Analyzing of various Internet metrics over the time in GCC countries and Yemen

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RIPE NCC - MENOG 17 - RACI 19-20 April 2017

Muscat - Oman
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19-20 April 2017
Agenda

- Introduction
- IPv6 Readiness
- Internet network status: Average connection speed
- Challenges and obstacles
- Analysis and discussion
- Recommendations
- Conclusions
Introduction – Internet state in 2016

Source: https://www.stateoftheinternet.com/
Introduction: Importance of this study

- Measure and analyze some internet metrics and introduce solutions.
- Share the knowledge between ISPs, engineers, researchers.
- Cooperate between Internet technical community in the region.
- Compare the achievement between related countries in Internet sector.
- Provide solutions for troubled countries.
Introduction: Internet Usage in the ME, Nov. 30, 2016

Internet Users in the World by Regions
November 2015

Source: Internet World Stats - www.internetworldstats.com/stats.htm
Basis: 3,366,261,156 internet users on November 30, 2015
Copyright © 2015, Miniwatts Marketing Group

Internet Users in the Middle East
November - 2015

96.3%
3.7%
Middle East 3.7%
Rest of world 96.3%

Source: Internet World Stats - www.internetworldstats.com
123,172,132 estimated Internet Users for November 2015
Copyright © 2015, Miniwatts Marketing Group

In GCC + Yemen = 46 Millions of Internet Users/ ~ 76 Millions habitants

Source: http://www.internetworldstats.com/stats.htm
Introduction: ME, GCC countries and Yemen Statistics

GCC = Saudi Arabia, UAE, Oman, Kuwait, Qatar, and Bahrain

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahrain</td>
<td>1,378,904</td>
<td>40,000</td>
<td>1,278,752</td>
<td>92.7 %</td>
<td>0.9 %</td>
<td>800,000</td>
</tr>
<tr>
<td>Iran</td>
<td>82,801,633</td>
<td>250,000</td>
<td>56,700,000</td>
<td>68.5 %</td>
<td>40.1 %</td>
<td>17,200,000</td>
</tr>
<tr>
<td>Iraq</td>
<td>37,547,686</td>
<td>12,500</td>
<td>14,000,000</td>
<td>37.3 %</td>
<td>9.9 %</td>
<td>14,000,000</td>
</tr>
<tr>
<td>Israel</td>
<td>8,174,527</td>
<td>1,270,000</td>
<td>5,941,174</td>
<td>72.7 %</td>
<td>4.2 %</td>
<td>4,900,000</td>
</tr>
<tr>
<td>Jordan</td>
<td>7,747,800</td>
<td>127,300</td>
<td>5,700,000</td>
<td>73.6 %</td>
<td>4.0 %</td>
<td>4,800,000</td>
</tr>
<tr>
<td>Kuwait</td>
<td>4,007,145</td>
<td>150,000</td>
<td>3,202,110</td>
<td>79.9 %</td>
<td>2.3 %</td>
<td>2,300,000</td>
</tr>
<tr>
<td>Lebanon</td>
<td>5,988,153</td>
<td>300,000</td>
<td>4,545,007</td>
<td>75.9 %</td>
<td>3.2 %</td>
<td>3,100,000</td>
</tr>
<tr>
<td>Oman</td>
<td>4,654,471</td>
<td>90,000</td>
<td>3,310,260</td>
<td>71.1 %</td>
<td>2.3 %</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Palestine</td>
<td>2,839,777</td>
<td>35,000</td>
<td>3,007,869</td>
<td>63.2 %</td>
<td>2.1 %</td>
<td>1,700,000</td>
</tr>
<tr>
<td>Qatar</td>
<td>2,258,283</td>
<td>30,000</td>
<td>2,200,000</td>
<td>97.4 %</td>
<td>1.6 %</td>
<td>2,200,000</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>32,157,974</td>
<td>200,000</td>
<td>20,813,695</td>
<td>64.7 %</td>
<td>14.7 %</td>
<td>14,000,000</td>
</tr>
<tr>
<td>Syria</td>
<td>18,563,595</td>
<td>30,000</td>
<td>5,502,250</td>
<td>29.6 %</td>
<td>3.9 %</td>
<td>n/a</td>
</tr>
<tr>
<td>United Arab</td>
<td>9,266,971</td>
<td>735,000</td>
<td>8,515,420</td>
<td>91.9 %</td>
<td>6.0 %</td>
<td>7,700,000</td>
</tr>
<tr>
<td>Yemen</td>
<td>27,392,779</td>
<td>15,000</td>
<td>6,773,228</td>
<td>24.7 %</td>
<td>4.8 %</td>
<td>1,800,000</td>
</tr>
<tr>
<td>Gaza Strip</td>
<td>1,921,202</td>
<td>see Palestine</td>
<td>see Palestine</td>
<td>n/a</td>
<td>n/a</td>
<td>see Palestine</td>
</tr>
</tbody>
</table>

