able to decrypt it. The possibility to improve transport protocols to present metadata to network management tools it to be pursued³.
- Last but not least, **mobile access users seem not to benefit from recent evolutions of transport protocols**. Real field statistics are controversial and justify search for further protocol improvements⁴.

Thus the need to find technical ways for a fair network management of Internet traffic, without preventing end-to-end encryption in order to maintain the required Internet security and user privacy

7. References:

¹ <https://datatracker.ietf.org/doc/draft-mm-wg-effect-encrypt/>

² <https://www.sandvine.com/downloads/general/global-internet-phenomena/2015/encrypted-internet-traffic.pdf>

³ <http://tools.ietf.org/html/draft-smith-encrypted-traffic-management-01>

⁴ <http://conferences.sigcomm.org/co-next/2013/program/p303.pdf>

8. The Vimpelcom Group

VimpelCom is one of the world's largest integrated telecommunications services groups providing voice and data services through a range of traditional and broadband mobile and fixed technologies

*VimpelCom has operations in **14 countries**, which are organized in to 5 "Business Units". The group is headquartered in **Amsterdam, Netherlands** and its shares are traded on **NASDAQ**. VimpelCom has **56,000 employees** worldwide*

*For the year ended 31st December 2014, VimpelCom reported that it had **222 million customers** out of an addressable population¹ of 740 people across the total Groups footprint*