

INTERNET FRAGMENTATION - A REALITY THAT CAN ENDANGER AND SHAPE THE INTERNET'S FUTURE

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Introduction

The Internet as we know it today, an open, all accessible 'global village' was nothing but a large area network connecting different nodes and transferring data using packets instead of circuits. In September 1969 for the first time ever, 2 nodes were connected and the first 'host to host' message was sent. It was called ARPANET and it implemented for the first time the TCP/IP protocol, both technologies combined became the basis for what we know as the 'Internet' today.¹ In 1989, Tim Berners-Lee invented the World Wide Web, which could be accessed via the internet.² Over time, the Internet has evolved as an all connecting network which is known for its traits of being open, diverse, accessible and interoperable. The Internet has crept into our lives and has become an integral part. Globally connecting people, states, it has helped the global economy grow making cross border trades easy and within reach. Though now, these same traits of the internet are becoming a cause for its vulnerabilities. With the growth of technology, the openness and accessibility traits of the internet are now being misused by various agencies for covert intelligence, cyber warfare, hacking, cyber attacks etc. The states are now looking at the openness of the internet as a threat to their national cyber security and are scouting for various measures they can undertake to prevent such threats and one of them being creation of separate national internets or as Crews 2001 calls them 'Splinternets' which are Parallel internets 'where prespecified ground rules regarding privacy and other governance issues replace regulation and central planning-may be superior. What matters most is not necessarily the Internet as it exists today, but Internet technology.'³

¹ Barry M. Leiner, Vinton G. Cerf, David D. Clark, Robert E. Kahn, Leonard Kleinrock, Daniel C. Lynch, Jon Postel, Larry G. Roberts, Stephen Wolff, 'Brief History of the Internet', (<http://www.internetsociety.org/internet/what-internet/history-internet/brief-history-internet> last accessed 25.12.2015)

² History of the web, (<http://webfoundation.org/about/vision/history-of-the-web/> last accessed 25.12.2015)

³ Clyde Wayne Crews Jr., One internet is not Enough, 11.04.2011.

(<http://www.cato.org/publications/techknowledge/one-internet-is-not-enough> last accessed 25.12.2015)

This paper looks to discuss albeit in an overall perspective how the abovementioned and other steps taken by nation states will disrupt the global and open nature of the internet and completely change the face of it. It shall also seek to discuss the effects and consequences such actions may have on the states, its citizens and the global economy at large. It shall also recommend alternative measures which can help tackle the issues relating to the internet that the states face yet preserving the Internet and its traits as they are in today's world.

What is Internet Fragmentation?

As Eugene Kaspersky says, "The utopia of a borderless digital global village may be coming to an end. Fragmentation of the world wide web is already taking place along borders."⁴ As stated above, many governments are being cautious and taking steps like creation of the splinternets/ separate national internets to create a whole new form of internet, which seeks to localize the data and prevent any information from leaking outside the borders of the states. Such changes to the current form of internet have been termed as 'Balkanization of the Internet'⁵ by the inventor of the world wide web Mr. Tim Burners-Lee himself. Balkanization in its original sense meant the division of the Balkan Peninsula into various other small states after the fall of the Ottoman empire, and the word is now used as a metaphor for breaking up or division of regions.⁶ With respect to the internet, the term balkanization means breaking up of the internet into separate enclaves.⁷ Tim Ray explains the concept of an 'internet enclave' by comparing it to a 'modern office'⁸. Let's consider the law department in a company. This department is separate from the other departments like HR, in the office therefore other members which are not a part of this department are locked out and information inside the law department stays inside and does not leak out, yet there is no privacy within the law department itself as the head of that department will control the information flow and infrastructure. Now,

⁴ Eugene Kaspersky, 'What will happen if countries carve up the internet?', 17.12.2013 (<http://www.theguardian.com/media-network/media-network-blog/2013/dec/17/internet-fragmentation-eugene-kaspersky> last accessed 26.12.2015)

⁵ Interview of Tim Burners-Lee Conducted By Marcel Rosenbach. Interview Question & Answer No. 3 (<http://www.spiegel.de/international/world/interview-with-tim-berners-lee-on-25th-anniversary-of-world-wide-web-a-958304.html> last accessed 26.12.2015)

⁶ Cram101, World Regional Geography: A Developmental Approach, 11th Ed. Definition of Balkanization.