TOTAL Middle East: 246,700,900, 3,284,800, 141,489,765, 57.4%, 100%, 76,000,000

NOTES: (1) The Middle East Statistics were updated for June 30, 2016. (2) Facebook subscribers data are also for June 30, 2016. (3) CLICK on each country name to see detailed data for individual countries and regions. (4) The population estimates are based mainly on data from the US Census Bureau and local sources. (5) Internet usage numbers come from various sources and are compiled here, see the site surfing guide for methodology. (6) The most recent usage information comes mainly from the data published by Nielsen Online, ITU, Facebook, and other trustworthy sources. (7) For Internet growth comparison purposes, the Middle East usage data published by ITU for the year 2000 is provided. (8) Data may be cited, giving the due credit and establishing an active link back to Internet World Stats. Copyright © 2016, Minilights Marketing Group. All rights reserved worldwide.
Introduction: Internet Penetration in GCC countries and Yemen

Global Internet penetration (%)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country Name</th>
<th>Penetration</th>
<th>Year CAGR*</th>
</tr>
</thead>
<tbody>
<tr>
<td>10th</td>
<td>Bahrain</td>
<td>90%</td>
<td>(+18)</td>
</tr>
<tr>
<td>12th</td>
<td>United Arab Emirates</td>
<td>88%</td>
<td>(+9)</td>
</tr>
<tr>
<td>16th</td>
<td>Qatar</td>
<td>85.3%</td>
<td>(+7)</td>
</tr>
<tr>
<td>29th</td>
<td>Kuwait</td>
<td>75.5%</td>
<td>(+7)</td>
</tr>
<tr>
<td>47th</td>
<td>Oman</td>
<td>66.5%</td>
<td>(+16)</td>
</tr>
<tr>
<td>59th</td>
<td>Saudi Arabia</td>
<td>60.5%</td>
<td>(+14)</td>
</tr>
<tr>
<td>125th</td>
<td>Yemen</td>
<td>20%</td>
<td>(+17)</td>
</tr>
</tbody>
</table>

*Compound Annual Growth Rate (CAGR)

Source: https://www.internetsociety.org/map/global-internet-report/3gclid=Cj0CUHdFdx5d3yDwodAqwaFhxGlobalInternetPenetration

Fixed broadband population penetration

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country Name</th>
<th>Penetration</th>
<th>Year CAGR*</th>
</tr>
</thead>
<tbody>
<tr>
<td>64th</td>
<td>Bahrain</td>
<td>13.2%</td>
<td>(+35%)</td>
</tr>
<tr>
<td>72th</td>
<td>United Arab Emirates</td>
<td>11.1%</td>
<td>(+6%)</td>
</tr>
<tr>
<td>77th</td>
<td>Qatar</td>
<td>9.9%</td>
<td>(+6%)</td>
</tr>
<tr>
<td>86th</td>
<td>Saudi Arabia</td>
<td>7.4%</td>
<td>(+10%)</td>
</tr>
<tr>
<td>105th</td>
<td>Oman</td>
<td>2.6%</td>
<td>(+13%)</td>
</tr>
<tr>
<td>115th</td>
<td>Kuwait</td>
<td>1.4%</td>
<td>(-3%)</td>
</tr>
<tr>
<td>118th</td>
<td>Yemen</td>
<td>1.1%</td>
<td>(+42%)</td>
</tr>
</tbody>
</table>

*Compound Annual Growth Rate (CAGR)

Source: https://www.internetsociety.org/map/global-internet-report/3gclid=Cj0CUHdFdx5d3yDwodAqwaFhxGlobalInternetPenetration

