

УДК 621.391

O.L. Nedashkivskiy

State University of Telecommunications, Kiev

ESTIMATION OF QUALITY OF INTERNET ACCESS SERVICES IN UKRAINE

A leading role in the grant of information to the users is occupied by a global network - Internet, based on IP protocol. The attempt of estimation of quality of Internet services in Ukraine is carried, and also the tasks of researches that will show out our country into deserving place in rating of leading countries of the world on Internet services are set. The solution of these problems will allow the Ukrainian segment of Internet to occupy a leading provision in all rating, and national IT industry will become like that magic stick that will revive all our economy.

Keywords: Internet, access, quality of services, rating.

Introduction

Rapid development of science and technique, successes in information technologies, openness of borders, between the states and people resulted in all greater globalization. In these terms success of any country, as well as separately any man depends on availability, timeliness, plenitude and rightness of necessary information. Thus it should be noted that formal this rule is not newly - a man that owned greater information at all times was let in on the ground as compared to all other. Changed, and more correct to say added, only methods of collection, storage and information transfer.

Obviously, that a leading role in the grant of information to the users is occupied by a global network - Internet, based on IP protocol. Thus most dynamic is a segment mobile the Internet.

Statement of the problem and its solution

It is known that IP protocol corresponds to the third level of OSI model [1] with the performance of basic objective are routing and transmissions of IP packages. We will conduct a clear border between "Internet services" and by "services base on Internet".

Internet services we will name the transmission of packages by mean or through the Internet, here clients are levels from fourth and higher of OSI model.

By services base on Internet we will count services that get to eventual application. Thus any services base on Internet is formed from a set of protocols of levels from fourth till the seventh of OSI model and has two interfaces: one with eventual application, second with an Internet network. Generally known, that an Internet does not have single administrator and single compatible basis (base) it is possible to name the first two levels of OSI model that.

Quality of Internet services it is possible in the first approaching to estimate on by large-sized global criteria:

a) index of availability, that will be formed coming from potential (zone of coverage) and real (amount of users) penetration;

b) minimum, middle and peak values access to the Internet speed, that will be formed coming from the potentially attainable (theoretical features of concrete technology of access and communication of data) and really attainable (practical realization is in the concrete terms of surroundings) values of the got results.

Structure and dynamics of Internet market in Ukraine

On the state on the end of September, 2015 from data of Government service of statistics of Ukraine [2] volume of profits from the grant of access to the Internet, IP-telephony and mobile communication is almost 73% from all telecom and mail services profits.

As be obvious from a Table 1, during five last years the total volume of profits grows insignificantly. It is expedient to analyze the dynamics of separate constituents.

A stake of mobile telephony is dominant (60,3%), although during this period diminished from 61,7% to 60,3%, that talks both about a market saturation and about absence of fresh drivers of height in the conditions of the present crisis phenomena.

The stake of IP-telephony diminished headily from 0,3% to 0,04%. It is possible to explain by, that IP-telephony as independent service stops to exist, it becomes technological component part of other complex services or dissolves in other services, for example in Internet access both mobile and fixed.

Most interesting is a dynamics of Internet access raise: the stake of Internet access increases on 1% annually. As be obvious from a Table 1, this service compensates falling of profits both from IP-telephony and from the being sated market of mobile communication.

The analysis of official statistical data allows to do next conclusions:

a) raise of profits from the Internet access for the last five years, even in the conditions of the crisis phenomena, increased on 9,3%, while indexes on industry increased only on 4,2%, and an economy showed a negative dynamics on the whole;

Table 1

Structure of earnings from mail and communication services in Ukraine

Year	Prof. all, mill. hrn	Internet access		IP-telephony		Mobile		Total %
		mill. hrn	%	mill. hrn	%	mill. hrn	%	
2015	41377	5193	12,5	16,9	0,04	24957,3	60,3	72,9
2014	52434	6190	11,8	92,6	0,2	31566,3	60,2	72,2
2013	52492	5697	10,9	136,3	0,3	31405,8	59,8	70,9
2012	52271	5402	10,3	135,8	0,3	31535,2	60,3	70,9
2011	50281	4749	9,4	161,2	0,3	31027,9	61,7	71,5

6) if the dynamics of receipt of profits from communication services will be saved, in what it is possible to express a confidence, then in the nearest 3-5 years the locomotive of increase of profits from the connection services there will be Internet access services.

Features of development of Internet services in Ukraine

For the estimation of current status, potential and ways of development of Internet network in Ukraine we will analyze the most known rating.

According to data of Internet Live Stats [3] for 2014 Ukraine is on 32 places on the amount of users. An annual increment was 9% while a mean value in the whole World was 6,6%, that talks that Internet in Ukraine develops passing ahead rates.

A maximal height is observed in developing coun-

tries (Burundi, Eritrea for 17%), and minimum in Sweden, Iceland for 1%.

A rise in the United States of America, the motherland the Internet, is 7%.

A part of Internet Live Stats rating is driven in Table 2.