⁷ Ibid.

⁸ Tim Ray, THE BIGGEST THREAT TO INDIVIDUAL ONLINE PRIVACY AND FREEDOM | THE BALKANIZATION OF THE INTERNET, PART 1, March 12, 2014. (<http://www.21ct.com/blog/the-balkanization-of-the-internet-and-its-threat-to-global-freedom/> last accessed 26.12.2015)

comparing that to the internet, we can see how fragmentation of the internet would look, it will turn the world wide web into a web of webs which have been created as per the whims and fancies of the nation states.

Jonah Hill's study of Internet Fragmentation⁹ is one of the finest works explaining the fragmentation of the internet at its various levels. Hill's theory to understanding fragmentation of the internet starts from the stand point of the analogy used by Tim Burners-Lee wherein he compares the laws of the internet to the laws of physics and states that laws which exist in one part of the internet, the same laws must apply to the other parts as well. A website, that is visible to one person in some part of the world, should be visible exactly the same to another person accessing it from a different location. Considering from this stand point where the laws of the internet apply equally, looking at the extreme opposite, a completely fragmented internet would mean that experience of each other user located in different geographical regions should vary due to the arbitrary restrictions put on the websites and the localized nature of it as per the law of the region.

How is Fragmentation being implemented?

Marshall Van Alstyne & Erik Brynjolfsson in their paper 'Global Village or Cyberbalkans?' state that 'It is also possible that improving communications access through emerging technology will fragment society and balkanize interactions.'¹⁰ This observation by the authors was in 1997, now 18 years later, the topic has sparked debate and is a hot topic of discussion in internet governance forums, conferences, political discussions. After the NSA whistleblower, Edward Snowden revealed to the world the dirty mass surveillance practice of the United States, there was a global backlash to the so called vision of the US of an open and free internet.¹¹ Most of the Internet traffic runs through the nodes located in the USA, which sparked a fear within states of the US snooping on their data and they feared for their state's cyber security. Brazilian President Dilma Rouseff at U.N's General Assembly 'called on other countries to disconnect from U.S. Internet hegemony' and to create their separate sovereign

⁹ Jonah Hill, Internet Fragmentation Highlighting the Major Technical, Governance and Diplomatic Challenges for U.S. Policy Makers, Harvard Kennedy School, Belfer Center for Science and International Affairs (Spring 2012), available at: http://belfercenter.ksg.harvard.edu/files/internet_fragmentation_jonah_hill.pdf

¹⁰ available at <http://web.mit.edu/marshall/www/papers/CyberBalkans.pdf> last accessed 28.12.2015

¹¹ Charlotte Alfred, Web At 25: Will Balkanization Kill The Global Internet?, Huffington Post (19.03.2014), http://www.huffingtonpost.com/2014/03/19/web-balkanization-national-internet_n_4964240.html. Last accessed 28.12.2015

internets and internet governance structures.¹² Brazil in its official response to NSA's spying stated that it would i. Encourage domestic content production & ii. Encourage use of domestically produced network equipment in order to keep the data traffic localized and safe from the prying eyes of the USA.¹³ Similarly, Russia already has its own private internet internet called as the 'Runet' and Russian government has already started taking steps towards protecting the Runet from external threats.¹⁴ The Chinese government has deployed the 'Great Firewall of China' which has made internet filtering even more strict. The Chinese residents will not be able to access most social networking sites, even search engines will have restricted access. The Government is also working on strengthening the detection of and disabling circumvention with the help of VPNs.¹⁵ Even more countries are now considering walling of their internets, for eg. France and Germany. German Chancellor Angela Merkel stated that she planned to discuss the idea of a 'Regional network' with the French president and that of a 'Schengen Routing' wherein the data within the Schengen Area will stay inside and they will no more have to 'send mails and other information across the Atlantic.'¹⁶ Google's Vinton G. Cerf while warning against internet fragmentation stated as to how they had implement google in different top level domains like .FR & .DE in order to comply with the localization laws.¹⁷ If this trend spreads, and as Eugene Kaspersky says that it is inevitable¹⁸, there will be parallel internets running arbitrarily. Sergio Alves Jr.¹⁹ mentions 8 international actors whose motives would lead to a fragmented internet –

1. International Telecommunication Union's (ITU) (ITU, 2014a) manifold

¹² Sascha Meinrath, We Can't Let the Internet Become Balkanized, 14.10.2013 available at http://www.slate.com/articles/technology/future_tense/2013/10/internet_balkanization_may_be_a_side_effect_of_the_snowden_surveillance.html last accessed 29.12.2015.