Networked Readiness

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Local DUN</th>
<th>Mobile DUN</th>
<th>Internet DUN</th>
<th>Domain</th>
<th>URL</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bahrain</td>
<td>4.3</td>
<td>5.0</td>
<td>4.7</td>
<td>5.0</td>
<td>4.7</td>
<td>4.7</td>
</tr>
<tr>
<td>2</td>
<td>United Arab</td>
<td>4.2</td>
<td>4.5</td>
<td>4.5</td>
<td>5.0</td>
<td>4.7</td>
<td>4.7</td>
</tr>
<tr>
<td>3</td>
<td>Oman</td>
<td>3.8</td>
<td>3.9</td>
<td>3.9</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Note: The Networked Readiness is based on 2018 data.
### Networked Readiness

The Networked Readiness Index 2016:

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country/Economy</th>
<th>Value</th>
<th>2016 rank (out of 143)</th>
<th>Income level*</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>United Arab Emirates</td>
<td>5.3</td>
<td>23</td>
<td>HI</td>
<td>MENAP</td>
</tr>
<tr>
<td>27</td>
<td>Qatar</td>
<td>5.2</td>
<td>27</td>
<td>HI</td>
<td>MENAP</td>
</tr>
<tr>
<td>30</td>
<td>Bahrain</td>
<td>5.1</td>
<td>30</td>
<td>HI</td>
<td>MENAP</td>
</tr>
<tr>
<td>35</td>
<td>Saudi Arabia</td>
<td>4.8</td>
<td>35</td>
<td>HI</td>
<td>MENAP</td>
</tr>
<tr>
<td>42</td>
<td>Oman</td>
<td>4.3</td>
<td>42</td>
<td>HI</td>
<td>MENAP</td>
</tr>
<tr>
<td>72</td>
<td>Kuwait</td>
<td>4.2</td>
<td>72</td>
<td>HI</td>
<td>MENAP</td>
</tr>
<tr>
<td>136</td>
<td>Yemen data: (2014)</td>
<td>2.7</td>
<td>140</td>
<td>LM</td>
<td>MENAP</td>
</tr>
</tbody>
</table>

* Income groups, HI = high-income economies that are not members of the OECD; HI-OECD = high-income OECD members; MENAP = Middle East, North Africa, and Pakistan; LM = lower-middle-income,

This graph shows the percentage of networks (ASes) that announce an IPv6 prefix for a specified list of countries or groups of countries.

Source: [http://v6asns.ripe.net/v6](http://v6asns.ripe.net/v6)
Networked Readiness: IPv6 Enabled Networks 04 April 2017

This graph shows the percentage of networks (ASes) that announce an IPv6 prefix for a specified list of countries or groups of countries.

Source: http://v6asns.ripe.net/v6?ALL=s=YE;s=SA;s=AE;s=OM;s=BH
IPv6 Readiness: Case of Yemen

IPv6 address types in Yemen

IPv6 allocated prefixes in Yemen

IPv6 Growth over Time Yemen

Source: https://www.vyncke.org/ipv6status/plotpenetration.php?country=ye
IPv6 Readiness: Case of Qatar

IPv6 allocated prefixes in Qatar

IPv6 Growth over Time in Qatar

IPv6 Users penetration measured by Akamai, APnic and Google
IPv6 Readiness: Case of Saudi Arabia

IPv6 allocated prefixes in KSA

IPv6 Growth over Time in KSA
IPv6 Readiness: Case of UAE

IPv6 allocated prefixes in UAE

IPv6 Growth over Time in UAE

IPv6 Users penetration measured by Akamai, APnic and Google
IPv6 Readiness: Case of Bahrain

IPv6 allocated prefixes in Bahrain

IPv6 Growth over Time in Bahrain
IPv6 Readiness: Case of Oman

**IPv6 address types in Oman**

- Native
- 6to4
- Teredo

**IPv6 allocated prefixes in Oman**

**IPv6 Growth over Time in Oman**

IPv6 Users penetration measured by Akamai, APnic and Google
IPv6 Readiness: Case of Kuwait

IPv6 address types in Kuwait

IPv6 allocated prefixes in Kuwait

IPv6 Growth over Time in Kuwait

IPv6 Users penetration measured by Akamai, APnic and Google
# Internet network status: Average connection speed