From the Table 2 evidently, that the Ukrainian segment of Internet develops quickly enough, limit of satiation yet far.

Thus, if to notice that even in the USA and South Korea, where penetration (relation of Internet users from the general population of country) makes about 90%, ready a rise makes about 7-8%, that can be done conclusion, that in the near future satiations in Ukraine is not expected and it will be necessary to decide many tasks and problems, related to the height and development the Internet in Ukraine.

Table 2

Internet users by country (2014)

Rank	Country	Internet Users	1 Year Growth %	Total Country Population	Penetration (% of Pop. with Internet)
1	China	641601070	4%	1393783836	46,03%
2	United States	279834232	7%	322583006	86,75%
12	South Korea	45314248	8%	49512026	91,52%
32	Ukraine	16849008	9%	44941303	37,49%
47	Sweden	8581261	1%	9631261	89,10%
60	Hong Kong SAR	5751357	9%	7259569	79,22%
95	Lithuania	2113393	2%	3008287	70,25%
135	Iceland	321475	1%	333135	96,50%
159	Burundi	146219	17%	10482752	1,39%
173	Eritrea	59784	17%	6536176	0,91%
198	Niue	617	5%	28	47,2%
-	MIP	2817874294	6,6%	7096625556	39,71%

Comparative estimation of connection speed to Internet

Another known way of estimation of rating of Internet quality, used by the Akamai Technologies company, there is Internet access speed [4]. In the report of State of the Internet it is talked for the first quarter of 2014, that middle Internet access speed (under middle

Internet access speed will understood meddle value of great number of the individual independent measuring produced during the investigated period by plenty of end user in the direction of different test servers in by the help of WEB-application like Speedtest [5] and grouped on directions) in the world is 3,9 Mbps, that on 1,8% more as compared to the result of previous quarter and on 24% more than by a year before (Table 3).

The first five countries with the most rapid Internet looked like the following: South Korea (68,5 Mbps), Hong Kong (66,0 Mbps), Singapore (57,7 Mbps), Israel (57,6 Mbps) and Japan (Mbps). Estonia, Russia, Ukraine, Armenia, Kazakhstan and Georgia, occupied in the world rating 31, 35, 36, 54, 57 and 58 places accordingly. Kyrgyzstan, Tajikistan and Belarus, a bit fell behind, appearing on 71, 74 and 75 places.

It is also possible to mark the active height of the so-called high broadband (>10 Mbps) Internet access in the with values from 10 Mbps and higher (Table 4). Penetration of high broadband in the world overcame a border in 20% general stake of all connections, showing a height at the level of 9,4 %.

In speed connections of mobile devices (including Wi-Fi) (Table 5) leadership in the world market belongs to South Korea. A middle index in country is estimated by experts in 14,7 Mbps.

It is should especially mark pleasant fact, that according to the results in Europe Ukraine (Table 5) leads on the index of the highest middle speed of mobile connection (networks of the second and third generation, Wi-Fi) - 7,3 Mbps. Middle peak speed of mobile connection in Ukraine is 28,4 Mbps. In addition, in Ukraine the stake of >4 Mbps connections is 89%% of all connections - again the highest index in Europe.

Table 3
Average connection speed by country/region (first ten)

Rank	Country/Region	Q1 14 Avg. Mbps	QoQ Change	YoY Change
-	Global	3,9	1,8%	24%
1	South Korea	23,6	8%	145%
2	Japan	14,6	12%	29%
3	Hong Kong	13,3	8,5%	24%
4	Switzerland	12,7	5,8%	26%
5	Netherlands	12,4	0,3%	28%
6	Latvia	12	15%	26%
7	Sweden	11,6	6,6%	30%
8	Czech Republic	11,2	-1,9%	24%
9	Finland	10,7	18%	37%
10	Ireland	10,7	4,3%	47%

Table 4
High broadband (>10 mbps) connectivity (first ten)

Rank	Country/Region	% above 10 Mbps	QoQ Change	YoY Change
-	Global	21%	9,4%	65%
1	South Korea	77%	8,2%	146%
2	Japan	54%	11%	32%
3	Hong Kong	45%	7,3%	49%
4	Switzerland	44%	-3%	52%
5	Netherlands	43%	14%	30%
6	Latvia	37%	15%	26%
7	Sweden	36%	10%	62%
8	Czech Republic	35%	7,6%	81%
9	Finland	35%	-0,5%	73%
10	Ireland	34%	-9,3%	54%

Table 5

Average and average peak connection speeds, broadband (>4 mbps) connectivity for mobile connections by country/region