¹³ Bill Woodcock, On Internet, Brazil is beating US at its own game, 20.09.2013. Available at <http://america.aljazeera.com/articles/2013/9/20/brazil-internet-dilmarousseffnsa.html>

¹⁴ Oleg Demidov, Does Russia really want a fragmented Internet?, 30.09.2014 available at <http://www.russia-direct.org/opinion/does-russia-really-want-fragmented-internet>

¹⁵ Charlie Osborne, China reinforces its 'Great Firewall', 30.01.2015, available at <http://www.cnet.com/news/china-reinforces-its-firewall-doubles-down-on-social-media/>

¹⁶ 16.02.2014 Merkel and Hollande mull secure European communication web, <http://www.dw.com/en/merkel-and-hollande-mull-secure-european-communication-web/a-17435895>

¹⁷ Steve Rosenbush, Google's Vint Cerf warns against fragmentation of Internet, 14.05.2015. available at - <http://blogs.wsj.com/cio/2015/05/14/internet-pioneer-vint-cerf-warns-against-fragmentation-of-internet/>

¹⁸ Eugene Kasperky, supra note 4.

¹⁹ Conference Paper - Internet Governance 2.0.1.4: The Internet Balkanization Fragmentation, 20th ITS Biennial Conference, Rio de Janeiro, Brazil, 30 Nov. - 03 Dec. 2014: The Net and the Internet - Emerging Markets and Policies

- government- led conferences; [SEP]
2. Dilma Rouseff's (Miller, 2014) calls for mandatory data localization (Boadle, 2014) and deployment of emancipatory undersea cables (Graham & Sabbata, 2014) from Brazil to Europe and Africa (Emmott, 2014).
 3. Angela Merckel and Neelie Kroes' (Brandon, 2014) too-high-to-beat data privacy standards pushing for a pan-European cloud (Blau, 2014); [SEP]
 4. Russia's (Sugarman, 2014) ever increasing restrictions to Internet access; [SEP]
 5. India's (Arora, 2013) proposal for a United Nations body to coordinate Internet [SEP]governance matters;
 6. China's (Toor, 2013) Great Firewall; [SEP]
 7. Iran's (Carrington, 2013) halal Internet; [SEP]
 8. Turkey's (Tuysuz & Watson, 2014) social media crackdown. [SEP]

Therefore, from the above mentioned facts this paper answers the question of Internet Fragmentation's reality in affirmative. It is indeed a reality, it is happening and as Vint Cerf says, "Sadly, it looks like the period in which the Internet functions seamlessly is over."²⁰

Forces of Balkanization.

1. DNS Filtering - Cyber Crimes like Child Pornography, illegal online betting, infringement of Intellectual Property Rights are a major concern for policy makers. In order to tackle such issues, governments world over are making use of the system of DNS Filtering/ blocking. DNS filtering has been used as a way to 'block content consumption'²¹ Yet, DNS Filtering is not the final solution. It does not solve the problem its only stops access to the website in a certain region, the website and its contents can still be accessed via a VPN or from any other region and therefore it is said to encourage to Internet Fragmentation.²² It interferes

²⁰ Rana Foroohar, The Internet Splits Up, NEWSWEEK INT'L, May 15, 2006, at 38, available at <http://www.newsweek.com/id/47643>.

²¹ Policy paper on Internet Society Perspectives on Domain Name System (DNS) Filtering by the internet society. Available at <https://www.internetsociety.org/sites/default/files/Perspectives%20on%20Domain%20Name%20System%20Filtering-en.pdf>

²² Public Policy article on blocking internet content-harmful or efficient. Available at <https://www.internetsociety.org/blog/2011/09/blocking-internet-content-harmful-or-efficient>

with the cross-border flow of data and it ‘undermines the internet as a single, unified global communications network.’²³