<table>
<thead>
<tr>
<th>Description/Country</th>
<th>Yemen</th>
<th>KSA</th>
<th>Qatar</th>
<th>Bahrain</th>
<th>Oman</th>
<th>UAE</th>
<th>Kuwait</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Download Speed*</td>
<td>575 Kbps (72 kB/s)</td>
<td>12.1 Mbps (1.5 MB/s)</td>
<td>3.1 Mbps (392 kB/s)</td>
<td>5.4 Mbps (680 kB/s)</td>
<td>5.4 Mbps (676 kB/s)</td>
<td>6.1 Mbps (759 kB/s)</td>
<td>3.9 Mbps (482 kB/s)</td>
</tr>
<tr>
<td>Current Download Speed Index</td>
<td>22.4 Mbps (2.8 MB/s)</td>
<td>20.4 Mbps (2.6 MB/s)</td>
<td>20.4 Mbps (2.6 MB/s)</td>
<td>19.7 Mbps (2.5 MB/s)</td>
<td>19.8 Mbps (2.5 MB/s)</td>
<td>19.9 Mbps (2.5 MB/s)</td>
<td>20.1 Mbps (2.5 MB/s)</td>
</tr>
<tr>
<td>Upload Speed**</td>
<td>291 Kbps (36 kB/s)</td>
<td>2.5 Mbps (312 kB/s)</td>
<td>3.9 Mbps (492 kB/s)</td>
<td>2.3 Mbps (287 kB/s)</td>
<td>1.2 Mbps (155 kB/s)</td>
<td>3.5 Mbps (443 kB/s)</td>
<td>4.2 Mbps (521 kB/s)</td>
</tr>
<tr>
<td>Current Upload Speed Index</td>
<td>6.2 Mbps (777 kB/s)</td>
<td>6.2 Mbps (774 kB/s)</td>
<td>6.0 Mbps (749 kB/s)</td>
<td>6.1 Mbps (767 kB/s)</td>
<td>6.1 Mbps (764 kB/s)</td>
<td>6.2 Mbps (781 kB/s)</td>
<td>6.3 Mbps (793 kB/s)</td>
</tr>
</tbody>
</table>

* Download speed refers to the rate that digital data is transferred from the Internet to your computer.

** Upload speed is the rate that online data is transferred from your computer to the Internet.


Source: [http://testmy.net/country/ye/Tested](http://testmy.net/country/ye/Tested) on 24 January, 7:20 PM (GMT)
## Internet network status: in Scandinavian countries

To Compare Internet Speed with GCC countries:

<table>
<thead>
<tr>
<th>Description/Country</th>
<th>Denmark</th>
<th>Finland</th>
<th>Sweden</th>
<th>Norway</th>
<th>Iceland Norway</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average Download Speed</strong></td>
<td>34.6 Mbps (4.3 MB/s)</td>
<td>9.3 Mbps (1.2 MB/s)</td>
<td>18.6 Mbps (2.3 MB/s)</td>
<td>11.6 Mbps (1.5 MB/s)</td>
<td>36.4 Mbps (4.5 MB/s))</td>
</tr>
<tr>
<td><strong>Current Download Speed Index</strong></td>
<td>19.8 Mbps (2.5 MB/s)</td>
<td>25.2 Mbps (3.2 MB/s)</td>
<td>26.6 Mbps (3.3 MB/s)</td>
<td>26 Mbps (3.2 MB/s)</td>
<td>26.2 Mbps (3.3 MB/s)</td>
</tr>
<tr>
<td><strong>Upload Speed:</strong>*</td>
<td>7.9 Mbps (983 kB/s)</td>
<td>6 Mbps (749 kB/s))</td>
<td>22.4 Mbps (2.8 MB/s)</td>
<td>1.2 Mbps (154 kB/s)</td>
<td>16.6 Mbps (2.1 MB/s)</td>
</tr>
<tr>
<td><strong>Current Upload Speed Index:</strong></td>
<td>5.8 Mbps (720 kB/s)</td>
<td>5.4 Mbps (678 kB/s)</td>
<td>5.2 Mbps (648 kB/s))</td>
<td>5.4 Mbps (677 kB/s)</td>
<td>5.2 Mbps (653 kB/s)</td>
</tr>
</tbody>
</table>