Country/Region	Q1 14 Avg. Mbps	Q1 14 Peak Mbps	% above 4 Mbps
AFRICA			
Egypt	2	11,6	2,5%
Morocco	1,8	14,6	1,1%
South Africa	1,7	6	4,8%
ASIA			
China	4,8	12,2	57%
Hong Kong	4,9	23,4	42%
India	1,3	8,7	2,7%
Indonesia	2	10,8	3,5%
Iran	2	5	3,9%
Japan	5,7	47,3	61%
Kazakhstan	2	7,8	1,7%
Kuwait	3,5	33,1	17%
Malaysia	2,3	19,8	7,6%
Pakistan	1,5	14,7	2,8%
Singapore	3,6	23,2	19%
South Korea	14,7	41,3	78%
Sri Lanka	2,3	23,7	3,6%
Taiwan	3,4	27,8	13%
Thailand	2	35,1	4,6%
Vietnam	1,1	6,5	0,1%
EUROPE			
Austria	6,1	32,2	63%
Belgium	3,2	9,2	17%
Croatia	2,2	9,1	1,8%
Czech Republic	4,9	18,6	58%
Denmark	7	30,4	84%
France	5,9	34	66%
Germany	2,9	14,8	11%
Hungary	2,9	16,6	10%
Ireland	5,1	27,6	40%
Italy	4,6	36,6	47%
Lithuania	3,4	24,4	20%
Moldova	3,8	17,9	26%
Netherlands	3,3	16	17%
Norway	4,3	17,9	36%
Poland	3,9	24,7	35%
Romania	3,2	24,5	13%
Russia	6,1	35,1	63%
Slovakia	7	37	71%
Slovenia	3,5	13,9	26%
Spain	4,8	27,3	46%
Sweden	6,6	34,3	81%
Turkey	2,7	21,1	5,3%
Ukraine	7,3	28,4	89%
United Kingdom	5,6	34,6	53%
NORTH AMERICA			
Canada	6,3	21,5	60%
El Salvador	2,3	12,8	3,4%
United States	5,5	15,1	33%
OCEANIA			
Australia	4,6	14,2	40%
New Zealand	3	14,3	25,0%

End of table 5

SOUTH AMERICA			
Argentina	1	6,6	1,6%
Bolivia	1,2	7,1	0,1%
Brazil	1,2	9,3	0,4%
Chile	1,4	11,2	1,4%
Colombia	1,7	9,1	0,2%
Paraguay	1,4	8,5	0,1%
Uruguay	1,6	11,1	3,2%
Venezuela	4,3	19,9	69%

High evaluation indexes on access speed and the subzero indexes of penetration can be explained by that at the construction of new networks for Internet access the newest technologies are used in Ukraine, and part of out-of-date or low-speed technologies is extremely insignificant.

In addition in the conditions of the crisis phenomena as a rule choice done: a) on highly profitable projects; b) on the real effective demand; c) on withholding of existent clients, that together results in that speeds of tariff plans grow, profits fall, networks do not develop in breadth (expansion in regions).

Thus, looking on the quite good results of level of development the Internet in Ukraine, we should consider necessary to distinguish the chain of problems:

- a) digital divide of territories;
- b) unbalanced of capital investments;
- c) unfair competition or her complete absence.

The solution of these problems will allow the Ukrainian segment of Internet to occupy a leading provision in all rating, and national IT industry will become like that magic stick that will revive all our economy.

Conclusion

1. The market of Internet access in Ukraine (9,3%) grows quicker, than other communication services (4,2%), but yet it far to prevailing (12,5%).

Надійшла до редколегії 1.12.2016

Рецензент: д-р техн. наук, проф. А.І. Семенко, Державний університет телекомунікацій, Київ.

ОЦІНКА ЯКОСТІ НАДАННЯ ПОСЛУГ МЕРЕЖІ ІНТЕРНЕТ В УКРАЇНІ

О.Л. Недашківський

Все більш провідну роль у наданні інформації користувачам займає глобальна мережа - Інтернет, яка базується на основі протоколу IP. У статті виконано спроба оцінки якості Інтернет послуг в Україні, а також вказані проблеми майбутніх досліджень, проведення яких виведуть нашу країну на гідне місце в рейтингах провідних країн світу по послугах мережі Інтернет. Вирішення вказаних проблем дозволить українському сегменту мережі Інтернету не тільки зайняти лідируюче положення у всіх рейтингах, а й перетворити національну ІТ індустрію в ту чарівну паличку, яка оживить всю нашу економіку.

Ключові слова: Інтернет, доступ, якість послуг, рейтинг.

ОЦЕНКА КАЧЕСТВА ПРЕДОСТАВЛЕНИЯ УСЛУГ СЕТИ ИНТЕРНЕТ В УКРАИНЕ

А.Л. Недашковский

Все более ведущую роль в предоставлении информации пользователям занимает глобальная сеть - Интернет, которая базируется на основе протокола IP. В статье выполнена попытка оценки качества Интернет услуг в Украине, а также указаны проблемы будущих исследований, проведение которых выведут нашу страну на достойное место в рейтингах ведущих стран мира по услугам сети Интернет. Решение указанных проблем позволит украинскому сегменту сети Интернета не только занять лидирующее положение во всех рейтингах, но и превратит национальную ИТ индустрию в ту волшебную палочку, которая оживит всю нашу экономику.

Ключевые слова: Интернет, доступ, качество услуг, рейтинг.