2. Notion of Internet profits Americans – There is a notion that since the internet was developed in the USA, it profits the Americans more and that American Companies have an upper hand due and will crush foreign competition.²⁴
3. Data Localization laws – Countries, like Brazil are forcing IT giants like Google and Facebook to relocate their data centers in Brazil in order to process the data locally²⁵. Such laws being implemented by countries which require companies to host files in the country where the service is used, are a major threat to the unity of the web.
4. Cable Routing²⁶ – Much of the worlds data traffic flows through the USA, but with Cables like BRICS which connect Brazil, Russia, India, China and South Africa and ROTACS which links Japan, Russia and the UK for transmission of data traffic, soon the United State alone won’t be at the center node and such cables which link only specific regions, will be an enabling factor in the fragmentation of the internet.
5. Government efforts to control Social Media²⁷ – with the emergence of social networks like minded people came in touch and bridge connections but that also meant it was easier for people to be anonymous yet come together to plan something. These fears gave rise to the governments wanting to control the Internet. As is known, China has strictly blocked access to facebook, twitter, gmail etc. So did Egypt when the uprising took place. Therefore such different levels of controls and restrictions on the internet are a cause of internet fragmentation.
6. ...and of course, the acts of the NSA, when revealed by Snowden, broke the other Nation State’s trust in the USA and people themselves felt hurt and betrayed. That’s when most countries started rooting for separate internets.²⁸

²³ Supra note 21.

²⁴ Joshua Bleiberg and Darrell M. West, How to Stop the Internet from Breaking Apart, 06.10.2014, available at <http://www.brookings.edu/blogs/techtank/posts/2014/10/6-preventing-internet-balkanization>

²⁵ Eugene supra note 4.

²⁶ Tim Ray, supra note 8.

²⁷ Tim Ray, THE REVOLUTION WILL (NOT) BE TWEETED | THE BALKANIZATION OF THE INTERNET, PART 2, 19.03.2014, Available at - <http://www.21ct.com/blog/the-revolution-will-not-be-tweeted-the-balkanization-of-the-internet-part-2/>

²⁸ Sascha Meinrath, supra note 12.

Effects of Internet Balkanization.

To answer the 2nd part of the question as to whether internet fragmentation will endanger and shape the internet's future, the implications of the concept of internet fragmentation will have to be dwelled into. With such a drastic change in the whole nature of the internet itself, there are bound to be implications/ effects on certain technologies or people.

1. Restricting Cloud Computing – the CEO and co-founder of BOX Mr. Aaron Levie termed Balkanization of the Internet as ‘Incredibly Bad’²⁹. Since we have established what fragmentation of the internet means, let us now see what it would mean for ‘the Cloud’. If the internet fragments, so does the cloud therefore there will be a creation of nationalized clouds. The most basic structure of a cloud is its vastness and decentralized-ness, therefore having nationalized clouds would be absolutely meaningless. In terms of clouds as they exist today, the cloud storage vendors will have immense pressure and an extremely uphill task of supporting customers forced to store data in a certain region and then also to comply with the laws and regulations of the jurisdiction to which the data will travel and finally deciding which place will have jurisdiction over it. Moreover, the basic characteristic of a cloud is to be able to provide access to the customer to its files from anywhere, therefore in an environment of restricted data flow the customers won't be able to enjoy the real benefits of the cloud and also the cloud service provider won't be able to provide protection by sharding and obfuscation on a global scale.³⁰
2. Restricting Data would mean restricting innovation³¹ – The internet has been a boon for innovation. The magnitude of people using the internet and the multitude of ideas available out there to exchange, gather, discuss, it has been a playfield for discoveries

²⁹ Steven Norton, ‘Box CEO: Balkanization of the internet would be incredibly bad’, <http://blogs.wsj.com/cio/2014/06/11/box-ceo-balkanization-of-the-internet-would-be-incredibly-bad/>

³⁰ Patrick S. Ryan, Sarah Falvey & Ronak Merchant, When the Cloud Goes Local: The Global Problem with Data Localization, 46 COMPUTER 54, 56 (2013).

³¹ Internet Governance Forum - Background Paper, ‘Preserving a Universal Internet: Economic and Political costs of Internet Fragmentation.’ Available at http://www.intgovforum.org/cms/wks2014/uploads/proposal_background_paper/2014_IGF_-_Background_Paper_-_Internet_Fragmentation.pdf

and innovation. Interactions of people world over, coming together of like minded people or people interested in the same field, the discussion of ideas and thoughts from all over the world has given innovation such a boost. With internet fragmentation there would be no or limited data exchange, further crippling mixing of different ideas. For eg. The field of Pharmacy where there is constant innovation, update in medicines, procedures and Doctors and pharmacists are able to keep up to date only because of the all accessible nature of the internet. Without that there wouldn't be a possibility of digitization of medical records or collaborative treatment.