Source: [http://testmy.net/country/ye/Tested](http://testmy.net/country/ye/Tested) on 24 January, 7:50 PM (GMT)
To Compare Internet Speed with GCC countries:

<table>
<thead>
<tr>
<th>Description/Country</th>
<th>Denmark</th>
<th>Finland</th>
<th>Sweden</th>
<th>Norway</th>
<th>Iceland Norway</th>
</tr>
</thead>
<tbody>
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<td>5.4 Mbps (677 kB/s)</td>
<td>5.2 Mbps (653 kB/s)</td>
</tr>
</tbody>
</table>

Source: [http://testmy.net/country/ye/Tested](http://testmy.net/country/ye/Tested) on 24 January, 7:50 PM (GMT)
Challenges and obstacles

The study reached the following: Case of Yemen

- Political instability.
- Lack of a Regulatory Authority.
- Low economic development.
- Bad infrastructure.
- Fixed-lines services unreachable for majority of people.

The study reached the following: General case

- The spread of illiteracy in the region.
- Not to make the most of the Internet in the education sector in some countries.
Analysis and discussion

Internet sector in Yemen rank is 136 in international level according to (CAGR) compared to GCC countries have an advanced rank. Therefore, study proposes the following:

- Evaluate the Internet sector in Yemen and proposed solutions.
- Encourage the cooperation between Yemeni internet sector with RIPE NCC and GCC countries.
- Encourage stakeholders to develop own network based on IPv6 addresses.
- Convince the decision-makers that developing Internet sector in Yemen main a lot of things economically and in terms of information.
- Participate of academic establishments to increase the knowledge level of students.
- Help Yemen to widely use e-learning in education sector.
- Reserve IPv6 addresses for education sector.
Analysis and discussion (2)

- Exchange of experience between internet operators in the region.

- Cooperate between academic establishments with and Internet operators and RIPE NCC, etc.

- Encourage positive competition in the field of Information Technology.

- Benefit from the expertise of the leading countries in this field.

- Grant an annual incentive awards to companies and leading establishments in this field in the region.

- Encourage the organization of many events in universities for the new generation of internet technology.
Analysis and discussion

We note that:

- Internet speed in Scandinavian countries is so high compared to the GCC countries.

For the following reason:

- Widespread use of Internet in the field of e-commerce.

- Increased the education level in Scandinavia.

- Existence of e-governments in all the countries.

- Increasing number of digital TV services being delivered over a Broadband Internet.
Propositions to improve the internet sector in related countries:

- Accelerating high-speed Internet access.
- Improving the existing internet infrastructure.
- Expanding of e-commerce marketing.
- Improving the quality of internet services (QoS).
- Finally, Freedom of the press.
Analysis and discussion

Special propositions to improve internet sector in Yemen:

- Installing new generation of cellular networks as 4G or 5G.
- Developing internet market.
- Expanding of internet access in terms of international and regional connectivity.
- Upgrading national internet backbone.
- Improving access networks for (fixed and mobile environments).
- Increasing the average internet speeds.
- Encouraging the competition between ISPs.
- Launching of a new IP Points.
- Decreasing the price of the internet services.
Recommendations to RIPE NCC and MENOG to help Internet sector in Yemen*

1. Identifying the strengths and weaknesses of the Internet sector in Yemen.
2. Developing a plan according to a timetable to improve the internet sector of this country.
3. Urging mobile operators to interact positively with the IPv6.
4. Delivering a clear message to decision makers in Yemen to further develop the Internet sector.
5. Creating several internet’s training centers.
6. Spreading the culture of the IPv6 in educational institutions (for example organize: seminars, workshops, and distribution the latest e-books, related websites, etc.
7. Raising awareness for community the importance of the services provided by IPv6.
8. Supply RIPE NCC all information needed to update Yemeni Internet.
9. Setting the agenda and designing a future Yemeni e-Governance.
10. Explaining of negative implications of un-development Internet sector in Yemen.
11. Concentrating on the Internet and sustainable development.

* Several sponsors can be support and enhance Internet sector in Yemen.
Thank you: Questions???

Source: http://reversehomesickness.com/asia/socotra-the-most-alien-place-on-earth/