3. Economic Costs³² - With restricted data flow and localization of laws relating to the internet there will be an increase in the cost of transactions necessary for business. Investors won't get a clear picture about the global financial markets and therefore there will reduction in investments. Also, internet was facilitated making remittances across the world, a matter of minutes and that too at your finger tips, therefore fragmentation would cause reduction in the such remittances in turn hampering the global financial market. Businesses will also be affected in trying to comply with all sorts of data localization requirements and local security requirements.
4. A balkanized internet would breed inequality³³ – By Complicating the structure of the internet there will be very few people with the technical know how, legalities and operations of such a fragmented internet. Therefore, those who can afford it will become the haves and those who do not have the means or knowledge to do so will become the have-nots. Big companies will navigate through it by employing the necessary people, but small enterprises will be left behind and they won't get the equal opportunity to proceed on par with the big companies.
5. Arbitrary use of power - with nationalized networks the governments will get the arbitrary power to regulate the internet and the data. It will become an authoritarian regime and information control is a must to the survival of such regimes. The internet

³² *ibid.*

³³ Rich Cooper, Say No to the Balkanization of the Internet, 30.03.2015. Available at <https://www.uschamberfoundation.org/blog/post/say-no-balkanization-internet/42923>

has kept the government at bay from exercising such authoritarian control³⁴ but data localization will do the exact inverse.

6. Effect on the Internet of Things³⁵ – With the invention of smart watches, smart TVs, even smart fridges and smart music players, everyone is moving towards interconnected devices. These devices store the data received by the wearer or operator of such device. Therefore, with localization of the internet will restrict the data flow of these devices, rendering them useless in other jurisdictions than the one they are meant for and this in itself would bring crashing down the whole idea of ‘Internet of Things’.

Therefore, from the abovementioned facts it is established that Internet Fragmentation can endanger the future of the internet as we know it today. As Eugene Kaspersky rightly observes, “Internet fragmentation will bring about a paradoxical de-globalisation of the world, as communications within national borders among governmental bodies and large national companies become increasingly localised.”³⁶ He also believes that the idea of the internet as it exists today, a global village with its ‘netizens’, would exist no more as what will be left of the global unified village would be a ‘patchwork of online nation states with different rules and regulations and hindered communications.’³⁷

To ensure the Future of the Web³⁸ -

- i. The United Nations should play a leading role in Internet Governance – There are various platforms to discuss internet governance at a national as well as regional level but they lack coordination and it creates a mess. Therefore, the United Nations being the authoritative

³⁴ See, e.g., Dong Le, China Employs Two Million Microblog Monitors State Media Say, BBC (Oct. 4, 2013), <http://www.bbc.com/news/world-asia-china-24396957>.

³⁵ Anupam Chander & Uyen P. Le, Breaking the Web: Data Localization vs. the Global Internet, April 2014, P. 41

³⁶ Eugene Kaspersky, Supra note 4.

³⁷ Ibid.

³⁸ MA Xinmin, What Kind of Internet Order Do We Need? 2015. Published by Oxford University Press

International organization should be at the helm of internet governance issues.

- ii. A legal Regime may be established with the UN Charter as its base. – the rule of law should be the fundamental approach towards internet governance. Common interests of the nation states, individuals at large should be taken into considering in conformity with the laws.
- iii. Existing International law can be taken inspiration from or be clubbed with a new cyberspace law.
- iv. International cyberspace law should be harmonized with the domestic regulations in place for dealing with cyber issues.

Conclusion

I would like to conclude this essay with Mr Burner-Lee's thought³⁹ that the internet as we know it today and the vast amount of opportunities it has created and everything that it has given us, is due to its non-national, open and universal traits and as Mr. Vinton G. Cerf observes⁴⁰ that 'fragmentation is destructive of the basic functioning of the Internet and it would be a terrible outcome & it would destroy value of the internet and hence we have to work to make sure there is no reason to fragment.'

³⁹ supra note 5.

⁴⁰ Steve, supra note 17.